Alberta-British Columbia Intertie Restoration (AIR) Project Planning Report

AESO Project Number: P7006

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Executive Summary

The current import capability of the Alberta-British Columbia intertie is approximately 800 MW.

The Transmission Regulation requires the AESO to:

- File a Needs Identification Document (NID), by December 31, 2026, to increase the import capability of the Alberta-BC intertie to (or near to) 950 MW
- Prepare a plan and make arrangements to restore and operate the intertie to an import capability at or near 1200 MW

The AESO has conducted transmission planning studies, evaluated transmission development options, and selected a Proposed Transmission Development to:

- Increase the import capability of the intertie near to 950 MW
- Support a later increase in import capability near to 1200 MW

Need Assessment

The AESO conducted planning studies to determine the constraints that limit the import capability, which include:

- An insufficient static voltage stability limit
- Supply loss contingencies causing
  - Thermal overloads on the Bennett 520S transformer and 1201L
  - Unstable power swings, leading to RAS action and system separation
  - Low voltages at Natal

Accordingly, the need has three components:

- Increase the loadability of 1201L (i.e., add reactive power support)
- Increase the transformation capability at the Bennett 520S substation
- Increase the thermal rating of 1201L

Proposed Transmission Development

The AESO considered different transmission development options for each of the three components required to increase import capability to (or near to) 950 MW (with provisions for 1200 MW).

Based on the technical performance, cost estimates, environmental and land use effects, and outage considerations, the AESO selected the following as the Proposed Transmission Development described in this planning report.

Table 1: Proposed Transmission Development

Option	Description	Cost (±30%)
1C	Add 50% series compensation on 1201L	$84.8M
2A	Replace the existing 500/240 kV transformer at Bennett 520S with a transformer rated at least 1350/1850 MVA situated adjacent to the existing one	$81.5M
3B	Increase the thermal rating of 1201L to at least 1350/1850 MVA	$12.4M
	Alberta Project Cost	**$178.7M**

The proposed development:

- Fulfils the AESO's obligation under Section 16(2) of the Transmission Regulation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW[1]
- Incorporates provisions for increasing the import capability to (or near to) 1200 MW
  - The Bennett 520S transformer rating and 1201L thermal rating are sized for 1200 MW
- Increases import capability at the lowest cost per incremental MW
- Reduces reliability risks associated with construction outages

[1] This report focuses on the equipment required to comply with Section 16(2) of the Transmission Regulation, with provisions for Section 16(1). Ancillary services are also required to increase import capability and the AESO will comply with Section 16(6) of the Transmission Regulation through other initiatives.

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Abbreviations

AACE	Association for the Advancement of Cost Engineering
AESO	Alberta Electric System Operator
AB	Alberta
AC	Alternating Current
AIES	Alberta Interconnected Electric System
AIR	Alberta - British Columbia Intertie Restoration
BC	British Columbia
DC	Direct Current
EATL	Eastern Alberta Transmission Line
ELUE	Environmental and Land Use Effects
HVDC	High-Voltage Direct Current
ISD	In-service Date
km	Kilometer
kV	Kilovolt
LTO	AESO's Long-term Outlook
LTP	AESO's Long-term Transmission Plan
MATL	Montana-Alberta Tie Line
MSSC	Most Severe Single Contingency
MVA	Megavolt Ampere
MVAr	Megavolt Ampere Reactive
MW	Megawatt
NID	Needs Identification Document
OTP	Optimal Transmission Planning
PST	Phase-Shift Transformer
P-V	Power-Voltage
RAS	Remedial Action Scheme
REM	Restructured Energy Market
SCED	Security Constrained Economic Dispatch
SSR	Sub-synchronous Resonance
SSCI	Sub-synchronous Control Interaction
SVC	Static Var Compensator
TFO	Transmission Facility Owner
TPL	Transmission Planning Standards (part of the Alberta Reliability Standards)
VSM	Voltage Stability Margin
WATL	Western Alberta Transmission Line
WECC	Western Electricity Coordinating Council

1. Introduction

The current import[2] capability of the Alberta-British Columbia intertie is approximately 800 MW.

The Transmission Regulation[3] requires the AESO to:

- File a Needs Identification Document (NID), by December 31, 2026, to increase the import capability of the Alberta-BC intertie to (or near to) 950 MW
- Prepare a plan and make arrangements to restore and operate the intertie to an import capability at (or near) 1200 MW at a later date
- The AESO has conducted transmission planning studies, evaluated transmission development options, and selected a Proposed Transmission Development to:
- Increase the import capability of the intertie near to 950 MW
- Support a later increase in import capability near to 1200 MW

This planning report identifies the constraints that limit import capability and the most appropriate solution to mitigate the constraints, as required for the AESO to comply with the Transmission Regulation.[4,5] The AESO is only proposing 950 MW at this time, in alignment with 16(2) of the Transmission Regulation.

1.1 Study Area

The Alberta-BC intertie comprises transmission lines 1201L/5L94 (between Bennett 520S and Cranbrook substations), 786L/1L275 (between Coleman 799S and Natal substations), and 887L/1L274 (between Pocaterra 48S and Natal substations).

The Alberta-BC intertie has far-reaching effects on the entire Alberta Interconnected Electric System (AIES). The study area in this planning report includes the AIES and the Western Interconnection as a whole, with a particular focus on the Calgary area in Alberta and the East Kootenay area in BC (where 1201L terminates).

1.2 Transmission System in the Study Area

Figure 1 and Figure 2 show the pre-development transmission system in the study area, including the Alberta-BC tie lines.

[2] This report takes the Alberta perspective for intertie flow directions. “Import” means flow from BC to Alberta, and “export” means flow from Alberta to BC.
[3] *Transmission Regulation 168/2025* (amended July 9, 2025), Section 16(1) and 16(2)
[4] This report focuses on the equipment required to comply with Section 16(2) of the Transmission Regulation, with provisions for Section 16(1).
[5] This report does not address frequency performance constraints. Ancillary services are also required to increase import capability and the AESO will comply with Section 16(6) of the Transmission Regulation through other initiatives.

Figure 1: Pre-Development Transmission System in and near the Study Area (Simplified)

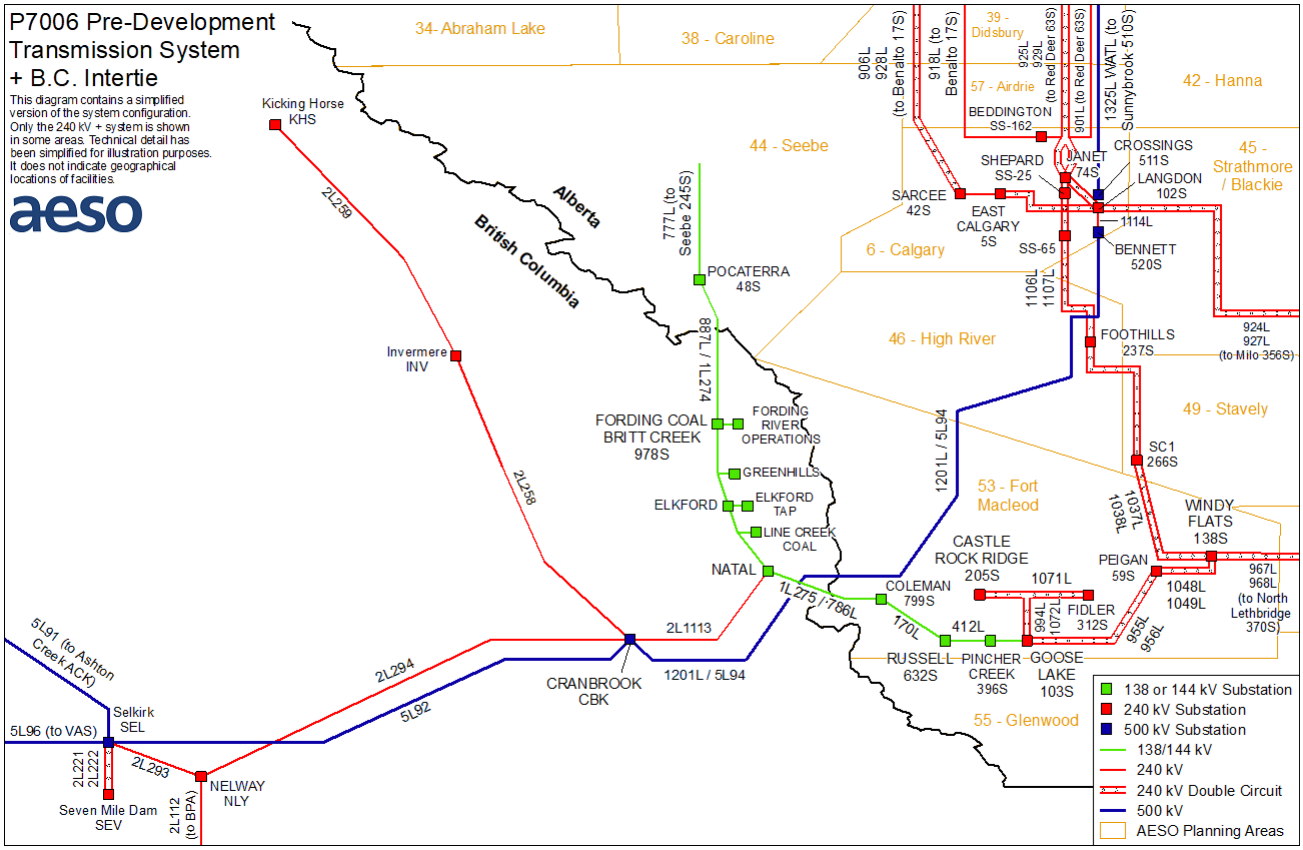
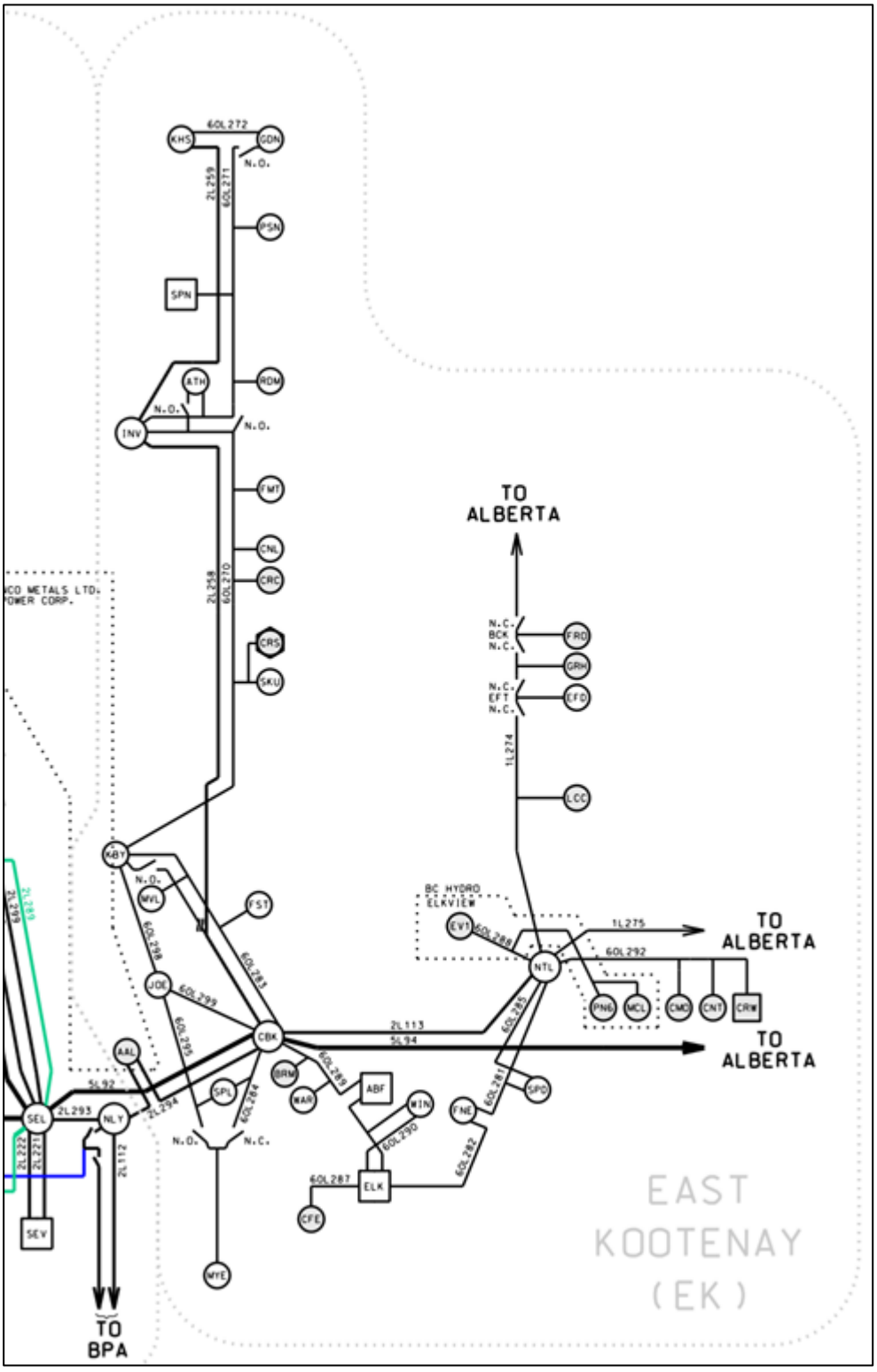


Figure 2: Pre-Development Transmission System in British Columbia[6]



[6] Excerpt from https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/transmission/maps/transmission-diagram.pdf

1.3 Study Objectives

The study objectives were to:

- Determine the constraints limiting the import capability of the Alberta-BC intertie
- Propose transmission development options to alleviate the constraints
- Evaluate the transmission development options
- Select a Proposed Transmission Development to increase import capability to (or near to) 950 MW
- Consider provisions that enable a further increase in import capability to (or near to) 1200 MW

1.4 Study Scope

The AESO completed the studies described in this section.

- **Need Assessment**

  The AESO determined the constraints that limit import capability using the following methods of analysis:

  – **P-V analysis** to determine the static voltage stability limit
  – **Transient stability analysis** to determine the import limit such that incremental imports caused by supply loss events
    - Result in transient voltages within acceptable limits
    - Do not cause instability, system separation, or inadvertent RAS operation
  – **Power flow analysis** to determine the steady-state import limit considering facility ratings and voltage limits

  The analysis was performed for the pre-development system.

- **Transmission Development Options**

  The need requires three components to increase the import capability to (or near to) 950 MW (with provisions for 1200 MW). The AESO considered the following transmission development options for each component:

  – Component 1: Increase the loadability of 1201L

    Add compensation on 1201L
    - Option 1A: Add 20% series compensation
    - Option 1B: Add 30% series compensation
    - Option 1C: Add 50% series compensation
    - Option 4A: Add +200 MVAr dynamic shunt compensation
    - Option 4B: Add +300 MVAr dynamic shunt compensation
  – Component 2: Increase the transformation capability at the Bennett 520S substation transformer rating

    Replace the existing 500/240 kV transformer
    - Option 2A: The replacement is situated adjacent to the existing transformer
    - Option 2B: The replacement is situated at the same location as the existing transformer
  – Component 3: Increase the thermal rating of 1201L to at least
    - Option 3A: 1200 MVA/1400 MVA (continuous/emergency)
    - Option 3B: 1350 MVA/1850 MVA (continuous/emergency)

- **Technical Assessment of the Transmission Development Options**
  - The AESO determined the efficacy of different levels of series (and dynamic shunt) compensation.
    - The AESO used the P-V analysis, transient stability analysis, and power flow analysis results to determine the increase in import capability for each reactive compensation option.
    - Additionally, the AESO performed voltage profile analysis for 1201L to test whether voltage along the line would remain within acceptable levels (i.e., insulation withstand levels) for each level of series compensation.
  - The AESO determined the appropriate size of transformer and the 1201L thermal rating based on power flow analysis results with the proposed level of series compensation.
- **Selection of the Proposed Transmission Development**

  The AESO selected the Proposed Transmission Development based on a comparison of incremental import capability, cost, environmental and land use effects, and outage considerations.
- **Validation of Performance of the Proposed Transmission Development**

  The AESO further analysed the Proposed Transmission Development to test its efficacy under various system conditions and ensure its performance complies with applicable reliability standards and criteria.

2. Transmission Reliability Standards and Criteria

The AESO evaluated system performance considering the Alberta Reliability Standards (ARS) for transmission planning (the TPL standards) and the *Transmission Planning Criteria – Basis and Assumptions*.

The TPL standards (including TPL-001-AB-0, TPL-002-AB1-0, and TPL-003-AB-0) require that system elements can be operated within applicable ratings or limits for:

- Category A system conditions (all elements in service)
- Category B contingencies (single element outages)
- Category C contingencies (multiple element outages)

Applicable ratings include:

- Thermal ratings
  - For transmission lines, the seasonal normal ratings
  - For transformers, the highest specified normal and emergency rating
  - For the Alberta-BC intertie, the seasonal normal ratings and the emergency ratings during inrush conditions (see Section 4.1)
- Voltage limits
  - For Category A conditions:
    - The Normal Minimum and Normal Maximum voltage range in Table 2-1 of the *Transmission Planning Criteria – Basis and Assumptions*
  - For Category B and Category C contingency conditions:
    - The Extreme Minimum and Extreme Maximum voltage range in Table 2-1 of the *Transmission Planning Criteria – Basis and Assumptions*

The AESO evaluated the effects of the intertie restoration on system performance in BC considering NERC standard TPL-001-4[7], WECC standard TPL-001-WECC-CRT-4[8] and BC Hydro system operating order 7T-22 – *Voltage Control*.[9]

[7] TPL-001-4 is currently effective in British Columbia. BCUC recently approved adoption of TPL-001-5.1 with an effective date of July 1, 2030 (https://www.ordersdecisions.bcuc.com/bcuc/orders/en/522779/1/document.do) which will supersede TPL-001-4.
[8] https://www.wecc.org/wecc-document/6901
[9] https://www.bchydro.com/energy-in-bc/operations/transmission/transmission-system/system-operating-orders.html

3. Study Assumptions

3.1 Study Scenarios

The AESO conducted the technical studies for year 2034 based on the anticipated in-service date of the Proposed Transmission Development.

The studies used 12 scenarios with various combinations of load, generation, and intertie flows. They are listed in Table 2.

- The AIES was modelled using data developed or compiled by the AESO
- The BC system was modelled using base cases BC Hydro provided in September 2025
- The rest of the Western Interconnection was modelled using September 2025 WECC base cases

The study scenarios represented 950 MW or 1200 MW import.

- The need assessment used the 950 MW import scenarios
- The technical assessment used a combination of 950 MW and 1200 MW import scenarios depending on the study objective

The AESO used additional study scenarios for sensitivity analysis. They are described in Section 12.

Table 2: Study Scenarios

Year	Load Pattern	Generation Pattern	Alberta Import from BC (MW)	Alberta Import on MATL (MW)	AIES Gen. (MW)	AIES Load (MW)	Selkirk Gen. (MW)	BC Import on Path 3 (MW)
2034	Summer Peak	High Renewables	950	300	11404	11731	1500	-75
			1200		11194			
		Low Renewables	950		11180			
			1200		10914			
	Summer Light	High Renewables	950	300	8768	9153	1307	-74
			1200		8548			
		Low Renewables	950		8549			
			1200		8299			
	Winter Peak	High Renewables	950	300	12335	12700	1866	-78
			1200		12110			
		Low Renewables	950		12118			
			1200		11918			

3.2 Generation, Load and Transmission Development

The study scenarios modelled future load, generation, and transmission as follows:

- For Alberta:
  - Load was based on the *AESO 2024 Long-term Outlook* (2024 LTO) Reference Case forecast
  - Generation included existing generators and new generator projects that meet the AESO's project inclusion criteria (based on the project ISD and status as published in the June 2024 Connection Project List)
  - Generators were dispatched according to the anticipated economic merit order and security constraints were not enforced
- For BC, load and generation were based on the 2034 Summer Peak, Summer Light, and Winter Peak base cases provided by BC Hydro in September 2025[10]
- For the remainder of WECC, load and generation were based on the September 2025 WECC base cases

The study scenarios did not include any planned transmission development in Alberta, except the options under study (when applicable), because no other planned development would affect the conclusions.[11]

3.3 Interties

The AIES is connected to BC via the Alberta-BC intertie (WECC Path 1), to Saskatchewan via the McNeil back-to-back HVDC link (WECC Path 2), and to Montana via MATL (WECC Path 83).

BC is connected to the United States by WECC Path 3, comprising a 500 kV double circuit tie line between Ingledow substation in BC and Custer substation in Washington, a 230 kV tie line between Nelway substation in BC and Boundary substation in Washington, and a normally open 230kV tie line between Waneta substation in BC and Boundary substation in Washington.

Table 2 lists the Path 1, Path 3, and Path 83 intertie flows modelled in the study scenarios.

3.3.1 887L/1L274 Status

The Natal 138/66 kV transformers T7 and T8, and 1L274 (Natal – Pocaterra 48S) experience category A thermal overloads during high import scenarios. BC Hydro currently mitigates these thermal overloads by:

- Requesting the AESO to adjust the Russell 632S PST
- Opening 786L/1L275 (Natal – Coleman 799S) at Natal, if the Russell PST is ineffective
- Requesting the AESO to open 887L/1L274 (Natal – Pocaterra 48S) at Pocaterra 48S

[10] BC Hydro's base cases do not include REV G6.
[11] The AESO cancelled the Chapel Rock-to-Pincher Creek Transmission Development (P7064) in December 2025.

The studies opened 887L at Pocaterra 48S to mitigate these overloads in all the study scenarios (after confirming these existing system thermal overloads are present).

In the studies, opening 887L/1L274 at Pocaterra 48S results in a radial configuration of 1L274 from Natal. This topology can result in greater variability in the voltage performance, and the voltages along the circuit can drop significantly during outages.[12]

Mitigating the existing 1L274 voltage performance during this radial configuration is out of scope of the Alberta-BC intertie project and the project is not expected to exacerbate the voltage performance.[13]

The AESO calculated the post-MSSC voltages on the Natal 230 kV bus for the existing system at 800 MW of imports and then included these as a minimum voltage range limit (and ignored voltage range violations on 1L274). This ensures the Proposed Transmission Development and increased imports do not negatively impact the voltage performance of the Natal area.

3.3.2 786L/1L275 Flow Control

The Russell 632S PST controls the power flow on 786L/1L275 (Natal – Coleman 799S). The PST controls the power flow between 90 MW export and 40 MW import.[14] During high import scenarios, the PST limits imports on the path to 40 MW.

The studies set the PST's pre-contingency power flow between 35 and 40 MW imports.

3.3.3 MATL Flow Control

The PST at Picture Butte 120S controls the power flow on MATL (Picture Butte 120S – Great Falls) to the intertie schedule.

The studies maintained the MATL schedule in Table 2 by adjusting the MATL PST in pre-contingency.

3.4 Voltage Profile

The study scenarios had voltage profiles that complied with the applicable limits in Section 2. In addition, specific busses follow Normal Low and Normal High voltage range within Information Document #2010-007RS, *General Operating Practices – Voltage Control*.

3.5 Transmission Facility Ratings

The studies modelled the facility ratings provided by the applicable TFO. Table 3 and Table 4 provide the ratings of key transmission lines and transformers. Table 5 provides the details of key shunt elements.

[12] BC System Operating Order 7T-17
[13] BC Hydro can continue using the existing operating order or investigate transmission developments to mitigate the existing voltage performance. The Alberta-BC intertie project is not dependent on this mitigation.
[14] Measured at the Russell 632S PST

Table 3: Key Transmission Line Ratings in the Study Area

Base Voltage (kV)	Transmission Line	From Substation	To Substation	Normal Rating	
				Summer (MVA)	Winter (MVA)
500	1201L/5L94	Bennett 520S	Cranbrook	1222	1386
500	5L92	Cranbrook	Selkirk	2489	2489
240	1114L	Langdon 102S	Bennett 520S	1359	1528
240	916L	Sarcee 42S	East Calgary 5S	408	494
240	936L	Langdon 102S	East Calgary 5S	481	597
240	937L	Langdon 102S	East Calgary 5S	481	597
240	924L	Langdon 102	924L Tap	576	711
240	924L	924L Tap	Milo 356S	547	676
240	927L	Langdon 102S	Milo 356S	576	711
240	985L	Sub 25	Janet 74S	973	1039
240	1003L	Sub 2	Janet 74S	973	1039
240	1080L	Sub 65	Sub 25	487	604
240	1109L	Sub 6	Sub 25	487	604
230	2L113	Cranbrook	Natal	318.7	318.7
138	786L/1L275	Coleman 799S	Natal	99	131.9
138	887L/1L274. POC	Pocaterra 48S	Fording Coal Britt Creek	71.7	71.7
138	1L274.-FRO	Fording Coal Britt Creek	Fording River Operations	63.3	117.6
138	1L274.BCK	Fording Coal Britt Creek	Greenhills	65.5	116.9
138	1L274.GRH	Greenhills	Elkford Tap	65.5	116.9
138	1L274.-EFD	Elkford Tap	Elkford	63.3	117.6
138	1L274.EFD	Elkford Tap	Line Creek Coal	65.5	116.9
138	1L274.LCC	Line Creek Coal	Natal	102.8	118.3

Table 4: Key Transformer Ratings in the Study Area

Substation Name and Number	Transformer ID	Transformer Voltages (kV)	Summer Rating (MVA)	Winter Rating (MVA)
Bennett 520S	T1	500/240	1200	1200
Natal	T3	230/66	168	199.5
Natal	T4	230/66	168	199.5
Natal	T7	138/66	75	90
Natal	T8	138/66	75	90

Table 5: Key Shunt Elements in the Study Area

Substation Name and Number	Base Voltage (kV)	Size
Langdon 102S SVC	240	± 250 MVAr
Natal 1CX1	138	+40 MVAr
Natal 1CX2	138	+40 MVAr
Natal 12CX1	138	+10 MVAr
Natal 12CX3	138	+19.59 MVAr
Cranbrook 12RX32	230	+75 MVAr
Cranbrook 12CX2	138	+19.2 MVAr
Cranbrook 12CX3	138	+19.2 MVAr
Cranbrook 12CRX6	138	-10 MVAr
Cranbrook 12CRX7	138	-10 MVAr
Cranbrook 5RX4	500	-122.45 MVAr
Cranbrook 5RX5	500	-122.45 MVAr
Selkirk 5RX3	500	-122.45 MVAr
Selkirk 5RX2	500	-122.45 MVAr

3.6 Dynamic Data

The transient stability studies used the following dynamic models:

- For Alberta:
  - The most recent validated dynamic data for existing equipment (generators, loads, SVCs, etc.) when available
  - Generic dynamic models for new facilities assumed to be in service within the timeline of this study or when validated data for existing equipment was not available
- For BC, dynamic data provided by BC Hydro in September 2025
- For the remainder of WECC, dynamic data released by WECC as of September 2025

3.7 Protection Fault Clearing Times

The transient stability studies used fault clearing times provided by the applicable TFOs, when available. Where information was not available, the AESO assumed standard fault clearing times specified in Table 2-3 of the *AESO's Transmission Planning Criteria – Basis and Assumptions*.

3.8 HVDC Power Order

The study scenarios dispatched EATL and WATL to minimize system losses and configured the HVDC filters and reactive power compensation to comply with the limits in Table 6 for net reactive power interchange.

Table 6: Limits for Reactive Power Interchange Between HVDC and System

HVDC Facility	North Terminal Reactive Power Limit	South Terminal Reactive Power Limit
EATL	-85 to 75 MVAr	-35 to 35 MVAr
WATL	-75 to 75 MVAr	-35 to 35 MVAr

3.9 RAS Modelling

The studies modelled the following remedial action schemes (RAS):

- Island AIES on Loss of 1201L/5L94
  - When a 1201L terminal opens:
    - Direct transfer trip 786L/1L275 and 887L/1L274
    - Direct transfer trip MATL
- Direct Transfer Trip 1201L/5L94 on loss of 5L92
  - Transfer trip 1201L/5L94 on loss of 5L92, under the following arming conditions:
    - System normal, or one of the following lines out of service: North-of-Kelly Lake 500 kV lines, 5L76, 5L79, 5L75, 5L77, Natal tie

    - 2L294 is in service, and (5L92 + 2L294) flow at Cranbrook westbound > 370 MW or eastbound > 315MW
    - Notes: The system condition “Natal tie out of service” includes any of the following:
        - 887L/1L274 out of service or radial
        - 786L/1L275 out of service or radial
        - 777L out of service
        - 170L out of service
        - Natal T7 and T8 out of service

- Cranbrook Undervoltage/Overpower Protection
    - Trip 1201L/5L94 when Cranbrook 500 kV bus voltage is < 421 kV for 0.5 seconds, with no power supervision. This is a setting agreed between BC Hydro and the AESO when 1201L/5L94 was built, and is designed as a last resort to trip 1201L/5L94 for non-recoverable power swings
- Natal Undervoltage Protection
    - Transfer trip 887L/1L274 at Pocaterra and trip 786L/1L275 at Natal via 1CB4 and 1CB5 when Natal 138 kV voltage drops < 117.3 kV for 0.5 seconds and 2L113 is in service. This is a backup to the Island AIES RAS
- Natal Overpower RAS
    - Transfer trip 887L/1L274 at Pocaterra and trip 786L/1L275 at Natal when detecting an individual transformer T7/T8 hotspot winding temperature at 120°C and top oil temperature reaching 105°C. If the high temperature still exists 8 minutes after the tripping signal, the transformer will be tripped.
- MATL RAS
    - Trip MATL at Picture Butte 120S when detecting one of the following conditions:
        - Out-of-step
        - Undervoltage and overpower
        - High rate of change of power (dP/dt) and change of frequency |Δf|
    - A similar scheme is also installed at Great Falls

3.10 Monitored Elements

Where transmission overloads are reported in Section 5 through Section 8 and Section 12 and voltage violations are reported in Section 5 and Section 6, reporting only included:

- The Alberta-BC tie lines (1201L/5L94, 786L/1L275 and 887L/1L274)
- In the Alberta system, all system elements rated at 138 kV and above in the planning areas of Seebe, Strathmore/Blackie, High River, Stavely, Fort Macleod, Lethbridge, Glenwood, Calgary and Airdrie.

- In the BC system, the Selkirk-Cranbrook 500 kV path, the Nelway-Boundary 230 kV path, and the Selkirk-Nelway-Cranbrook-Natal 230 kV path.

3.11 Selected Contingencies

The contingency list for system studies is provided in Table 7.

Table 7: Contingency List

Category	Contingency
Category B	MSSC (Genesee 3 GN3)
	MATL (Picture Butte 120S – Great Falls, MT)
	WATL (Sunnybrook 510S – Crossings 511S)
	916L (Sarcee 42S – East Calgary 5S)
	936L (Langdon 102S – East Calgary 5S)
	937L (Langdon 102S – East Calgary 5S)
	924L (Langdon 102S – Milo 356S)
	927L (Langdon 102S – Milo 356S)
	1064L (Langdon 102S – Janet 74S)
	1065L (Langdon 102S – Janet 74S)
	985L (Sub 25 – Janet 74S)
	1003L (Sub 25 – Janet 74S)
	1080L (Sub 65 – Sub 25)
	1109L (Sub 65 – Sub 25)
	1106L (Foothills 237S – Sub 65)
	1107L (Foothills 237S – Sub 65)
	1037L (Foothills 237S – Windy Flats 138S)
	1038L (Foothills 237S – Windy Flats 138S)

Category	Contingency
	5L81 (Ingledow – Nicola)
	5L91 (Ashton Creek – Selkirk)
	5L92 (Selkirk – Cranbrook) Note 1
	1201L/5L94 (Cranbrook – Benett) Note 1
	5L96 (Vaseux Lake – Selkirk)
	5L98 (Nicola – Vaseux Lake)
	2L112 (Nelway – Boundary)
	2L293 (Nelway – Selkirk)
	2L294 (Nelway – Cranbrook)
Category C5	936L & 937L (Langdon 102S – East Calgary 5S)
	924L & 927L (Langdon 102S – Milo 356S)
	1064L & 1065L (Langdon 102S – Janet 74S)
	985L & 1003L (Sub 25 – Janet 74S)
	1080L & 1109L (Sub 65 – Sub 25)
	1106L & 1107L (Foothills 237S – Sub 65)
	1037L & 1038L (Foothills 237S – Windy Flats 138S)
	5L81 & 5L82 (Ingledow – Nicola & Meridian – Nicola)
	5L76 & 5L79 (Nicola – Ashton Creek)

Notes:

1. The planning studies only assessed transient stability for 5L92 and 1201L/5L94 contingencies with single phase faults followed by successful reclosure, not permanent faults cleared by tripping the lines. The latter separate Alberta from the Western Interconnection. (They “island” Alberta.) The AESO manages the reliability consequences of islanding contingencies using a system ATC limit for import and Fast Frequency Response (FFR). This study does not aim to determine FFR requirements.

4. Planning Methodology

To determine a Proposed Transmission Development, the AESO:

- Developed study scenarios that modelled generation and load forecasts for the AIES, the BC system, and the rest of the Western Interconnection
- Conducted need assessment studies to identify the constraints that limit the import capability of the Alberta-BC intertie
- Identified transmission development options to increase import capability by alleviating those constraints
- Evaluated the performance of the transmission development options
- Selected a Proposed Transmission Development to increase the import capability of the Alberta-BC intertie to (or near to) 950 MW, with provisions for a further increase to (or near to) 1200 MW
- Verified the performance of the Proposed Transmission Development through power flow analysis, P-V analysis, transient stability analysis, voltage profile analysis, and sensitivity studies

4.1 Design Basis

The import capability of the Alberta-BC intertie is set to ensure system security before and after contingencies, accounting for the following limits:[15]

- Thermal
- Voltage stability
- Voltage range
- Transient stability

As explained below, the Most Severe Single Contingency (MSSC) determines the import capability.

The MSSC is Alberta's largest supply loss contingency, which is 466 MW. Supply loss causes incremental power flow into Alberta (i.e., "inrush") on the Alberta-BC intertie and MATL.[16] The total inrush is approximately equal to the supply loss (plus any changes in system losses). Figure 3 illustrates the MSSC inrush power flow concept.

A distribution factor is the change is power flow on a specific transmission line due to a change in power transfer. The Alberta-BC intertie typically carries 71% to 76% of the total inrush, while MATL carries 24% to 29%. These distribution factors vary based on system conditions and are affected by series compensation.

[15] Import capability is also set to ensure system security after islanding, accounting for frequency stability without load shedding.
[16] No inrush occurs on the Alberta-Saskatchewan intertie because it is a DC intertie with a controlled power flow.

Figure 3: MSSC Inrush Power Flow

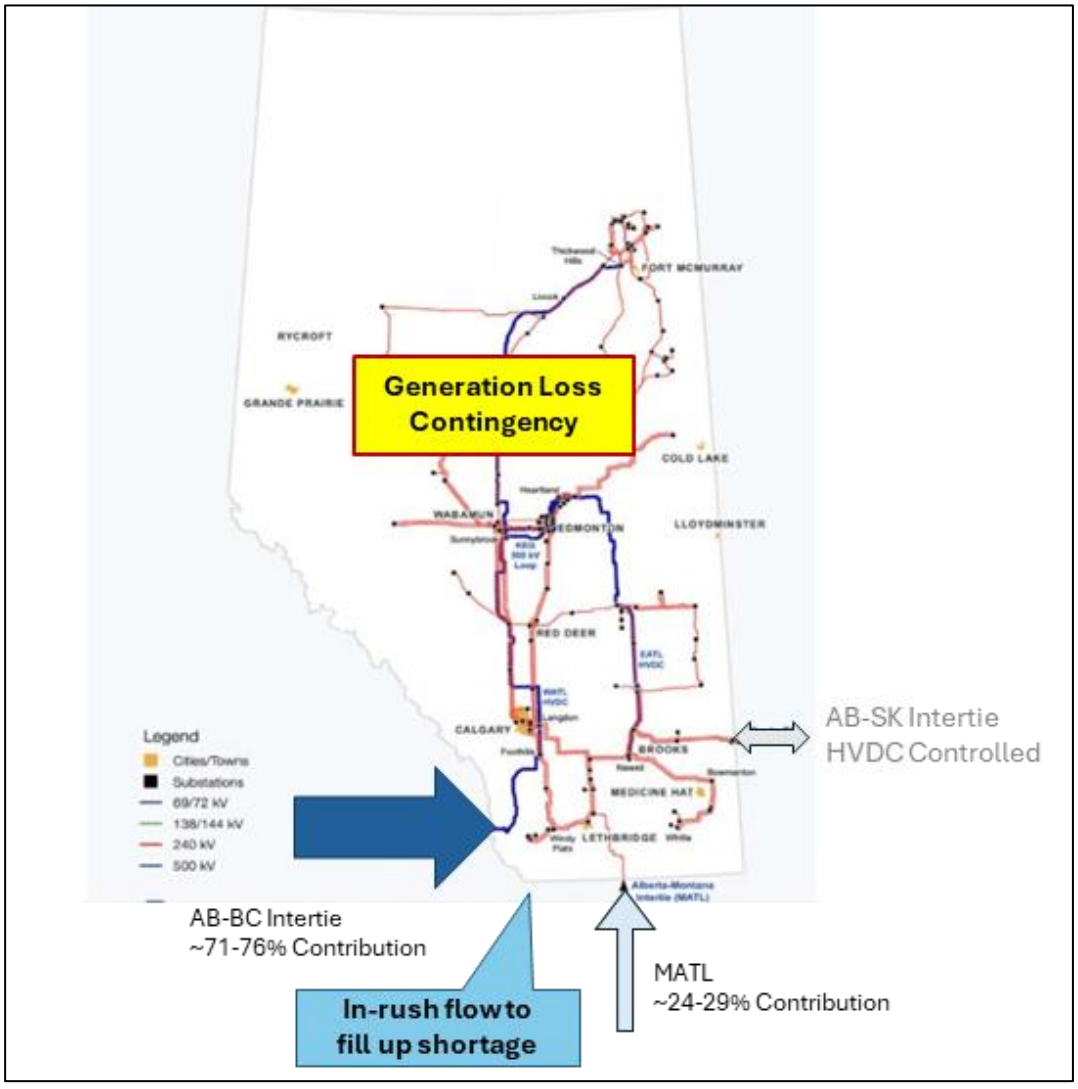


Figure 4 shows how thermal ratings relates to import capability. This illustration assumes for simplicity that 1201L is the limiting element and all import from BC flows through it.[17]

The thermal limit must allow capacity for:

- Import power flows
- The MSSC inrush margin
- Reactive power flow and losses

[17] While this is a good approximation, part of the total interchange also flows through 786L and 887L. When considering import capability, we account for flows on all tie line elements and ensure all flows are within thermal limits.

Figure 4: Relationship Between Imports and Thermal Limit

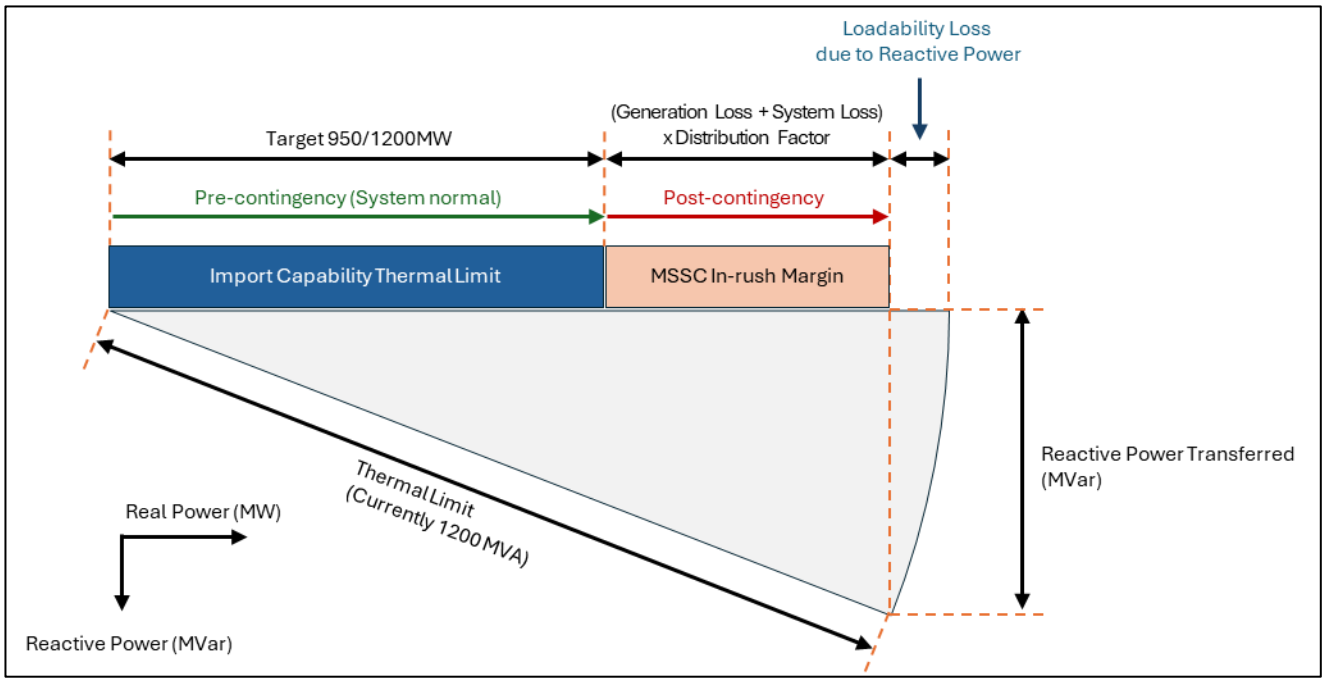
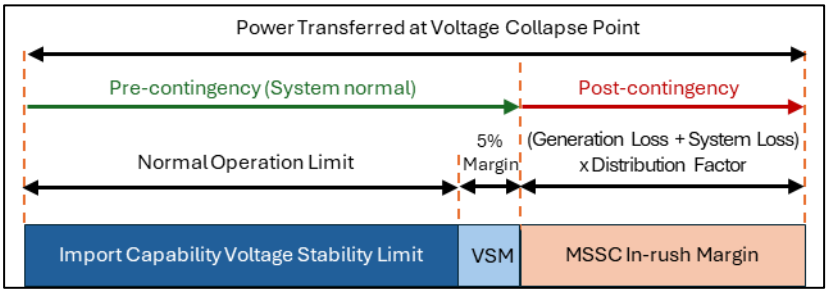


Figure 5 illustrates how the import capability could be constrained by the voltage stability limit. Reactive power compensation must be sized to allow for:

- Import power flows
- The MSSC inrush margin
- A 5% voltage stability margin (see Section 4.2.1)

Figure 5: Relationship Between Imports and Voltage Stability Limit



The preferred development must meet the following performance objectives:

- The Alberta-BC intertie must be capable of importing at or near 950 MW
- The Alberta-BC intertie must be able to remain connected after the Alberta MSSC event (i.e., a 466 MW supply loss) when the pre-contingency flow is at or near 950 MW

4.2 Technical Studies

The following sub-sections describe how the AESO assessed import capability.

The AESO conducted power flow analysis, P-V analysis, and transient stability analysis for the system as-is to show upgrades are required to comply with the Transmission Regulation. These analyses were repeated with various transmission development options to show how the options increase import capability.

4.2.1 P-V Analysis

The AESO assessed the static voltage stability limit of the system for each scenario in Table 2 by:

- Defining the AIES as the sink system and the rest of the Western Interconnection as the source system
- Defining Genesee #3 (GN3) (operating at 466 MW) as the MSSC[18]
- Increasing transfer from source to sink in small increments and recalculating power flow at each increment to find the pre-contingency transfer level at which voltage collapse occurs following MSSC
  - Adjusting voltage regulation devices to maintain pre-contingency operating voltages
  - As power transfer into the AIES increases, post-contingency Alberta-BC intertie terminal and nearby voltages decrease
  - The system must remain stable after MSSC
- Establishing a transfer limit that allows for:
  - Incremental inflow caused by the MSSC
  - A 5% margin relative to the nose point, per WECC practice[19]

4.2.2 Power Flow Analysis

The AESO calculated power flows and voltages for each scenario in Table 2 and each contingency in Table 7. Section 3.10 identifies the elements monitored for ratings violations.

4.2.3 Transient Stability Analysis

Transient stability analysis comprises simulations that show whether the system can remain synchronized and stable after contingencies. System elements including generators, their control systems, and loads are represented with dynamic models. The models are used together with a transmission system model to perform time-domain simulations of contingencies. The simulation results show whether the system stabilizes as required to comply with reliability standards.

For each simulation of a contingency event, an acceptable result is obtained when:

[18] There are several supply loss contingencies at or near MSSC. Section 12.5 demonstrates they all have a similar effect.
[19] Guide to WECC/NERC Planning Standards I.D: Voltage Support and Reactive Power

- No generators lose synchronism
- Voltage and frequency remain within acceptable envelopes
- RAS operate as intended
- The system returns or will return to steady state (oscillations are damped)

The AESO simulated system dynamics for each 950 MW scenario in Table 2 and each contingency in Table 7, as well as MSSC at the voltage stability limit in Section 6.2.1.

4.2.4 Voltage Profile Analysis

The AESO considered series compensation on 1201L as a transmission development option. Series compensation changes the voltage profile along the line by introducing a step change in reactance. Therefore, the AESO calculated the voltage profile along the line for various transfer levels, with the objective of showing voltage along the line would be within design values for normal terminal operating voltages and planned transfer levels.

The AESO only performed voltage profile analysis for the 50% series compensation option.

4.2.5 Transfer Limit Analysis

In transfer limit analysis:

- Transfer between source and sink is increased incrementally
- System performance is evaluated at each increment
- The transfer limit is the maximum transfer level at which the system has acceptable performance

In our analysis, the AESO increased Alberta-BC import in 10 MW increments and applied the following criteria:

- Voltage range
  - The post-contingency voltage for the most limiting contingency must remain within the applicable limit, as defined in Section 2 and Section 3.3.1, for all buses deemed relevant to the limit
- Thermal loading
  - The pre-contingency flow or the post-contingency flow for the most limiting contingency must not exceed the thermal rating for any element deemed relevant to the limit
- Stability
  - The transient simulation of the most limiting contingency must have a stable result (as defined in Section 4.2.3)

4.3 Sensitivity Studies

The AESO assessed the performance of the Proposed Transmission Development through the following sensitivity studies:

- Confirmation of export capability
  - The series compensation impacts the voltage profile along 1201L. The AESO performed voltage profile analysis (Section 4.2.4) for export scenarios to assess whether the series compensation would negatively impact the export capability
- Short circuit level and system loss impact assessment
  - The series compensation impacts short circuit levels. The AESO calculated the short circuit levels of buses near 1201L to assess whether short circuit levels exceed the equipment fault duty
  - The AESO assessed the impact of the Proposed Transmission Development on system loss
- Outage of generators near the Alberta-BC intertie
  - In BC, the Seven Mile (SEV), Kootenay Canal (KCL), and Waneta (WAN/WAX) hydro generation facilities are the nearest contributors to system strength at the Cranbrook terminal
  - In Alberta, the Shepard (EGC1) and ENMAX Calgary Energy Centre (CAL1) combined cycle generation facilities are the nearest contributors to system strength at the Bennett 520S terminal
  - Some generator units at these facilities may be offline for planned outages, forced outages, or economic reasons. The AESO assessed whether this could reduce the import transfer limit.
- BC Path 3 and Selkirk area dispatch
  - 1201L/5L94 connects to the East Kootenay area in BC, which is connected to the Selkirk area via transmission lines 5L92 and 2L294.
  - Selkirk area generation and Path 3 flows could potentially affect Path 1 transfer limits
  - Therefore, the AESO created and analysed the following study scenarios in addition to those in Table 2:
    - Path 3 high import (2400 MW) and Selkirk area high generation dispatch
    - Path 3 high import (2400 MW) and Selkirk area medium generation dispatch
    - Path 3 high export (2000 MW) and Selkirk area high generation dispatch
    - Path 3 high export (2000 MW) and Selkirk area medium generation dispatch
- Distribution factor verification
  - The MSSC is determinative of import capability.
  - The Alberta system has contingencies in different places that could result in (or near to) 466 MW supply loss
  - While the study results are based on simulating Genesee #3 (GN3) 466 MW supply loss contingency, the AESO calculated the distribution factors for other supply loss contingencies to ensure the import transfer limit accounted for an appropriate amount of inrush

5. Need Assessment

The AESO evaluated the import capability of the Alberta-BC intertie prior to transmission development and identified the transmission system constraints that limit import capability below 950 MW. The evaluation included P-V, power flow, and transient stability analysis for the scenarios in Section 3.1.

The evaluation results show import capability is constrained by:

- An insufficient static voltage stability limit
- Supply loss contingencies causing
  - Thermal overloads on the Bennett 520S transformer and 1201L
  - Unstable power swings, leading to RAS action and system separation
  - Low voltages at Natal

Accordingly, the need has the following three components:

- Increase the loadability of 1201L (i.e., add reactive power support)
- Increase the transformation capability at the Bennett 520S substation
- Increase the thermal rating of 1201L

The following sub-sections provide the detailed results.

5.1 P-V Analysis

The AESO conducted P-V analysis as described in Section 4.2.1 and the results are listed in Table 8. The import transfer limit is less than 950 MW in all scenarios after accounting for the voltage stability margin and inrush from supply loss contingencies. Therefore, reactive power support on 1201L is needed to increase the import capability to 950 MW.

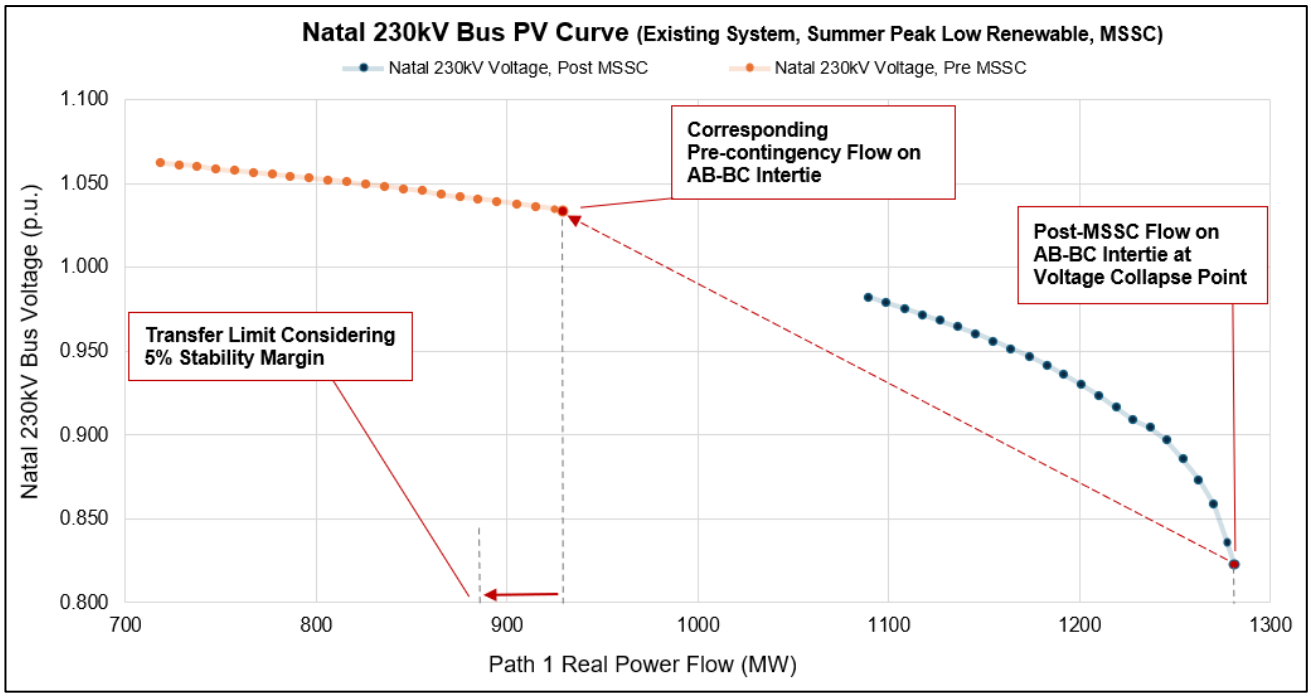
Figure 6 shows an example of the P-V curve and analysis for the summer peak, low renewable scenario.

- The intertie supports 1281 MW of import before voltage collapse occurs at the Natal 230 kV bus following the MSSC. This forms the knee point of the P-V curve
- The pre-contingency flow corresponding to the knee point is 930 MW import (1281 MW less the inrush caused by the MSSC)
- The import capability limit is 884 MW after providing a 5% voltage stability margin

Table 8: Voltage Stability Limits for Import (Existing System)

Scenario	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
Summer Light, High Renewables	1228	822	781
Summer Light, Low Renewables	1278	929	883
Summer Peak, High Renewables	1247	838	796
Summer Peak, Low Renewables	1281	930	884
Winter Peak, High Renewables	1201	800	760
Winter Peak, Low Renewables	1208	856	813

Figure 6: P-V Curve Example (2034 Summer Peak, Low Renewable)



5.2 Power Flow Analysis

The AESO conducted power flow analysis as described in Section 4.2.2 and the results are listed in Table 9. For scenarios with 950 MW of import, supply loss contingencies including the MSSC and loss of MATL[20] may cause:

- Voltage collapse[21]
  - This implies the voltage stability limit is lower than the transfer level in the study scenarios
- Voltage at Natal to drop below its post-contingency emergency limit
- Thermal overloads of 1201L and the Bennett 520S transformer

These results demonstrate the need to:

- Increase the transformation capability at the Bennett 520S substation[22]
- Increase the thermal rating of 1201L
- Add reactive power support on 1201L

Other Thermal Violations

The Government of Alberta directed the AESO to design and implement the Restructured Electricity Market (REM) and Optimal Transmission Planning (OTP).

- In the new OTP framework
  - The AESO will attempt to mitigate congestion when the benefits outweigh the costs
- REM introduces security constrained economic dispatch (SCED), which determines the most efficient dispatch of generators and interties while respecting transmission system constraints

The results in Table 9 show some contingencies cause overloads on transmission lines in the Calgary area. The overloads appear in high renewable scenarios but not low renewable scenarios. Since the Calgary area overloads appear in some scenarios but not others, they are not determinative of the overall import capability. SCED can mitigate the overloads in the scenarios in which they appear.

Mitigating overloads that can be managed by SCED is out of scope for the Alberta-BC intertie project. These mitigations would go beyond the AESO's obligation to restore import capability. The AESO 2025 Long-Term Transmission Plan[23] identifies near-term transmission plans for these overloads:

- New double-circuit 240 kV line from Sub 65 to Sarcee 42S
- New double-circuit 240 kV or 500 kV line from Newell 2075S to Milo 356S to Langdon 102S

[20] When importing 300 MW on MATL
[21] Where the power flow equations have no solution
[22] Including bus work and reconductoring approximately 145 meters of the 240 kV transmission line 1114L between Langdon 102S and Bennett 520S substations
[23] https://www.aeso.ca/assets/2025-AESO-Long-Term-Transmission-Plan.pdf, page 50

The AESO will evaluate these transmission developments (and others) using the OTP framework.[24]

Table 9: Category B Thermal Violations for 950 MW Import (Existing System)

Scenario	Contingency	Constraint	Thermal Loading		
			Nominal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Summer Light High Renewables	MSSC	N/A	Unsolved		
	MATL	1201L (Bennett 520S – Cranbrook)	1222	1275.9	104.4
		Bennett 520S Transformer	1200	1283.9	107.0
		1L274 (Elkford – Greenhills)	65.5	75.4	115.1
		1L274 (Elkford – Line Creek Coal)	65.5	77.6	118.4
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	477.1	116.9
		1L274 (Elkford – Greenhills)	65.5	66.6	101.7
		1L274 (Elkford – Line Creek Coal)	65.5	68.6	104.7
	1080L	1109L (Sub 25 – Sub 65)	487	582.6	119.6
	1109L	1080L (Sub 25 – Sub 65)	487	582.2	119.6
Summer Light Low Renewables	MSSC	N/A	Unsolved		
	MATL	Benett 520S Transformer	1200	1344.1	112.0
		1201L (Bennett 520S – Cranbrook)	1222	1342.8	109.9
	WATL	1L274 (Elkford – Line Creek Coal)	65.5	66.4	101.4
Summer Peak High Renewables	MSSC	N/A	Unsolved		
	MATL	Bennett 520S Transformer	1200	1309.7	109.1
		1201L (Bennett 520S – Cranbrook)	1222	1276.8	104.5
		1L274 (Elkford – Greenhills)	65.5	73.1	111.6
		1L274 (Elkford – Line Creek Coal)	65.5	76.3	116.6
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	622.7	152.6
		936L (Langdon 102S – East Calgary 5S)	487	493.8	101.4

[24] The AESO filed *ISO Rule 401.1 Optimal Transmission Planning* for AUC approval, which specifies the requirements for planning transmission.

Scenario	Contingency	Constraint	Thermal Loading		
			Nominal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		937L (Langdon 102S – East Calgary 5S)	487	496.1	101.9
		1L274 (Elkford – Greenhills)	65.5	65.9	100.6
		1L274 (Elkford – Line Creek Coal)	65.5	68.9	105.2
	936L	937L (Langdon 102S – East Calgary 5S)	487	503.3	103.4
	937L	936L (Langdon 102S – East Calgary 5S)	576	624.8	108.5
	927L	924L (Langdon 102S – 924LTap)	576	624.8	108.5
	985L	1003L (Janet 74S – Sub 25)	973	1025.4	105.4
	1003L	985L (Sub 25 – Janet 74S)	973	1026.1	105.4
Summer Peak Low Renewables	MSSC	N/A	Unsolved		
	MATL	1201L (Bennett 520S – Cranbrook)	1222	1334.9	109.2
		Bennett 520S Transformer	1222	1364.6	113.7
		1L274 (Elkford – Greenhills)	65.5	77.1	117.8
		1L274 (Elkford – Line Creek Coal)	65.5	80.5	123.0
Winter Peak High Renewables	MSSC	N/A	Unsolved		
	MATL	N/A	Unsolved		
	WATL	916L (Sarcee 42S – East Calgary 5S)	494	522.8	105.8
Winter Peak Low Renewables	MSSC	N/A	Unsolved		
	MATL	N/A	Unsolved		

Table 10: Category B Voltage Violation for 950 MW Import (Existing System)

Scenario	Contingency	Substation	Voltage Violations		
			Voltage (p.u.)	Voltage (kV)	Acceptable Range
Summer Light High Renewables	MSSC	N/A	Unsolved		
	MATL	Natal 230	0.899	206.8	207-253
	MATL	Coleman 799S	0.920	127.0	124-150
Summer Light Low Renewables	MSSC	N/A	Unsolved		
	MATL	Natal 230	0.865	198.9	207-253
	MATL	Coleman 799S	0.900	124.2	124-150
Summer Peak High Renewables	MSSC	N/A	Unsolved		
	MATL	Natal 230	0.882	202.9	207-253
	MATL	Coleman 799S	0.917	126.5	124-150
Summer Peak Low Renewables	MSSC	N/A	Unsolved		
	MATL	Natal 230	0.853	196.2	207-253
	MATL	Coleman 799S	0.887	122.4	124-150
Winter Peak High Renewables	MSSC	N/A	Unsolved		
	MATL	N/A	Unsolved		
Winter Peak Low Renewables	MSSC	N/A	Unsolved		
	MATL	N/A	Unsolved		

5.3 Transient Stability Analysis

The AESO conducted transient stability analysis as described in Section 4.2.3.

For the import of 950 MW, the following was identified in some scenarios:

- Without the Cranbrook undervoltage RAS:
  - The MSSC causes an unstable power swing
  - Alberta and BC lose synchronism

- With the Cranbrook undervoltage RAS:
  - The MSSC causes a power swing with low voltages at Cranbrook and Natal
  - The RAS operates, islanding Alberta from the Western Interconnection

Therefore, the transient stability analysis demonstrates reactive power support on 1201L is needed to prevent the loss of synchronism or separation of the Alberta and BC systems following Alberta supply loss contingencies when Alberta is importing at 950 MW.

See Attachment B Section 1 for plots of the transient simulation results.

6. Component 1: Increase the Loadability of 1201L

6.1 Transmission Development Options

The AESO considered the following transmission development options to increase the loadability of 1201L.

6.1.1 Option 1A: Add 20% Series Compensation on 1201L

- Add one substation, to be designated SC2 541S, connected to the existing 500 kV transmission line 1201L in an in-and-out configuration and located within approximately ±10% of the 1201L midpoint[25]
- Add one 500 kV circuit breaker and a series capacitor at the substation that provides 20% compensation for 1201L, with physical space available for increasing compensation to 50%
- Connect the existing 1201L line to the substation
- Add or modify associated equipment as required for the above transmission development, including a bypass breaker

6.1.2 Option 1B: Add 30% Series Compensation on 1201L

- Add one substation, to be designated SC2 541S, connected to the existing 500 kV transmission line 1201L in an in-and-out configuration and located within approximately ±10% of the 1201L midpoint
- Add one 500 kV circuit breaker and a series capacitor at the substation that provides 30% compensation for 1201L, with physical space available for increasing compensation to 50%
- Connect the existing 1201L line to the substation
- Add or modify associated equipment as required for the above transmission development, including a bypass breaker

6.1.3 Option 1C: Add 50% Series Compensation on 1201L

- Add one substation, to be designated SC2 541S, connected to the existing 500 kV transmission line 1201L in an in-and-out configuration and located within approximately ±10% of the 1201L midpoint
- Add one 500 kV circuit breaker and a series capacitor at the substation that provides 50% compensation for 1201L
- Connect the existing 1201L line to the substation
- Add or modify associated equipment as required for the above transmission development, including a bypass breaker

[25] In other words, the substation should be near the existing right of way and 40% to 60% of the line distance (127 km to 191 km) from Bennett 520S substation.

6.1.4 Option 4A: Add +200 MVAr Dynamic Shunt Compensation on 1201L

- Add one substation, to be designated SC2 541S, connected to the existing 500 kV transmission line 1201L in an in-and-out configuration and located within approximately ±10% of 1201L
- Add one 500 kV circuit breaker and dynamic shunt compensator at the substation capable of providing +200 MVAr of capacitive reactive power
- Connect the existing 1201L line to the substation
- Add or modify any associated equipment as required for the above transmission developments

6.1.5 Option 4B: Add +300 MVAr Dynamic Shunt Compensation on 1201L

- Add one substation, to be designated SC2 541S, connected to the existing 500 kV transmission line 1201L in an in-and-out configuration and located within approximately ±10% of 1201L
- Add one 500 kV circuit breaker and dynamic shunt compensator at the substation capable of providing +300 MVAr of capacitive reactive power
- Connect the existing 1201L line to the substation
- Add or modify any associated equipment as required for the above transmission developments

6.2 Technical Assessment

The AESO analysed different sizes of series compensation and dynamic shunt compensation to test their efficacy. Table 11 summarises the results.

The results show that:

- Series compensation at 30% or 50% is technically feasible
- Dynamic shunt compensation at +200 or +300 MVAr is technically feasible
- Series compensation is preferred over dynamic shunt compensation

The technical assessment ruled out dynamic shunt compensation as it provides relatively lower transfer capability at a higher cost, when compared to series compensation.

Table 11: Options to Increase Loadability of 1201L

Reactive Compensation Type	Size	P-V Limit (MW)	Voltage Range Limit (MW)	Transient Stability Limit (MW)	Import Transfer Limit (MW)
Series Compensation	20%	854 - 990	873 – 893	⩾ PV Limit	**854 – 893** (Ruled out)
	30%	906 - 1038	922 – 951	⩾ PV Limit	**906 – 951**
	50%	1008 - 1145	1031 – 1063	⩾ PV Limit	**1008 – 1063**

Reactive Compensation Type	Size	P-V Limit (MW)	Voltage Range Limit (MW)	Transient Stability Limit (MW)	Import Transfer Limit (MW)
Dynamic Shunt Compensation	+200 MVAr	843 – 971	Ruled out due to cost (see Section 10.1)		
	+300 MVAr	889 – 1006			

The following sections provide more detailed results.

6.2.1 P-V Analysis

The AESO conducted P-V analysis as described in Section 4.2.1 for each study scenario and different sizes of series and dynamic shunt compensation. The import capability varies depending on the system conditions.

Transfer limits for the series compensation options are listed in Table 12.

Transfer limits for the dynamic shunt compensation options are listed in Table 13.

The P-V analysis shows that:

- Series compensation of 20% or more would adequately increase the voltage stability limit
  - With 20% or 30% compensation, the import capability meets the at or near 950 MW requirement in low renewables scenarios
  - With 50% compensation, the import capability meets the at or near 950 MW requirement in all scenarios
- Dynamic shunt compensation of +200 MVAr or more would increase the voltage stability limit. However, +200 MVAr shunt compensation is less effective and nearly twice the cost of 50% series compensation (based on the cost estimates in Section 10.1). Therefore, series dynamic shunt compensation was ruled out and no further studies were conducted for dynamic shunt compensation.

Table 12: Voltage Stability Limits, Series Compensation

Development Option	Scenario	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
20% Series Compensation	Summer Light High Renewables	1332	926	880
	Summer Light Low Renewables	1385	1022	971
	Summer Peak High Renewables	1342	923	877

Development Option	Scenario	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
	Summer Peak Low Renewables	1397	1042	990
	Winter Peak High Renewables	1295	899	854
	Winter Peak Low Renewables	1316	956	908
30% Series Compensation	Summer Light High Renewables	1376	966	917
	Summer Light Low Renewables	1441	1074	1020
	Summer Peak High Renewables	1396	971	923
	Summer Peak Low Renewables	1452	1093	1038
	Winter Peak High Renewables	1354	954	906
	Winter Peak Low Renewables	1374	1016	965
50% Series Compensation	Summer Light High Renewables	1515	1092	1037
	Summer Light Low Renewables	1574	1200	1140
	Summer Peak High Renewables	1499	1061	1008
	Summer Peak Low Renewables	1579	1205	1145
	Winter Peak High Renewables	1481	1071	1017
	Winter Peak Low Renewables	1500	1127	1071

Table 13: Voltage Stability Limits, Dynamic Shunt Compensation

Development Option	Scenario	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
200 MVAr Dynamic	Summer Light High Renewables	1322	920	874
	Summer Light Low Renewables	1366	1008	958

Development Option	Scenario	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
Shunt Compensation	Summer Peak High Renewables	1347	933	887
	Summer Peak Low Renewables	1374	1022	971
	Winter Peak High Renewables	1280	888	843
	Winter Peak Low Renewables	1311	958	910
300 MVAr Dynamic Shunt Compensation	Summer Light High Renewables	1359	954	906
	Summer Light Low Renewables	1405	1045	993
	Summer Peak High Renewables	1387	971	922
	Summer Peak Low Renewables	1417	1059	1006
	Winter Peak High Renewables	1329	936	889
	Winter Peak Low Renewables	1356	998	948

6.2.2 Power Flow Analysis

The AESO conducted power flow analysis as described in Section 4.2.2 for each study scenario and each series compensation option. The P-V analysis in Section 6.2.1 ruled out dynamic shunt compensation.

The results in Table 14 and Table 15 show that at 950 MW import:

- For 20% or 30% compensation, voltages collapse or voltages drop below their post-contingency emergency limit of 0.9 p.u. following the MSSC
- For 50% compensation, voltages remain within acceptable ranges
- Series compensation does not remove the need for ratings increases addressed by Component 2 and Component 3

Table 14 and Table 15 are filtered to only show the results relevant to the intertie. The full results are provided in Attachment A Table 1.

Attachment A Table 2 provides the power flow results for Category C5 contingencies.

The AESO also conducted transfer limit analysis as described in Section 4.2.5 for each study scenario and each series compensation option. The transfer limit analysis calculated the transfer limit that ensured the Natal 230 kV post-MSSC voltage remains above the existing system post-

MSSC voltage. This transfer limit maintains the existing voltage performance of the Natal area (see Section 3.3.1).

The results in Table 16 show that 30% or 50% compensation increases the import capability to (or near to) 950 MW while maintaining the existing Natal post-MSSC voltage performance.

Table 14: Power Flow Results, Series Compensation

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Rating (MVA)	Flow (MVA)	% of MVA Rating
Summer Light High Renewables	MSSC	1114L (Langdon102S – Bennett 520S)	20	1359	Unsolved	
			30		1457.3	107.2
			50		1390.6	102.3
		1201L (Bennett 520S – Cranbrook)	20	1222	Unsolved	
			30		1459.1	119.4
			50		1392.2	113.9
		Bennett 520S Transformer	20	1200	Unsolved	
			30		1443.3	120.3
			50		1407.2	117.3
		1L274 (Elkford – Greenhills)	20	65.5	Unsolved	
			30		79.4	121.2
			50		73.4	112.0
		1L274 (Elkford – Line Creek Coal)	20	65.5	Unsolved	
			30		81.6	124.6
			50		75.5	115.2
	MATL	Bennett 520S Transformer	20	1200	103.4	103.4
			30		102.6	102.6
			50		101.2	101.2
		1L274 (Elkford – Greenhills)	20	65.5	69.6	106.3
			30		69.3	105.9
			50		68.3	104.2
		1L274 (Elkford – Line Creek Coal)	20	65.5	71.6	109.4
			30		71.4	109.0
			50		70.3	107.3
Summer Light Low Renewables	MSSC	1201L (Bennett 520S – Cranbrook)	20	1222	1383.9	113.2
			30		1355.2	110.9
			50		1323.7	108.3
		Bennett 520S Transformer	20	1200	1389.9	115.8
			30		1384.3	115.4

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Rating (MVA)	Flow (MVA)	% of MVA Rating
			50		1368.0	114.0
		1L274 (Elkford – Greenhills)	20	65.5	76.8	117.2
			30		73.8	112.7
			50		70.8	108.1
		1L274 (Elkford – Line Creek Coal)	20	65.5	78.9	120.5
			30		75.9	115.9
			50		72.8	111.2
	MATL	Bennett 520S Transformer	20	1200	1261.5	106.6
			30		1264.0	105.3
			50		1245.3	103.8
		1L274 (Elkford – Greenhills)	20	65.5	76.8	109.8
			30		70.3	107.3
			50		68.6	104.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	78.9	113.0
			30		72.3	110.4
			50		70.6	107.8
Summer Peak High Renewables	MSSC	1114L (Langdon 102S – Bennett 520S)	20	1359	Unsolved	
			30		1511.5	111.2
			50		1423.2	104.7
		1201L (Bennett 520S – Cranbrook)	20	1222	Unsolved	
			30		1475.5	120.7
			50		1389.3	113.7
		Bennett 520S Transformer	20	1200	Unsolved	
			30		1489.2	124.1
			50		1438.3	119.9
		1L274 (Elkford – Greenhills)	20	65.5	Unsolved	
			30		81.0	123.7
			50		71.3	108.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	Unsolved	
			30		84.5	129.0
			50		74.5	113.7
	MATL	Bennett 520S Transformer	20	1200	1254.6	104.6
			30		1241.8	103.5

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Rating (MVA)	Flow (MVA)	% of MVA Rating
			50		1223.4	101.9
		1L274 (Elkford – Greenhills)	20	65.5	69.2	105.7
			30		68.7	105.0
			50		66.1	101.0
		1L274 (Elkford – Line Creek Coal)	20	65.5	72.3	110.4
			30		71.8	109.7
			50		69.1	105.6
Summer Peak Low Renewables	MSSC	1201L (Bennett 520S – Cranbrook)	20	1222	1365.4	111.7
			30		1337.2	109.4
			50		1304.5	106.7
		1114L (Langdon 102S – Bennett 520S)	20	1359	1395.7	102.7
			30		1368.7	100.7
			50		1363.6	99.8
		Bennett 520S Transformer	20	1200	1418.9	118.2
			30		1400.7	116.7
			50		1408.7	117.4
		1L274 (Elkford – Greenhills)	20	65.5	74.5	113.8
			30		72.4	110.5
			50		68.7	104.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	77.8	118.9
			30		75.6	115.4
			50		71.8	109.6
	MATL	Bennett 520S Transformer	20	1200	1300.7	108.4
			30		1284.7	107.1
			50		1260.9	105.1
		1L274 (Elkford – Greenhills)	20	65.5	70.3	107.3
			30		69.2	105.7
			50		66.7	101.9
		1L274 (Elkford – Line Creek Coal)	20	65.5	73.4	112.1
			30		72.4	110.5
			50		69.7	106.5
Winter Peak High Renewables	MSSC	Bennett 520S Transformer	20	1200	Unsolved	
			30		Unsolved	
			50		1472.2	122.7

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Rating (MVA)	Flow (MVA)	% of MVA Rating
	MATL	Bennett 520S Transformer	20	1200	1291.1	107.6
			30		1284.9	107.1
			50		1267.9	105.7
Winter Peak Low Renewables	MSSC	Bennett 520S Transformer	20	1200	1478.7	123.2
			30		1434.4	119.5
			50		1394.3	116.2
	MATL	Bennett 520S Transformer	20	1200	1331.5	111.0
			30		1308.2	109.0
			50		1270.6	105.9

Table 15: Voltage Violations, Series Compensation

Scenario	Contingency	Substation	Series Comp. (%)	Voltage Violations		
				Voltage (p.u.)	Voltage (kV)	Acceptable Range (kV)
Summer Light High Renewables	MSSC	N/A	20	Unsolved		
		Natal 230	30	0.879	202.2	207-253
		Coleman 799S	30	0.895	123.5	124-150
		Cranbrook 230	30	0.916	210.7	207-253
		Natal 230	50	0.939	216.0	207-253
		Coleman 799S	50	0.936	129.2	124-150
Summer Light Low Renewables	MSSC	Natal 230	20	0.892	205.2	207-253
		Coleman 799S	20	0.909	125.4	124-150
		Cranbrook 230	20	0.927	213.2	207-253
		Natal 230	30	0.918	211.1	207-253
		Coleman 799S	30	0.930	128.3	124-150
		Cranbrook 230	30	0.948	218.0	207-253
		Natal 230	50	0.958	220.3	207-253
		Coleman 799S	50	0.954	131.7	124-150
Summer Peak High Renewables	MSSC	N/A	20	Unsolved		
		Natal 230	30	0.853	196.2	207-253
		Coleman 799S	30	0.868	119.8	124-150

Scenario	Contingency	Substation	Series Comp. (%)	Voltage Violations		
				Voltage (p.u.)	Voltage (kV)	Acceptable Range (kV)
		Cranbrook 230	30	0.899	206.8	207-253
		Natal 230	50	0.943	216.9	207-253
		Coleman 799S	50	0.931	128.5	124-150
Summer Peak Low Renewables	MSSC	Natal 230	20	0.883	203.1	207-253
		Coleman 799S	20	0.905	124.9	124-150
		Cranbrook 230	20	0.925	212.7	207-253
		Natal 230	30	0.912	209.8	207-253
		Coleman 799S	30	0.922	127.2	124-150
		Cranbrook 230	30	0.949	218.3	207-253
		Natal 230	50	0.950	218.5	207-253
		Coleman 799S	50	0.950	131.1	124-150
Winter Peak High Renewables	MSSC	N/A	20	Unsolved		
		Natal 230	30	Unsolved		
		Natal 230	50	0.939	215.9	207-253
		Coleman 799S	50	0.917	126.5	124-150
Winter Peak Low Renewables	MSSC	Natal 230	20	0.849	195.3	207-253
		Coleman 799S	20	0.851	117.4	124-150
		Cranbrook 230	20	0.894	205.6	207-253
		Natal 230	30	0.908	208.8	207-253
		Coleman 799S	30	0.901	124.3	124-150
		Cranbrook 230	30	0.939	216.0	207-253
		Natal 230	50	0.961	221.0	207-253
		Coleman 799S	50	0.943	130.1	124-150

Table 16: Voltage Range Transfer Limit Analysis, to Maintain Natal 230 kV Post-MSSC Voltage Performance

Development Option	Scenario	Natal 230 kV Post-MSSC Voltage Limit (Existing System 800 MW Import Performance, p.u.)	Path 1 Power Transfer Limit (MW, Pre-contingency)
	Summer Light High Renewable	0.933	878

Development Option	Scenario	Natal 230 kV Post-MSSC Voltage Limit (Existing System 800 MW Import Performance, p.u.)	Path 1 Power Transfer Limit (MW, Pre-contingency)
20% Series Compensation	Summer Light Low Renewable	0.957	890
	Summer Peak High Renewable	0.905	885
	Summer Peak Low Renewable	0.949	893
	Winter Peak High Renewable	0.900*	873
	Winter Peak Low Renewable	0.909	892
30% Series Compensation	Summer Light High Renewable	0.933	922
	Summer Light Low Renewable	0.957	940
	Summer Peak High Renewable	0.905	939
	Summer Peak Low Renewable	0.949	942
	Winter Peak High Renewable	0.900*	927
	Winter Peak Low Renewable	0.909	951
50% Series Compensation	Summer Light High Renewable	0.933	1031
	Summer Light Low Renewable	0.957	1055
	Summer Peak High Renewable	0.905	1040
	Summer Peak Low Renewable	0.949	1063
	Winter Peak High Renewable	0.900*	1055
	Winter Peak Low Renewable	0.909	1061

*Note: The voltage limit was below the WECC planning criteria, so the Voltage Range Transfer Limit Analysis used 0.9 p.u..

6.2.3 Transient Stability Analysis

The AESO conducted transient stability analysis as described in Section 4.2.3, including each study scenario, each contingency, and each series compensation option.

The analysis assessed transient stability at the voltage stability limits identified in Section 6.2.1. The results show that:

- Series compensation mitigates the unstable power swing caused by the MSSC and prevents the Cranbrook under-voltage RAS from operating
- The transient stability limit exceeds the voltage stability limit, and does not constrain the import capability

Output plots are provided in Attachment B Sections 2 to 3.

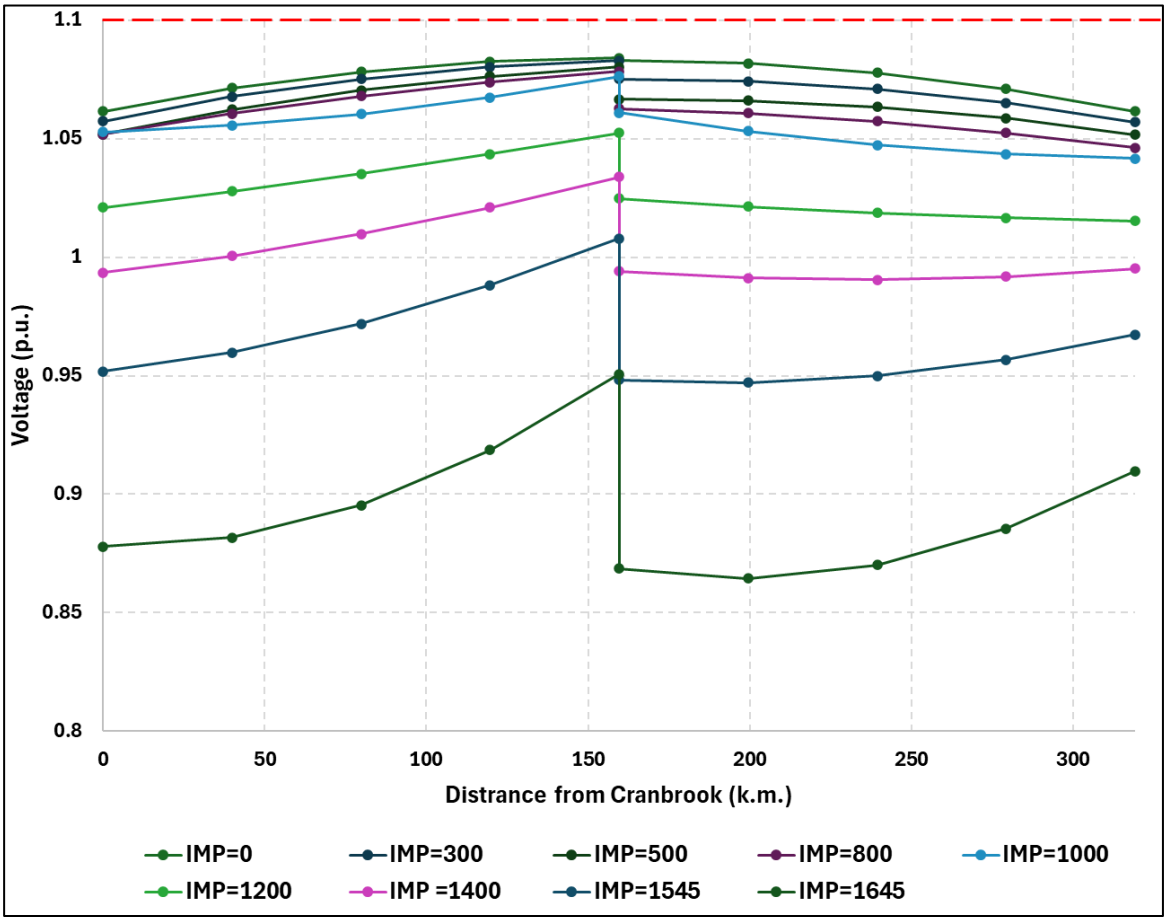
6.2.4 Voltage Profile Analysis

The AESO conducted voltage profile analysis as described in Section 4.2.4. The analysis was limited to 50% series compensation for the summer light low renewable case. This scenario was chosen as it provides the highest voltage among the scenarios, making it more likely to reach the limit of 1.1p.u. where the series compensation is placed. As lower compensation levels cause smaller changes in the voltage profile, if 50% series compensation is feasible, then any lower compensation level is also feasible.

The results in Figure 7 show that:

- The voltage along 1201L would remain below the maximum limit of 550 kV (1.1 p.u.)
- 50% series compensation is feasible

Figure 7: Voltage Profile On 1201L for 50% Series Compensation (Import)



7. Component 2: Increase the Transformation Capability at the Bennett 520S Substation

7.1 Transmission Development Options

The AESO considered the following transmission development options to increase the transformation capability at the Bennett 520S substation.

7.1.1 Option 2A: Replace the existing 500/240 kV transformer at Bennett 520S with one situated adjacent to the existing transformer

- Replace the existing 500/240 kV transformer at the Bennett 520S substation with a 500/240 kV transformer situated adjacent to the existing transformer
  - The new transformer must have a continuous rating of at least1350 MVA and an emergency rating no less than 1850 MVA for 30 minutes
  - The new transformer must have one spare phase
- The existing transformer will be discontinued from use when the new transformer is commissioned
- Upgrade 1114L (between Bennett 520S and Langdon 102S substations) by replacing the conductor with a conductor that has a thermal rating of at least 1350 MVA/1850 MVA (continuous/ emergency) for a duration of 30 minutes
- Add or modify associated equipment as required

7.1.2 Option 2B: Replace the existing 500/240 kV transformer at Bennett 520S with one situated at the same location as the existing transformer

- Replace the existing 500/240 kV transformer at the Bennett 520S substation with a 500/240 kV transformer situated at the same location as the existing transformer
  - The new transformer must have a continuous rating no less than 1350 MVA and an emergency rating no less than 1850 MVA for 30 minutes
  - The new transformer must have one spare phase
- The existing transformer will be discontinued from use before the new transformer is commissioned[26]
- Upgrade 1114L (between Bennett 520S and Langdon 102S substations) by replacing the conductor with a conductor that has a thermal rating of at least 1350 MVA/1850 MVA (continuous/ emergency) for a duration of 30 minutes
- Add or modify associated equipment as required

[26] AltaLink is proposing to replace one single phase units of the transformer at a time

7.2 Technical Assessment

The applicable TFO cannot incrementally increase the transformer rating. Therefore, the transformer must be sized for an eventual increase of import capability to (or near to) 1200 MW.

The AESO conducted power flow analysis as described in Section 4.2.2, using 1200 MW import study scenarios with 30% and 50% series compensation, to determine the minimum required transformer ratings.[27] The results are summarized in Table 17. For each series compensation level:

- The maximum pre-contingency flow among all scenarios establishes the minimum acceptable continuous rating
- The maximum post-contingency flow among all scenarios (caused by the MSSC) establishes the minimum acceptable emergency rating

Table 17: Minimum Transformer Ratings for 1200 MW Import

Import	Series Compensation (%)	Minimum Continuous Rating (MVA)	Minimum Emergency Rating (MVA)
1200 MW	30	1222	1740
	50	1206	1738

Both options have the same ratings of 1350 MVA continuous and 1850 MVA emergency. These ratings provide a margin of approximately 6% to allow for ranges of operating voltages at the terminals and the resulting reactive power flows.

Both options provision for increasing the import capability to (or near to) 1200 MW.

[27] The assessment added a fictitious shunt compensator at the Cranbrook 500kV bus to increase the loadability of the intertie to 1200 MW.

8. Component 3: Increase the Thermal Rating of 1201L

8.1 Transmission Development Options

The AESO considered the following transmission development options to increase the thermal rating of 1201L.

8.1.1 Option 3A: Increase the Thermal Rating of 1201L to 1200 MVA/1400 MVA (continuous/ emergency)

- Increase the 1201L thermal rating within Alberta (between the Bennett 520S substation and the BC border) to enable a continuous rating no less than 1200 MVA and an emergency rating no less than 1400 MVA for 30 minutes
- Add or modify associated equipment as required

8.1.2 Option 3B: Increase the Thermal Rating of 1201L to 1350 MVA/1850 MVA (continuous/ emergency)

- Increase the 1201L thermal rating within Alberta (between the Bennett 520S substation and the BC border) to enable a continuous rating no less than 1350 MVA and an emergency rating no less than 1850 MVA for 30 minutes
- Add or modify associated equipment as required

8.2 Technical Assessment

The AESO conducted power flow analysis as described in Section 4.2.2, using study scenarios with 30% and 50% series compensation, to determine the minimum line ratings required for 950 MW and 1200 MW import.[28] The maximum pre- and post-contingency loading observed among planning scenarios establish the minimum acceptable continuous and emergency ratings, respectively.

Table 18 shows the minimum ratings required for 950 MW and 1200 MW import.

Table 18: Minimum Line Ratings for 950 MW and 1200 MW Import

Import	Series Compensation (%)	Minimum Continuous Rating (MVA)	Minimum Emergency Rating (MVA)
950 MW	30	934	1476
	50	941	1390
1200 MW	30	1176	1772
	50	1158	1756

[28] The assessment added a fictitious shunt compensator at the Cranbrook 500kV bus to increase the loadability of the intertie to 1200 MW

The AESO conducted transfer limit analysis as described in Section 4.2.5 to find the transfer limit that ensures the post-contingency power flow remains below the emergency rating. The most limiting contingency is the MSSC.

Table 19 summarizes the transfer limits for Option 3A and 3B with 30% and 50% series compensation.

Option 3A is marginally adequate for 950 MW import with 50% series compensation, and results in a lower transfer limit with 30% series compensation due to higher reactive power transfer.

Option 3B is adequate for 1200 MW import at either level of series compensation. Its ratings provide a margin of approximately 5% to allow for ranges of operating voltages at the terminals and the resulting reactive power flows. Option 3B makes provision for increasing the import capability to (or near to) 1200 MW.

Table 19: Transfer Limits with Series Compensation

Line Rating	Limit with 30% Series Compensation (MW)	Limit with 50% Series Compensation (MW)
Option 3A: 1200/1400 MVA	910	965
Option 3B: 1350/1850 MVA	1200	1200

9. Assessment of Potential Import Capabilities

The import capability depends on the selected option for each component and their individual limitations.

The results in Table 20 show the import capability for different combinations of series compensation and 1201L ratings. The lowest transfer limit arising from the reactive compensation and line ratings establishes the import capability.

Table 20: Maximum Import Capability when Combining the Options

Decision Matrix		Component 1: Series Compensation	
		30% compensation Import Capability: 906 - 951 MW	50% compensation Import Capability: 1008 - 1063 MW
Component 3: 1201L Thermal Rating	1200/1400 MVA ratings	Import Capability: **906 - 910 MW**	Import Capability: **965 MW**
	1350/1850 MVA ratings	Import Capability: **906 - 951 MW**	Import Capability: **1008 - 1063 MW**

The transformer development options (Component 2) do not appear in the decision matrix because they do not limit the import capability.

10. Additional Information for the Transmission Development Options

The AESO directed AltaLink Management Ltd., in its capacity as general partner of AltaLink, L.P. (AltaLink), to provide cost estimates and environmental and land use effect assessments (NID Appendix B and E). This section summarizes the results.

The AESO requested cost estimates and environmental and land use effect assessments for the transmission development options described in Section 6 to Section 8.

10.1 Cost Estimate

AltaLink prepared AACE class 4 cost estimates with an accuracy range of ±30%.[29] Table 21 provides a summary of the cost estimates for each option.

Table 21: AACE Class 4 Cost Estimate Summary

Option	Description	Cost (±30%)
1A	Add 20% series compensation on 1201L	$78.8M
1B	Add 30% series compensation on 1201L	$81.6M
1C	Add 50% series compensation on 1201L	$84.8M
4A	Add +200 MVAr dynamic shunt compensation on 1201L	$147.3M
4B	Add +300 MVAr dynamic shunt compensation on 1201L	$175.2M
2A	Replace the existing 500/240 kV transformer at Bennett 520S substation with a new transformer situated adjacent to the existing one	$81.5M
2B	Replace the existing 500/240 kV transformer at Bennett 520S substation with a new transformer situated at the same location	$67.3M
3A	Increase the thermal rating of 1201L to at least 1200 MVA continuous and at least 1400 MVA emergency[30]	$9.8M
3B	Increase the thermal rating of 1201L to at least 1350 MVA continuous and at least 1850 MVA emergency[30]	$12.4M

[29] The cost estimates are in nominal dollars using a base year of 2025 with escalation considered and ±30% accuracy
[30] The emergency ratings are for 30 minutes at 100% pre-loading

AltaLink advised that subsequently upgrading to 50% series compensation at a later time has additional cost.[31]

- Upgrading from 20% to 50% series compensation would cost approximately $43M (compared to $6M now)
- Upgrading from 30% to 50% series compensation would cost approximately $39M (compared to $3.2M now)

10.2 Environmental and Land Use Effects

The AESO directed AltaLink to assess the environmental and land use effects for each option. As indicated in the Environmental and Land Use Effects Appendix:[32]

- For the series compensation development, all options are expected to have similar environmental and land use impacts
- For the transformer development, Option 2B is anticipated to have lower environmental impacts as no site expansion is required. However, AltaLink "anticipates the fence expansion and associated land use impacts for Option 2A to be negligible" and confirmed that it owns the area needed for the substation expansion.
- For the 1201L thermal rating development, AltaLink confirmed "the impacts to be negligible between Option 3A and 3B."

10.3 Construction Outages

AltaLink advised of a preliminary outage duration estimate of the 1201L (which also results in an outage on MATL) for each option[33]. AltaLink will refine the outage plans during the preparation of its Facility Proposal. In summary:

- The series compensation development options require the same outage duration
- The transformer development options require notably different outage durations
  - Option 2A (transformer situated at an adjacent location) can reduce the outage by between 19 to 24 days compared to Option 2B (transformer situated at the same location), depending on how much the transformer replacement outage would overlap with the other required outages. For example:
    - Installing a new transformer could be completed during the annual intertie outage[34]
    - Replacing the transformer with one situated at the same location as the existing transformer would require an additional 24 days beyond the annual outage (assuming some overlap with the annual outage)

[31] For comparative purposes only. Based on current information and assuming the upgrade would occur in 2040
[32] NID Appendix E – Environment and Land Use Effects Assessment
[33] Attachment C – Outage Schedule
[34] AltaLink typically requires one 10-day outage per year

    - Overlapping one 5-day outage with the series compensation outage (assuming it is not also overlapping the annual intertie outage) could reduce the total outage duration

- The 1201L thermal rating development options may have the same or marginally different outage durations
  - Option 3A (1200/1400 MVA ratings) can reduce the outage requirement by 6 days compared to Option 3B (1350/1850 MVA ratings).
  - However, AltaLink can coordinate the line clearance work with the annual intertie outage and/or the series compensation and transformer outages. This would mitigate any impact to intertie availability.

Option 2A has a shorter outage duration than Option 2B, and therefore has the following benefits:

- Reduces reliability risks associated with islanded operation when the intertie is out of service
- Improves economic efficiency for the interconnected markets when the intertie is in service
- May reduce the need for additional ancillary services required for islanded operation
  - Islanded operation may require more regulating reserve and contingency reserve[35]

Additionally, Option 2A:

- Provides the option to remove the existing transformer after the early failure (infant mortality) period of the new transformer
- Simplifies construction
- Improves worker safety (less work near live equipment)

Table 22: Outage Comparison

Transmission Development	Estimate Option	Outage Requirements
Add series compensation on 1201L	Option 1A 20% series compensation	Estimated 2-week outage required on 1201L to connect the series capacitor
	Option 1B 30% series compensation	
	Option 1C 50% series compensation	

[35] The AESO is proposing to retire BAL-002-WECC-AB1-2. If this standard is retired, then the AESO may procure less contingency reserve during interconnected operations.

Transmission Development	Estimate Option	Outage Requirements
Increase the Bennett 520S 500/240 kV transformer ratings to 1350/1850 MVA	Option 2A Replace the existing transformer with a new transformer situated adjacent to the existing one	Estimated 7 days outage in total
	Option 2B Replace the existing transformer with a new transformer situated at the same location	Estimated 29 days outage in total, split into nine separate outages
Increase the thermal rating of 1201L	Option 3A Increase ratings to at least 1200/1400 MVA	Estimated 6 days outage in total, split into three separate outages
	Option 3B Increase ratings to at least 1350/1850 MVA	Estimated 12 days outage in total, split into six separate outages

AltaLink advised the AESO that the outage requirements it identified are preliminary estimates. AltaLink will conduct further analysis during the Service Proposal stage to improve the estimates.

11. Selection of the Proposed Transmission Development

The AESO has considered the technical performance, cost estimates, environmental and land use effects, and outage requirements of the transmission development options and selected a Proposed Transmission Development. This section explains the rationale.

The AESO selected the preferred option for each component by ranking the options according to the selection criteria outlined in Section 11.1.

11.1 Selection Criteria

The selection criteria were technical performance, cost, environmental and land use effects, and outage duration and risk. Table 23 summarises which criteria revealed material differences when the AESO assessed comparable options.

- Component 1: The series compensation levels differed in technical performance and cost
- Component 2: The transformer upgrade options differed in cost, environmental and land use effects, and outage duration and risk
- Component 3: The 1201L rating increase options differed in technical performance and cost

Table 23: Selection Criteria

Transmission Development	Material Differences in Assessment			
	Technical Performance	Cost	Environmental and Land Use	Outage Duration and Risk
Component 1 Series compensation	Yes	Yes	No	No
Component 2 Transformer upgrade	No	Yes	Yes	Yes
Component 3 1201L rating increase	Yes	Yes	No	No

11.2 Series Compensation and 1201L Rating

Technical performance and cost were the decisive criteria for selecting the series compensation level and the 1201L thermal rating increase options.

Section 9 shows how import capability varies based on series compensation level and 1201L ratings. Table 24 shows the cost effectiveness of each combination of options, incorporating the cost estimates in Section 10.1.

The preferred and most cost-effective development is 50% series compensation (Option 1C) in combination with 1201L ratings of 1350/1850 MVA (Option 3B).

This development:

- Fulfils the AESO's obligation under the Transmission Regulation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW
- Incorporates provisions for increasing import capability to 1200 MW
  - Avoids the additional cost of subsequent upgrades to the series compensation
- Increases import capability at the lowest cost per incremental MW

Table 24: Cost per MW Comparison[36]

Decision Matrix		Component 1: Series Compensation	
		Option 1B: 30% $81.6M	**Option 1C: 50% $84.8M**
Component 3: 1201L Thermal Rating	**Option 3A: 1200/1400 MVA $9.8M**	Cost: $172.9M[1] Import Capability: 906 – 910 MW Import Increase[2]: 106 – 110 MW **$/MW: 1.57M – 1.63M**	Cost: $176.1M[1] Import Capability: 965 MW Import Increase[2]: 165 MW **$/MW: 1.07M**
	Option 3B: 1350/1850 MVA $12.4M	Cost: $175.5M[1] Import Capability: 906 – 951 MW Import Increase[2]: 106 – 151 MW **$/MW: 1.16M – 1.66M**	Cost: $178.7M[1] Import Capability: 1008 – 1063 MW Import Increase[2]: 208 – 263 MW **$/MW: 0.68M – 0.86M**

1) Includes transformer cost of $81.5M (Option 2A)

2) Compared to the existing 800 MW import capability

[36] The calculations are based on the detailed cost estimates provided in NID Appendix B. For readability, the values shown in the table have been rounded.

11.3 Transformer Upgrade

Cost, environmental and land use effects, and outage considerations were the decisive criteria for selecting the transformer upgrade option.

Table 25 summarizes the benefits of each option. The AESO determined that the benefits of Option 2A outweighed those of Option 2B, so Option 2A is preferred.

Table 25: Benefits of Transformer Development Options

Option	Benefits
Option 2A Replace the existing transformer with a new transformer situated adjacent to the existing one	• Reduces intertie outages by 19 to 24 days and therefore reduces reliability risks • Simplifies construction • Improves worker safety
Option 2B Replace the existing 500/240 kV transformer at Bennett 520S substation with one situated at the same location as the existing transformer	• Lower cost • Negligibly lower environmental and land use effects

11.4 Proposed Transmission Development

For each component, the AESO must select one option from among the mutually exclusive alternatives set out below. Based on the technical performance, cost estimates, environmental and land use effects, and outage considerations, the AESO selected Options 1C, 2A and 3B as the Proposed Transmission Development. The rationale is explained by Figure 8, and the proposed development is further described in Table 26.

Figure 8: Development Options Comparison

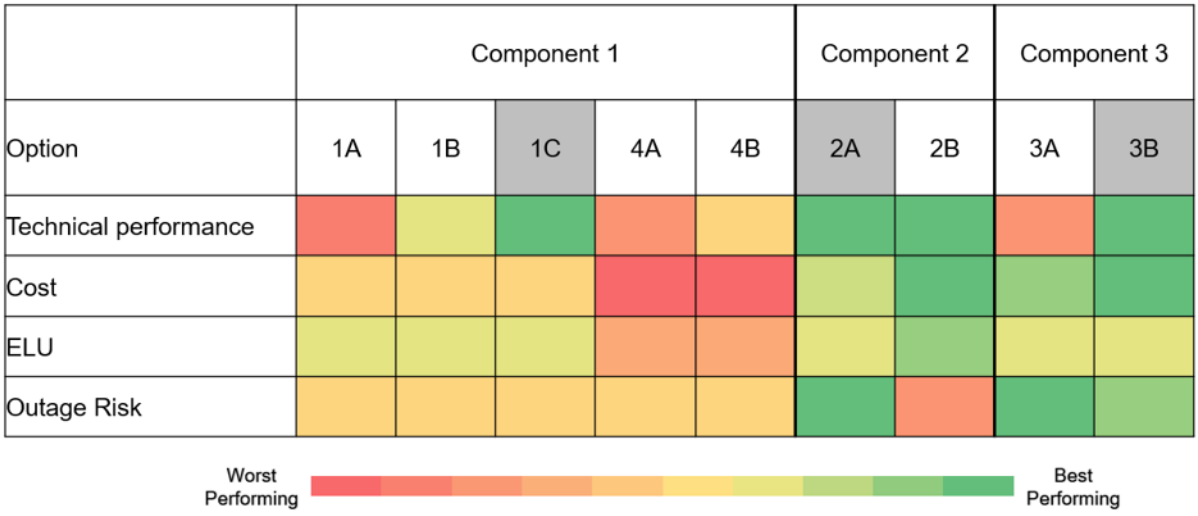


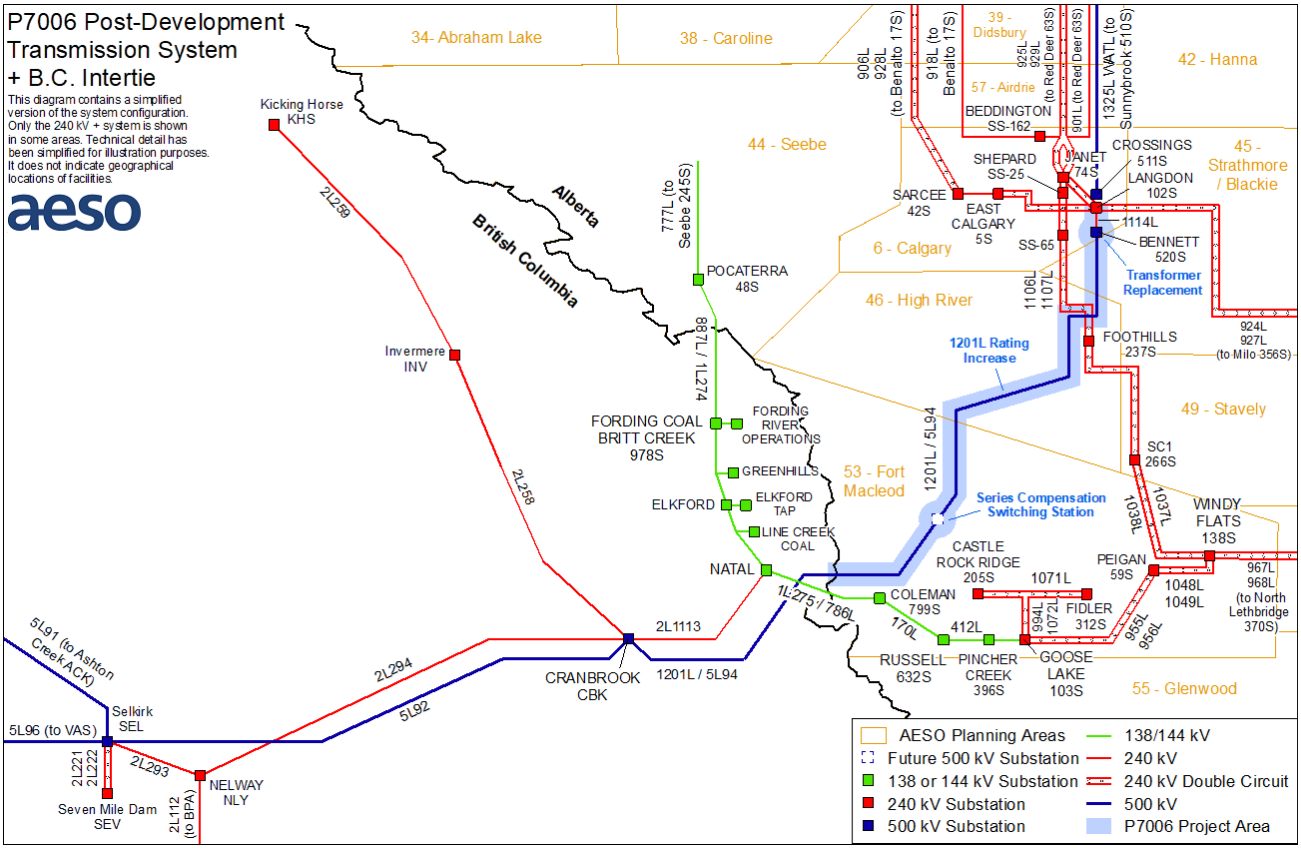
Table 26: Proposed Transmission Development

Option	Description	Cost (±30%)
1C	Add 50% series compensation on 1201L	$84.8M
2A	Replace the existing 500/240 kV transformer at Bennett 520S substation with a transformer rated 1350/1850 MVA situated adjacent to the existing one	$81.5M
3B	Increase the thermal rating of 1201L to at least 1350/1850 MVA	$12.4M
	Alberta Project Cost	**$178.7M**

The proposed development:

- Fulfils the AESO's obligation under Section 16(2) of the Transmission Regulation to restore the Alberta-BC intertie's import capability to (or near to) 950 MW
- Incorporates provisions for restoring the import capability to (or near to) 1200 MW
  - The Bennett 520S transformer rating (component 2) and 1201L thermal rating (component 3) are sized for 1200 MW
- Increases import capability at the lowest cost per incremental MW
- Reduces reliability risks associated with construction outages

Figure 9: Post-Development Transmission System in and near the Study Area (Alberta)



12. Additional Assessments for the Proposed Transmission Development

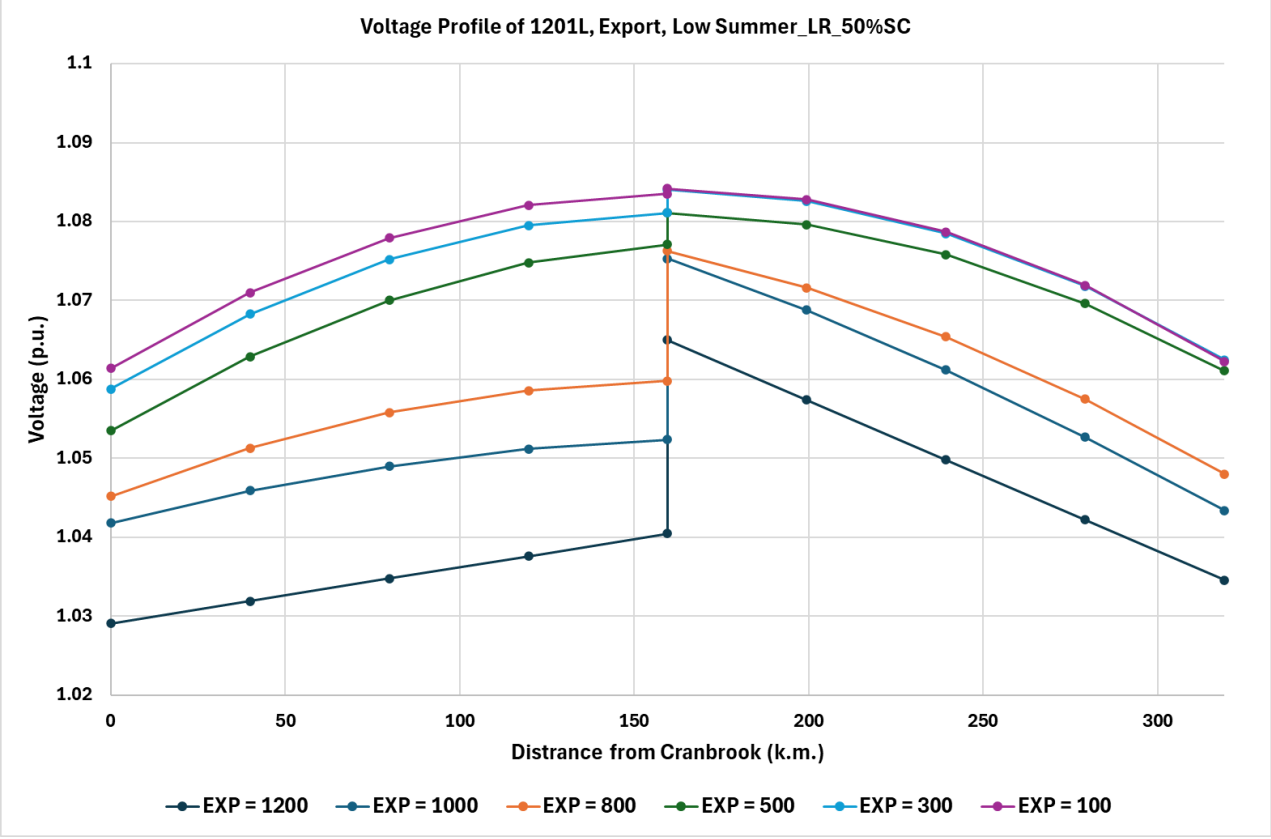
The AESO conducted additional sensitivity assessments to further assess the performance of the Proposed Transmission Development.

12.1 Confirmation of Export Capability

The current Alberta-BC export capability is 1000 MW. The AESO assessed whether the Proposed Transmission Development could adversely affect the export capability.

Figure 10 shows the voltage profile on 1201L while exporting, using the same methodology and scenario as in Section 6.2.4. Voltage along the line does not reach the upper limit of 550 kV (1.1 p.u.), and therefore the series capacitor does not adversely impact the export capability. This assessment accounts for the incremental outflow that could result from a load loss contingency as large as 250 MW, assuming an 80% distribution factor.

Figure 10: Voltage Profile on 1201L for 50% Series Compensation (Export)



12.2 Post-development Short Circuit Level and System Loss Impact

The AESO assessed the short circuit current levels and system losses pre- and post-development.

Table 27 provides the pre- and post-development short circuit levels for buses in the vicinity of the Proposed Transmission Development under maximum short circuit conditions. The short circuit currents are within the equipment fault duty.

Table 27: Short Circuit Level Study Results

Bus	Short Circuit Level (kA)			Equipment Fault Duty
	Pre-Development	Post-Development	Project Impact	
Langdon 240kV	30.9	32.2	+1.3	40 kA
Bennett 240kV	29.4	30.7	+1.3	40 kA
Bennett 500kV	9.6	10.5	+0.9	40 kA
Cranbrook 500kV	8.3	9.4	+1.1	50 kA

Table 28 and Table 29 provide the pre- and post-development system losses for 950 MW of imports. The results demonstrate that the Proposed Transmission Development reduces system loss.

Table 28: System Loss (WECC) Study Results

Scenario	WECC System Loss (MW) Pre-Development	WECC System Loss (MW) Post-Development	Delta (MW)
Summer Light, High Renewable	4787.4	4785.2	-2.2
Summer Light, Low Renewable	4575.2	4572.2	-2.9
Summer Peak, High Renewable	5102.6	5098.4	-4.2
Summer Peak, Low Renewable	4875.4	4872.1	-3.3
Winter Peak, High Renewable	5375.5	5370.6	-4.9
Winter Peak, Low Renewable	5218.4	5216.8	-1.6

Table 29: System Loss (AIES) Study Results

Scenario	AIES System Loss (MW) Pre-Development	AIES System Loss (MW) Post-Development	Delta (MW)
Summer Light, High Renewable	453.6	452.1	-1.5
Summer Light, Low Renewable	239.7	237.7	-2.0
Summer Peak, High Renewable	524.3	521.6	-2.6
Summer Peak, Low Renewable	298.4	296.3	-2.1
Winter Peak, High Renewable	485.5	483.3	-2.2
Winter Peak, Low Renewable	329.9	328.2	-1.7

12.3 Sensitivity to BC or Alberta Generator Outages

The AESO assessed the impact of generator outages for units near the intertie terminals. Given that high renewable scenarios tend to have lower transfer limits, the analysis focused on these scenarios. Per Section 4.3, the sensitivity assessments assumed the following generators could be offline:

- In BC, all of the following (2195 MW total):
  - Seven Mile (SEV) – 800 MW total
  - Kootenay Canal Generators (KCL) – 580 MW total
  - Waneta (WAN/WAX) – 815 MW total
- In Alberta, all of the following (1198 MW total):
  - Shepard (EGC1) – 868 MW total
  - ENMAX Calgary Energy Centre (CAL1) – 330 MW total

The results show that outages of multiple generators near the intertie terminals could temporarily reduce the import capability. The BC generators have a larger effect on import capability. Even with significant generator outages, the Proposed Transmission Development still fulfils the AESO's obligation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW. Table 30 summarises the study results.

Table 30: Summary of Generator Outages Sensitivity Study Results

Case Set	P-V Limit (MW)	Voltage Range Limit (MW)	Transient Stability Limit	Import Transfer Limit (MW)
Reference	1008 - 1145	1031 – 1063	≥ PV Limit	**1008 – 1063**
BC Gen. Off	931 - 1028	948 - 989	≥ PV Limit	**931 - 989**
AIES Gen. Off	982 - 1154	1025 - 1098	≥ PV Limit	**982 - 1098**

12.3.1 P-V and Transfer Limit Analysis

The AESO conducted P-V analysis and voltage range transfer limit analysis following the methodology in Section 4.2.1 and 4.2.5. Table 31 and Table 32 show the import capability is lower during generator outages.

Table 31: P-V Results: Generator Outages Sensitivity

Scenario	Case Set	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
Summer Light High Renewable	Reference	1515	1092	1037
	BC Gen. Off	1410	998	948
	AIES Gen. Off	1498	1075	1021
Summer Light Low Renewable	Reference	1574	1200	1140
	BC Gen. Off	1452	1082	1028
	AIES Gen. Off	1574	1200	1140
Summer Peak High Renewable	Reference	1499	1061	1008
	BC Gen. Off	1407	980	931
	AIES Gen. Off	1447	1052	1000
Summer Peak Low Renewable	Reference	1579	1205	1145
	BC Gen. Off	1443	1080	1026
	AIES Gen. Off	1546	1215	1154
Winter Peak High Renewable	Reference	1481	1071	1017
	BC Gen. Off	1396	989	939
	AIES Gen. Off	1399	1033	982
Winter Peak Low Renewable	Reference	1500	1127	1071
	BC Gen. Off	1354	991	941
	AIES Gen. Off	1468	1123	1067

Table 32: Voltage Range Limit Analysis Results: Generator Outages Sensitivity

Scenario	Case Set	Voltage Range Transfer Limit (MW, Pre-contingency)
Summer Light High Renewable	Reference	1031
	BC Gen. Off	948
	AIES Gen. Off	1025
Summer Light Low Renewable	Reference	1055
	BC Gen. Off	984
	AIES Gen. Off	1055
Summer Peak	Reference	1040

Scenario	Case Set	Voltage Range Transfer Limit (MW, Pre-contingency)
High Renewable	BC Gen. Off	971
	AIES Gen. Off	1052
Summer Peak Low Renewable	Reference	1063
	BC Gen. Off	964
	AIES Gen. Off	1098
Winter Peak High Renewable	Reference	1055
	BC Gen. Off	989
	AIES Gen. Off	1033
Winter Peak Low Renewable	Reference	1061
	BC Gen. Off	951
	AIES Gen. Off	1075

12.3.2 Power Flow Analysis

The AESO conducted power flow analysis as described in Section 4.2.2 for study scenarios with the BC or Alberta generator outages applied. The results show that voltage stability, not the 1201L and Bennett transformer ratings, will limit the import capability. Table 33 is filtered to only show the results relevant to the intertie. The full results are provided in Attachment A Table 3.

Table 33: Power Flow Analysis for Generator Outage Scenarios

Scenario	Contingency	Constraint	Thermal Loading			
			Rating (MVA)	Emer. Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Summer Light High Renewables BC Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1460.3	107.4
		1201L (Bennett 520S – Cranbrook)	1350	1850	1462.1	119.6
		Bennett 520S Transformer	1350	1850	1447.3	120.6
		1L274 (Elkford – Greenhills)	65.5	90.4	79.3	121.1
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	81.6	124.5

Scenario	Contingency	Constraint	Thermal Loading			
			Rating (MVA)	Emer. Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
	WATL	1L274 (Elkford – Line Creek Coal)	65.5	90.4	67.4	102.9
	MATL	Bennett 520S Transformer	1350	1850	1223.6	102.0
		1L274 (Elkford – Greenhills)	65.5	90.4	68.7	104.9
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	70.7	108.0
Summer Light High Renewables AB Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1381.3	101.6
		1201L (Bennett 520S – Cranbrook)	1350	1850	1383.0	113.2
		Bennett 520S Transformer	1350	1850	1399.2	116.6
		1L274 (Elkford – Greenhills)	65.5	90.4	73.3	111.9
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	75.4	115.1
	WATL	1L274 (Elkford – Greenhills)	65.5	90.4	65.9	100.7
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	67.9	103.6
	MATL	Bennett 520S Transformer	1350	1850	1206.3	100.5
		1L274 (Elkford – Greenhills)	65.5	90.4	68.3	104.3
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	70.3	107.3
	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1540.2	113.3
		1201L (Bennett 520S – Cranbrook)	1350	1850	1503.5	123.0

Scenario	Contingency	Constraint	Thermal Loading			
			Rating (MVA)	Emer. Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		Bennett 520S Transformer	1350	1850	1510.7	125.9
		1L274 (Elkford – Greenhills)	65.5	90.4	82.1	125.3
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	85.7	130.8
	WATL	1L274 (Elkford – Line Creek Coal)	65.5	90.4	68.4	104.5
	MATL	Bennett 520S Transformer	1350	1850	1239.9	103.3
		1L274 (Elkford – Greenhills)	65.5	90.4	67.9	103.7
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	71.0	108.4
Summer Peak High Renewables AB Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1436.5	105.7
		1201L (Bennett 520S – Cranbrook)	1350	1850	1402.3	114.8
		Bennett 520S Transformer	1350	1850	1375.0	114.6
		1L274 (Elkford – Greenhills)	65.5	90.4	75.3	114.9
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	78.6	120.0
	WATL	1L274 (Elkford – Line Creek Coal)	65.5	90.4	67.0	102.3
	MATL	Bennett 520S Transformer	1350	1850	1204.5	100.4
		1L274 (Elkford – Greenhills)	65.5	90.4	67.8	103.5
		1L274 (Elkford – Line Creek Coal)	65.5	90.4	70.8	108.1

Scenario	Contingency	Constraint	Thermal Loading			
			Rating (MVA)	Emer. Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Winter Peak High Renewables BC Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1528	1663	1529.7	100.1
		Bennett 520S Transformer	1350	1850	1527.4	127.3
	WATL	916L (Sarcee 42S – East Calgary 5S)	494	593	522.1	105.7
	MATL	Bennett 520S Transformer	1350	1850	1285.2	107.1
Winter Peak High Renewables AB Gen off	MSSC	Bennett 520S Transformer	1350	1850	1381.9	115.2
	MATL	Bennett 520S Transformer	1350	1850	1253.6	104.5

12.3.3 Transient Stability Analysis

The AESO conducted transient stability analysis as described in Section 4.2.3, for two sets of study scenarios with the BC or Alberta generator outages applied, respectively. No contingency events became unstable because of the generator outages. See Attachment B Section 4.1 for simulation output plots.

12.3.4 Conclusion

Import capability may be temporarily reduced if the Alberta or BC system is weakened by multiple generator outages, however, the Proposed Transmission Development still fulfils the AESO's obligation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW. Considering the number of generators offline, the AESO expects such transfer limit reductions would almost never happen.

12.4 Sensitivity to Path 3 Transfer and Selkirk Area Generation

The AESO developed a set of sensitivity scenarios to assess whether the Alberta-BC import transfer limit depends on Path 3 transfer or Selkirk area generator dispatch. The Summer Peak High Renewables scenario was selected as a reference case, and the sensitivity scenarios were created by changing BC Hydro load and generation dispatch within the reference case. Table 34 describes the sensitivity scenarios.

Table 34: Study Scenarios of Path 3/Selkirk Dispatch Sensitivity

Selected Bookend Cases for Comparison	Selkirk Area Generation (MW)	Path 3 Transfer into BC (MW)	Alberta Import from BC (MW)
Reference - Summer Peak High Renewables Scenario	1497	-72.9	950
High Path 3 export / High Selkirk	1955	-2000	
High Path 3 export / Medium Selkirk	1840	-2000	
High Path 3 import / High Selkirk	1215	2400	
High Path 3 import / Medium Selkirk	1100	2400	

The results show that the sensitivity scenarios have a slightly lower import capability compared to the reference case. However, the Proposed Transmission Development still fulfils the AESO's obligation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW. Table 35 summarises the study results.

Table 35: Summary of Path 3/Selkirk Dispatch Sensitivity Study Results

Case Set	P-V Limit (MW)	Voltage Range Limit (MW)	Transient Stability Limit	Import Transfer Limit (MW)
Reference - Summer Peak High Renewables Scenario	1008	1040	⩾ PV Limit	1008
High Path 3 export / High Selkirk	963	996	⩾ PV Limit	963
High Path 3 export / Medium Selkirk	964	998	⩾ PV Limit	964
High Path 3 import / High Selkirk	962	1007	⩾ PV Limit	962
High Path 3 import / Medium Selkirk	962	1007	⩾ PV Limit	962

12.4.1 P-V and Transfer Limit Analysis

The AESO conducted P-V analysis and voltage range transfer limit analysis following the methodology in Section 4.2.1 and 4.2.5. Table 36 and Table 37 show the import capability is lower during high Path 3 flows.

Table 36: PV Results: Path 3 and Selkirk Generation Dispatch Sensitivity

Case Set	Post-MSSC Flow on AB-BC Intertie at Voltage Collapse (MW)	Pre-contingency Flow on AB-BC Intertie (MW)	Transfer Limit Considering 5% Stability Margin (MW)
Reference Case	1499	1061	1008
High Path 3 export / High Selkirk	1488	1013	963
High Path 3 export / Medium Selkirk	1460	1015	964
High Path 3 import / High Selkirk	1472	1013	962
High Path 3 import / Medium Selkirk	1473	1013	962

Table 37: Voltage Range Limit Analysis Results: Path 3 and Selkirk Generation Dispatch Sensitivity

Case Set	Voltage Range Transfer Limit (MW, Pre-contingency)
Reference Case	1040
High Path 3 export / High Selkirk	996
High Path 3 export / Medium Selkirk	998
High Path 3 import / High Selkirk	1007
High Path 3 import / Medium Selkirk	1007

12.4.2 Power Flow Analysis

The AESO conducted power flow analysis as described in Section 4.2.2 on the study cases in Table 34. The results in Table 38 show that the power flows in the sensitivity scenarios are similar to the reference case. Table 38 is filtered to only show the results relevant to the intertie. The full results are provided in Attachment A Table 4.

Table 38: Category B Power Flow Analysis Result Comparison

Contingency	Constraint	Nominal Rating (MVA)	Emergency Rating (MVA)	AIES Summer Peak High Renewables		High Path 3 Imp. High Selkirk		High Path 3 Exp. High Selkirk		High Path 3 Imp. Medium Selkirk		High Path 3 Exp. Medium Selkirk	
				Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating	Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating (%)
MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1423.2	104.7	1434.9	105.6	1431.9	105.3	1435.1	105.6	1426.9	105.0
	1201L (Bennett 520S – Cranbrook)	1350	1850	1389.3	113.7	1400.8	114.6	1397.8	114.4	1401.0	114.6	1392.9	114.0
	Benett Transformer	1350	1850	1438.3	119.9	1425.9	118.8	1429.8	119.2	1426.0	118.8	1427.7	119.0
MATL	Benett Transformer	1350	1850	1223.4	101.9	1205.8	100.5	1208.7	100.7	1205.8	100.5	1206.9	100.6

12.4.3 Transient Stability Analysis

The AESO conducted transient stability analysis as described in Section 4.2.3. The sensitivity scenarios did not reveal any new stability concerns. See Attachment B Section 4.2 for simulation output plots.

12.4.4 Conclusion

Path 3 transfer and Selkirk area generator dispatch have a slightly lower import capability compared to the reference case. However, the Proposed Transmission Development still fulfils the AESO's obligation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW.

12.5 Verification of Distribution Factors

The study results were based on simulating Genesee #3 (GN3) 466 MW supply loss contingency.

Table 39 shows the distribution factors for other supply loss contingencies. The results demonstrate that the import transfer limits account for an appropriate amount of inrush.

Table 39: Distribution Factors Under Different Scenarios

Supply Change from Unit	Gen Decrement (MW)	Path1 Total @AB			MATL @PST			Import Total	
		Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)
Ref. Case SP HR Post Development	-	950.5	-	**76**	299.8	-	**24**	1250.3	-
Suncor Base Plant (NE)	100	1048.9	98.4	**80**	323.7	23.9	**20**	1372.6	122.3
Cascade (NW)	100	1043.5	93.0	**80**	322.3	22.5	**20**	1365.8	115.5
Genesee (Edmonton)	100	1041.6	91.1	**80**	321.9	22.1	**20**	1363.5	113.2
Shepard (Calgary)	100	1034.0	83.5	**80**	319.7	19.9	**20**	1353.7	103.4
Traverse (South)	100	1021.4	70.9	**76**	321.6	21.8	**24**	1343.0	92.7

Supply Change from Unit	Gen Decrement (MW)	Path1 Total @AB			MATL @PST			Import Total	
		Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)
Ref. Case SP HR Existing System	-	948.4	-	**76**	304.7	-	**24**	1253.1	-
Suncor Base Plant (NE)	100	1041.2	92.8	**74**	336.8	32.1	**26**	1378.0	124.9
Cascade (NW)	100	1036.2	87.8	**74**	334.9	30.2	**26**	1371.1	118.0
Genesee (Edmonton)	100	1034.4	86.0	**74**	334.3	29.6	**26**	1368.7	115.6
Shepard (Calgary)	100	1027.0	78.6	**75**	331.3	26.6	**25**	1358.3	105.2
Traverse (South)	100	1015.4	67.0	**71**	331.8	27.1	**29**	1347.2	94.1

Supply Change from Unit	Gen Decrement (MW)	Path1 Total @AB			MATL @PST			Import Total	
		Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)
Ref. Case SP LR Existing System	-	951.1	-	**76**	297.3	-	**24**	1248.4	-
Suncor Base Plant (NE)	100	1023.2	72.1	**75**	320.7	23.4	**25**	1343.9	95.5
Cascade (NW)	100	1021.3	70.2	**76**	320.0	22.7	**24**	1341.3	92.9
Genesee (Edmonton)	100	1028.1	77.0	**75**	322.3	25.0	**25**	1350.4	102.0
Shepard (Calgary)	100	1028.5	77.4	**76**	322.0	24.7	**24**	1350.5	102.1
Traverse (South)	100	1023.3	72.2	**72**	325.1	27.8	**28**	1348.4	100.0

Supply Change from Unit	Gen Decrement (MW)	Path1 Total @AB			MATL @PST			Import Total	
		Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)	Proportion (%)	Flow (MW)	Increment (MW)
Ref. Case WP HR Existing System	-	949.9	-	**76**	302.0	-	**24**	1252.0	-
Suncor Base Plant (NE)	100	1036.1	86.2	**75**	331.5	29.5	**26**	1367.5	115.5
Cascade (NW)	100	1033.9	84.0	**75**	330.6	28.6	**25**	1364.5	112.5
Genesee (Edmonton)	100	1032.9	83.0	**75**	330.3	28.3	**25**	1363.2	111.2
Shepard (Calgary)	100	1028.1	78.2	**75**	328.8	26.8	**26**	1356.9	104.9
Traverse (South)	100	1017.8	67.9	**71**	329.5	27.5	**29**	1347.3	95.3

13. Alignment with AESO's Long Term Plan

The AESO's long-term transmission system plans are high-level assessments of transmission capability and required transmission system development in Alberta focusing on broad technical aspects. More detailed studies are performed in preparation of a needs identification document application to ensure that the AESO's Proposed Transmission Development will address the identified reliability violations in the most efficient manner.

In the 2025 Long-Term Transmission Plan (LTP), the AB-BC Intertie Restoration was listed under the "Intertie-Driven Transmission Plans" category. As stated in the LTP, these project plans are based on directions issued by the Government of Alberta. The Proposed Transmission Development proposed in this Planning Report is aligned with *Step Two* under *AB-BC Intertie Restoration*, a subsection of *Near-Term Intertie Plans* in the AESO 2025 LTP.

14. Project Interdependencies

The Proposed Transmission Development is not dependent on other transmission developments that are currently planned within the AIES in this timeframe. BC Hydro also confirmed that the Proposed Transmission Development is not dependent on or impacted by other developments.

15. Additional Considerations

The technical assessments in this planning report focused on selecting the Proposed Transmission Development to fulfil the AESO's obligation under the Transmission Regulation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW.

- The planning report does not include additional assessments that do not influence the selection and sizing of the Proposed Transmission Development, such as assessments for sub-synchronous oscillations (SSO). The AESO will complete these additional assessments, if needed, in the next stages of the AIR project.
- The AESO and BC Hydro will initiate the WECC path rating process to calculate the revised path rating[37].
- The AESO will determine the revised import and export total transfer capability (TTC) in joint engineering studies with BC Hydro.

The AESO foresees that the Proposed Transmission Development will provide additional benefits, including increasing the Alberta-BC export capability and Alberta's Most Severe Single Demand Contingency (MSDC). The AESO did not evaluate these benefits in this planning report and will do so in the next stages of the project.

[37] The Path Task Force reviewed the path rating process and made recommendations, including that the process is reviewed and updated, replaced, or supplemented. The AESO will monitor the path rating process and follow the appropriate process.

16. Summary and Conclusions

The Transmission Regulation requires the AESO to:

- File a Needs Identification Document, by December 31, 2026, to increase the import capability of the Alberta-BC intertie to (or near to) 950 MW
- Further increase the import capability to (or near to) 1200 MW at a later date

The AESO has conducted transmission planning studies, evaluated transmission development options, and selected a Proposed Transmission Development to:

- Increase the import capability of the intertie near to 950 MW
- Support a later increase in import capability near to 1200 MW

The transmission planning studies demonstrated the need has three components:

- Increase the loadability of 1201L (i.e., add reactive power support)
- Increase the Bennett 520S transformer rating
- Increase the thermal rating of 1201L

The AESO identified transmission development options for these three components and conducted technical assessments of the options. The AESO selected the Proposed Transmission Development based on the technical performance, cost estimates, environmental and land use effects and outage information. Table 40 provides the cost for the Proposed Transmission Development, which:

- Fulfils the AESO's obligation under Section 16(2) of the Transmission Regulation to increase the Alberta-BC intertie's import capability to (or near to) 950 MW
- Incorporates provisions for increasing the import capability to 1200 MW
  - The Bennett 520S transformer rating (component 2) and 1201L thermal rating (component 3) are sized for 1200 MW
- Increases import capability at the lowest cost per incremental MW
- Reduces reliability risks associated with construction outages

Table 40: Proposed Transmission Development and Cost

Option	Description	Cost (±30%)
1B	Add 50% series compensation on 1201L	$84.8M
2A	Replace the existing 500/240 kV transformer at Bennett 520S substation with a new transformer rated 1350/1850 MVA situated adjacent to the existing one	$81.5M
3B	Increase the thermal rating of 1201L to at least 1350/1850 MVA	$12.4M
	Alberta Project Cost	**$178.7M**

Attachment A:
Power Flow Analysis Results (with Transmission Development)

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Table 1: Category B Power Flow Analysis Result, with Series Compensation (Section 6.2.2)

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Summer Light High Renewables	MSSC	1114L (Langdon102S – Bennett 520S)	20	1359	Unsolved	
			30		1457.3	107.2
			50		1390.6	102.3
		1201L (Bennett 520S – Cranbrook)	20	1222	Unsolved	
			30		1459.1	119.4
			50		1392.2	113.9
		Bennett 520S Transformer	20	1200	Unsolved	
			30		1443.3	120.3
			50		1407.2	117.3
		1L274 (Elkford – Greenhills)	20	65.5	Unsolved	
			30		79.4	121.2
			50		73.4	112.0
		1L274 (Elkford – Line Creek Coal)	20	65.5	Unsolved	
			30		81.6	124.6
			50		75.5	115.2
	MATL	Bennett 520S Transformer	20	1200	103.4	103.4
			30		102.6	102.6
			50		101.2	101.2
		1L274 (Elkford – Greenhills)	20	65.5	69.6	106.3
			30		69.3	105.9
			50		68.3	104.2

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Line Creek Coal)	20	65.5	71.6	109.4
			30		71.4	109.0
			50		70.3	107.3
	WATL	916L (Sarcee 42S – East Calgary 5S)	20	408	474.4	116.3
			30		474.8	116.4
			50		474.7	116.4
		1L274 (Elkford – Line Creek Coal)	20	65.5	67.3	102.8
			30		67.8	103.5
			50		67.9	103.6
	1080L	1109L (Sub 25 – Sub 65)	20	487	582.1	119.5
			30		582.2	119.5
			50		581.8	119.5
	1109L	1080L (Sub 25 – Sub 65)	20	487	581.8	119.5
			30		581.8	119.5
			50		581.4	119.4
Summer Light Low Renewables	MSSC	1201L (Bennett 520S – Cranbrook)	20	1222	1383.9	113.2
			30		1355.2	110.9
			50		1323.7	108.3
		Bennett 520S Transformer	20	1200	1389.9	115.8
			30		1384.3	115.4
			50		1368.0	114.0
		1L274 (Elkford – Greenhills)	20	65.5	76.8	117.2
			30		73.8	112.7
			50		70.8	108.1

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Line Creek Coal)	20	65.5	78.9	120.5
			30		75.9	115.9
			50		72.8	111.2
	MATL	Bennett 520S Transformer	20	1200	1261.5	106.6
			30		1264.0	105.3
			50		1245.3	103.8
		1L274 (Elkford – Greenhills)	20	65.5	76.8	109.8
			30		70.3	107.3
			50		68.6	104.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	78.9	113.0
			30		72.3	110.4
			50		70.6	107.8
Summer Peak High Renewables	MSSC	1114L (Langdon 102S – Bennett 520S)	20	1359	Unsolved	
			30		1511.5	111.2
			50		1423.2	104.7
		1201L (Bennett 520S – Cranbrook)	20	1222	Unsolved	
			30		1475.5	120.7
			50		1389.3	113.7
		916L (Sarcee 42S – East Calgary 5S)	20	408	Unsolved	
			30		501.8	123.0
			50		490.7	120.3
		Bennett 520S Transformer	20	1200	Unsolved	
			30		1489.2	124.1
			50		1438.3	119.9

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Greenhills)	20	65.5	Unsolved	
			30		81.0	123.7
			50		71.3	108.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	Unsolved	
			30		84.5	129.0
			50		74.5	113.7
	1003L	985L (Janet 74S – Sub 25)	20	973	1024.0	105.2
			30		1023.8	105.2
			50		1023.4	105.2
	985L	1003L (Janet 74S – Sub 25)	20	973	1023.2	105.2
			30		1023.1	105.1
			50		1022.6	105.1
	927L	924L (Langdon 102S – 924L Tap)	20	576	623.5	108.2
			30		622.9	108.1
			50		622.2	108.0
	936L	937L (Langdon 102S – East Calgary 5S)	20	487	502.8	103.2
			30		502.8	103.3
			50		503.6	103.4
	937L	936L (Langdon 102S – East Calgary 5S)	20	487	501.6	103.0
			30		501.7	103.0
			50		502.5	103.2
	MATL	Bennett 520S Transformer	20	1200	1254.6	104.6
			30		1241.8	103.5
			50		1223.4	101.9

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Greenhills)	20	65.5	69.2	105.7
			30		68.7	105.0
			50		66.1	101.0
		1L274 (Elkford – Line Creek Coal)	20	65.5	72.3	110.4
			30		71.8	109.7
			50		69.1	105.6
	WATL	936L (Langdon 102S – East Calgary 5S)	20	487	492.1	101.1
			30		491.6	101.0
			50		491.3	100.9
		937L (Langdon 102S – East Calgary 5S)	20	487	494.5	101.5
			30		494.0	101.4
			50		493.7	101.4
		916L (Sarcee 42S – East Calgary 5S)	20	408	619.8	151.9
			30		618.9	151.7
			50		618.0	151.5
		1L274 (Elkford – Line Creek Coal)	20	65.5	68.8	105.1
			30		69.1	105.5
			50		67.7	103.3
Summer Peak Low Renewables	MSSC	1201L (Bennett 520S – Cranbrook)	20	1222	1365.4	111.7
			30		1337.2	109.4
			50		1304.5	106.7
		1114L (Langdon 102S – Bennett 520S)	20	1359	1359	1395.7
			30		1359	1368.7
			50		1363.6	99.8

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		Bennett 520S Transformer	20	1200	1418.9	118.2
			30		1400.7	116.7
			50		1408.7	117.4
		1L274 (Elkford – Greenhills)	20	65.5	74.5	113.8
			30		72.4	110.5
			50		68.7	104.8
		1L274 (Elkford – Line Creek Coal)	20	65.5	77.8	118.9
			30		75.6	115.4
			50		71.8	109.6
	MATL	Bennett 520S Transformer	20	1200	1300.7	108.4
			30		1284.7	107.1
			50		1260.9	105.1
		1L274 (Elkford – Greenhills)	20	65.5	70.3	107.3
			30		69.2	105.7
			50		66.7	101.9
		1L274 (Elkford – Line Creek Coal)	20	65.5	73.4	112.1
			30		72.4	110.5
			50		69.7	106.5
Winter Peak High Renewables	MSSC	Bennett 520S Transformer	20	1200	Unsolved	
			30		Unsolved	
			50		1472.2	122.7
	MATL	Bennett 520S Transformer	20	1200	1291.1	107.6
			30		1284.9	107.1
			50		1267.9	105.7

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Winter Peak Low Renewables	WATL	916L (Sarcee 42S – East Calgary 5S)	20	494	521.4	105.5
			30		521.9	105.6
			50		522.0	105.7
	MSSC	Bennett 520S Transformer	20	1200	1478.7	123.2
			30		1434.4	119.5
			50		1394.3	116.2
	MATL	Bennett 520S Transformer	20	1200	1331.5	111.0
			30		1308.2	109.0
			50		1270.6	105.9

Table 2: Category C Power Flow Analysis Result, with Series Compensation (Section 6.2.2)

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Summer Light High Renewables	1037L & 1038L	1041L (North Lethbridge 370S – Travers 554S)	20	444	509.4	114.7
			30		506.0	114.0
			50		499.6	112.5
		1201L (Bennett 520S – Cranbrook)	20	1222	1253.3	102.6
			30		1239.9	101.5
		172L (Coaldale – Chin Chute Tap)	20	119	161.8	136.0
			30		160.5	134.8
			50		157.7	132.5
		172L (Chin Chute Tap – Taber)	20	119	168.7	141.7
			30		167.4	140.6
			50		164.7	138.4
		1L274 (Elkford – Greenhills)	20	65.5	67.7	103.3
			30		67.7	103.4
			50		67.0	102.3
		1L274 (Elkford – Line Creek Coal)	20	65.5	69.6	106.3
			30		69.7	106.4
			50		69.0	105.3
		225L (Spring Coulee – Magrath)	20	24	29.8	124.1
			30		29.7	123.5
			50		29.4	122.4
		924L (924L Tap – Milo 356S)	20	547	573.3	104.8
			30		570.4	104.3
			50		565.2	103.3

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		936L (Langdon 102S – East Calgary 5S)	20	481	648.9	134.9
			30		645.2	134.1
			50		638.3	132.7
		Bennett 520S Transformer	20	1200	1245.8	103.8
			30		1240.0	103.3
			50		1232.2	102.7
	1080L & 1109L	1L274 (Elkford – Line Creek Coal)	20	65.5	66.1	101.0
			30		66.6	101.7
			50		66.8	102.0
		24.82L (SS-24 – SS-65)	20	285	361.4	126.8
			30		361.3	126.8
			50		360.9	126.6
	1106L & 1107L	1041L (North Lethbridge 370S – Travers 554S)	20	444	472.7	106.5
			30		469.0	105.6
			50		463.1	104.3
		1201L (Bennett 520S – Cranbrook)	20	1222	1277.7	104.6
			30		1256.3	102.8
			50		1228.6	100.5
		172L (Coaldale – Chin Chute Tap)	20	119	152.0	127.7
			30		150.2	126.2
			50		147.5	123.9
		172L (Chin Chute Tap – Taber)	20	119	159.0	133.6
			30		157.3	132.1
			50		154.7	130.0

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Greenhills)	20	65.5	68.2	104.2
			30		68.0	103.8
			50		67.1	102.4
		1L274 (Elkford – Line Creek Coal)	20	65.5	70.2	107.2
			30		69.9	106.8
			50		69.0	105.4
		225L (Spring Coulee – Magrath)	20	24	28.6	119.2
			30		28.4	118.4
			50		28.2	117.3
		691L (Janet 74S – Chestermere 419S)	20	120	168.1	140.1
			30		167.5	139.6
			50		166.8	139.0
		733L (Gleichen 179S – Namaka 428S)	20	120	191.4	159.5
			30		189.7	158.1
			50		187.1	155.9
		733L (Namaka 428S – Strathmore 151S)	20	120	190.4	158.7
			30		189.2	157.7
			50		187.6	156.3
		753L (High River 65S – Blackie 253S)	20	121	121.4	100.3
		765L (Chestermere 419S – Strathmore 151S)	20	120	201.8	168.2
			30		200.8	167.3
			50		199.4	166.2
		876L (Blackie 253S – Gleichen 179S)	20	110	196.3	178.5
			30		194.6	176.9
			50		192.0	174.5

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		936L (Langdon 102S – East Calgary 5S)	20	481	612.7	127.4
			30		608.6	126.5
			50		602.1	125.2
		Bennett 520S Transformer	20	1200	1255.4	104.6
			30		1249.0	104.1
			50		1240.8	103.4
	5L76 & 5L79	1L274 (Elkford – Line Creek Coal)	20	65.5	66.2	101.1
			30		66.8	102.0
			50		67.1	102.4
	5L81 & 5L82	1L274 (Elkford – Line Creek Coal)	20	65.5	66.6	101.7
			30		67.1	102.5
			50		67.4	102.9
	985L & 1003L	1L274 (Elkford – Line Creek Coal)	20	65.5	66.1	101.0
			30		66.6	101.7
			50		66.8	102.0
		24.82L (SS-24 – SS-65)	20	285	360.6	126.5
			30		360.5	126.5
			50		360.0	126.3
Summer Peak High Renewables	1037L & 1038L	1041L (North Lethbridge 370S – Travers 554S)	20	444	447.7	100.8
			30		444.4	100.1
		1201L (Bennett 520S – Cranbrook)	20	1222	1226.1	100.3
		172L (Coaldale – Taber)	20	119	132.5	111.3
			30		131.3	110.3
			50		129.0	108.4

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Greenhills)	20	65.5	65.9	100.6
			30		65.8	100.5
		1L274 (Elkford – Line Creek Coal)	20	65.5	68.8	105.1
			30		68.8	105.1
			50		67.1	102.5
		225L (Spring Coulee – Magrath)	20	24	24.8	103.4
			30		24.7	102.9
			50		25.1	104.6
		916L (Sarcee 42S – East Calgary 5S)	20	408	417.9	102.4
			30		415.7	101.9
			50		411.1	100.8
		924L (924L Tap – Milo 356S)	20	547	629.1	115.0
			30		626.2	114.5
			50		620.9	113.5
		924L (Langdon 102S – 924L Tap)	20	576	726.0	126.0
			30		721.9	125.3
			50		713.7	123.9
		927L (Langdon 102S – Milo 356S)	20	576	661.5	114.8
			30		658.2	114.3
			50		651.9	113.2
		936L (Langdon 102S – East Calgary 5S)	20	481	579.1	120.4
			30		575.5	119.7
			50		569.1	118.3

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		Bennett 520S Transformer	20	1200	1253.9	104.5
			30		1245.7	103.8
			50		1237.2	103.1
	1064L & 1065L	1L274 (Elkford – Line Creek Coal)	20	65.5	66.4	101.4
			30		66.9	102.1
			50		65.8	100.4
	1080L & 1109L	1L274 (Elkford – Line Creek Coal)	20	65.5	65.9	100.6
			30		66.3	101.3
		24.82L (SS-24 – SS-65)	20	285	341.9	120.0
			30		341.7	119.9
			50		341.5	119.8
		26.83L (SS-26 – SS-65)	20	285	307.9	108.0
			30		307.8	108.0
			50		307.7	107.9
	1106L & 1107L	1201L (Bennett 520S – Cranbrook)	20	1222	1251.1	102.4
			30		1230.1	100.7
		172L (Coaldale – Taber)	20	119	122.6	103.0
			30		121.1	101.8
			50		119.1	100.1
		1L274 (Elkford – Greenhills)	20	65.5	66.5	101.5
			30		66.2	101.0
		1L274 (Elkford – Line Creek Coal)	20	65.5	69.5	106.1
			30		69.2	105.6
			50		67.4	102.9

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		691L (Janet 74S – Chestermere 419S)	20	120	180.0	150.0
			30		179.4	149.5
			50		178.6	148.8
		733L (Gleichen 179S – Namaka 428S)	20	120	199.3	166.1
			30		197.9	164.9
			50		195.9	163.3
		733L (Namaka 428S – Strathmore 151S)	20	120	211.1	175.9
			30		209.8	174.8
			50		208.0	173.3
		765L (Chestermere 419S – Strathmore 151S)	20	120	215.8	179.8
			30		214.7	179.0
			50		213.3	177.8
		851L (Carseland 525S – Blackie 253S)	20	85.1	91.7	107.8
			30		91.2	107.1
			50		90.4	106.2
		876L (Blackie 253S – Gleichen 179S)	20	110	199.7	181.6
			30		198.0	180.0
			50		195.8	178.0
		916L (Sarcee 42S – East Calgary 5S)	20	408	418.6	102.6
			30		414.1	101.5
			50		410.7	100.7
		924L (924L Tap – Milo 356S)	20	547	599.3	109.6
			30		596.2	109.0
			50		591.2	108.1

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		924L (Langdon 102S – 924L Tap)	20	576	700.8	121.7
			30		695.2	120.7
			50		687.7	119.4
		927L (Langdon 102S – Milo 356S)	20	576	633.2	109.9
			30		629.2	109.2
			50		623.3	108.2
		936L (Langdon 102S – East Calgary 5S)	20	481	541.9	112.7
			30		538.0	111.9
			50		532.2	110.7
		Bennett 520S Transformer	20	1200	1266.8	105.6
			30		1257.6	104.8
			50		1247.8	104.0
	5L76 & 5L79	1L274 (Elkford – Line Creek Coal)	20	65.5	66.0	100.8
			30		66.5	101.5
			50		65.6	100.2
	5L81 & 5L82	1L274 (Elkford – Line Creek Coal)	20	65.5	66.6	101.7
			30		67.0	102.4
			50		66.1	100.9
	924L & 927L	1L274 (Elkford – Greenhills)	20	65.5	66.9	102.2
			30	65.5	66.9	102.1
		1L274 (Elkford – Line Creek Coal)	20	65.5	70.0	106.8
			30		69.9	106.7
			50		67.8	103.6
		Bennett 520S Transformer	20	1200	1204.6	100.4

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		1L274 (Elkford – Line Creek Coal)	20	65.5	66.6	101.6
			30		67.0	102.3
			50		66.1	100.9
		23.80L (Janet 74S – SS-23)	20	285	332.3	116.6
			30		332.3	116.6
			50		332.6	116.7
		24.81L (SS-24 – SS-31)	20	287	312.7	109.0
			30		312.7	109.0
			50		312.9	109.0
		9.80L (SS-31 – SS-9)	20	287	306.7	106.9
			30		306.7	106.9
			50		306.9	106.9
	985L & 1003L	1L274 (Elkford – Line Creek Coal)	20	65.5	67.1	102.4
			30		67.4	102.8
			50		66.0	100.8
		2.81L (SS-9 – SS-2)	20	287	395.5	137.8
			30		395.0	137.6
			50		394.0	137.3
		24.82L (SS-24 – SS-65)	20	285	601.7	211.1
			30		600.4	210.7
			50		597.4	209.6
		26.81L (SS-32 – SS-26)	20	285	360.7	126.6
			30		360.0	126.3
			50		358.1	125.7

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		26.83L (SS-26 – SS-65)	20	285	451.2	158.3
			30		450.2	158.0
			50		447.6	157.1
		31.84L (SS-31 – SS-32)	20	161	182.1	113.1
			30		181.7	112.9
			50		181.1	112.5
		6.82L (SS-6 – SS-41)	20	161	198.6	123.3
			30		198.1	123.0
			50		197.0	122.3
		733L (Namaka 428S – Strathmore 151S)	20	120	121.5	101.3
			30		121.2	101.0
			50		120.4	100.3
		765L (Chestermere 419S – Strathmore 151S)	20	120	126.5	105.4
			30		126.3	105.2
			50		125.8	104.8
		9.80L (SS-31 – SS-9)	20	287	375.4	130.8
			30		374.6	130.5
			50		372.8	129.9
Winter Peak High Renewables	1037L & 1038L	172L (Coaldale – Taber)	20	146	146.5	100.3
		172L (Coaldale – Taber)	20	146	152.0	104.1
			30		151.3	103.6
			50		149.6	102.5
		225L (Spring Coulee – Magrath)	20	24	25.3	105.5
			30		25.3	105.5
			50		25.1	104.5

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
		936L (Langdon 102S – East Calgary 5S)	20	581	590.7	101.7
			30		588.3	101.3
			50		583.3	100.4
		Bennett 520S Transformer	20	1200	1252.2	104.3
			30		1252.1	104.3
			50		1247.1	103.9
	1106L & 1107L	691L (Janet 74S – Chestermere 419S)	20	148	156.3	105.6
			30		155.0	104.7
			50		154.4	104.3
		733L (Gleichen 179S – Namaka 428S)	20	148	156.5	105.7
			30		155.4	105.0
			50		154.3	104.2
		733L (Namaka 428S – Strathmore 151S)	20	148	203.7	137.6
			30		202.0	136.5
			50		201.1	135.9
		765L (Chestermere 419S – Strathmore 151S)	20	148	193.5	130.7
			30		191.9	129.7
			50		191.1	129.1
		876L (Blackie 253S – Gleichen 179S)	20	124	166.8	134.5
			30		165.9	133.8
			50		164.6	132.7
		Bennett 520S Transformer	20	1200	1213.6	101.1
			30		1215.2	101.3
			50		1211.6	101.0

Scenario	Contingency	Overloaded Element	Series Comp. (%)	Thermal Loading		
				Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
	936L & 937L	23.80L (Janet 74S – SS-23)	20	287	320.7	111.7
			30		320.7	111.7
			50		320.7	111.8
		24.81L (SS-24 – SS-31)	20	287	301.5	105.1
			30		301.5	105.1
			50		301.5	105.1
		9.80L (SS-31 – SS-9)	20	287	287.3	100.1
			30		287.4	100.1
			50		287.4	100.1
	985L & 1003L	2.81L (SS-9 – SS-2)	20	287	353.7	123.3
			30		353.6	123.2
			50		353.0	123.0
		24.82L (SS-24 – SS-65)	20	350	563.5	161.0
			30		563.5	161.0
			50		562.7	160.8
		26.81L (SS-32 – SS-26)	20	287	336.9	117.4
			30		336.8	117.4
			50		336.4	117.2
		26.83L (SS-26 – SS-65)	20	350	419.5	119.9
			30		419.5	119.9
			50		419.1	119.7
		9.80L (SS-31 – SS-9)	20	287	339.7	118.3
			30		339.6	118.3
			50		339.1	118.2

Table 3: Power Flow Analysis Result, Sensitivity to BC or Alberta Generator Outages (Section 12.3.2)

Scenario	Contingency	Overloaded Element	Thermal Loading		
			Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
Summer Light High Renewables BC Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1460.3	107.4
		1201L (Bennett 520S – Cranbrook)	1350	1462.1	119.6
		Bennett 520S Transformer	1350	1447.3	120.6
		1L274 (Elkford – Greenhills)	65.5	79.3	121.1
		1L274 (Elkford – Line Creek Coal)	65.5	81.6	124.5
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	473.3	116.0
		1L274 (Elkford – Line Creek Coal)	65.5	67.4	102.9
	MATL	Bennett 520S Transformer	1350	1223.6	102.0
		1L274 (Elkford – Greenhills)	65.5	68.7	104.9
		1L274 (Elkford – Line Creek Coal)	65.5	70.7	108.0
	1080L	1109L (Sub 25 – Sub 65)	487	582.3	119.6
	1109L	1080L (Sub 25 – Sub 65)	487	581.9	119.5
Summer Light High Renewables AB Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1381.3	101.6
		1201L (Bennett 520S – Cranbrook)	1350	1383.0	113.2
		Bennett 520S Transformer	1350	1399.2	116.6
		1L274 (Elkford – Greenhills)	65.5	73.3	111.9
		1L274 (Elkford – Line Creek Coal)	65.5	75.4	115.1
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	476	116.6
		1L274 (Elkford – Greenhills)	65.5	65.9	100.7
		1L274 (Elkford – Line Creek Coal)	65.5	67.9	103.6

Scenario	Contingency	Overloaded Element	Thermal Loading		
			Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
	MATL	Bennett 520S Transformer	1350	1206.3	100.5
		1L274 (Elkford – Greenhills)	65.5	68.3	104.3
		1L274 (Elkford – Line Creek Coal)	65.5	70.3	107.3
	1080L	1109L (Sub 25 – Sub 65)	487	582.2	119.6
	1109L	1080L (Sub 25 – Sub 65)	487	581.8	119.5
	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1540.2	113.3
		916L (Sarcee 42S – East Calgary 5S)	408	504.5	123.6
		1201L (Bennett 520S – Cranbrook)	1350	1503.5	123.0
		Bennett 520S Transformer	1350	1510.7	125.9
		1L274 (Elkford – Greenhills)	65.5	82.1	125.3
		1L274 (Elkford – Line Creek Coal)	65.5	85.7	130.8
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	618.3	151.6
		1L274 (Elkford – Line Creek Coal)	65.5	68.4	104.5
	MATL	Bennett 520S Transformer	1350	1239.9	103.3
		1L274 (Elkford – Greenhills)	65.5	67.9	103.7
		1L274 (Elkford – Line Creek Coal)	65.5	71.0	108.4
Summer Peak High Renewables AB Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1436.5	105.7
		1201L (Bennett 520S – Cranbrook)	1350	1402.3	114.8
		Bennett 520S Transformer	1350	1375.0	114.6
		1L274 (Elkford – Greenhills)	65.5	75.3	114.9
		1L274 (Elkford – Line Creek Coal)	65.5	78.6	120.0

Scenario	Contingency	Overloaded Element	Thermal Loading		
			Normal Rating (MVA)	Flow (MVA)	%I of MVA Rating (%)
	WATL	916L (Sarcee 42S – East Calgary 5S)	408	461.5	113.1
		1L274 (Elkford – Line Creek Coal)	65.5	67.0	102.3
	MATL	Bennett 520S Transformer	1350	1204.5	100.4
		1L274 (Elkford – Greenhills)	65.5	67.8	103.5
		1L274 (Elkford – Line Creek Coal)	65.5	70.8	108.1
	1080L	1109L (Sub 25 – Sub 65)	487	497.8	102.2
	1109L	1080L (Sub 25 – Sub 65)	487	497.4	102.1
Winter Peak High Renewables BC Gen off	MSSC	1114L (Langdon 102S – Bennett 520S)	1528	1529.7	100.1
		Bennett 520S Transformer	1350	1527.4	127.3
	WATL	916L (Sarcee 42S – East Calgary 5S)	494	522.1	105.7
	MATL	Bennett 520S Transformer	1350	1285.2	107.1
Winter Peak High Renewables AB Gen off	MSSC	Bennett 520S Transformer	1350	1381.9	115.2
	MATL	Bennett 520S Transformer	1350	1253.6	104.5

Table 4: Power Flow Analysis Result, Sensitivity to Path 3 Transfer and Selkirk Area Generation (Section 12.4.2)

Contingency	Overloaded Element	Normal Rating (MVA)	Emerg-ency Rating (MVA)	Reference Case		High Path 3 Imp. High Selkirk		High Path 3 Exp. High Selkirk		High Path 3 Imp. Medium Selkirk		High Path 3 Exp. Medium Selkirk	
				Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating	Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating (%)	Flow (MVA)	%I of MVA Rating (%)
MSSC	1114L (Langdon 102S – Bennett 520S)	1359	1495	1423.2	104.7	1434.9	105.6	1431.9	105.3	1435.1	105.6	1426.9	105.0
	1201L (Bennett 520S – Cranbrook)	1350	1850	1389.3	113.7	1400.8	114.6	1397.8	114.4	1401.0	114.6	1392.9	114.0
	916L (Sarcee 42S – East Calgary 5S)	408	490	490.7	120.3	513.6	125.9	497.2	121.9	513.6	125.9	503.5	123.4
	Benett Transformer	1350	1850	1438.3	119.9	1425.9	118.8	1429.8	119.2	1426.0	118.8	1427.7	119.0
MATL	Benett Transformer	1350	1850	1223.4	101.9	1205.8	100.5	1208.7	100.7	1205.8	100.5	1206.9	100.6
WATL	916L (Sarcee 42S – East Calgary 5S)	408	490	618.0	151.5	627.7	153.8	615.7	150.9	627.7	153.8	618.9	151.7
	937L (Langdon 102S – East Calgary 5S)	487	577	493.7	101.4	494.3	101.5	490.0	100.6	494.3	101.5	489.9	100.6
	936L (Langdon 102S – East Calgary 5S)	487	577	491.3	100.9	492.0	487.7	100.1	487.7	492.0	101.0	487.6	100.1
936L	937L (Langdon 102S – East Calgary 5S)	487	577	503.6	103.4	501.4	103.0	497.9	102.2	501.4	103.0	496.2	101.9
937L	936L (Langdon 102S – East Calgary 5S)	487	577	502.5	103.2	500.2	102.7	496.8	102.0	500.2	102.7	495.1	101.7
927L	924L (Langdon 102S – 924L Tap)	576	853	622.2	108.0	632.0	109.7	630.8	109.5	632.0	109.7	630.2	109.4
1003L	985L (Janet 74S – Sub 25)	973	1017	1022.6	105.1	1026.8	105.5	1026.2	105.4	1035.9	106.5	1035.9	106.5
985L	1003L (Janet 74S – Sub 25)	973	1017	1022.6	105.1	1035.2	106.4	1025.4	105.4	1035.1	106.4	1026.0	105.4

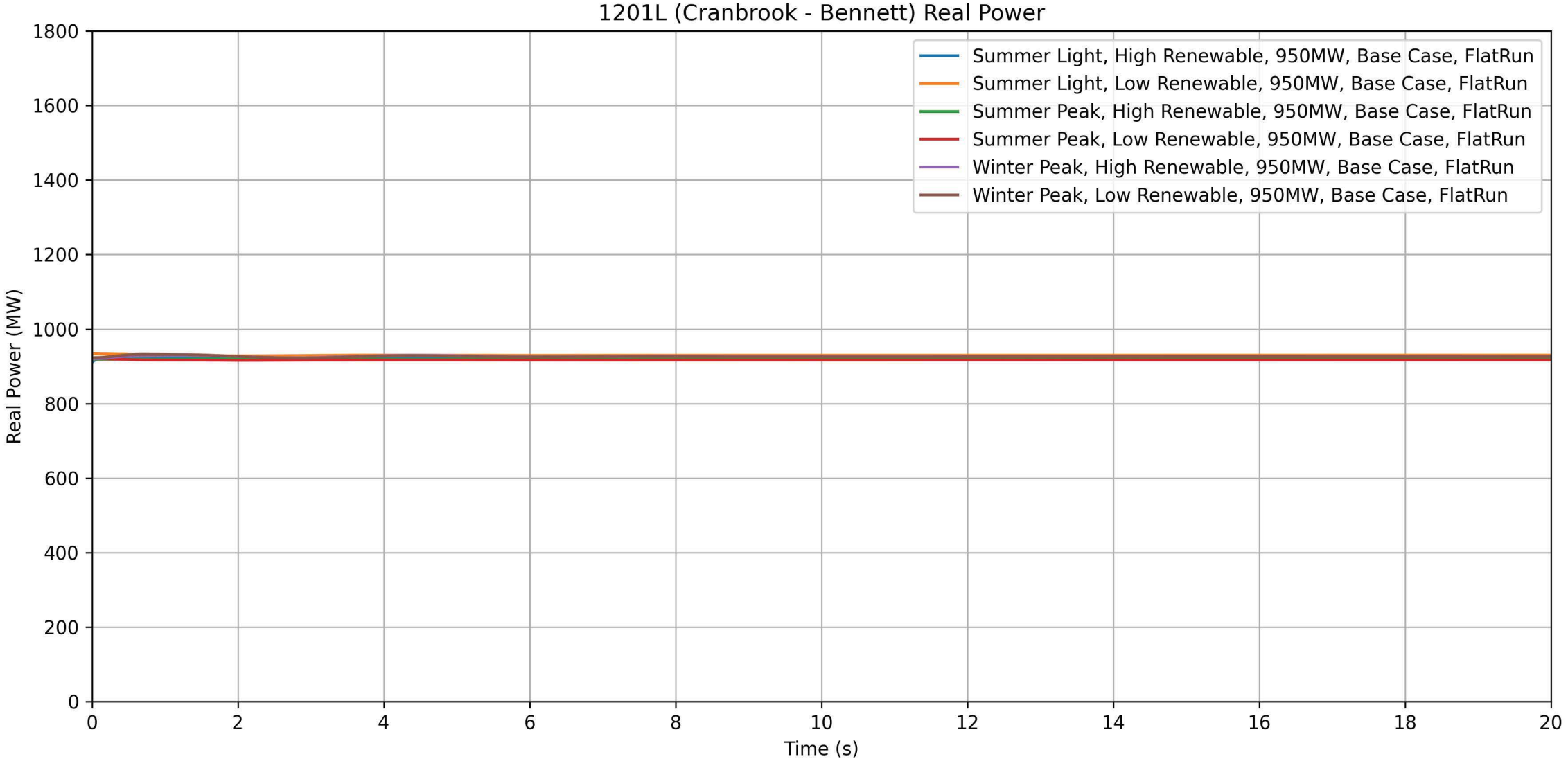
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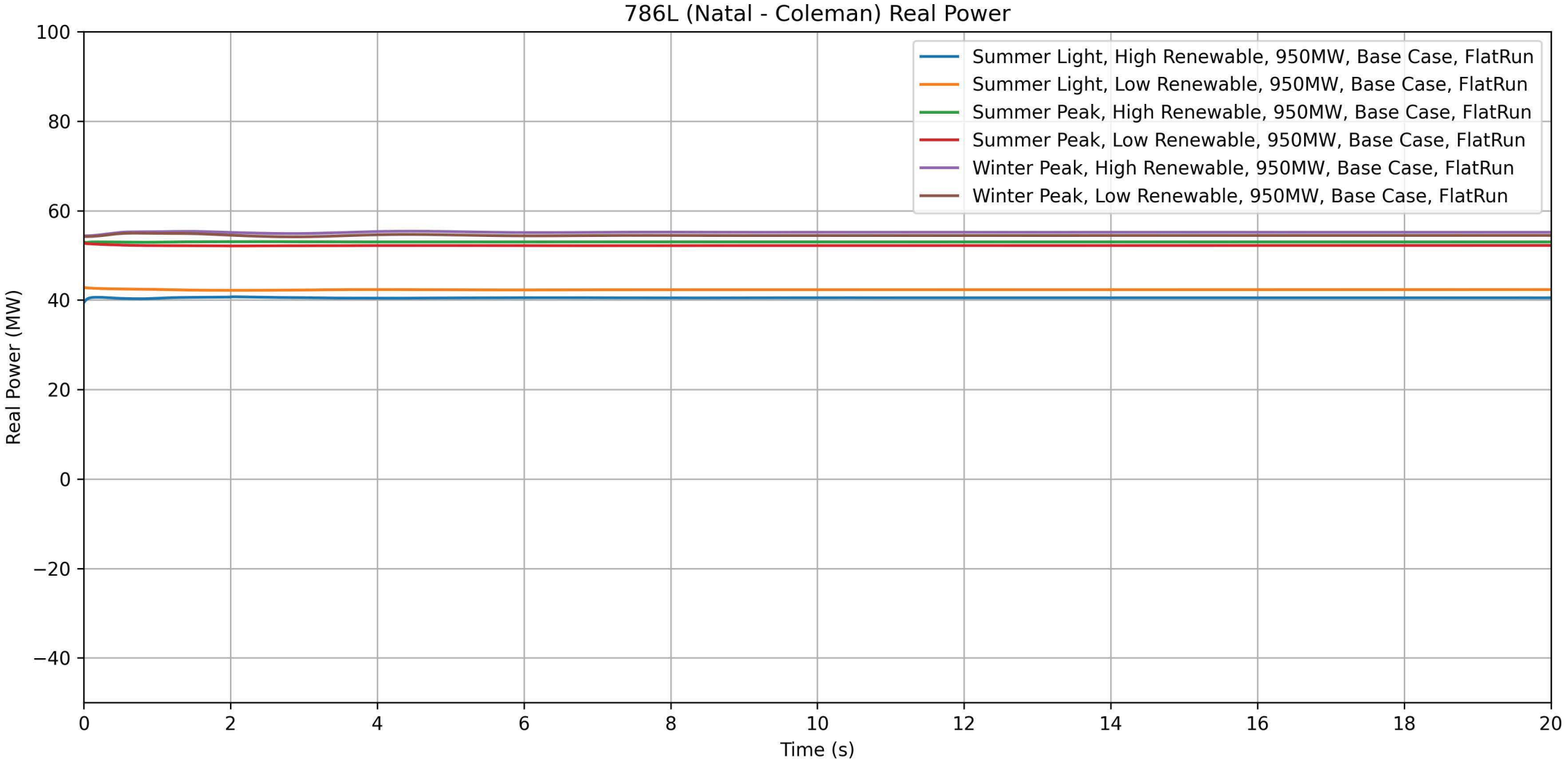
Transient Stability Analysis Plots

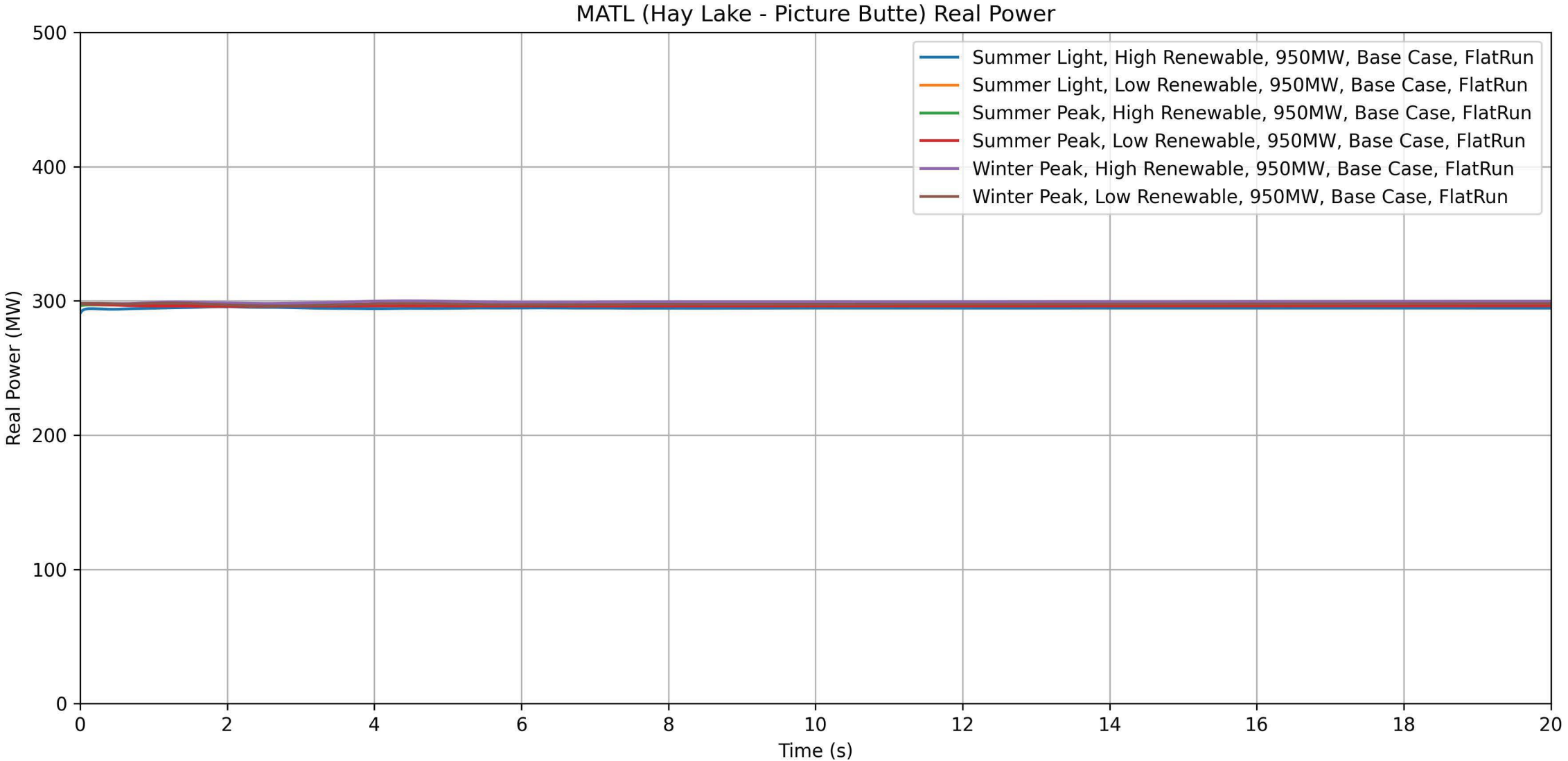
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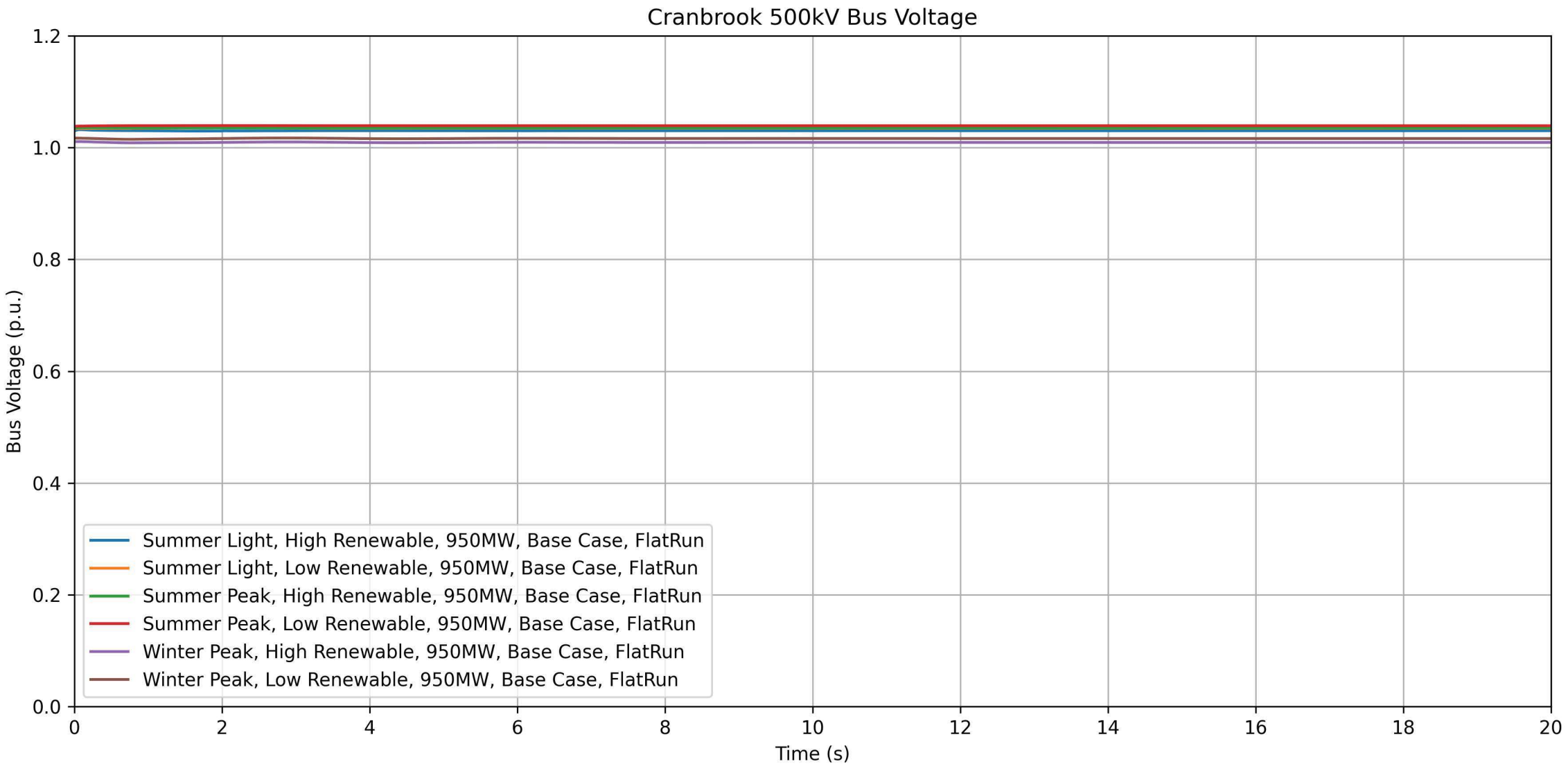
1. **Need Assessment**
   (Pre-development at 950MW import)
   - 1.1. Base Case, Flat Run
   - 1.2. Base Case, MSSC
   - 1.3. Base Case, MSSC without RAS
2. **Development Options Assessment**
   (Flat Run and MSSC Studies at Voltage Stability Limit)
   - 2.1. 20% Series Compensation, Flat Run
   - 2.2. 20% Series Compensation, MSSC
   - 2.3. 30% Series Compensation, Flat Run
   - 2.4. 30% Series Compensation, MSSC
   - 2.5. 50% Series Compensation, Flat Run
   - 2.6. 50% Series Compensation, MSSC
3. **Selected Transmission Development Assessment**
   (50% Series Compensation, Selected Contingencies Studies at Voltage Stability Limit)
   - 3.1. AIES Contingencies
     - 3.1.1. MATL Fault
     - 3.1.2. WATL Fault
     - 3.1.3. 916L Fault
     - 3.1.4. 936L Fault
     - 3.1.5. 937L Fault
     - 3.1.6. 924L Fault
     - 3.1.7. 927L Fault
     - 3.1.8. 1064L Fault
     - 3.1.9. 1065L Fault
     - 3.1.10. 985L Fault
     - 3.1.11. 1003L Fault
     - 3.1.12. 1080L Fault
     - 3.1.13. 1109L Fault
     - 3.1.14. 1106L Fault
     - 3.1.15. 1107L Fault
     - 3.1.16. 1037L Fault
     - 3.1.17. 1038L Fault

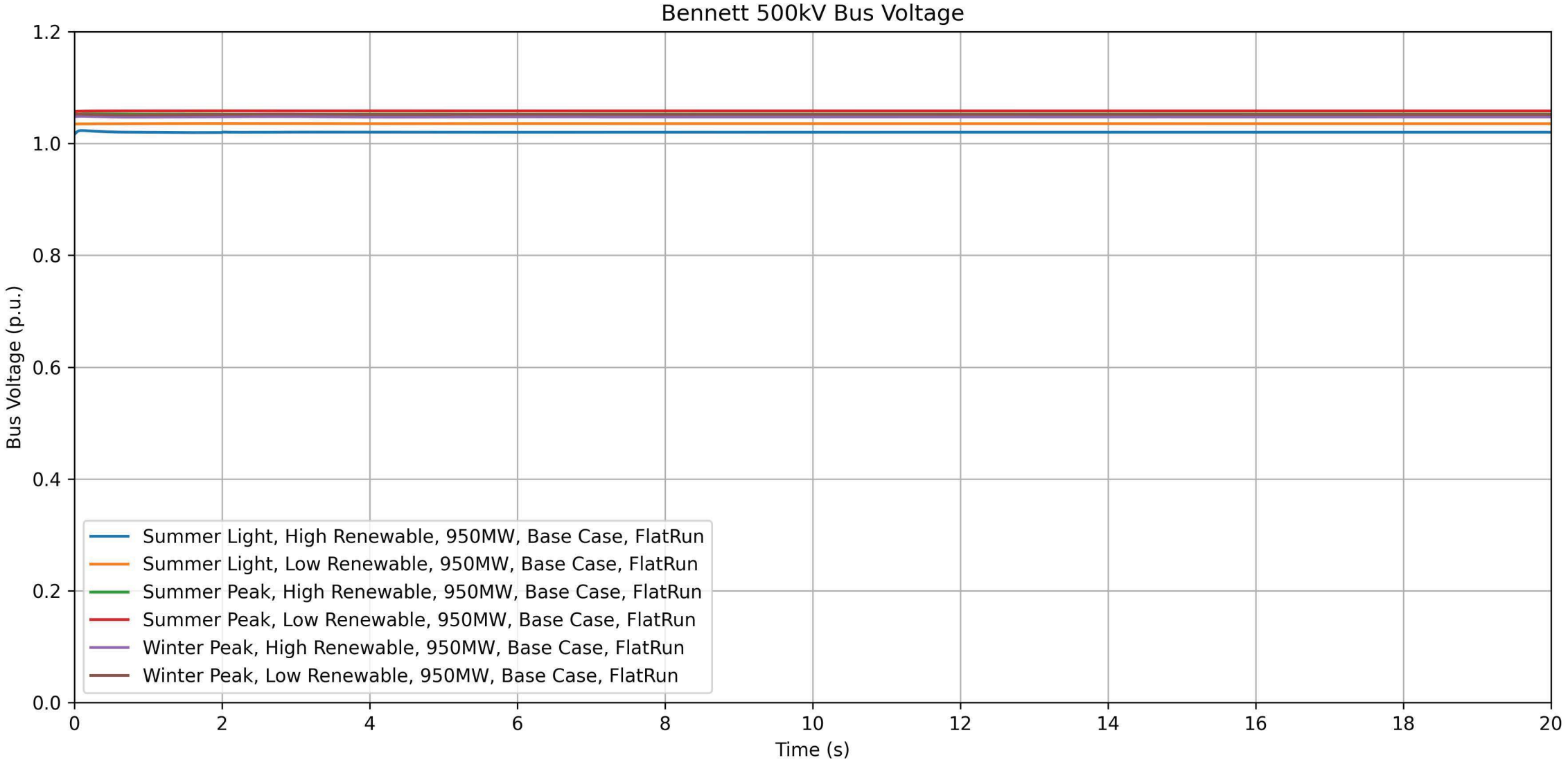
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3.1.19. 924L & 927L Fault
3.1.20. 1064L & 1065L Fault
3.1.21. 985L & 1003L Fault
3.1.22. 1080L & 1109L Fault
3.1.23. 1106L & 1107L Fault
3.1.24. 1037L & 1038L Fault
3.2. BC Hydro Contingencies
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3.2.2. 2L293 Fault
3.2.3. 2L294 Fault
3.2.4. 5L81 Fault
3.2.5. 5L91 Fault
3.2.6. 5L92 Fault
3.2.7. 5L94 Fault
3.2.8. 5L96 Fault
3.2.9. 5L98 Fault
3.2.10. 5L76 & 5L79 Fault
3.2.11. 5L81 & 5L82 Fault
4. Sensitivities
4.1. Multiple Synchronous Generators Off Sensitivity at Voltage Stability Limit
4.1.1. AIES Side (EGC, CAL off) / BC Hydro Side (SEV, KCL, WAN, WAX off)
4.2. BC Hydro Dispatch Bookend Sensitivity at Voltage Stability Limit
4.2.1. Path 3 2400MW Import – 2000MW Export / Selkirk Area High – Mid Generation

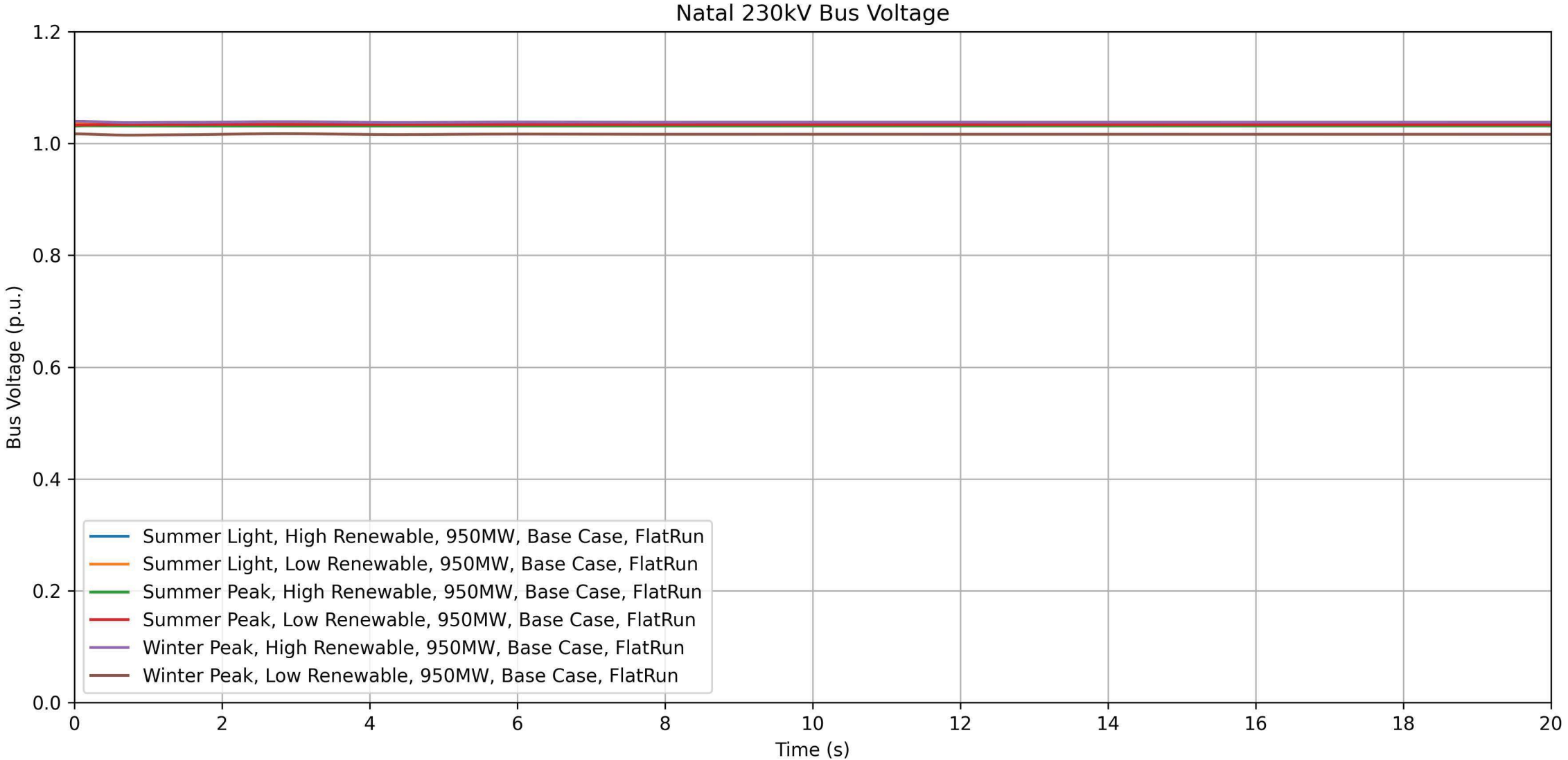

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (MW)
0
200
400
600
800
1000
1200
1400
1600
1800
Time (s)
0
2
4
6
8
10
12
14
16
18
20

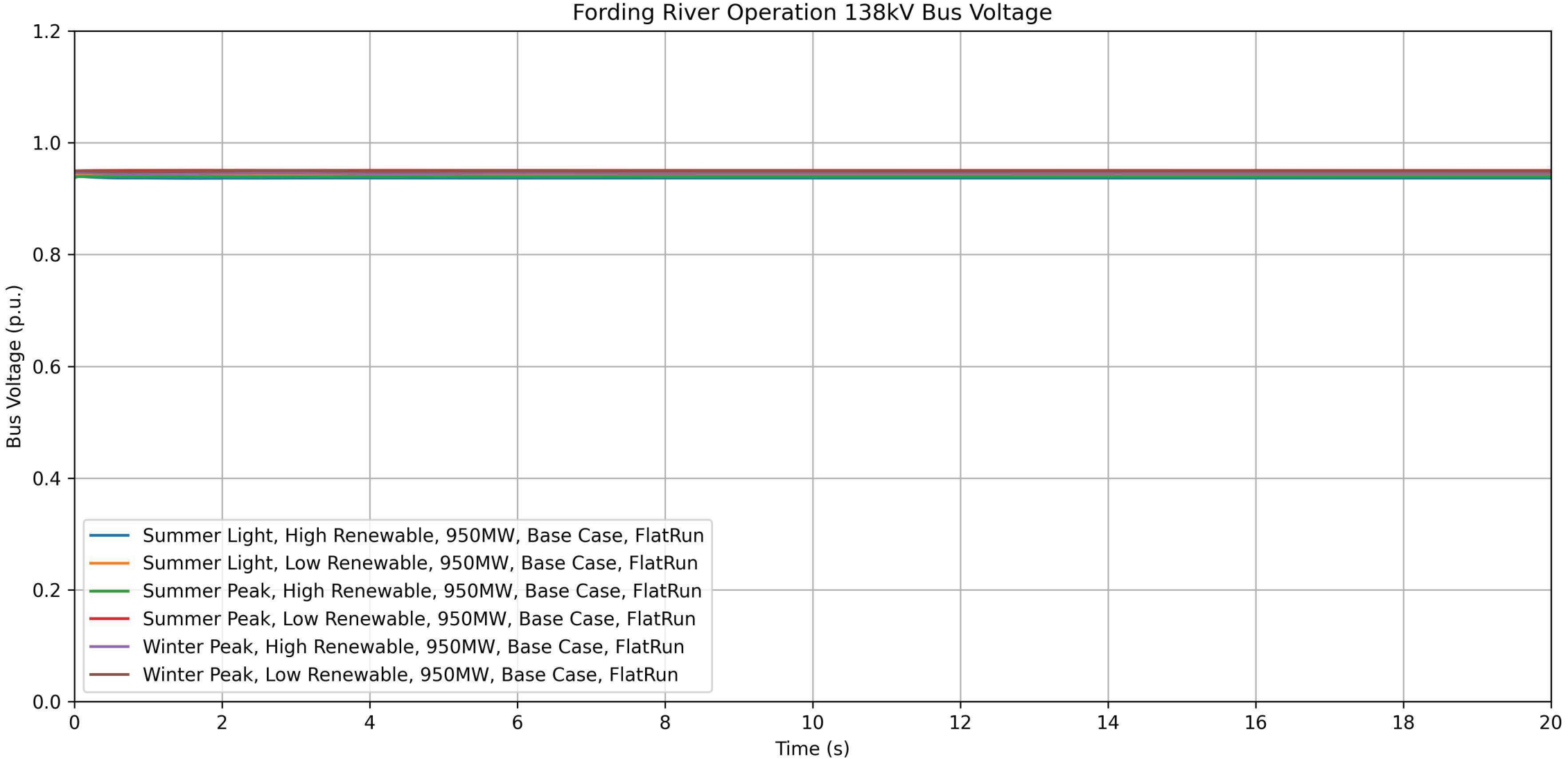

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

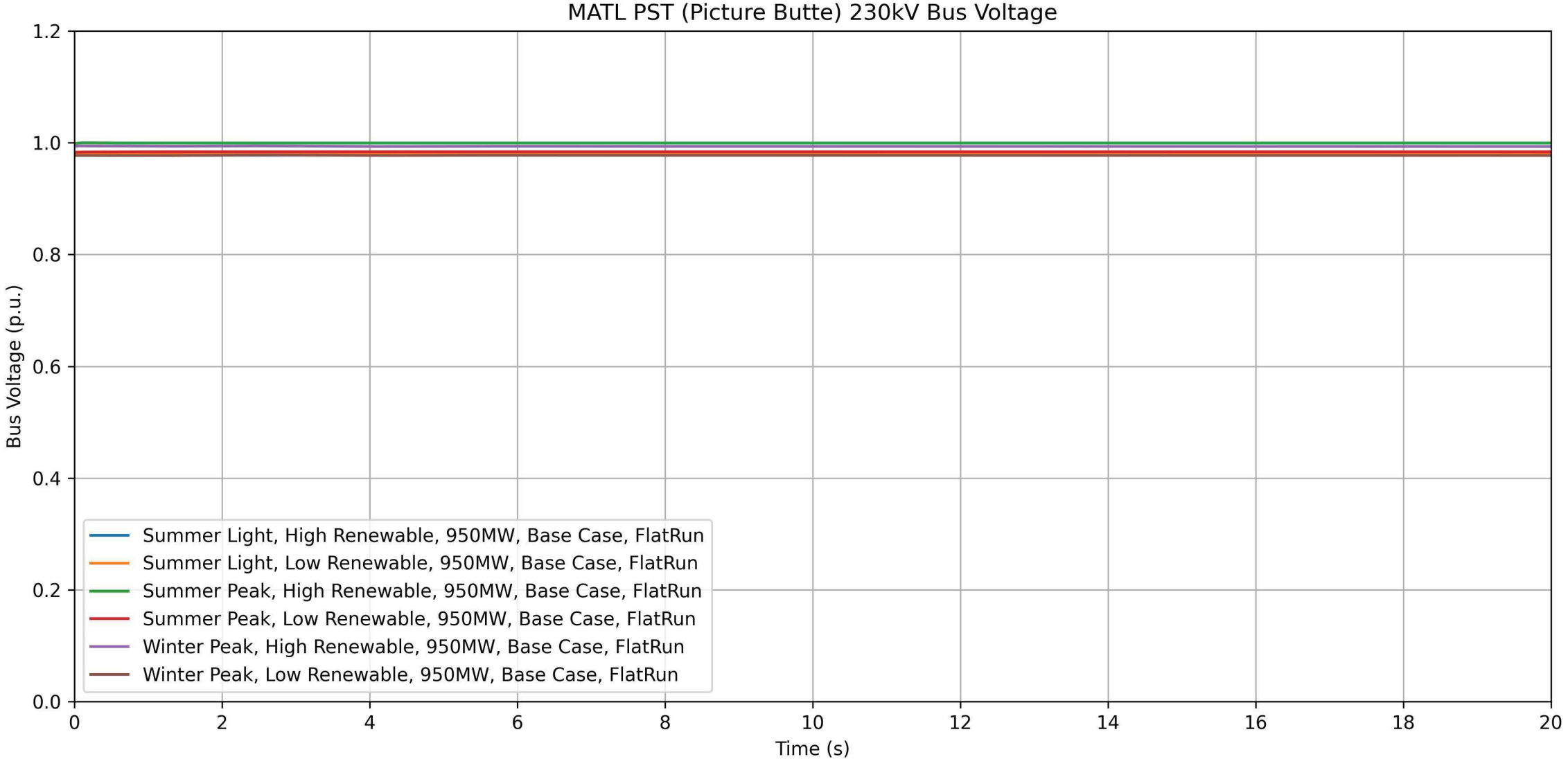

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

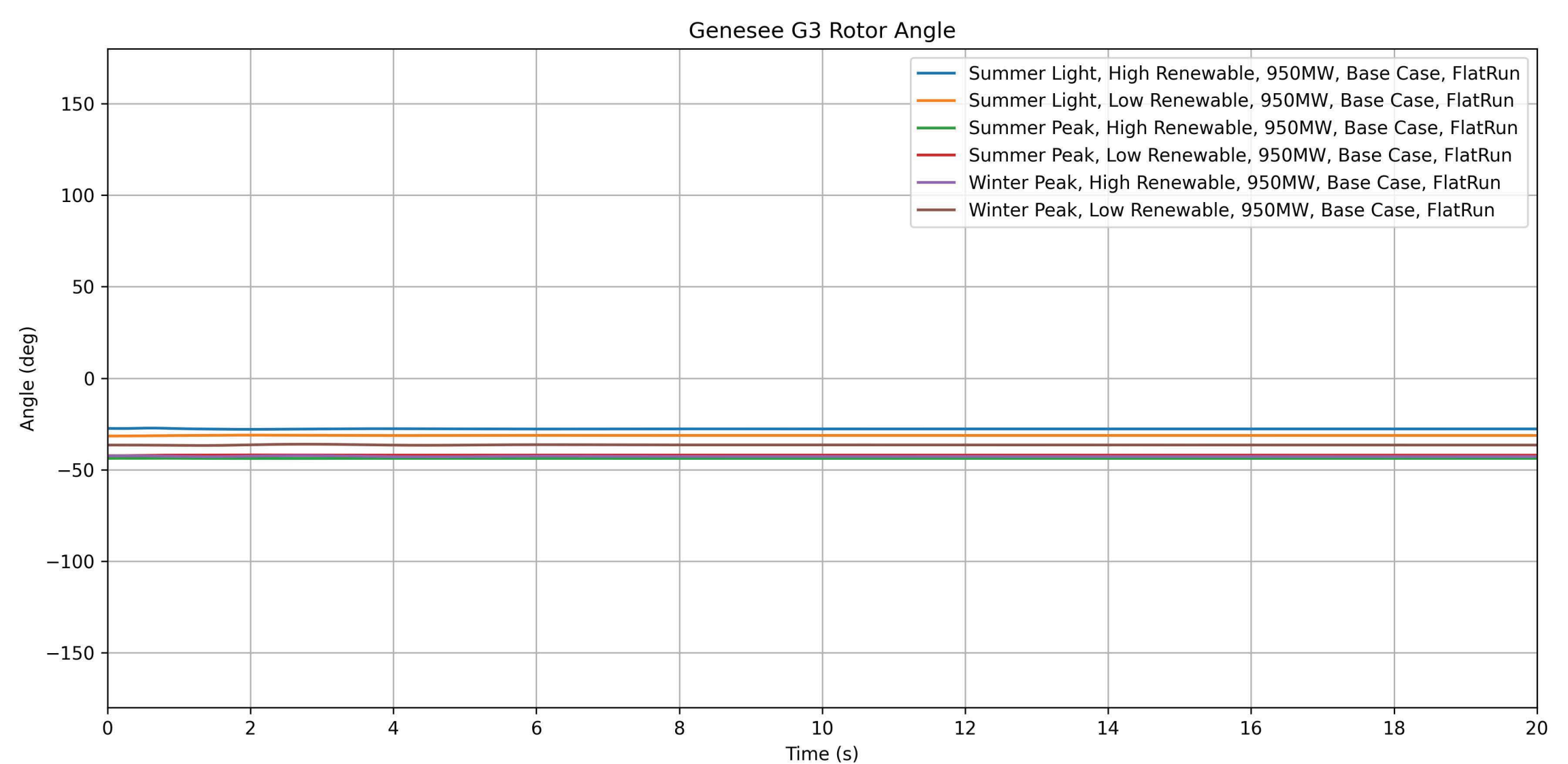

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

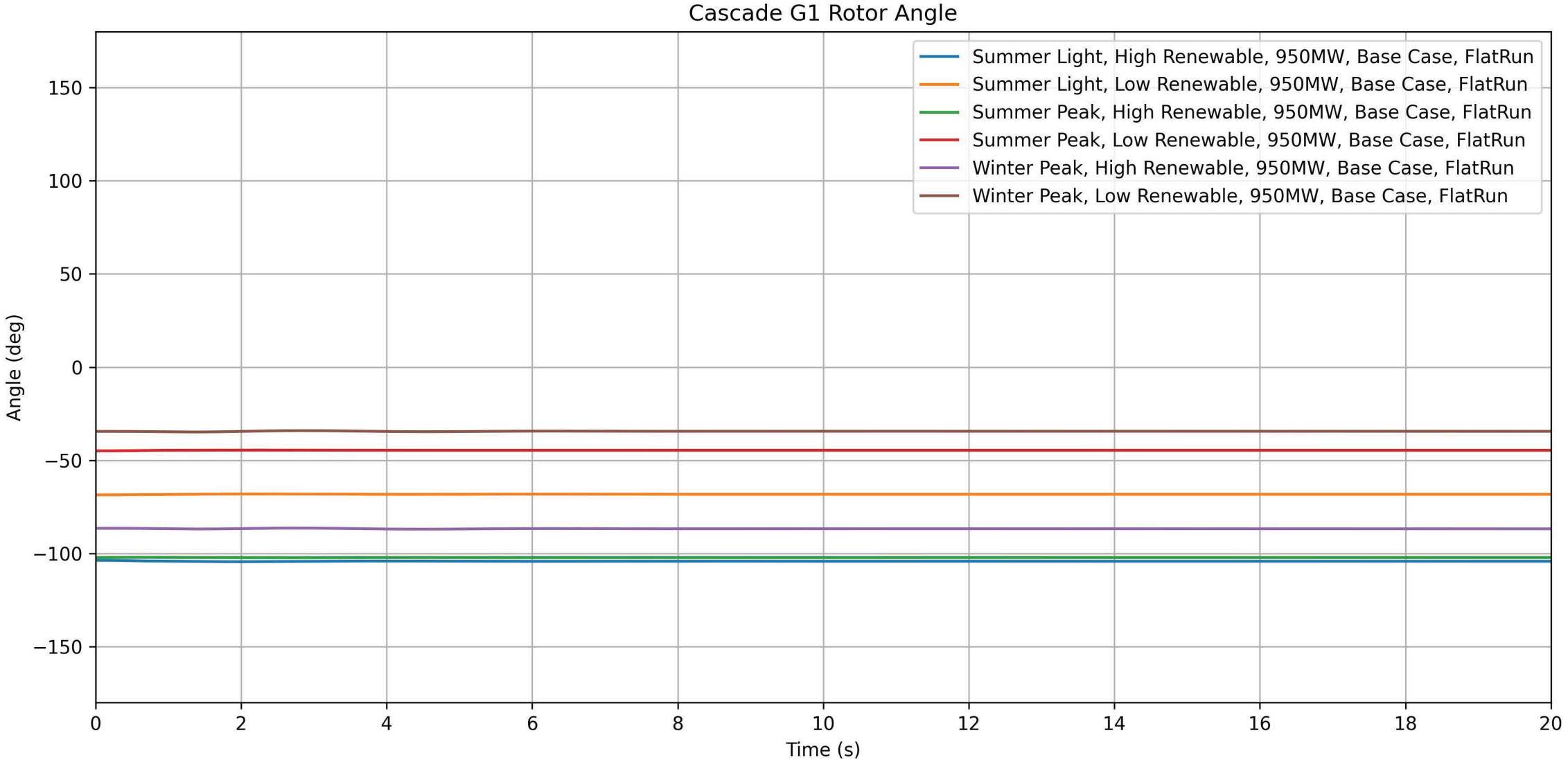

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

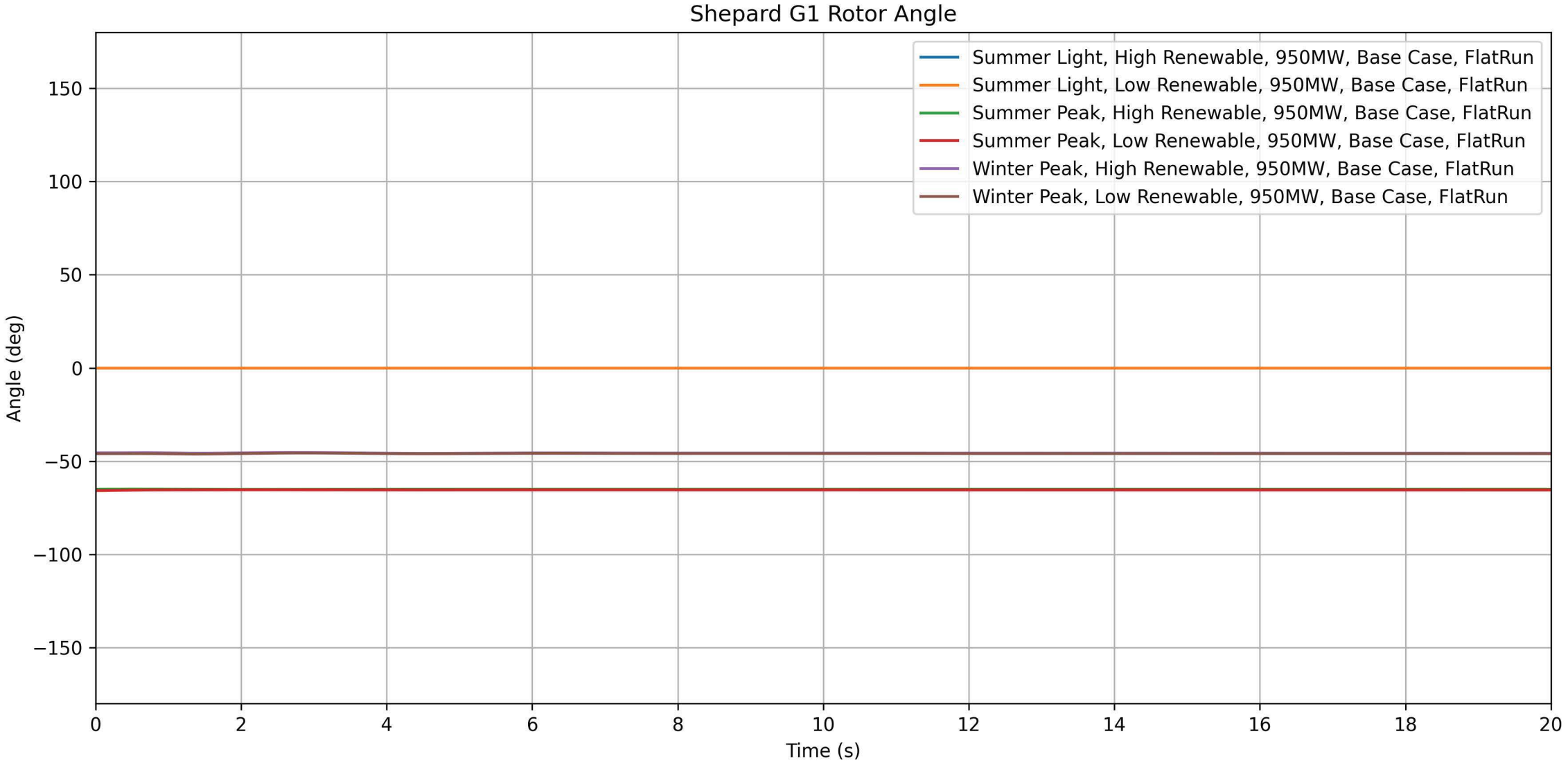

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

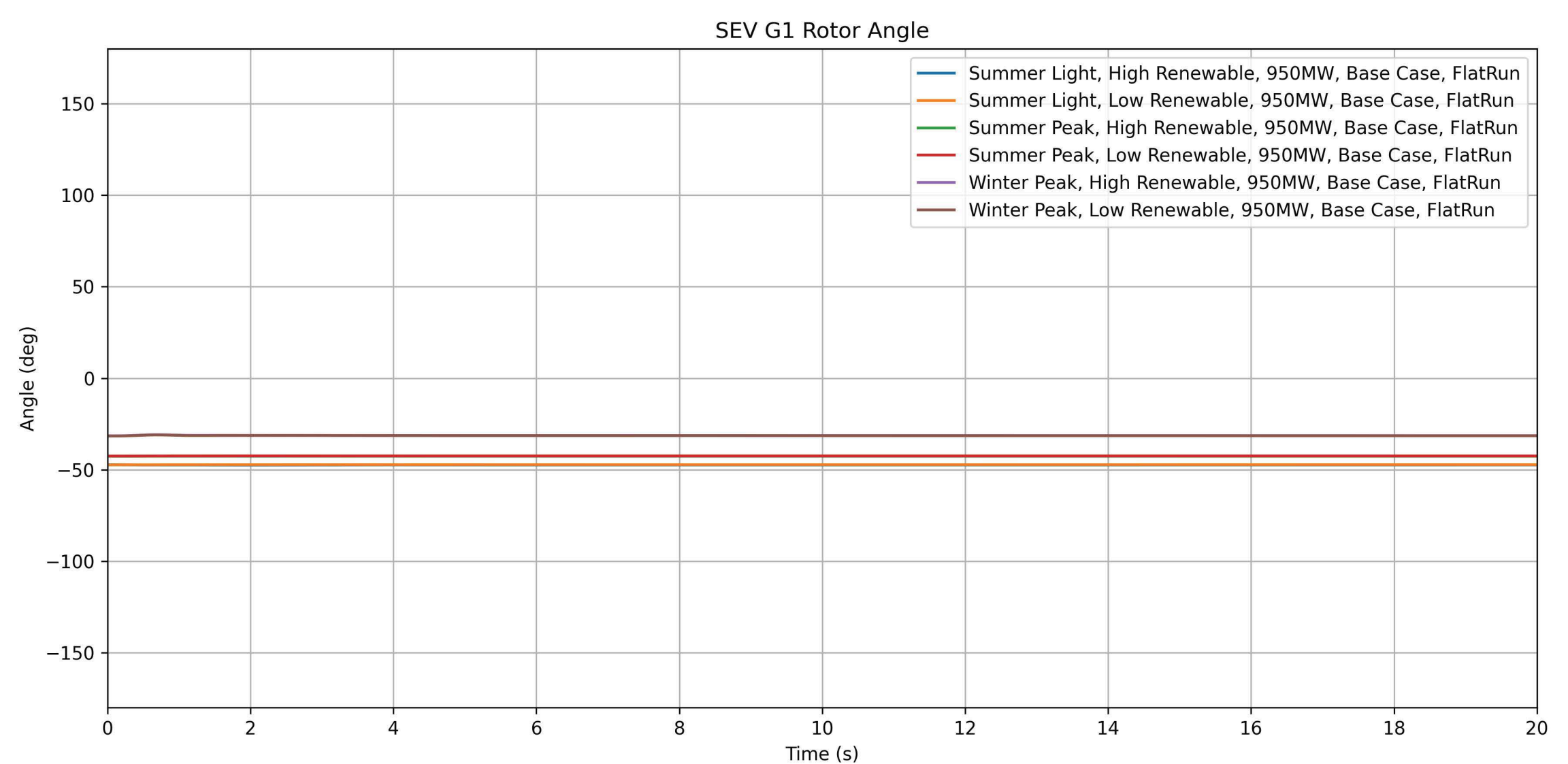

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

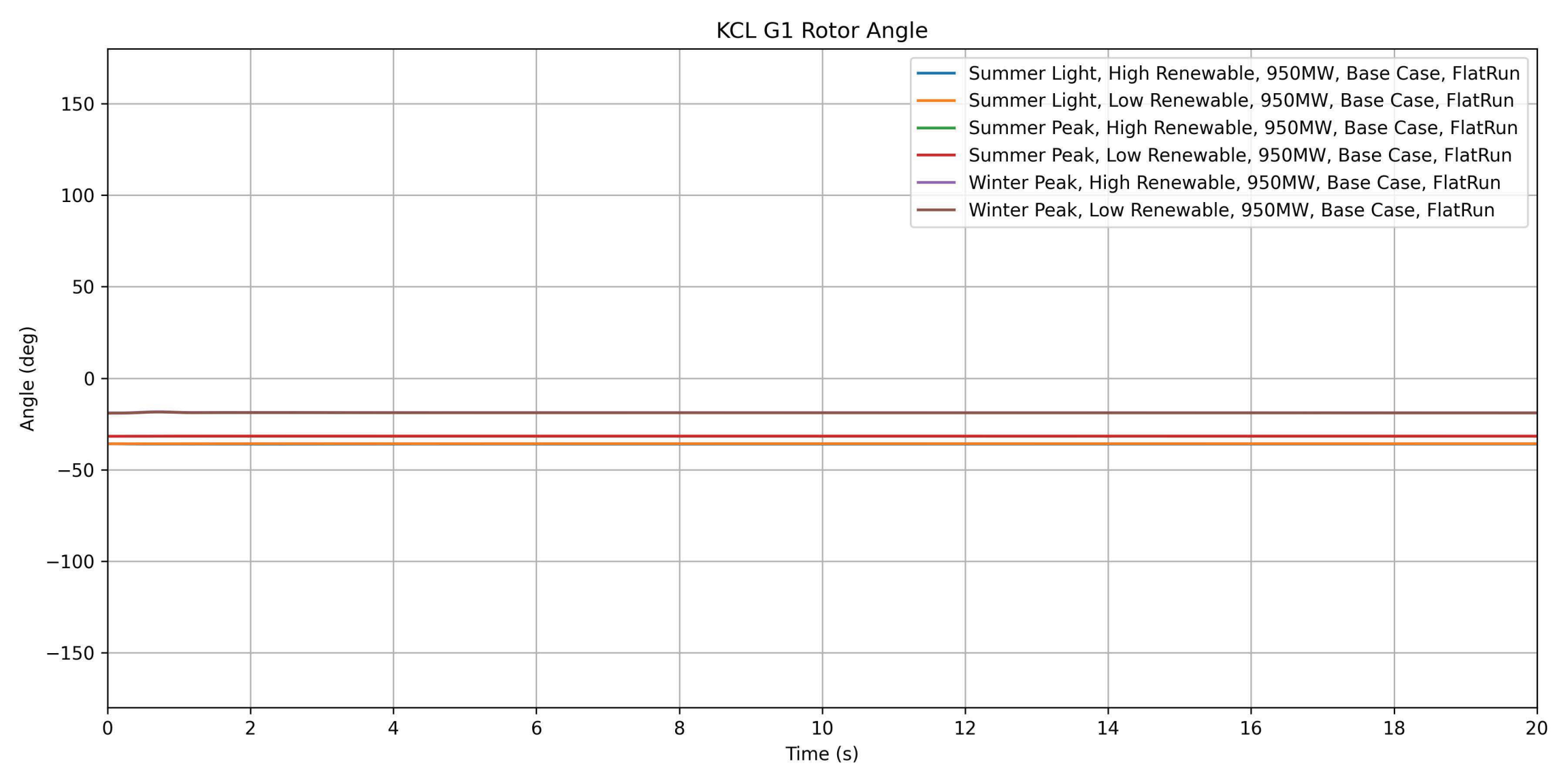

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

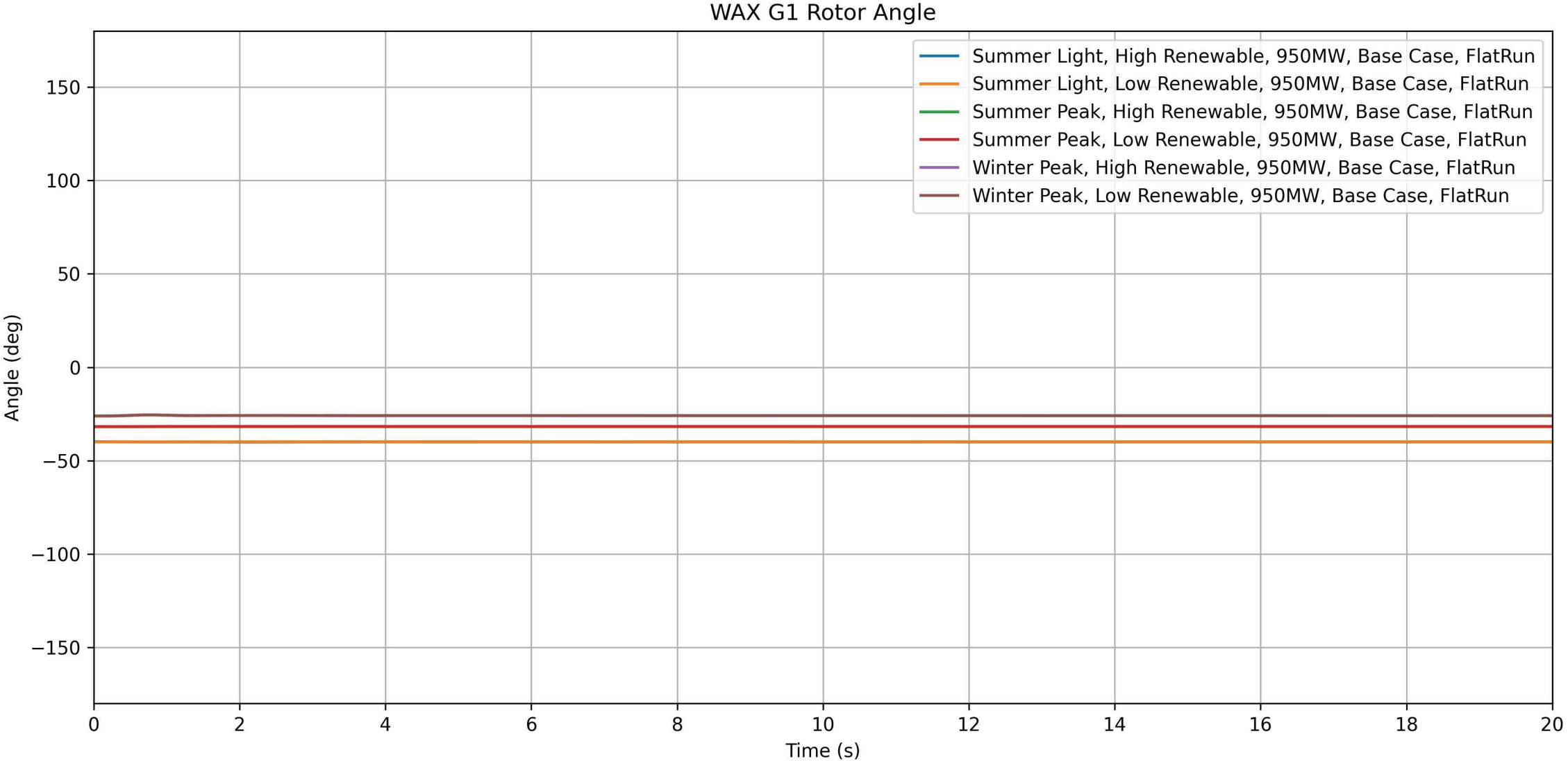

Genesee G3 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

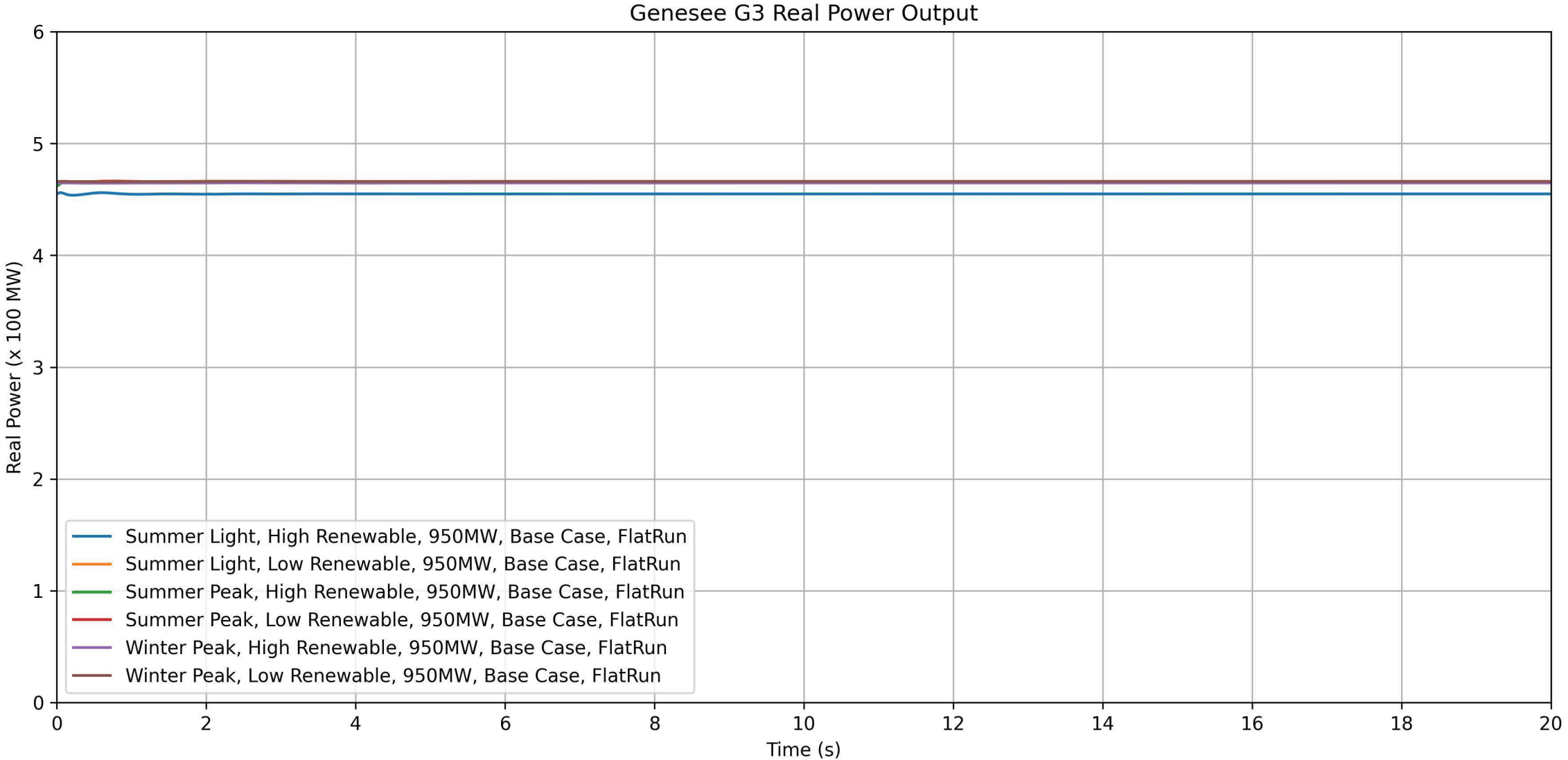

Cascade G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

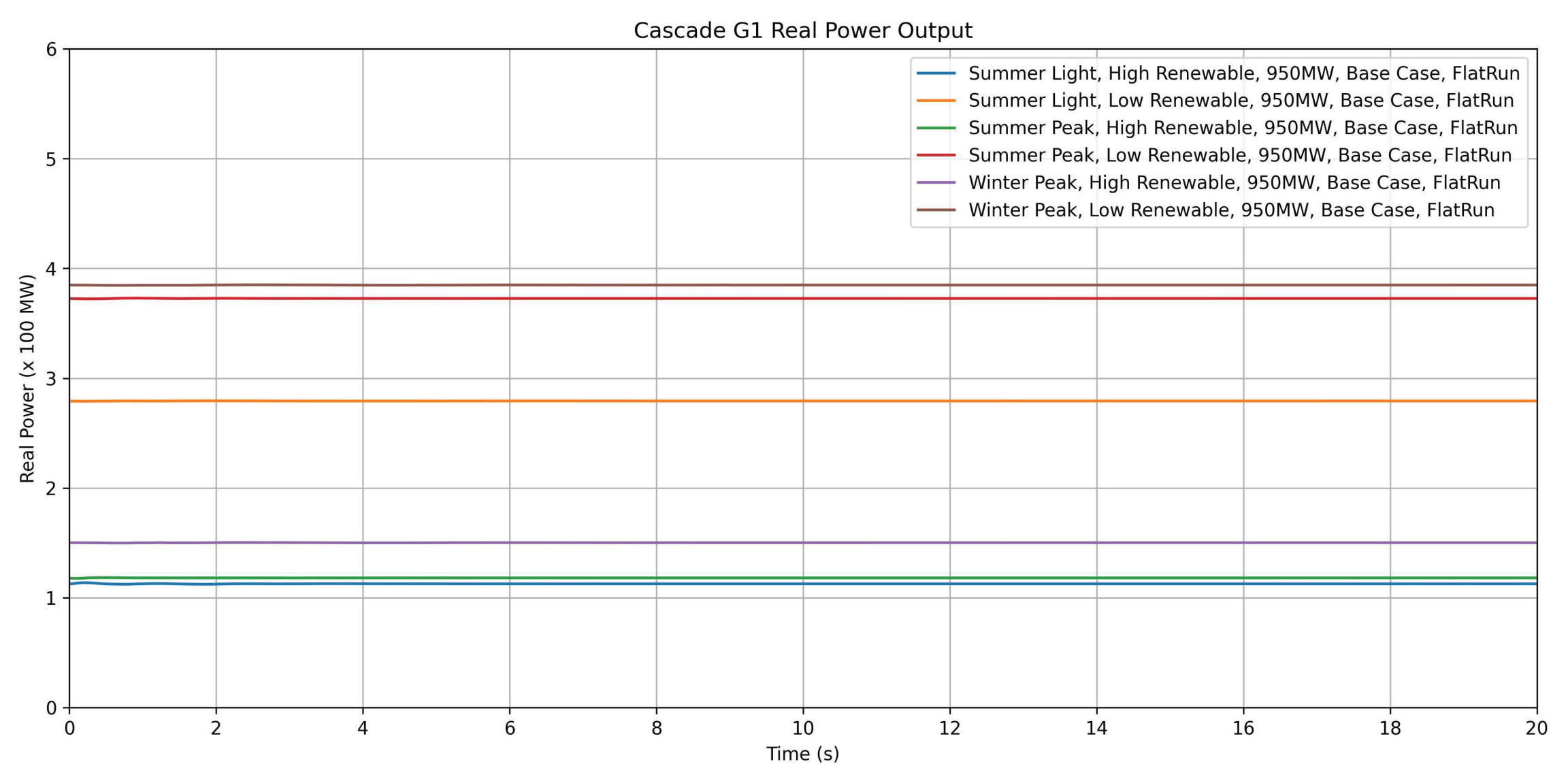

Shepard G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

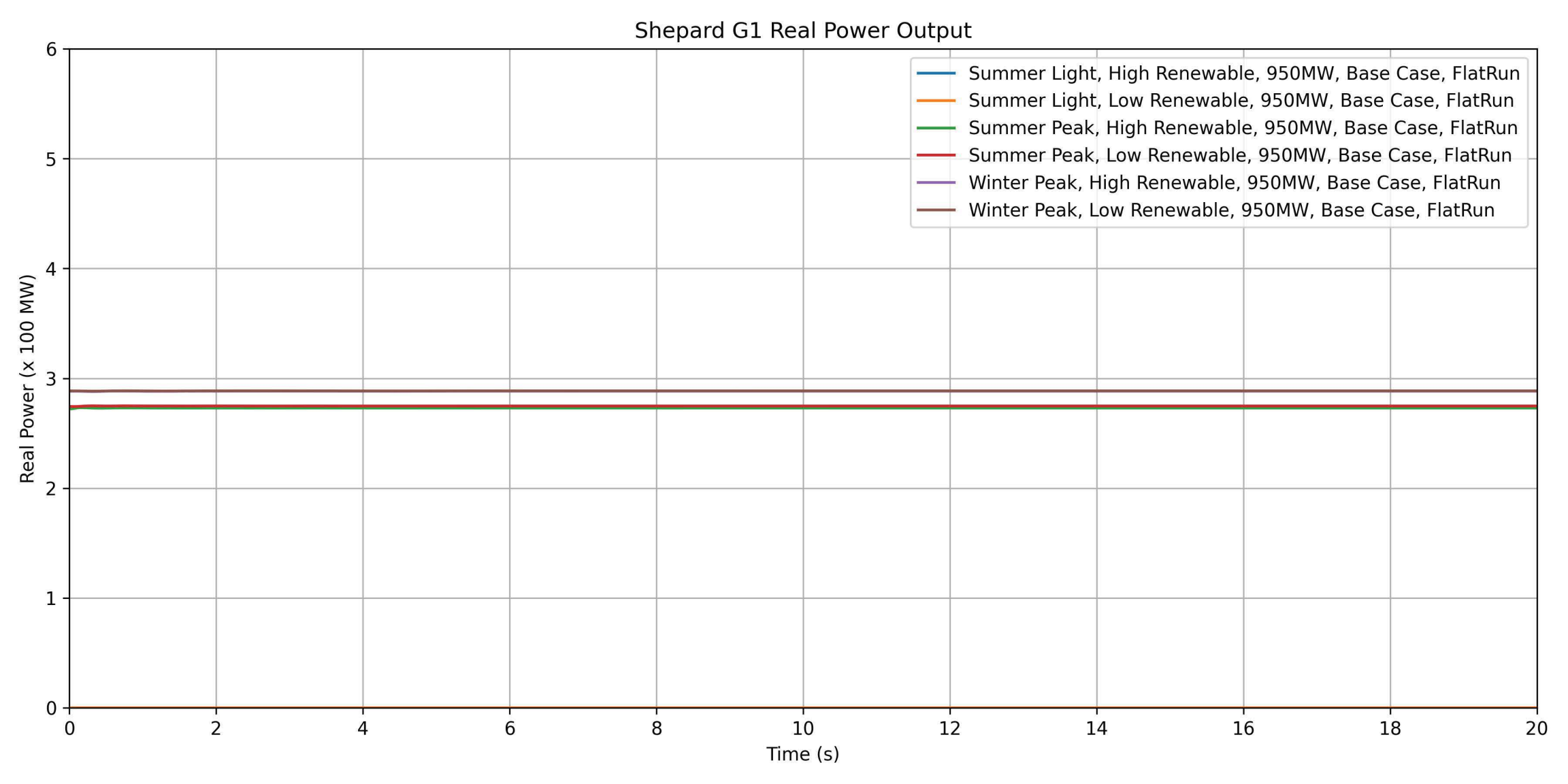

SEV G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

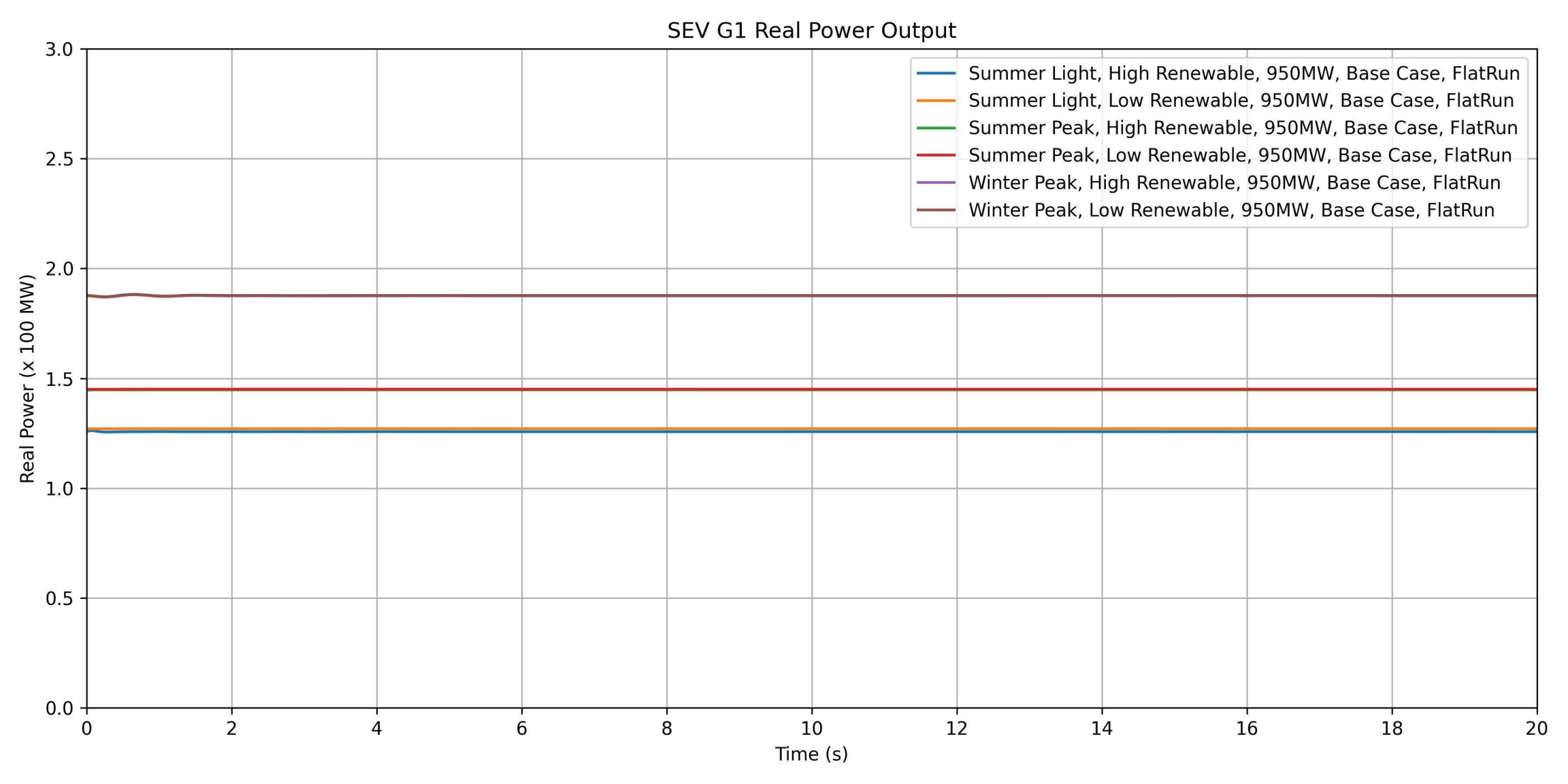

KCL G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

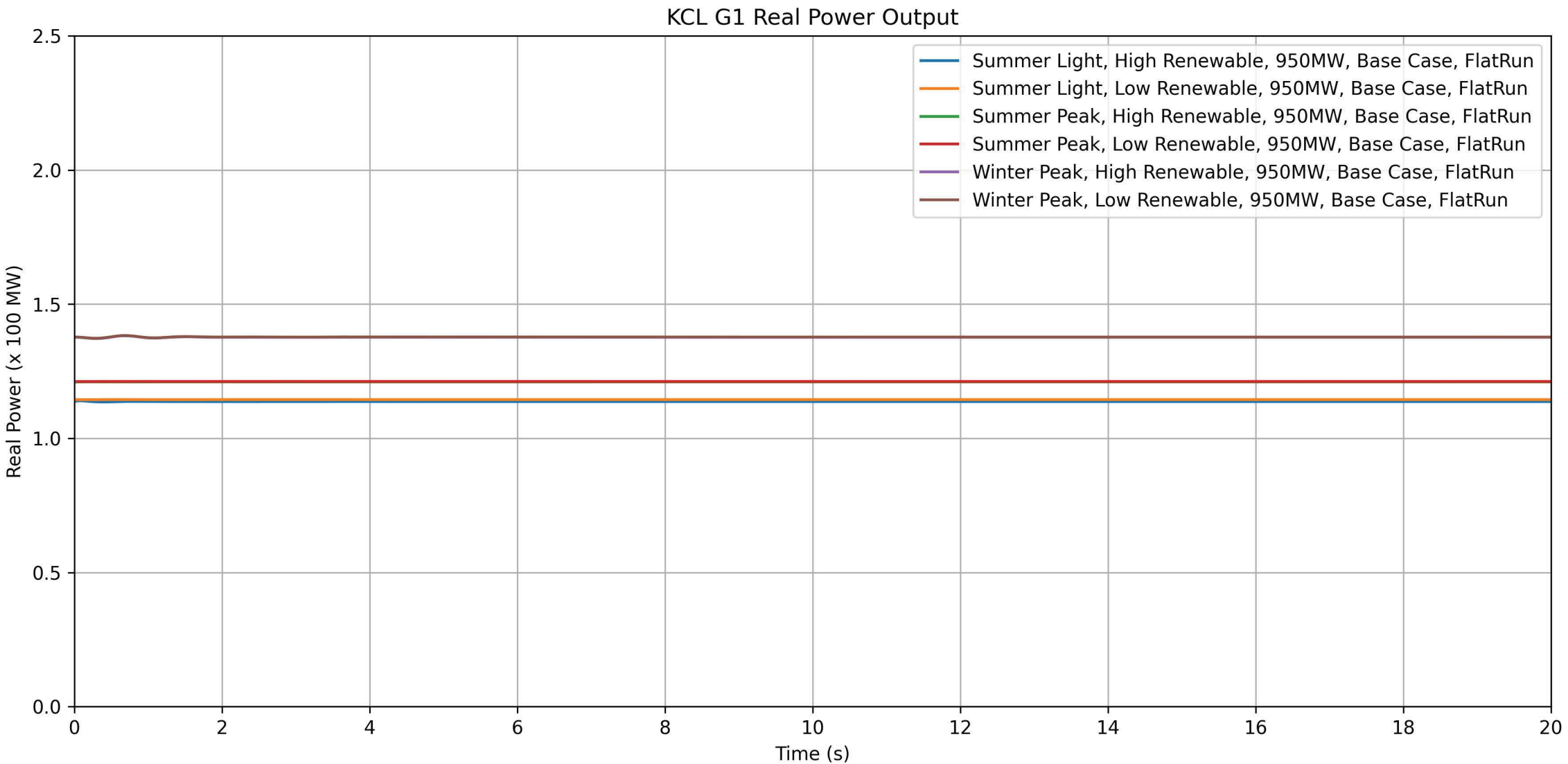

WAX G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

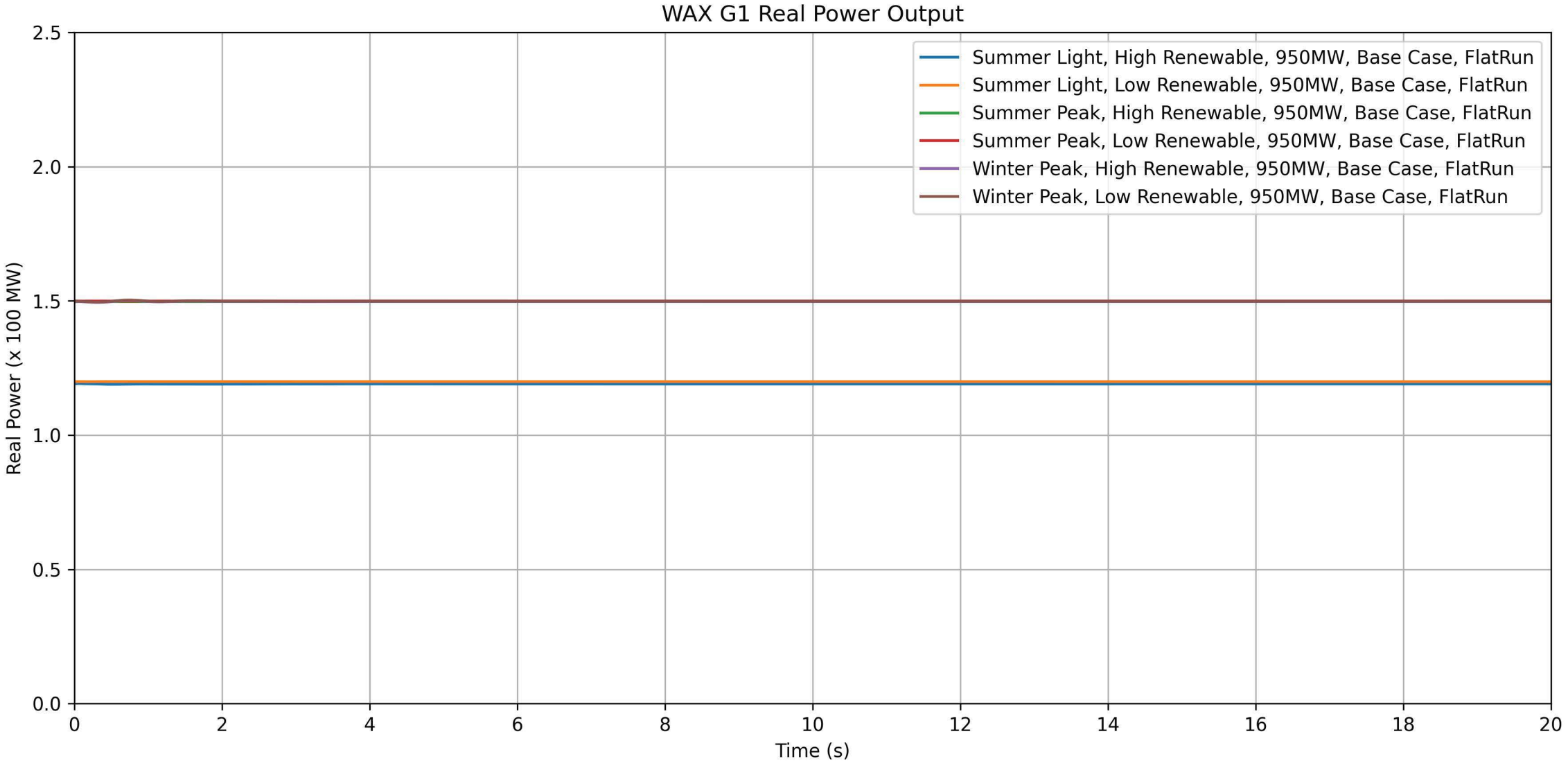

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun

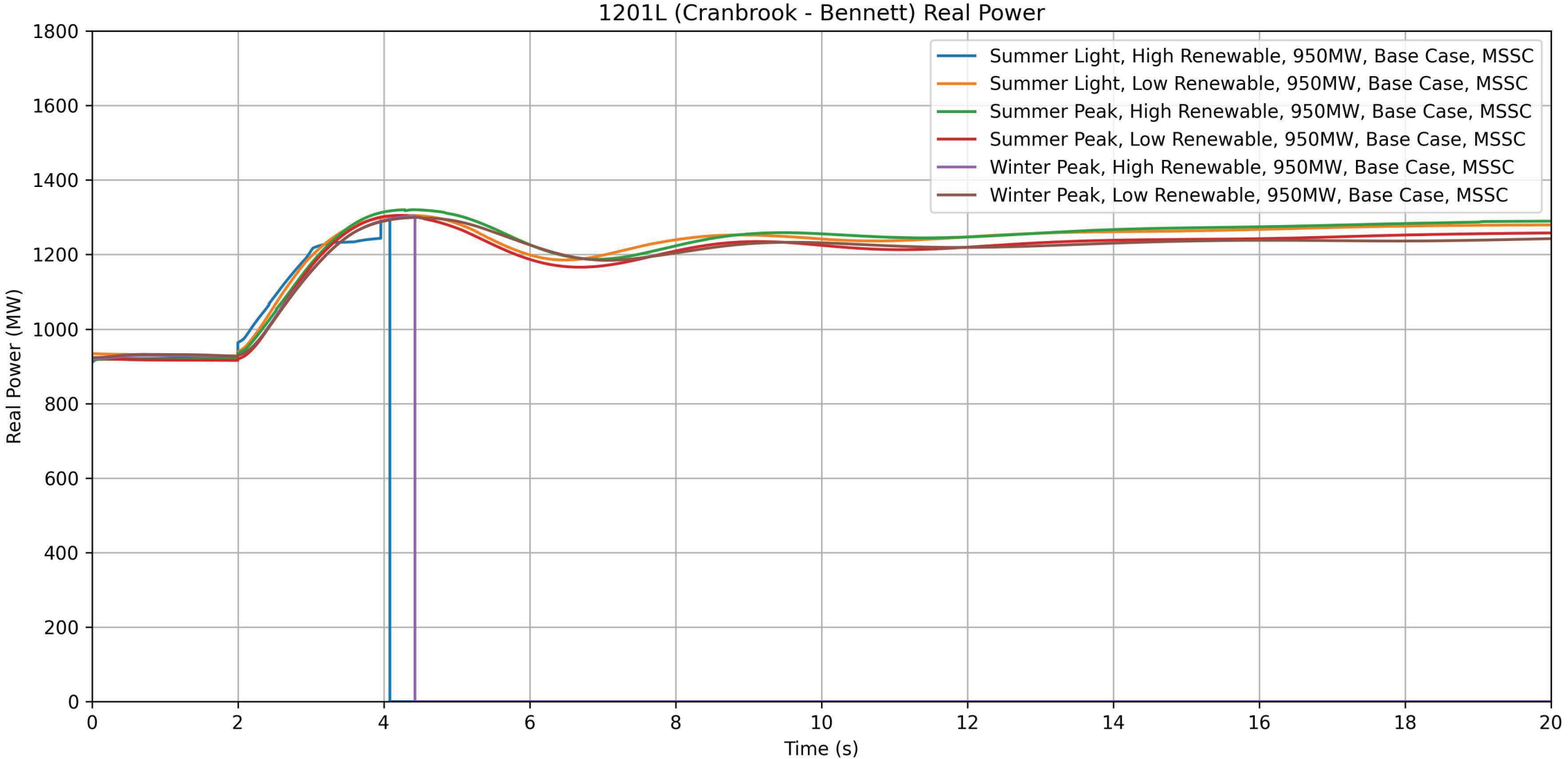

Cascade G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

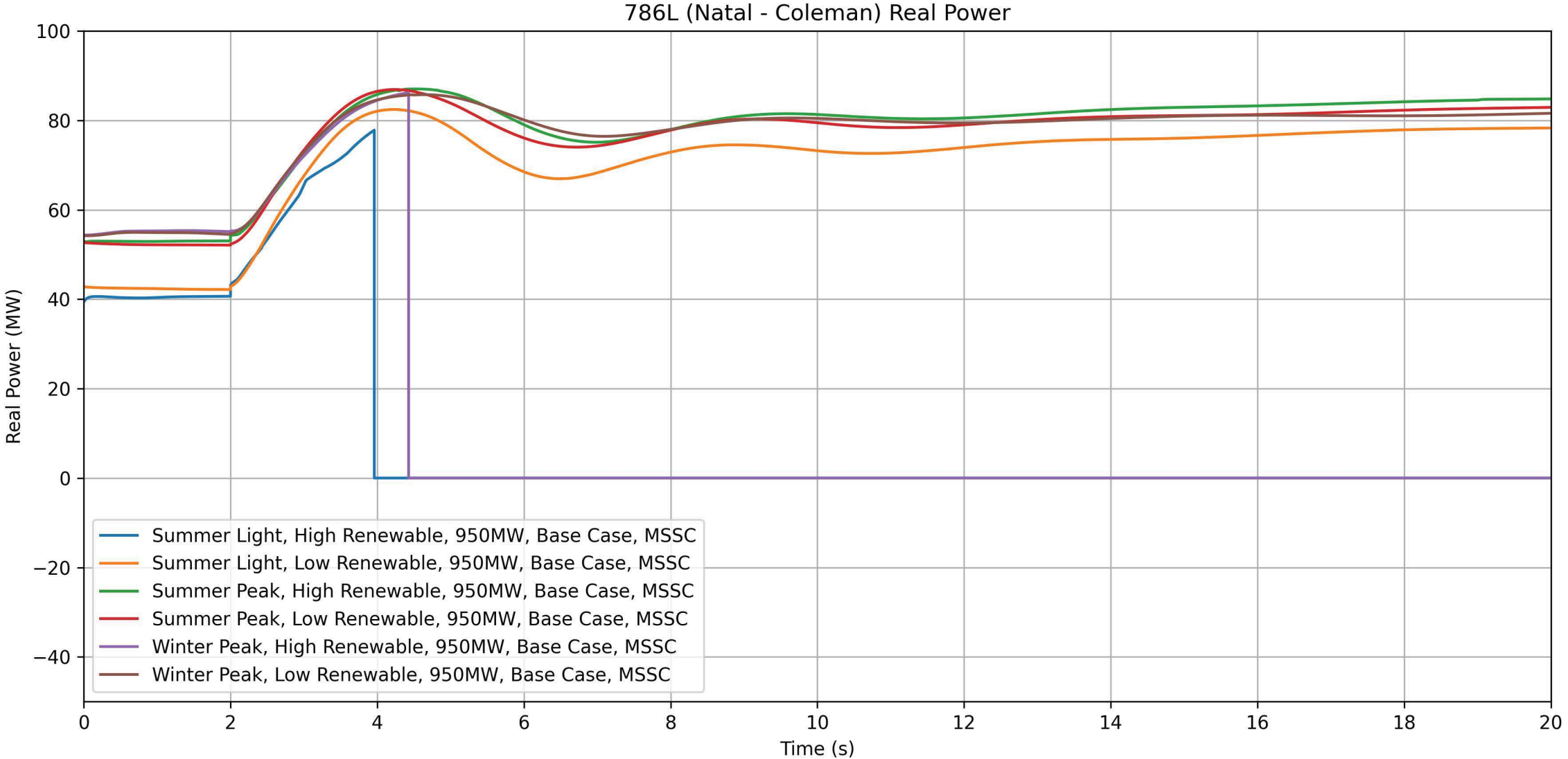

Shepard G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

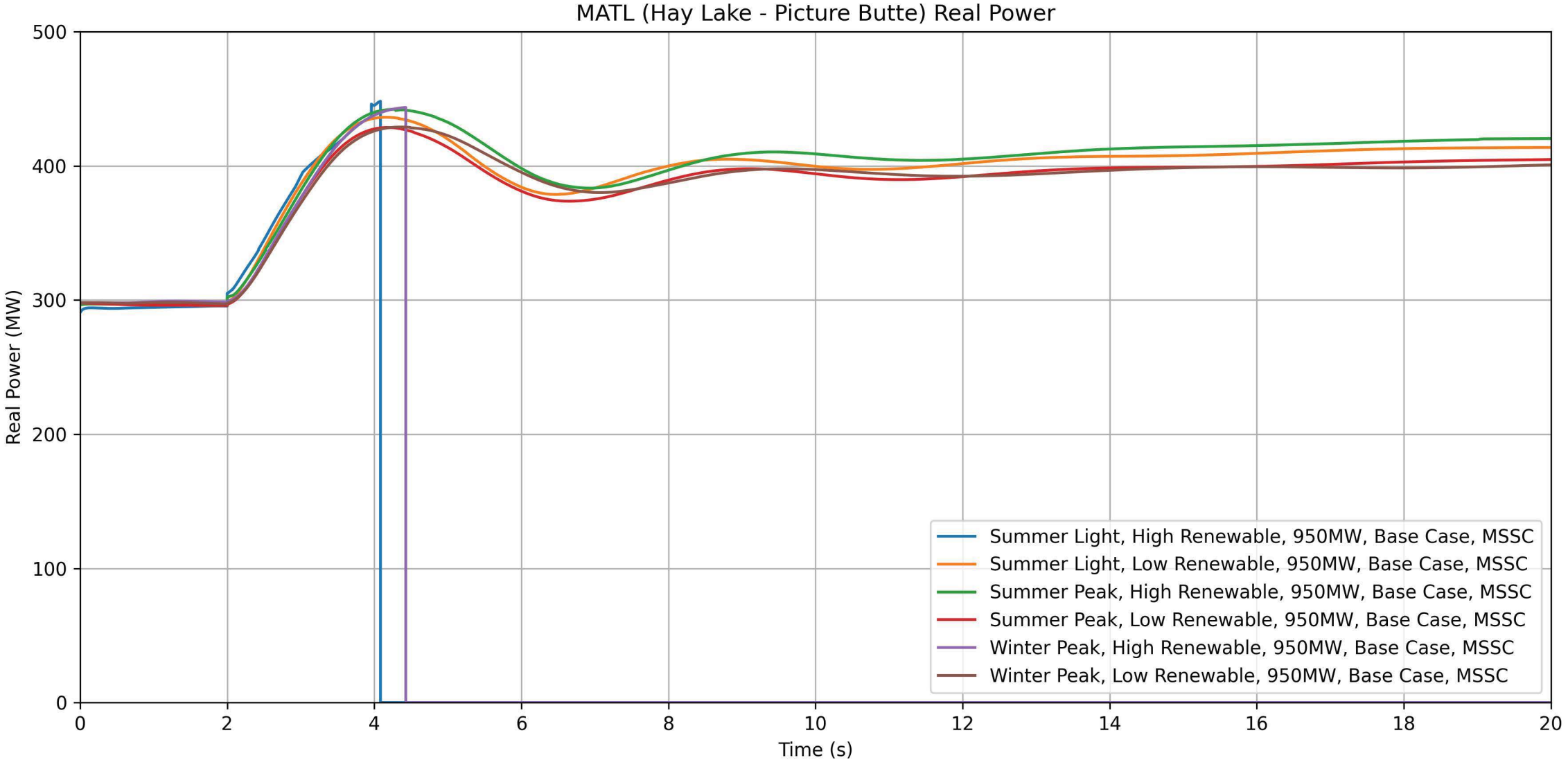

SEV G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

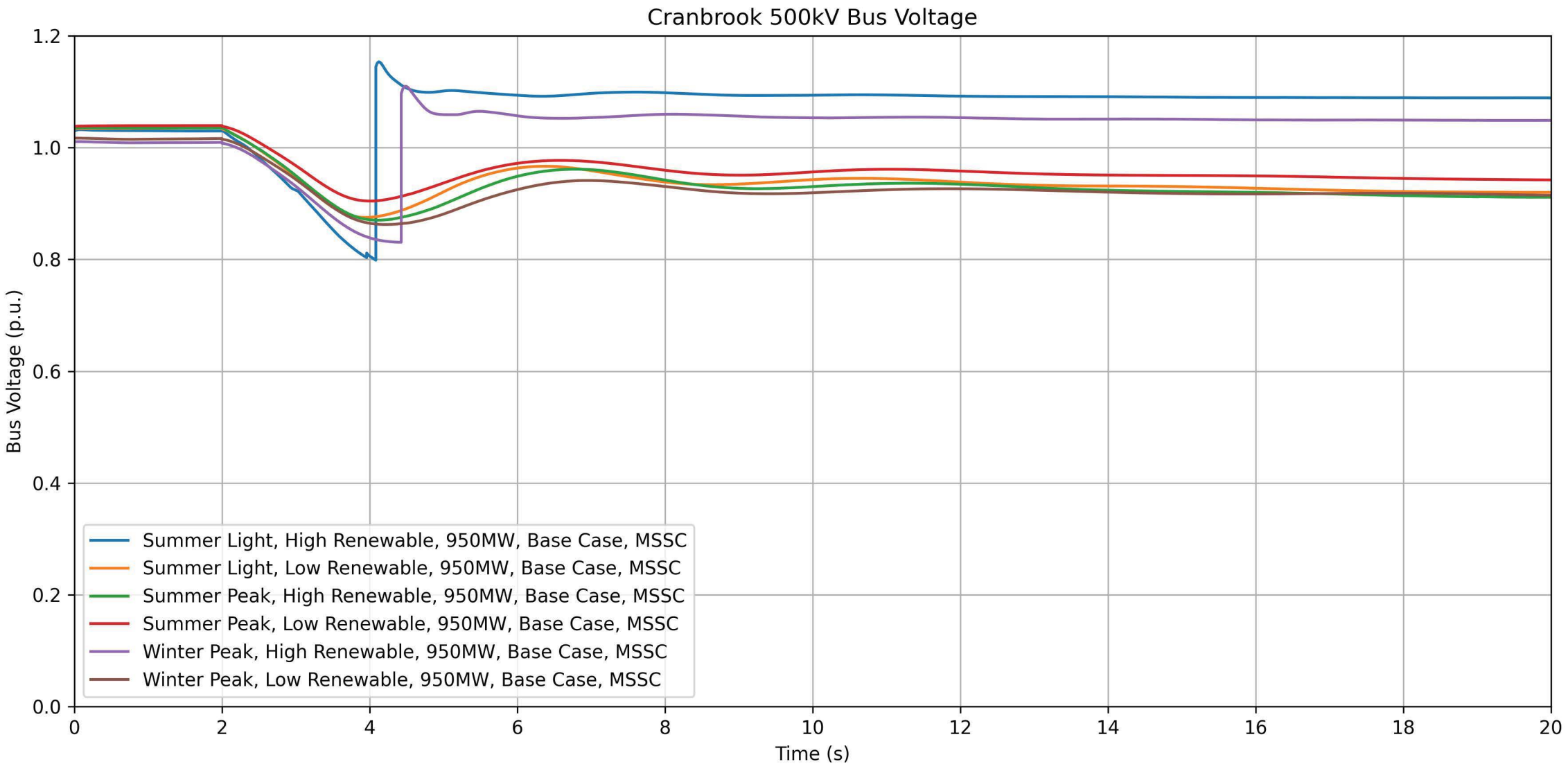

KCL G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

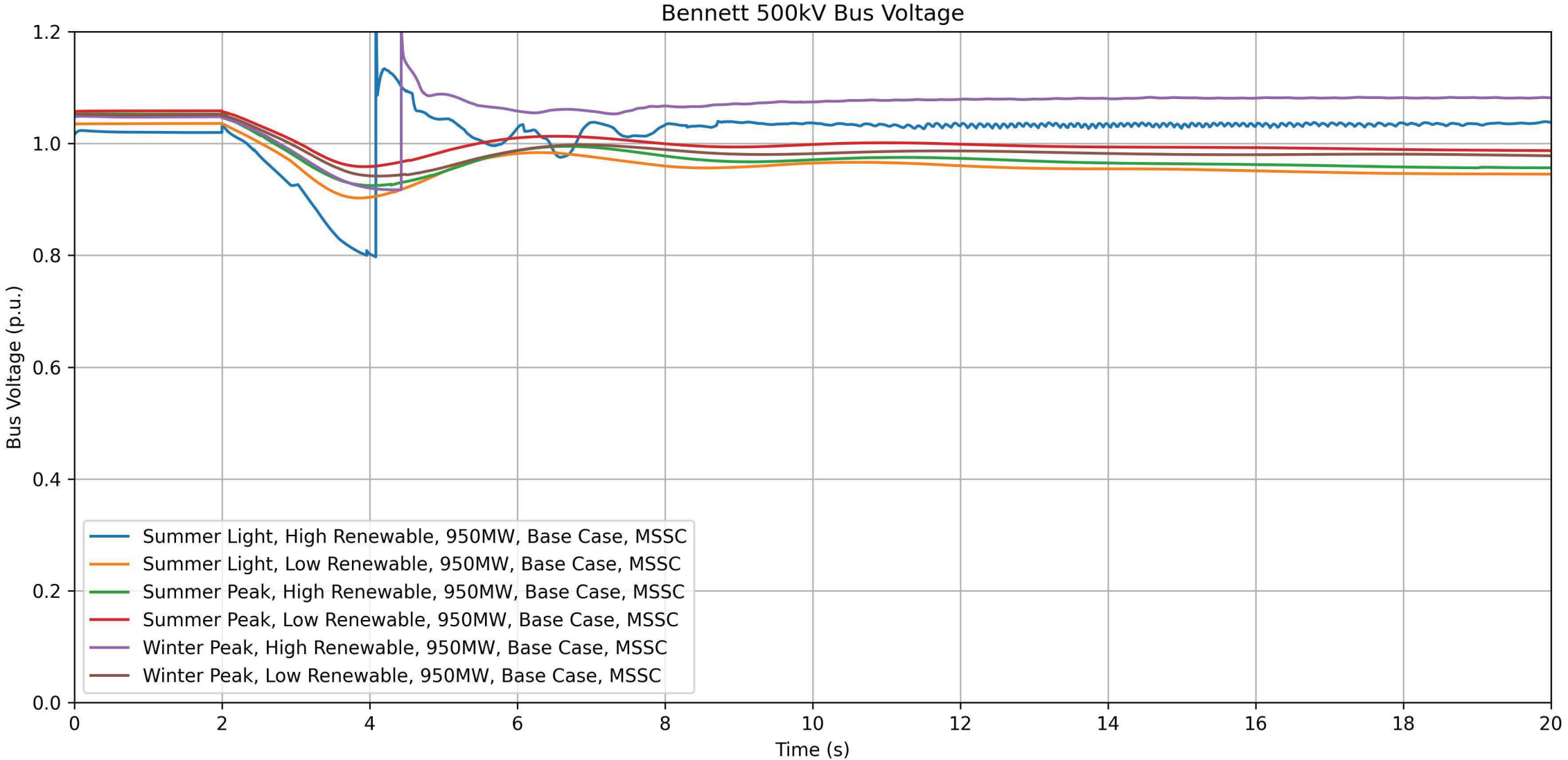

WAX G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, FlatRun
Summer Light, Low Renewable, 950MW, Base Case, FlatRun
Summer Peak, High Renewable, 950MW, Base Case, FlatRun
Summer Peak, Low Renewable, 950MW, Base Case, FlatRun
Winter Peak, High Renewable, 950MW, Base Case, FlatRun
Winter Peak, Low Renewable, 950MW, Base Case, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

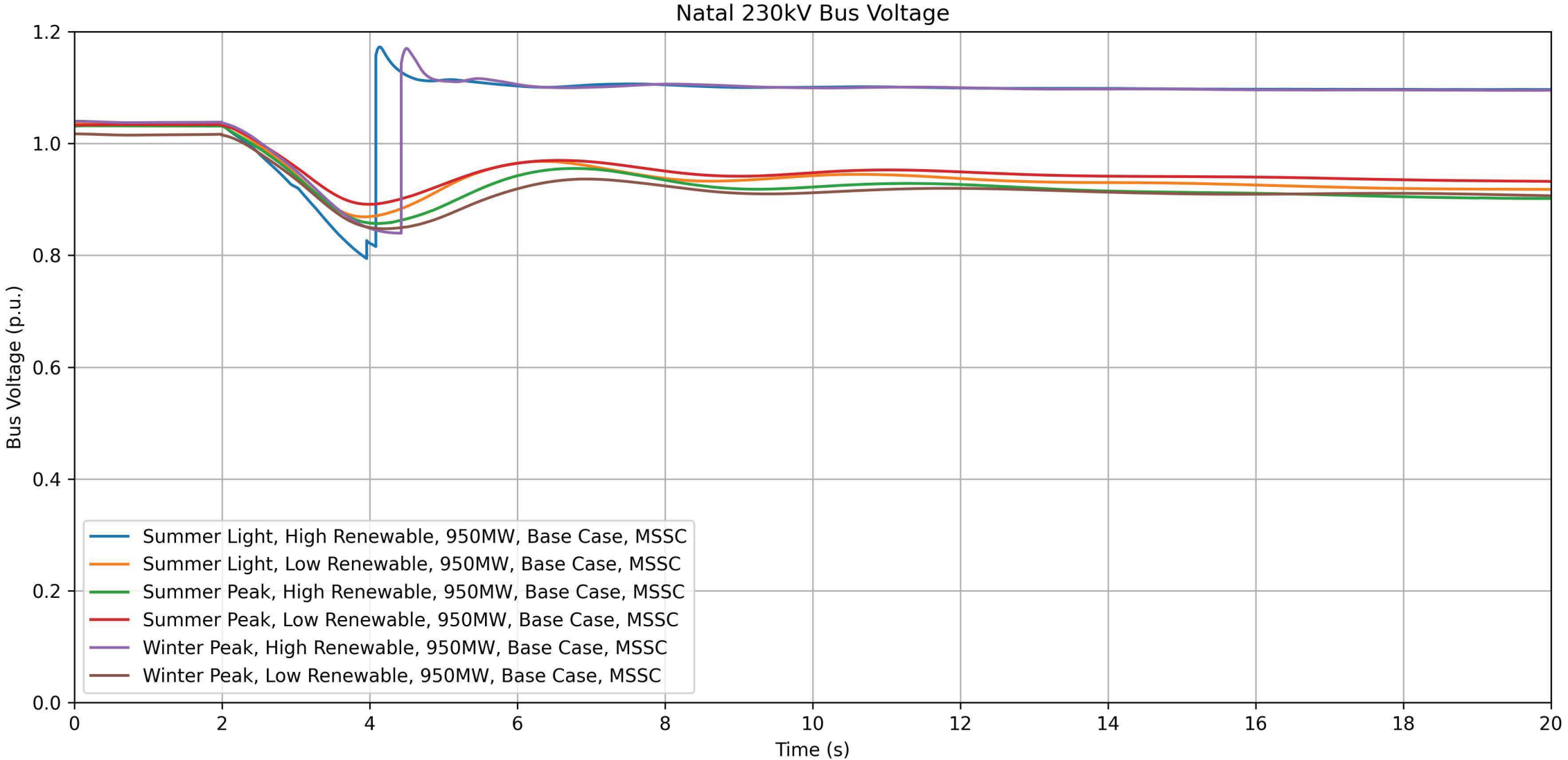

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

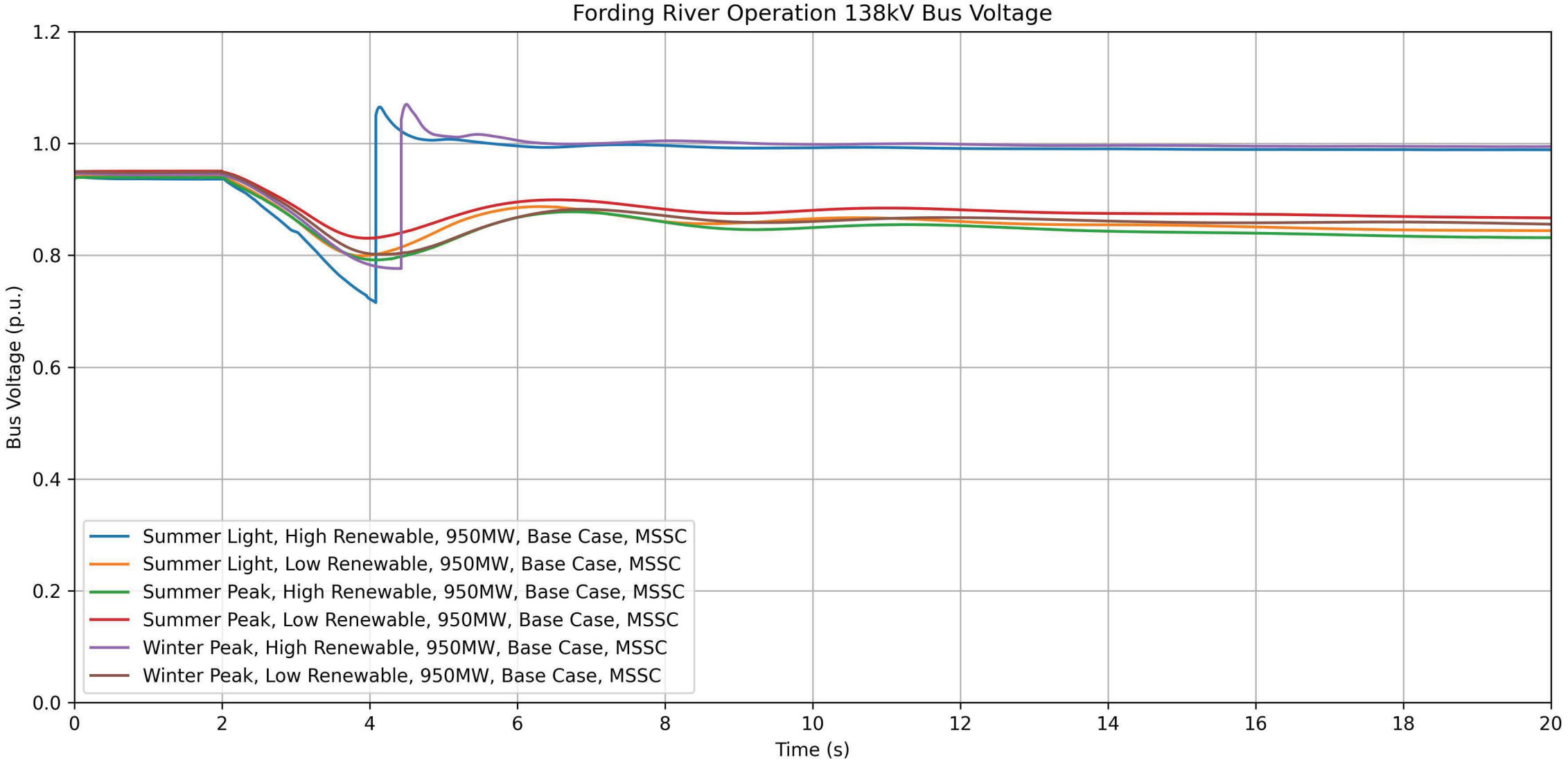

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

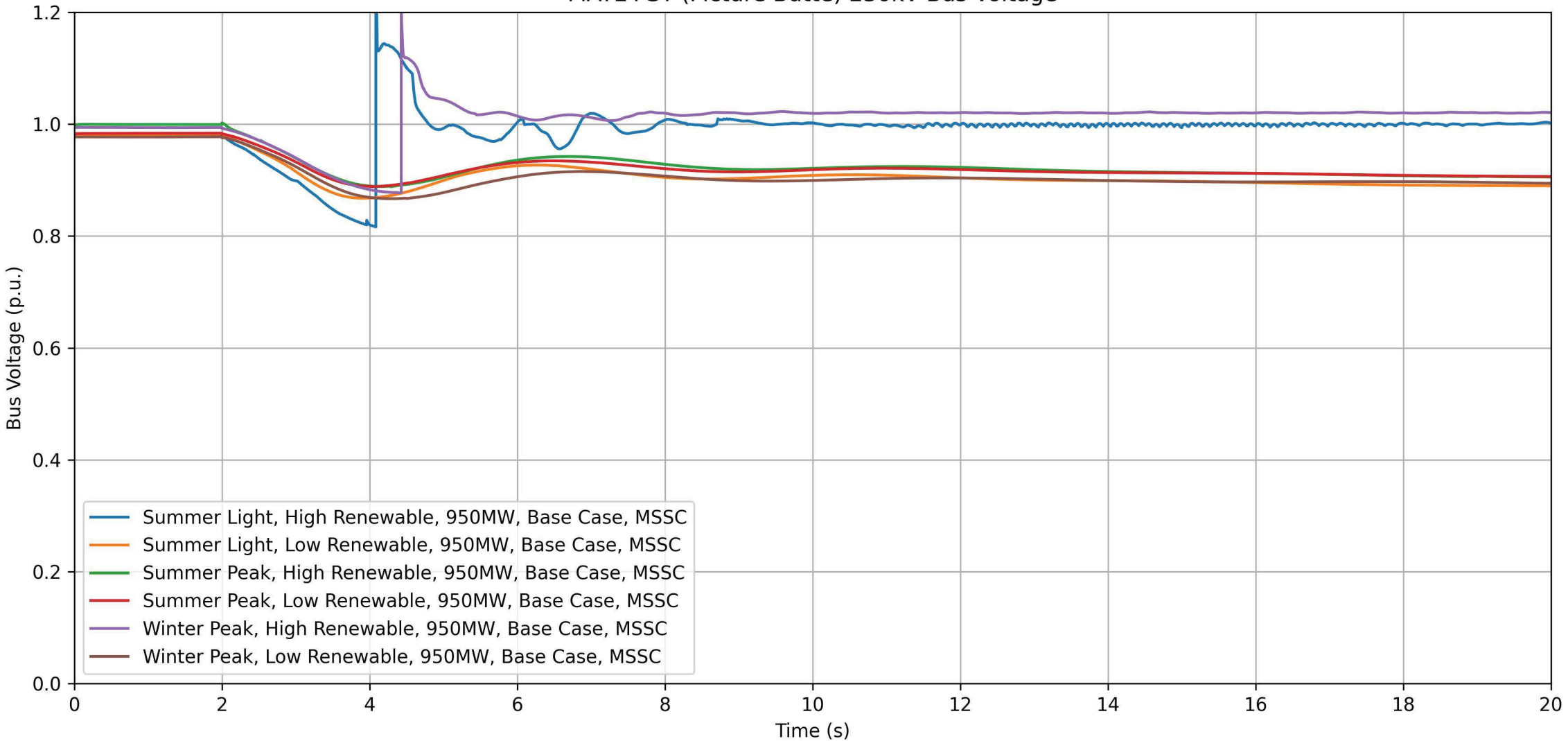

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

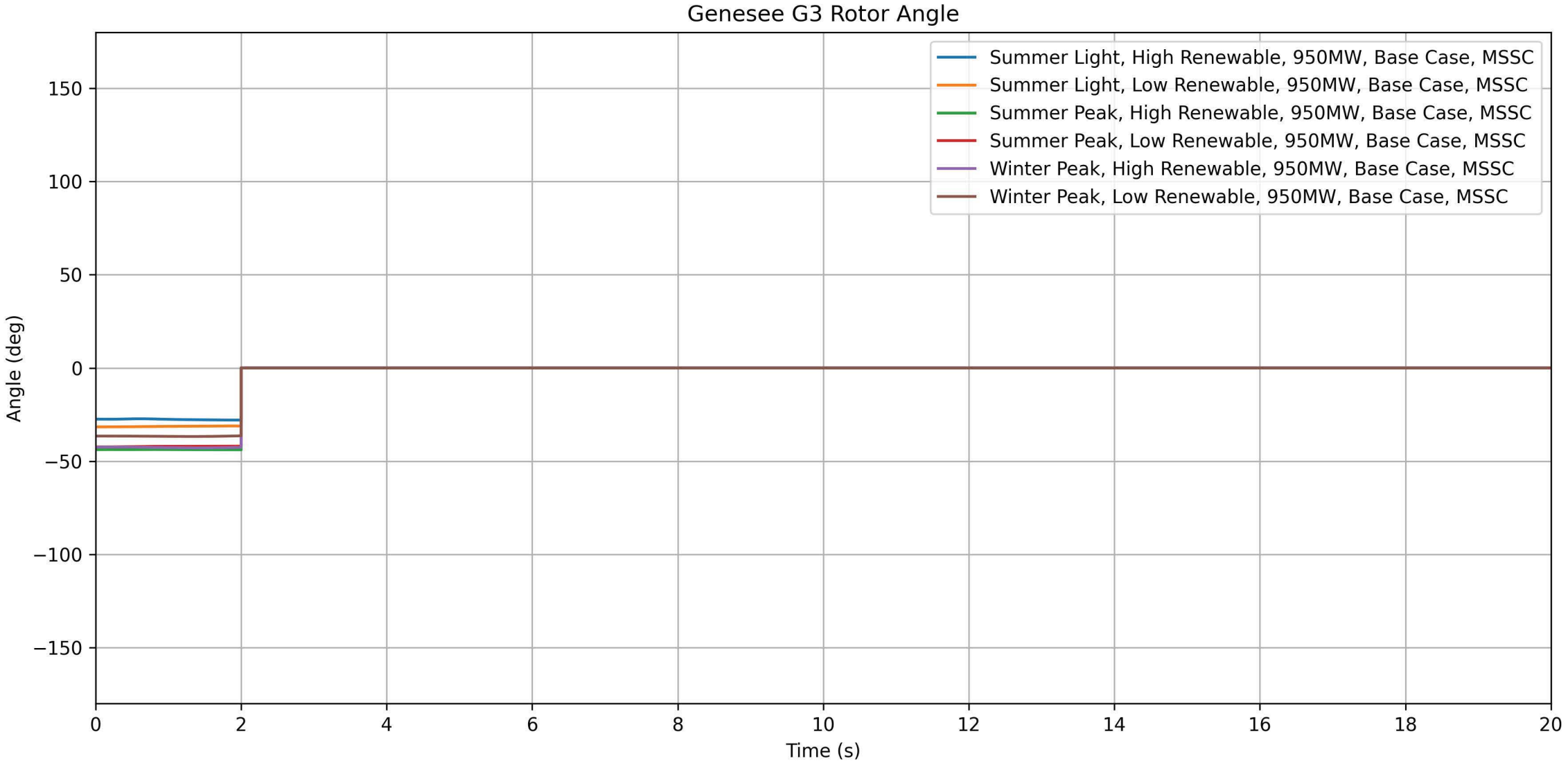

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

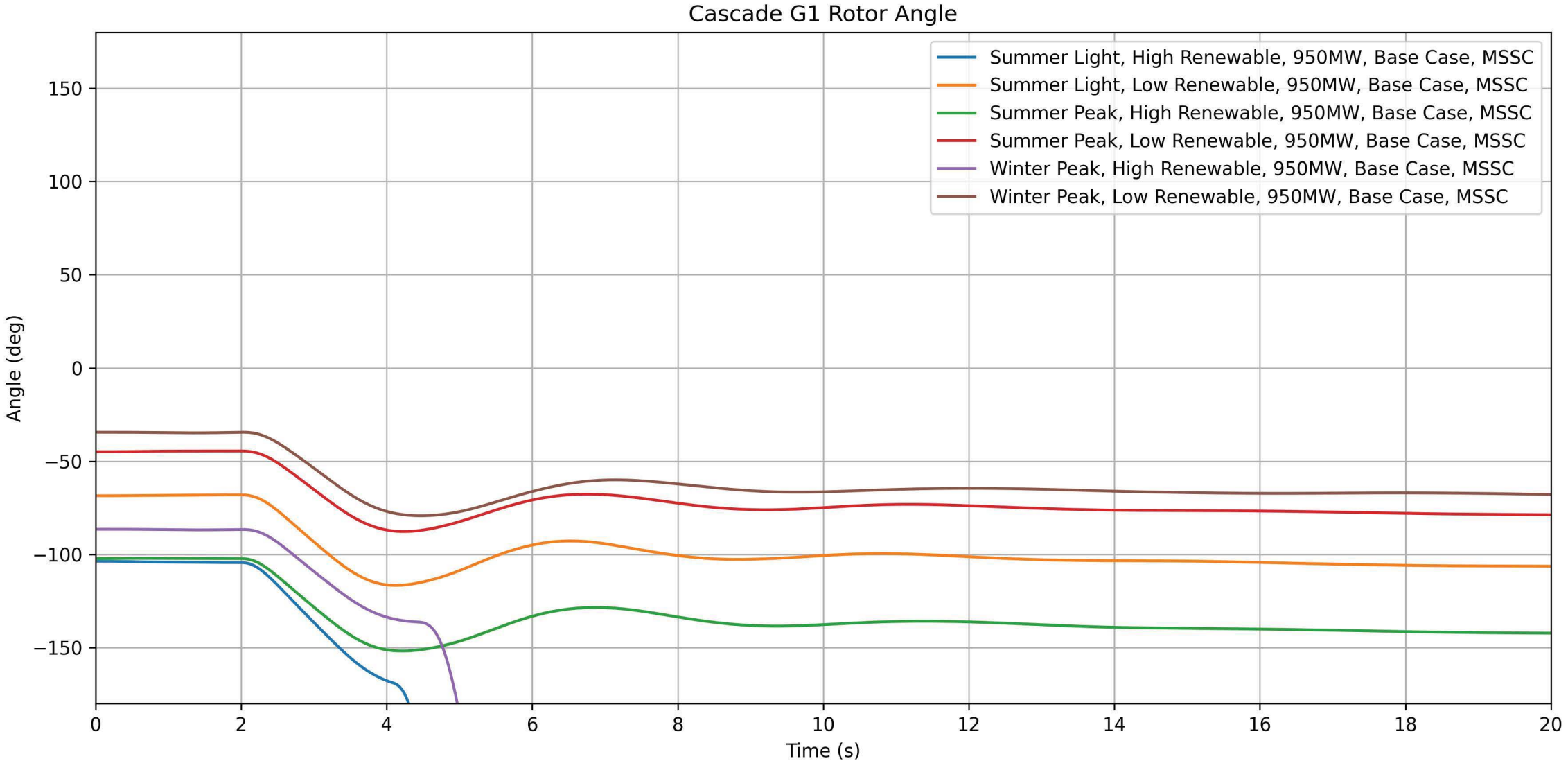

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

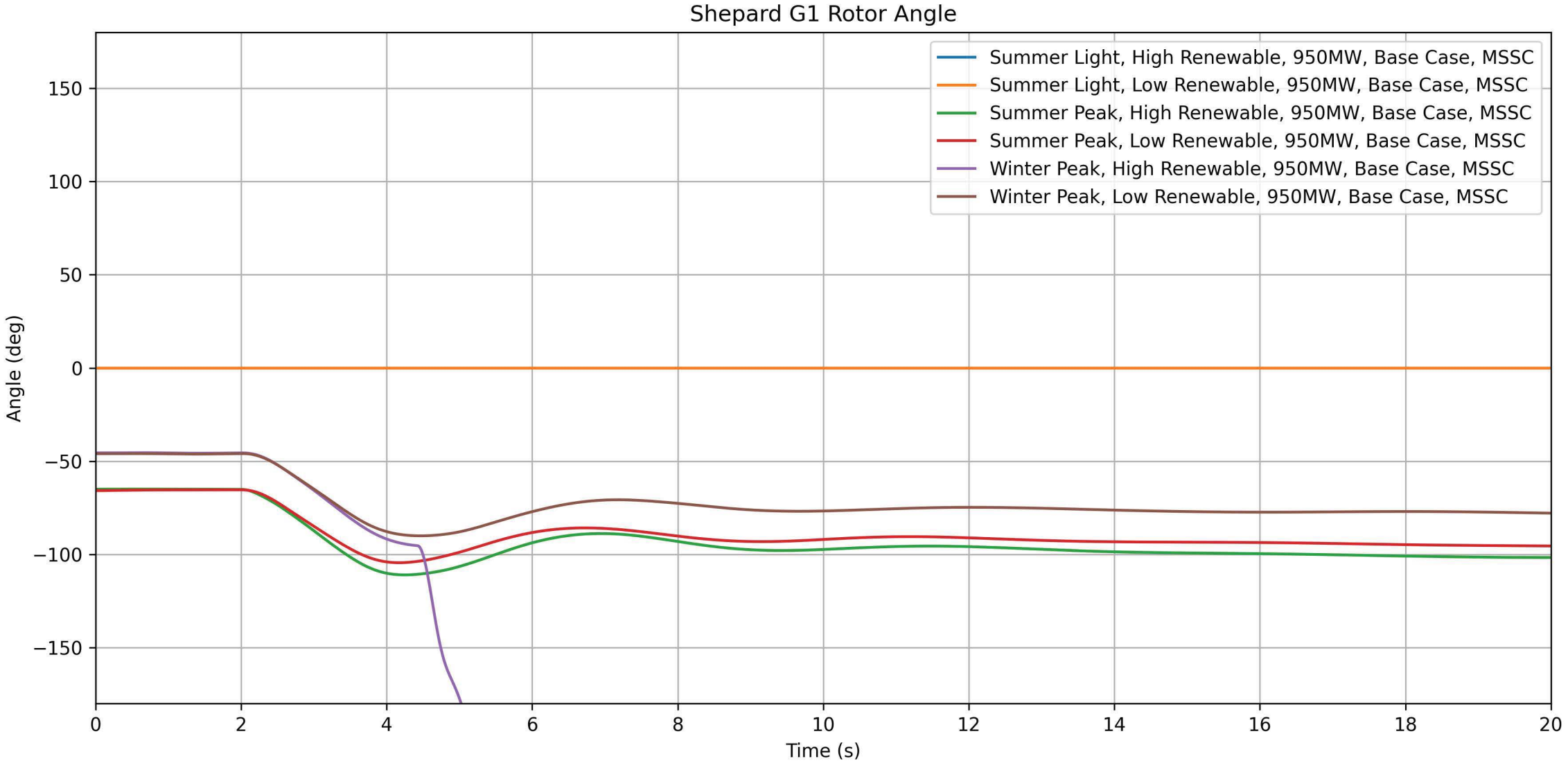

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

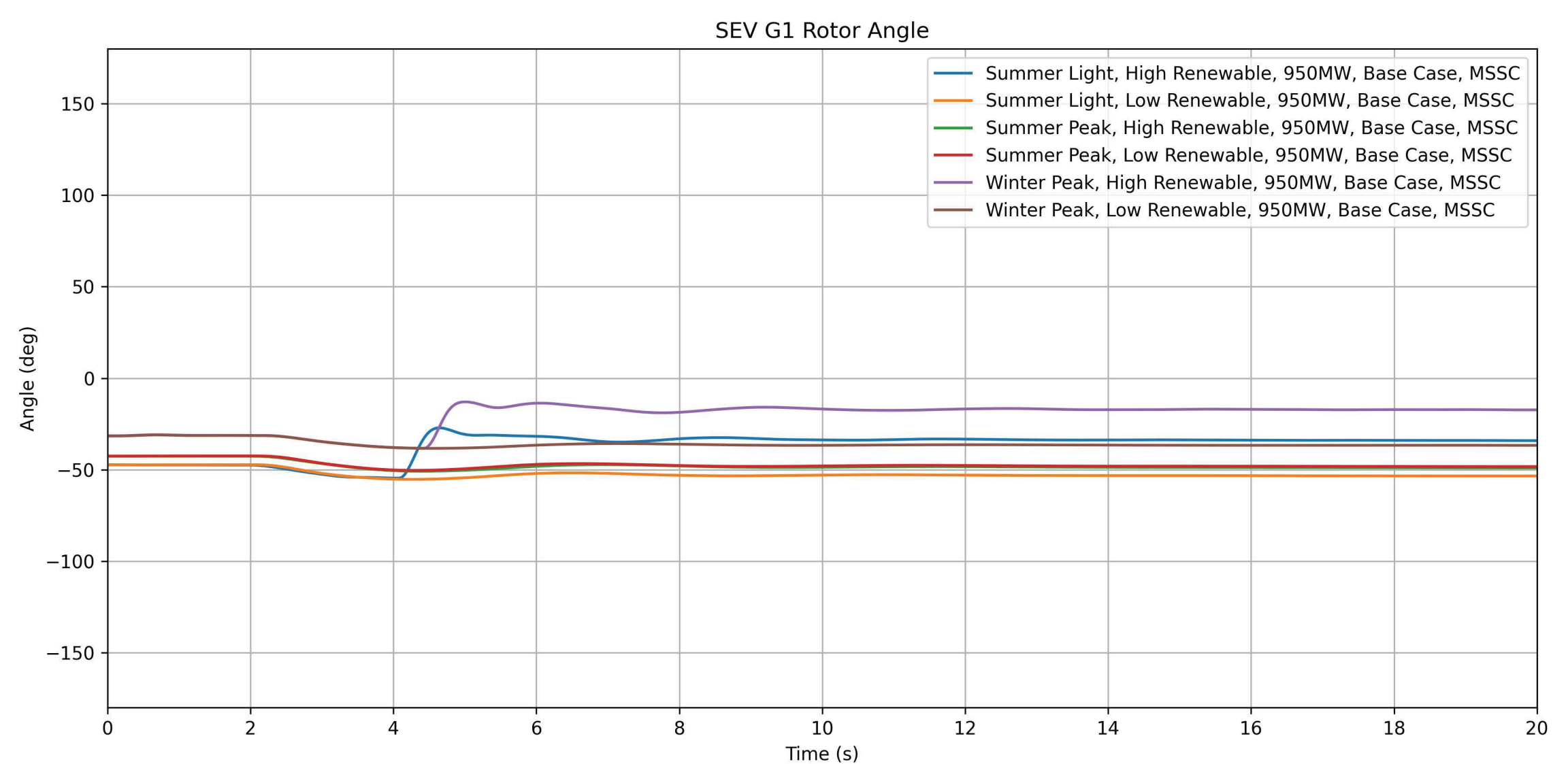

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

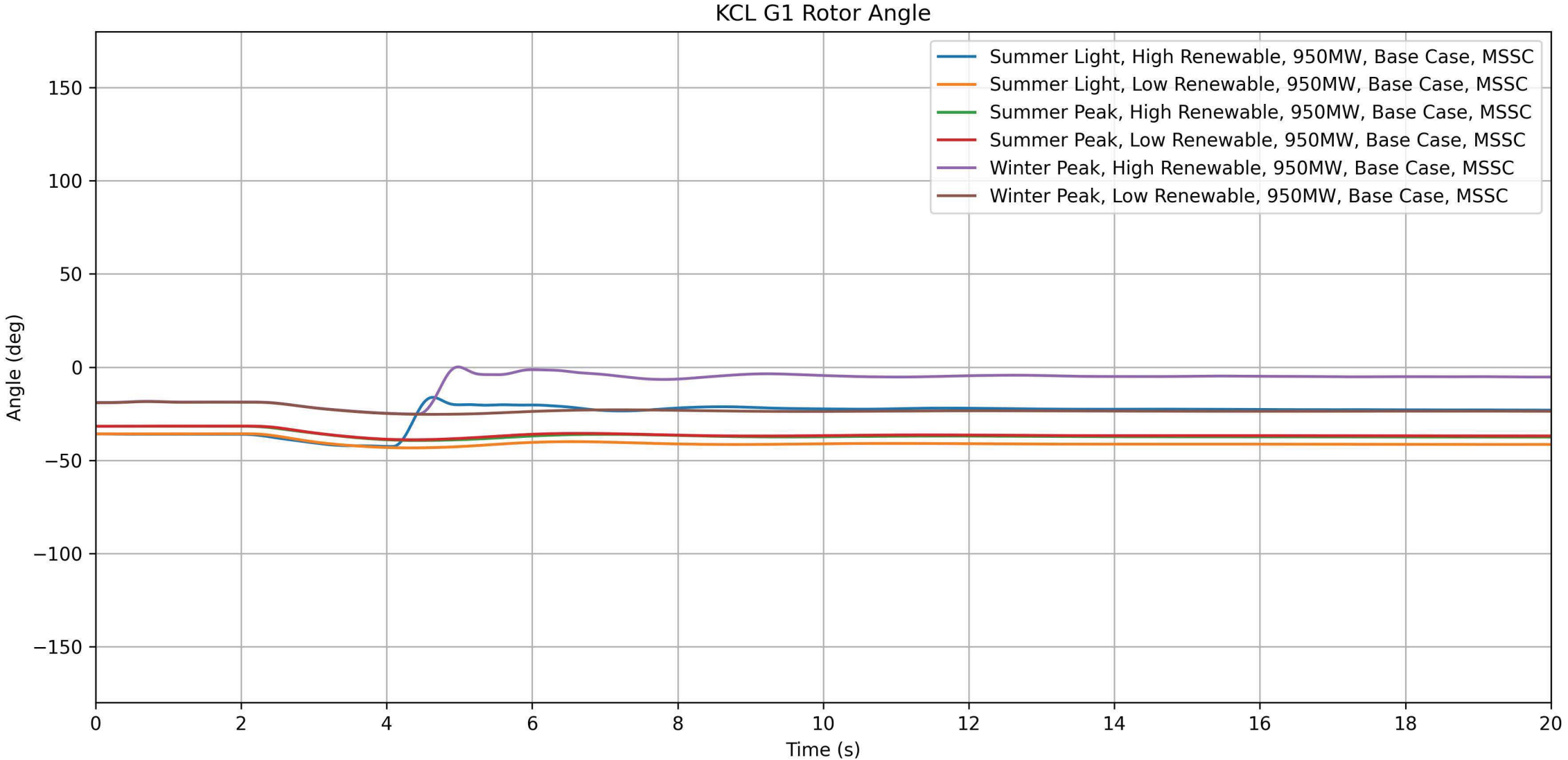

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC

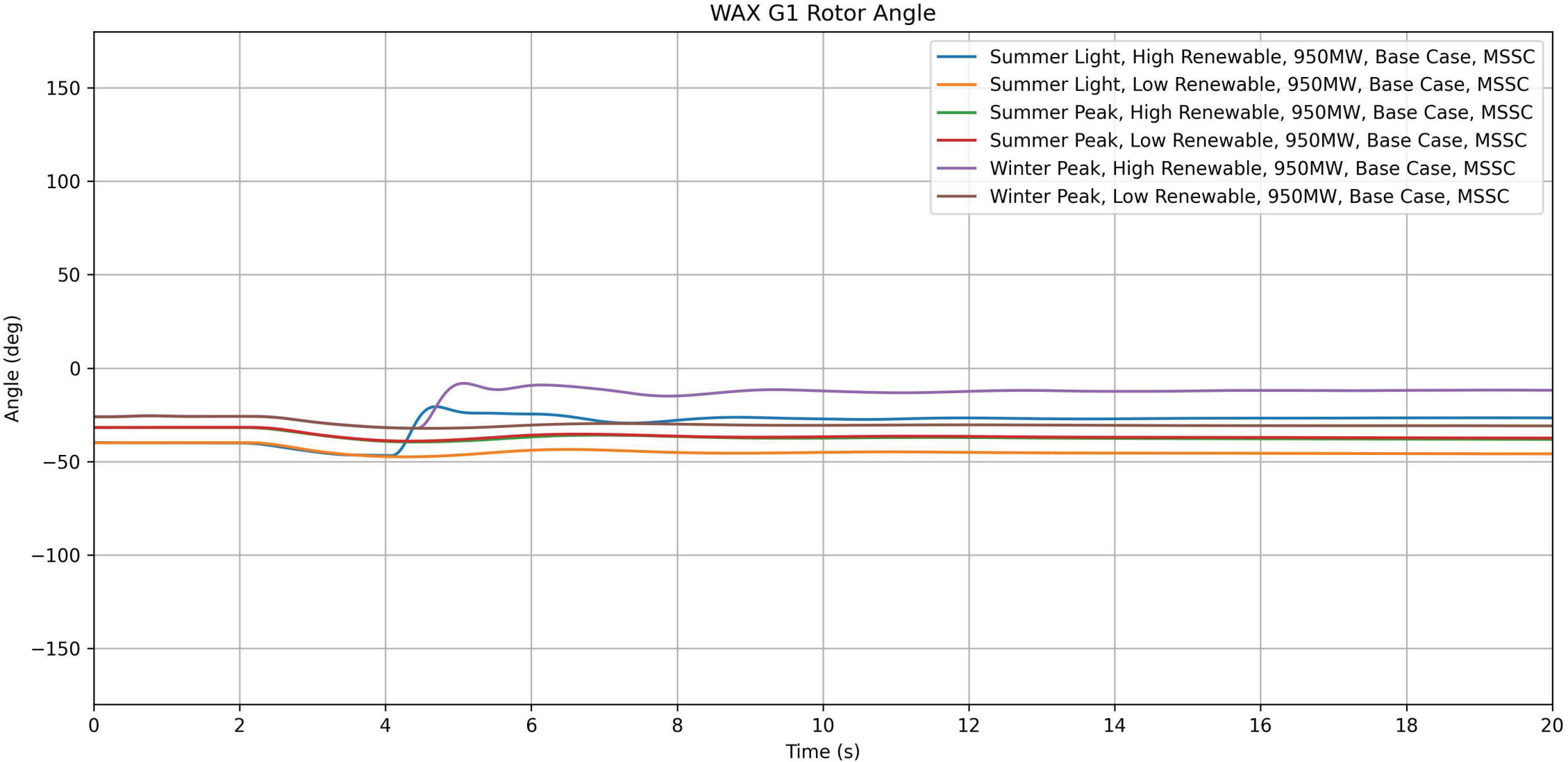

Genesee G3 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

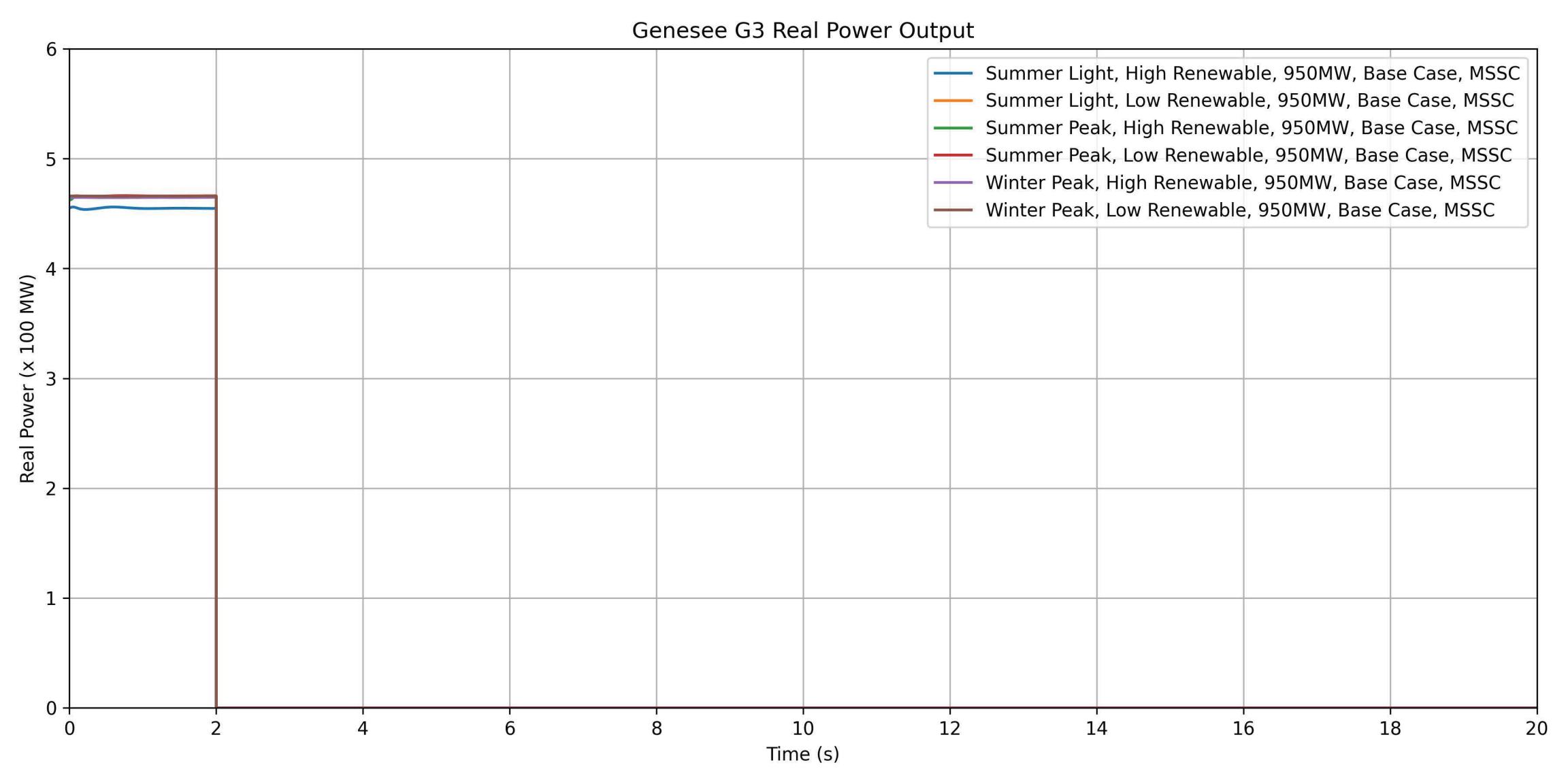

Cascade G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

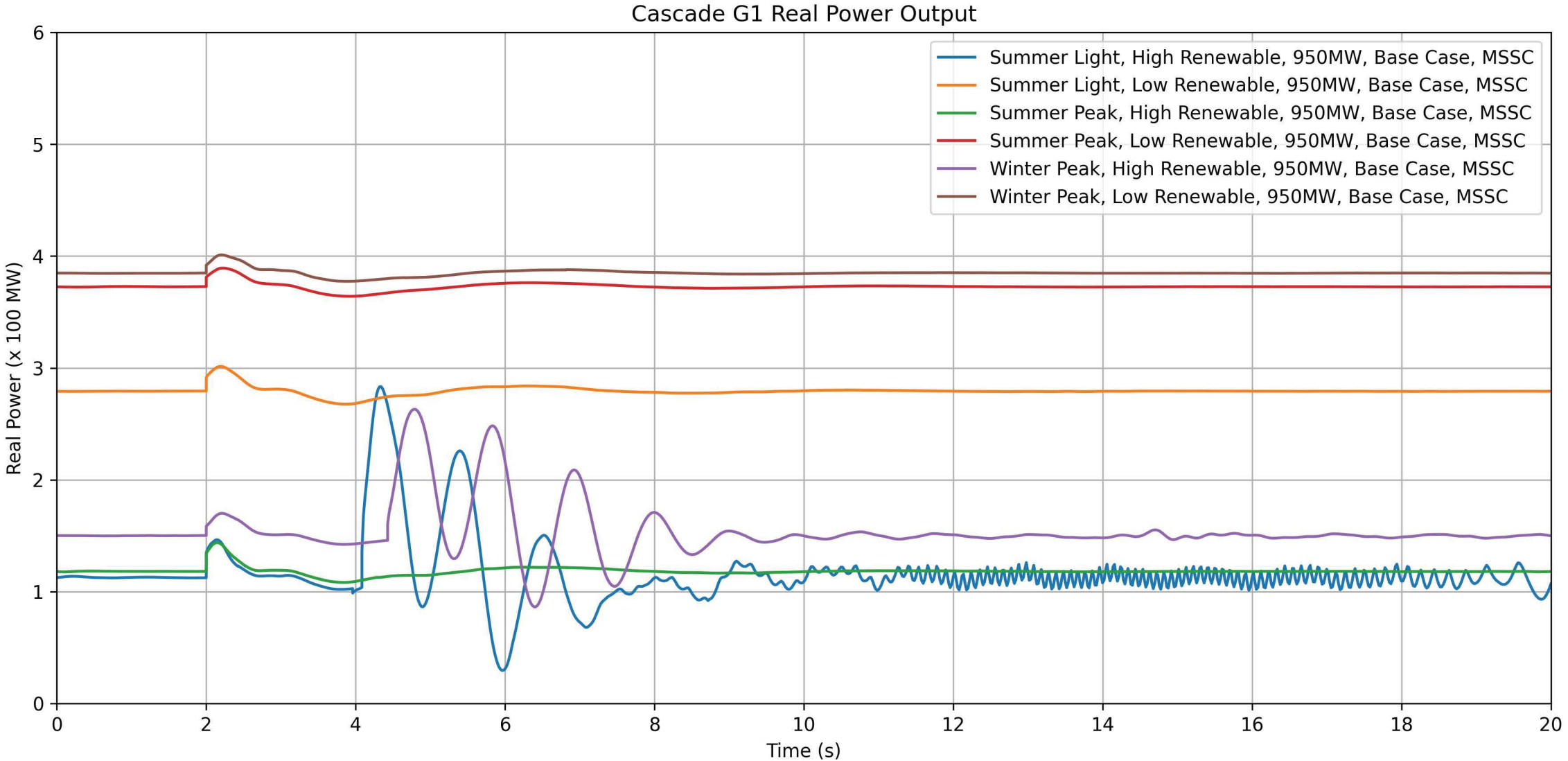

Shepard G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

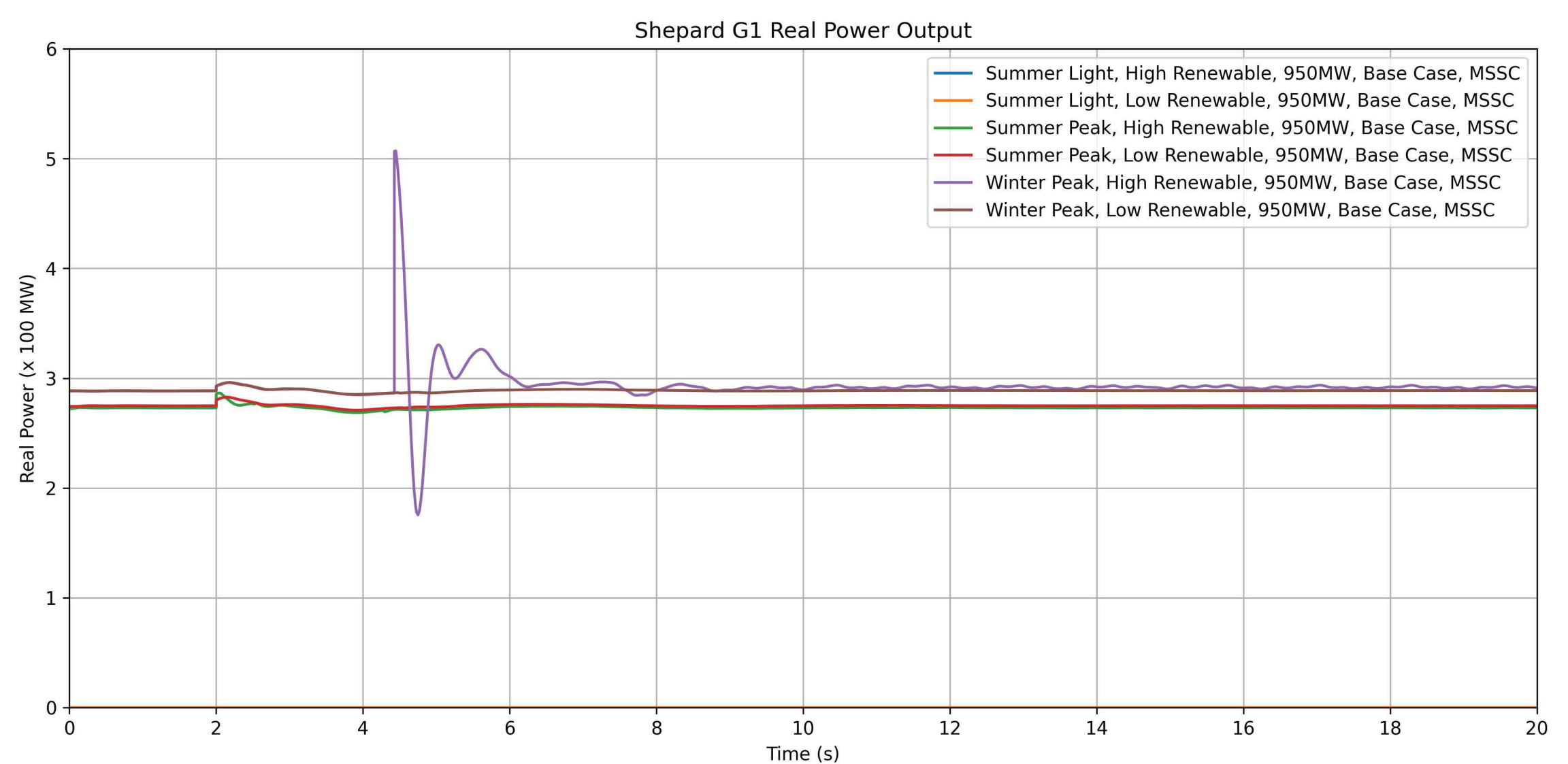

SEV G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

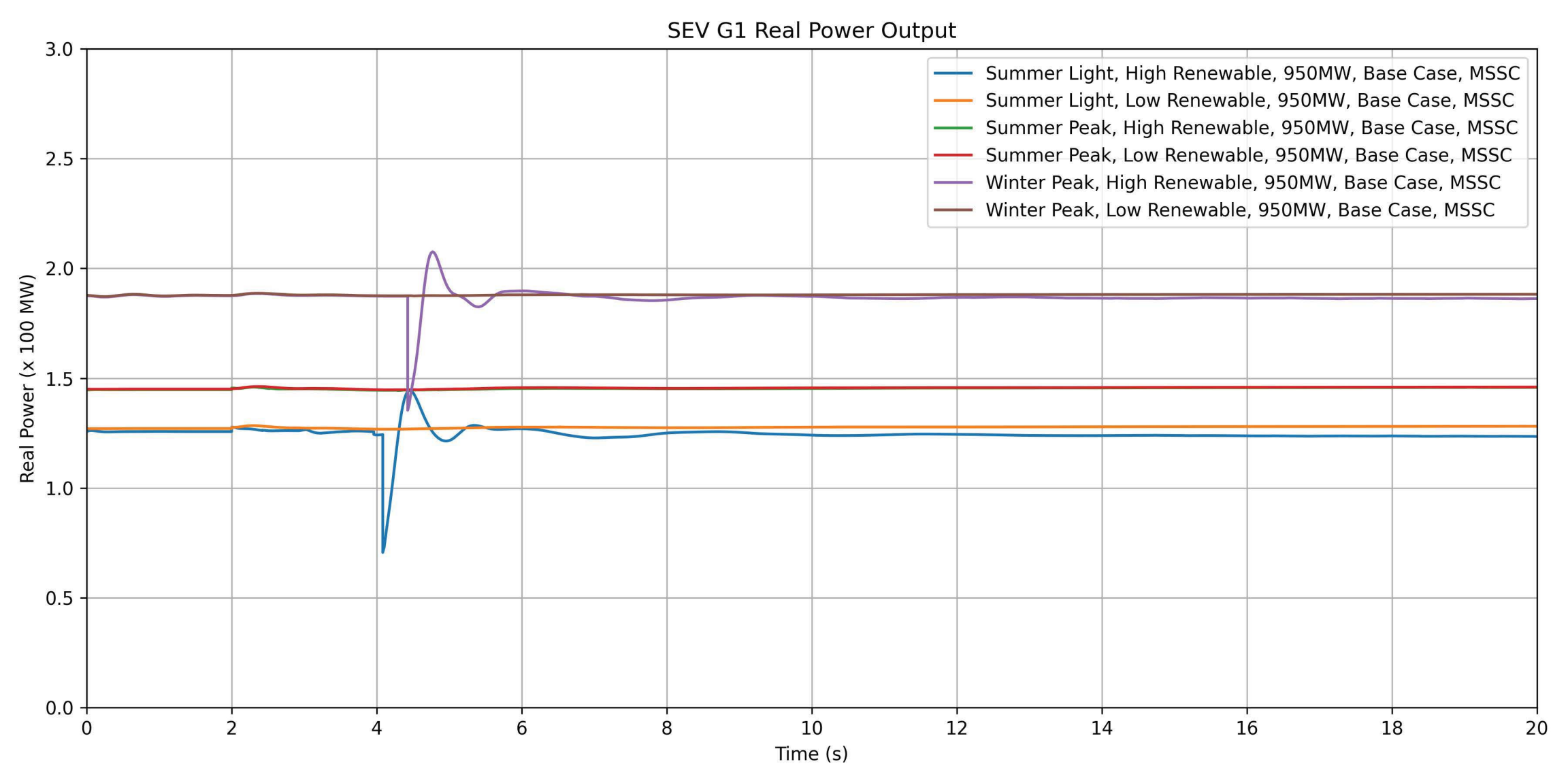

KCL G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

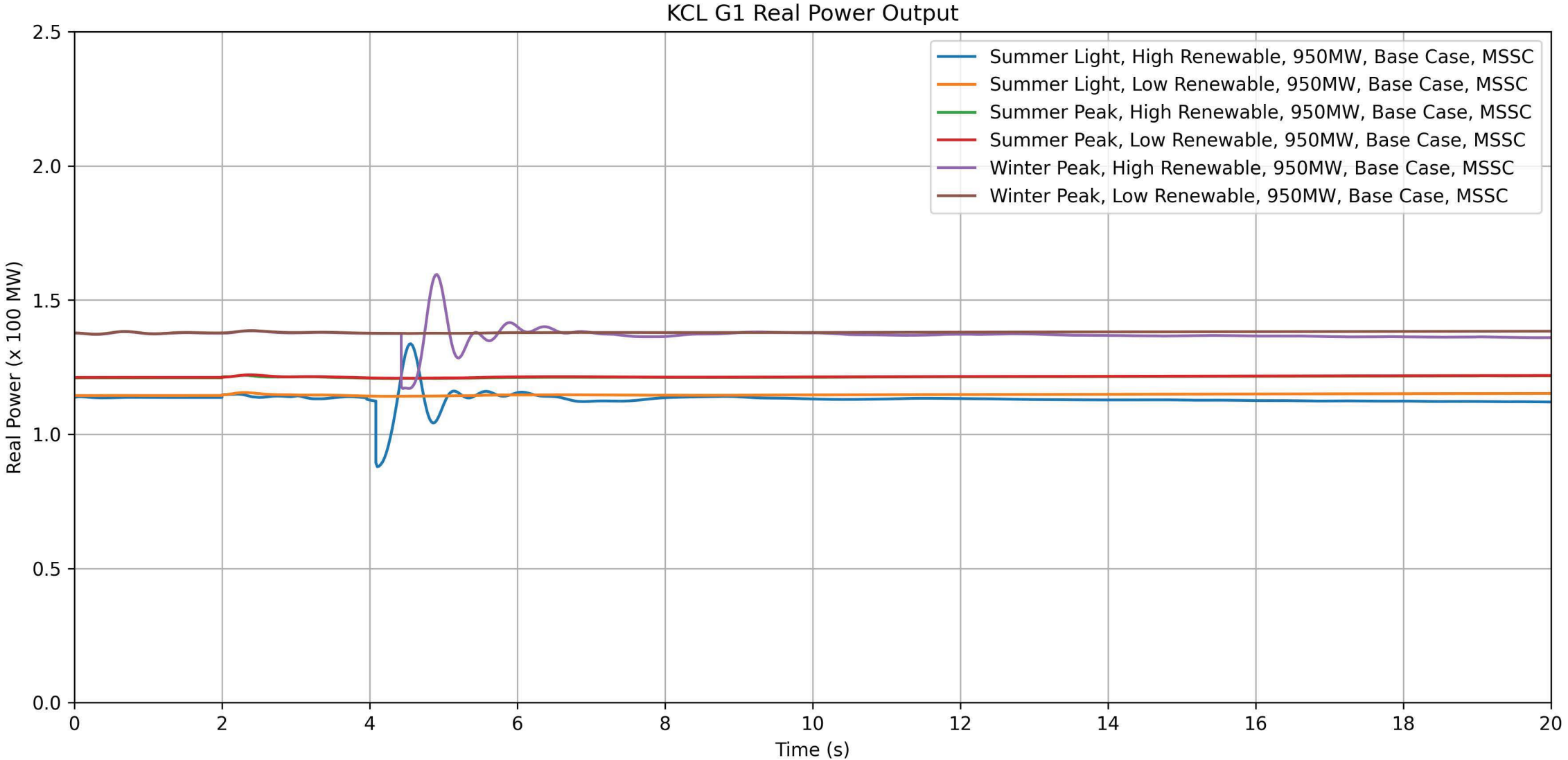

WAX G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

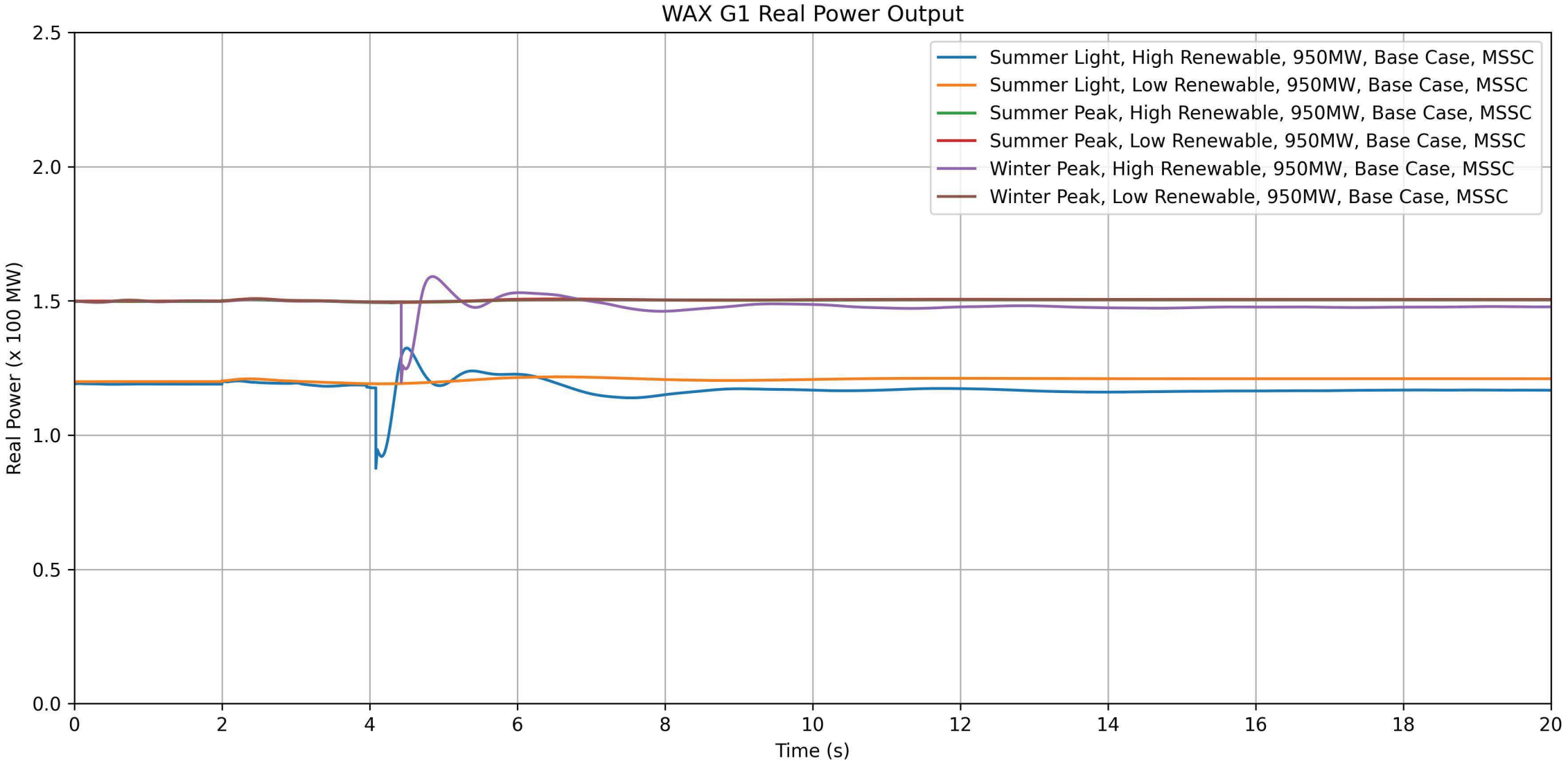

Genesee G3 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

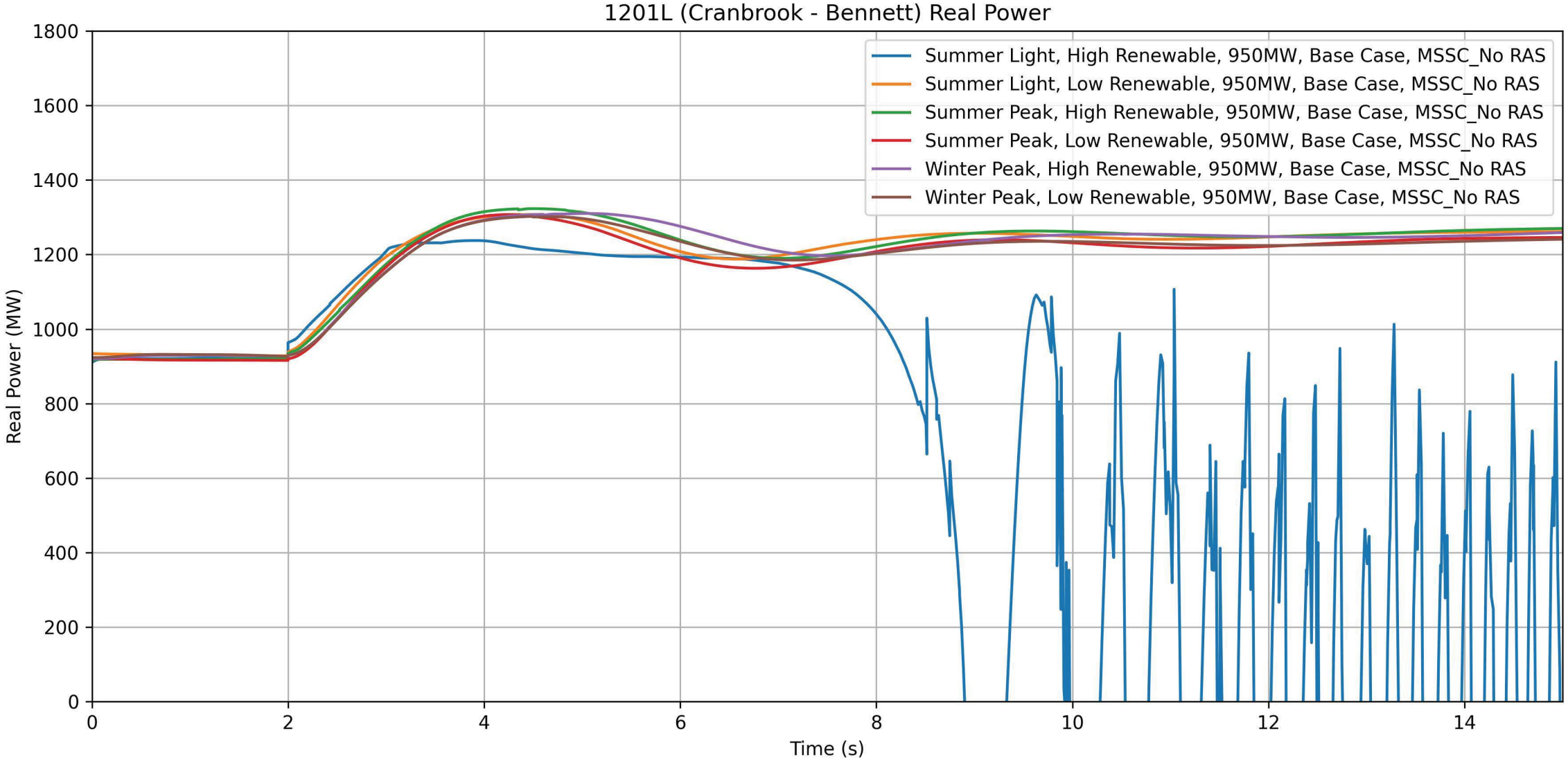

Cascade G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

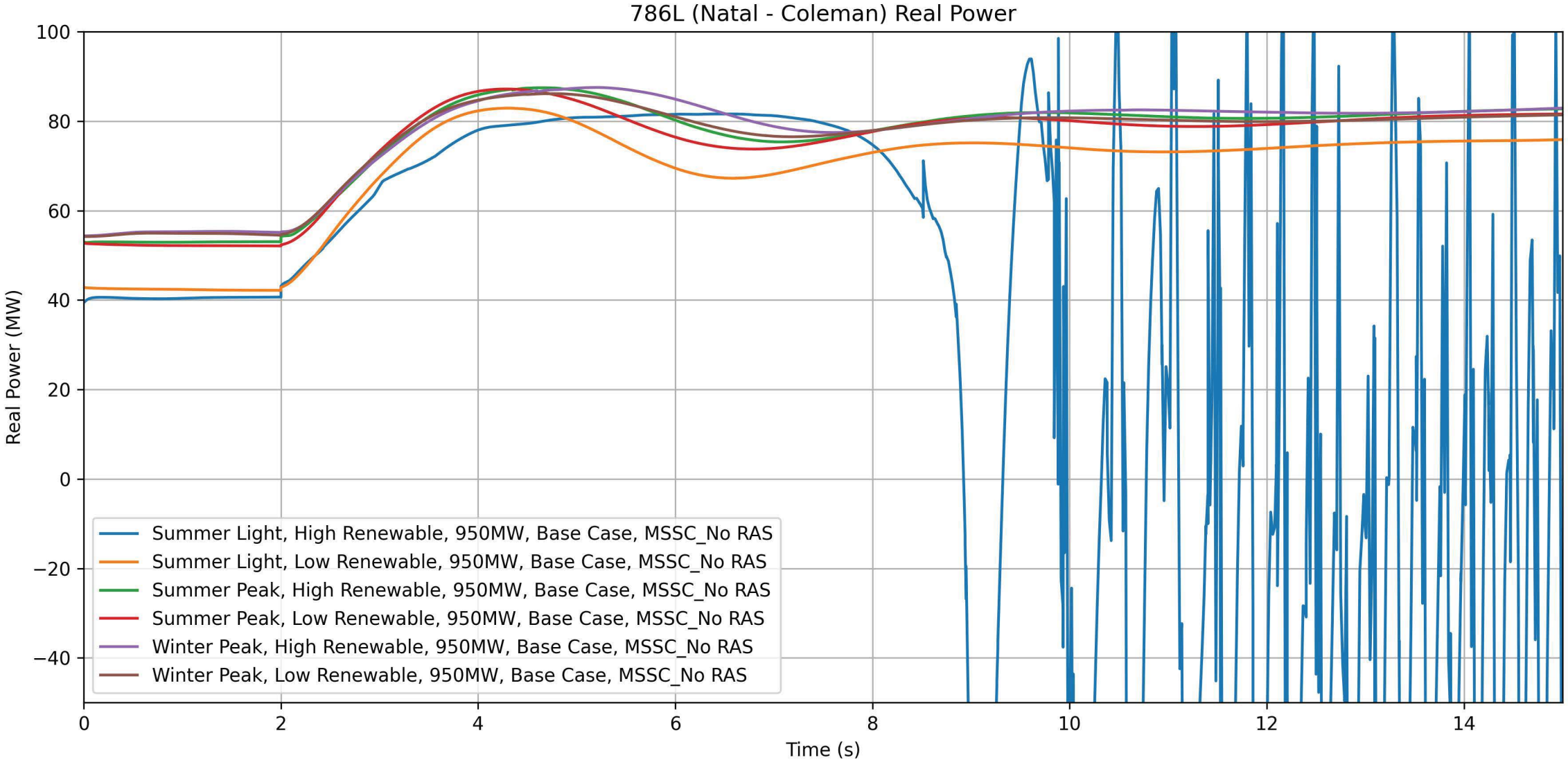

Shepard G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

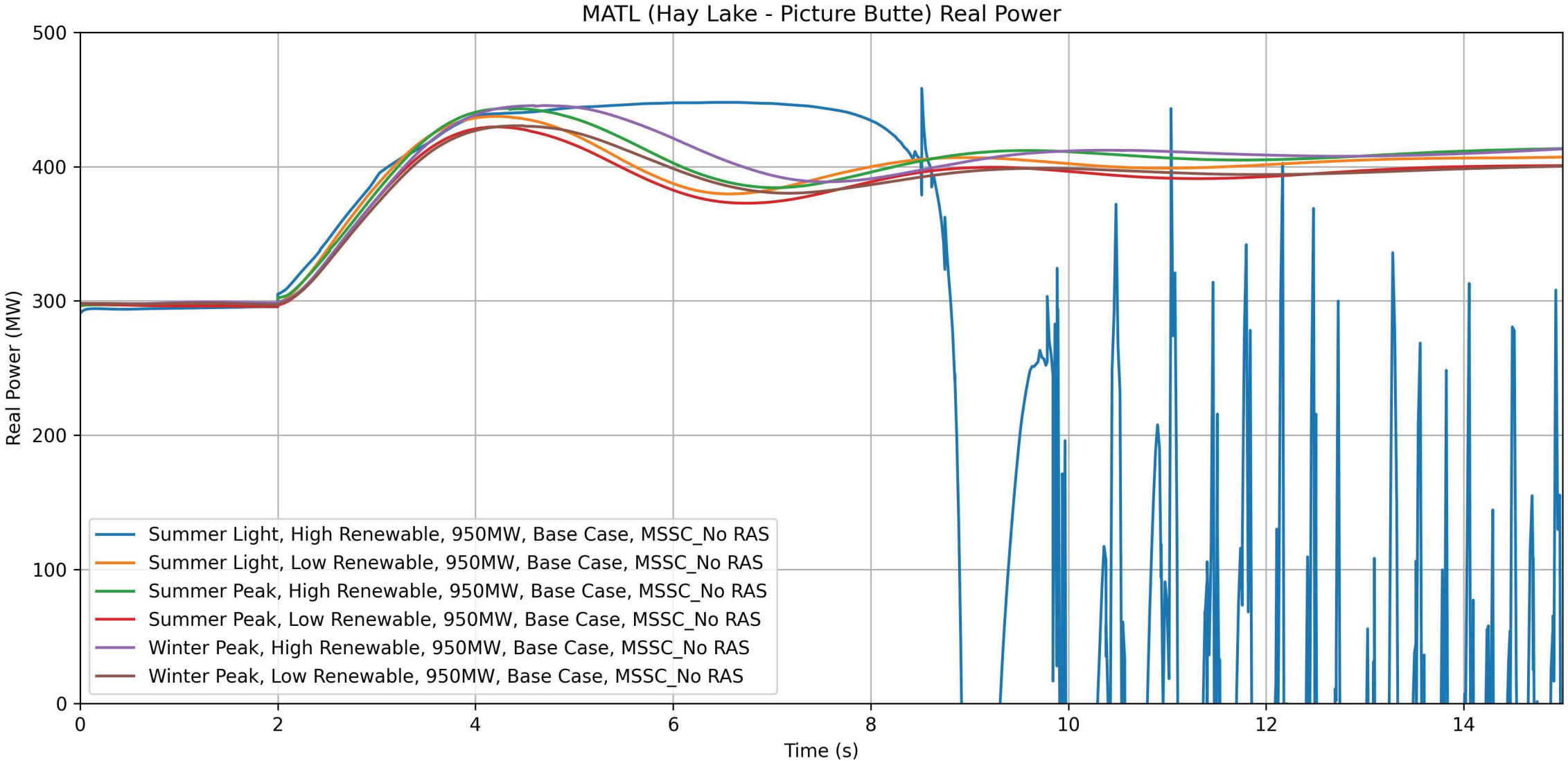

SEV G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

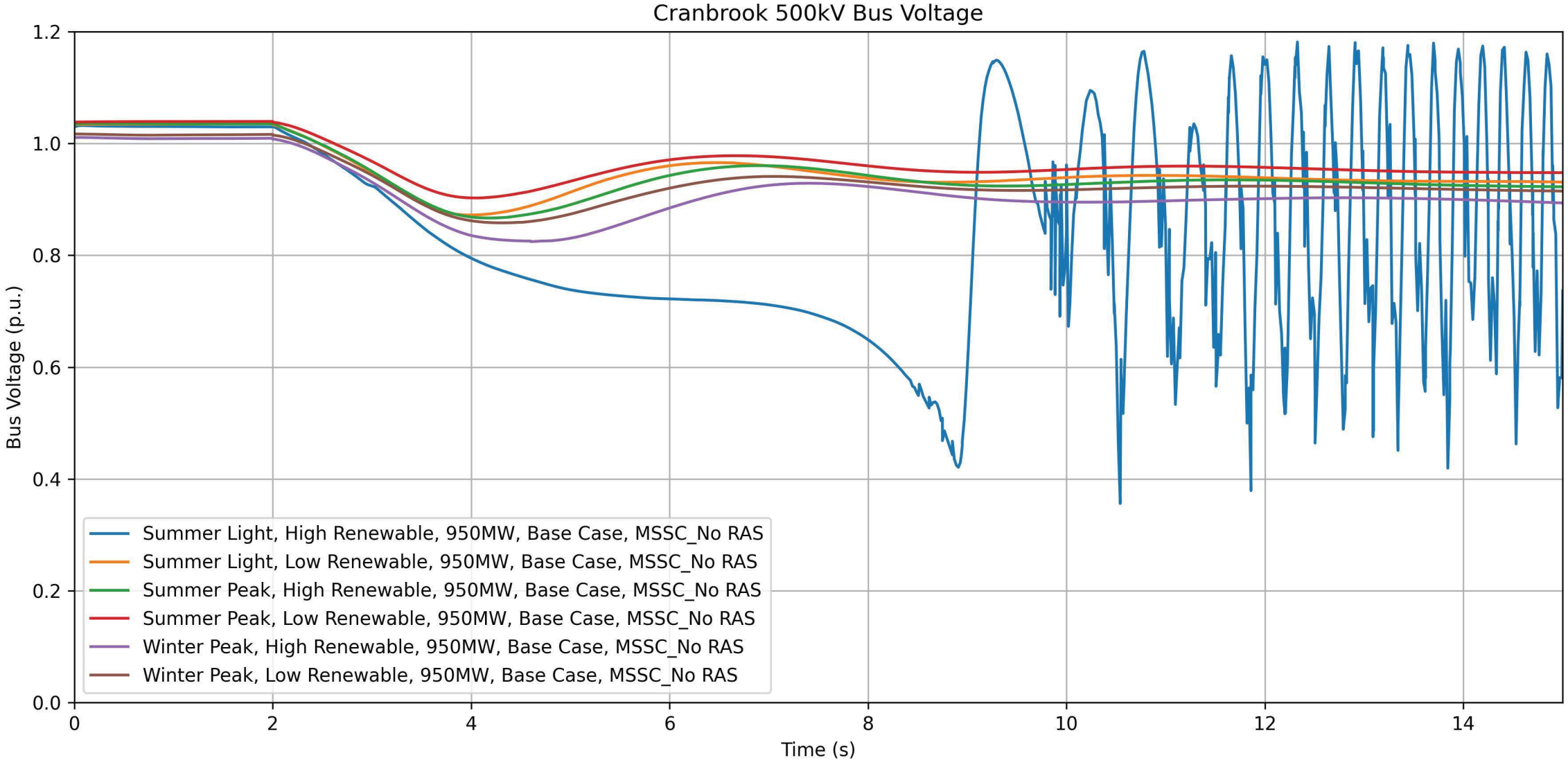

KCL G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

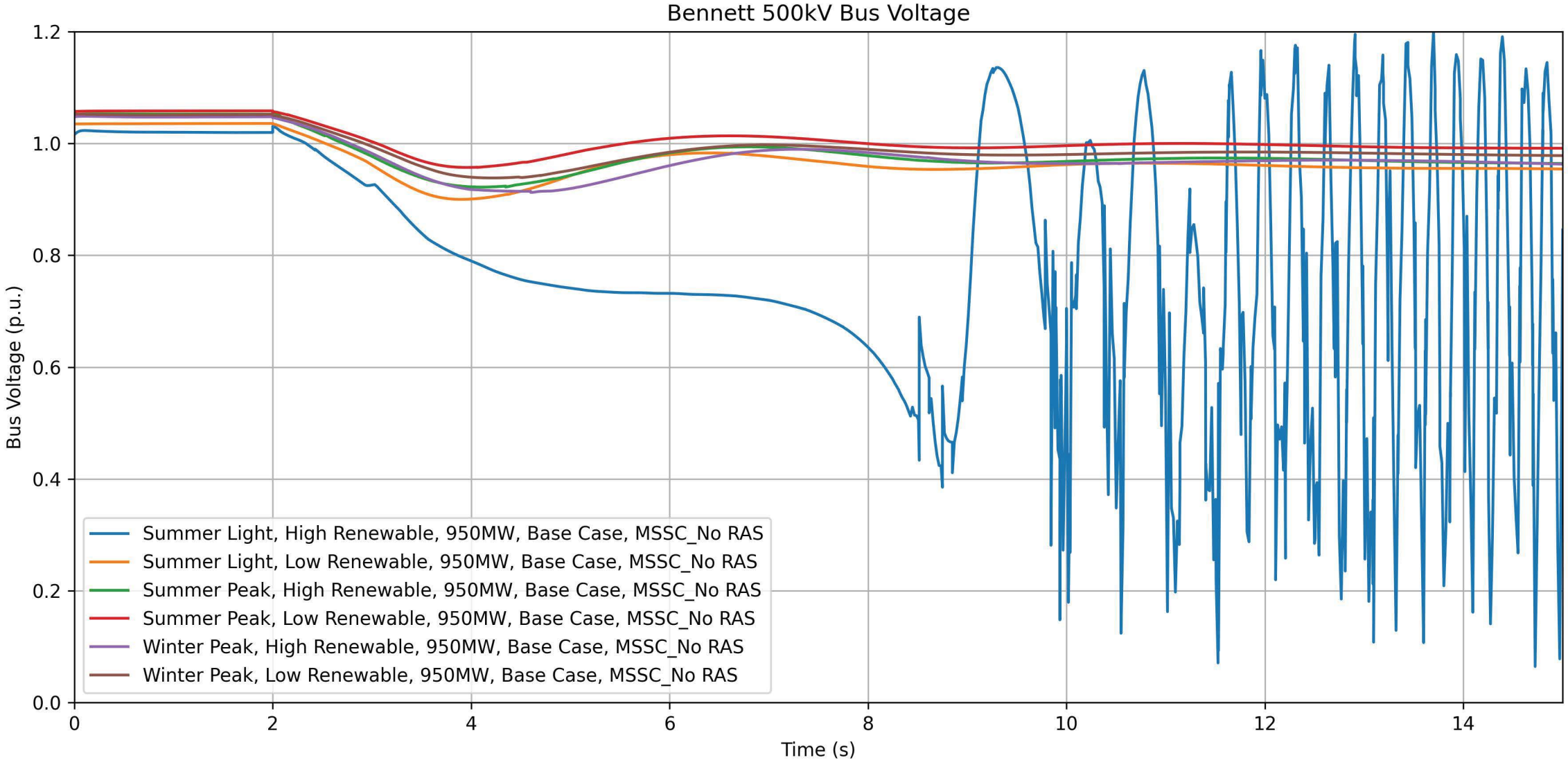

WAX G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC
Summer Light, Low Renewable, 950MW, Base Case, MSSC
Summer Peak, High Renewable, 950MW, Base Case, MSSC
Summer Peak, Low Renewable, 950MW, Base Case, MSSC
Winter Peak, High Renewable, 950MW, Base Case, MSSC
Winter Peak, Low Renewable, 950MW, Base Case, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

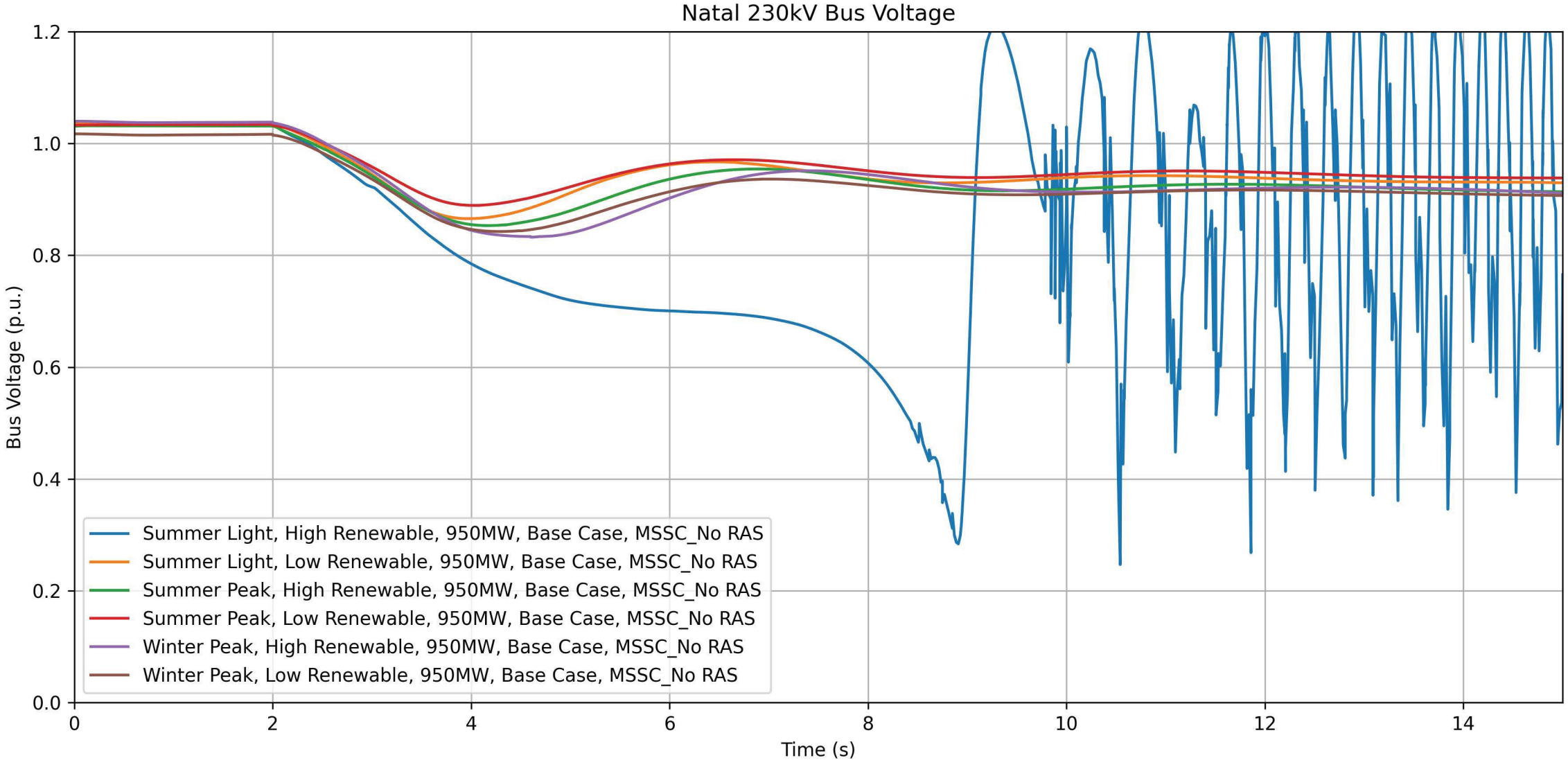

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14

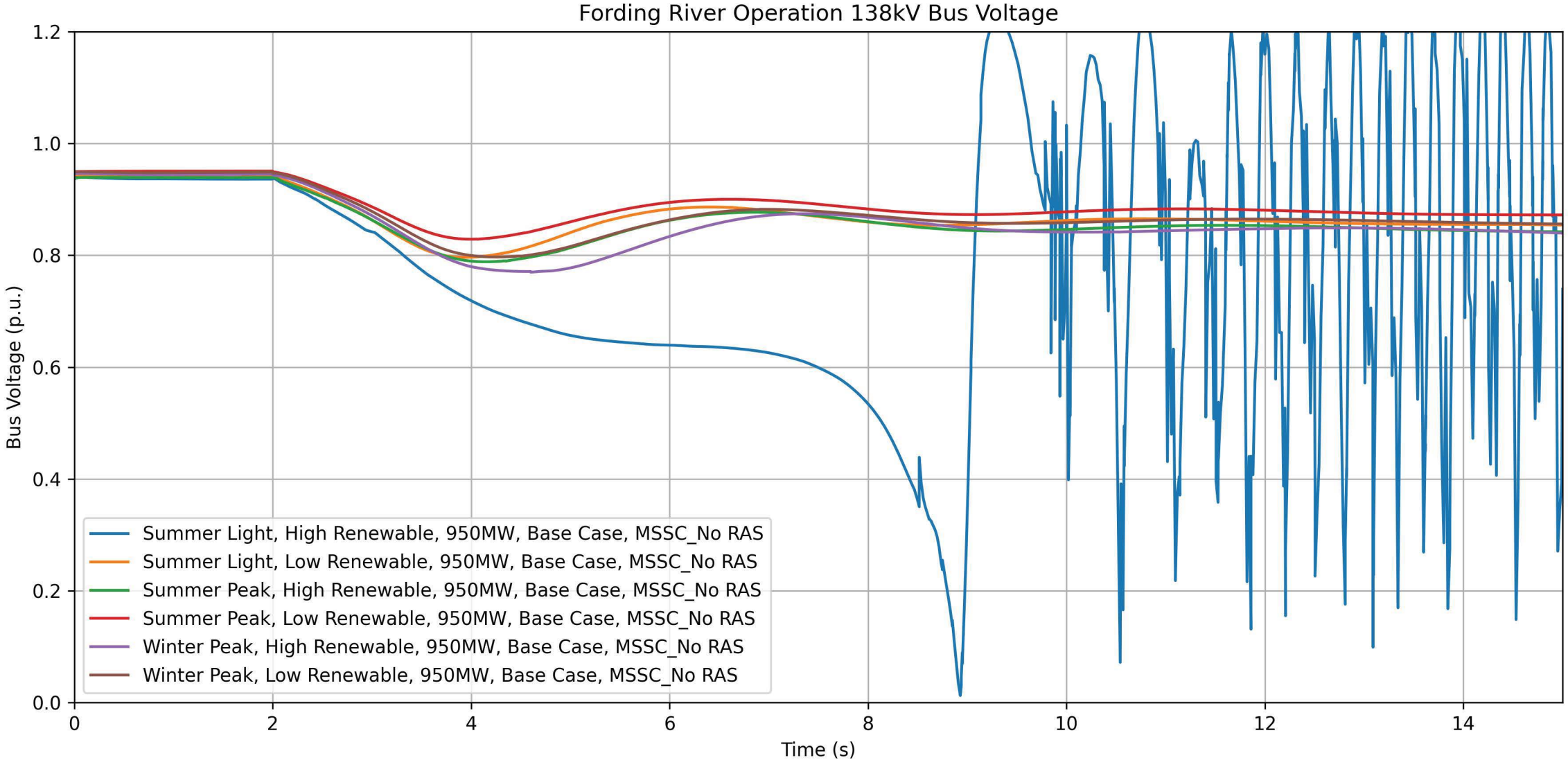

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

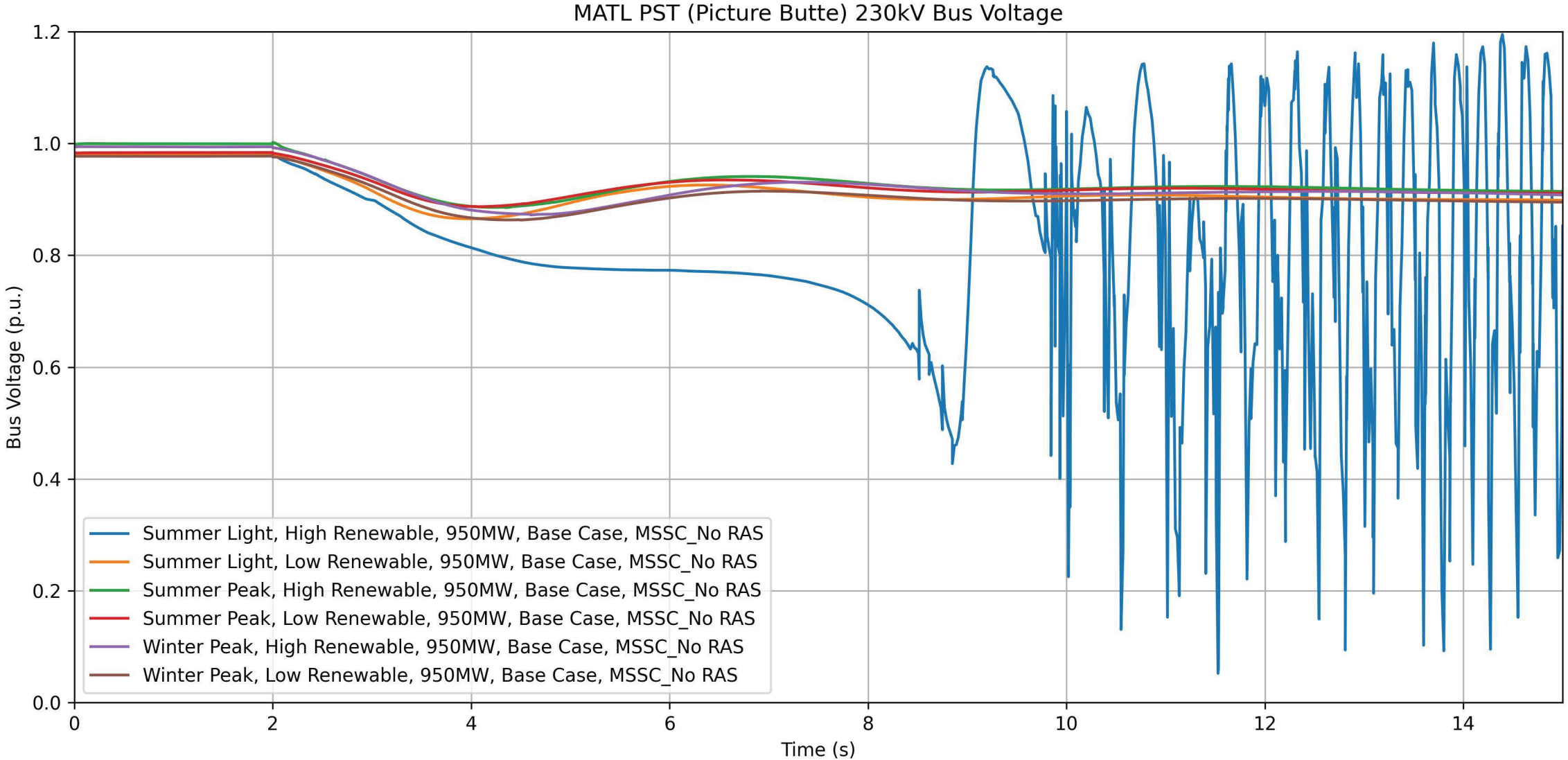

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

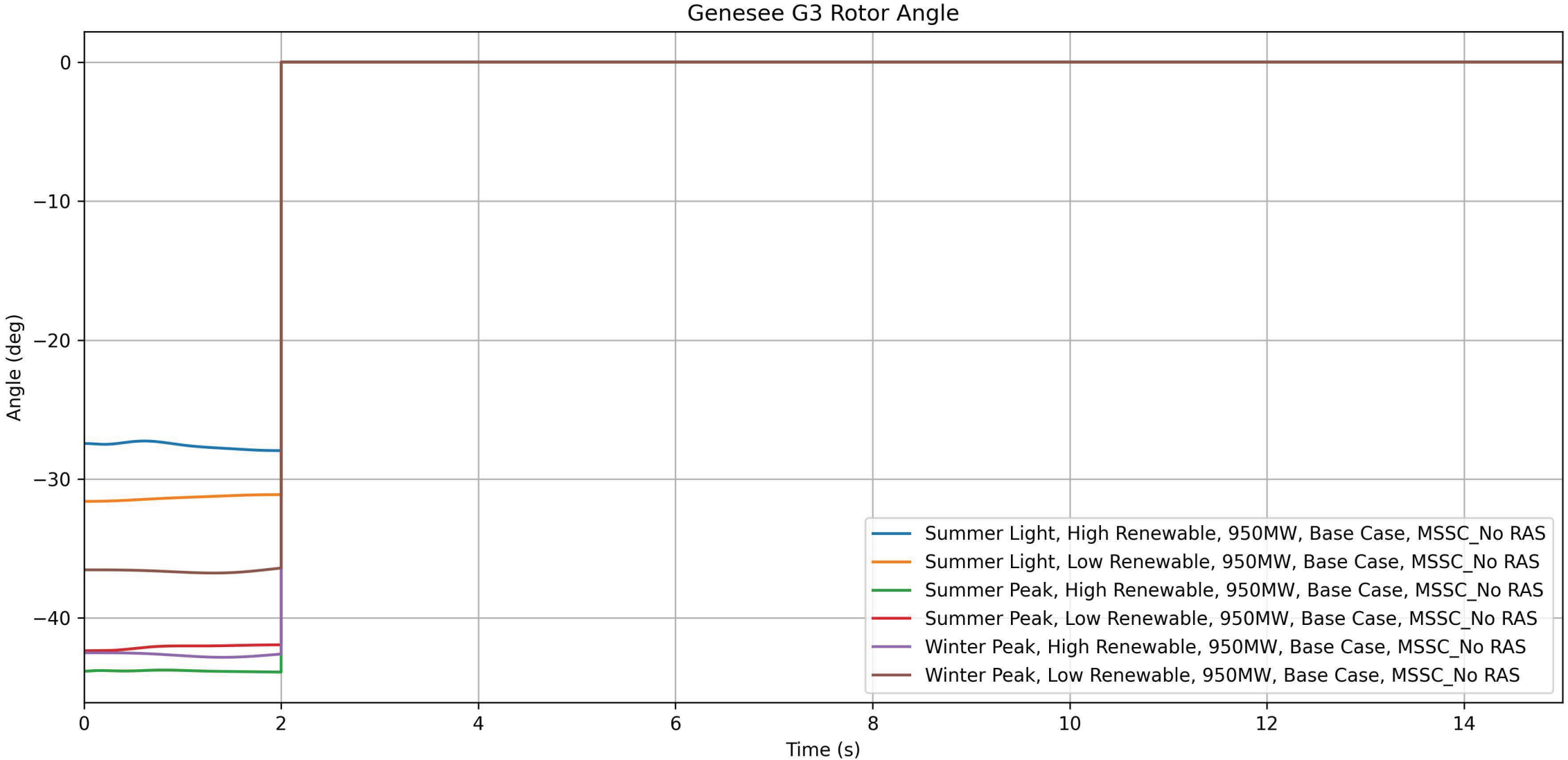

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

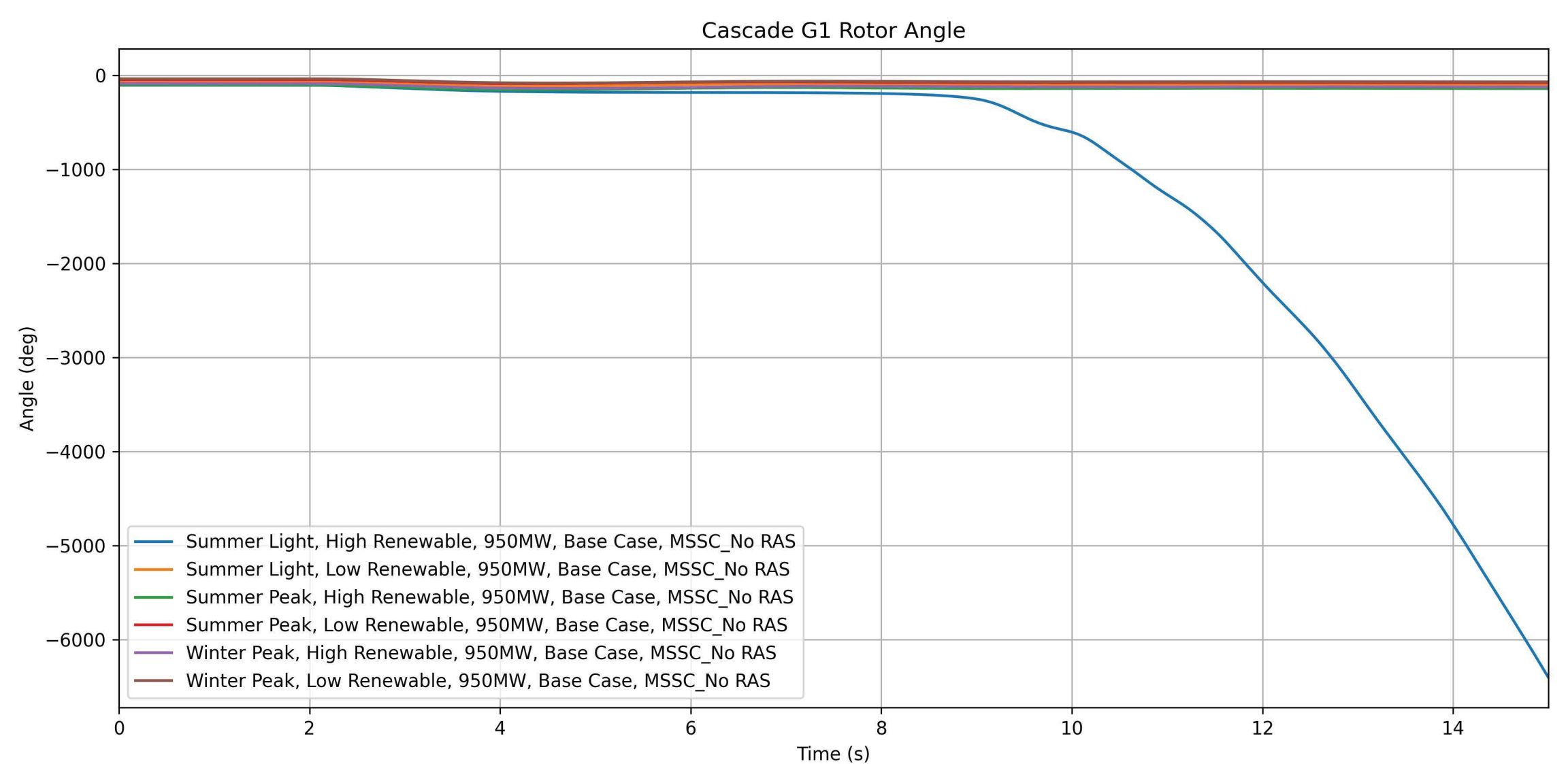

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

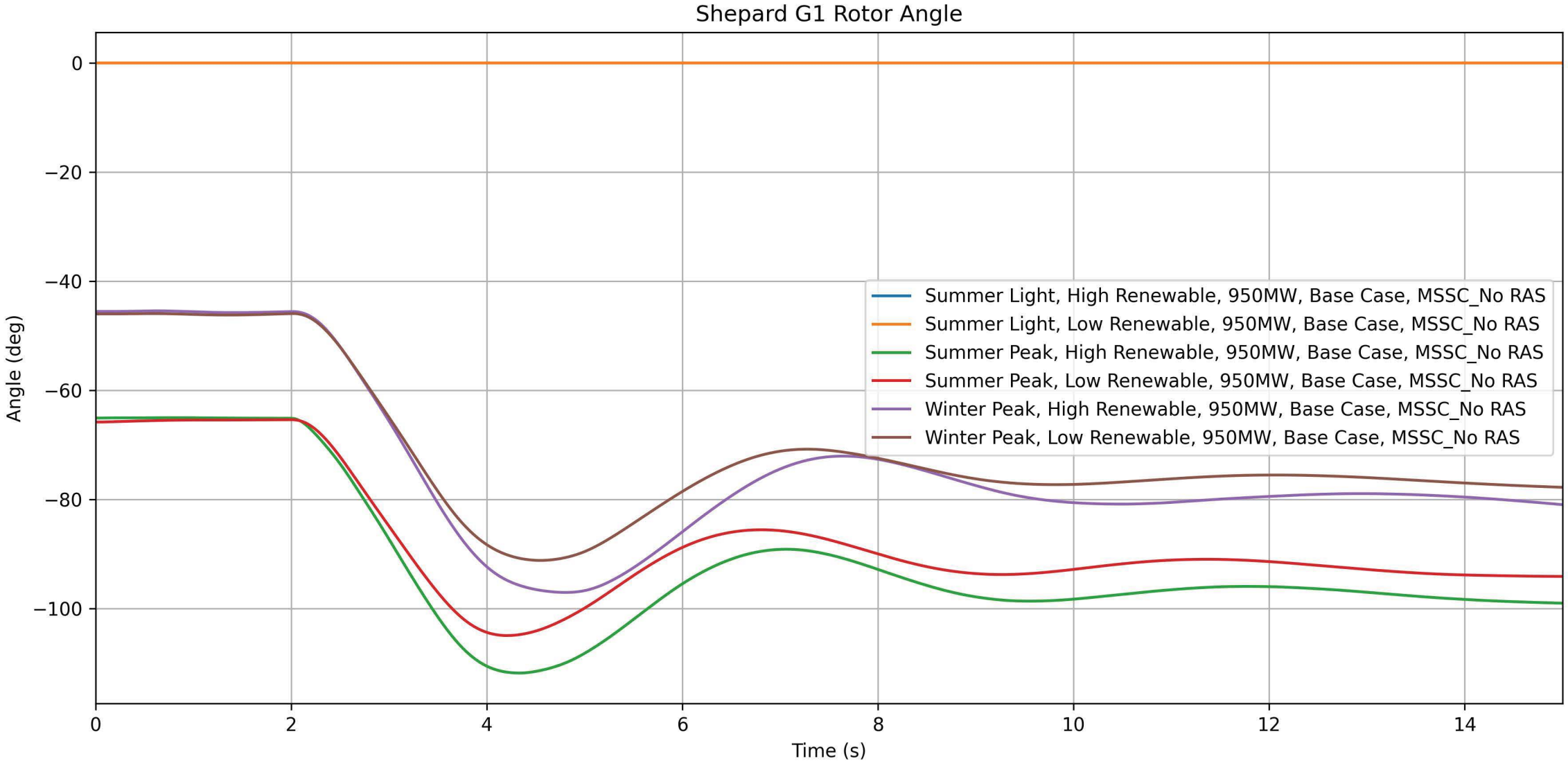

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

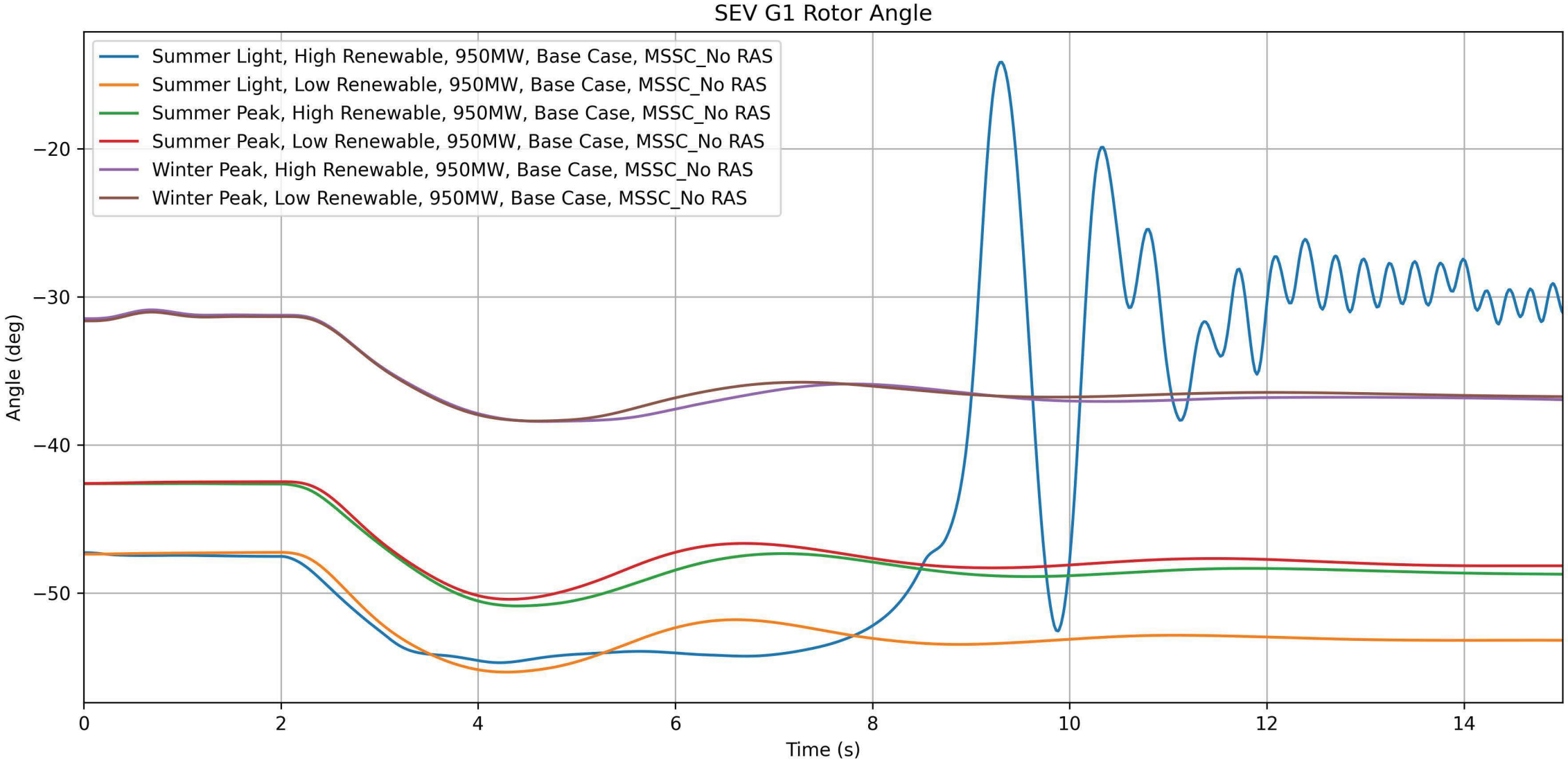

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

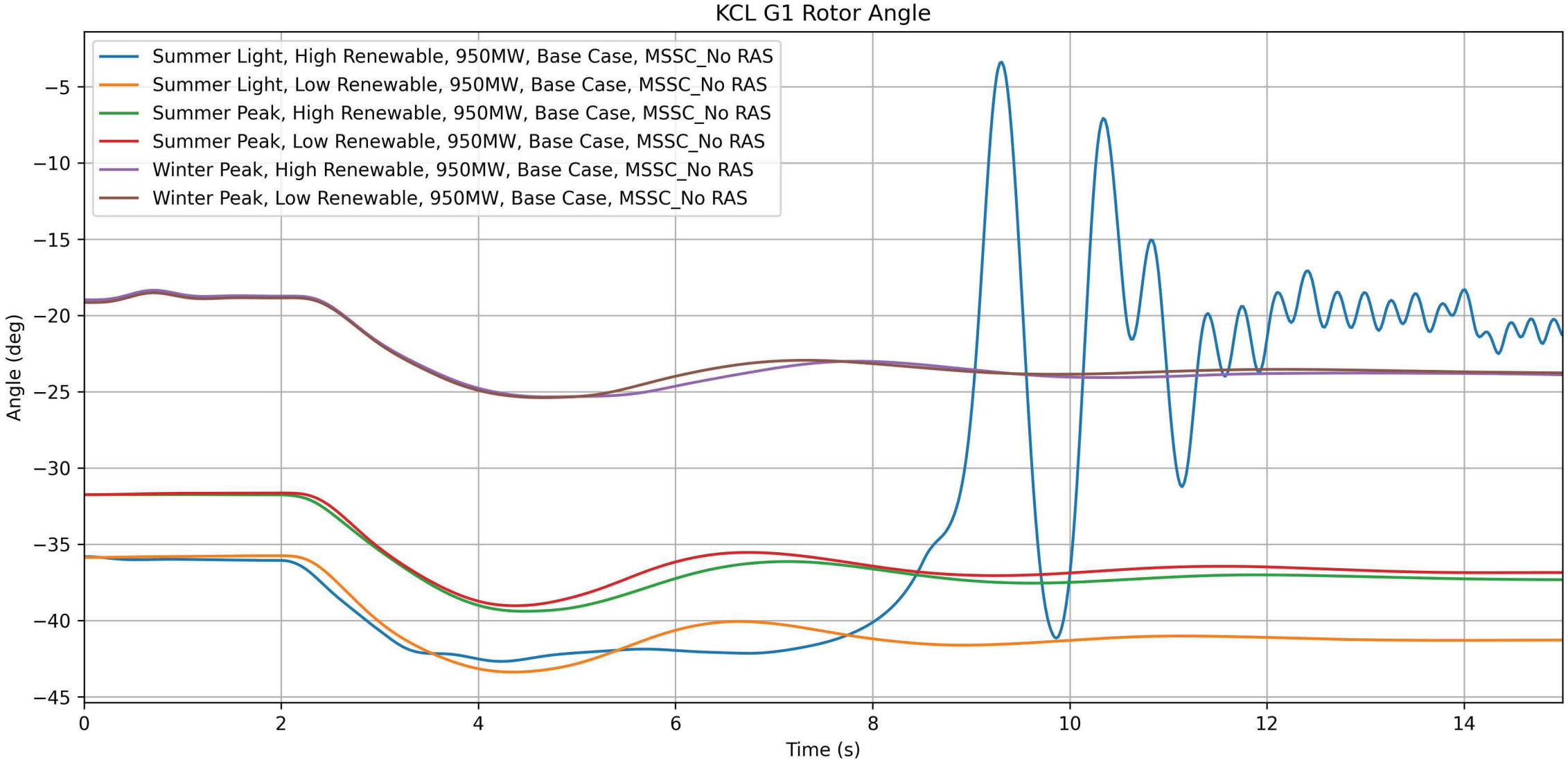

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

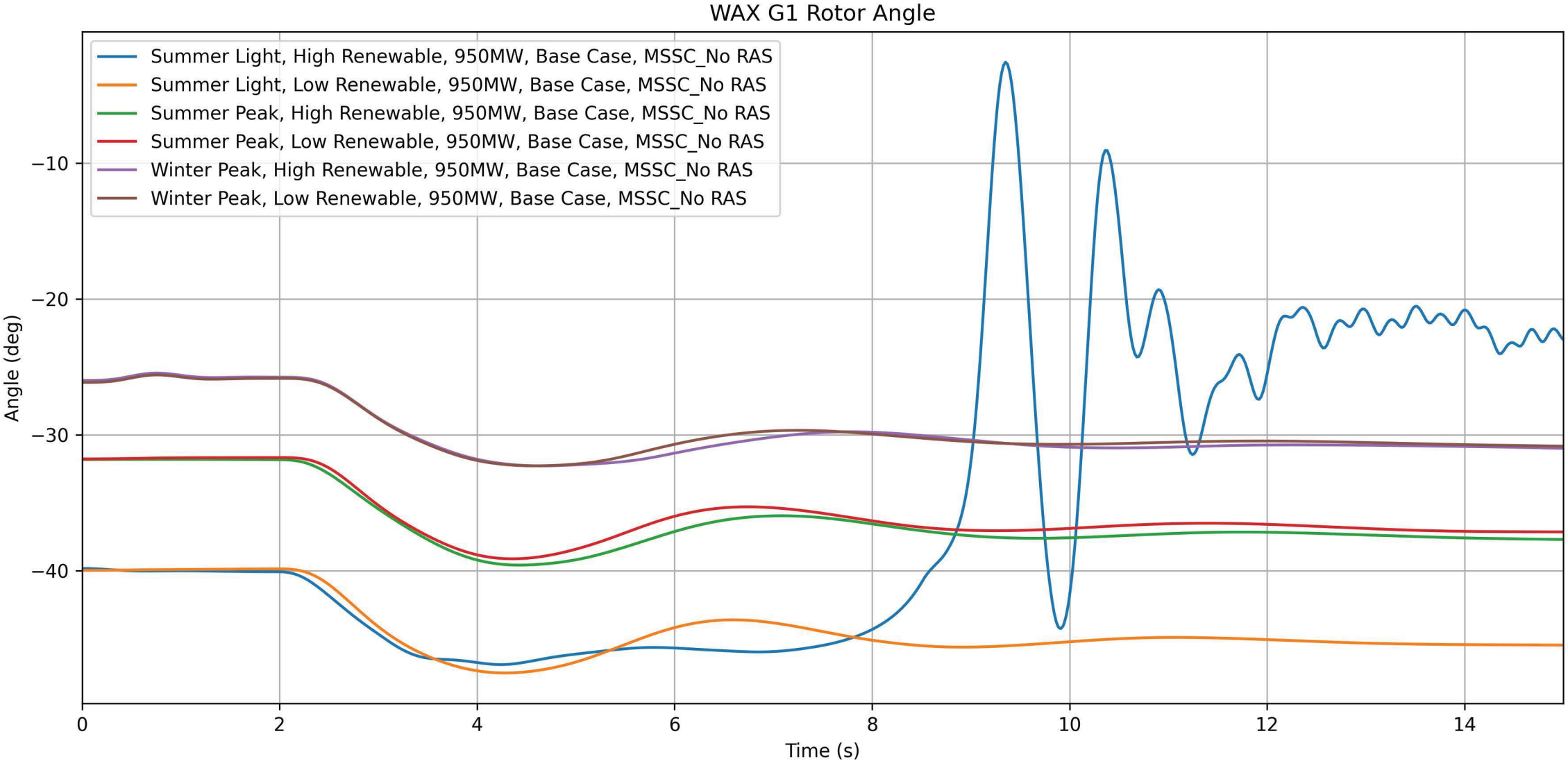

Genesee G3 Rotor Angle
Angle (deg)
Time (s)
0
−10
−20
−30
−40
0
2
4
6
8
10
12
14
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

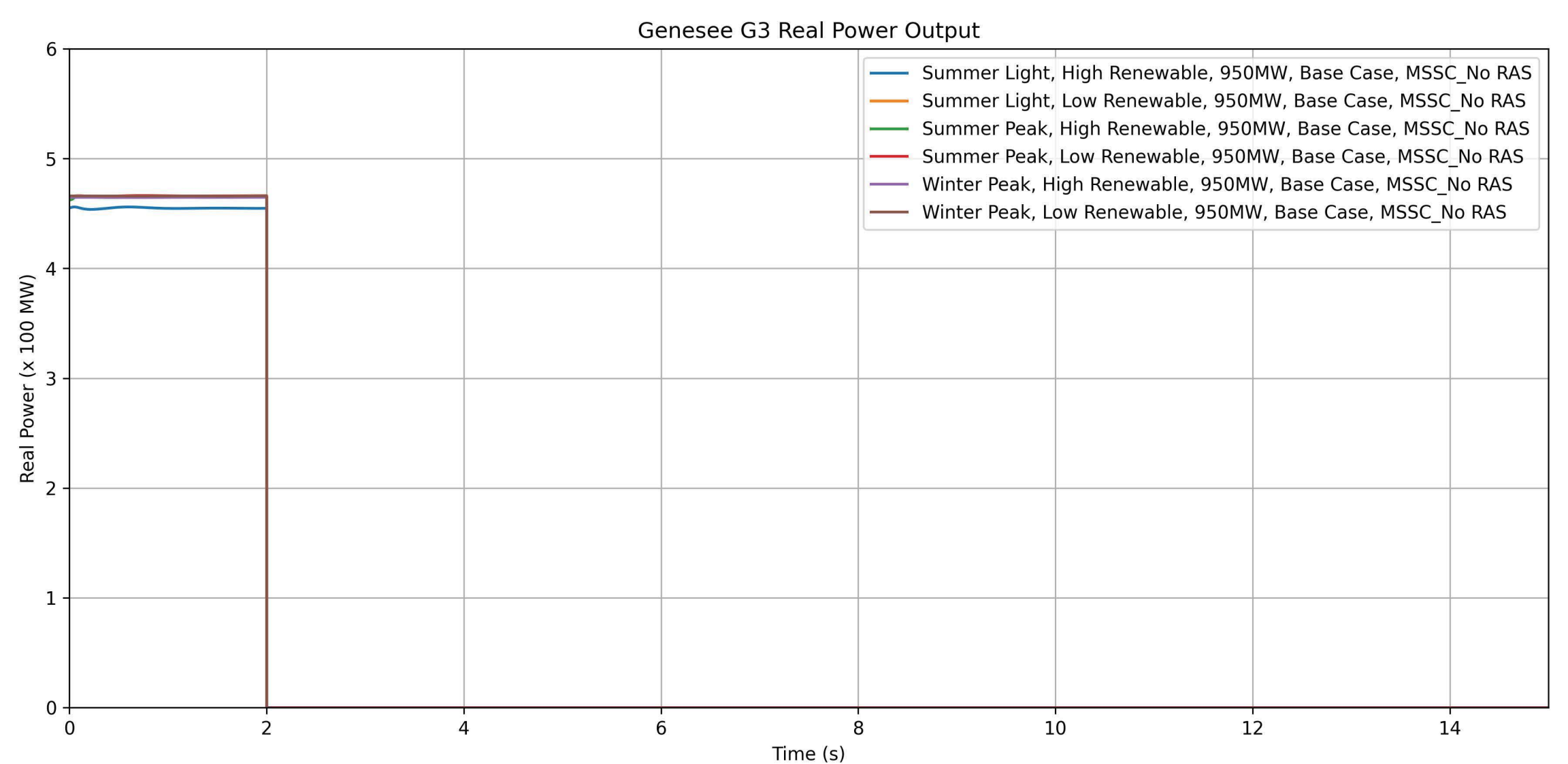

Cascade G1 Rotor Angle
Angle (deg)
0
−1000
−2000
−3000
−4000
−5000
−6000
0
2
4
6
8
10
12
14
Time (s)
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

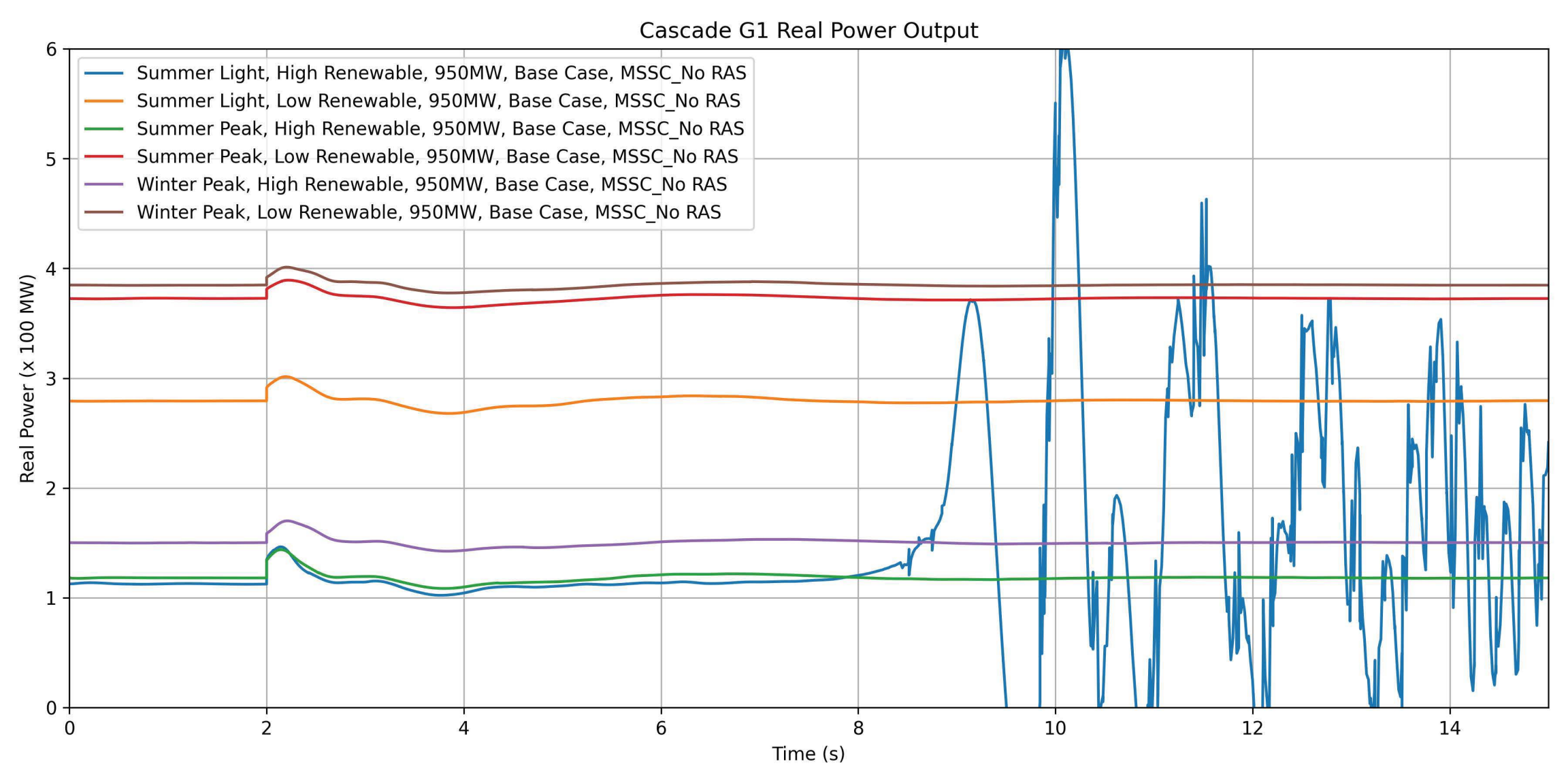

Shepard G1 Rotor Angle
0
−20
−40
−60
−80
−100
Angle (deg)
0
2
4
6
8
10
12
14
Time (s)
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS

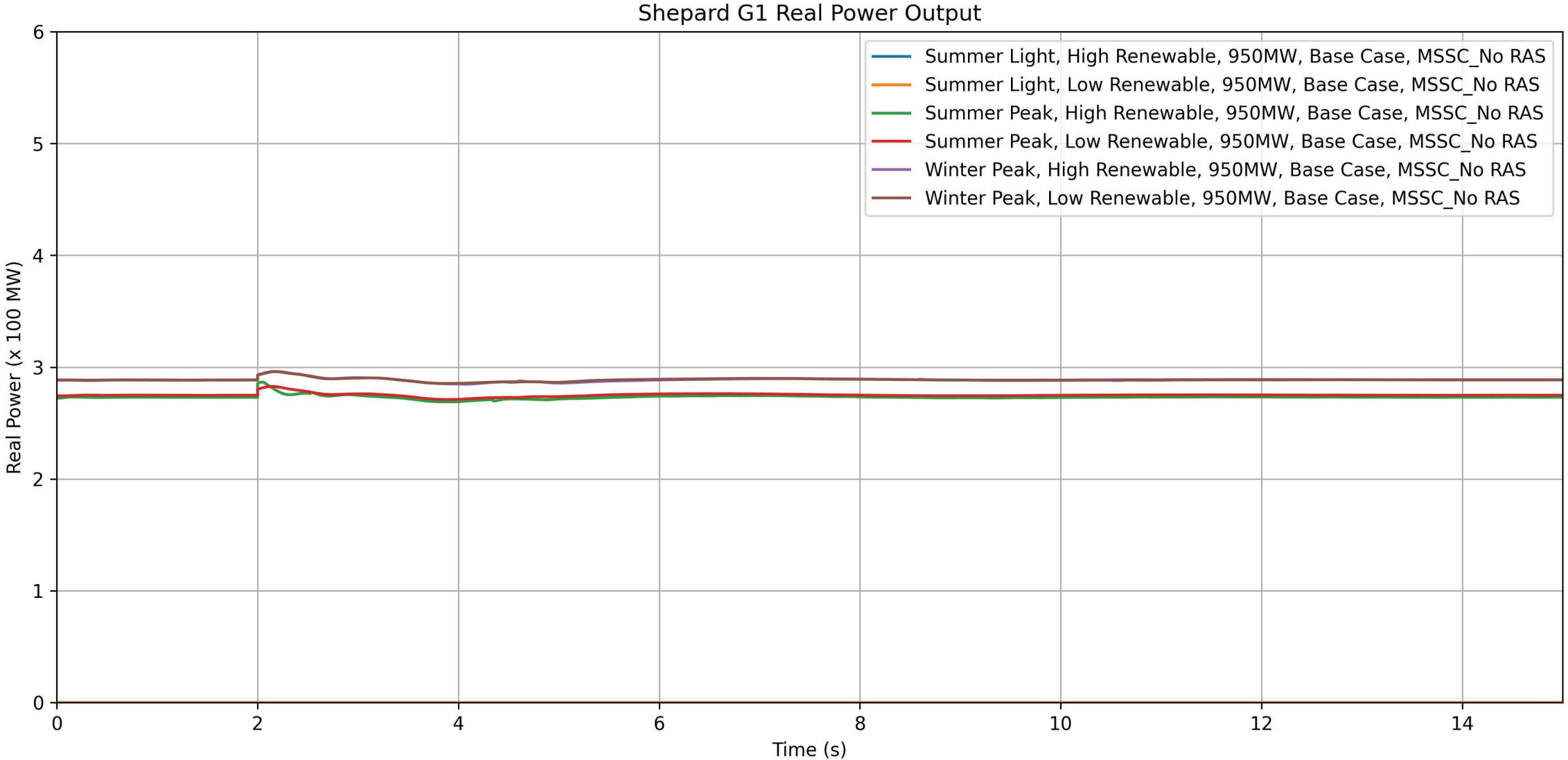

SEV G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Angle (deg)
−20
−30
−40
−50
0
2
4
6
8
10
12
14
Time (s)

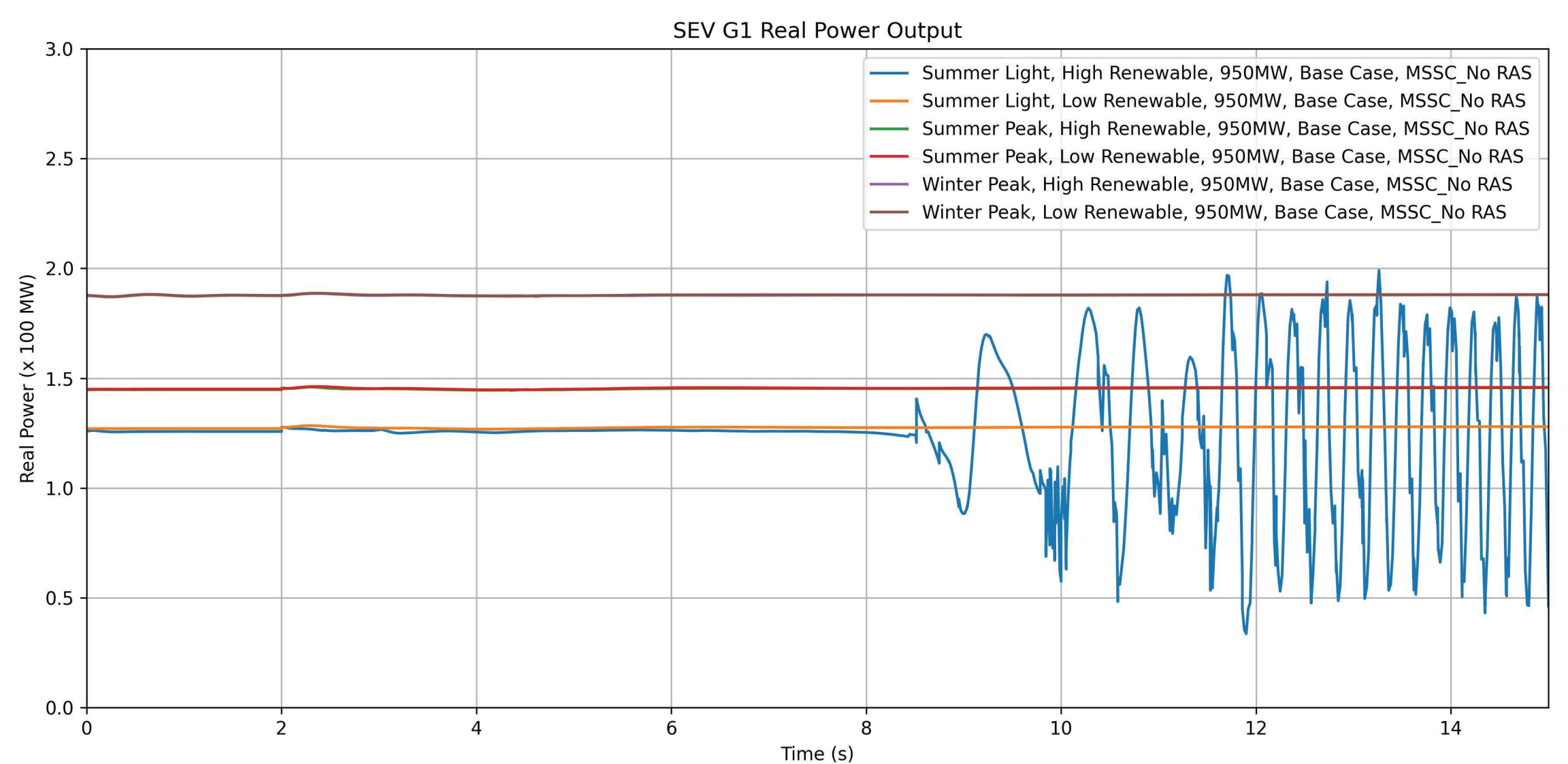

KCL G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Angle (deg)
−5
−10
−15
−20
−25
−30
−35
−40
−45
0
2
4
6
8
10
12
14
Time (s)

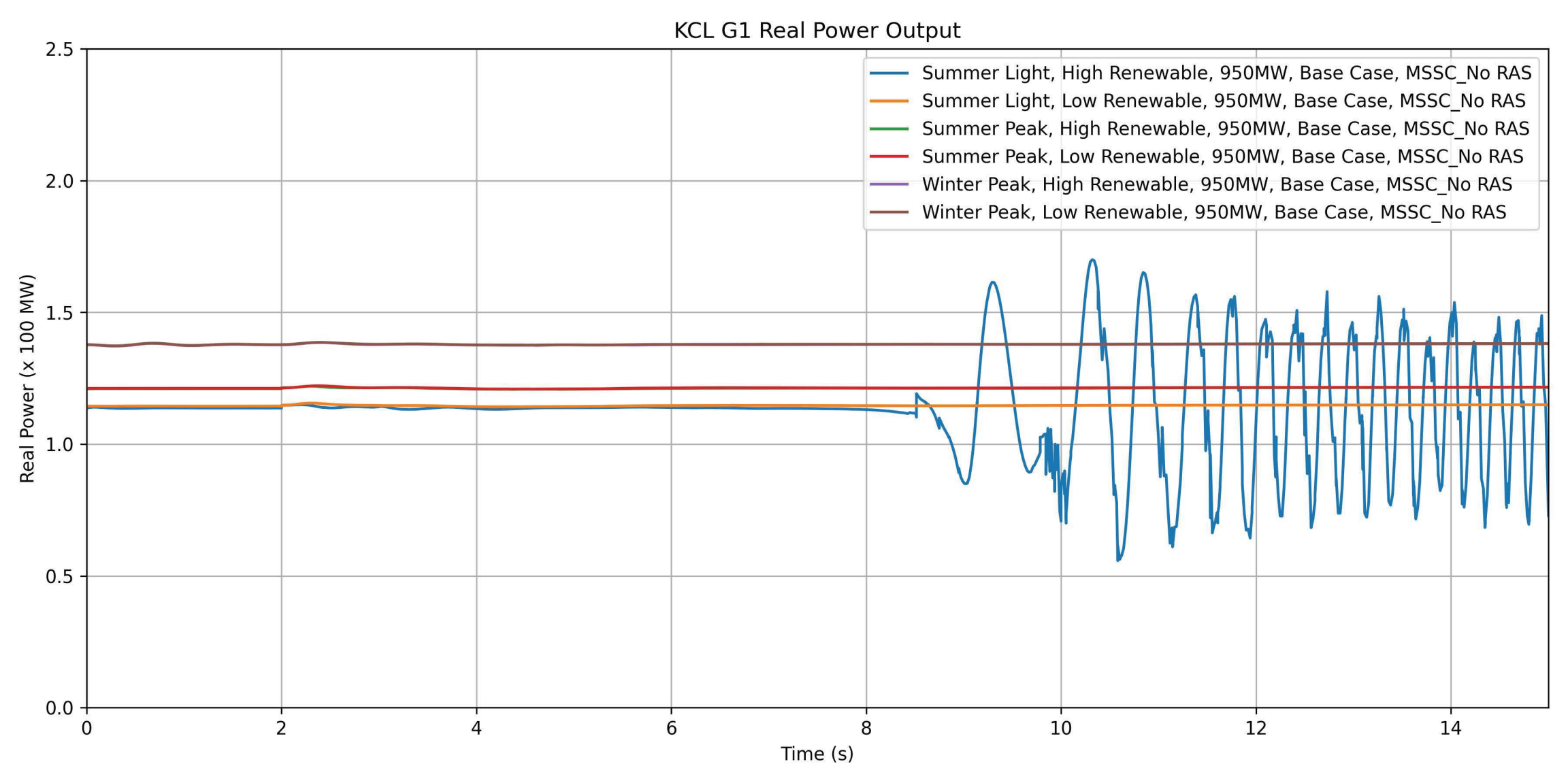

WAX G1 Rotor Angle
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Angle (deg)
−10
−20
−30
−40
0
2
4
6
8
10
12
14
Time (s)

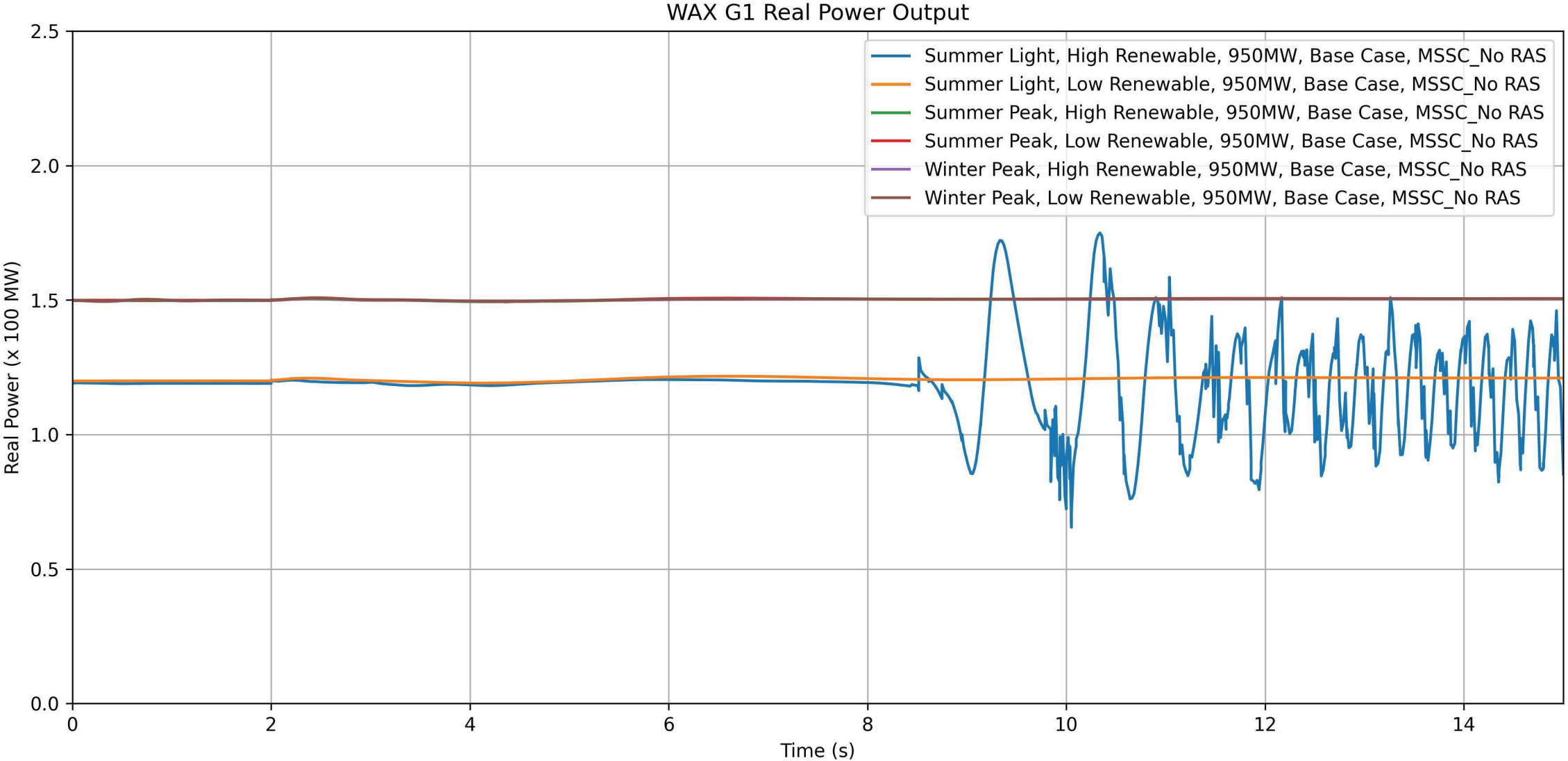

Genesee G3 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14

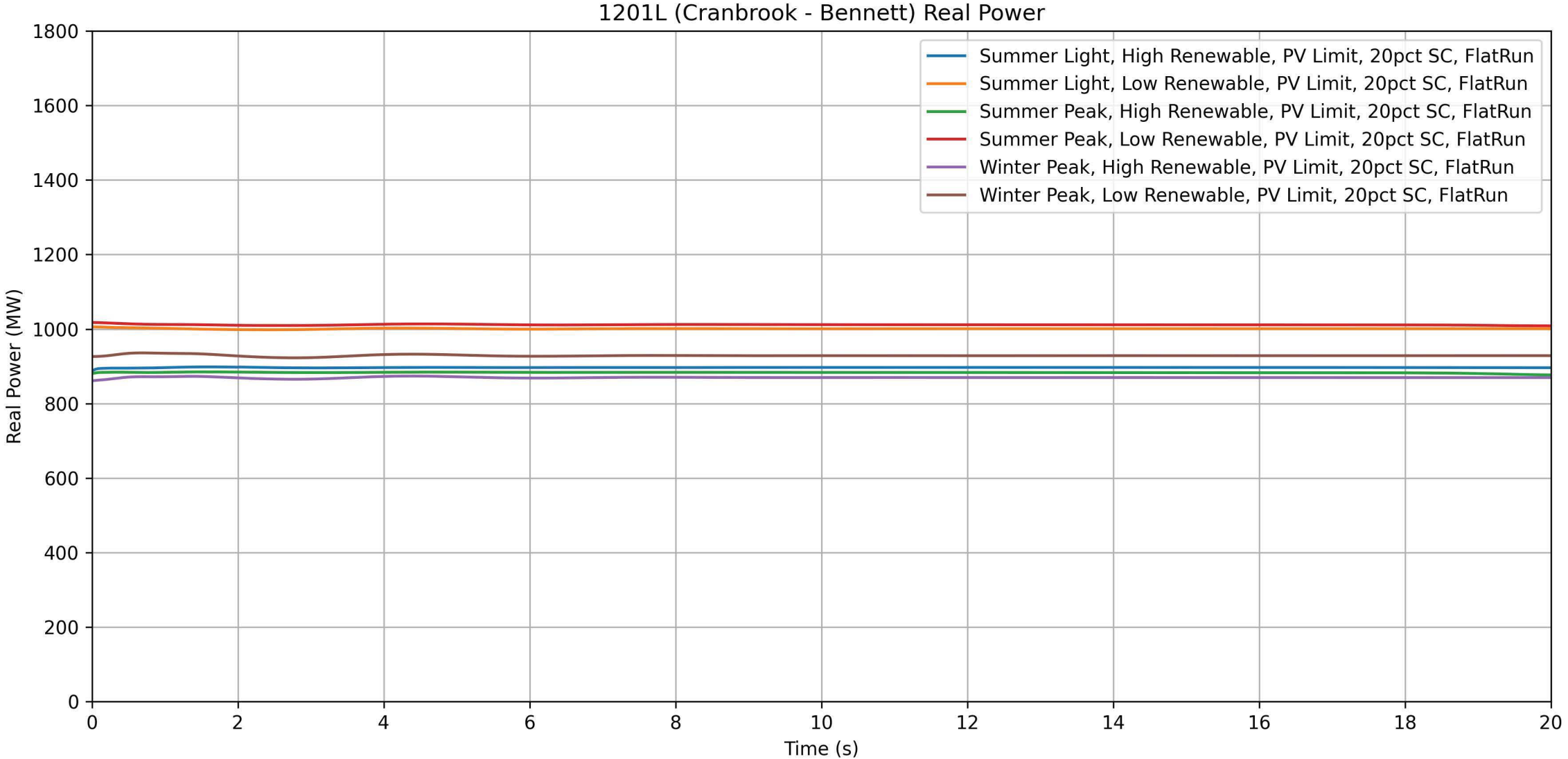

Cascade G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14

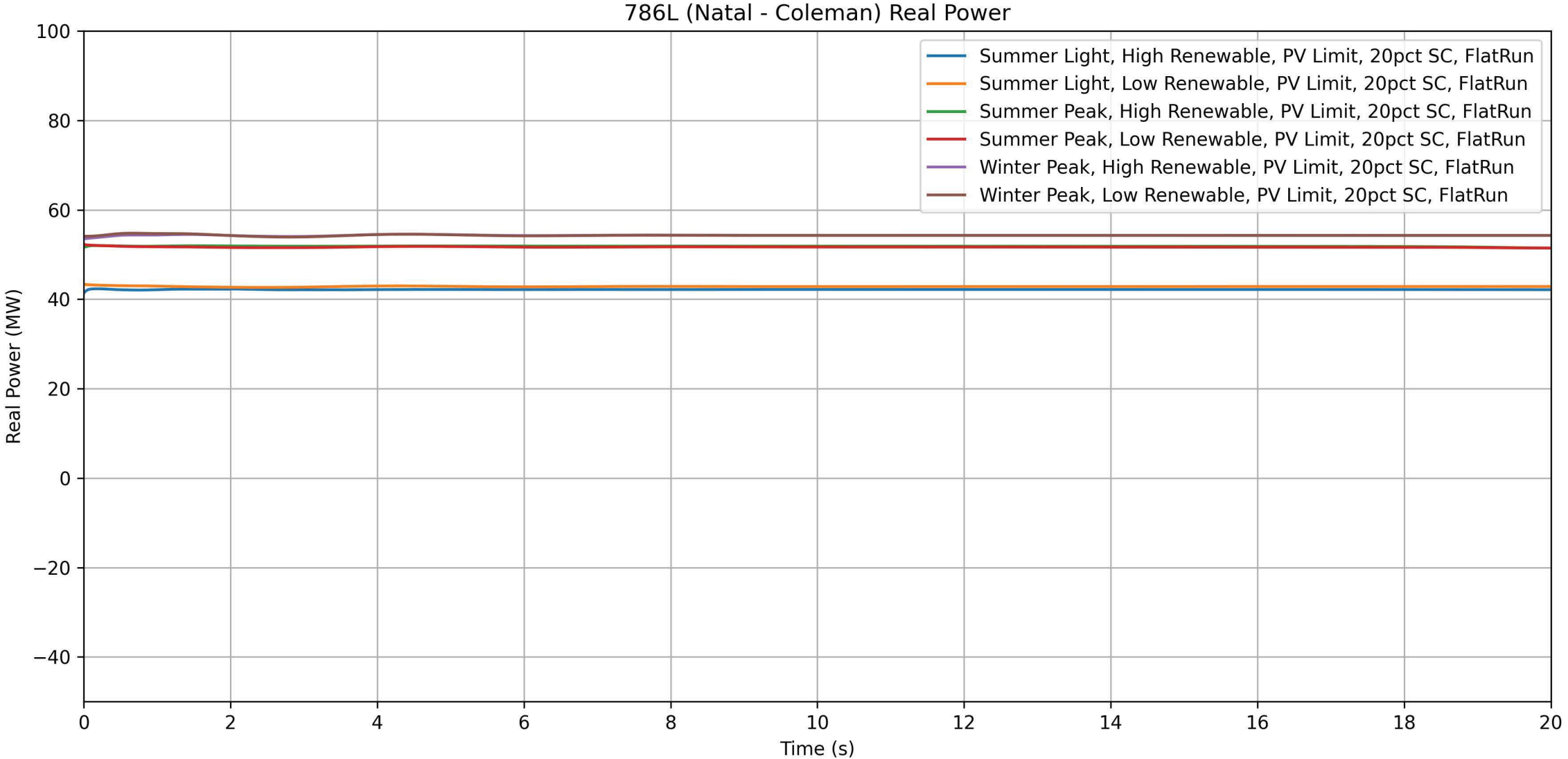

Shepard G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14

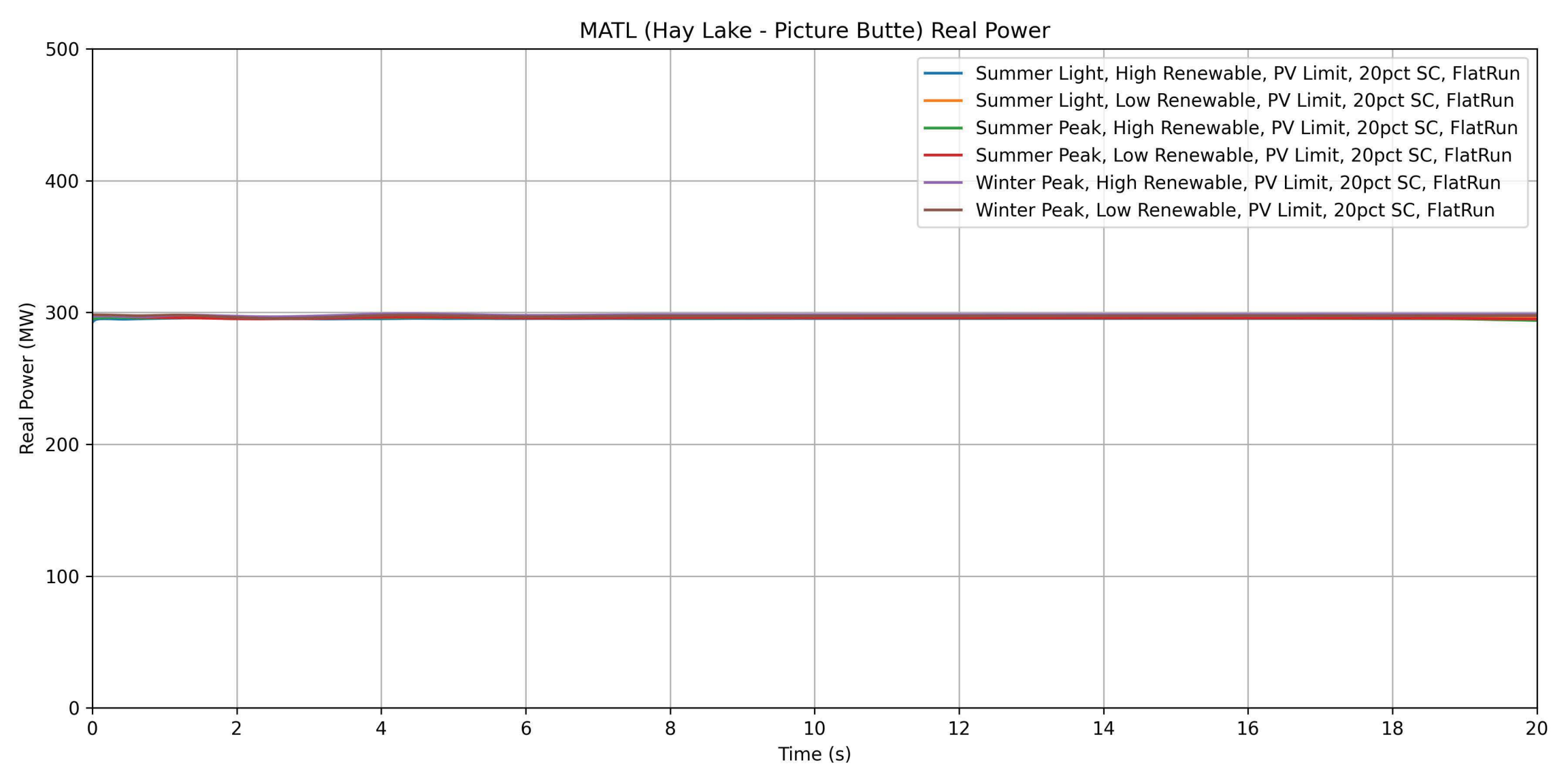

SEV G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14

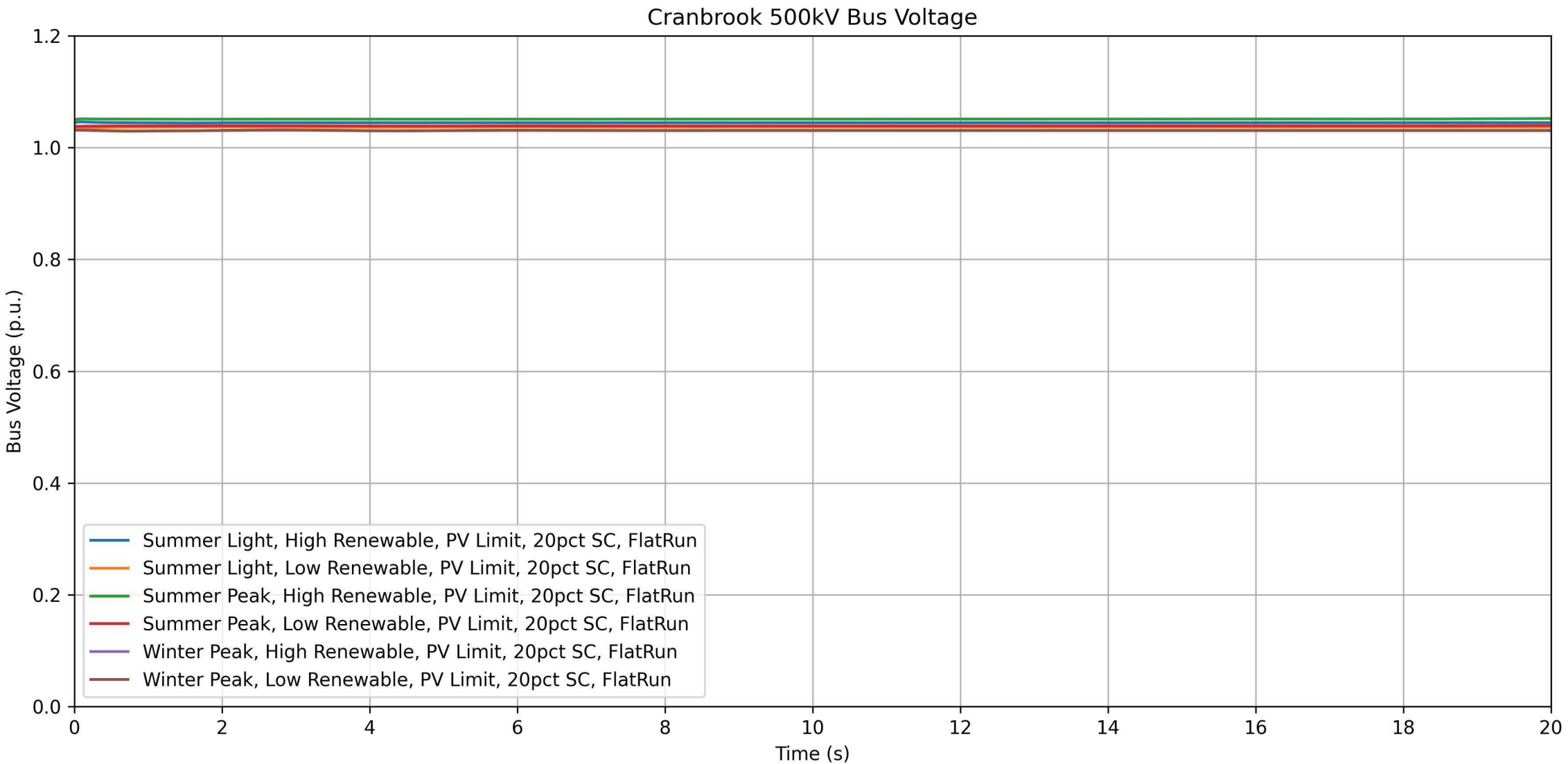

KCL G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14

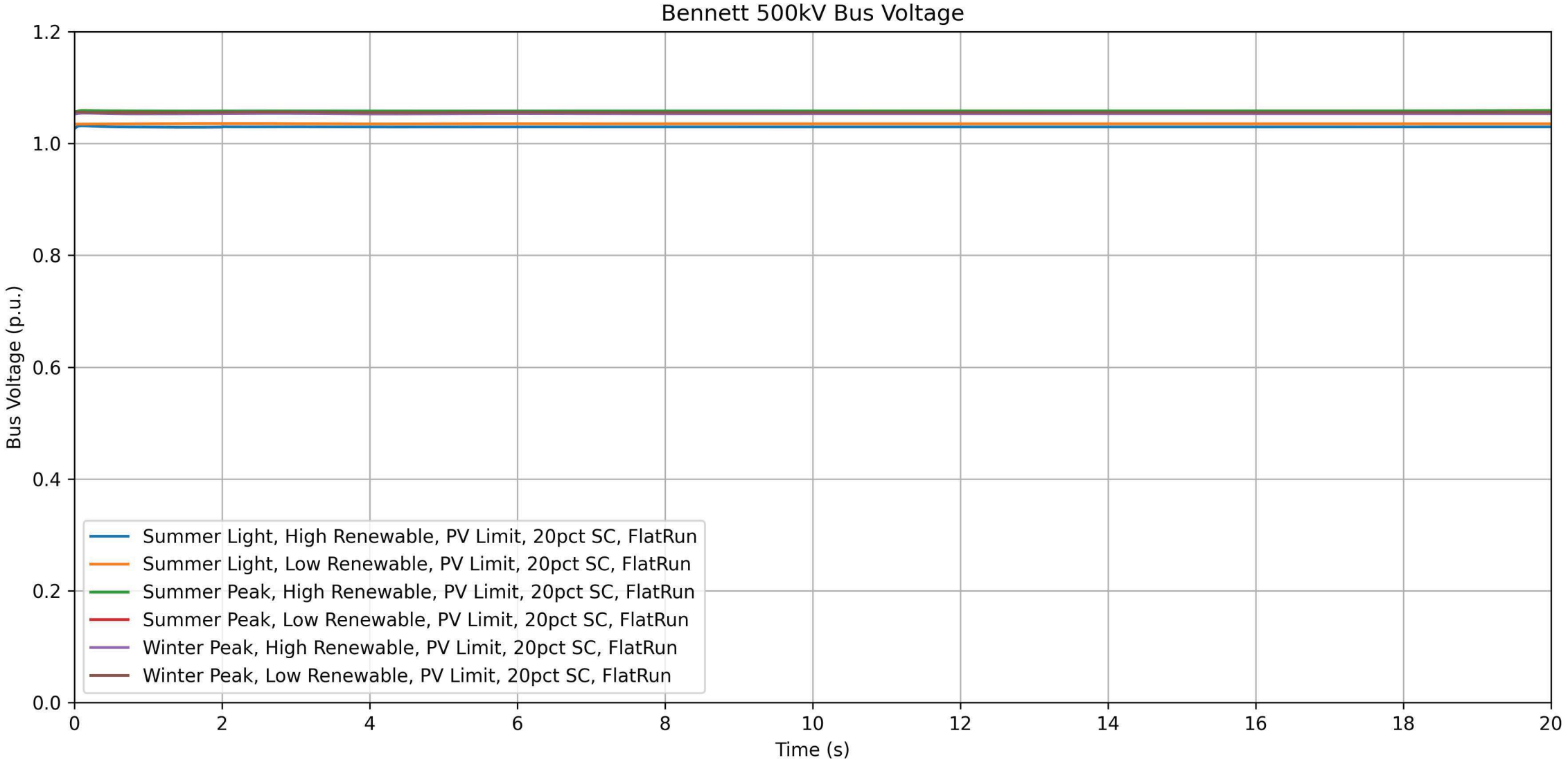

WAX G1 Real Power Output
Summer Light, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Light, Low Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Summer Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, High Renewable, 950MW, Base Case, MSSC_No RAS
Winter Peak, Low Renewable, 950MW, Base Case, MSSC_No RAS
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14

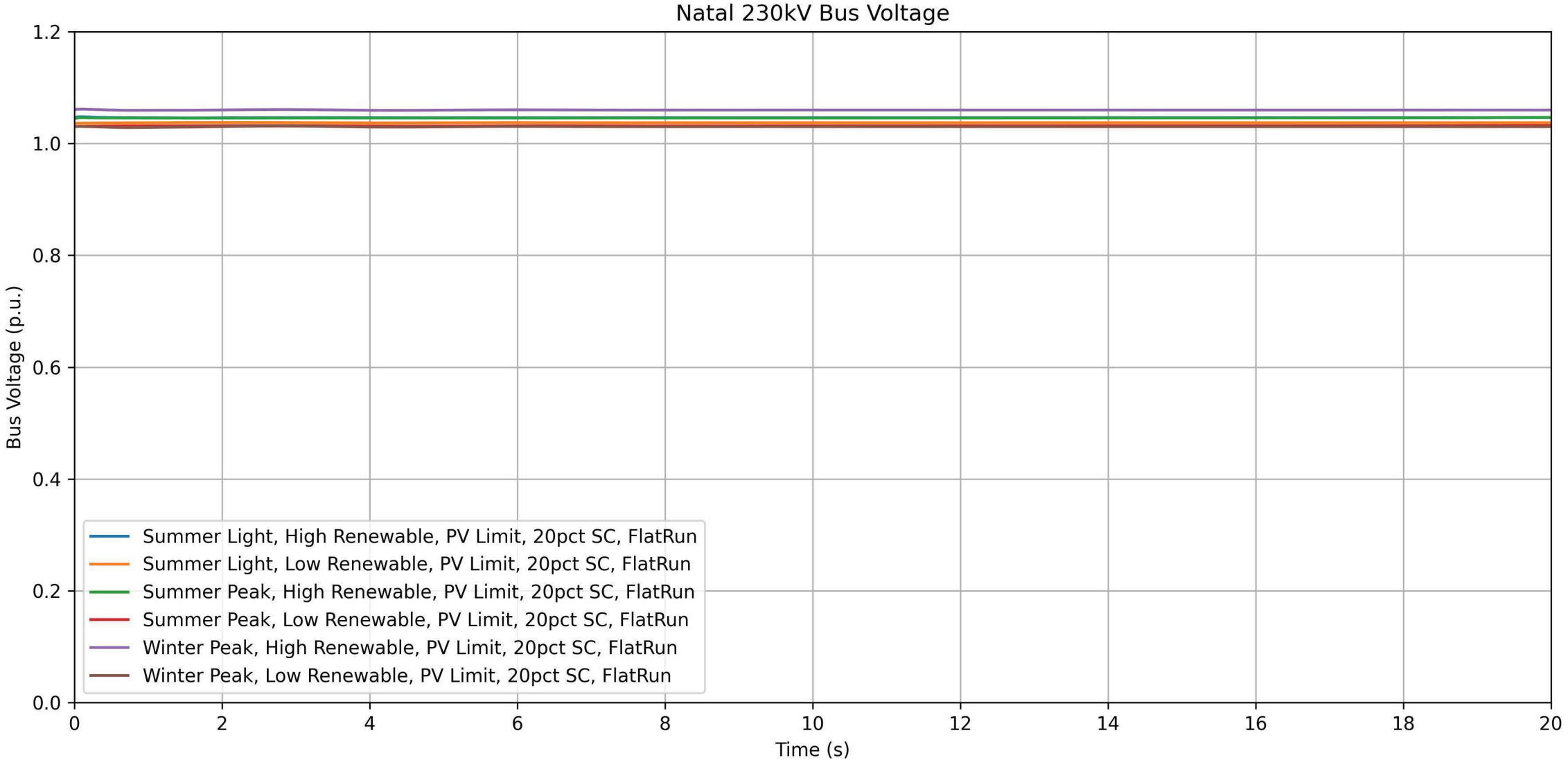

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (MW)
0
200
400
600
800
1000
1200
1400
1600
1800
Time (s)
0
2
4
6
8
10
12
14
16
18
20

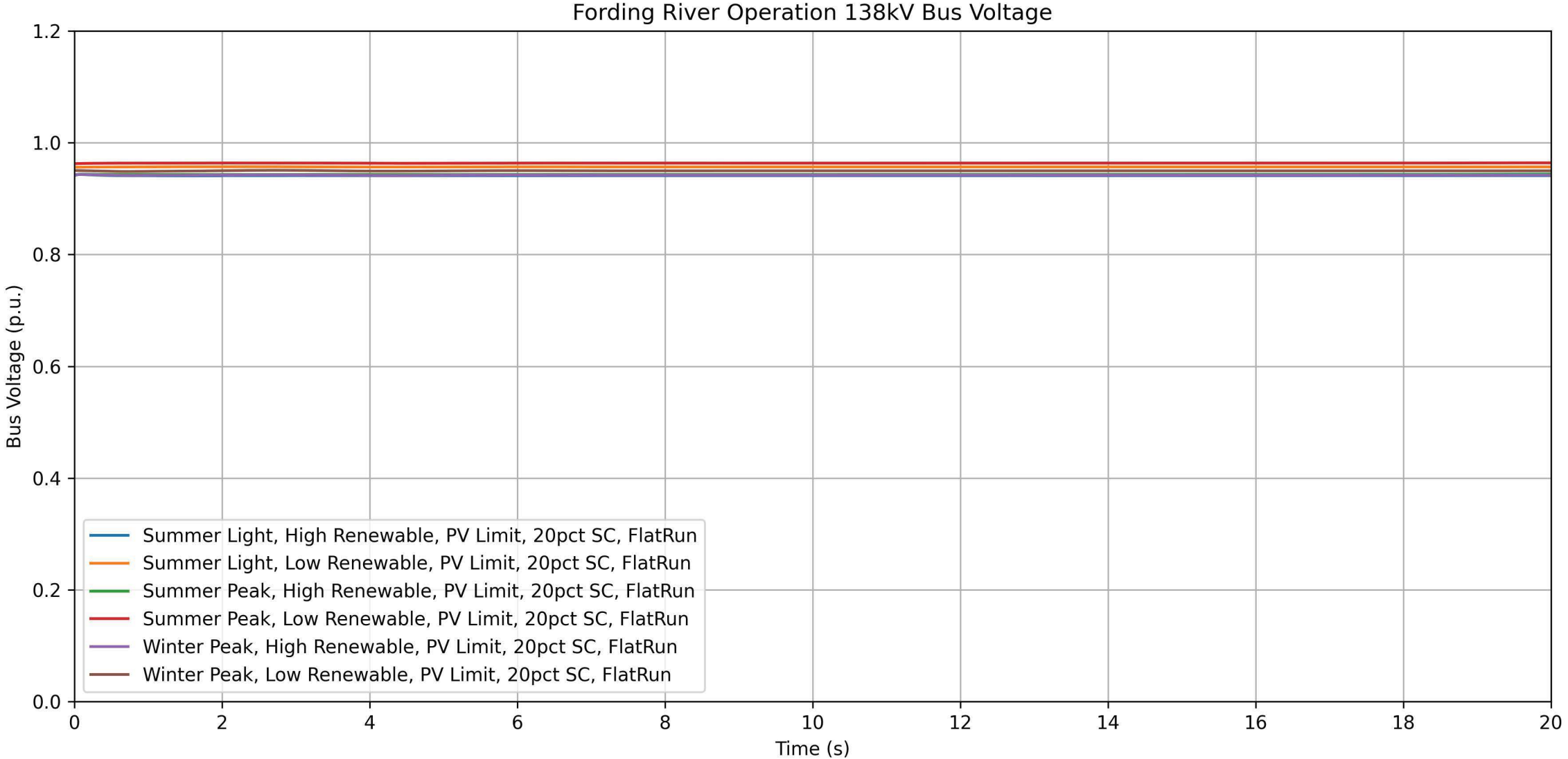

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

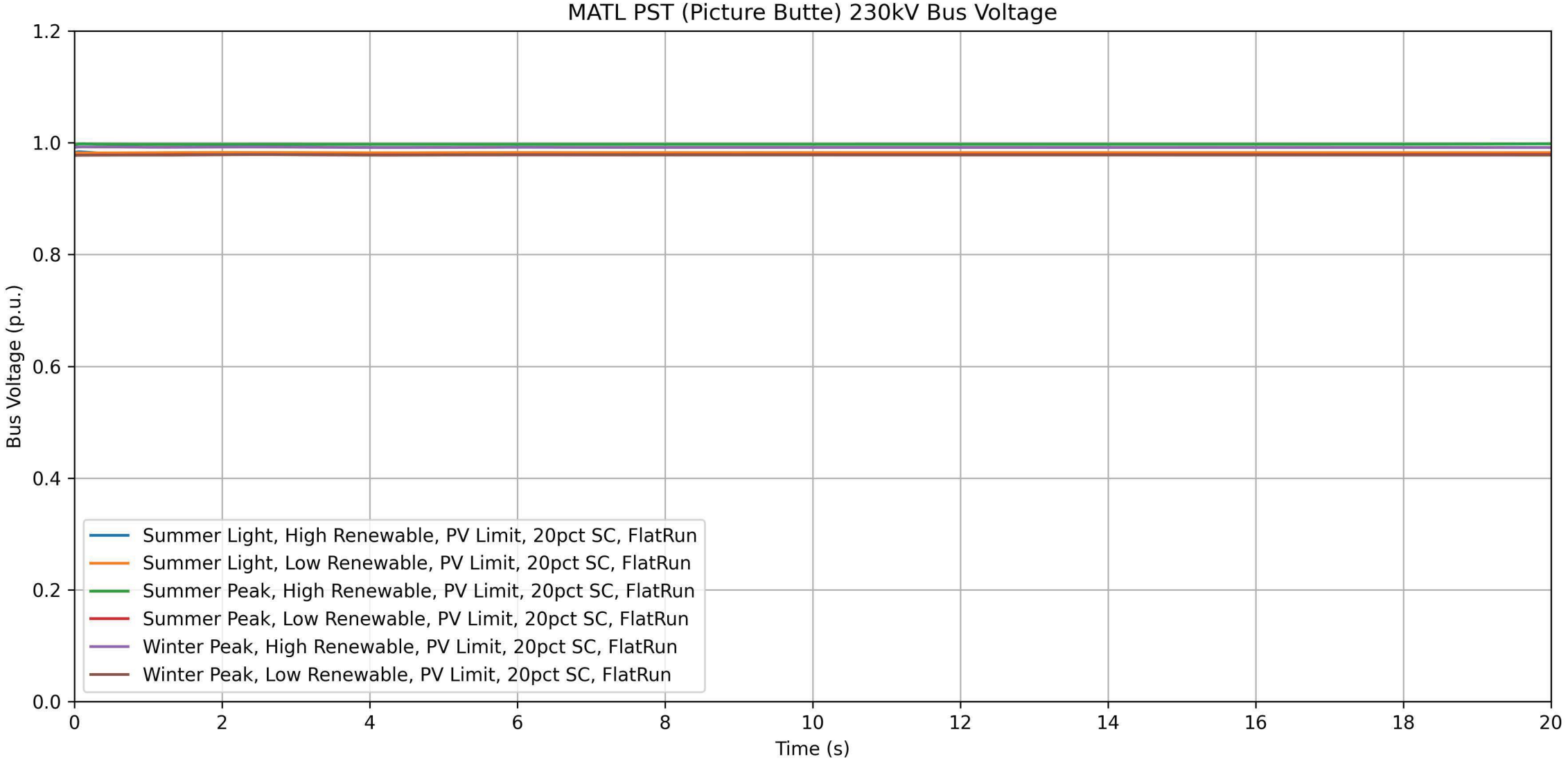

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

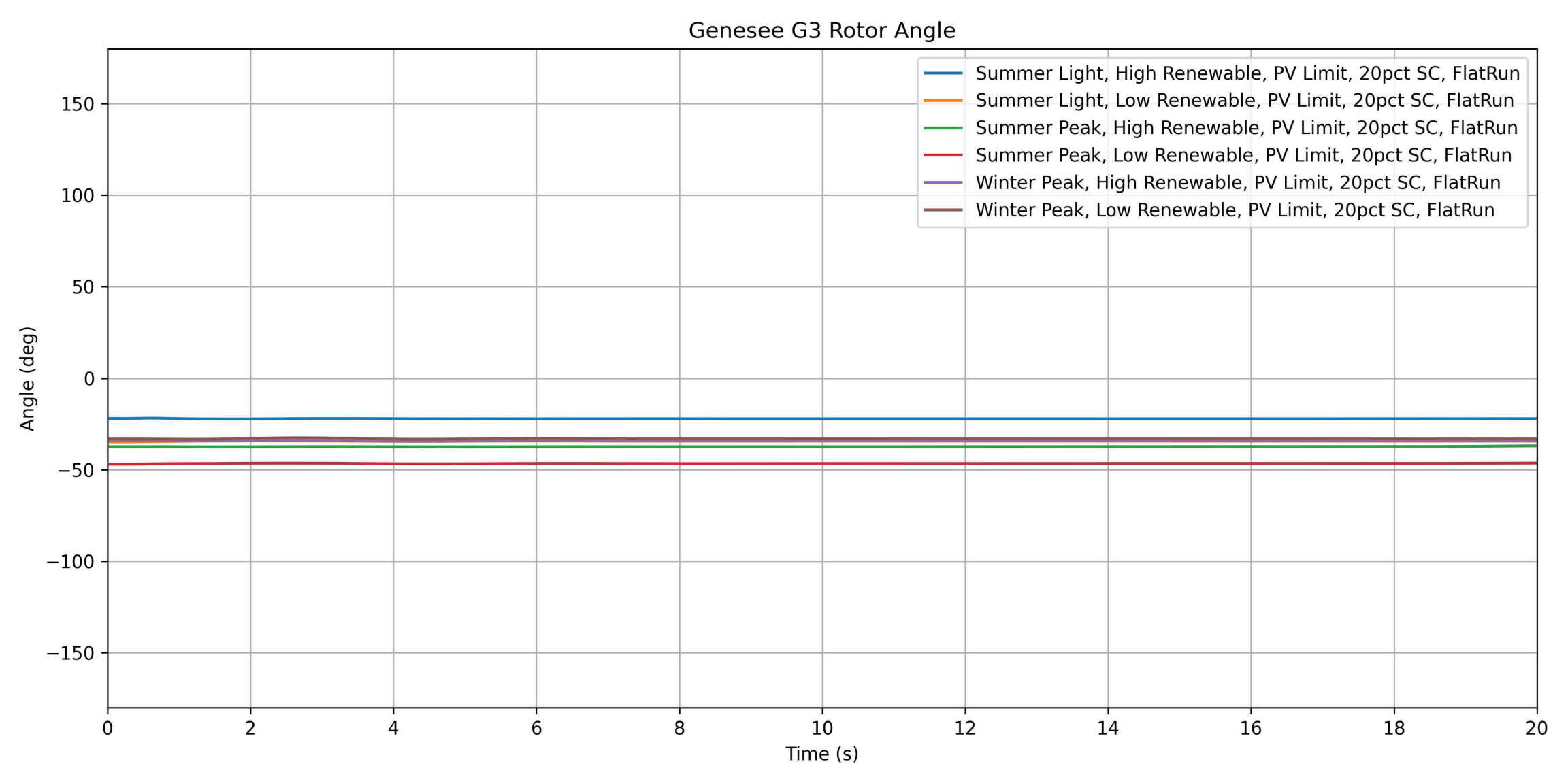

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

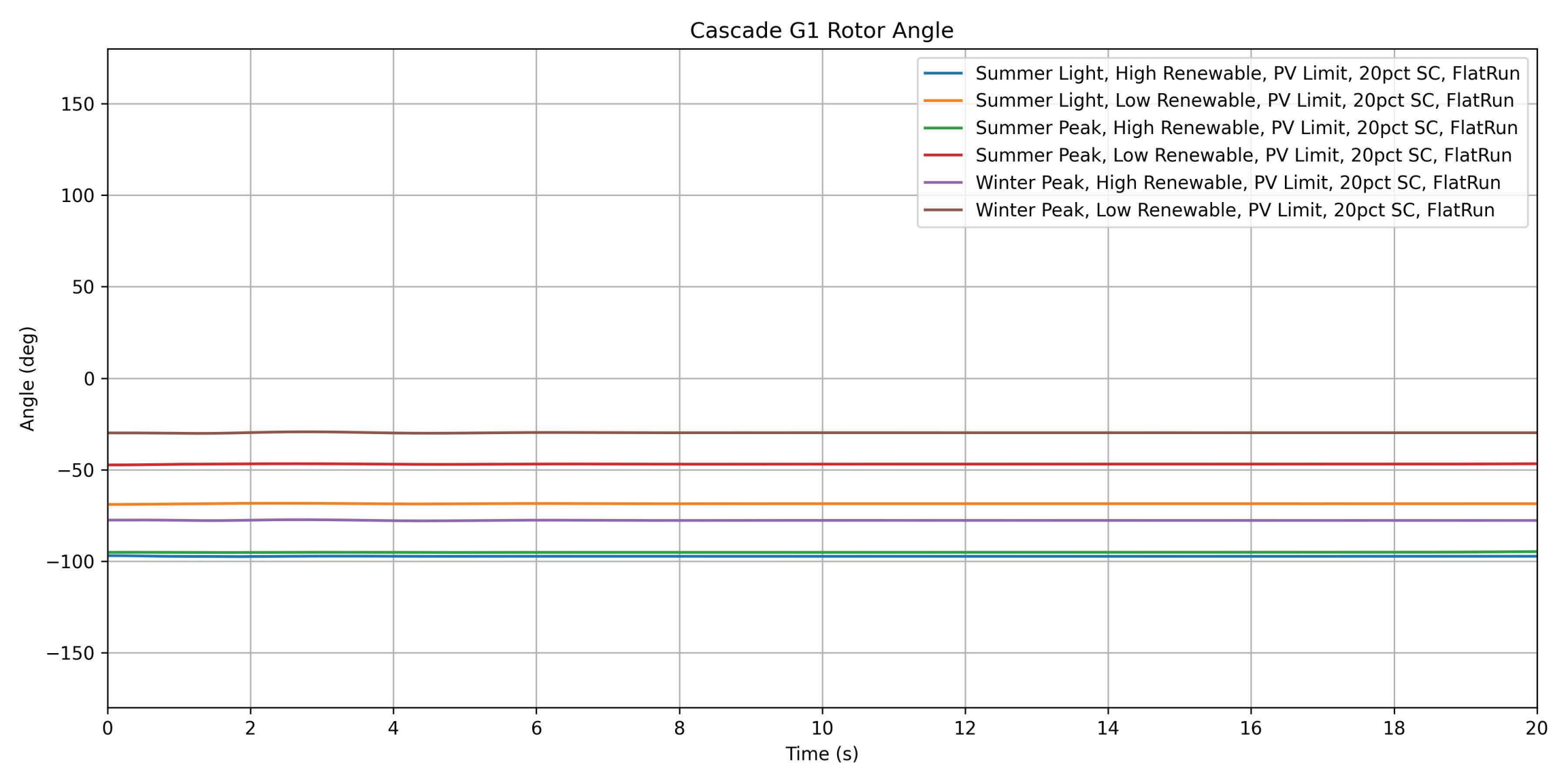

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

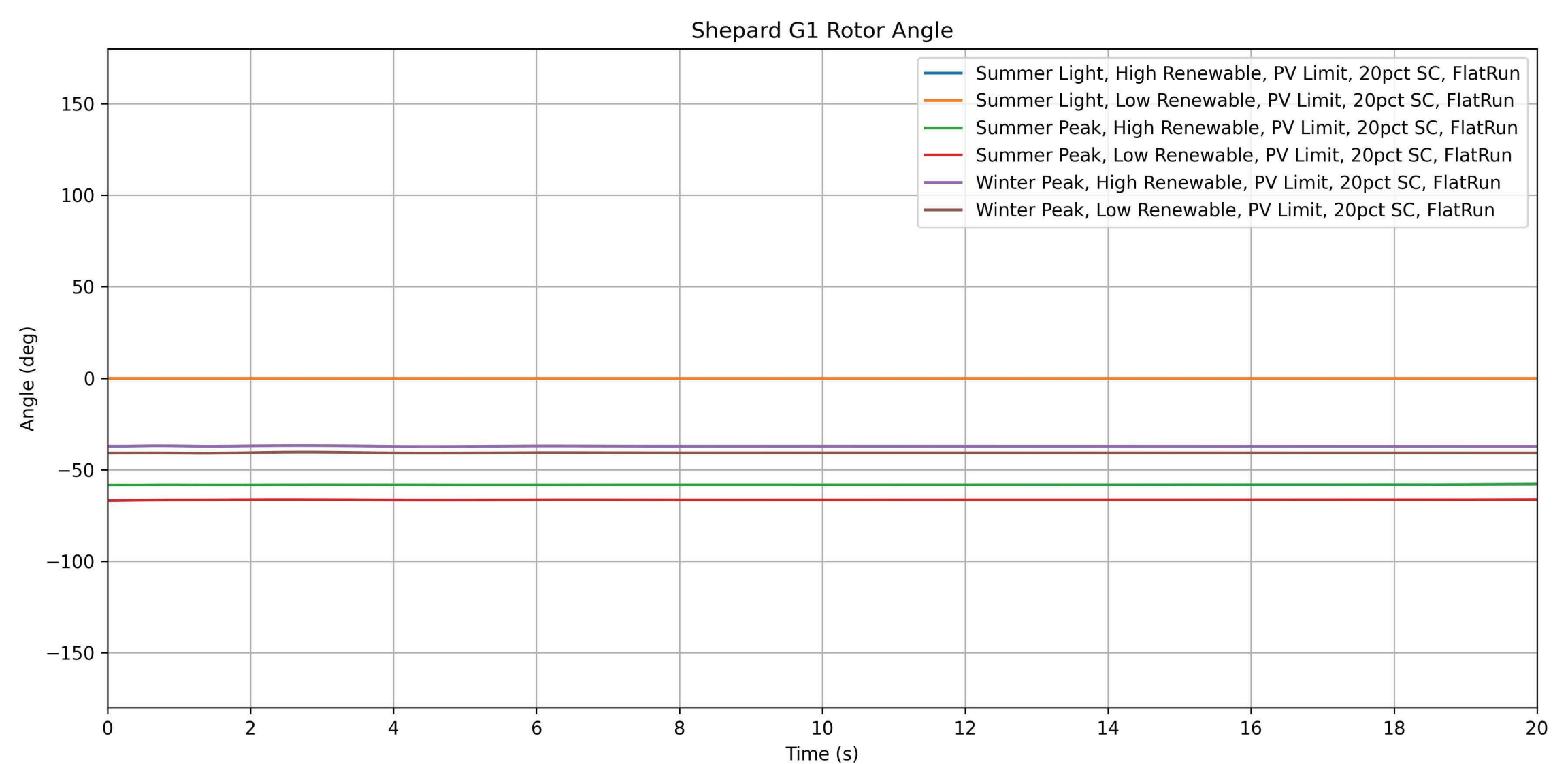

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

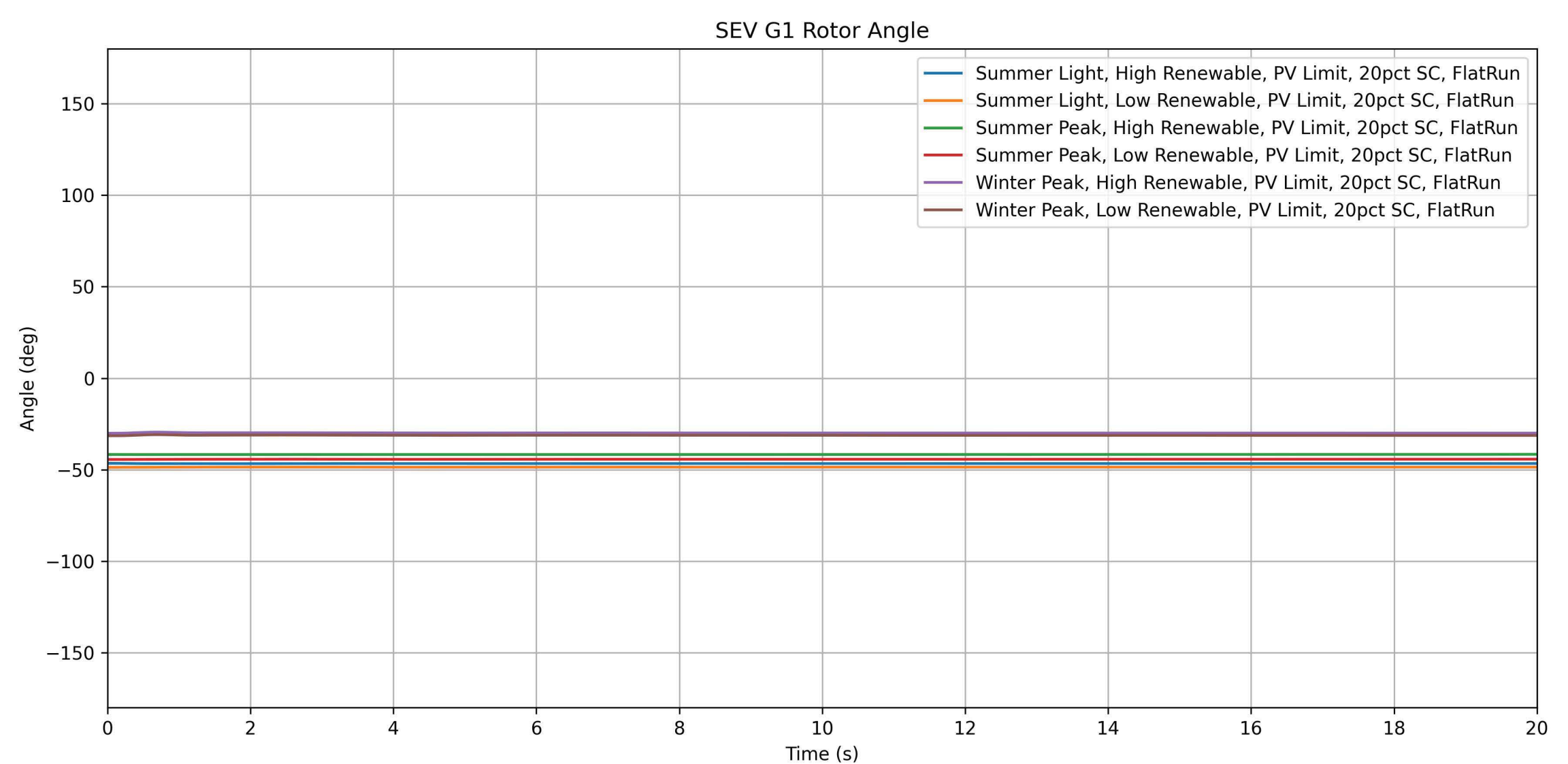

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

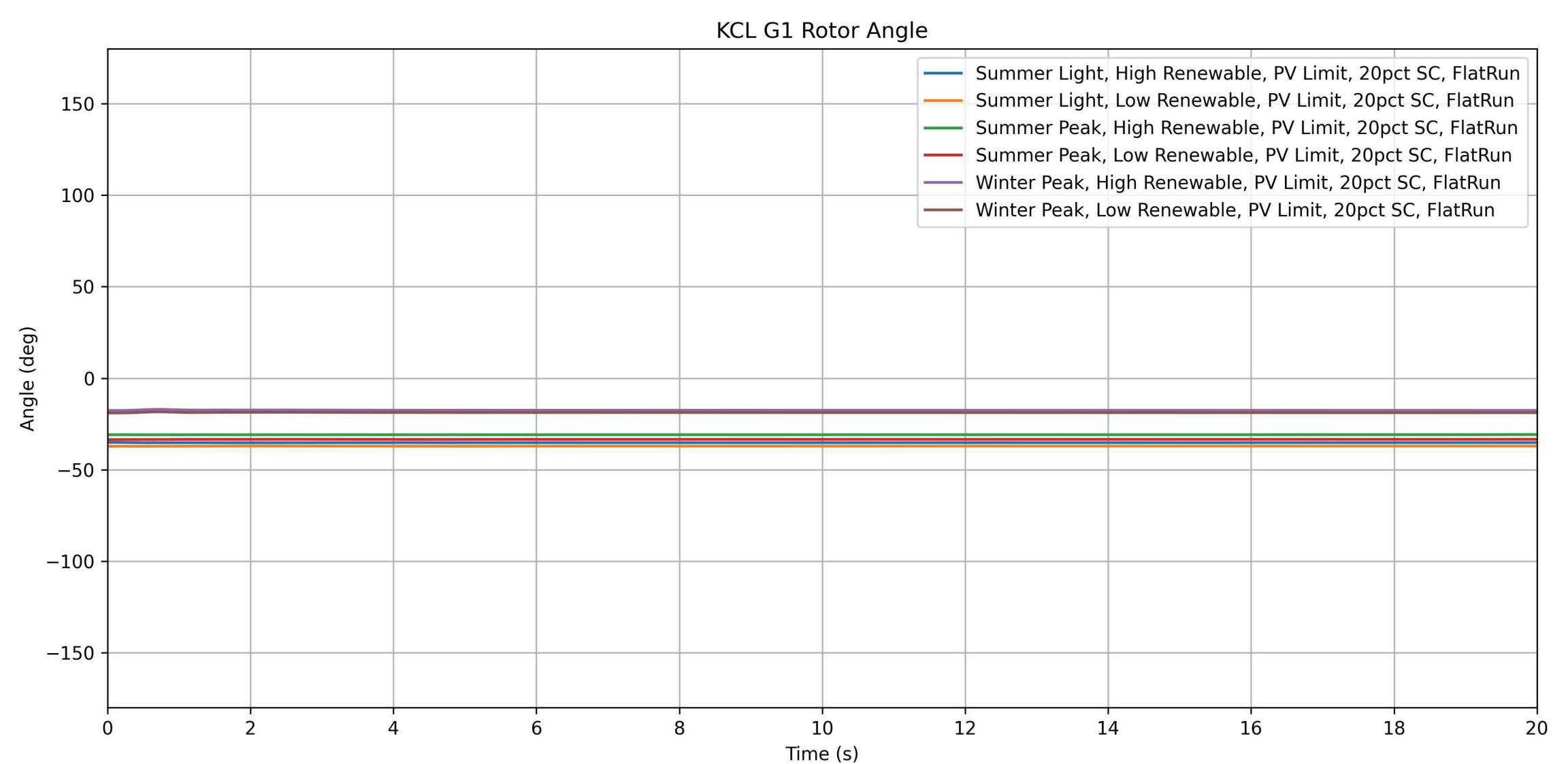

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

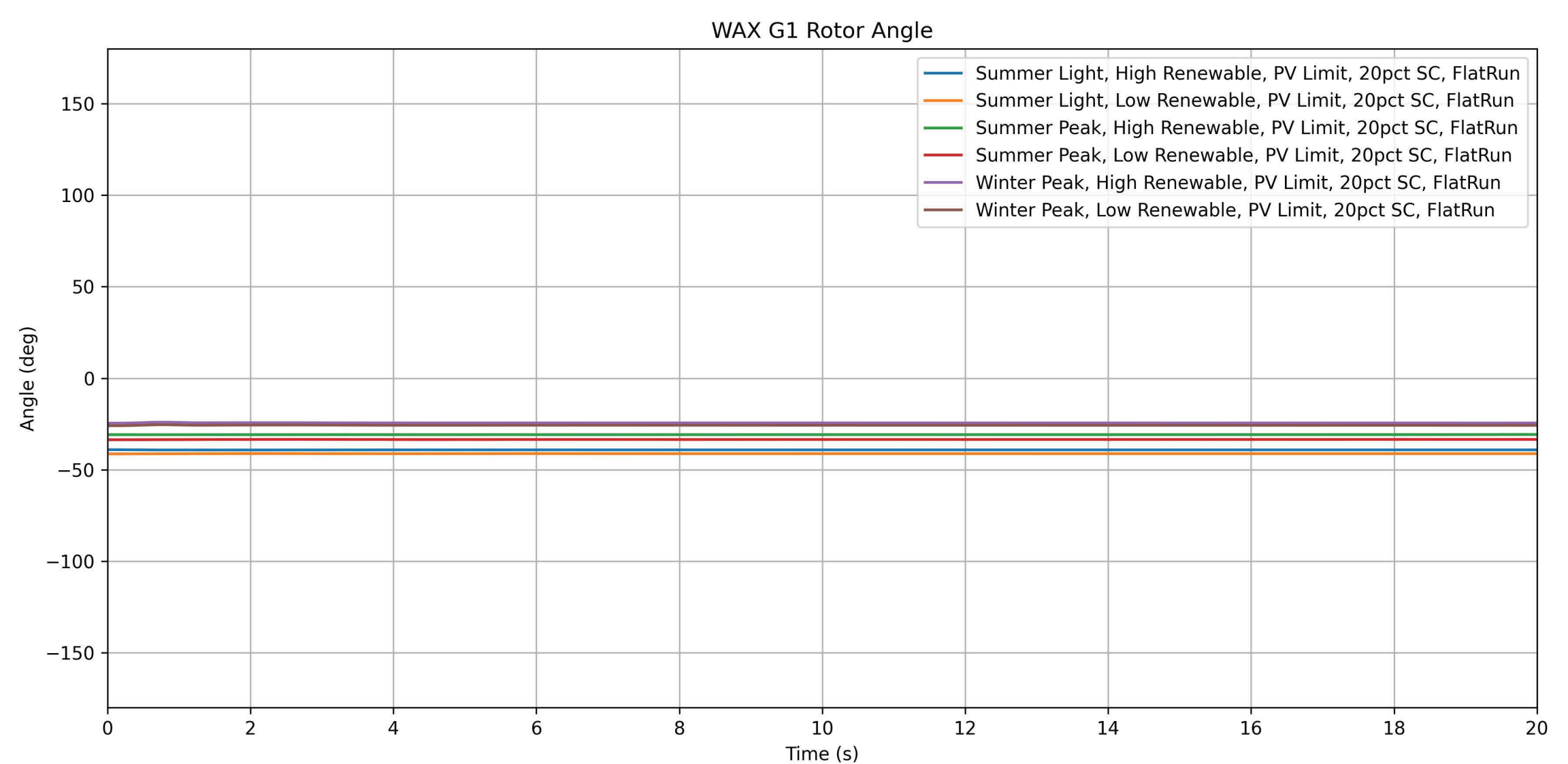

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

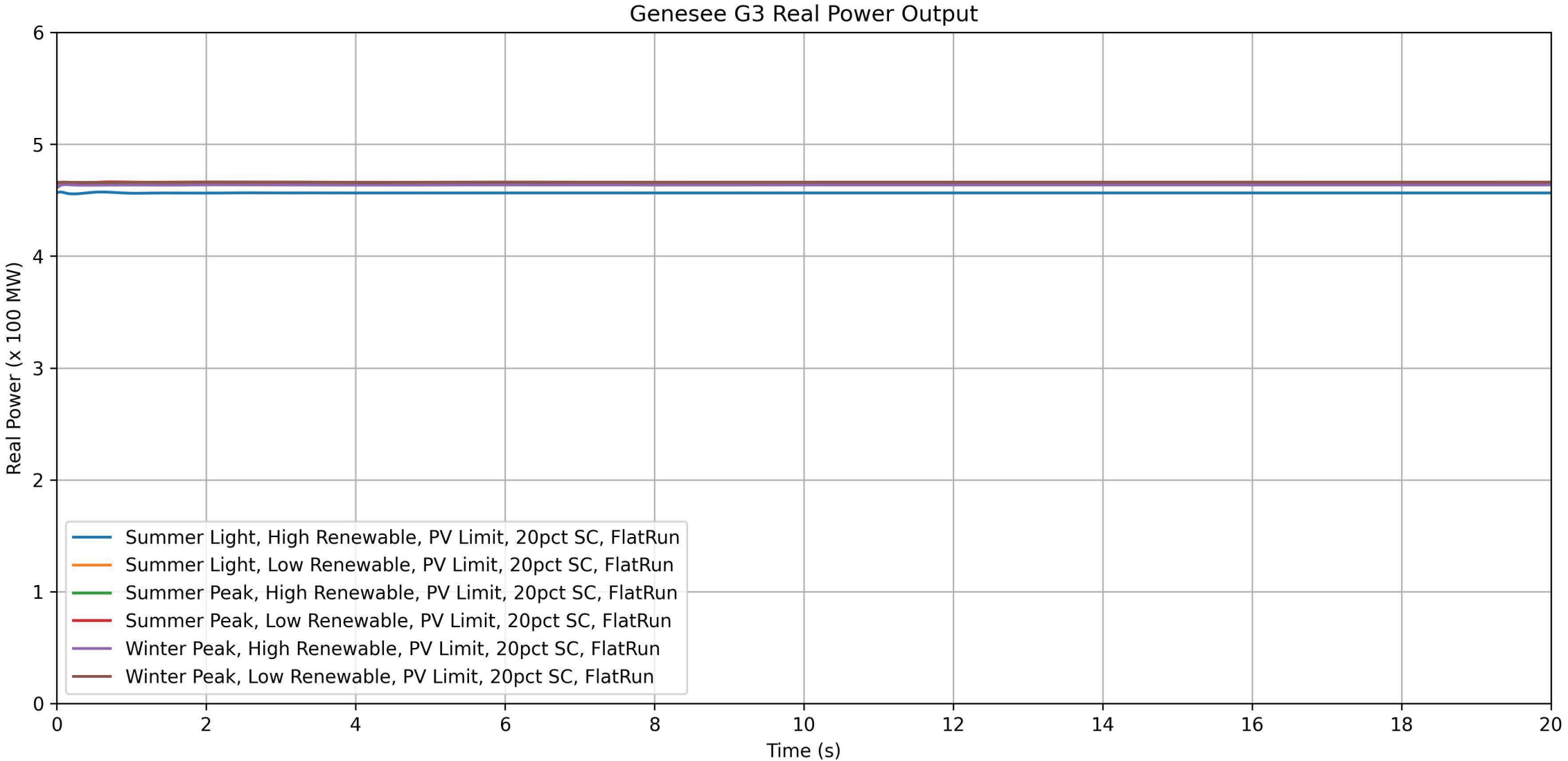

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

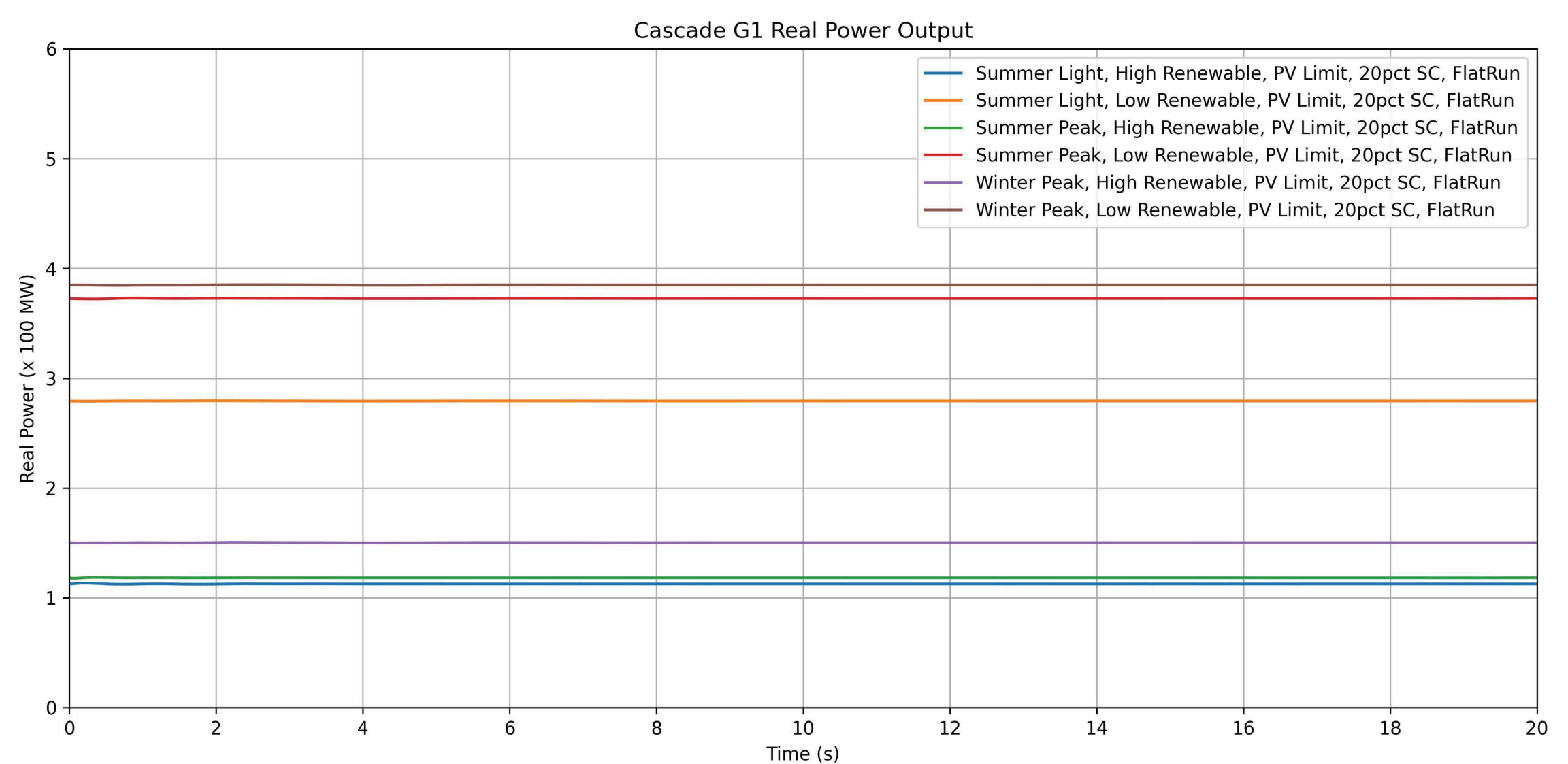

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

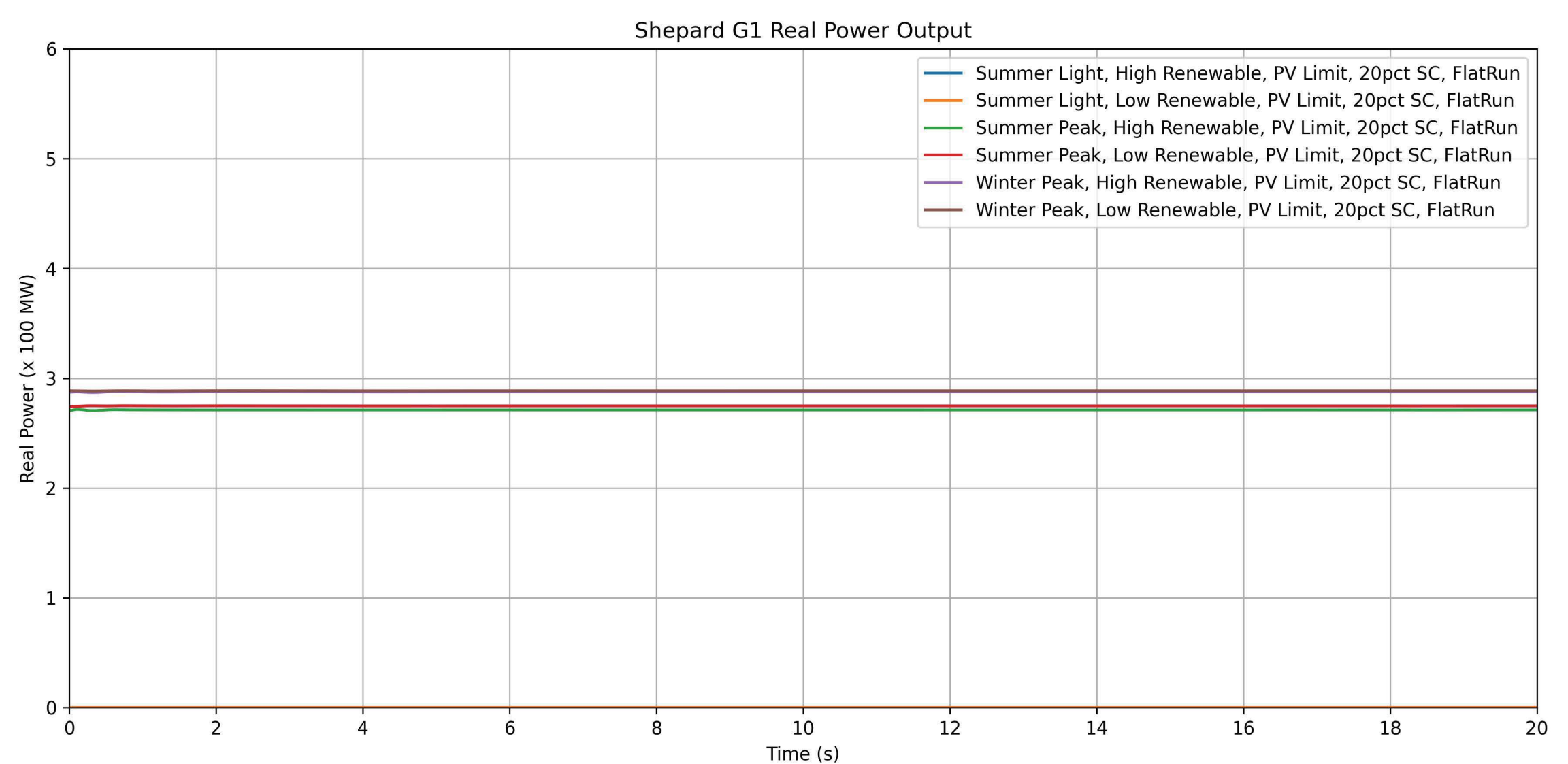

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

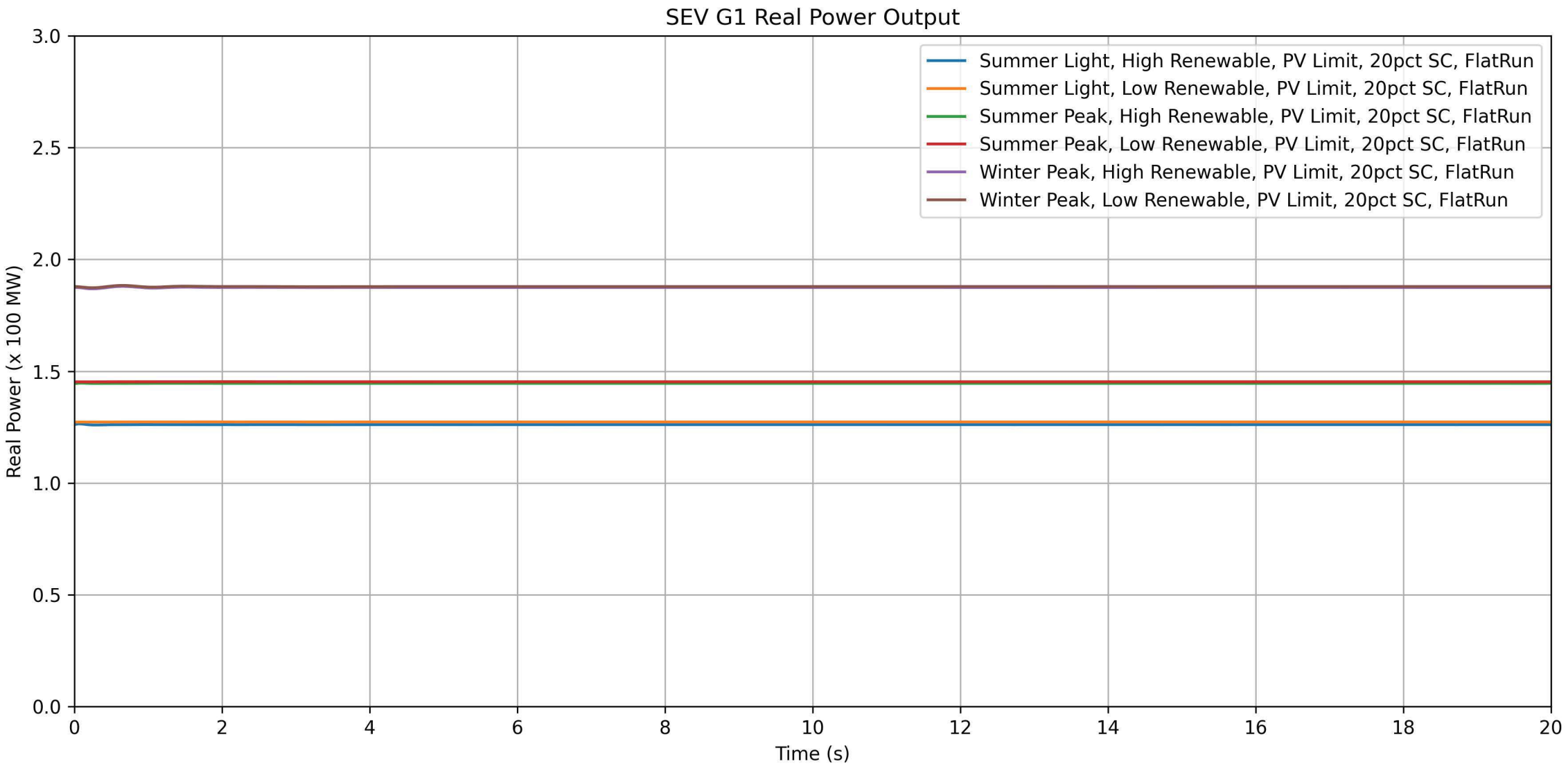

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

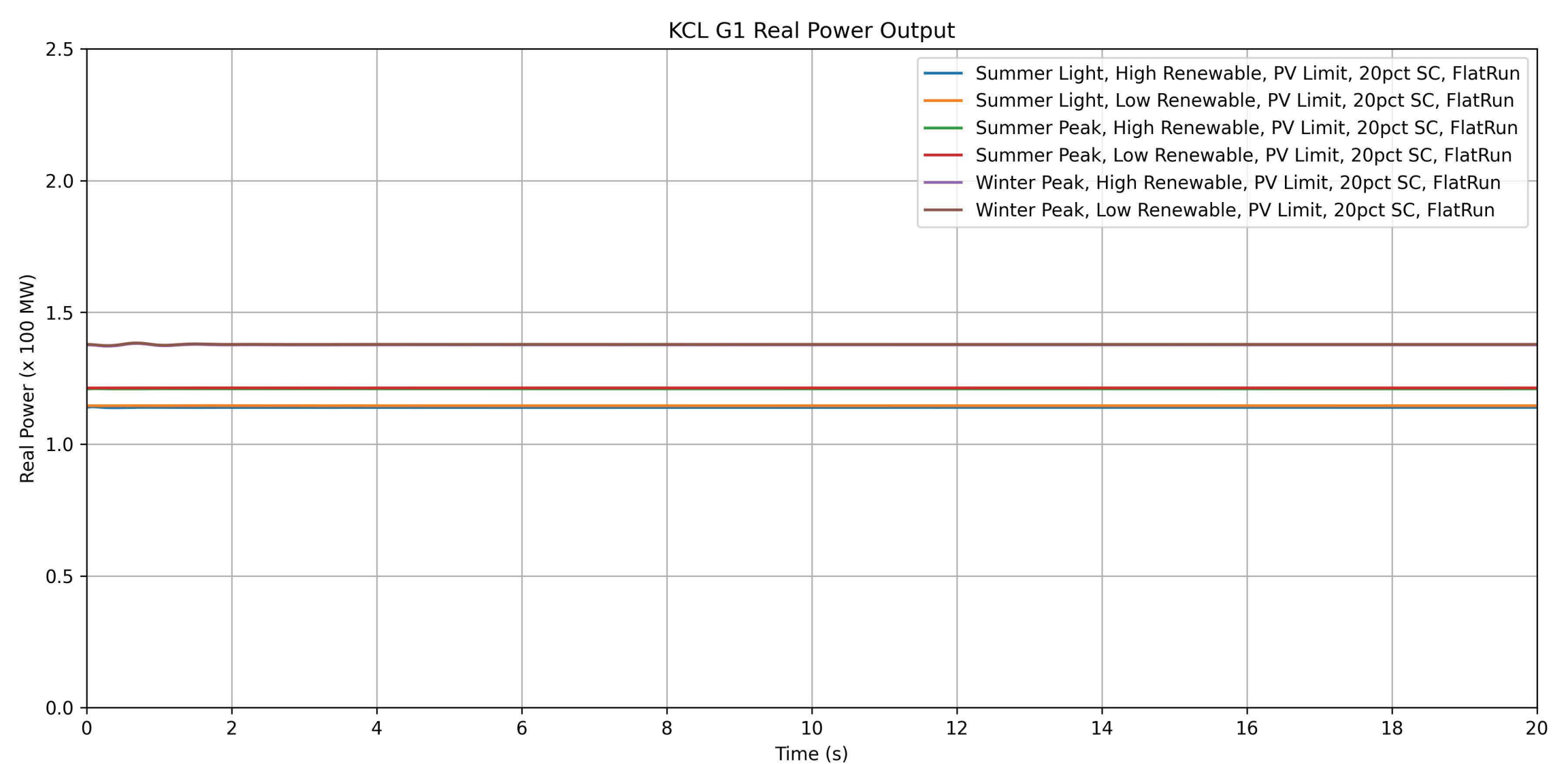

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

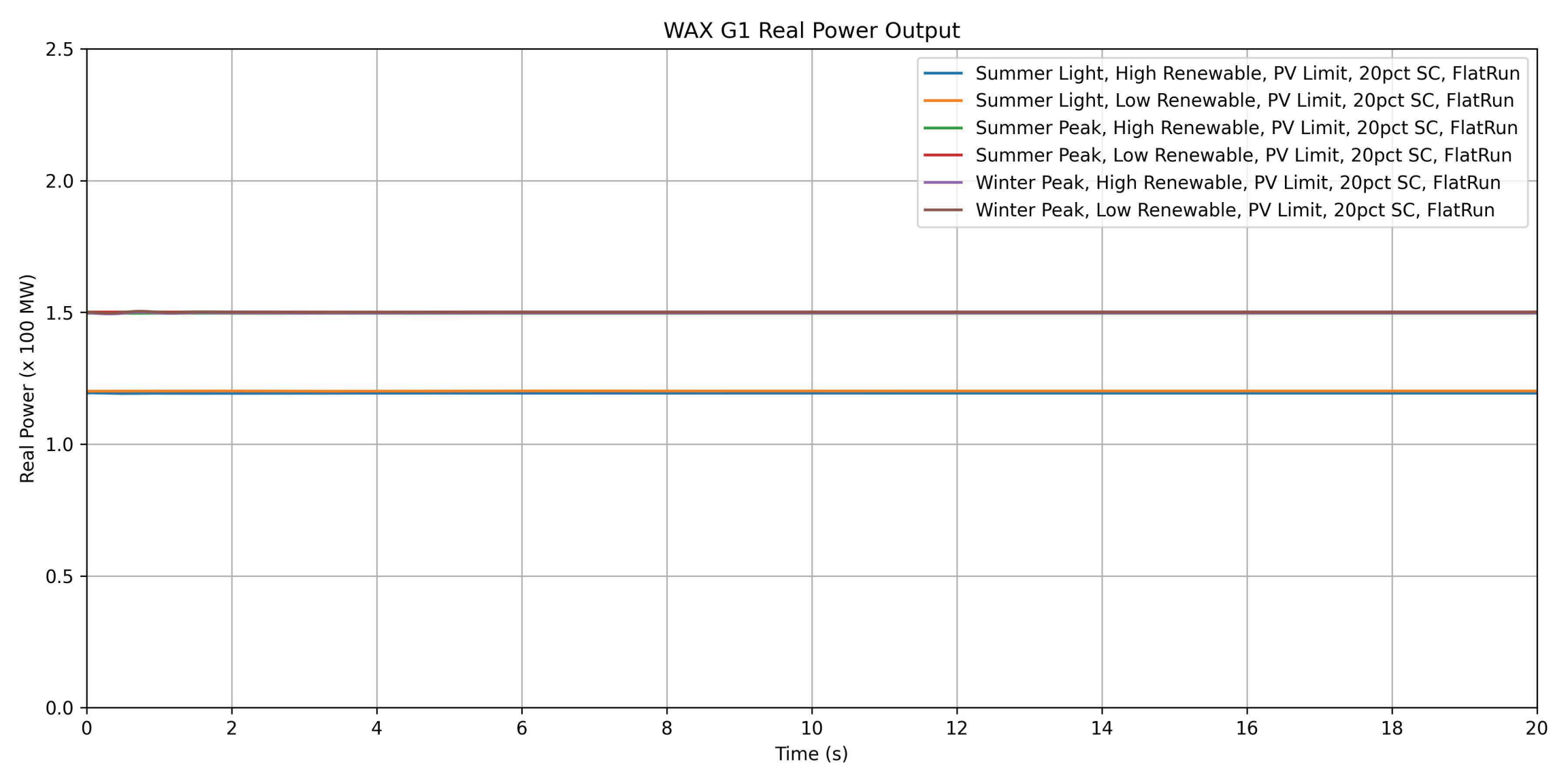

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun

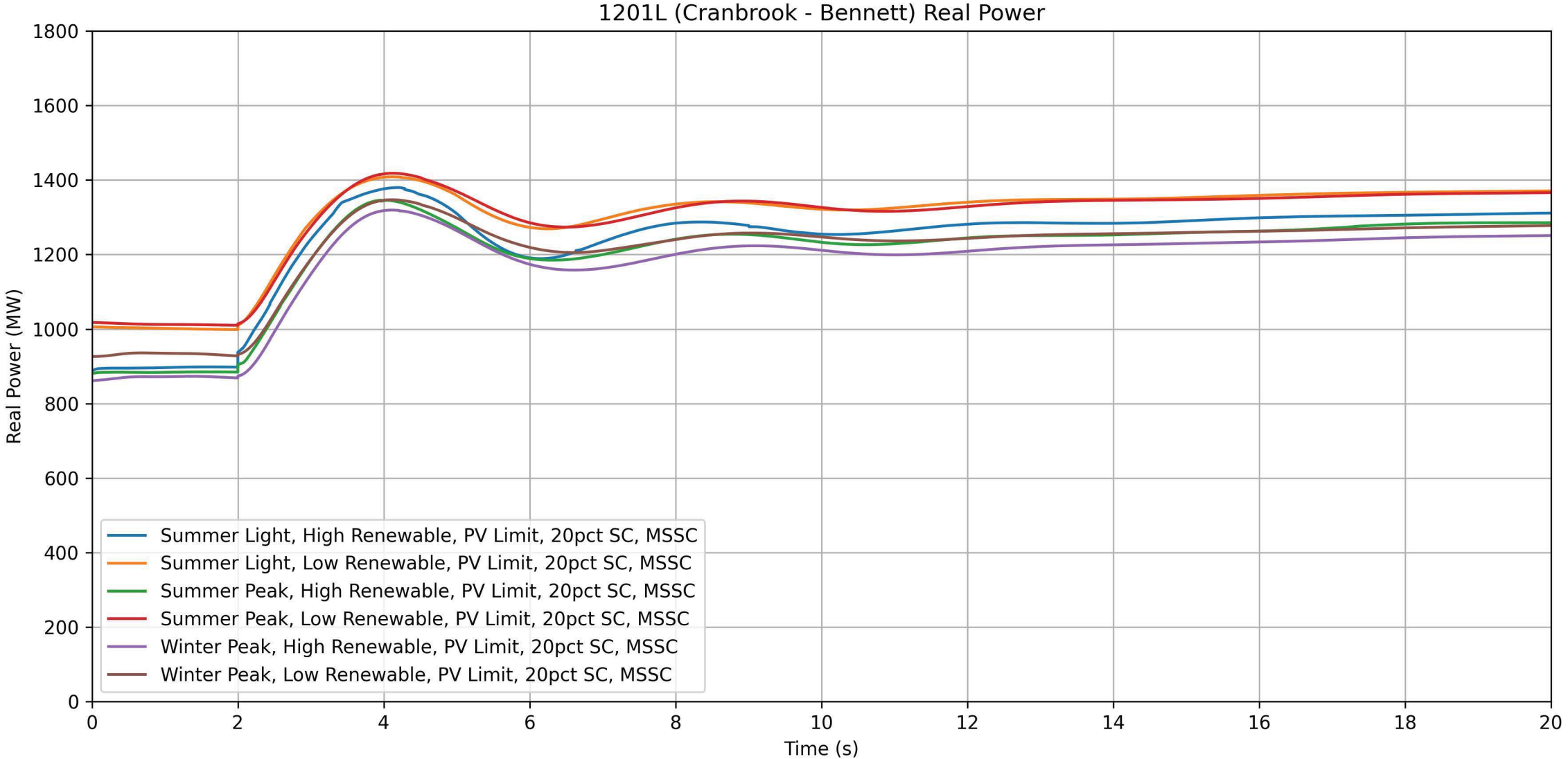

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

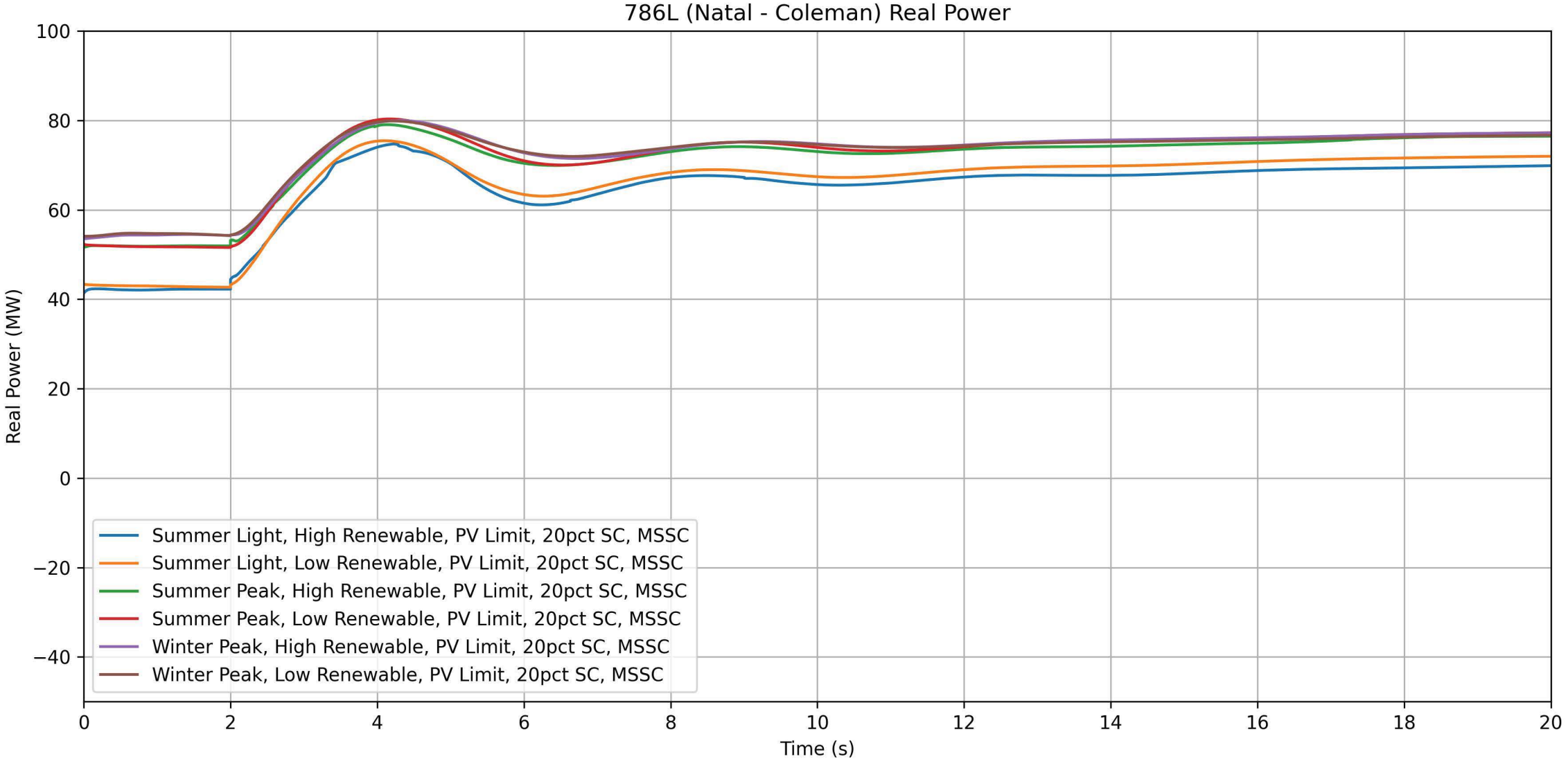

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

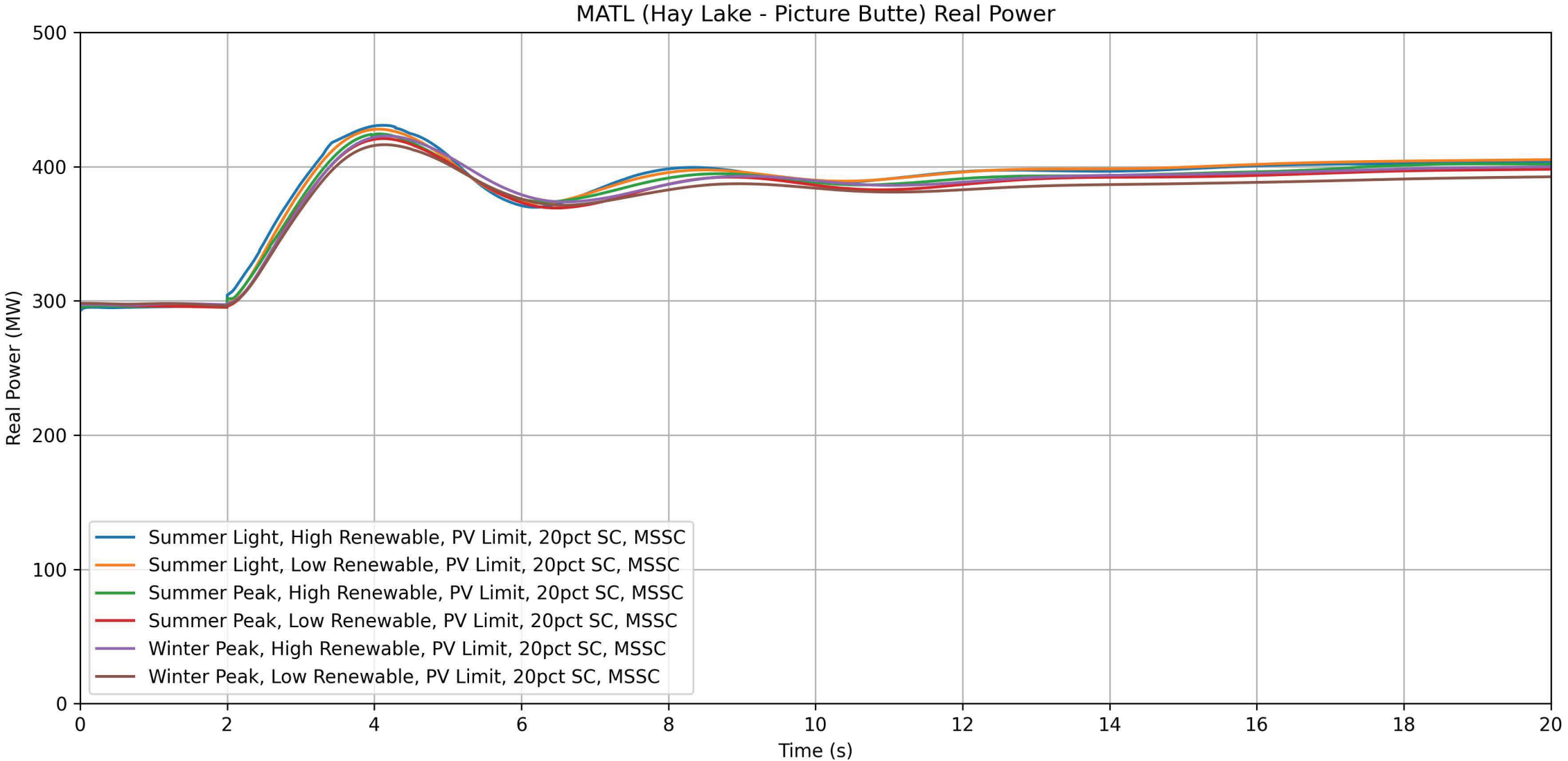

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

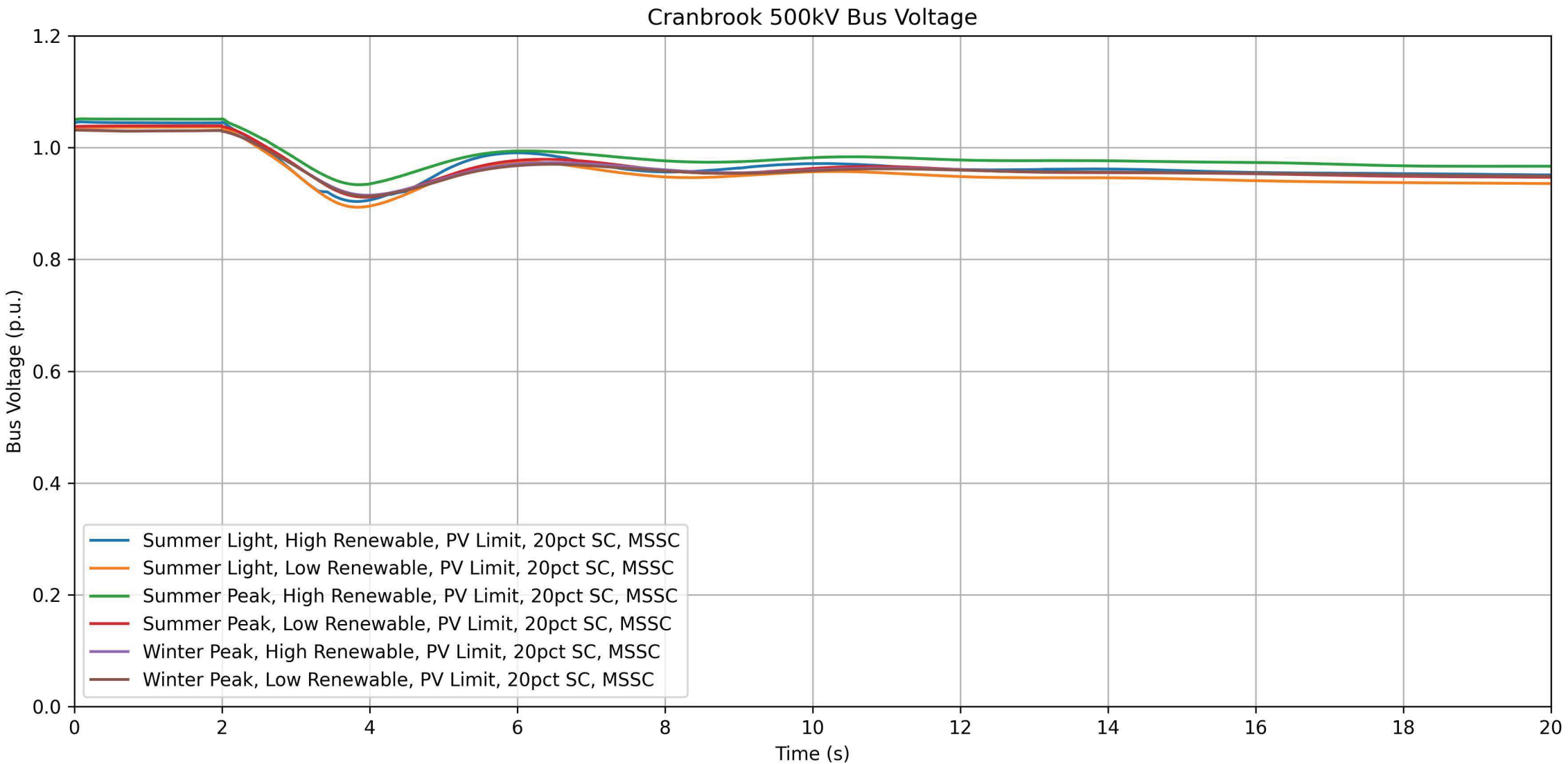

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

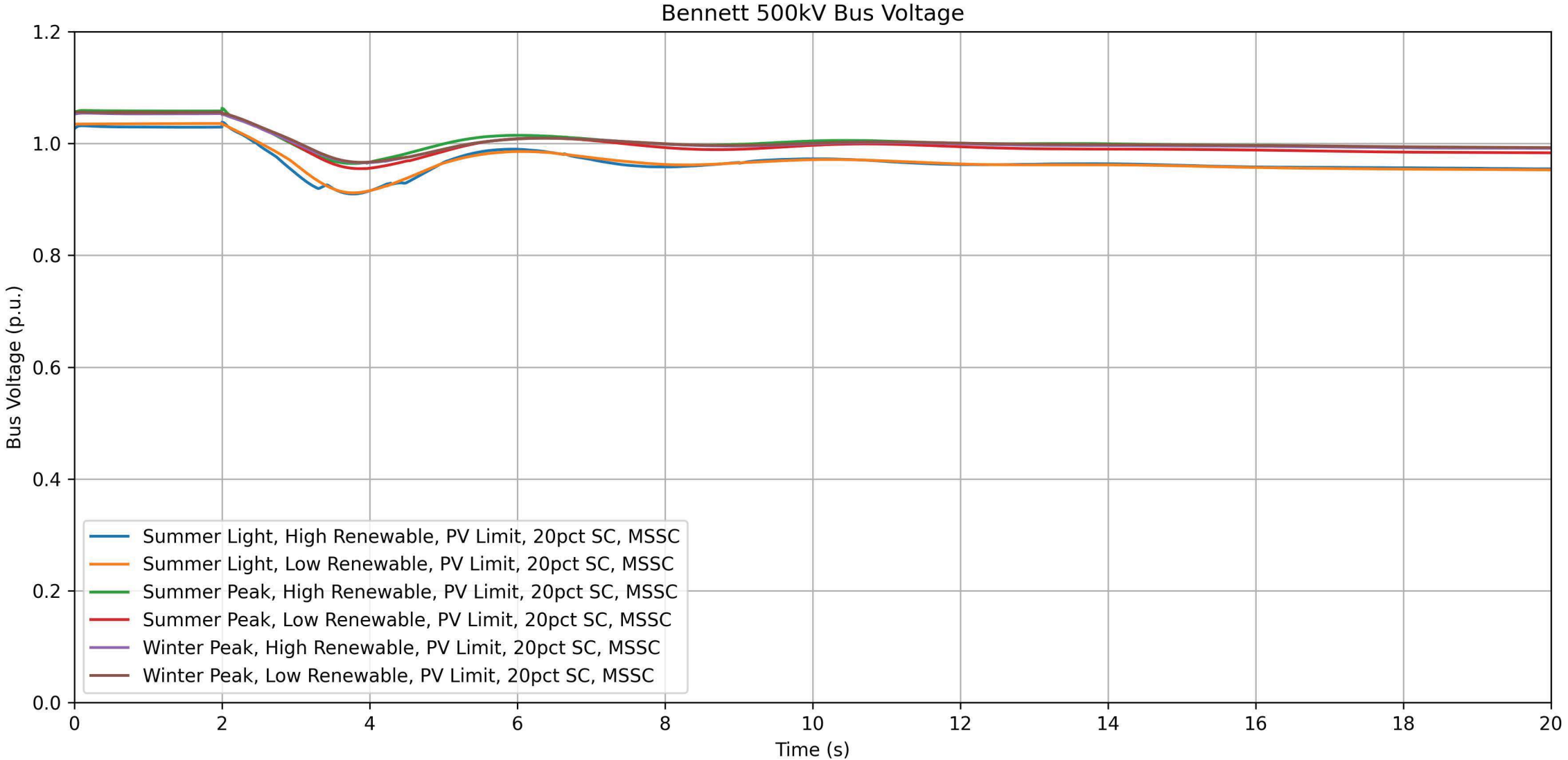

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 20pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 20pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

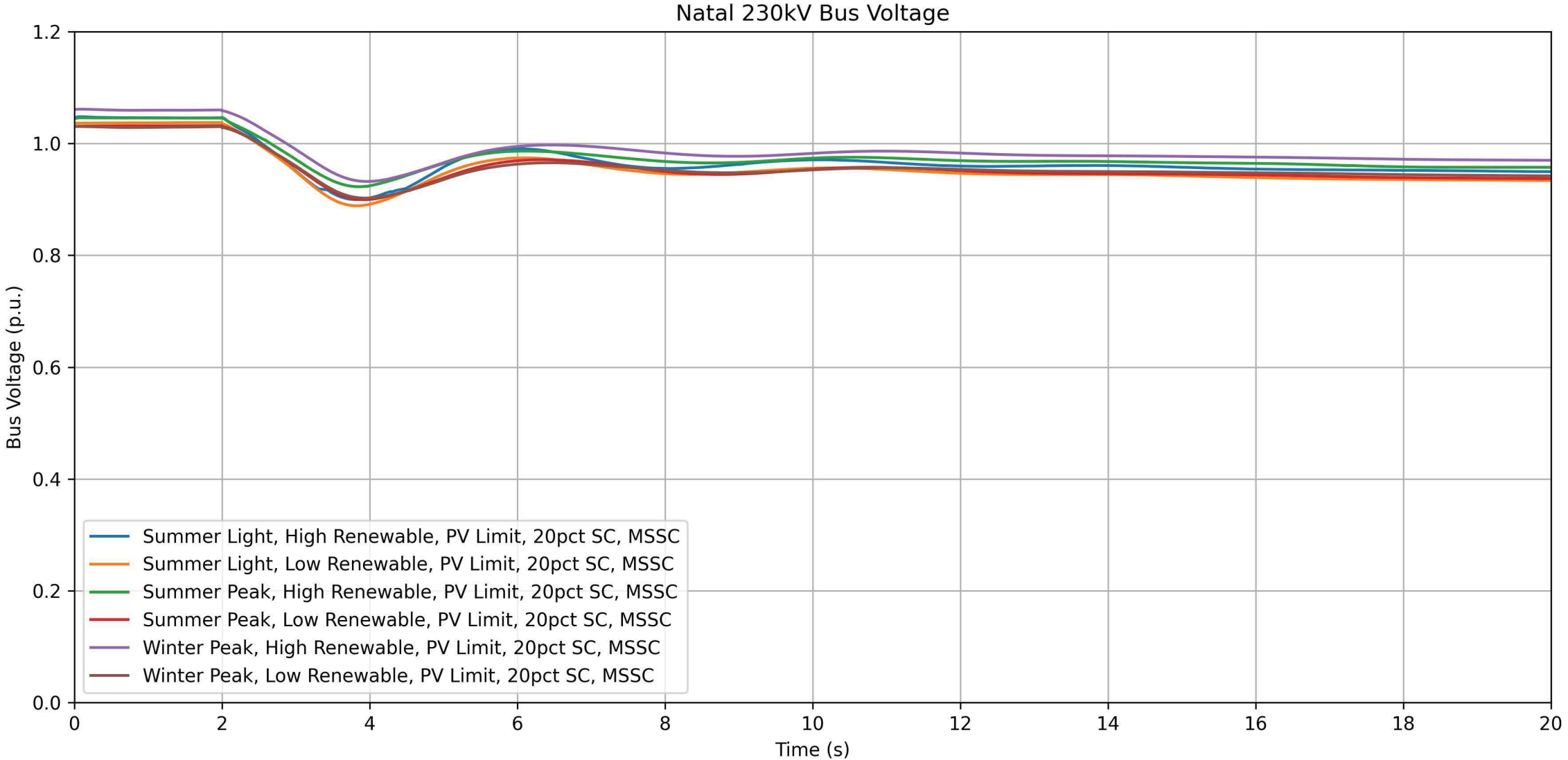

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

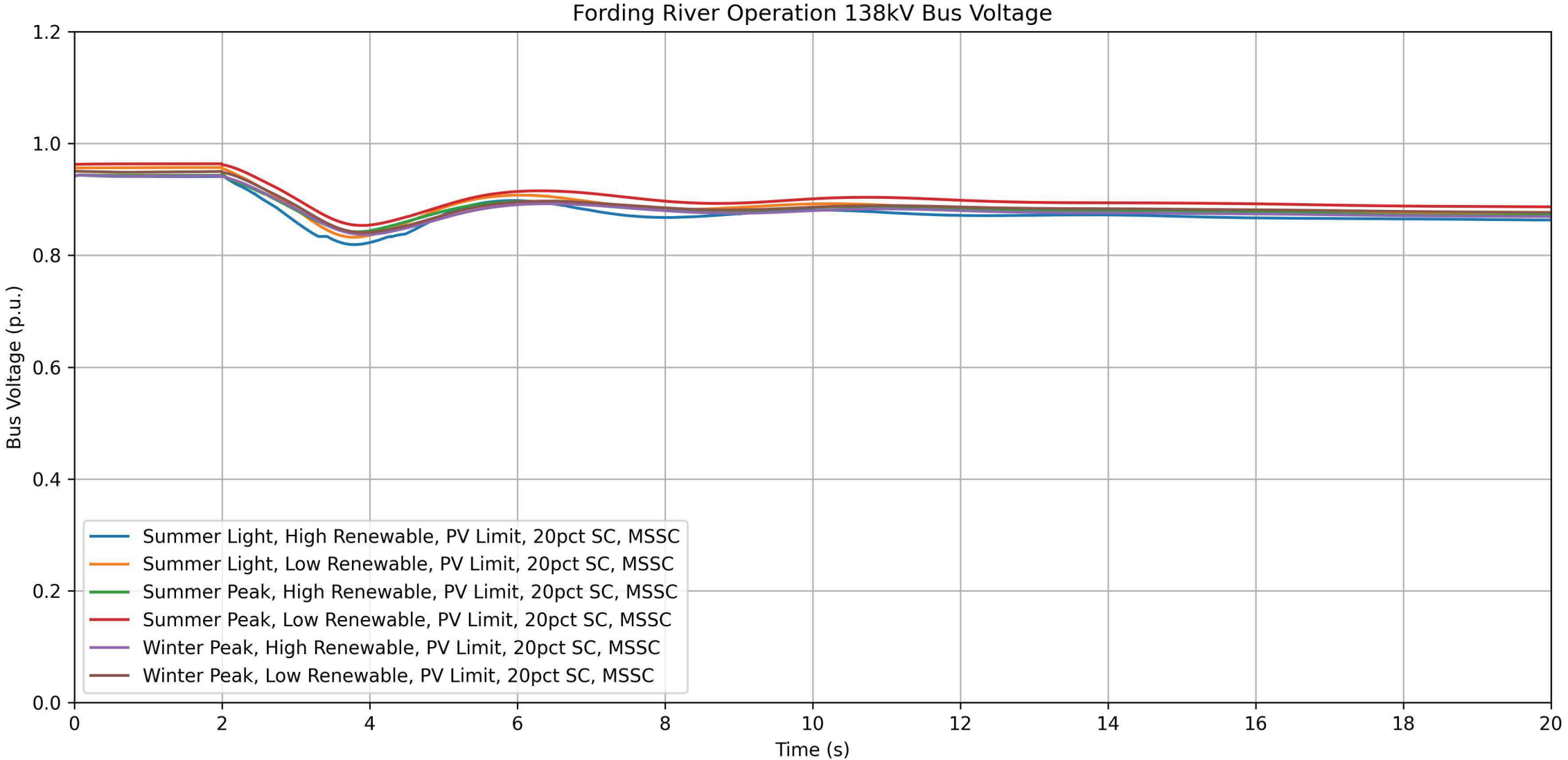

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

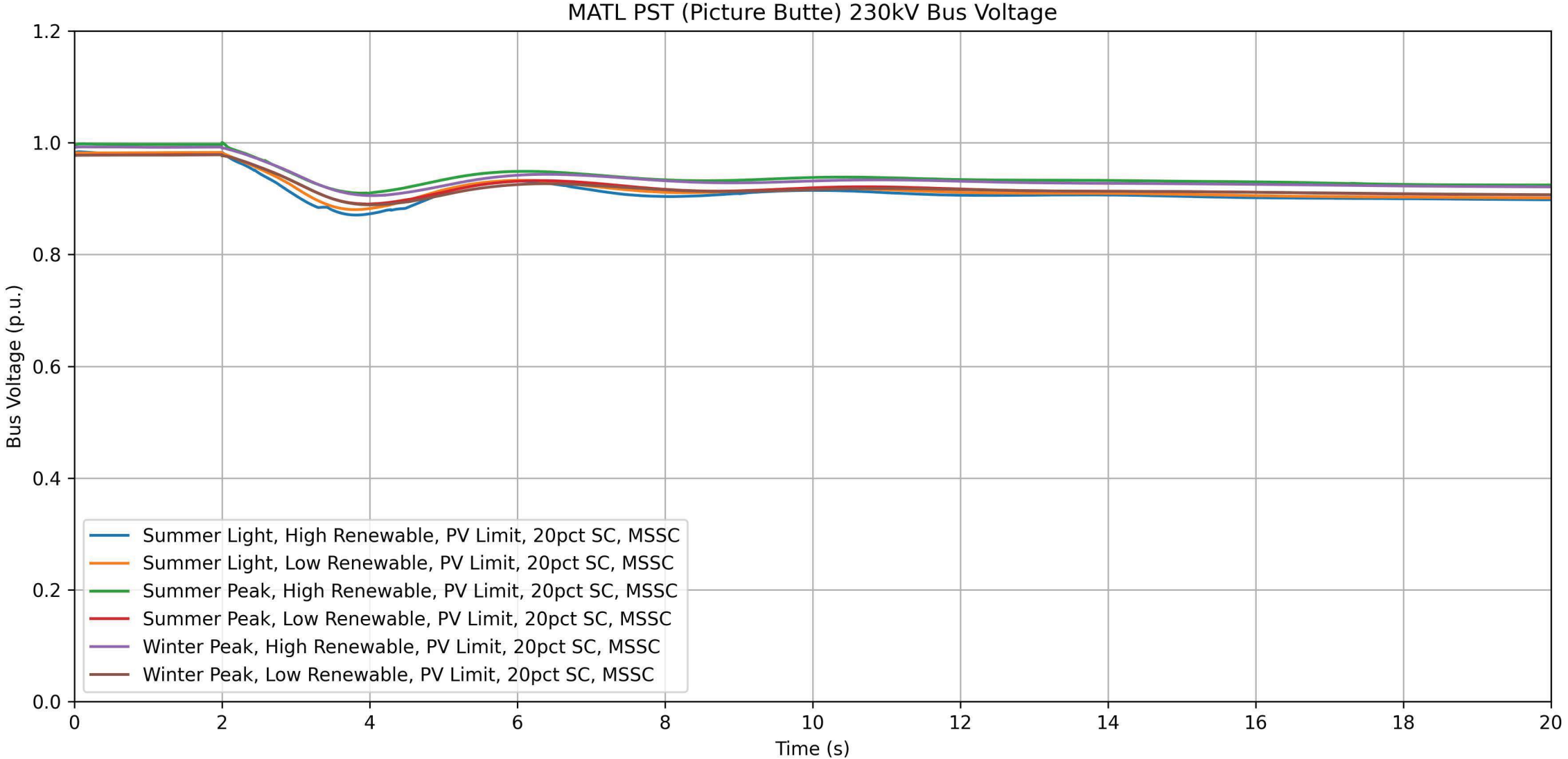

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

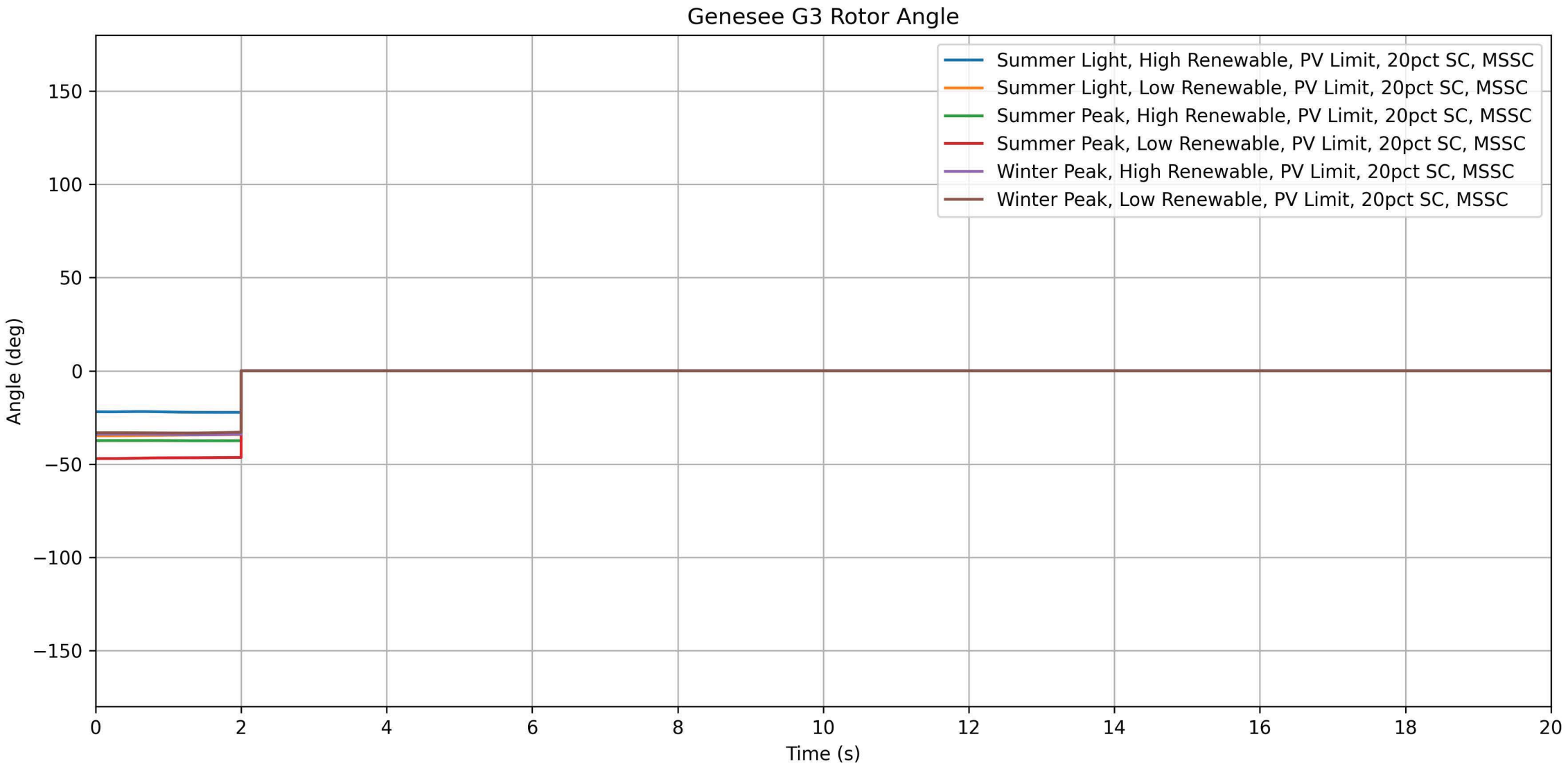

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

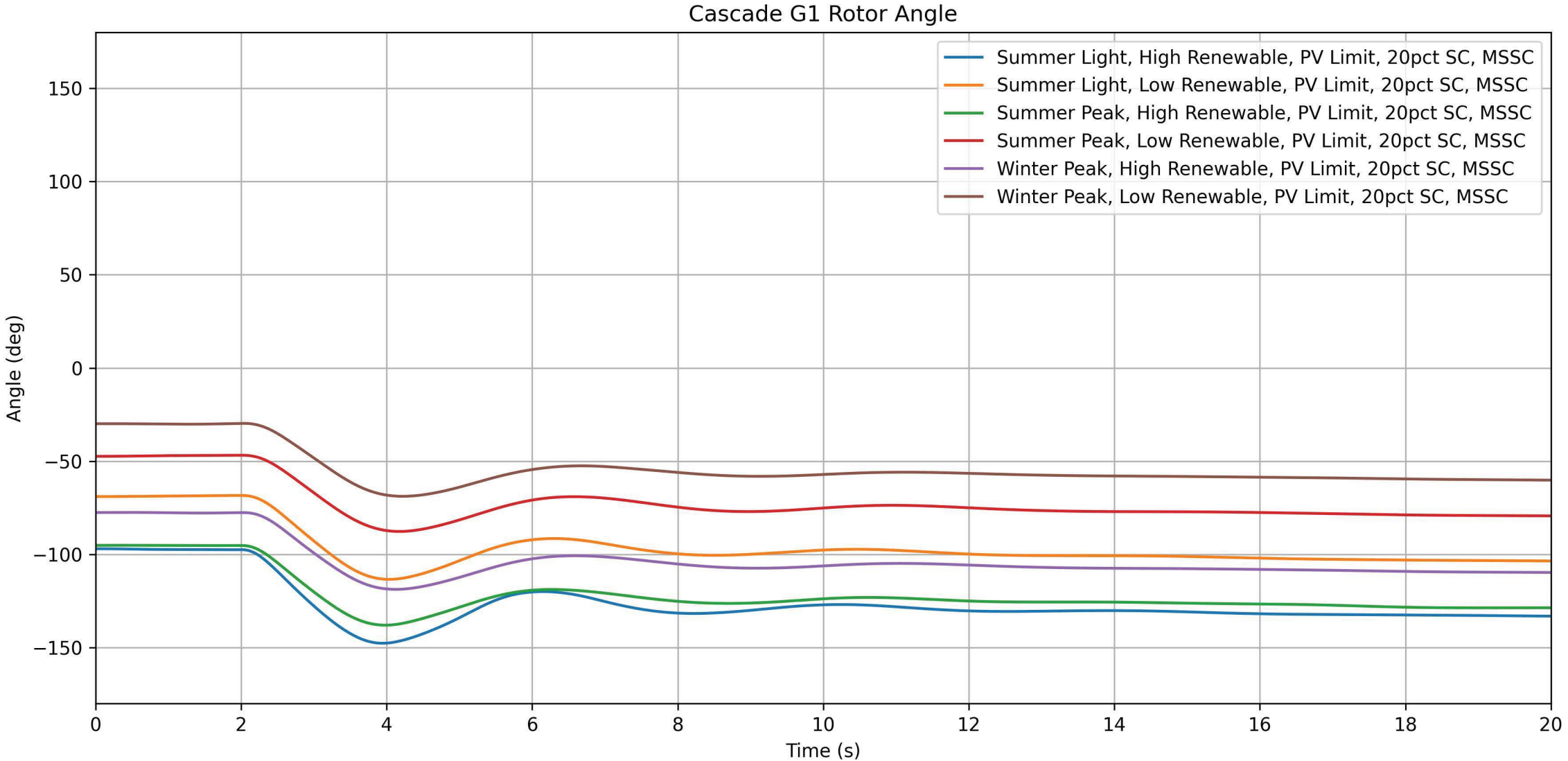

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

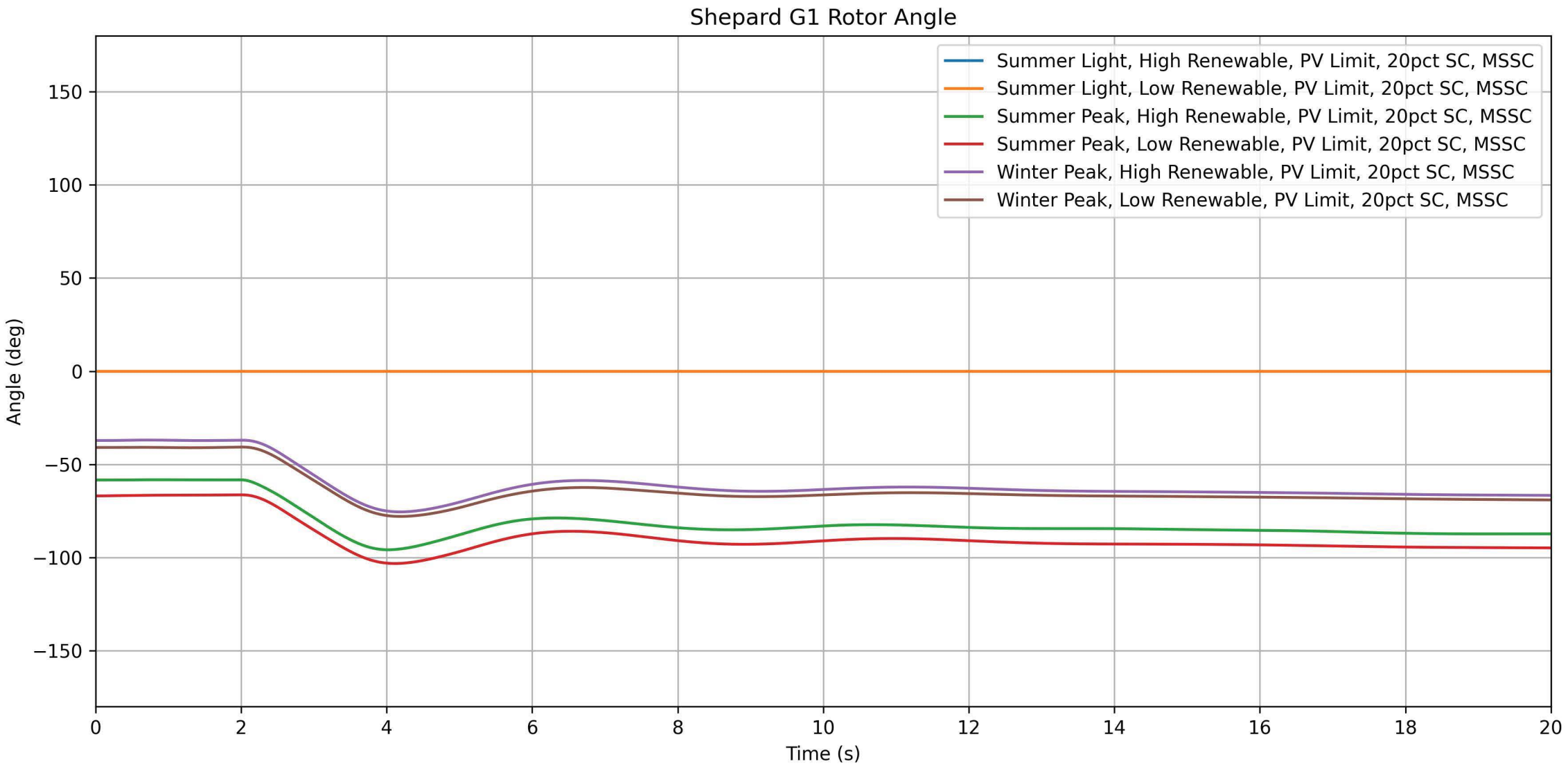

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

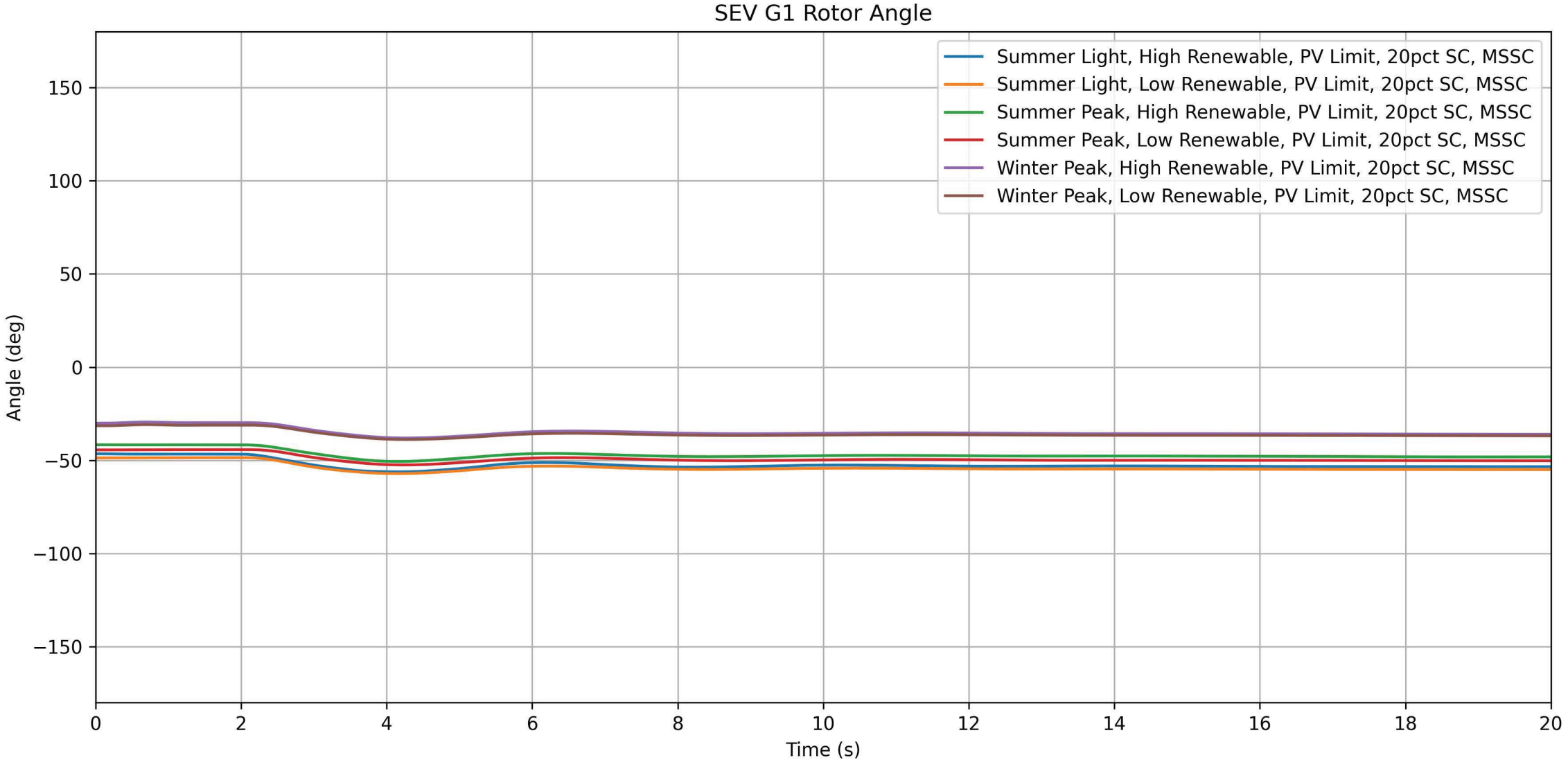

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

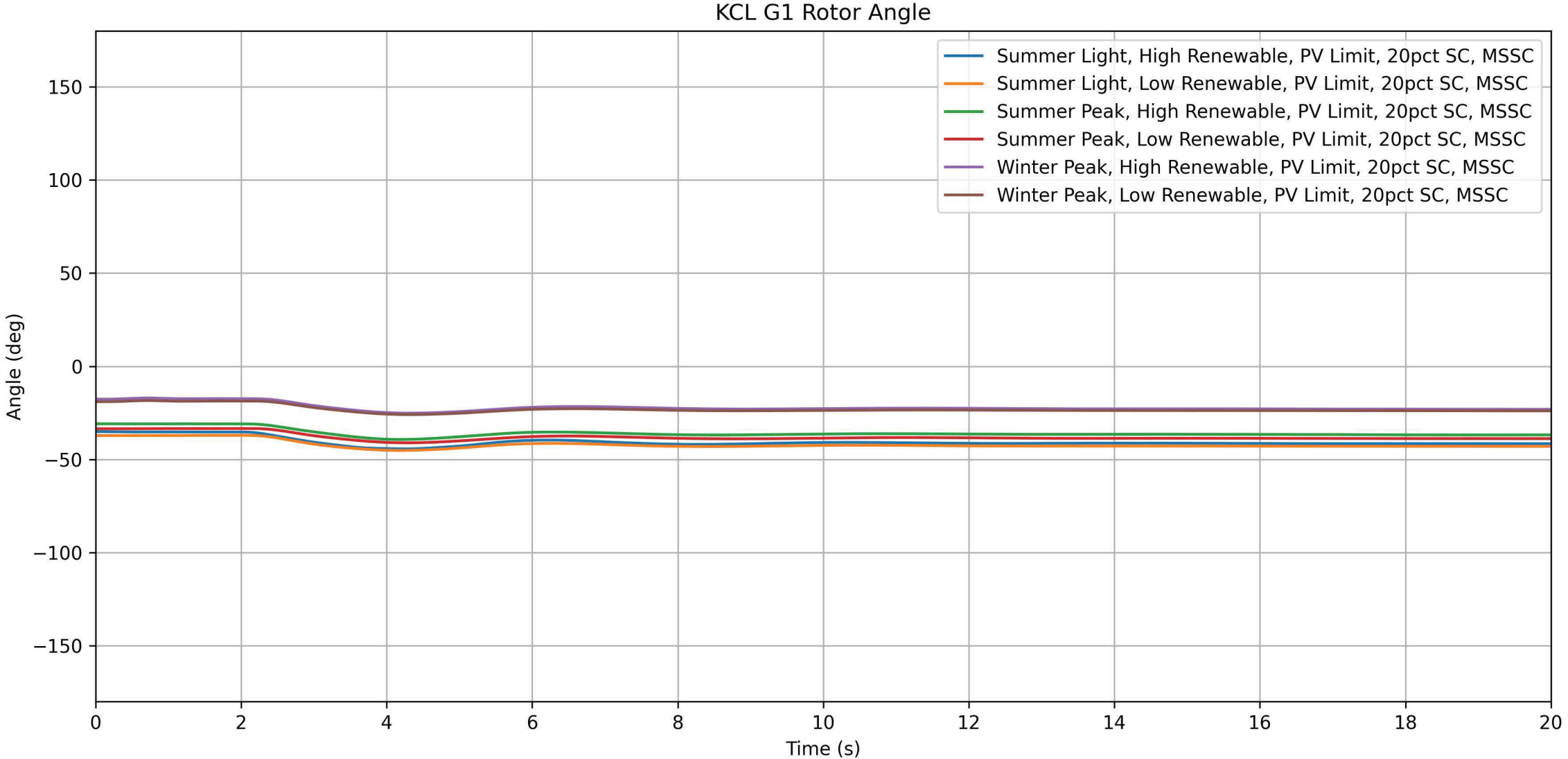

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC

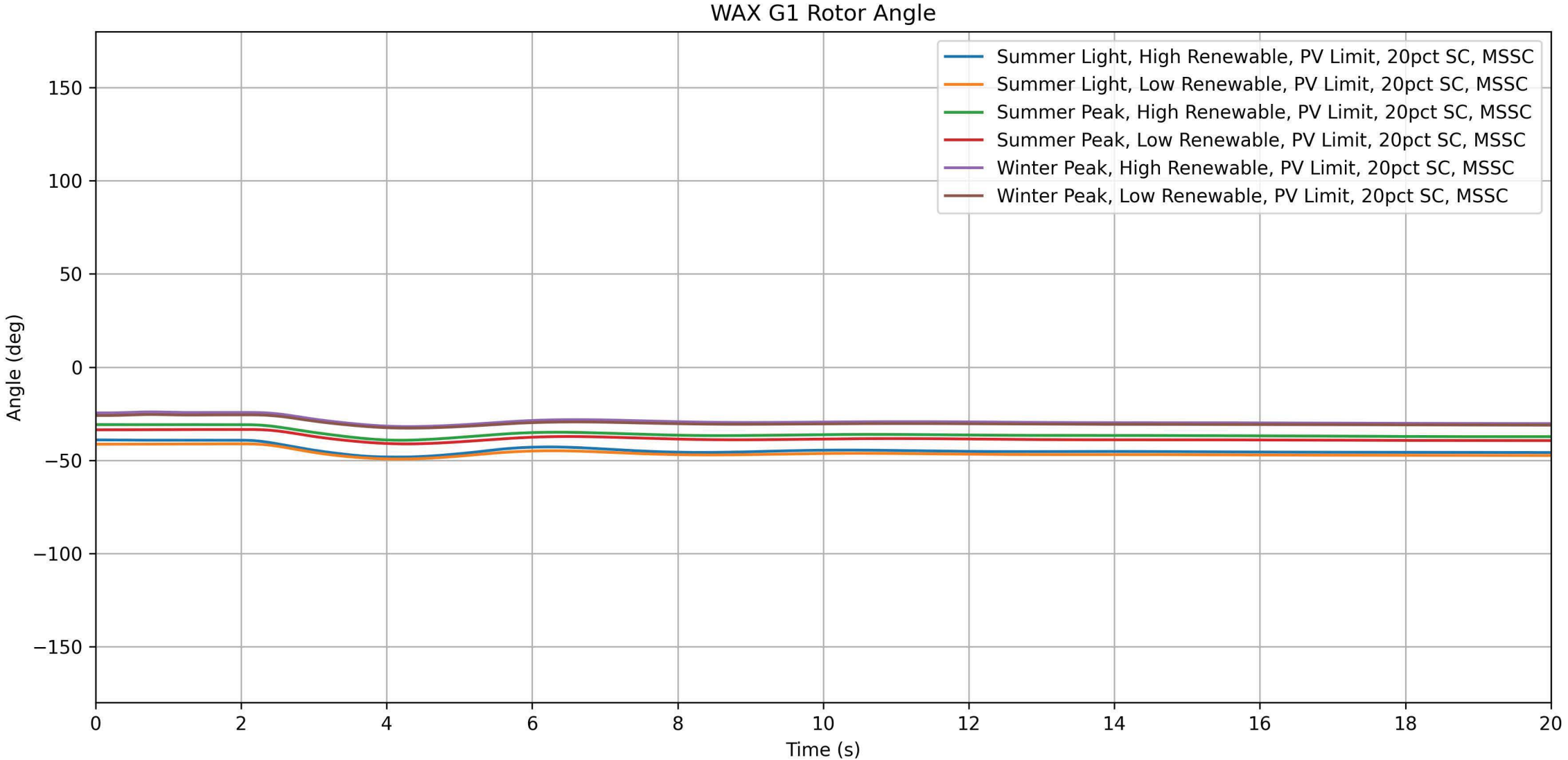

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

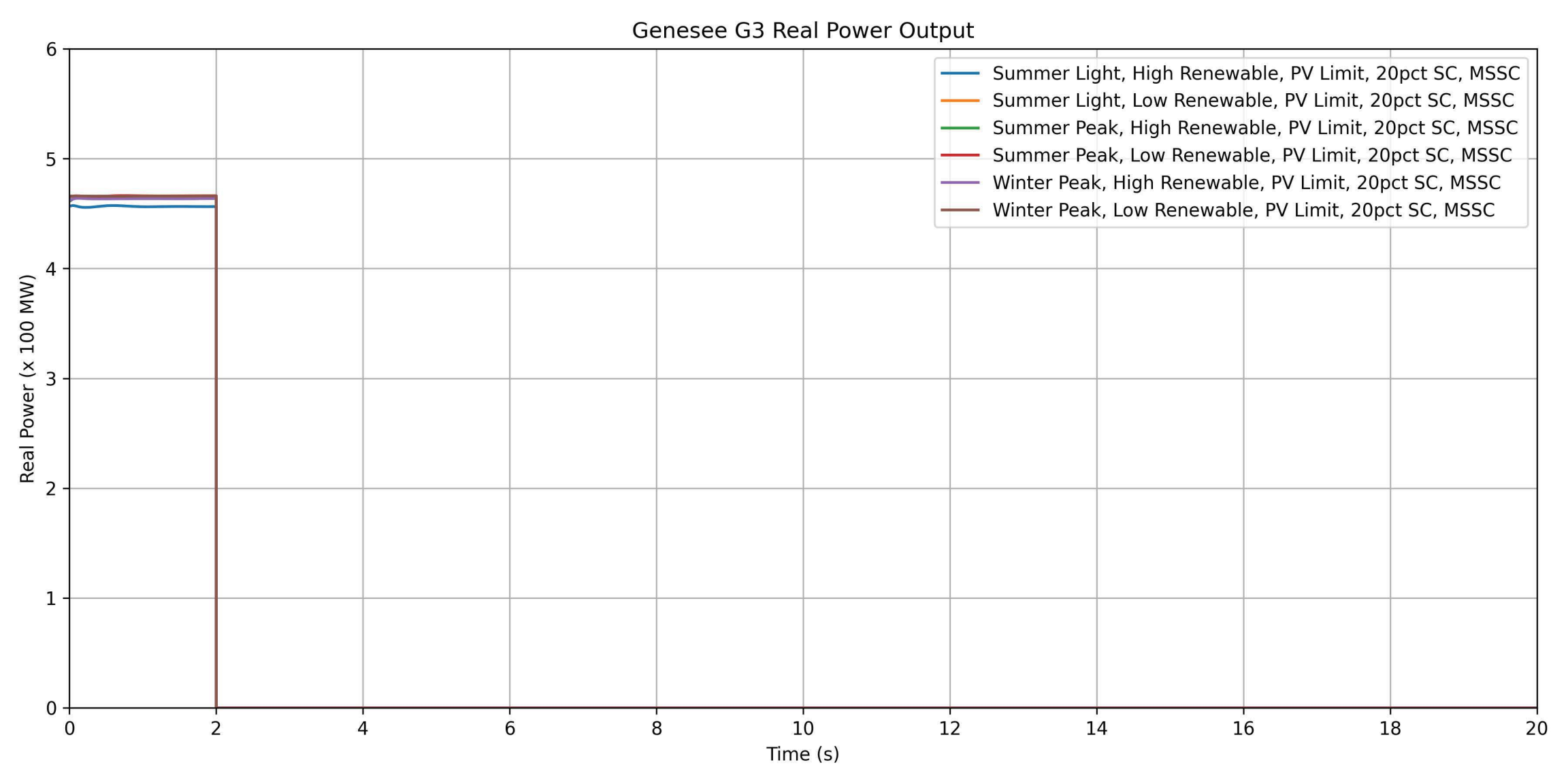

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

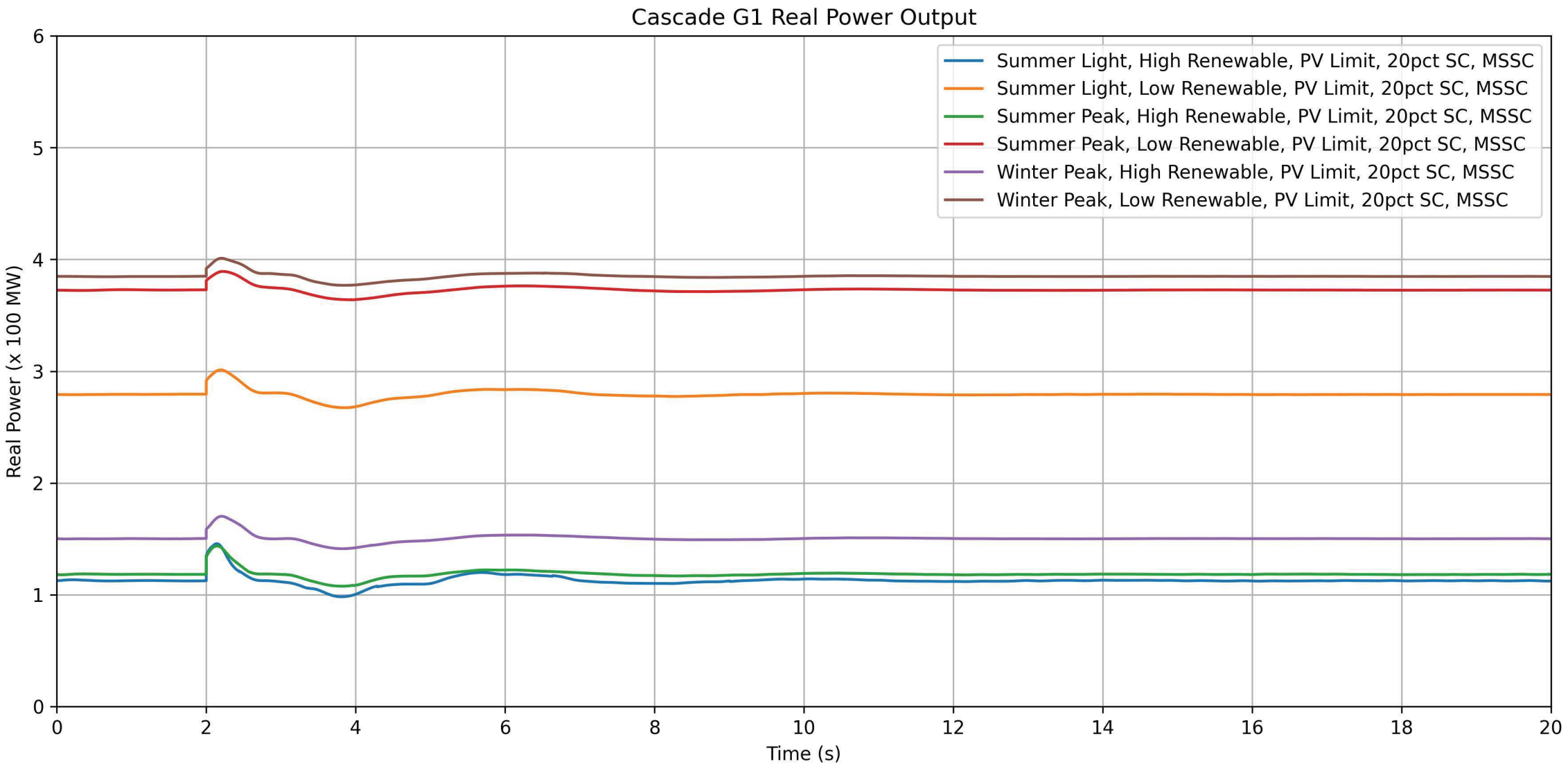

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

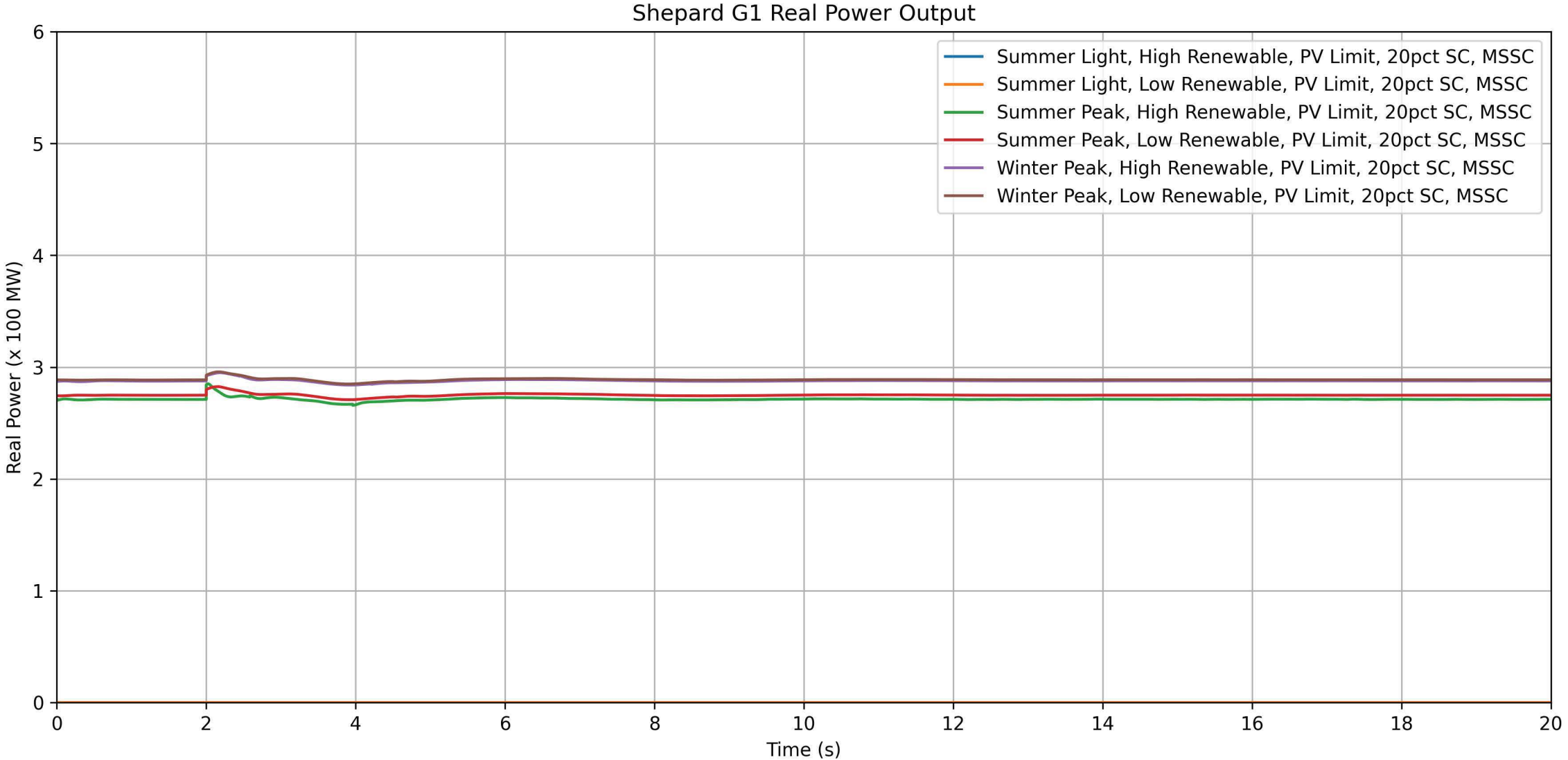

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

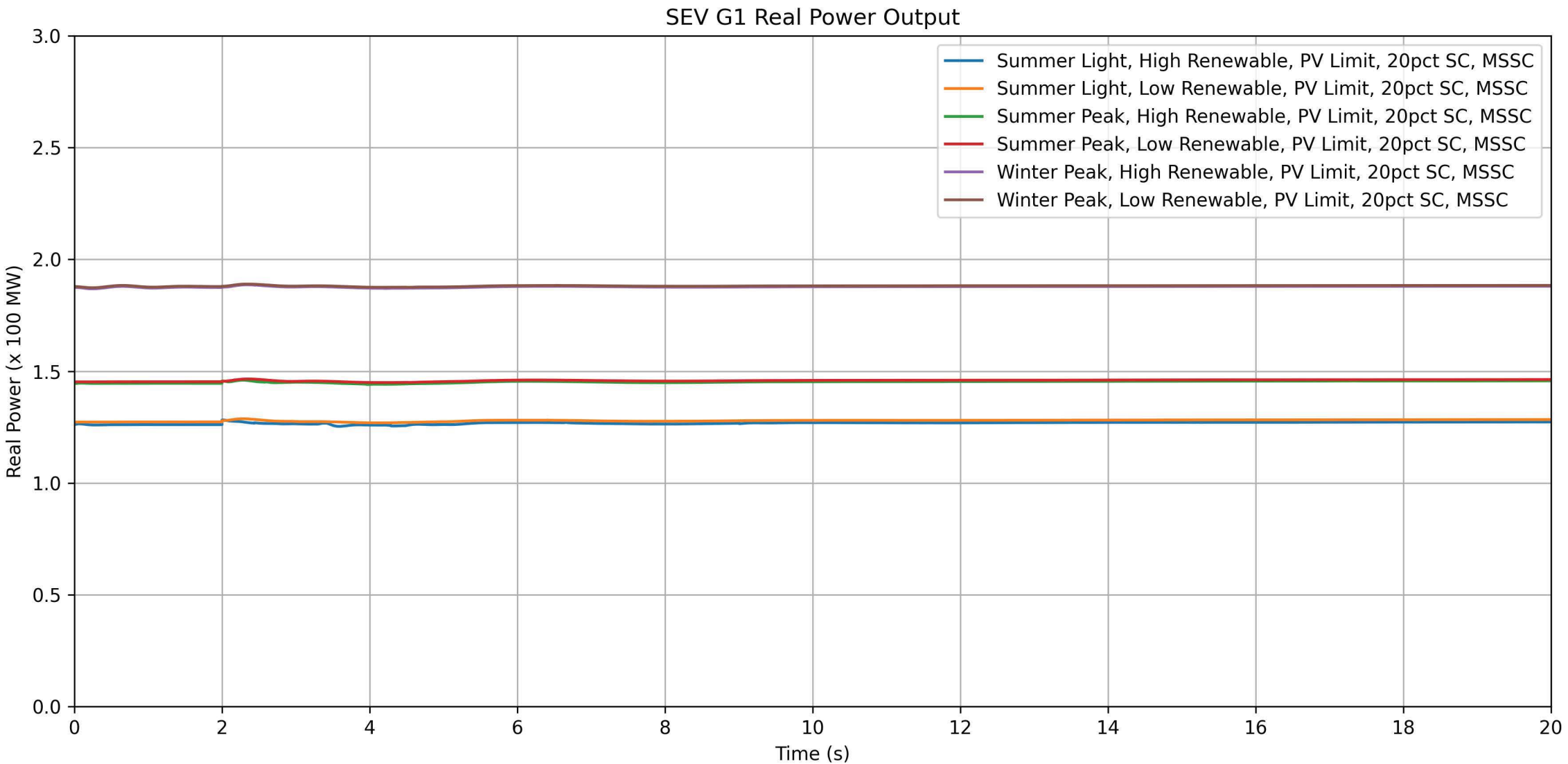

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

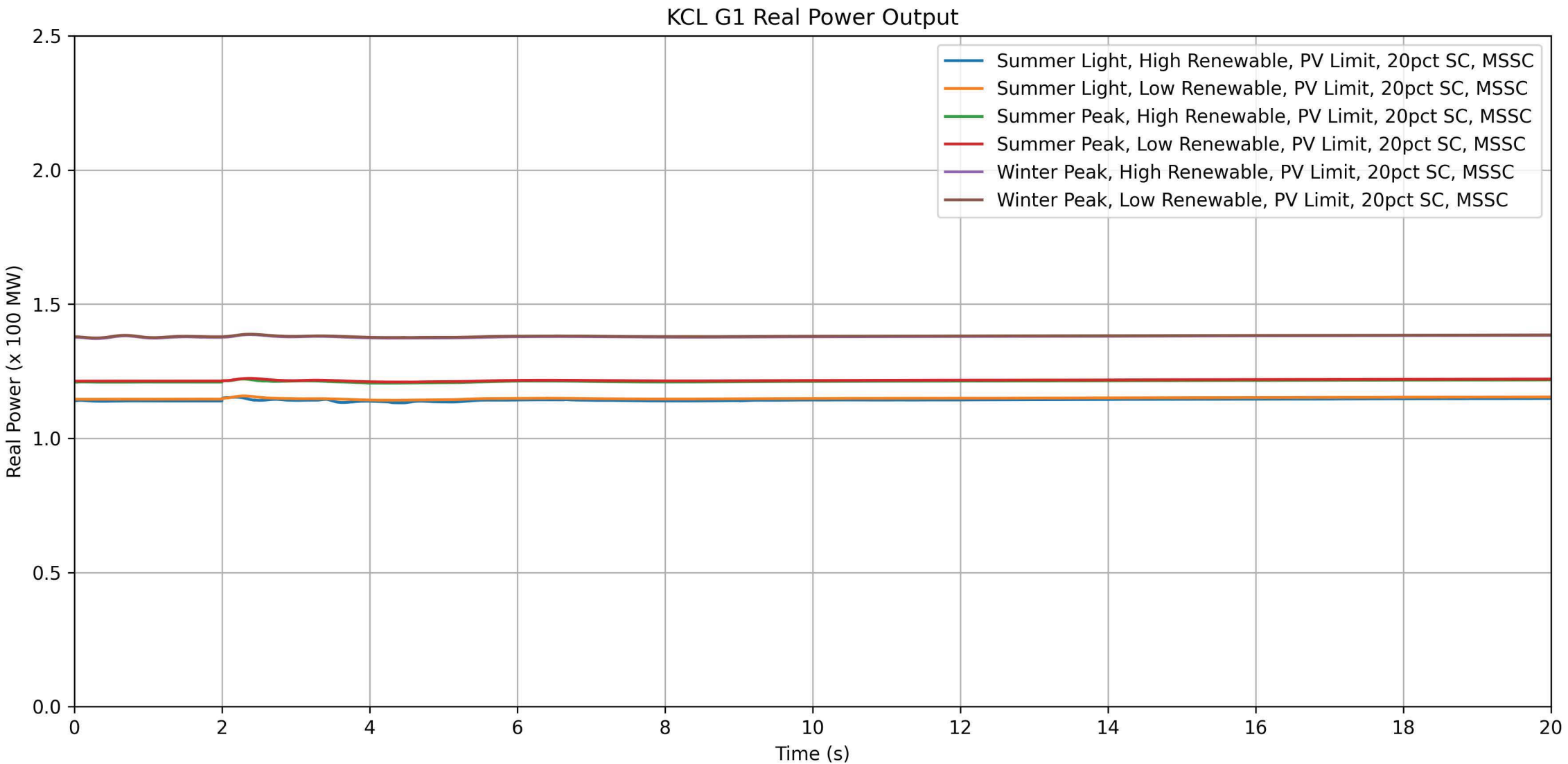

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

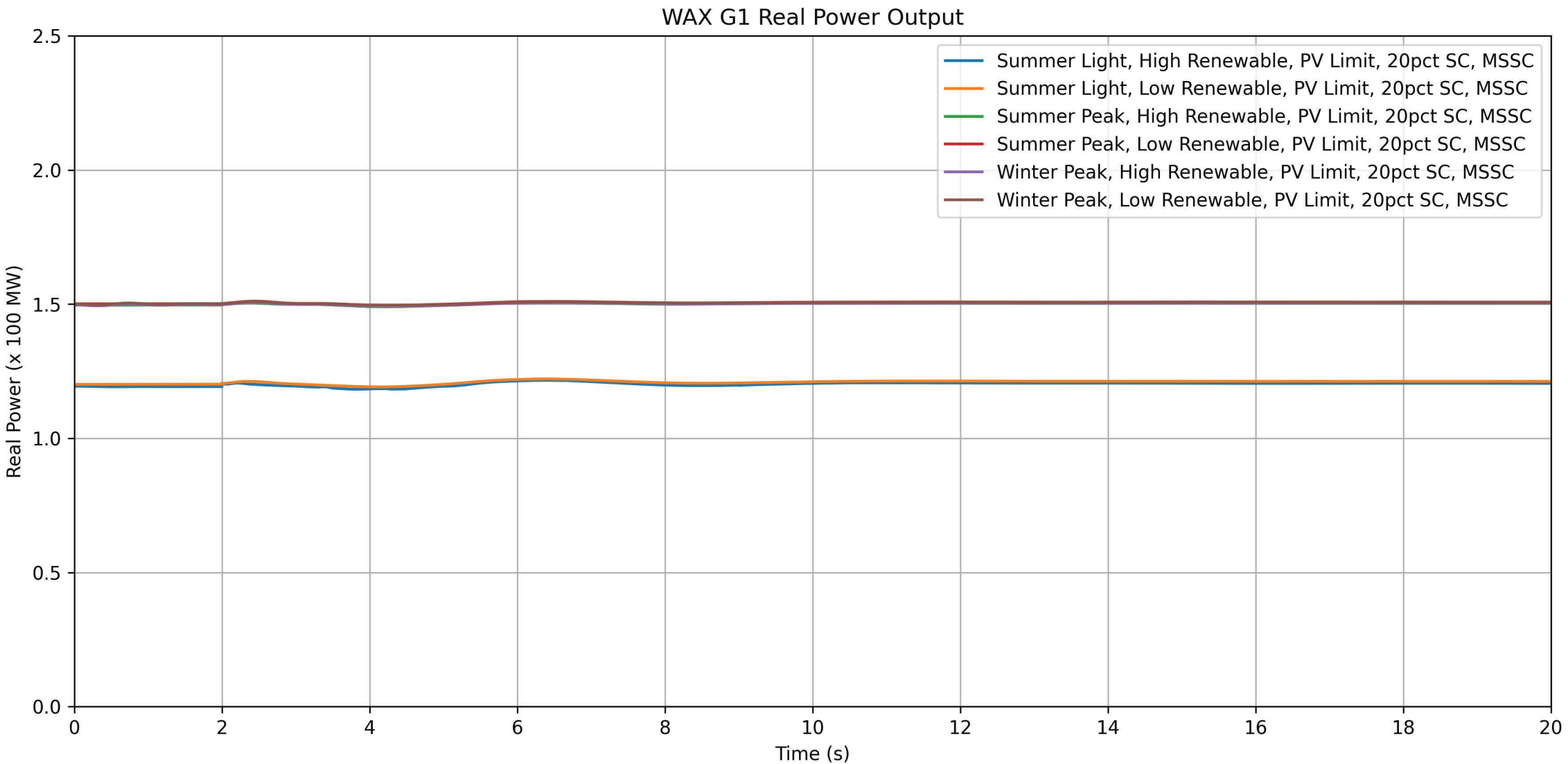

Genesee G3 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

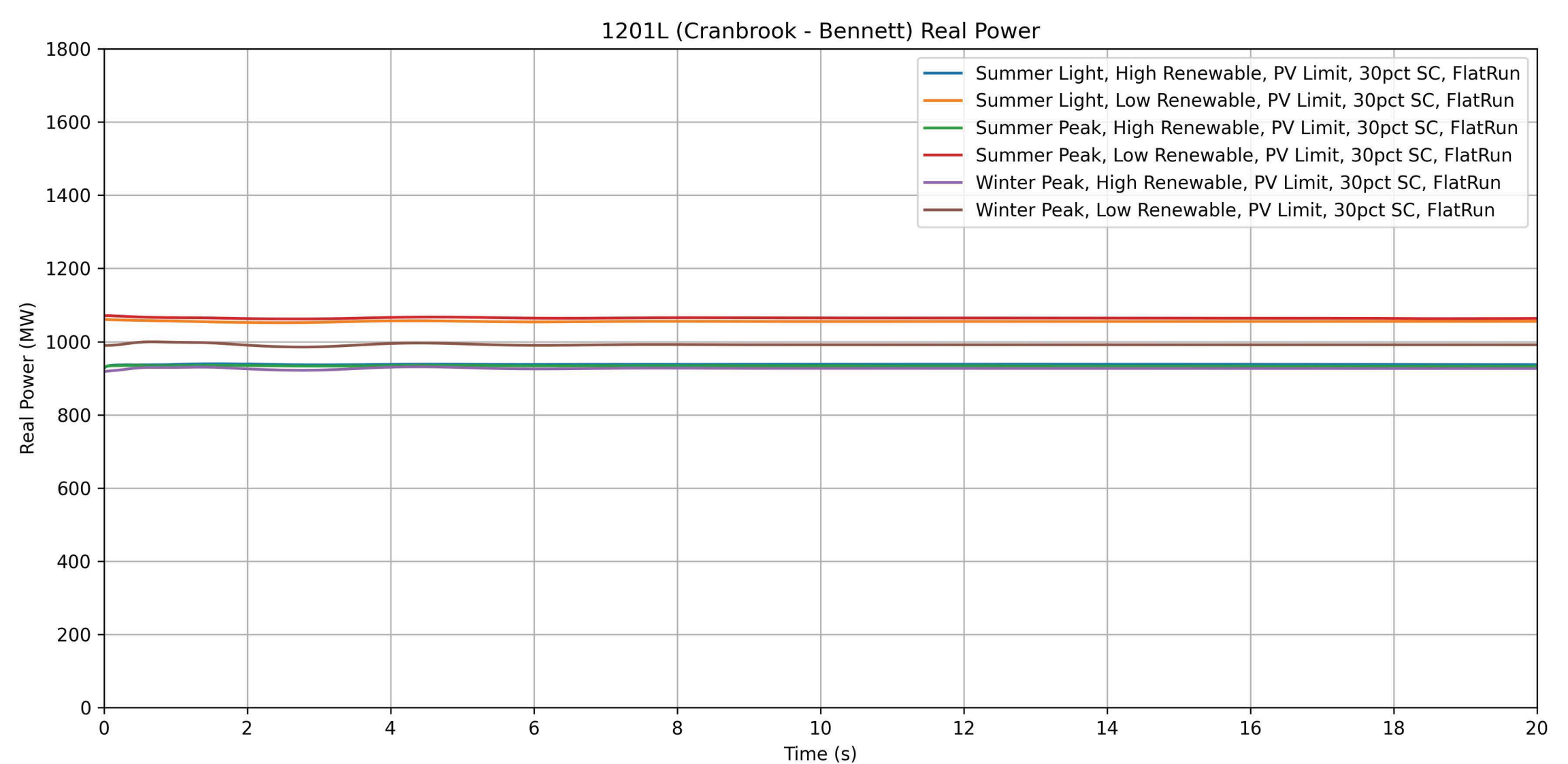

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

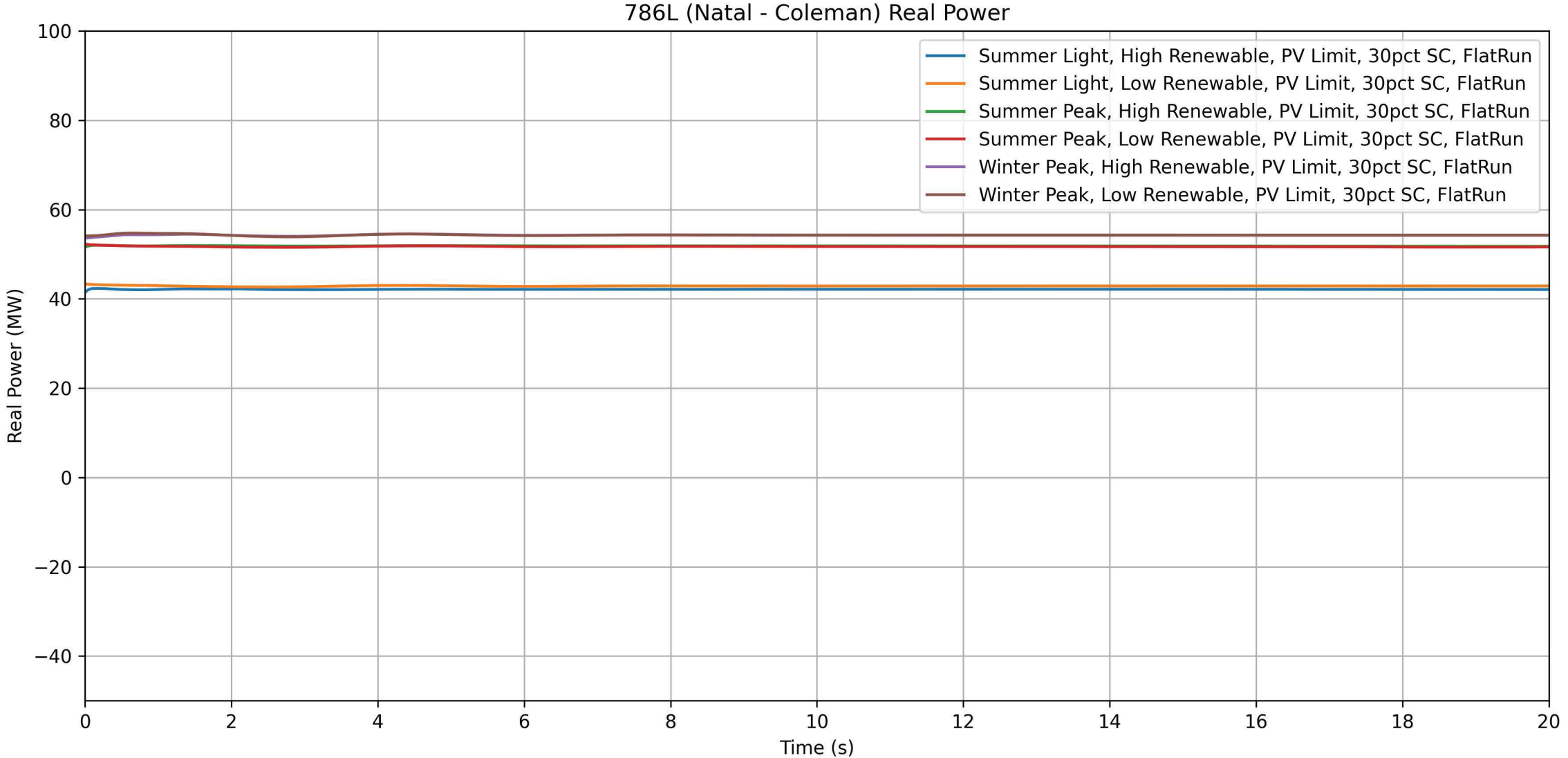

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

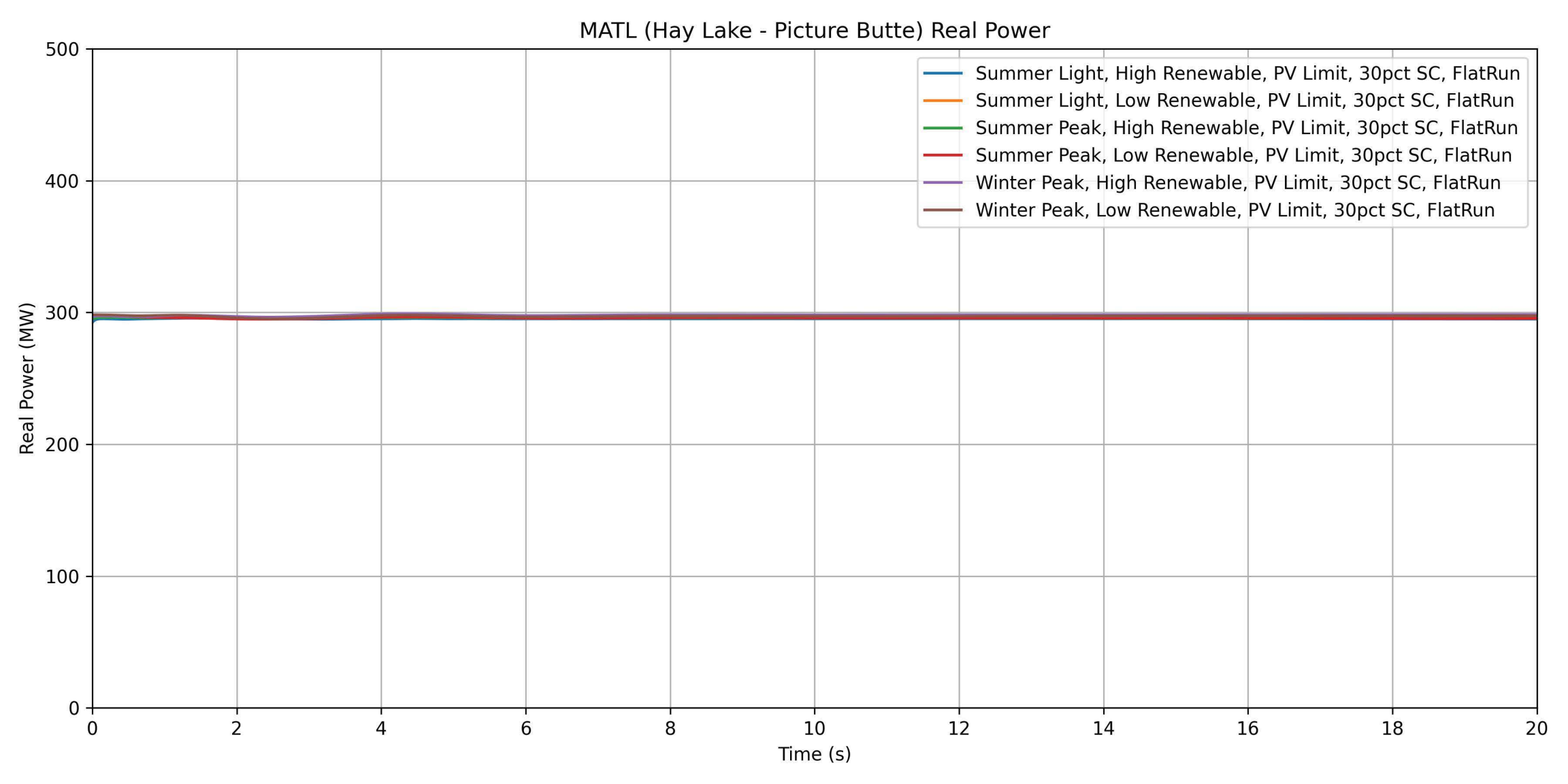

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

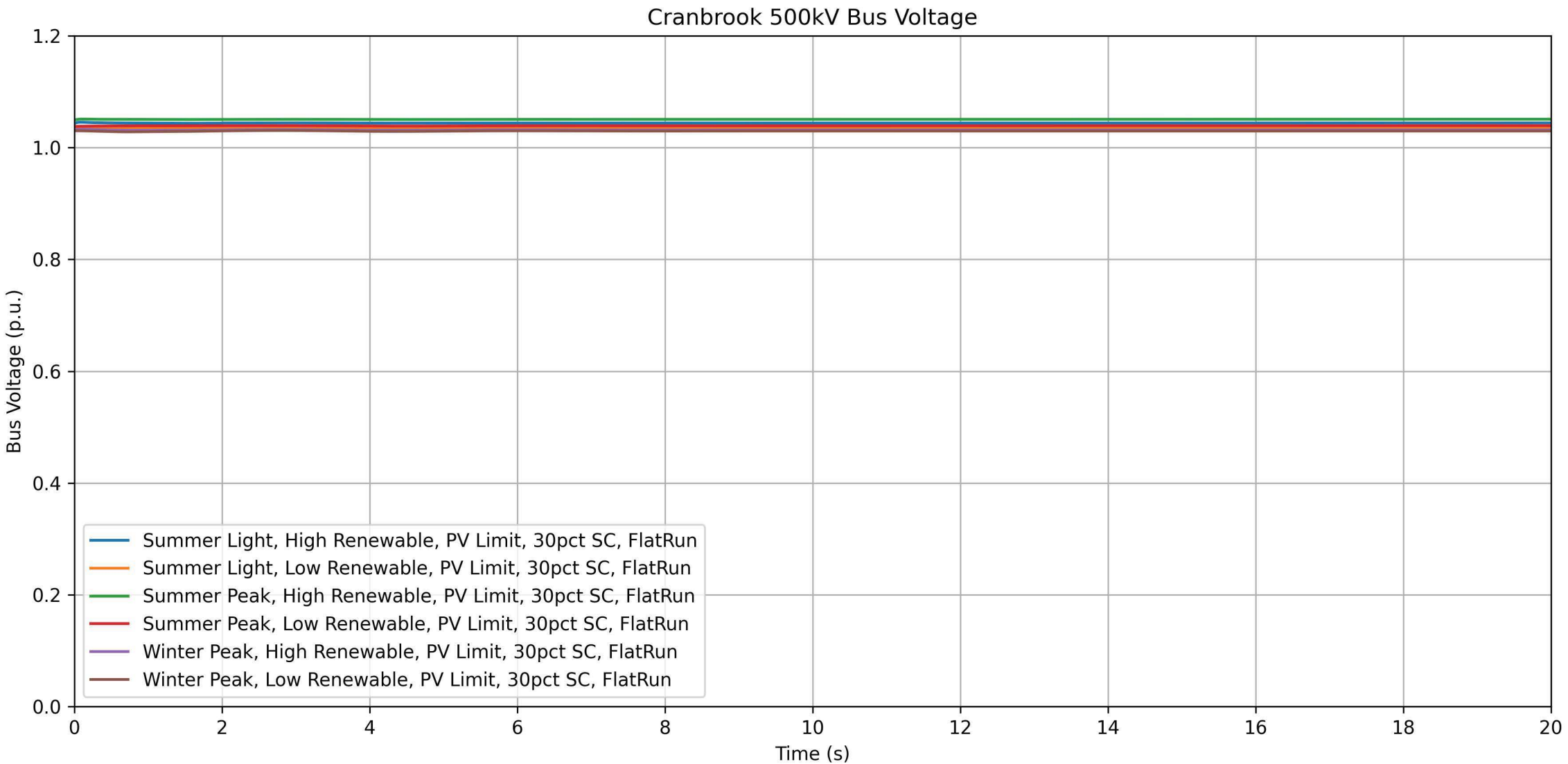

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

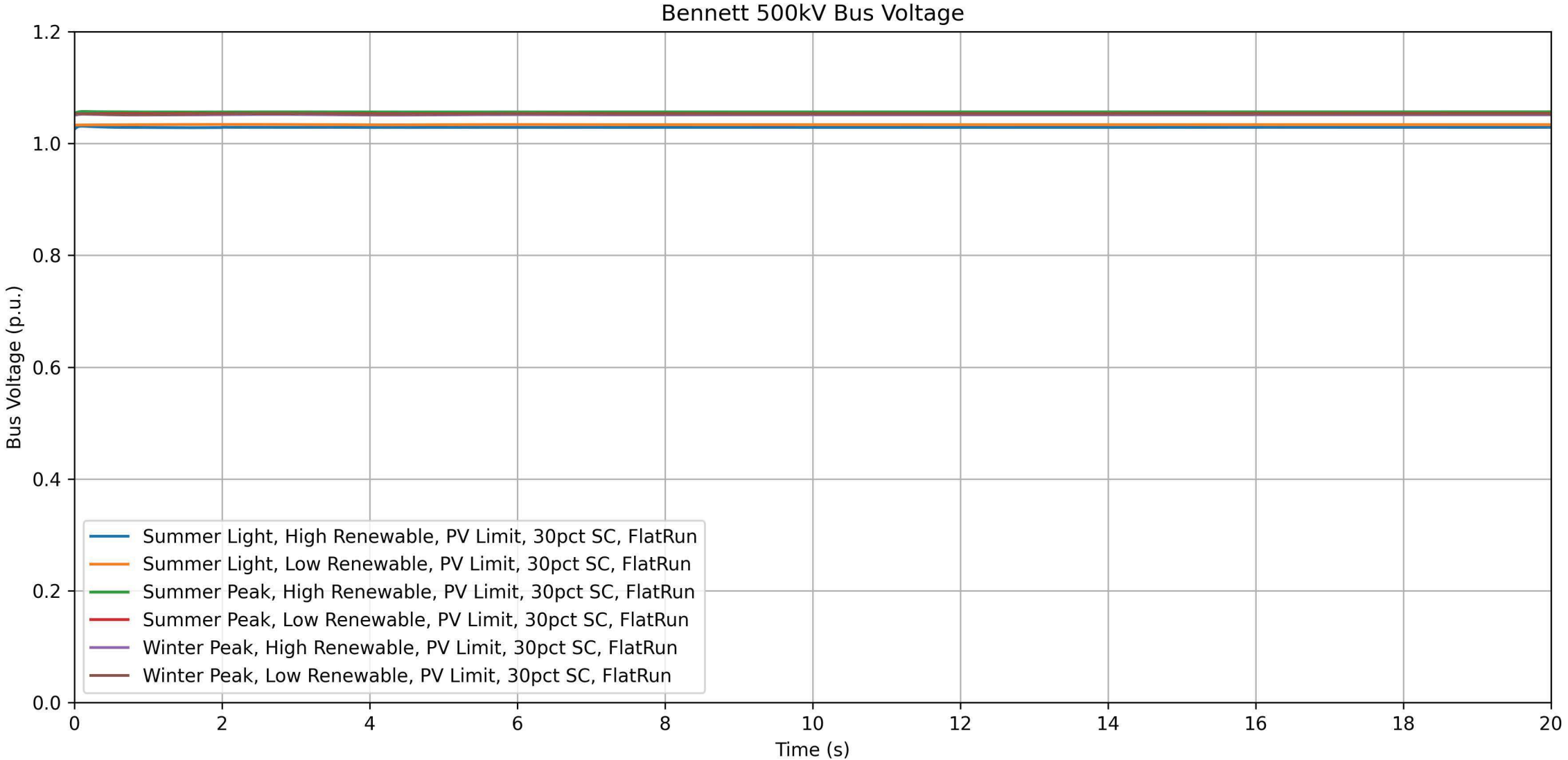

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 20pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 20pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 20pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 20pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

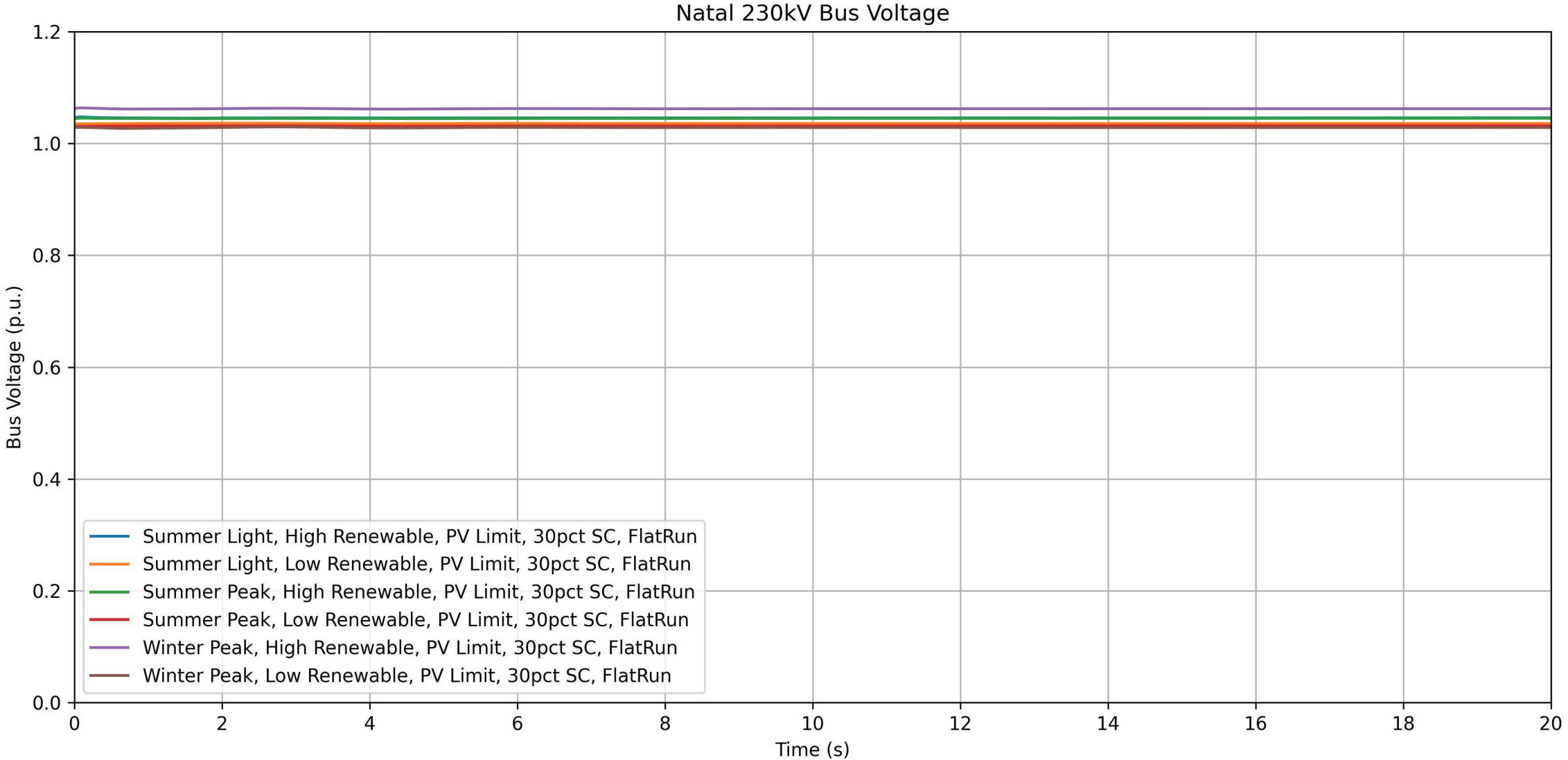

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (MW)
0
200
400
600
800
1000
1200
1400
1600
1800
Time (s)
0
2
4
6
8
10
12
14
16
18
20

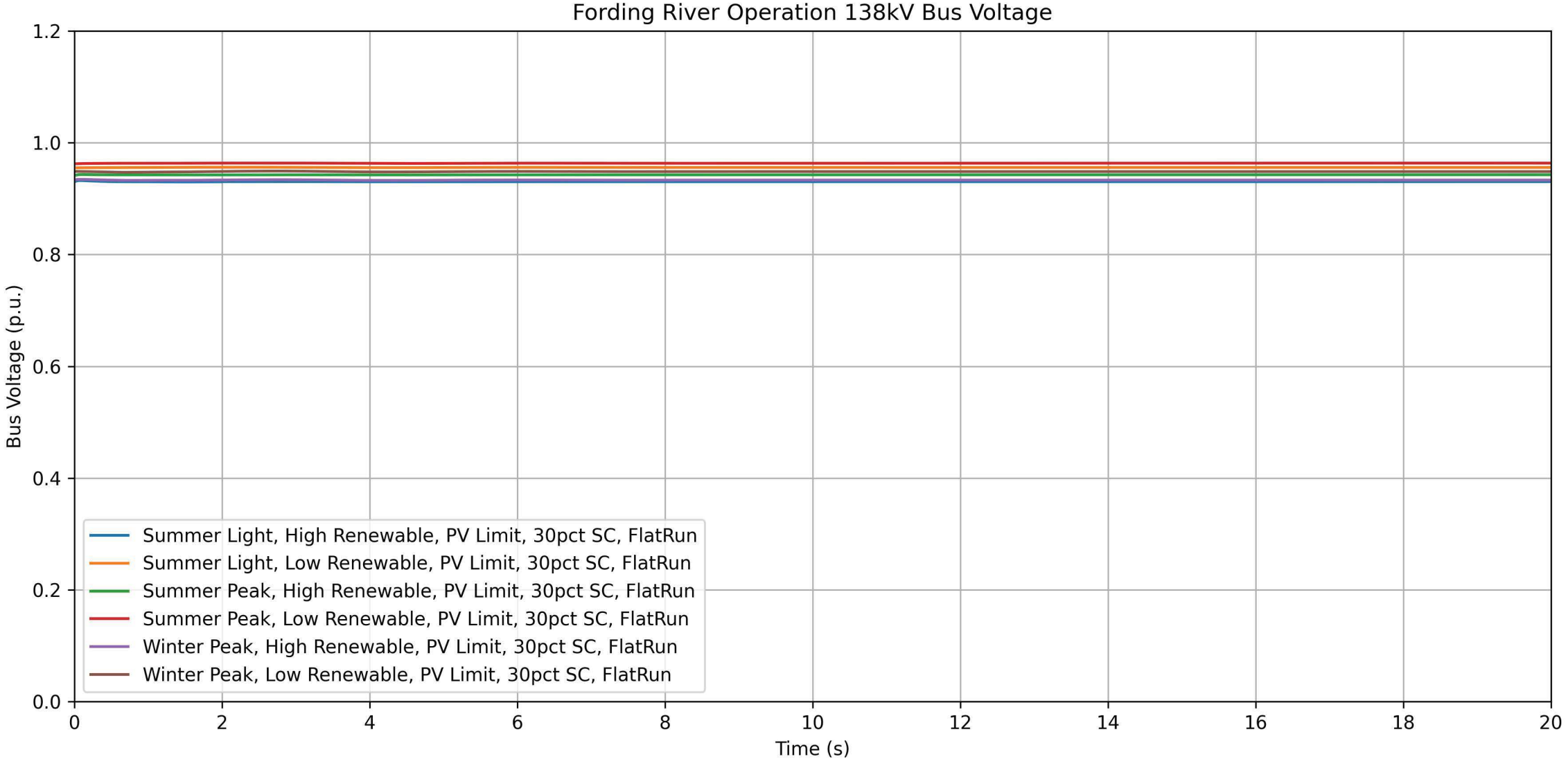

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

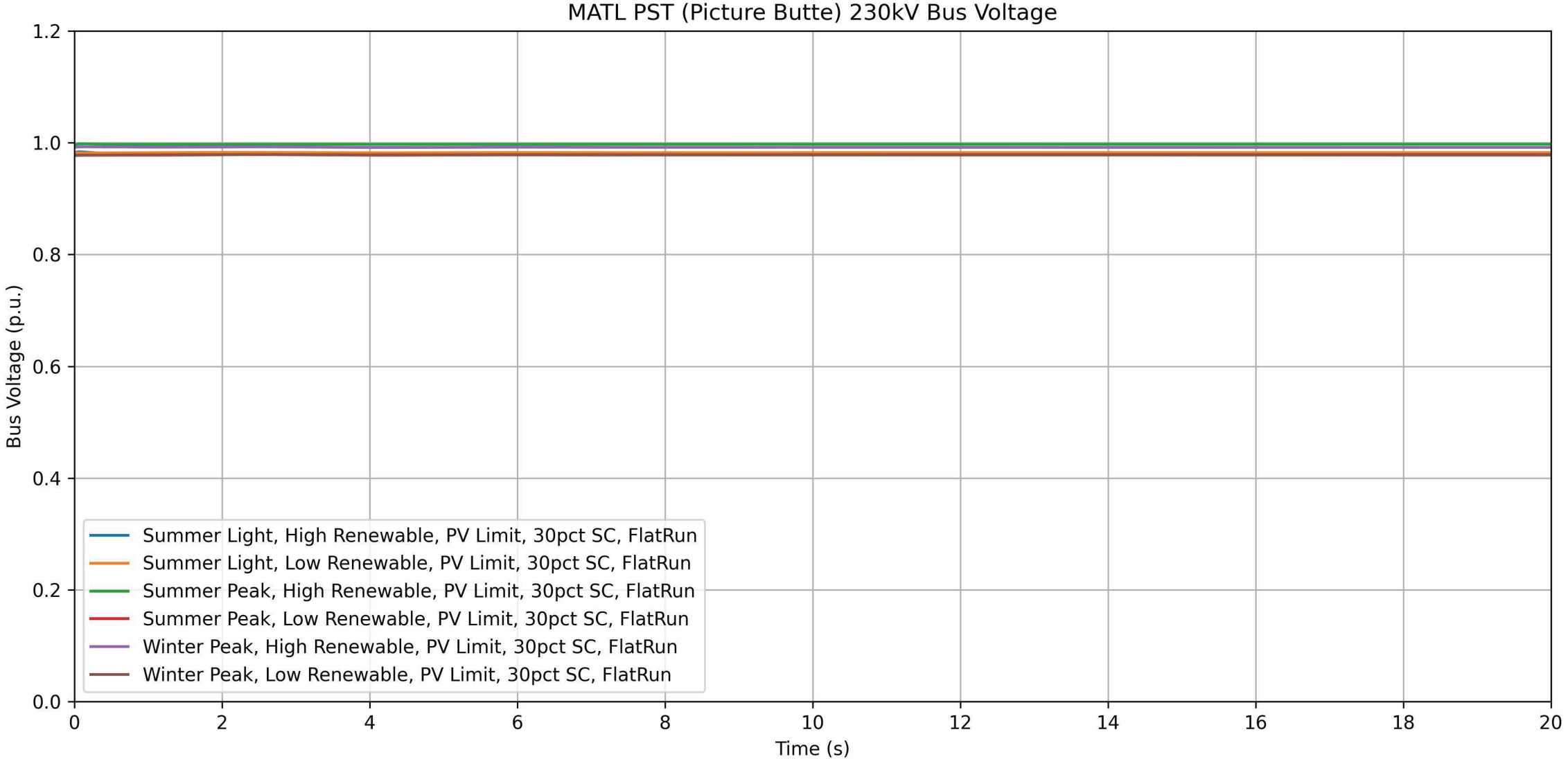

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

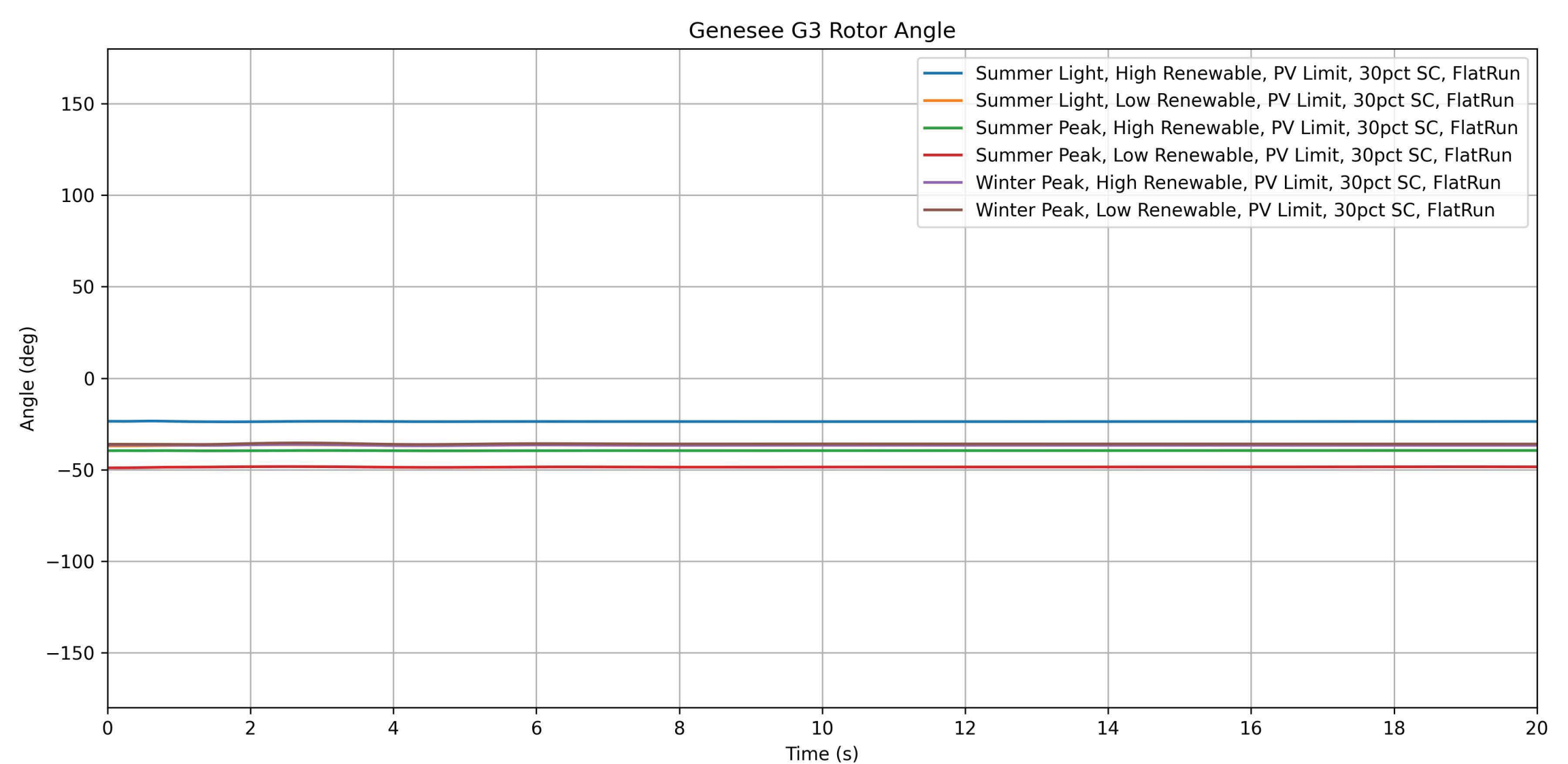

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

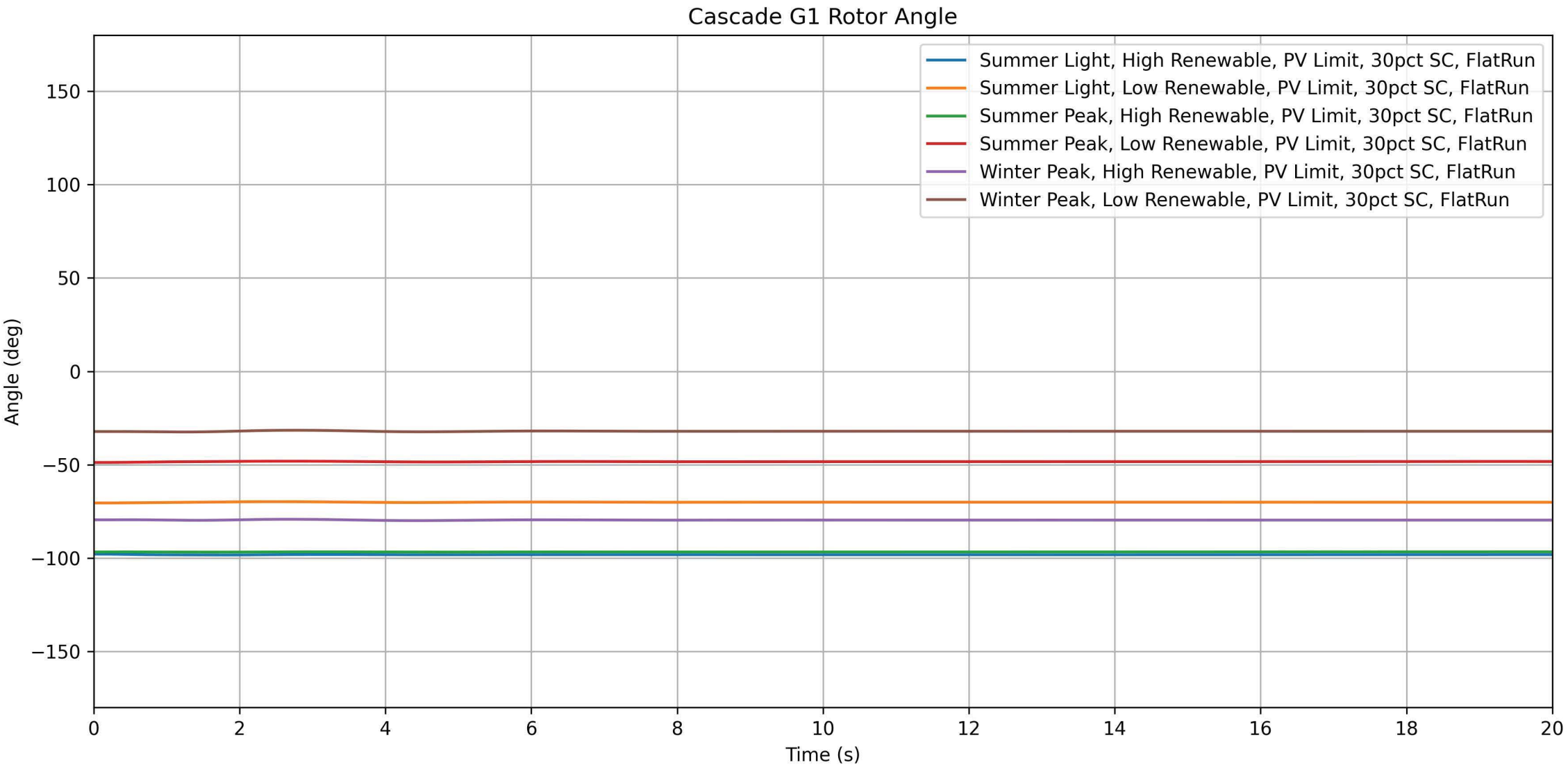

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

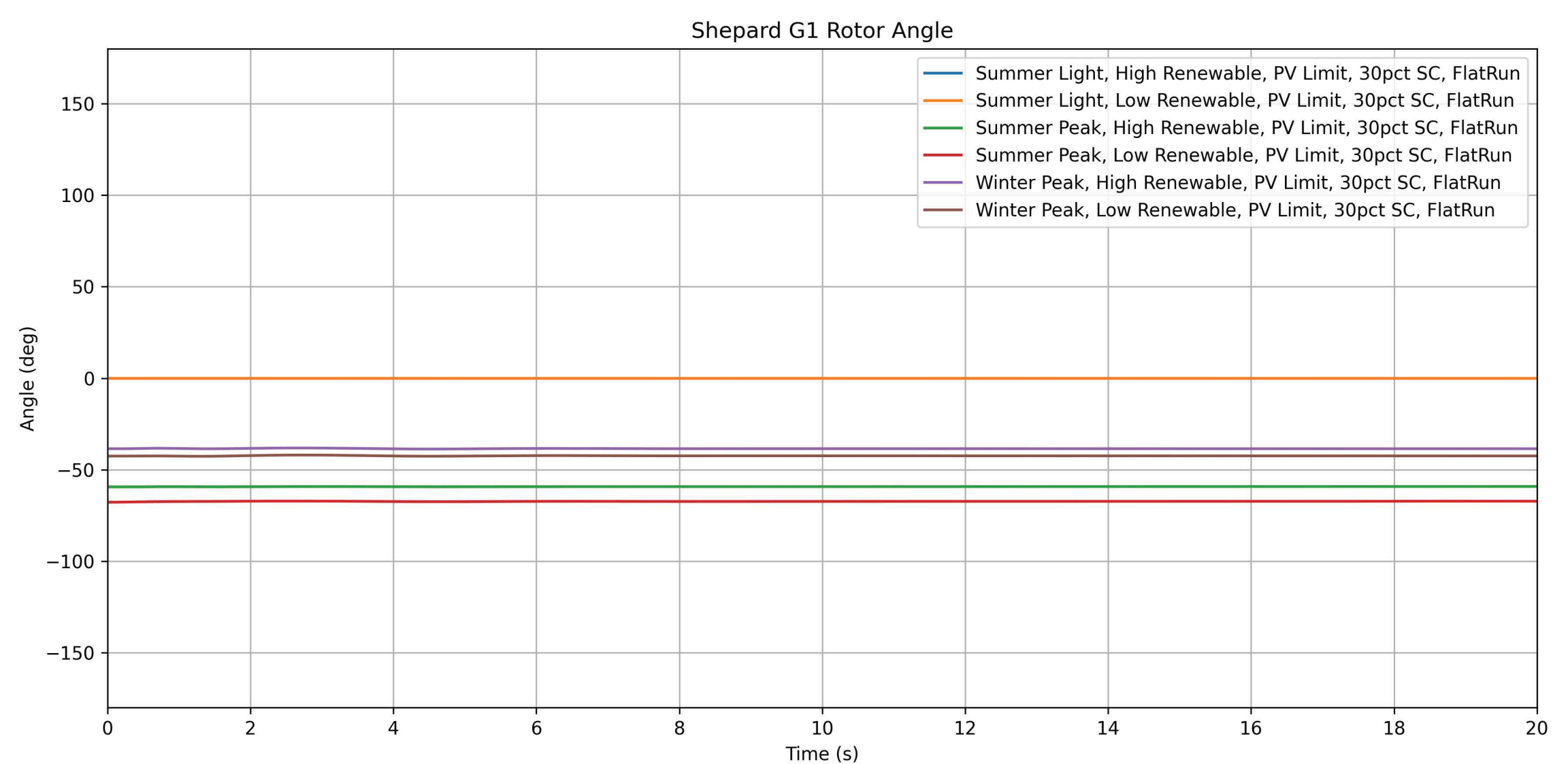

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

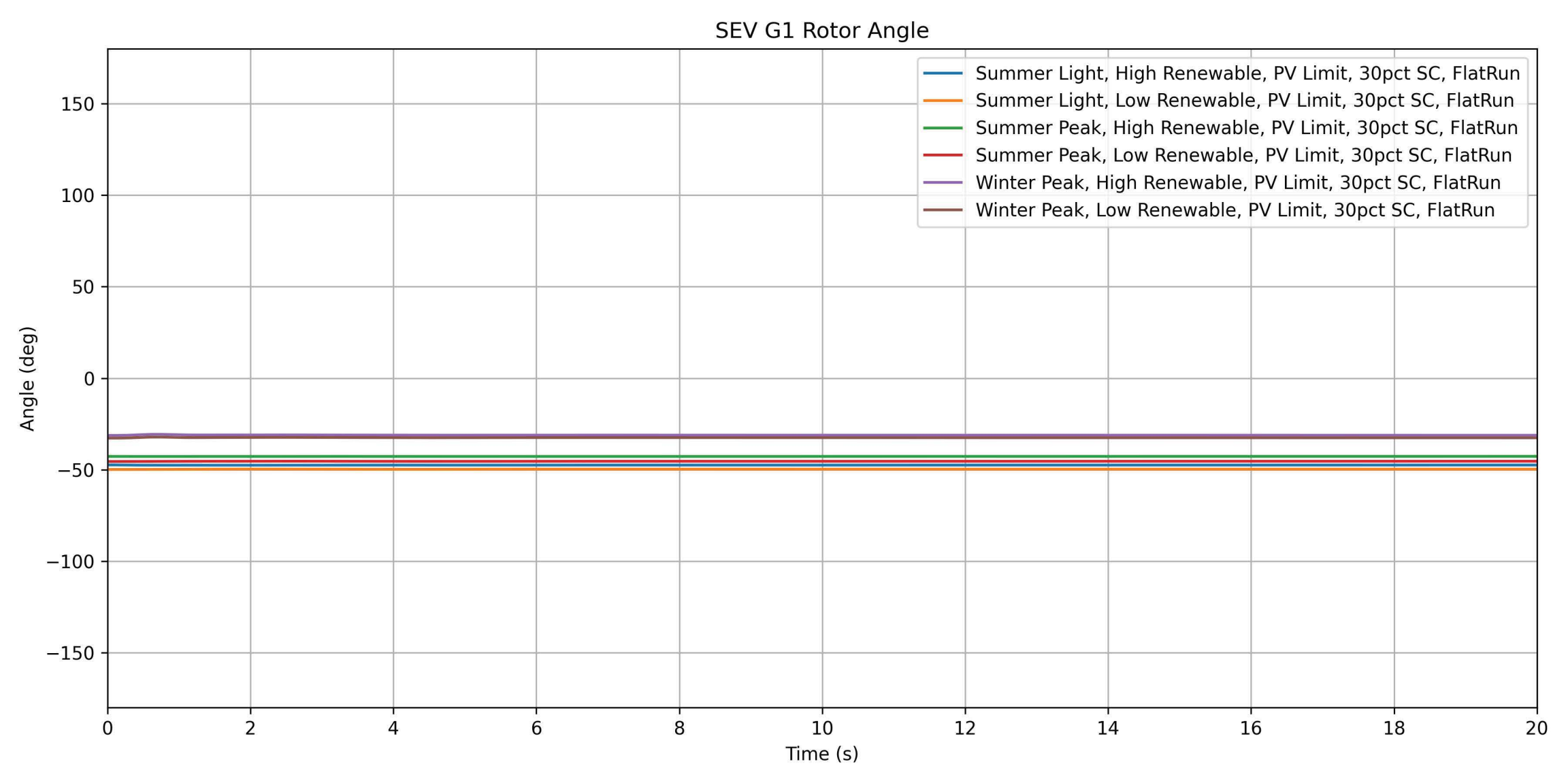

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

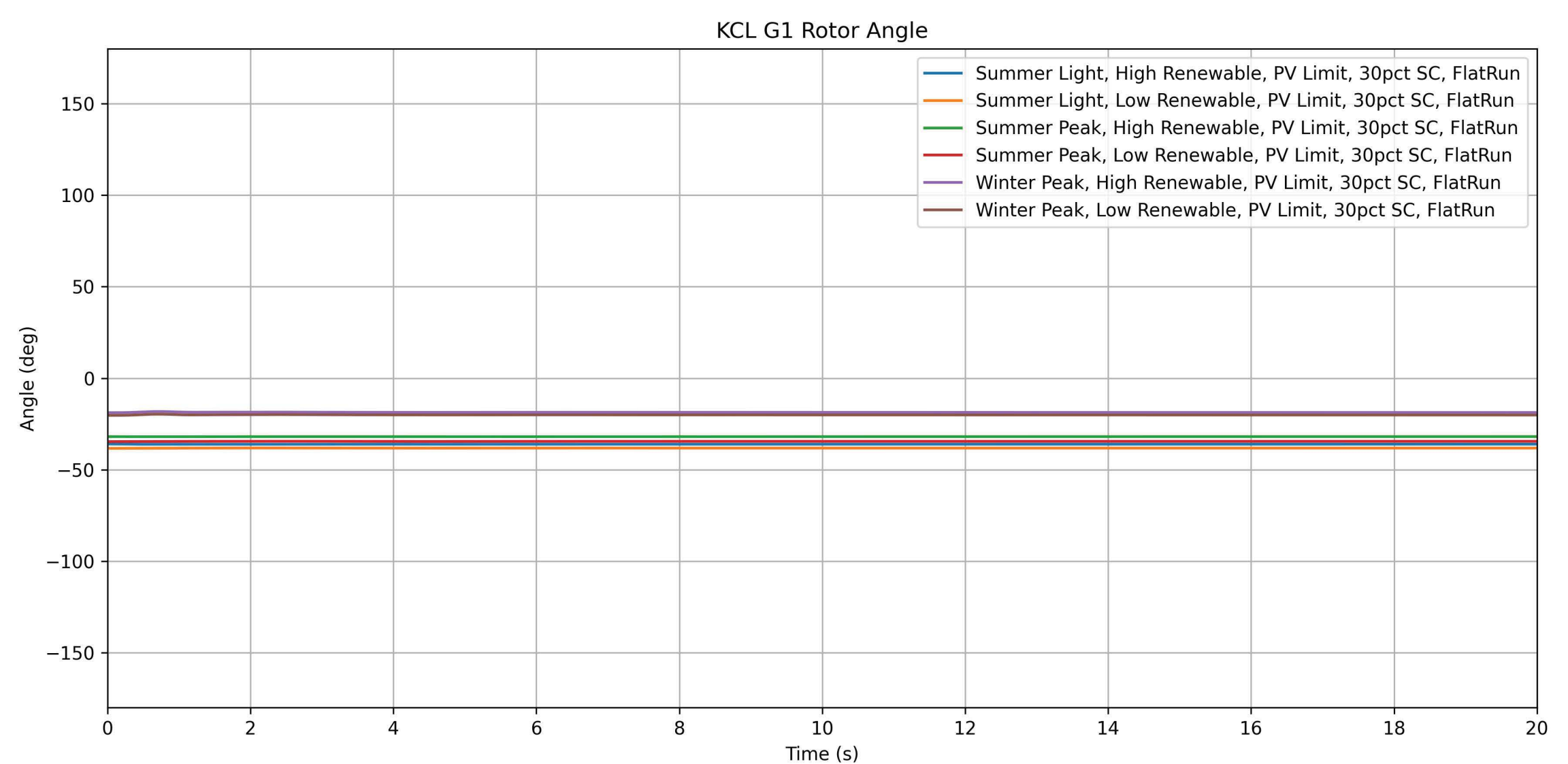

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

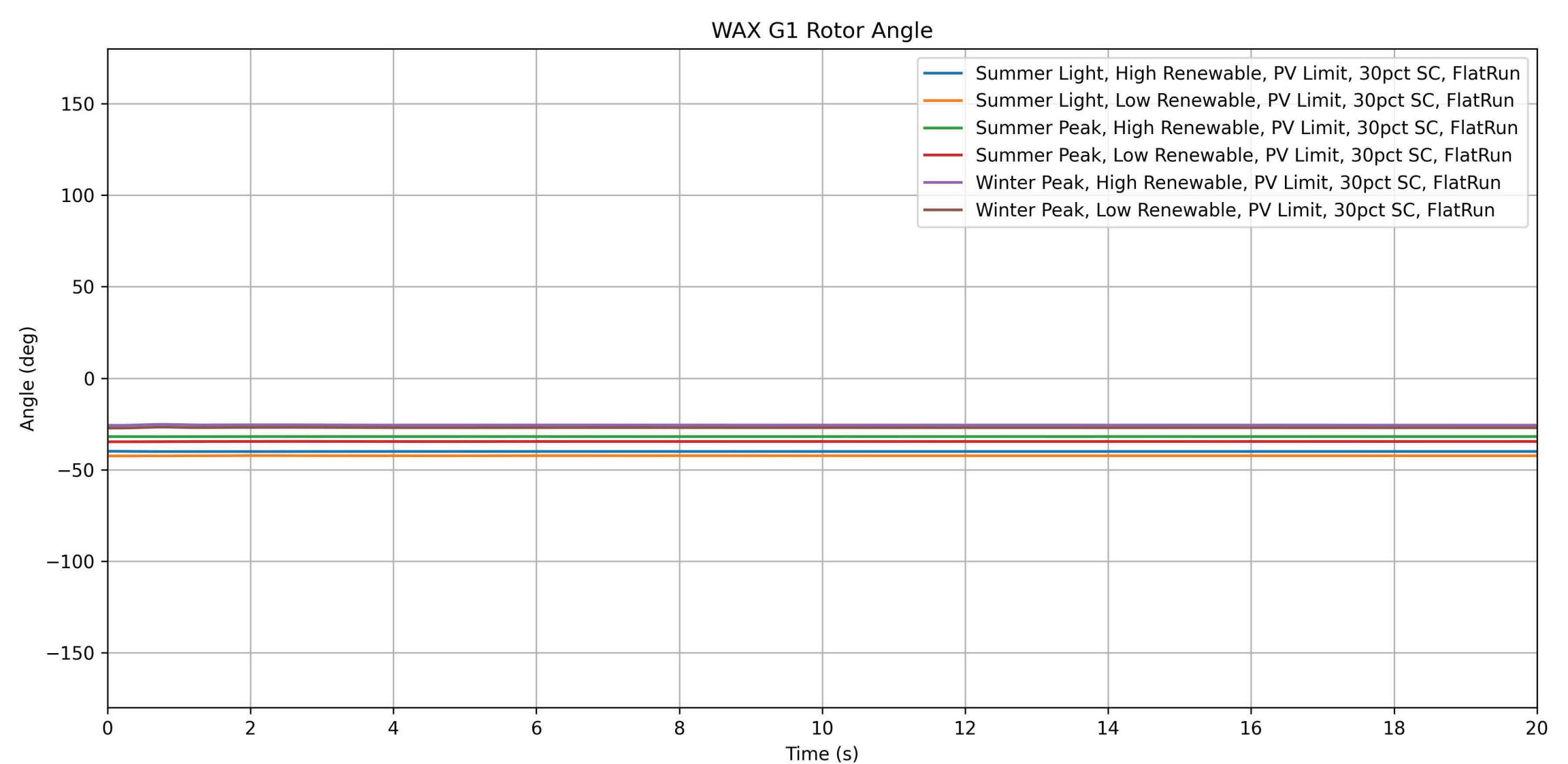

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

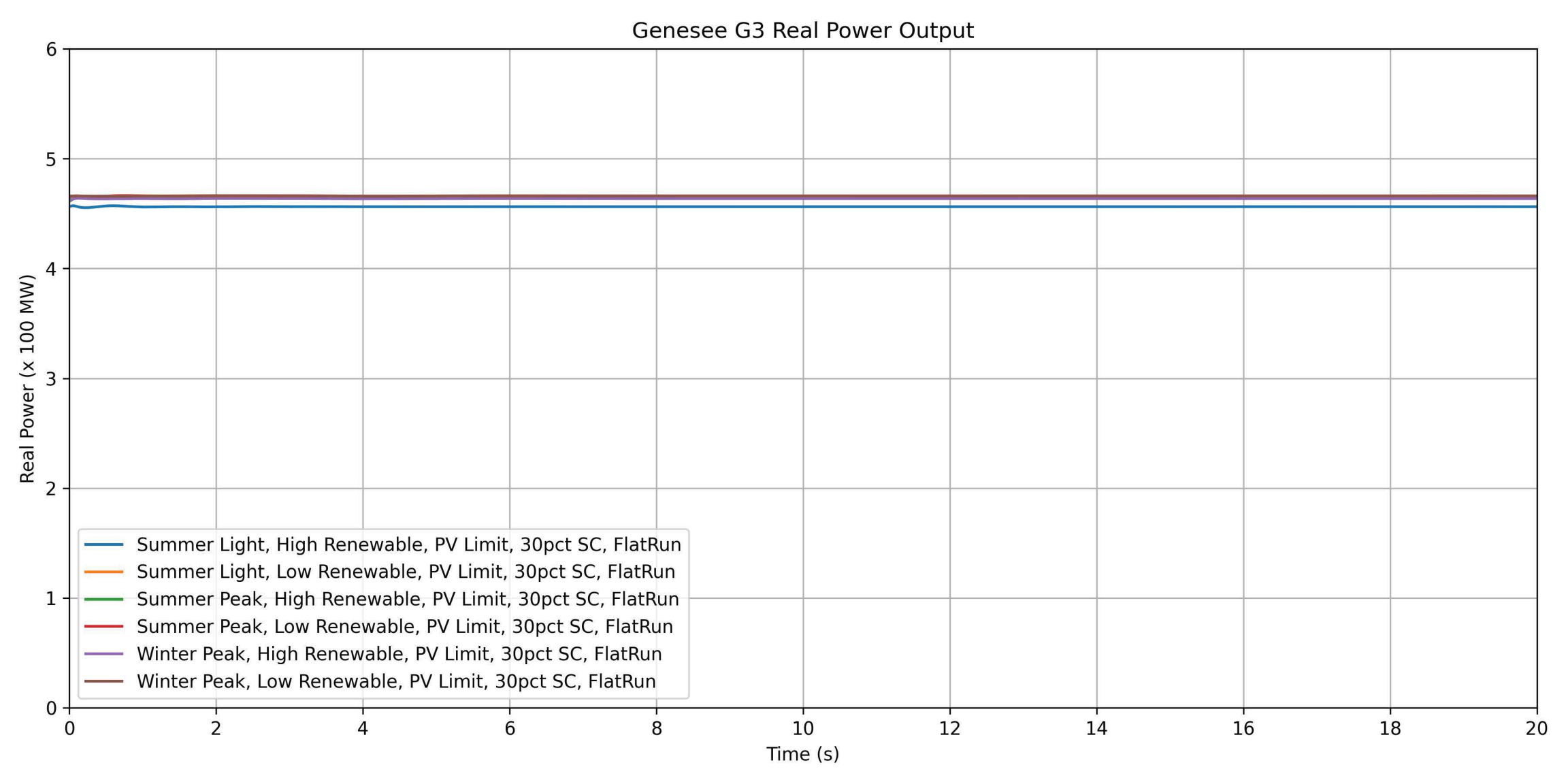

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

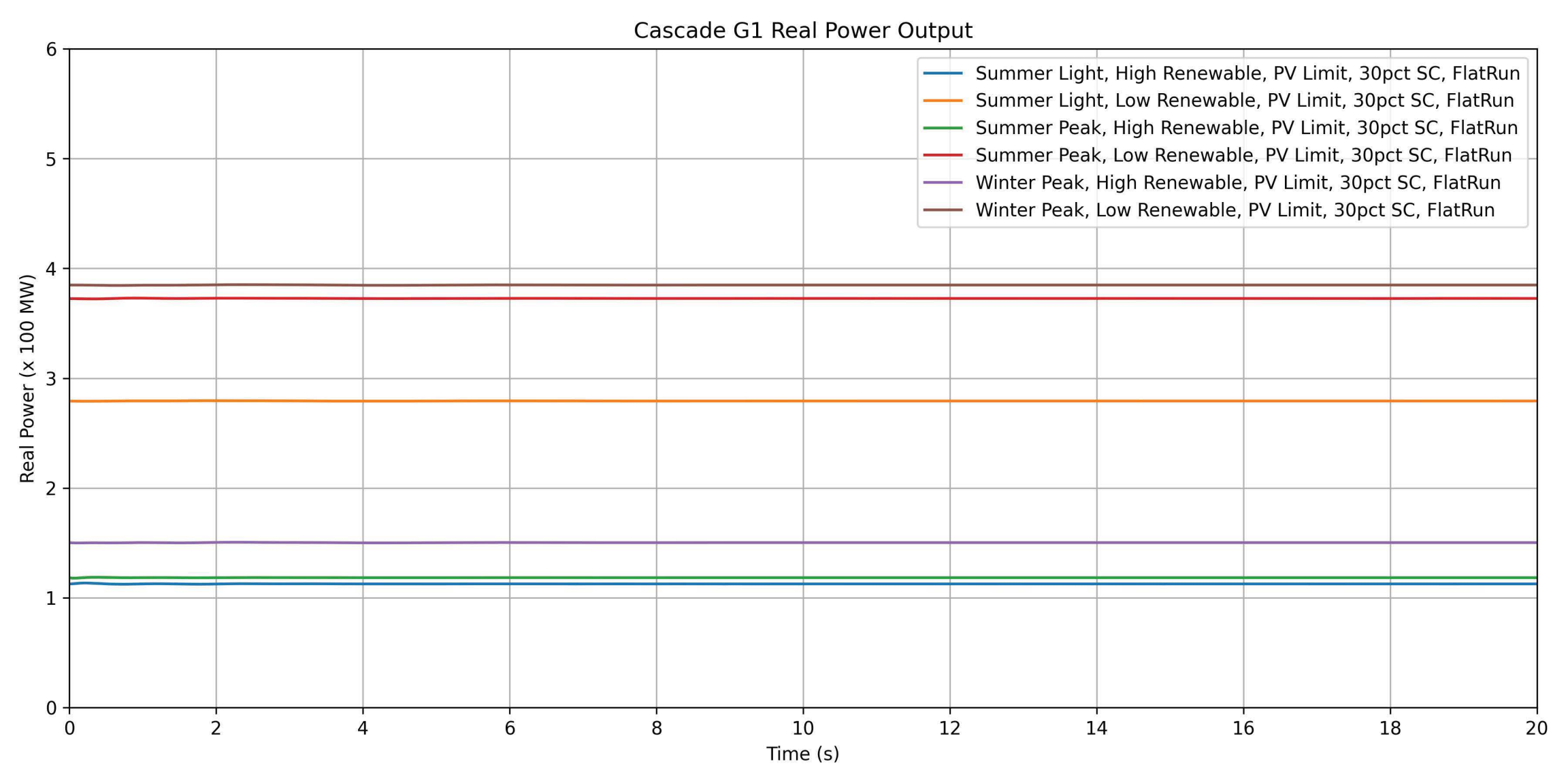

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

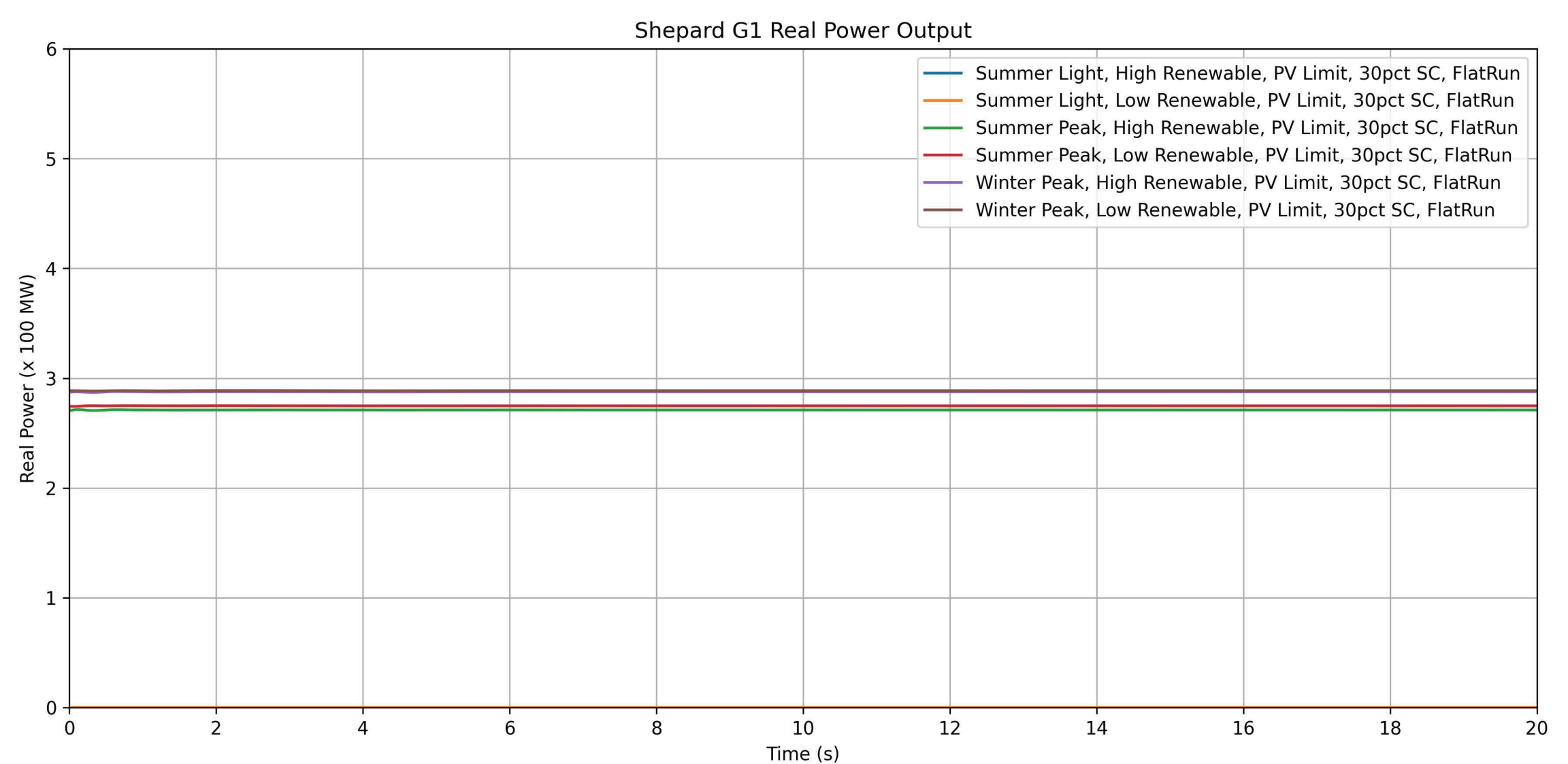

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

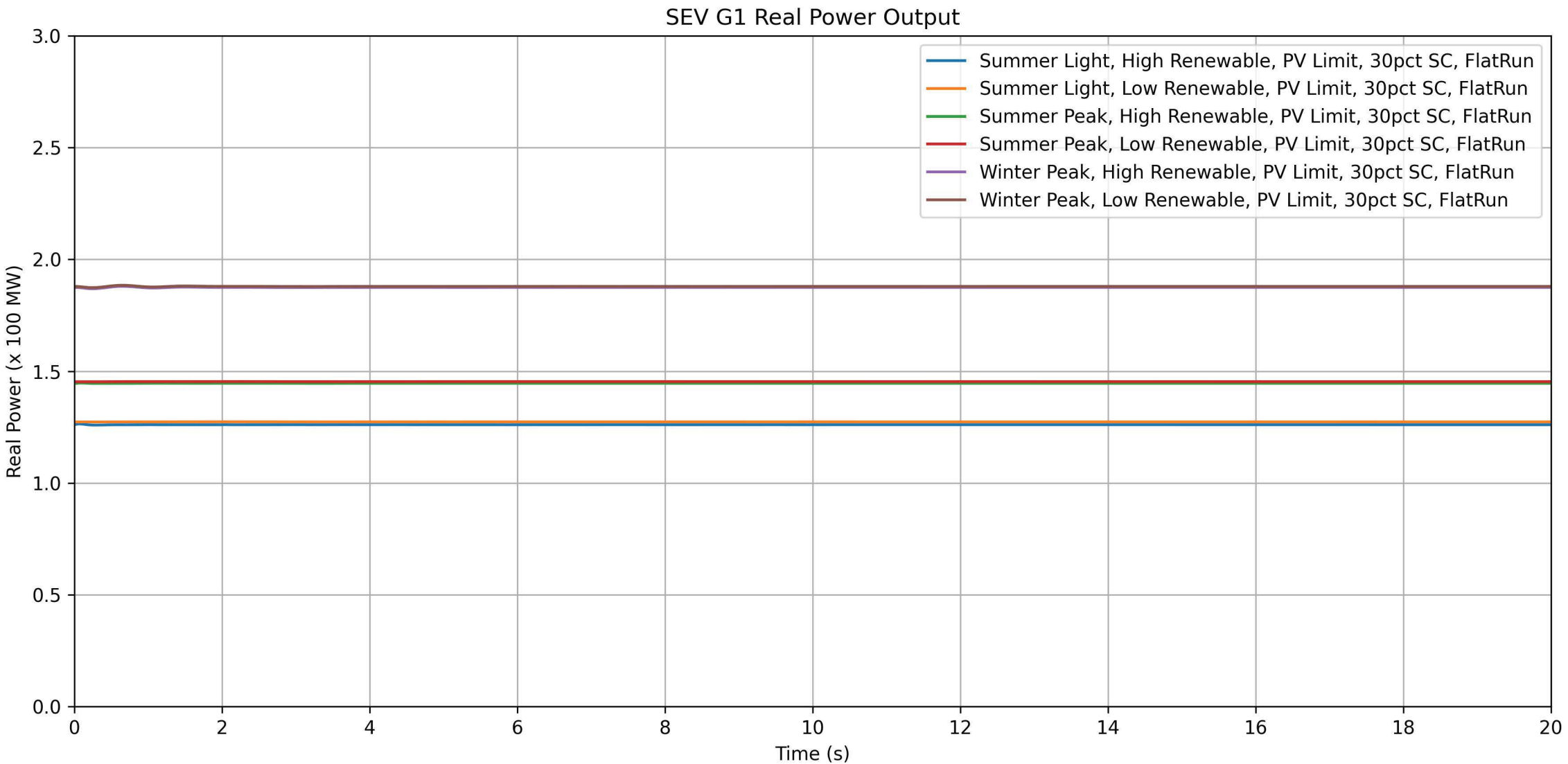

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

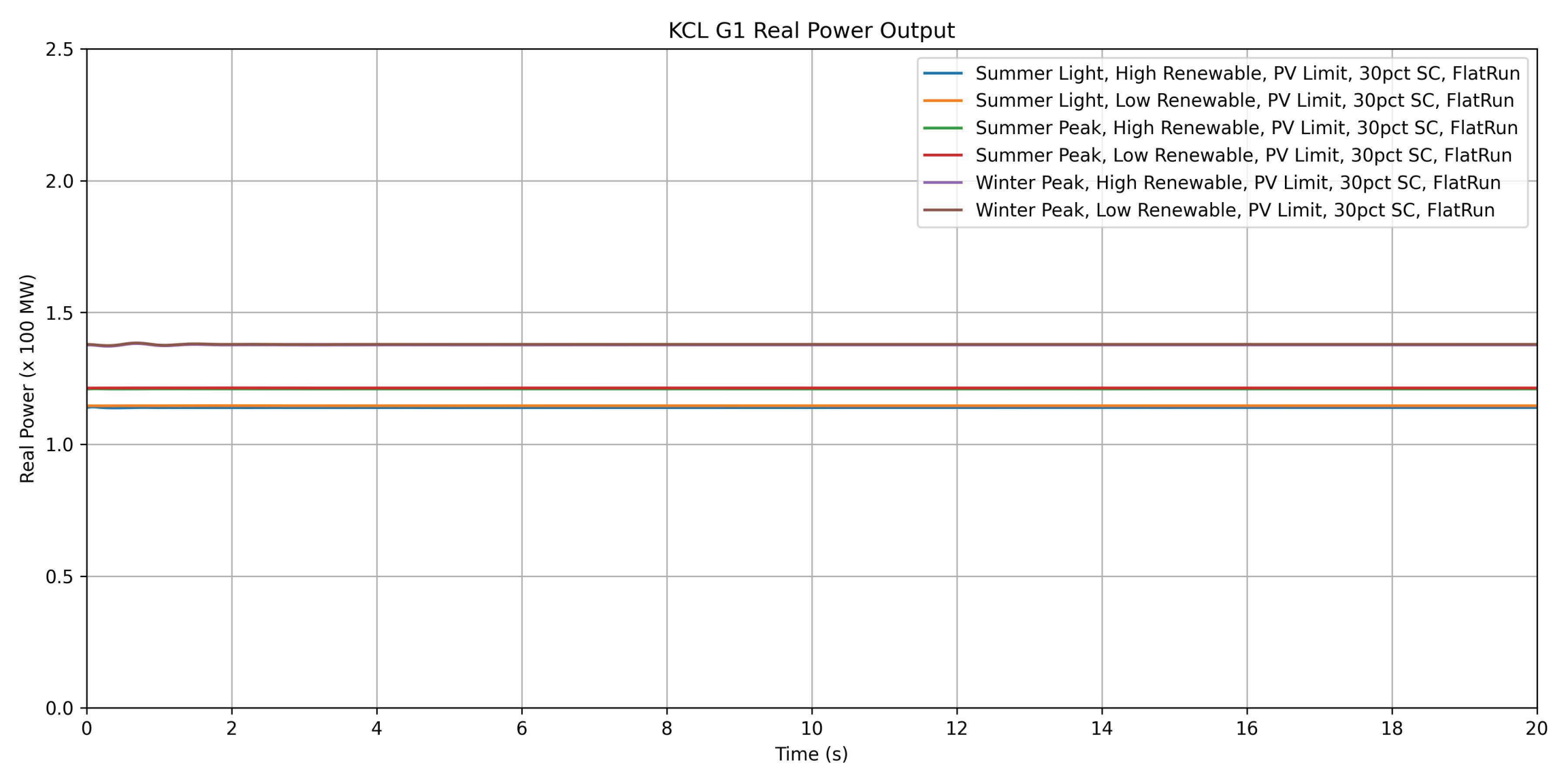

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

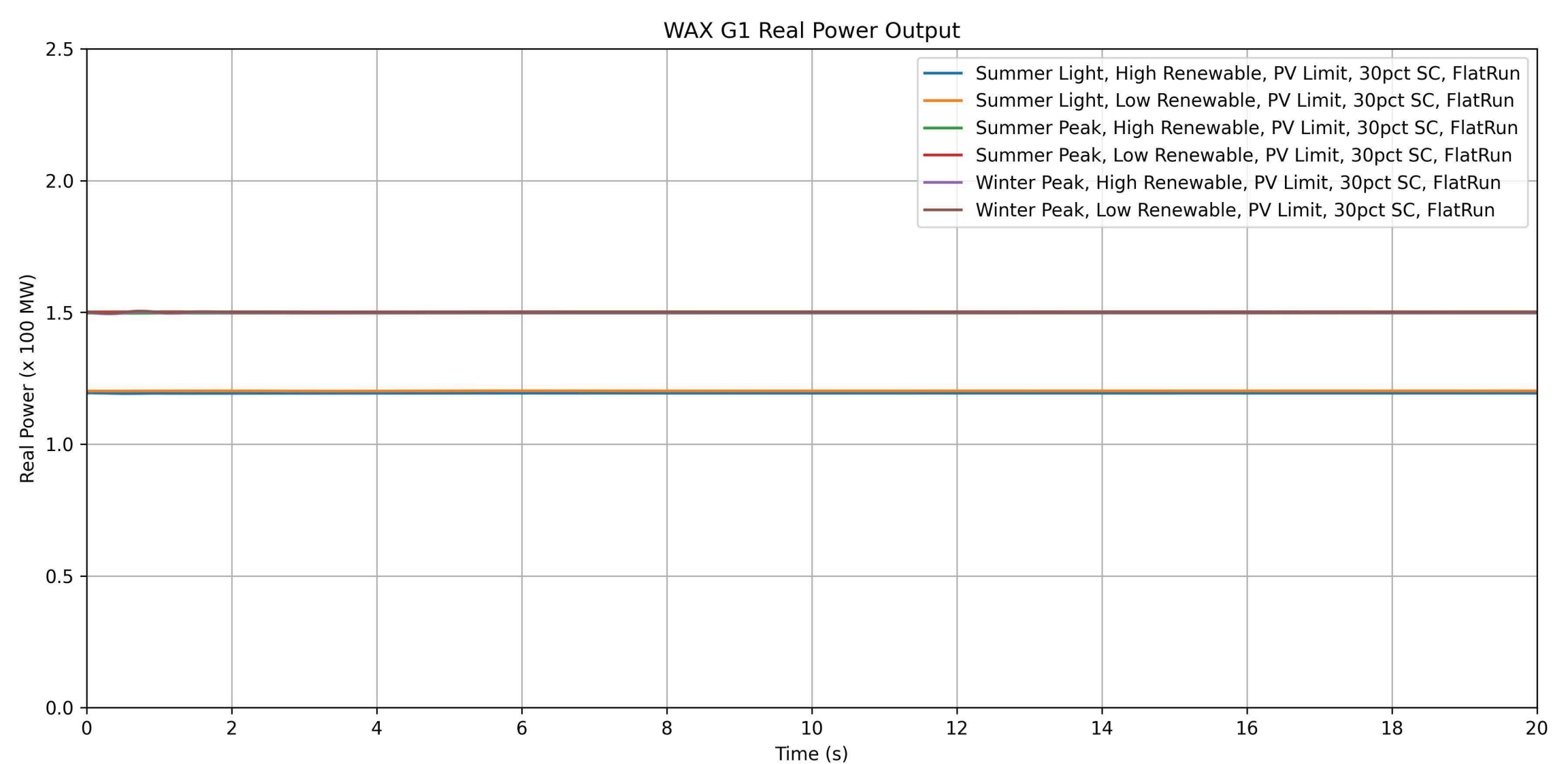

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun

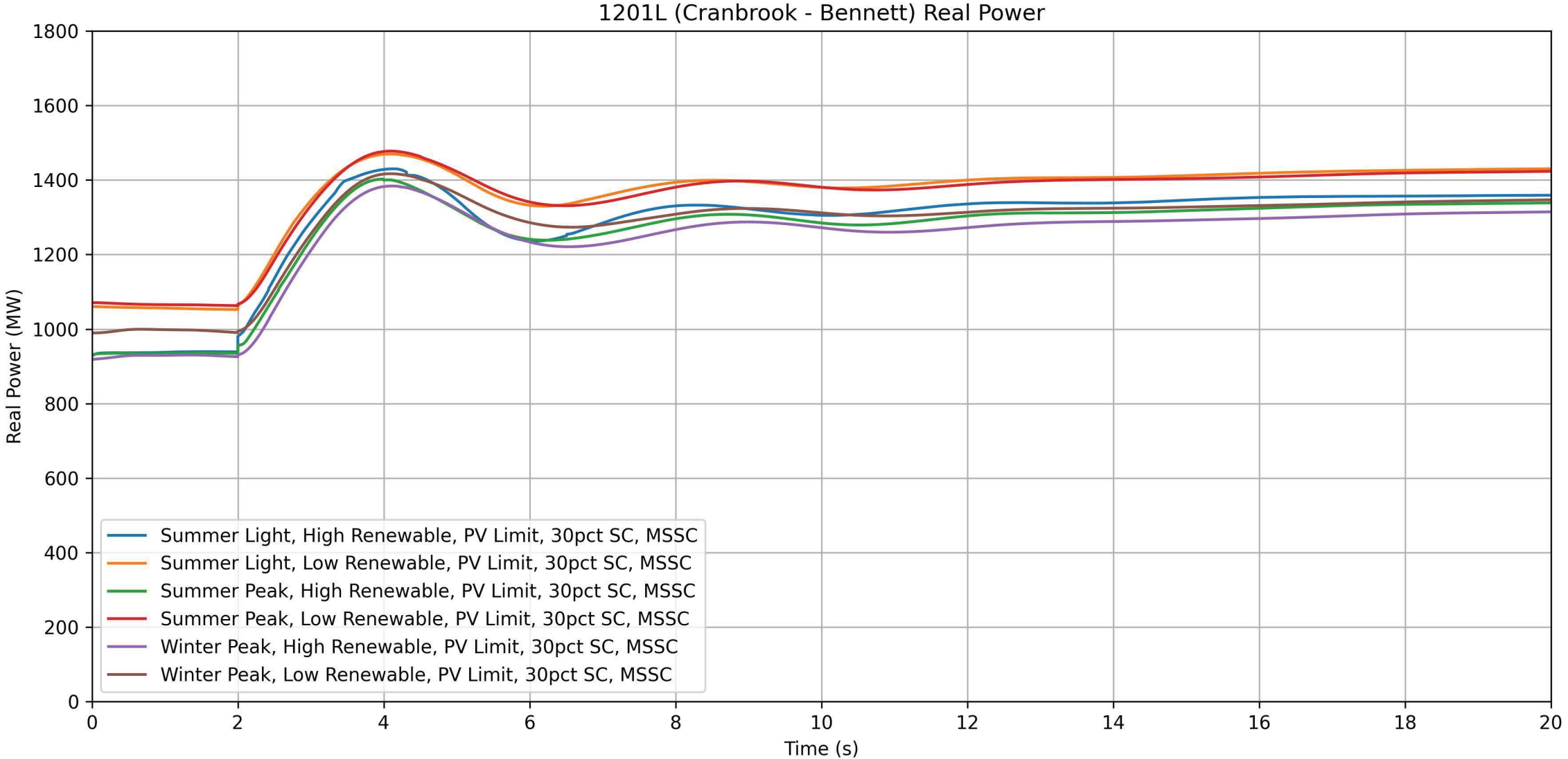

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

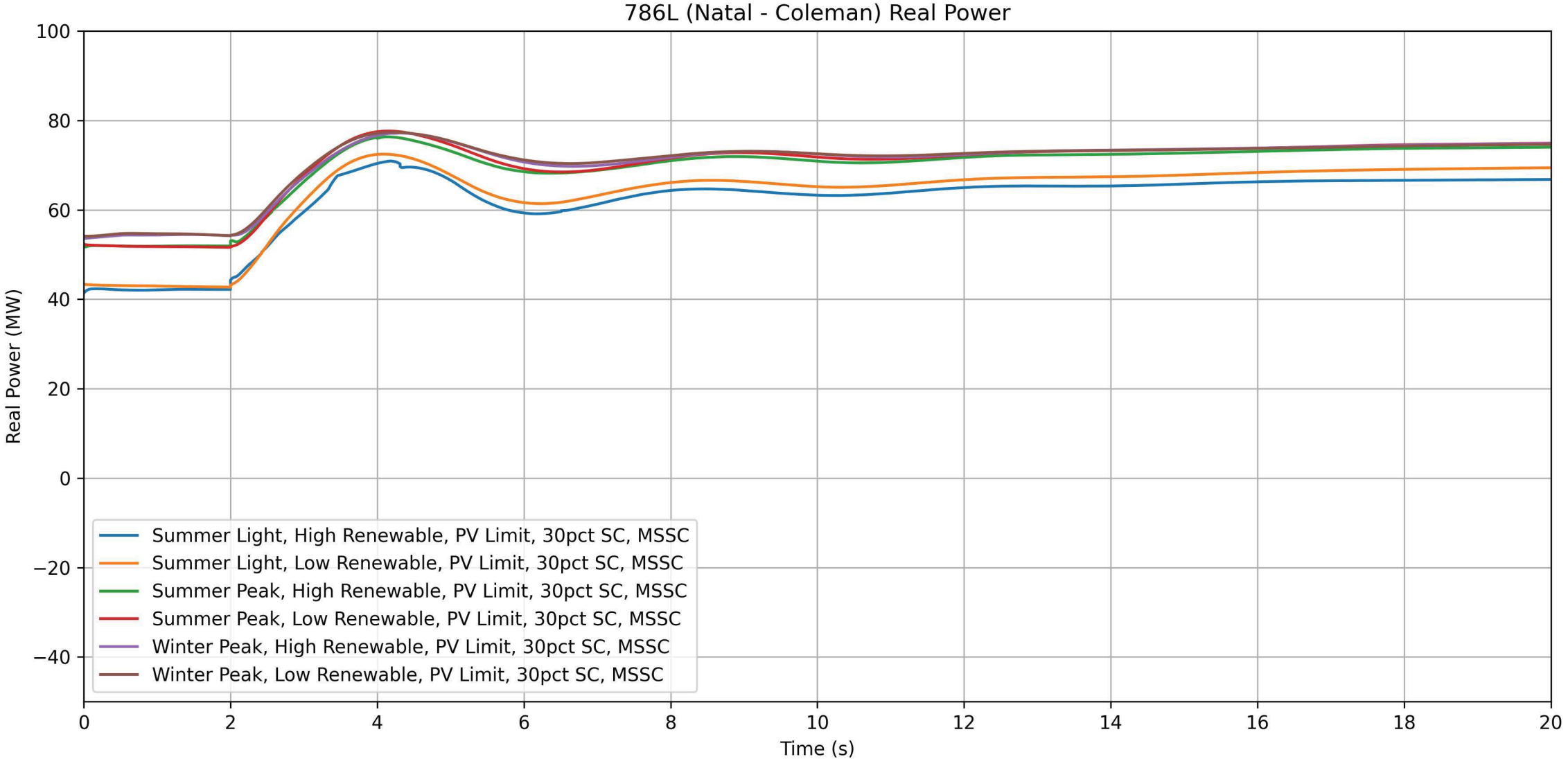

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

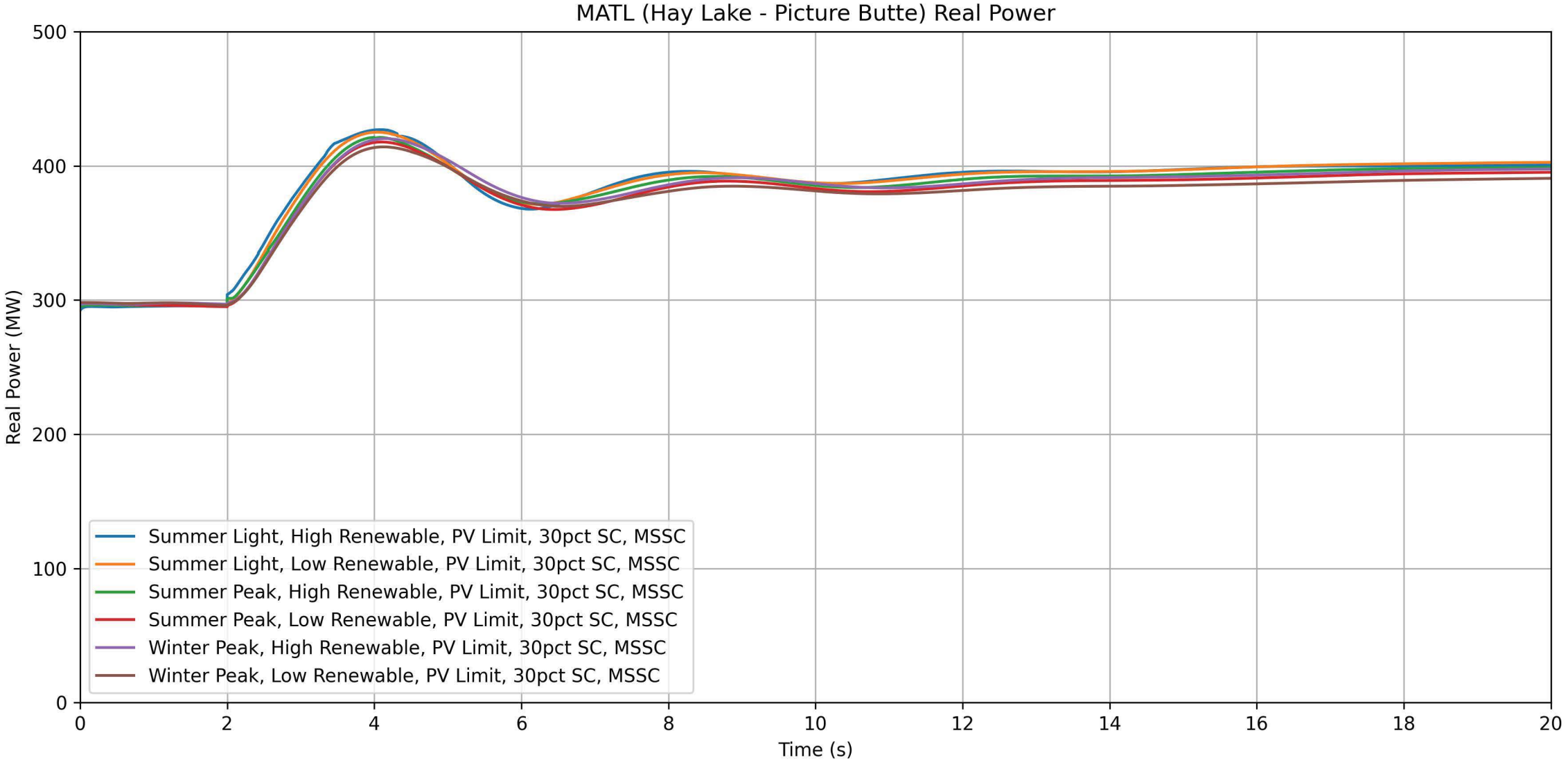

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Time (s)
0
2
4
6
8
10
12
14
16
18
20

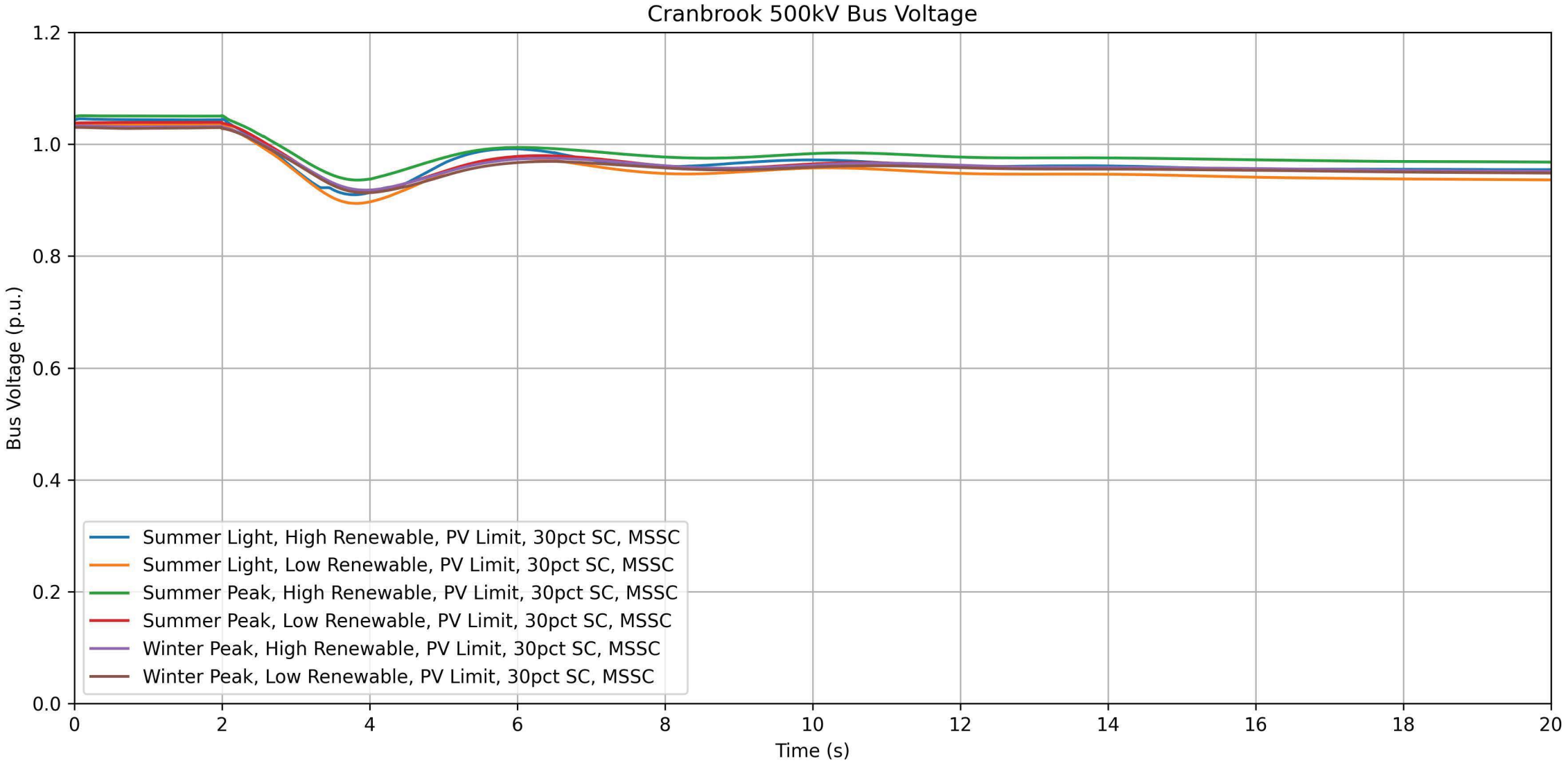

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

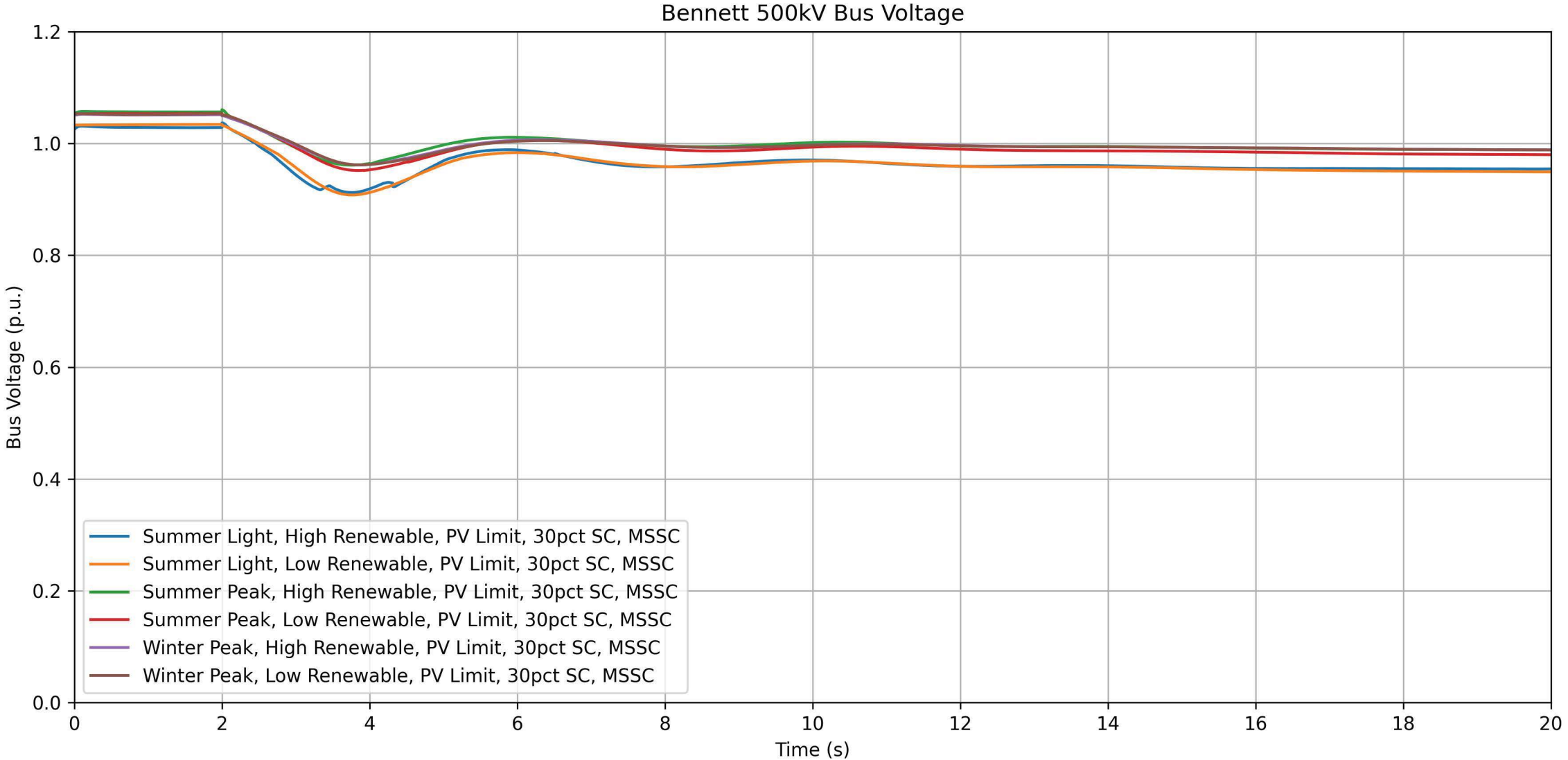

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 30pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 30pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

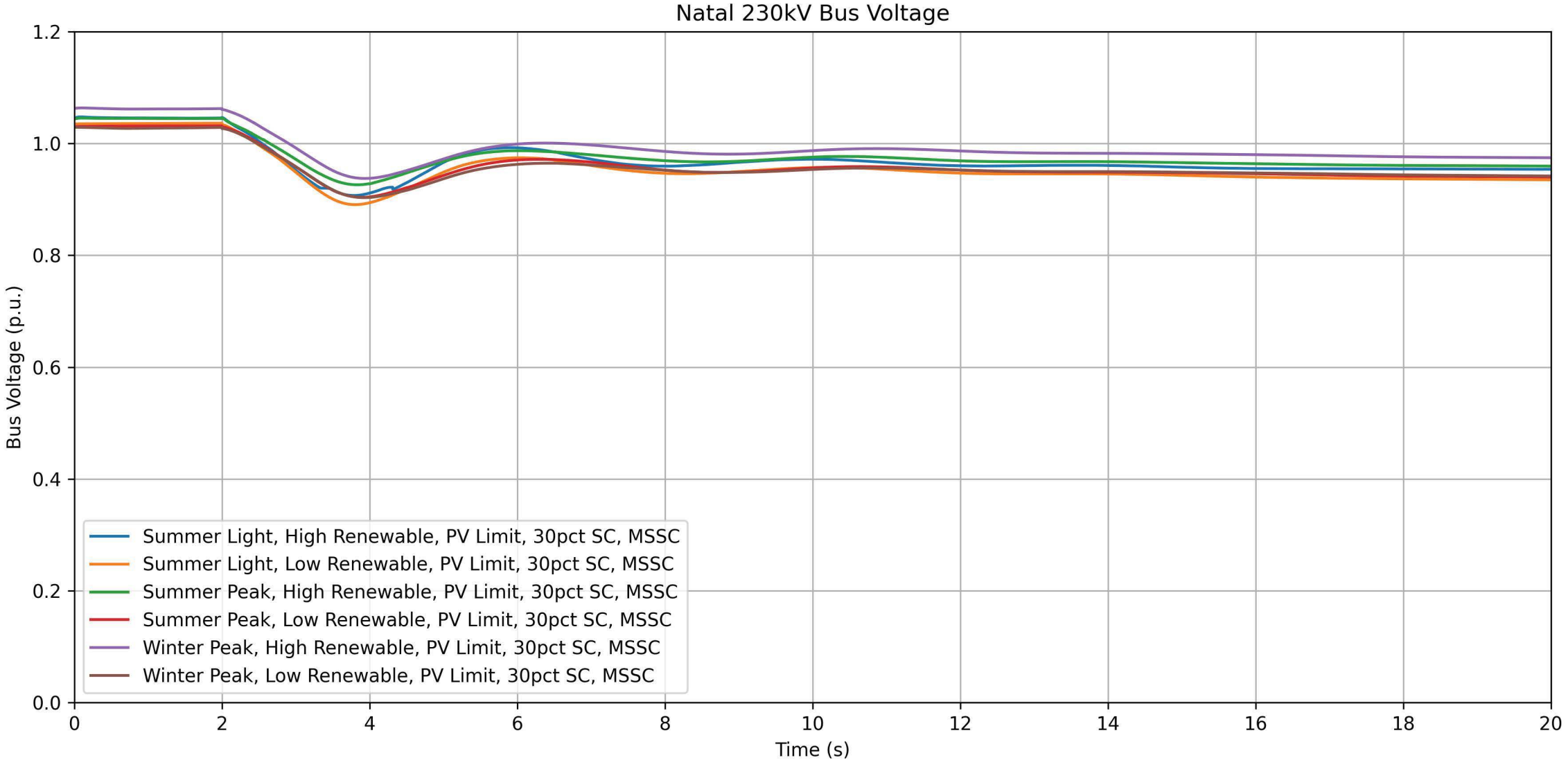

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

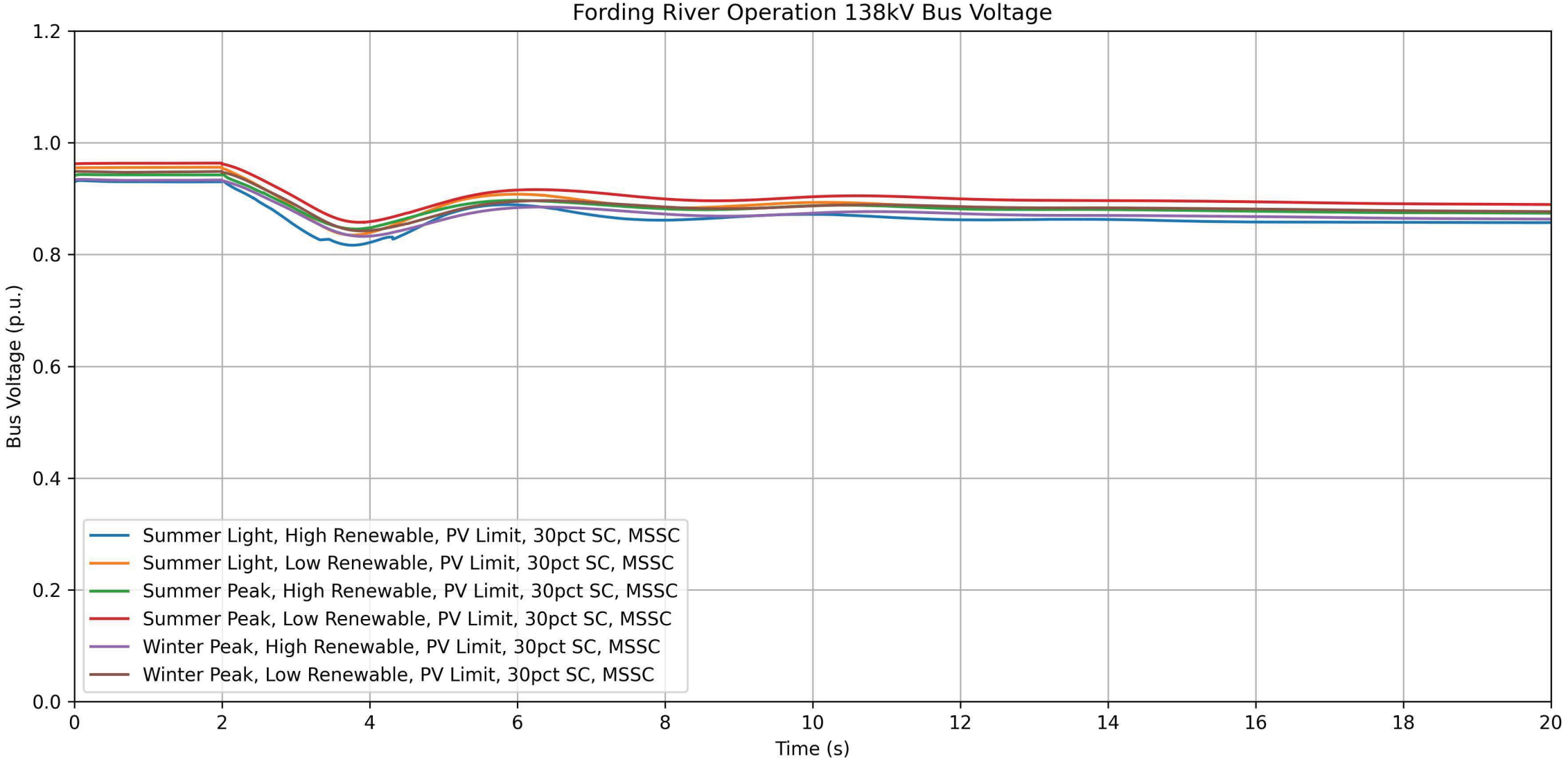

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

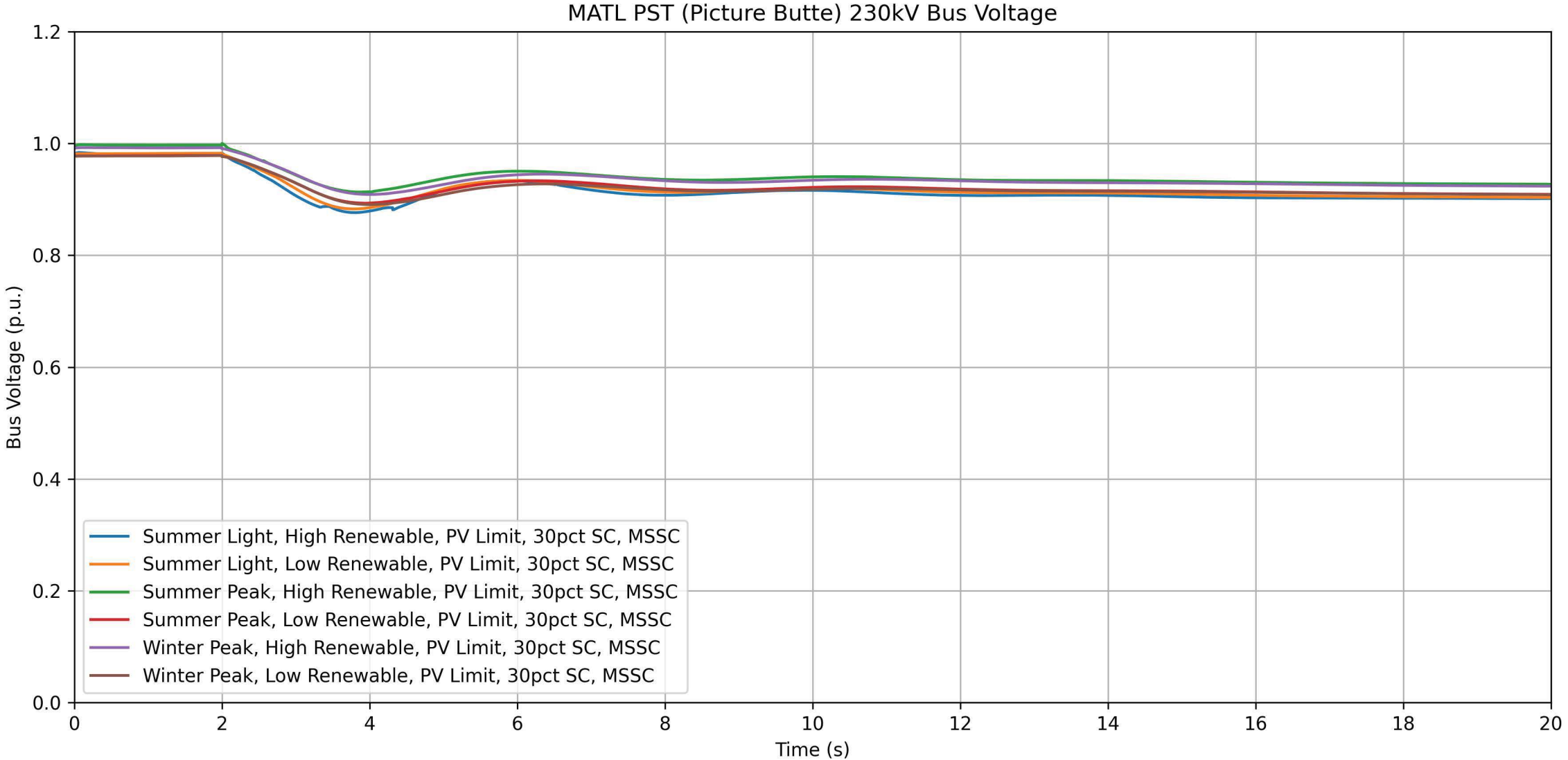

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

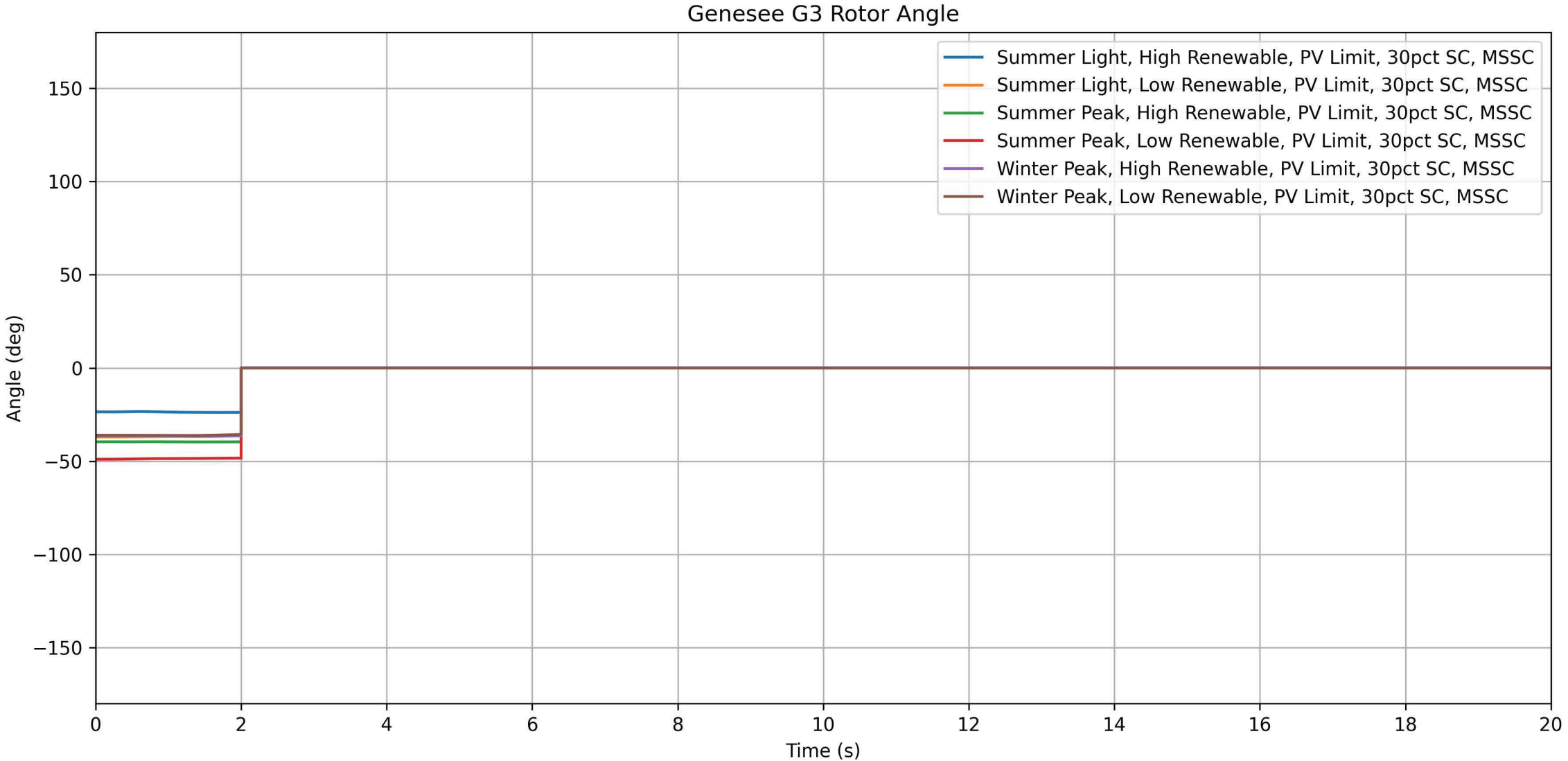

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

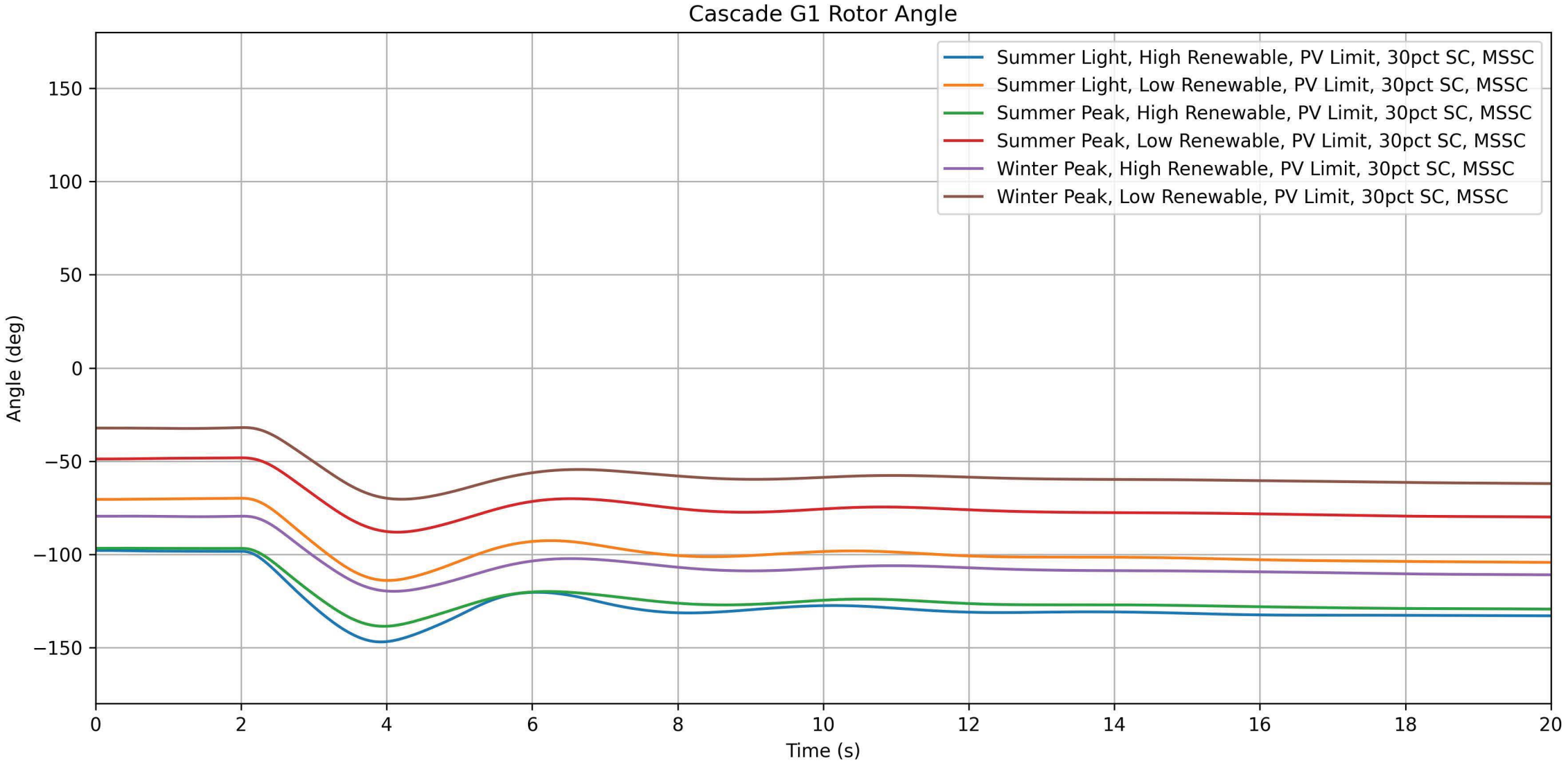

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

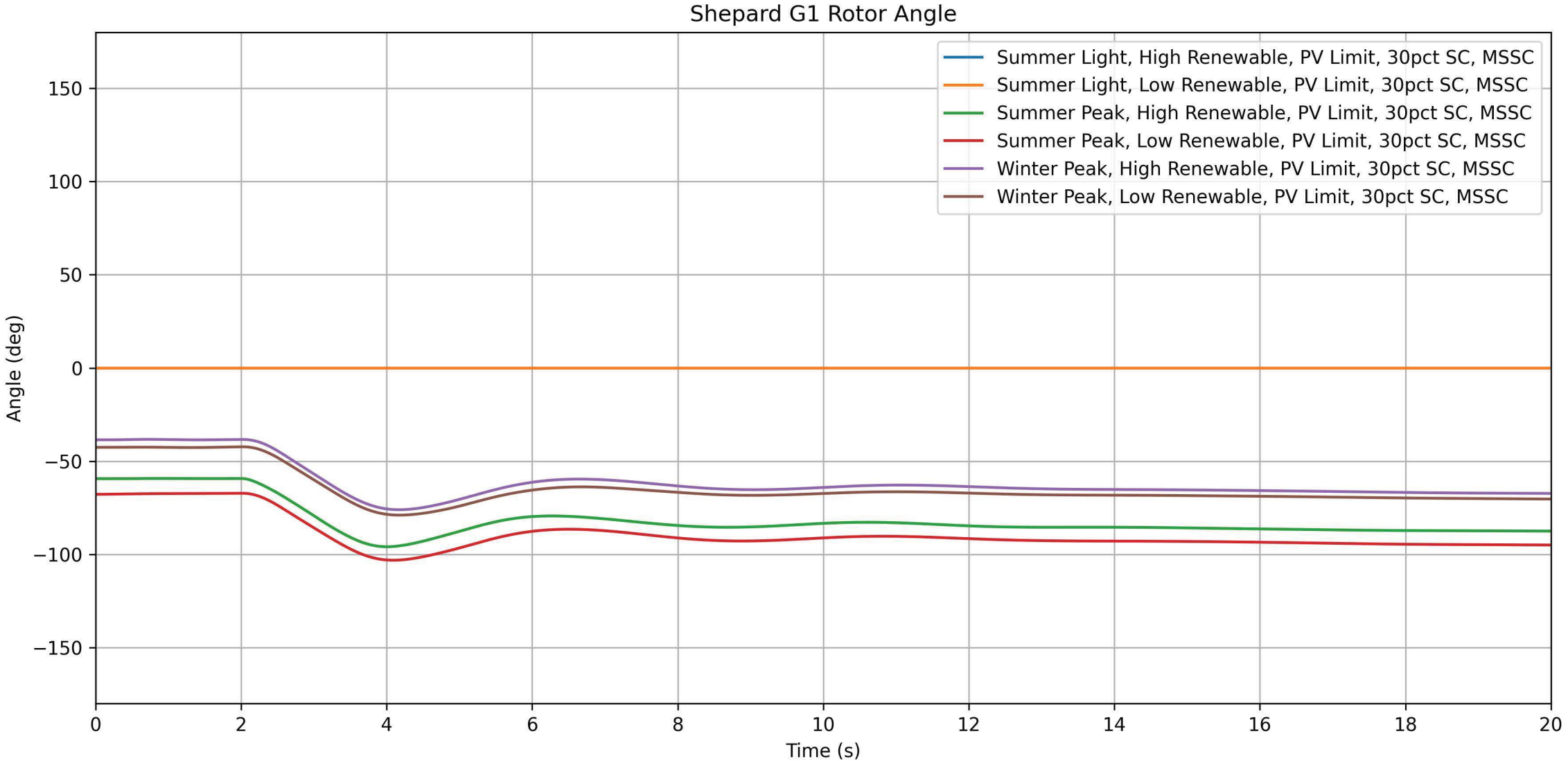

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

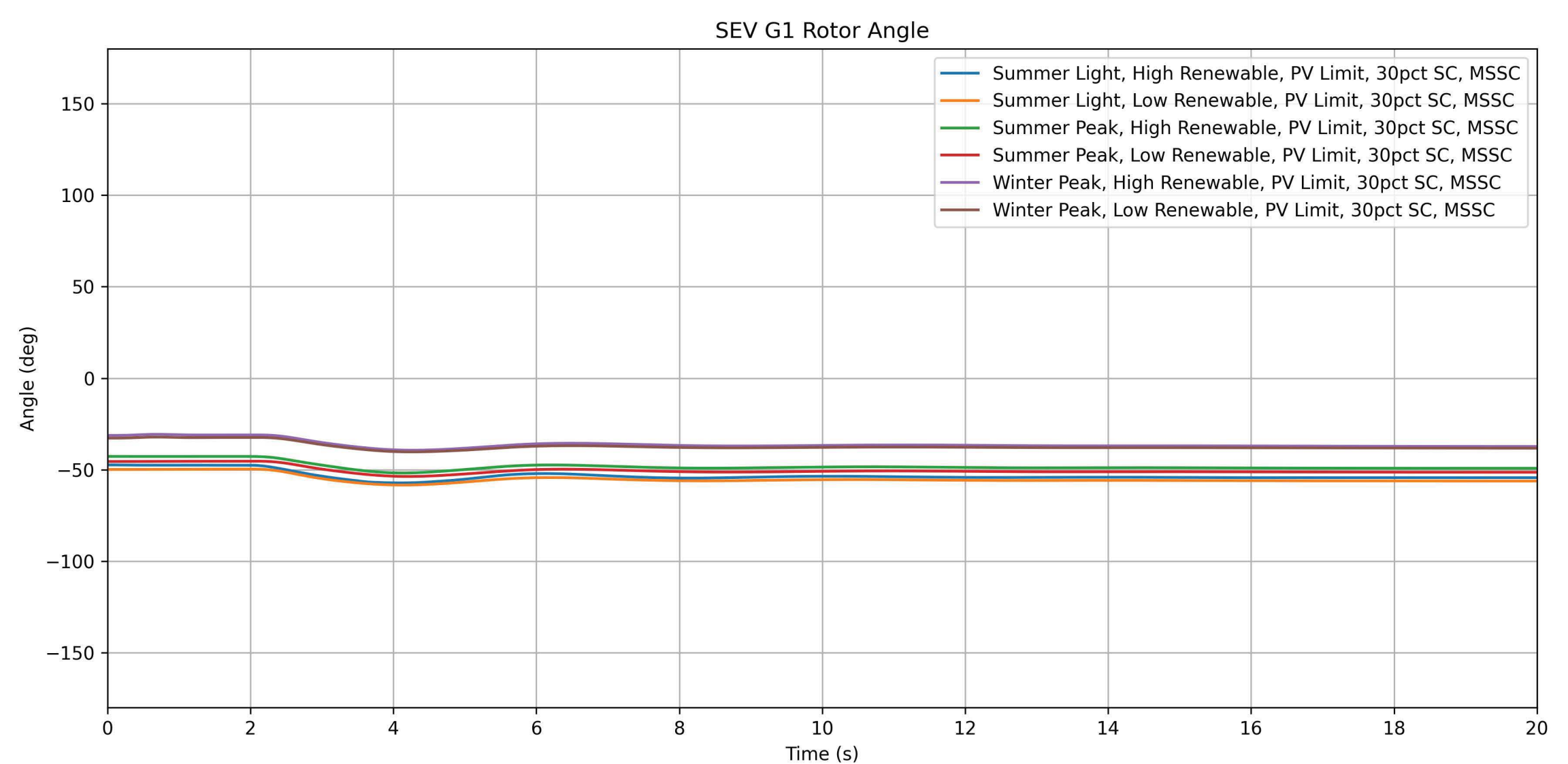

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

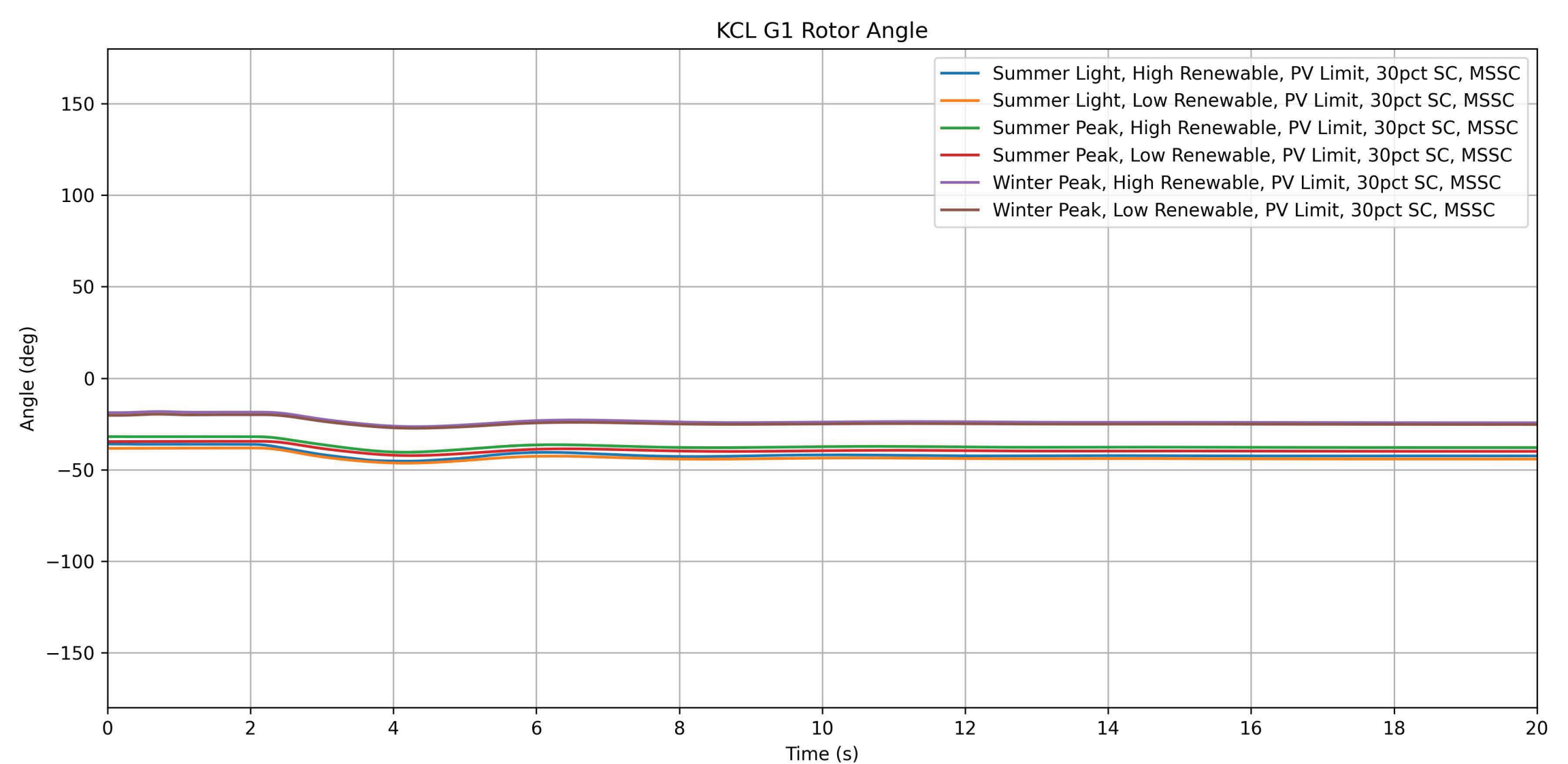

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC

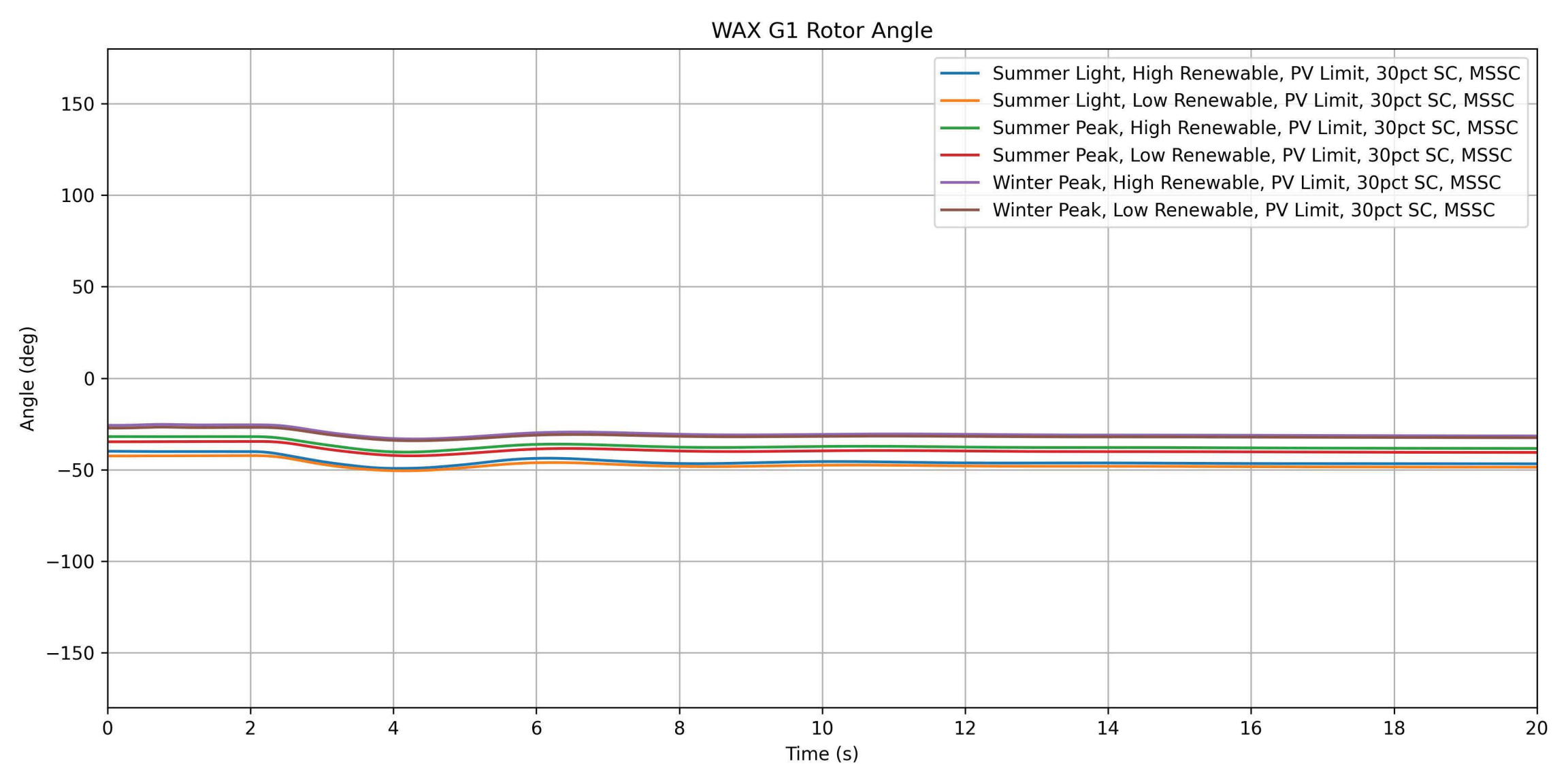

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

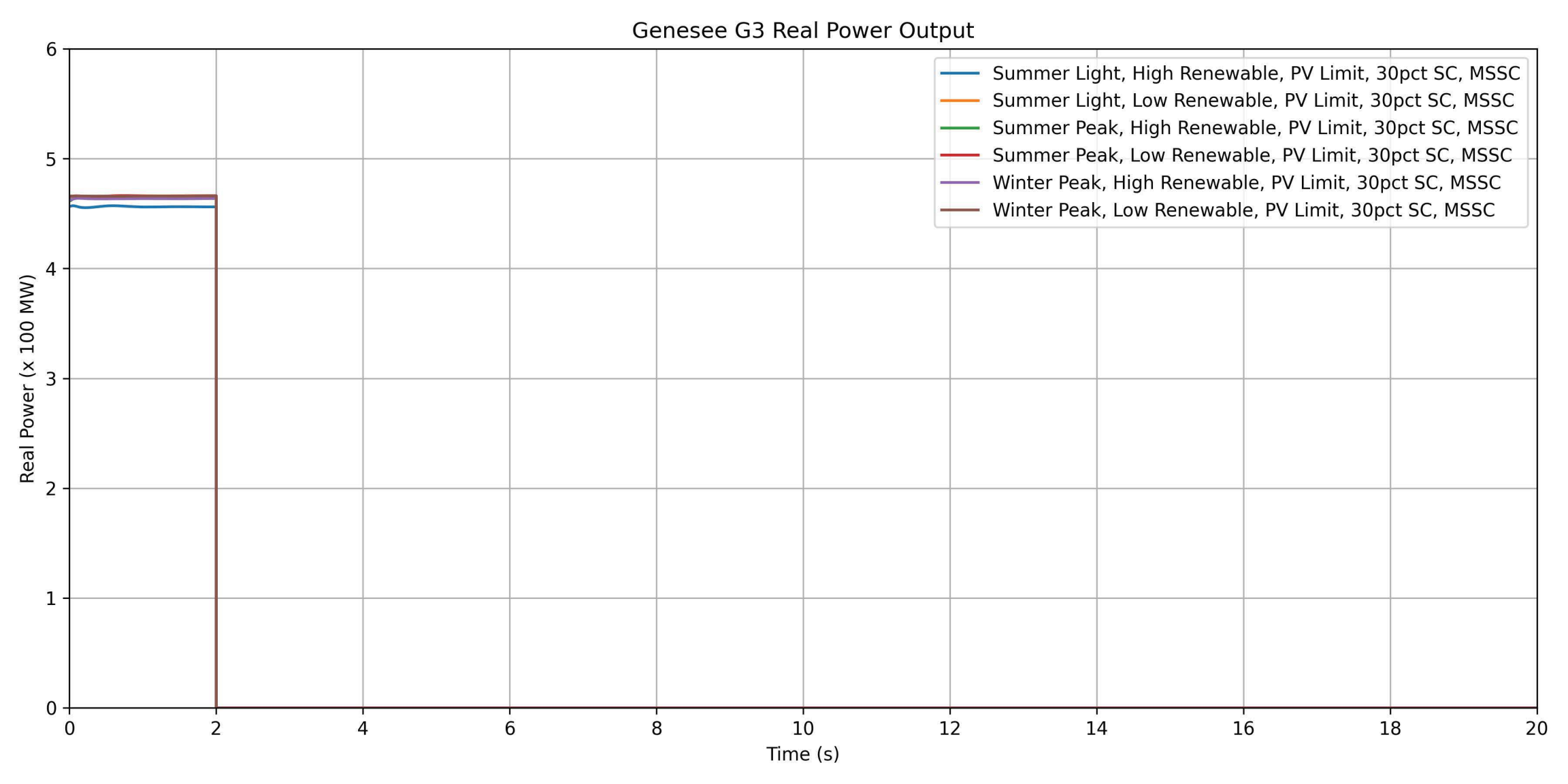

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

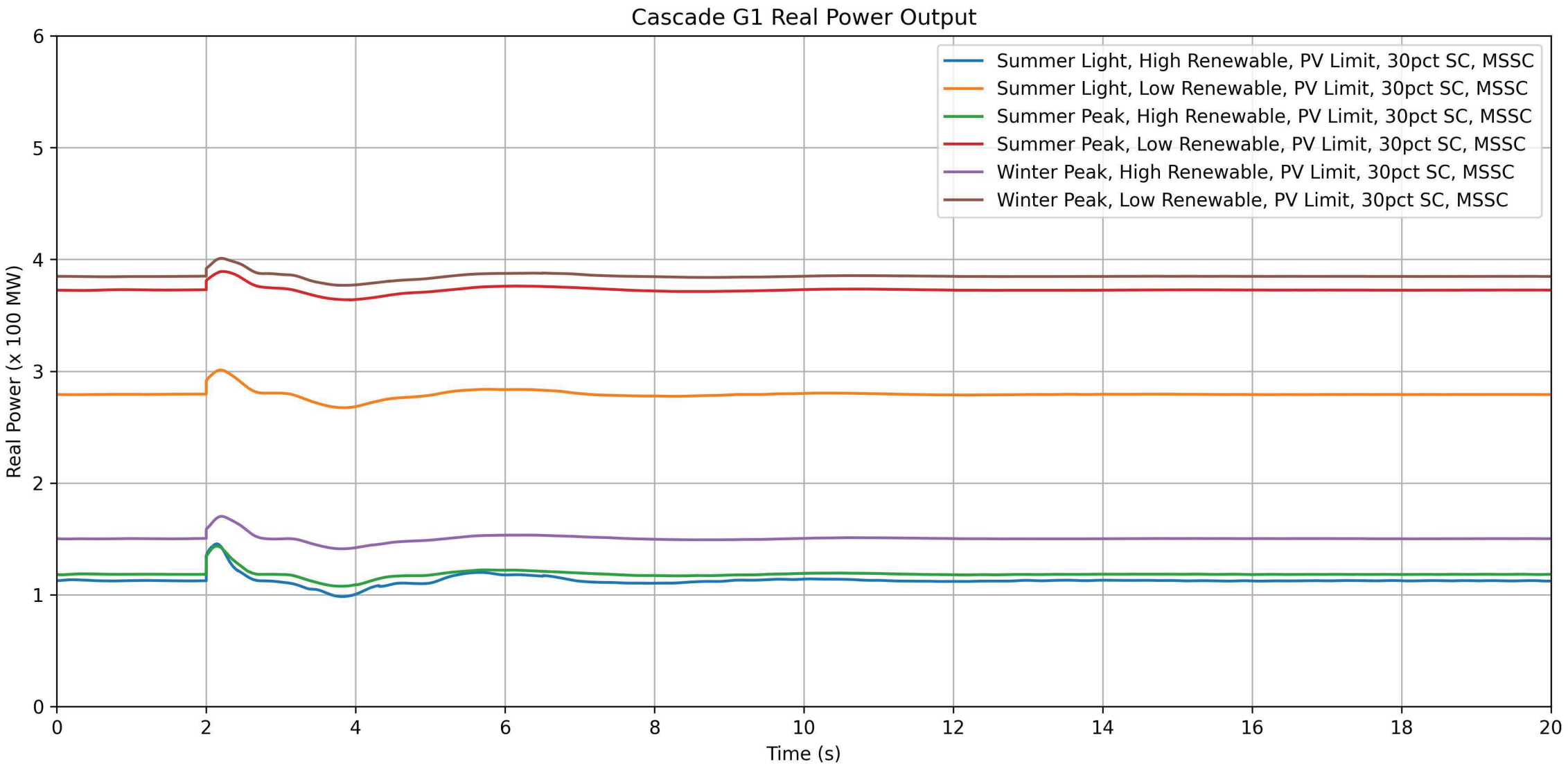

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

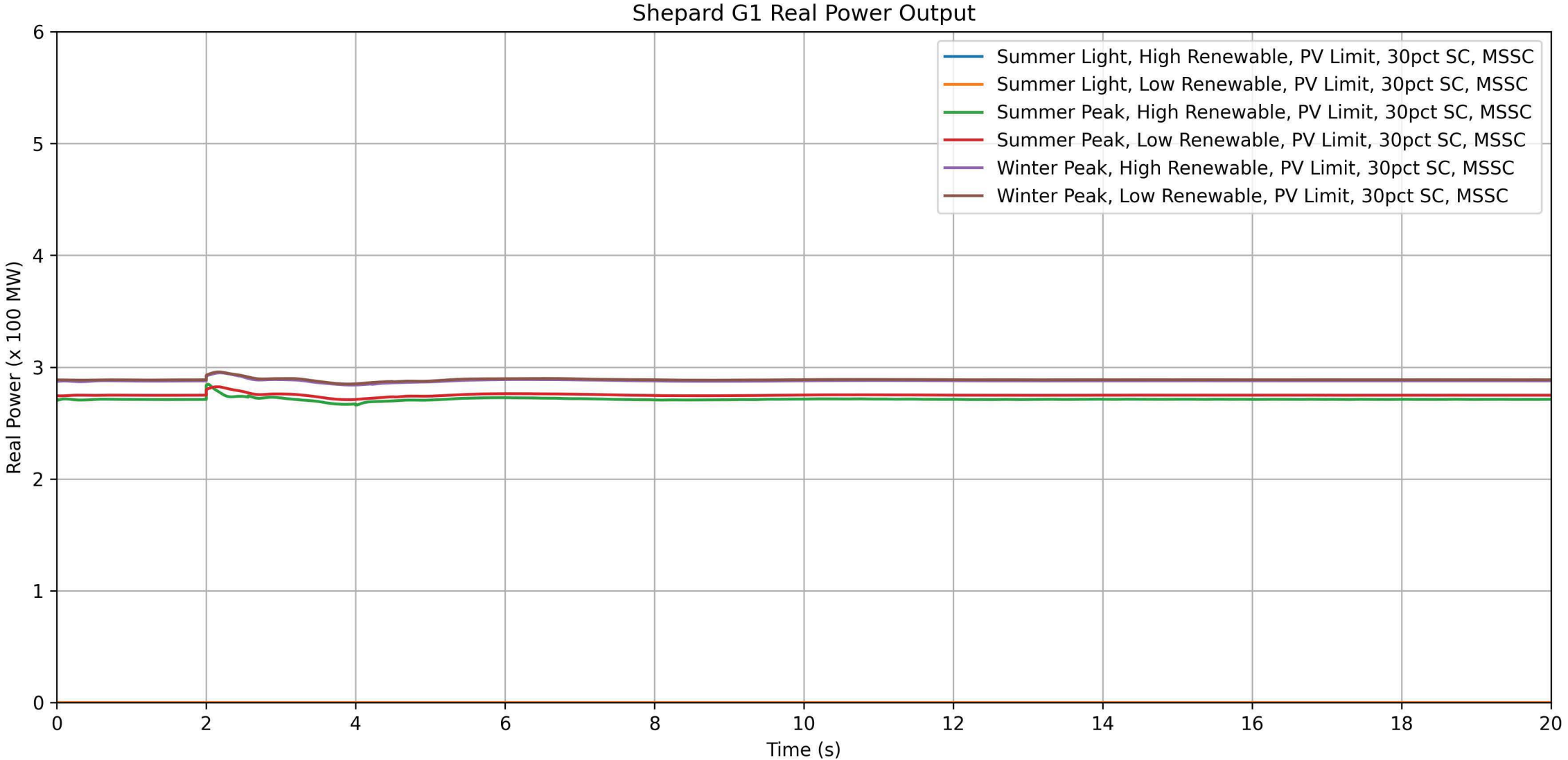

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

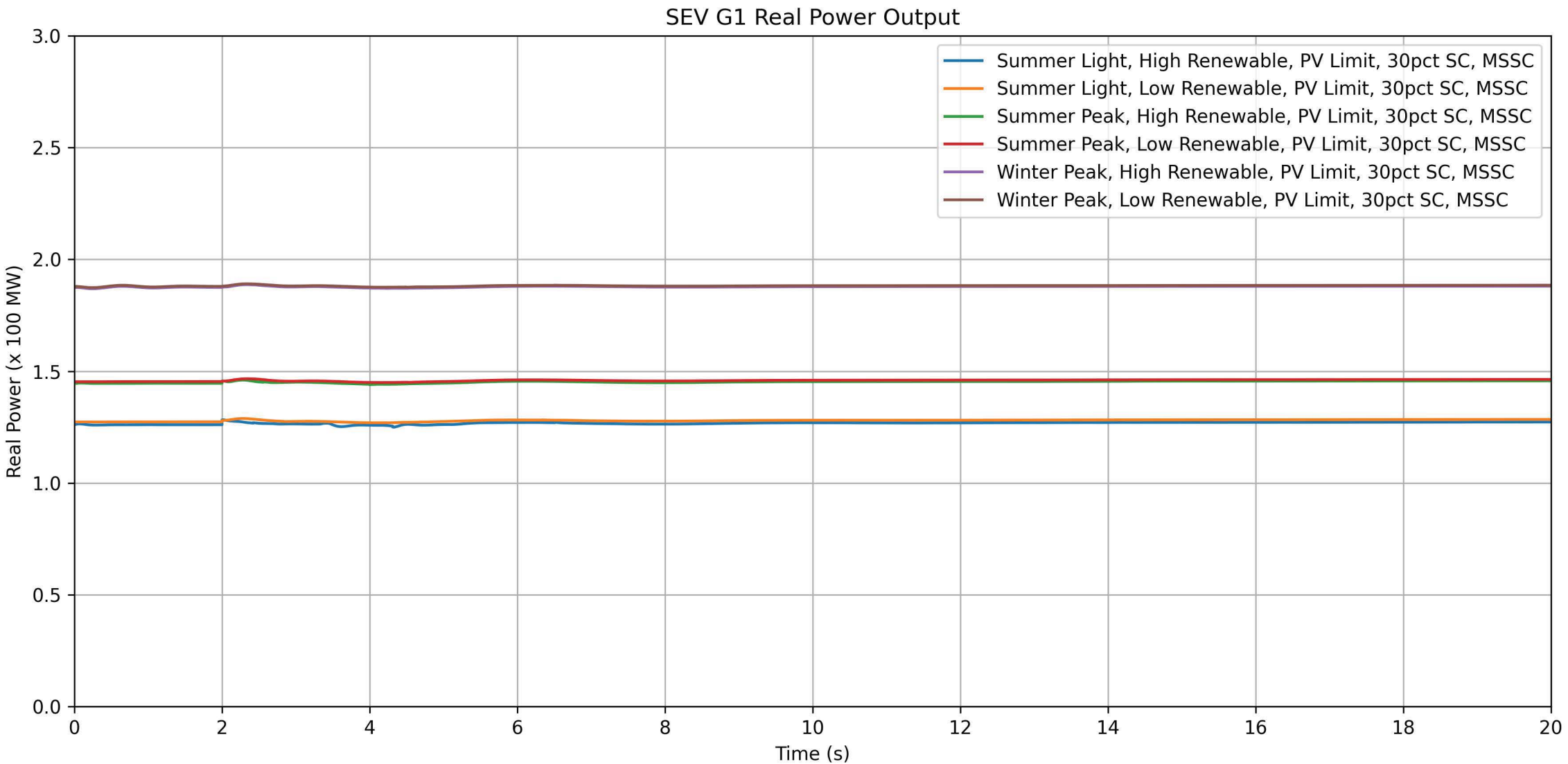

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

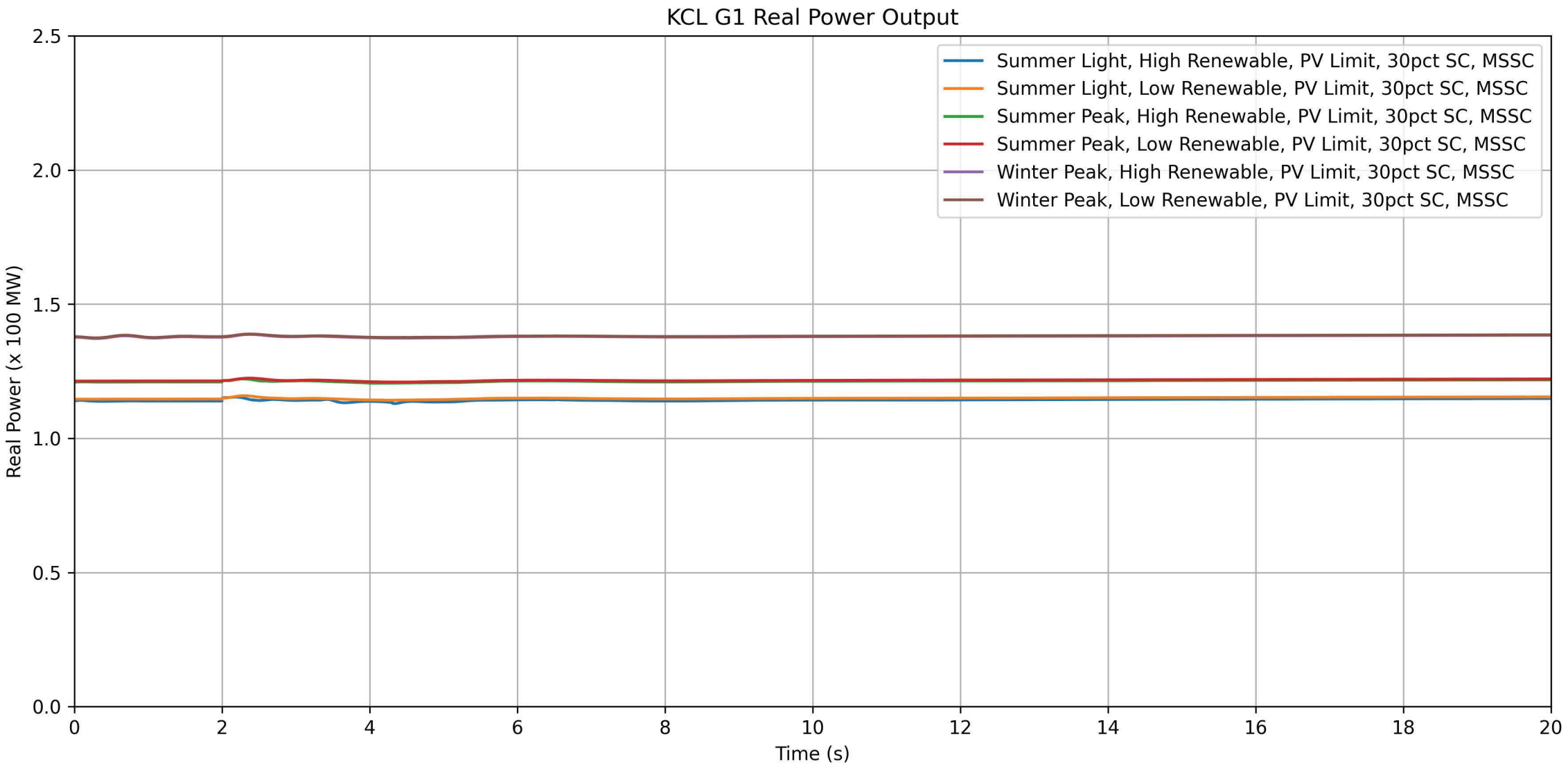

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

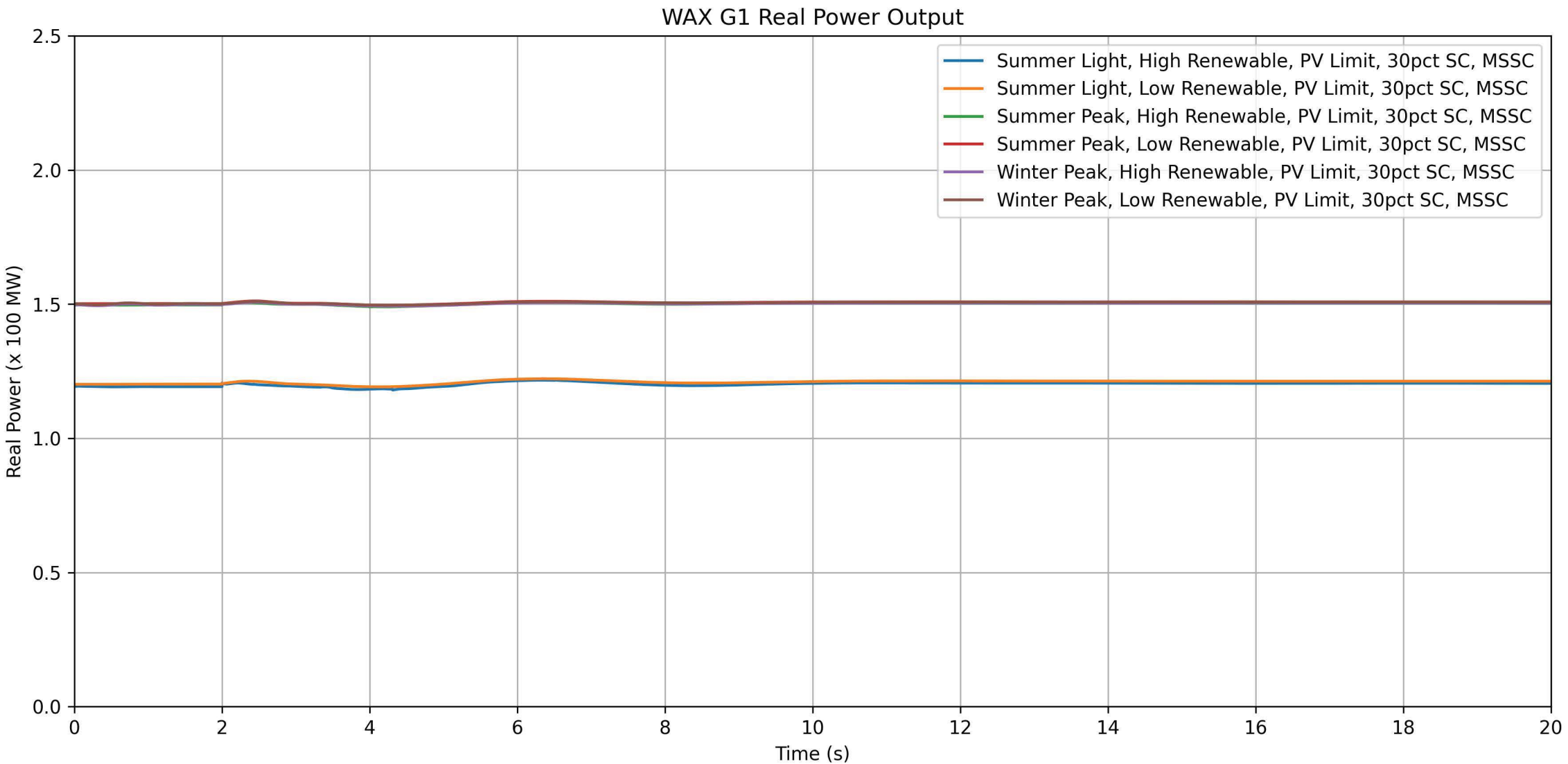

Genesee G3 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

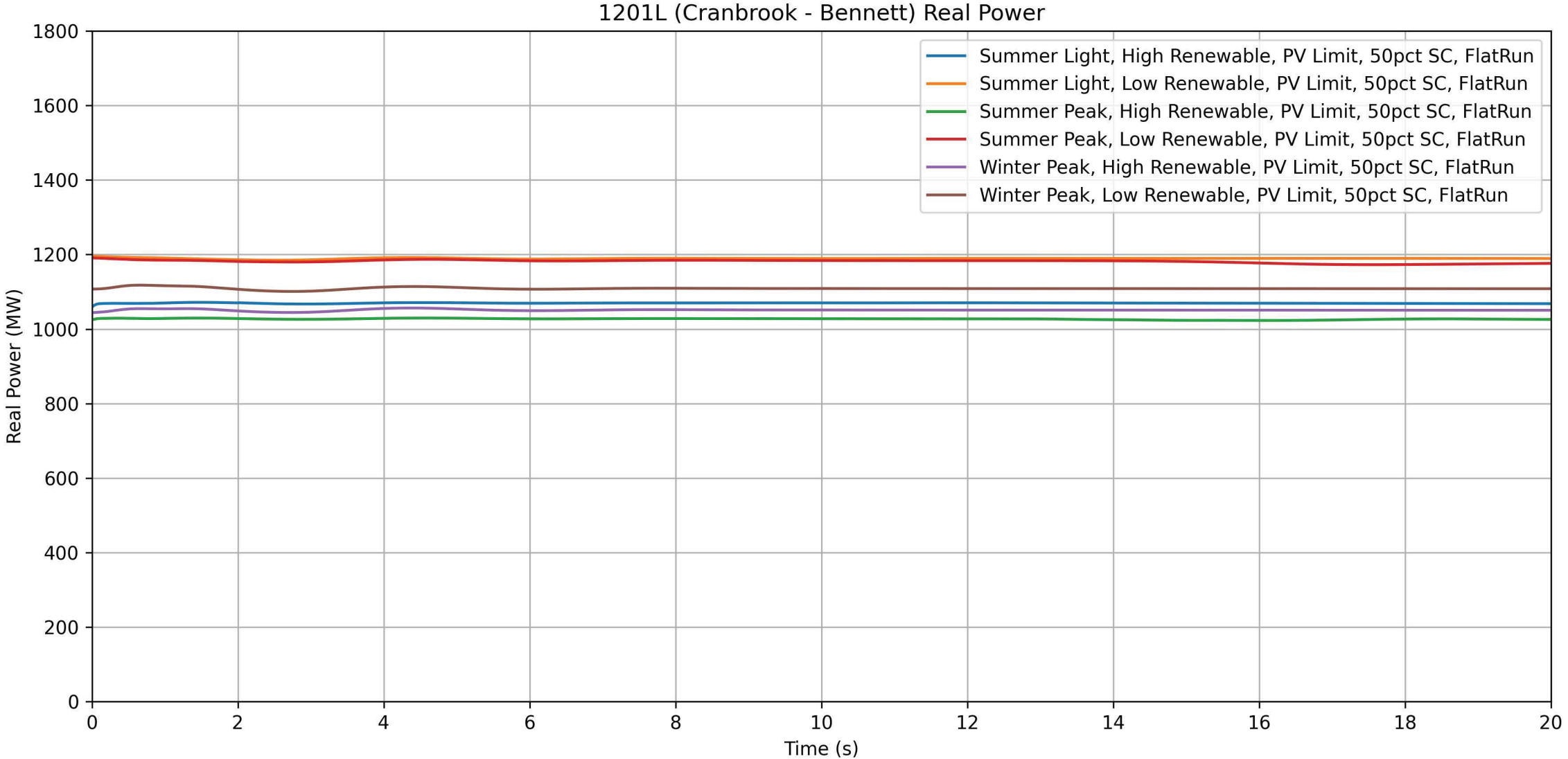

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

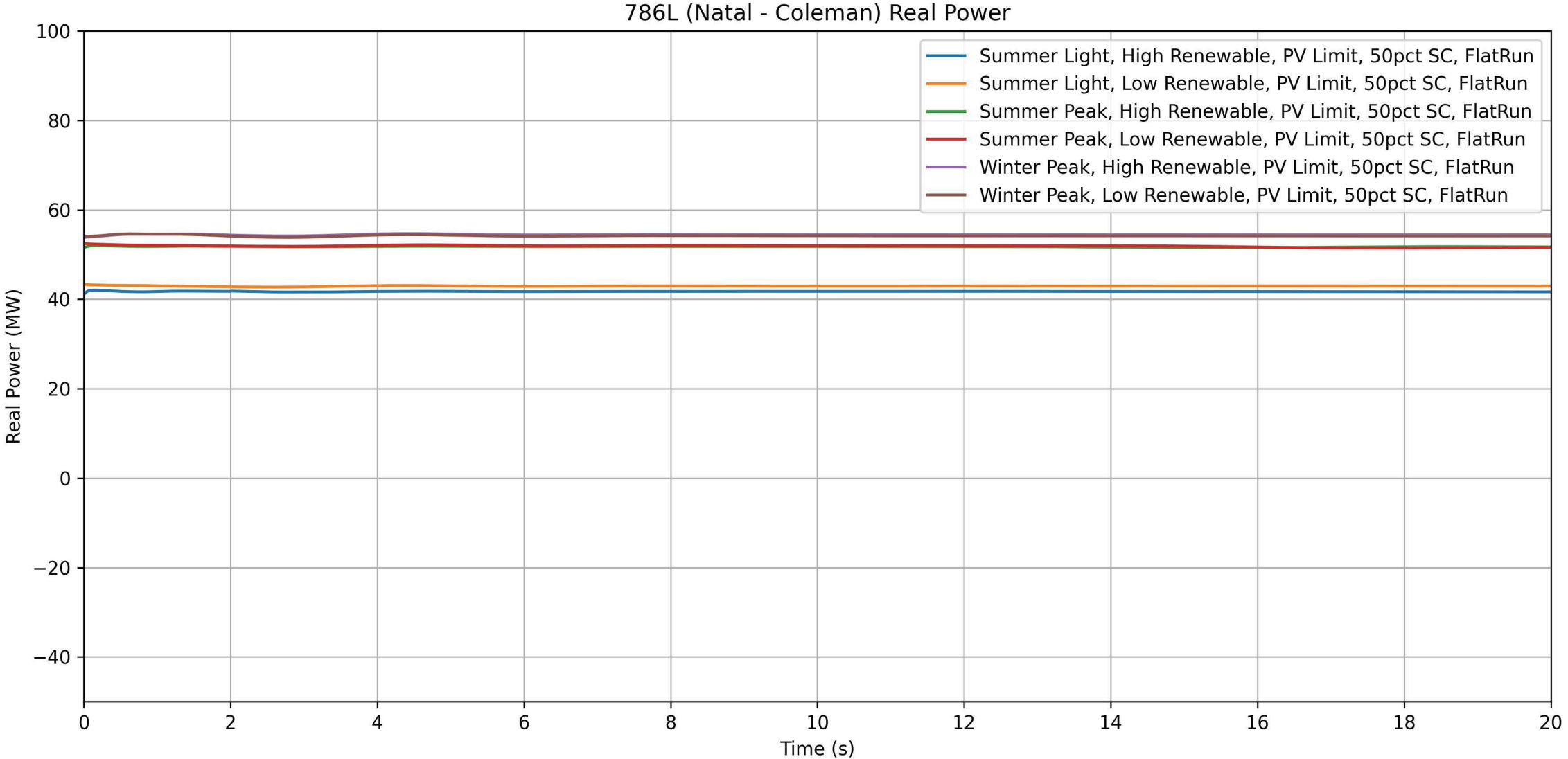

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

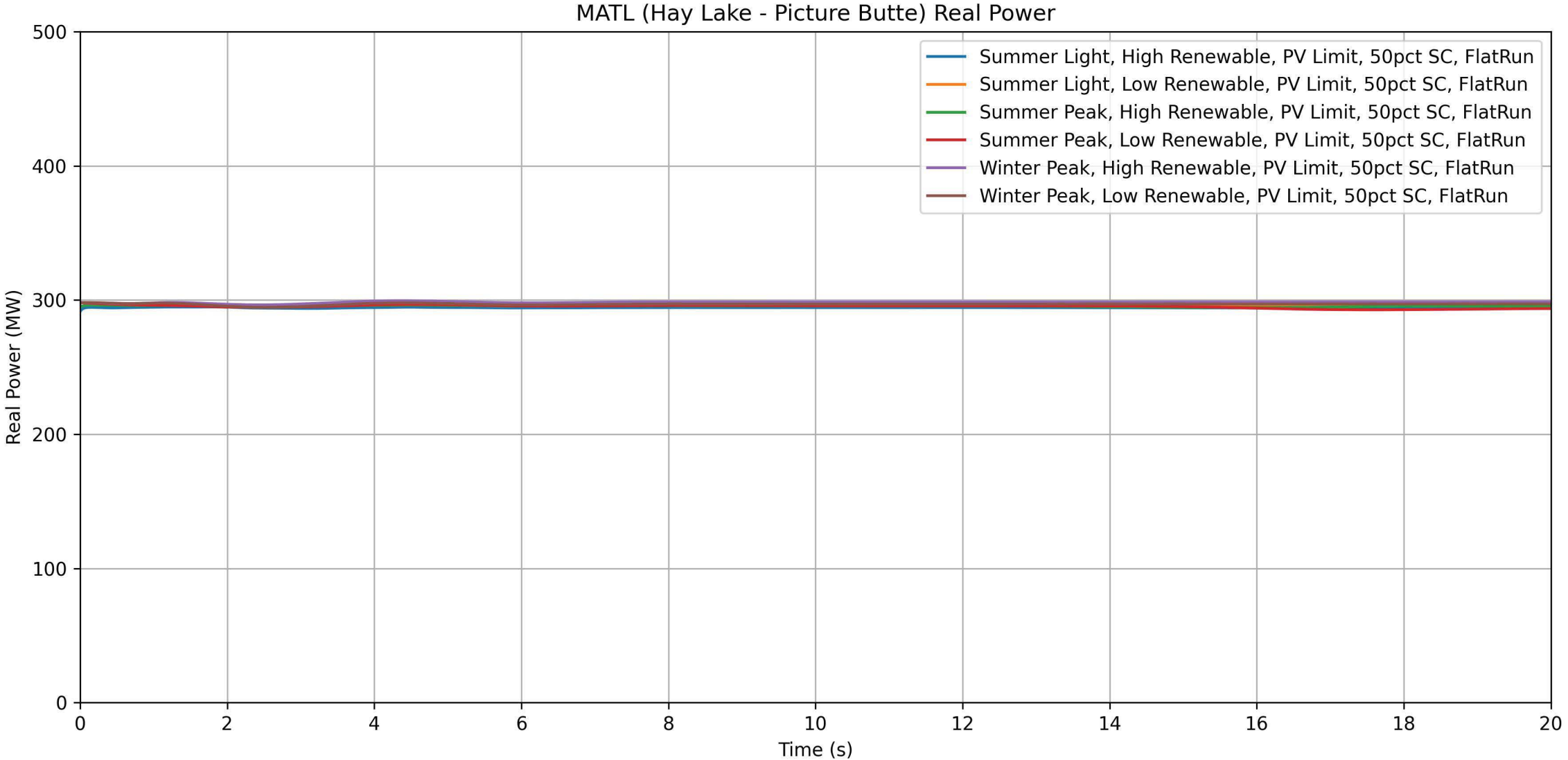

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

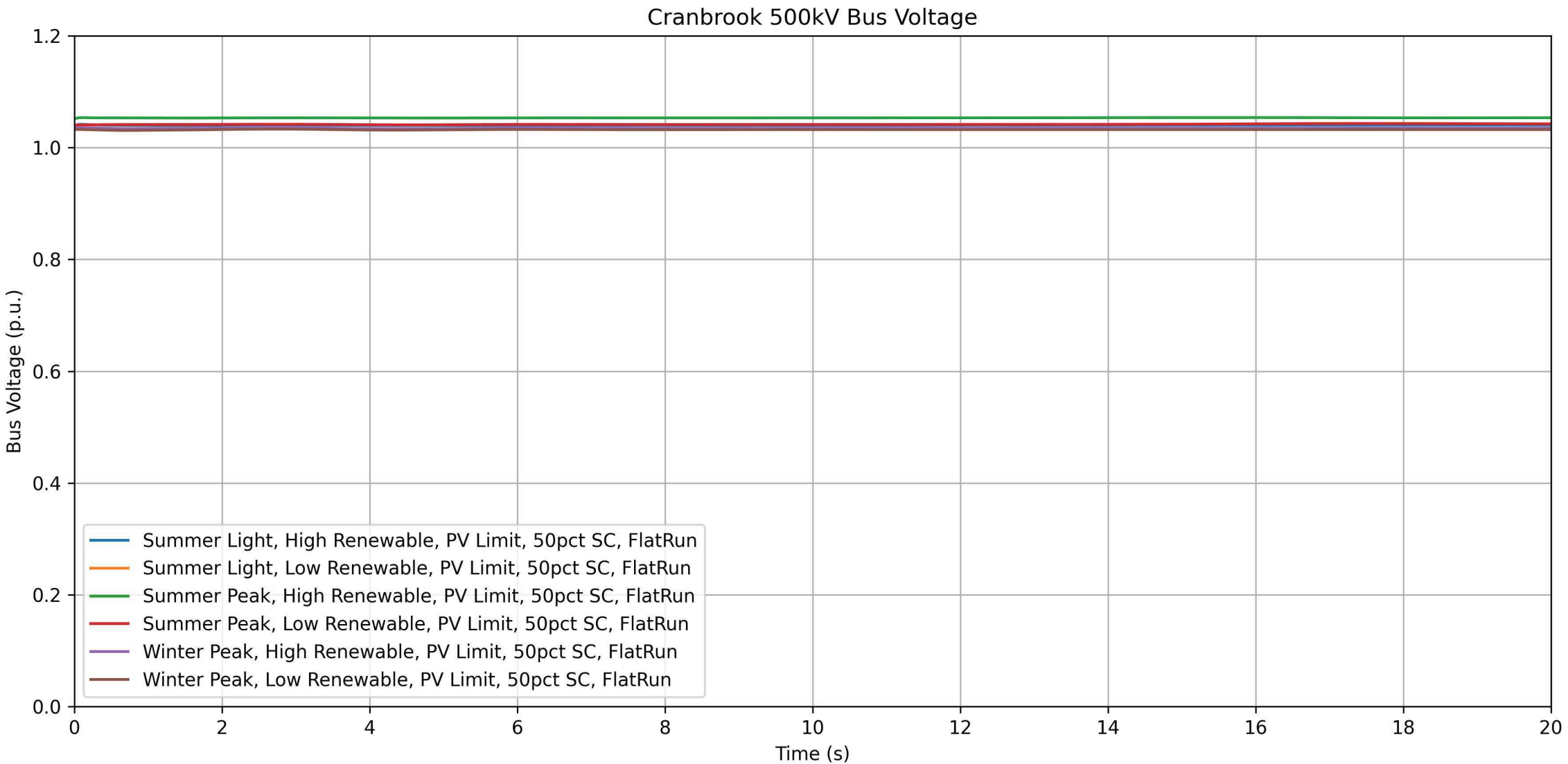

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

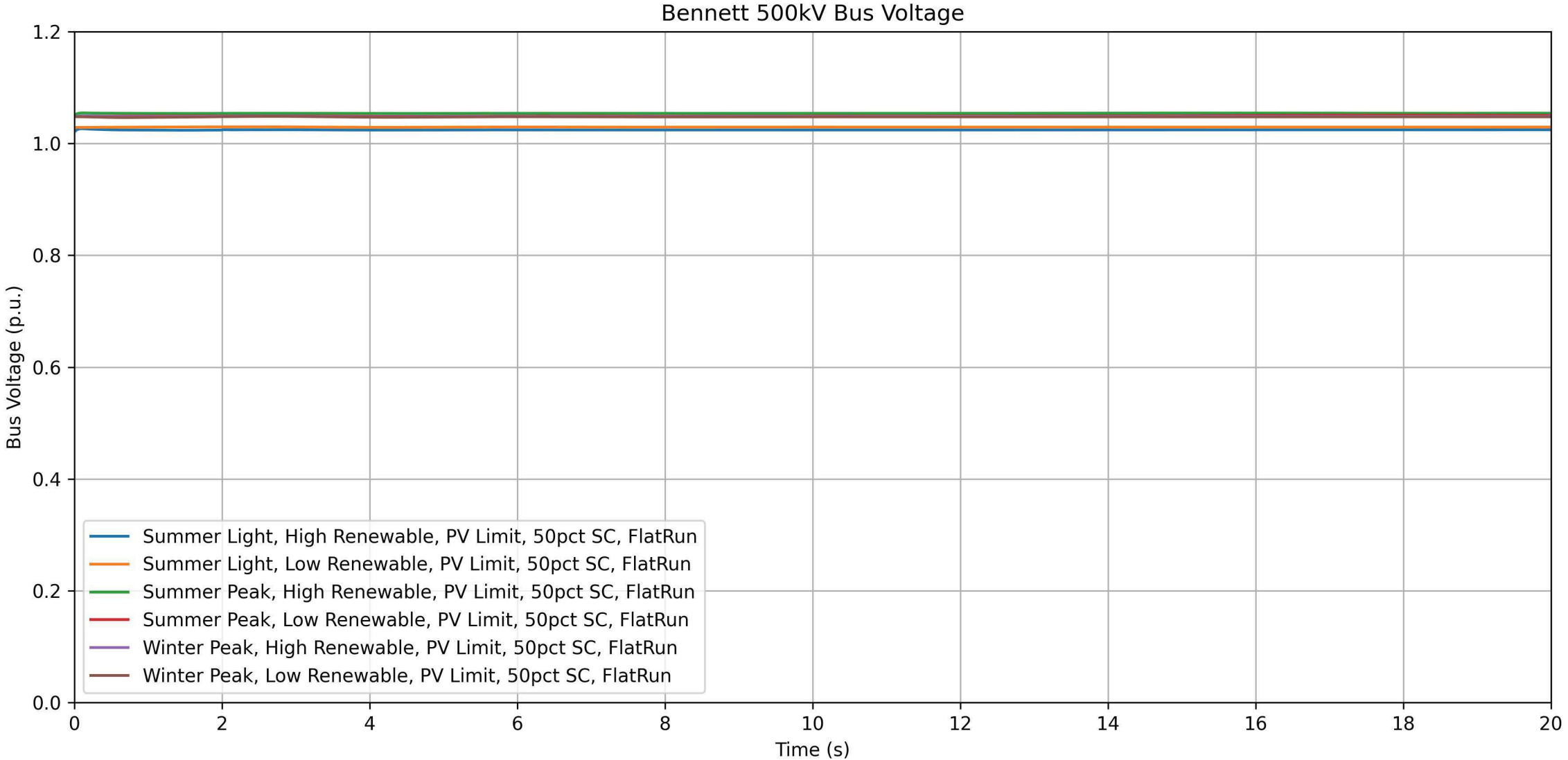

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 30pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 30pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 30pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 30pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

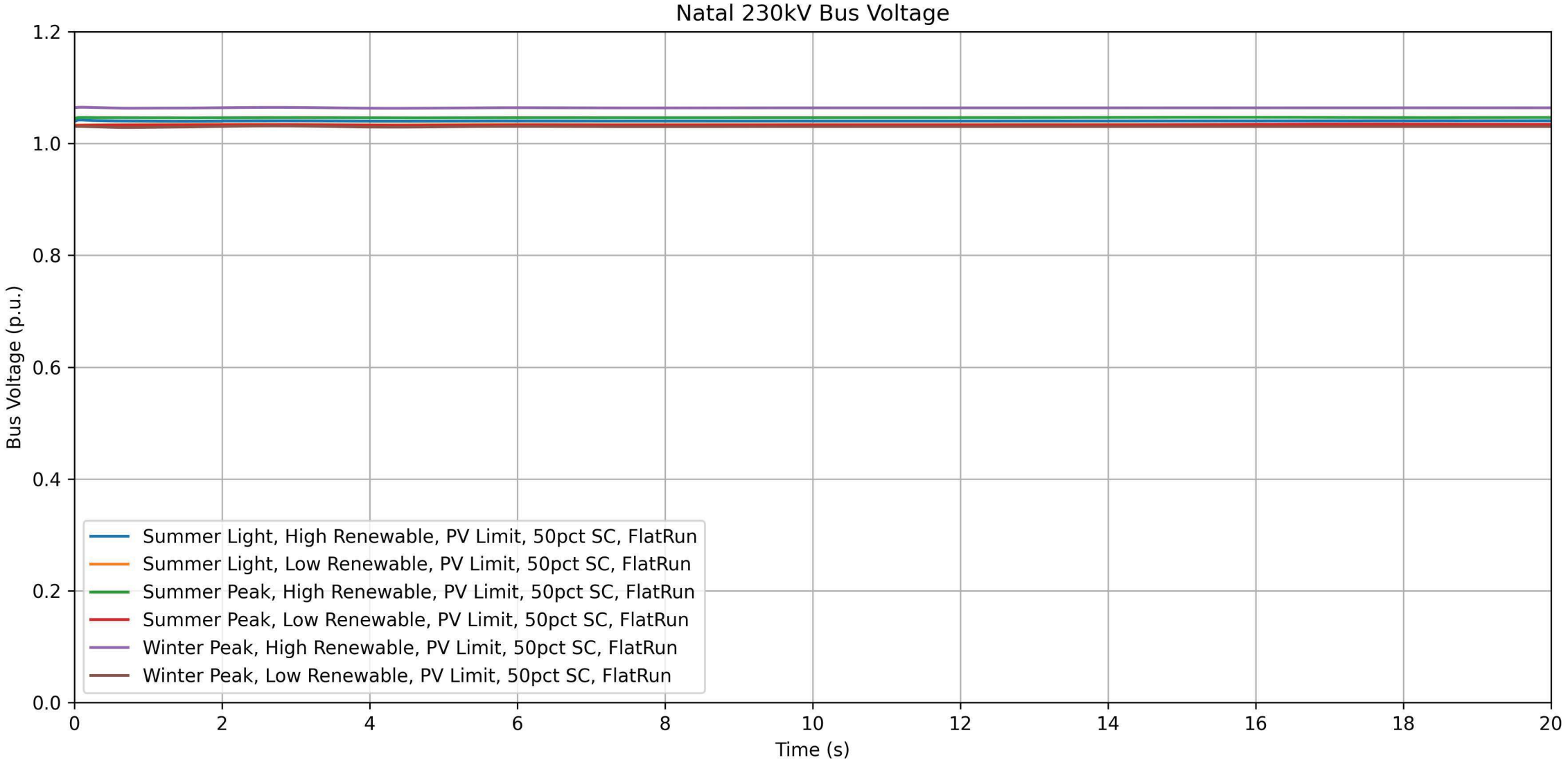

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

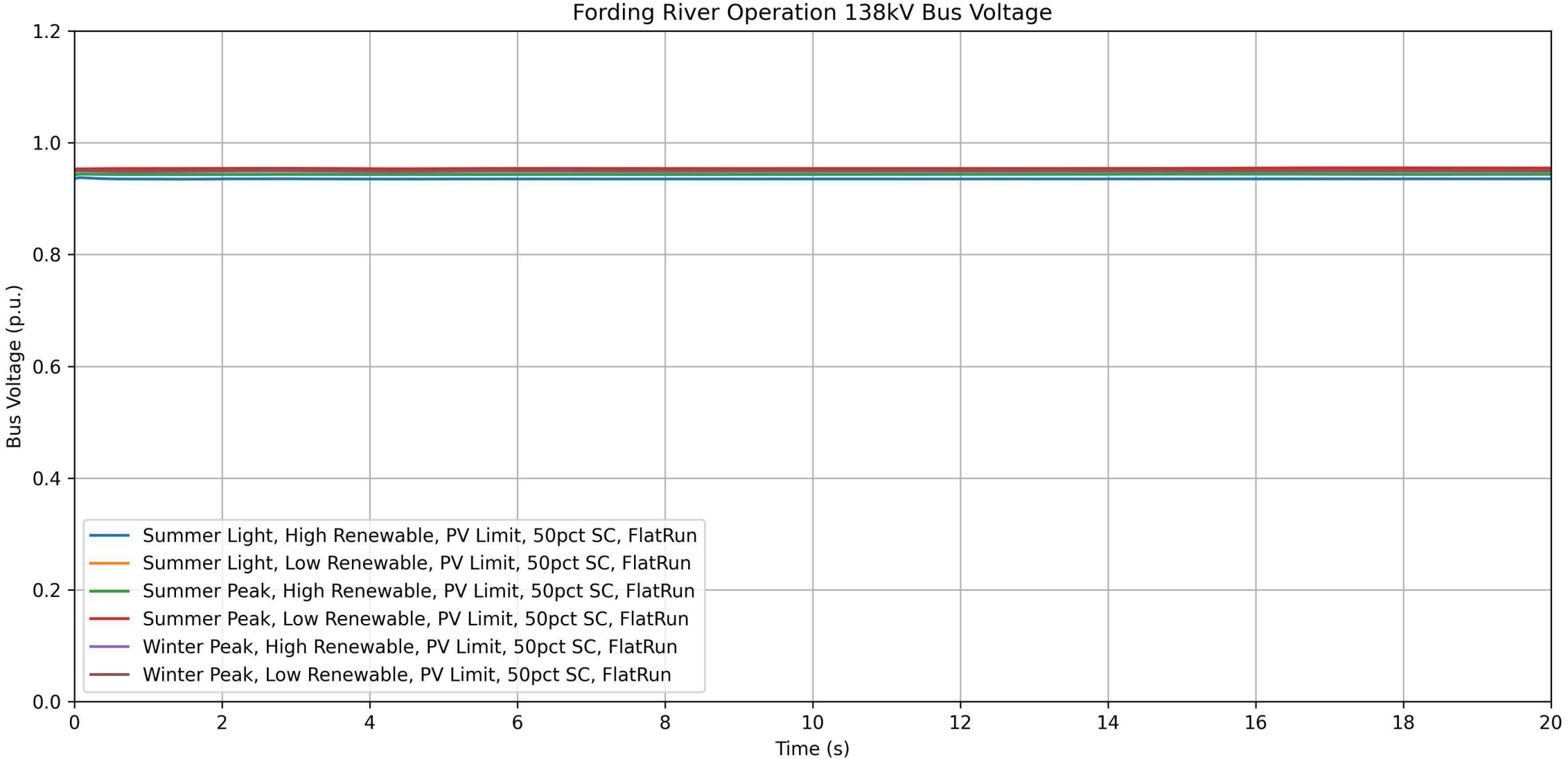

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

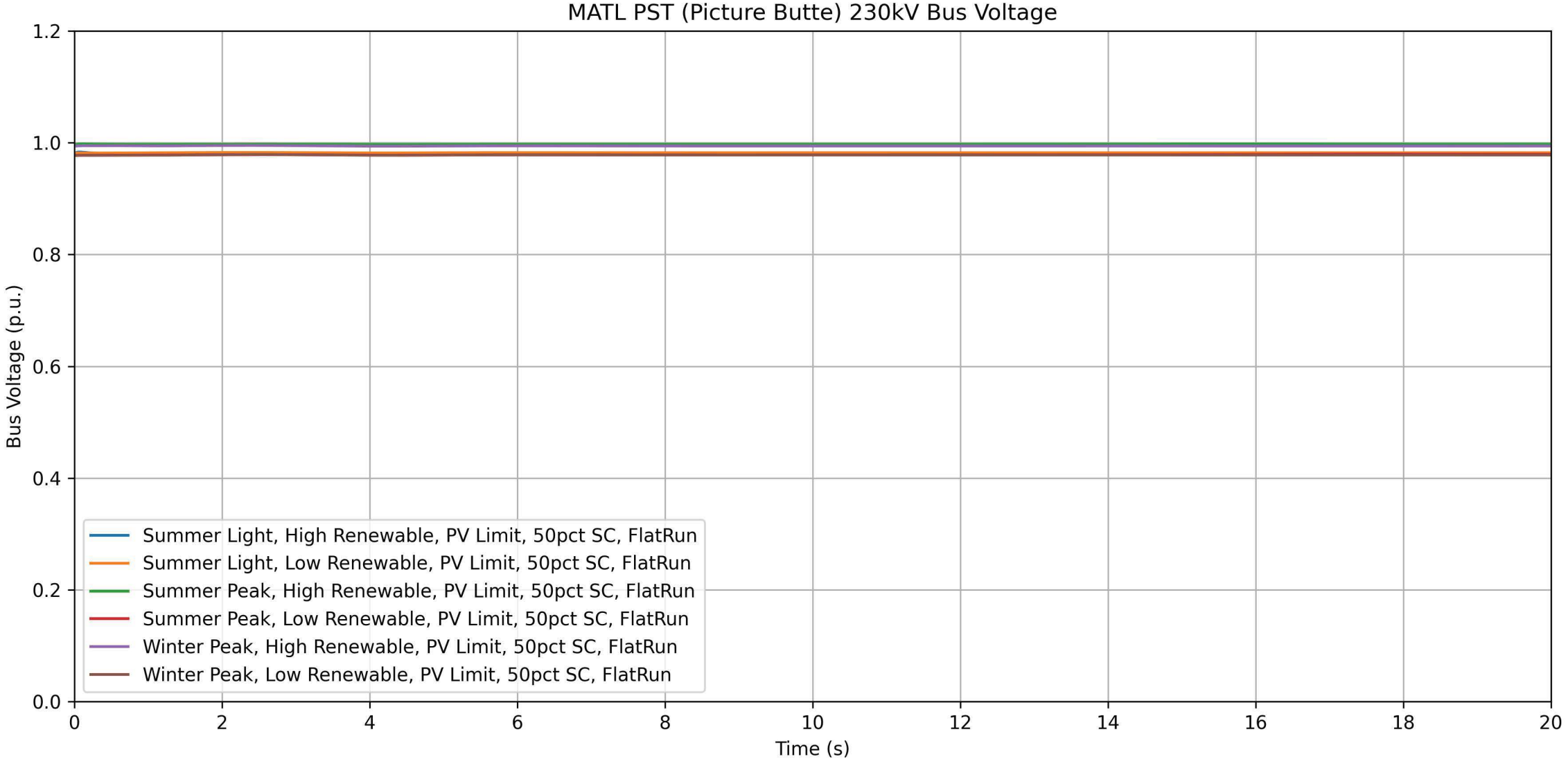

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

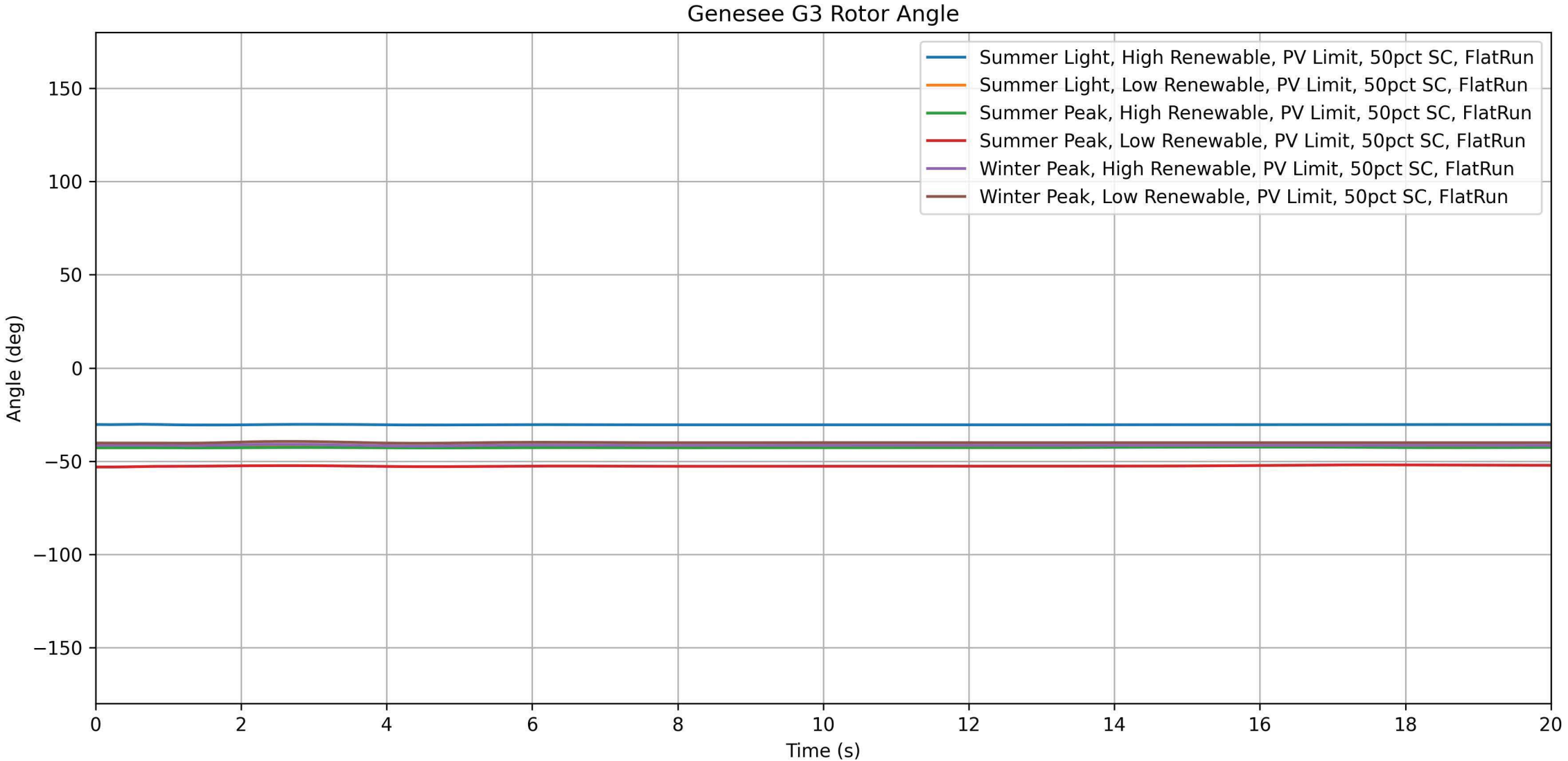

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

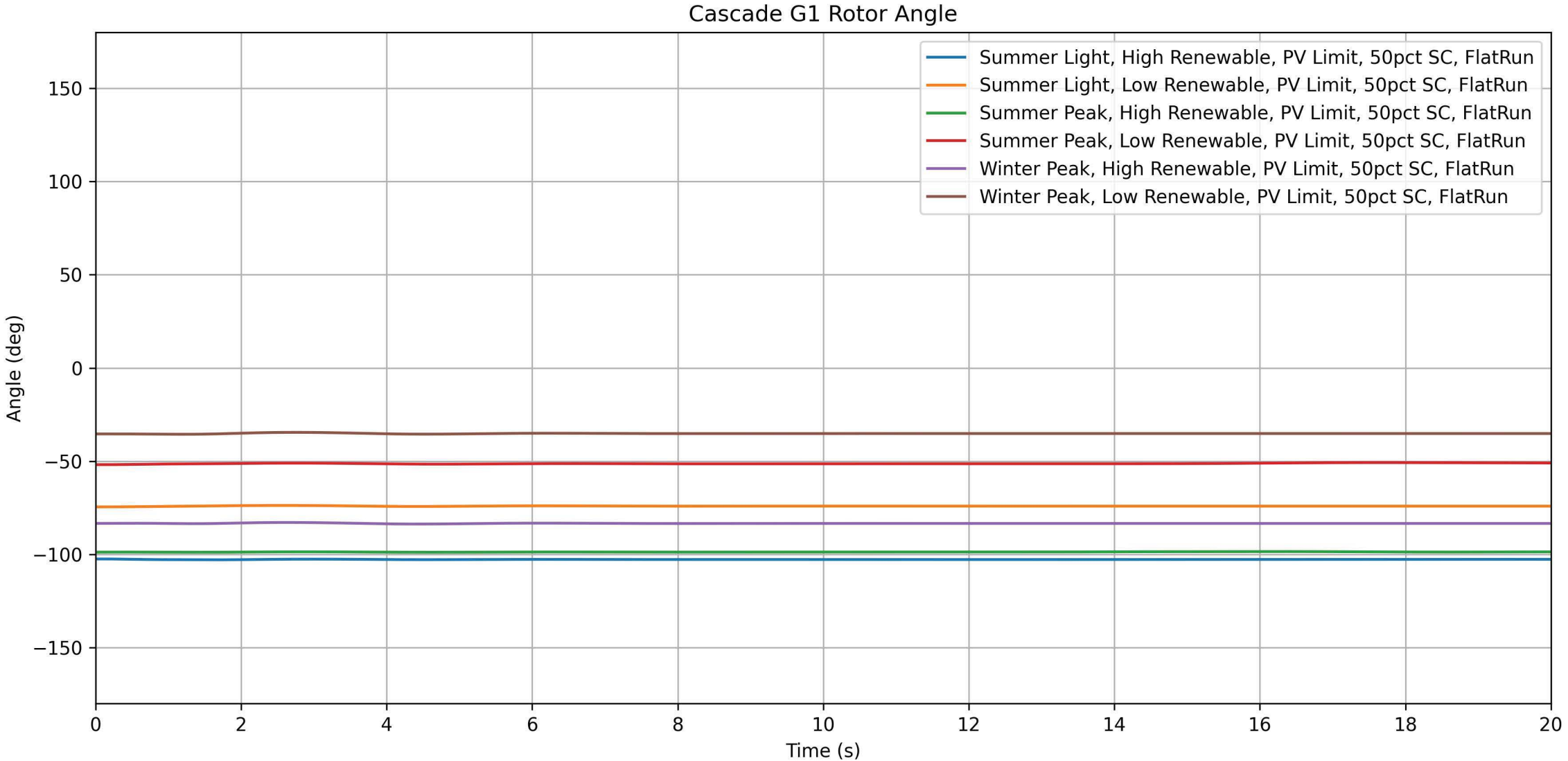

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

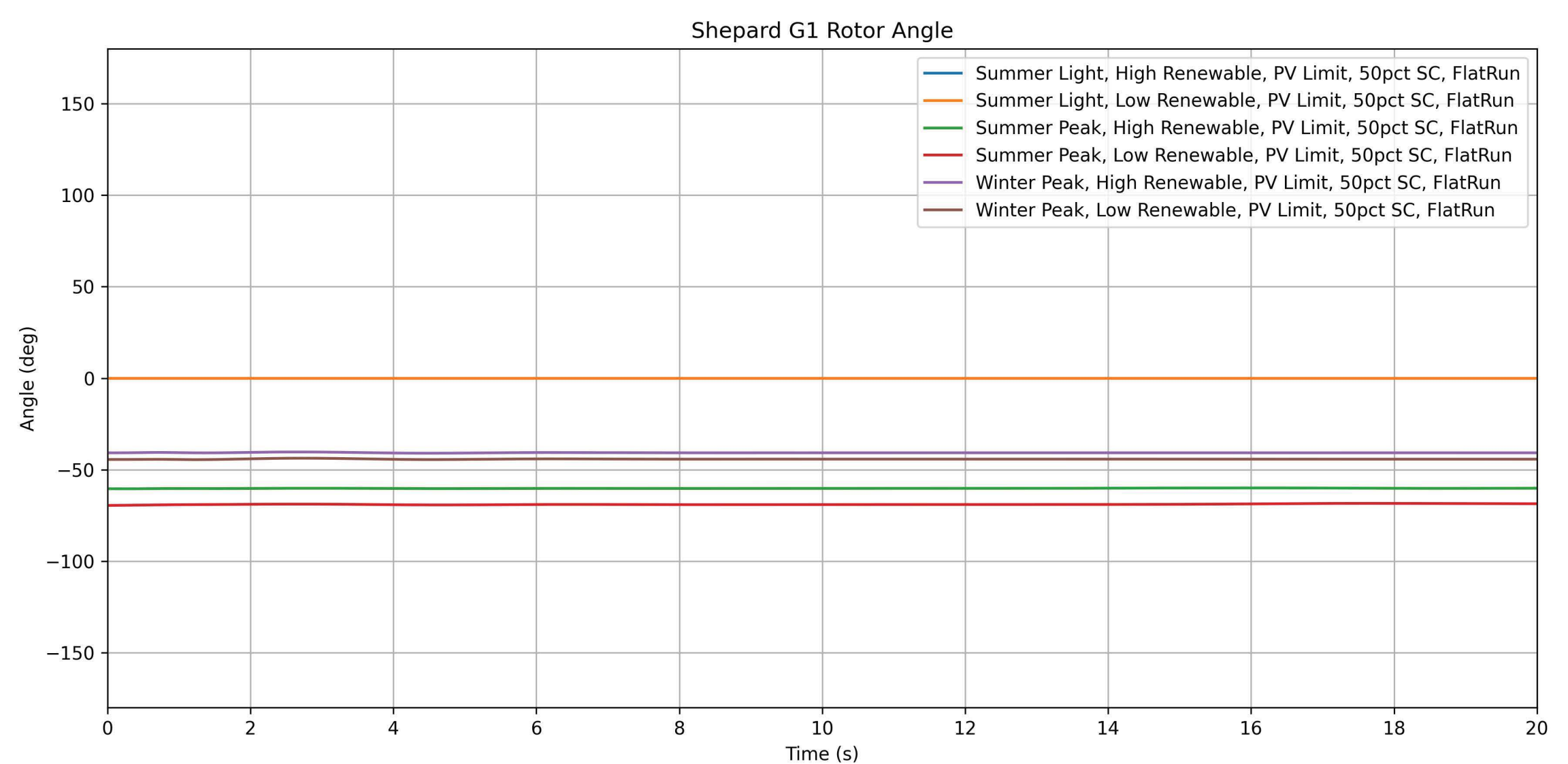

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

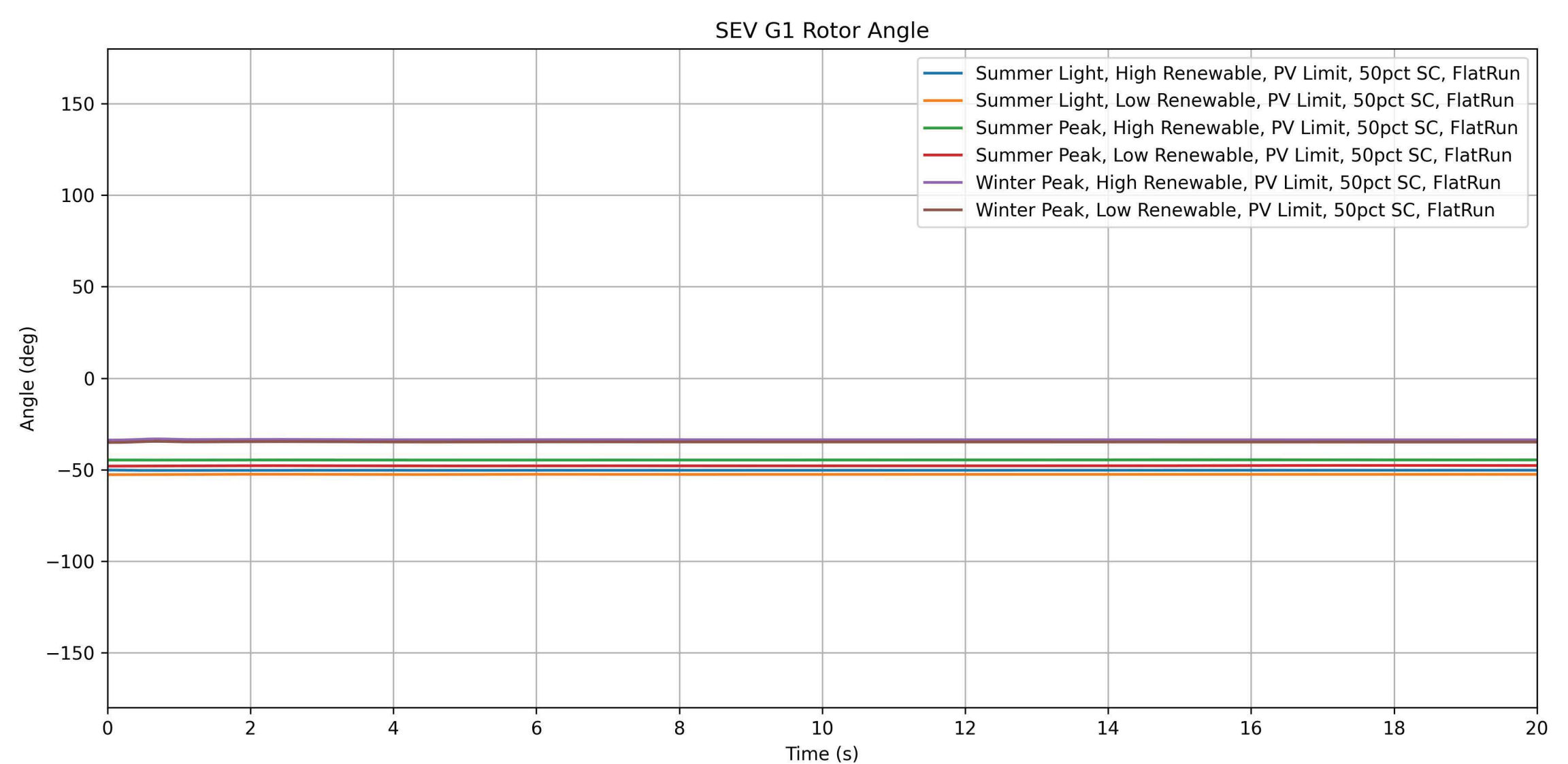

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

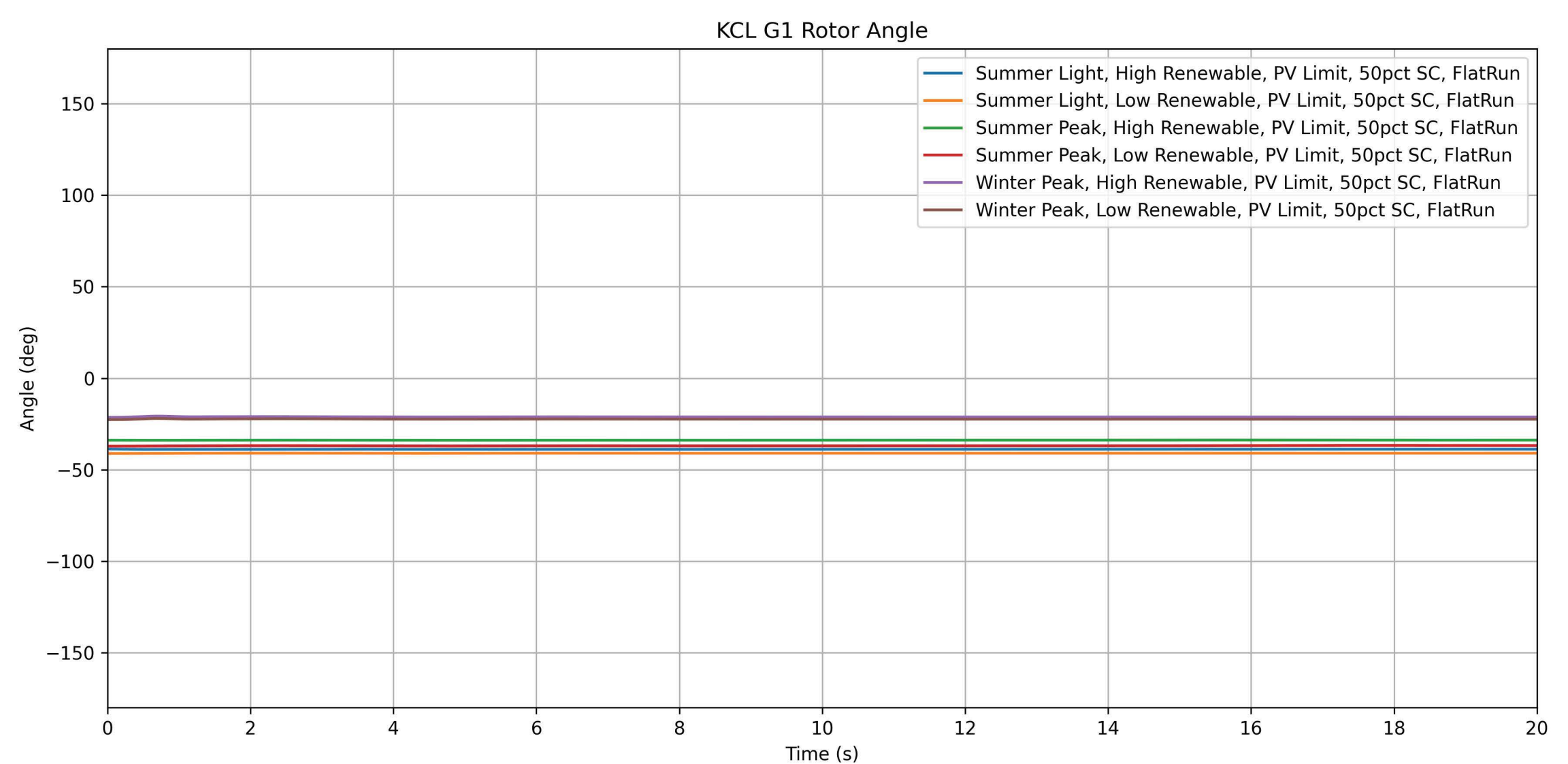

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

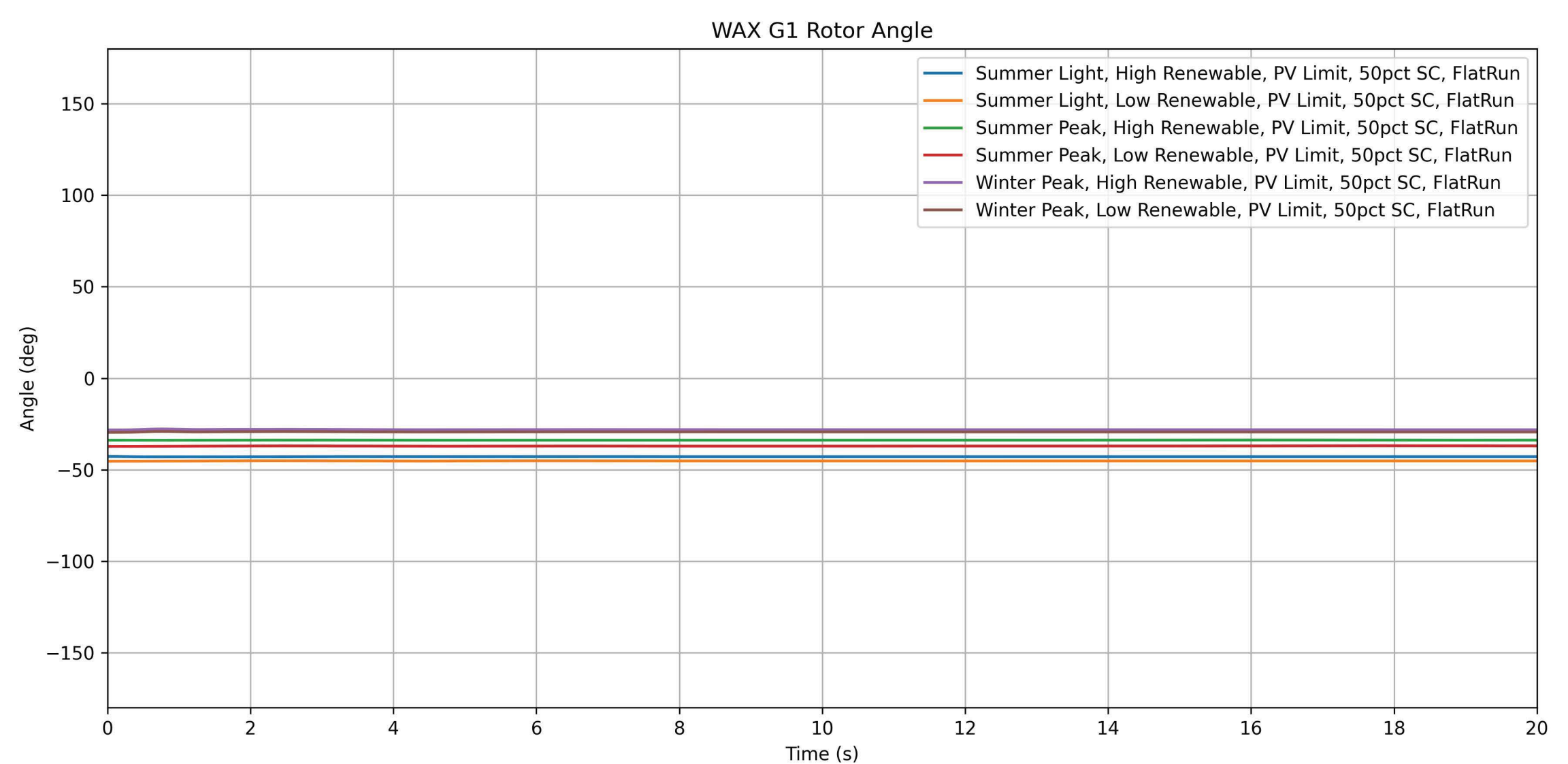

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

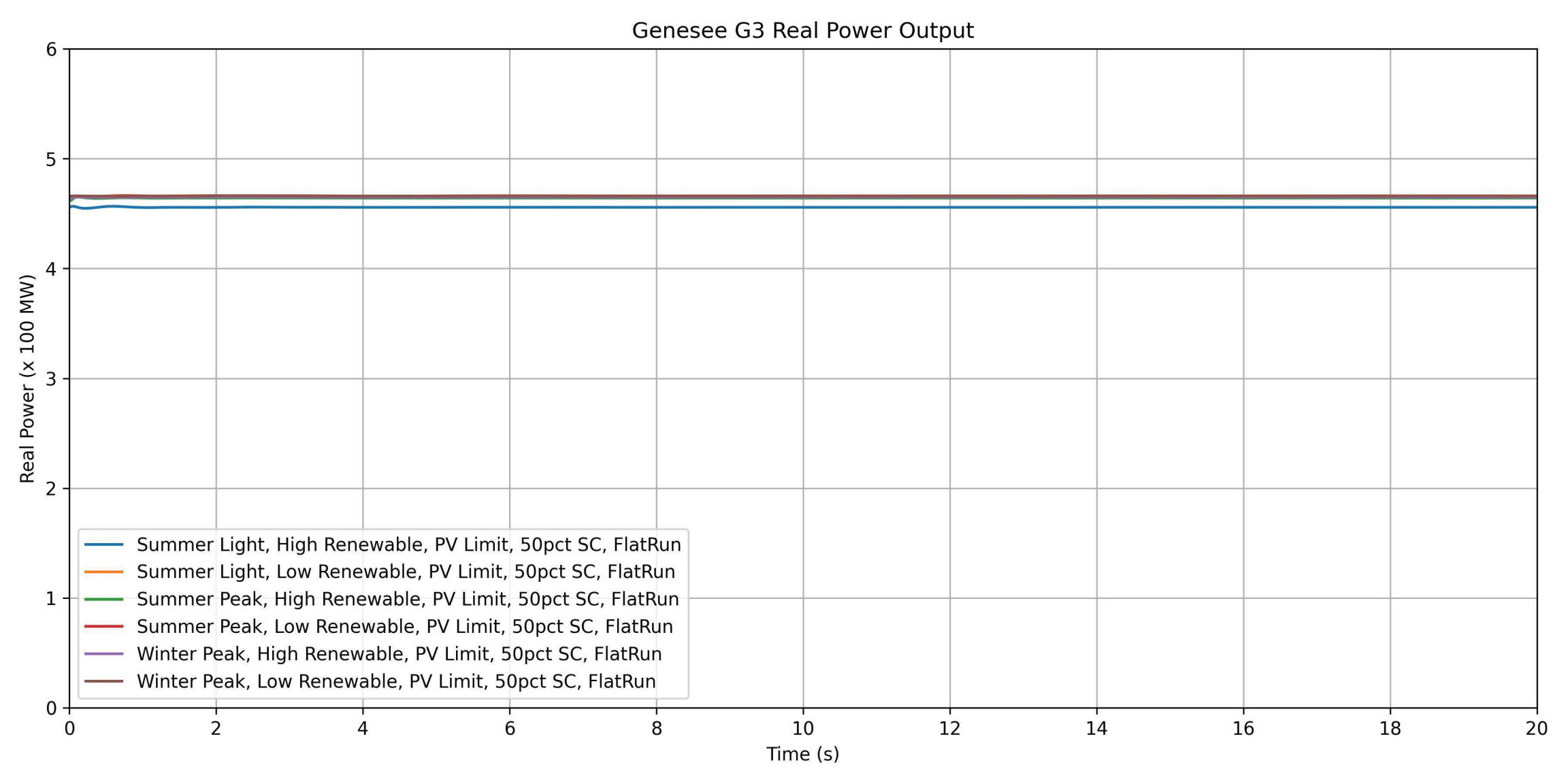

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

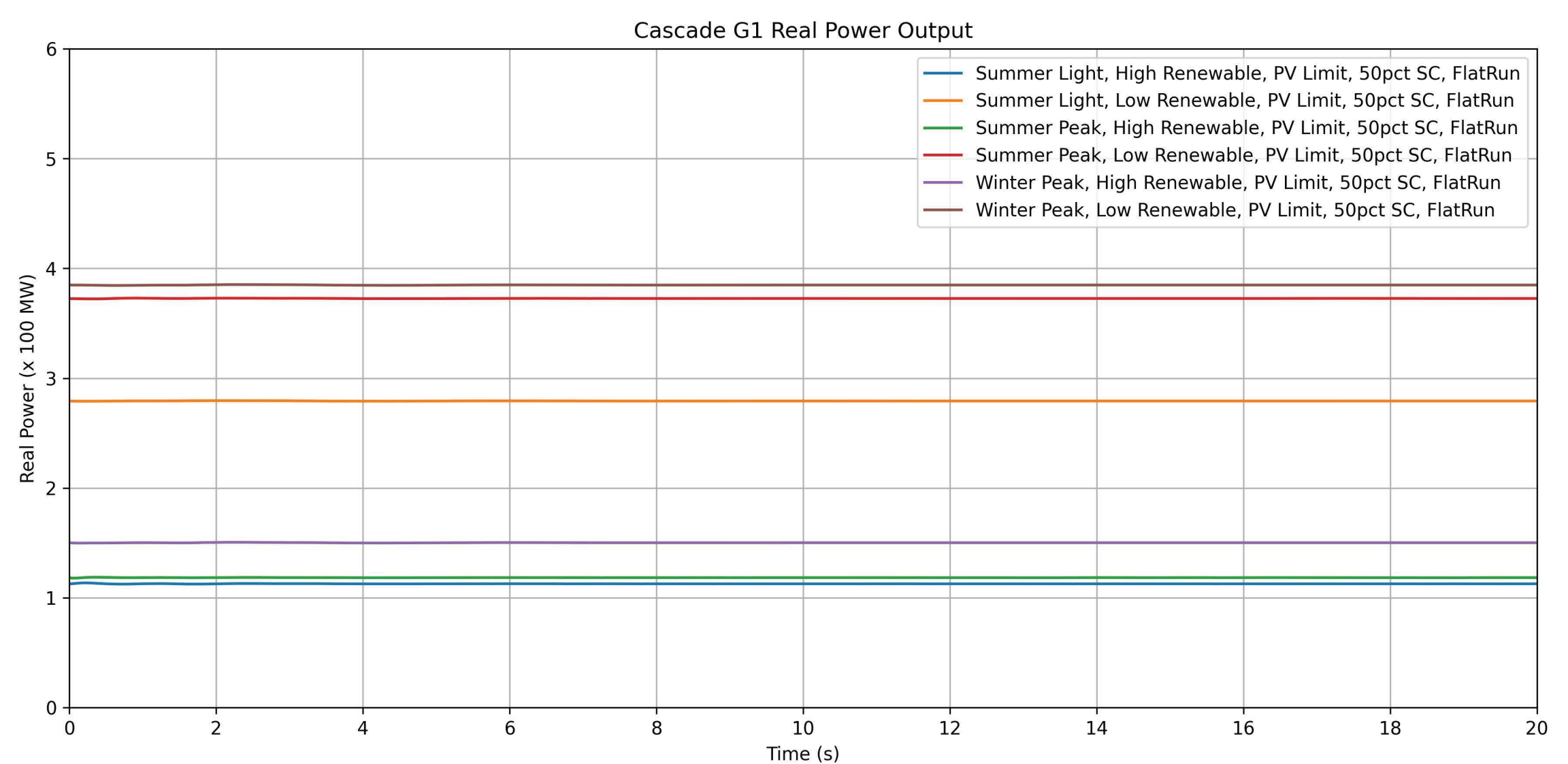

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

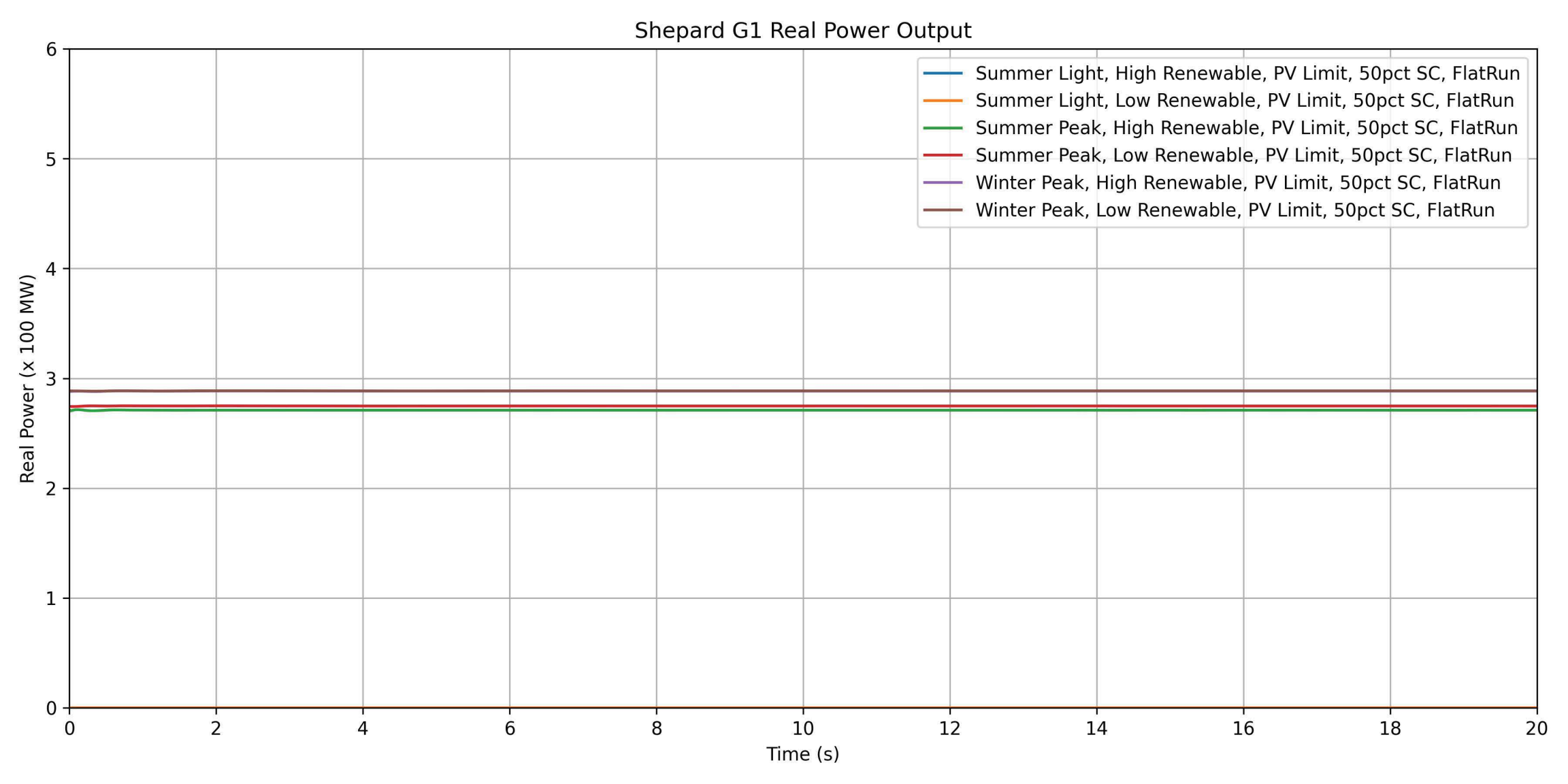

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

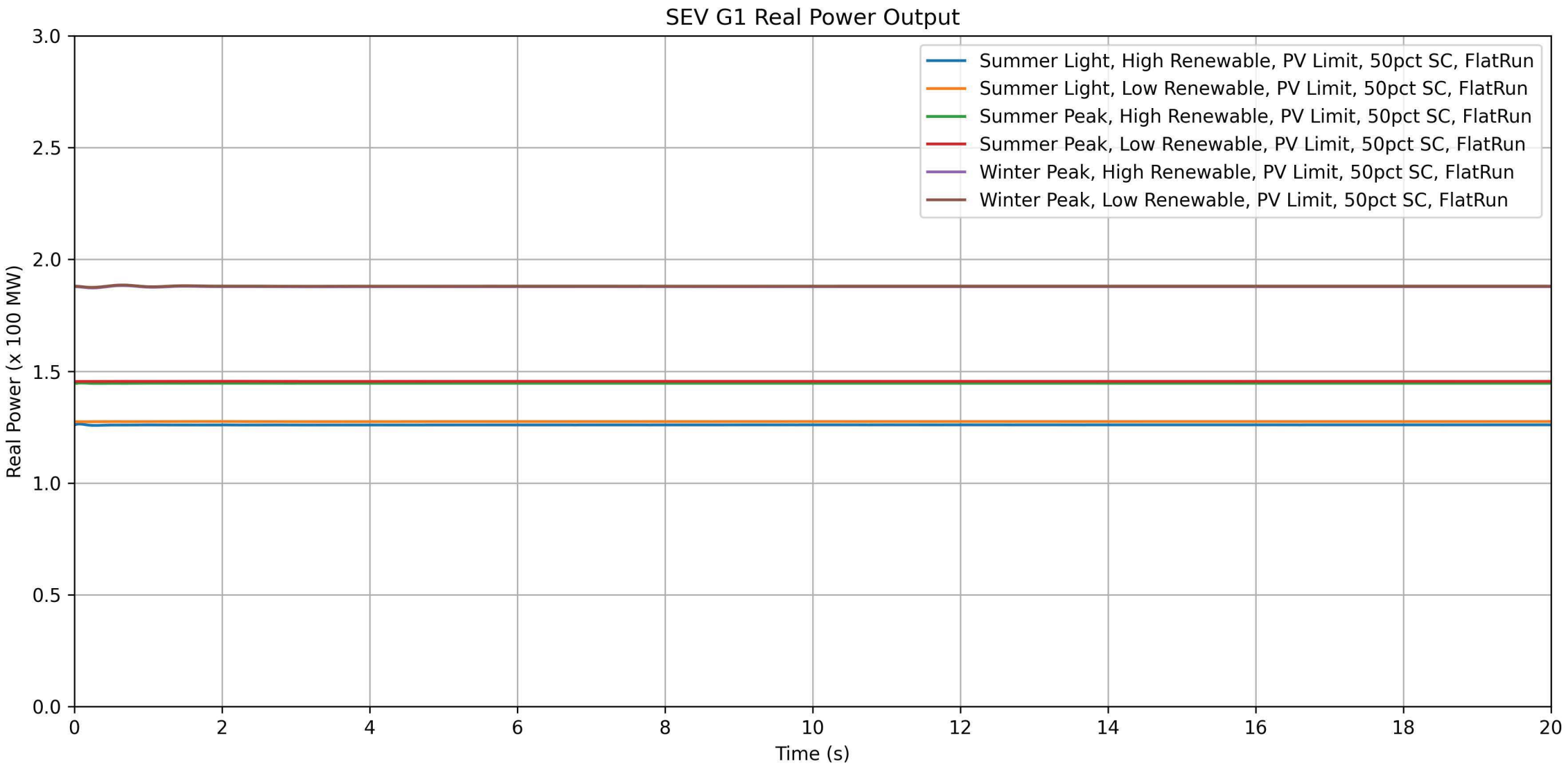

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

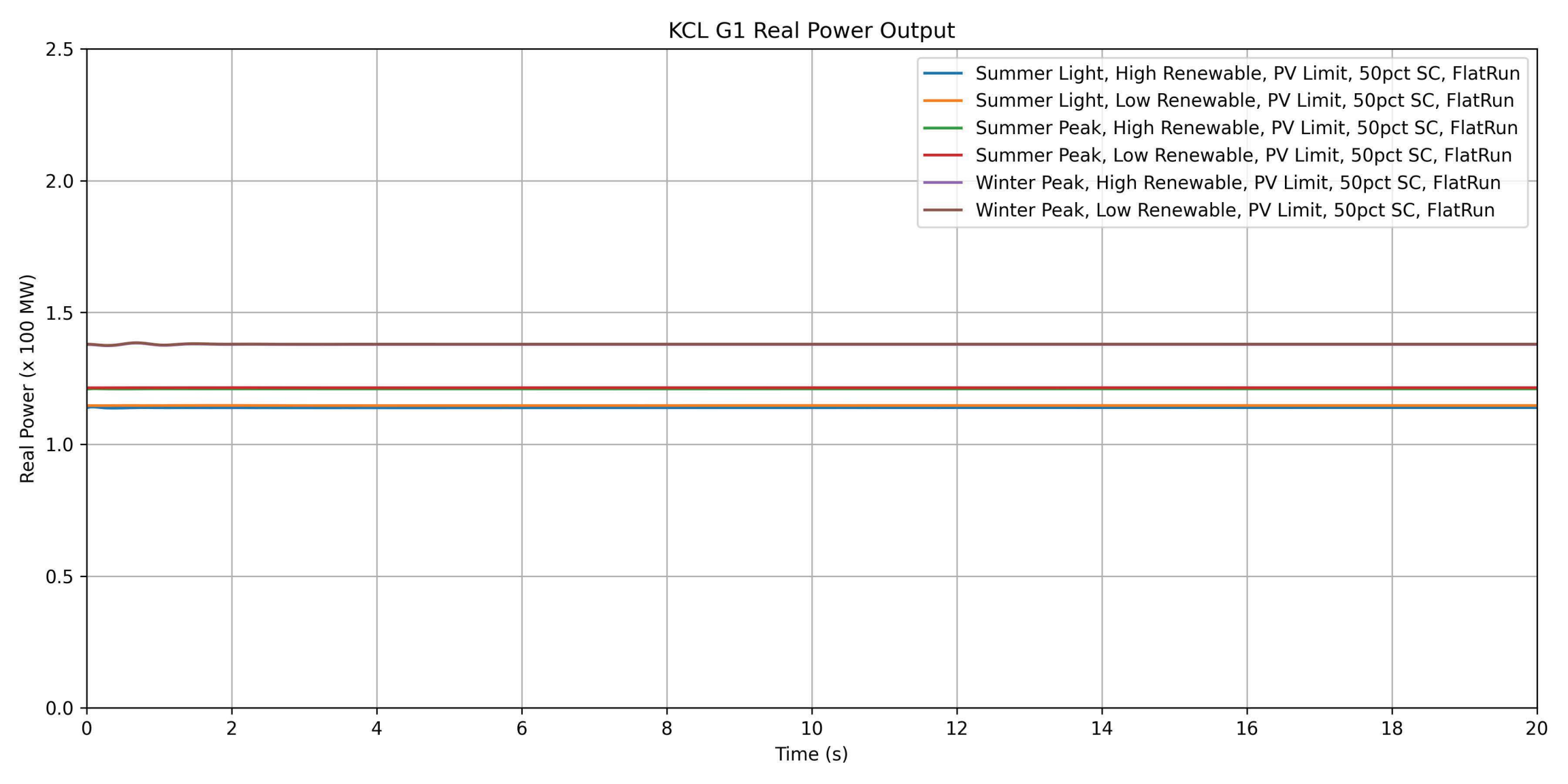

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

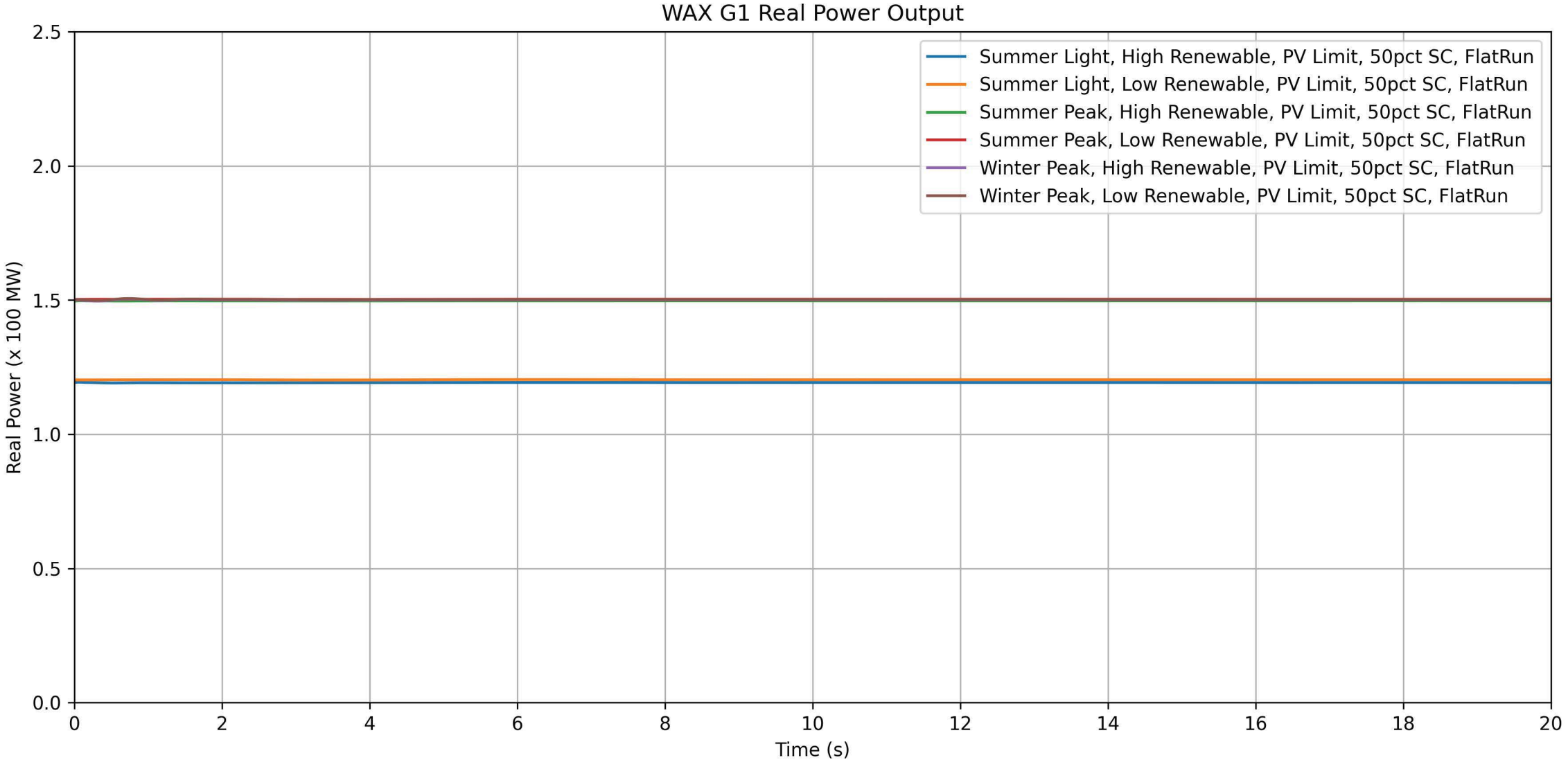

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun

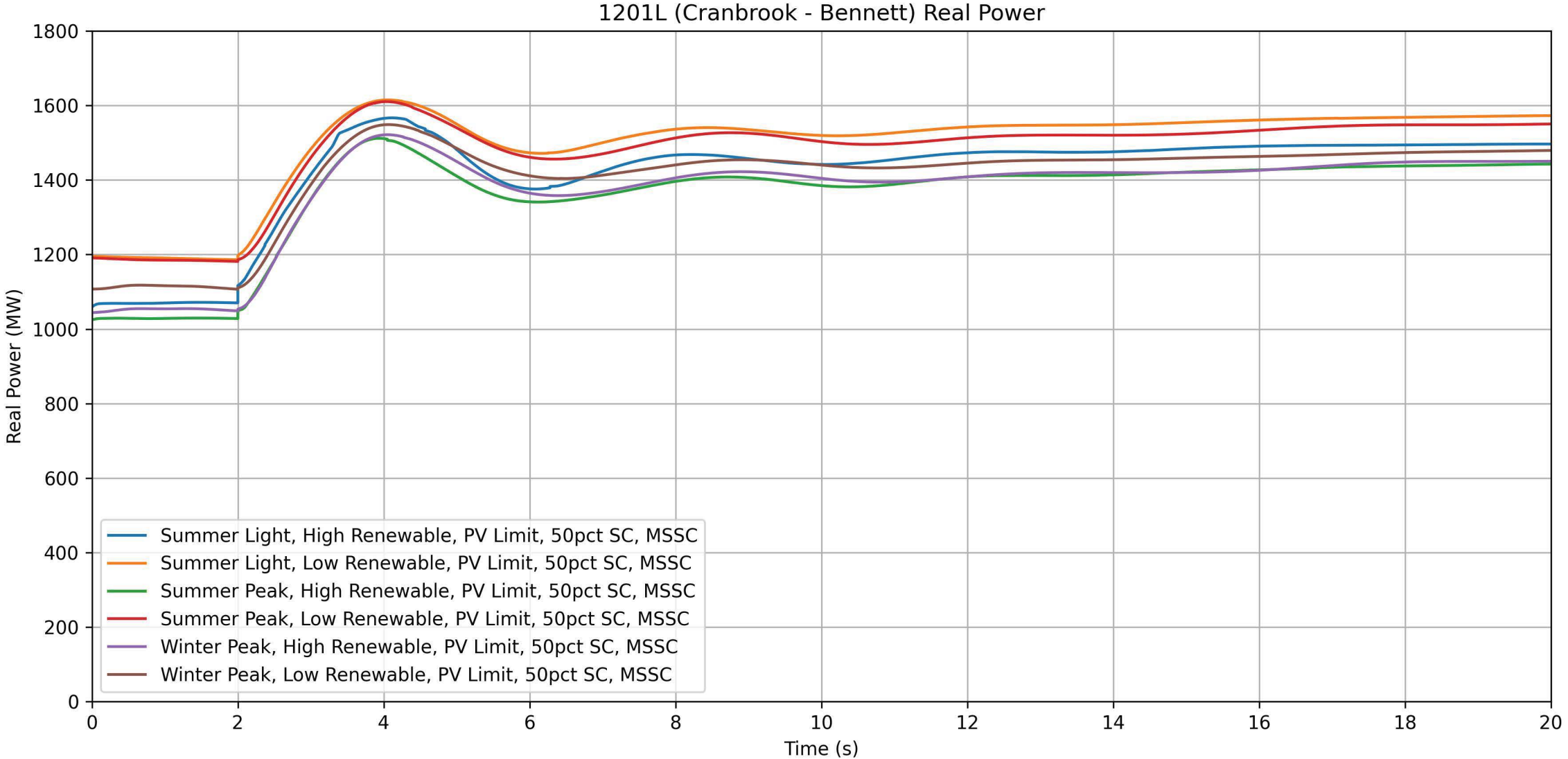

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

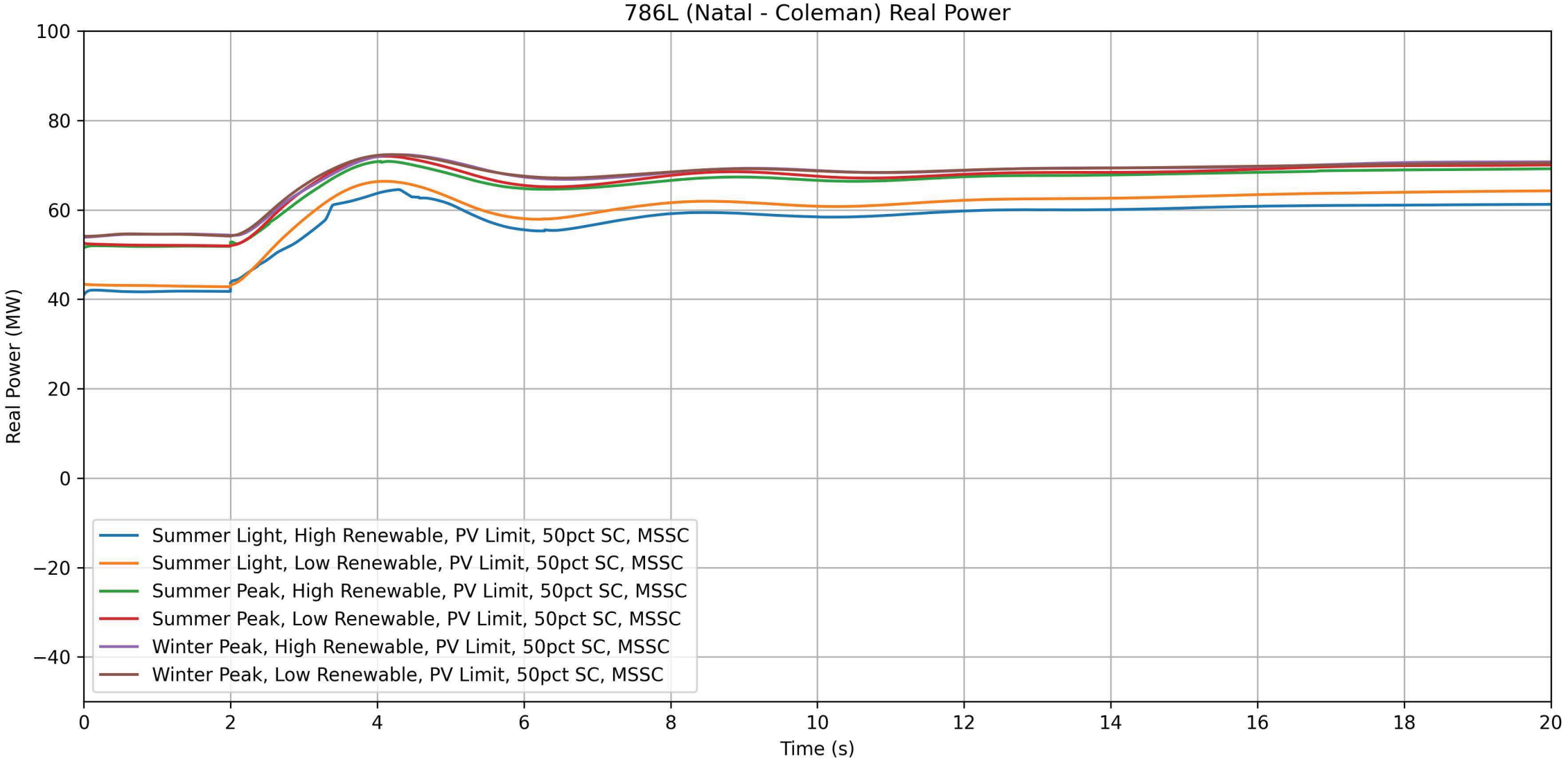

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

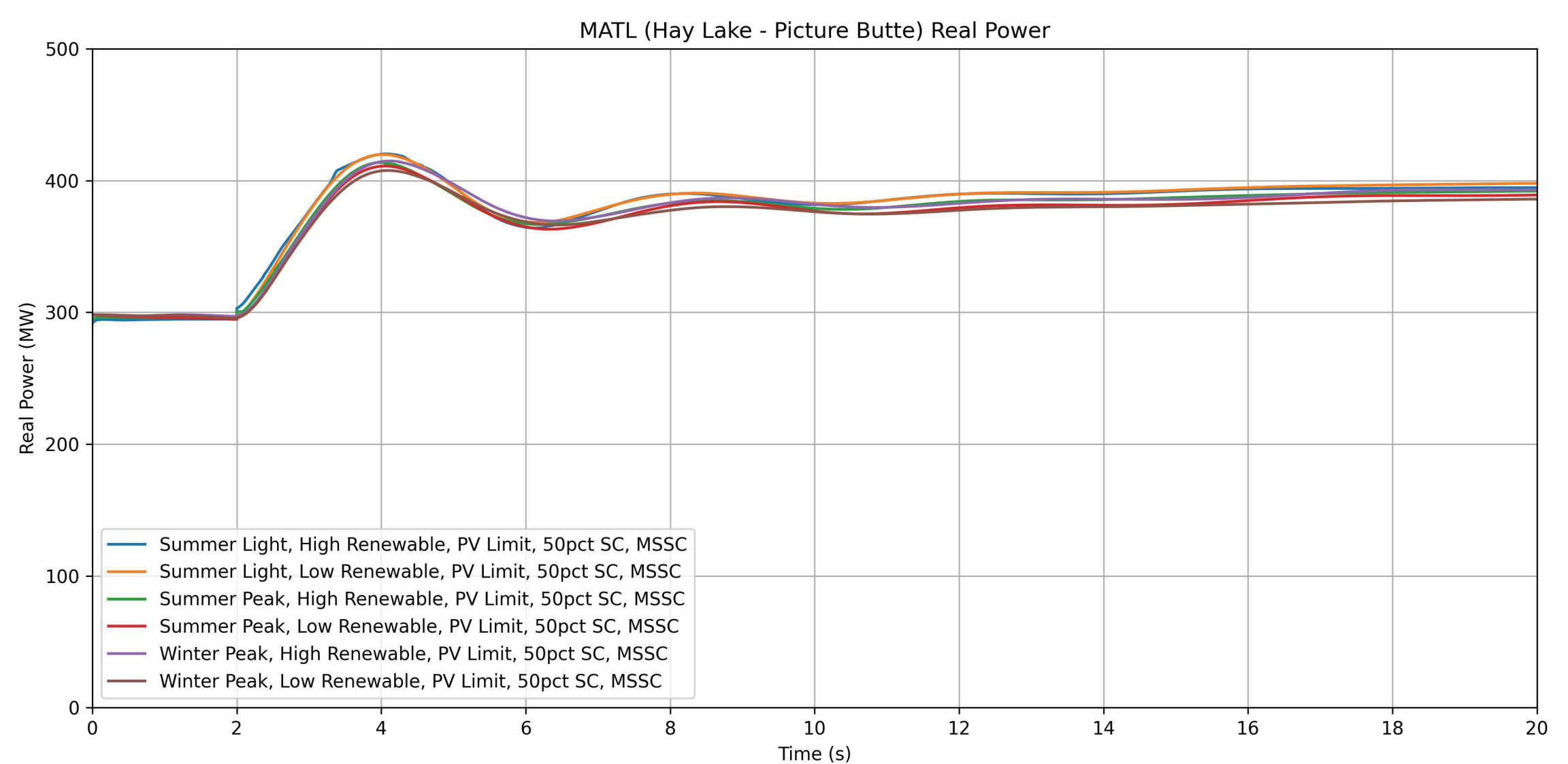

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

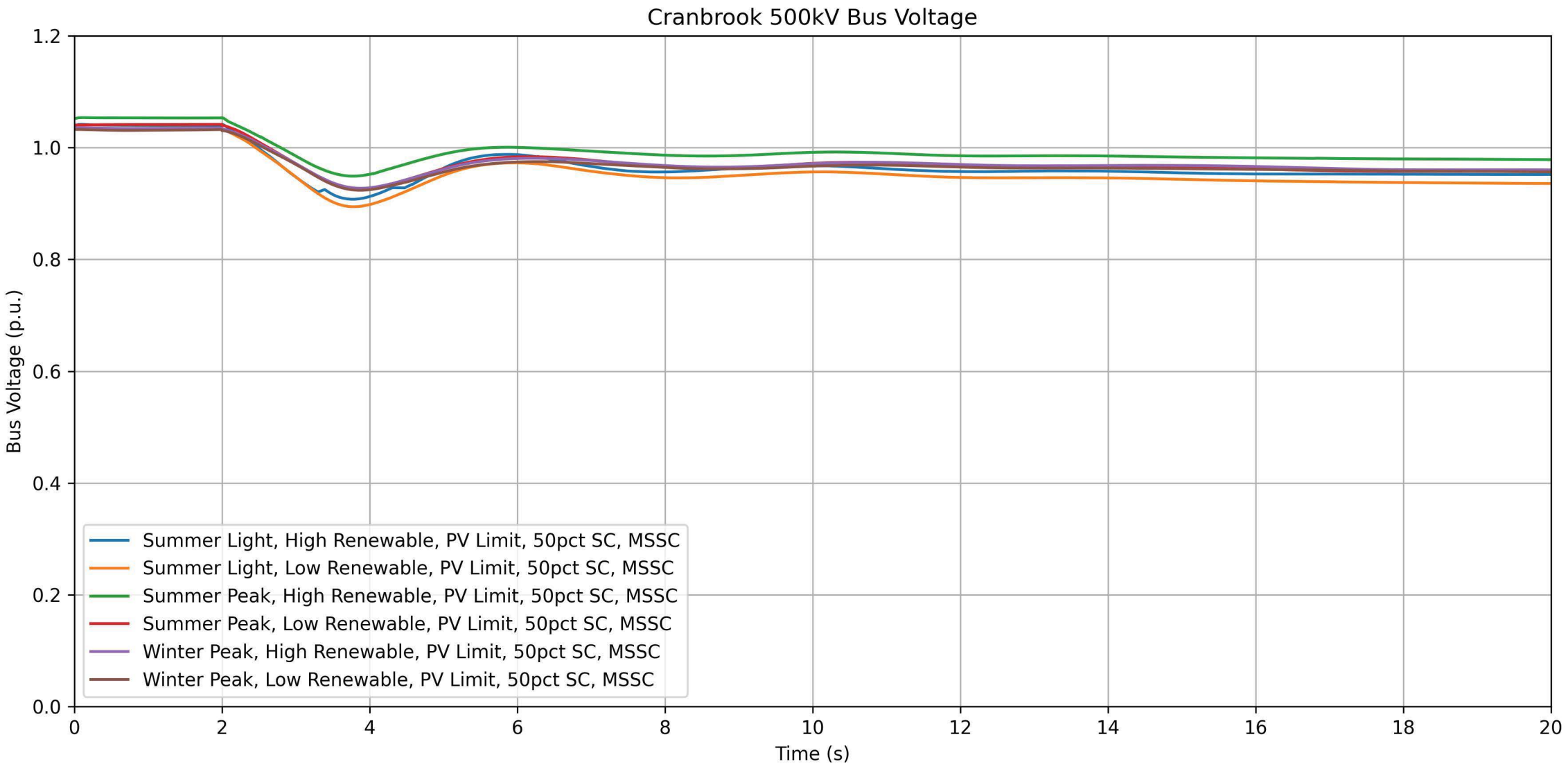

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

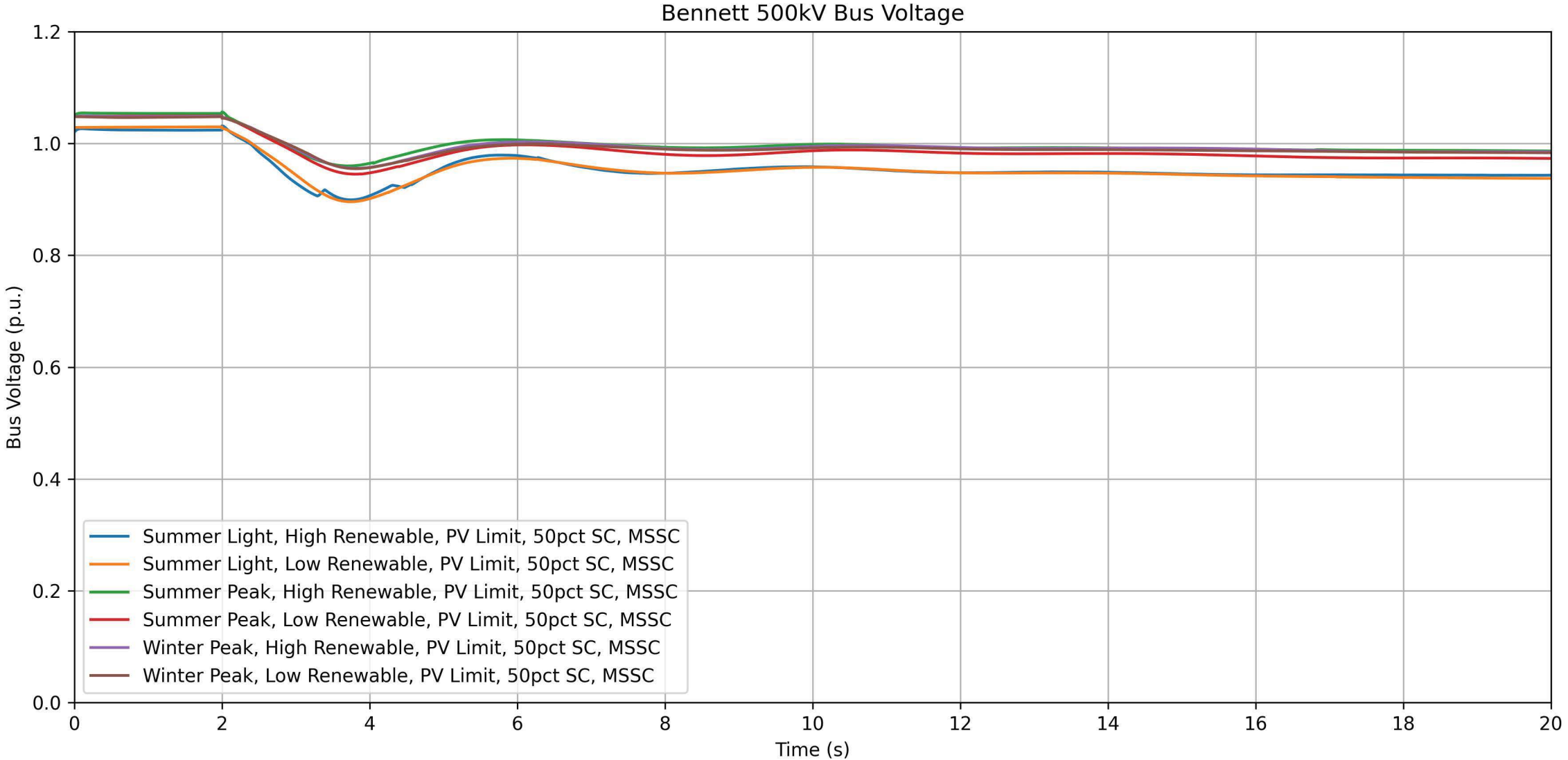

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Light, Low Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Summer Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, High Renewable, PV Limit, 50pct SC, FlatRun
Winter Peak, Low Renewable, PV Limit, 50pct SC, FlatRun
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

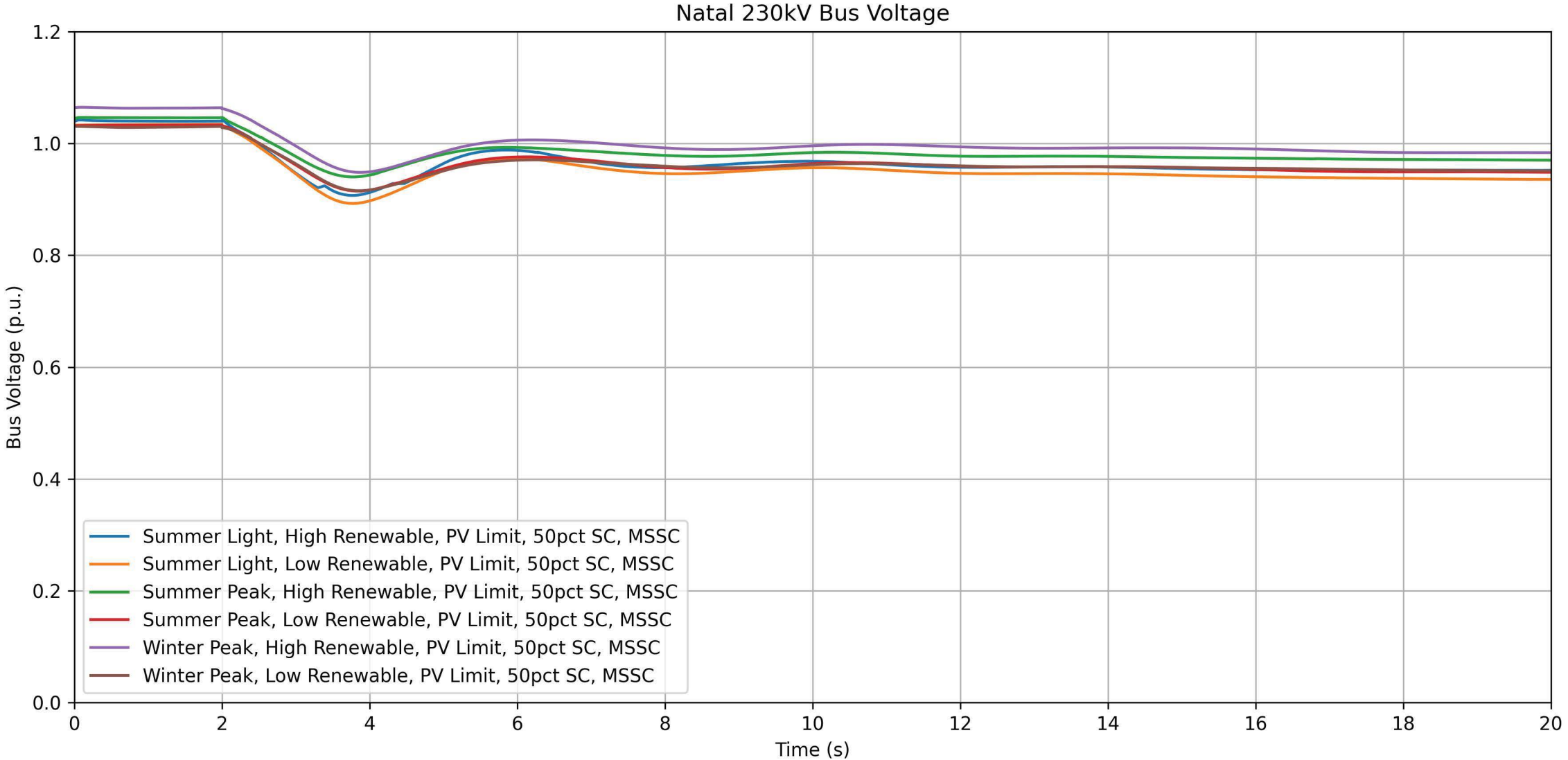

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

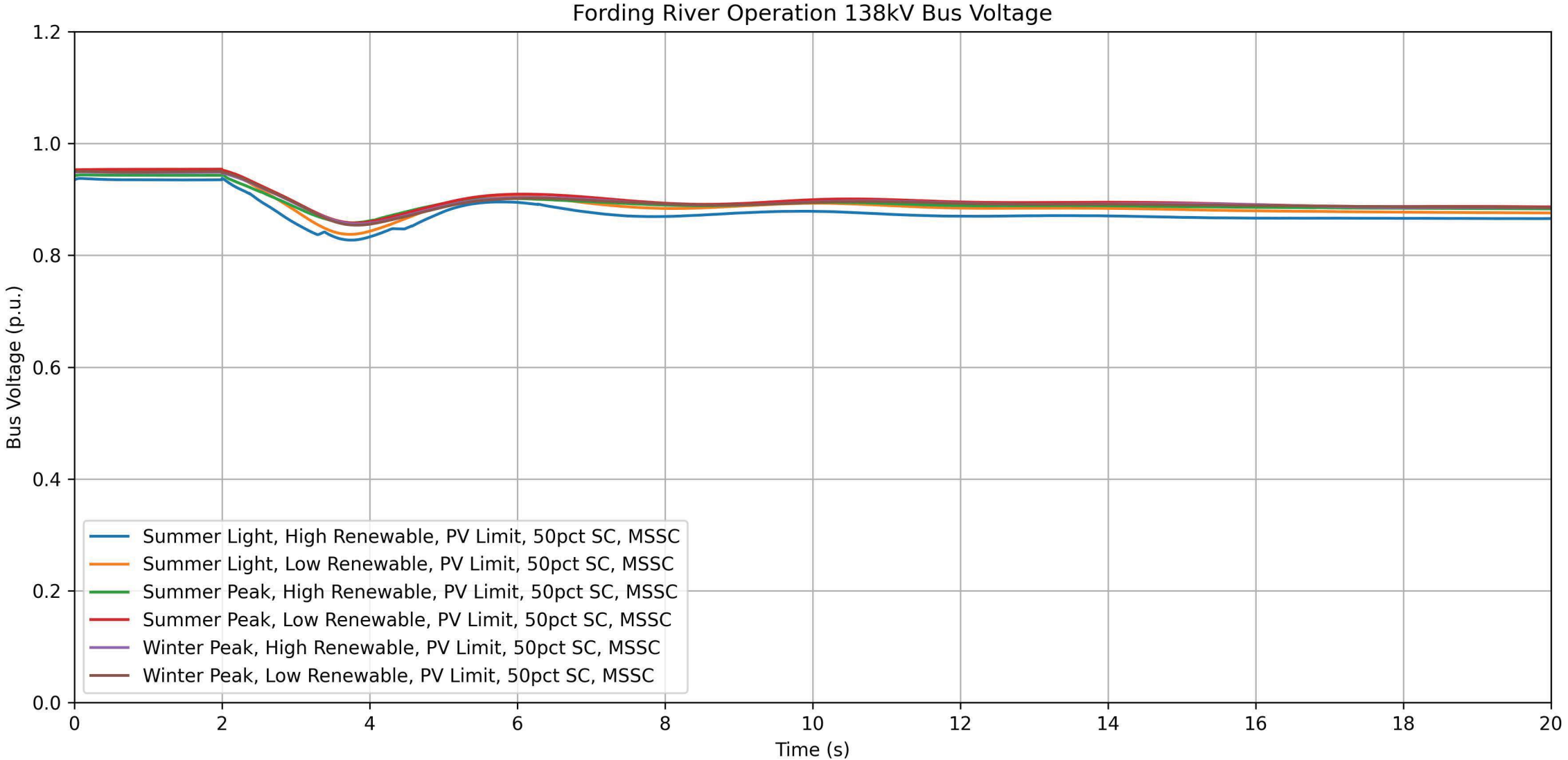

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

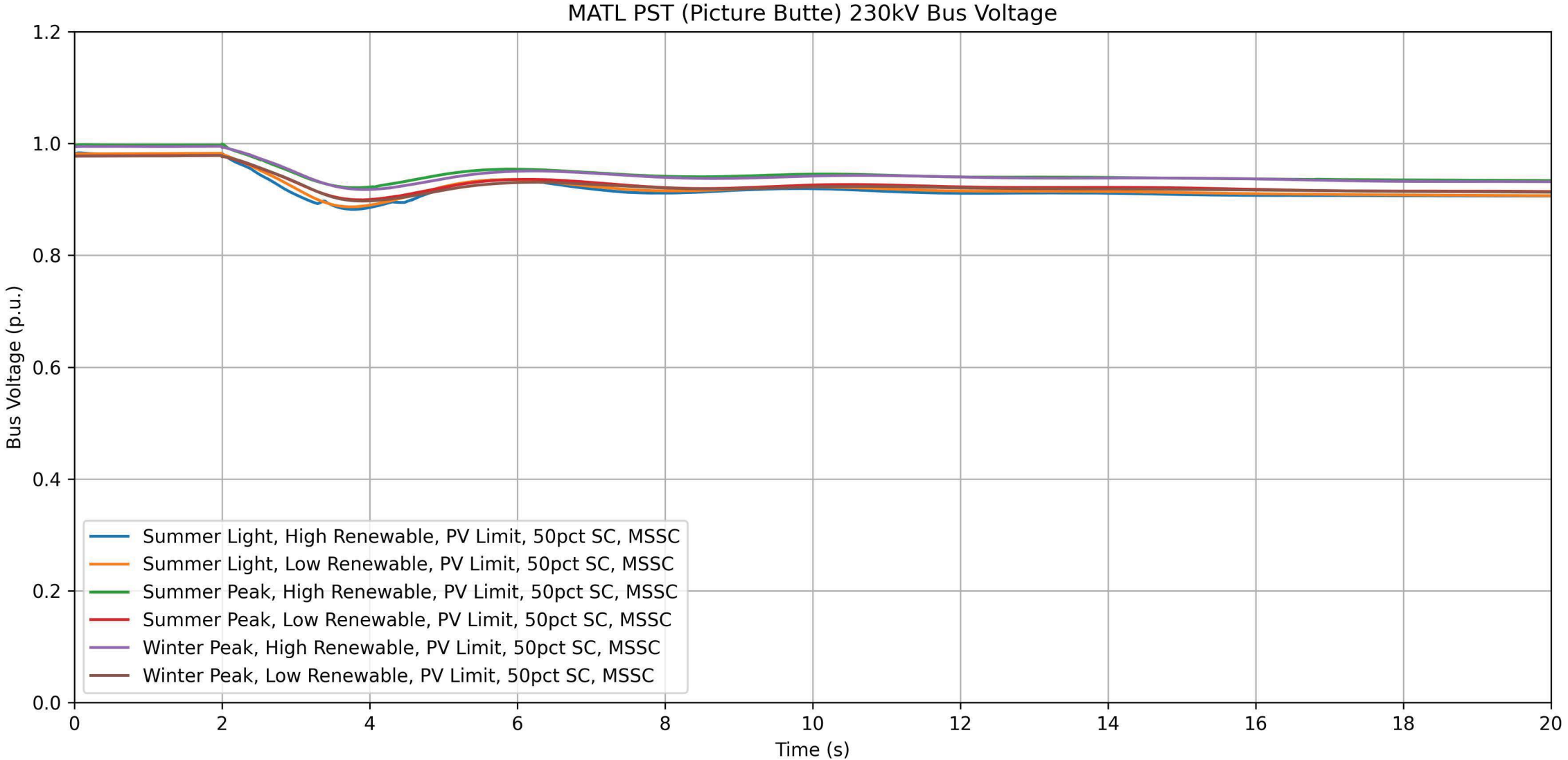

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

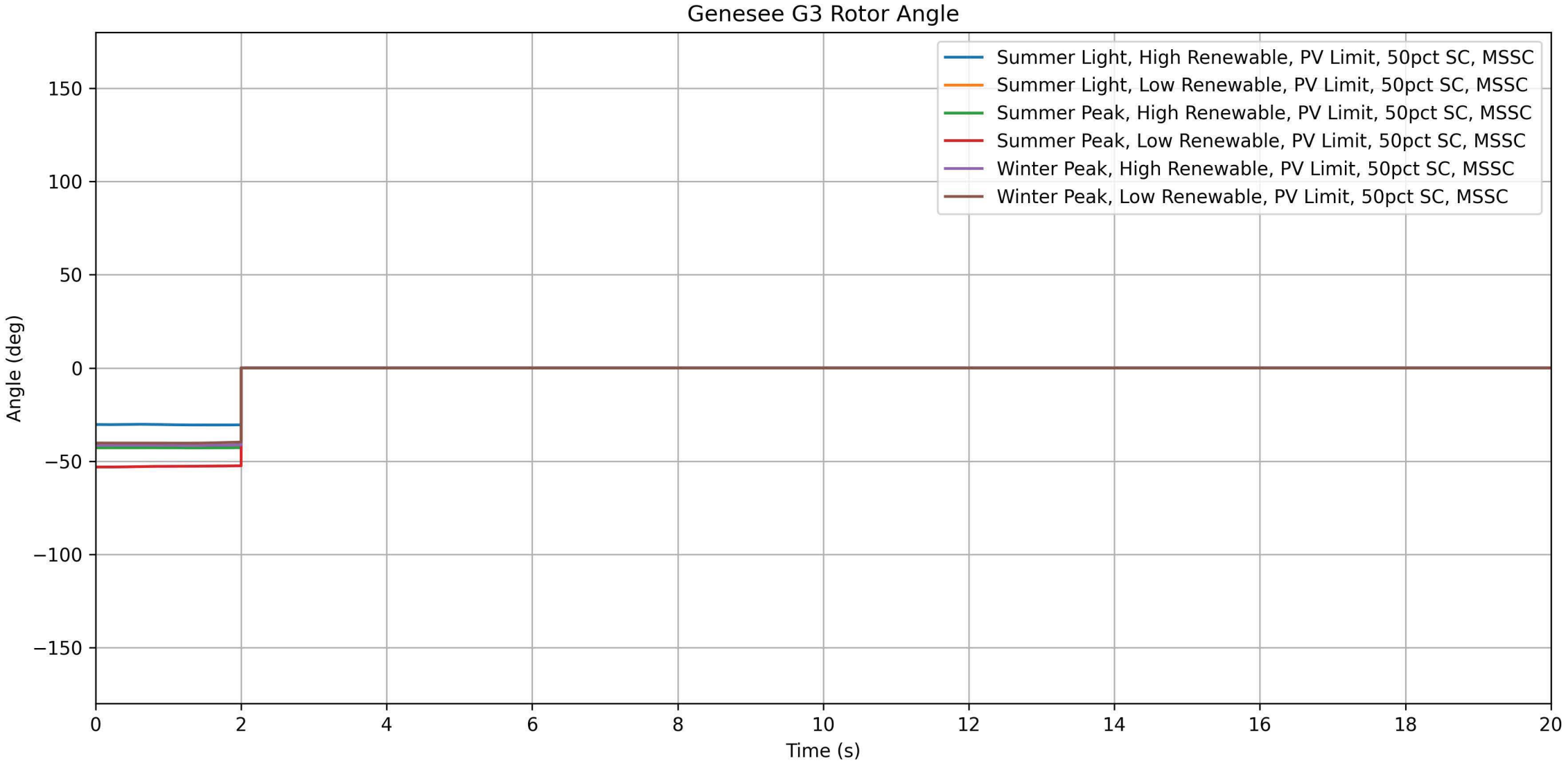

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

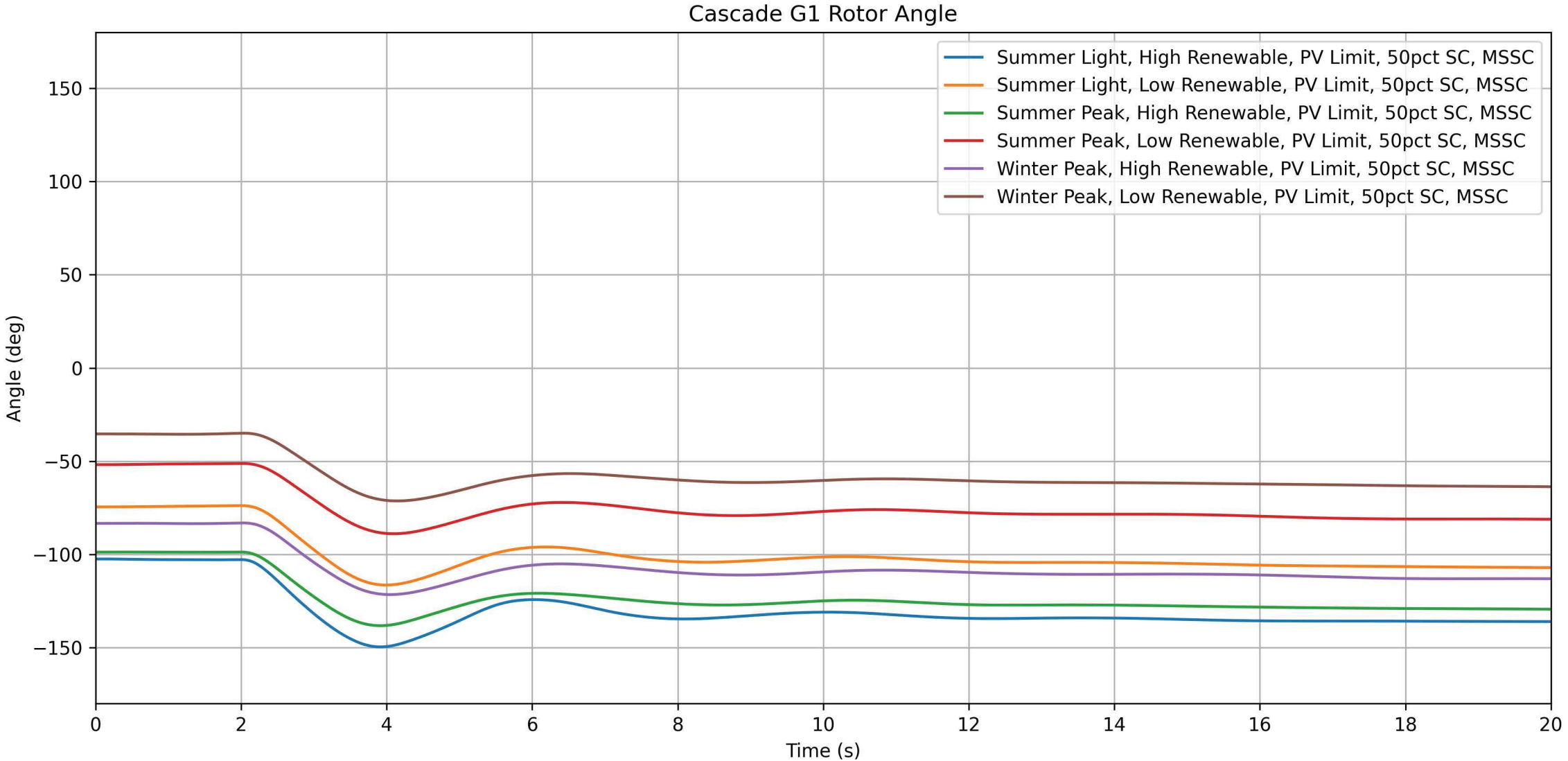

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

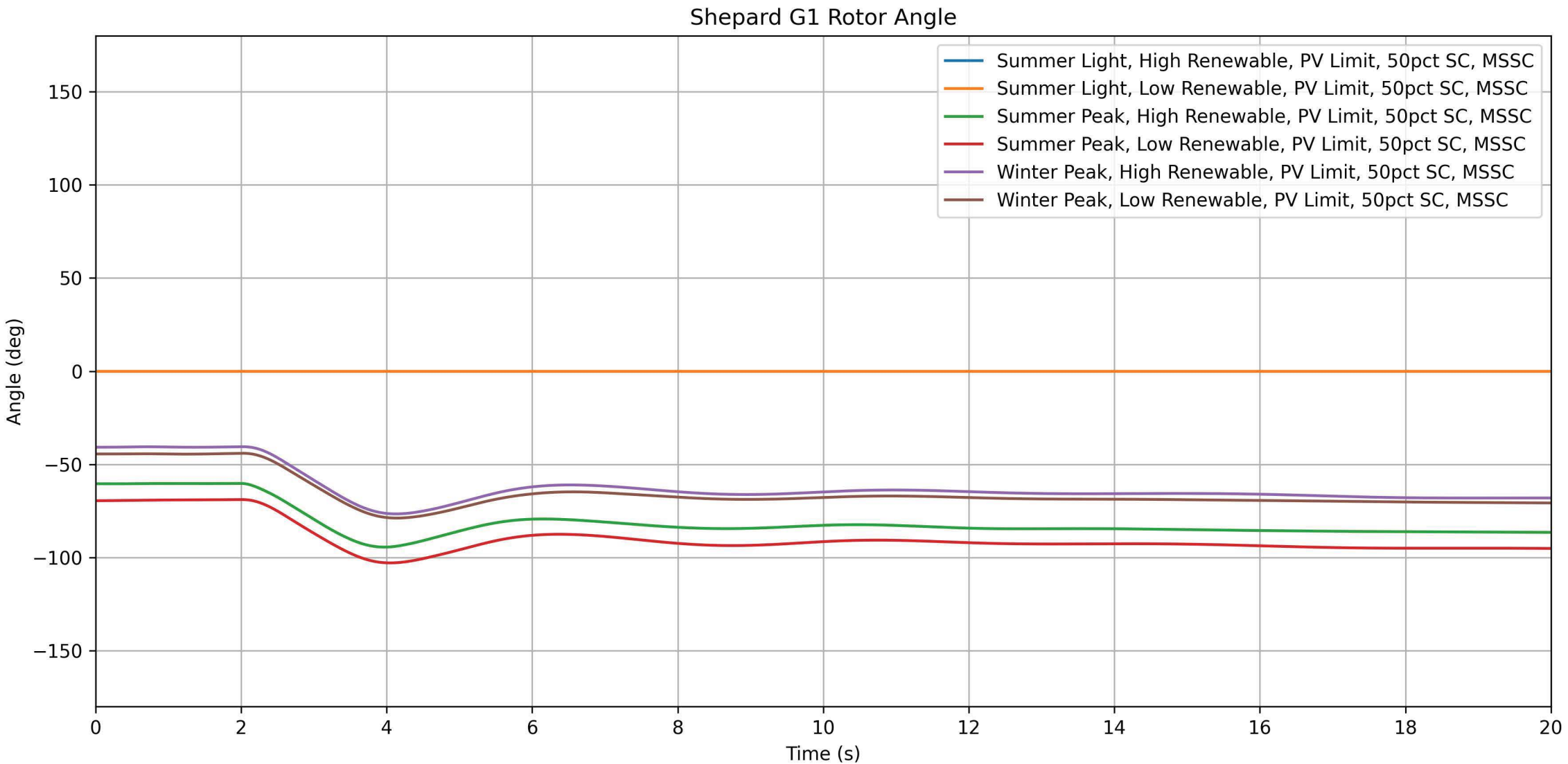

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

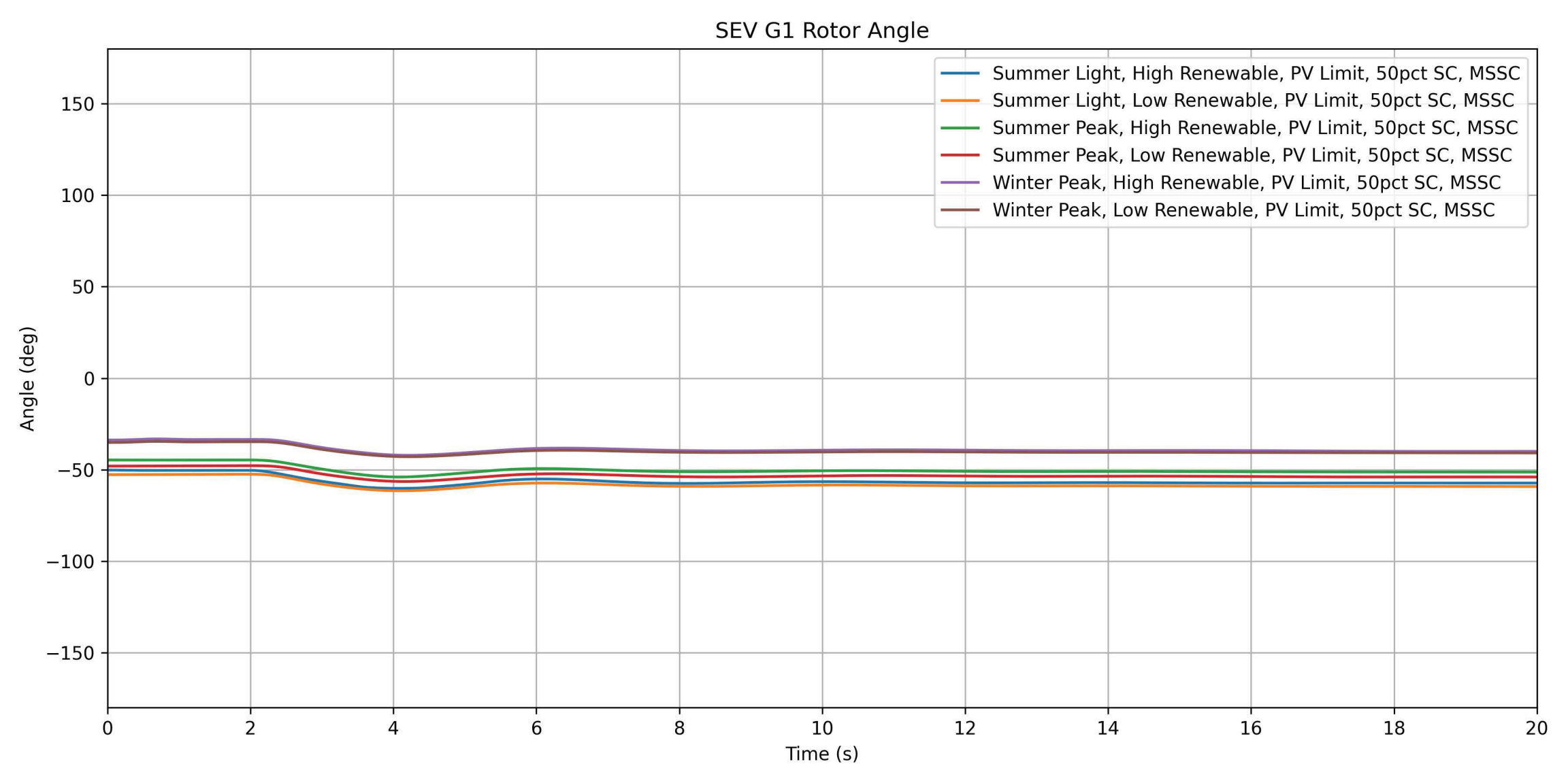

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

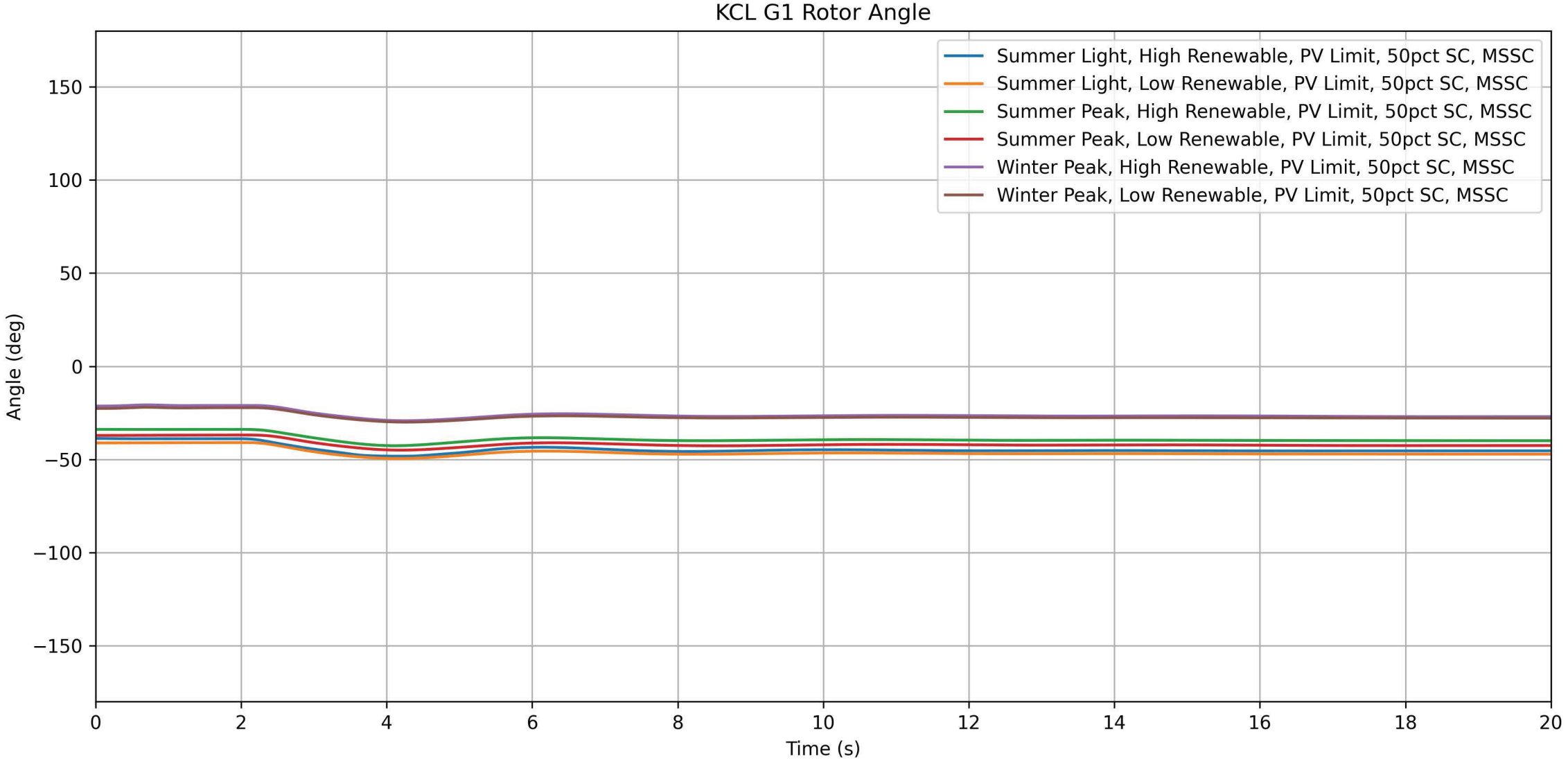

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC

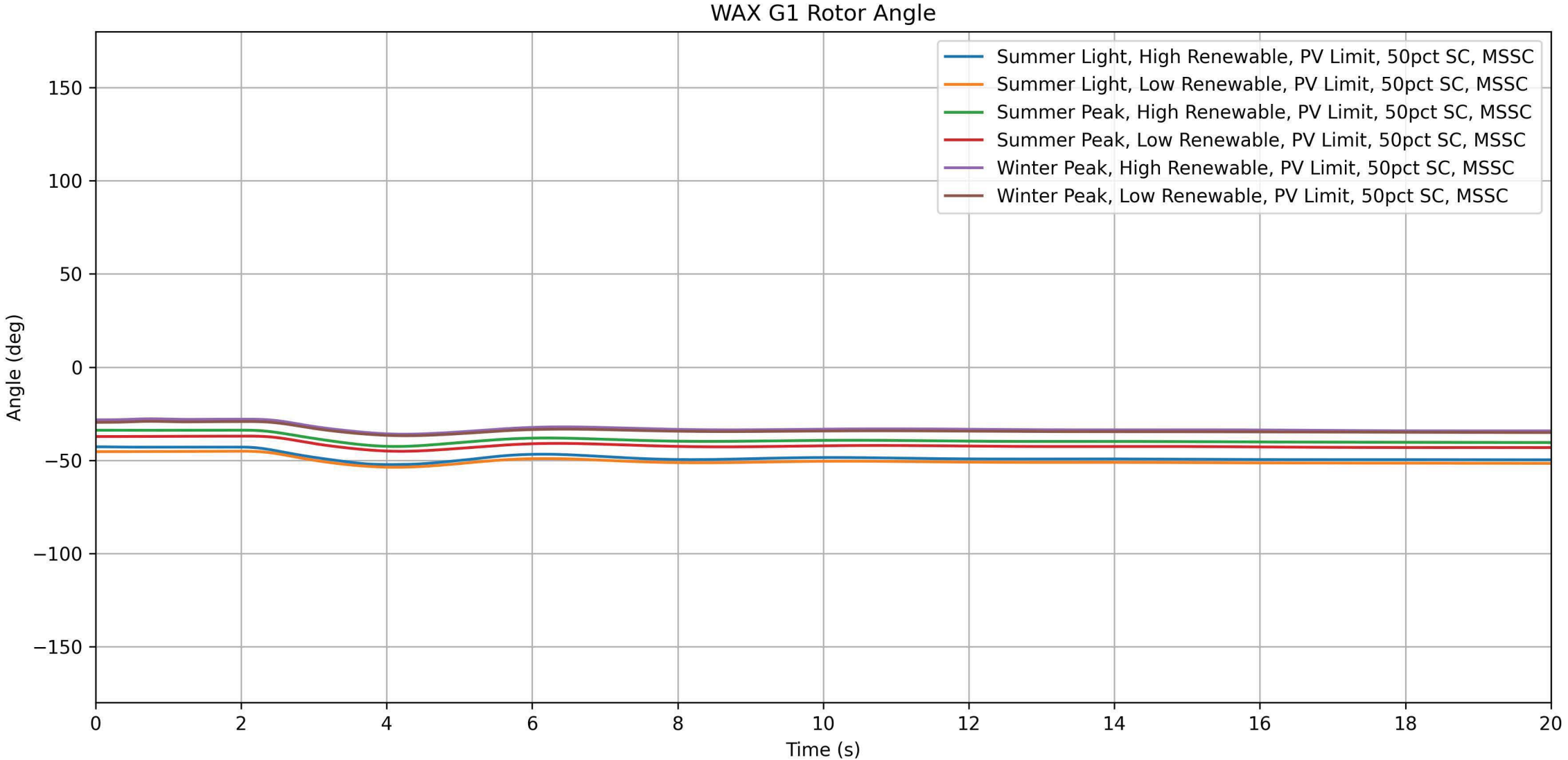

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

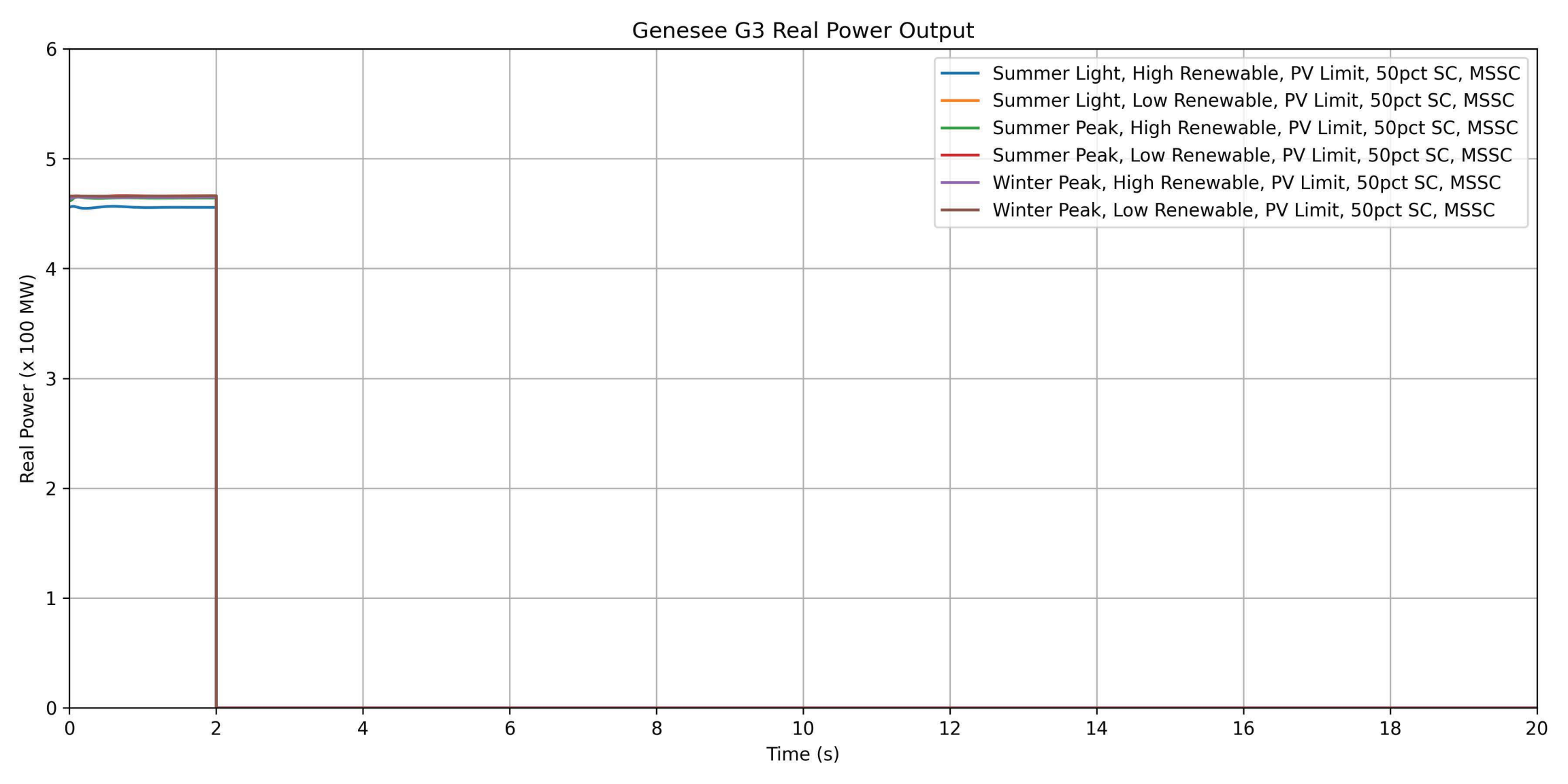

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

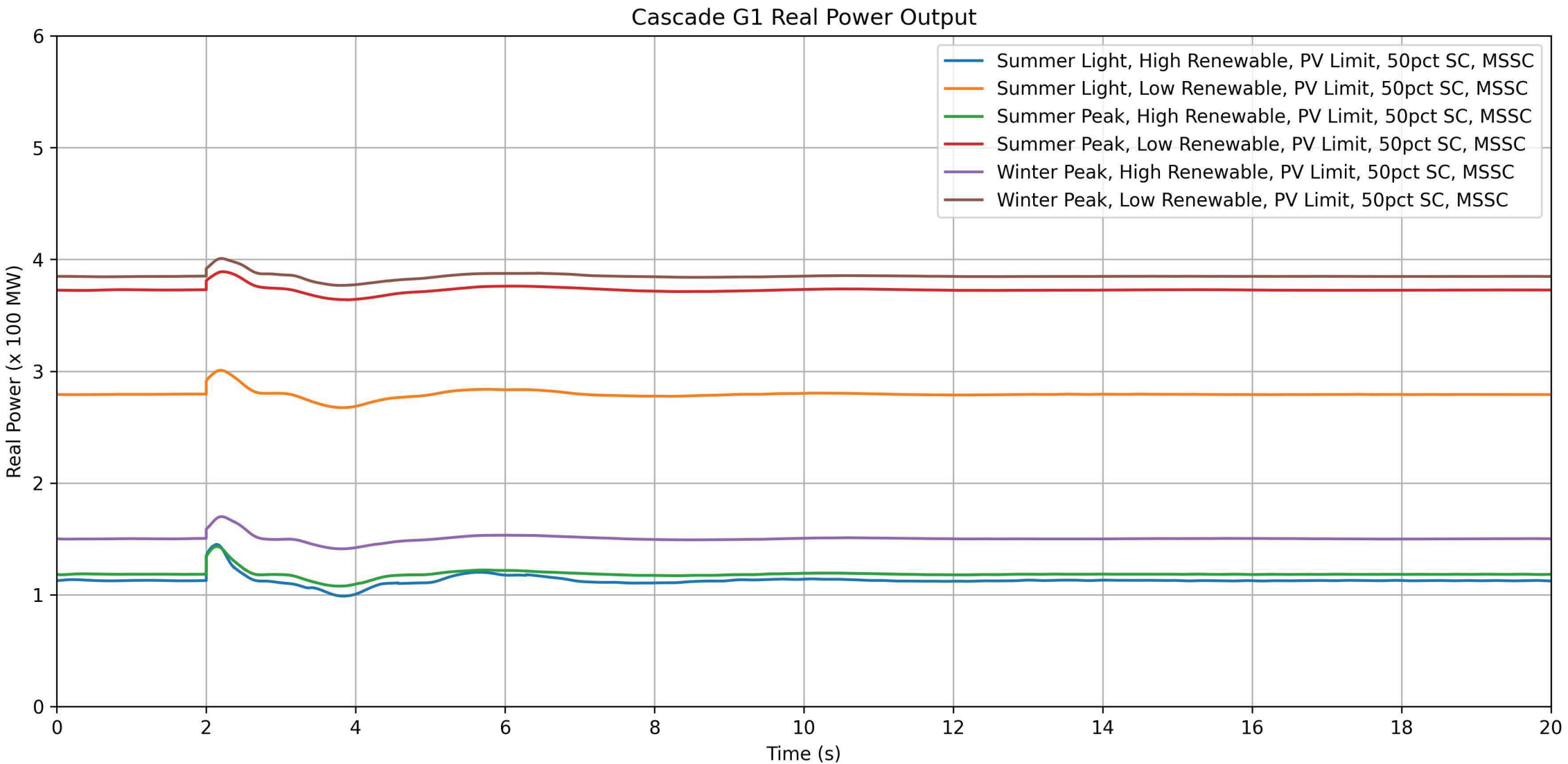

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

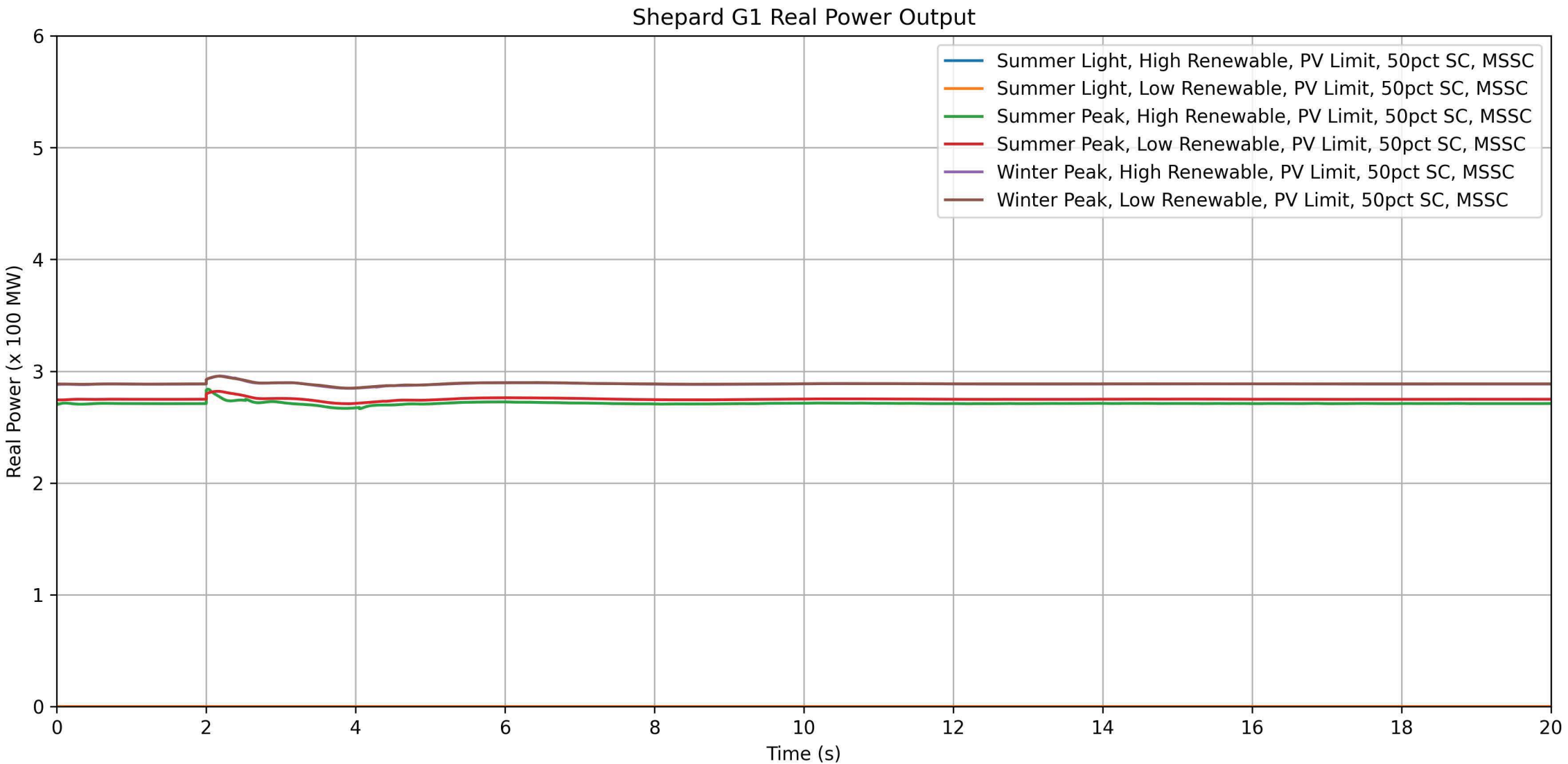

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

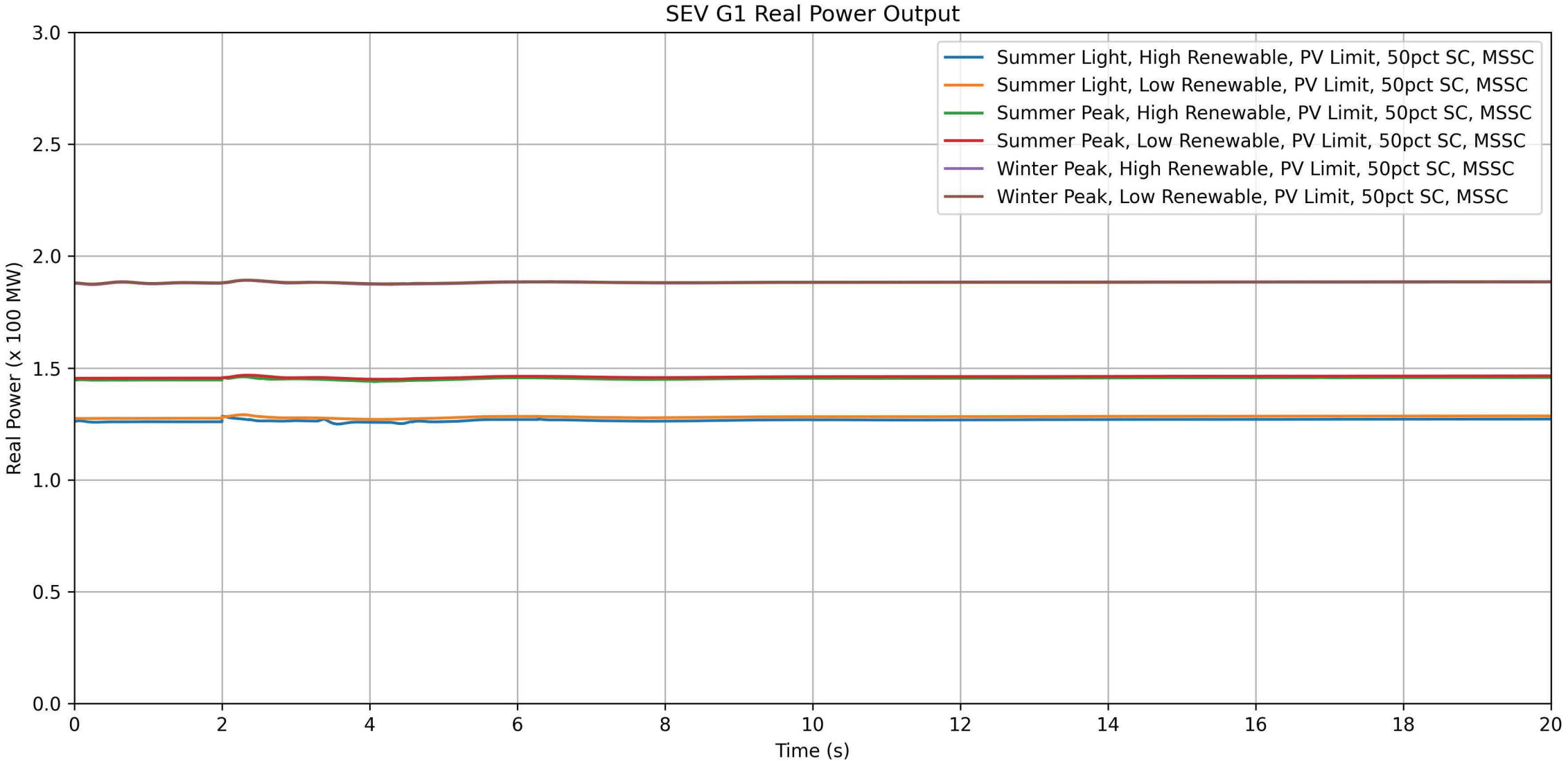

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

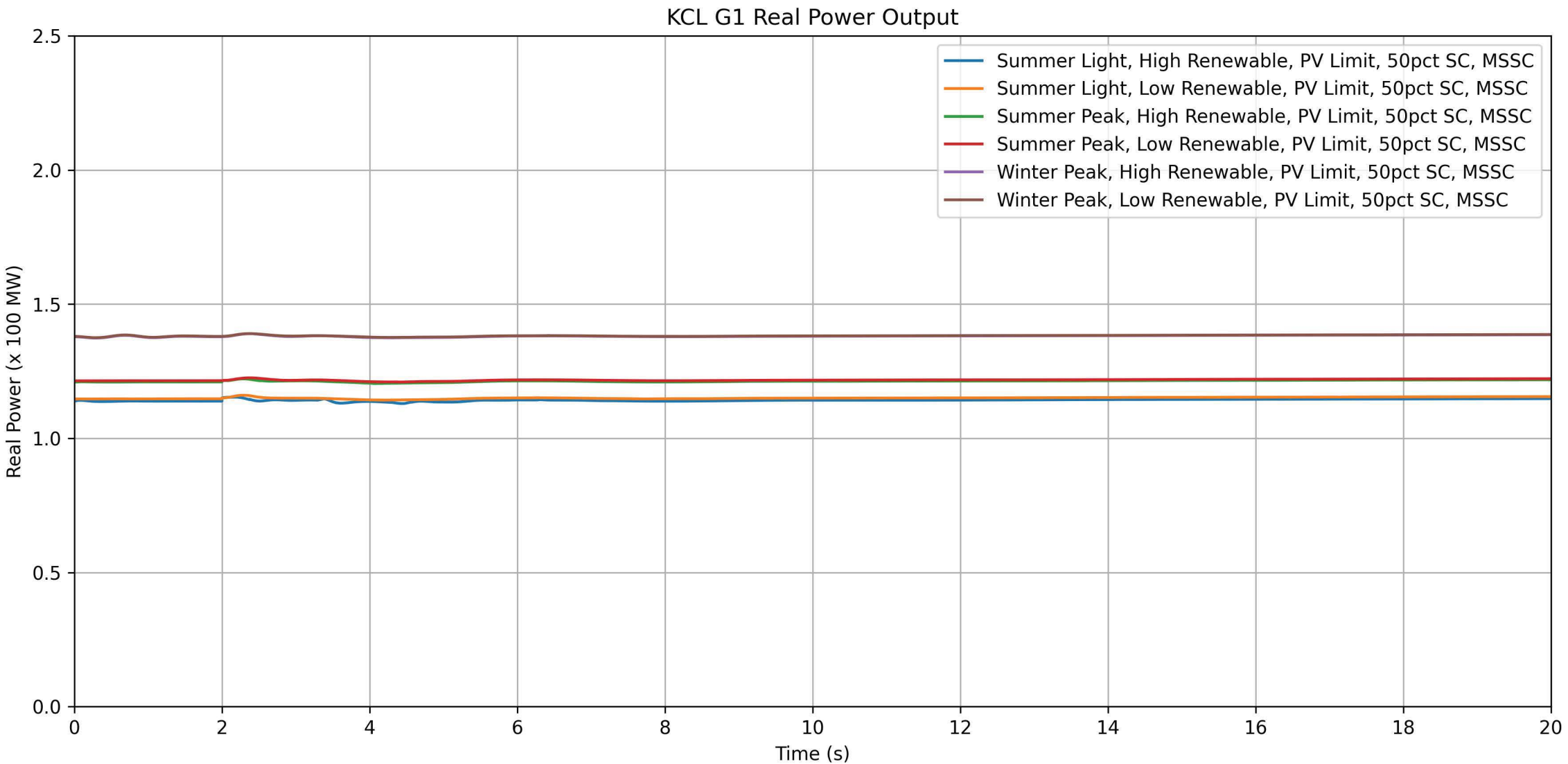

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

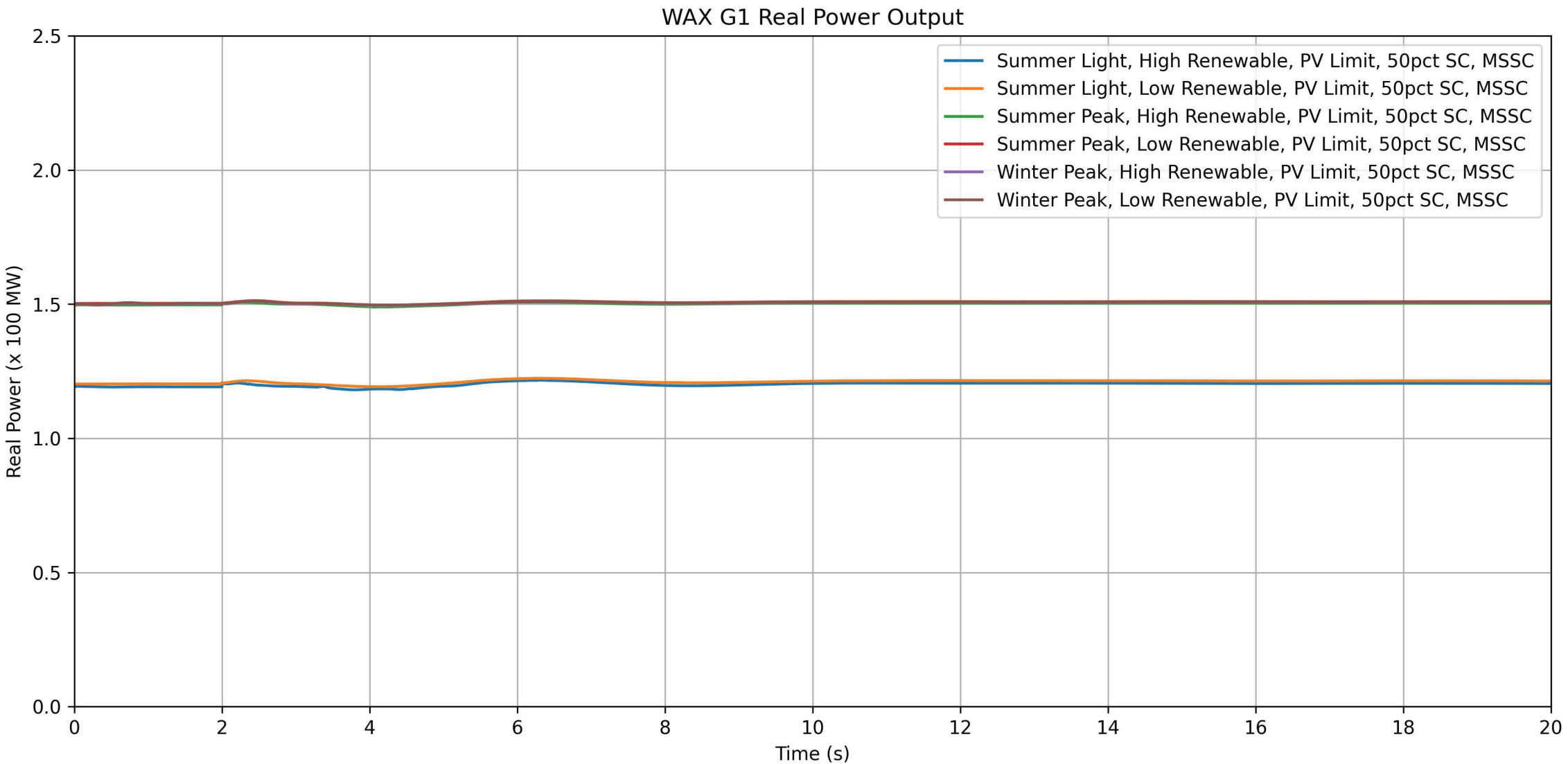

Genesee G3 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

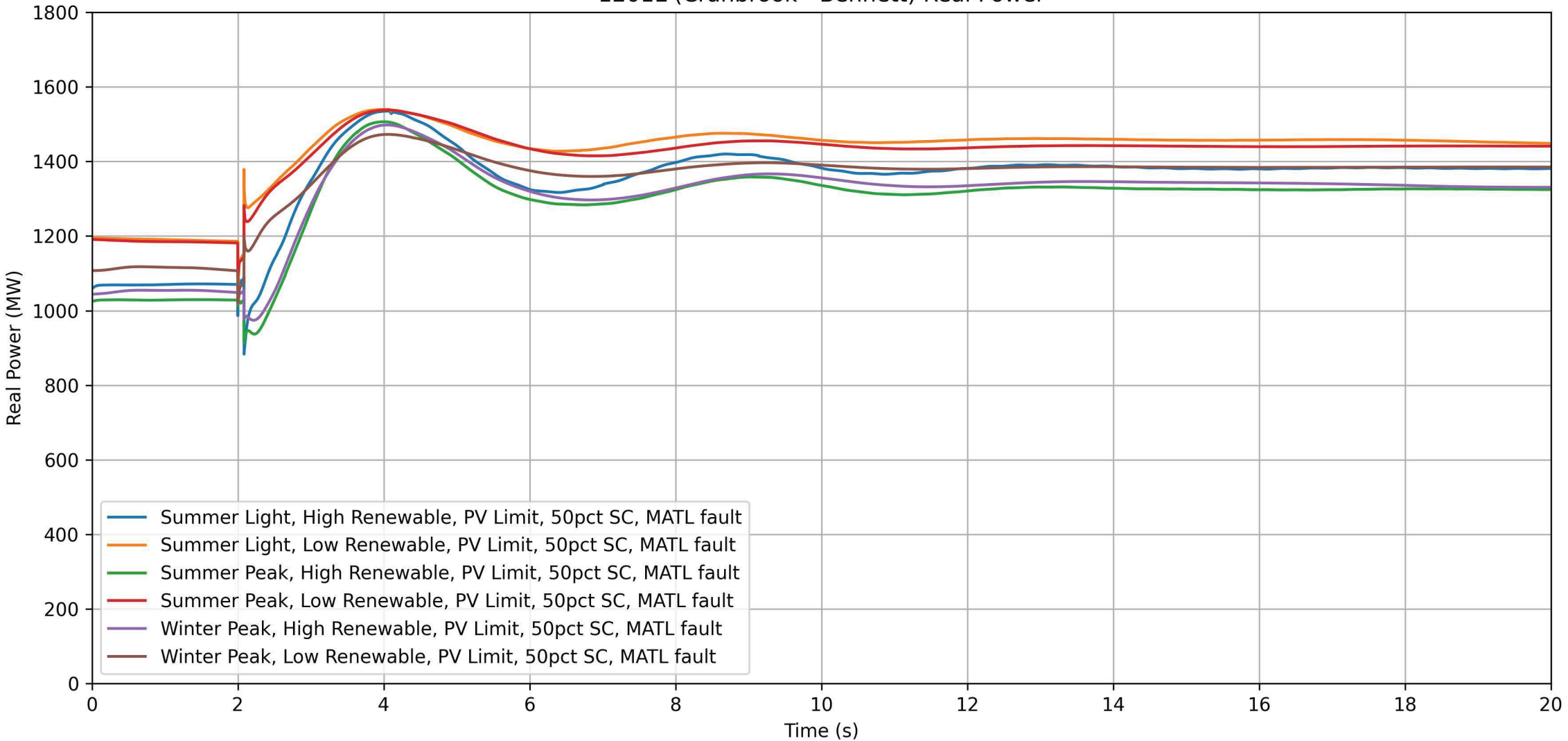

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

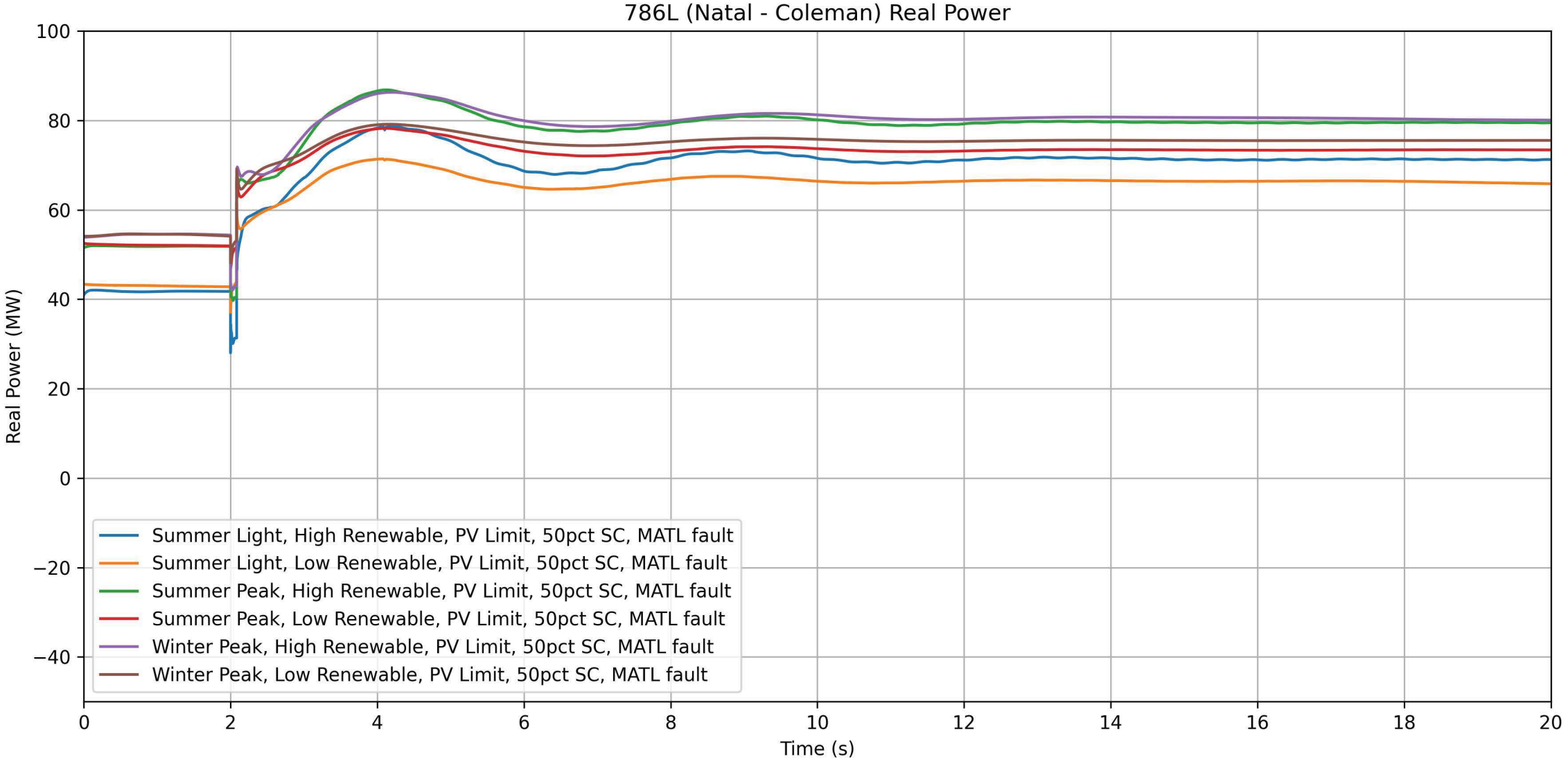

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

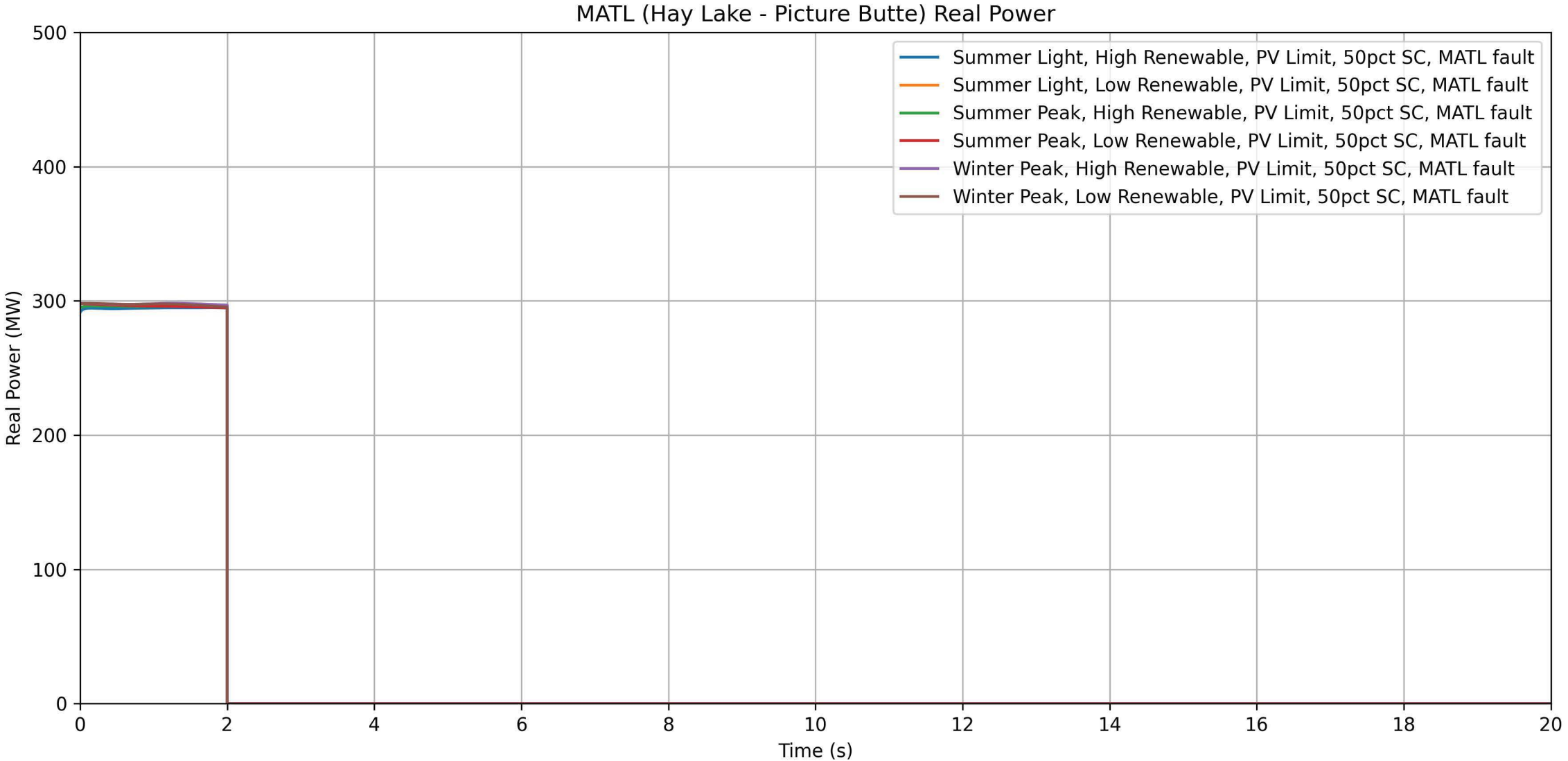

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

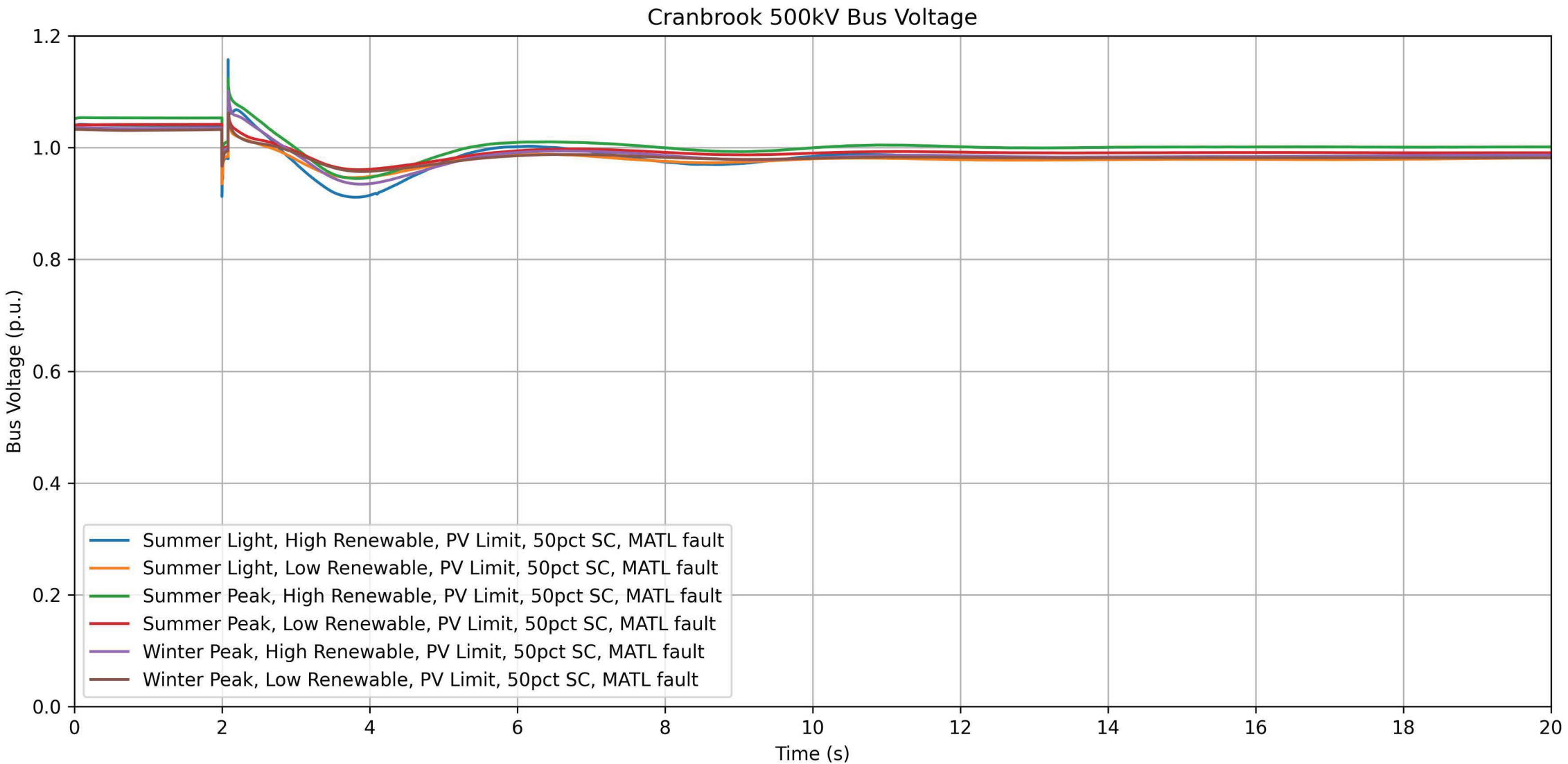

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

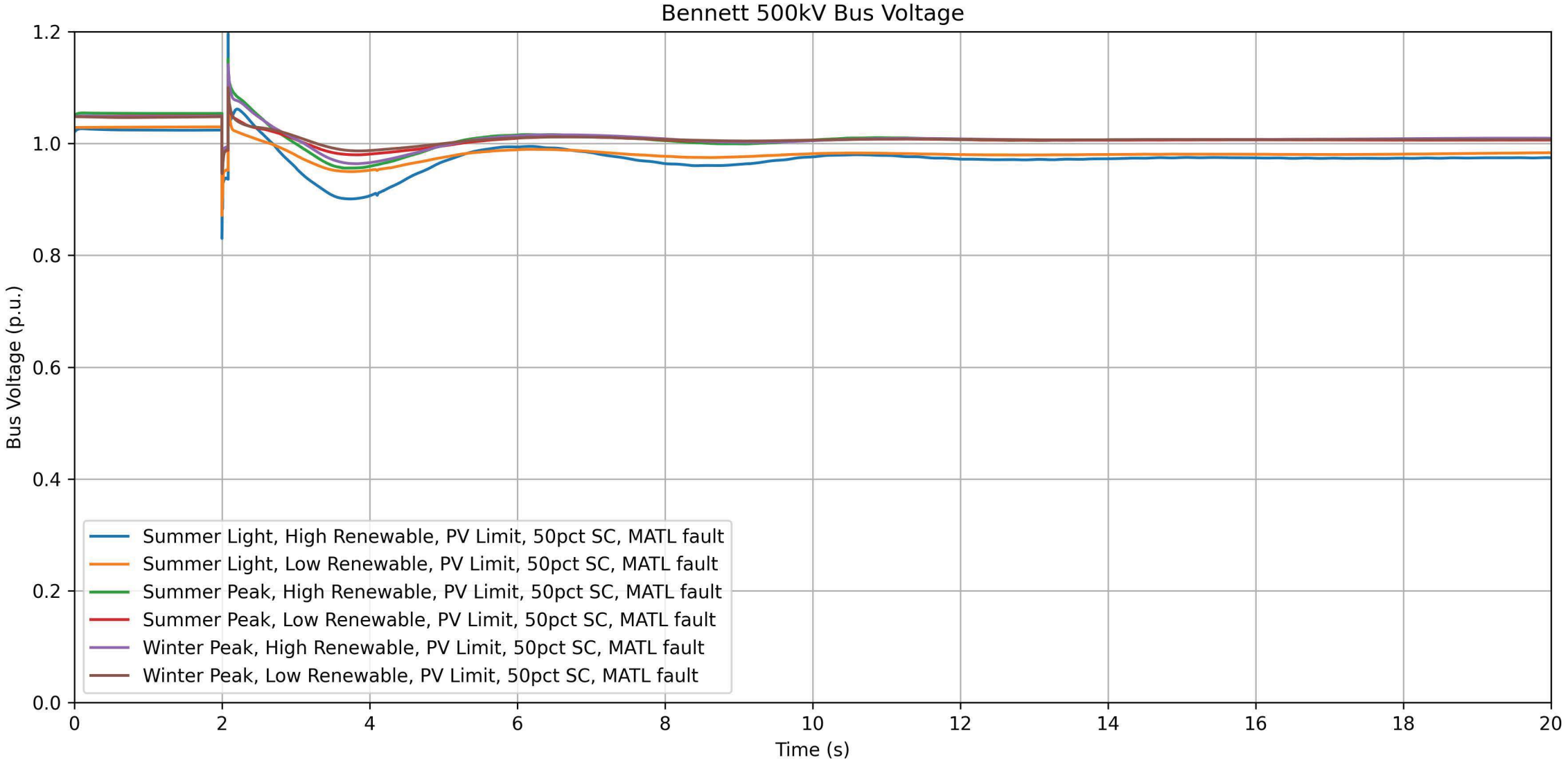

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

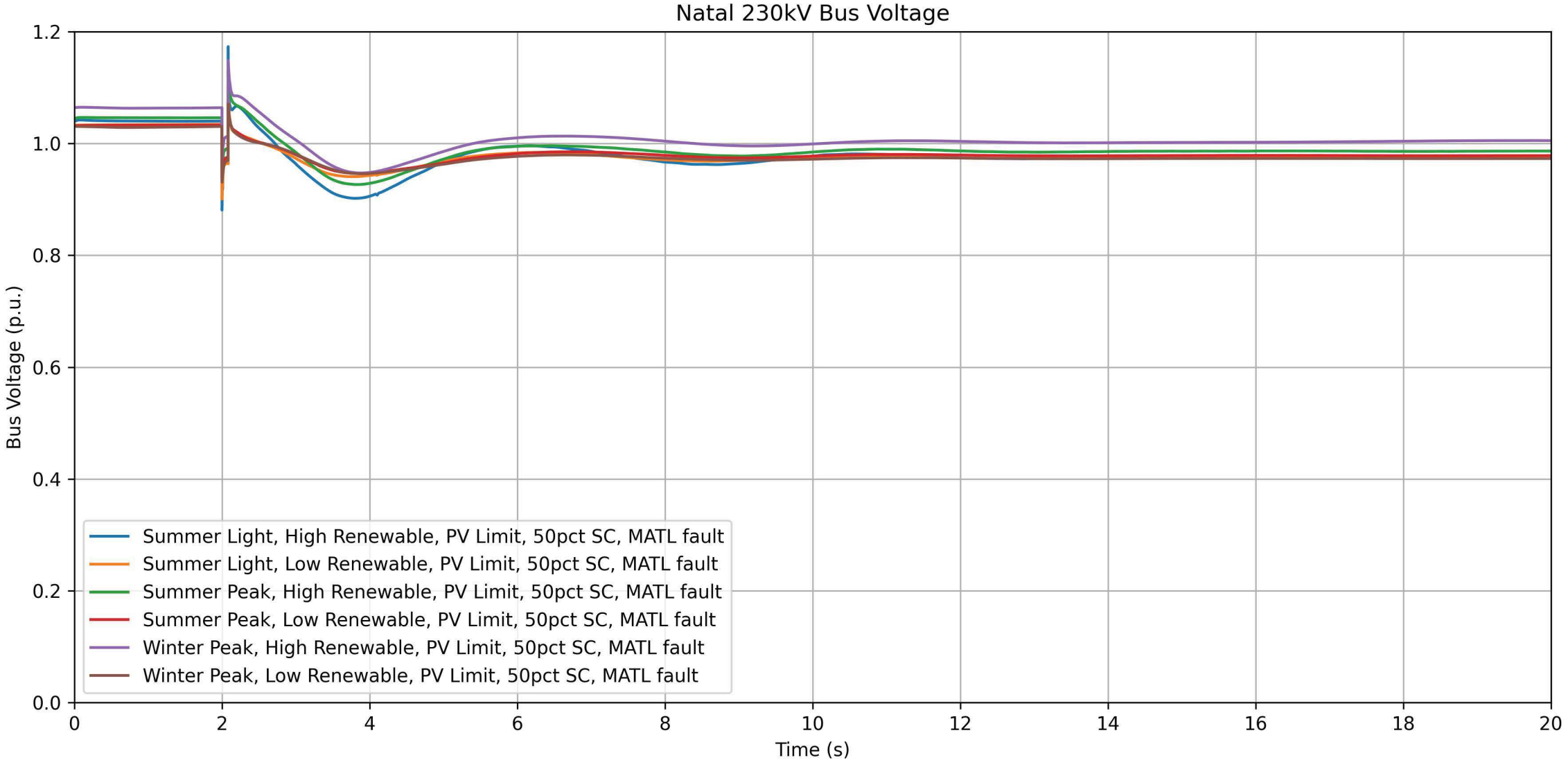

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

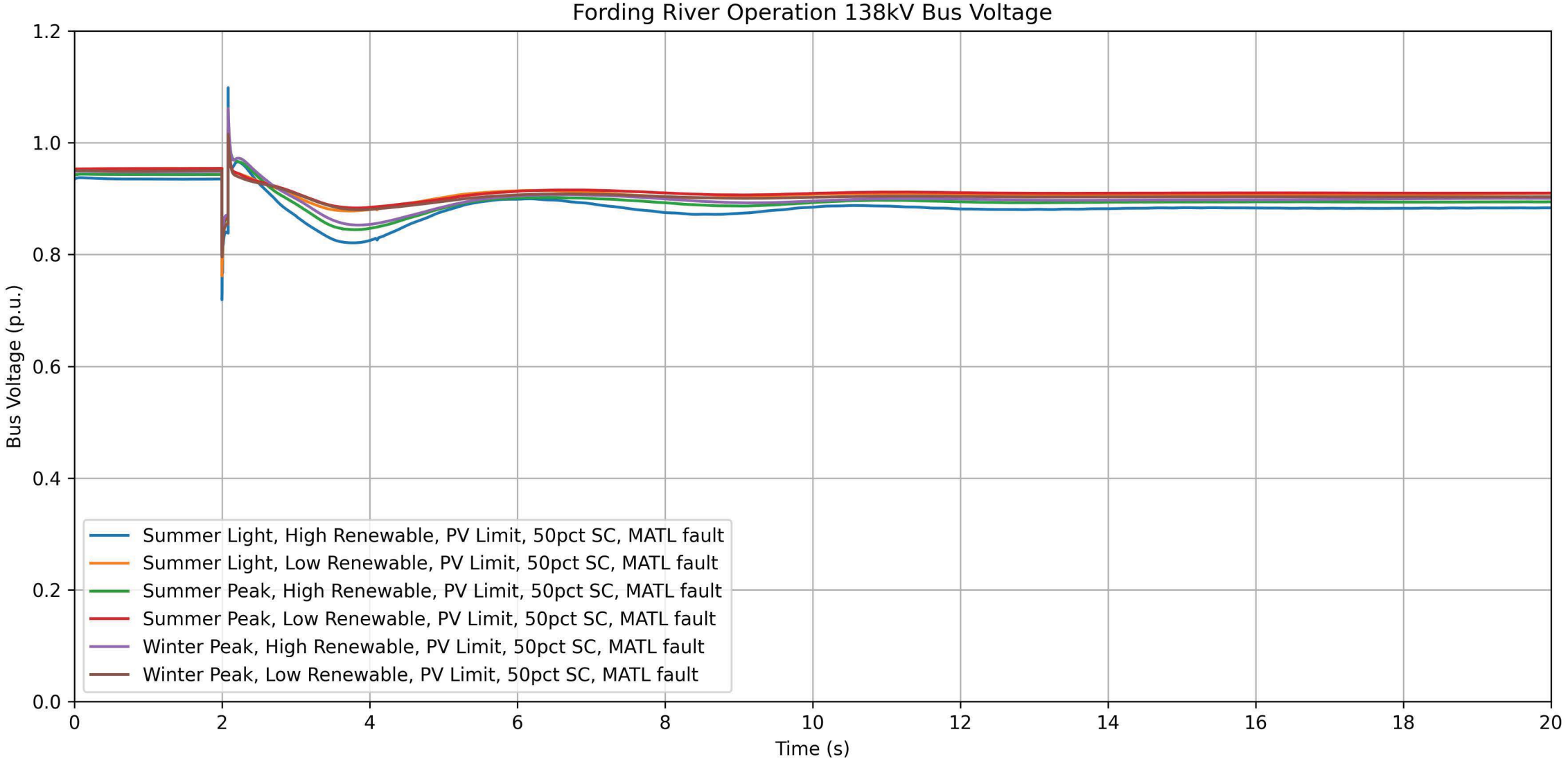

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

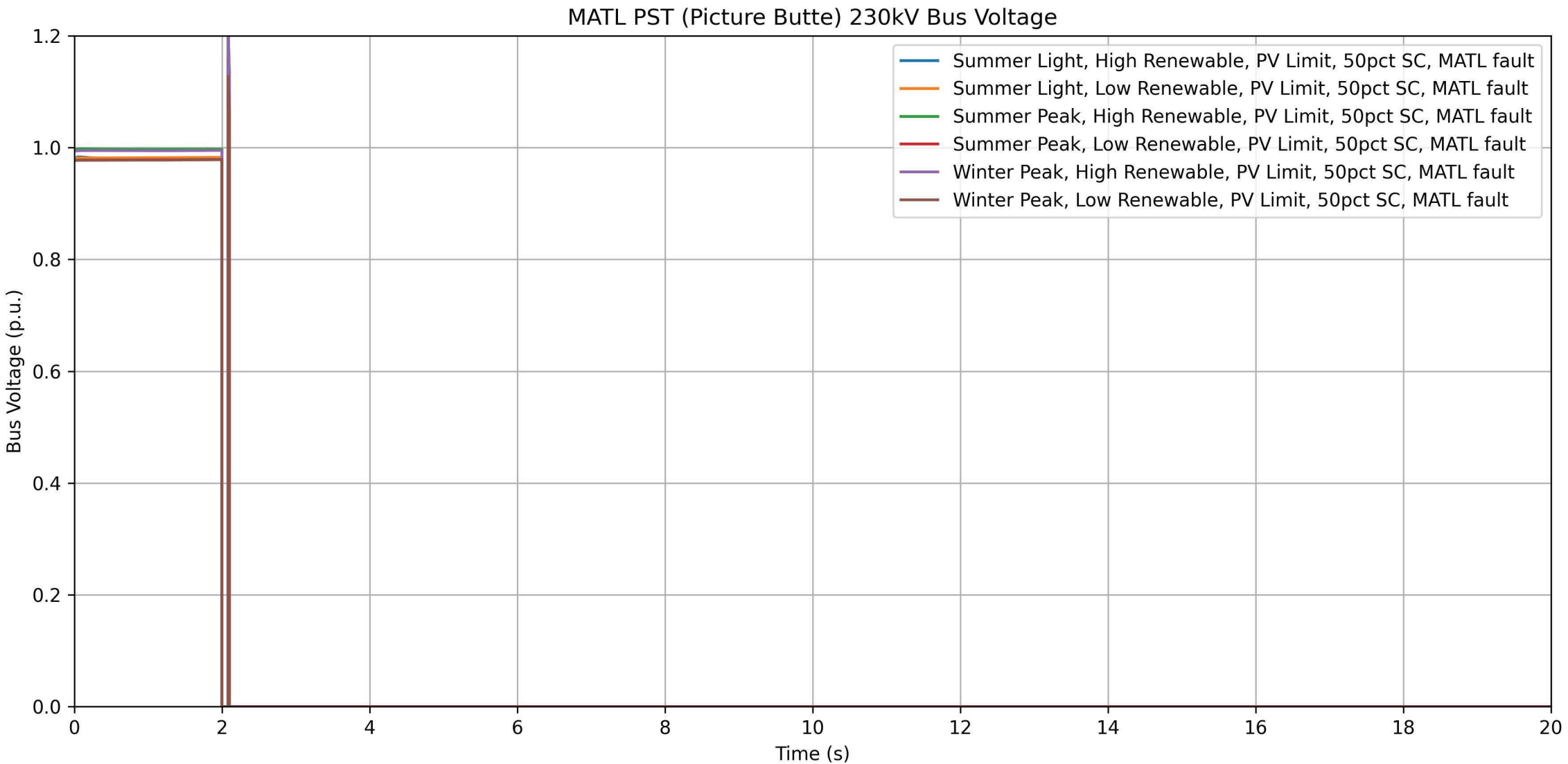

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

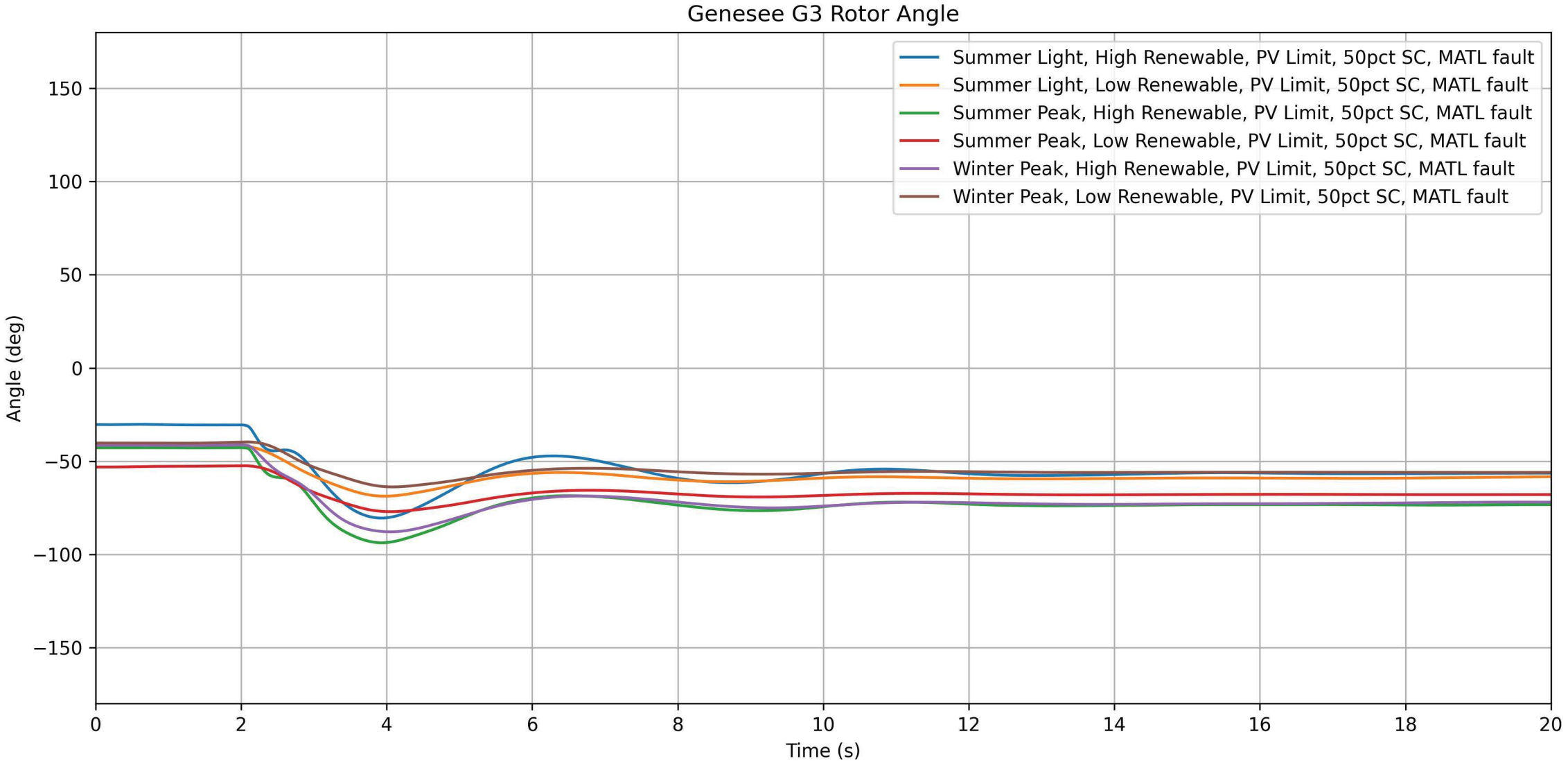

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

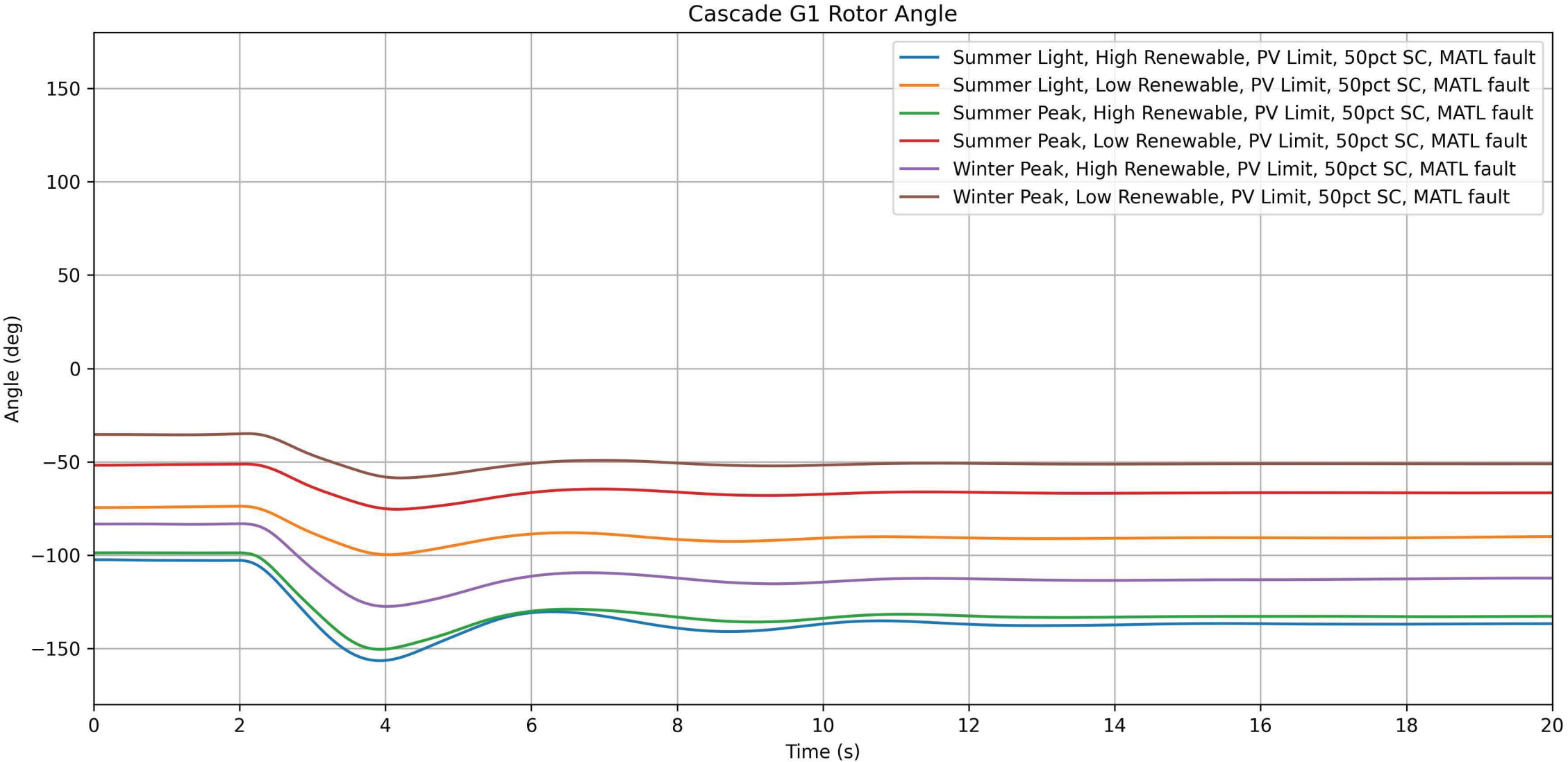

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

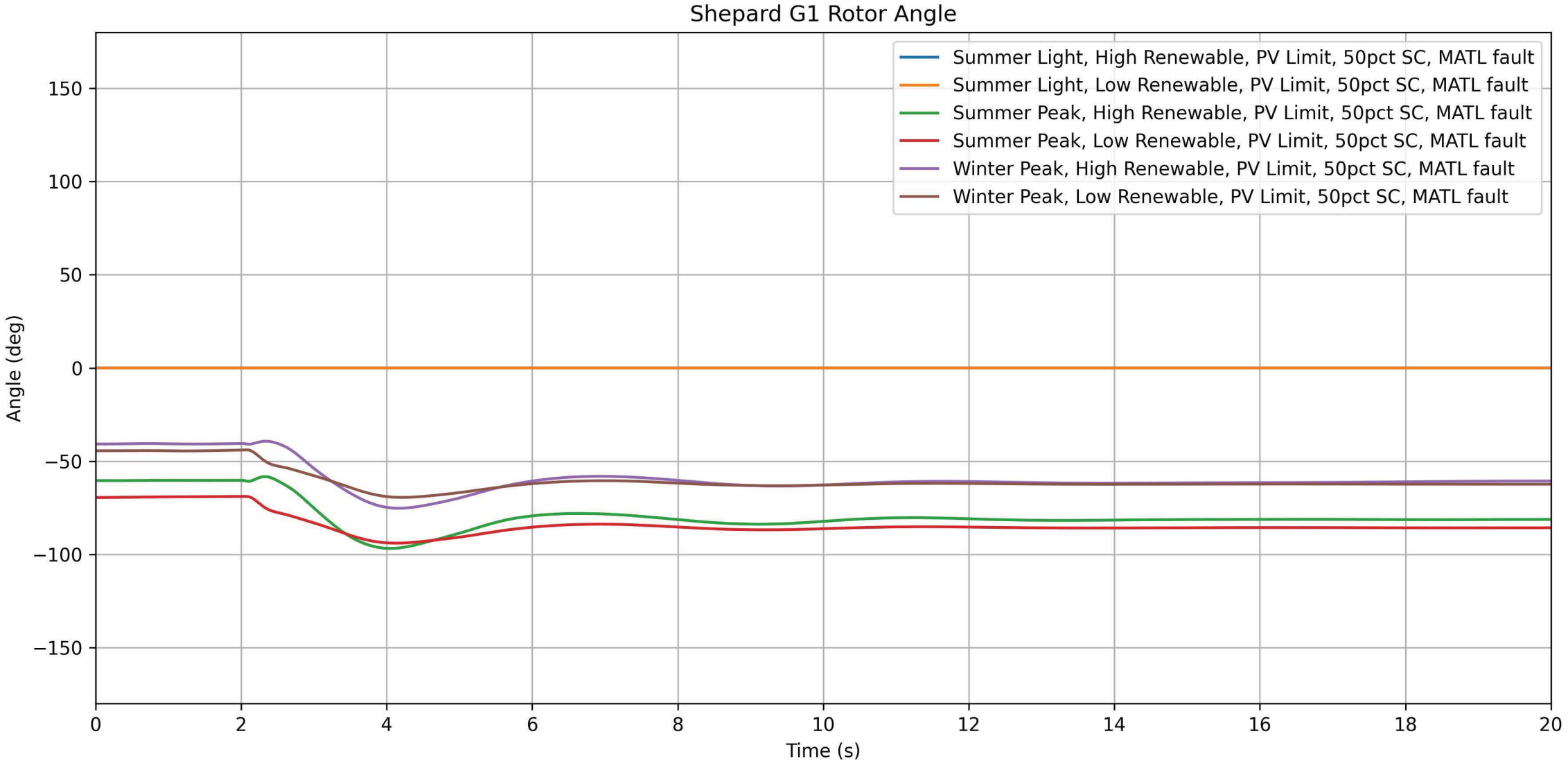

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

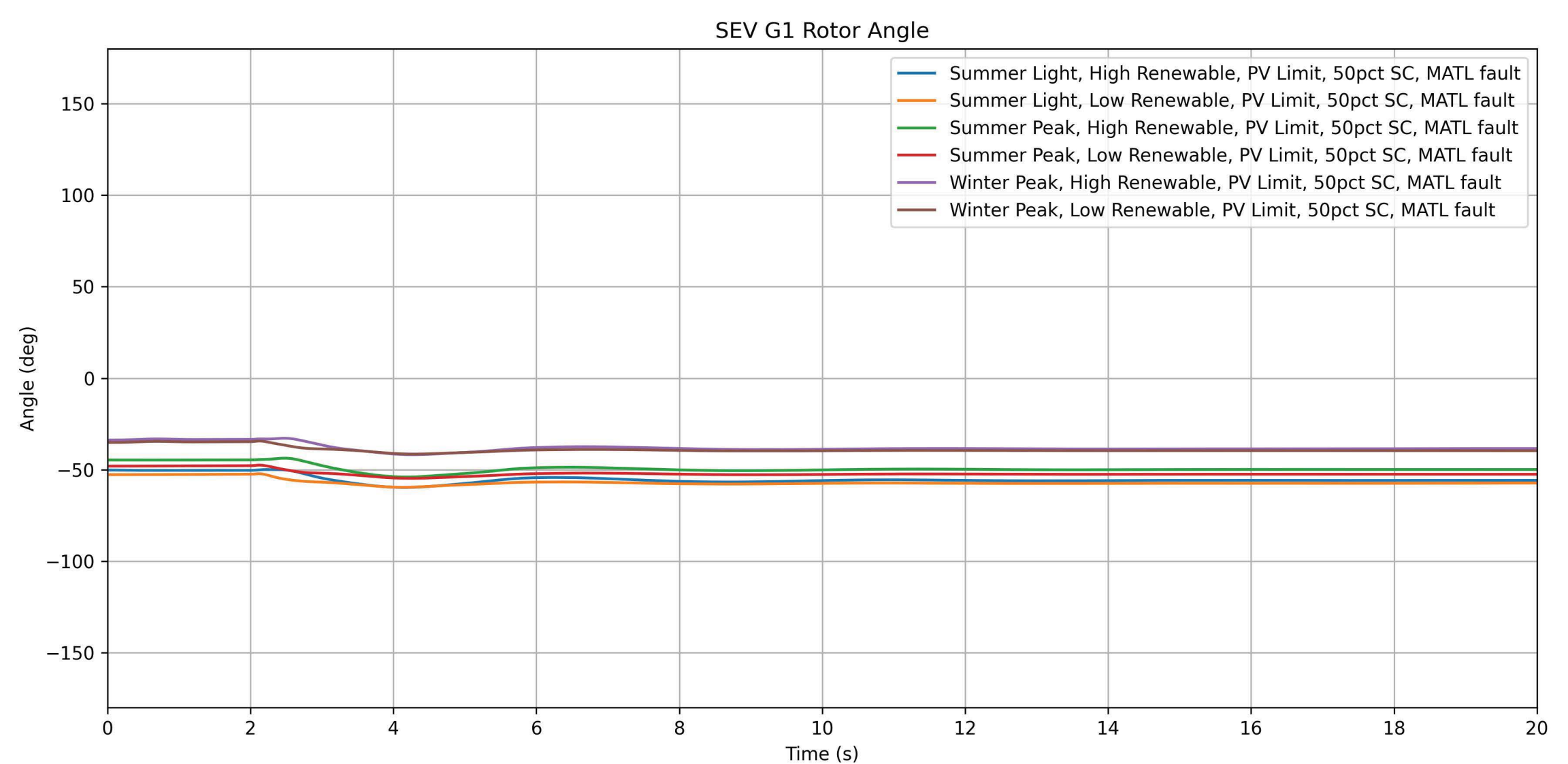

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

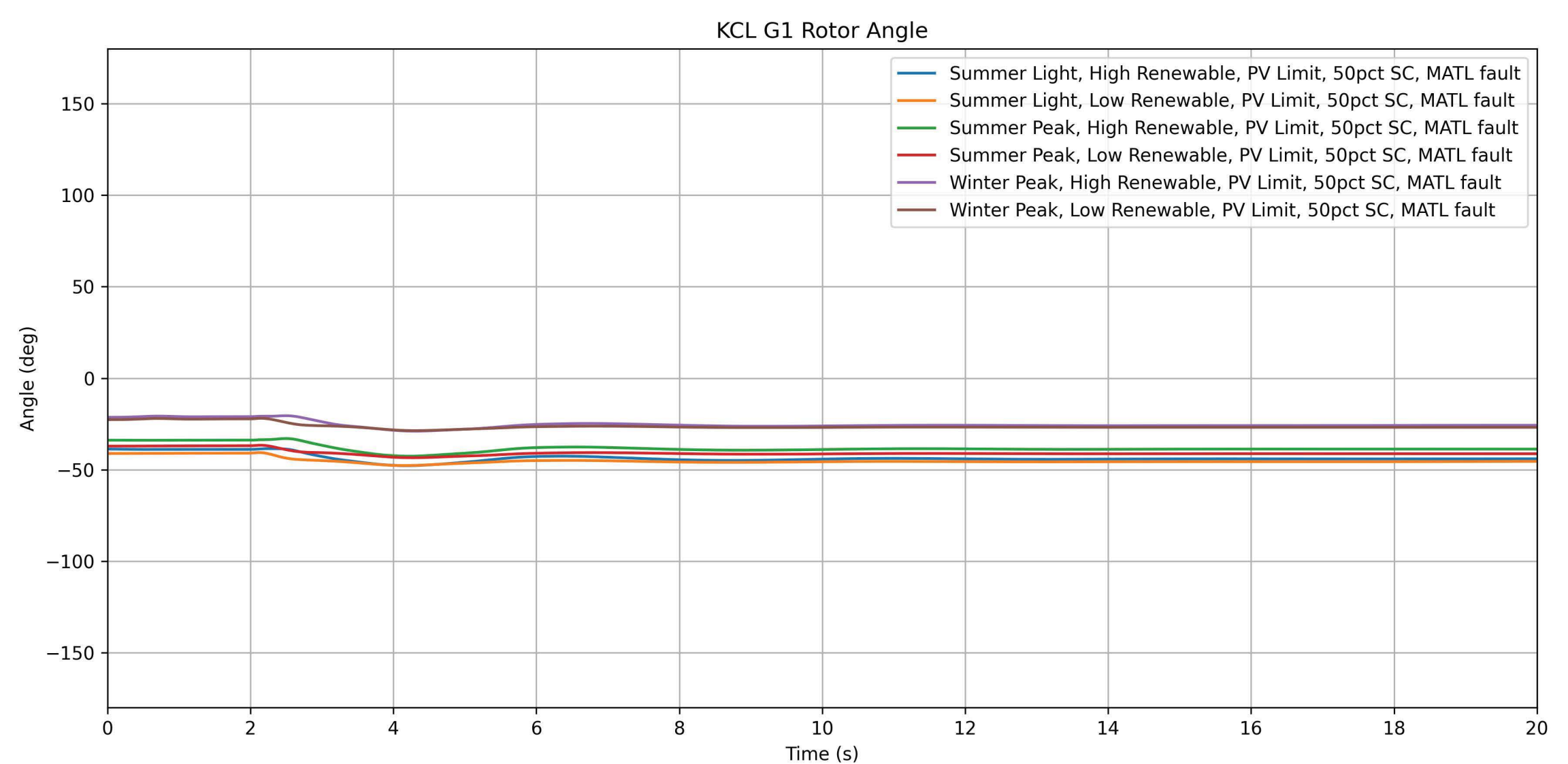

MATL PST (Picture Butte) 230kV Bus Voltage
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Bus Voltage (p.u.)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Time (s)
0
2
4
6
8
10
12
14
16
18
20

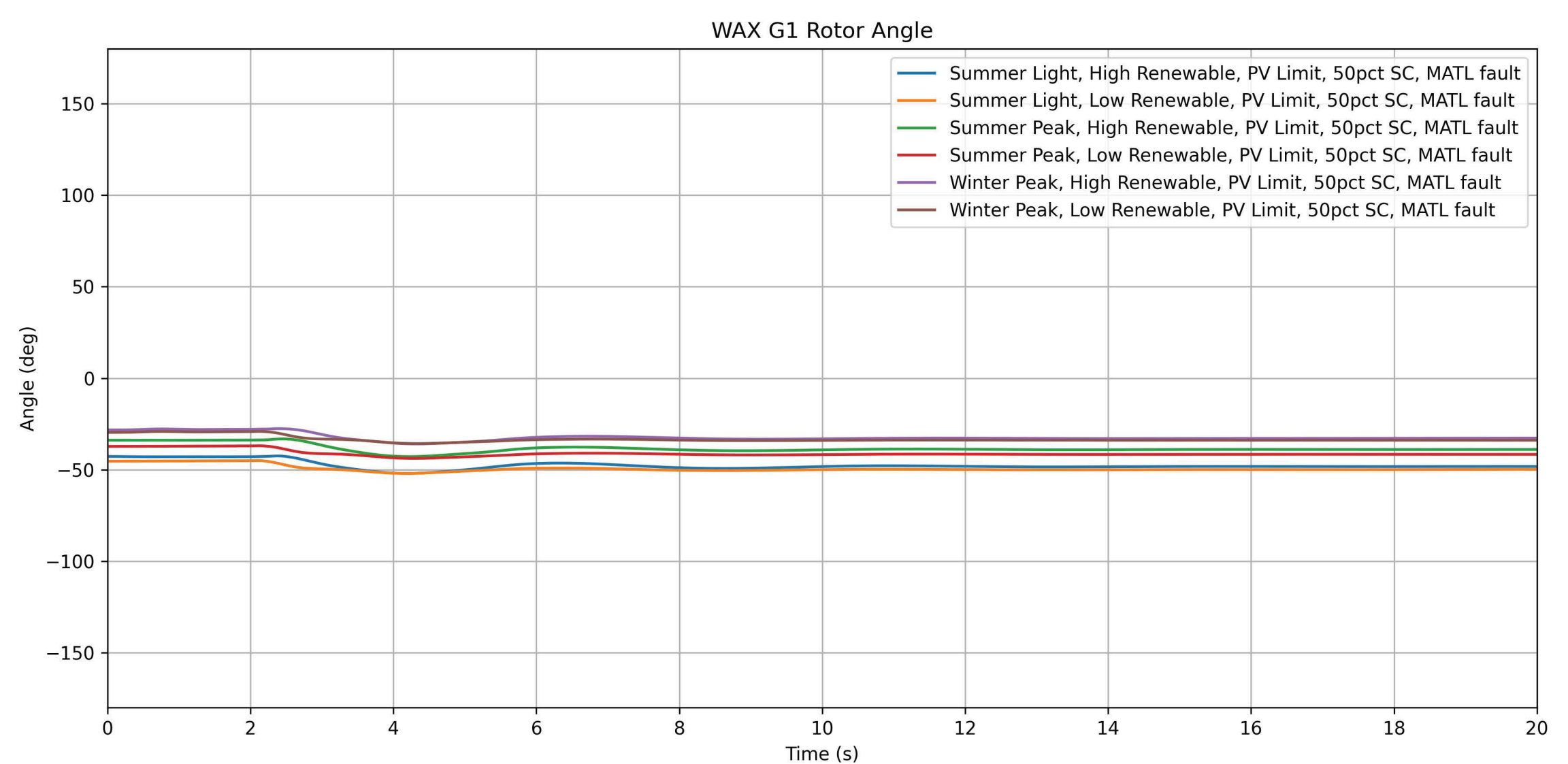

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

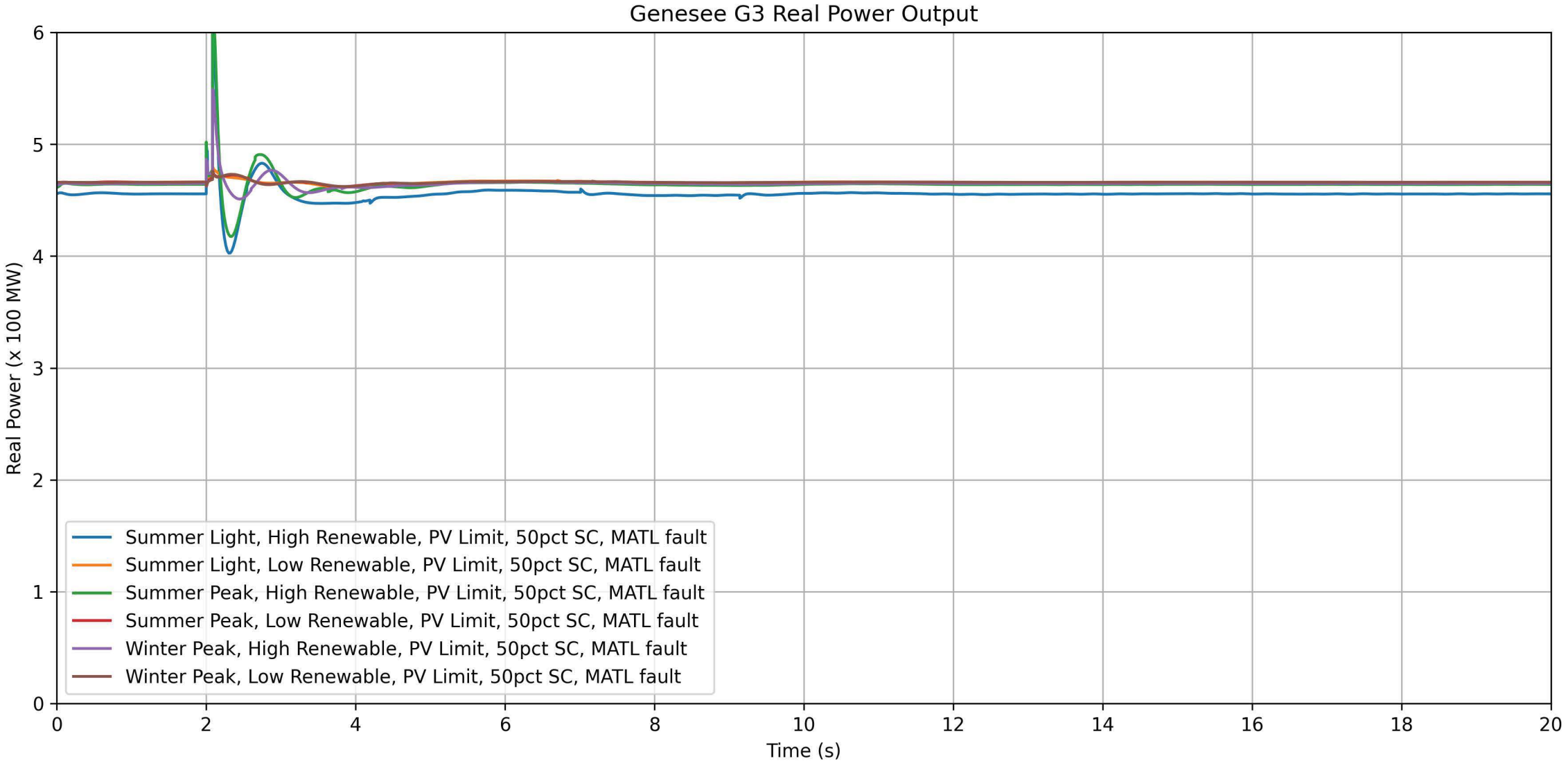

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

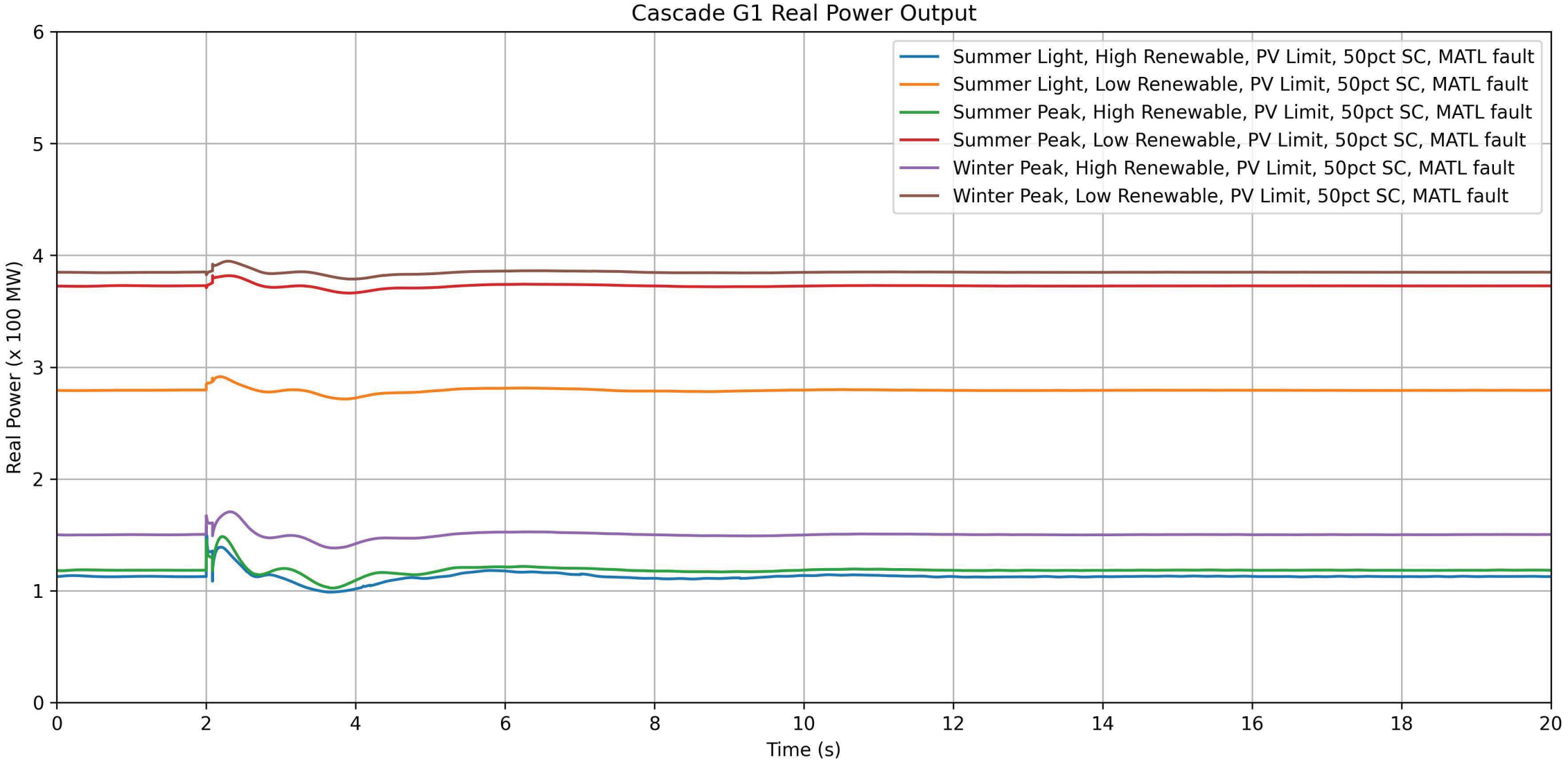

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

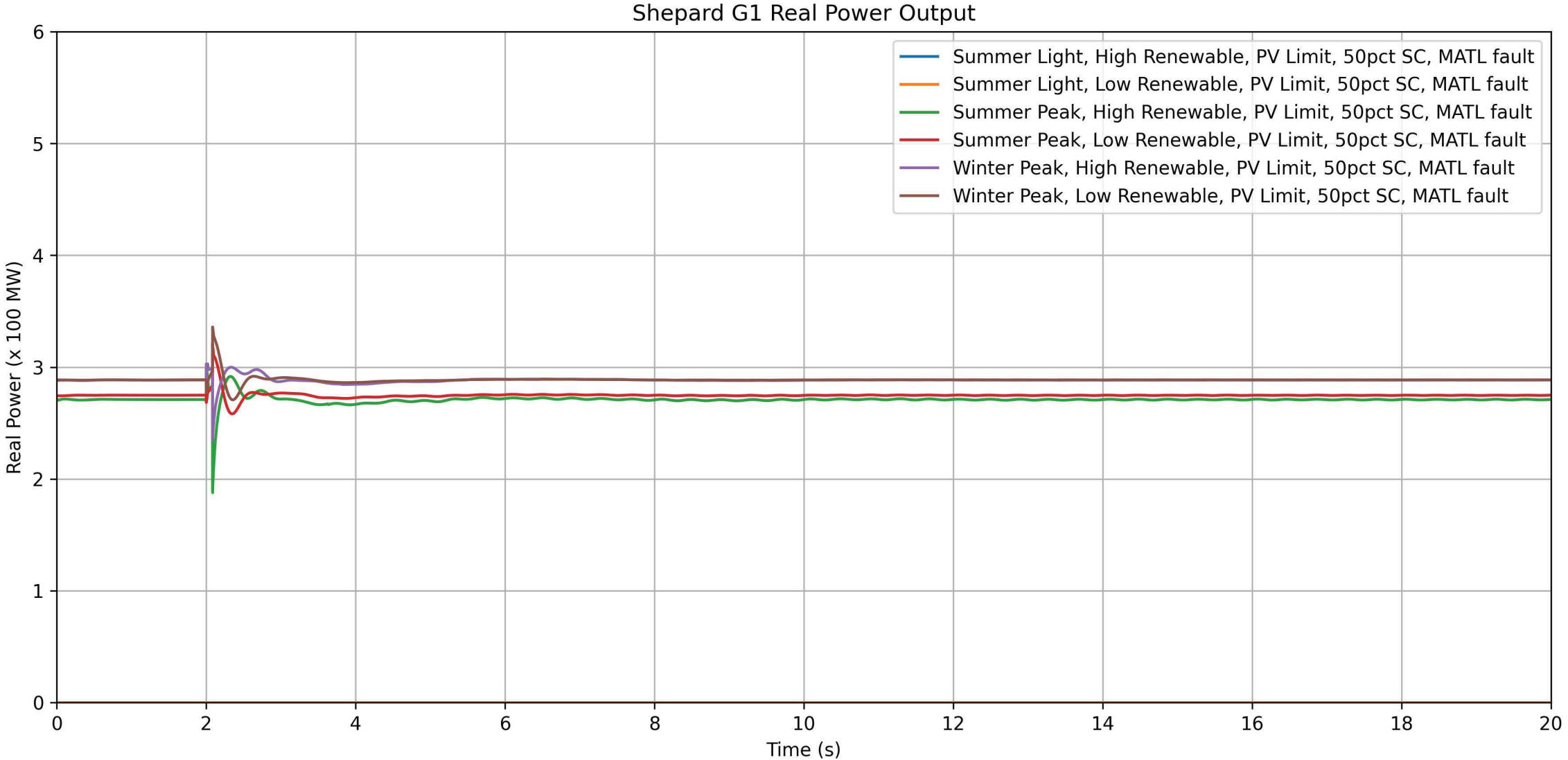

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

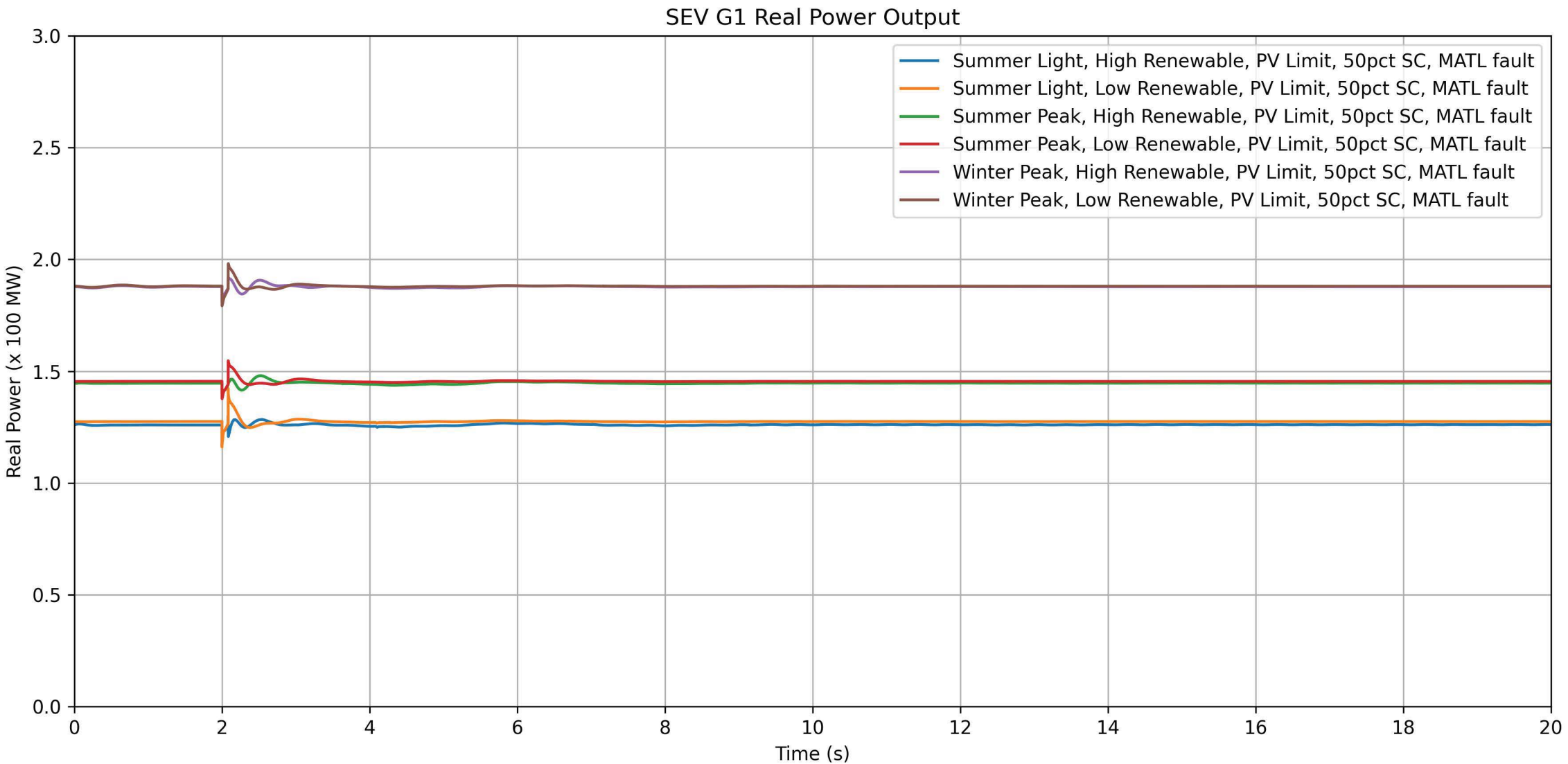

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

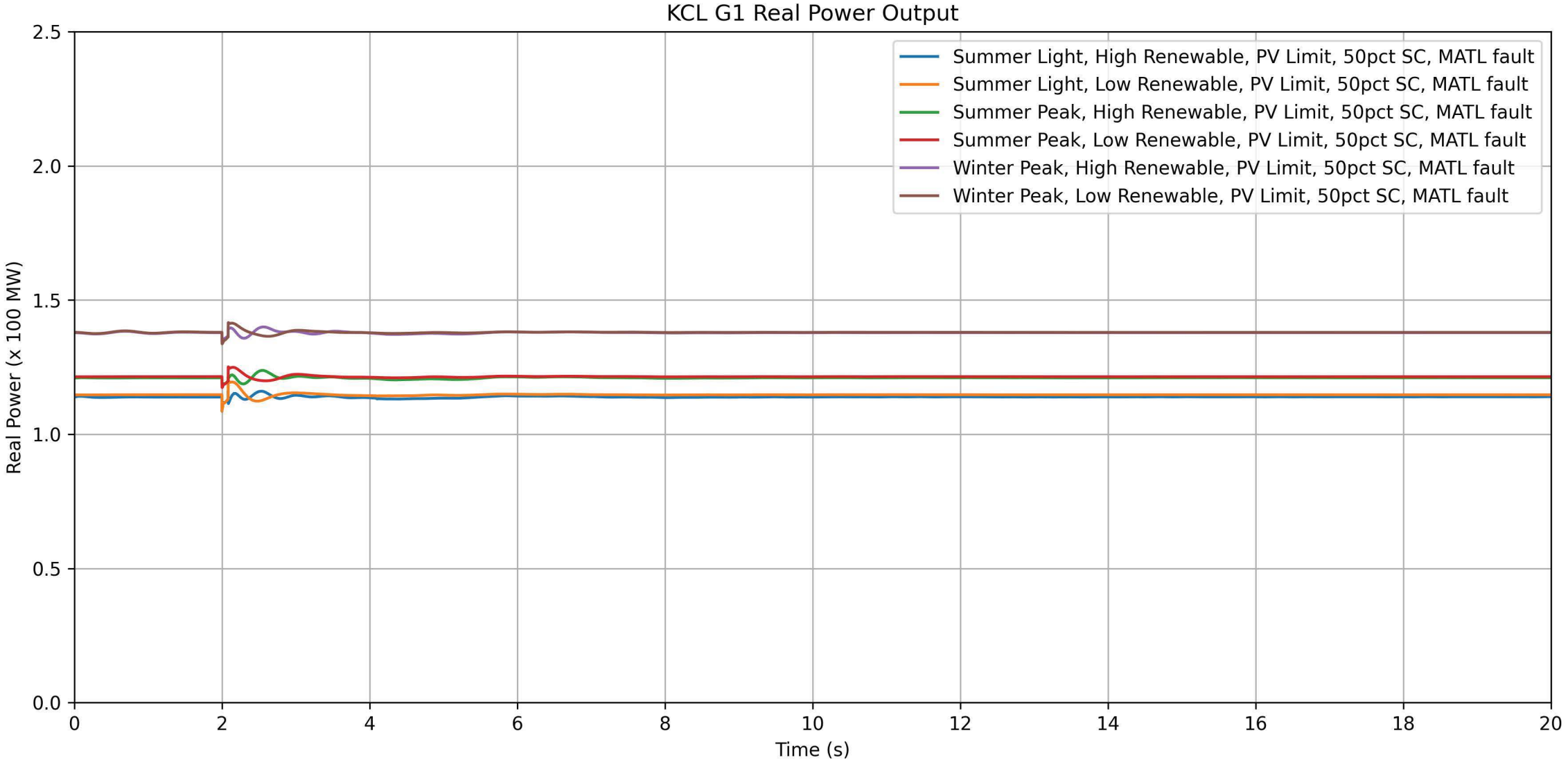

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

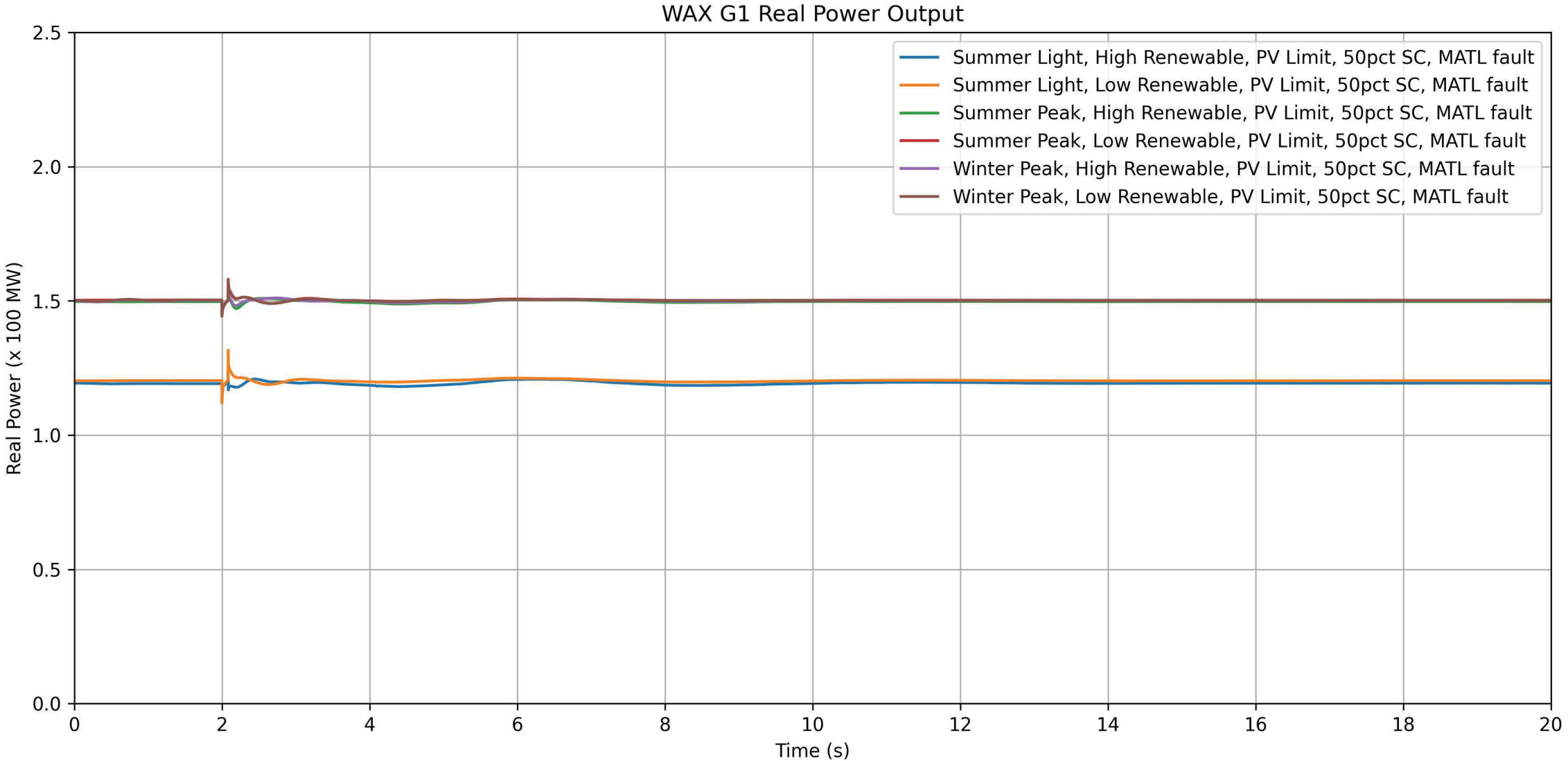

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault

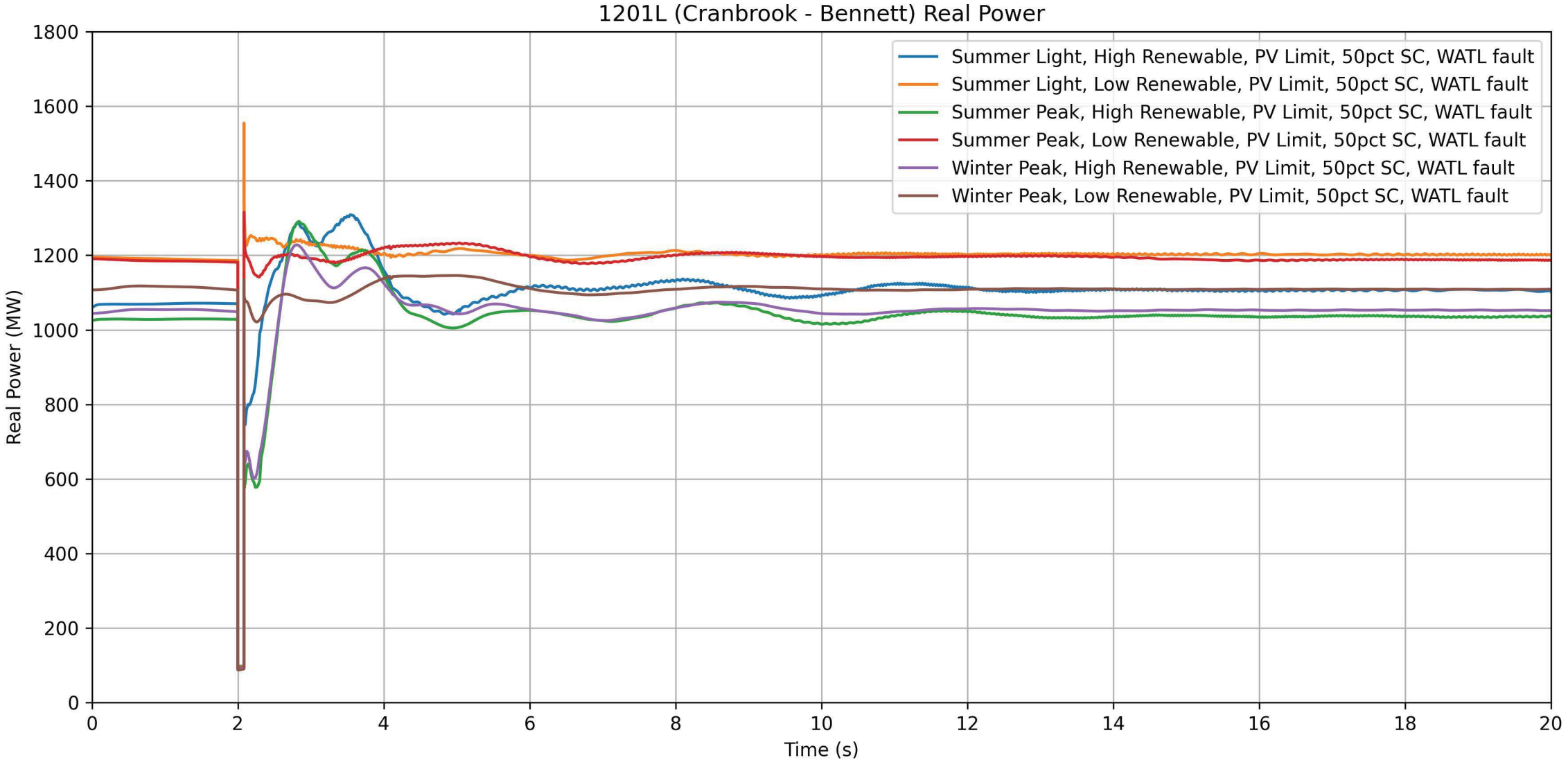

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

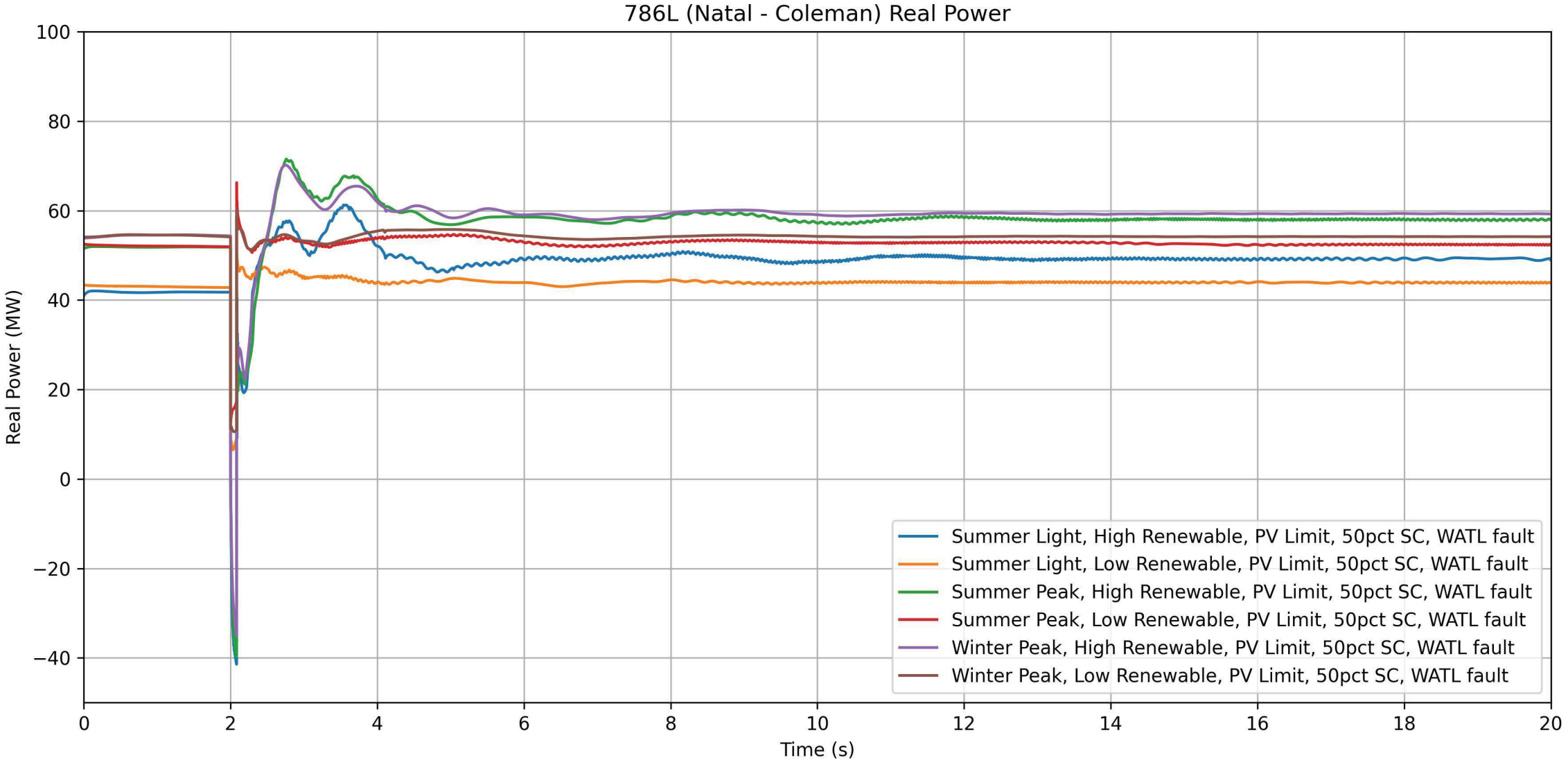

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

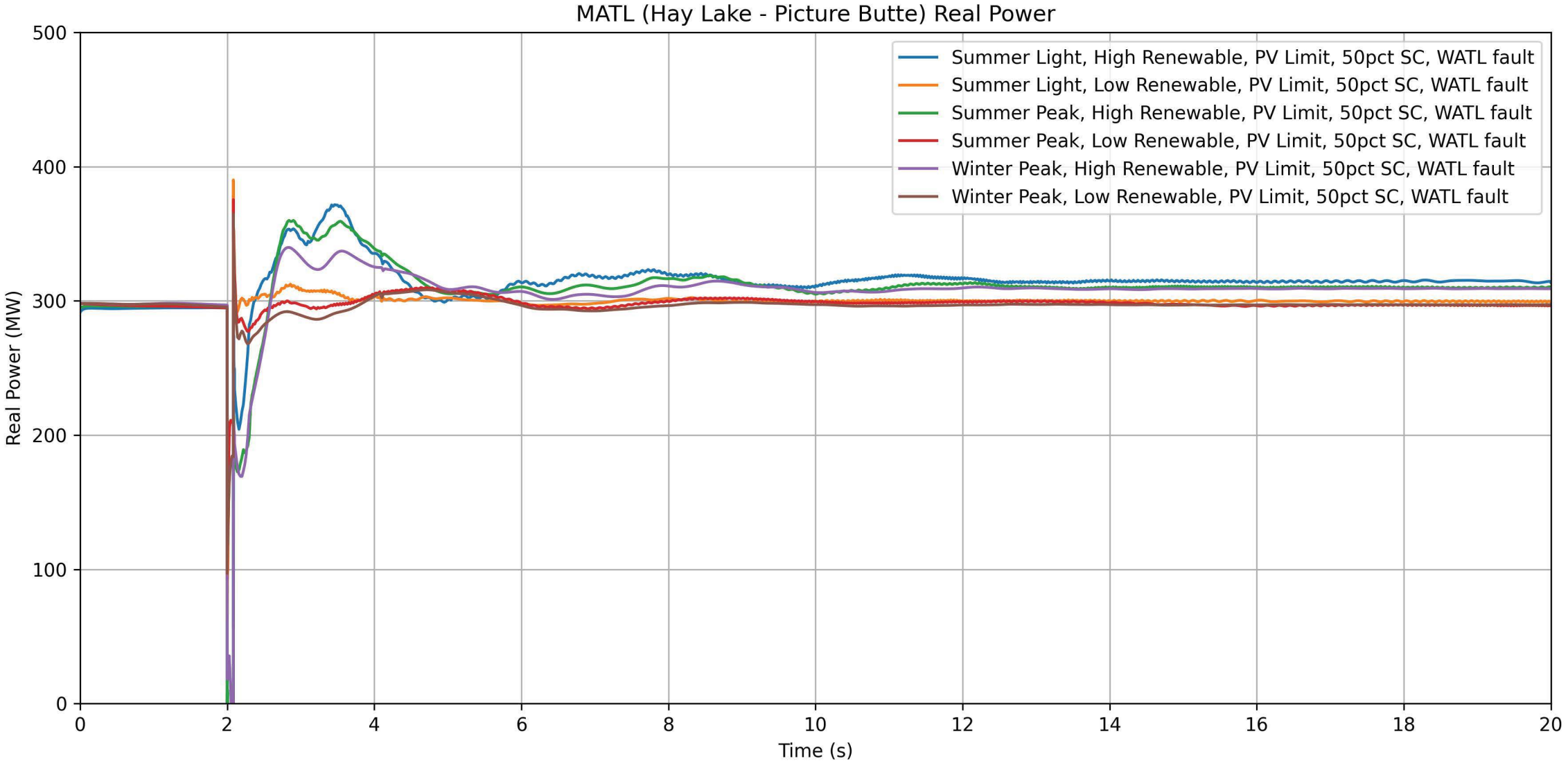

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

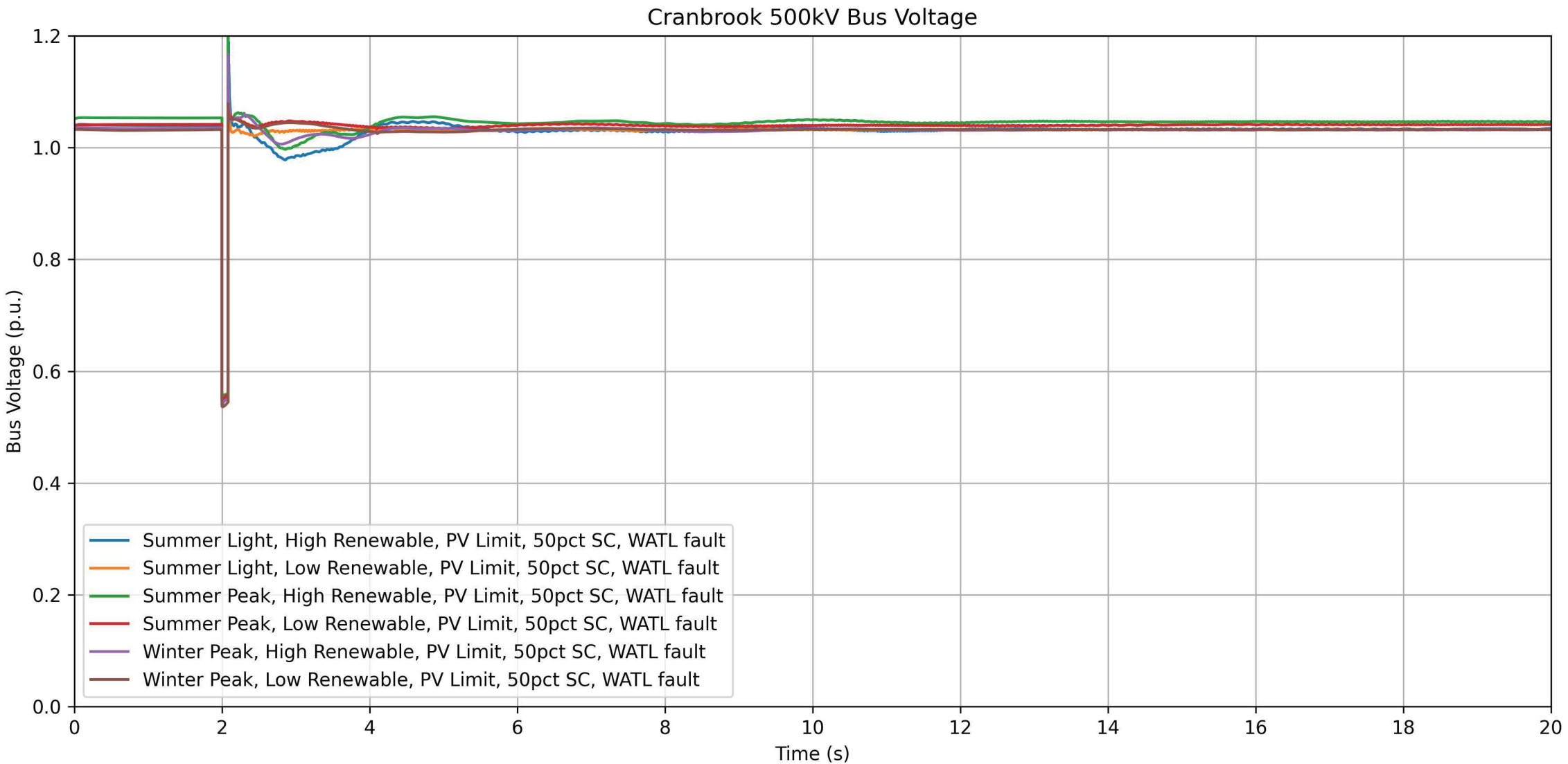

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

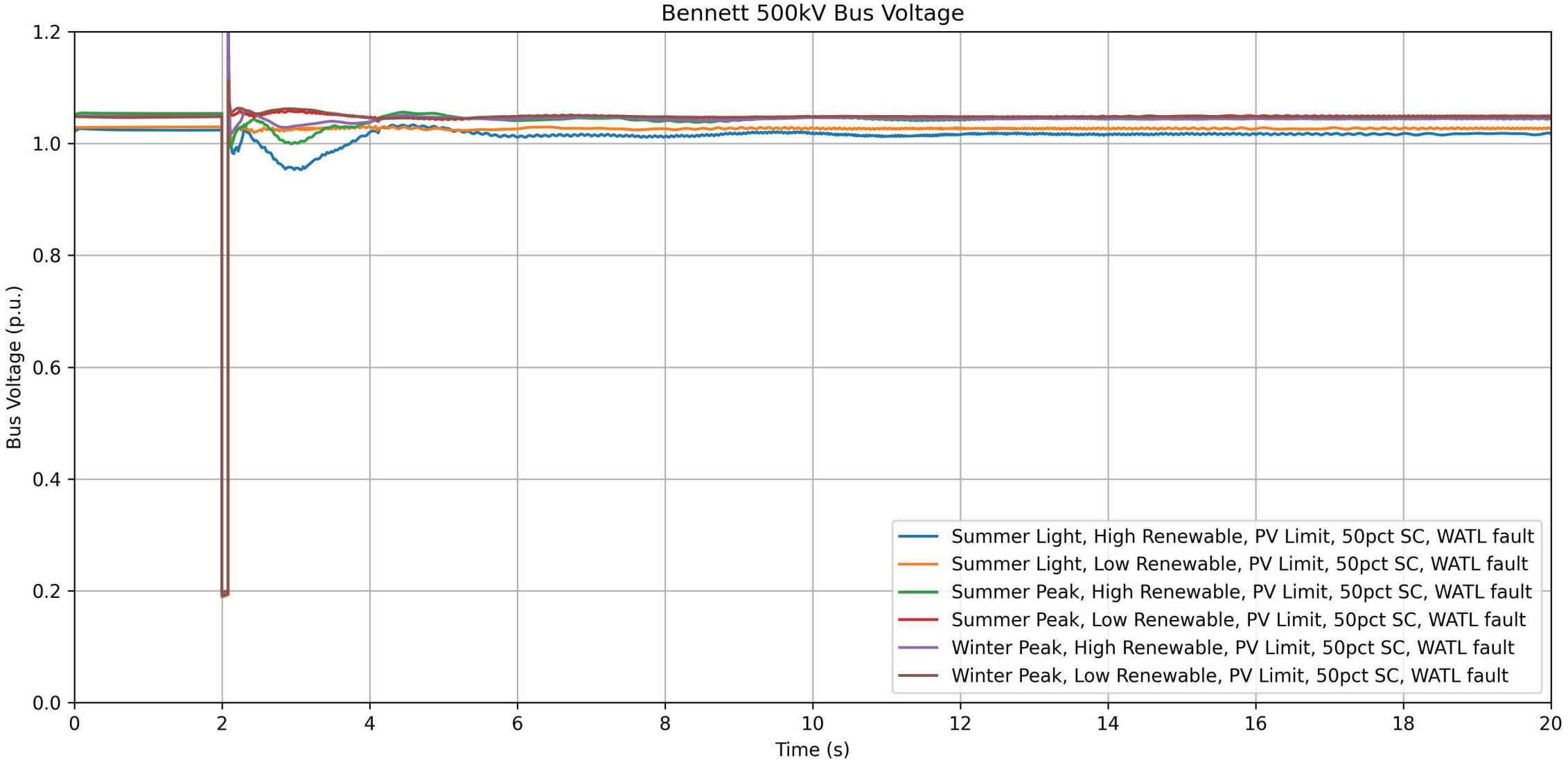

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, MATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, MATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

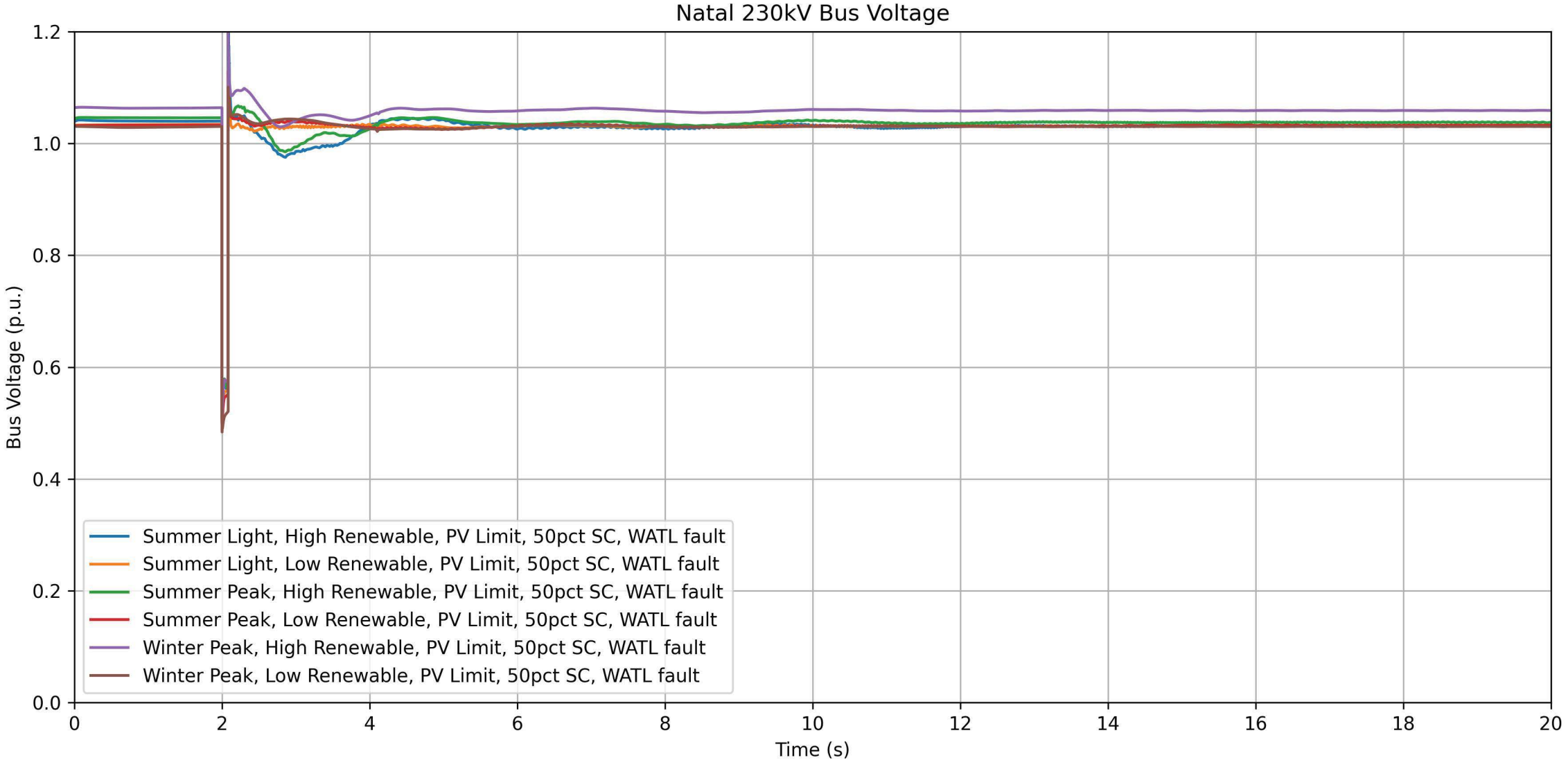

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

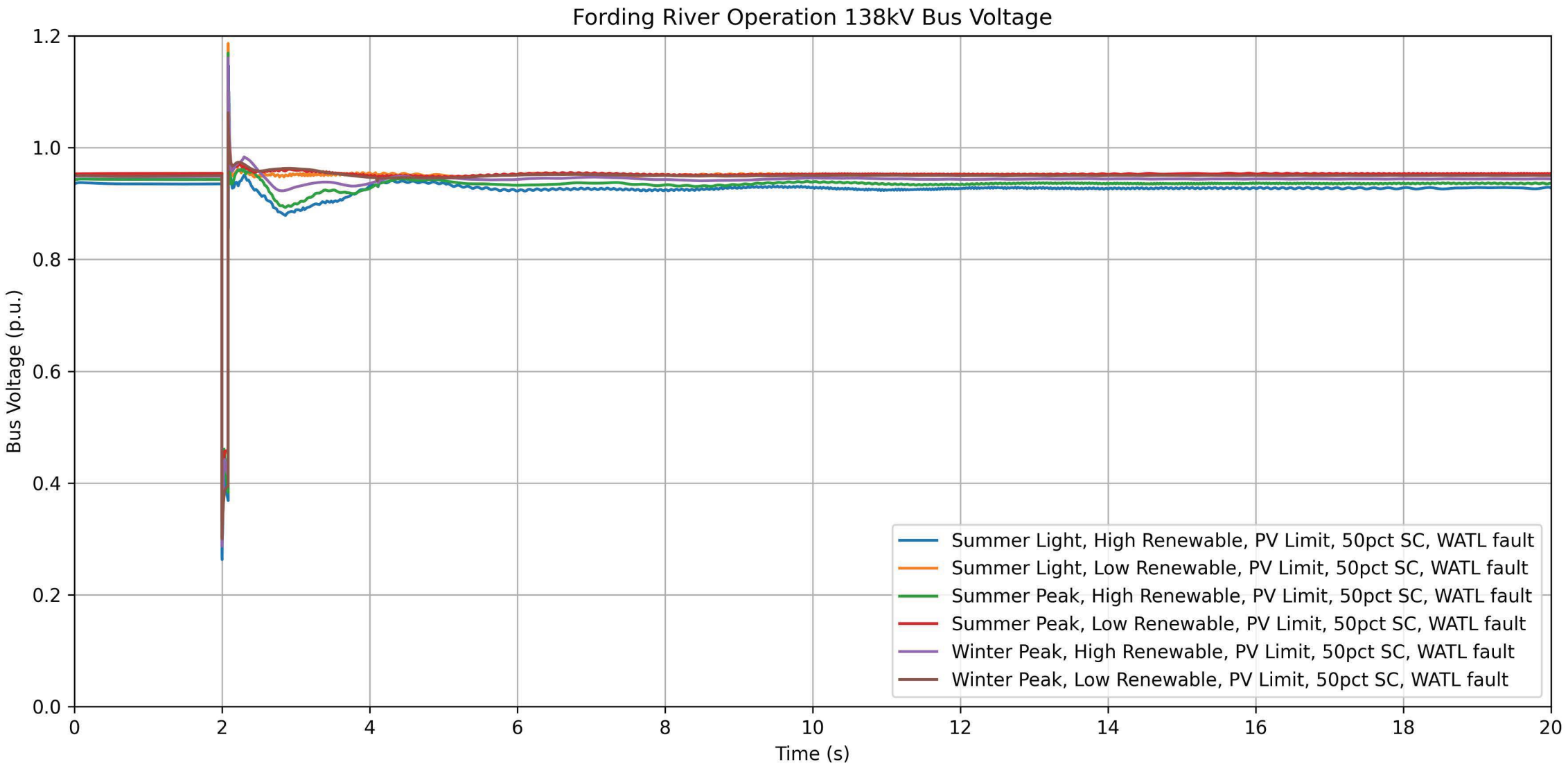

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

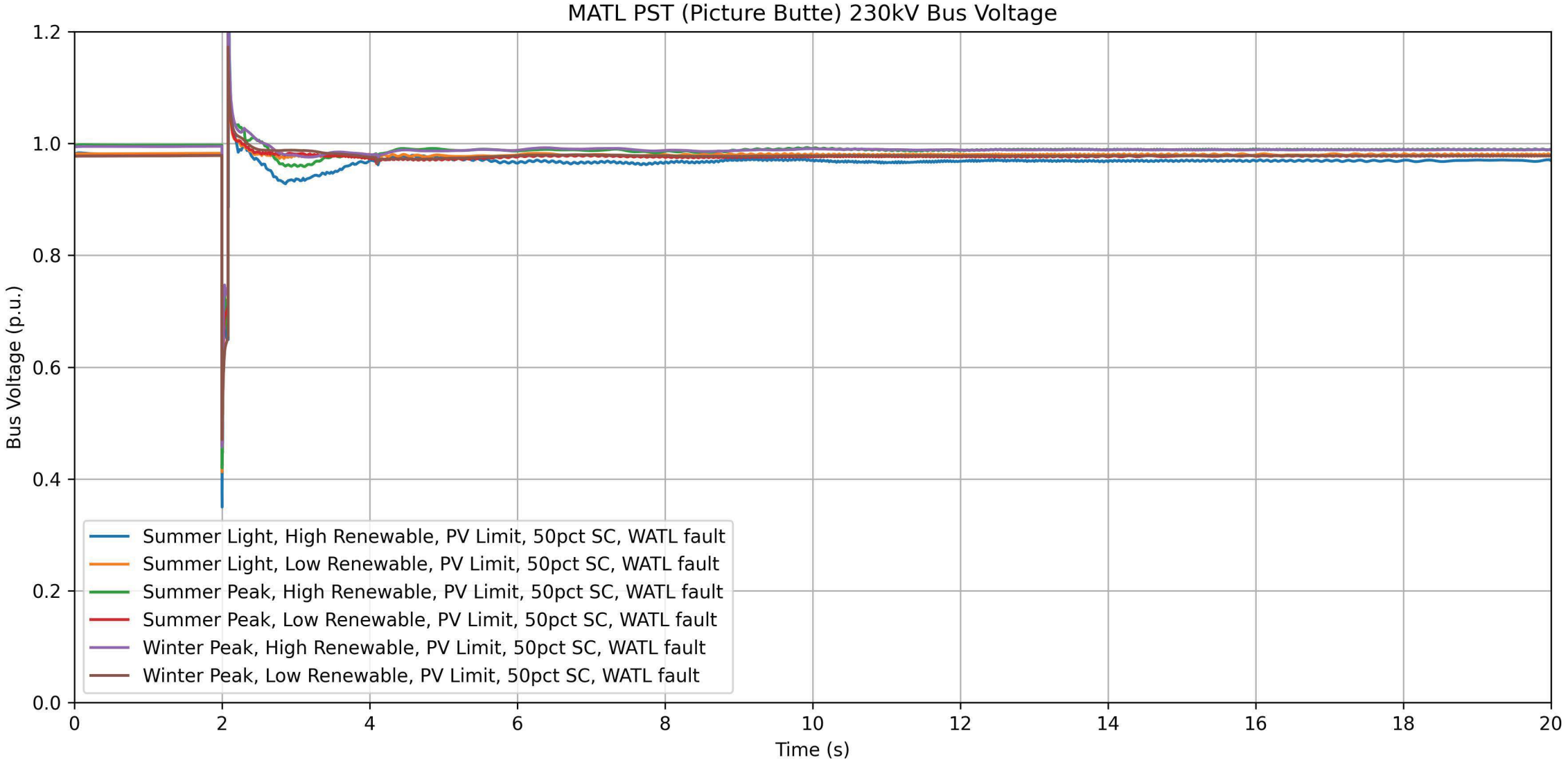

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

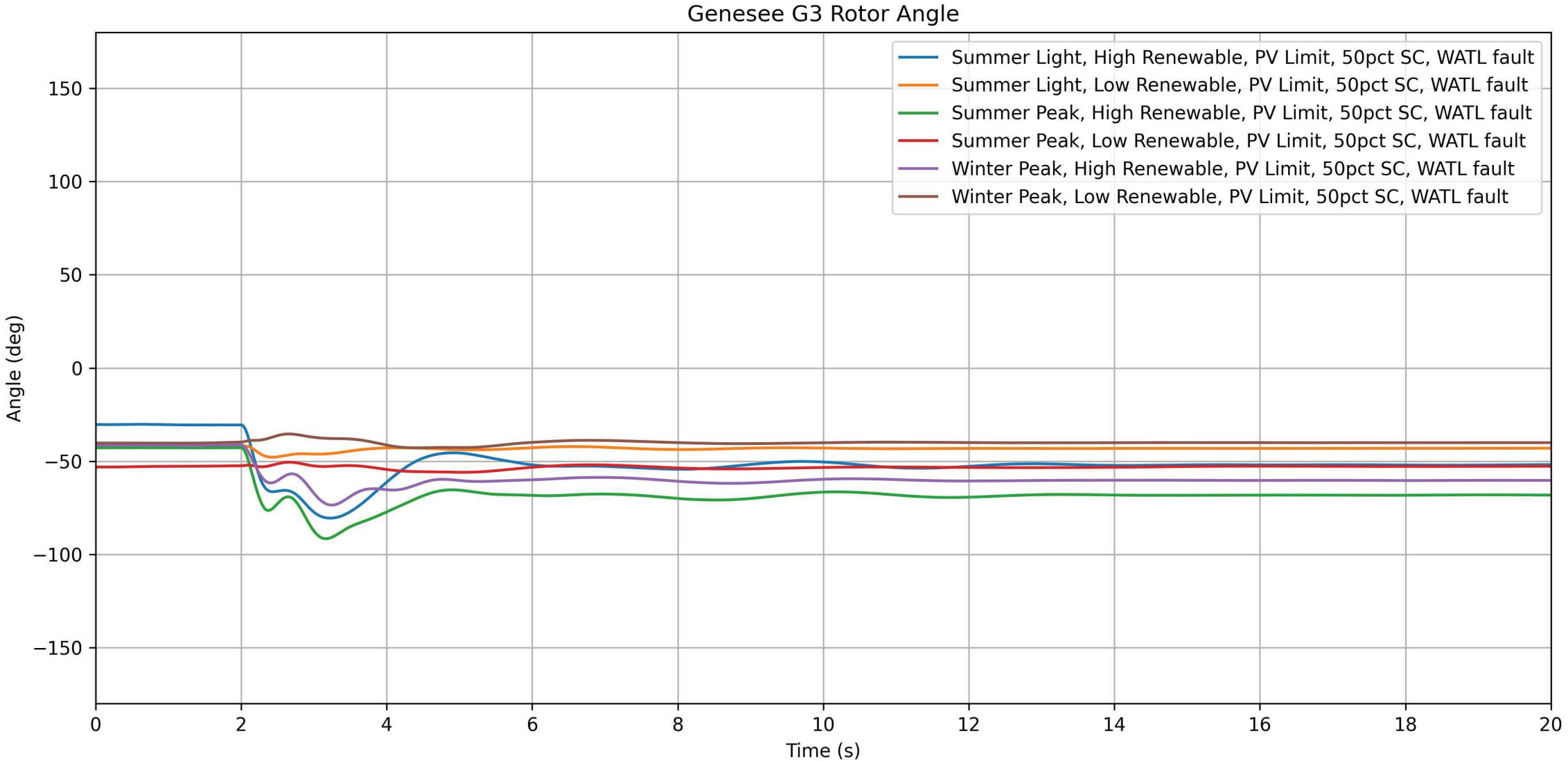

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

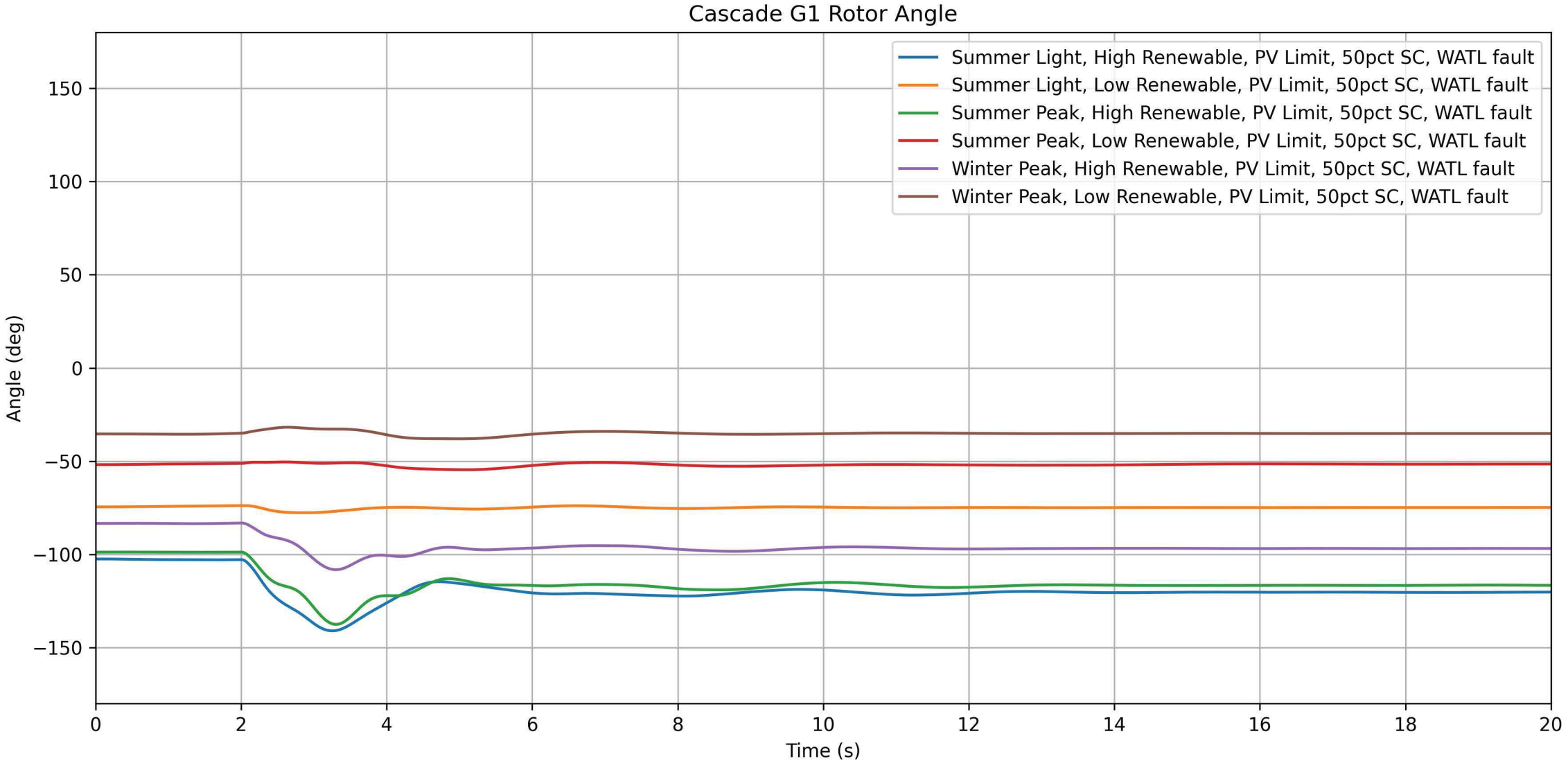

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

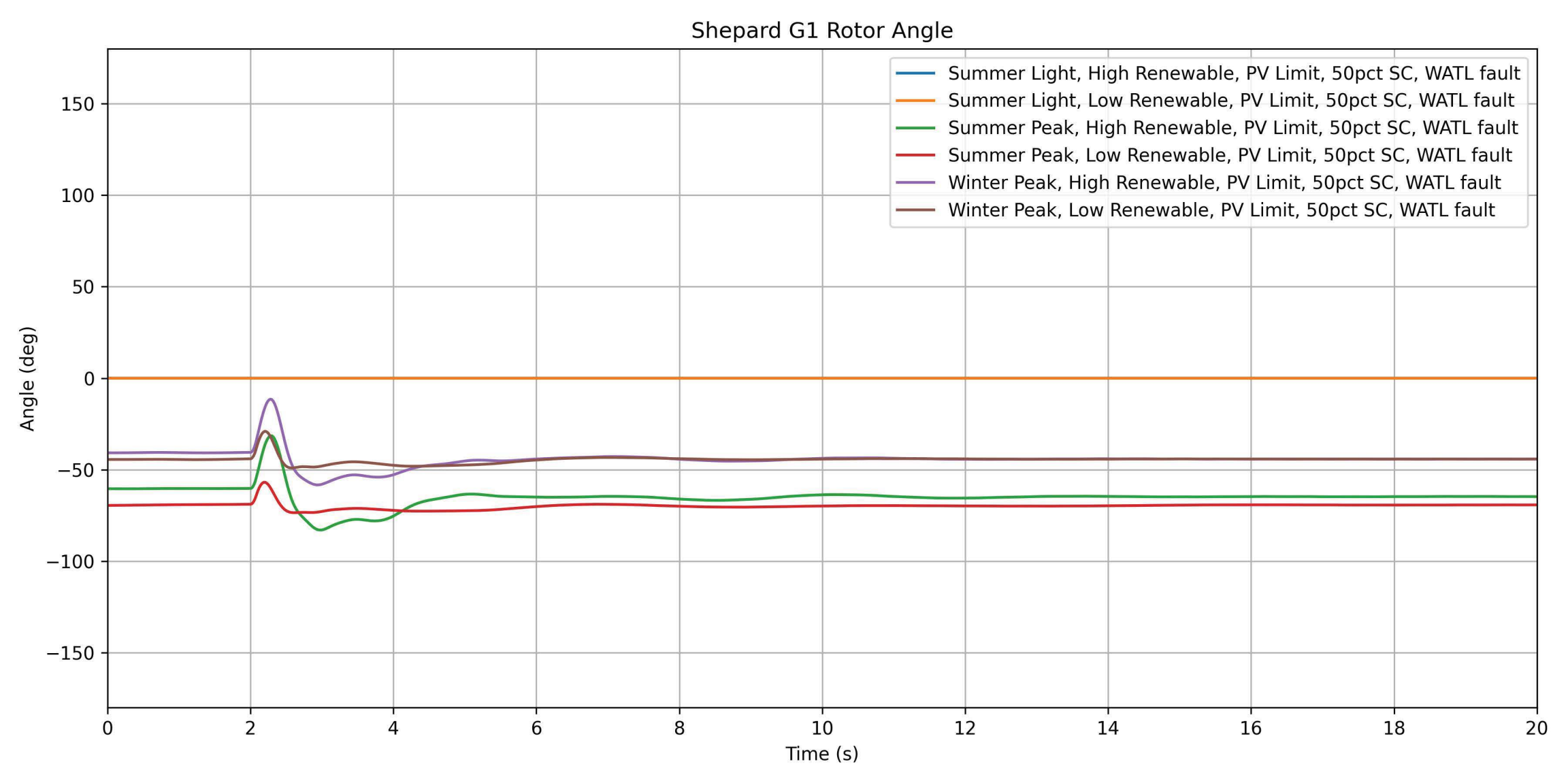

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

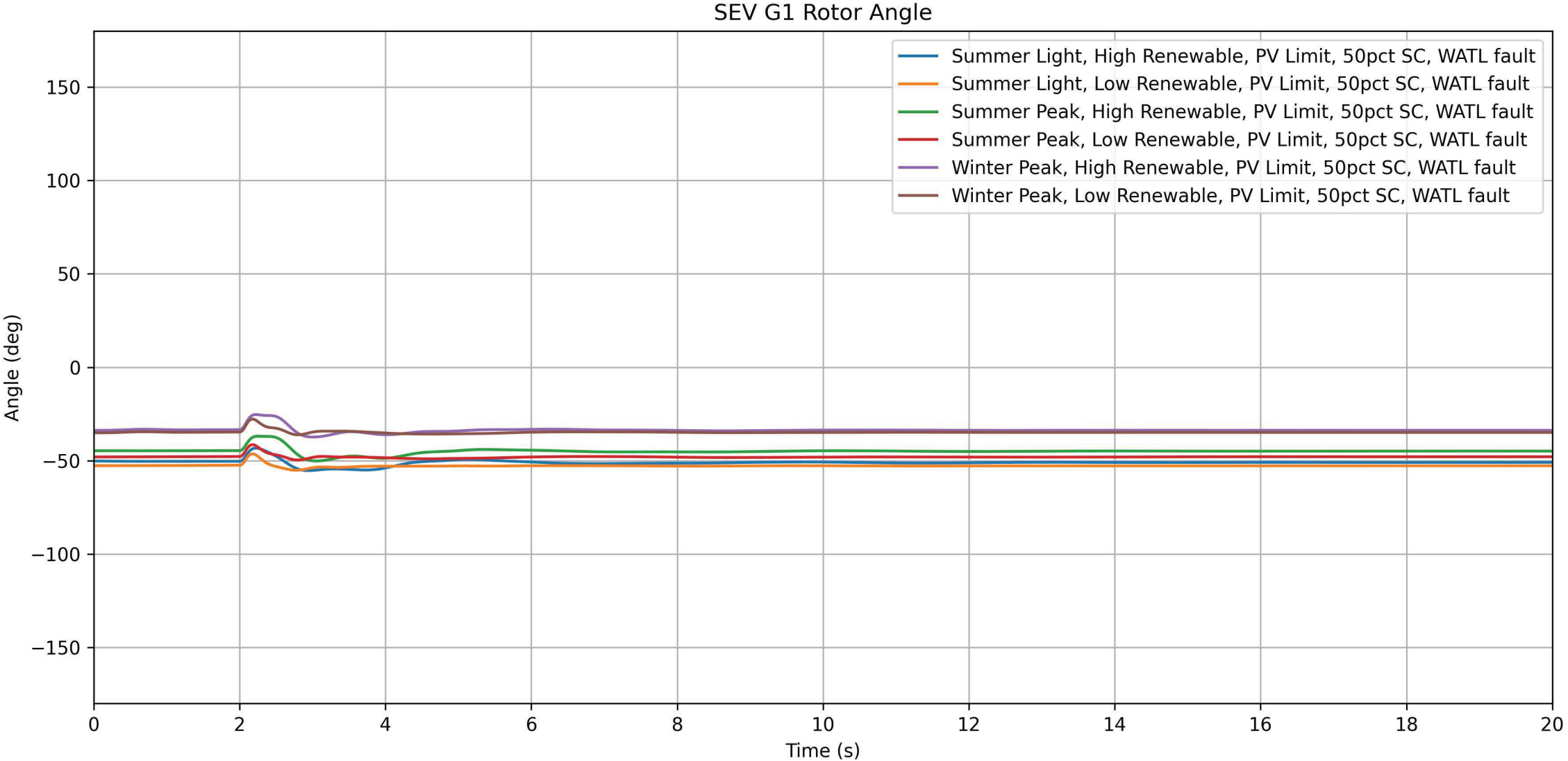

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

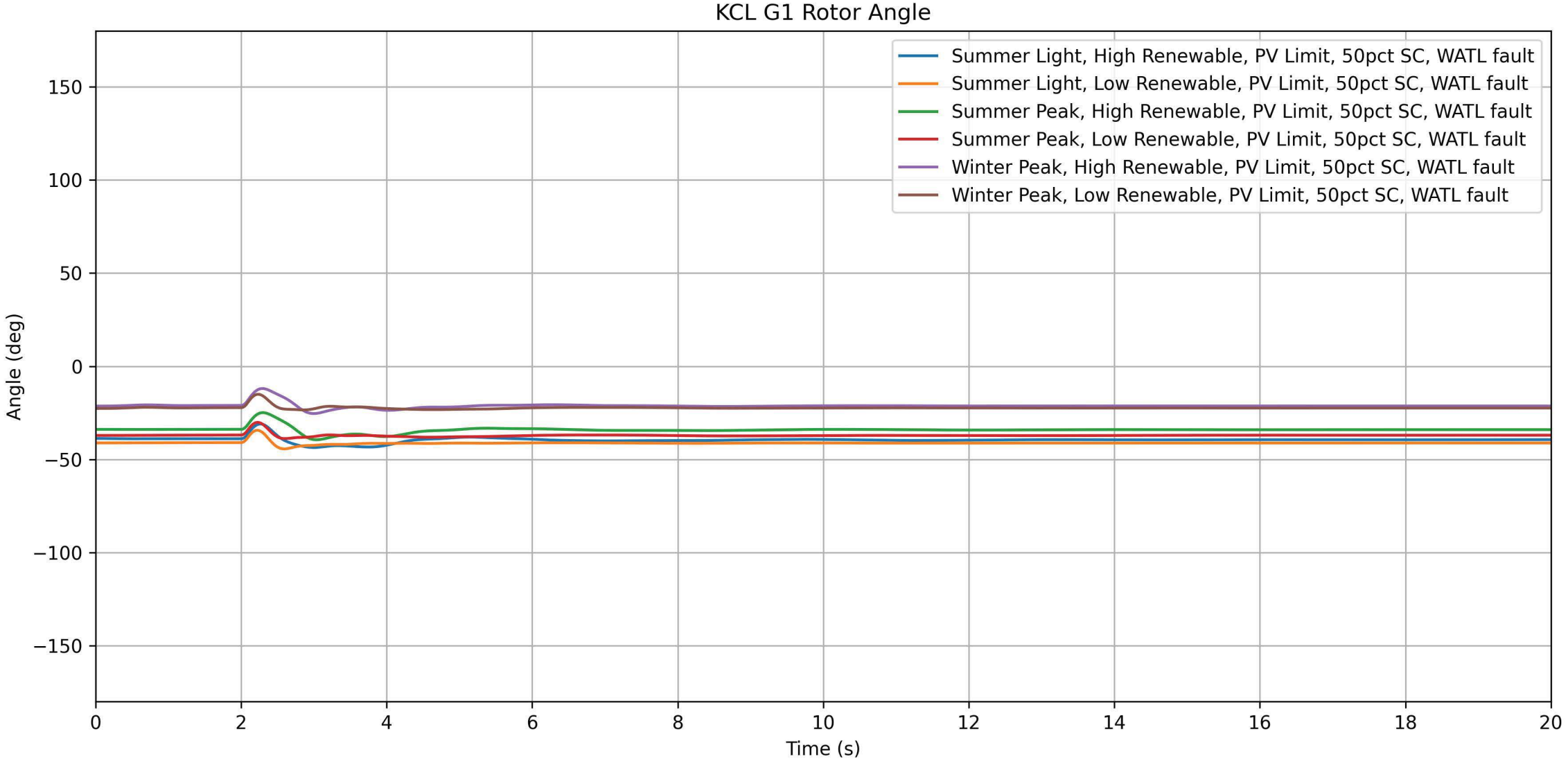

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

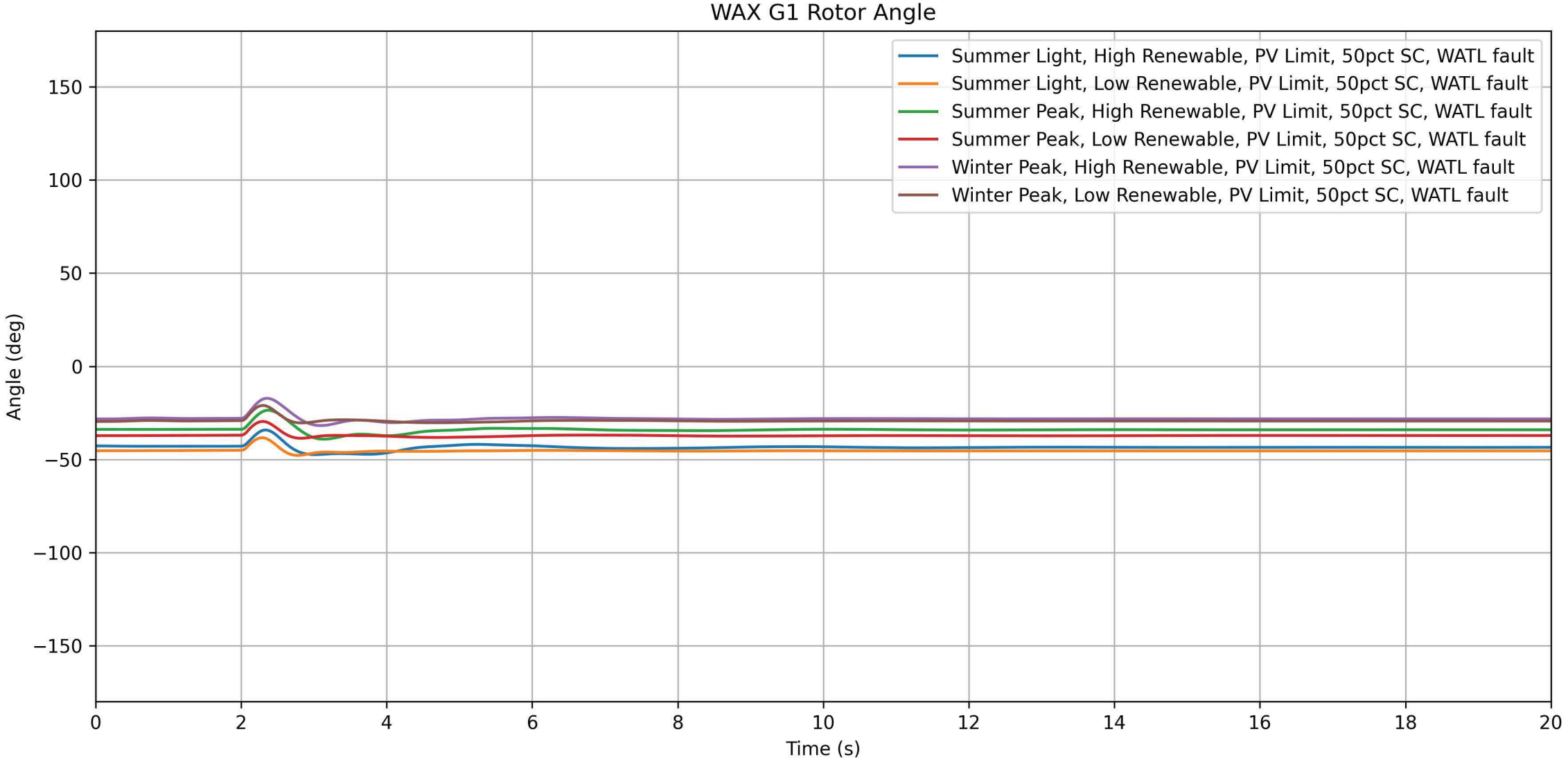

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

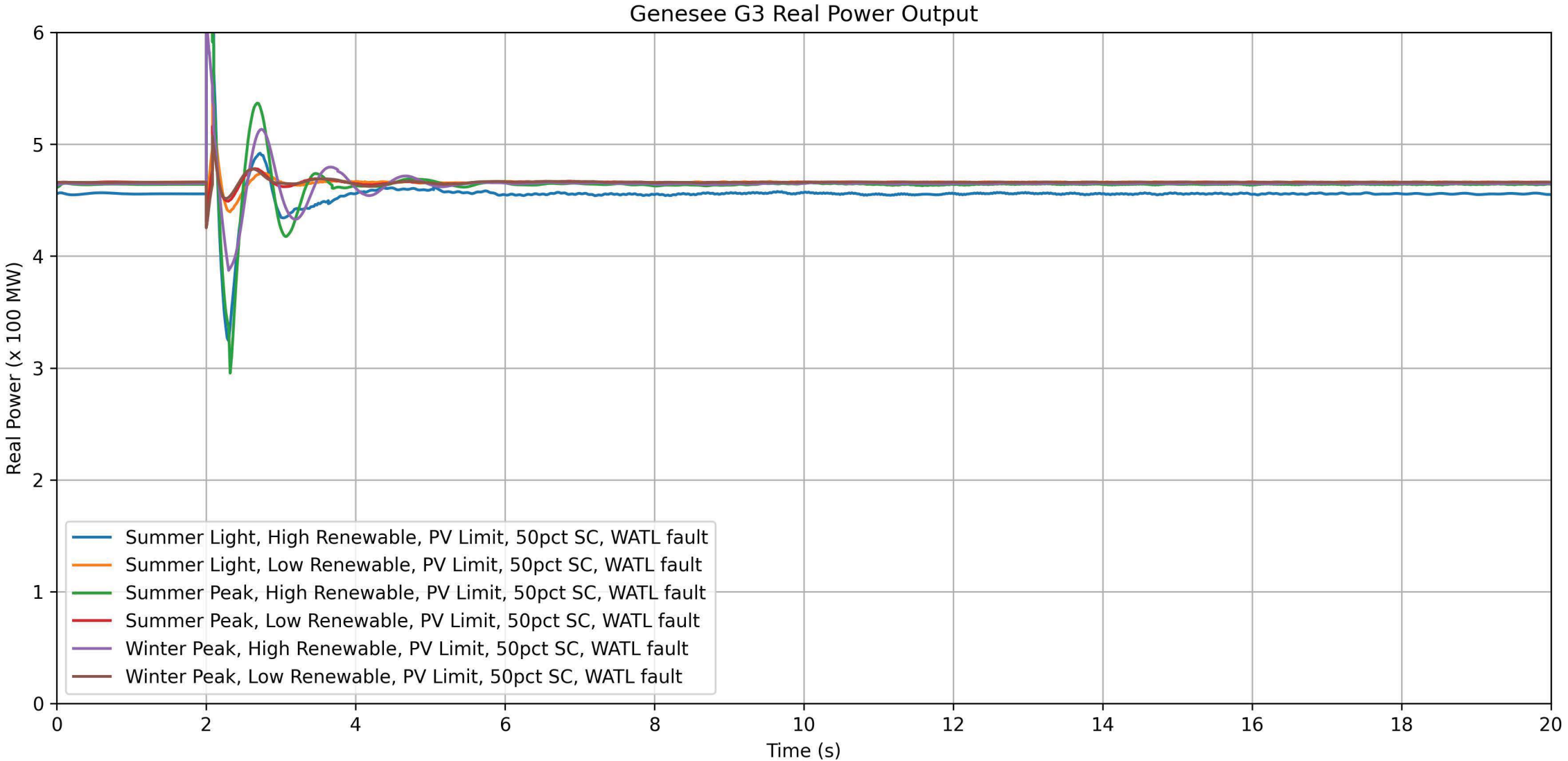

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

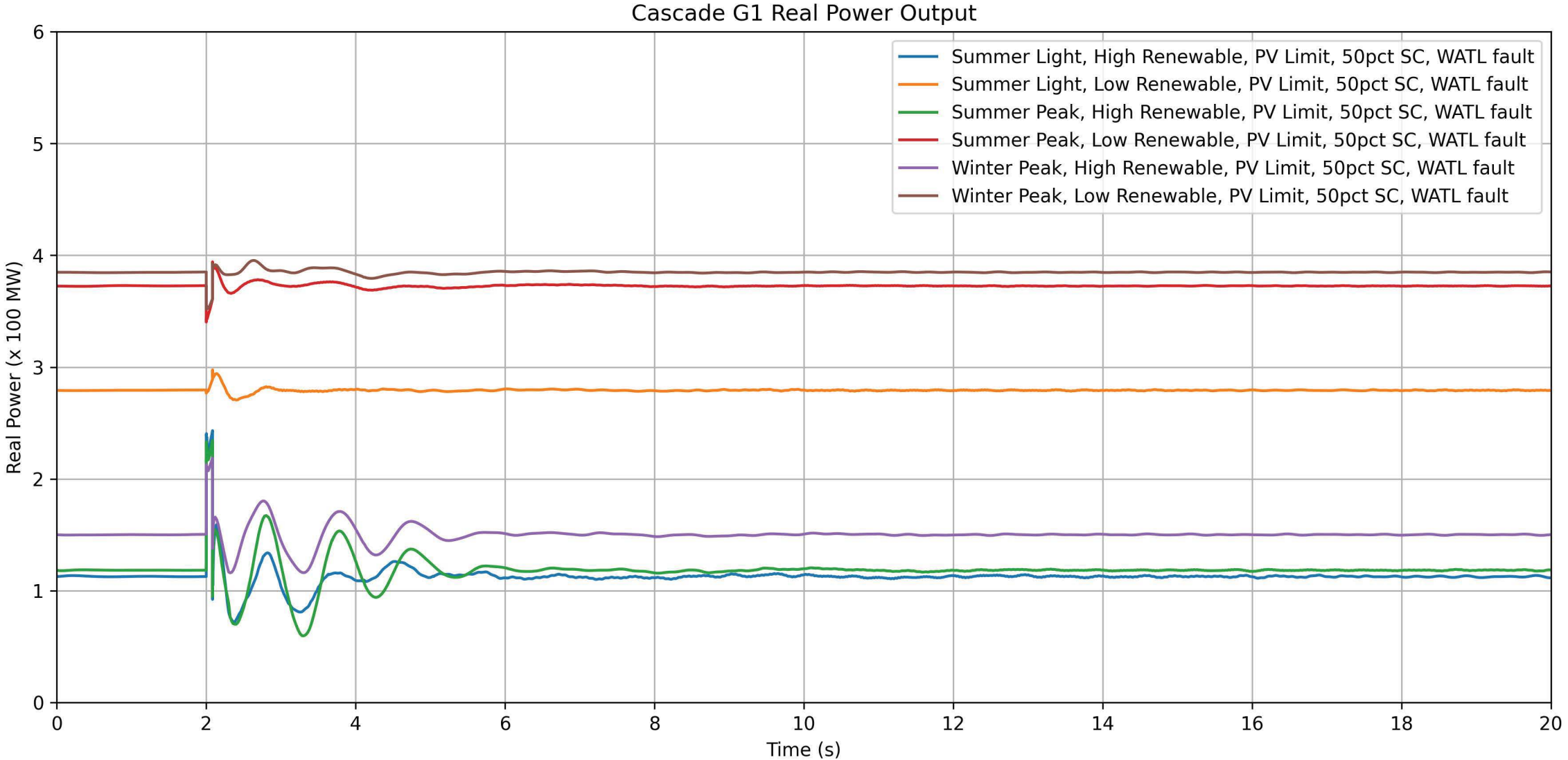

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

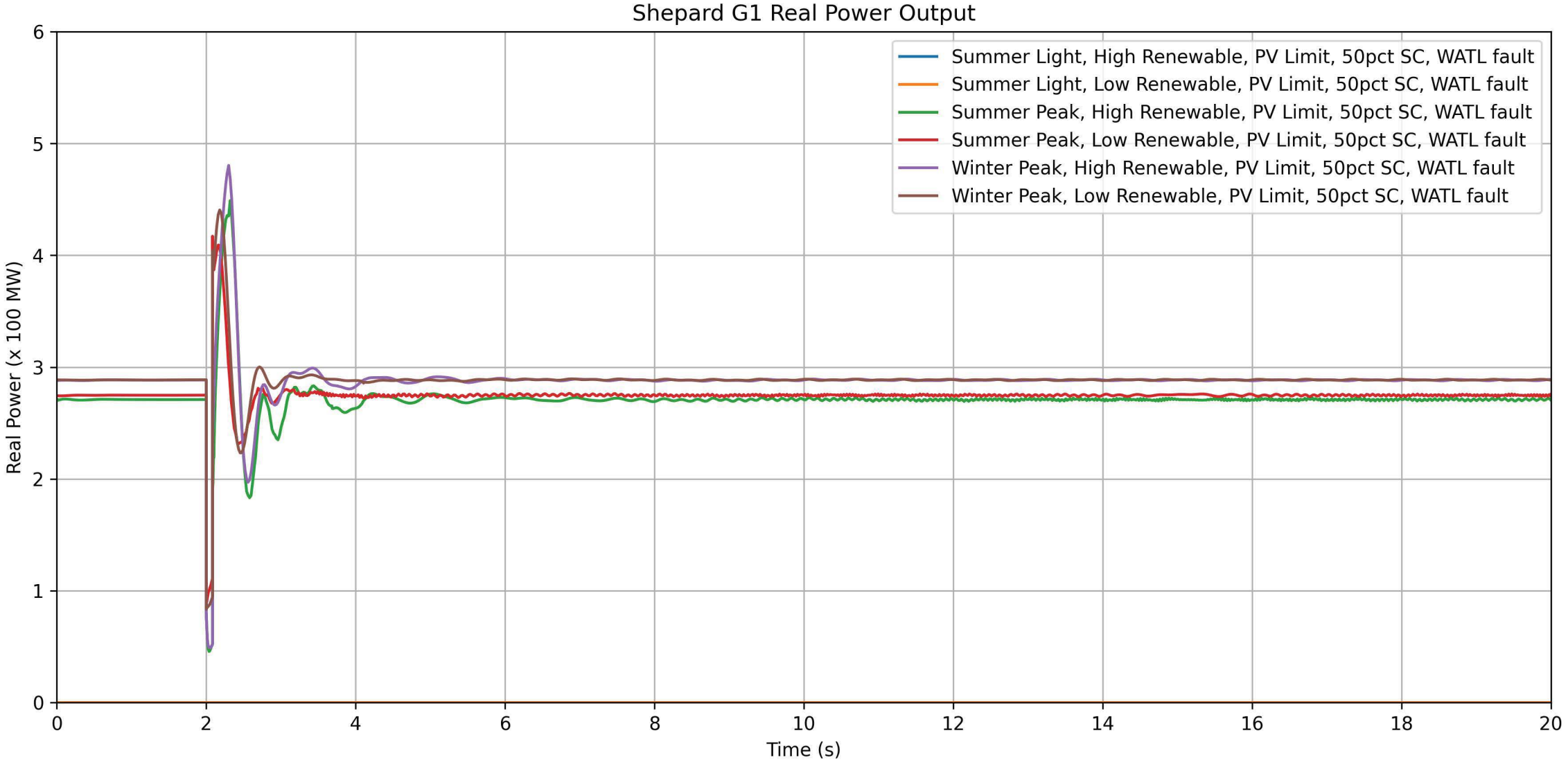

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

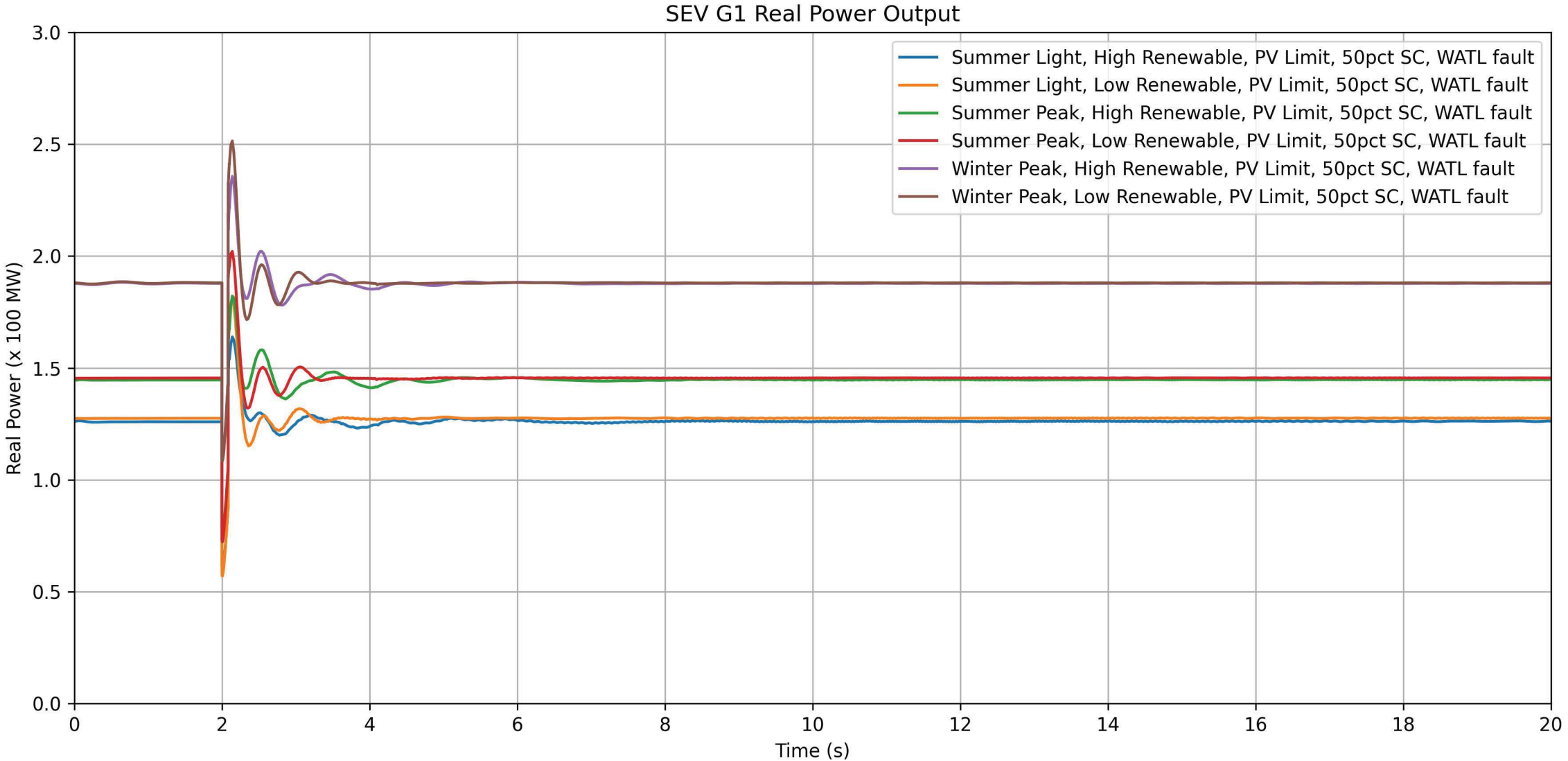

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

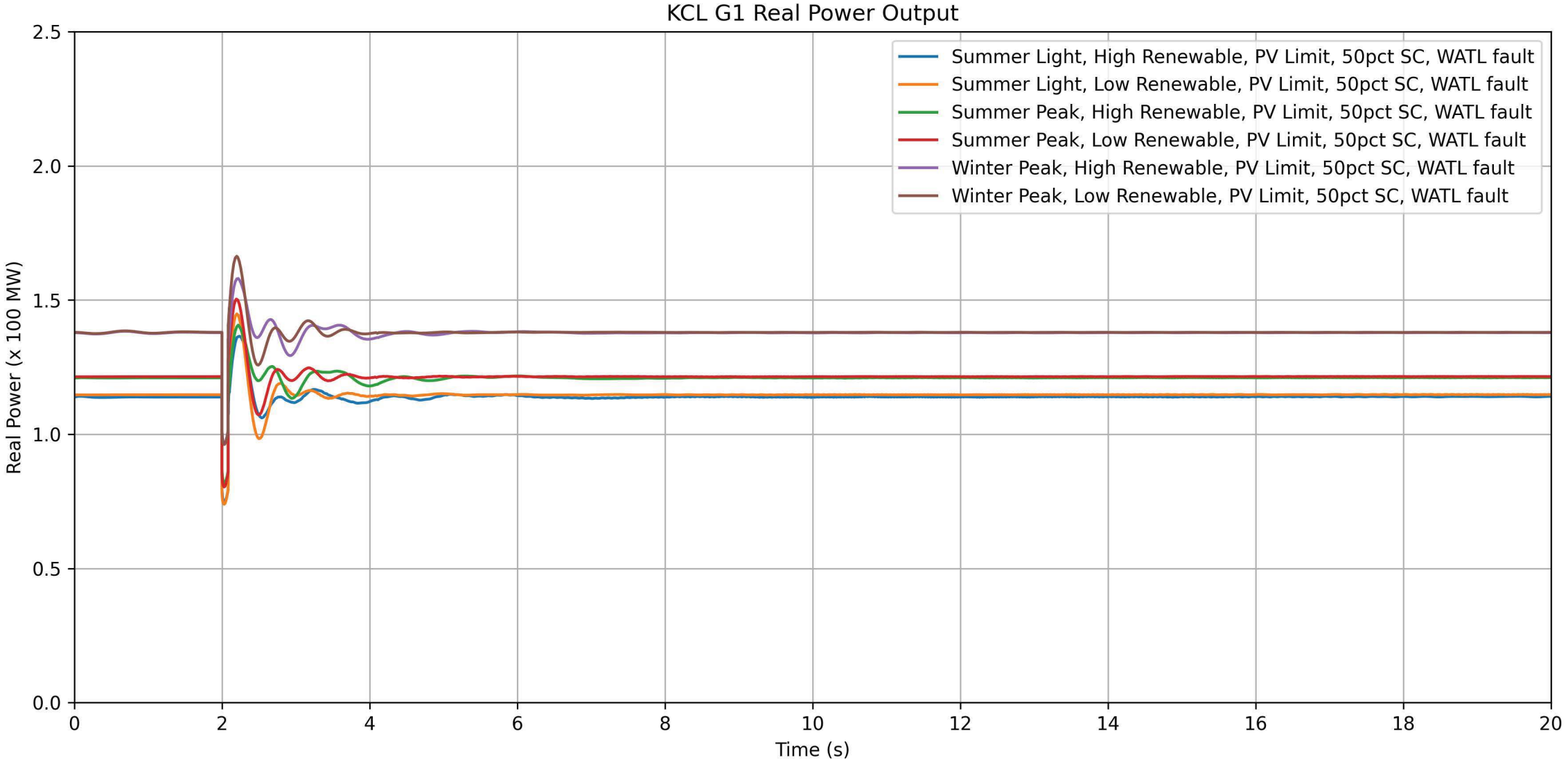

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

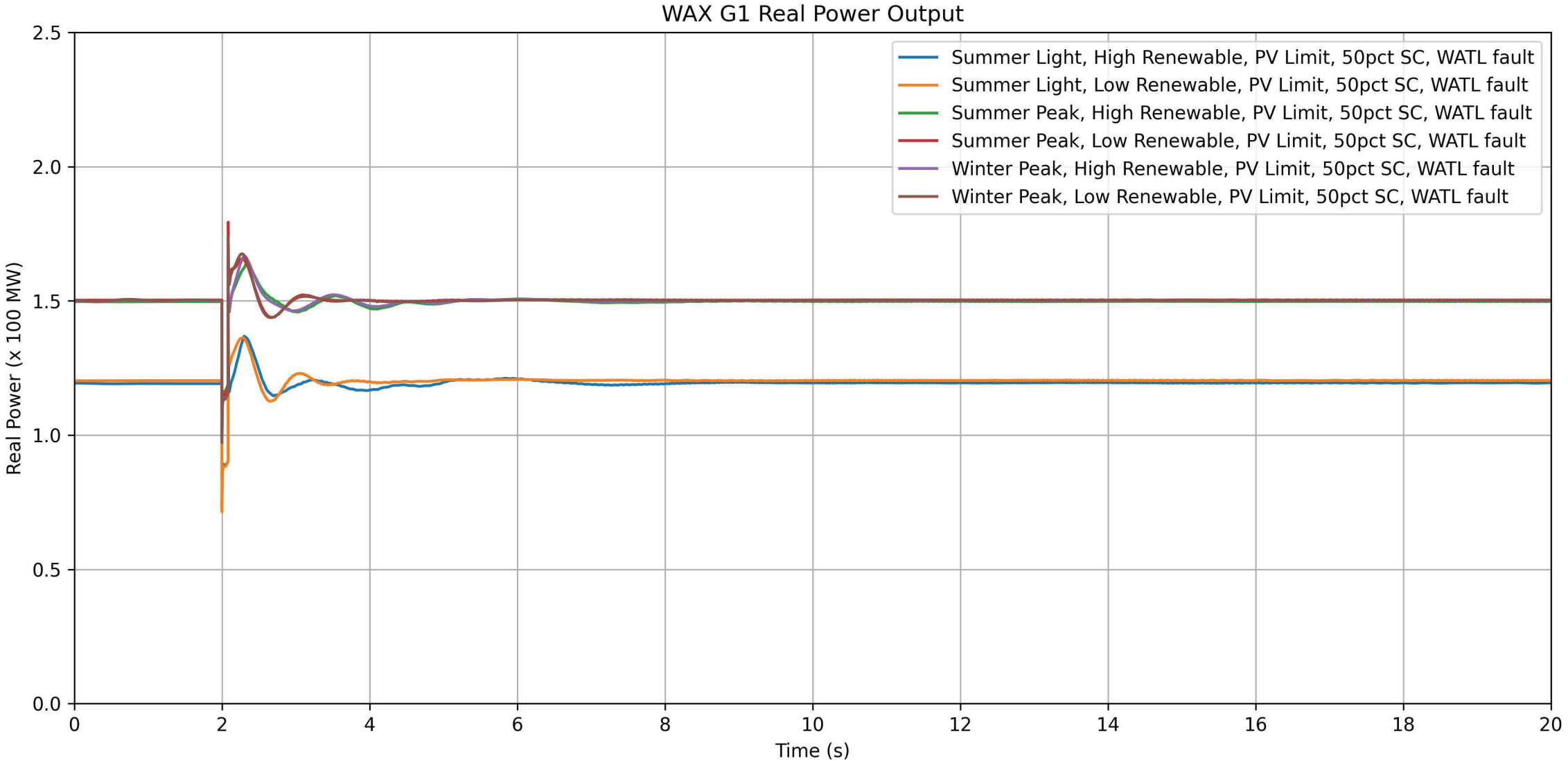

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault

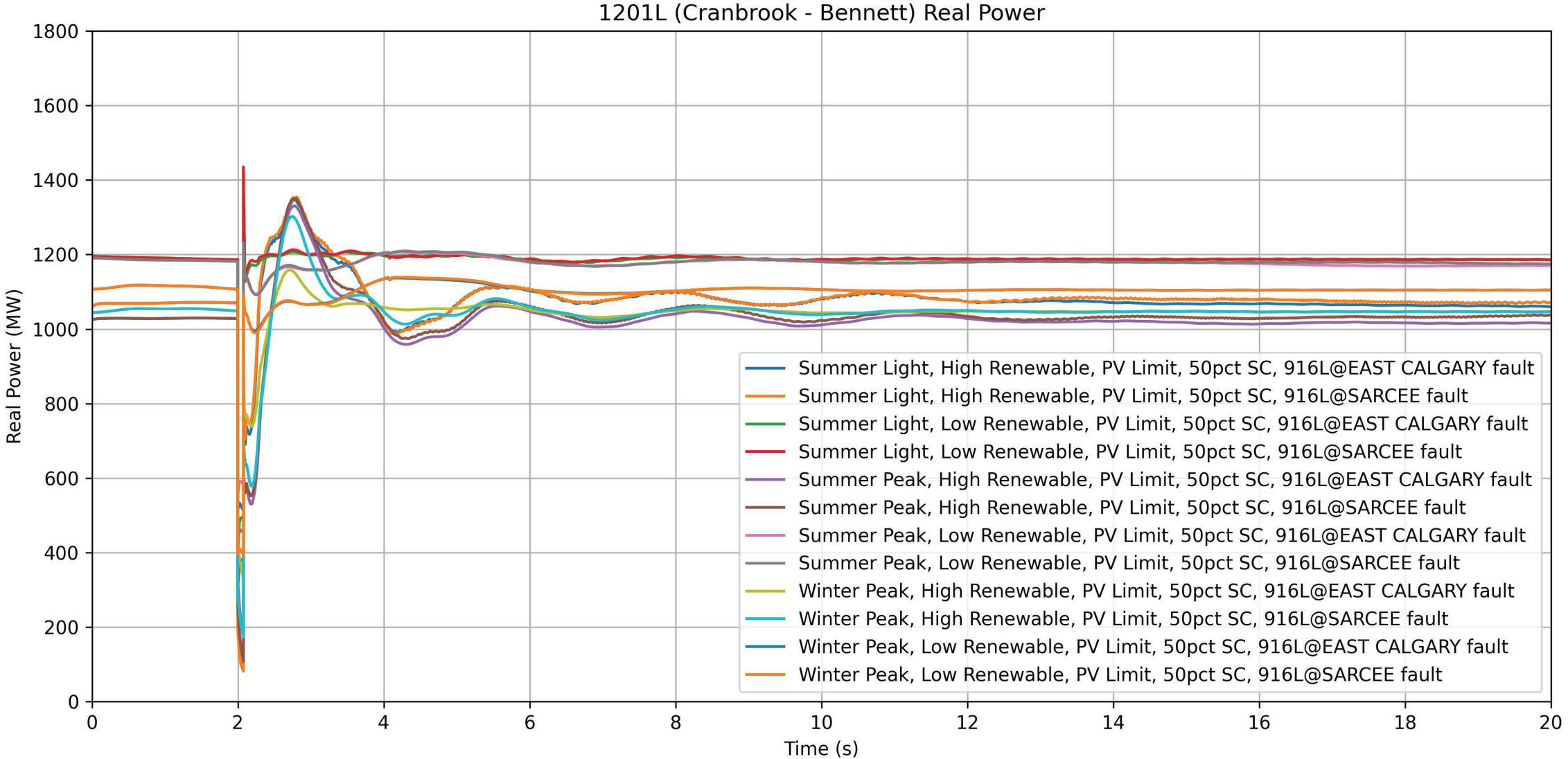

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

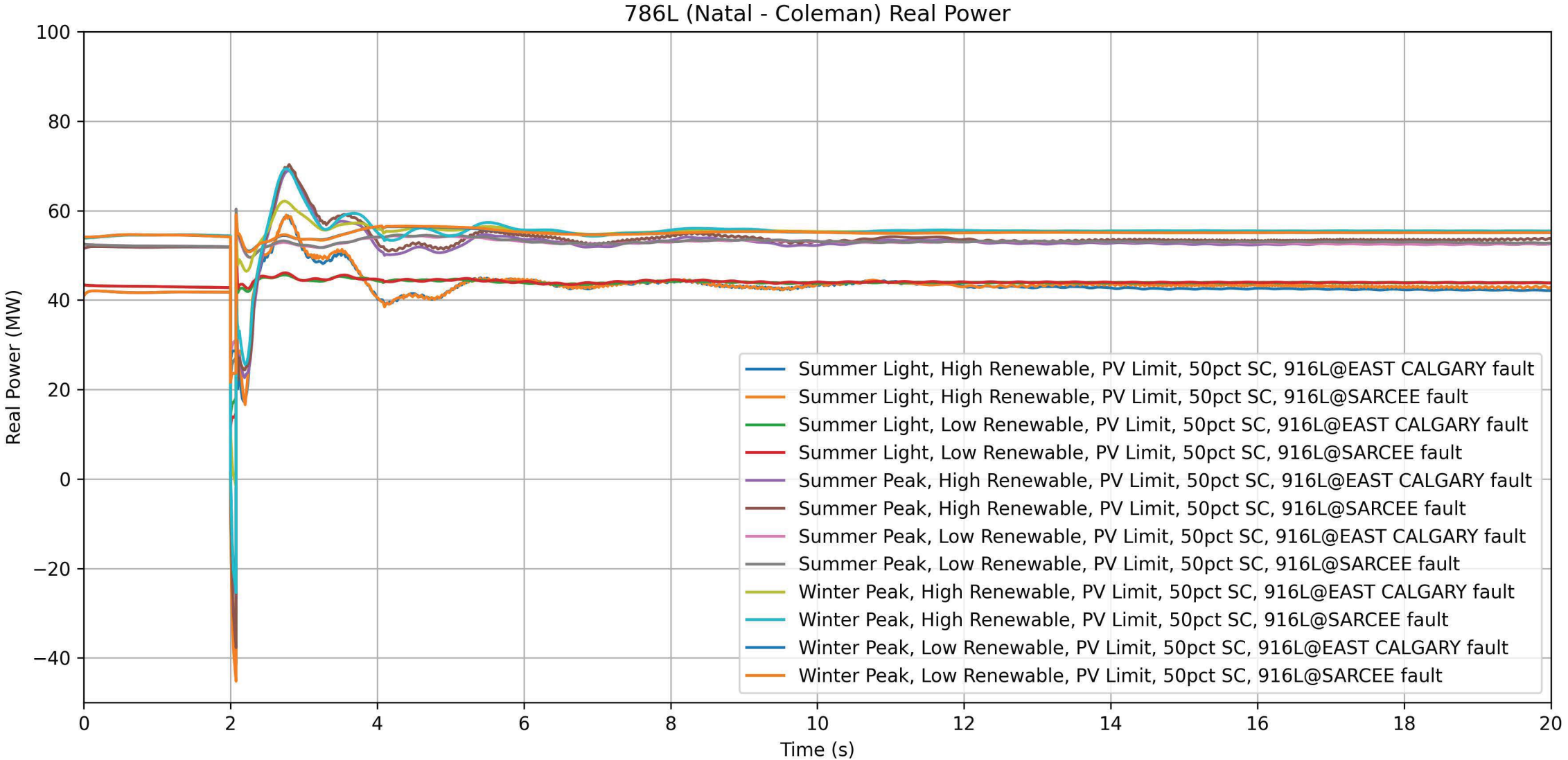

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

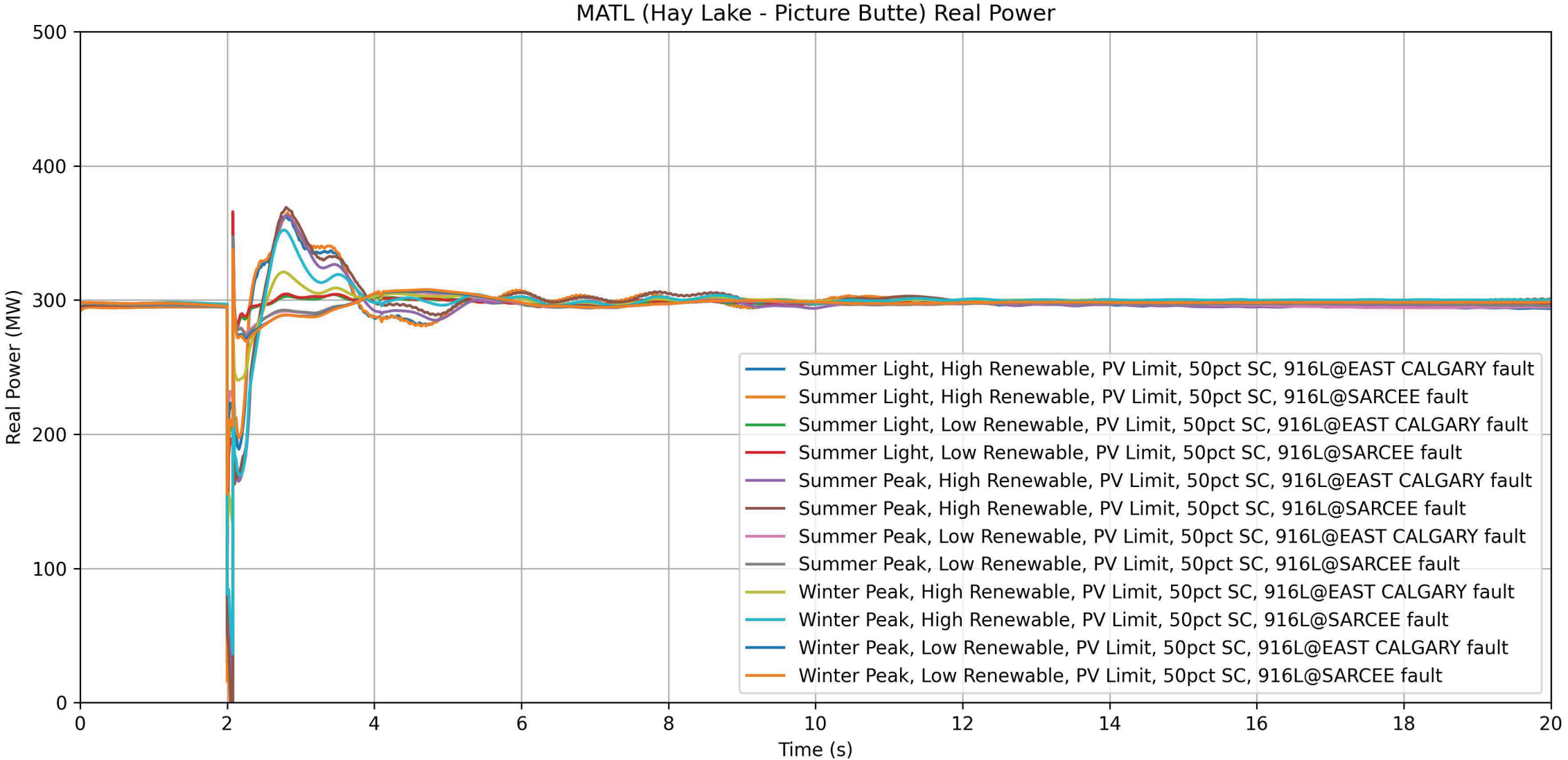

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

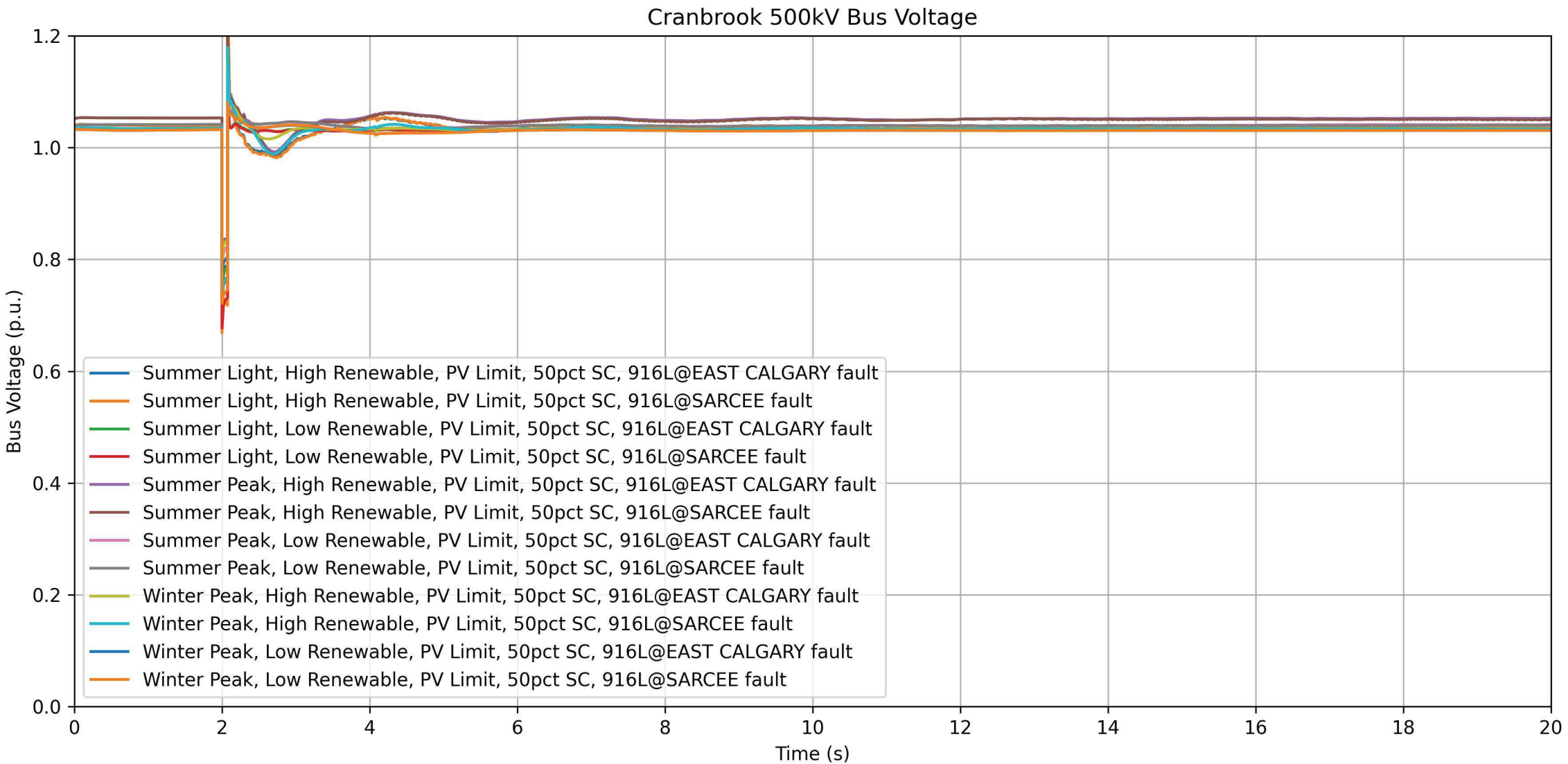

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

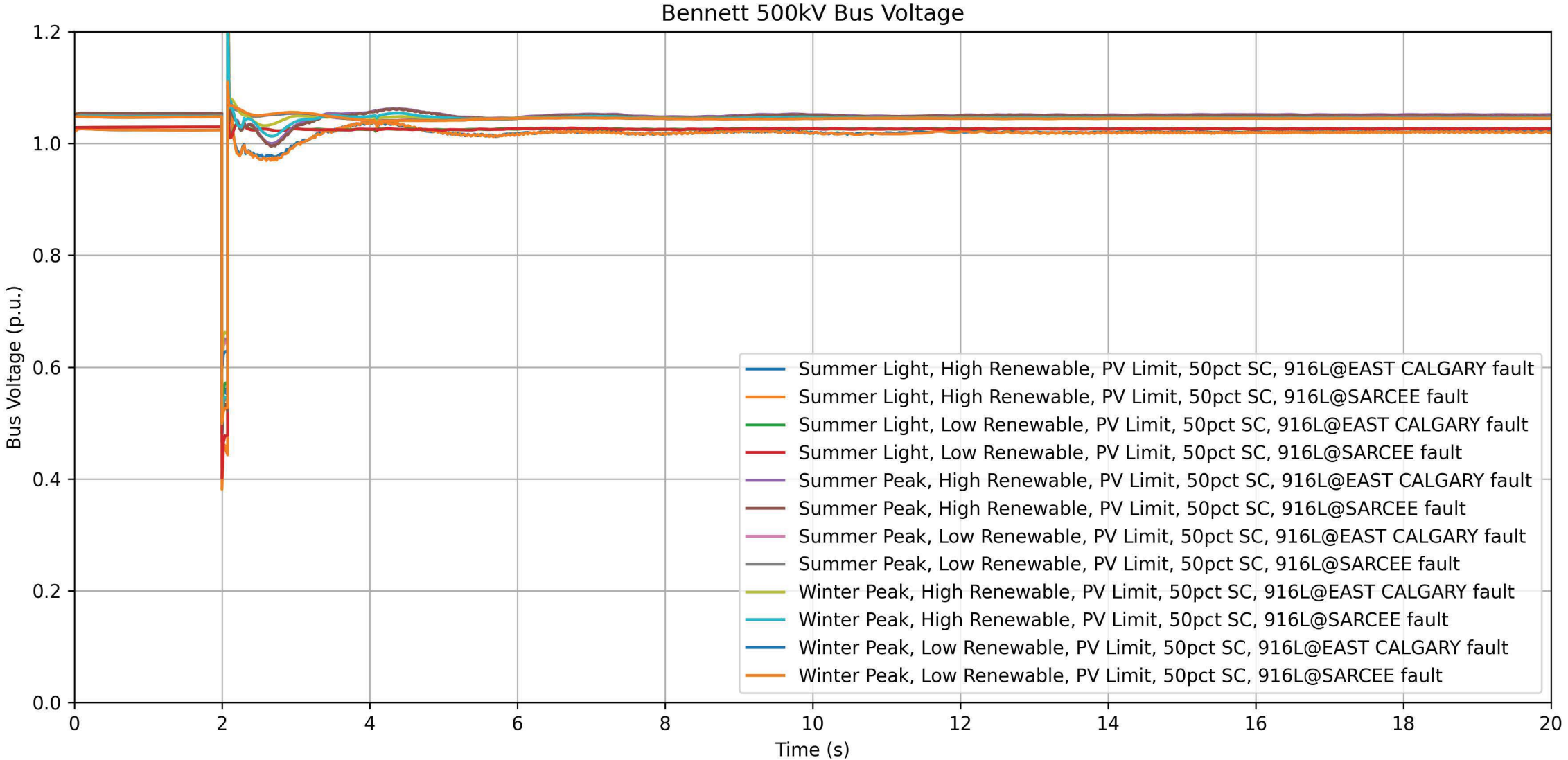

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Light, Low Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, High Renewable, PV Limit, 50pct SC, WATL fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, WATL fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

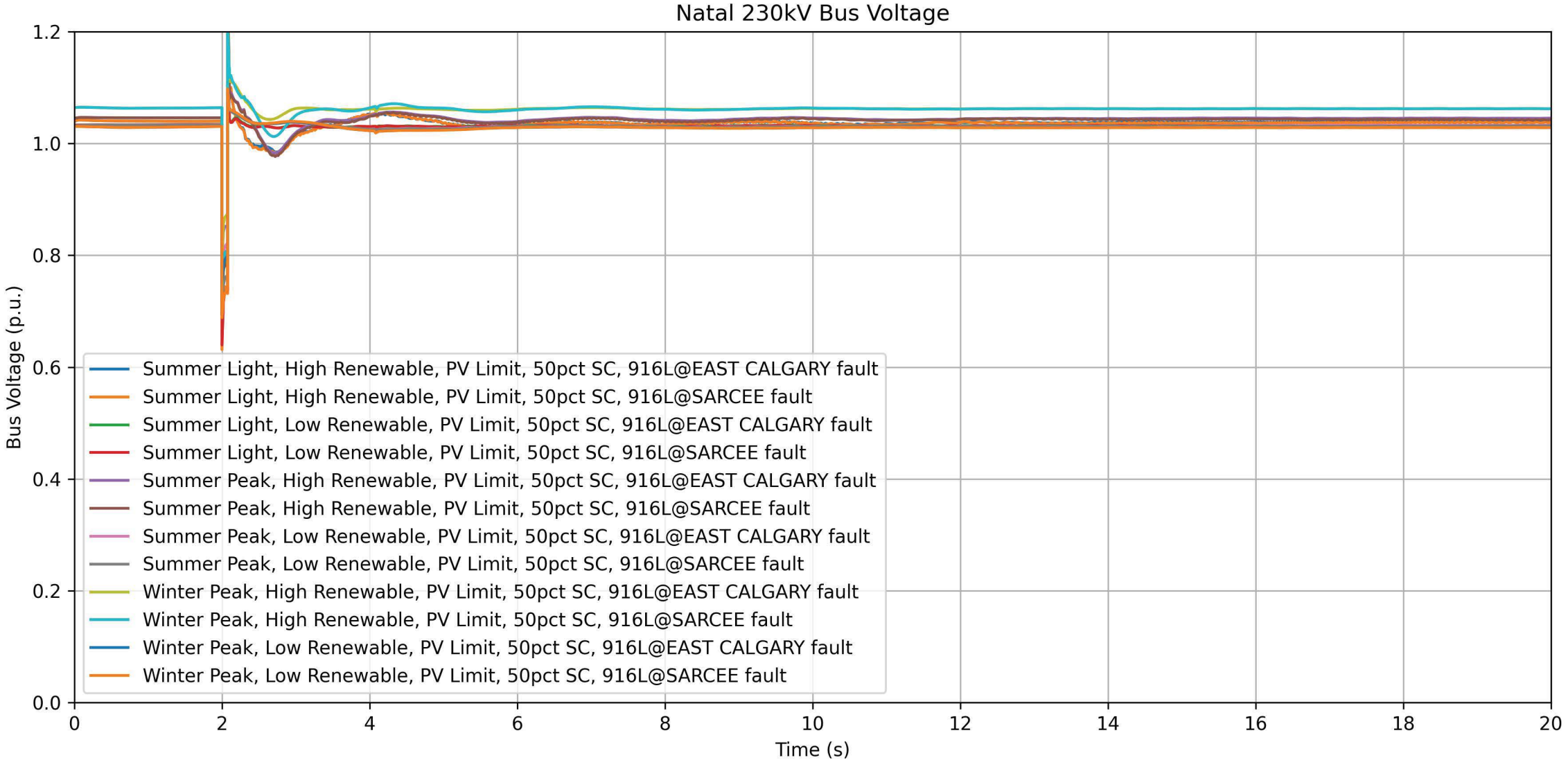

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

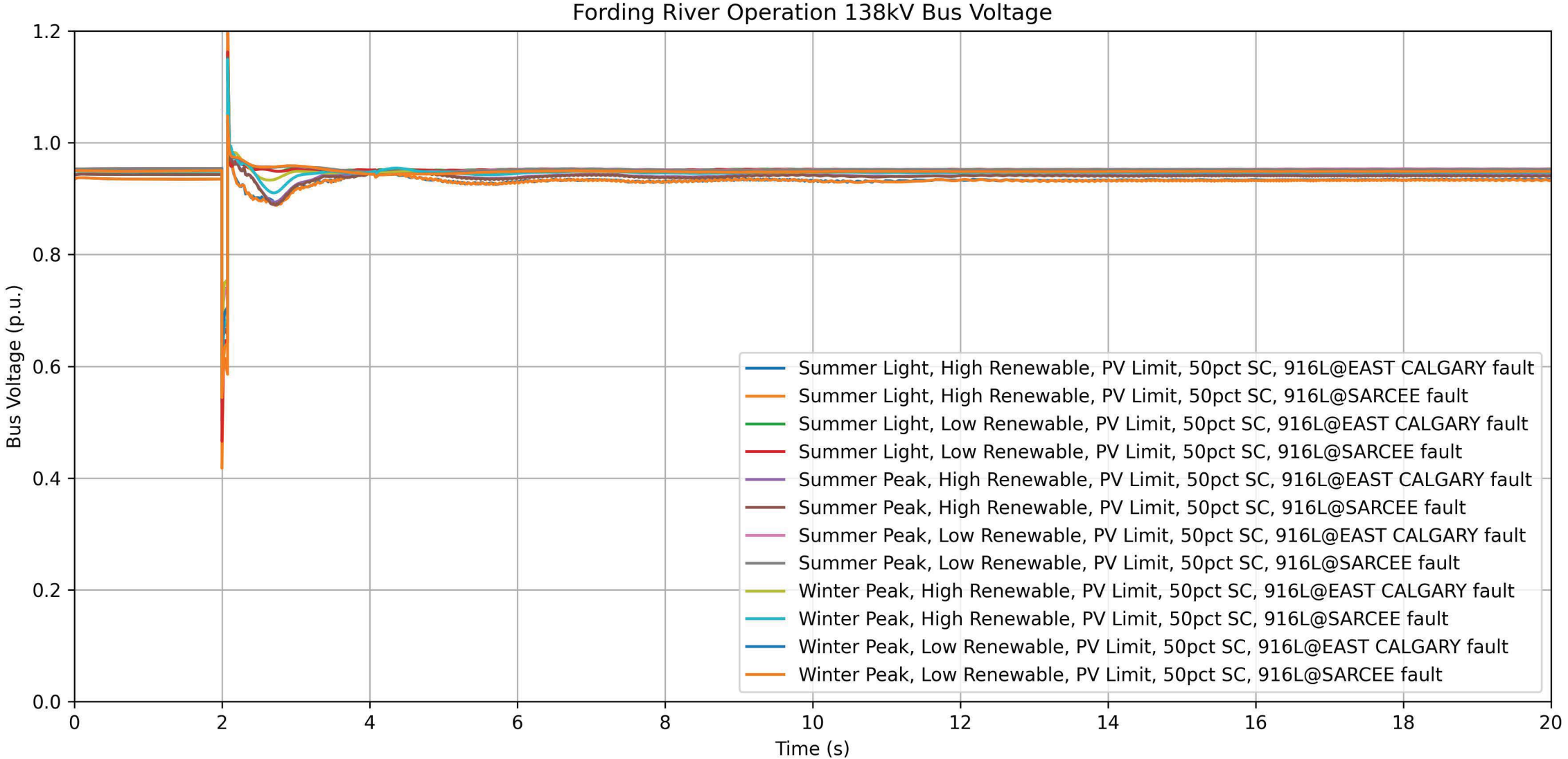

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

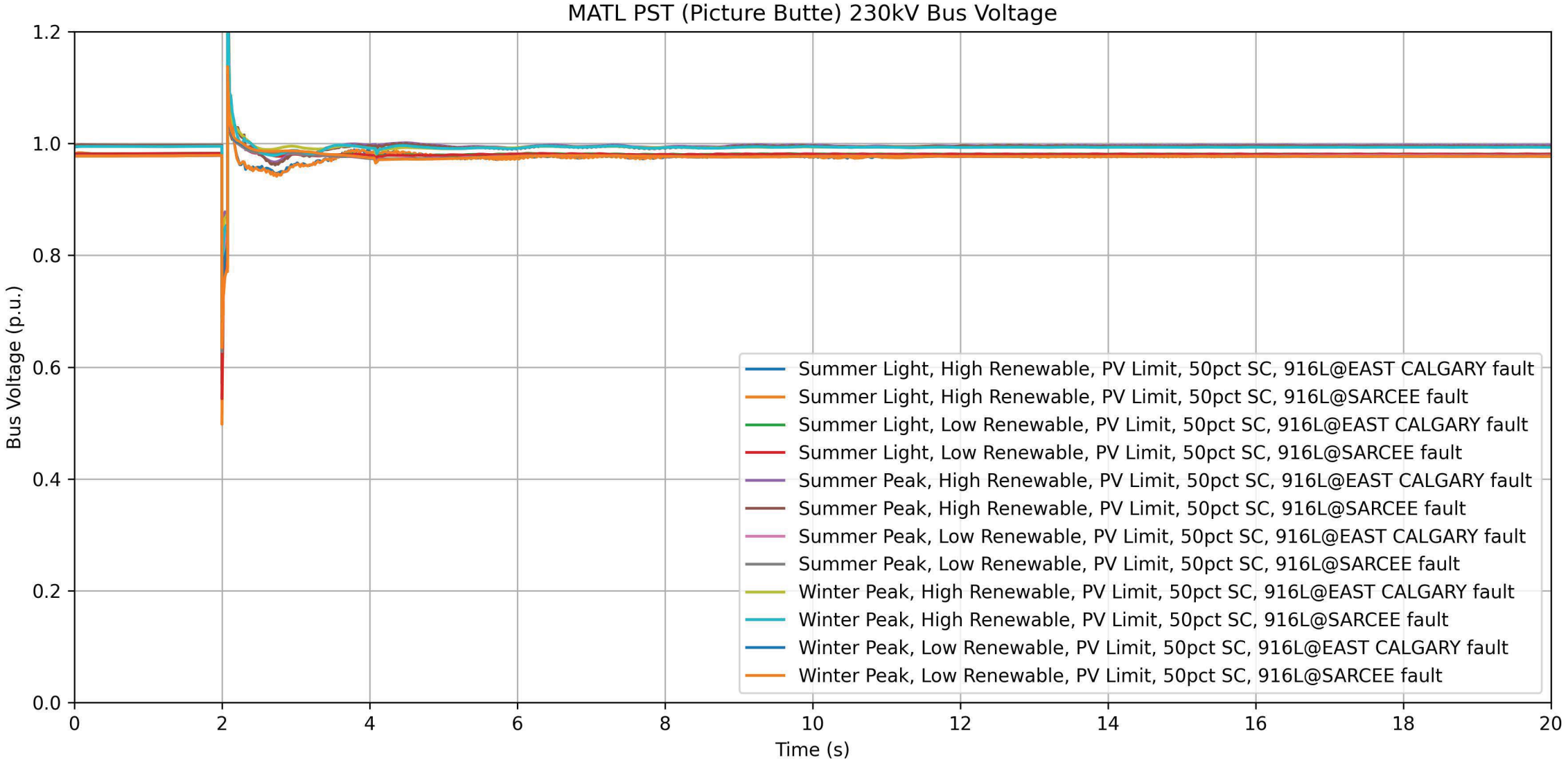

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

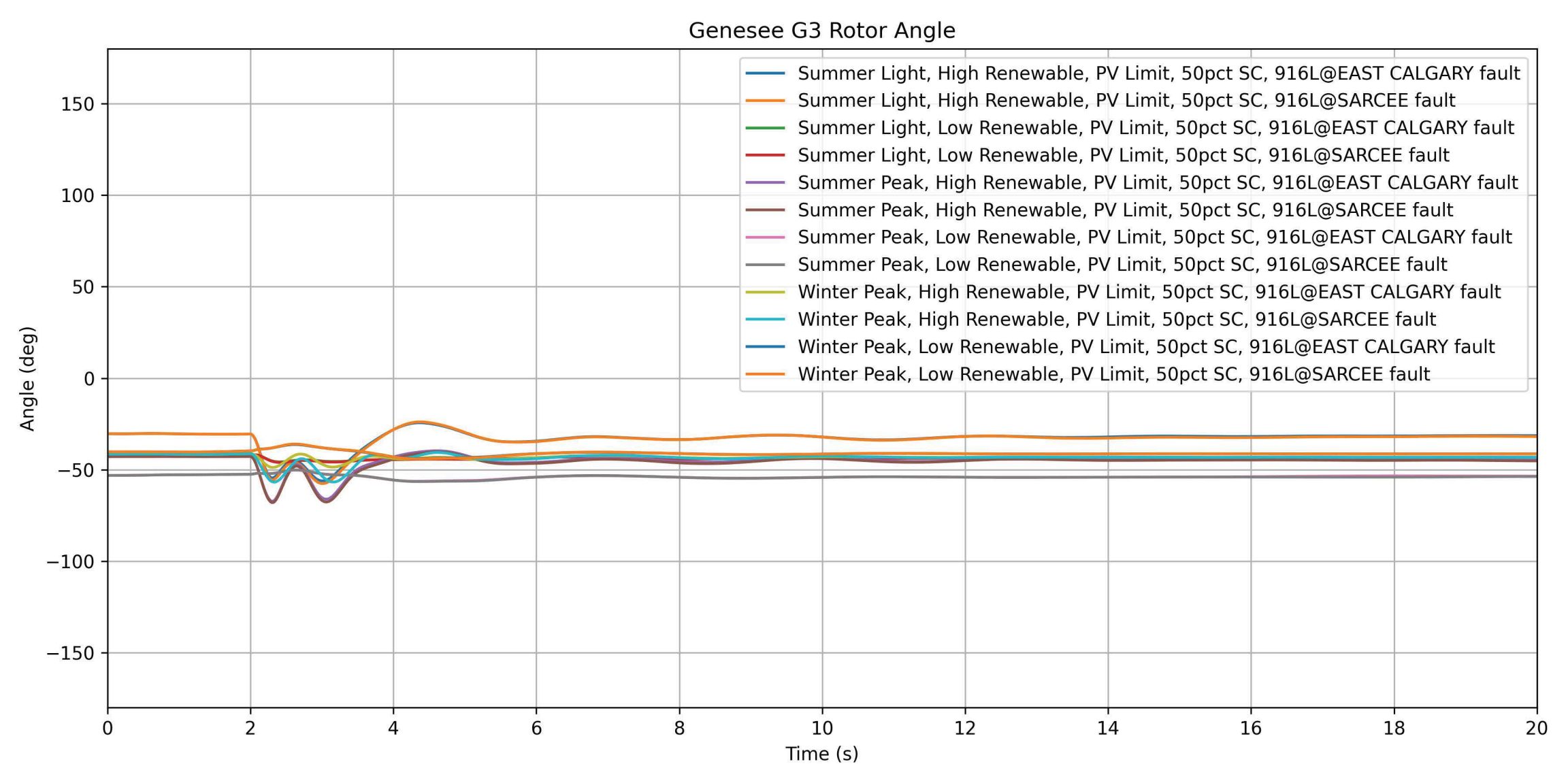

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

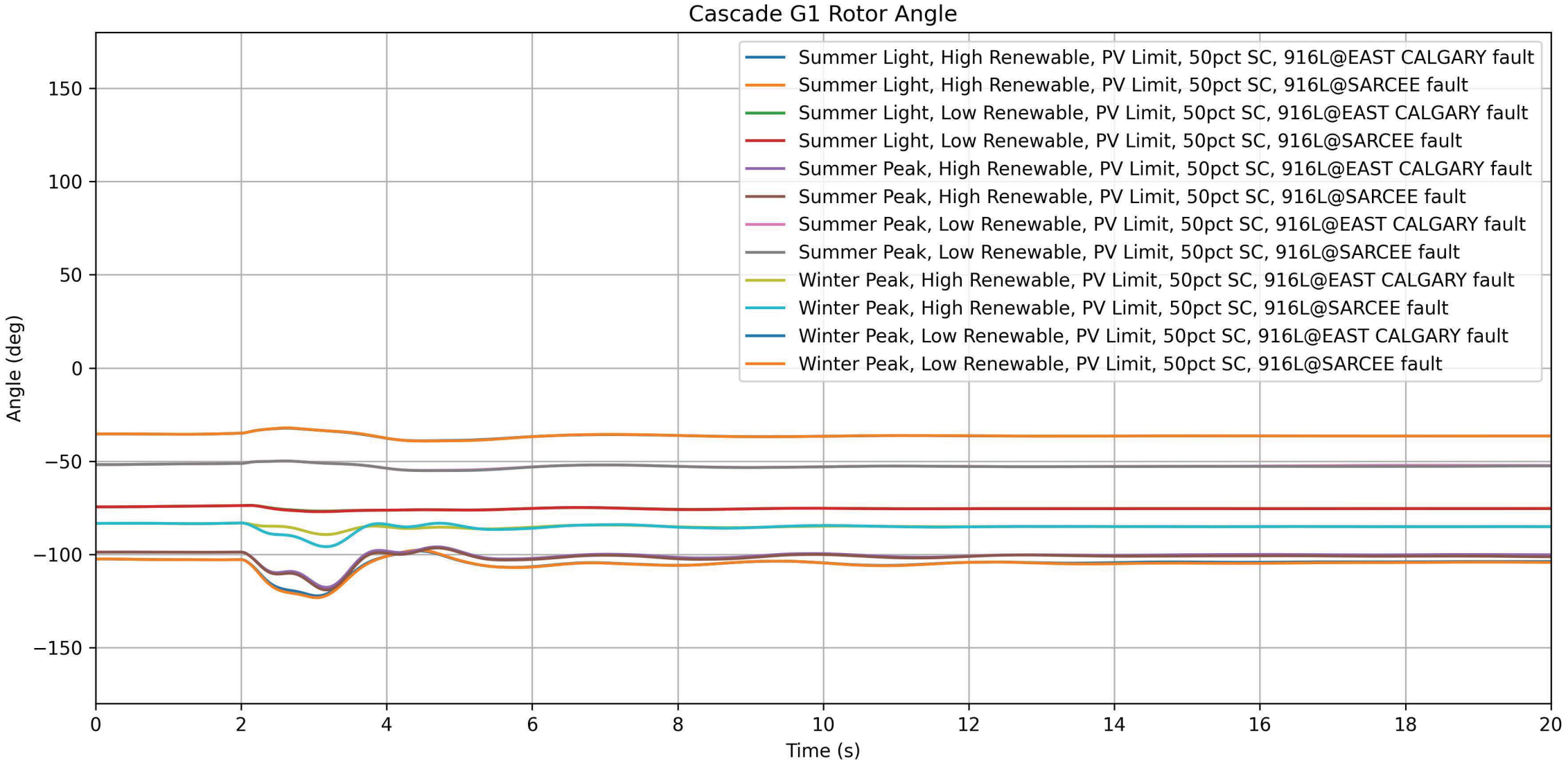

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

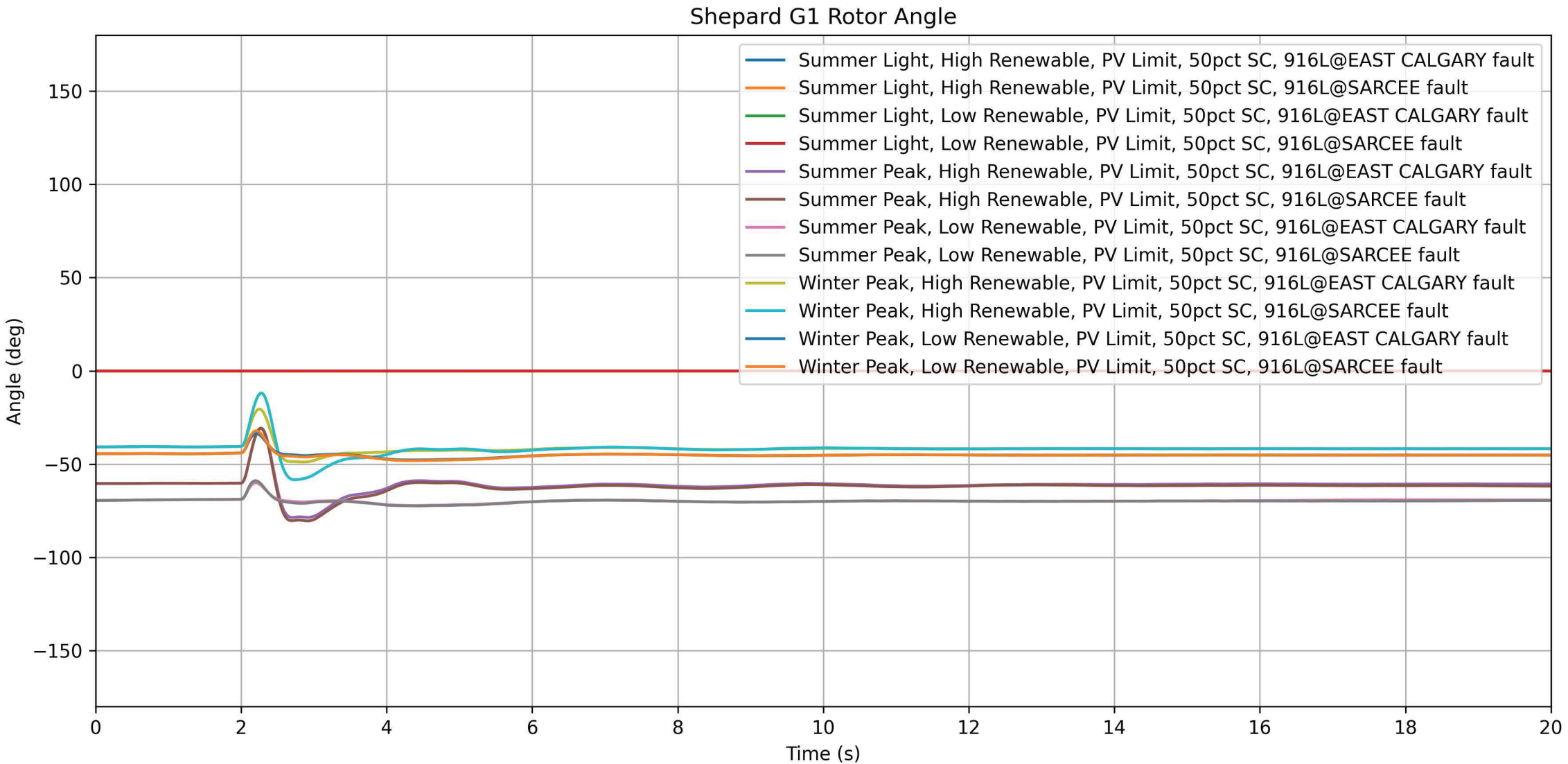

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

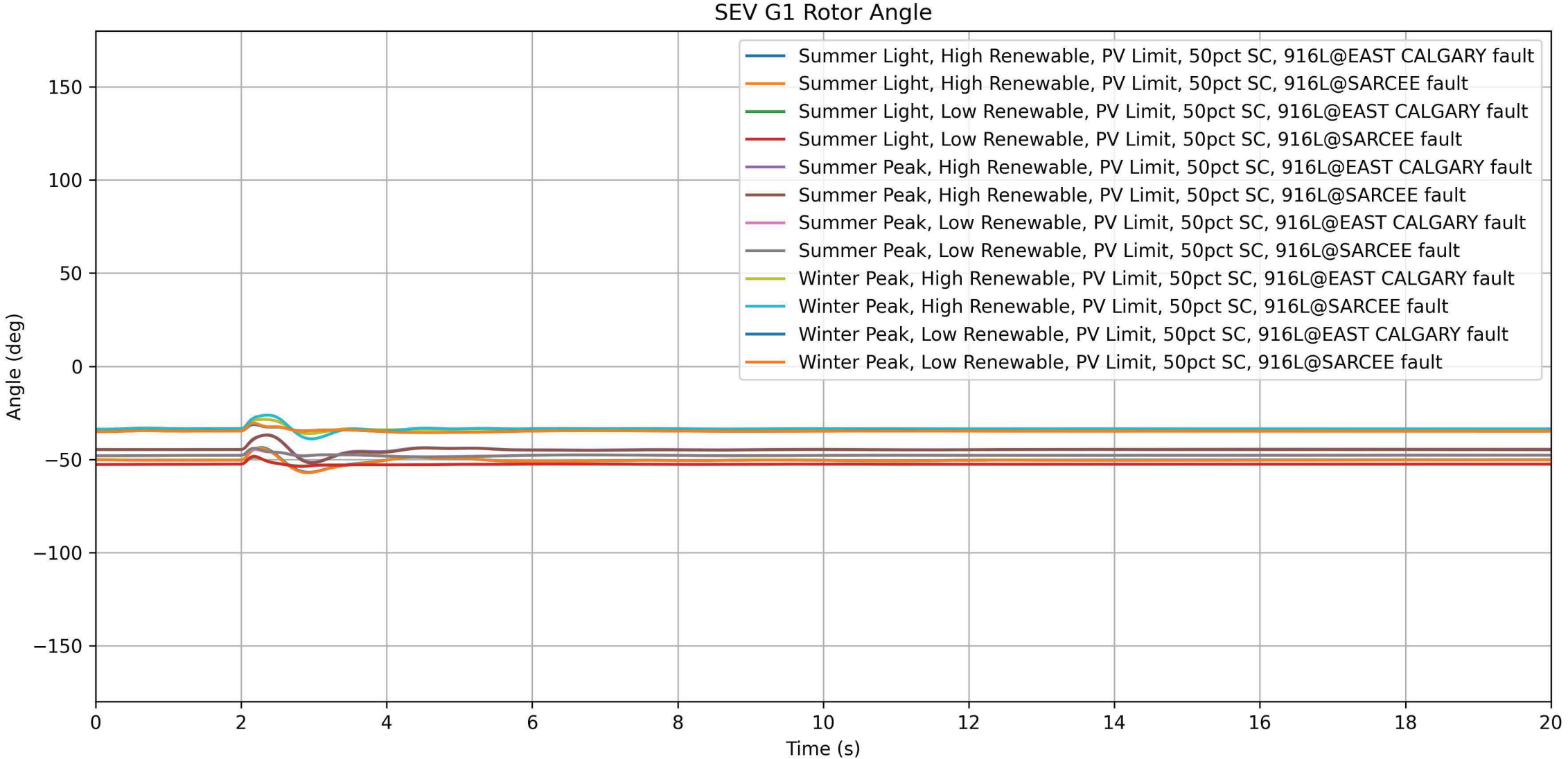

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

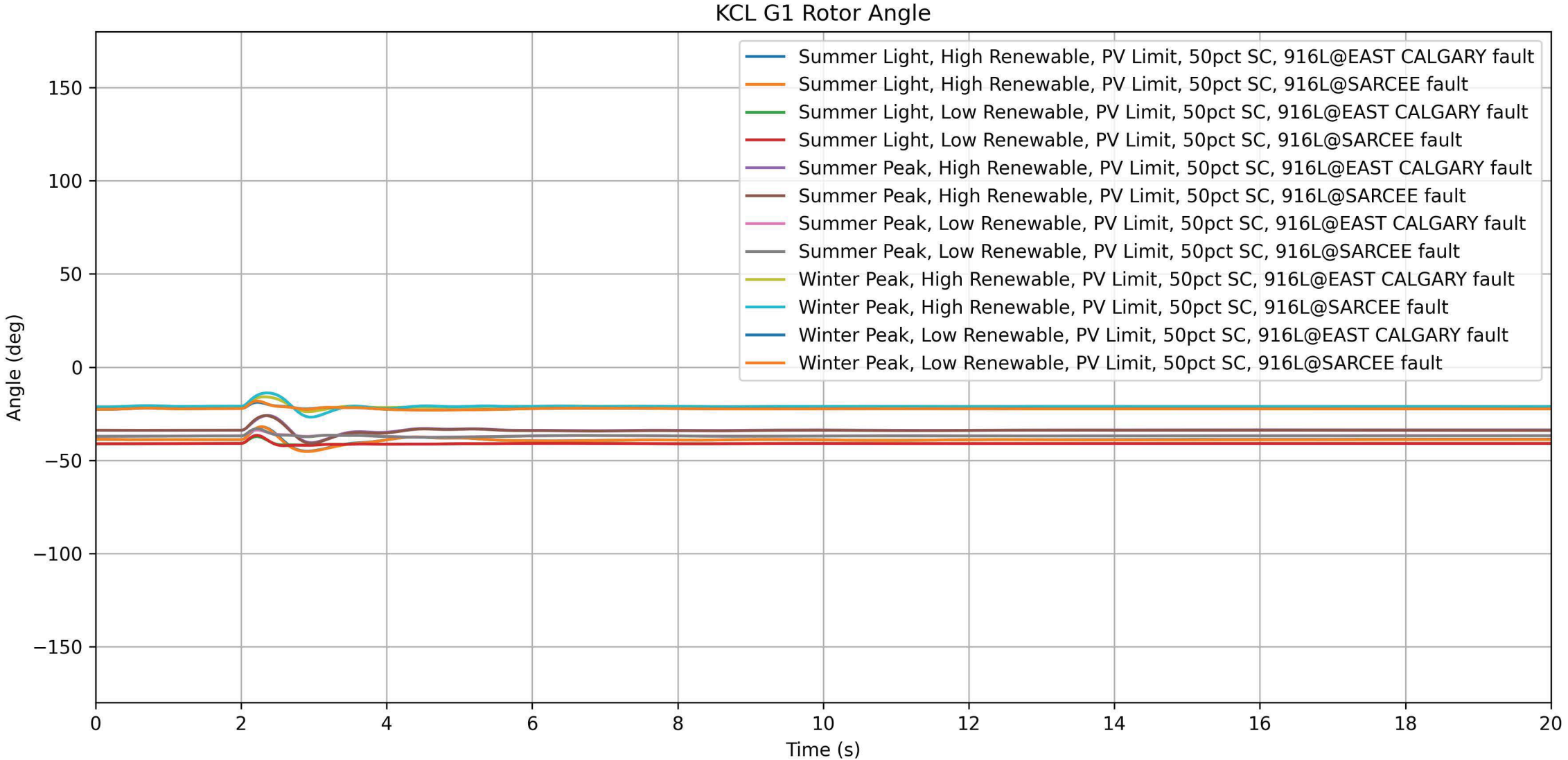

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

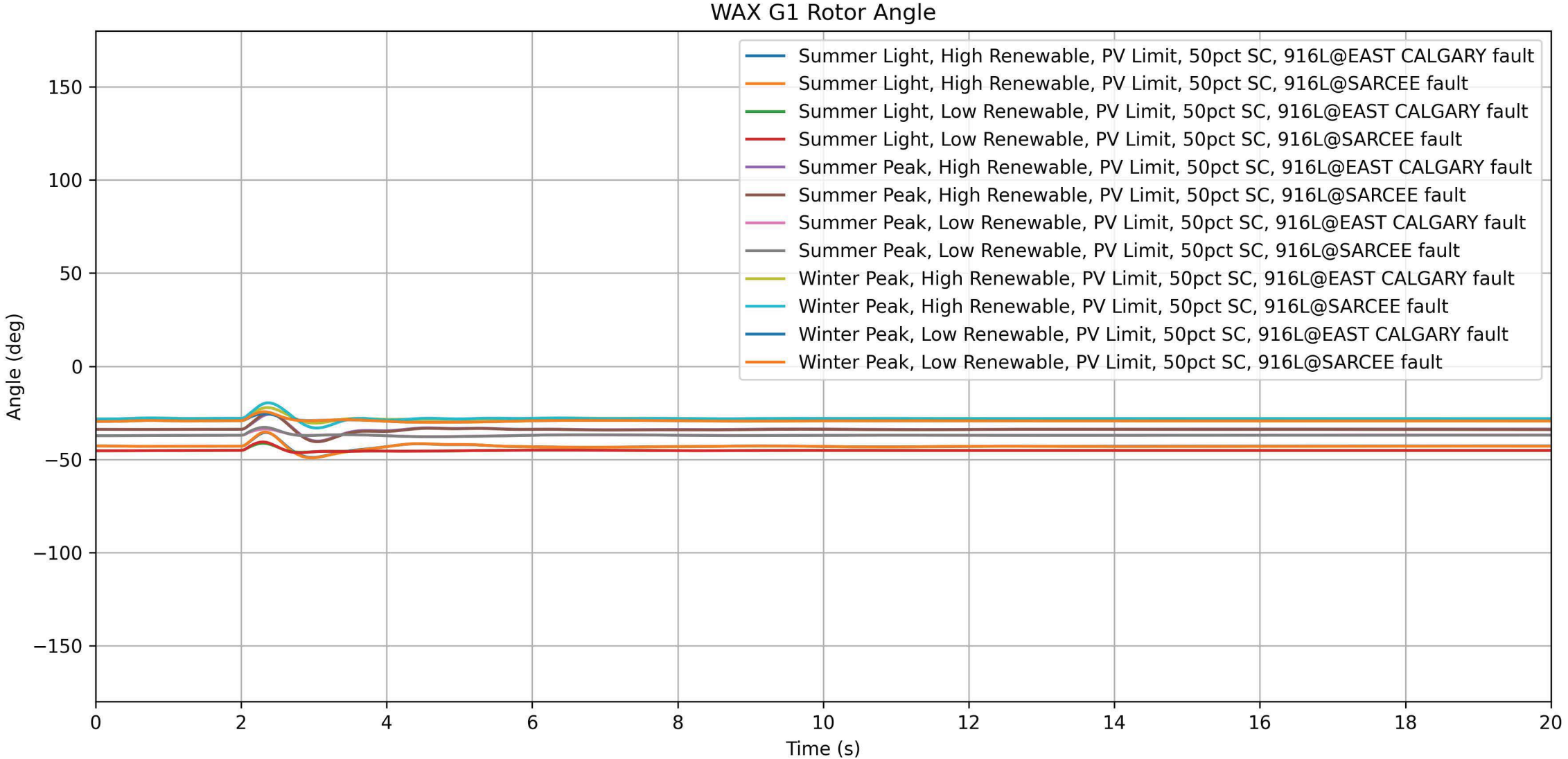

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

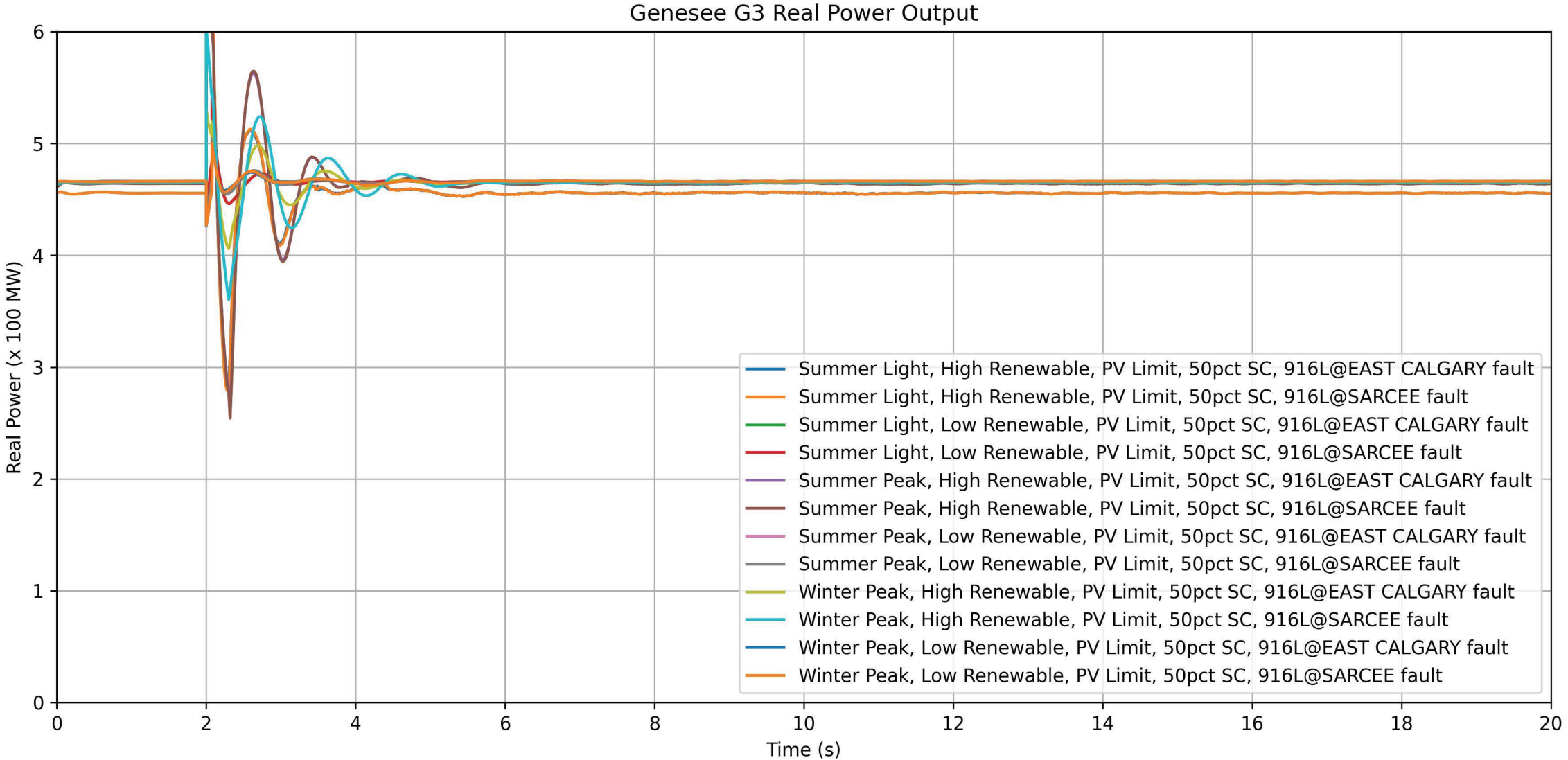

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

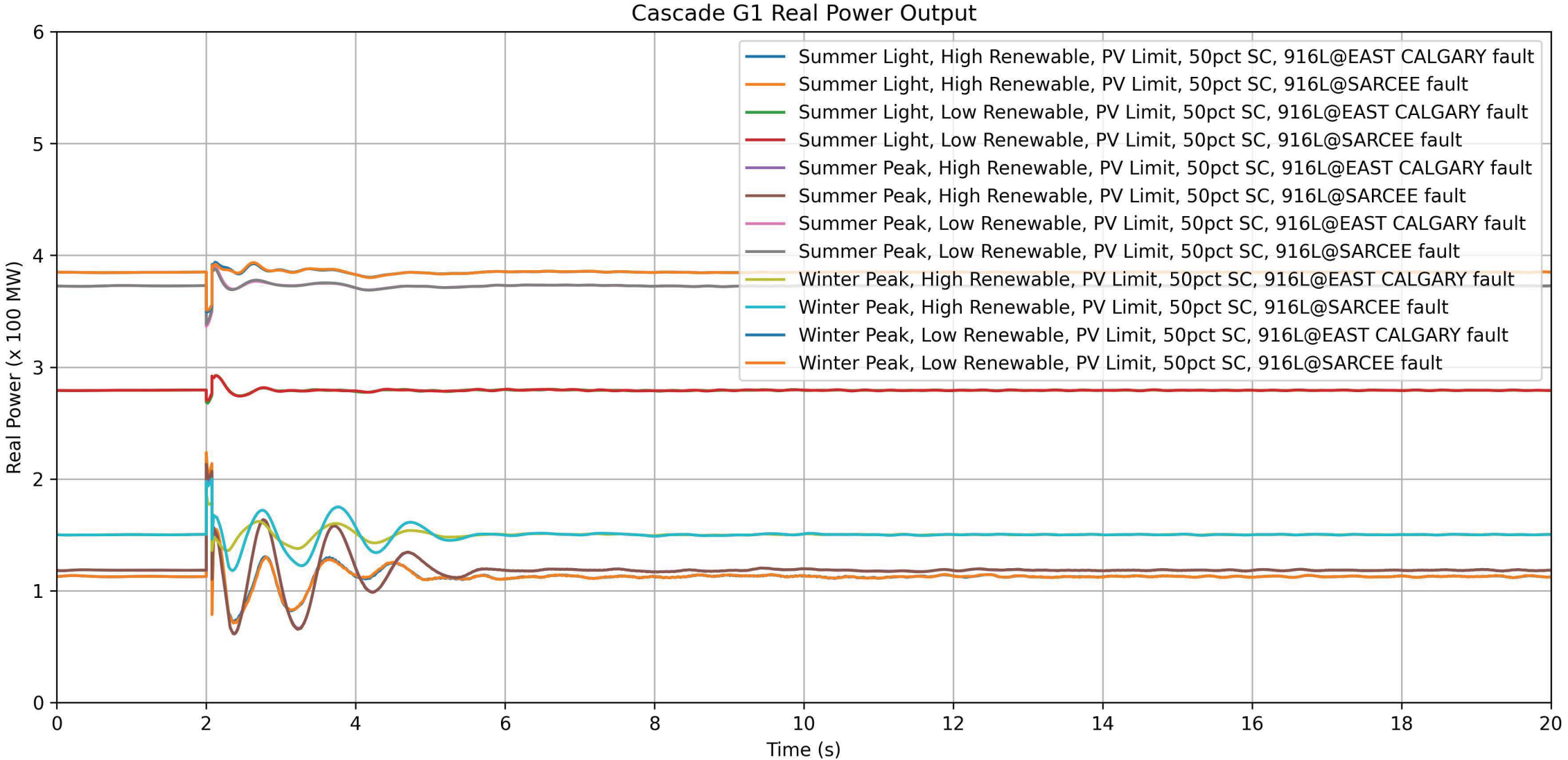

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

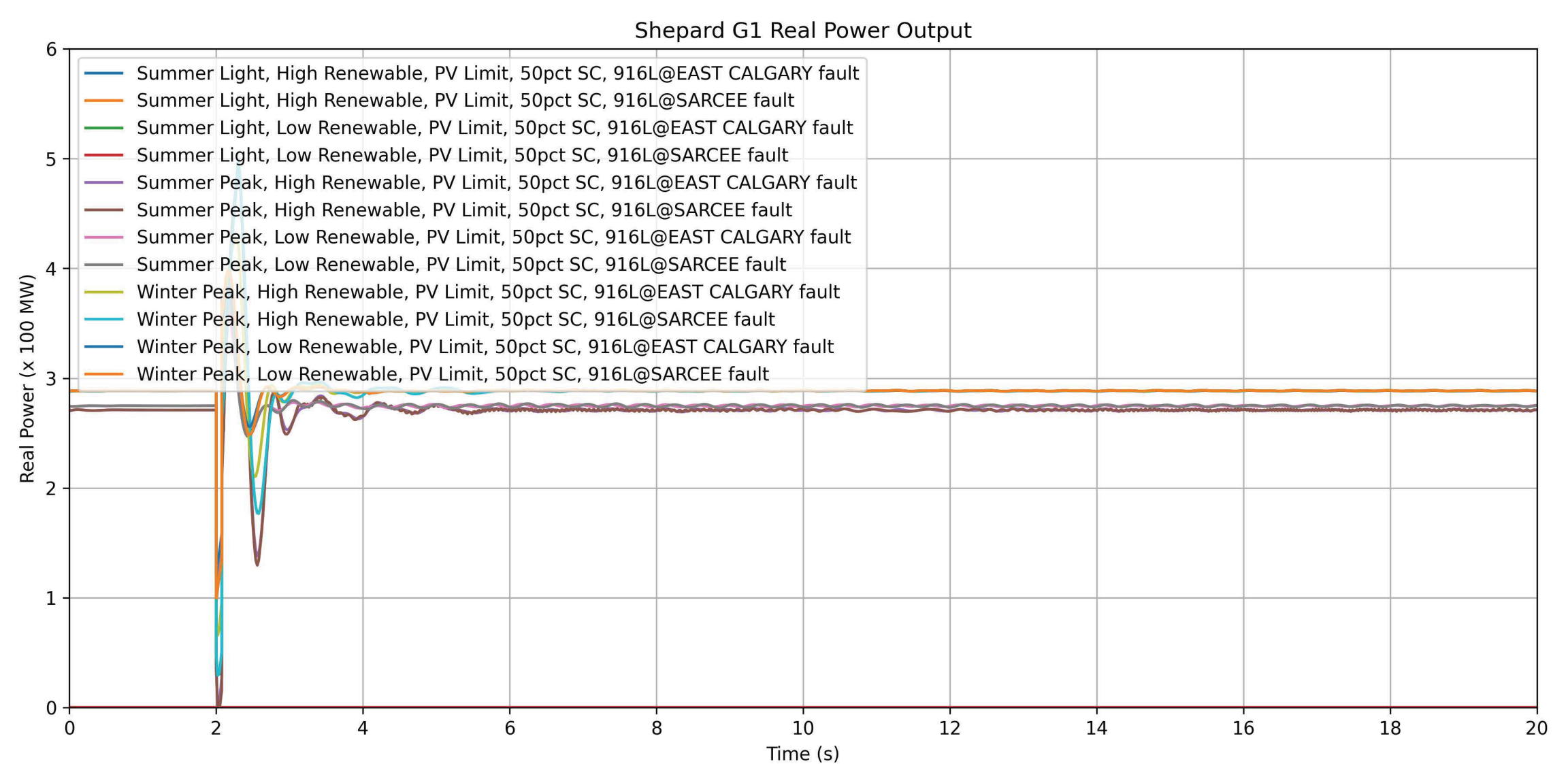

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

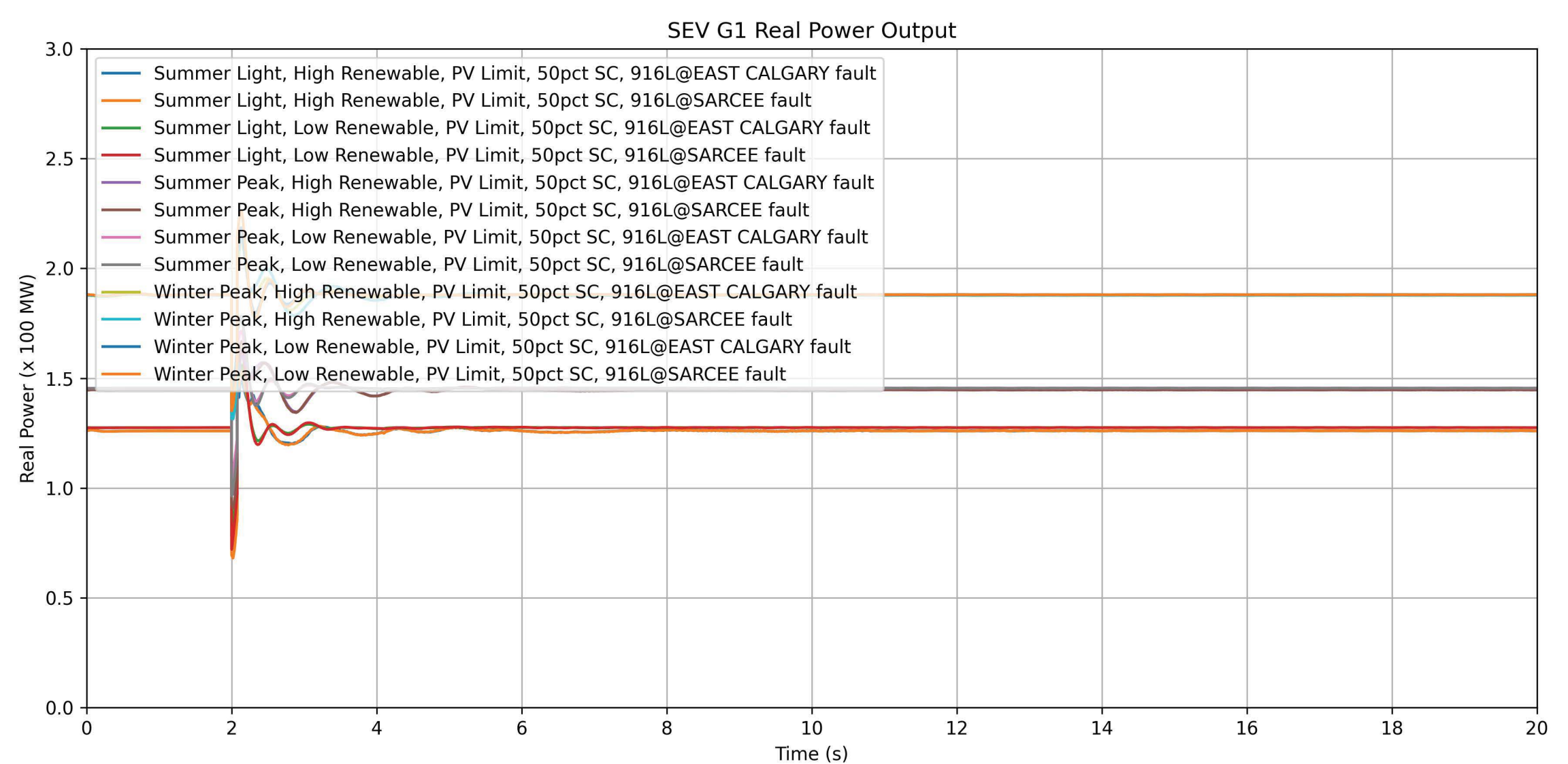

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

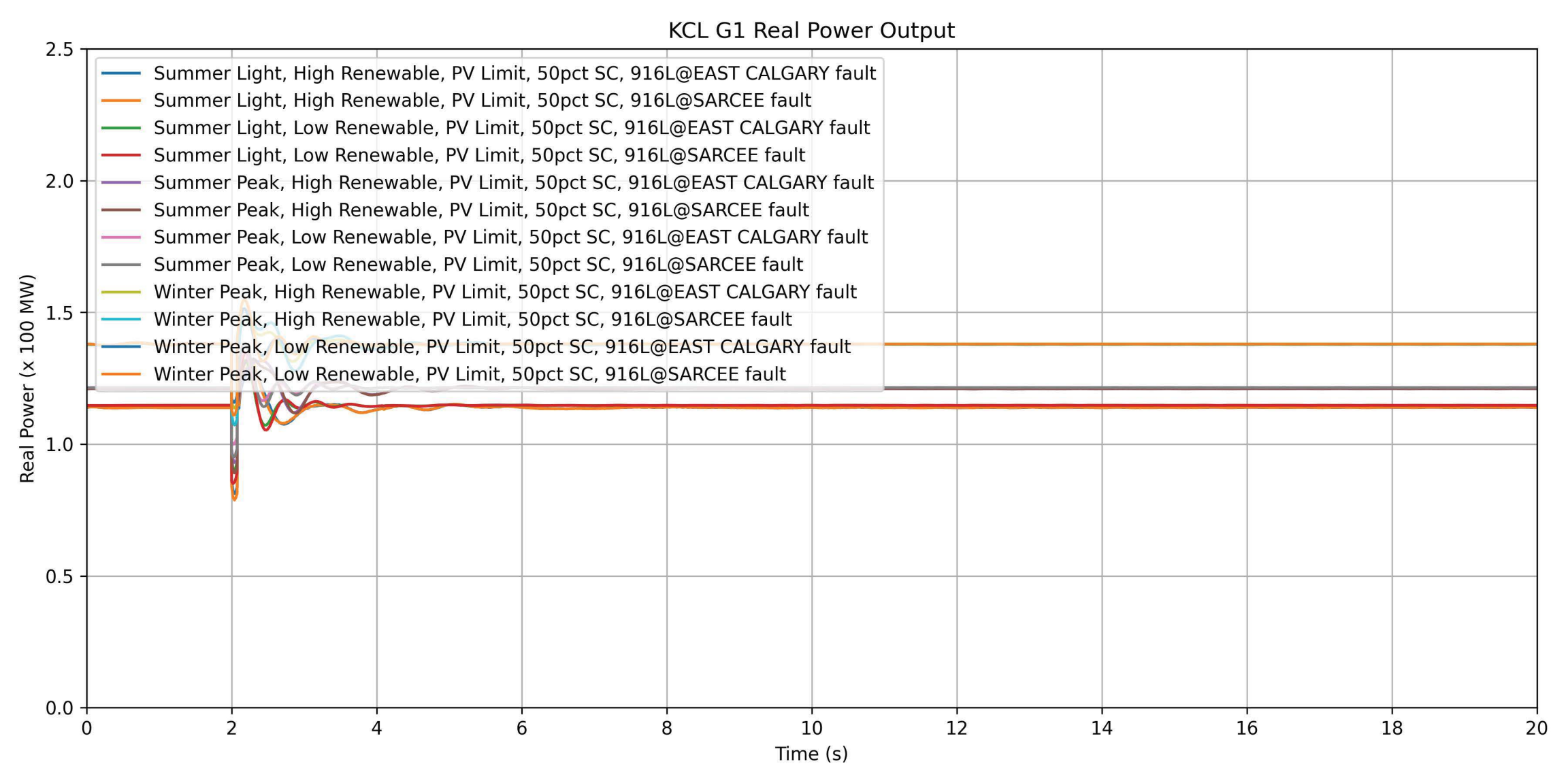

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

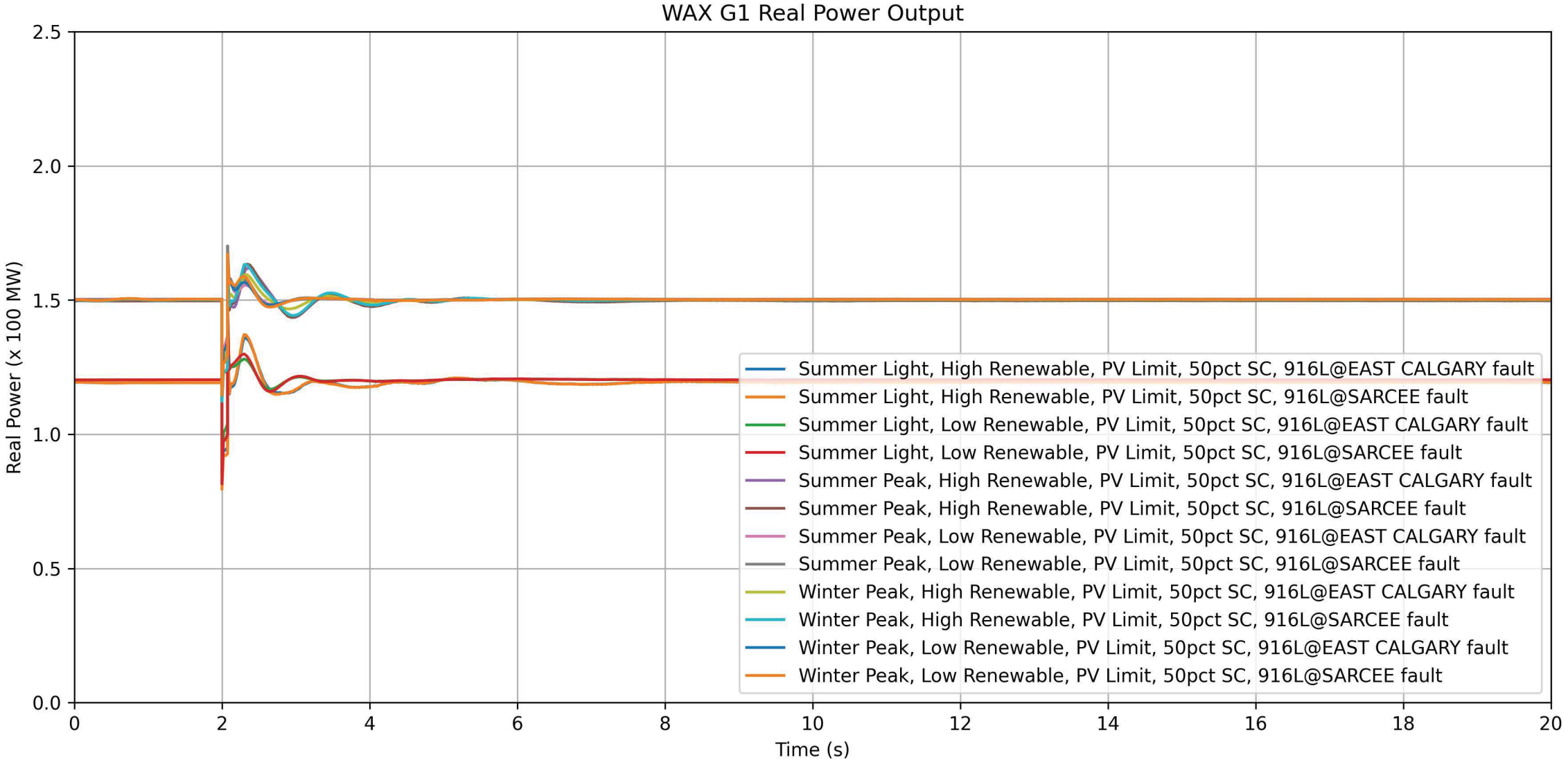

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

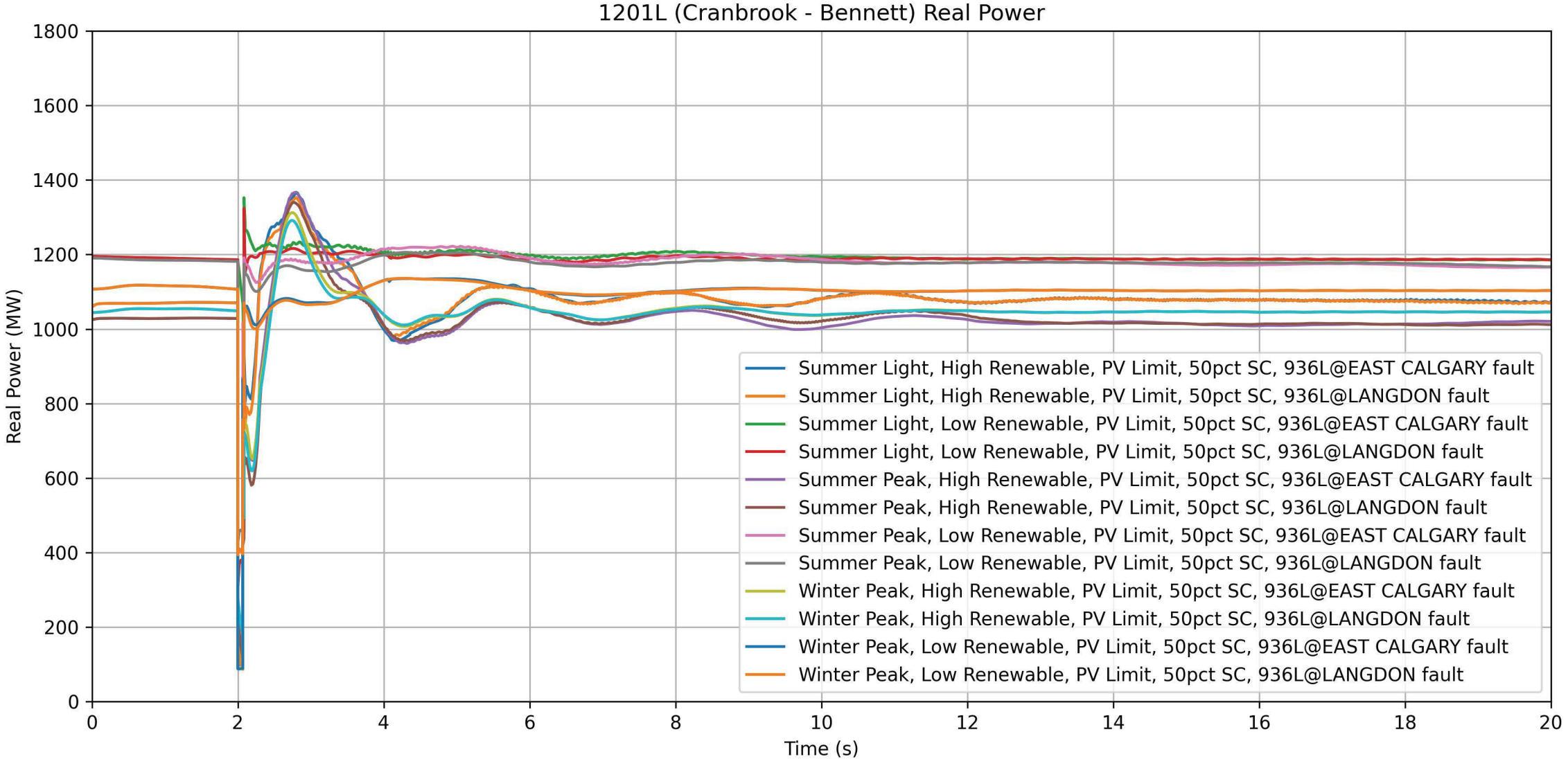

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

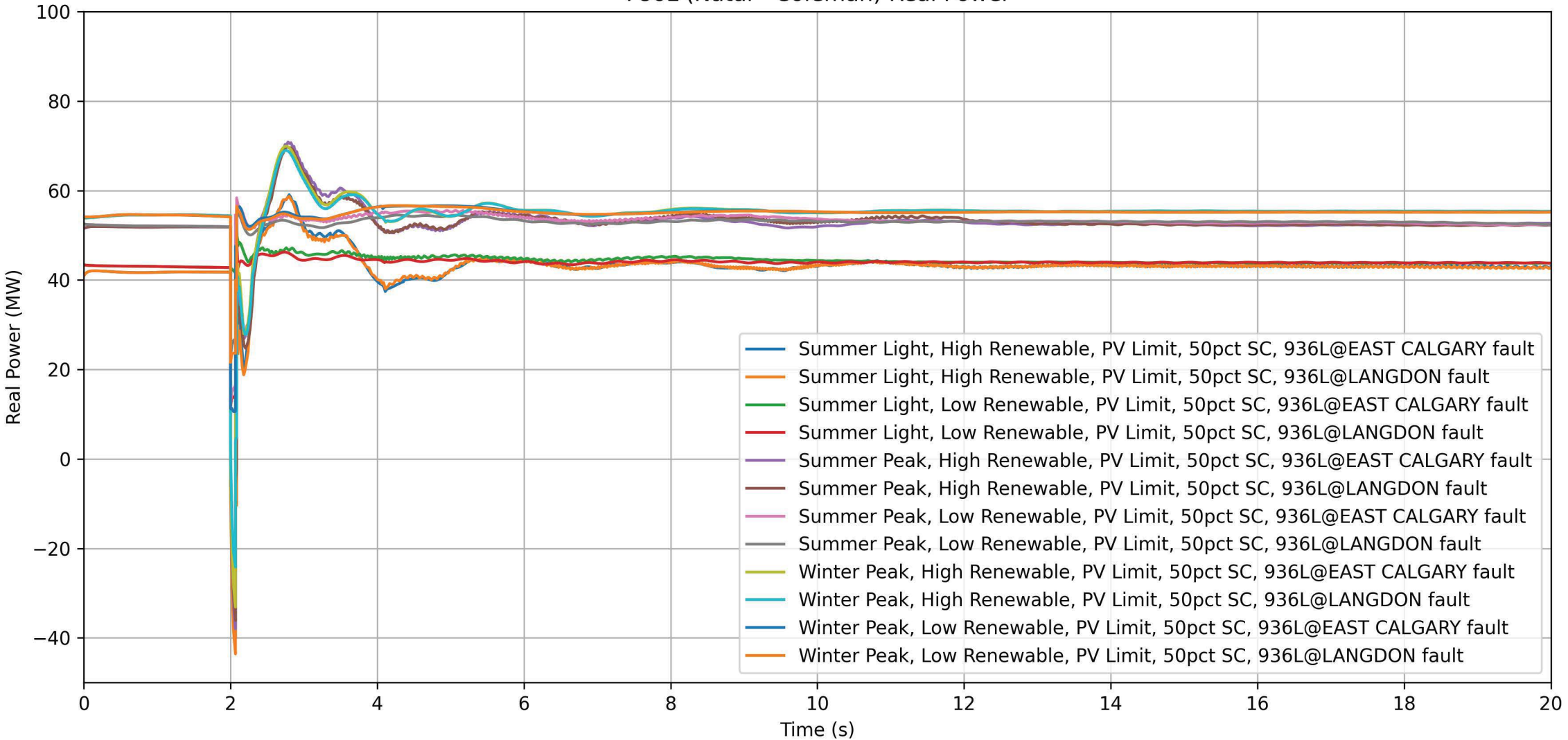

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

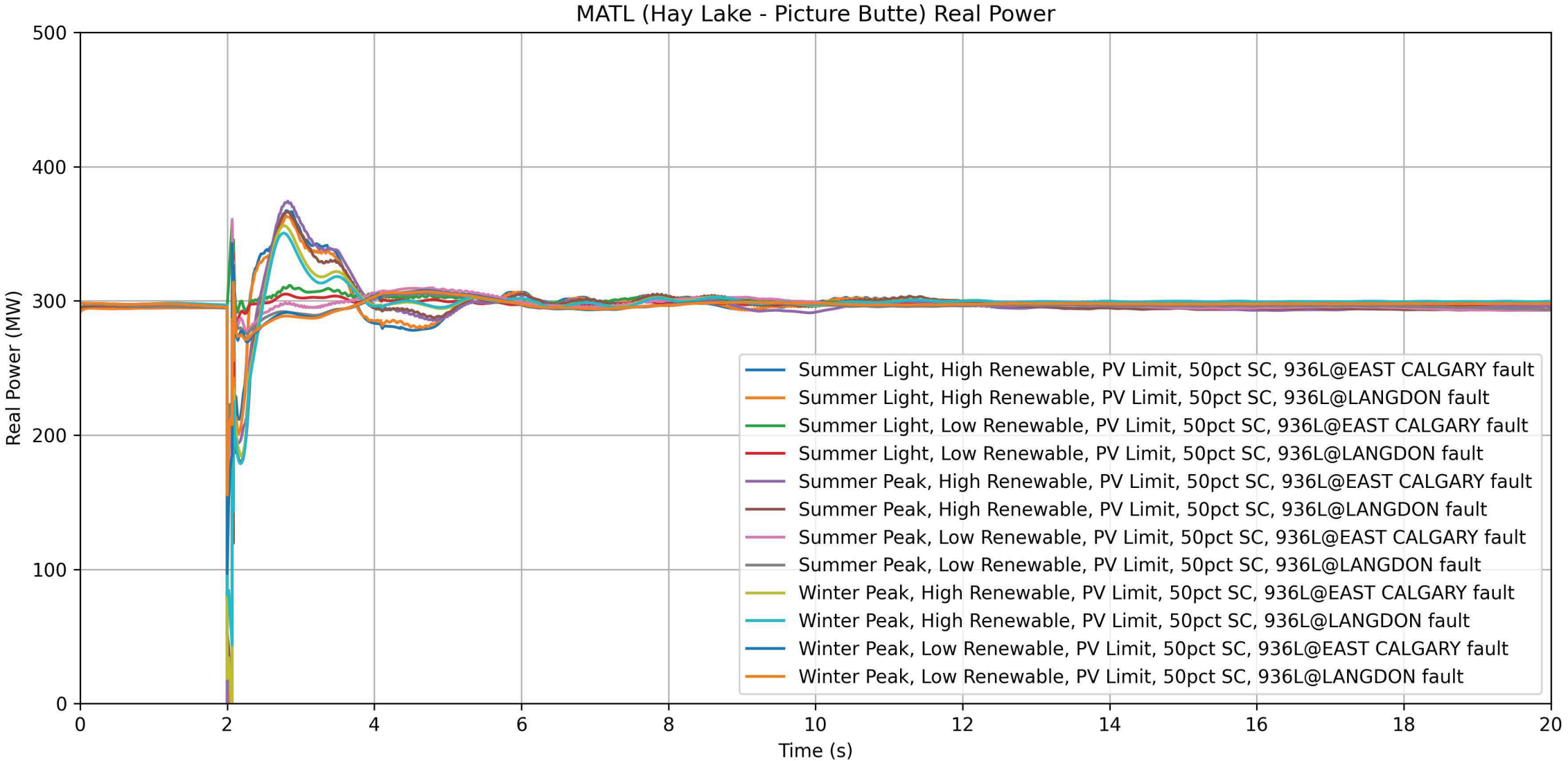

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

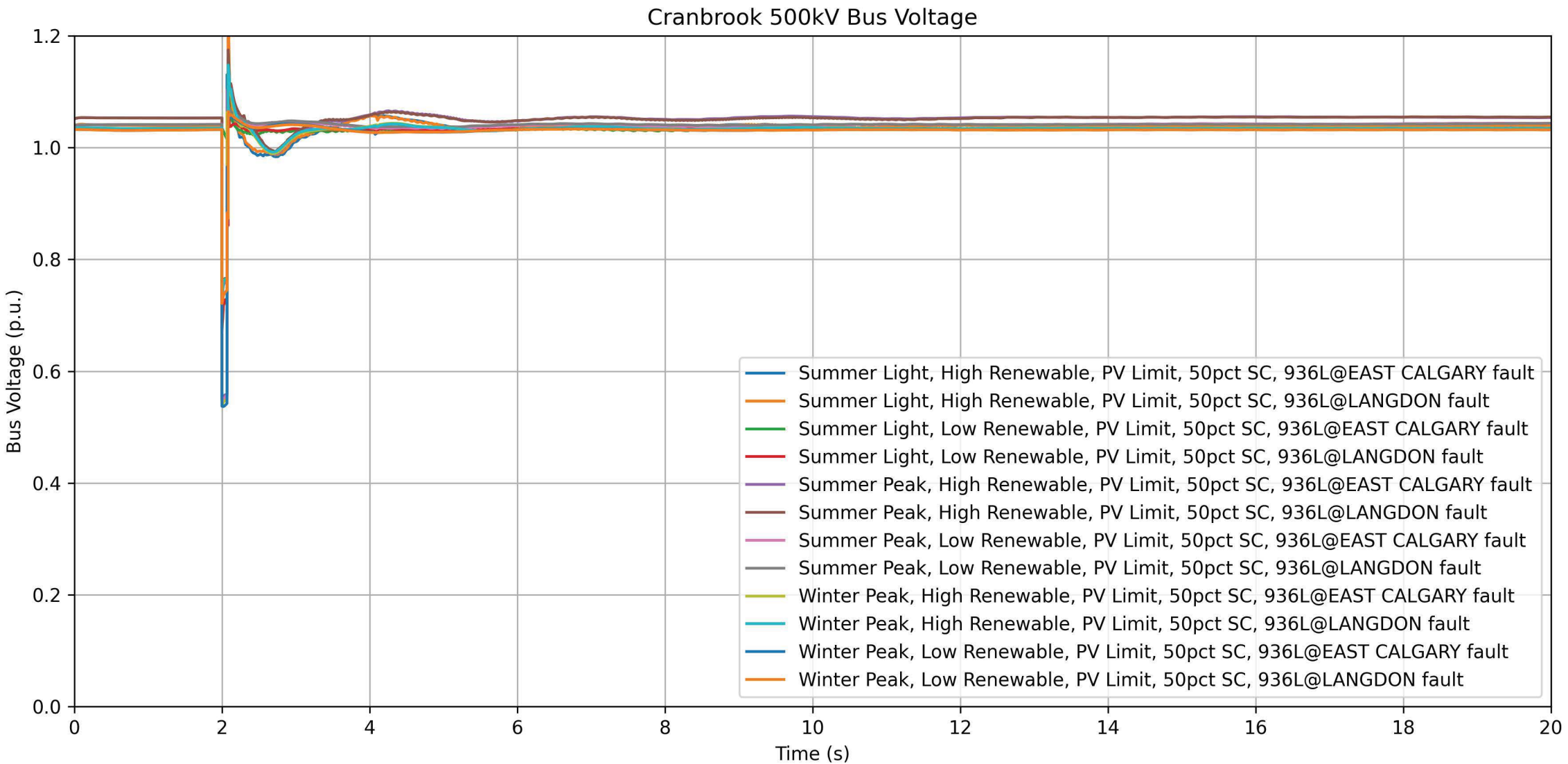

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

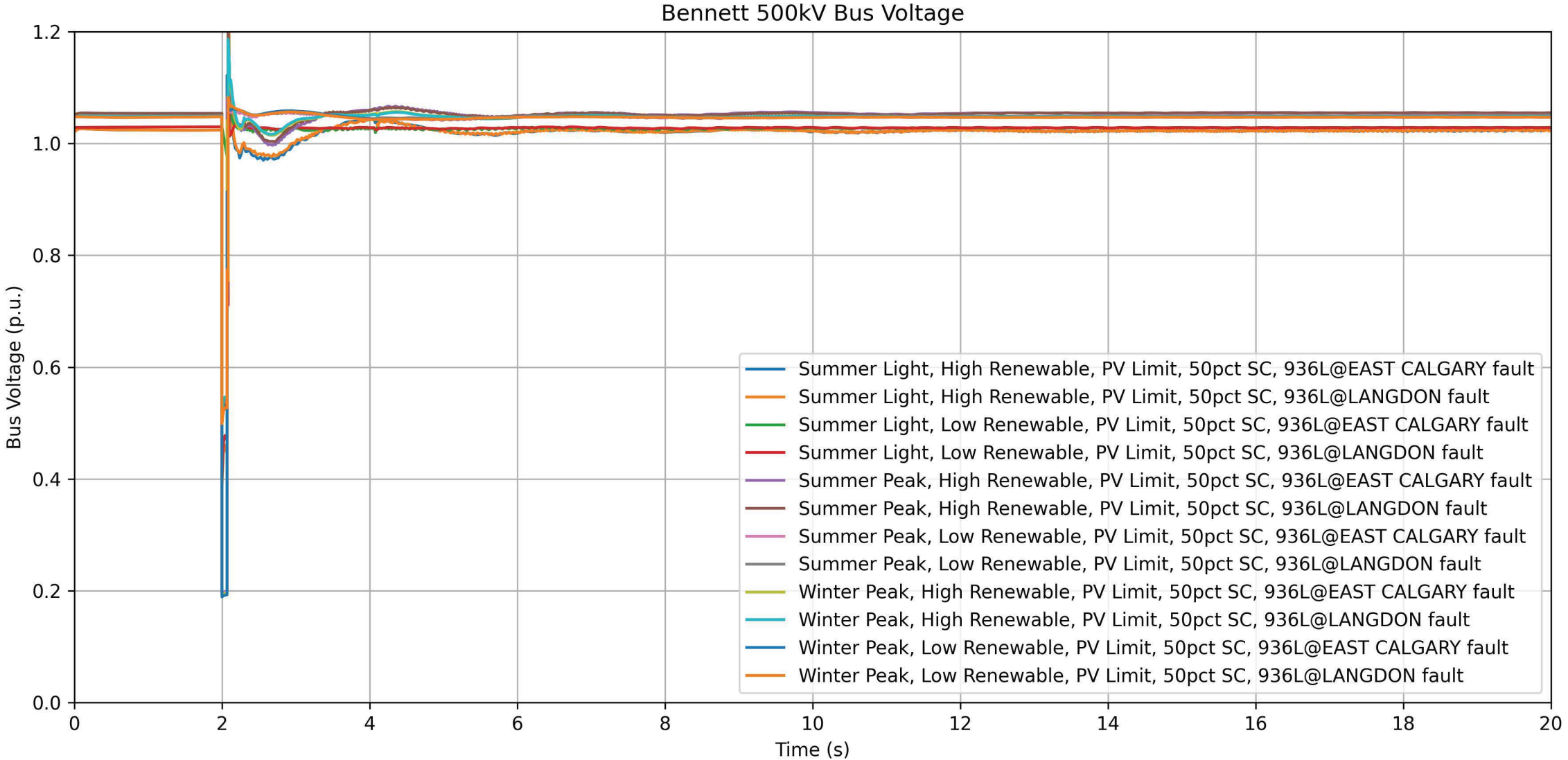

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 916L@SARCEE fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 916L@SARCEE fault

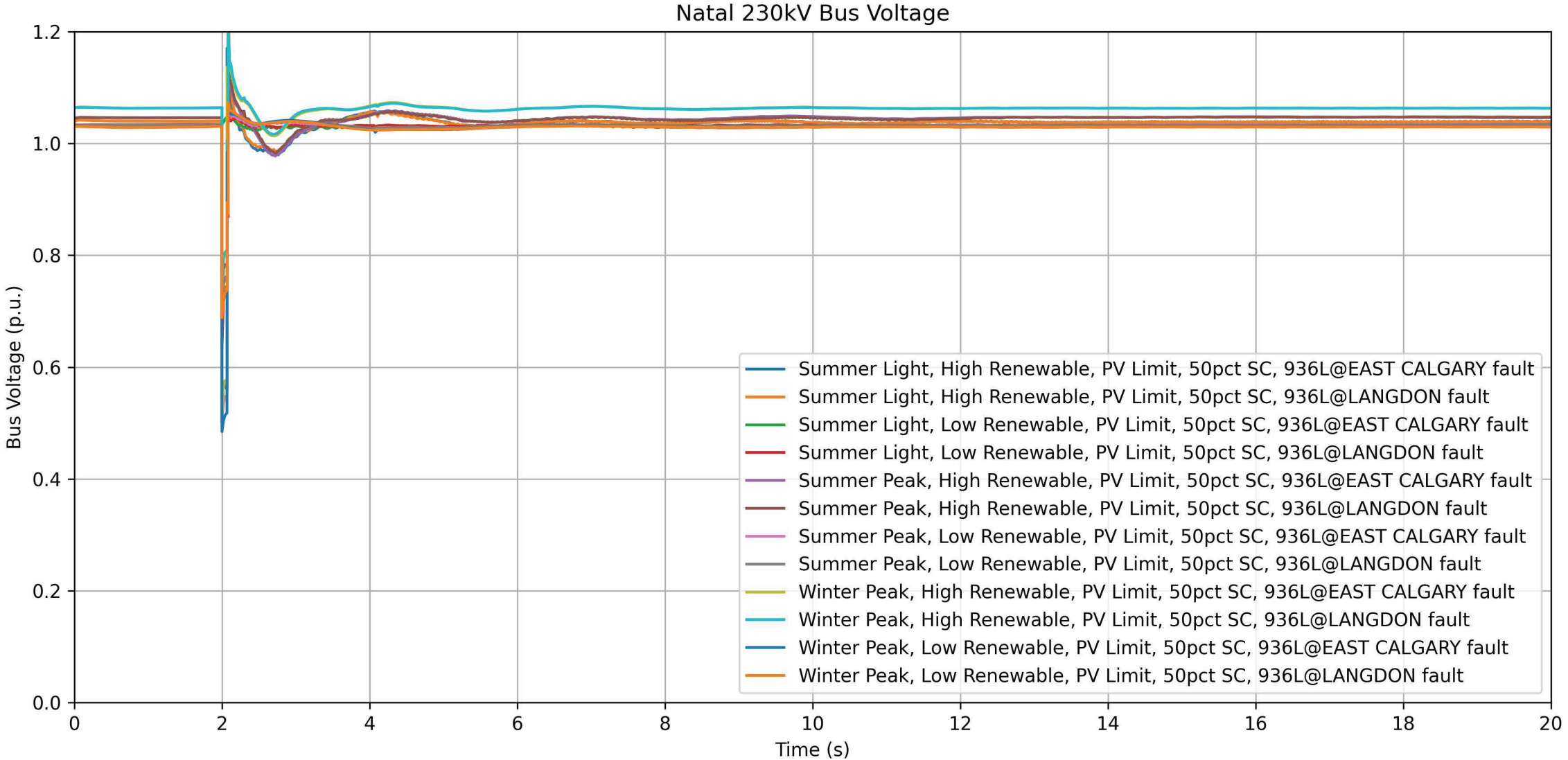

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

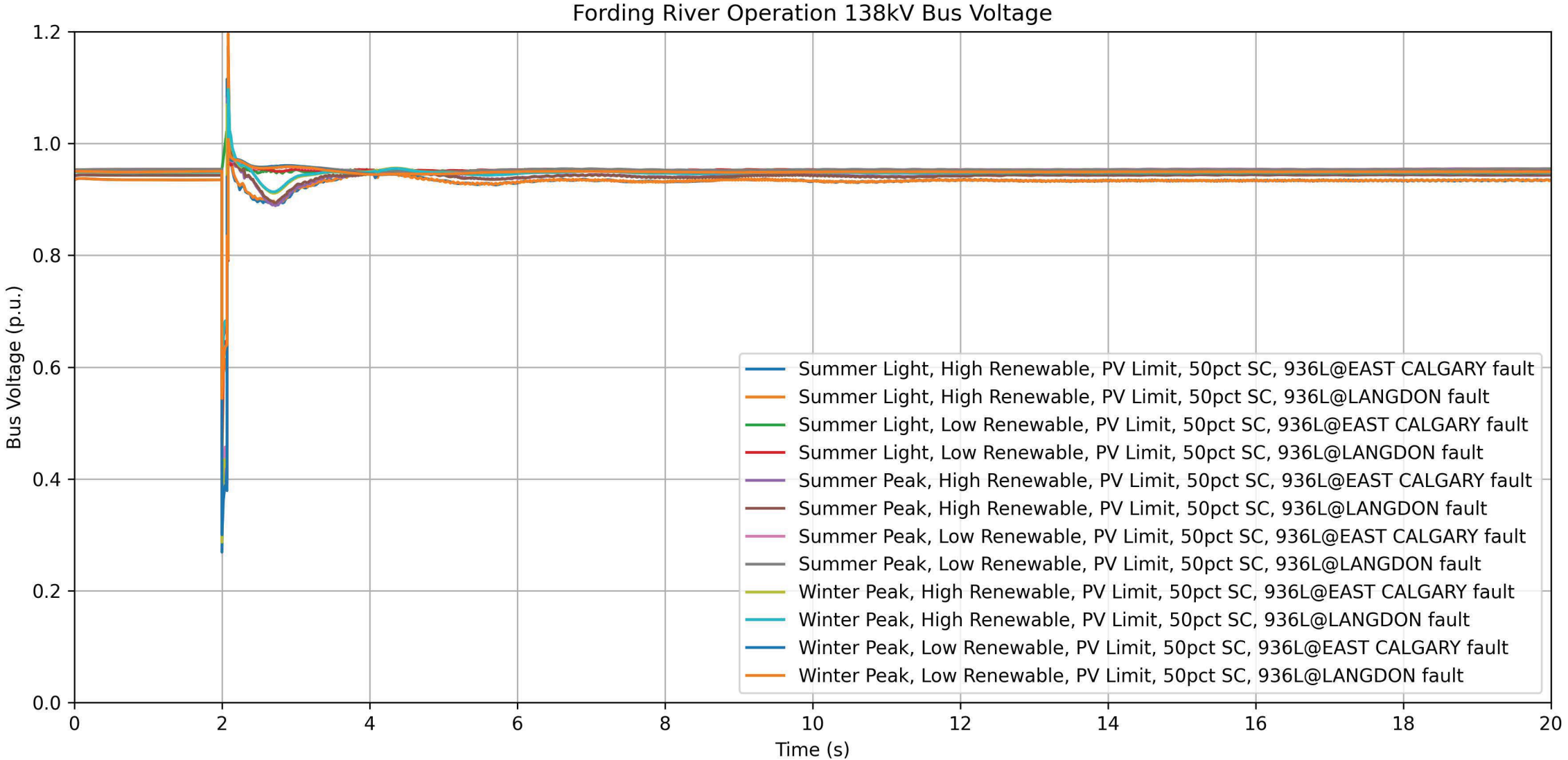

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

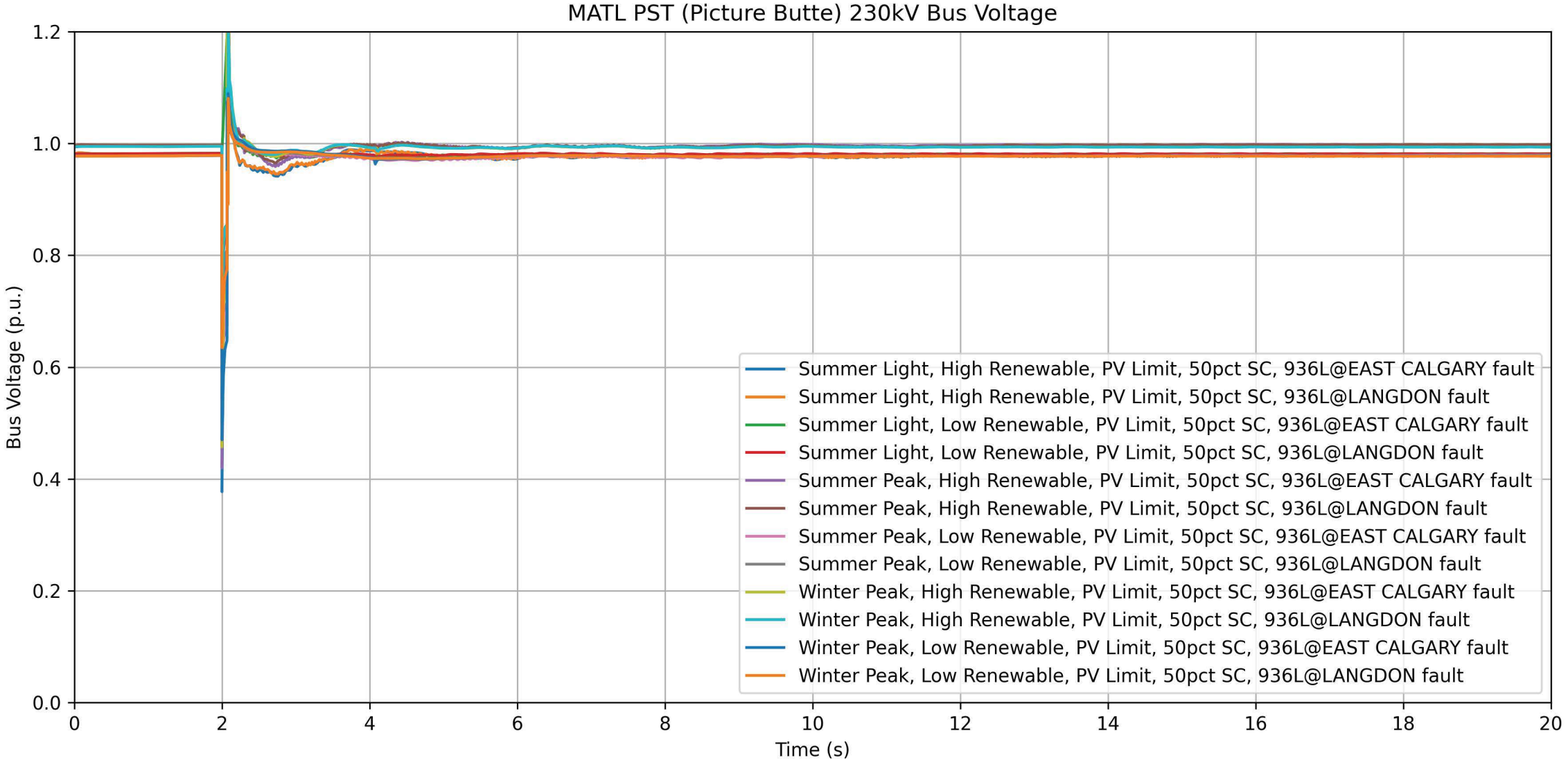

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

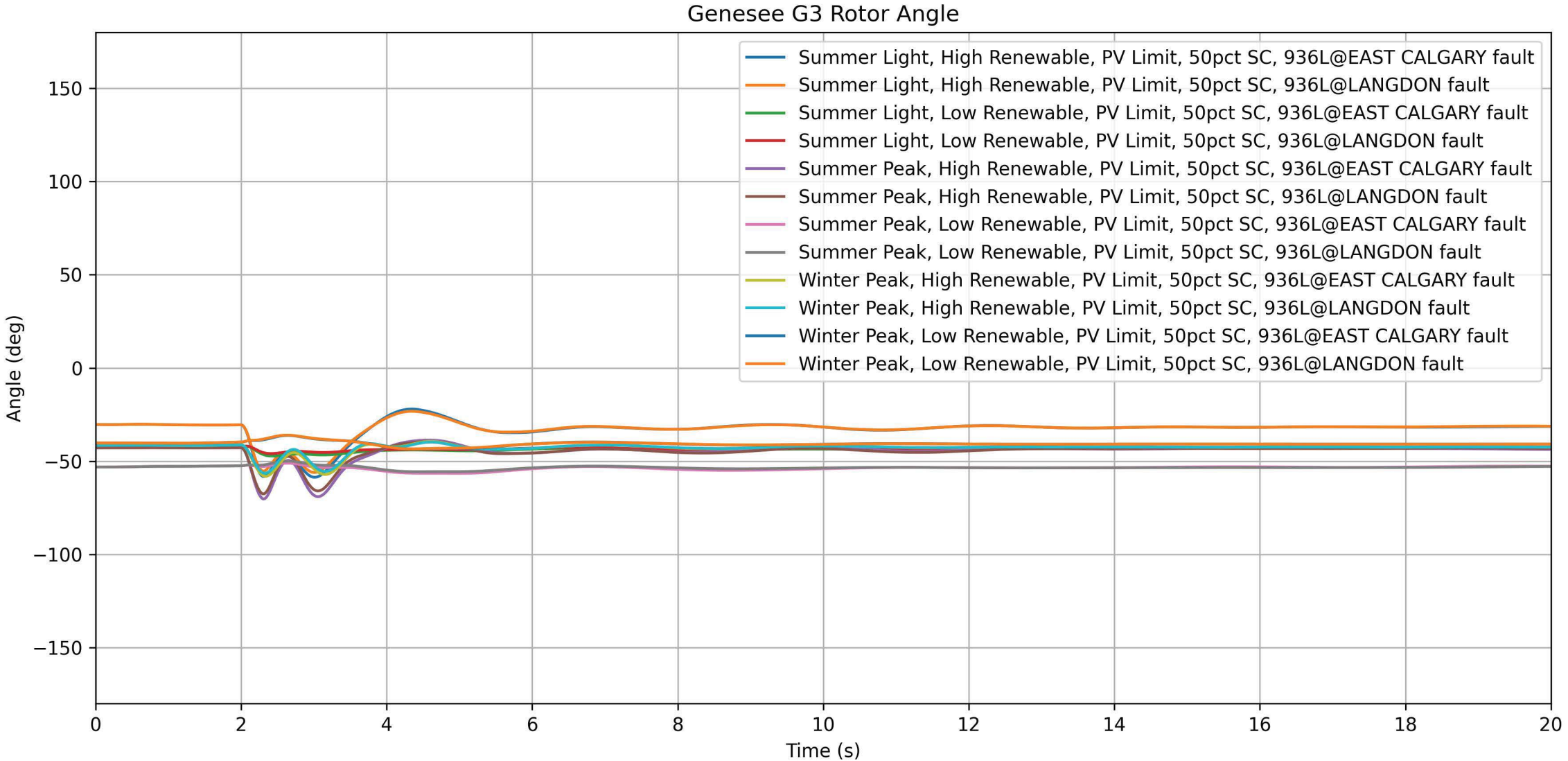

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

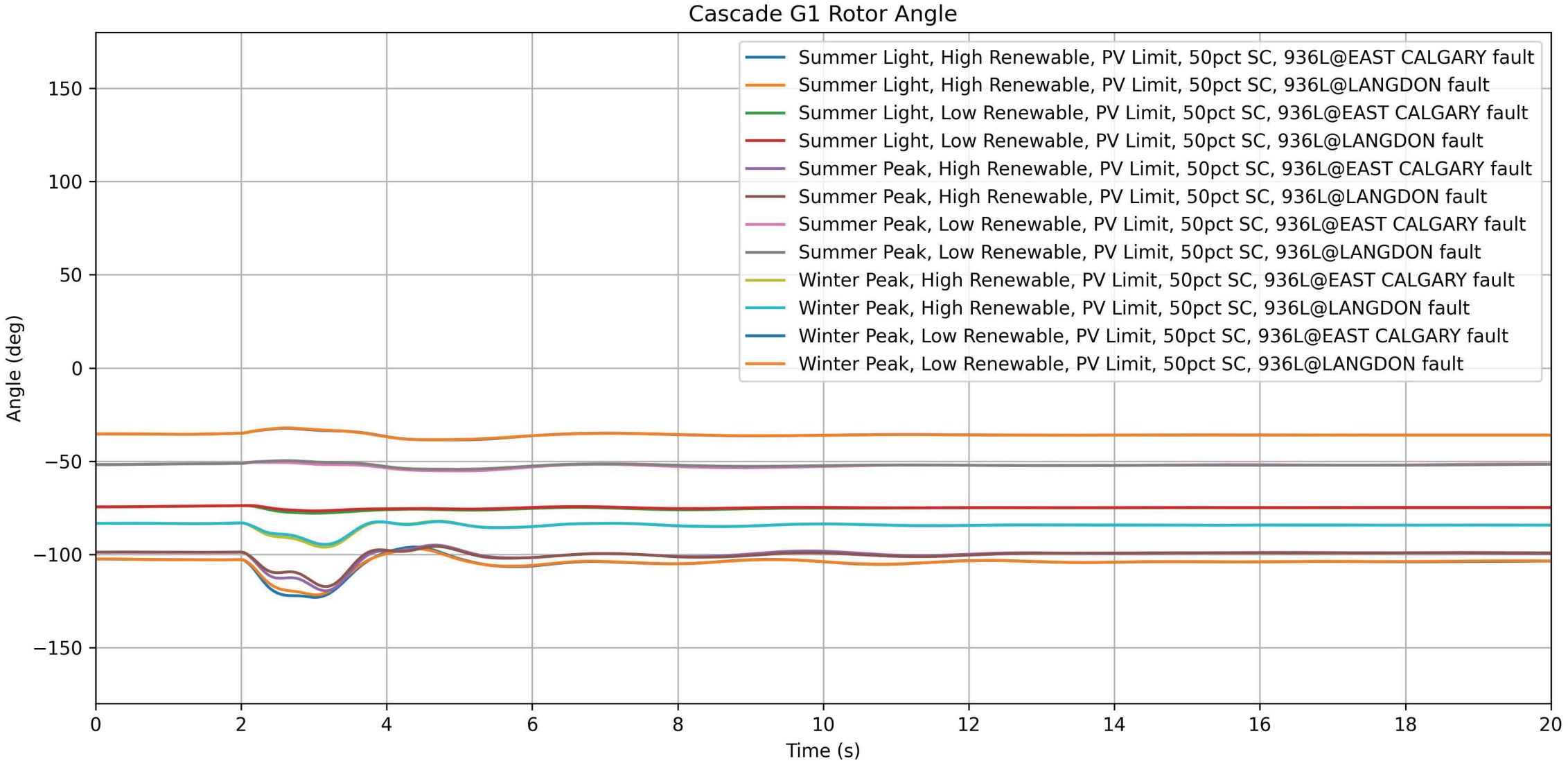

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

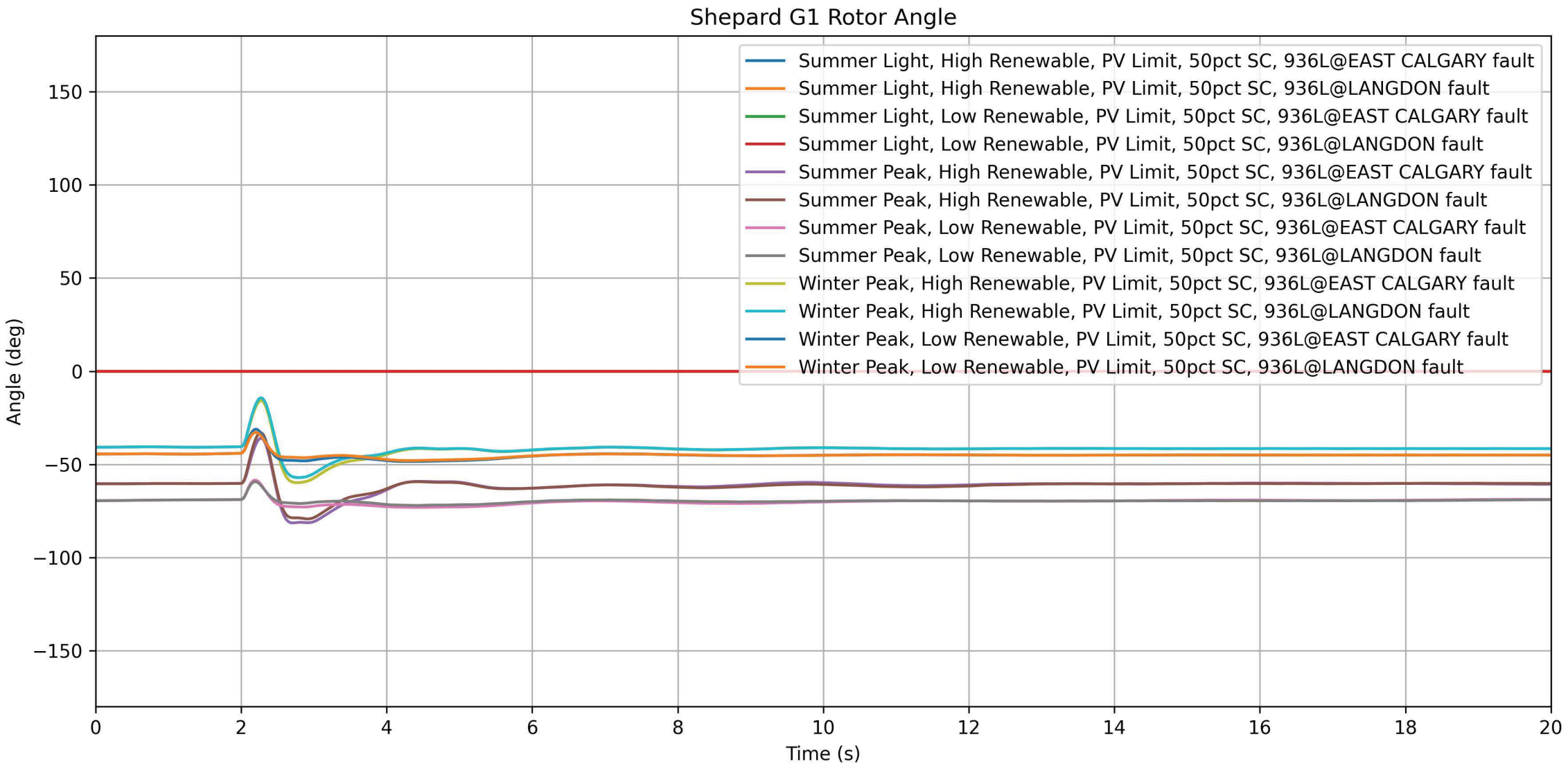

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

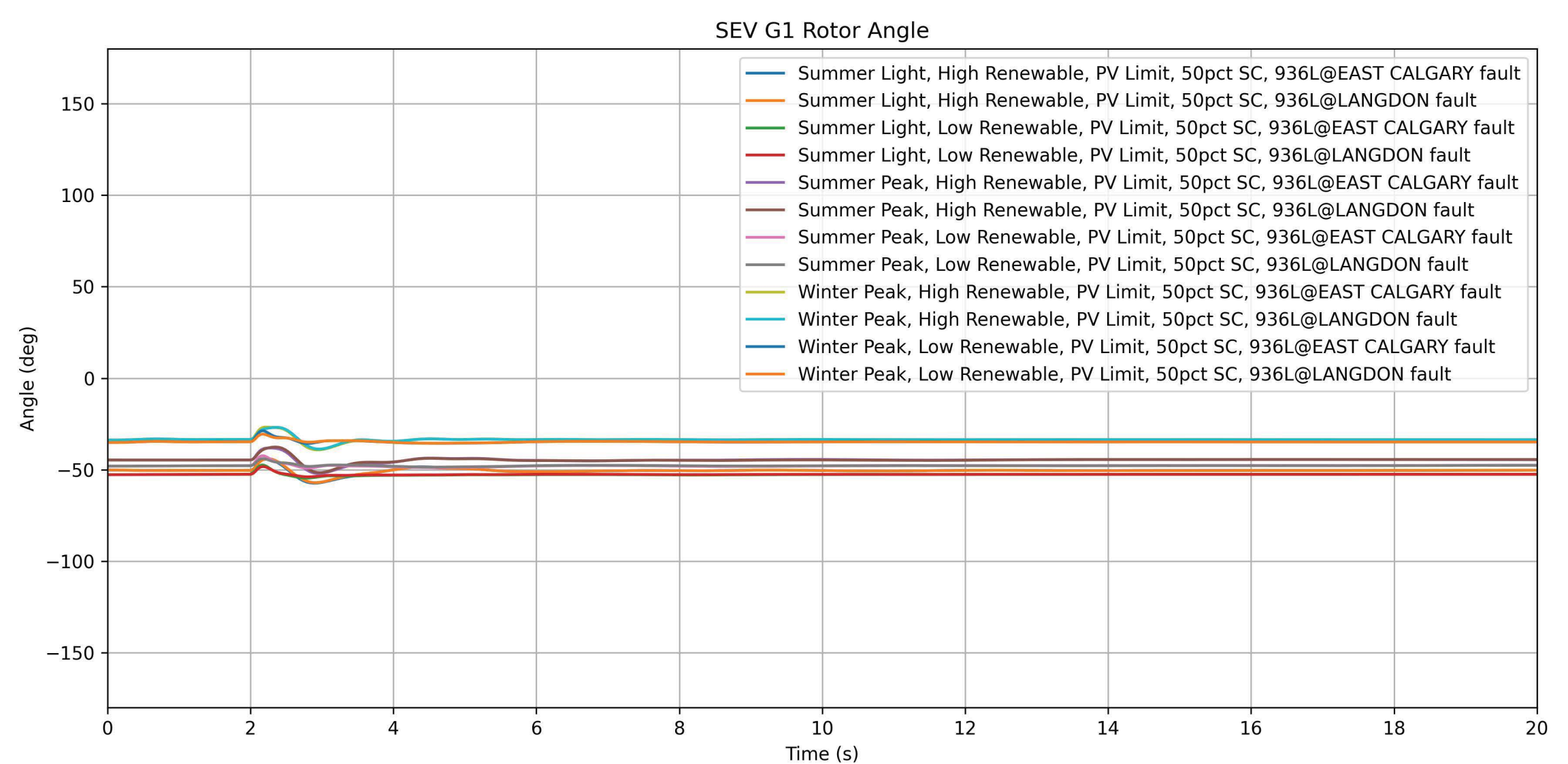

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

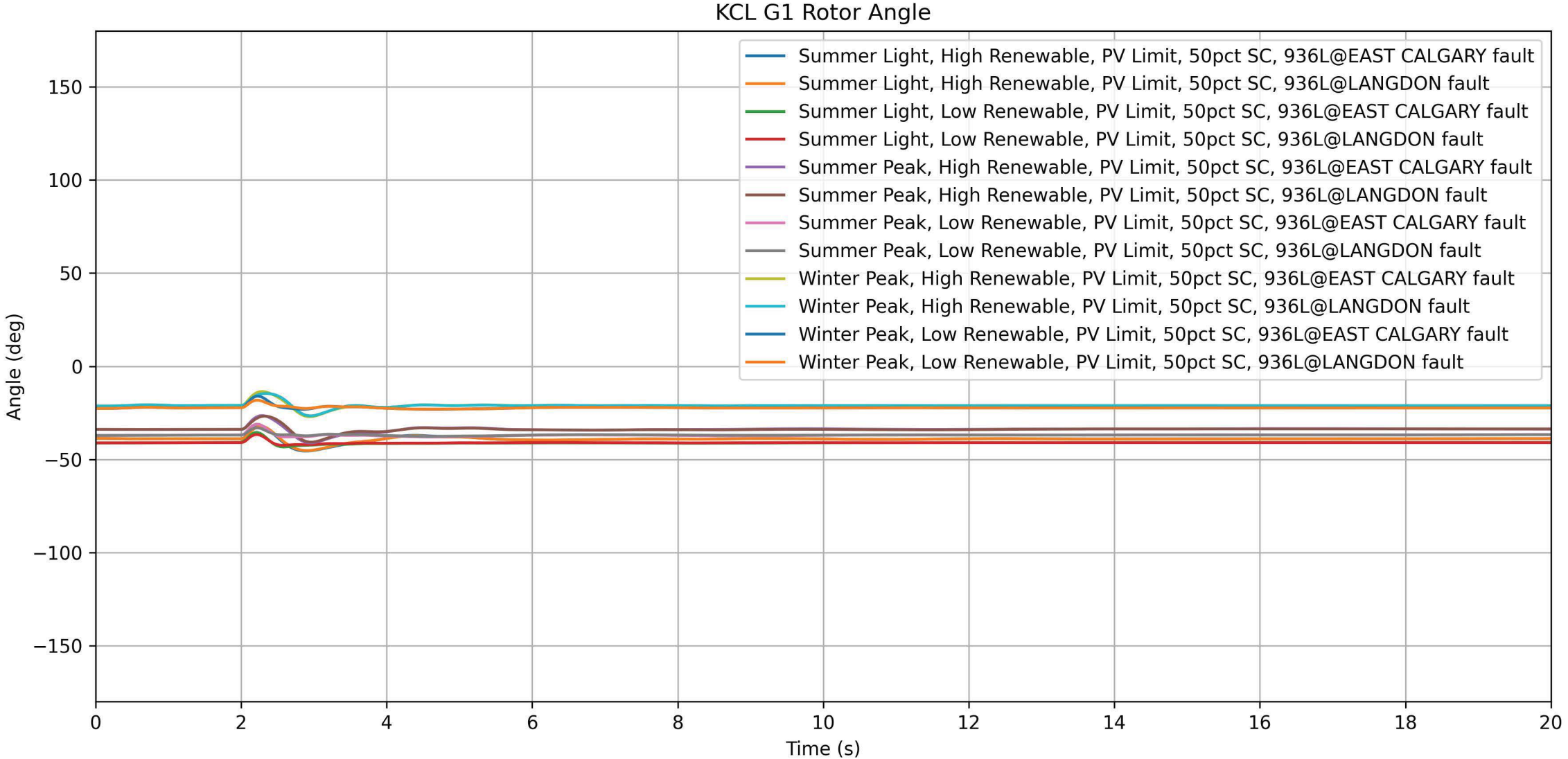

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

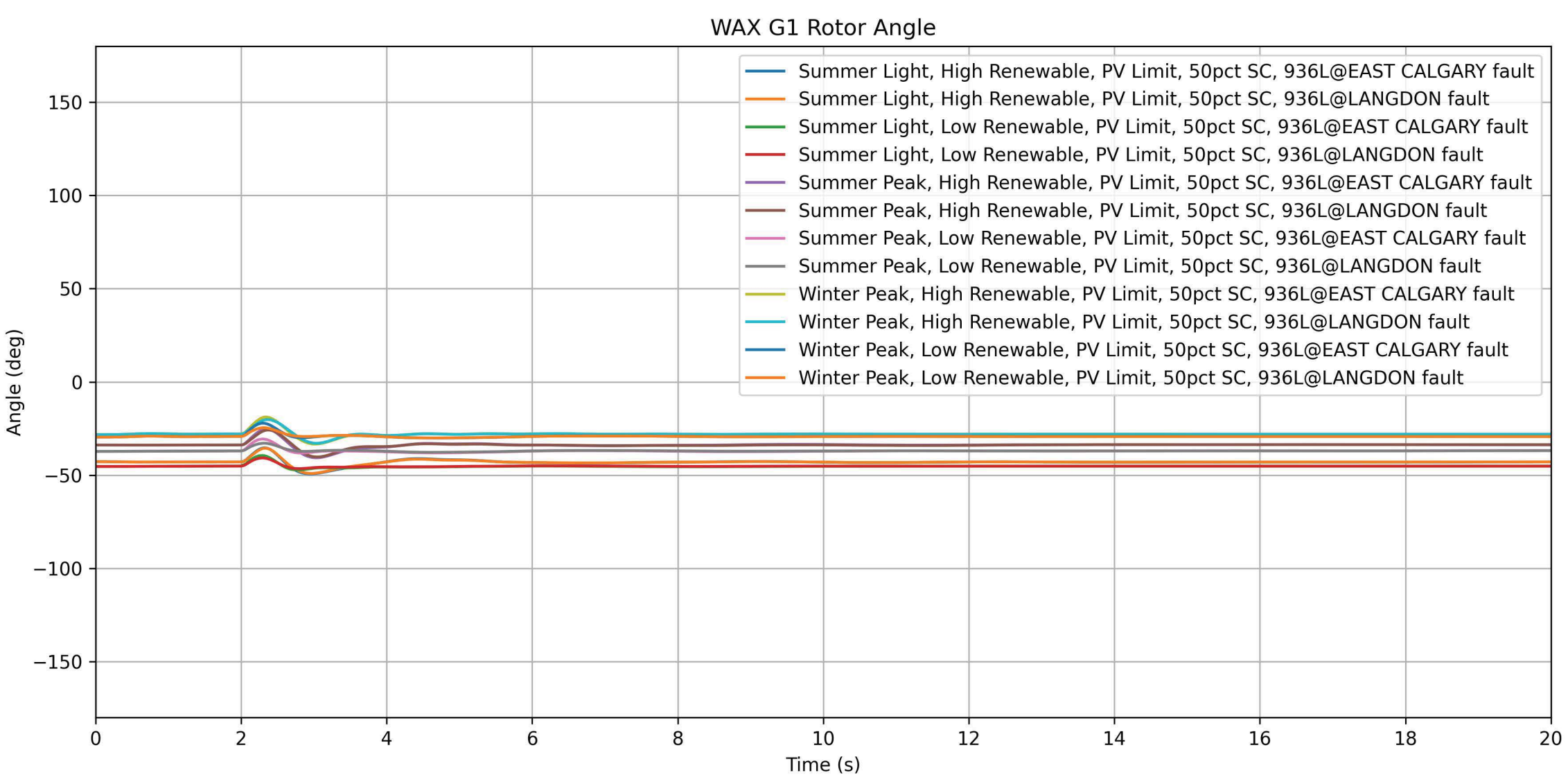

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

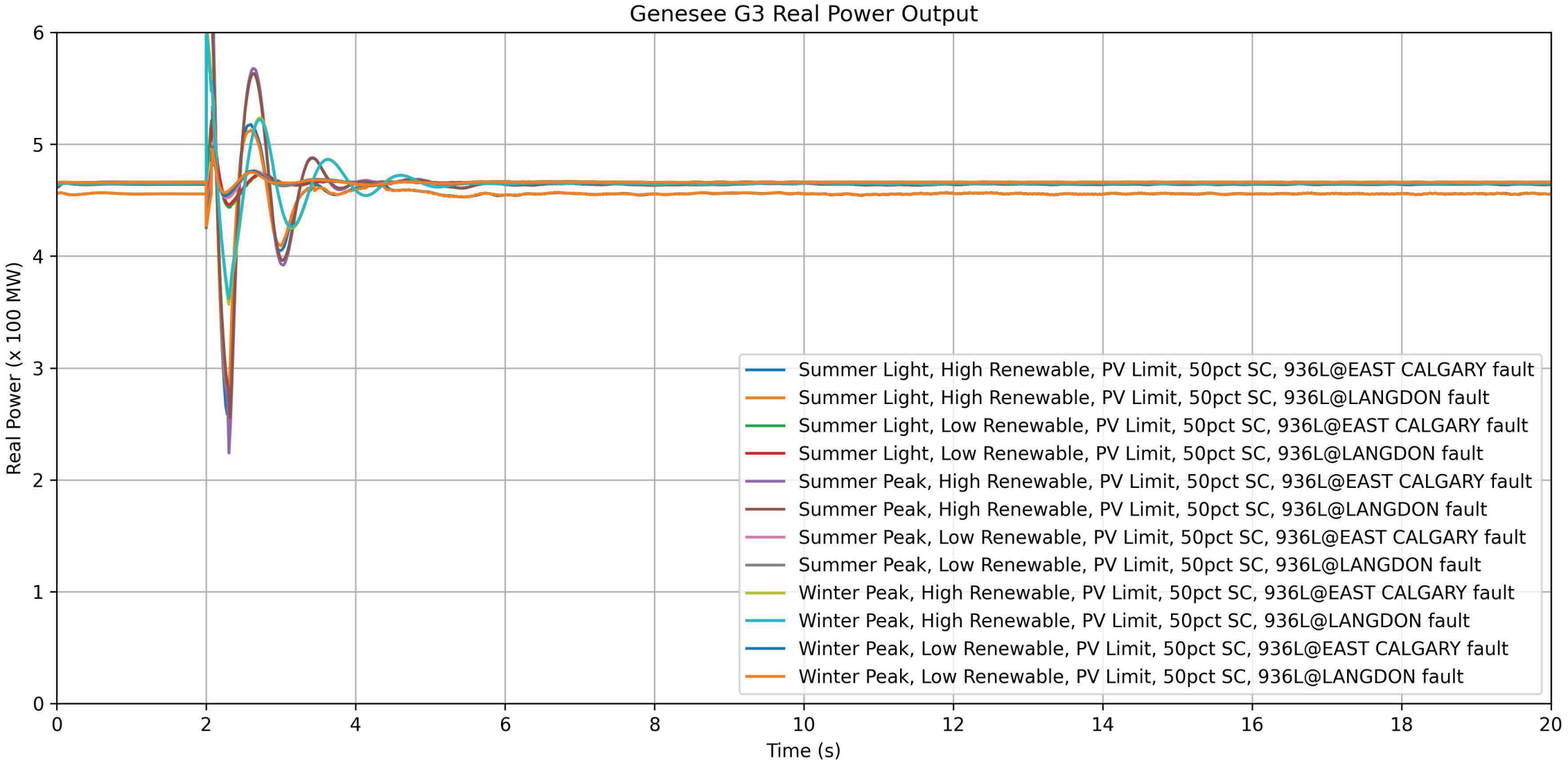

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

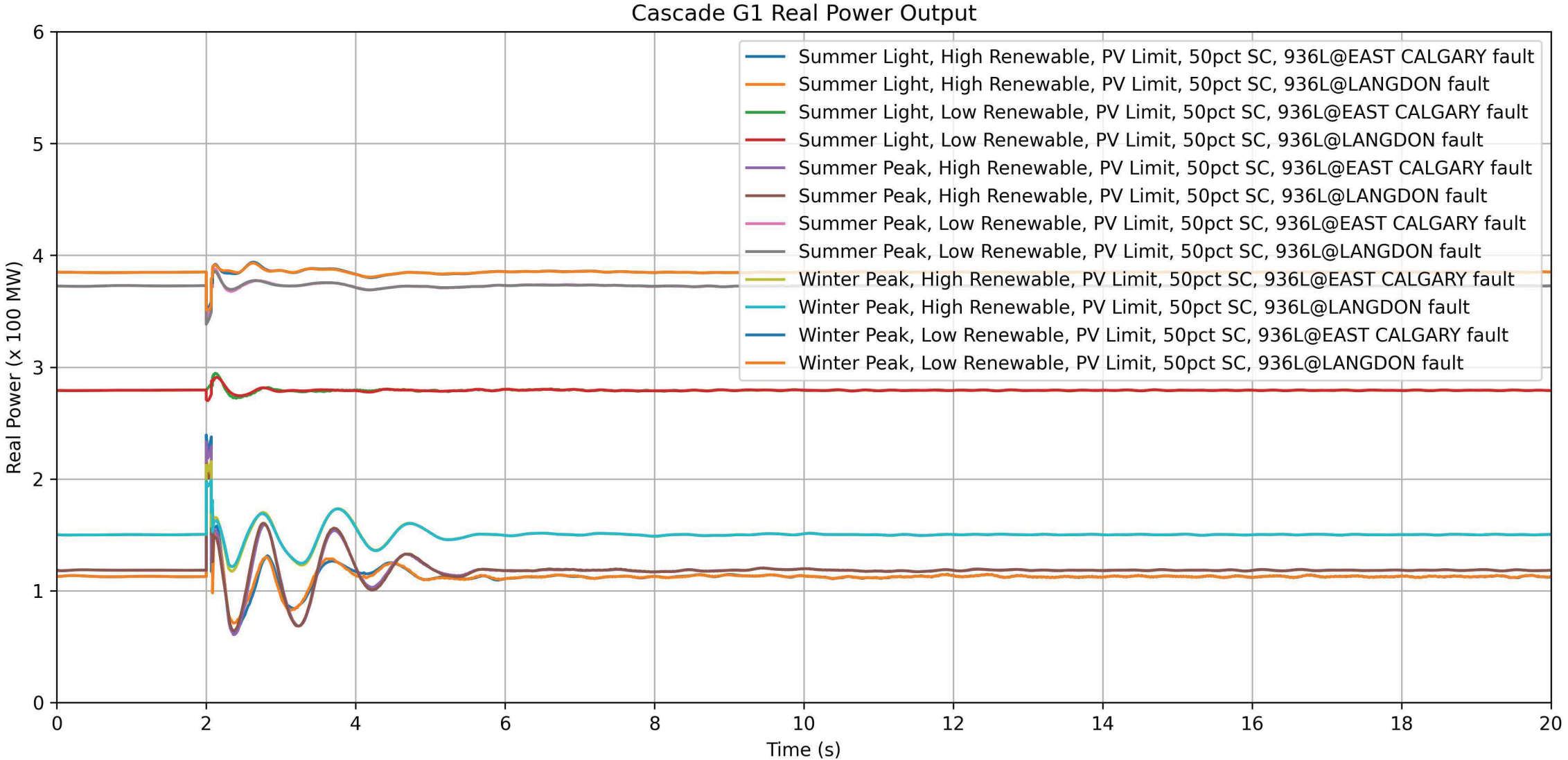

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

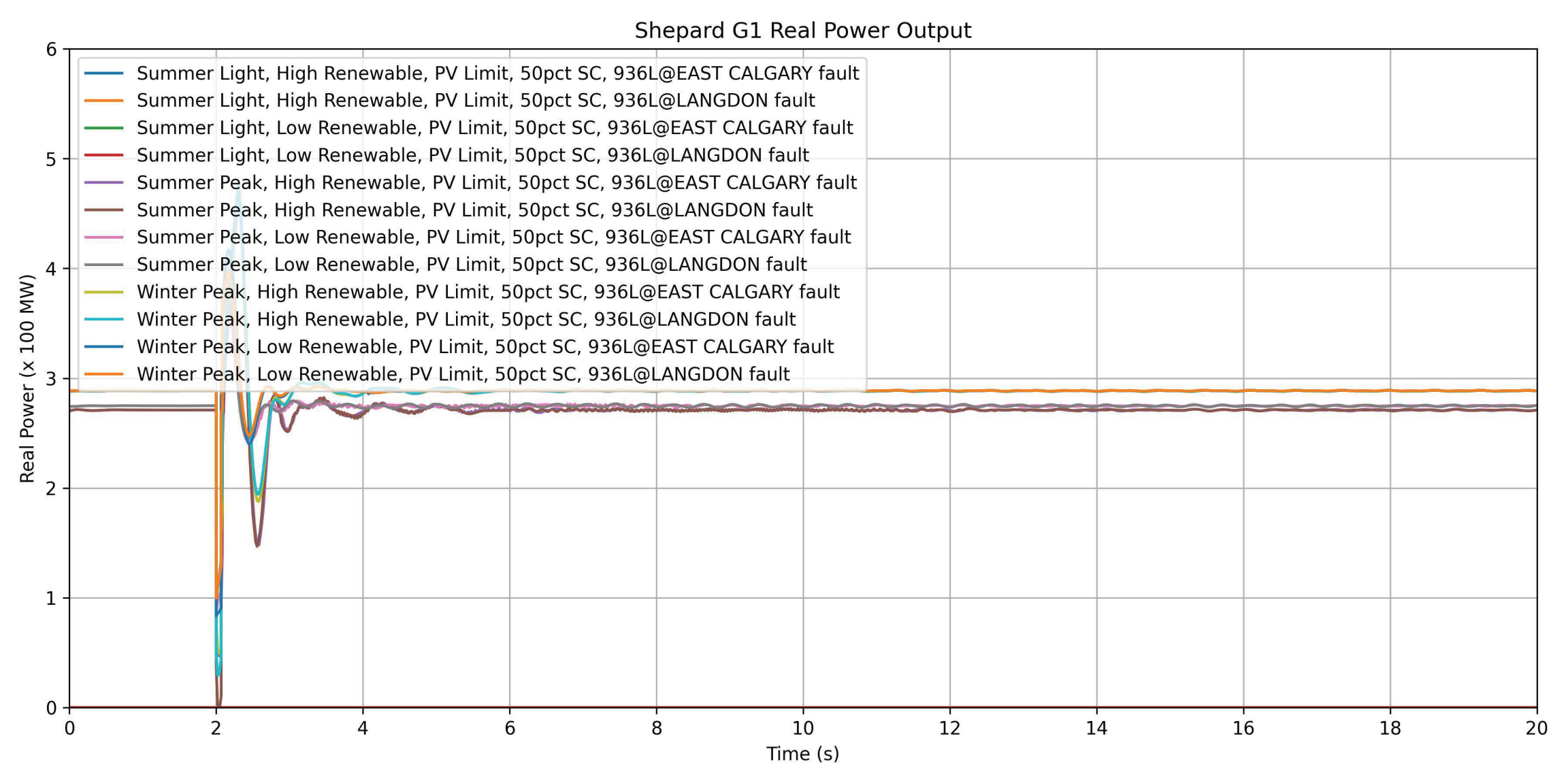

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

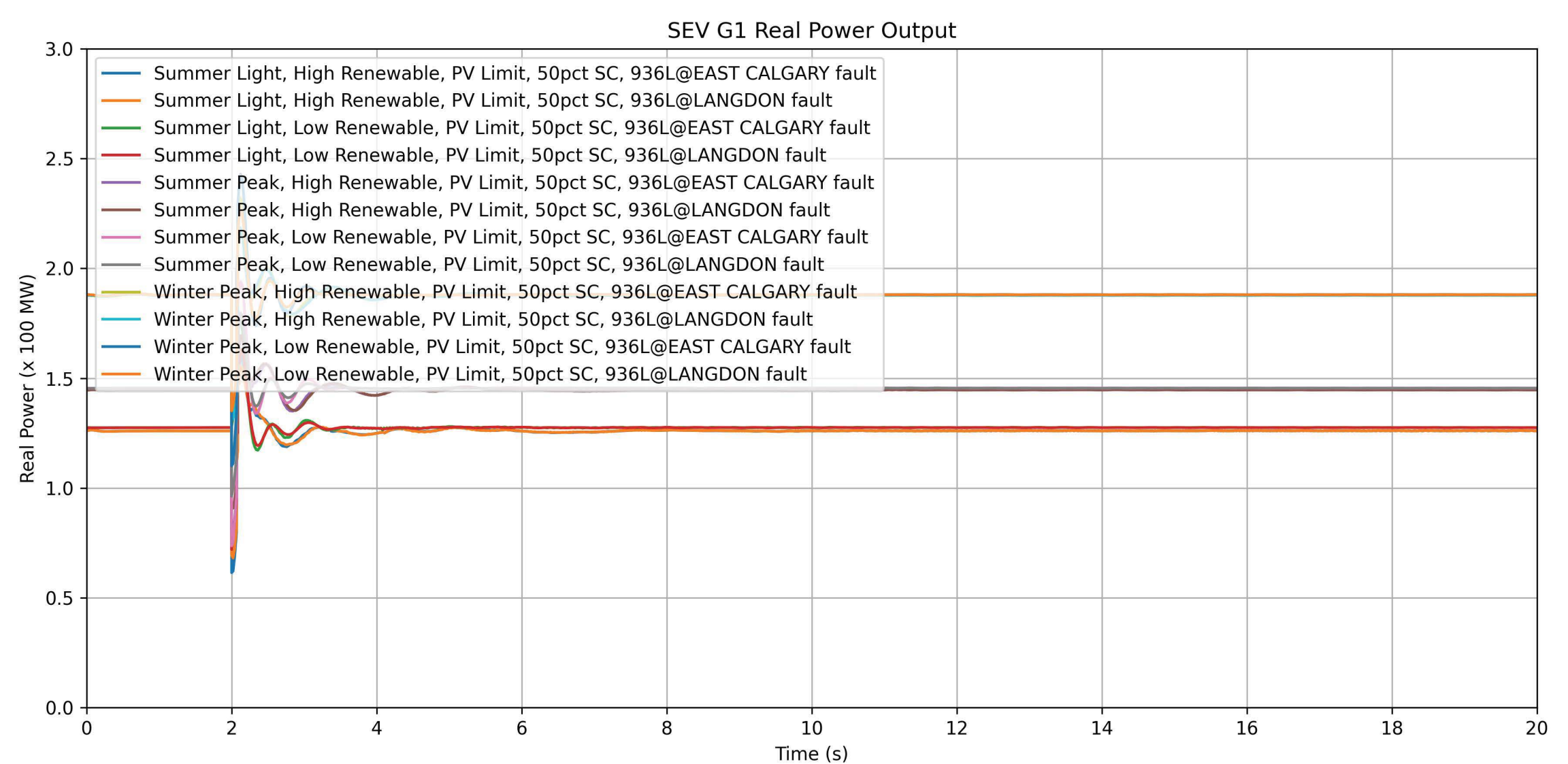

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

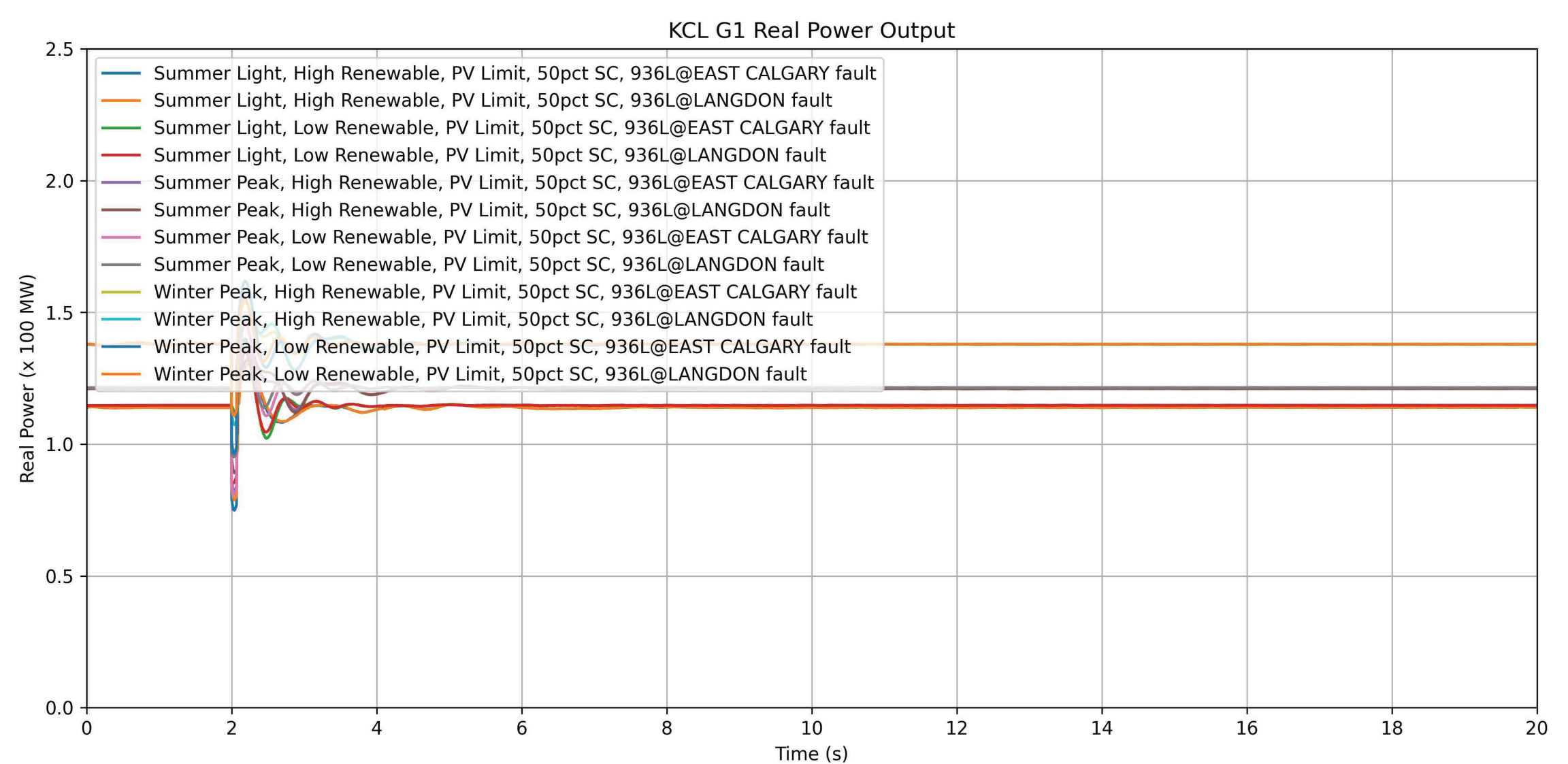

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

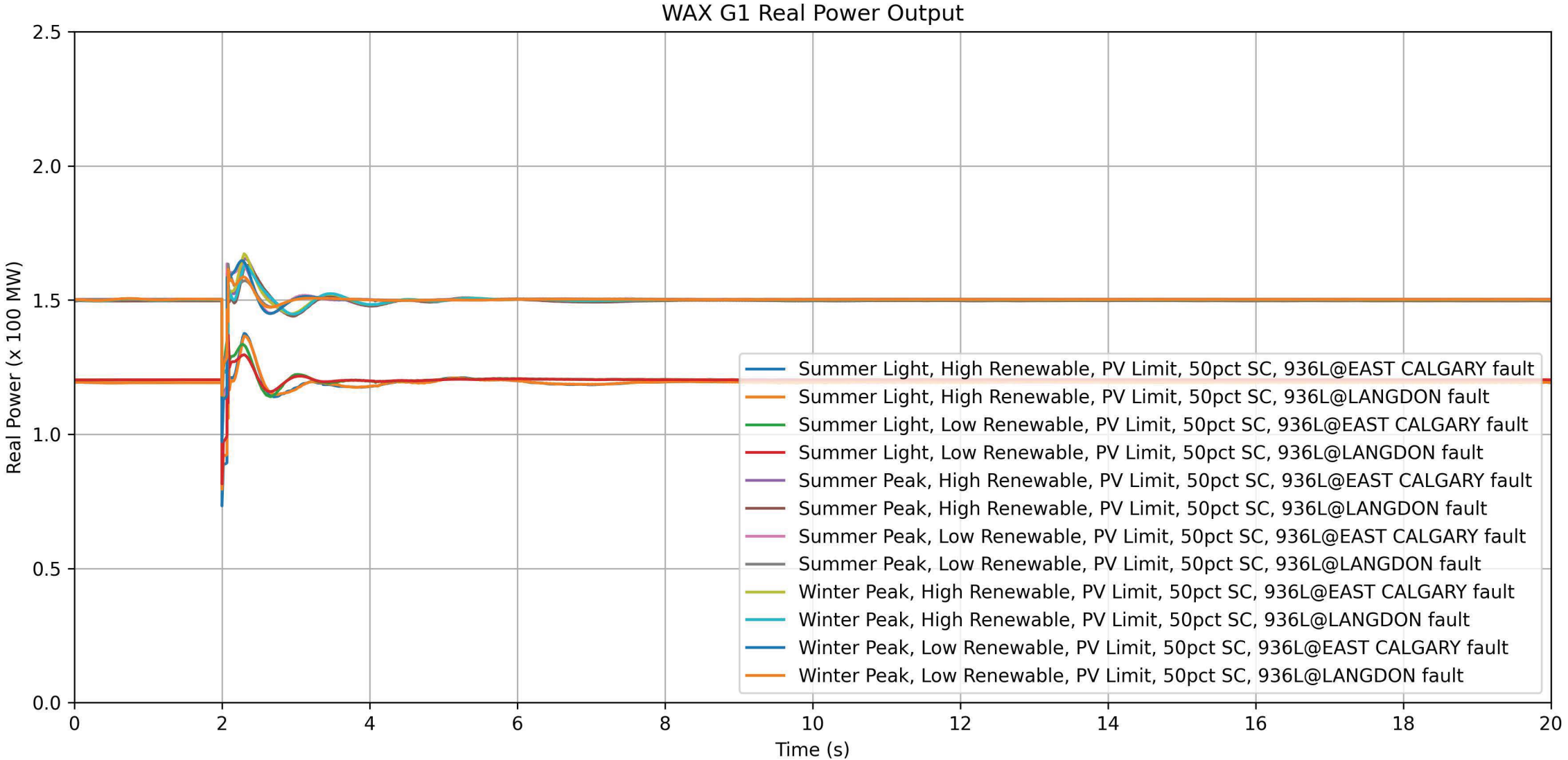

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

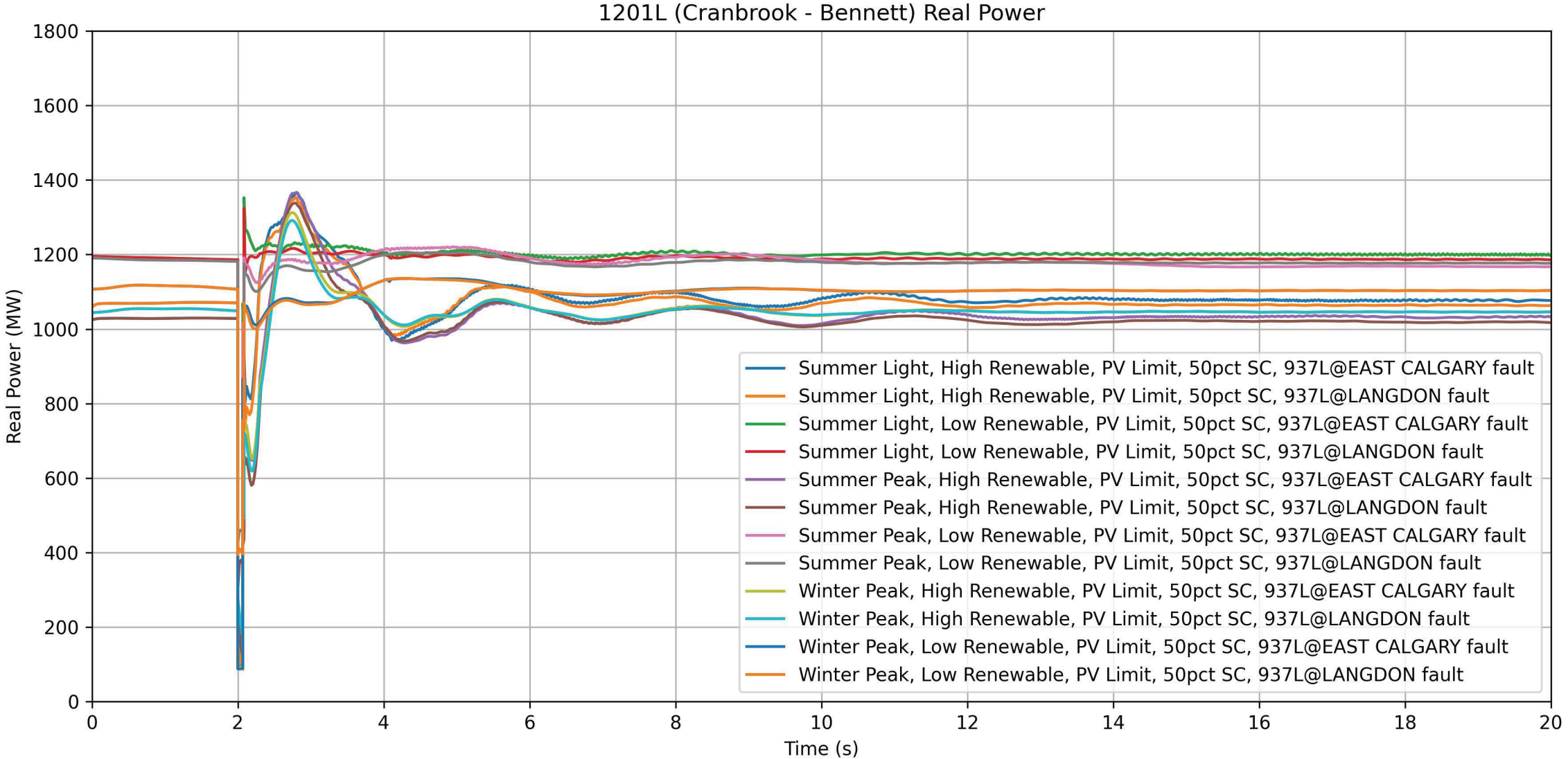

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

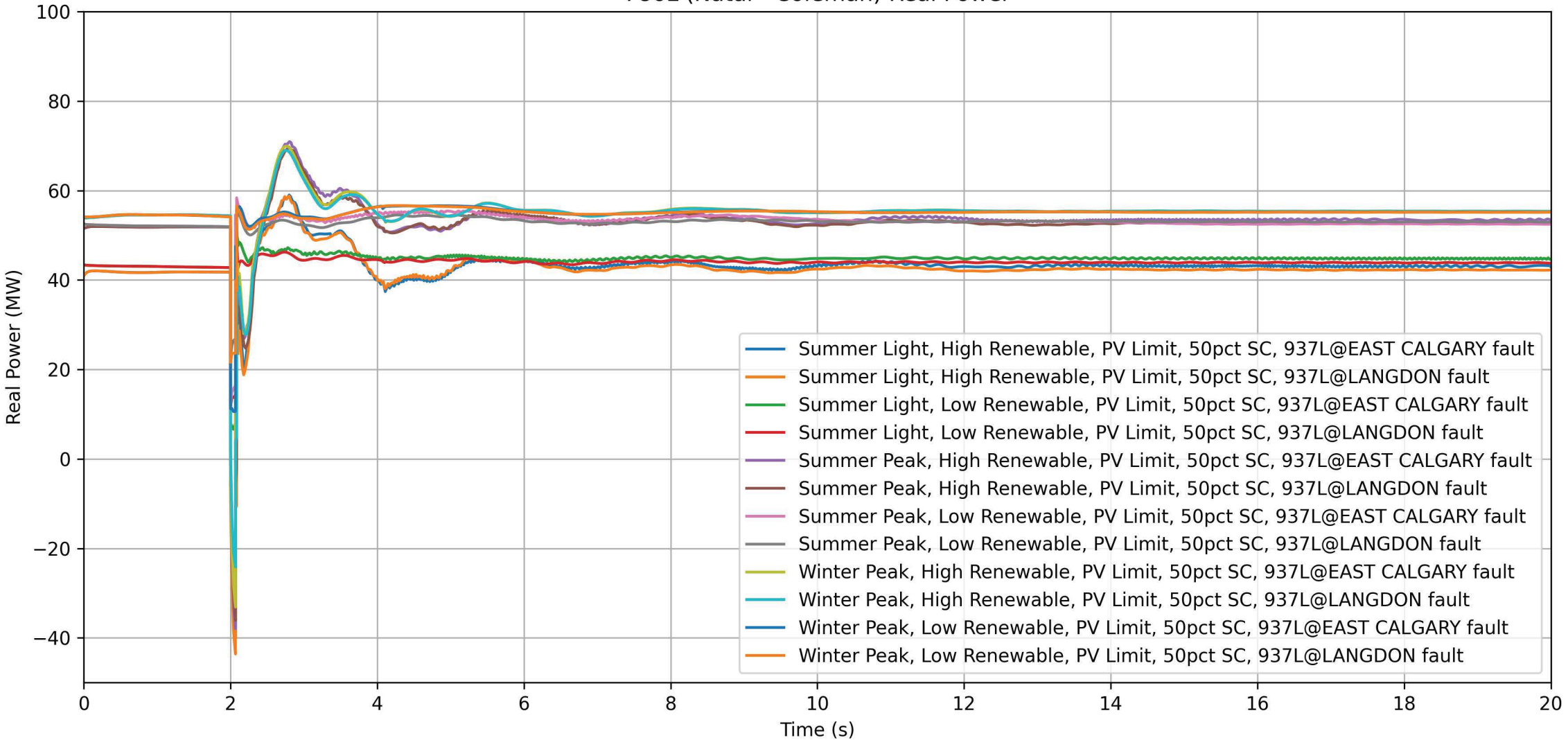

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

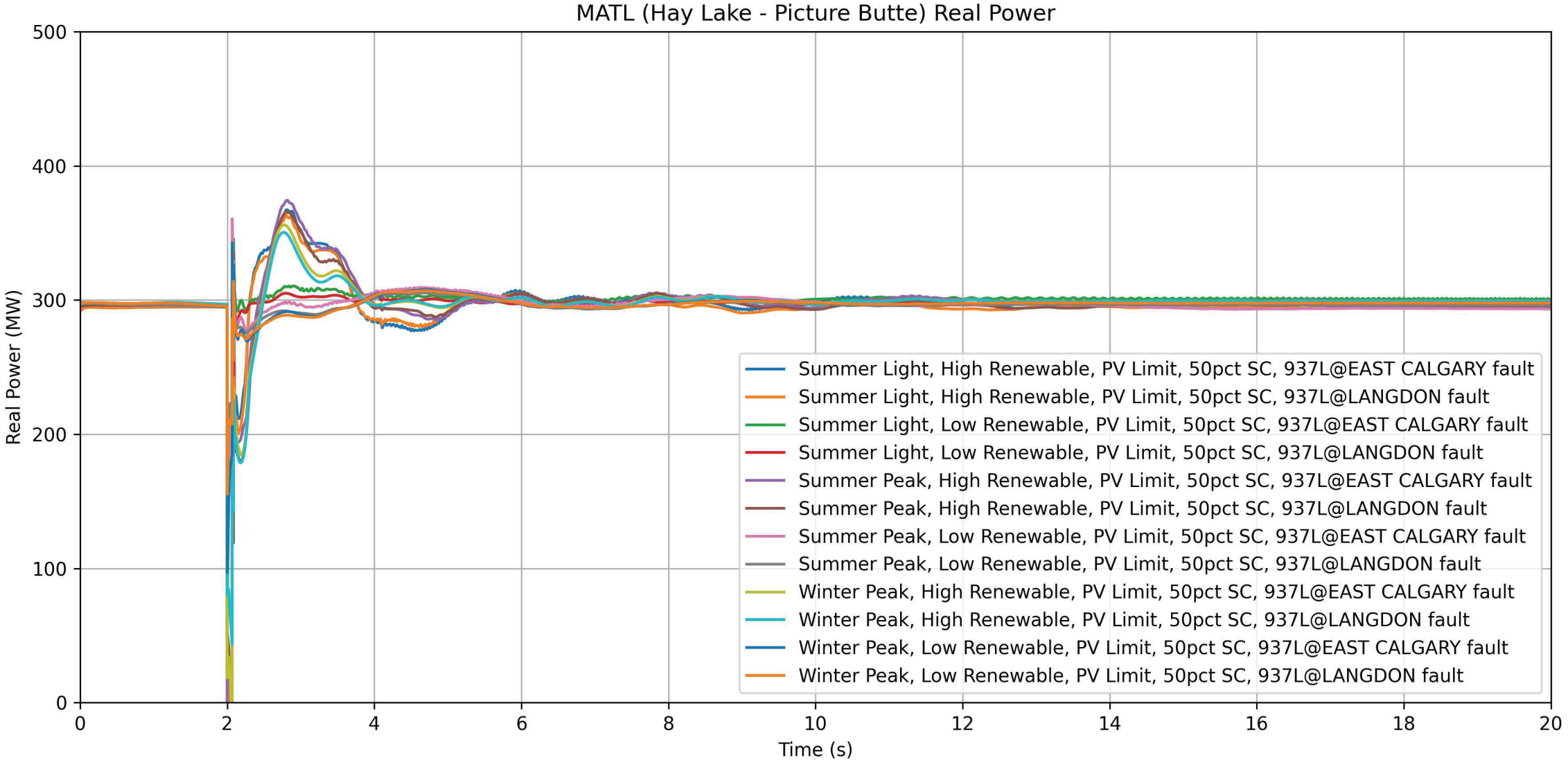

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Real Power (x 100 MW)
Time (s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20

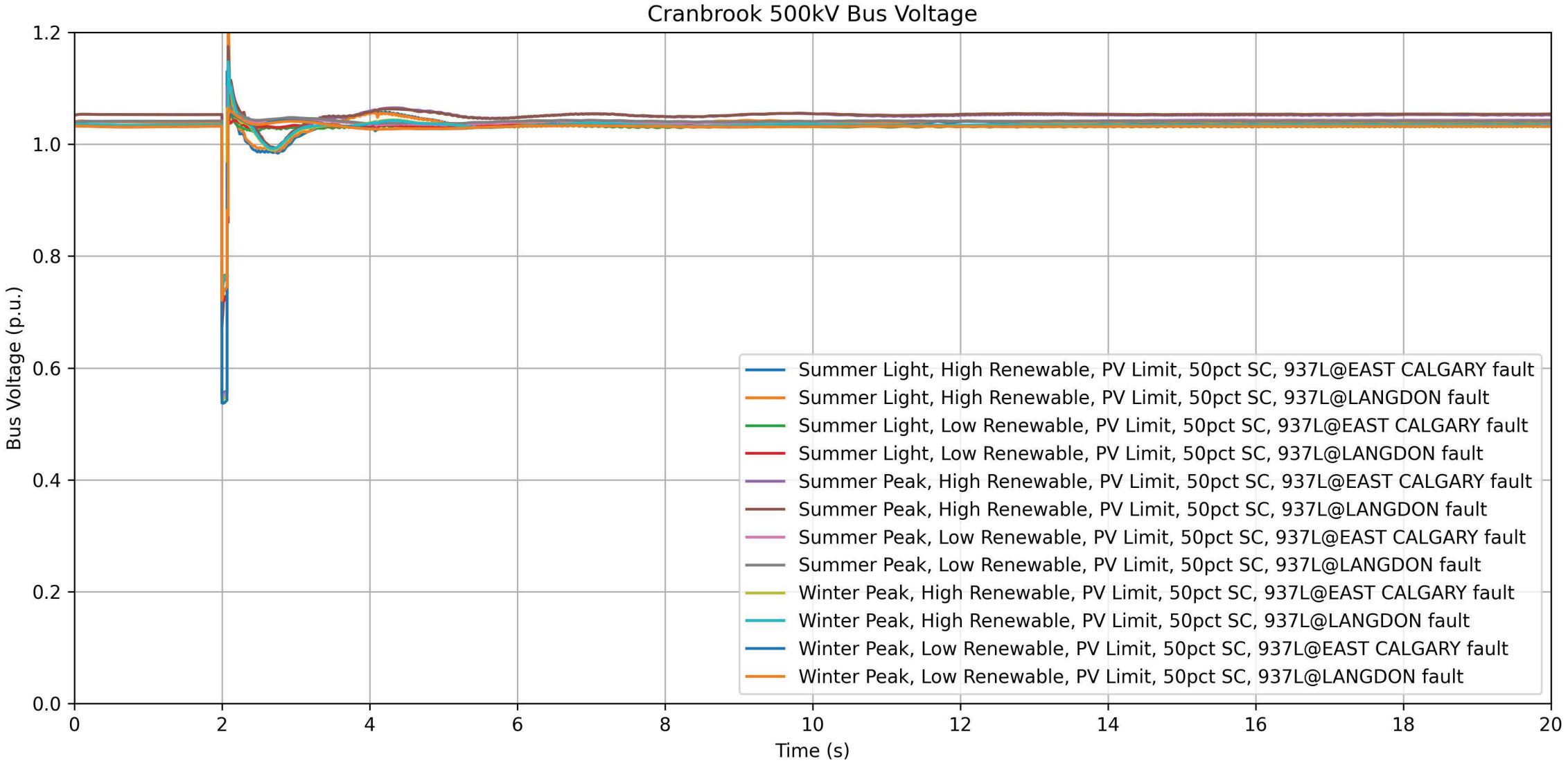

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

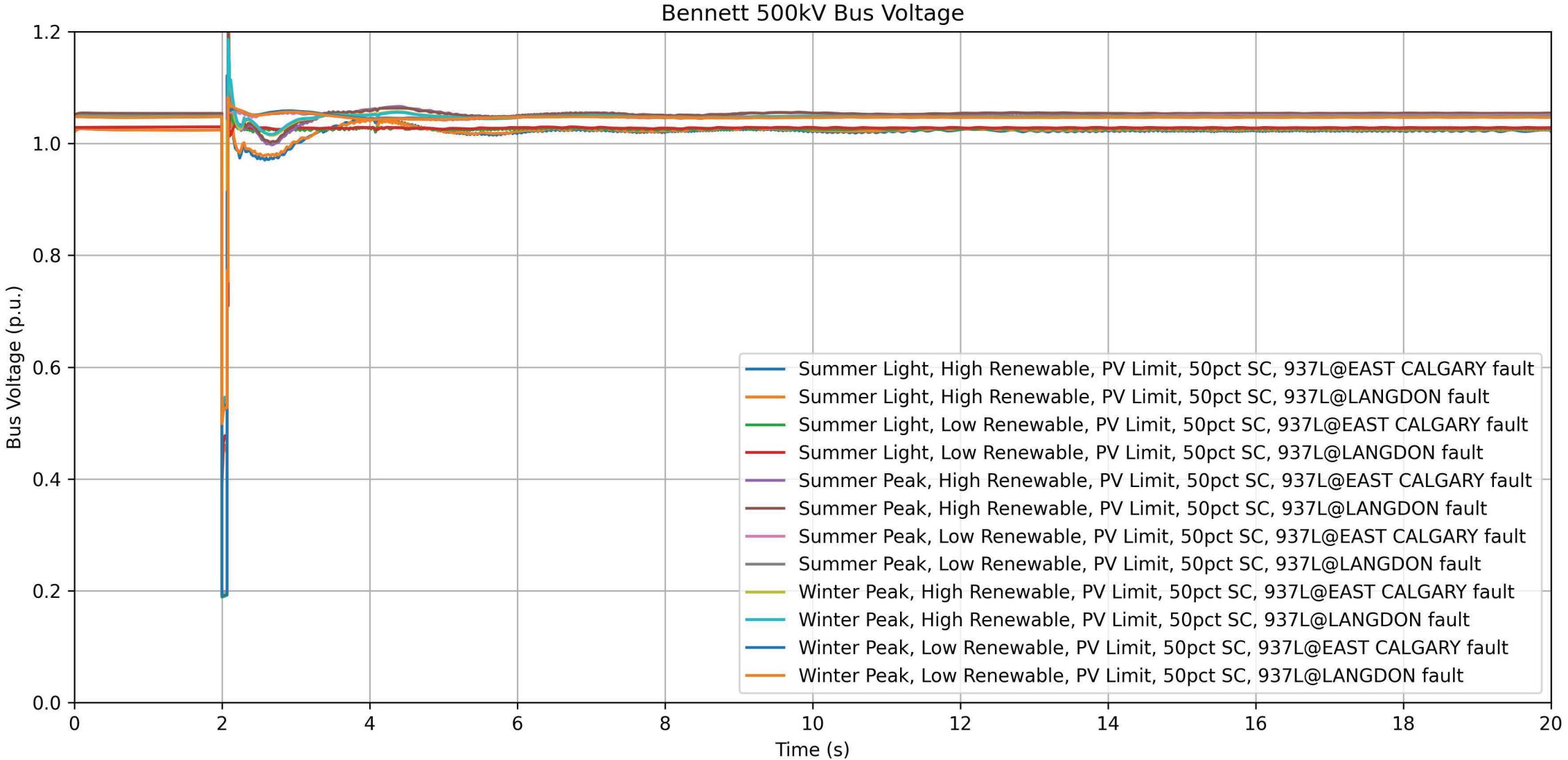

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L@LANGDON fault

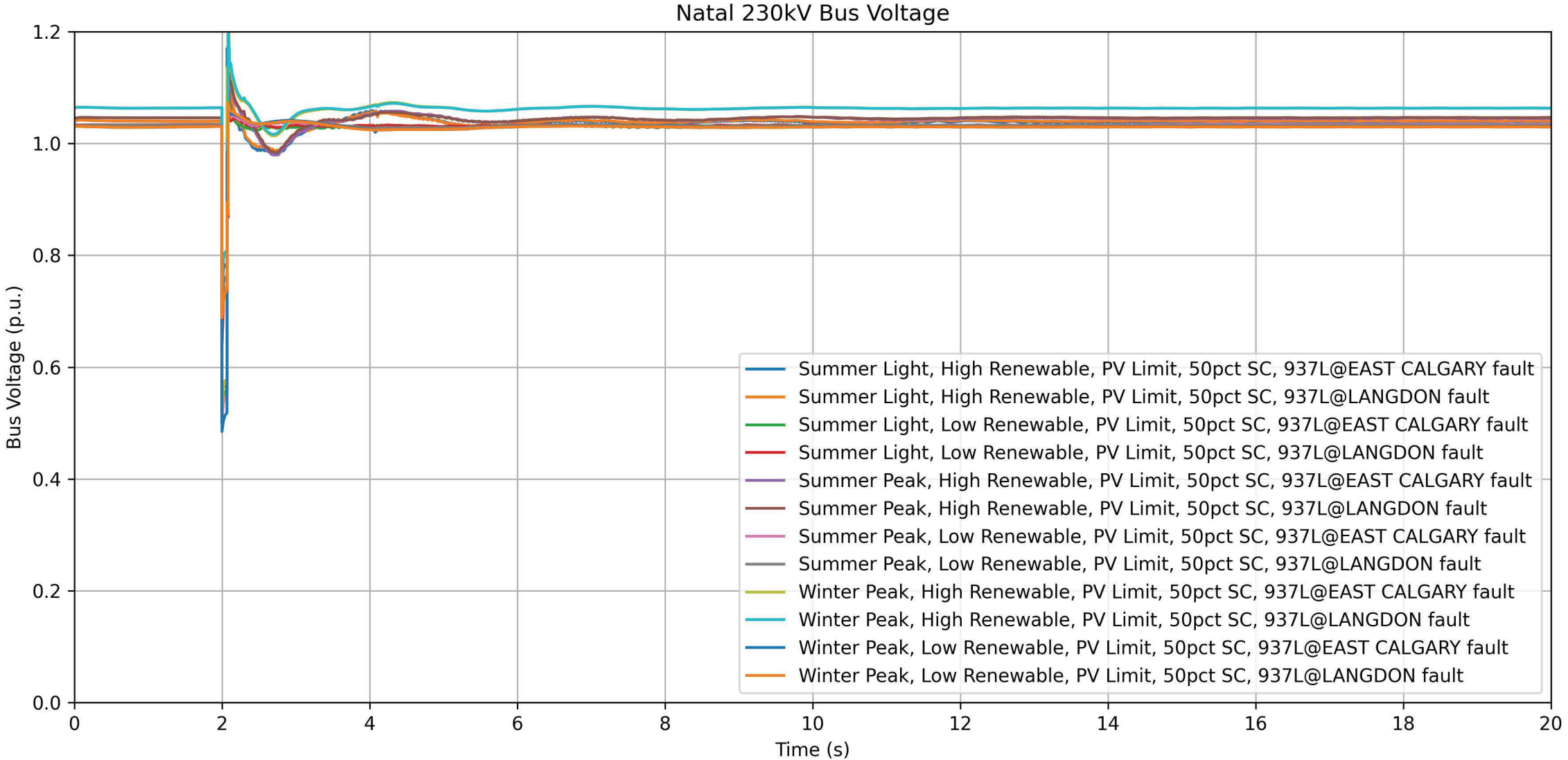

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

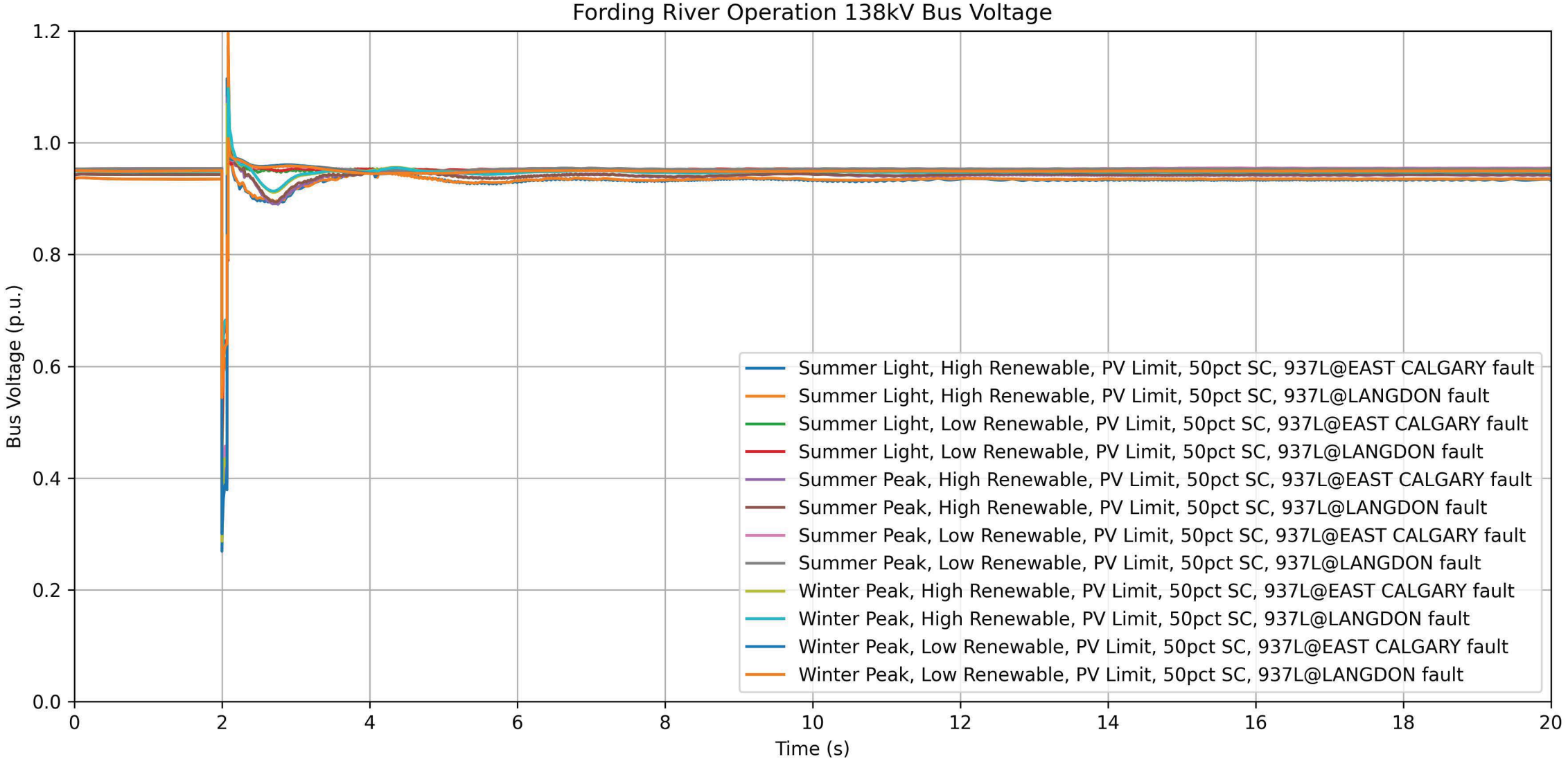

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

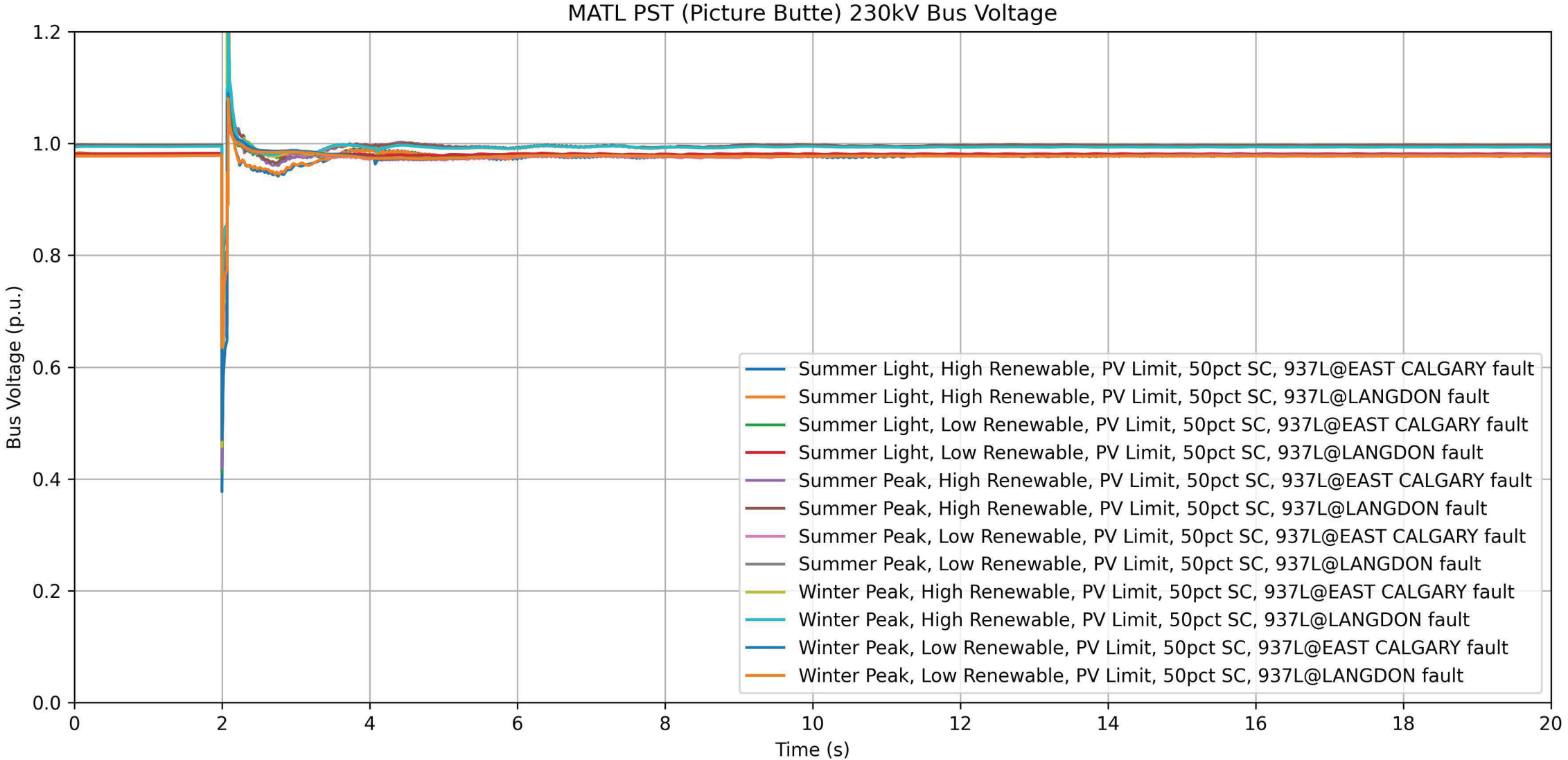

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

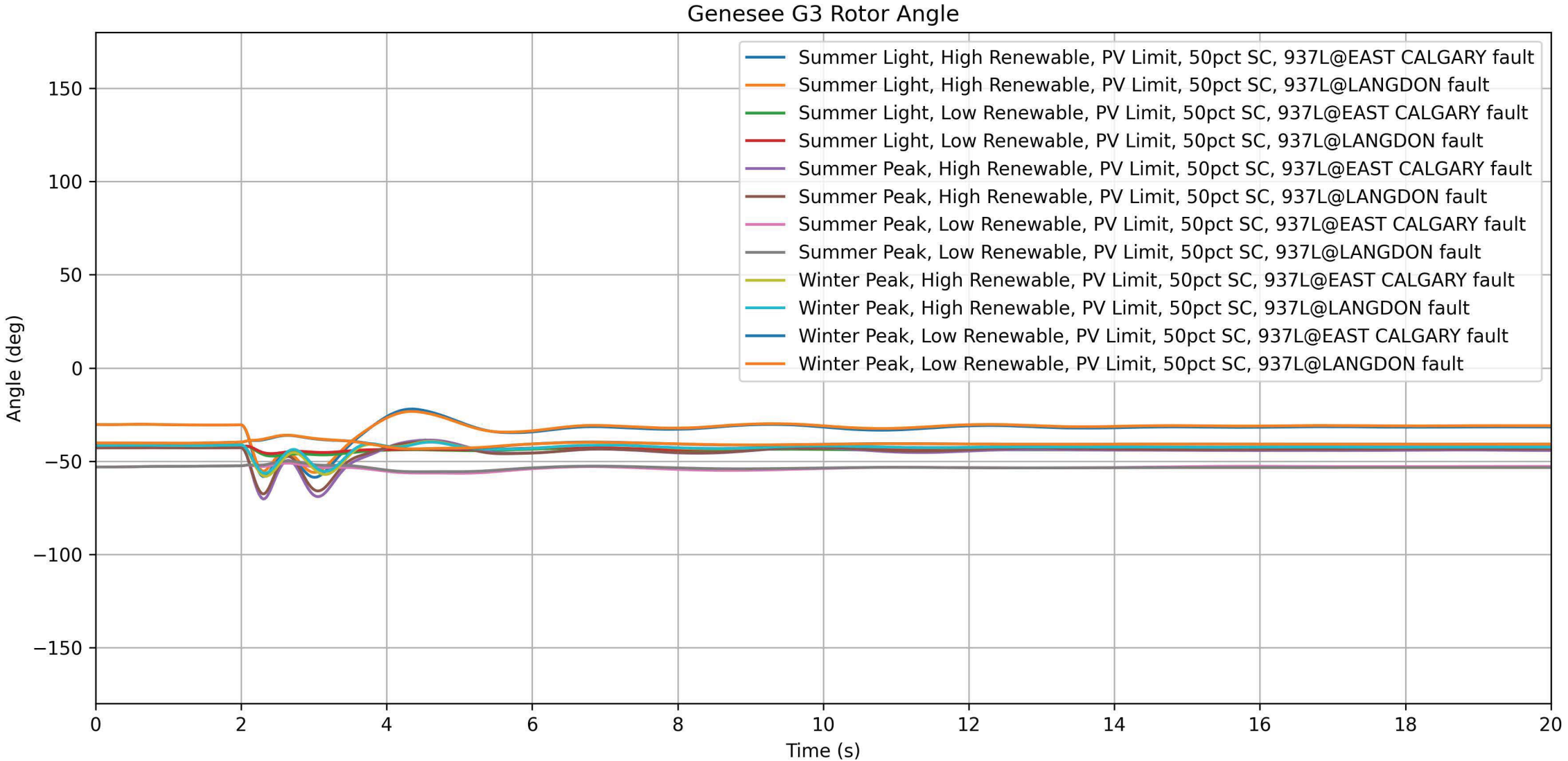

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

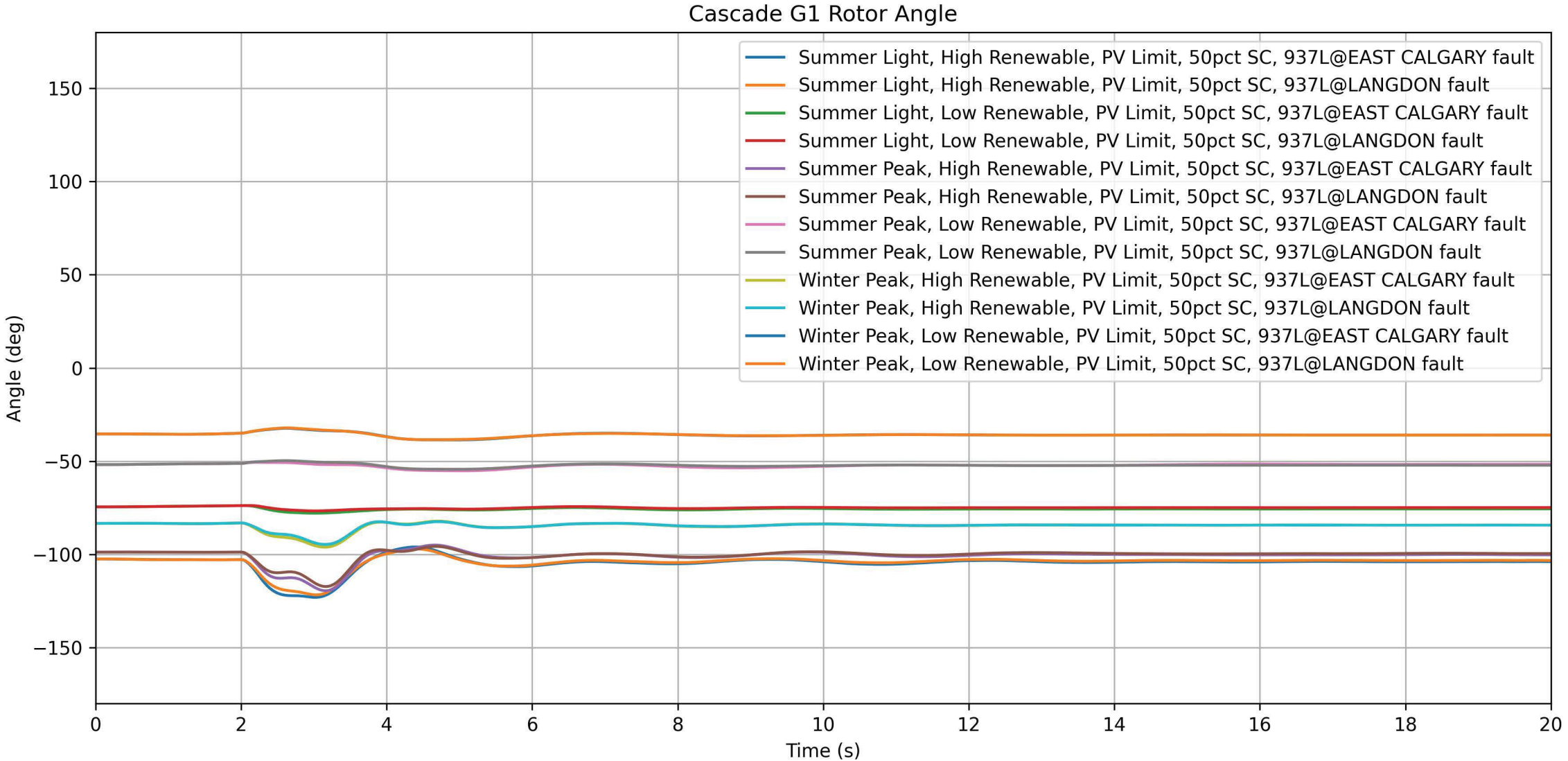

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

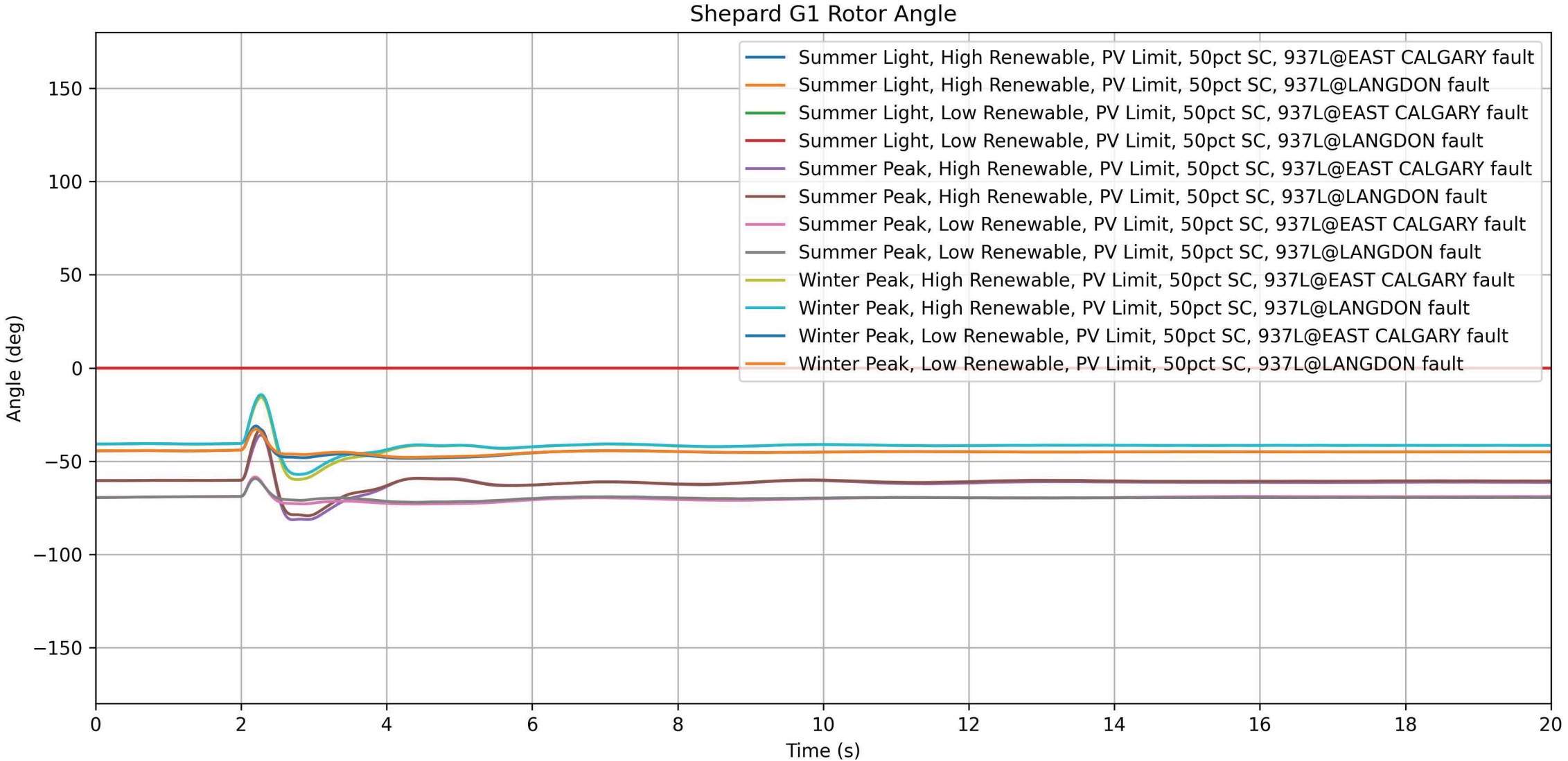

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

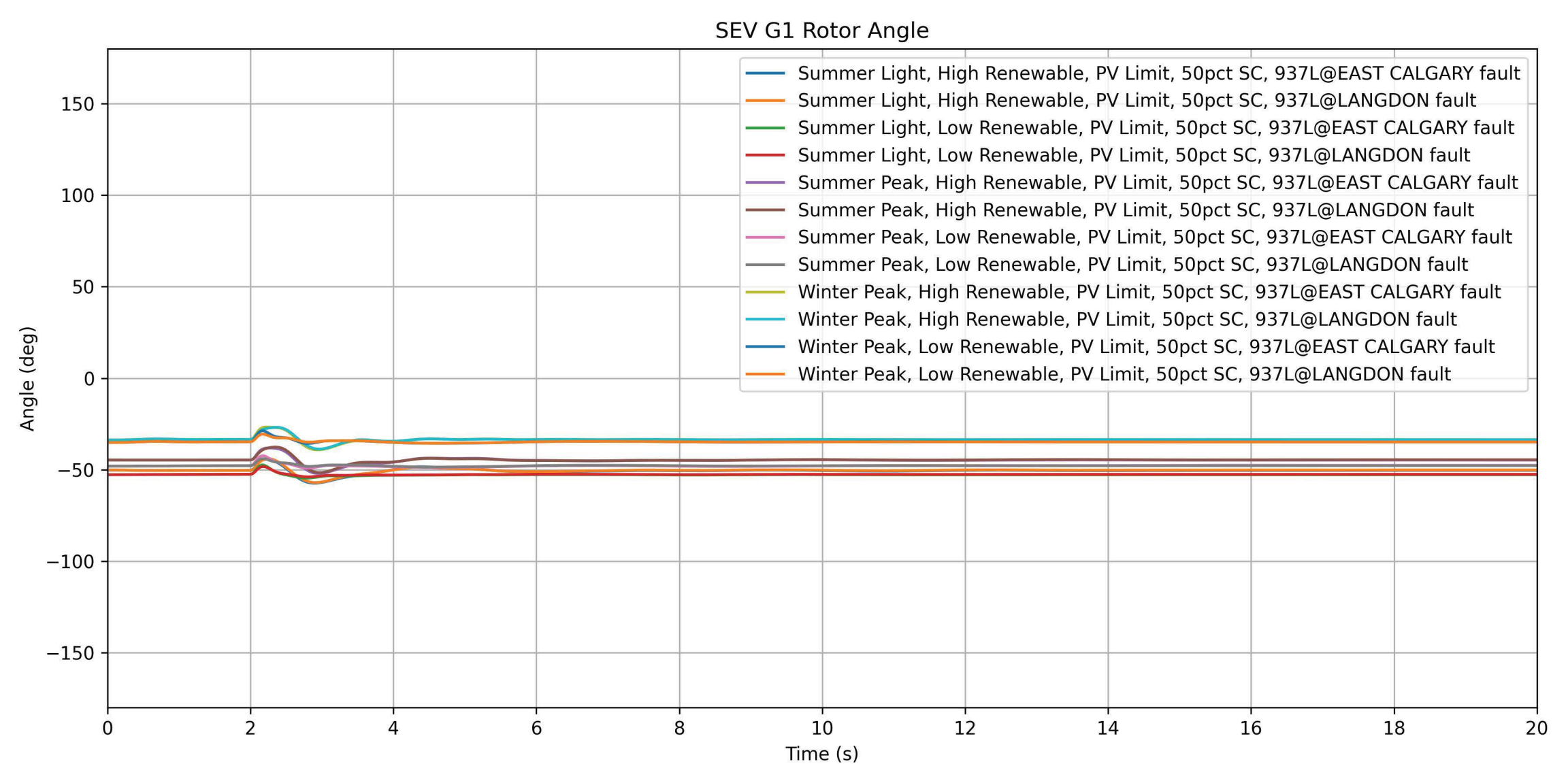

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

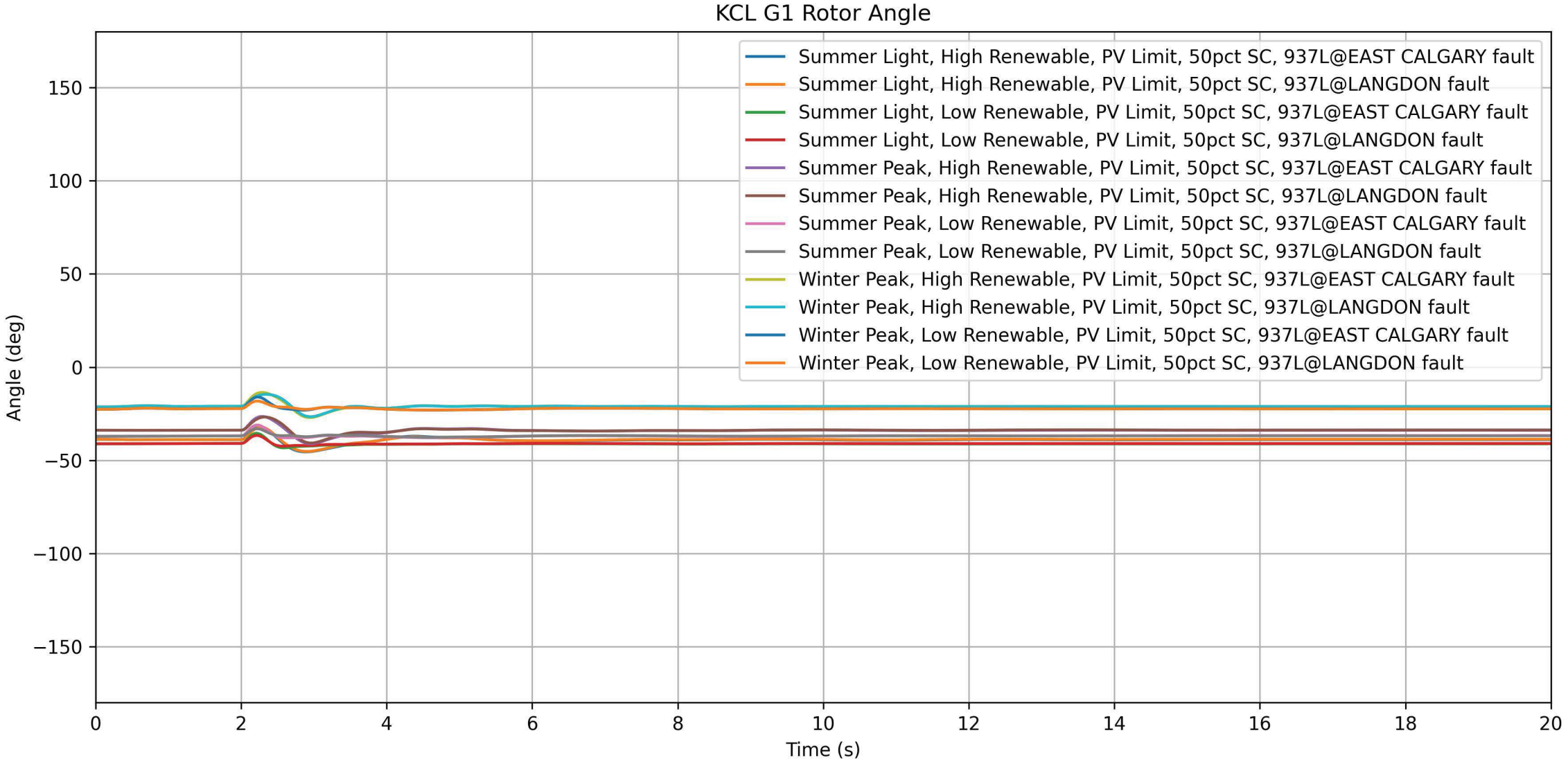

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

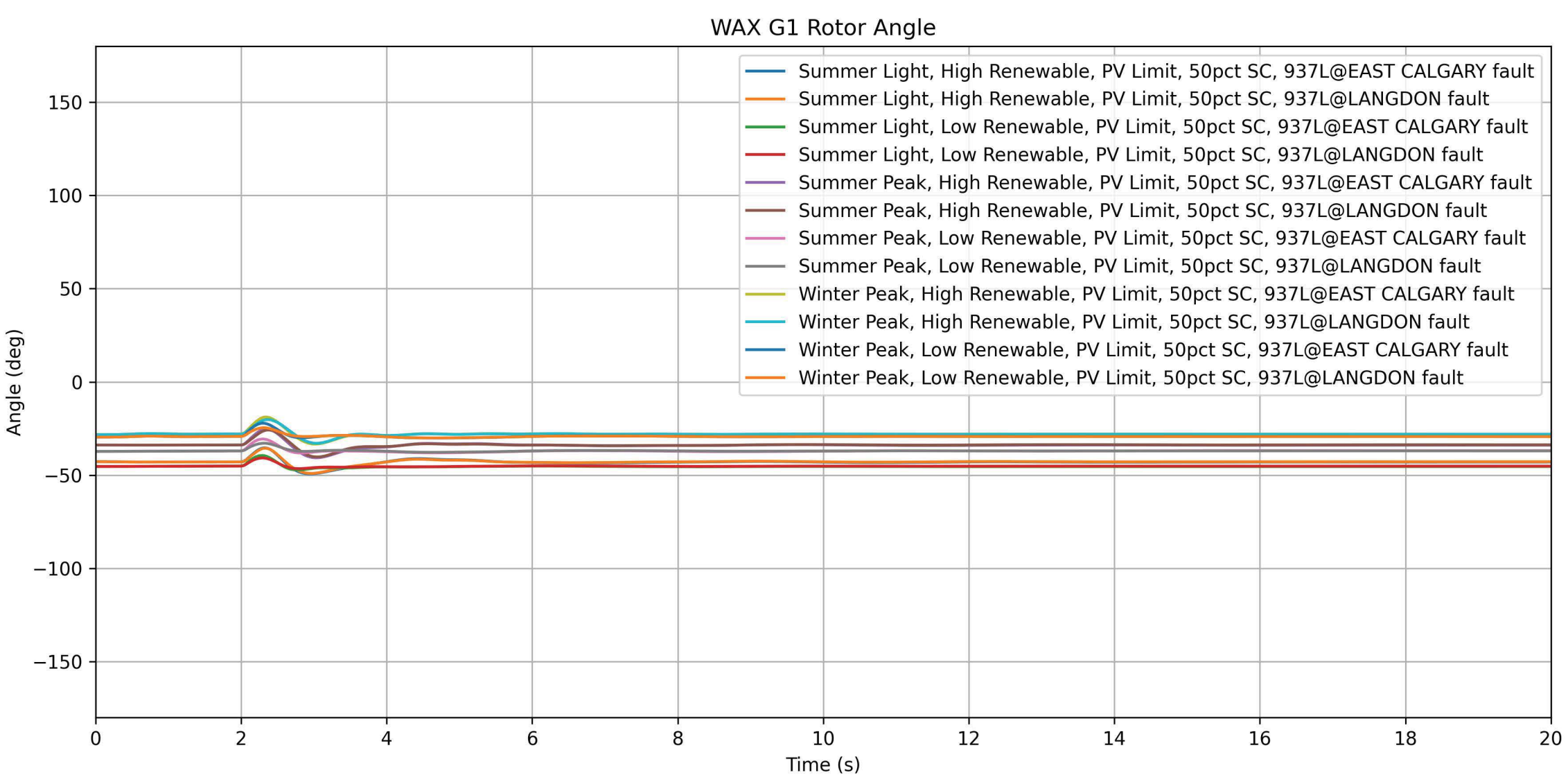

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

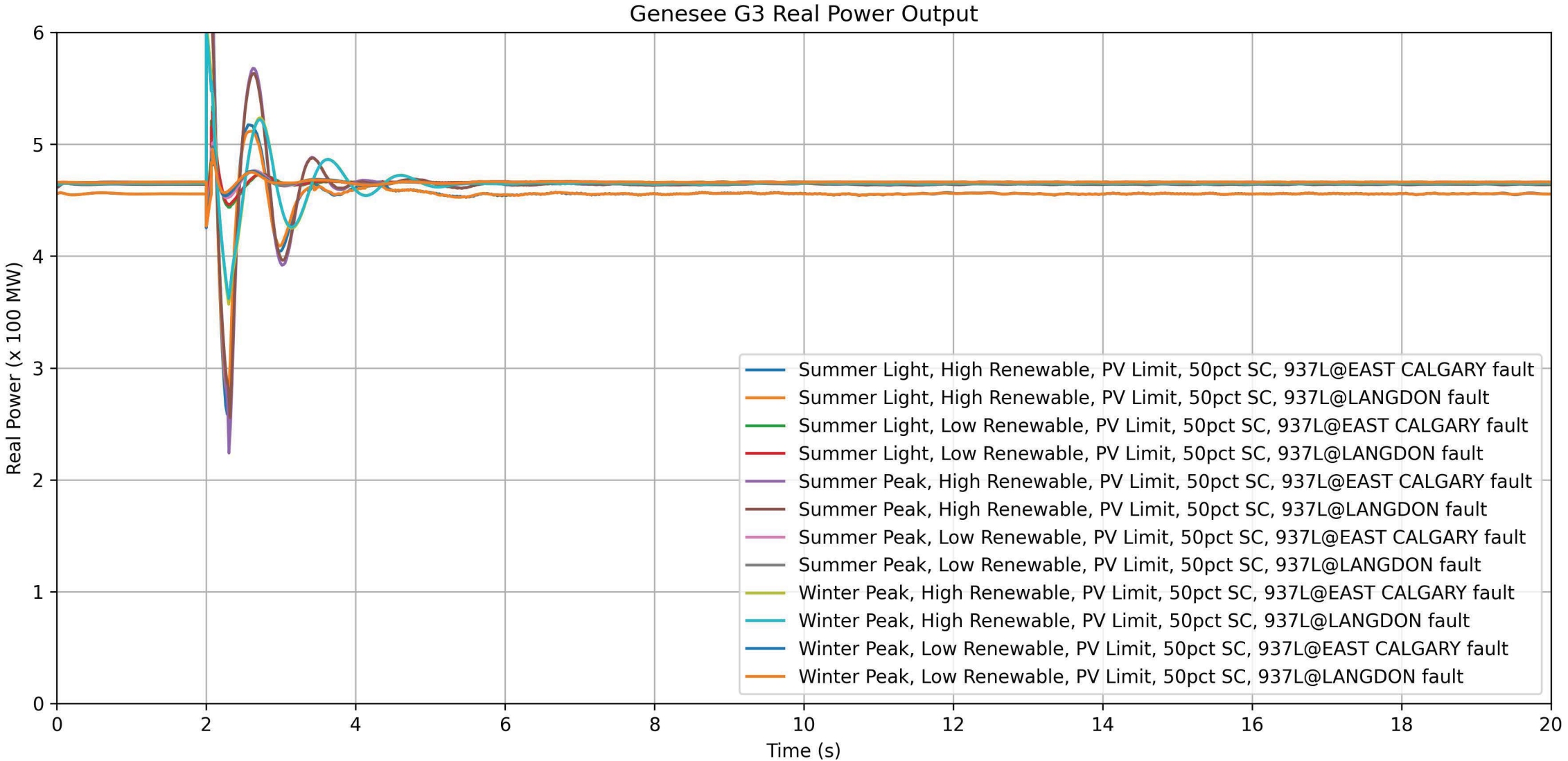

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

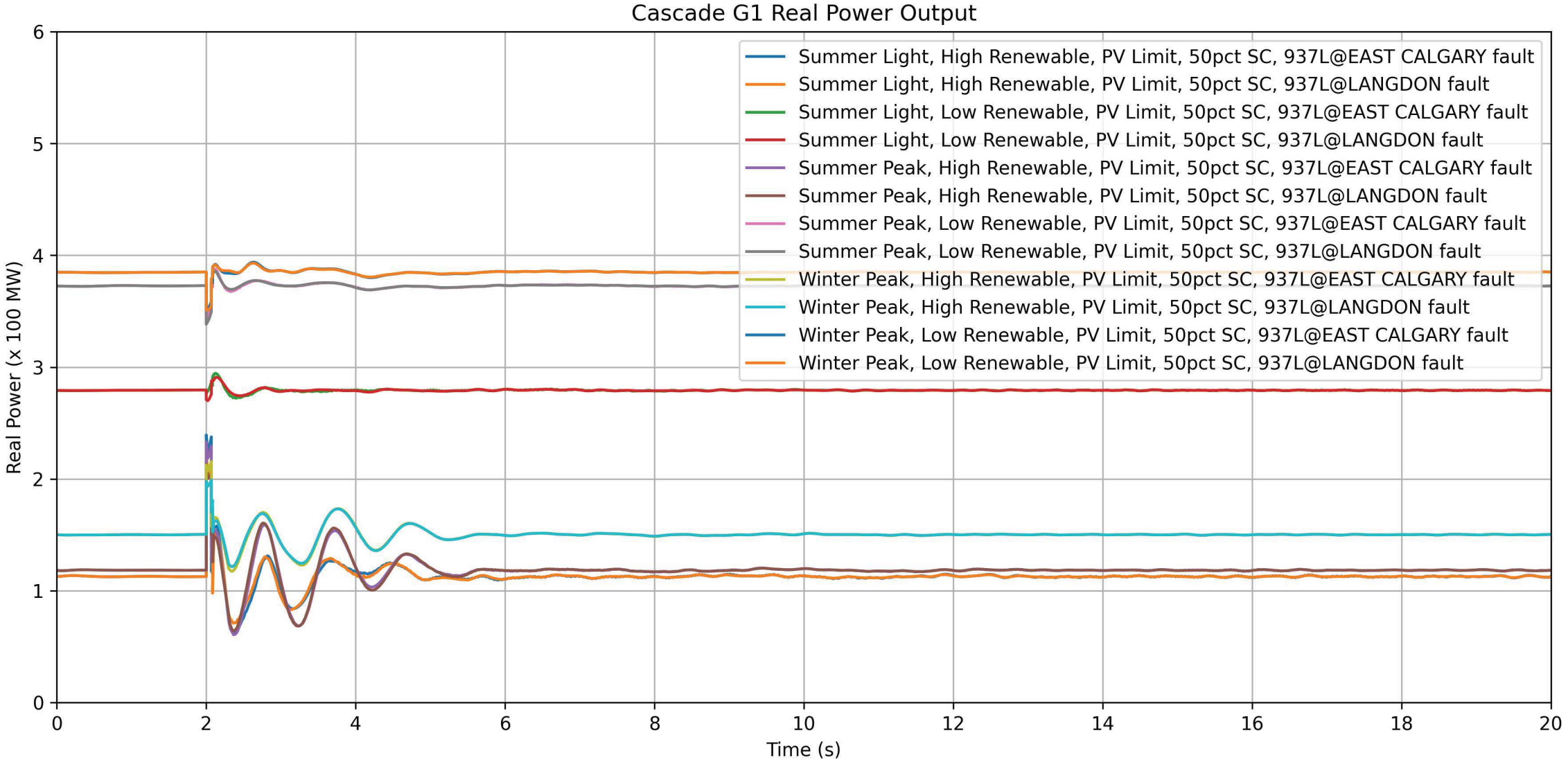

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

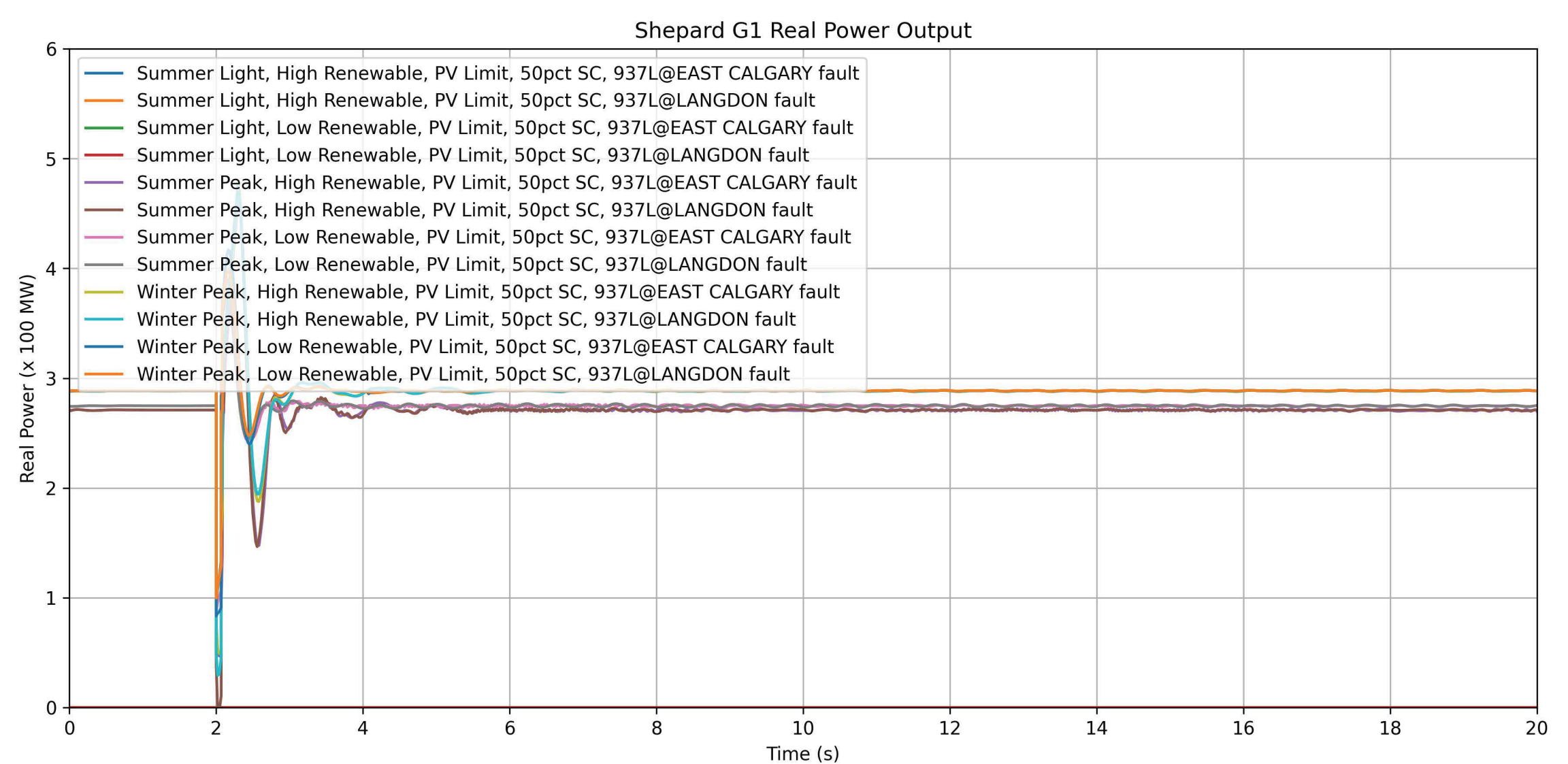

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

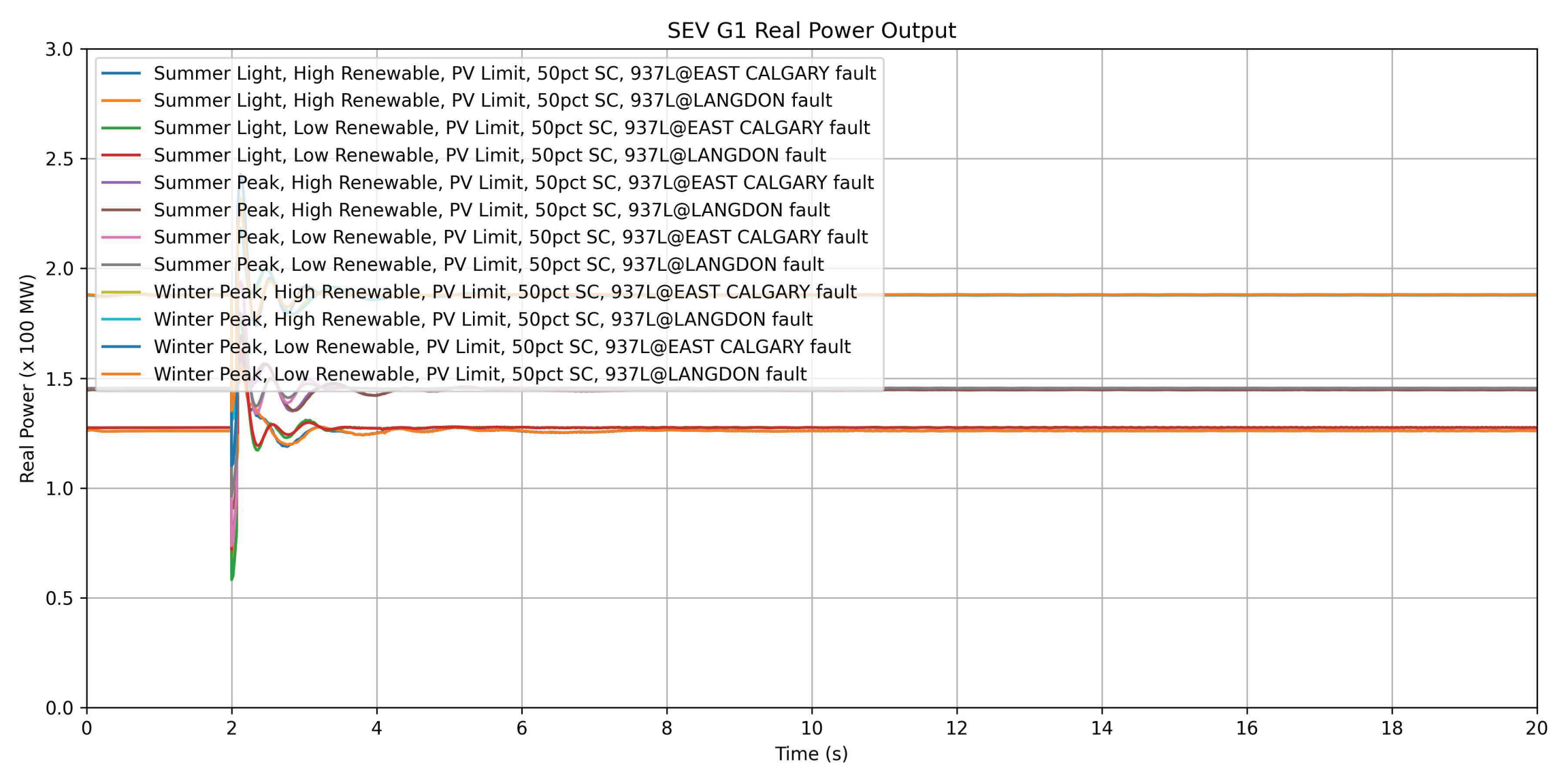

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

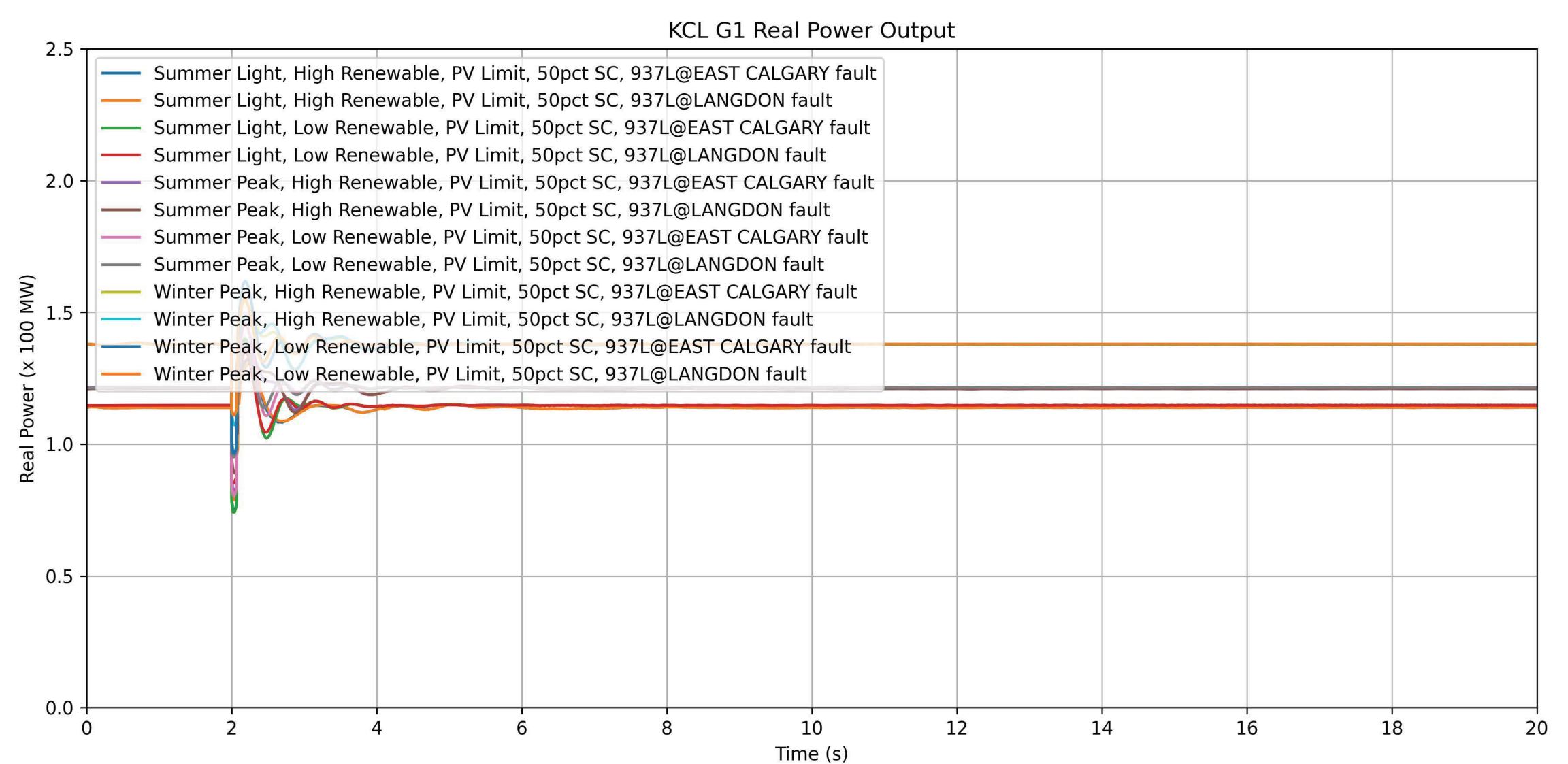

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

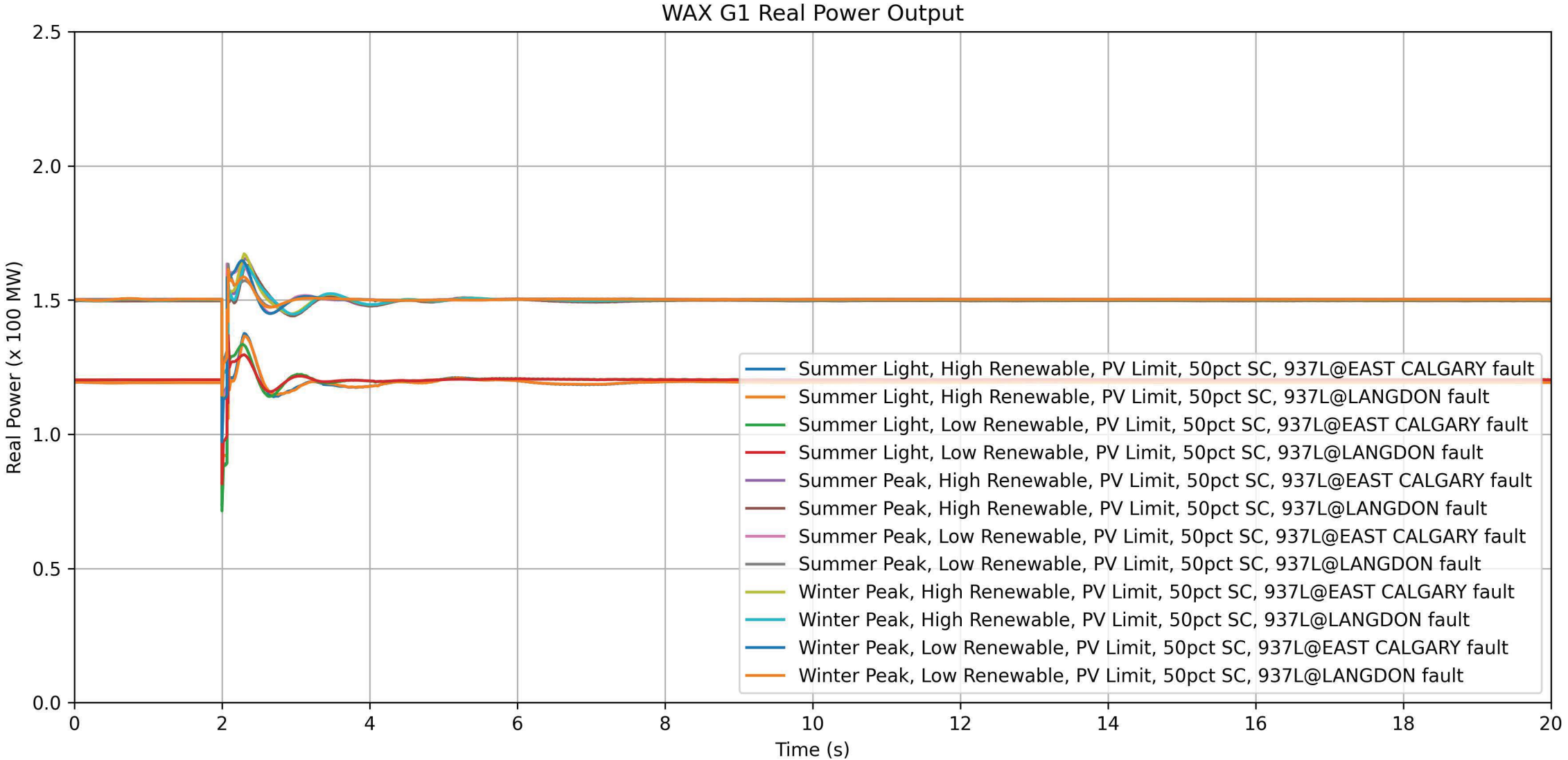

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

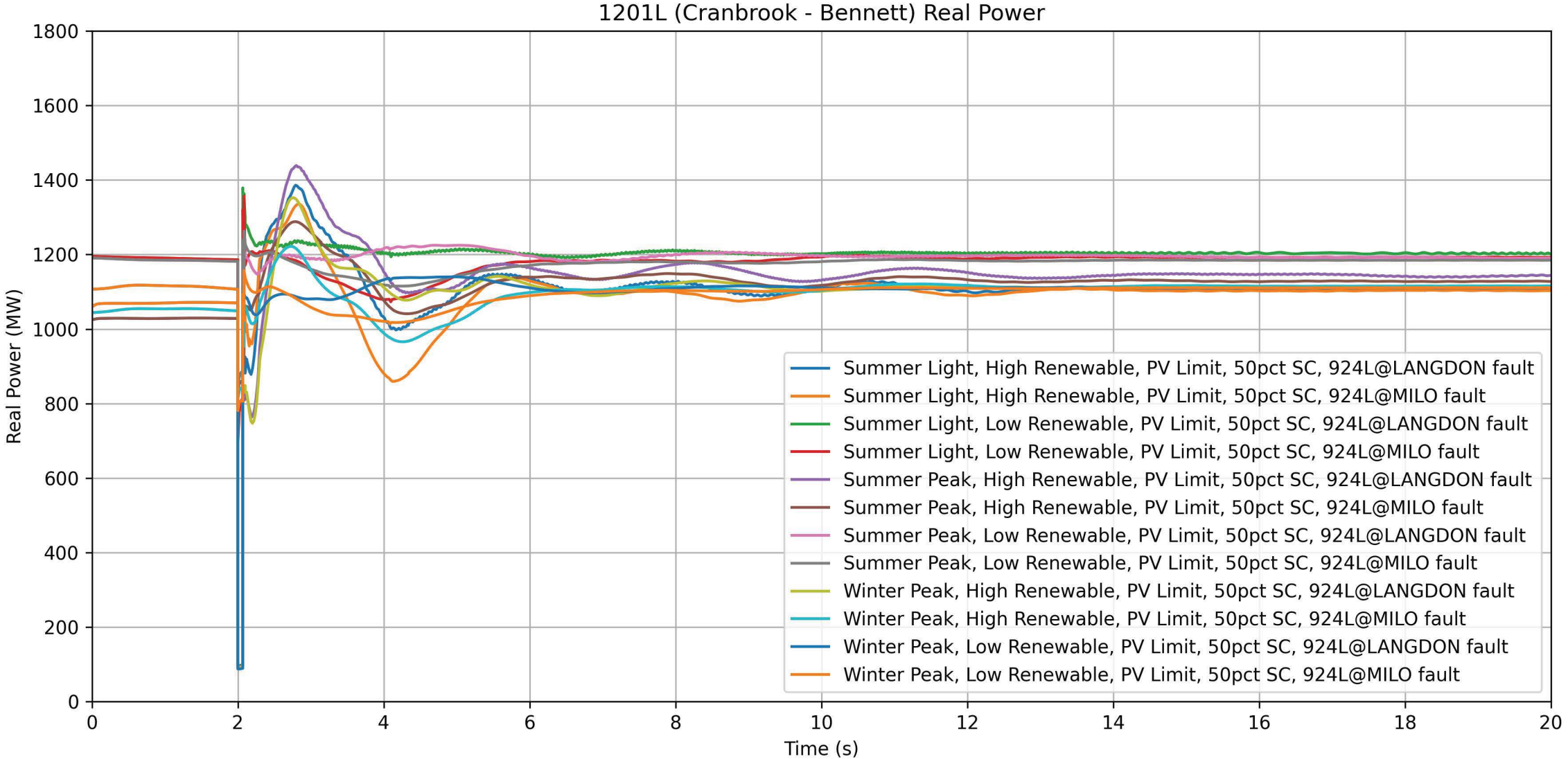

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

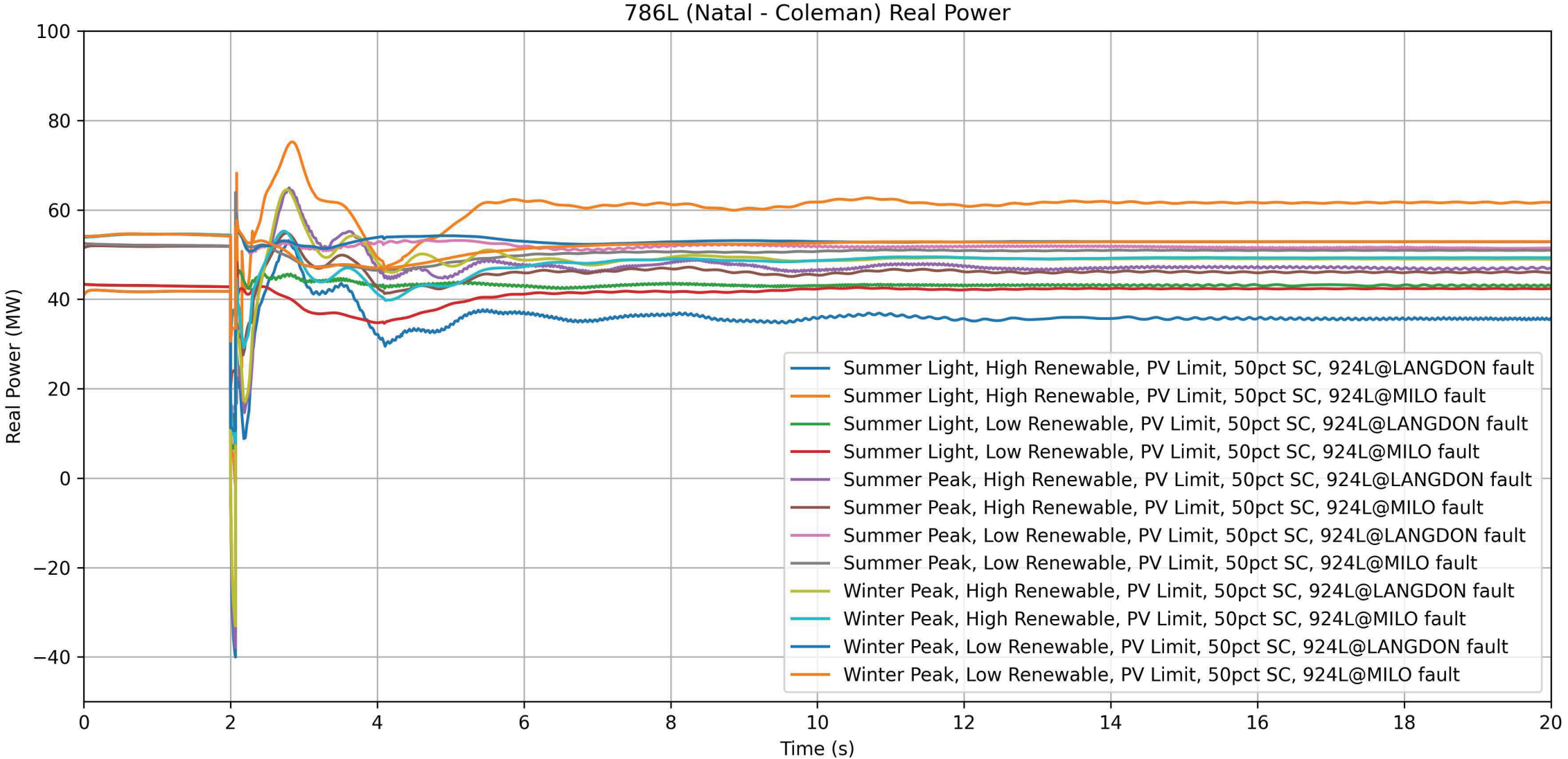

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

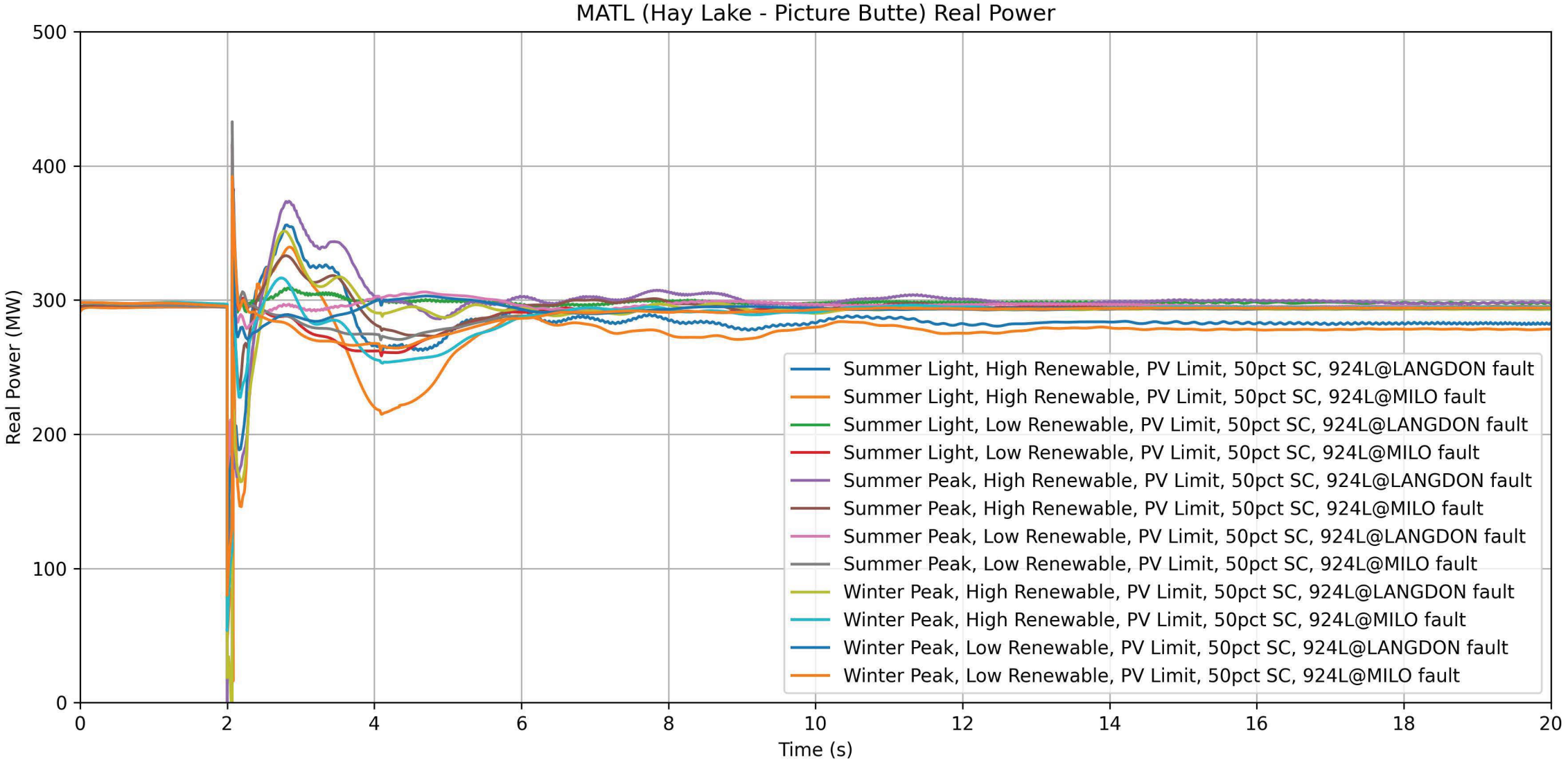

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

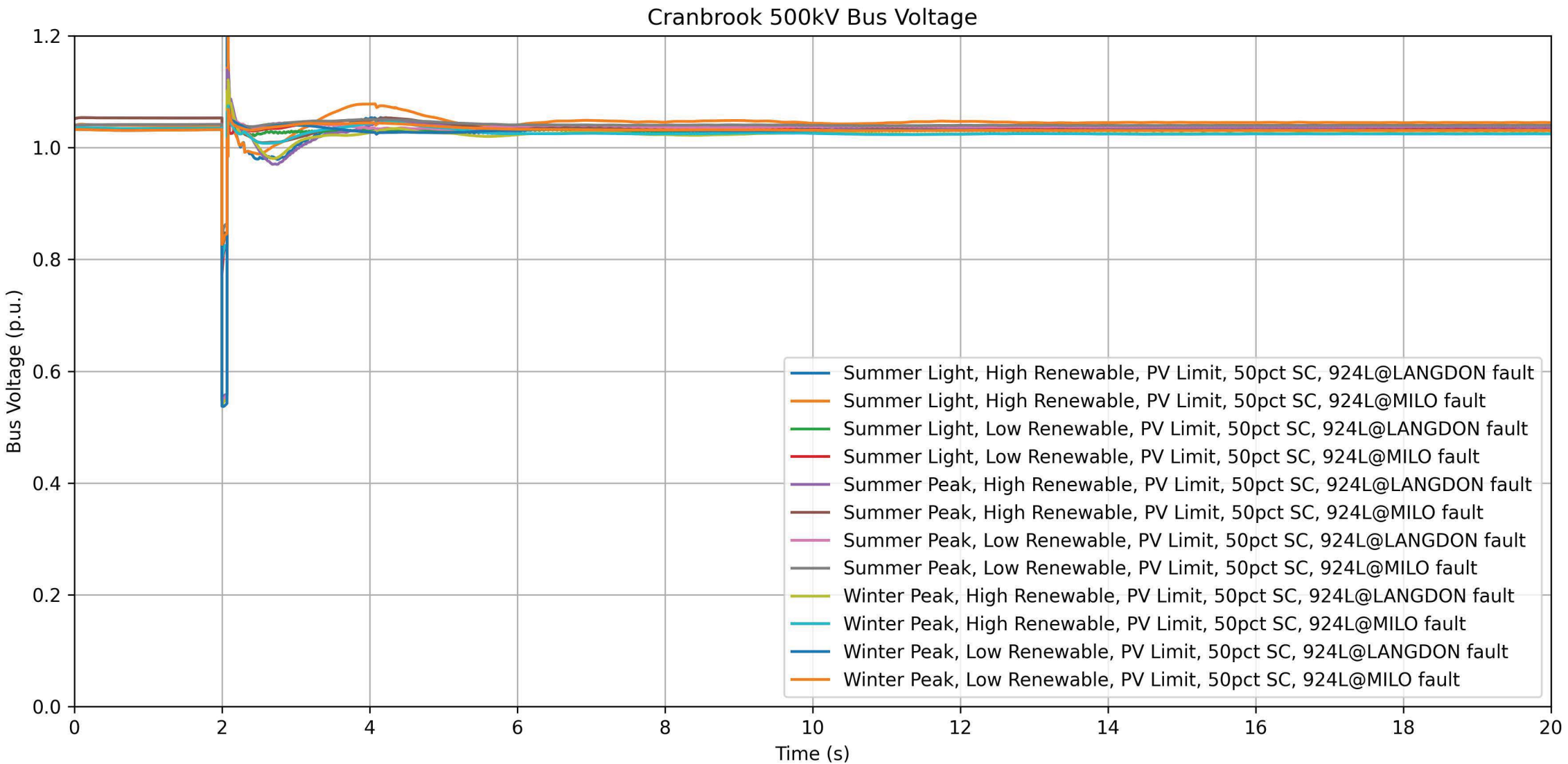

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

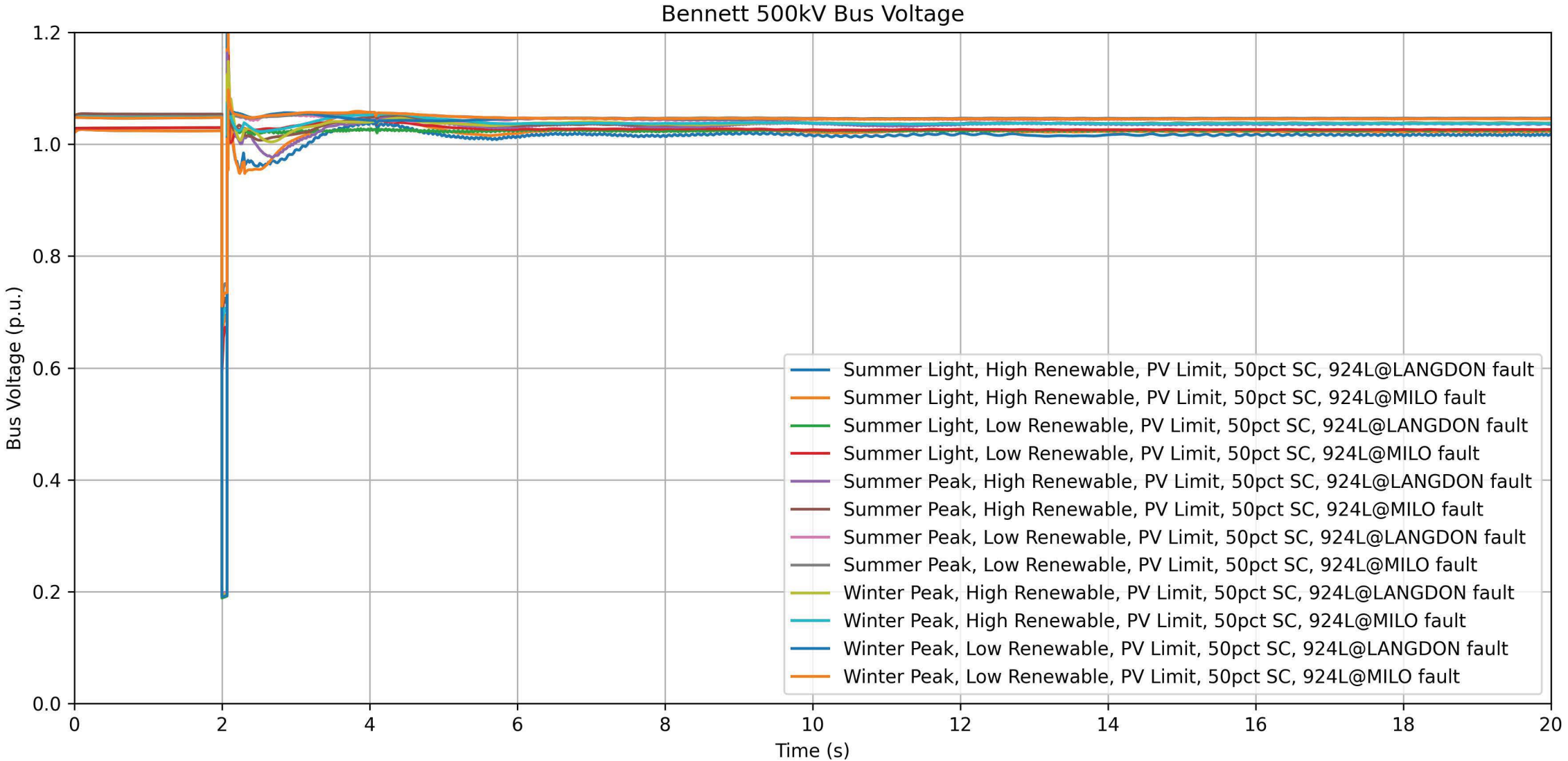

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 937L@LANGDON fault

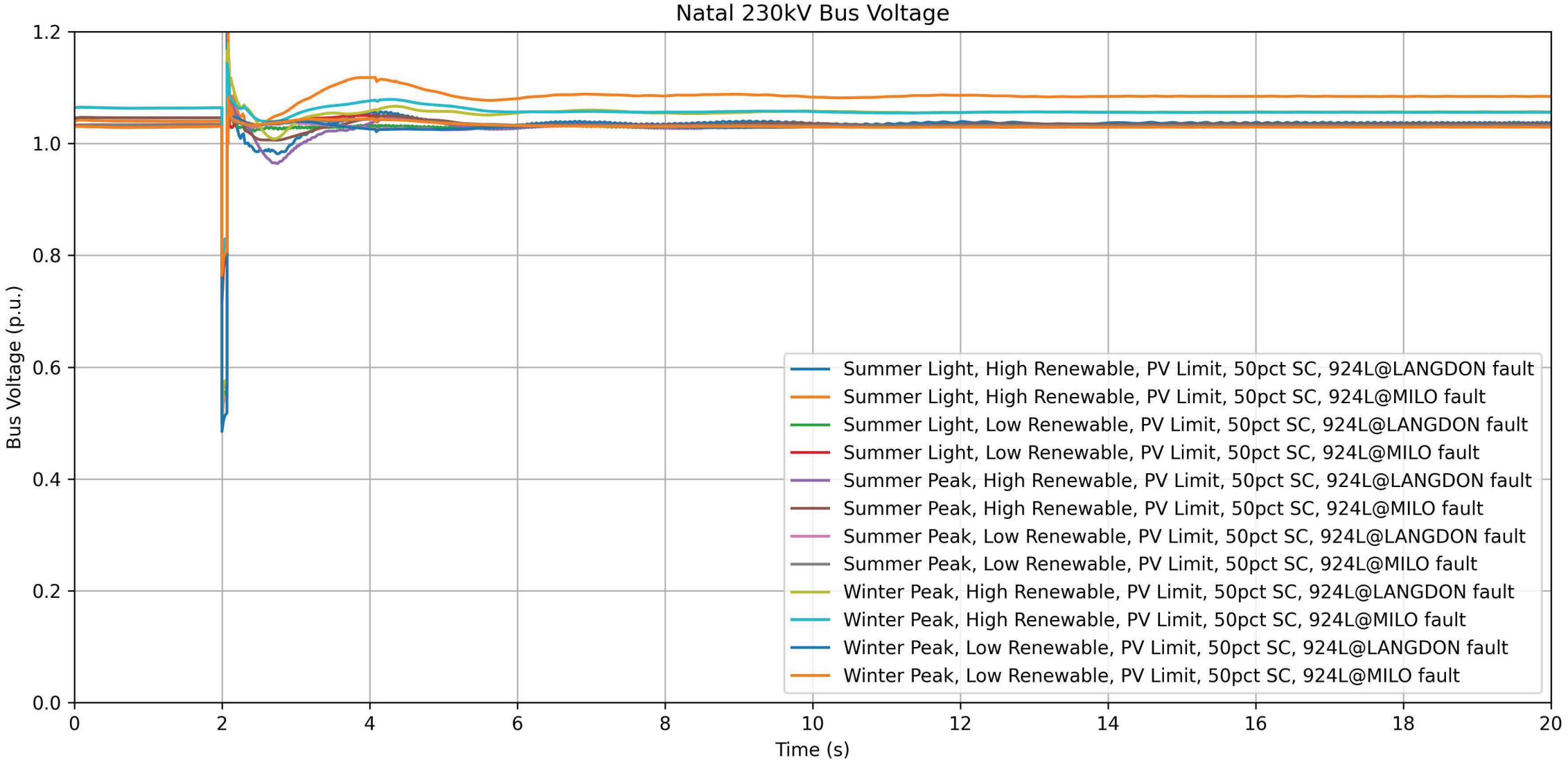

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

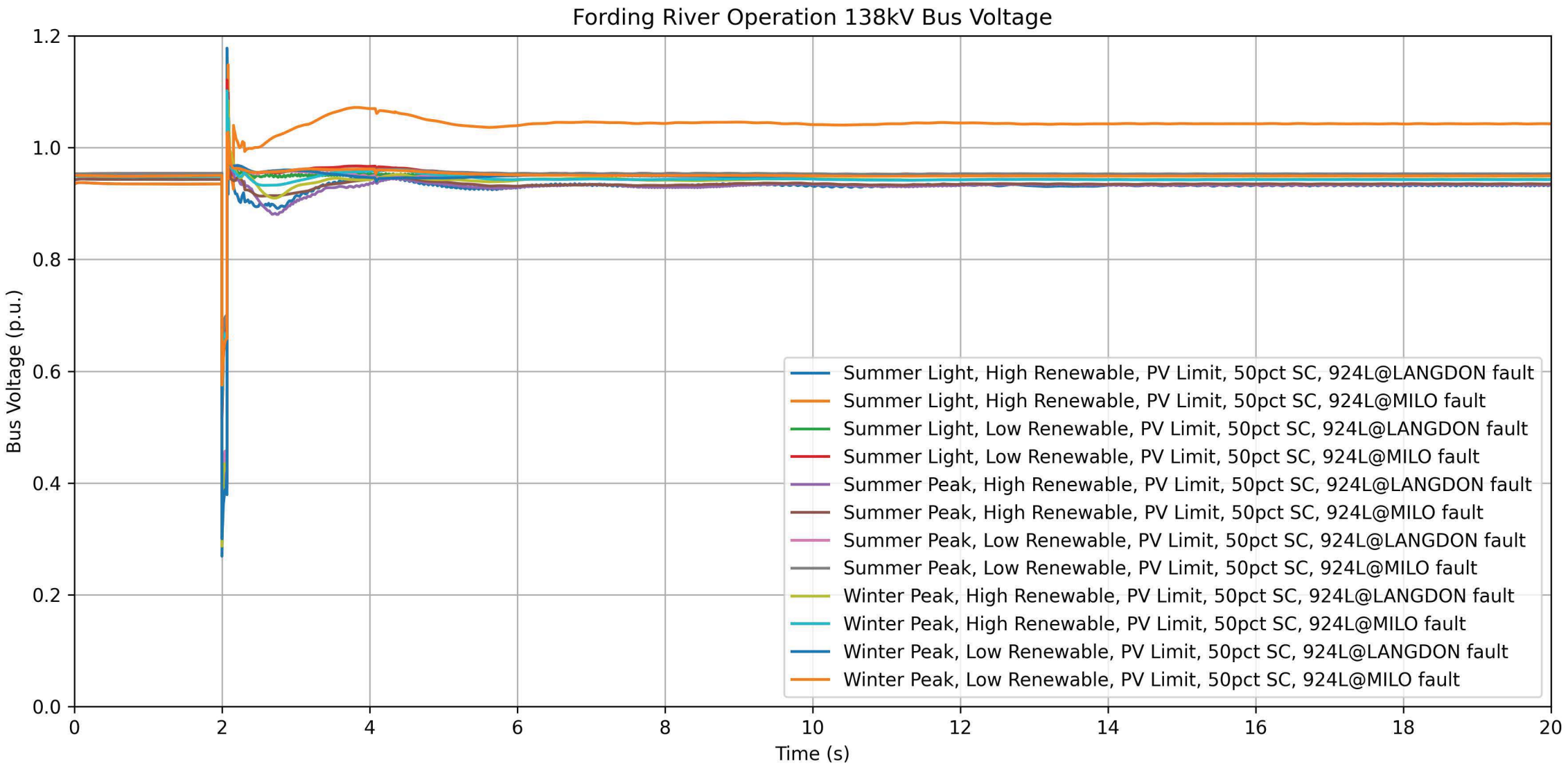

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

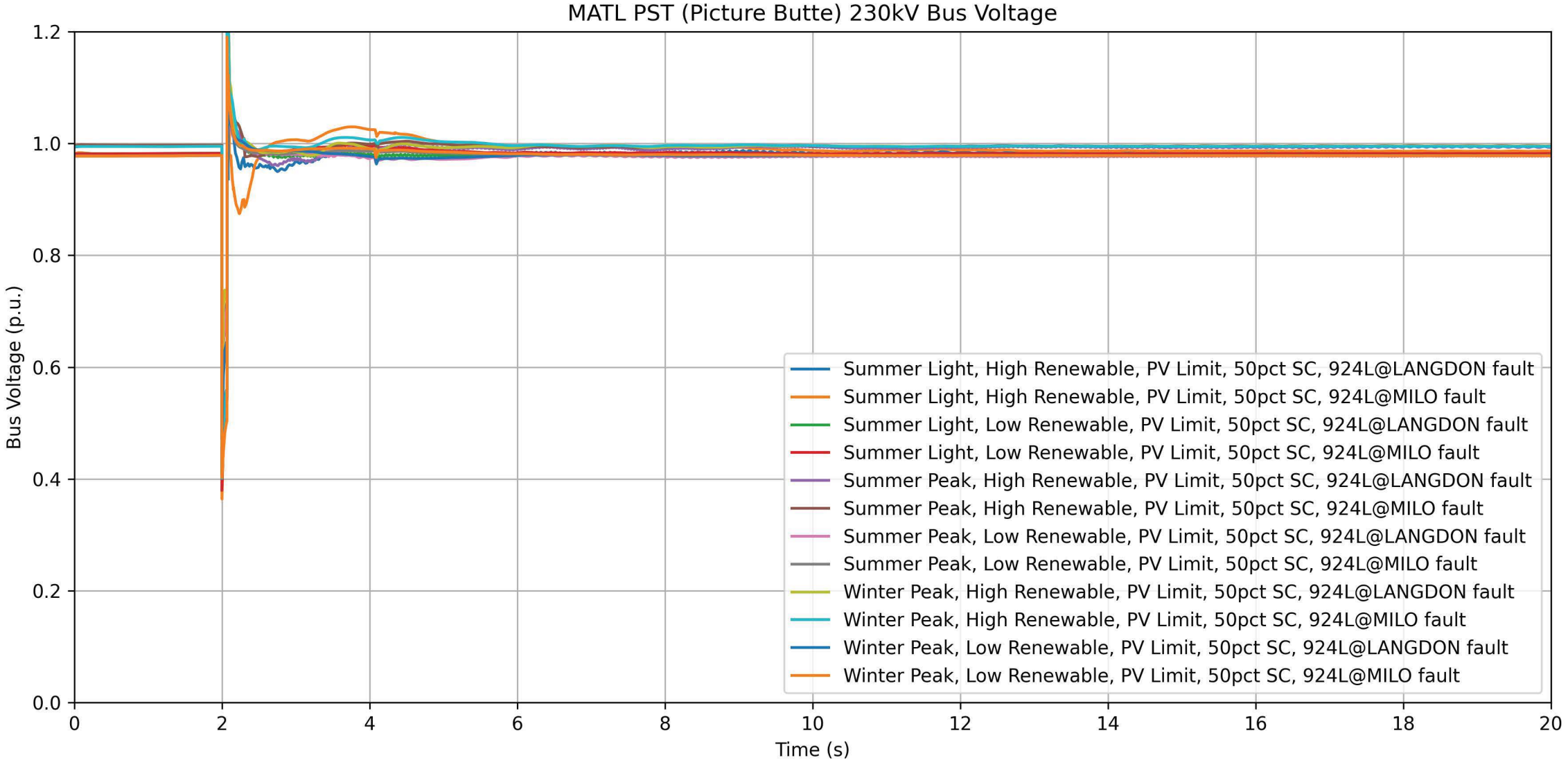

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

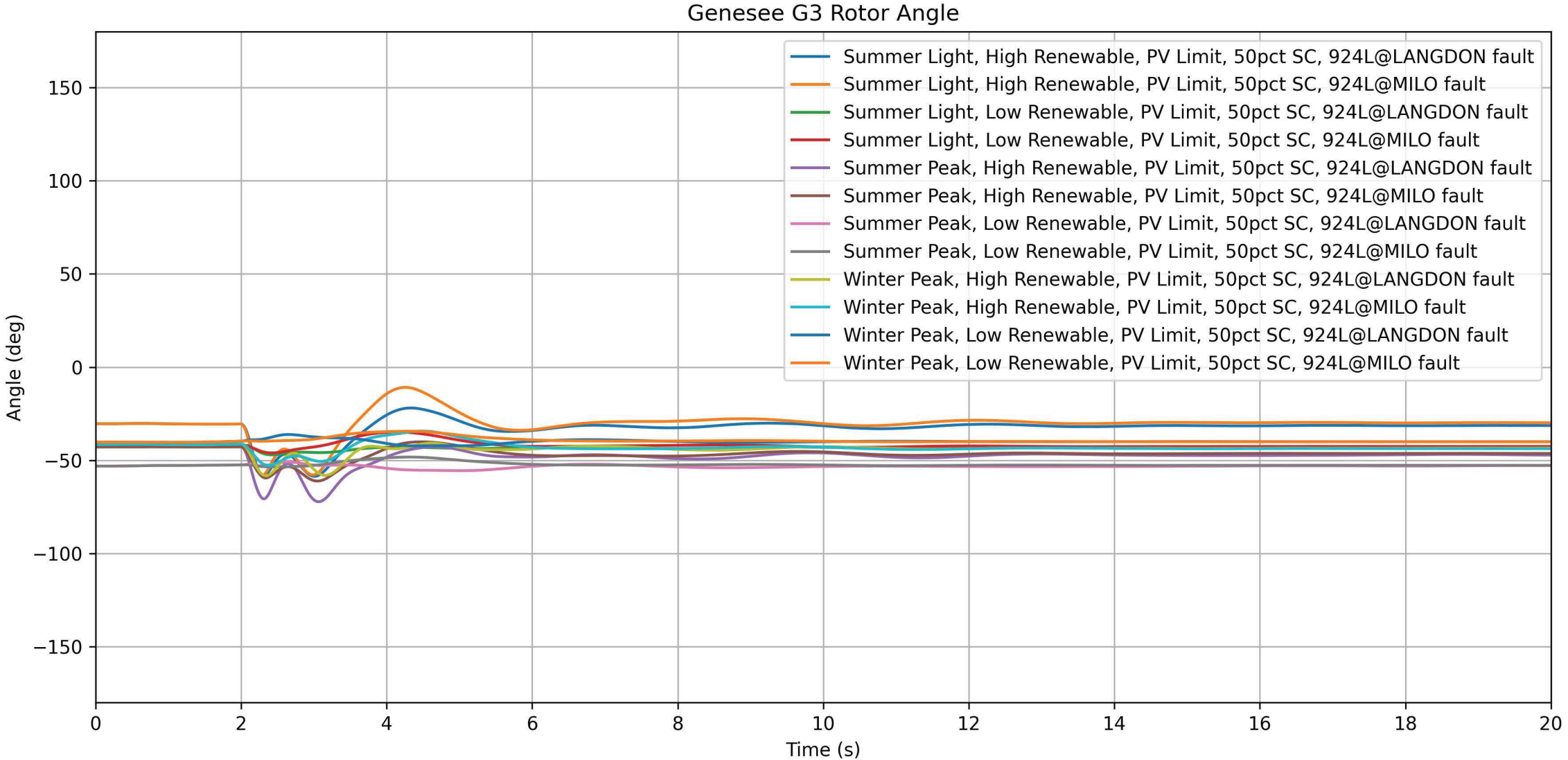

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

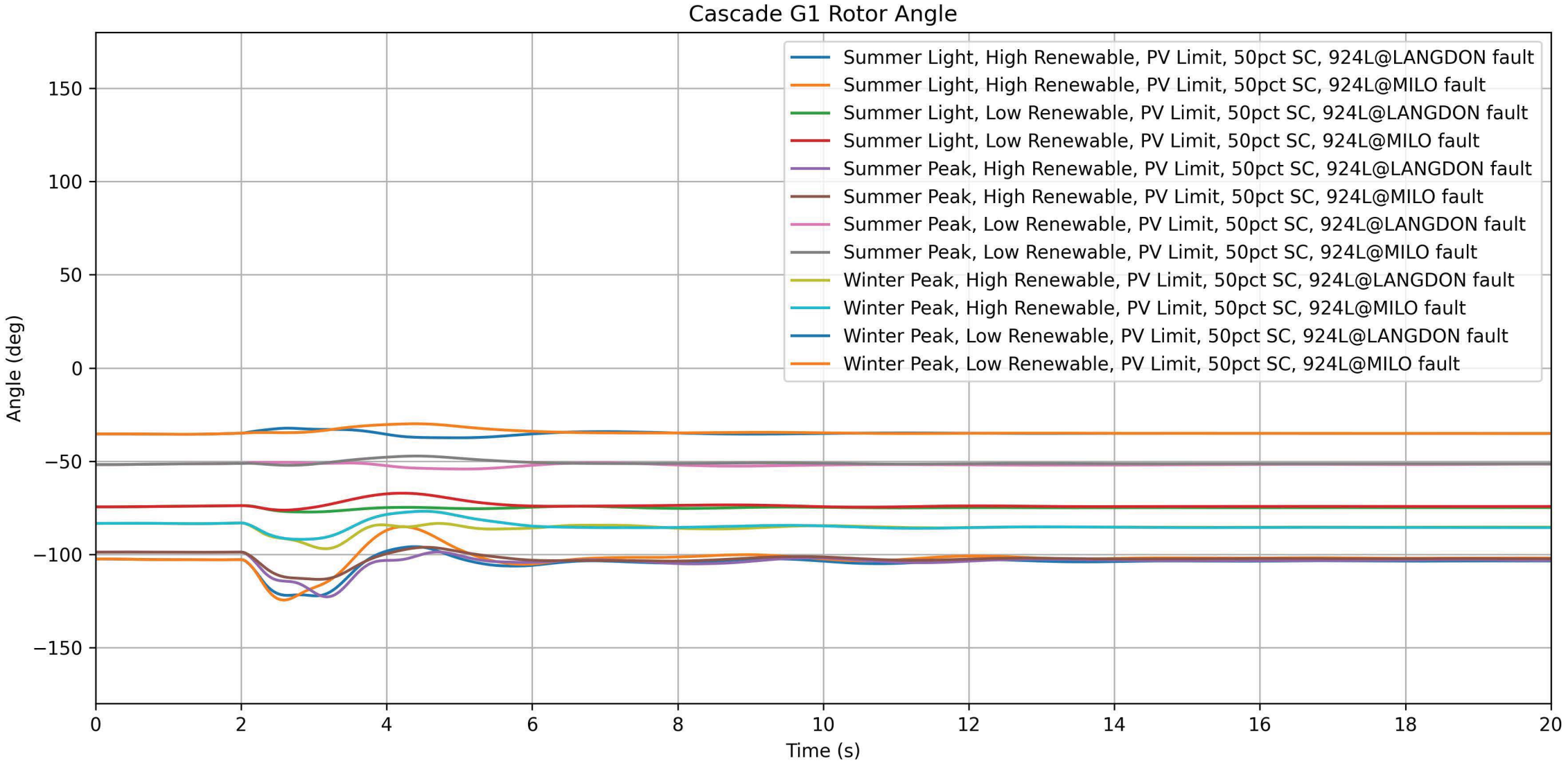

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

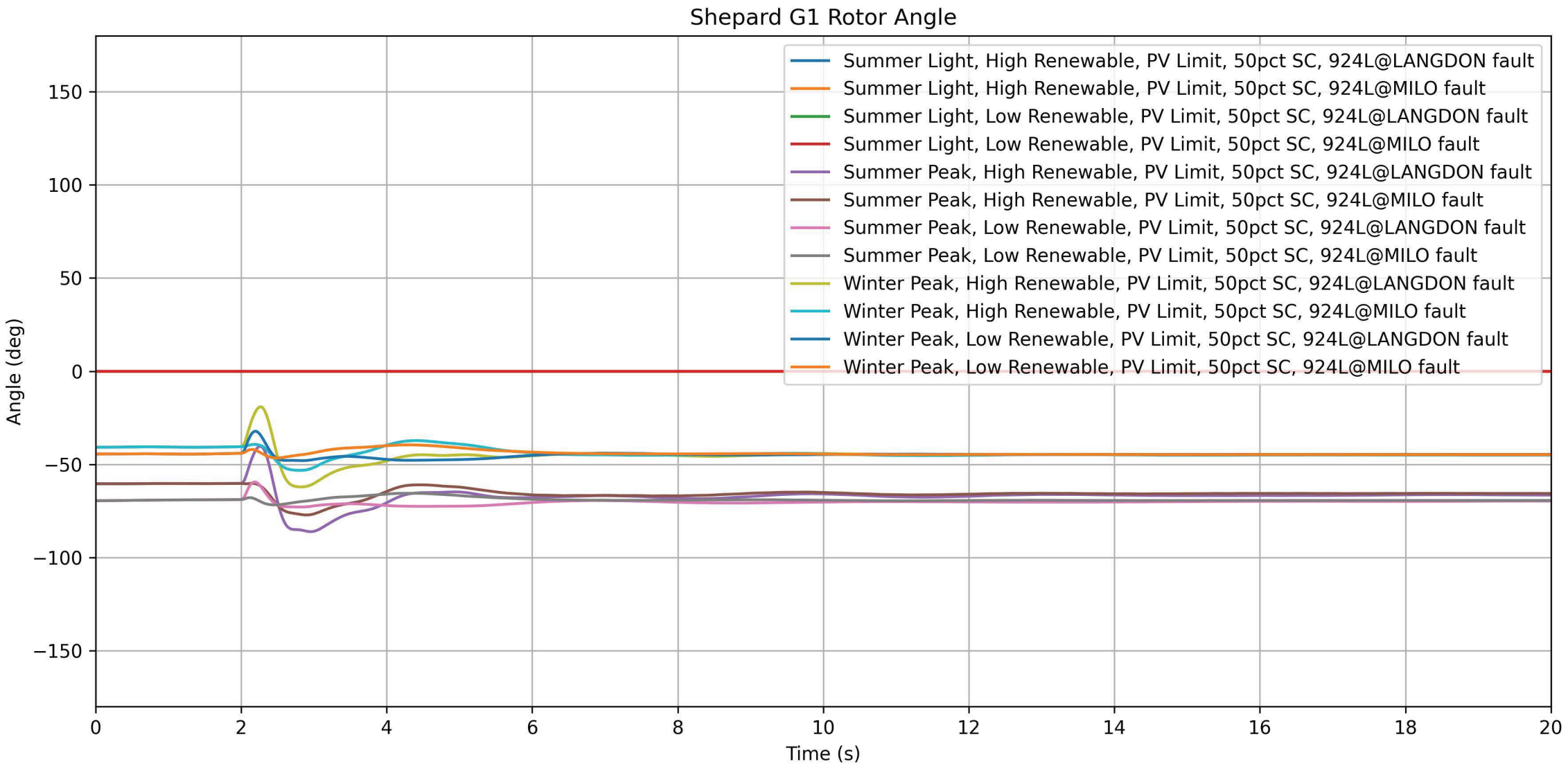

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

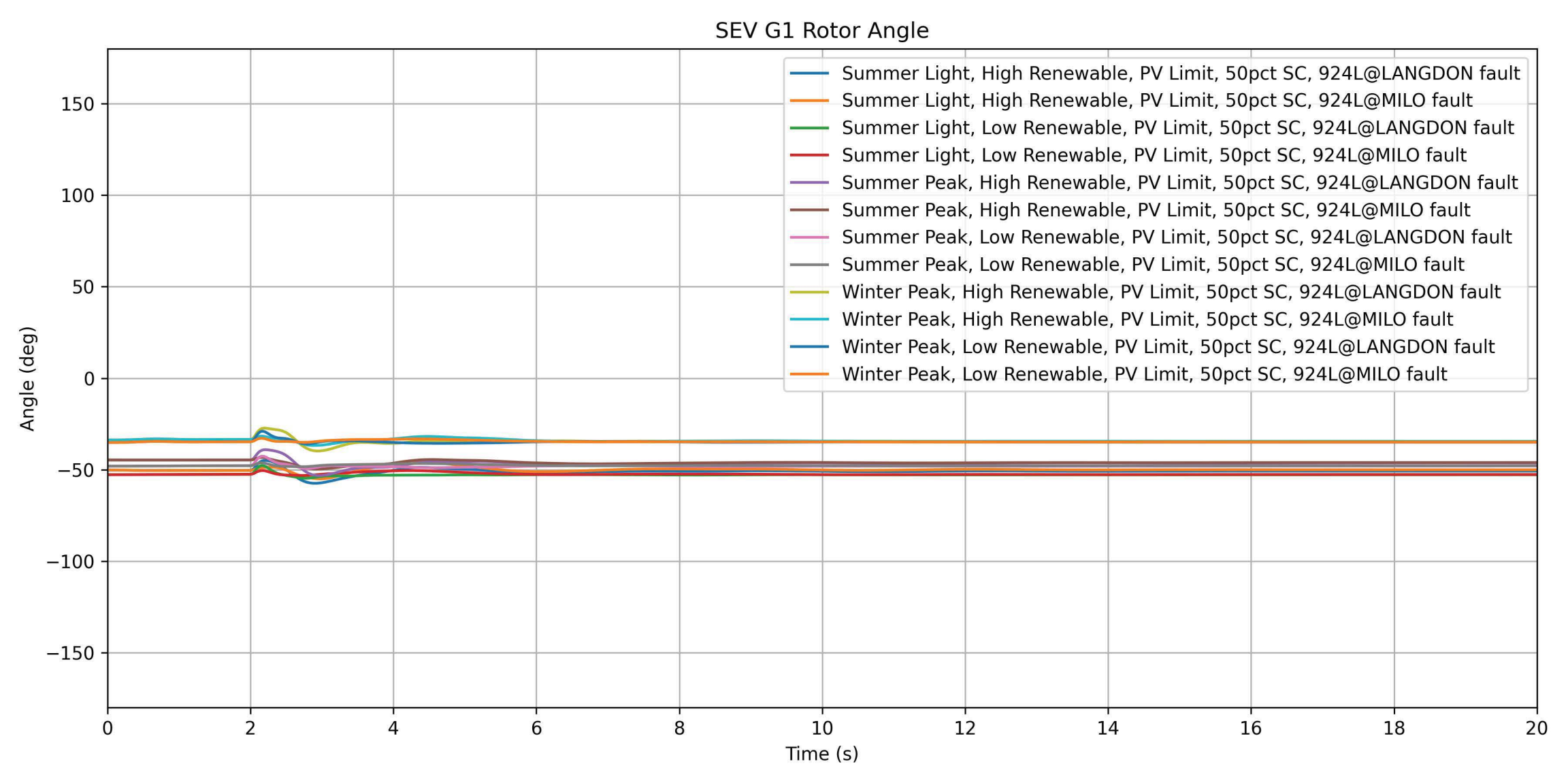

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

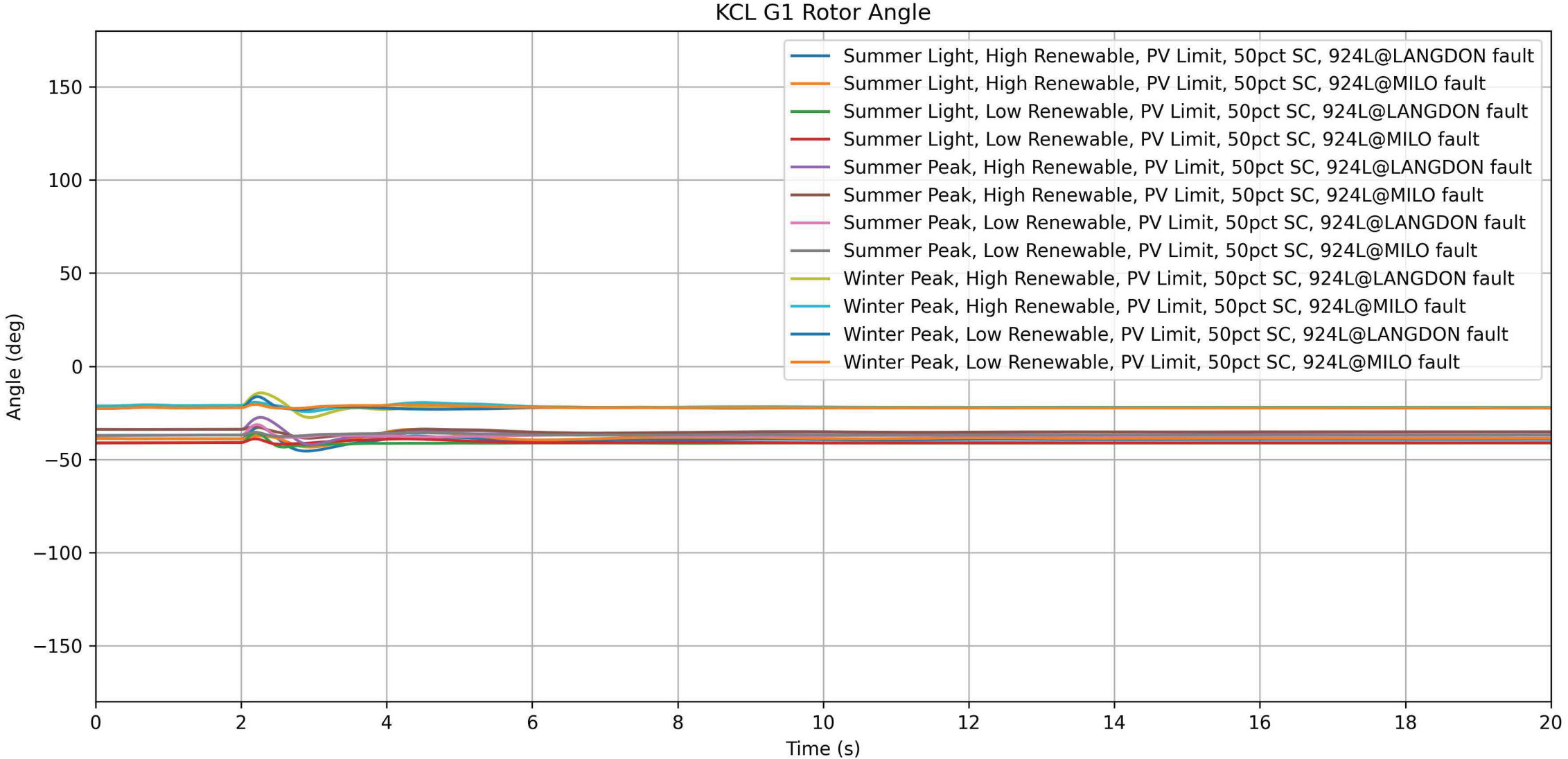

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

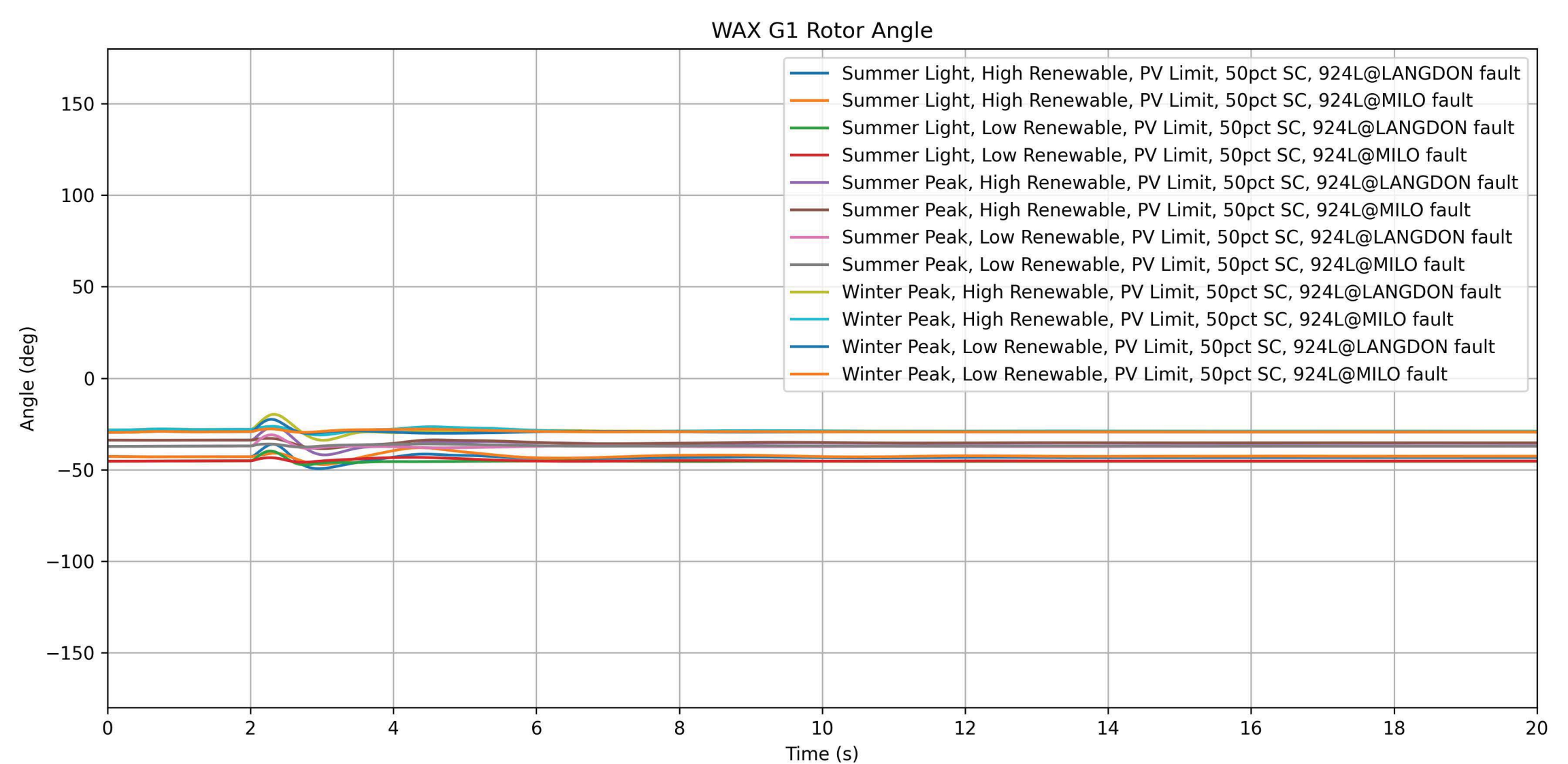

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

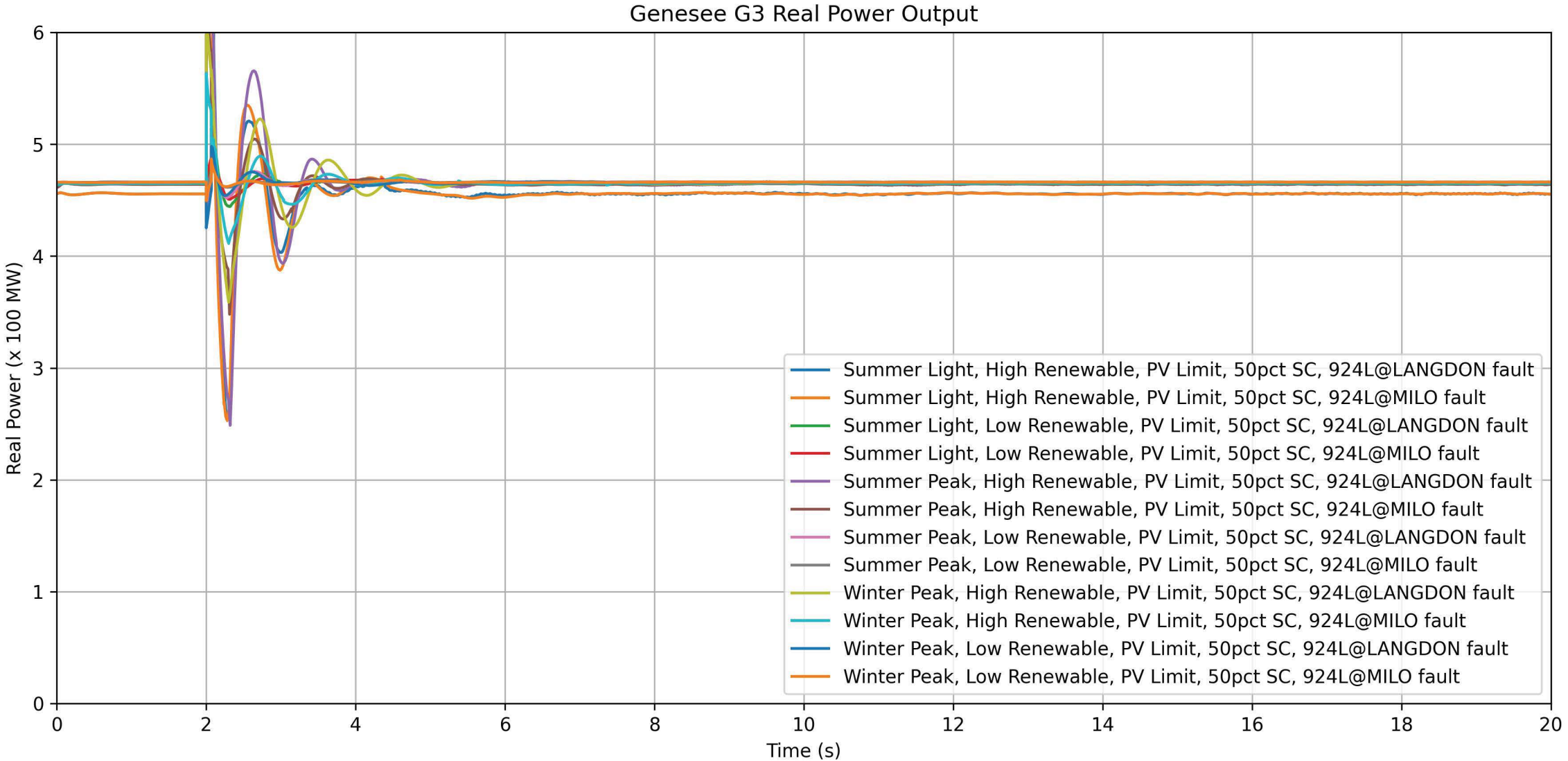

Cascade G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

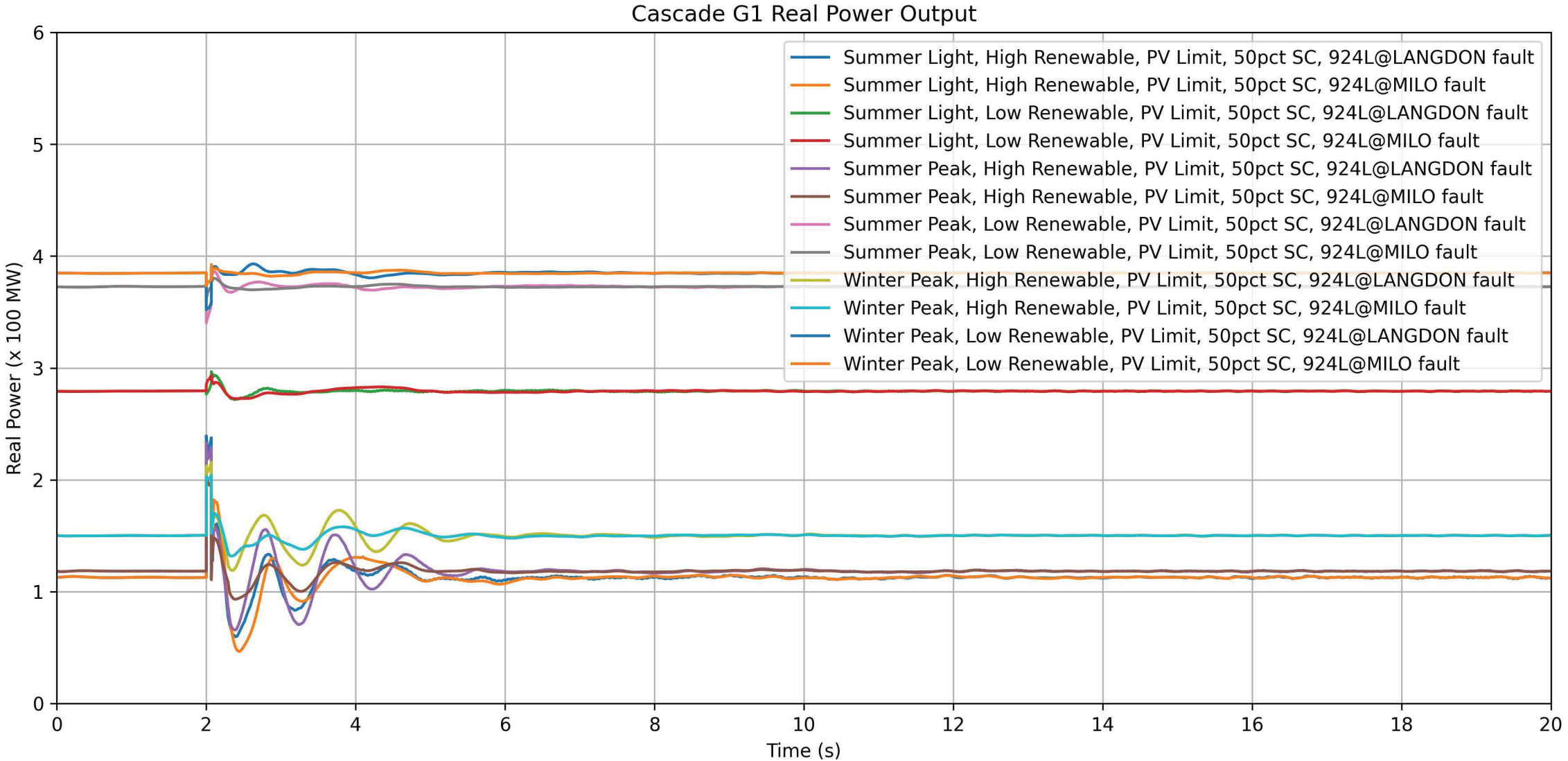

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

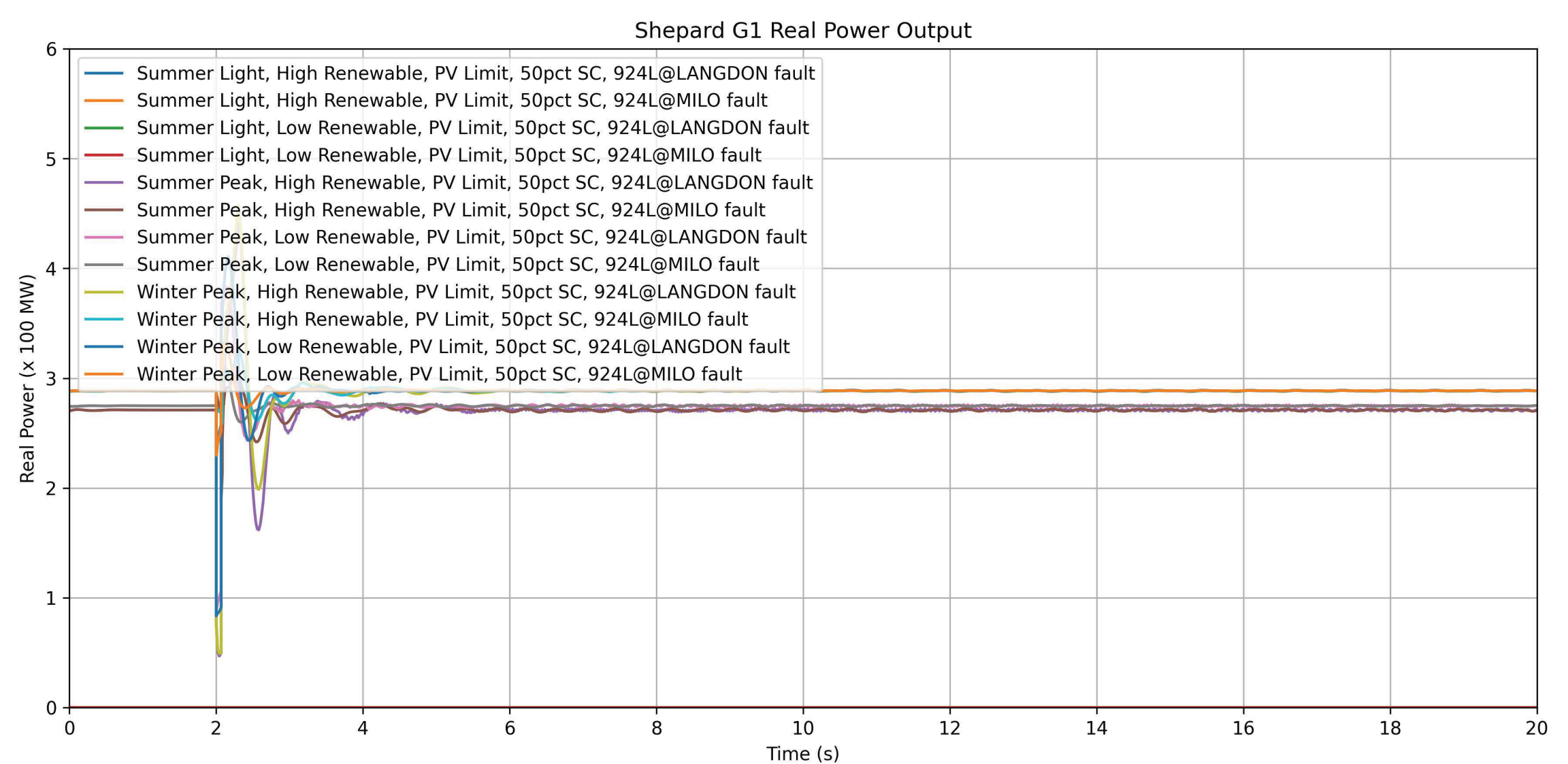

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

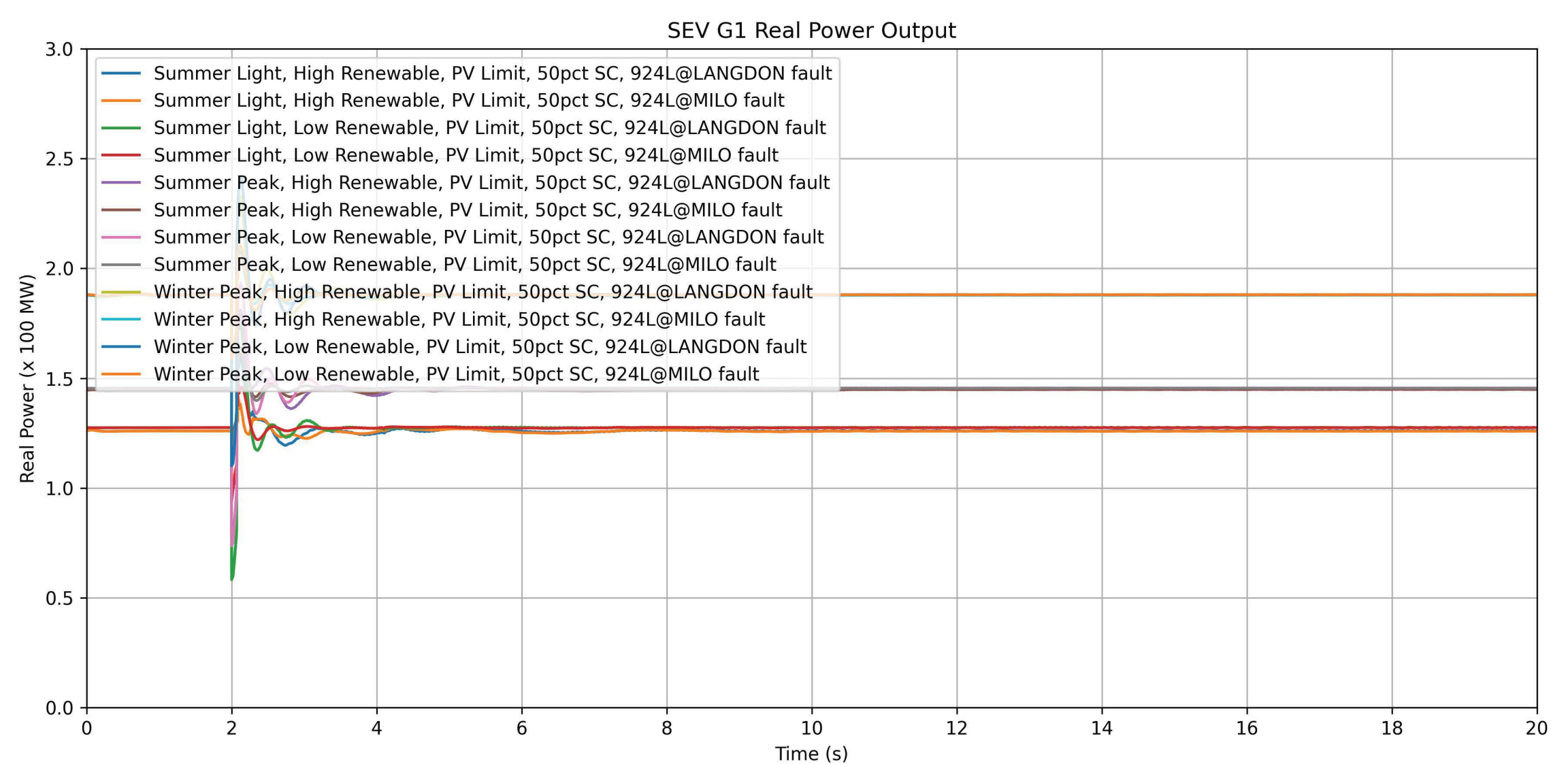

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

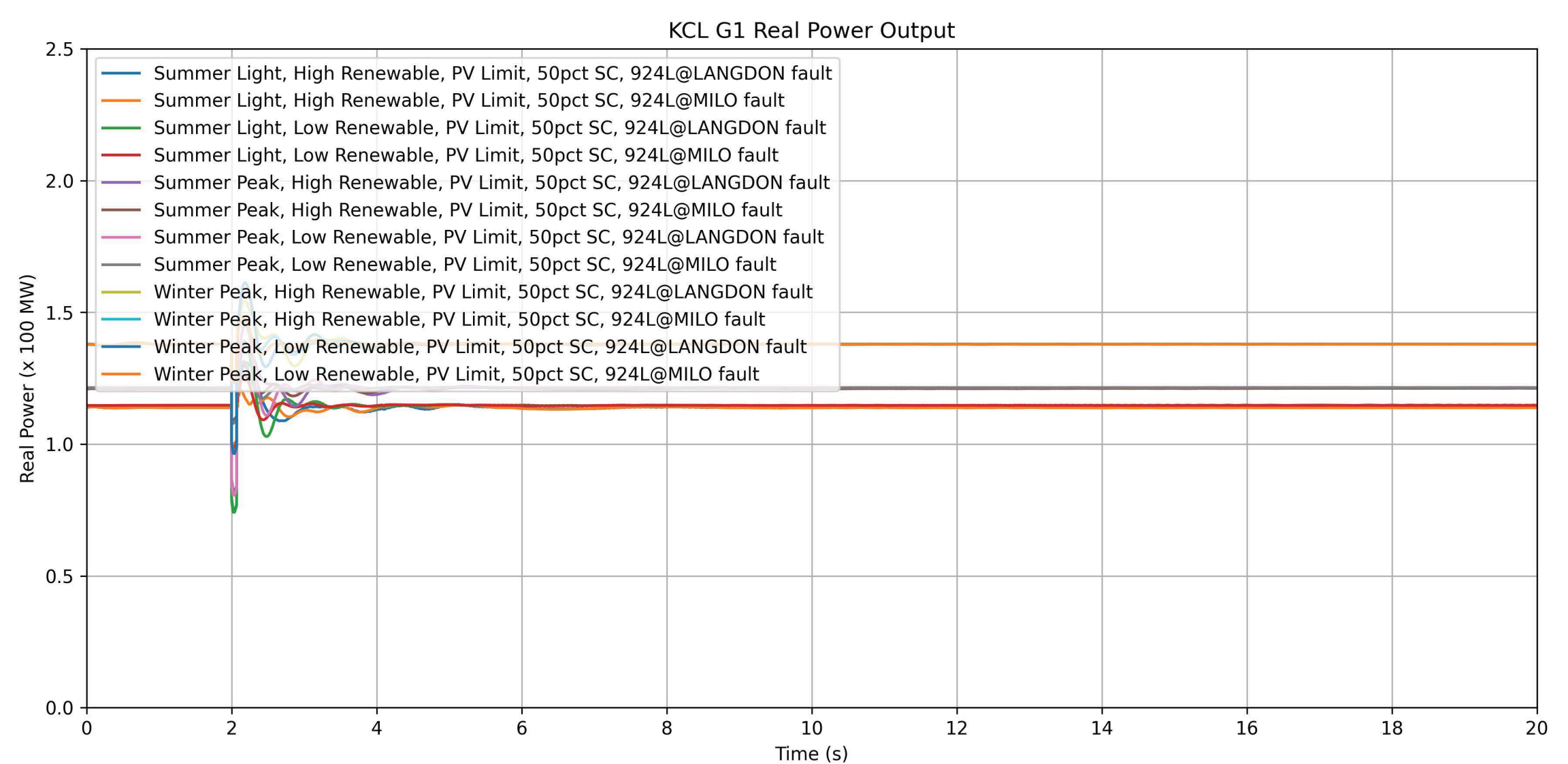

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

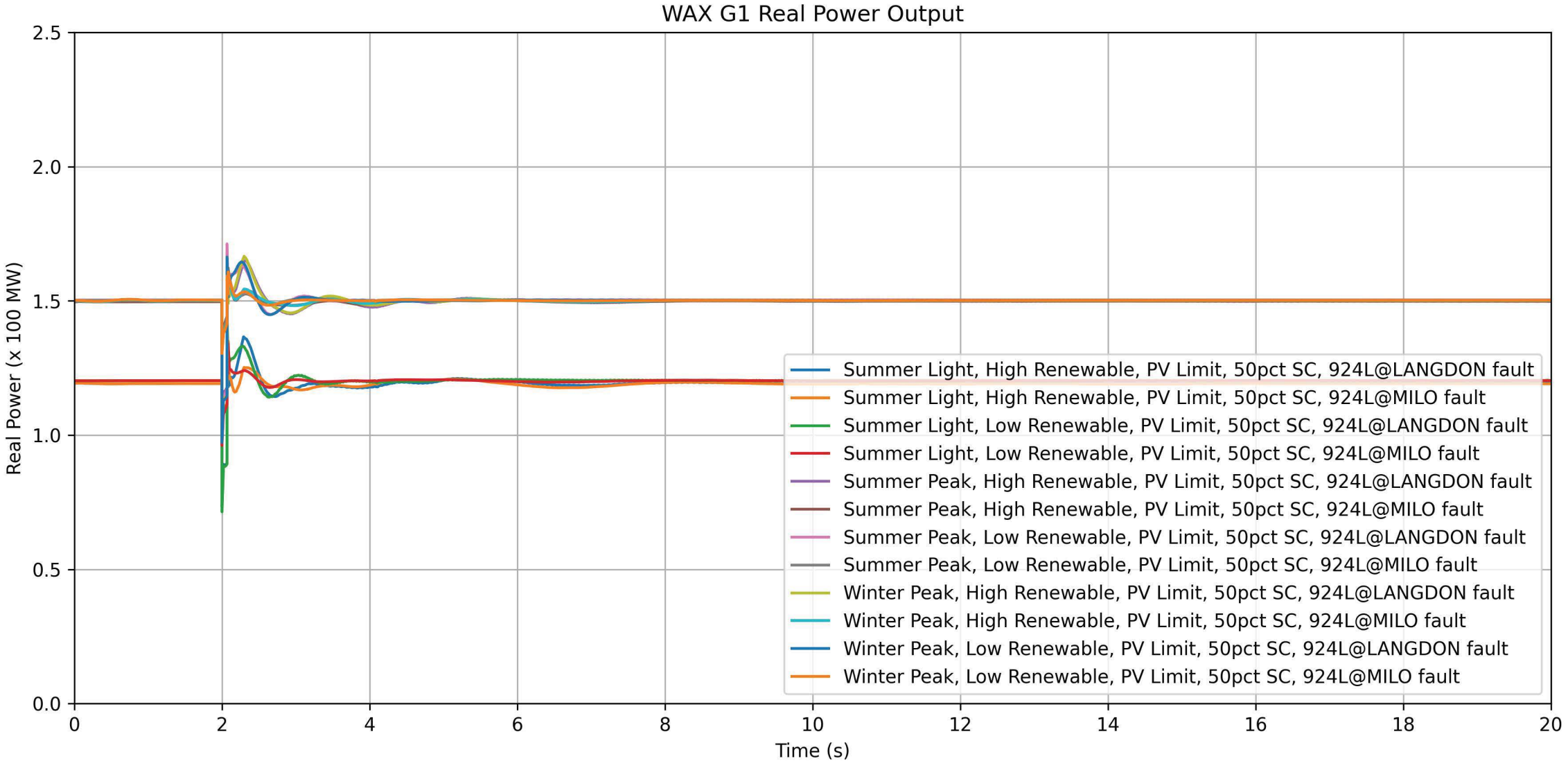

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

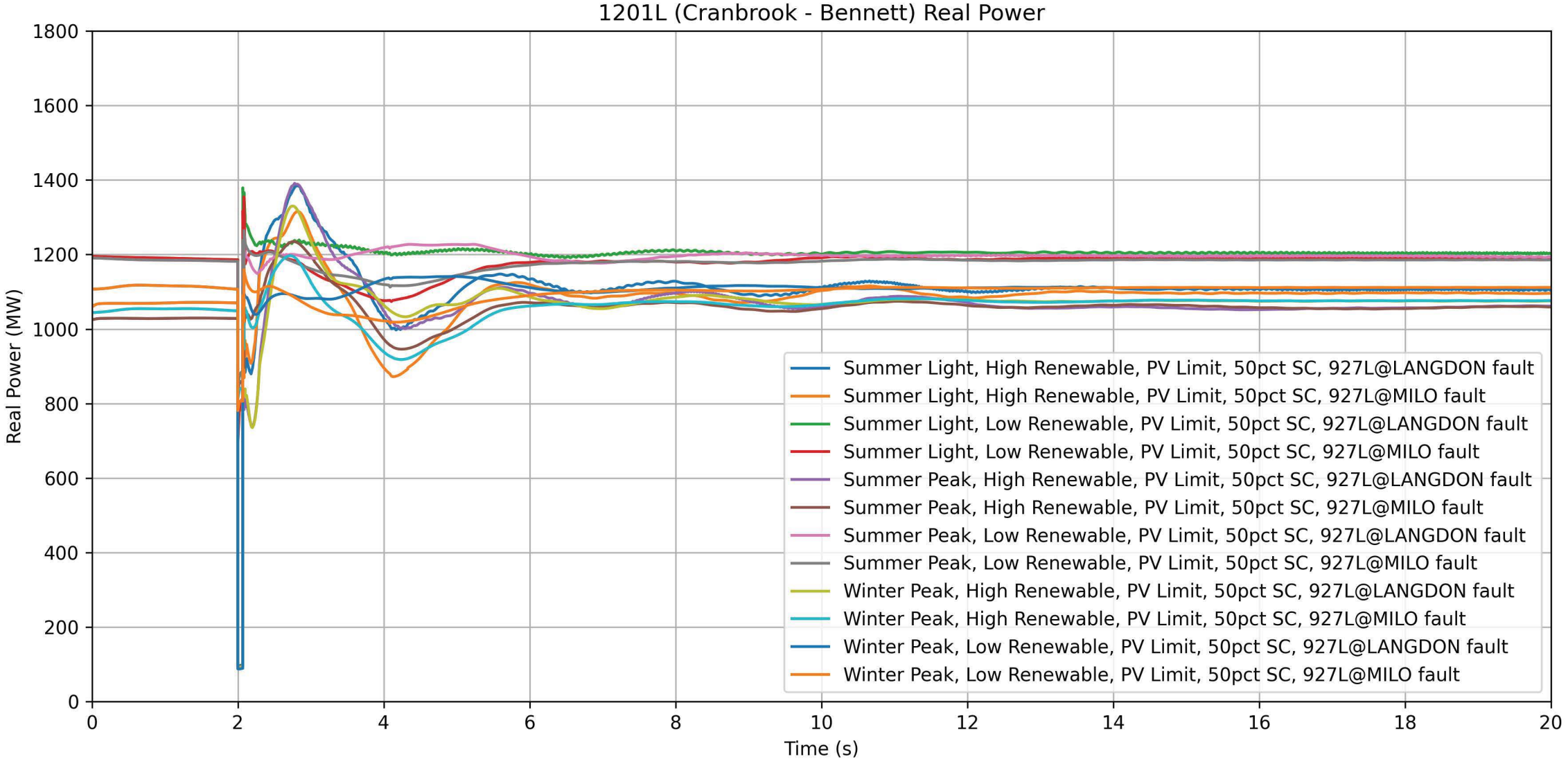

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

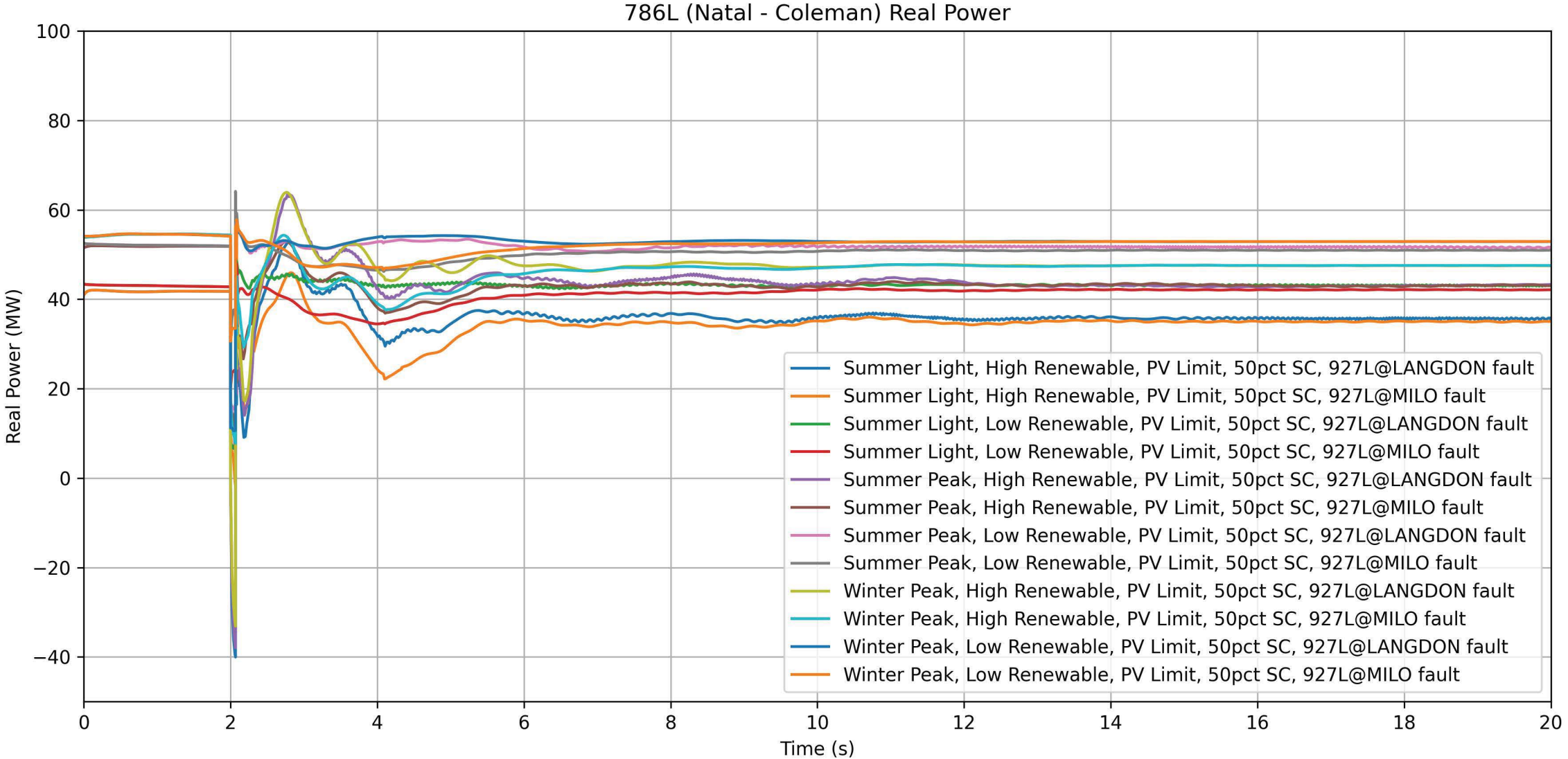

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Real Power (x 100 MW)
0
1
2
3
4
5
6
Time (s)
0
2
4
6
8
10
12
14
16
18
20

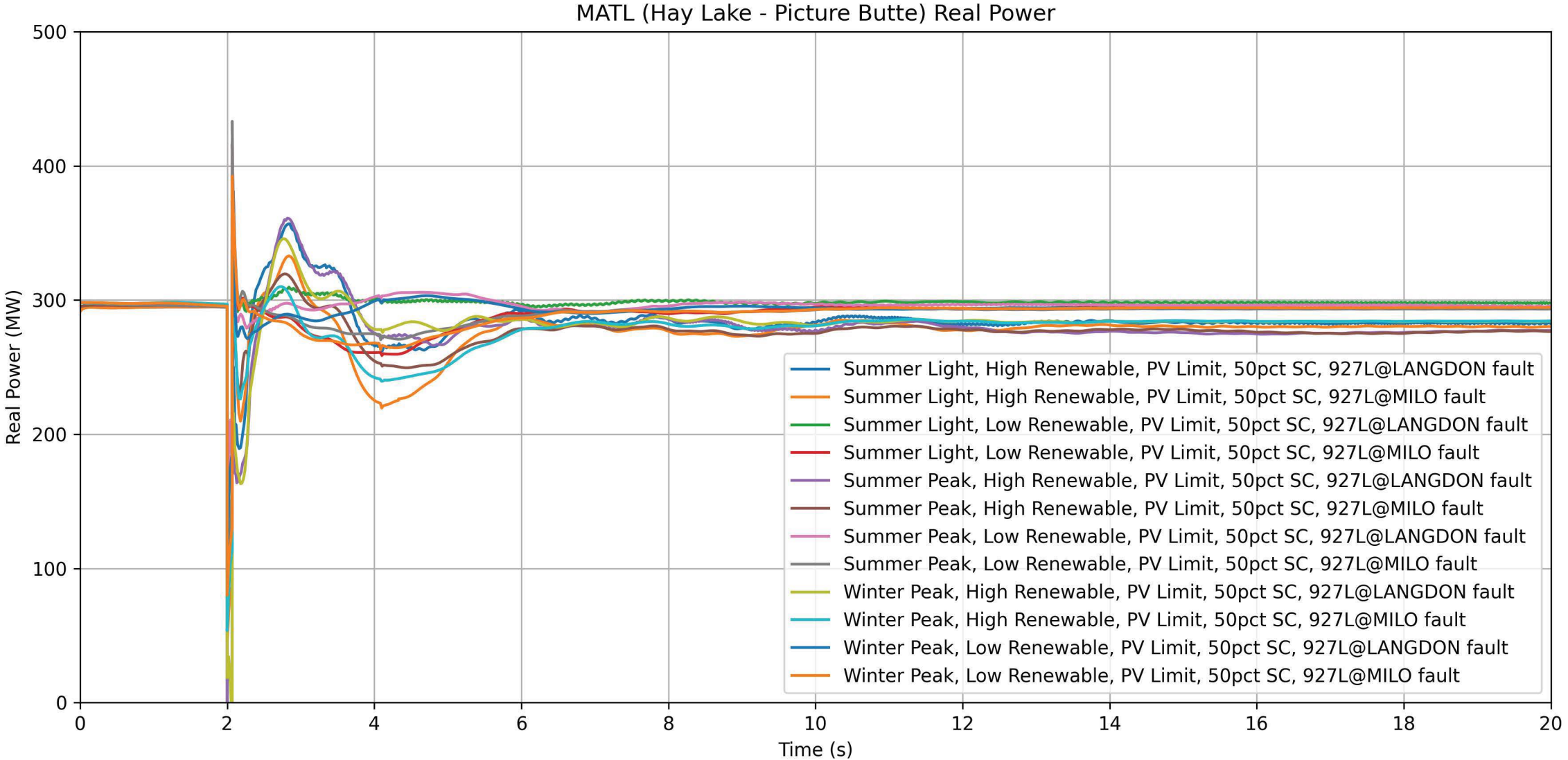

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

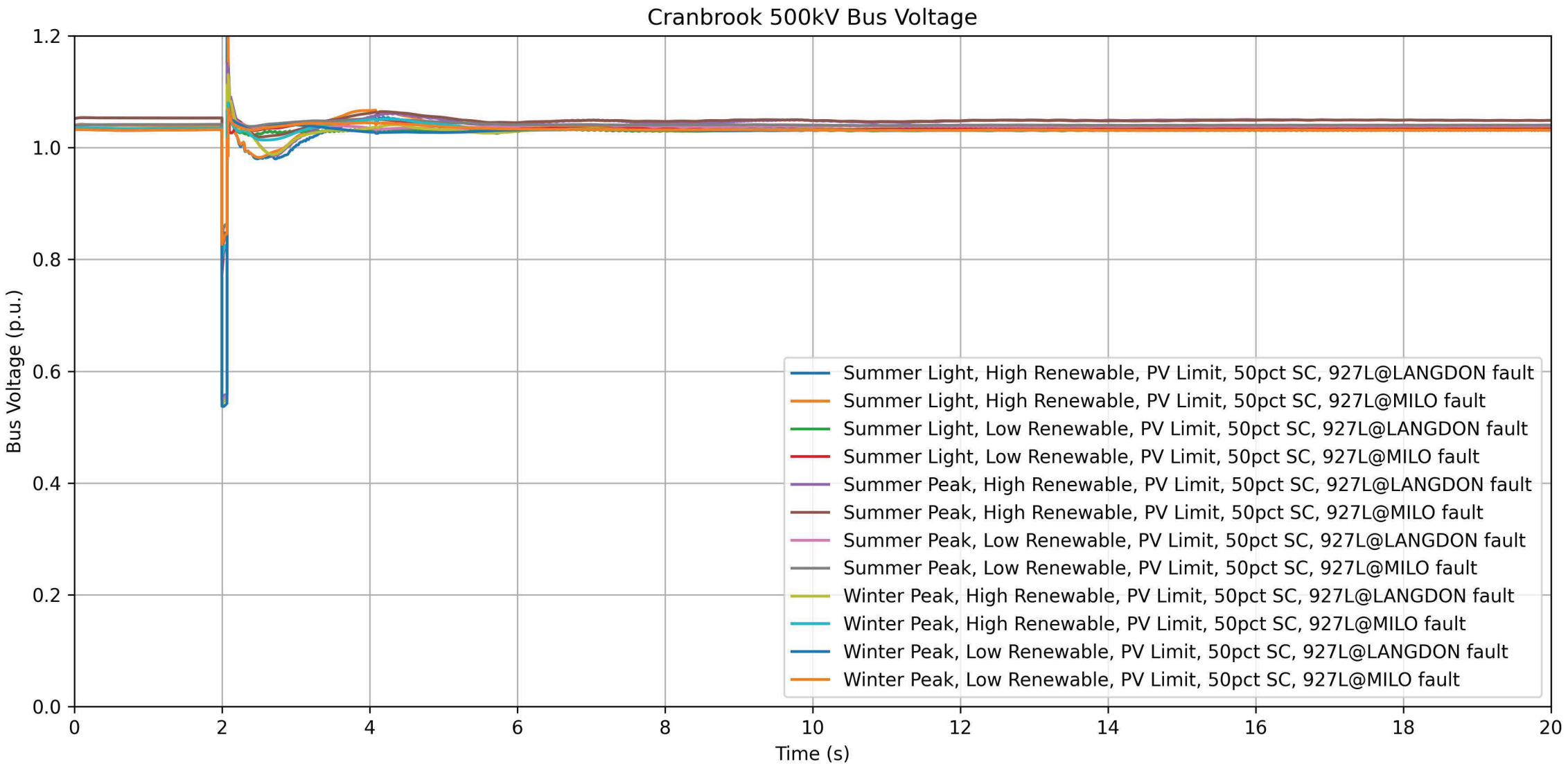

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

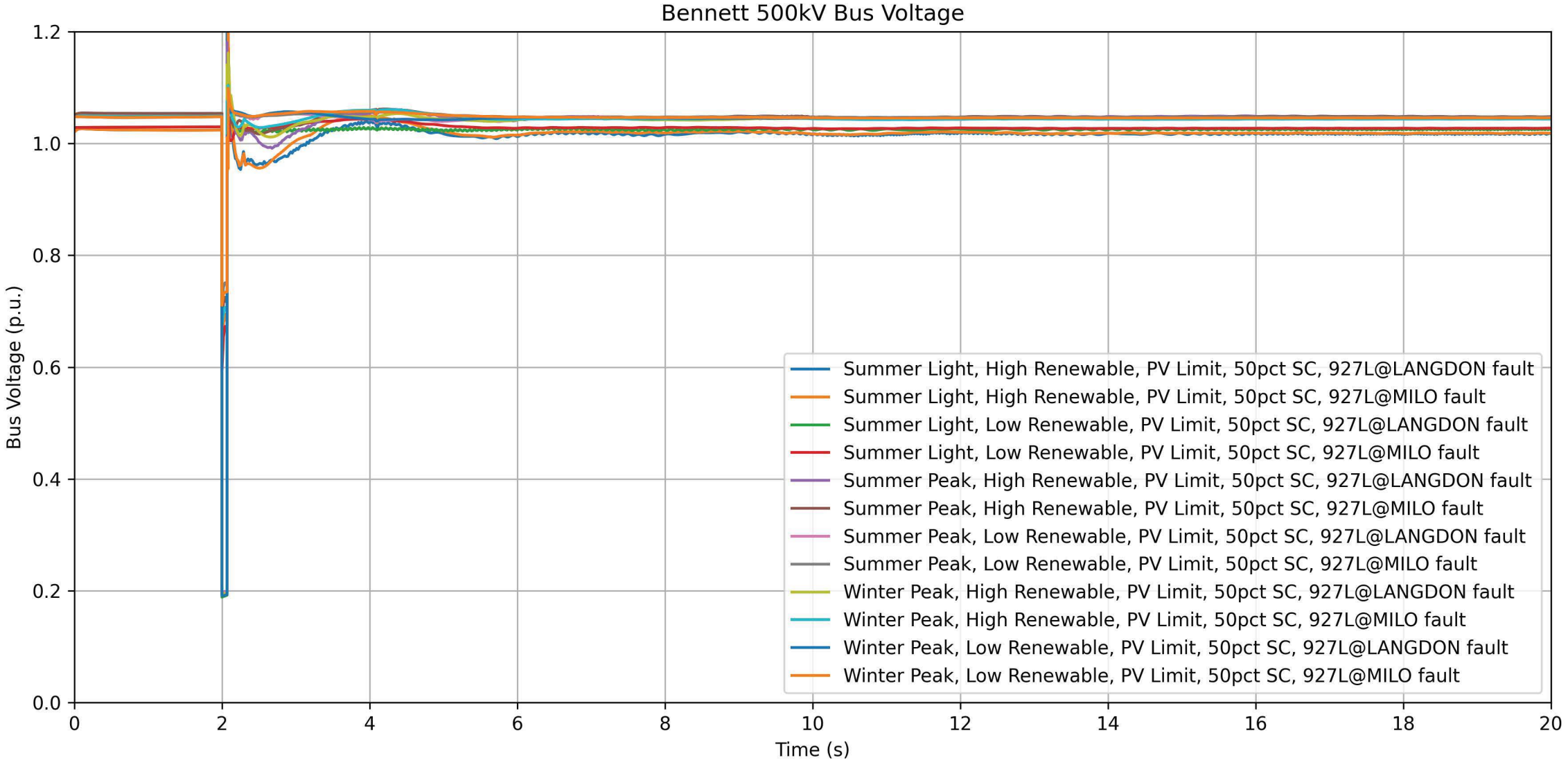

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L@MILO fault

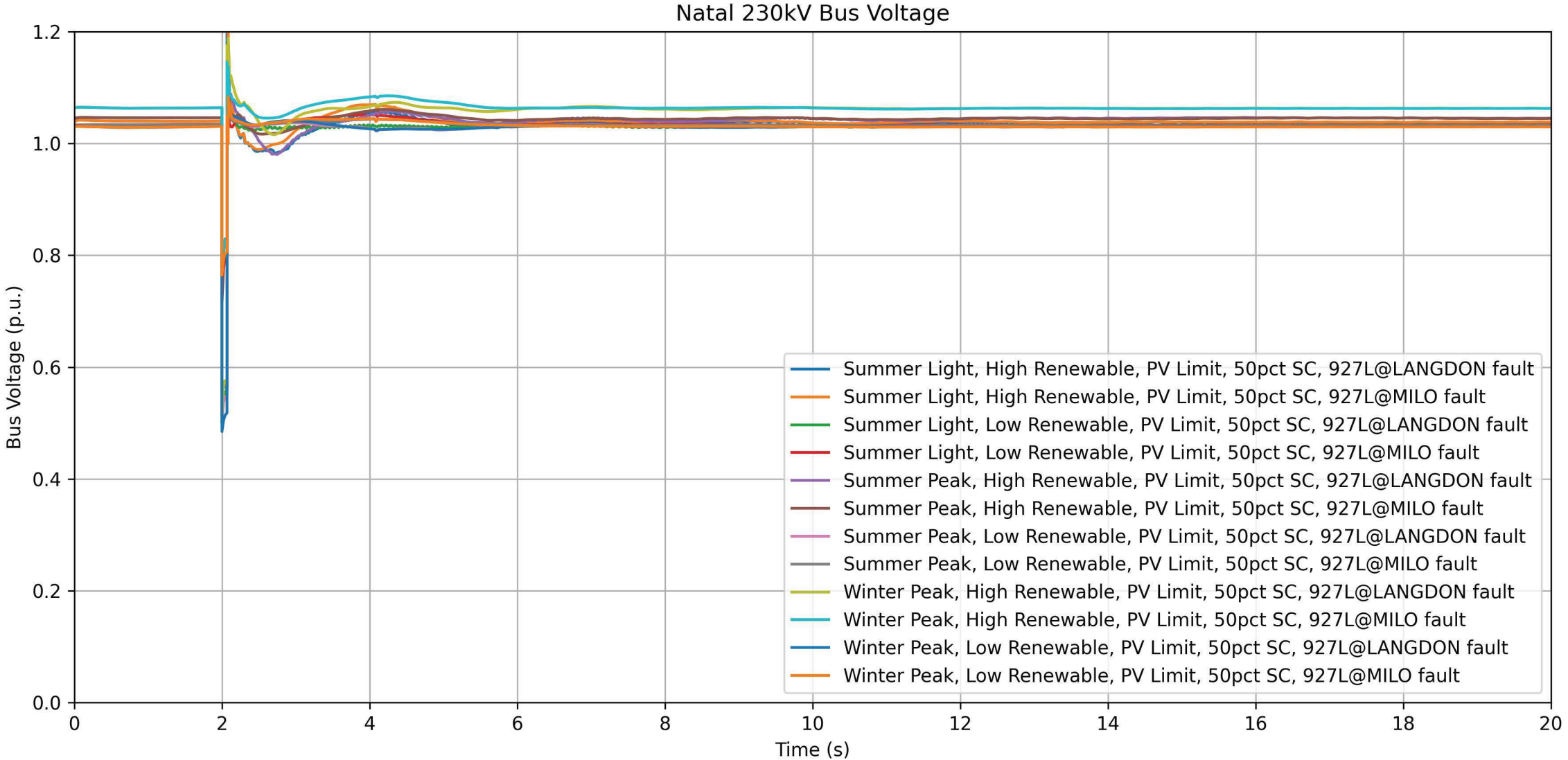

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

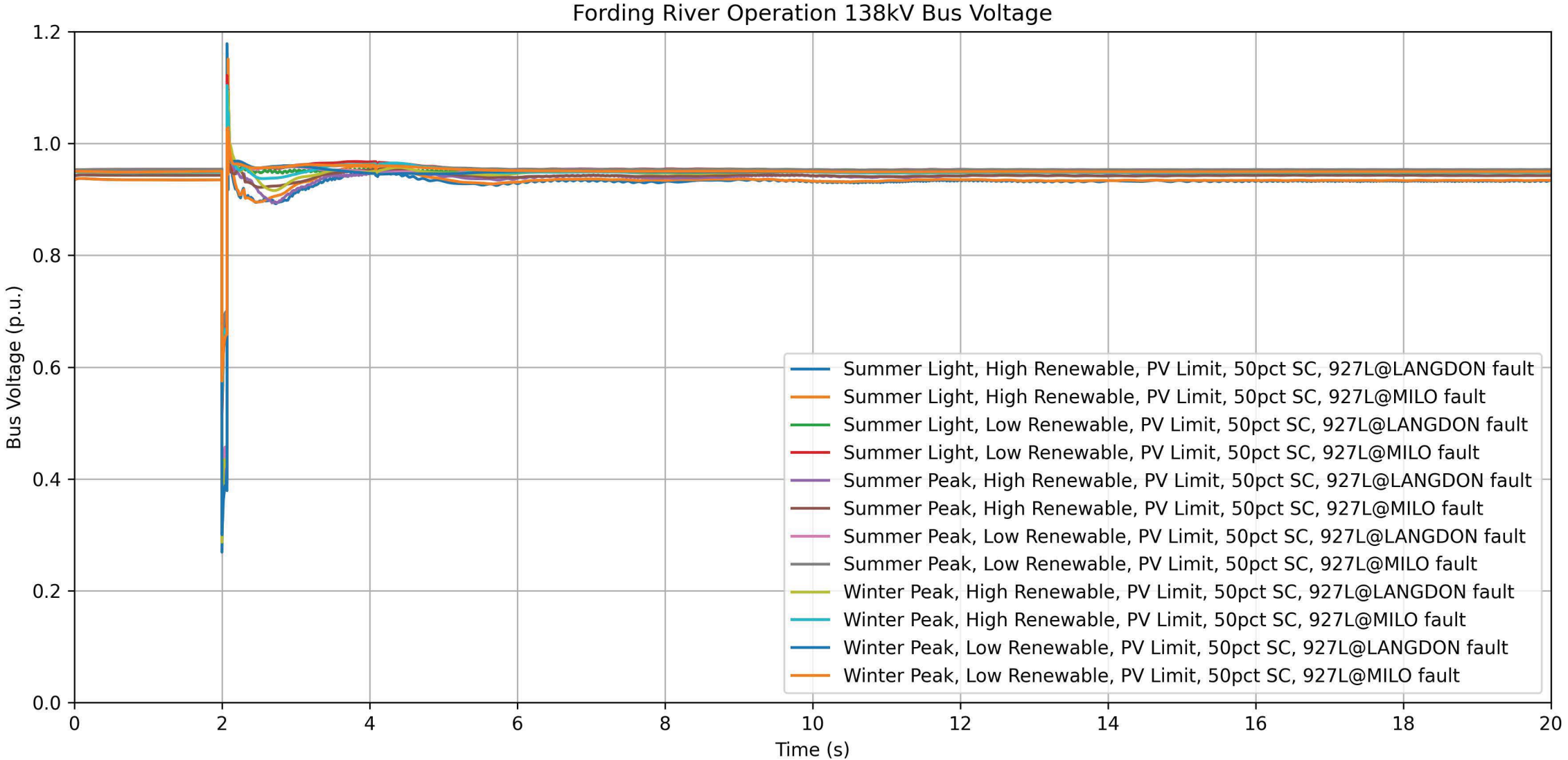

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

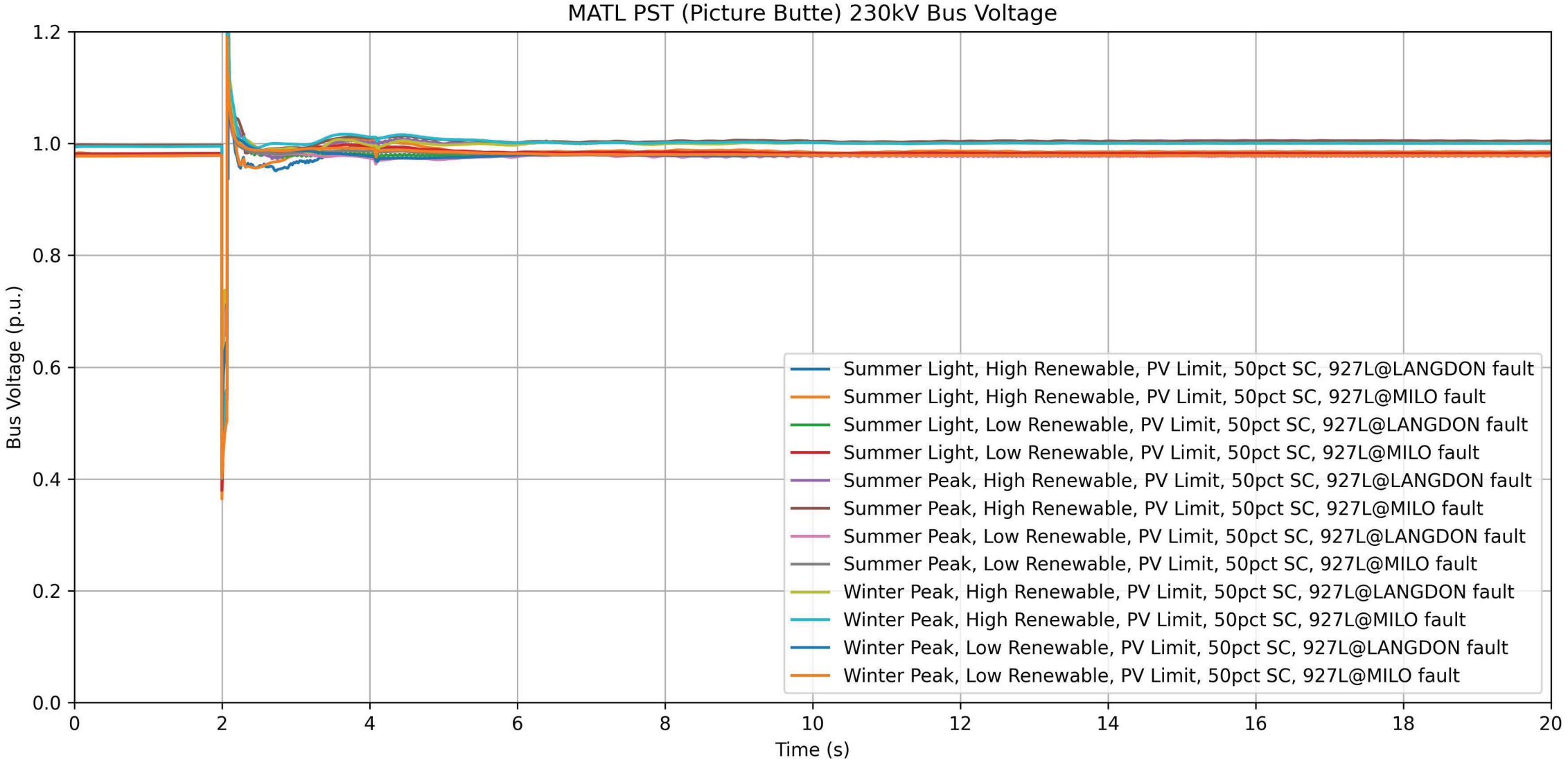

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

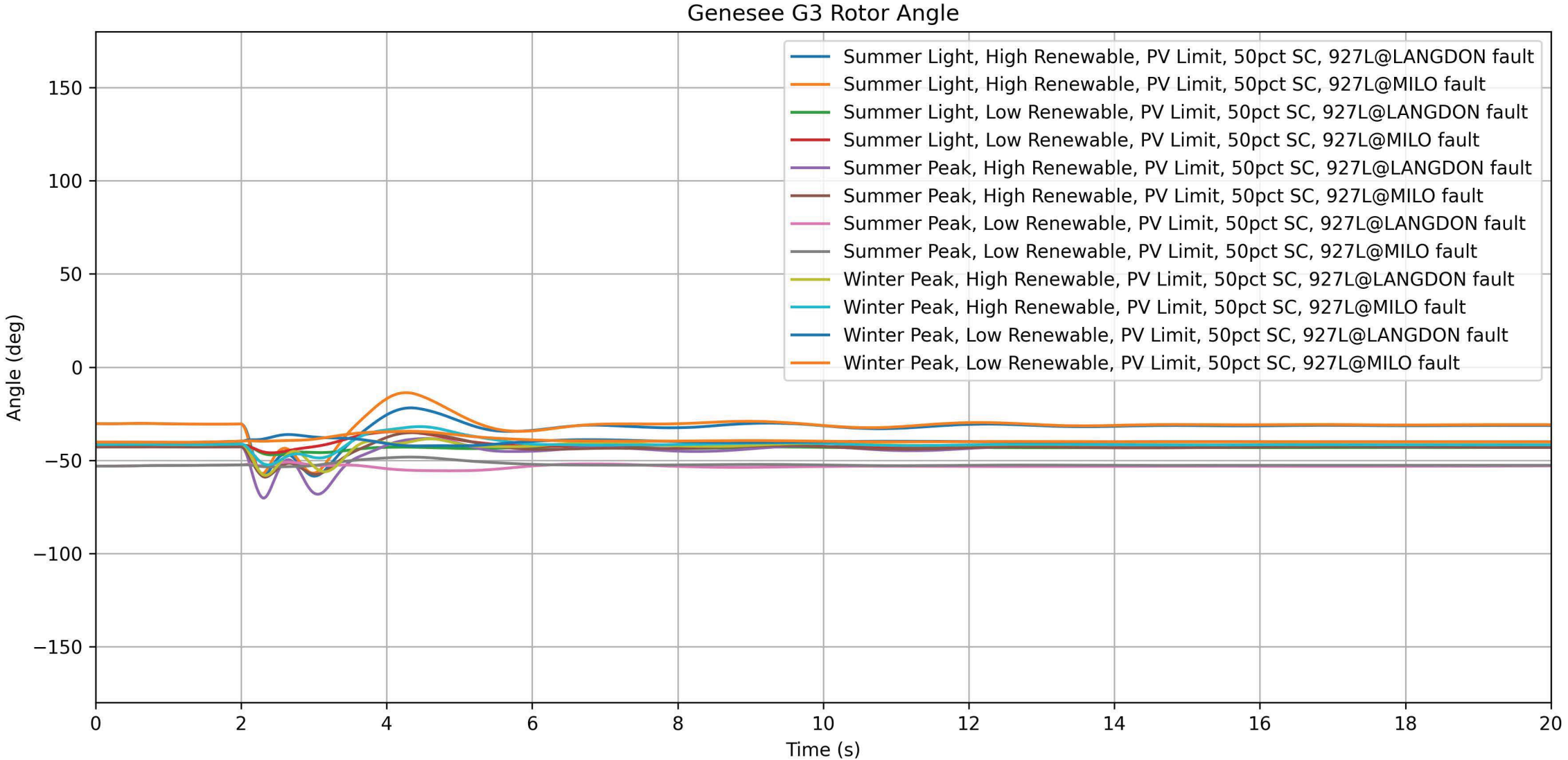

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

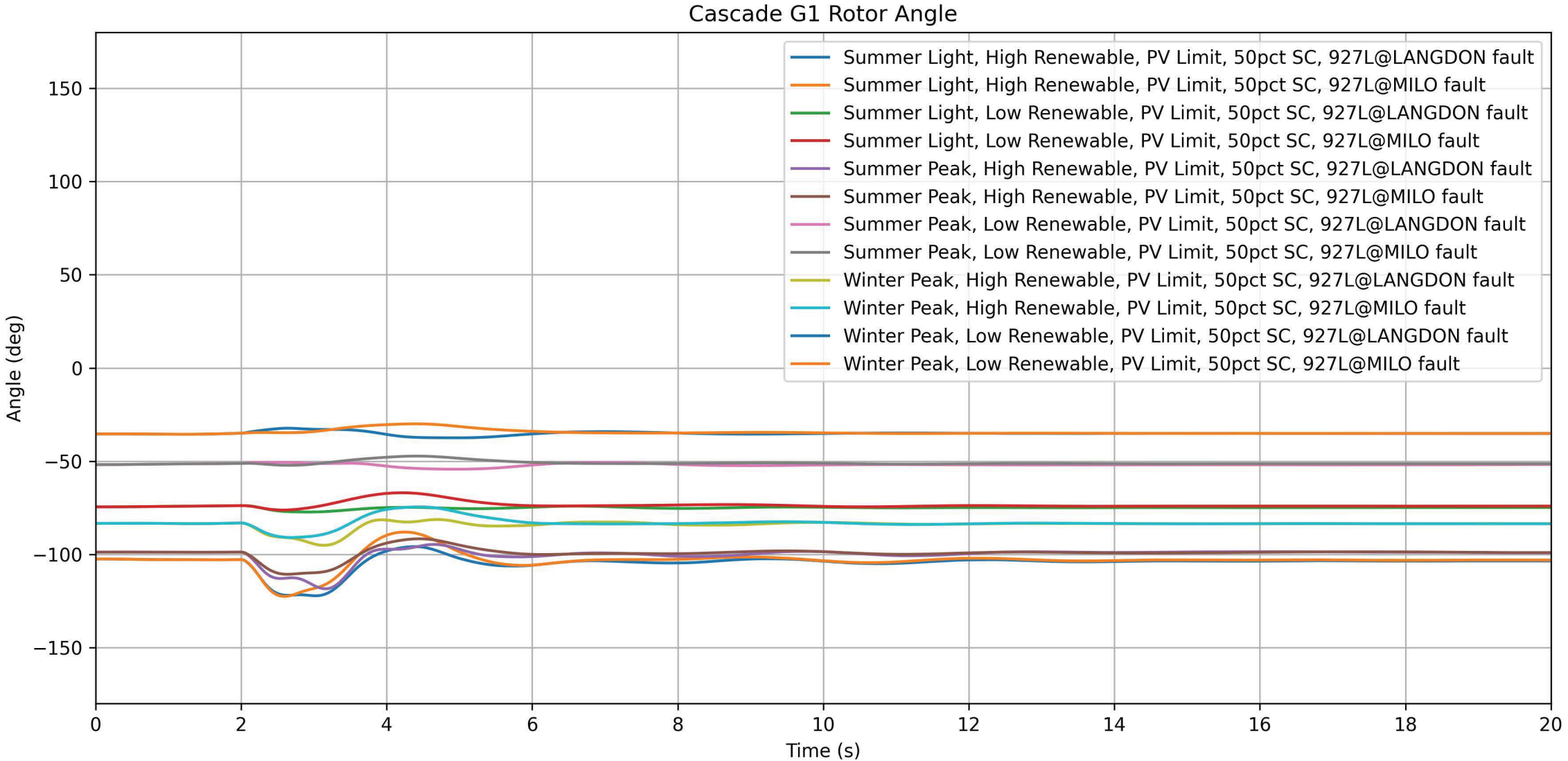

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

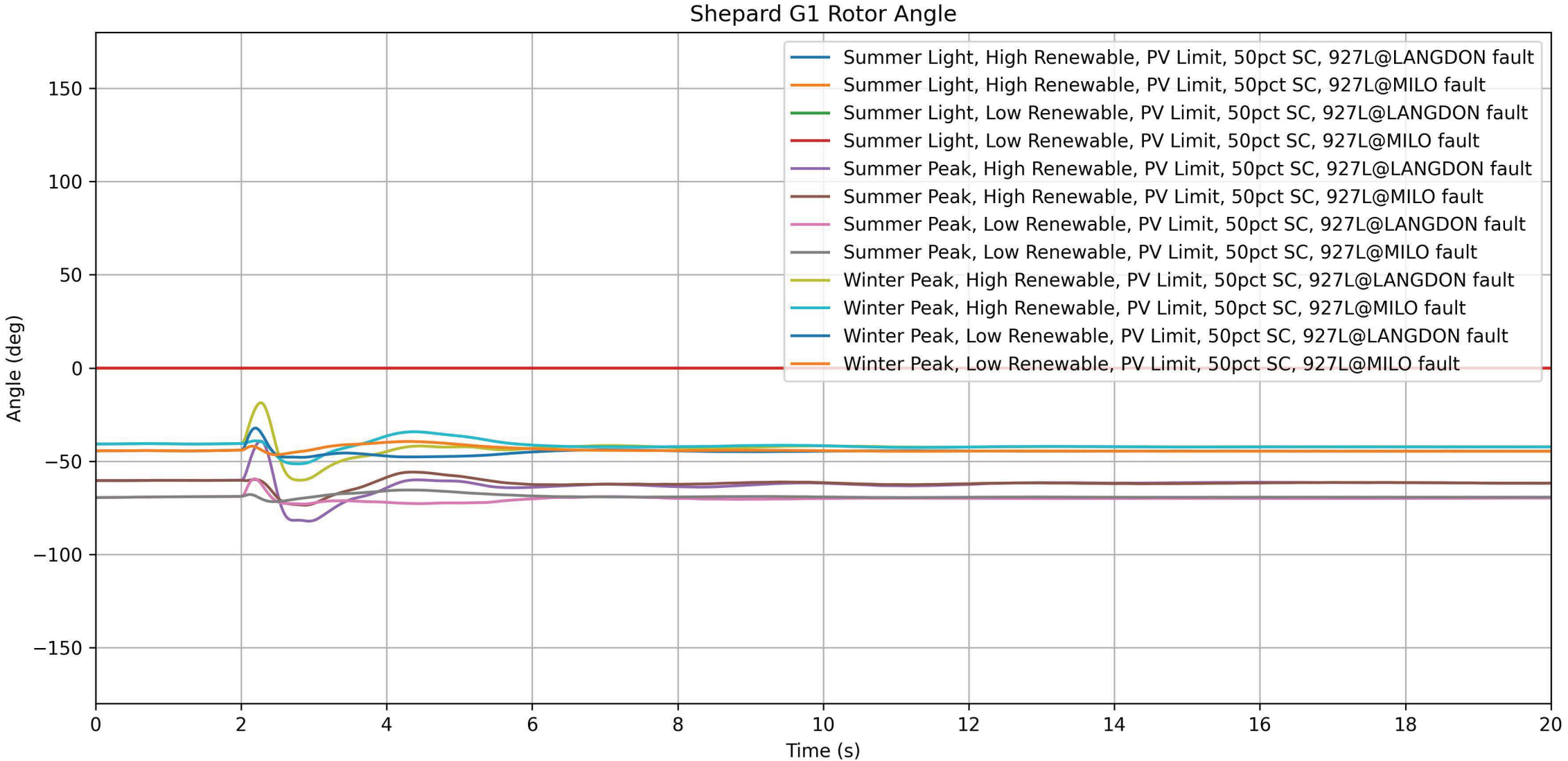

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

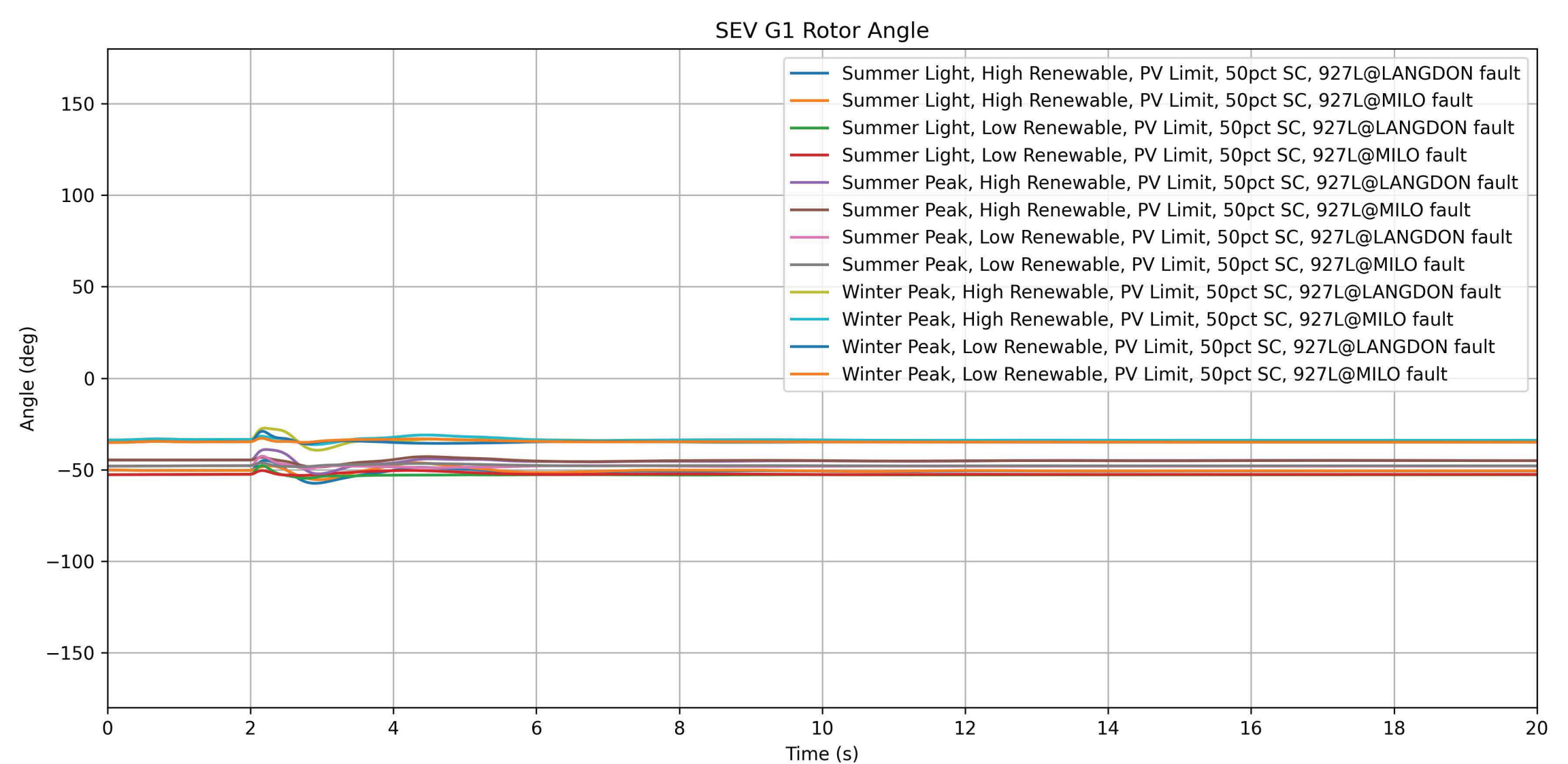

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

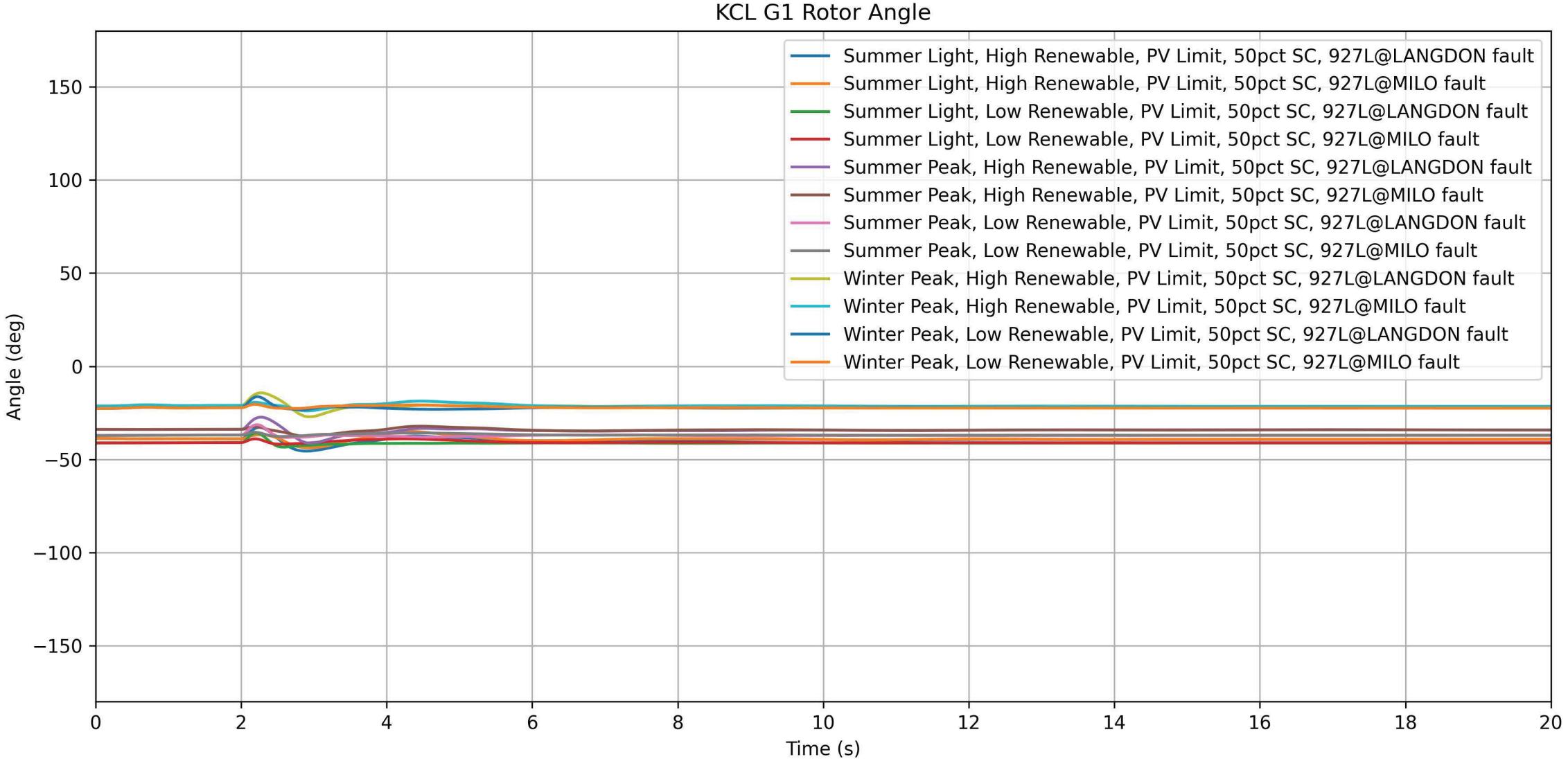

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

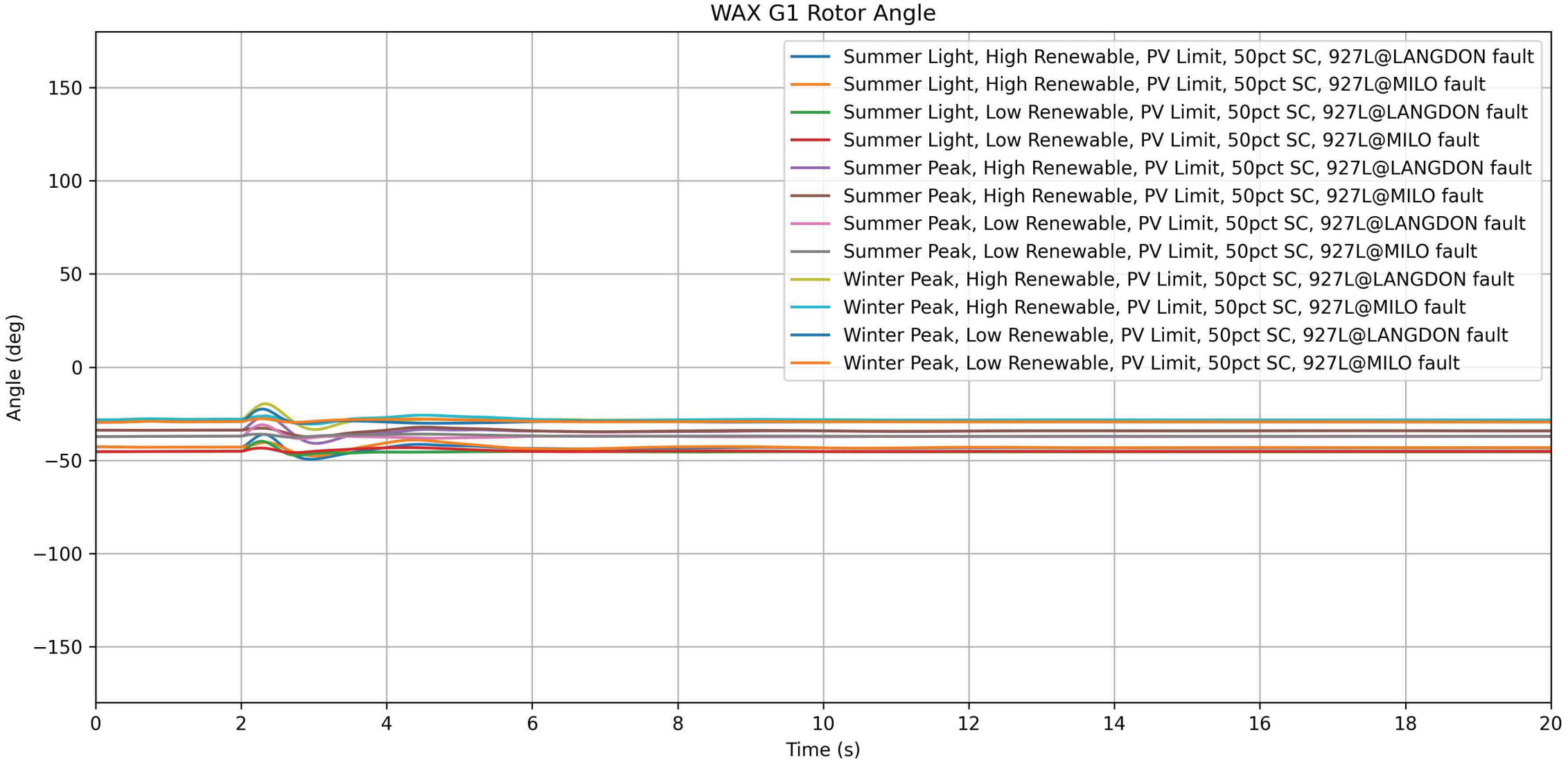

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

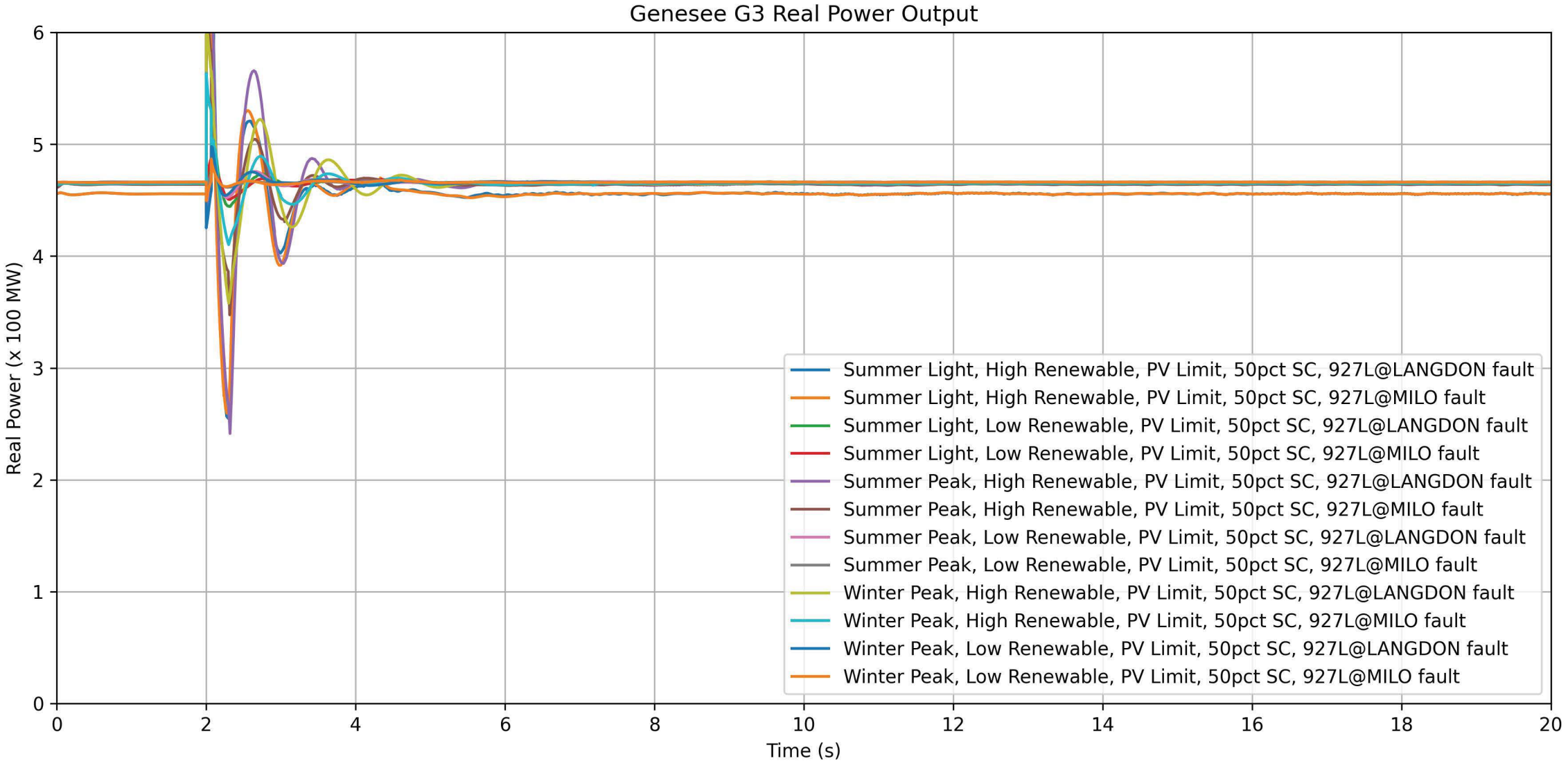

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

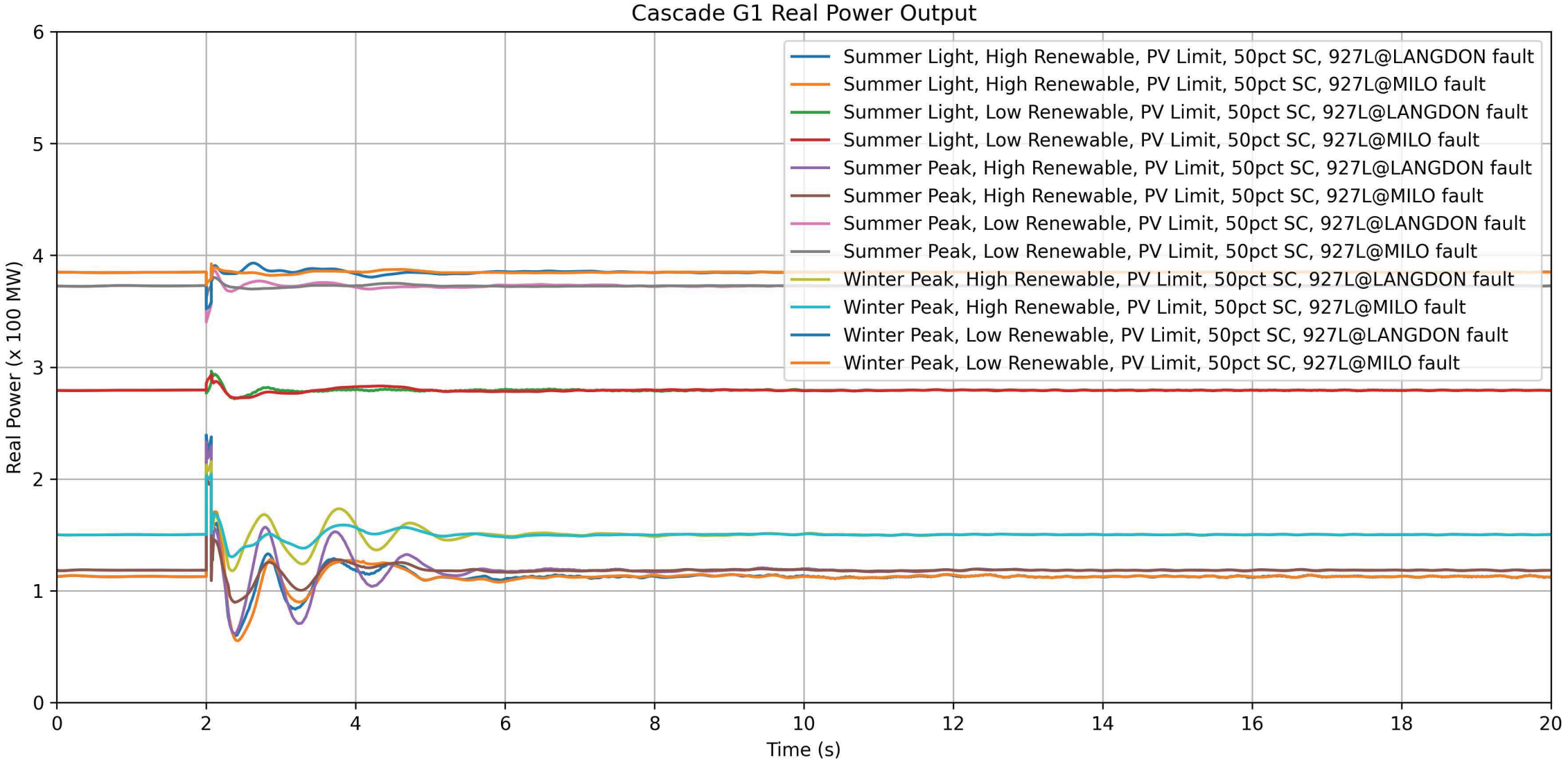

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

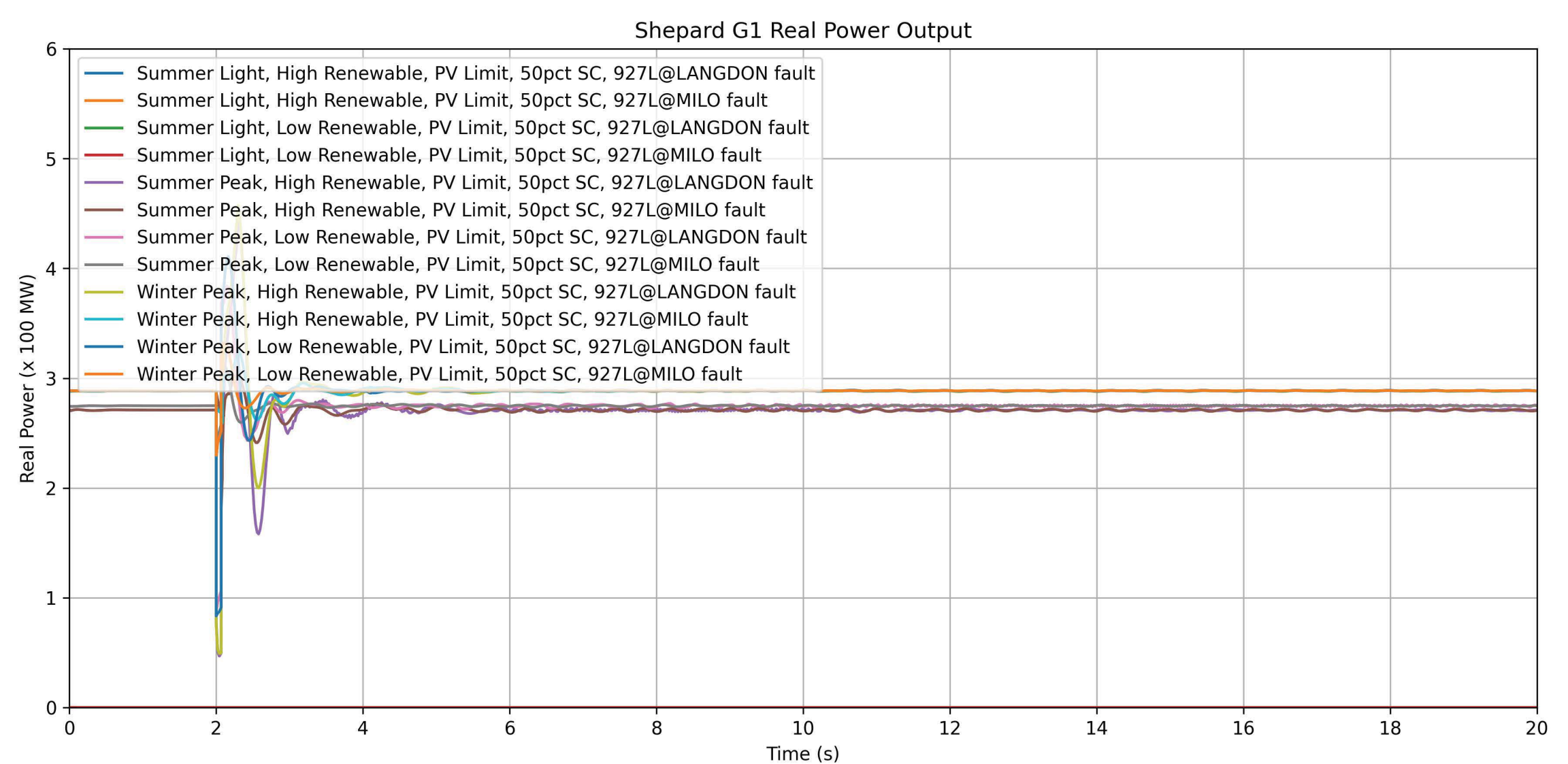

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

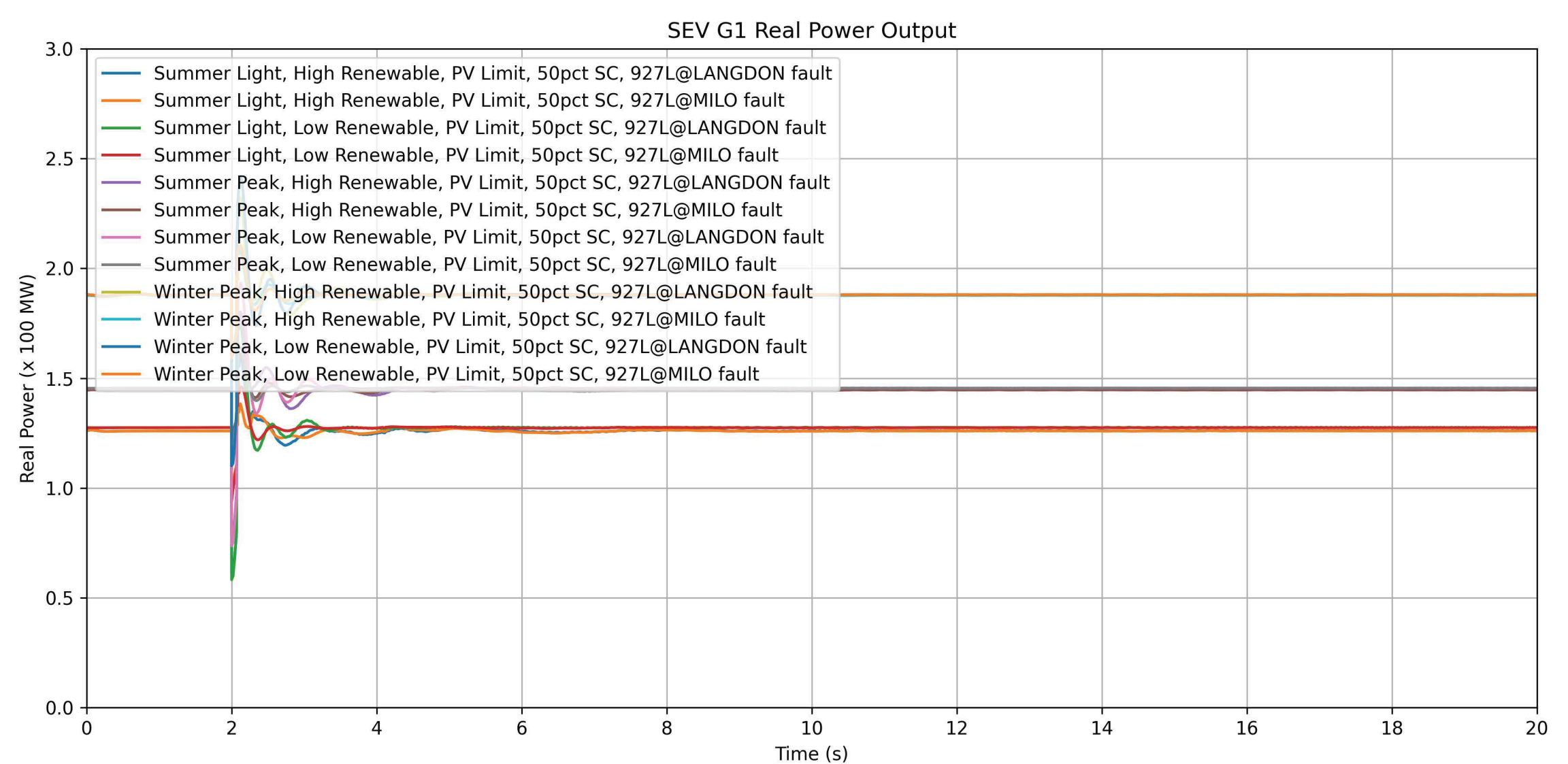

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

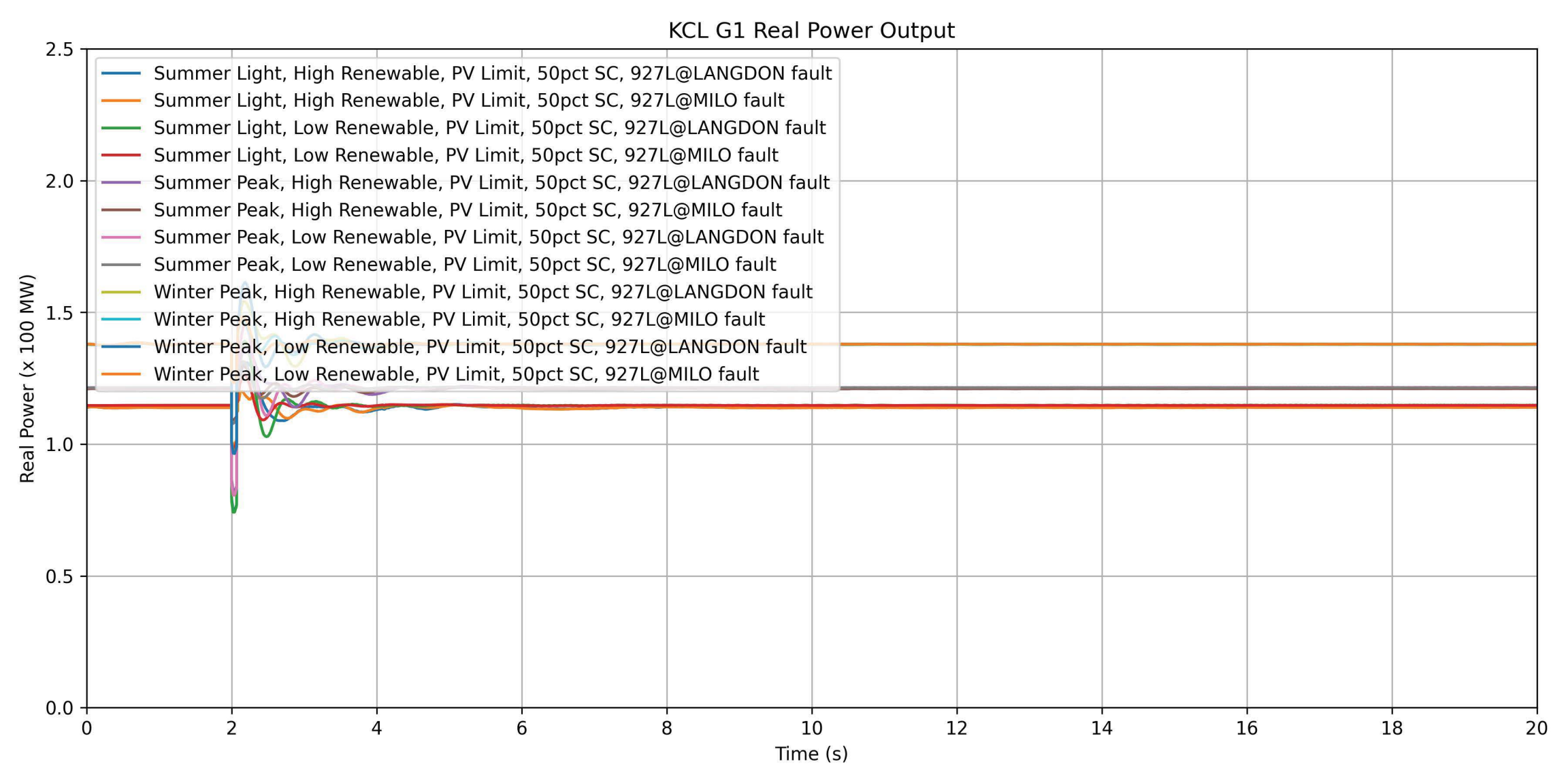

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

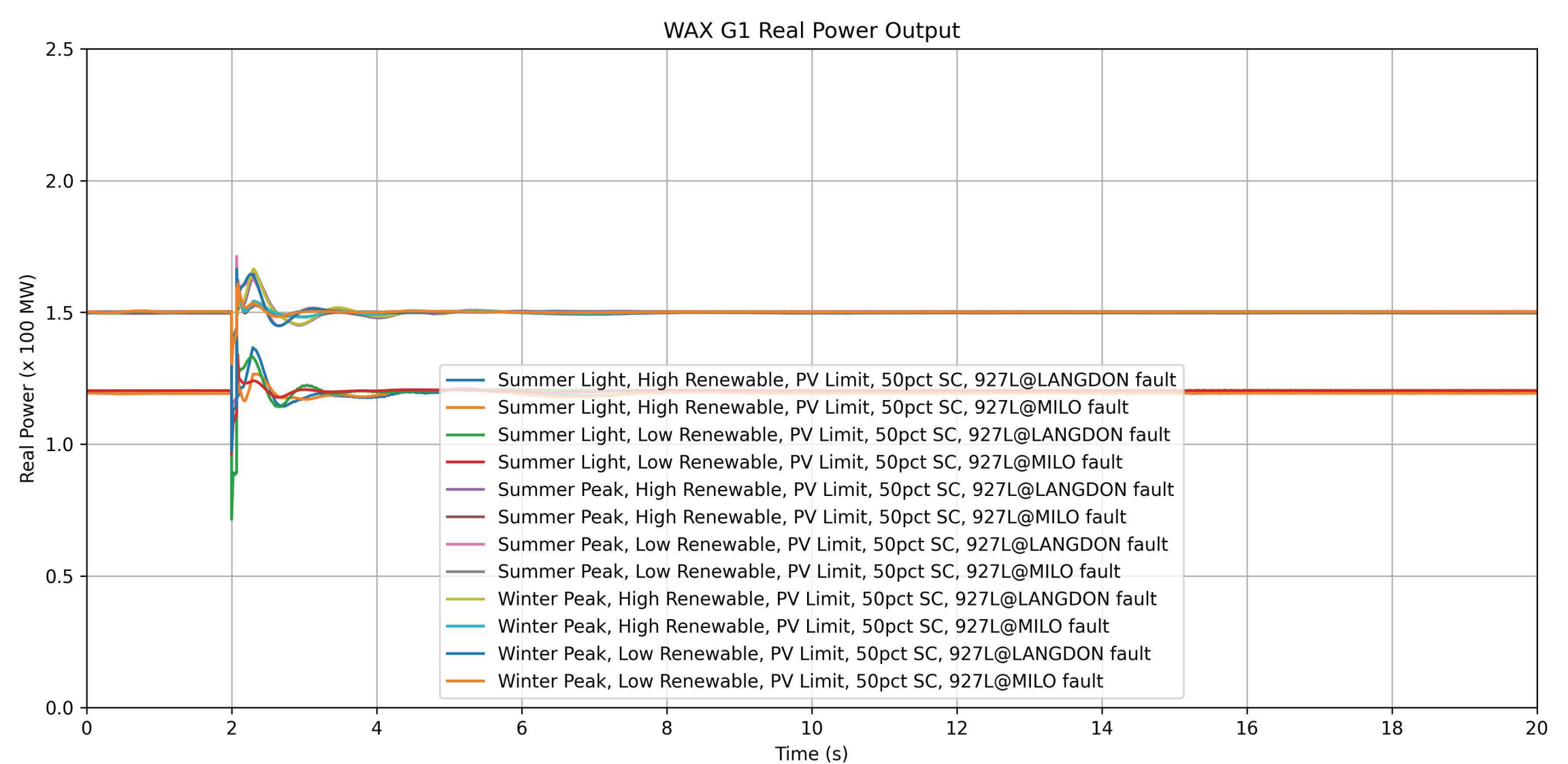

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

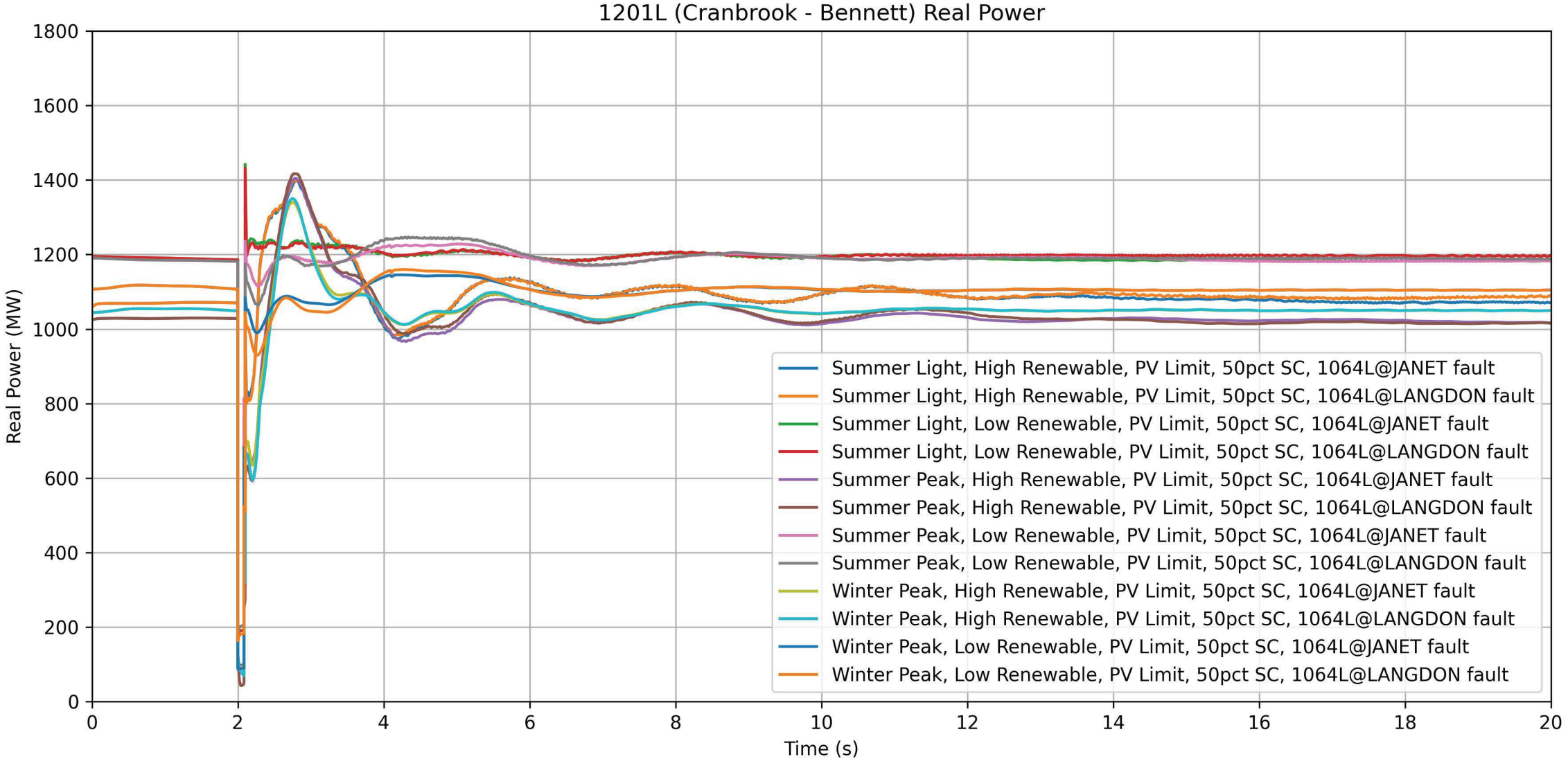

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

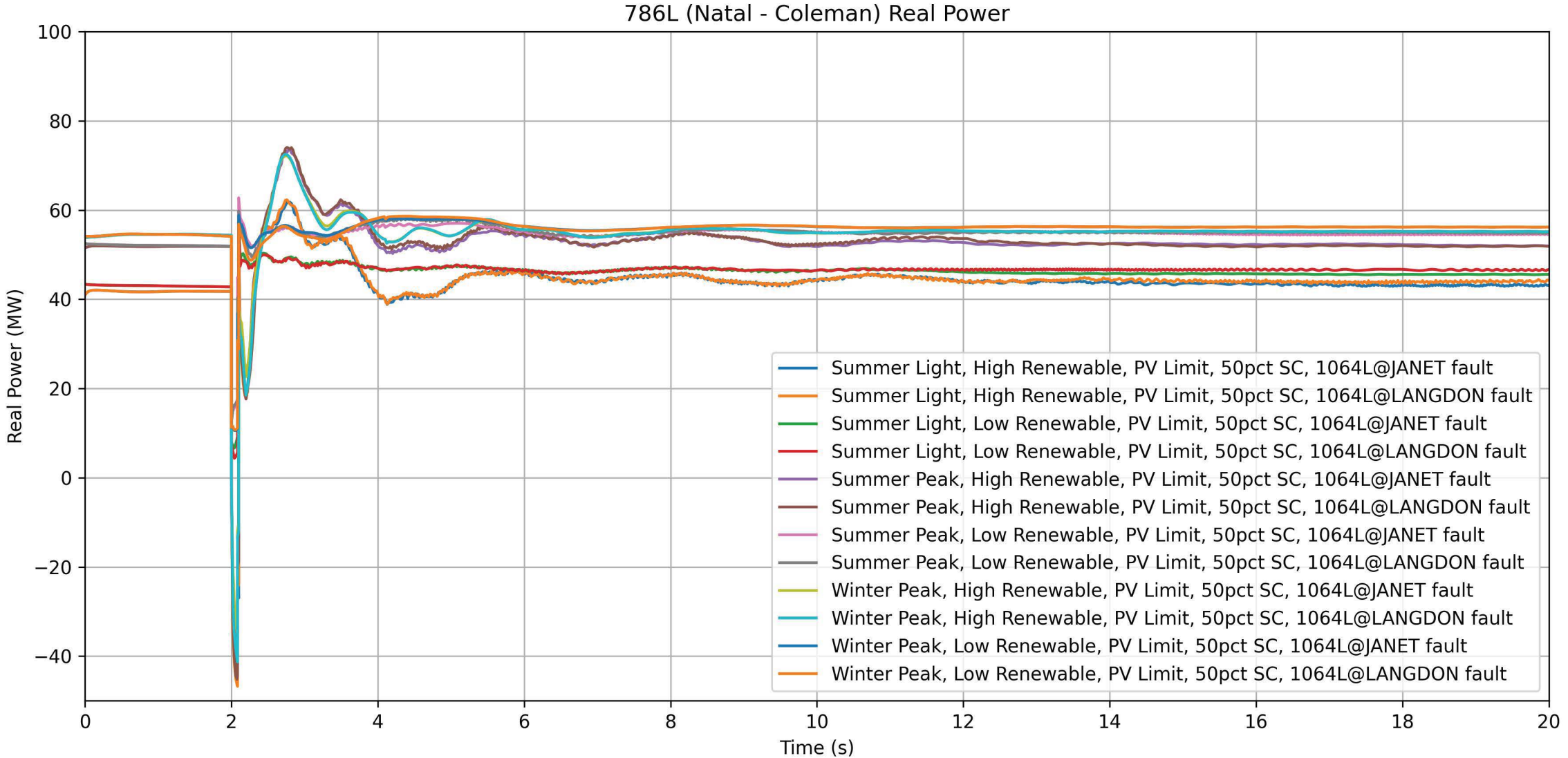

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

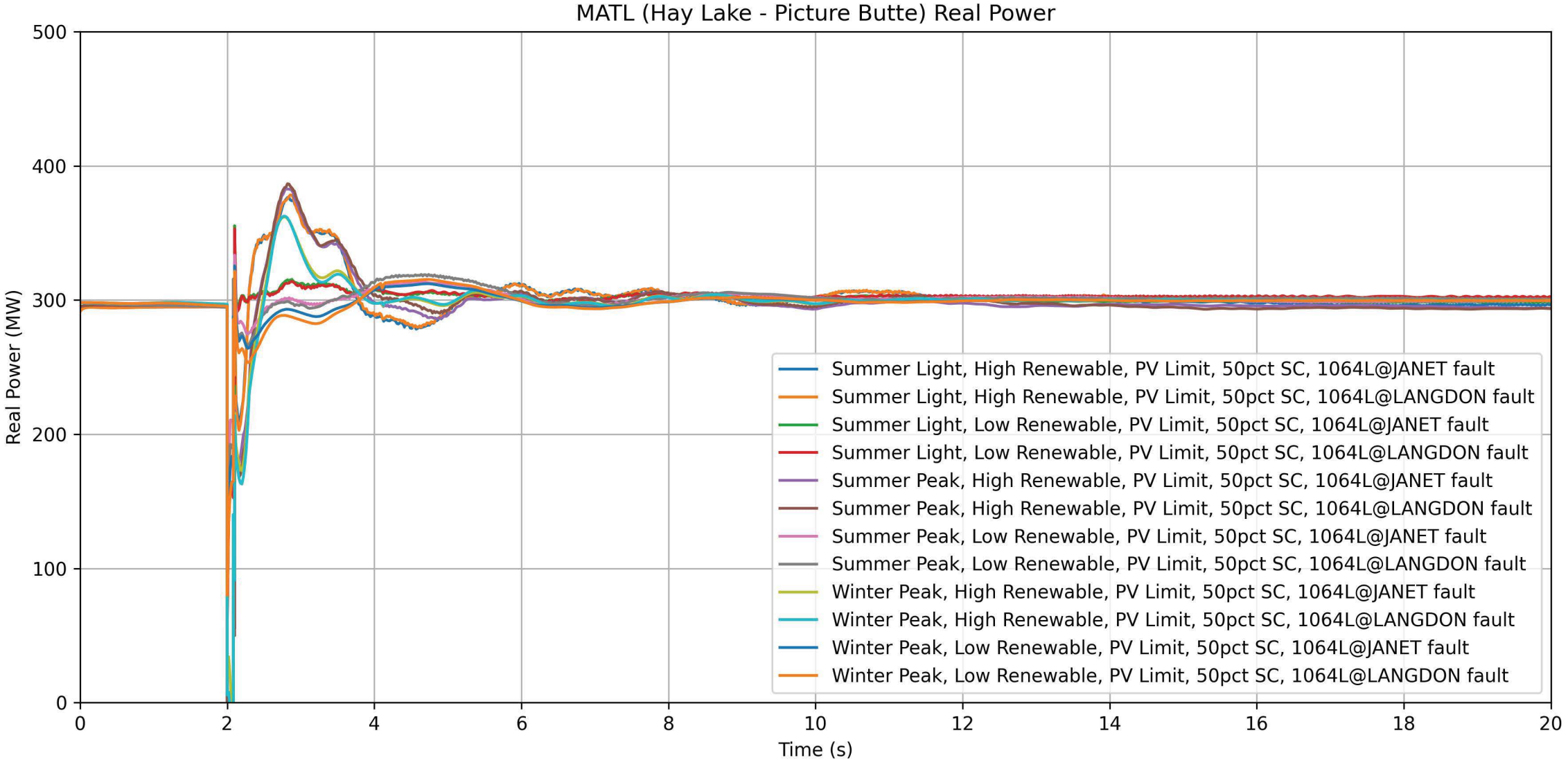

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

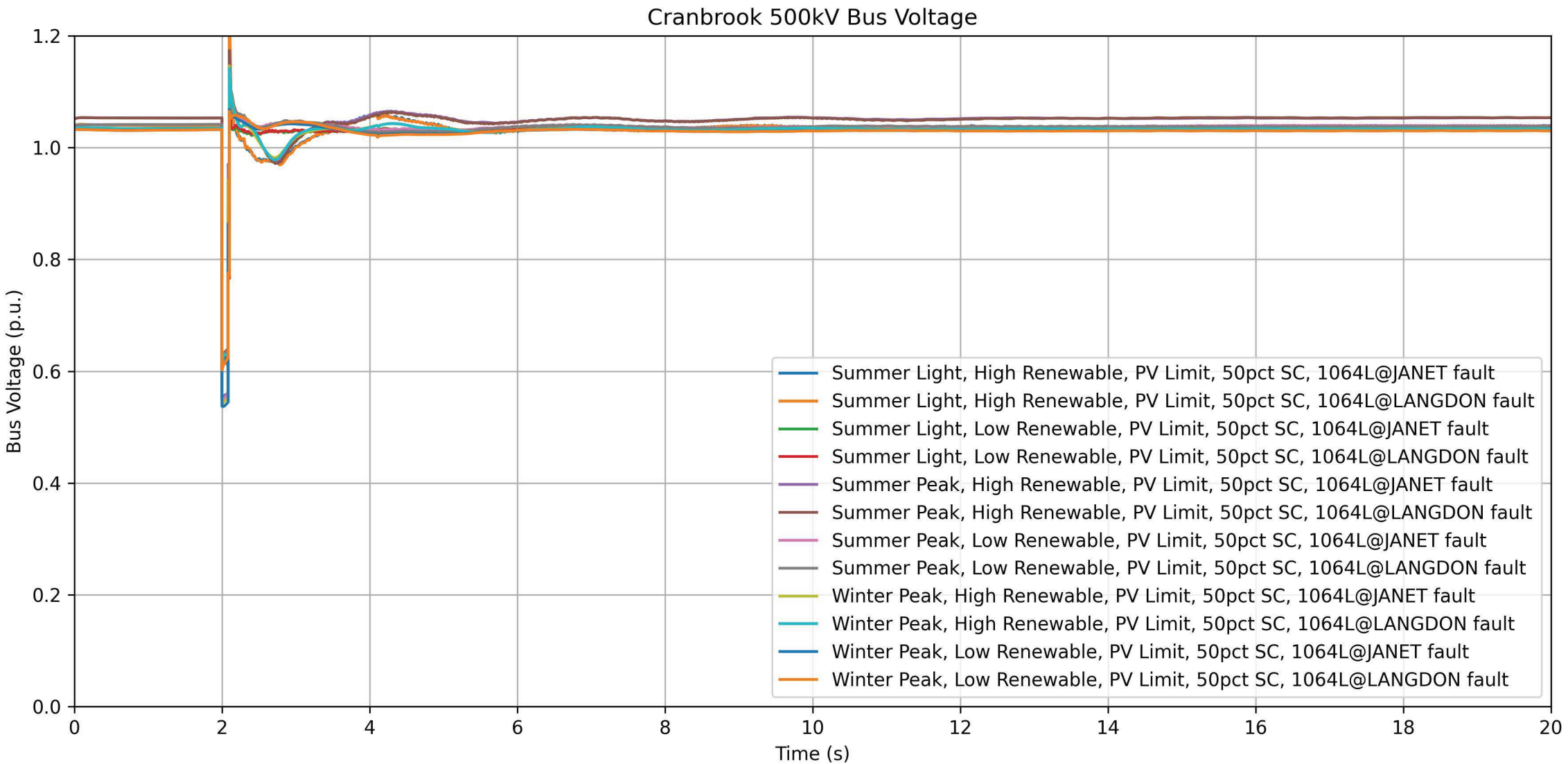

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

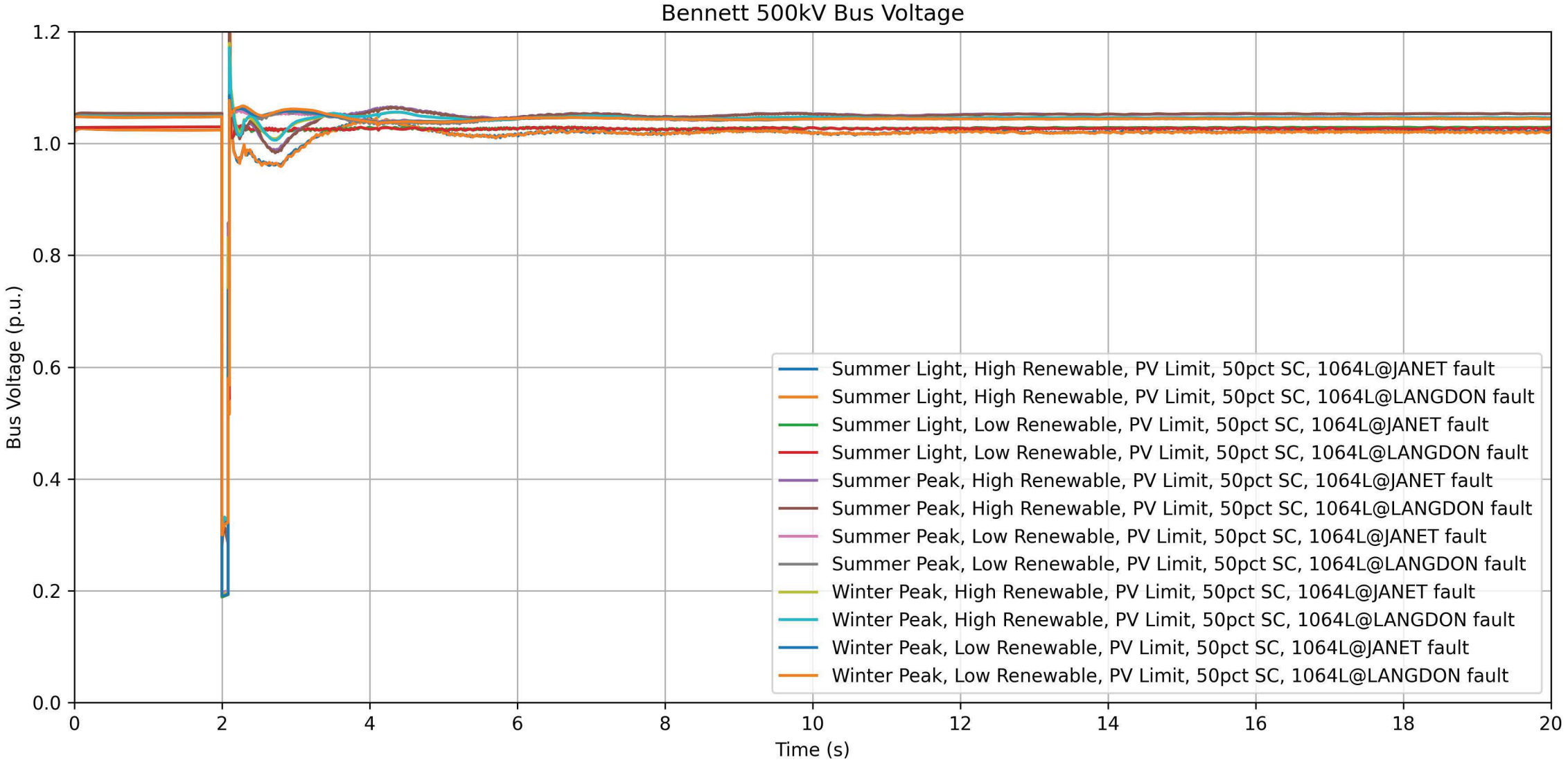

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 927L@MILO fault

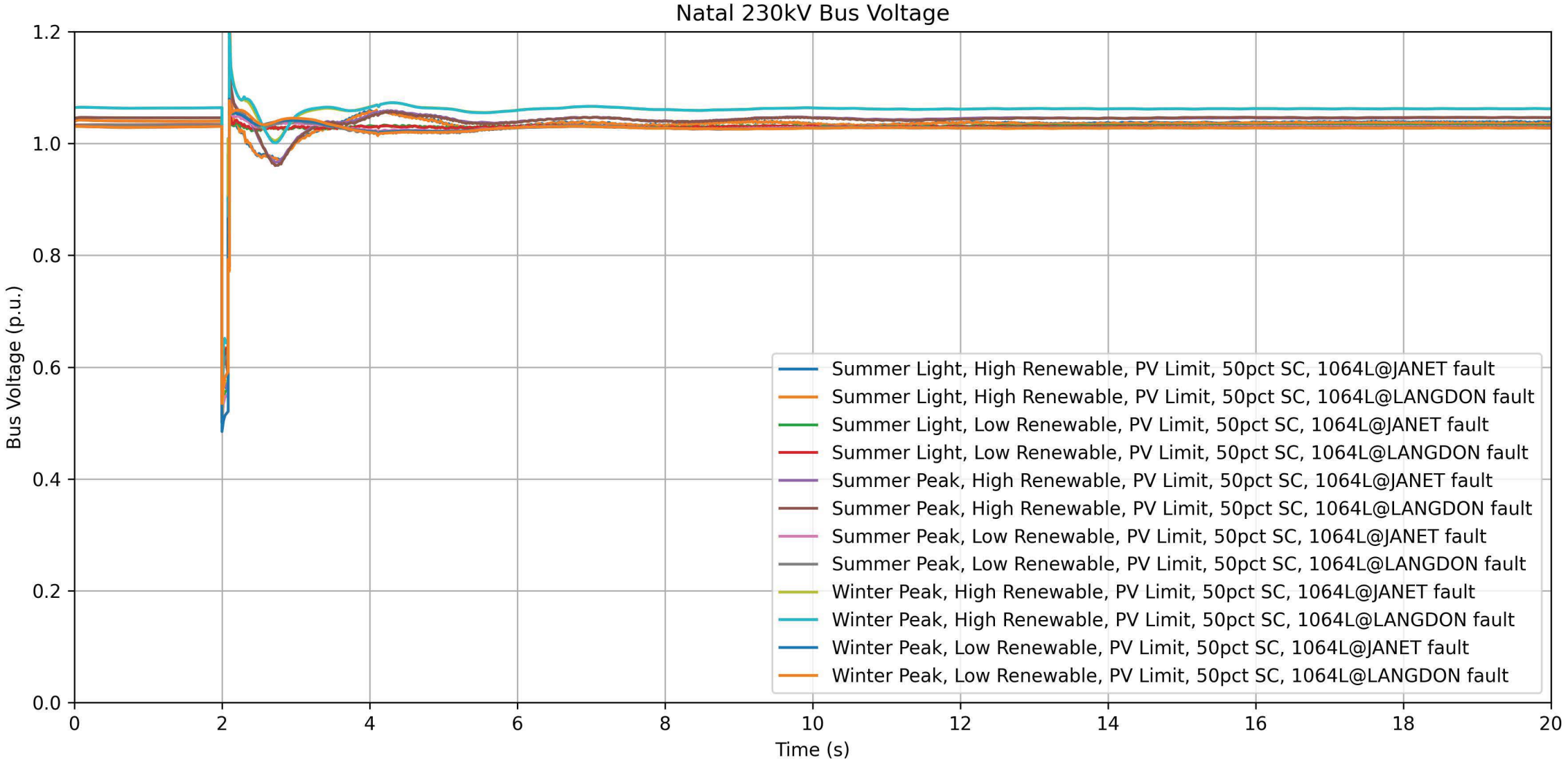

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

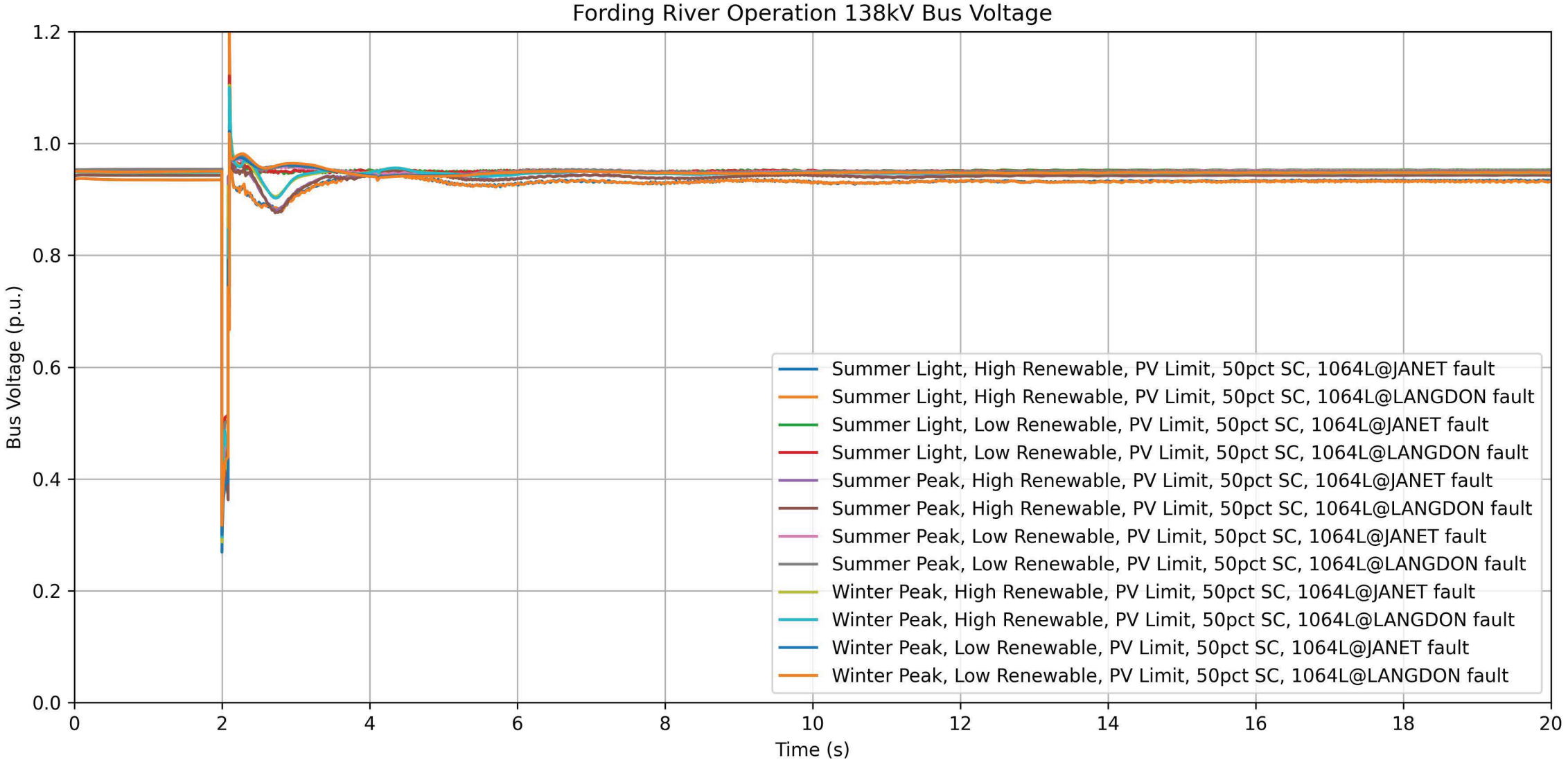

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

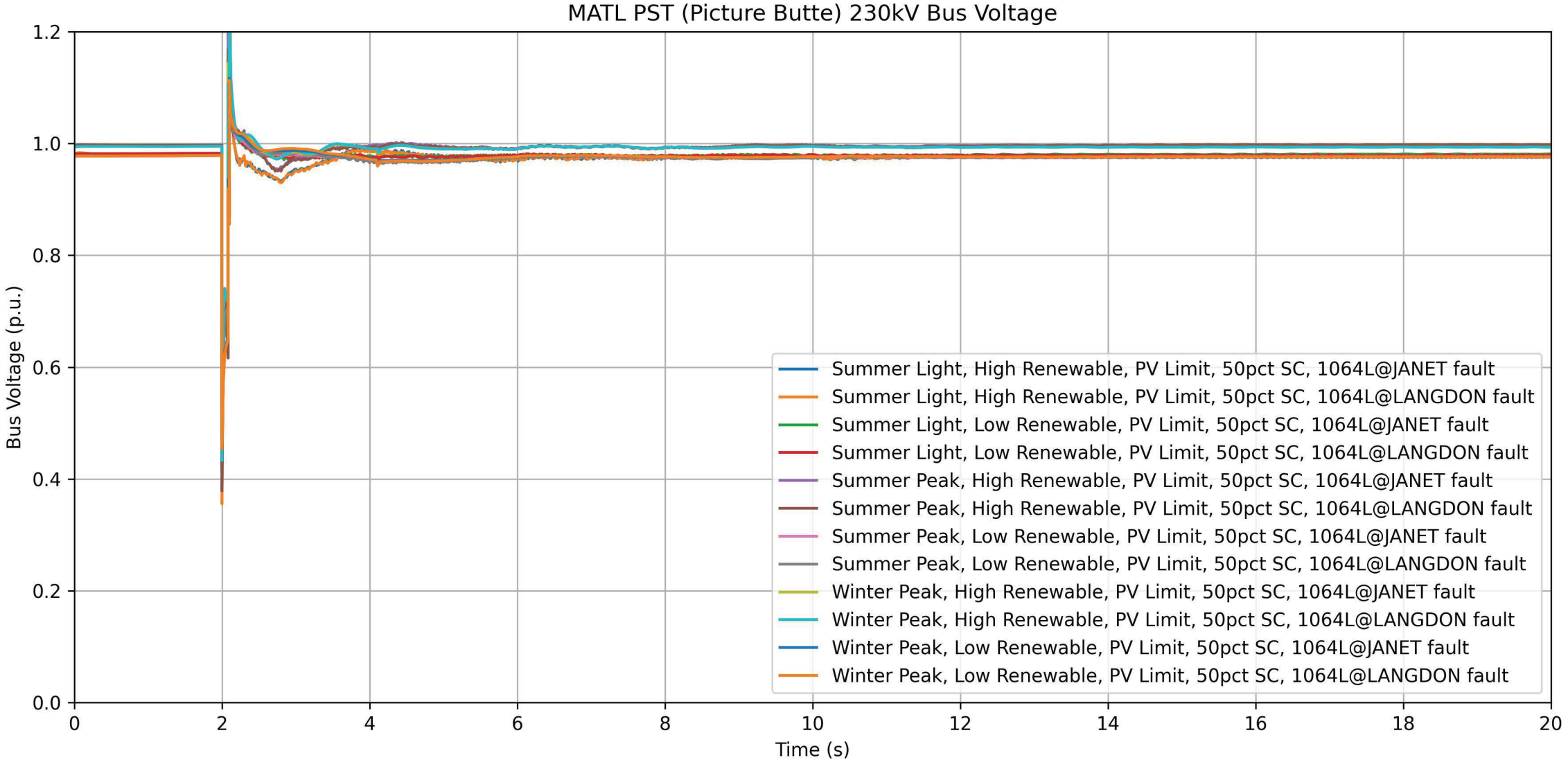

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

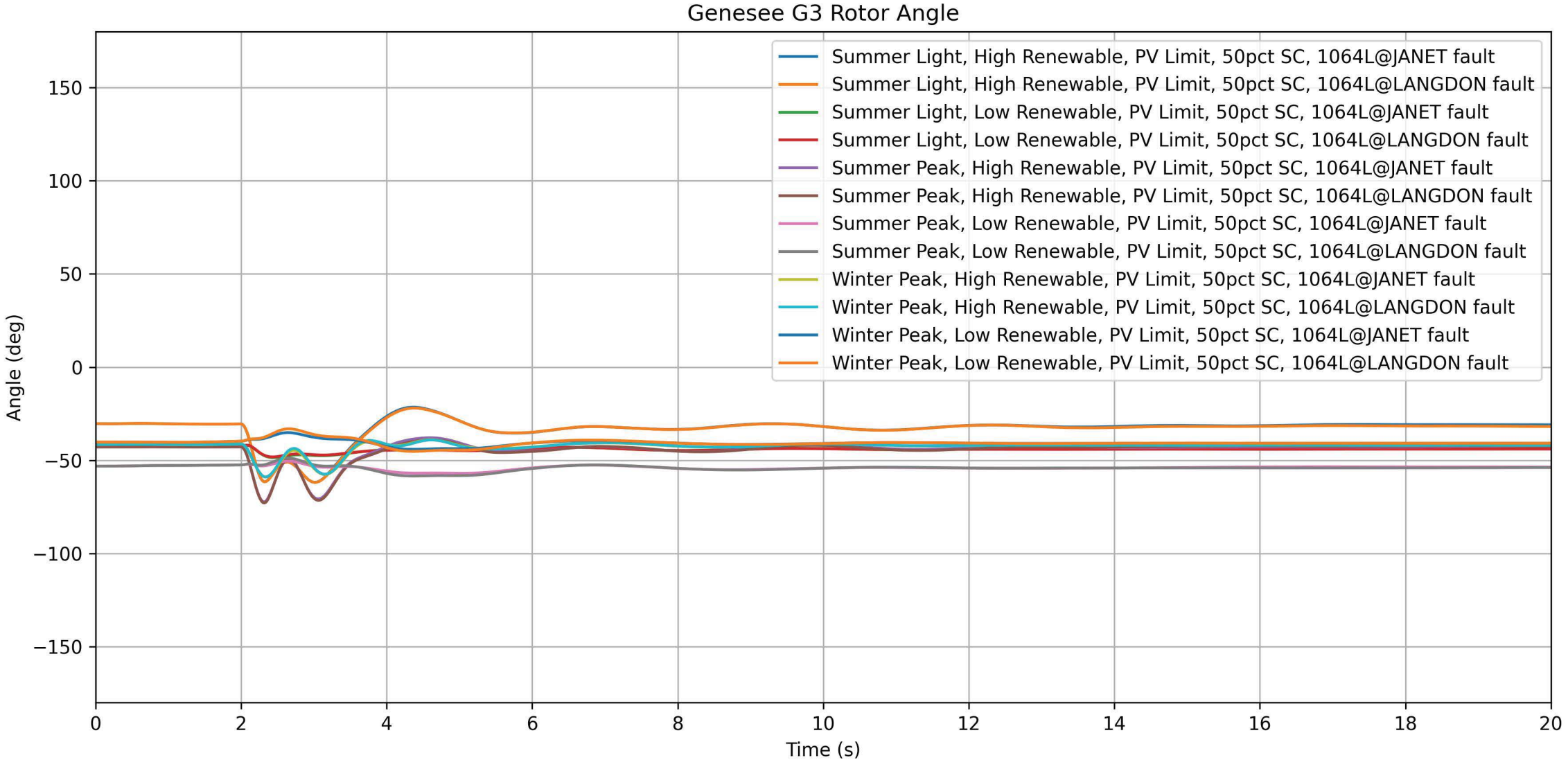

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

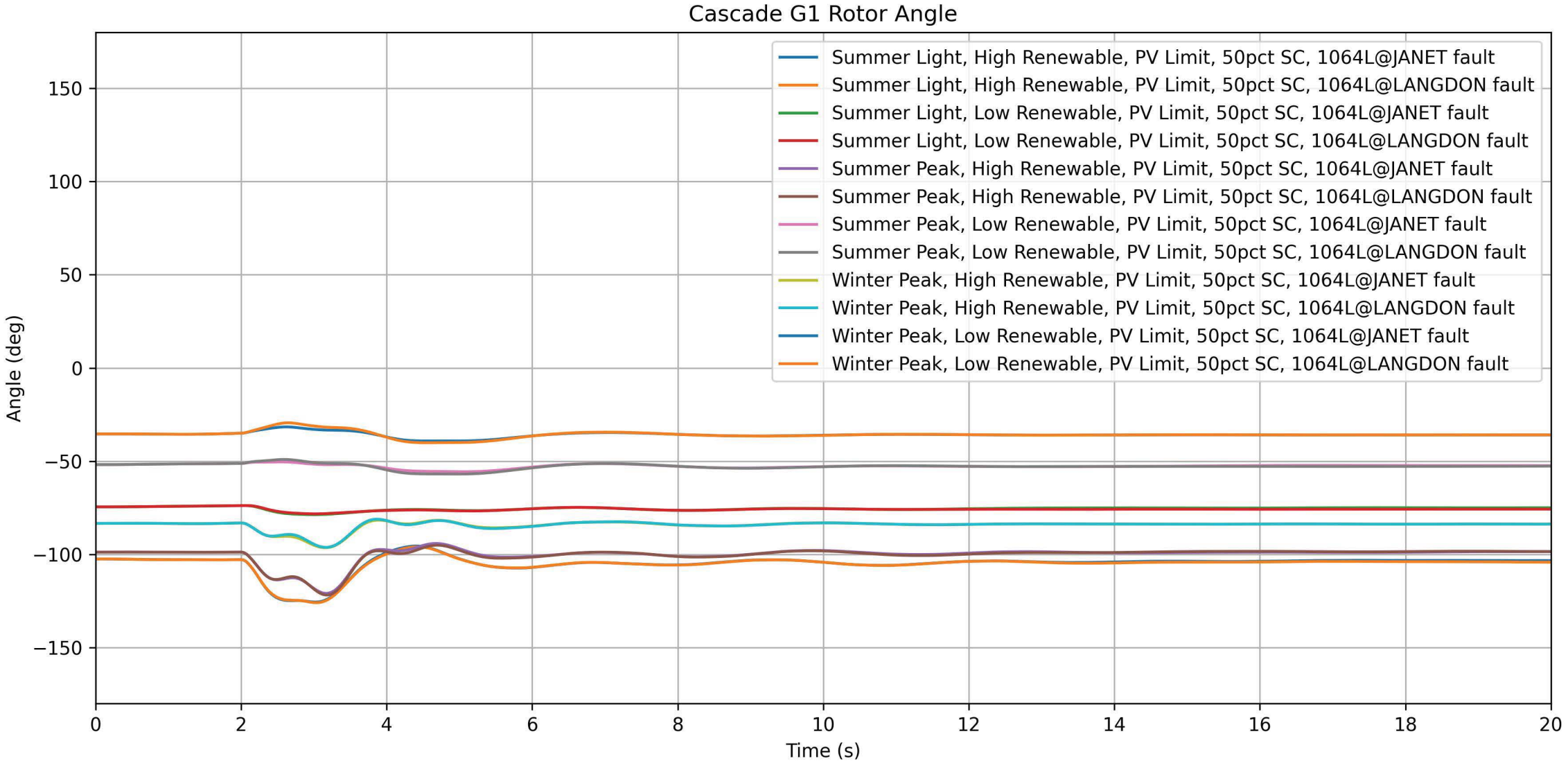

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

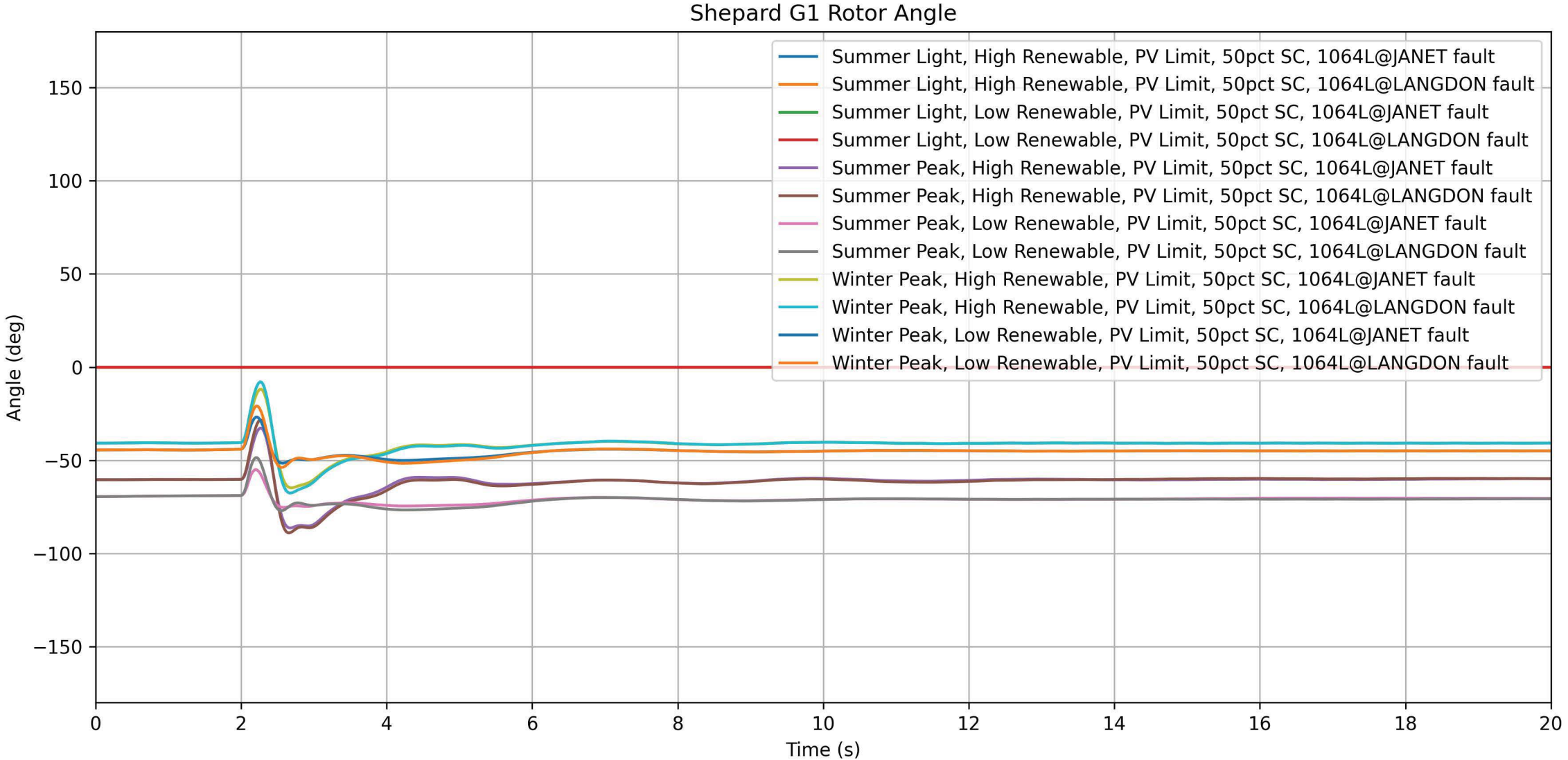

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

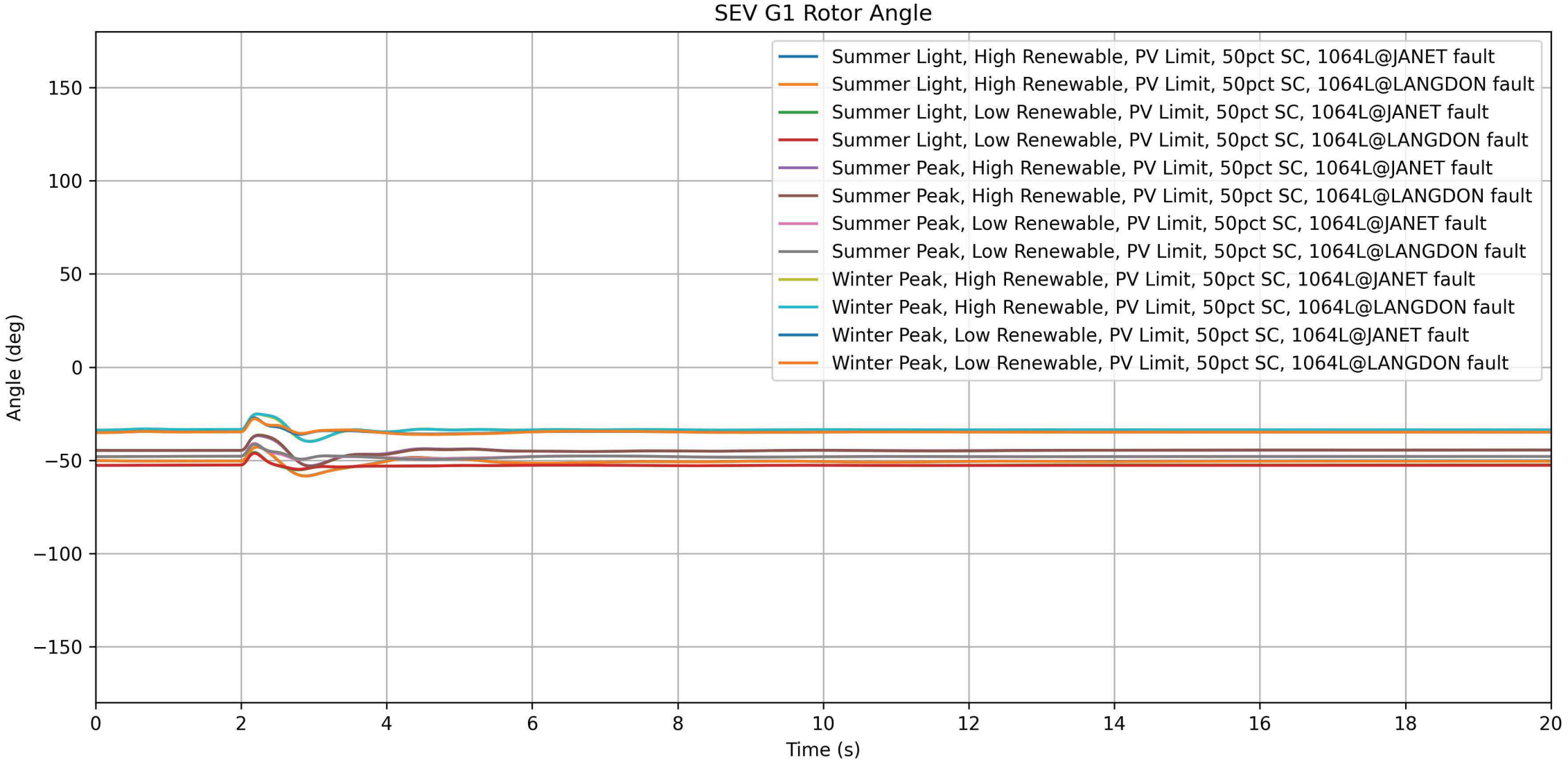

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

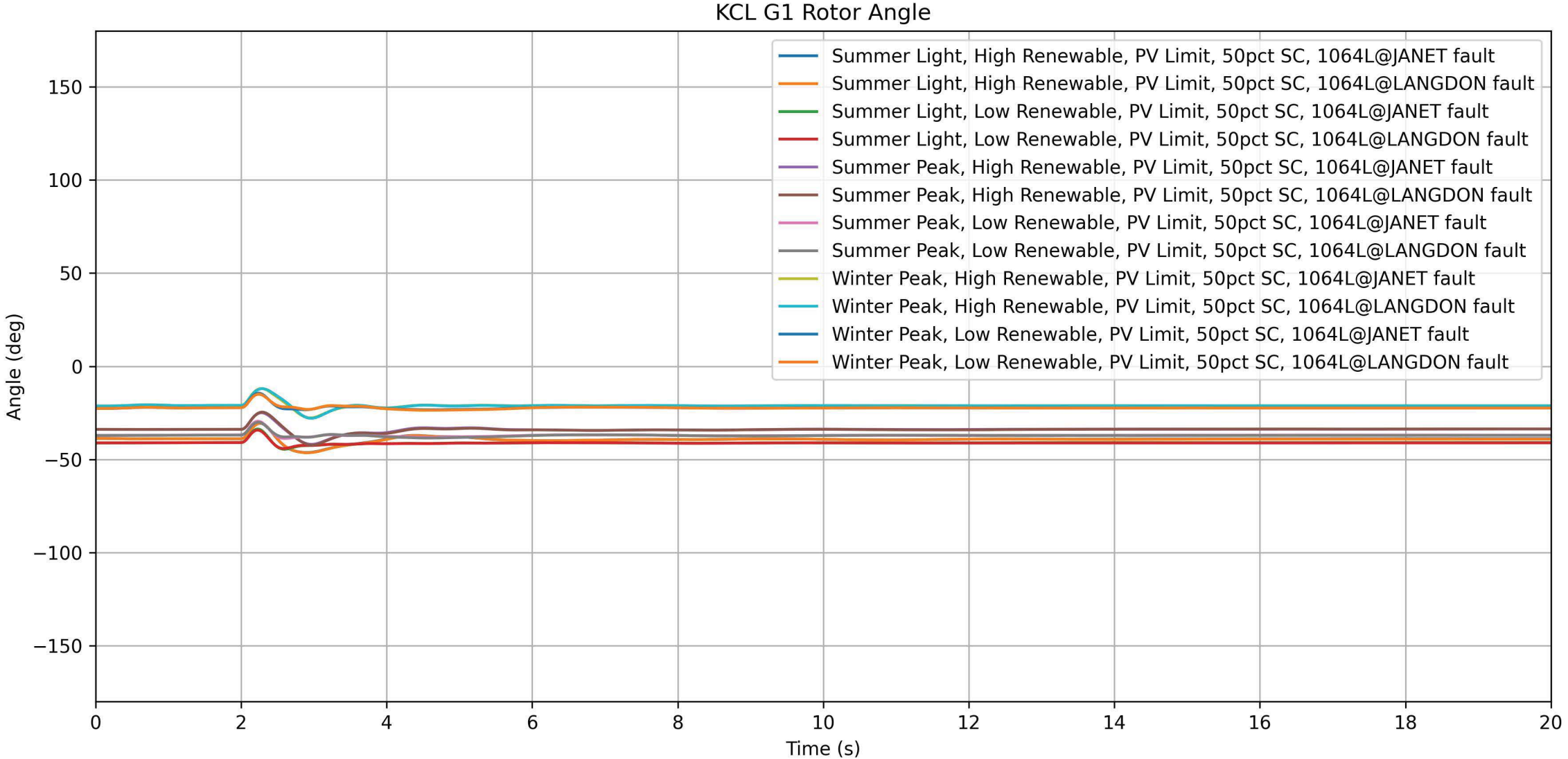

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

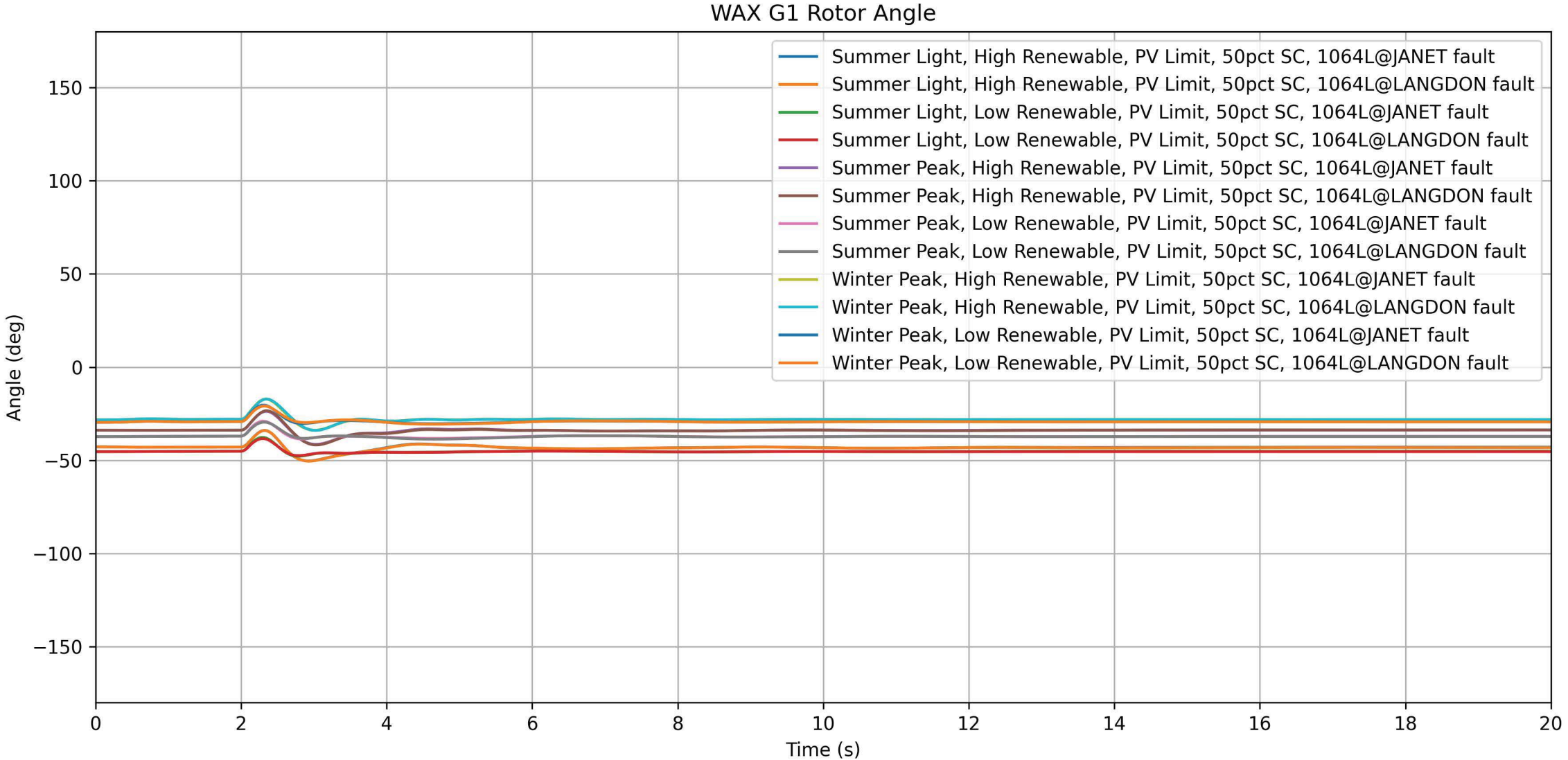

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

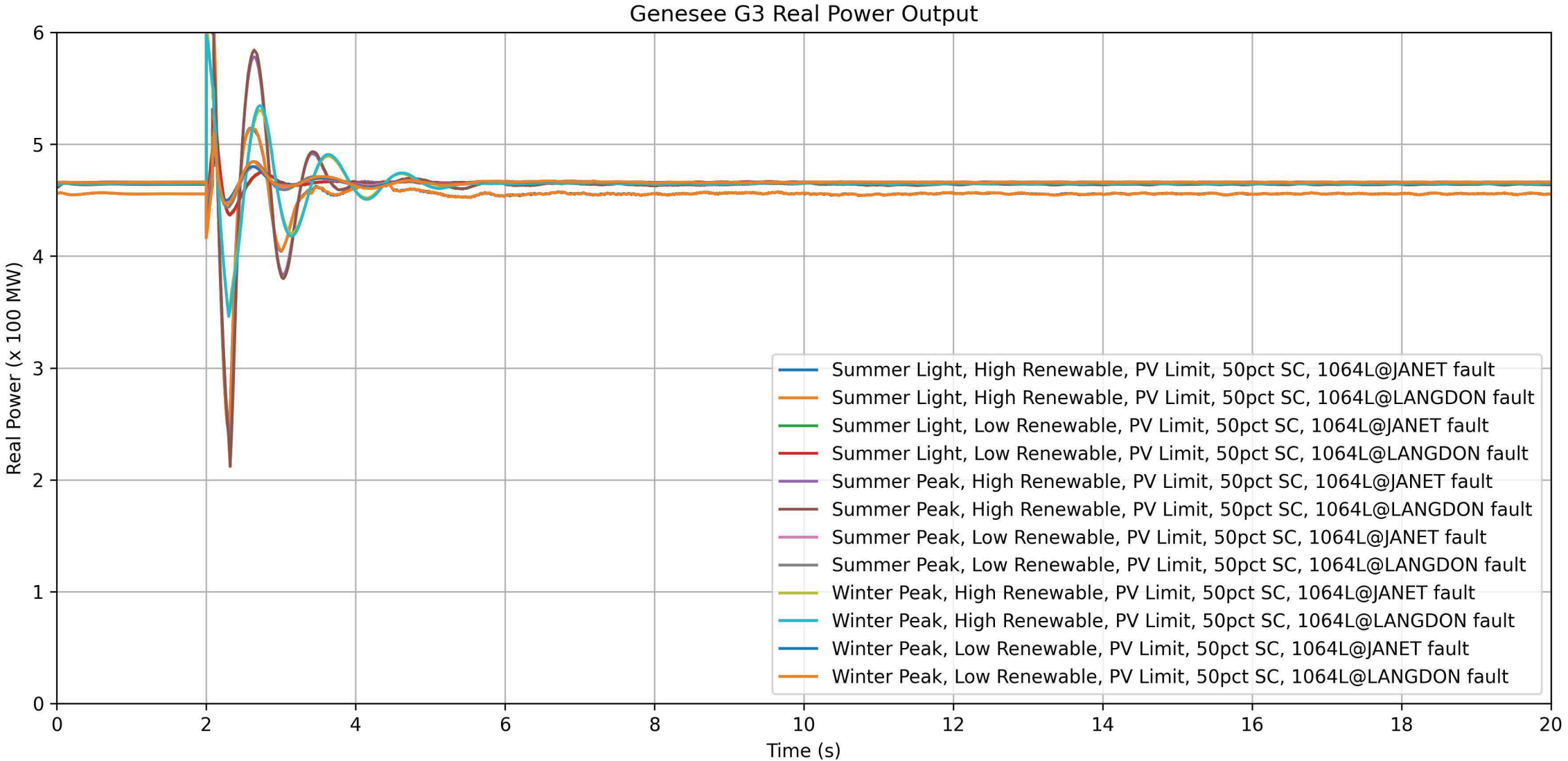

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

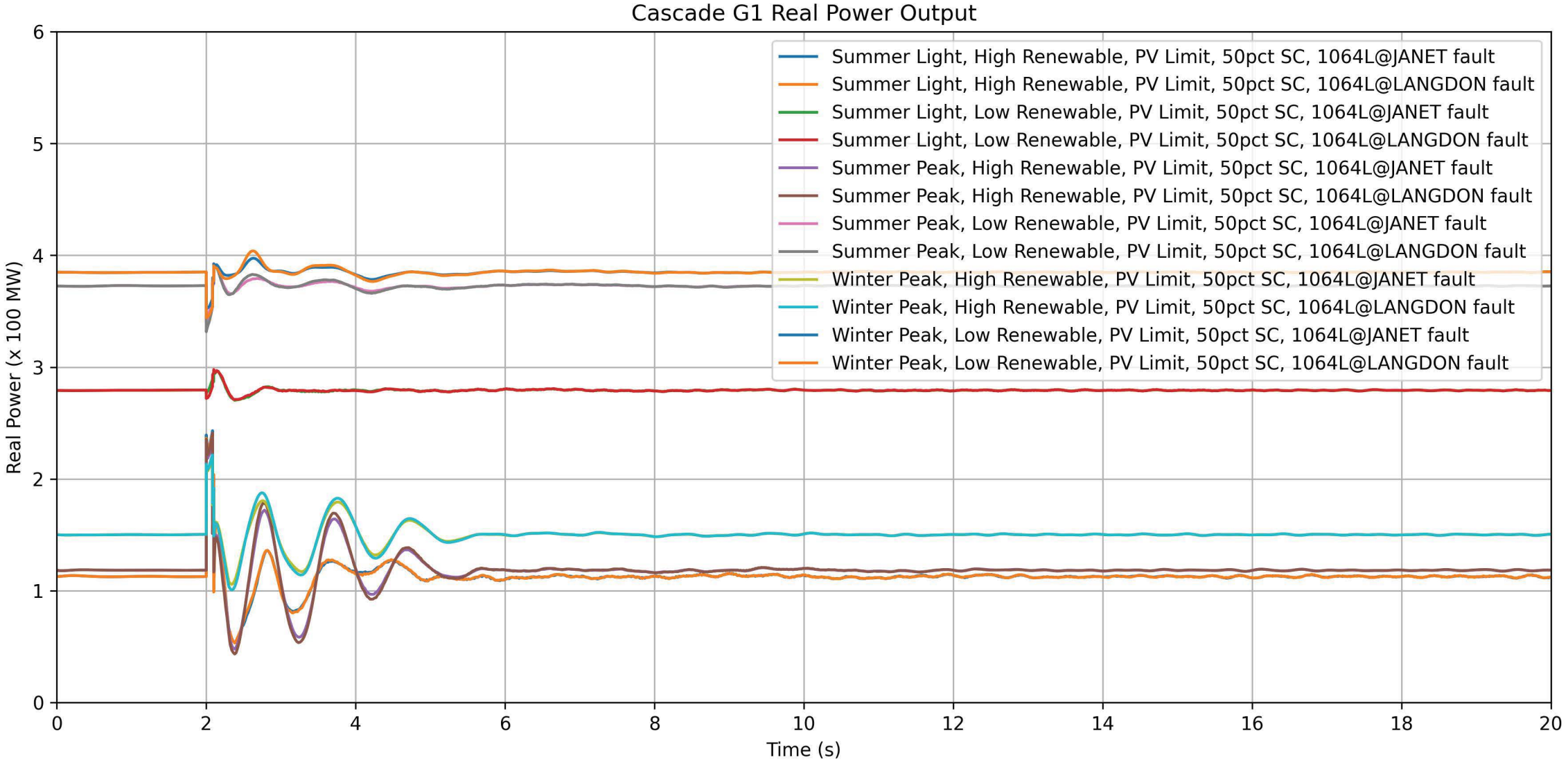

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

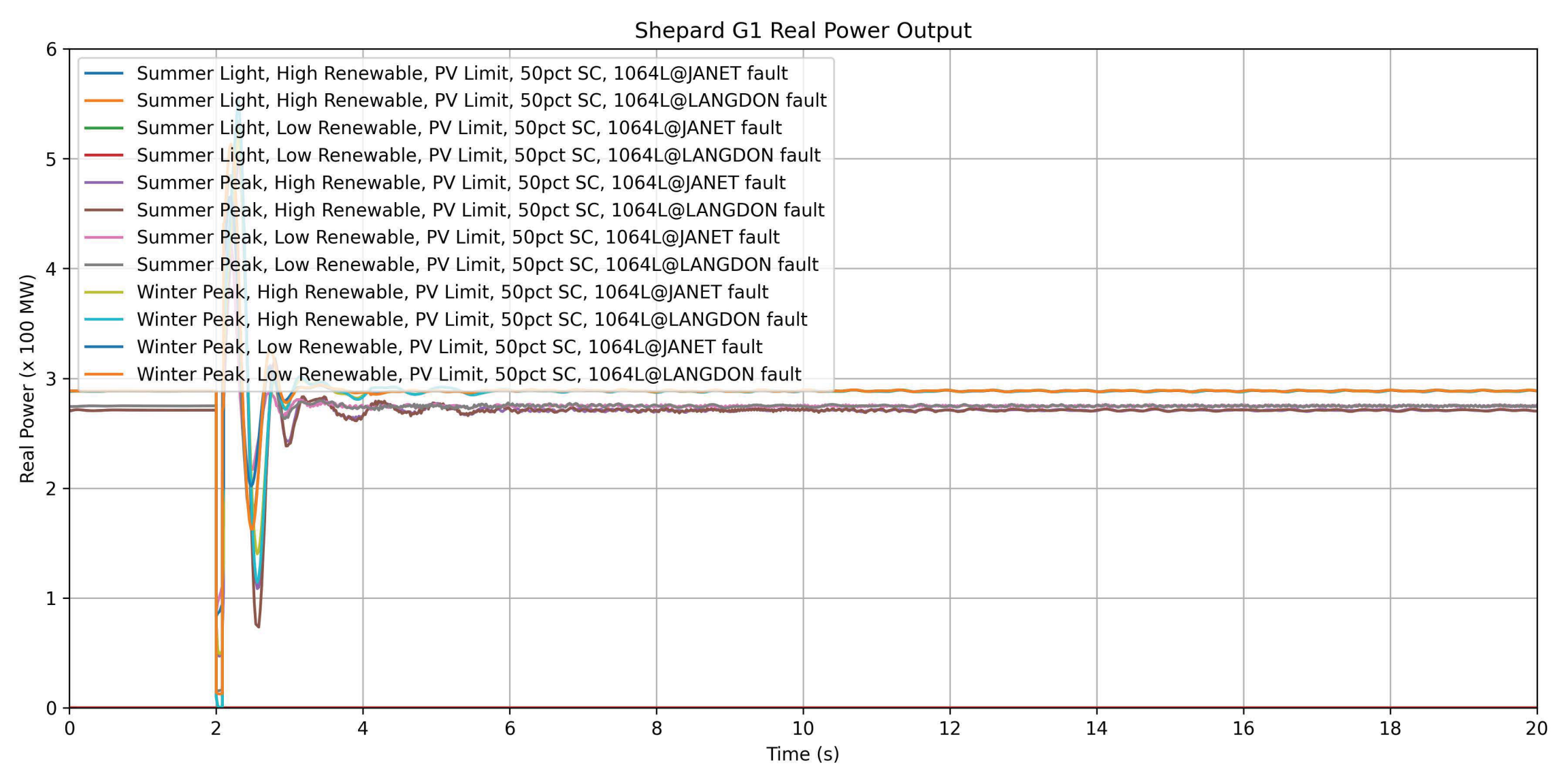

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

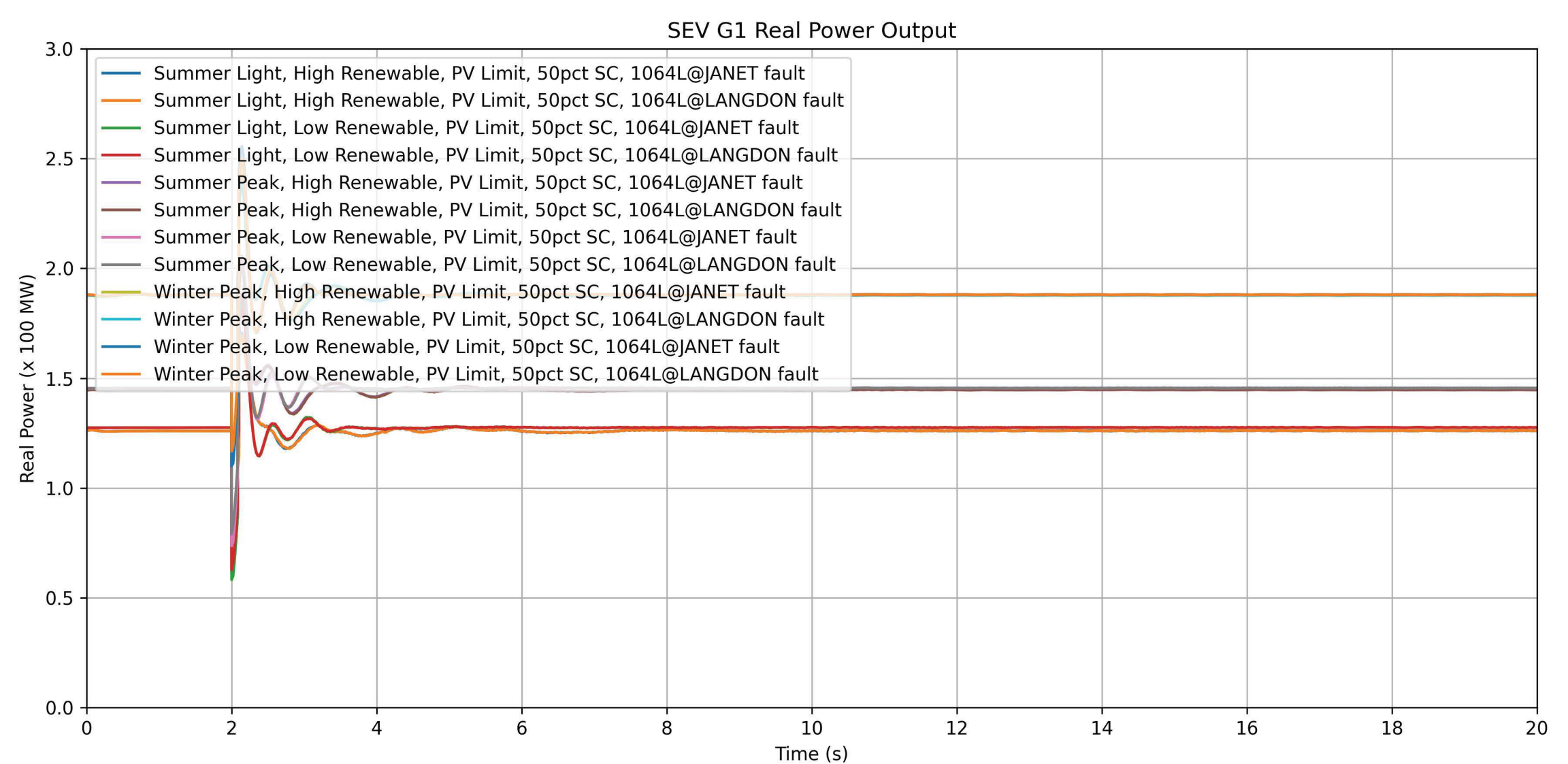

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

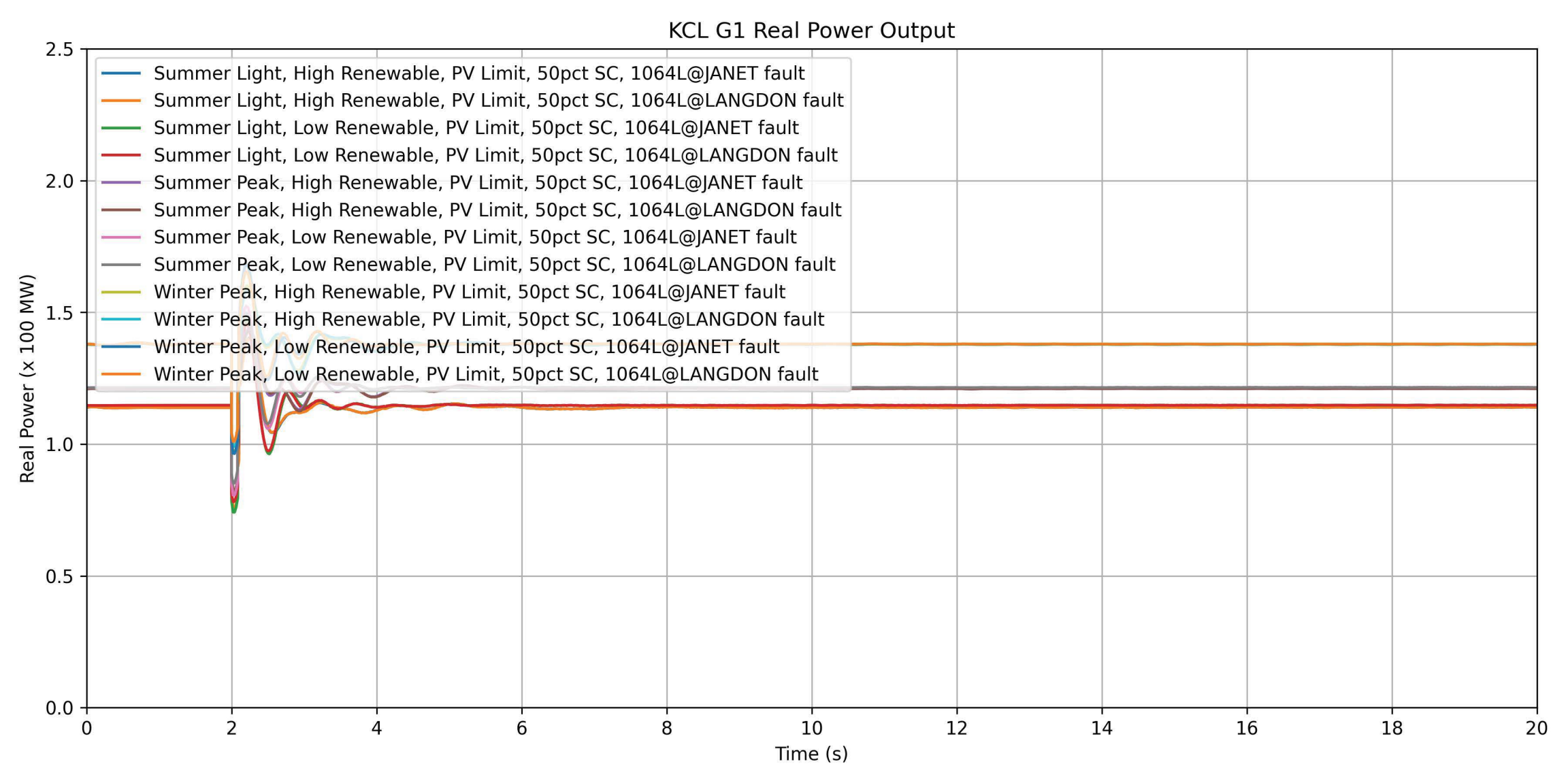

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

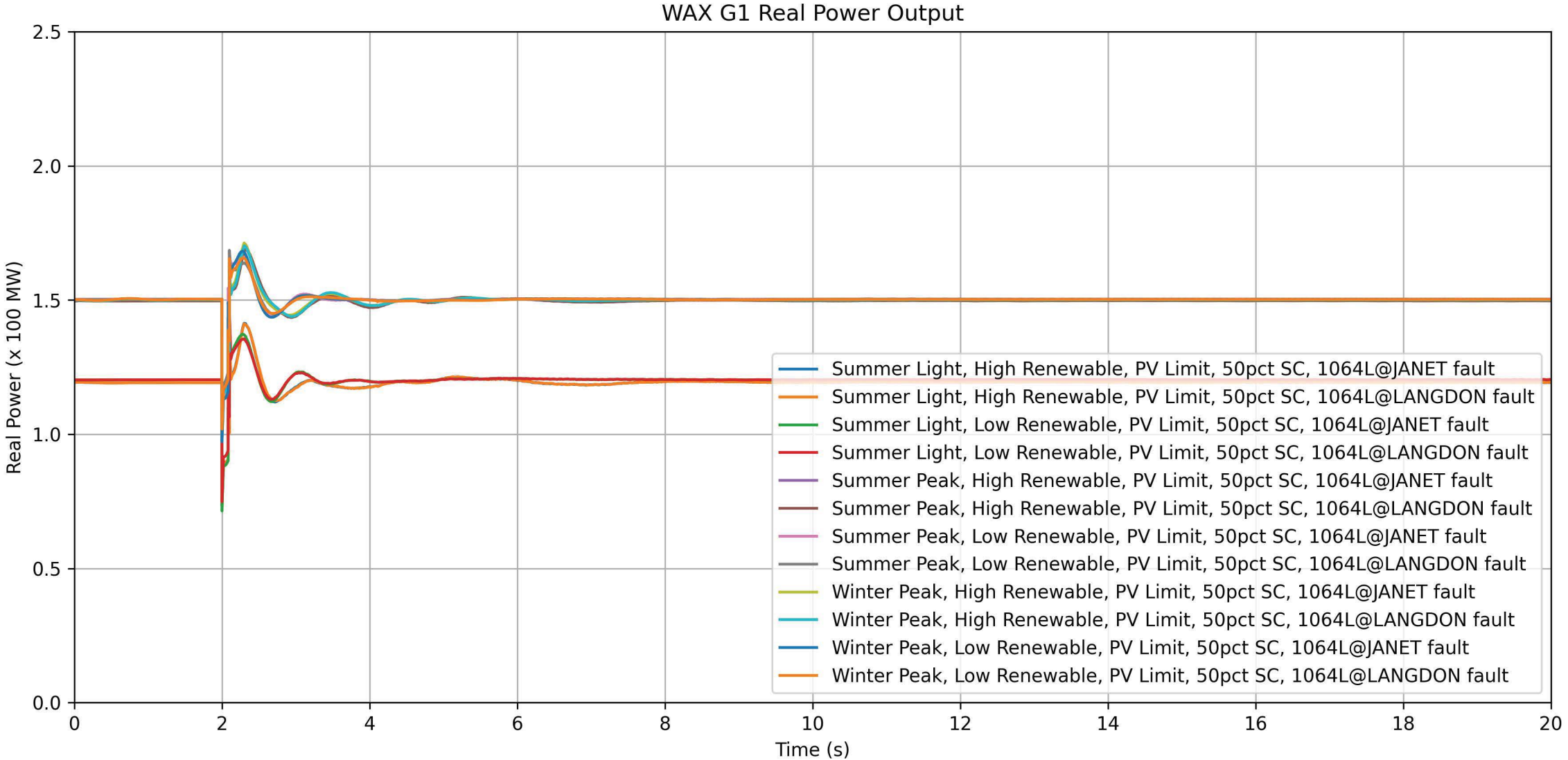

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

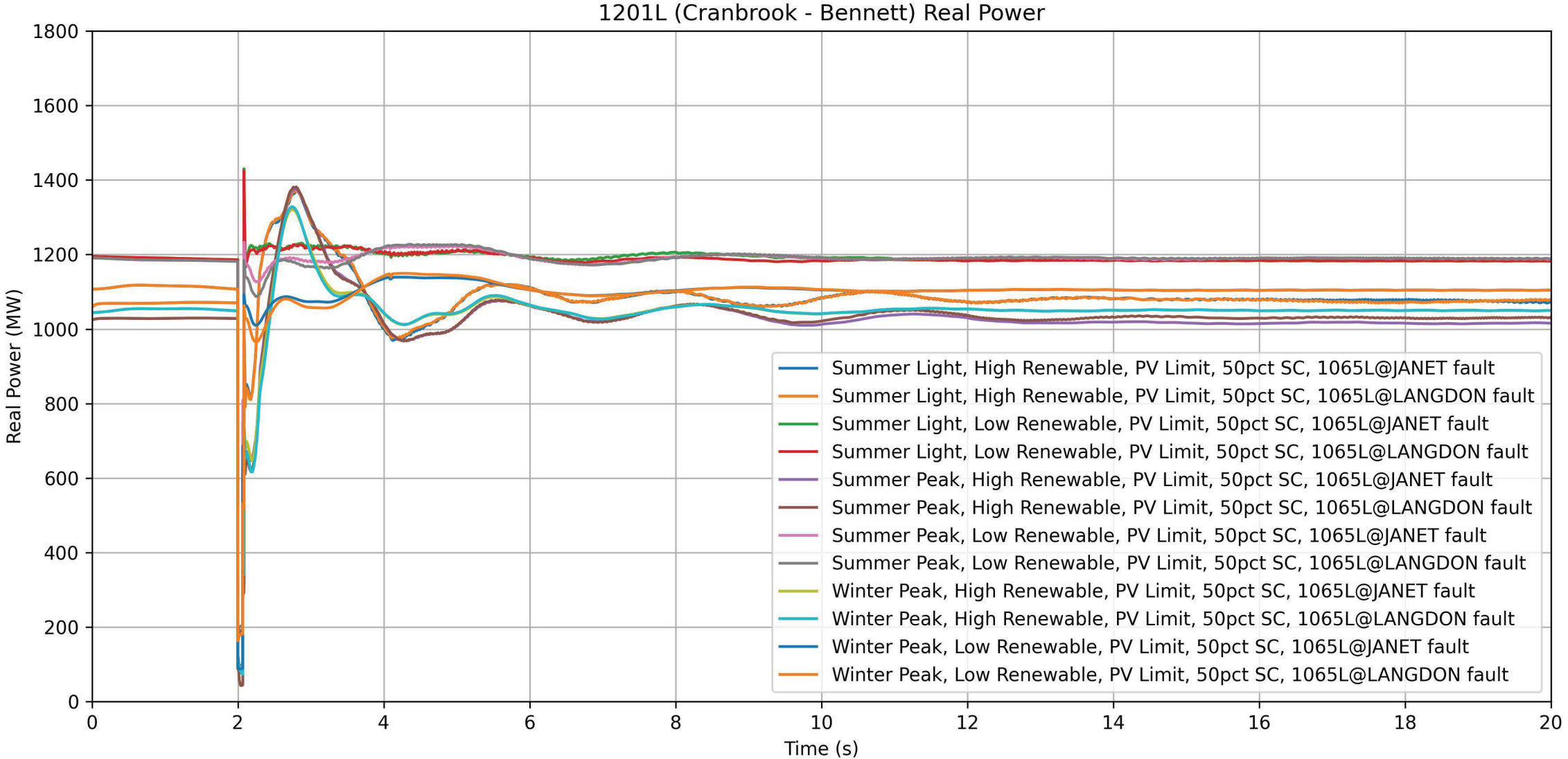

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

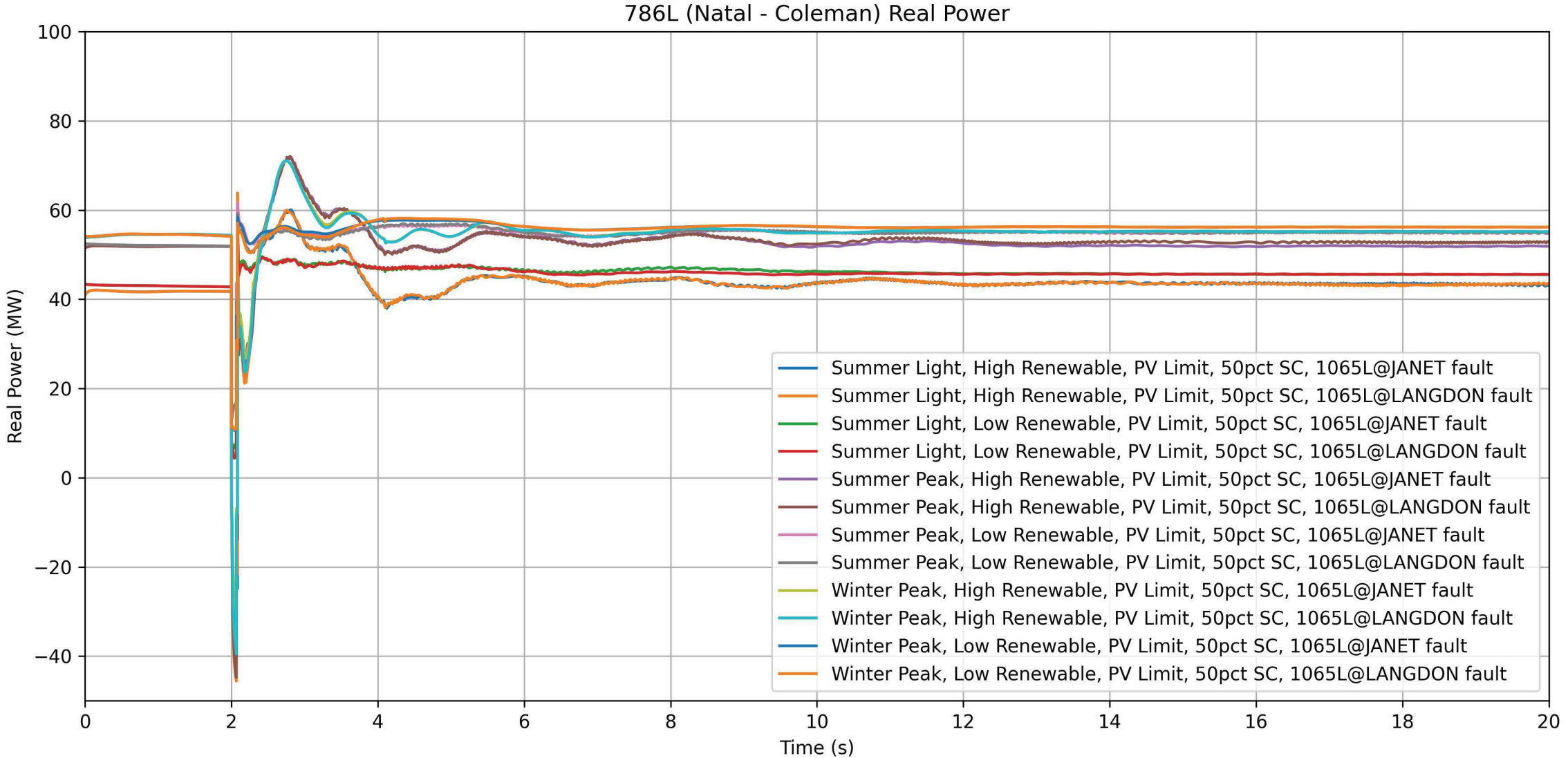

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

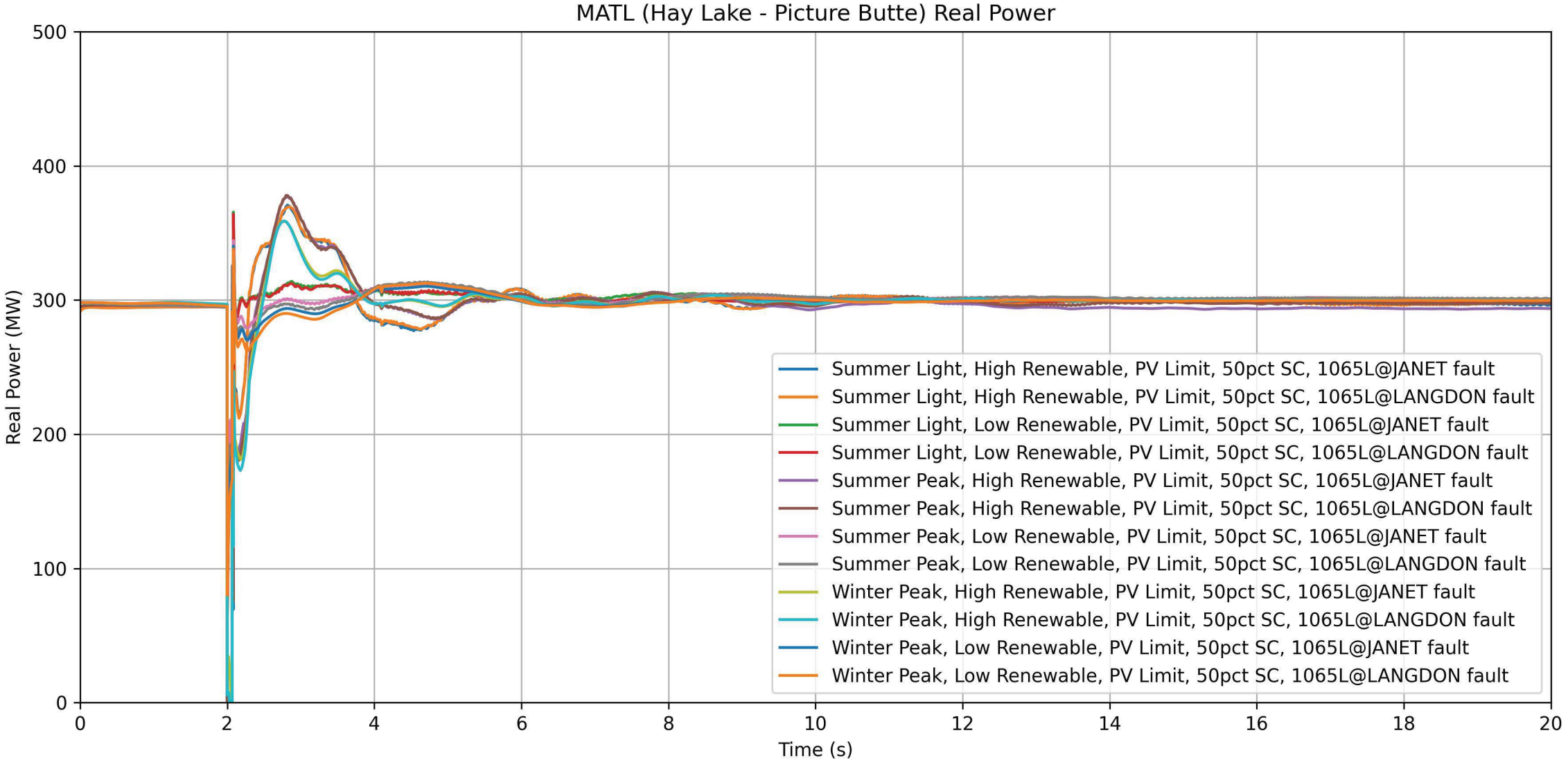

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

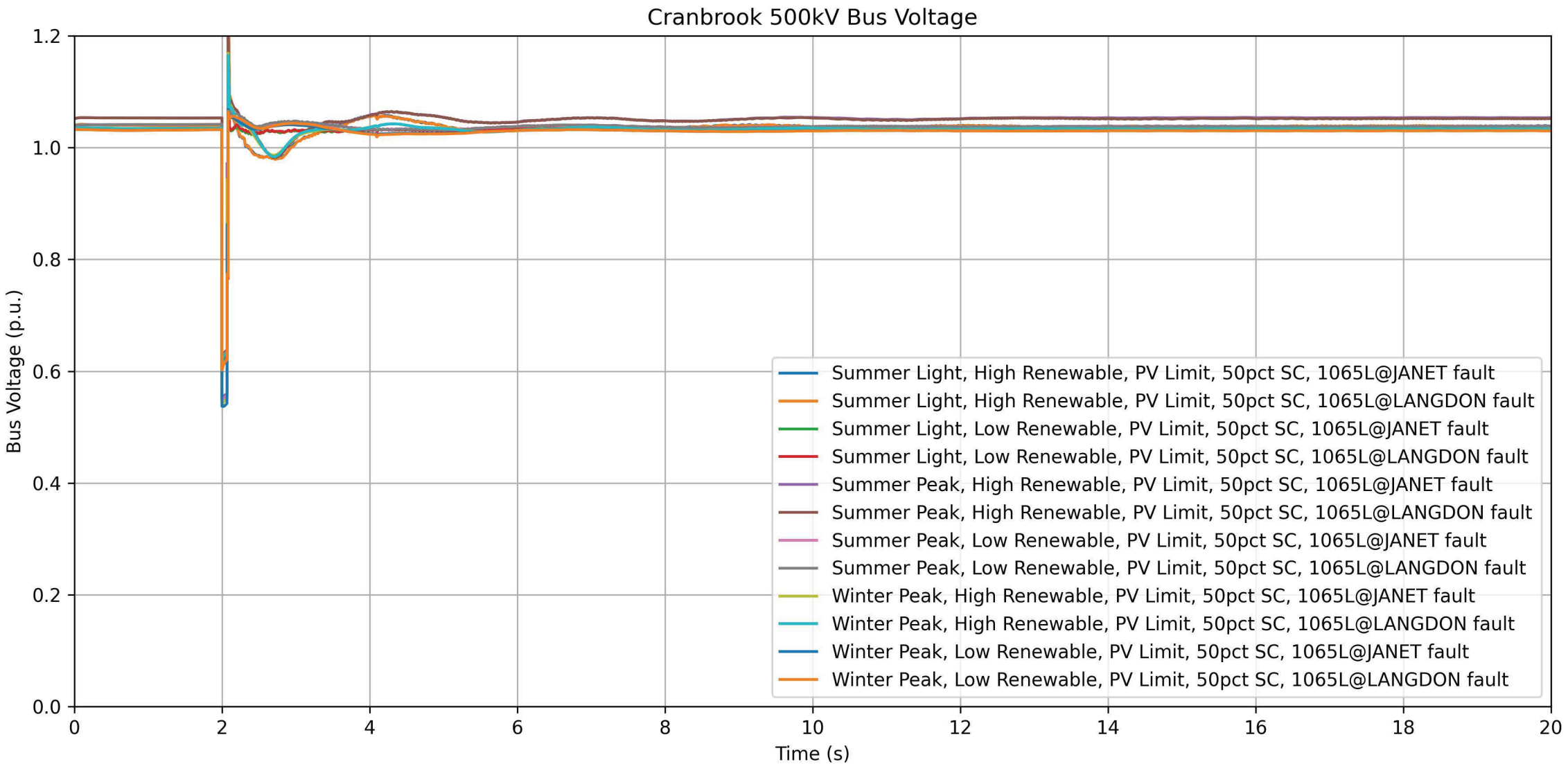

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

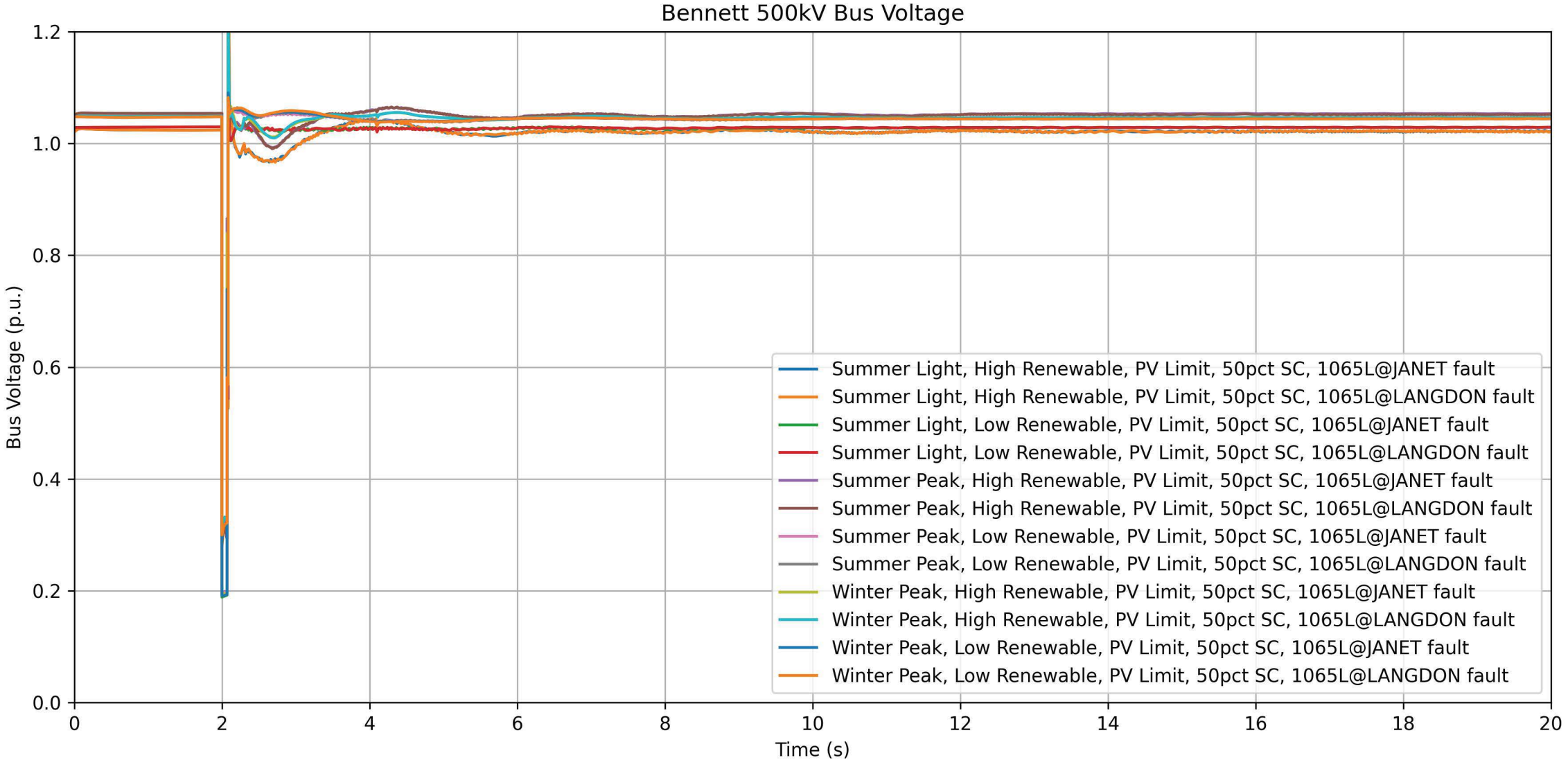

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L@LANGDON fault

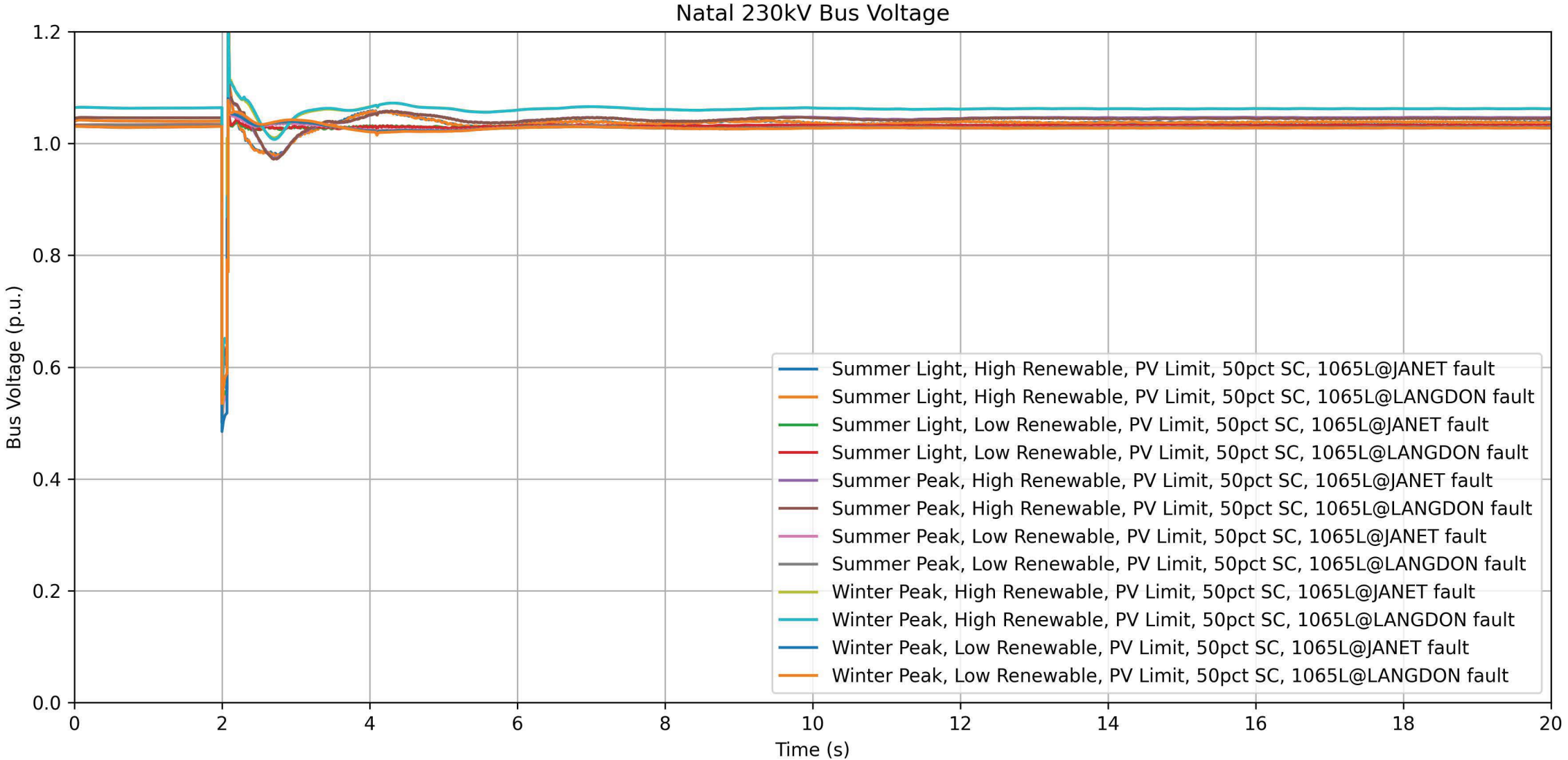

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

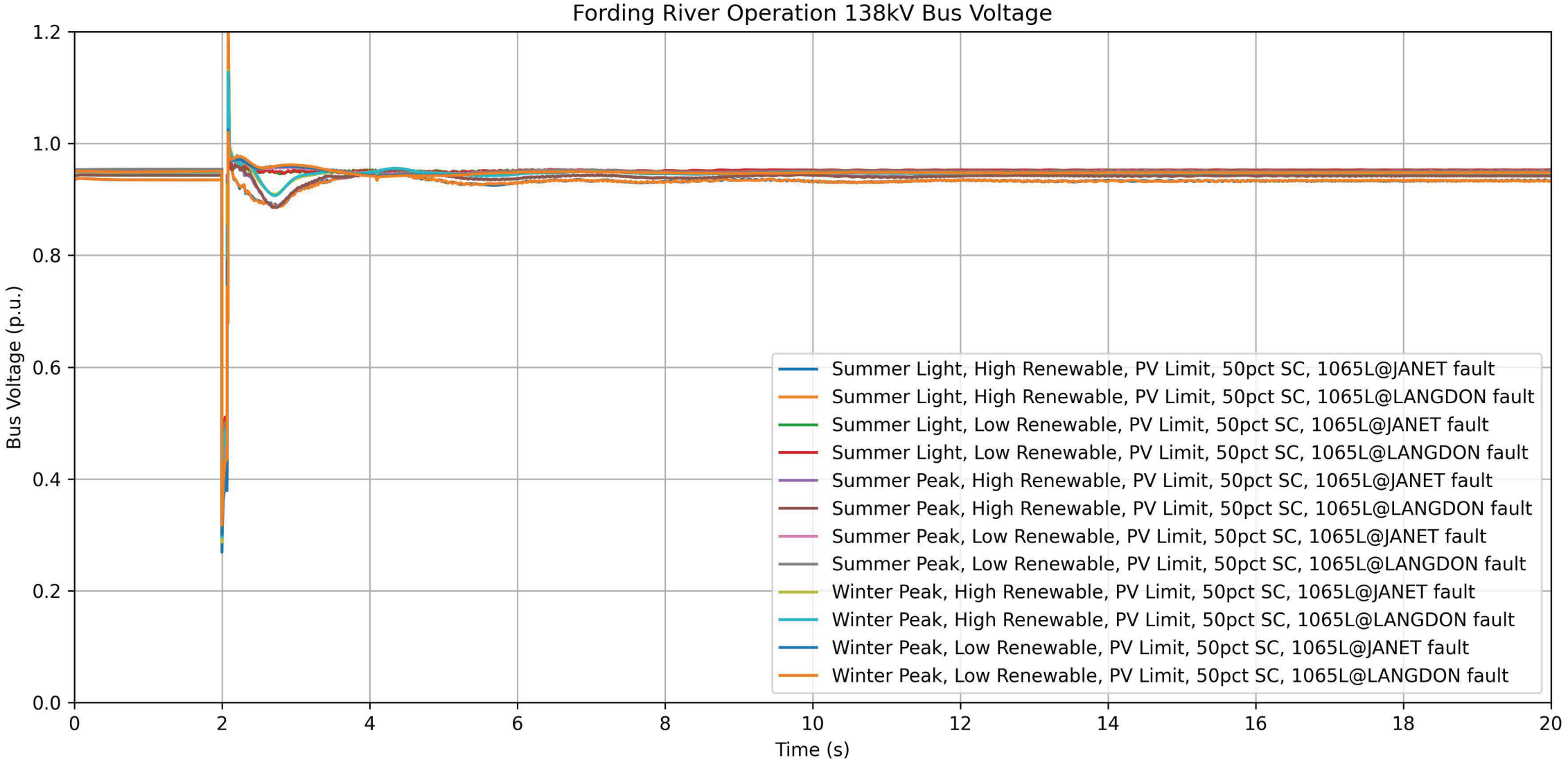

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

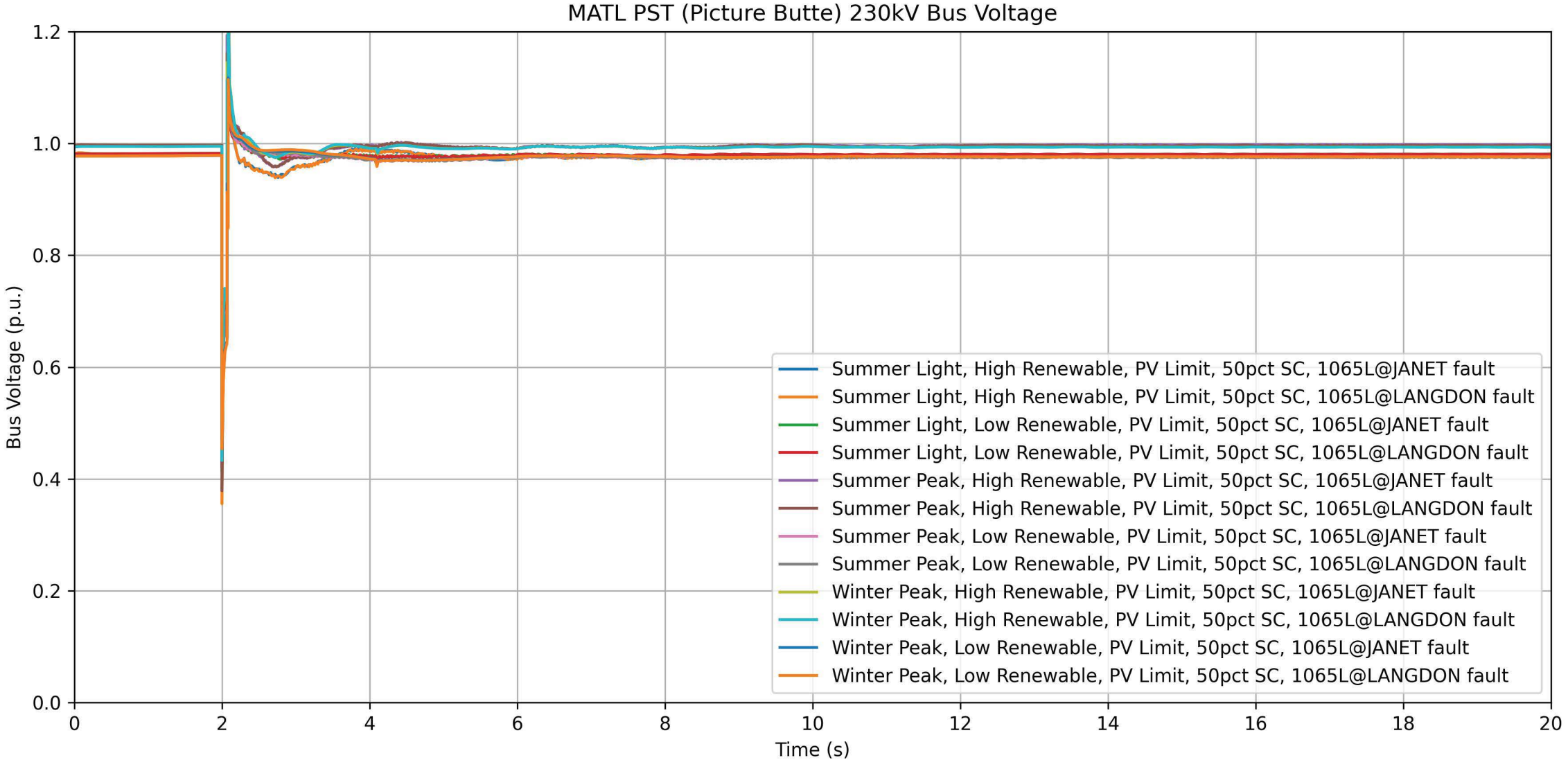

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

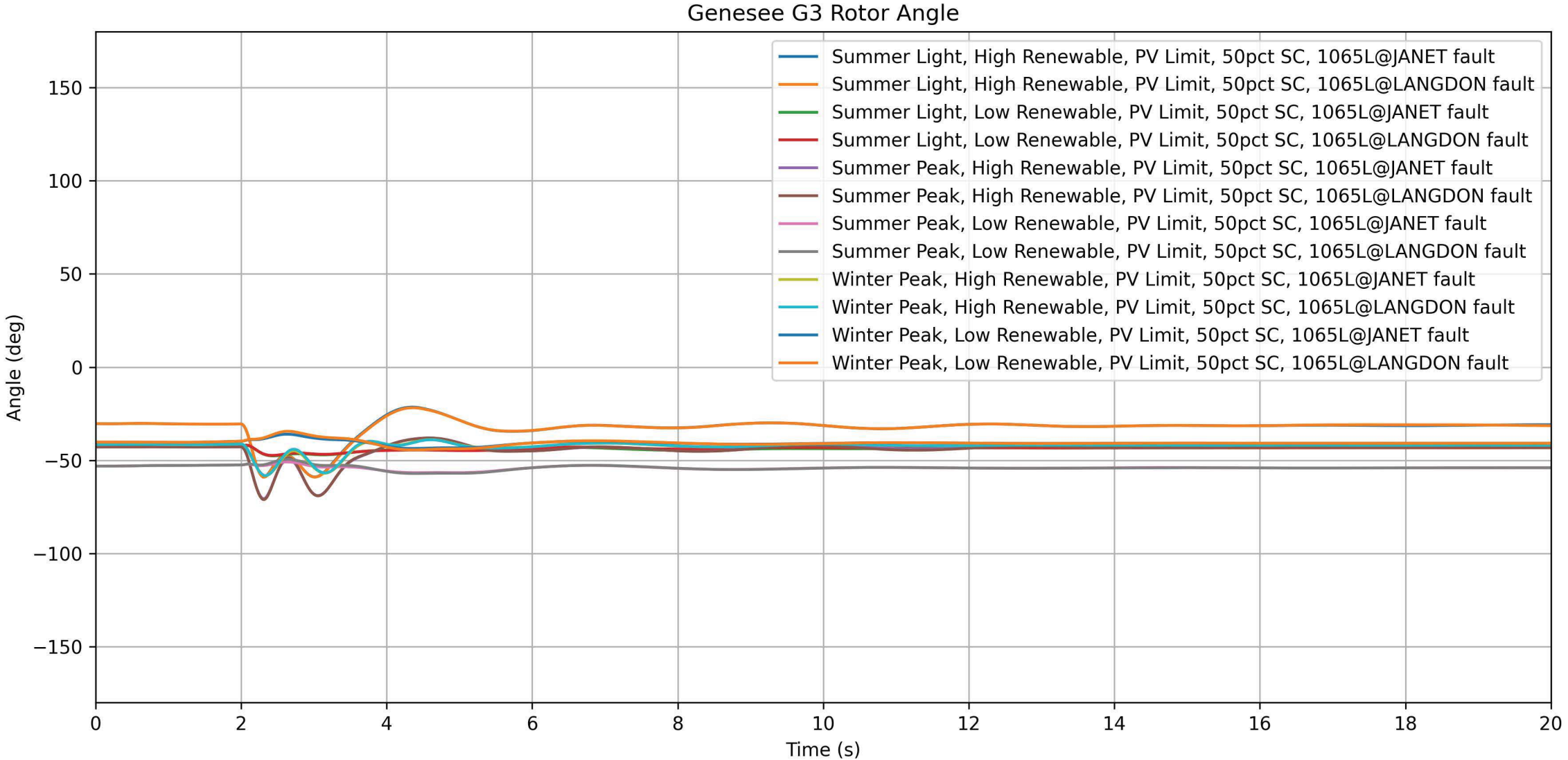

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

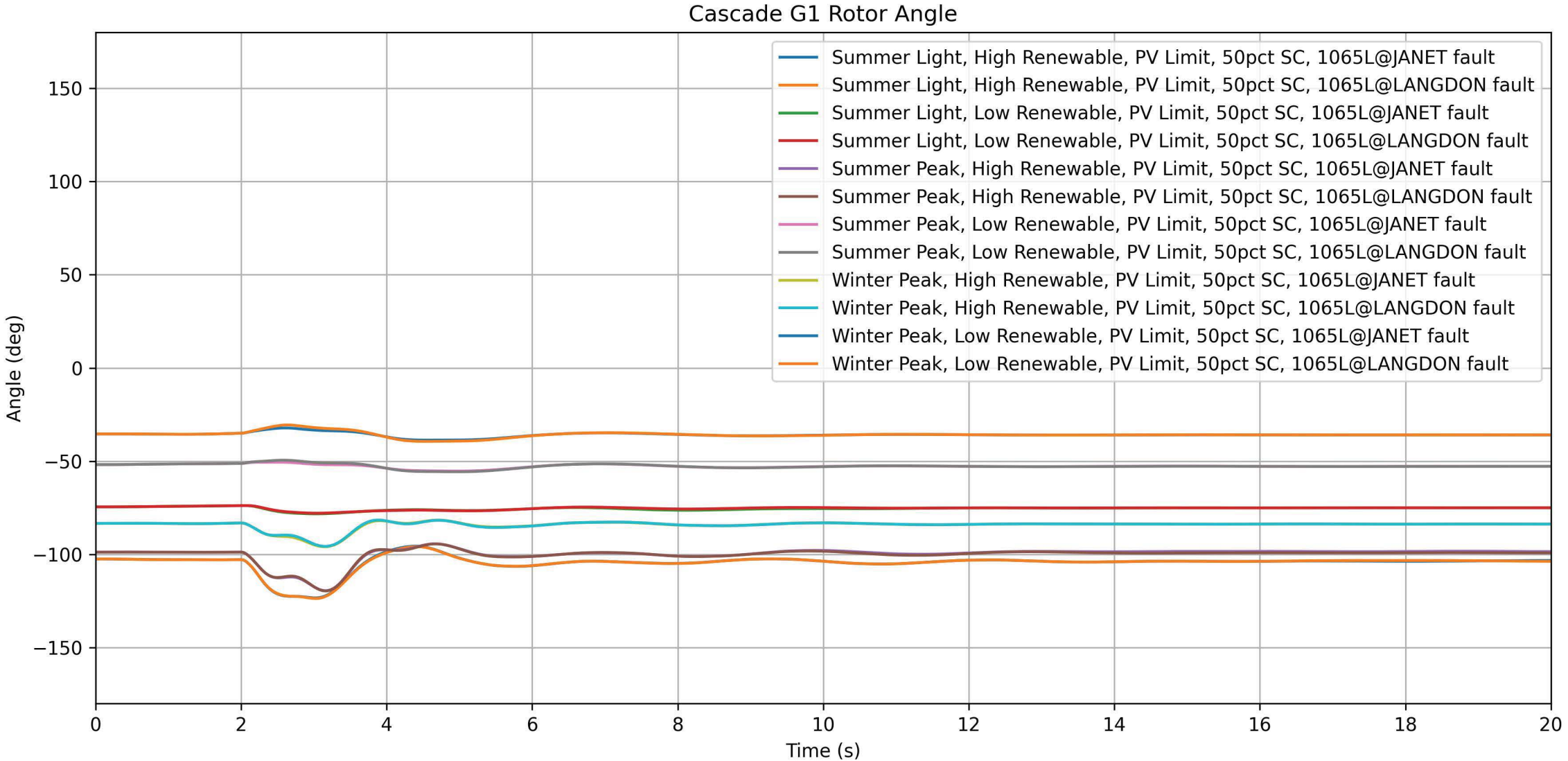

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

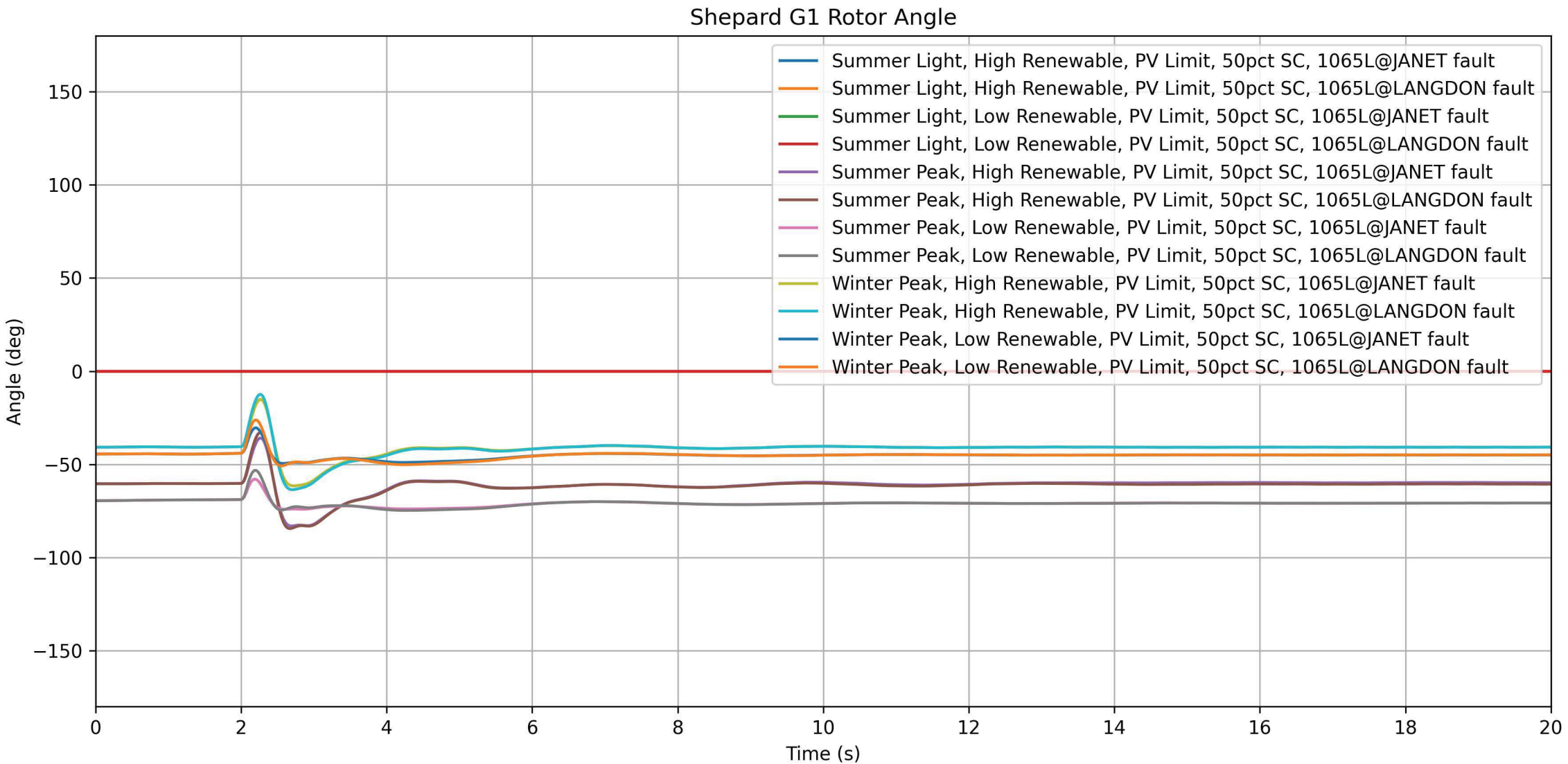

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

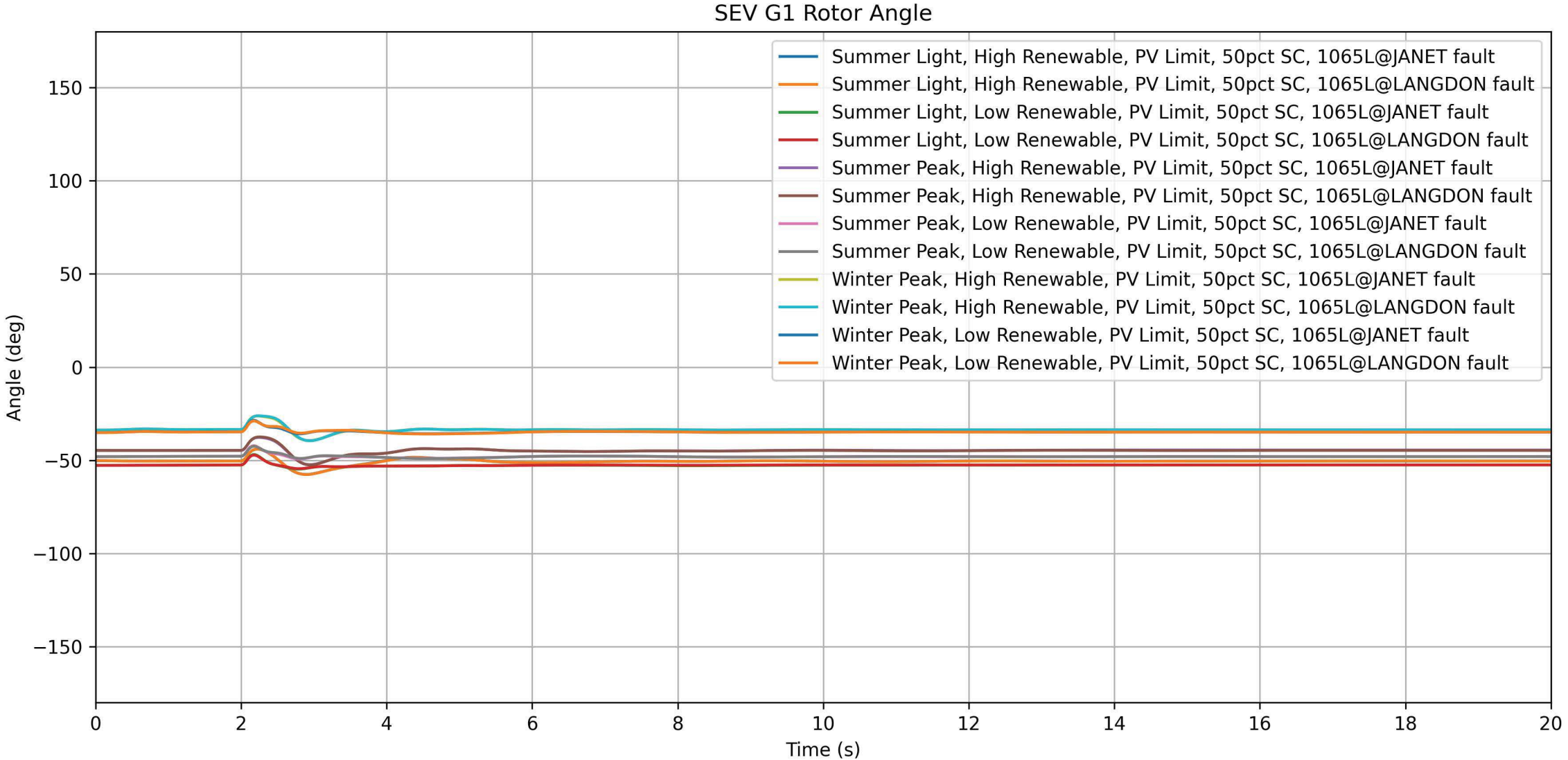

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

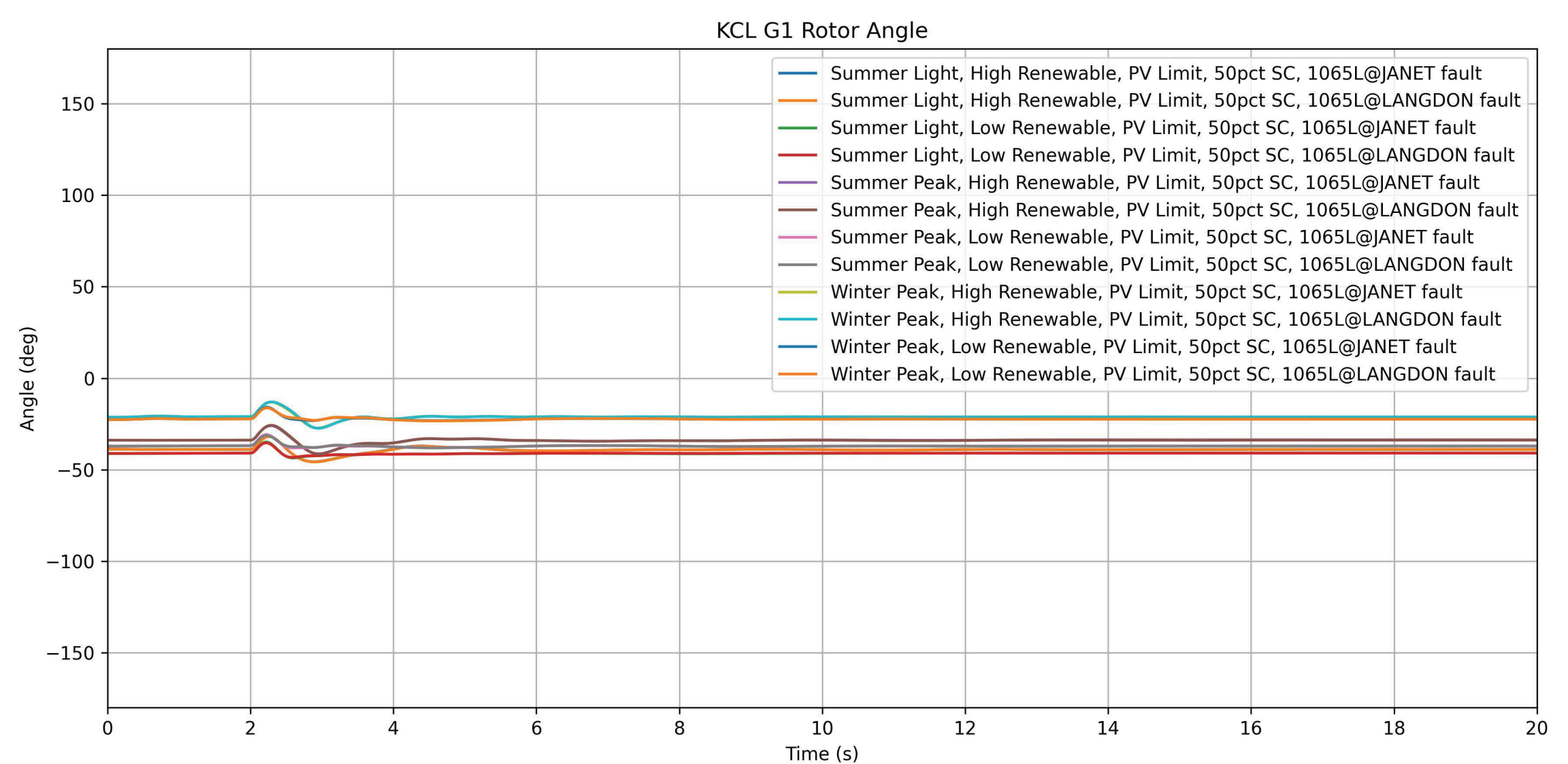

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

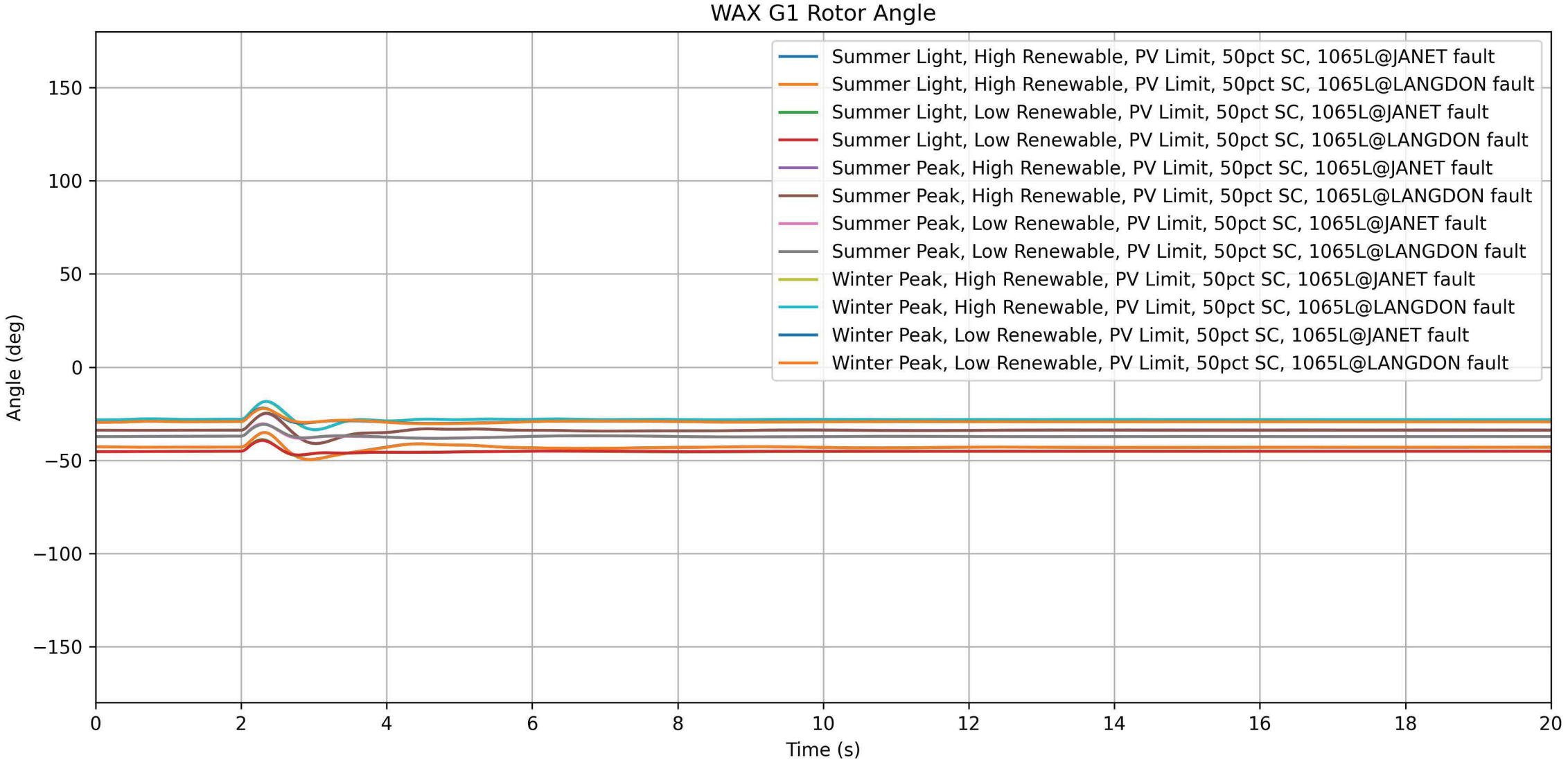

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

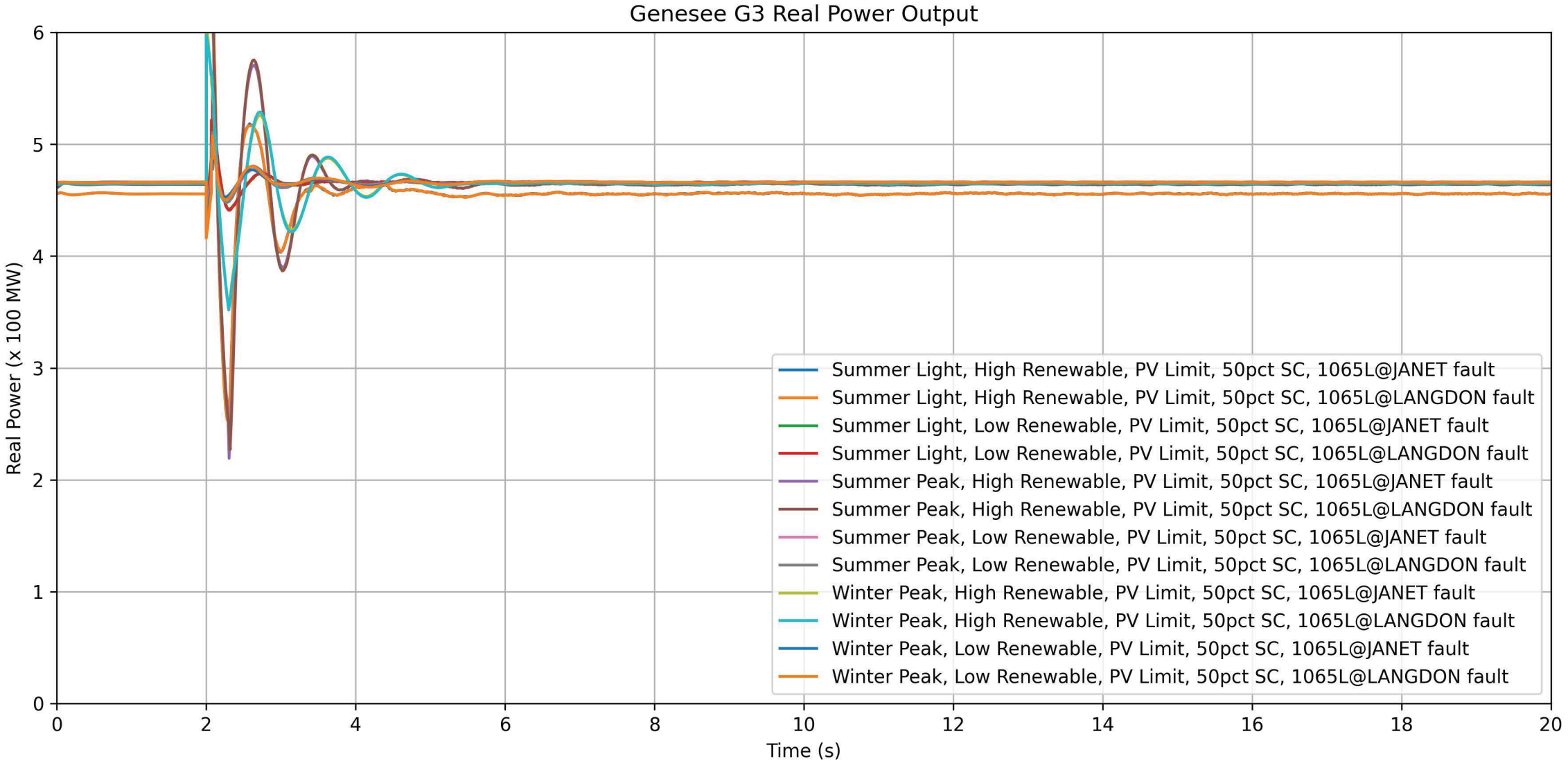

Cascade G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

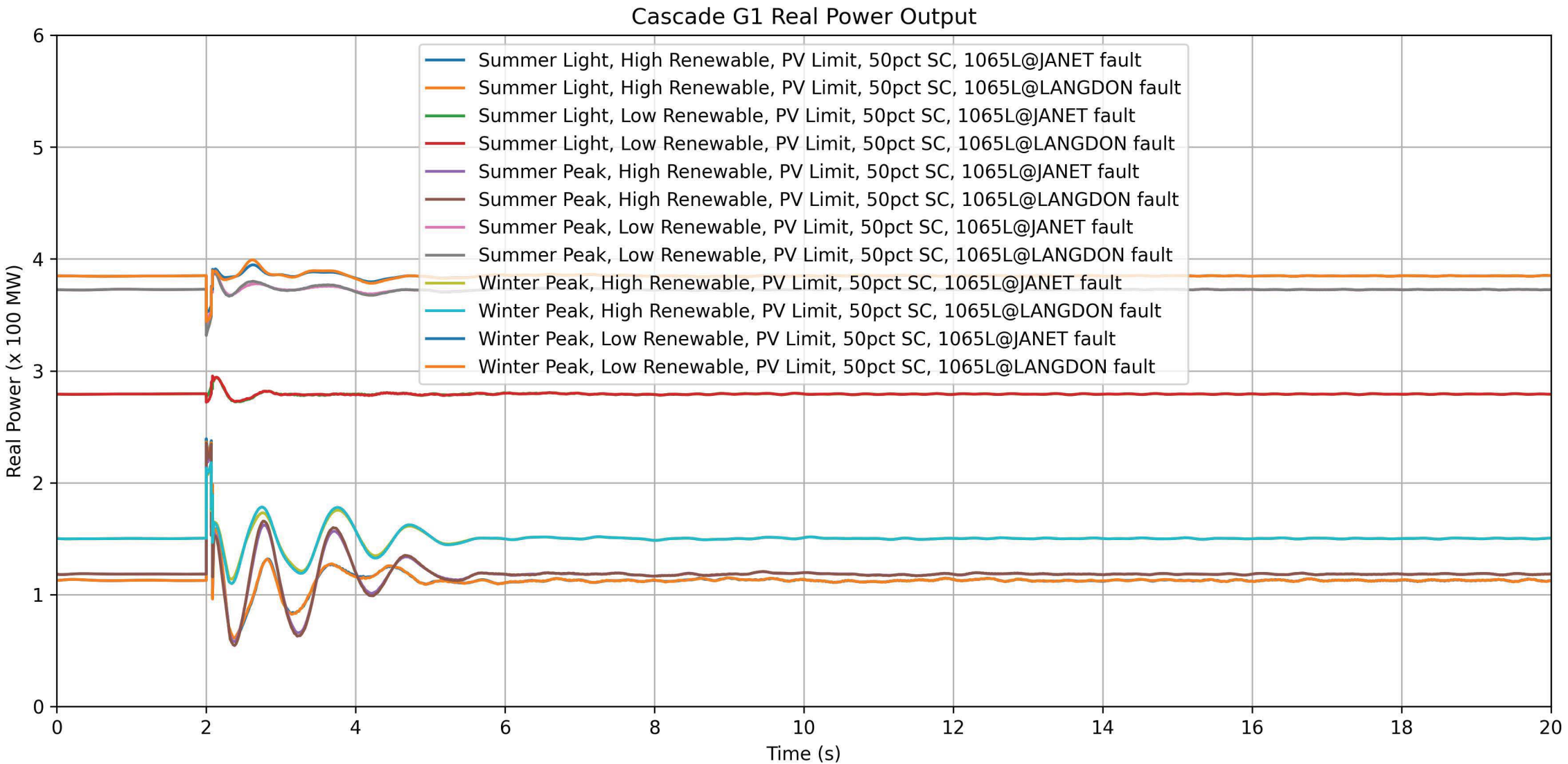

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

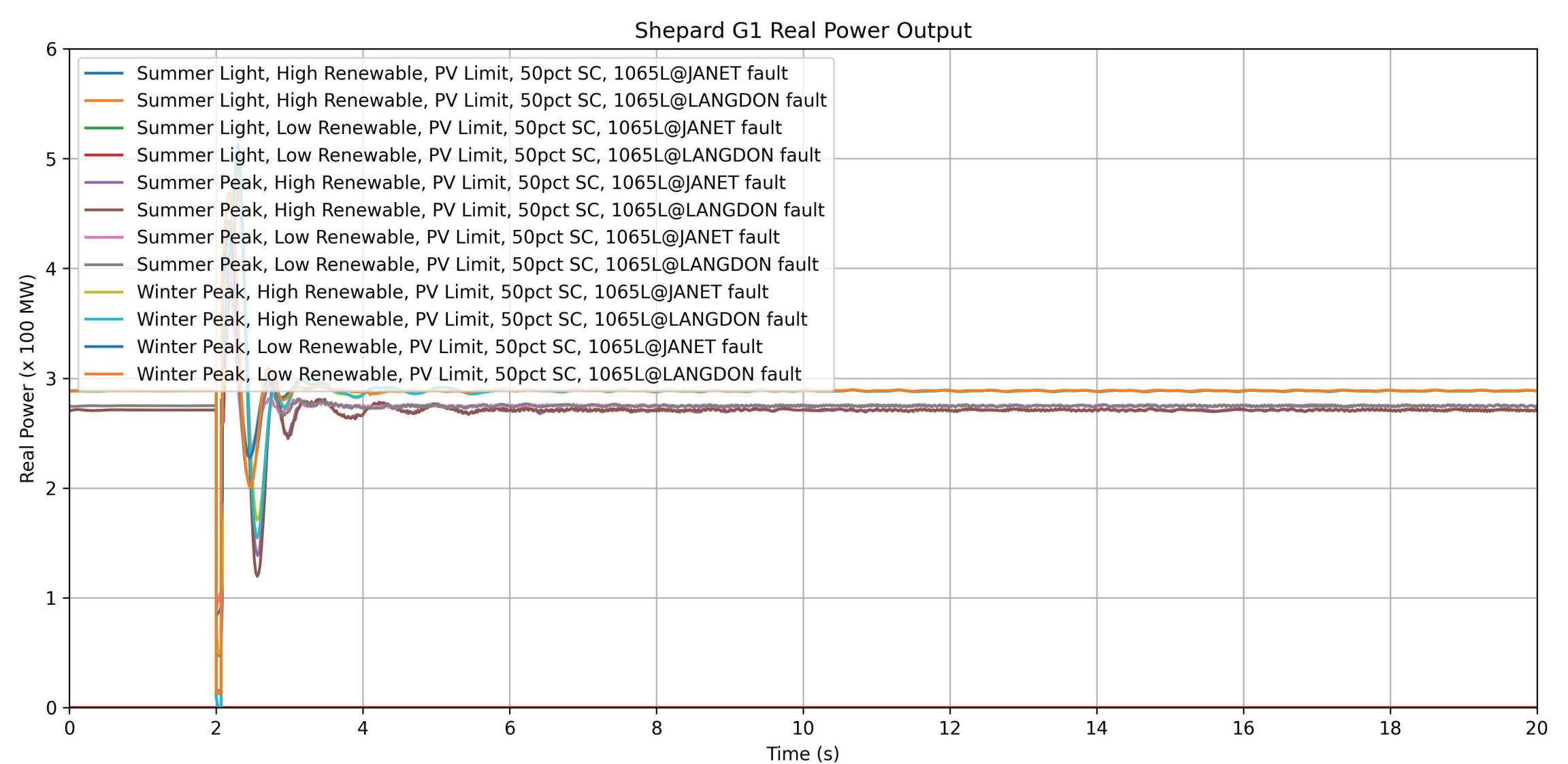

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

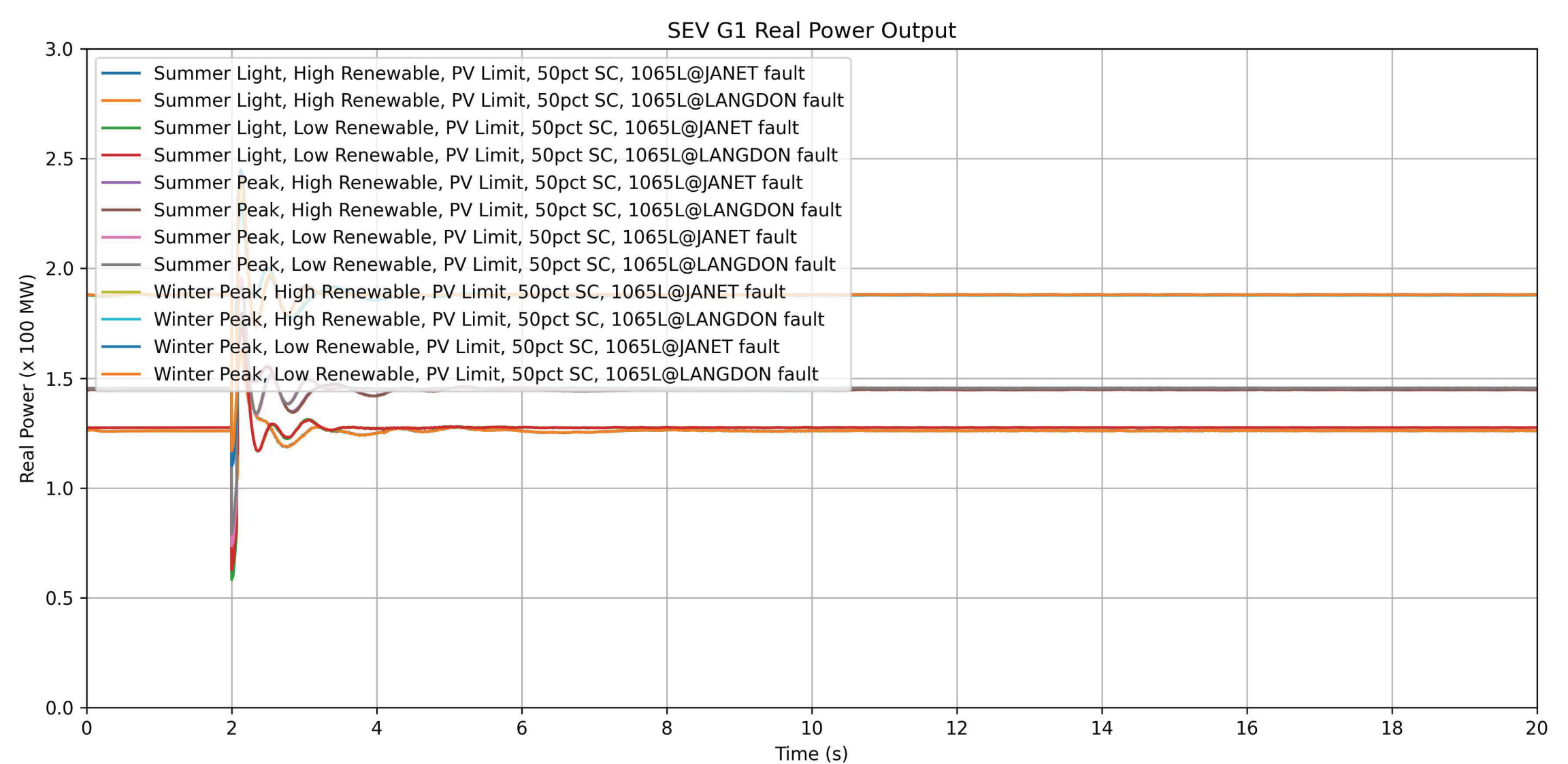

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

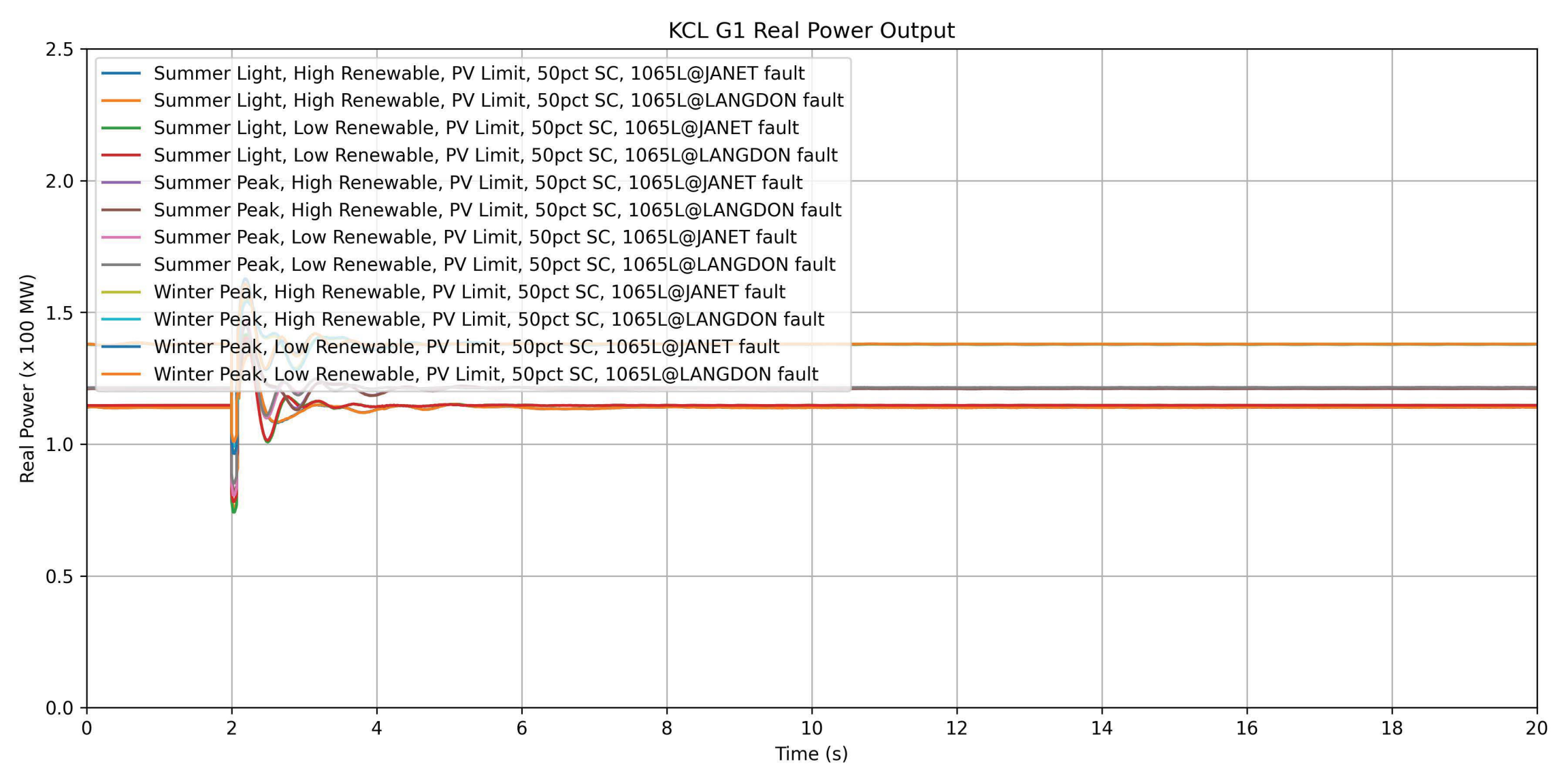

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

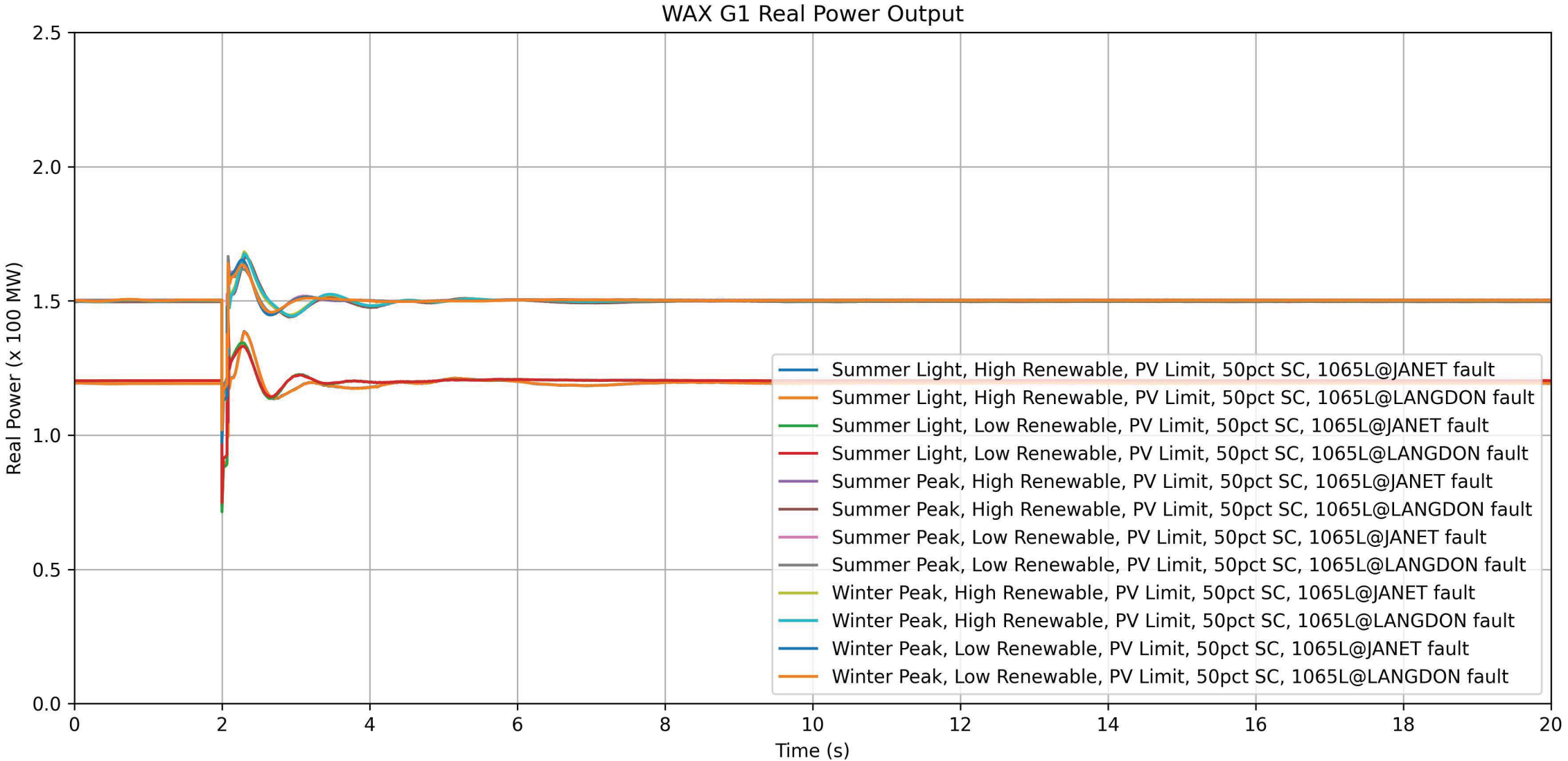

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

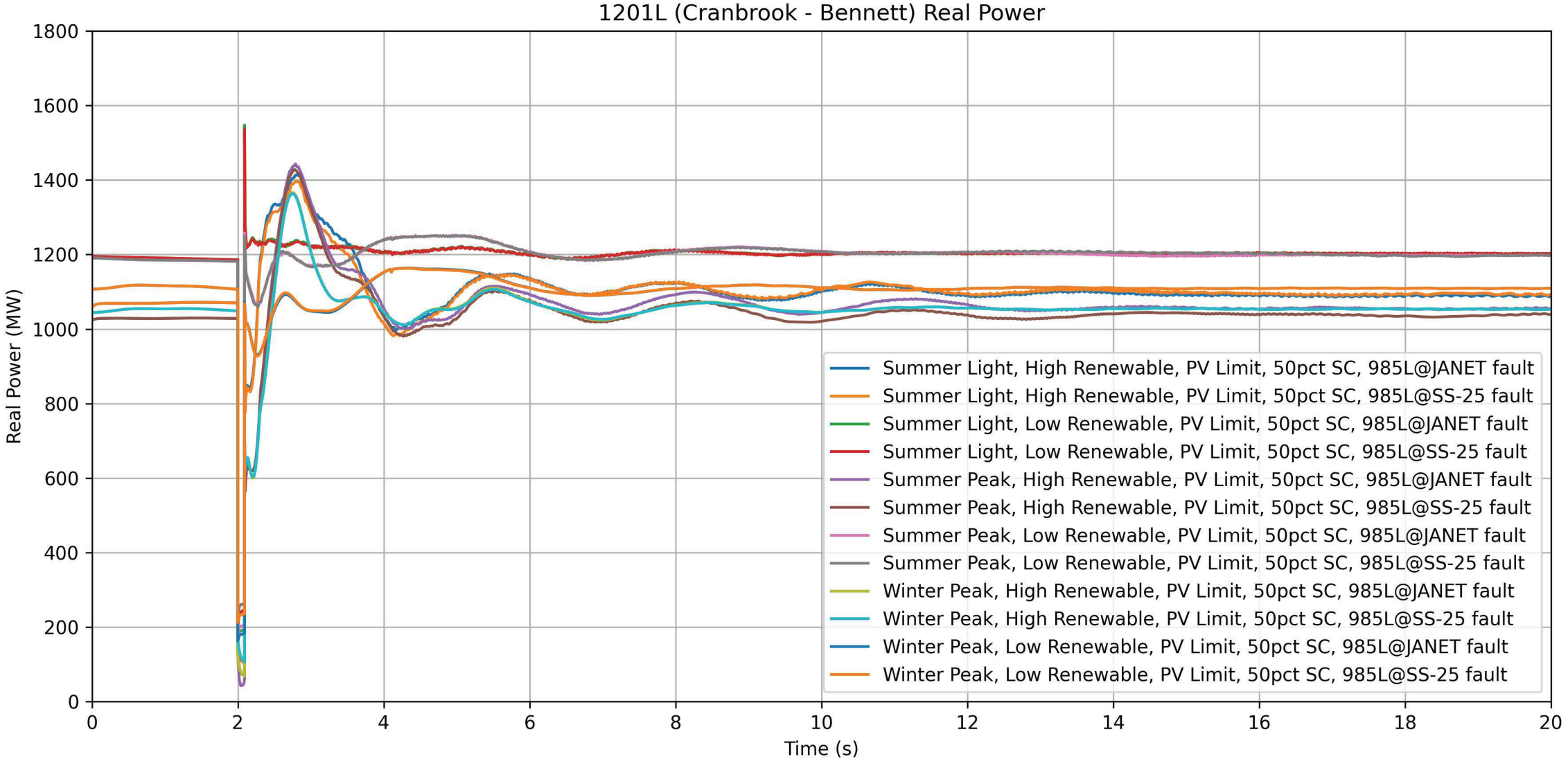

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

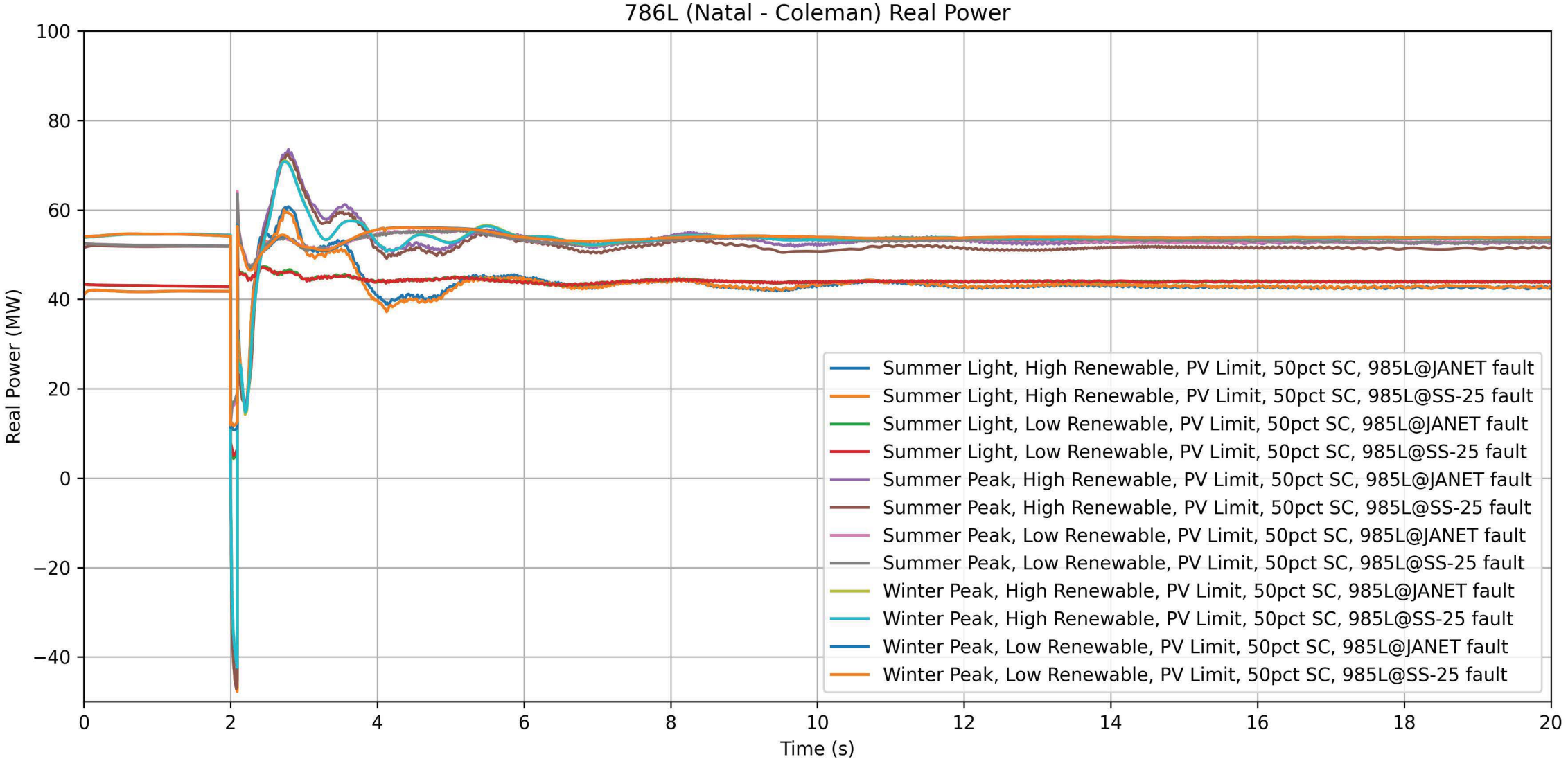

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

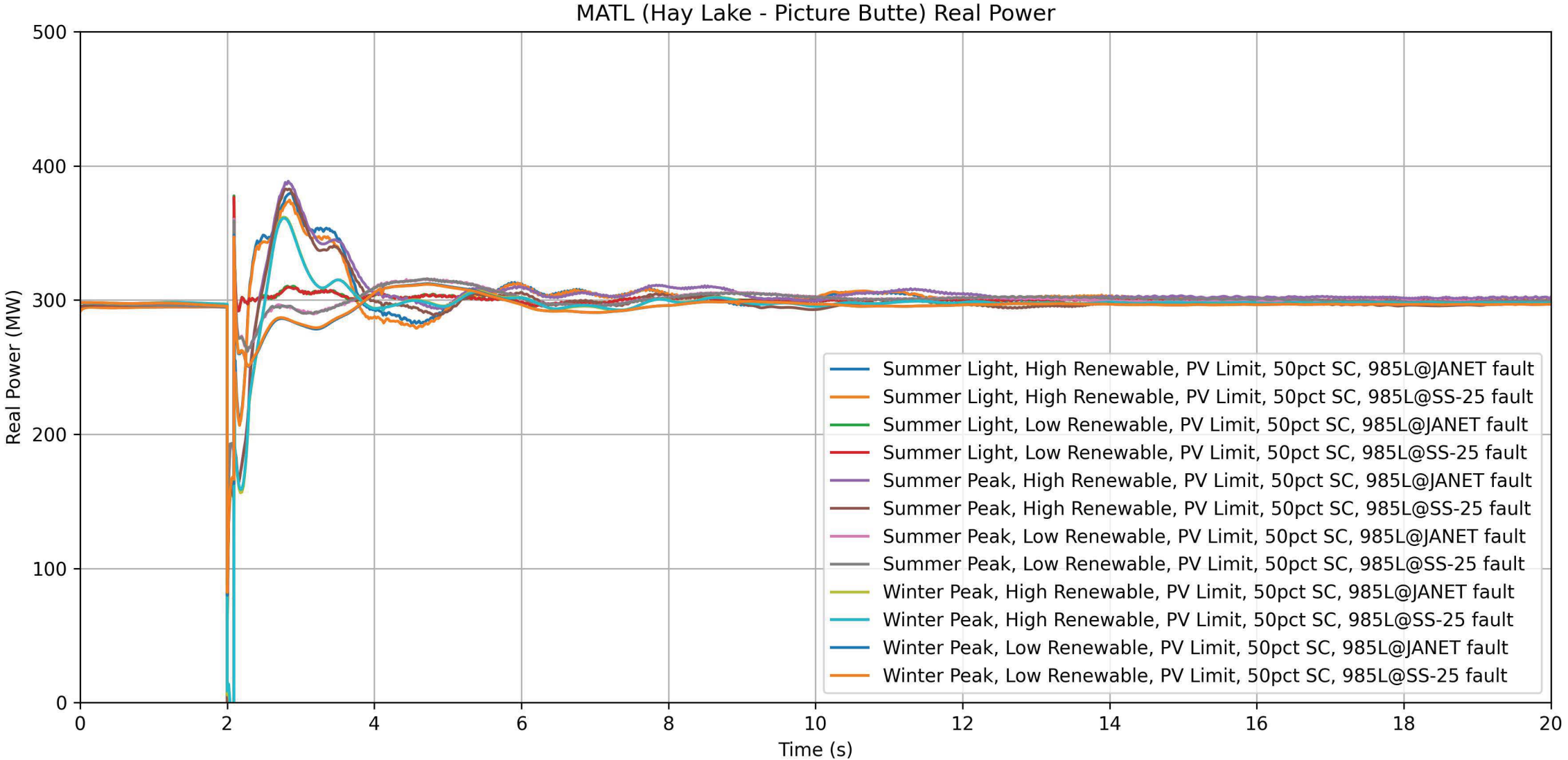

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

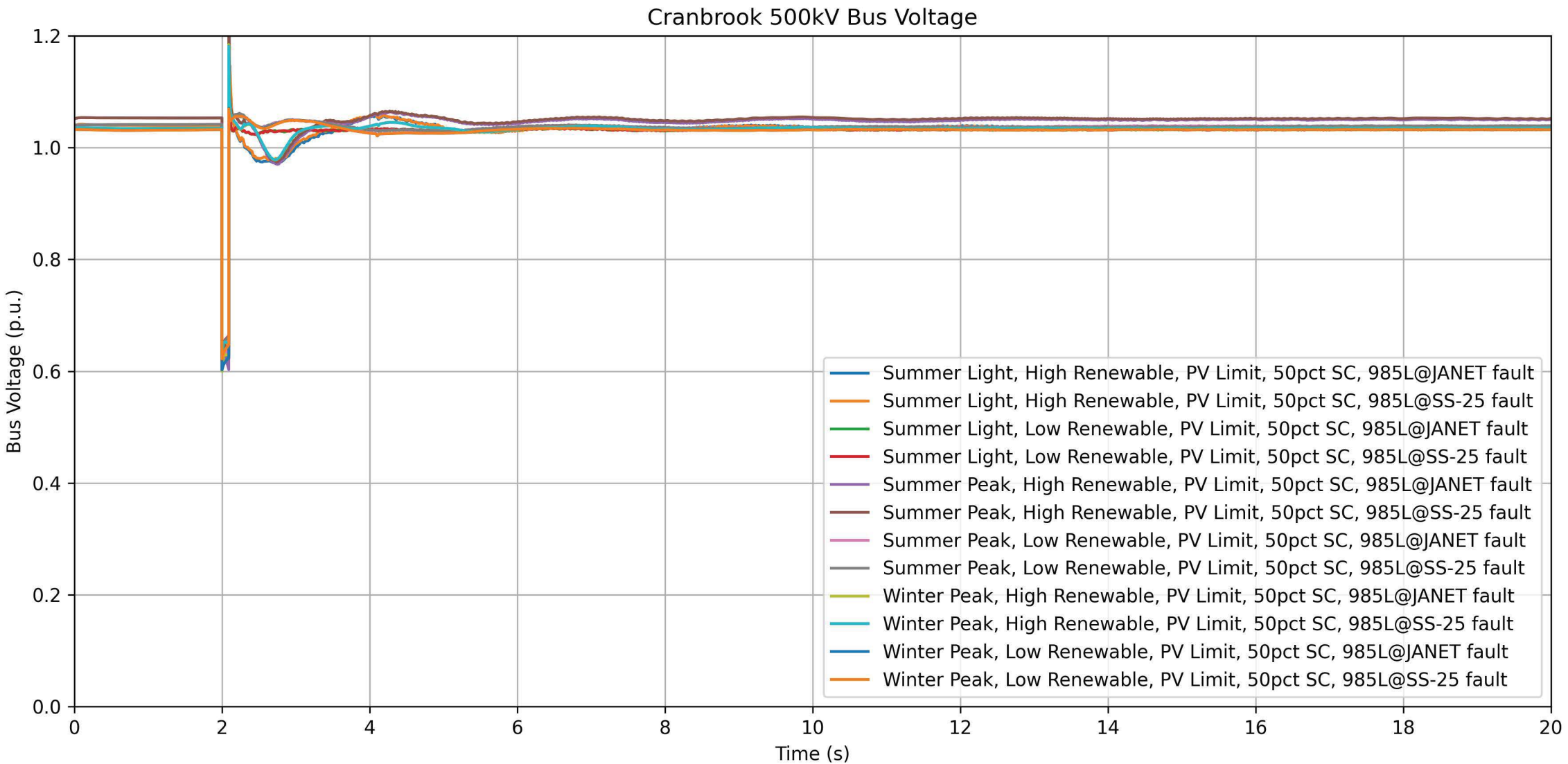

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

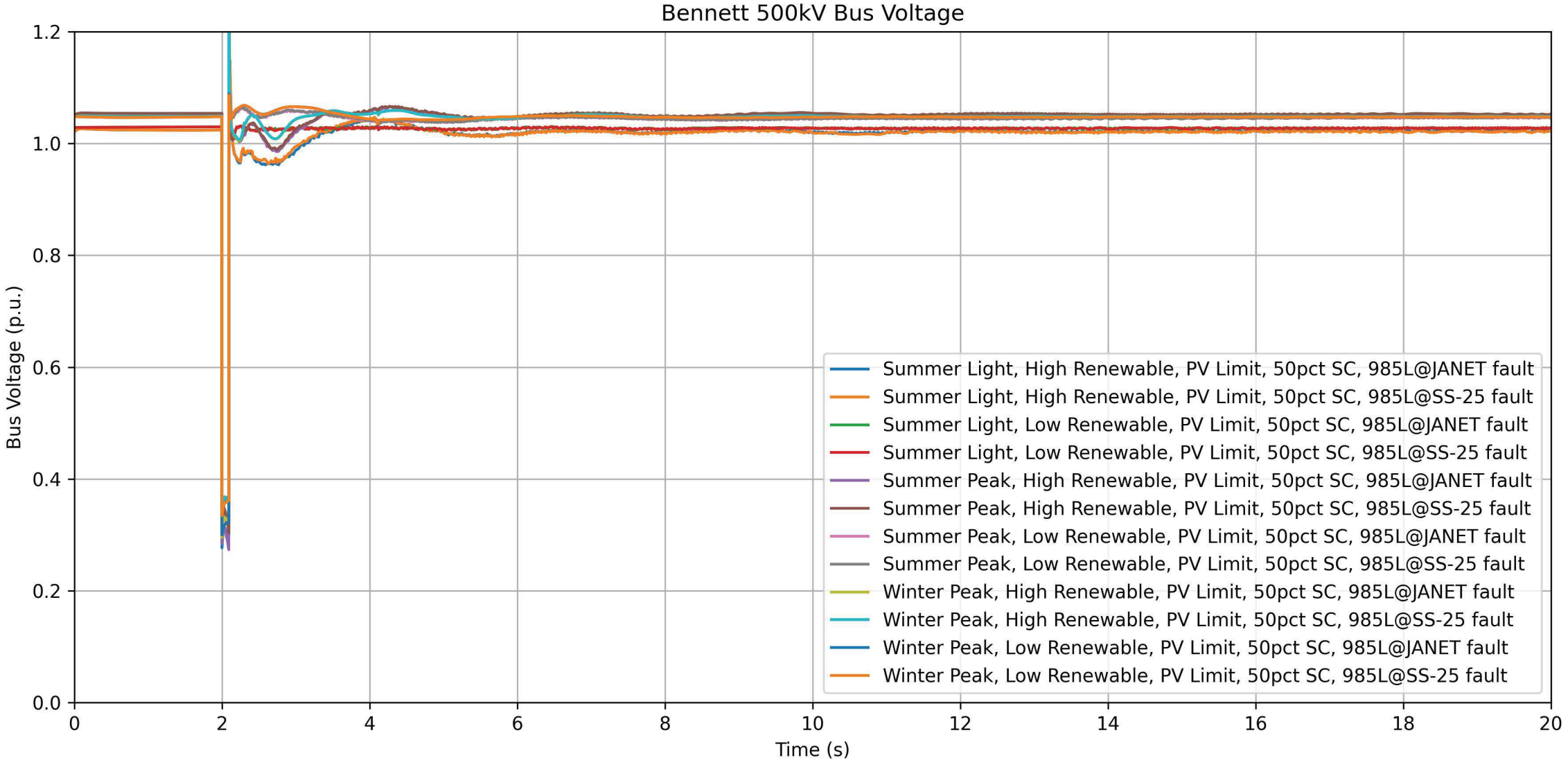

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1065L@LANGDON fault

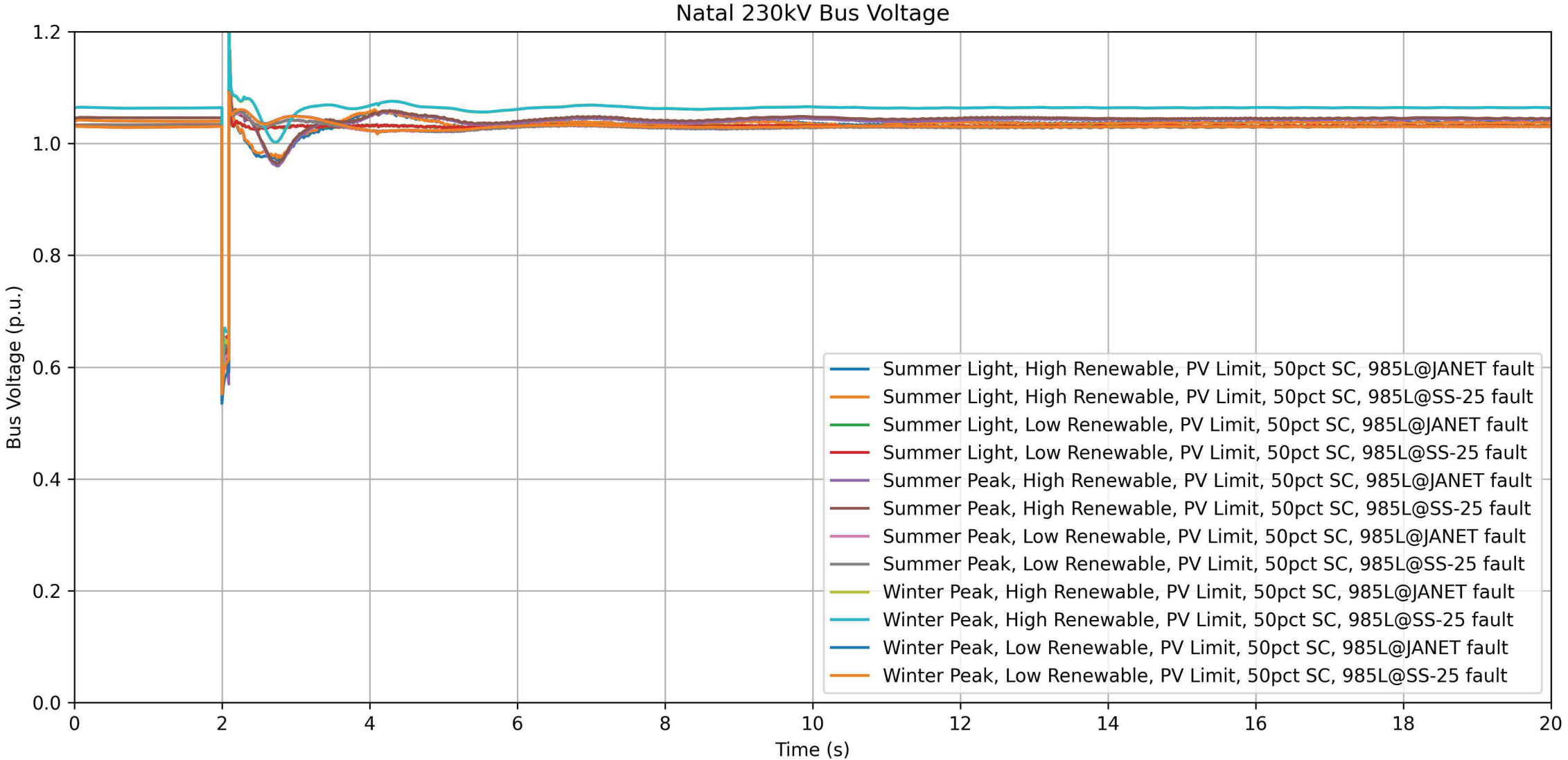

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

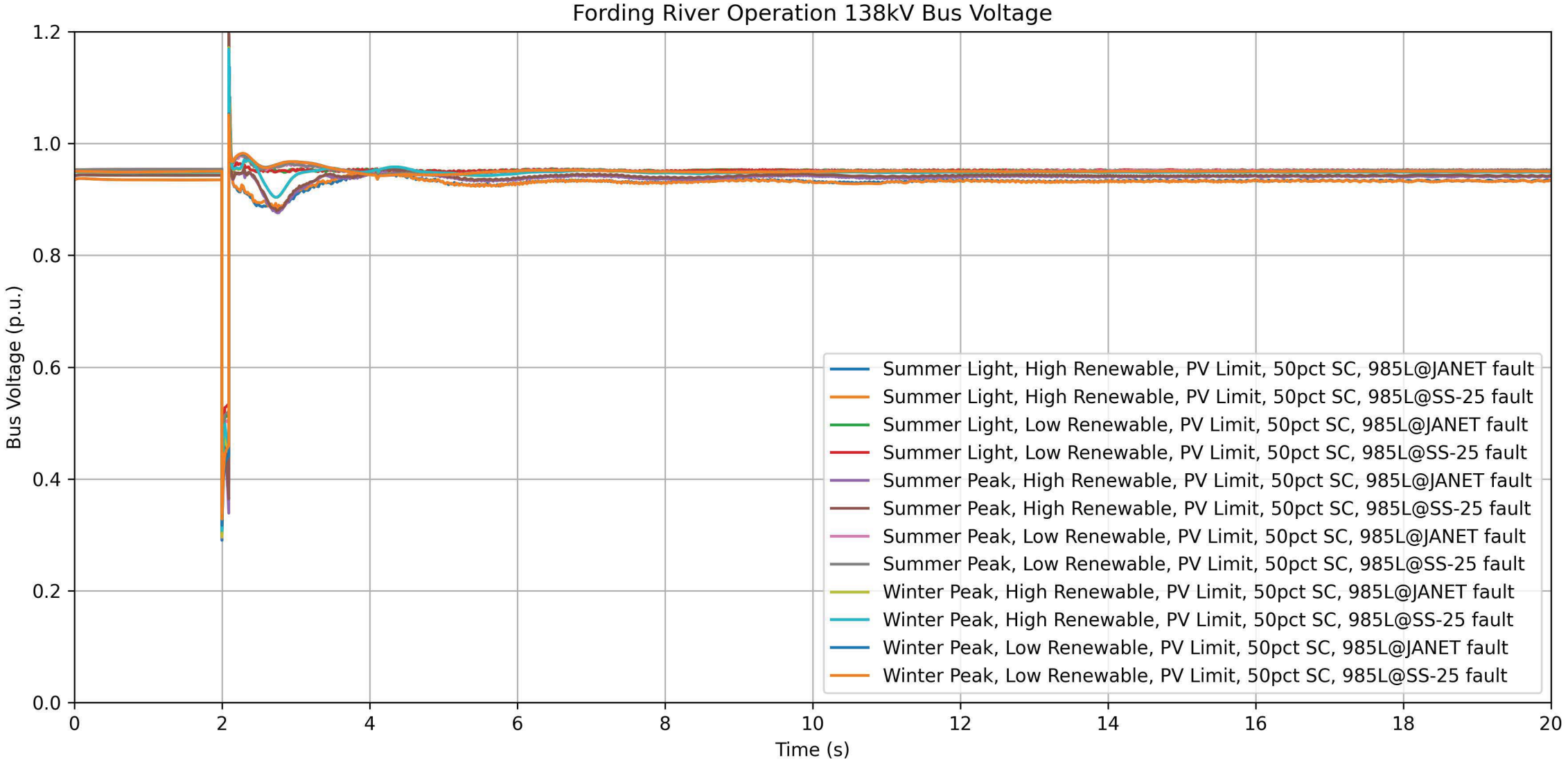

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

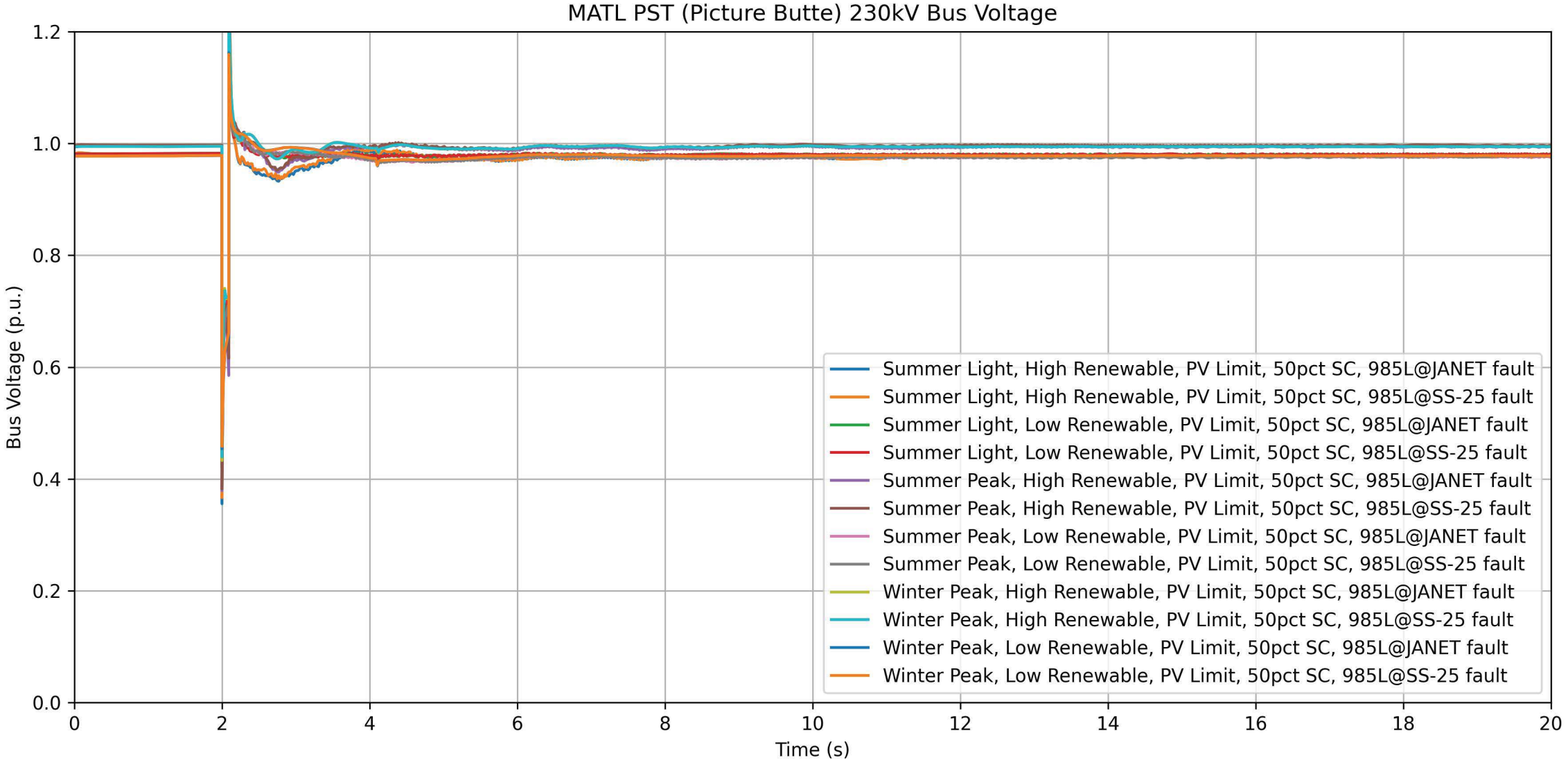

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

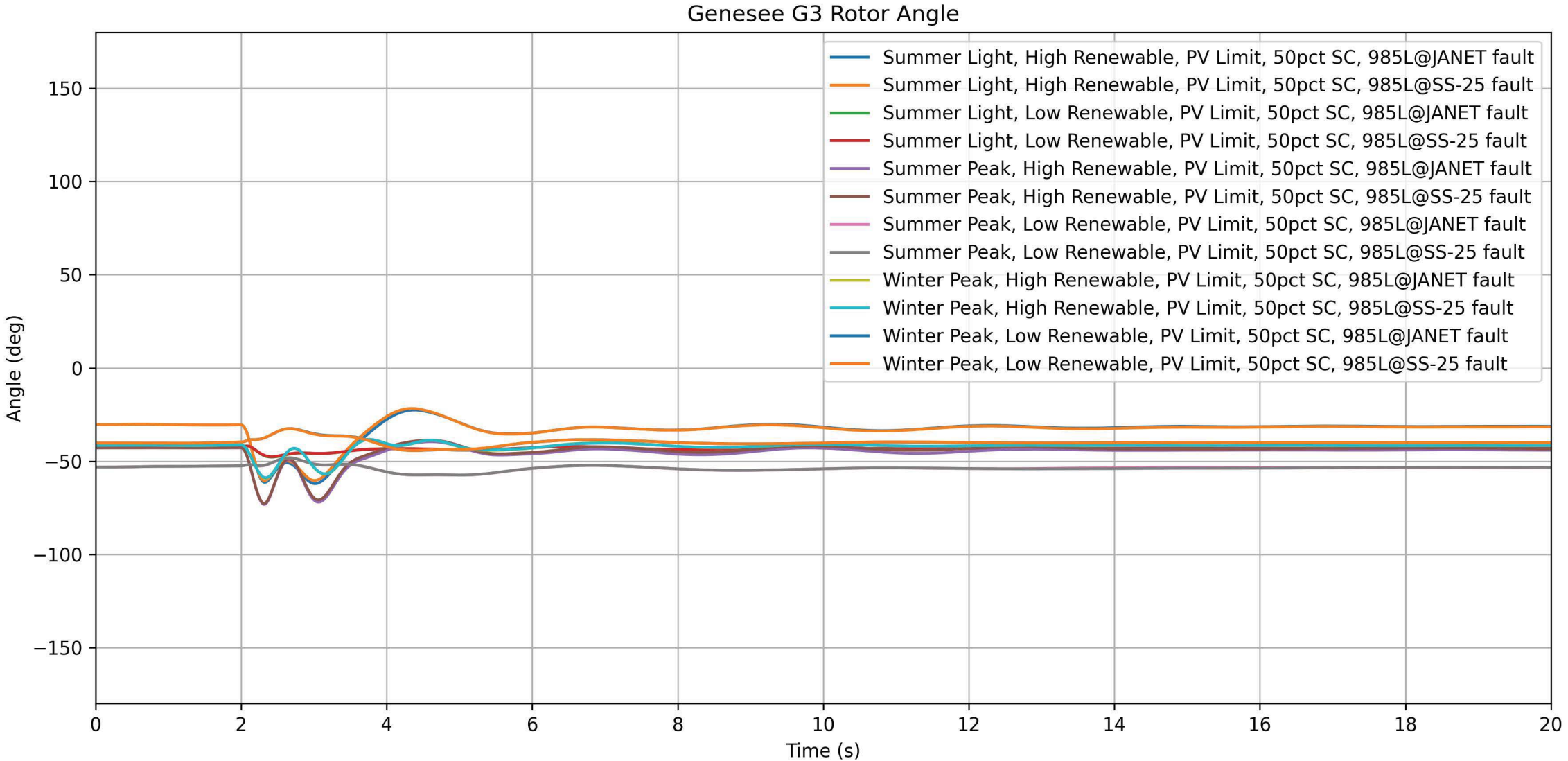

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

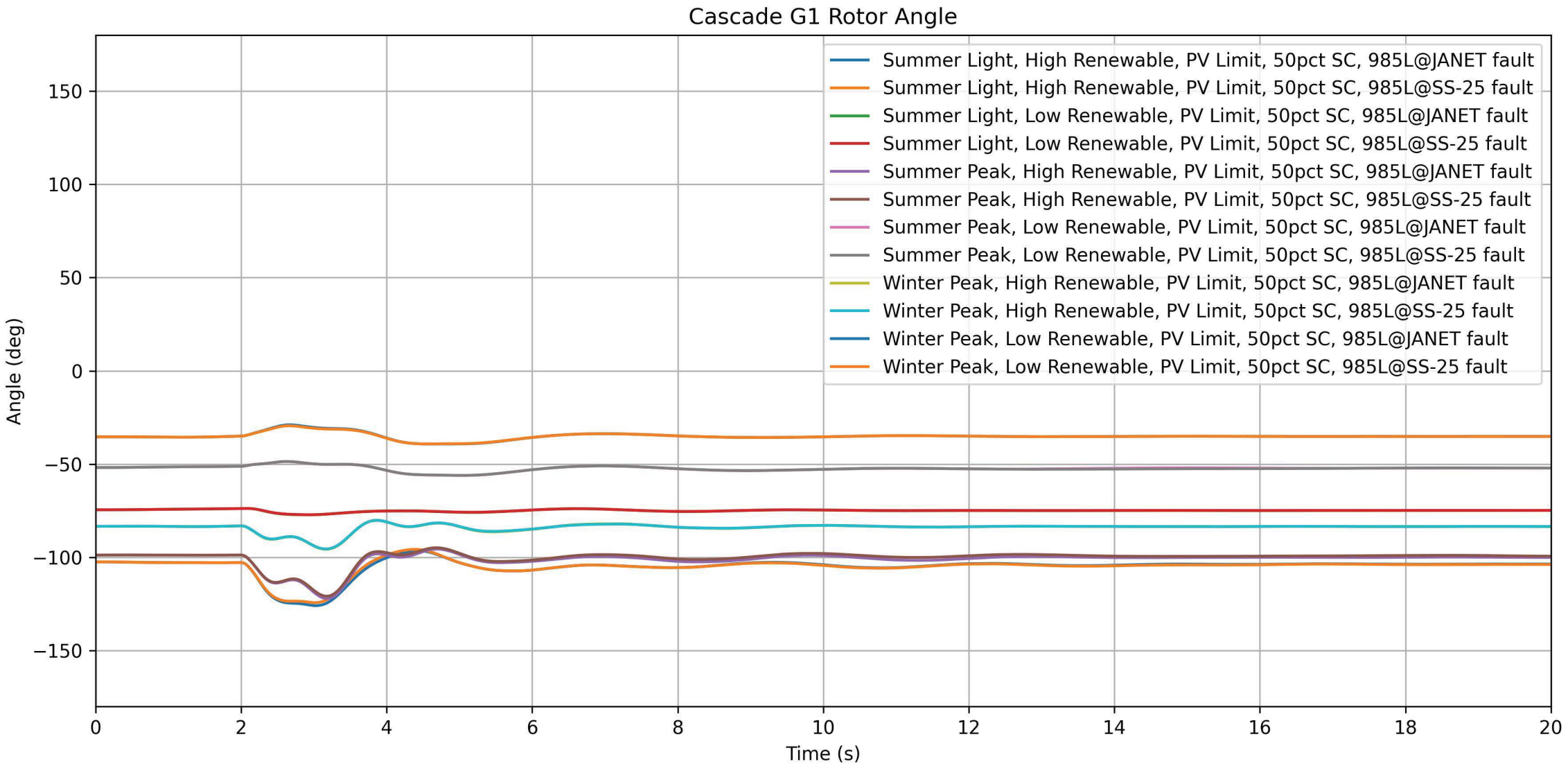

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

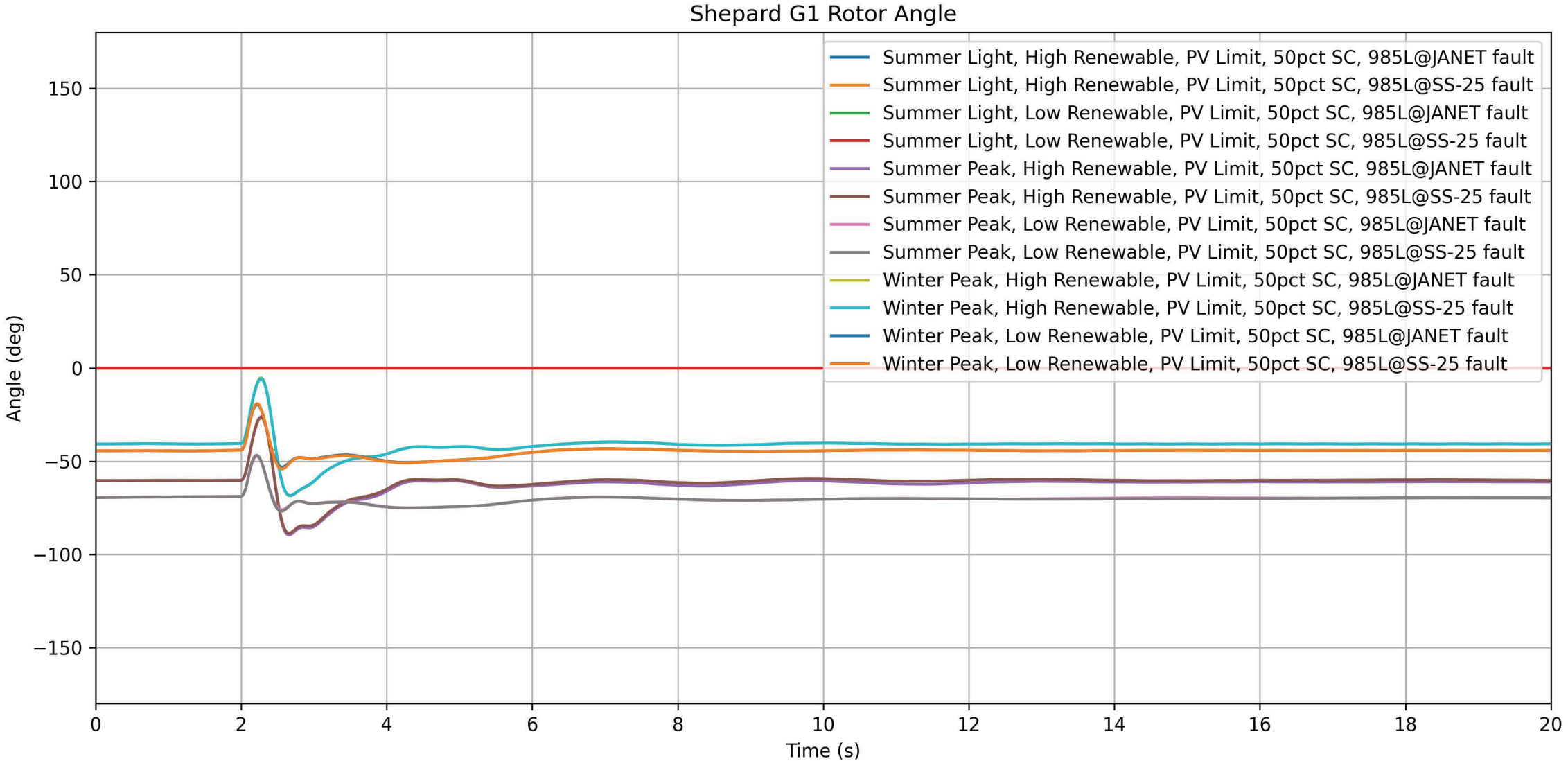

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

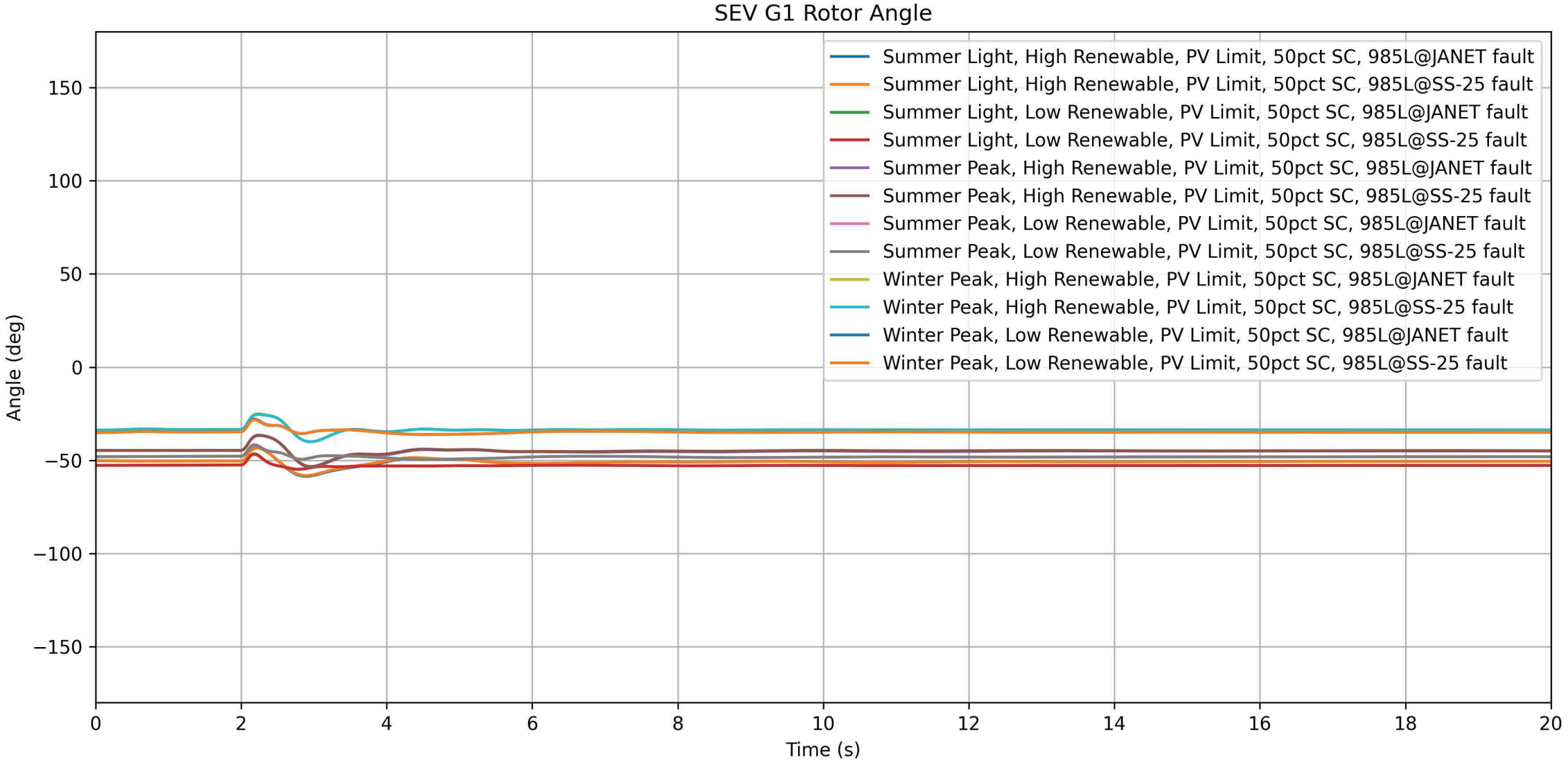

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

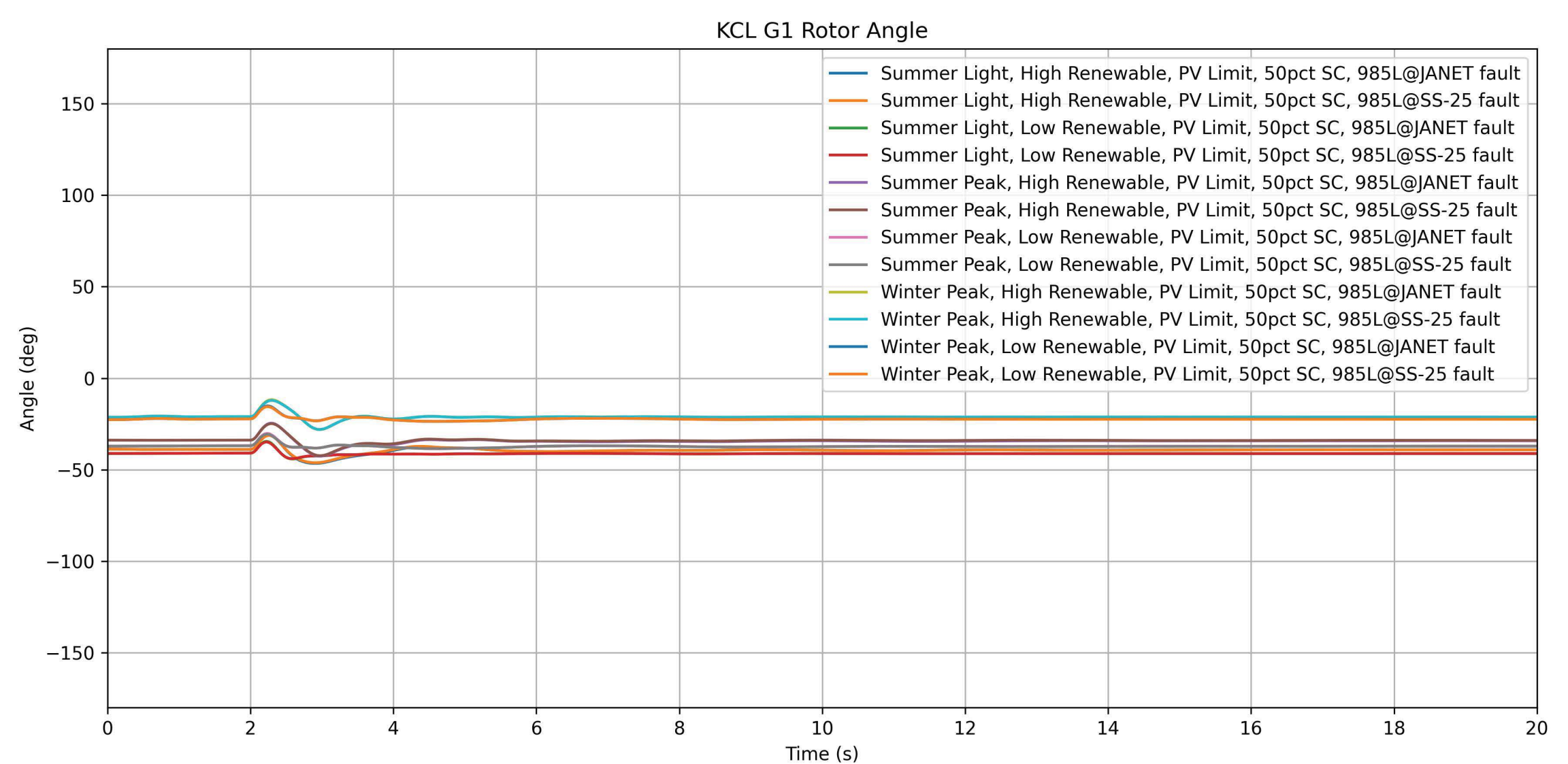

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

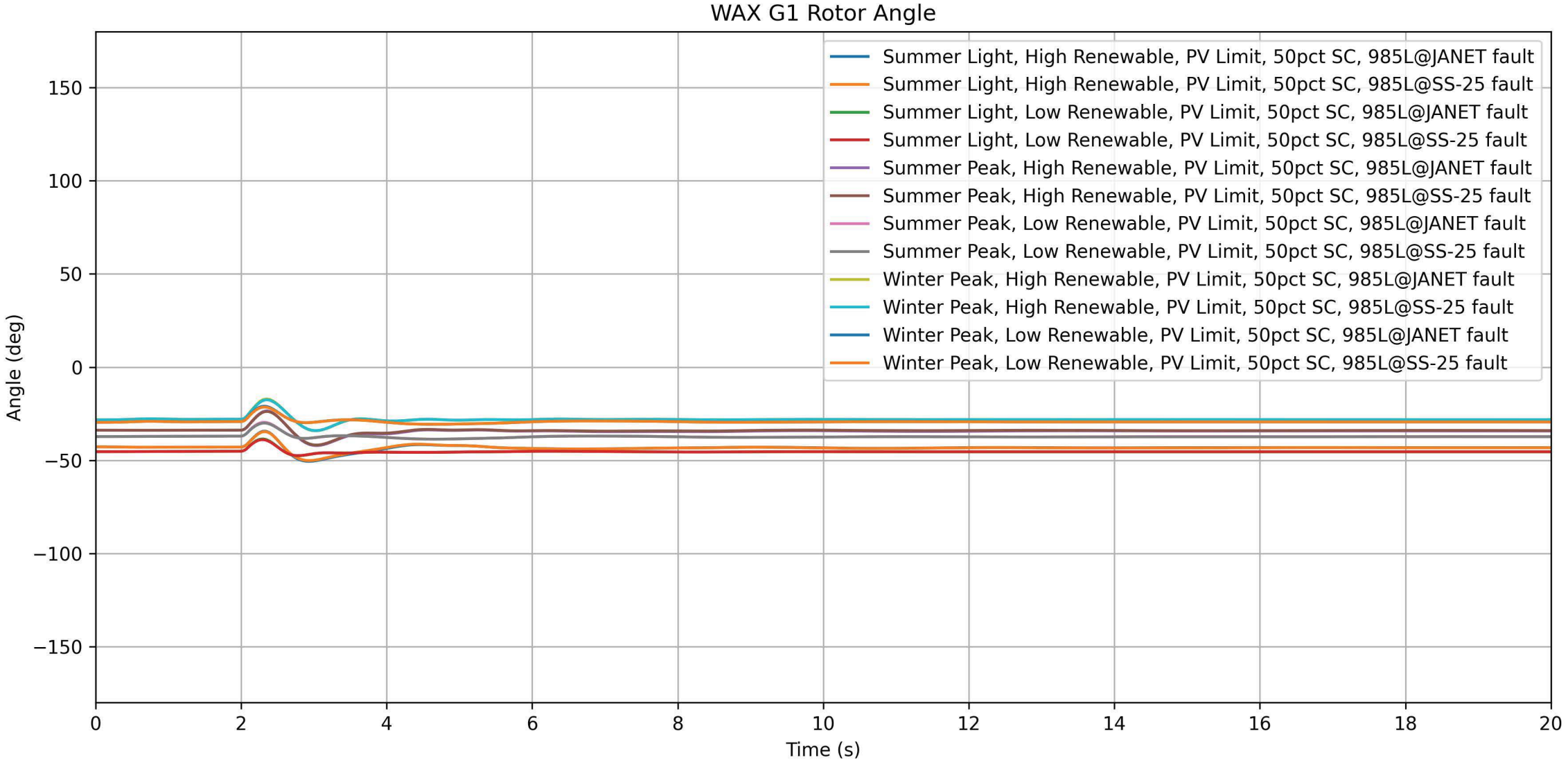

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

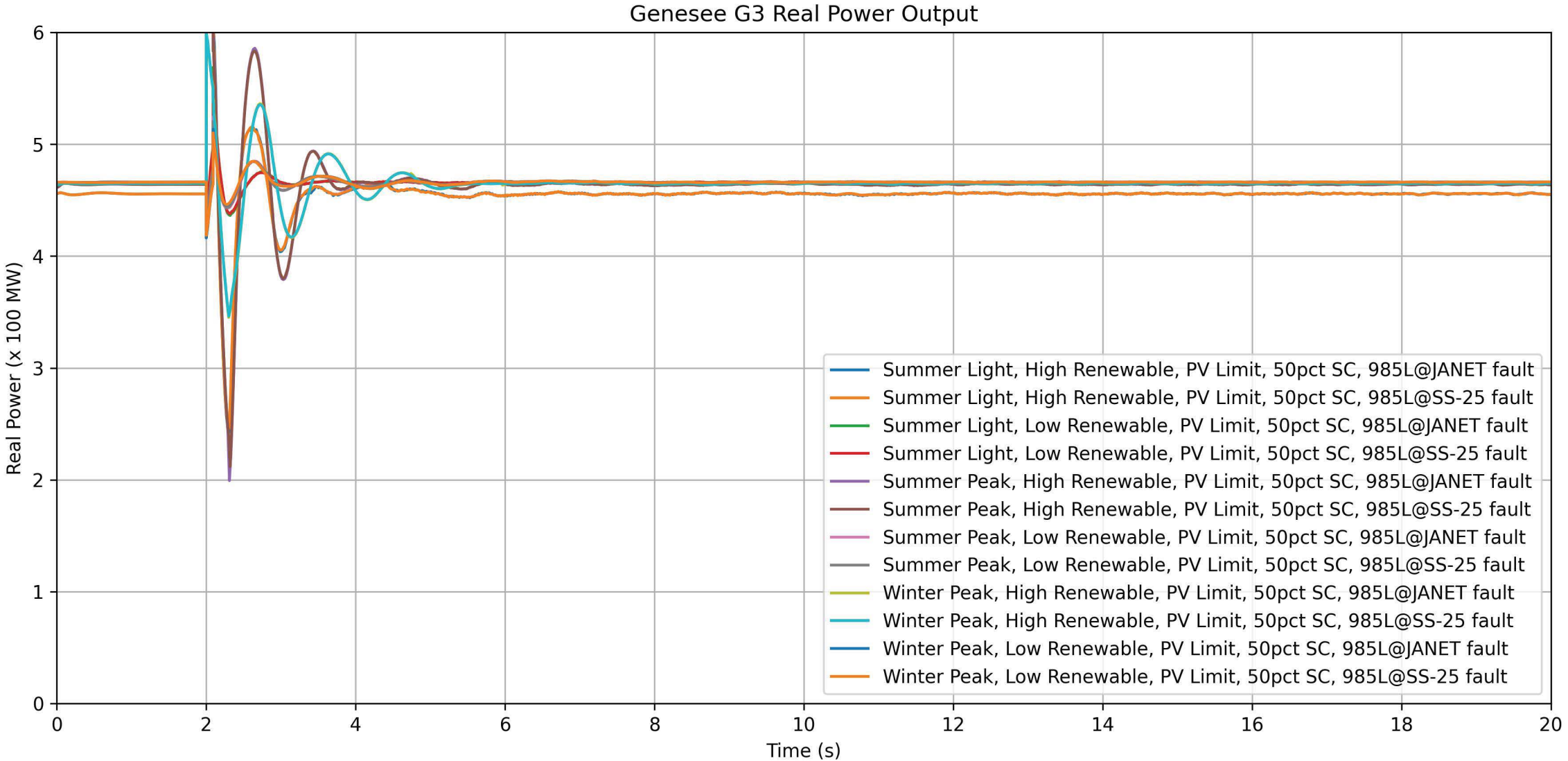

Cascade G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

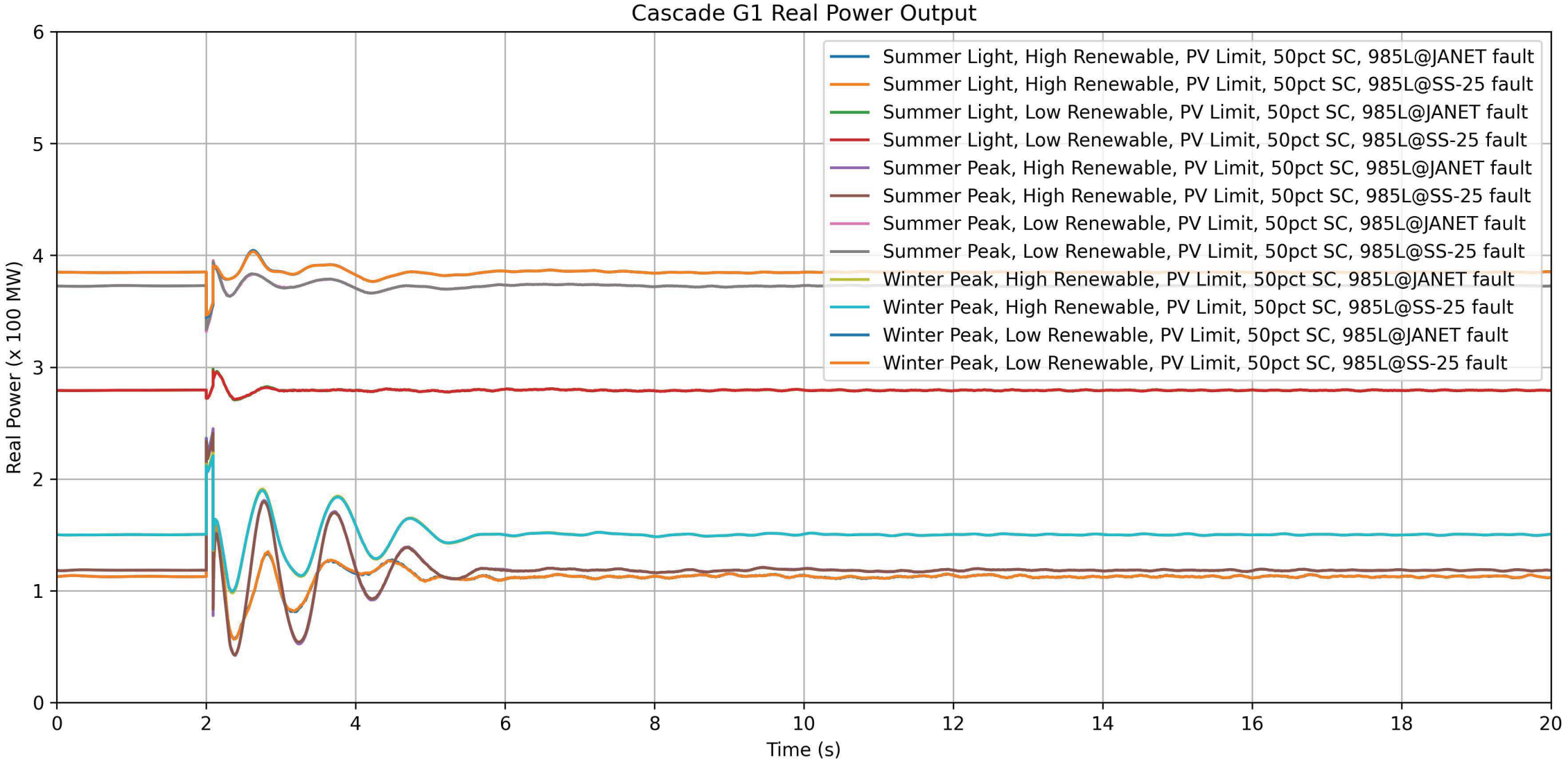

Shepard G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

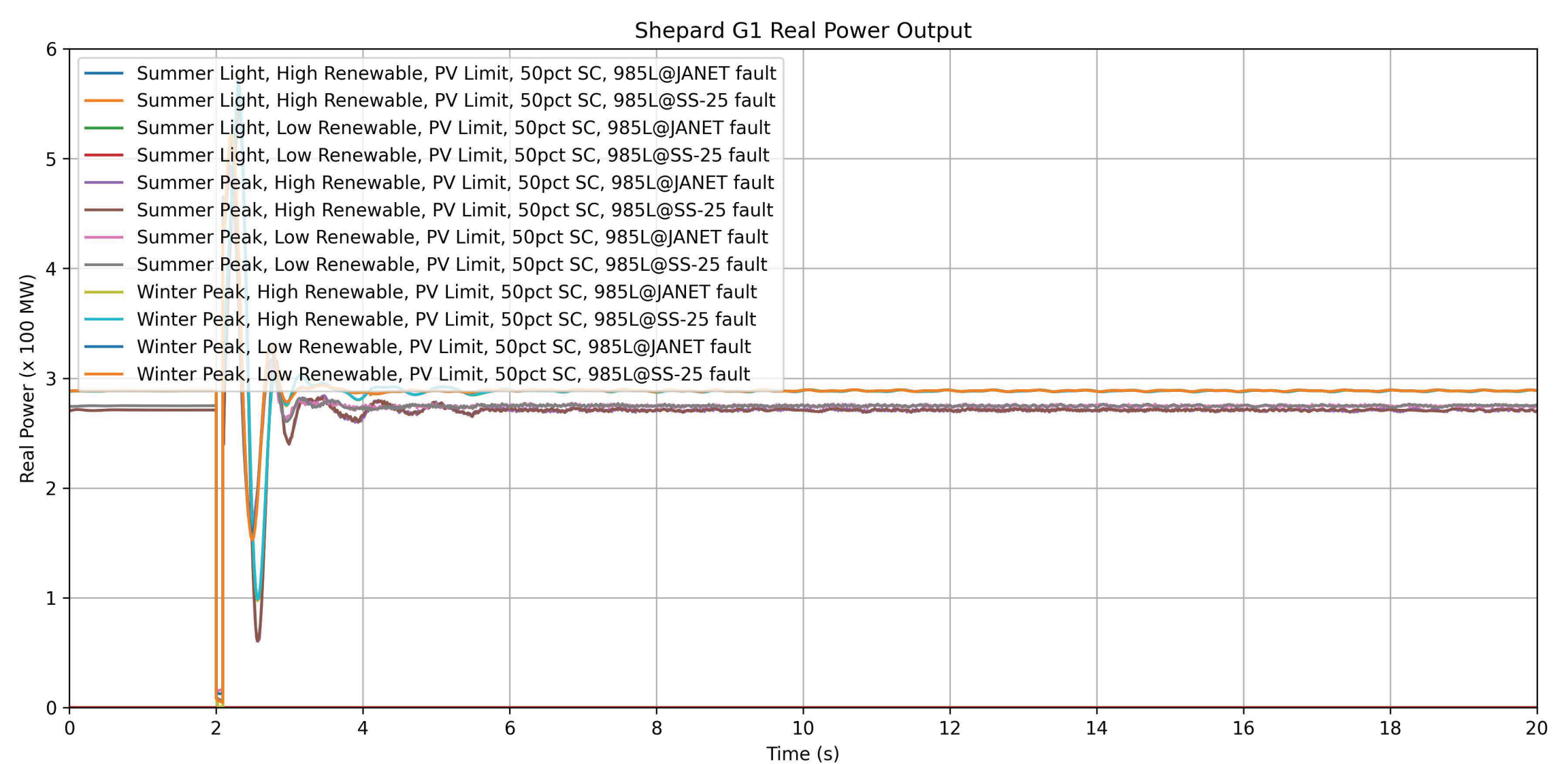

SEV G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

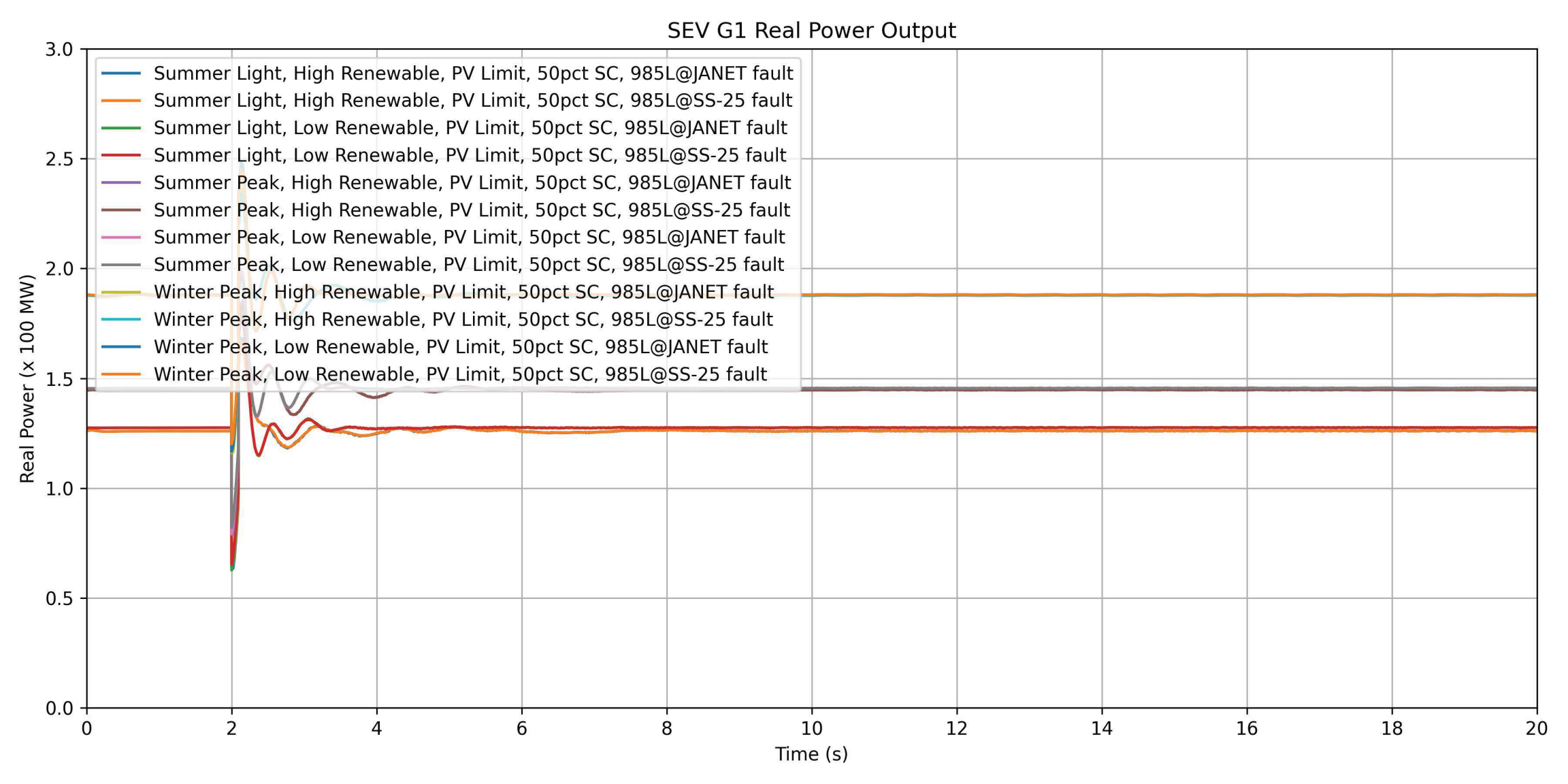

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

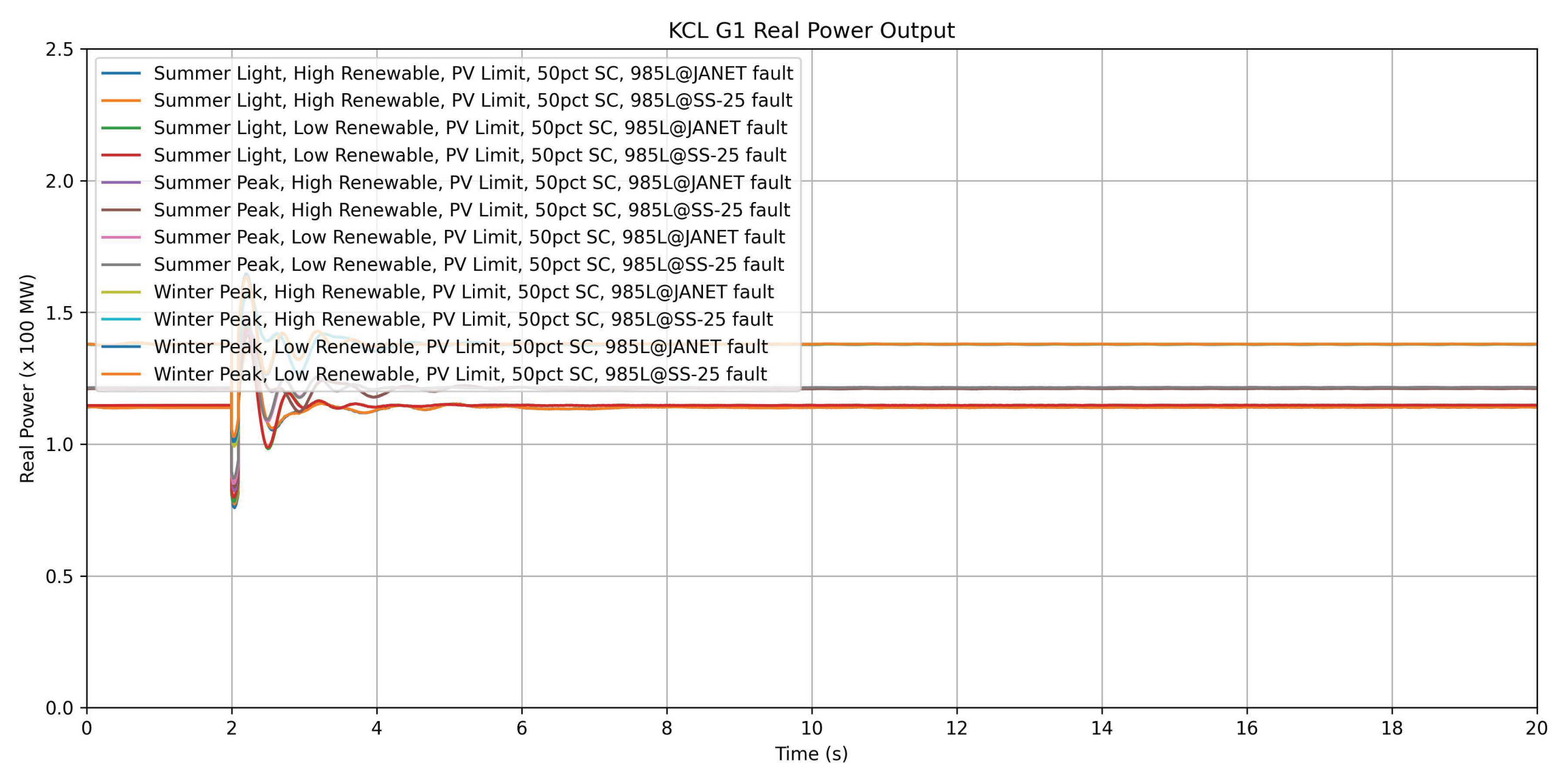

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

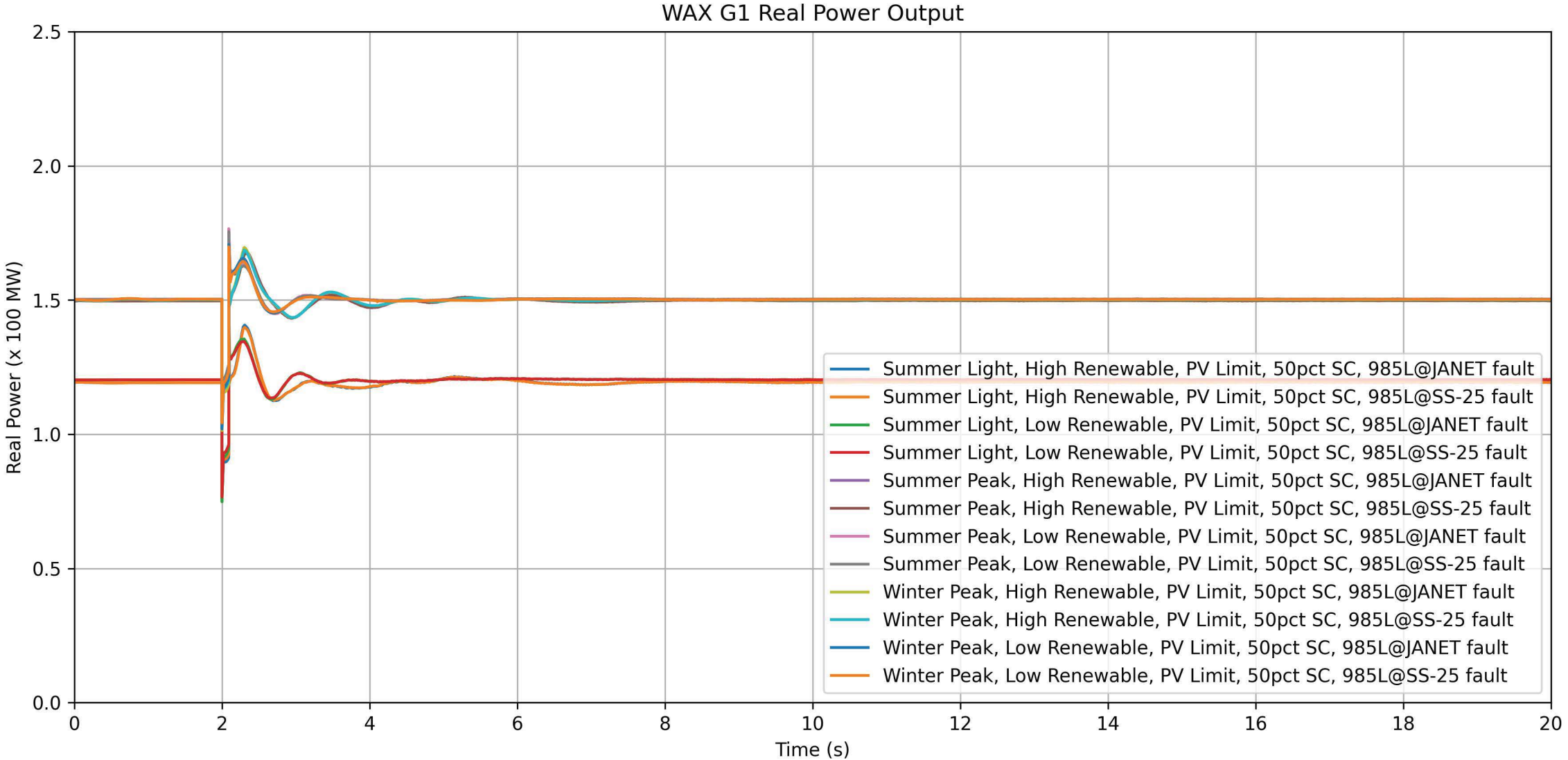

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

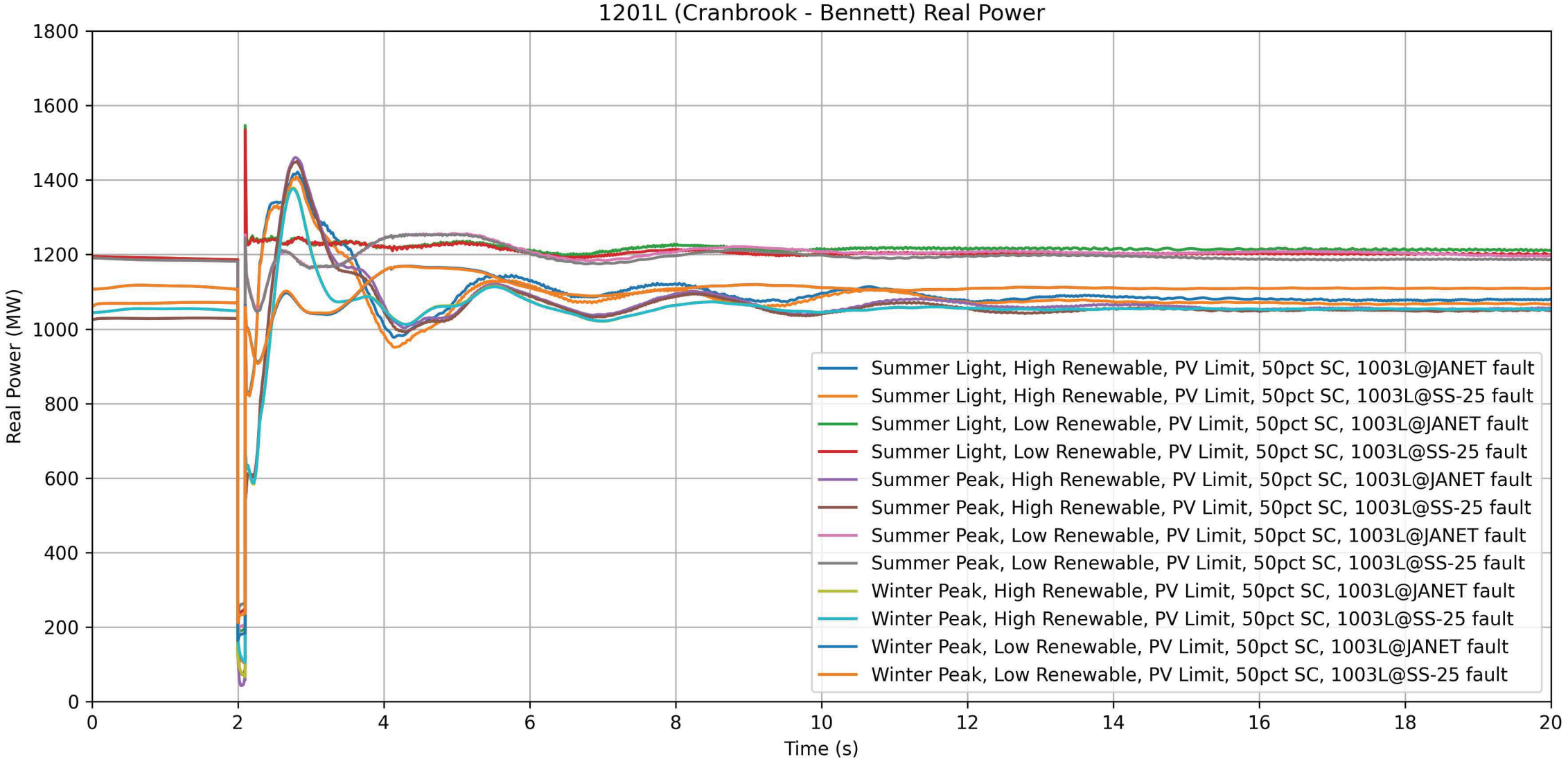

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

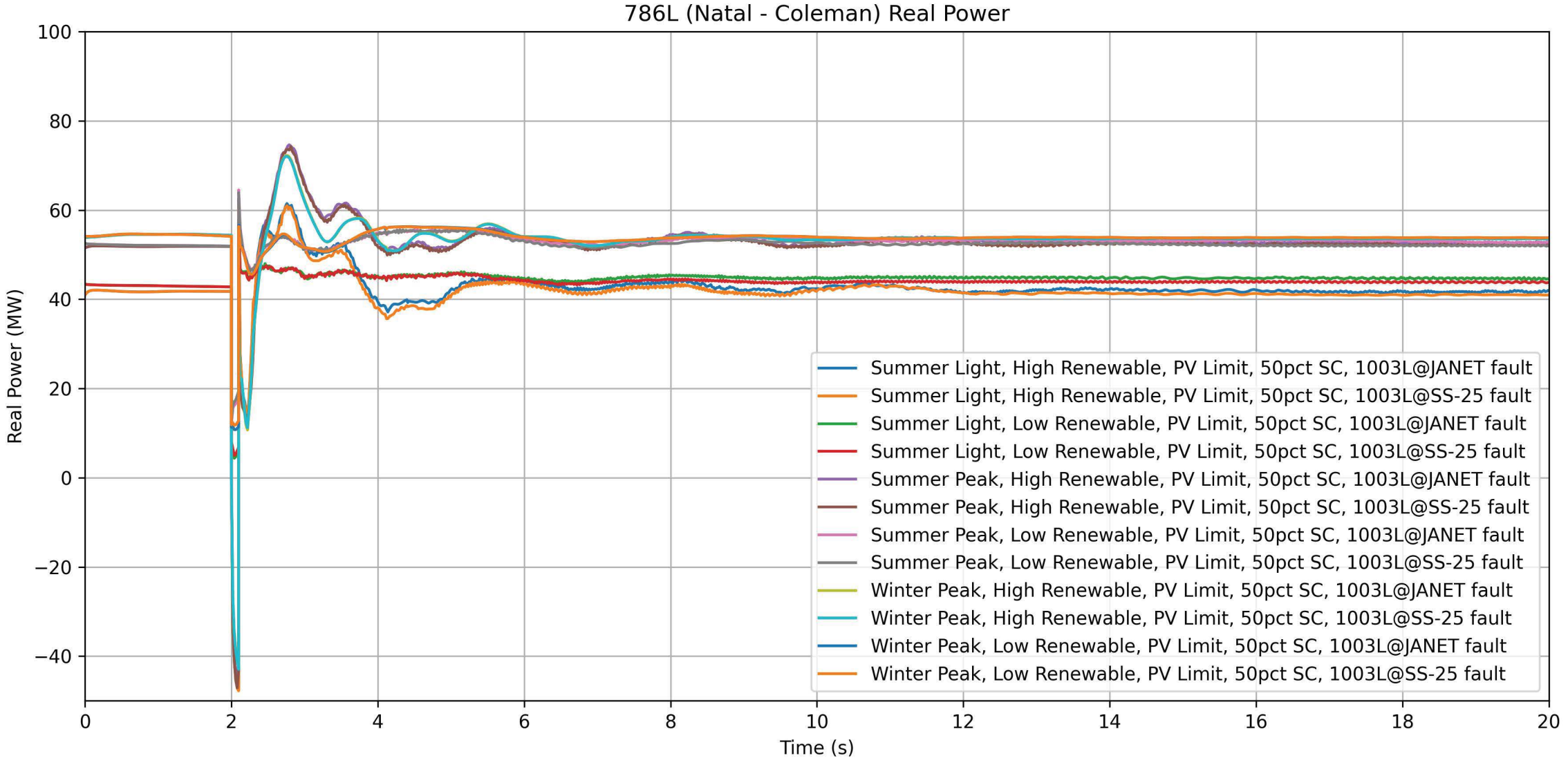

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

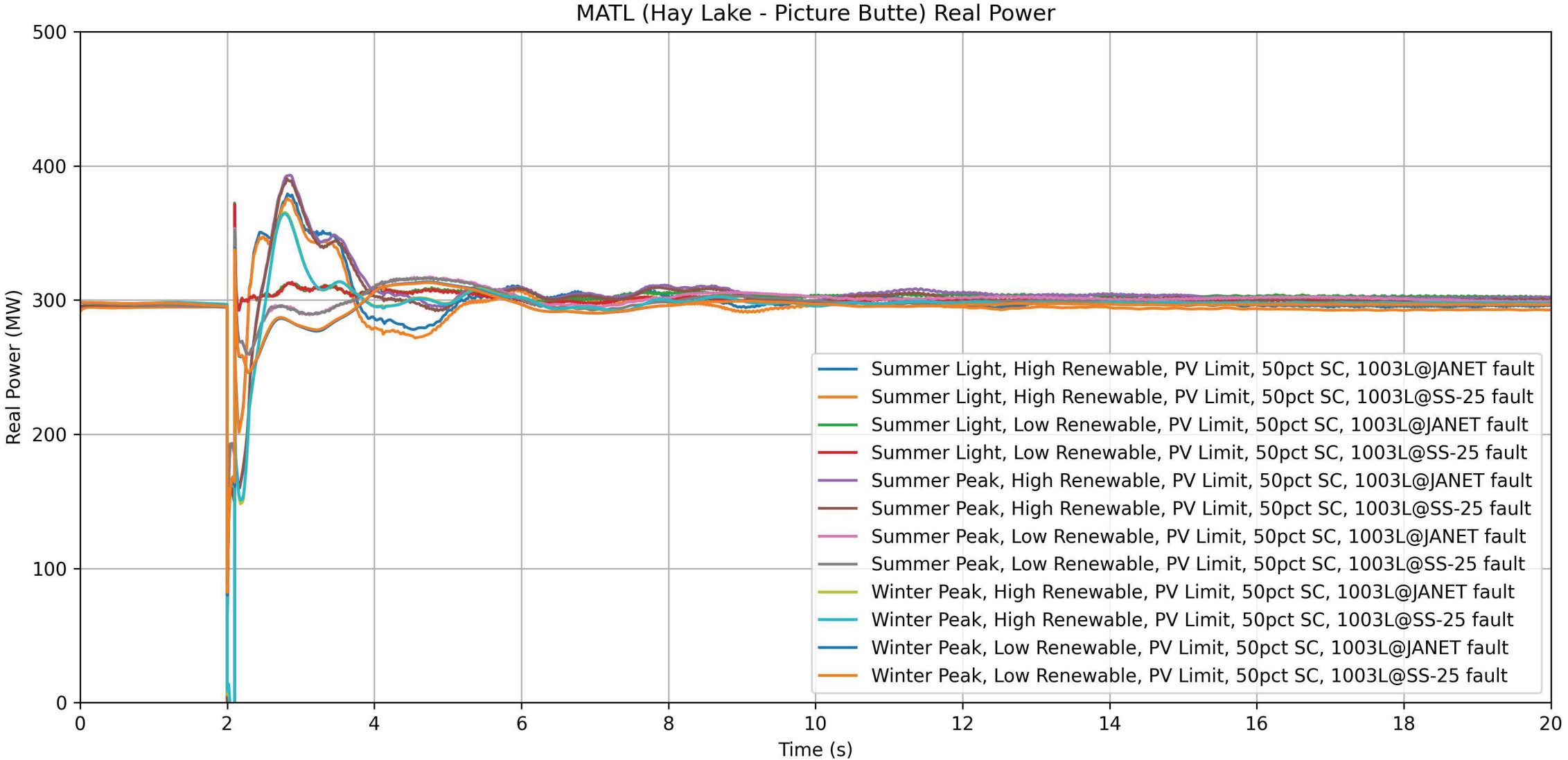

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

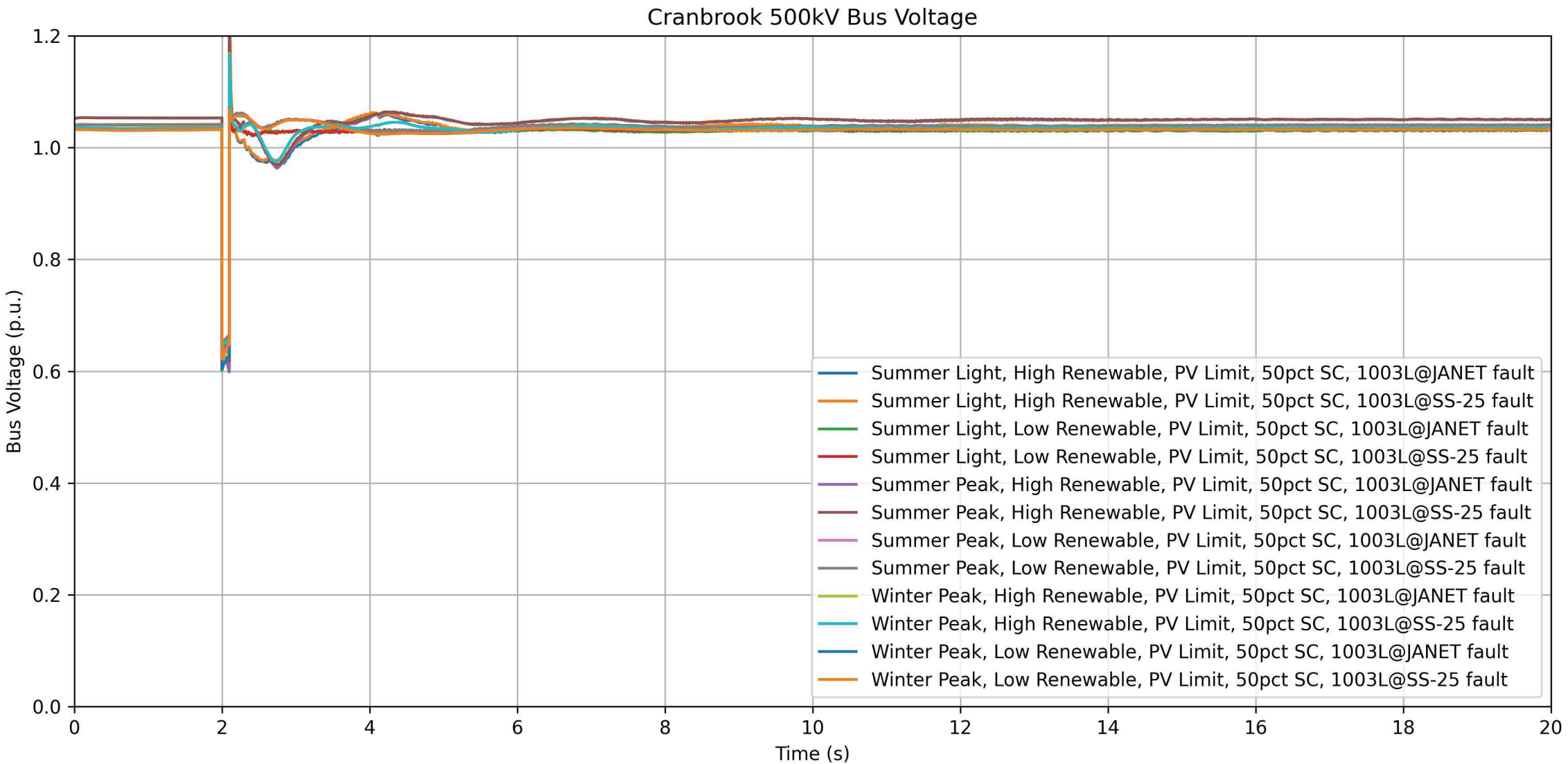

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

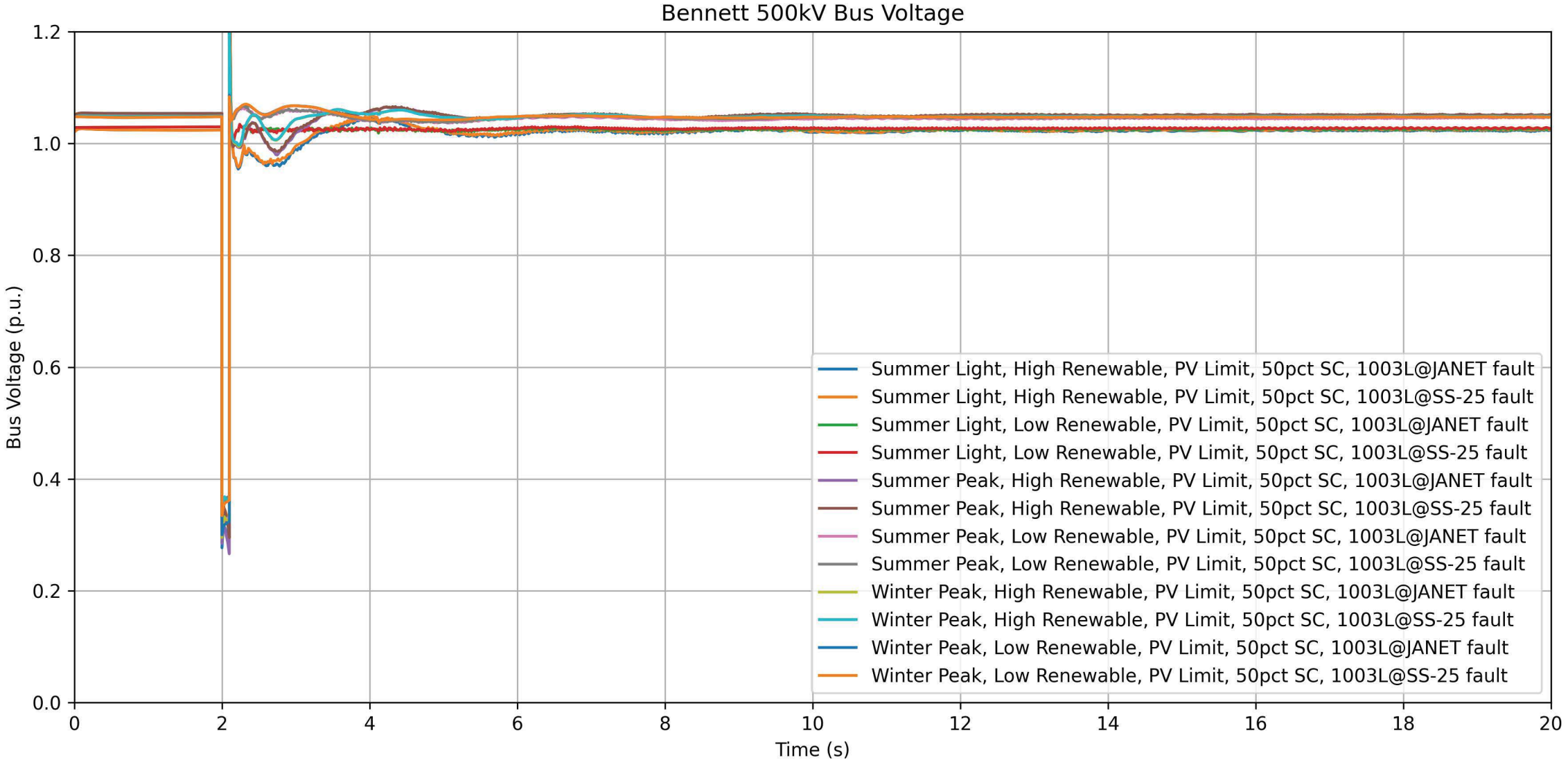

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 985L@SS-25 fault

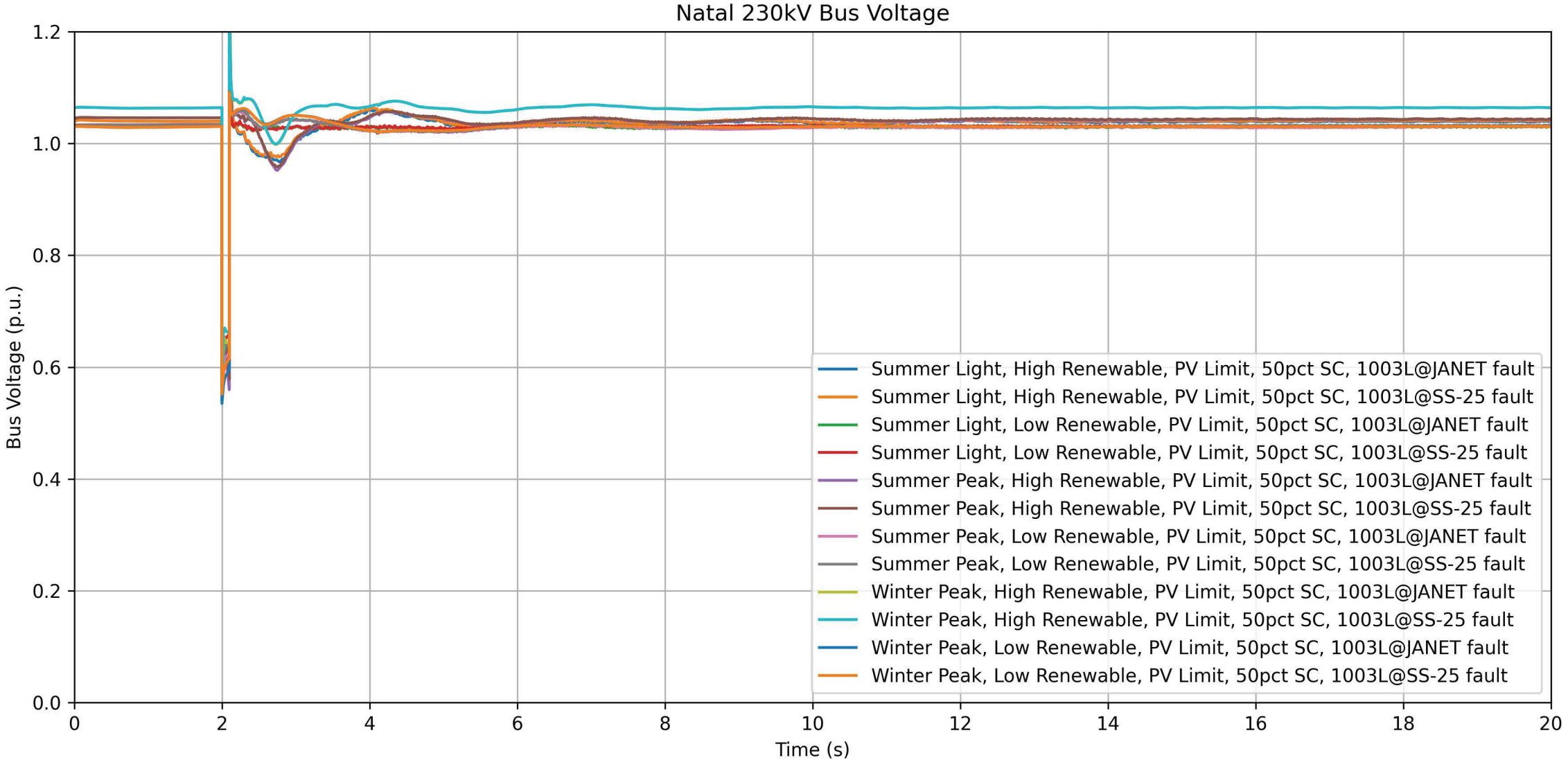

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

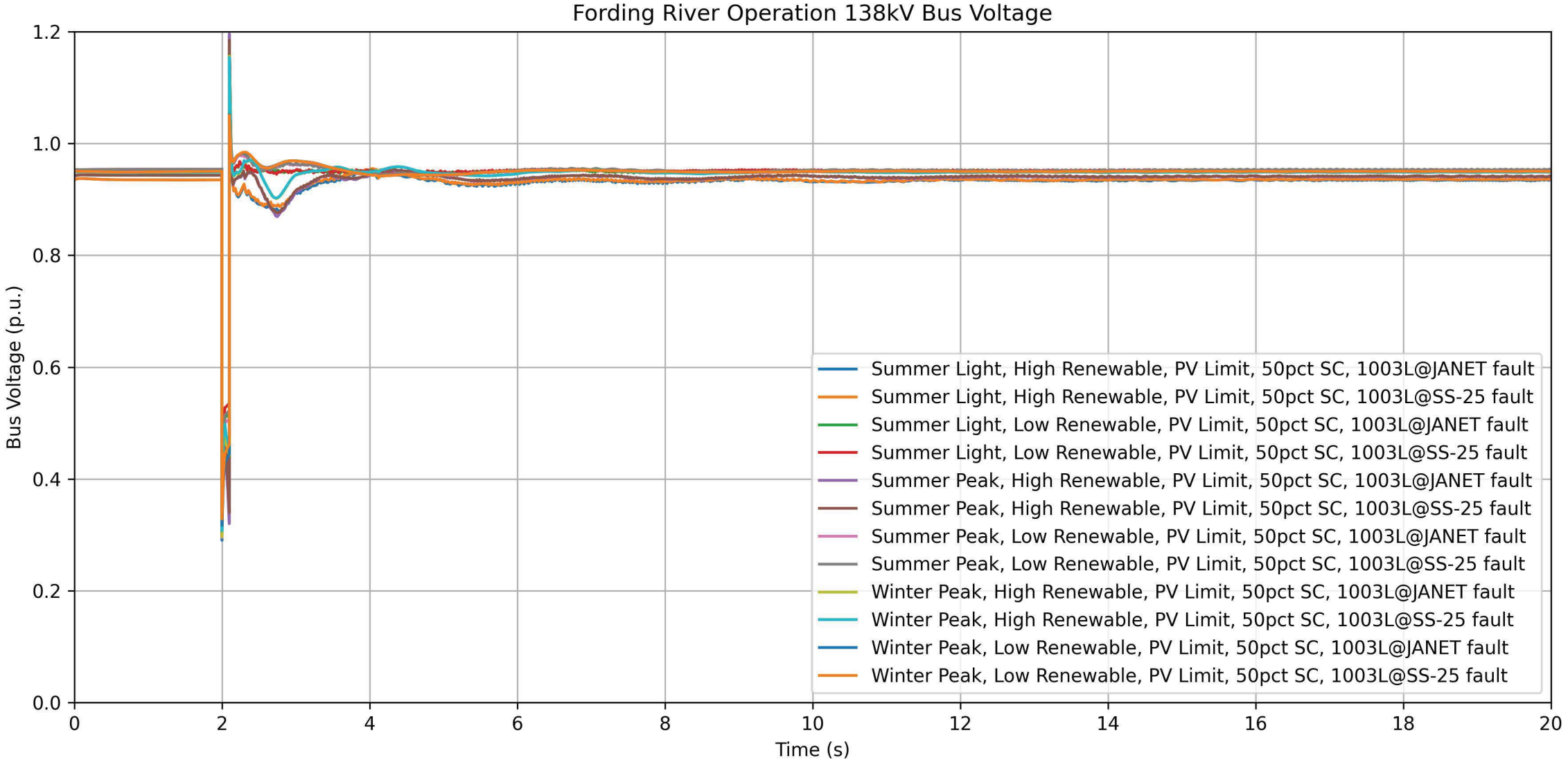

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

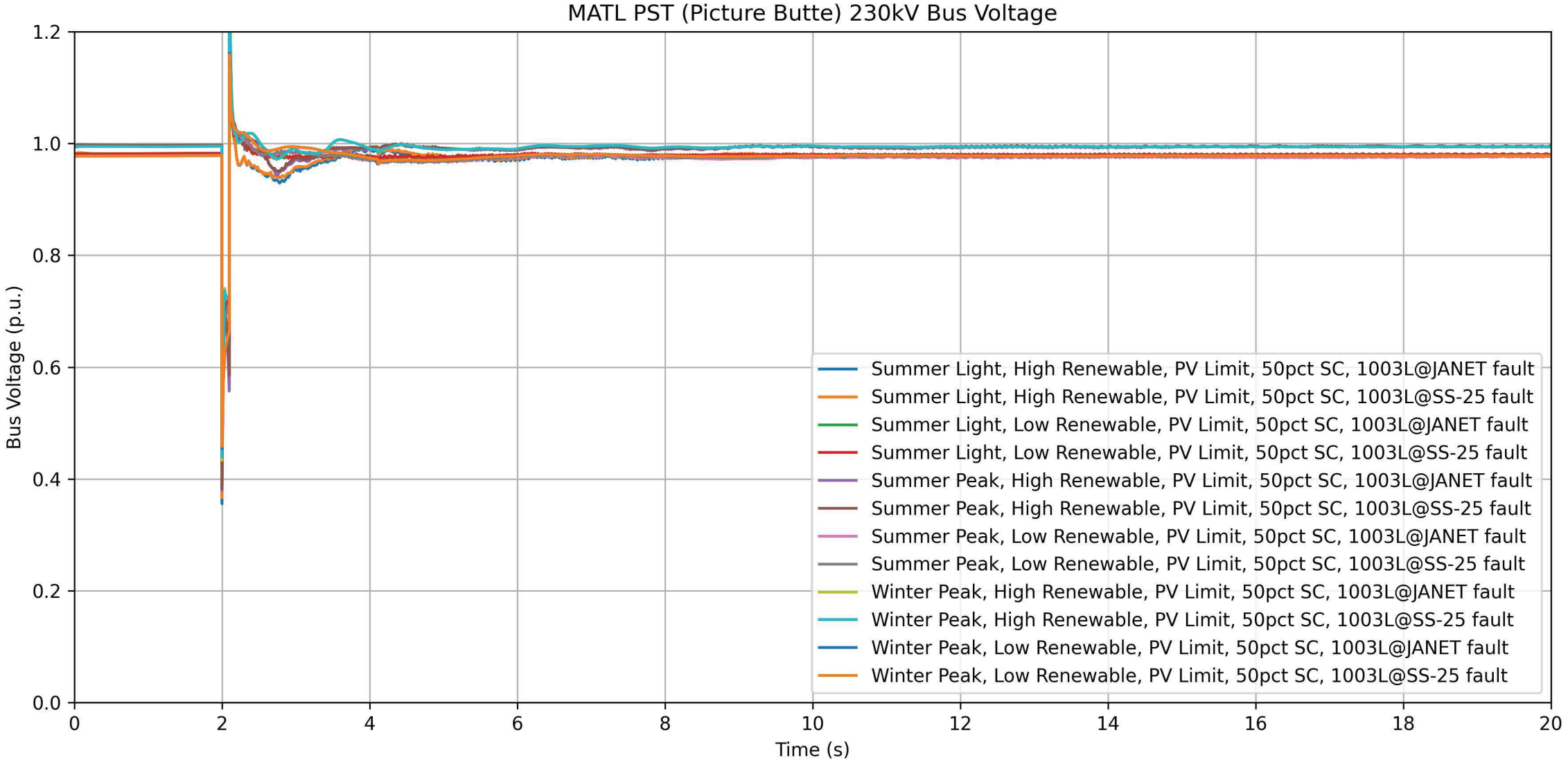

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

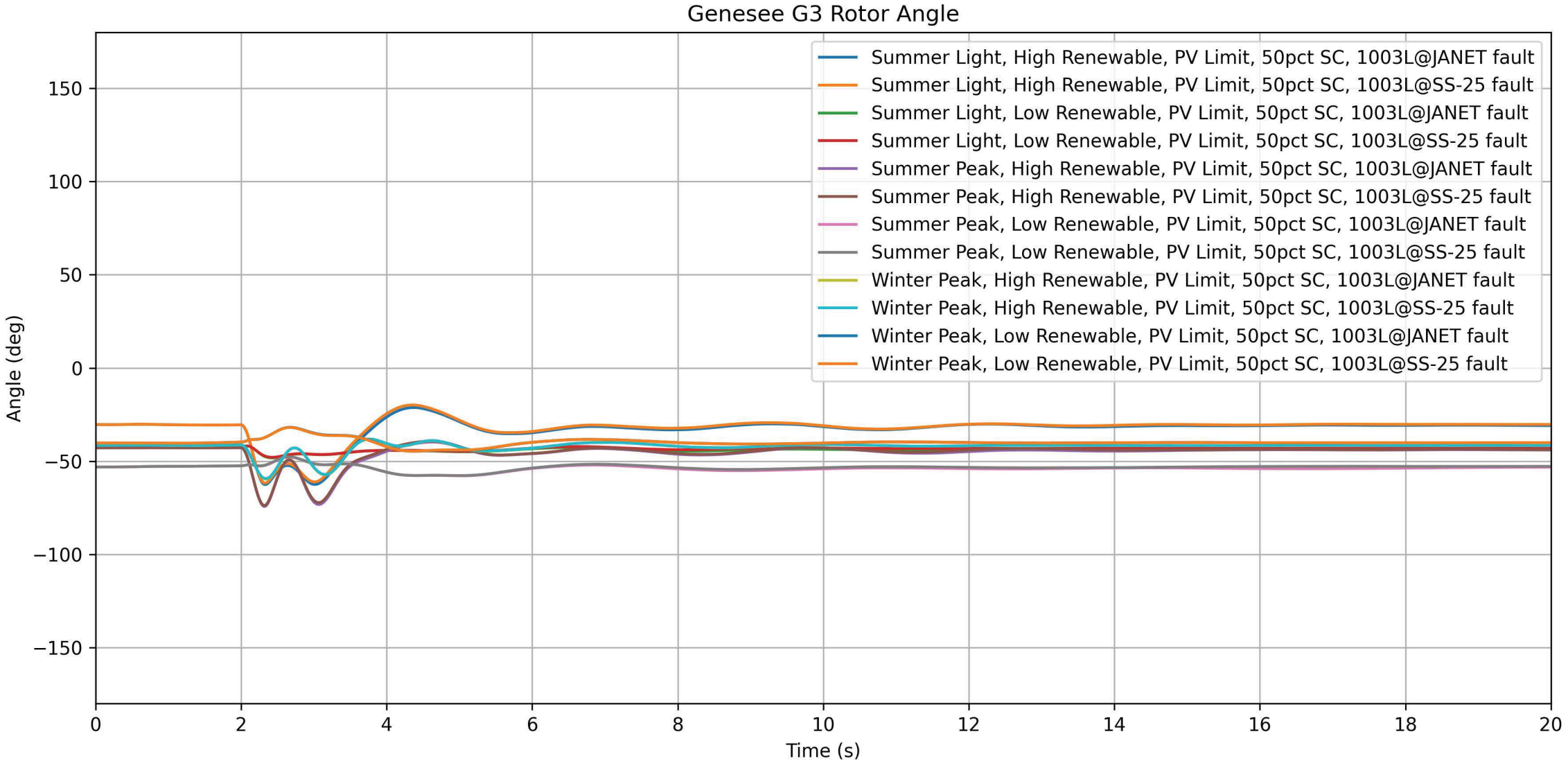

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

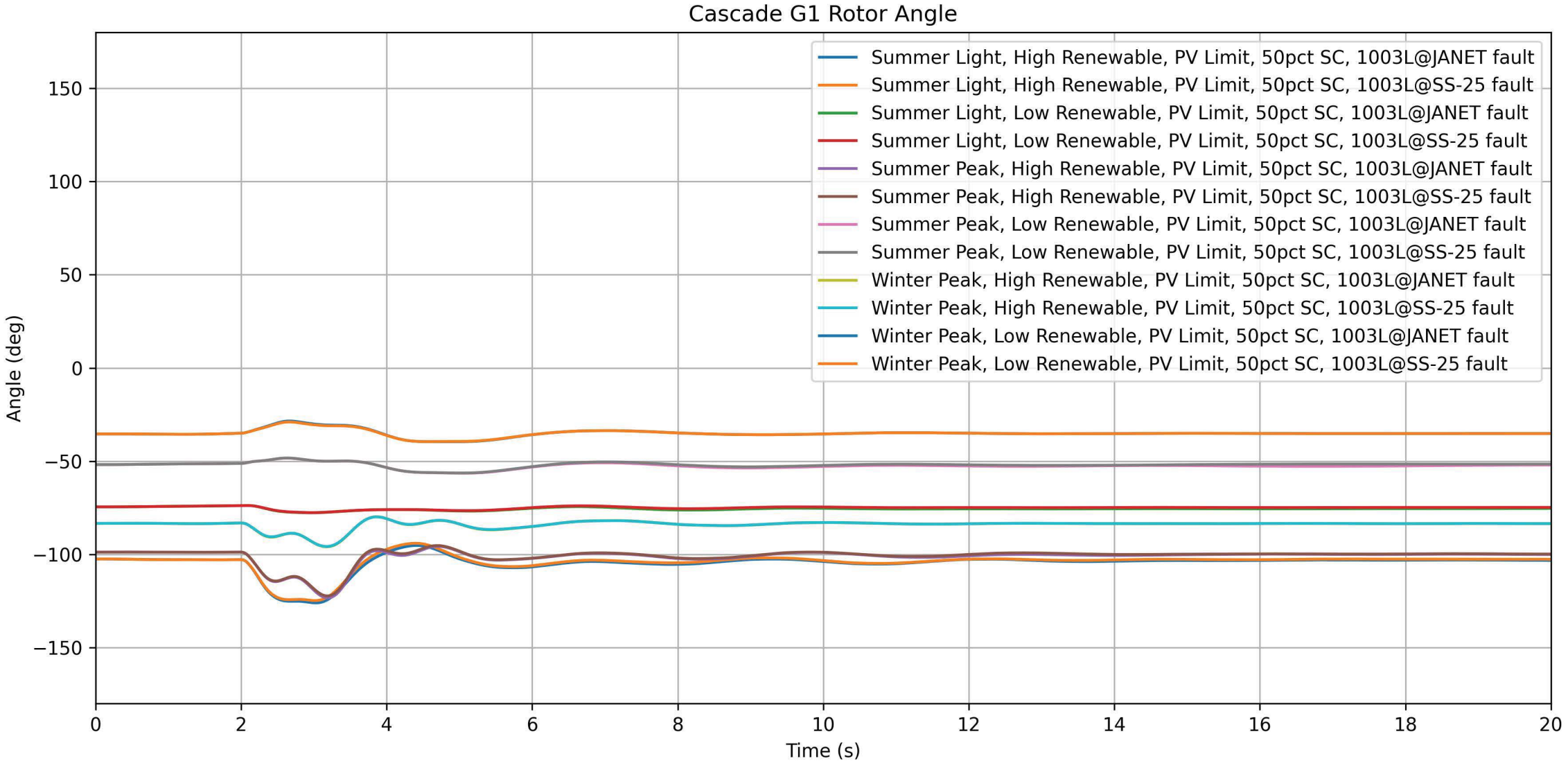

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

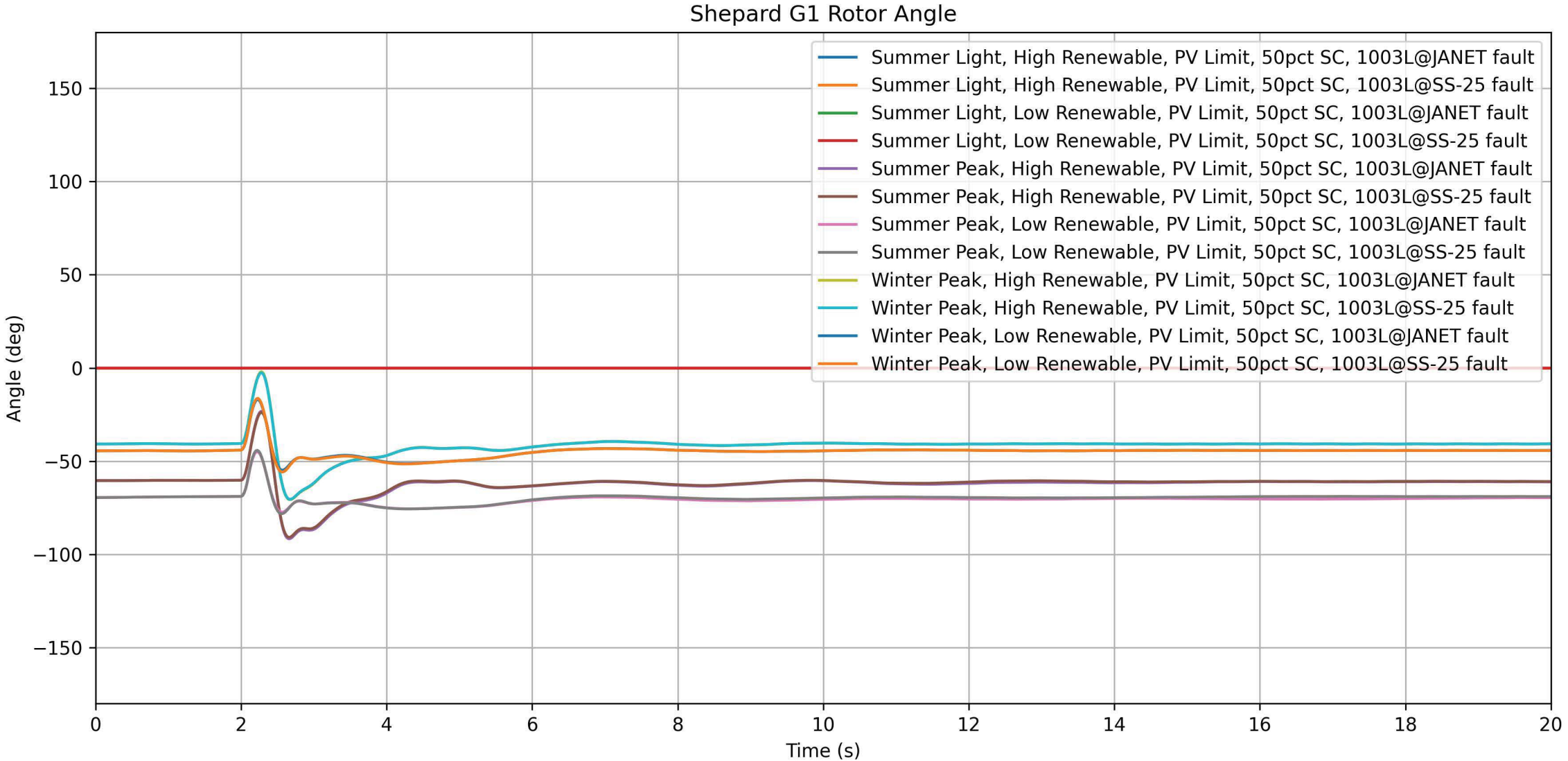

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

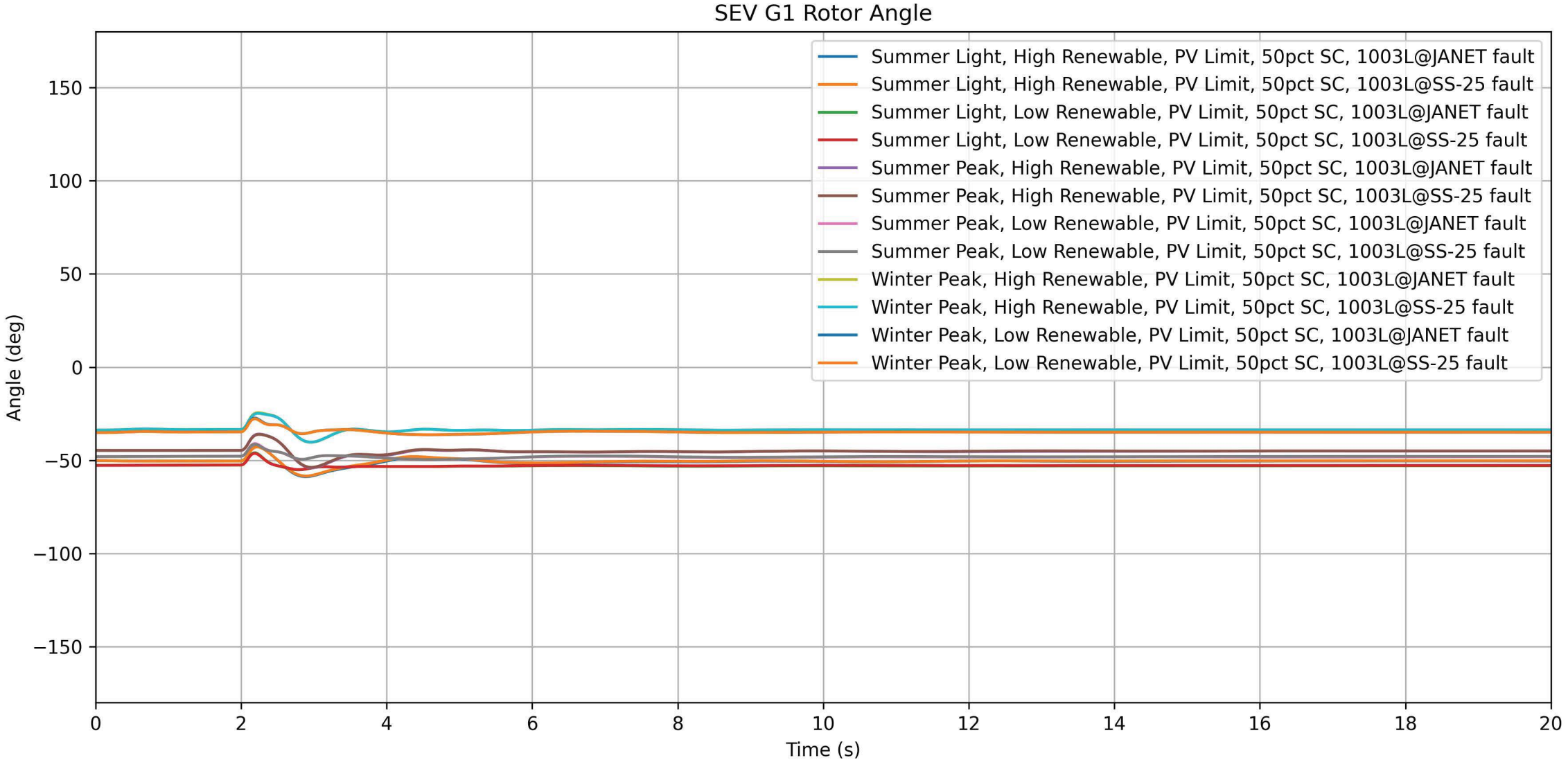

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

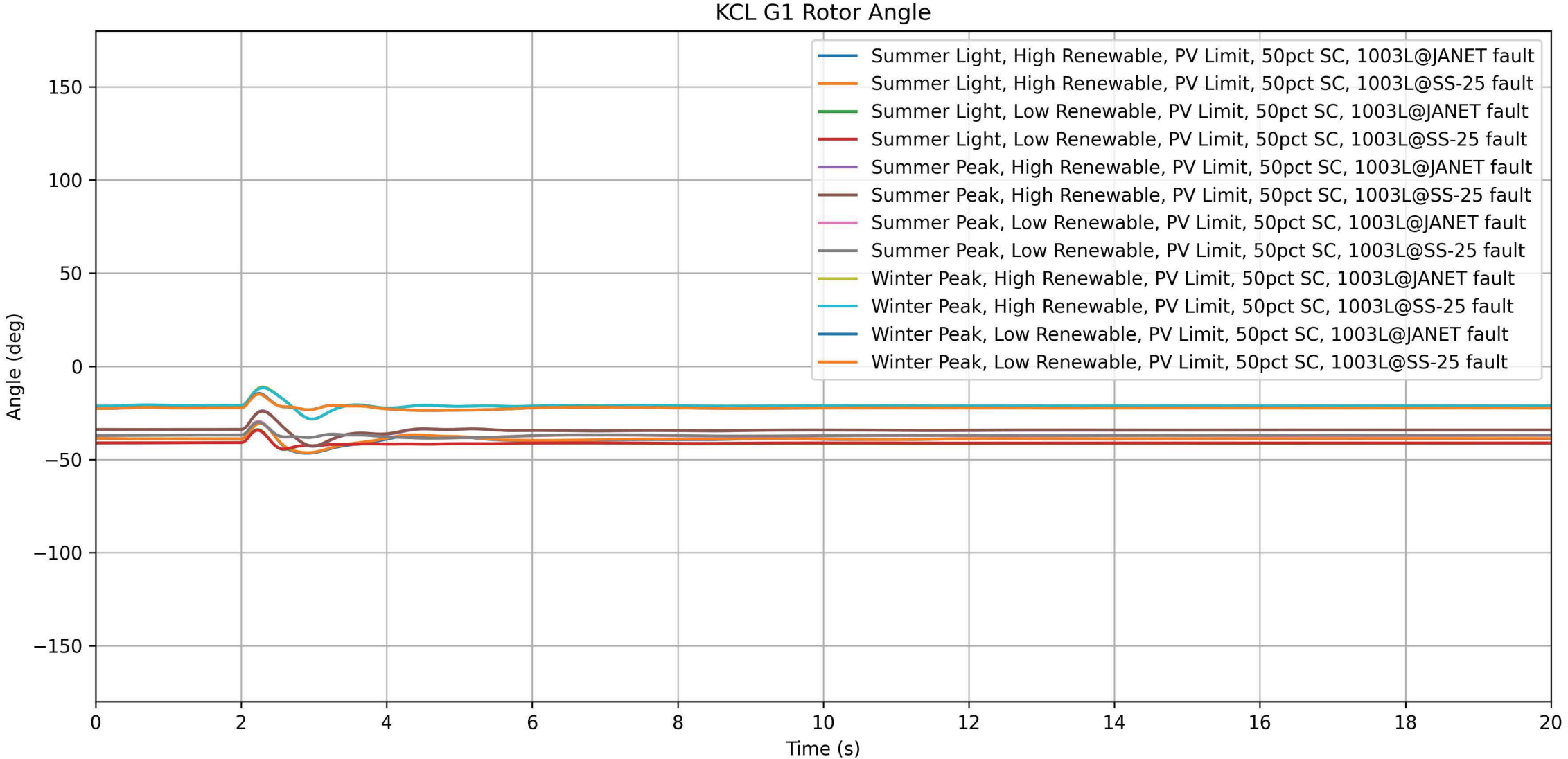

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

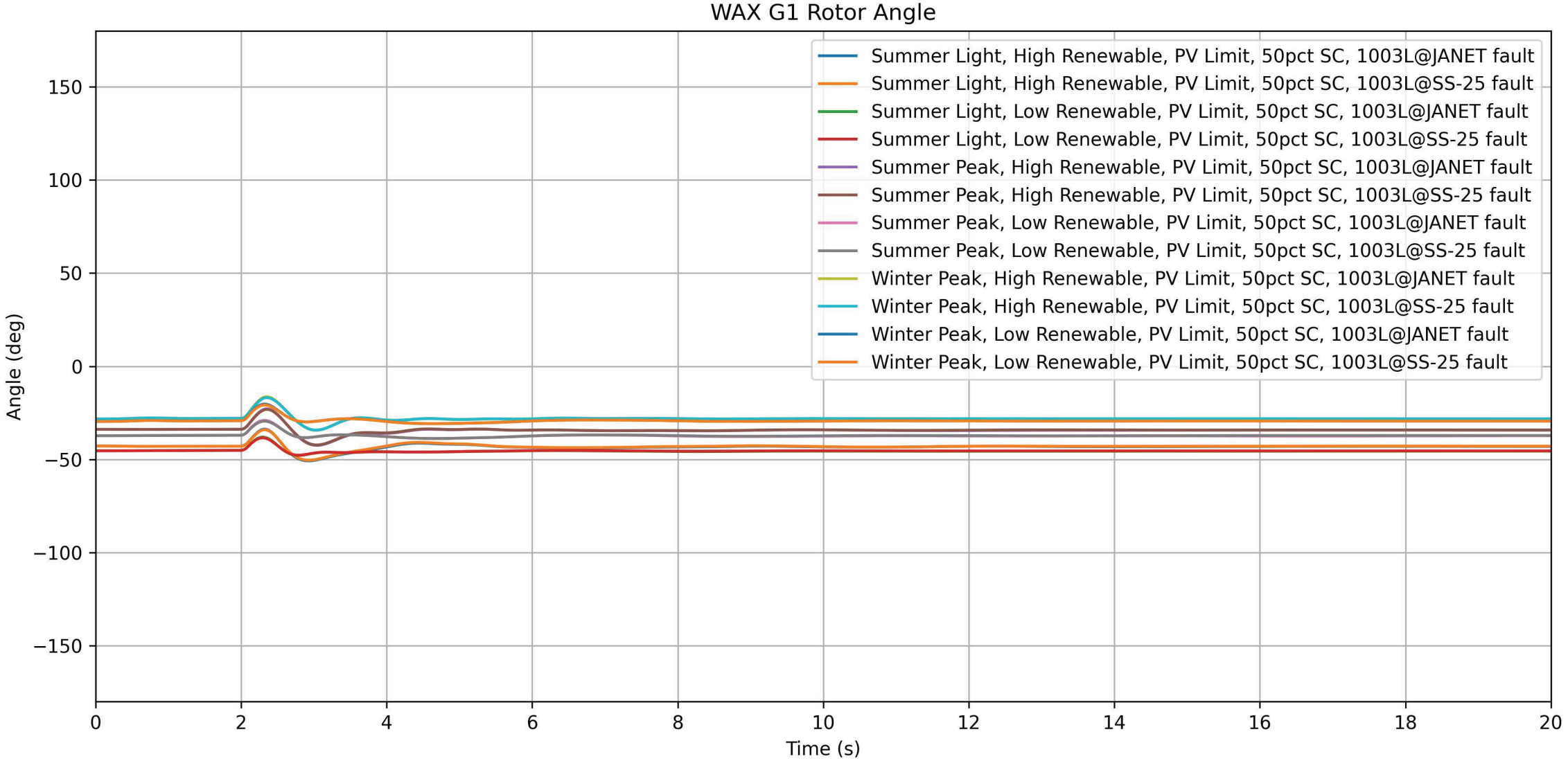

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

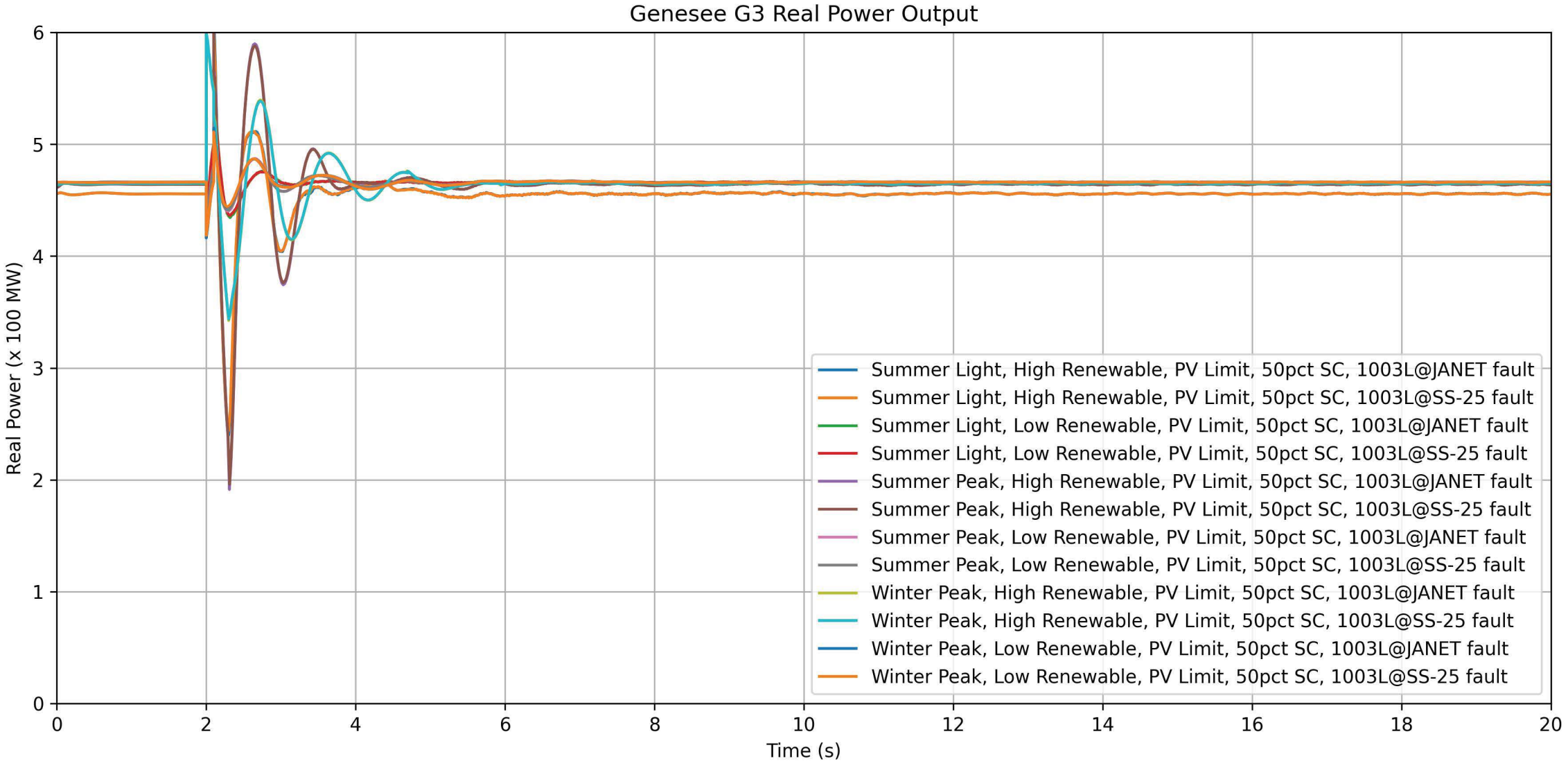

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

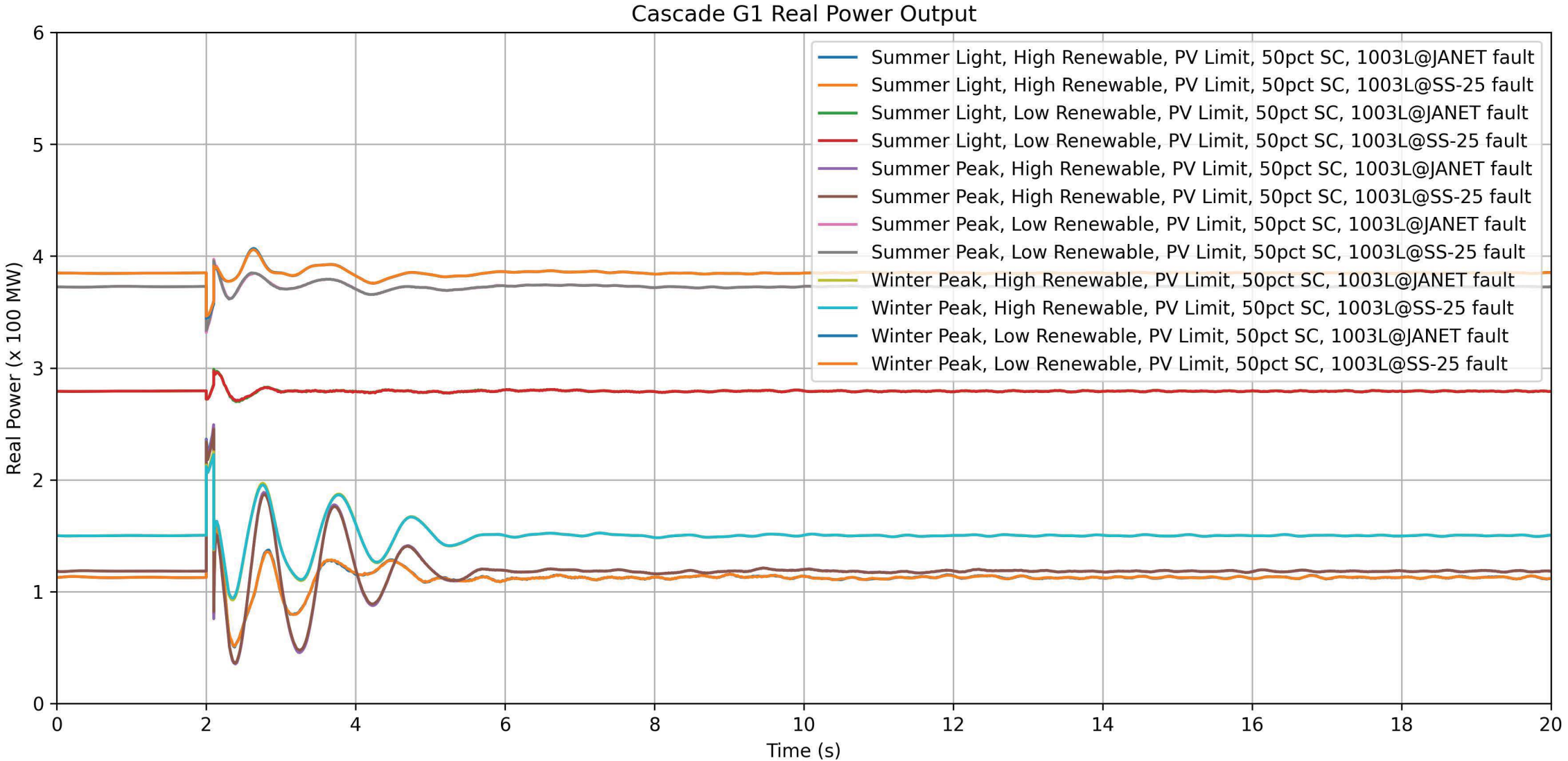

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

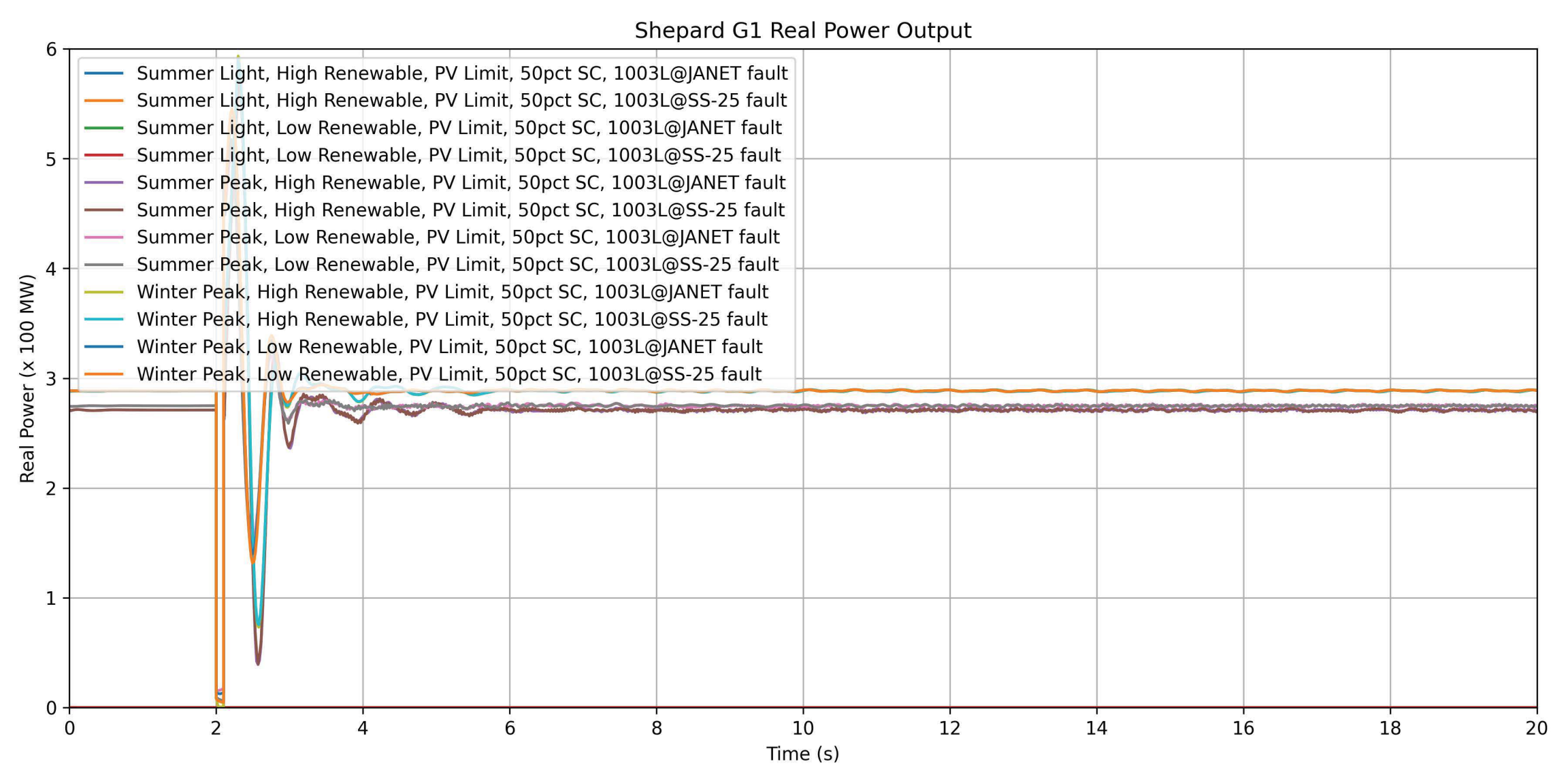

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

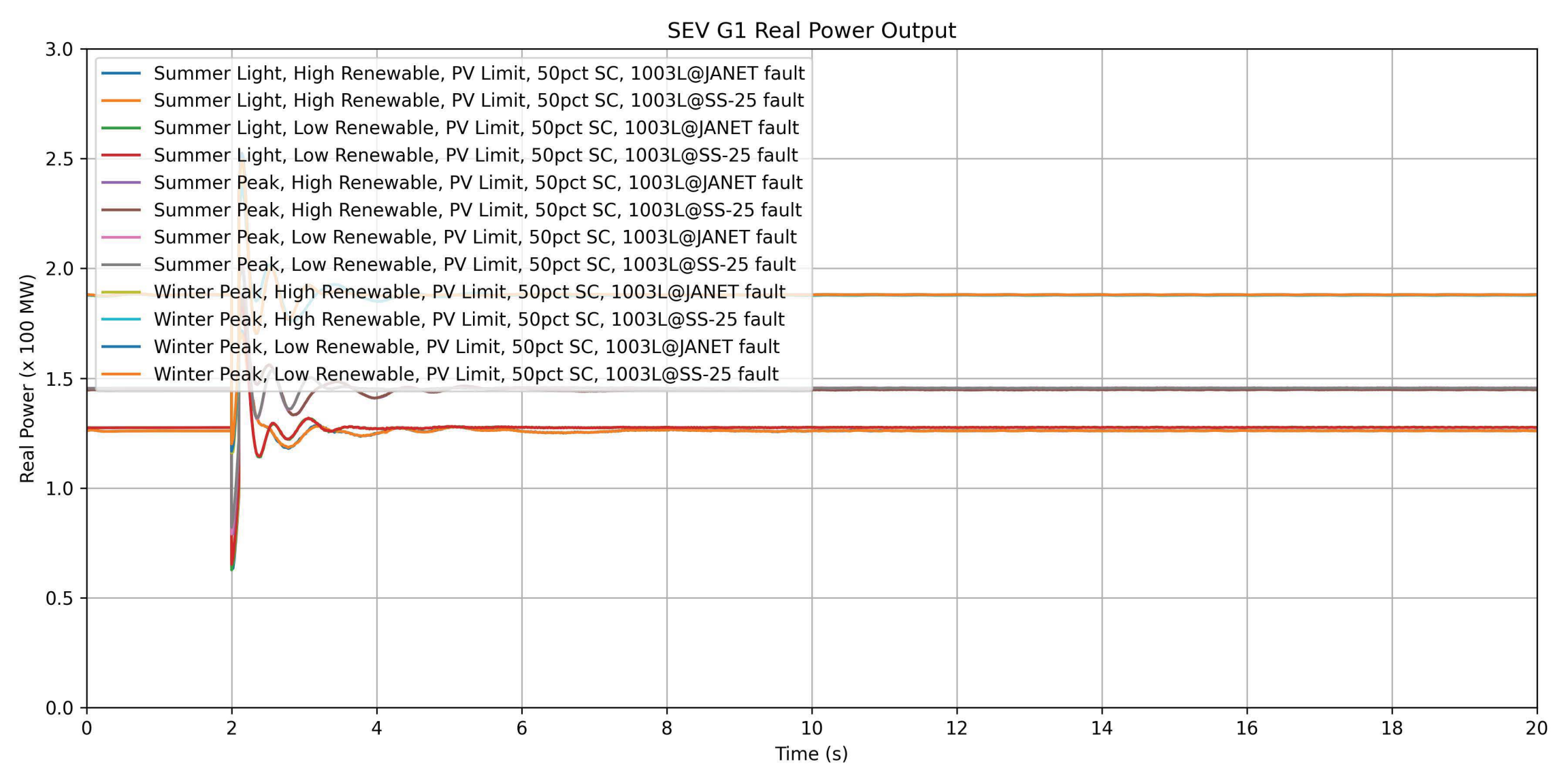

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

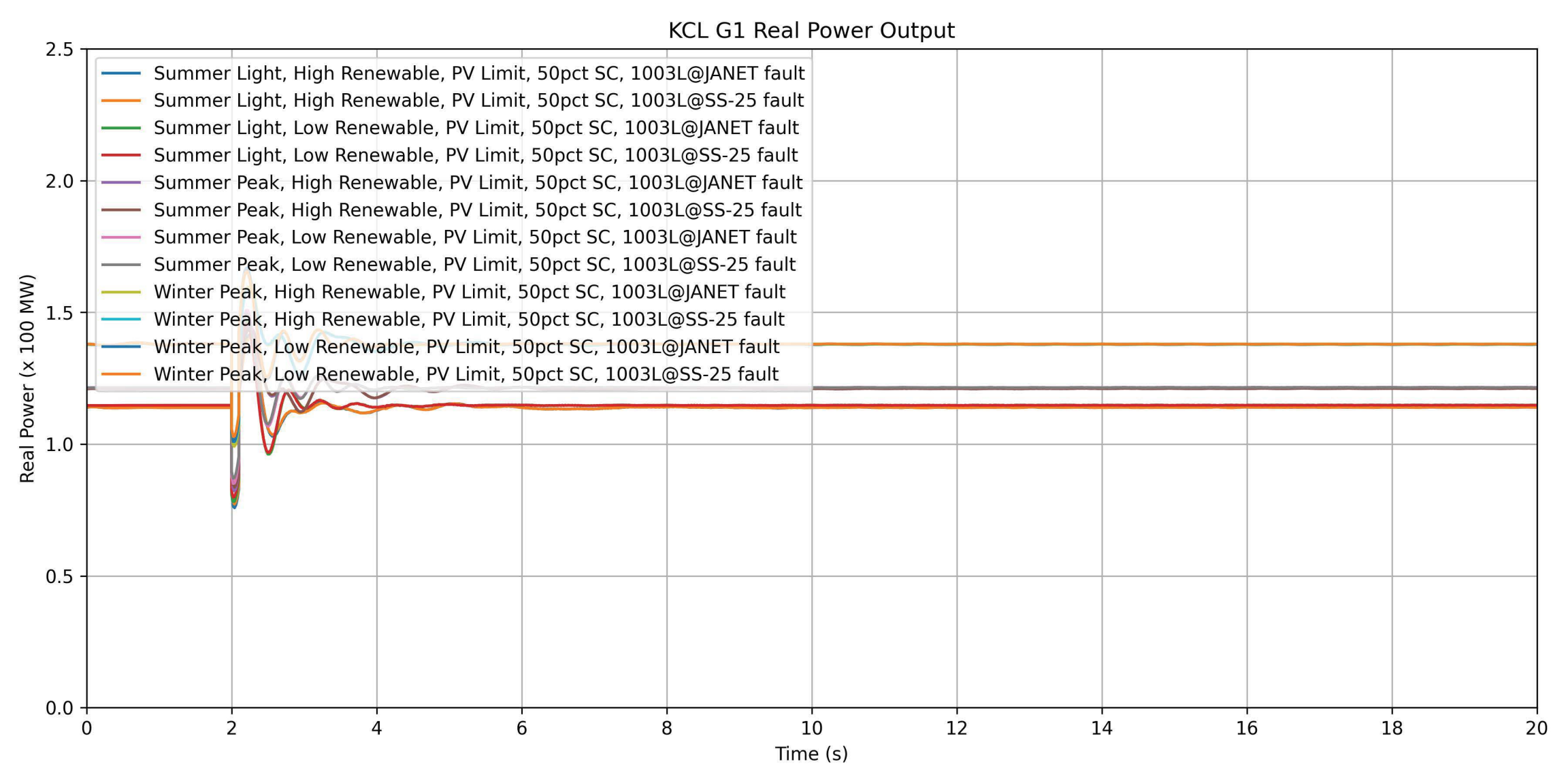

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

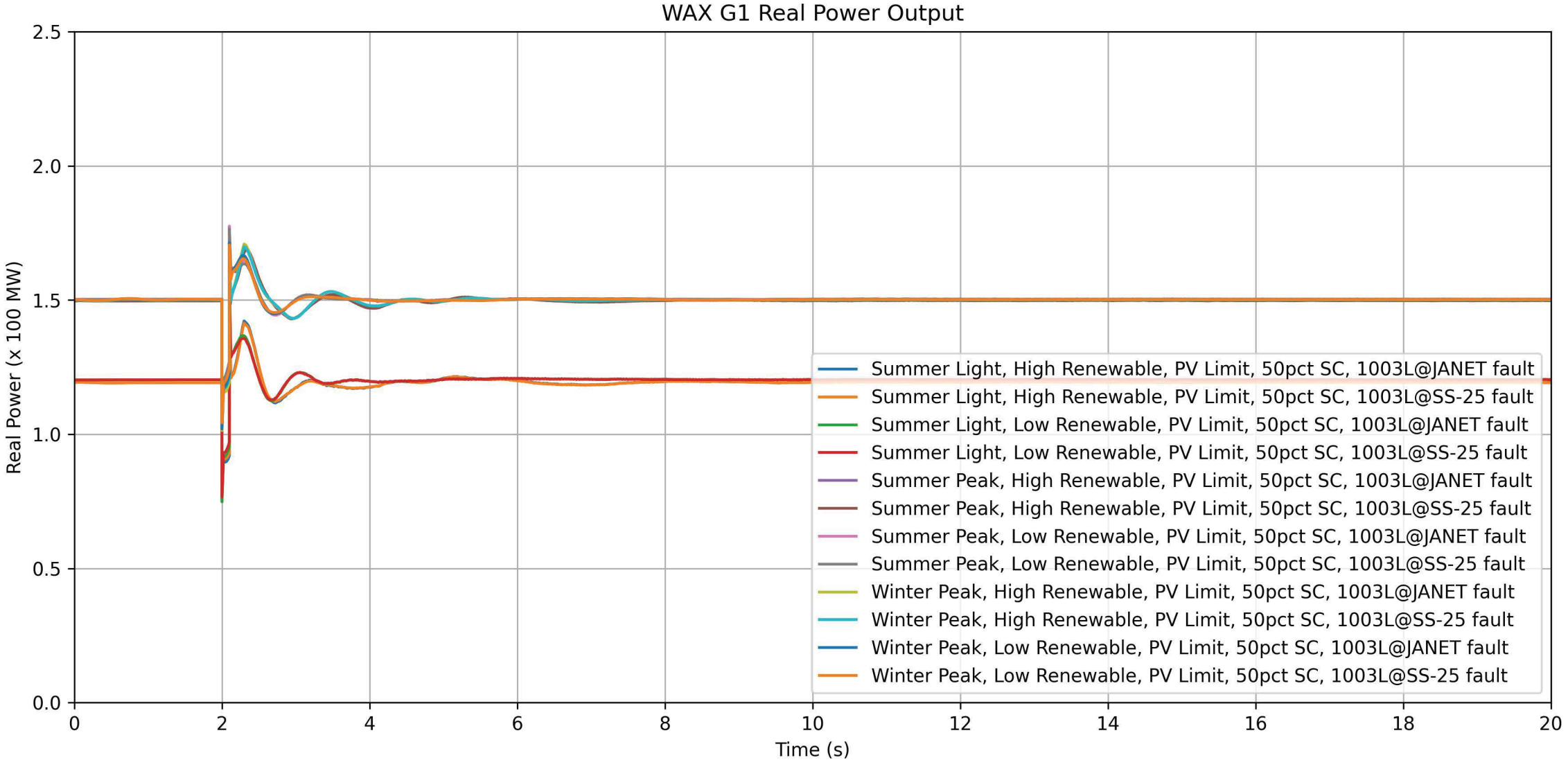

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

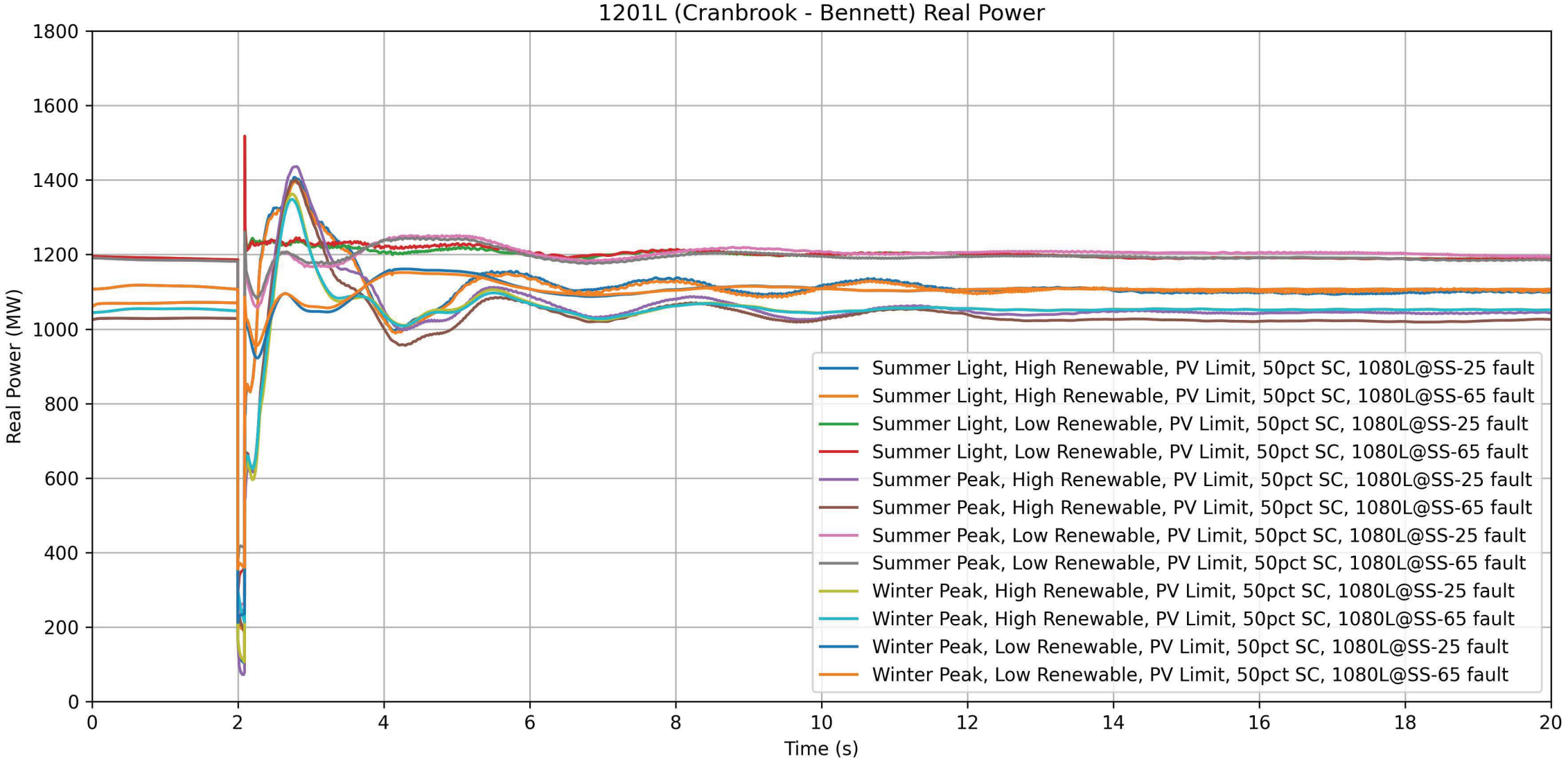

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

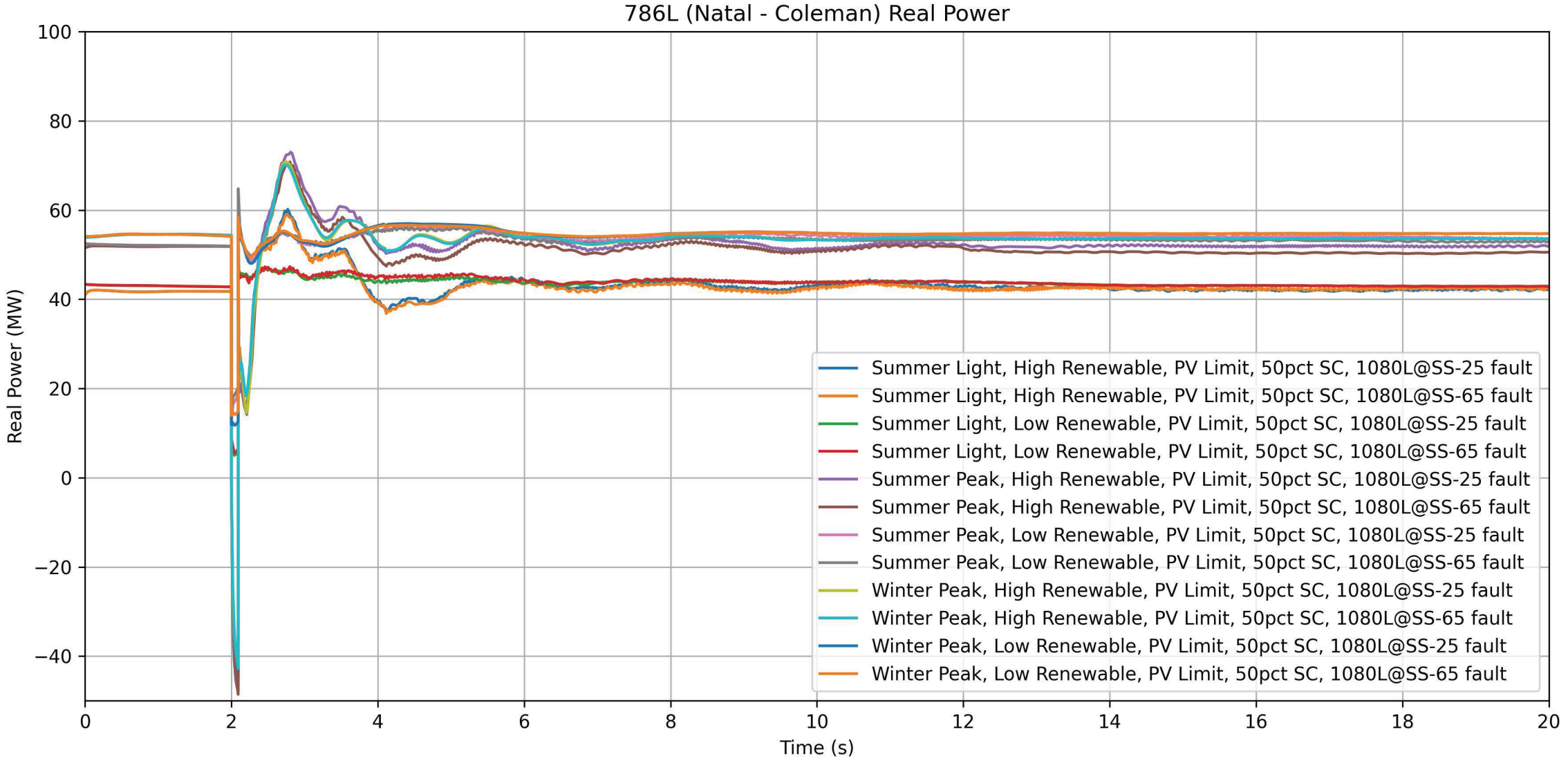

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

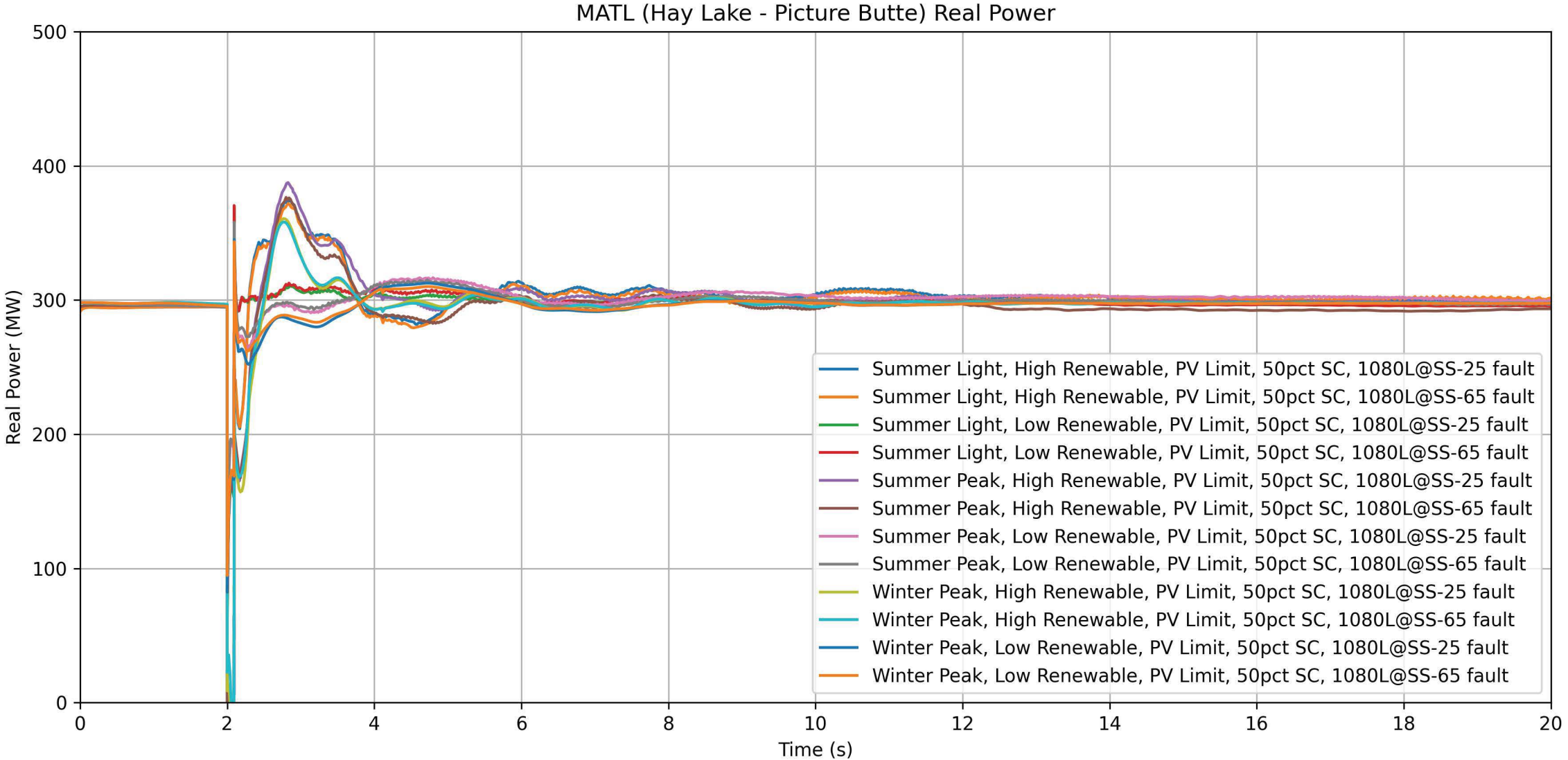

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

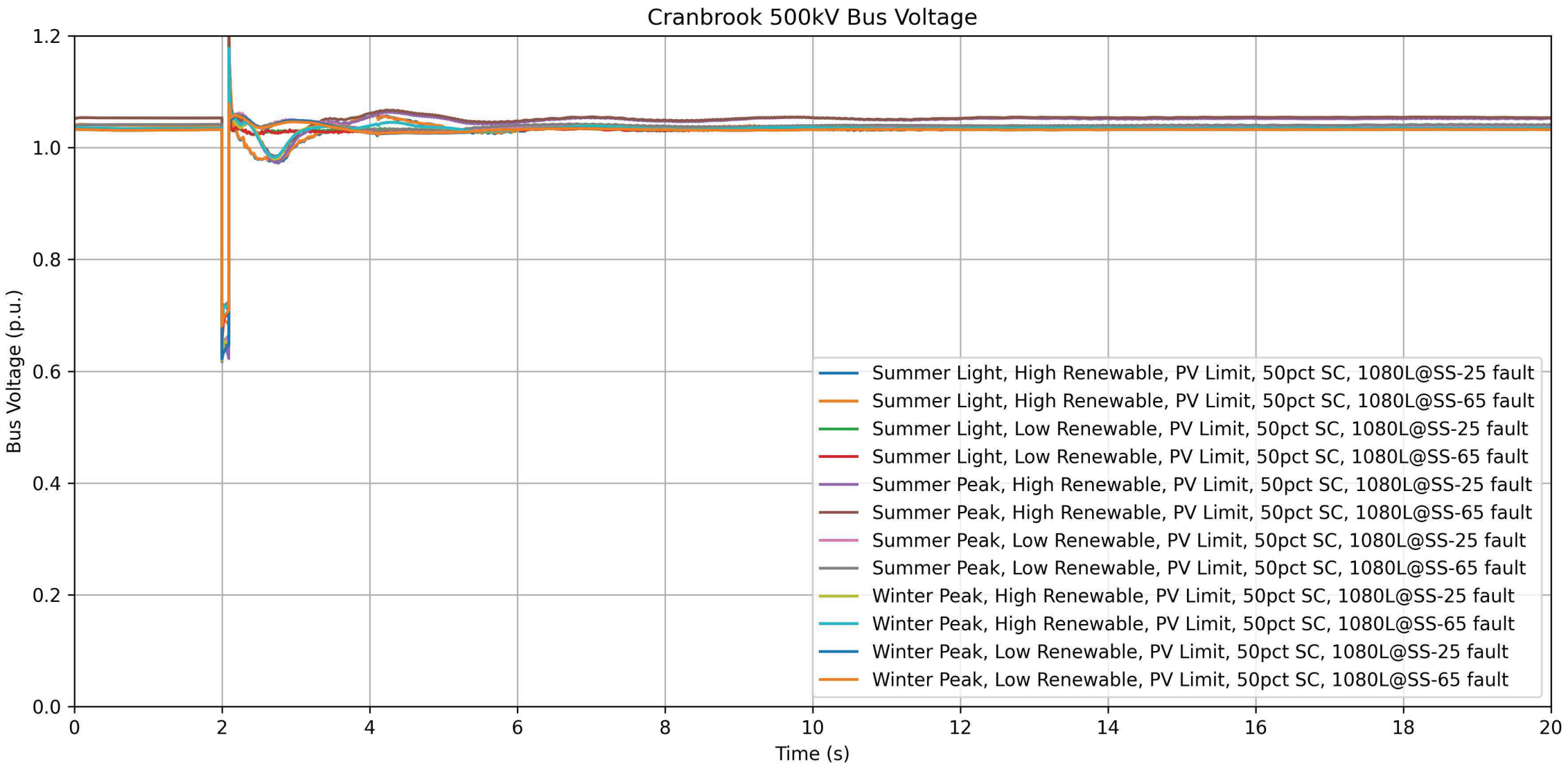

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

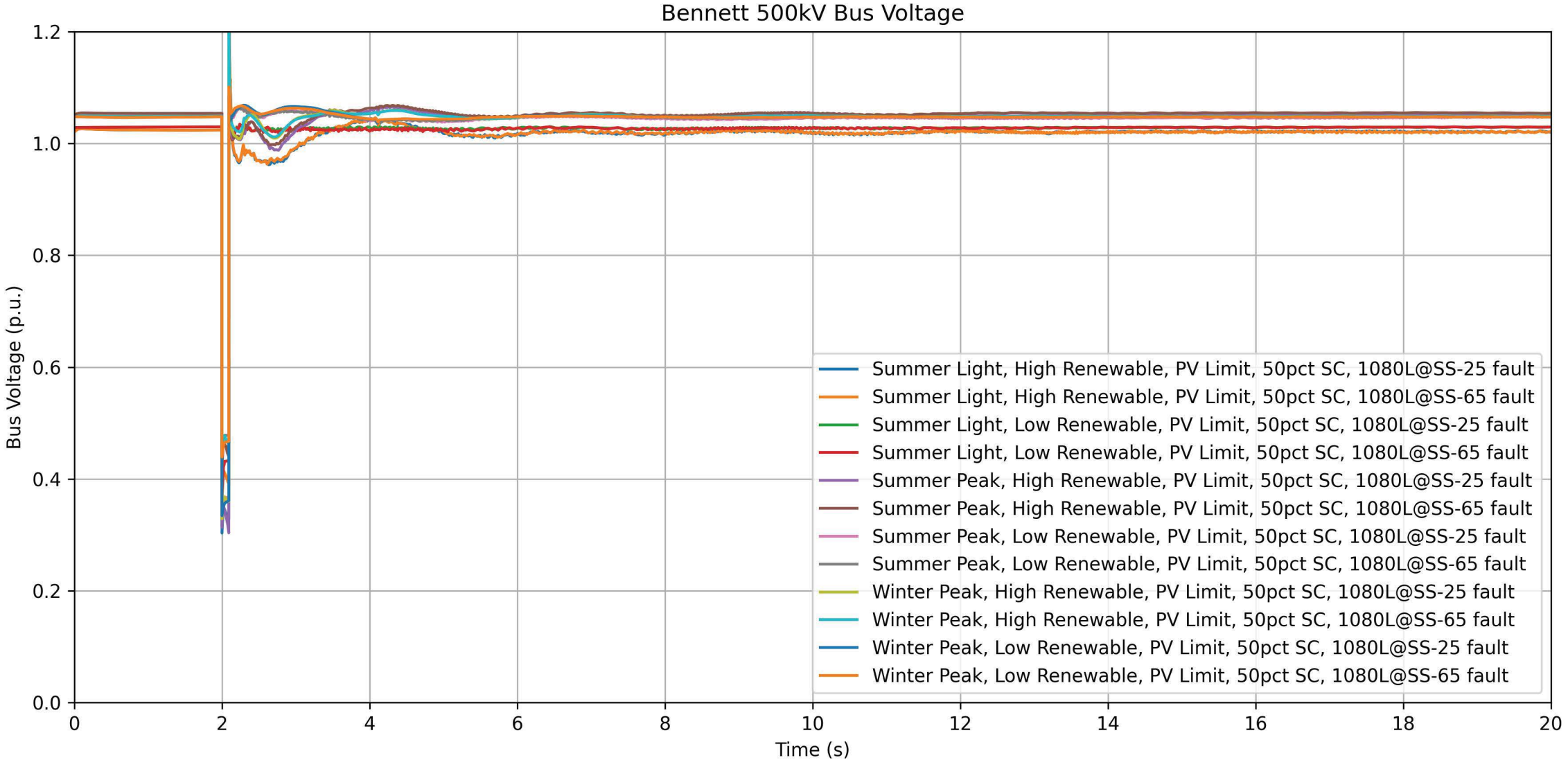

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L@SS-25 fault

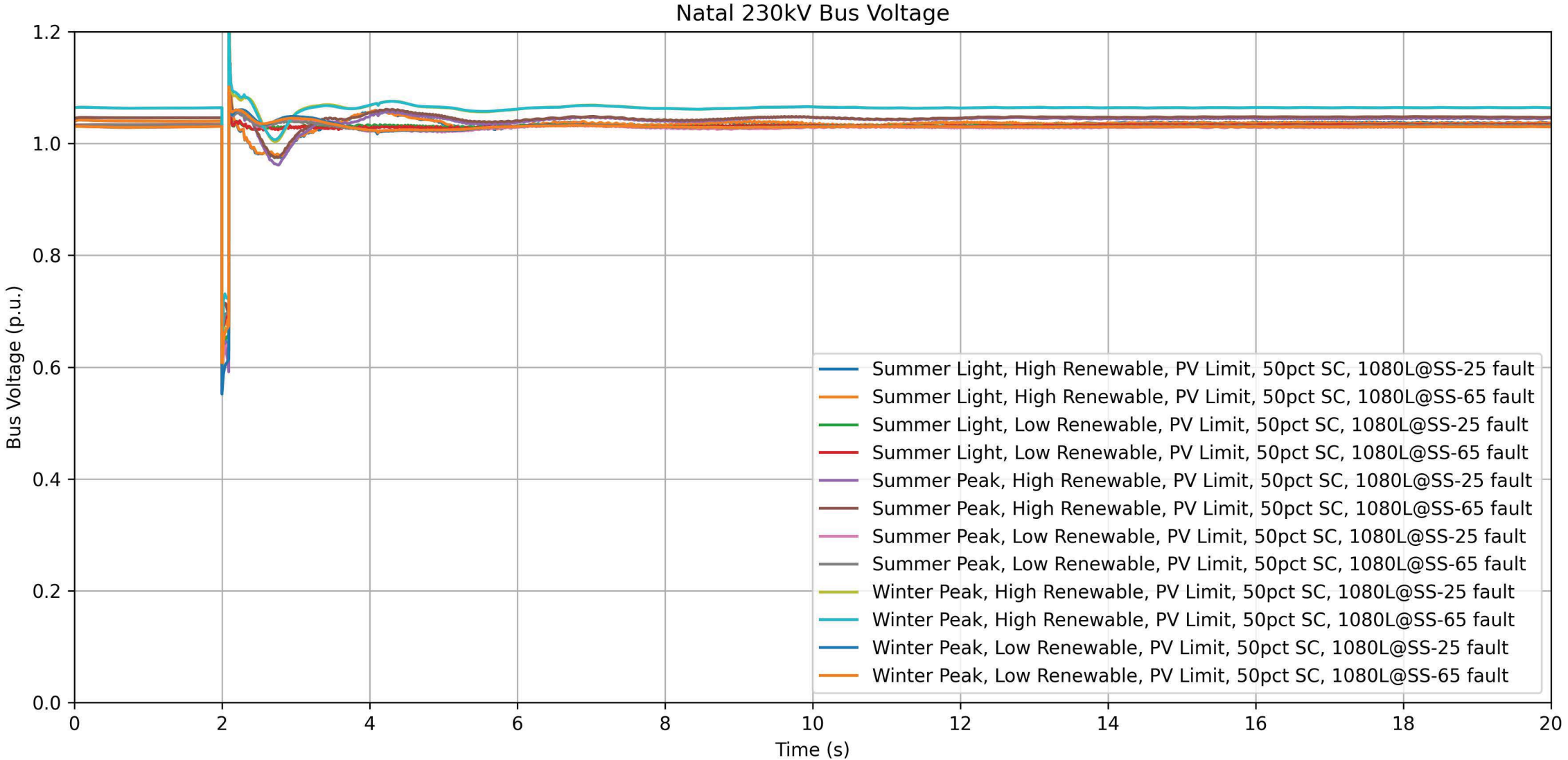

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

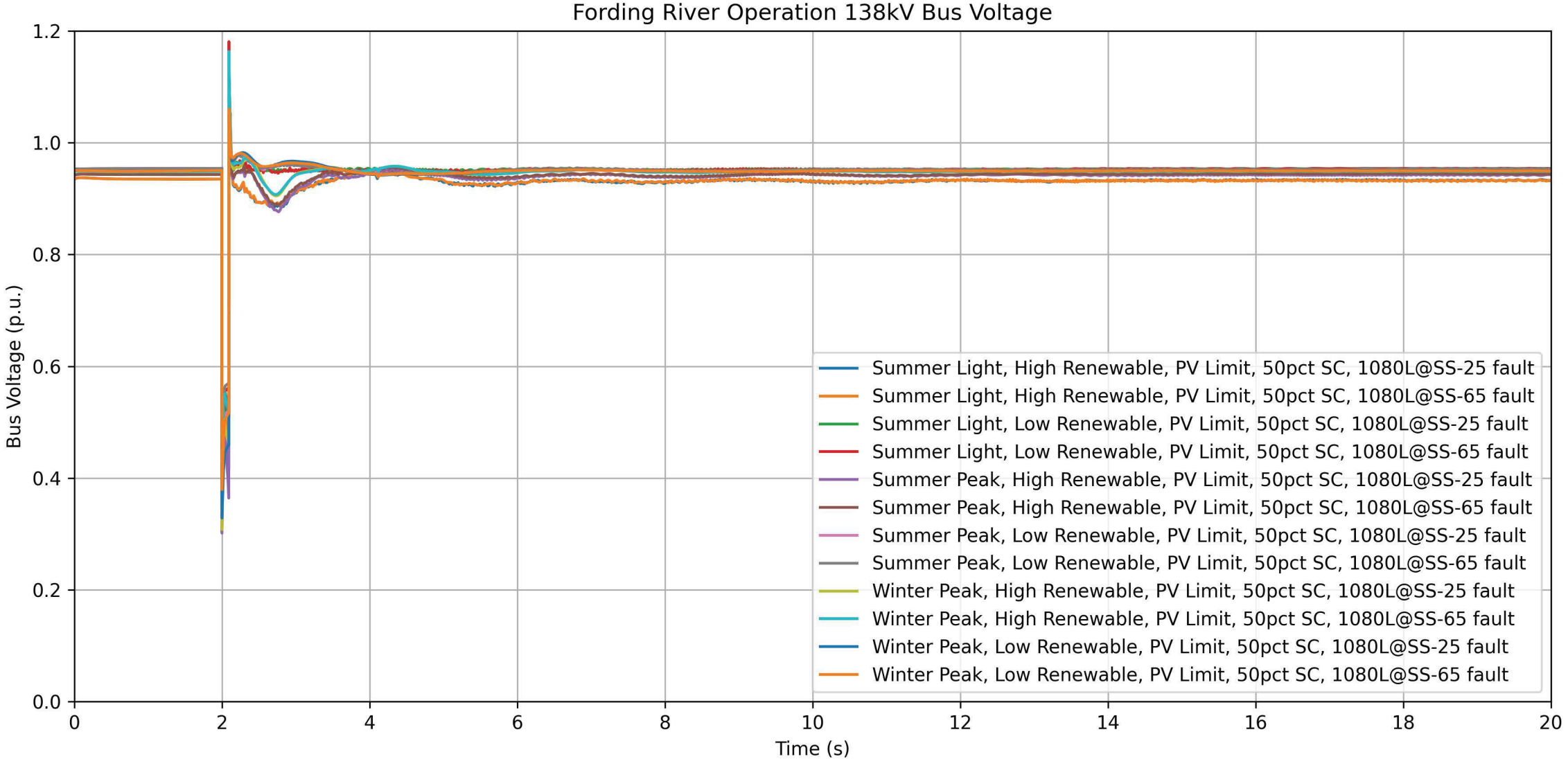

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

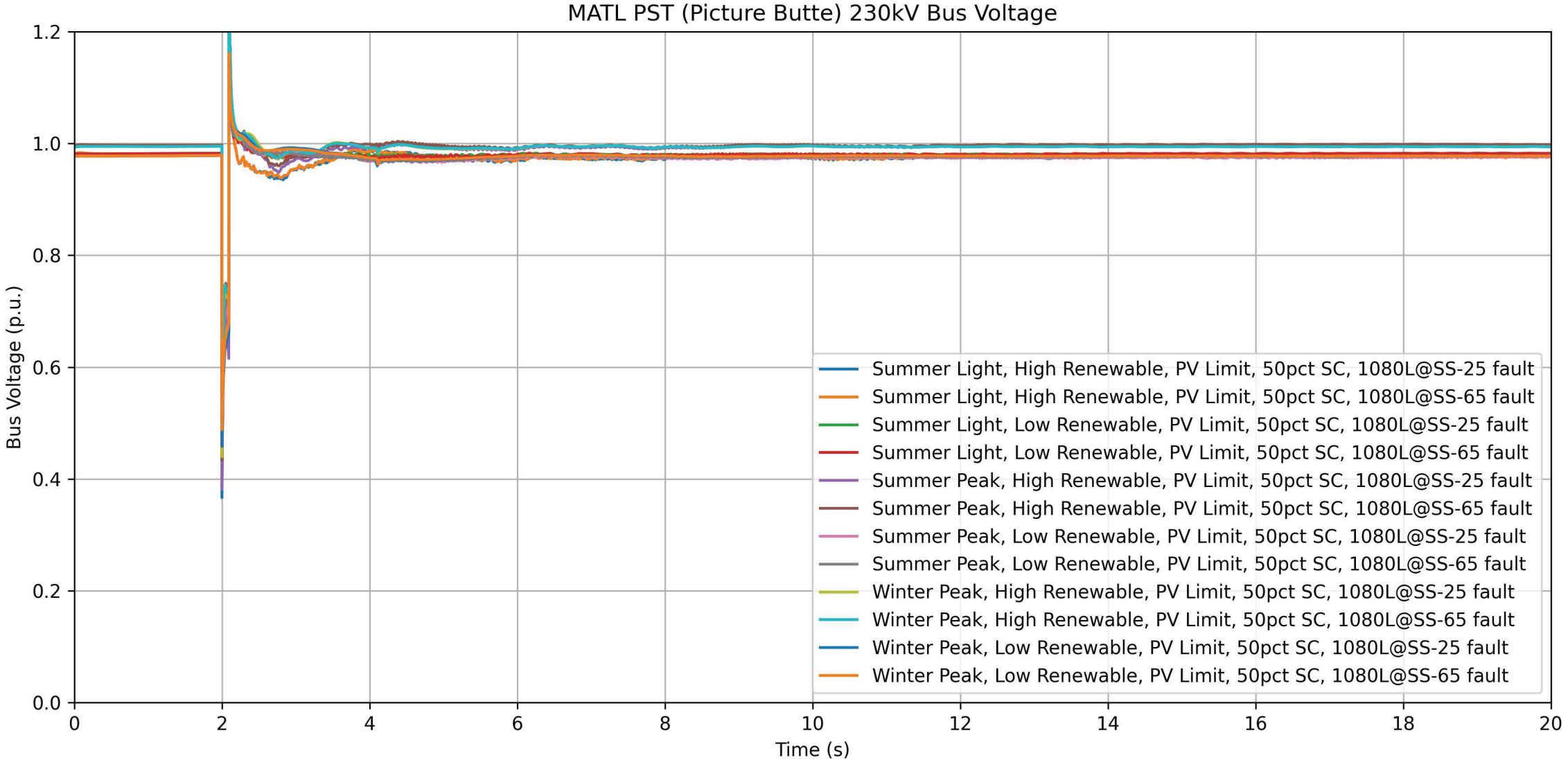

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

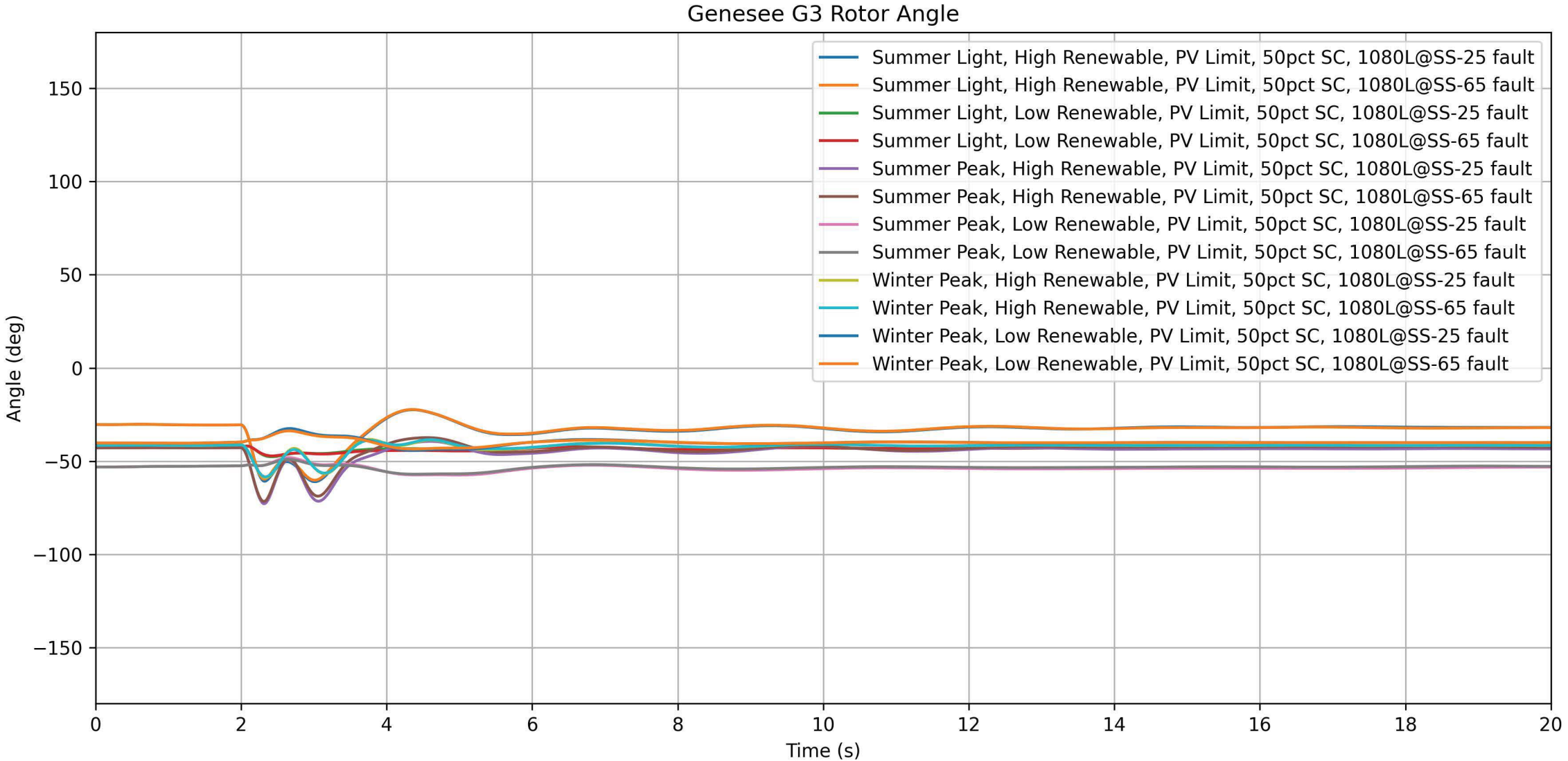

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

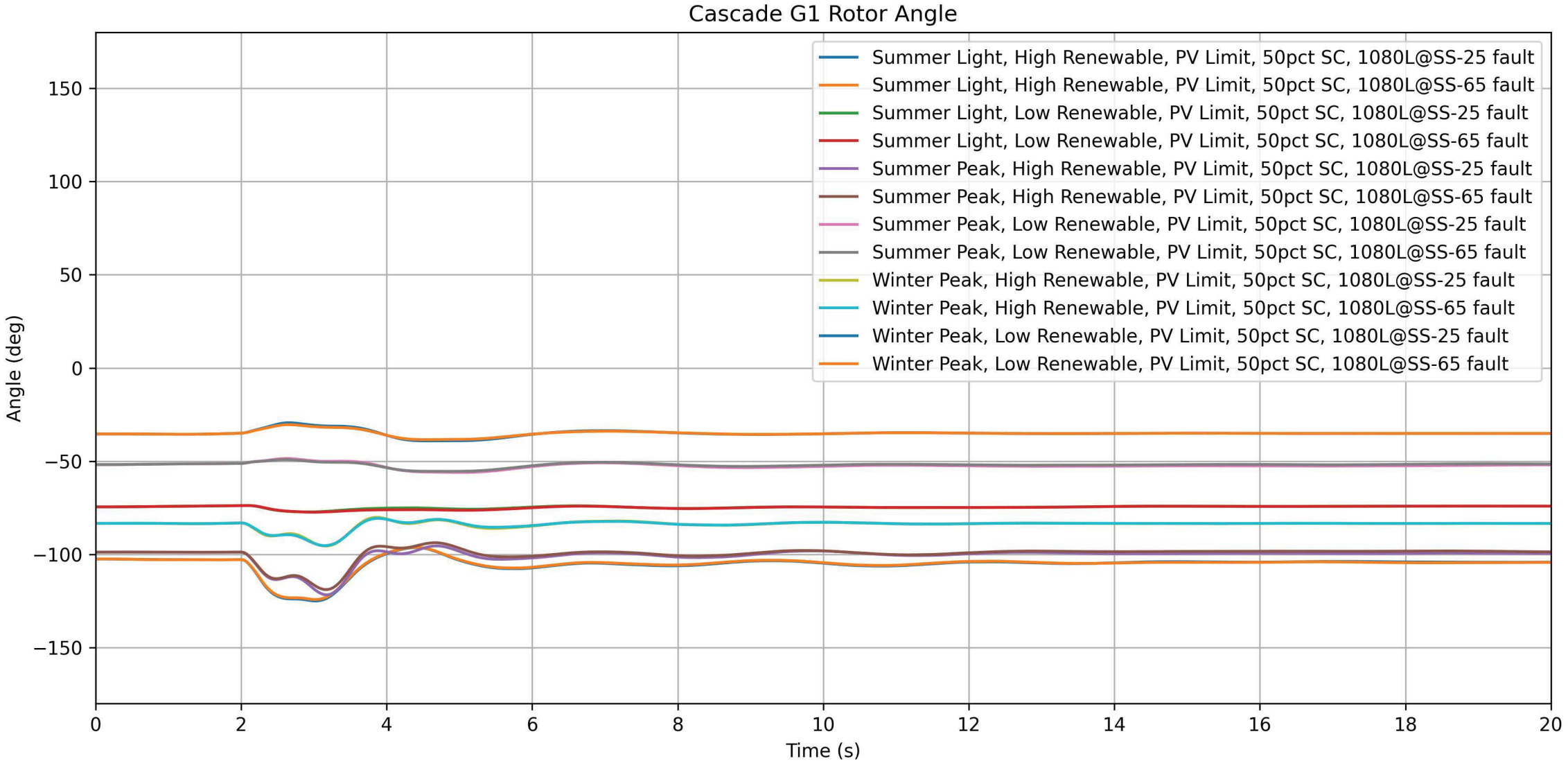

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

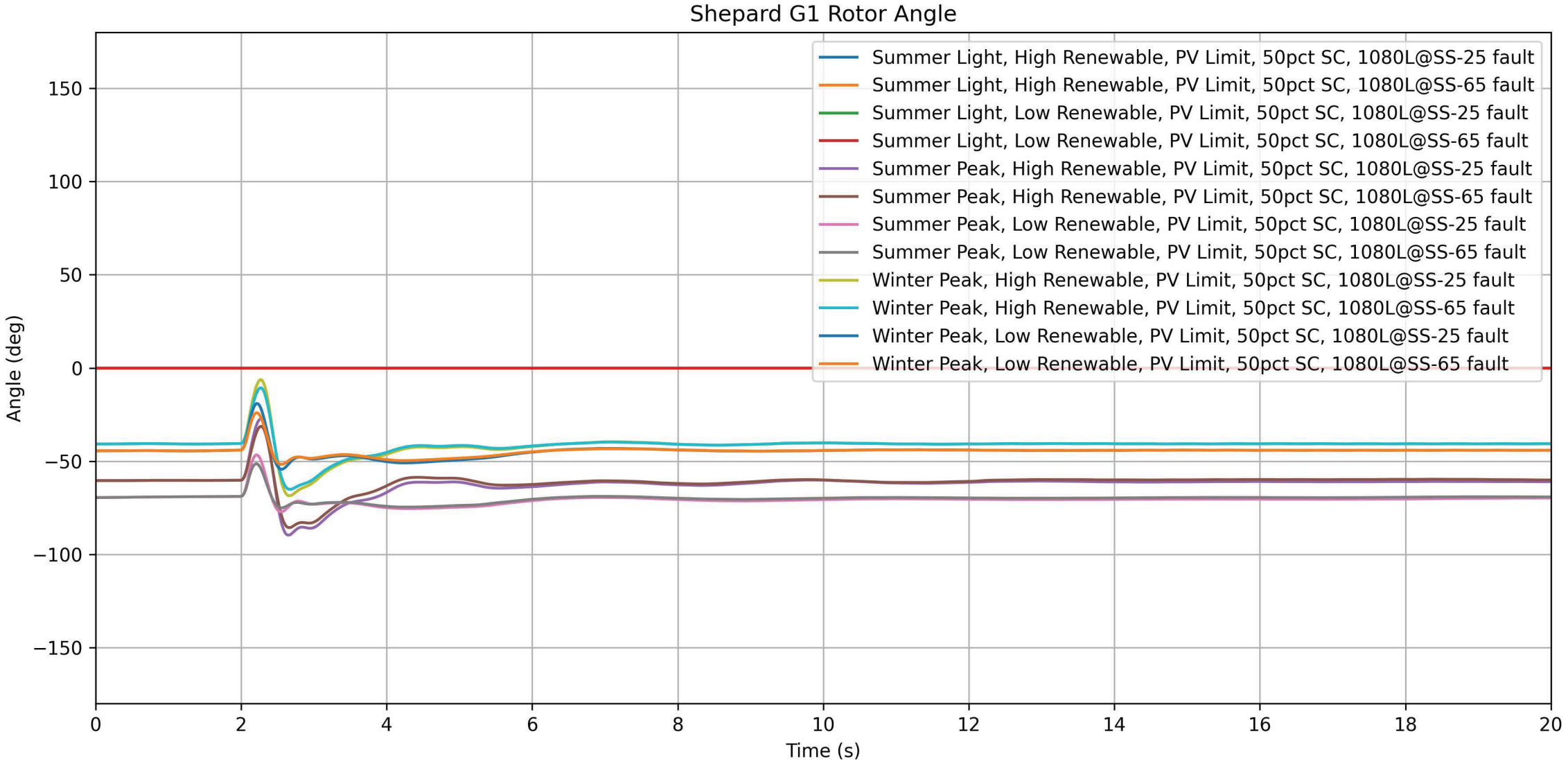

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

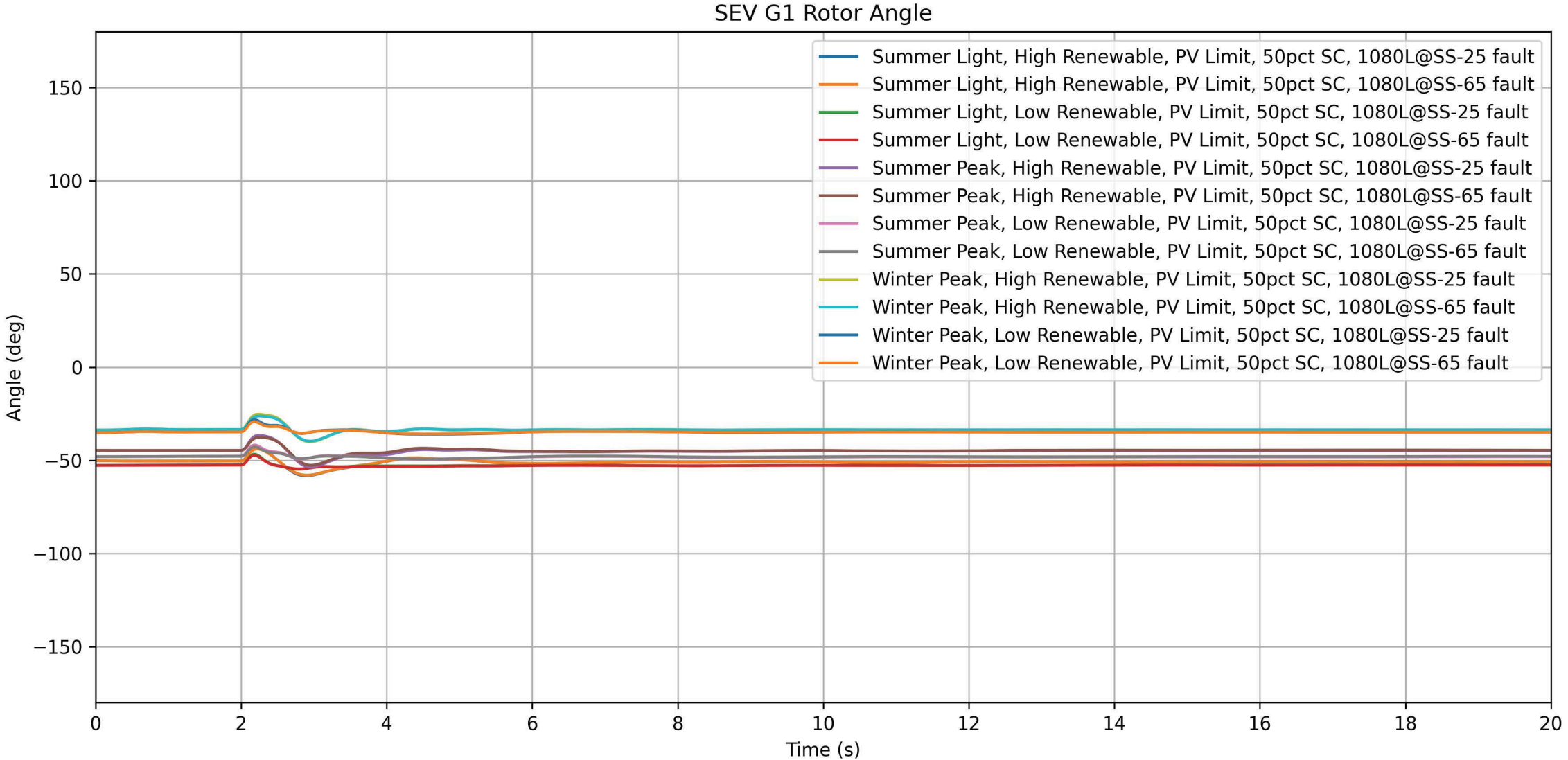

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

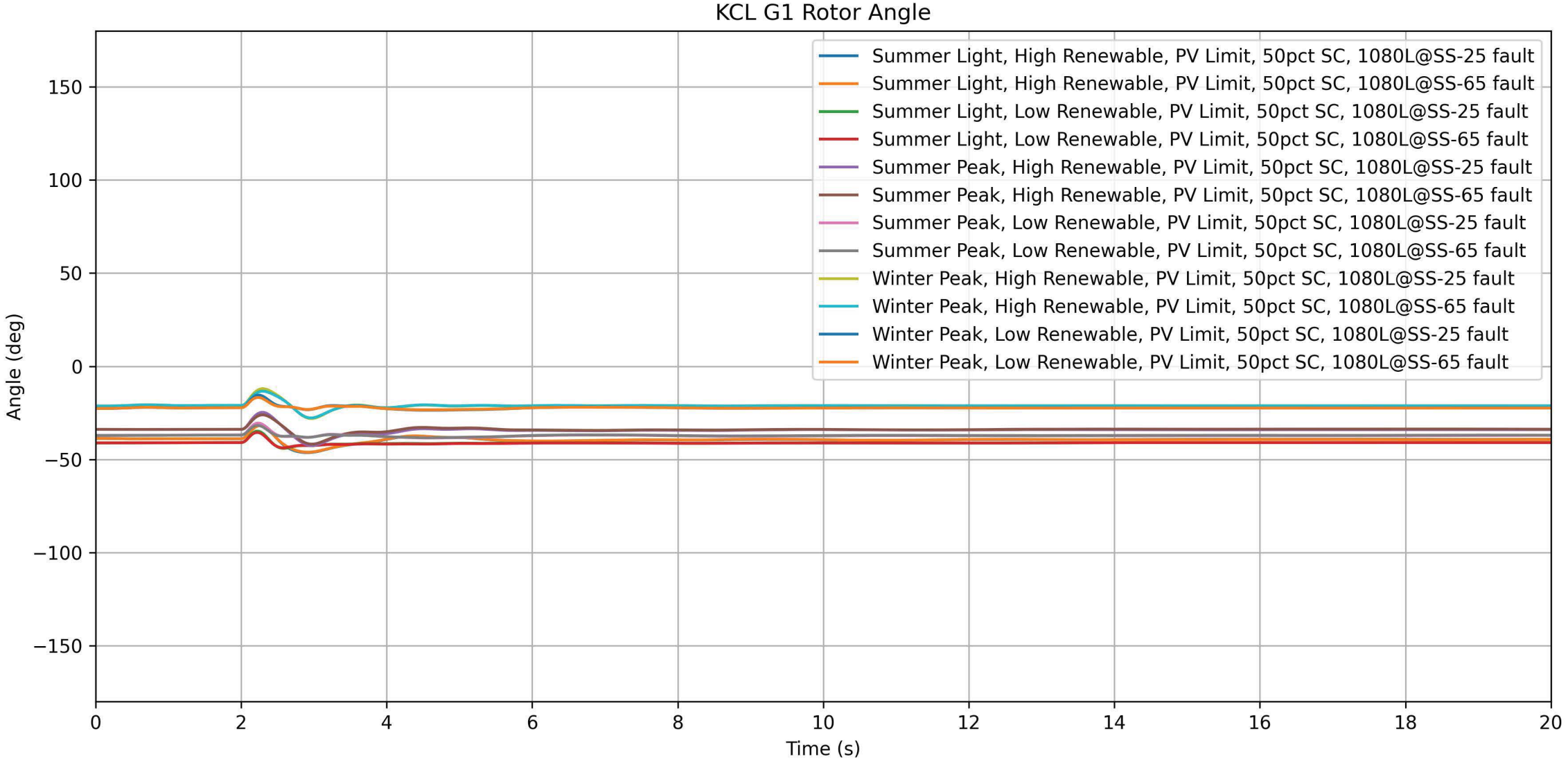

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

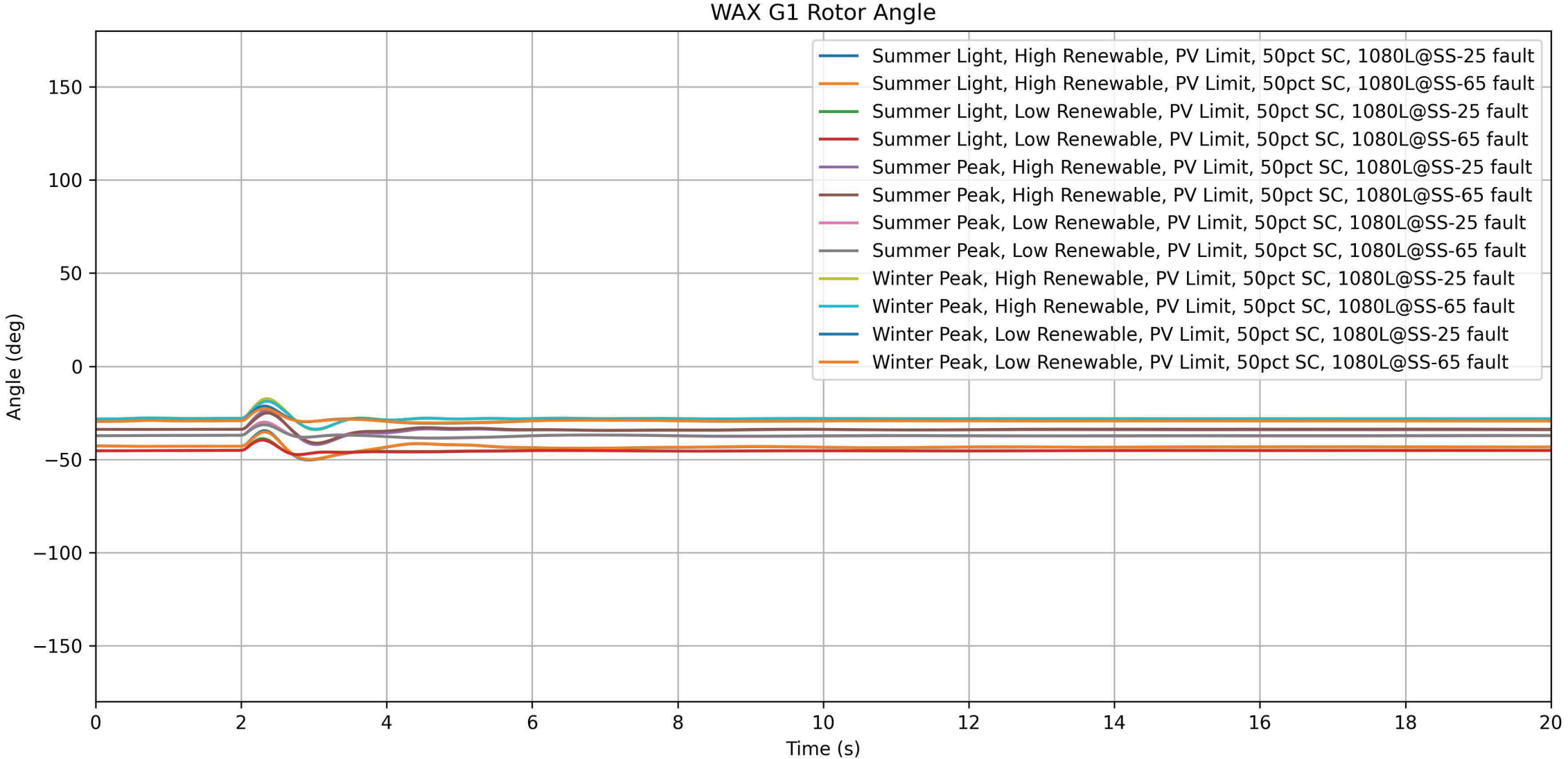

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

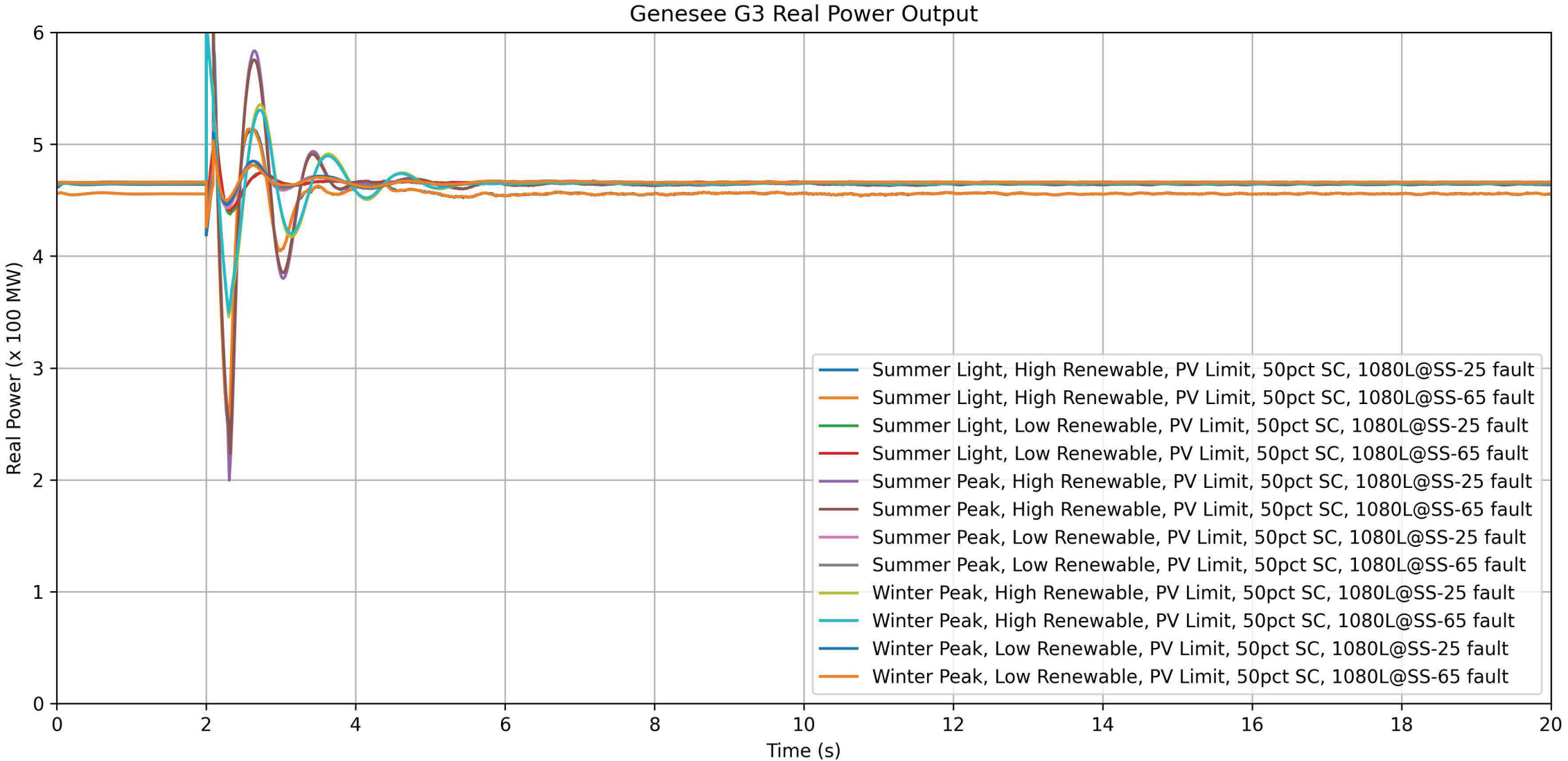

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

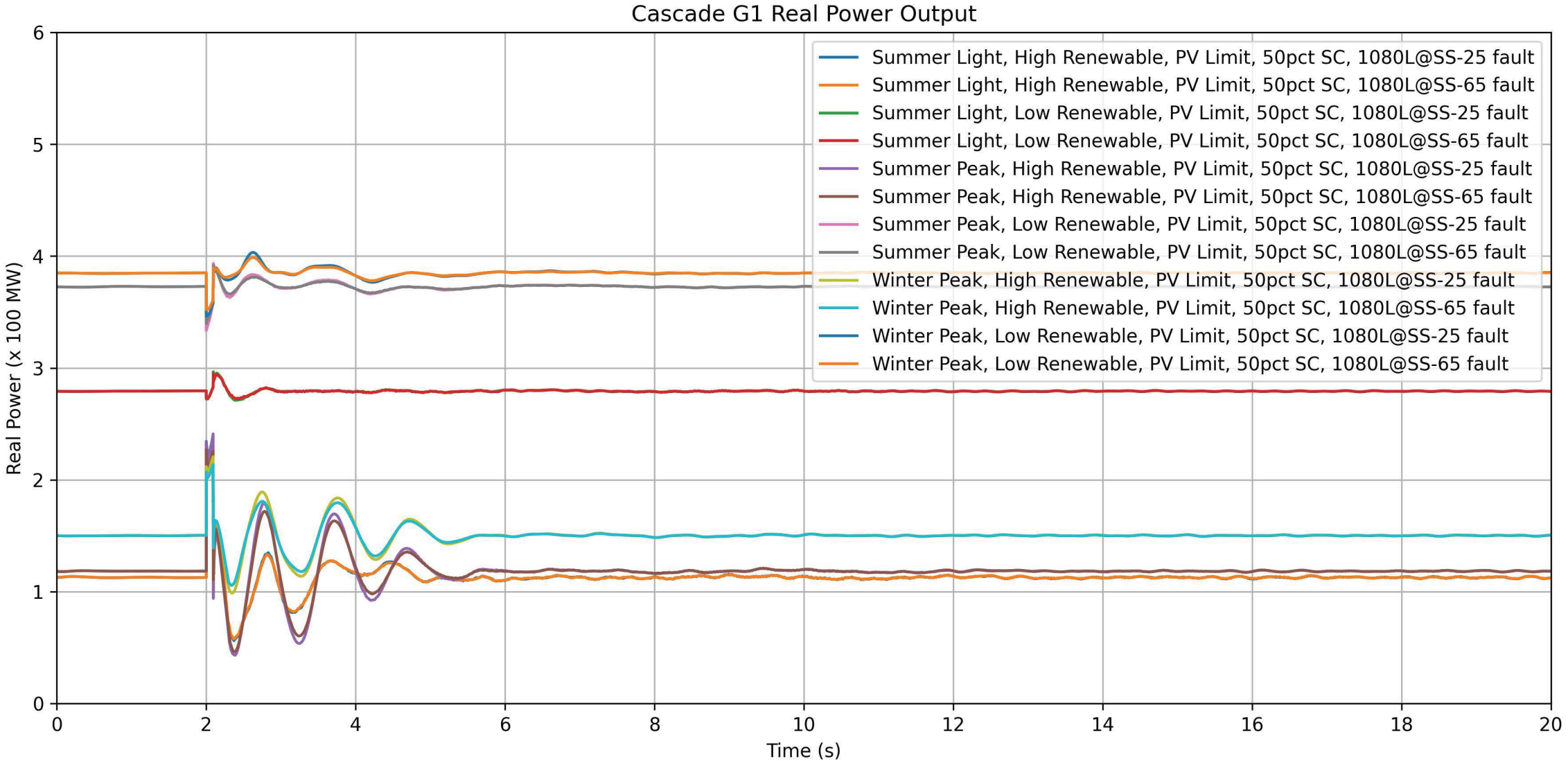

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

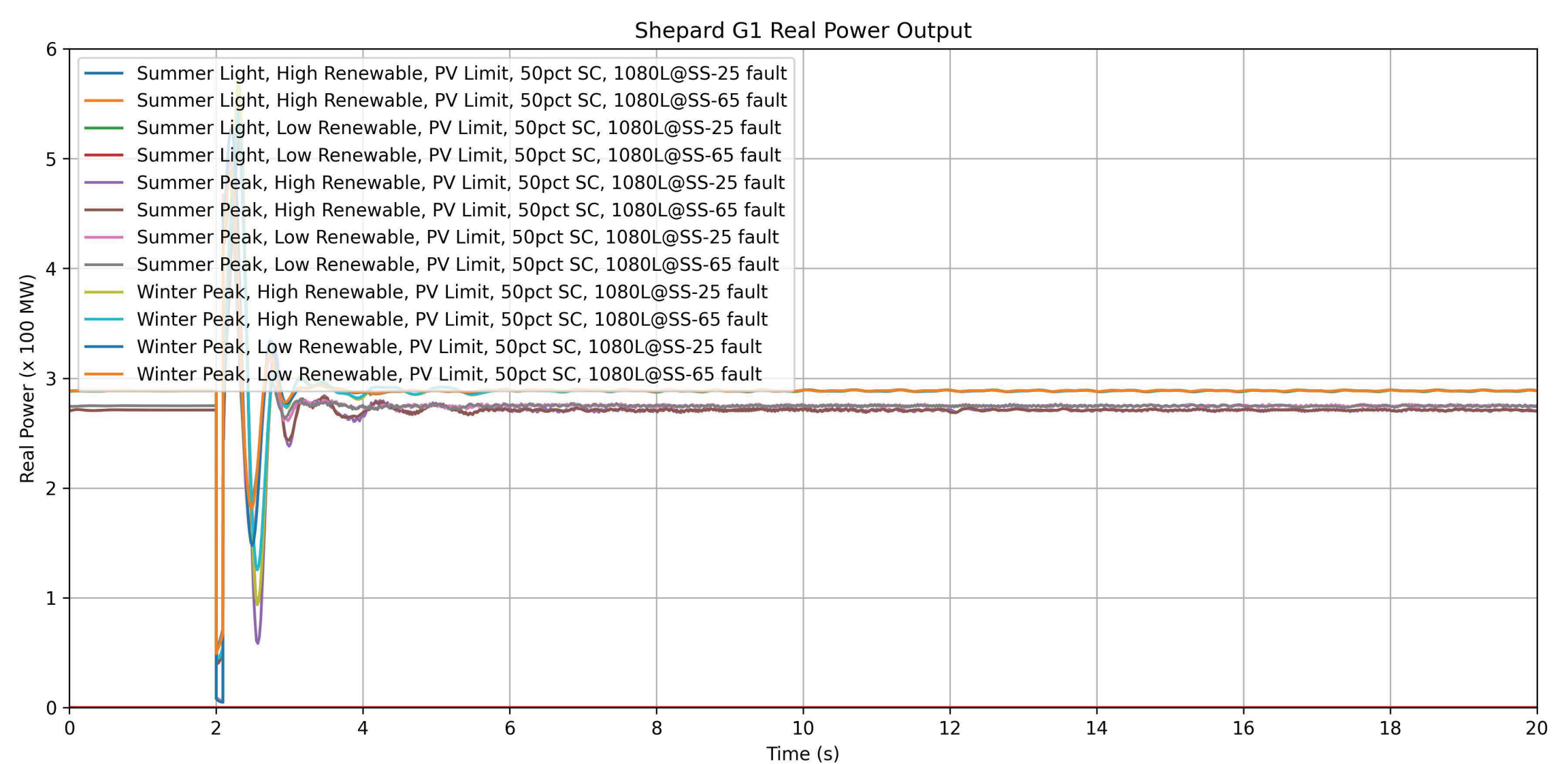

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

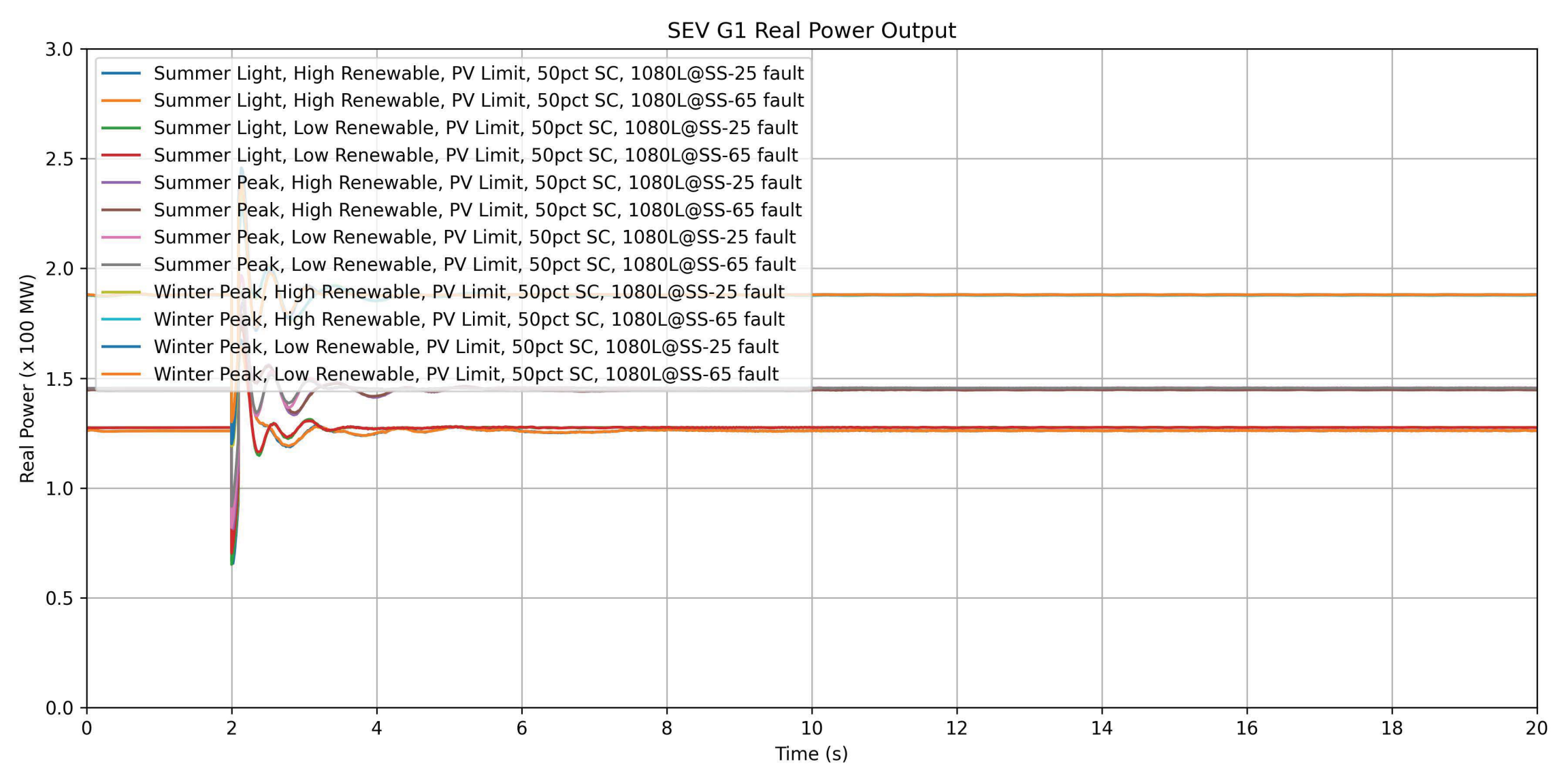

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

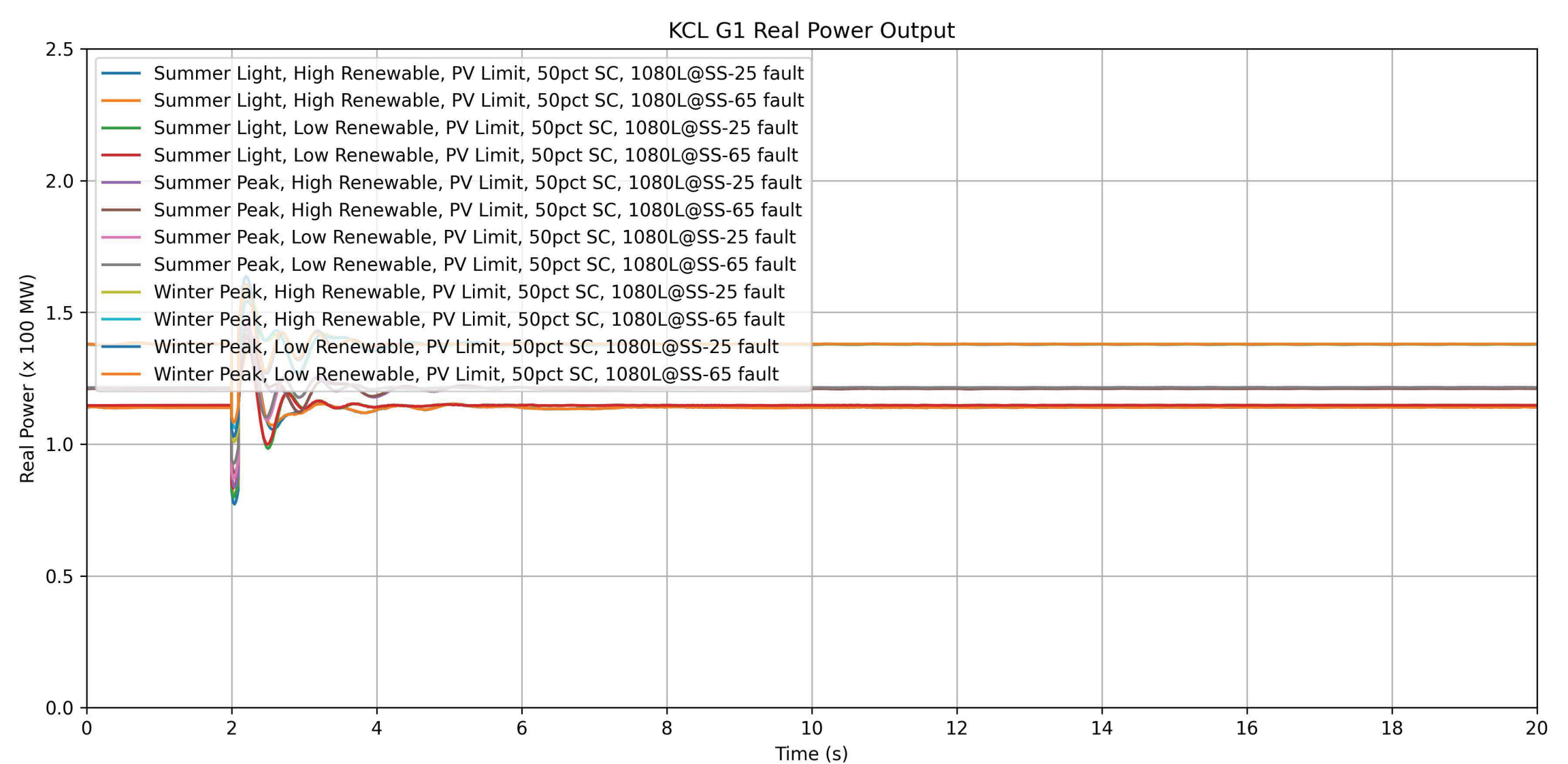

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

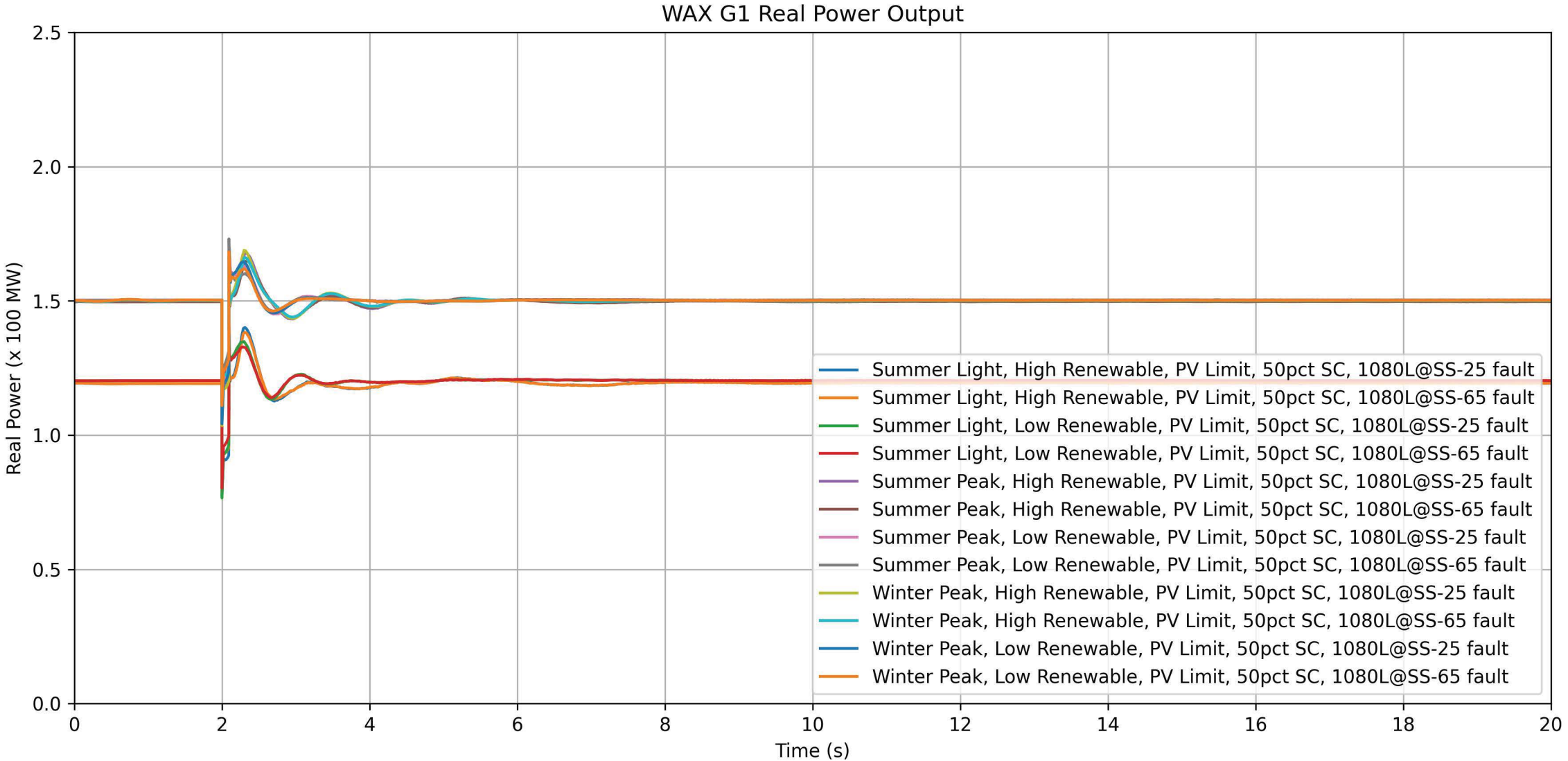

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

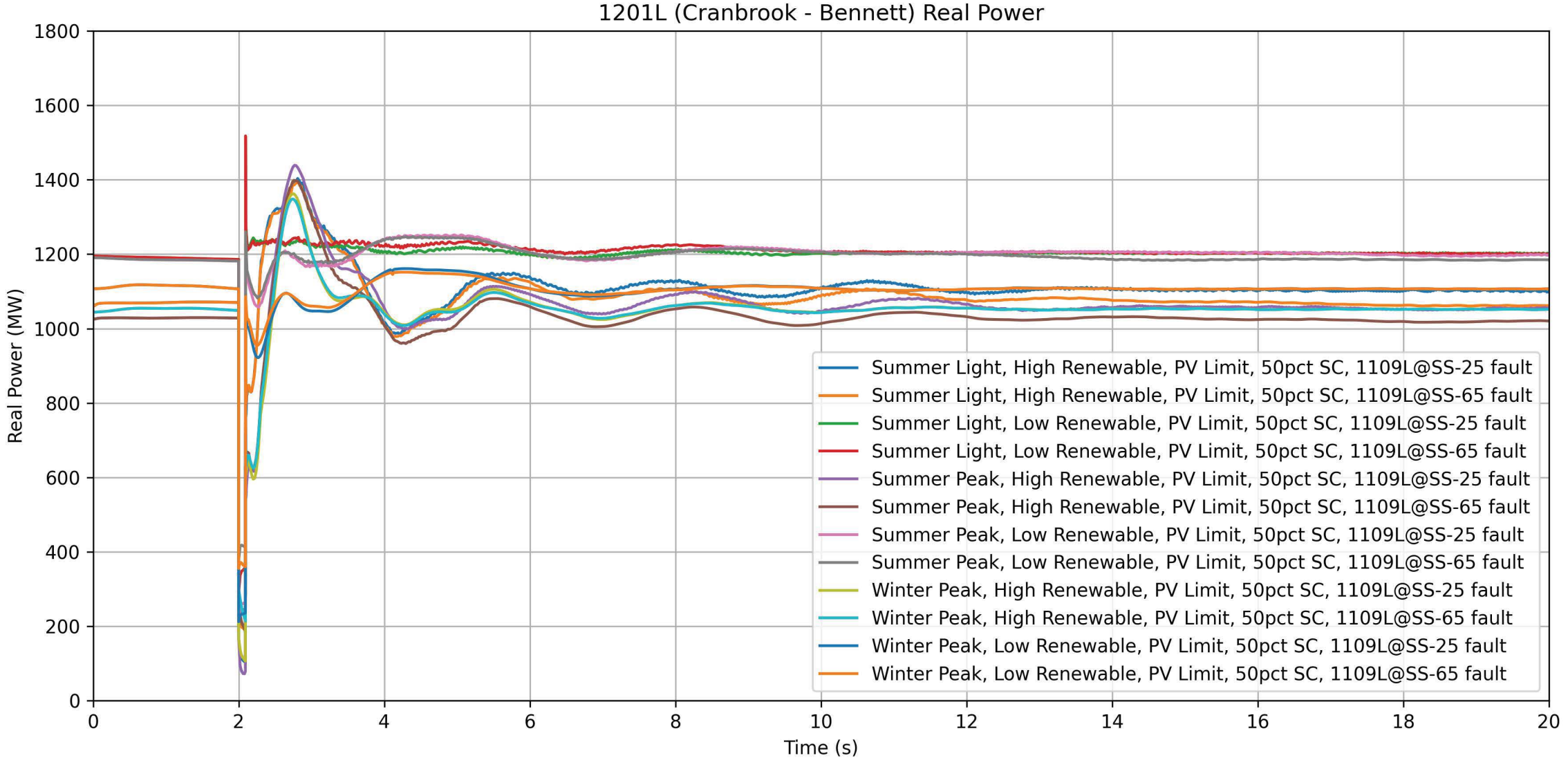

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

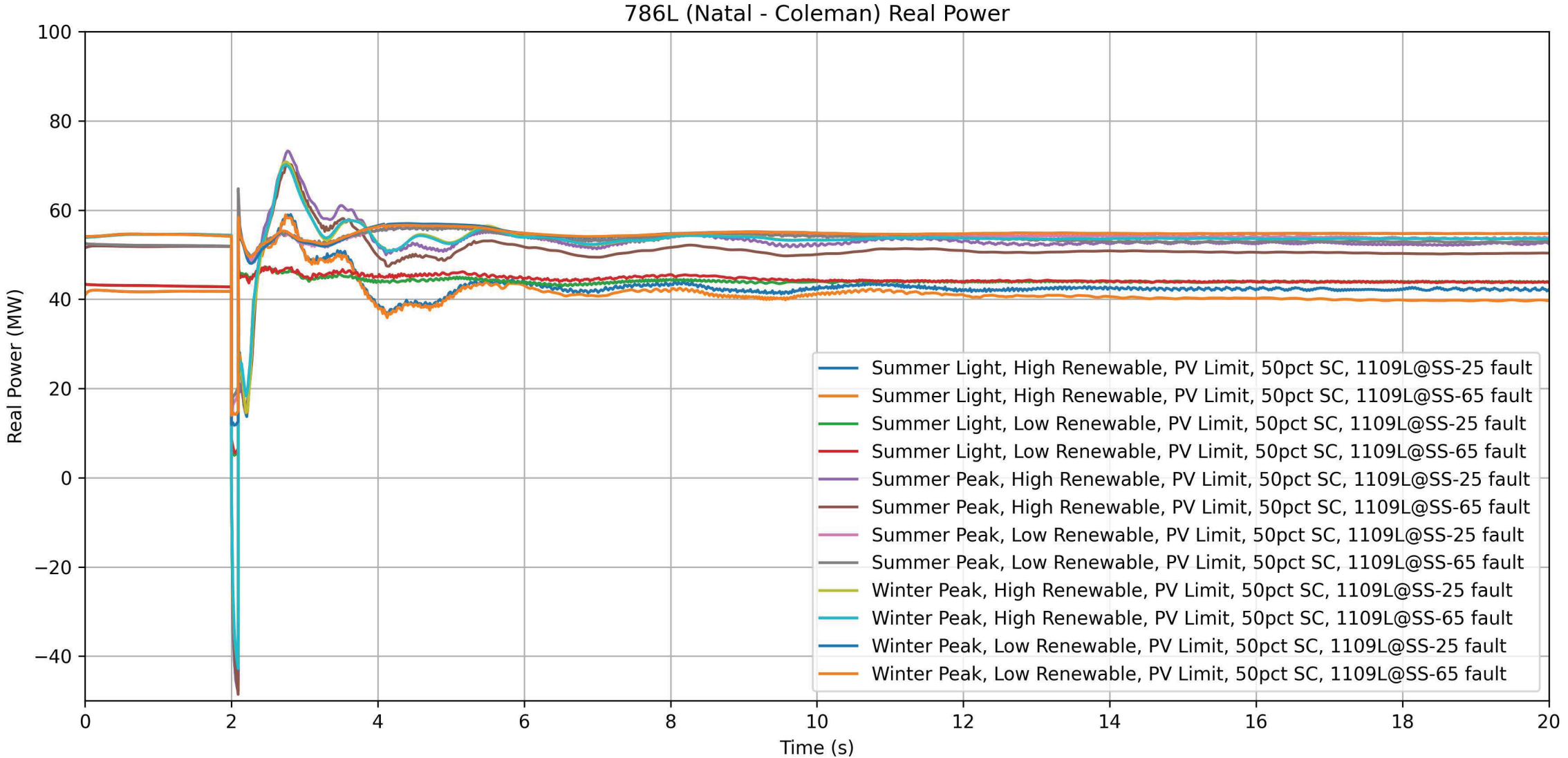

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

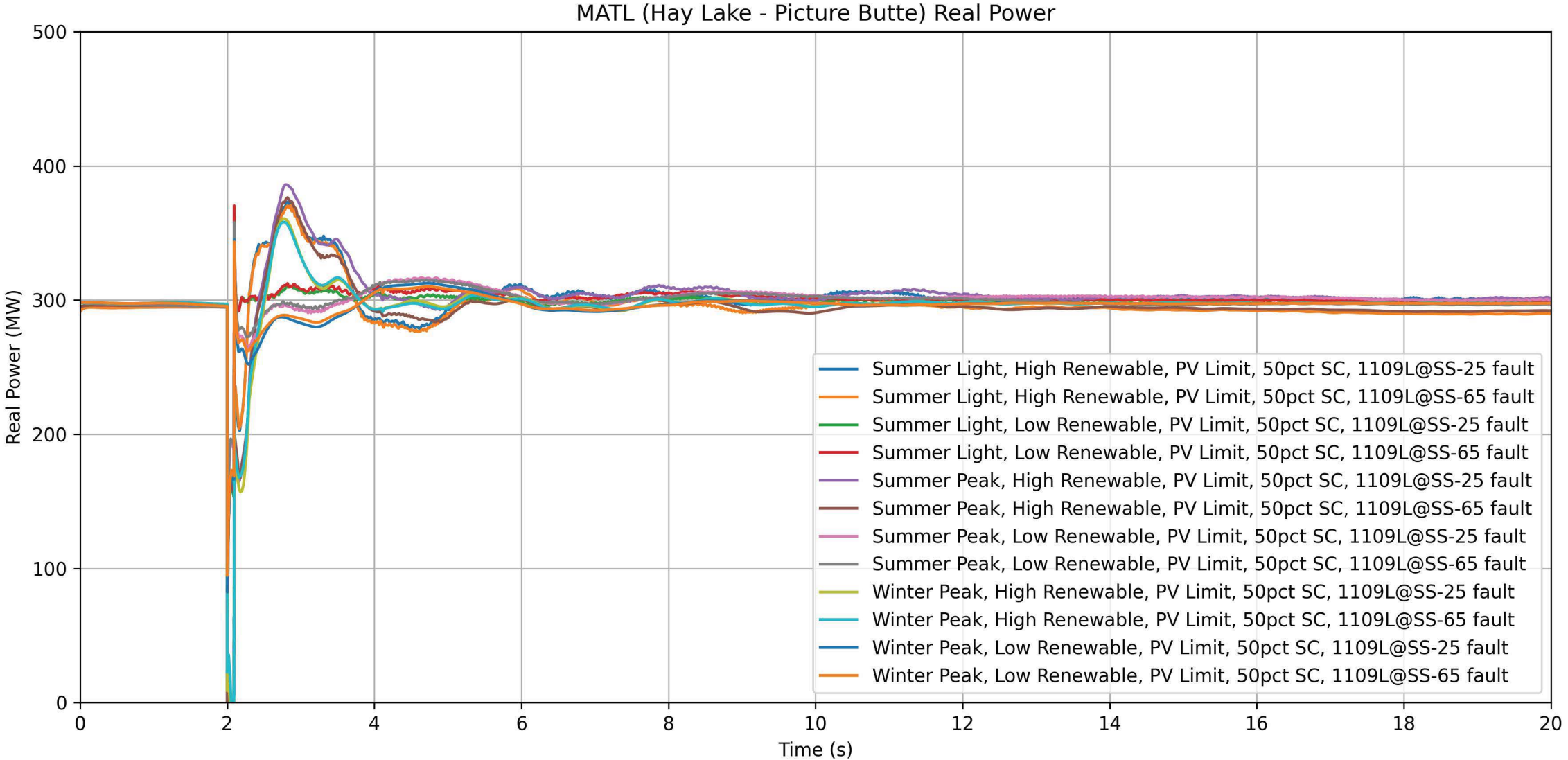

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

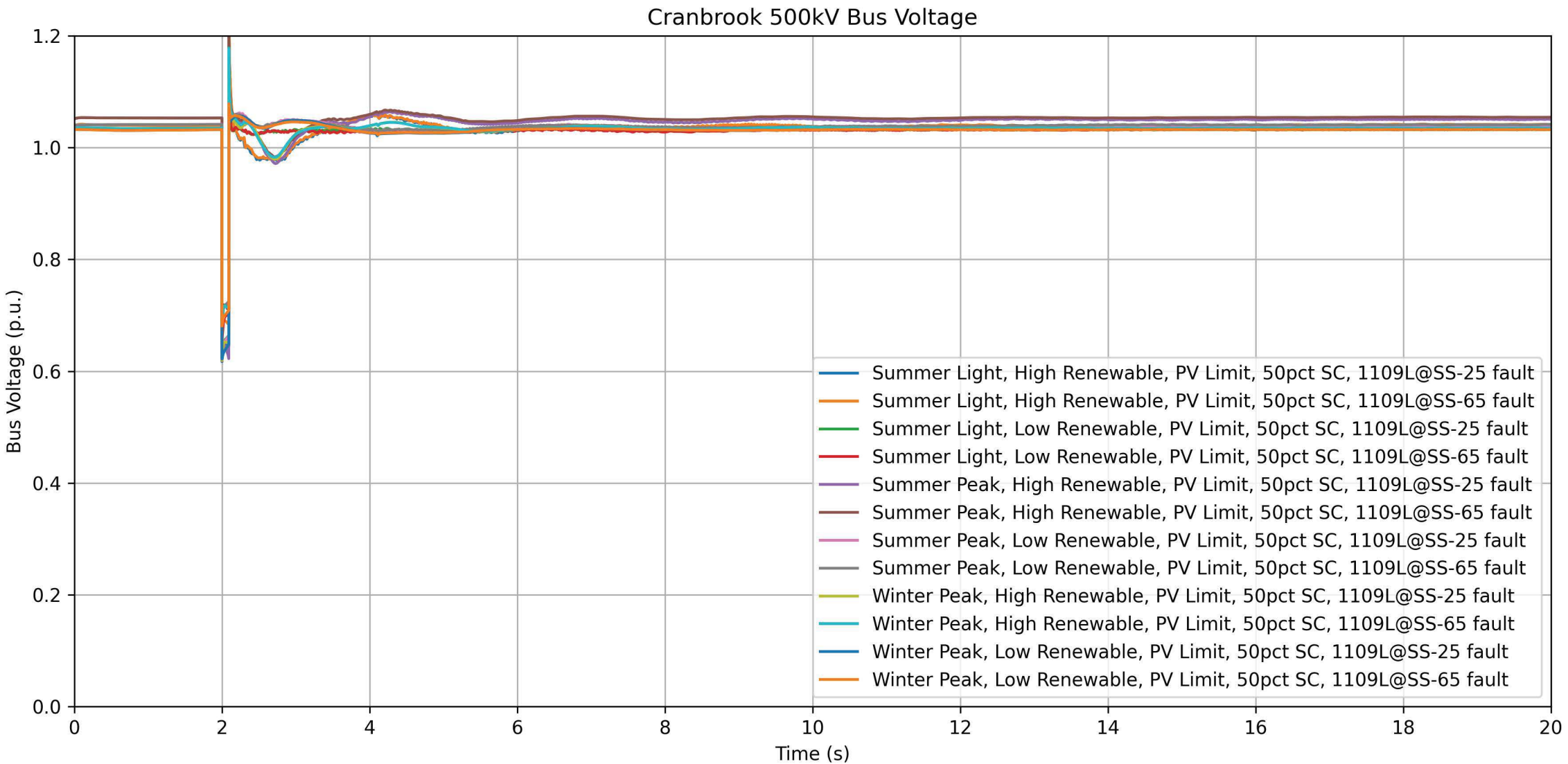

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

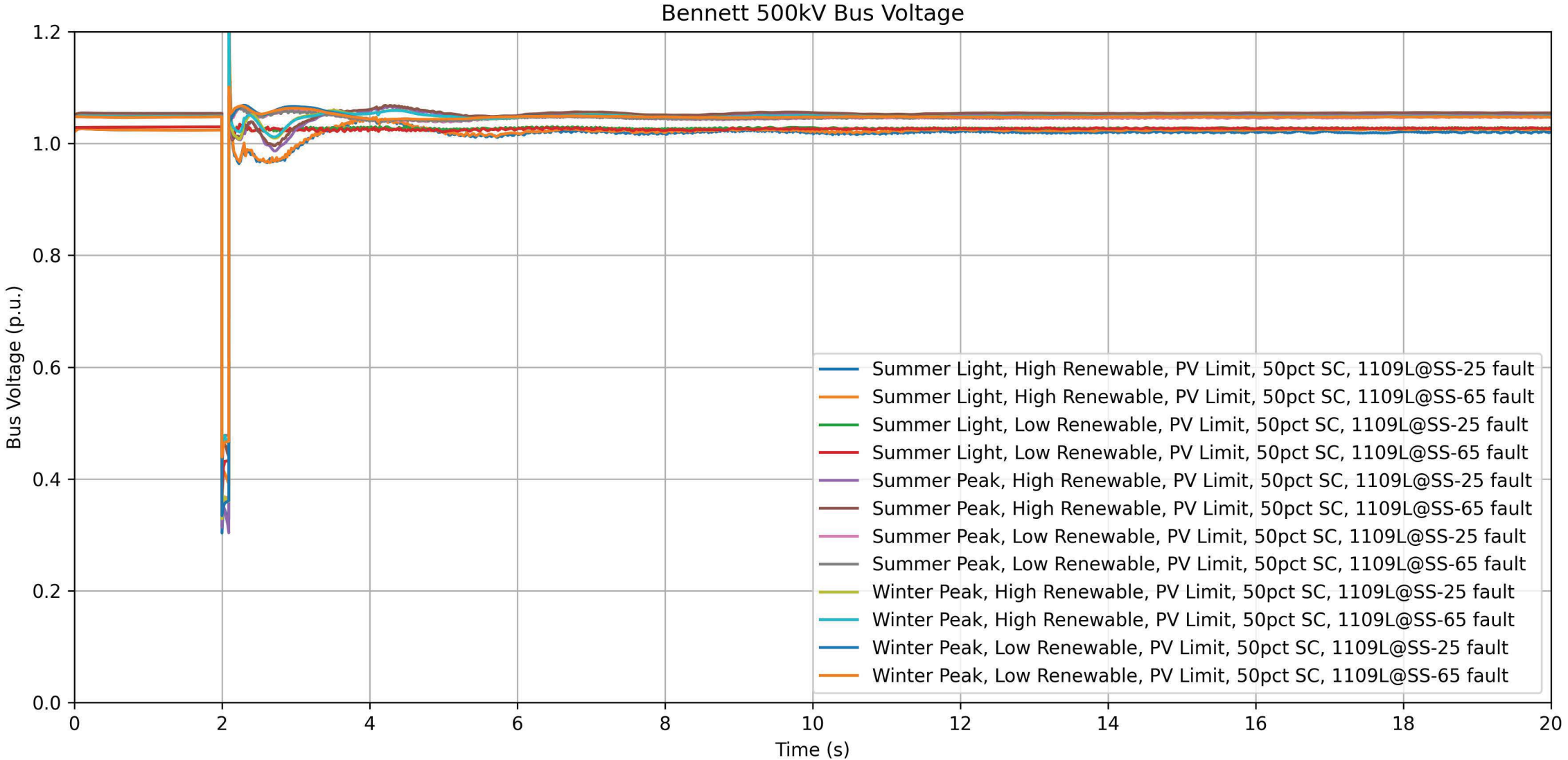

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L@SS-65 fault

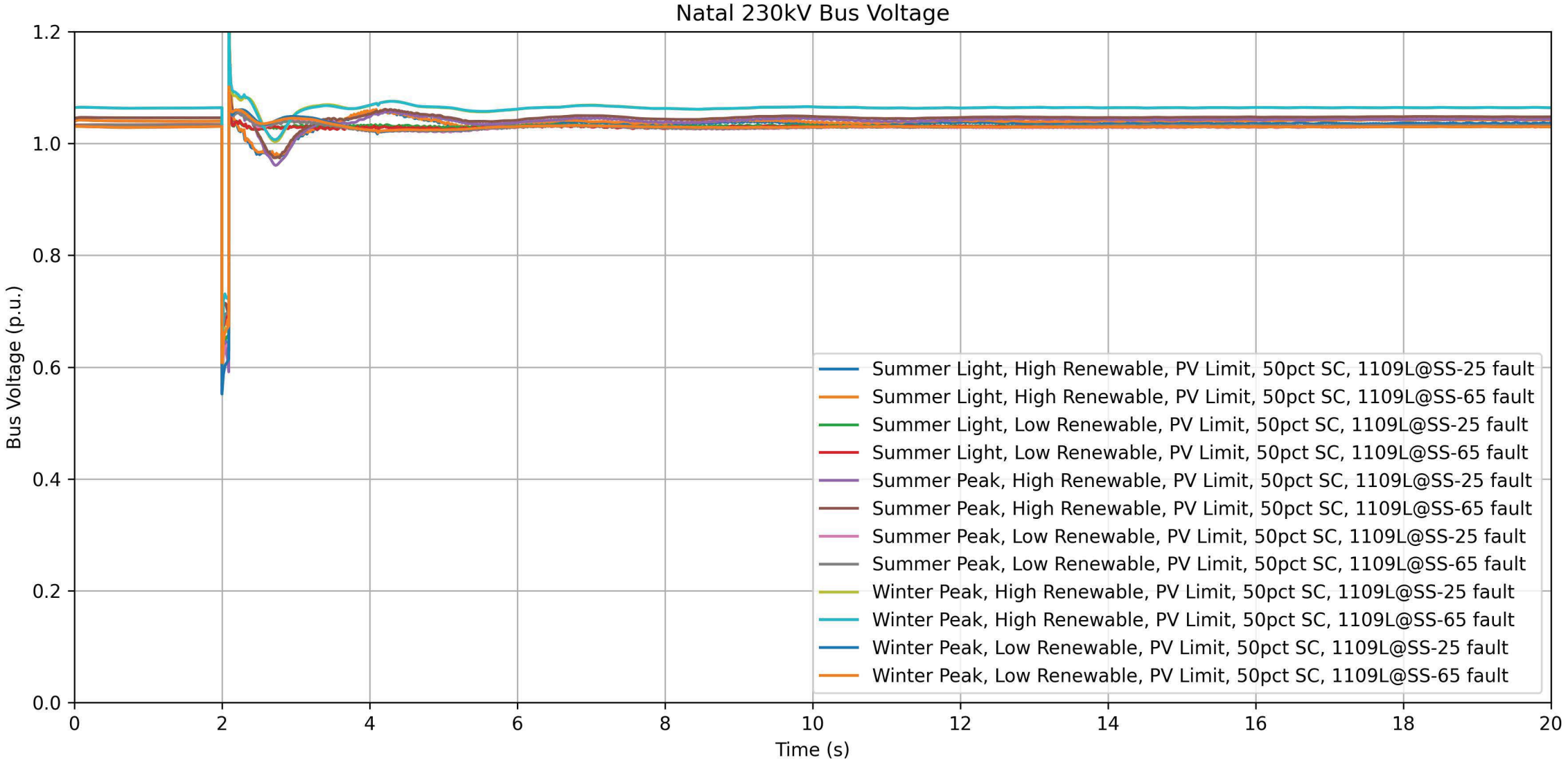

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

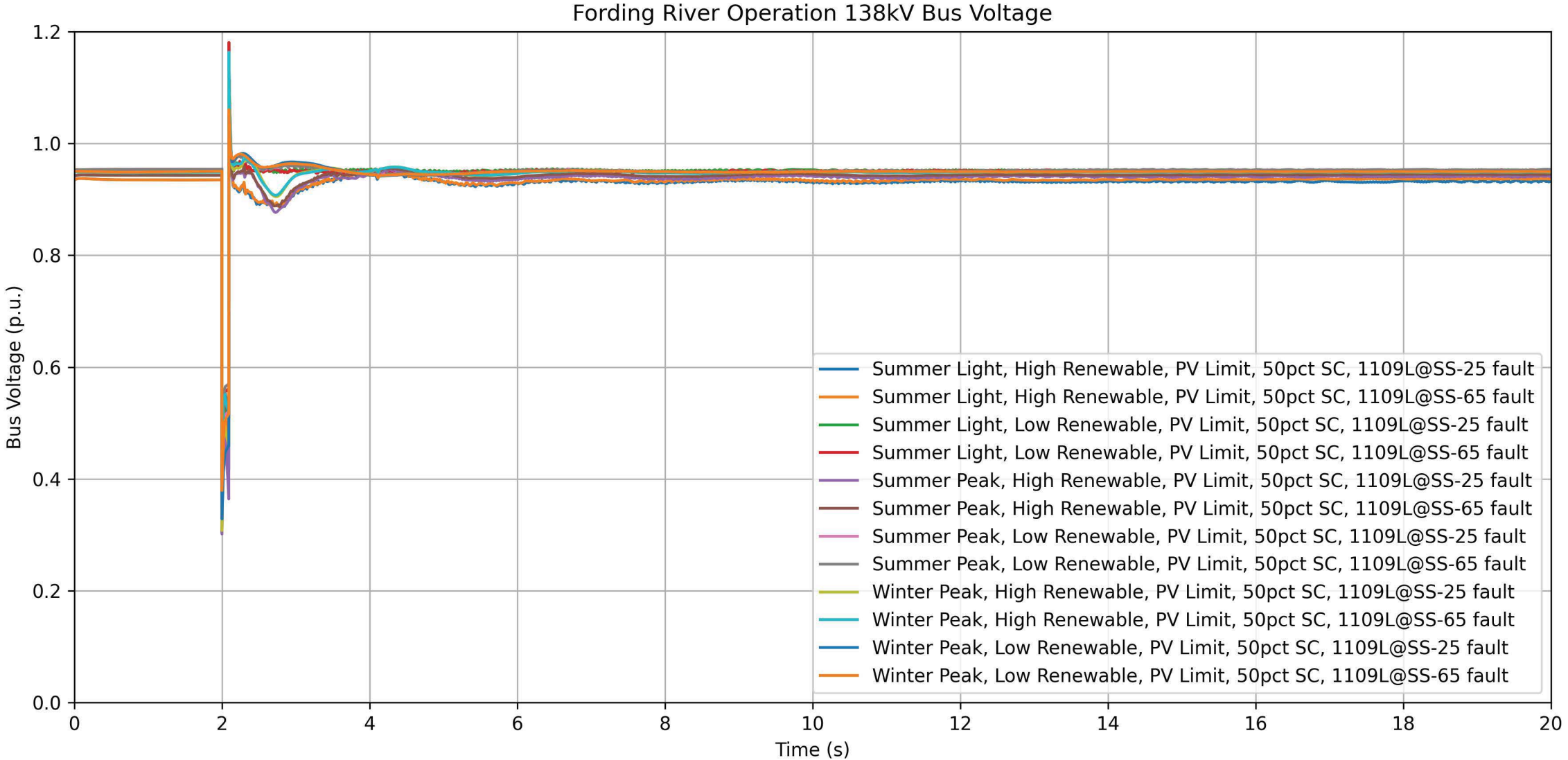

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

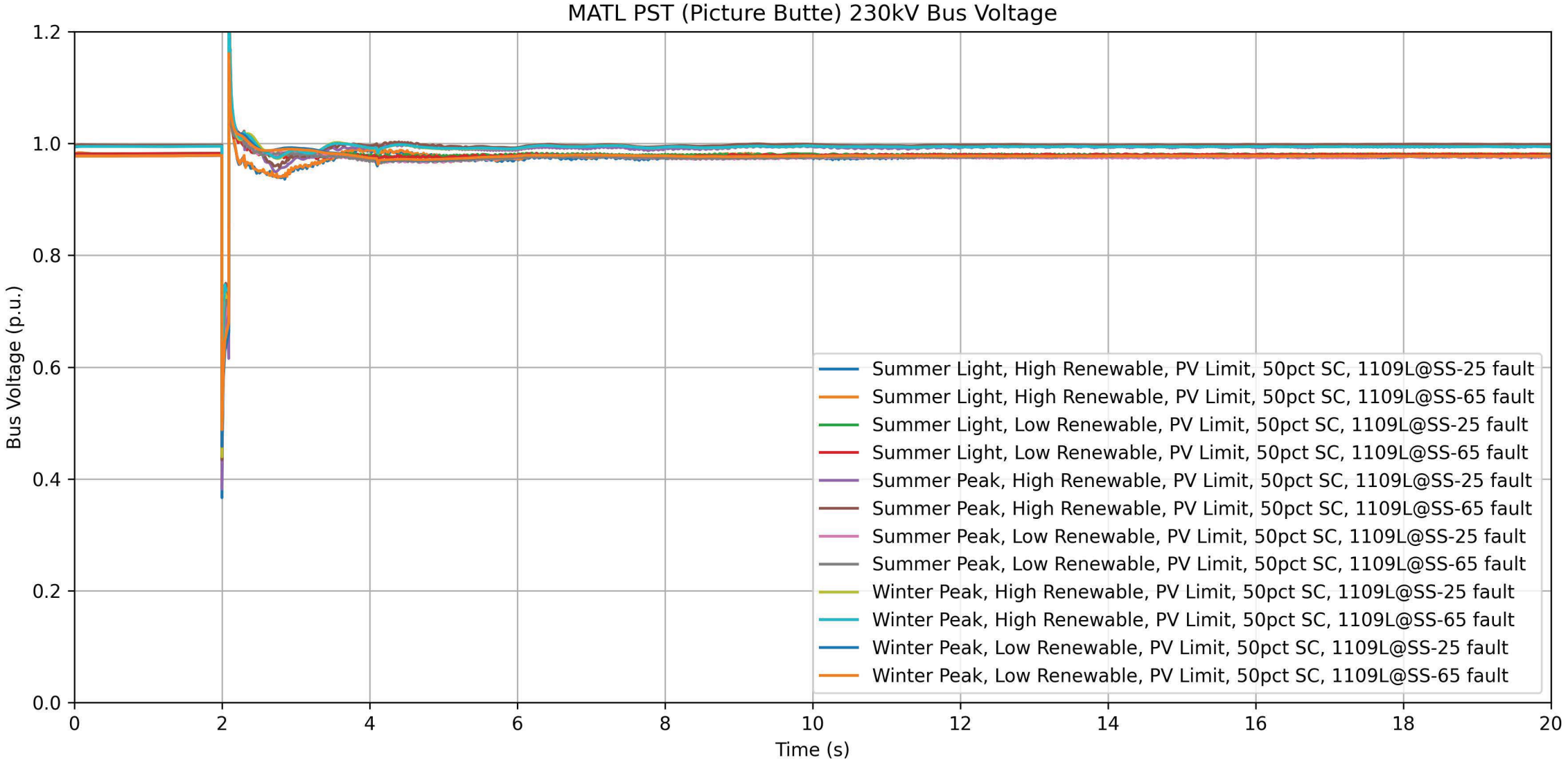

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

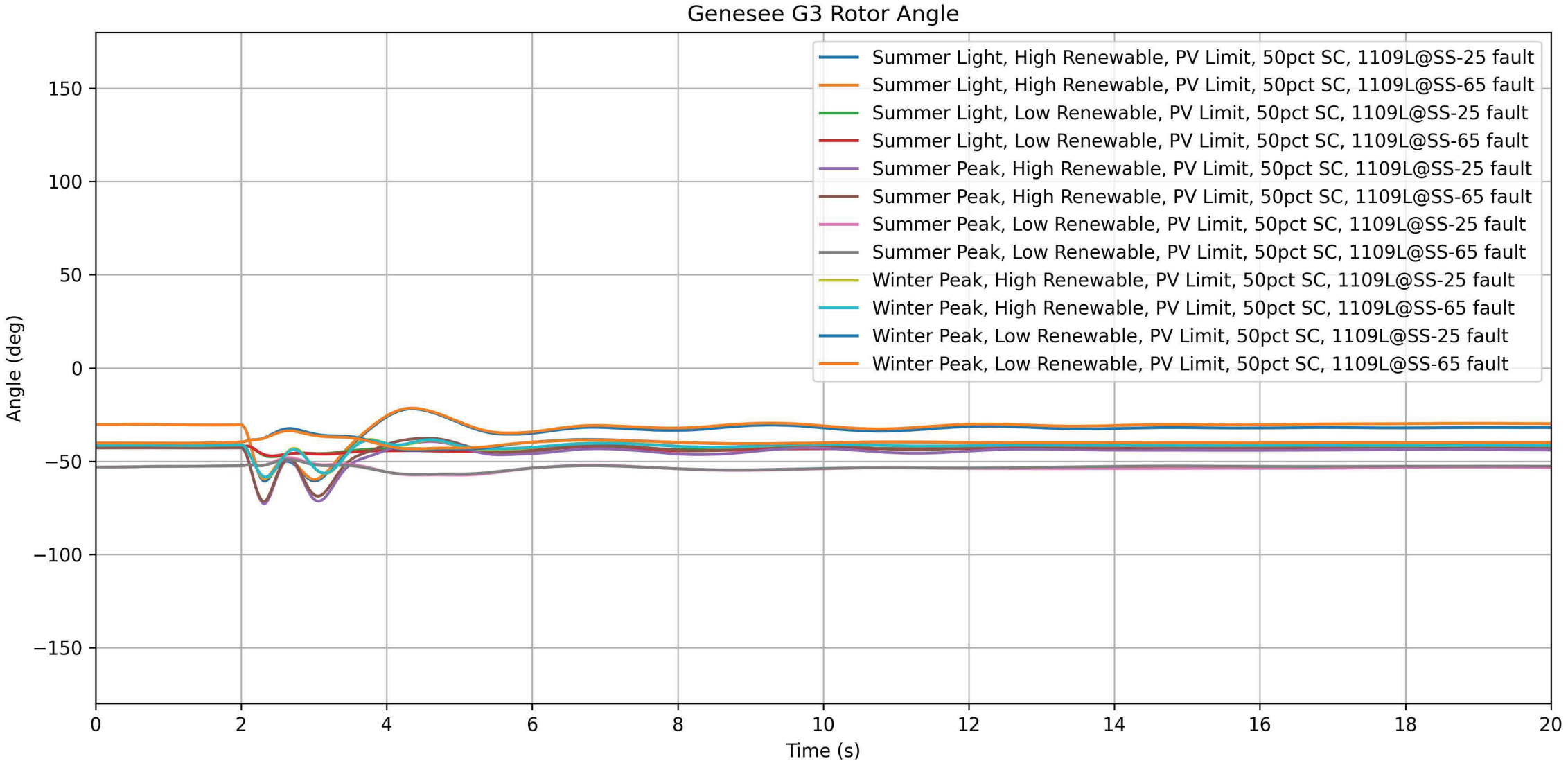

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

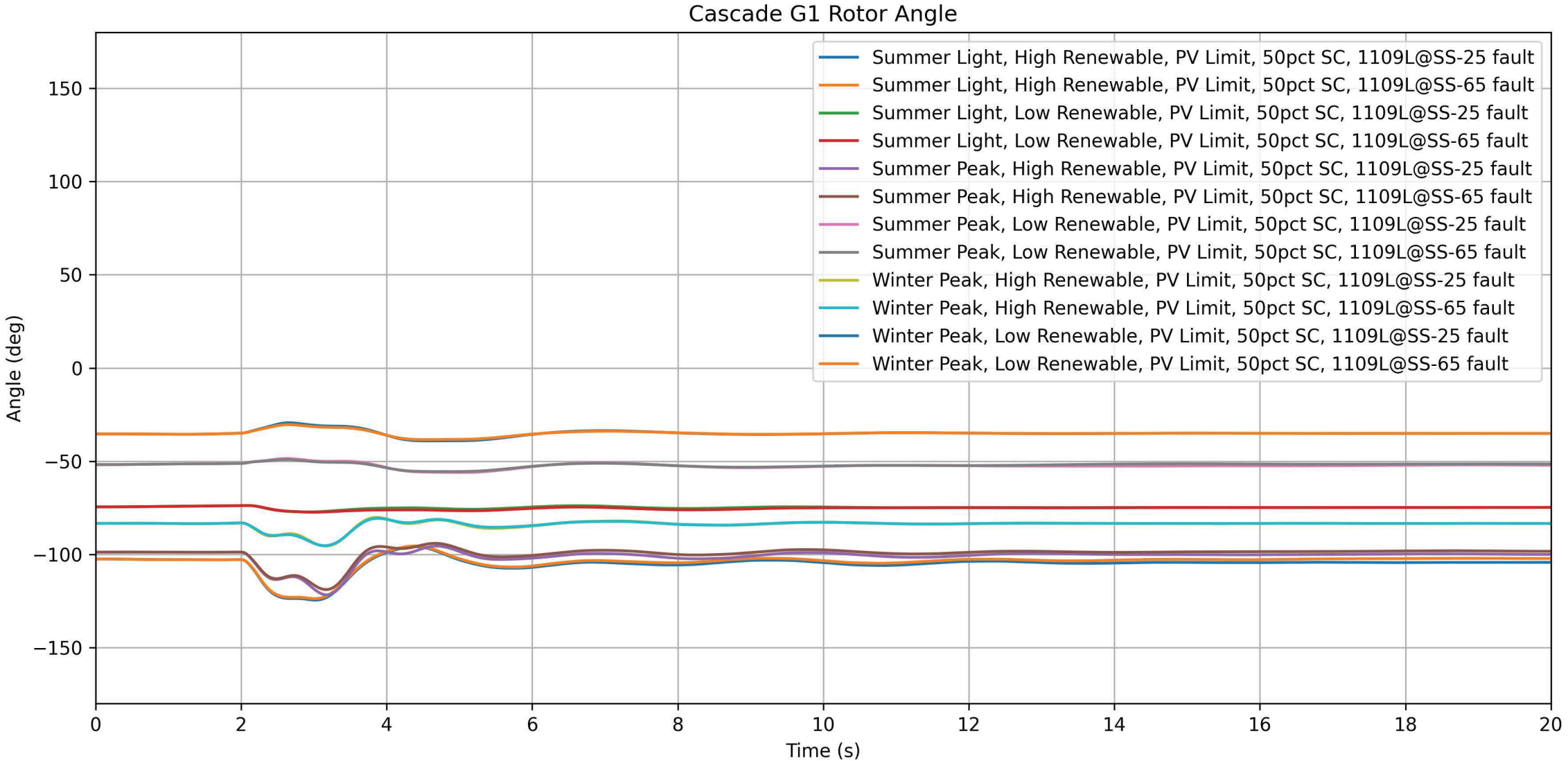

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

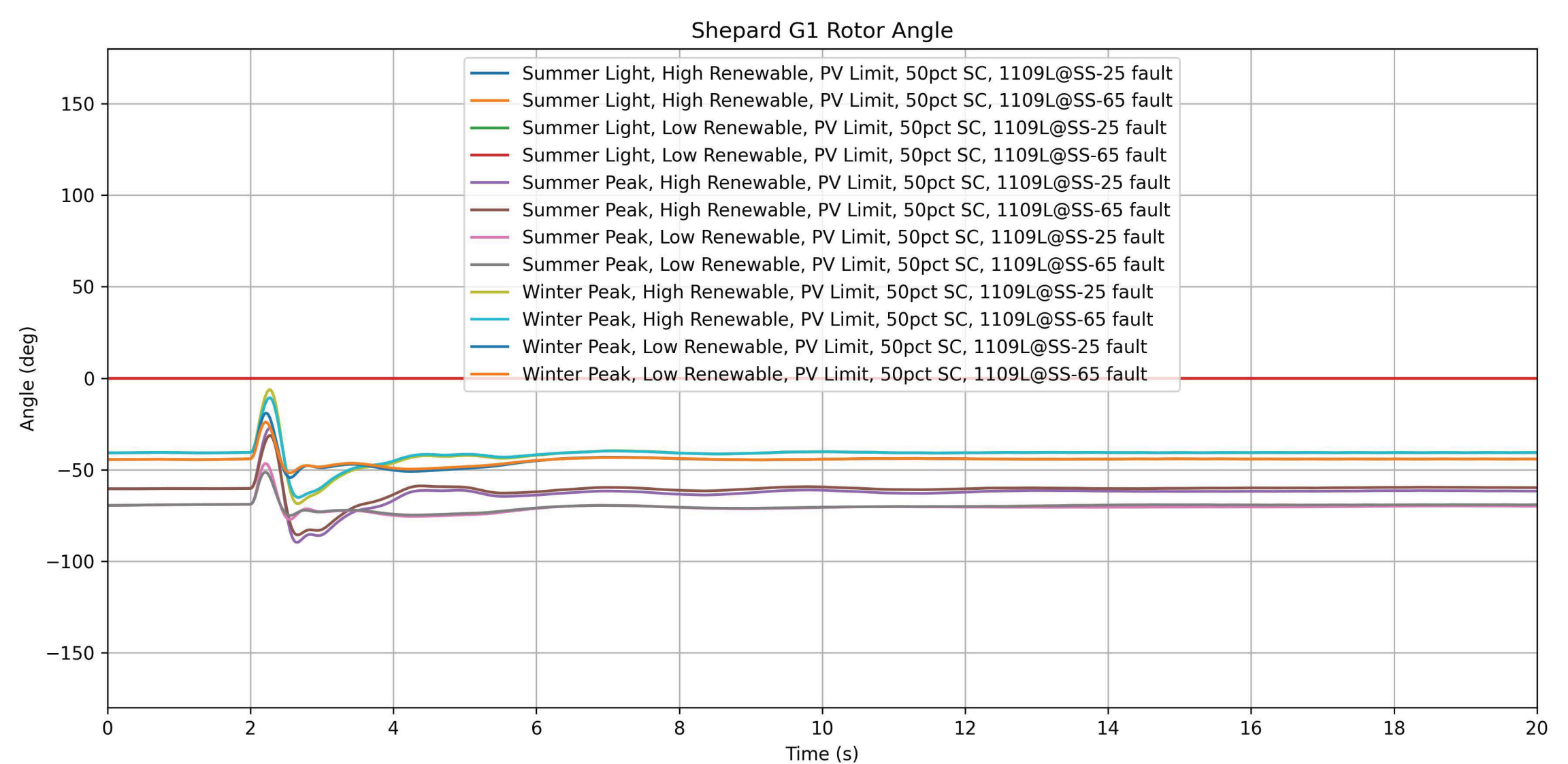

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

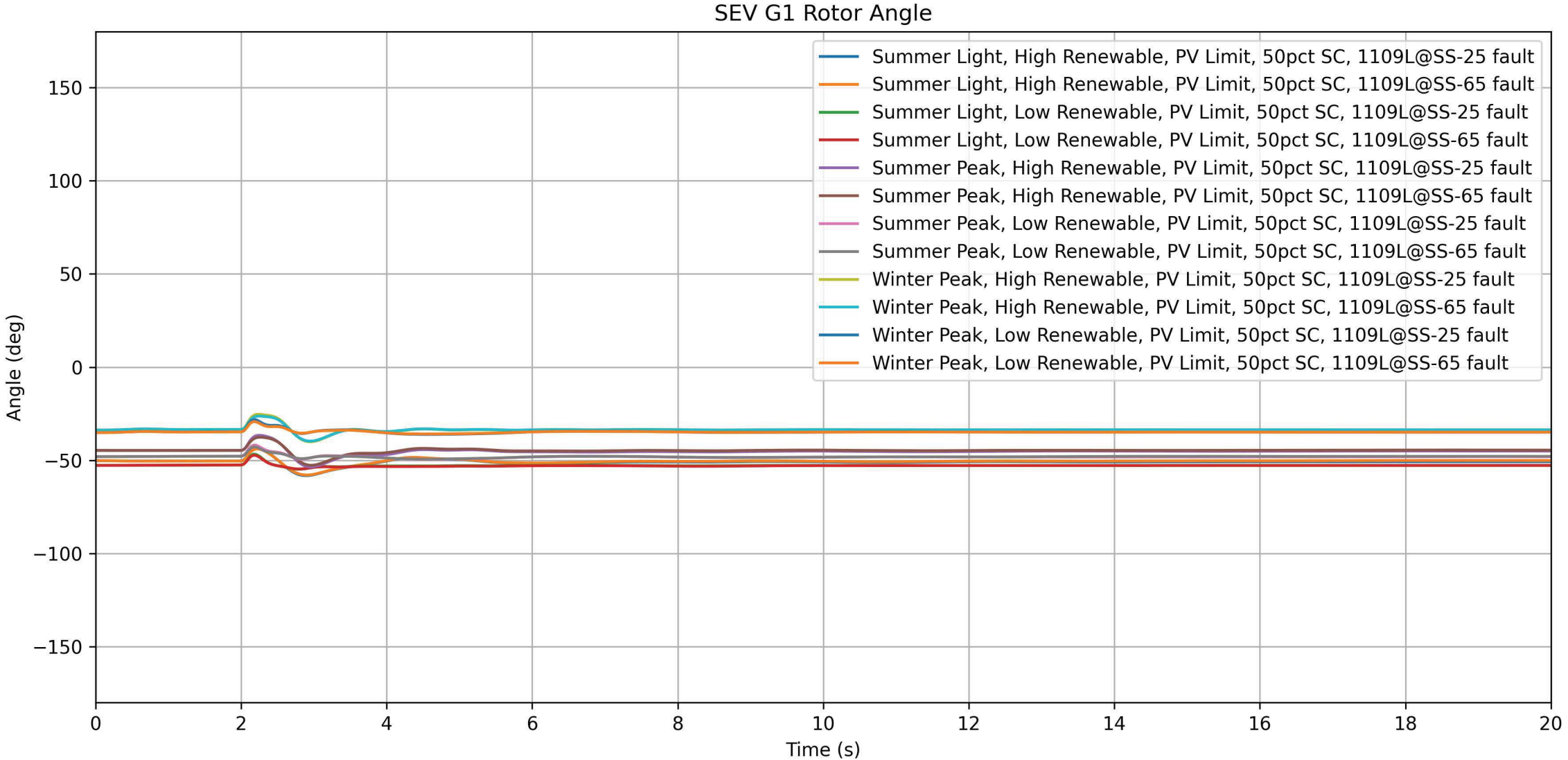

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

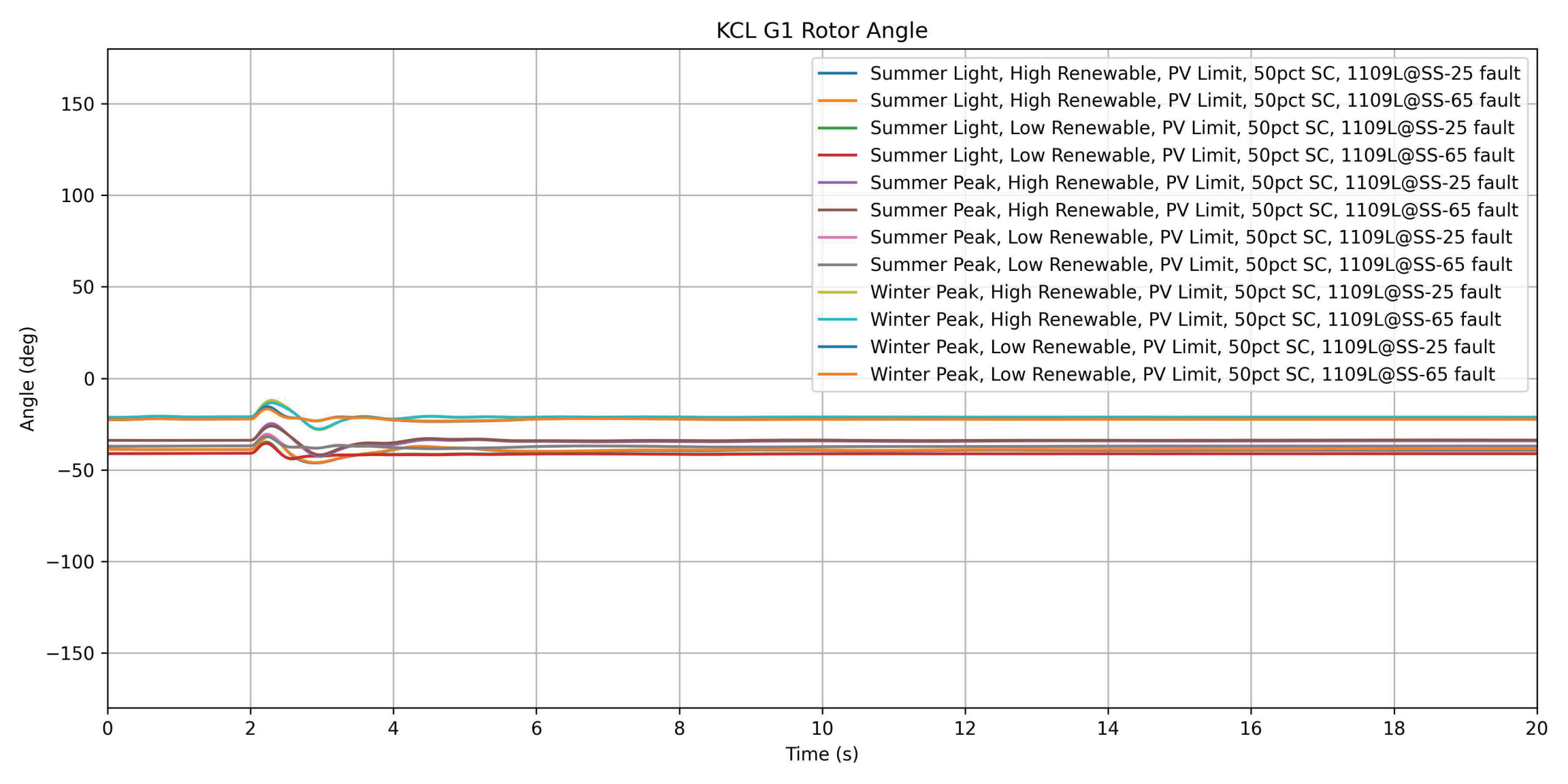

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

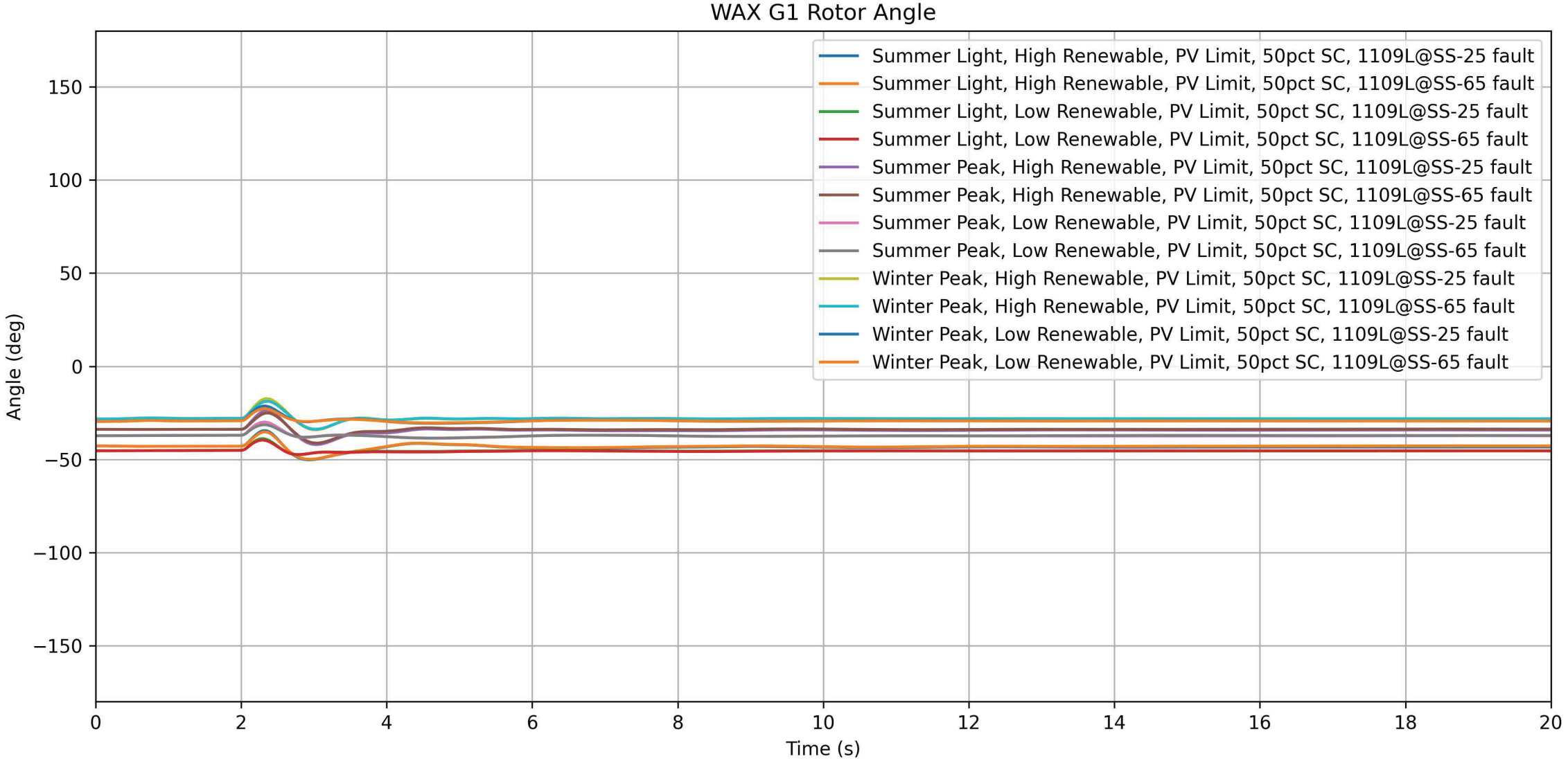

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

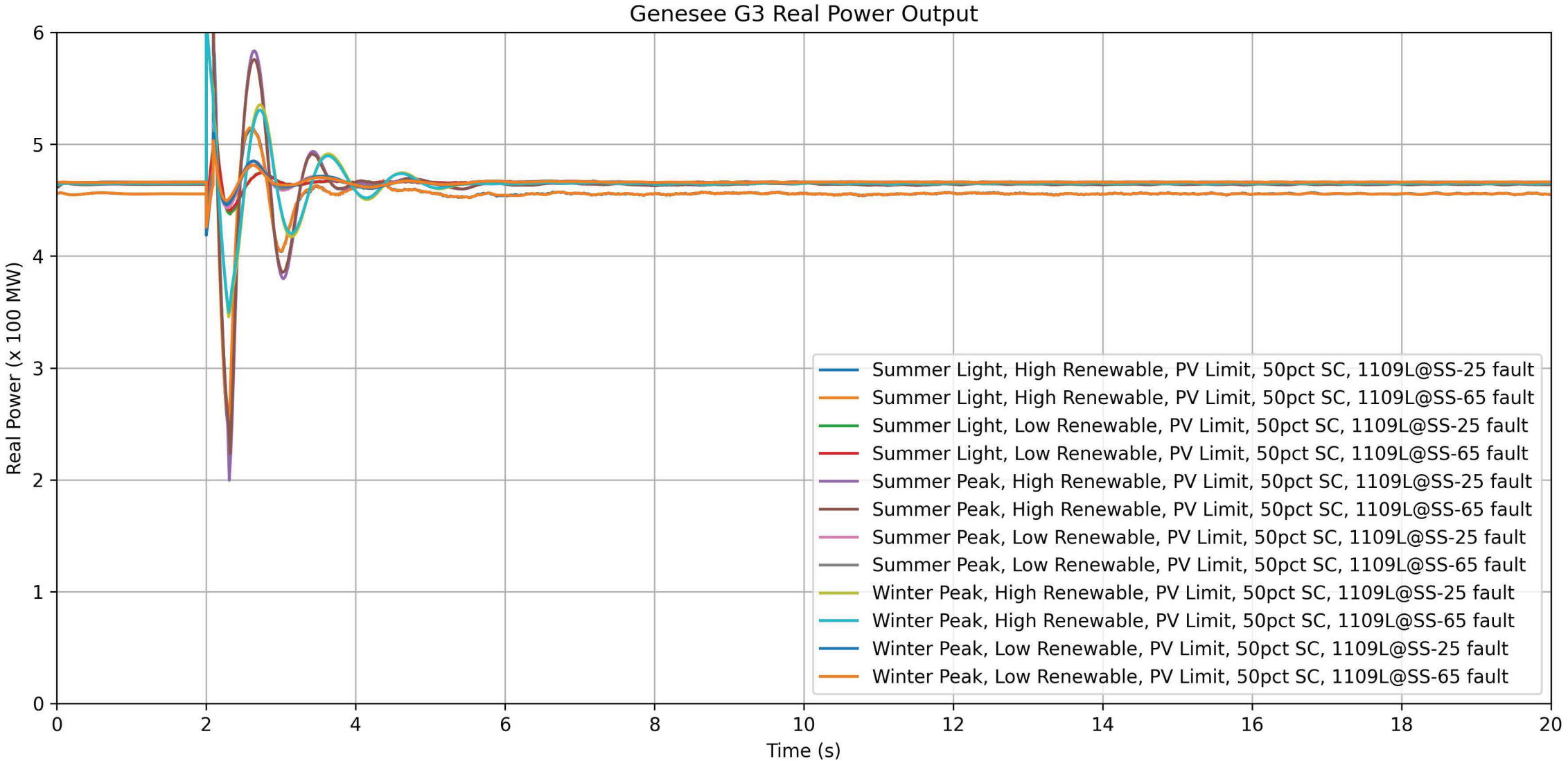

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

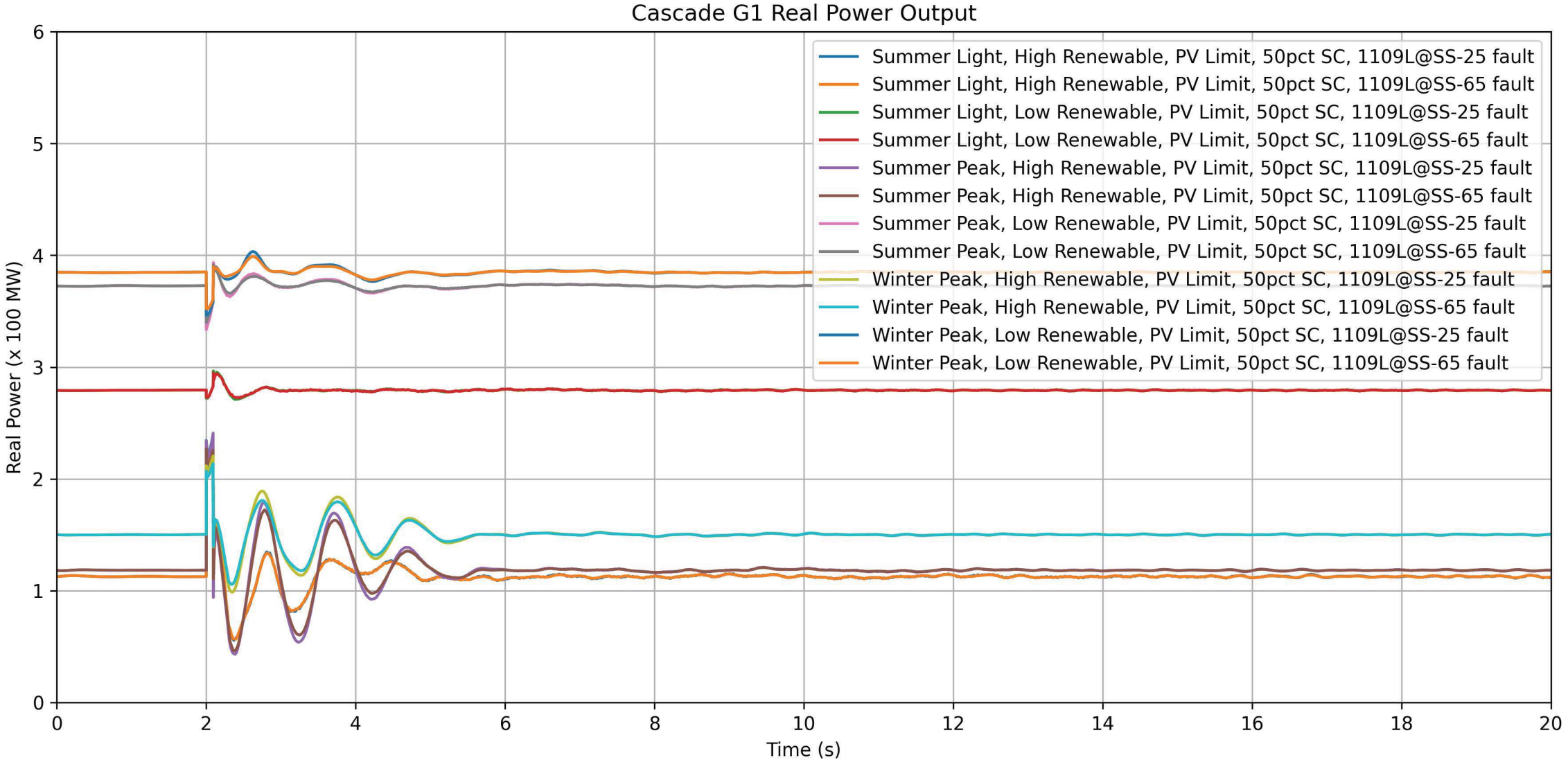

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

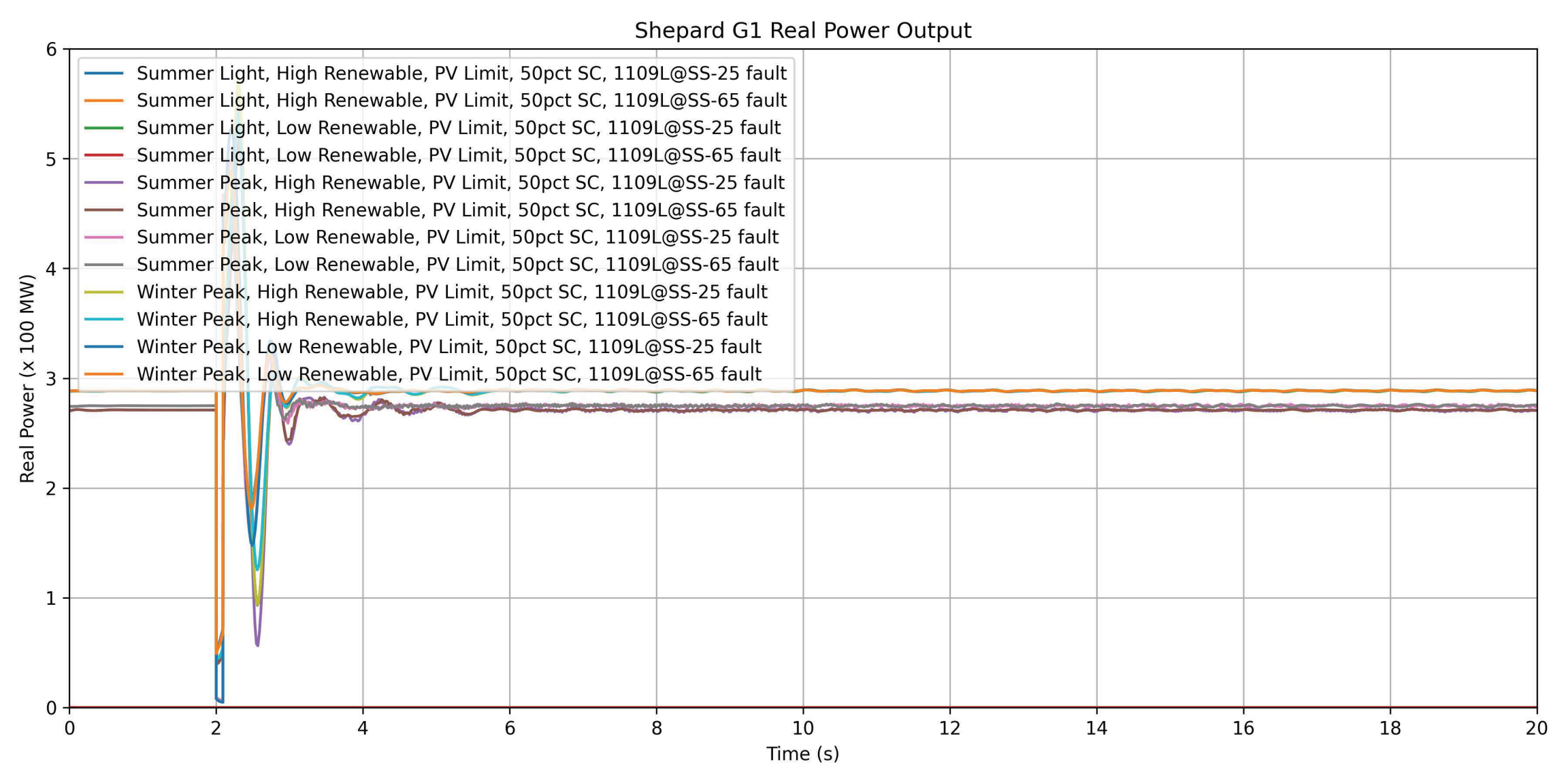

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

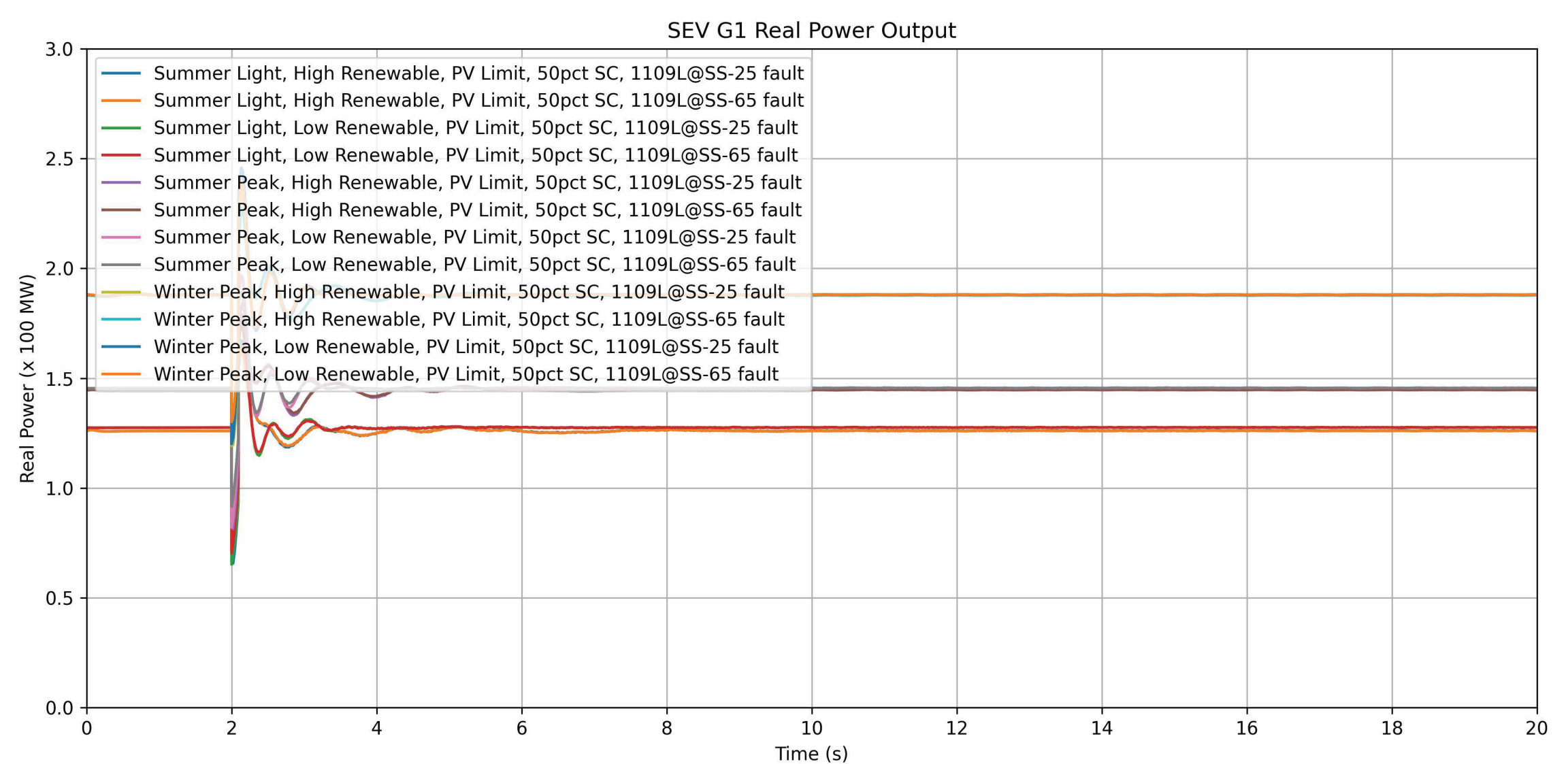

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

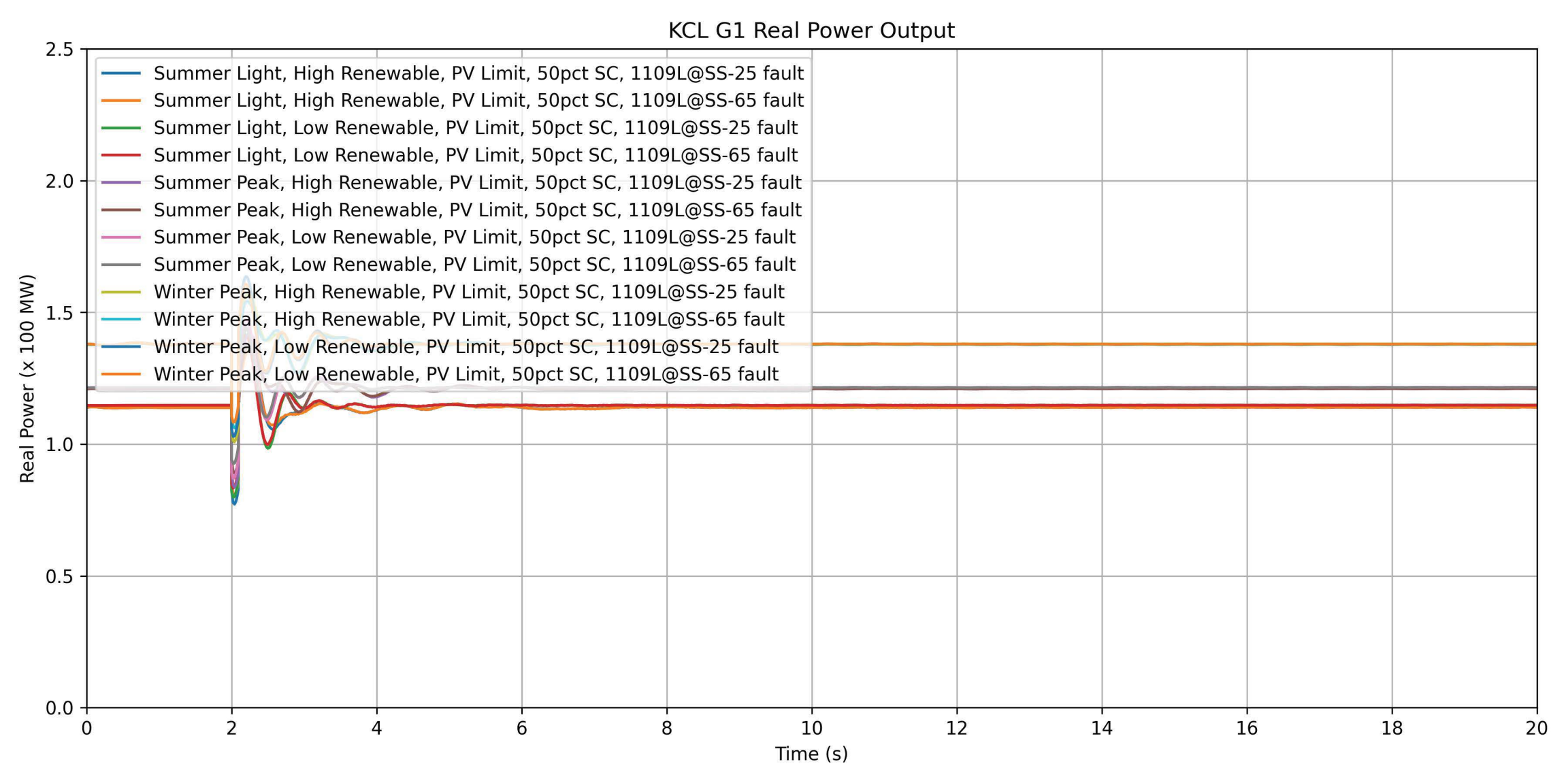

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

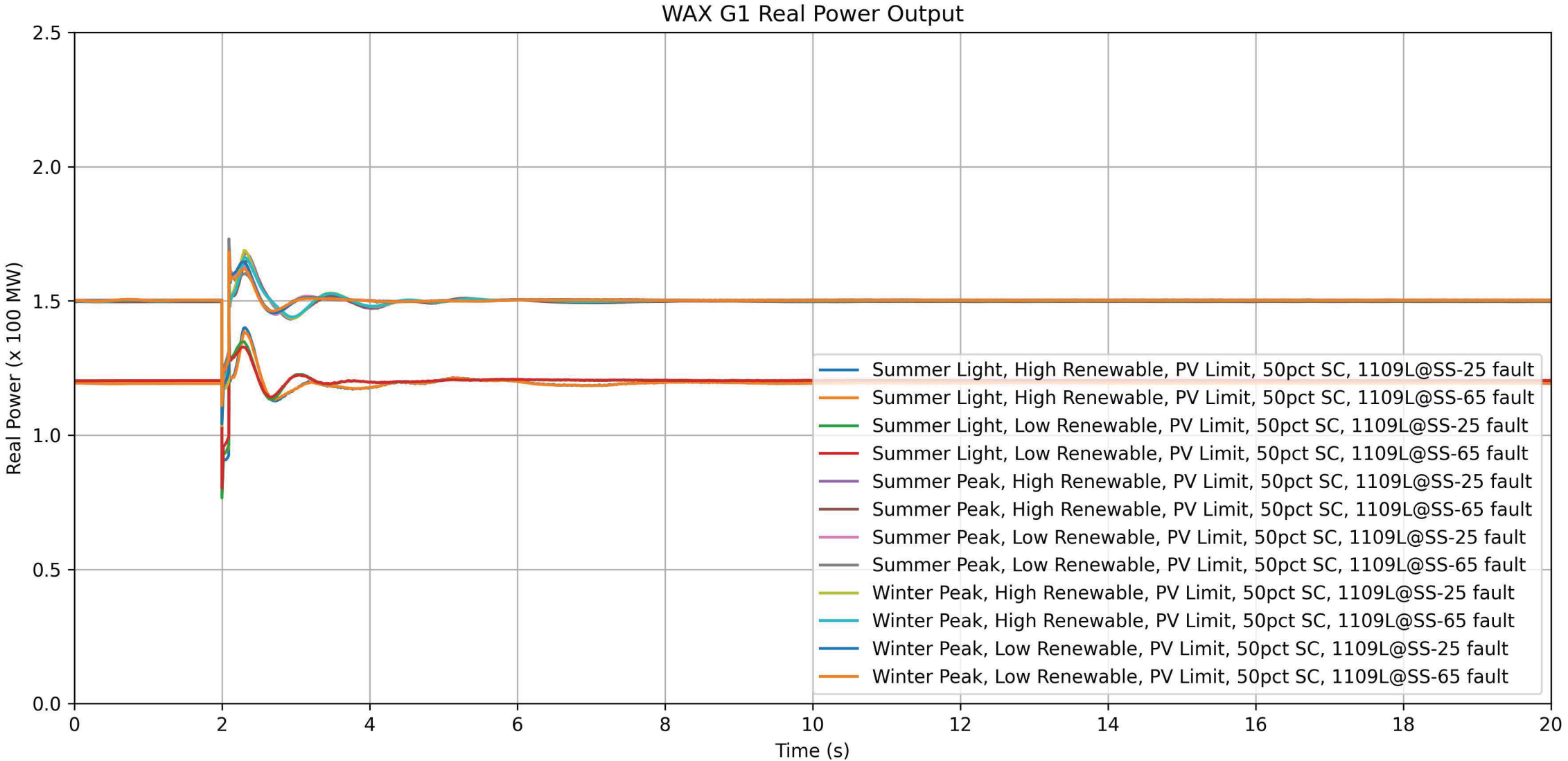

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

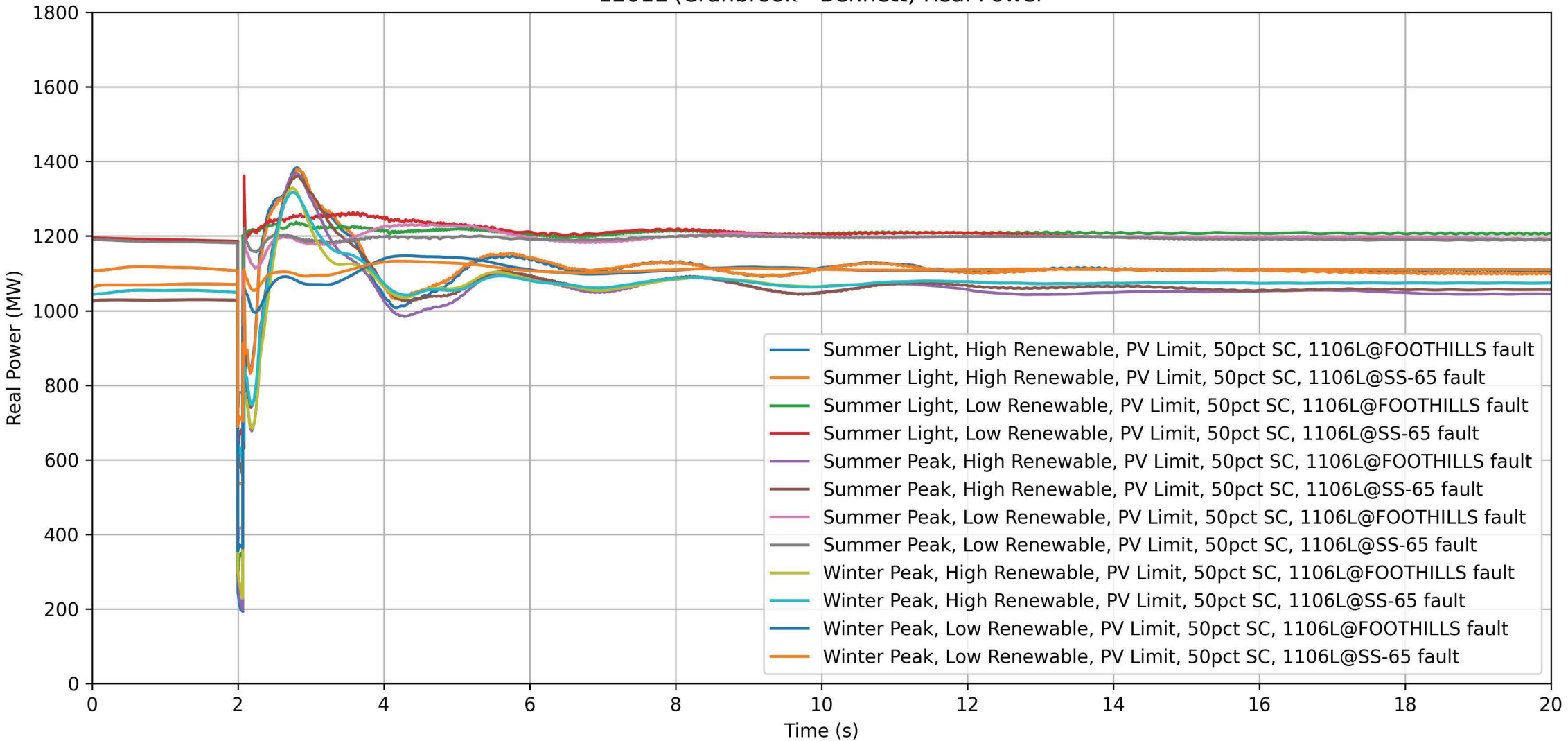

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

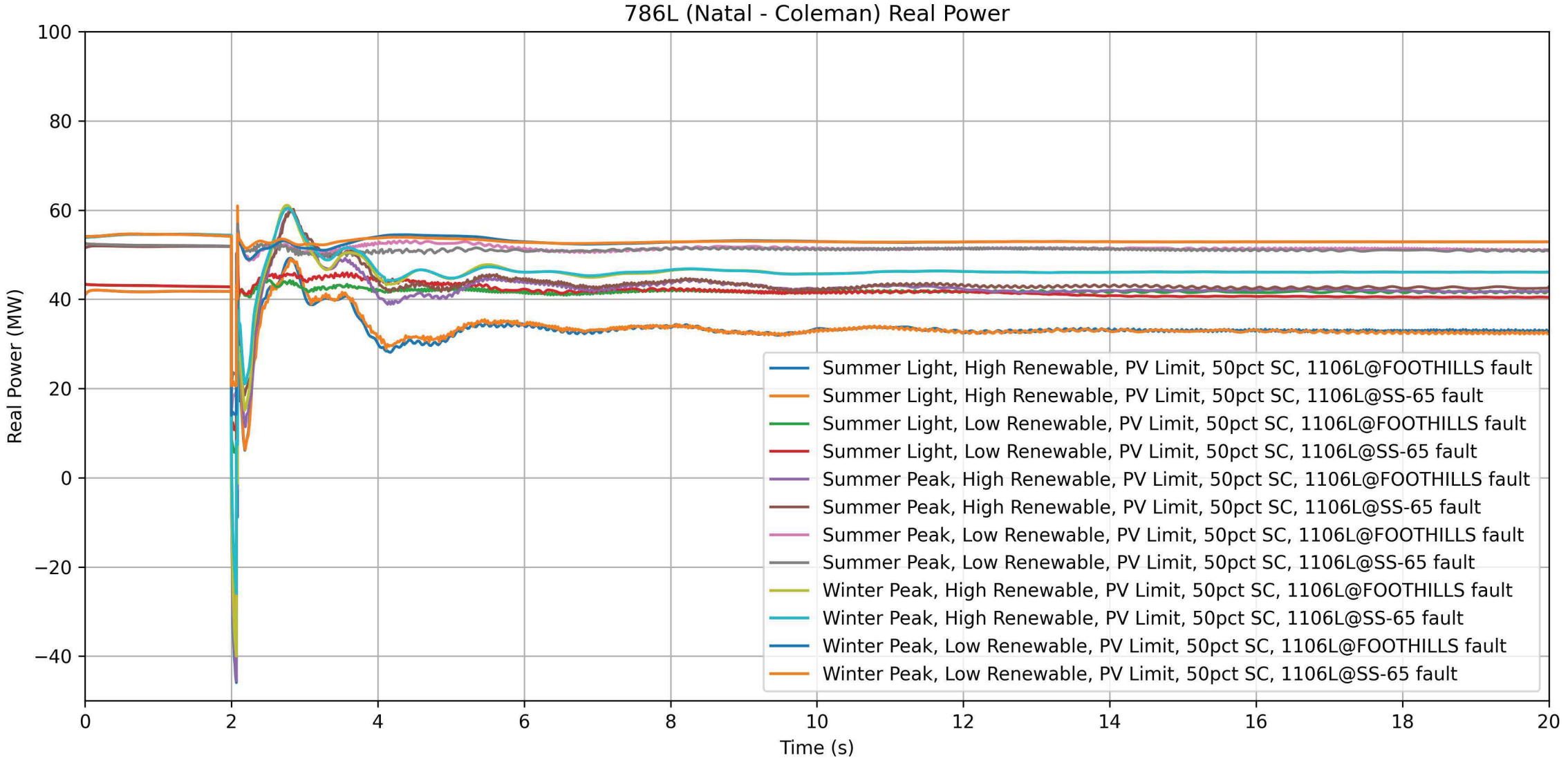

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

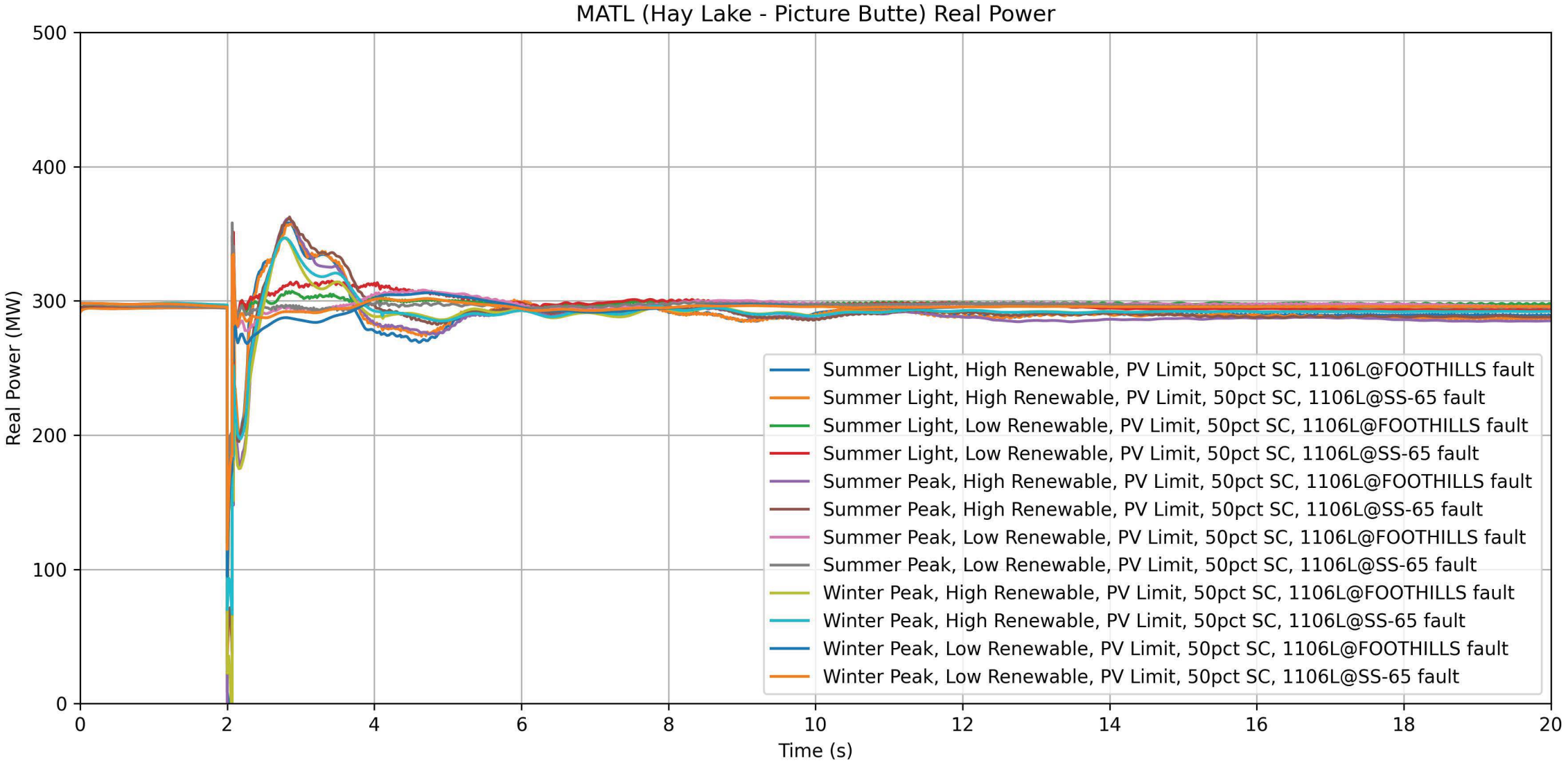

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

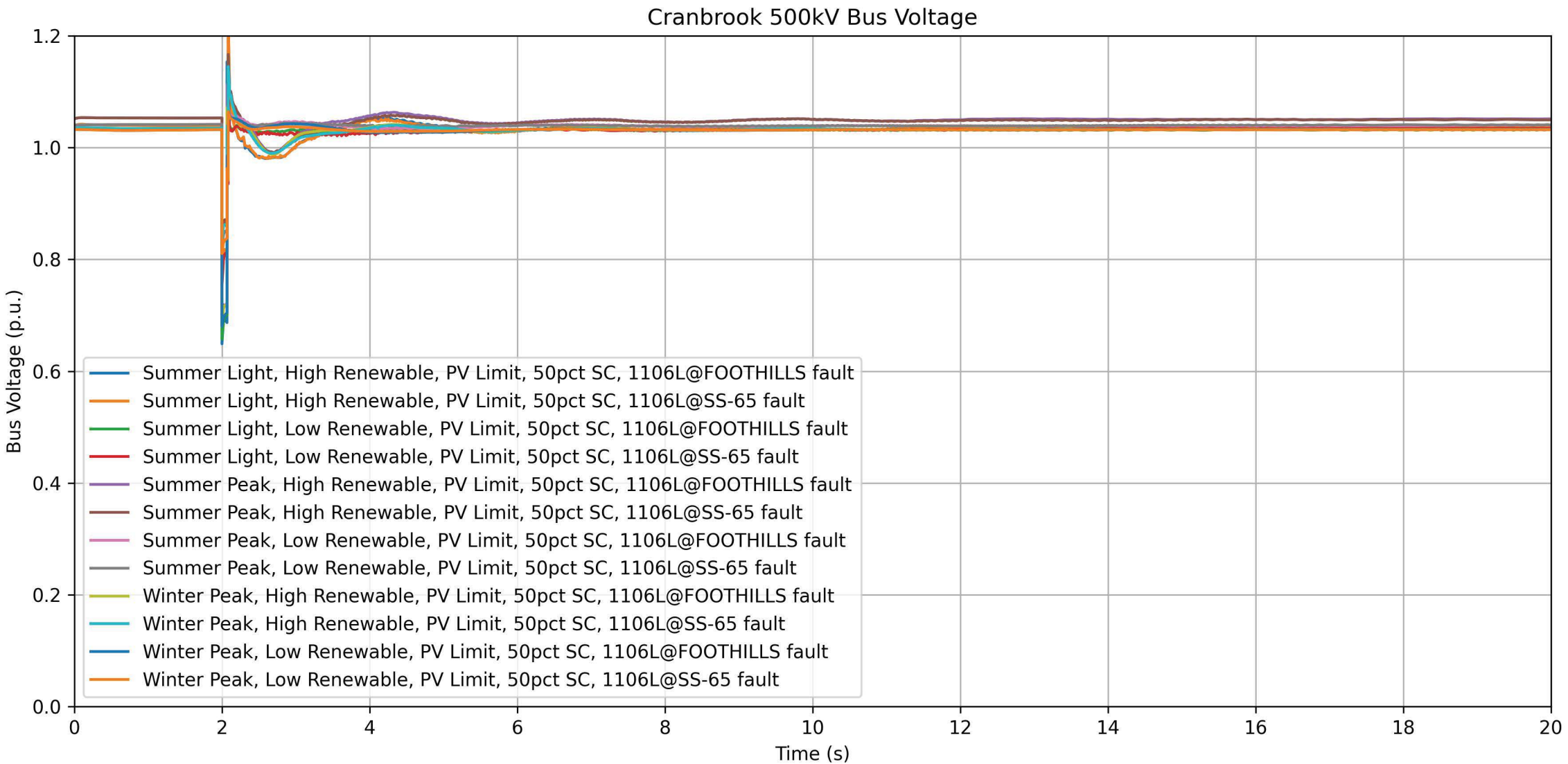

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

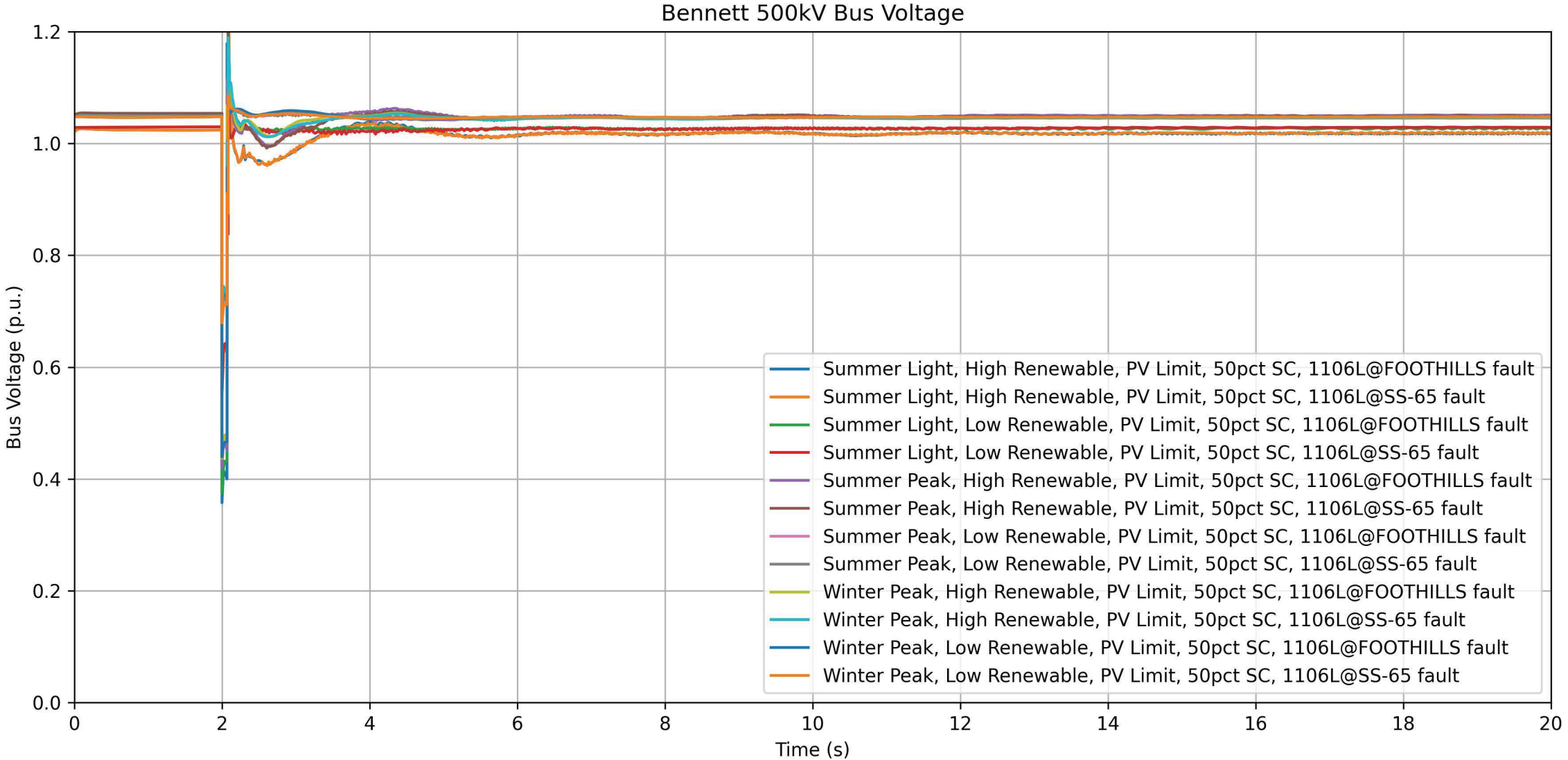

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1109L@SS-65 fault

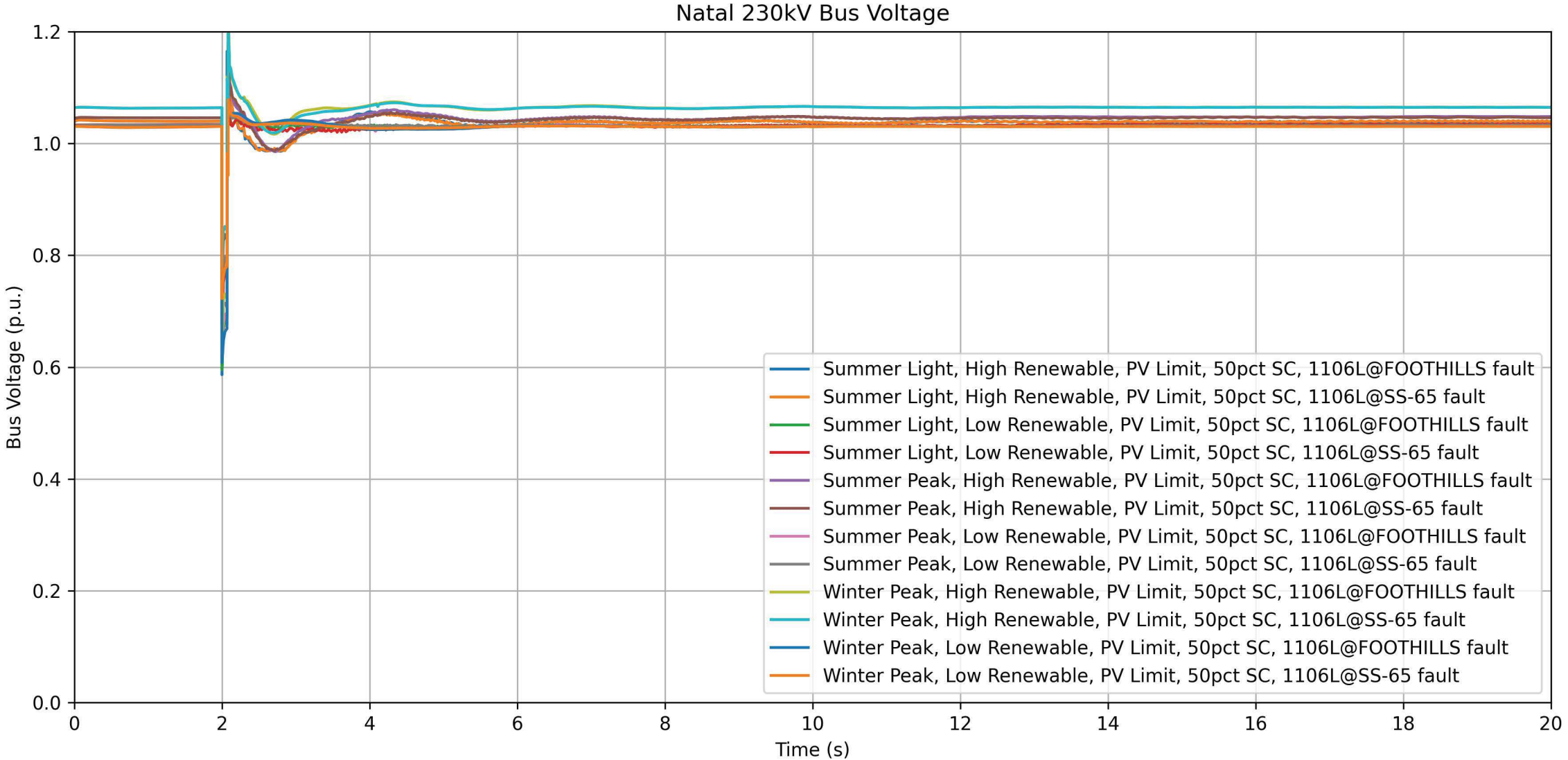

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

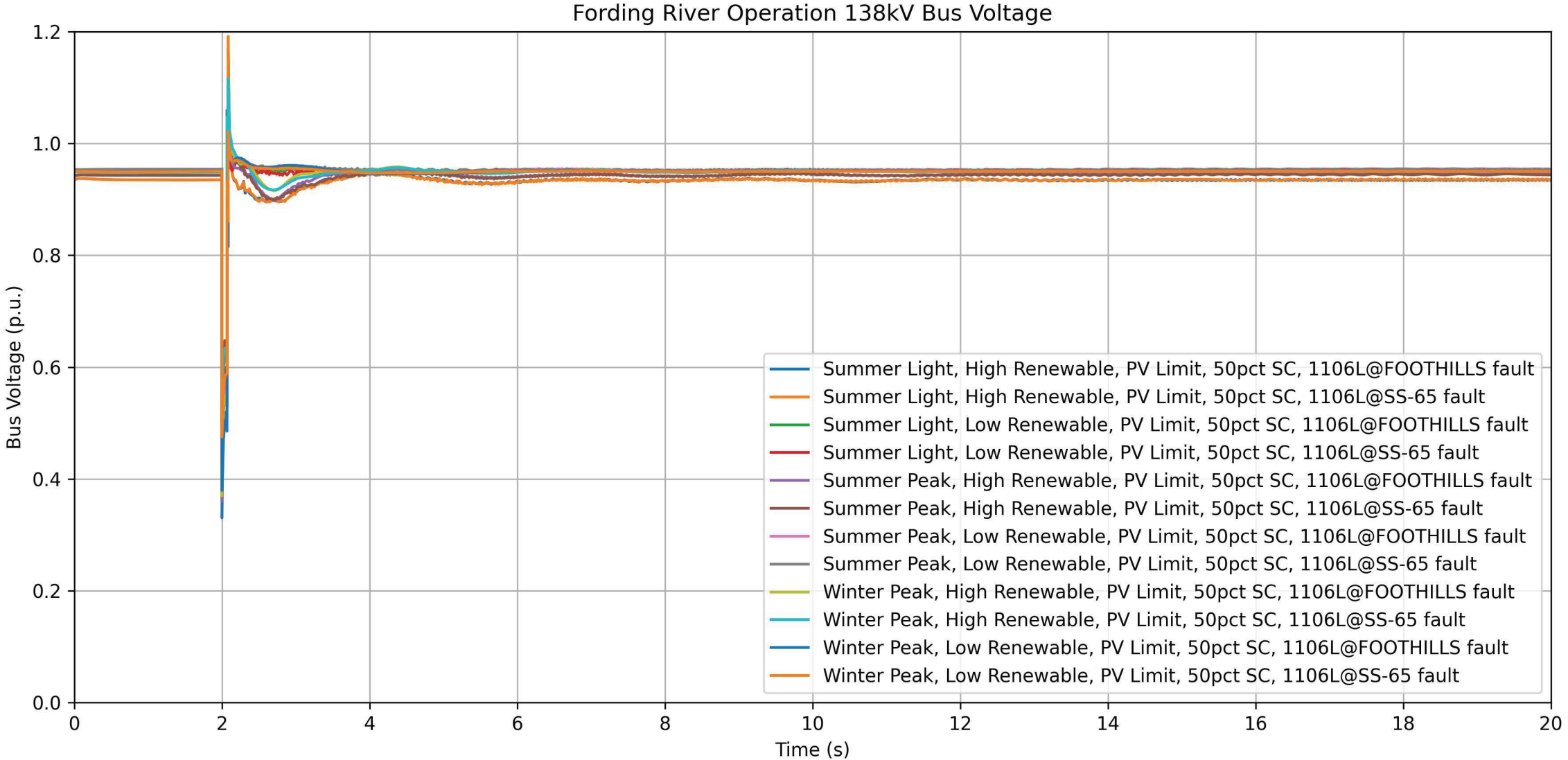

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

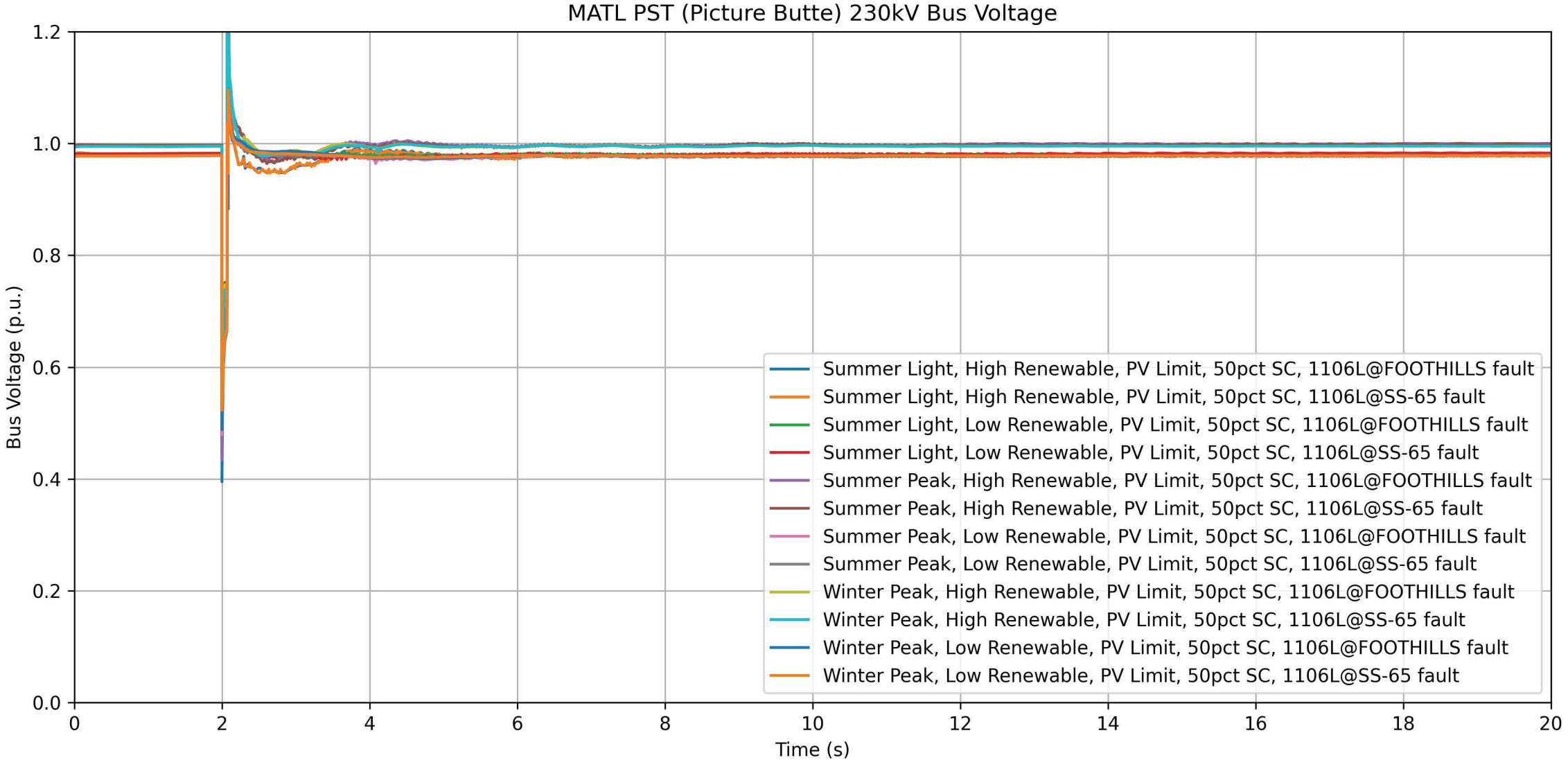

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

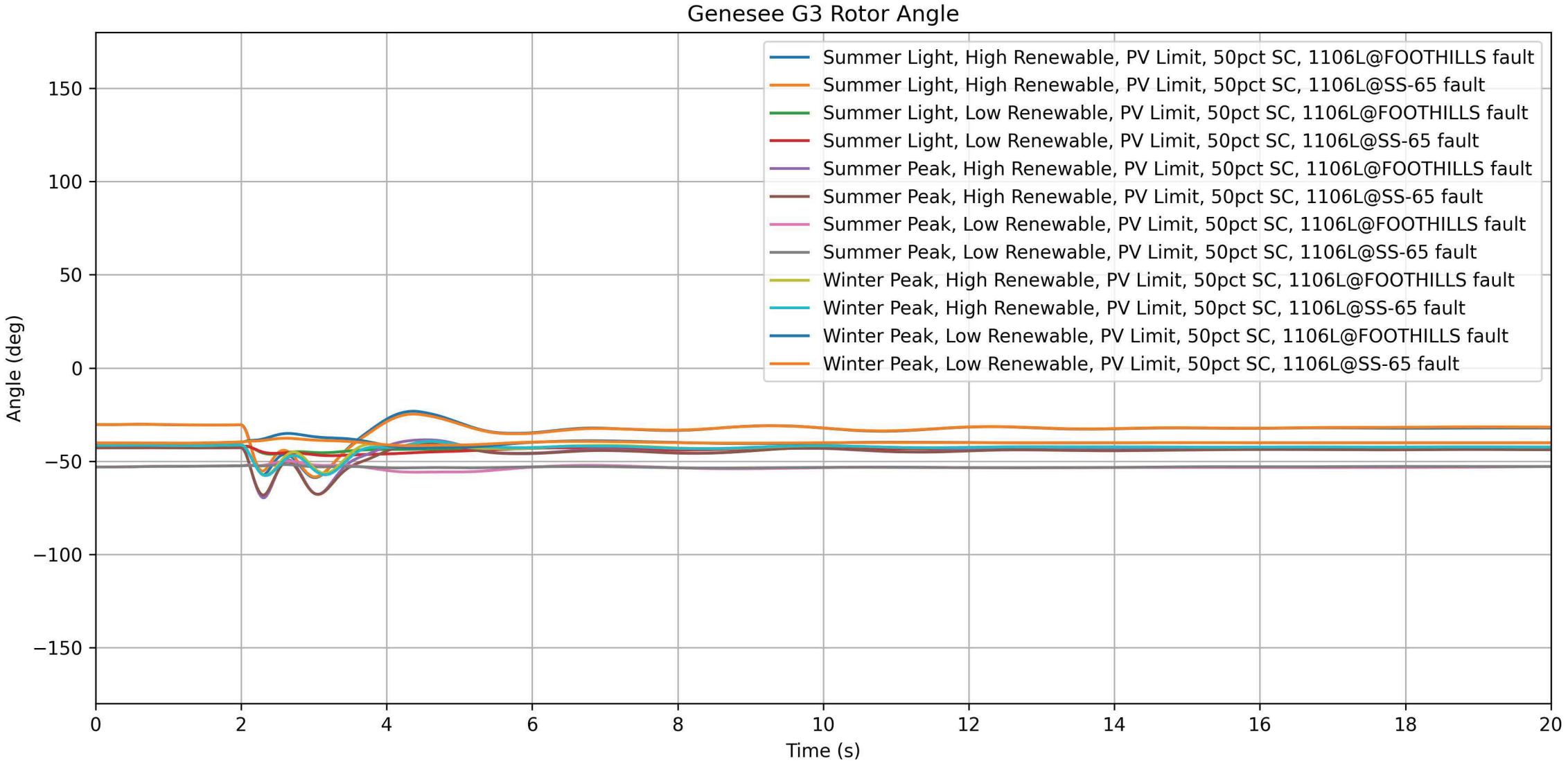

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

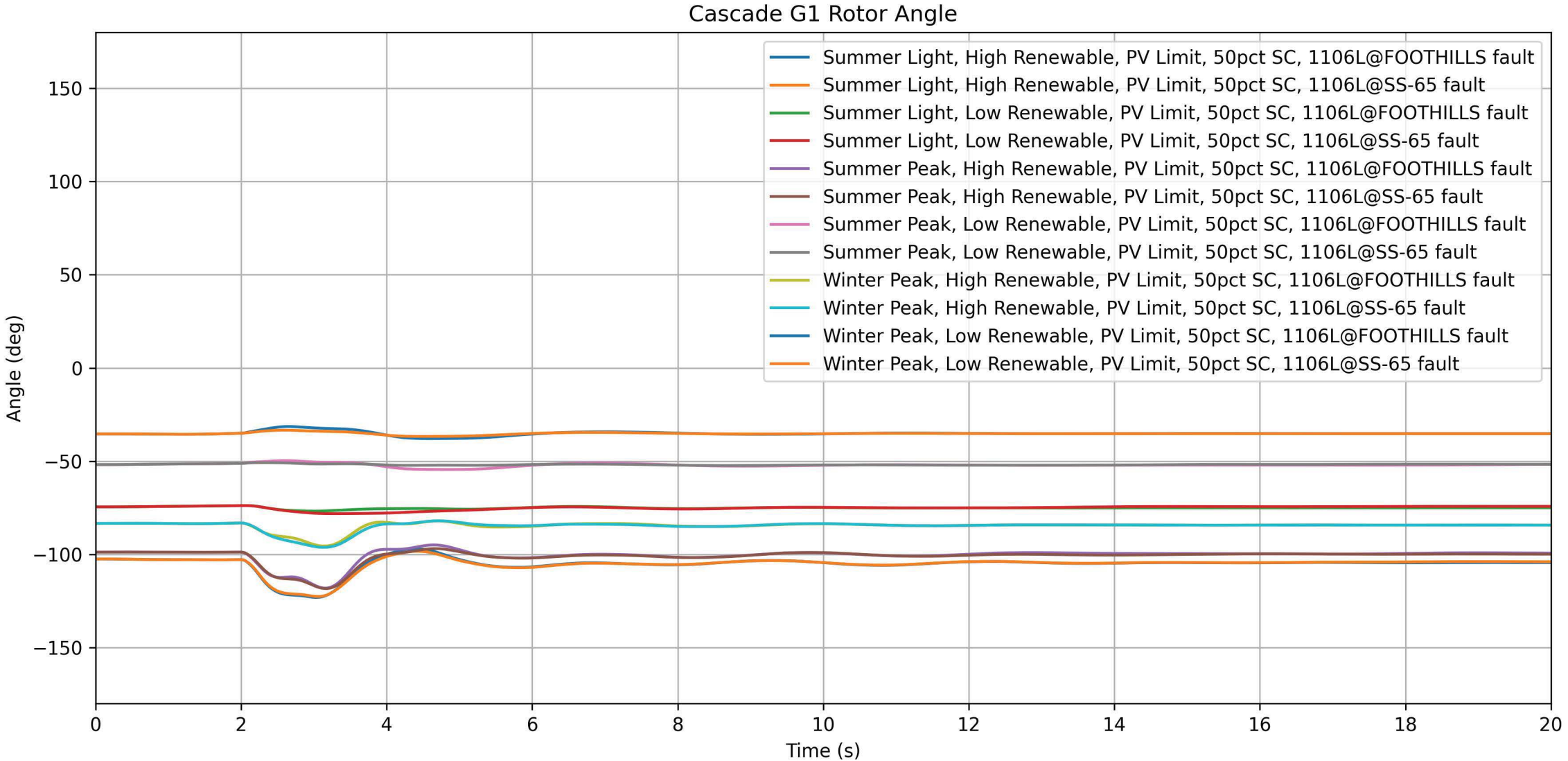

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

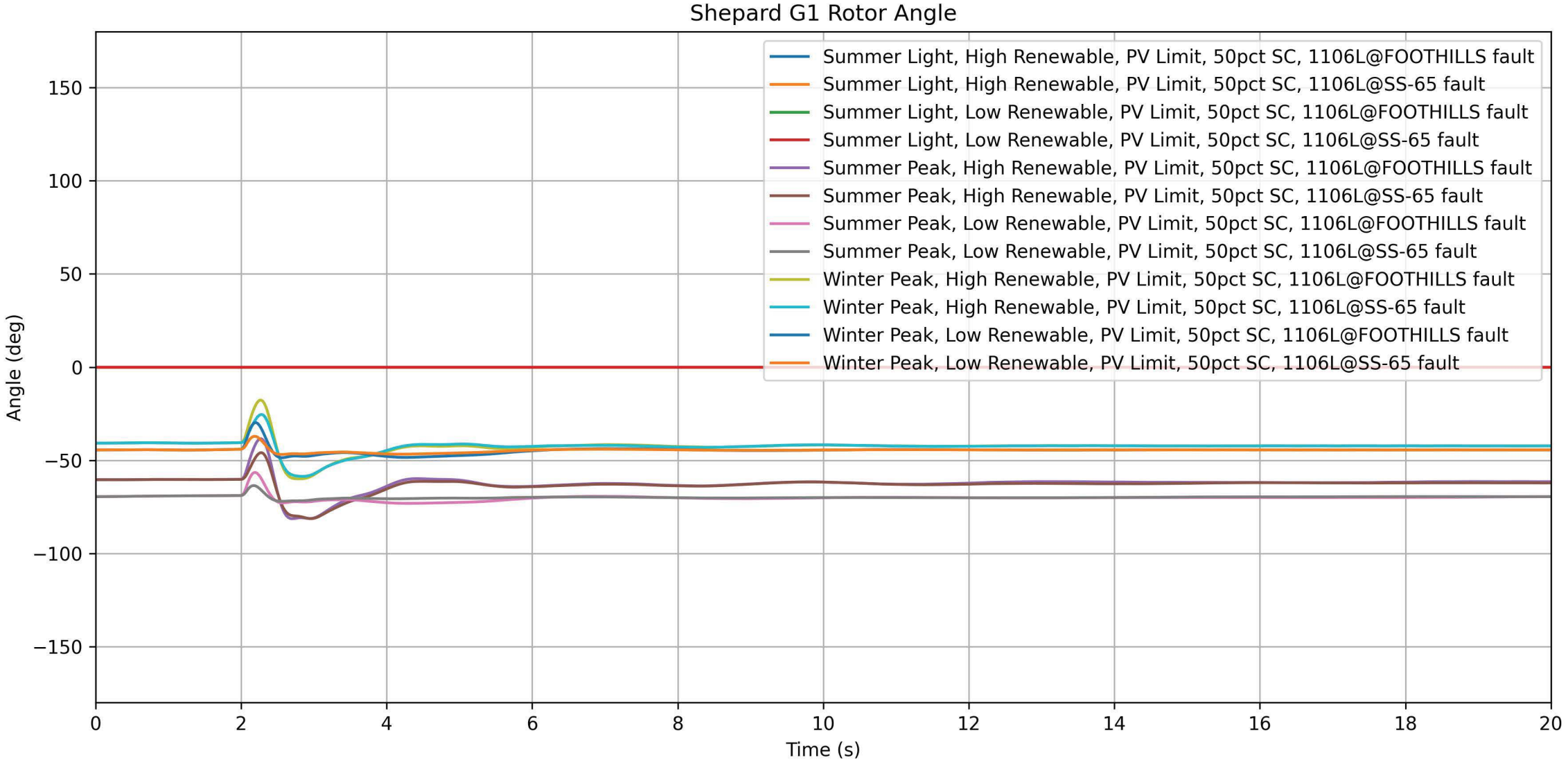

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

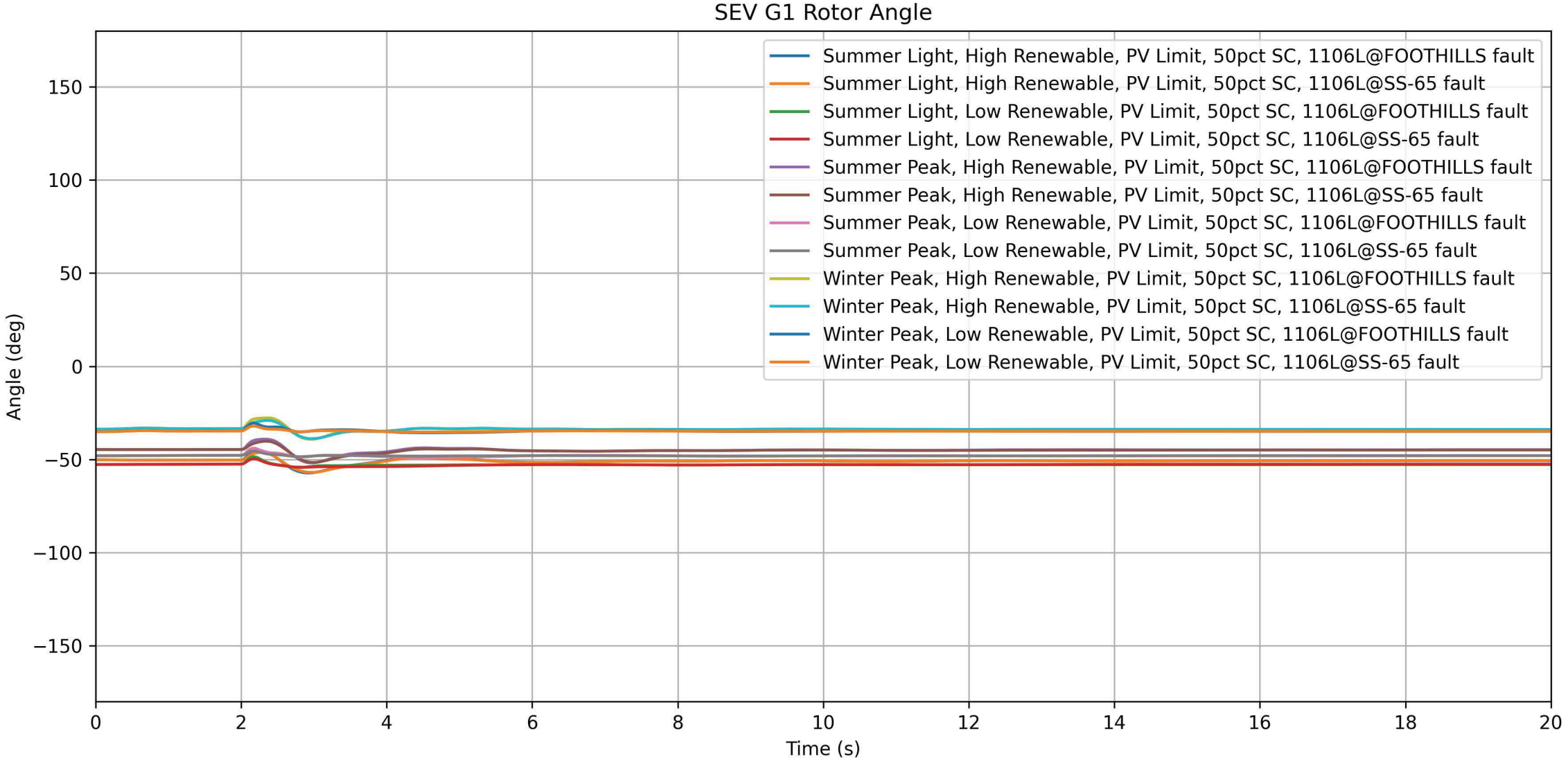

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

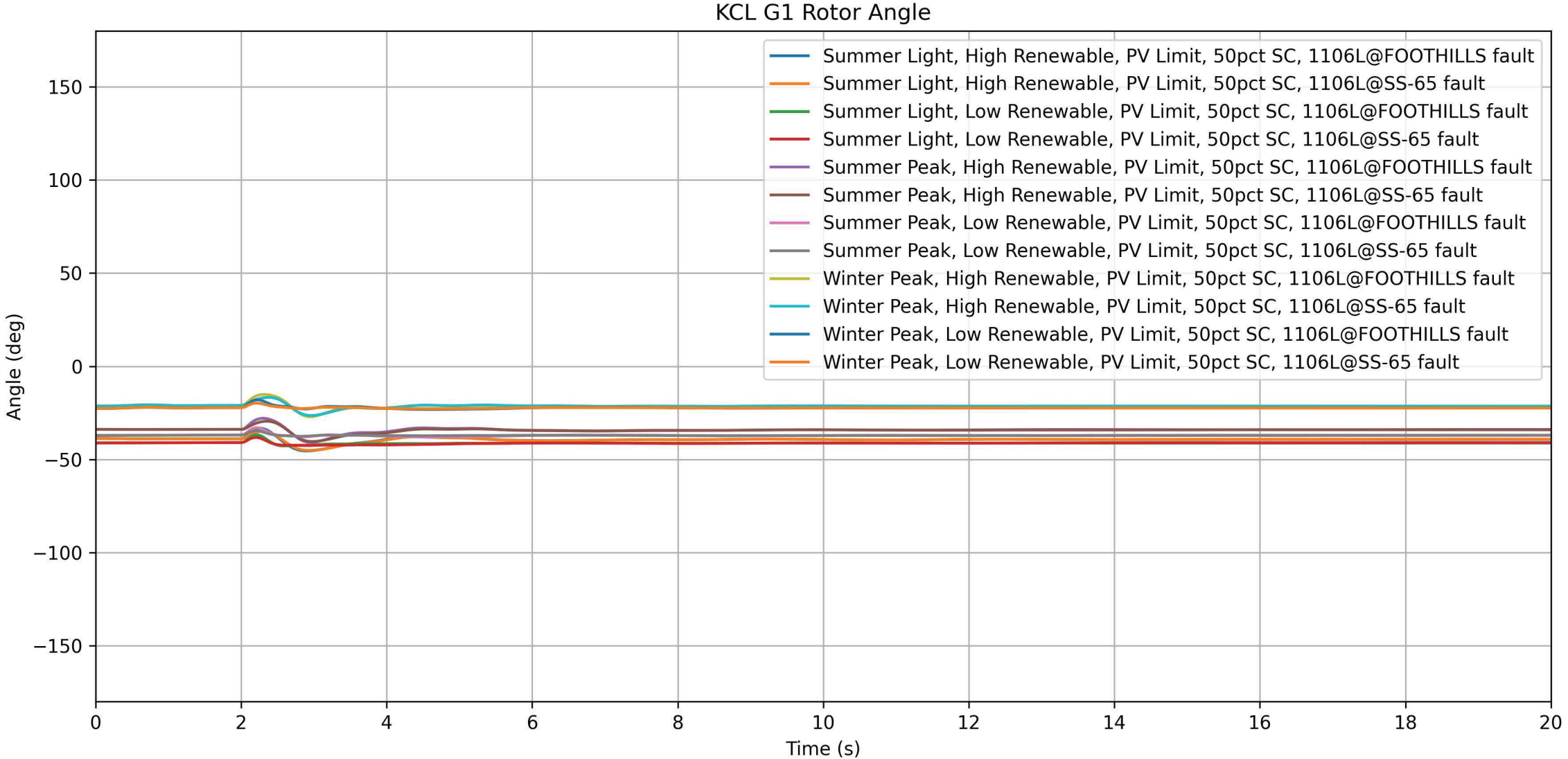

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

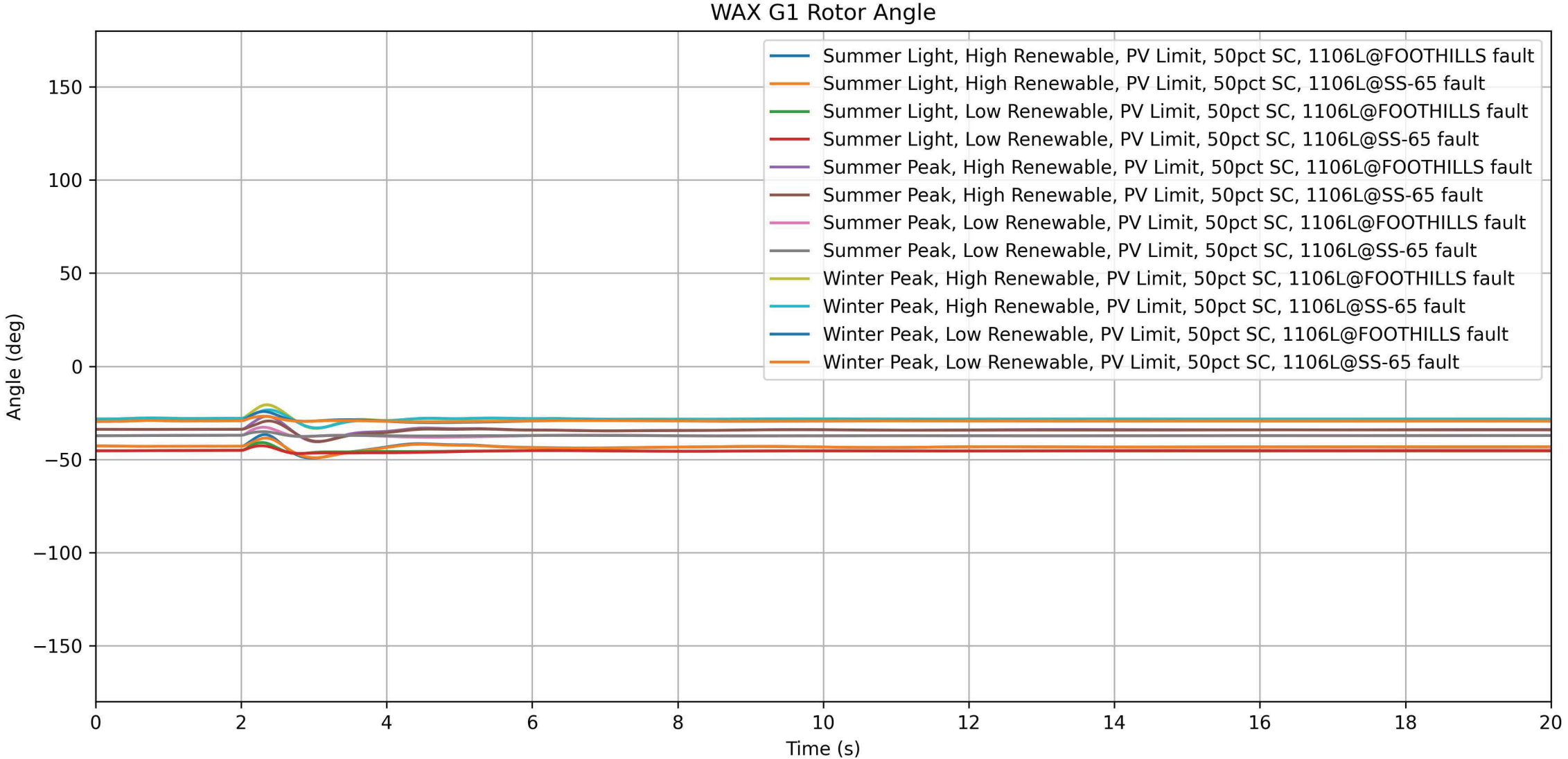

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

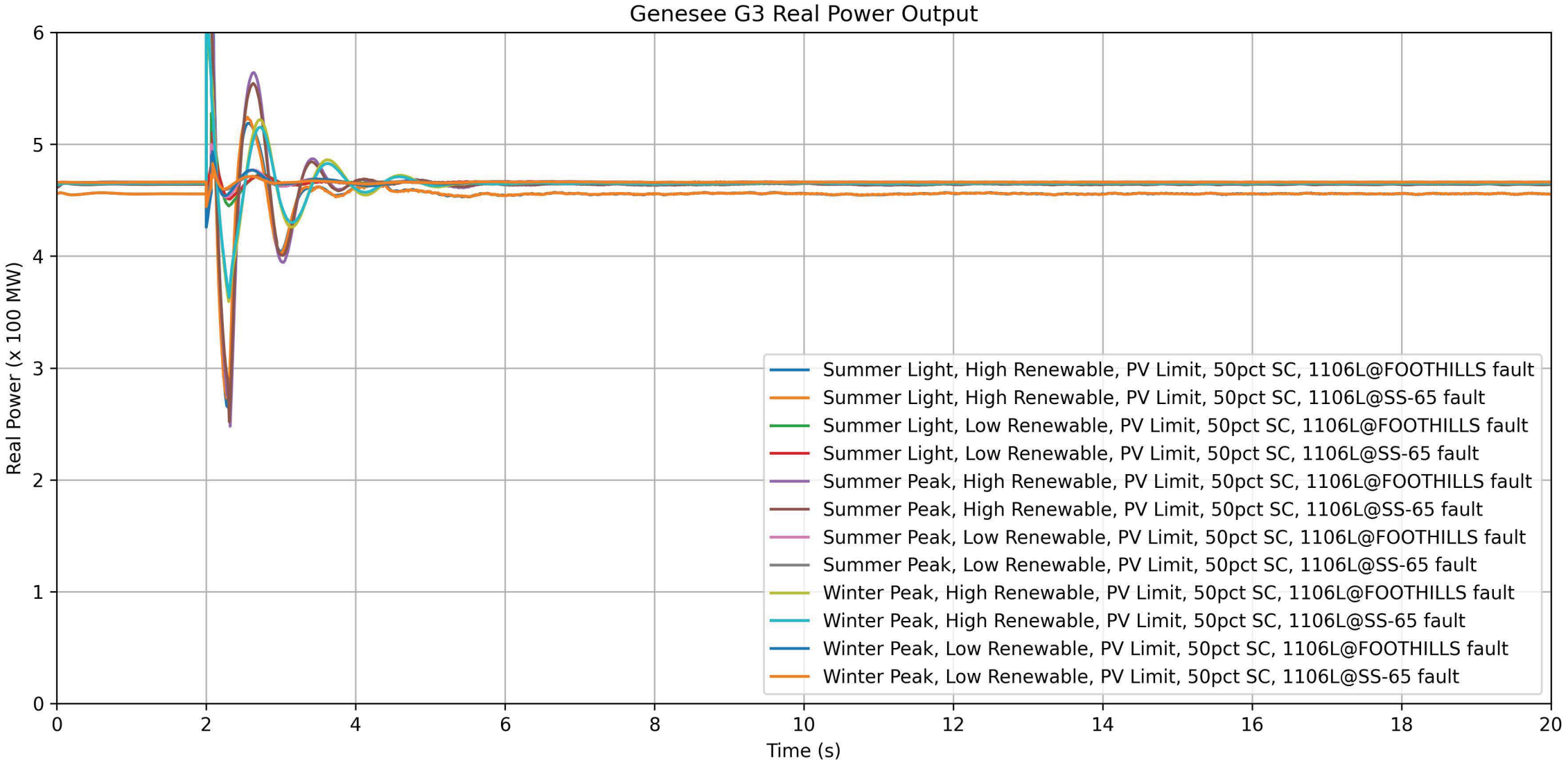

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

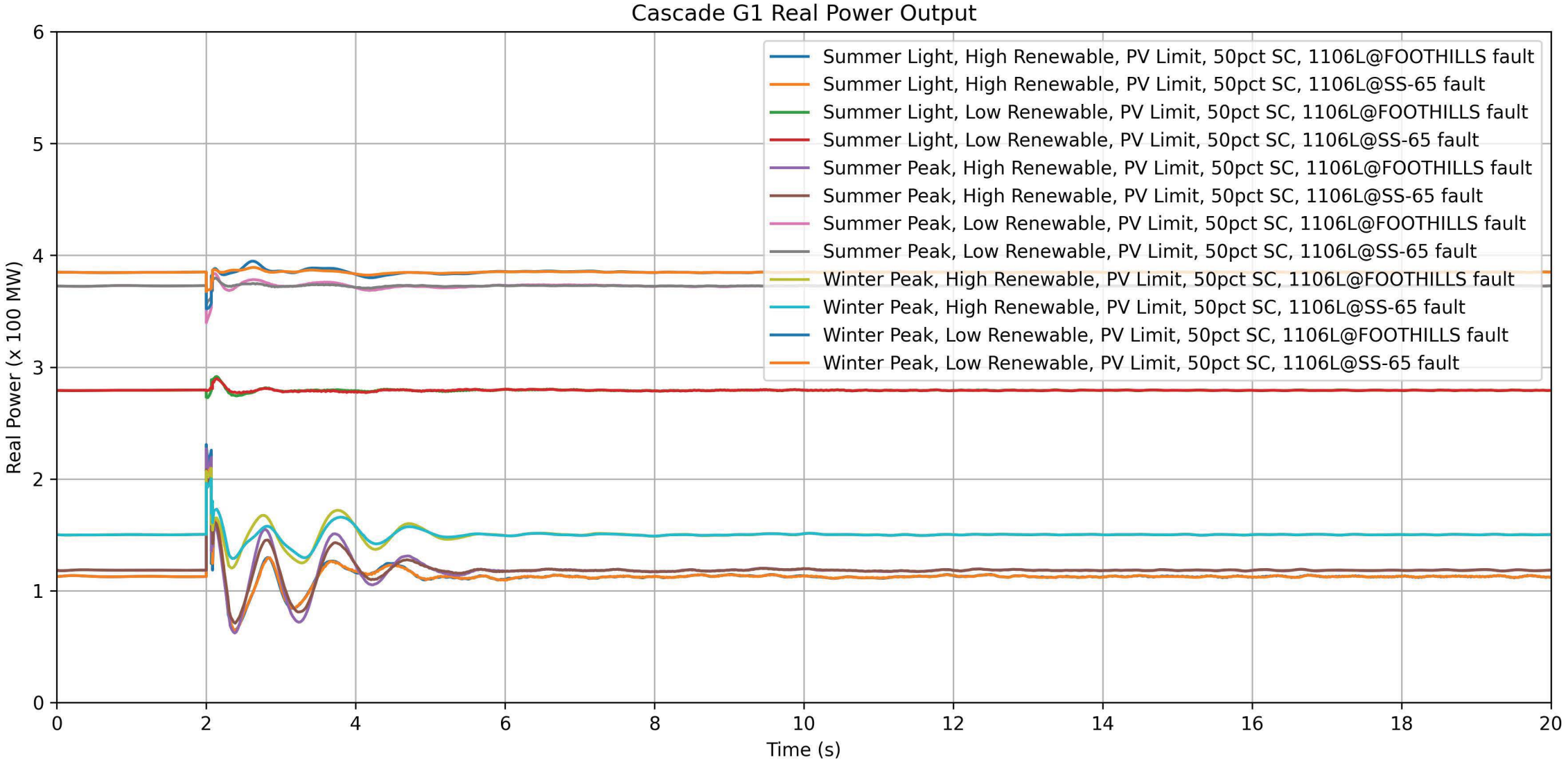

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

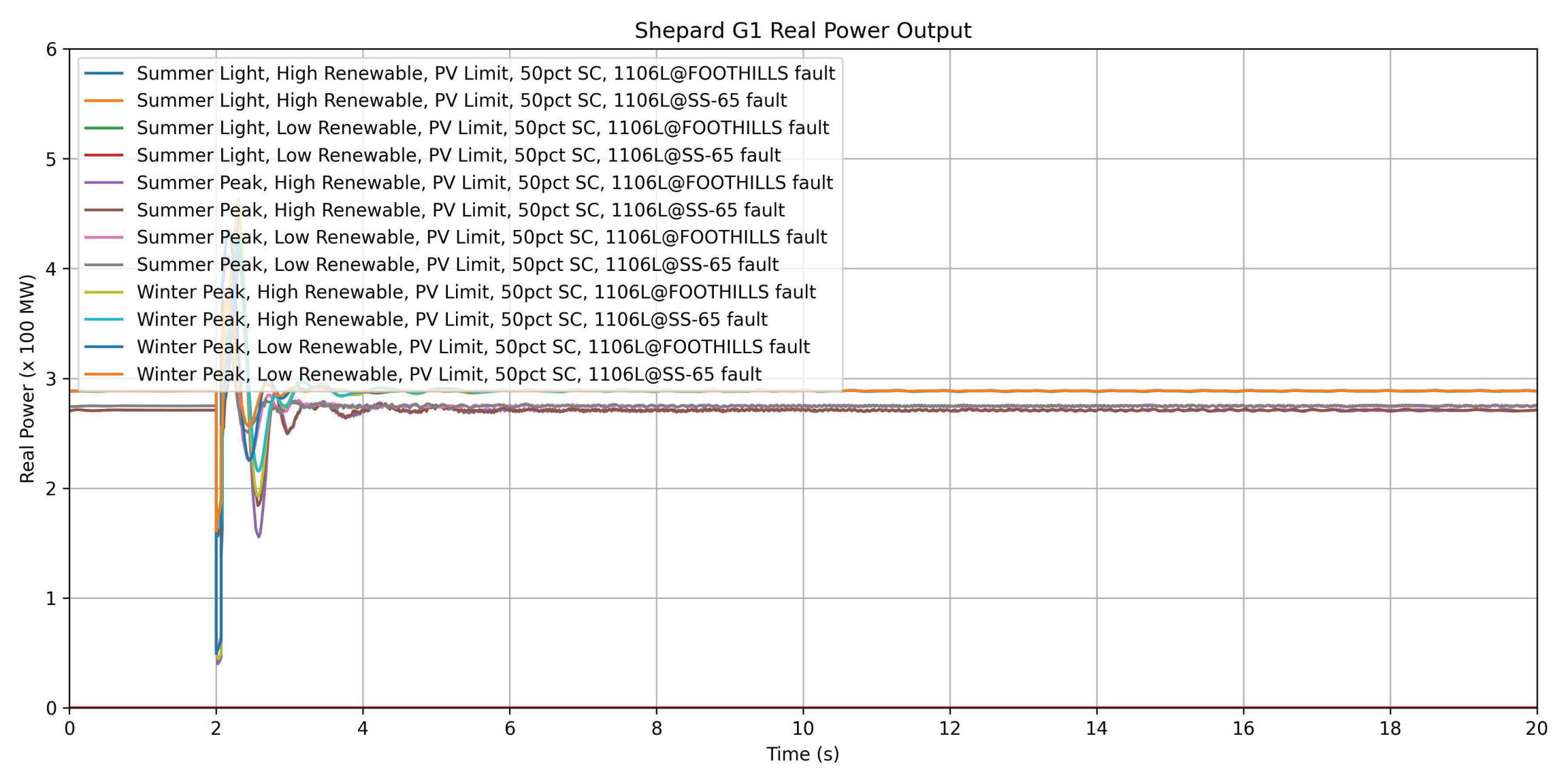

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

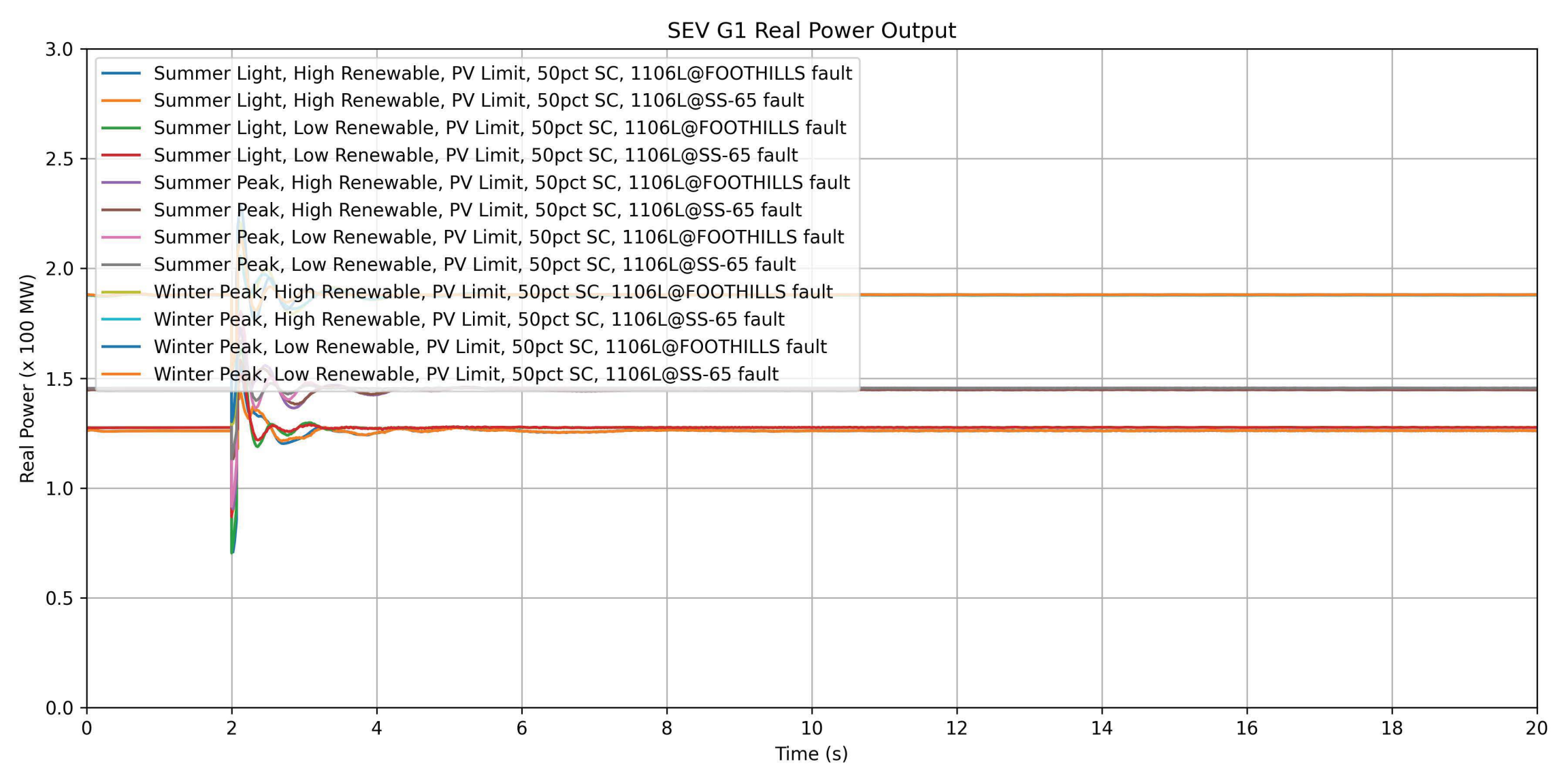

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

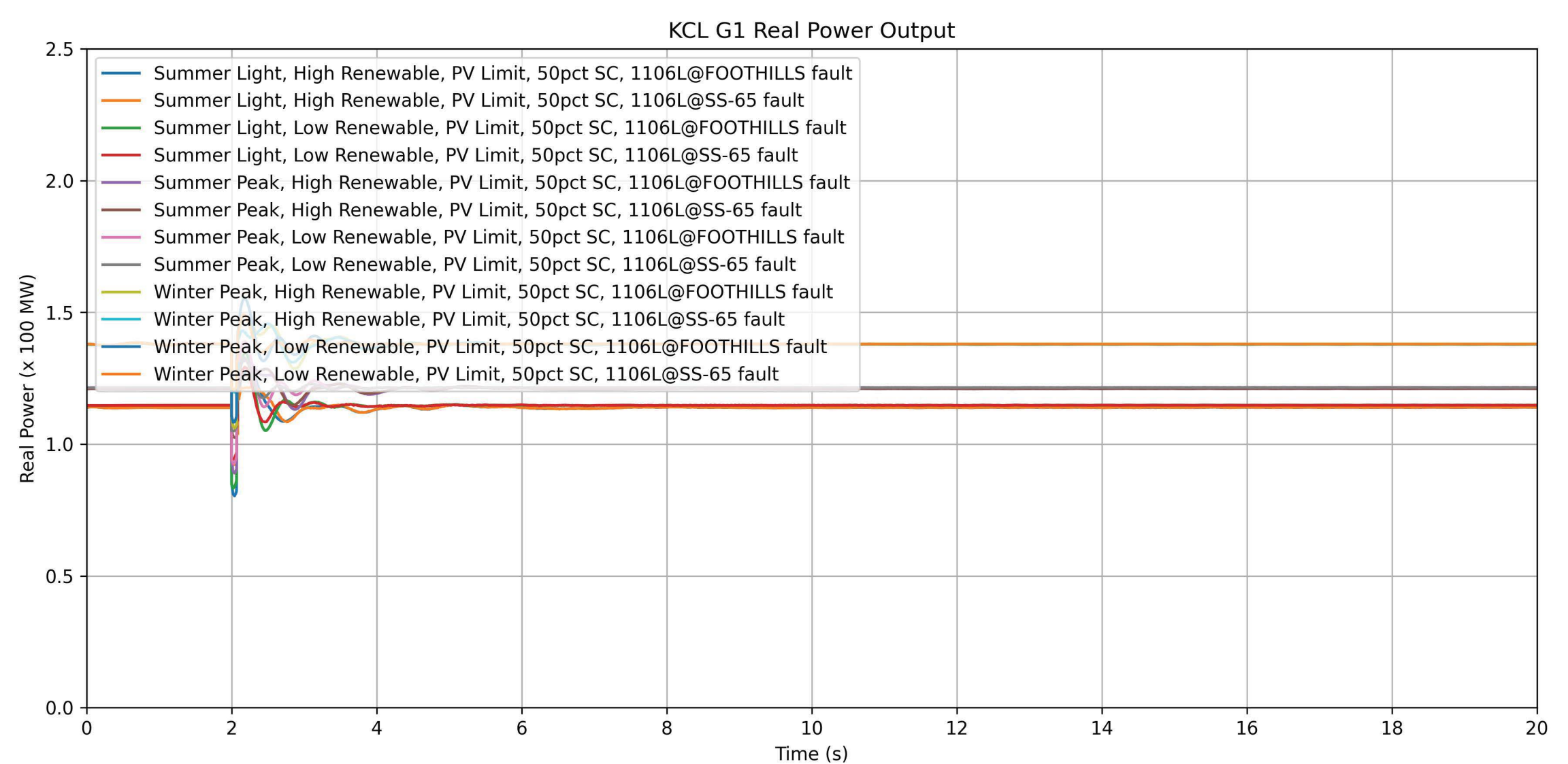

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

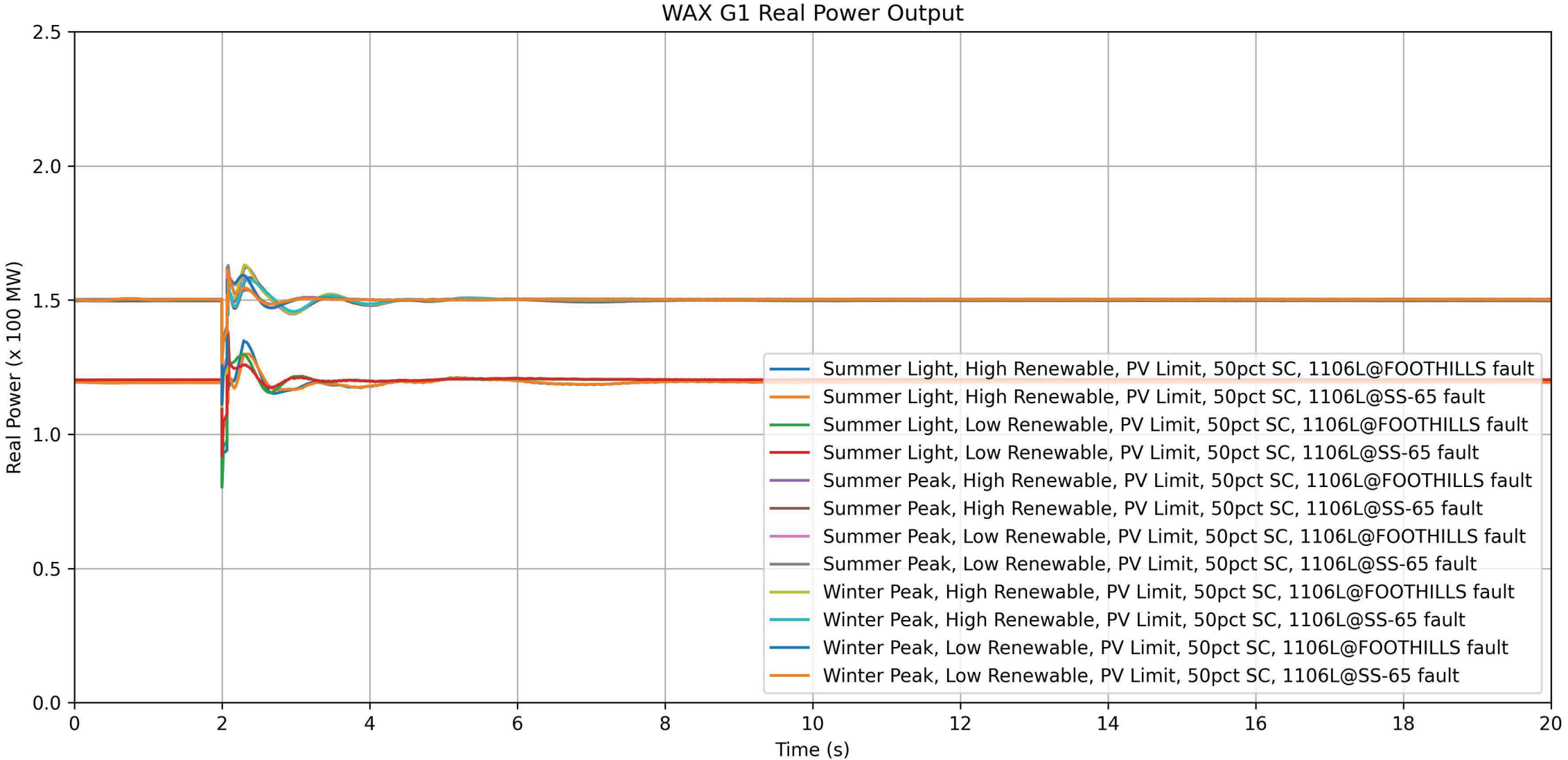

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

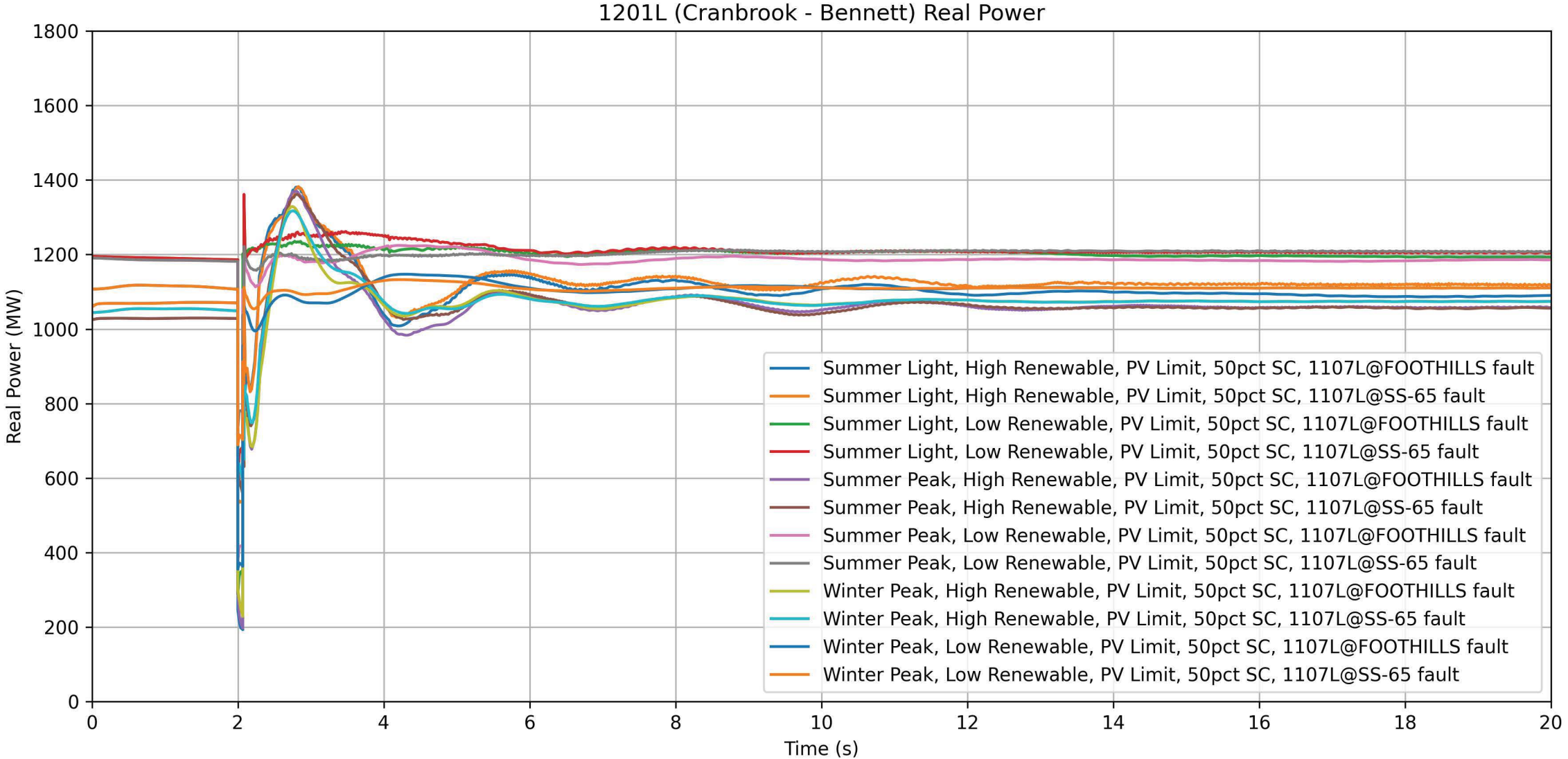

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

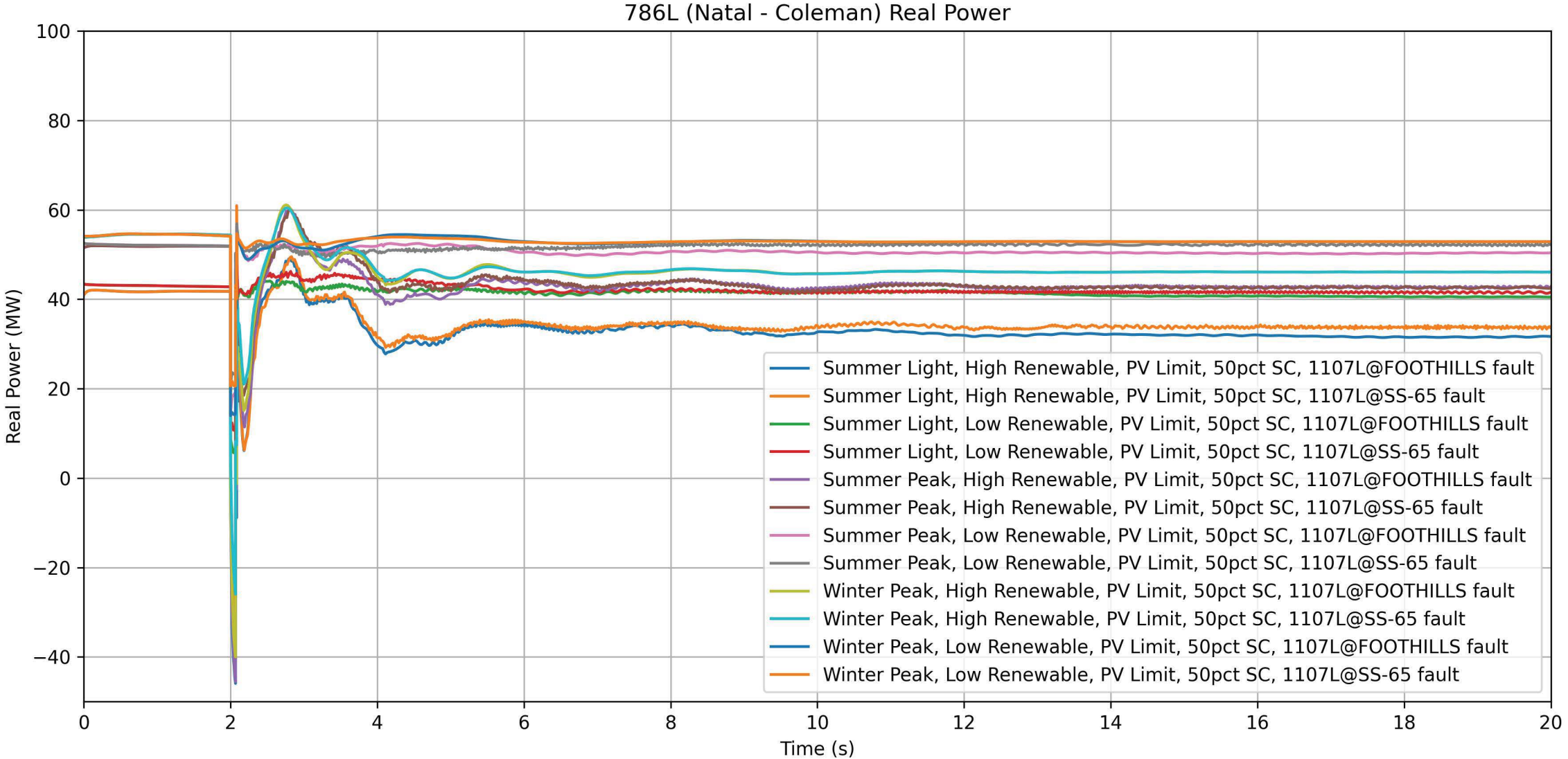

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

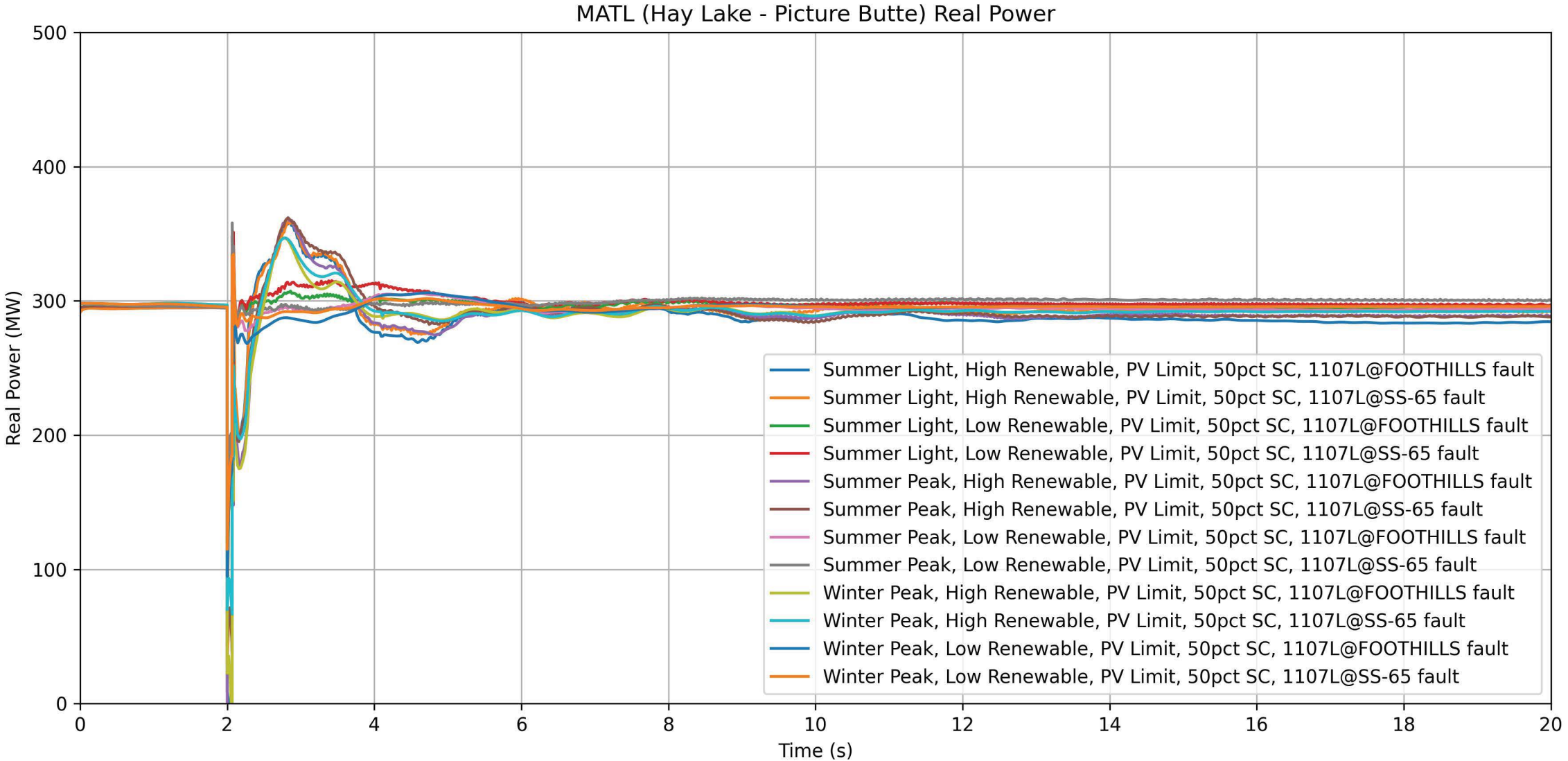

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

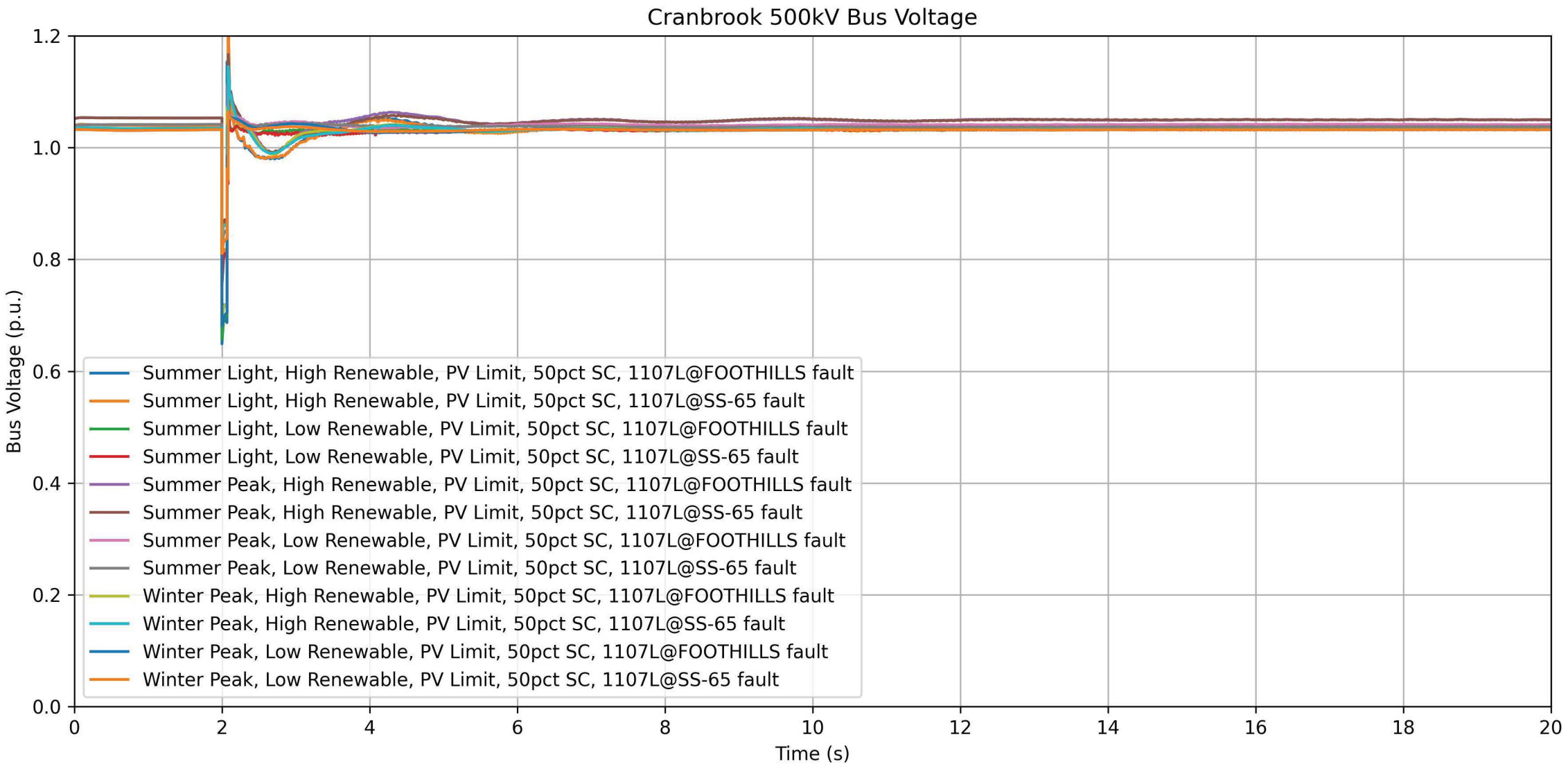

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

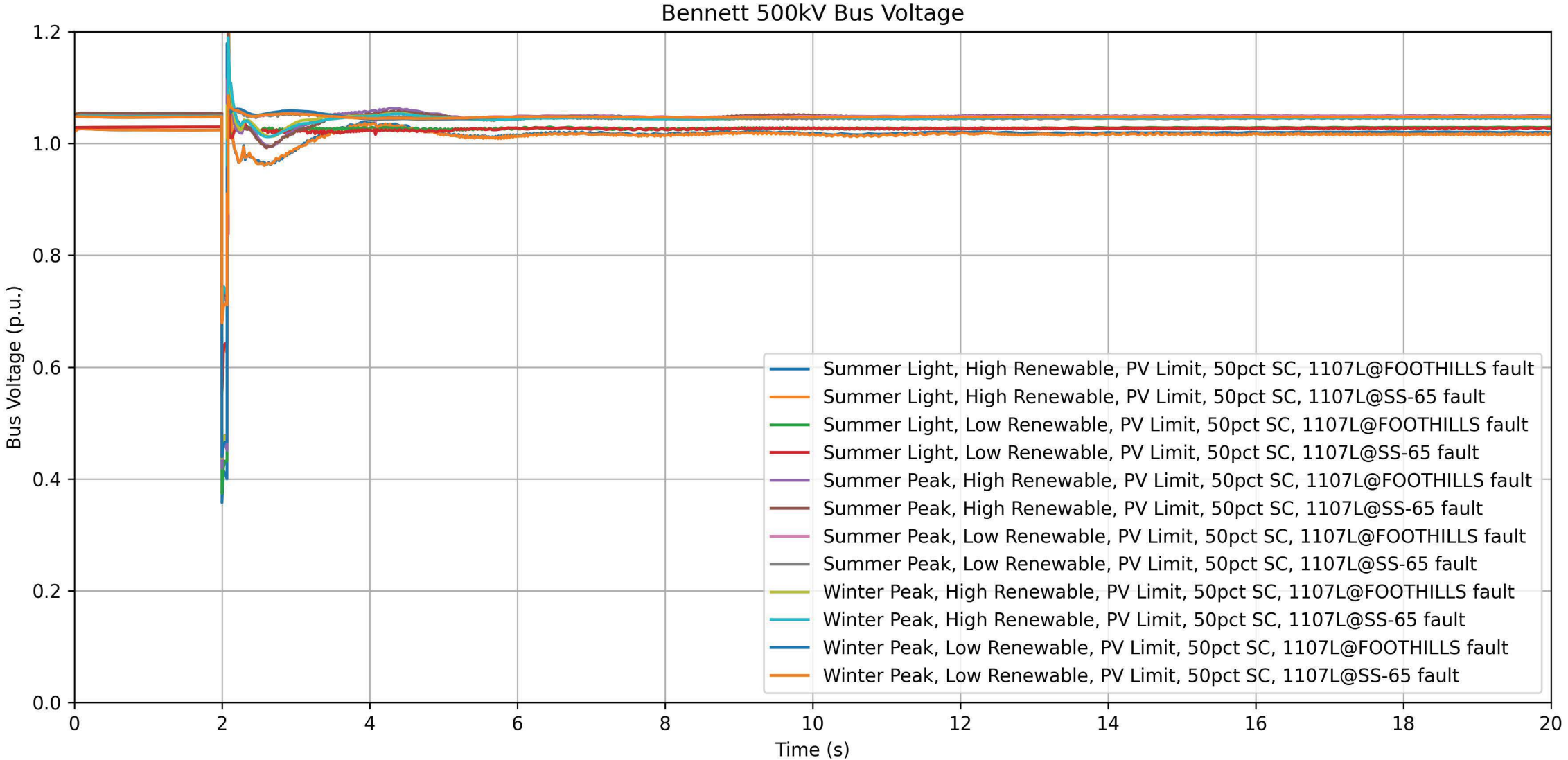

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L@SS-65 fault

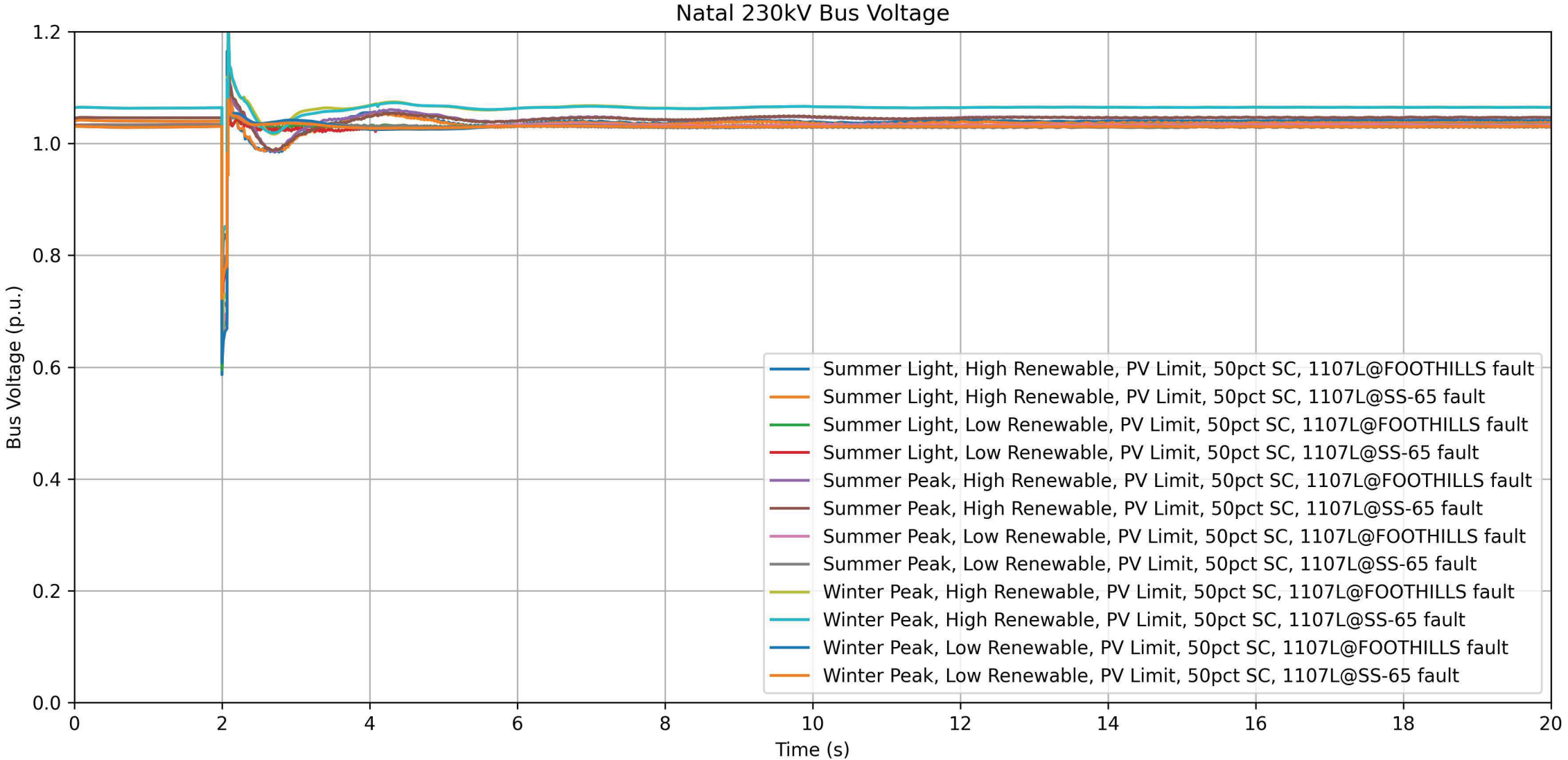

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

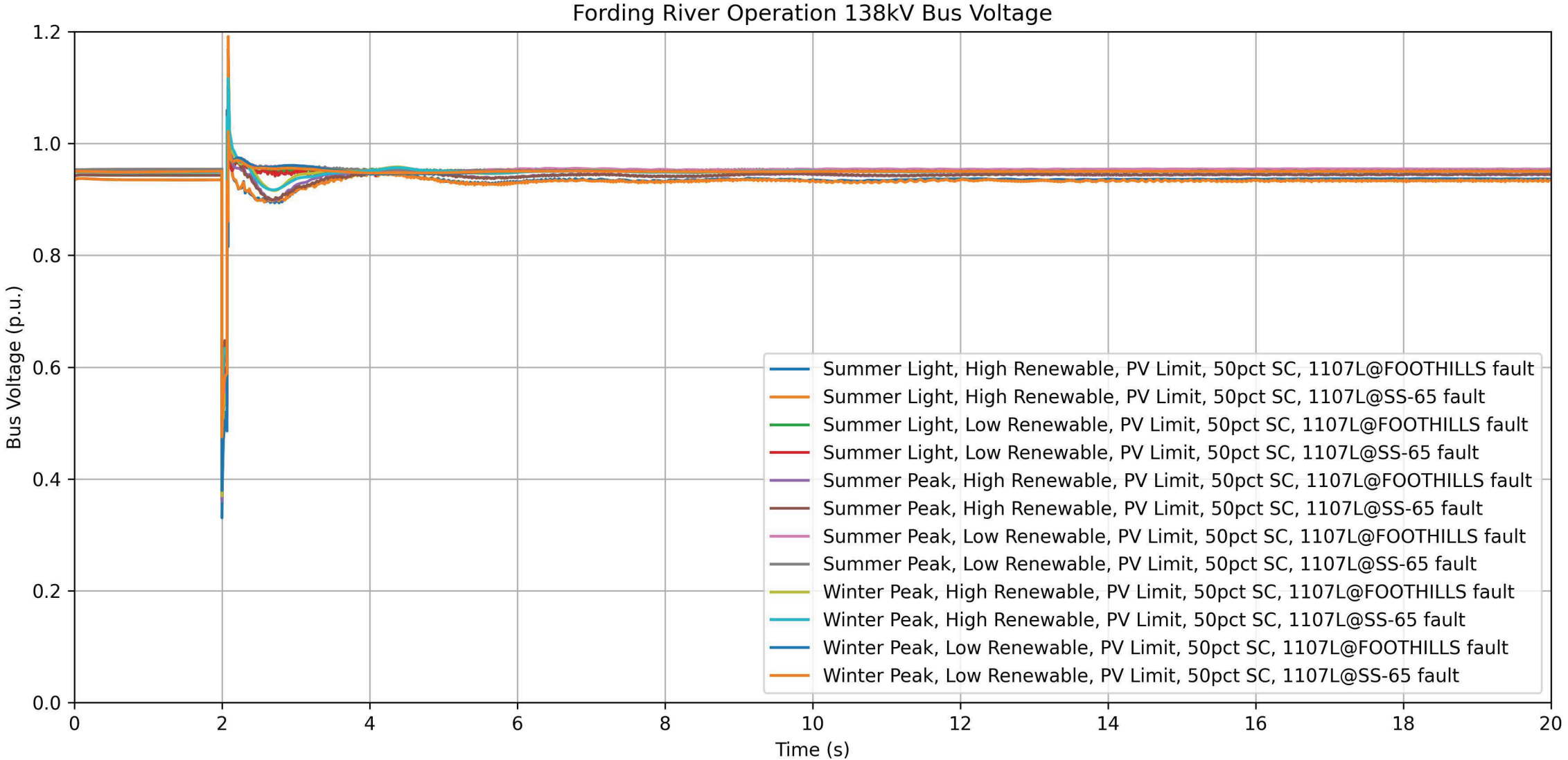

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

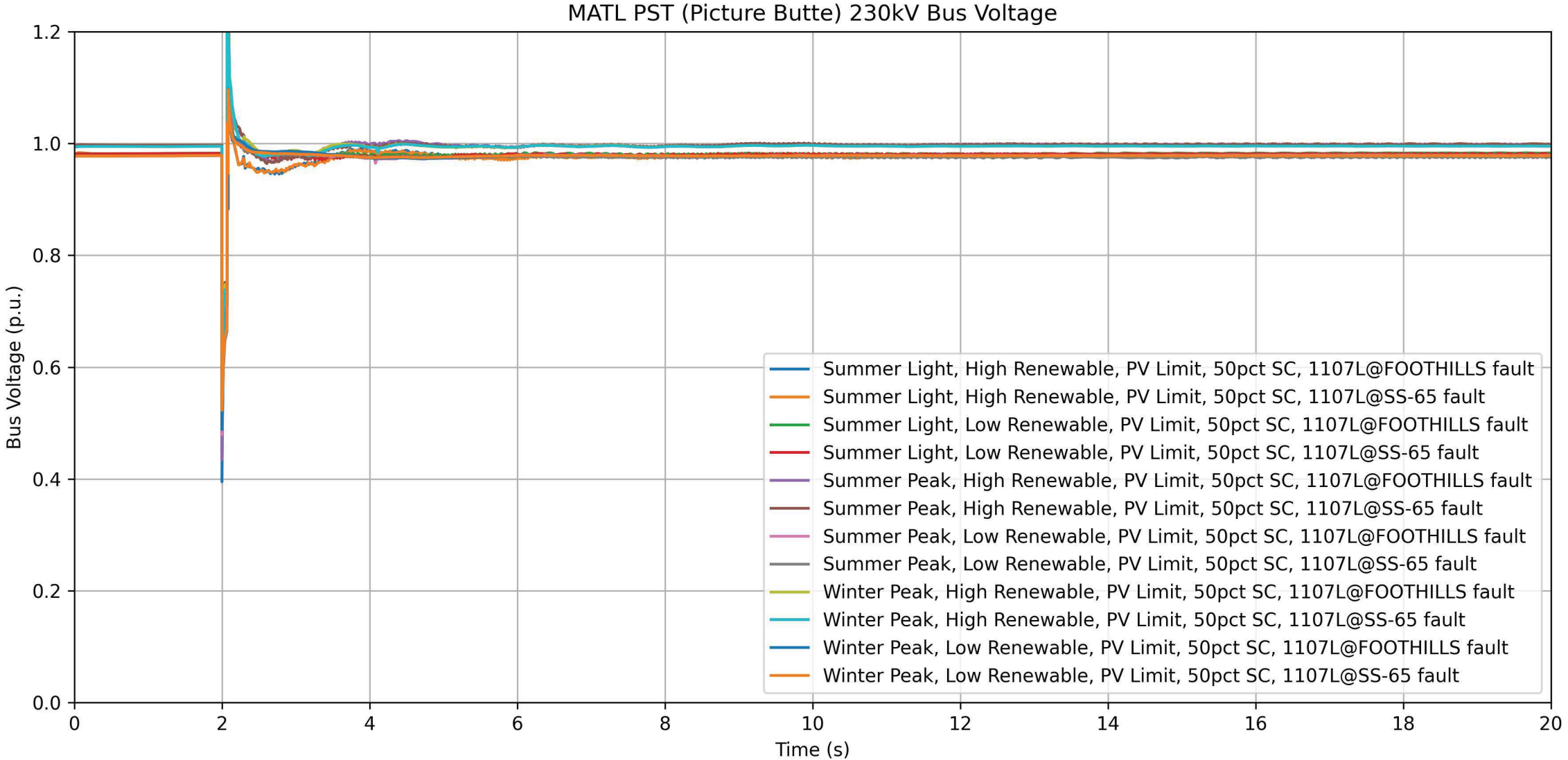

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

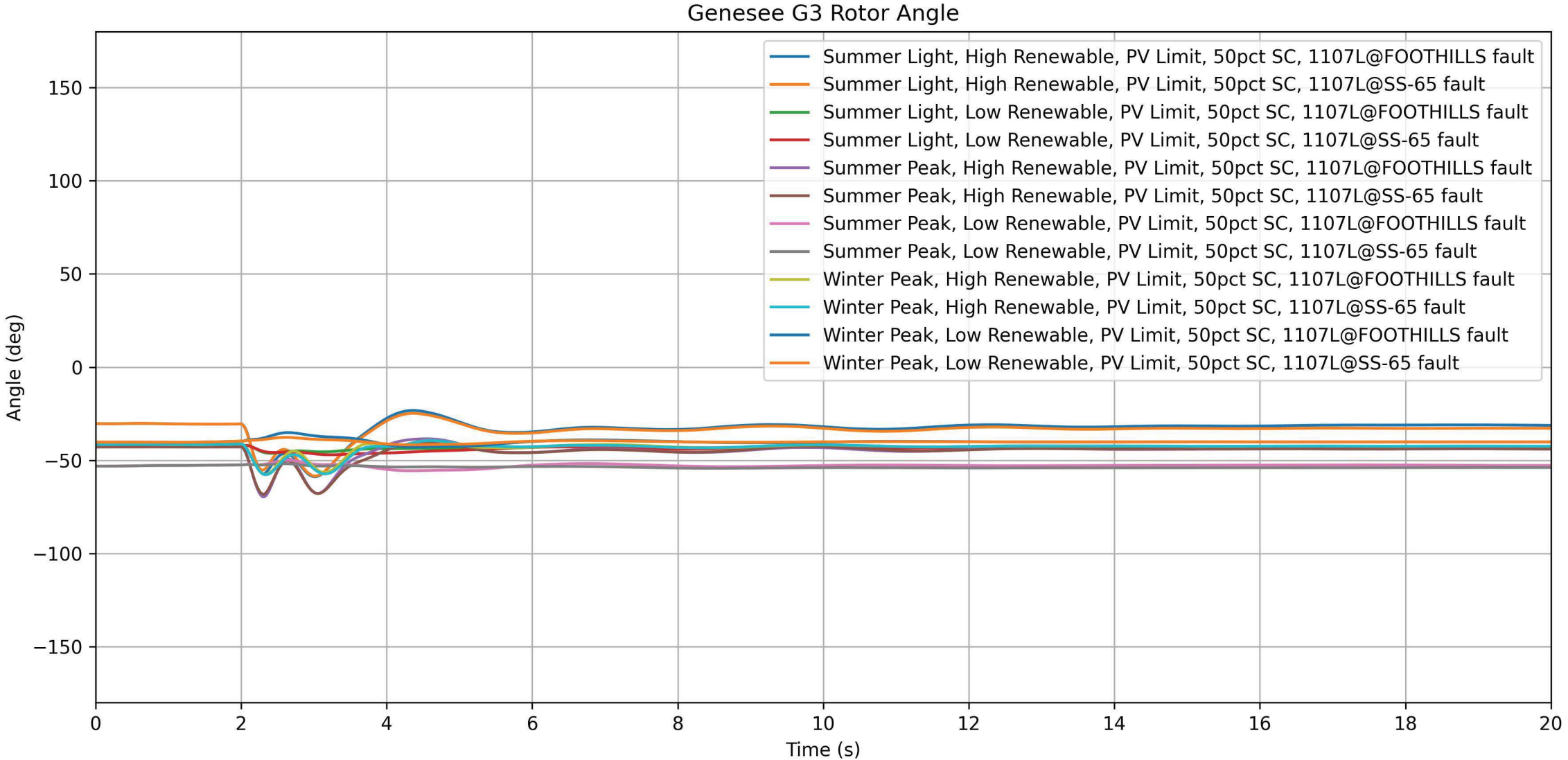

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

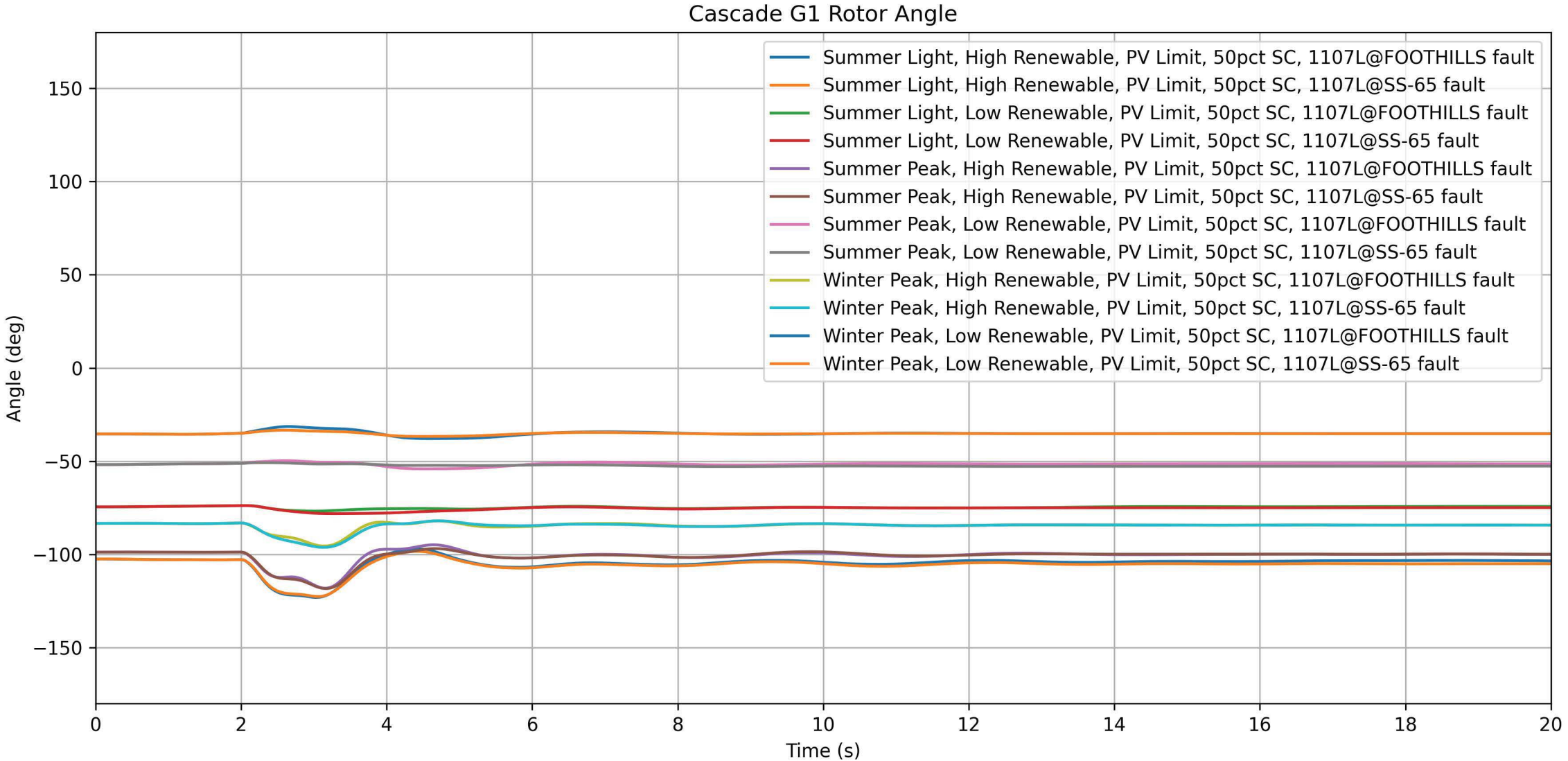

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

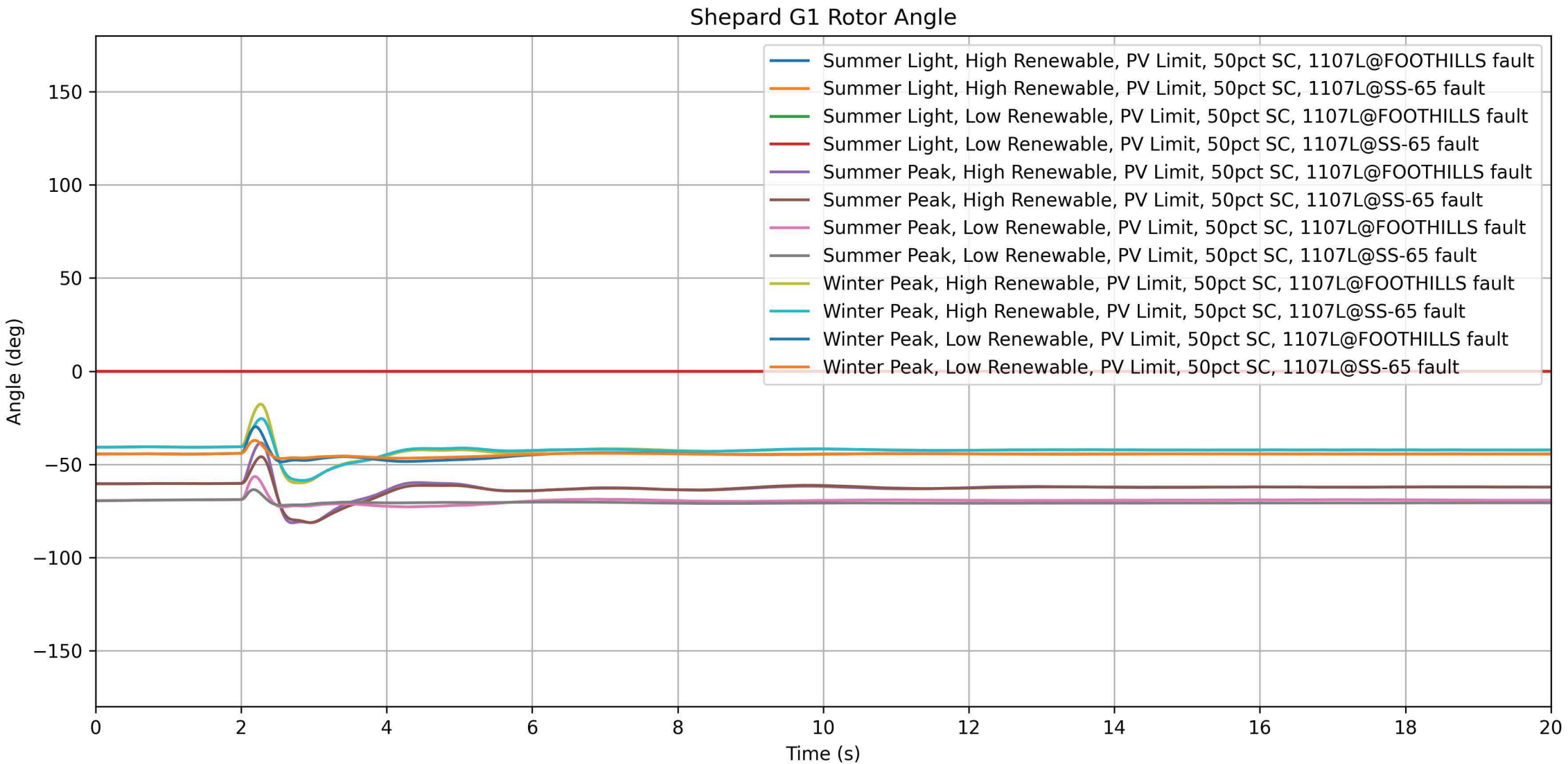

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

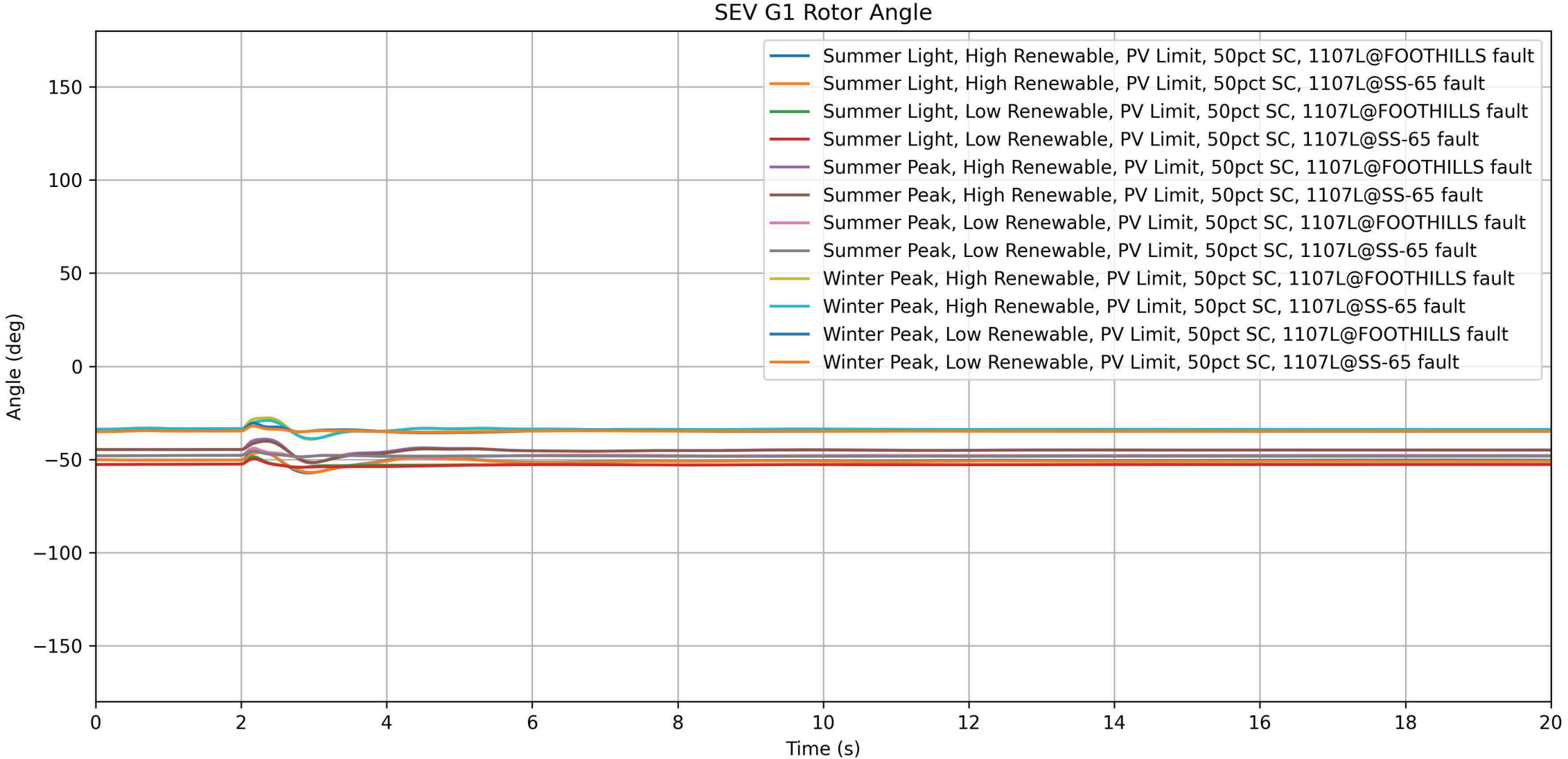

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

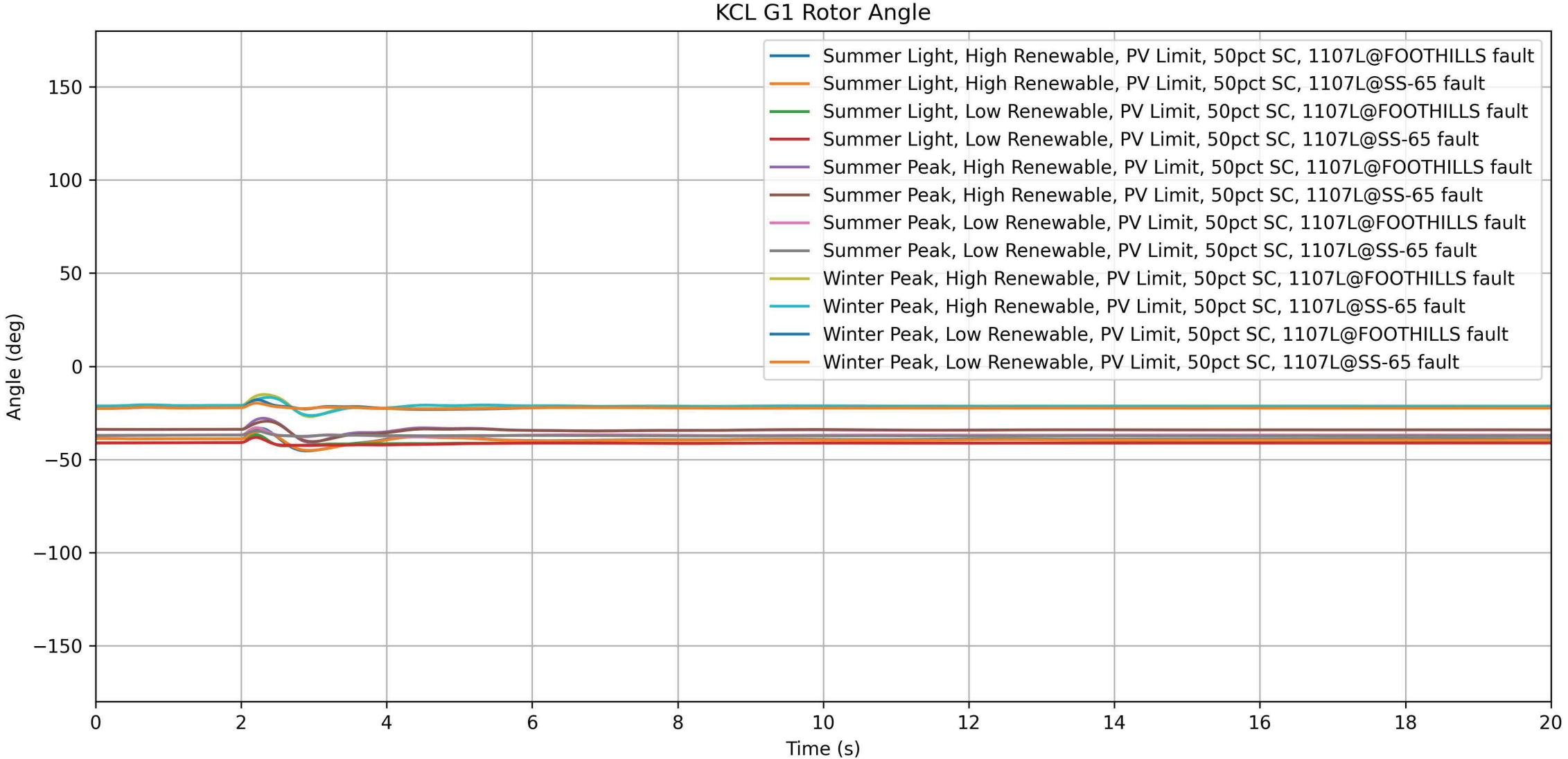

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

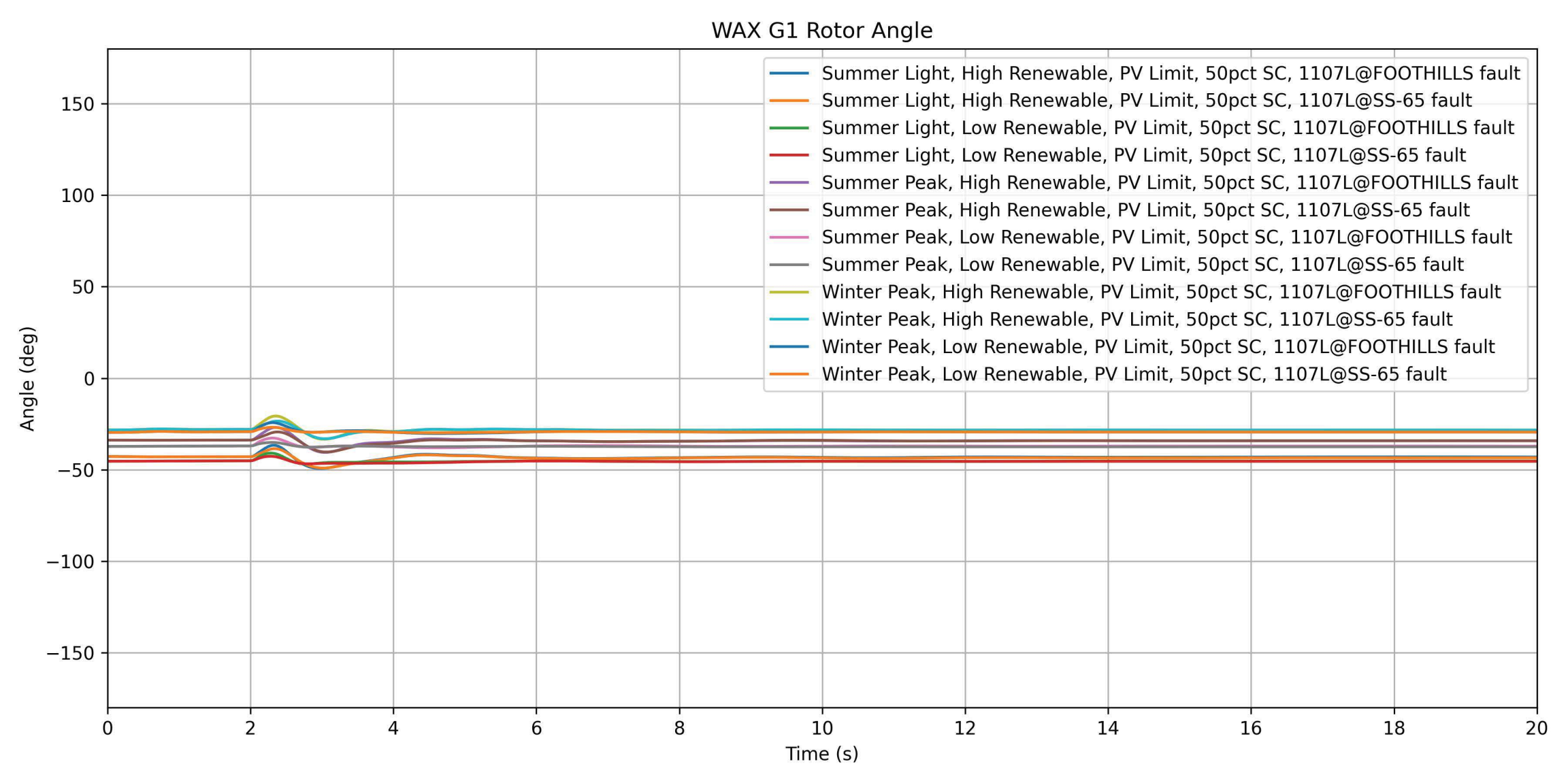

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

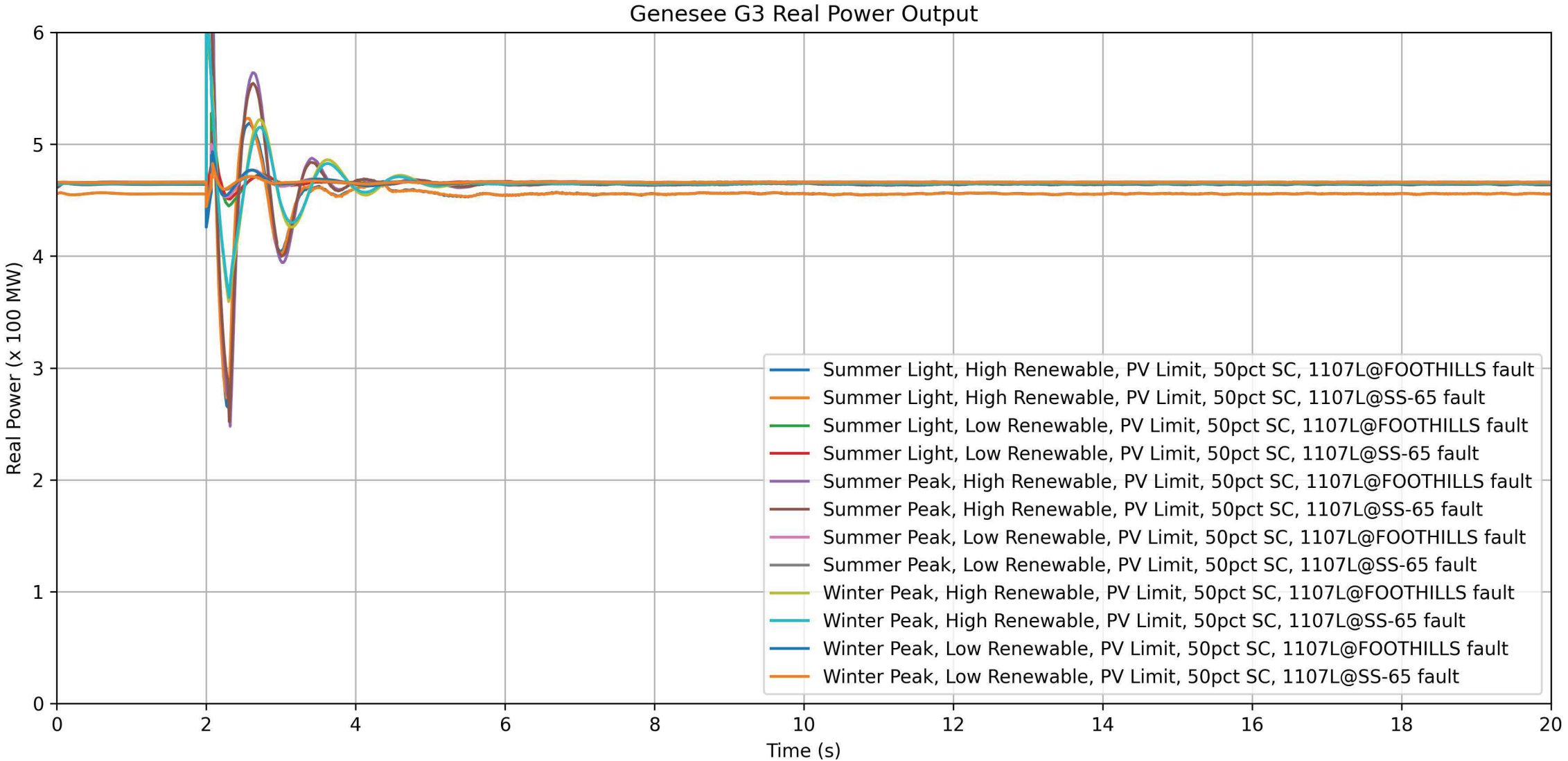

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

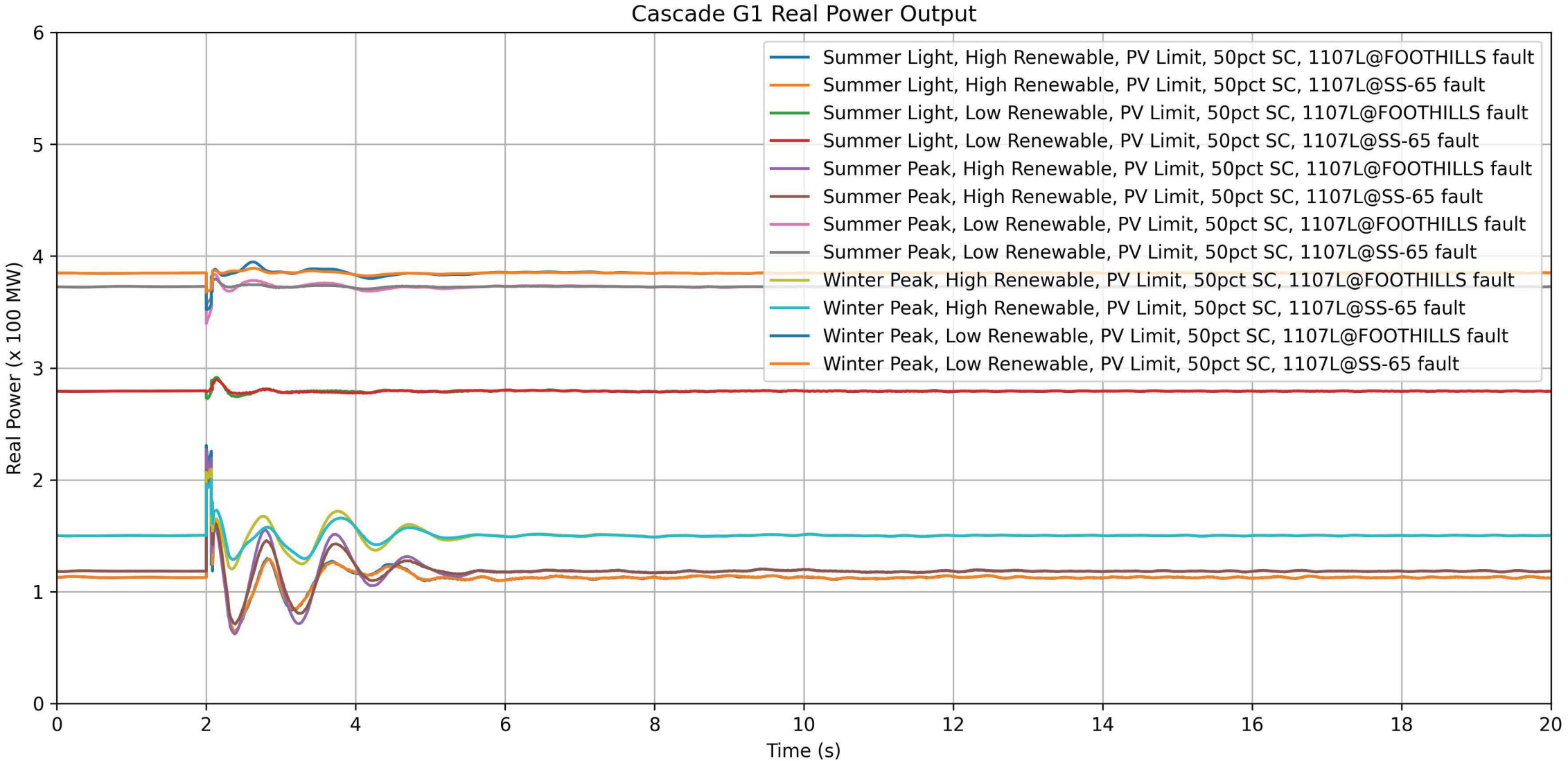

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

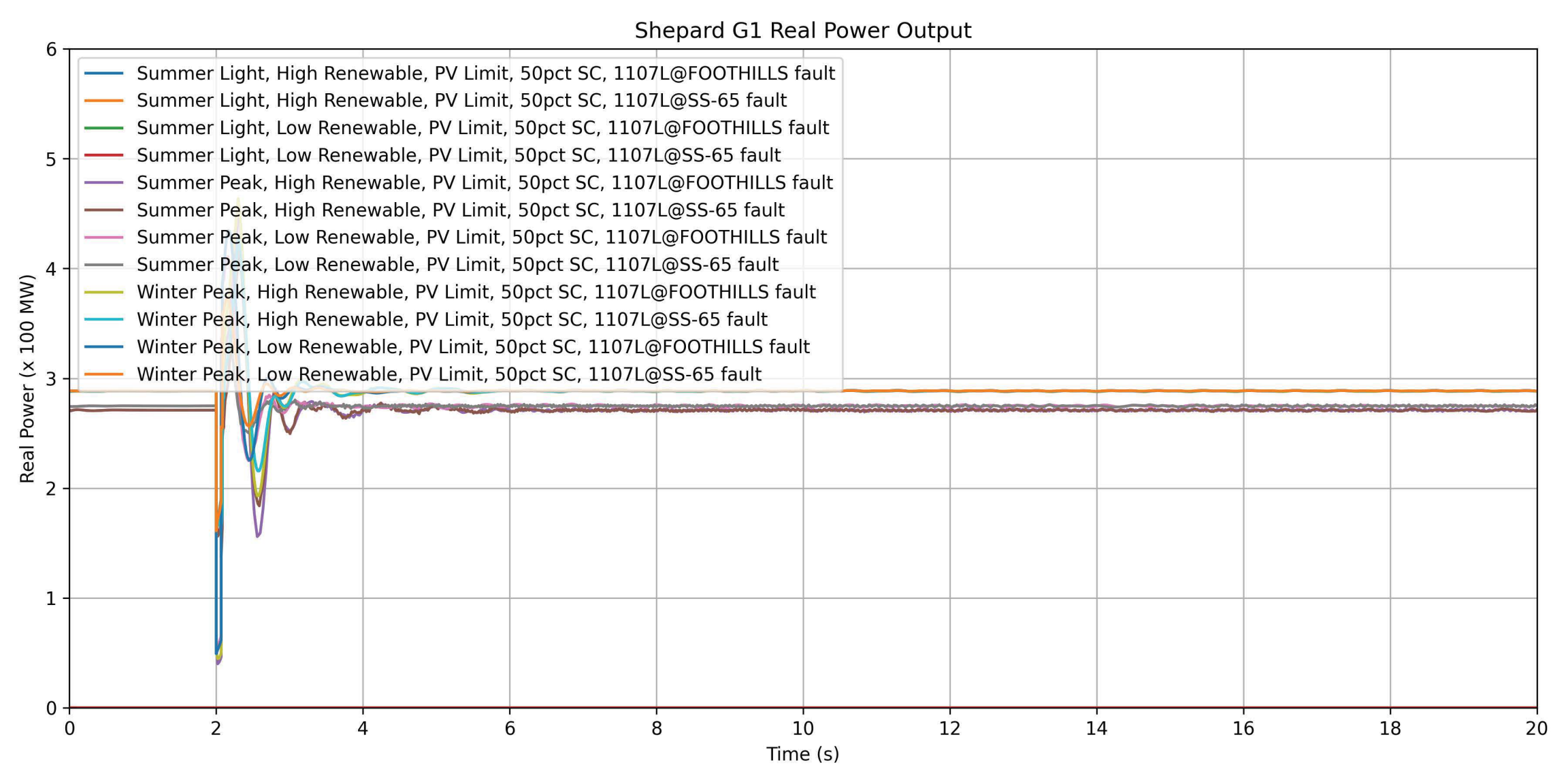

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

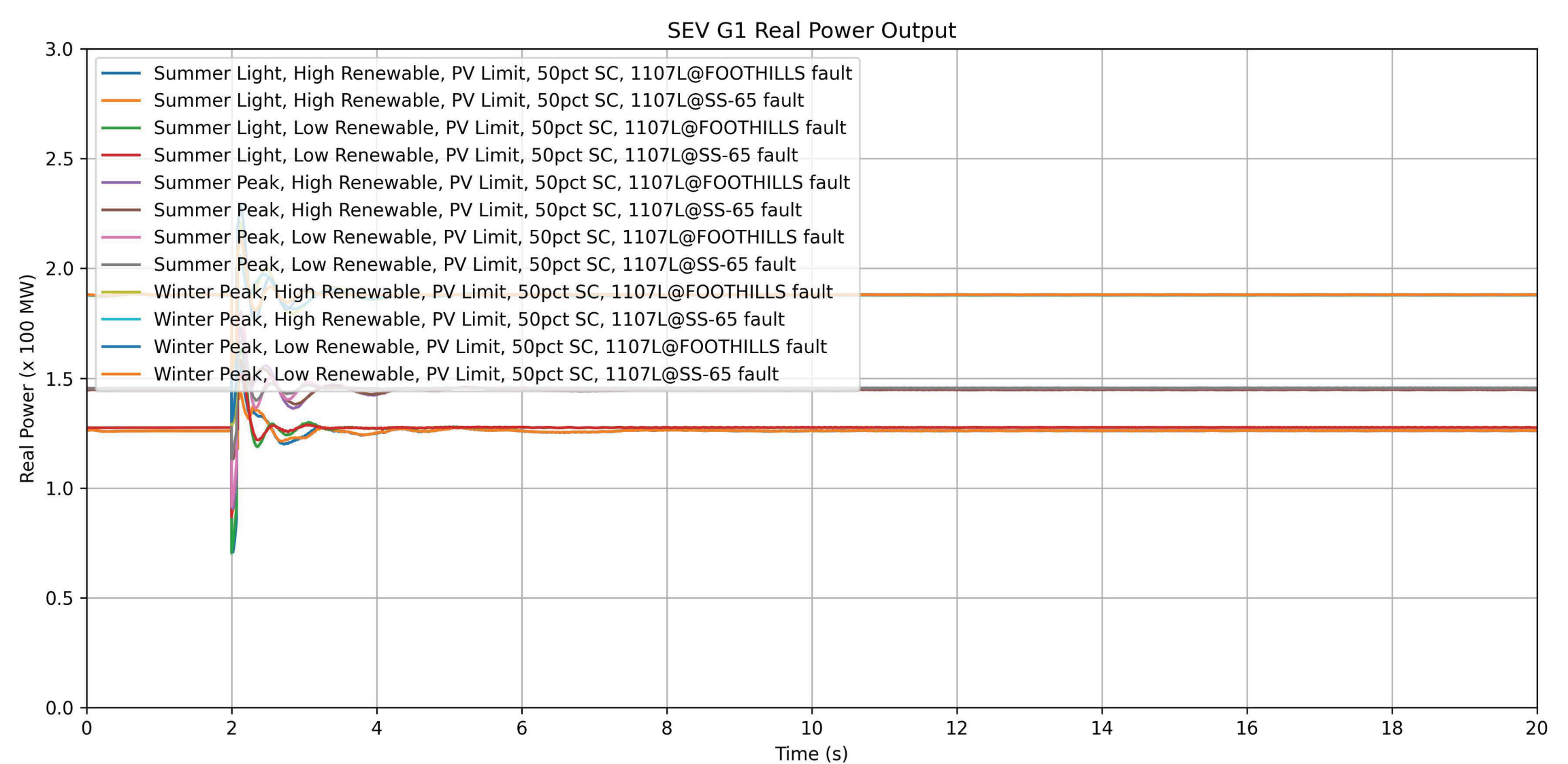

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

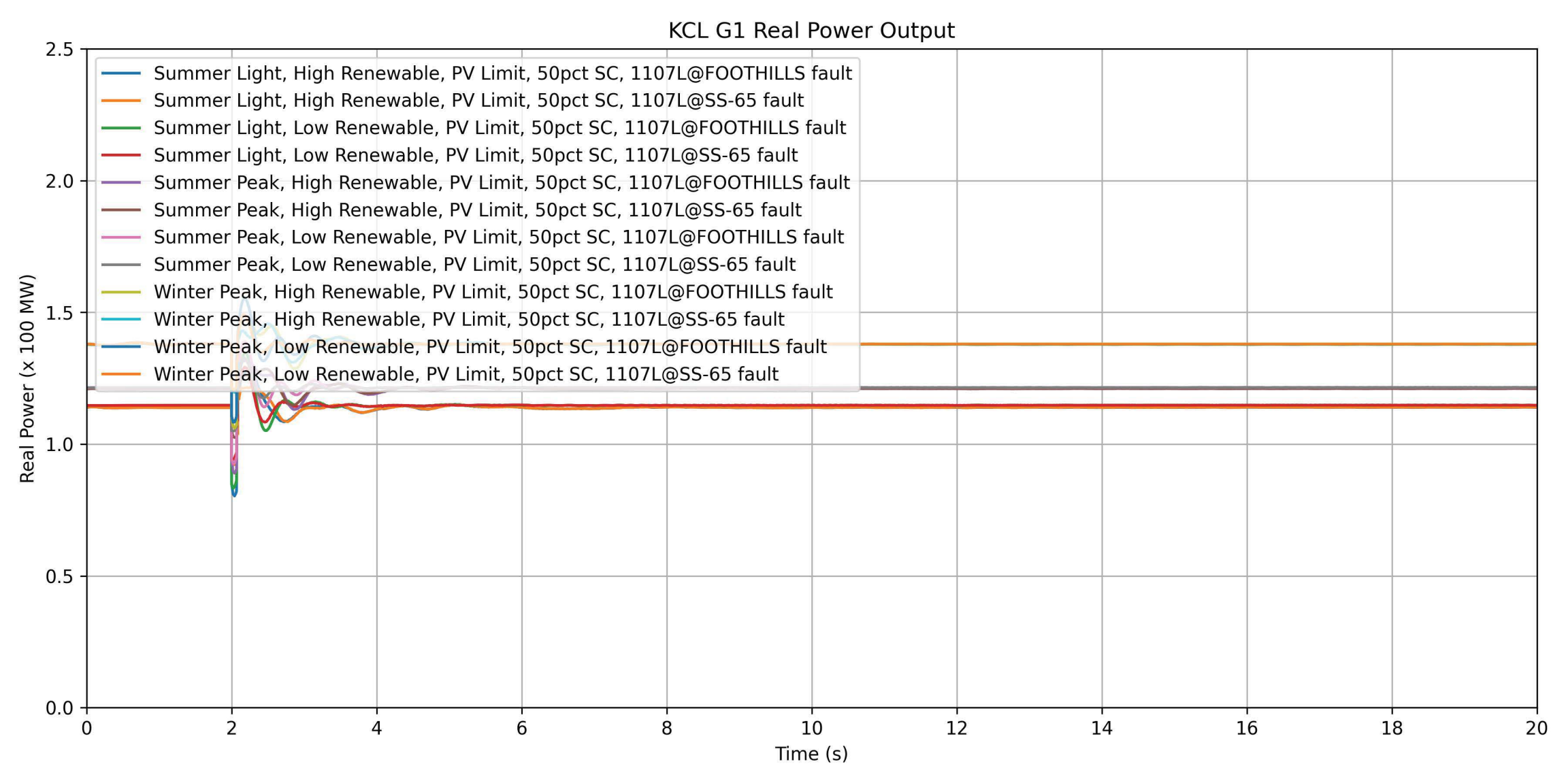

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

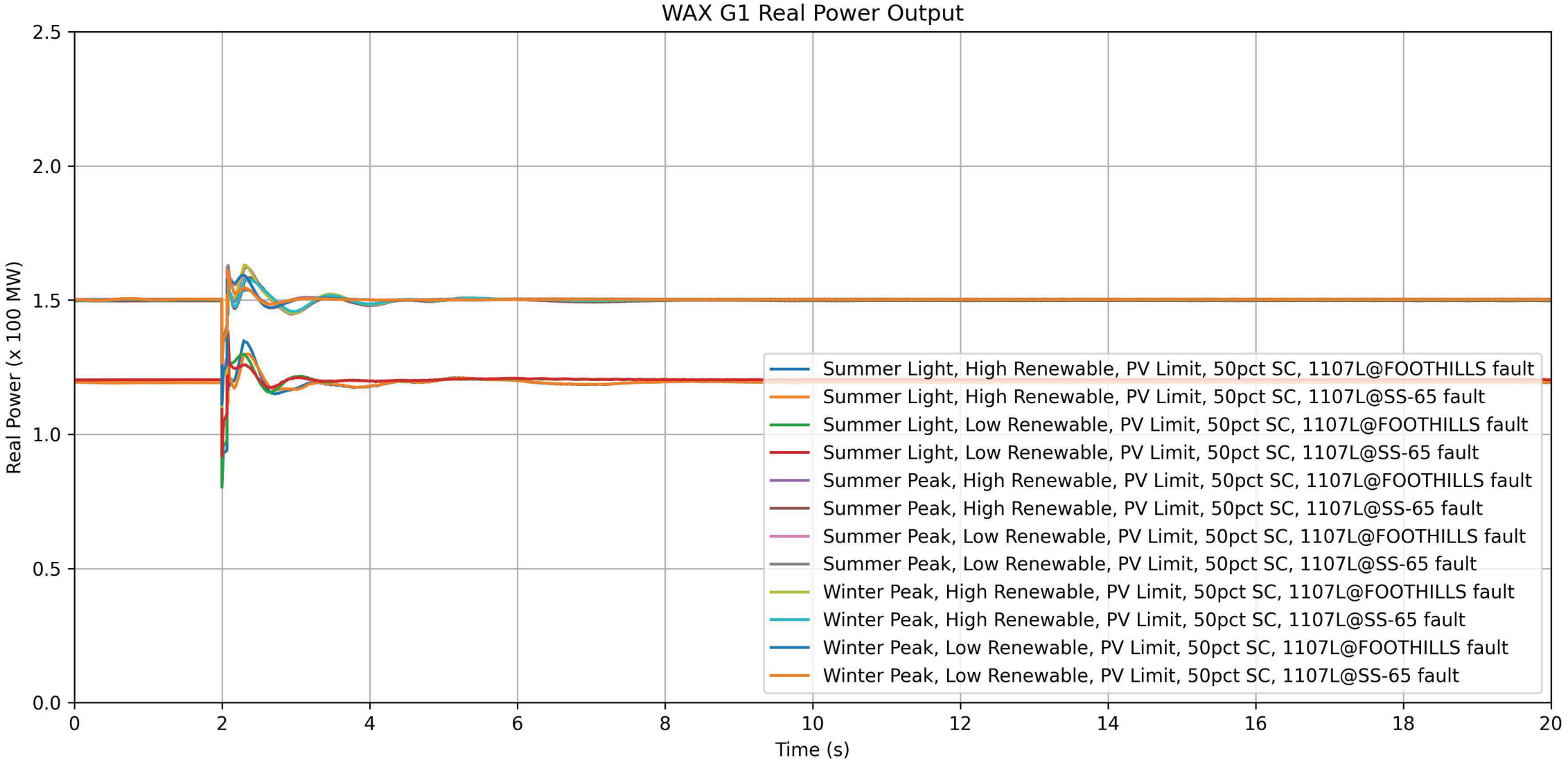

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

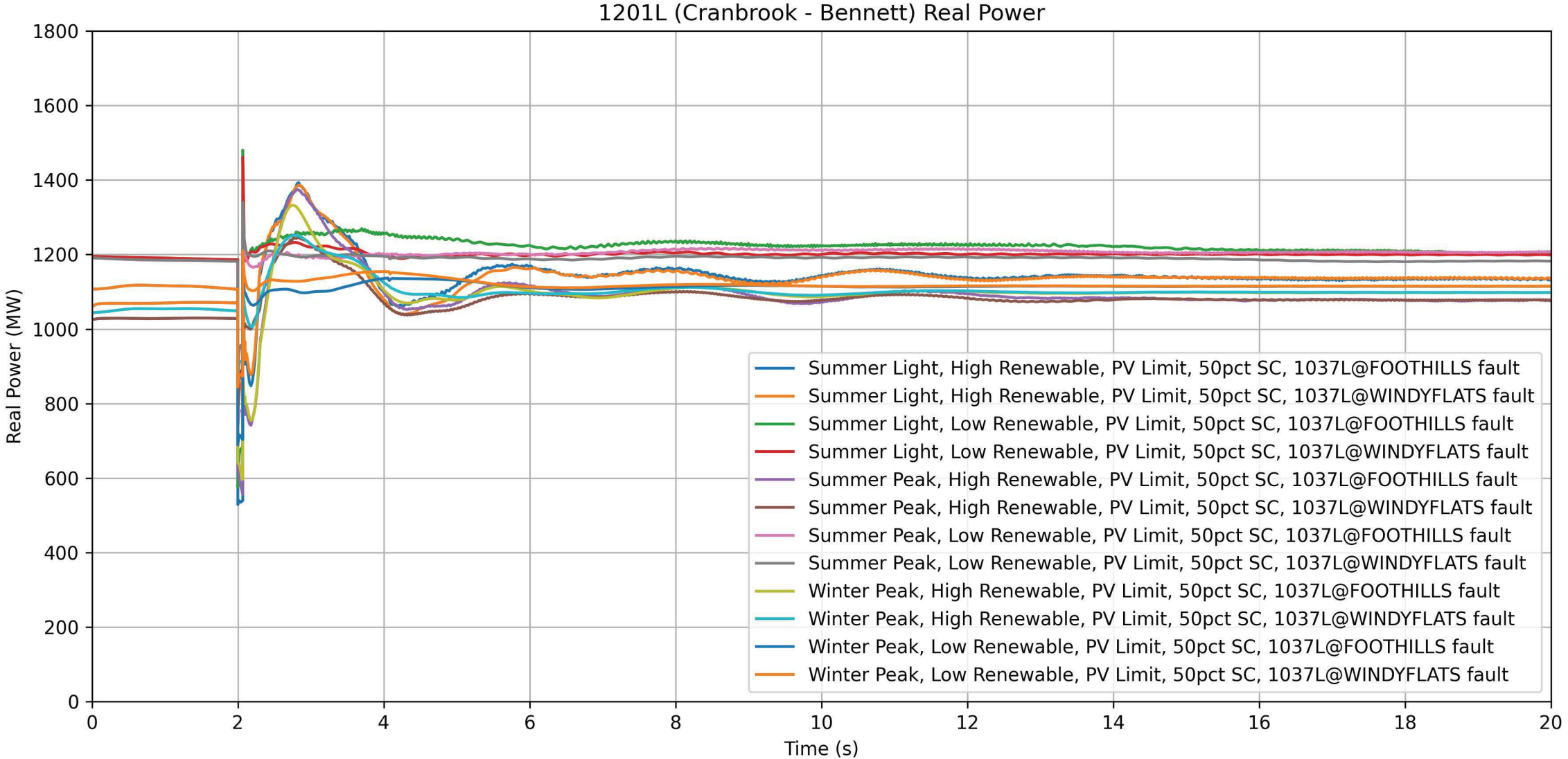

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

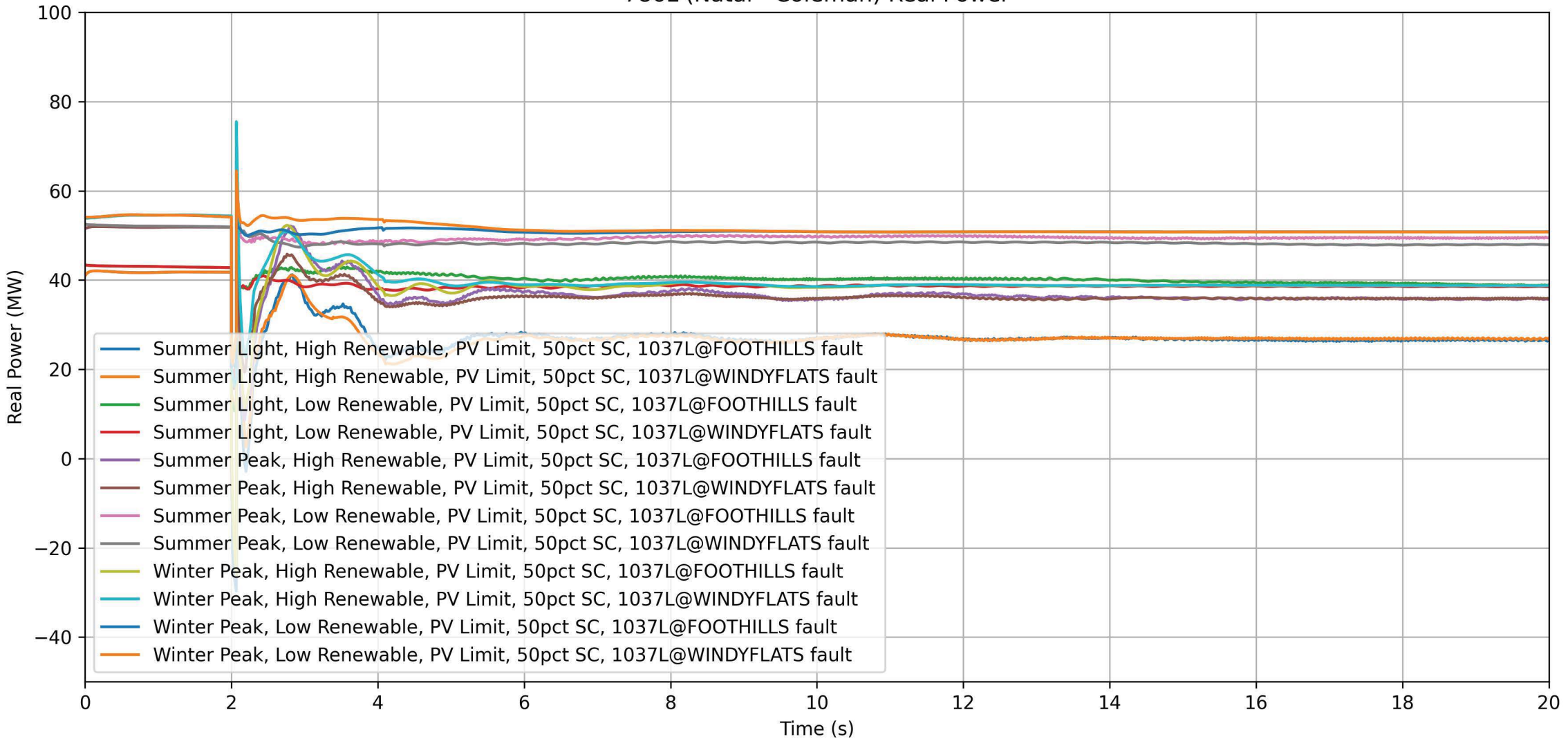

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

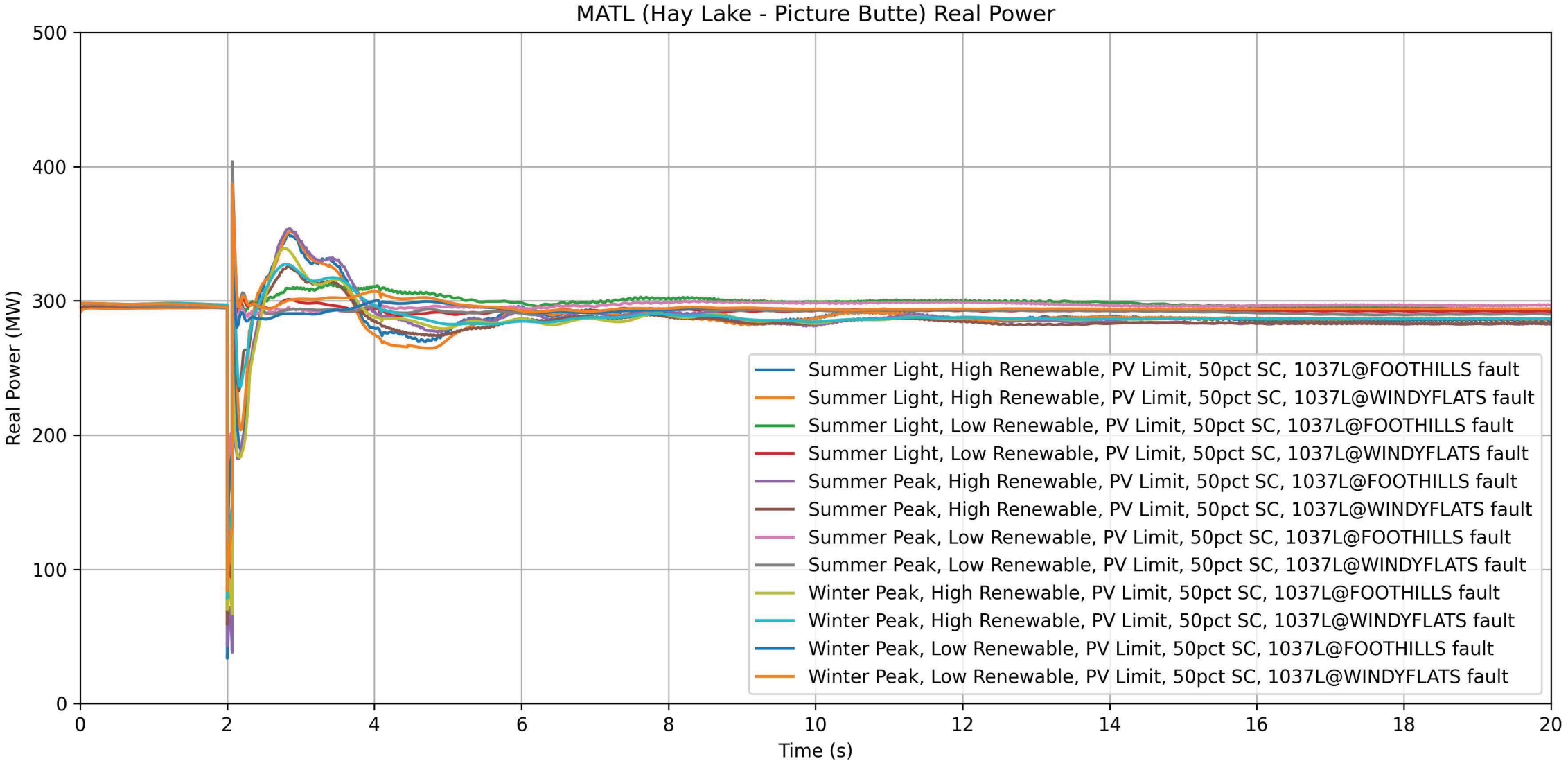

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

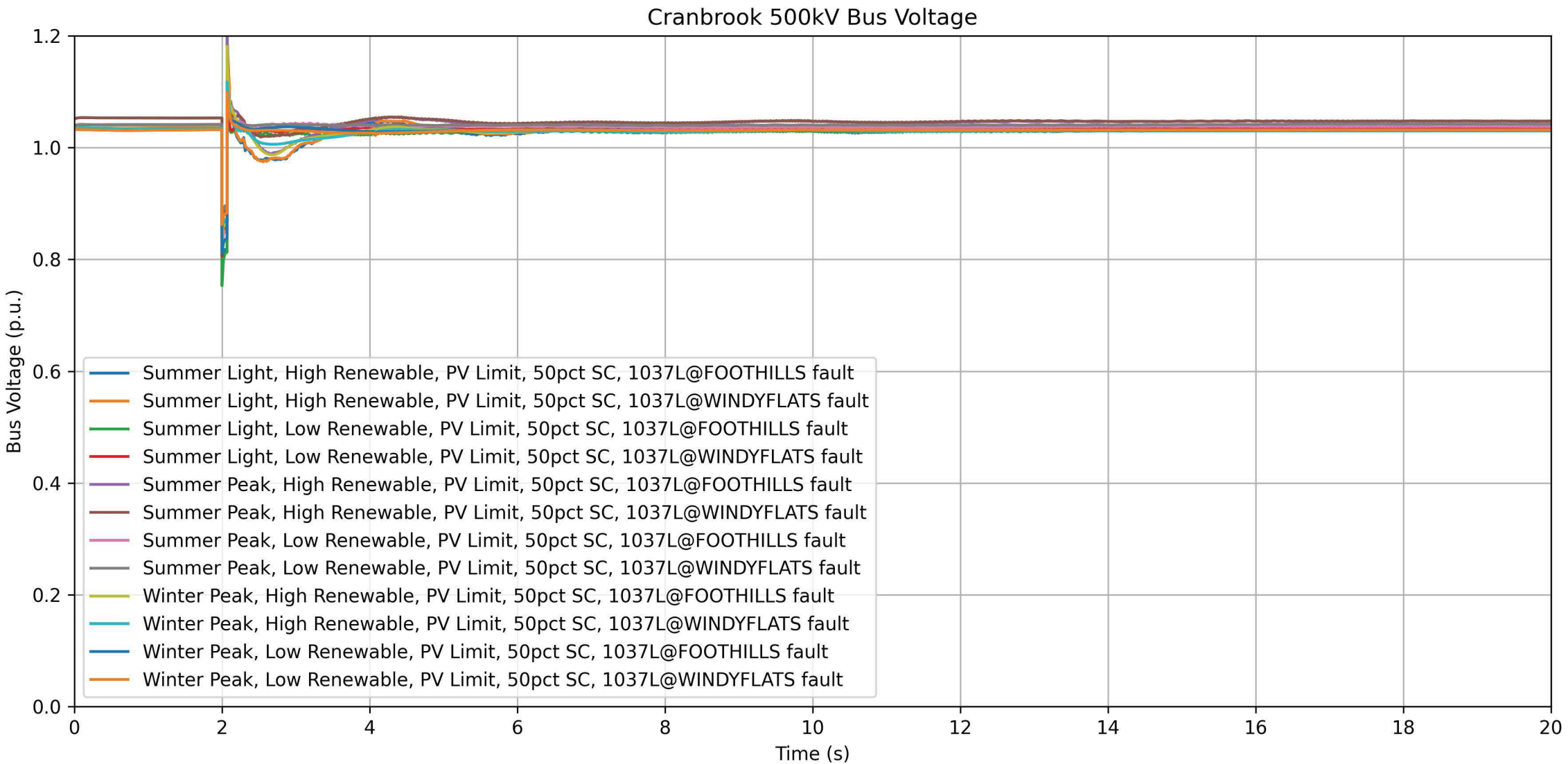

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

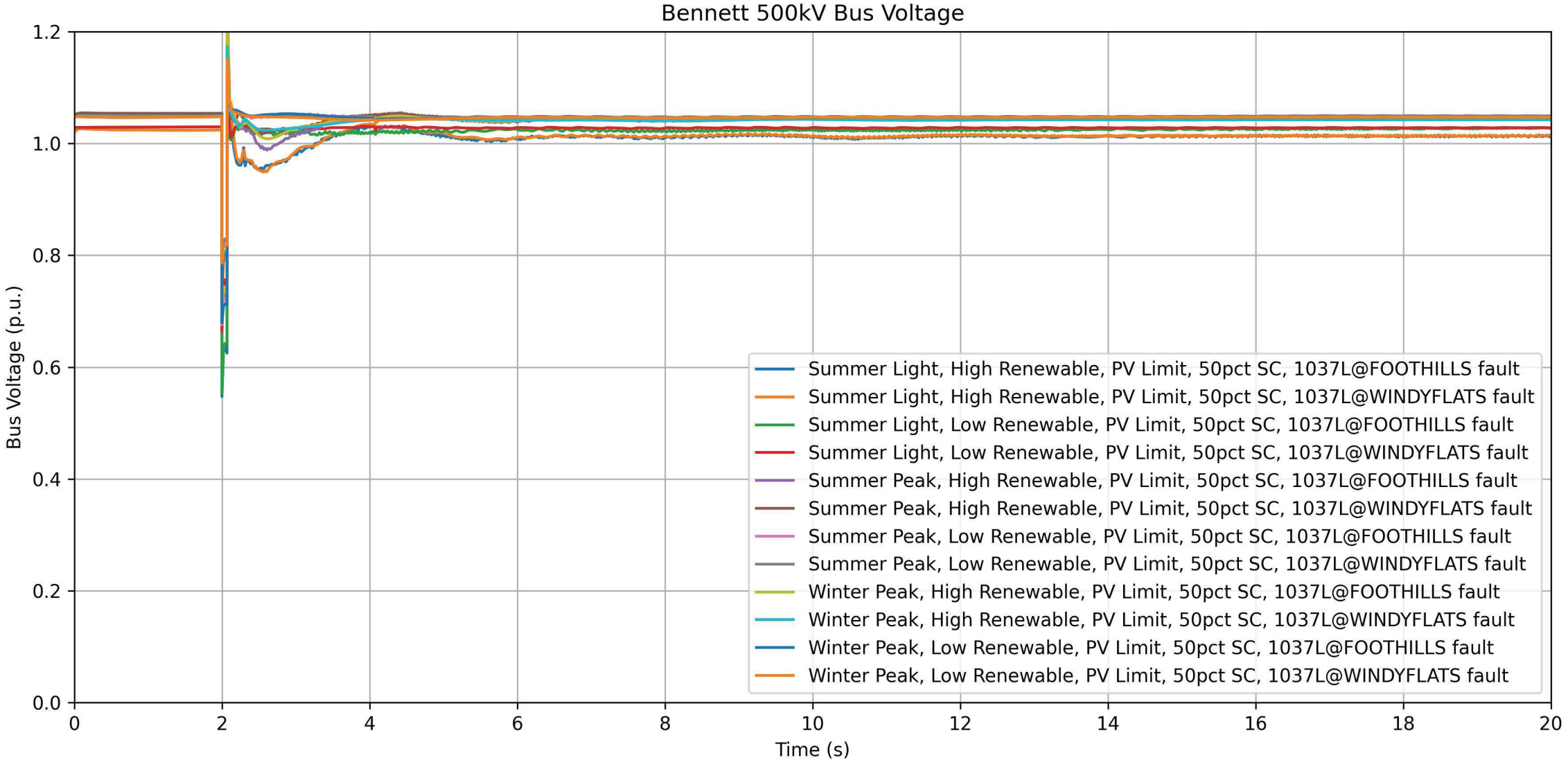

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1107L@SS-65 fault

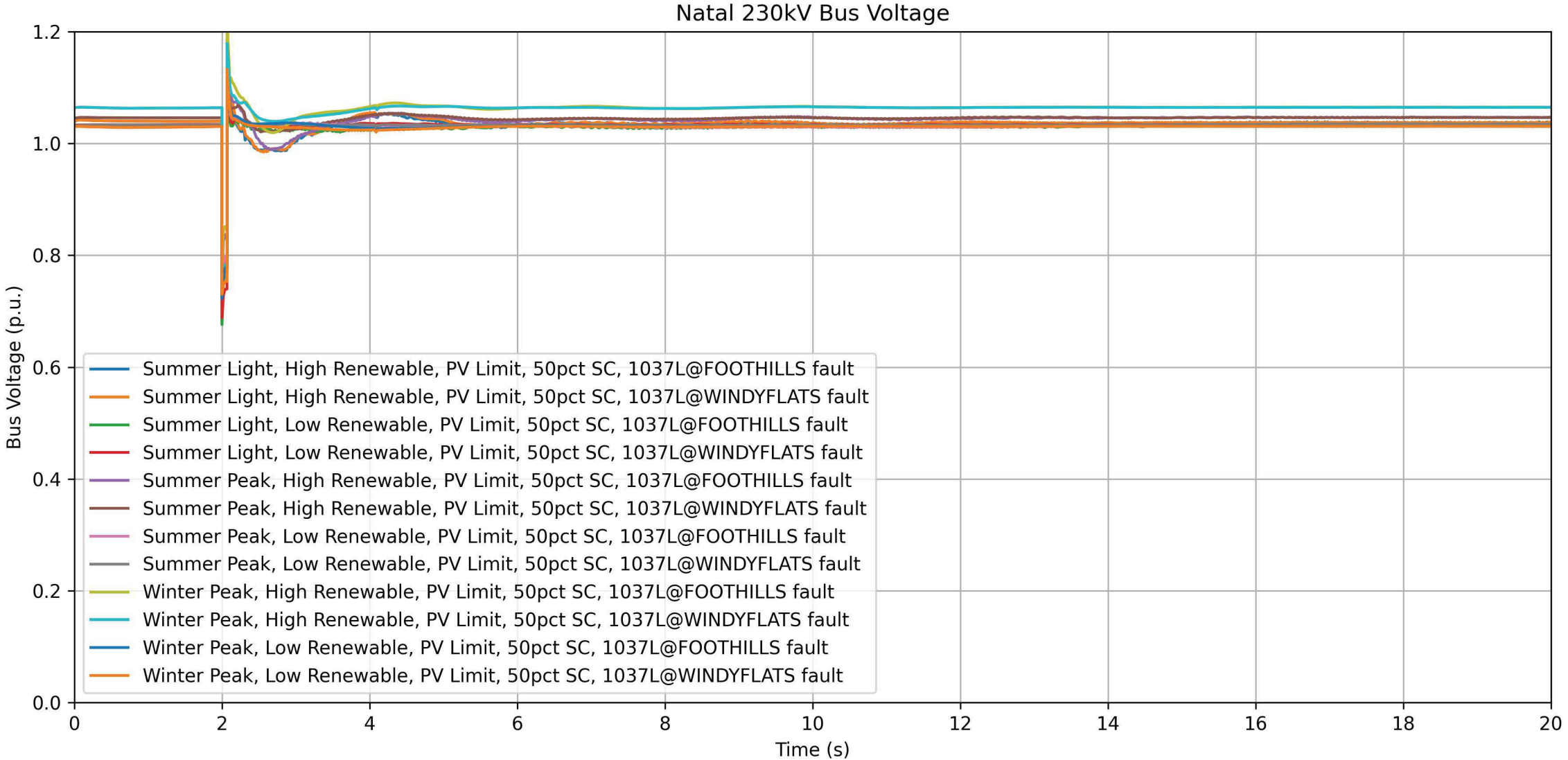

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

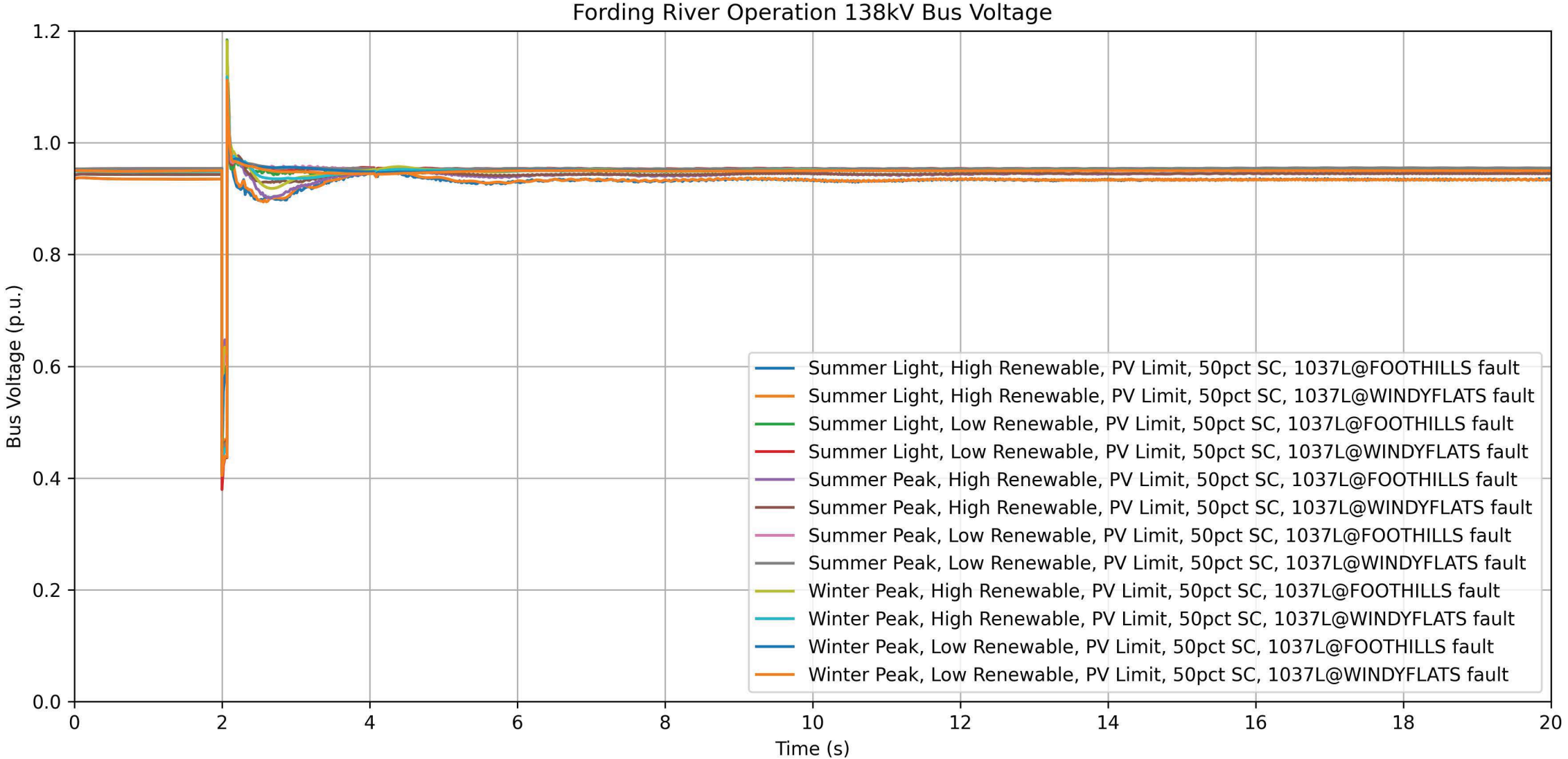

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

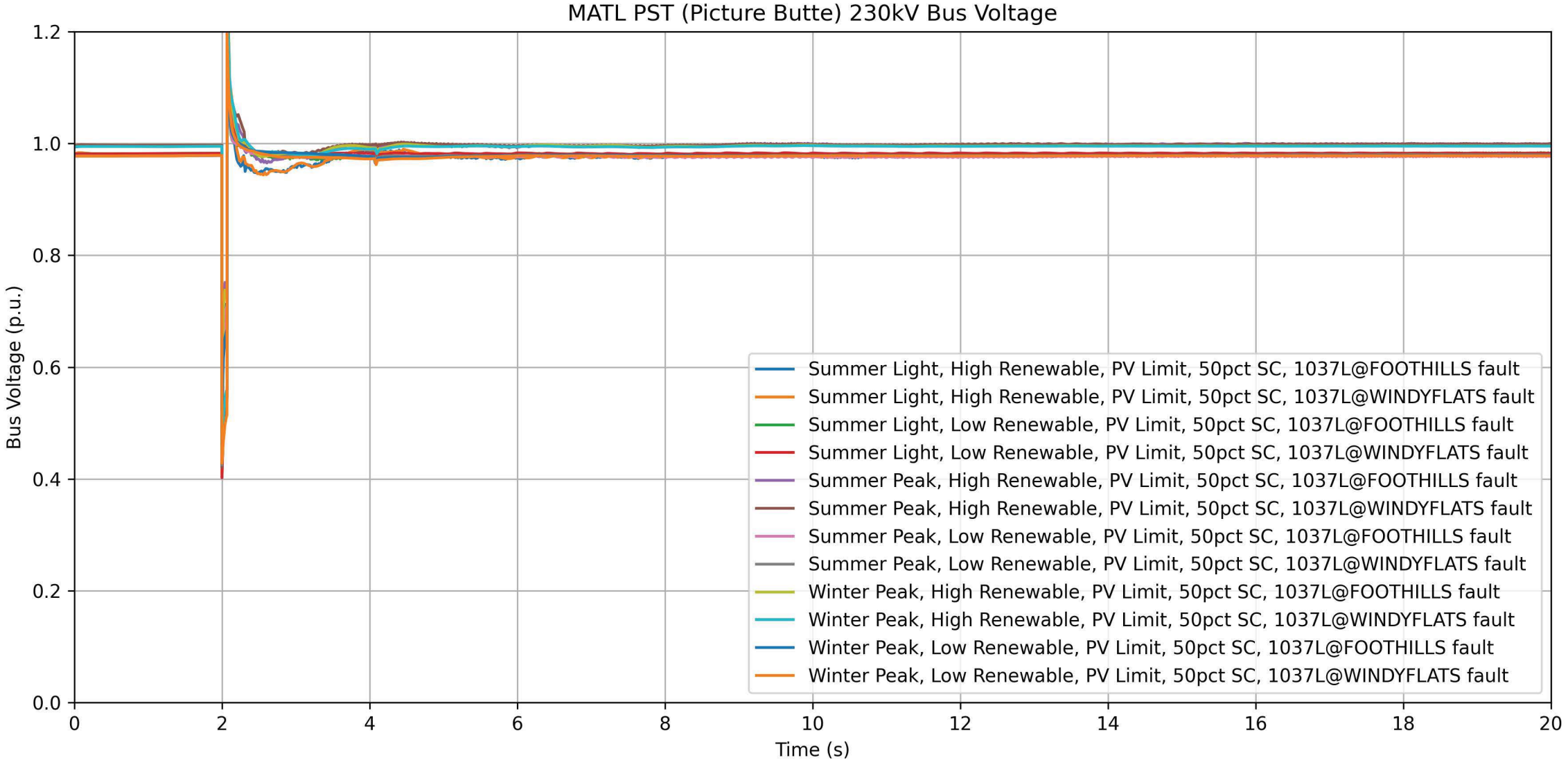

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

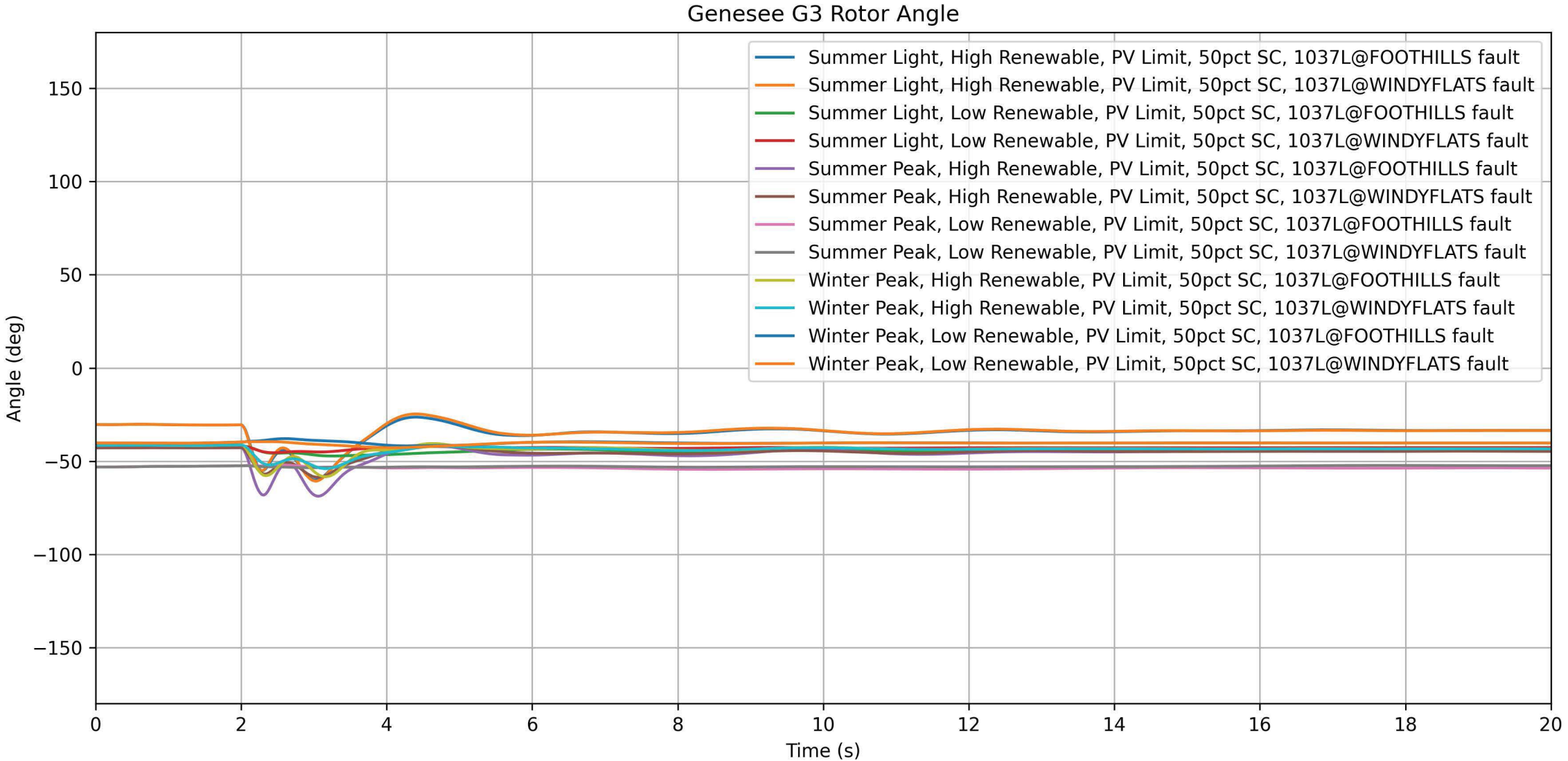

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

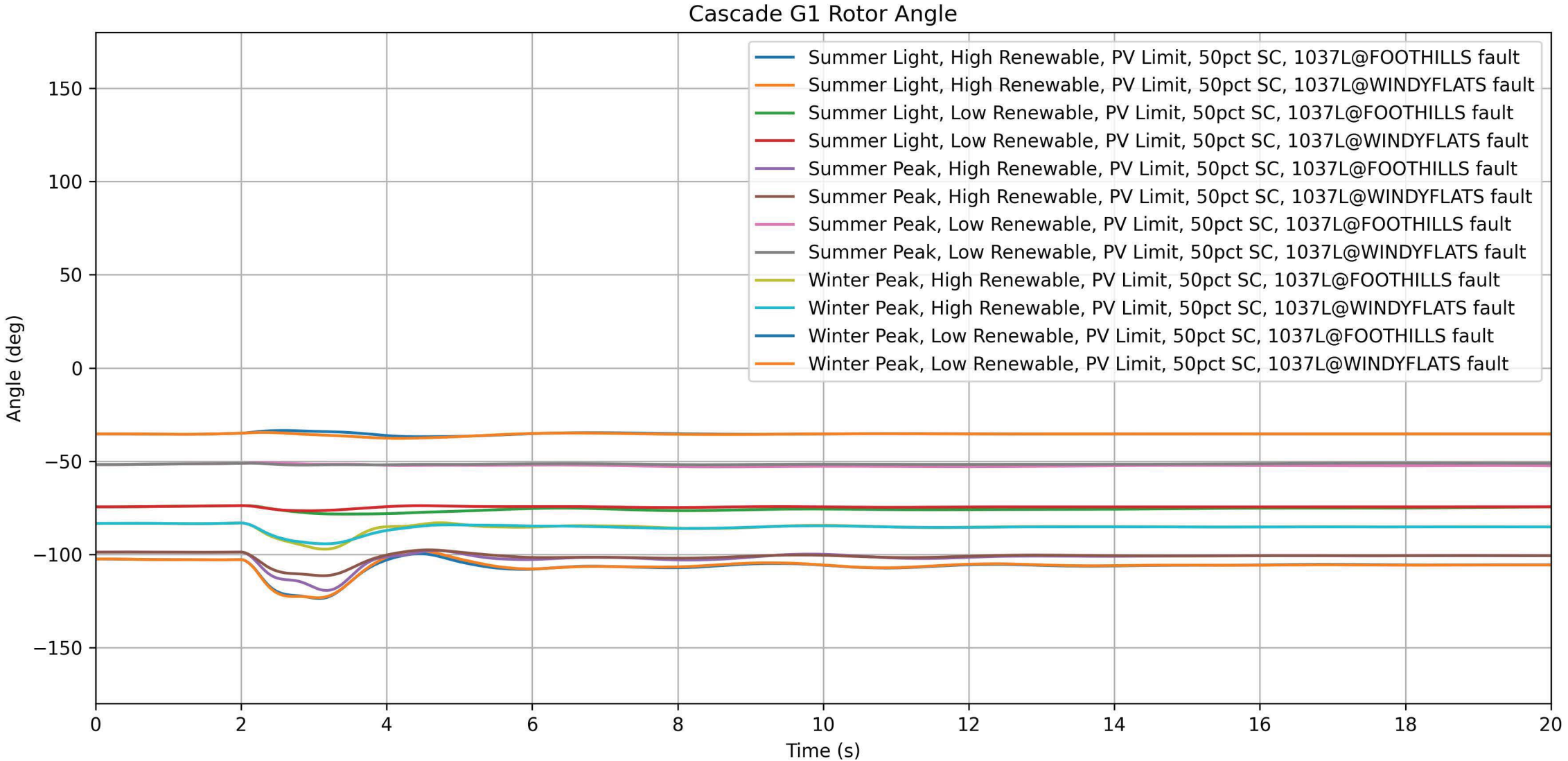

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

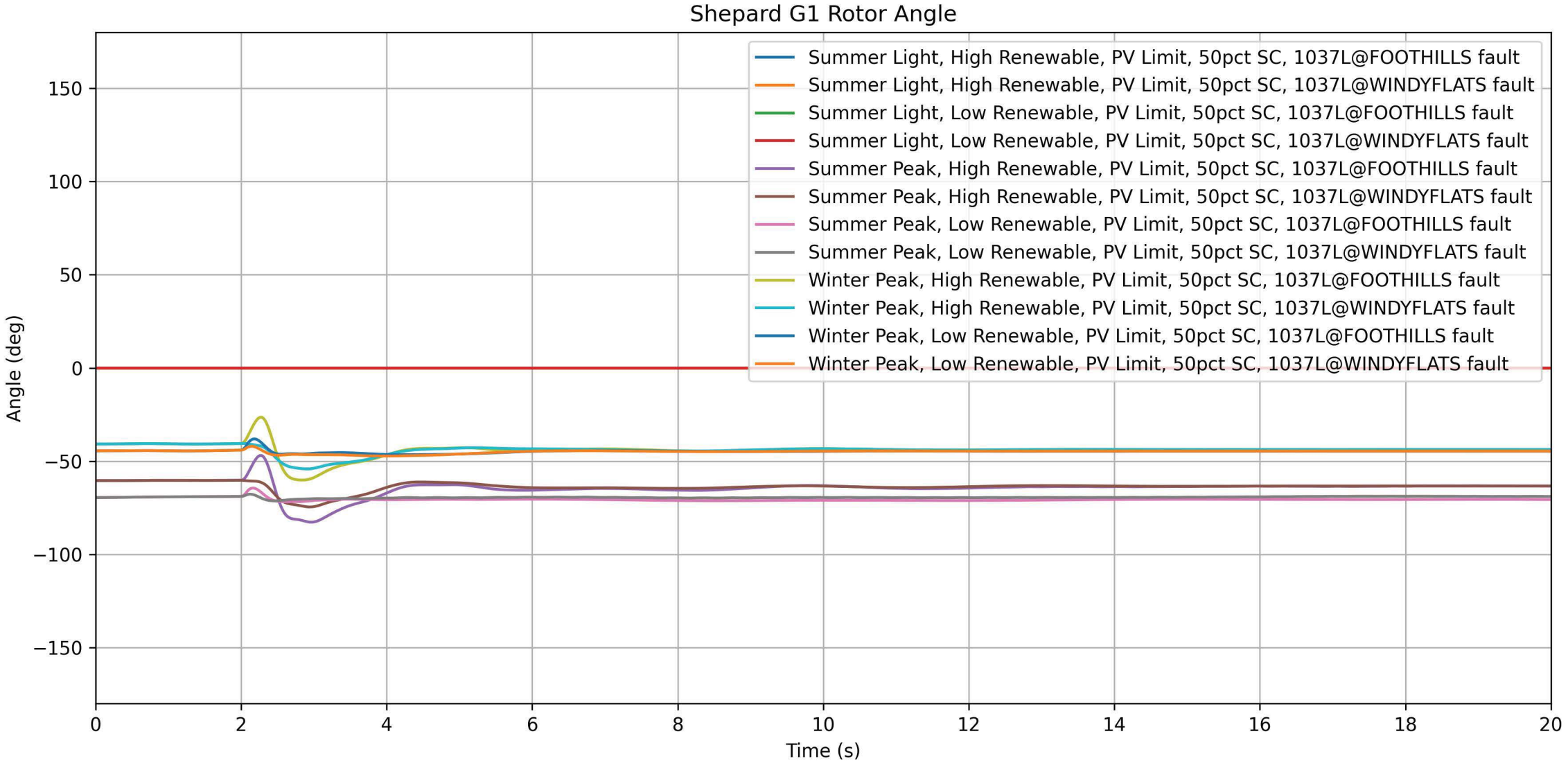

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

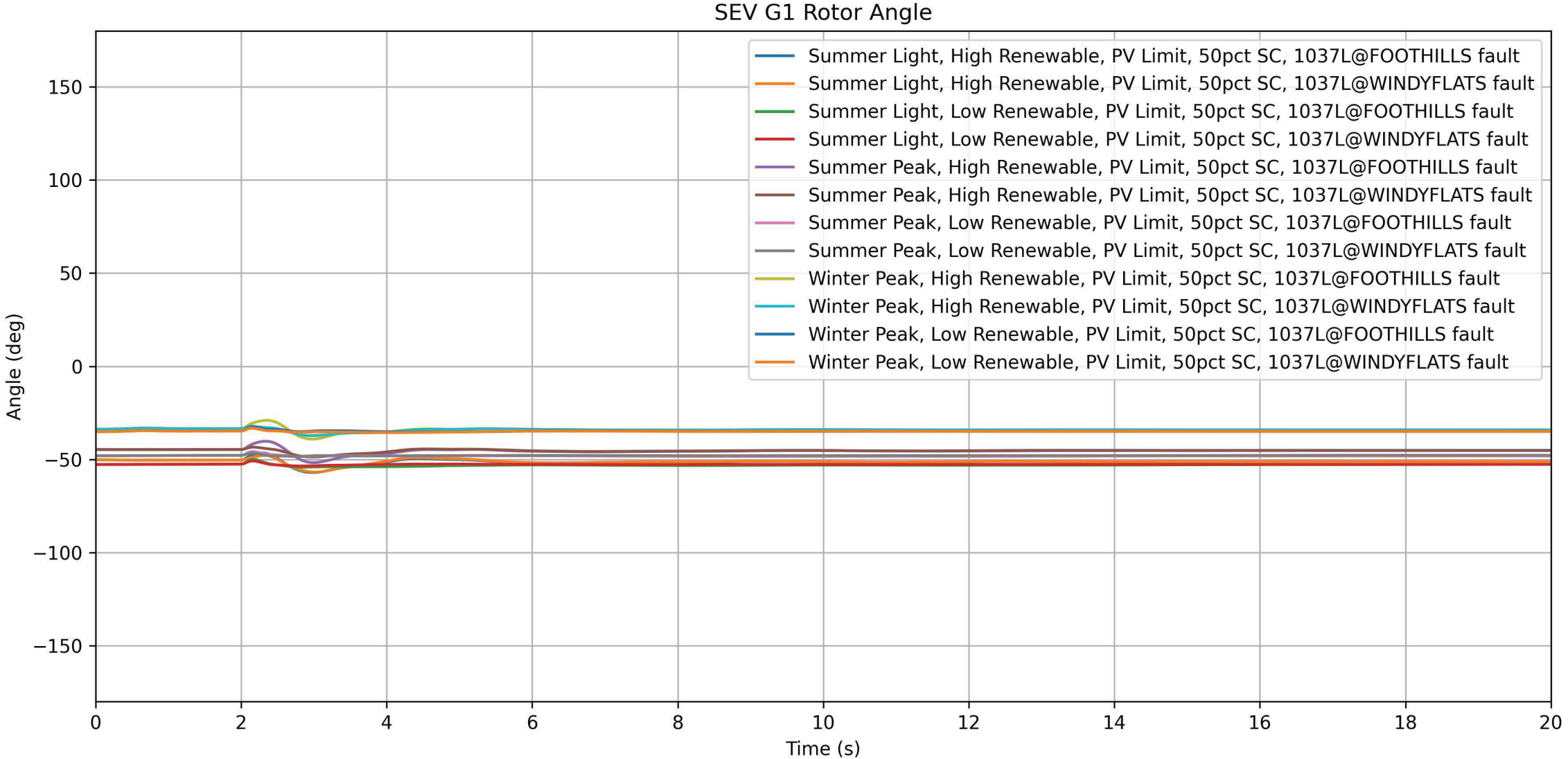

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

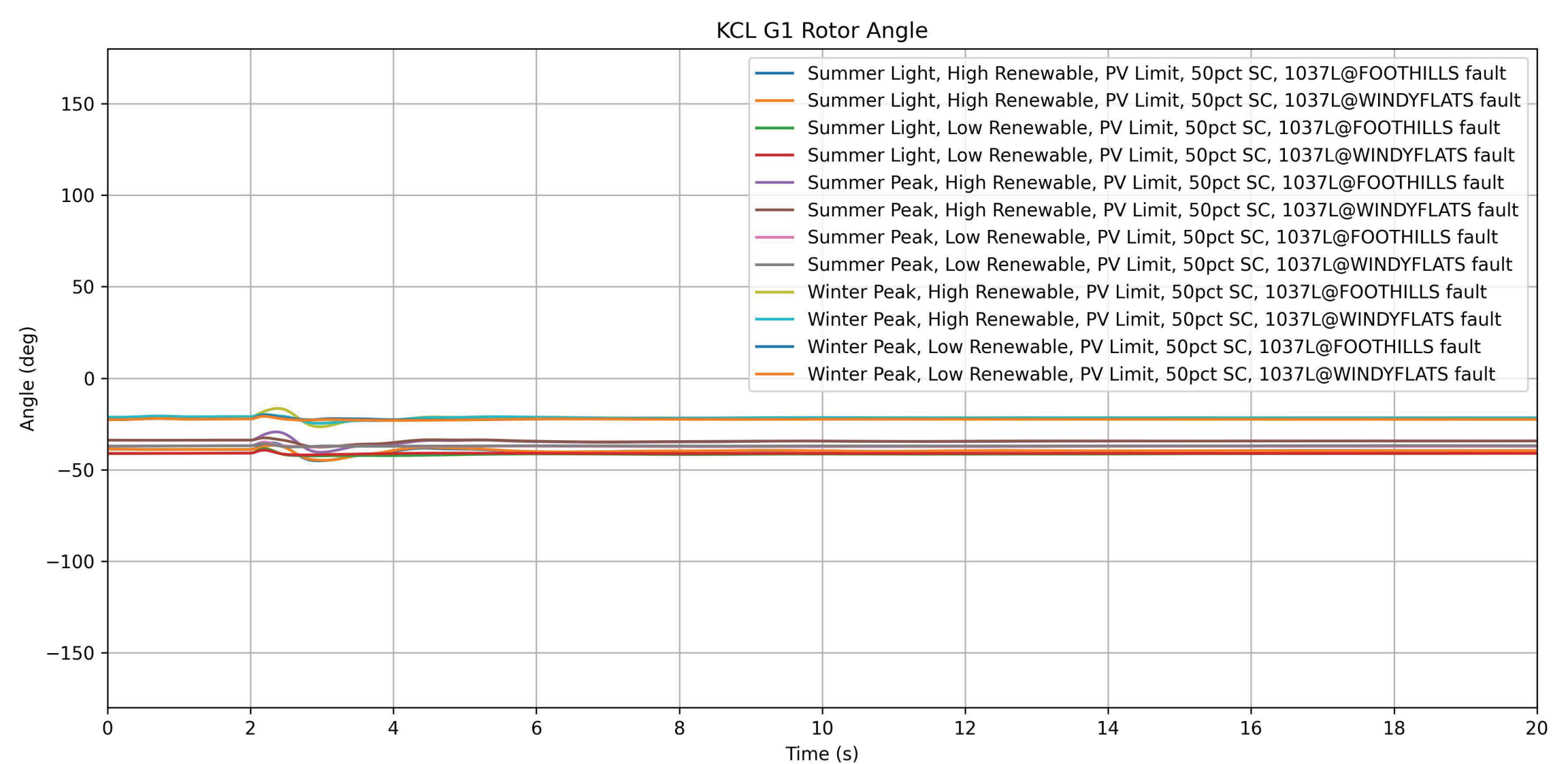

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

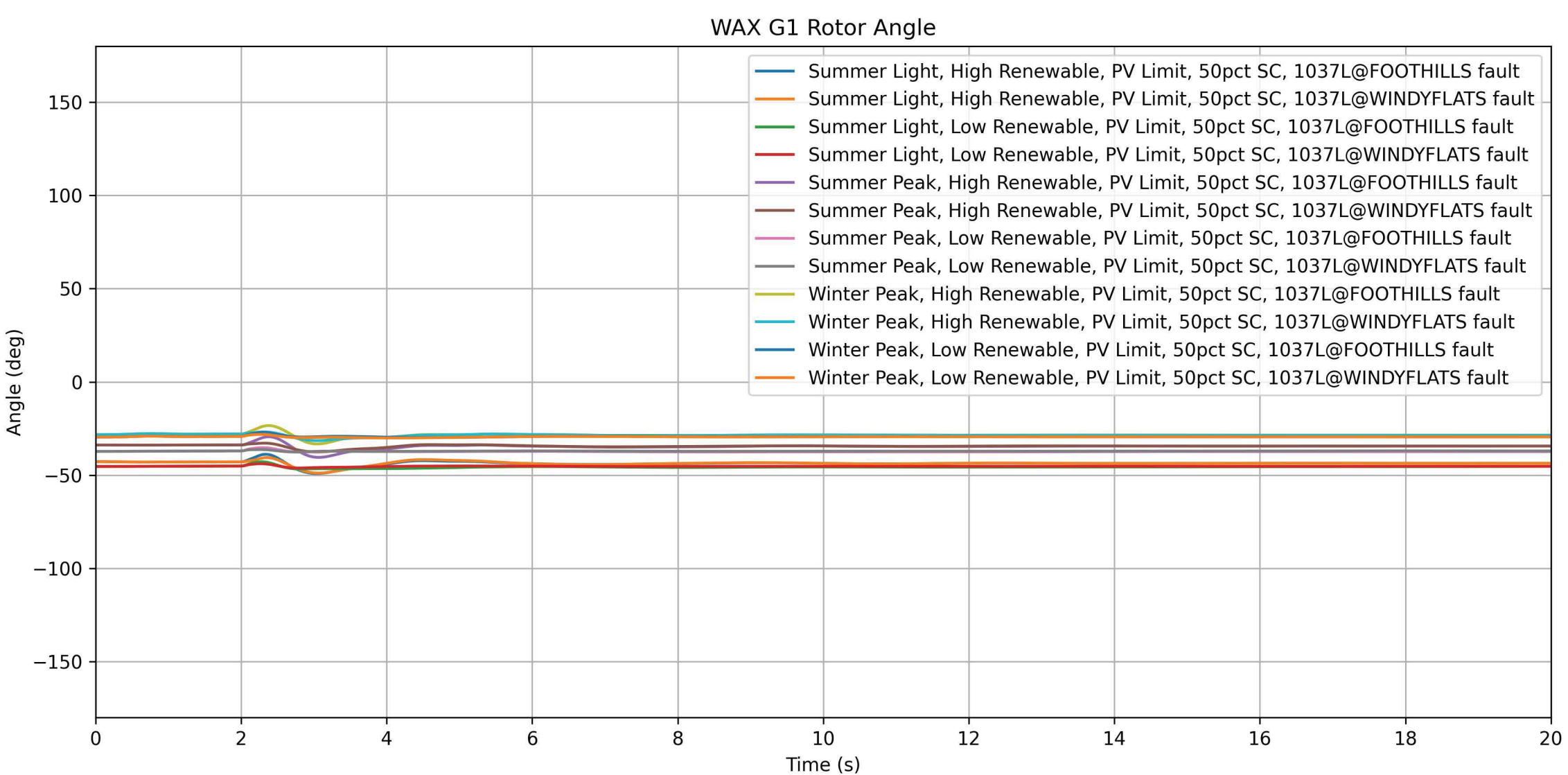

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

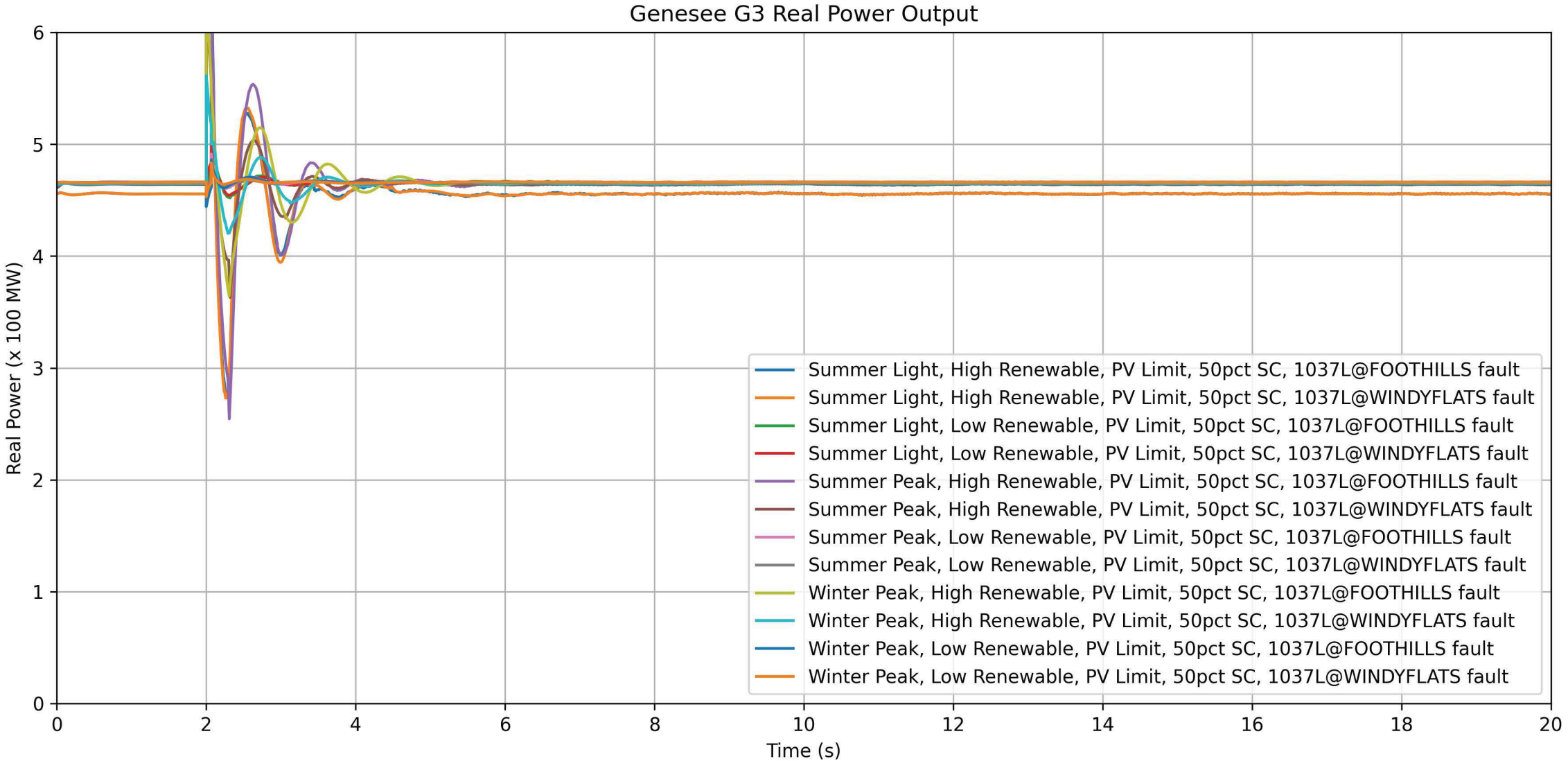

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

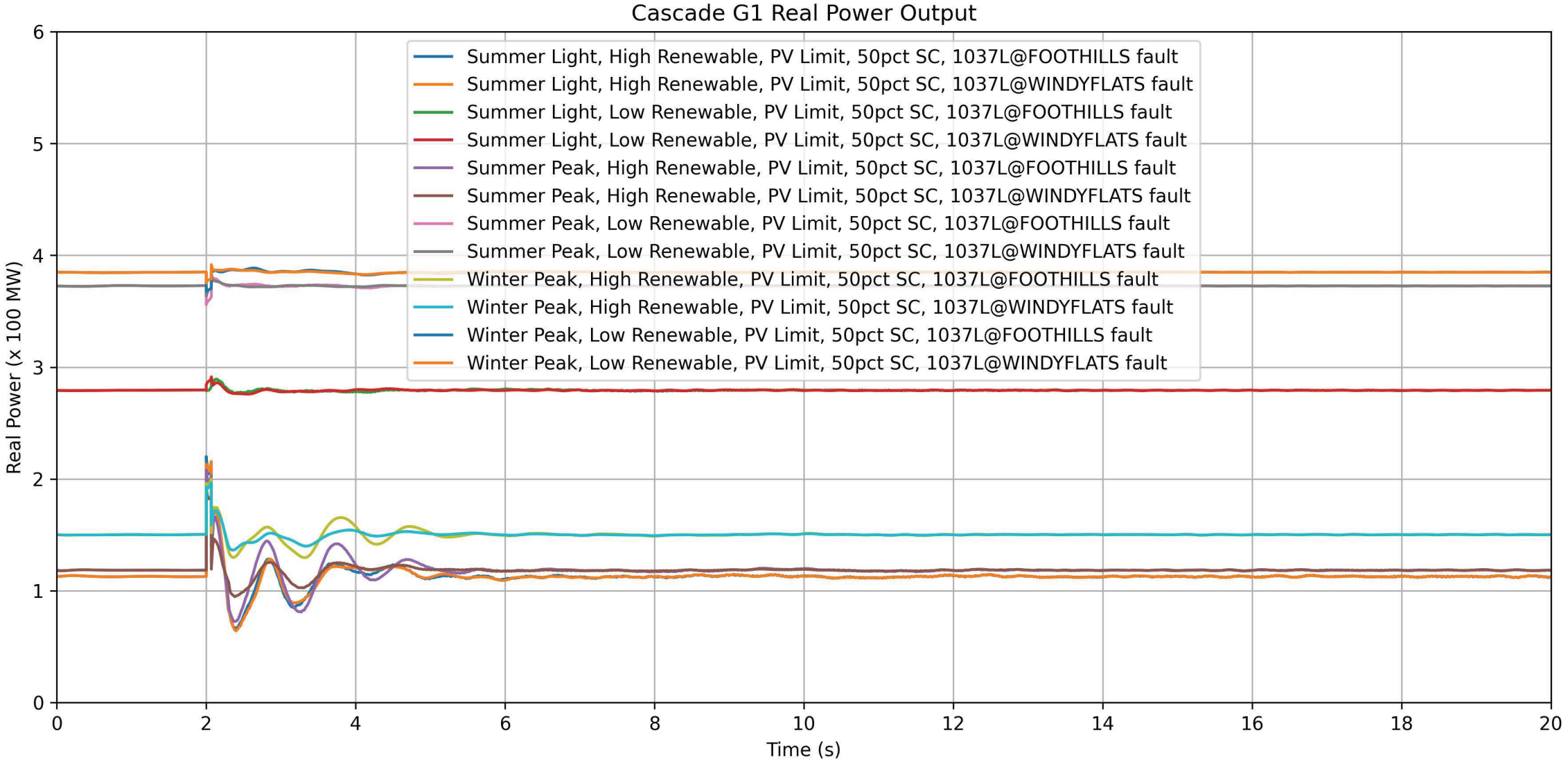

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

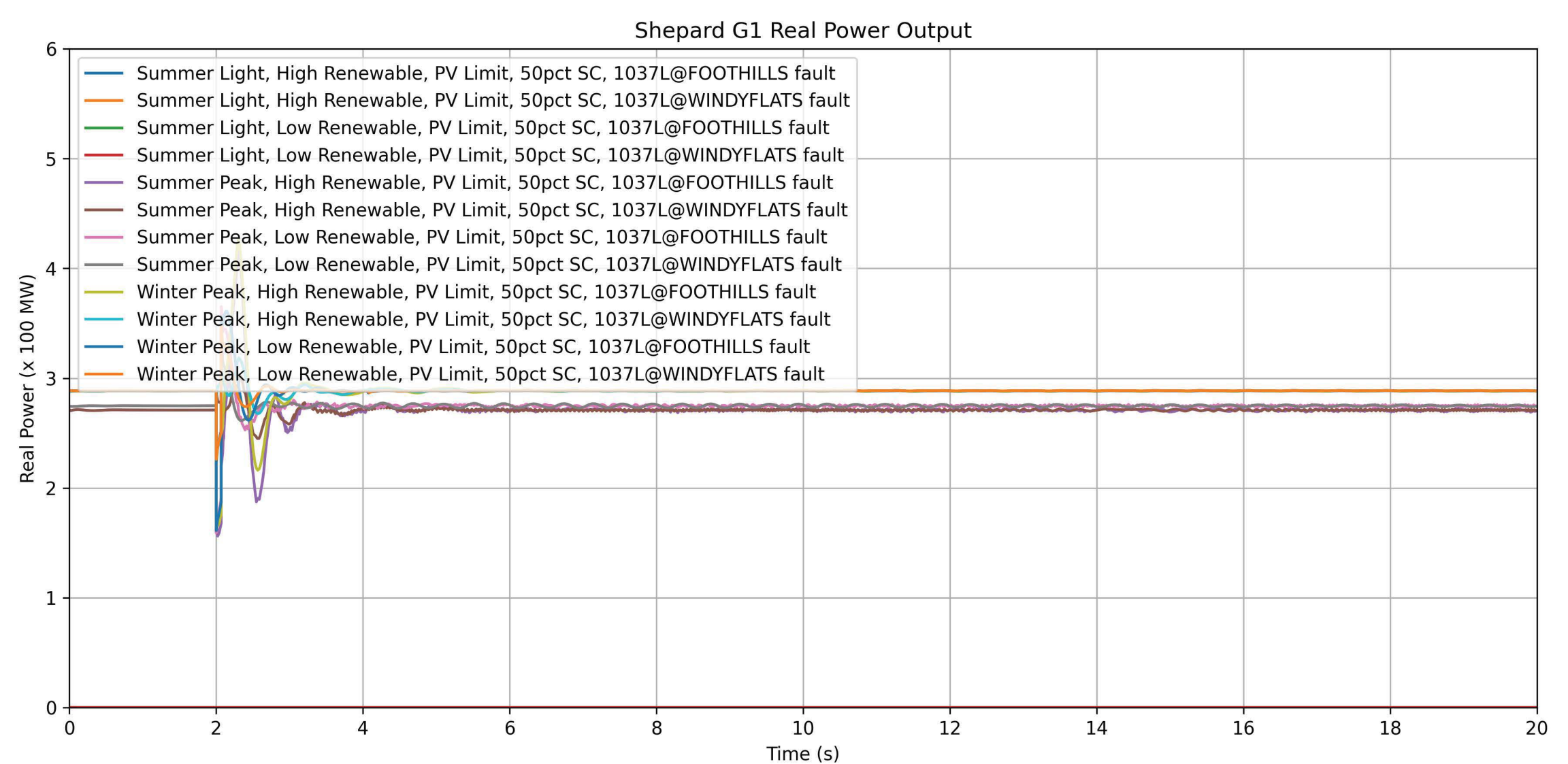

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

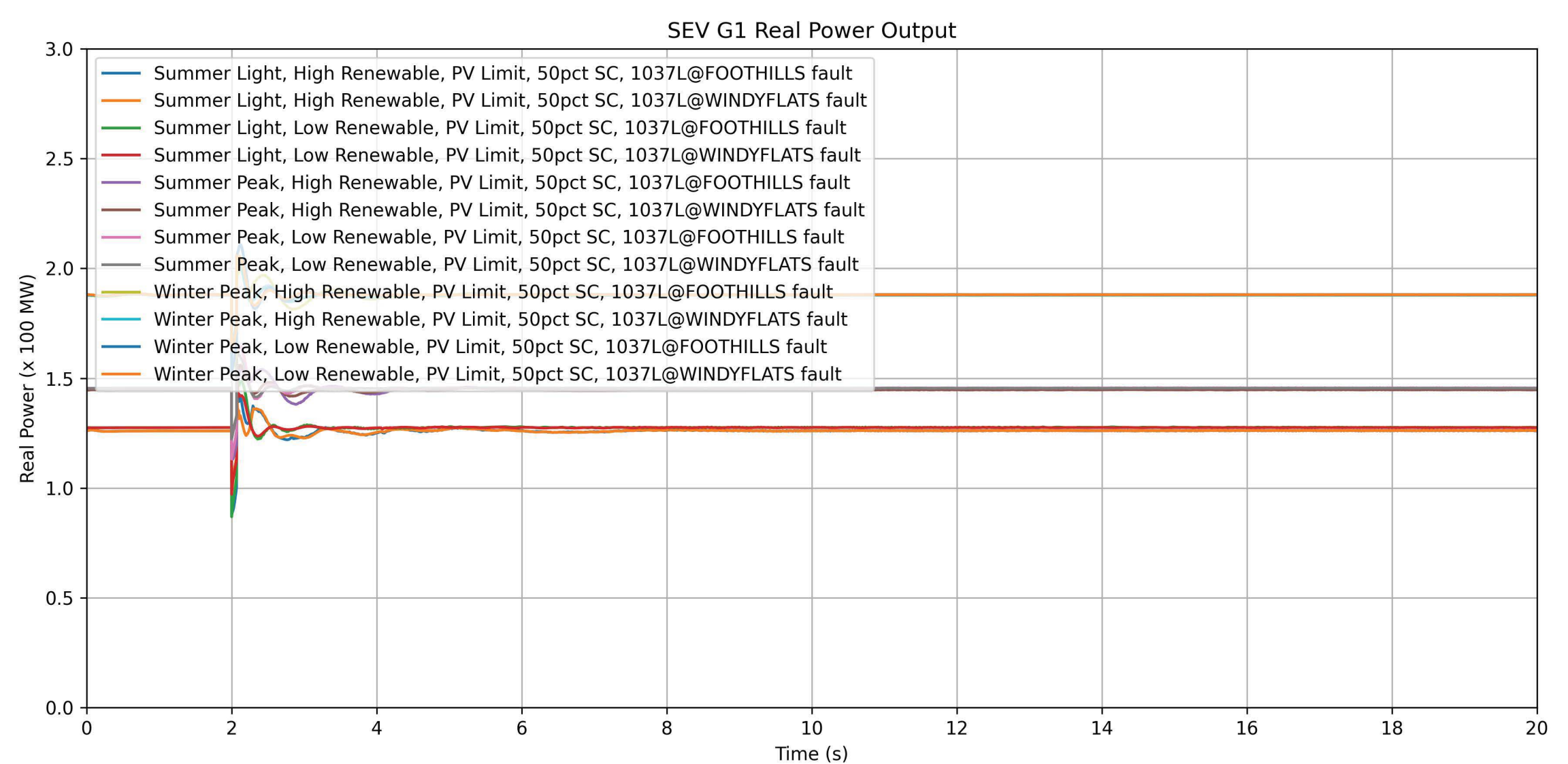

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

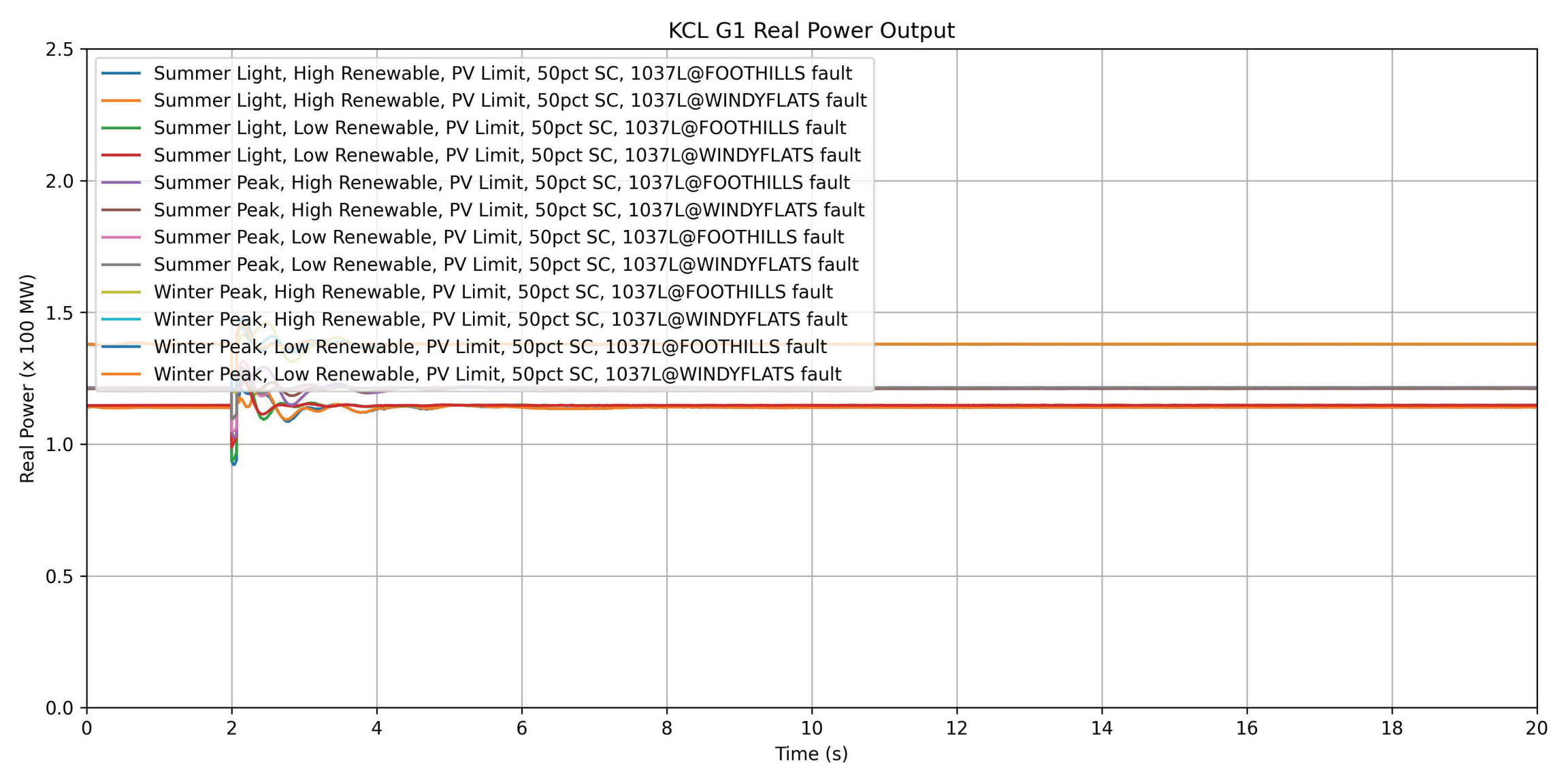

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

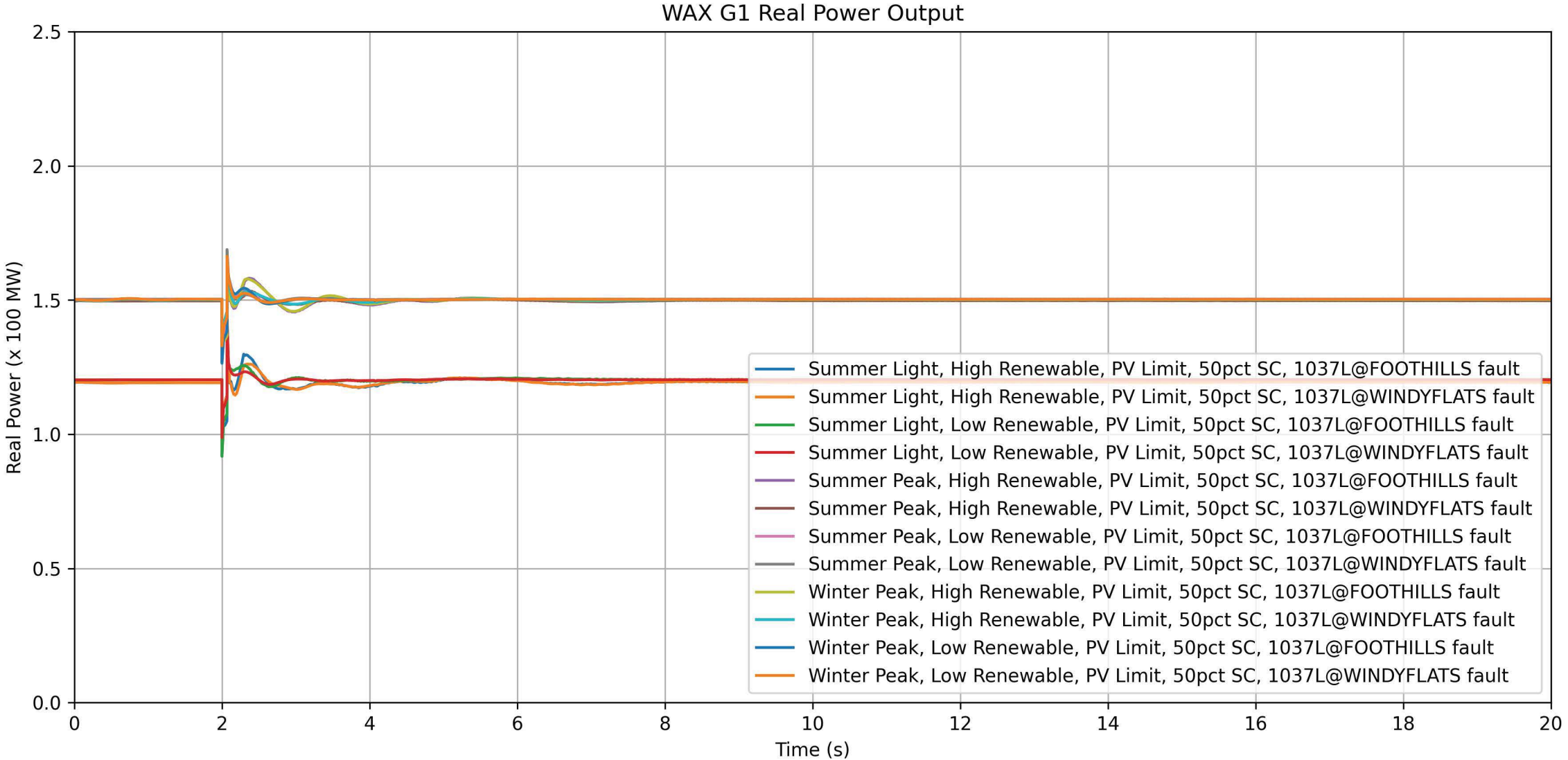

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

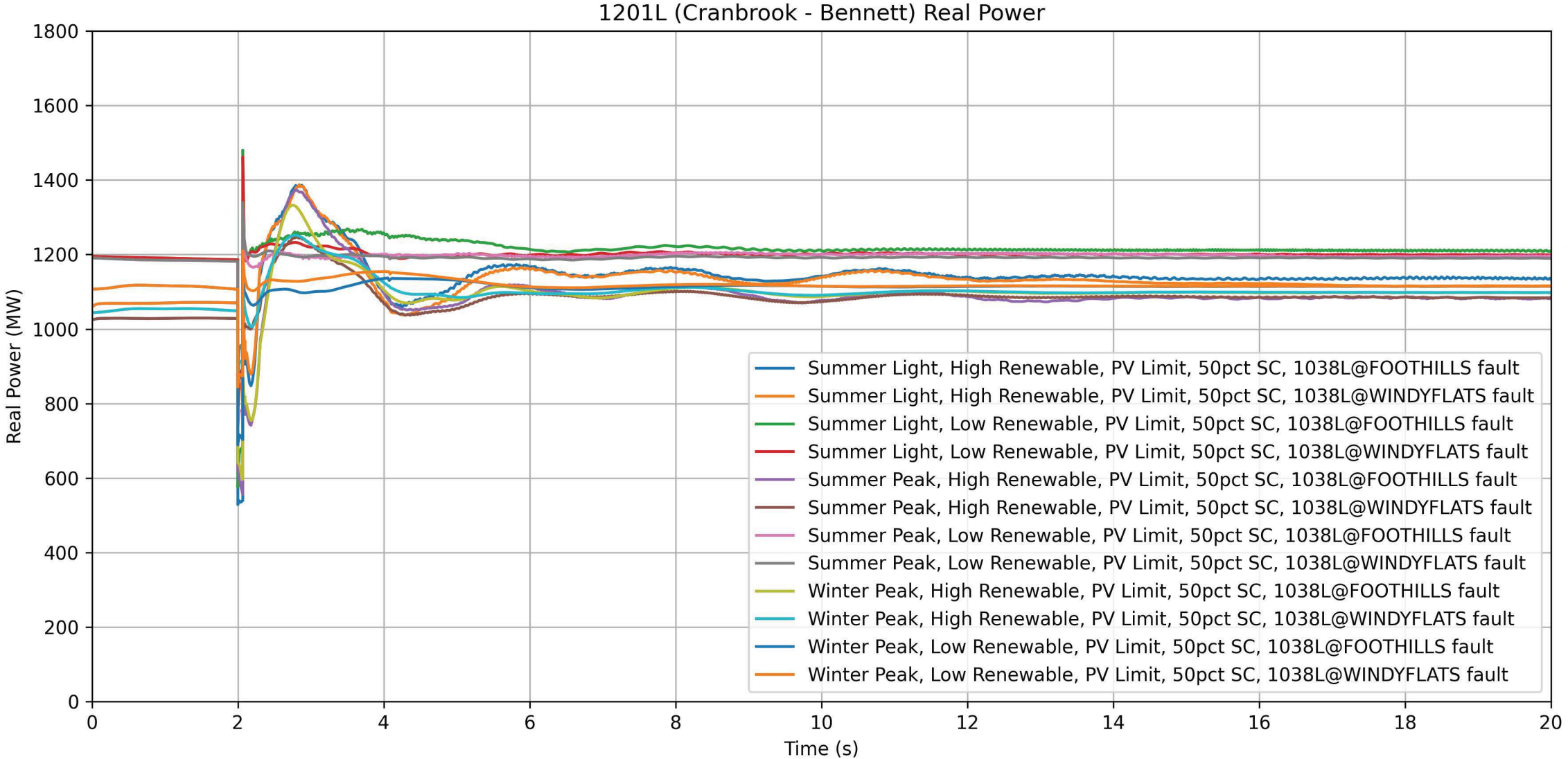

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

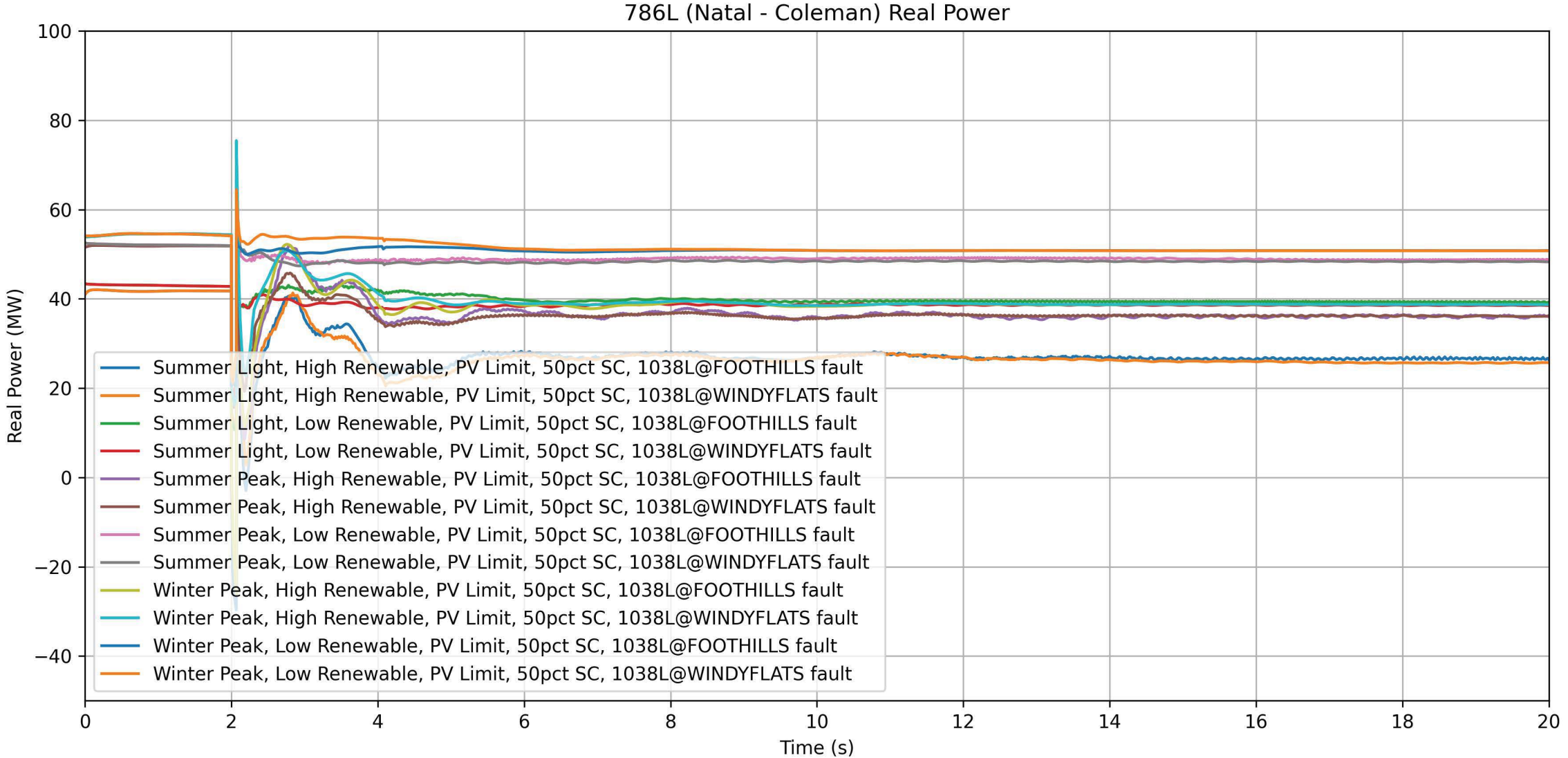

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

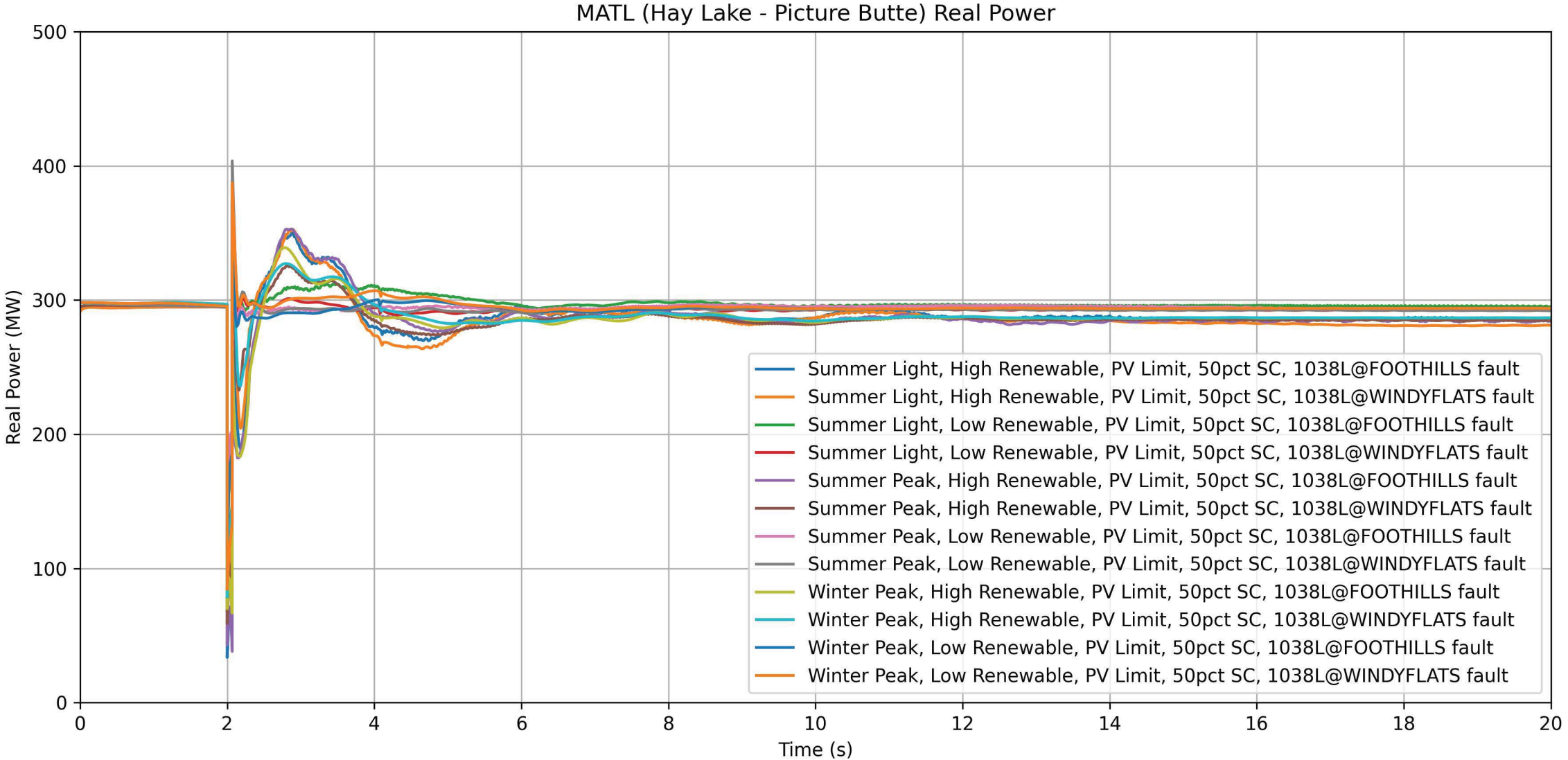

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

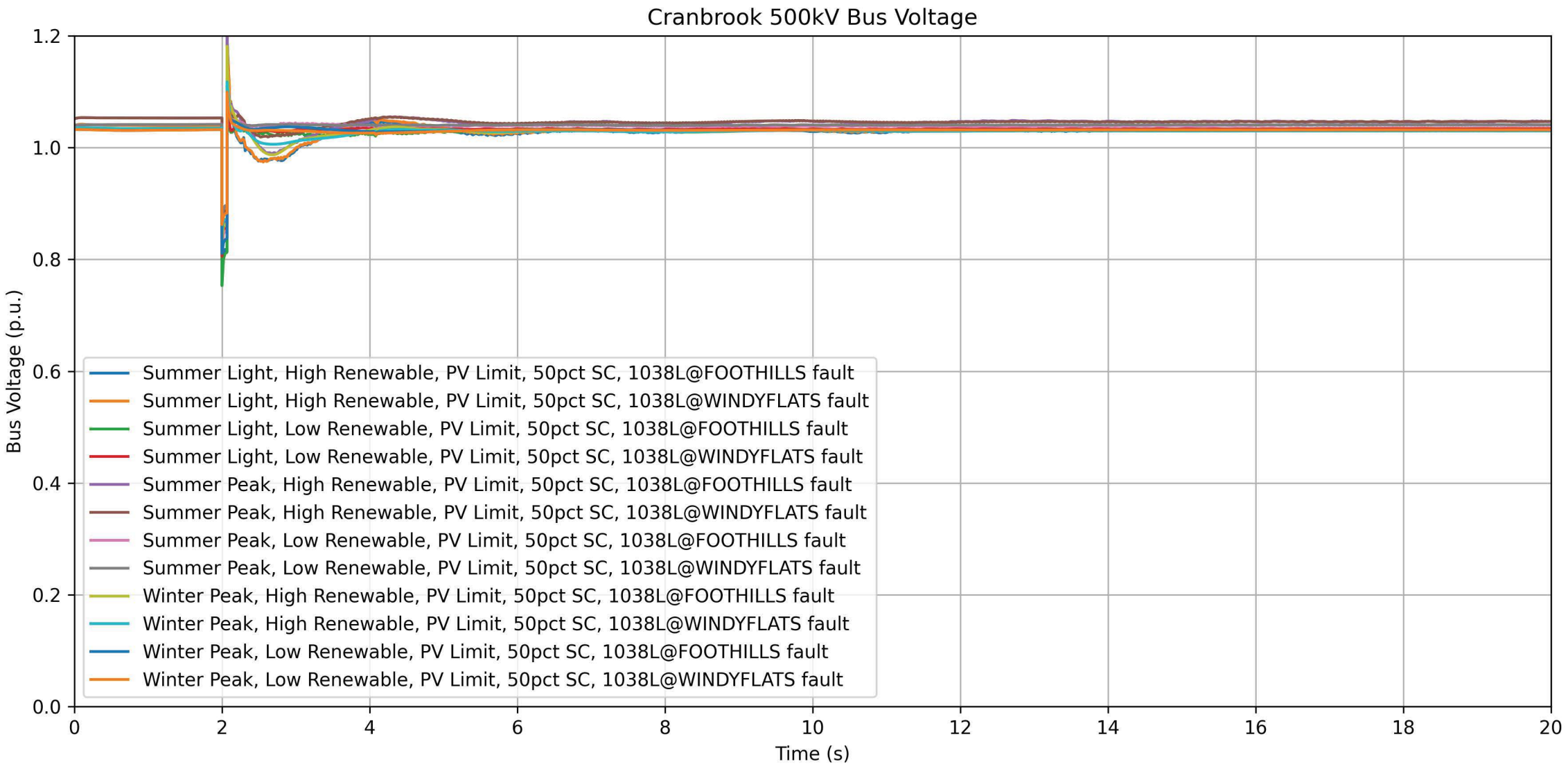

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

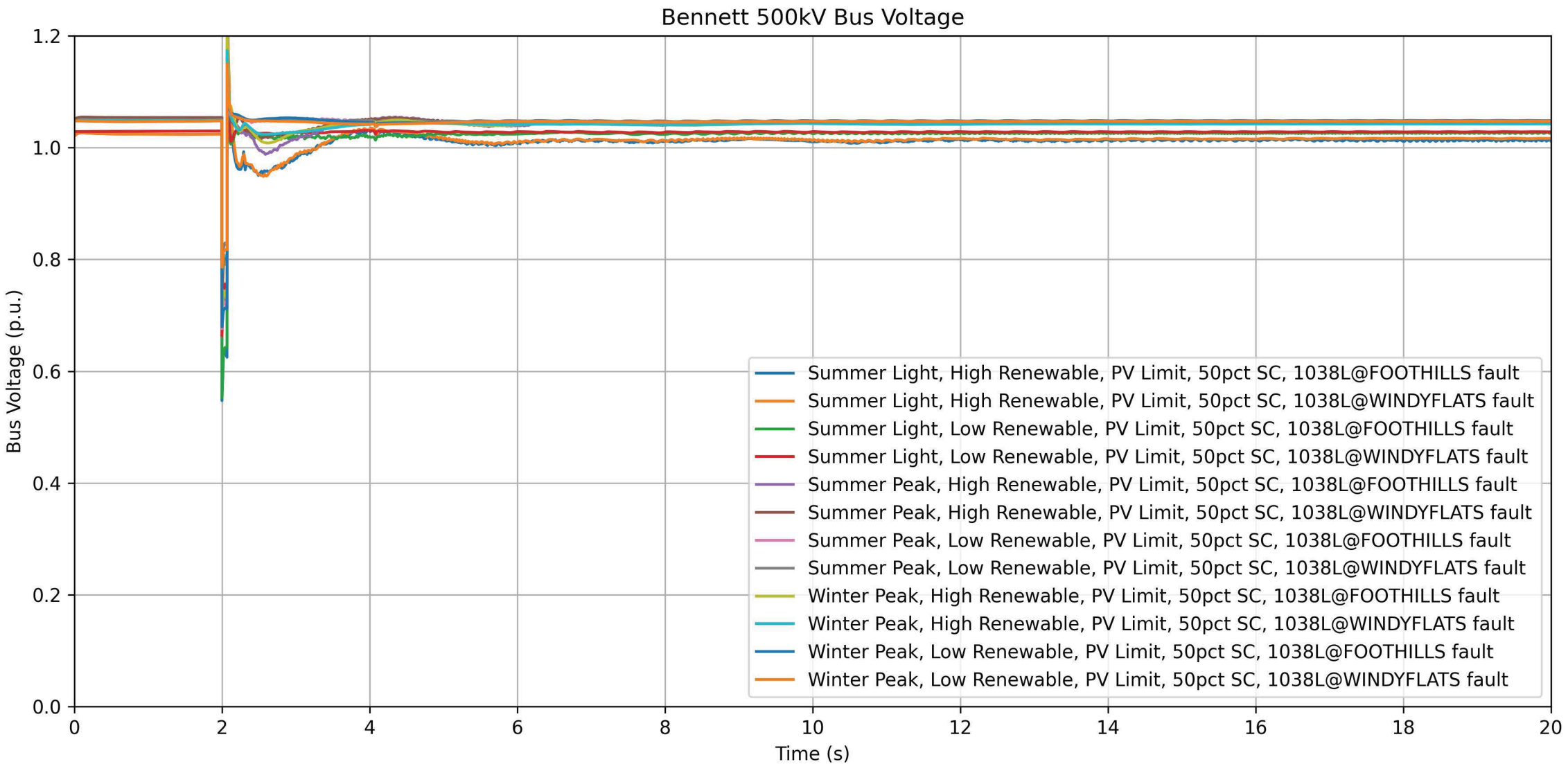

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L@WINDYFLATS fault

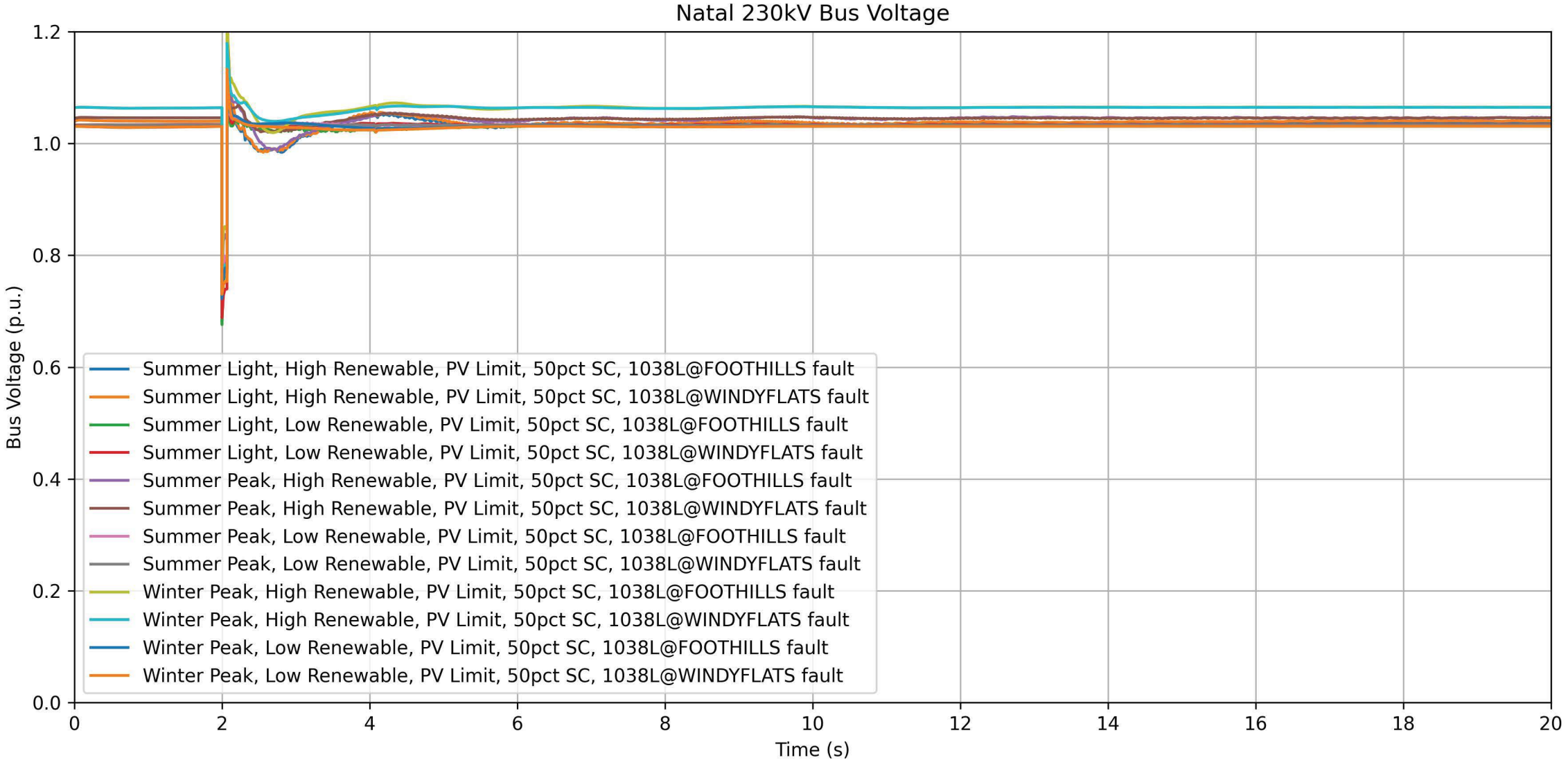

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

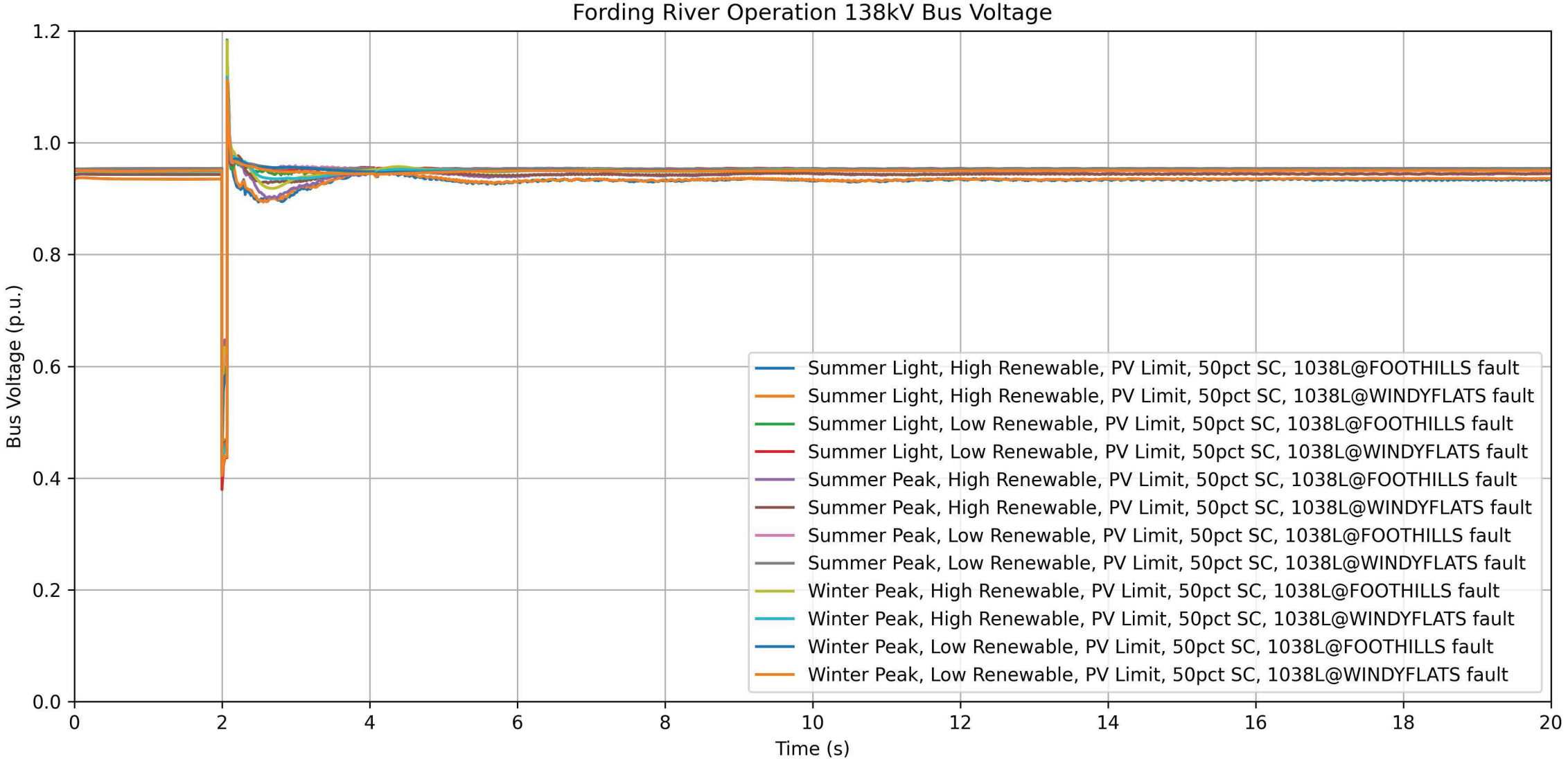

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

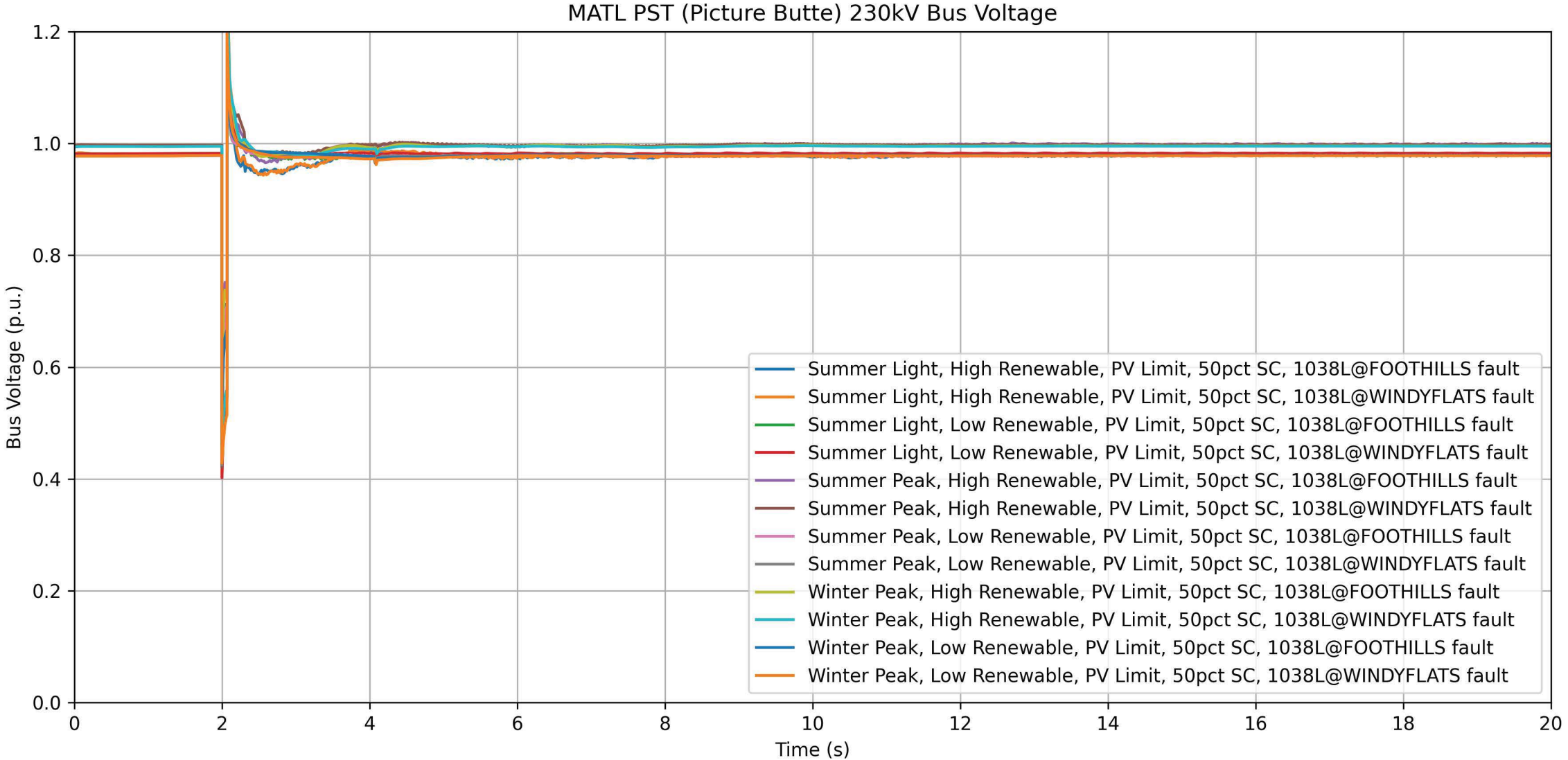

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

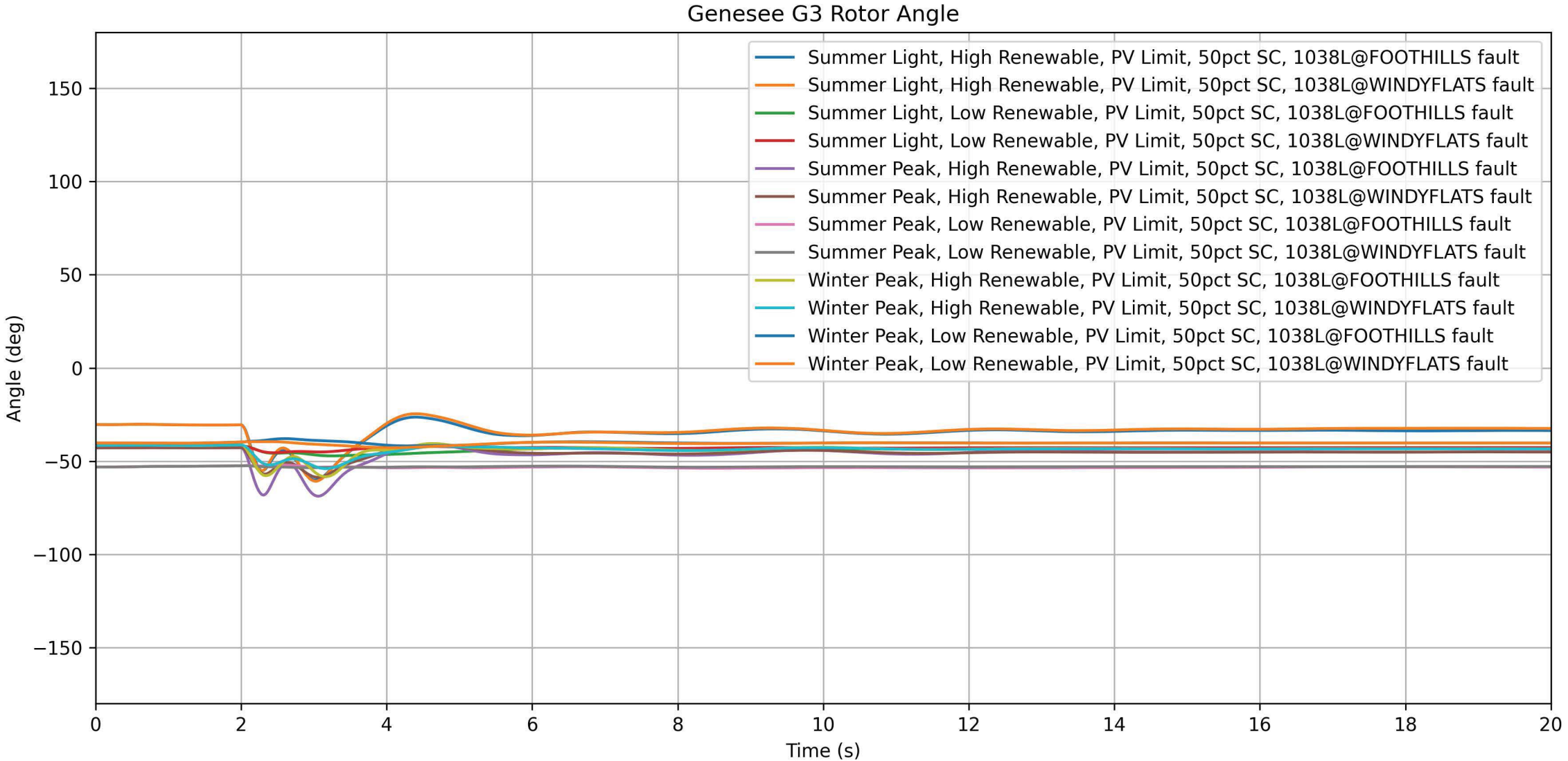

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

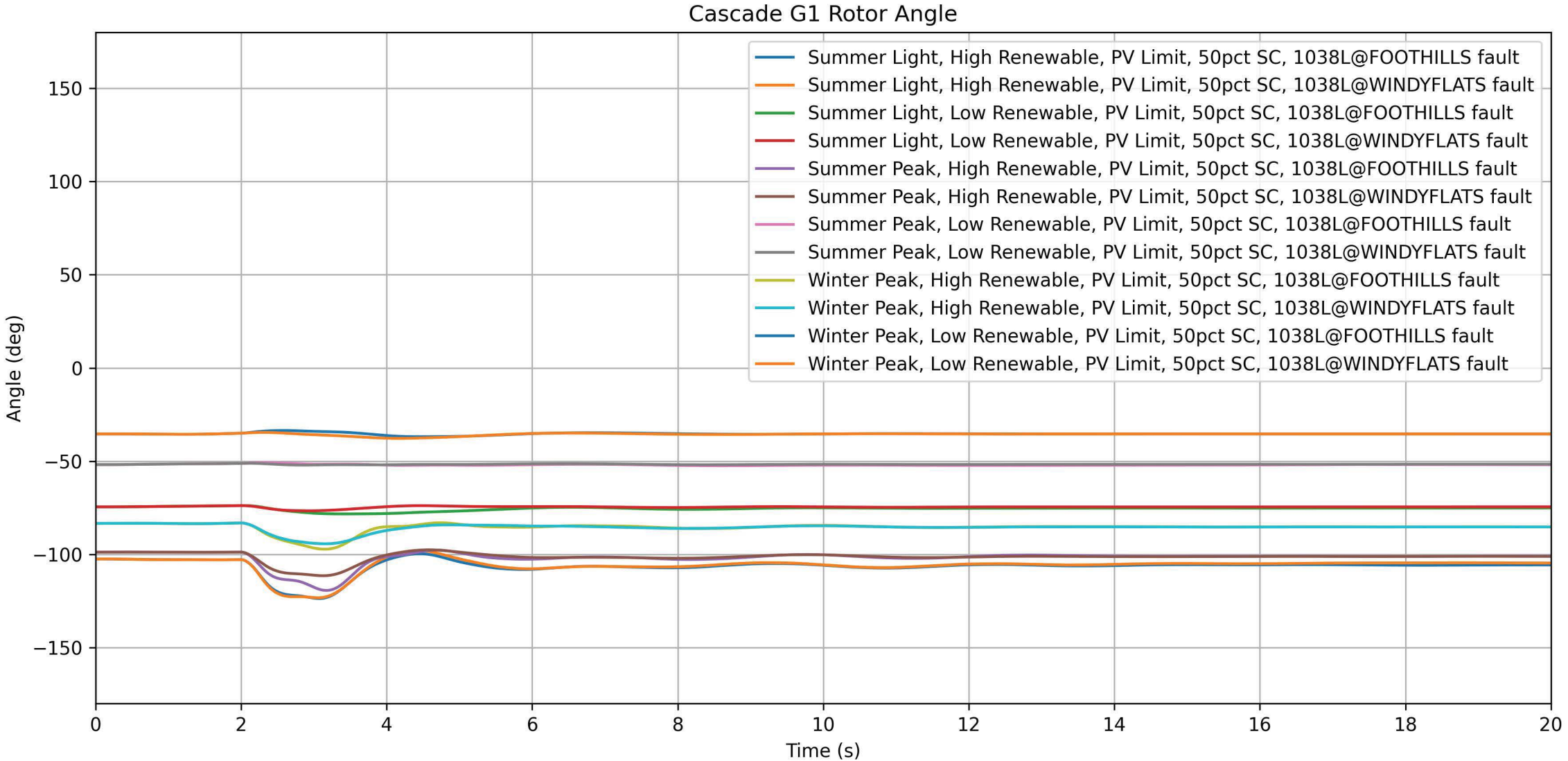

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

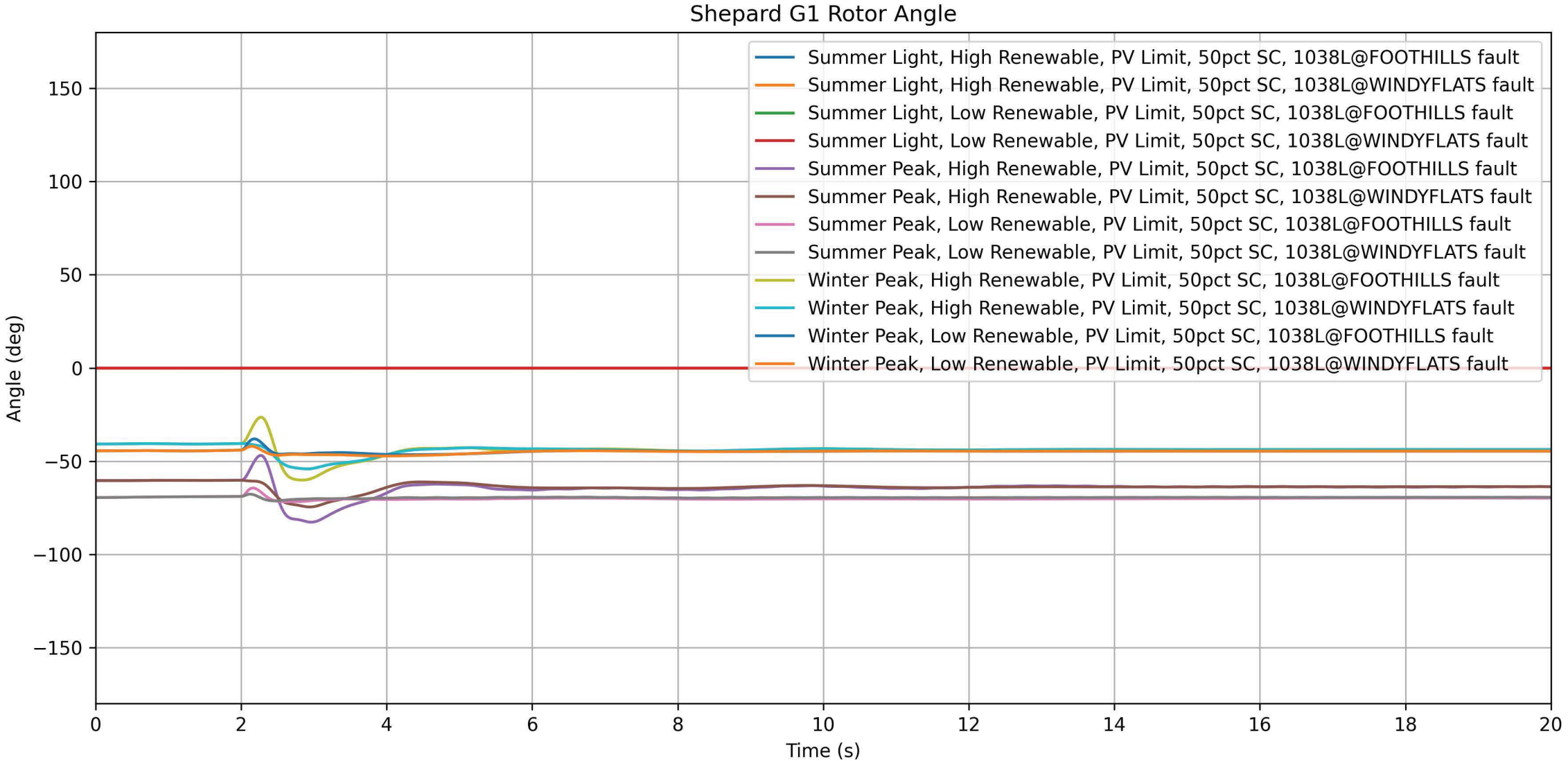

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

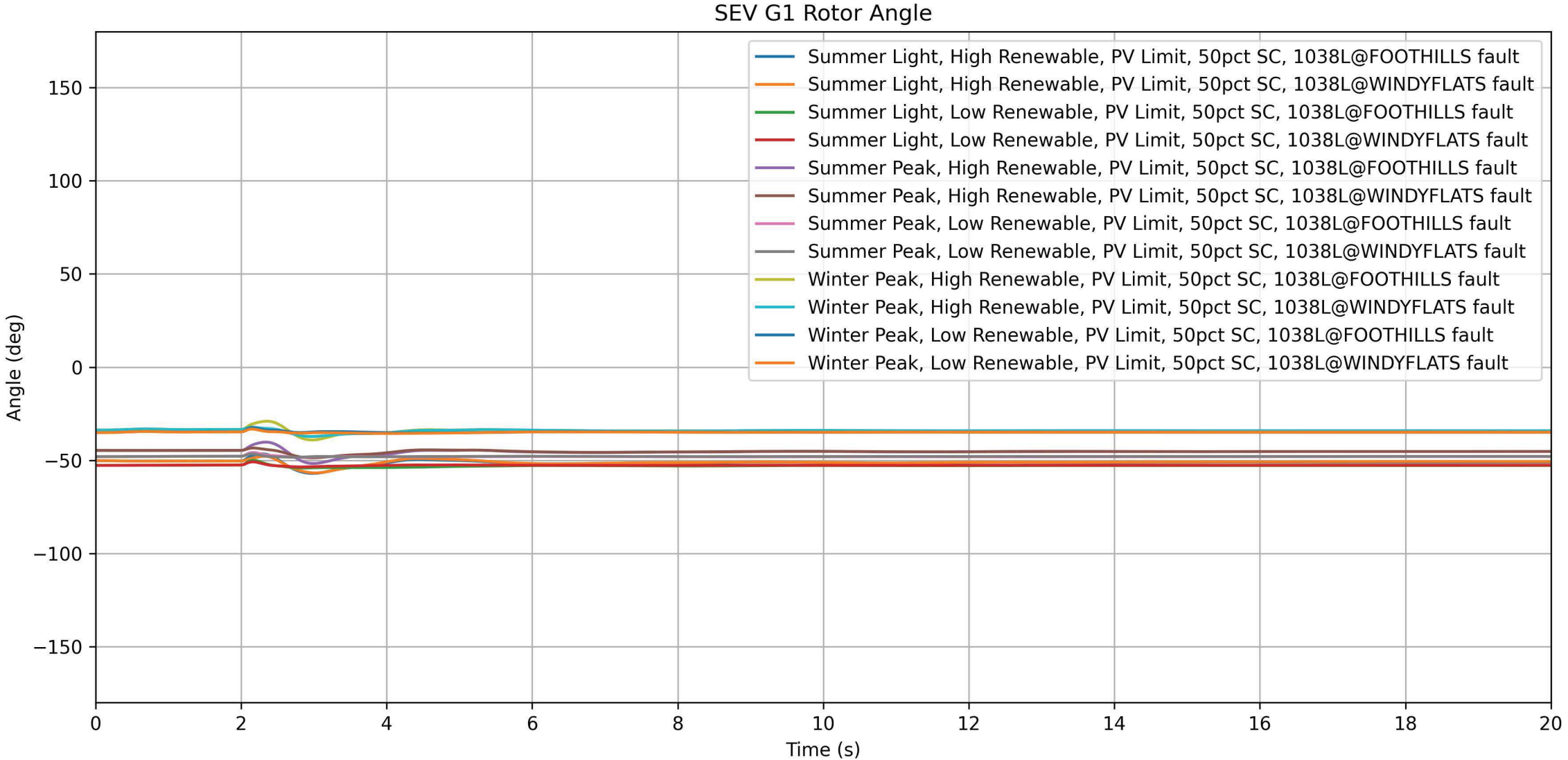

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

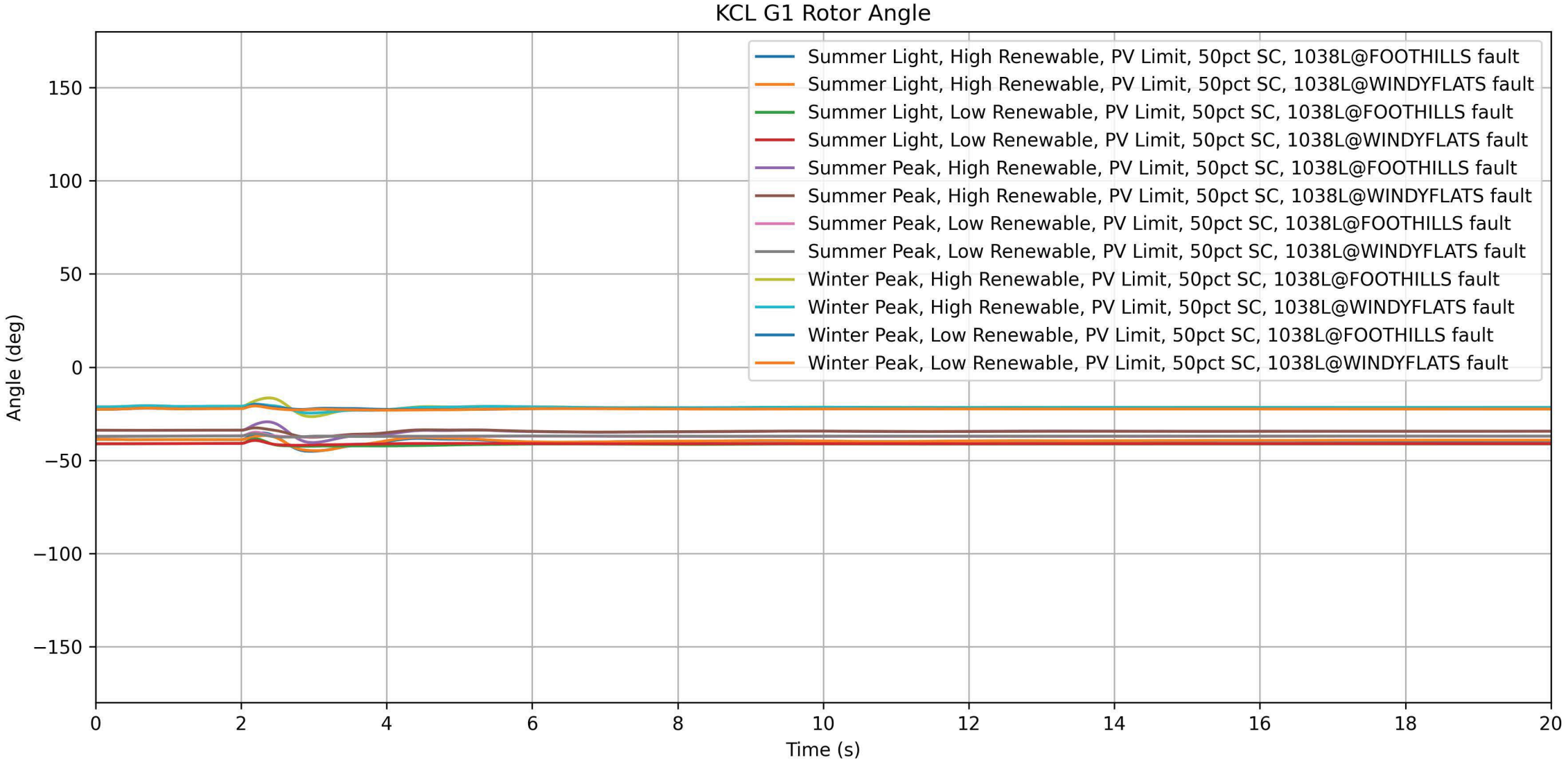

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

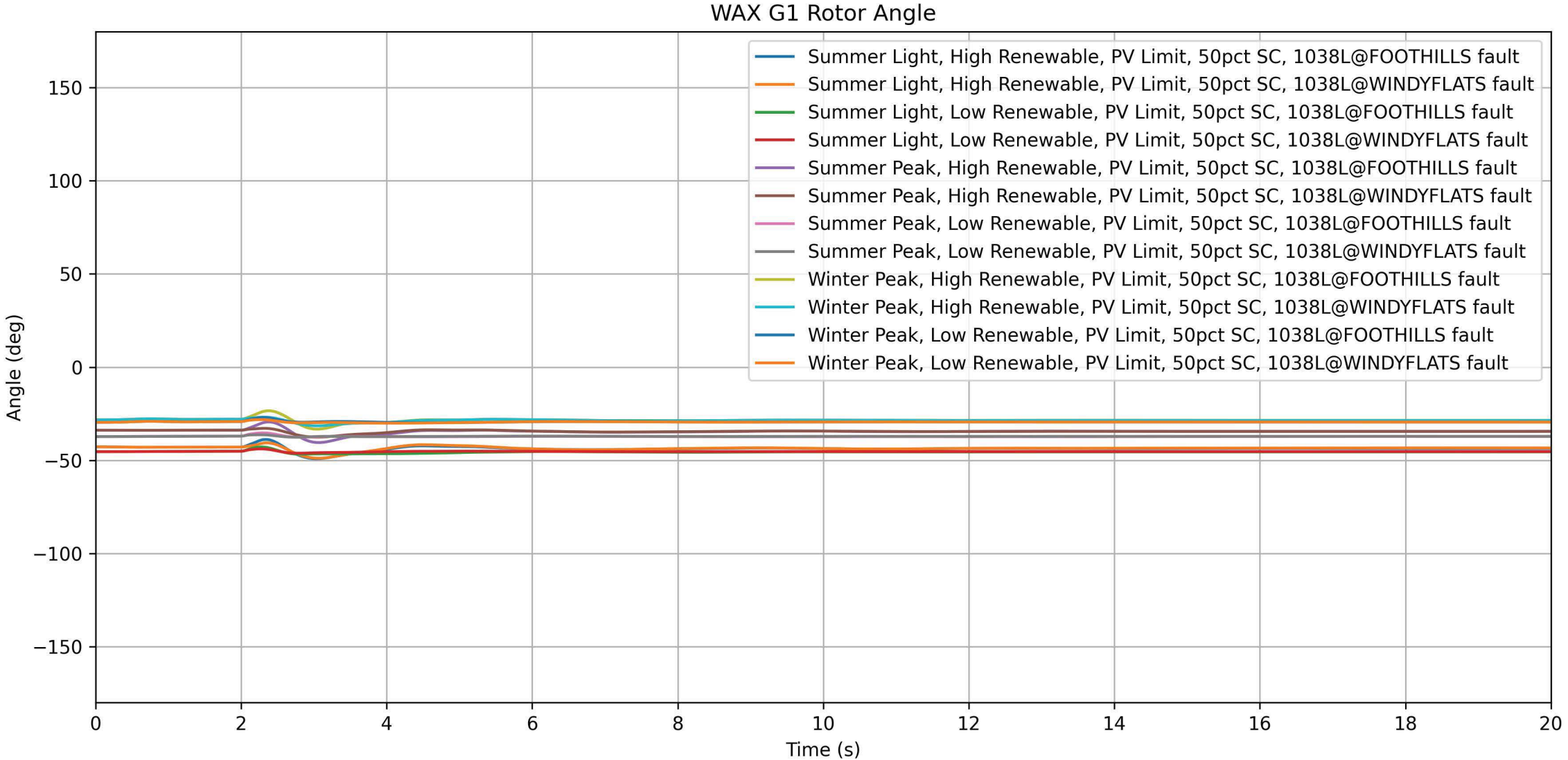

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

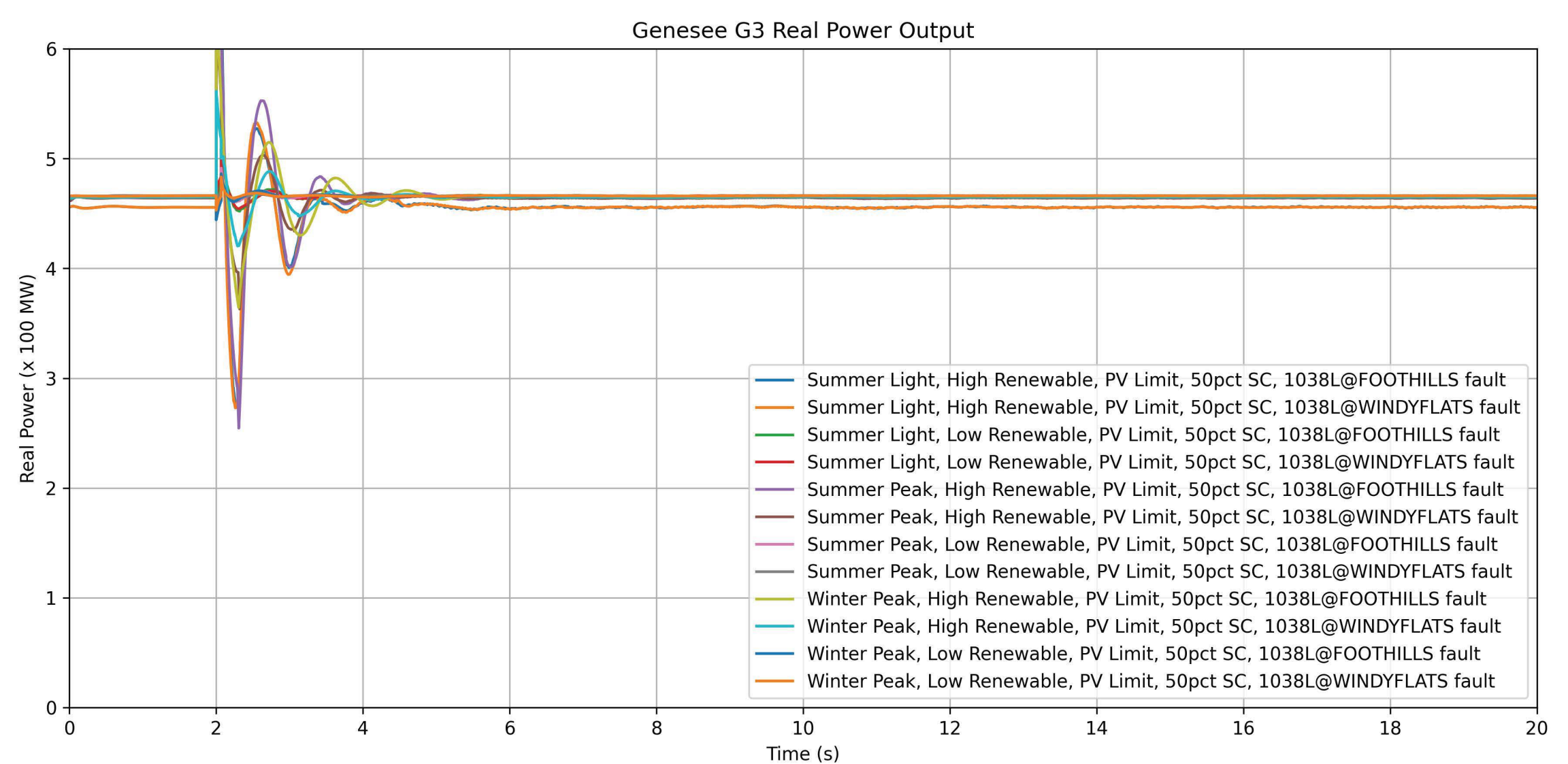

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

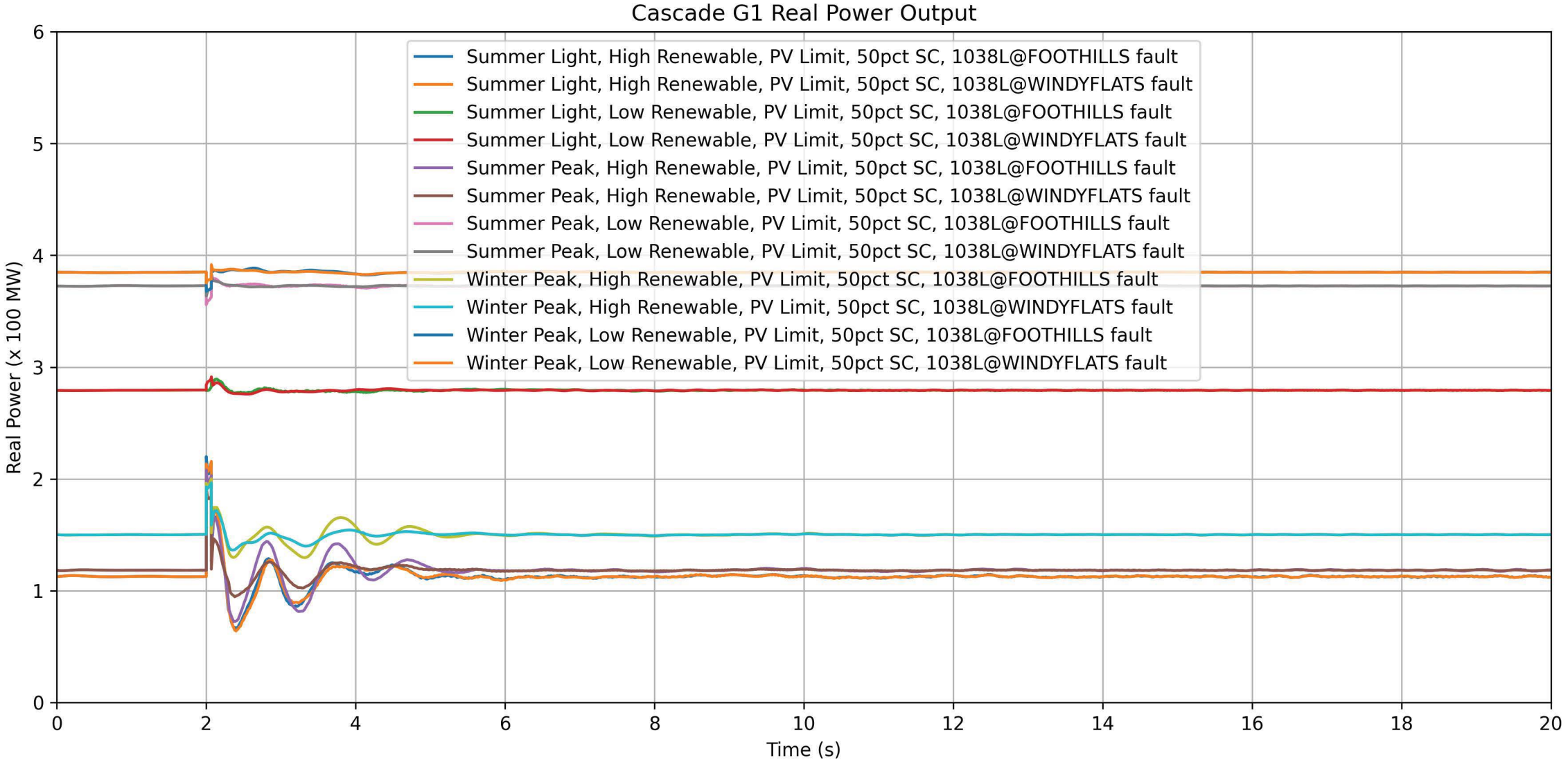

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

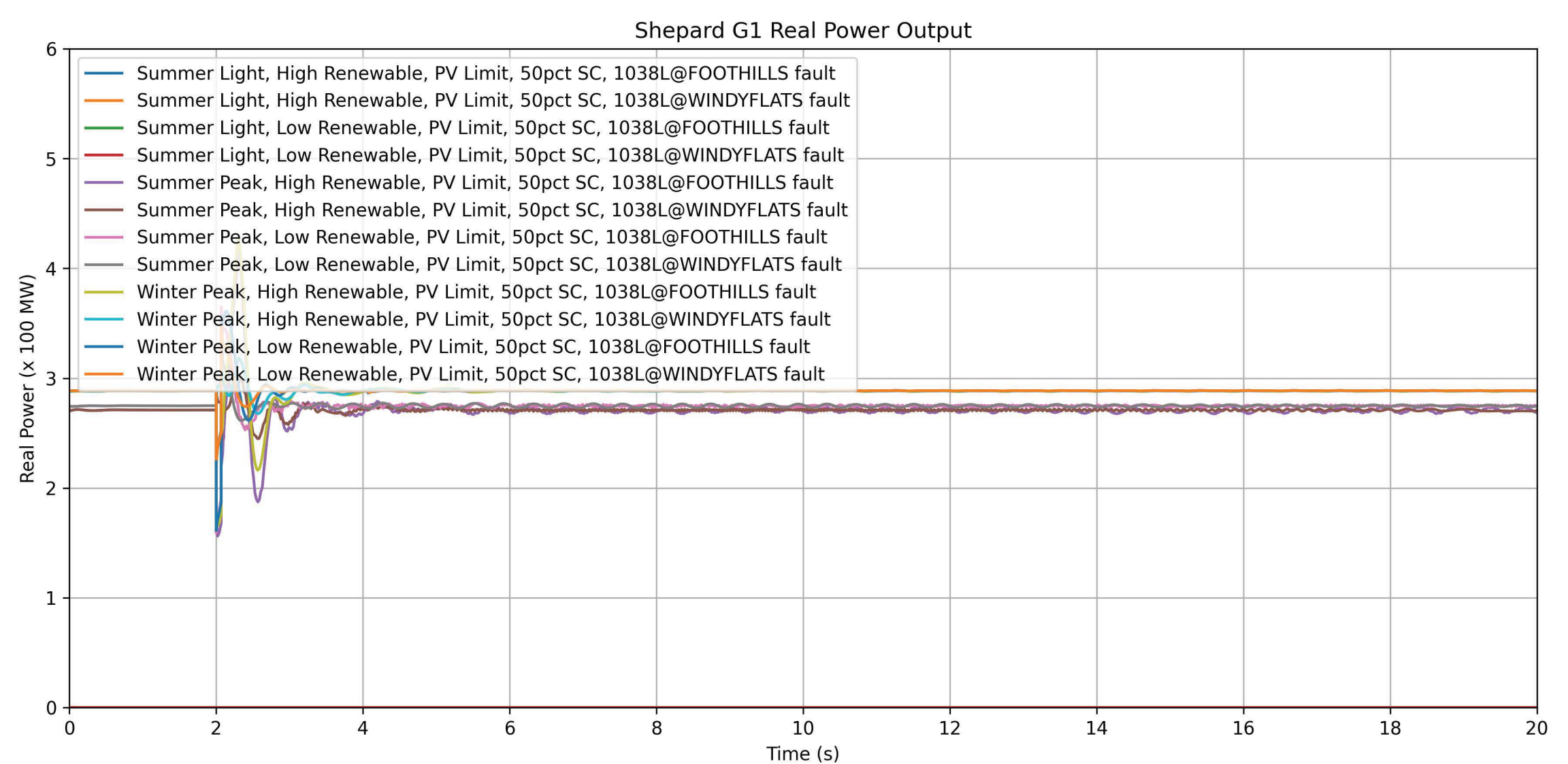

SEV G1 Rotor Angle
Angle (deg)
Time (s)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
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Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

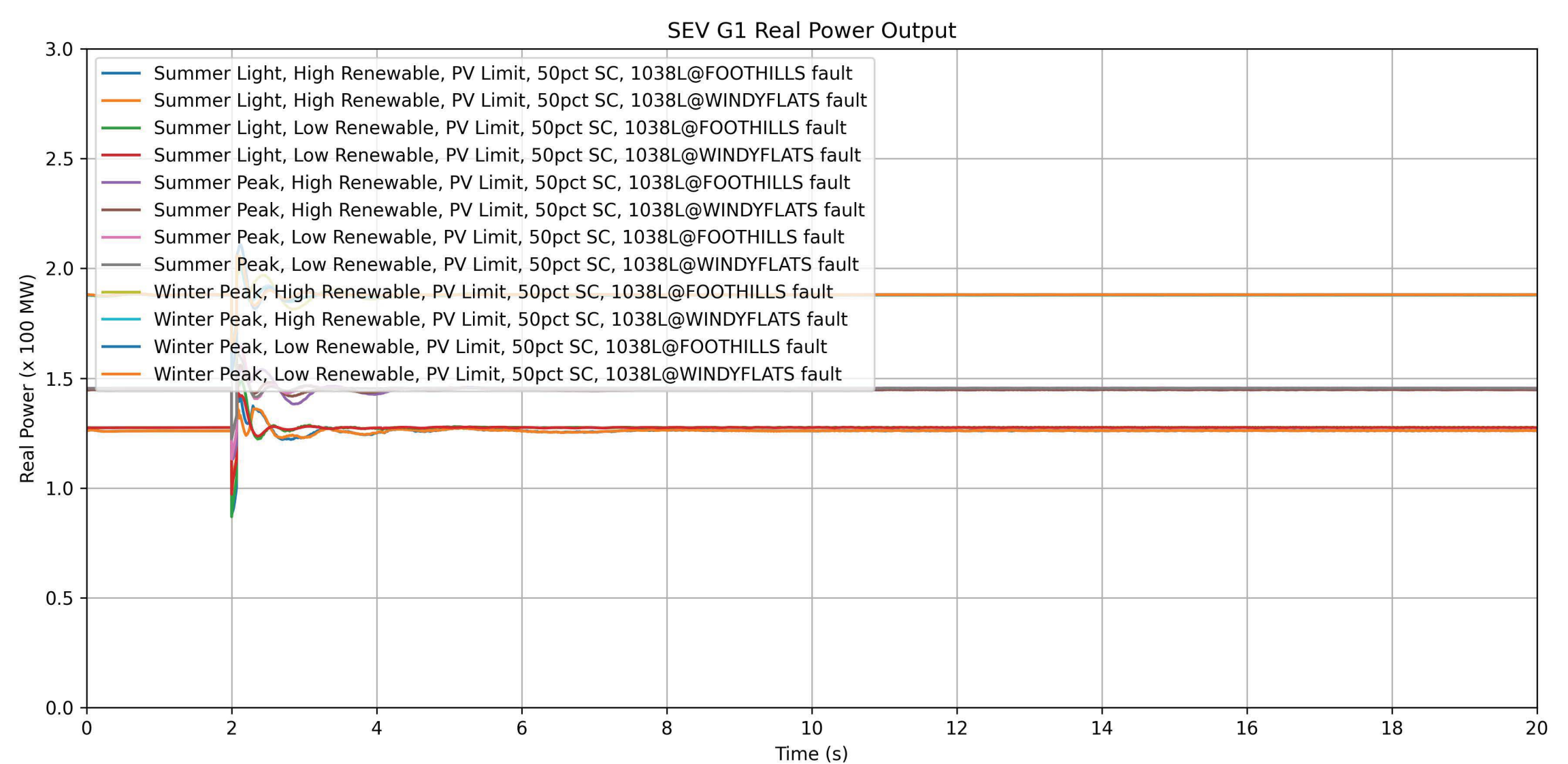

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

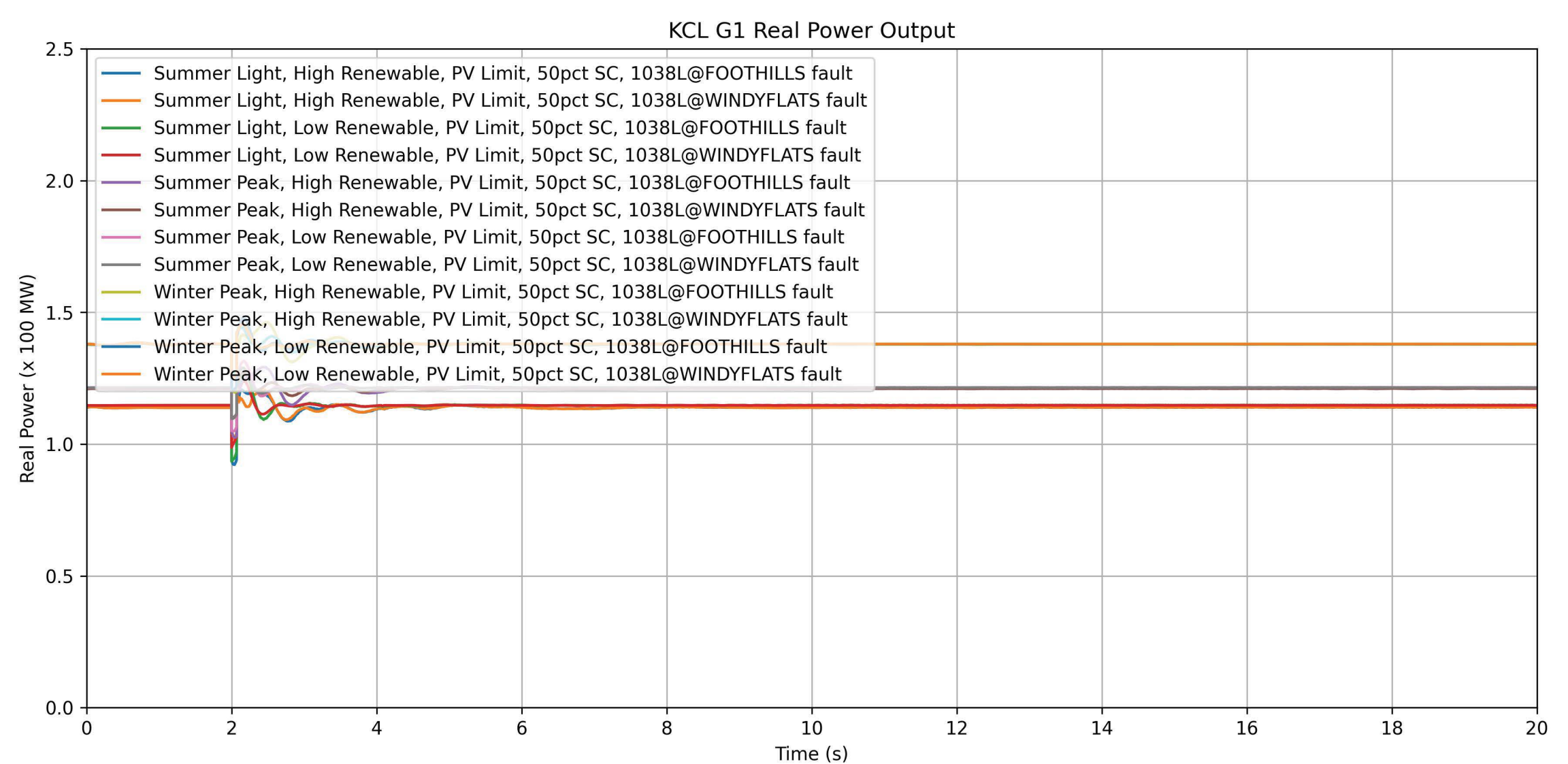

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

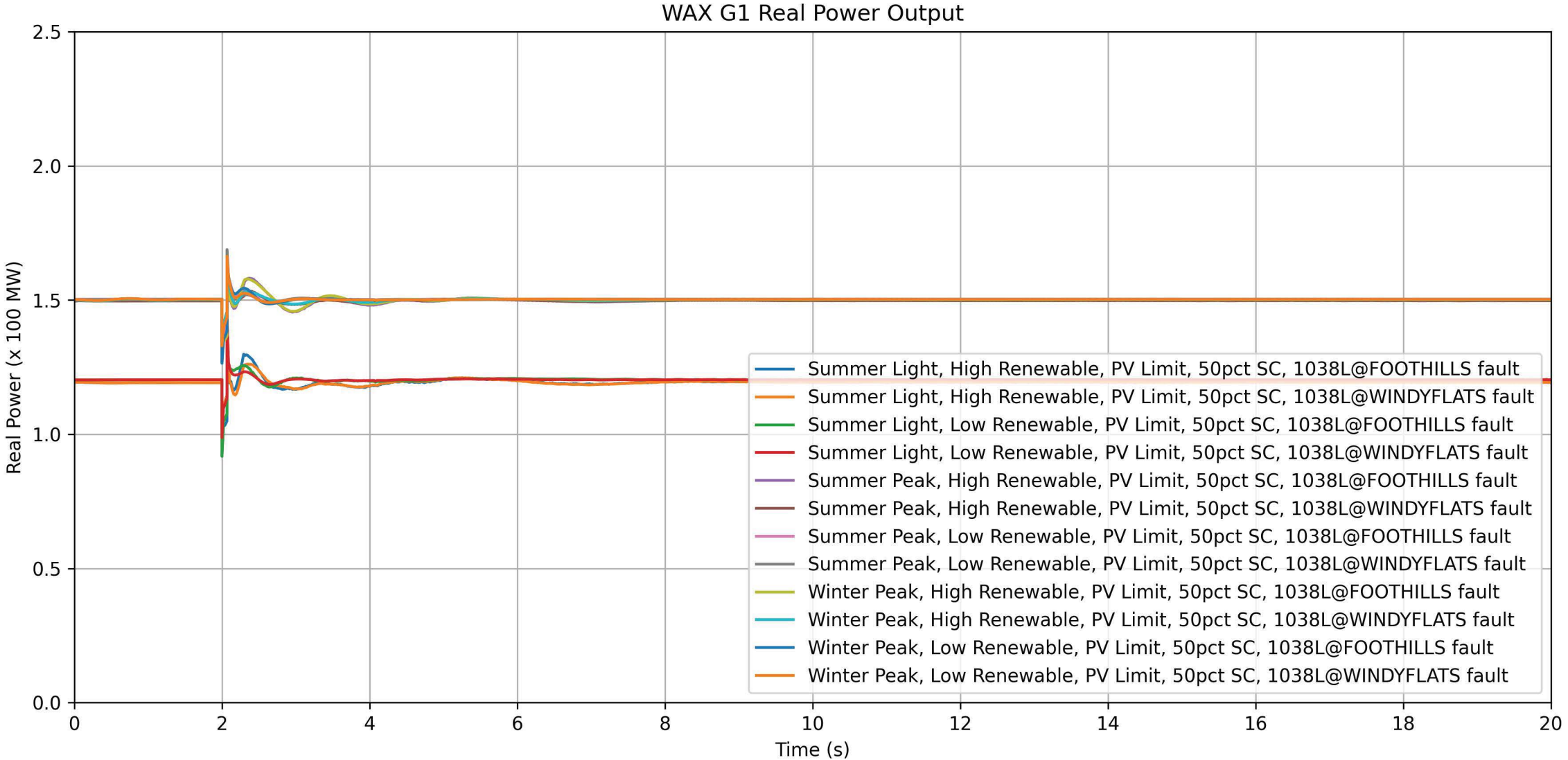

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

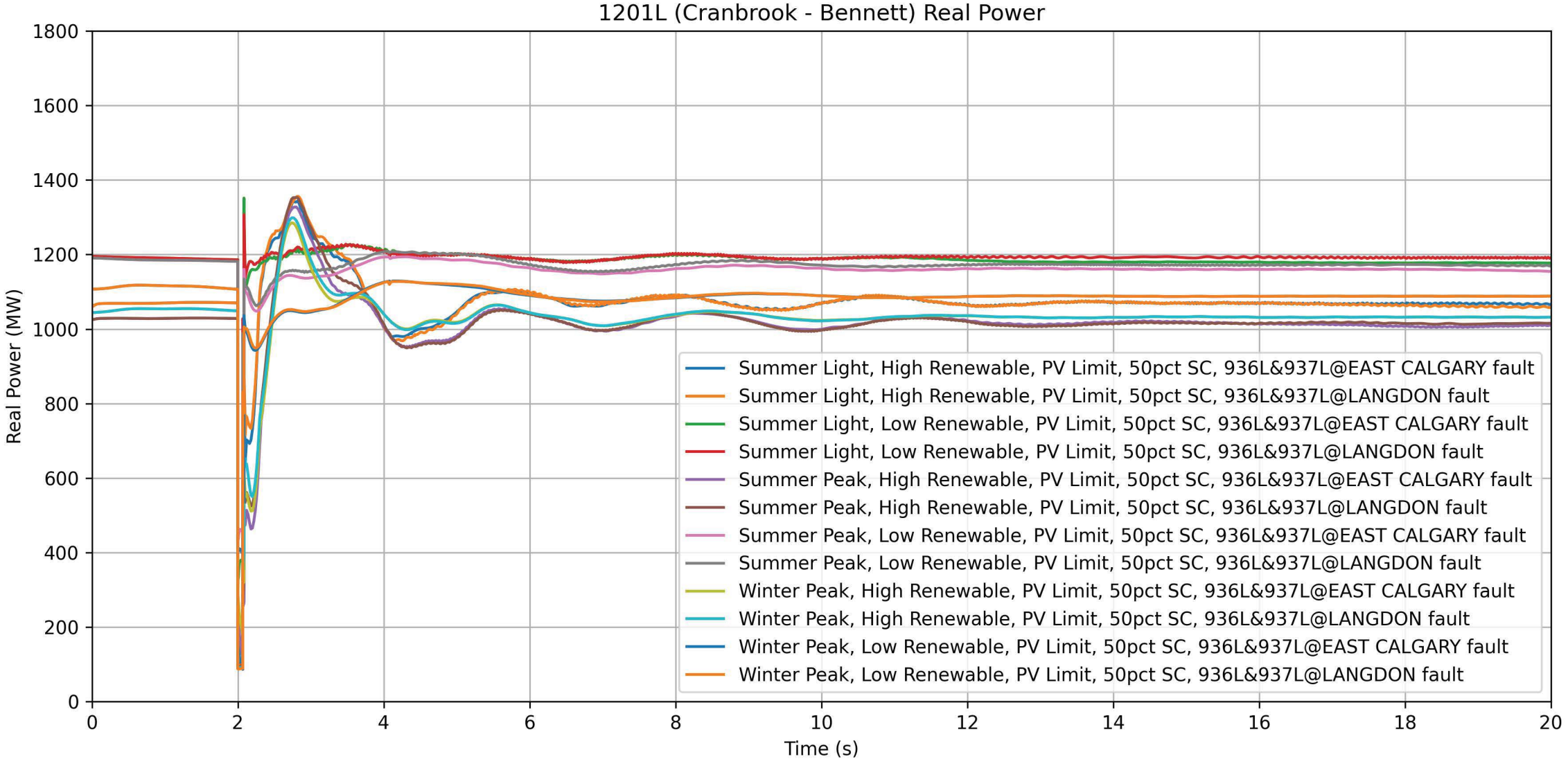

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

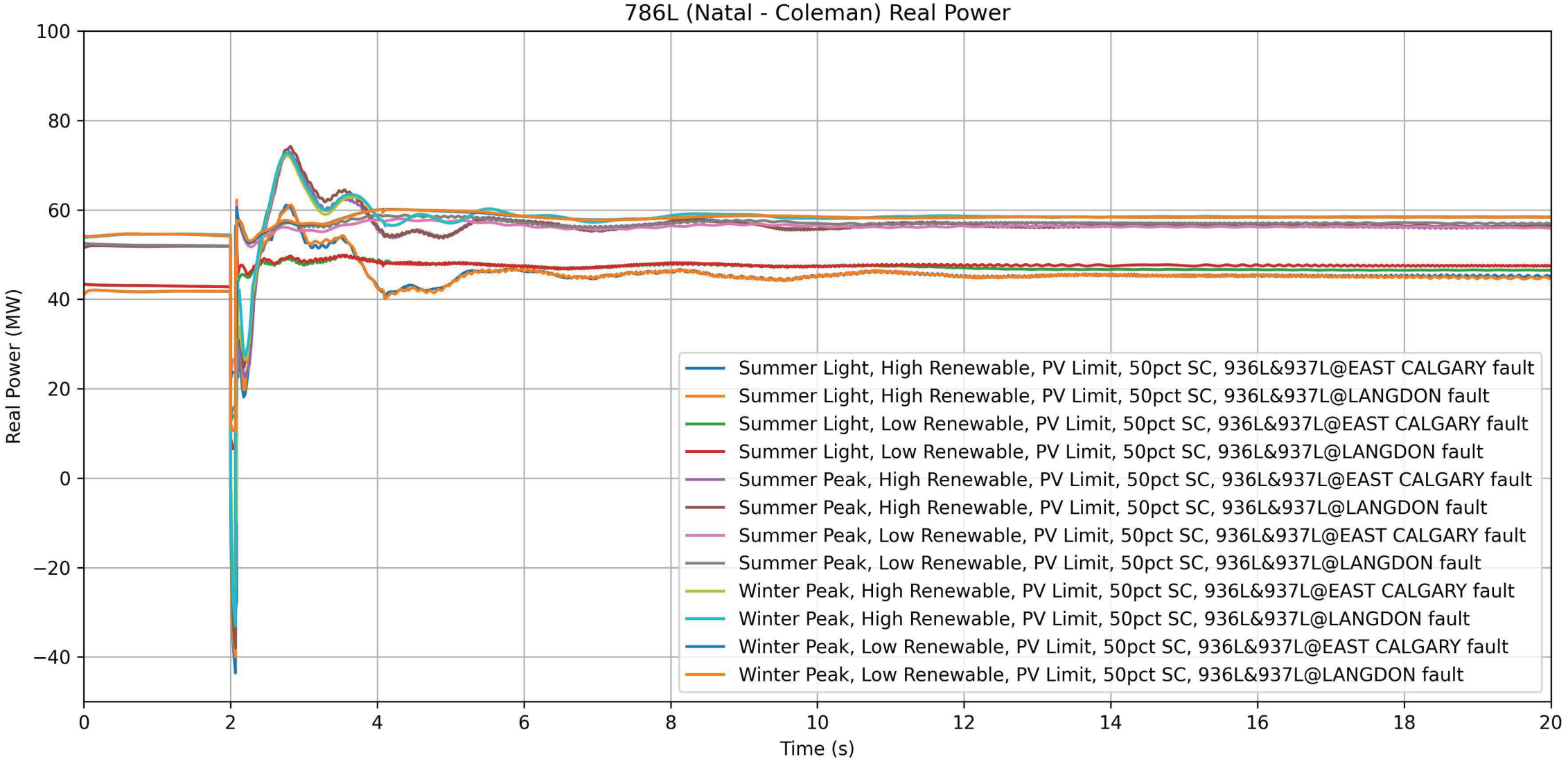

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

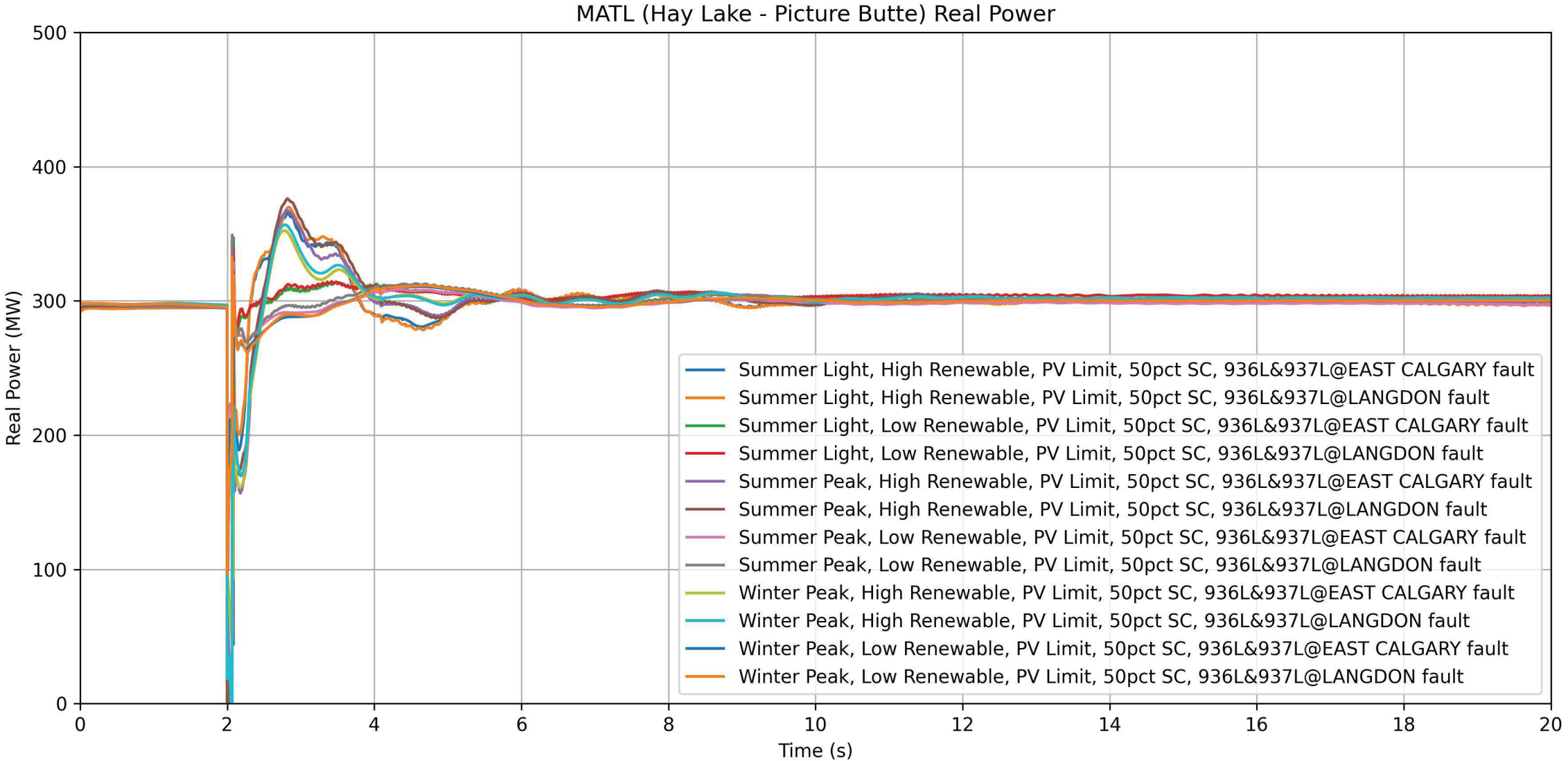

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

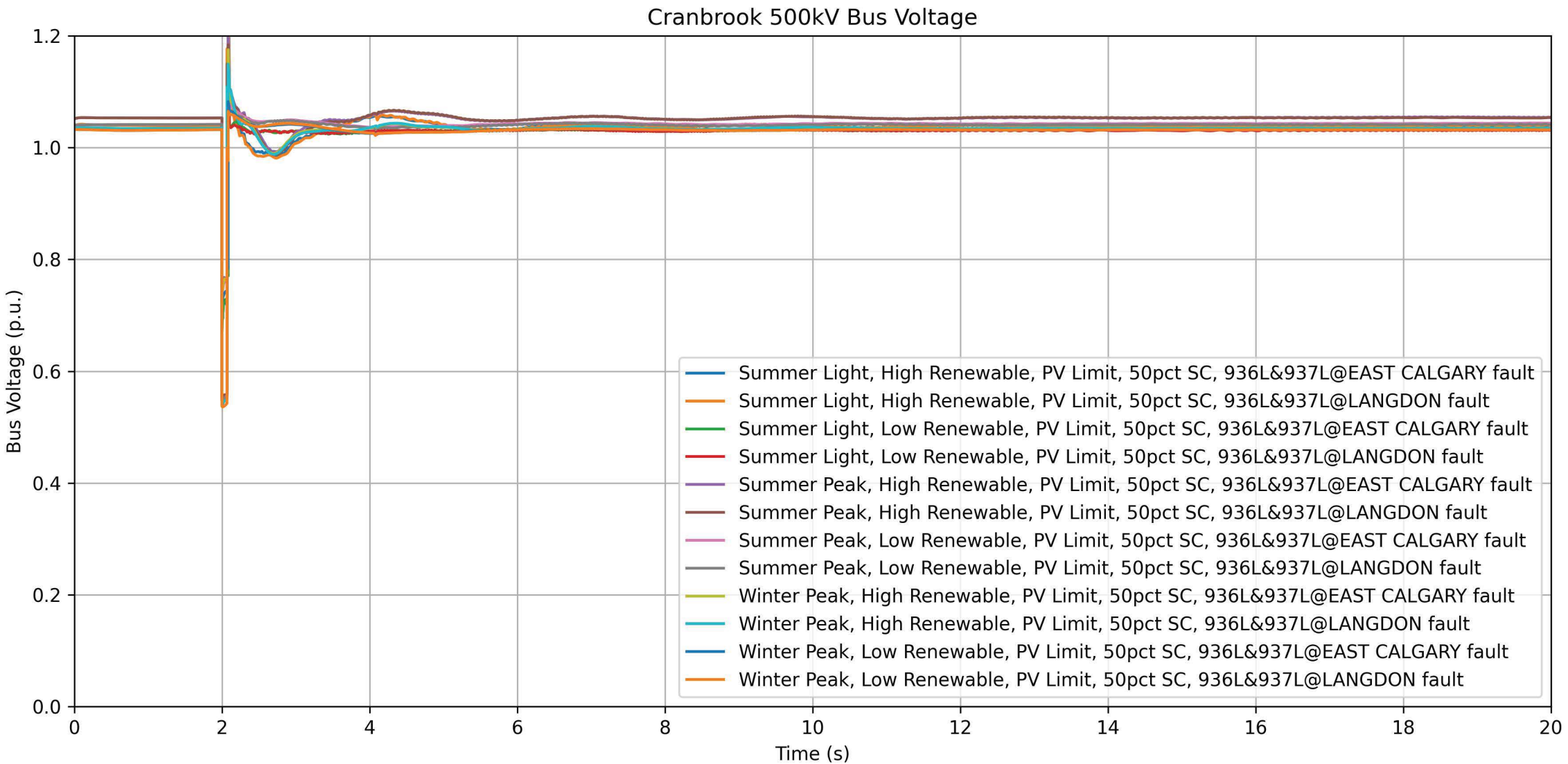

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

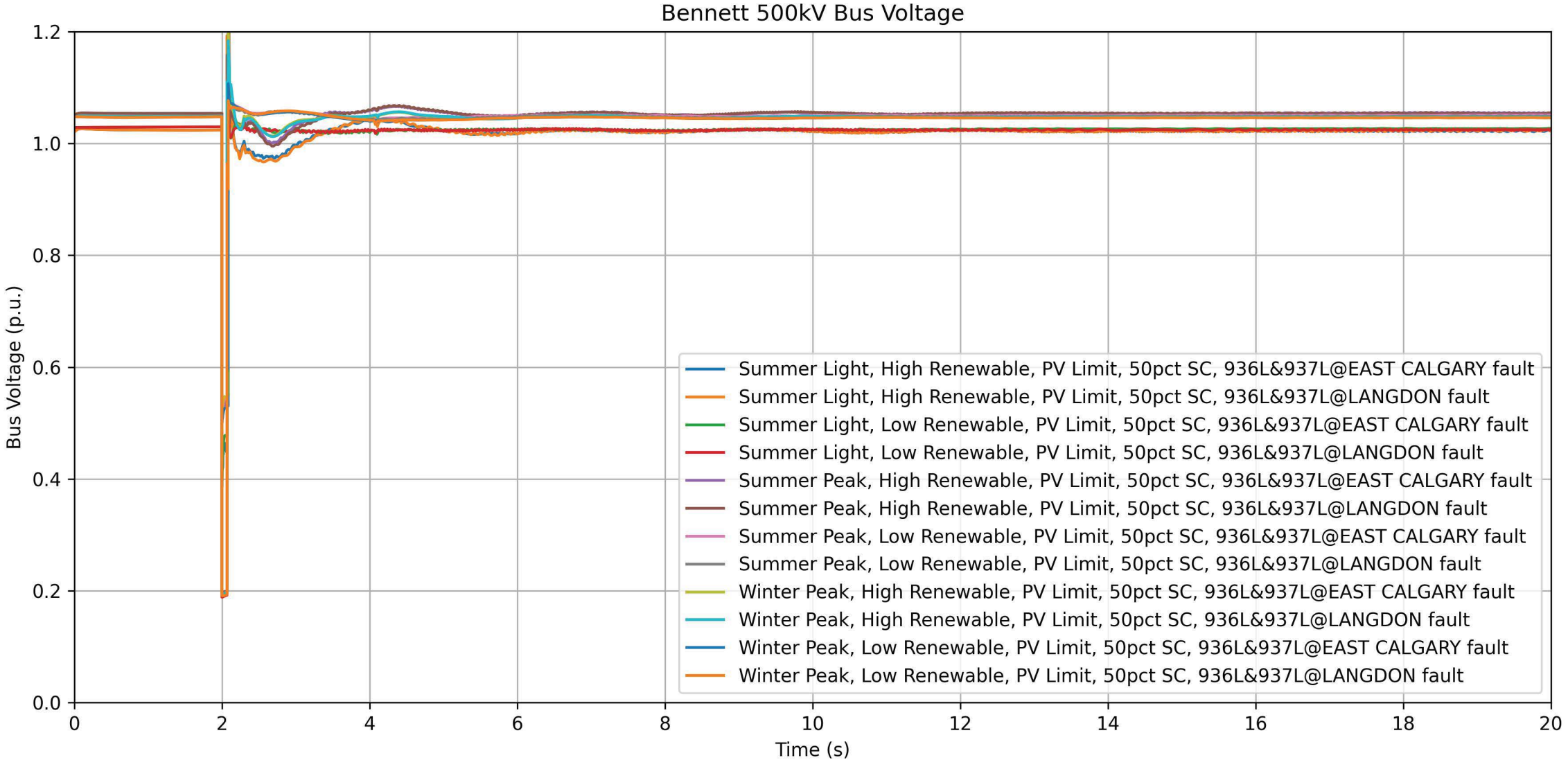

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1038L@WINDYFLATS fault

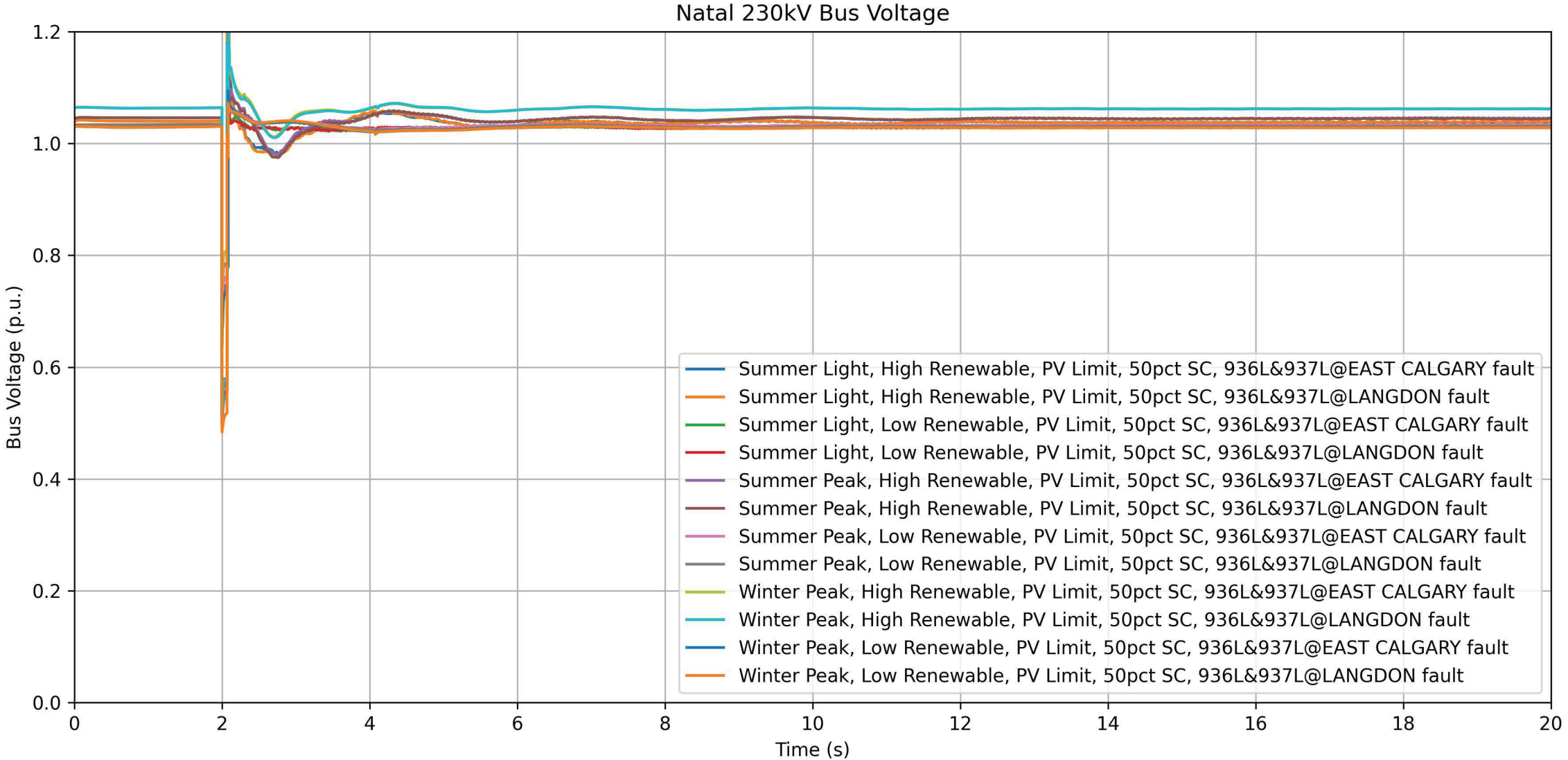

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

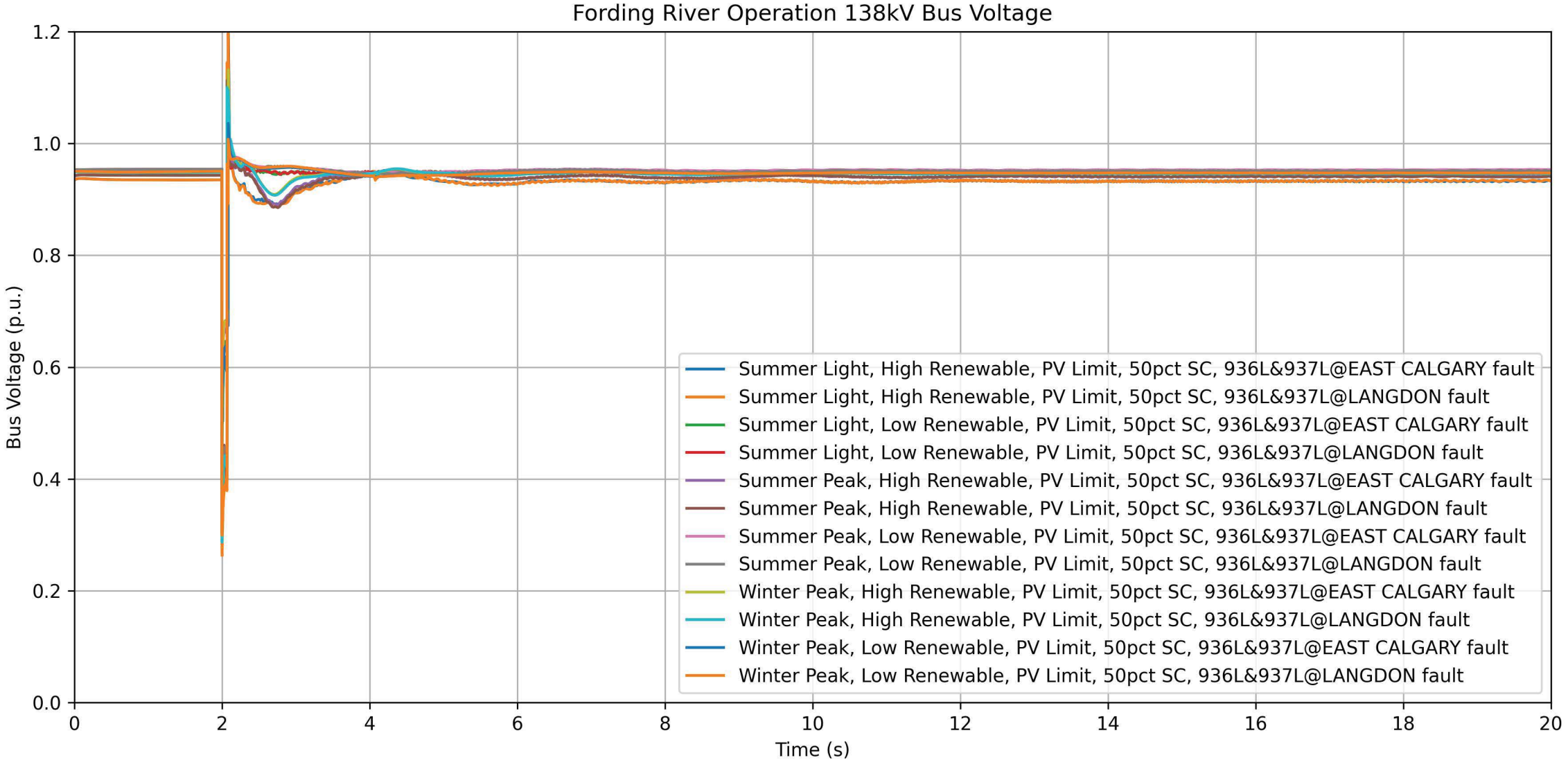

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

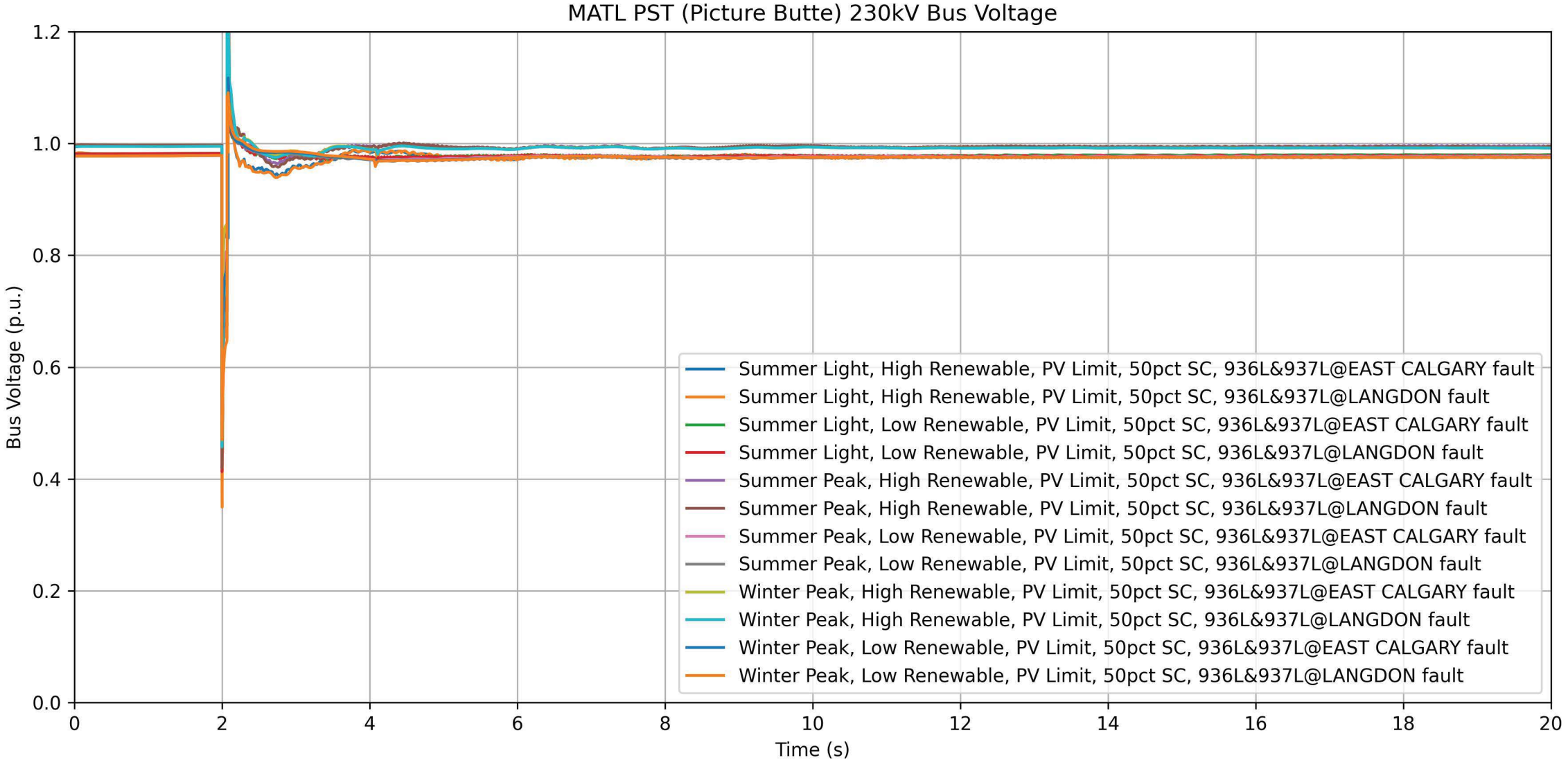

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

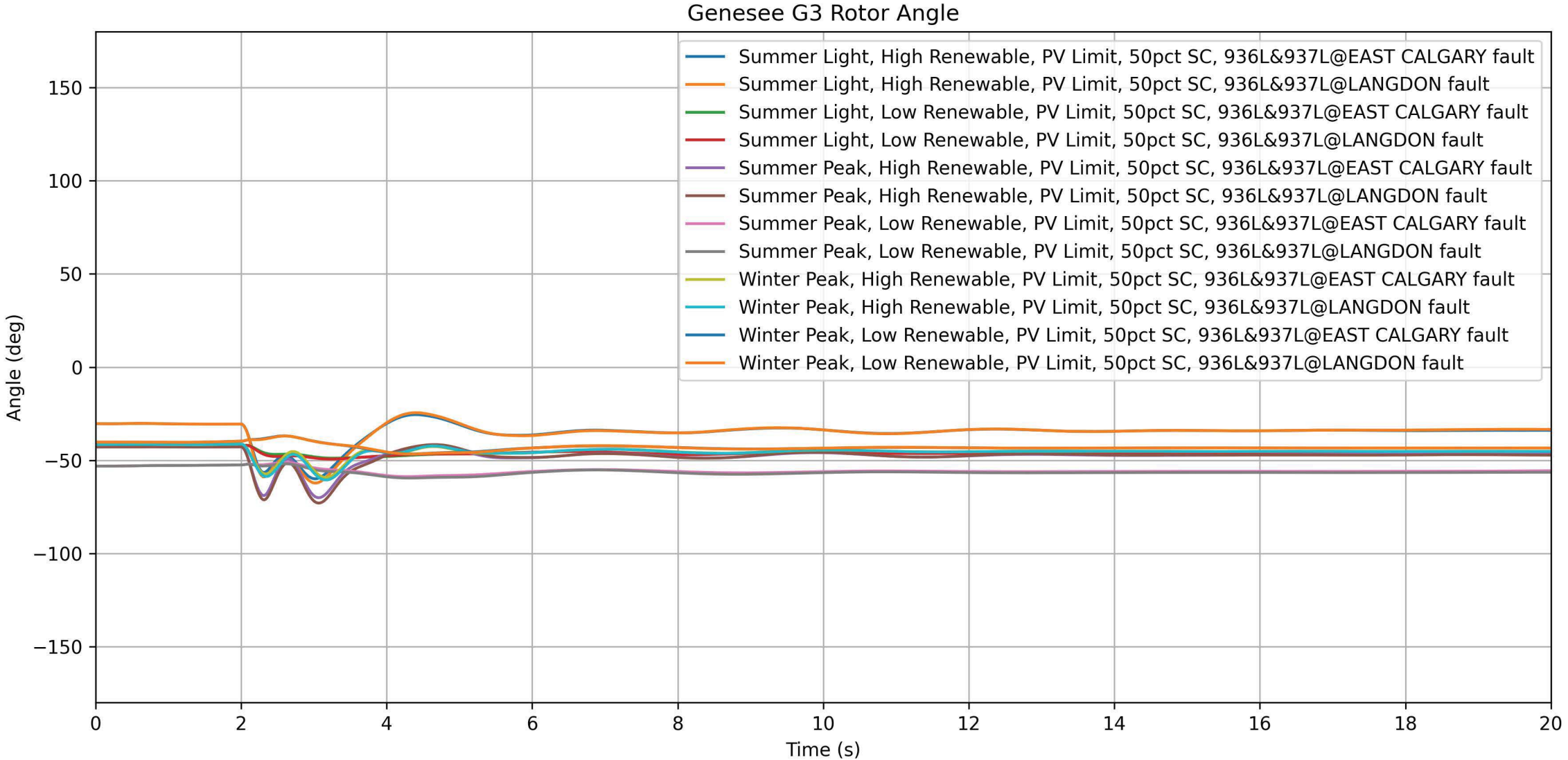

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

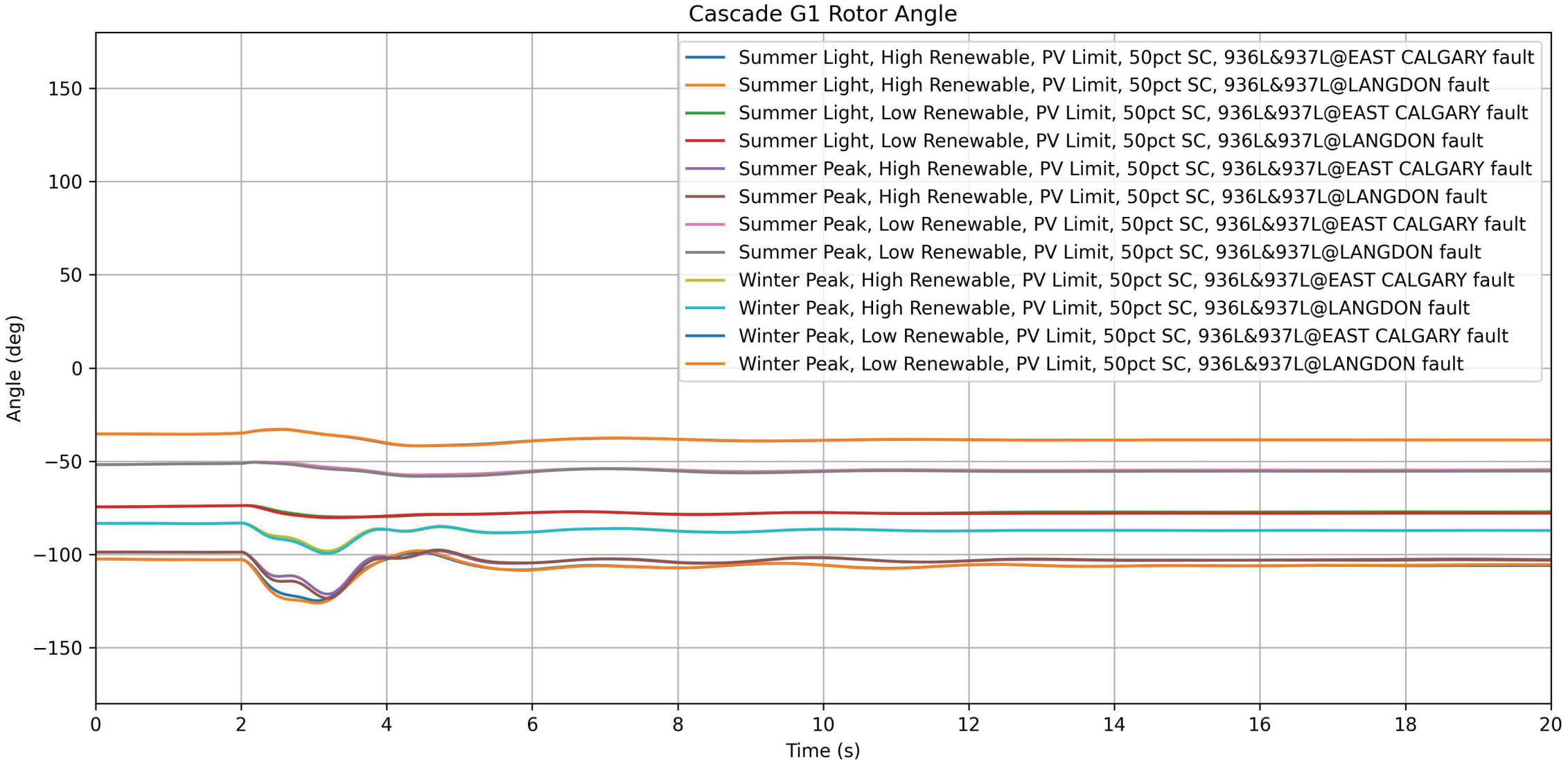

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

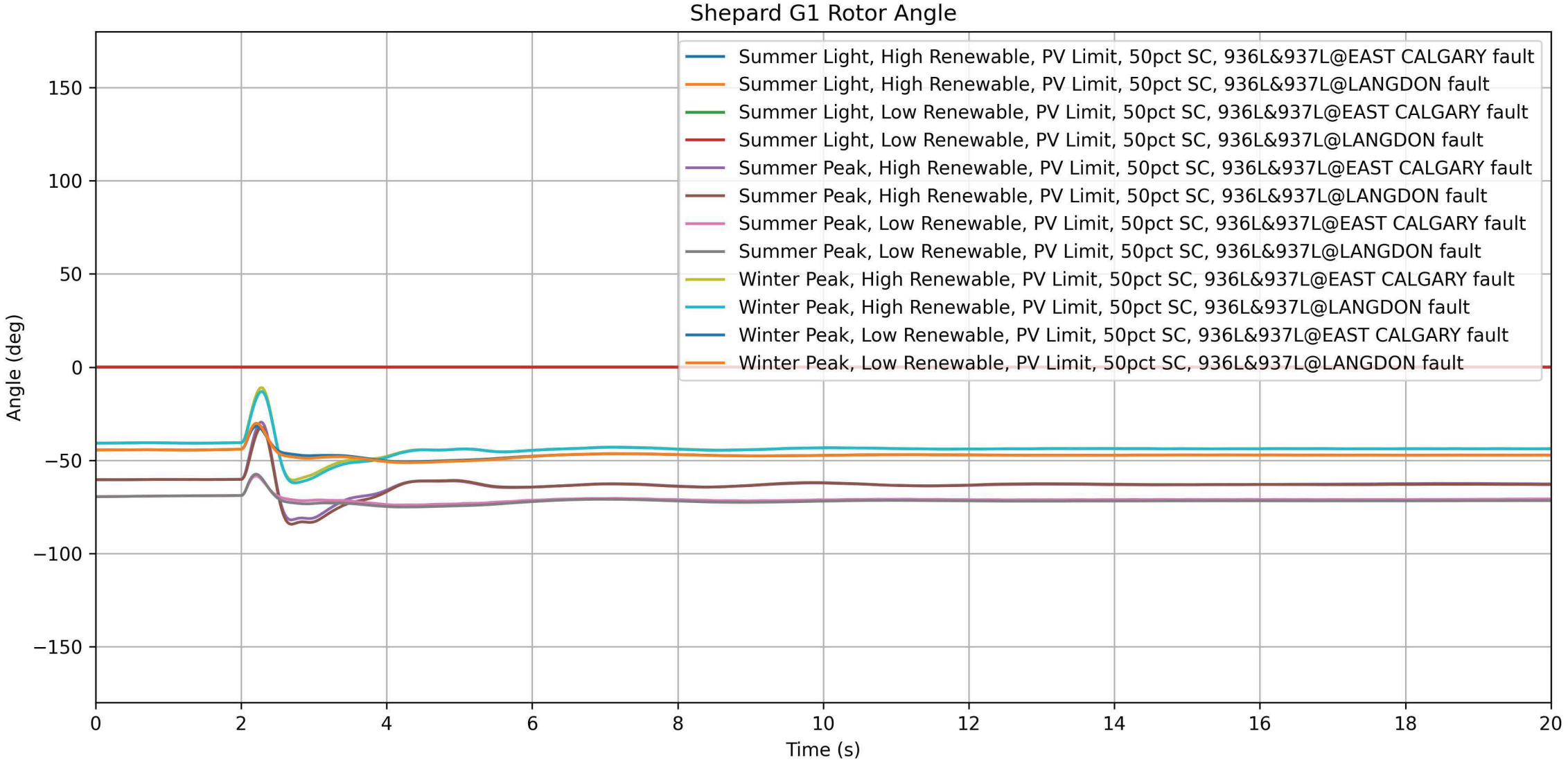

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

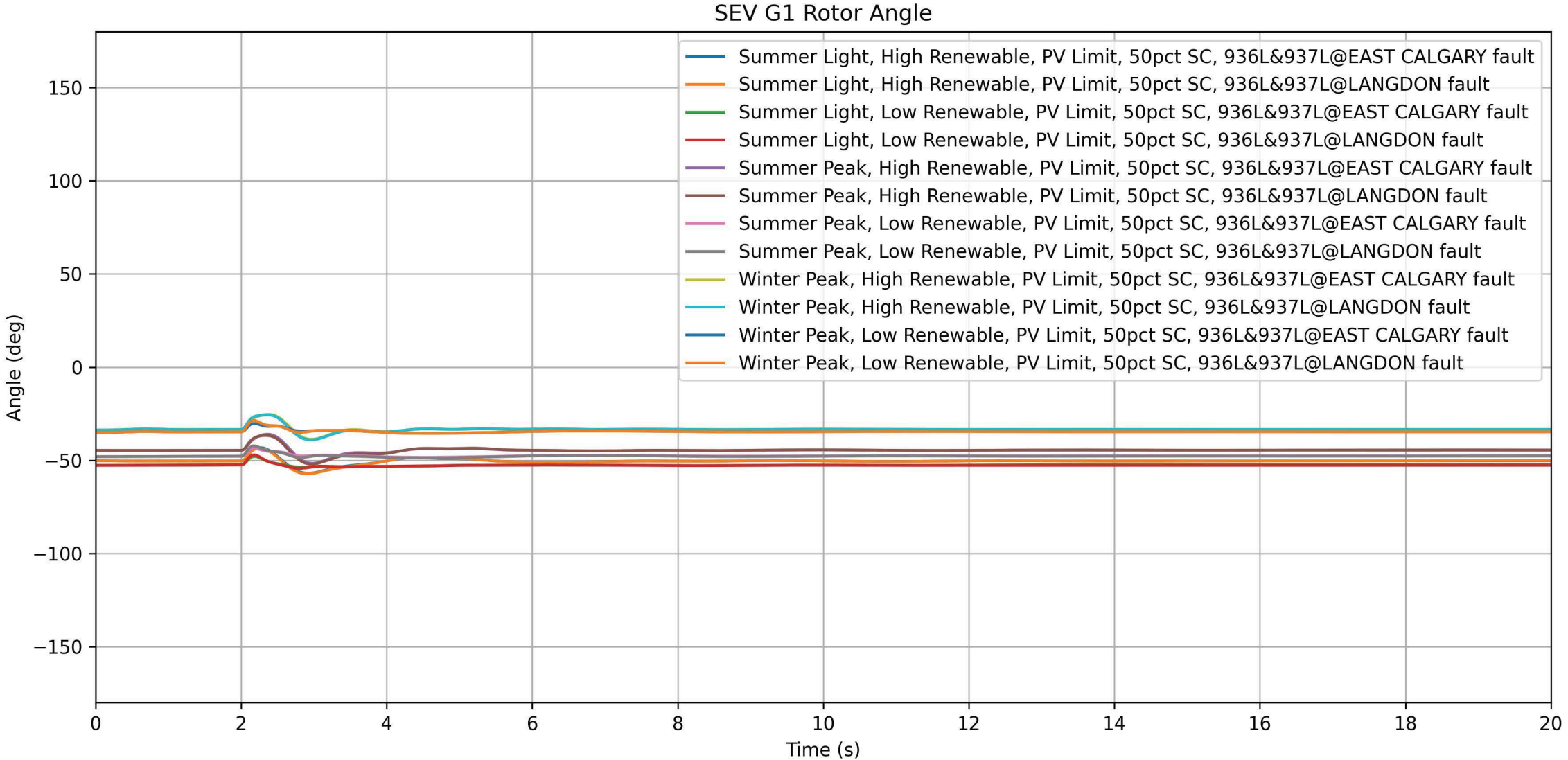

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

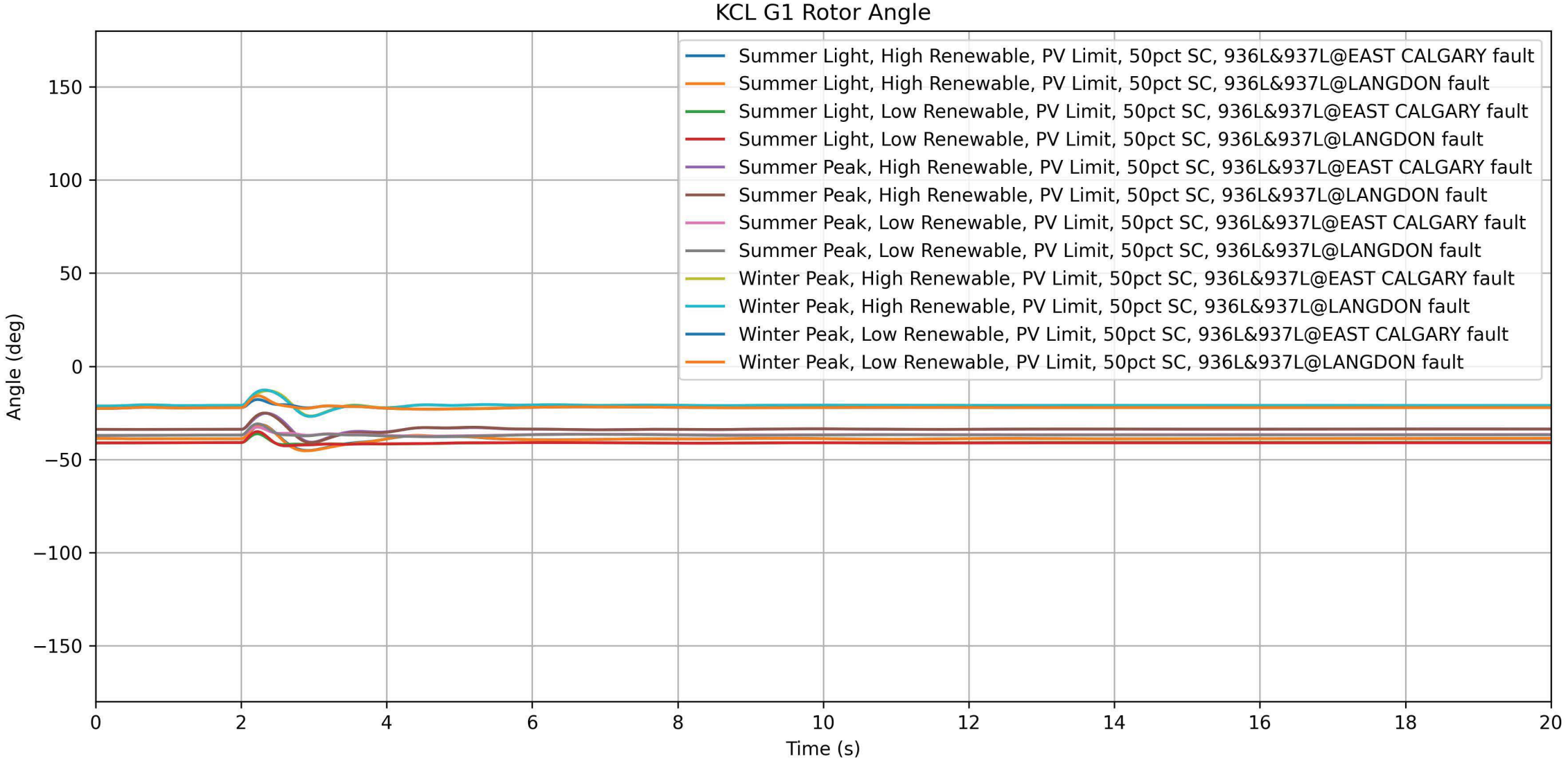

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

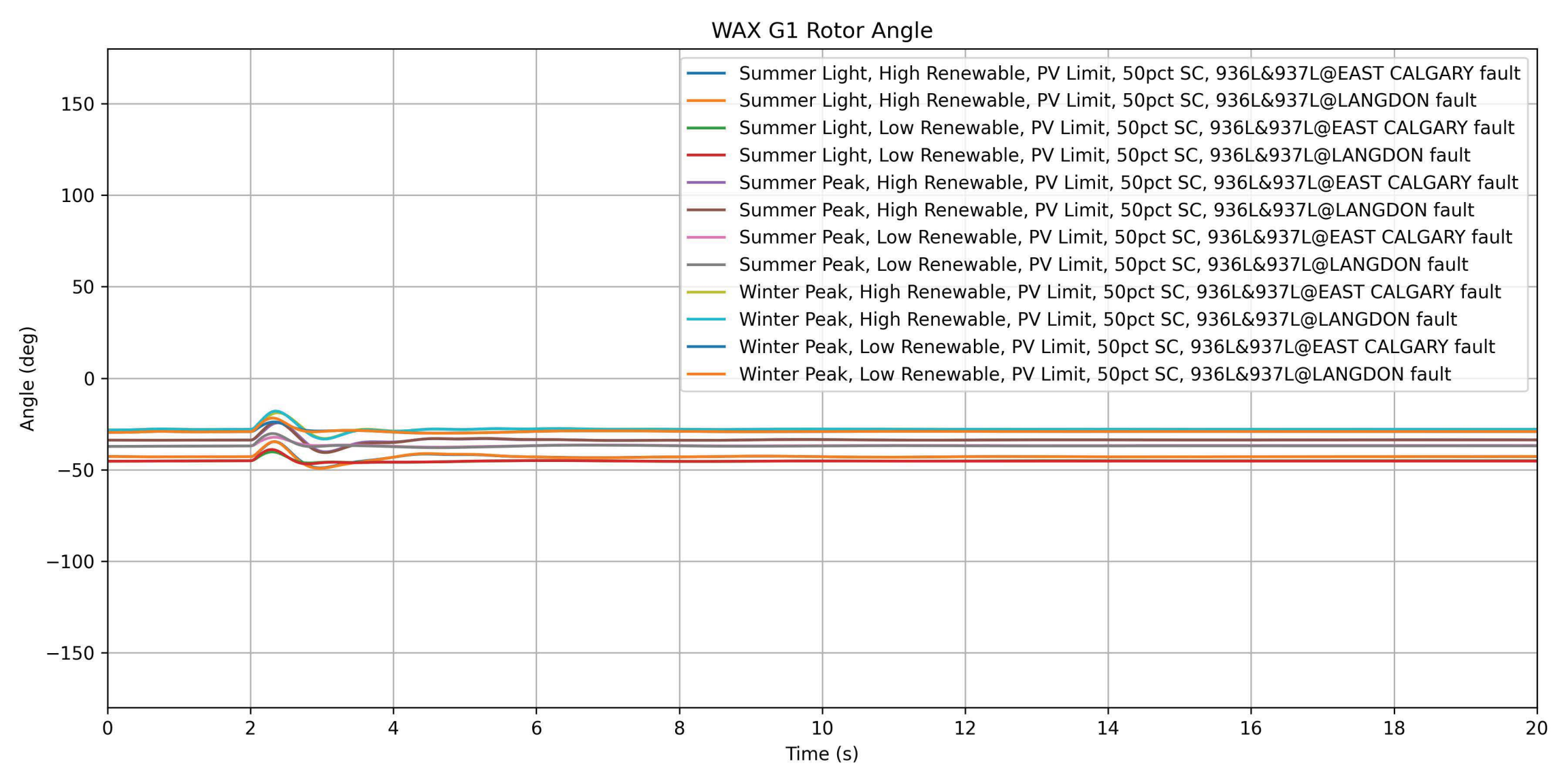

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

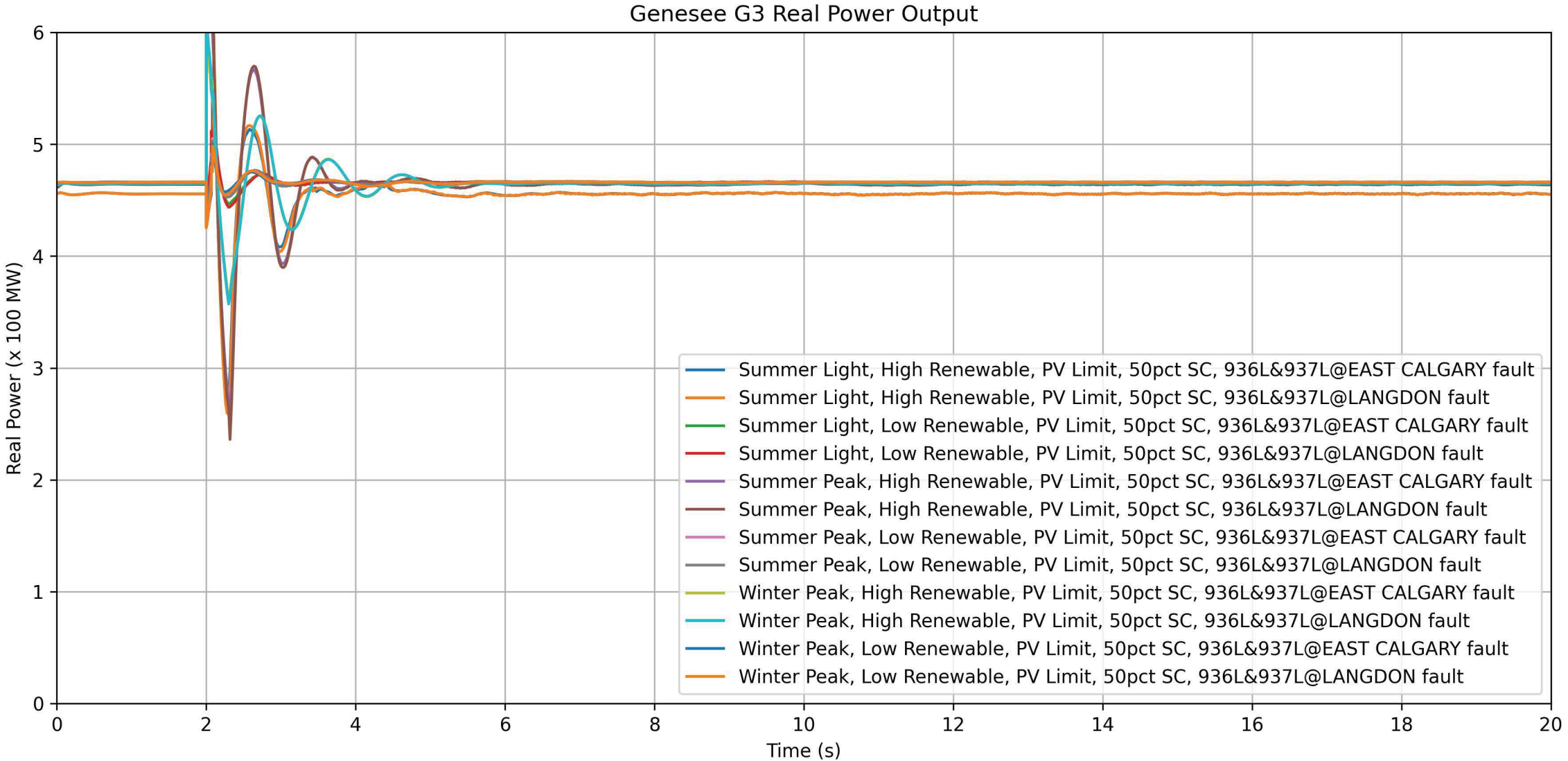

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

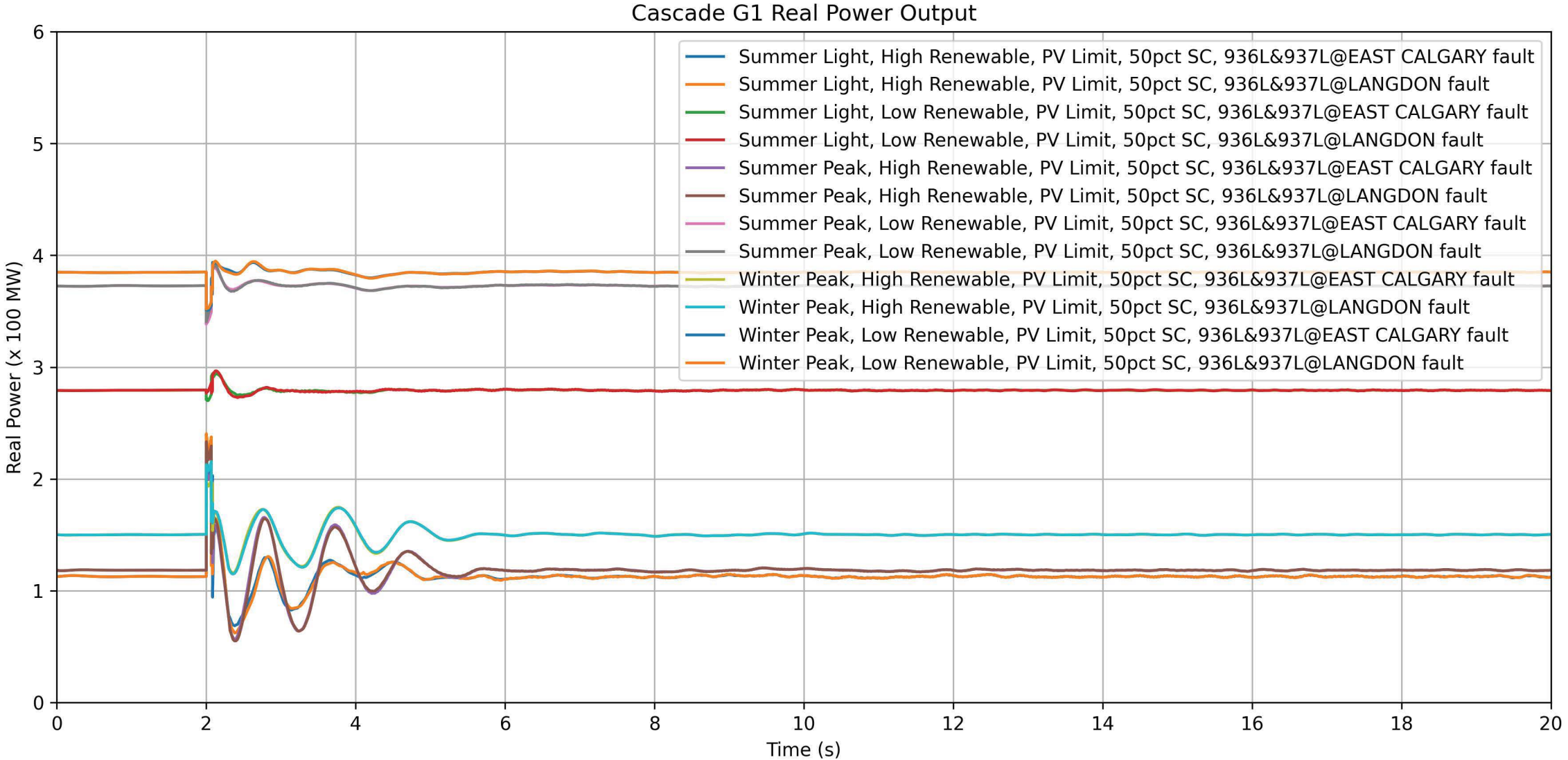

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

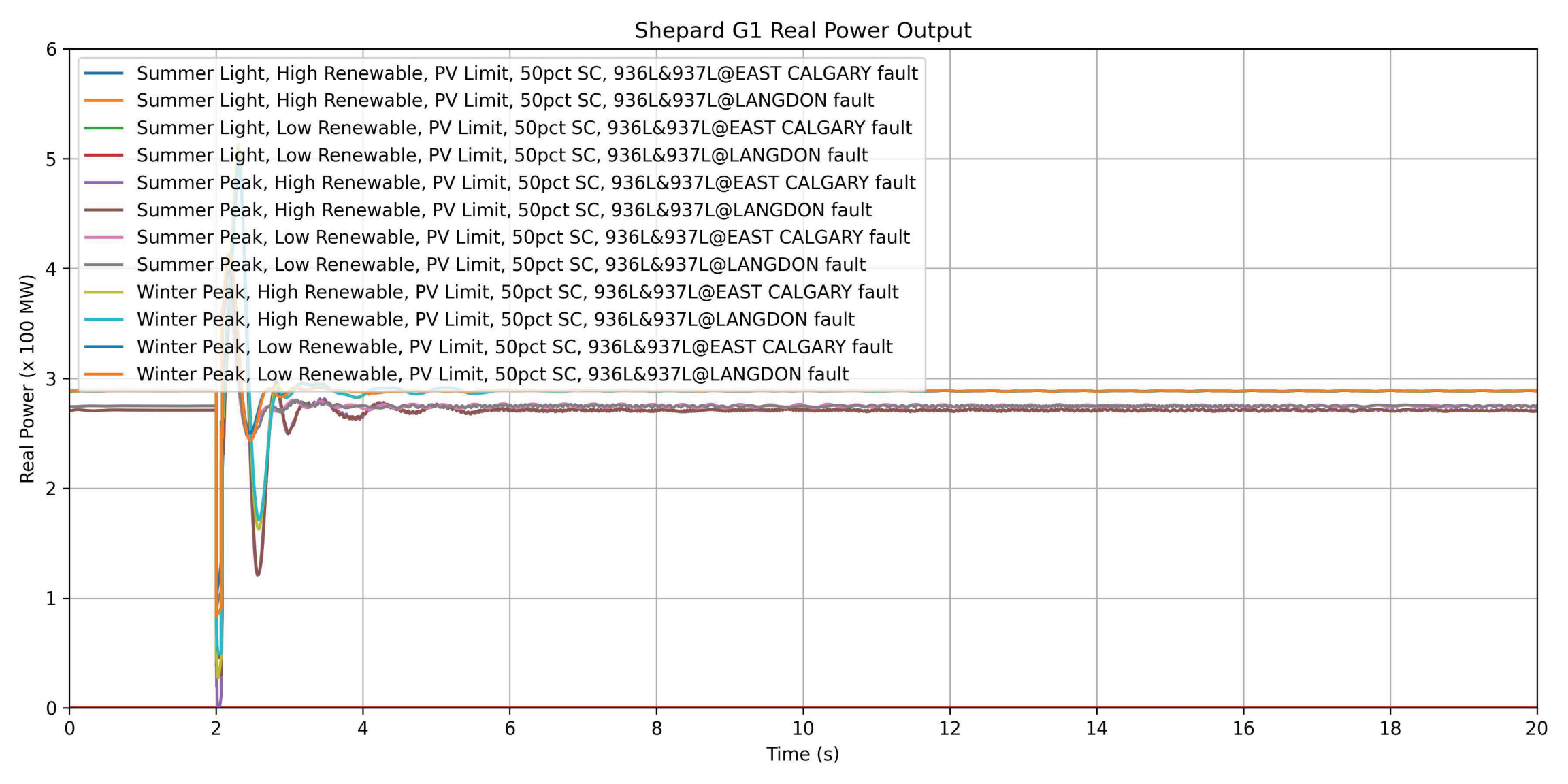

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

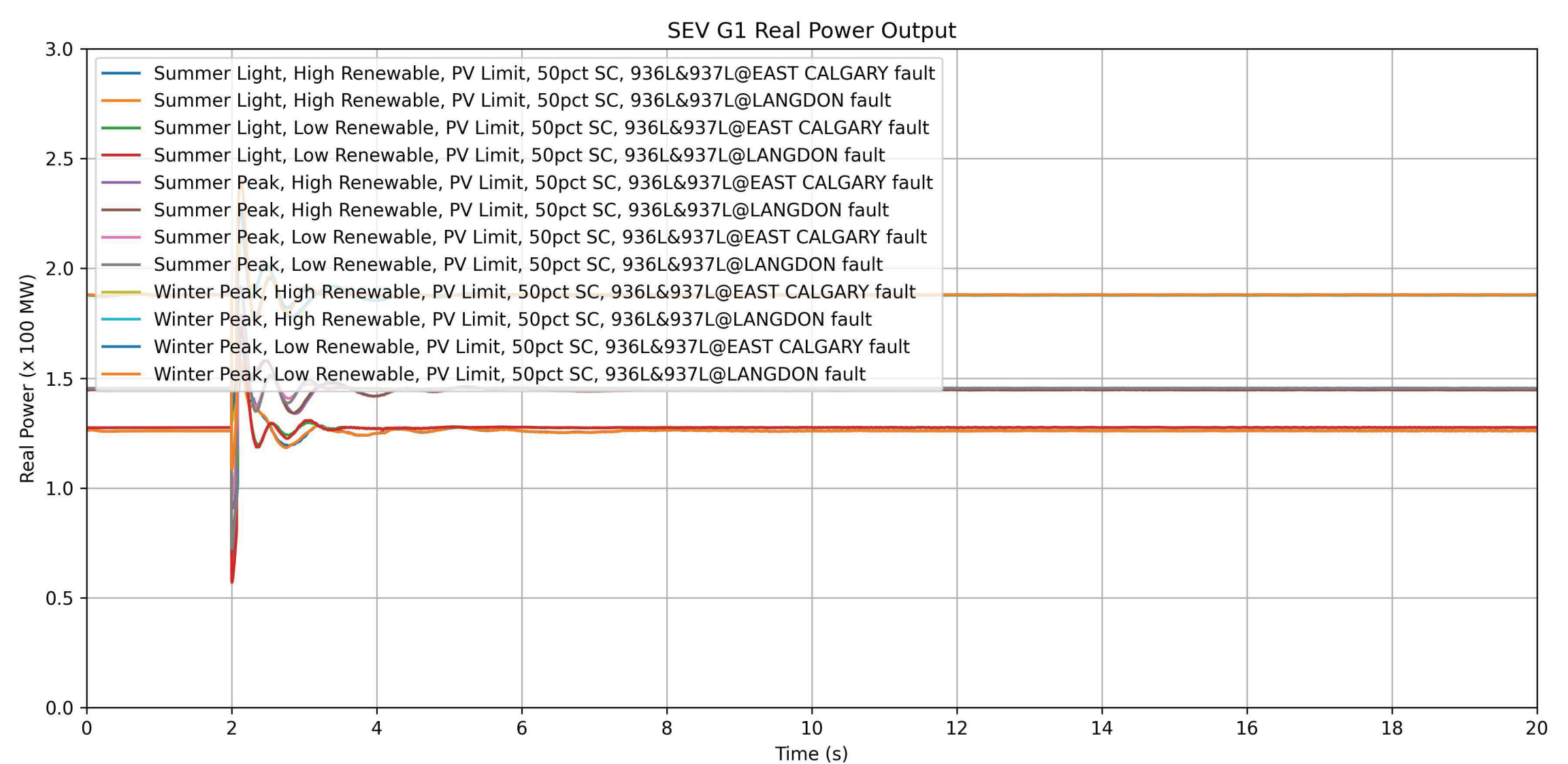

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

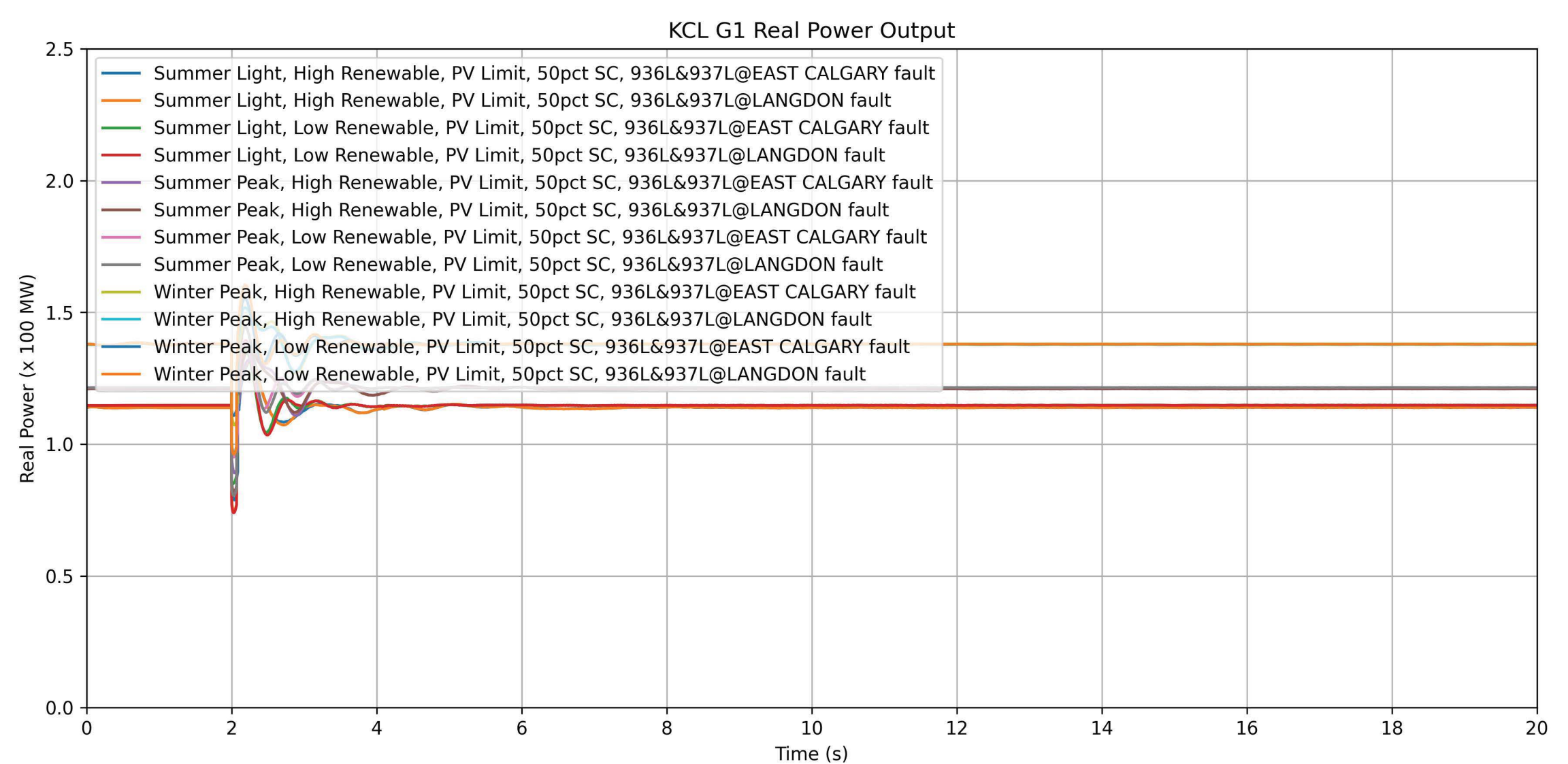

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

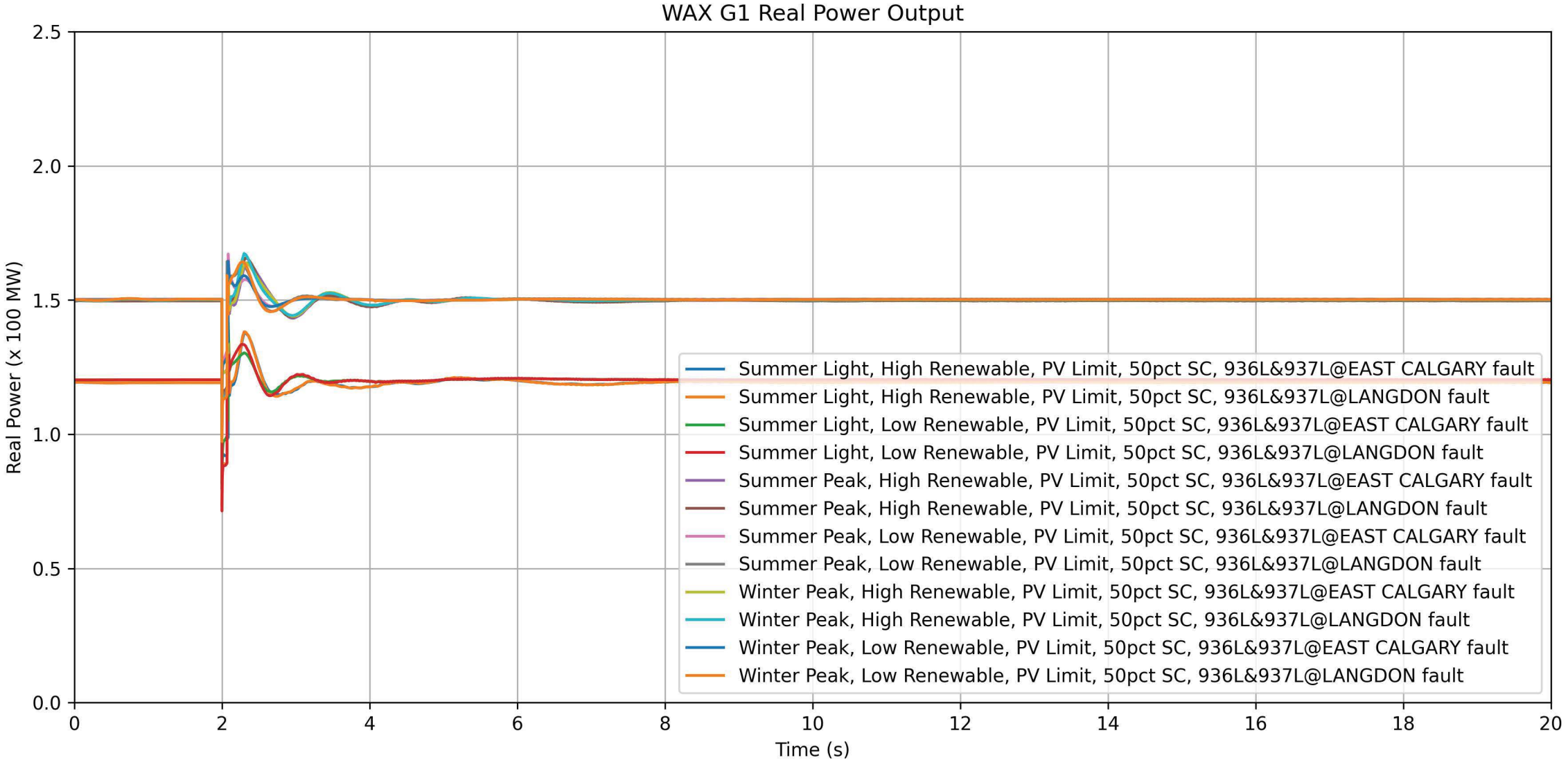

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

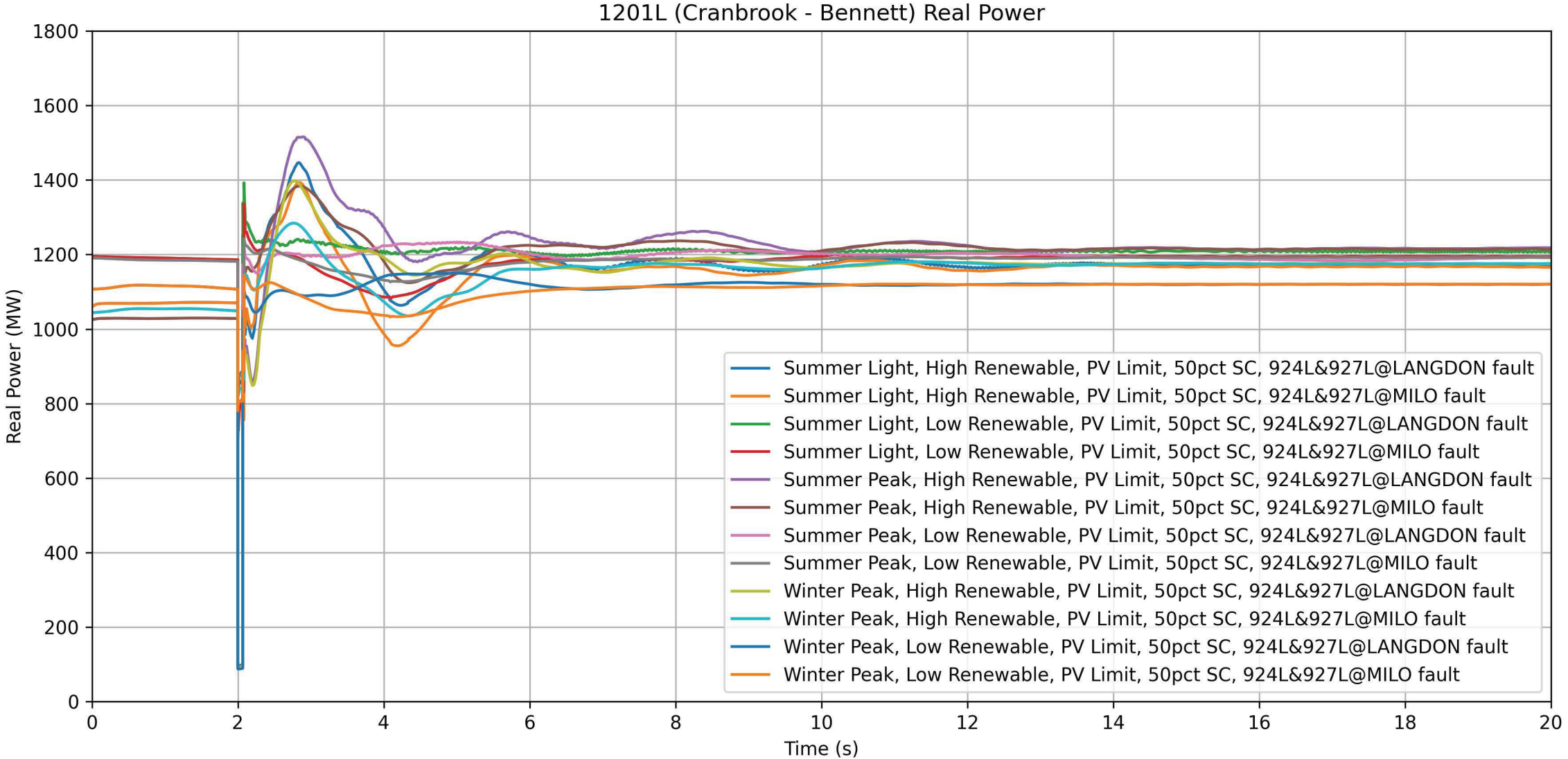

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

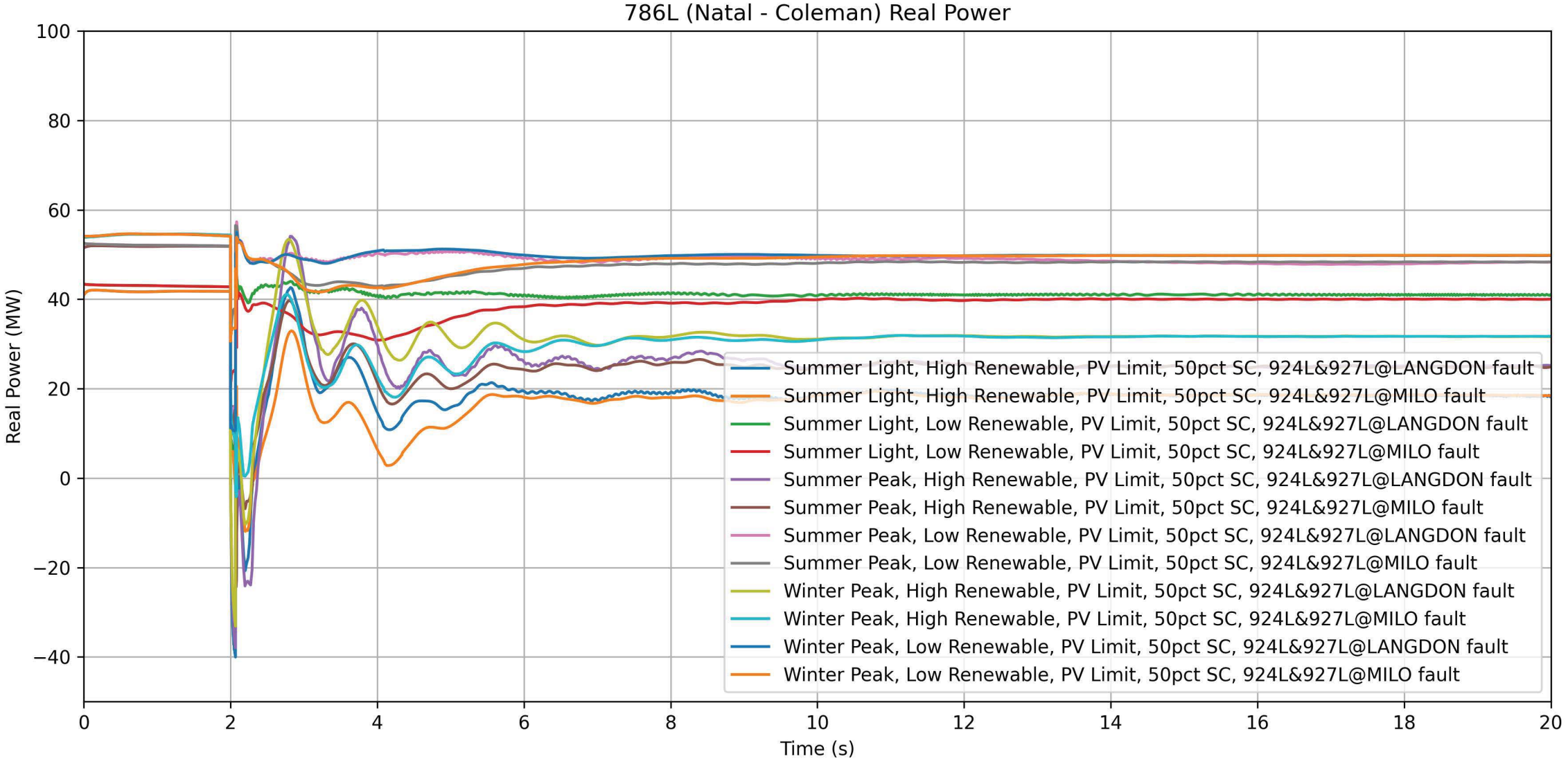

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

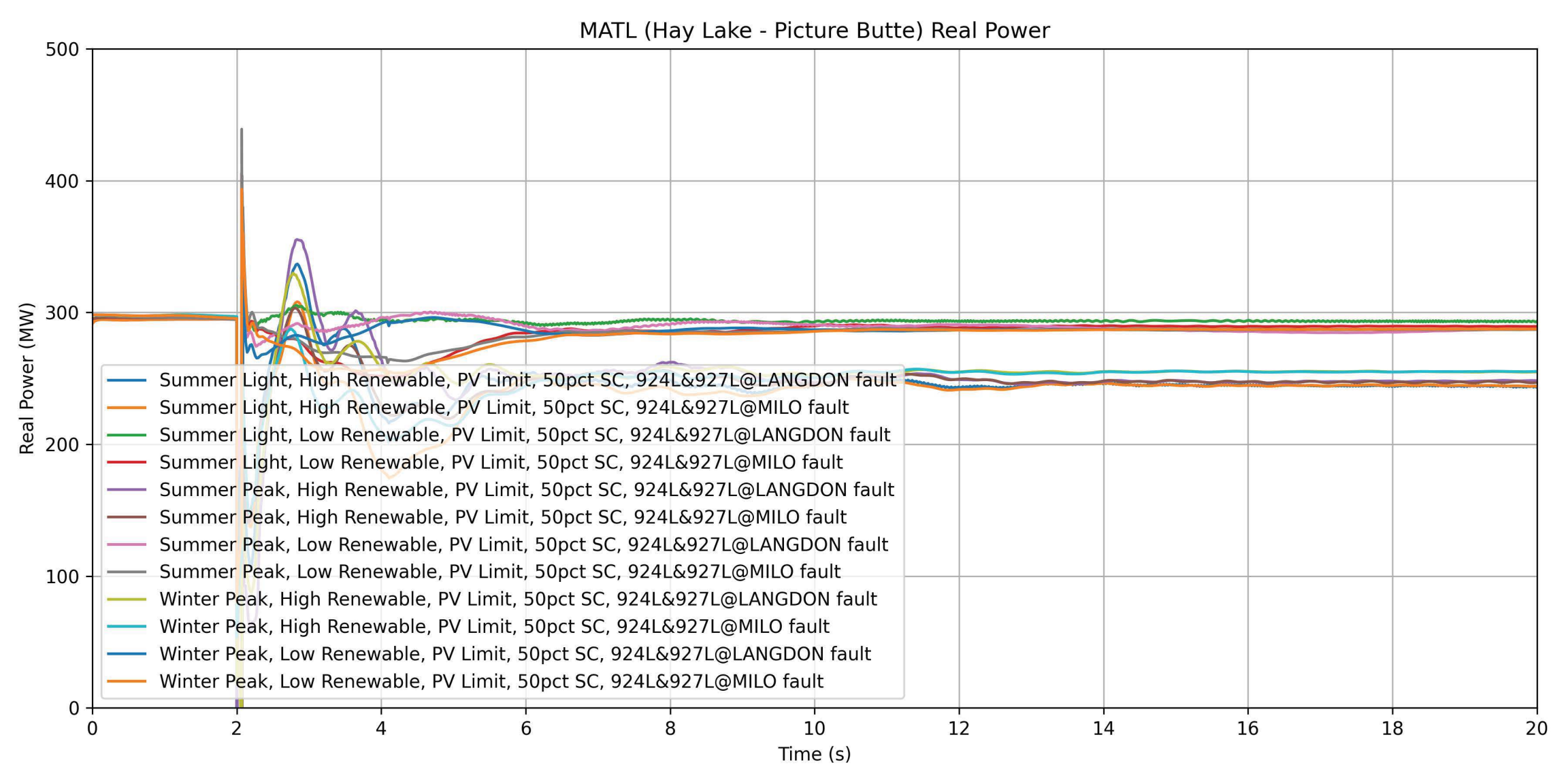

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Real Power (x 100 MW)
Time (s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20

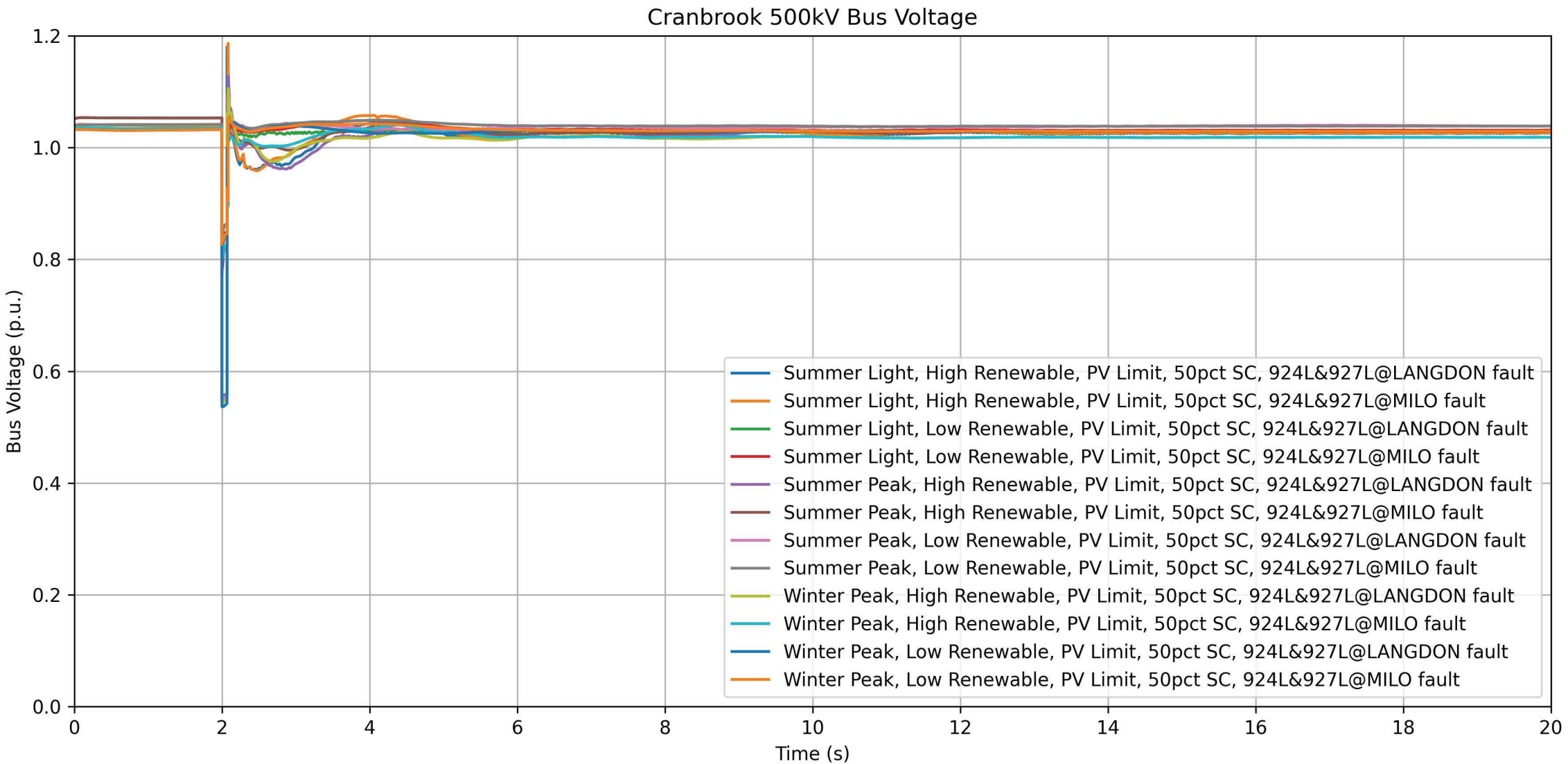

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

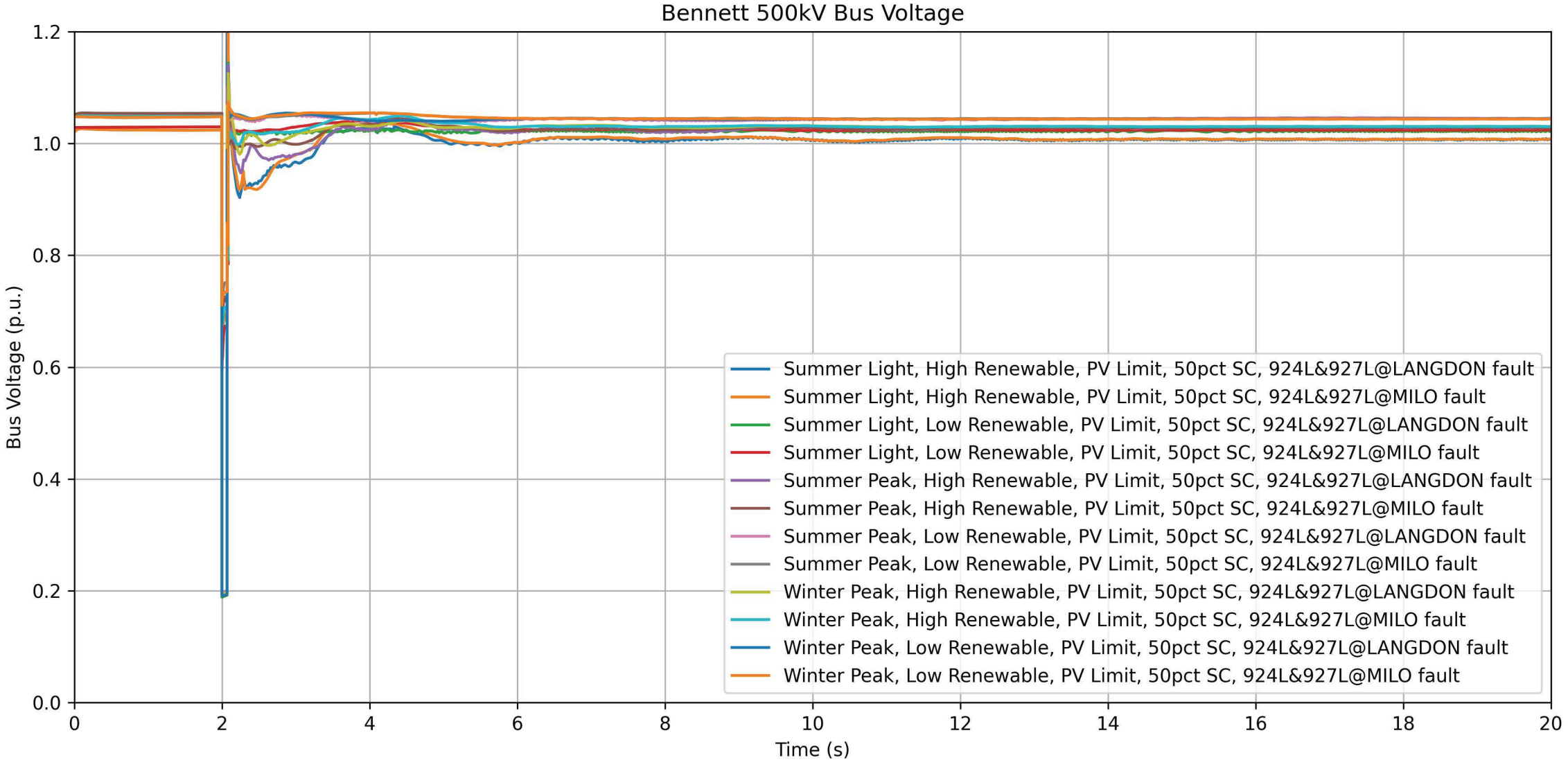

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@EAST CALGARY fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 936L&937L@LANGDON fault

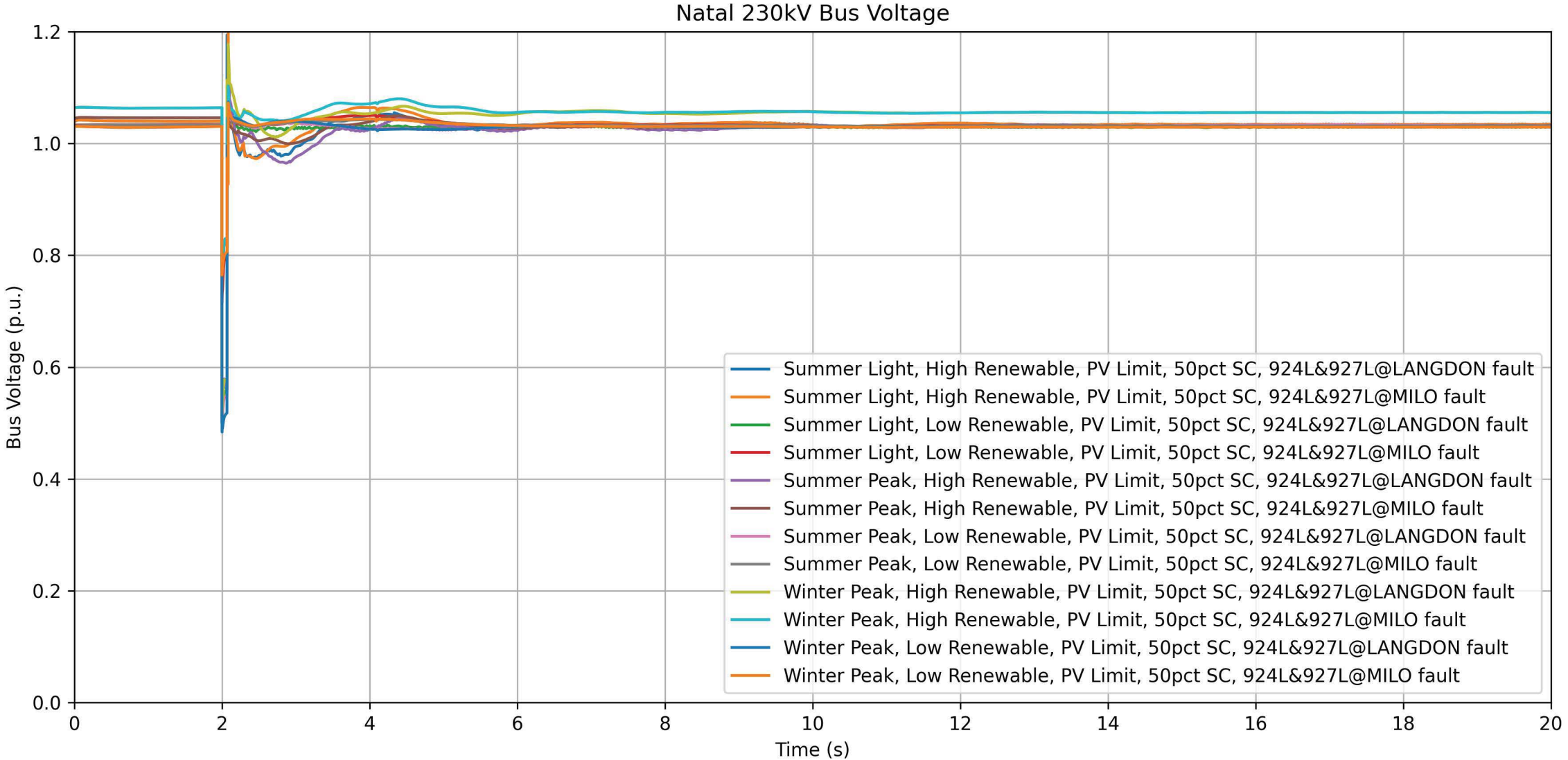

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

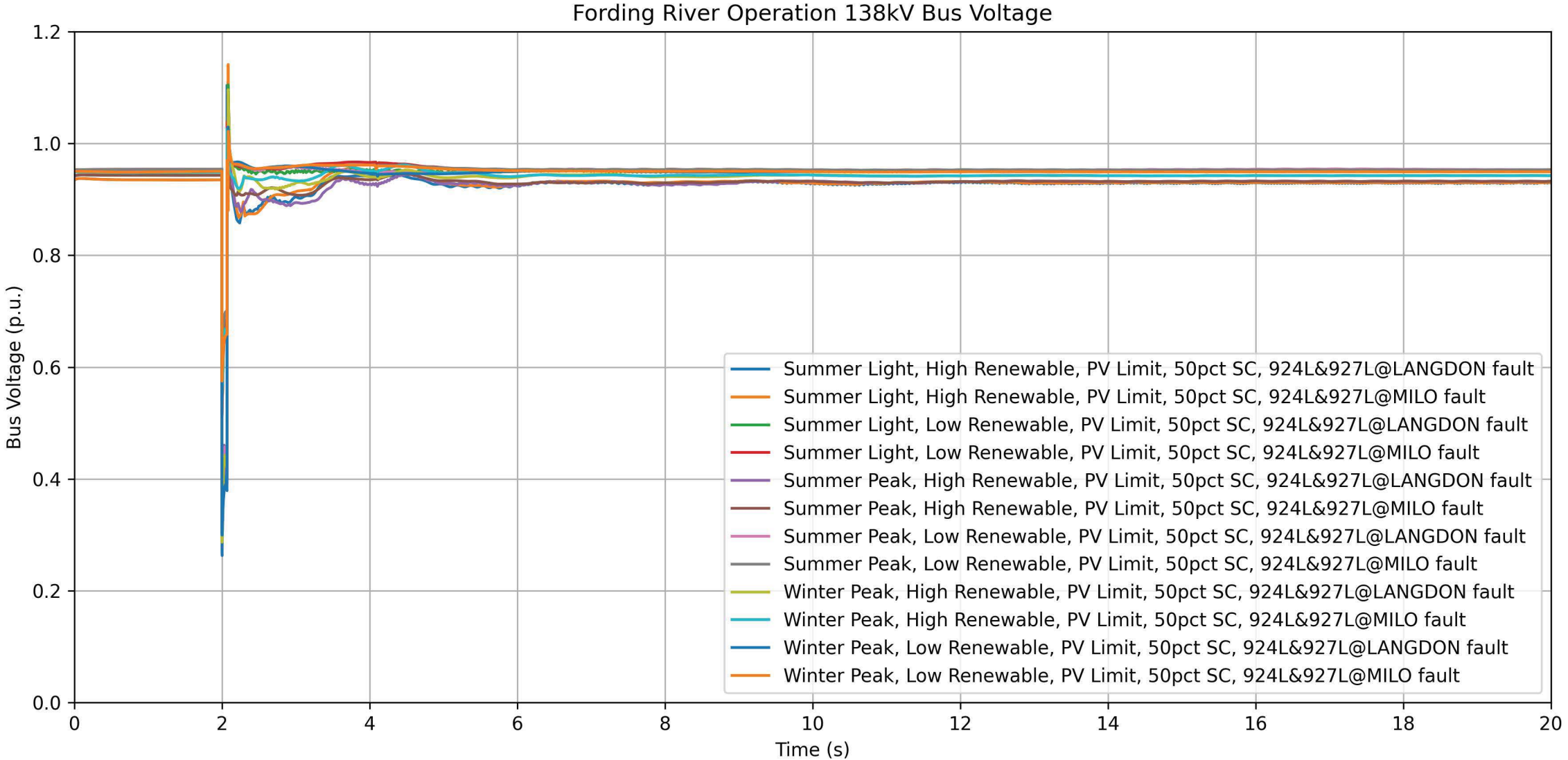

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

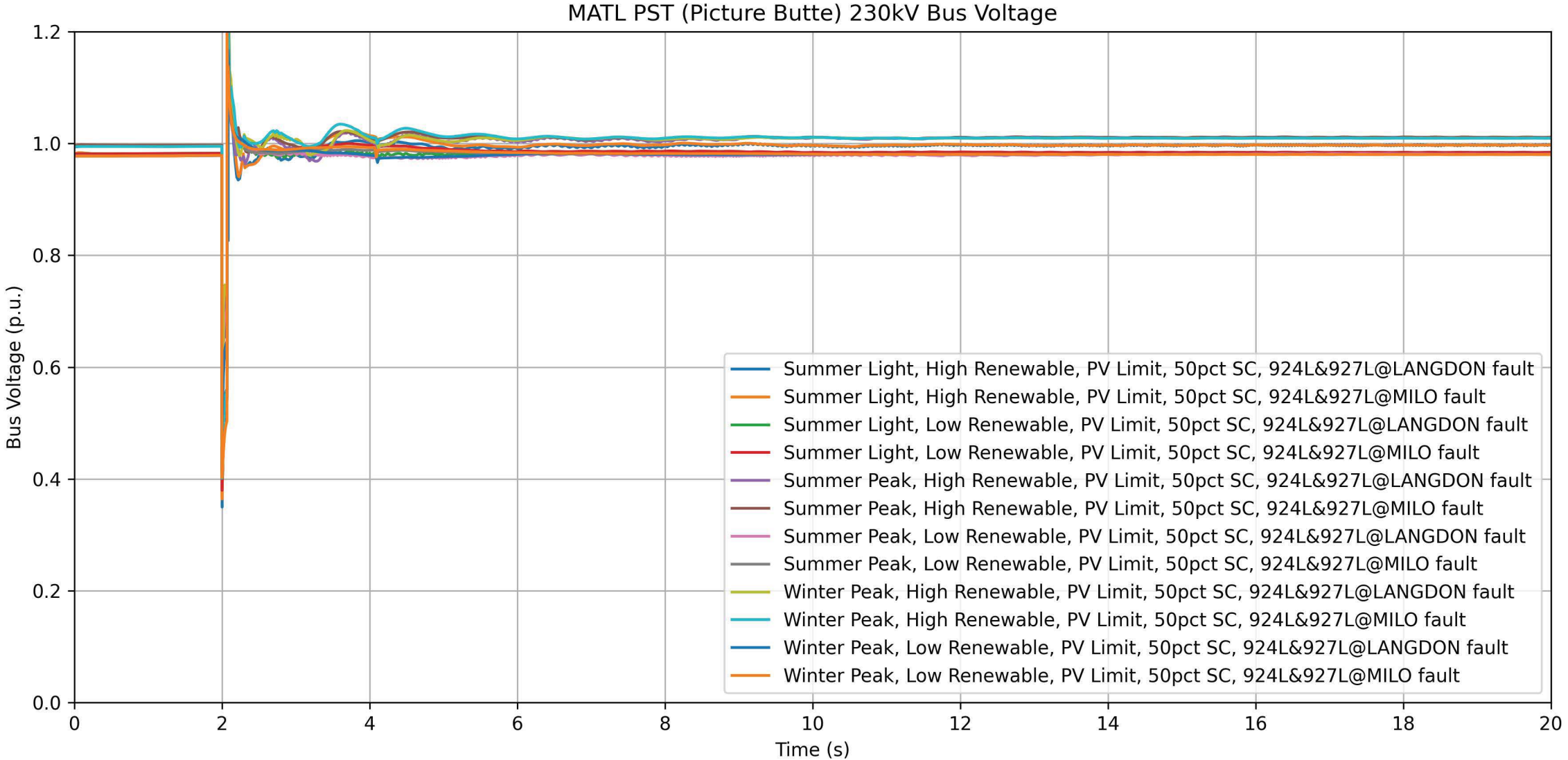

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

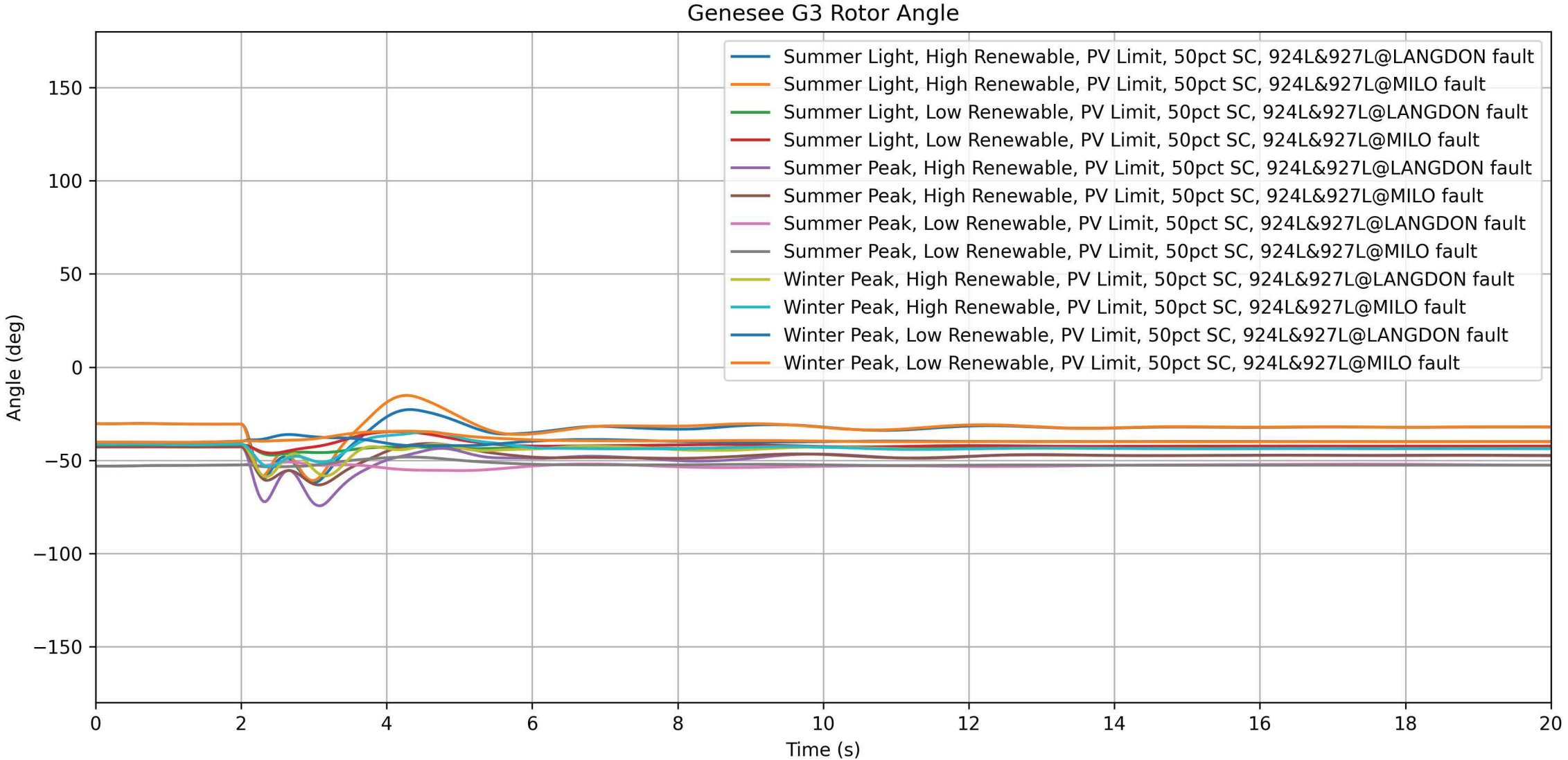

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

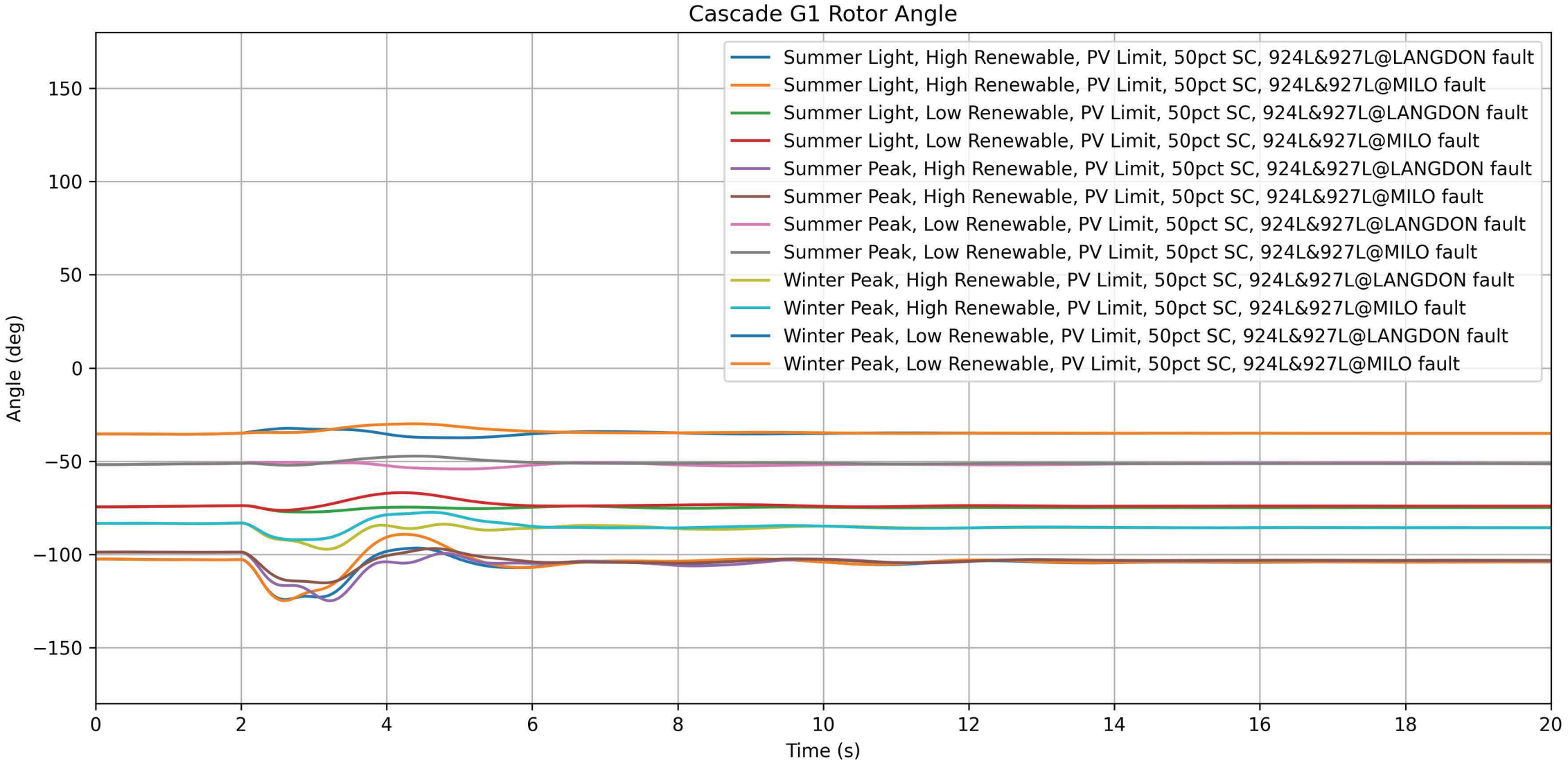

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

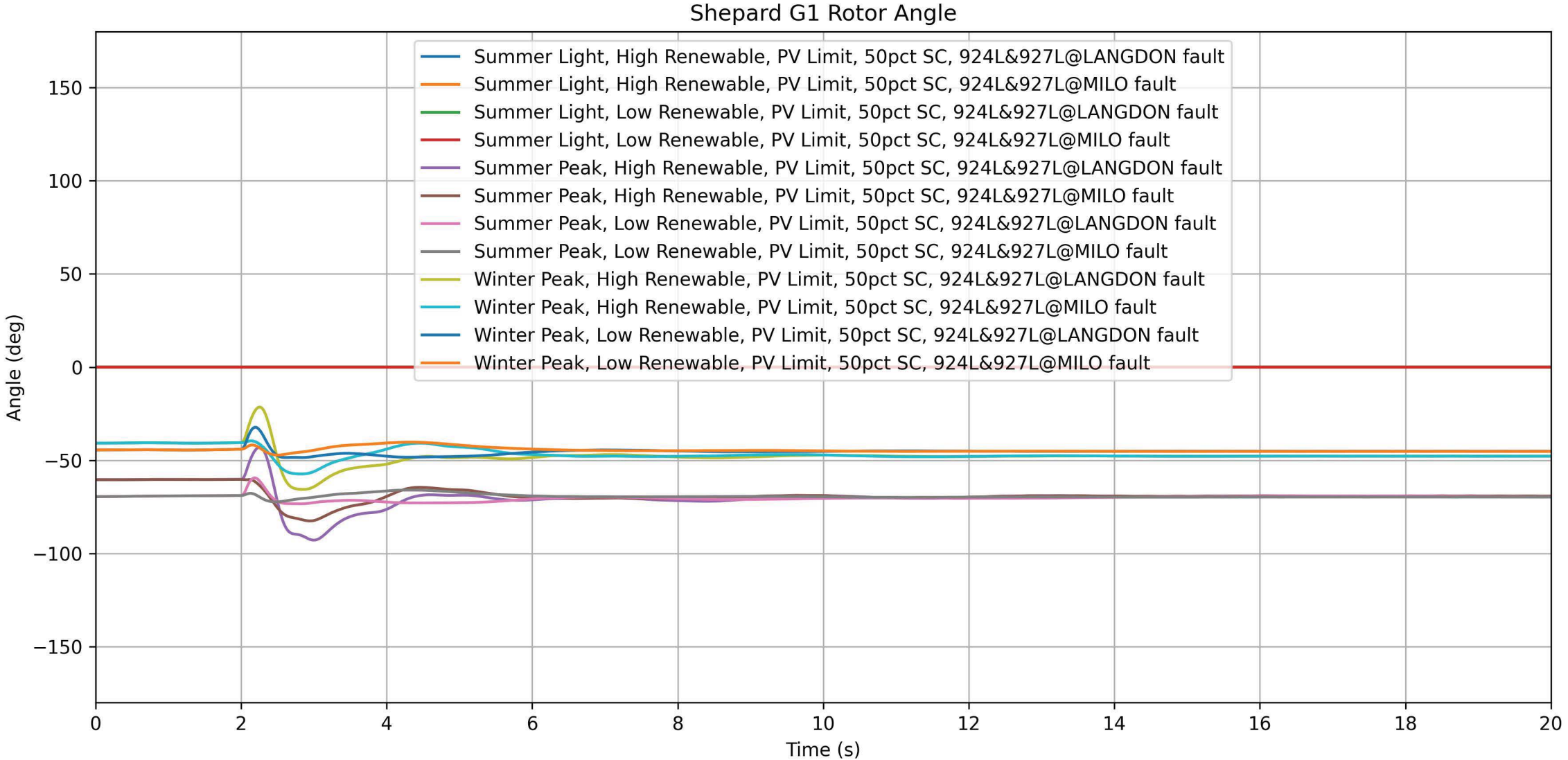

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

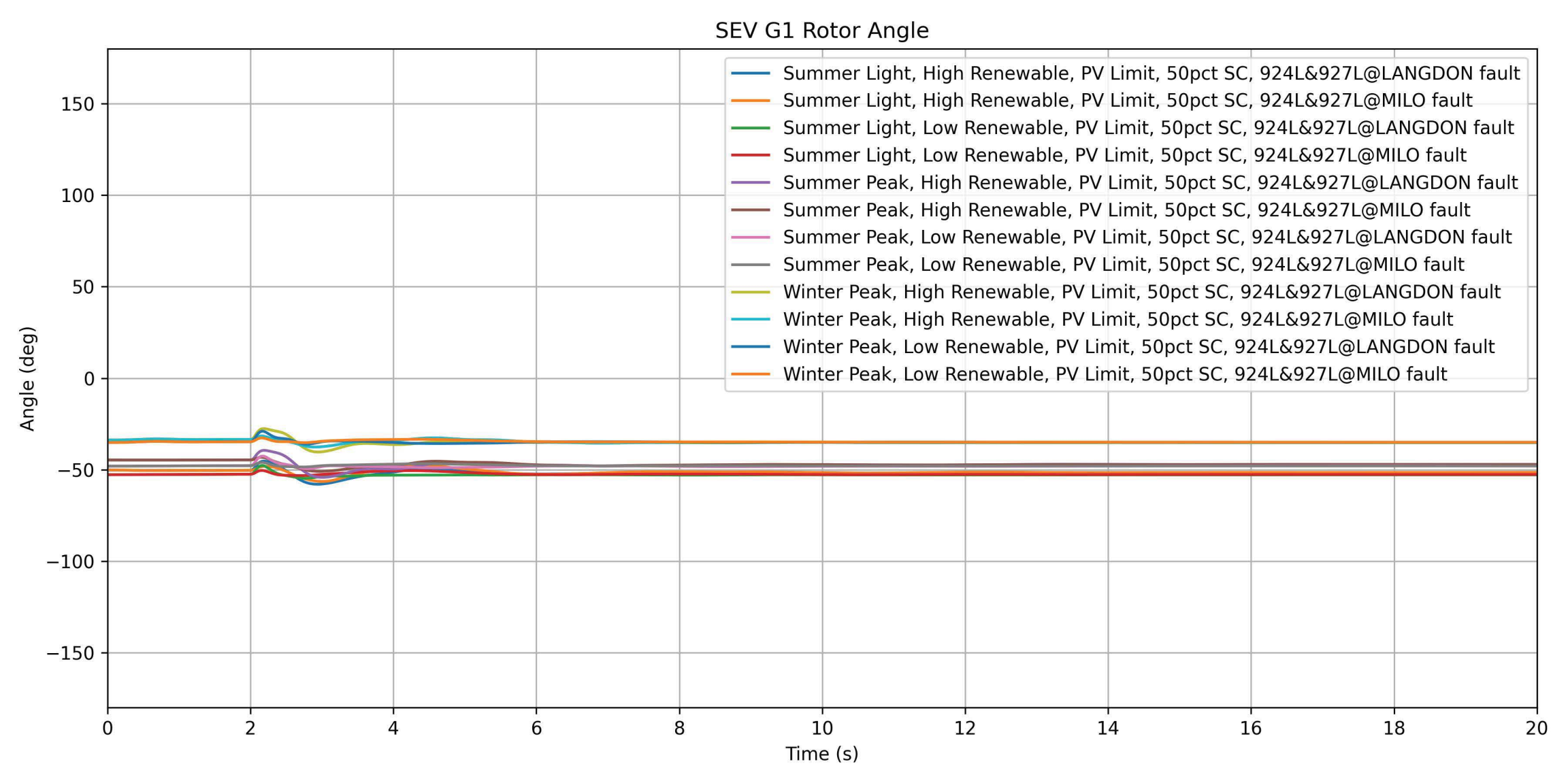

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

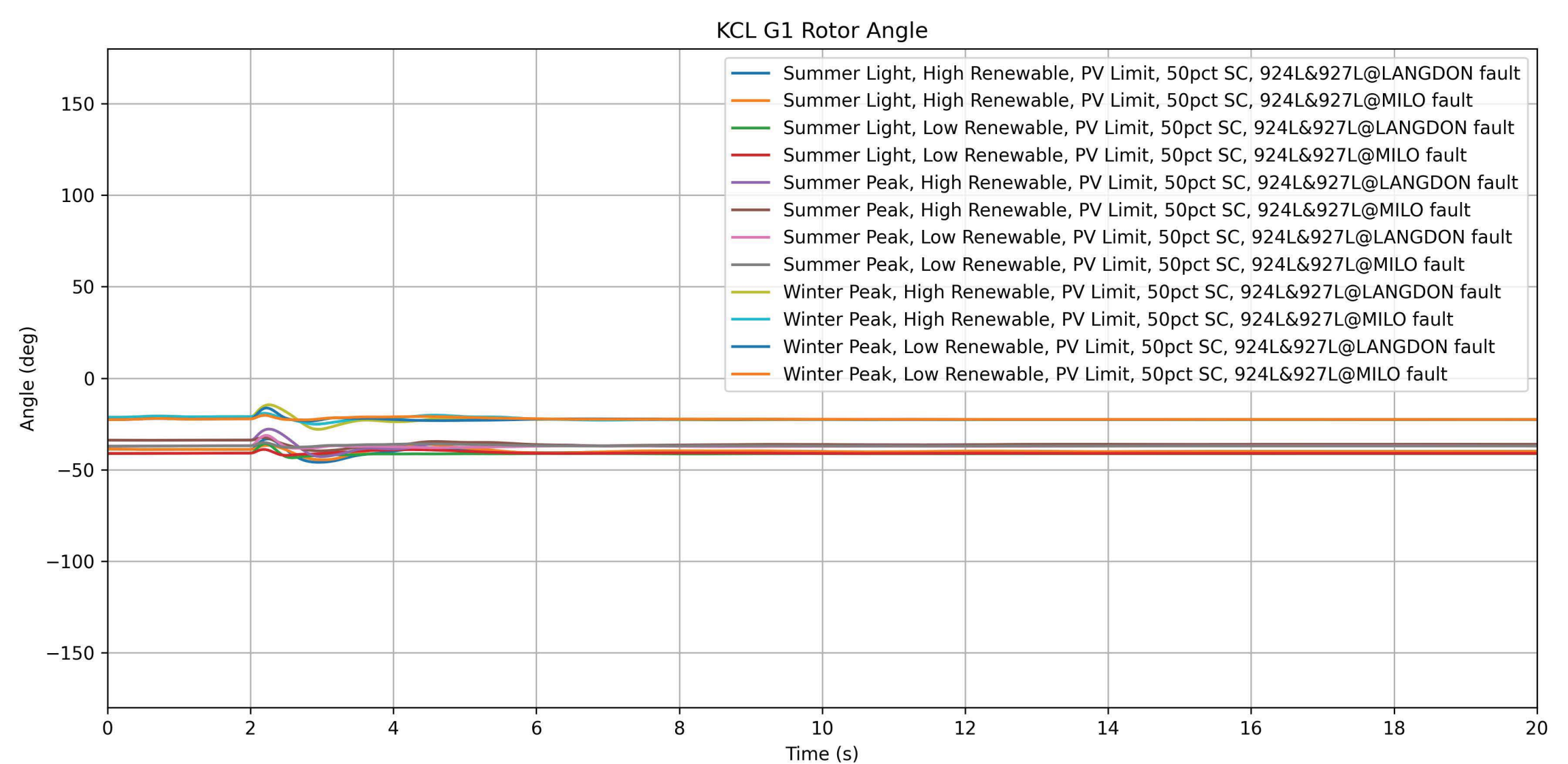

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

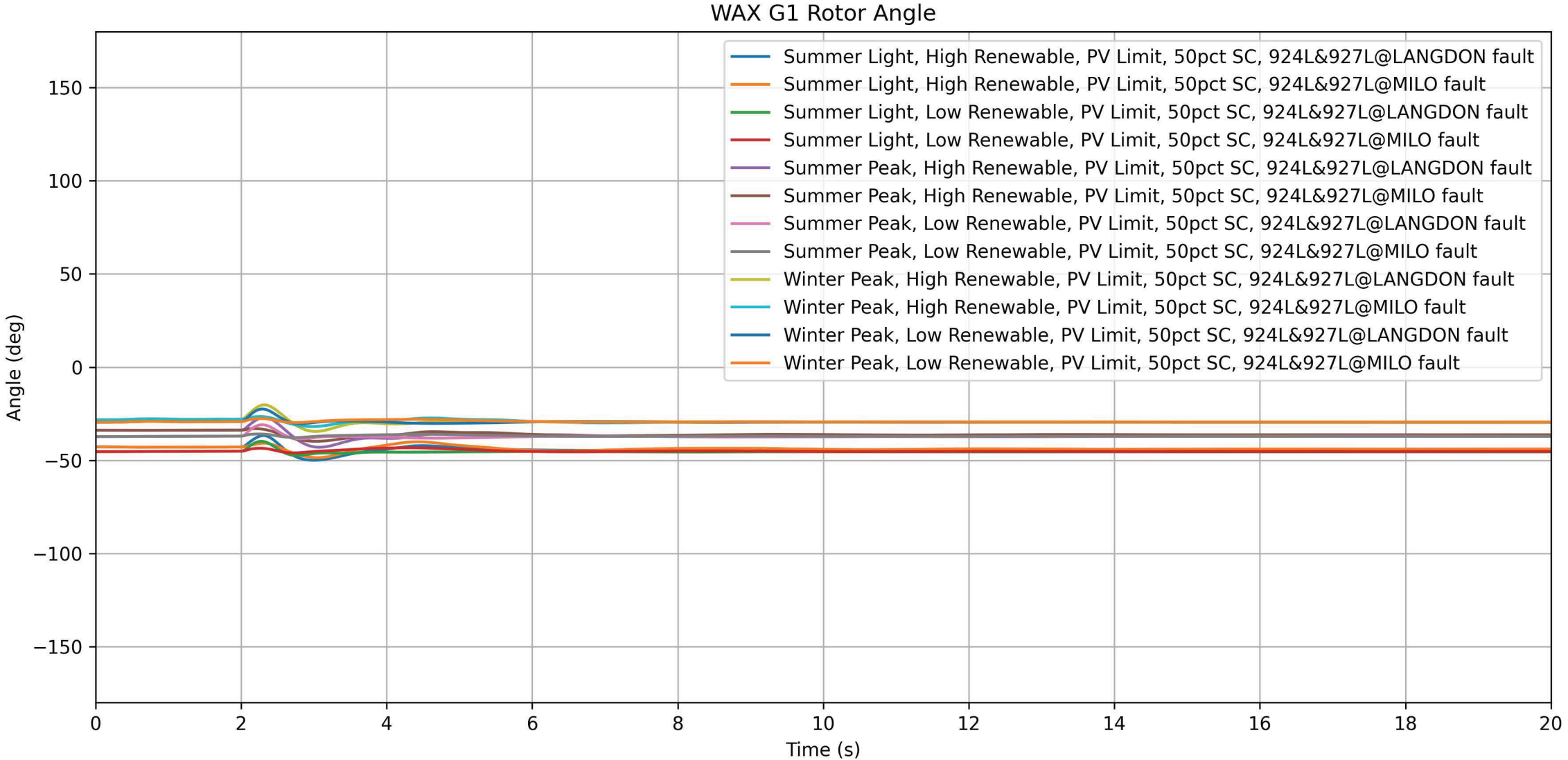

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

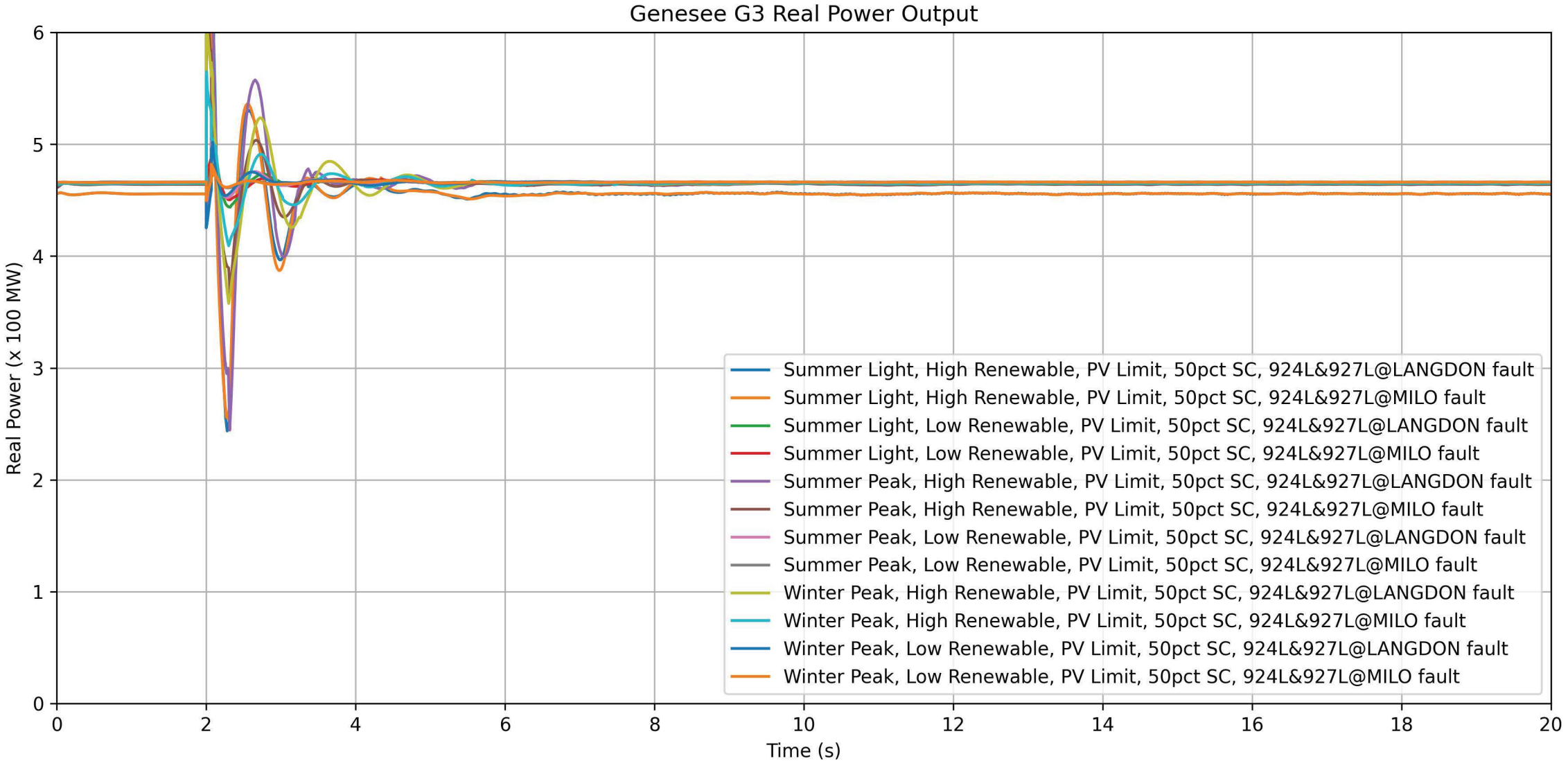

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

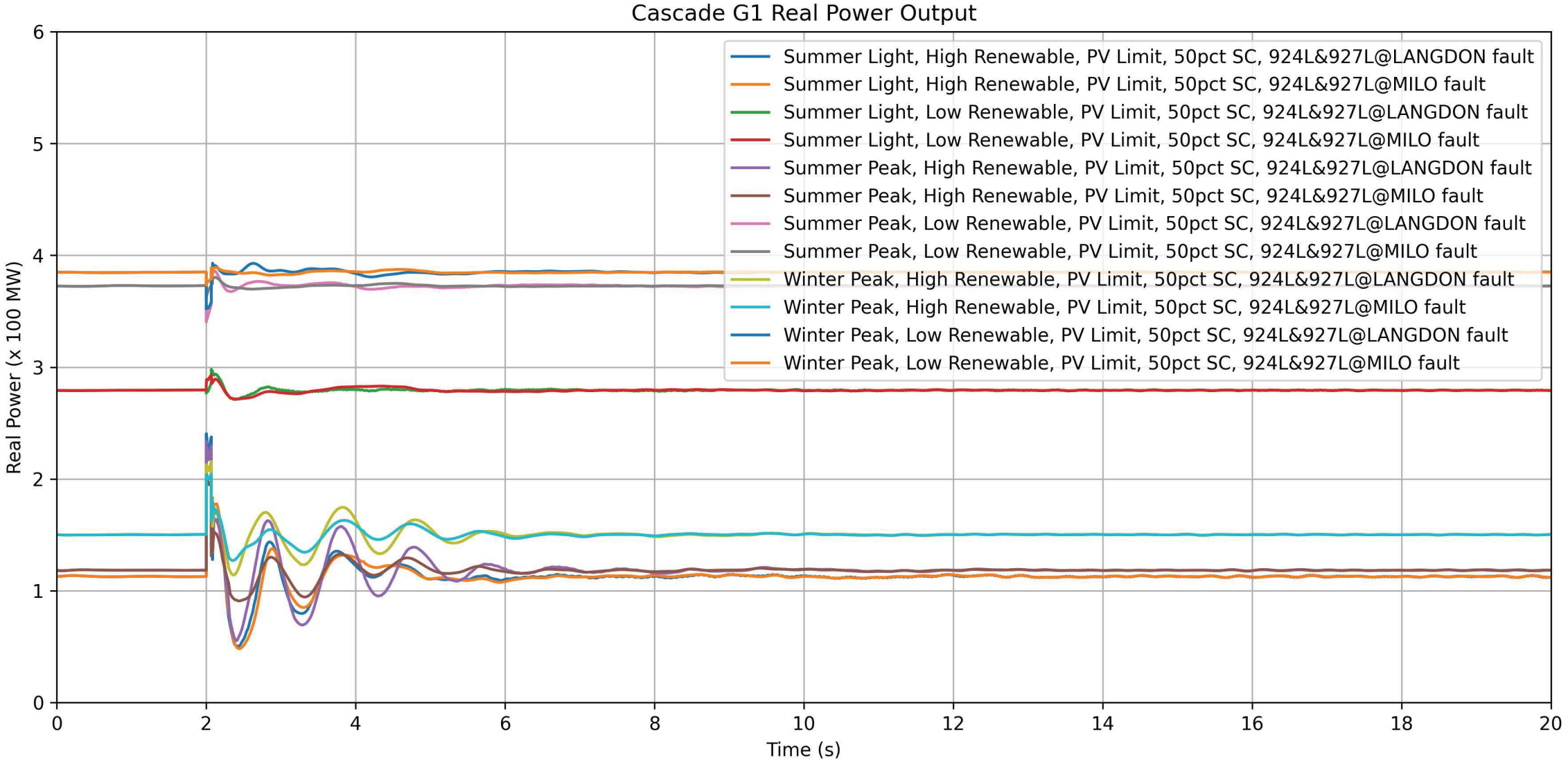

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

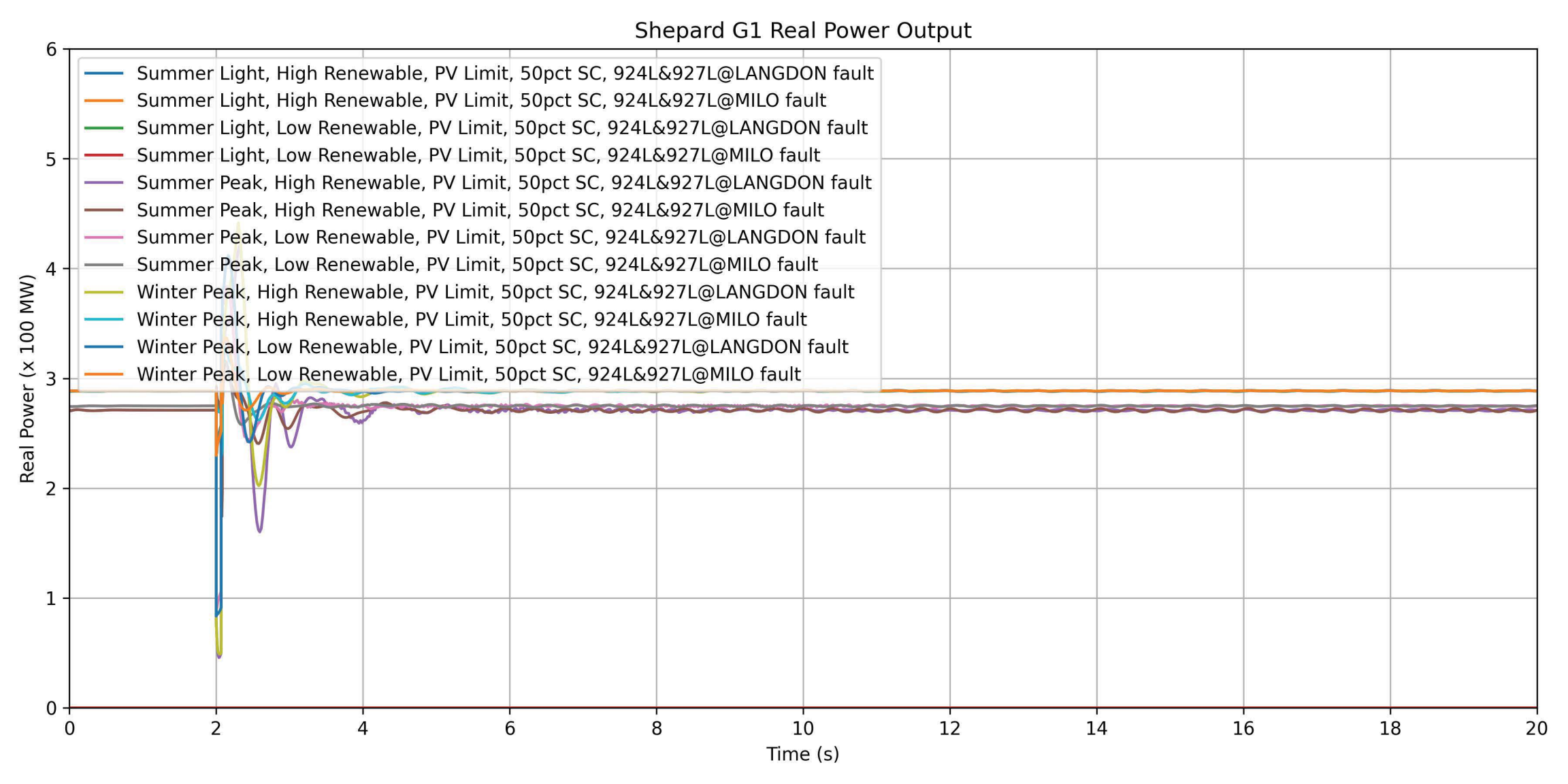

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

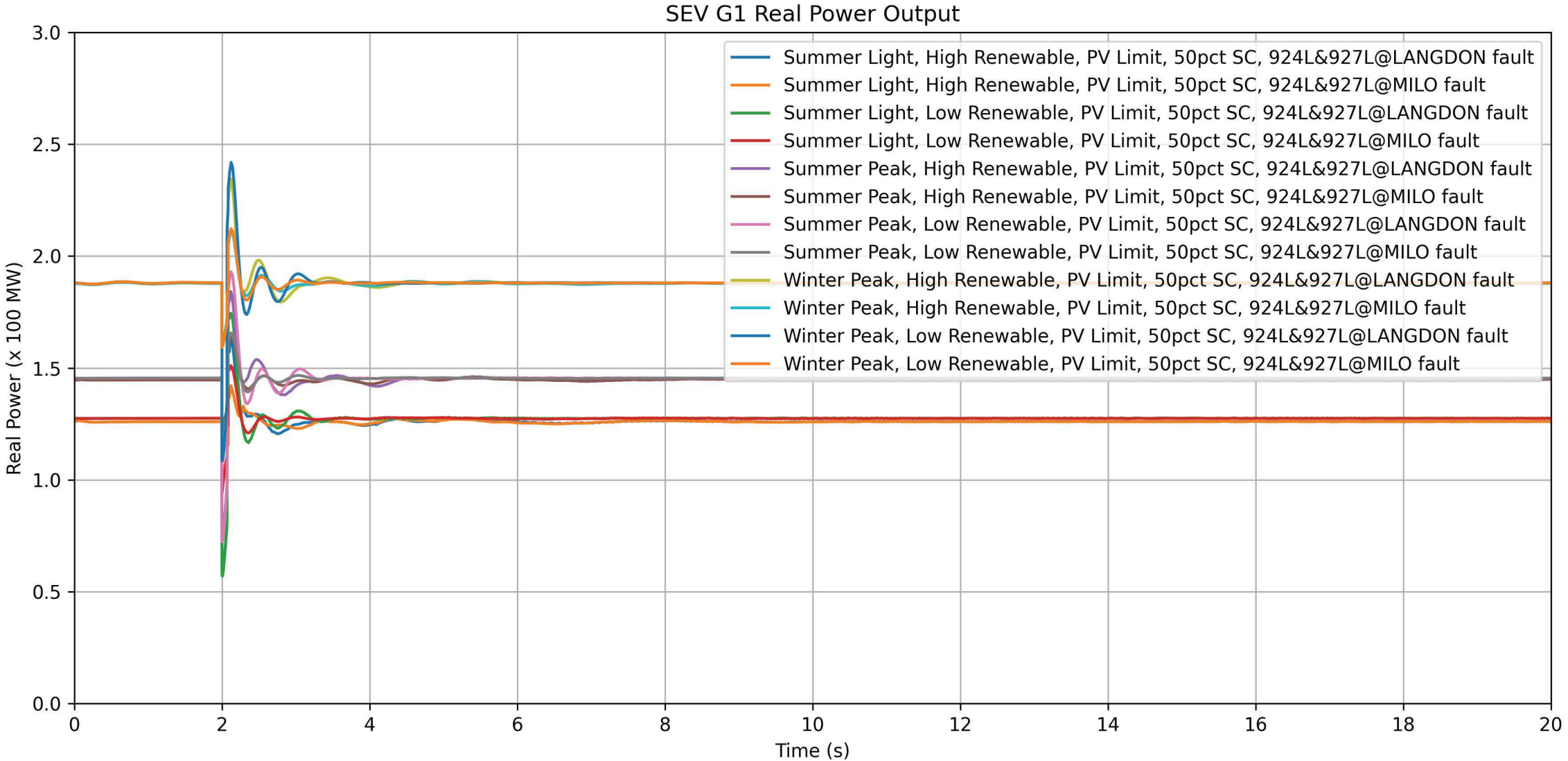

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

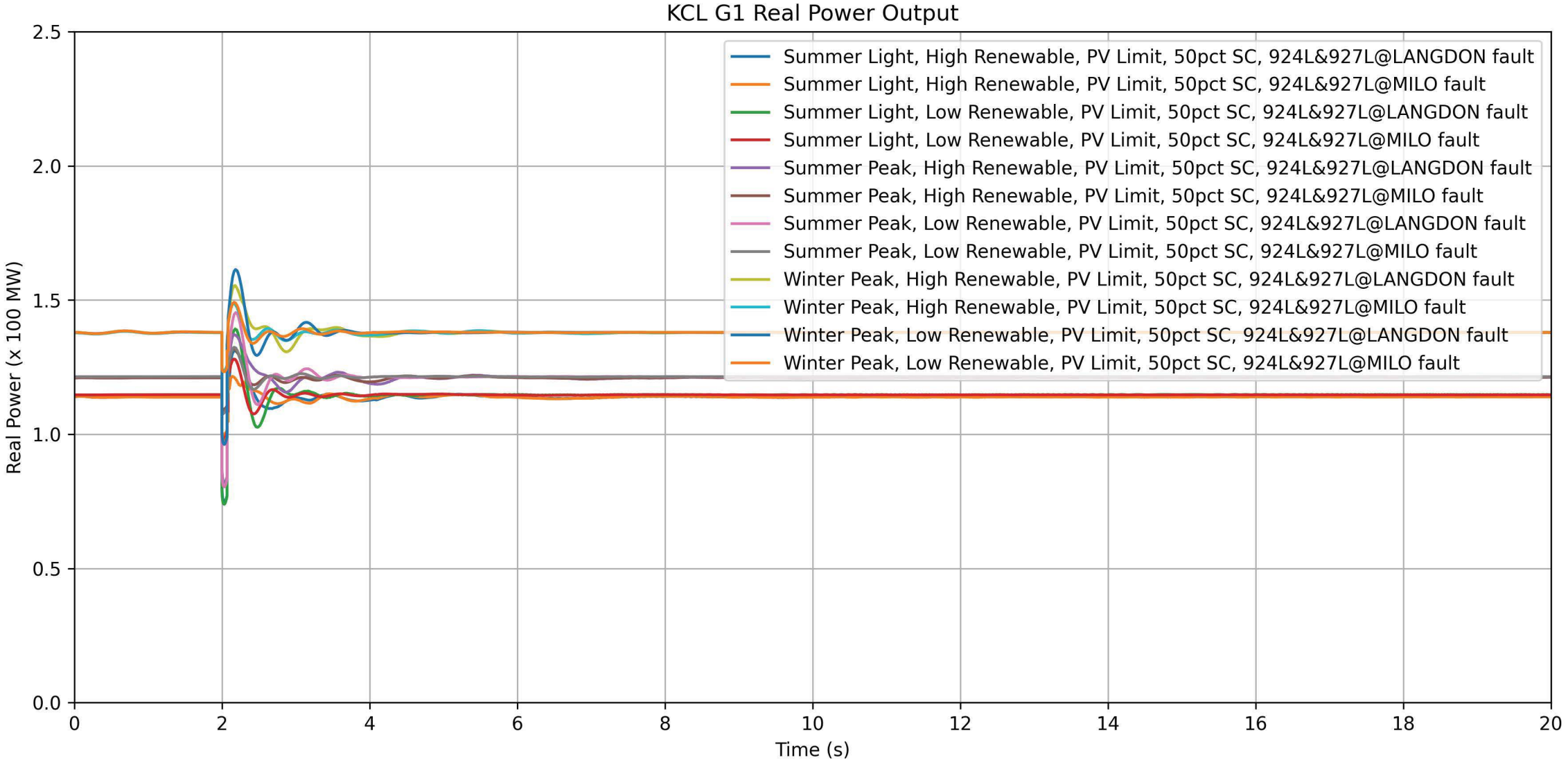

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

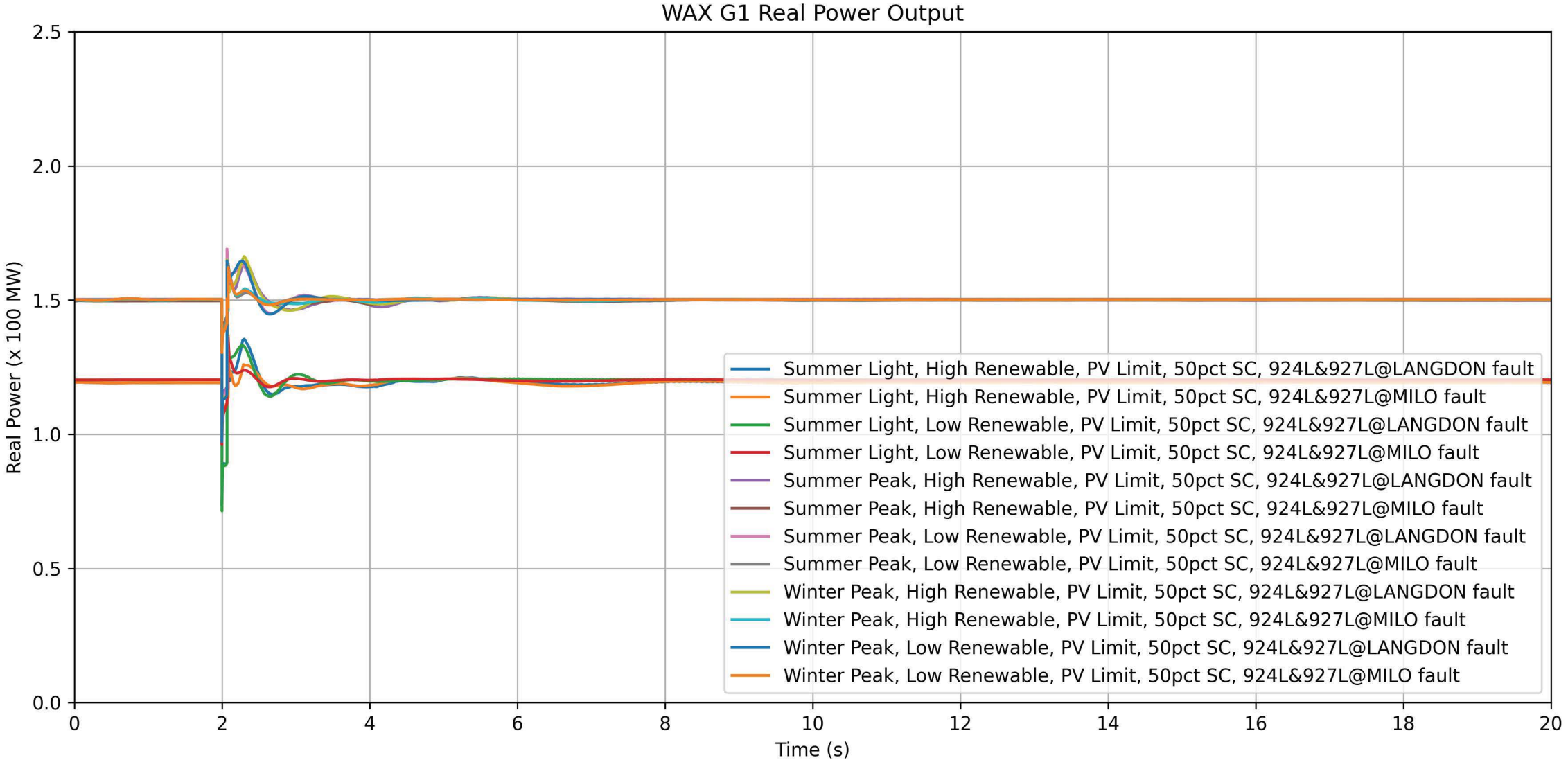

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

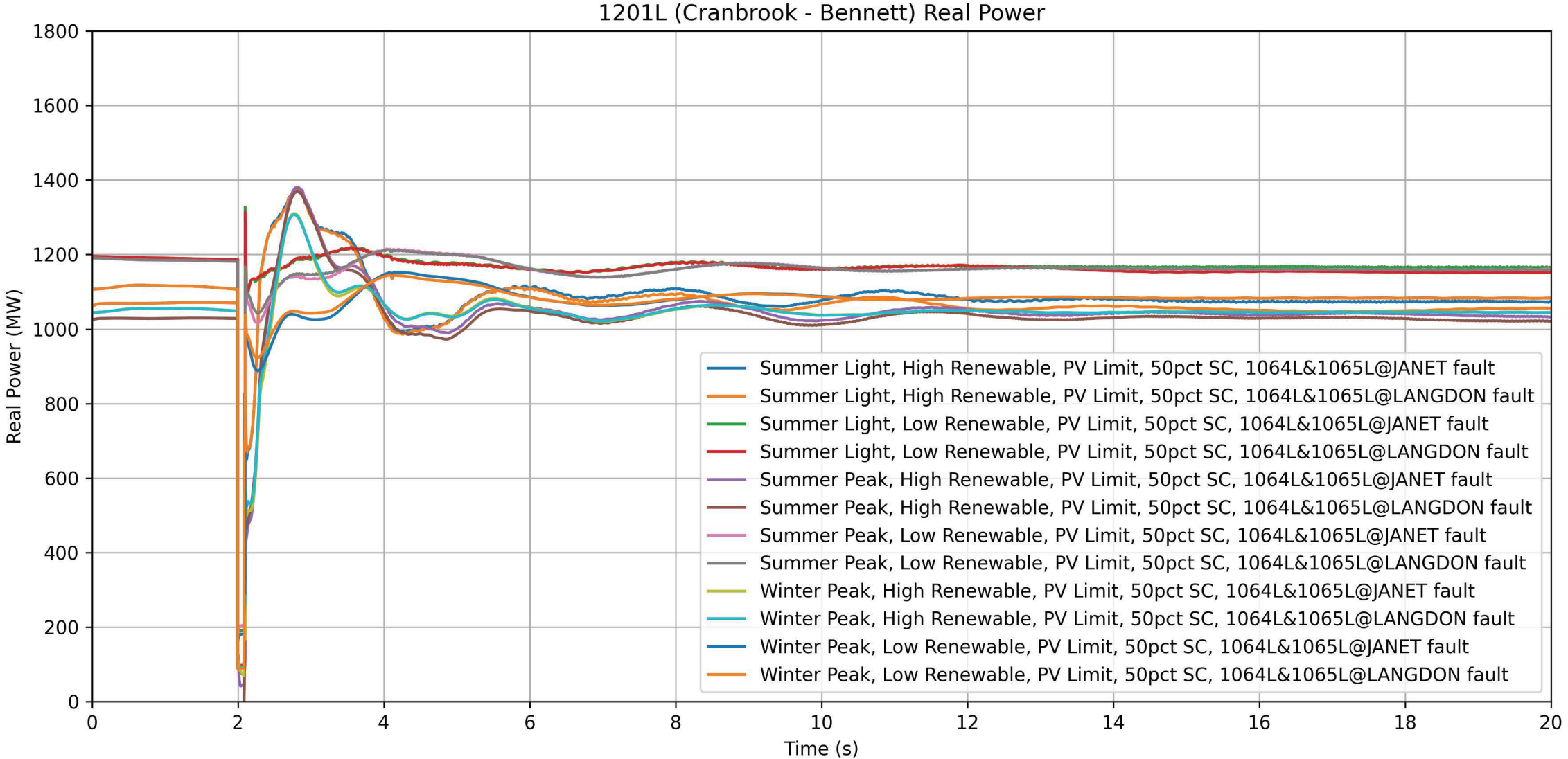

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

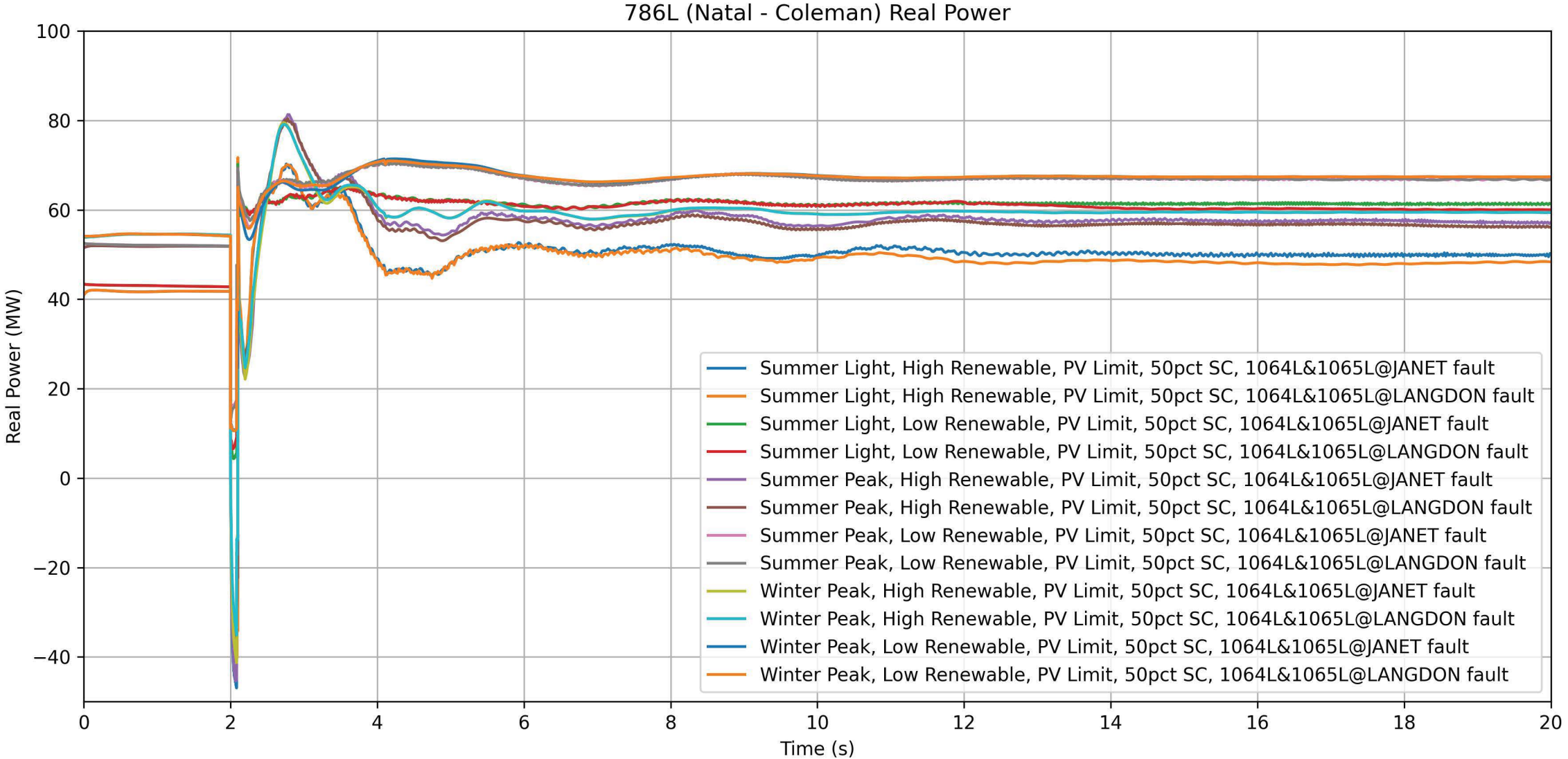

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

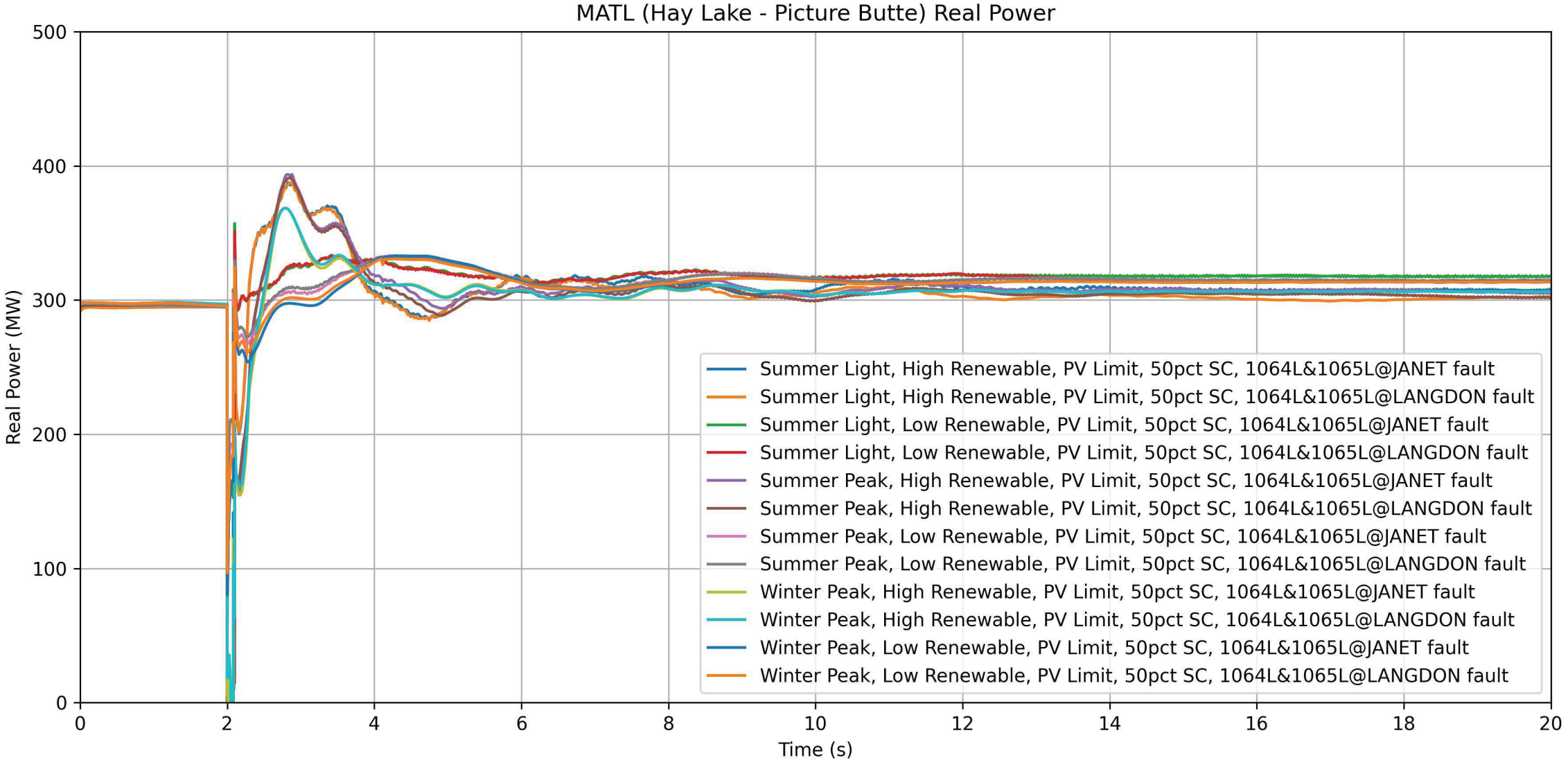

SEV G1 Real Power Output
Real Power (x 100 MW)
Time (s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

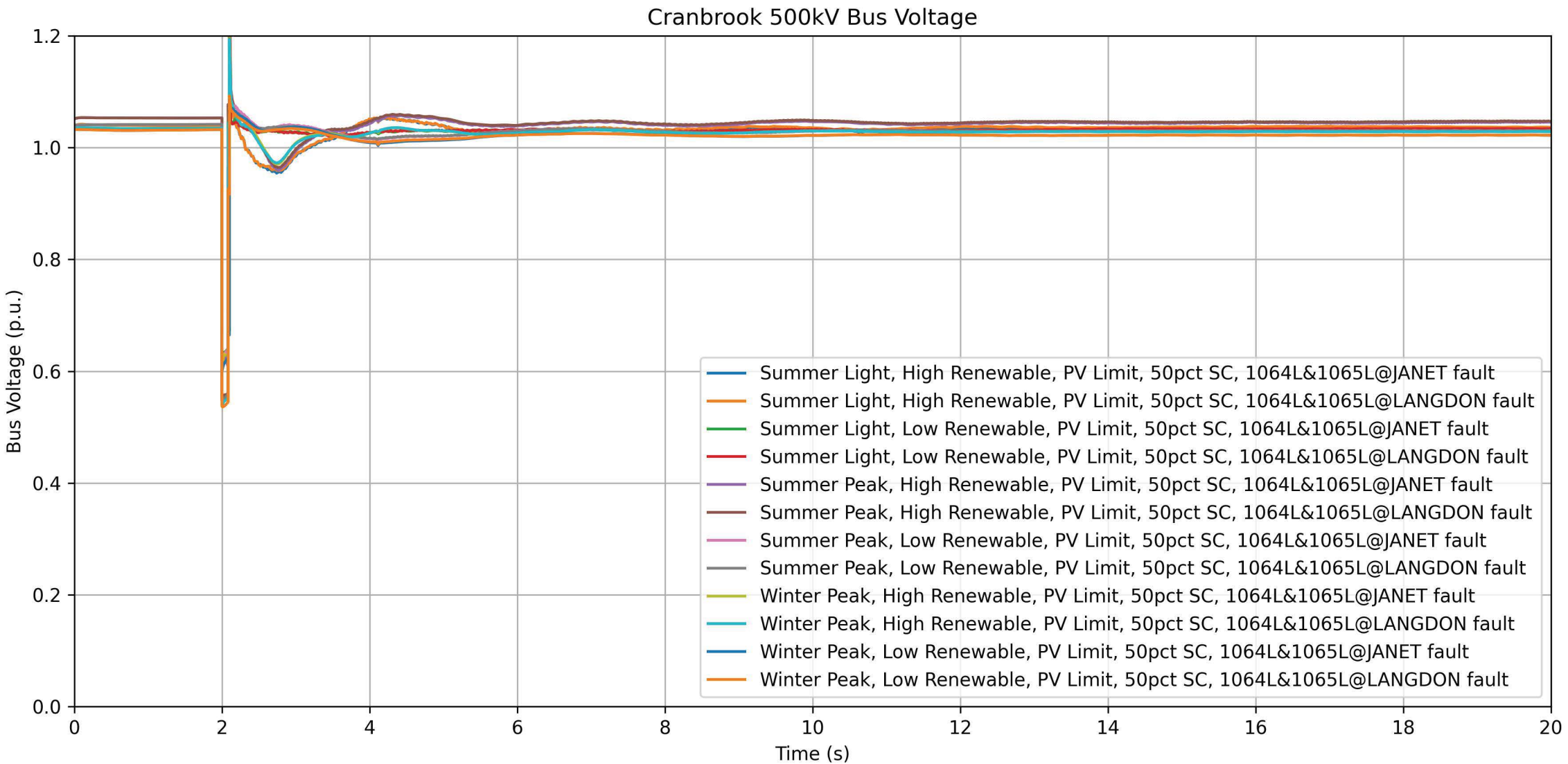

KCL G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

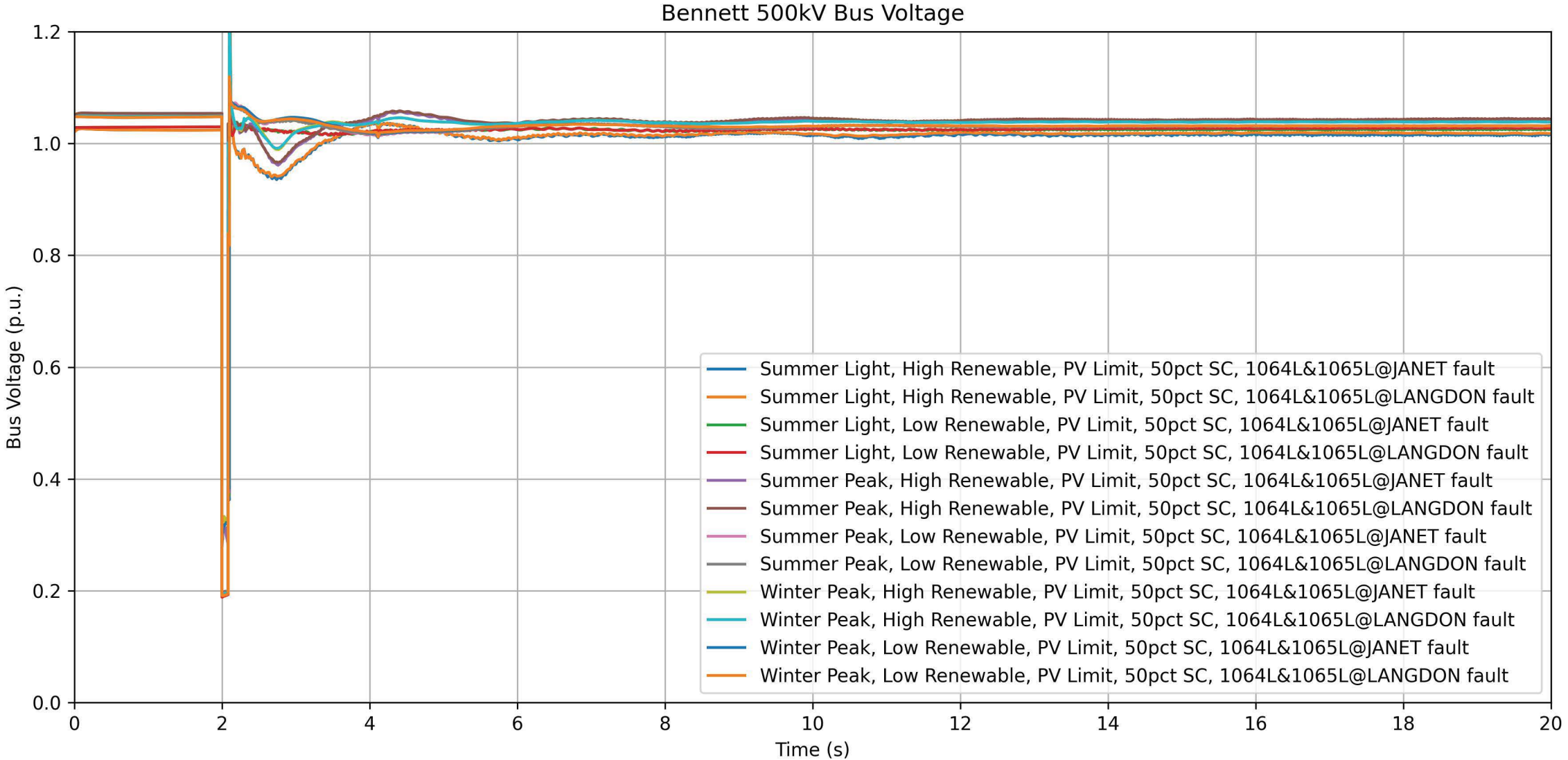

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 924L&927L@MILO fault

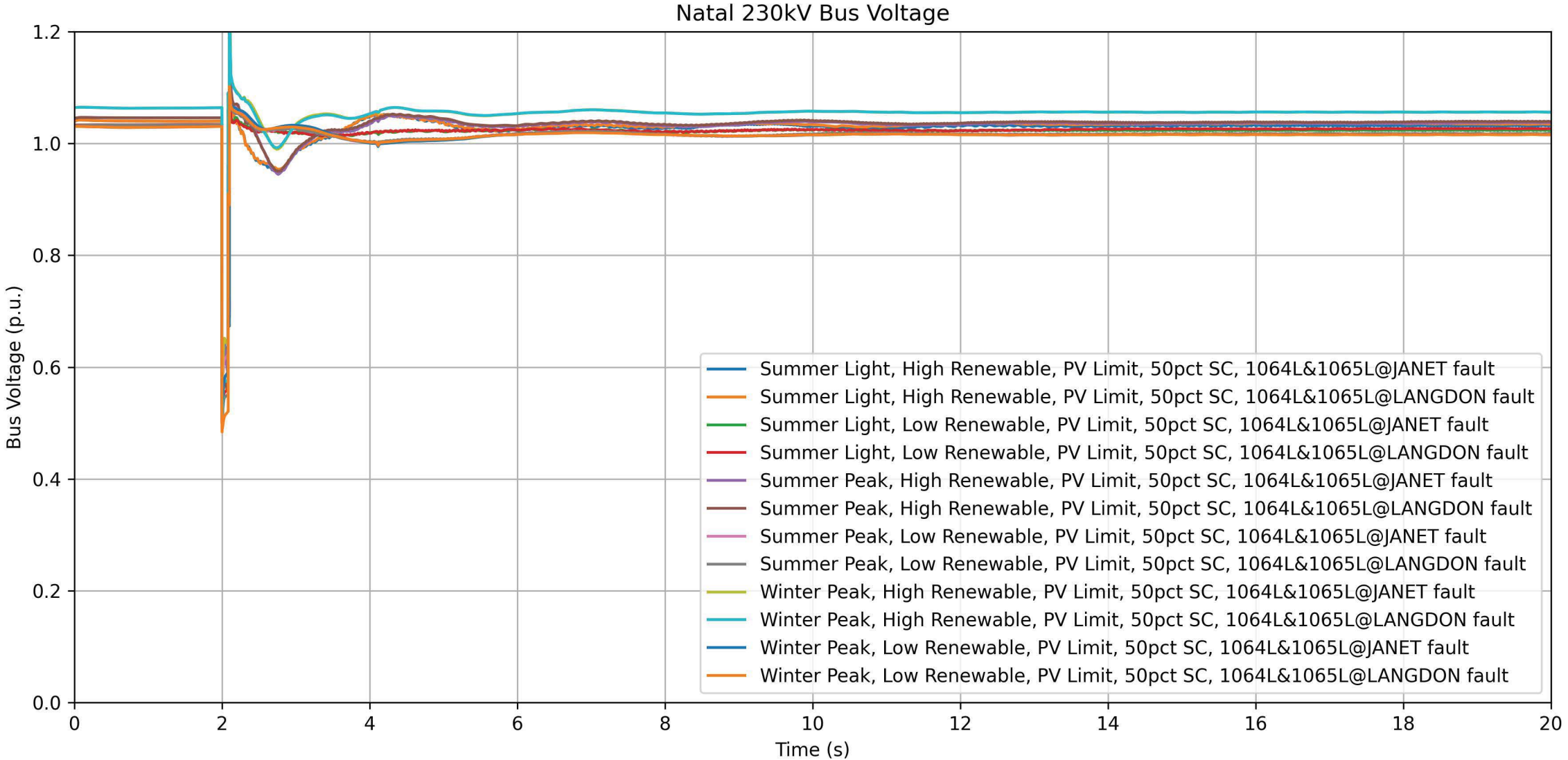

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

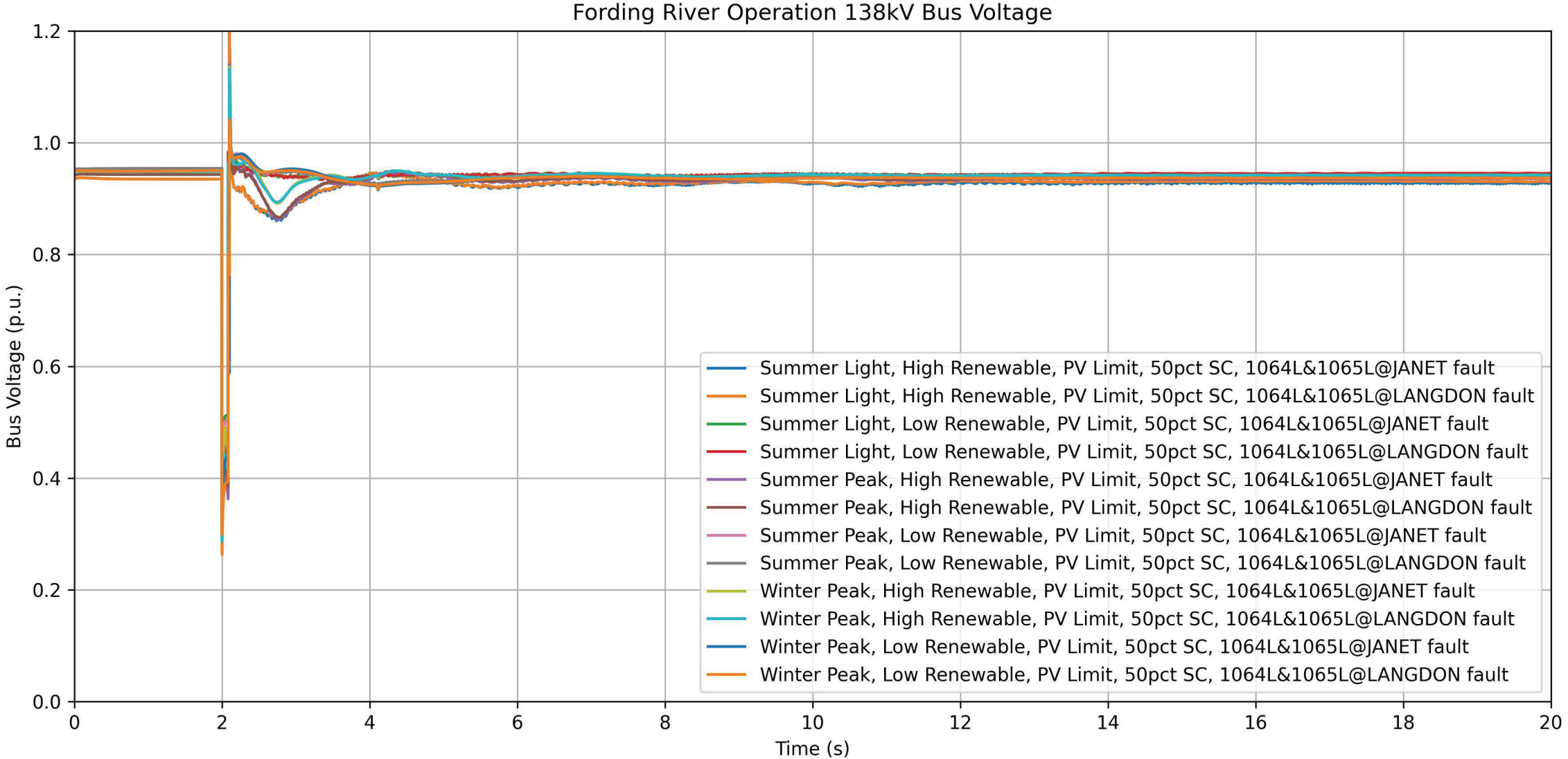

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

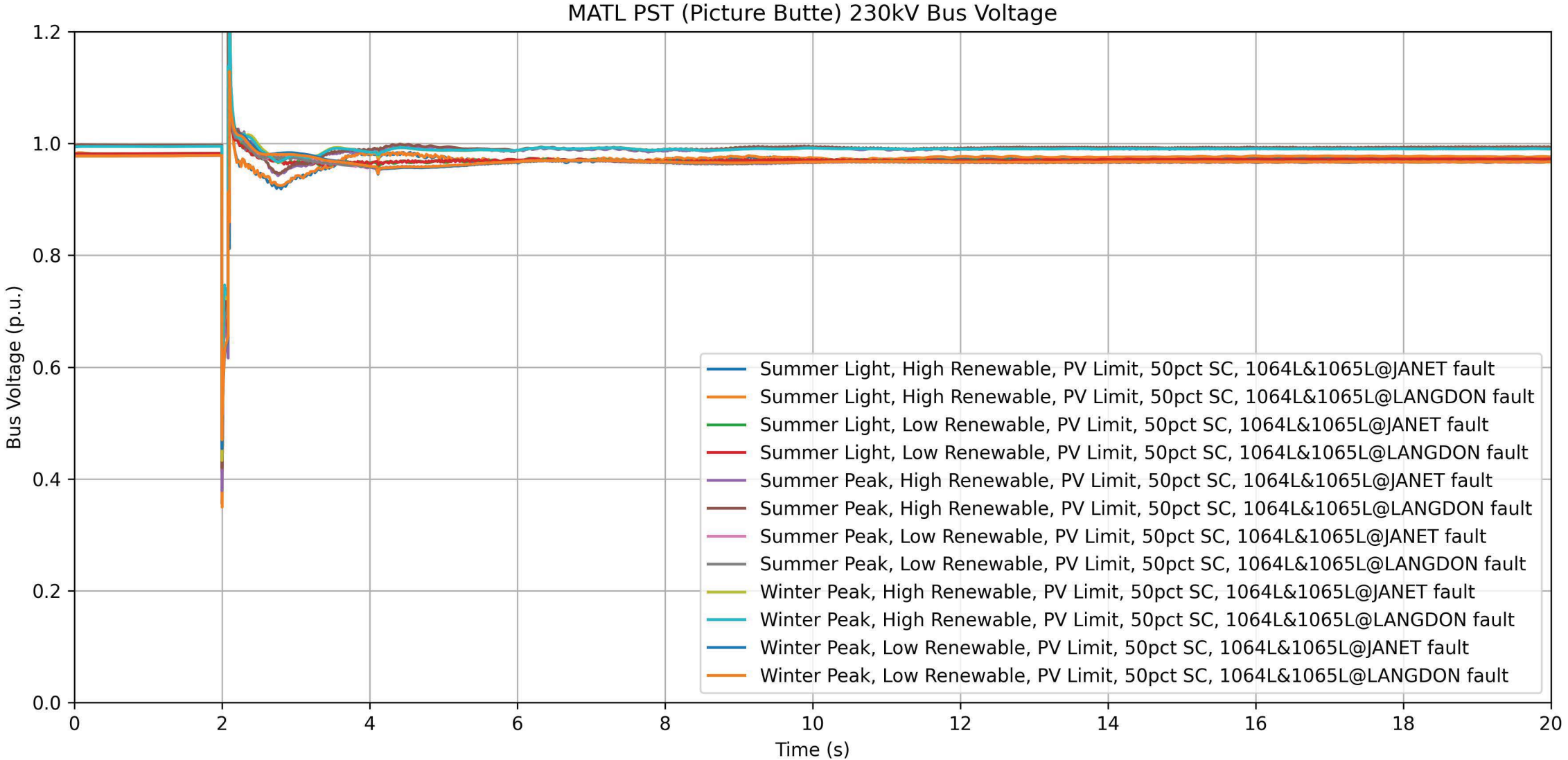

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

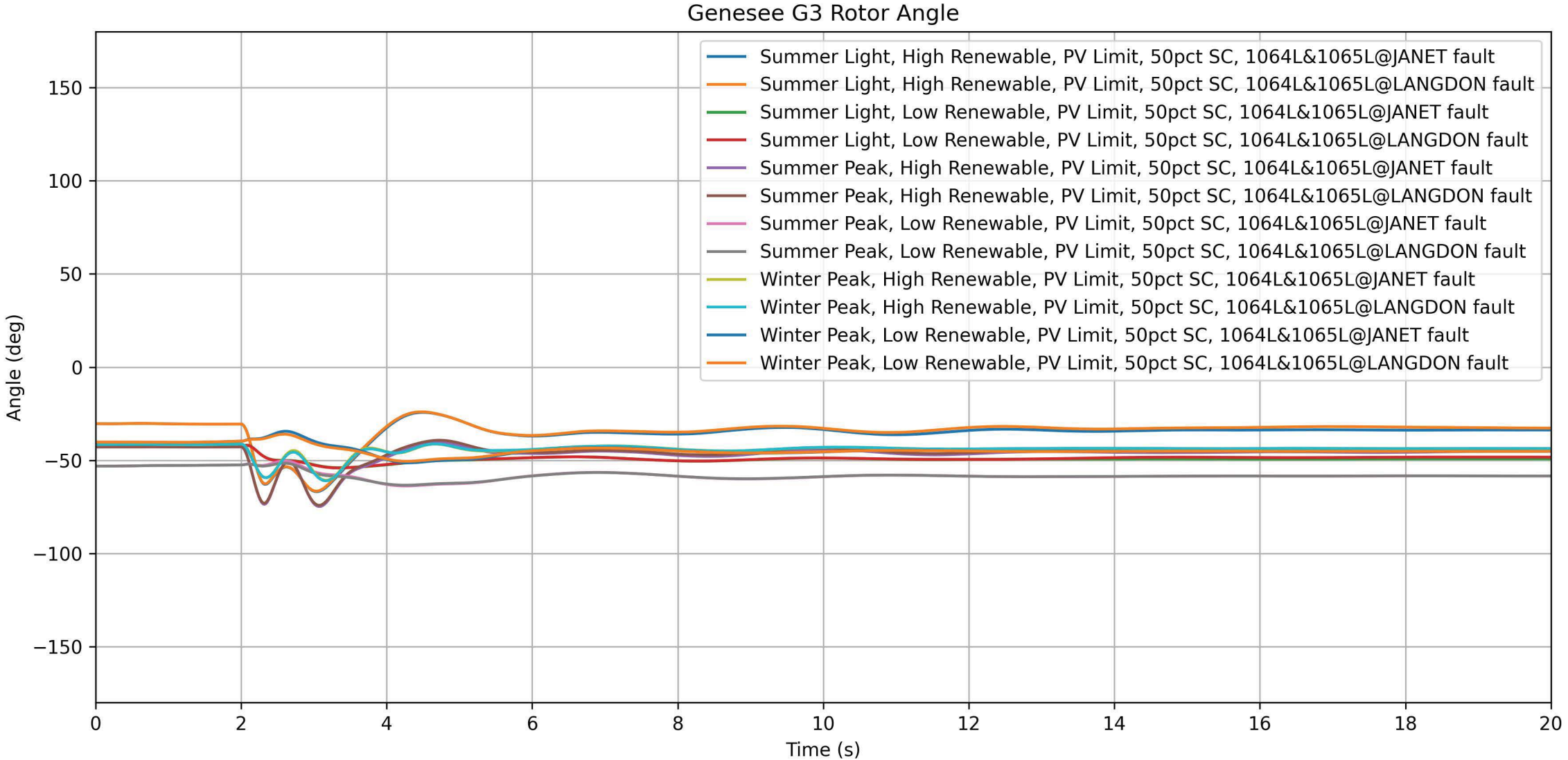

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

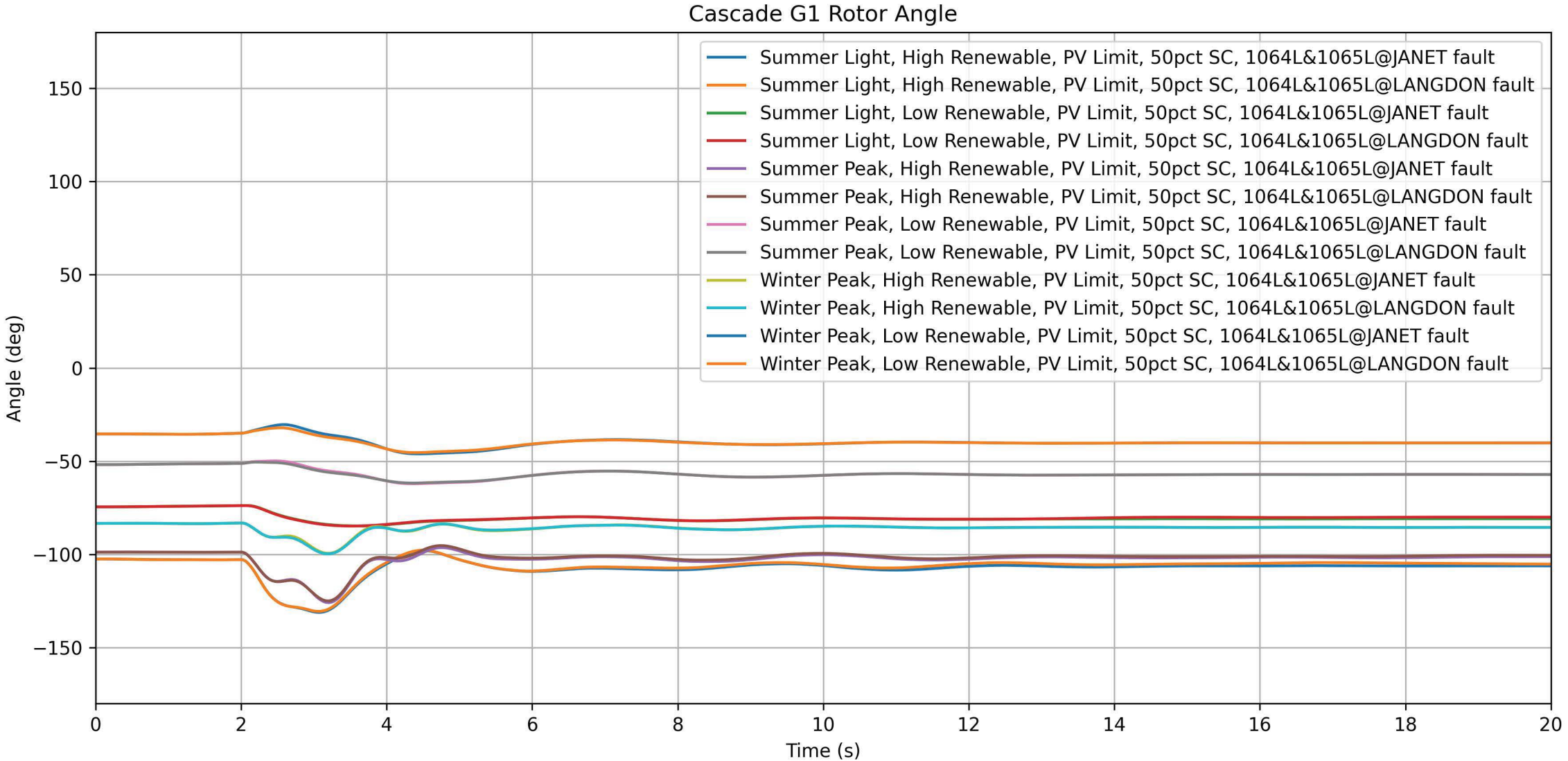

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

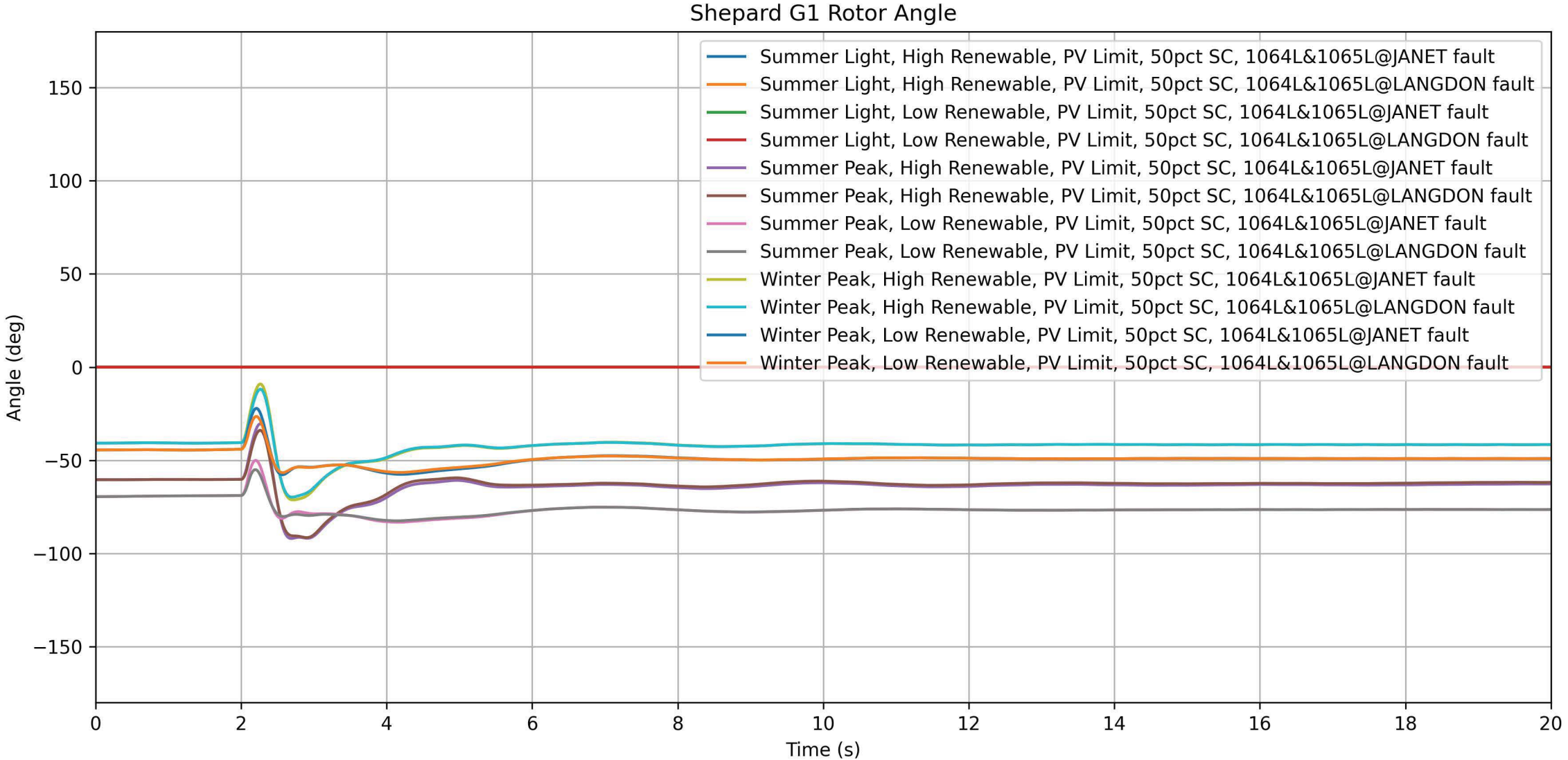

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

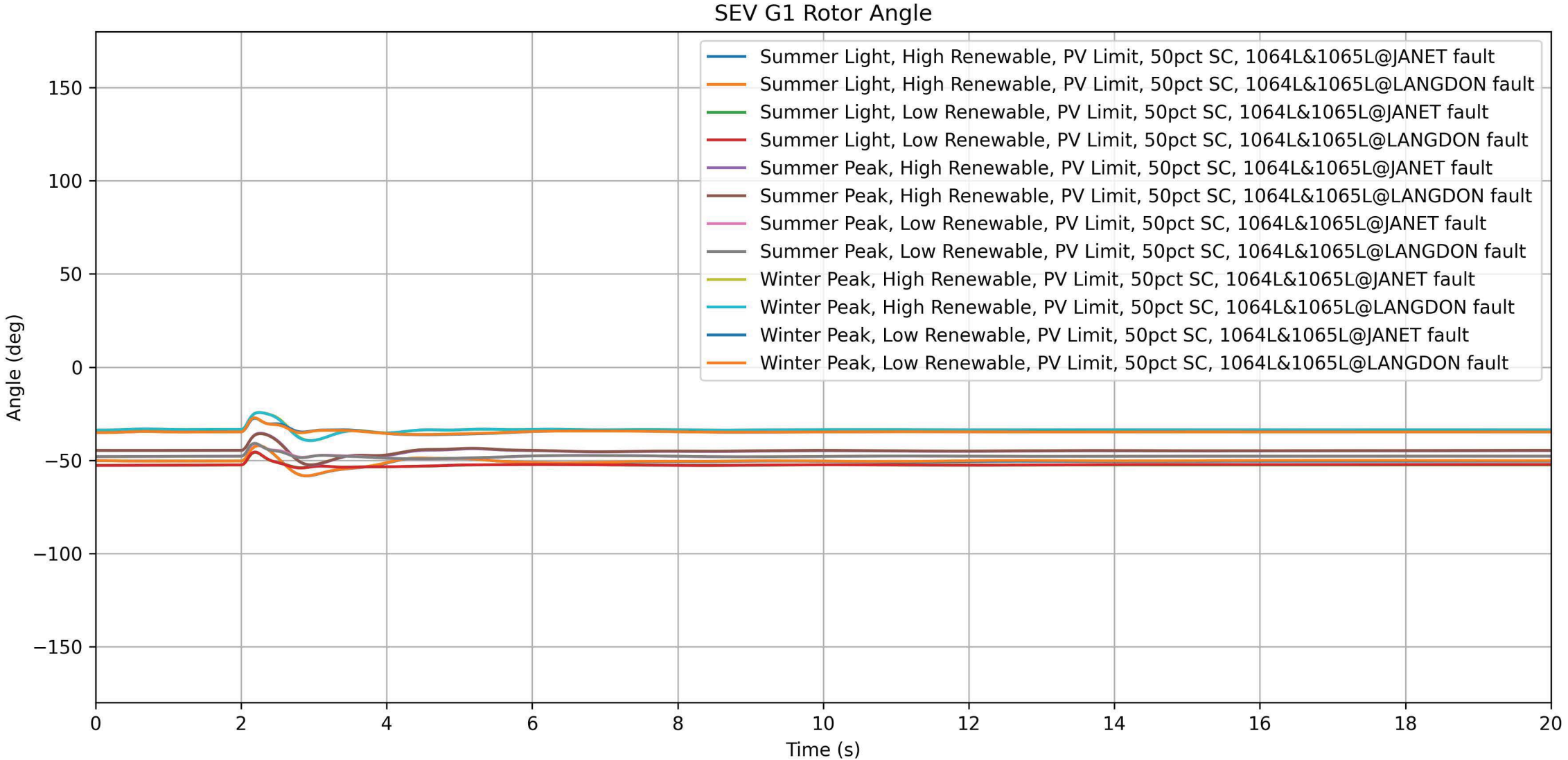

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

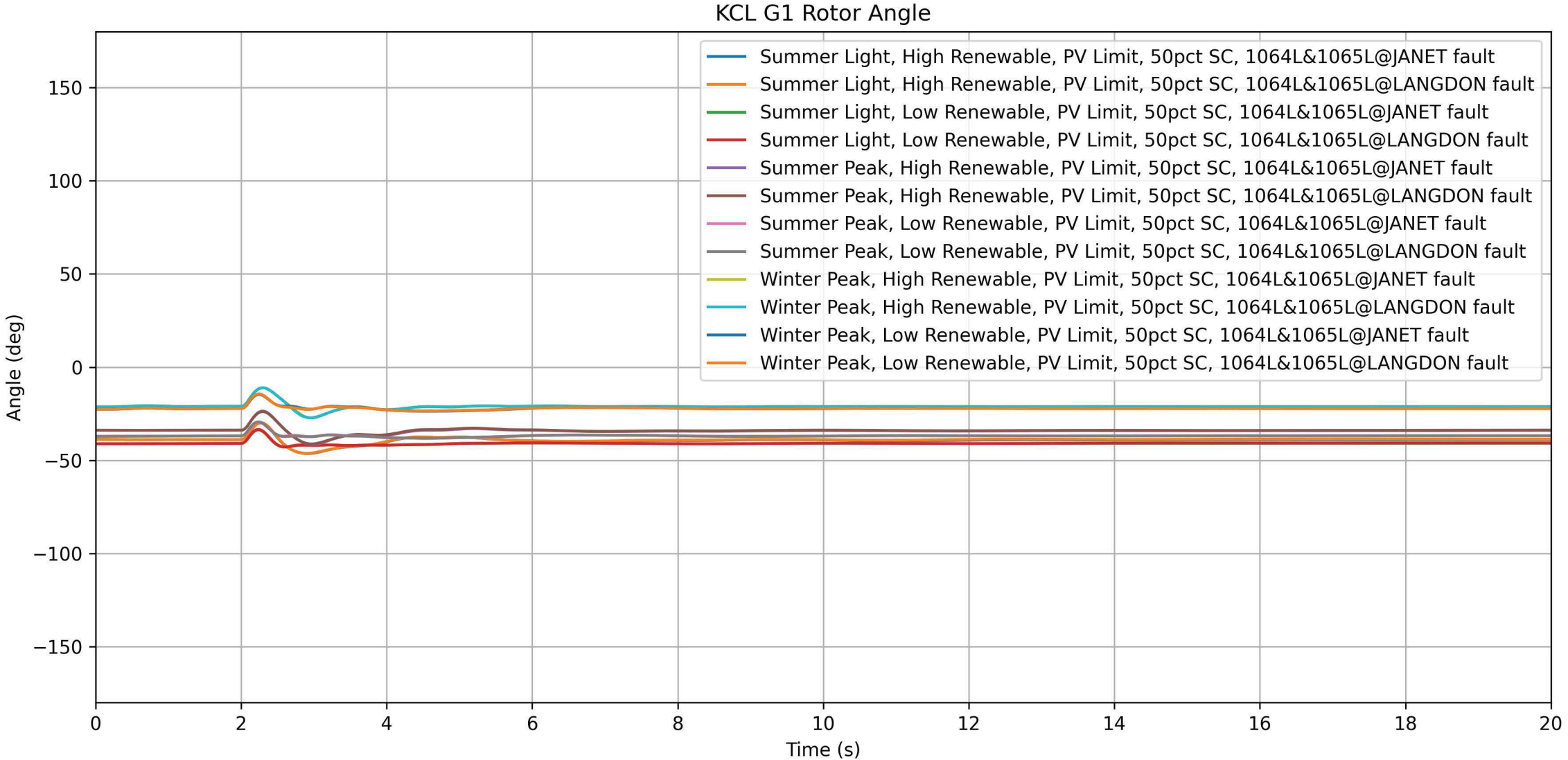

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

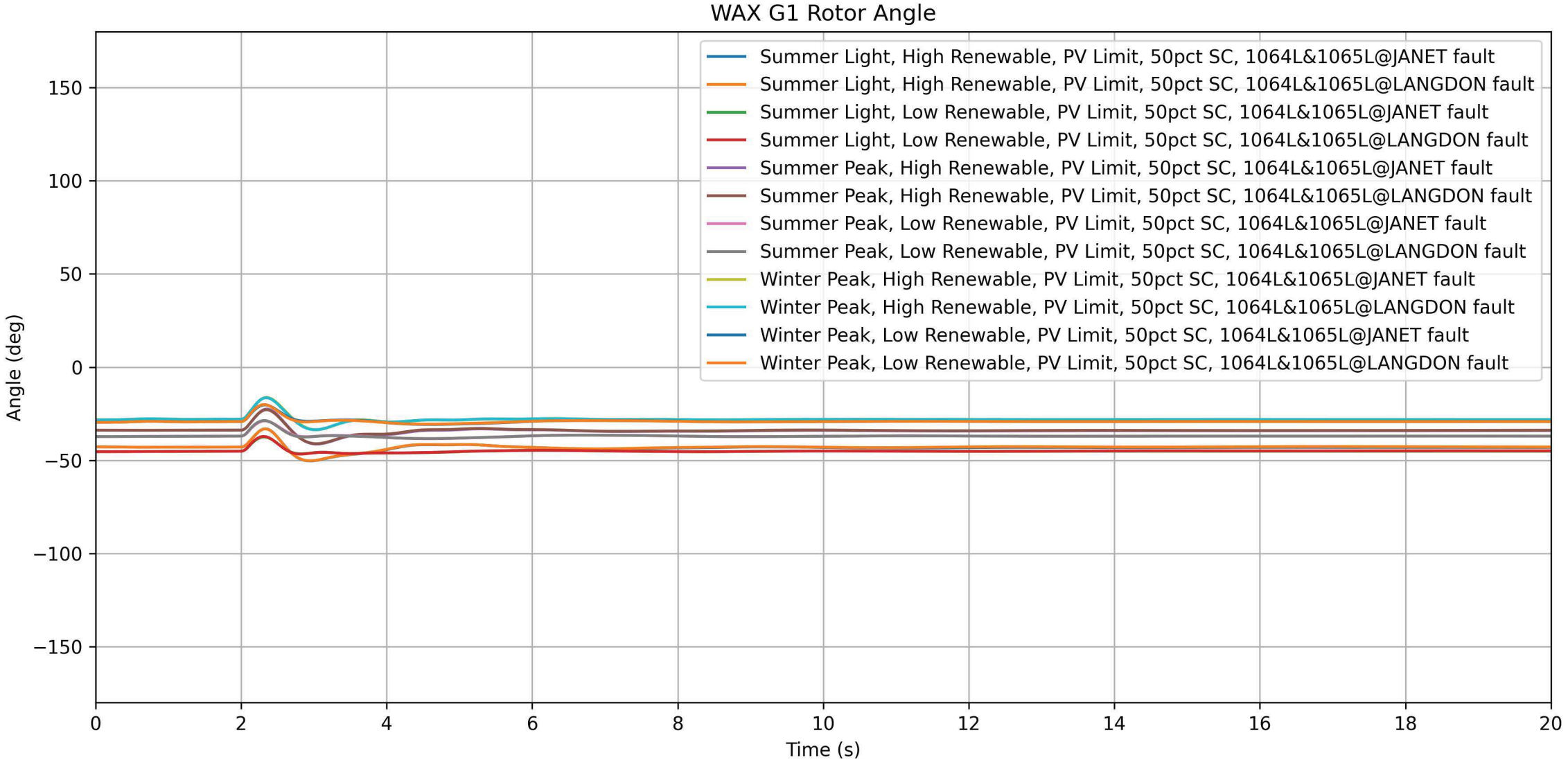

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

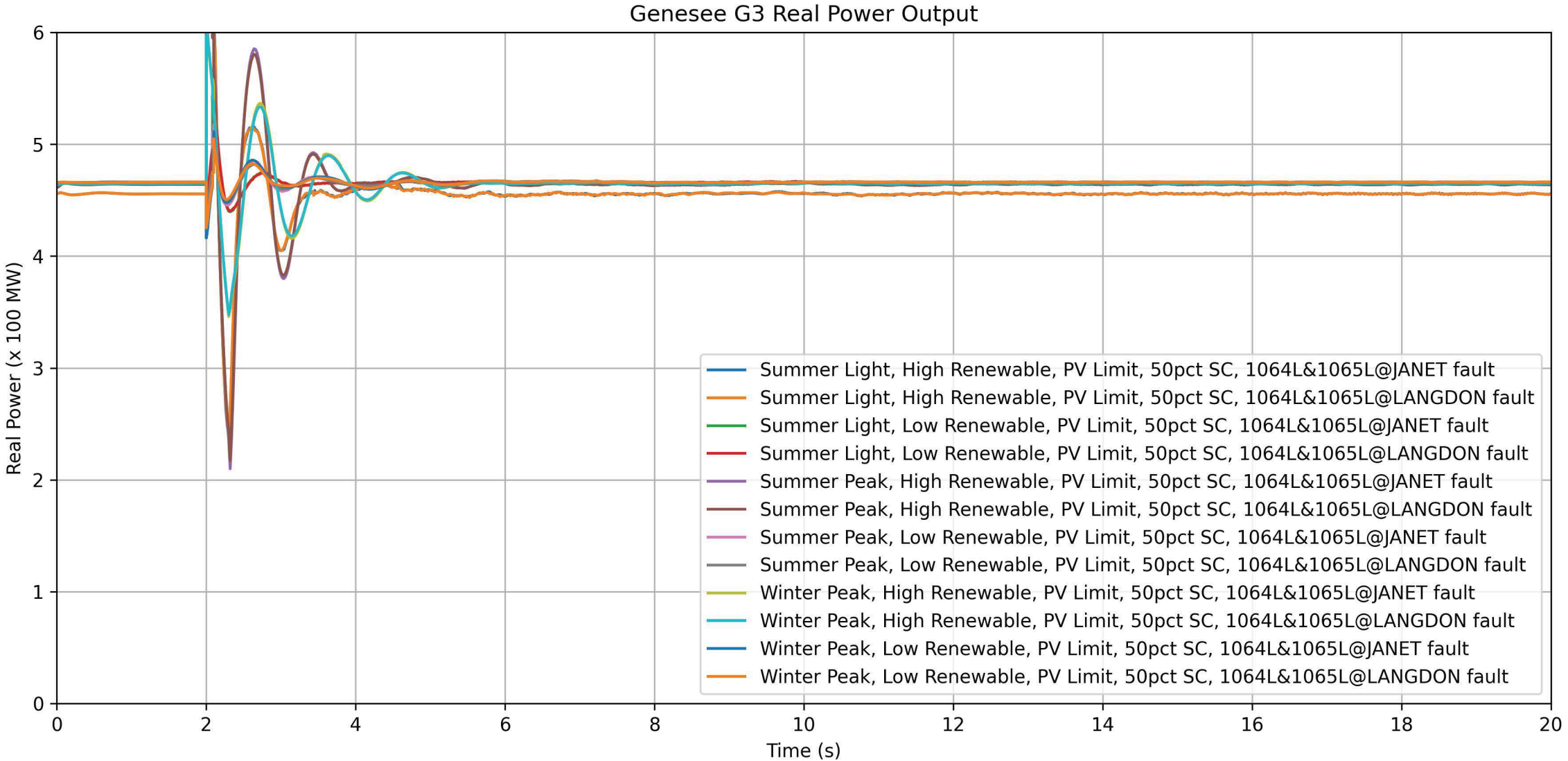

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

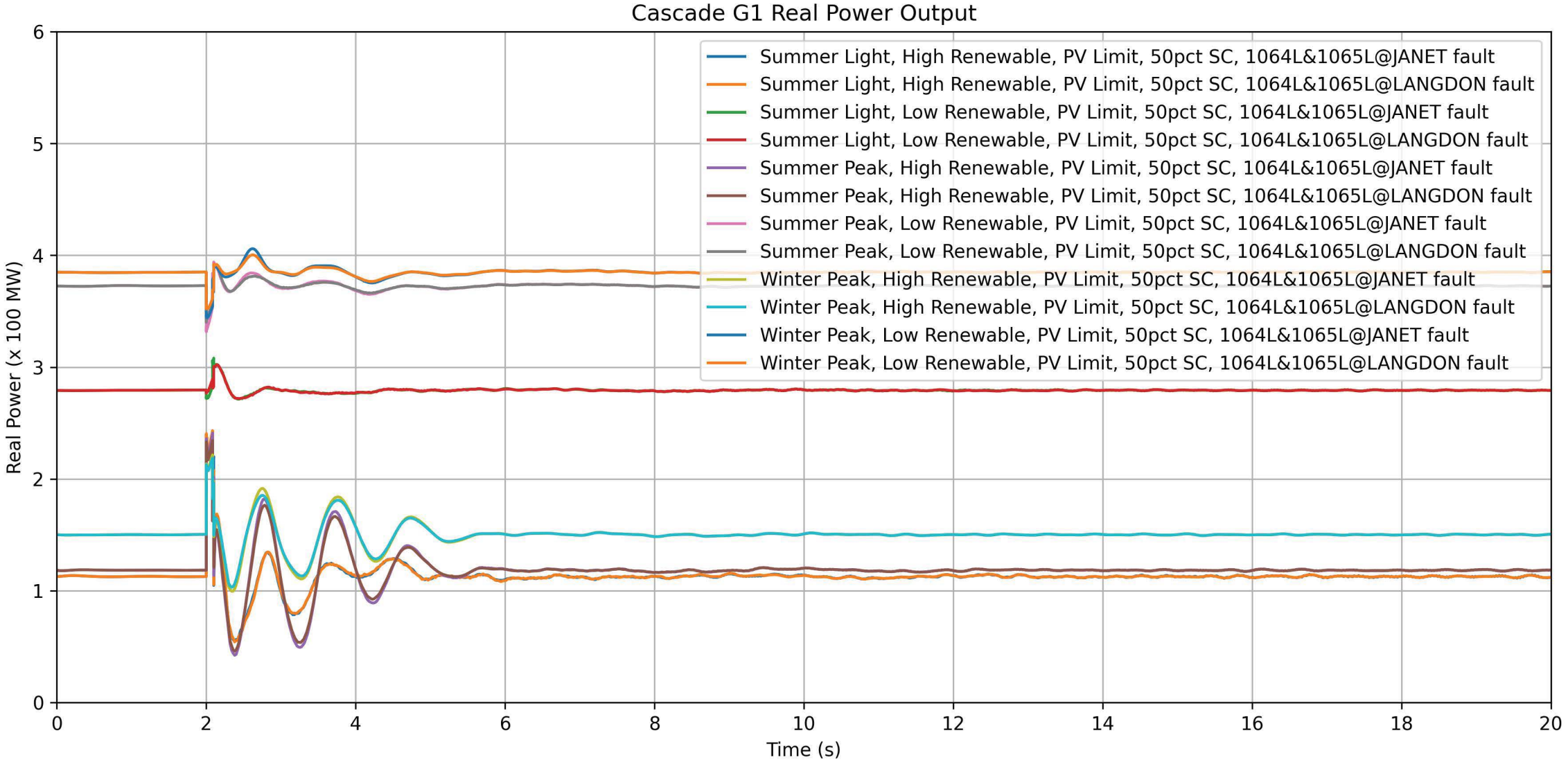

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

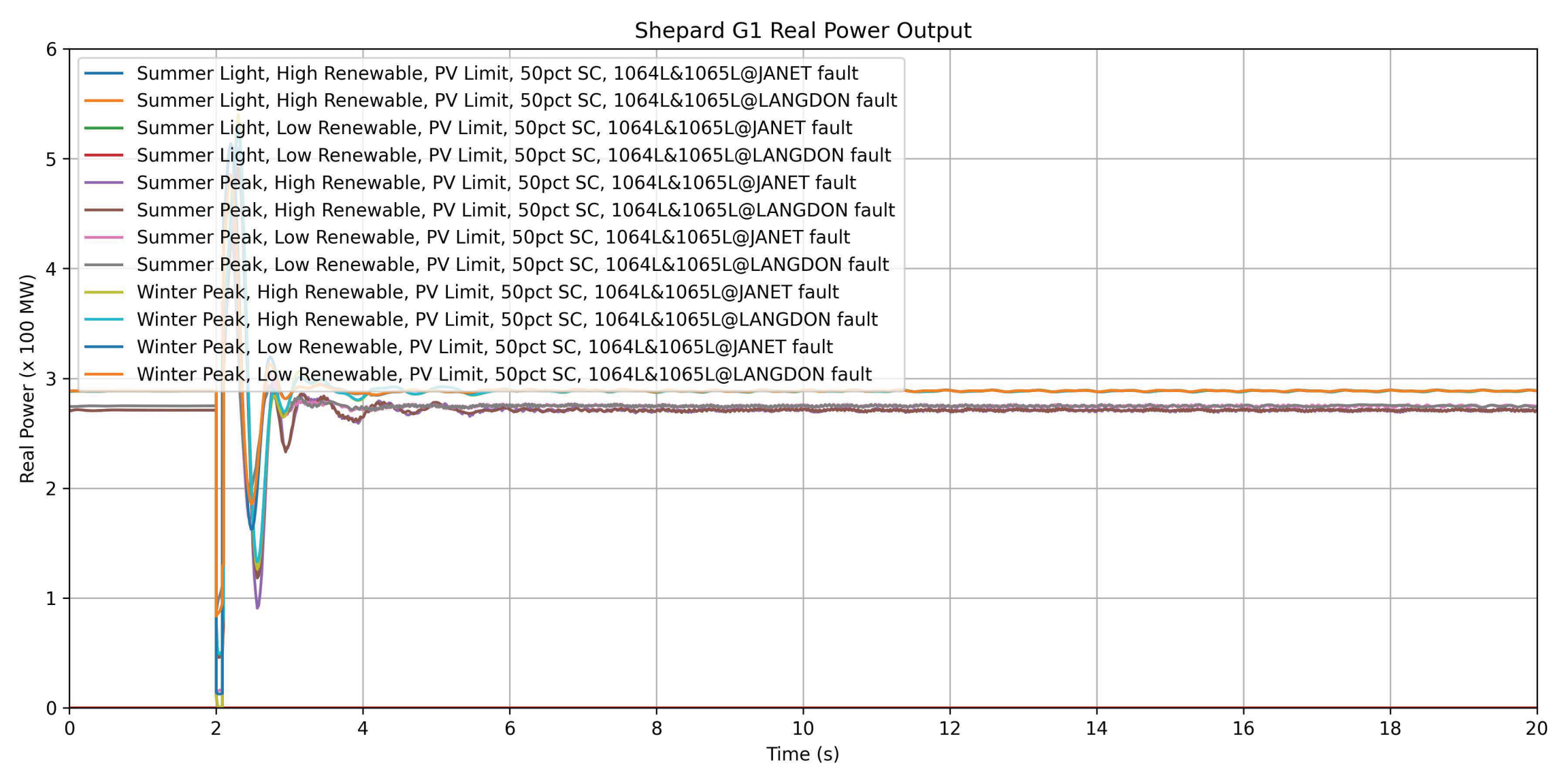

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

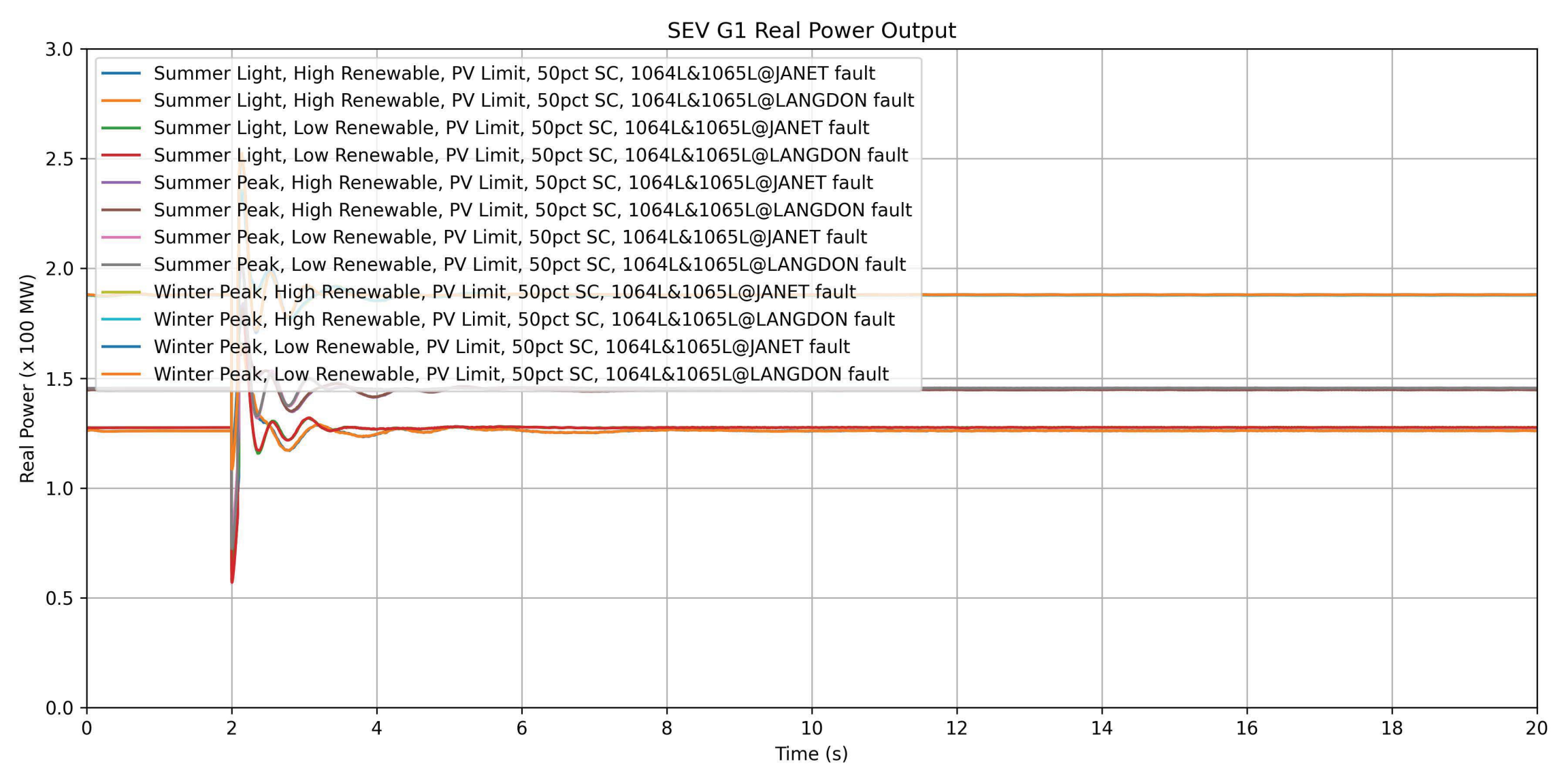

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

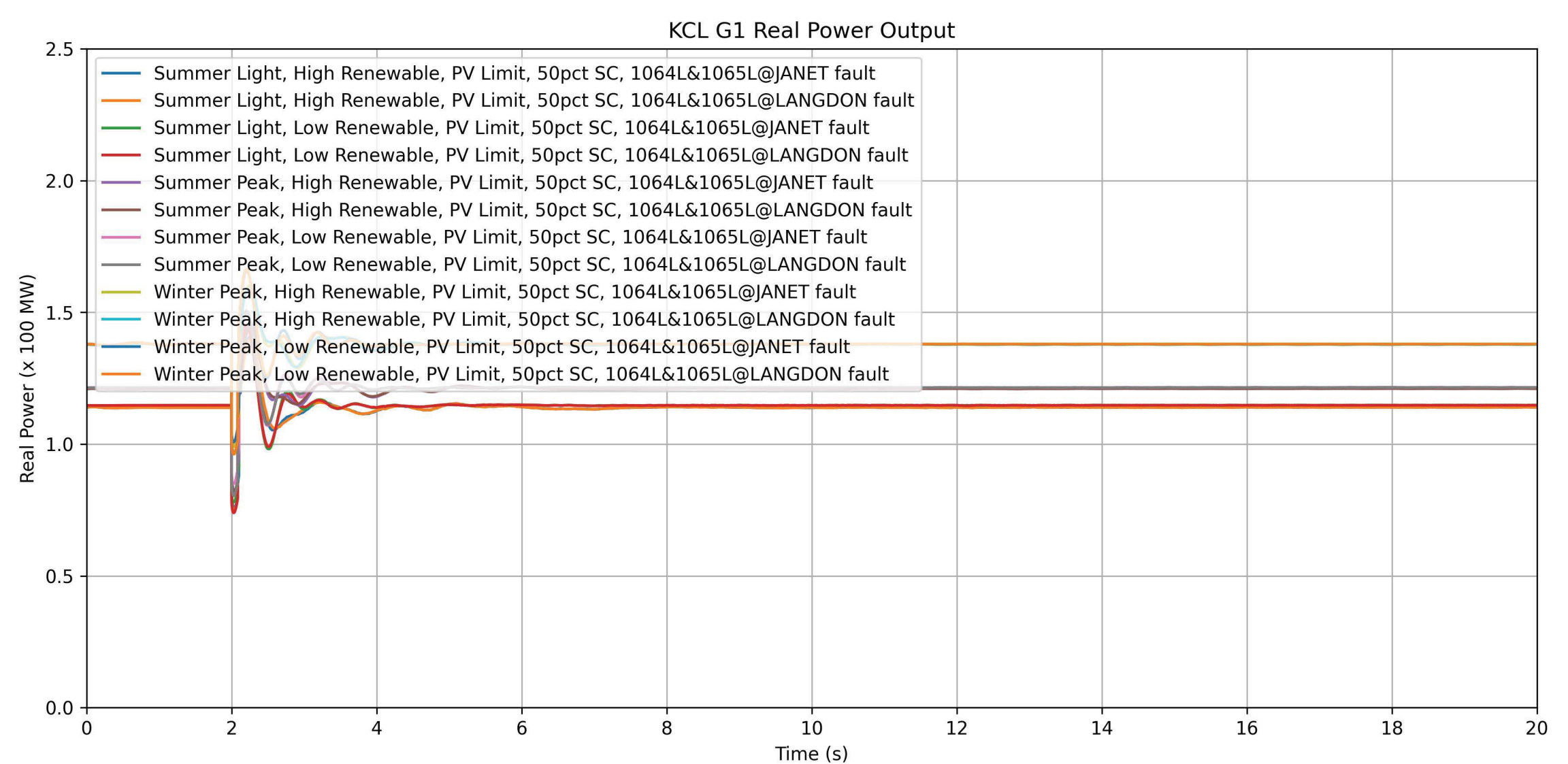

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

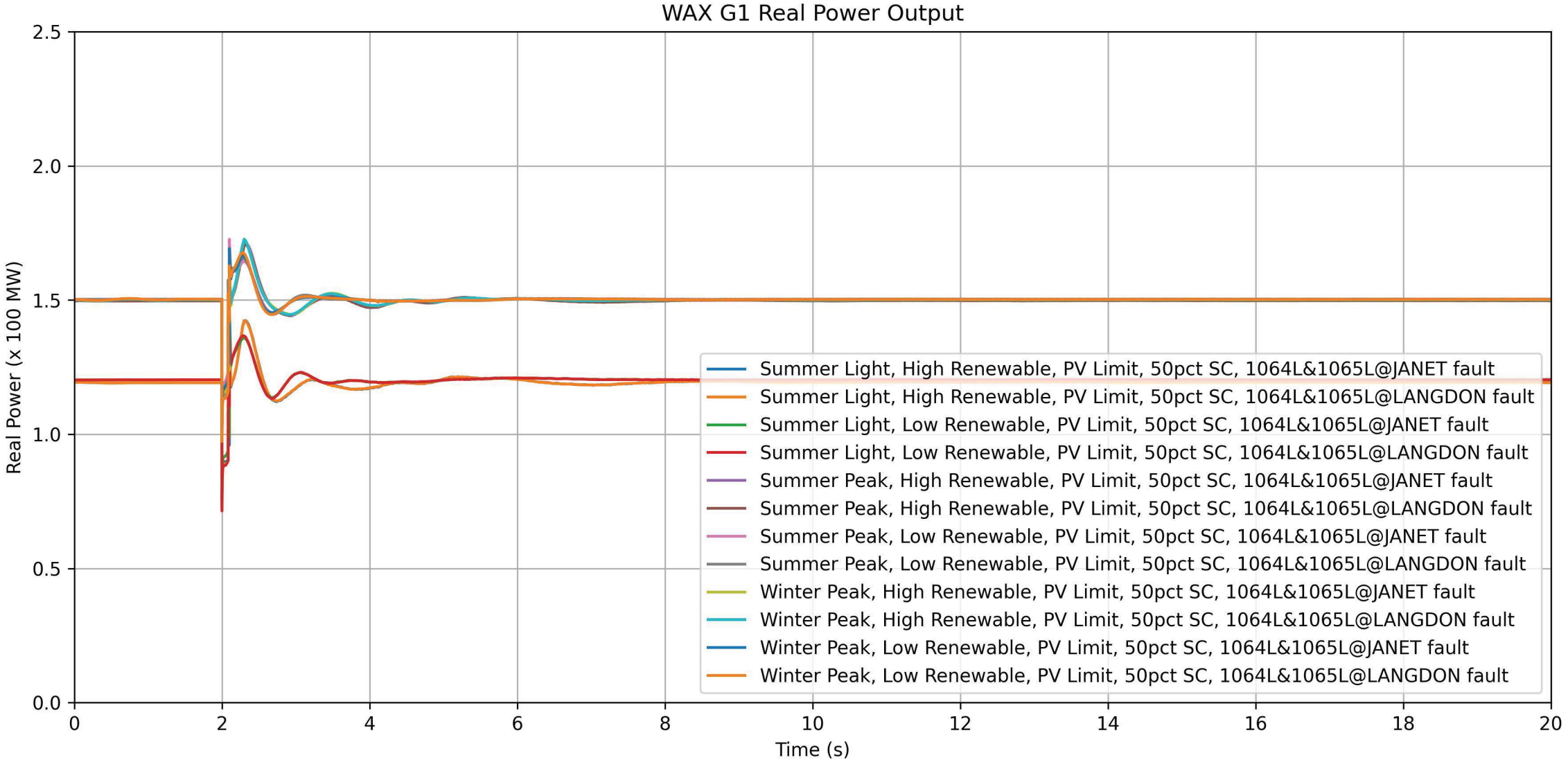

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

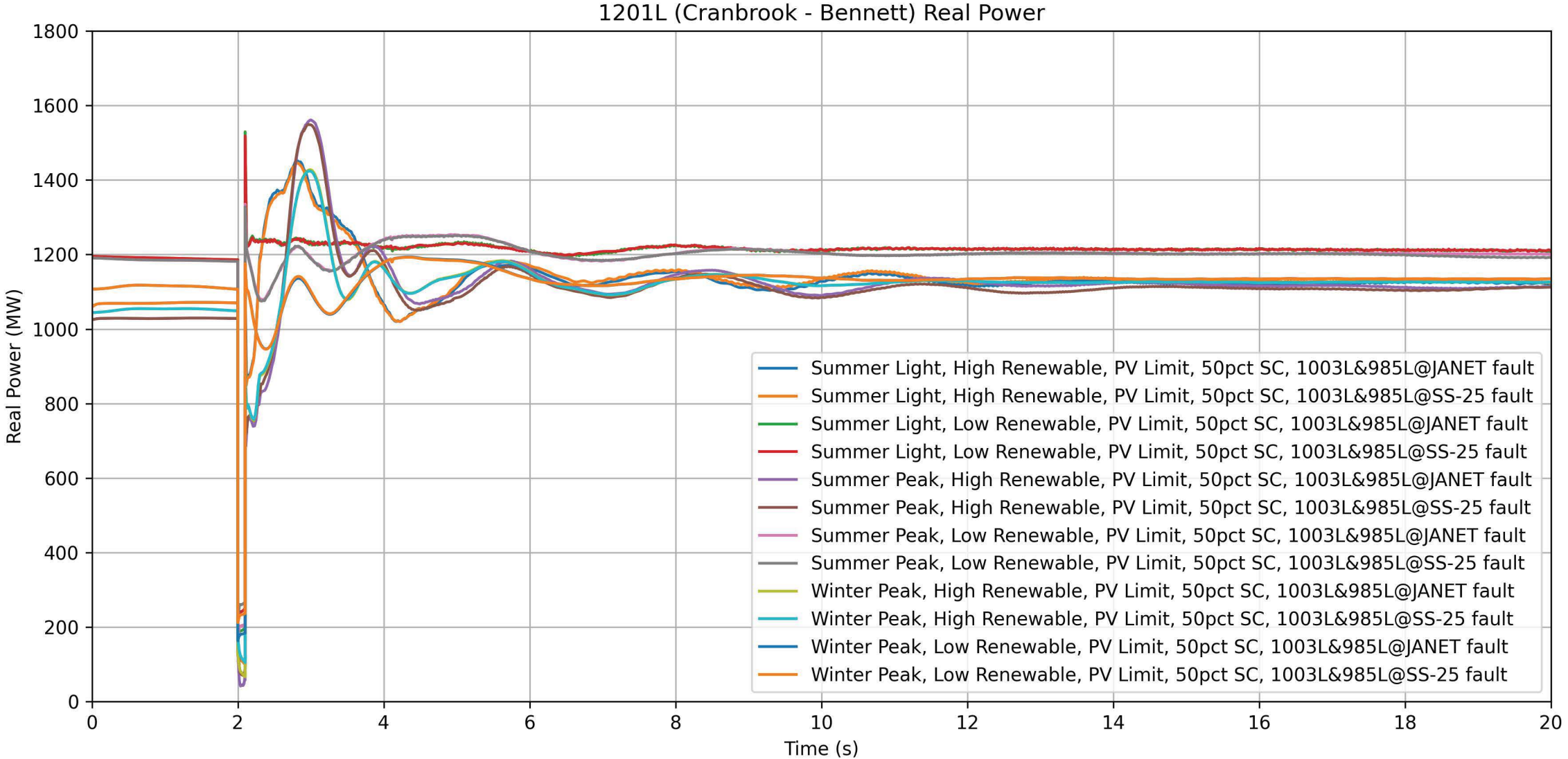

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

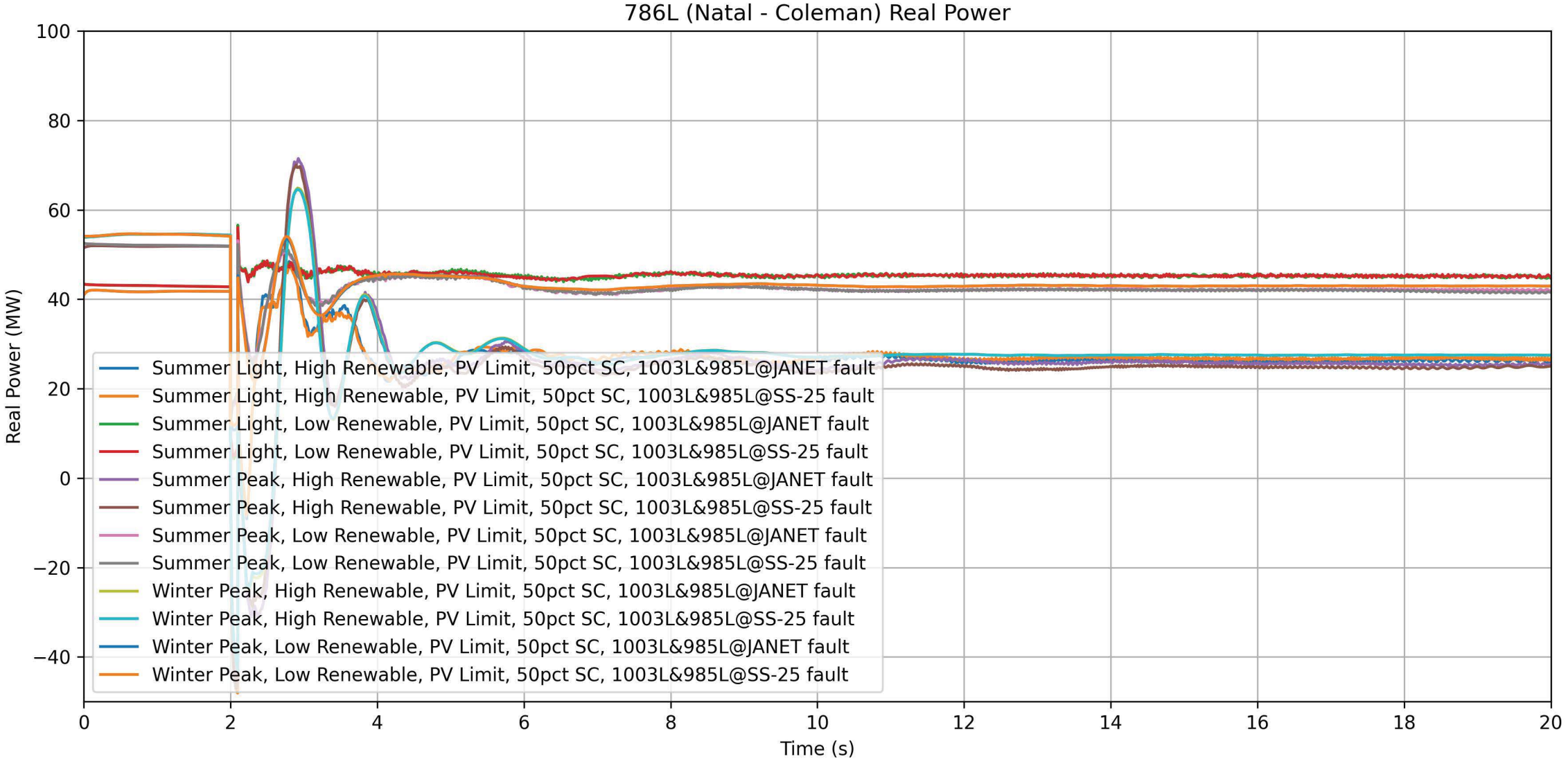

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

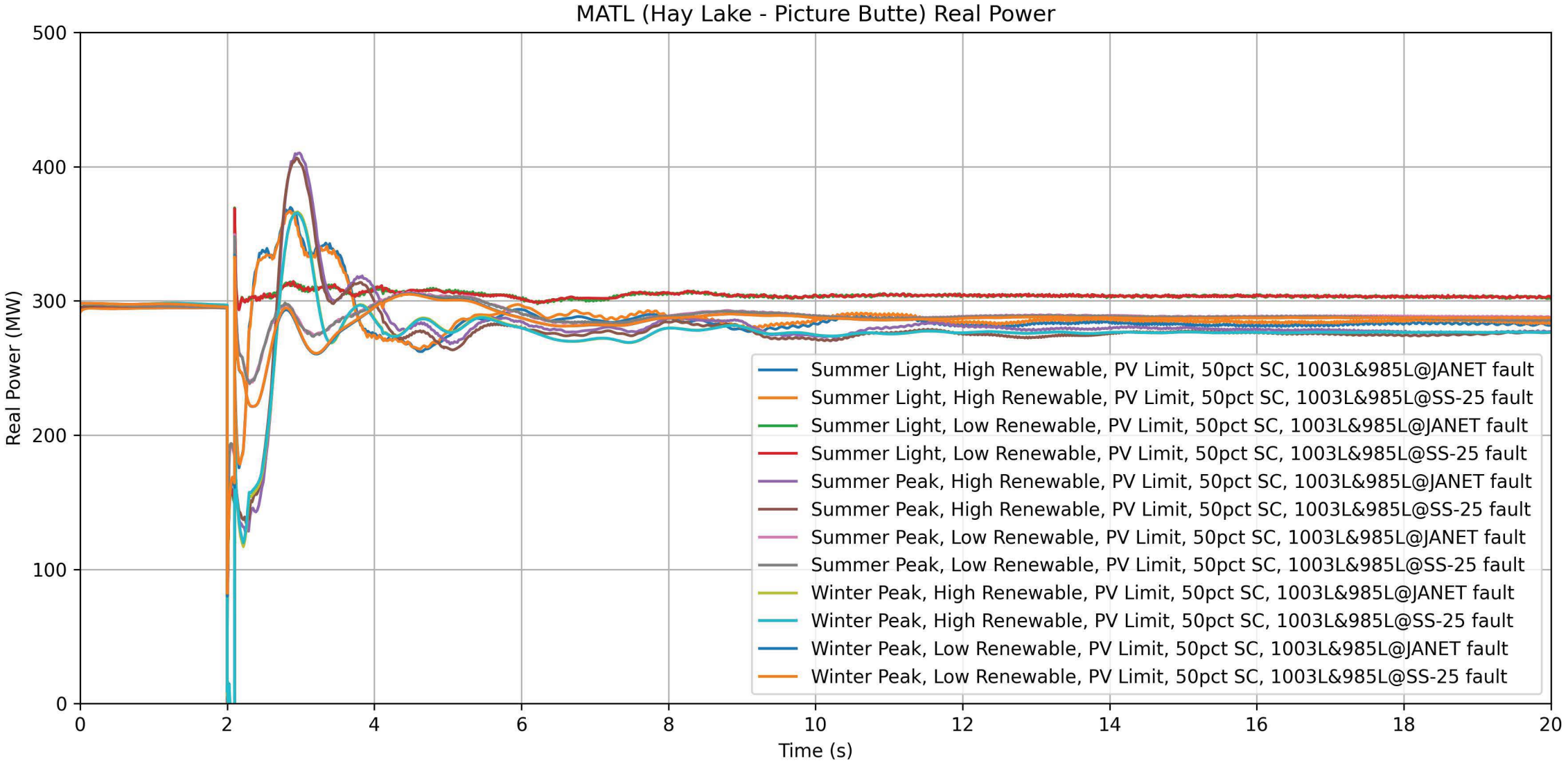

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

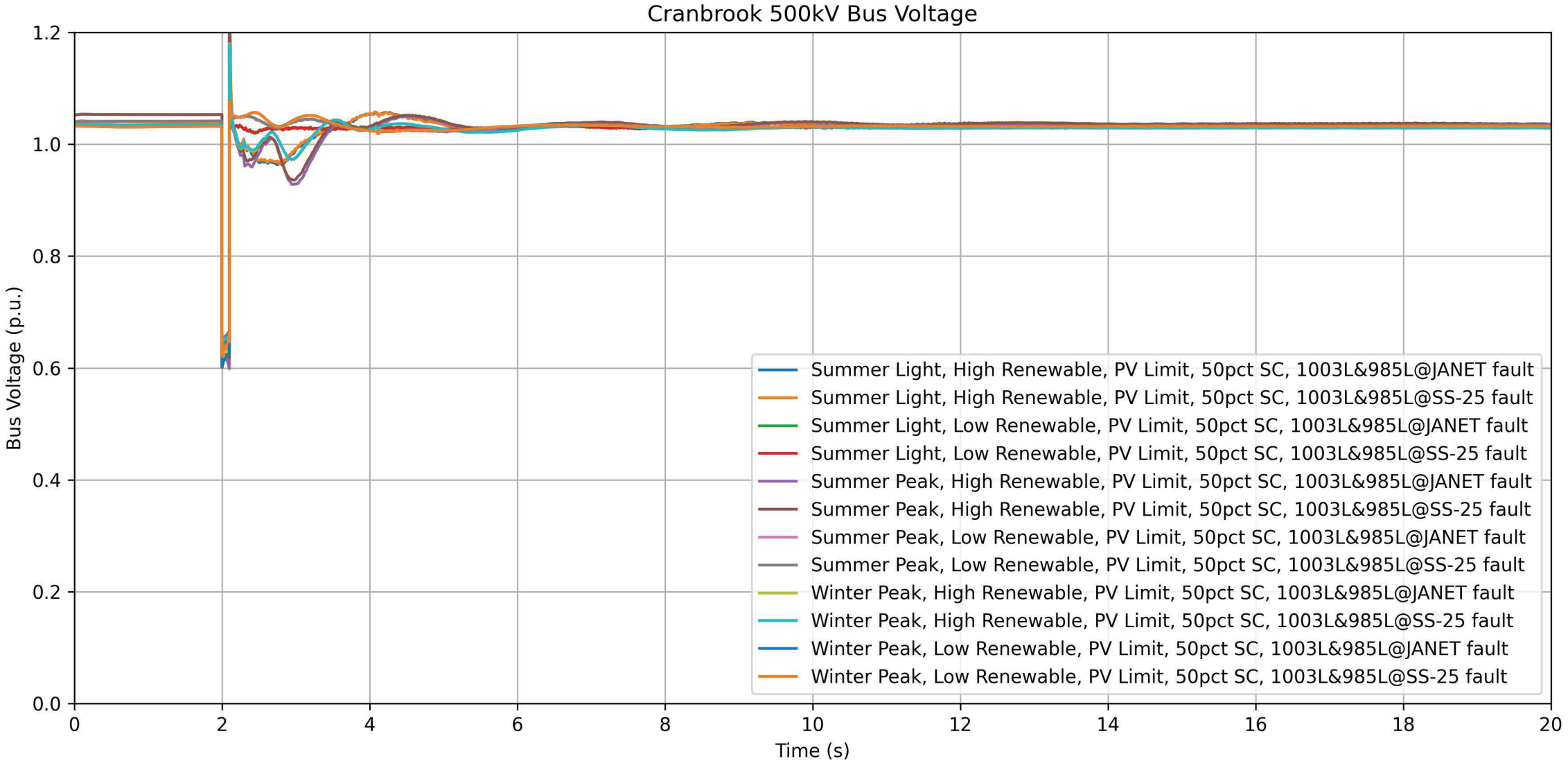

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

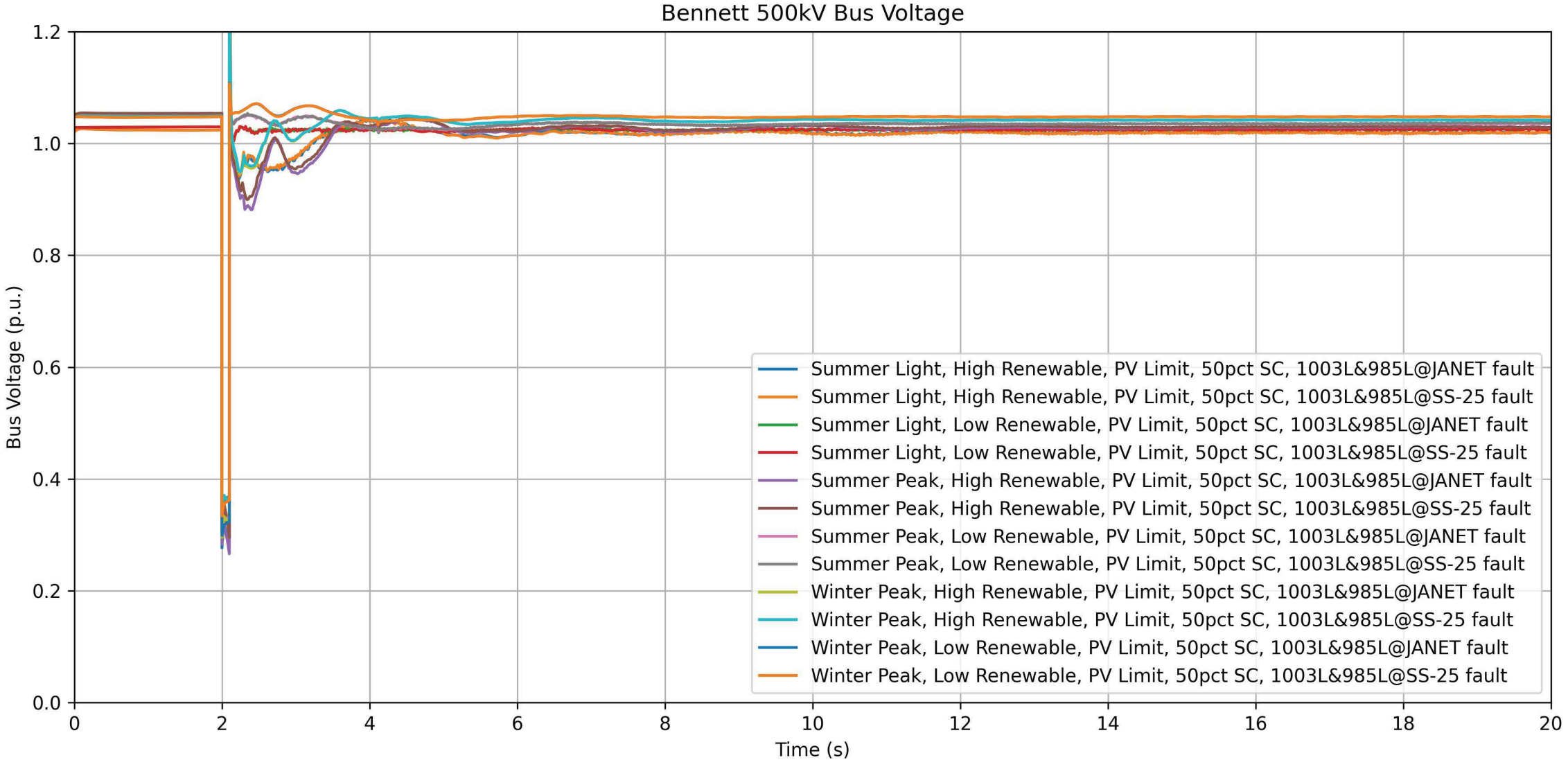

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1064L&1065L@LANGDON fault

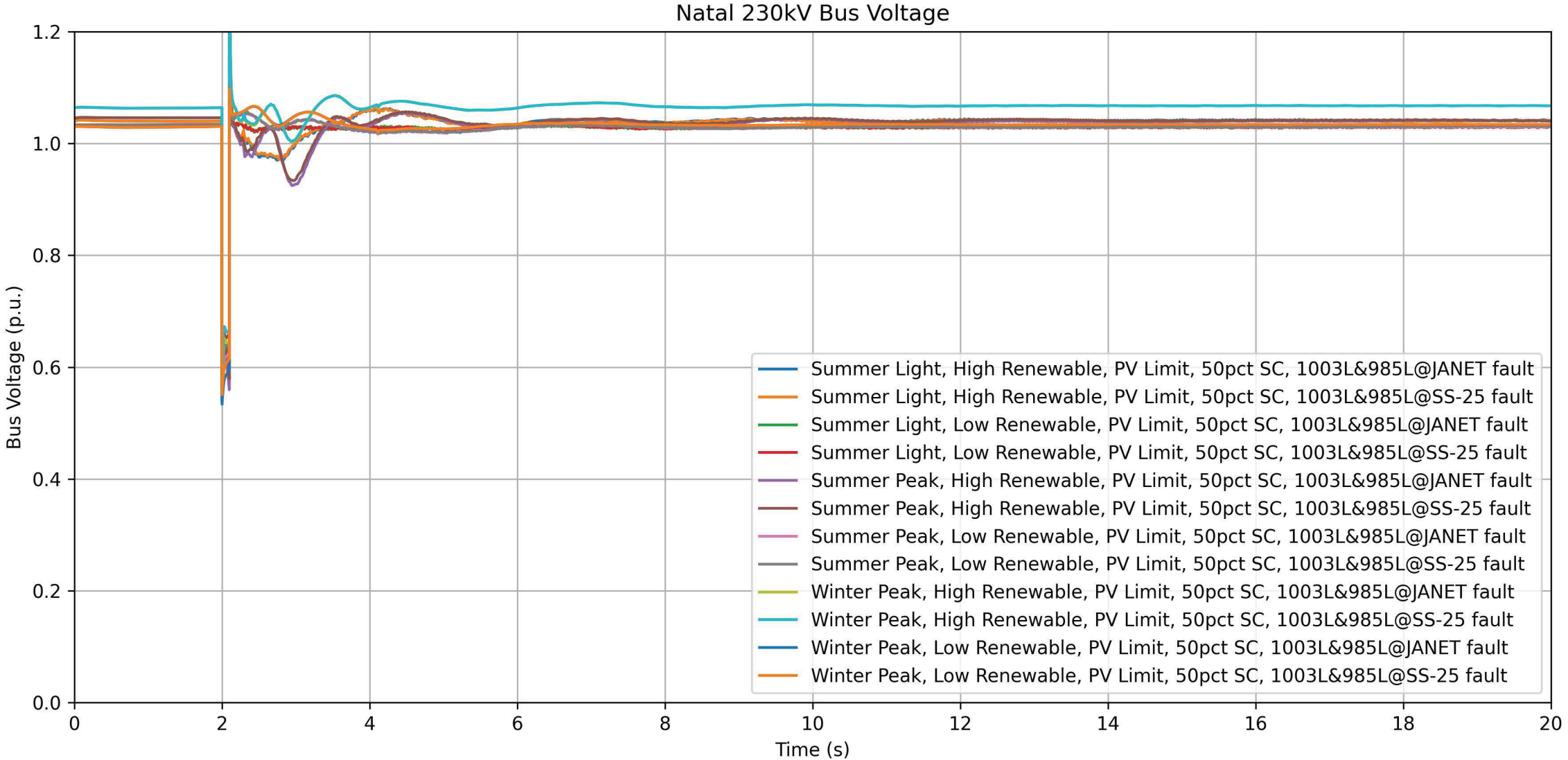

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

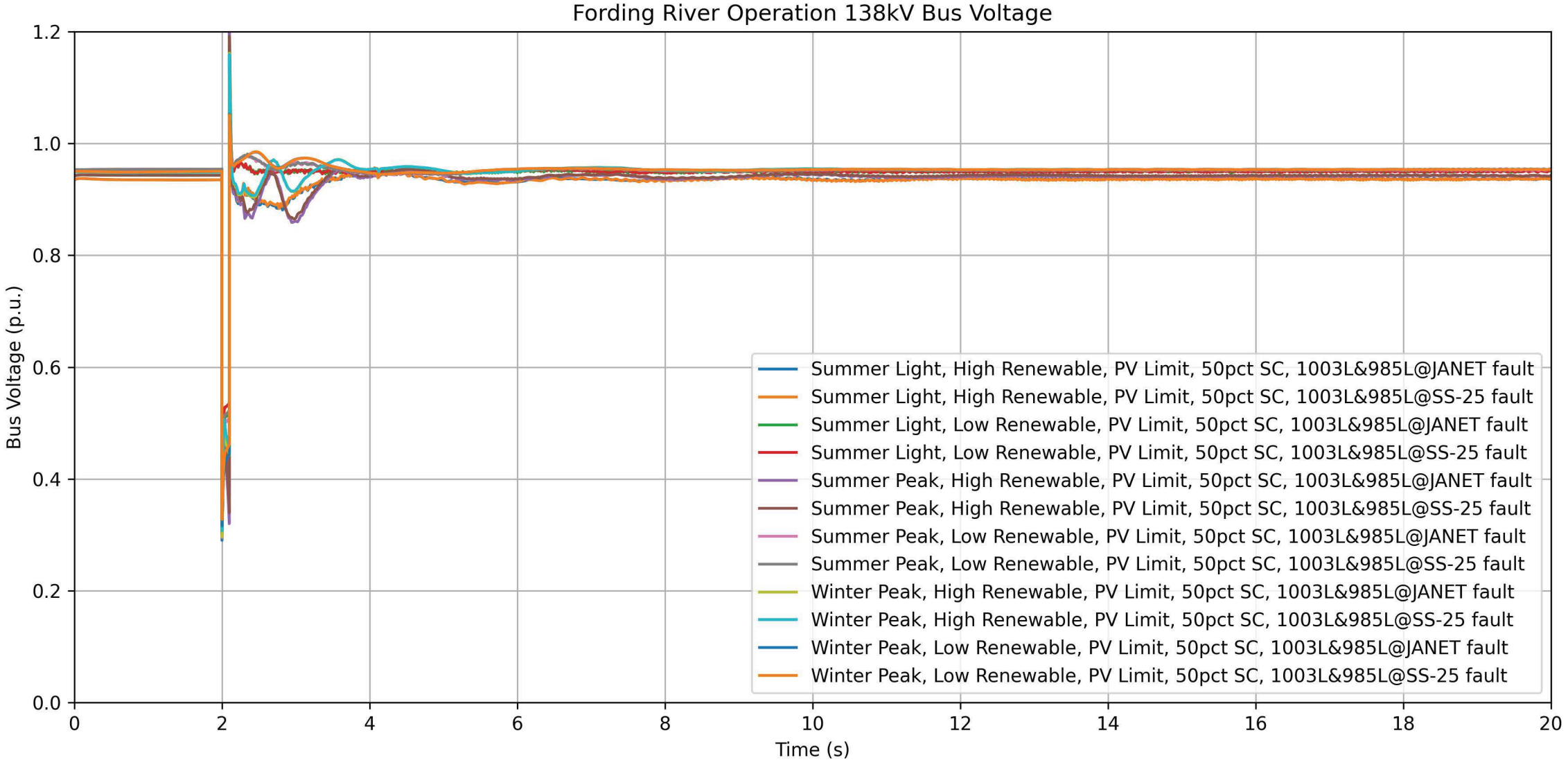

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

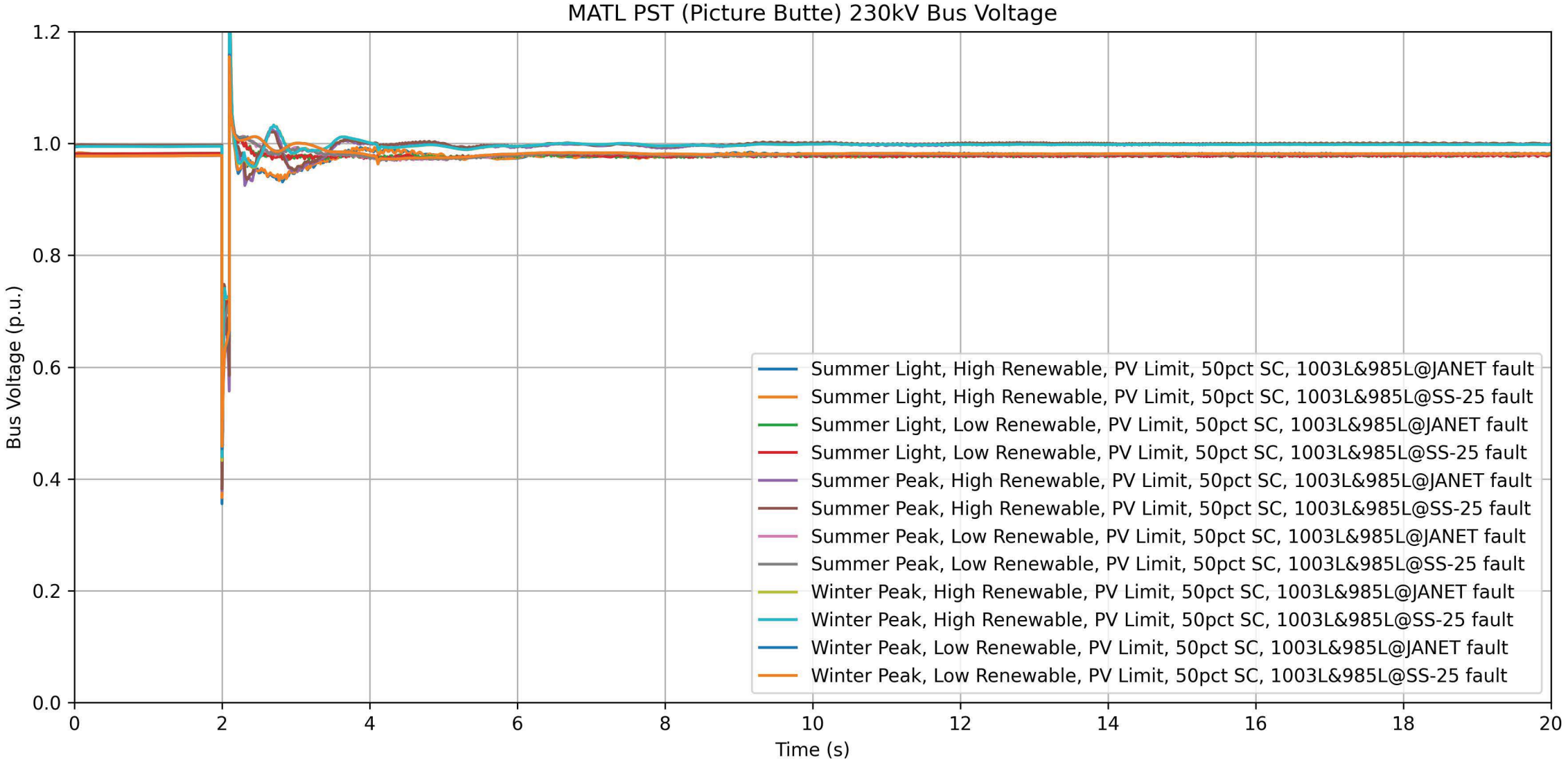

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

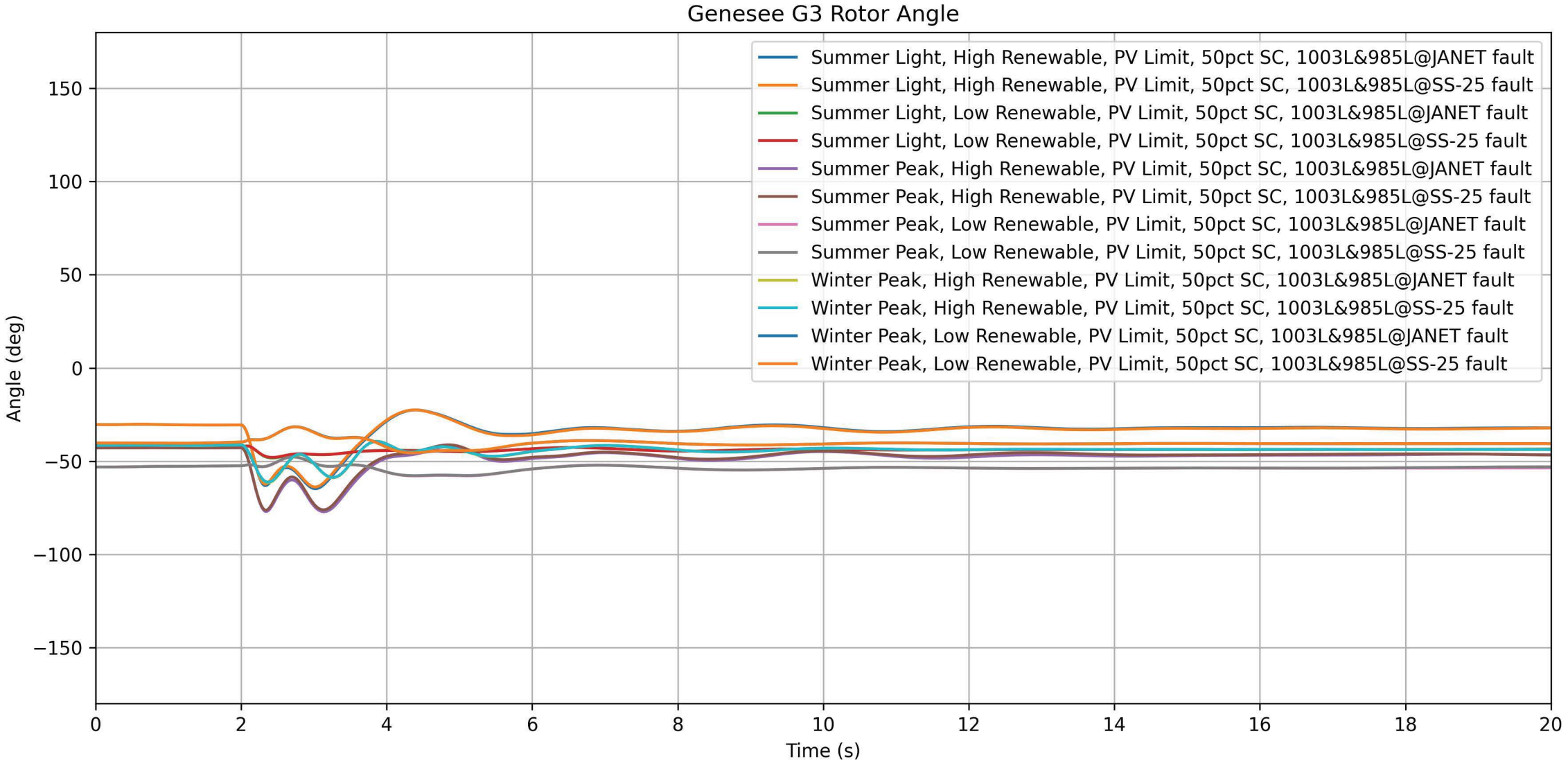

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

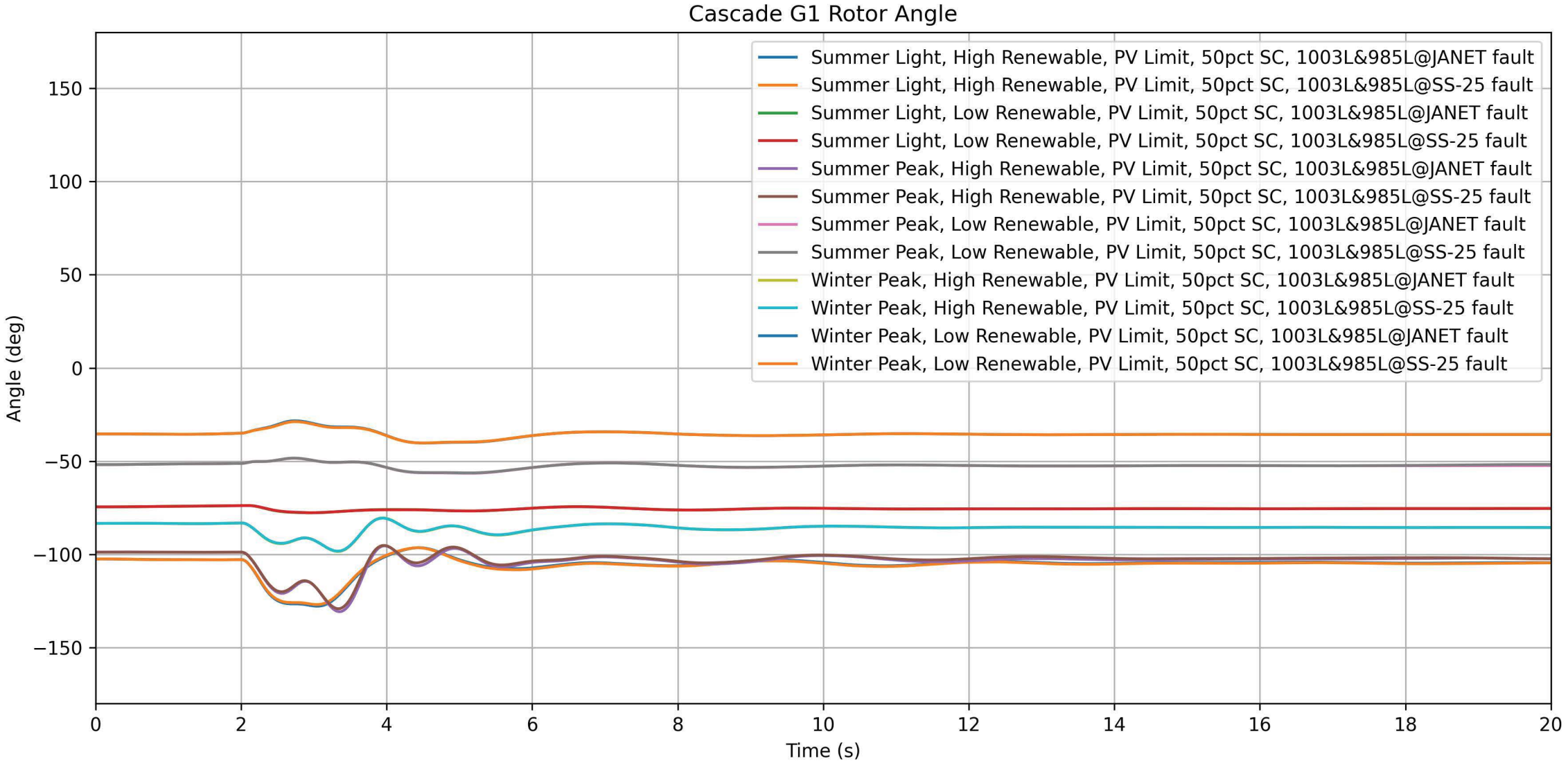

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

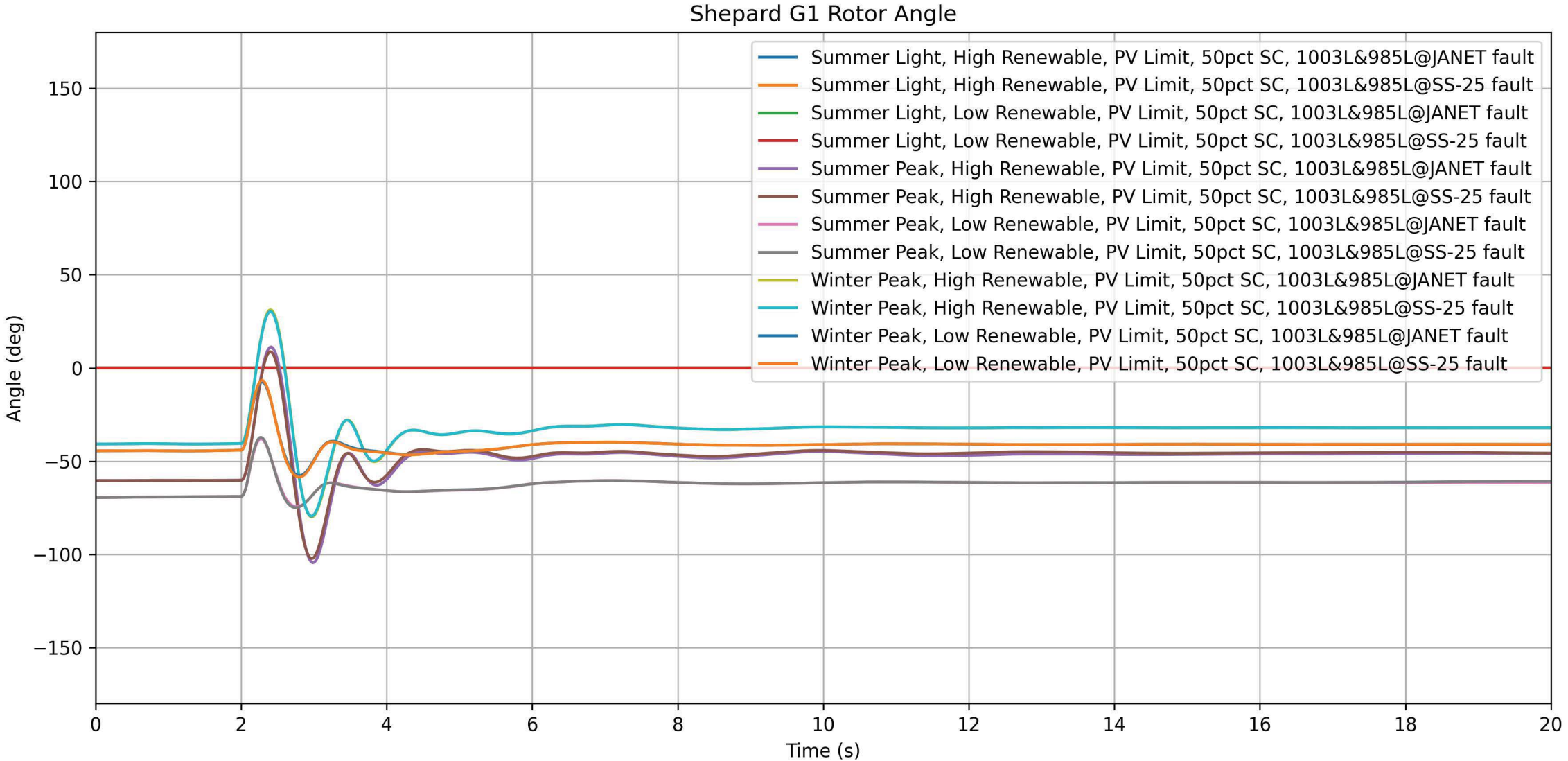

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

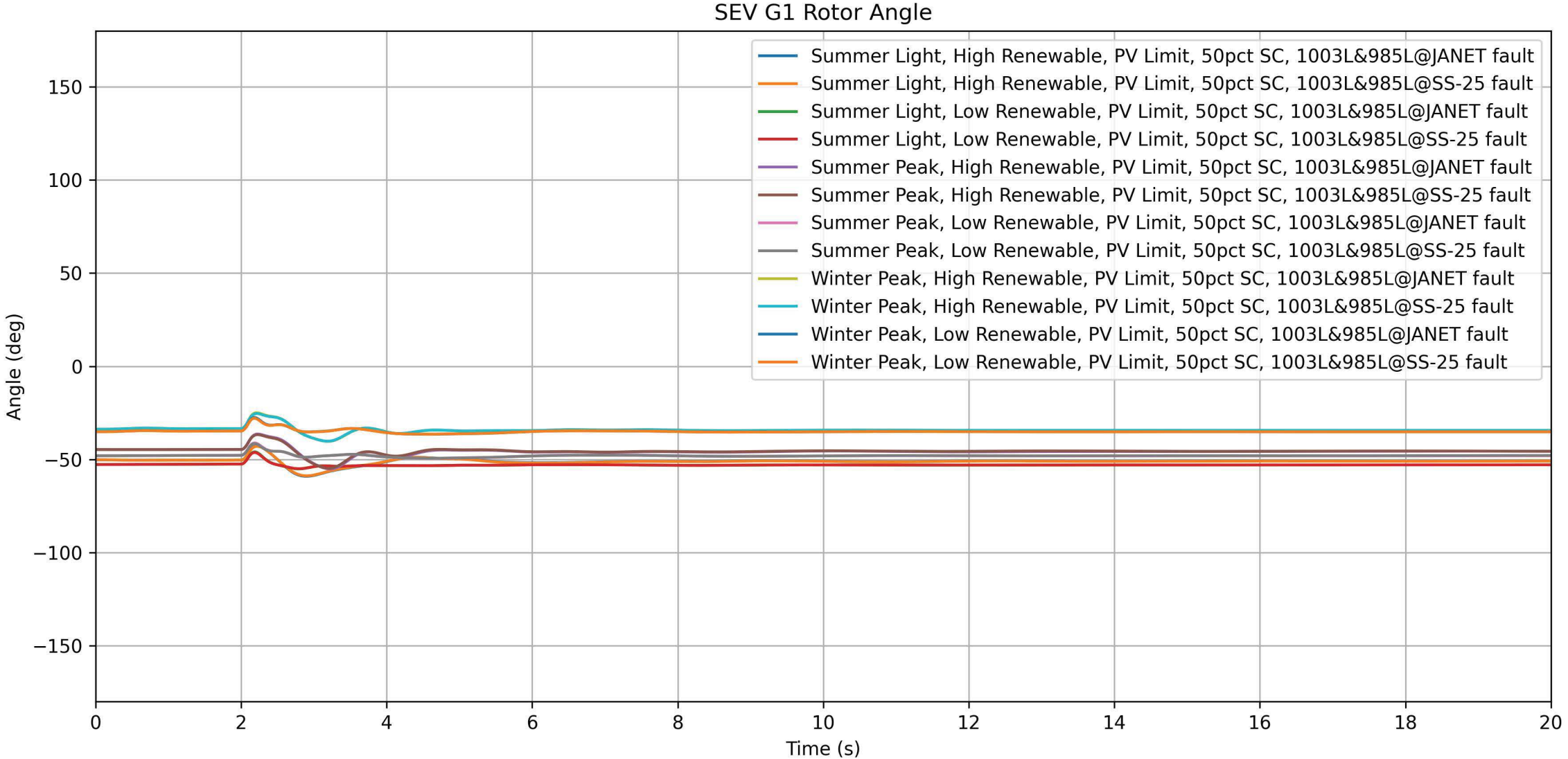

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

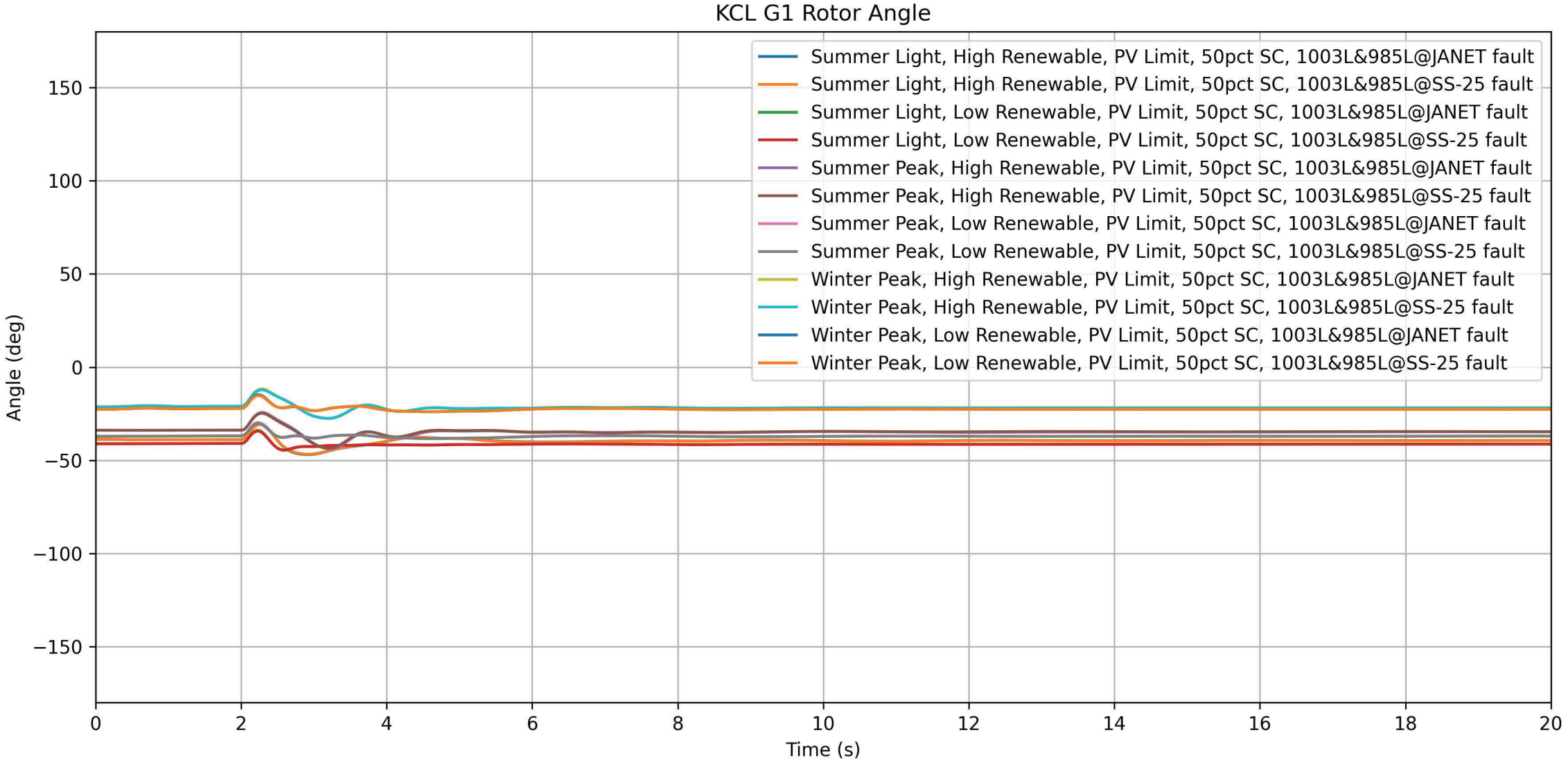

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

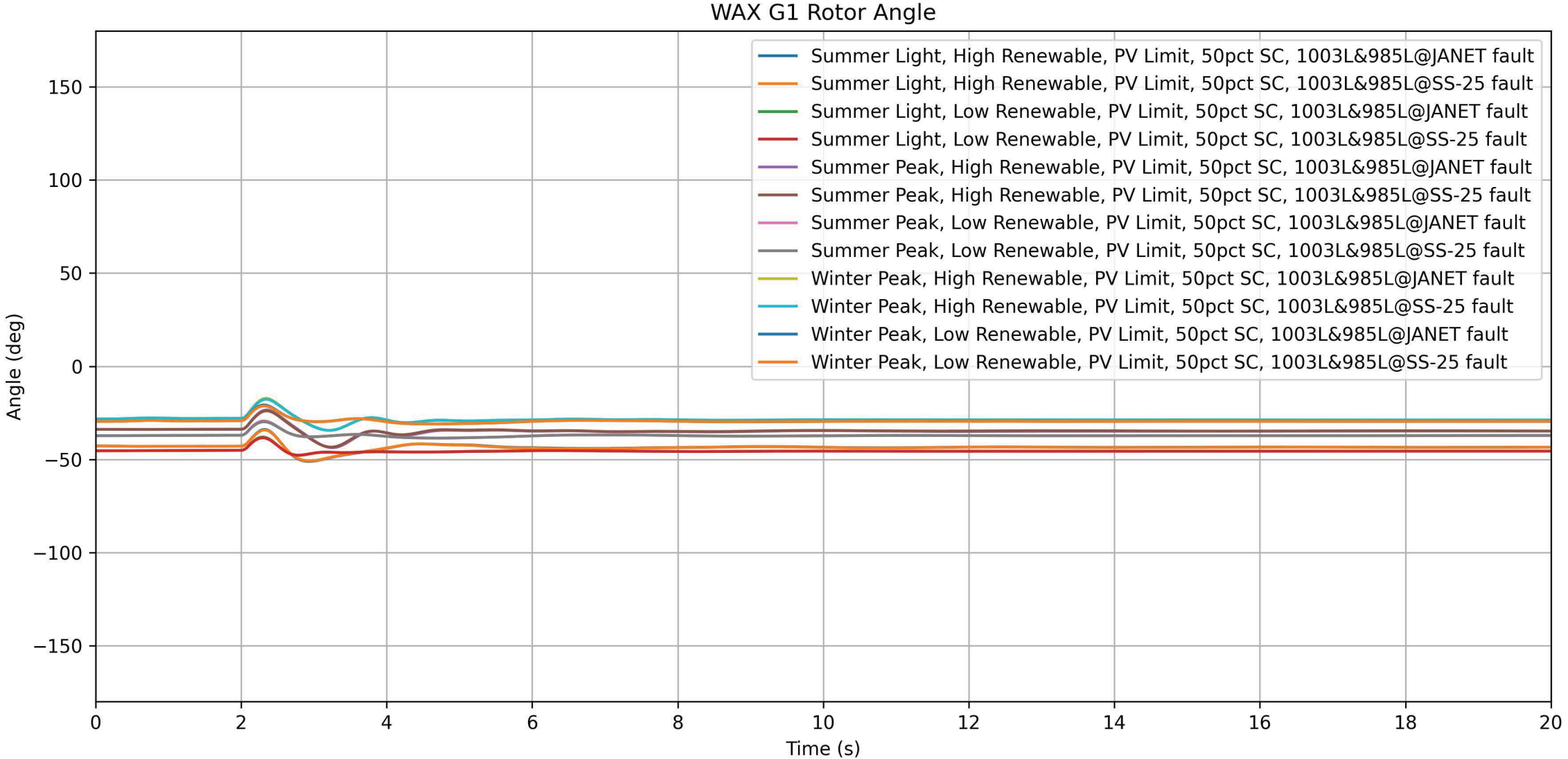

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

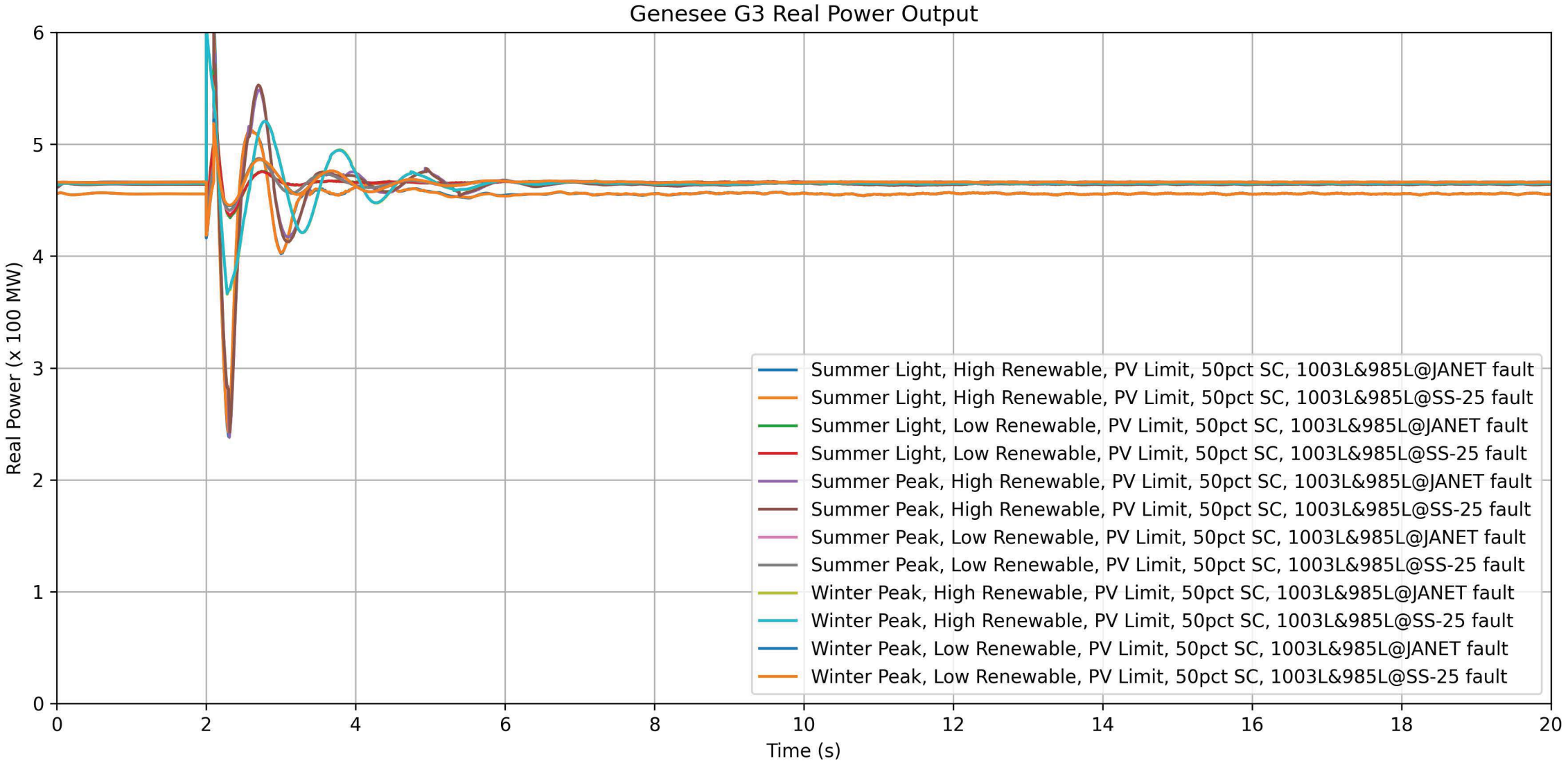

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

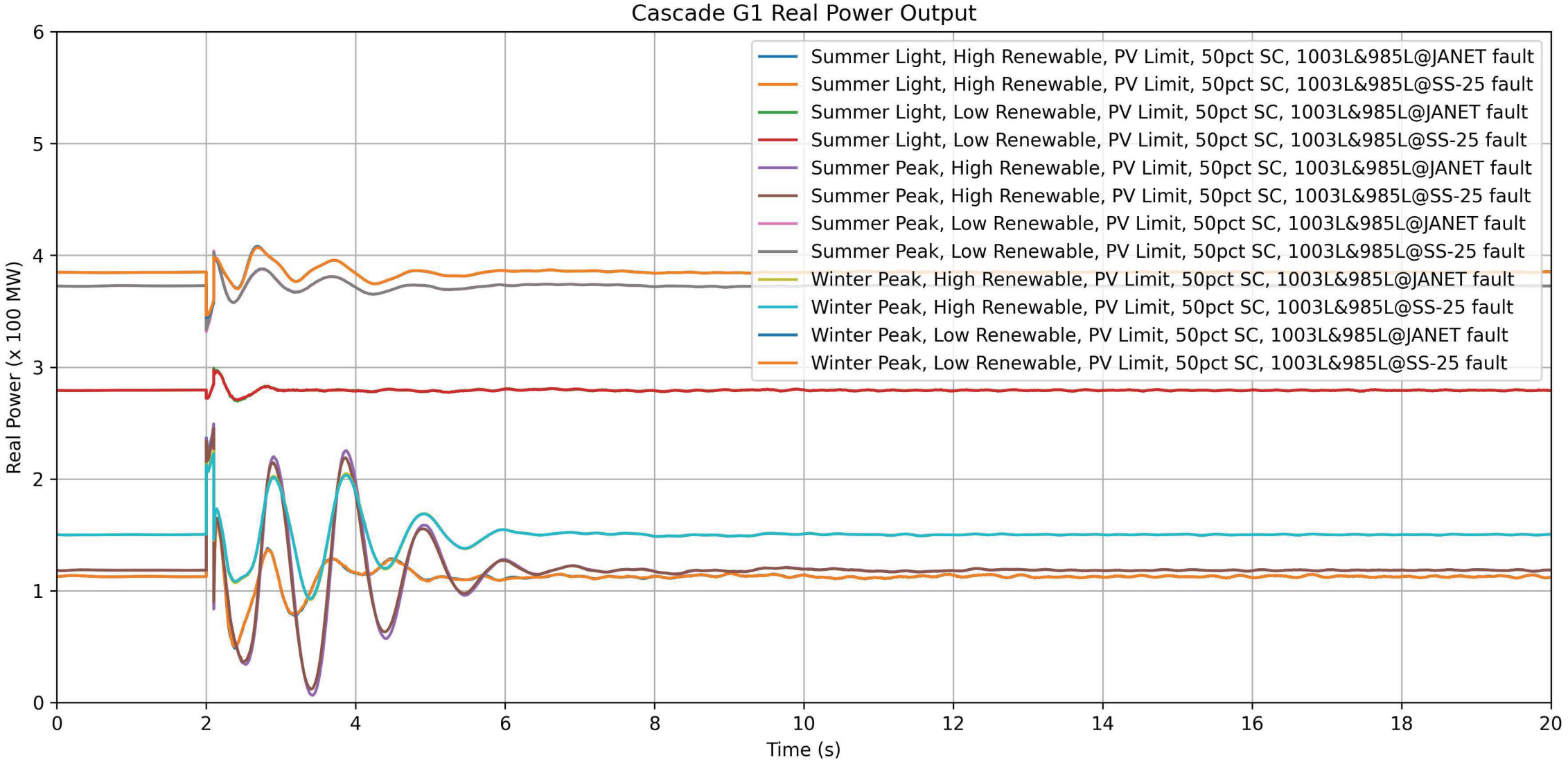

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

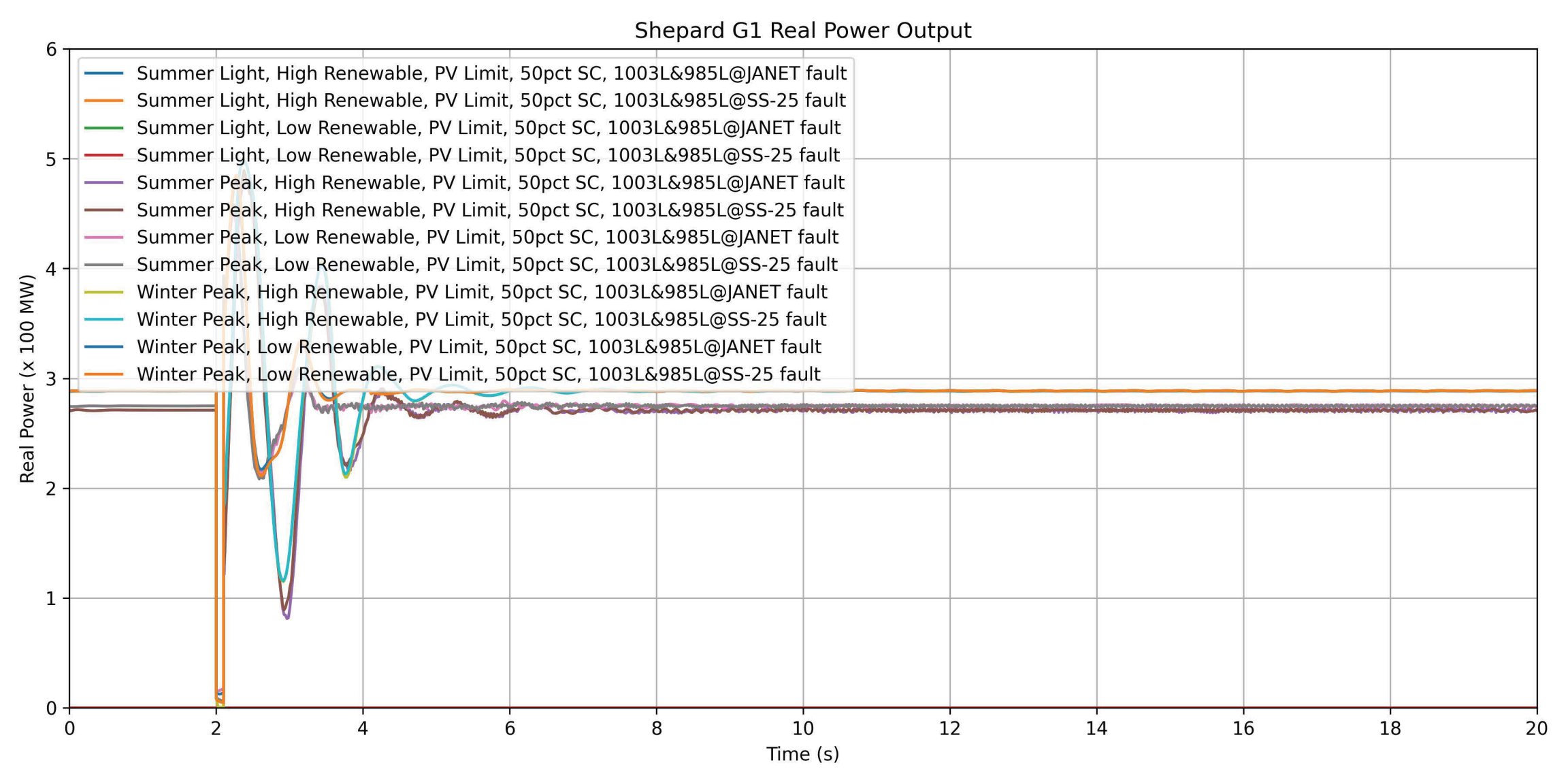

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

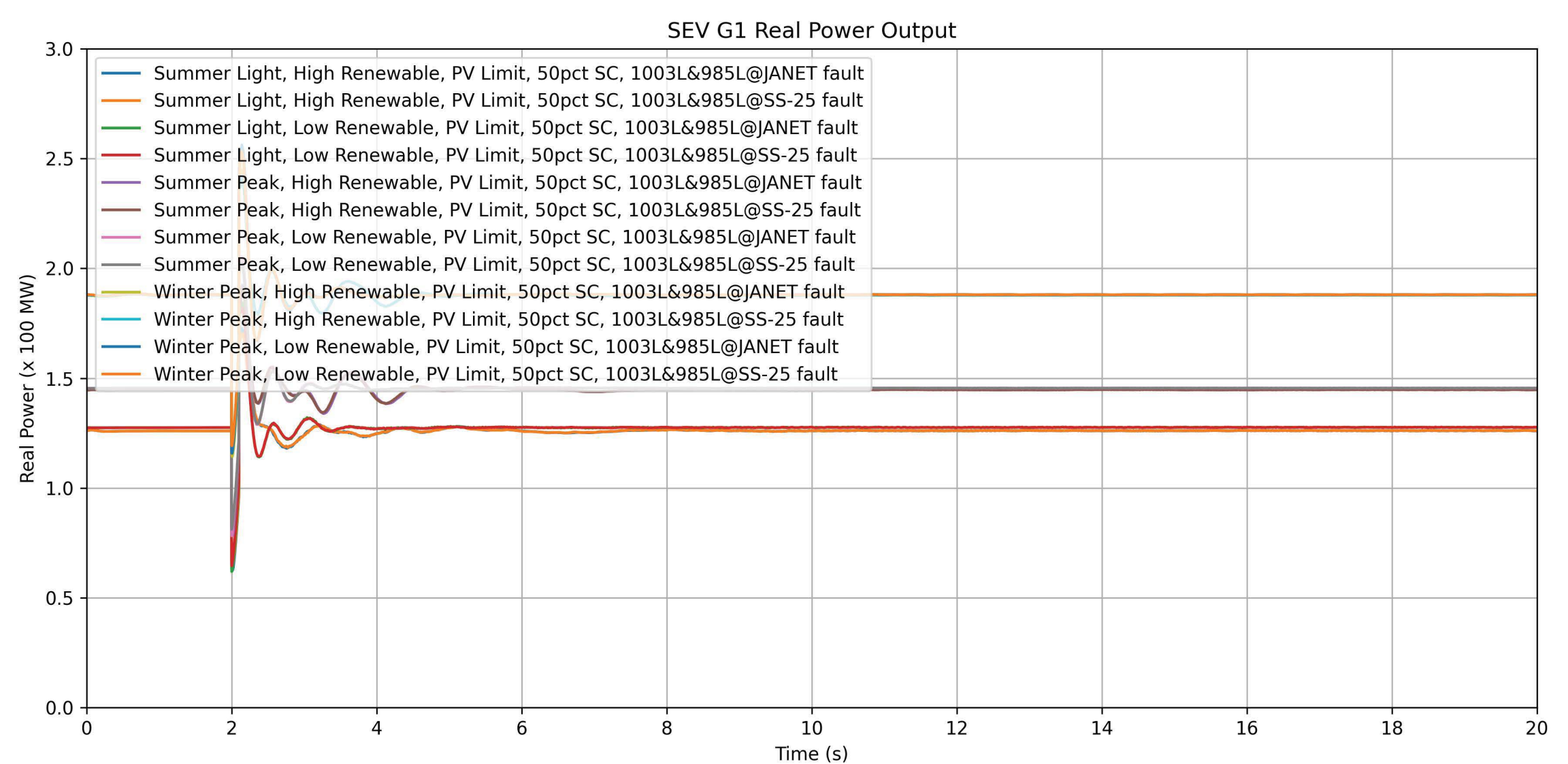

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

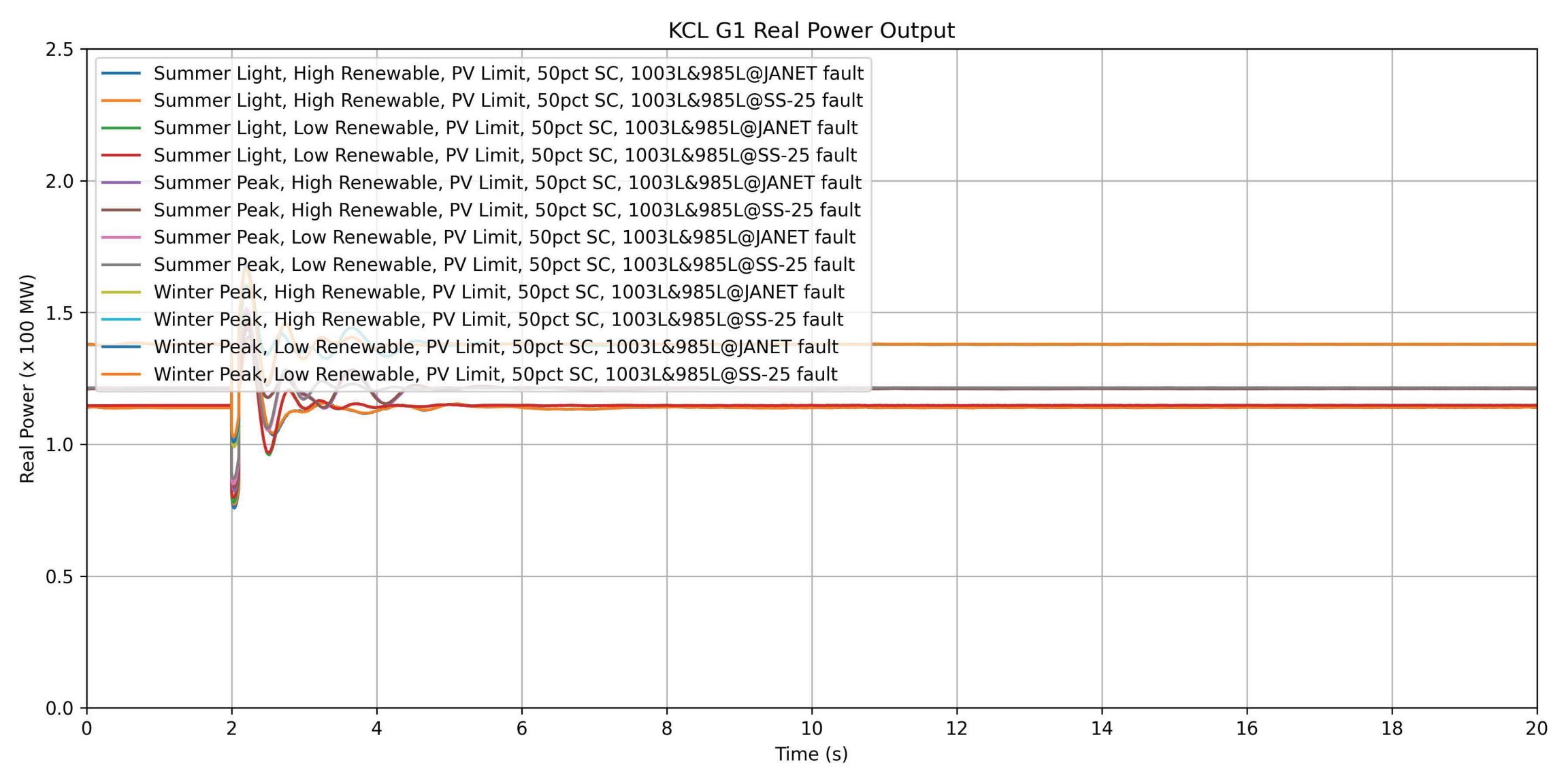

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

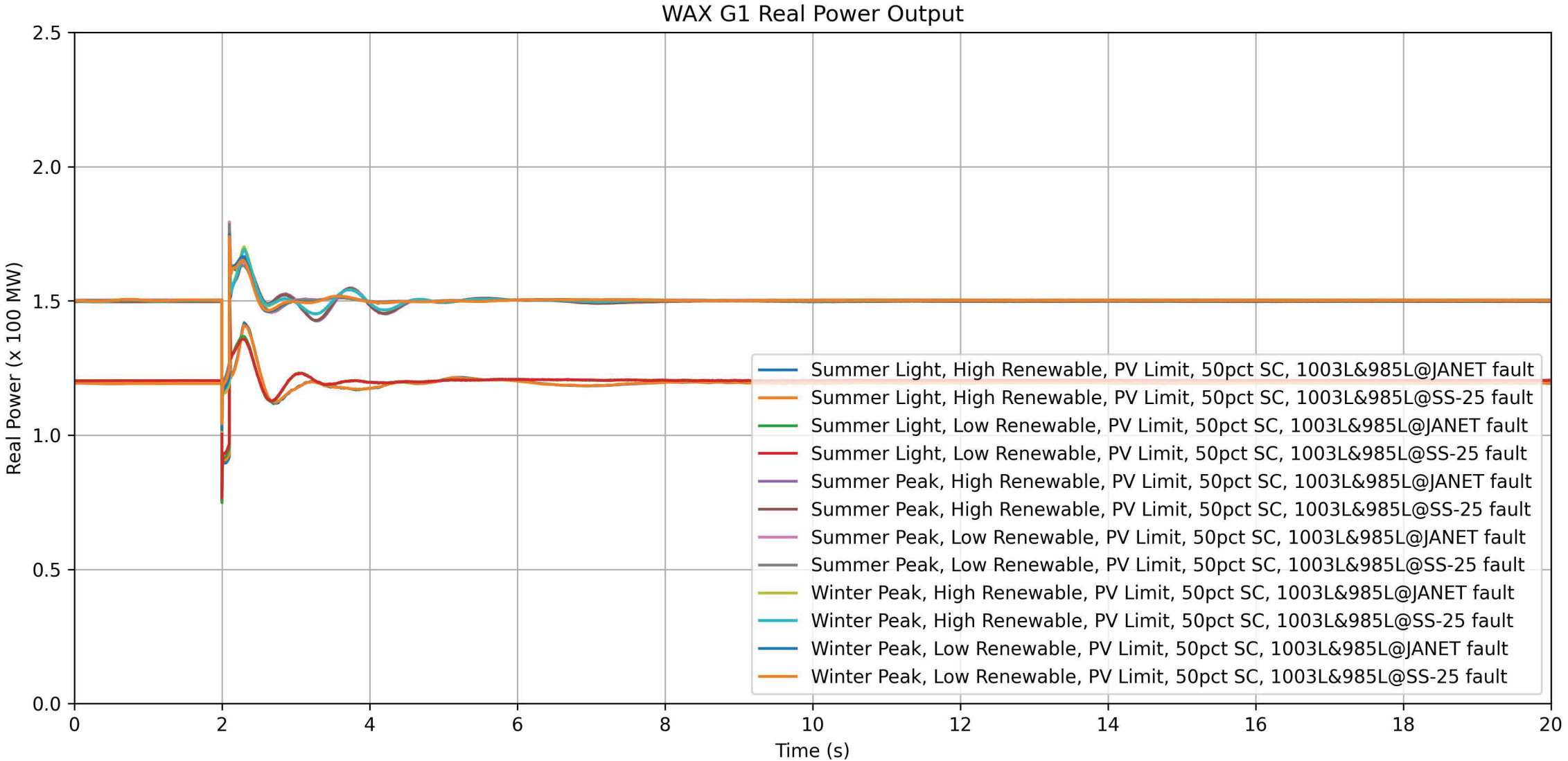

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

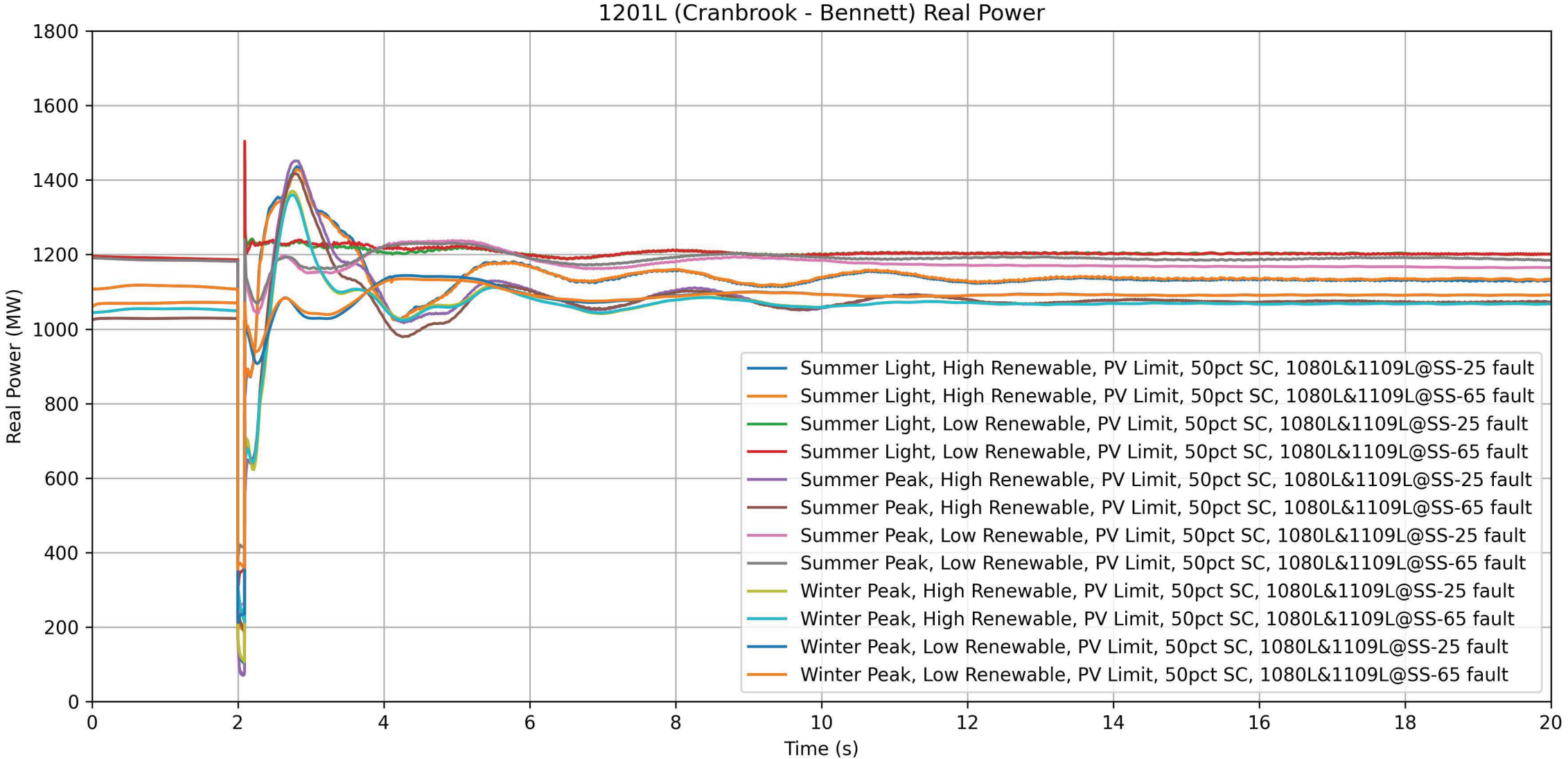

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

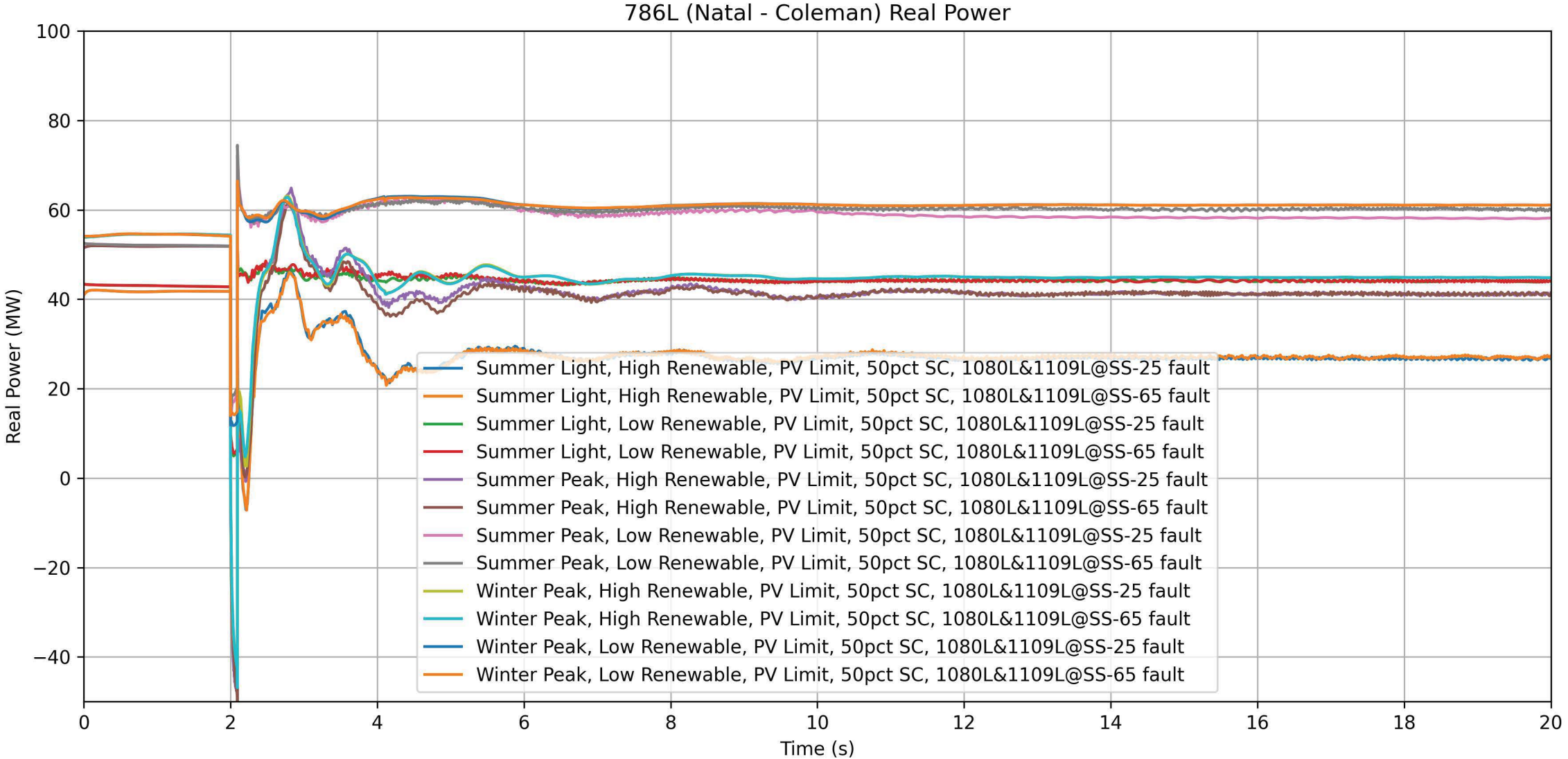

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

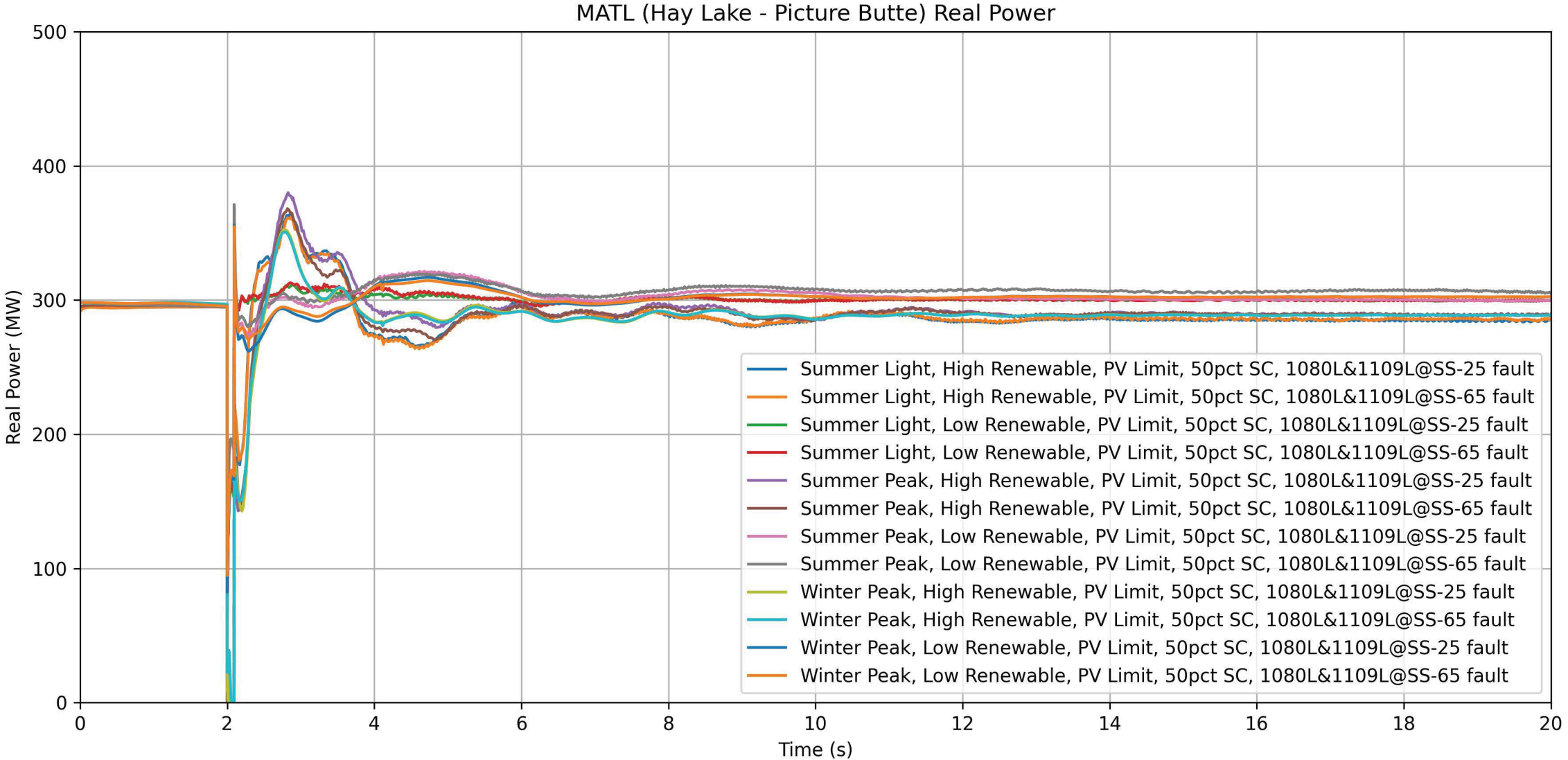

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

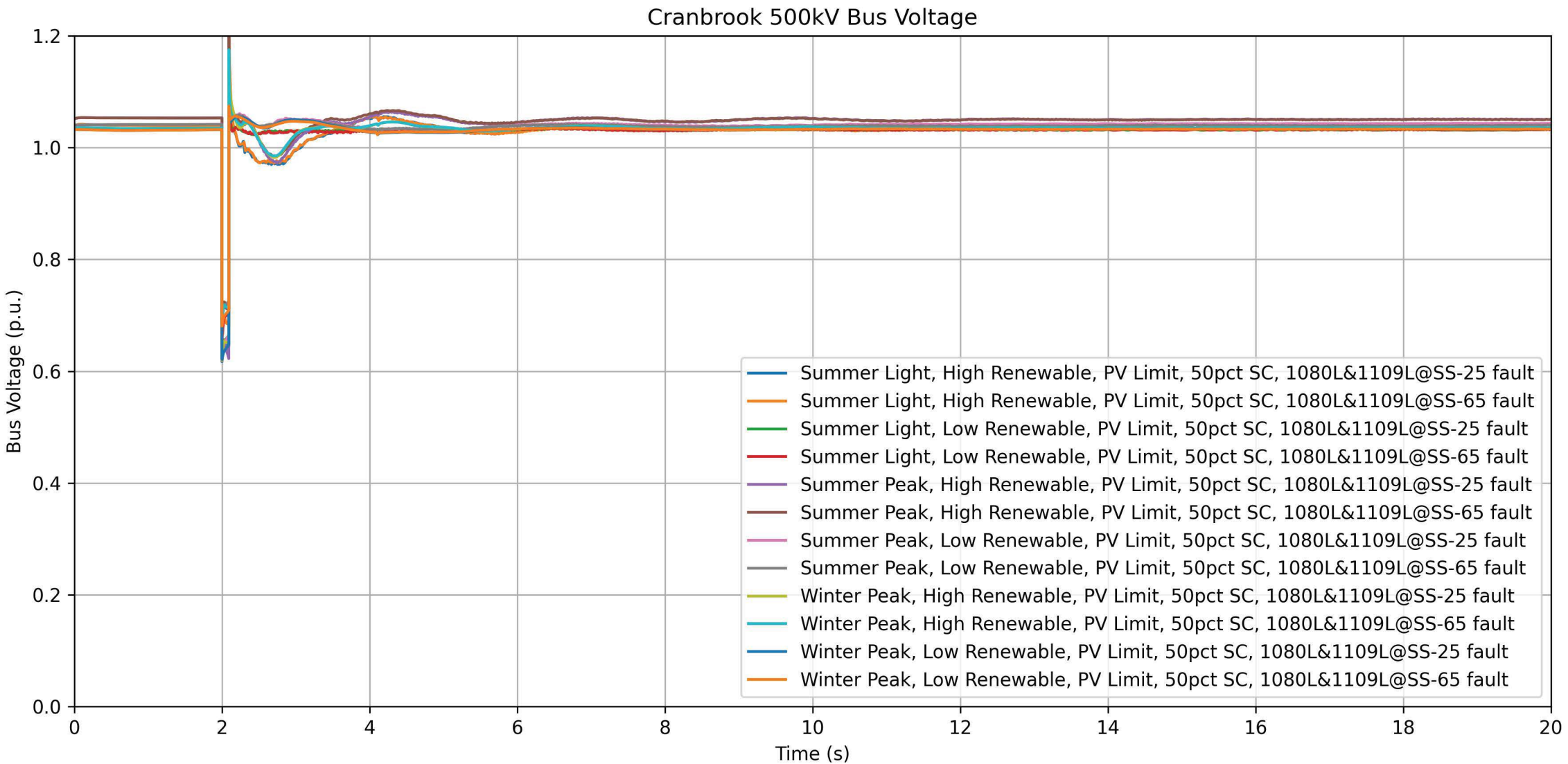

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

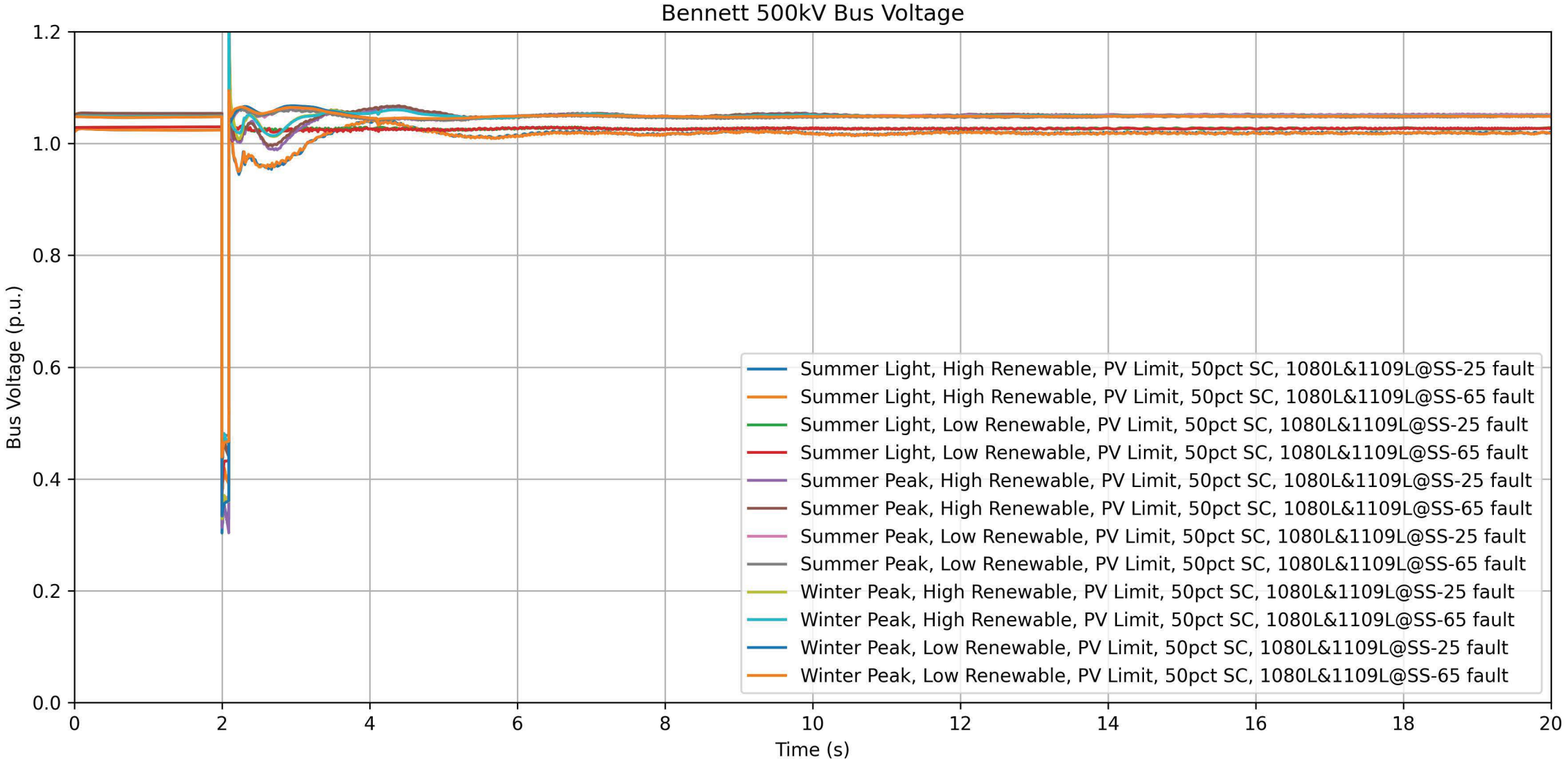

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@JANET fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1003L&985L@SS-25 fault

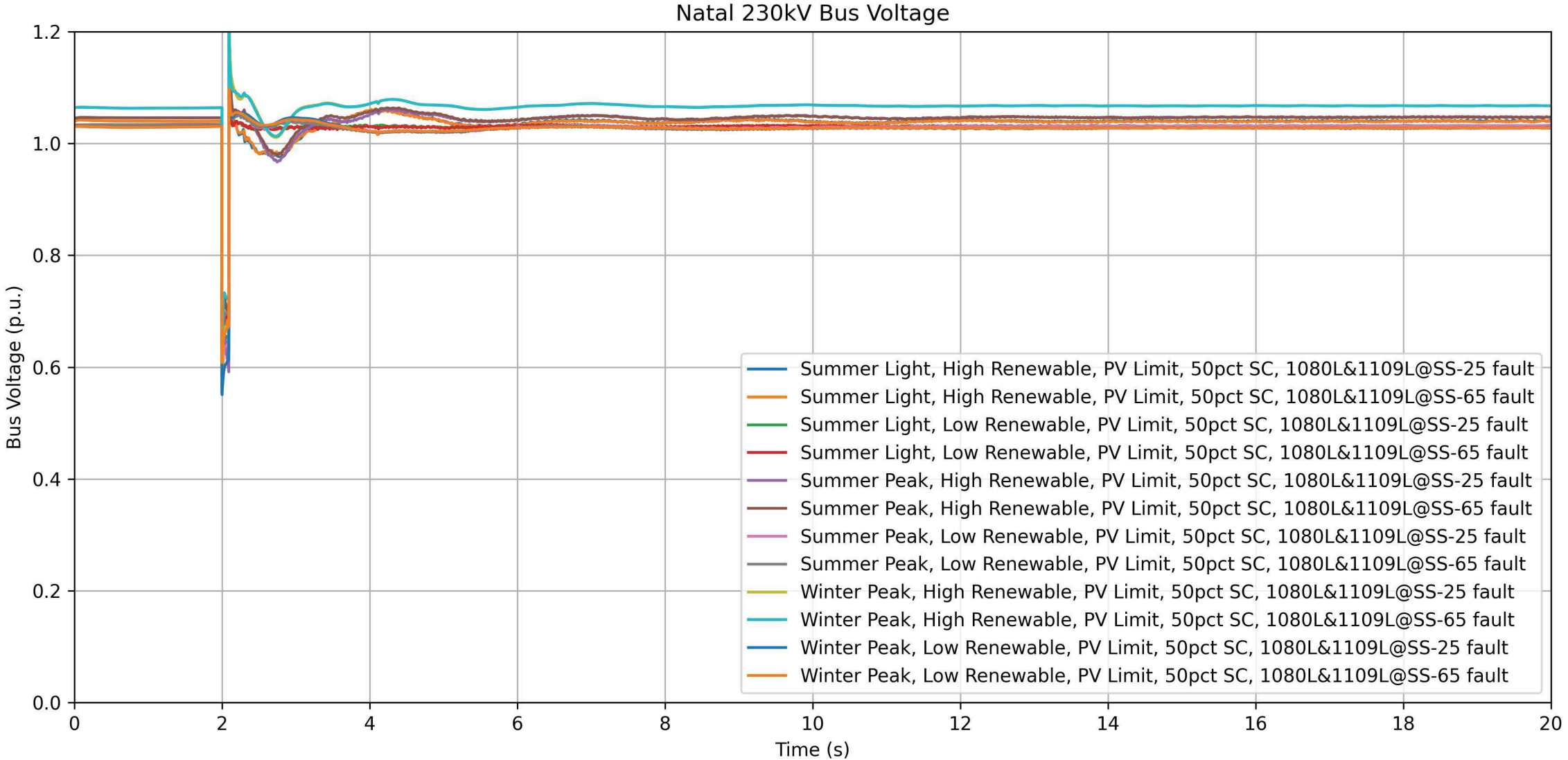

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

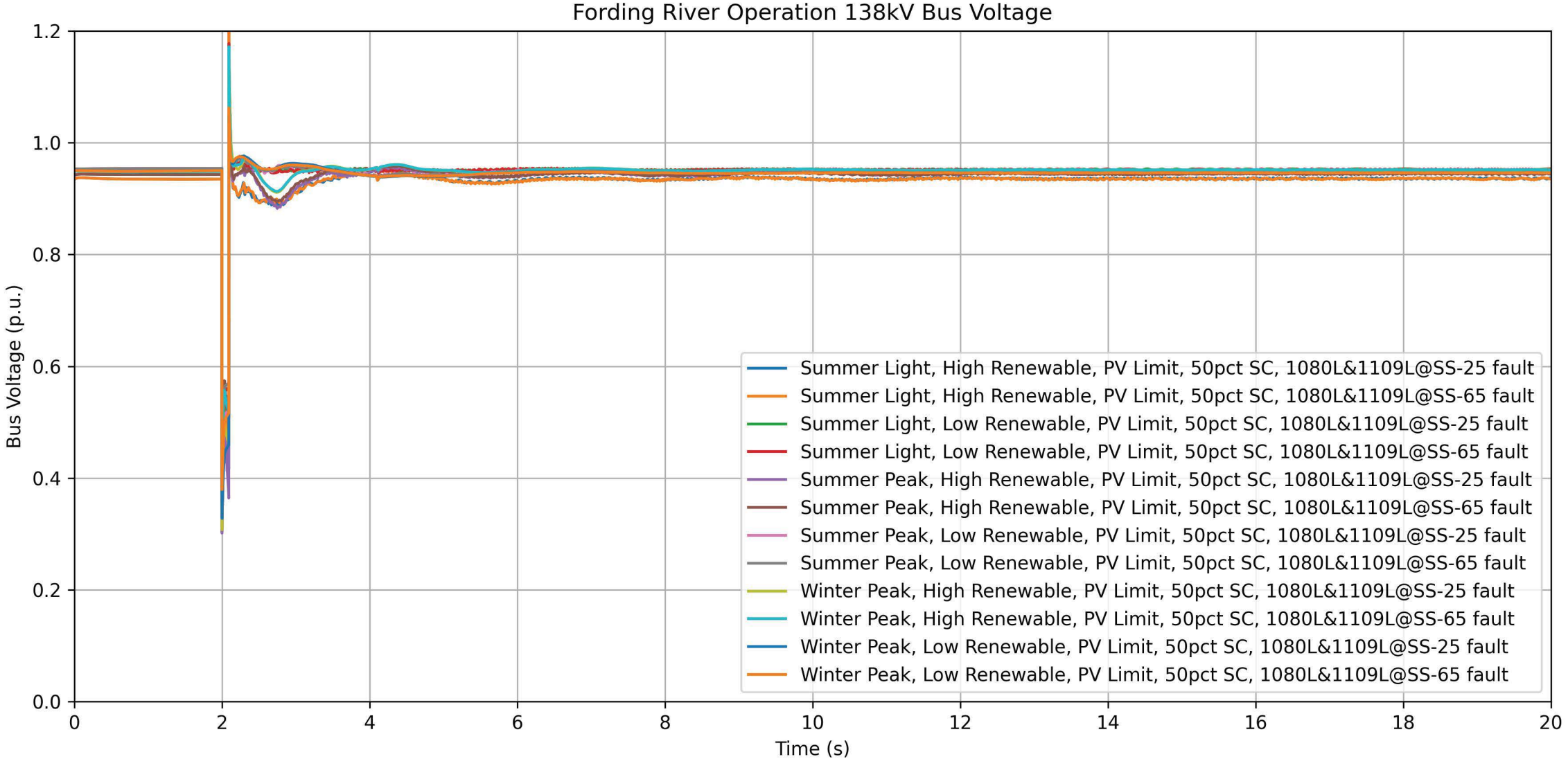

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

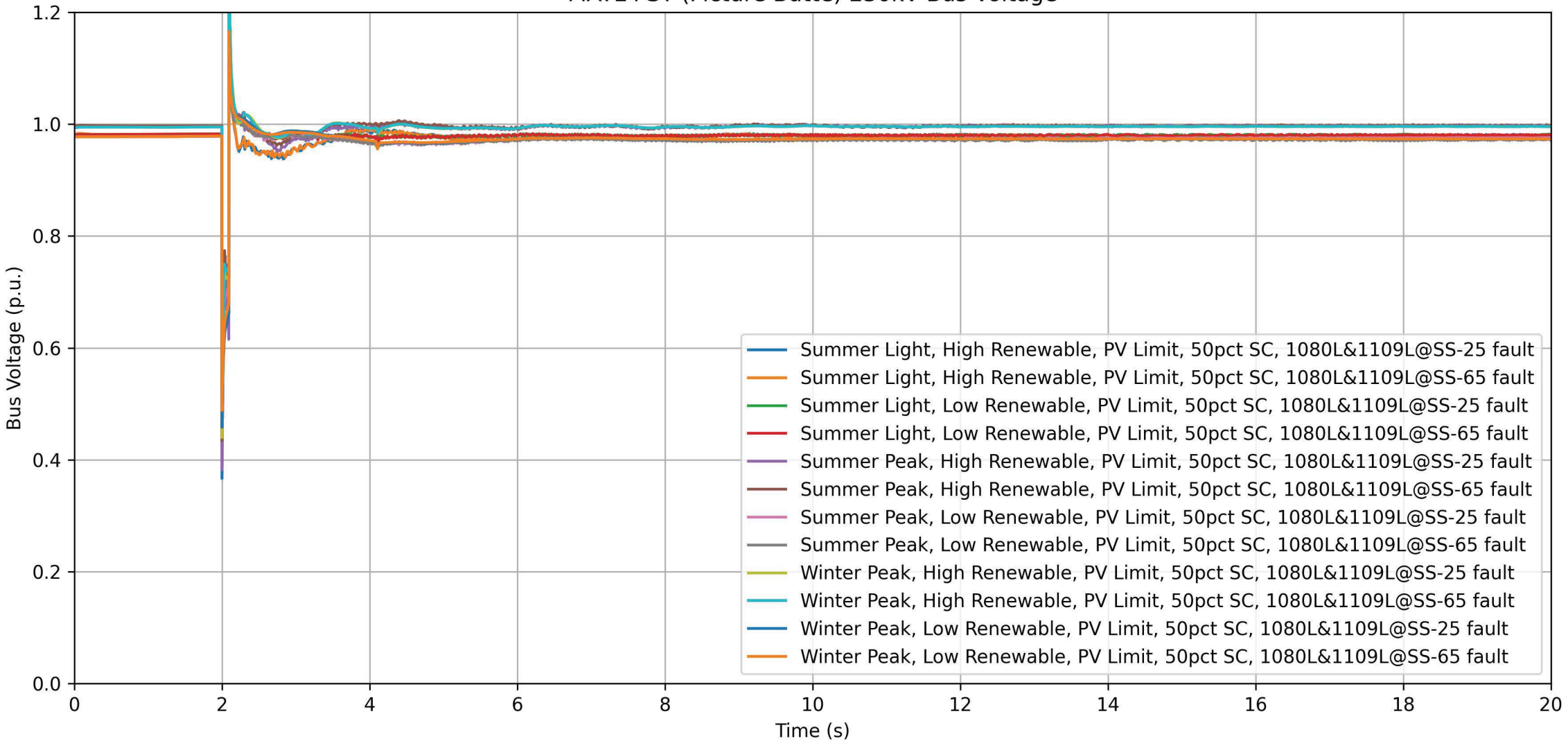

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

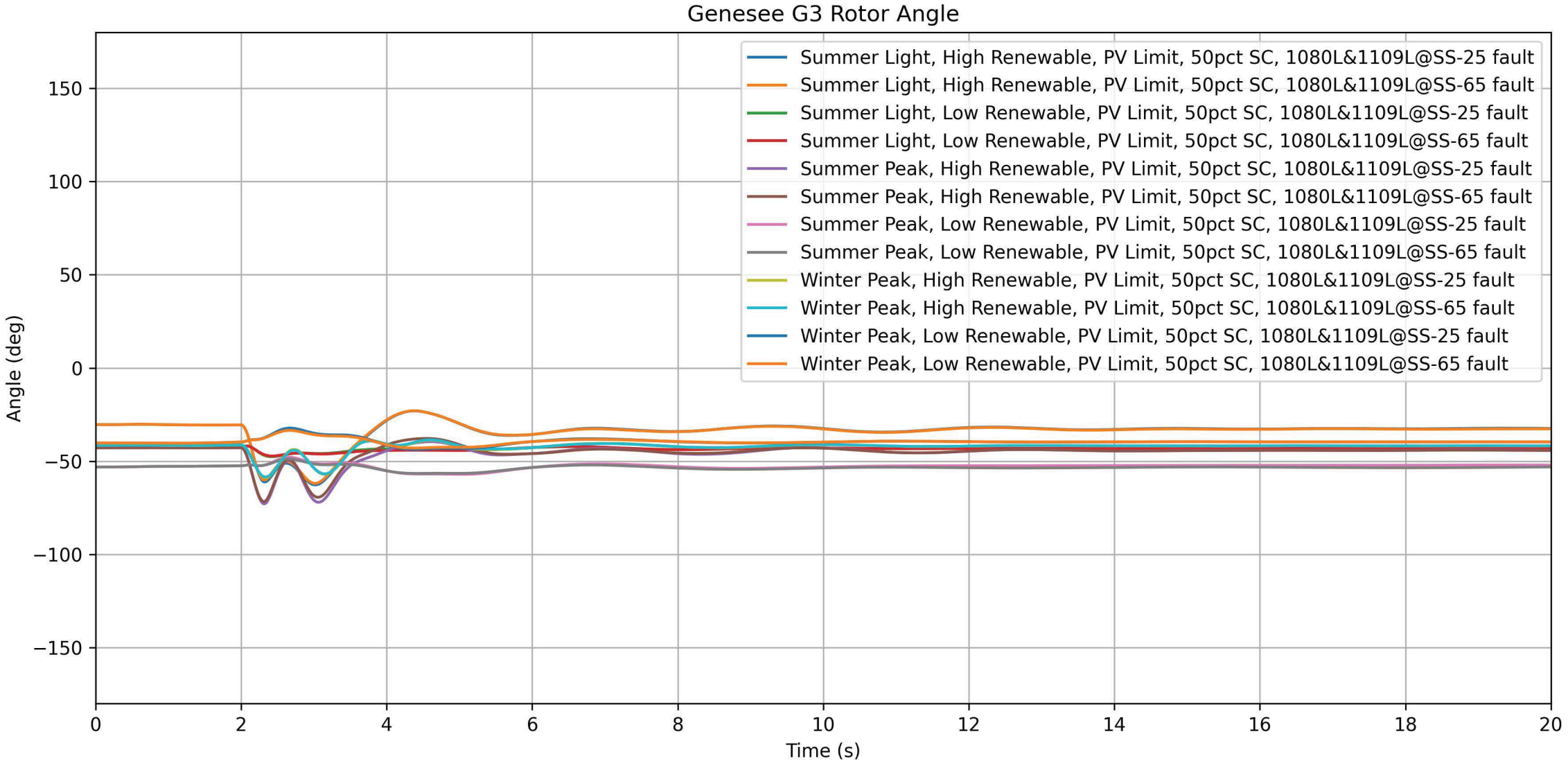

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

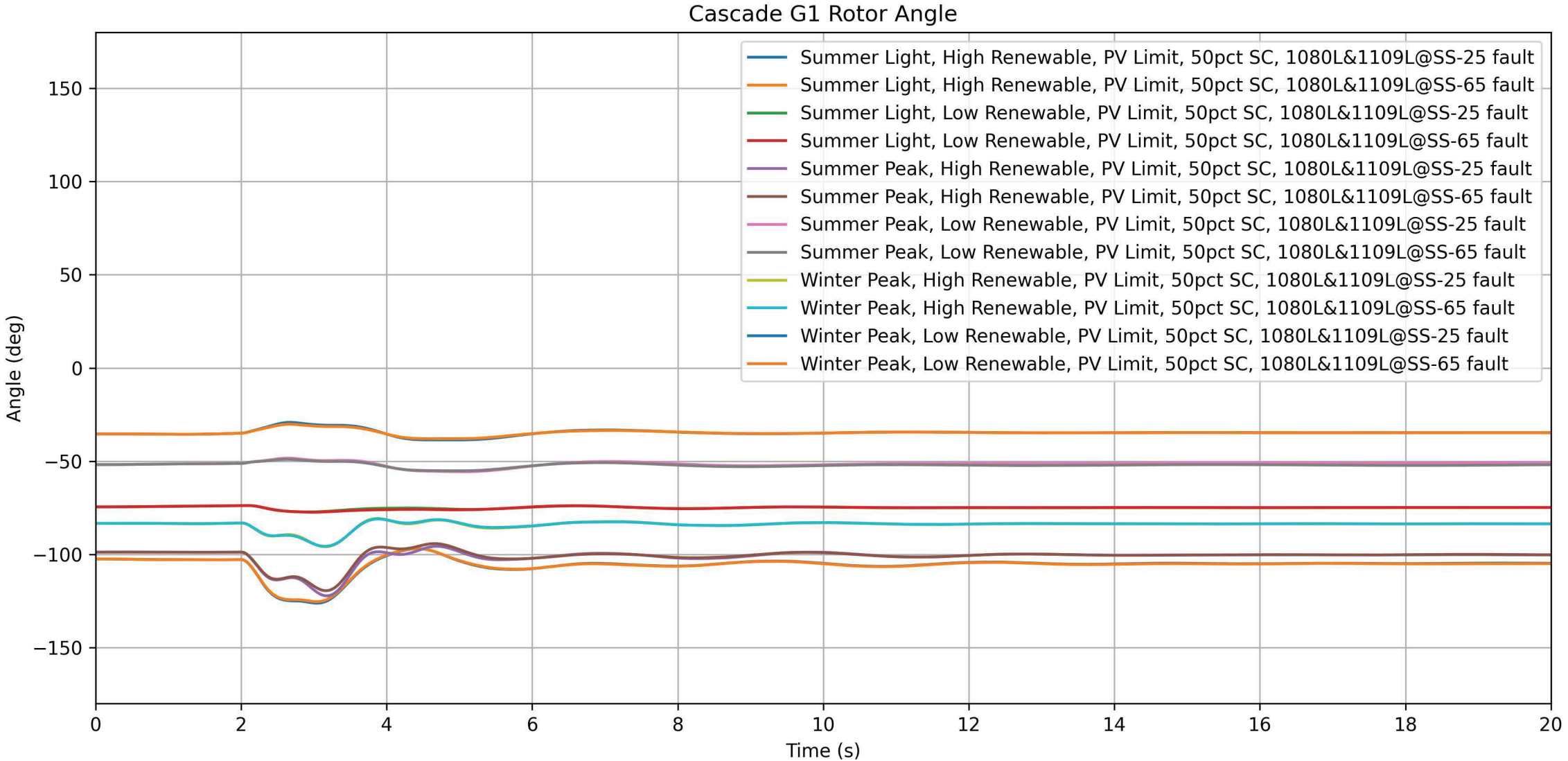

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

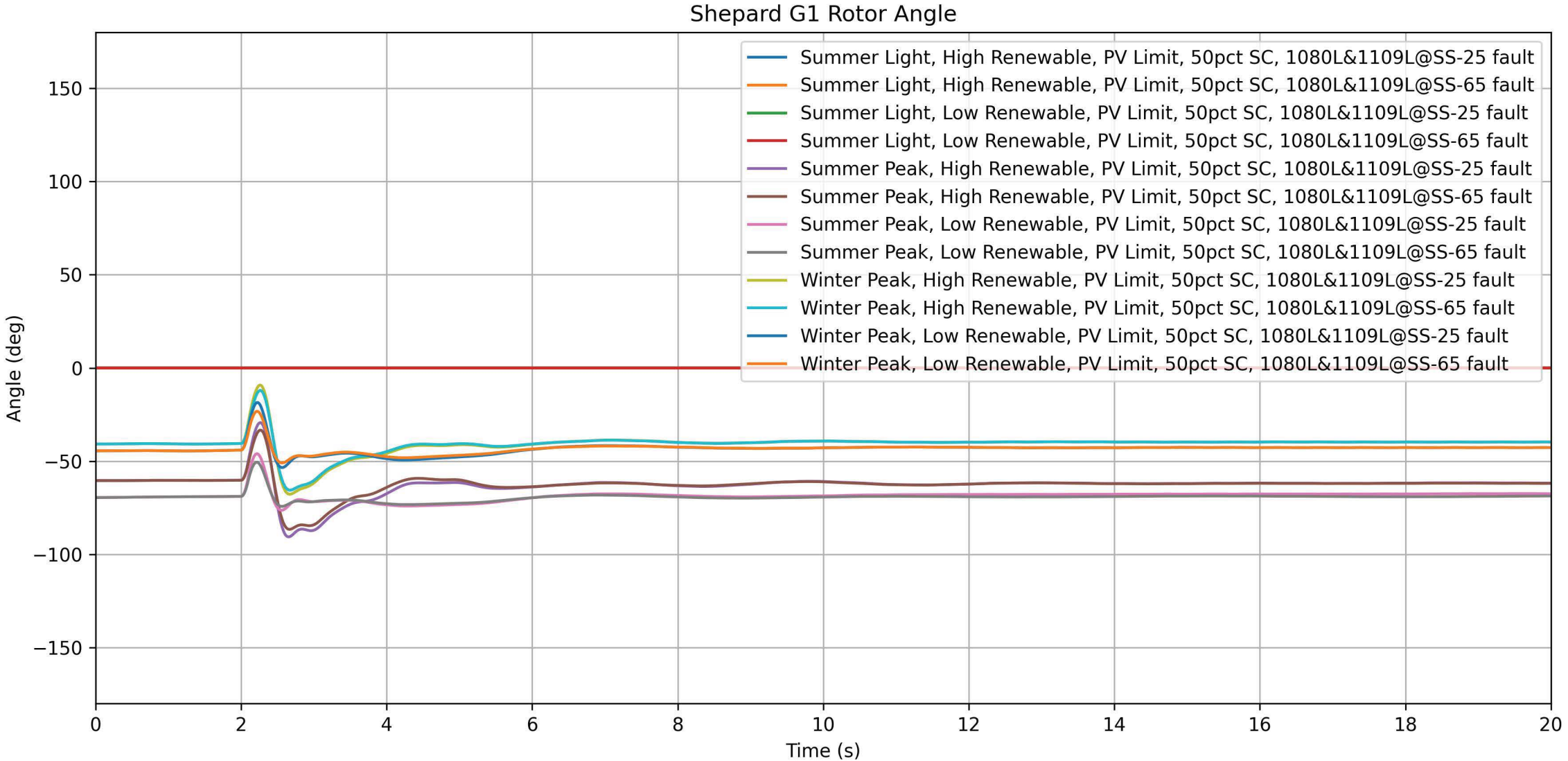

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

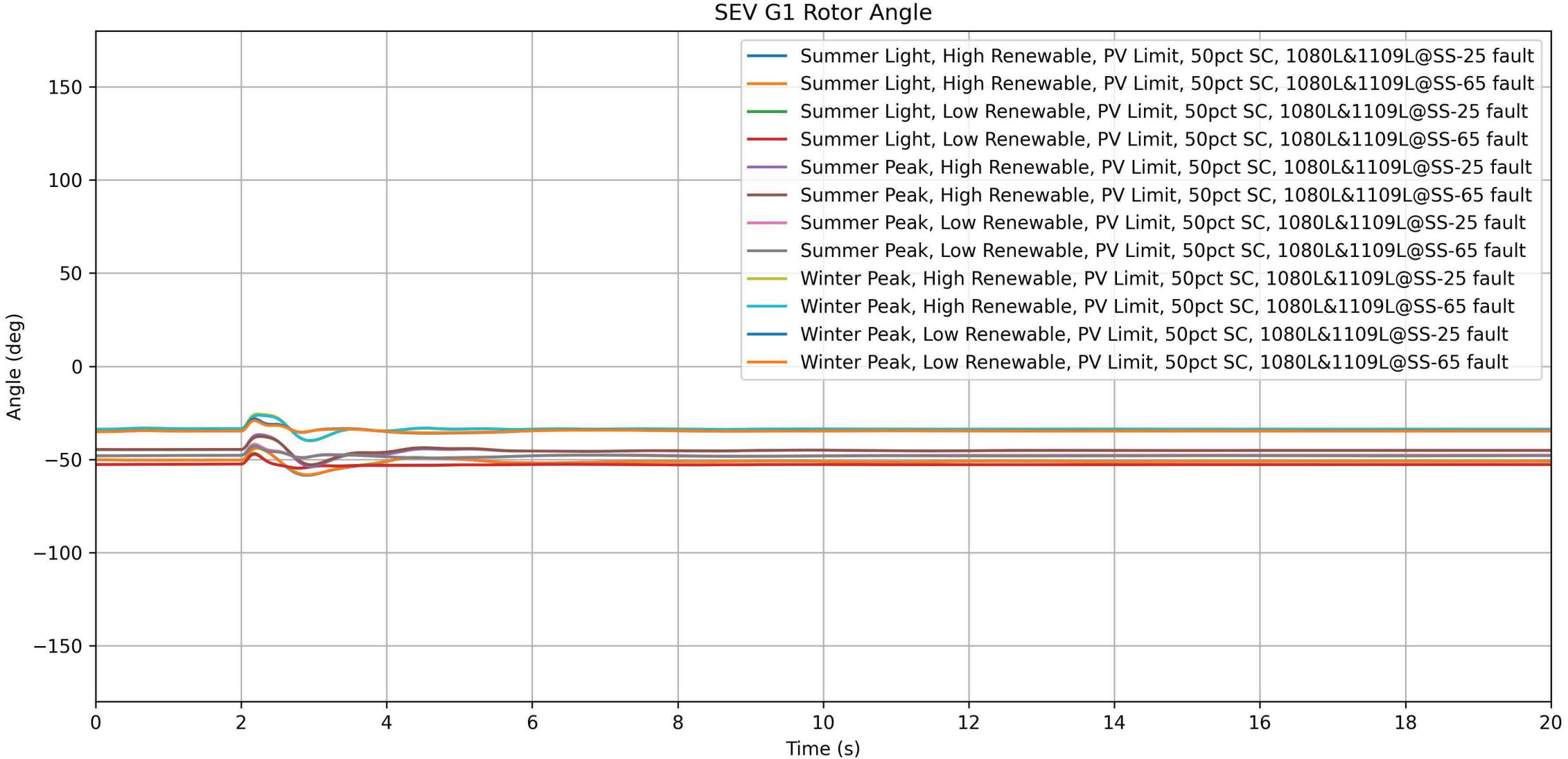

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

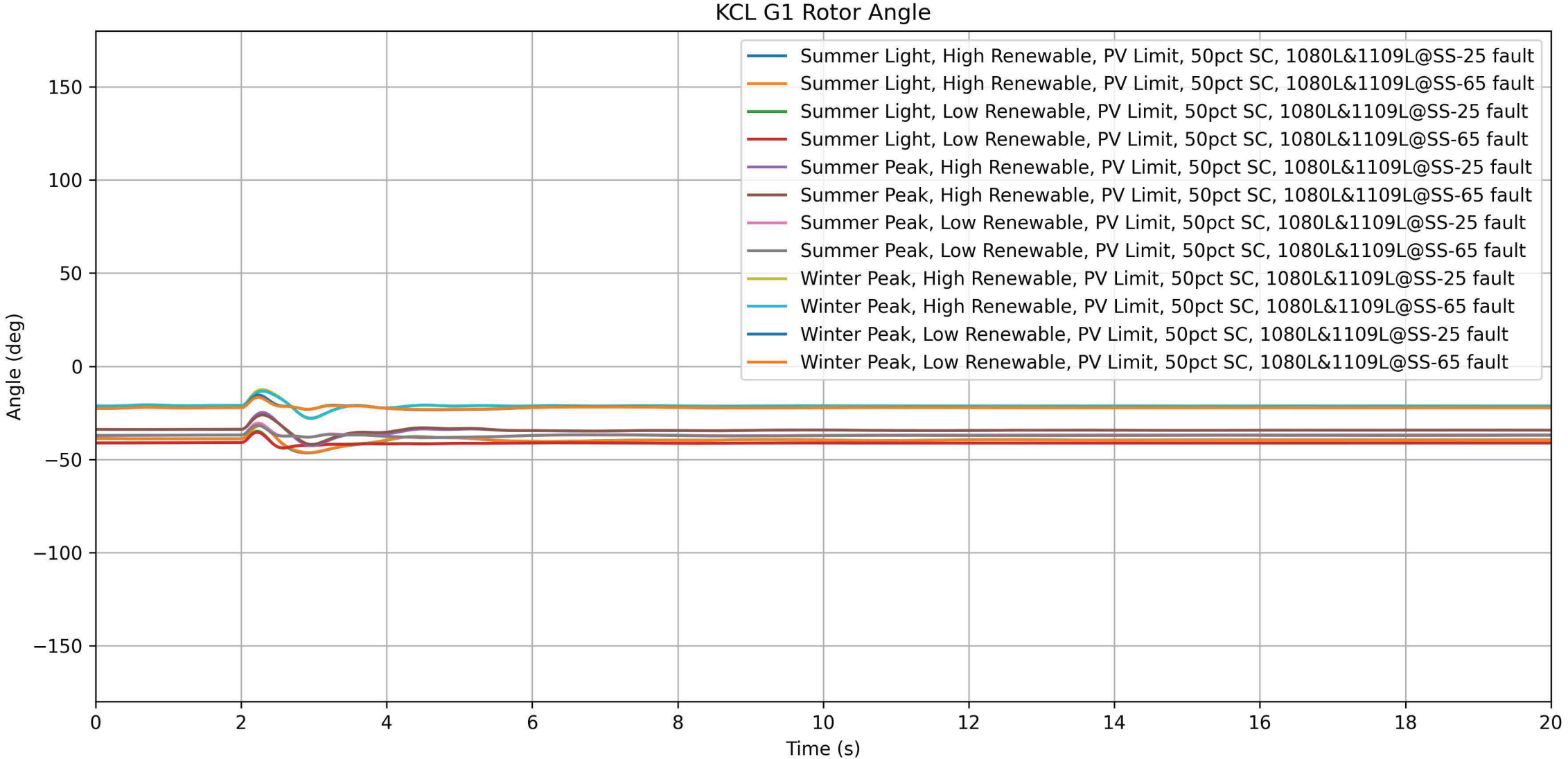

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

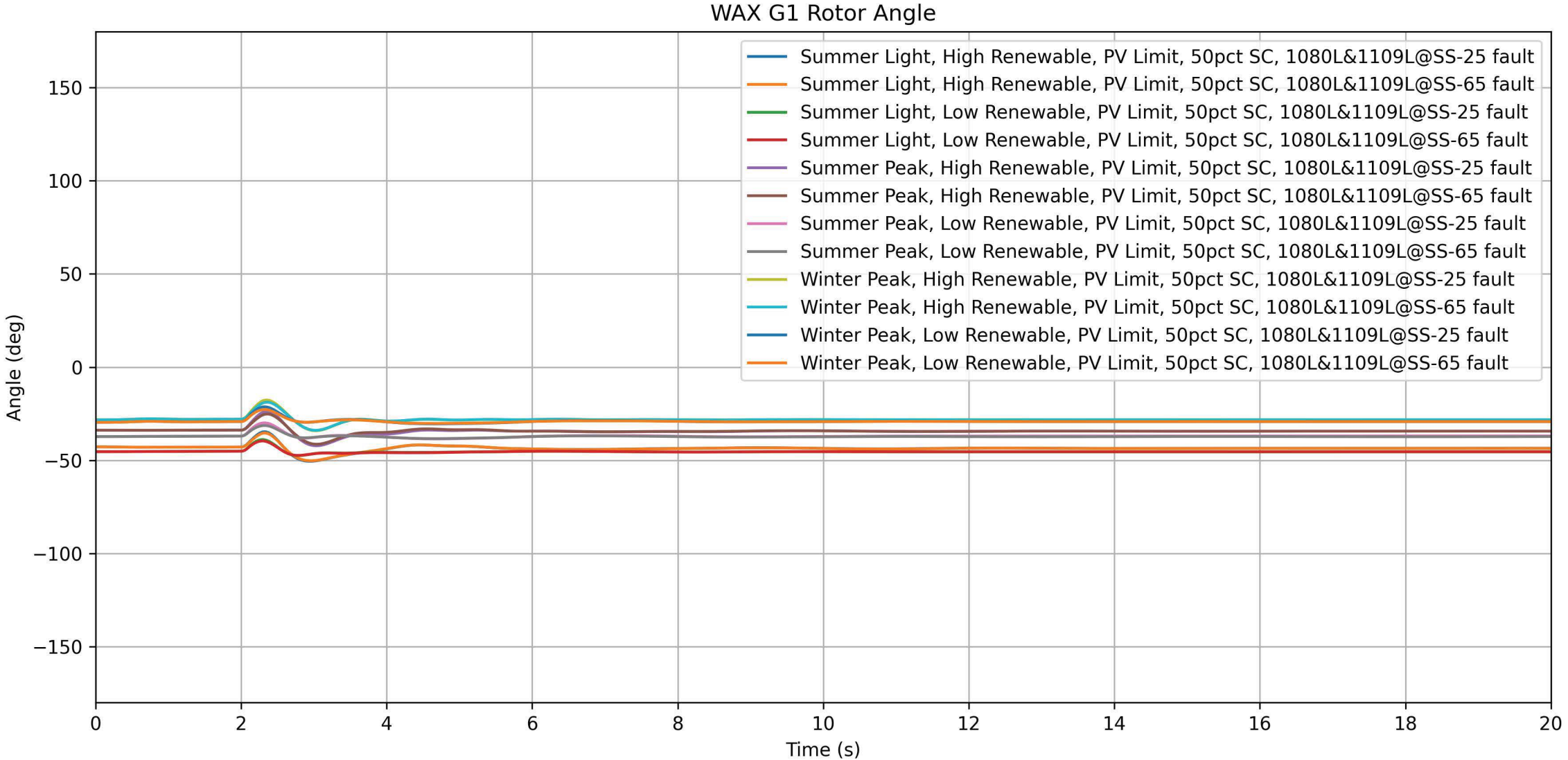

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

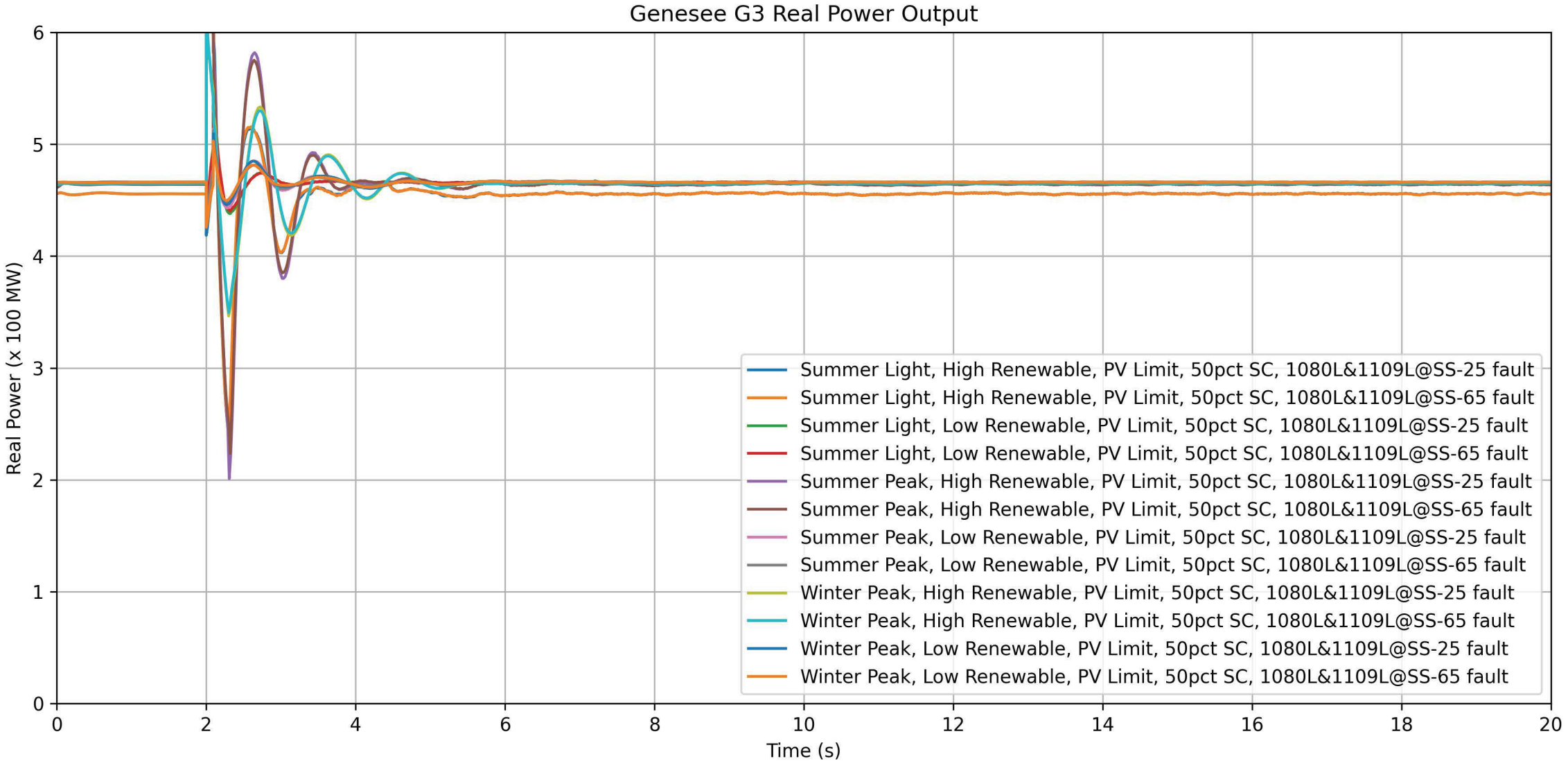

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

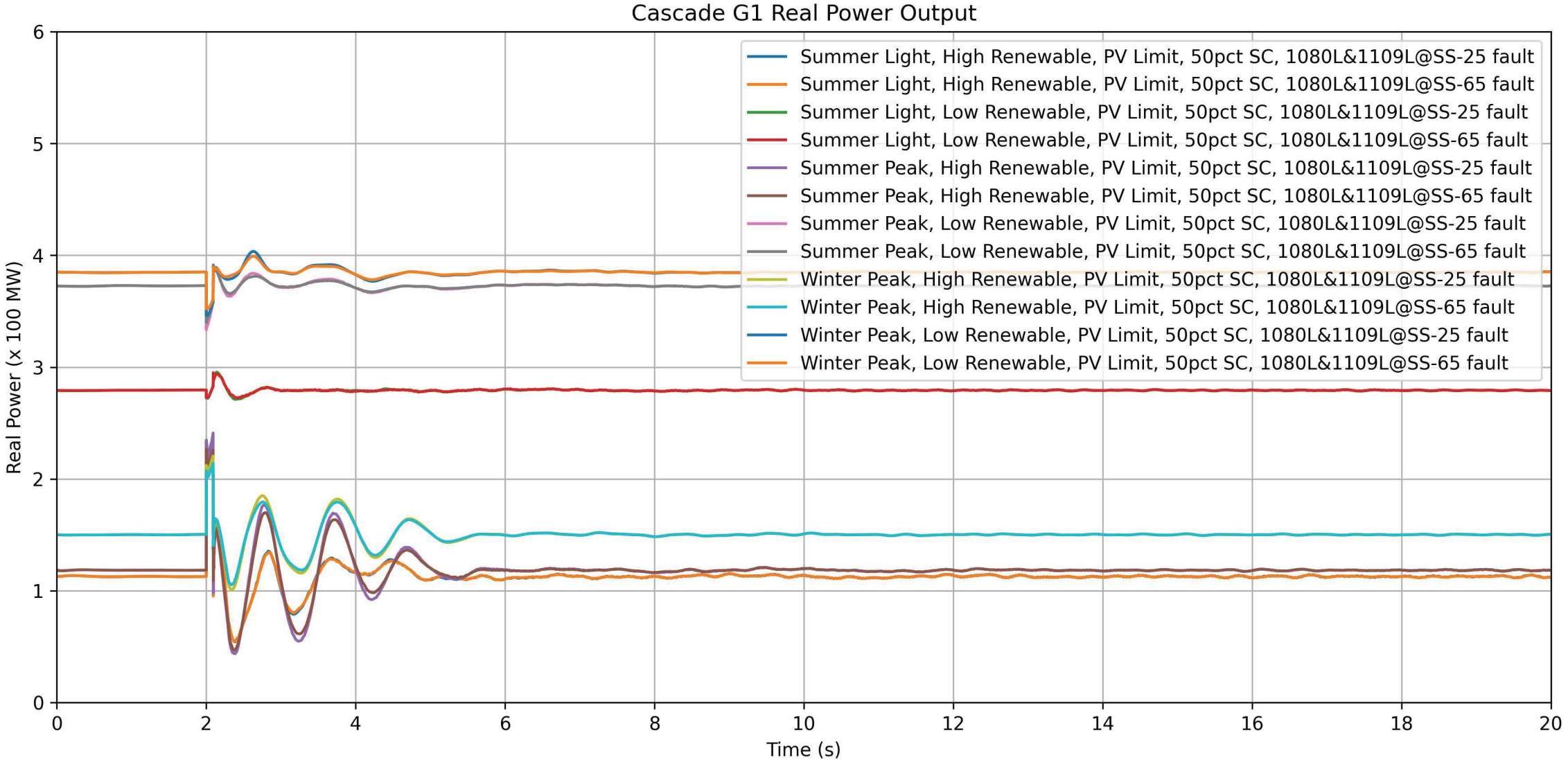

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

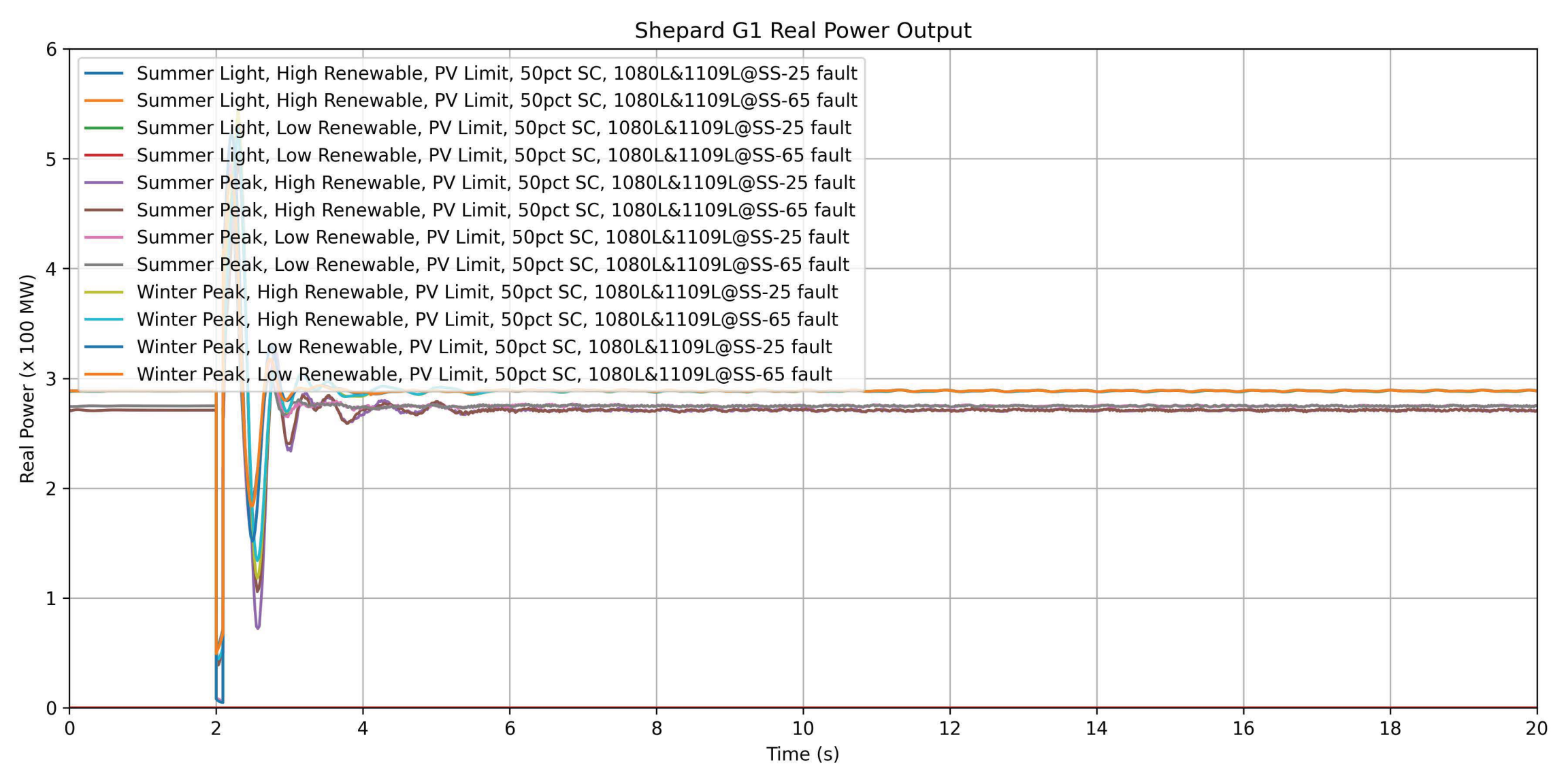

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

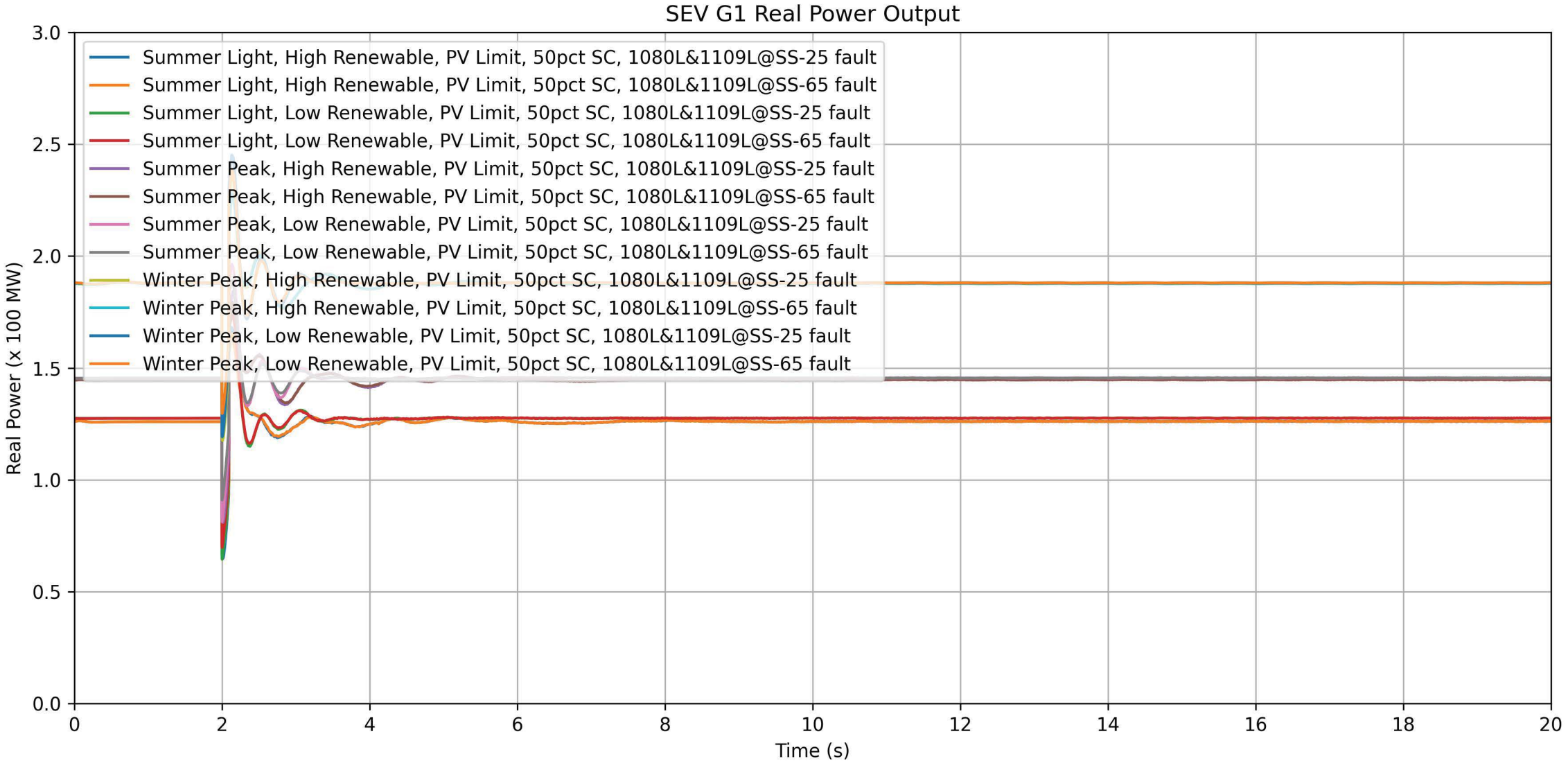

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

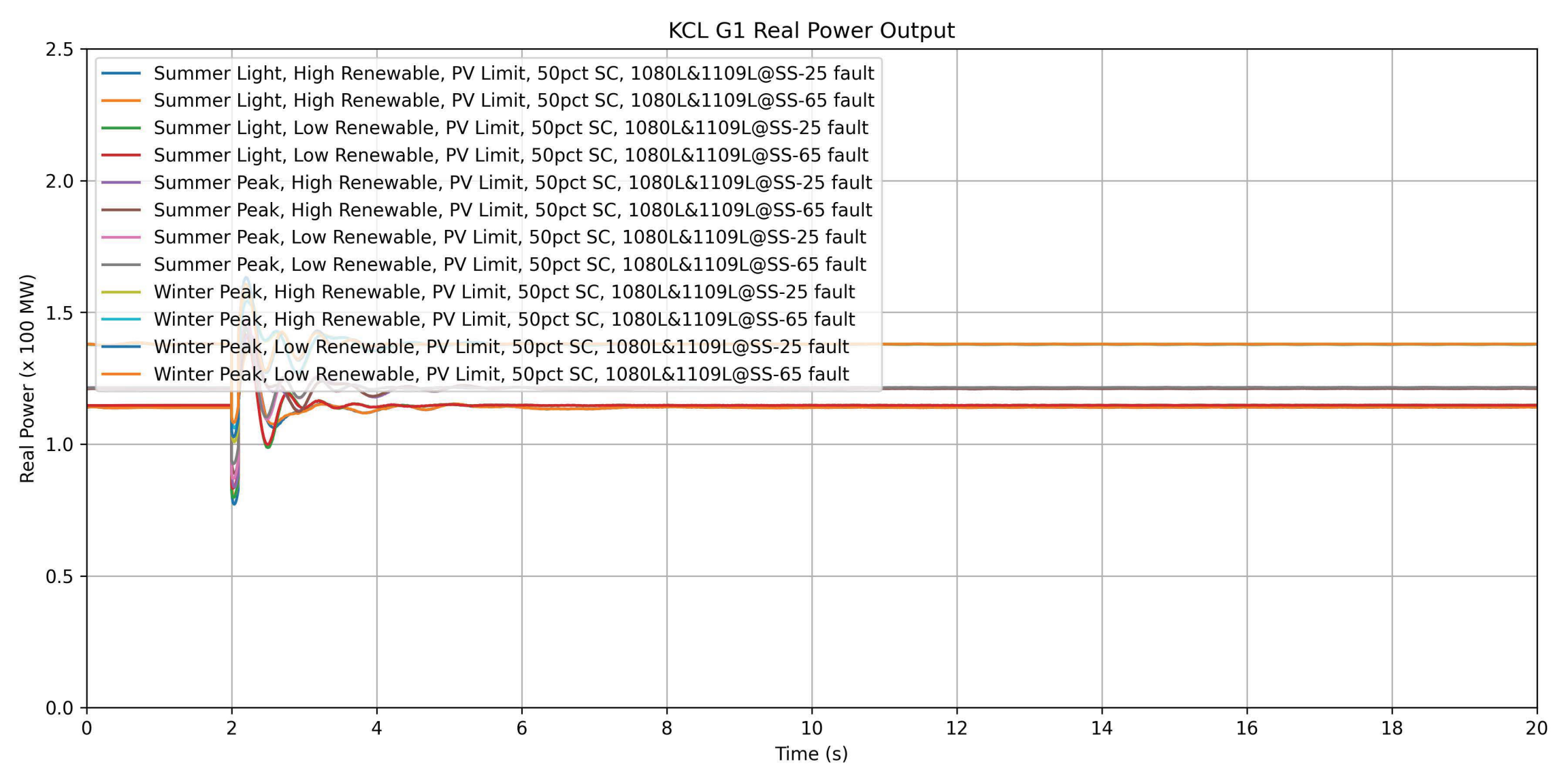

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

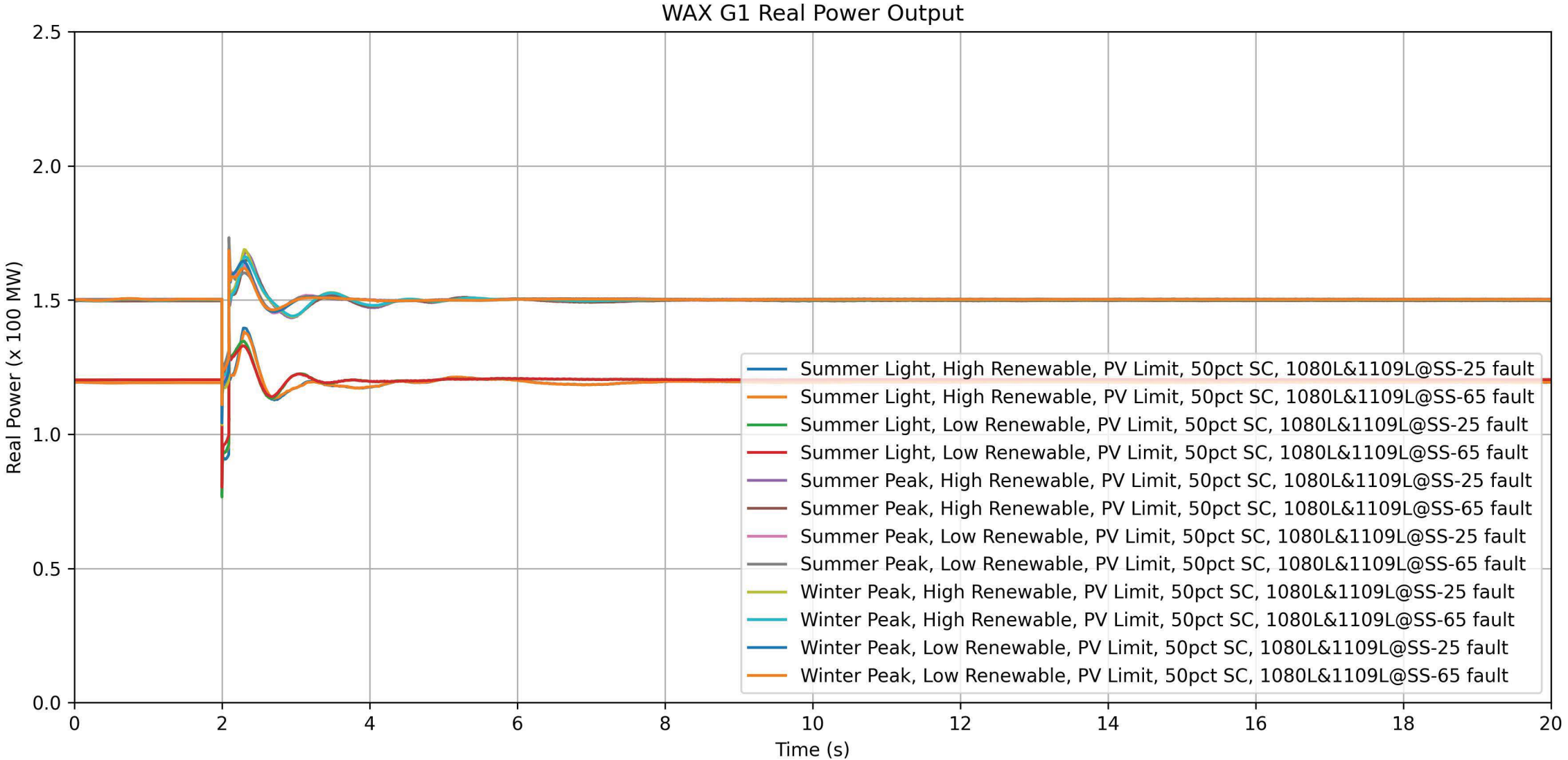

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

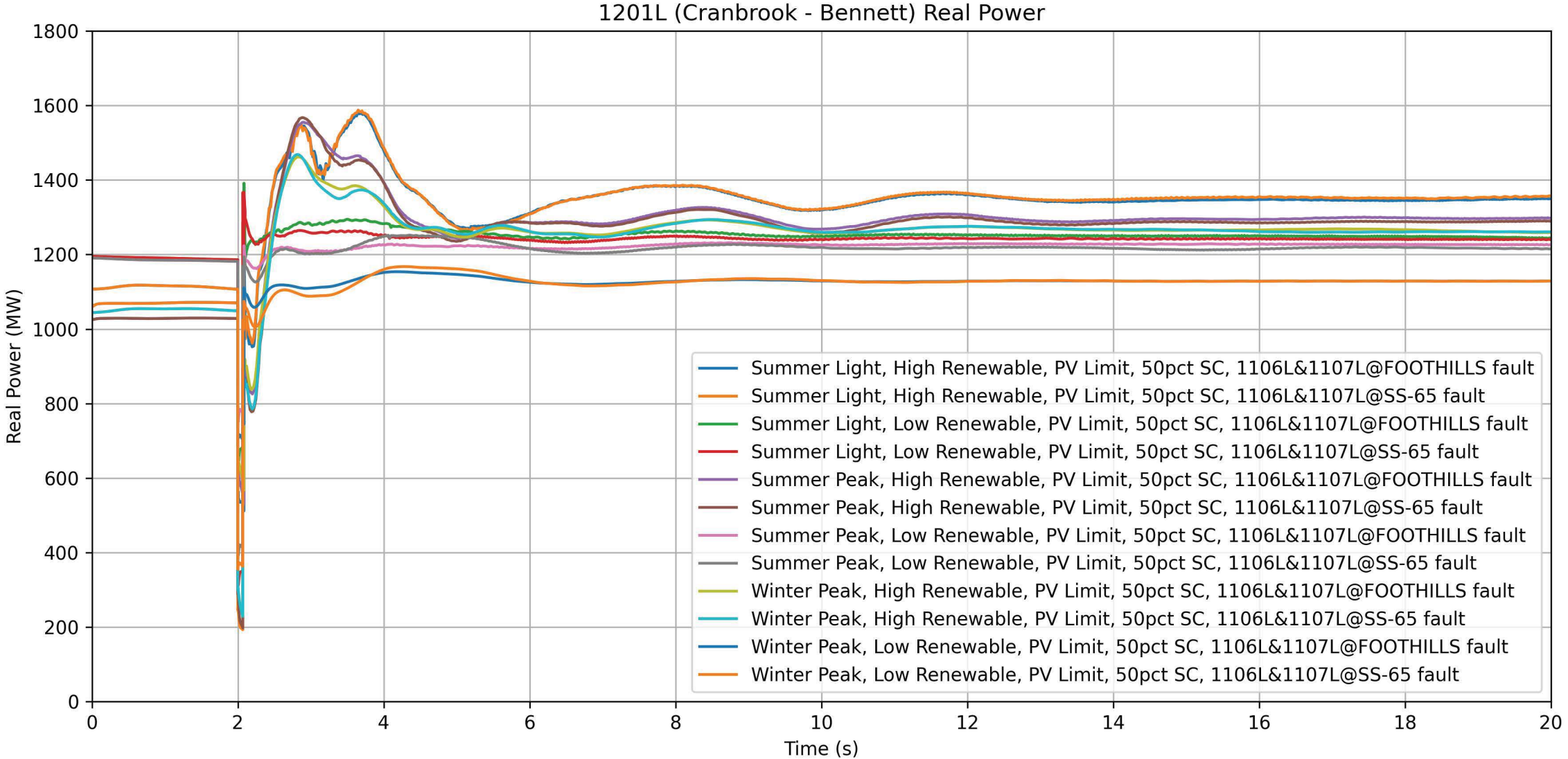

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

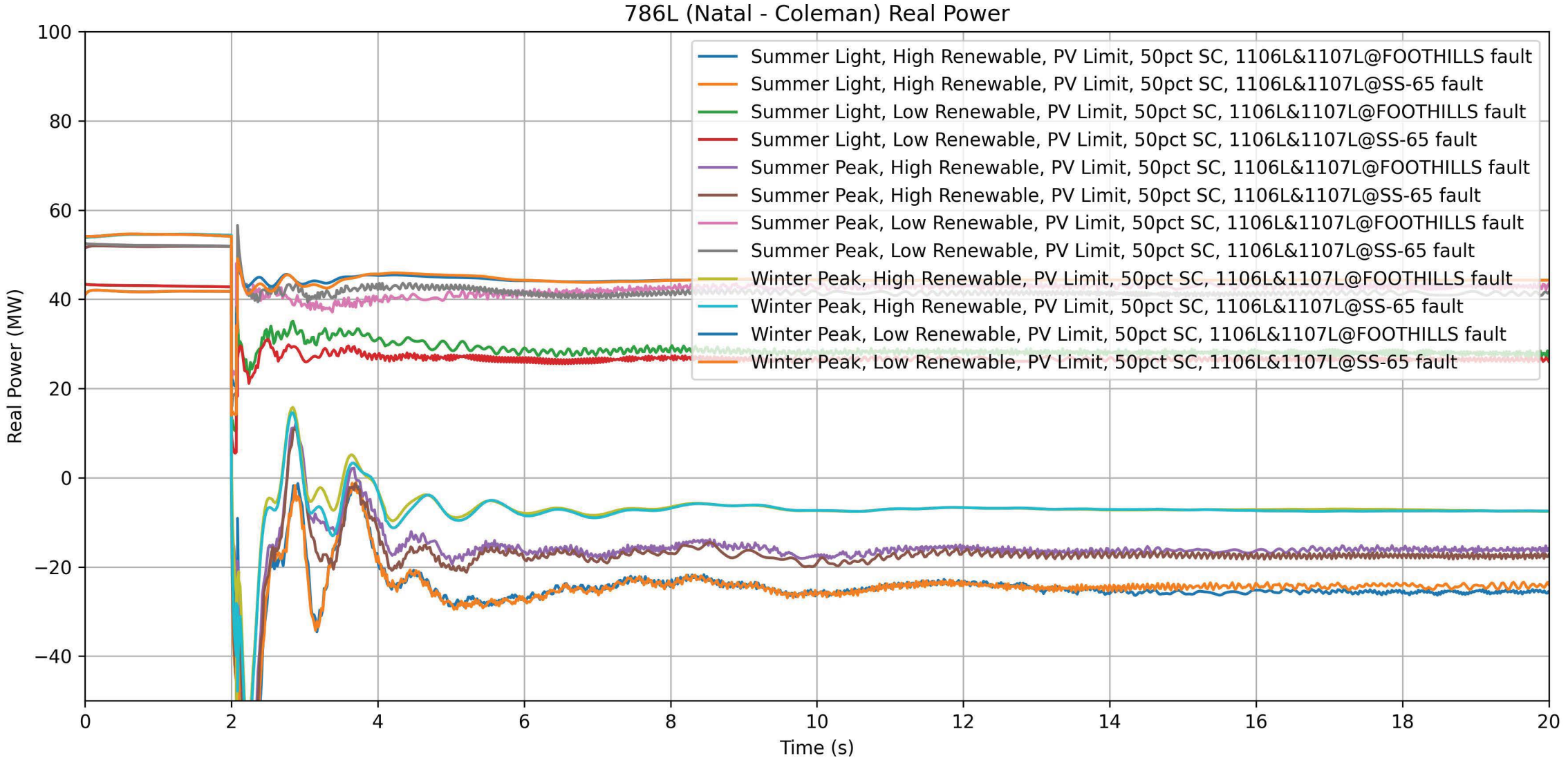

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

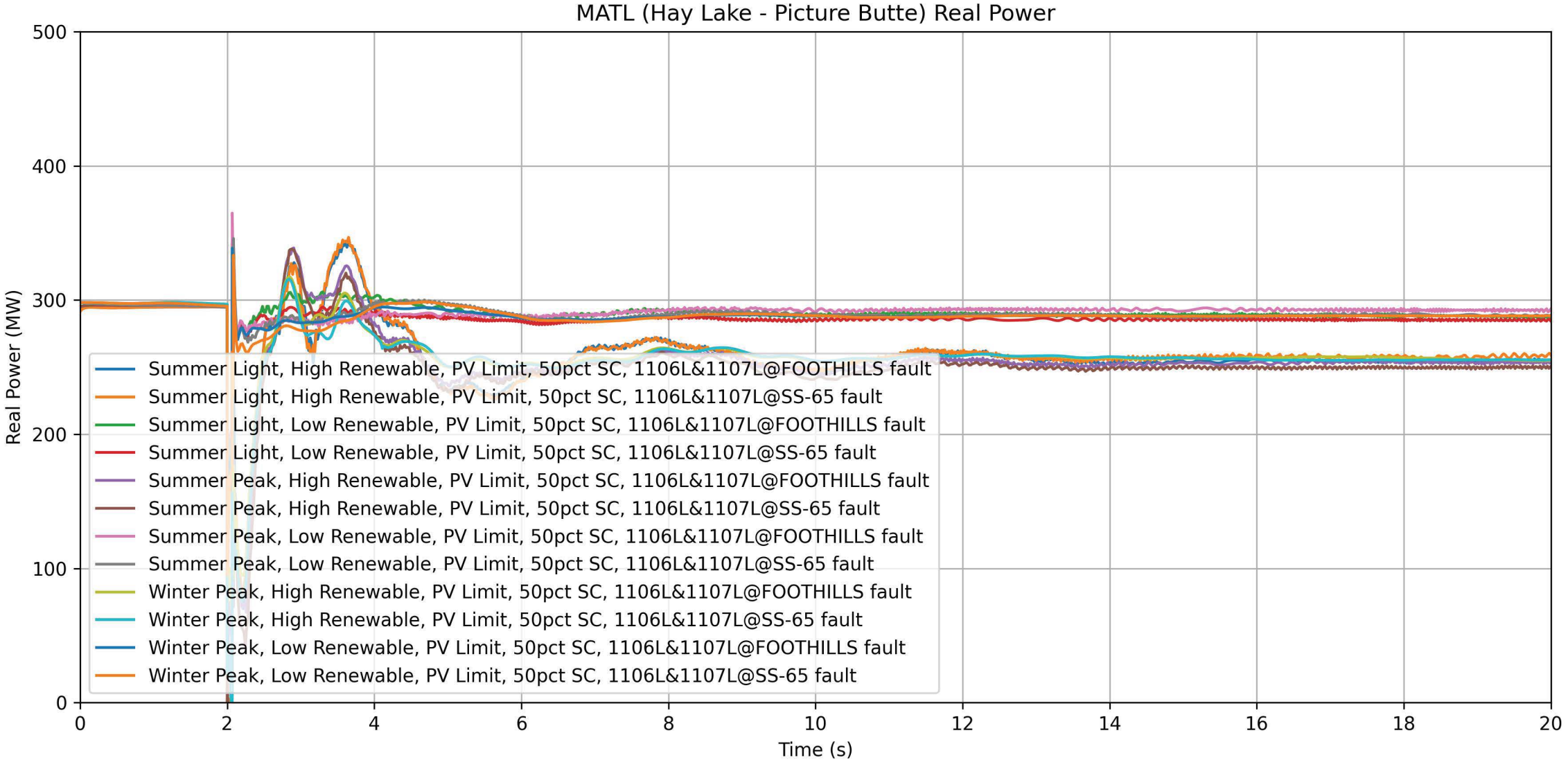

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

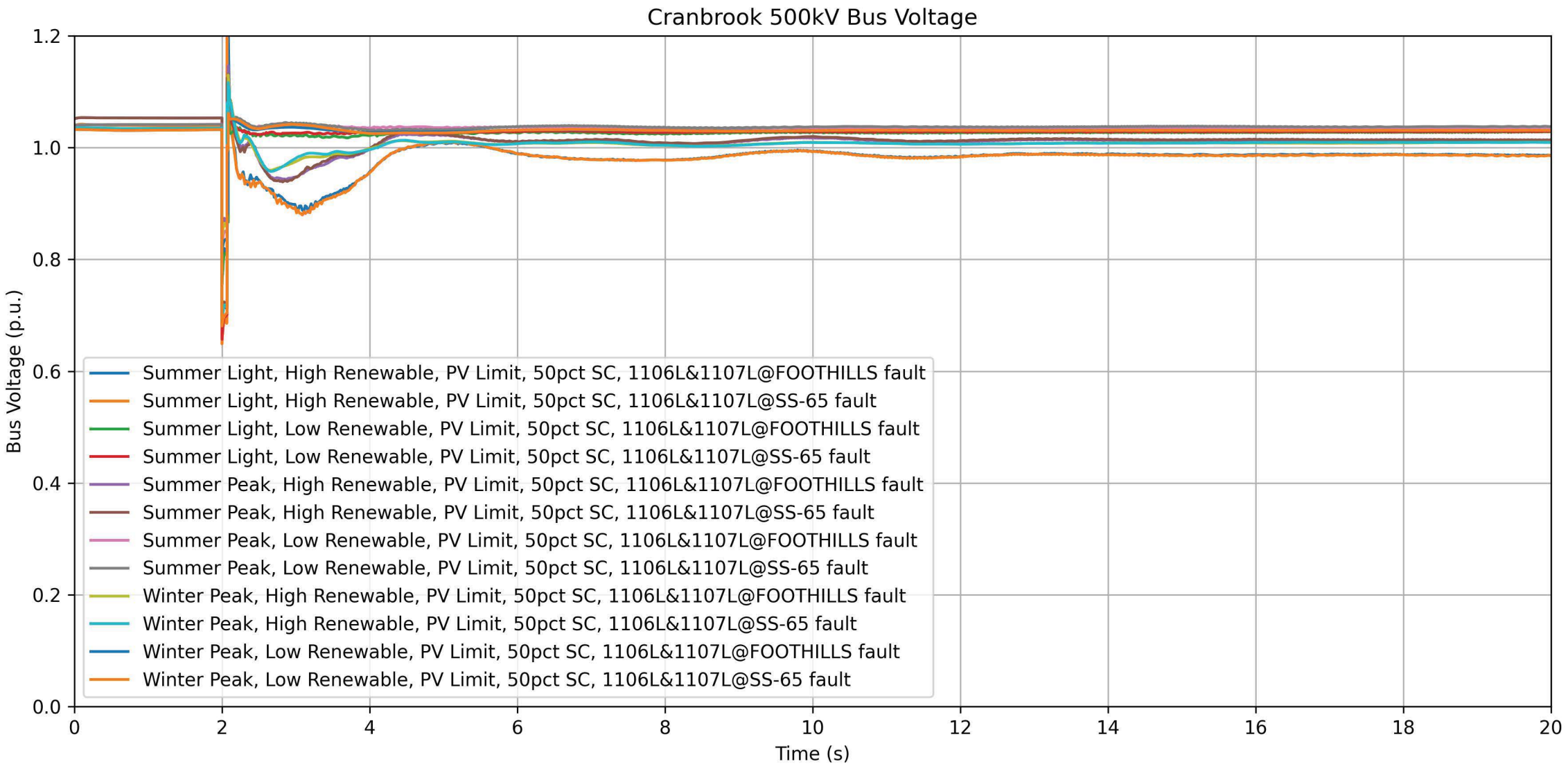

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

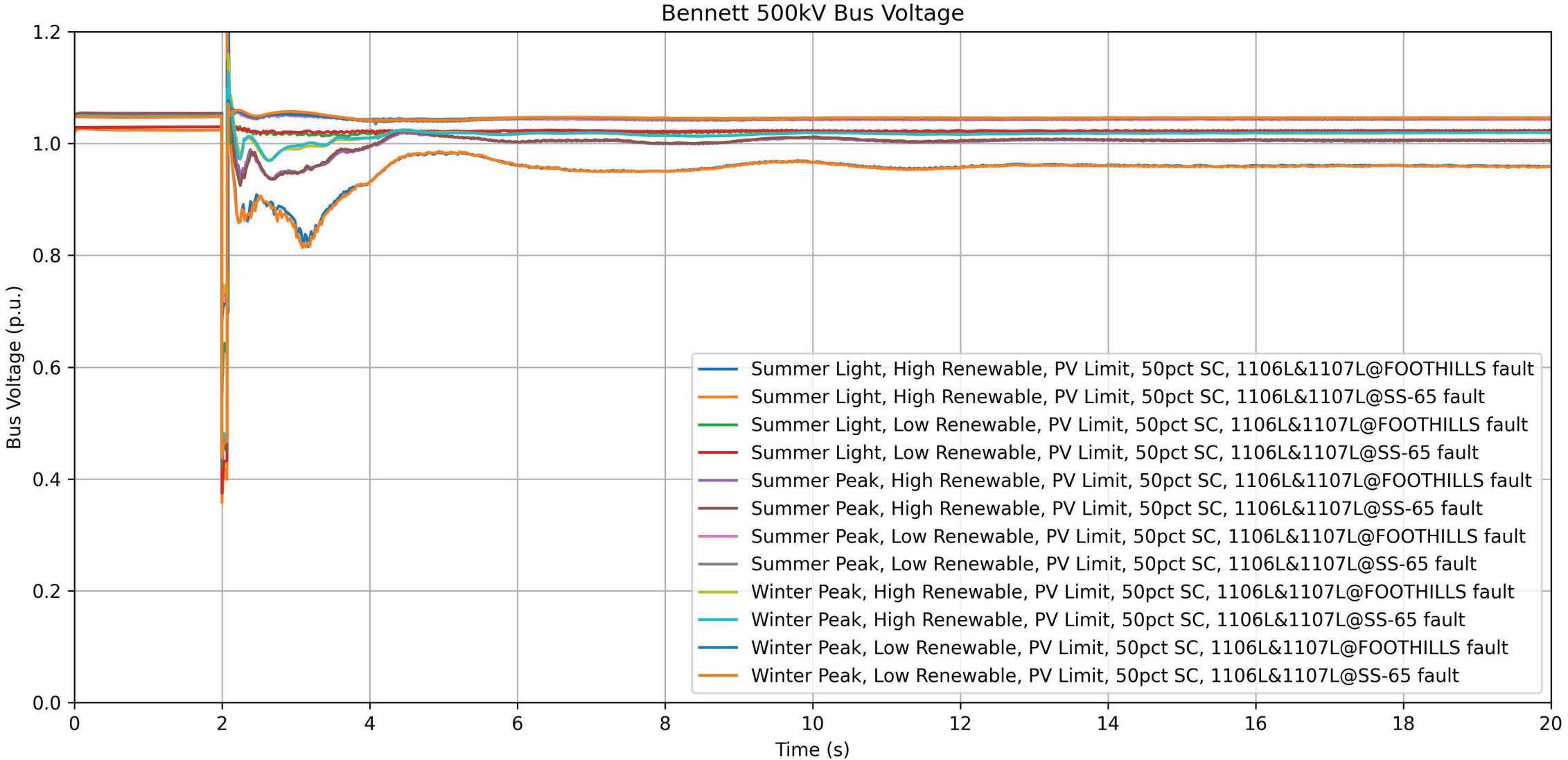

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-25 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1080L&1109L@SS-65 fault

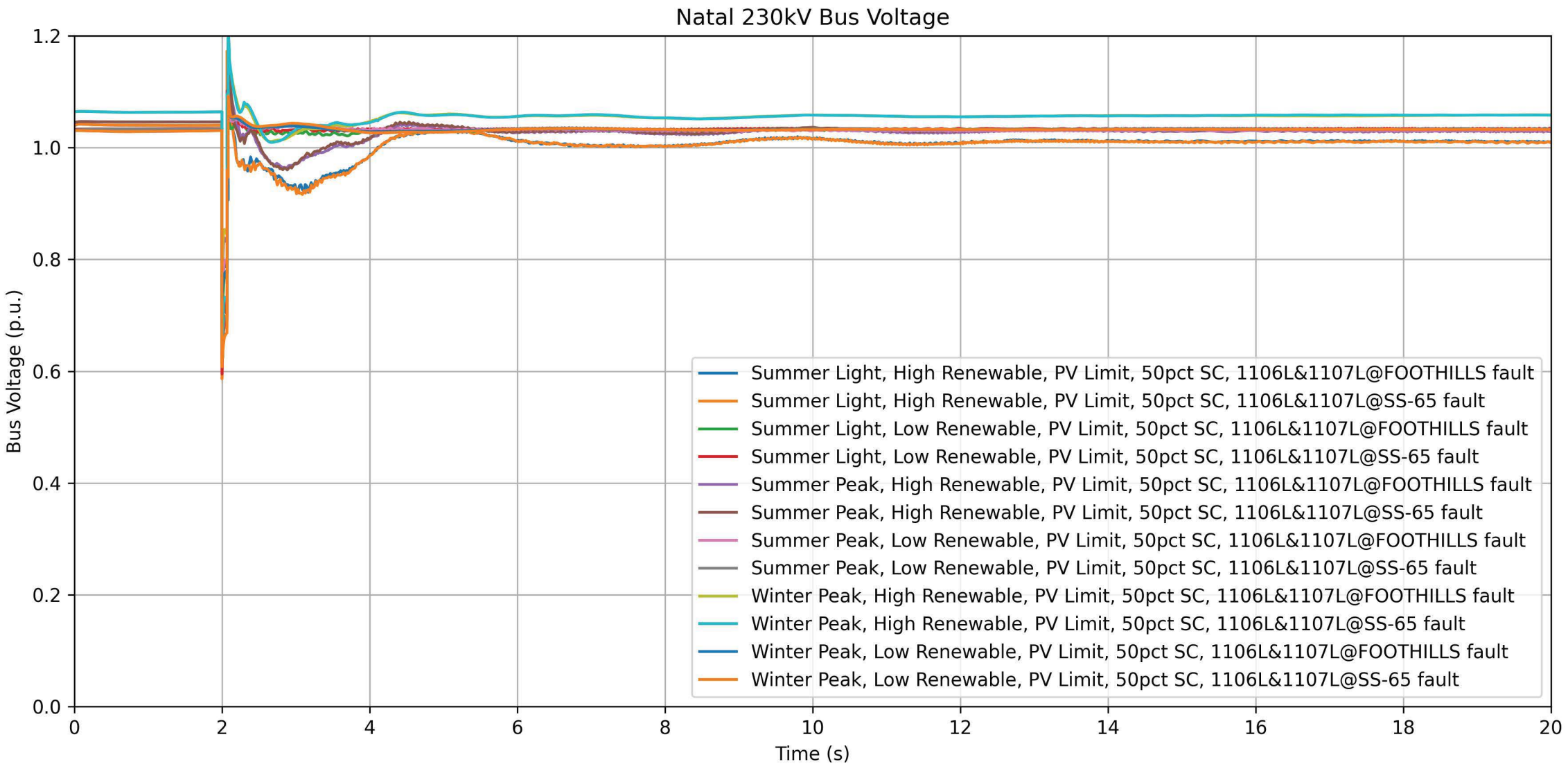

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

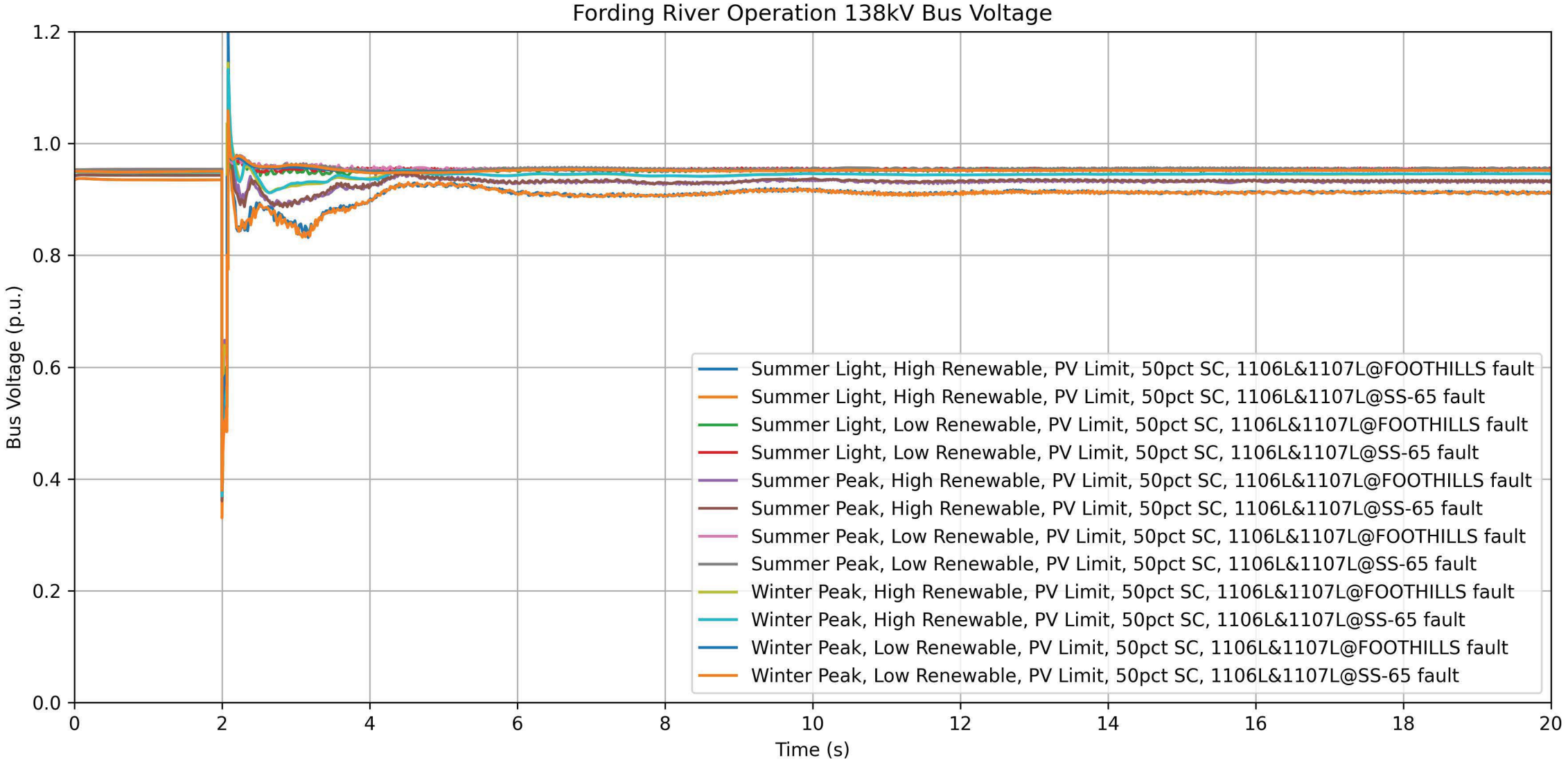

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

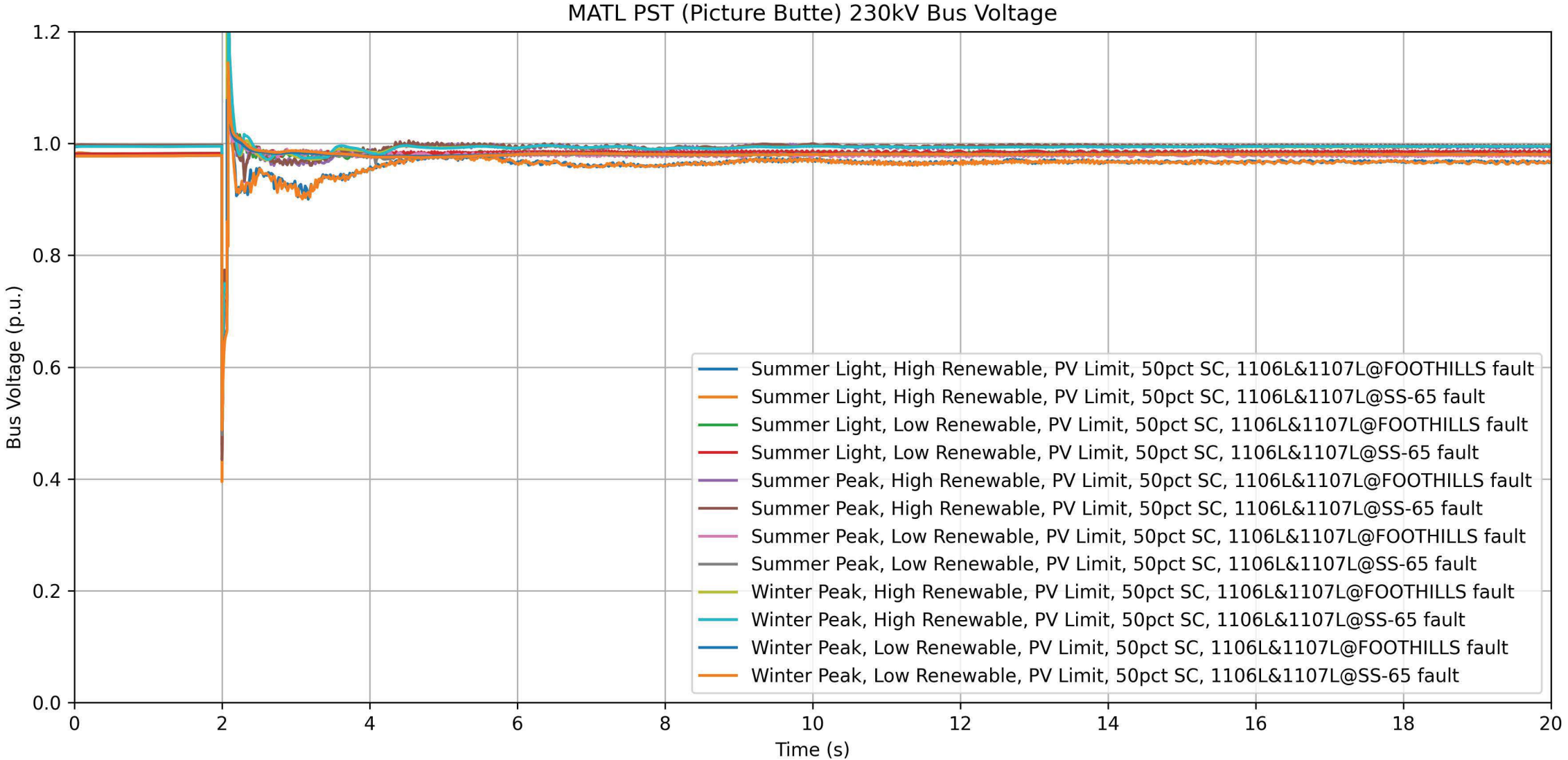

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

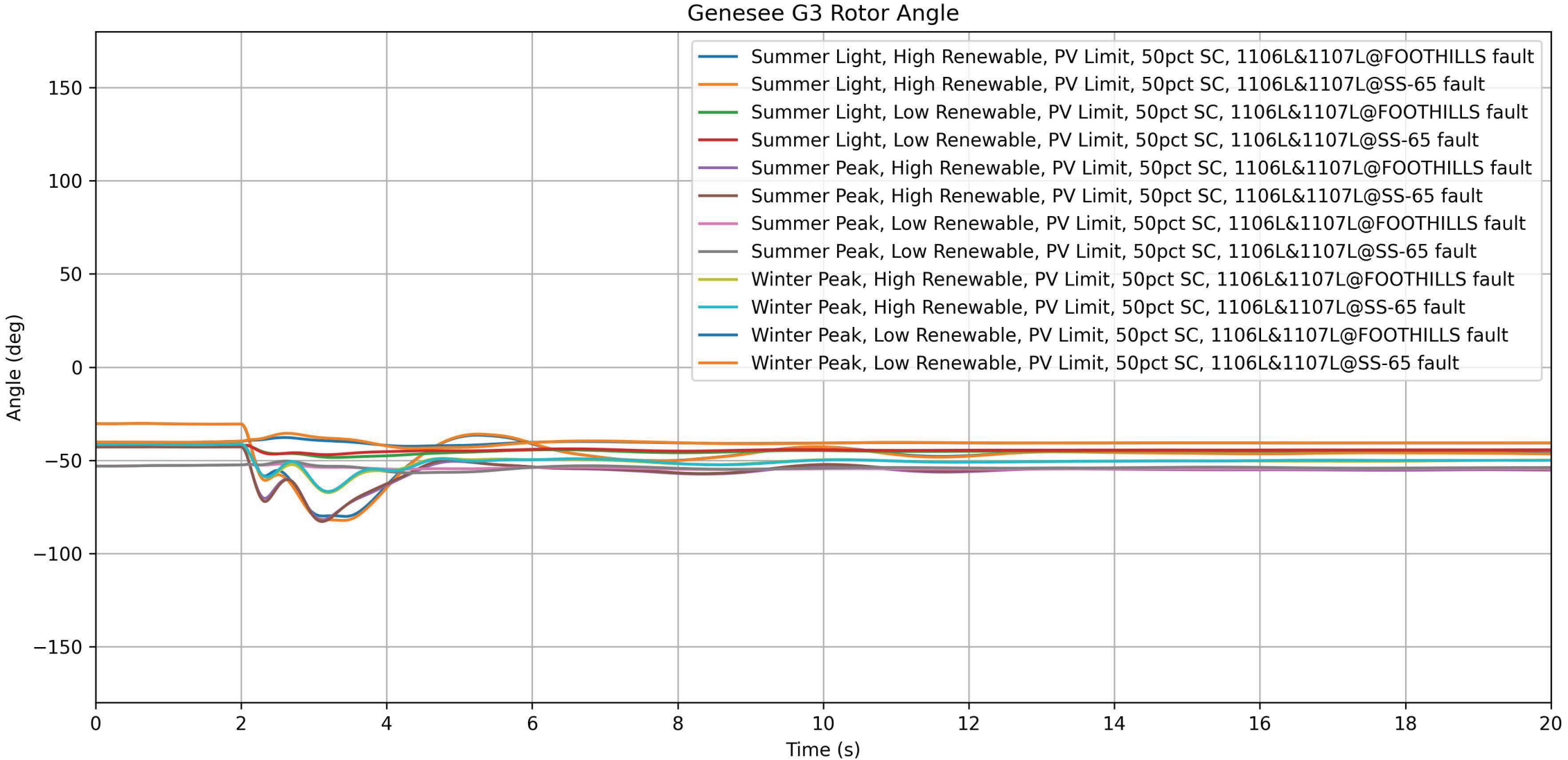

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

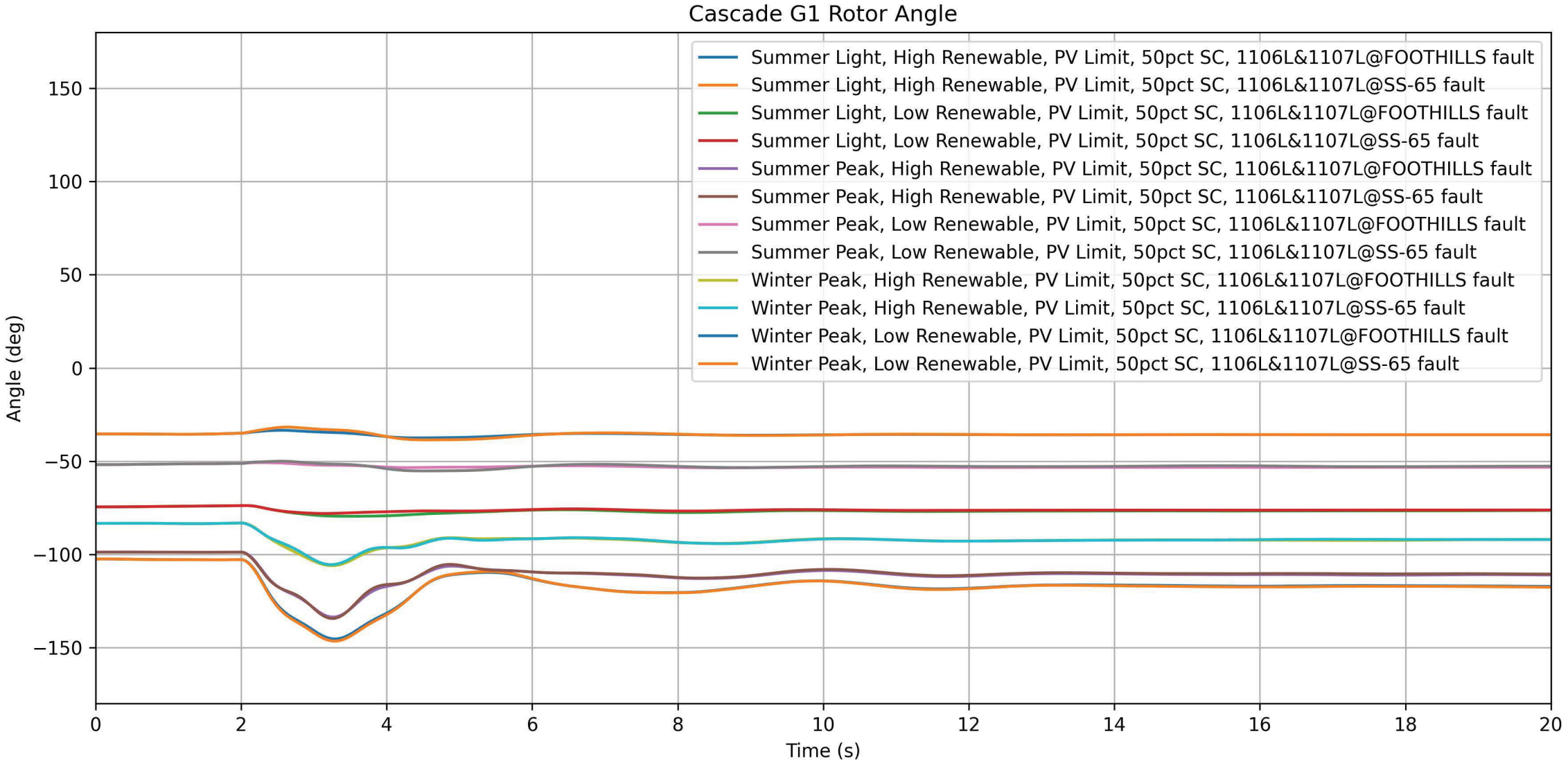

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

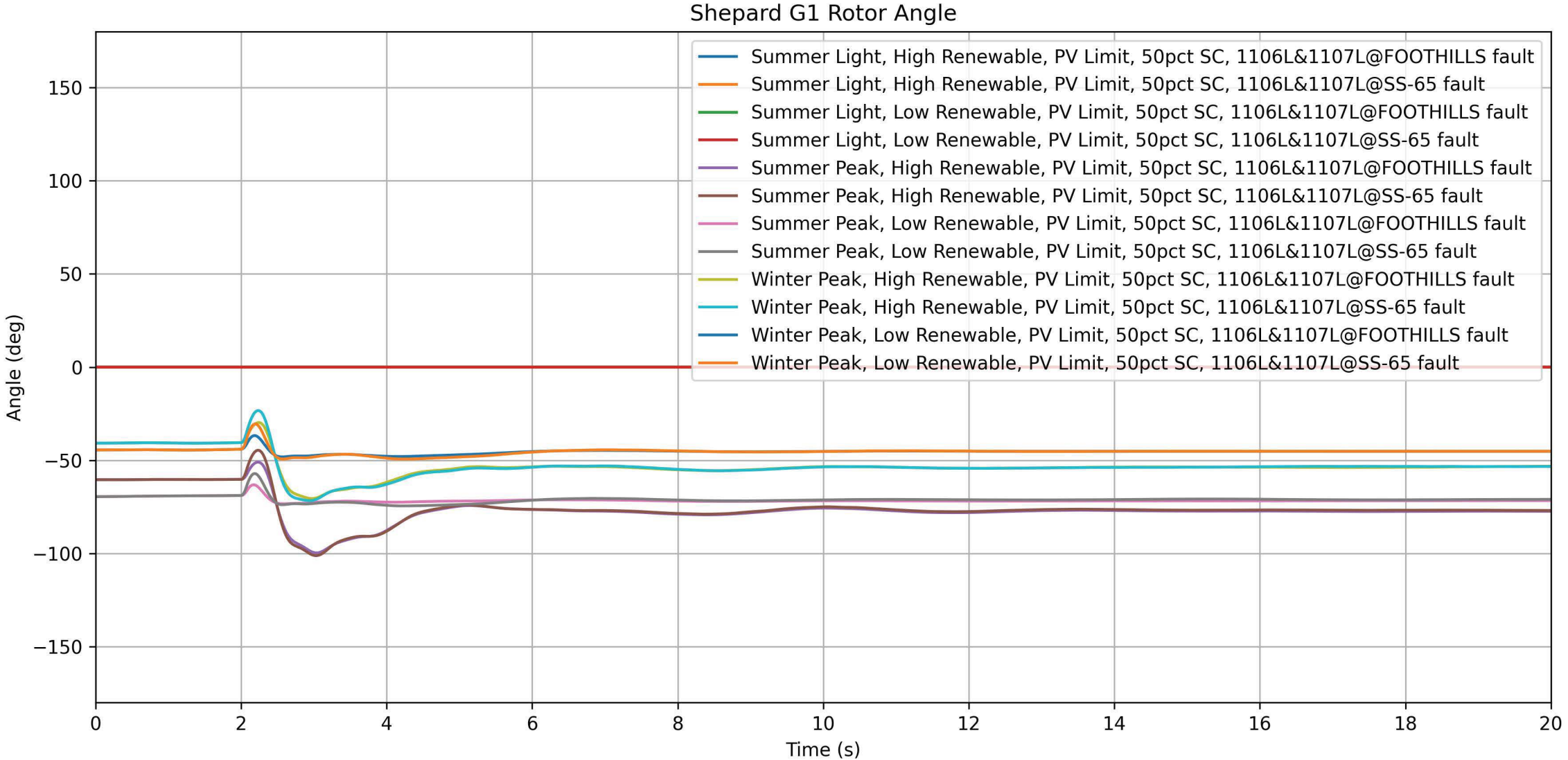

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

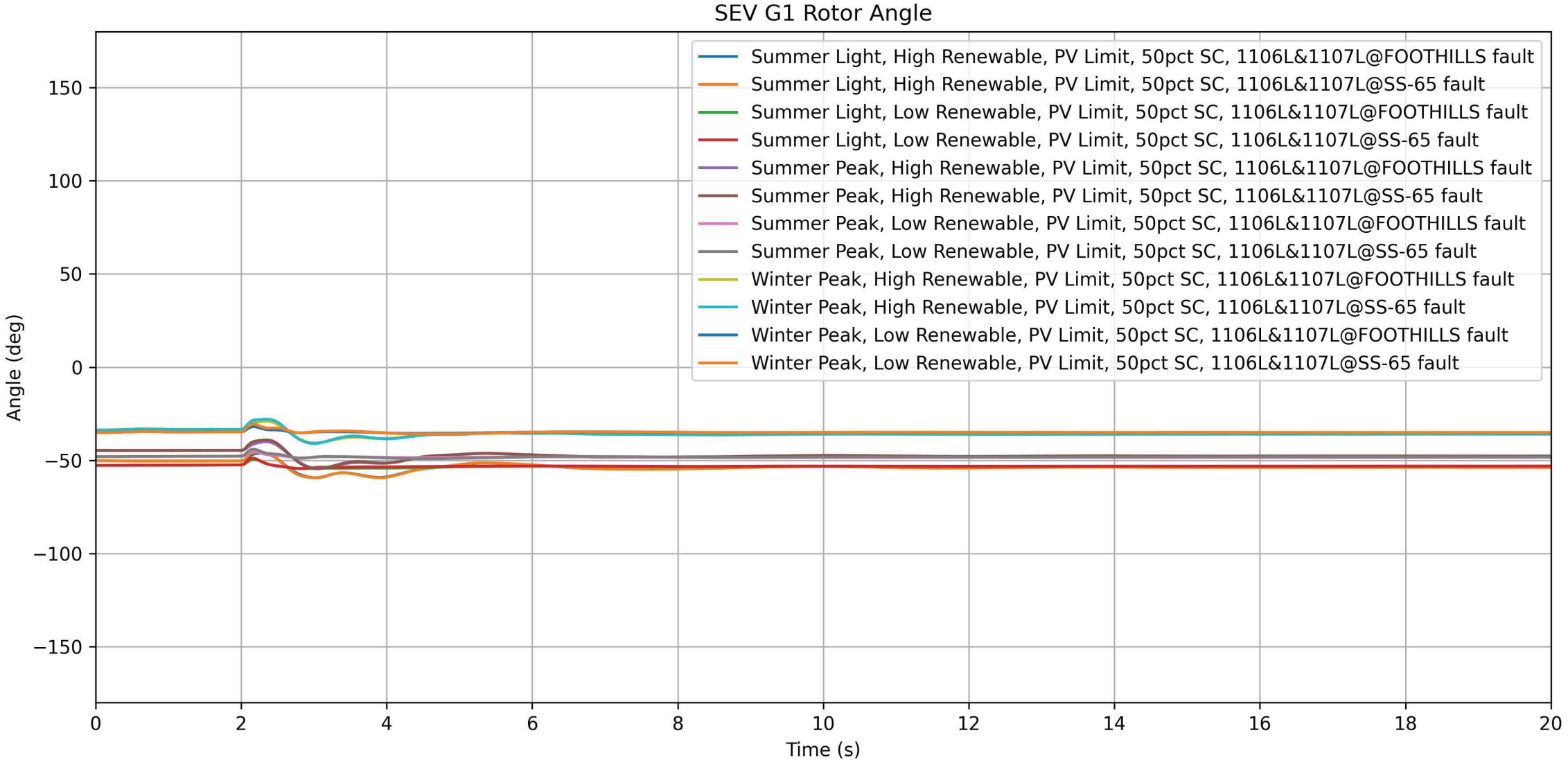

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

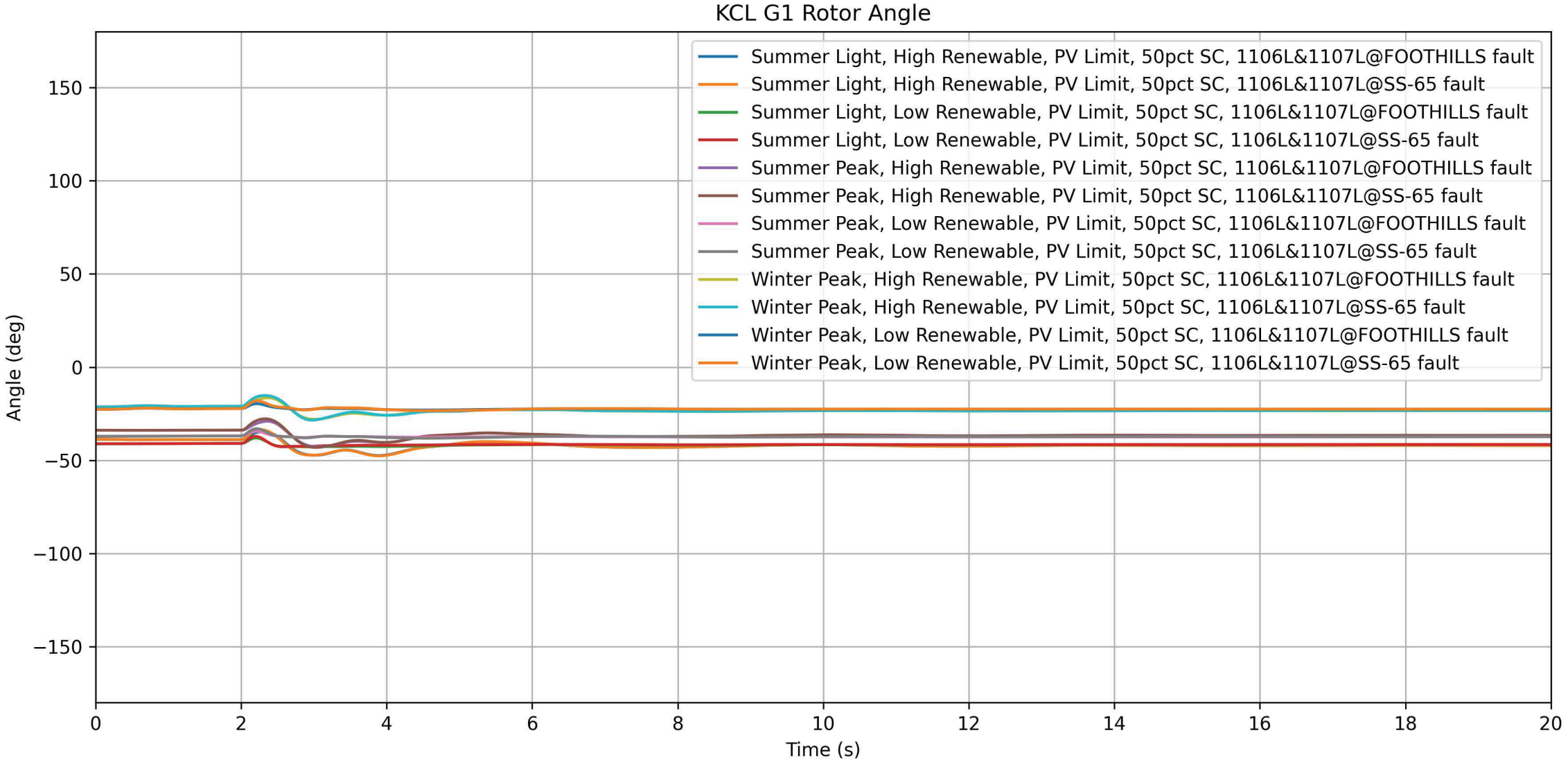

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

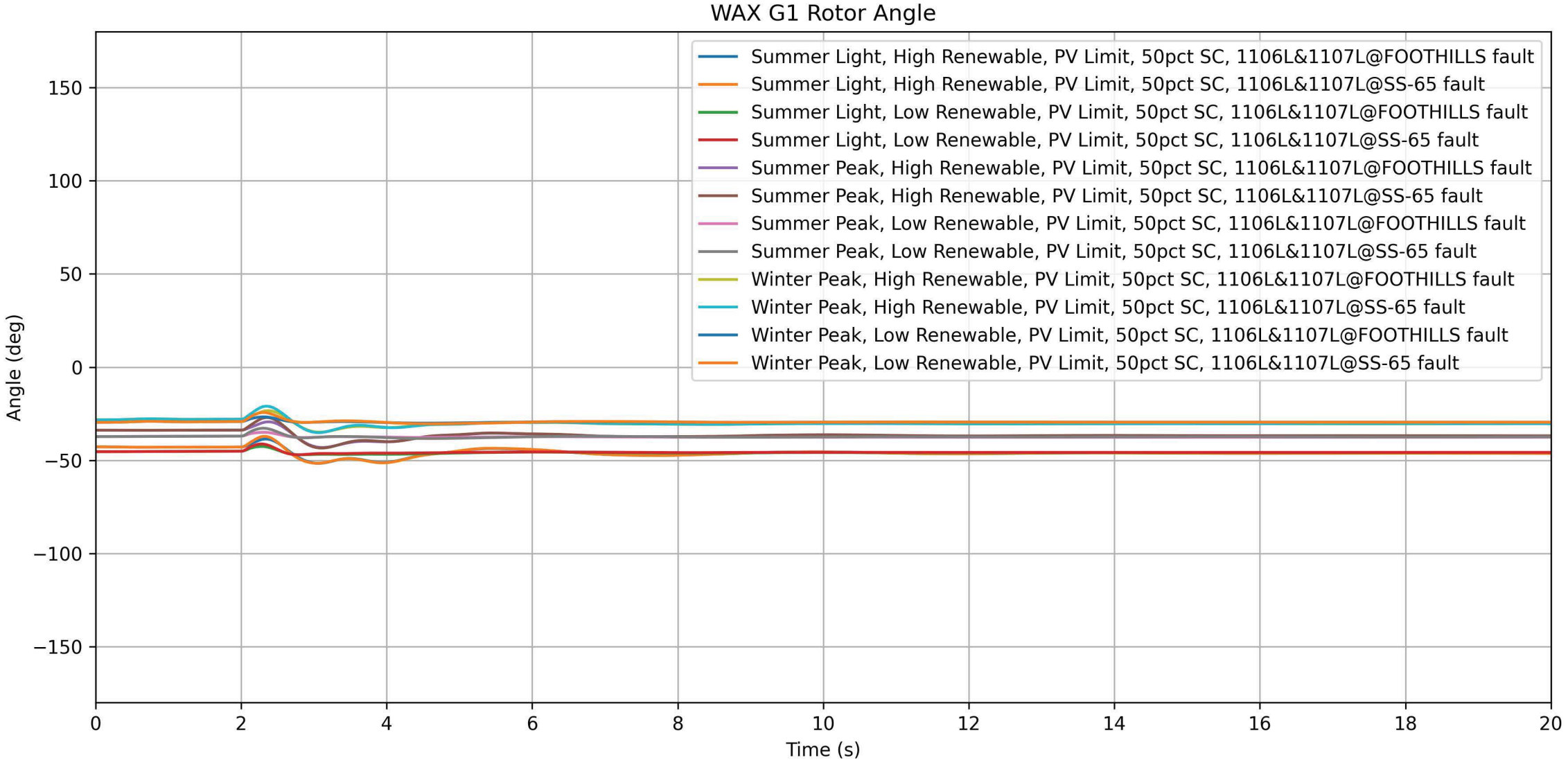

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

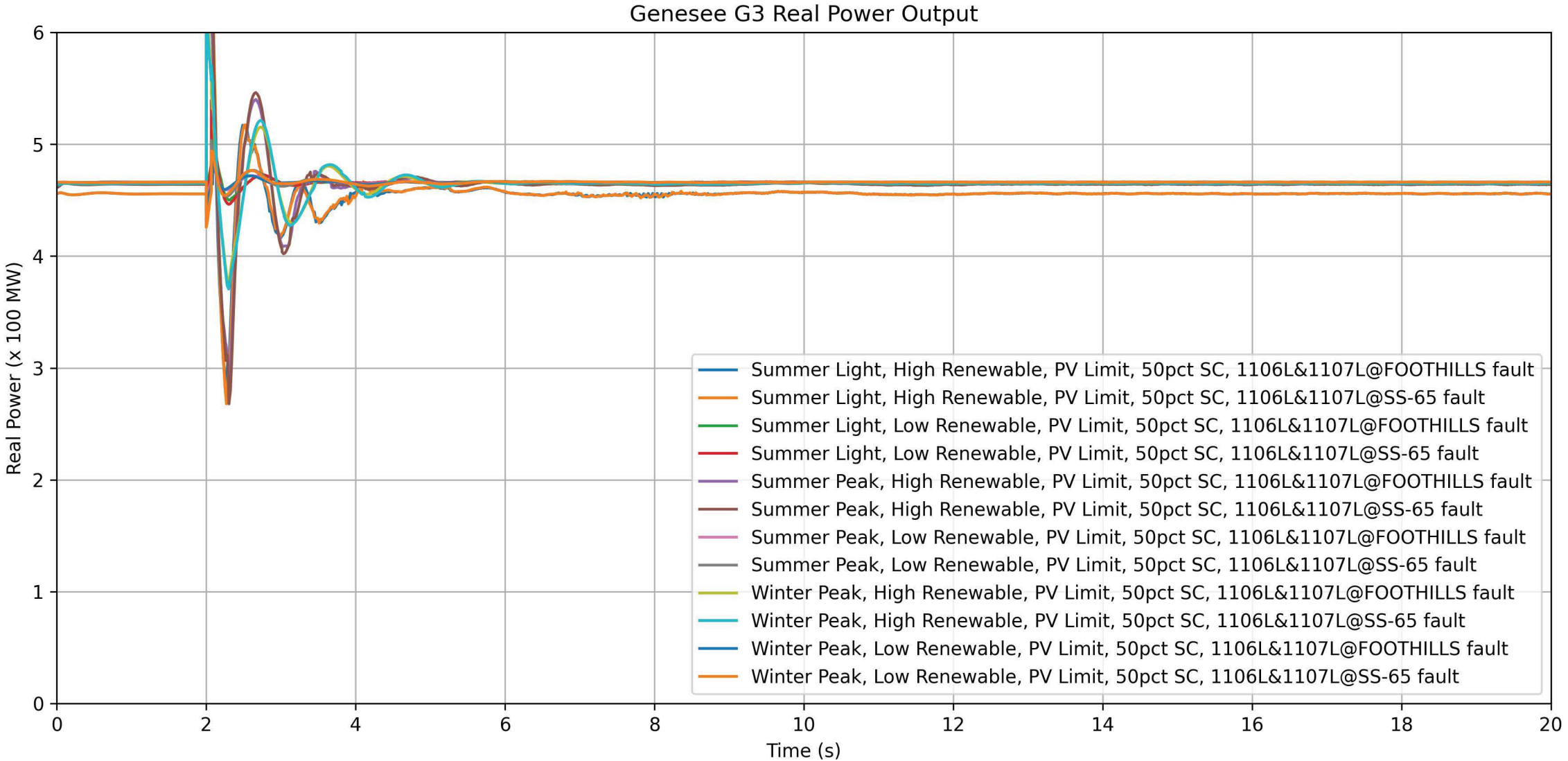

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

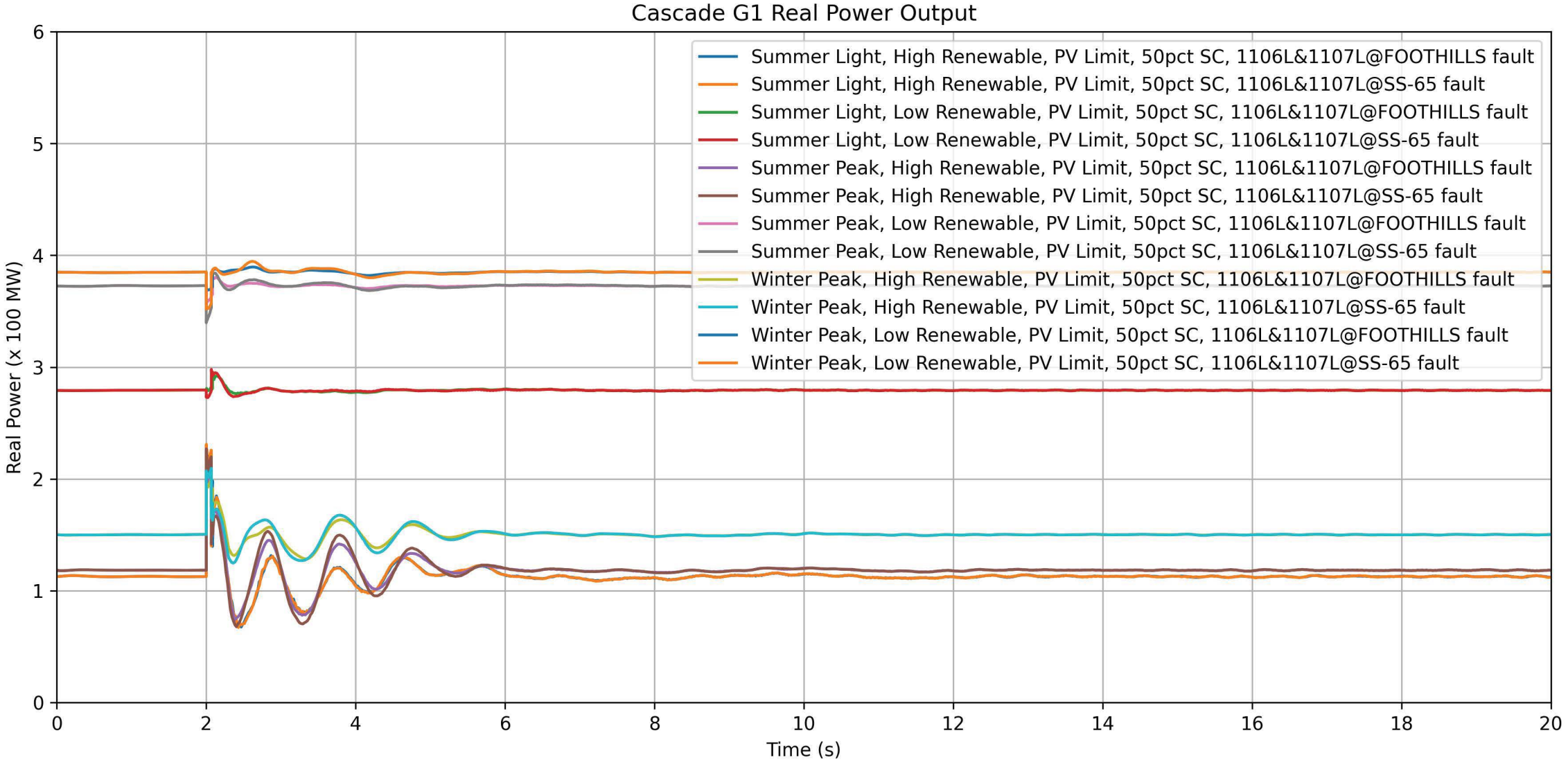

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

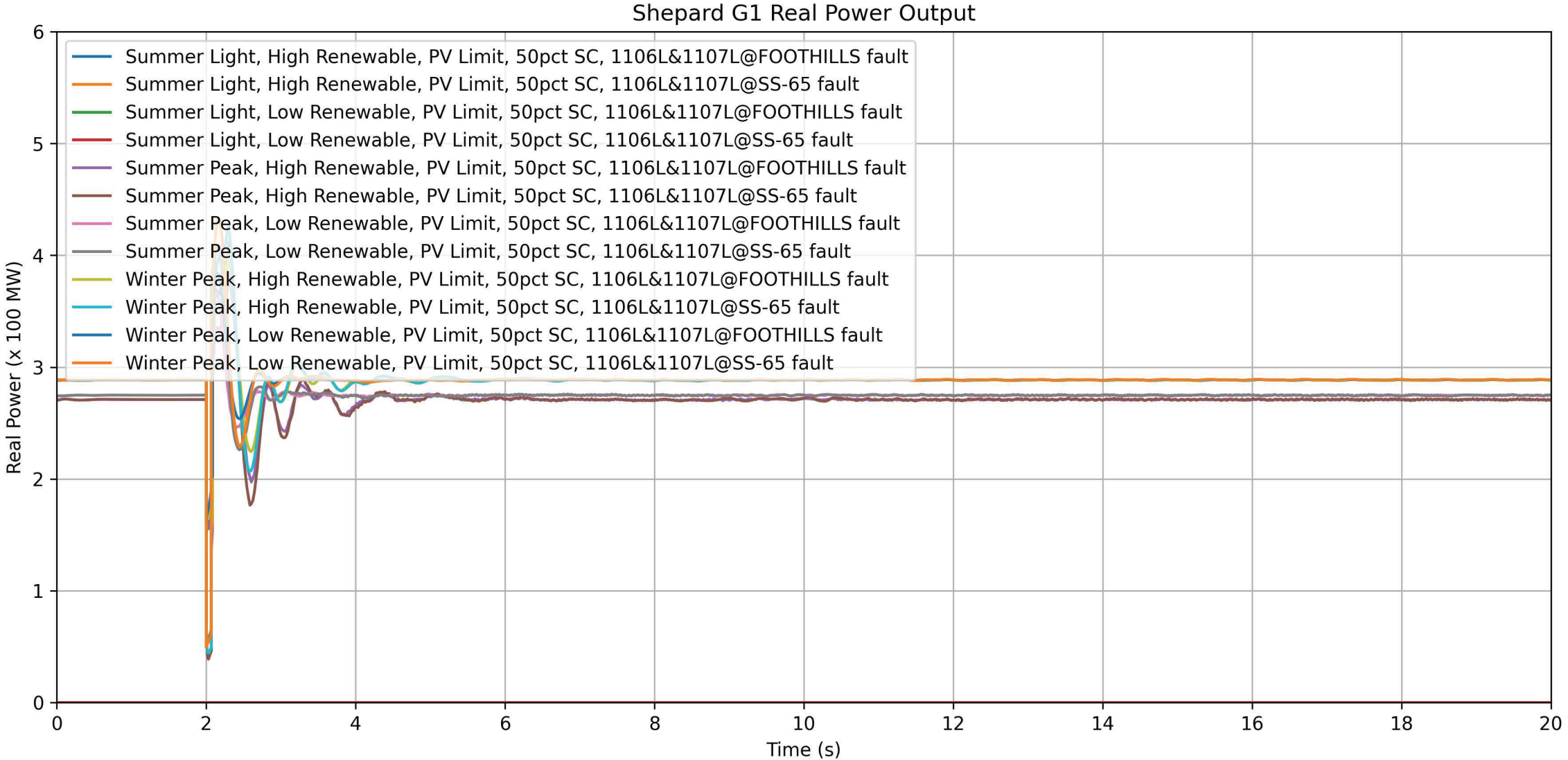

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

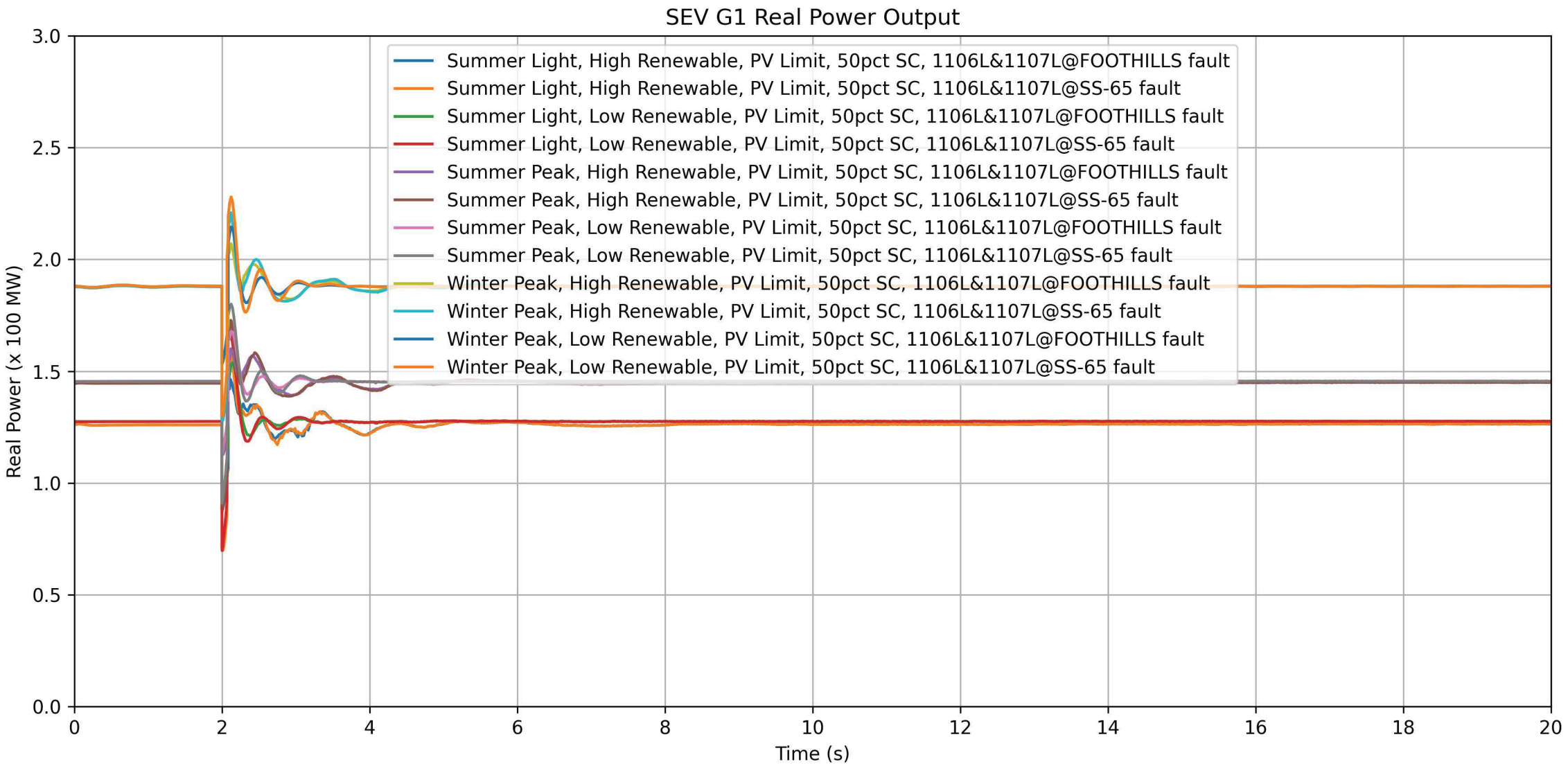

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

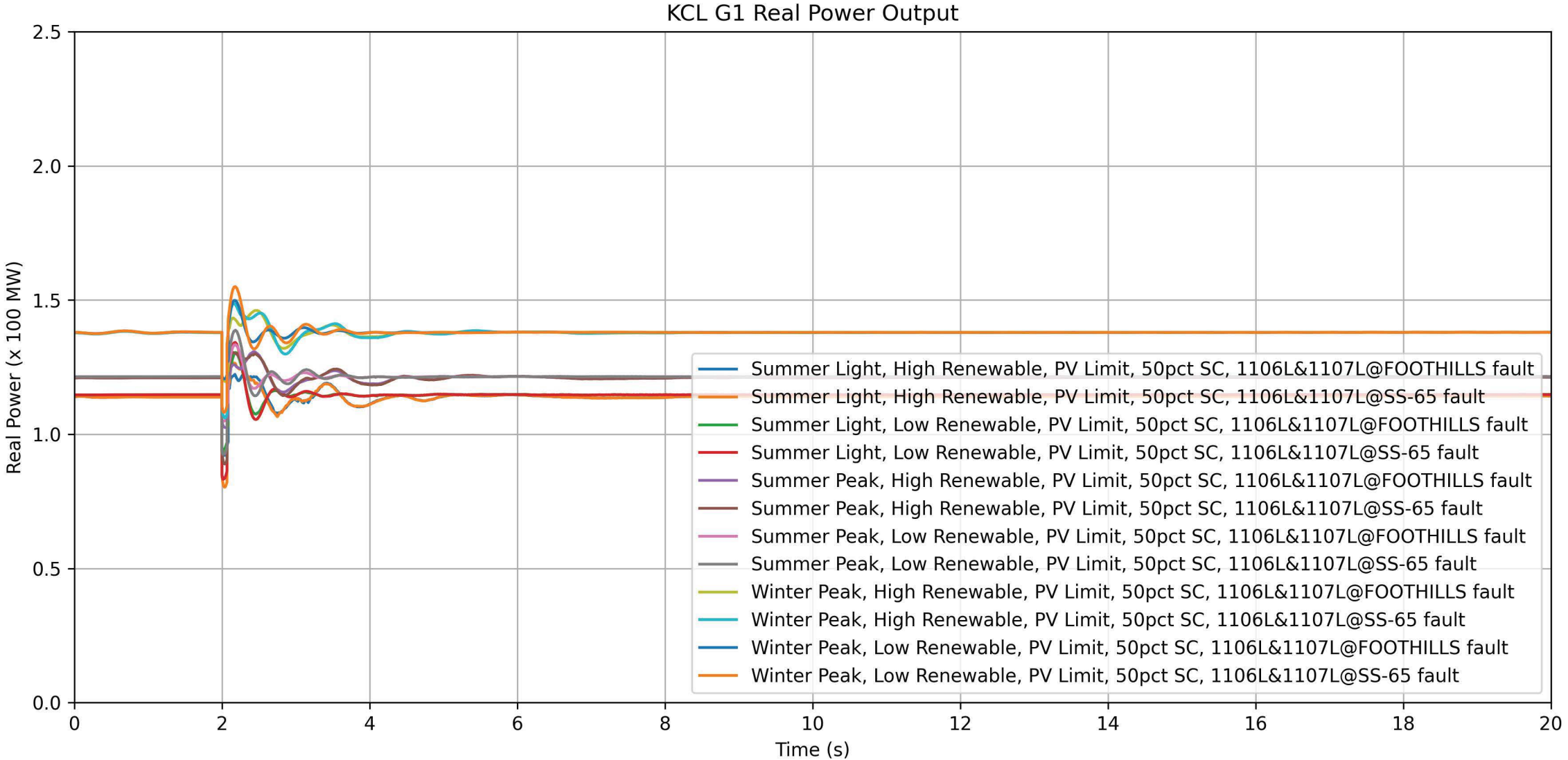

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

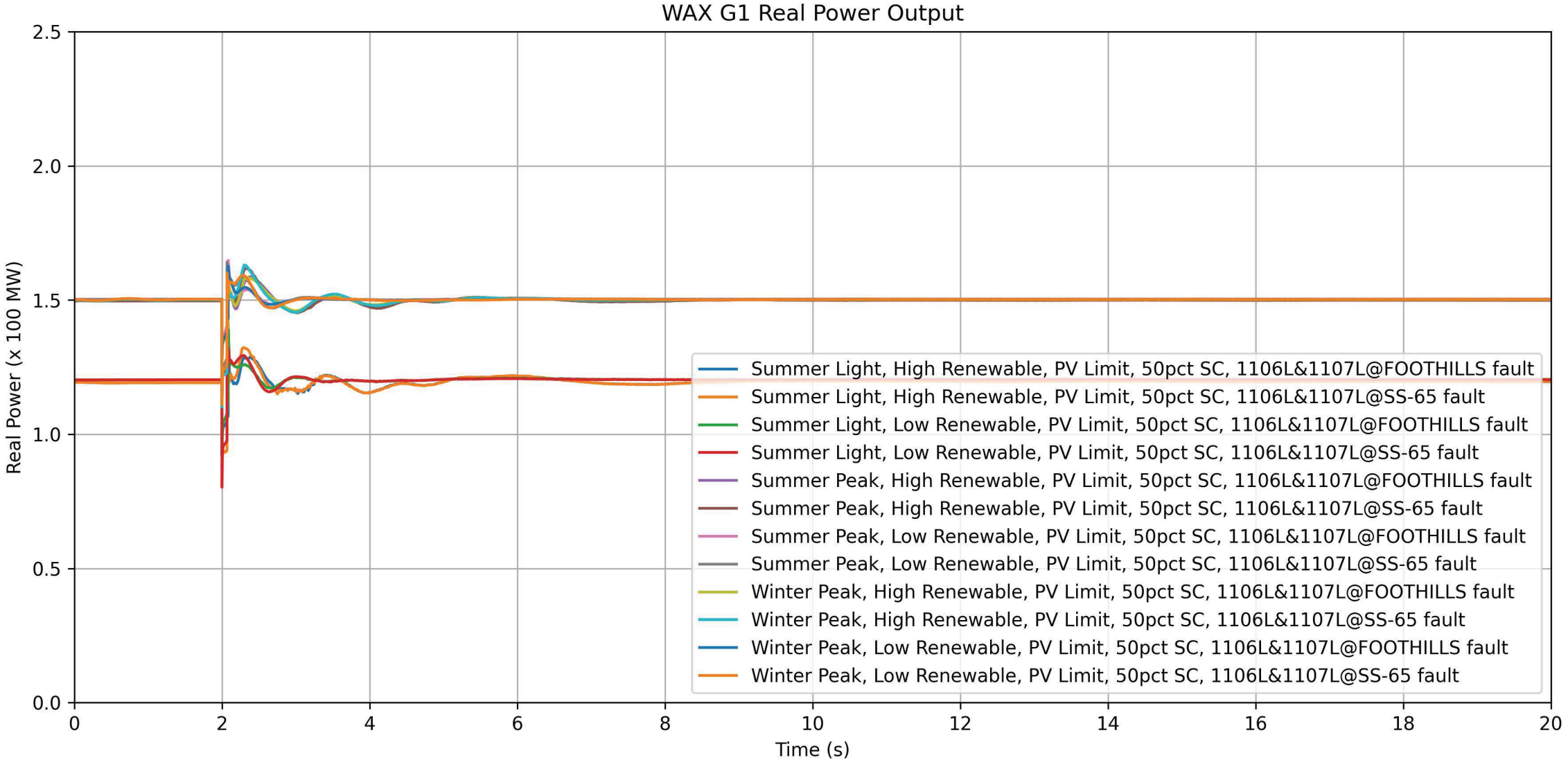

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

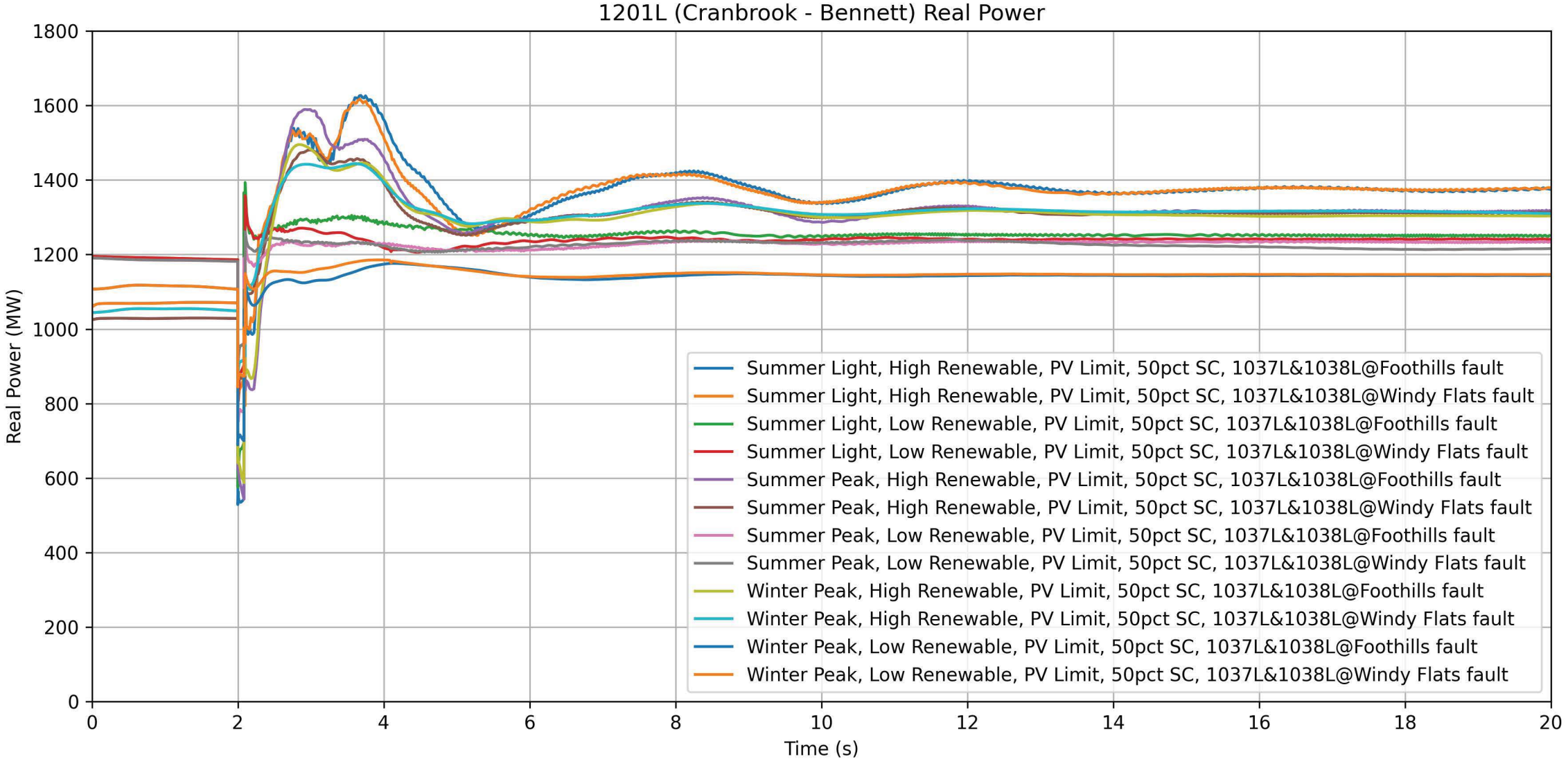

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

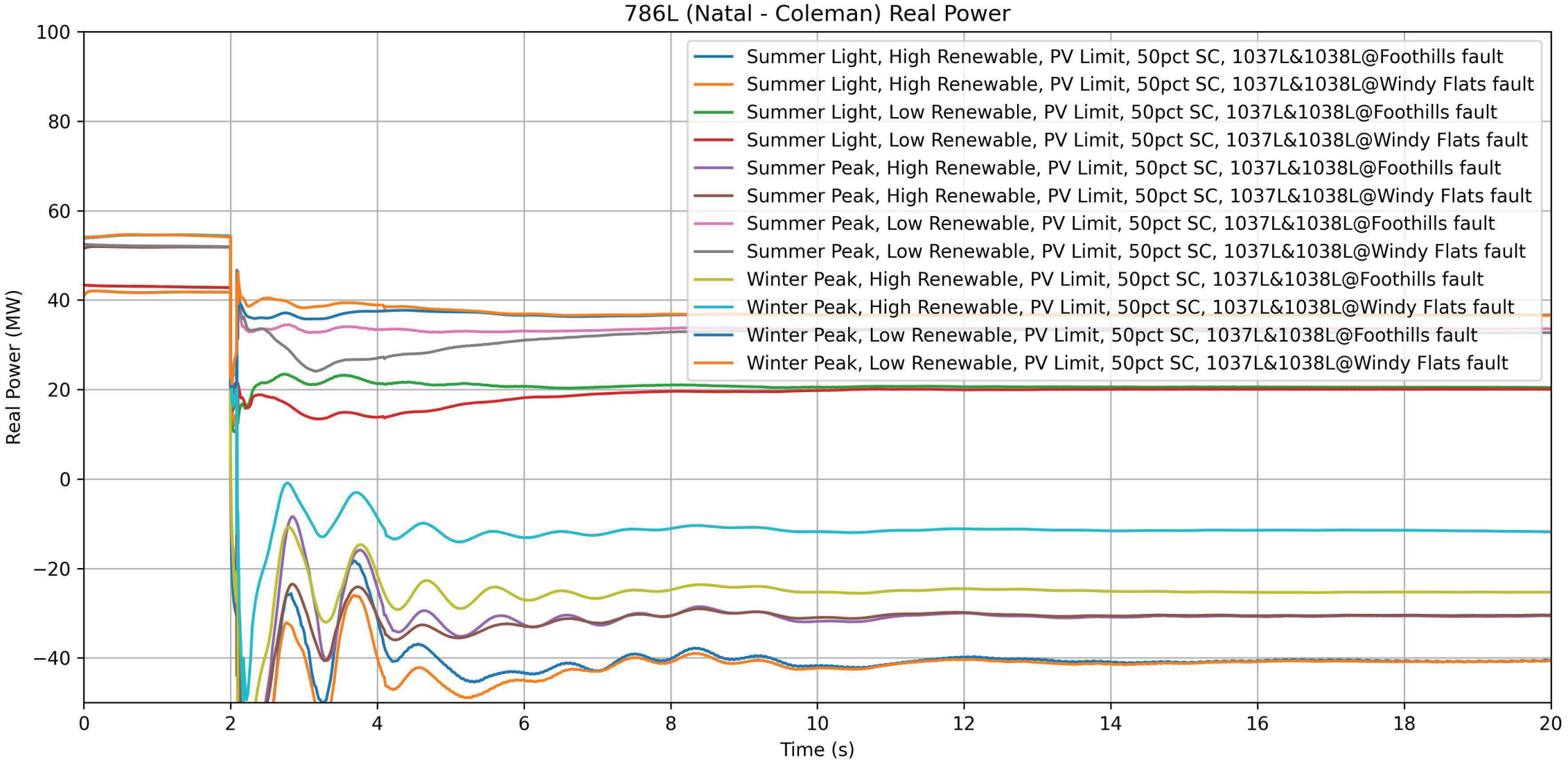

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

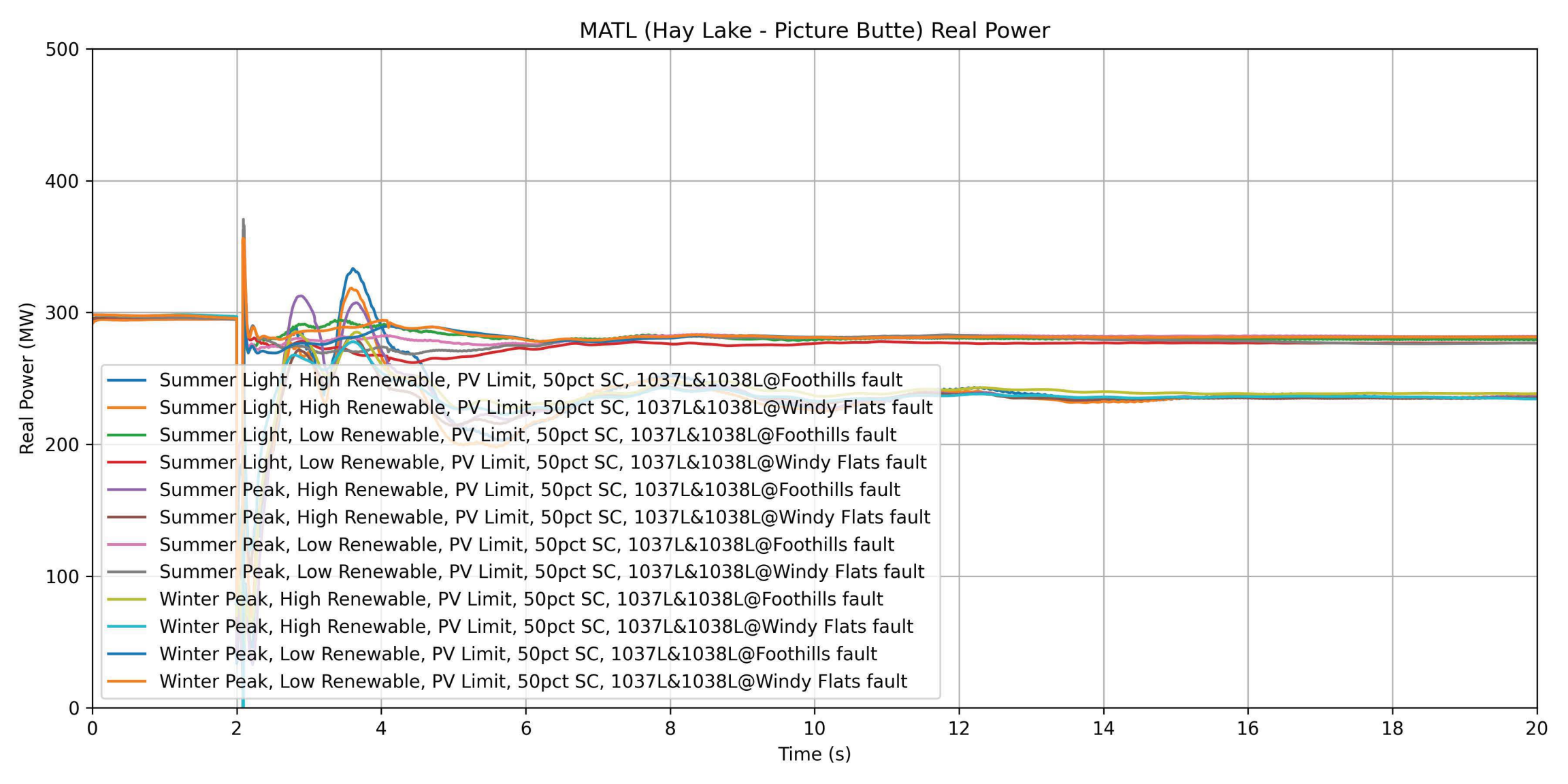

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

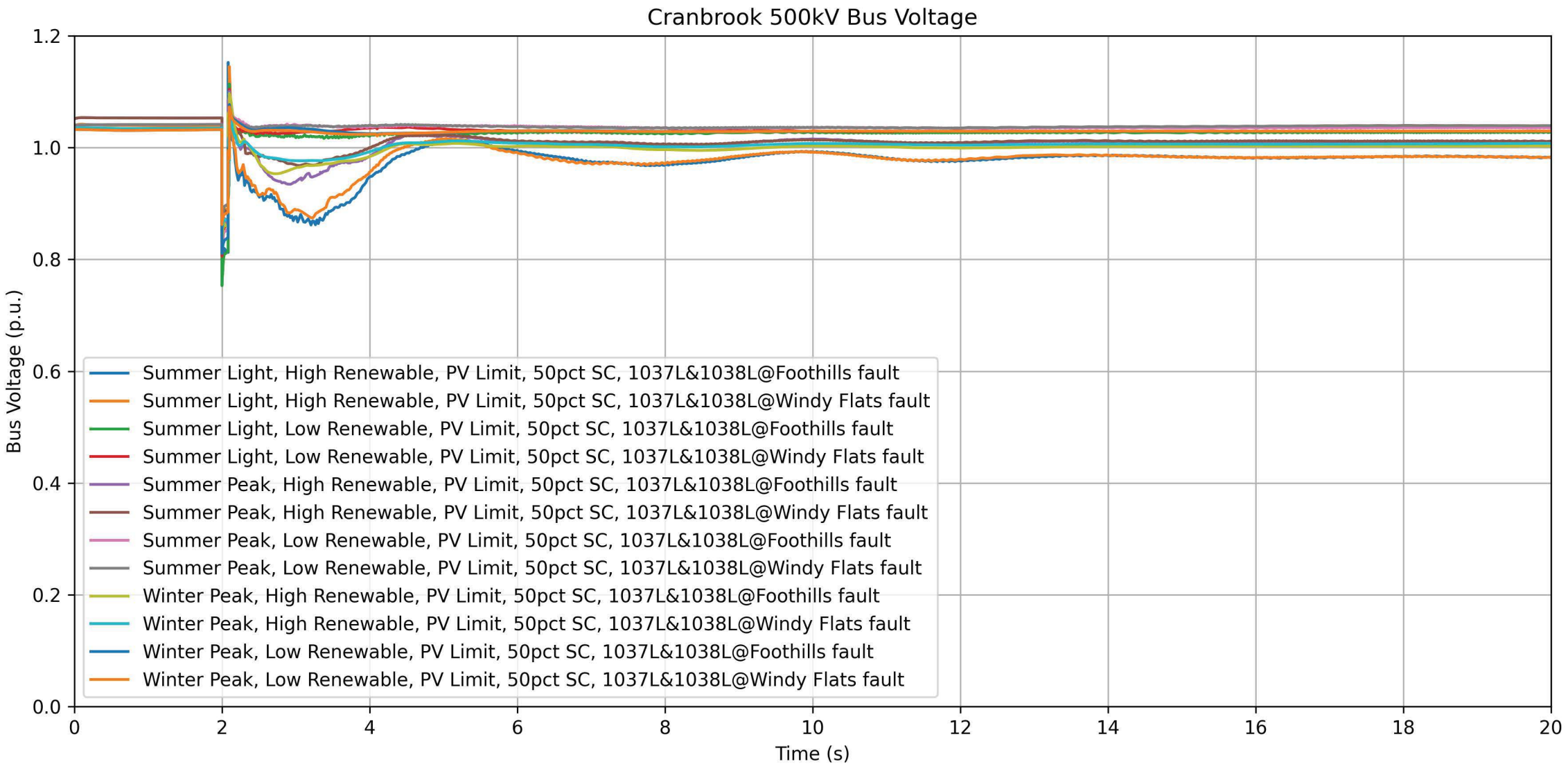

KCL G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

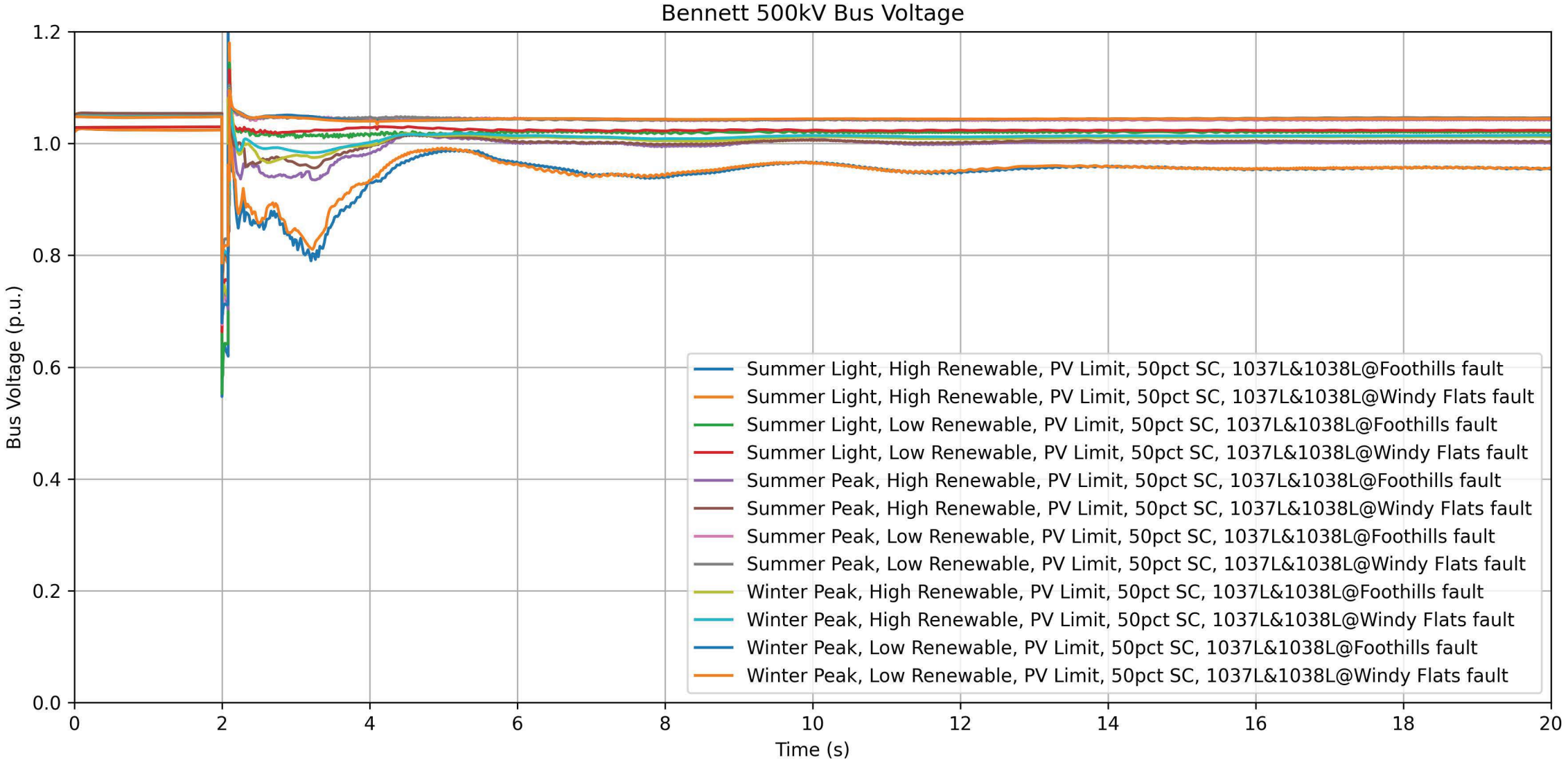

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@FOOTHILLS fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1106L&1107L@SS-65 fault

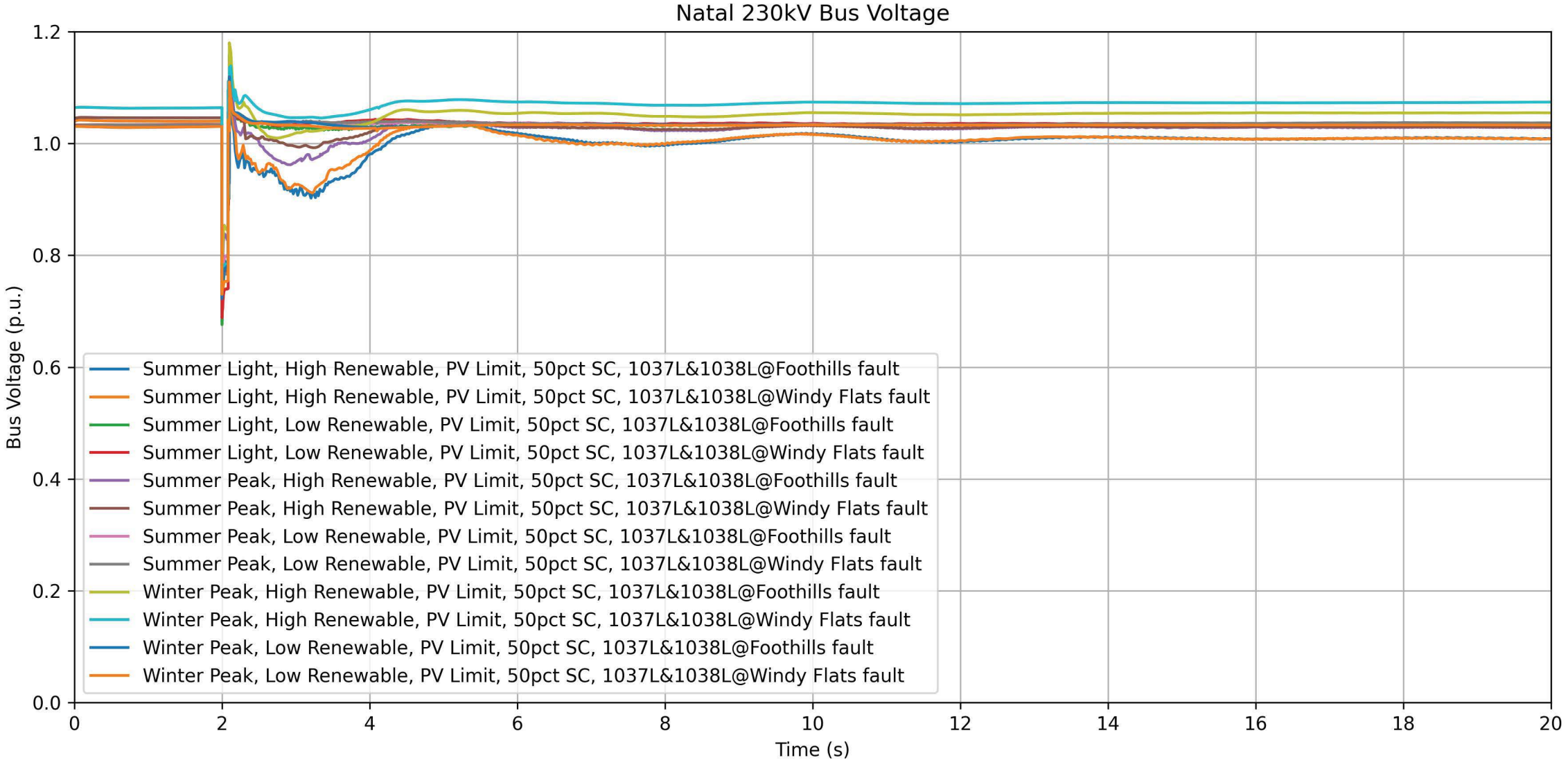

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

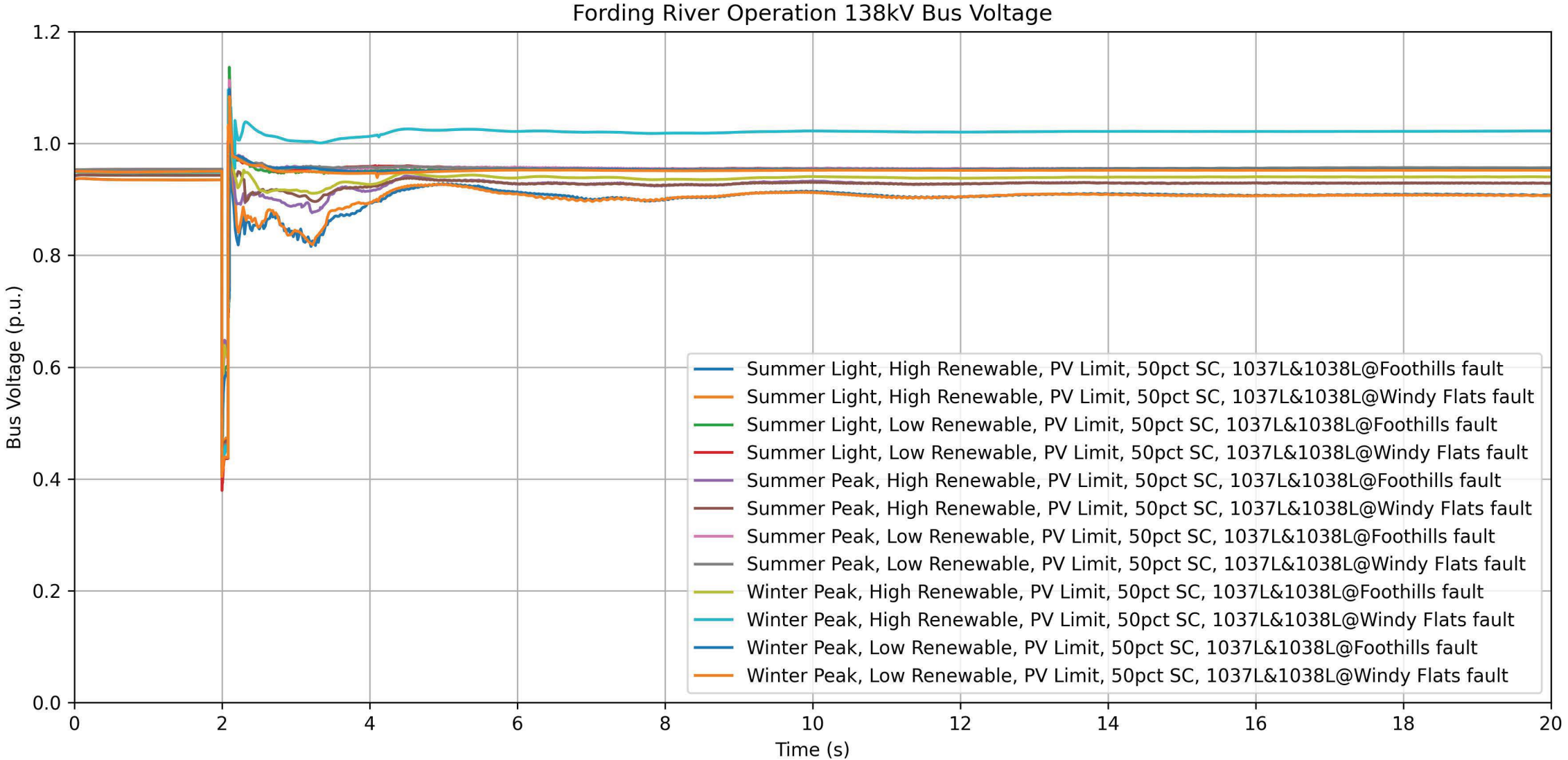

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

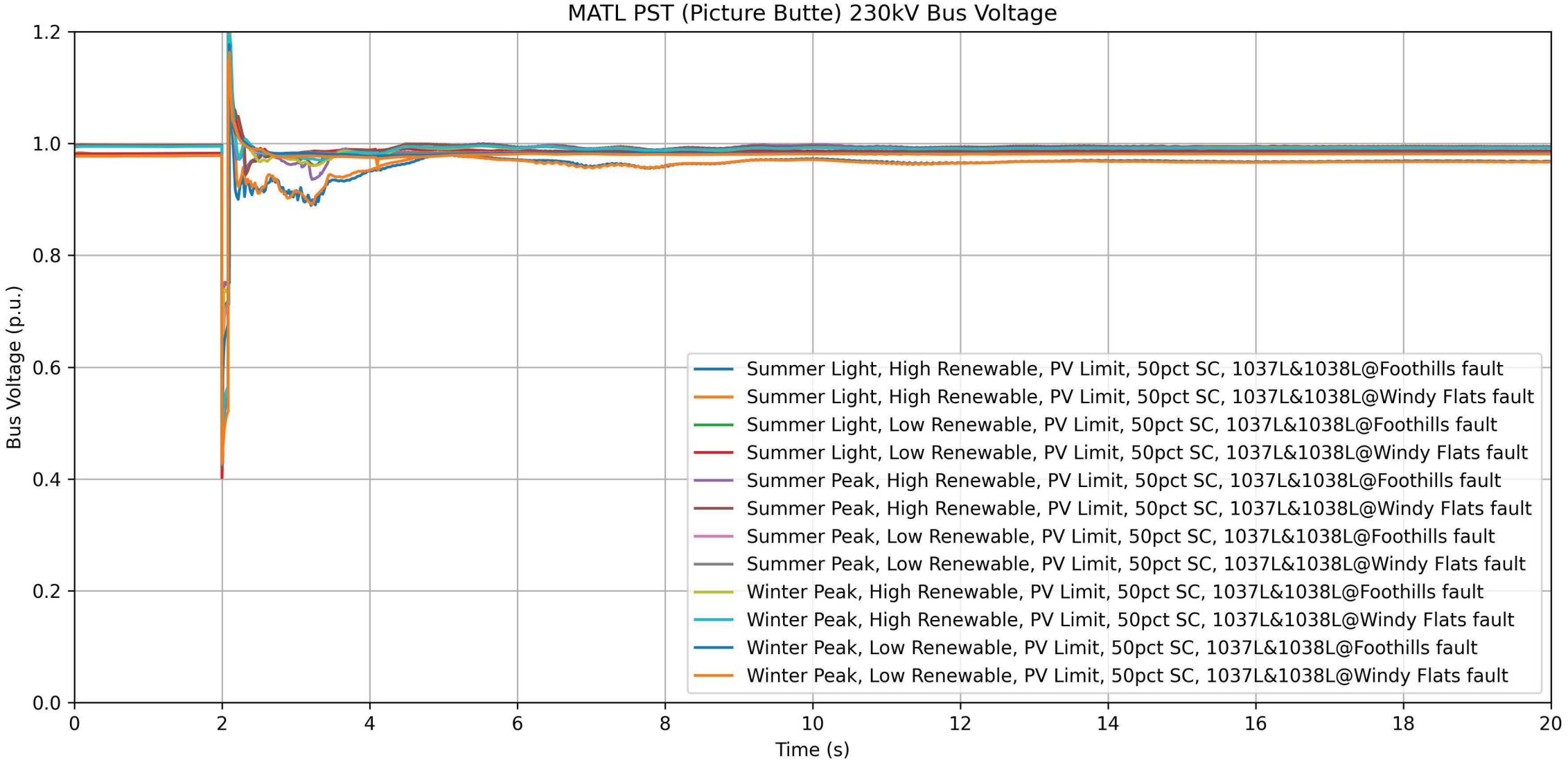

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

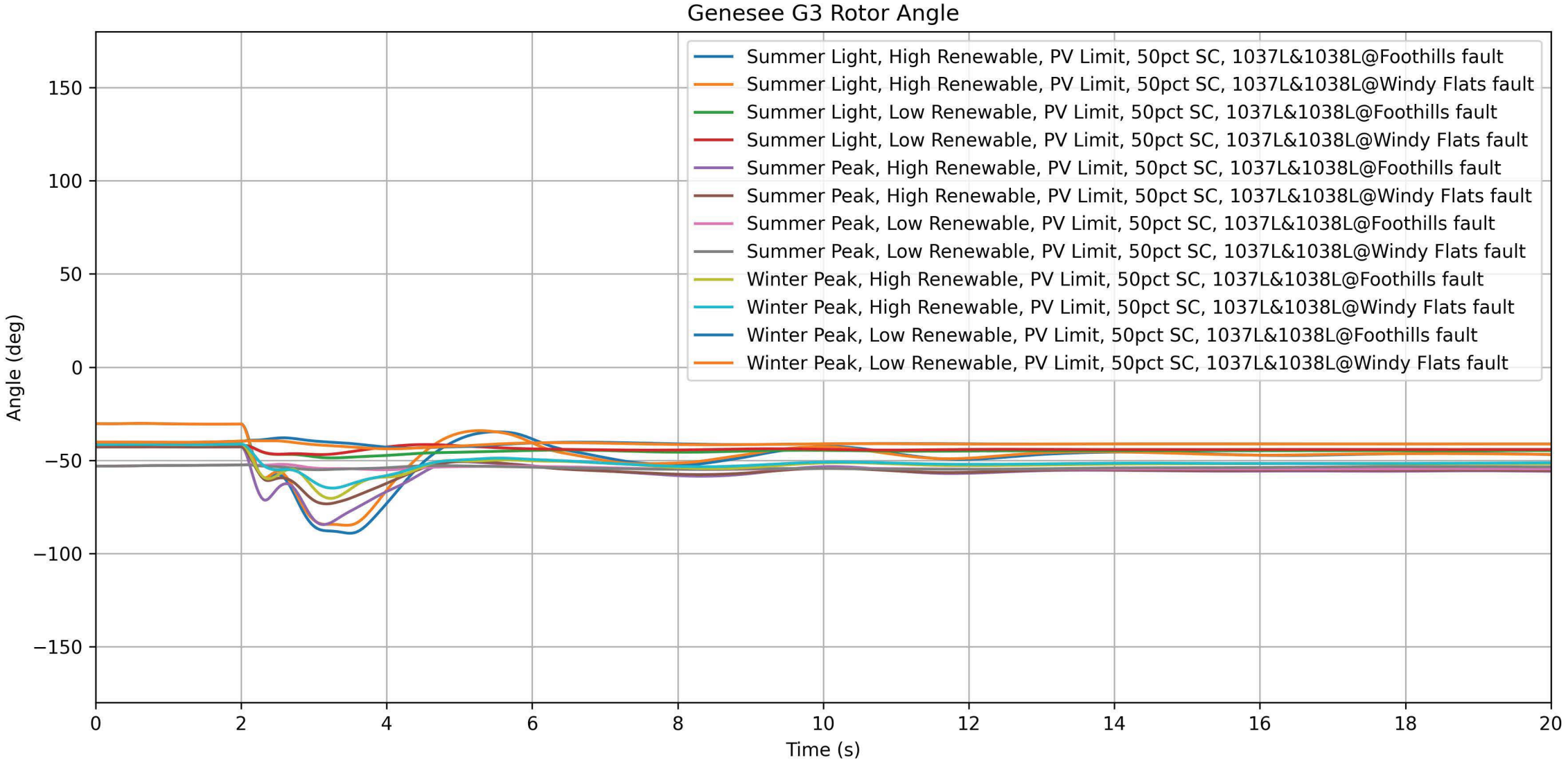

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

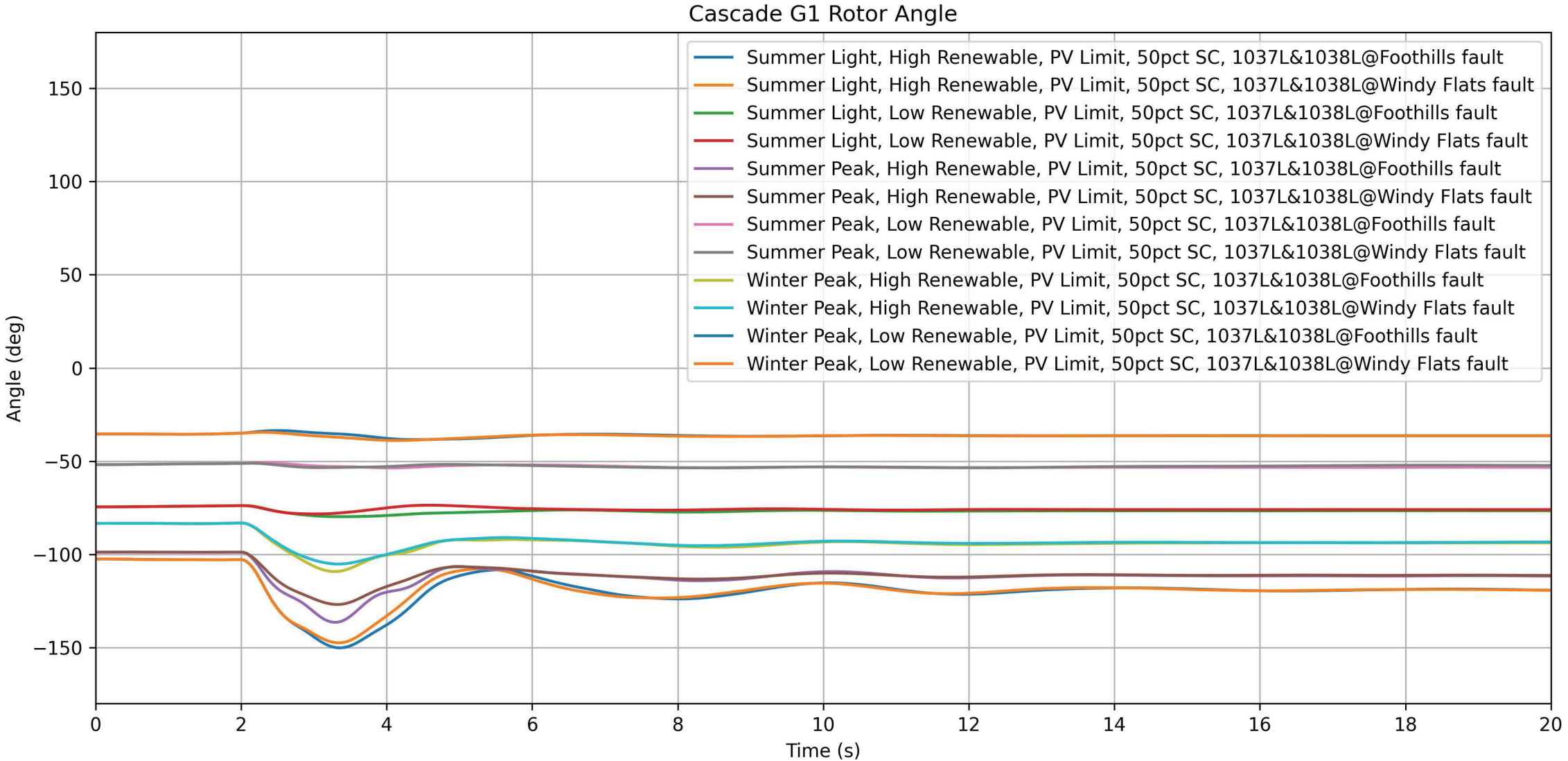

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

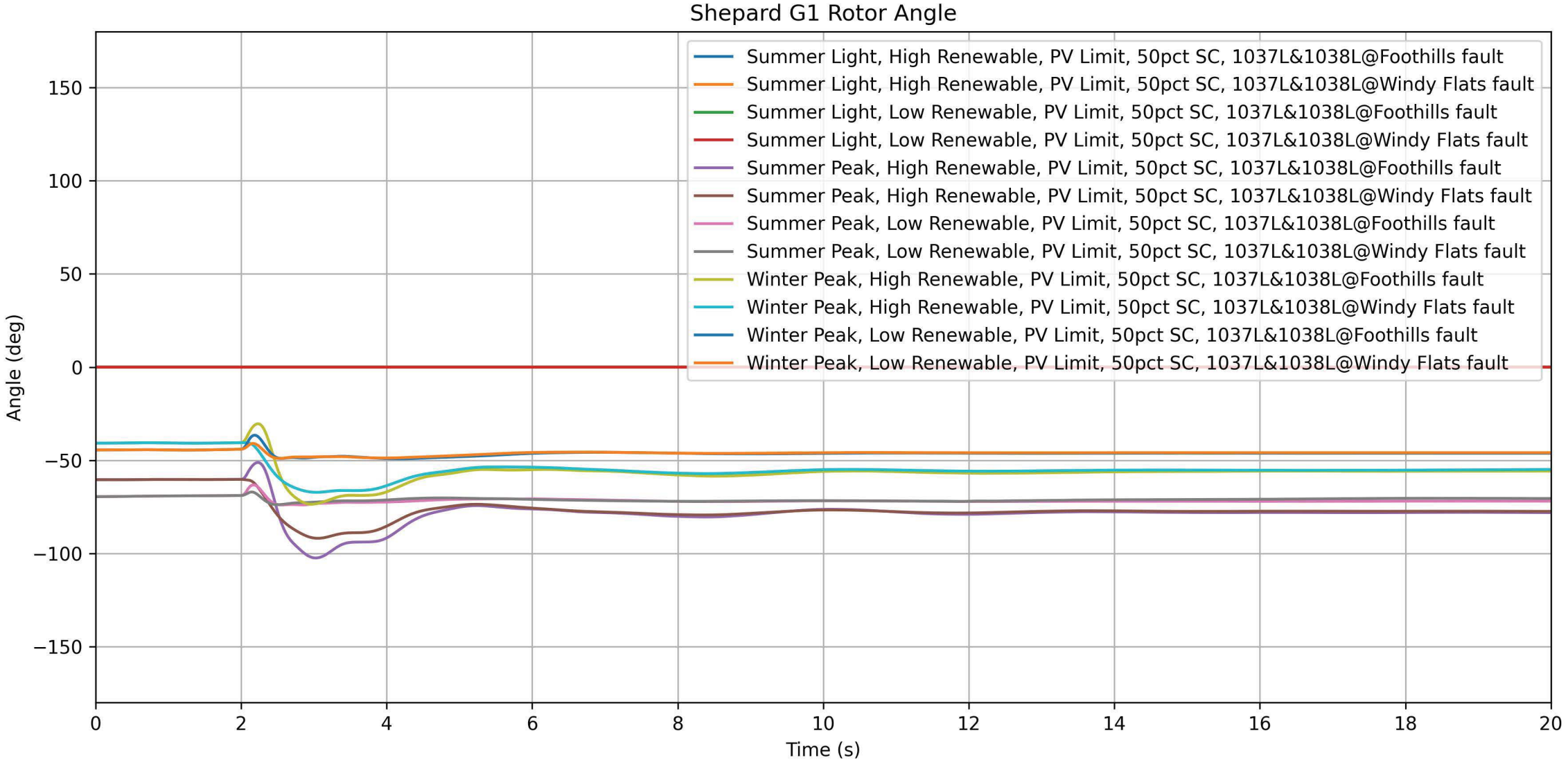

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

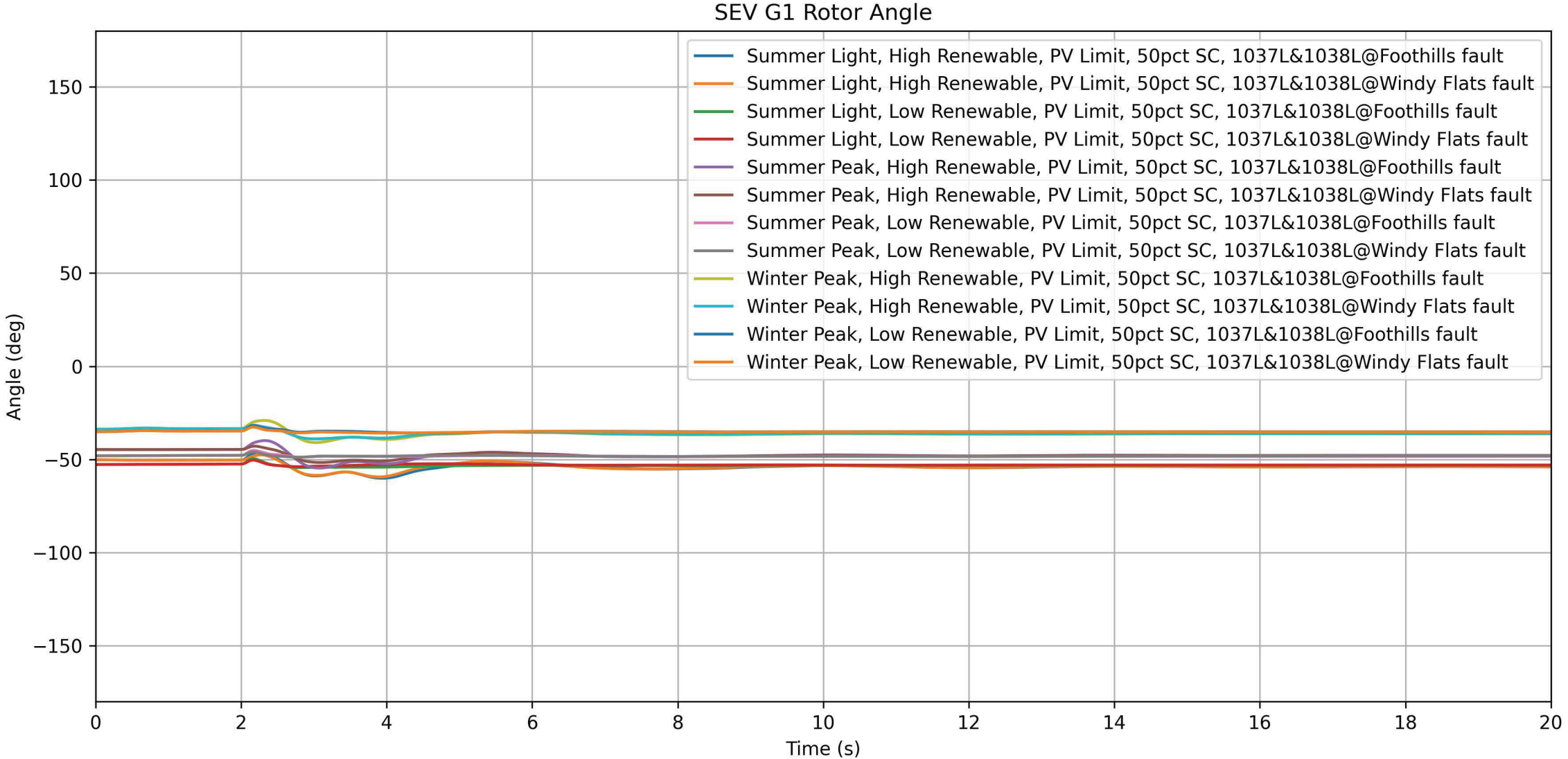

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

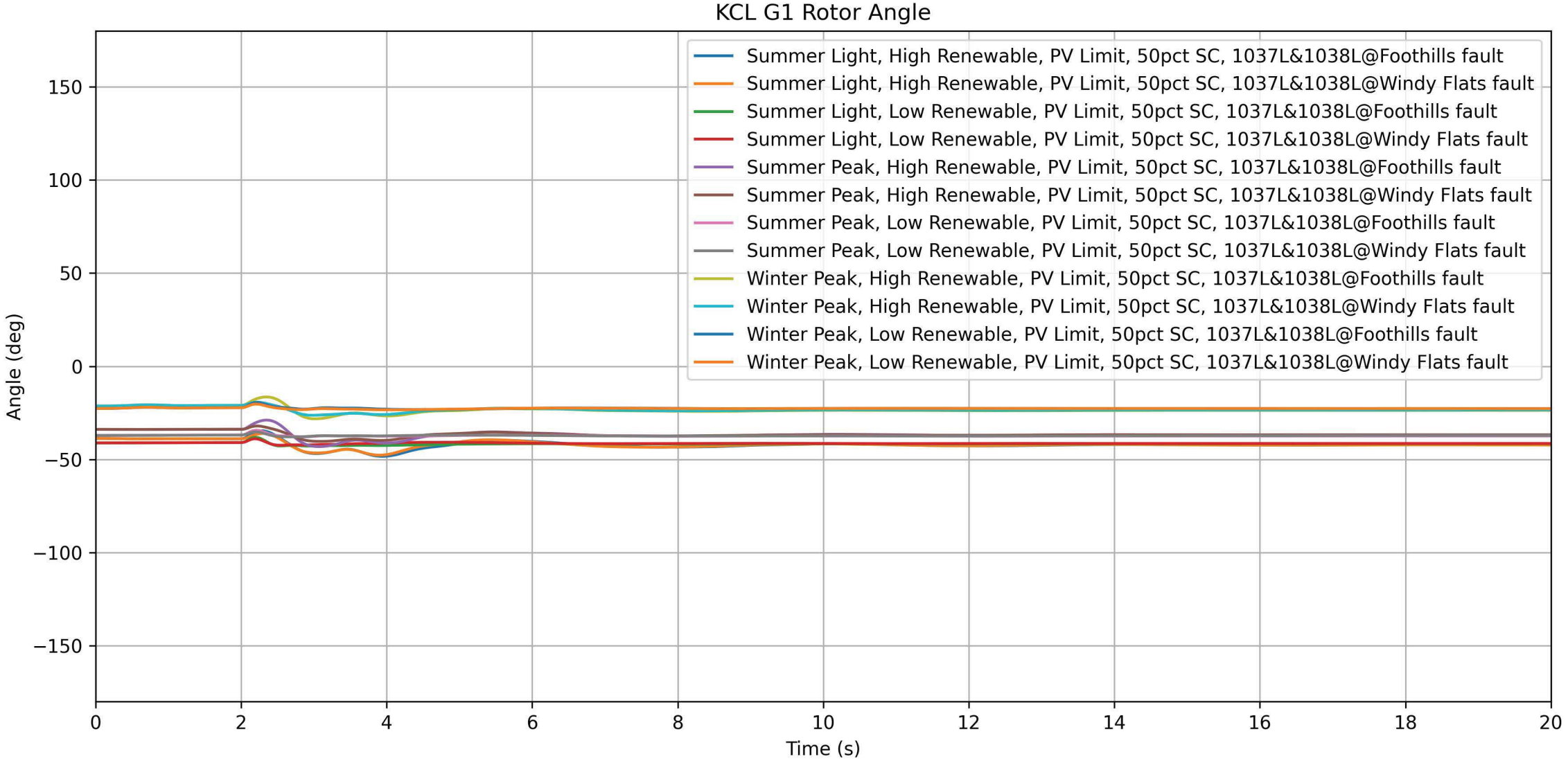

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

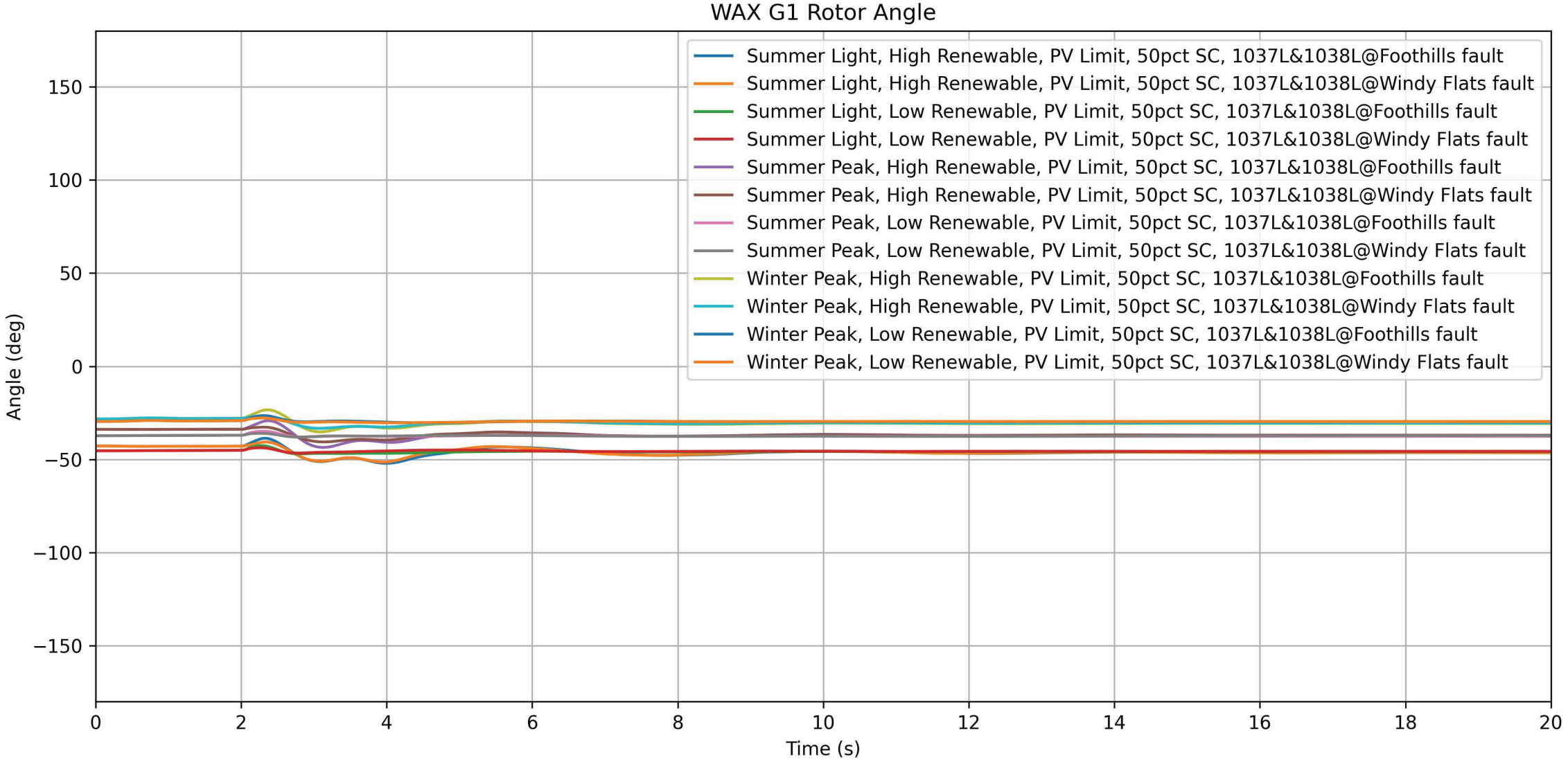

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

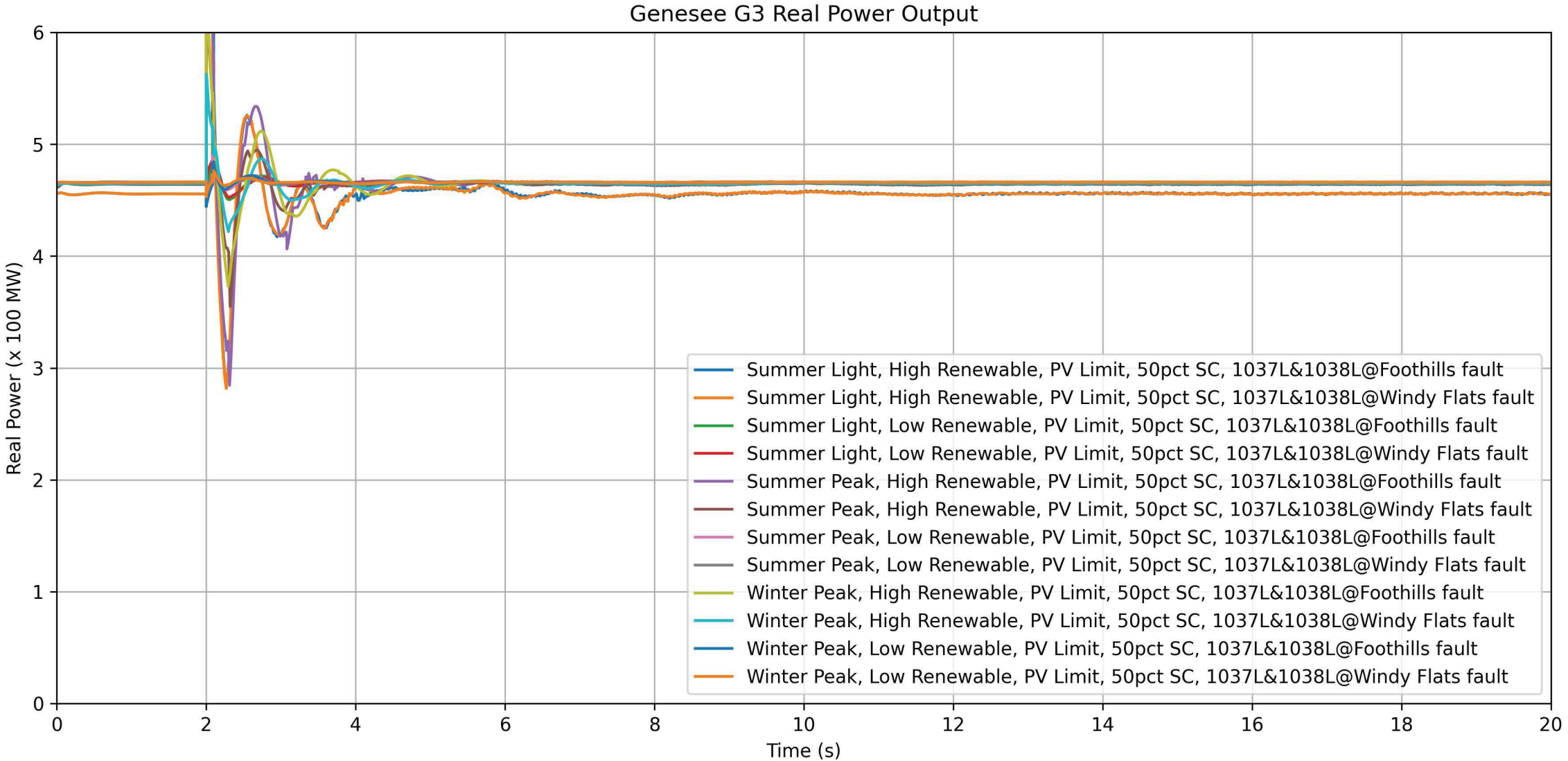

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

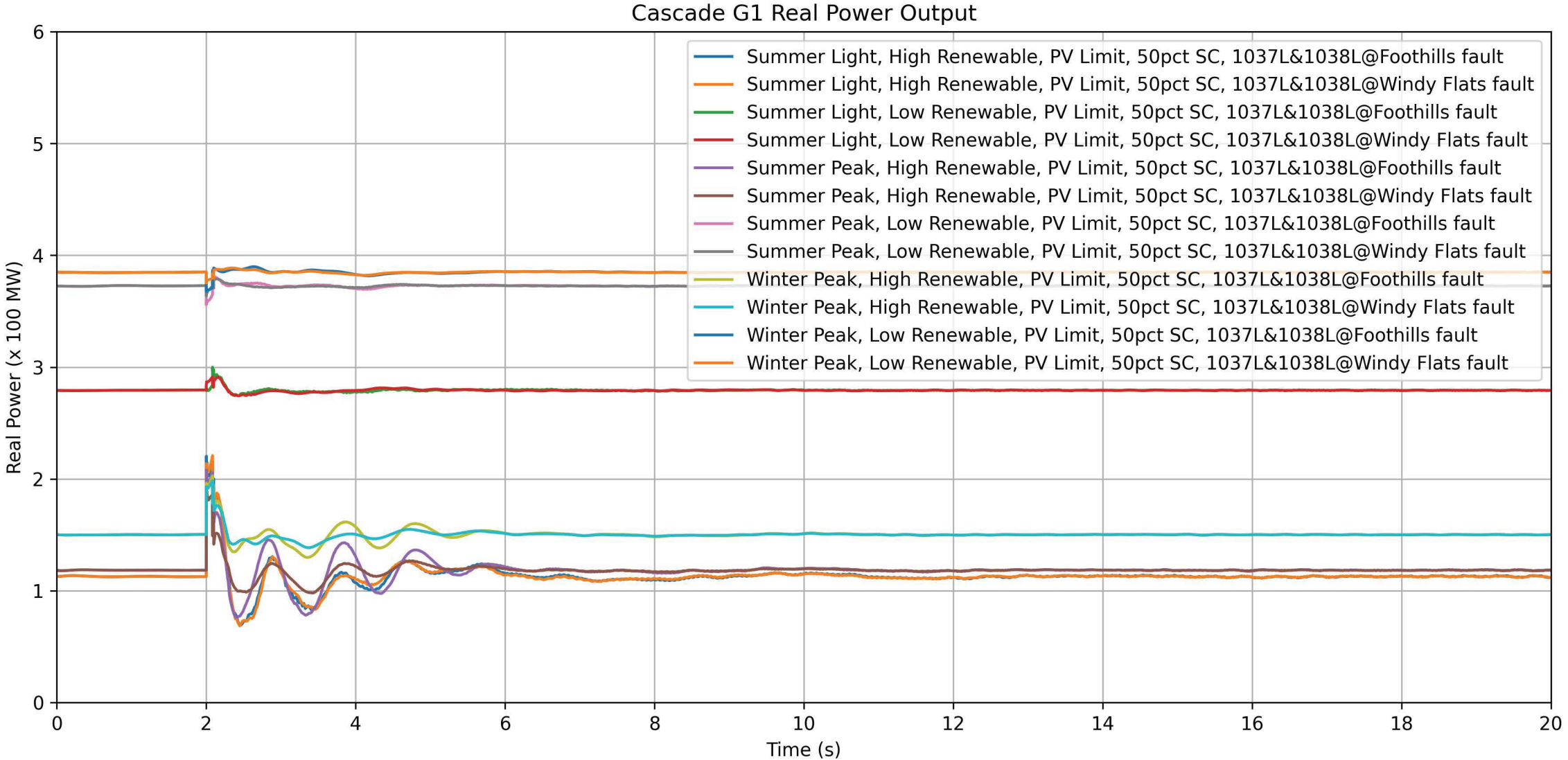

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

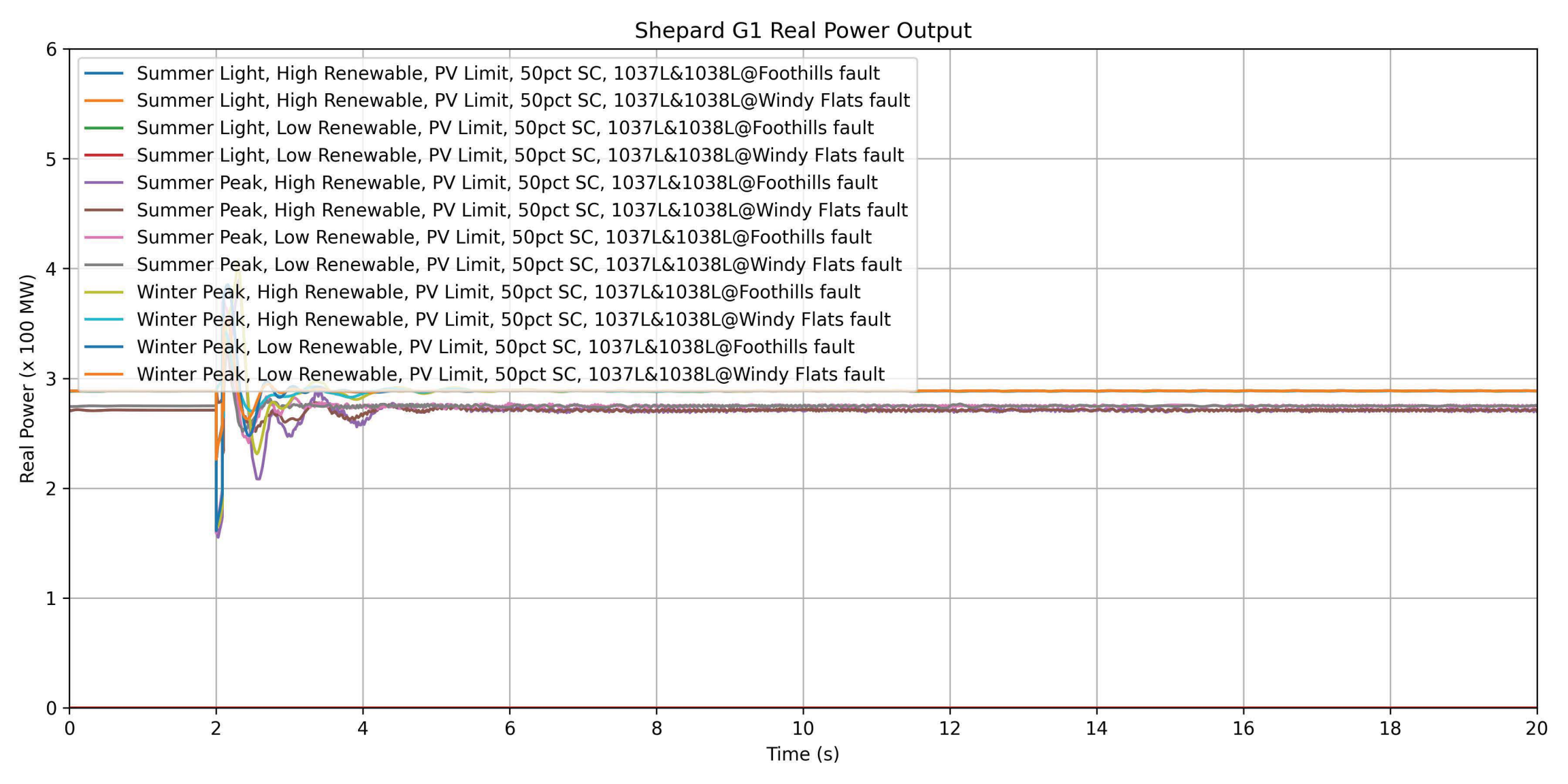

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

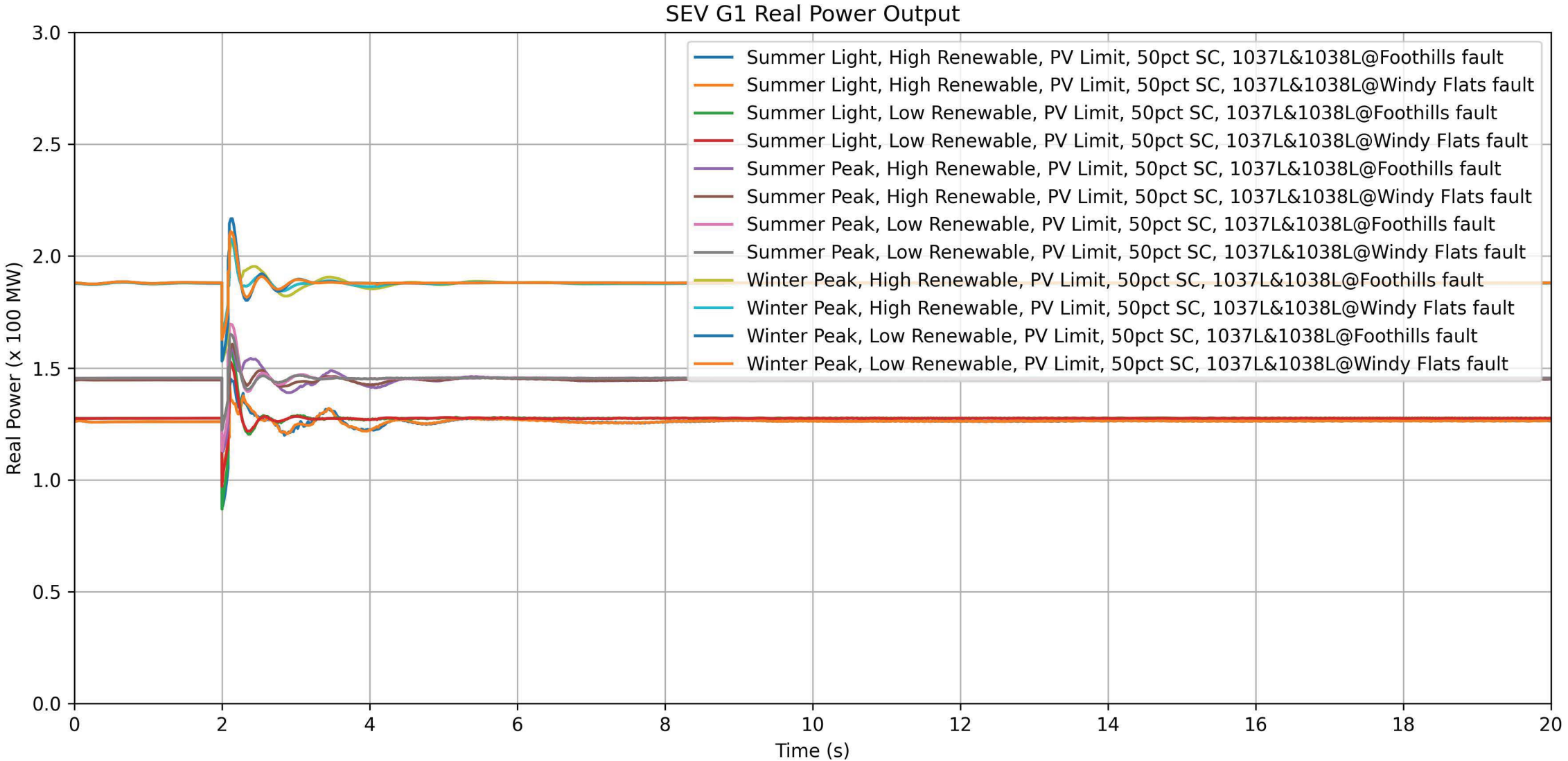

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

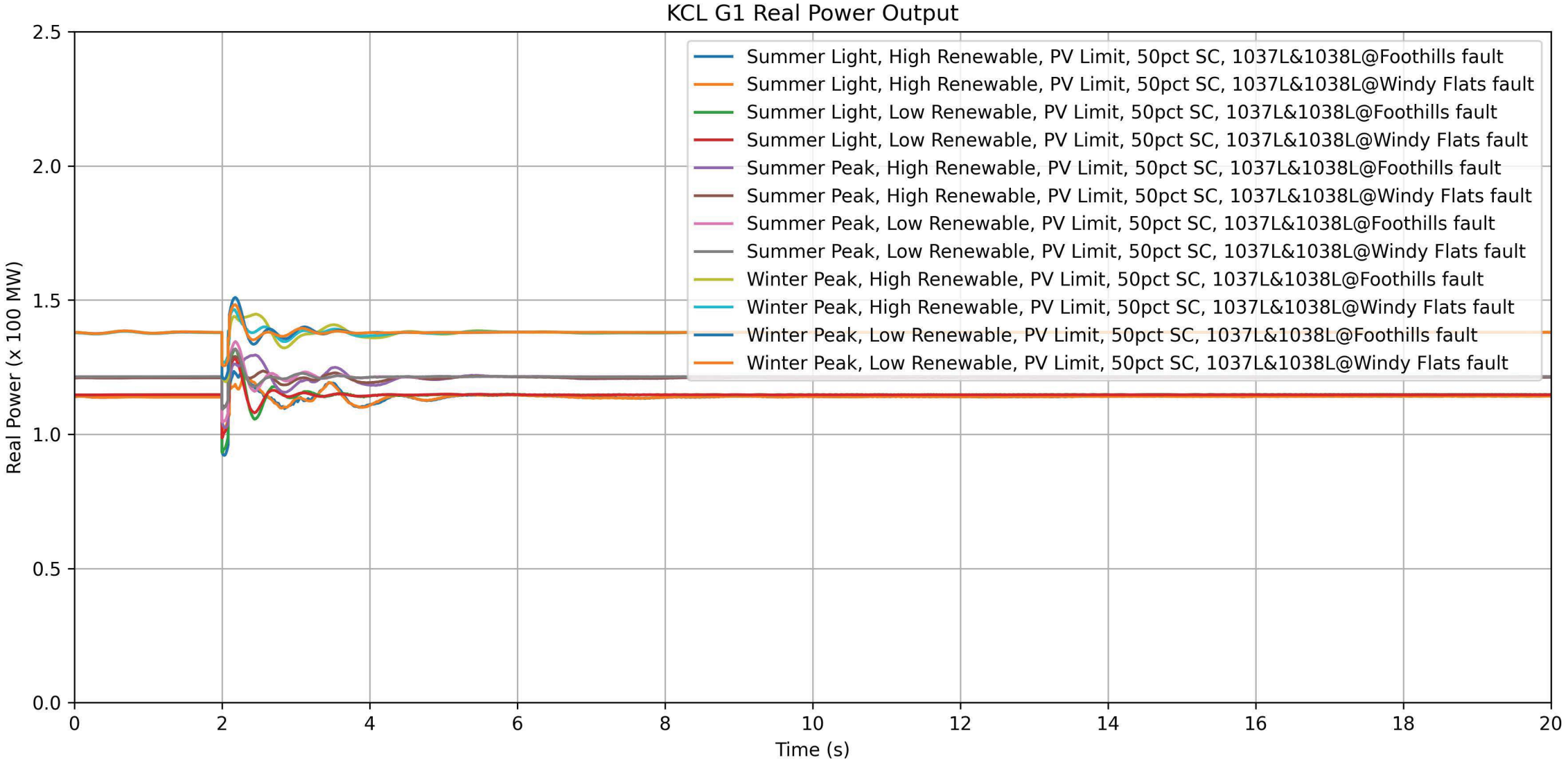

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

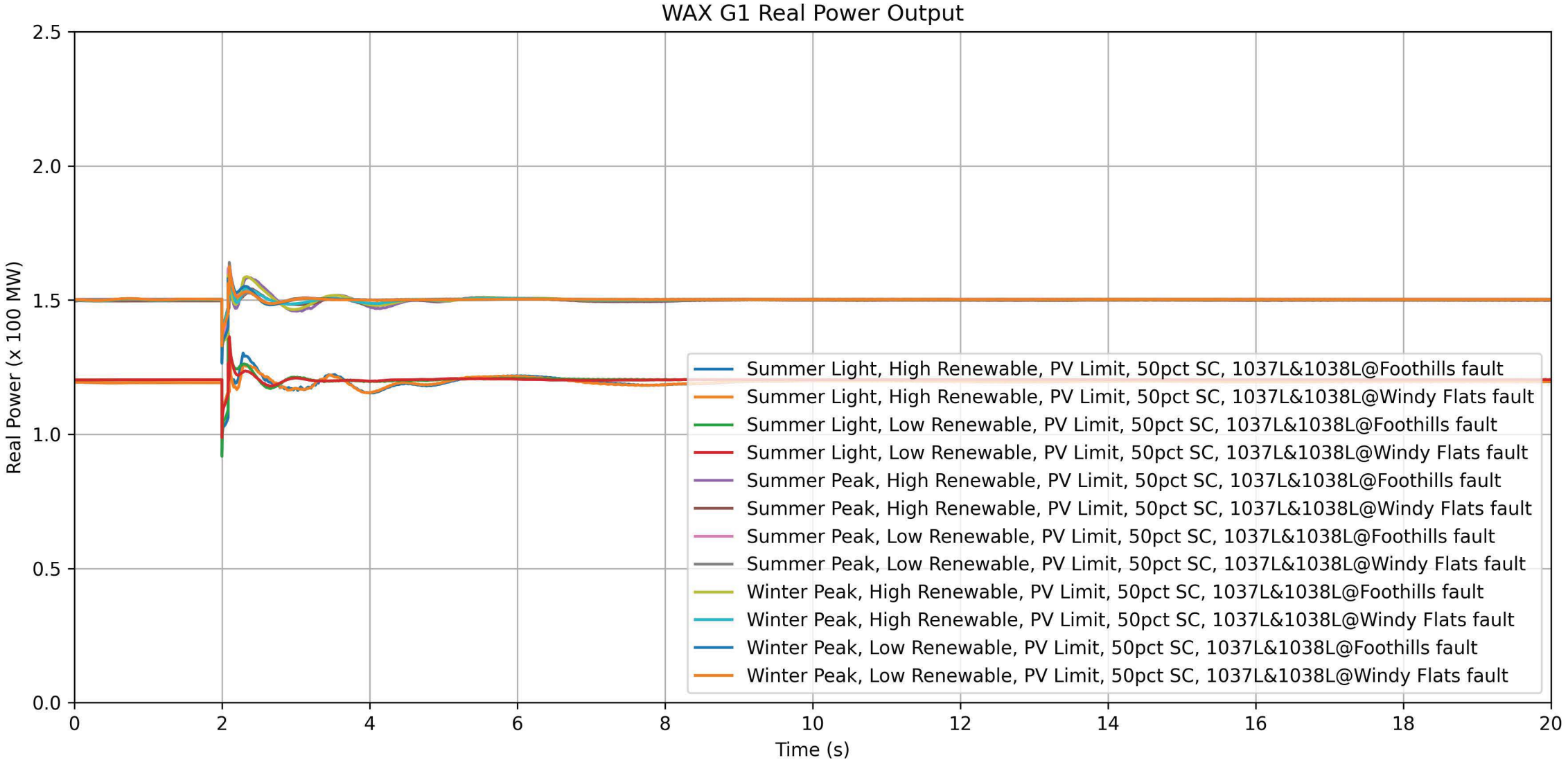

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

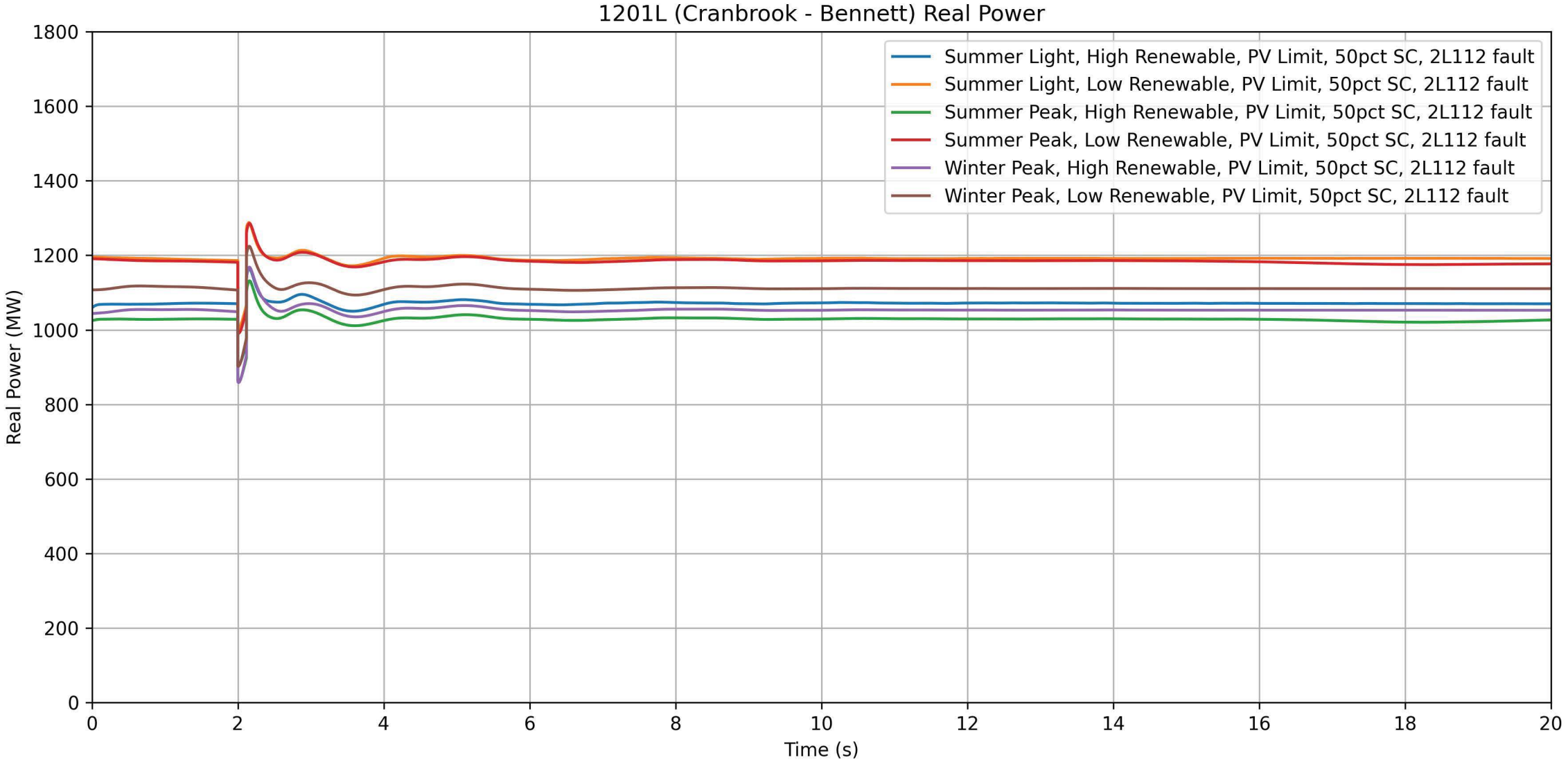

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

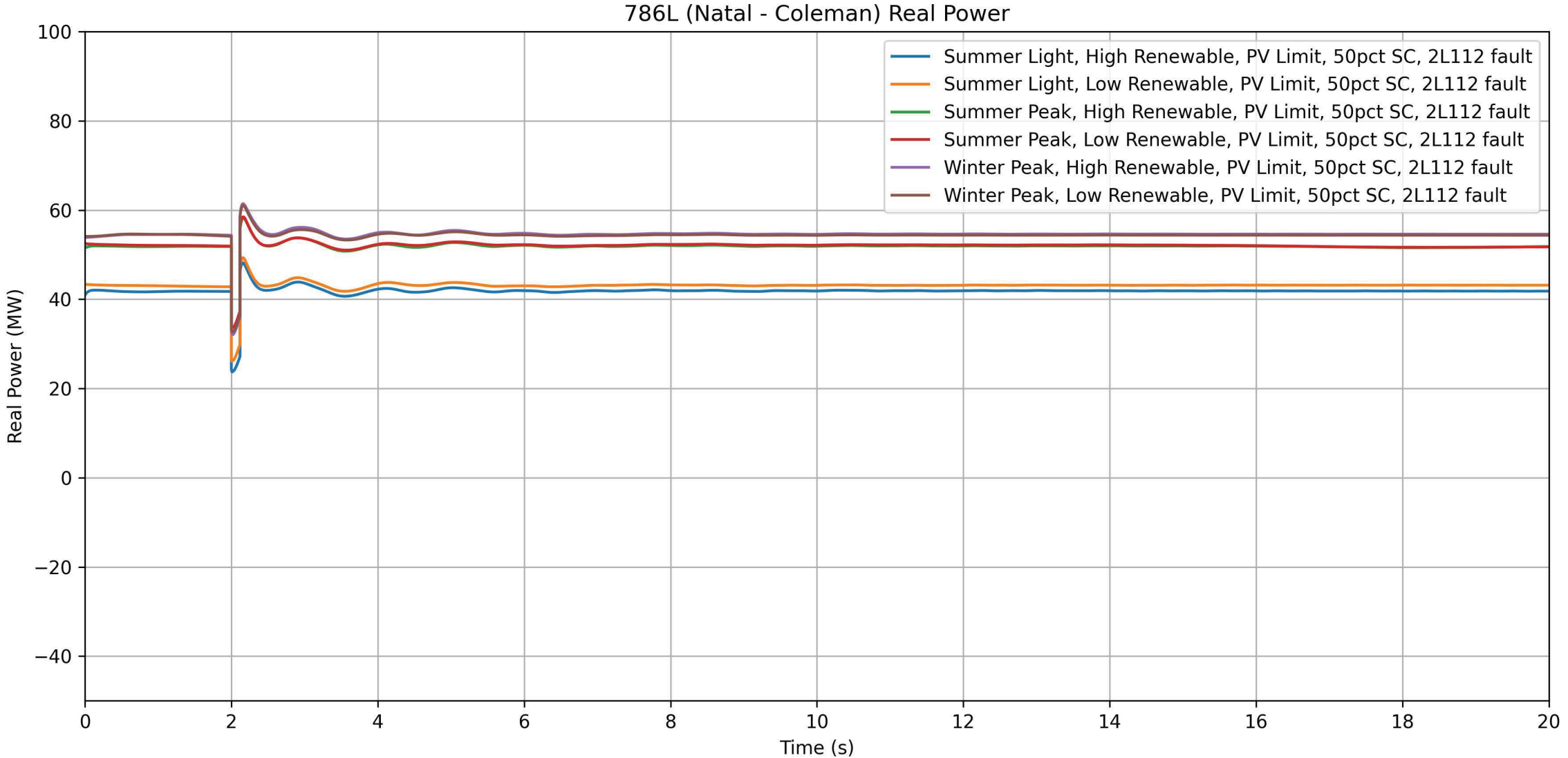

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

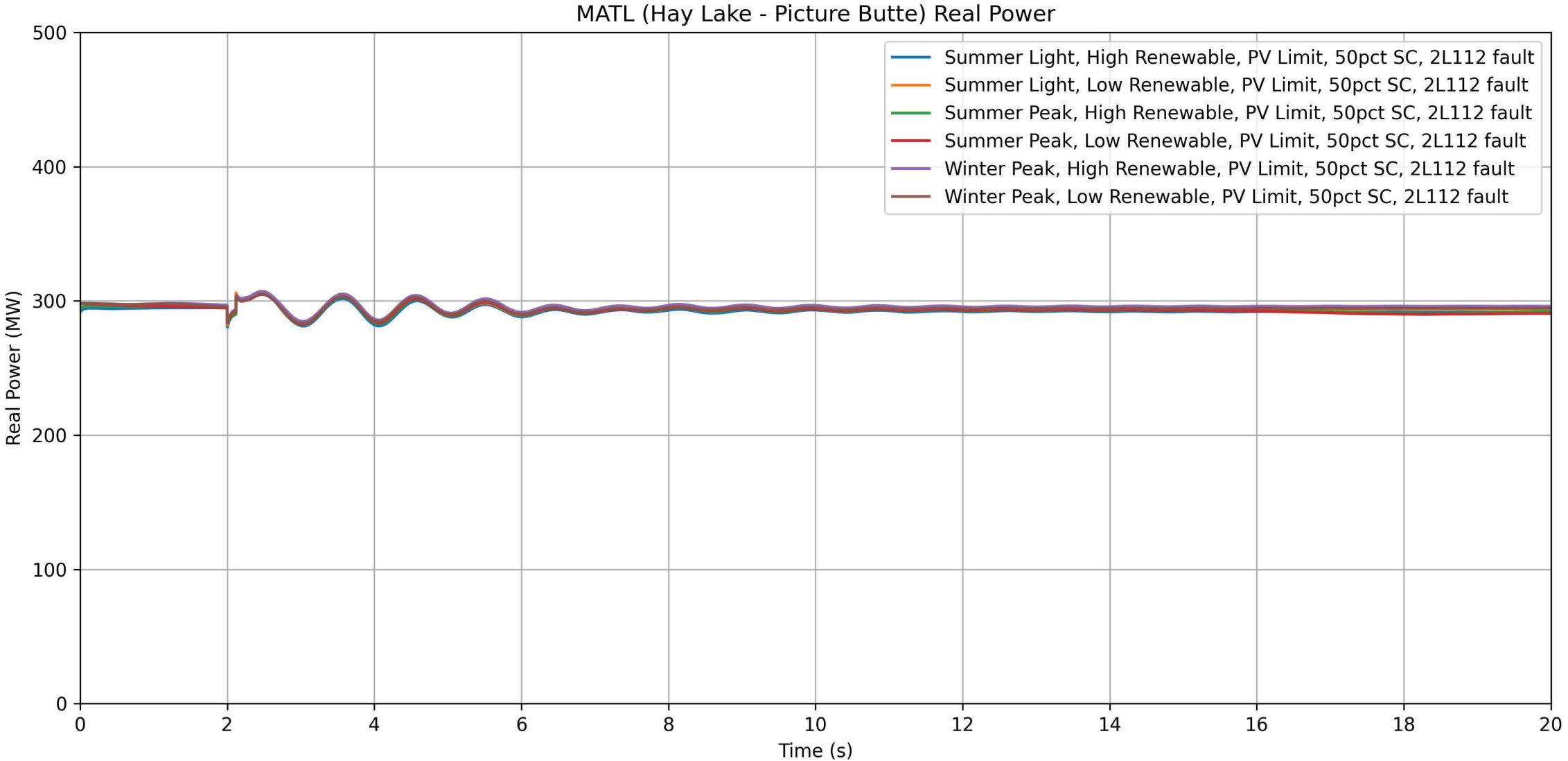

SEV G1 Real Power Output
Real Power (x 100 MW)
Time (s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

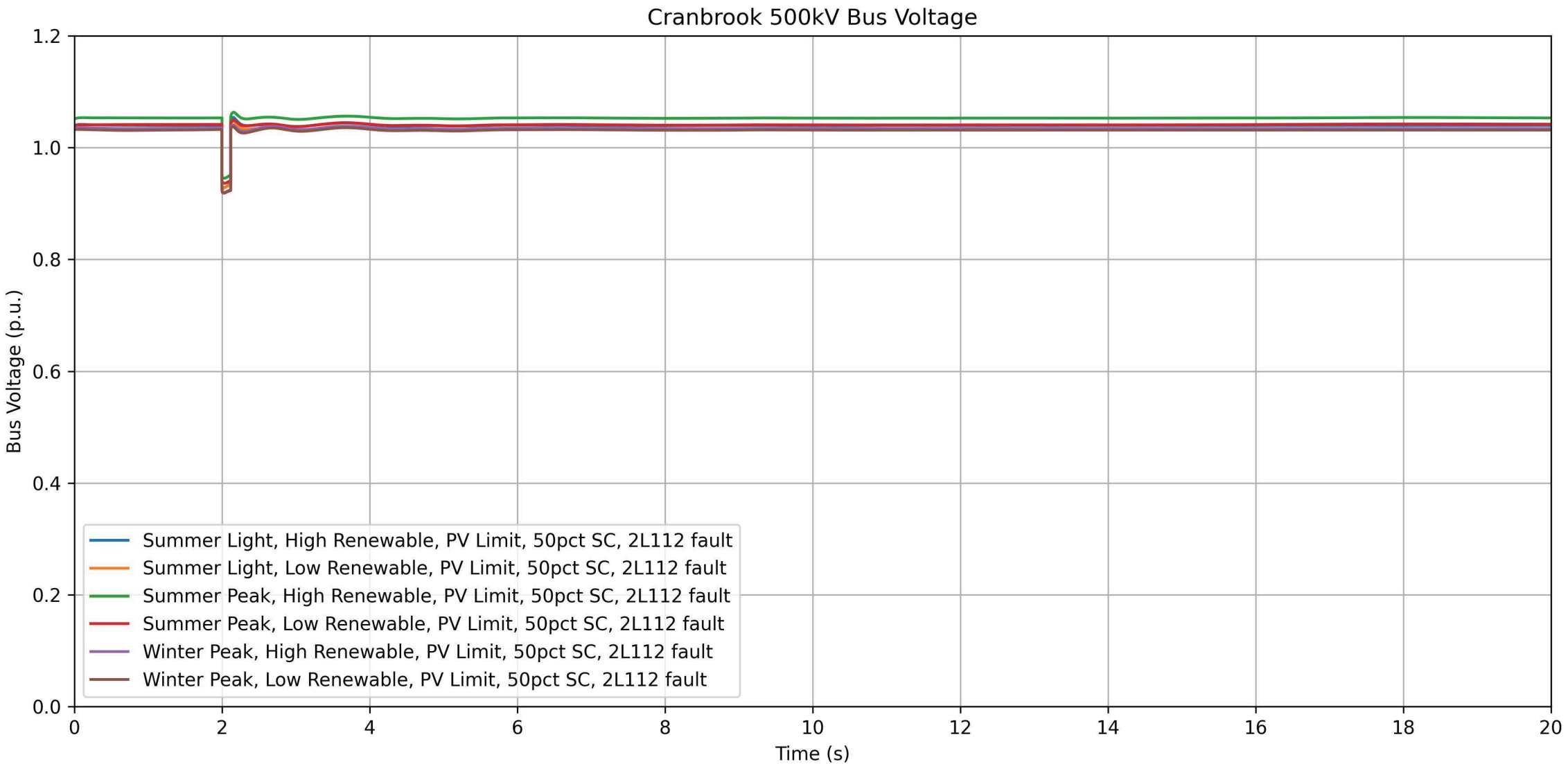

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

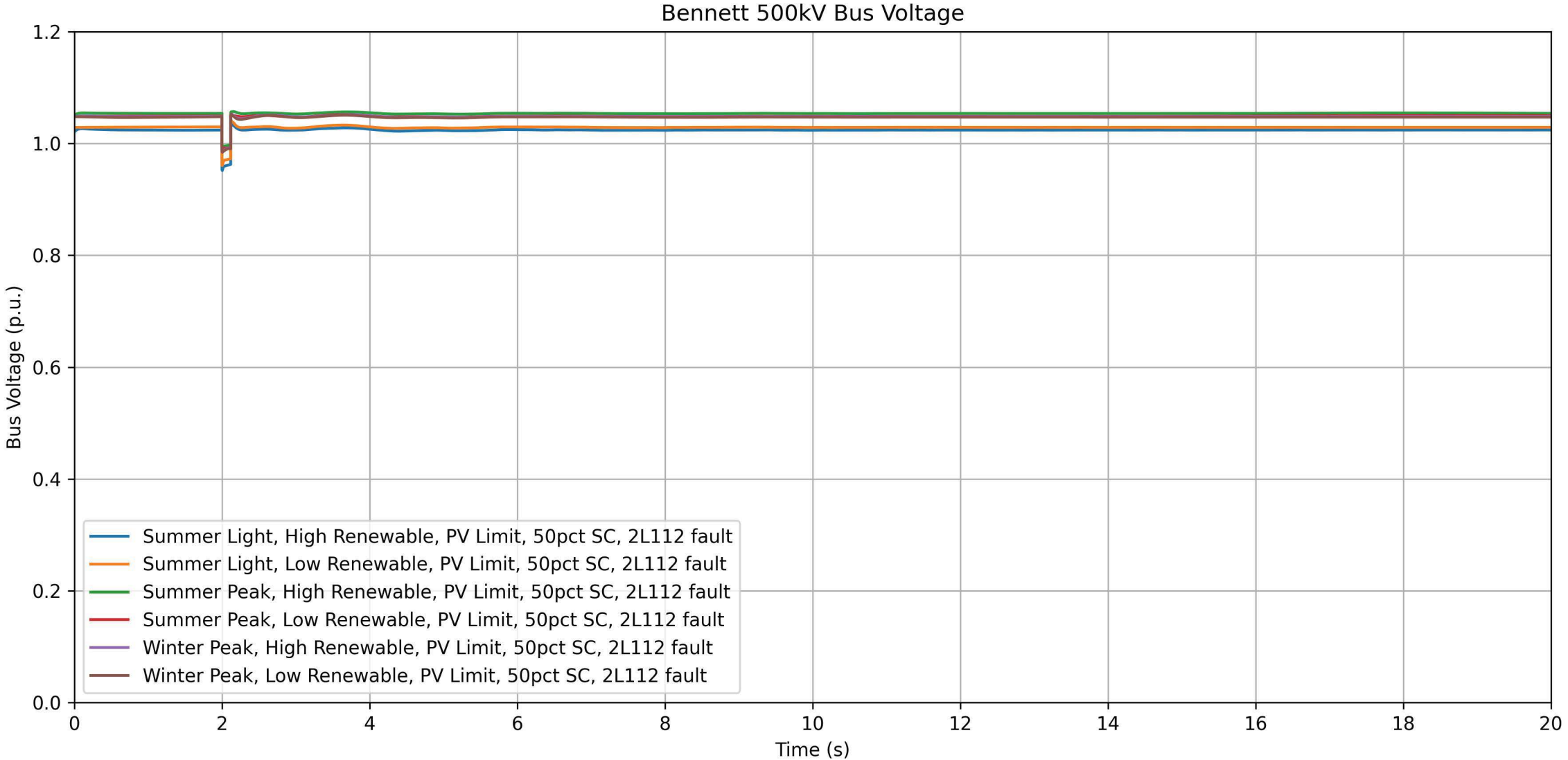

WAX G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Foothills fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 1037L&1038L@Windy Flats fault

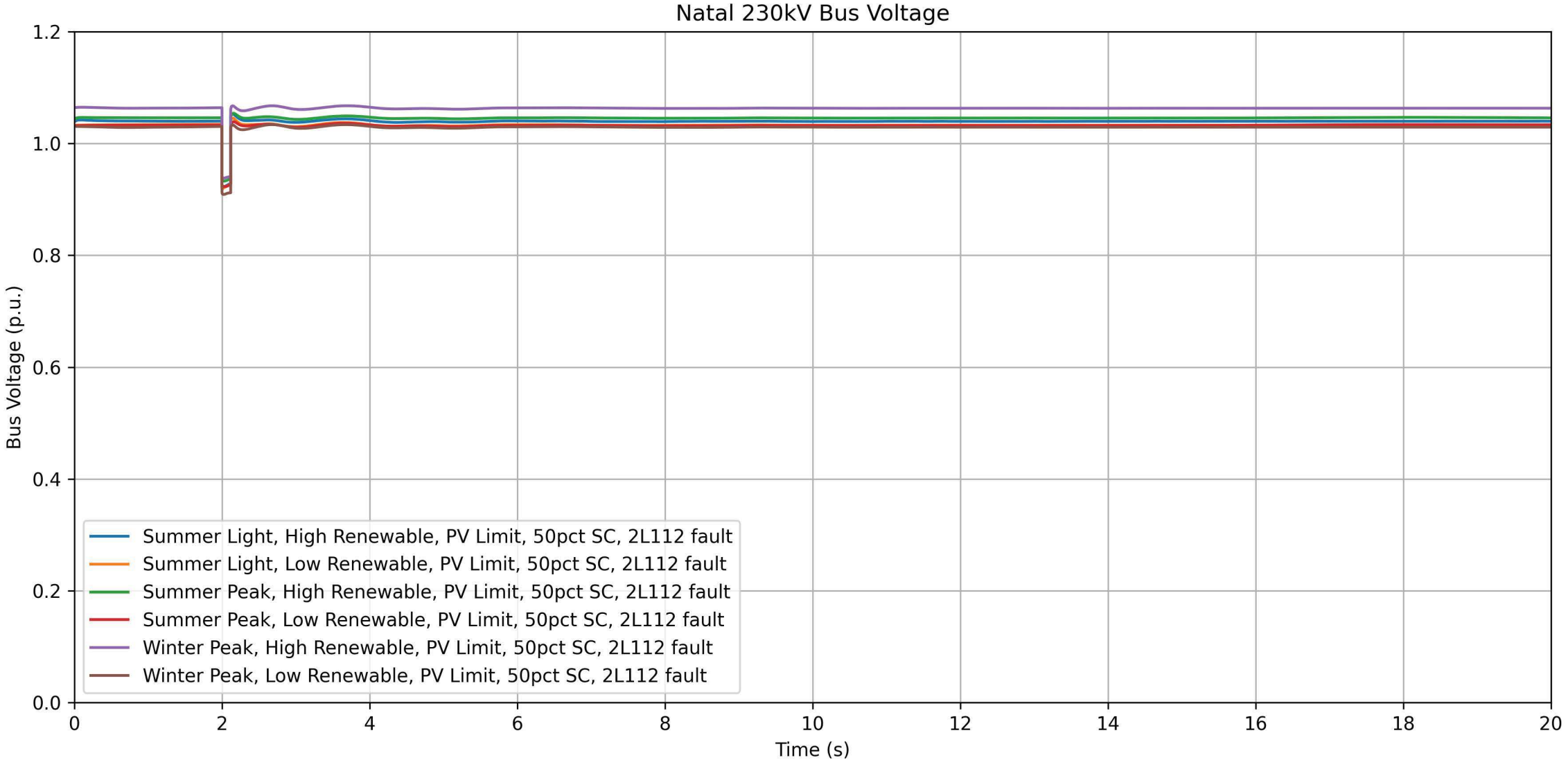

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

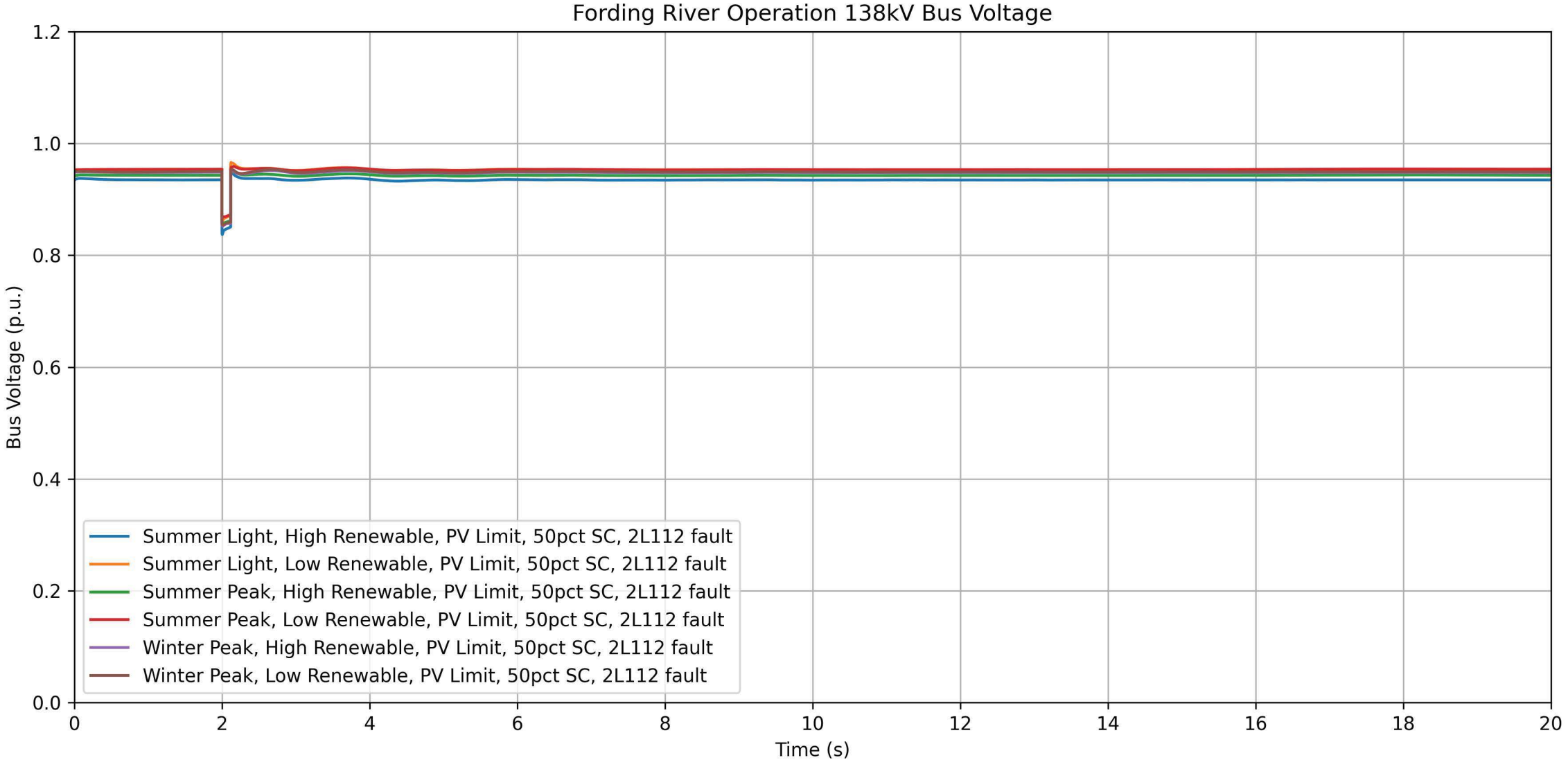

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

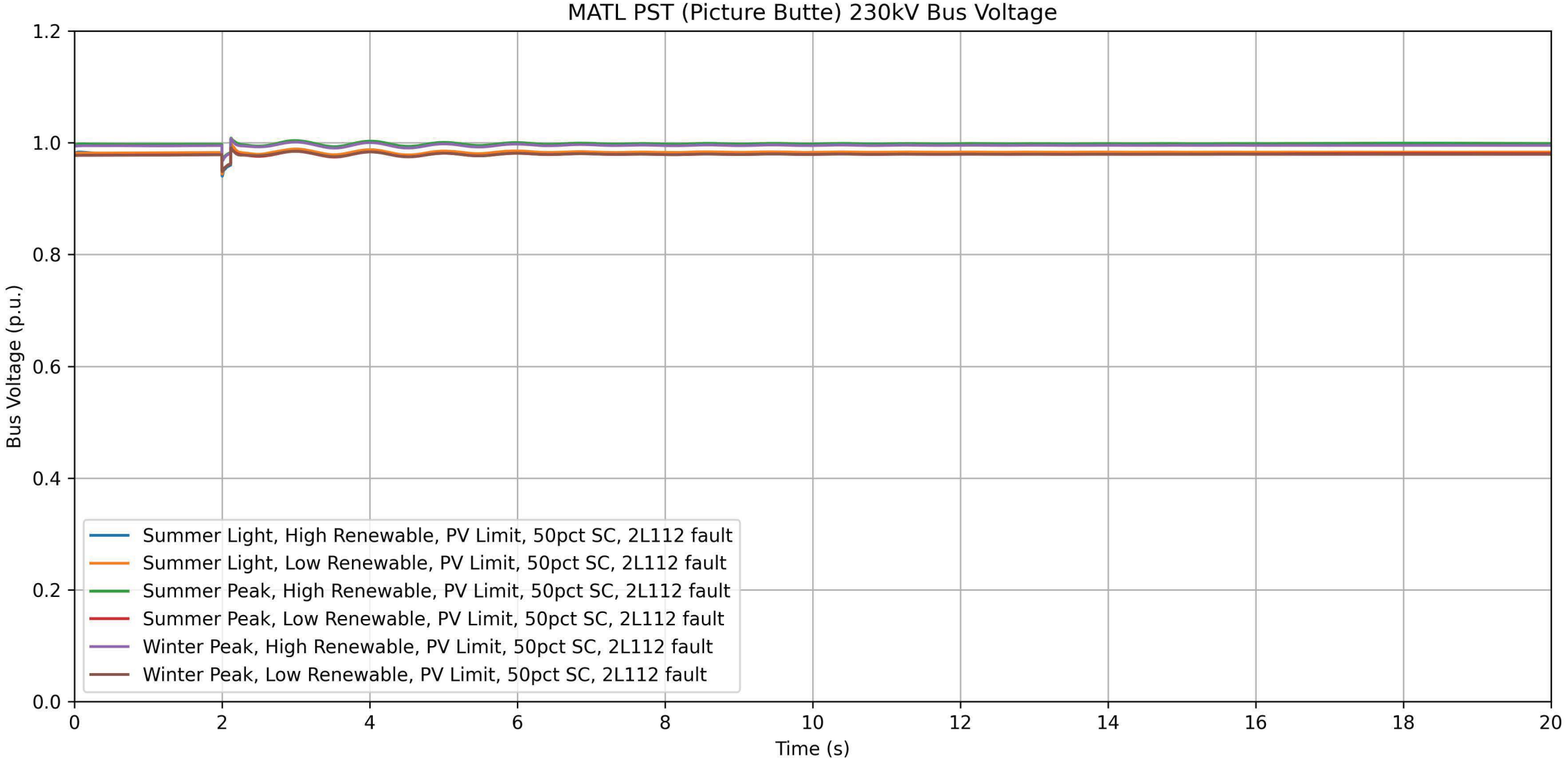

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

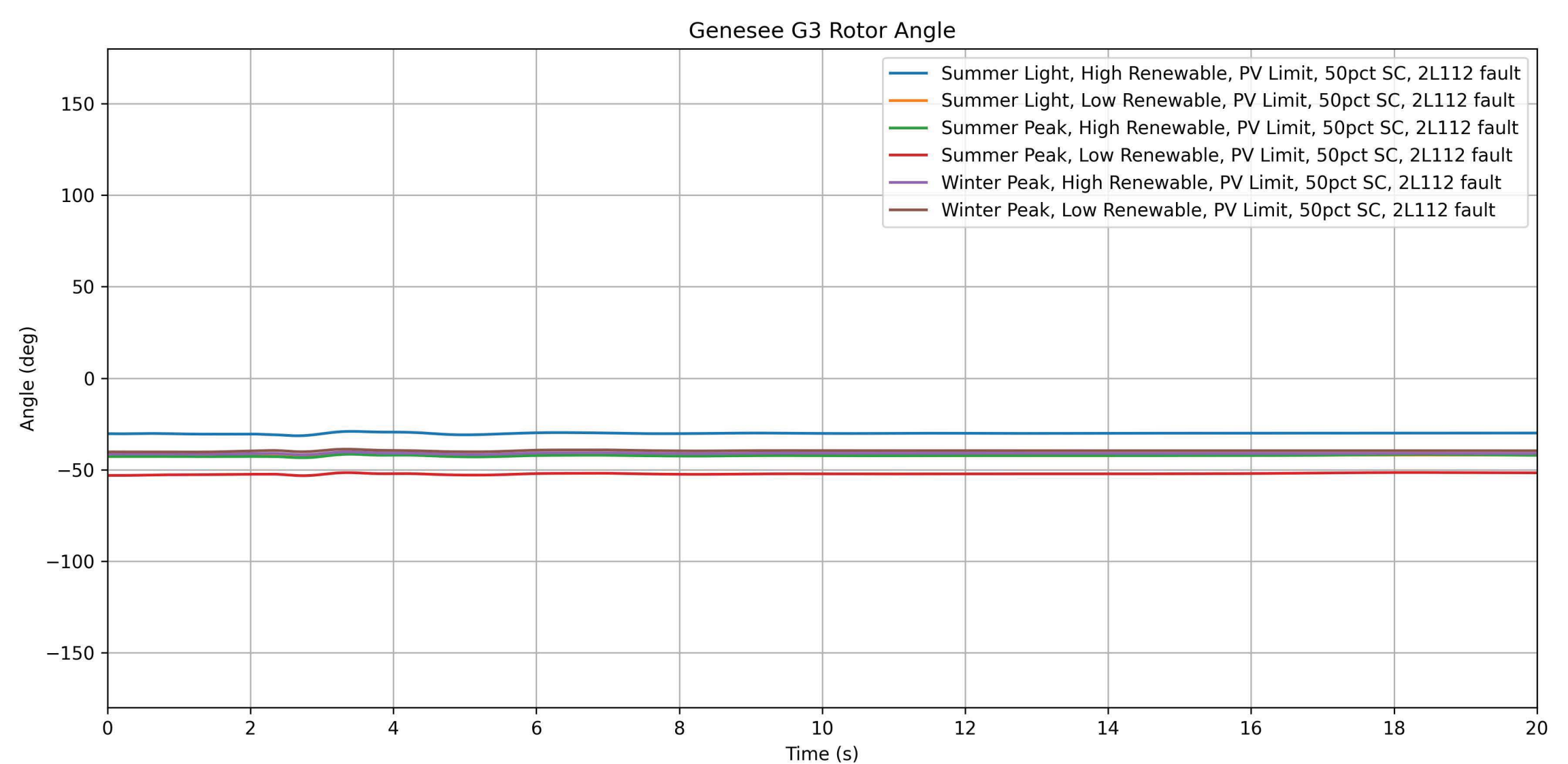

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

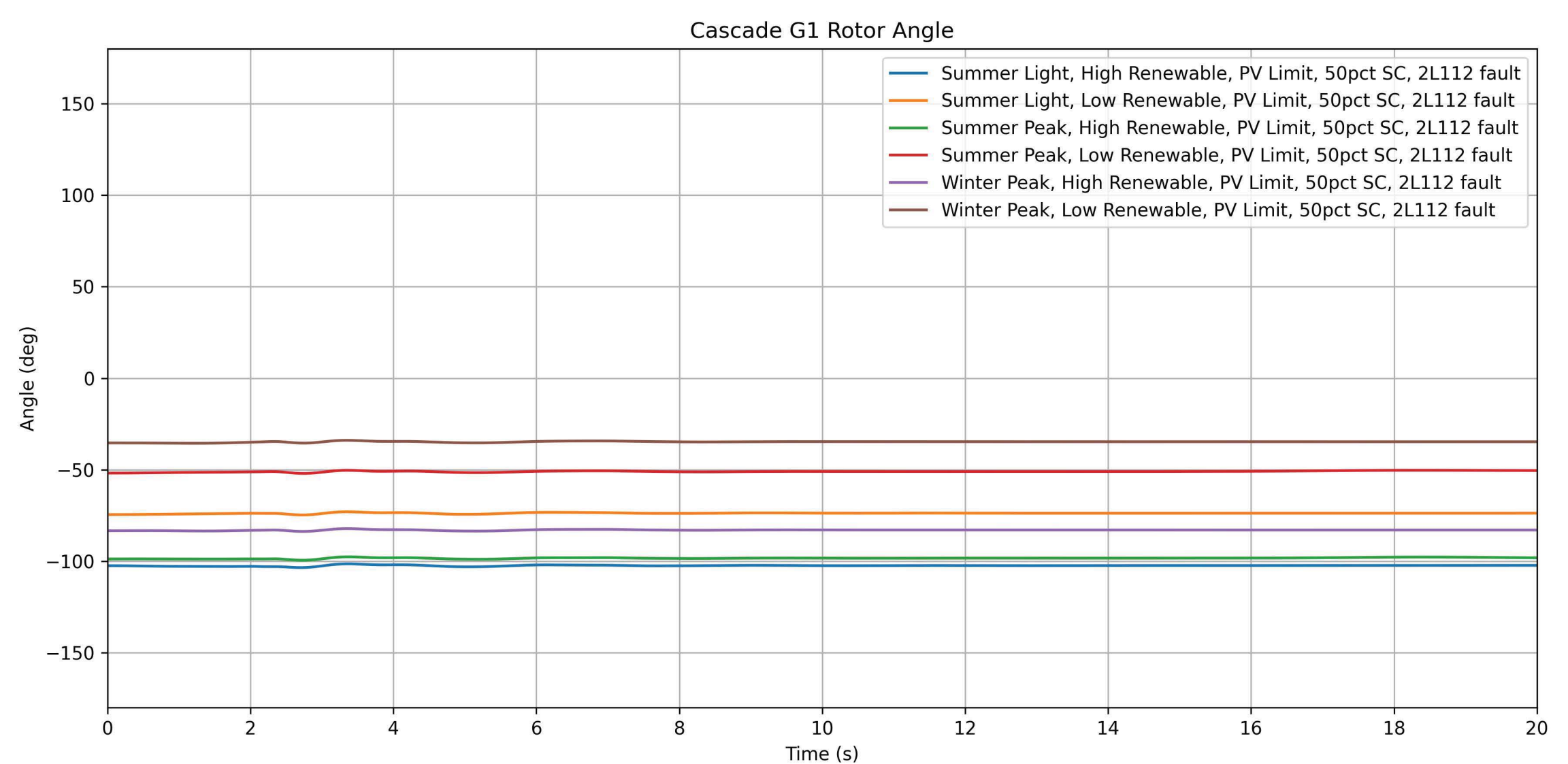

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

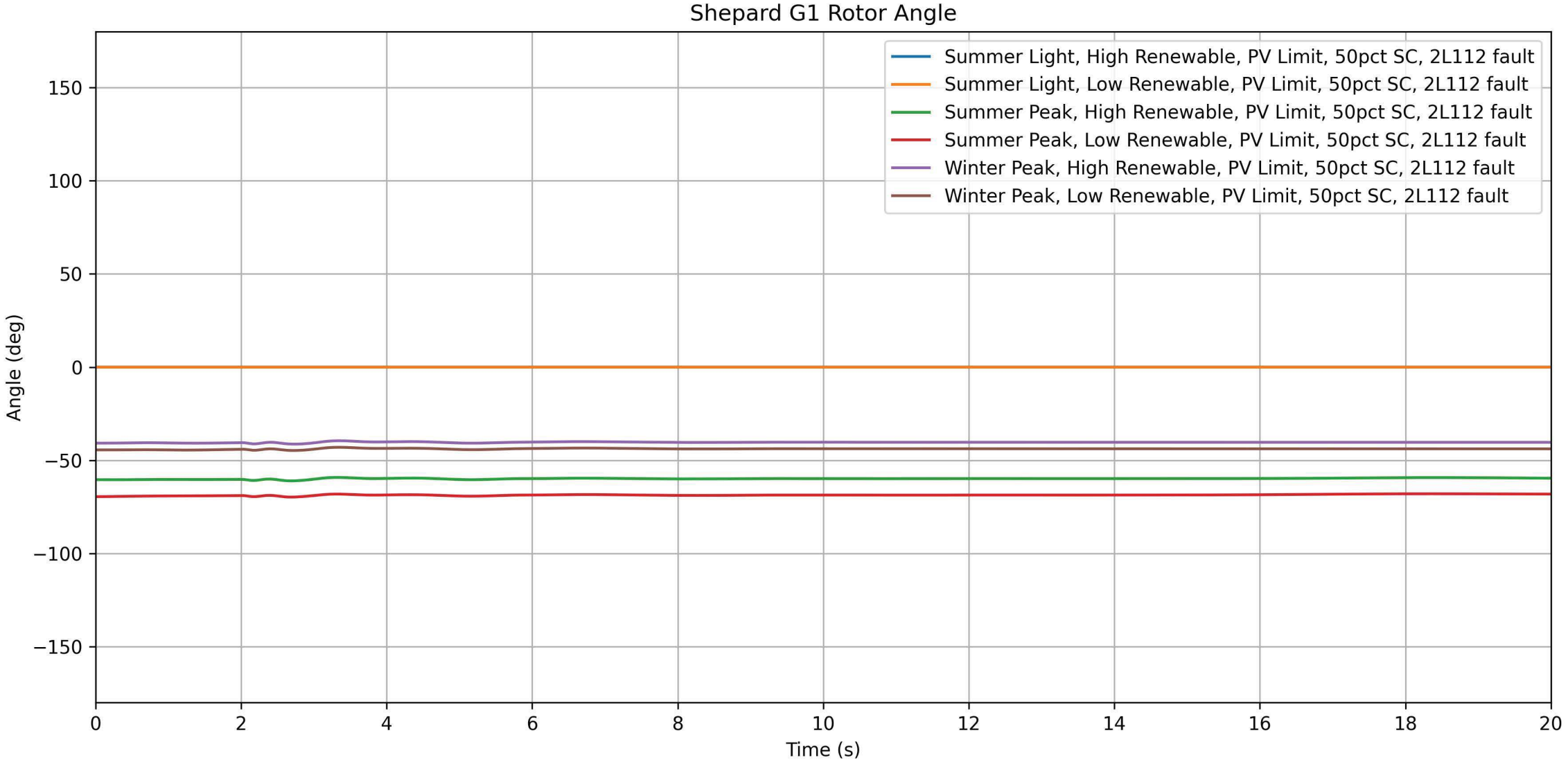

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

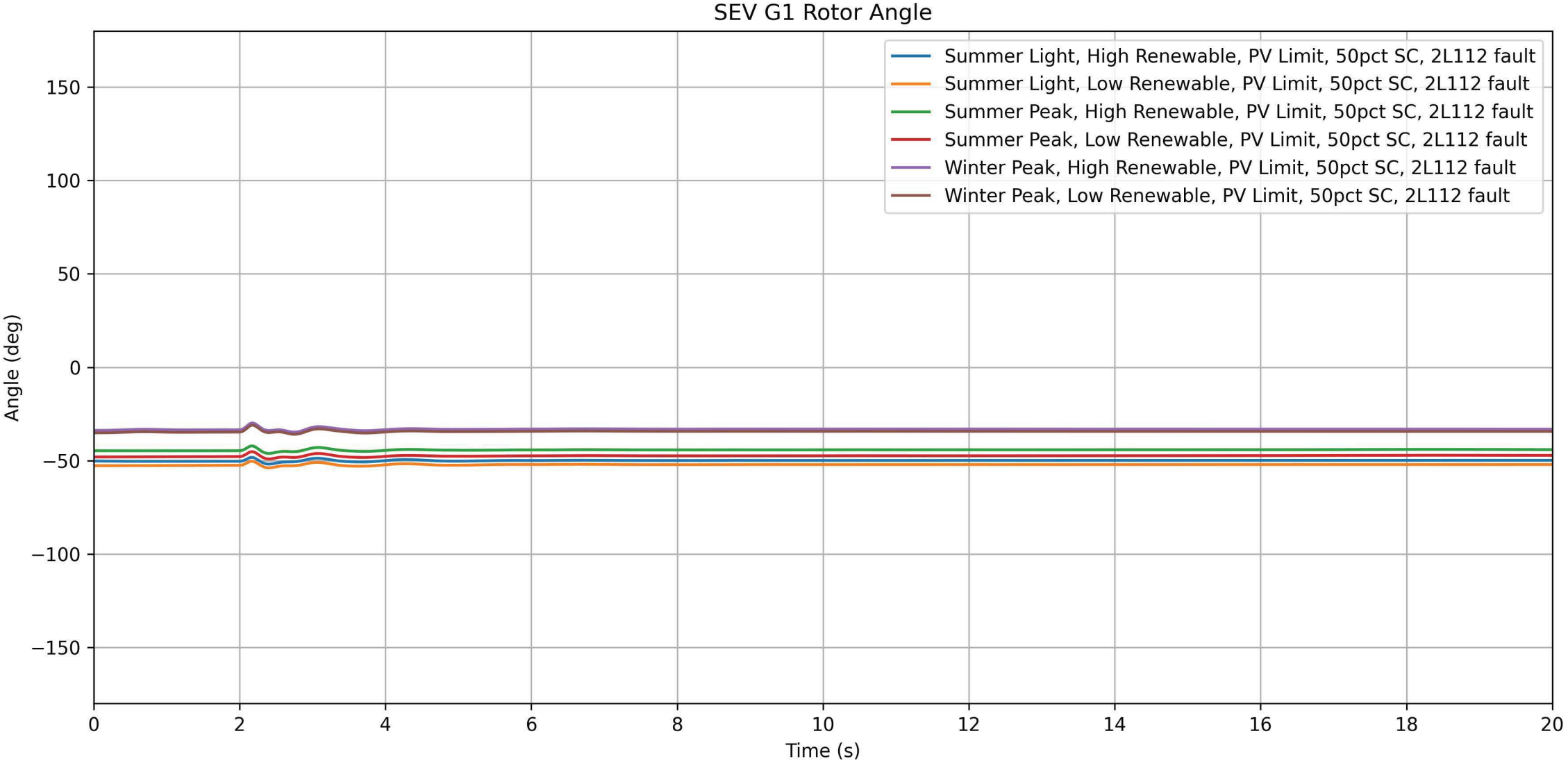

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

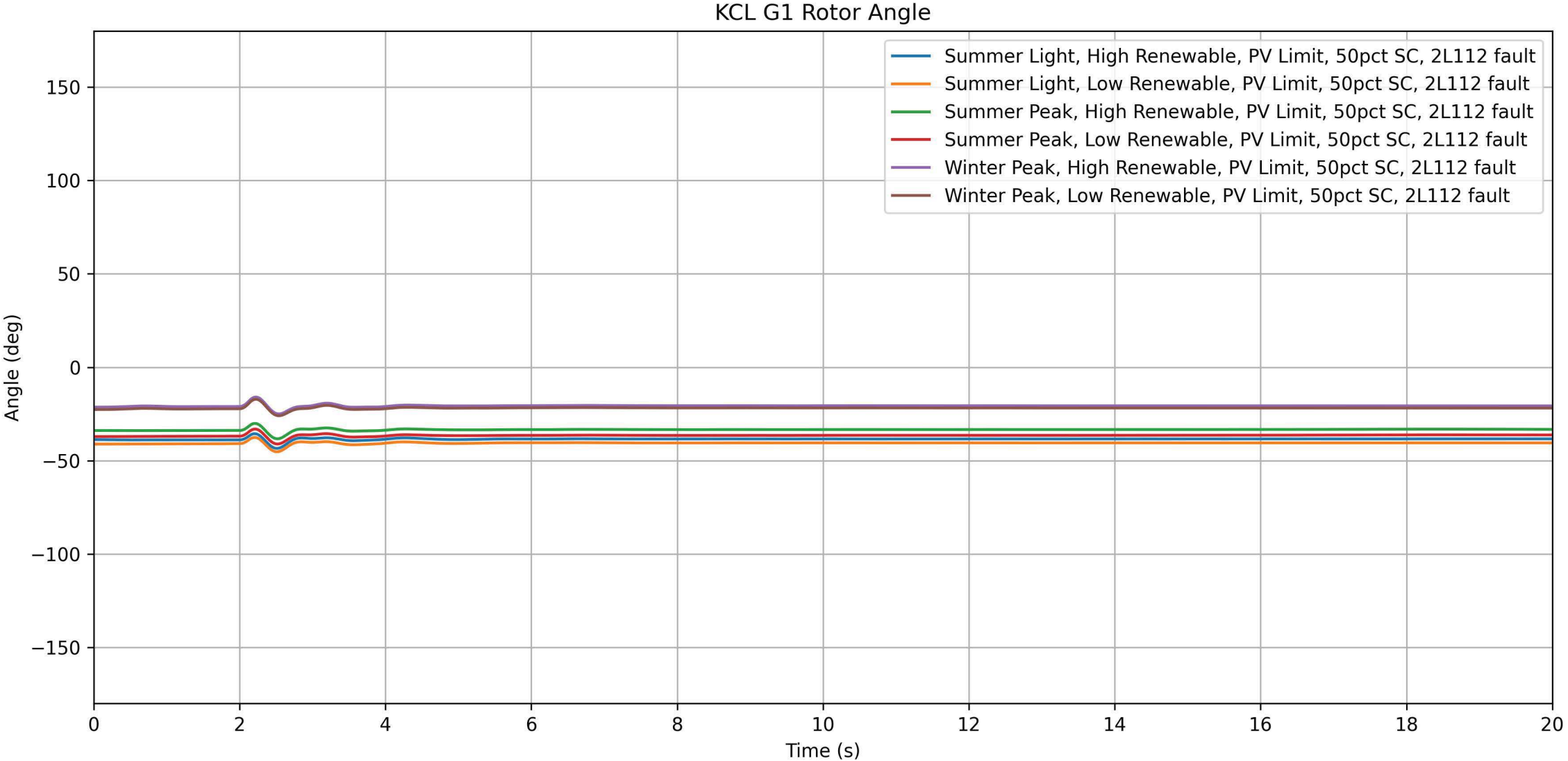

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

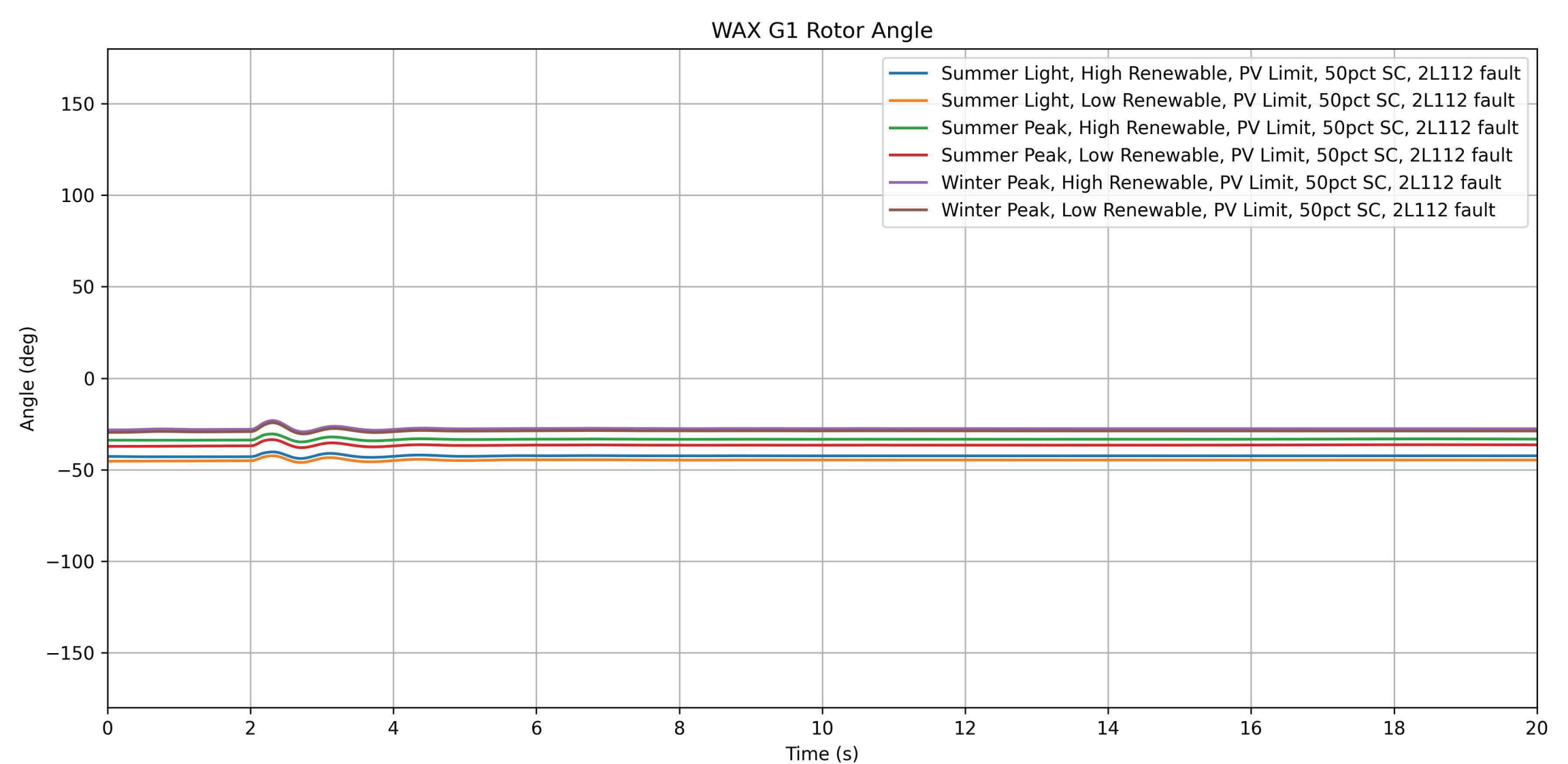

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

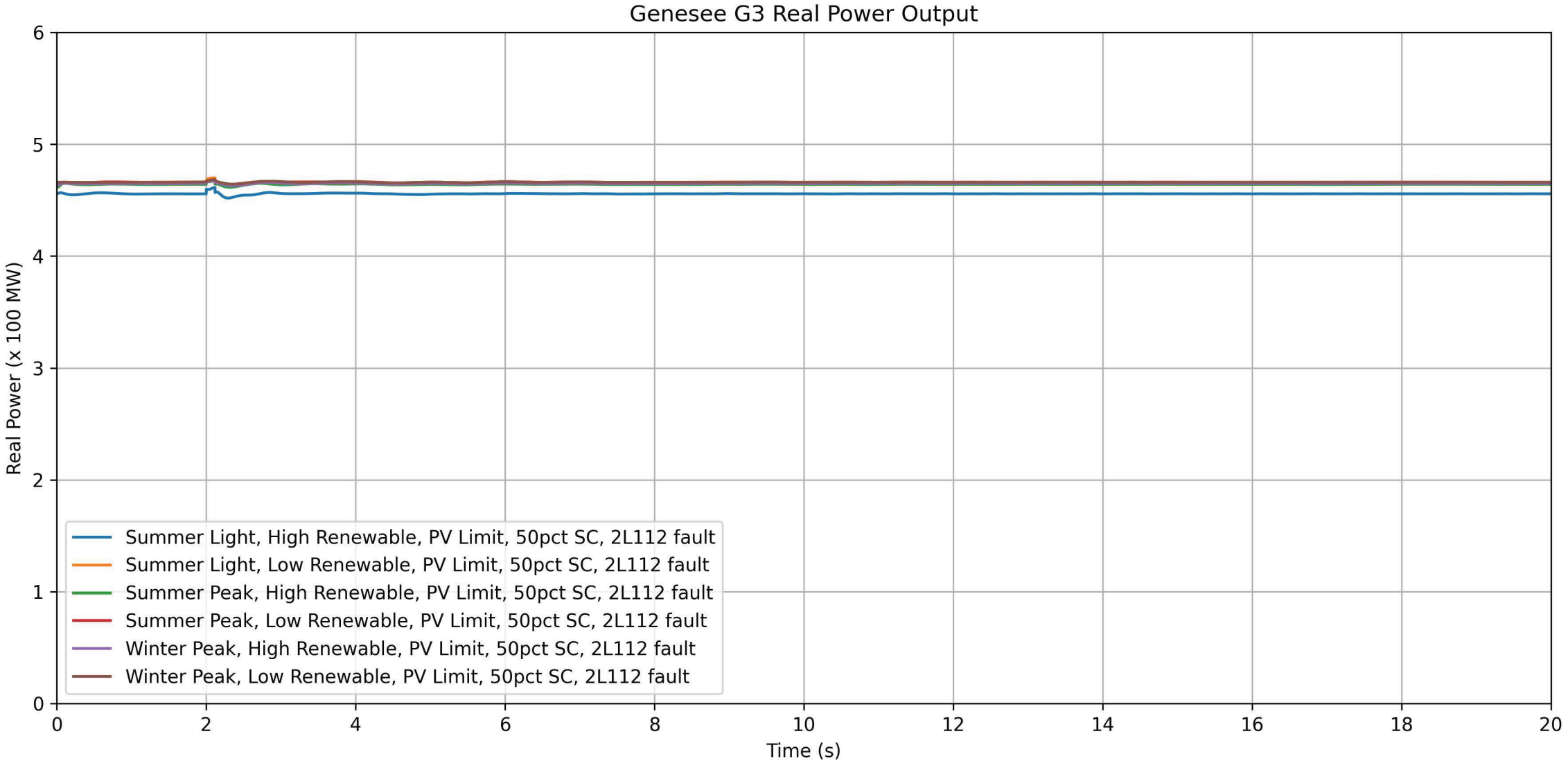

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

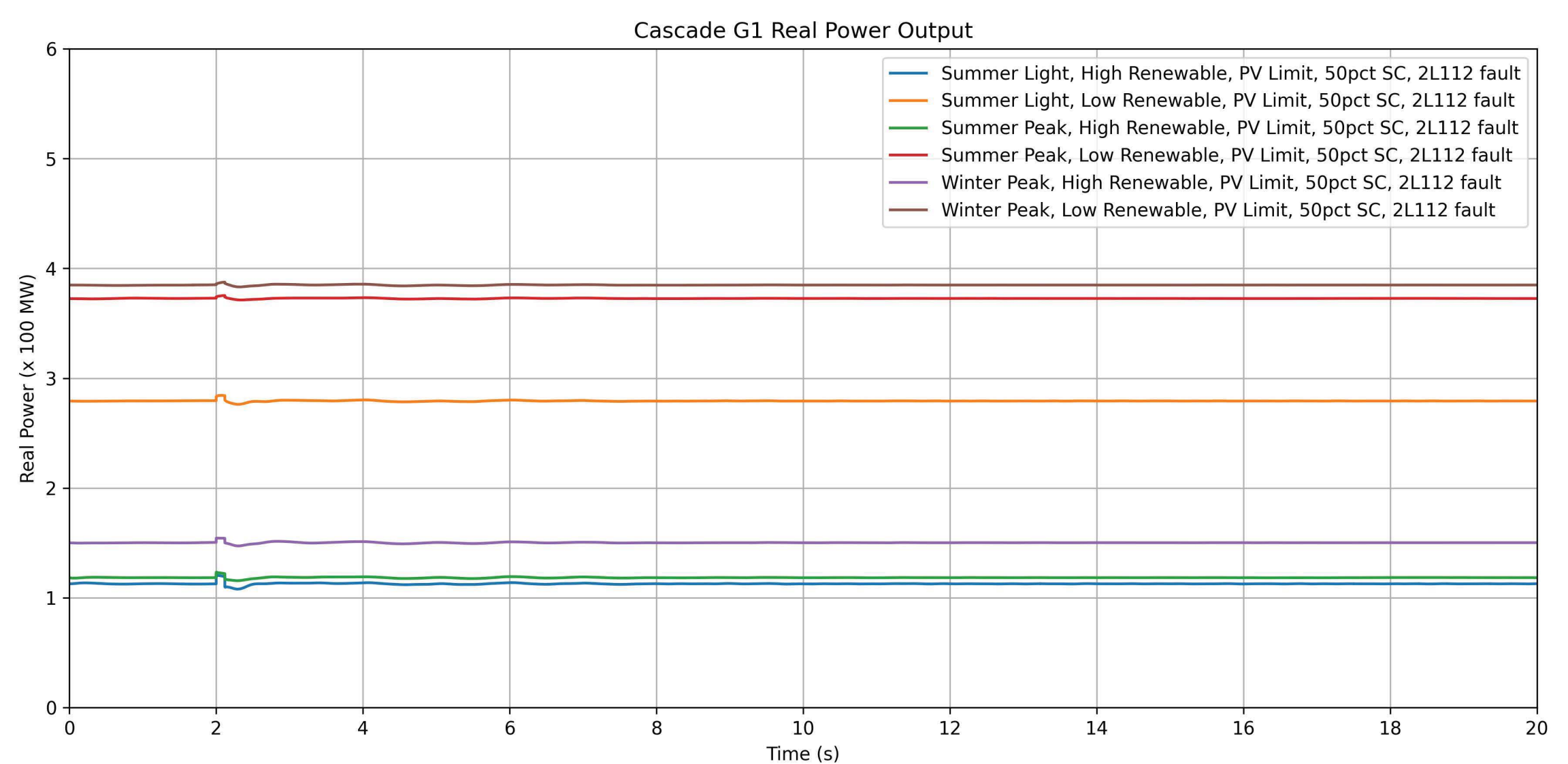

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

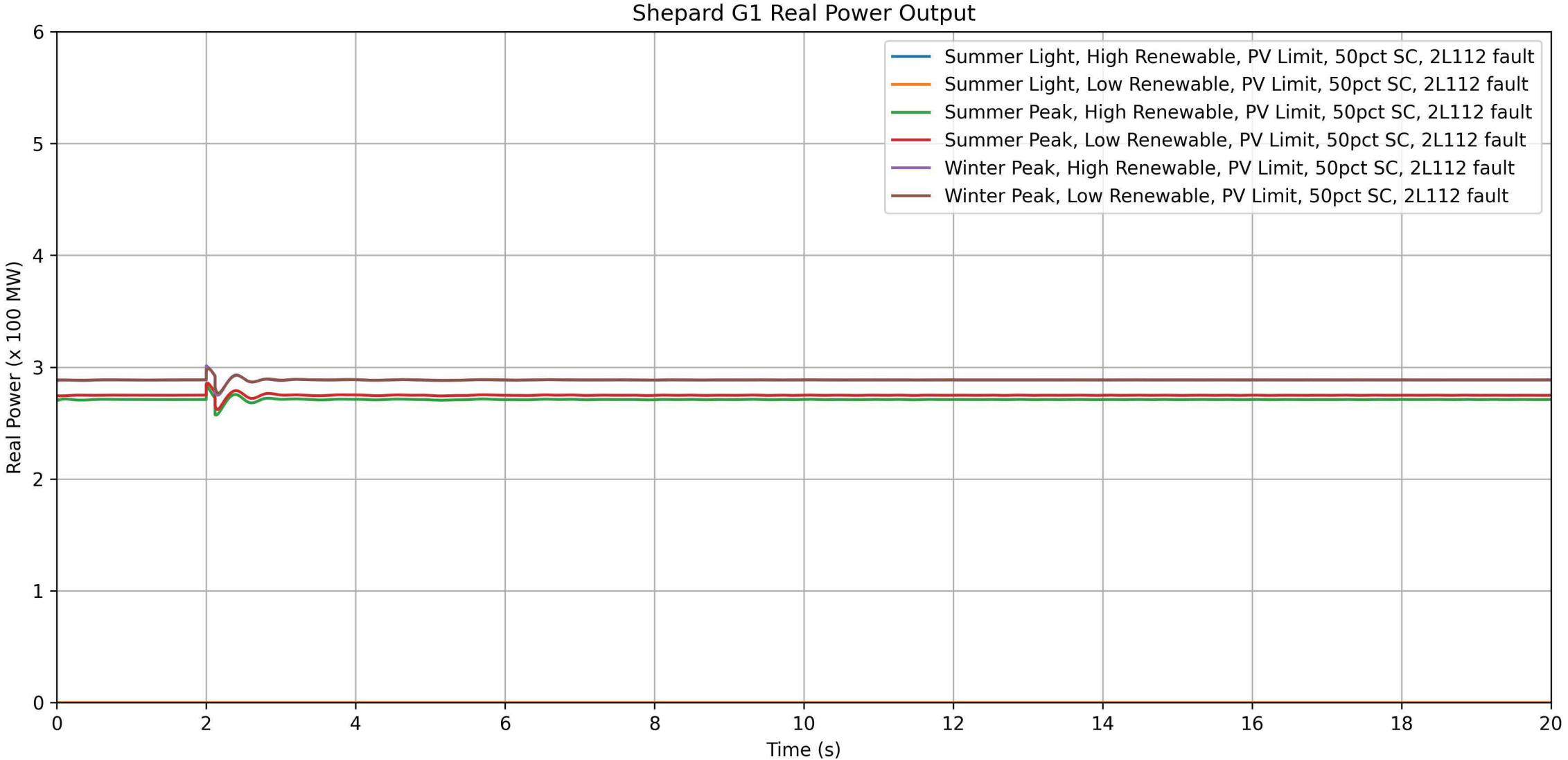

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

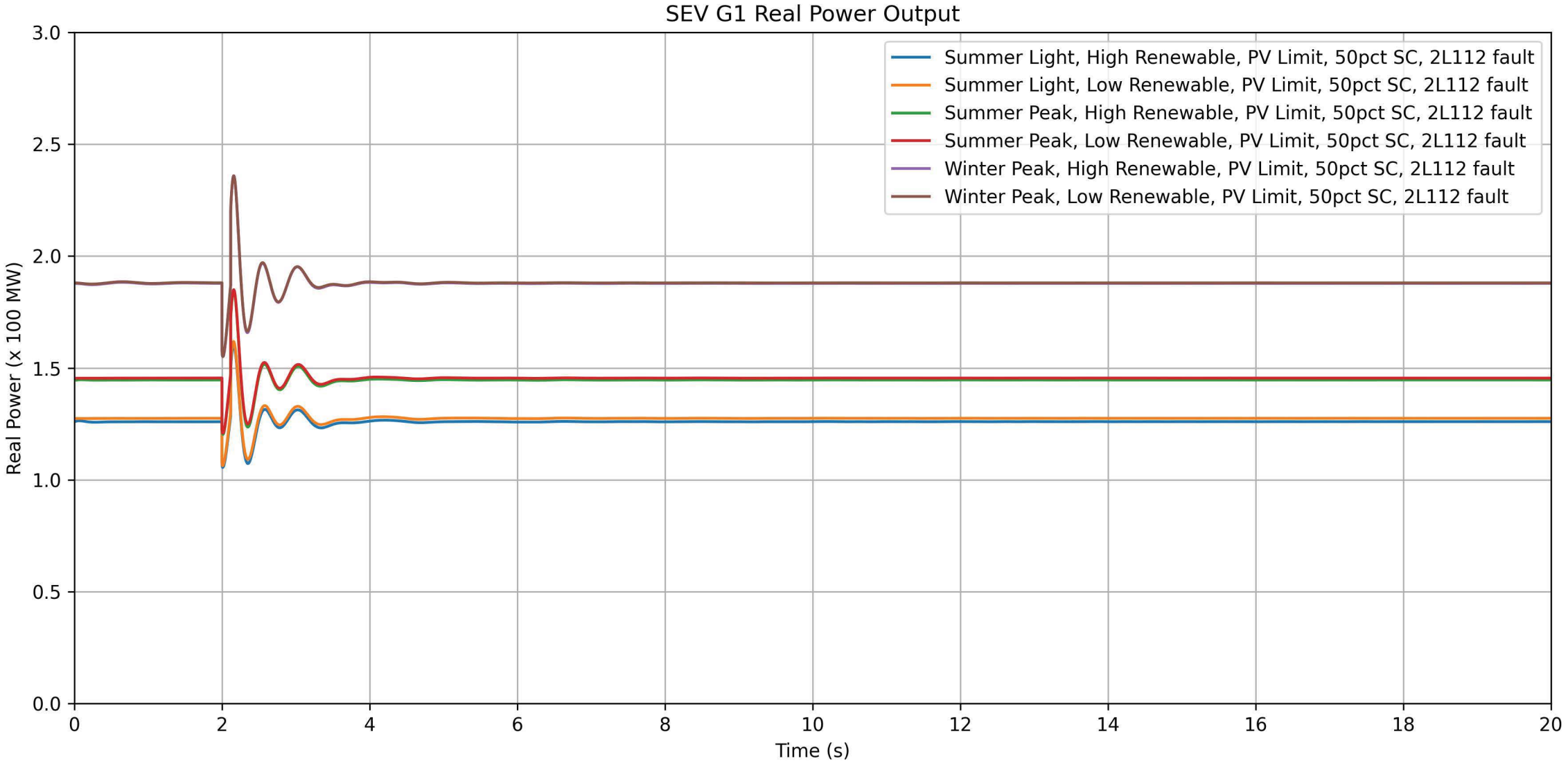

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

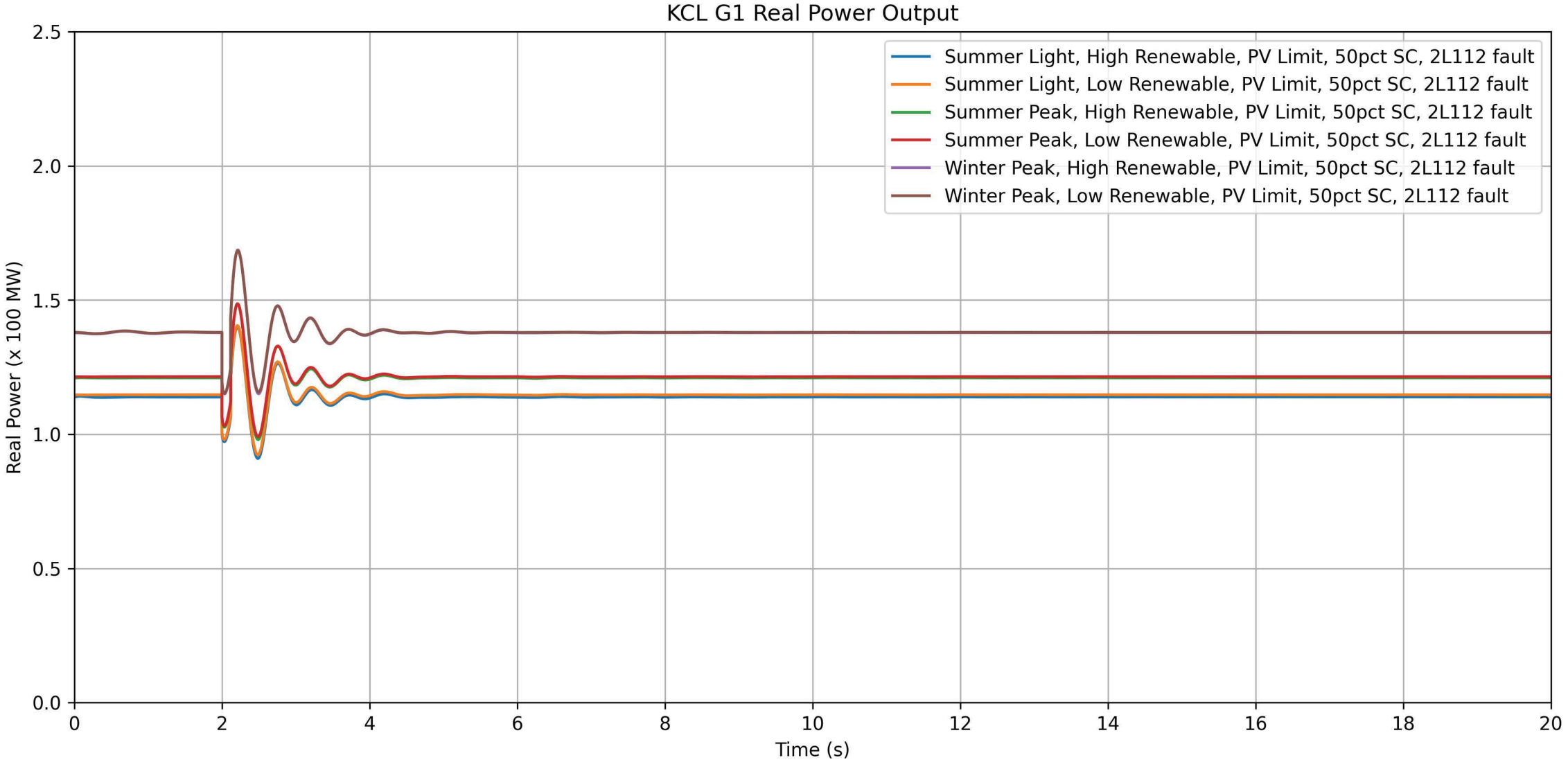

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

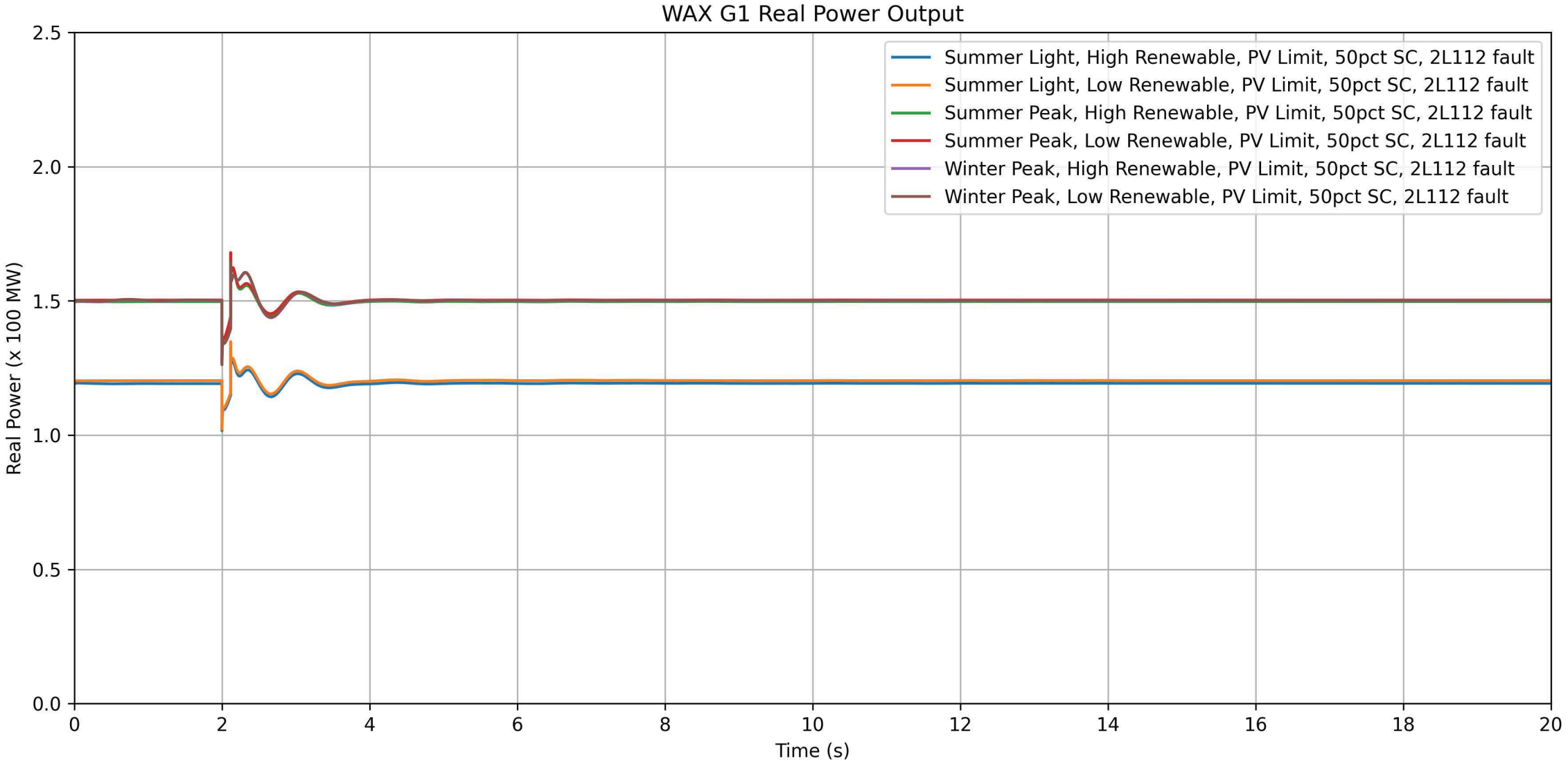

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault

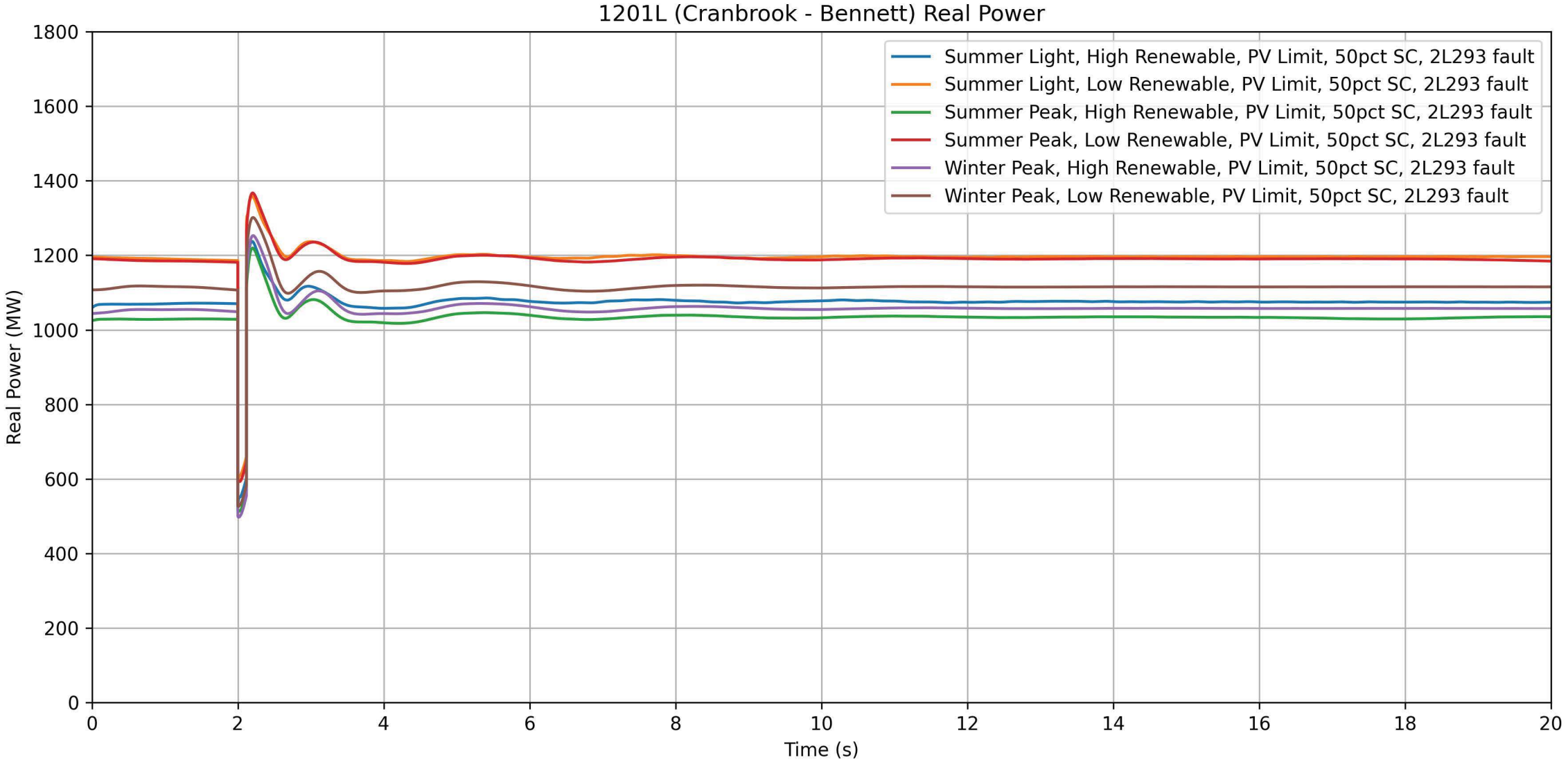

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

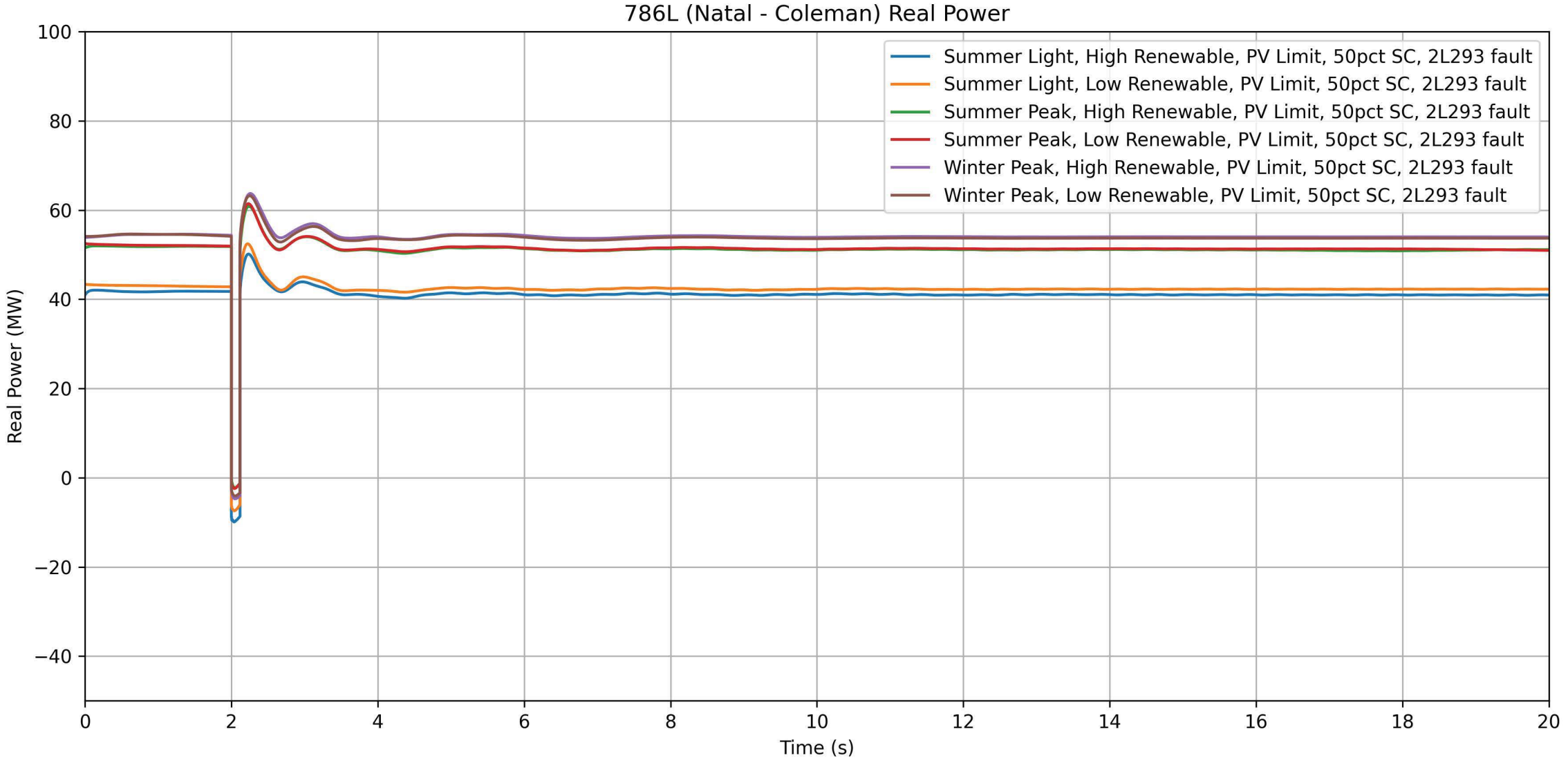

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

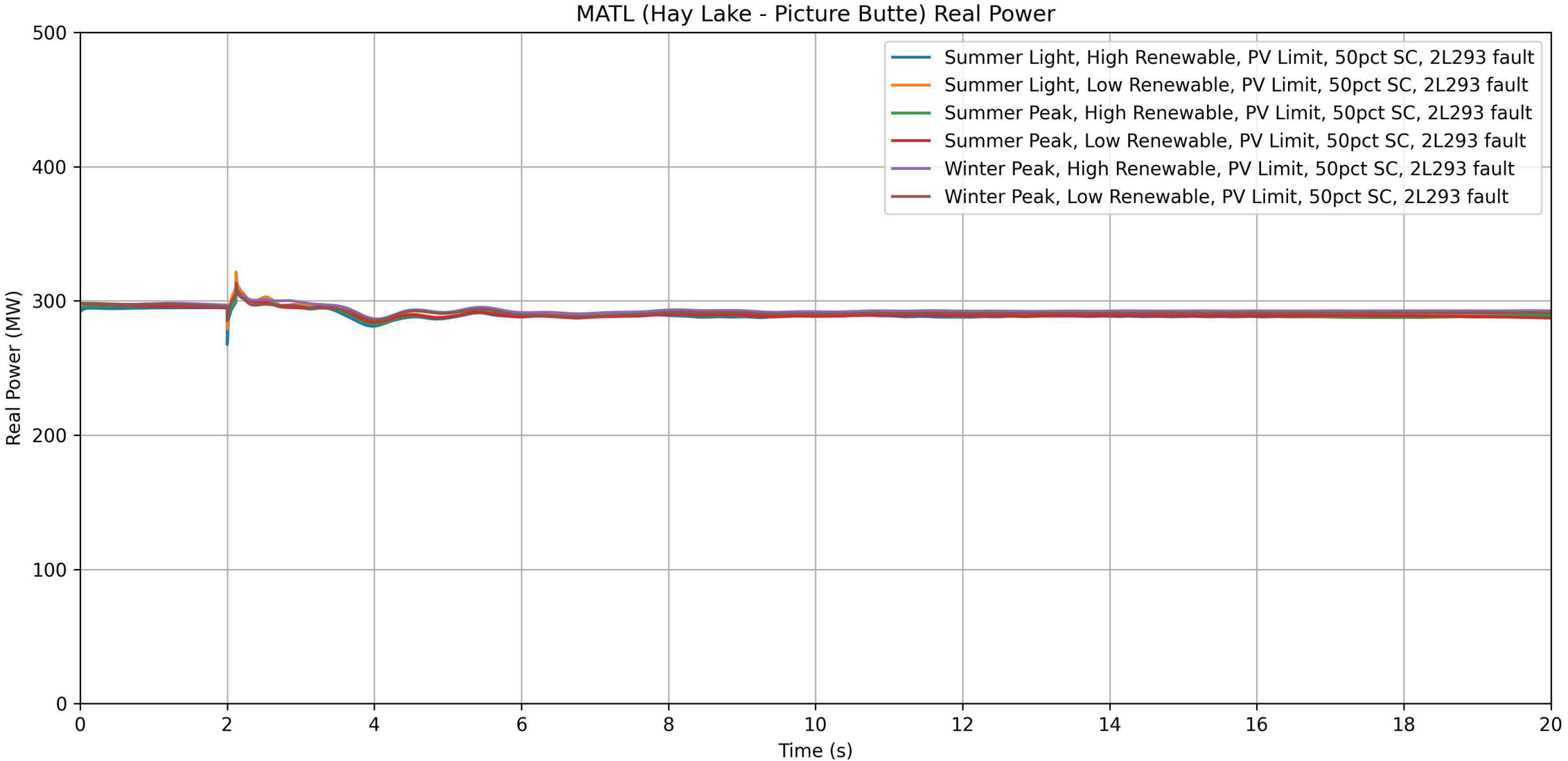

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

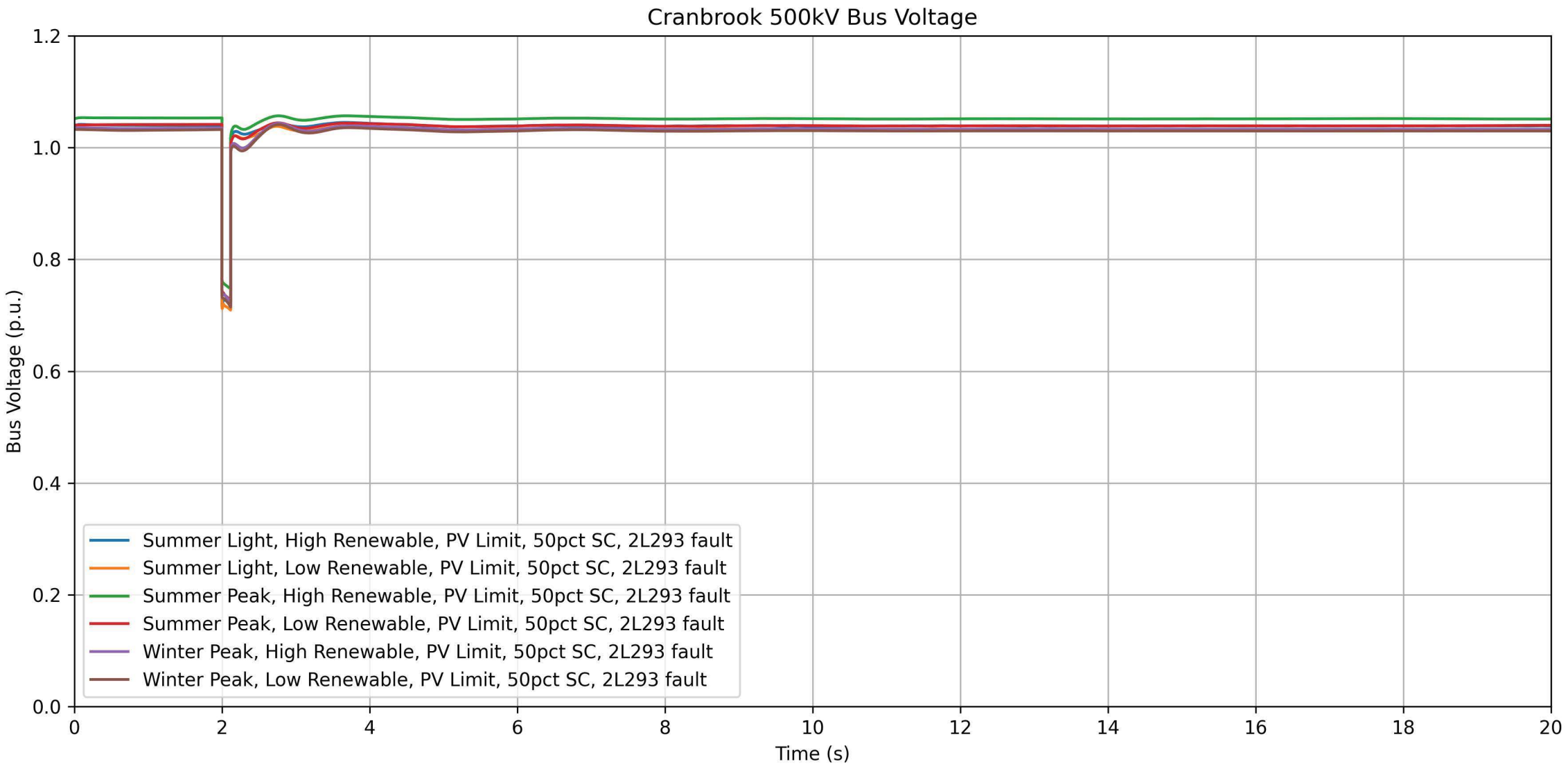

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

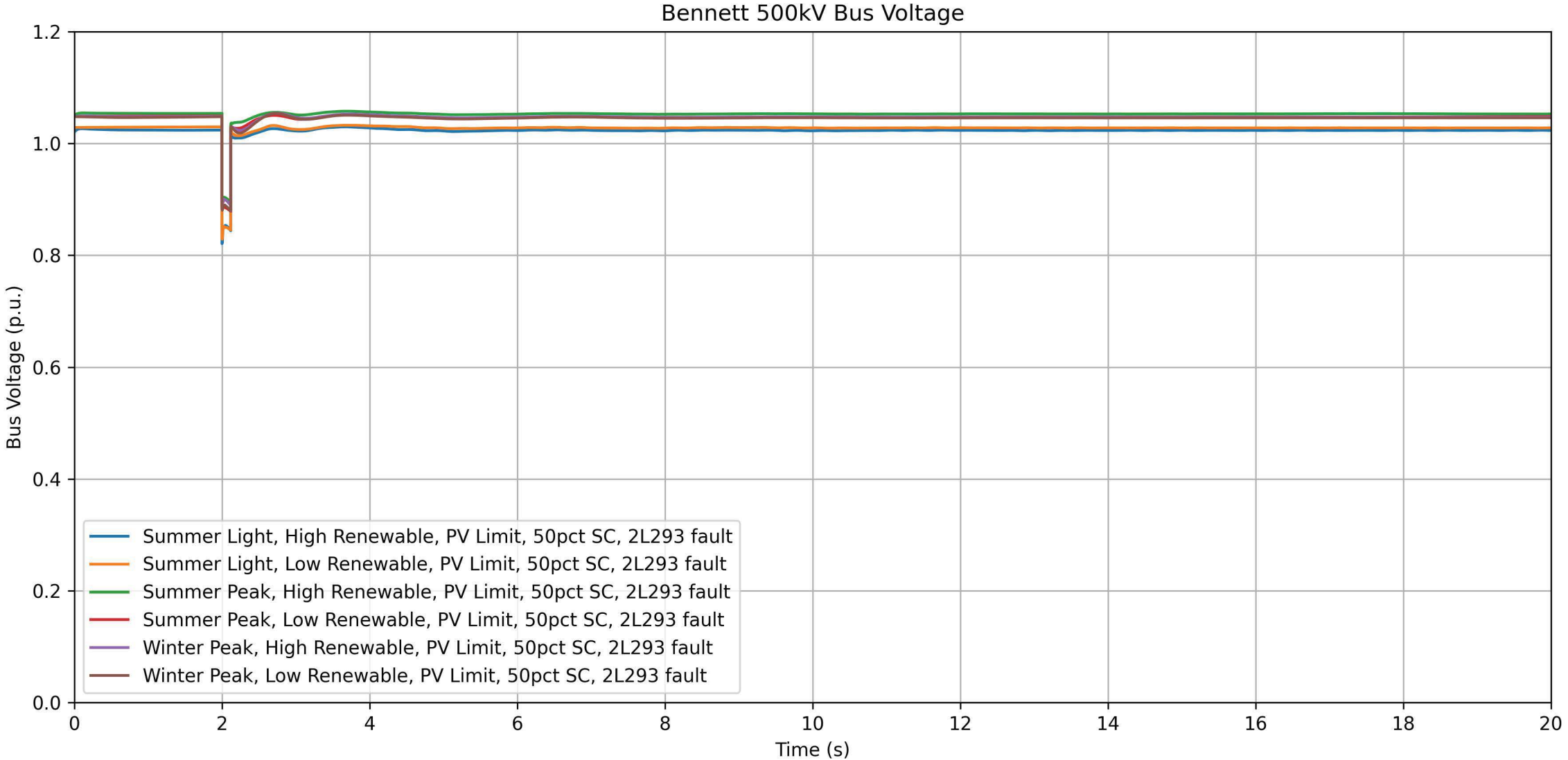

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L112 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L112 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

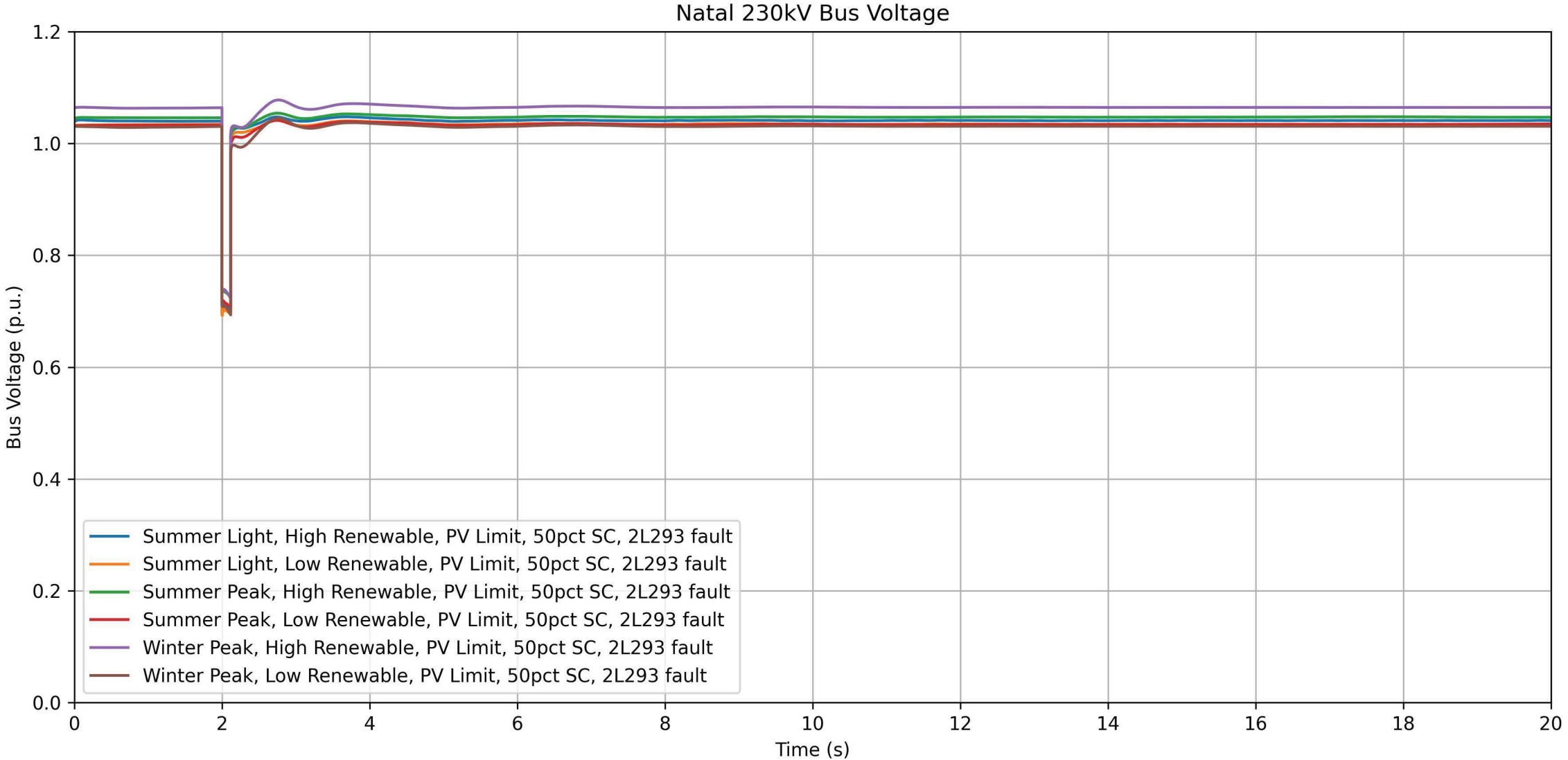

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

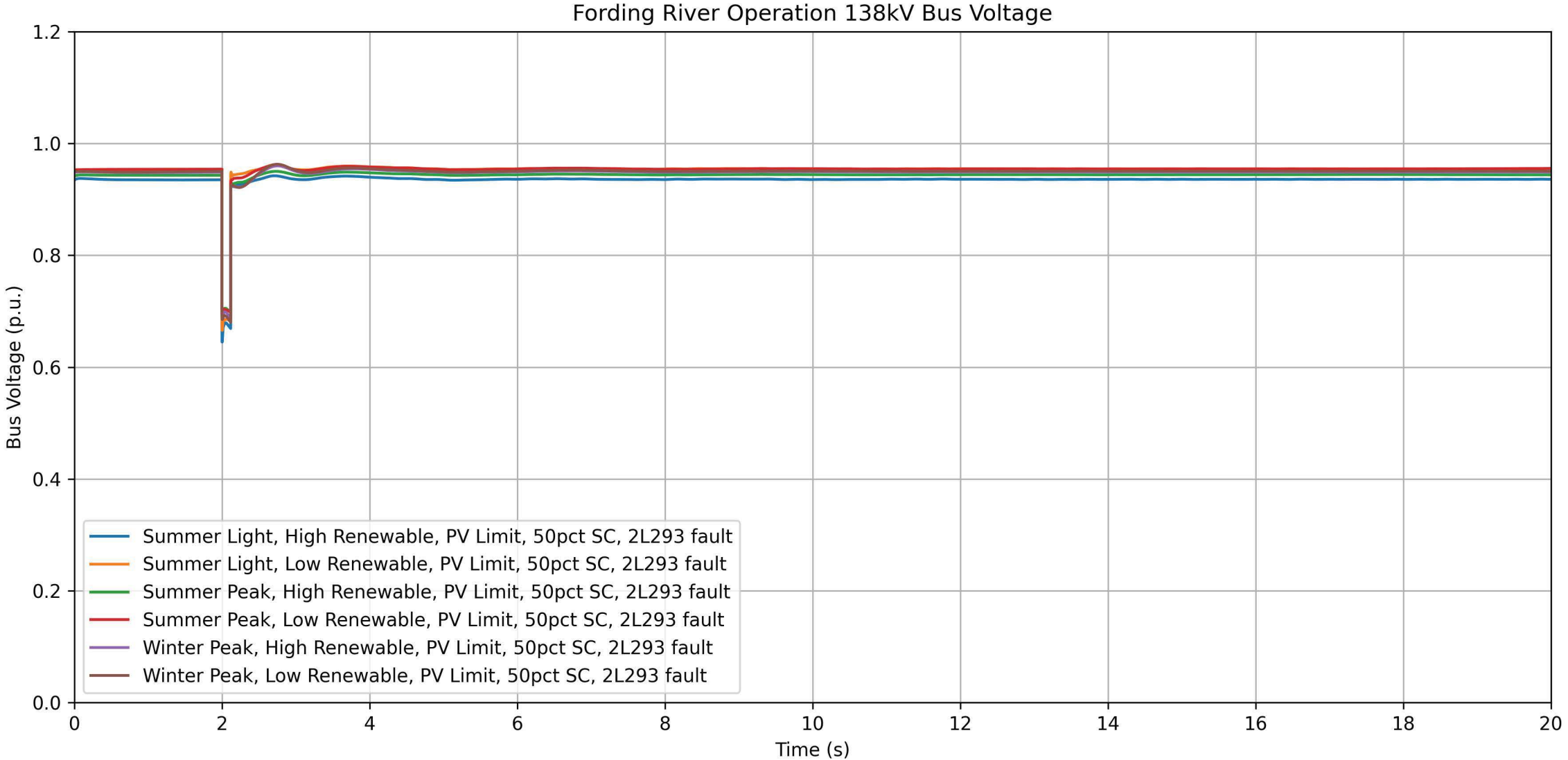

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

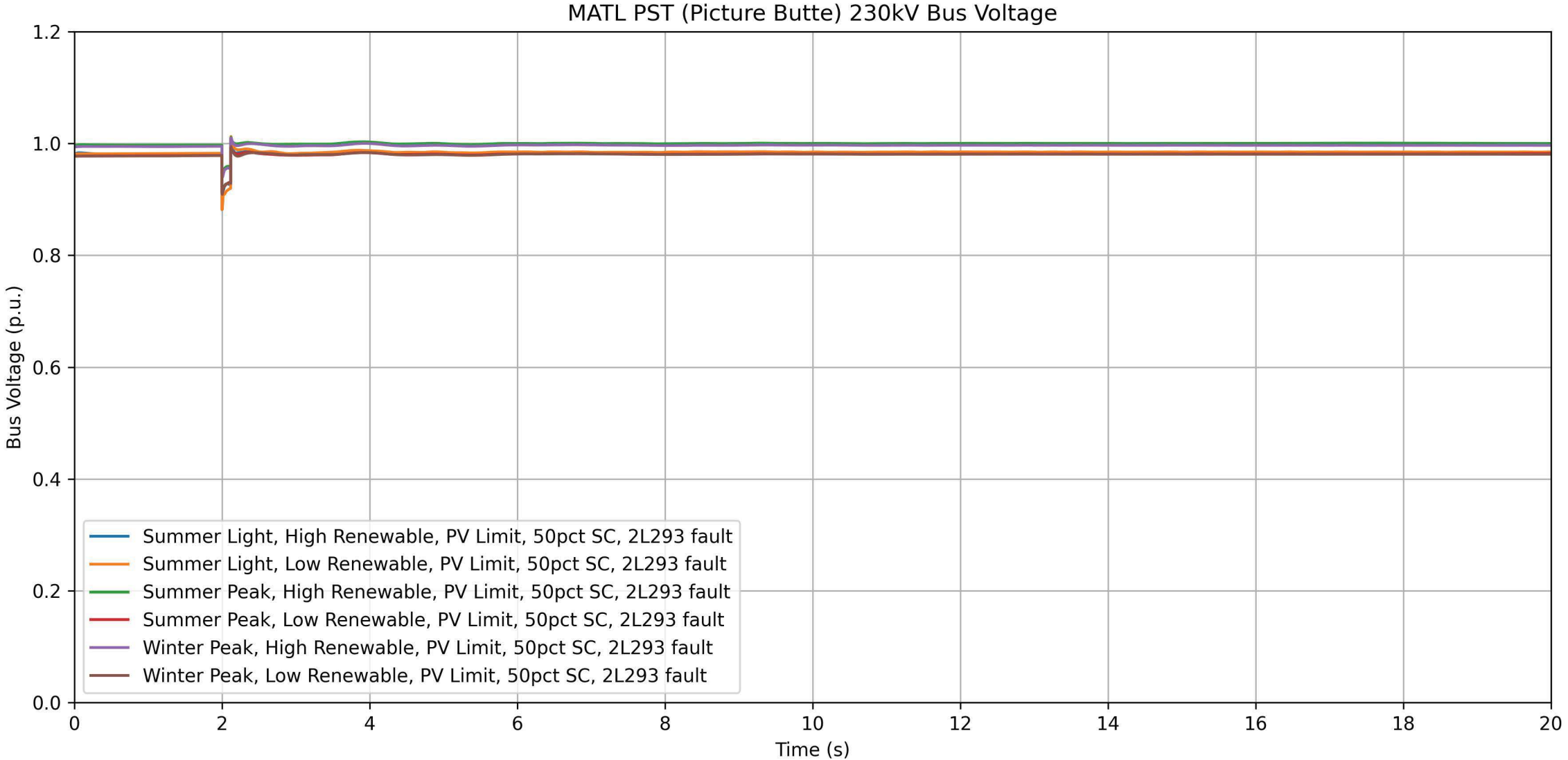

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

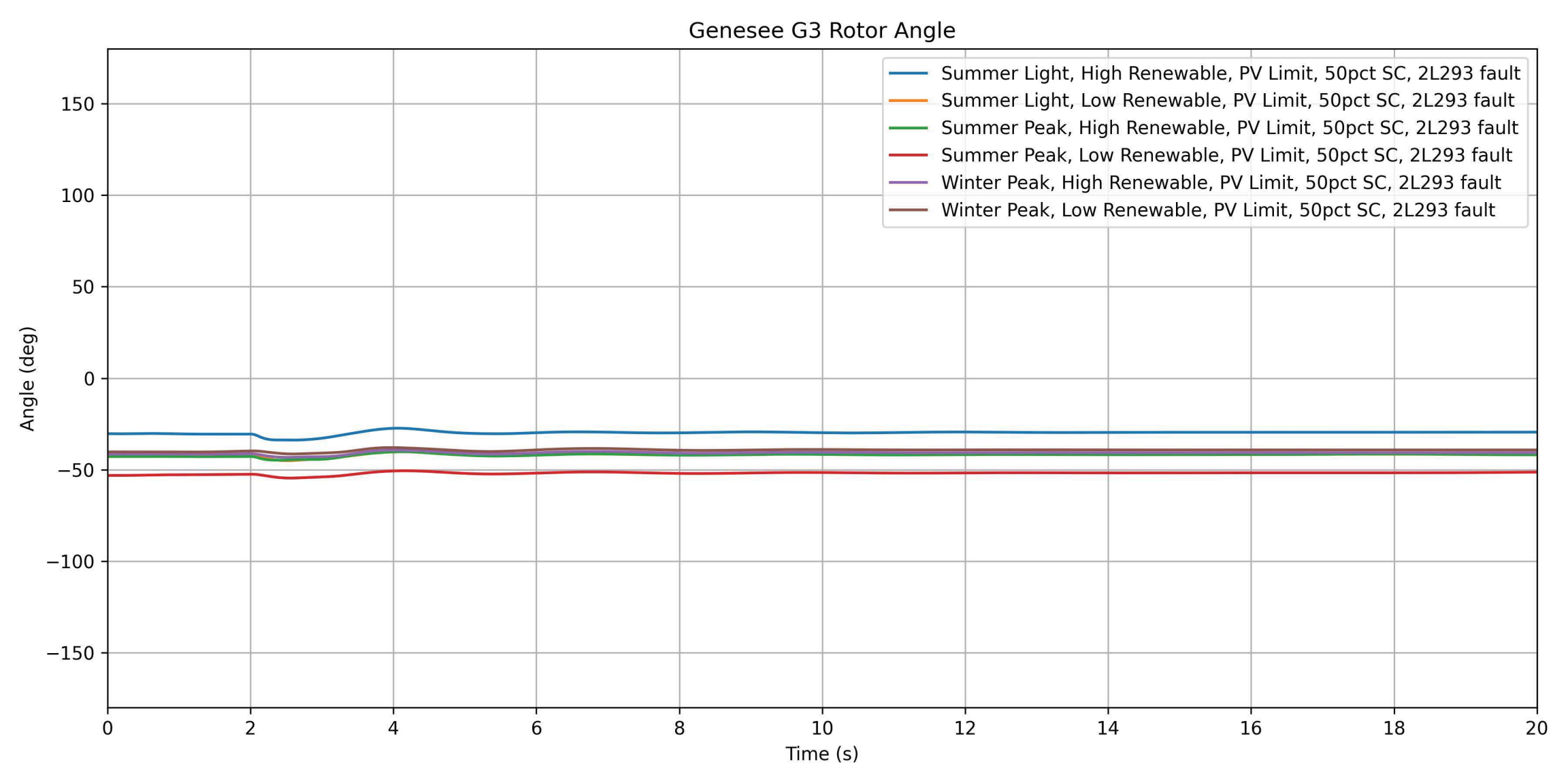

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

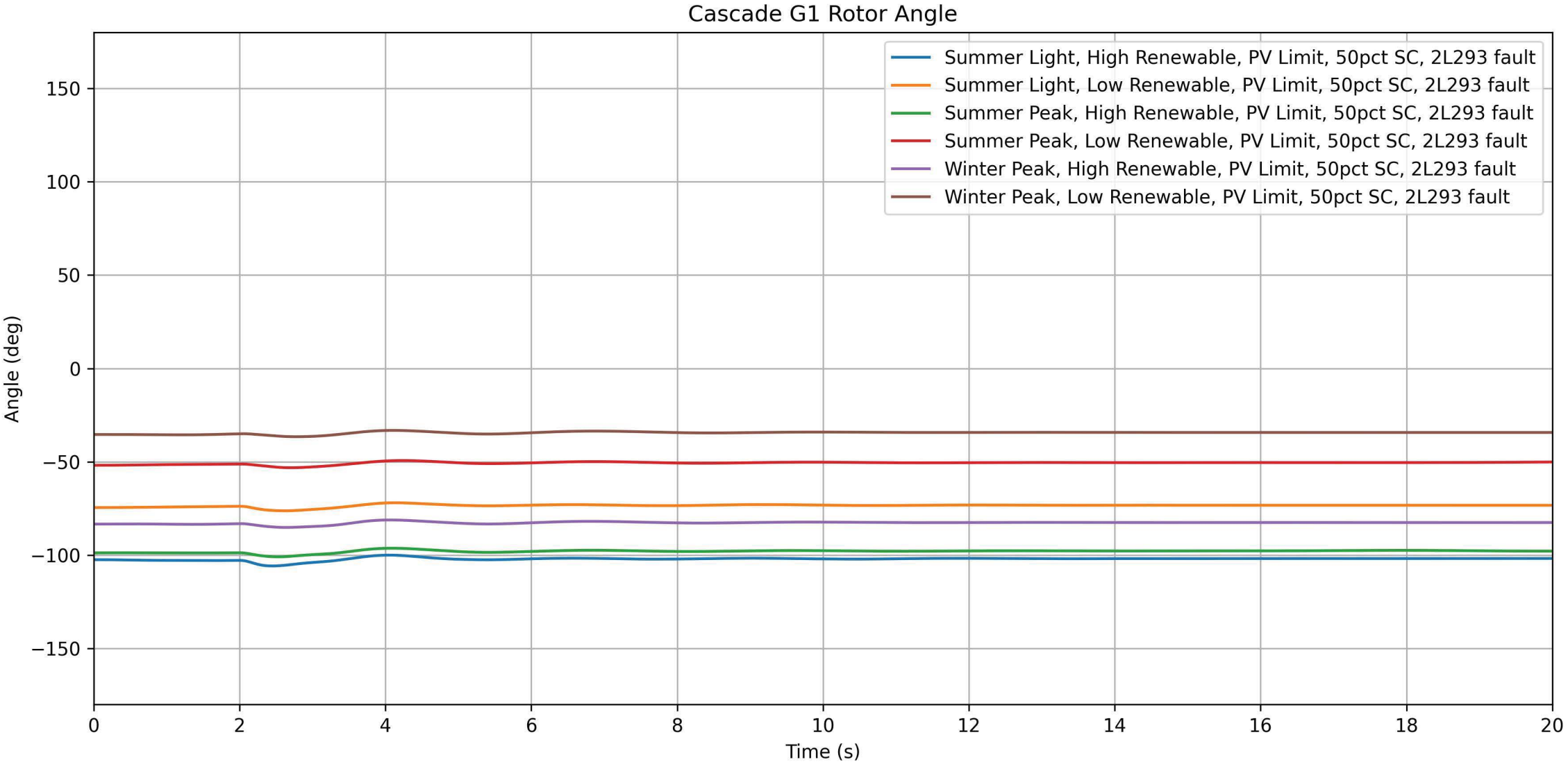

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

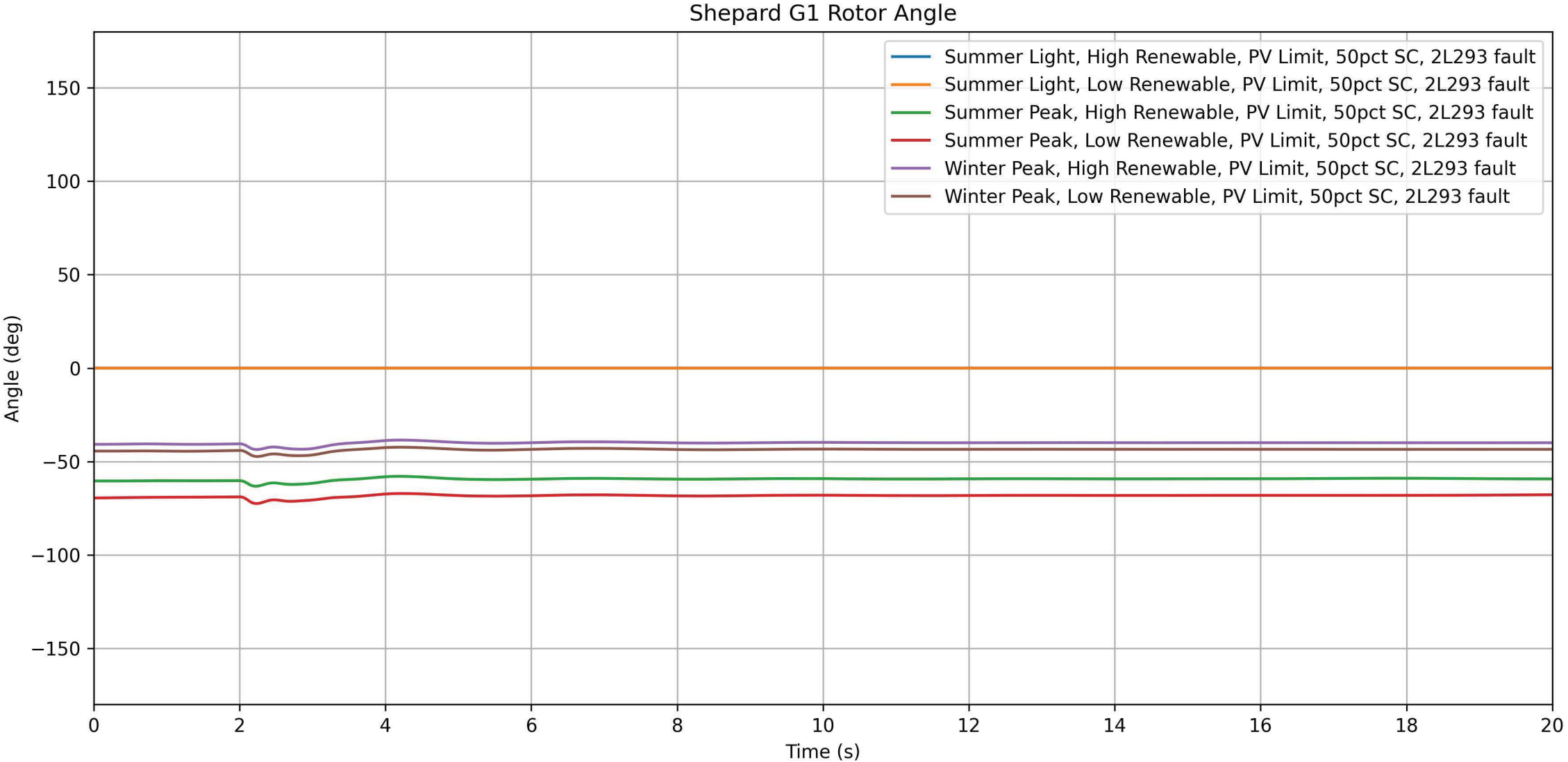

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

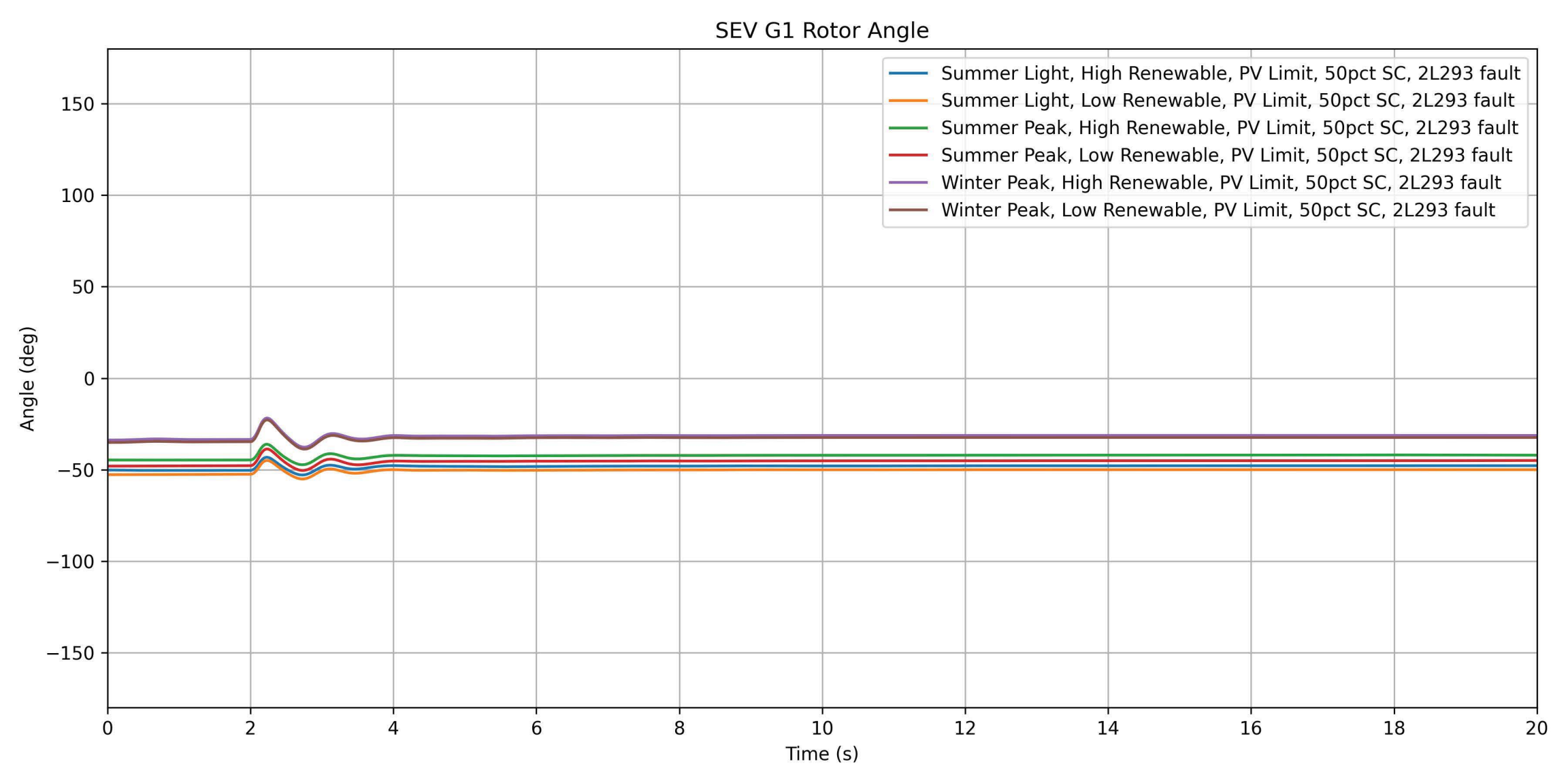

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

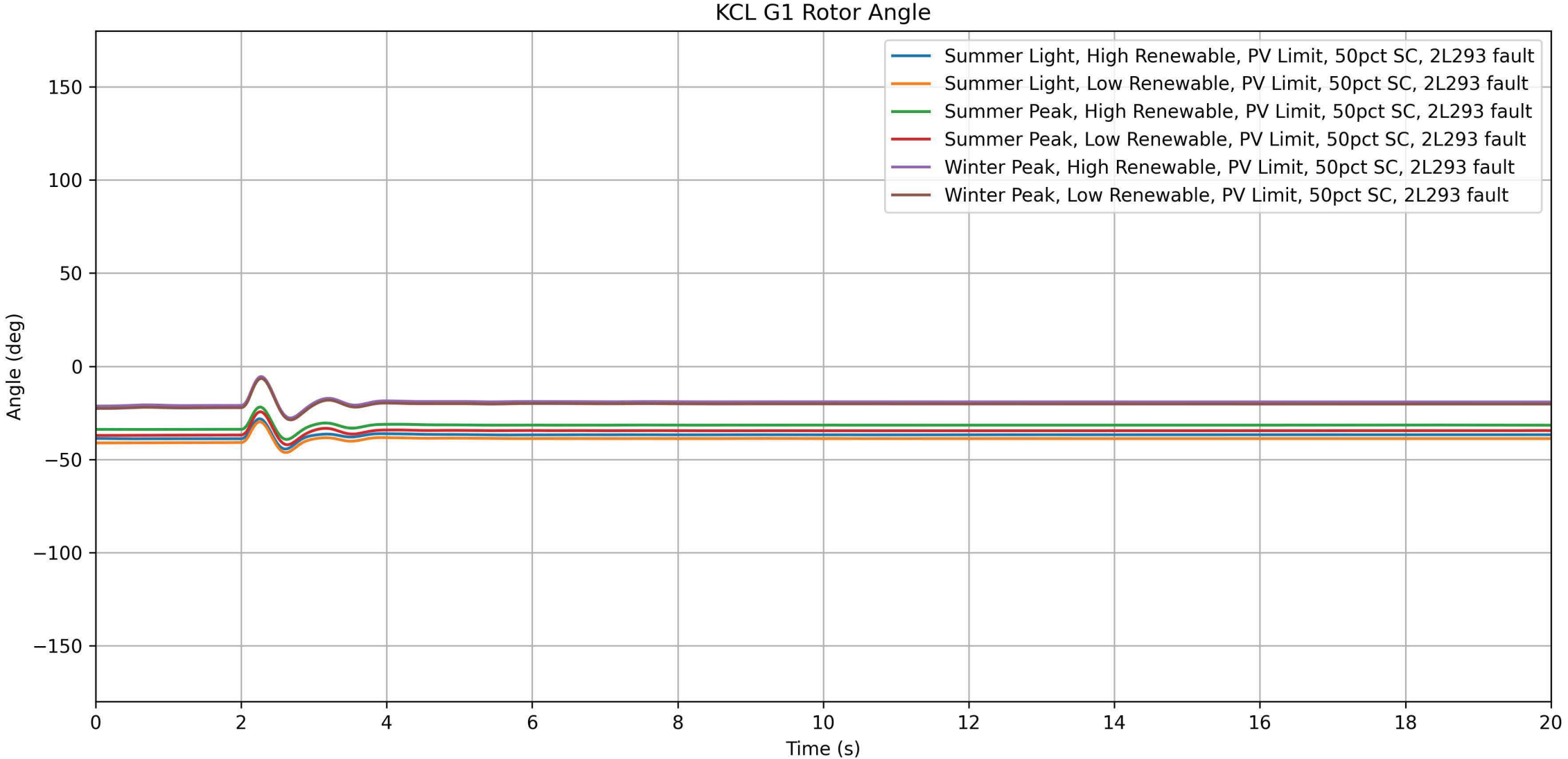

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

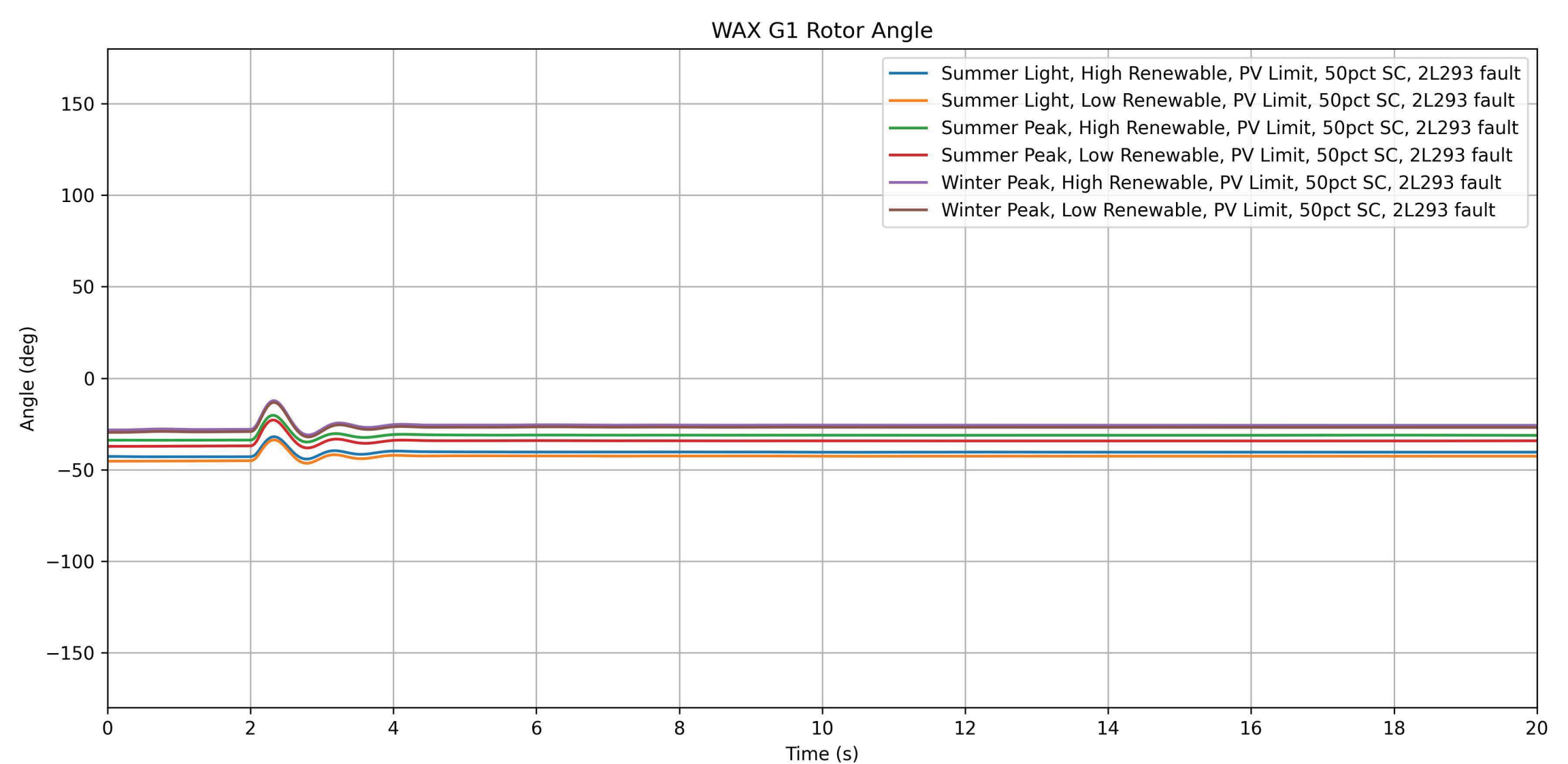

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

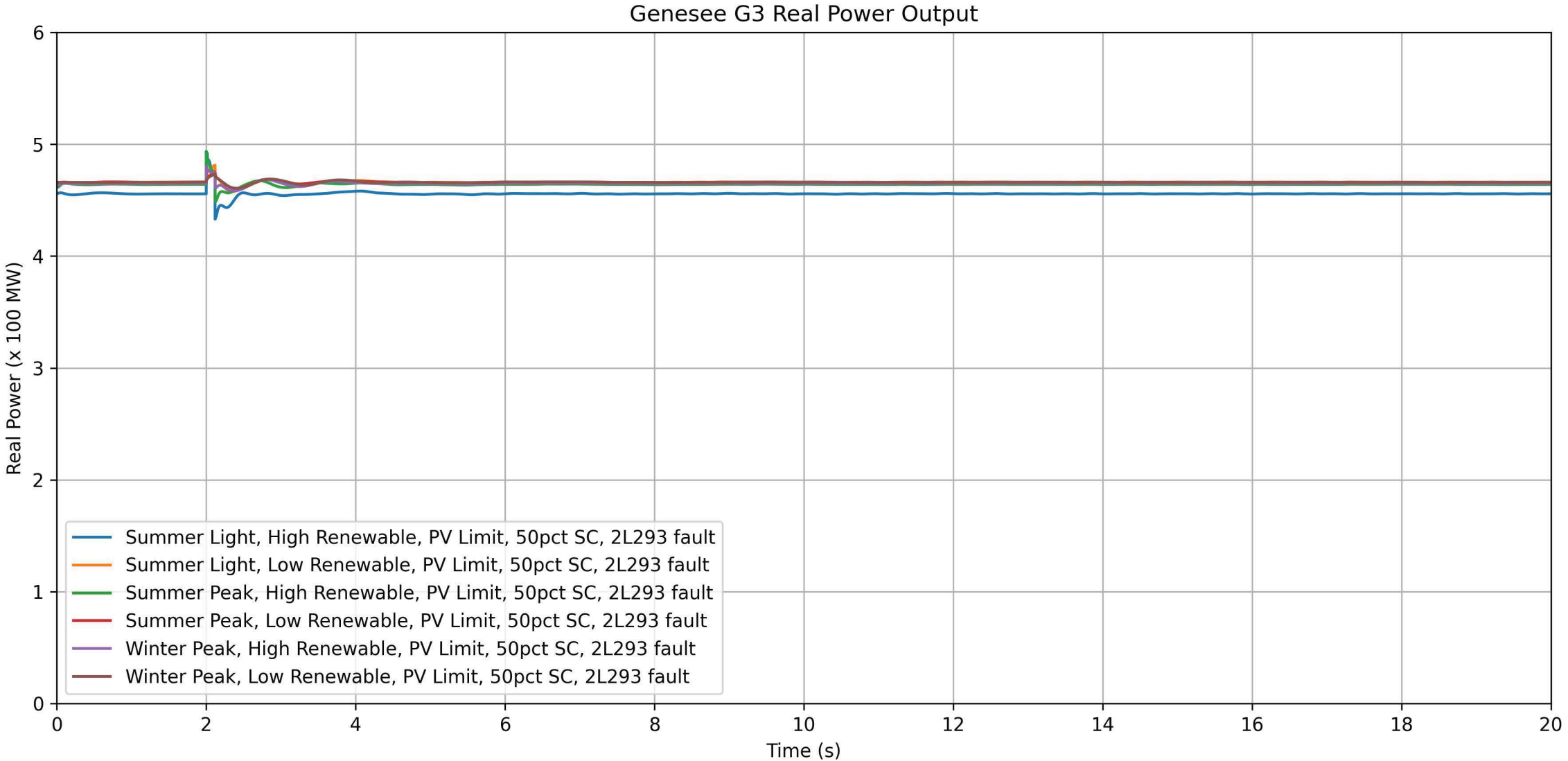

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

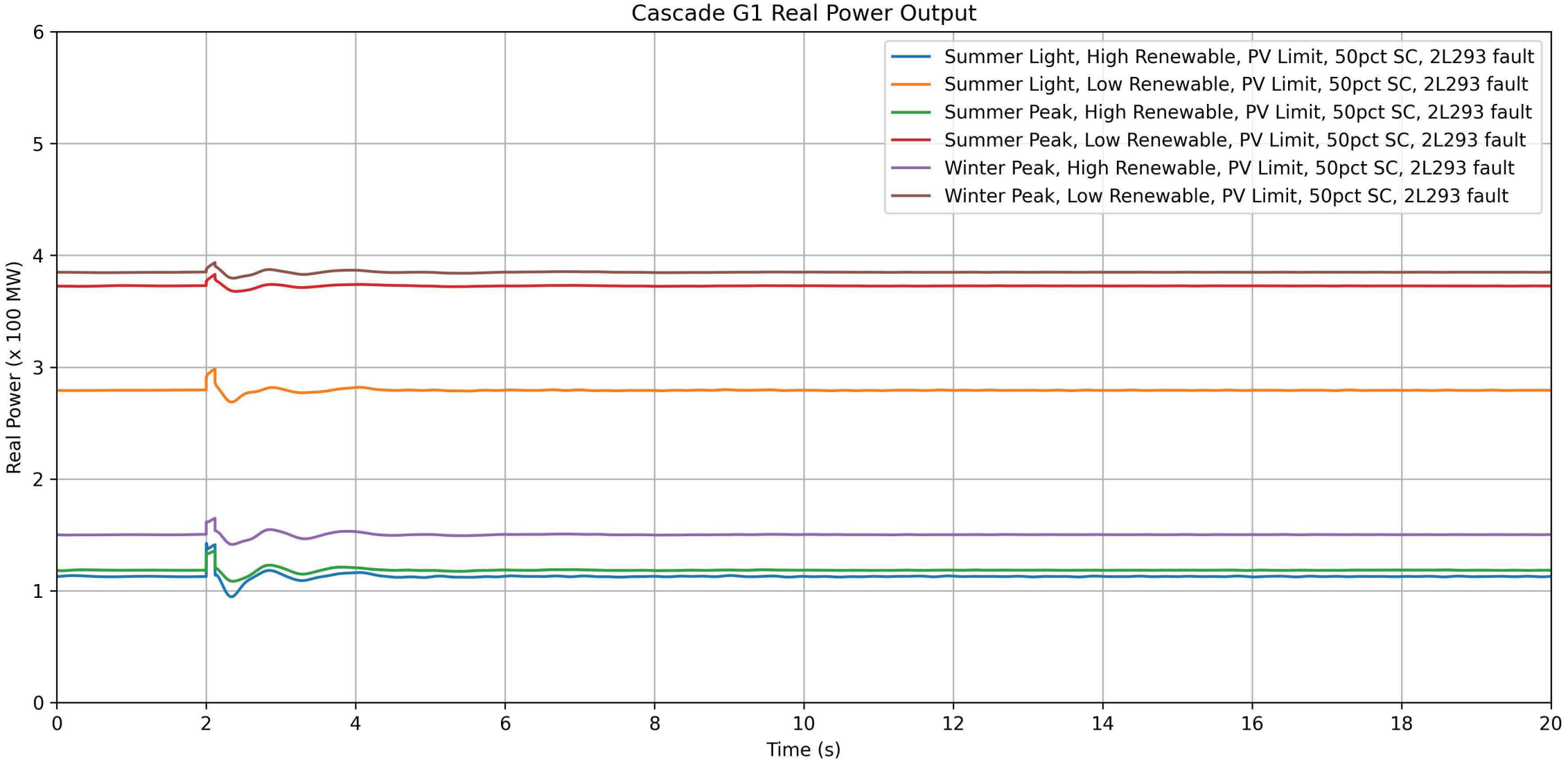

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

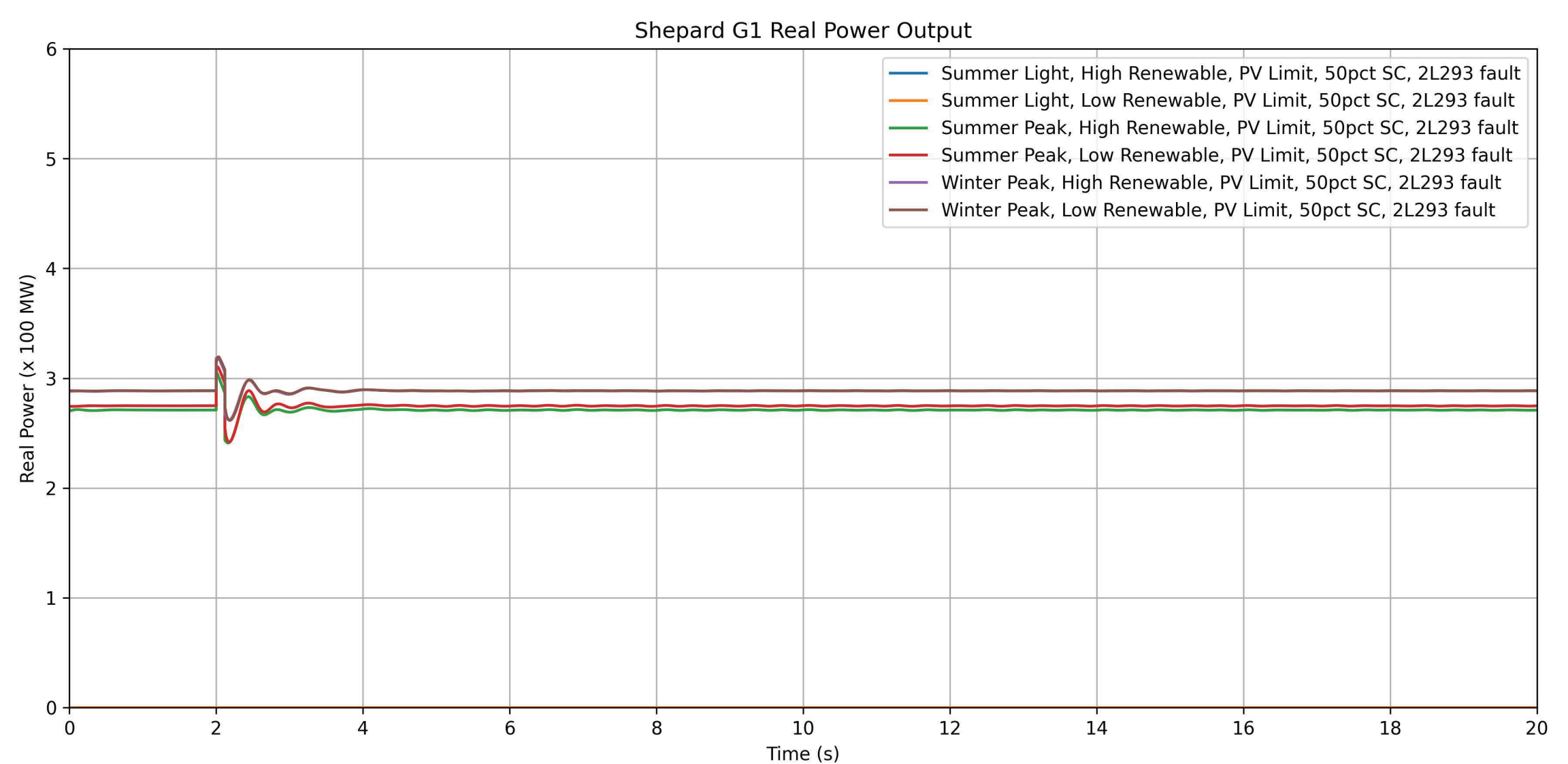

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

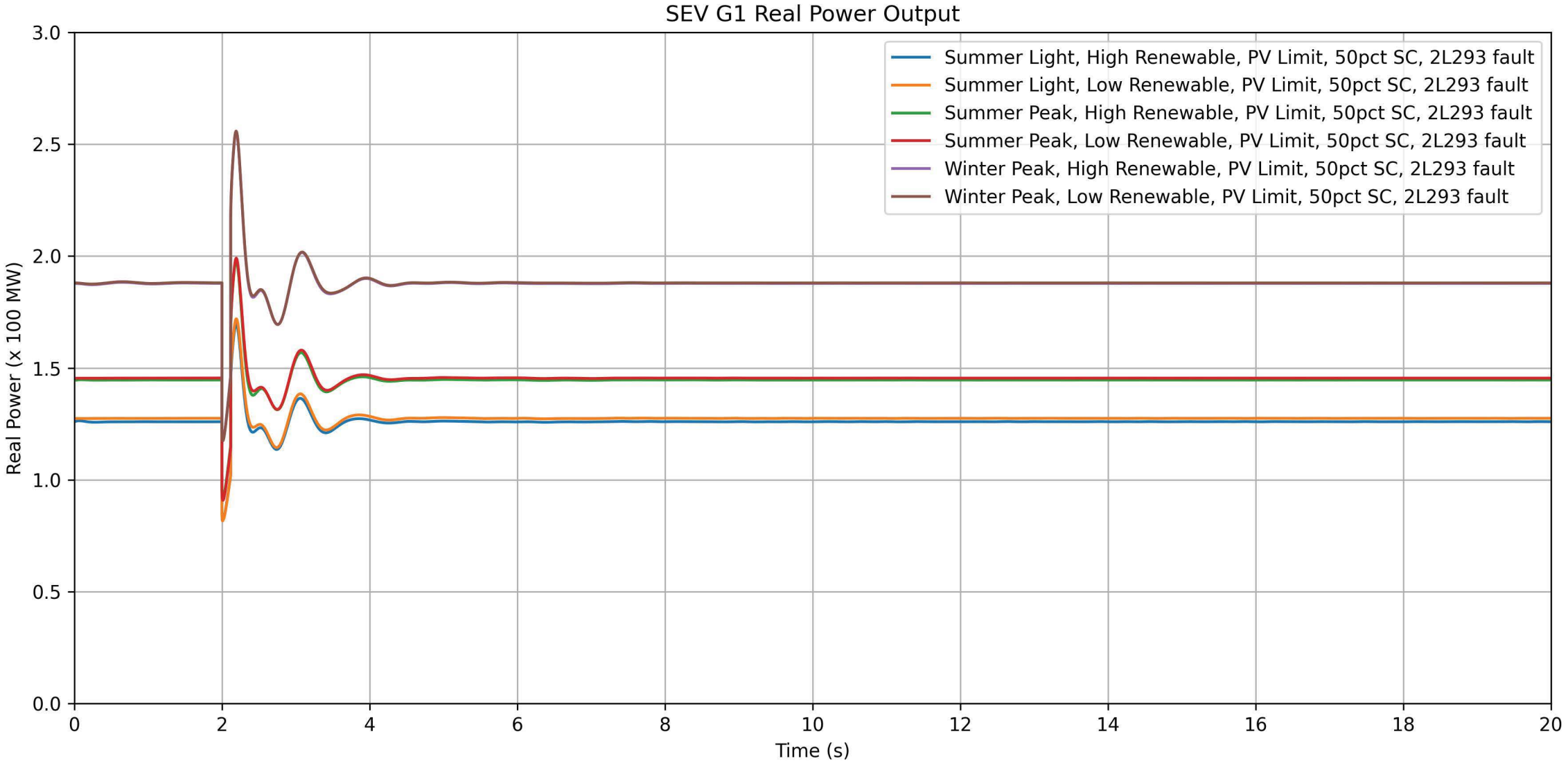

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

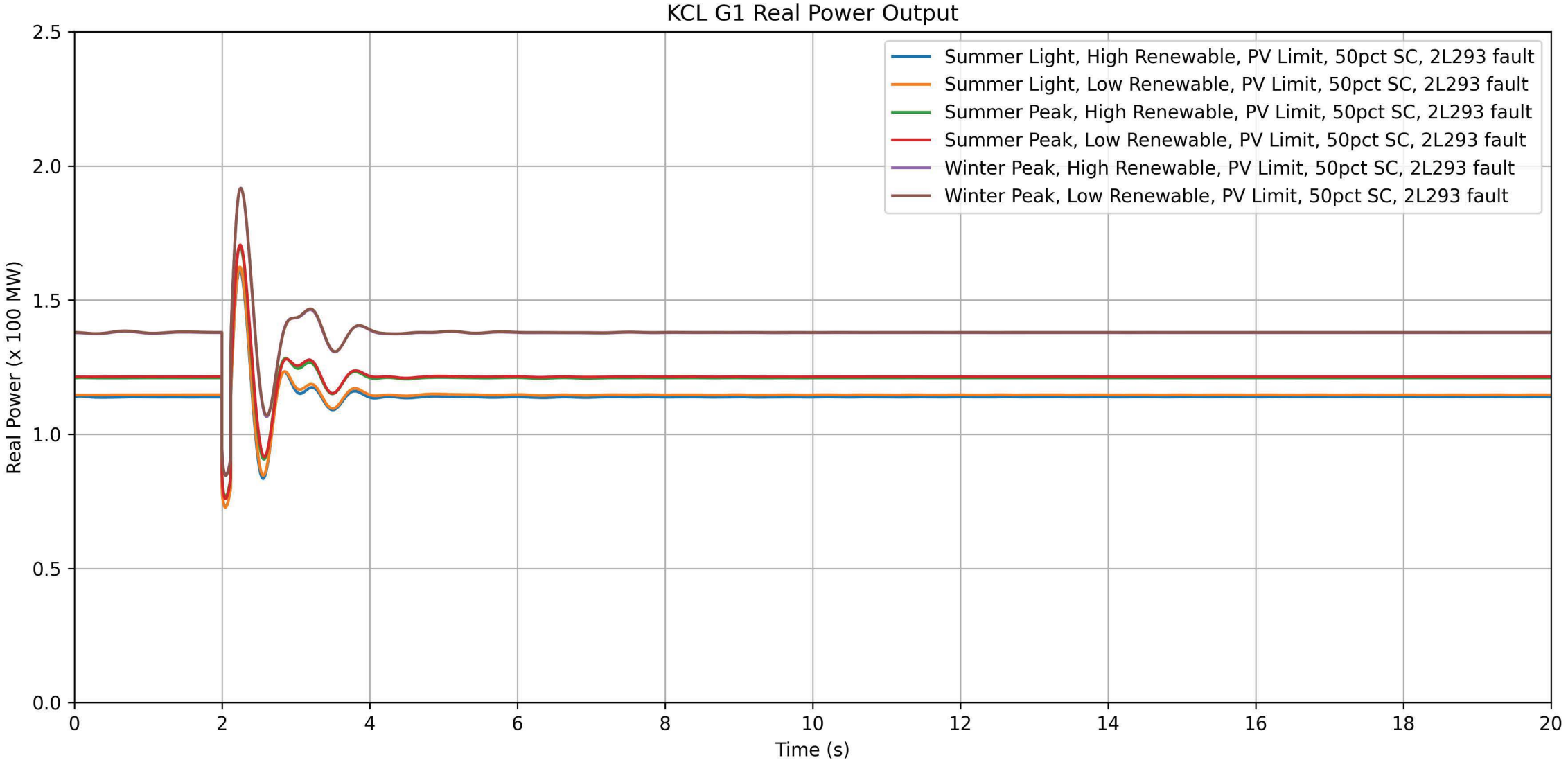

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

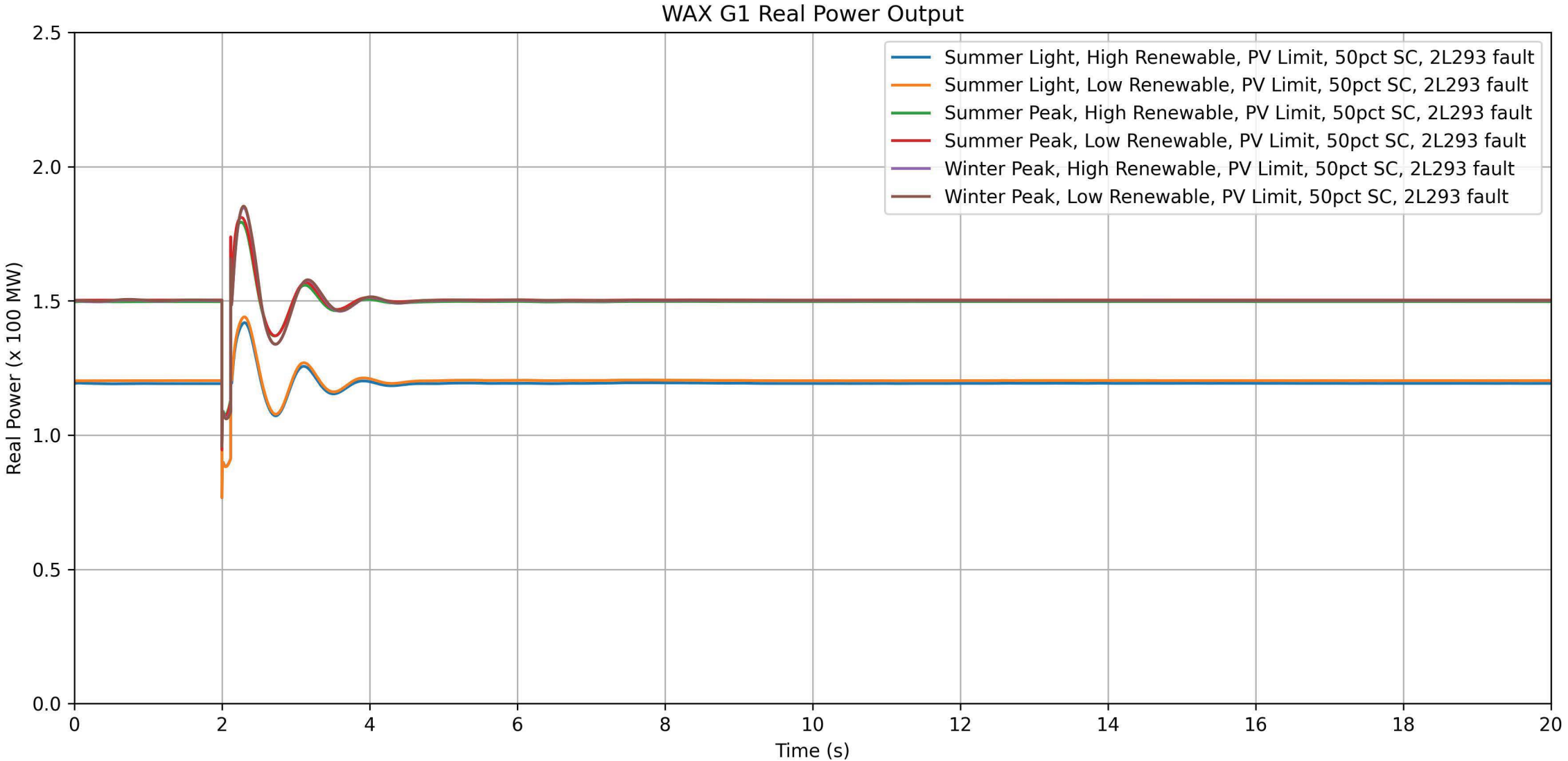

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault

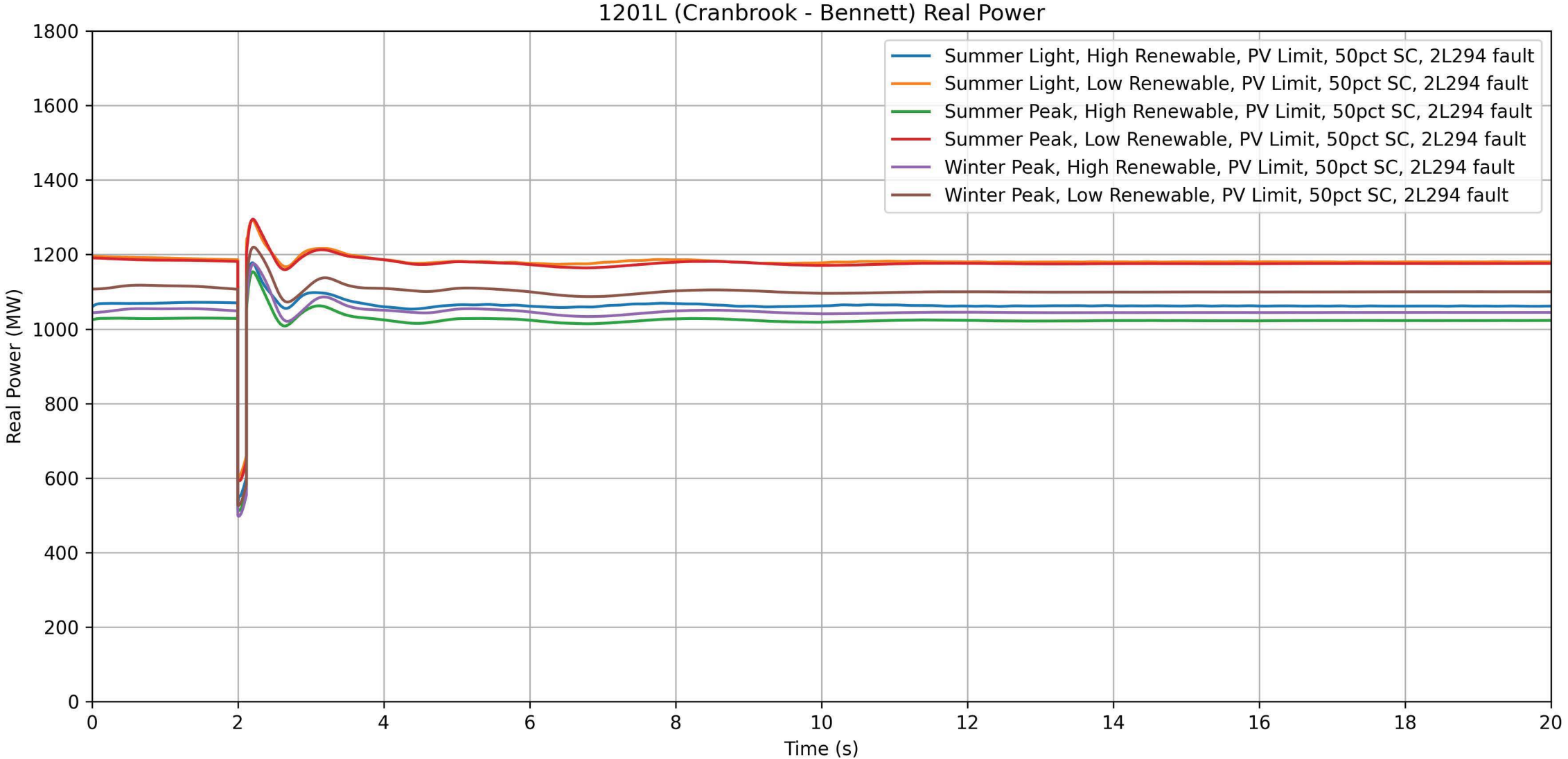

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

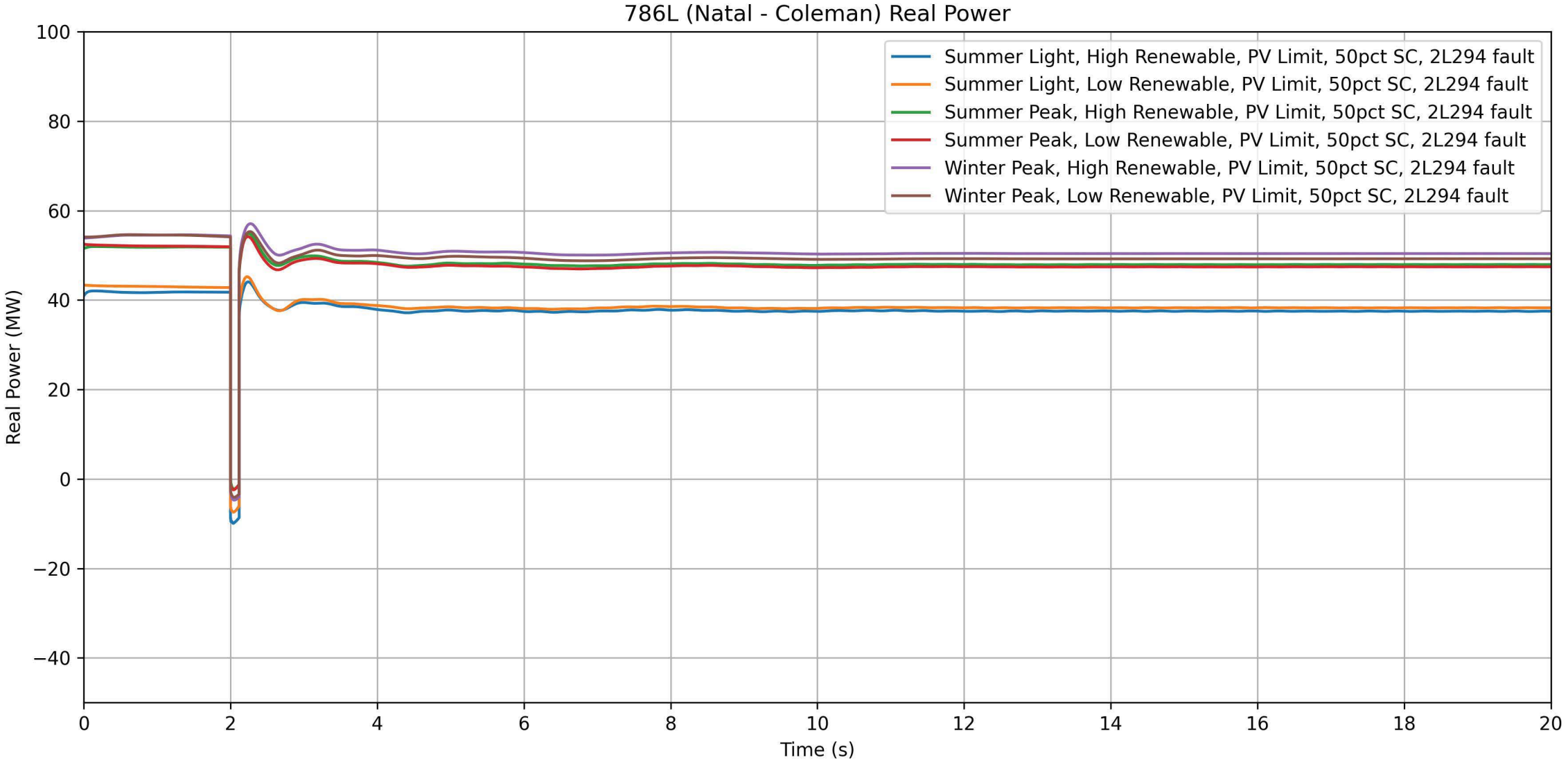

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

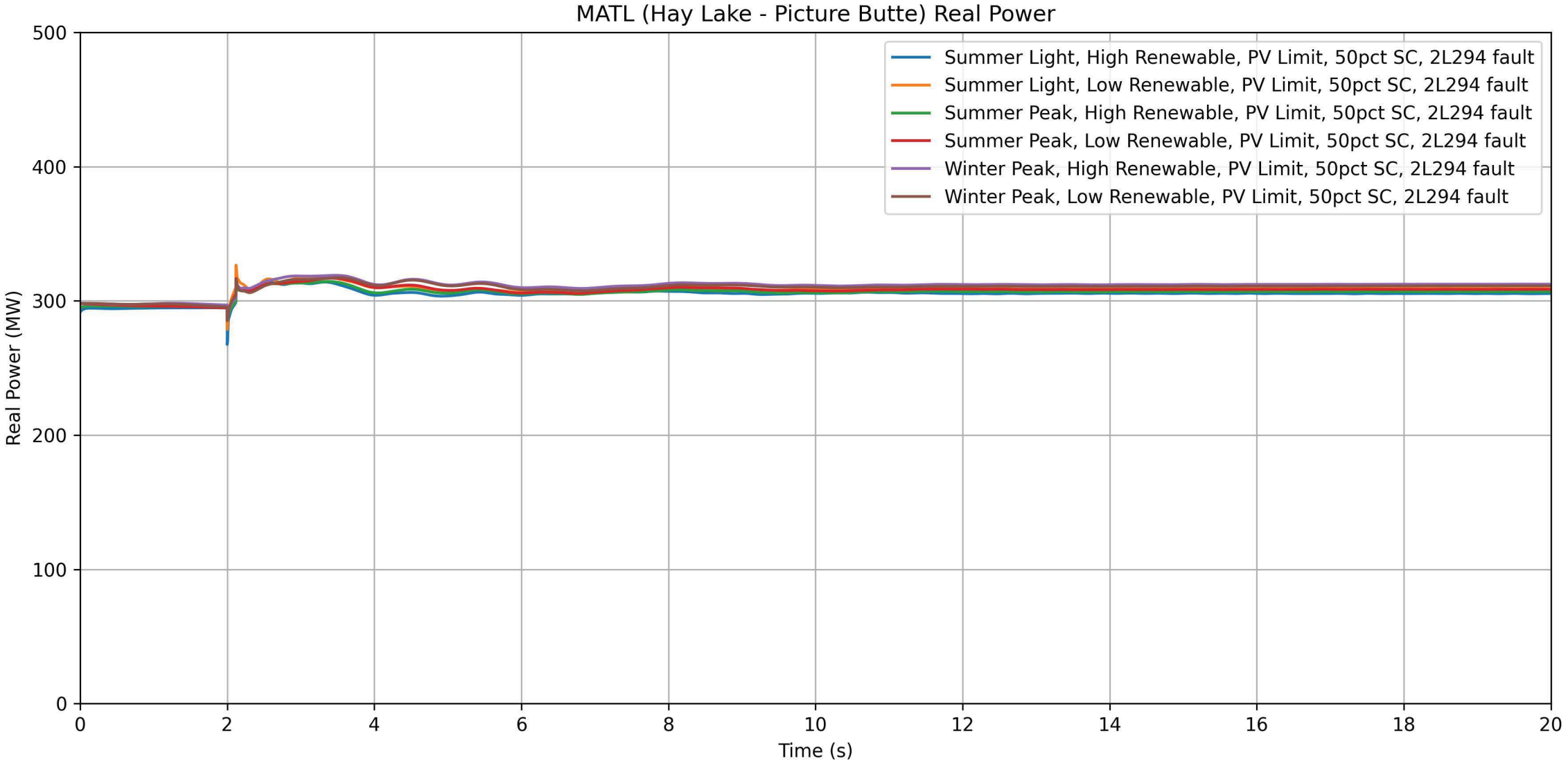

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

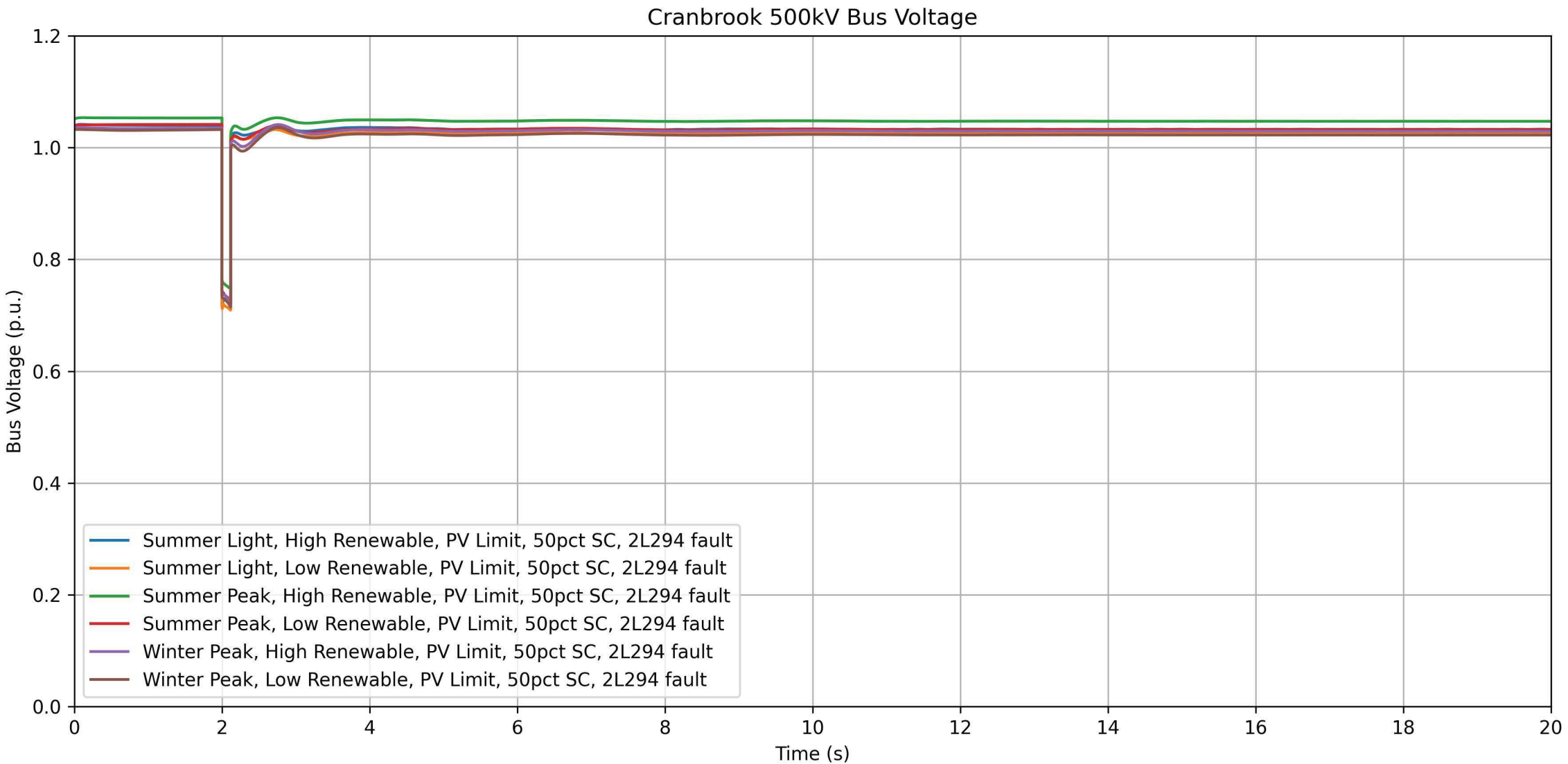

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

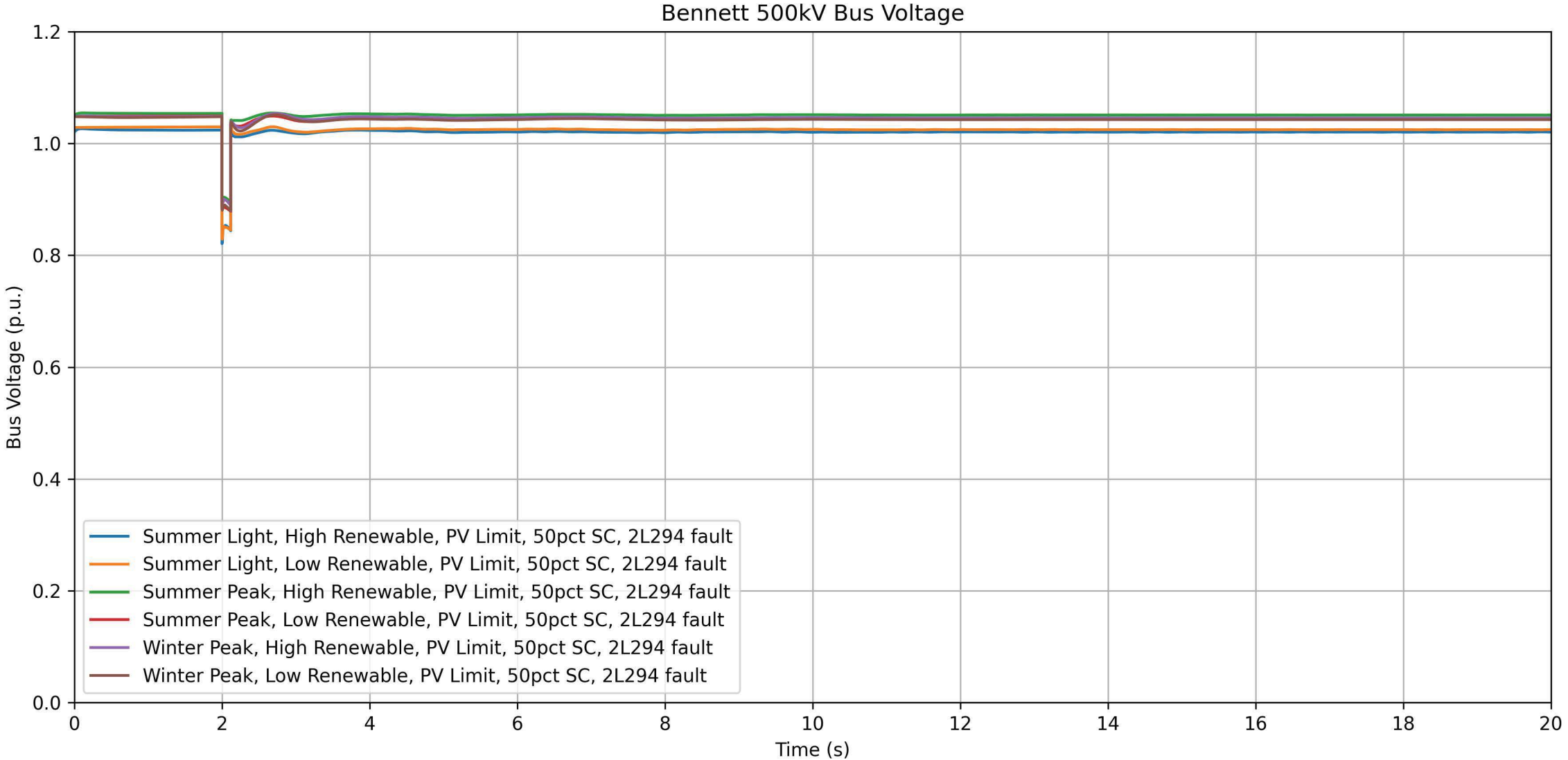

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L293 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L293 fault
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

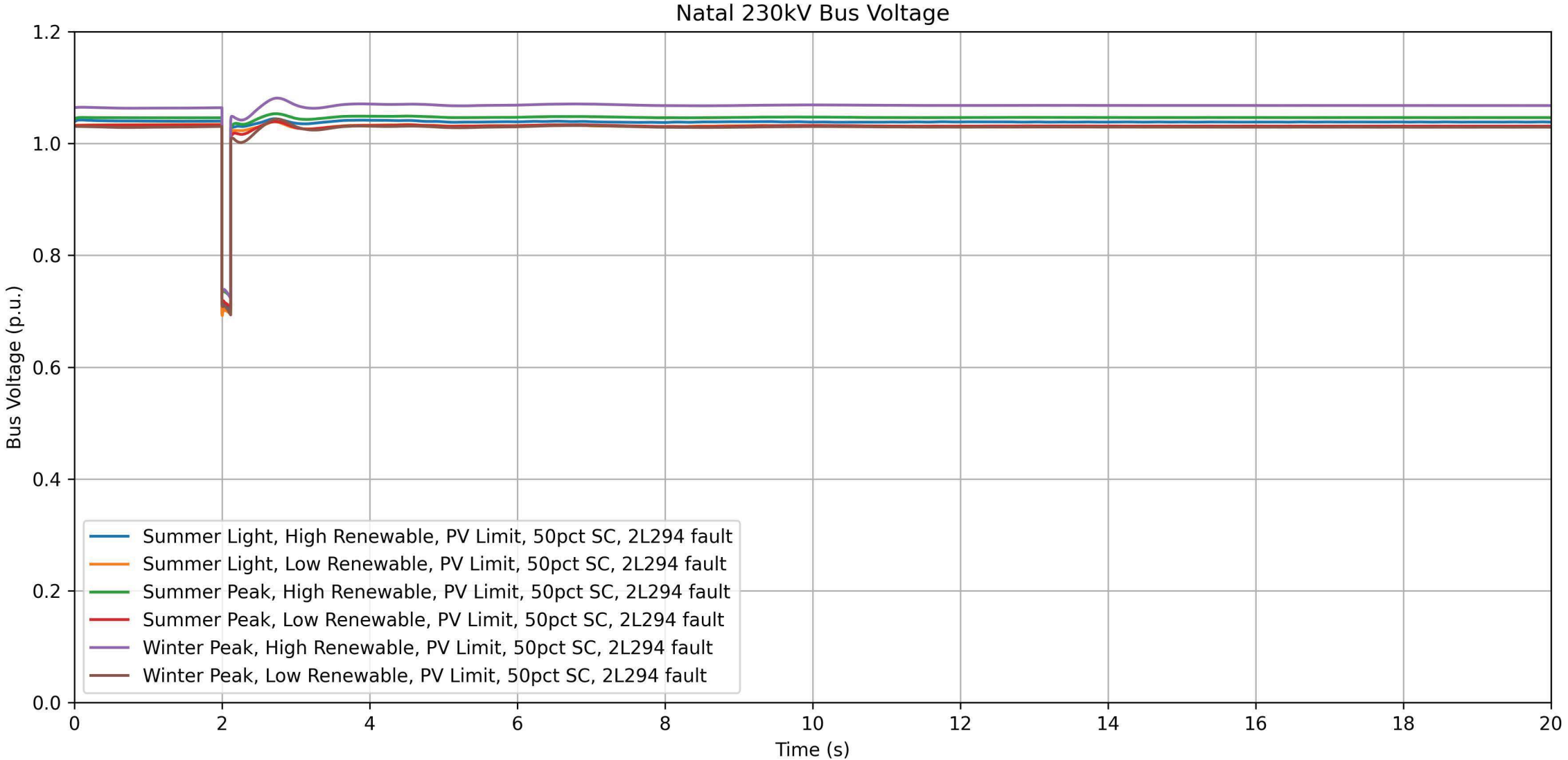

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

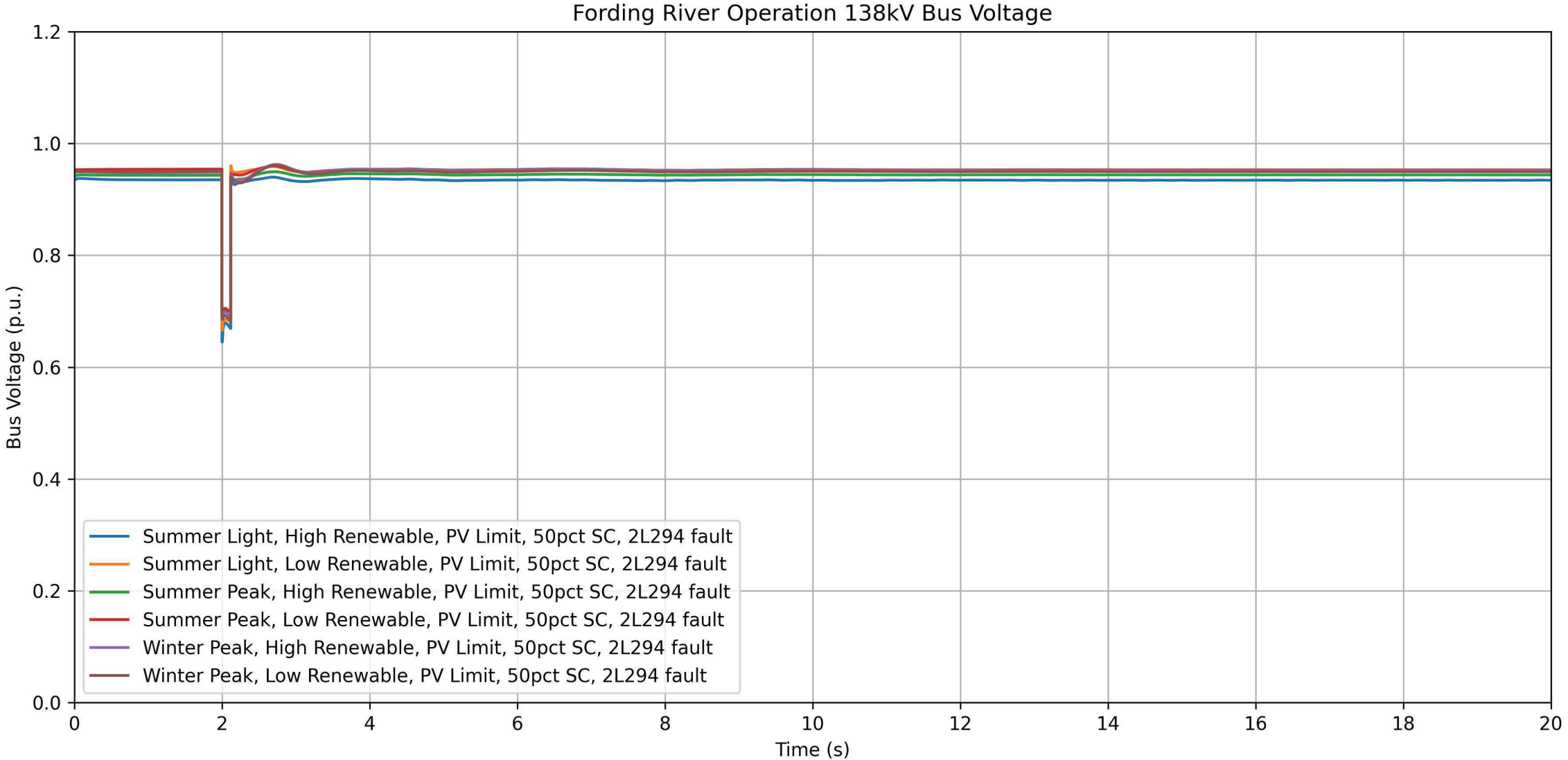

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
Time (s)
0
2
4
6
8
10
12
14
16
18
20

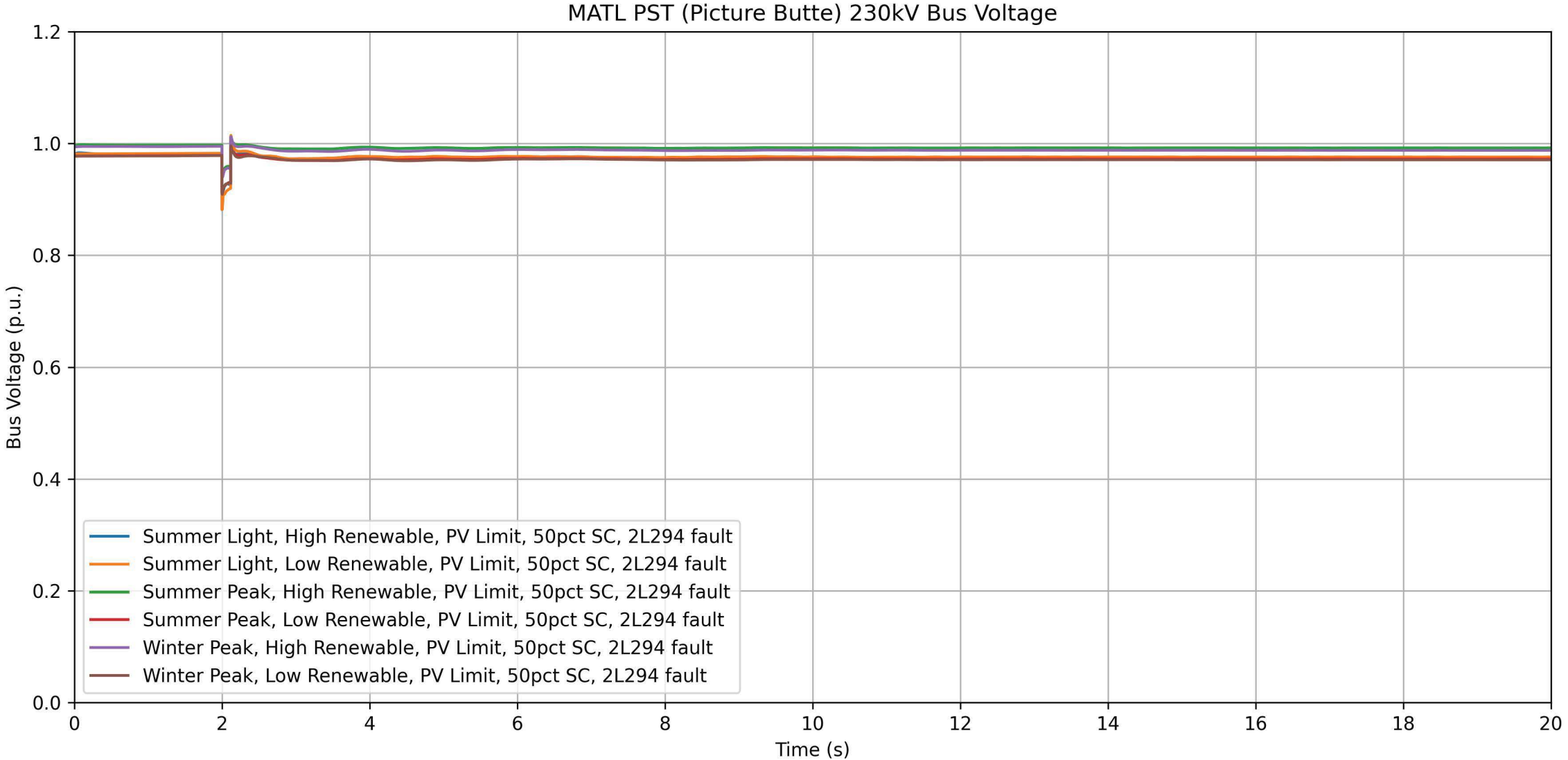

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

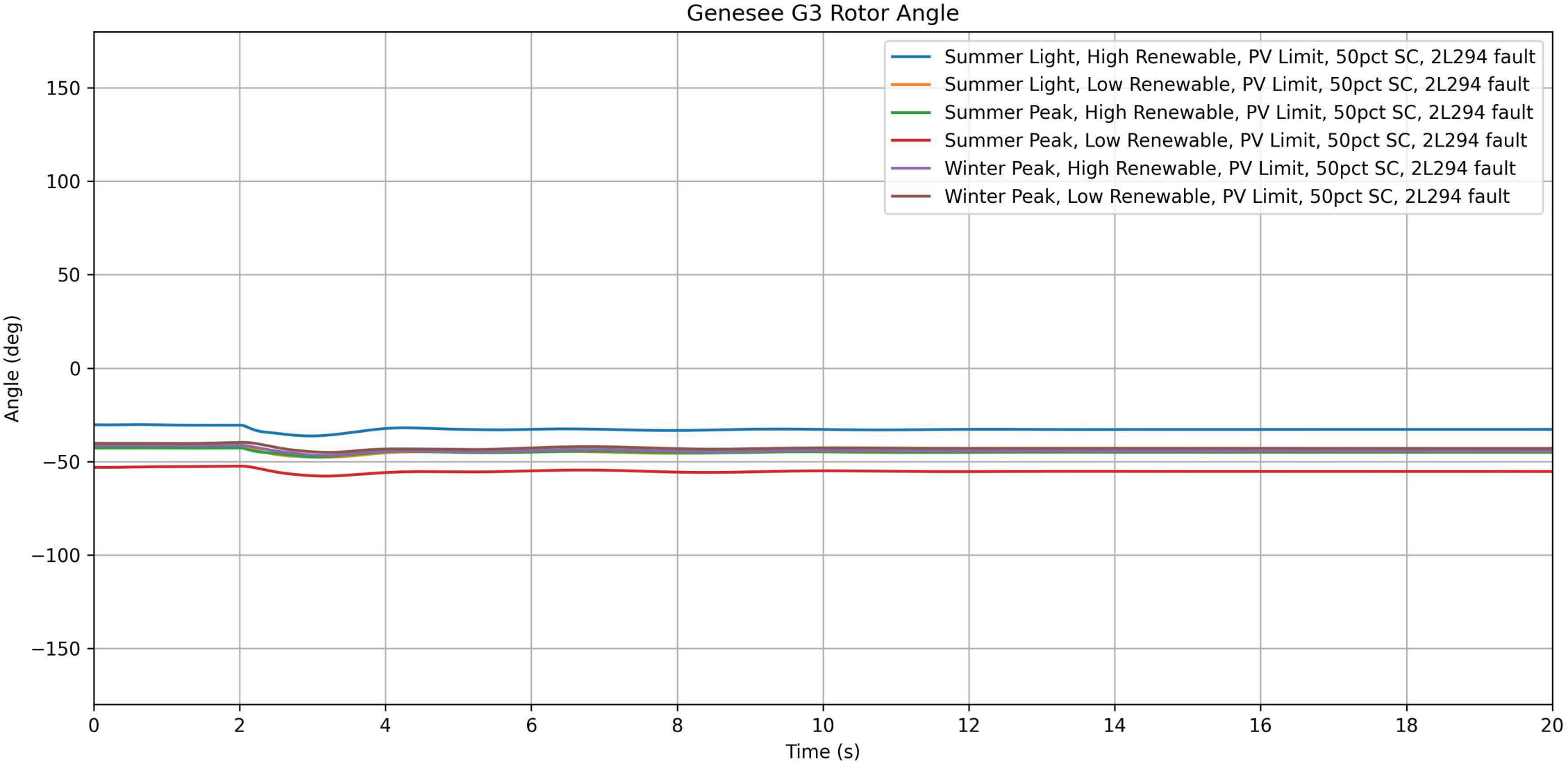

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

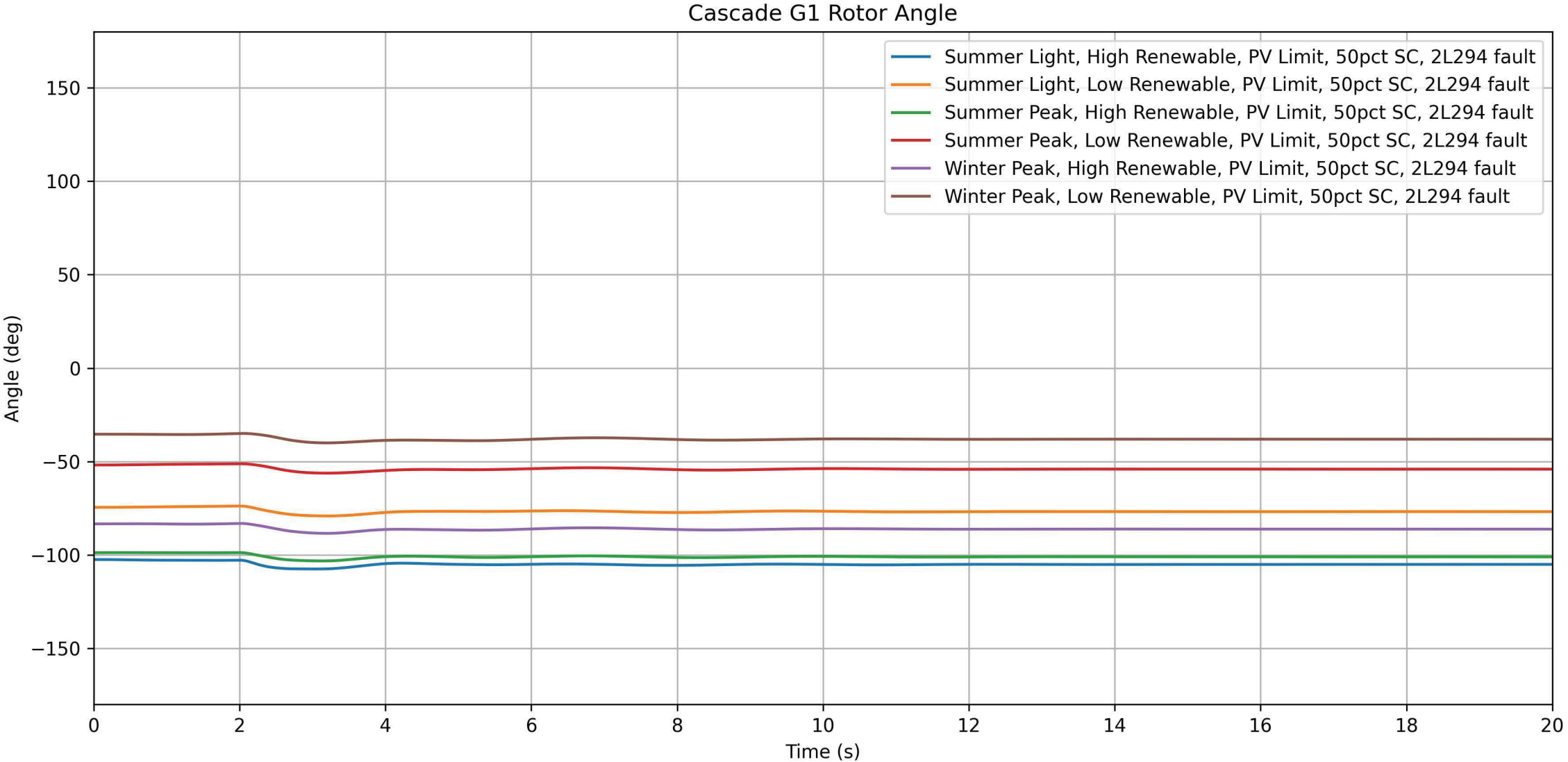

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

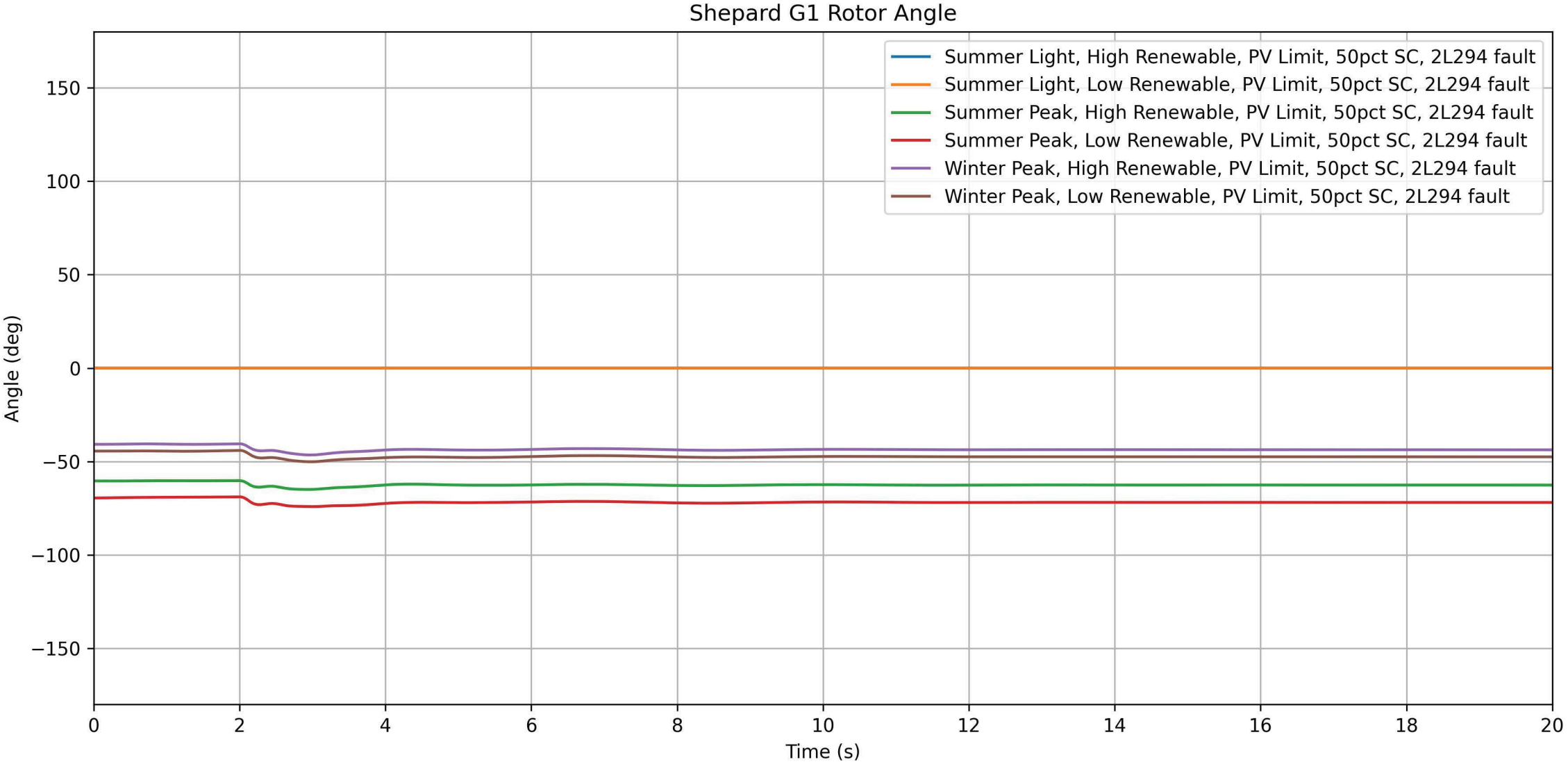

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

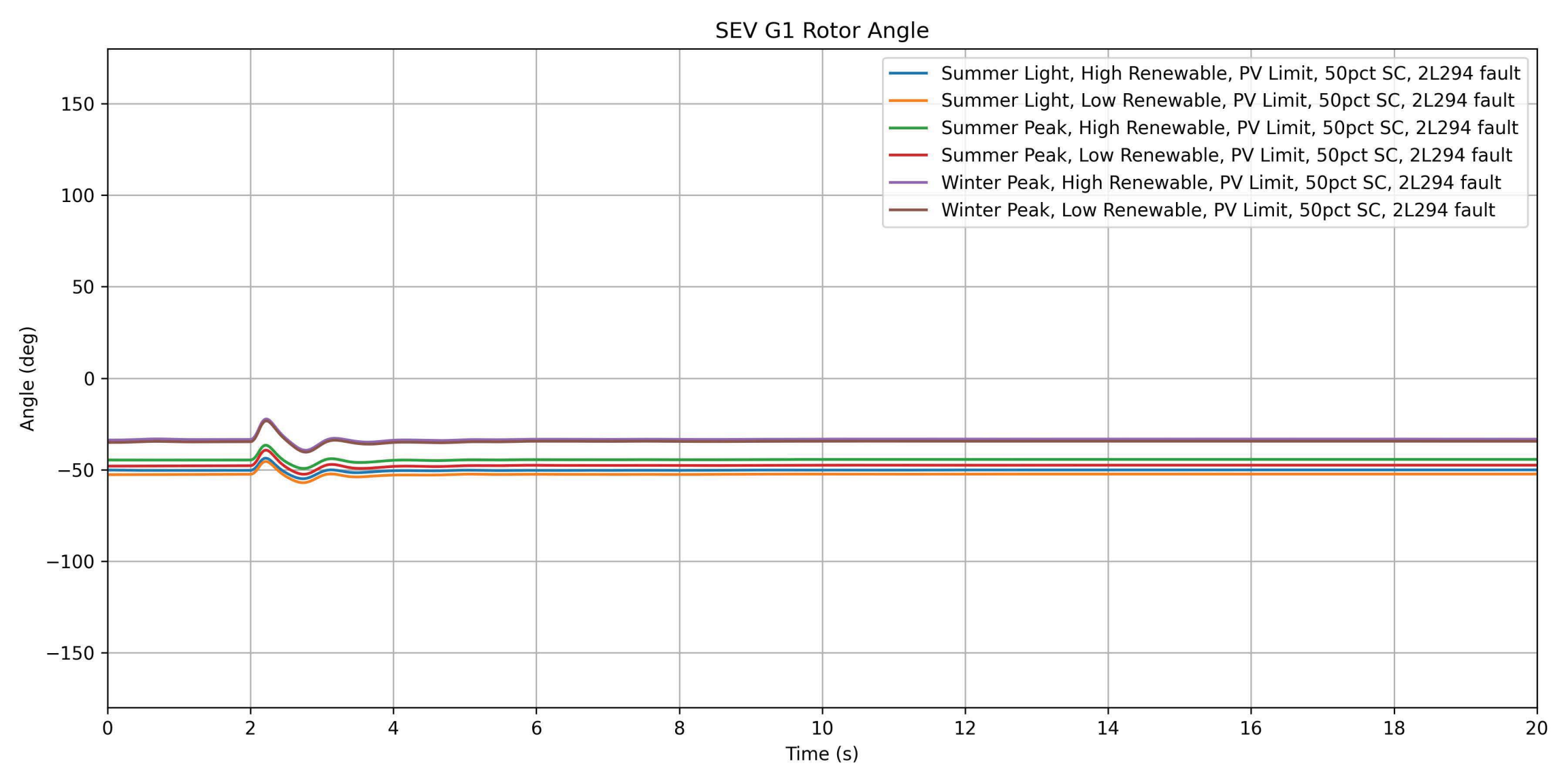

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

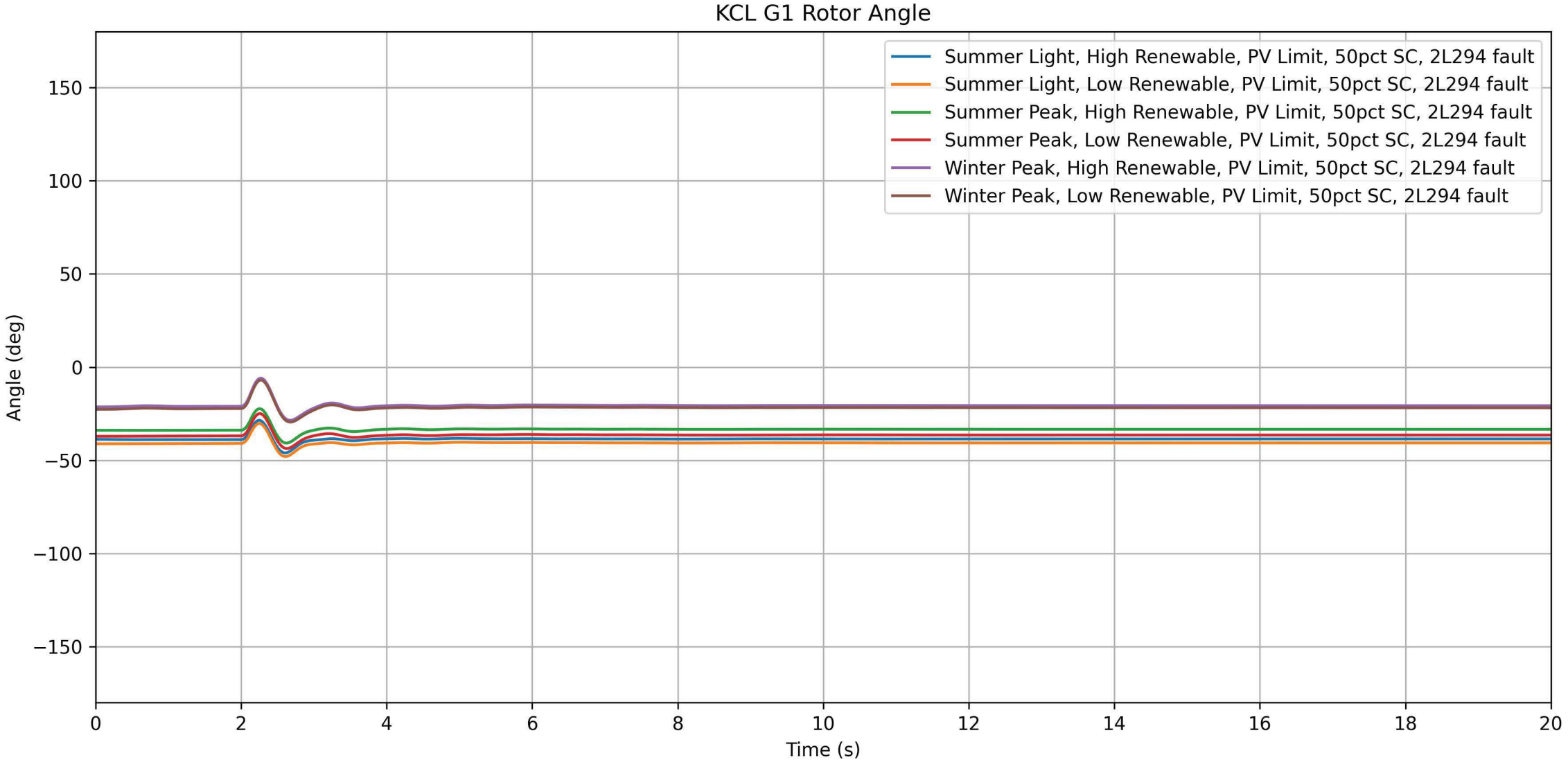

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

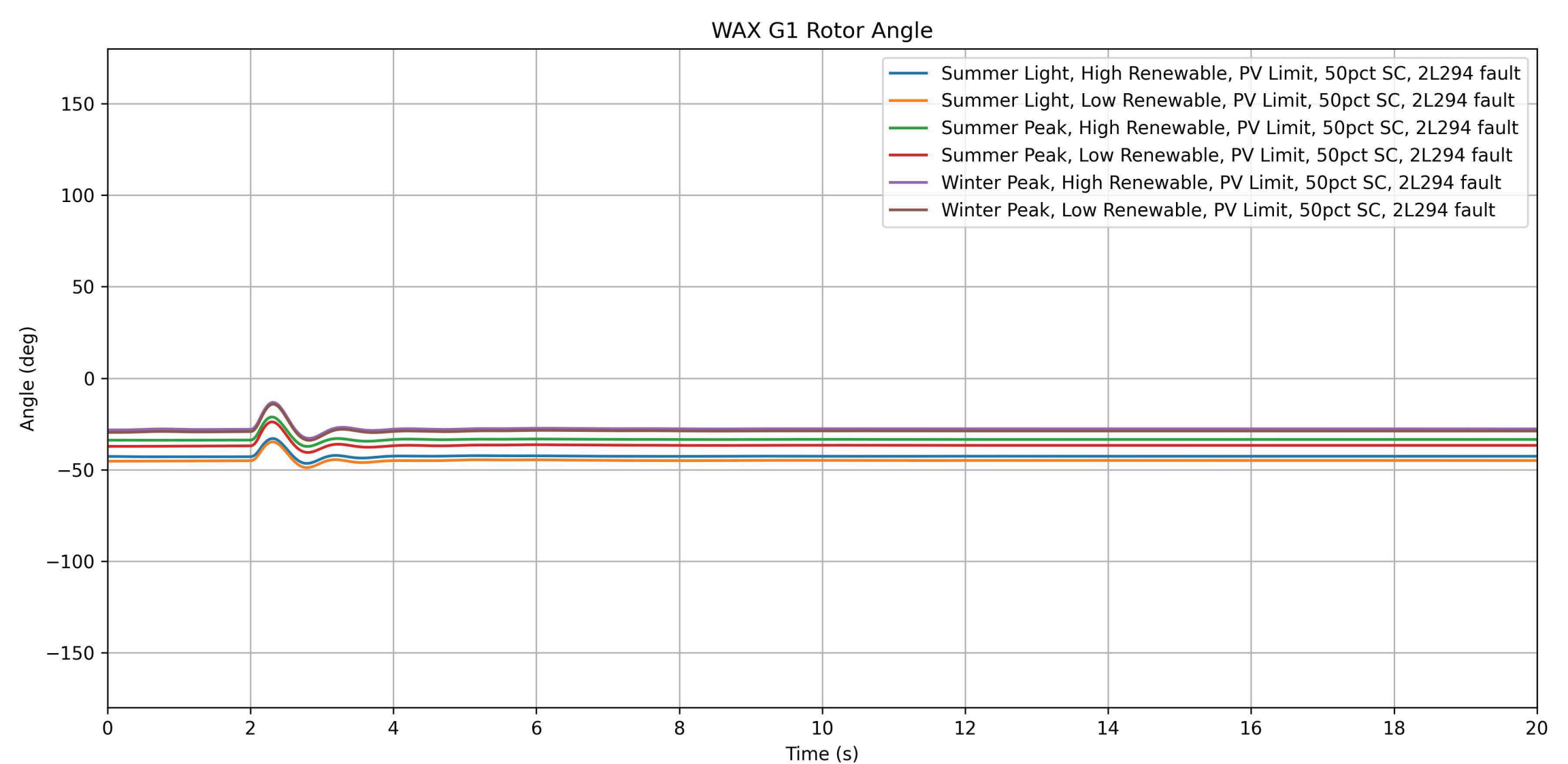

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

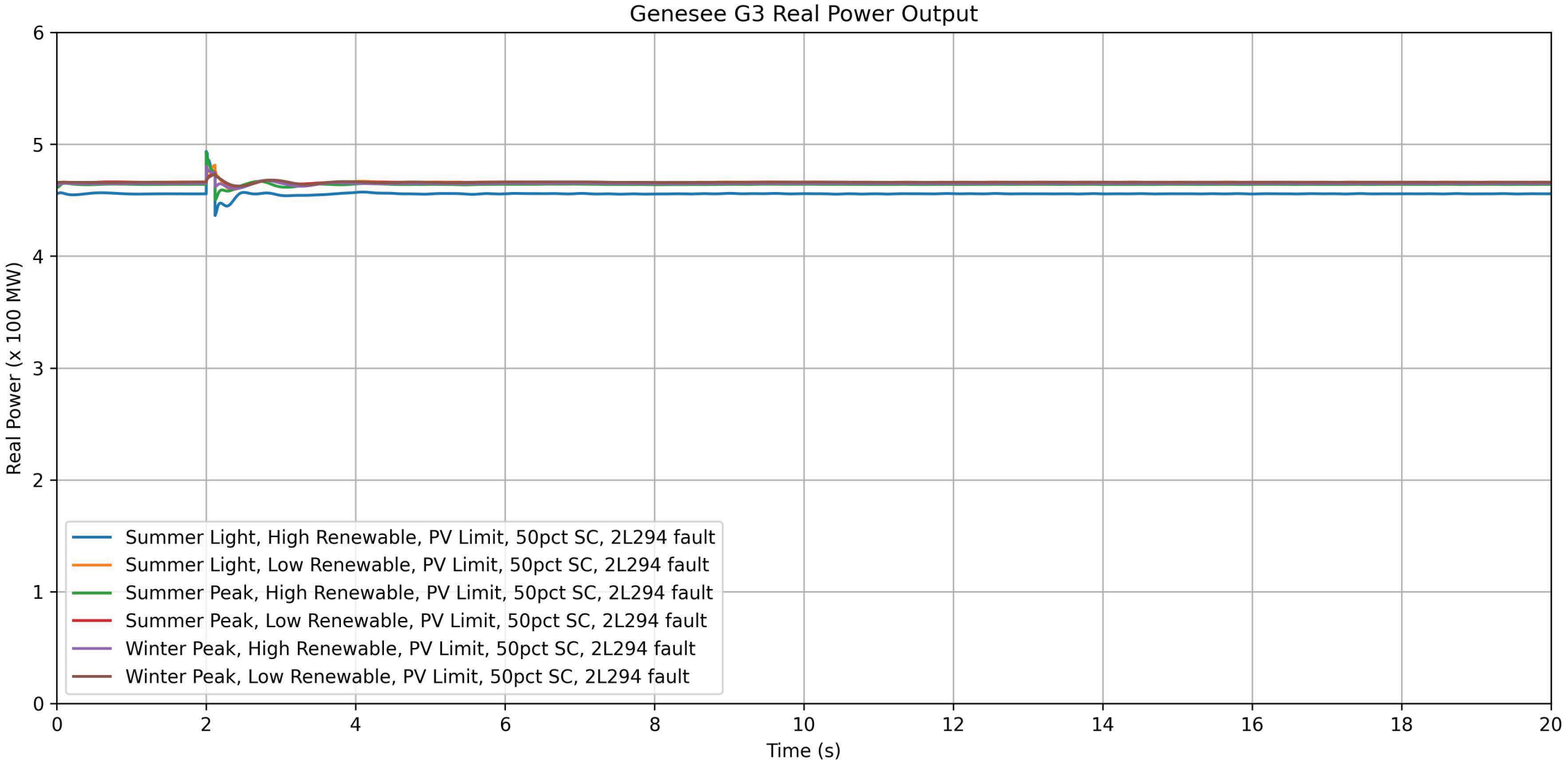

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

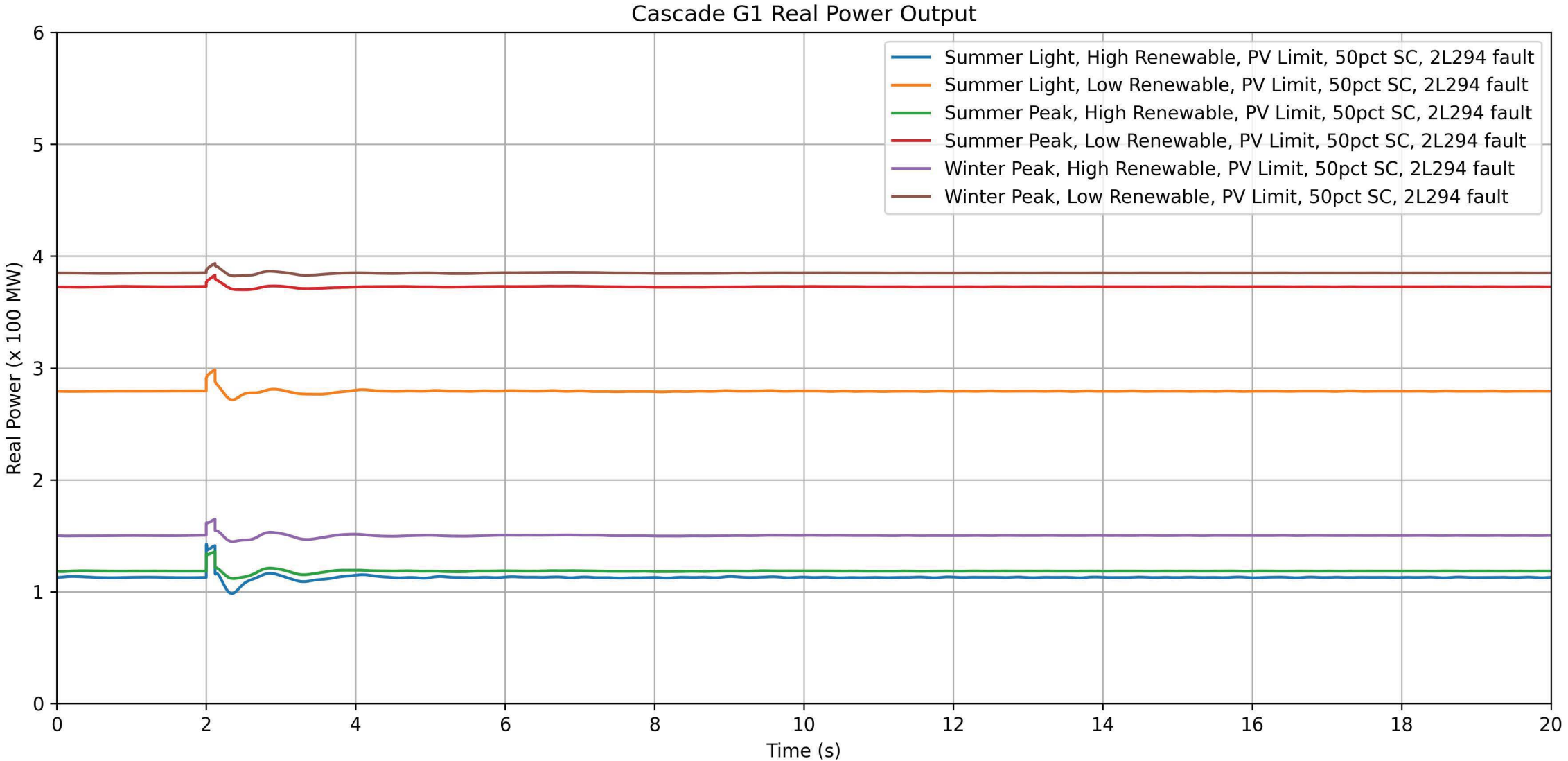

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

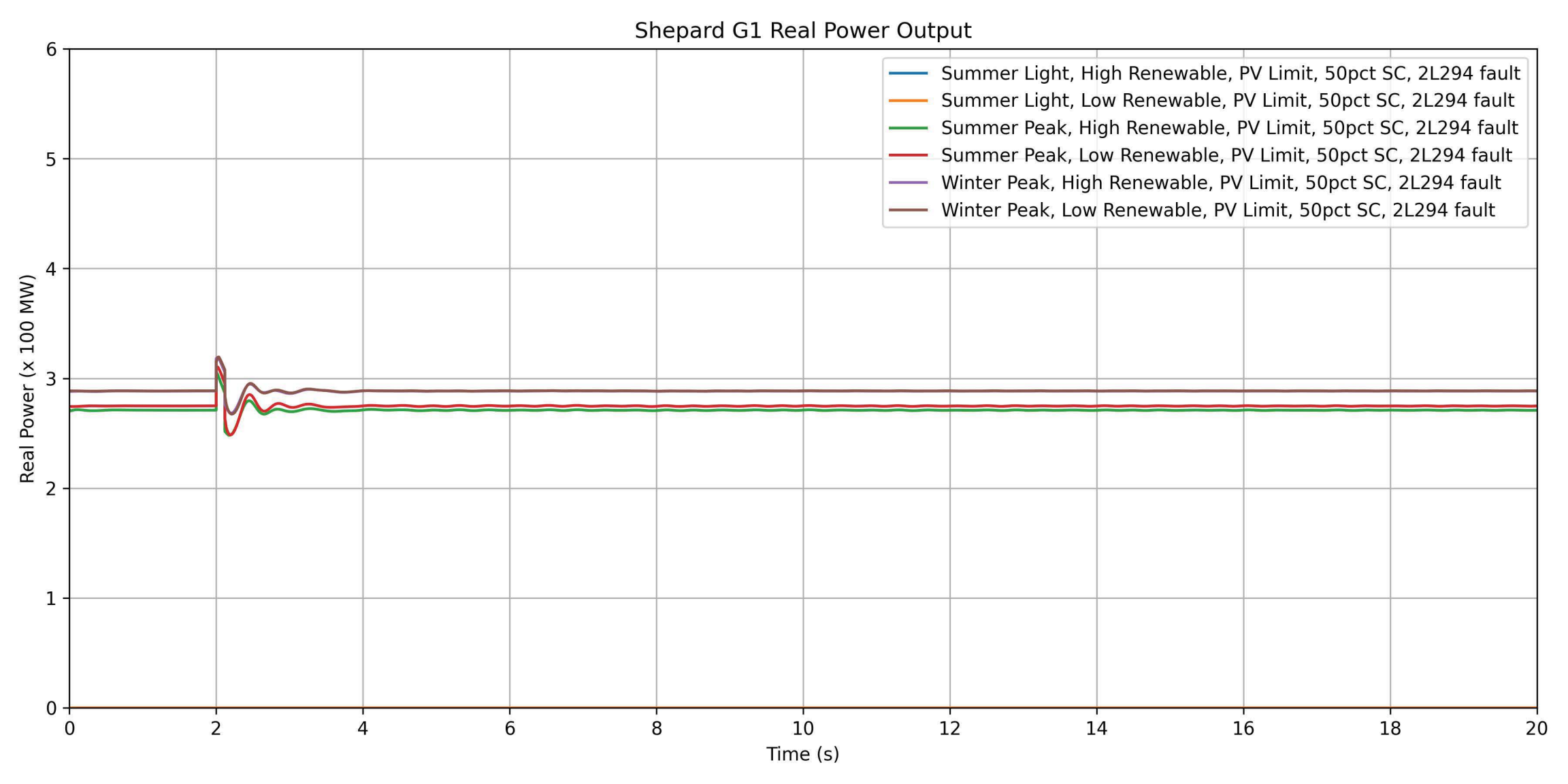

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

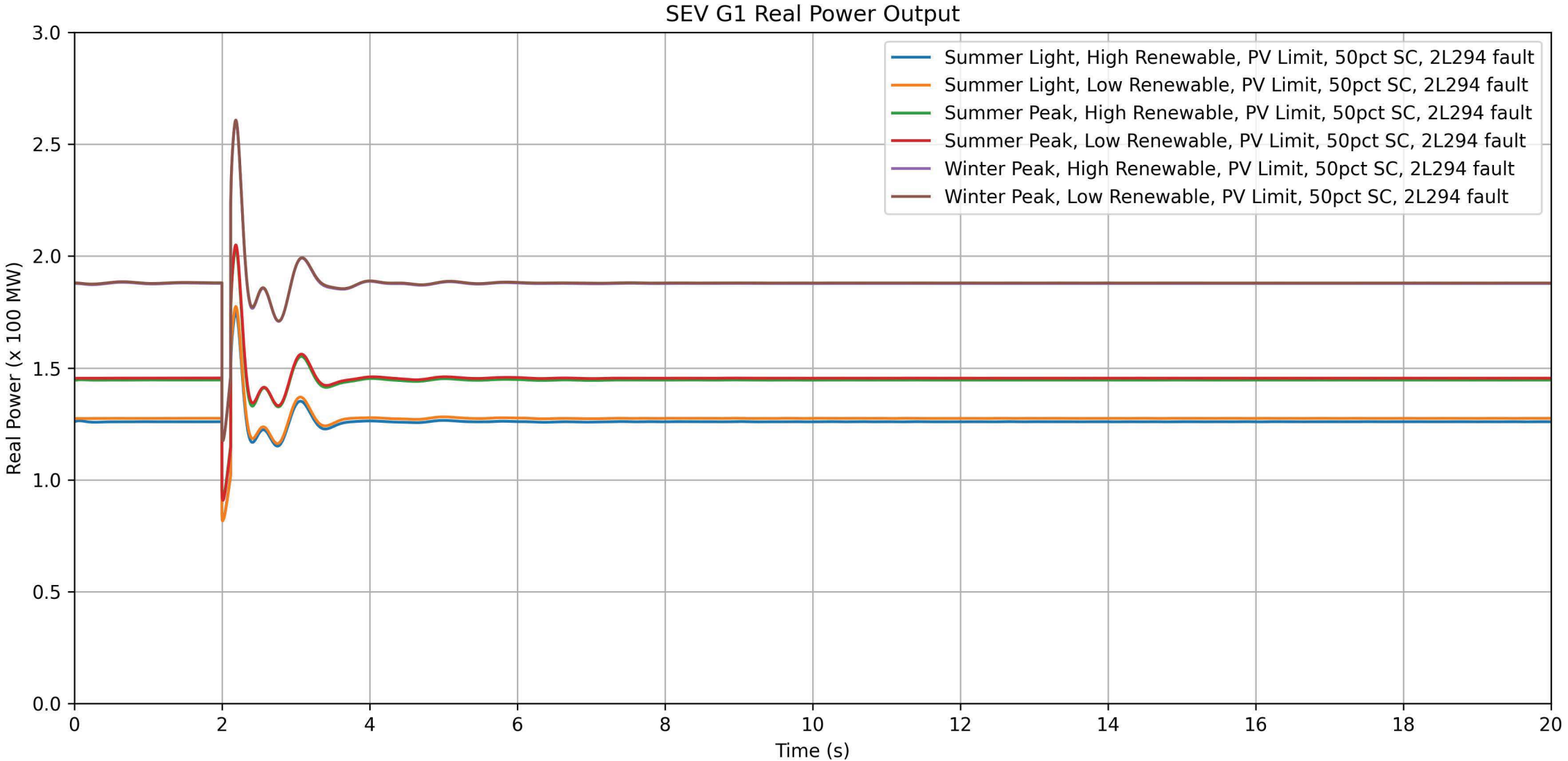

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

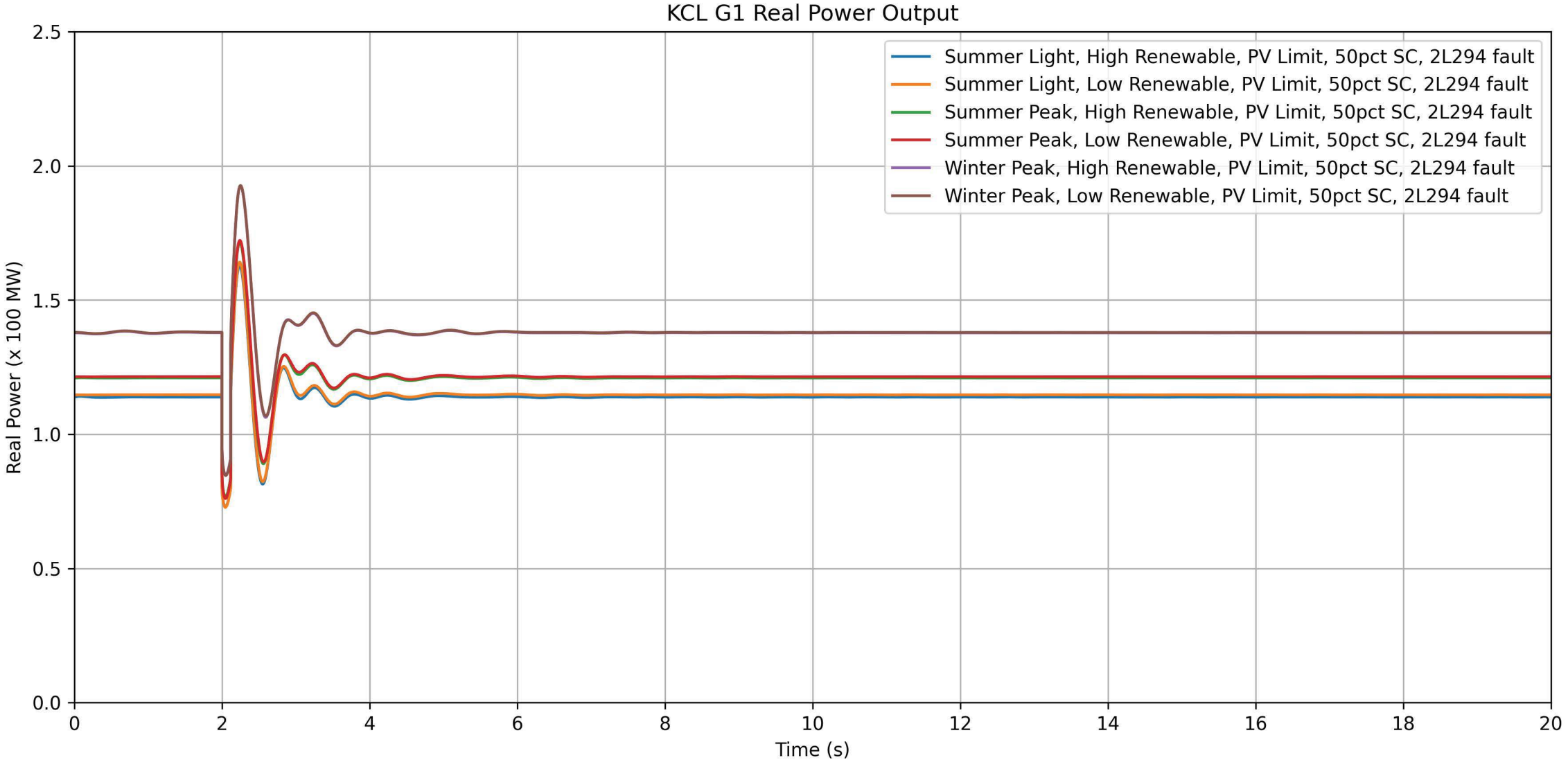

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

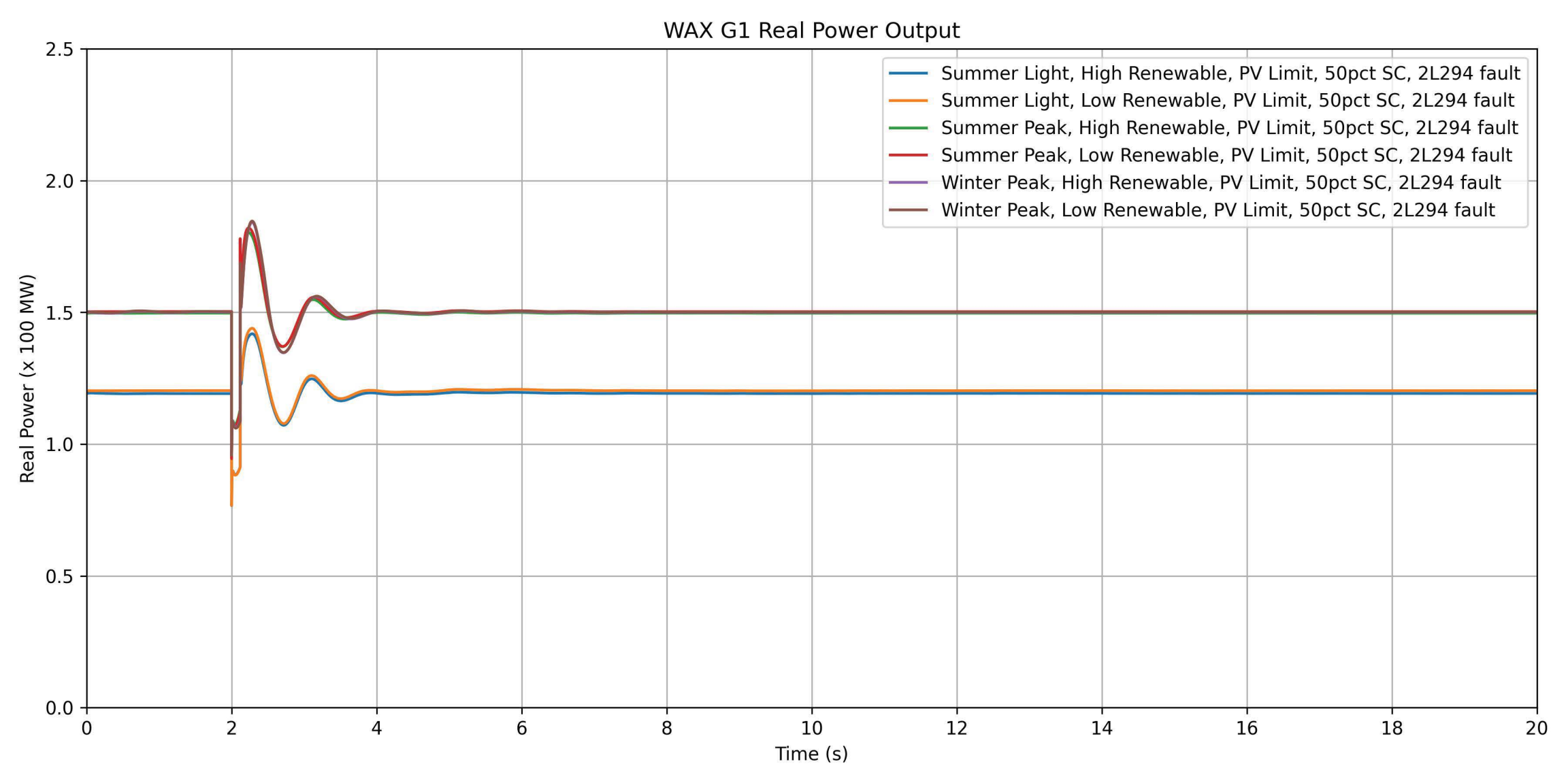

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault

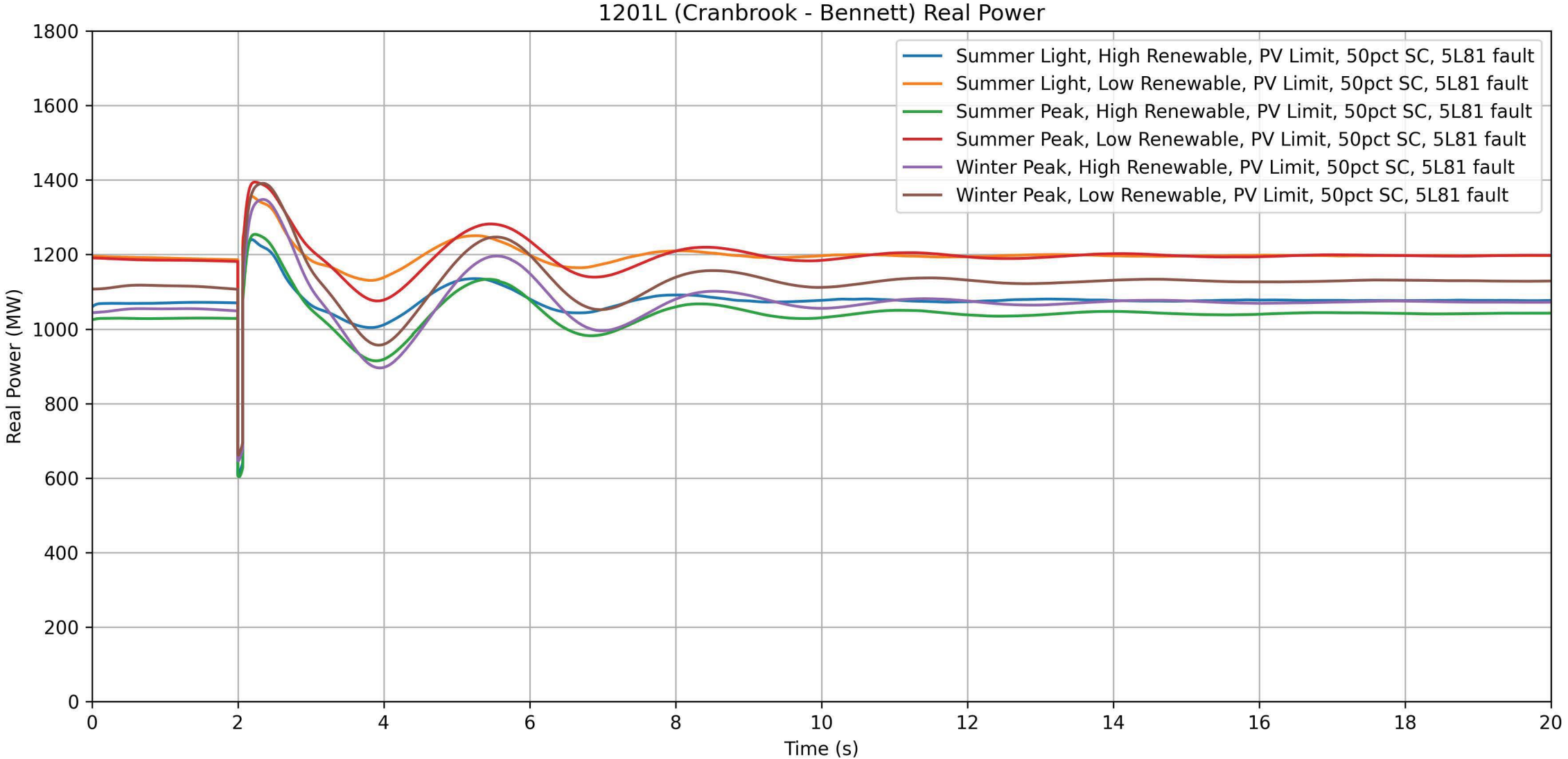

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

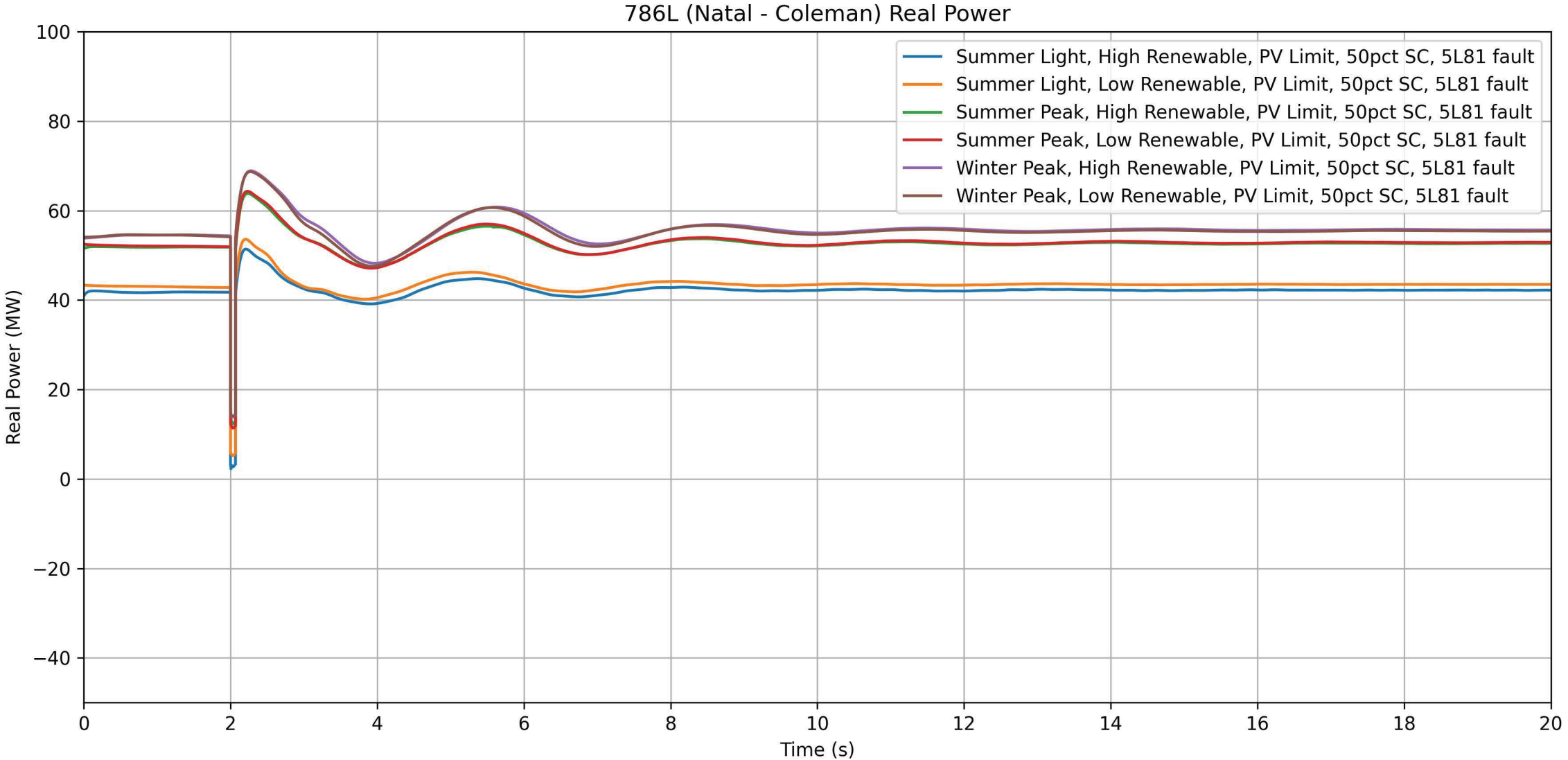

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

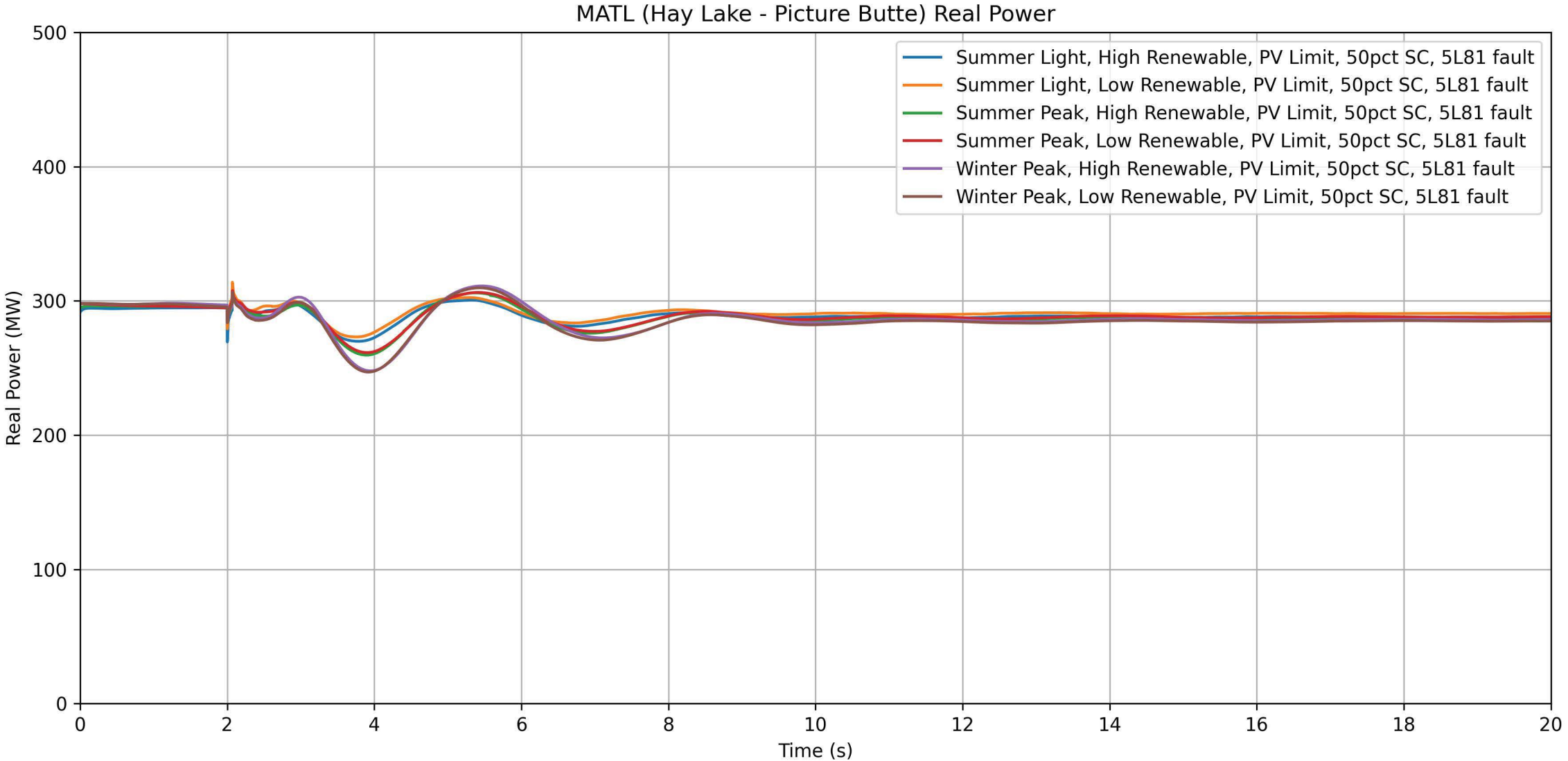

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

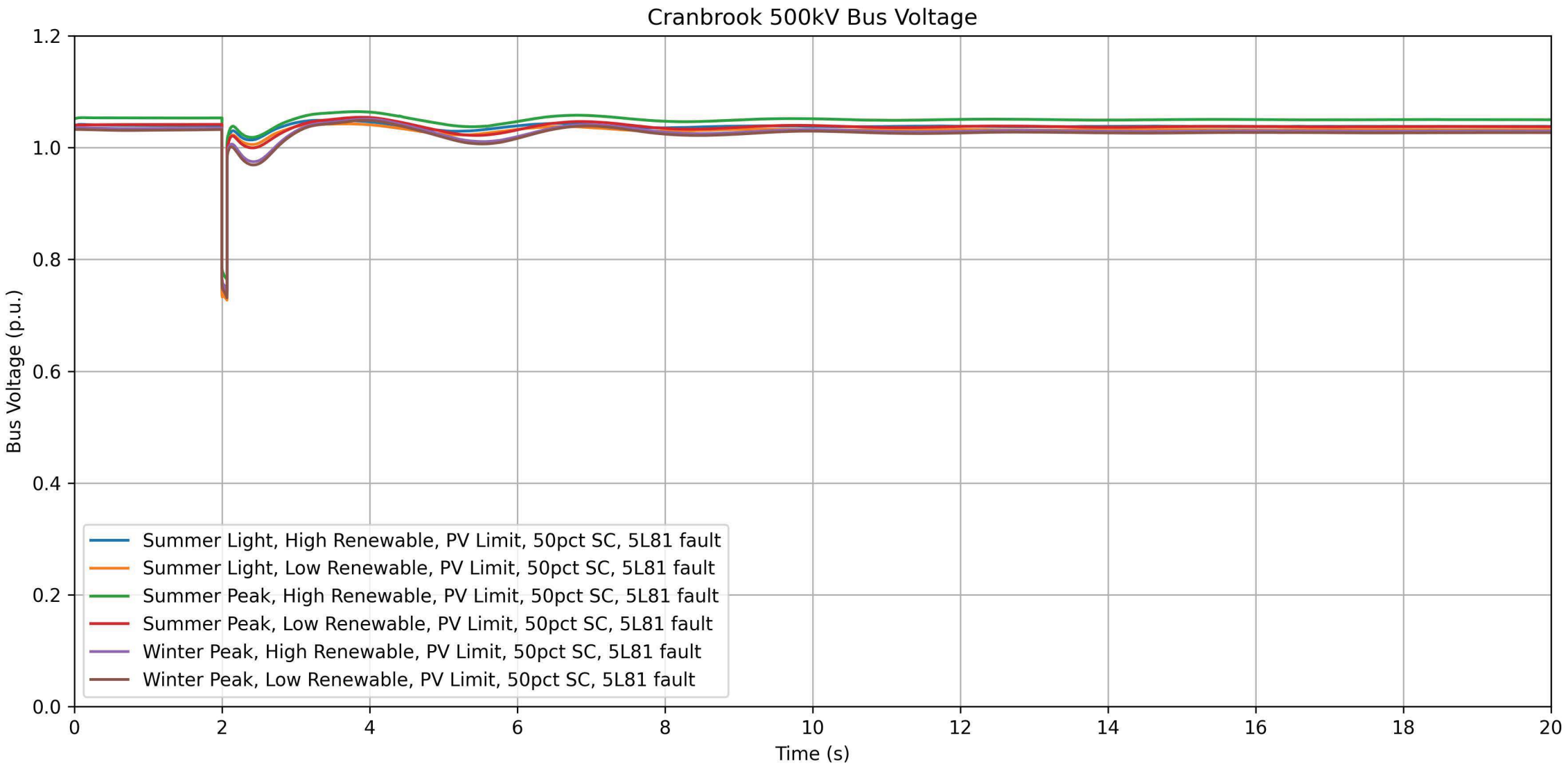

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

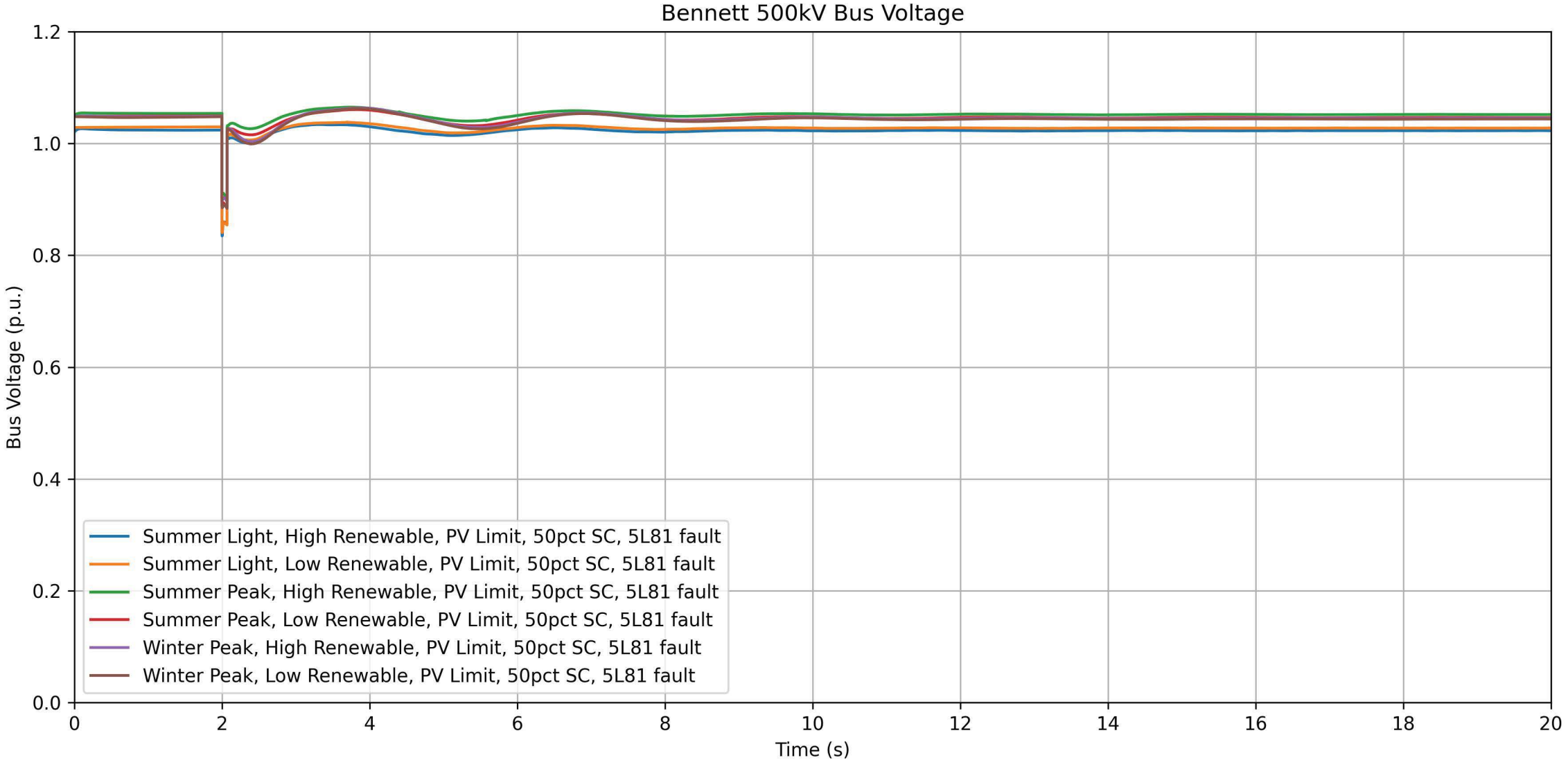

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 2L294 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 2L294 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

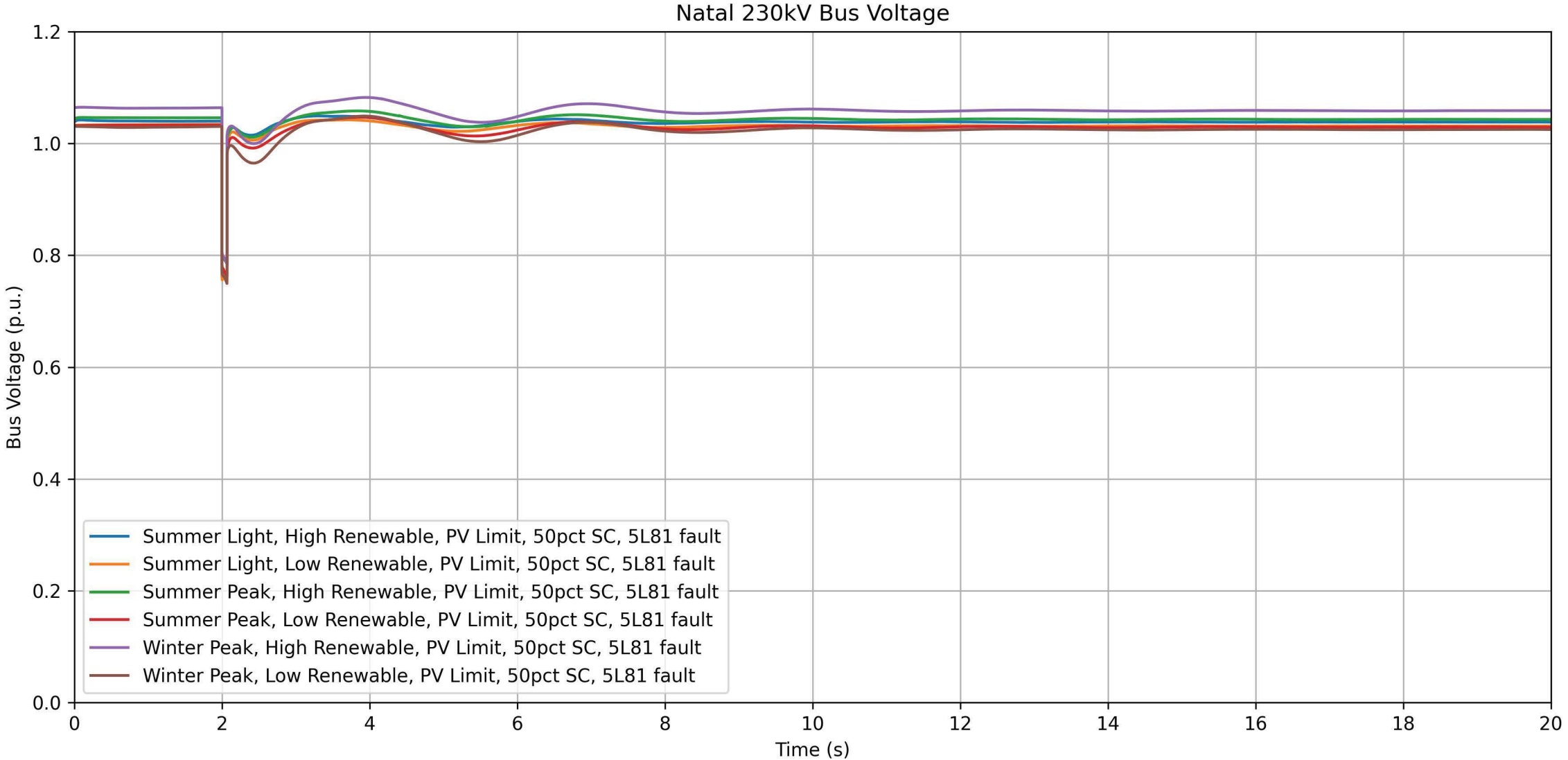

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

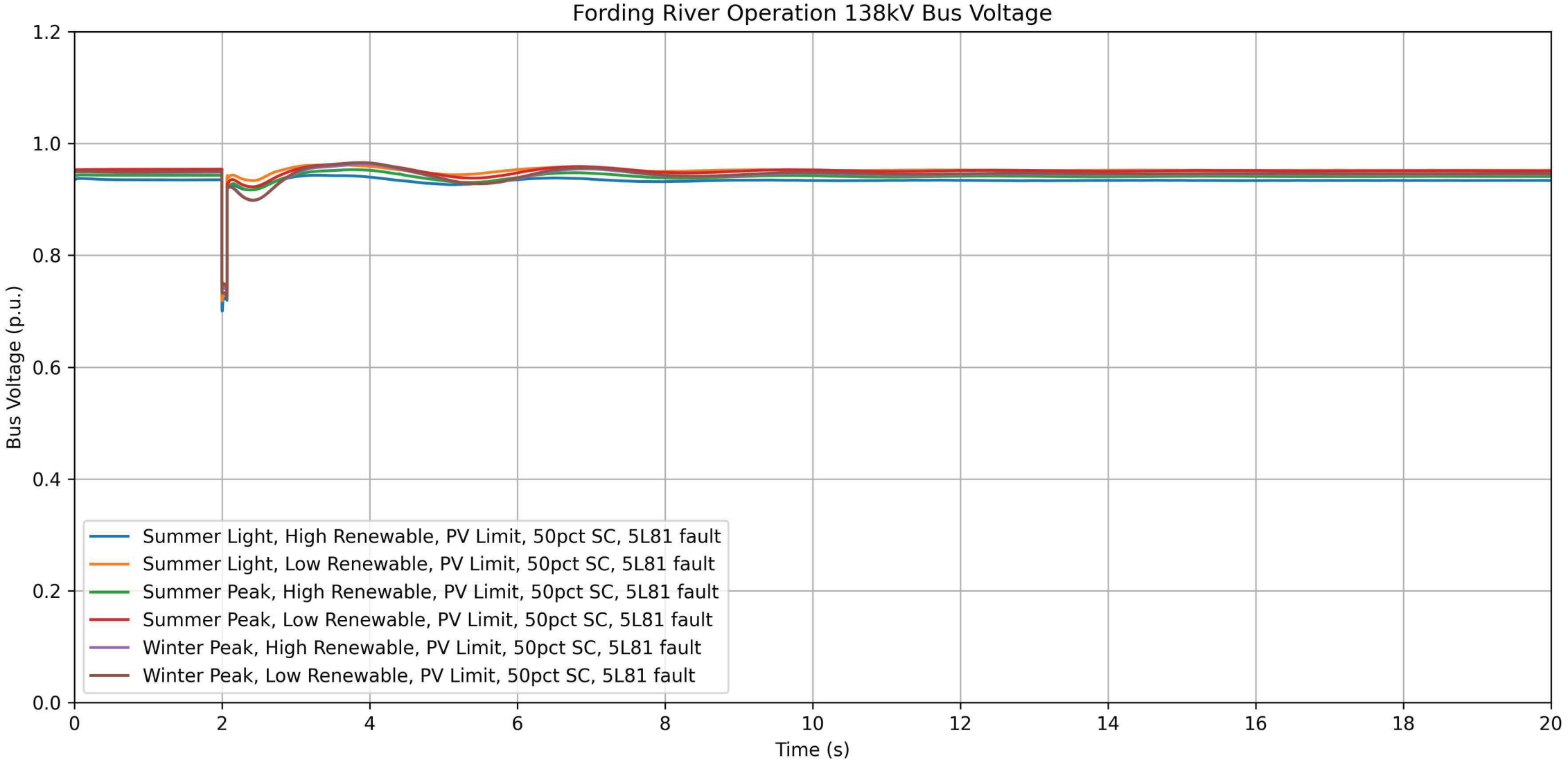

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

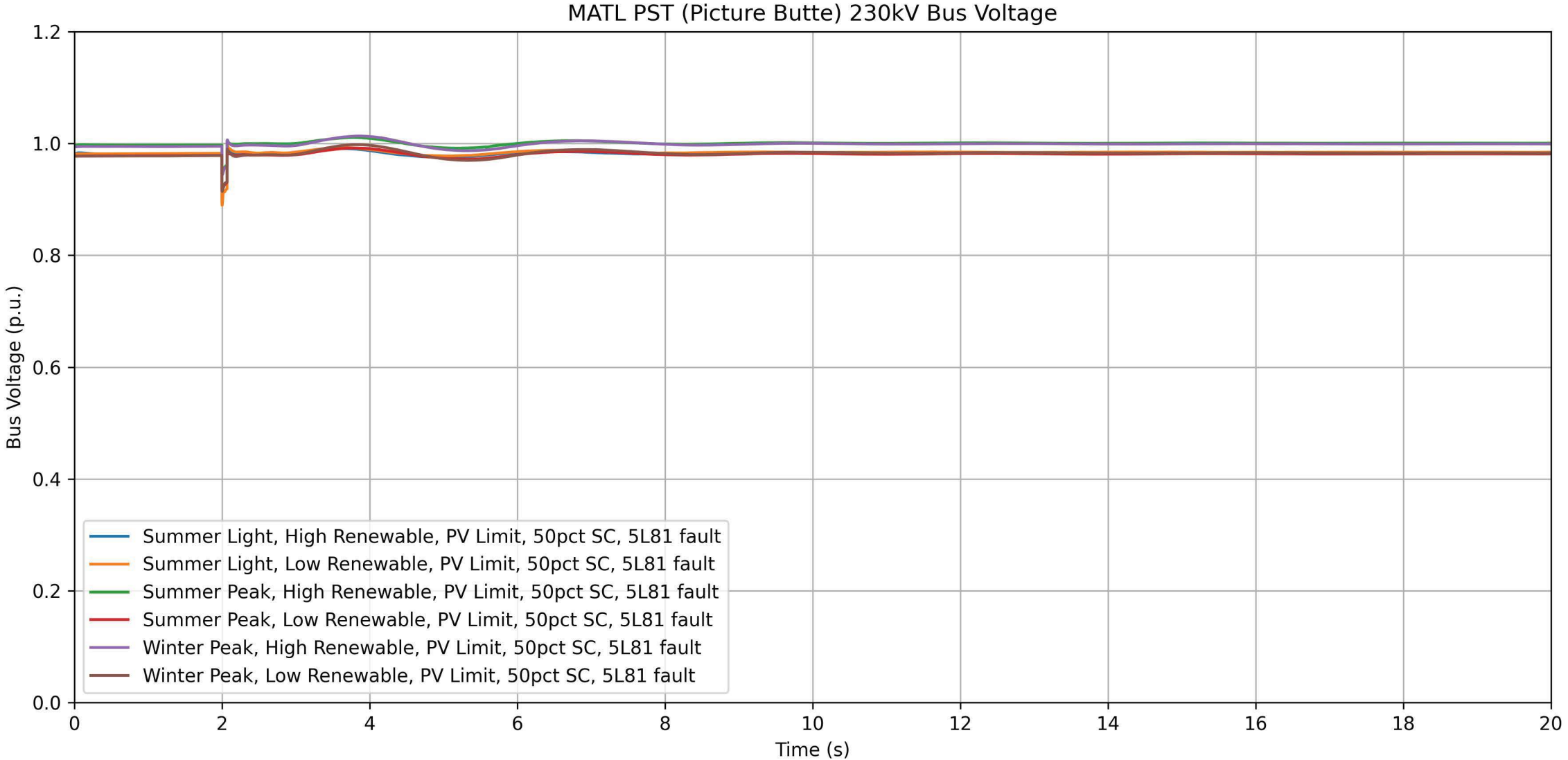

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

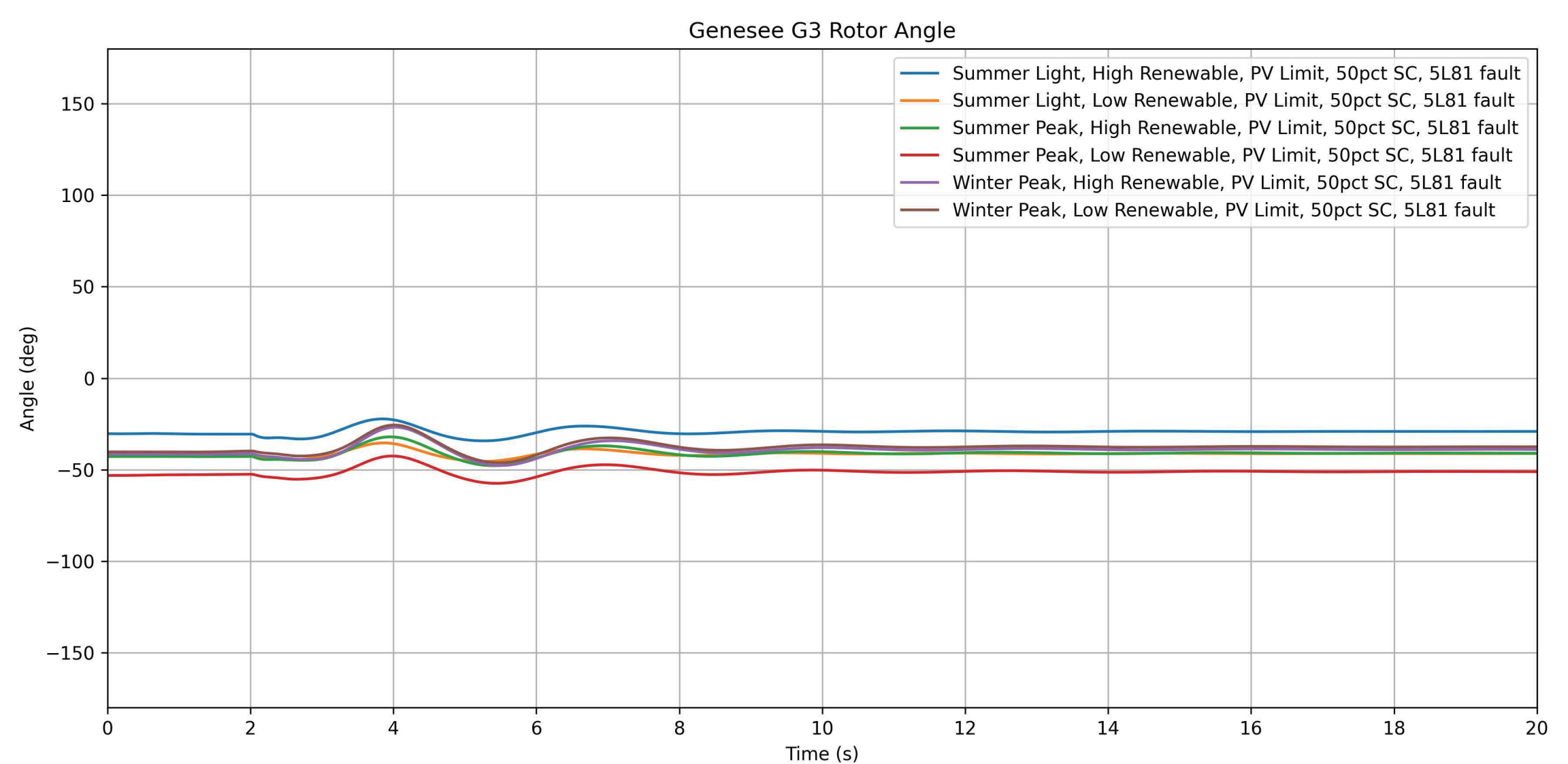

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

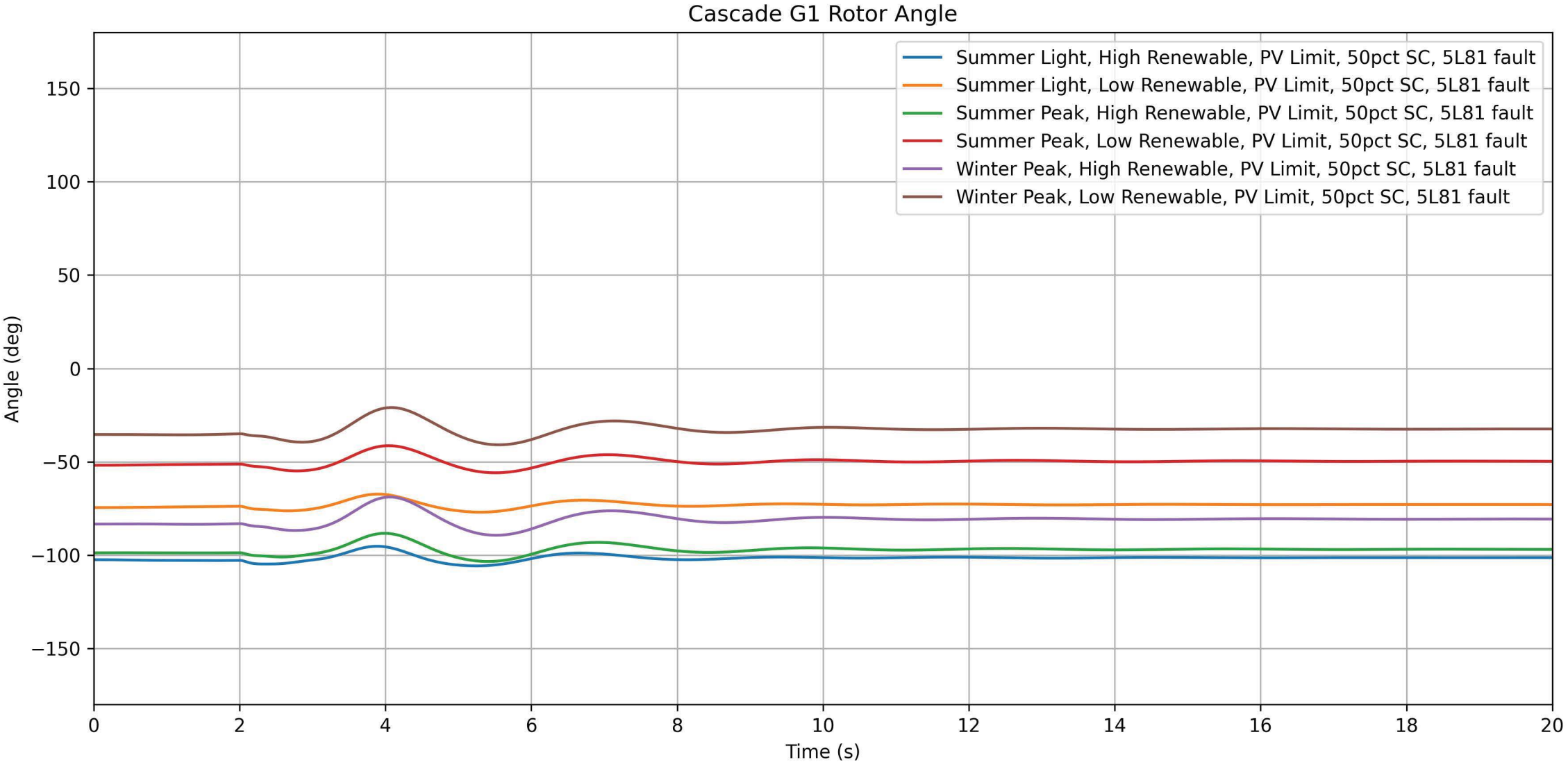

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

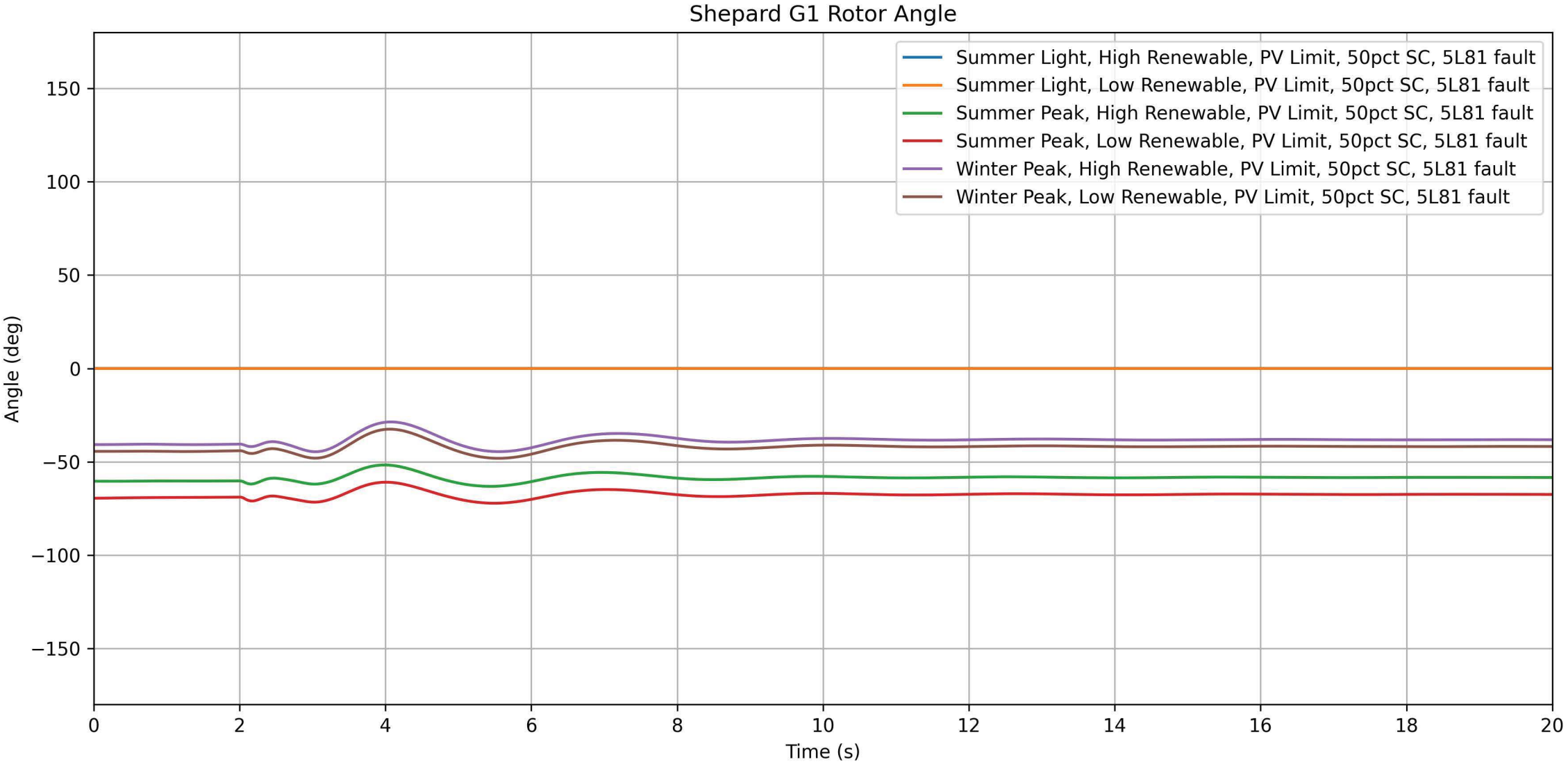

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

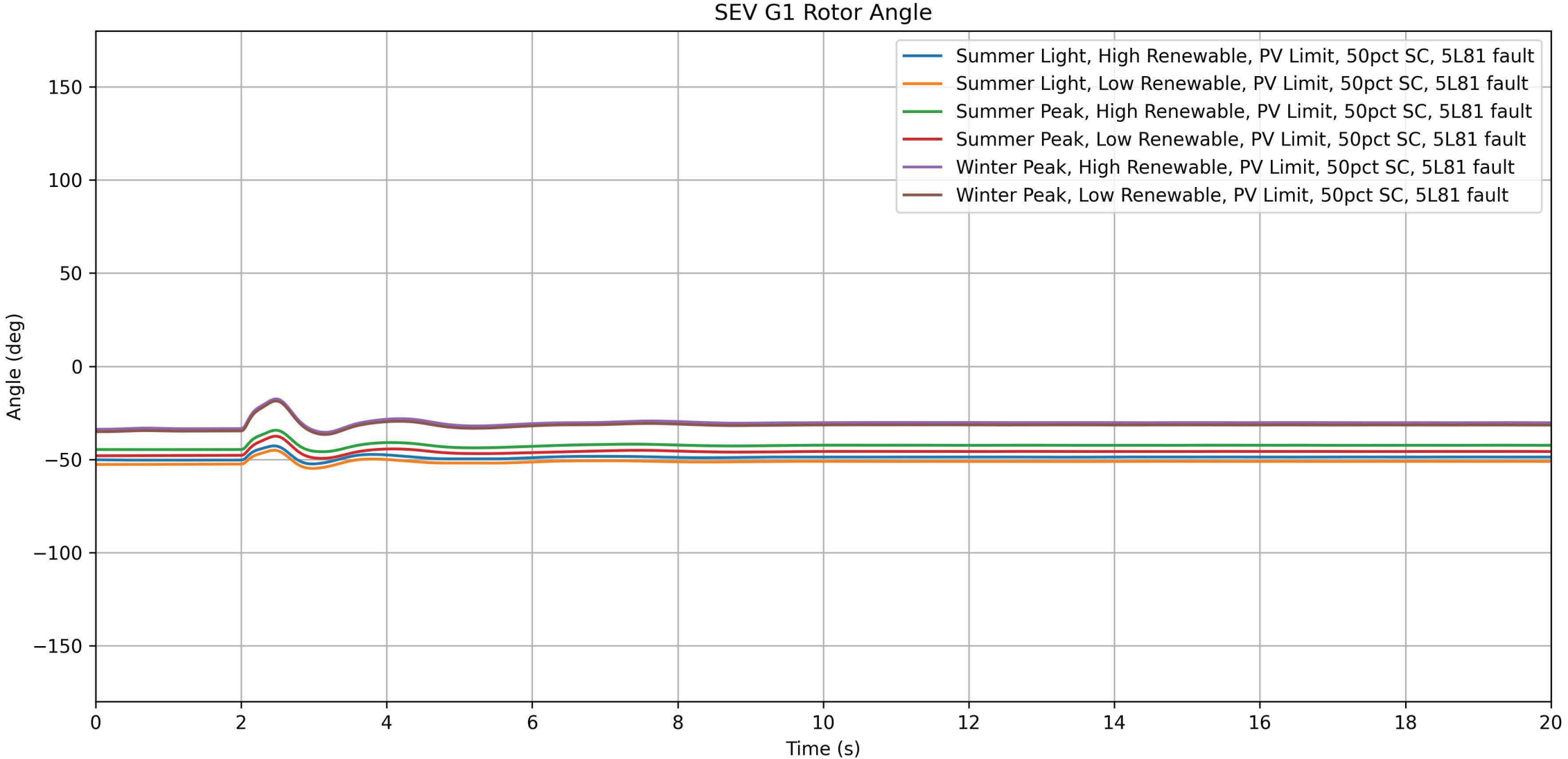

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

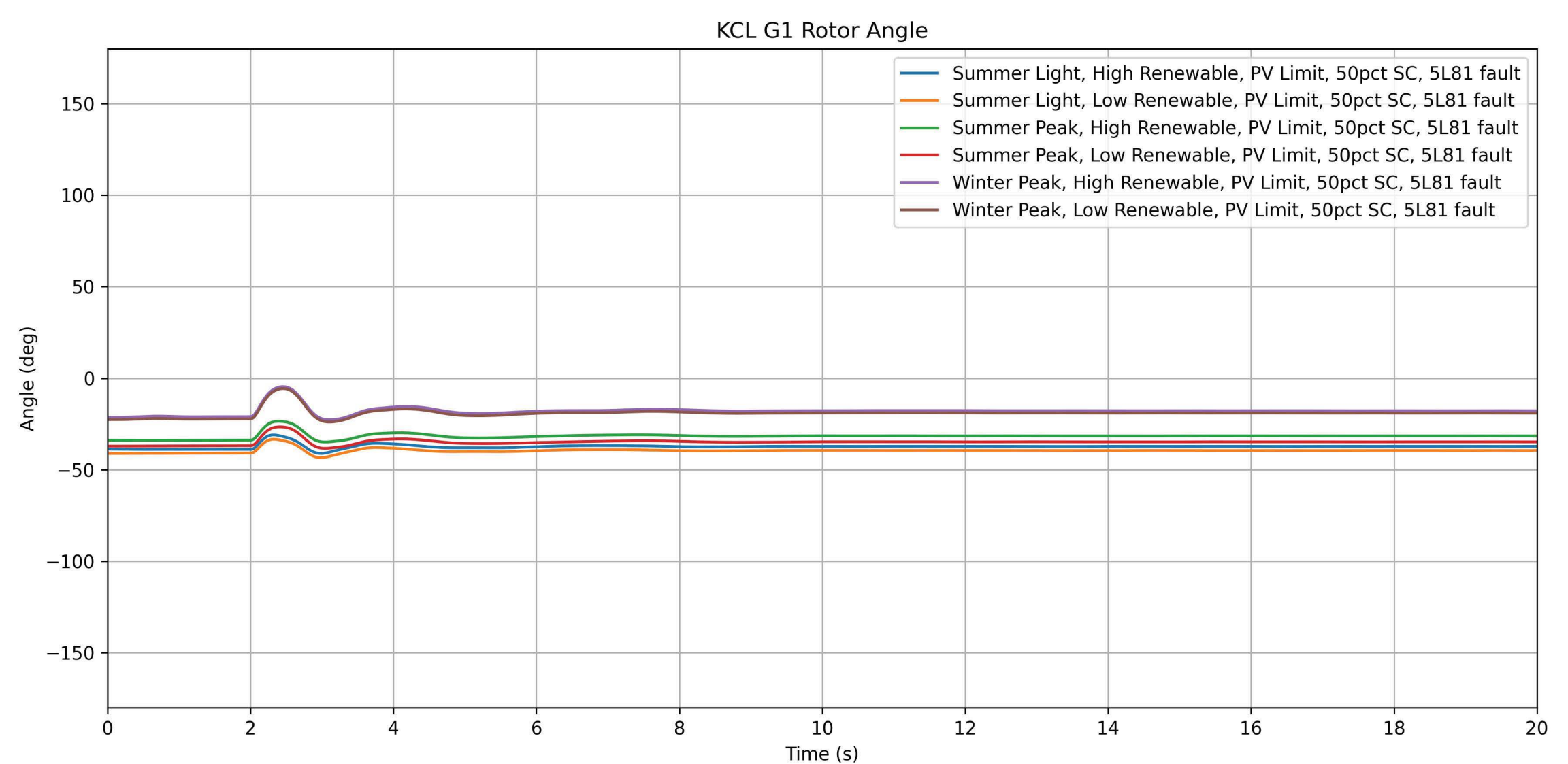

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

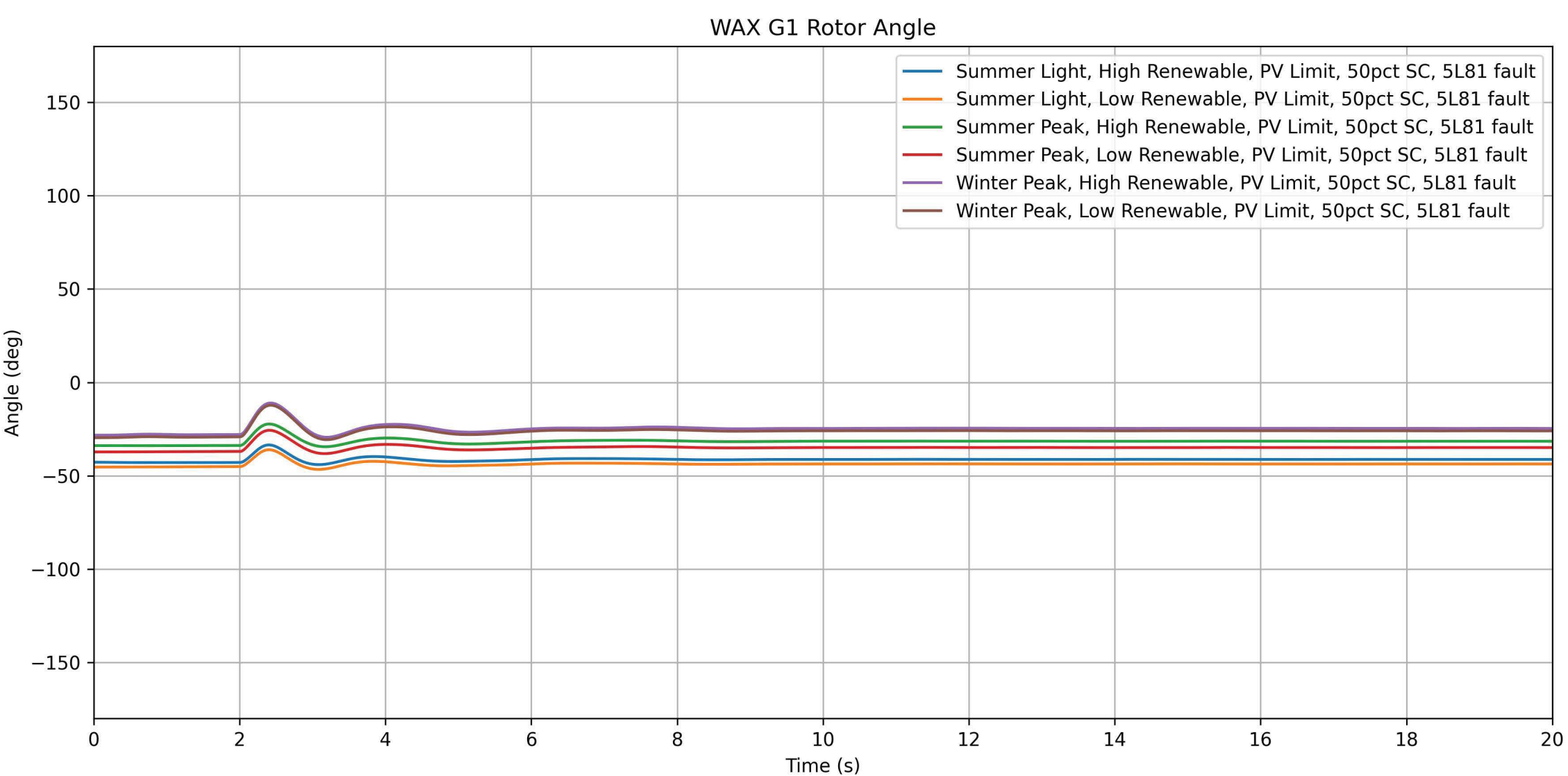

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

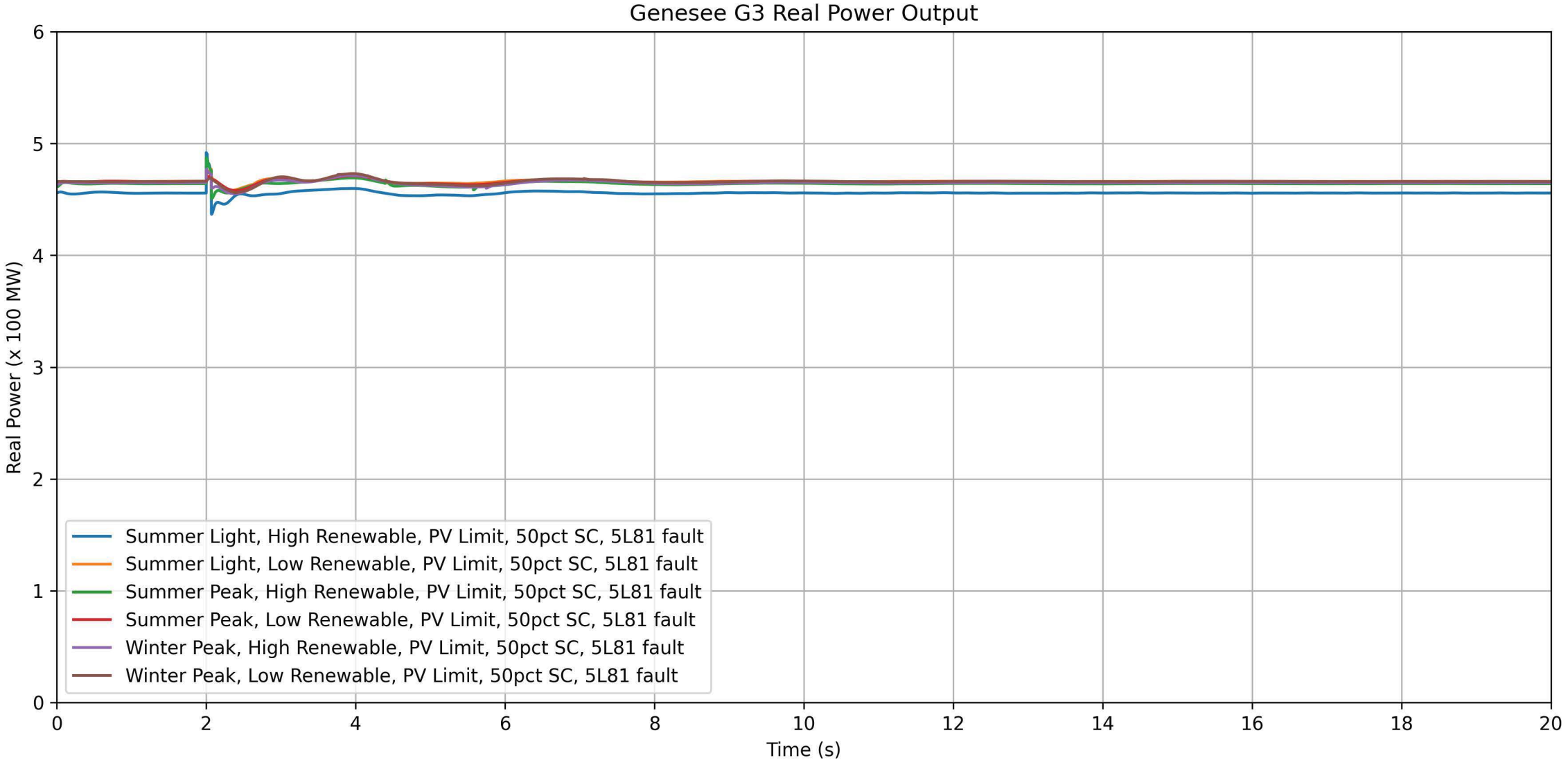

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

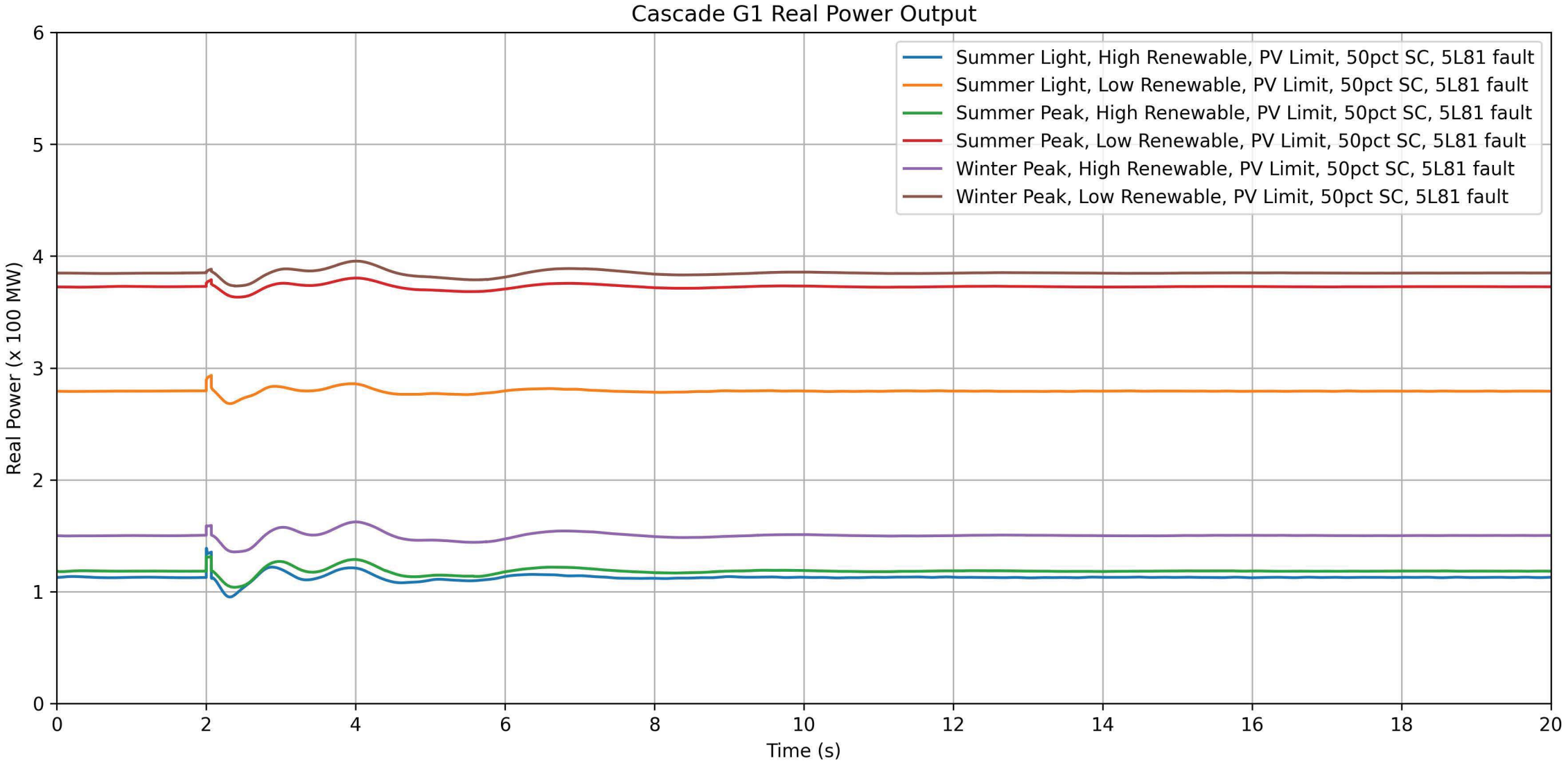

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

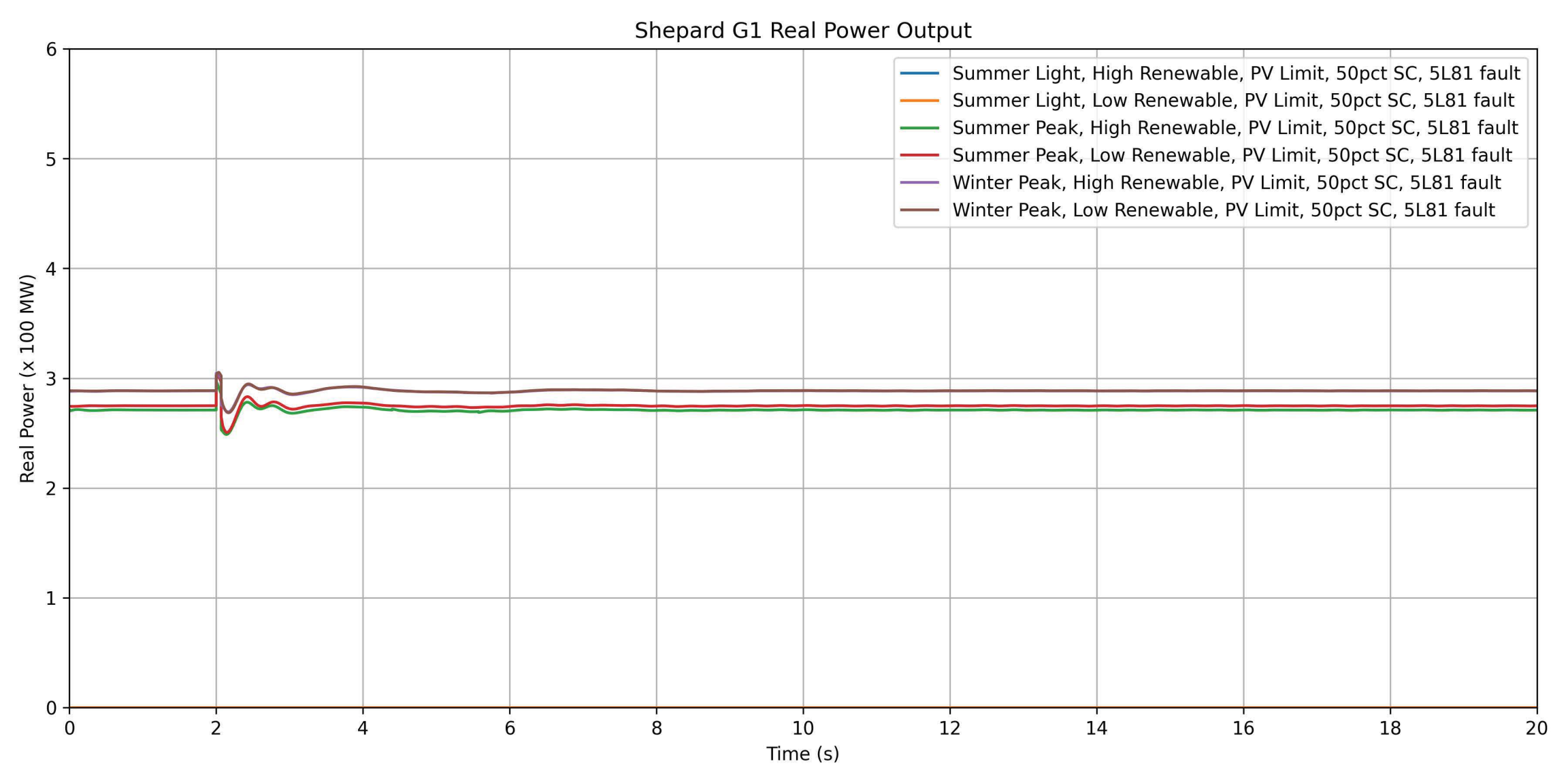

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

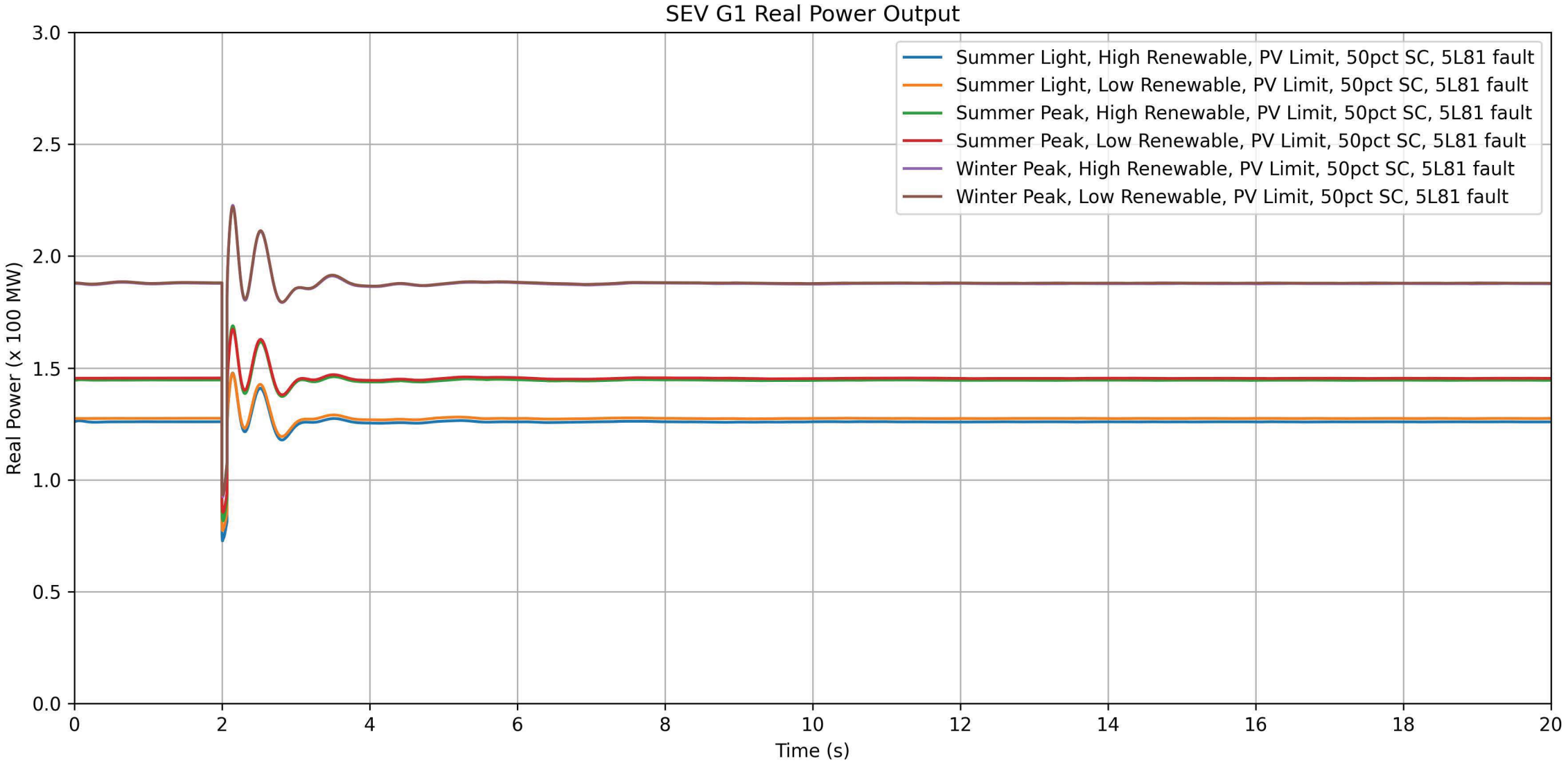

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

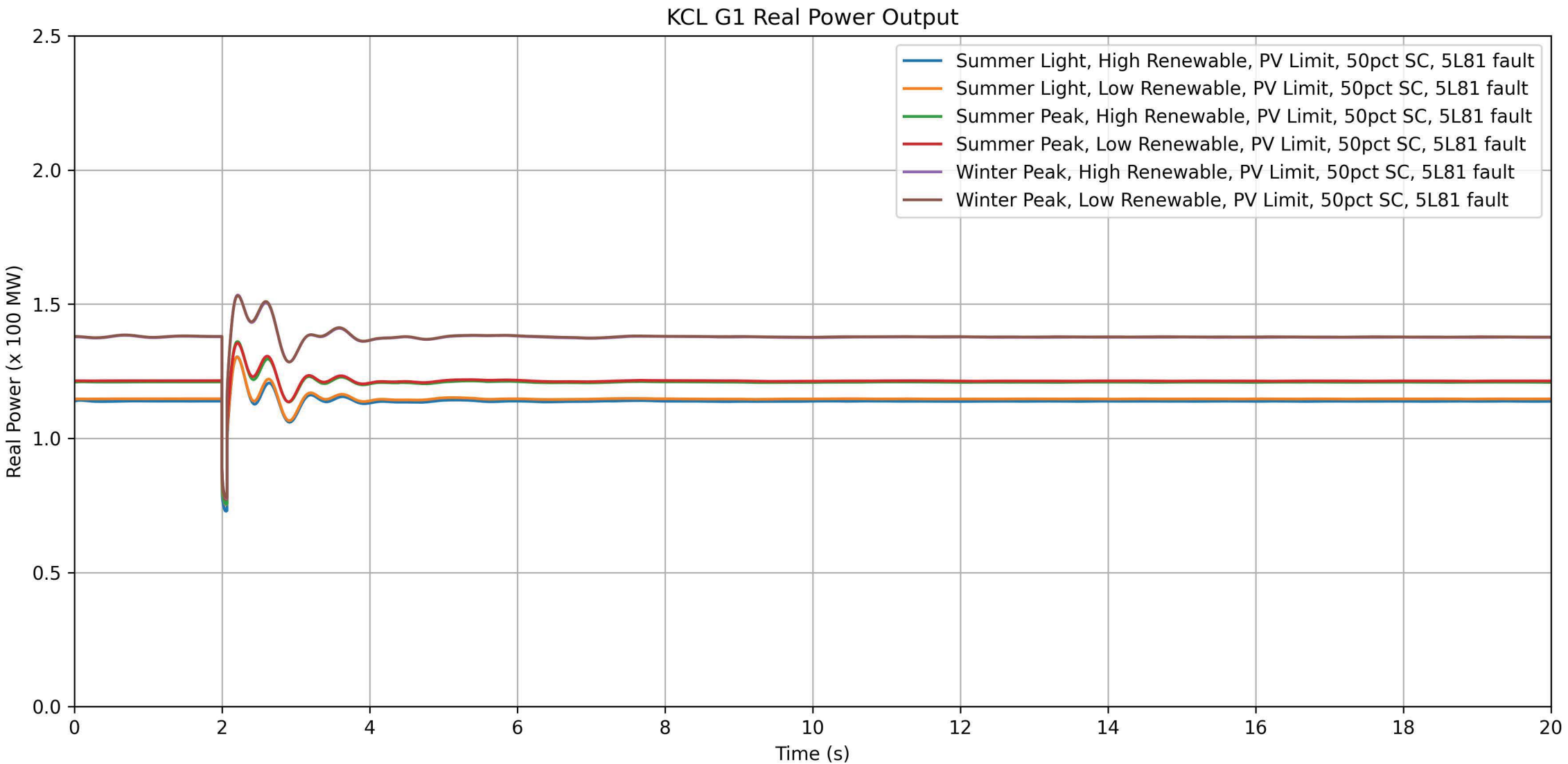

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

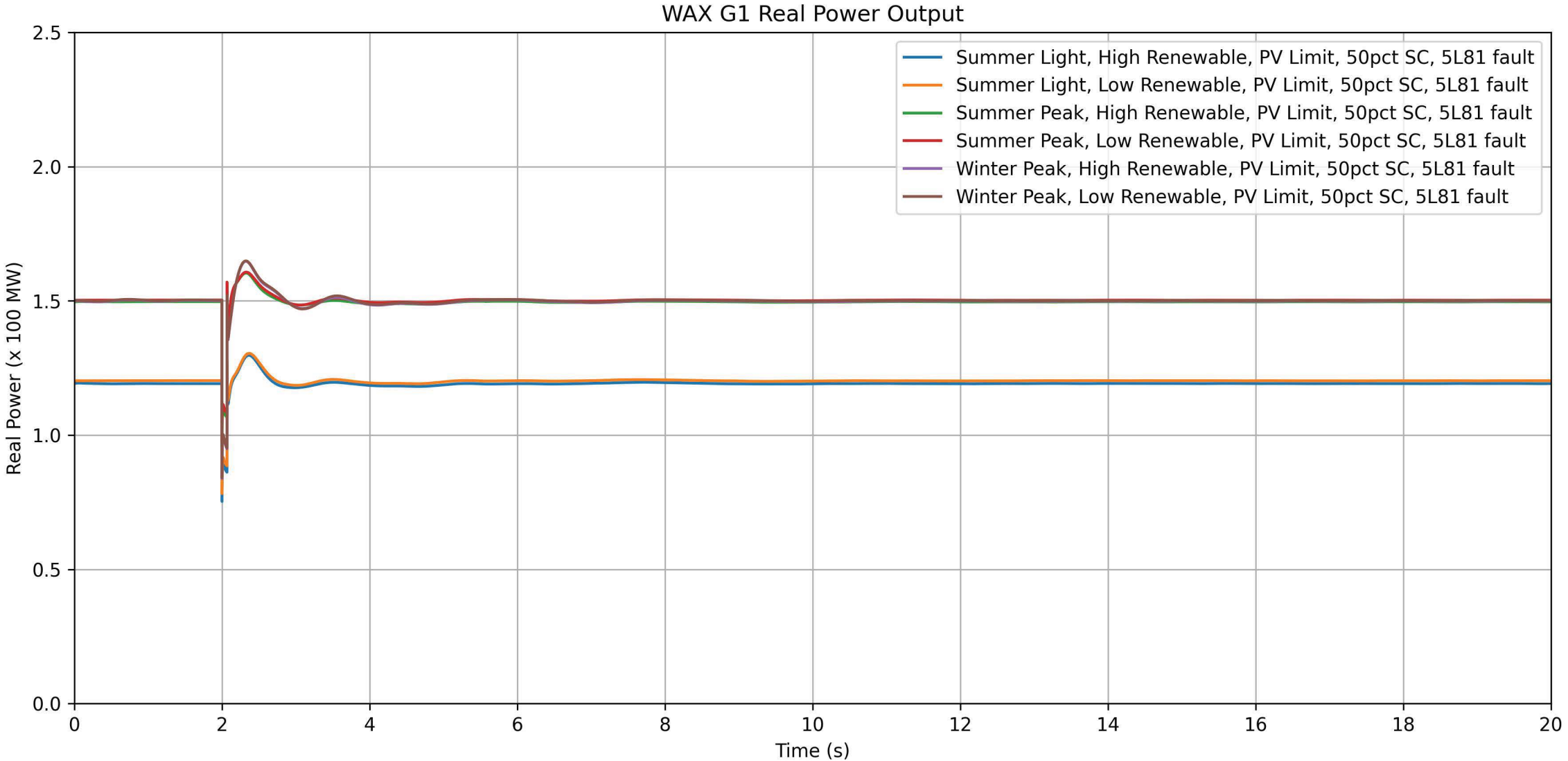

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault

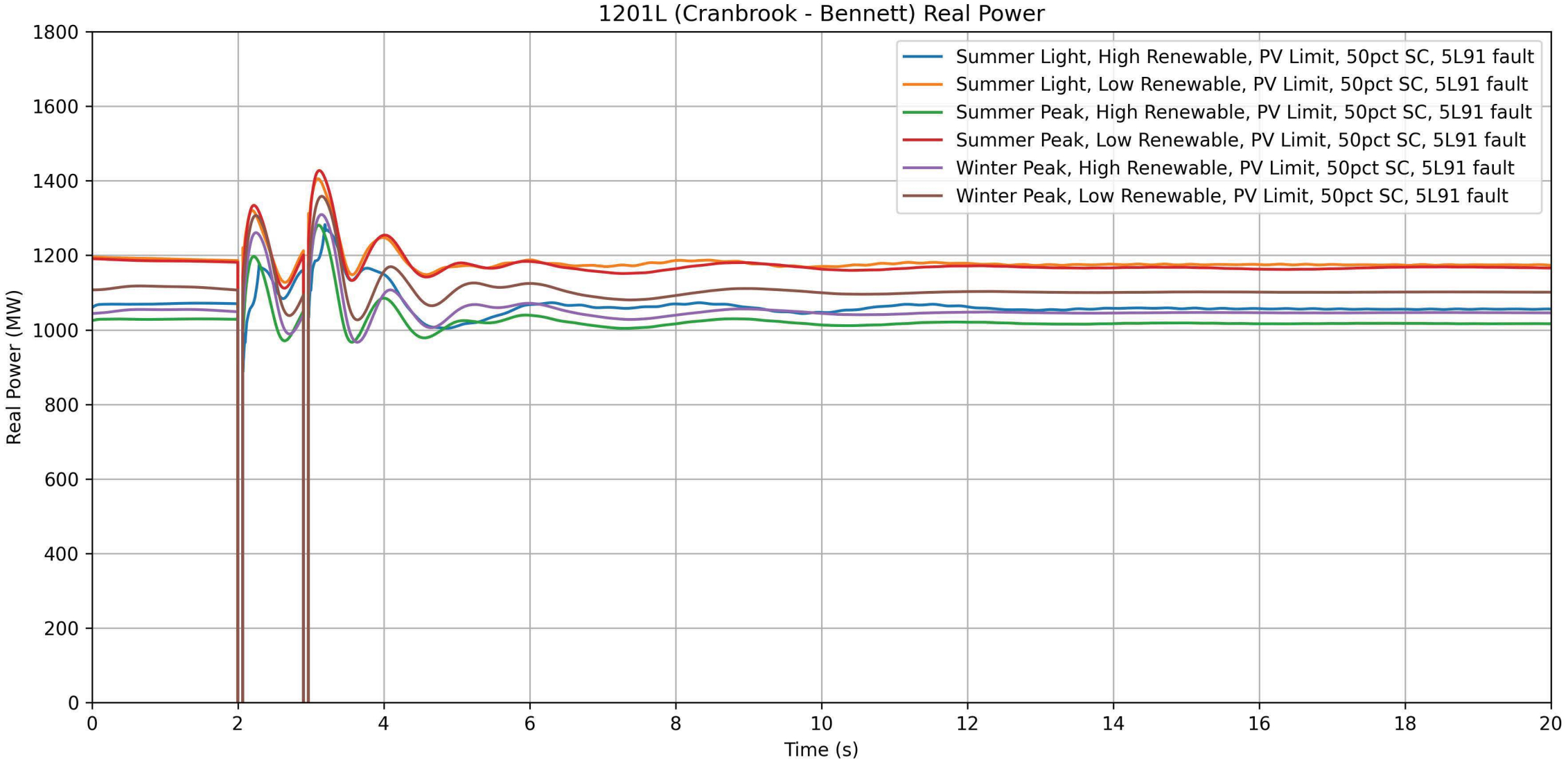

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

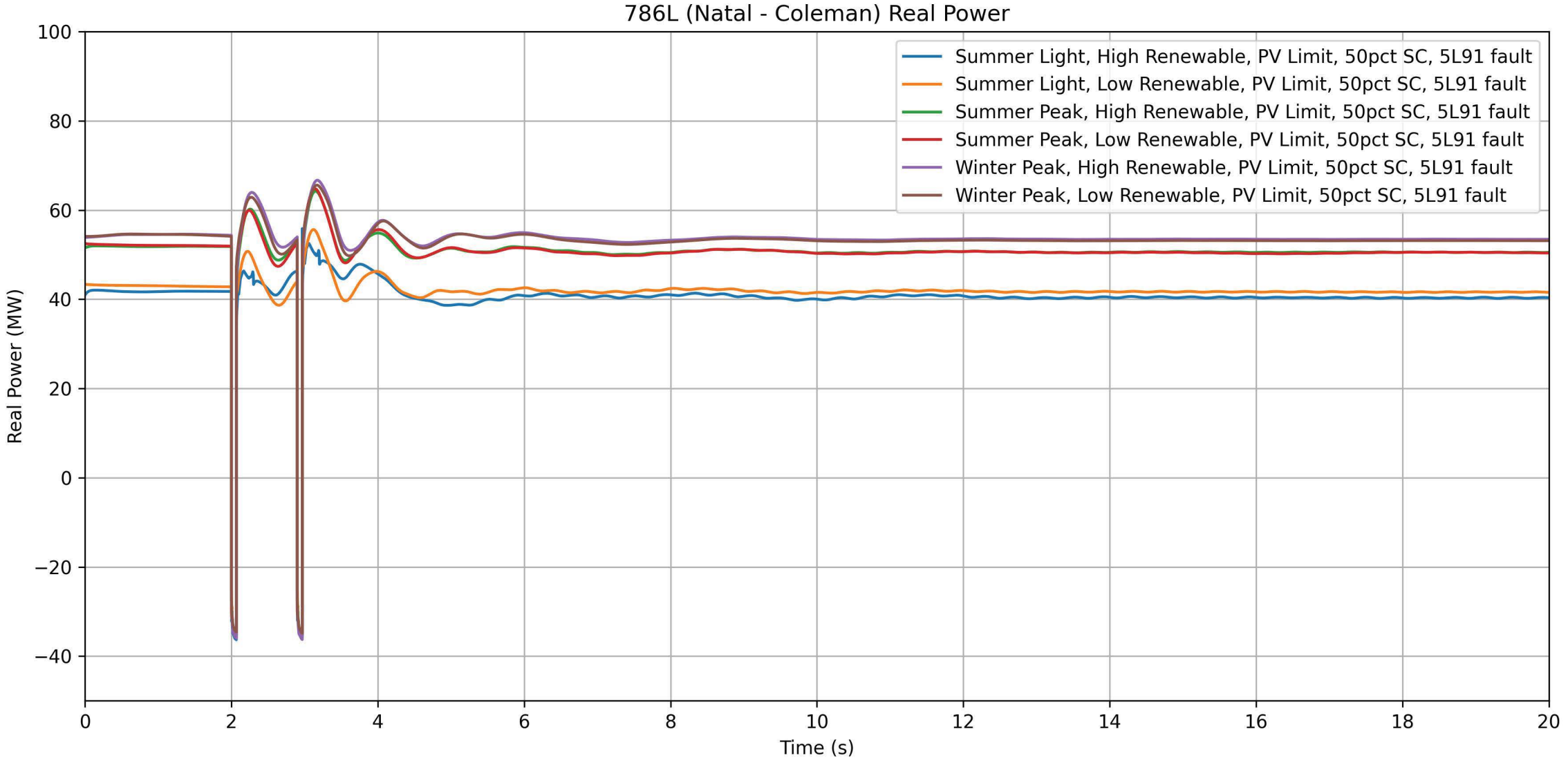

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

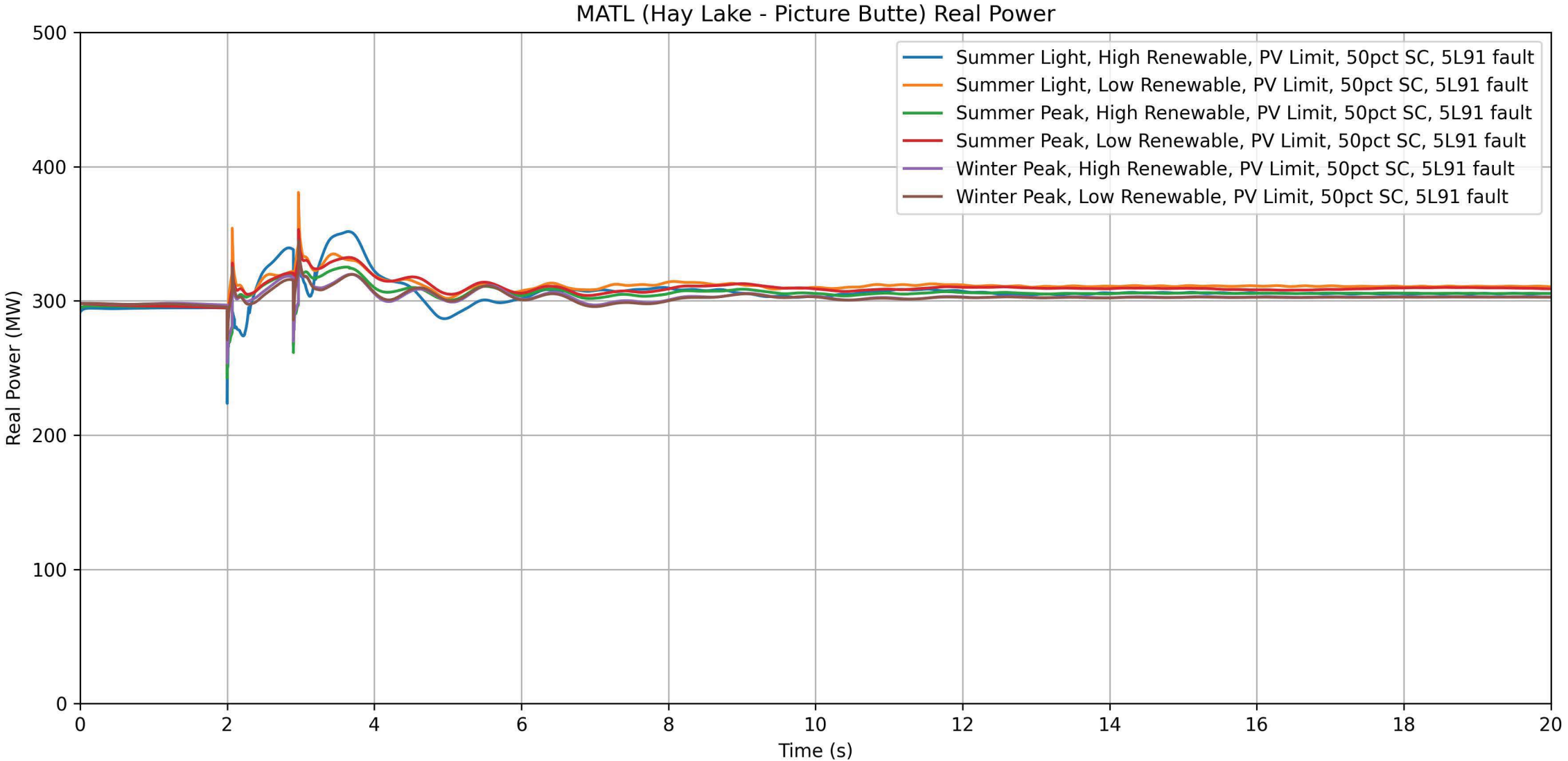

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

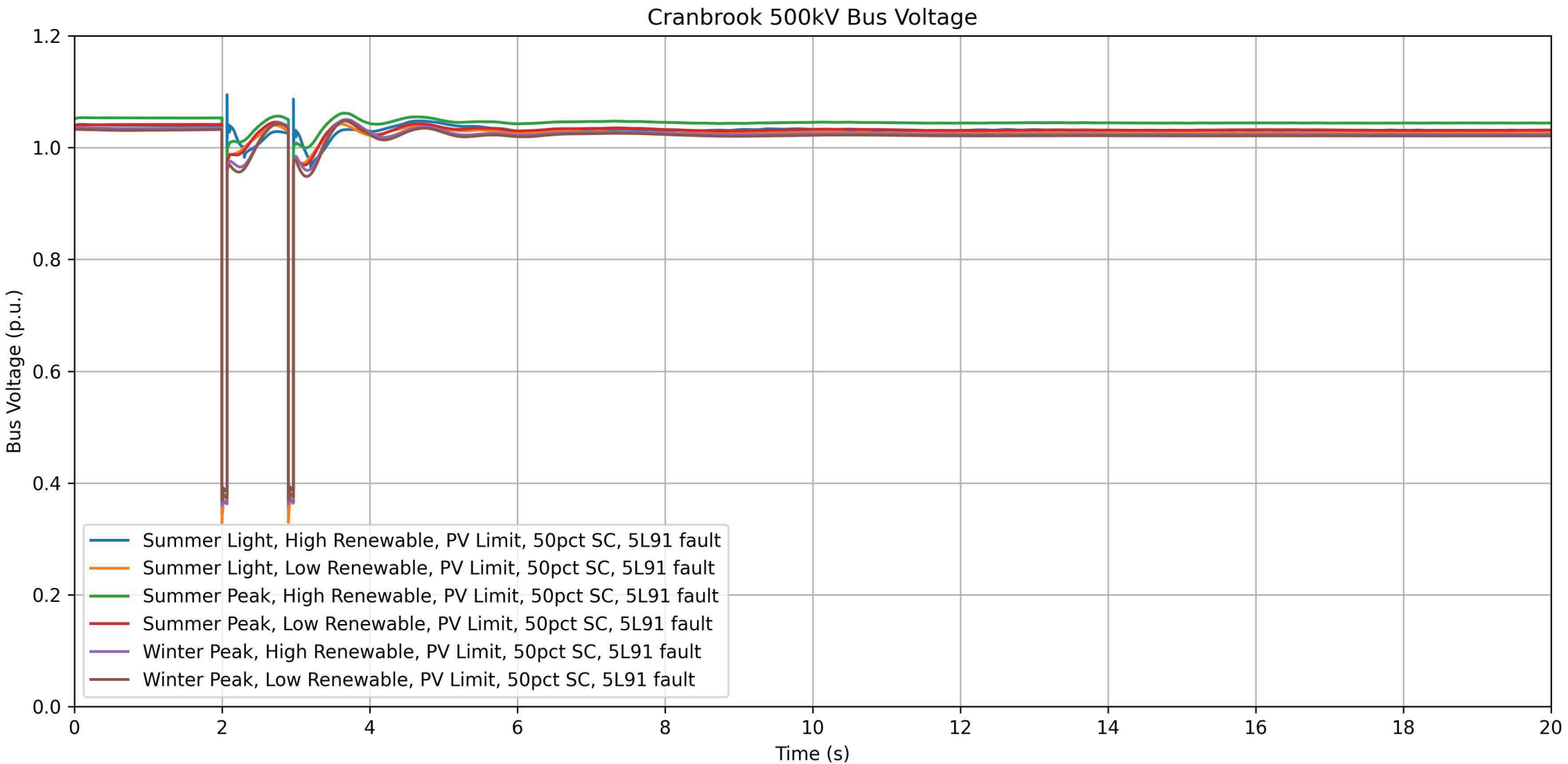

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

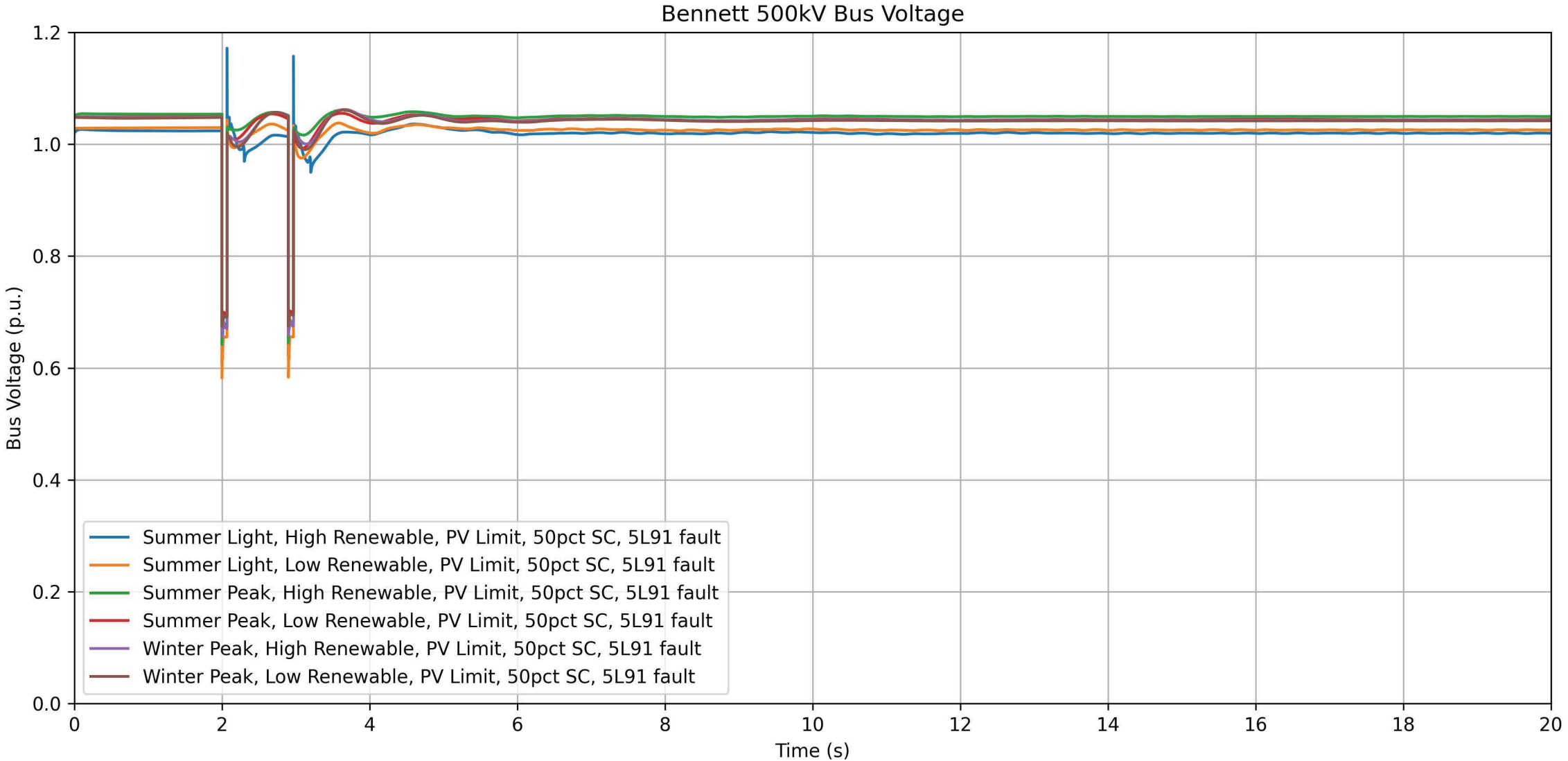

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

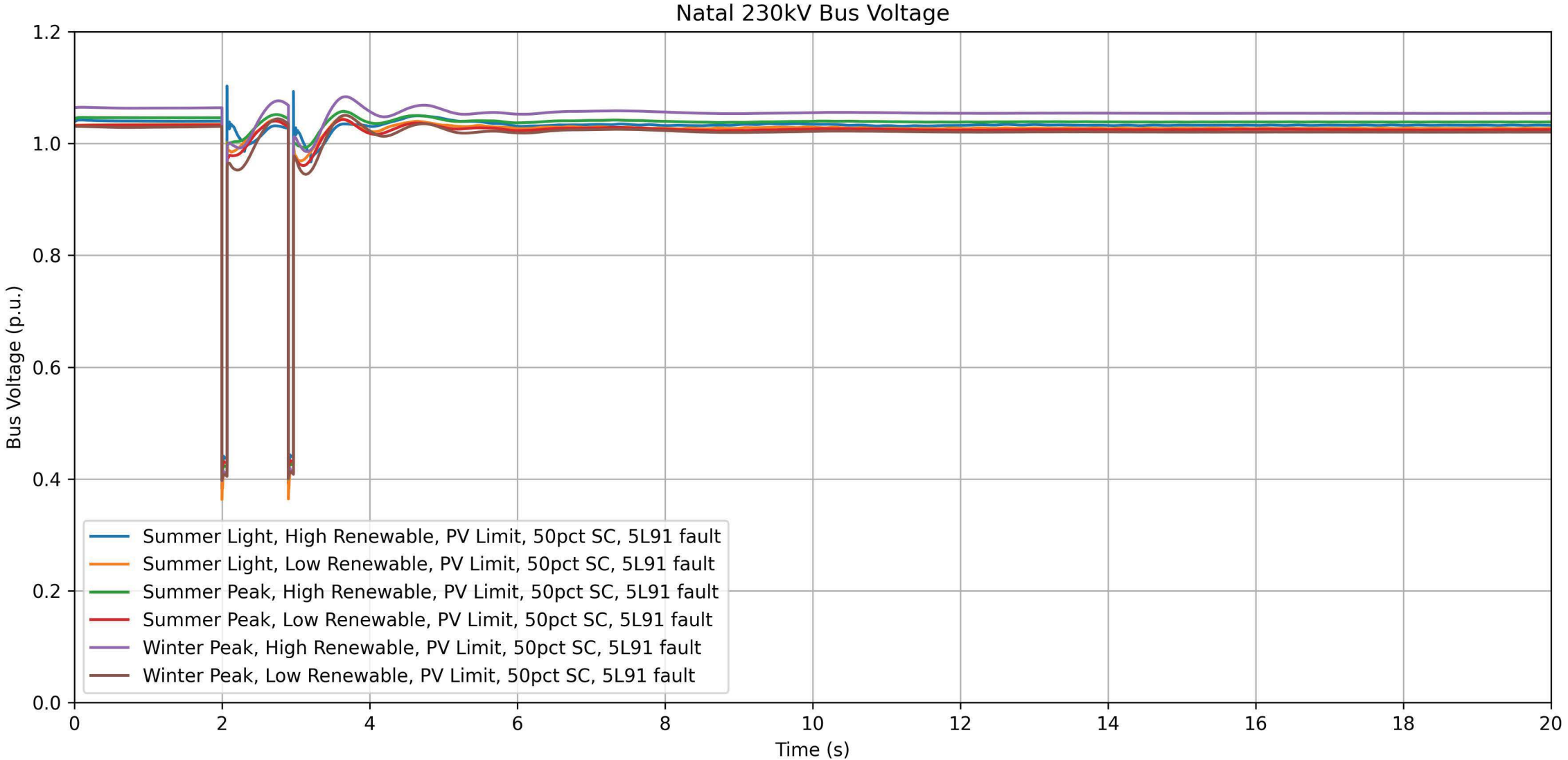

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

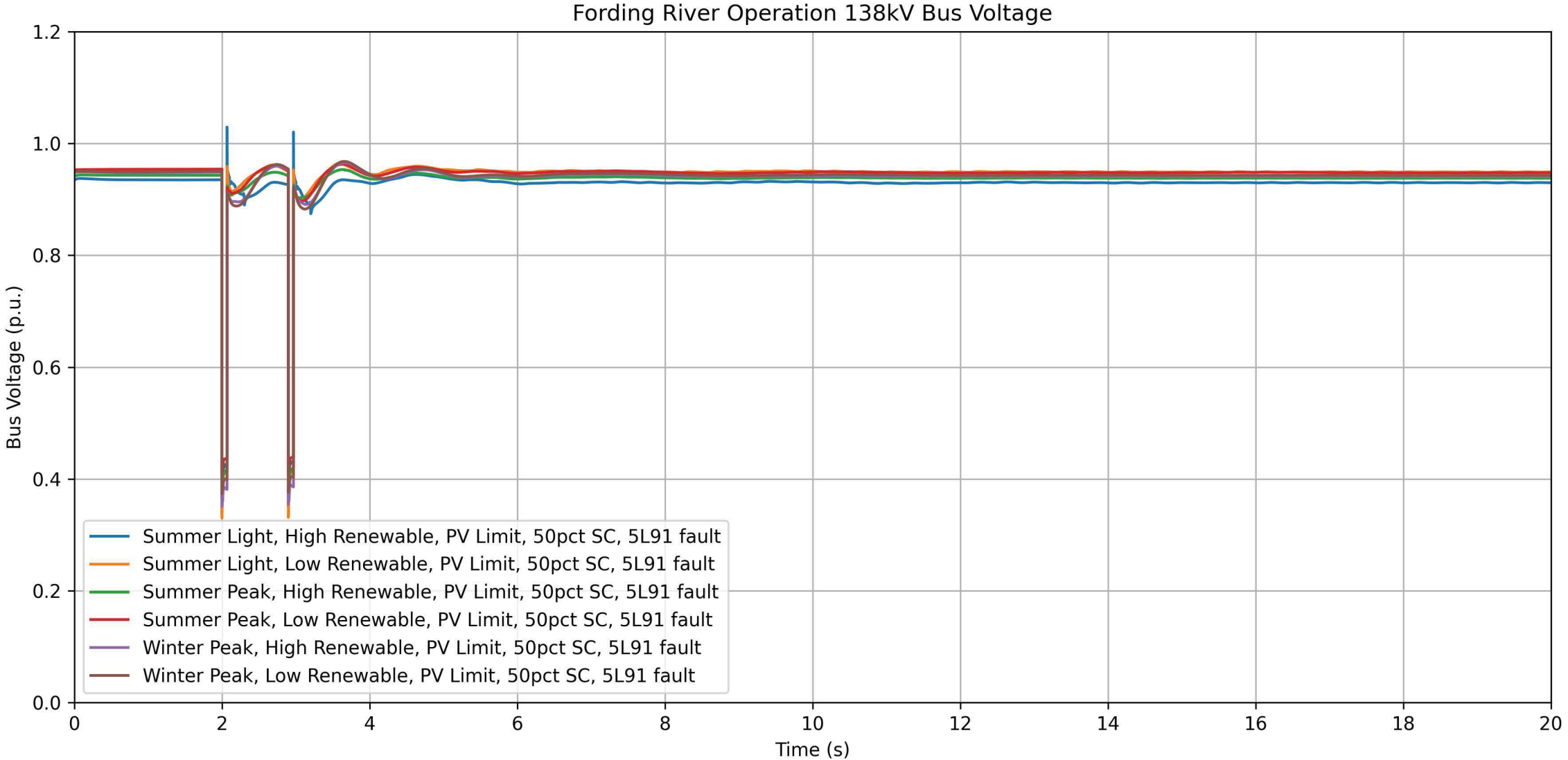

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

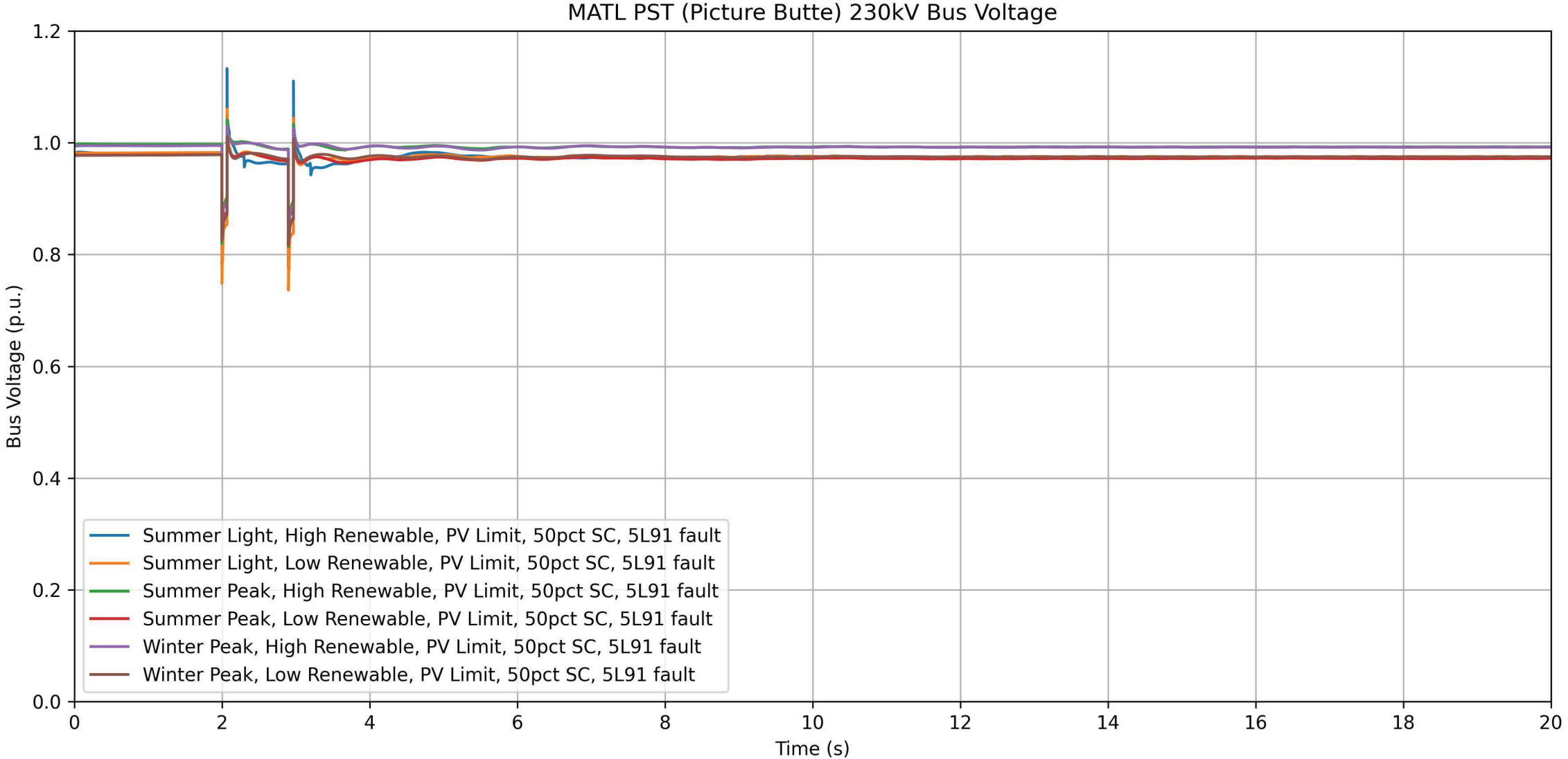

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

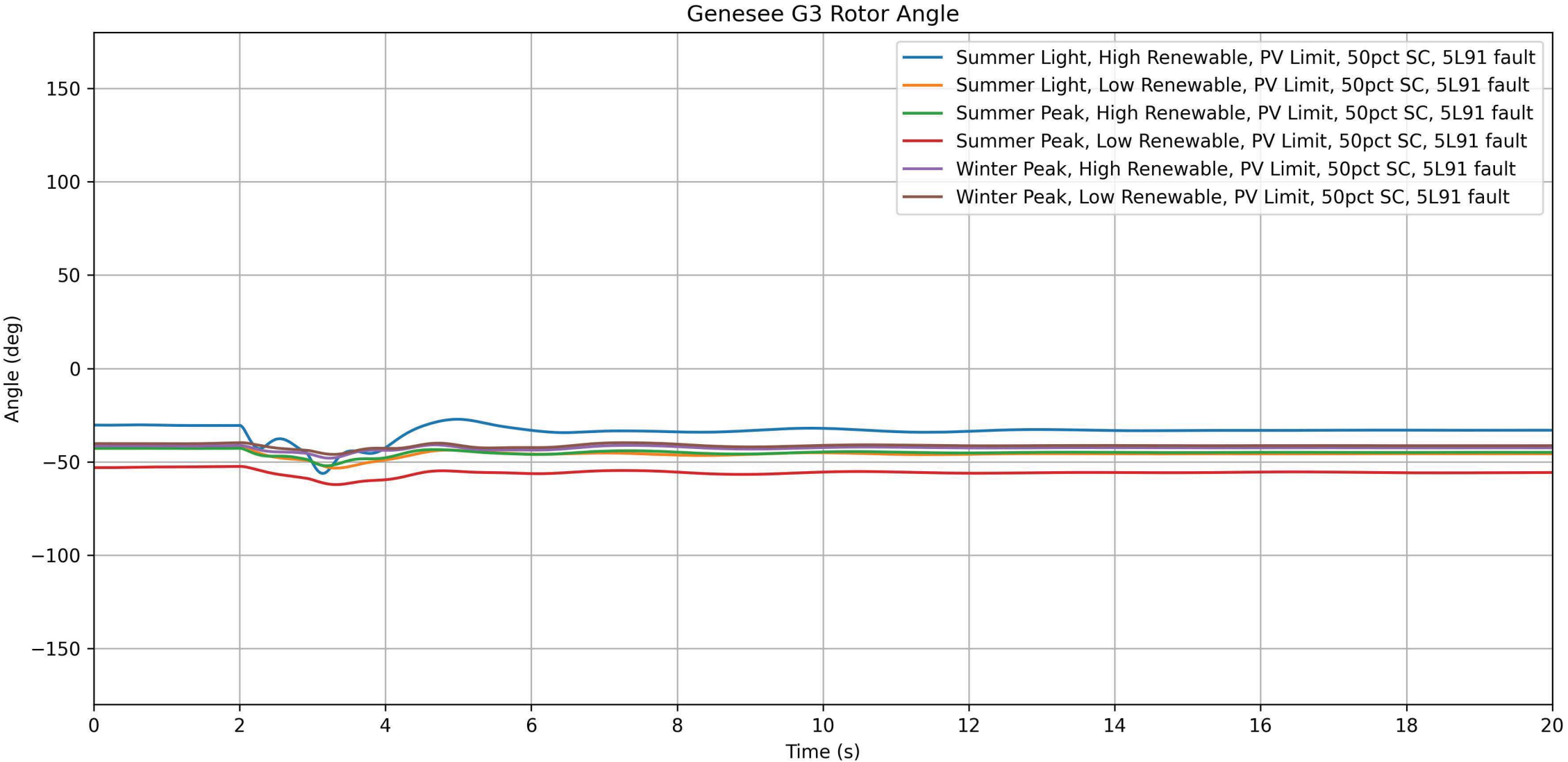

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

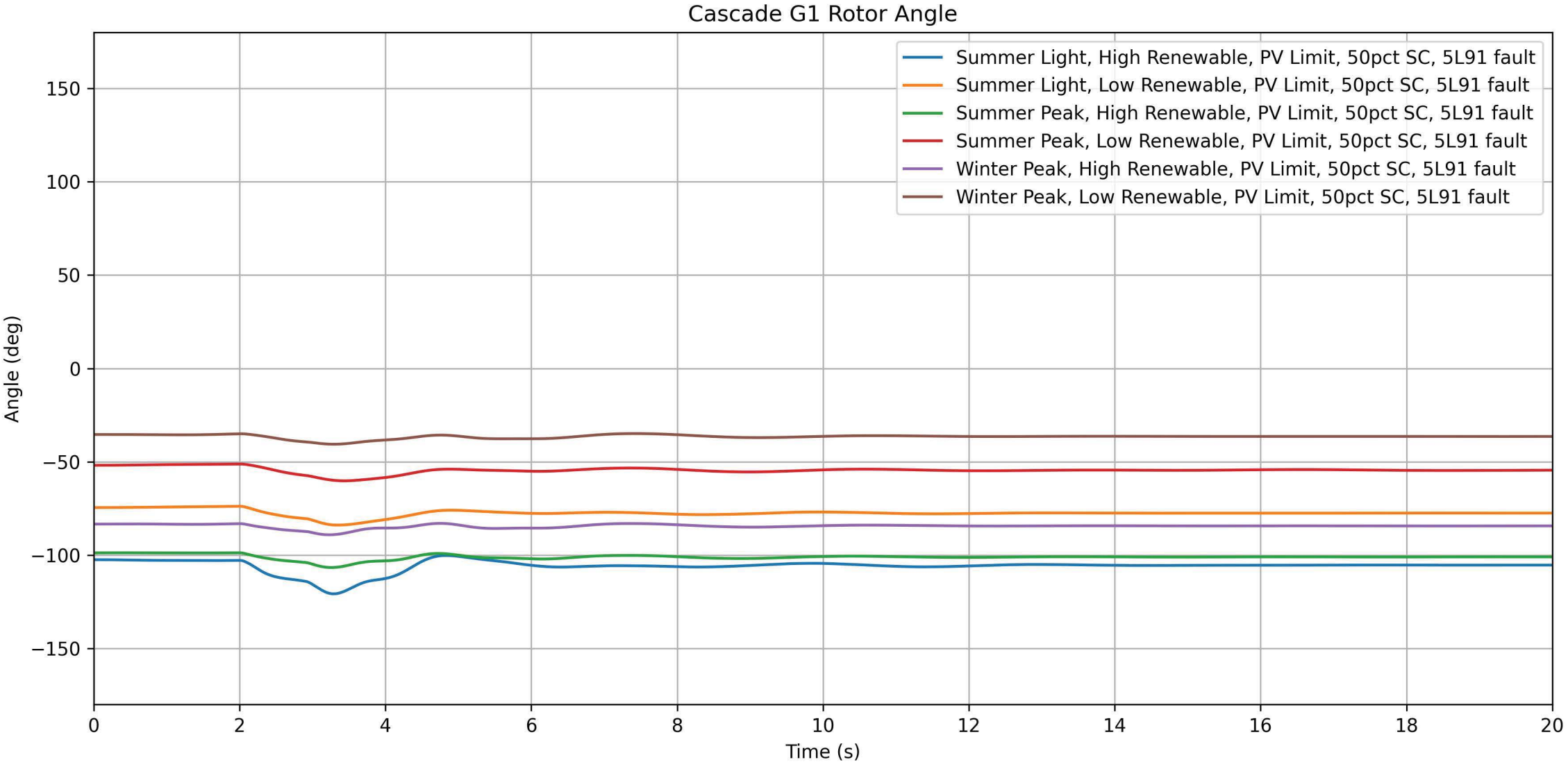

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

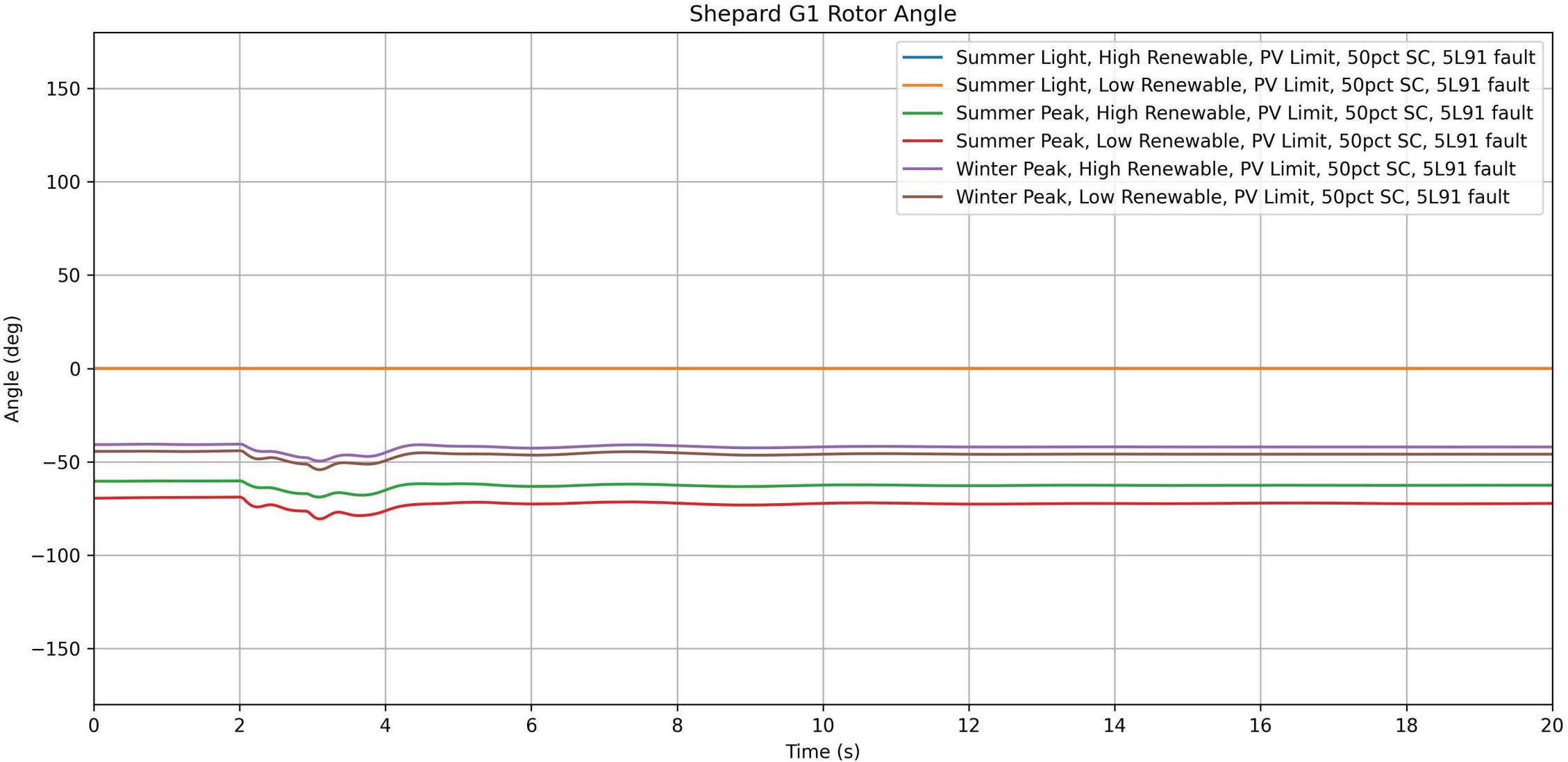

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

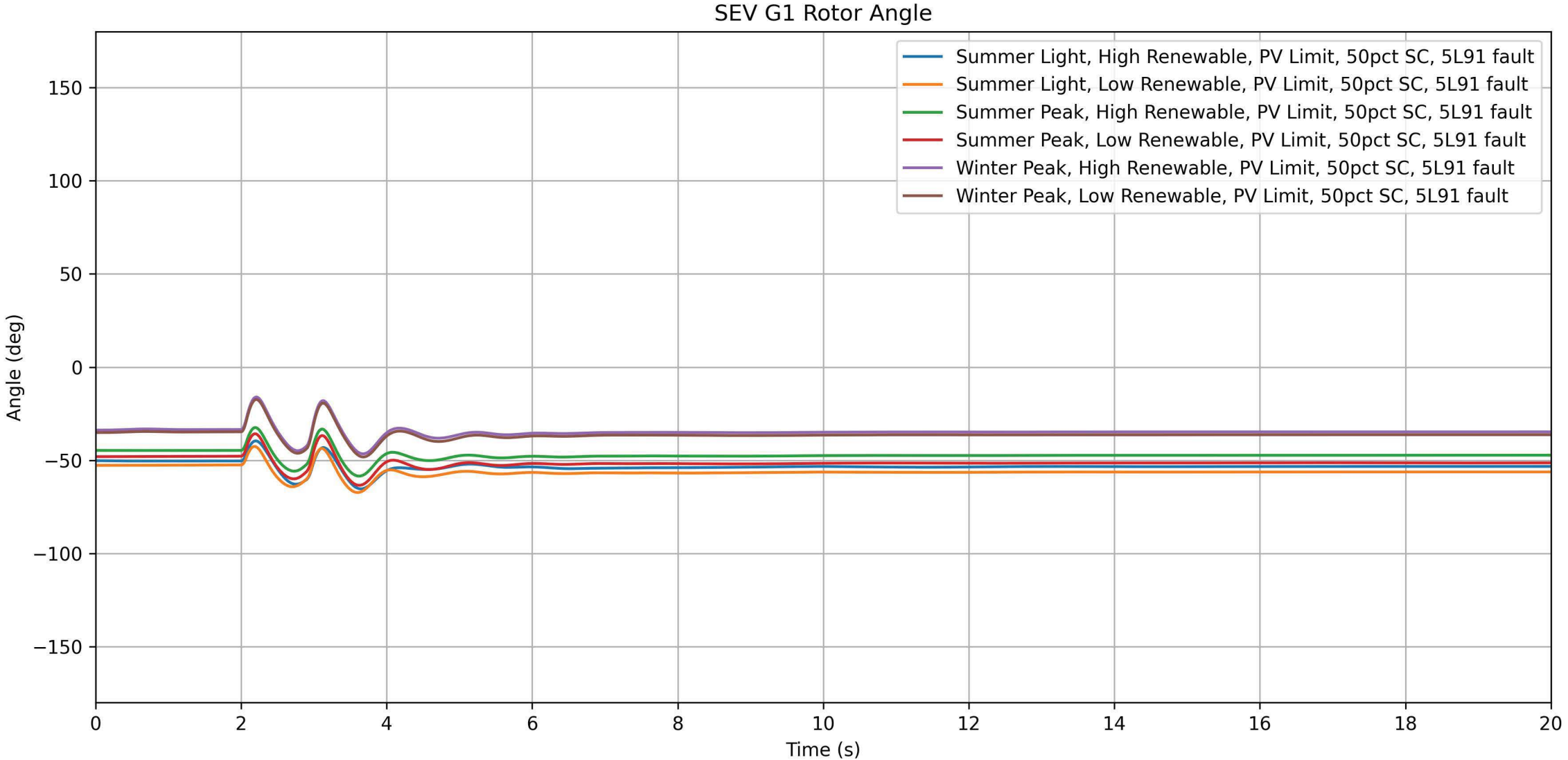

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

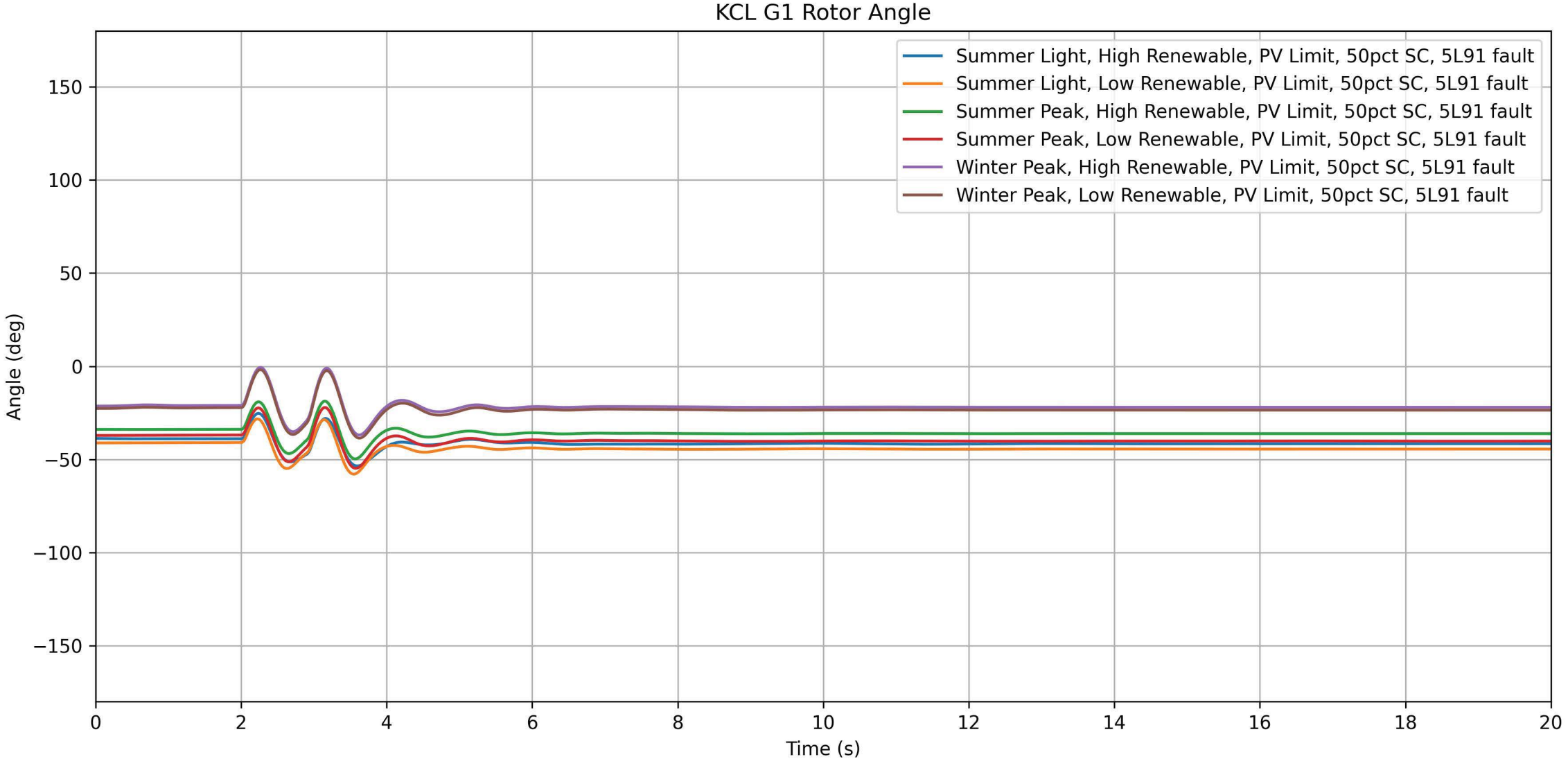

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

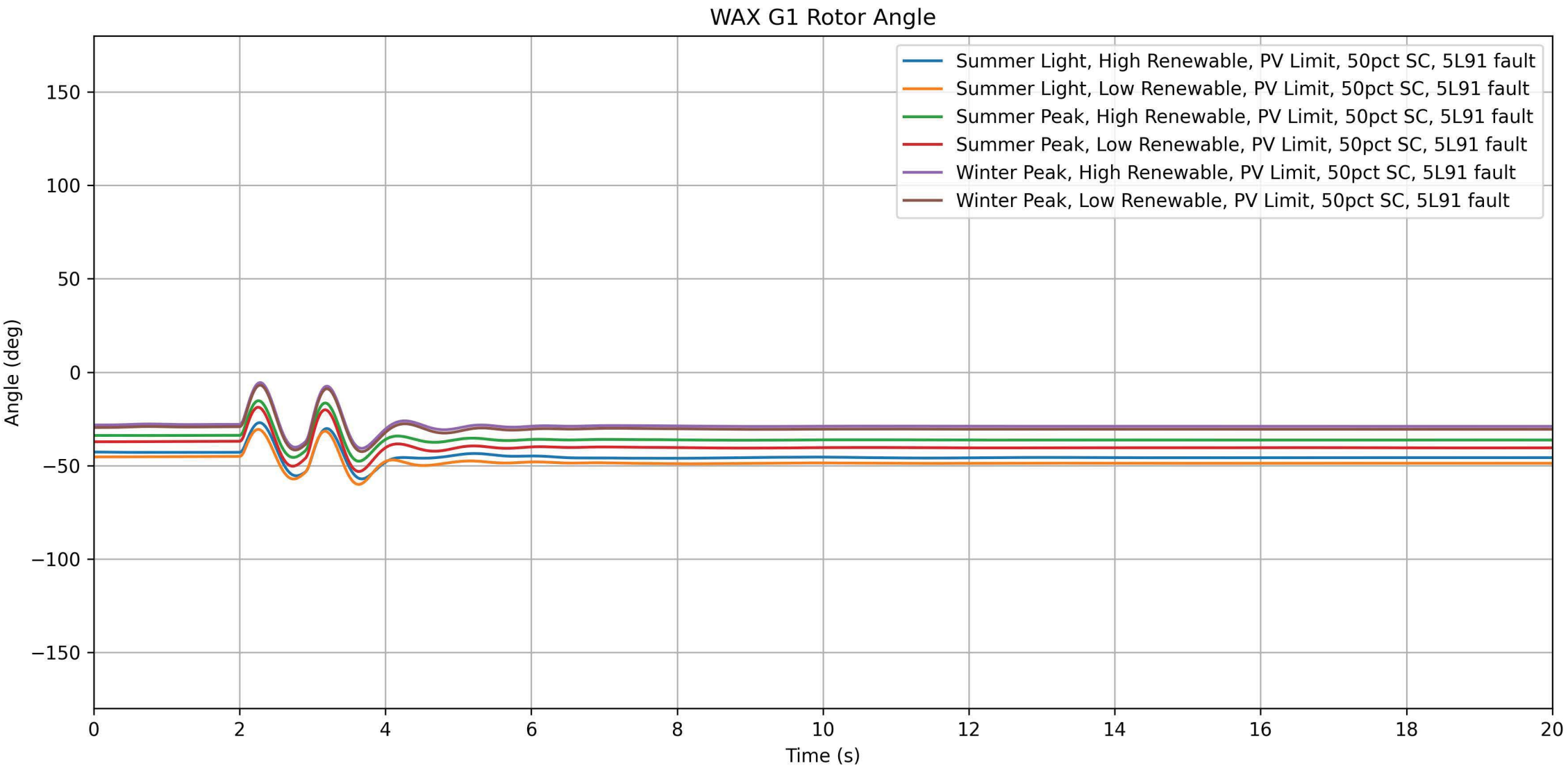

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

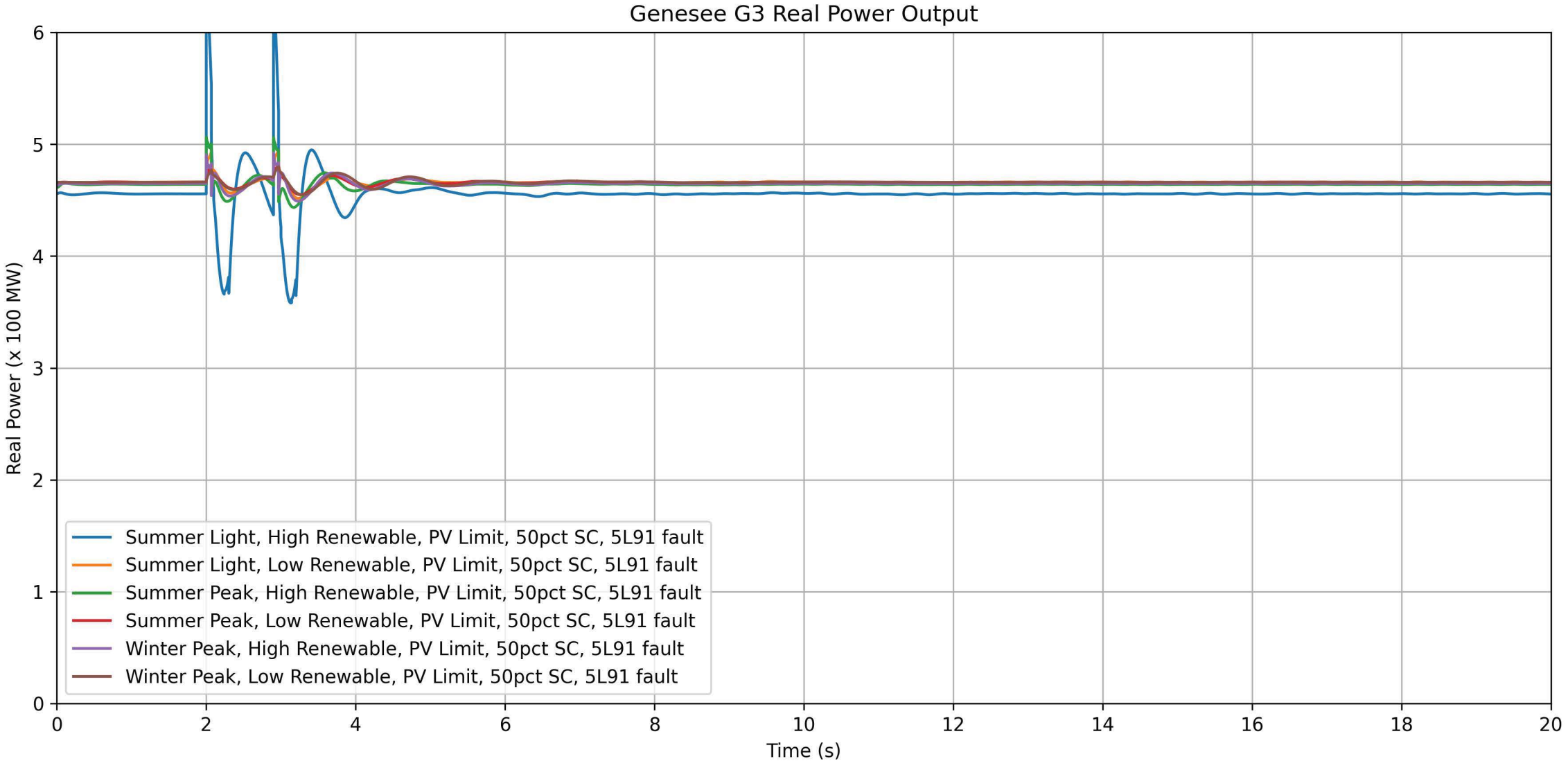

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
Time (s)
0
2
4
6
8
10
12
14
16
18
20

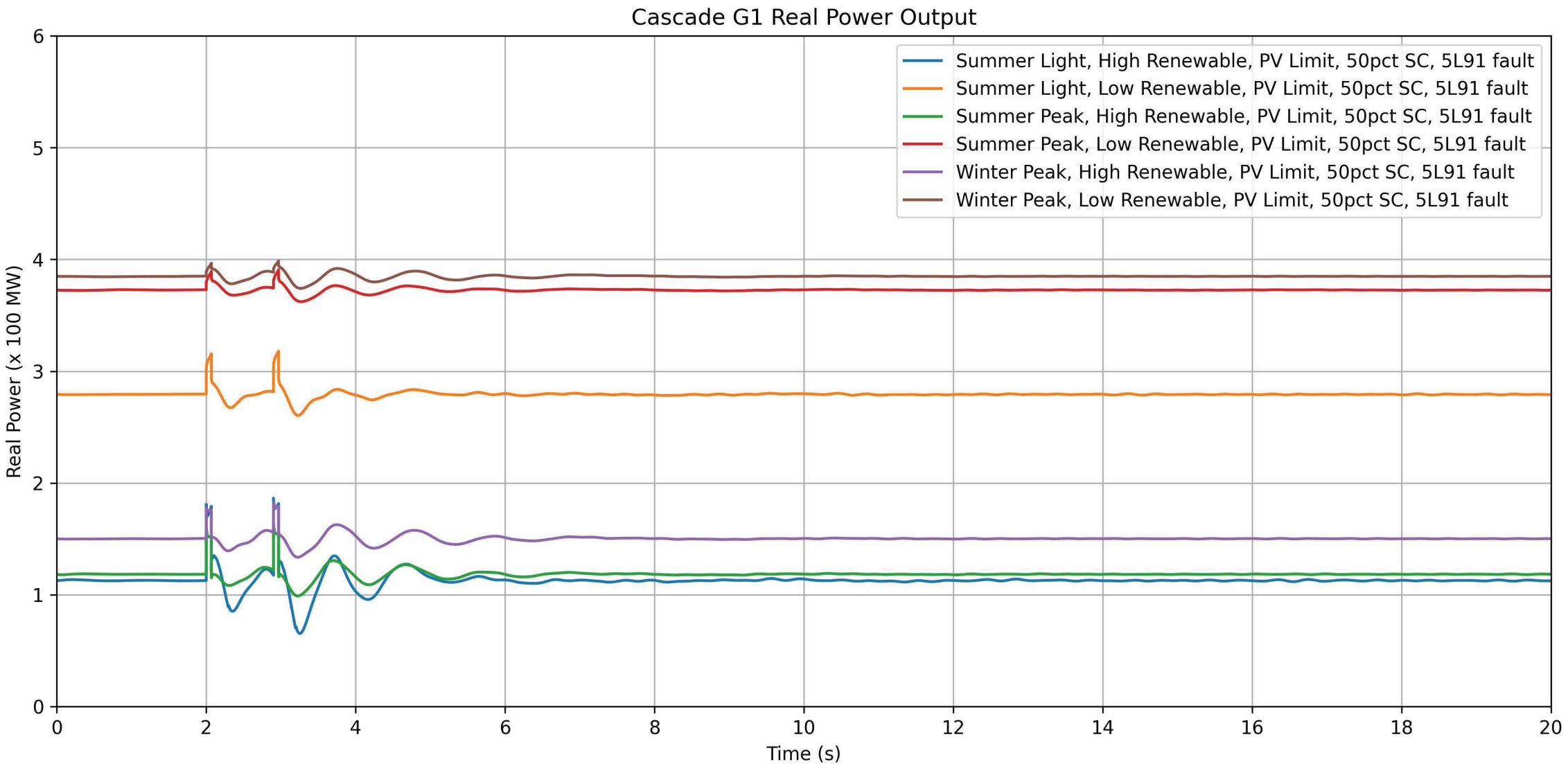

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

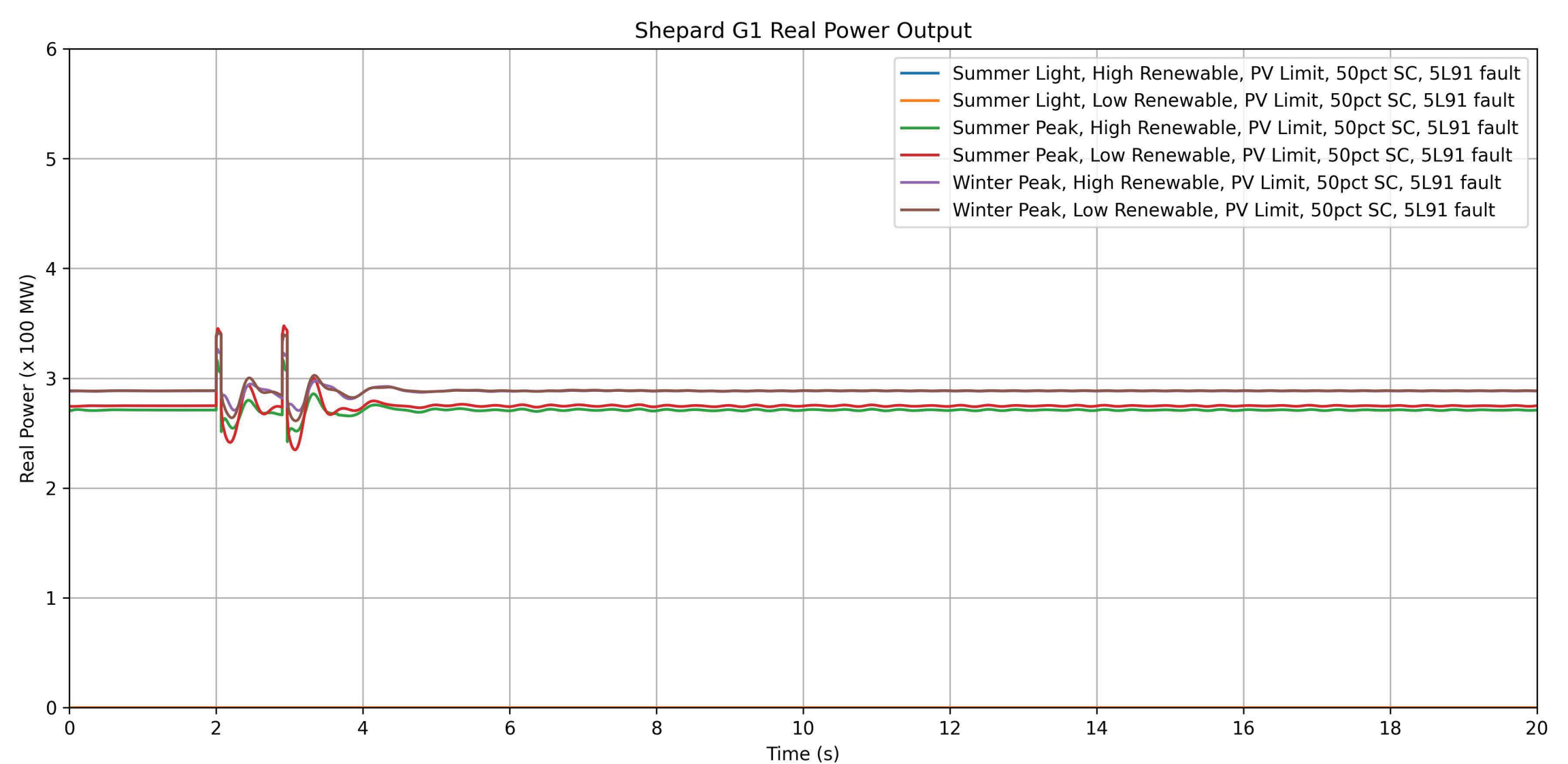

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

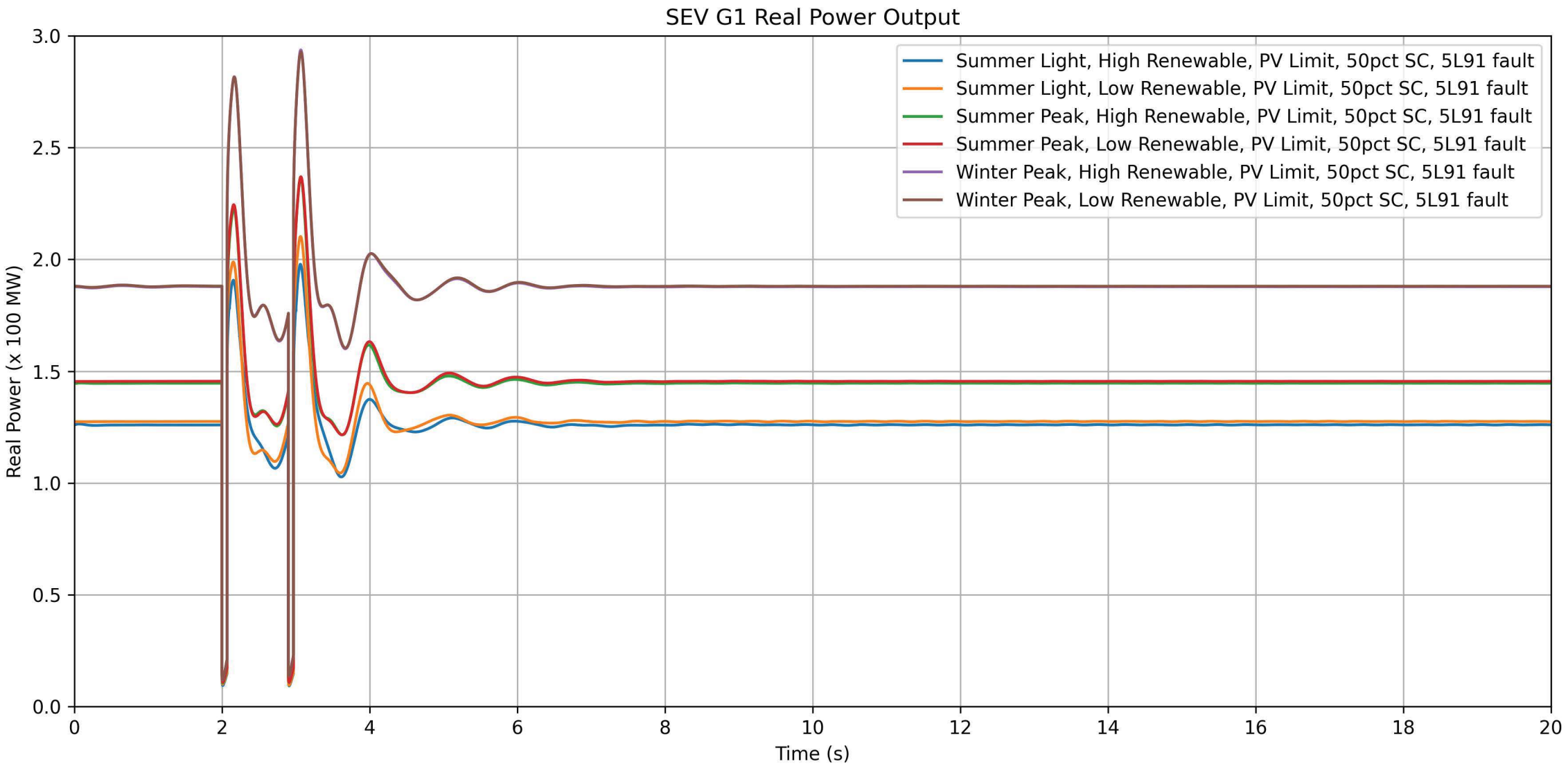

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

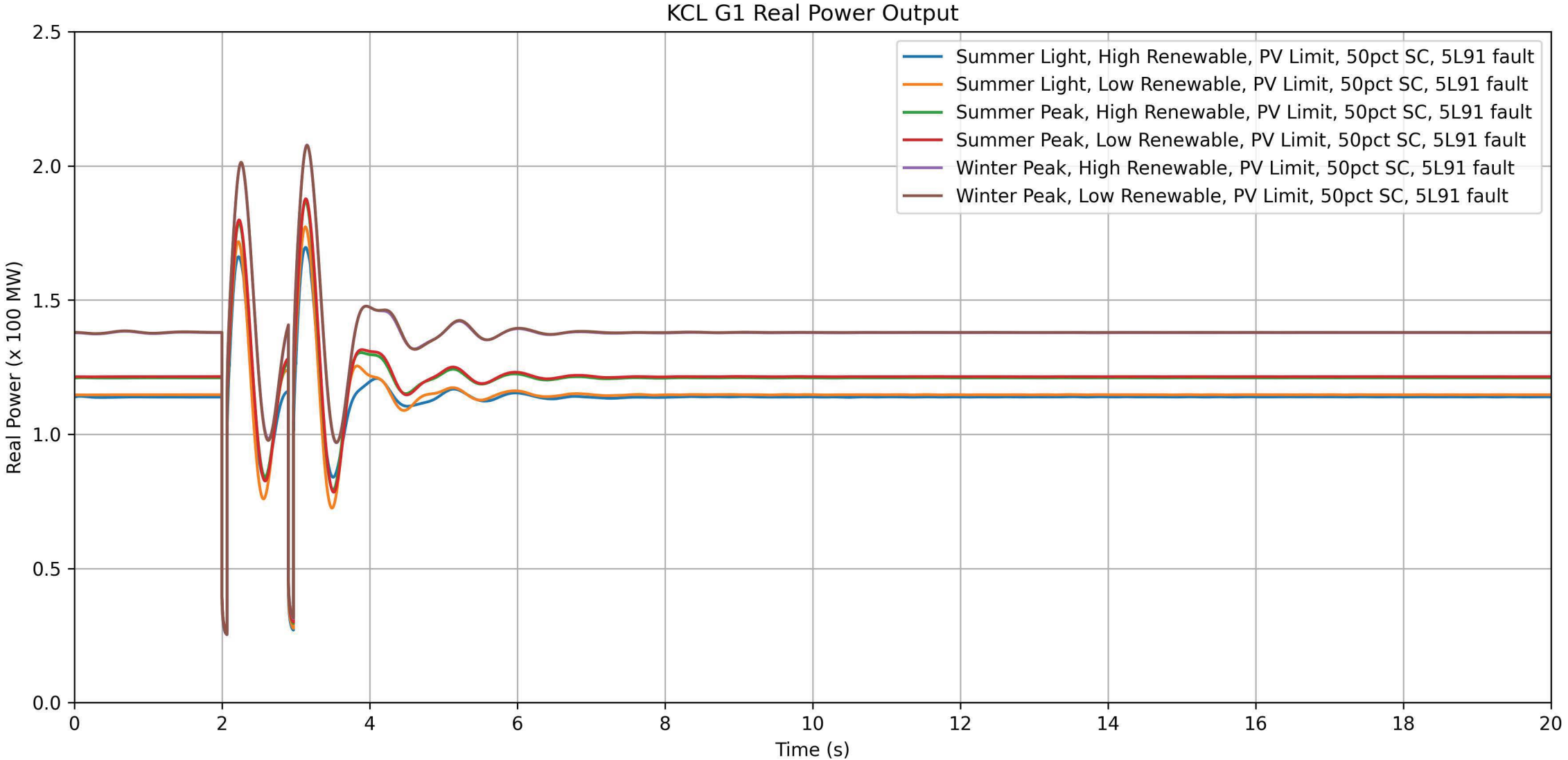

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

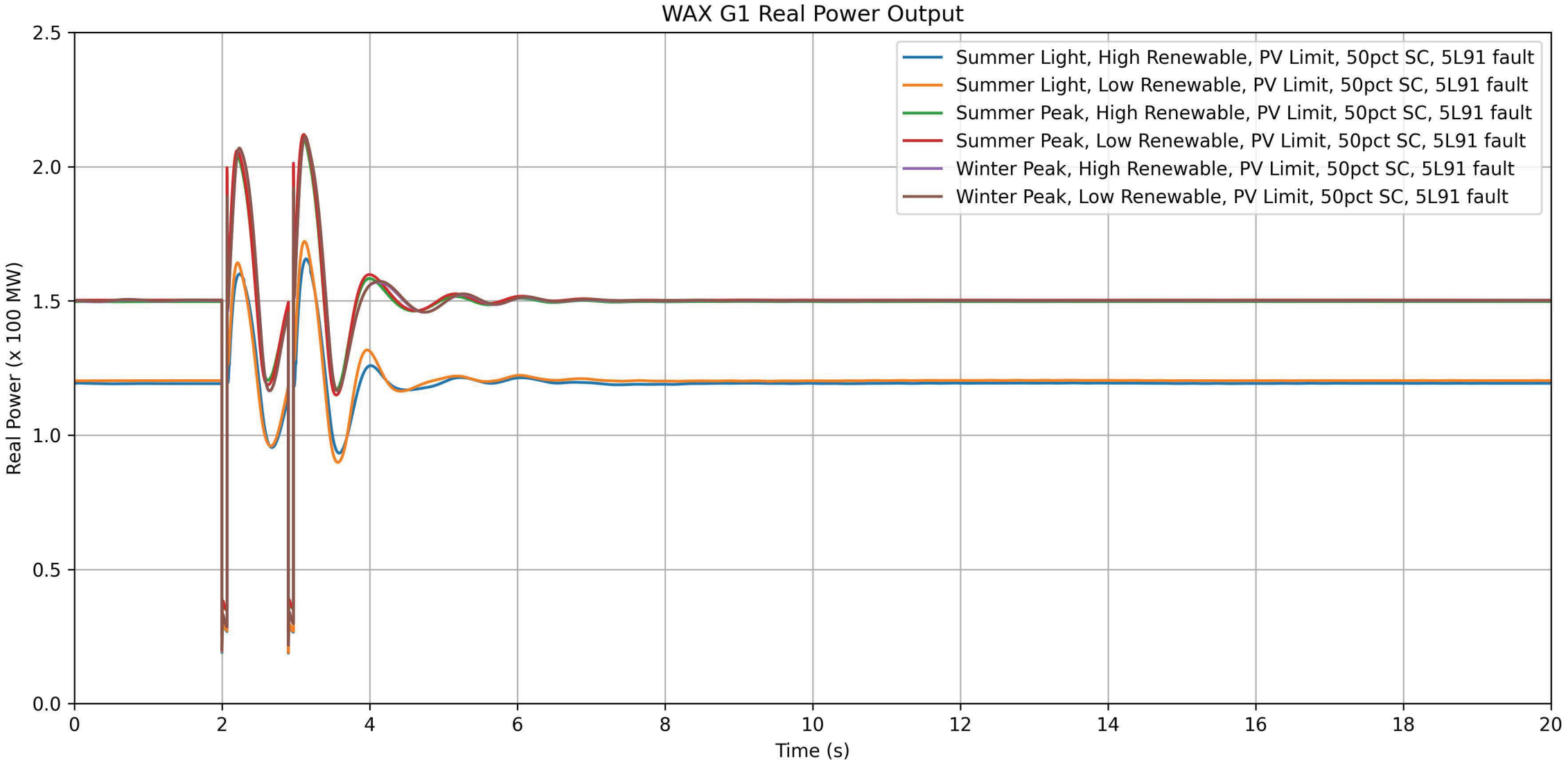

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault

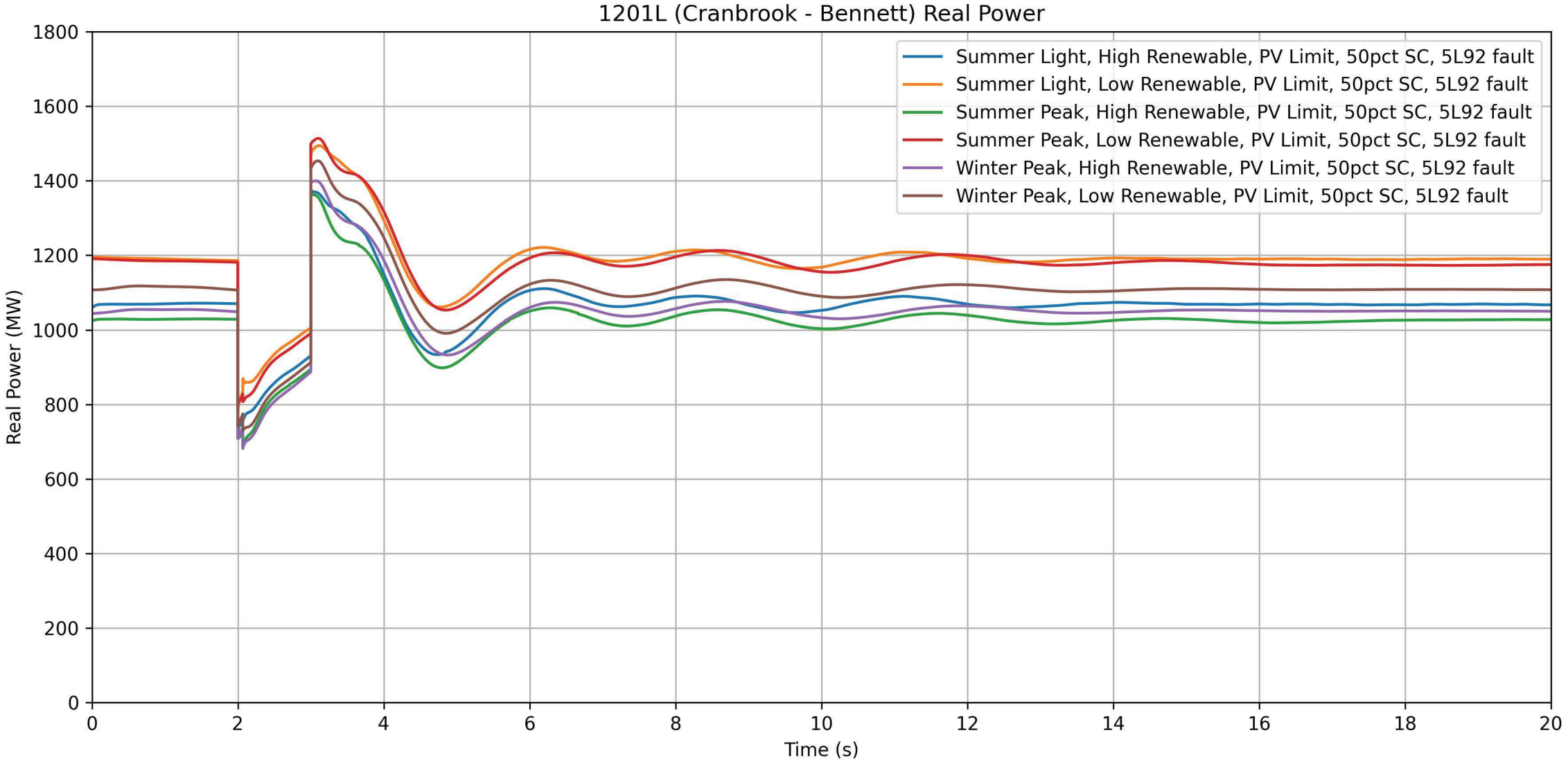

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

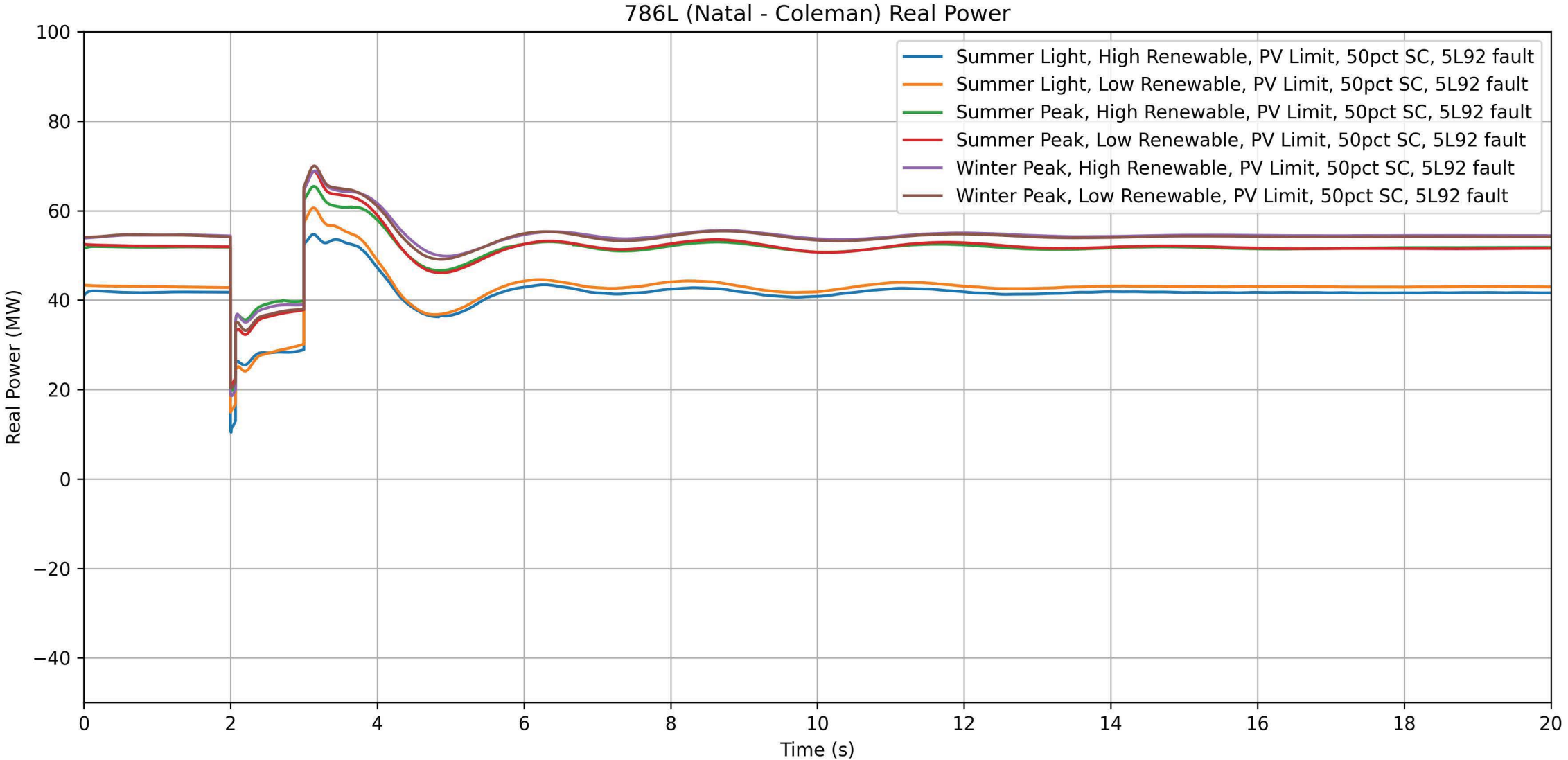

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

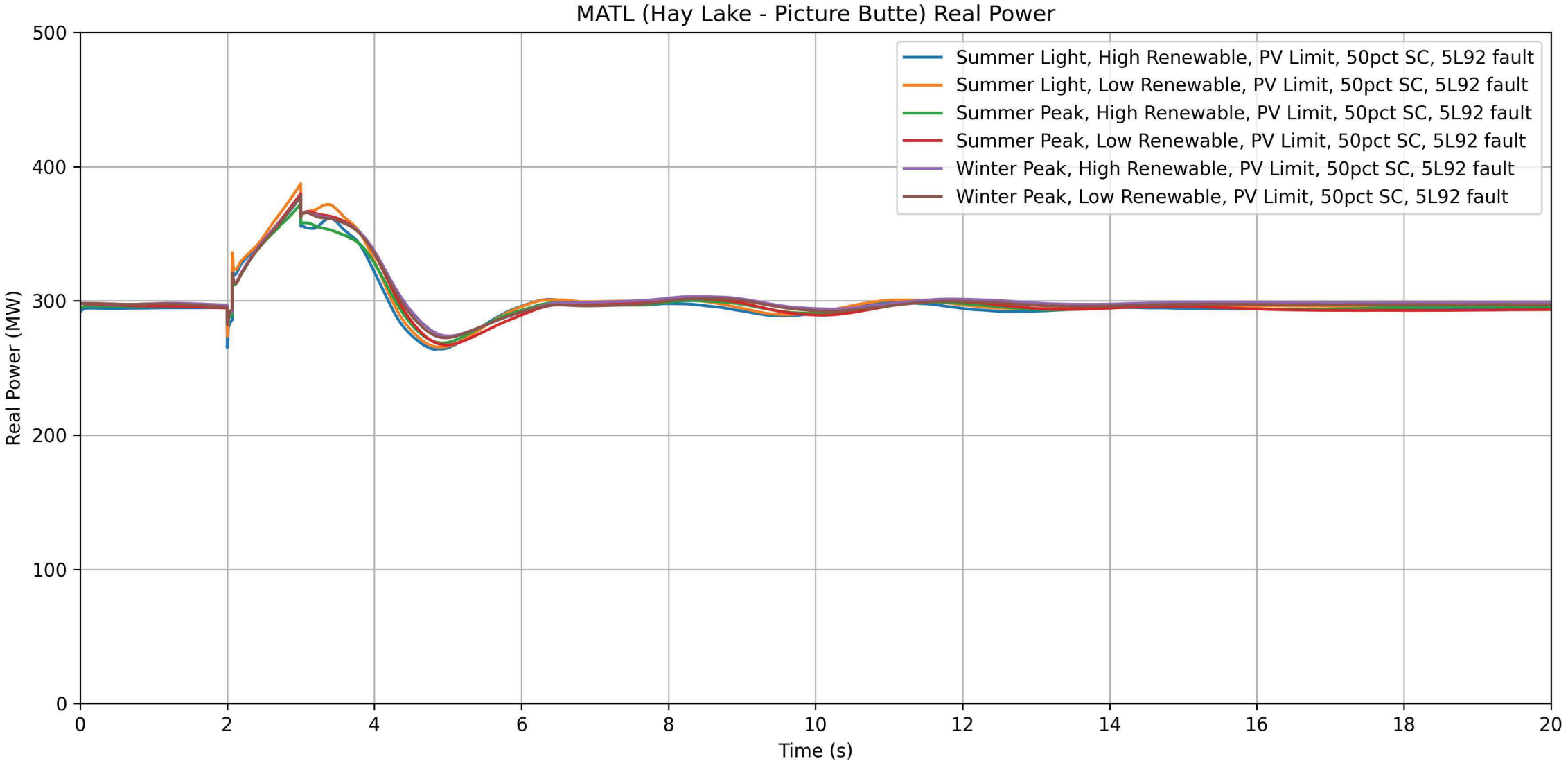

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

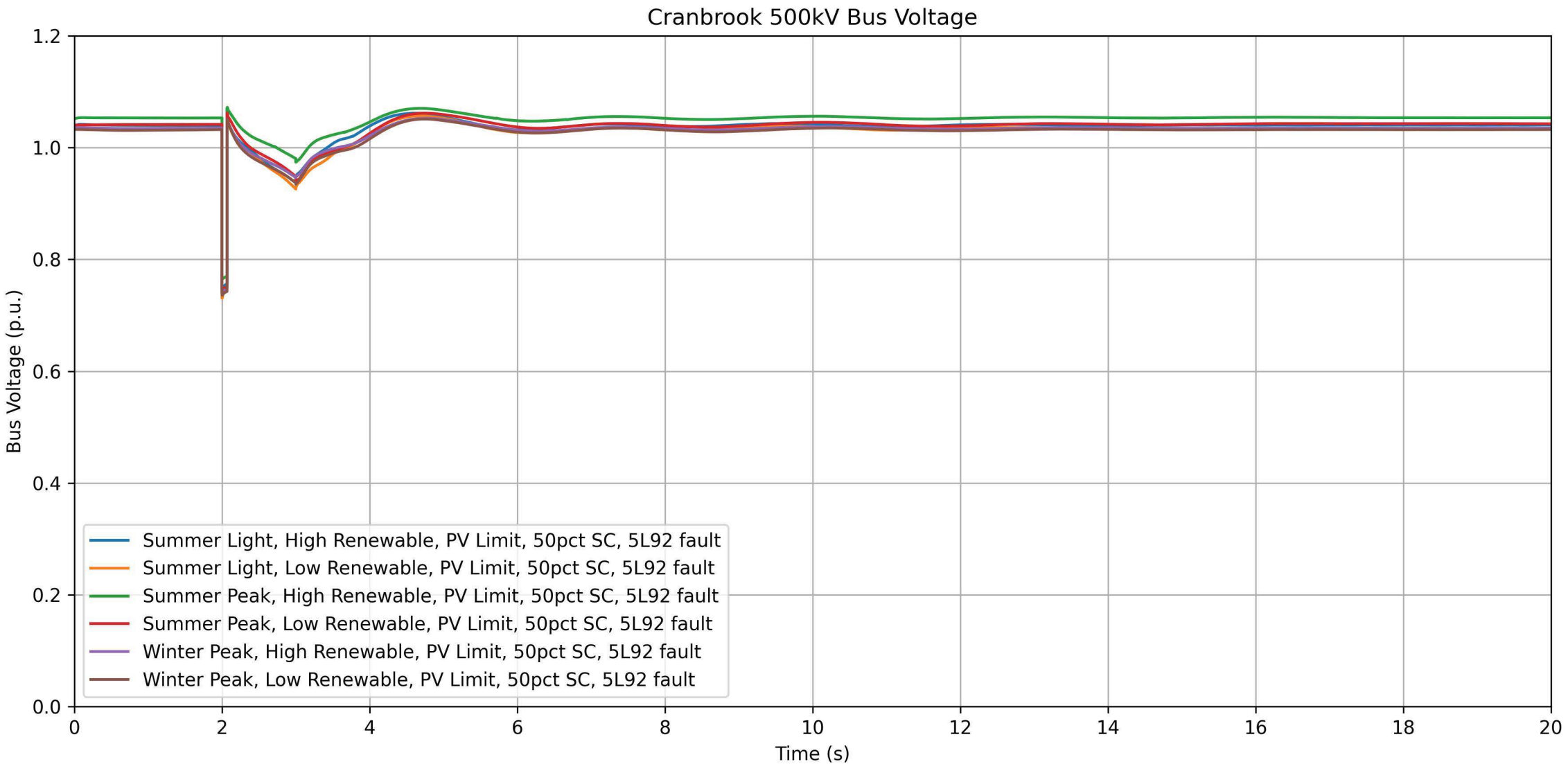

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

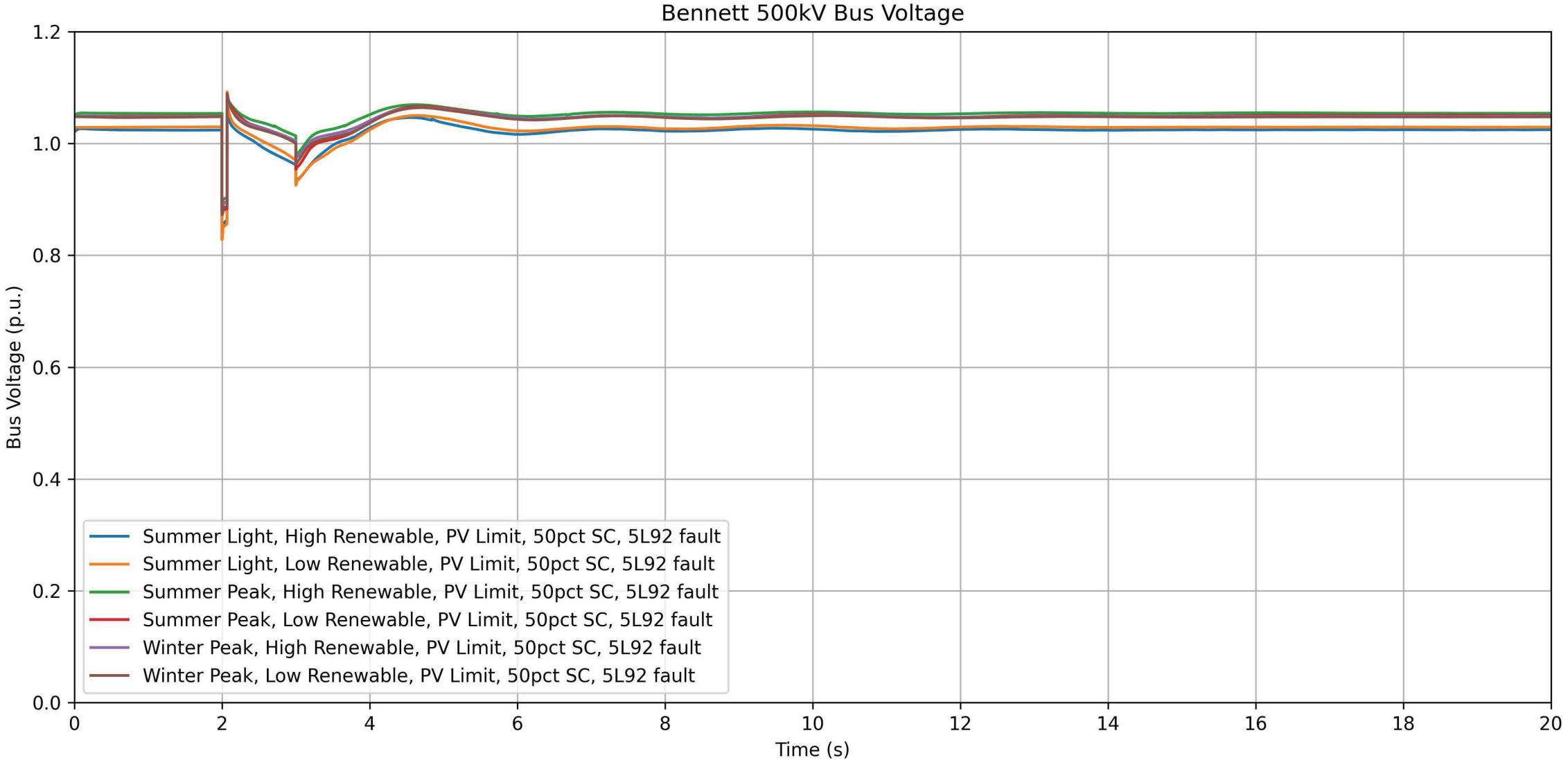

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L91 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L91 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

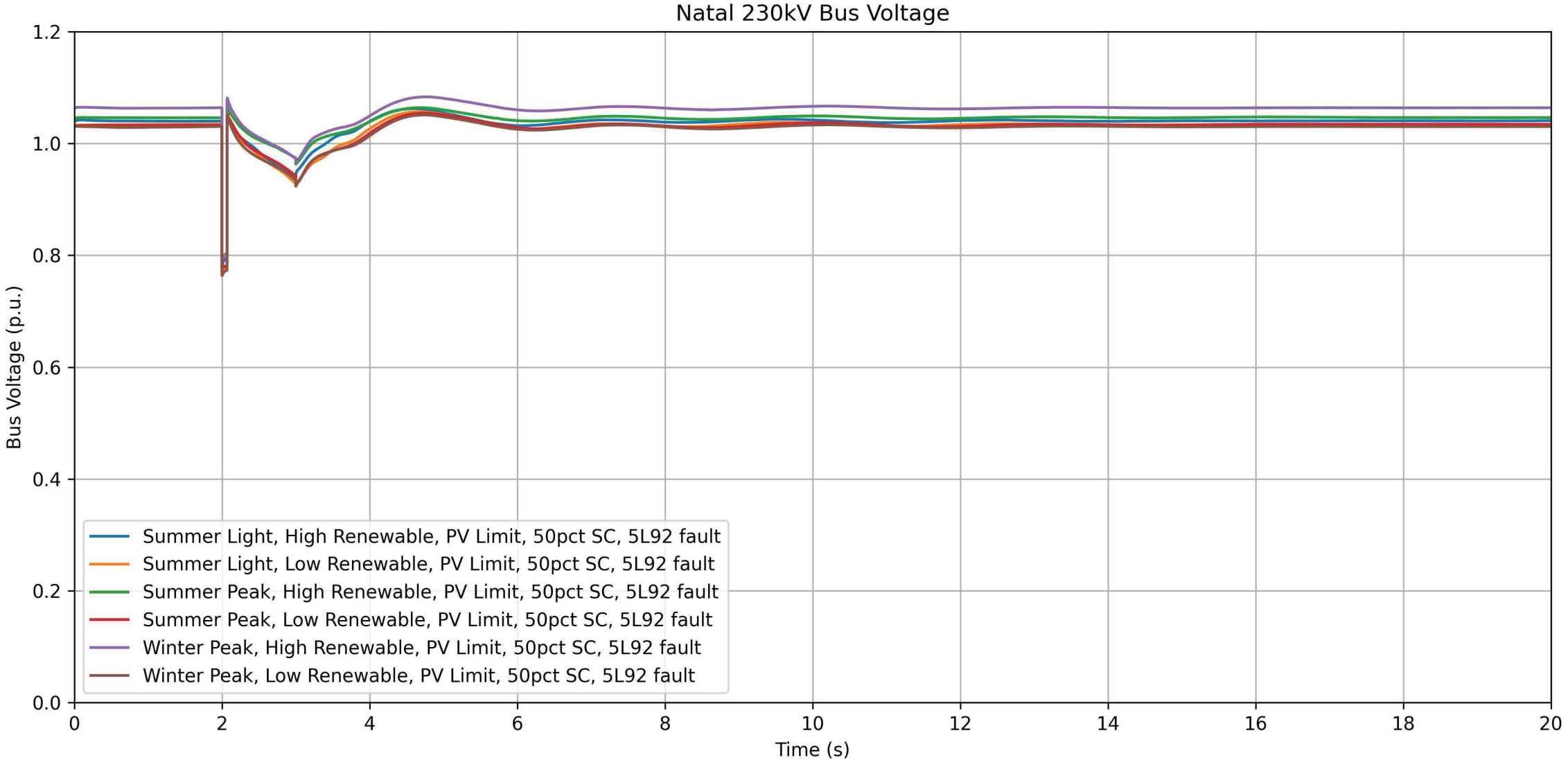

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

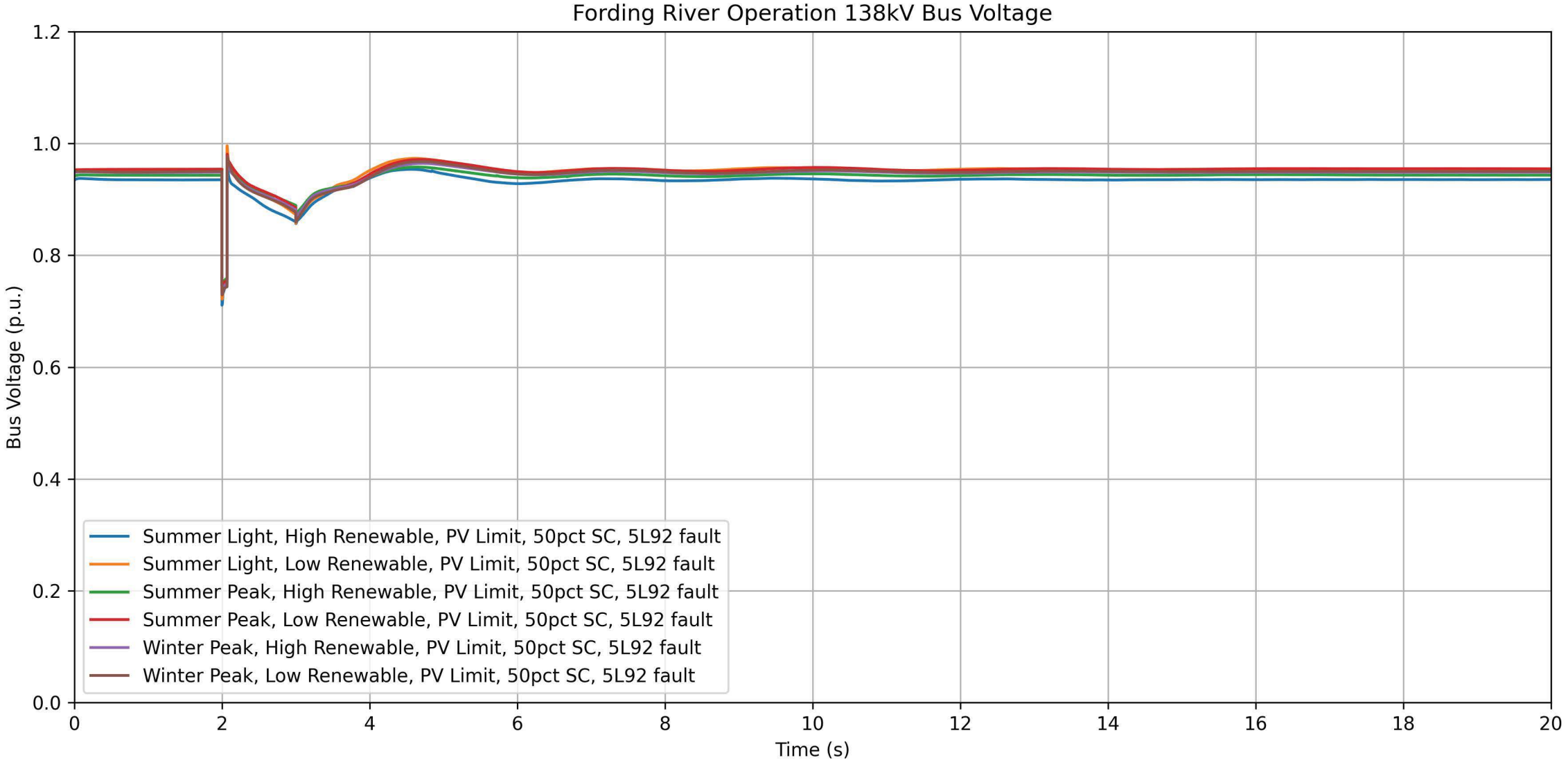

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
Time (s)
0
2
4
6
8
10
12
14
16
18
20

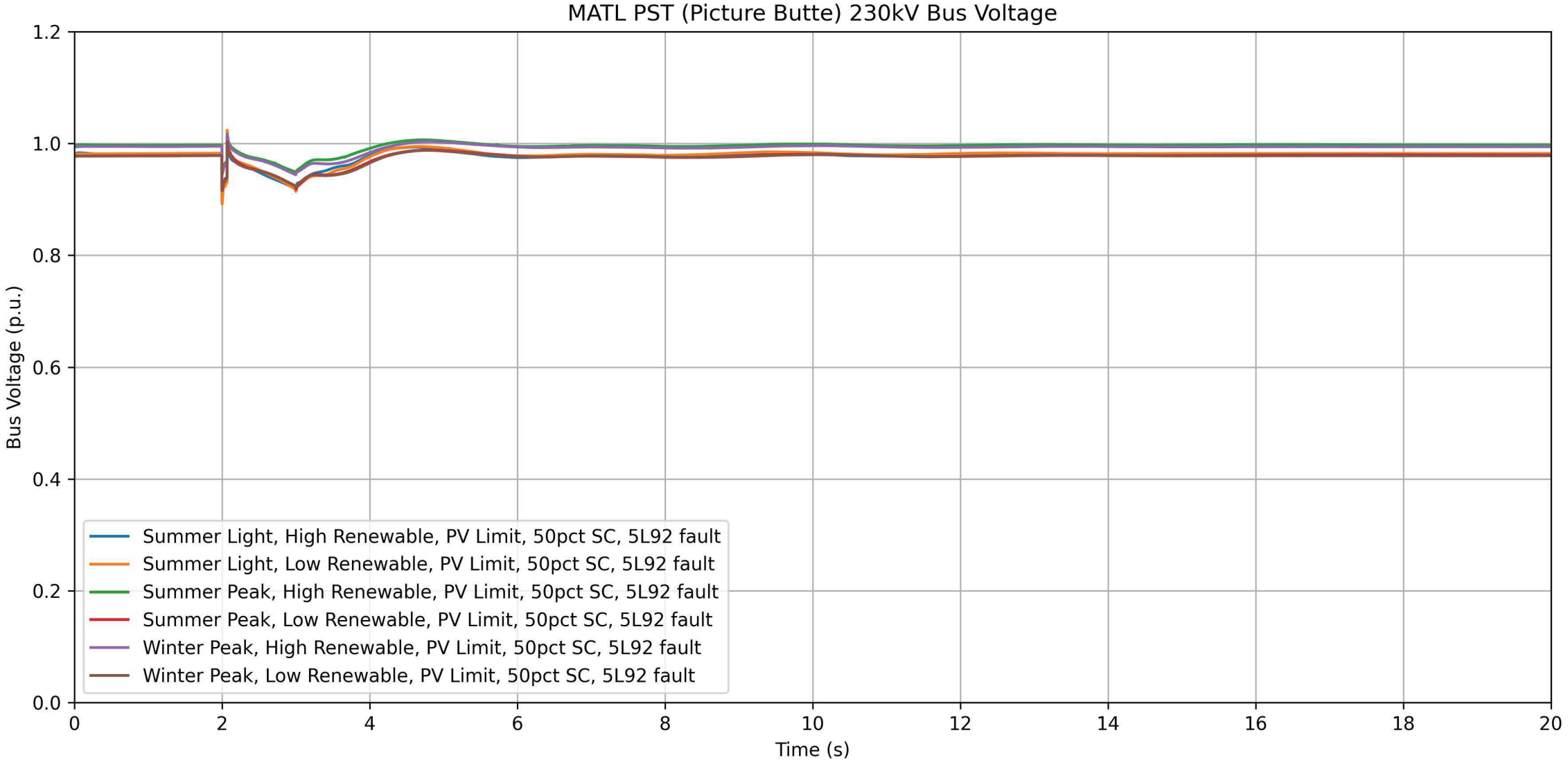

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

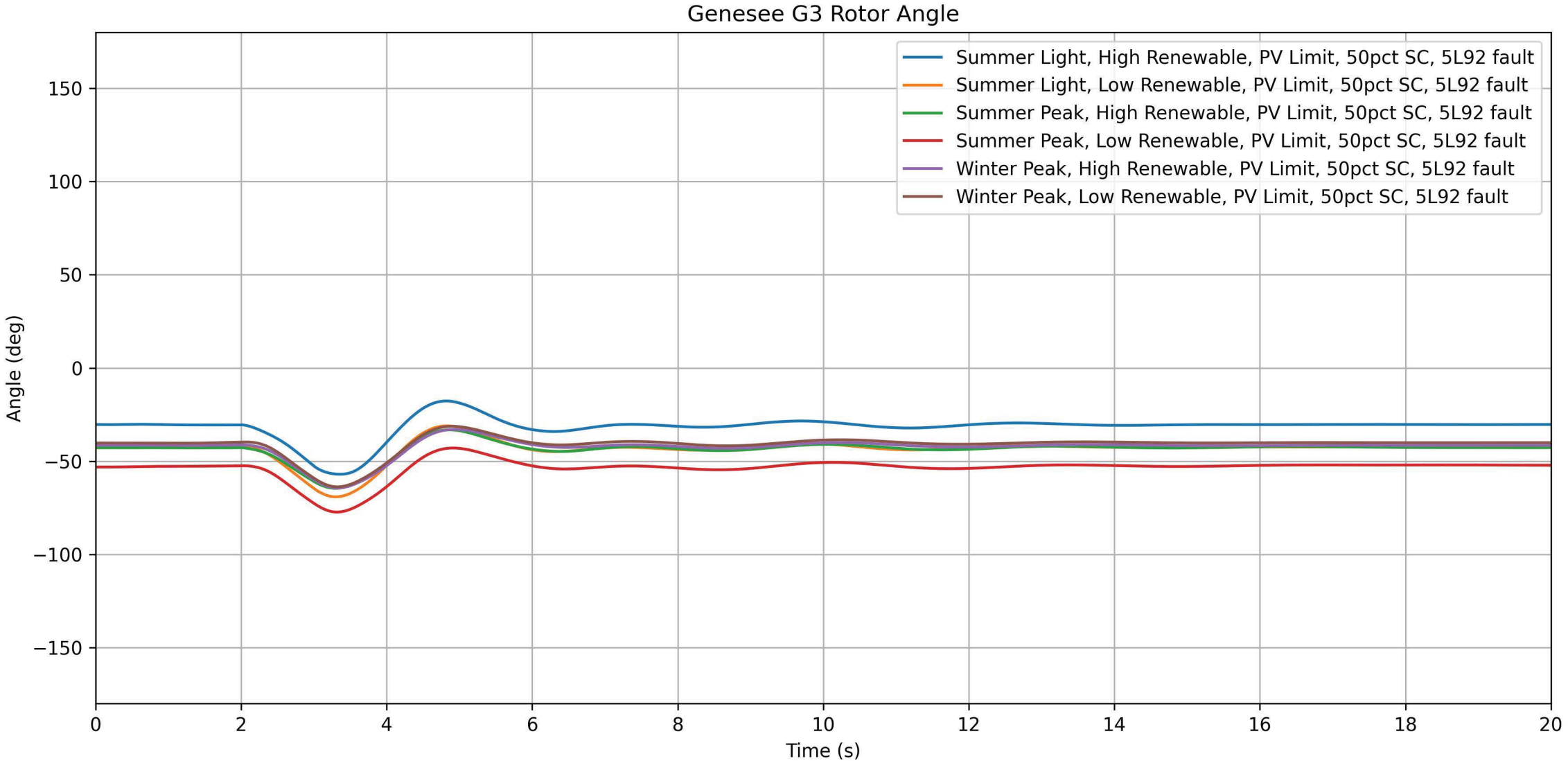

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

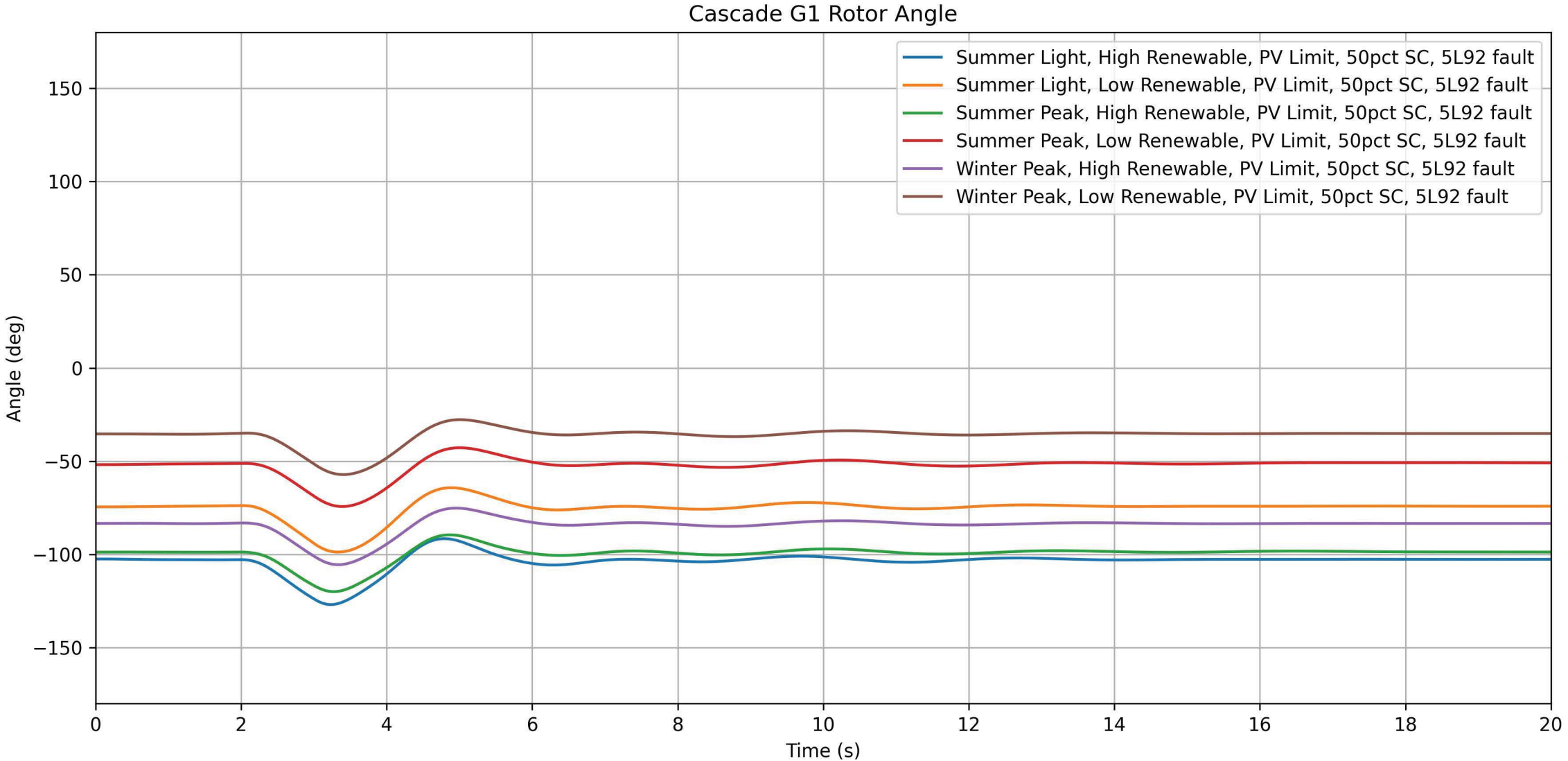

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

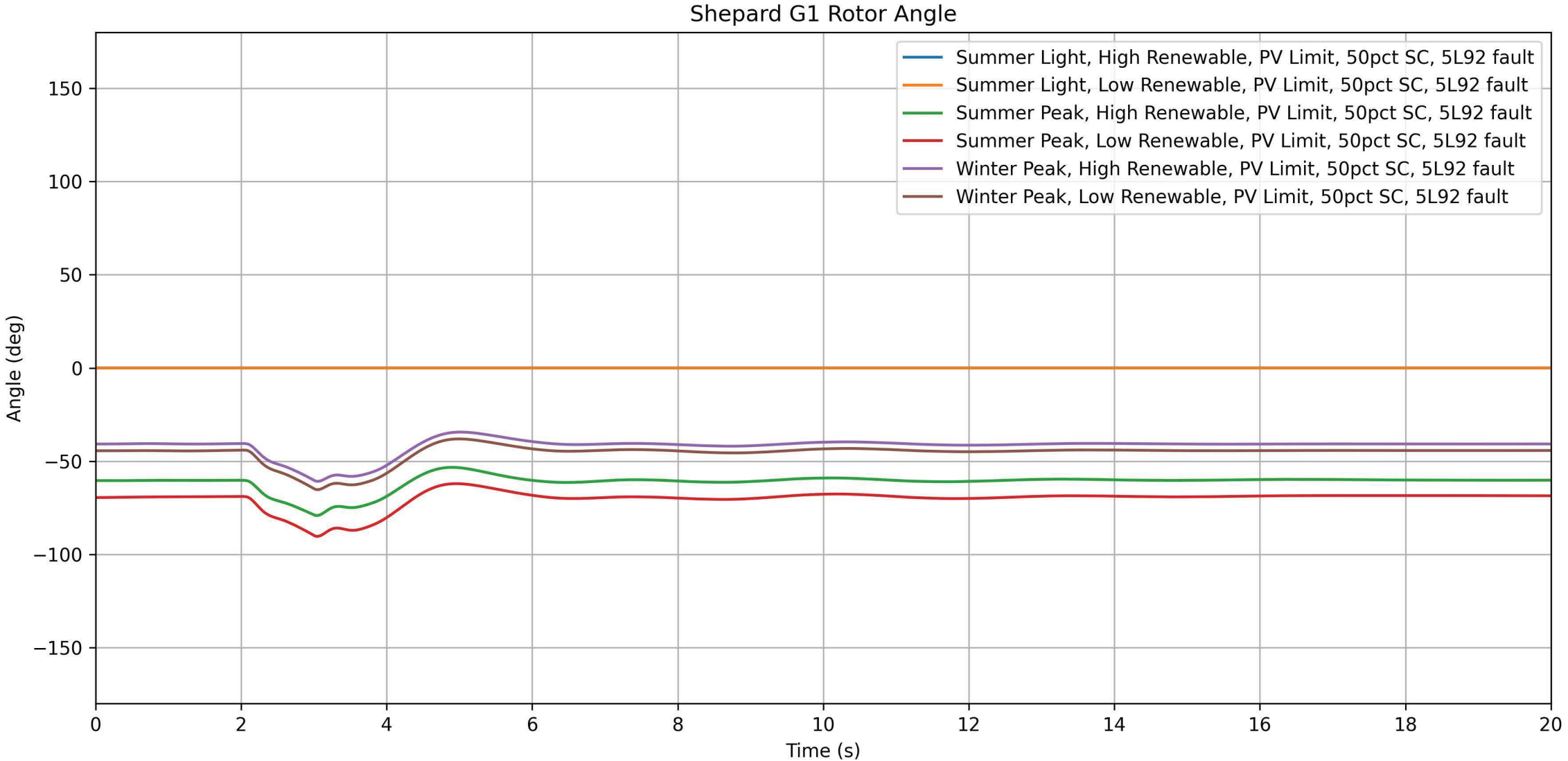

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

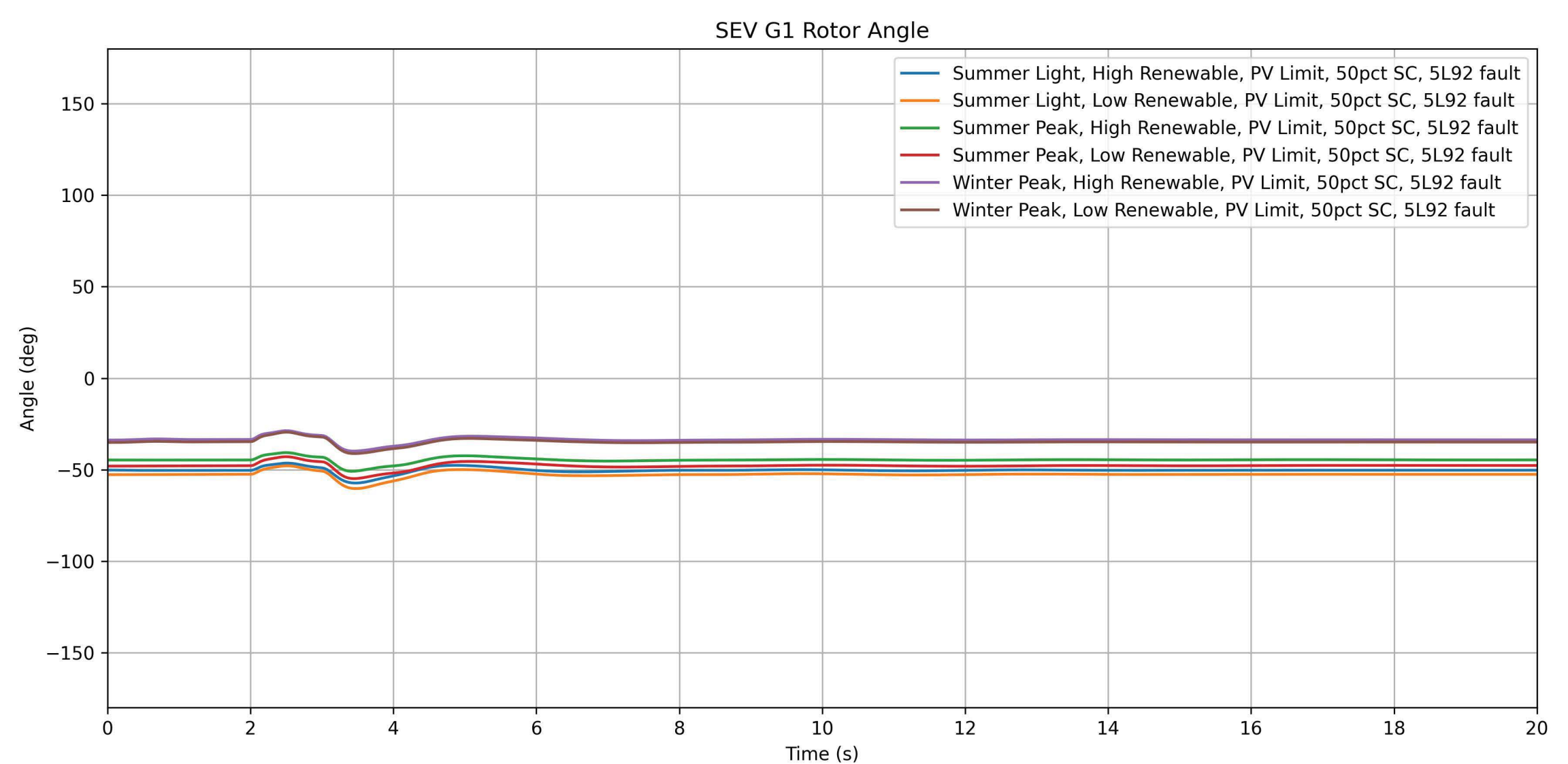

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

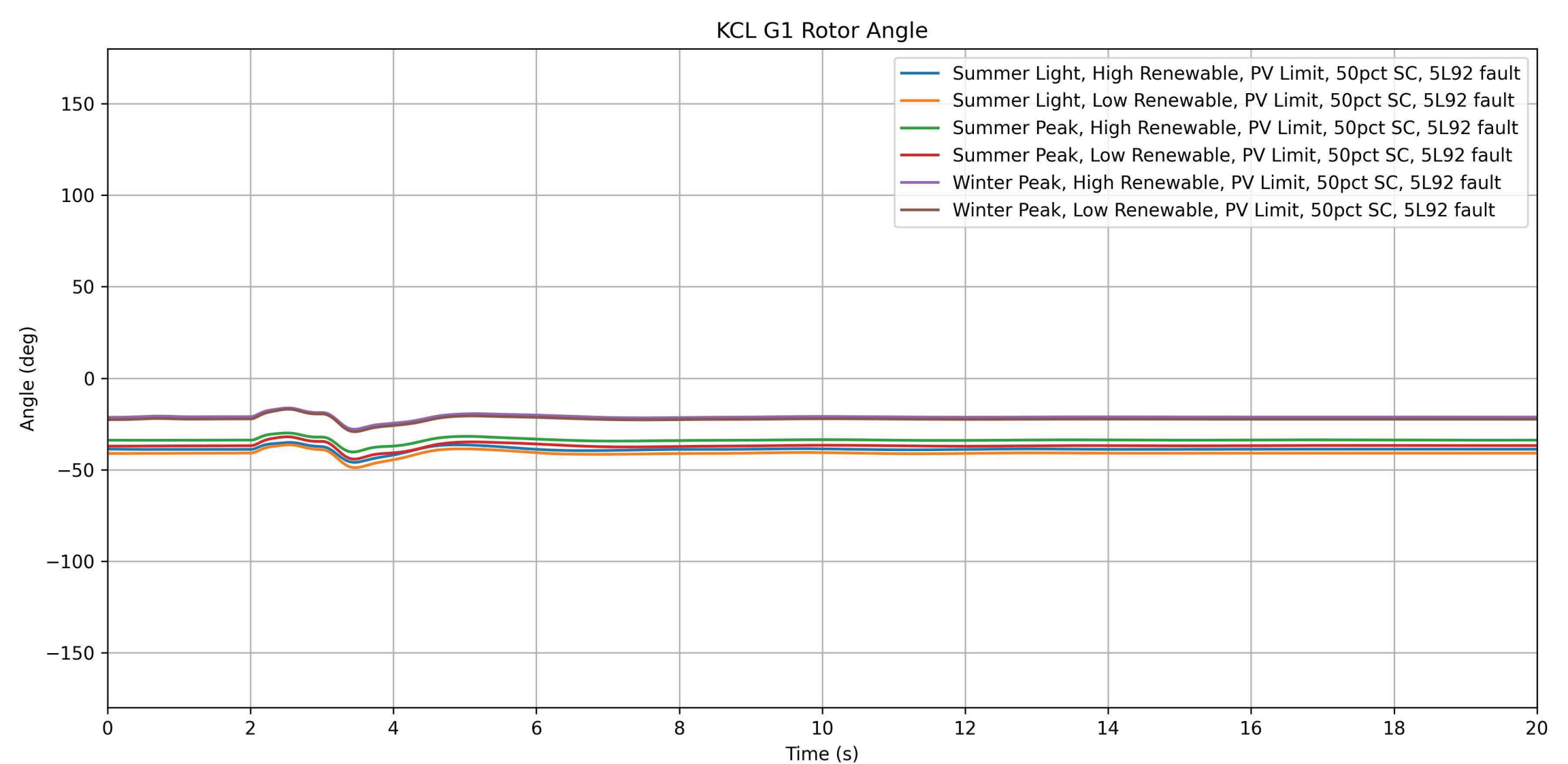

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

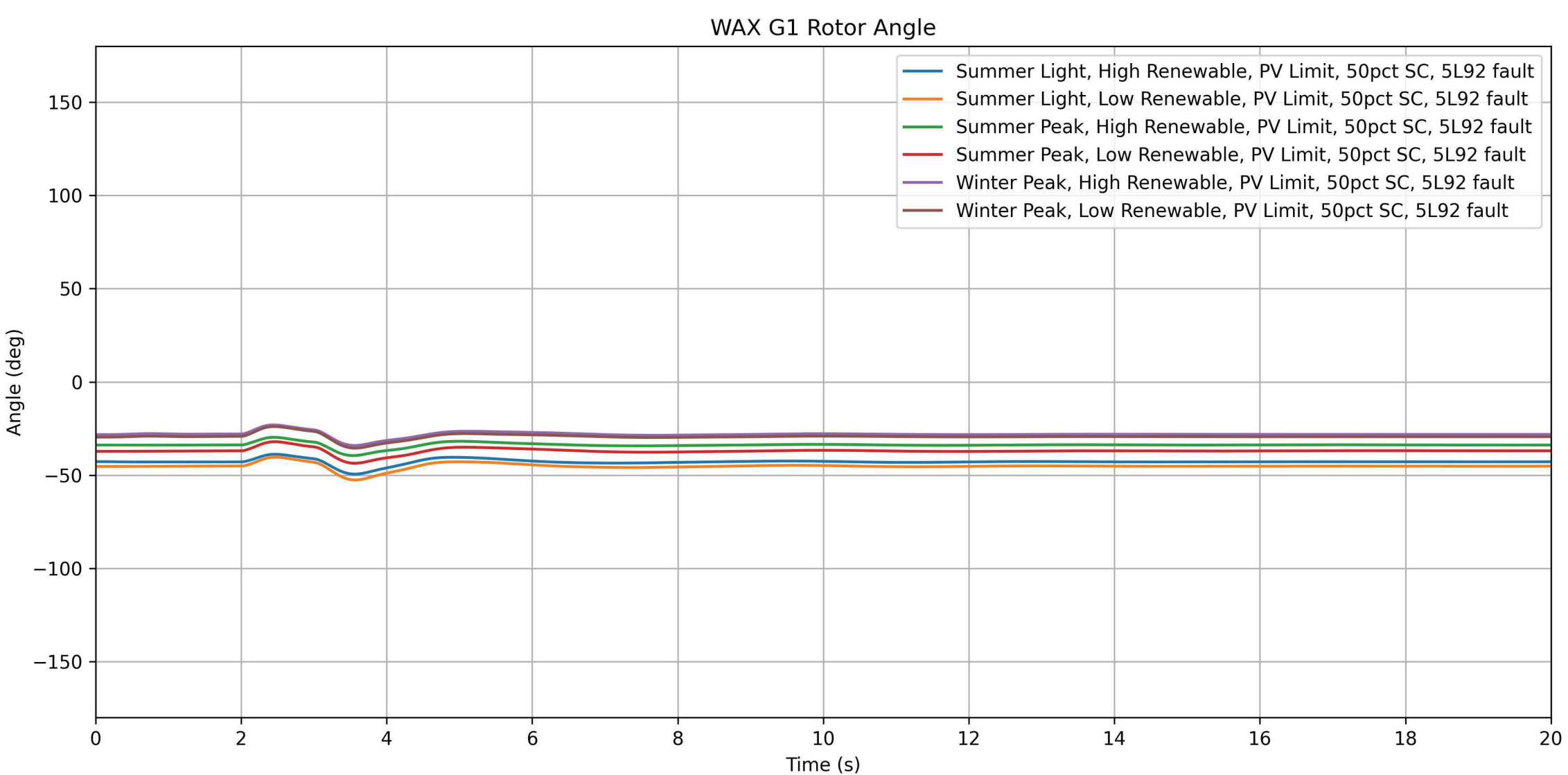

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

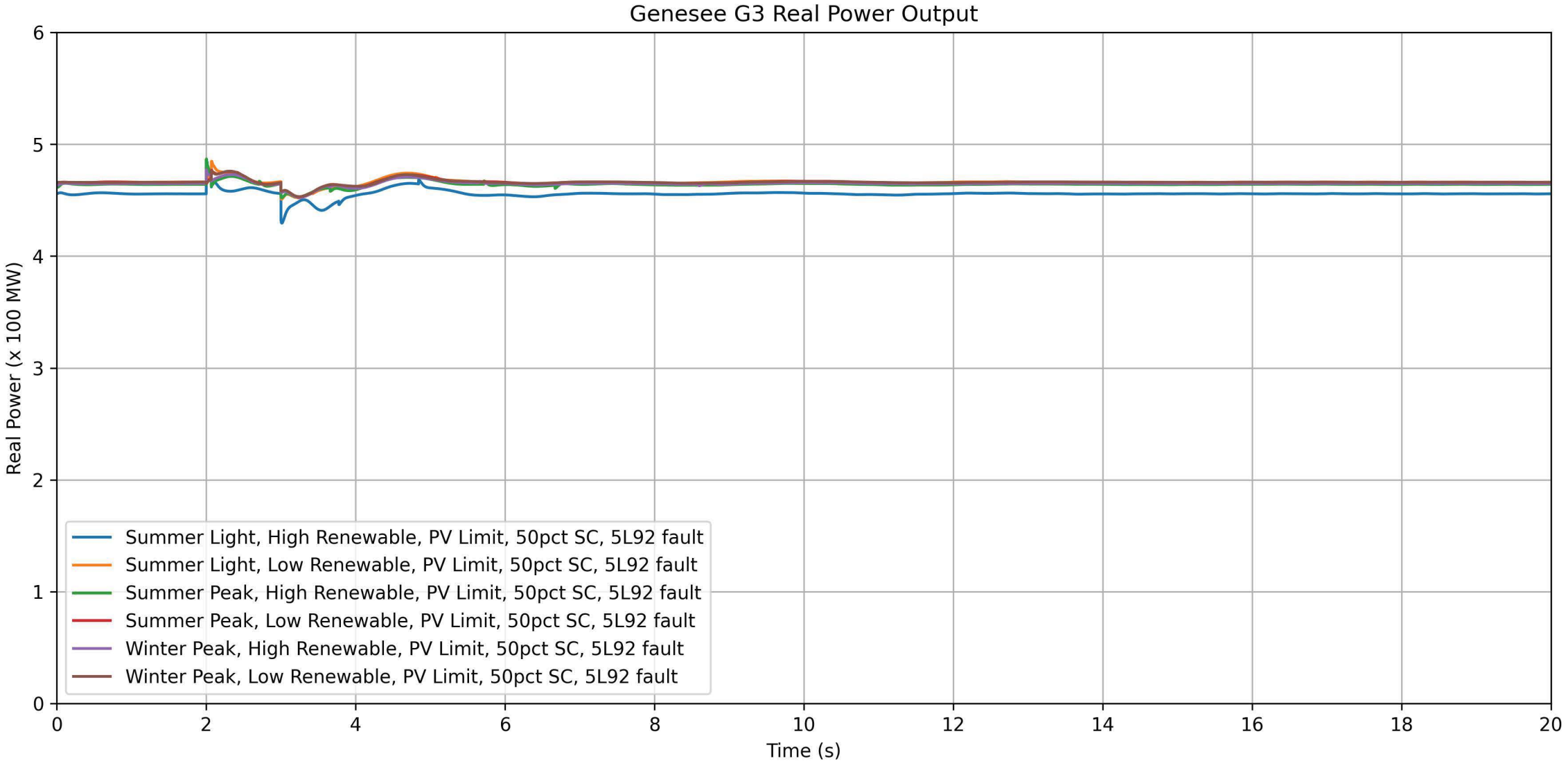

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

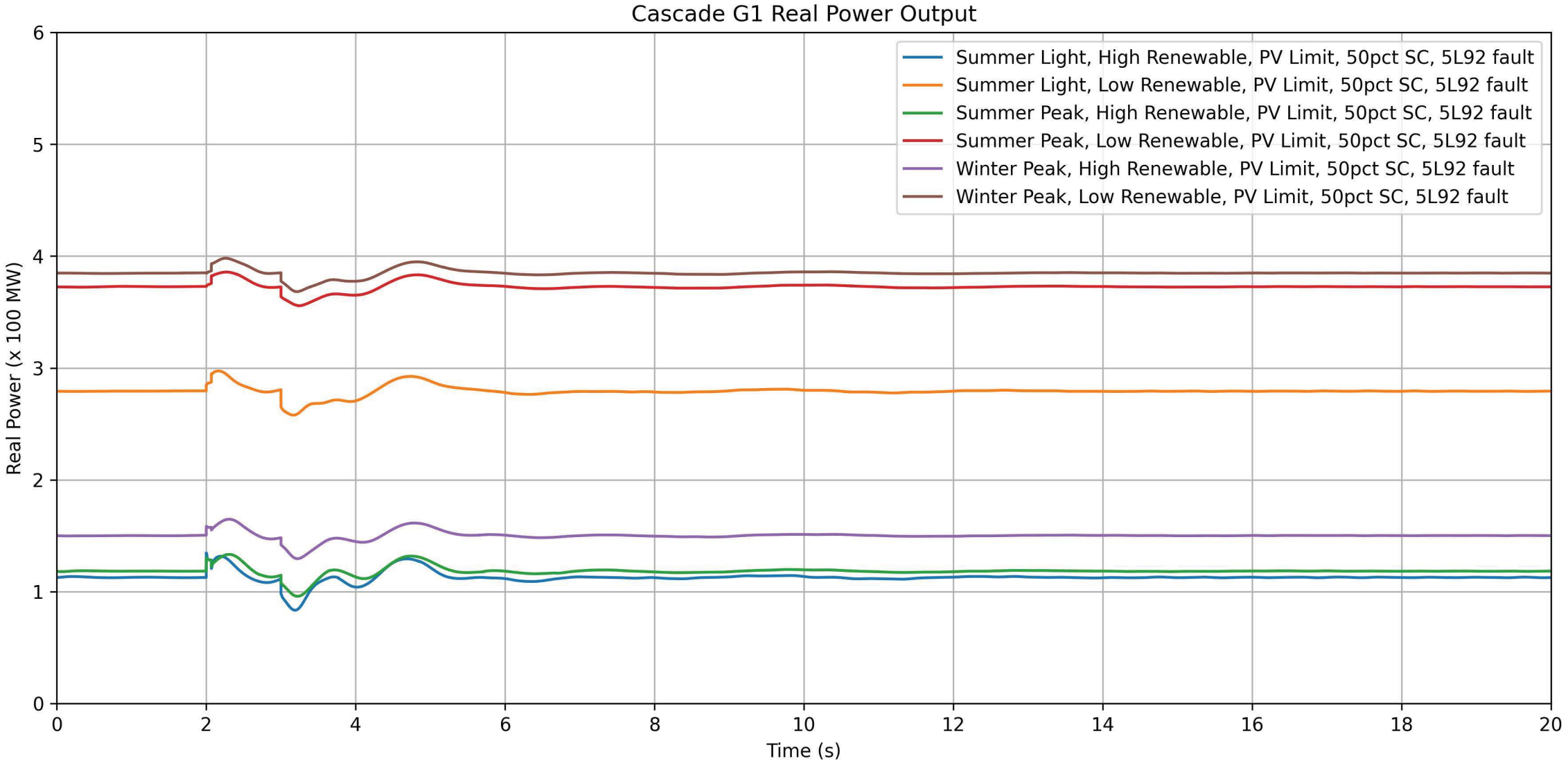

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

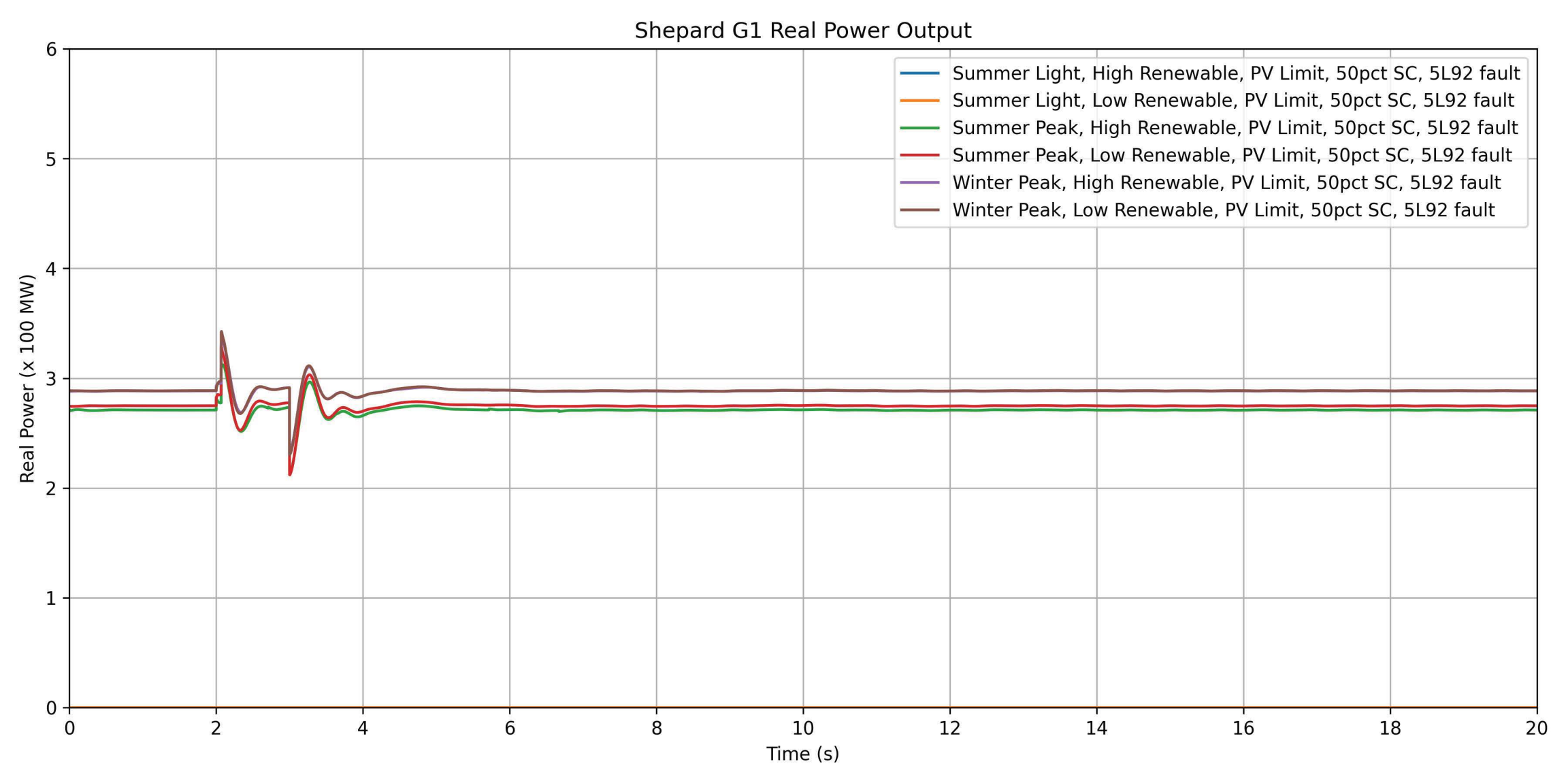

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

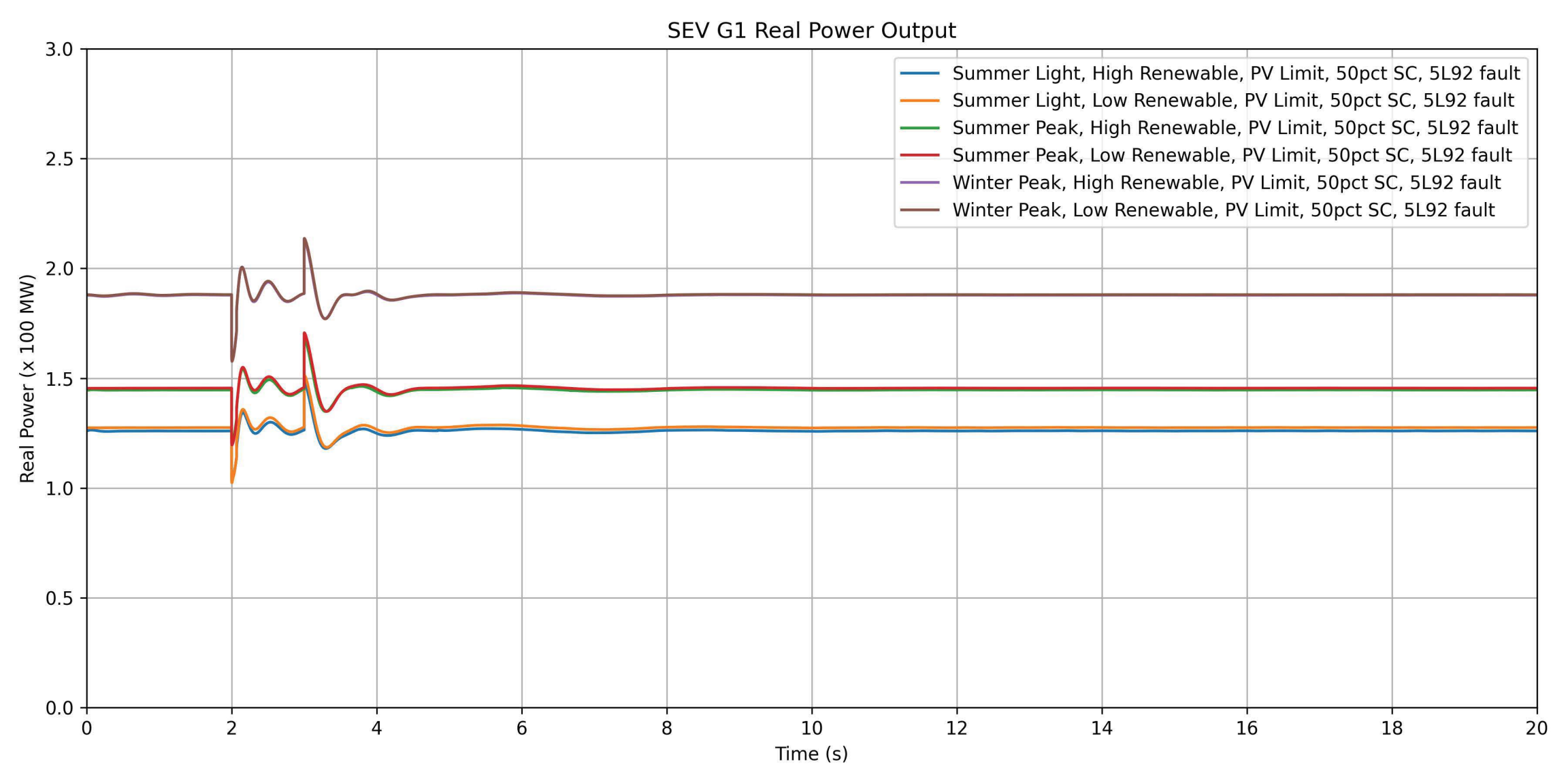

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

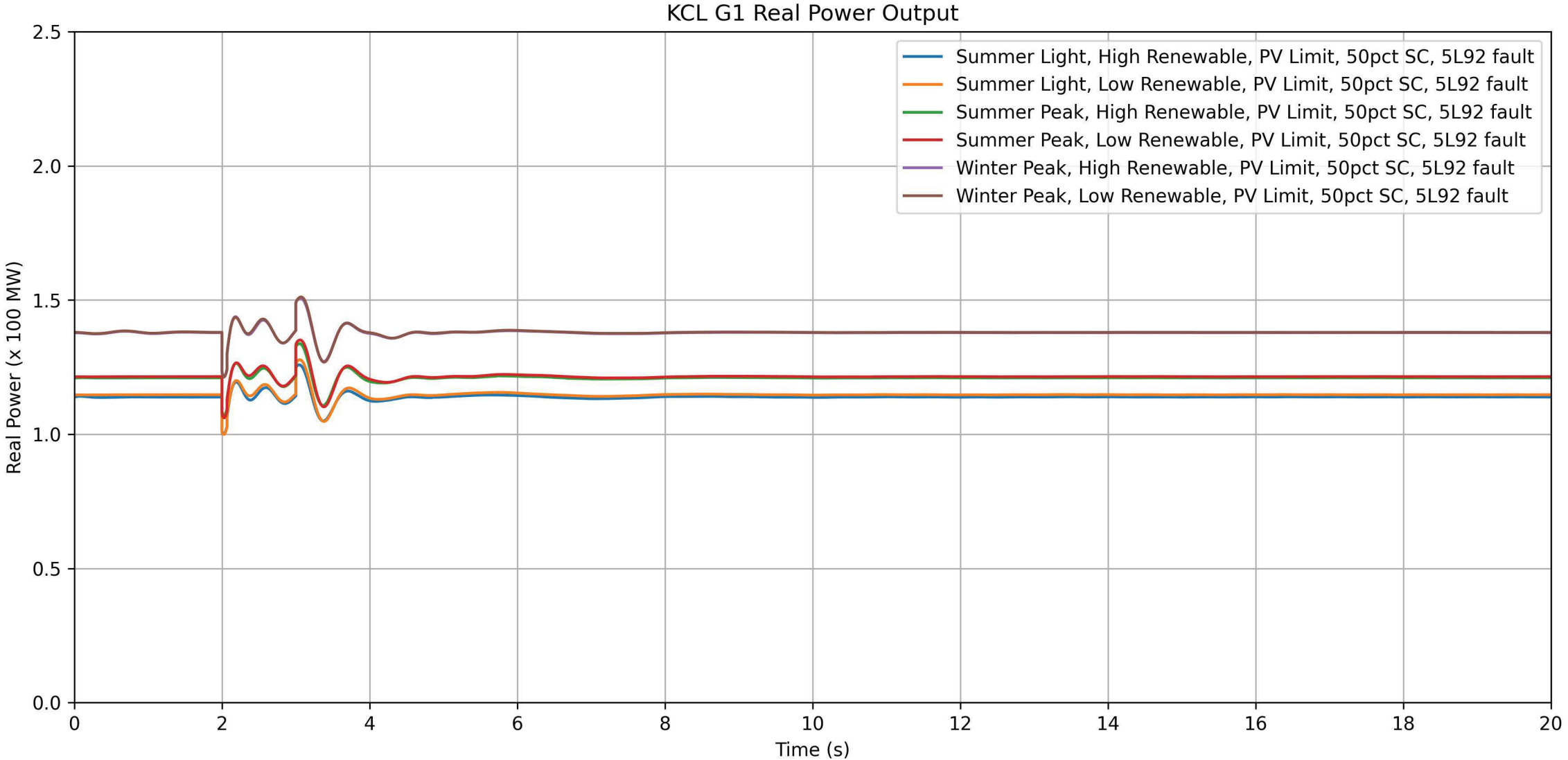

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

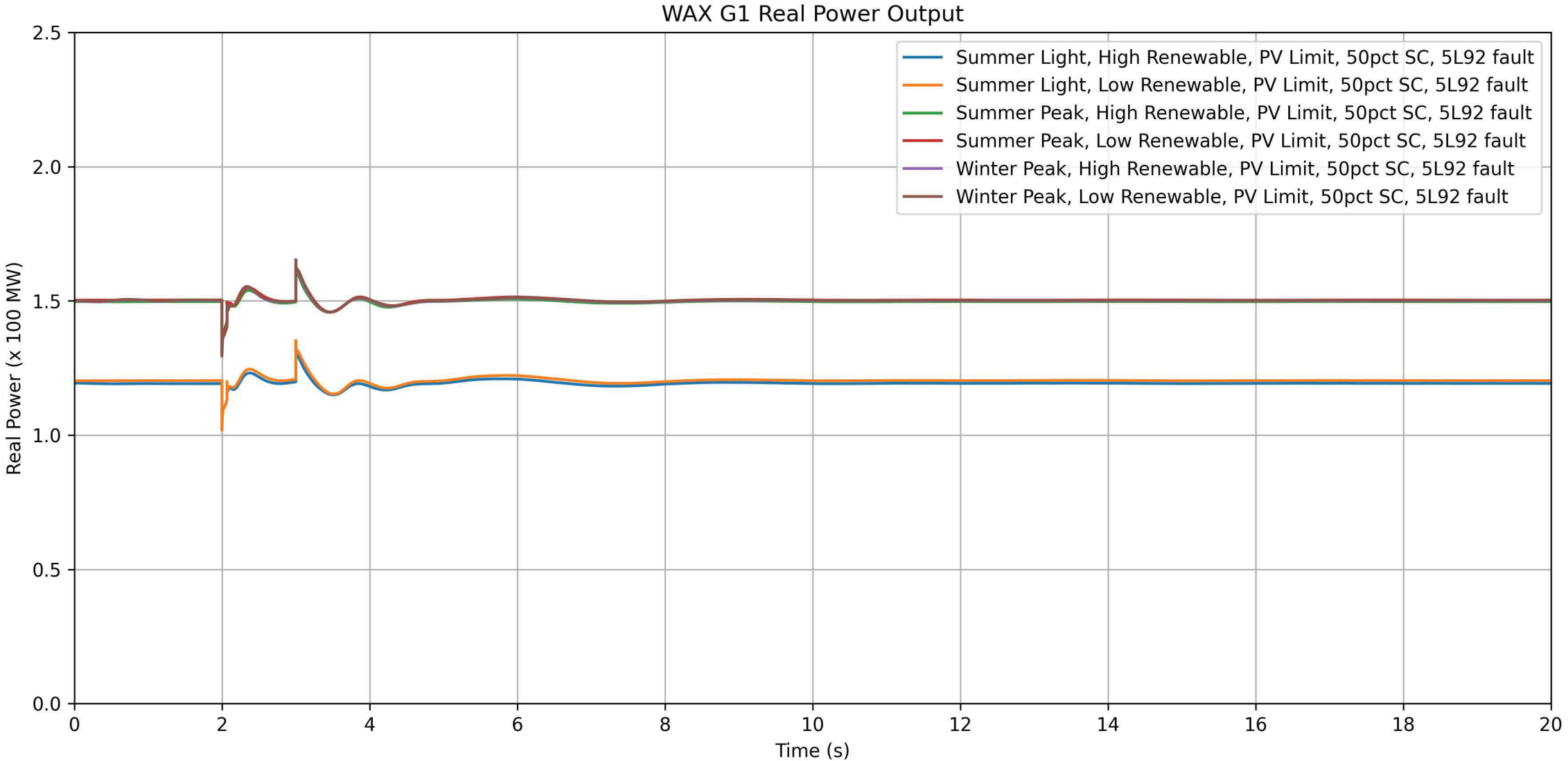

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault

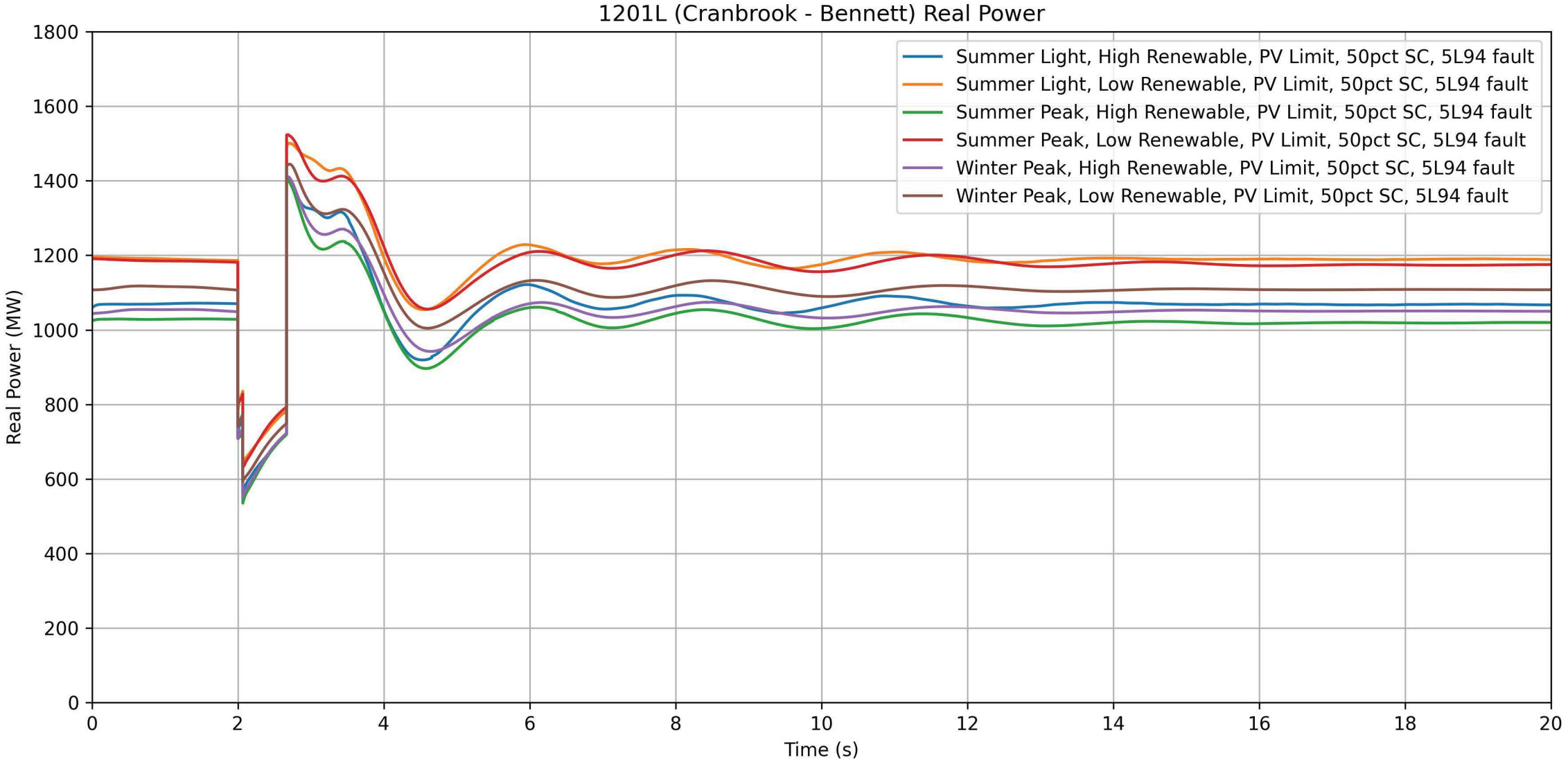

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

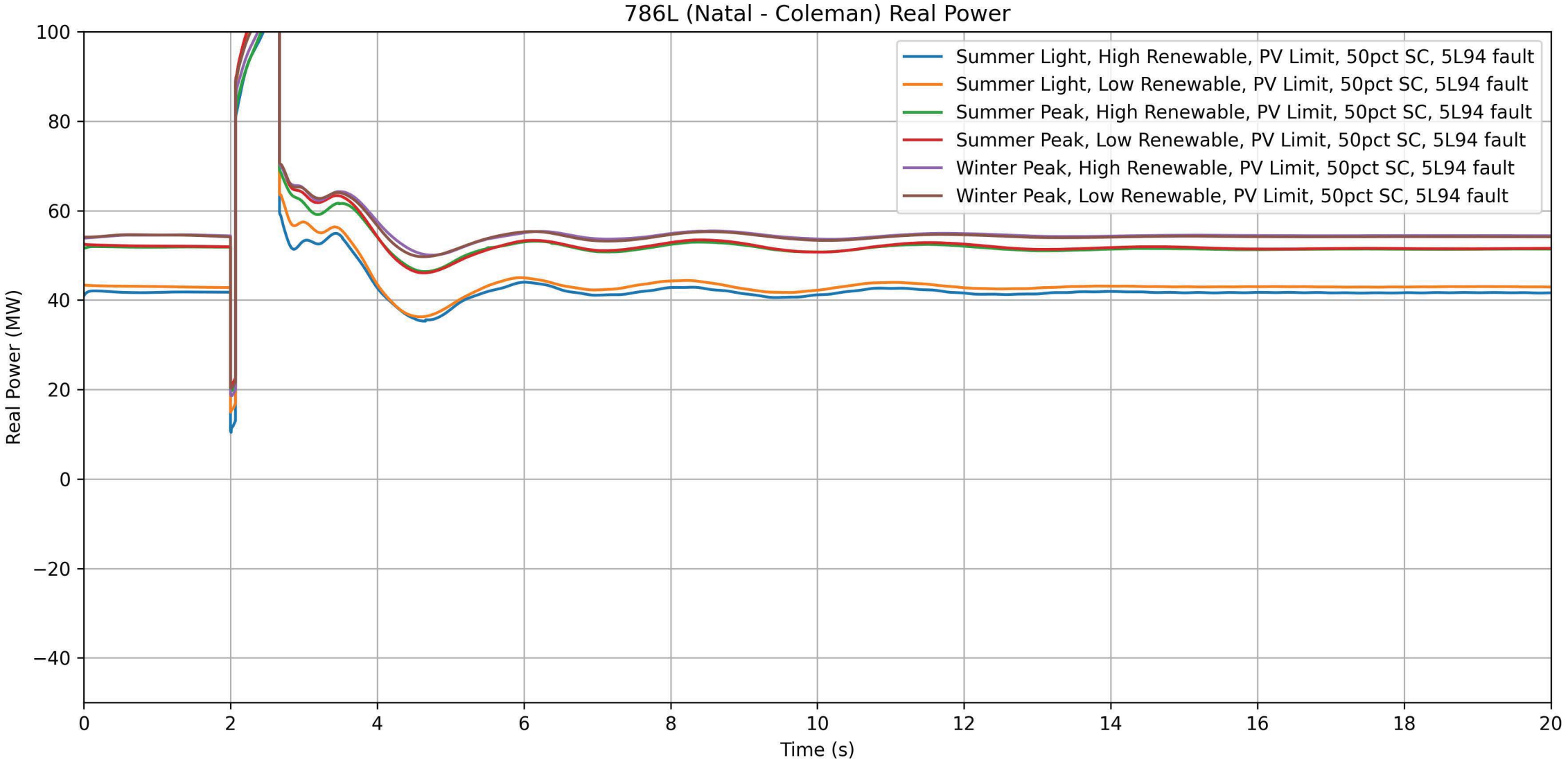

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

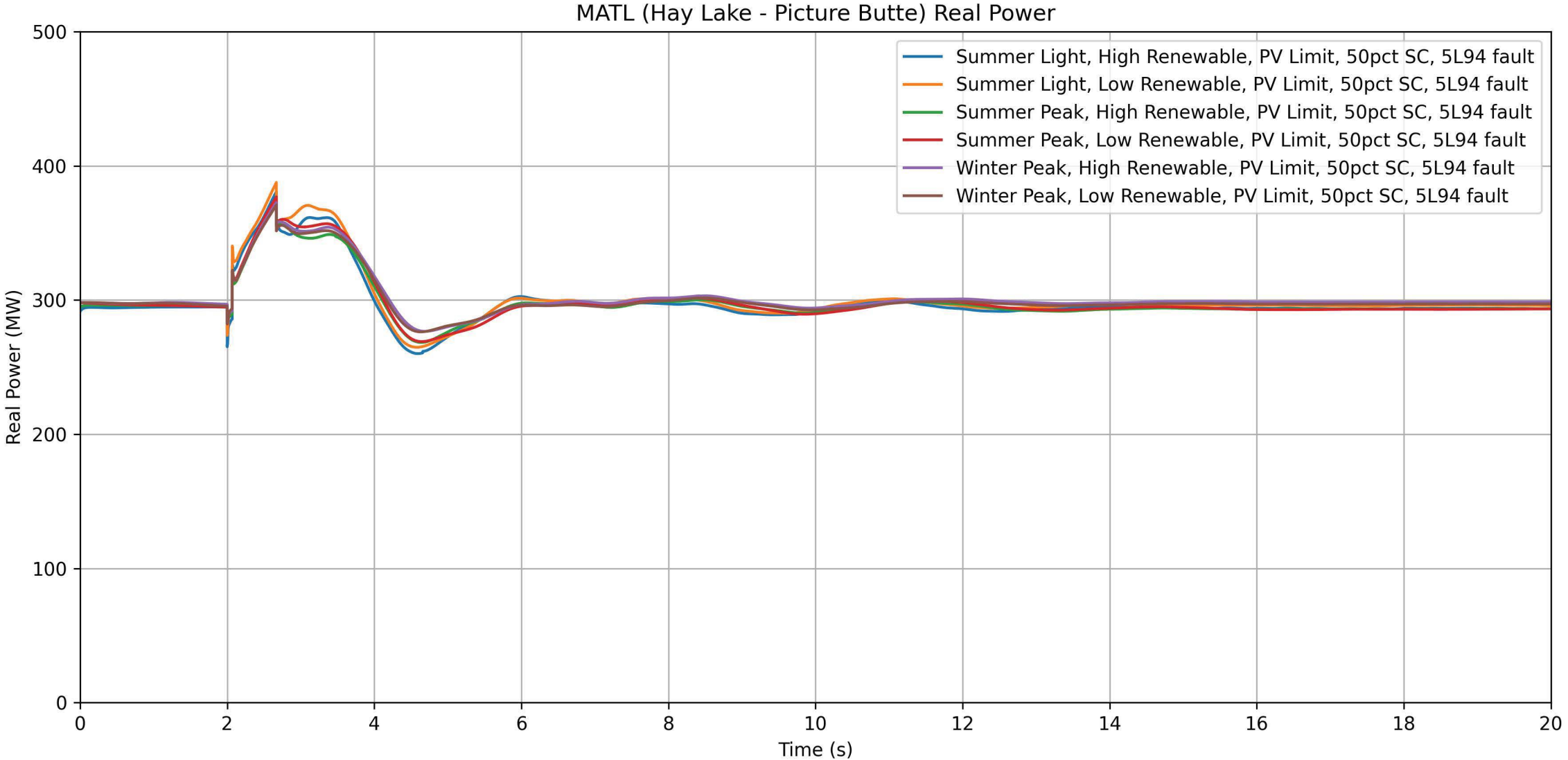

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

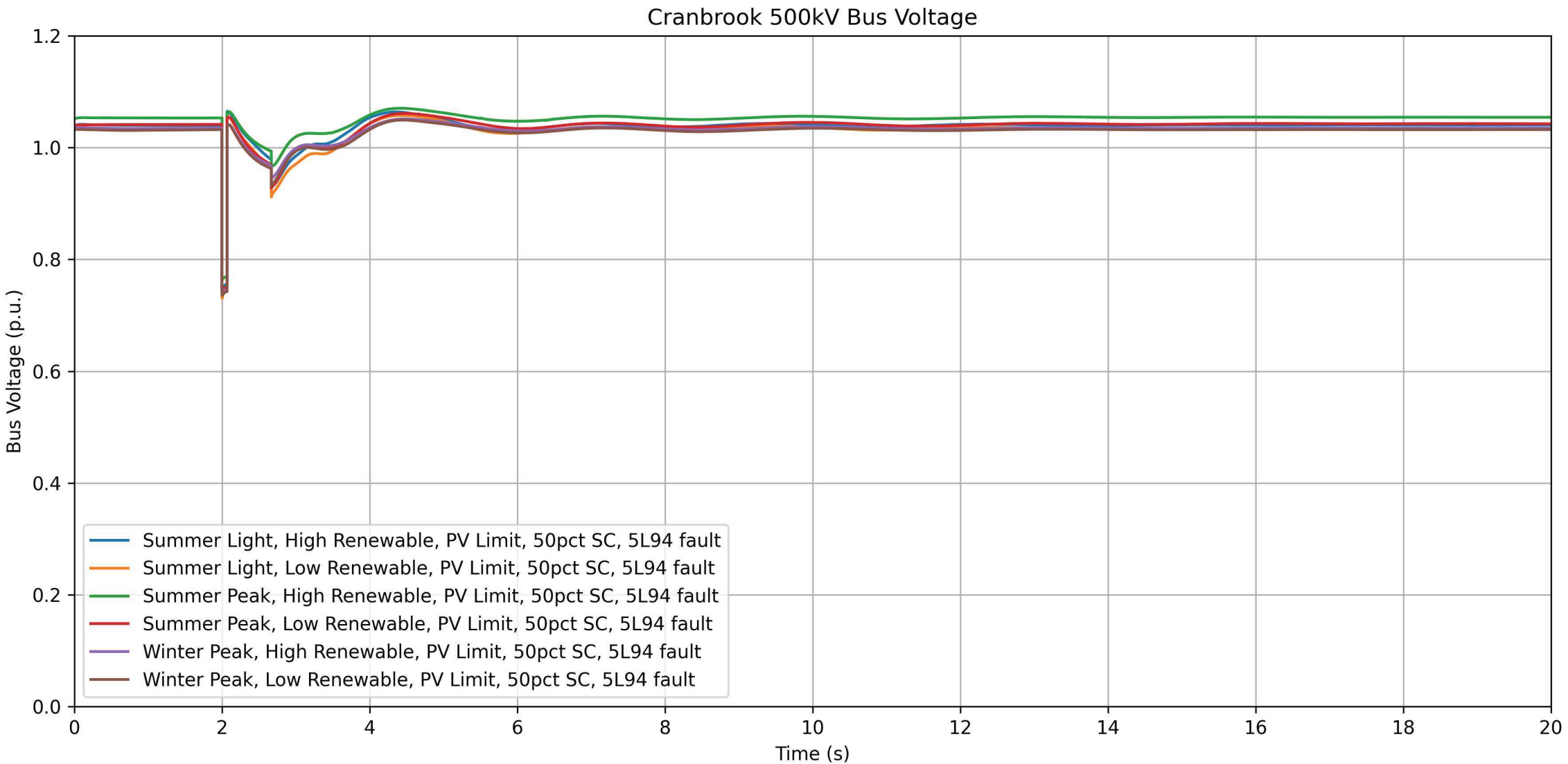

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

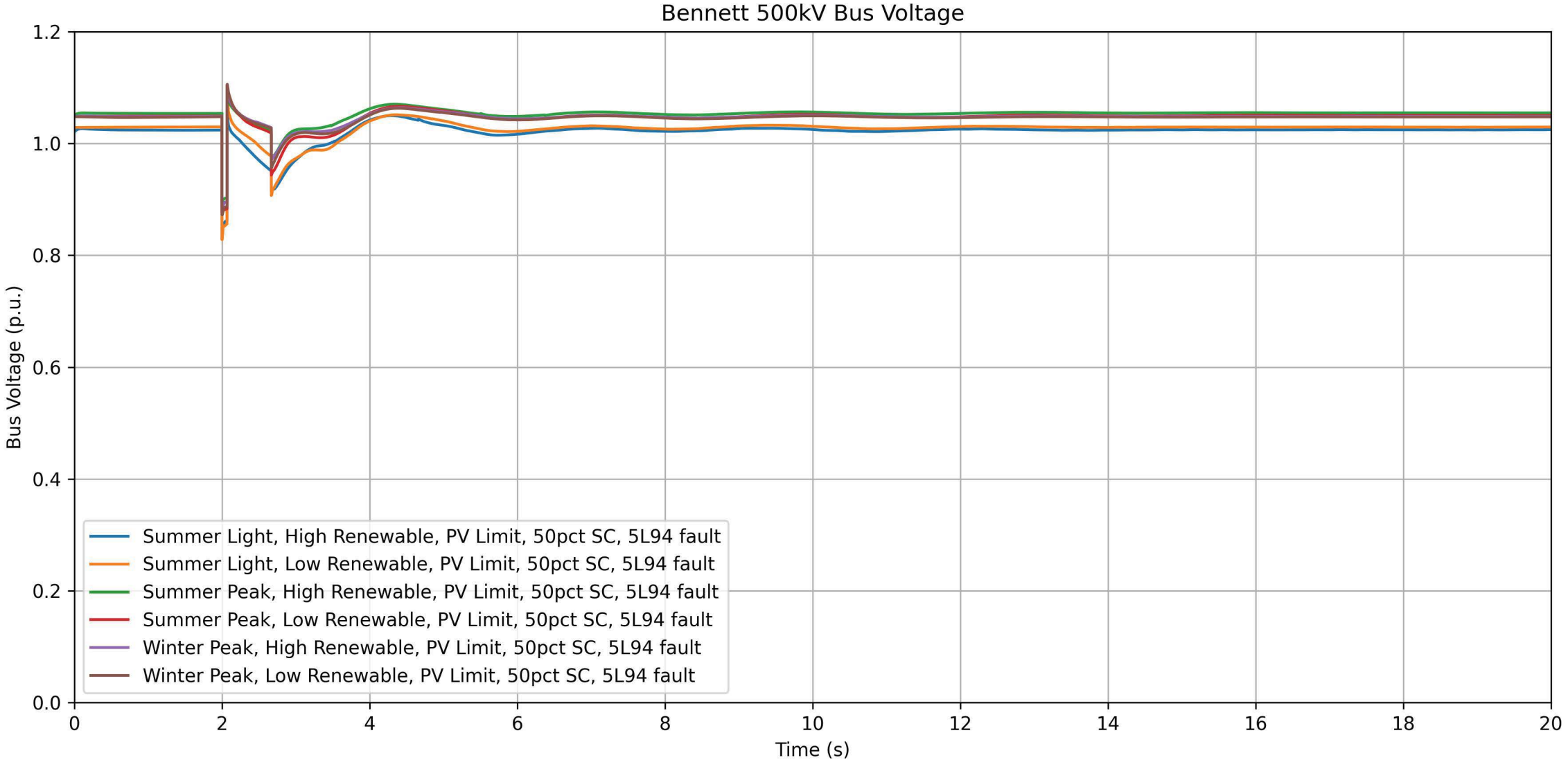

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L92 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L92 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

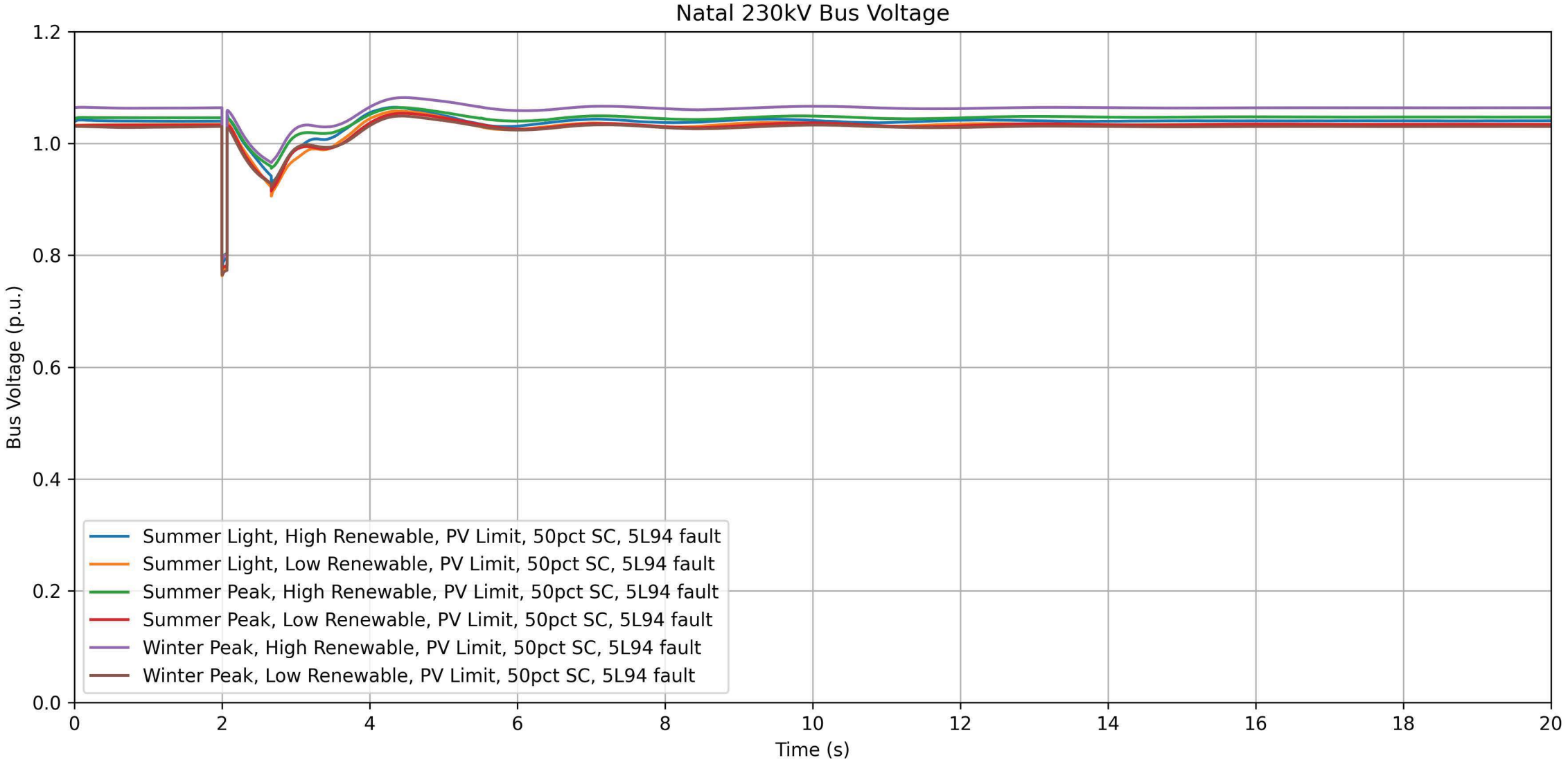

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

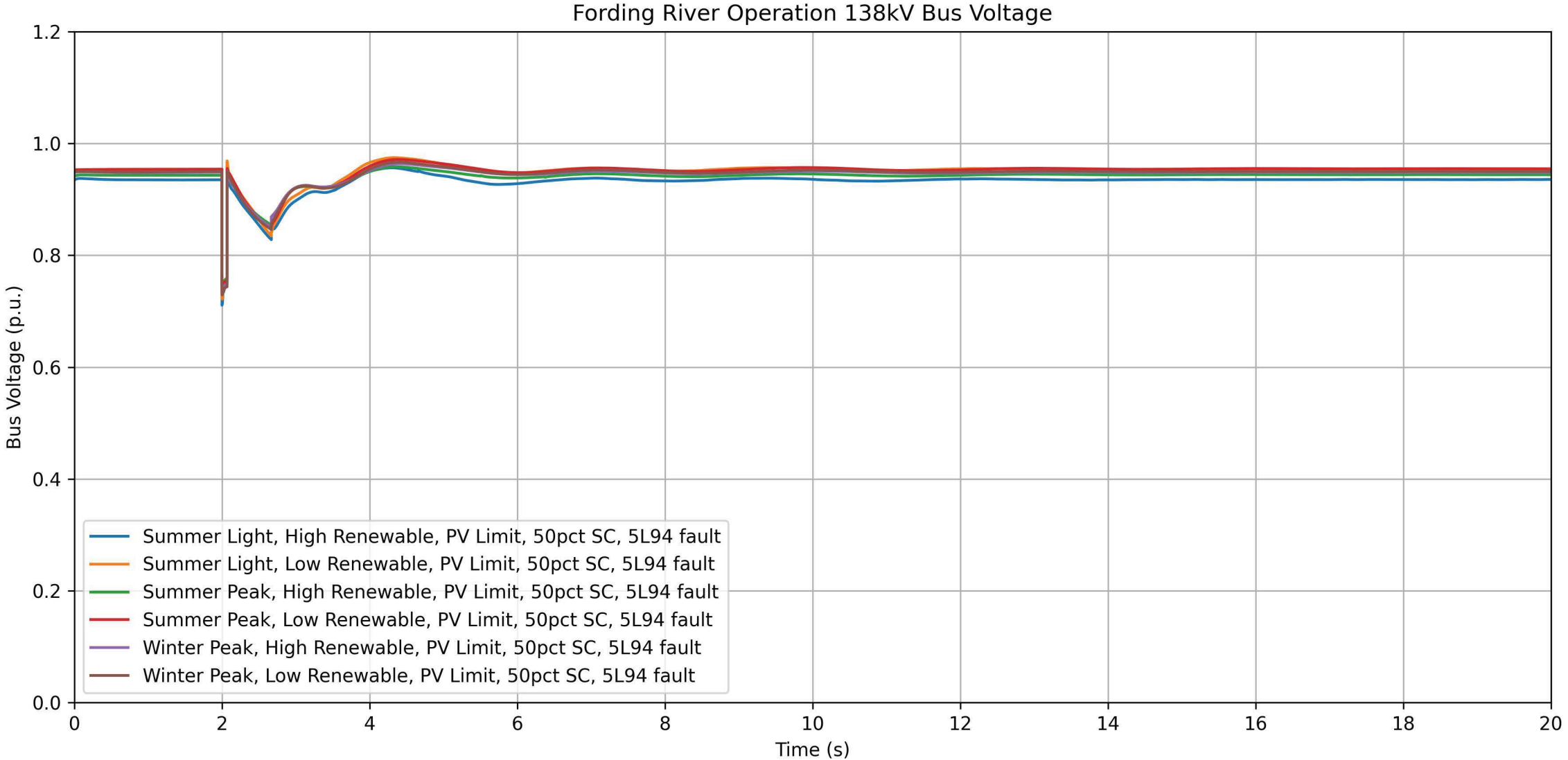

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

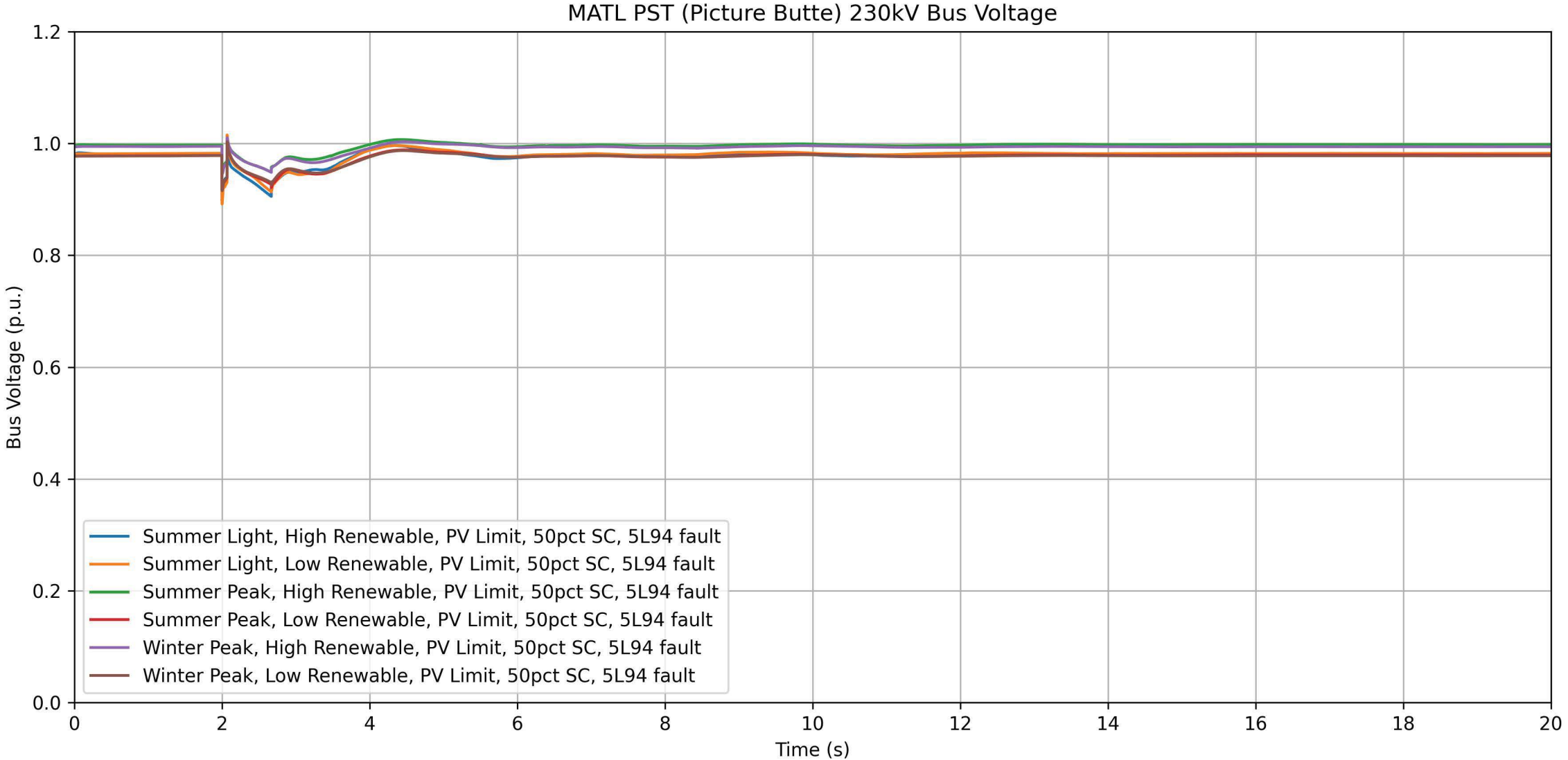

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

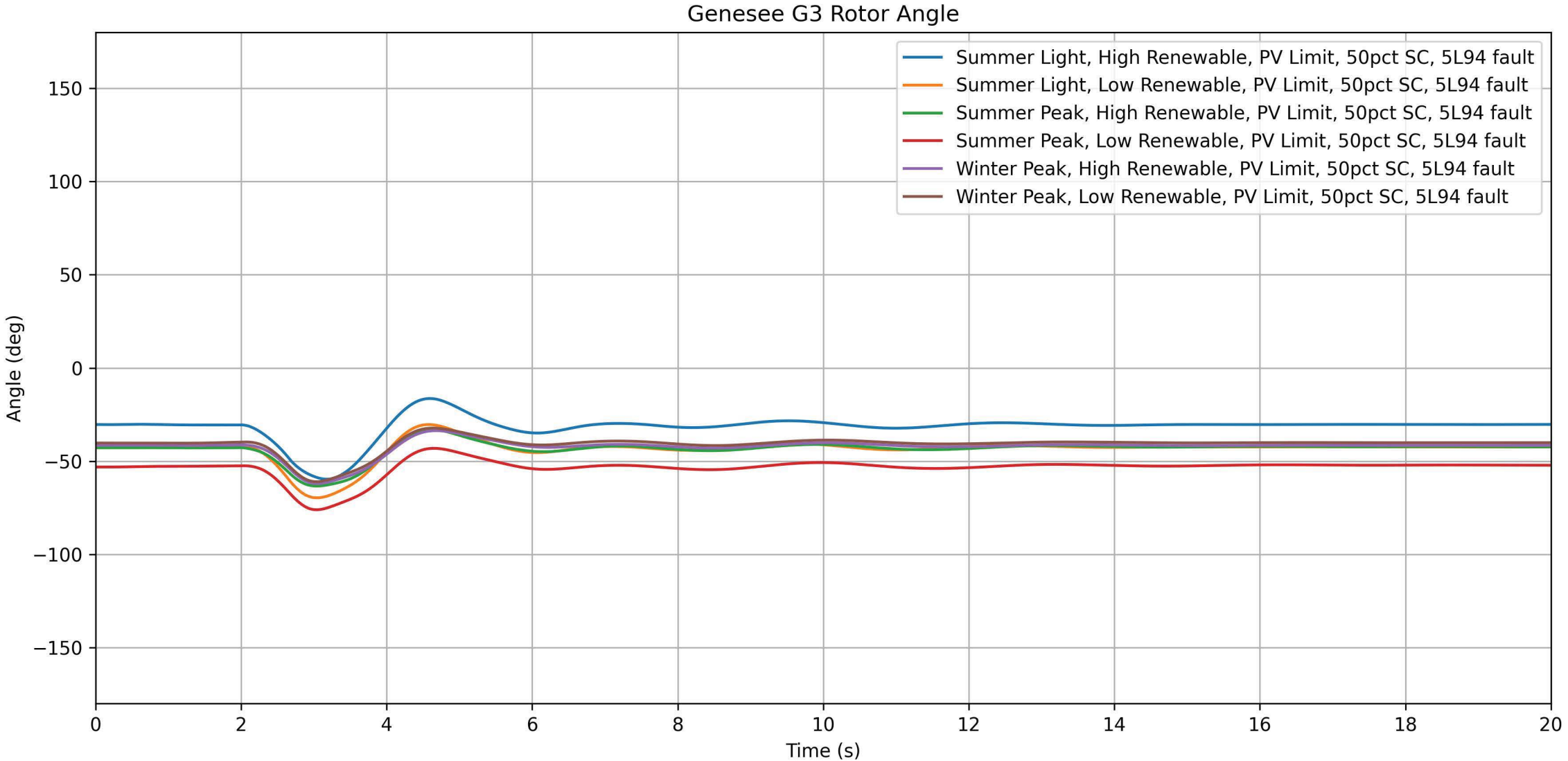

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

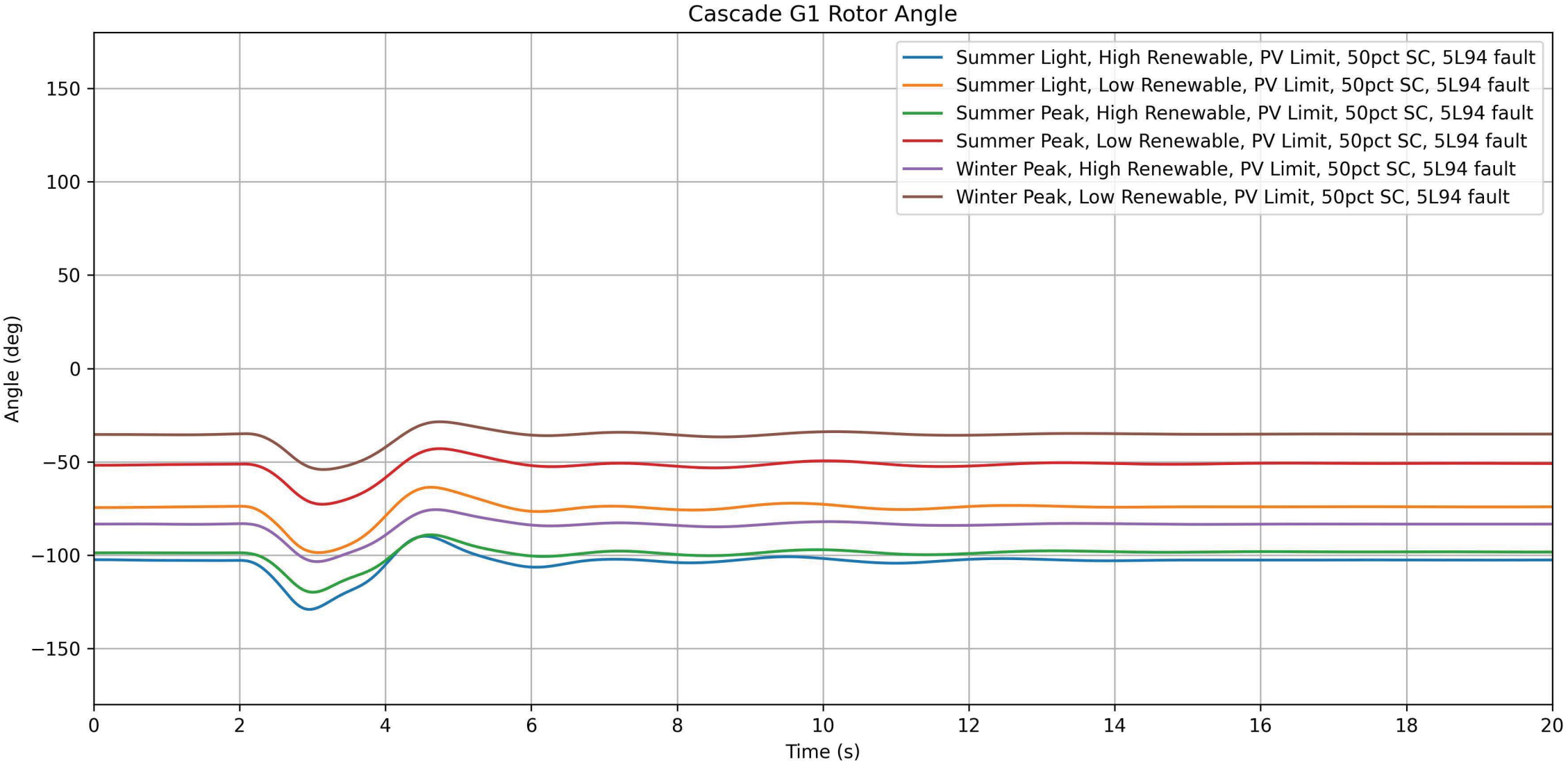

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

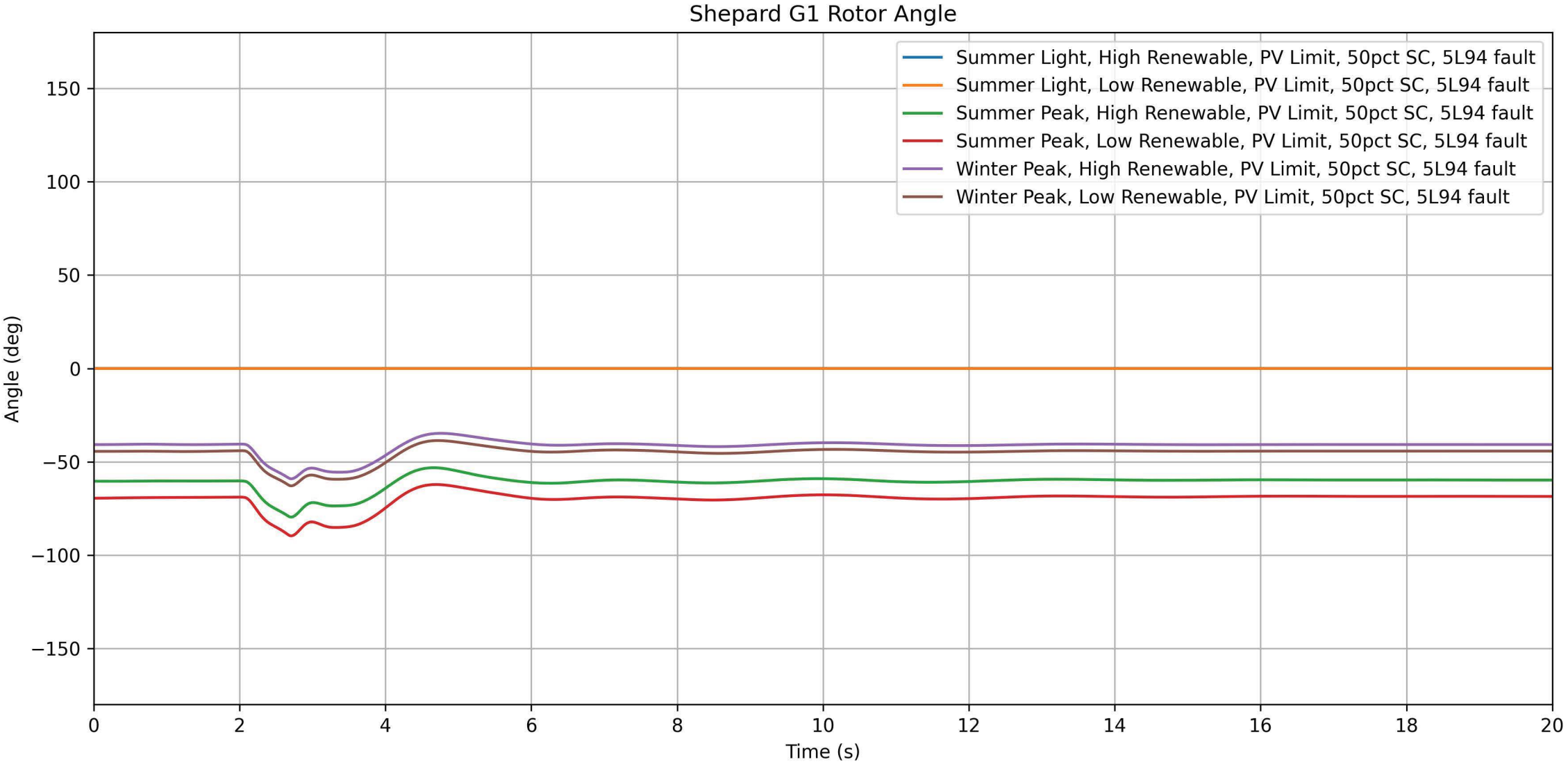

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

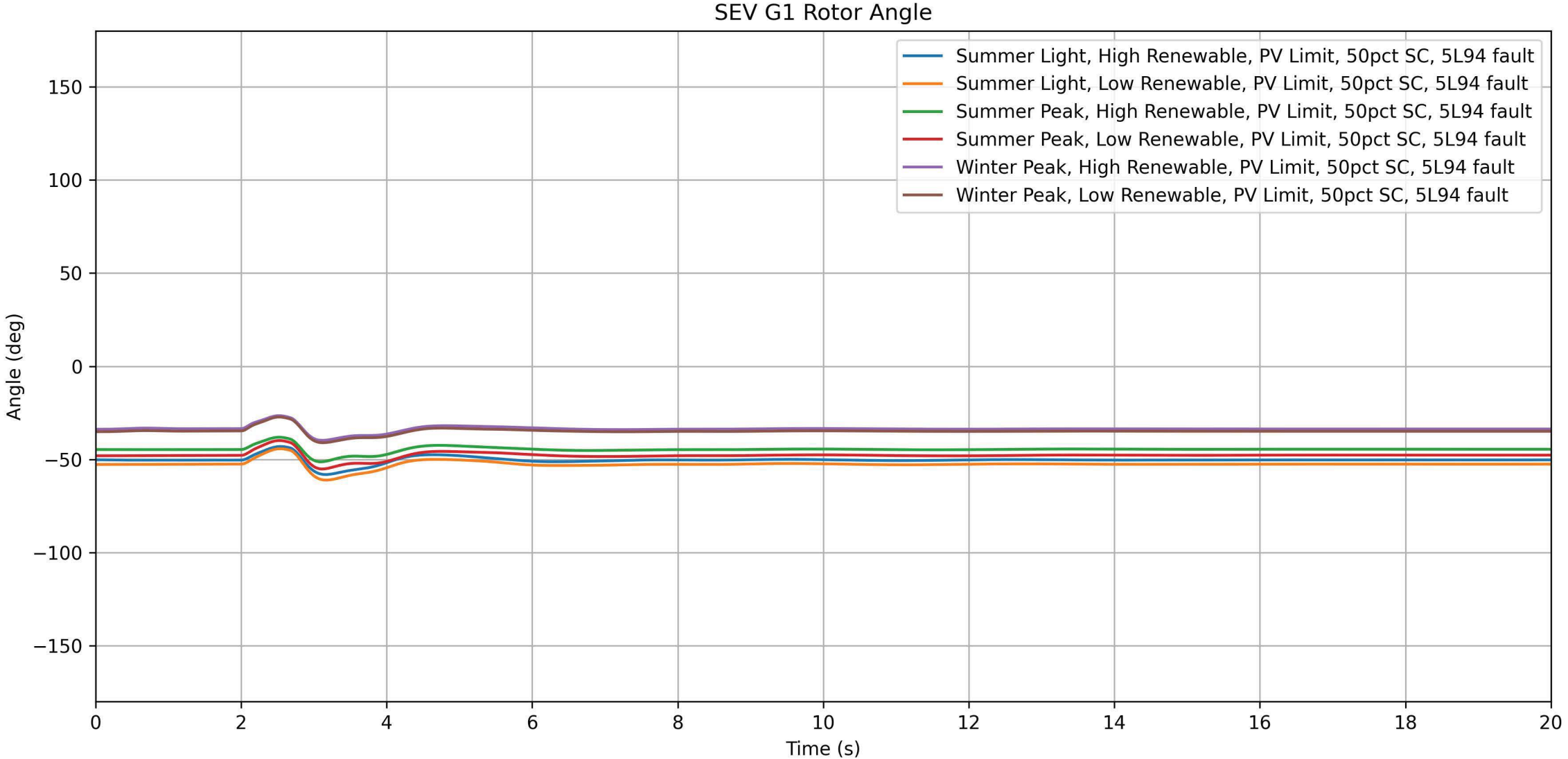

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

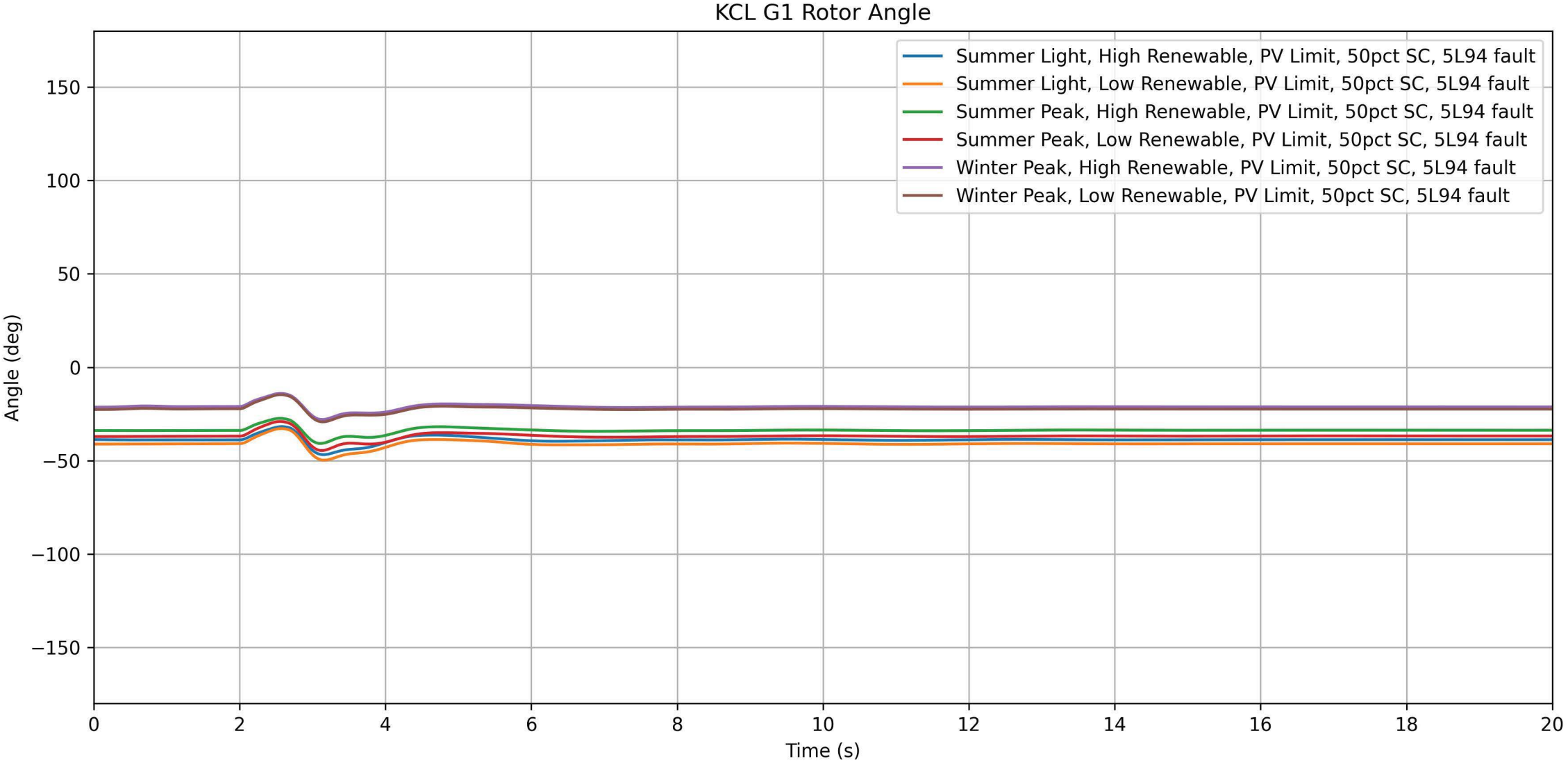

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

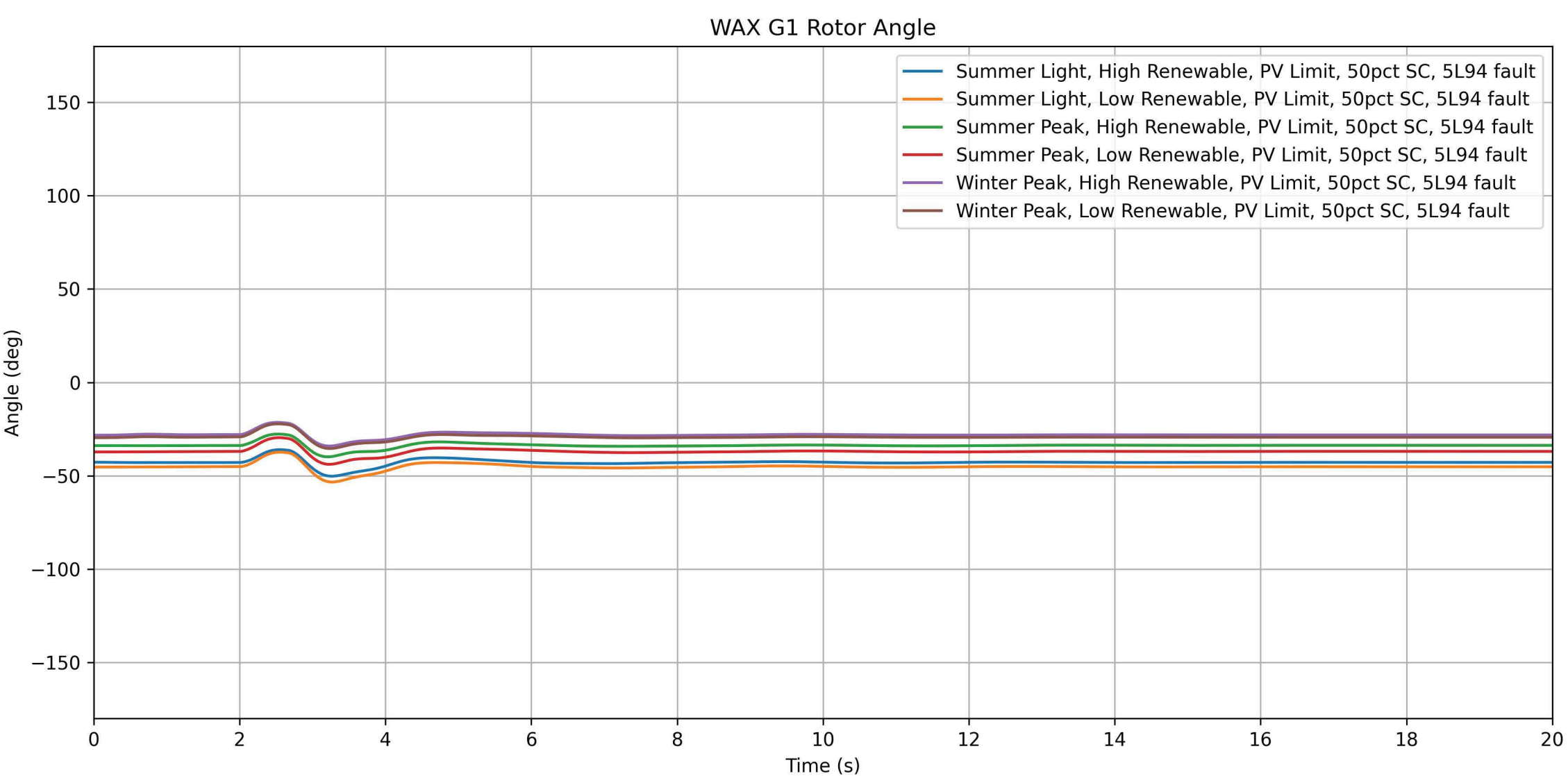

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

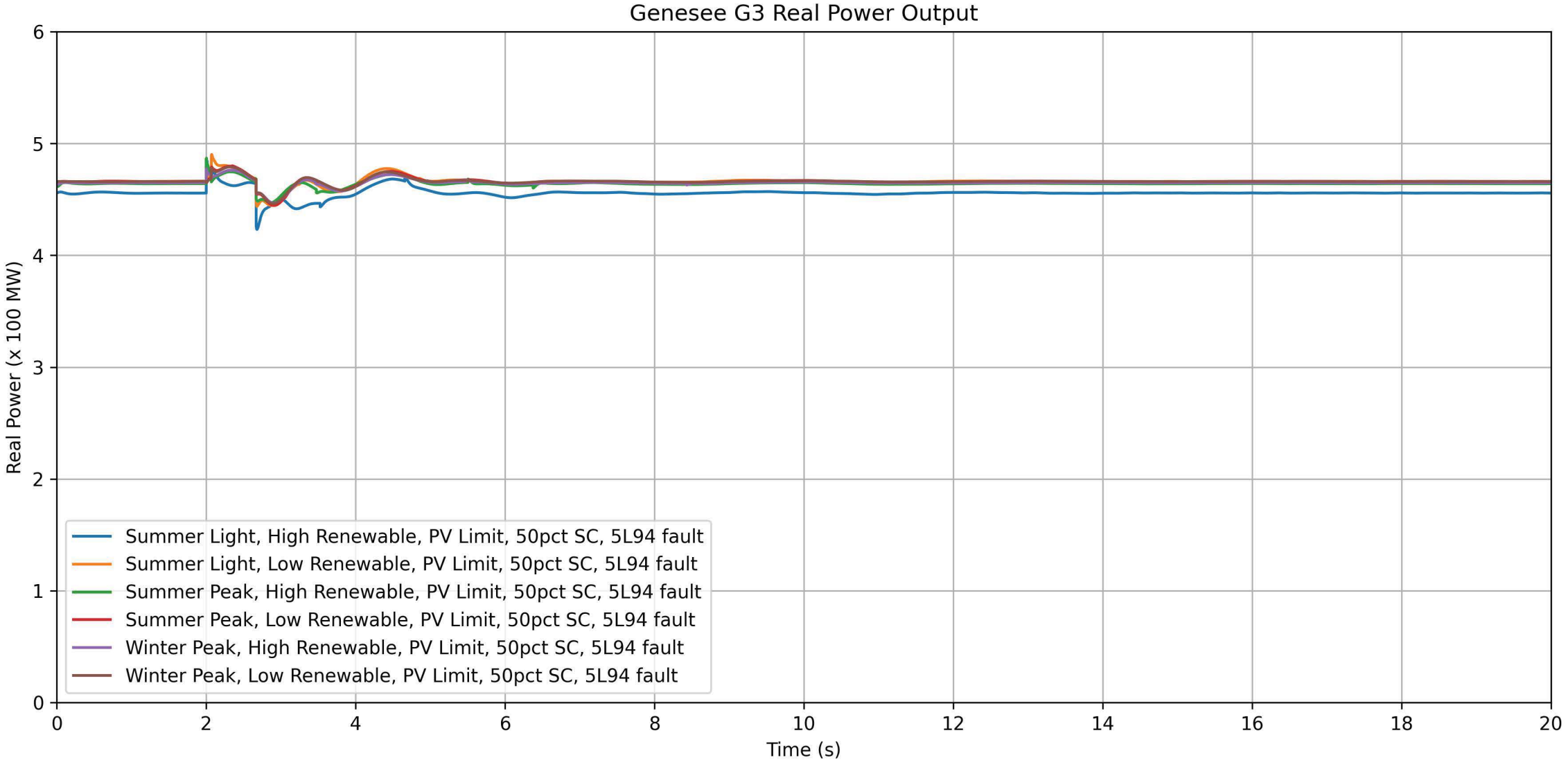

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

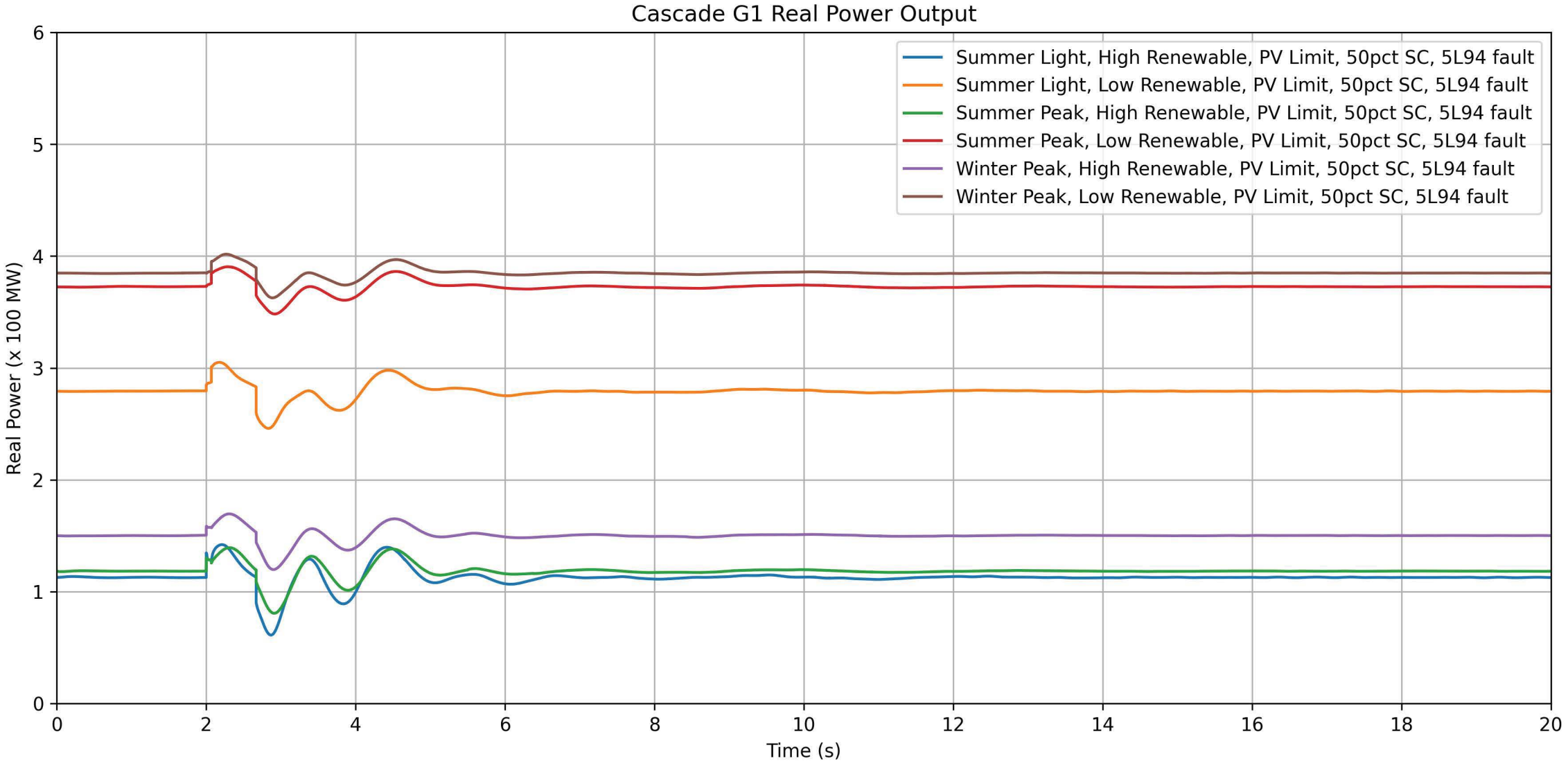

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

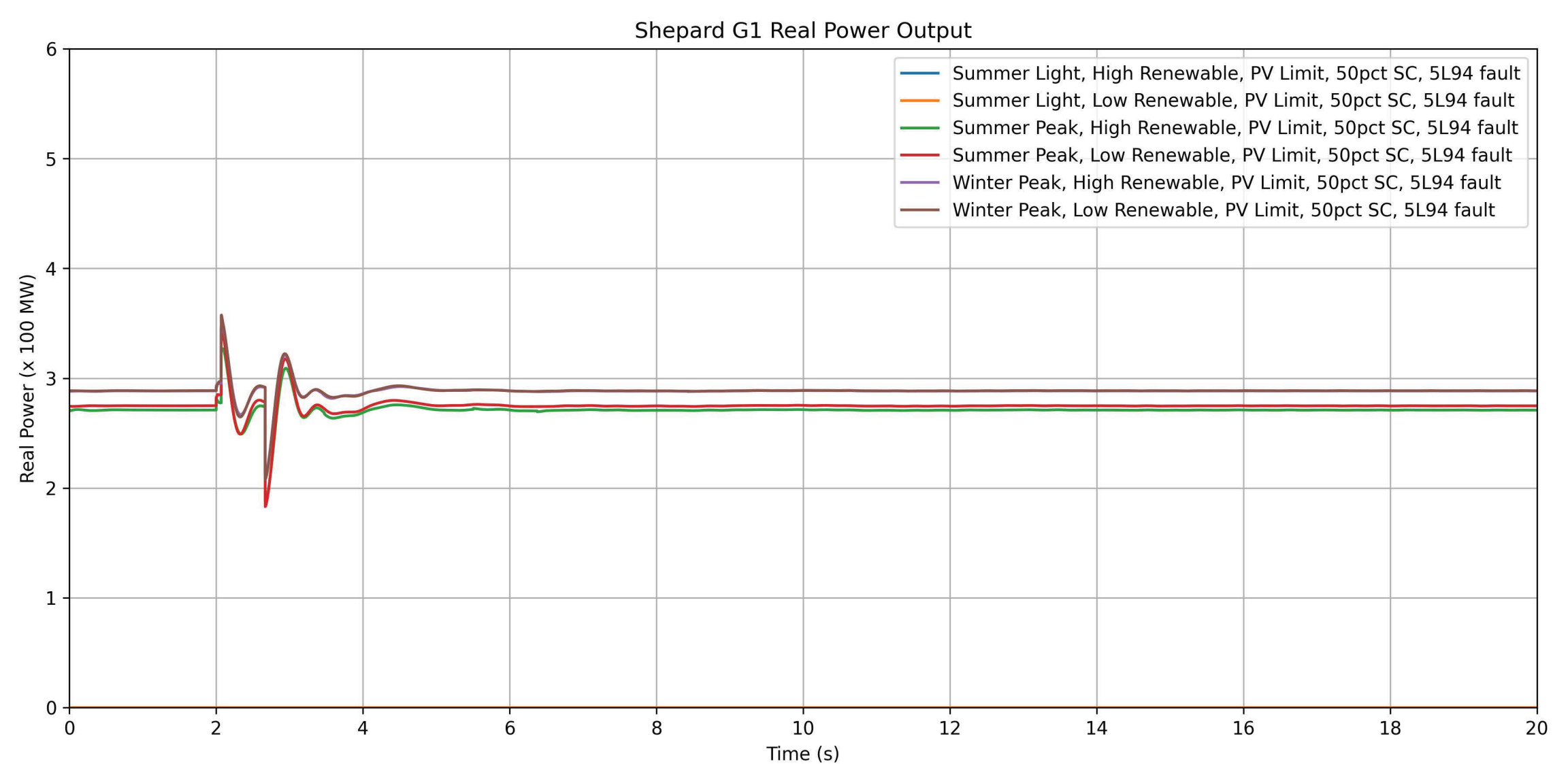

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

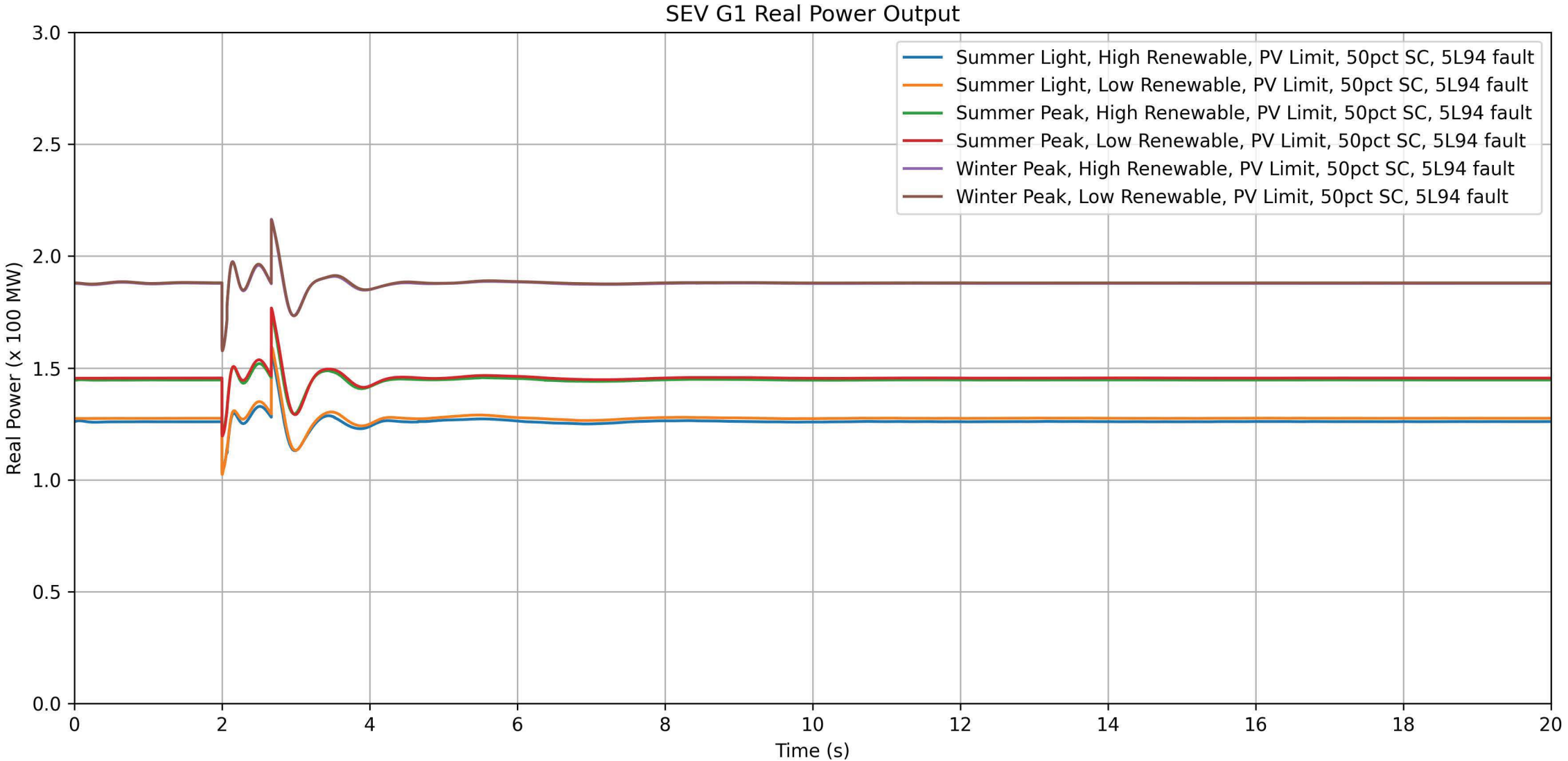

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

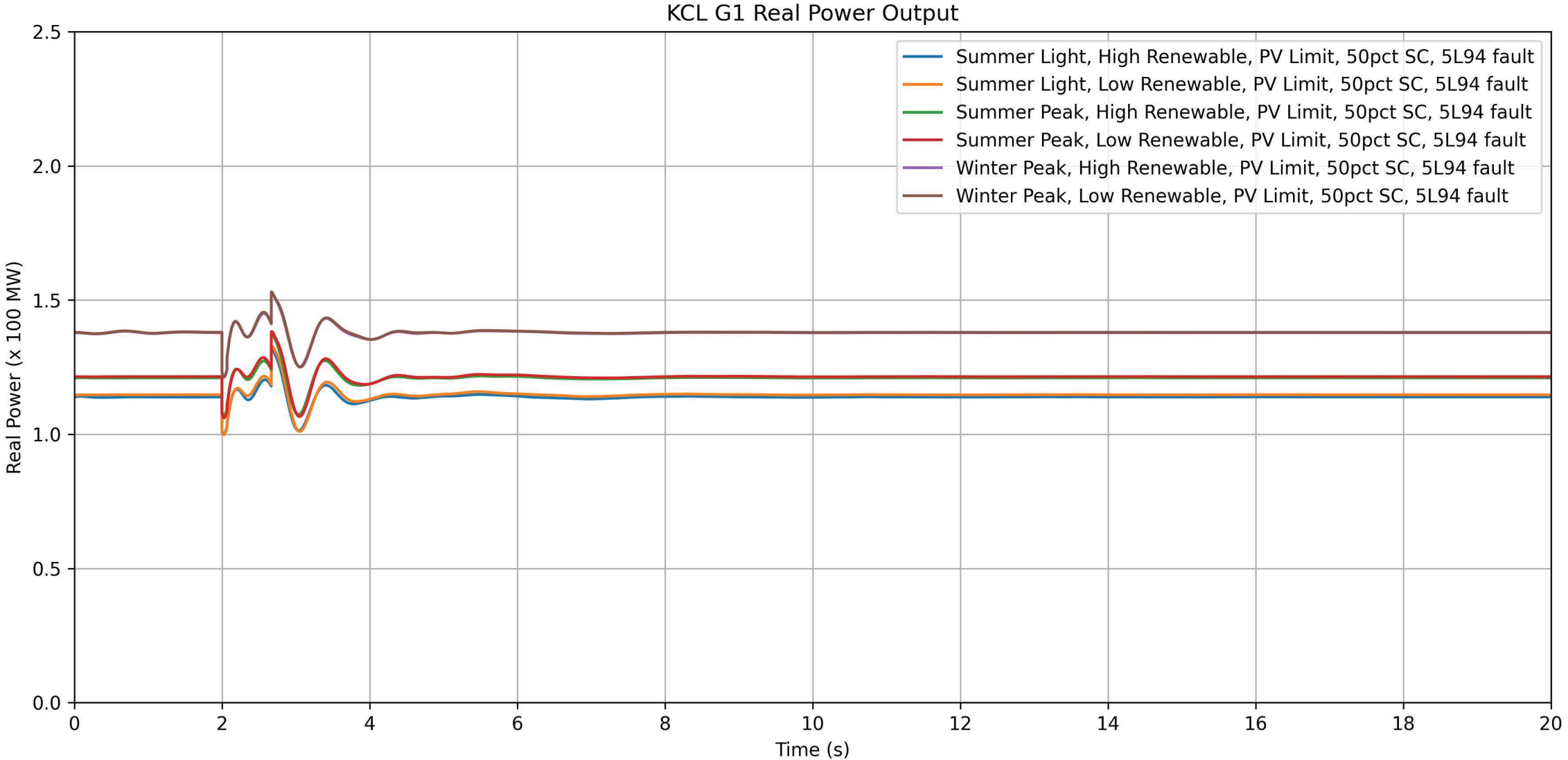

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

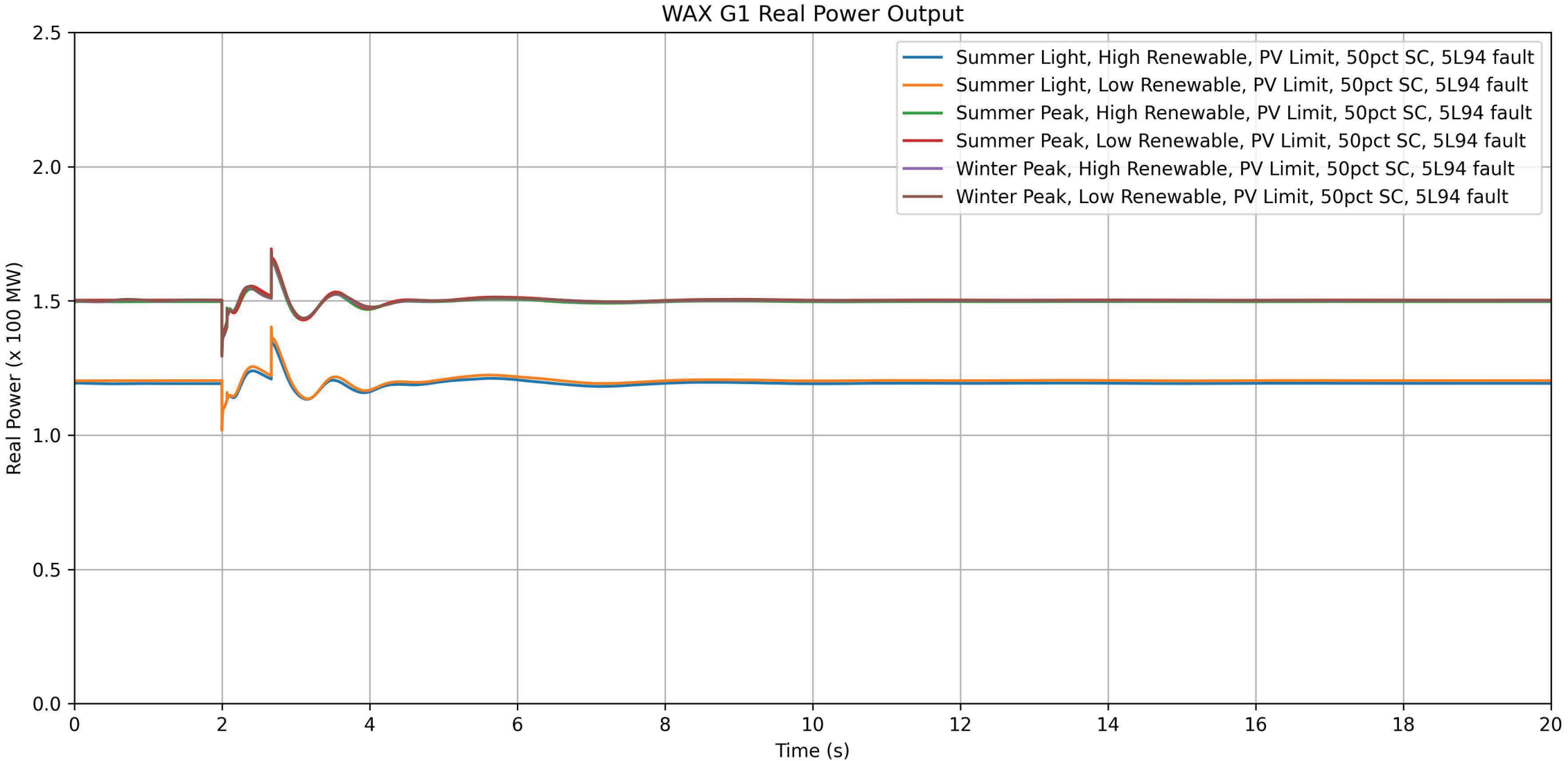

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault

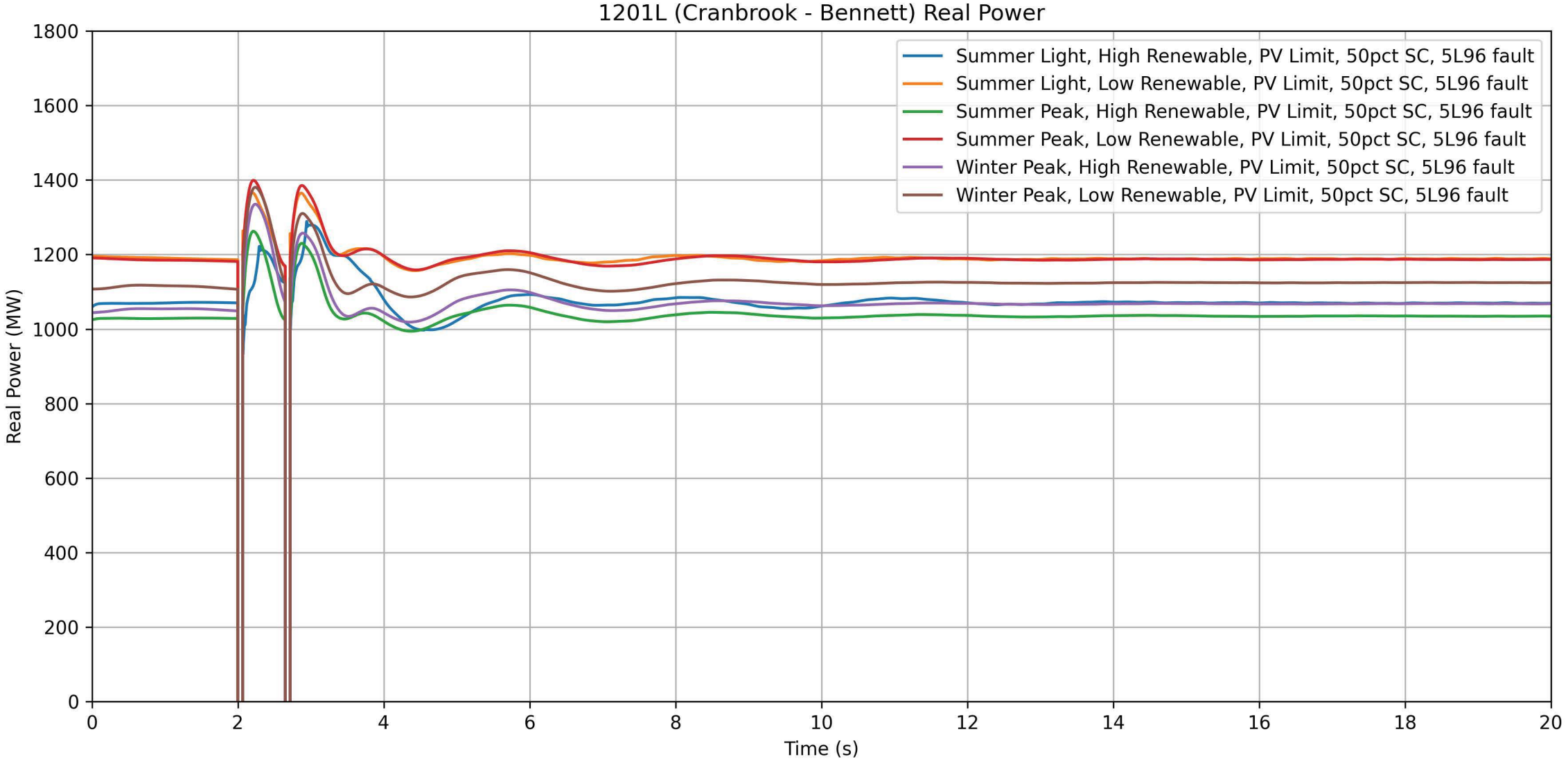

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

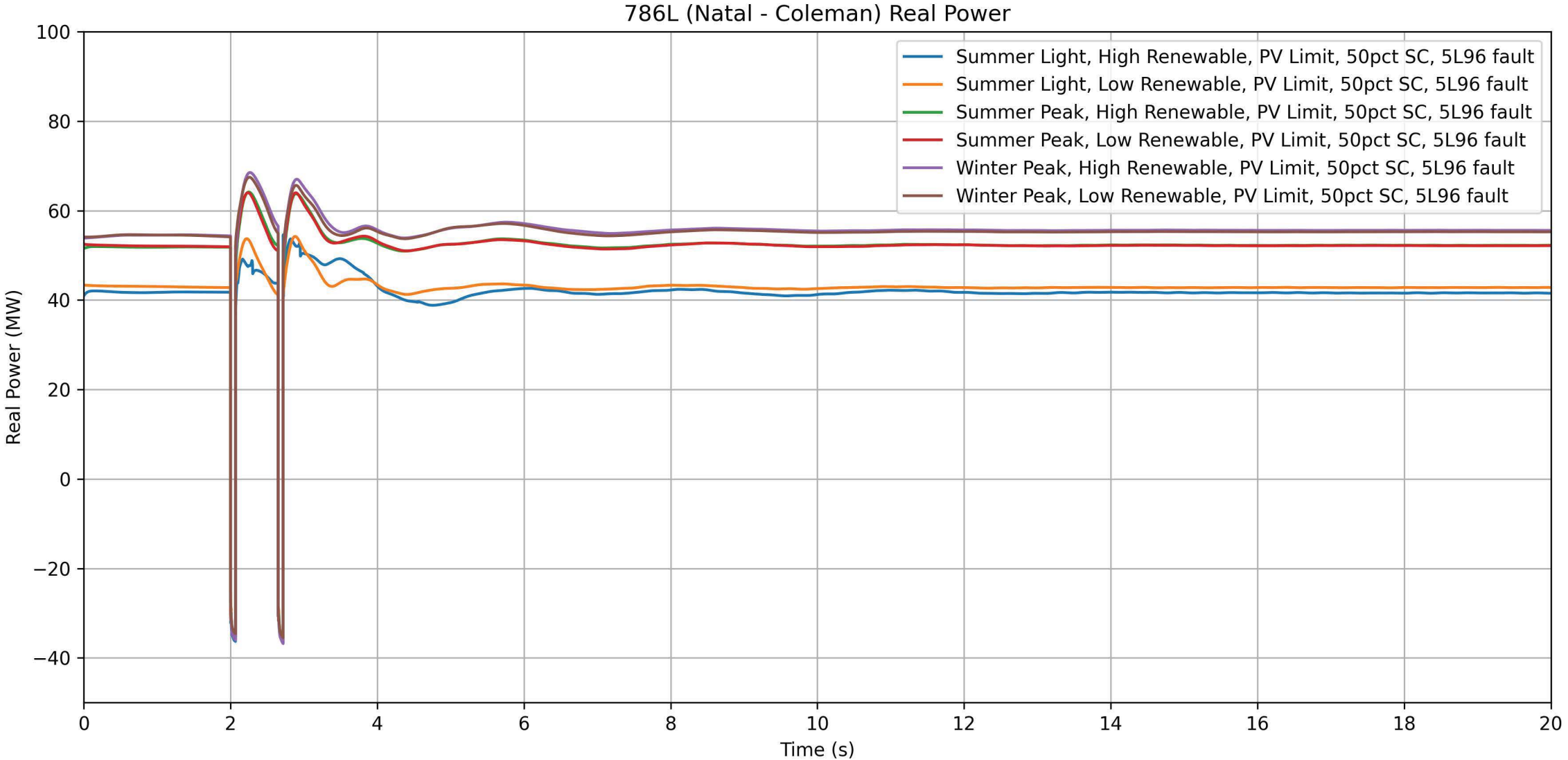

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

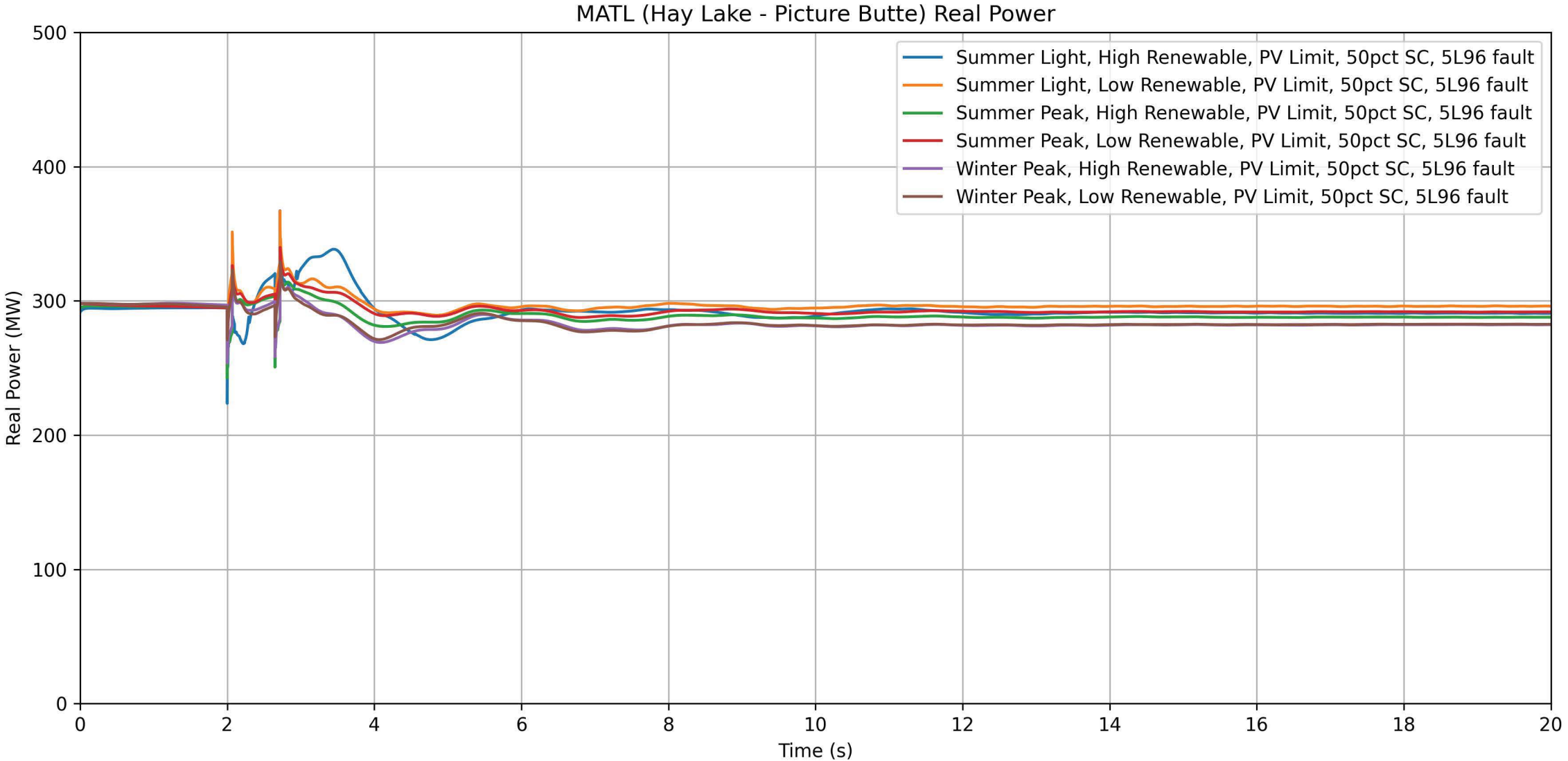

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

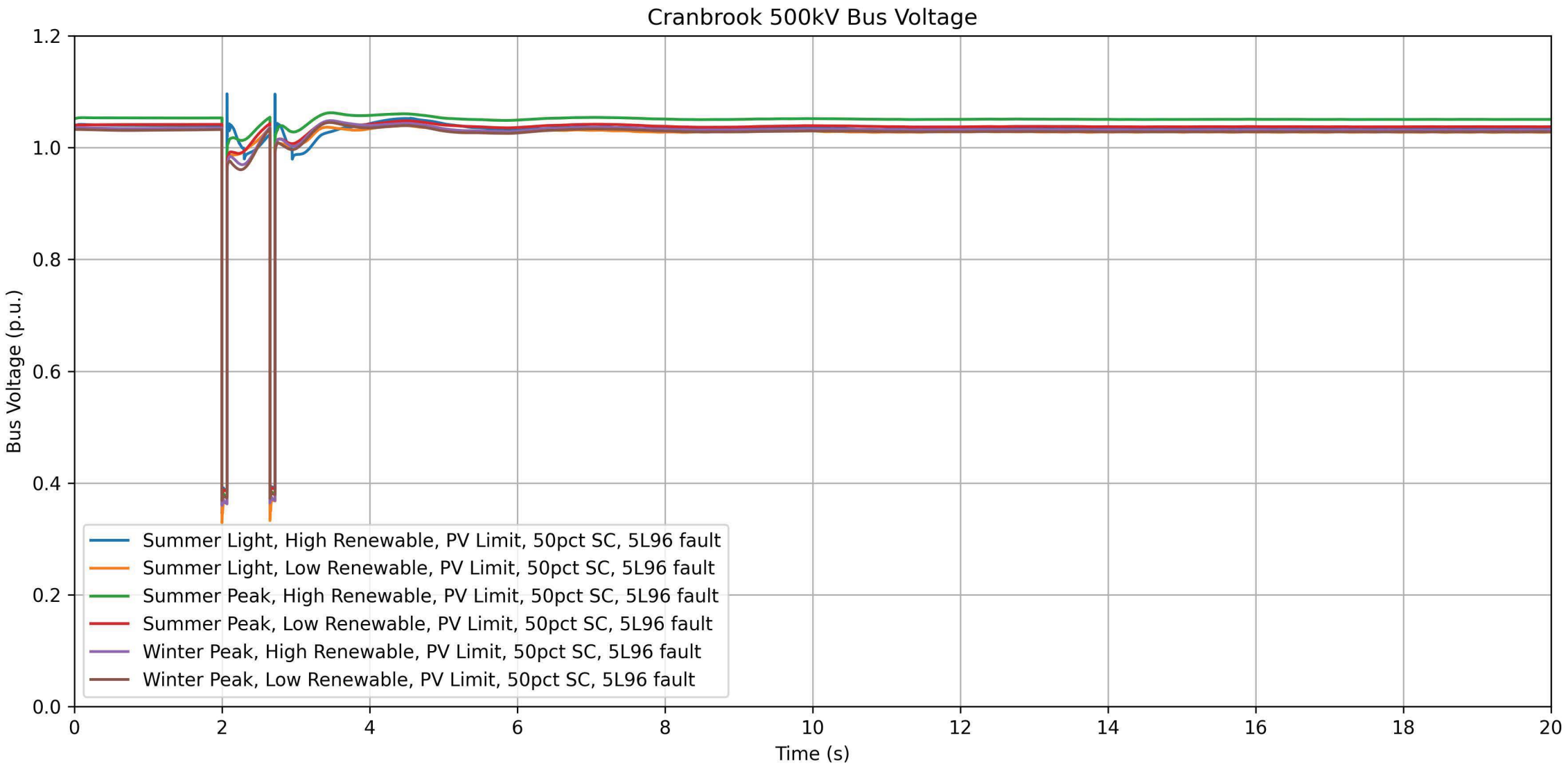

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

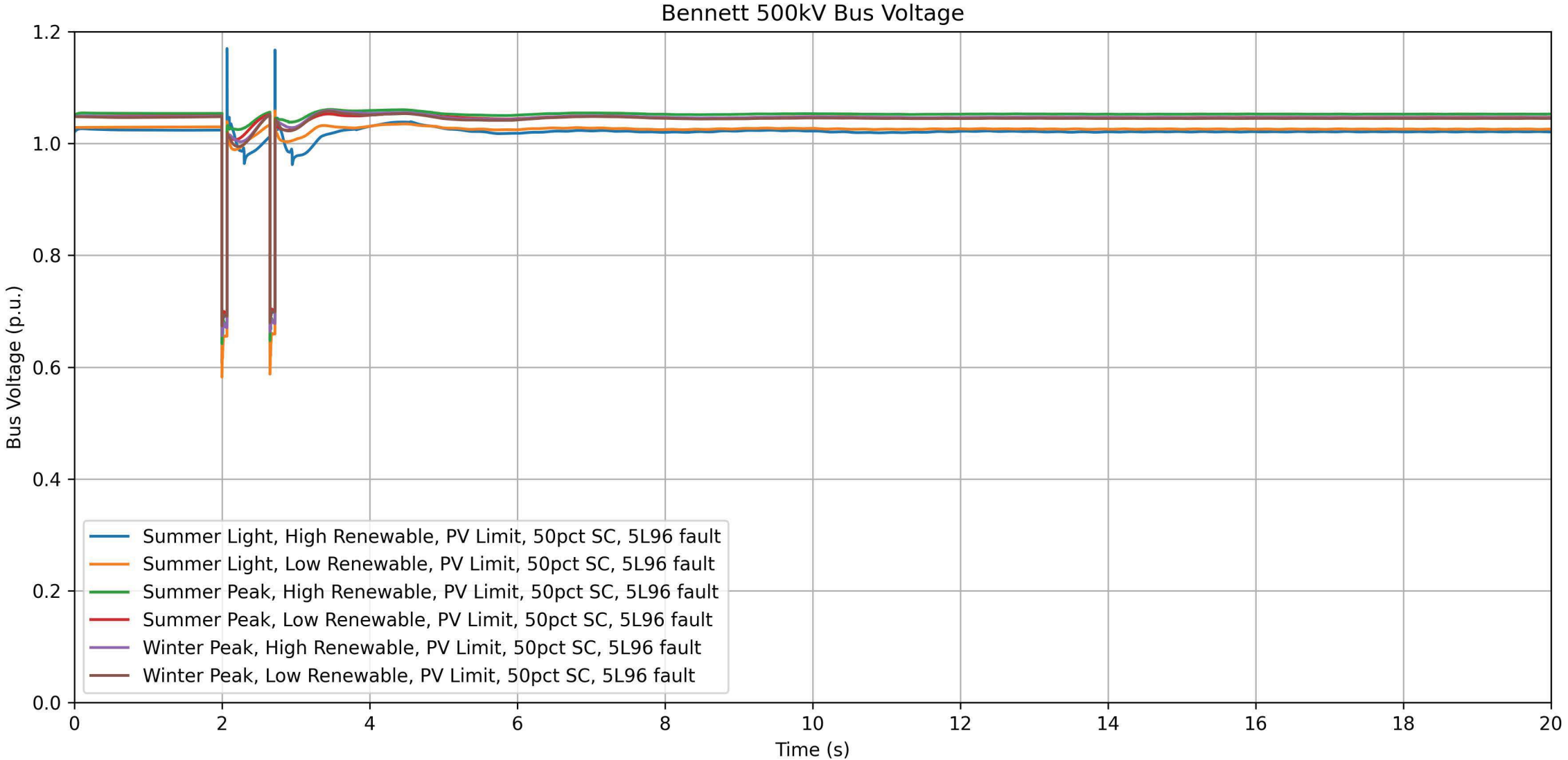

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L94 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L94 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

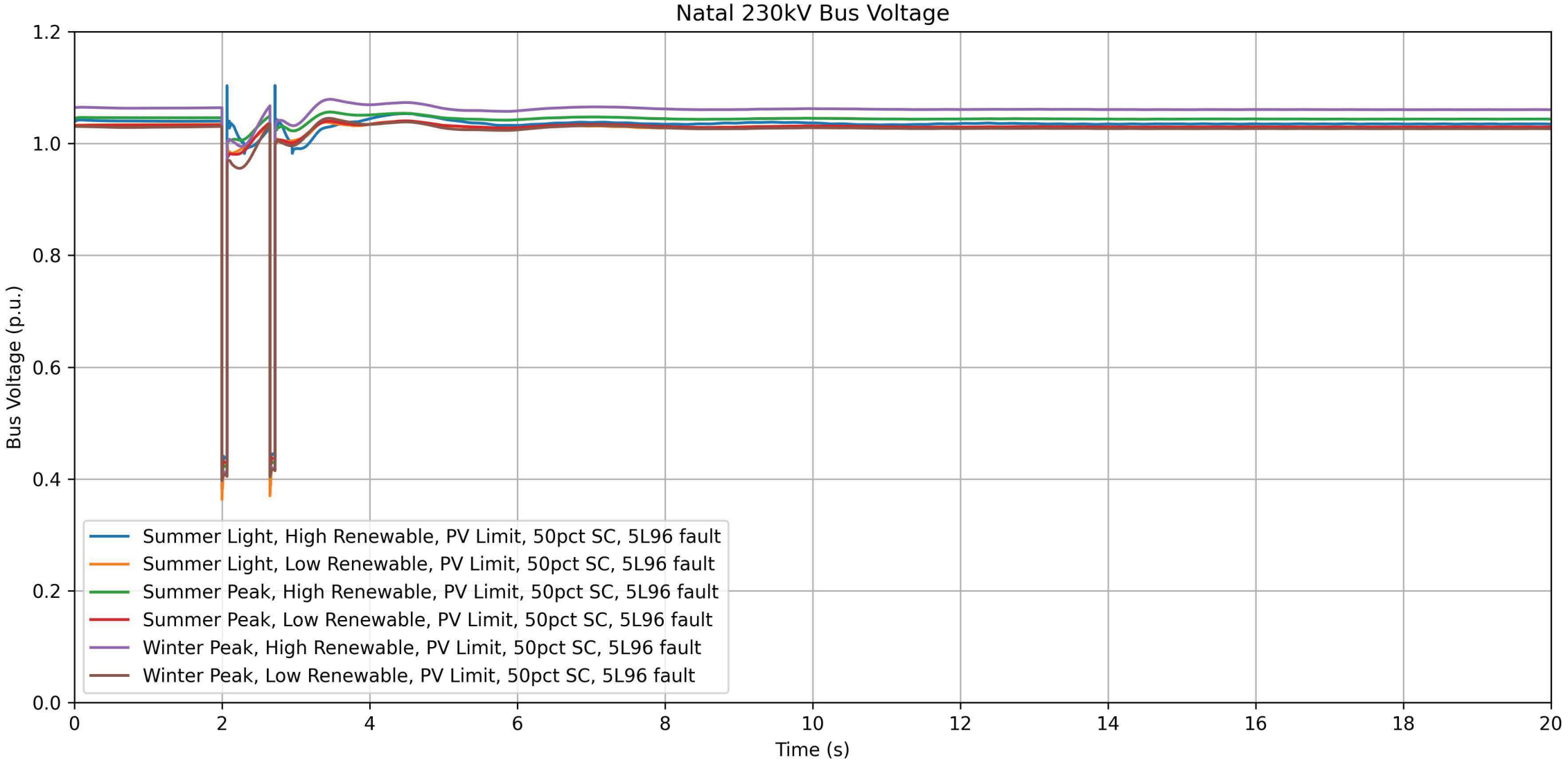

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

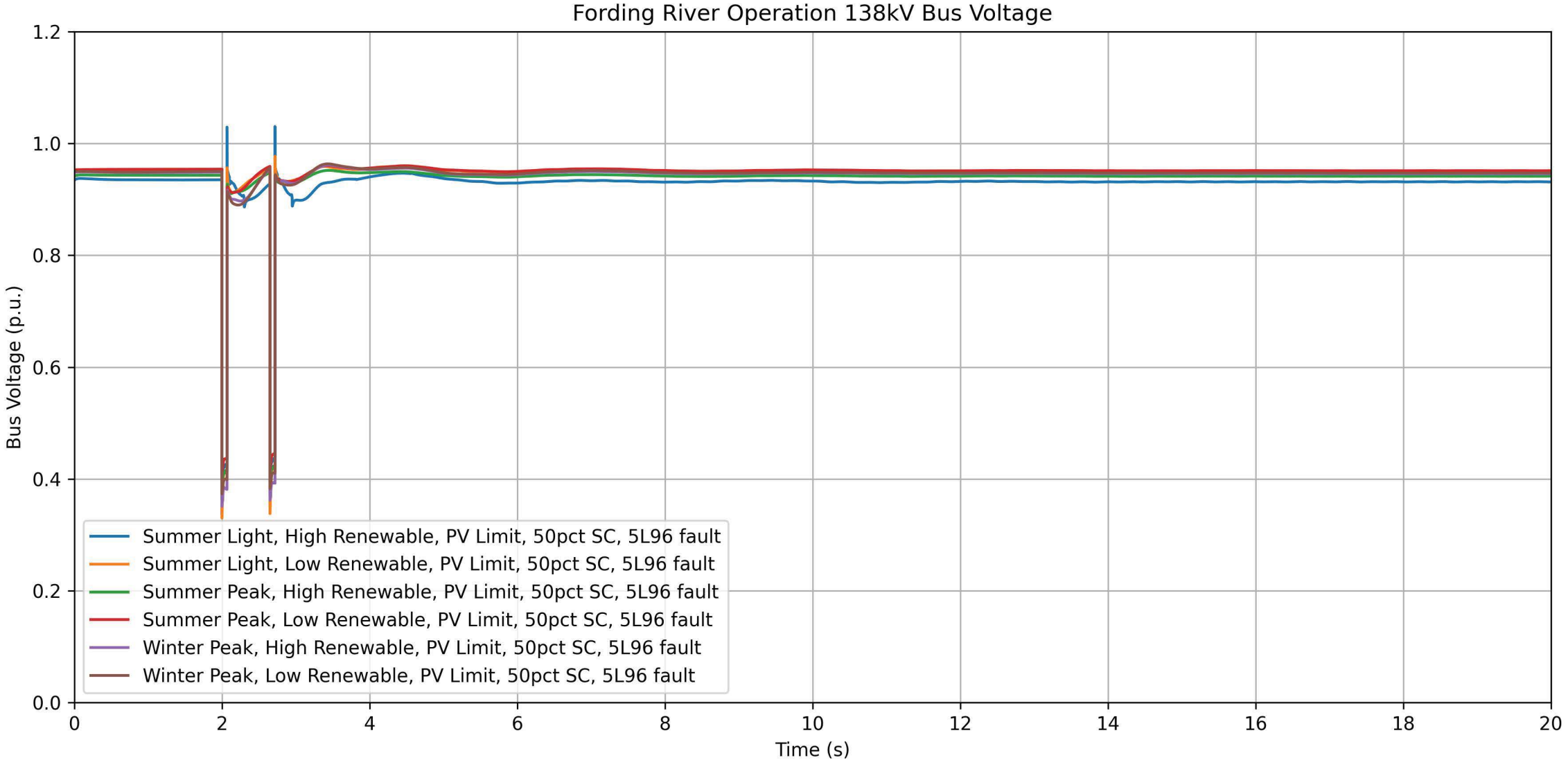

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

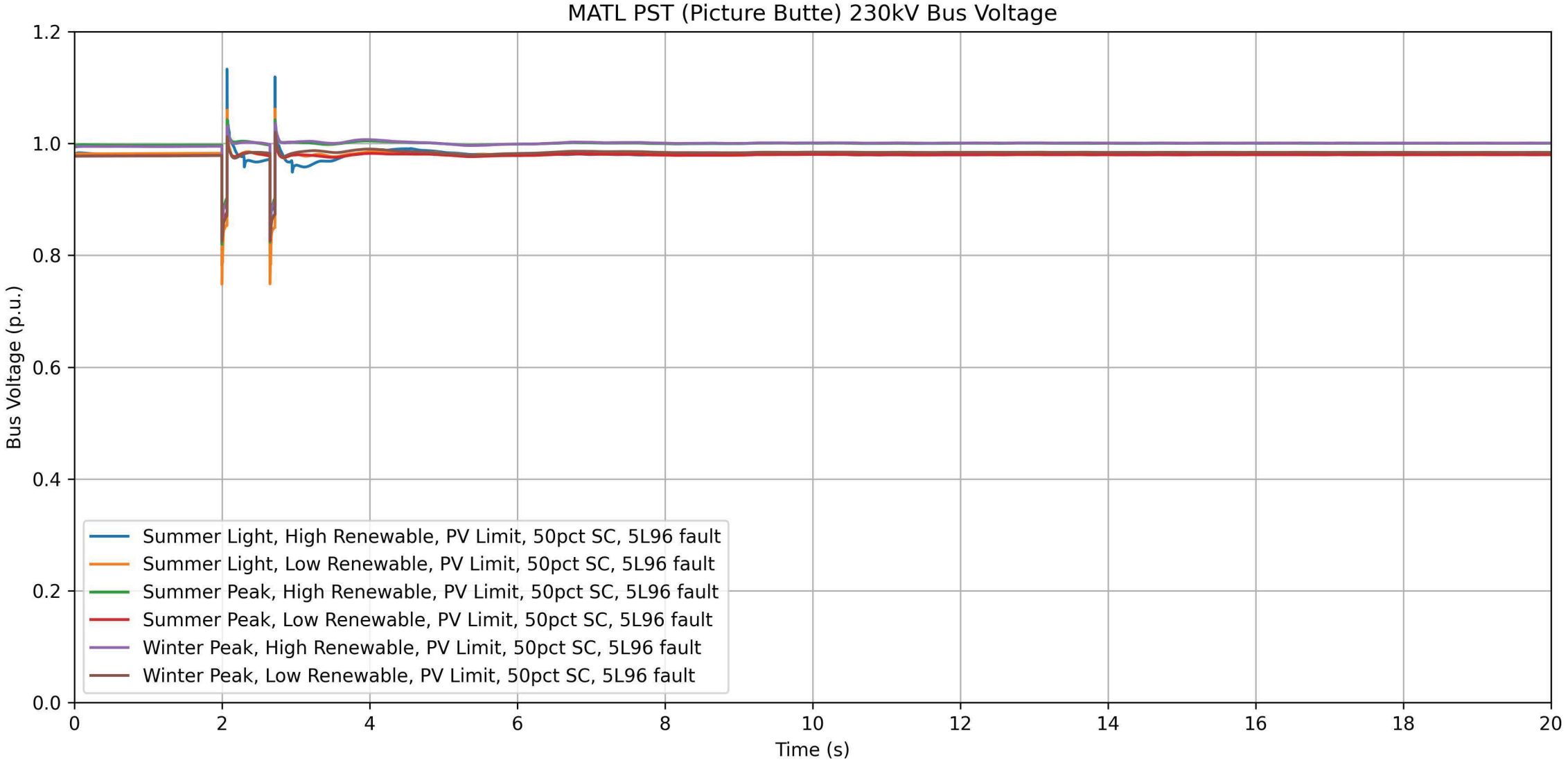

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

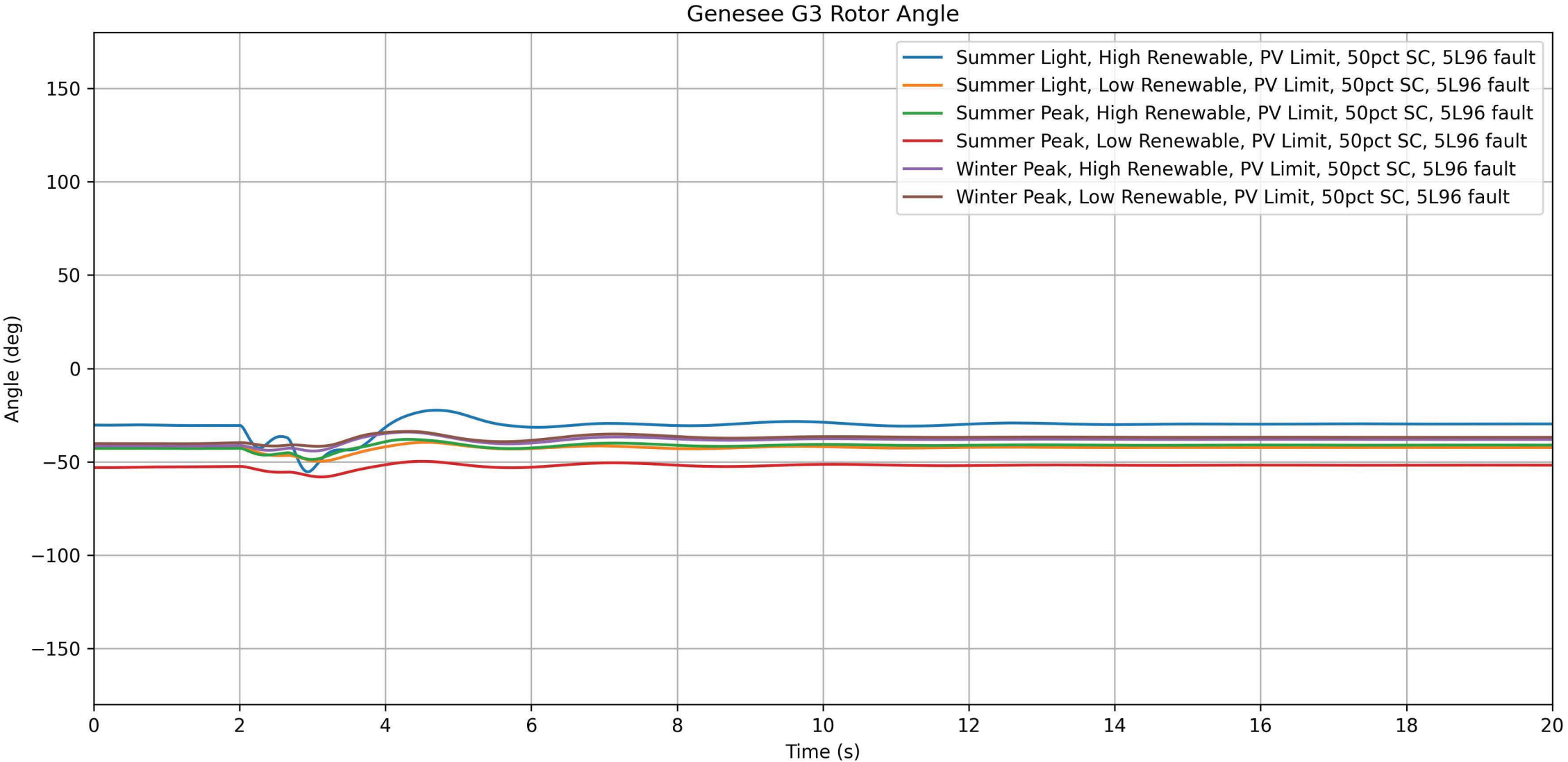

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

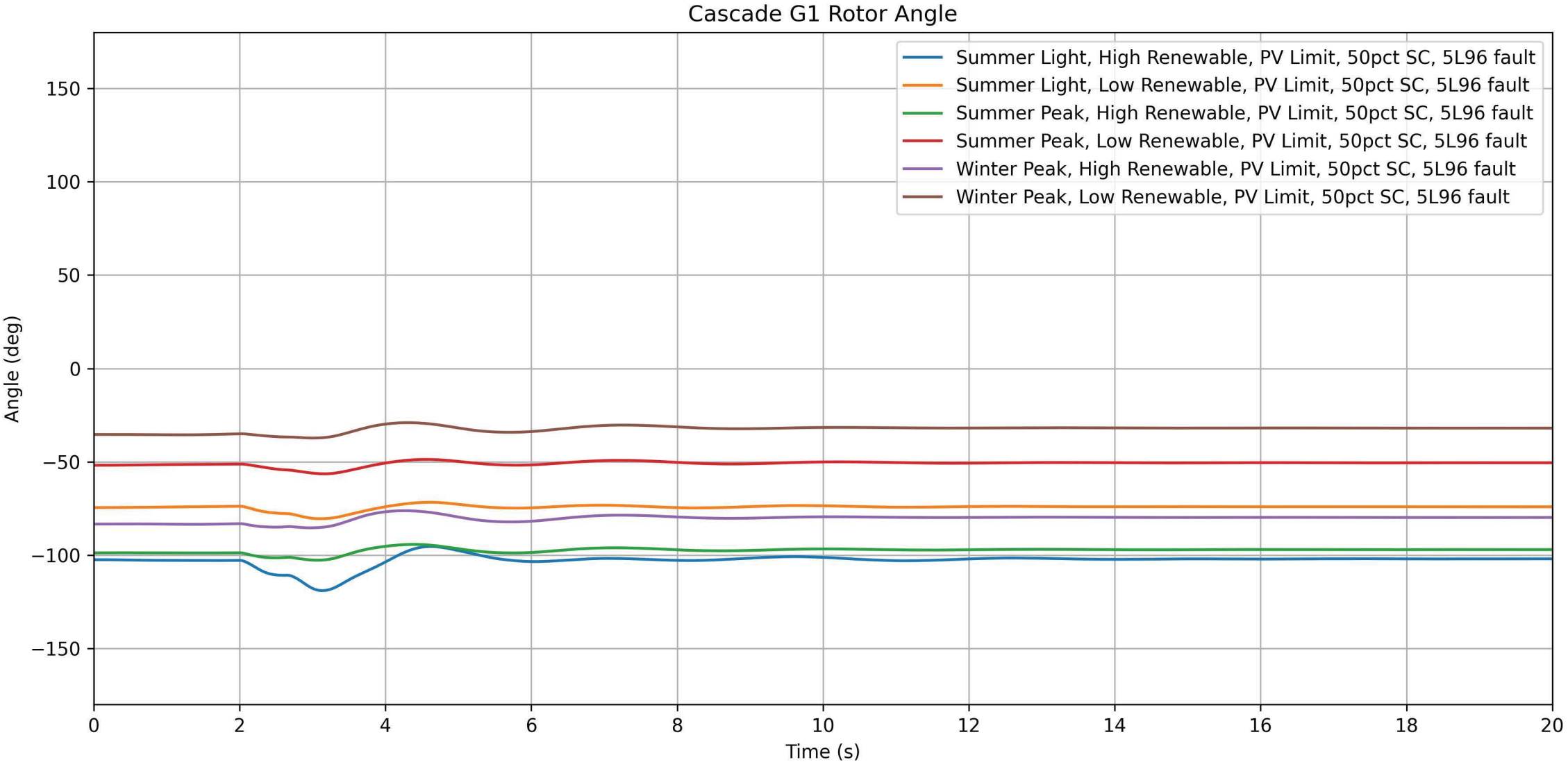

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

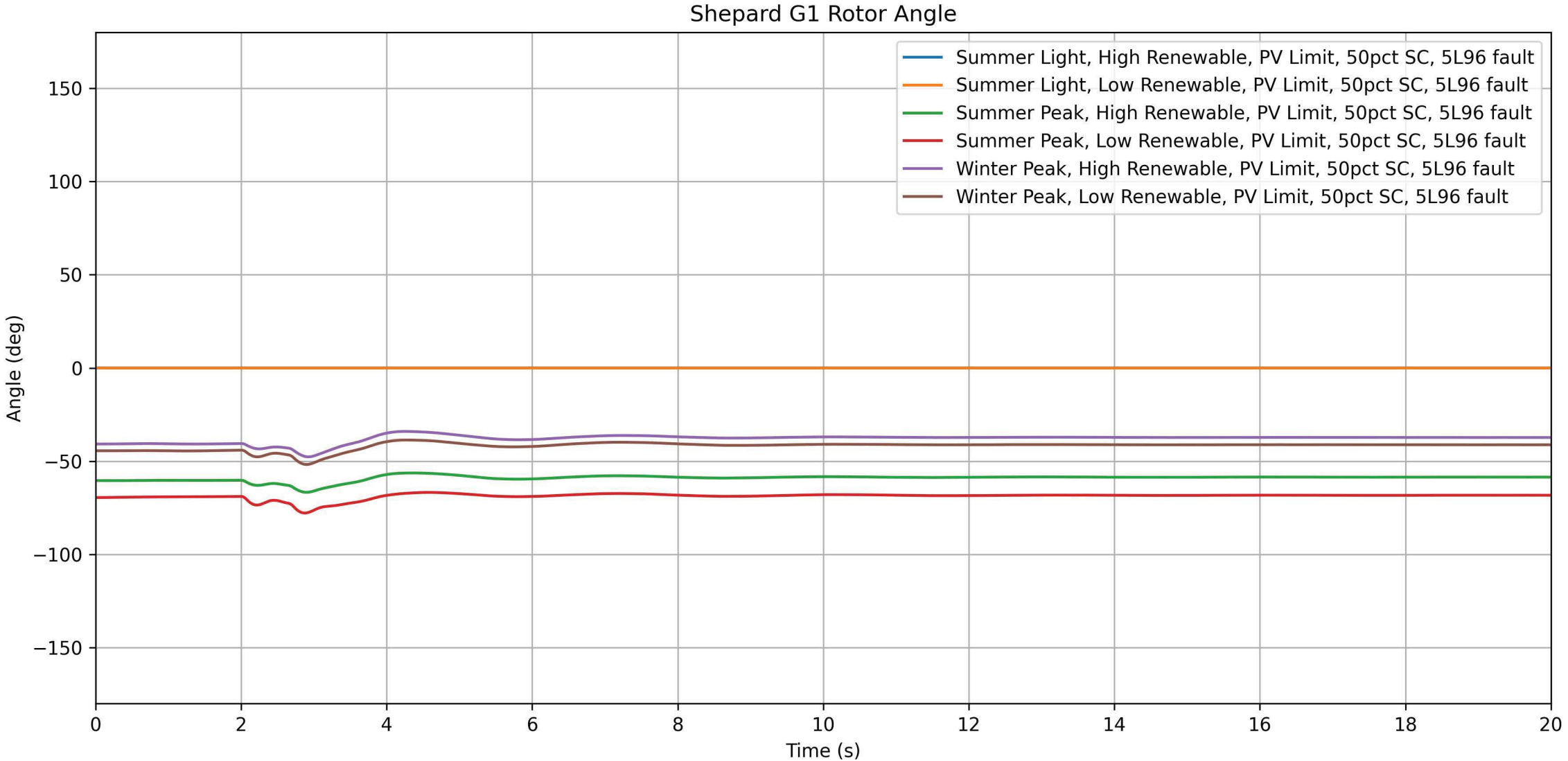

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

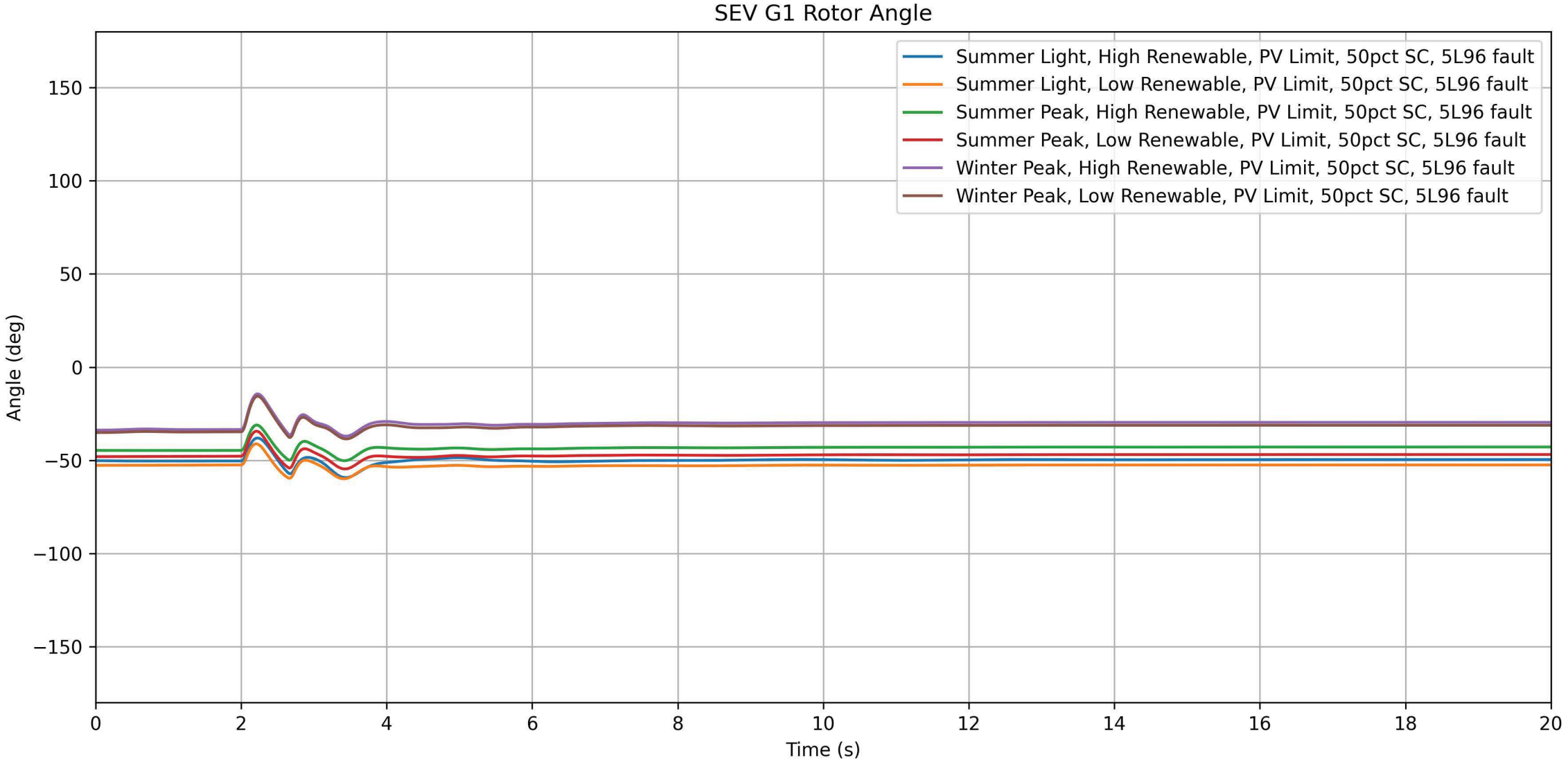

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

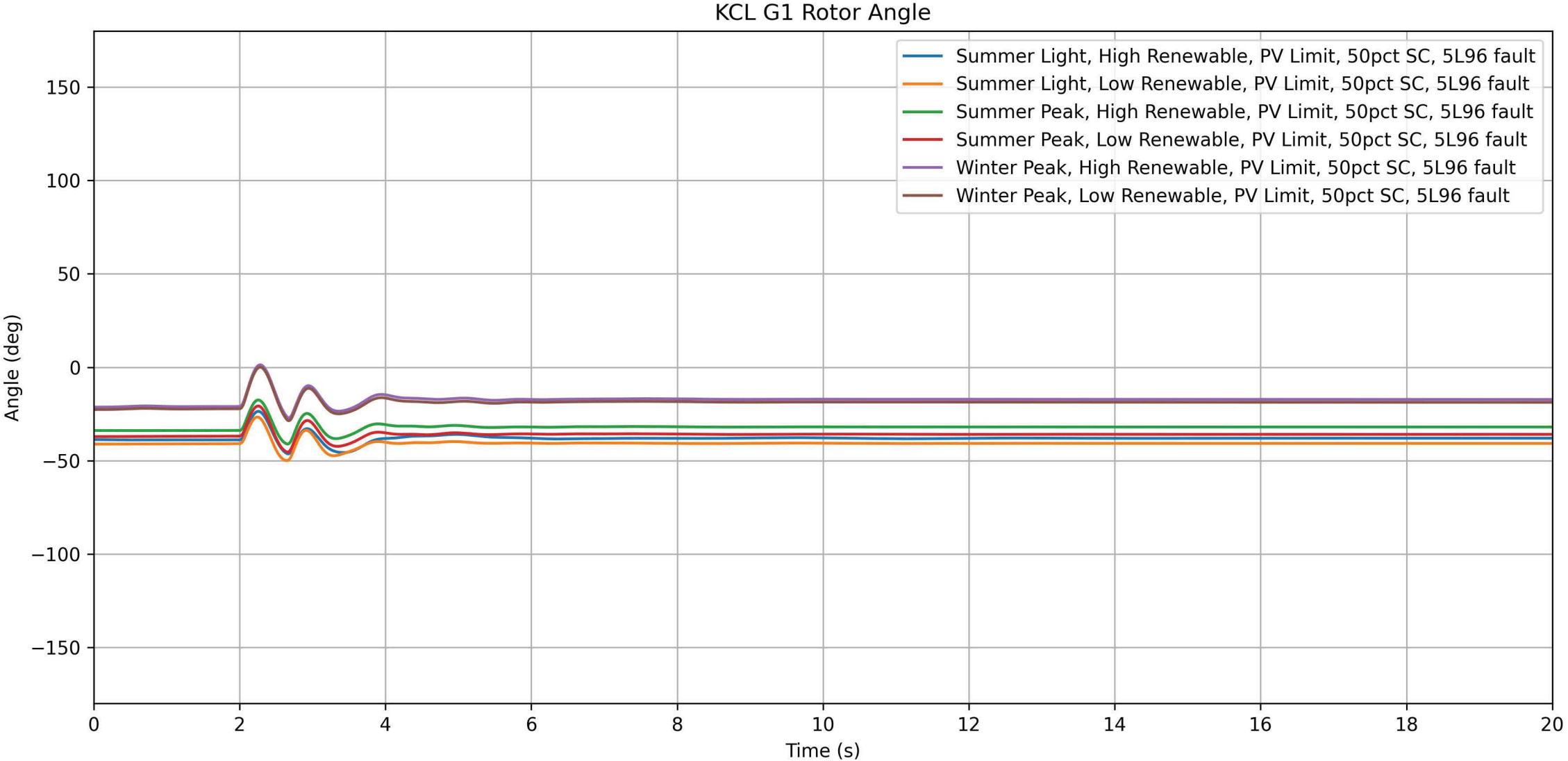

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

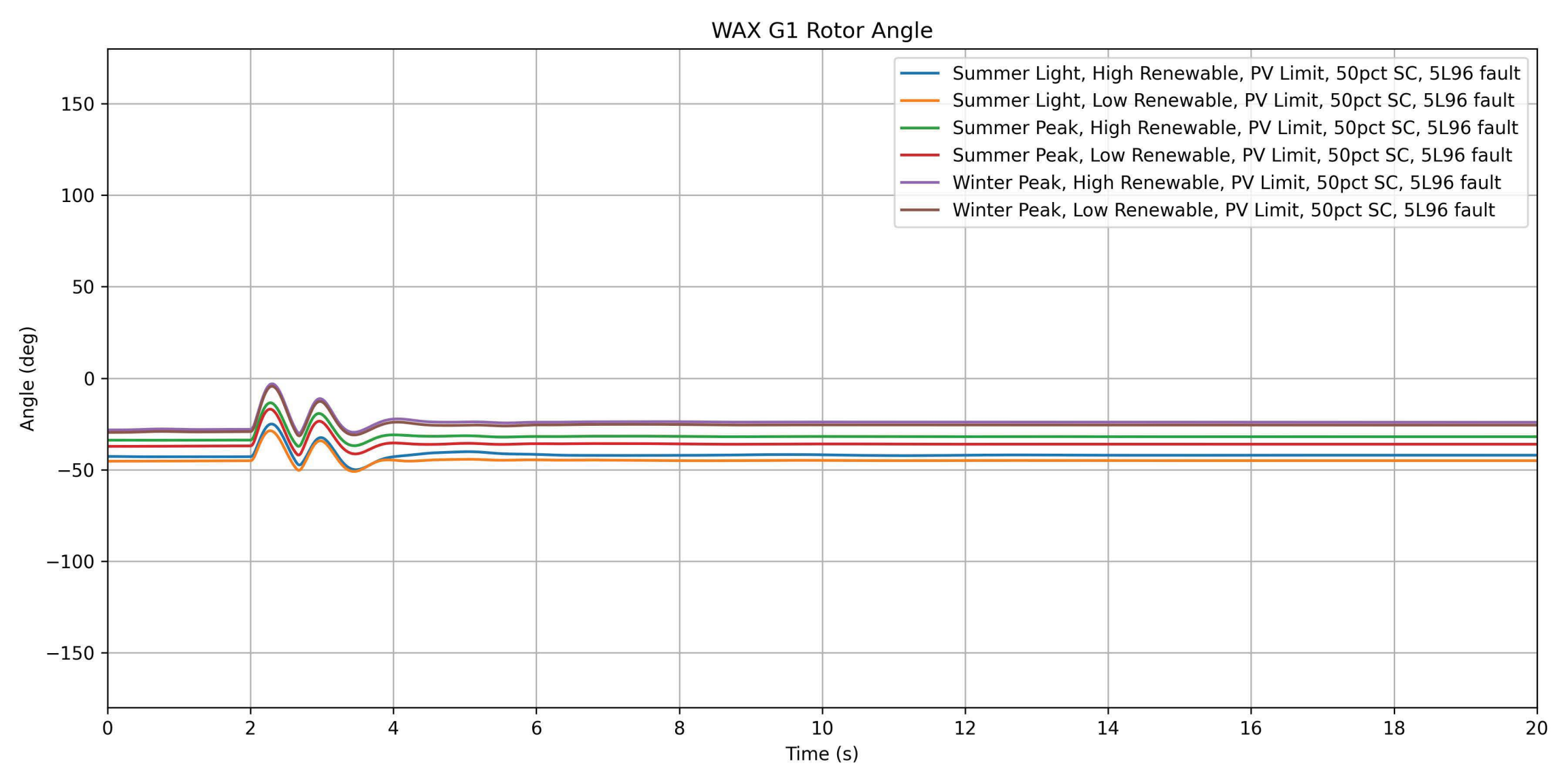

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

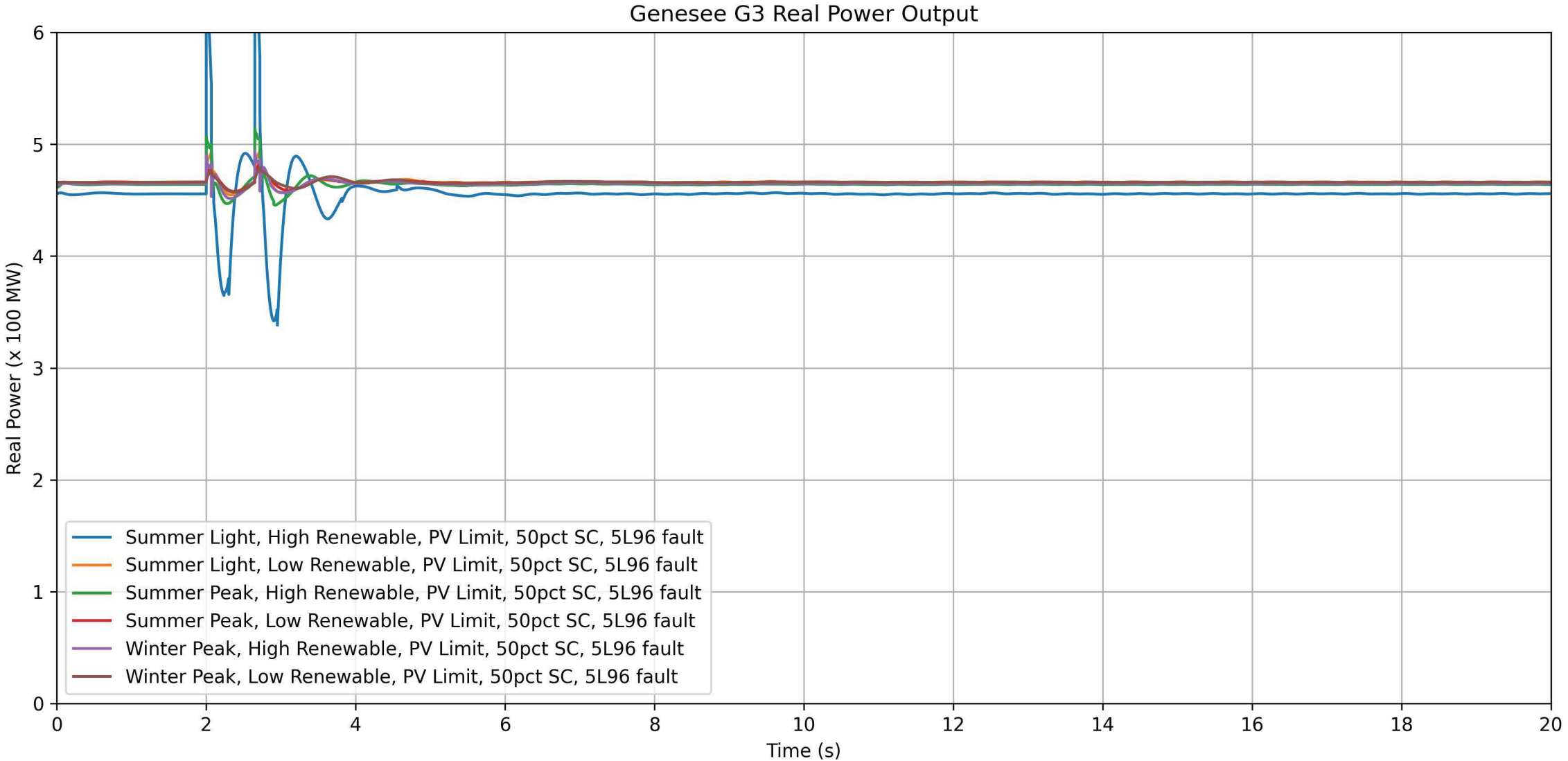

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

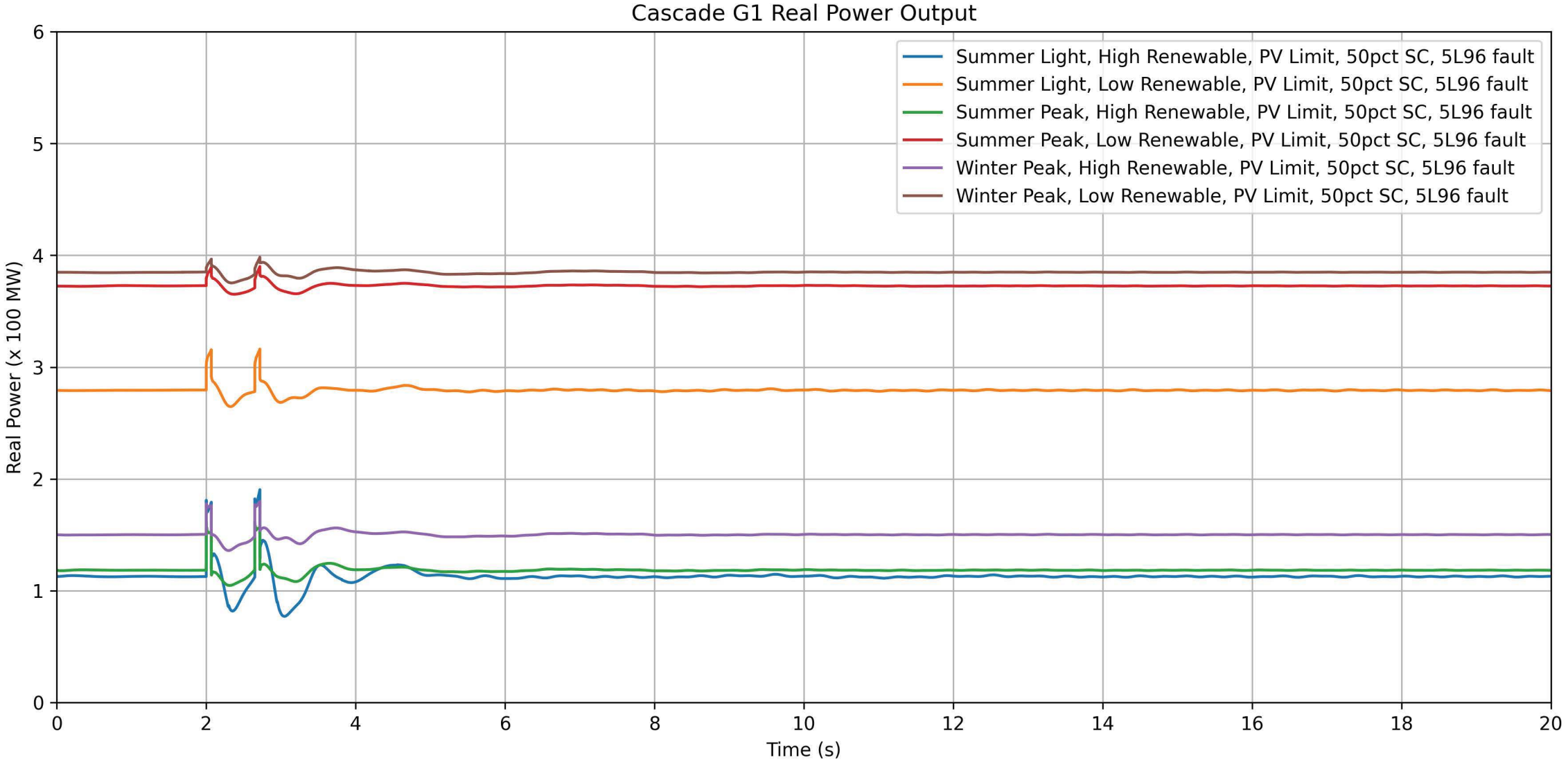

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

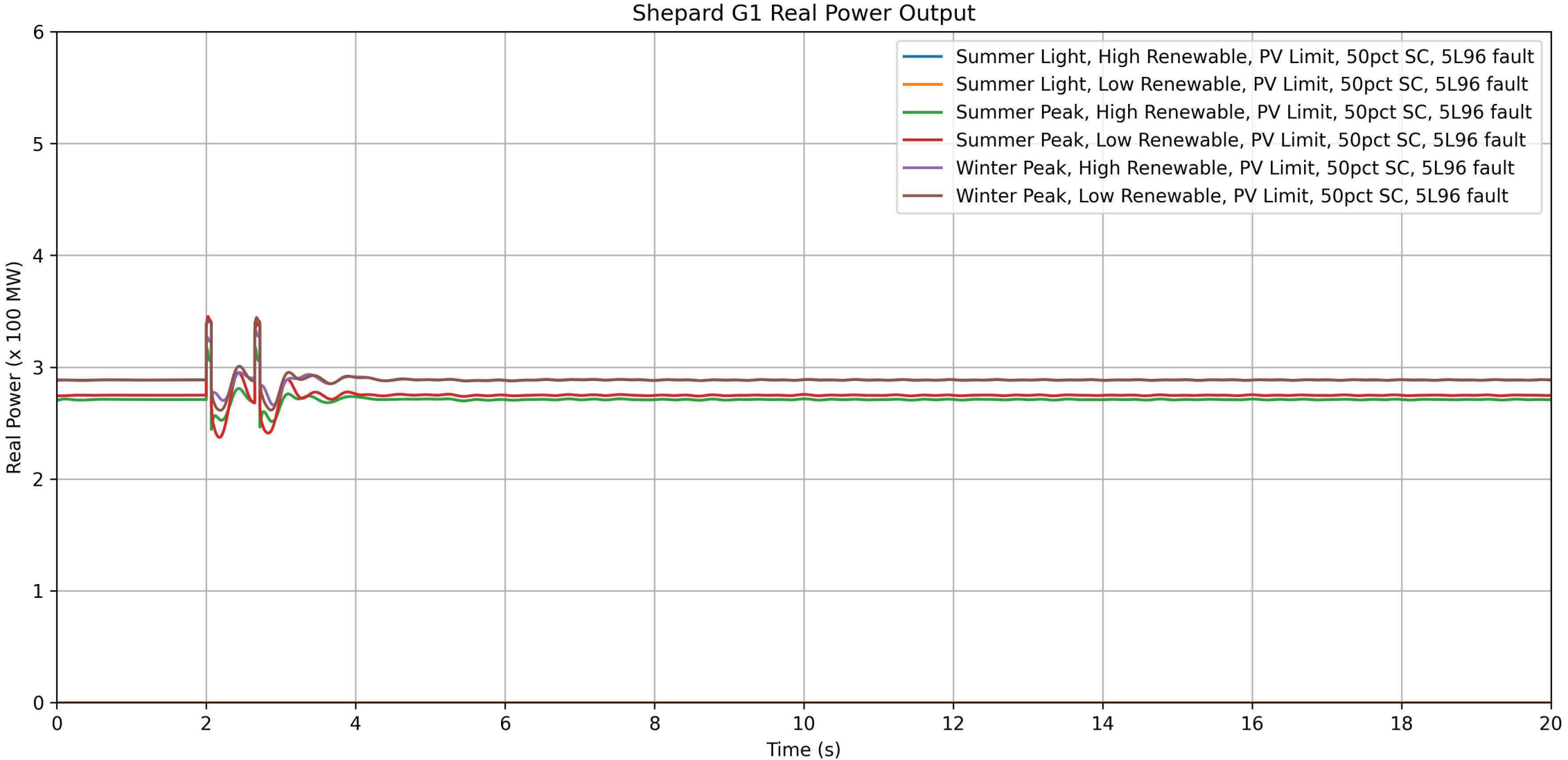

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

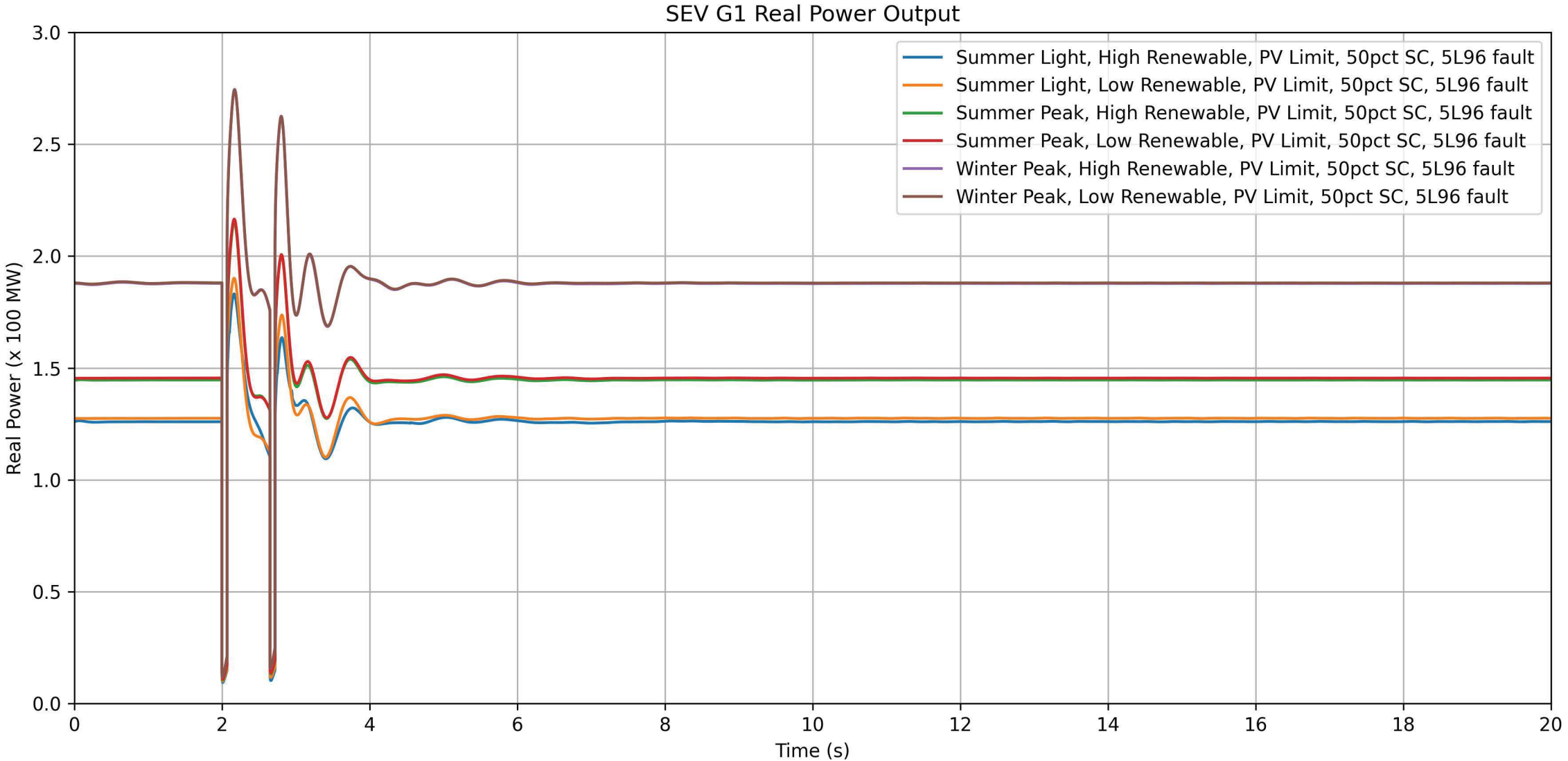

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

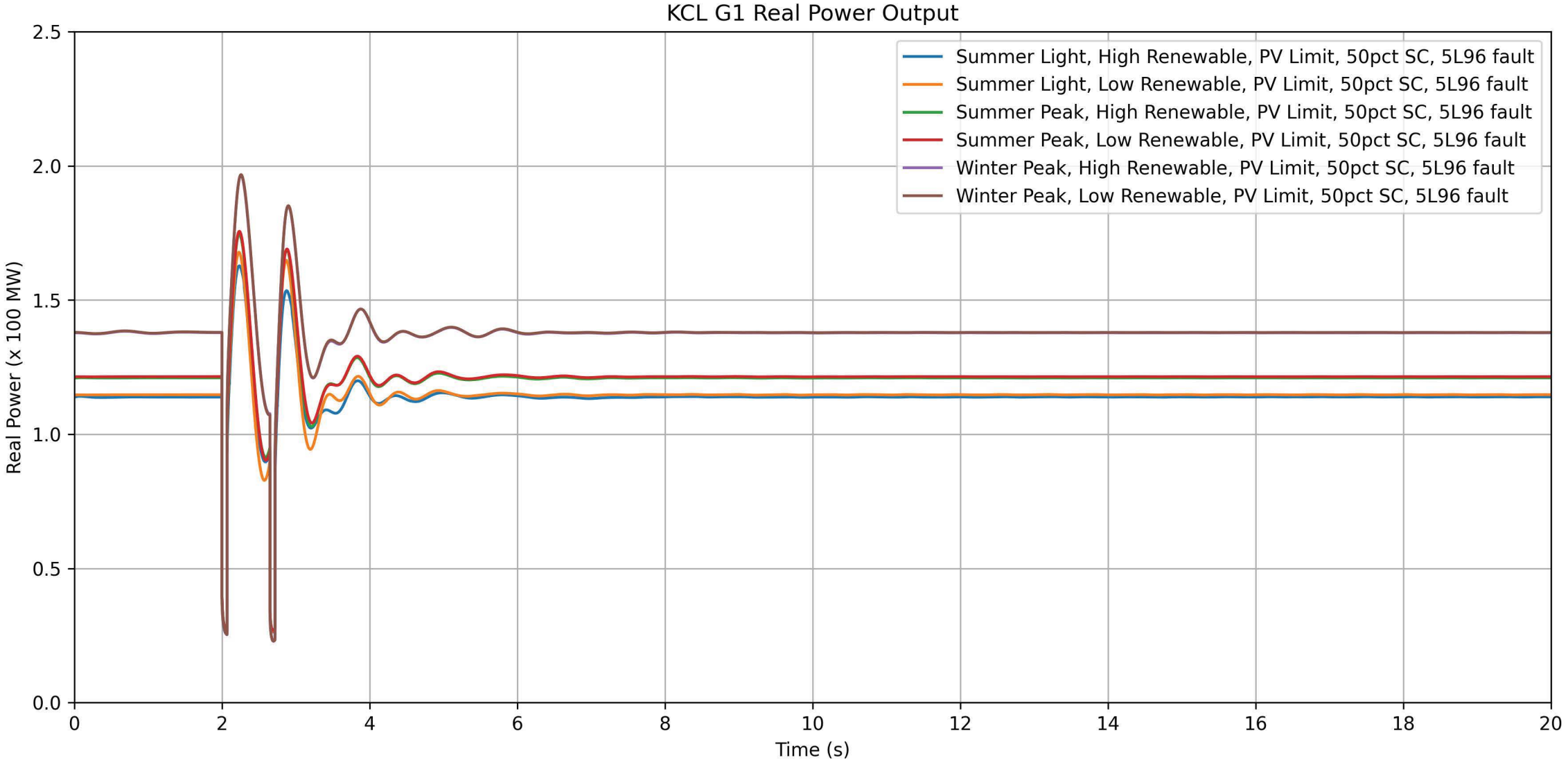

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

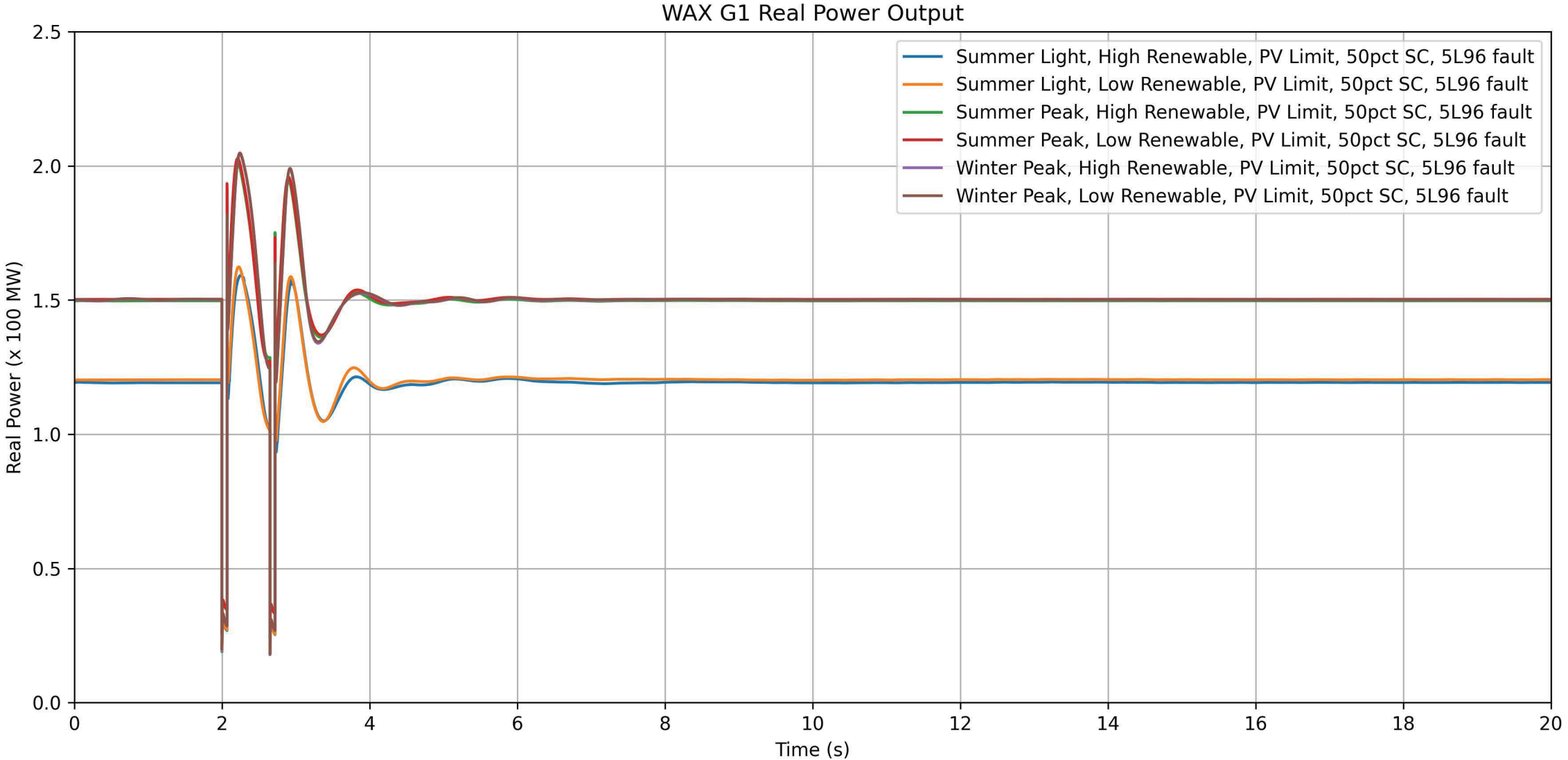

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault

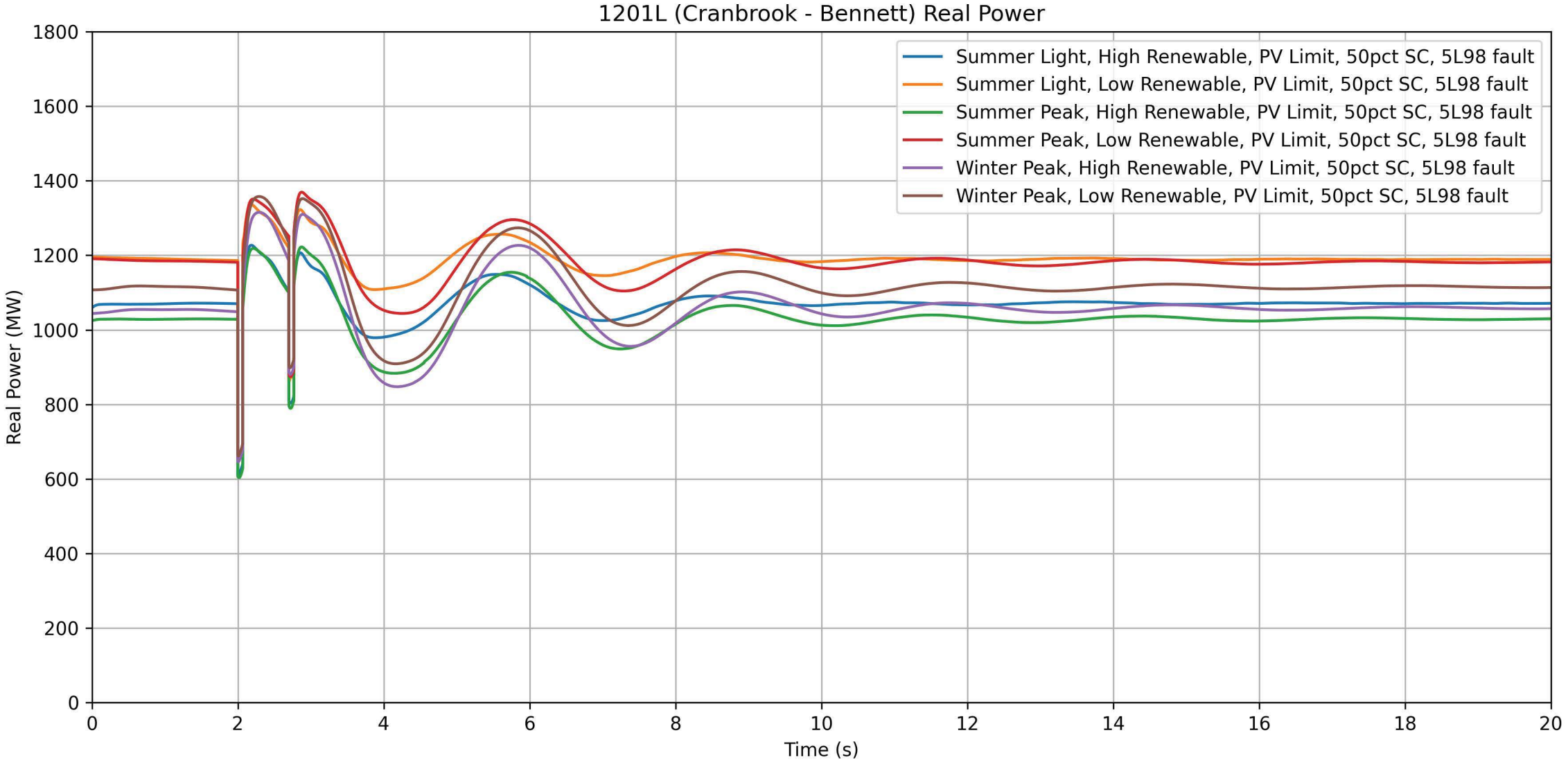

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

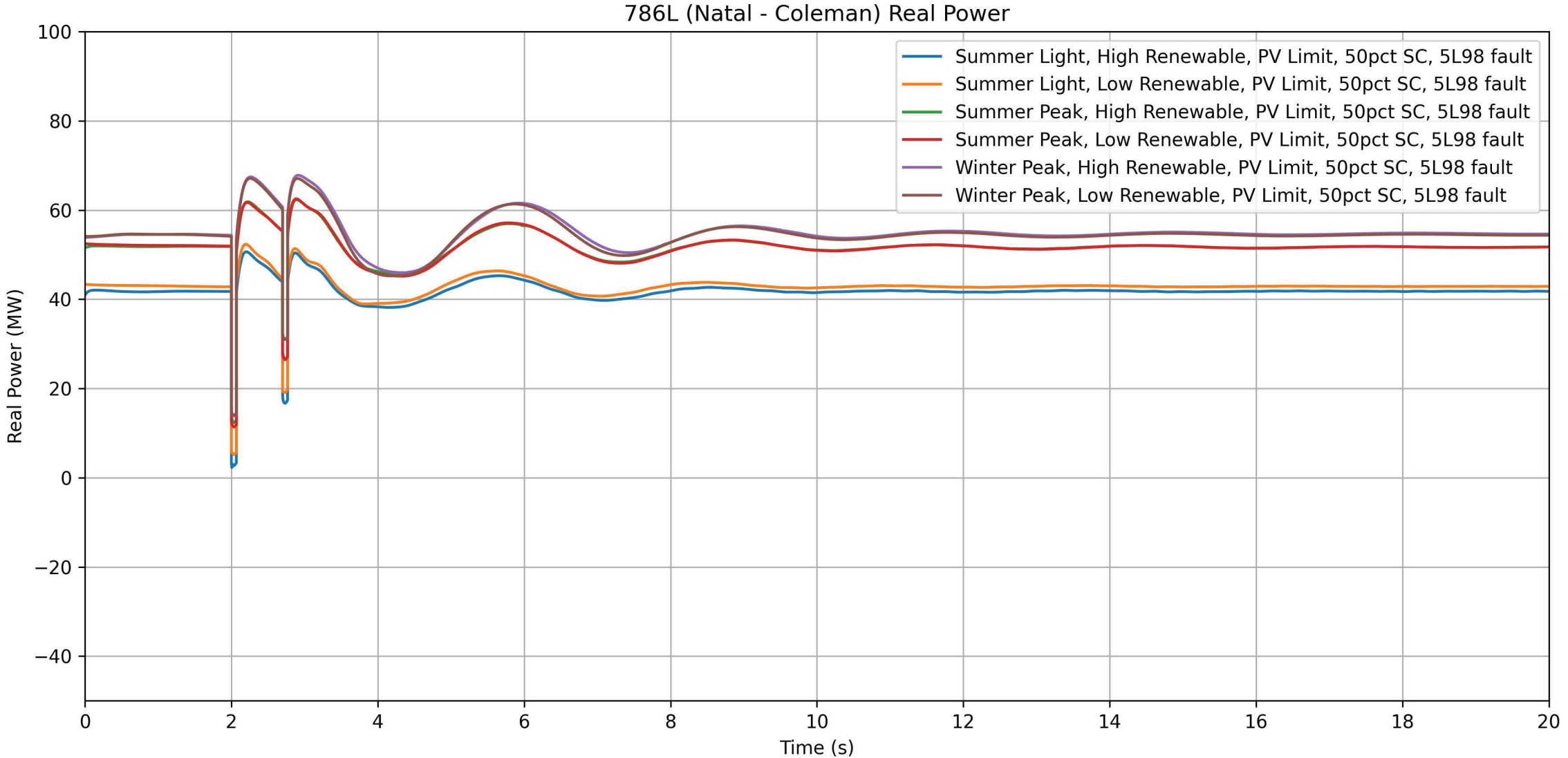

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

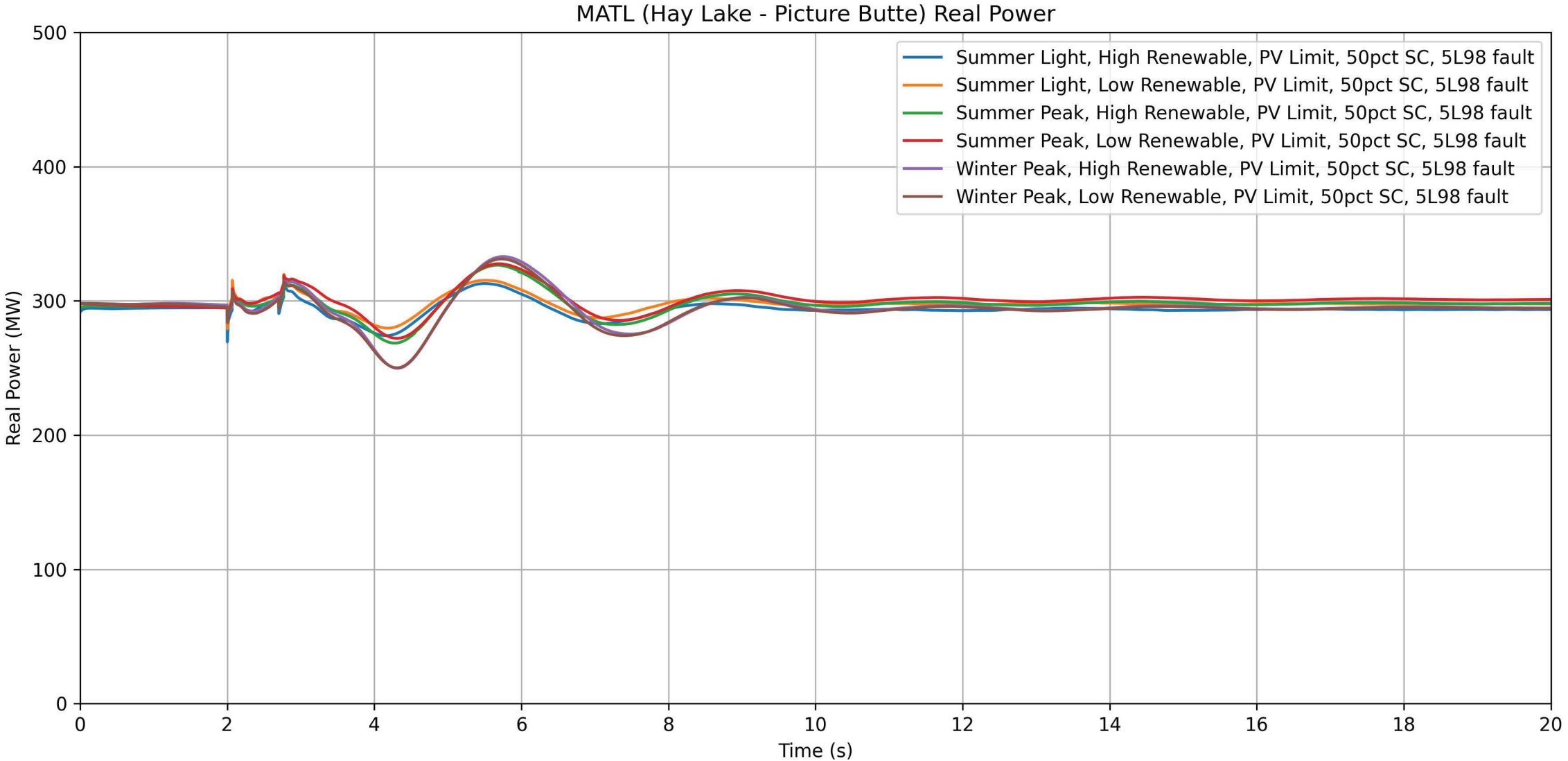

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

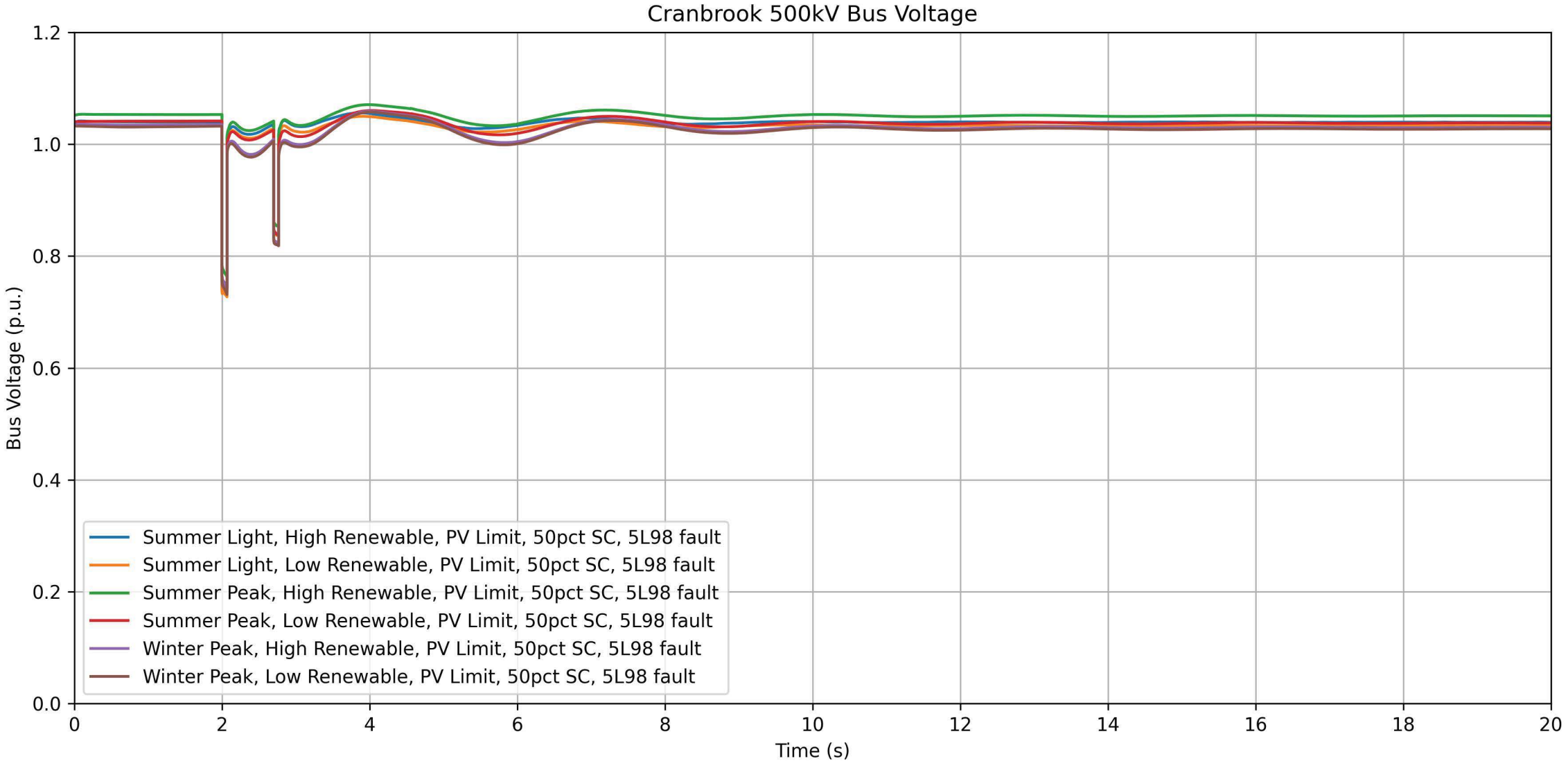

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

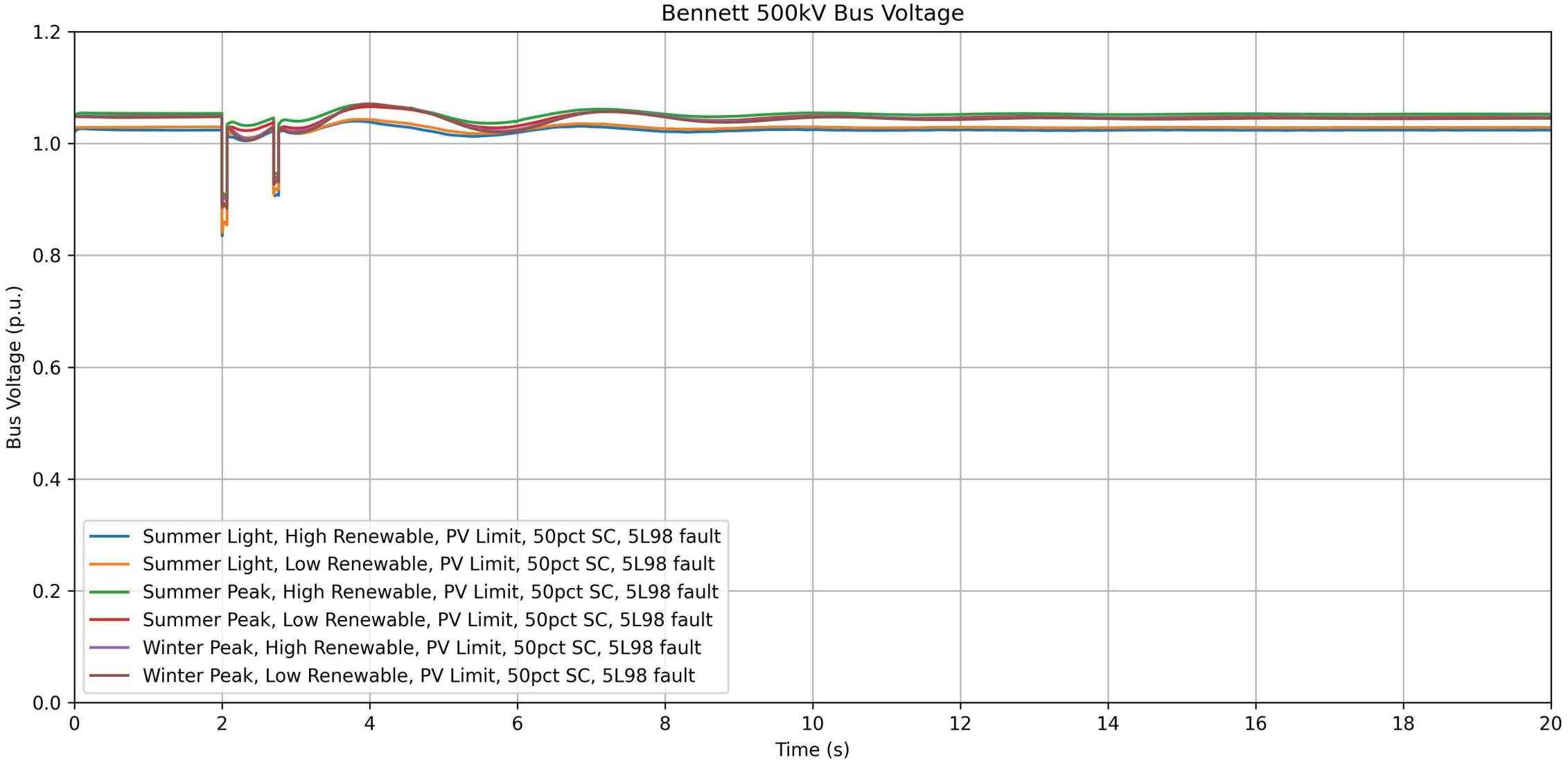

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L96 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L96 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

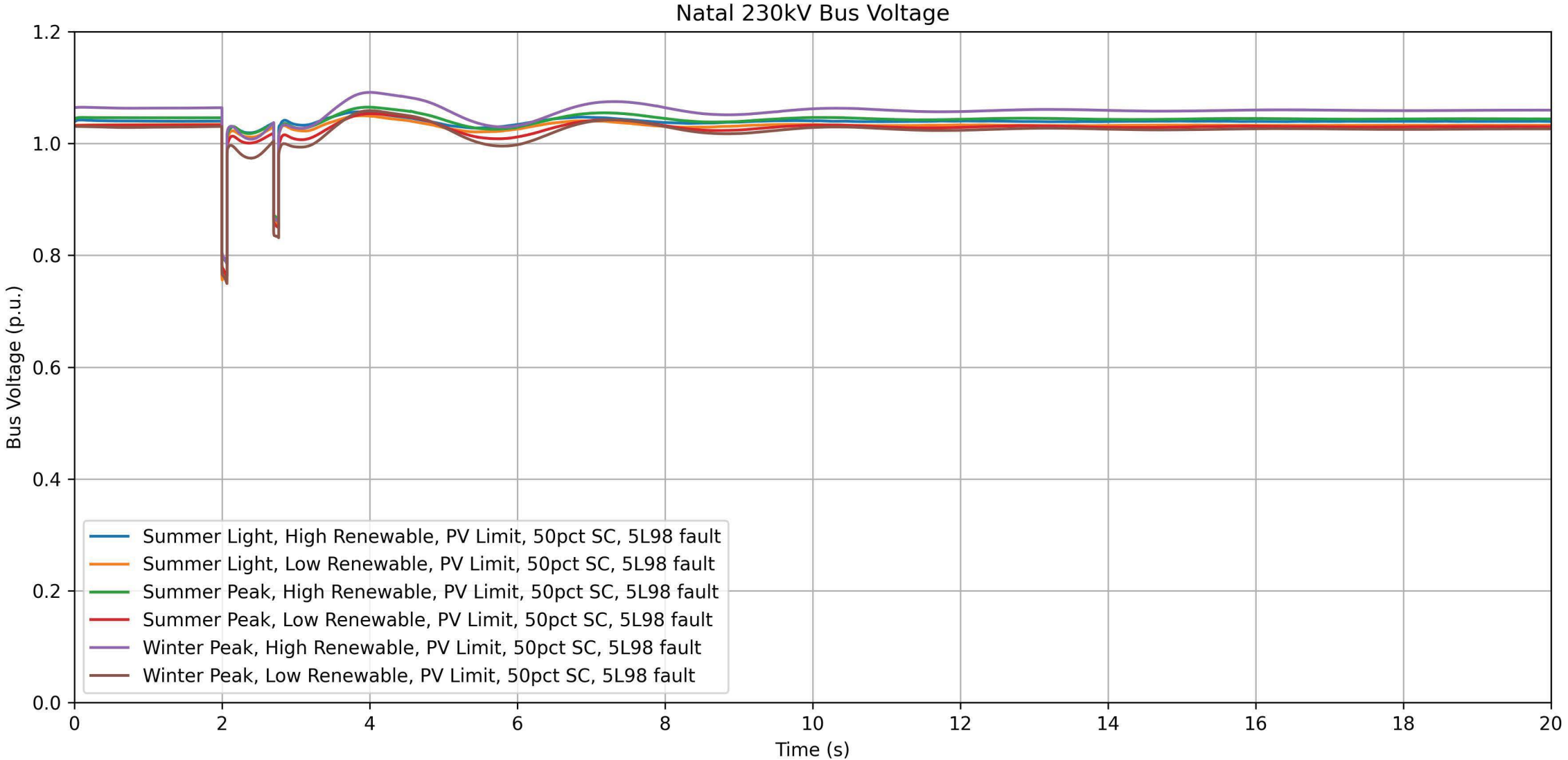

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

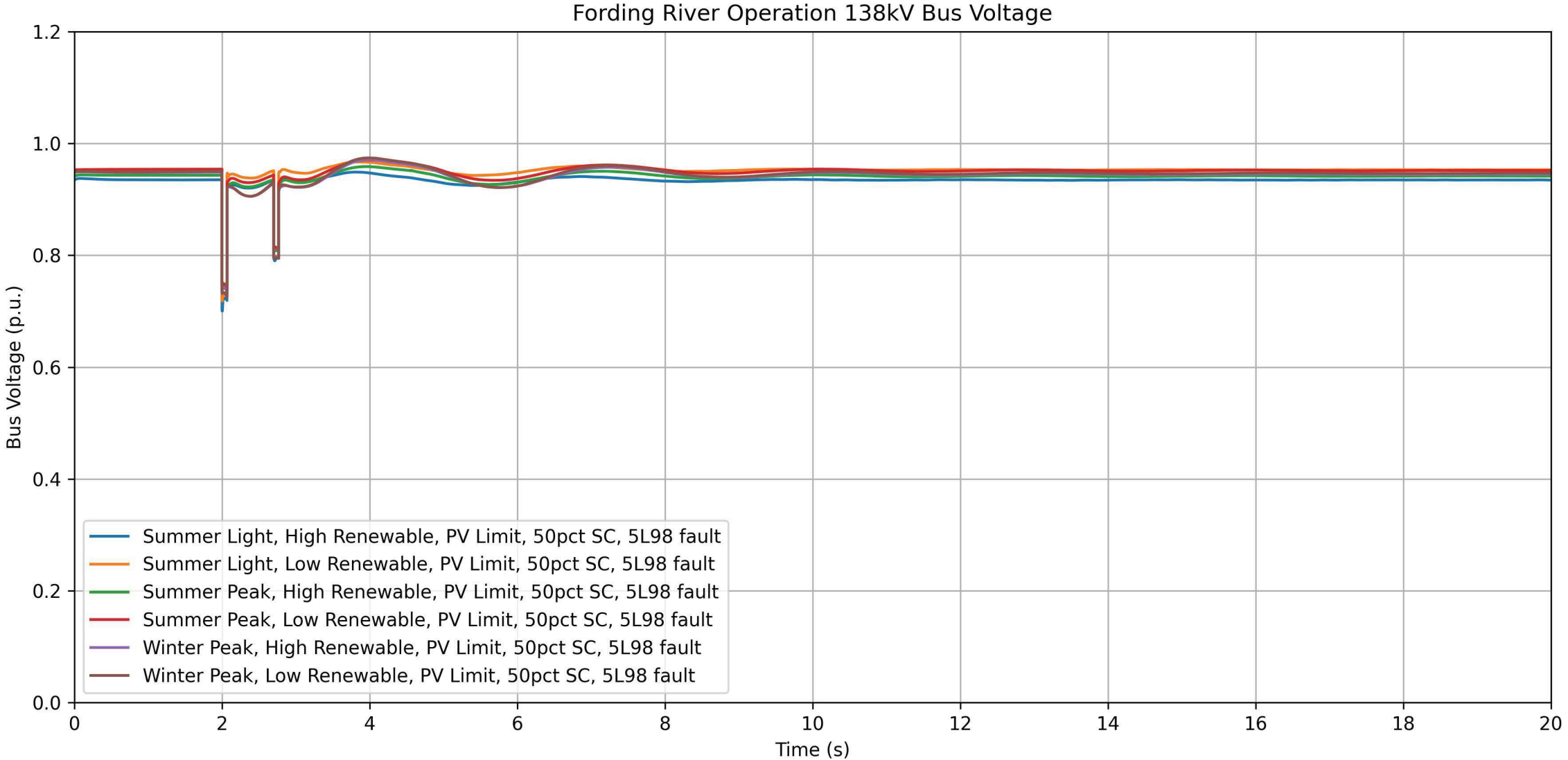

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

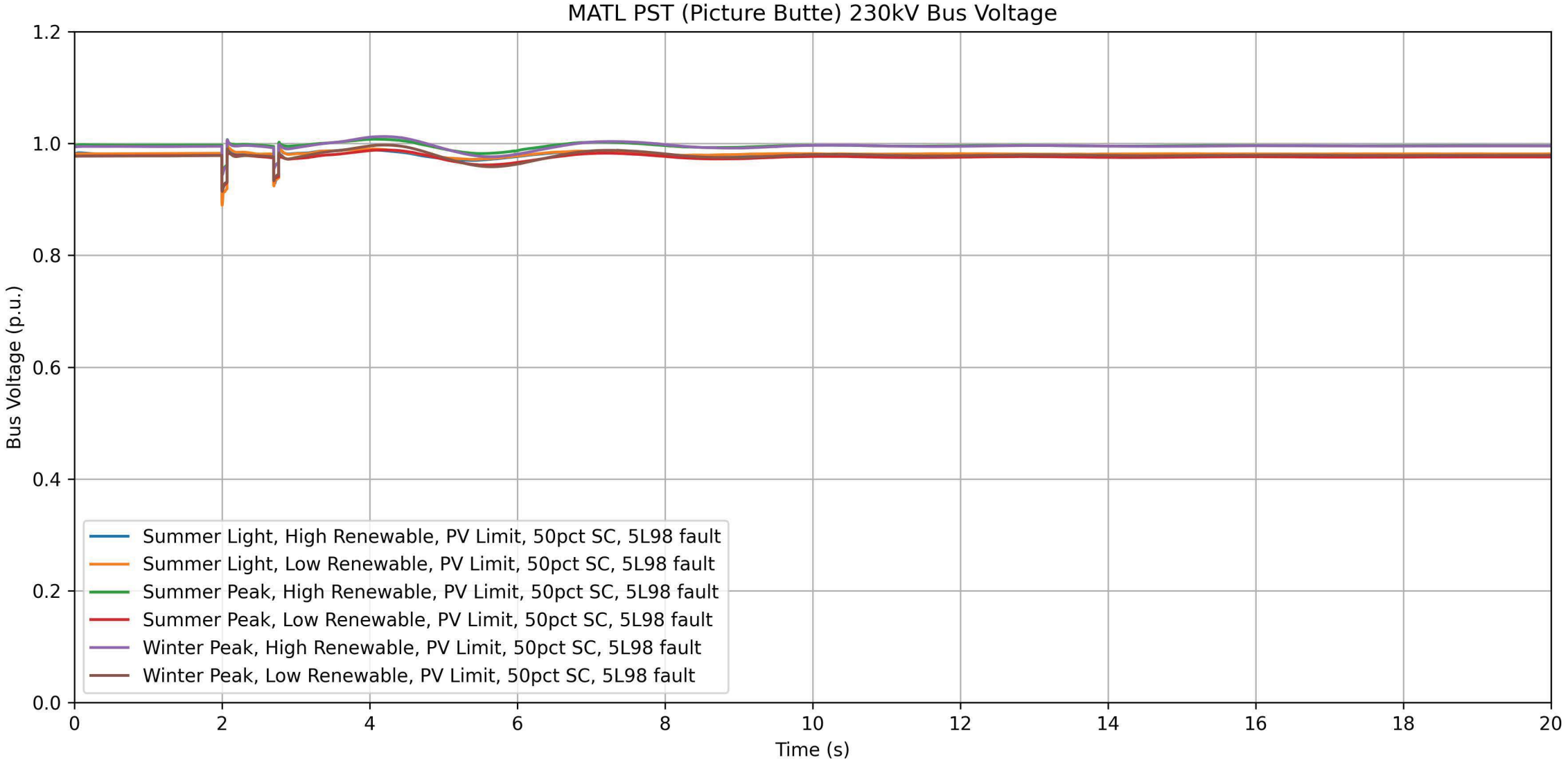

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

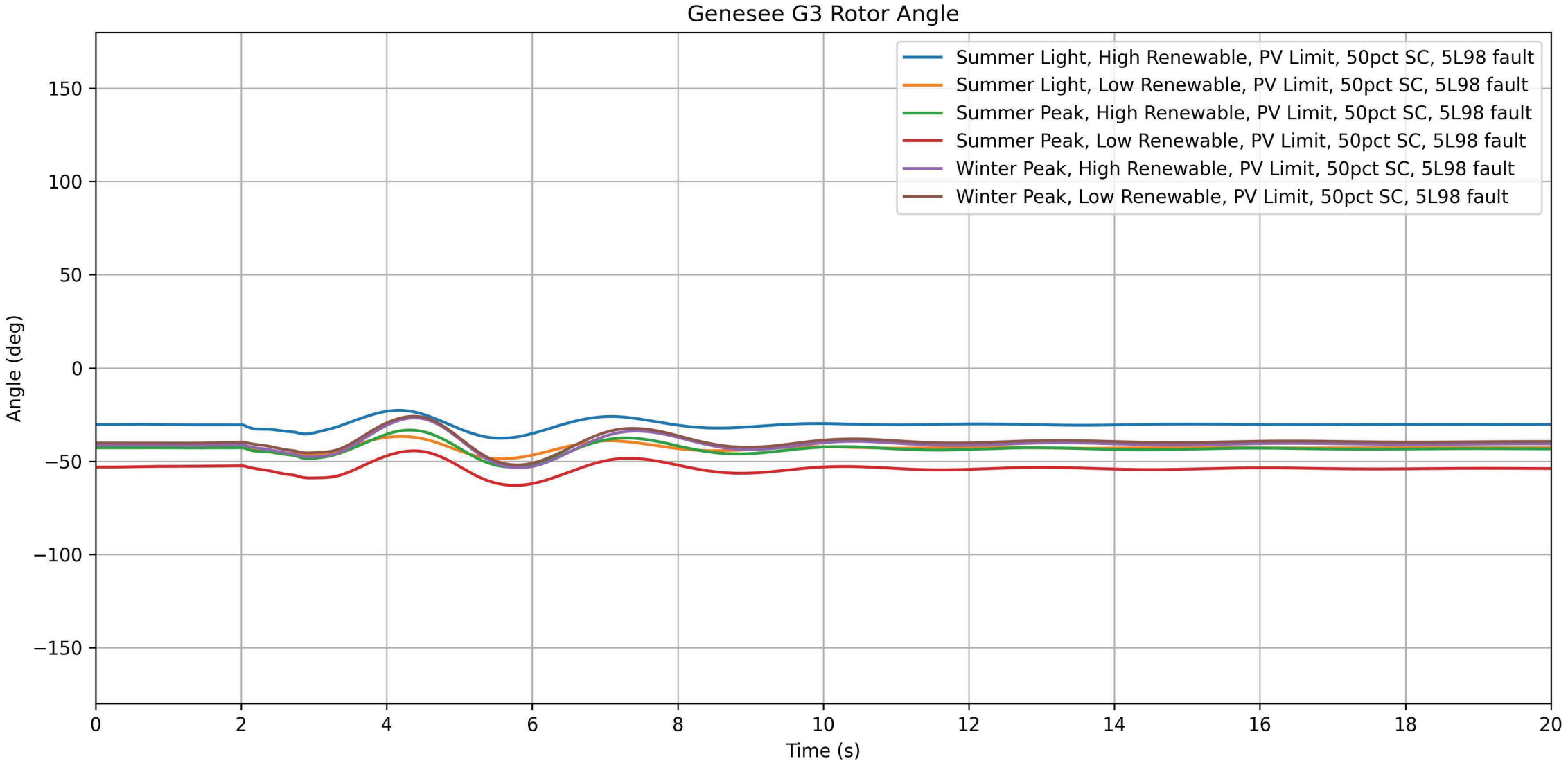

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

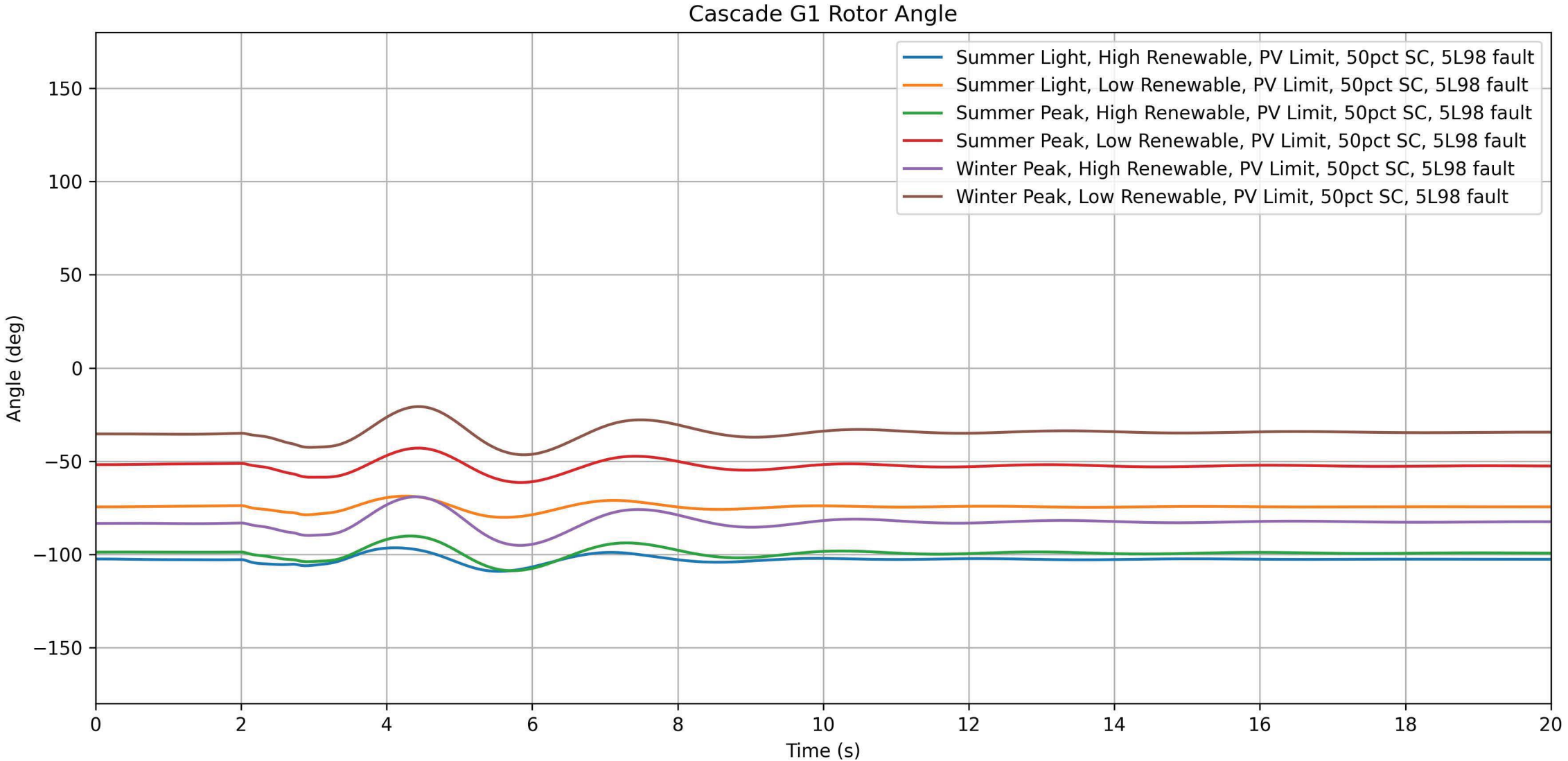

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

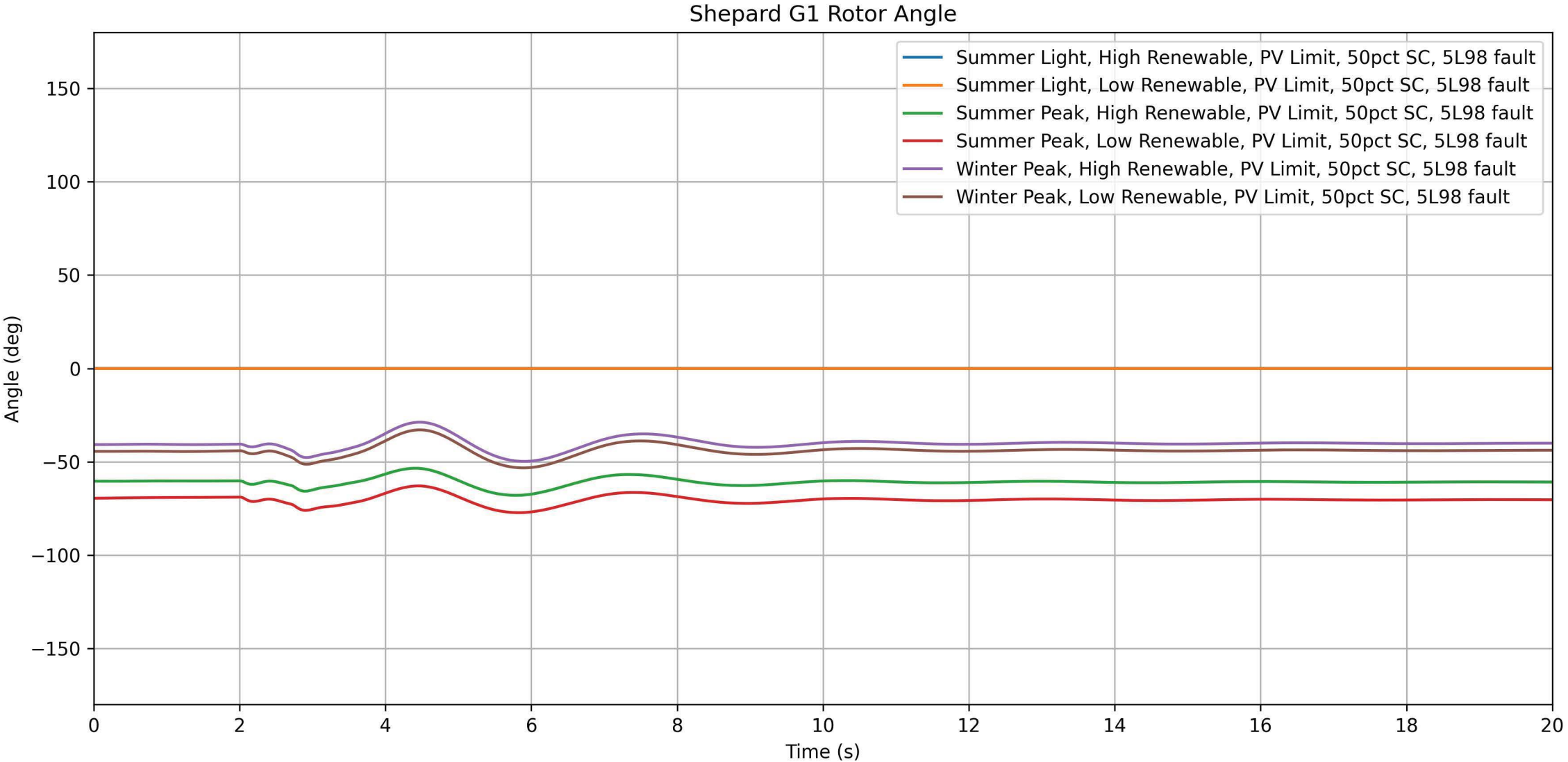

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

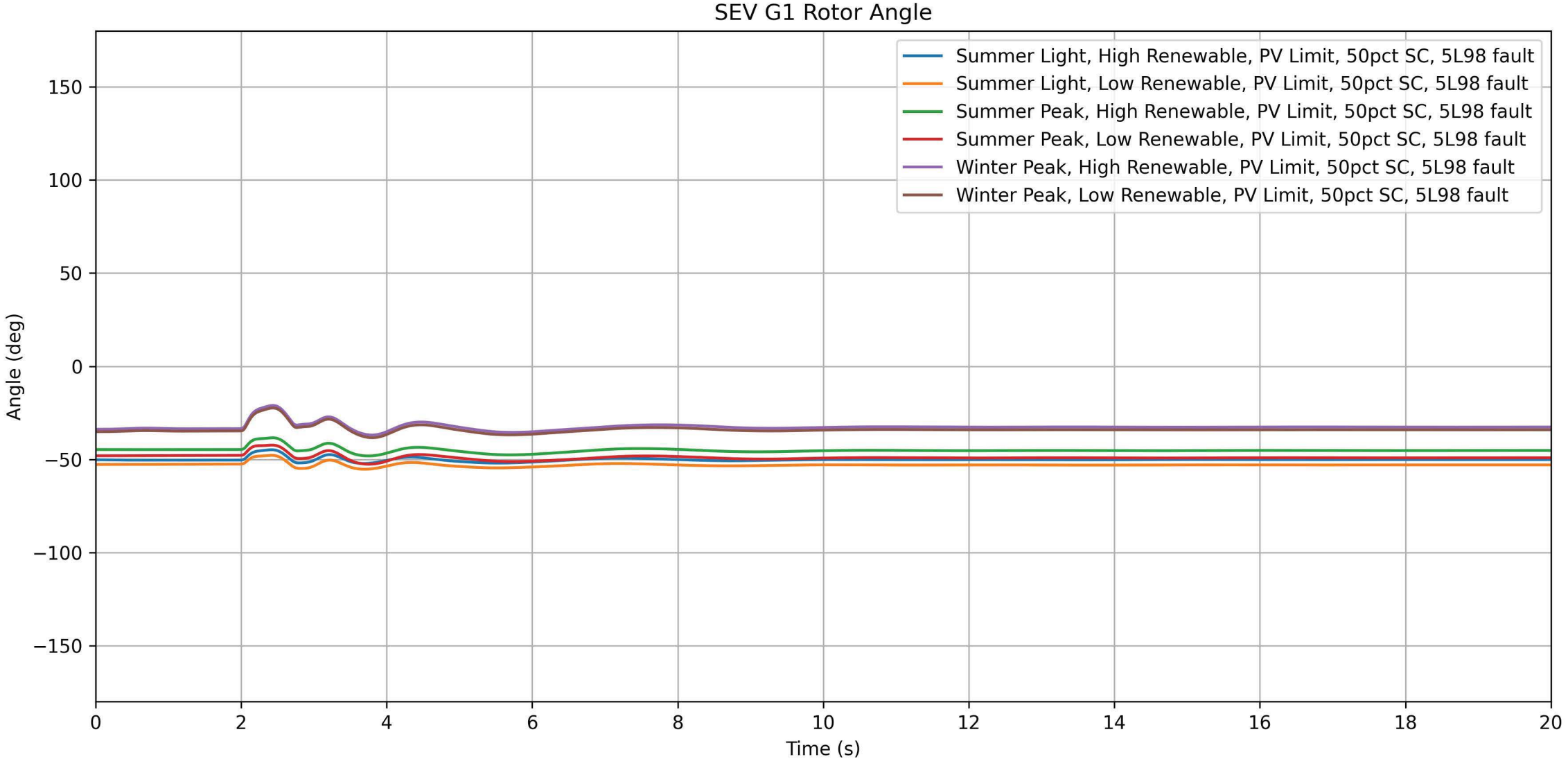

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

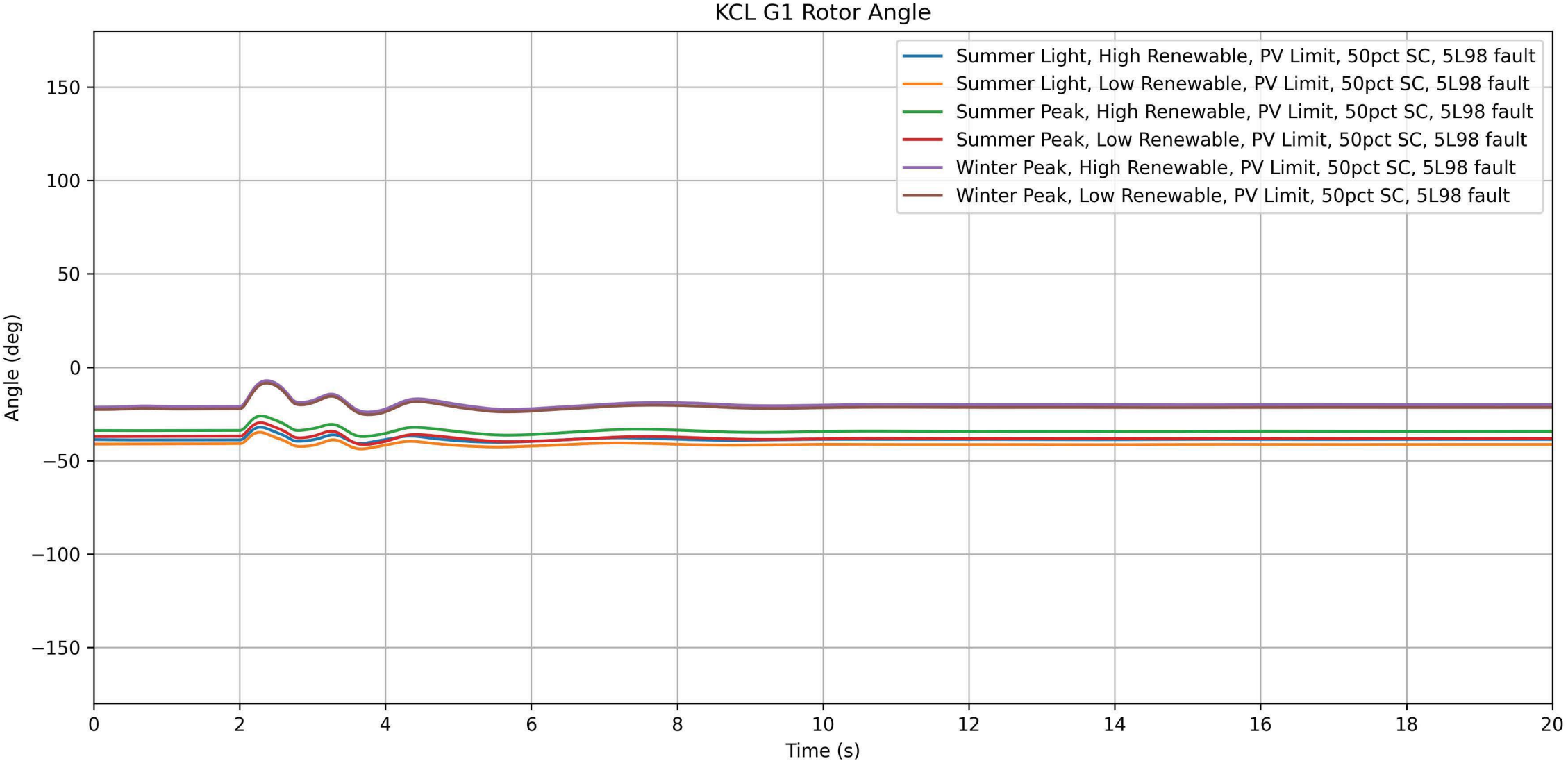

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

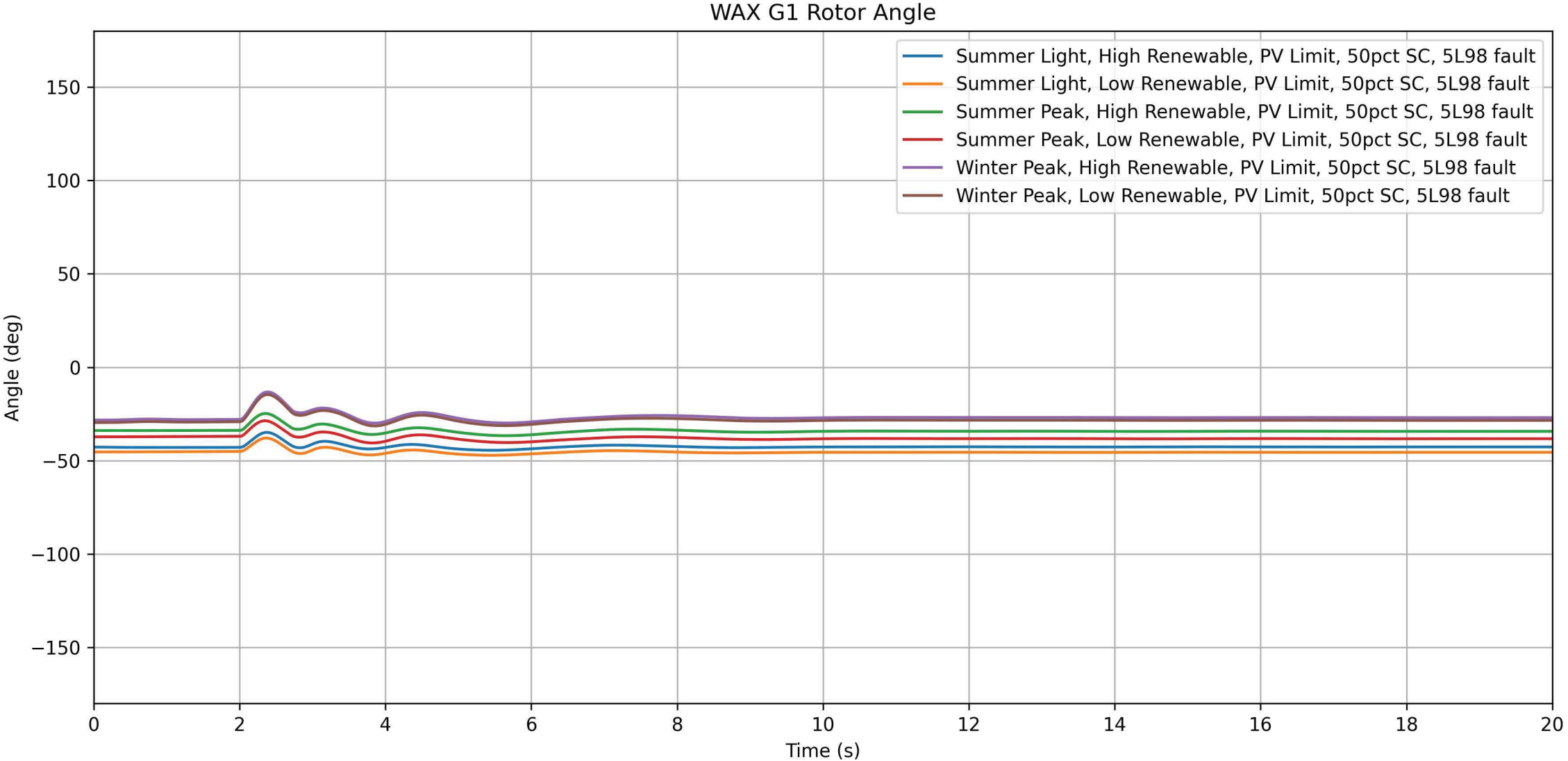

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

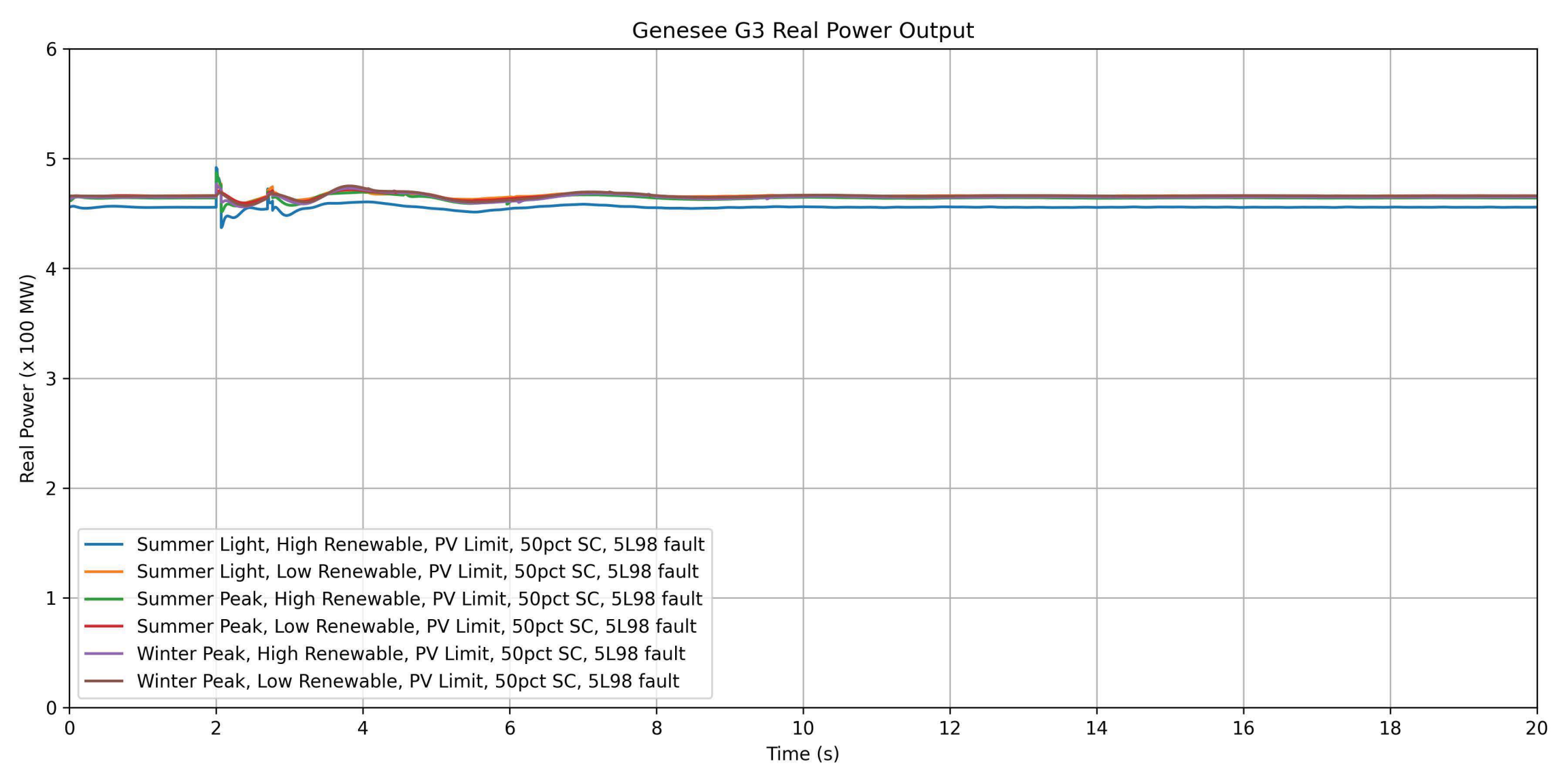

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

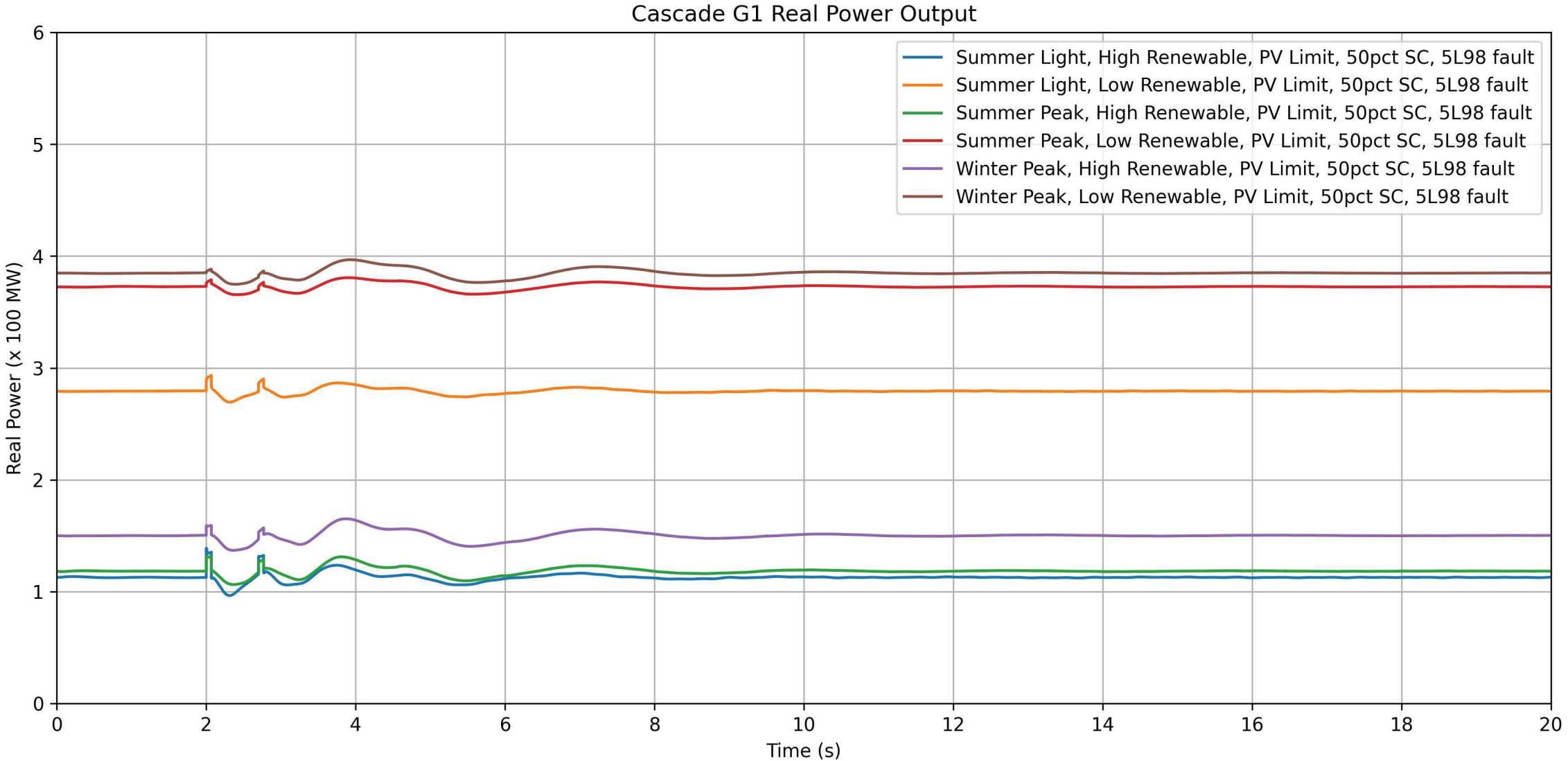

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

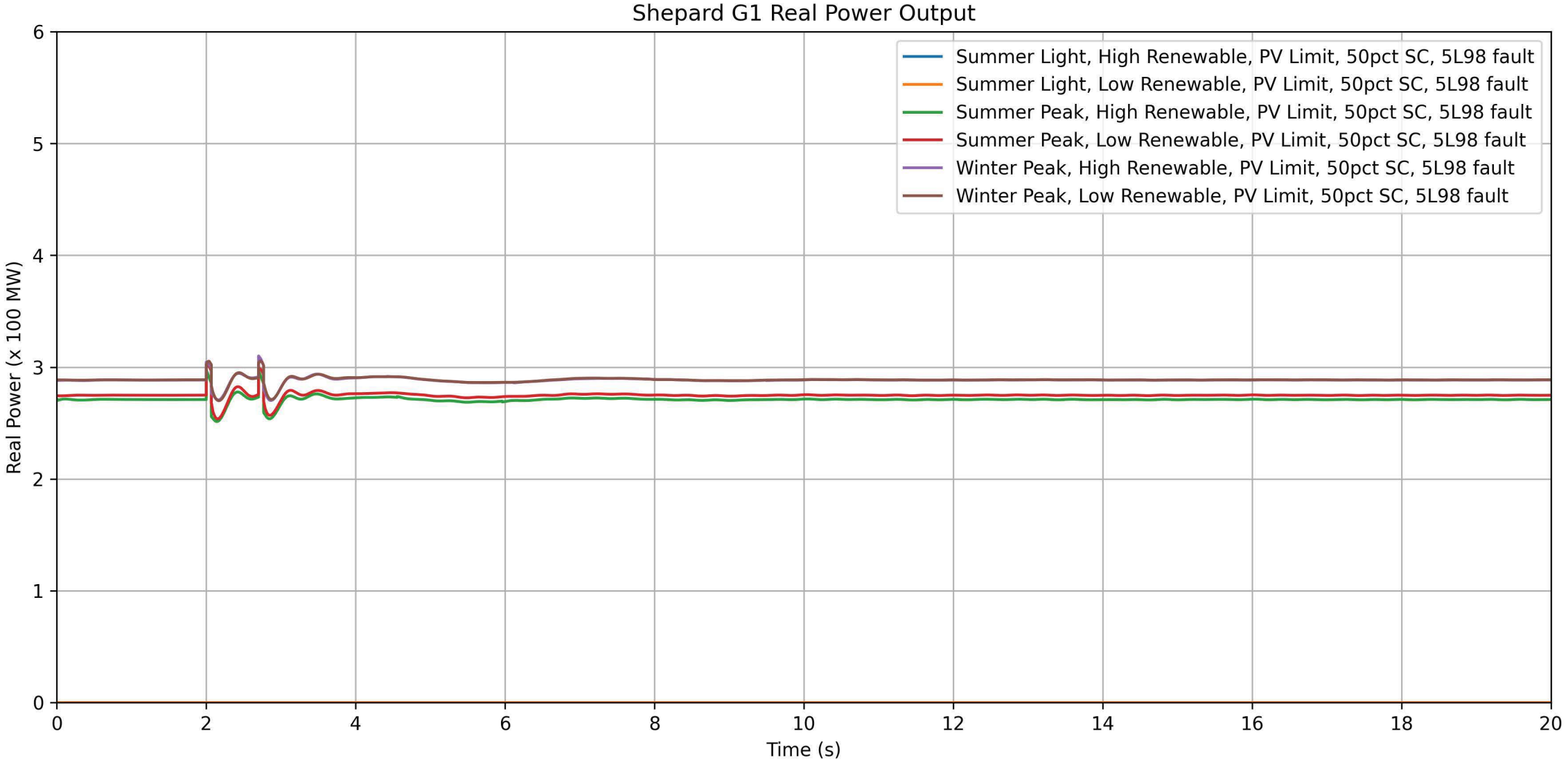

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

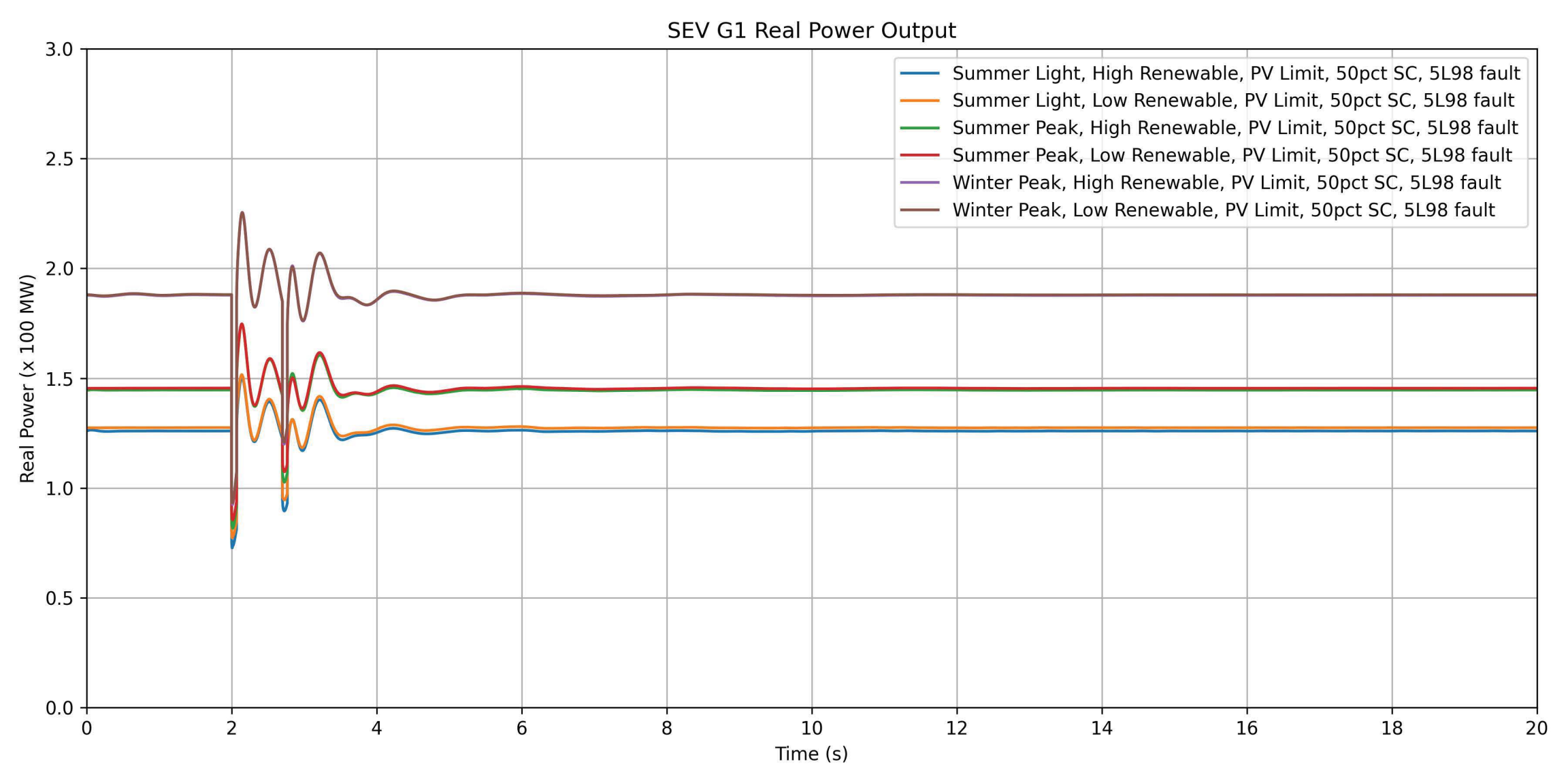

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

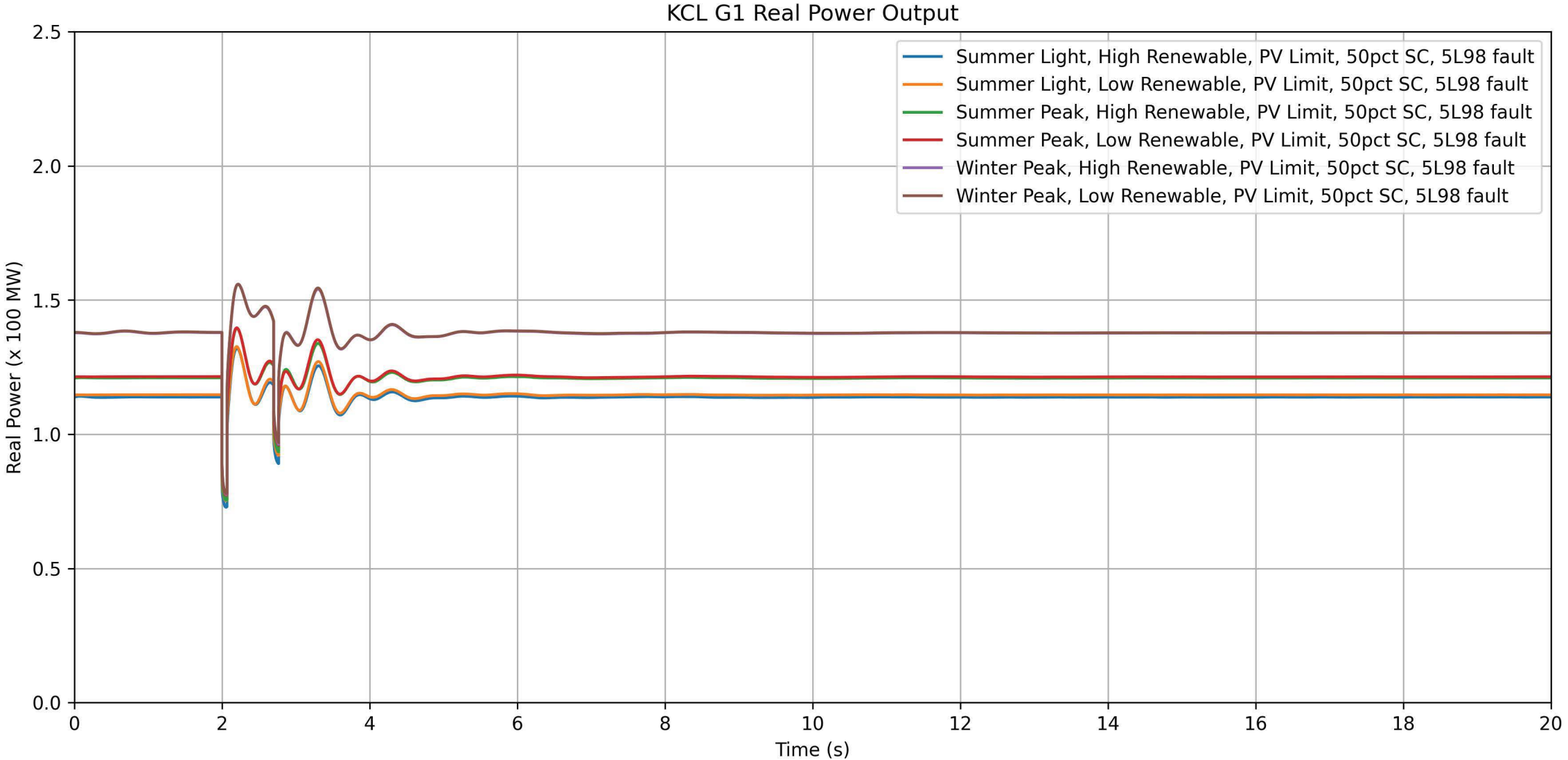

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

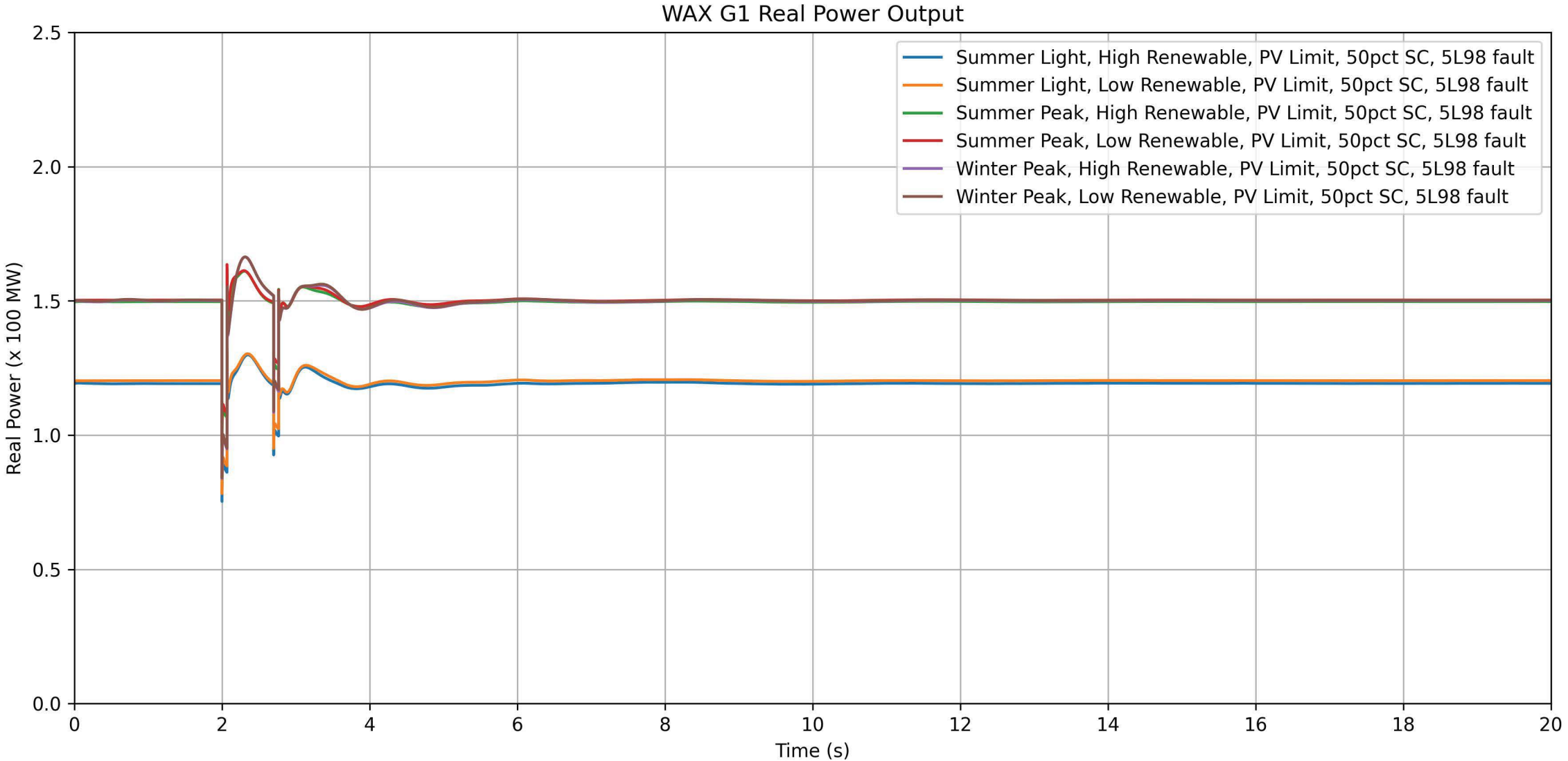

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault

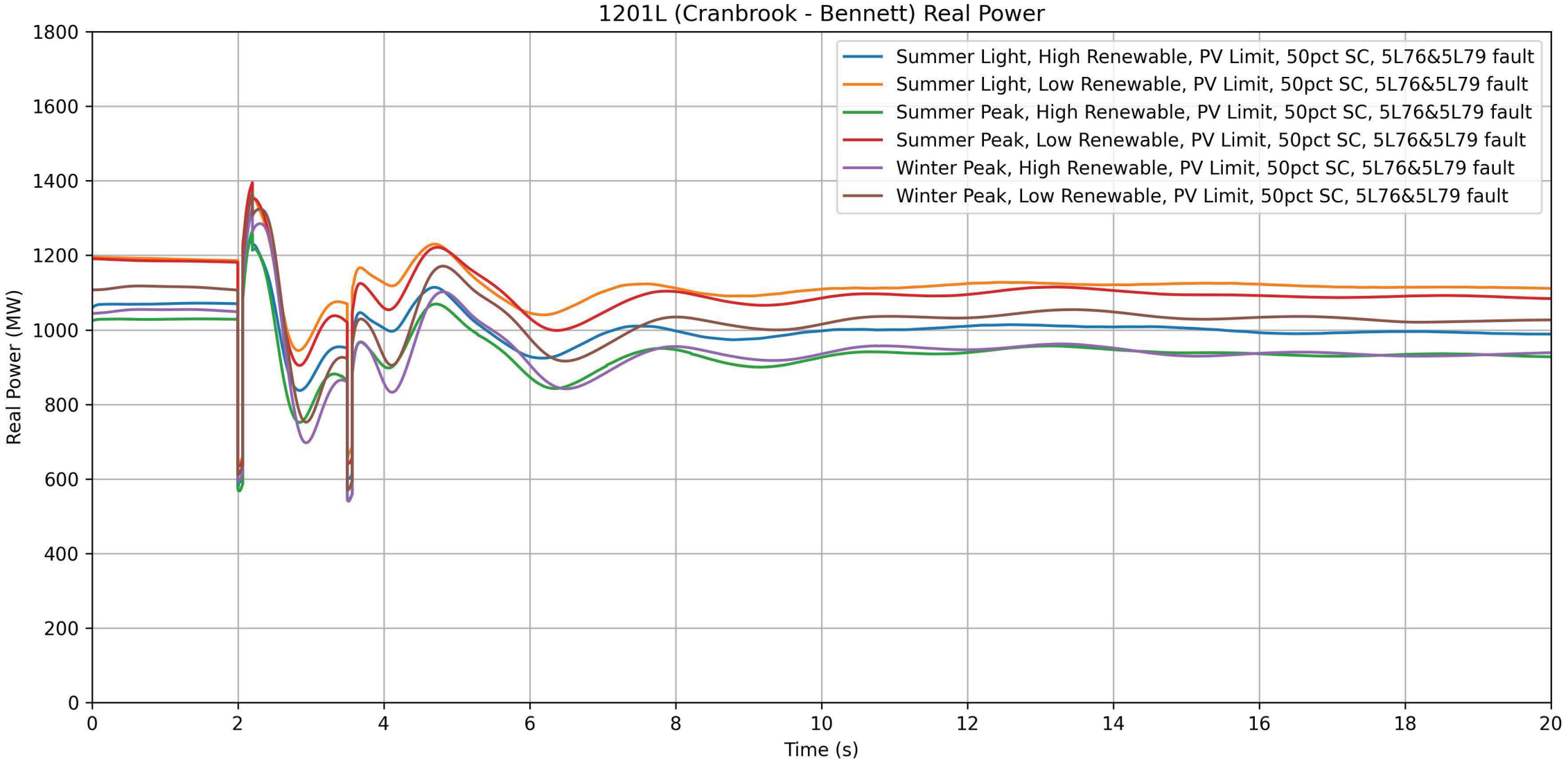

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

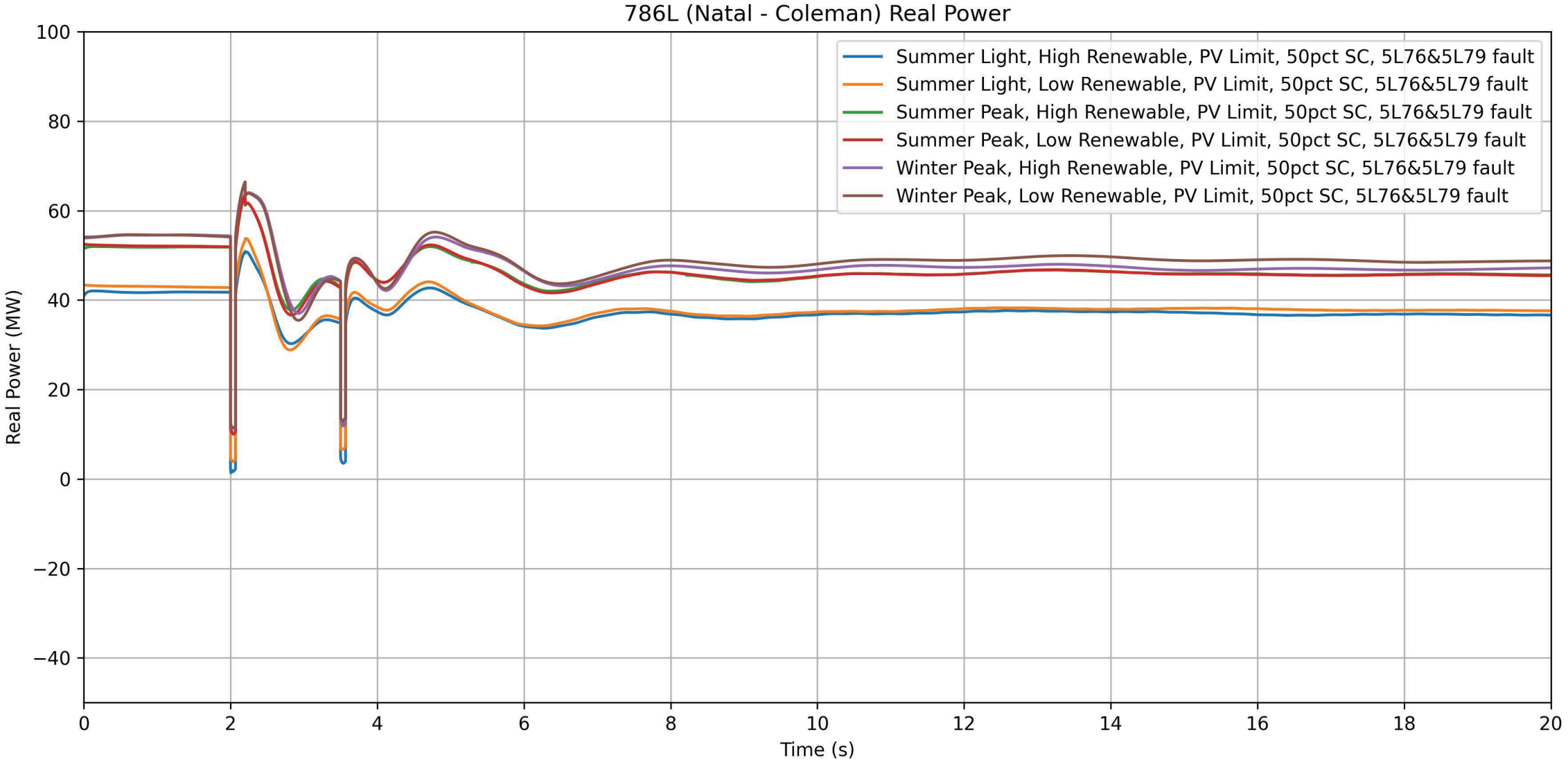

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

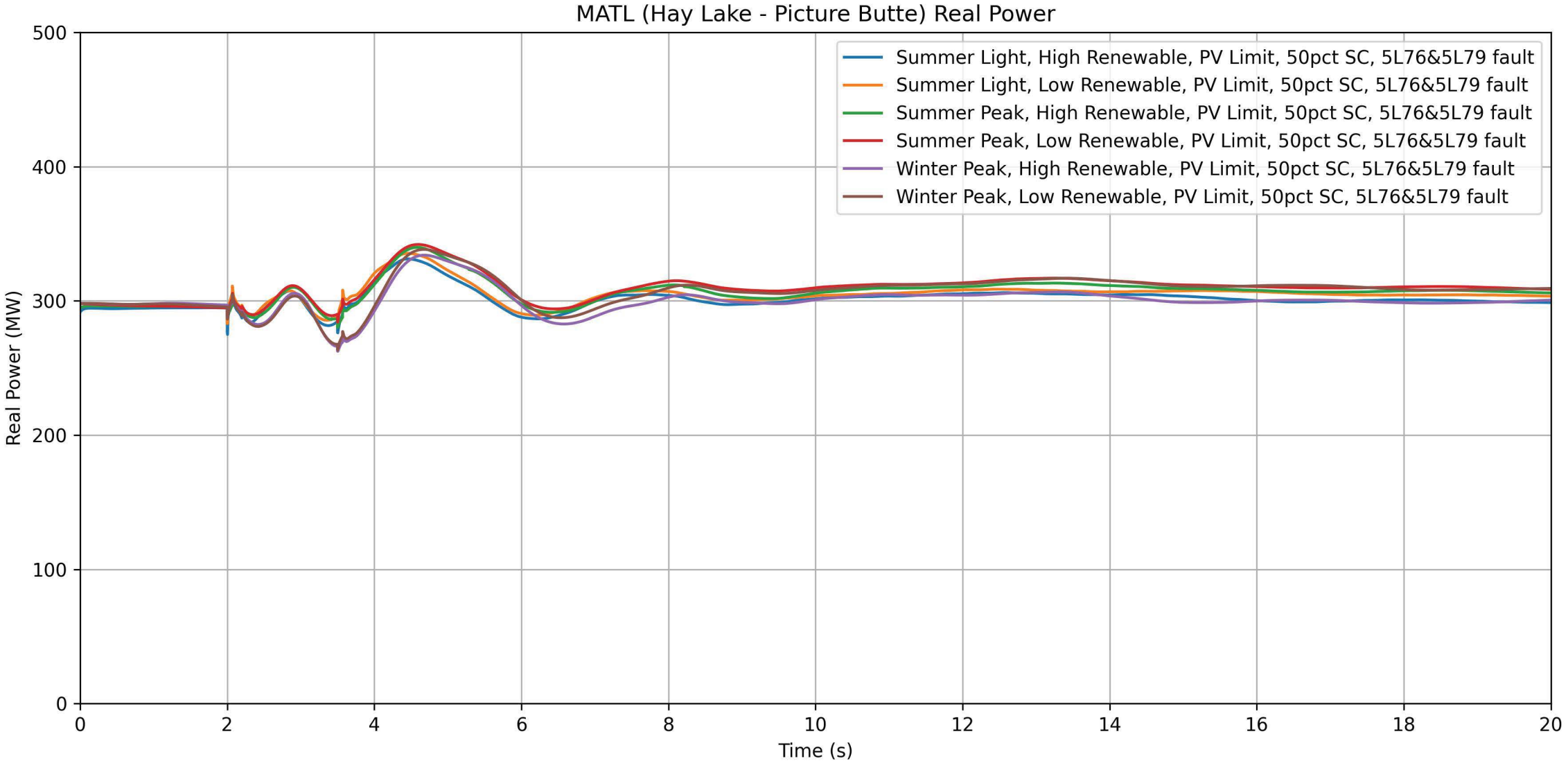

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

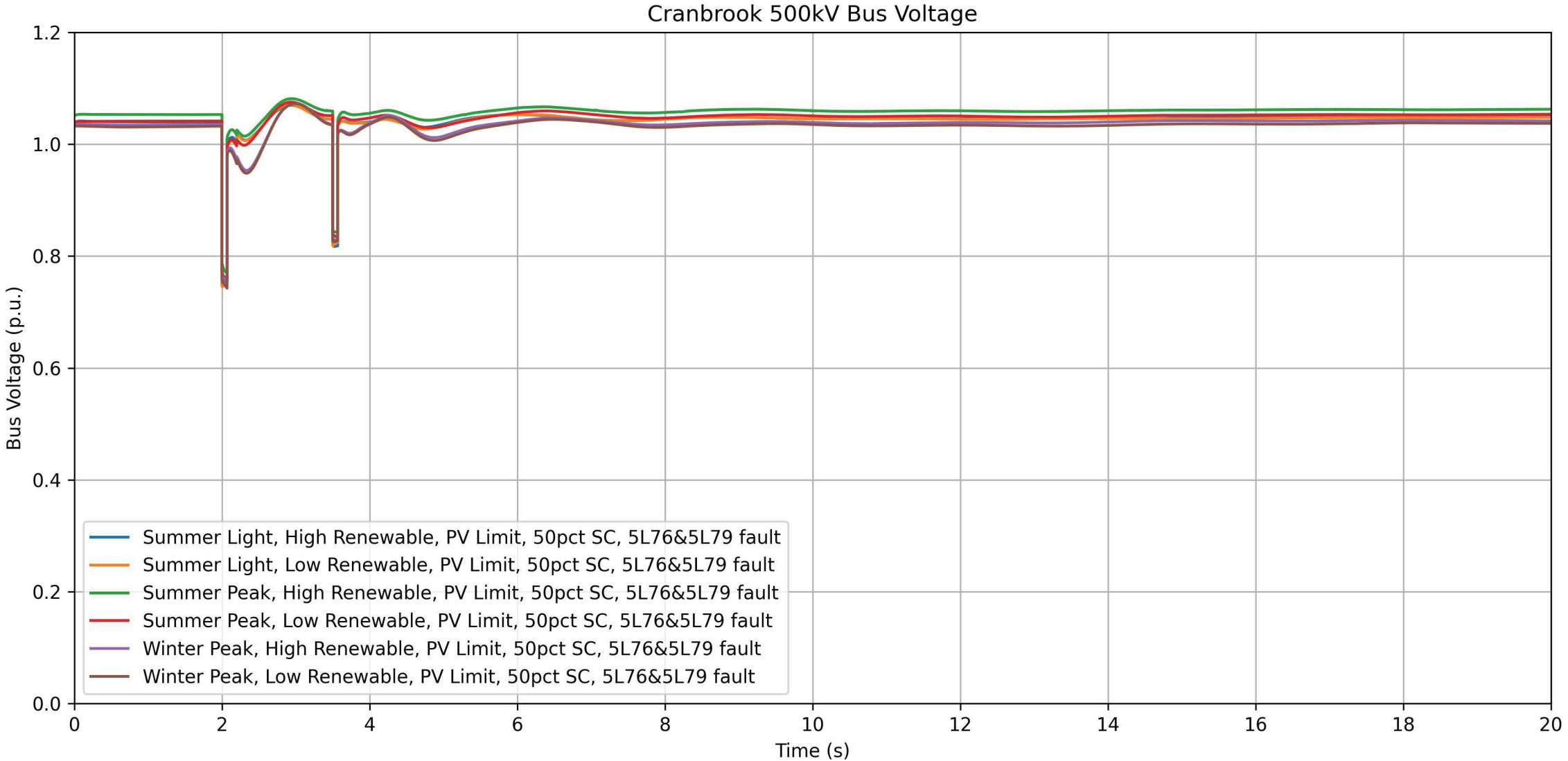

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

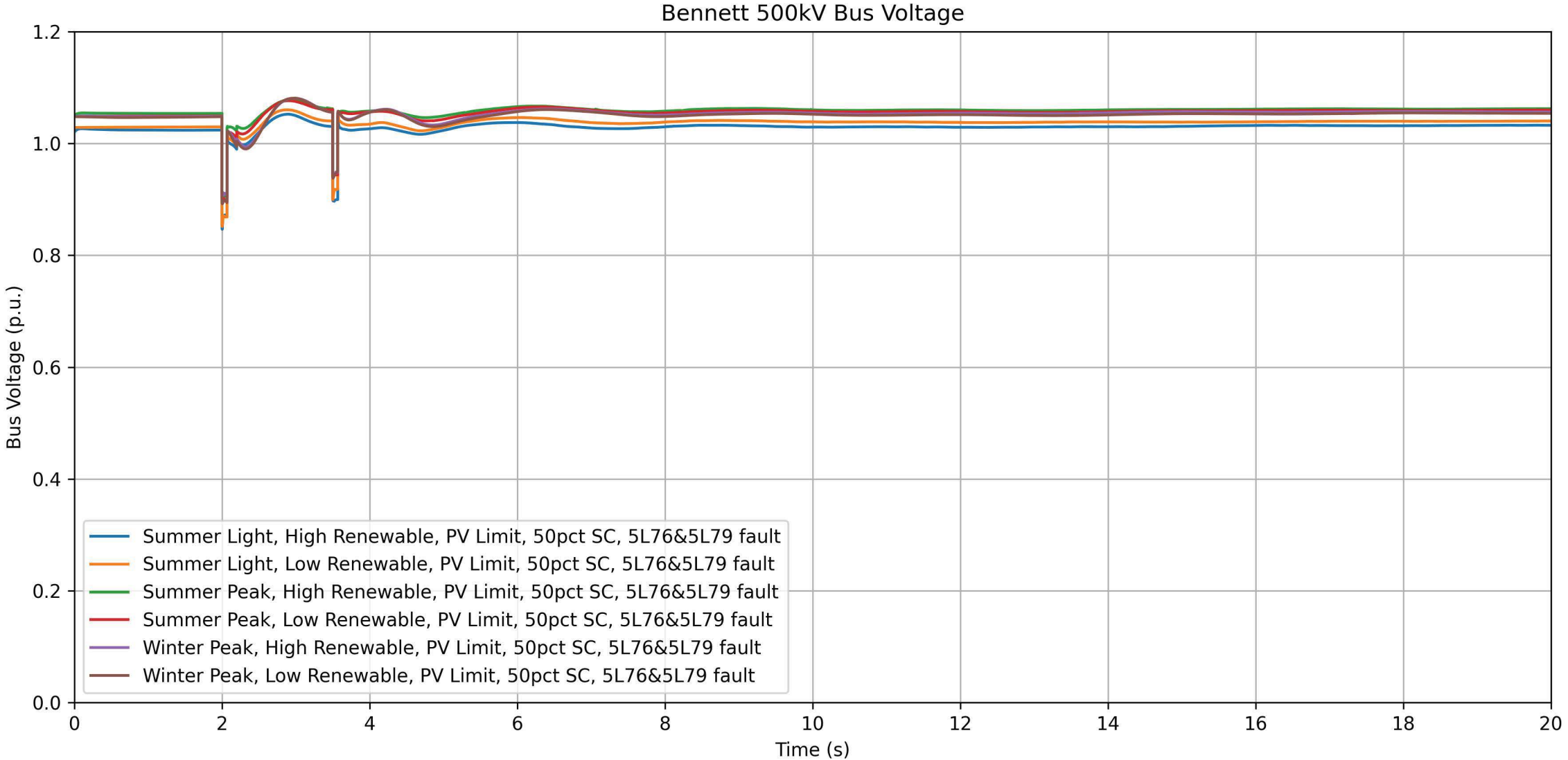

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L98 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L98 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

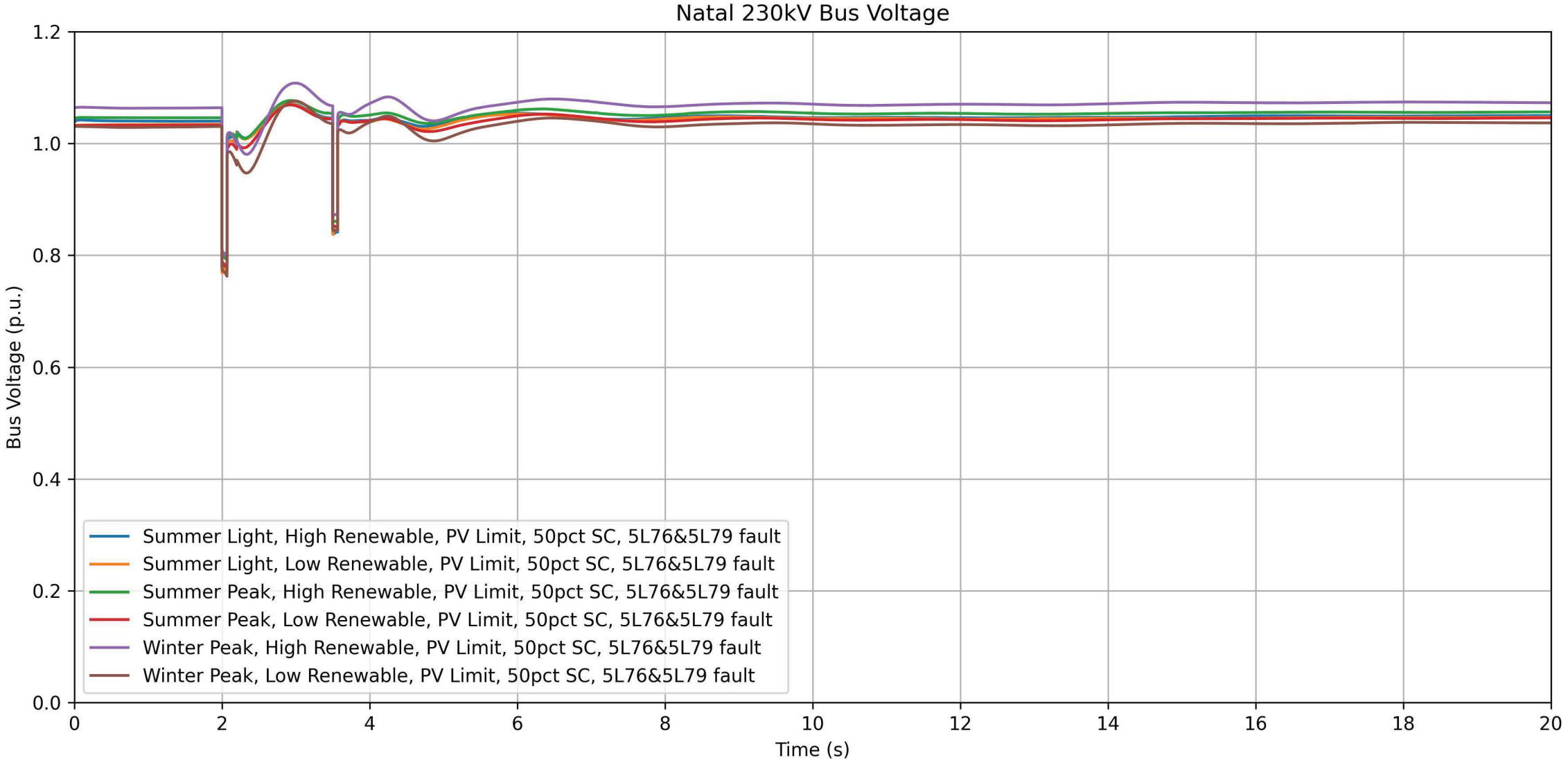

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

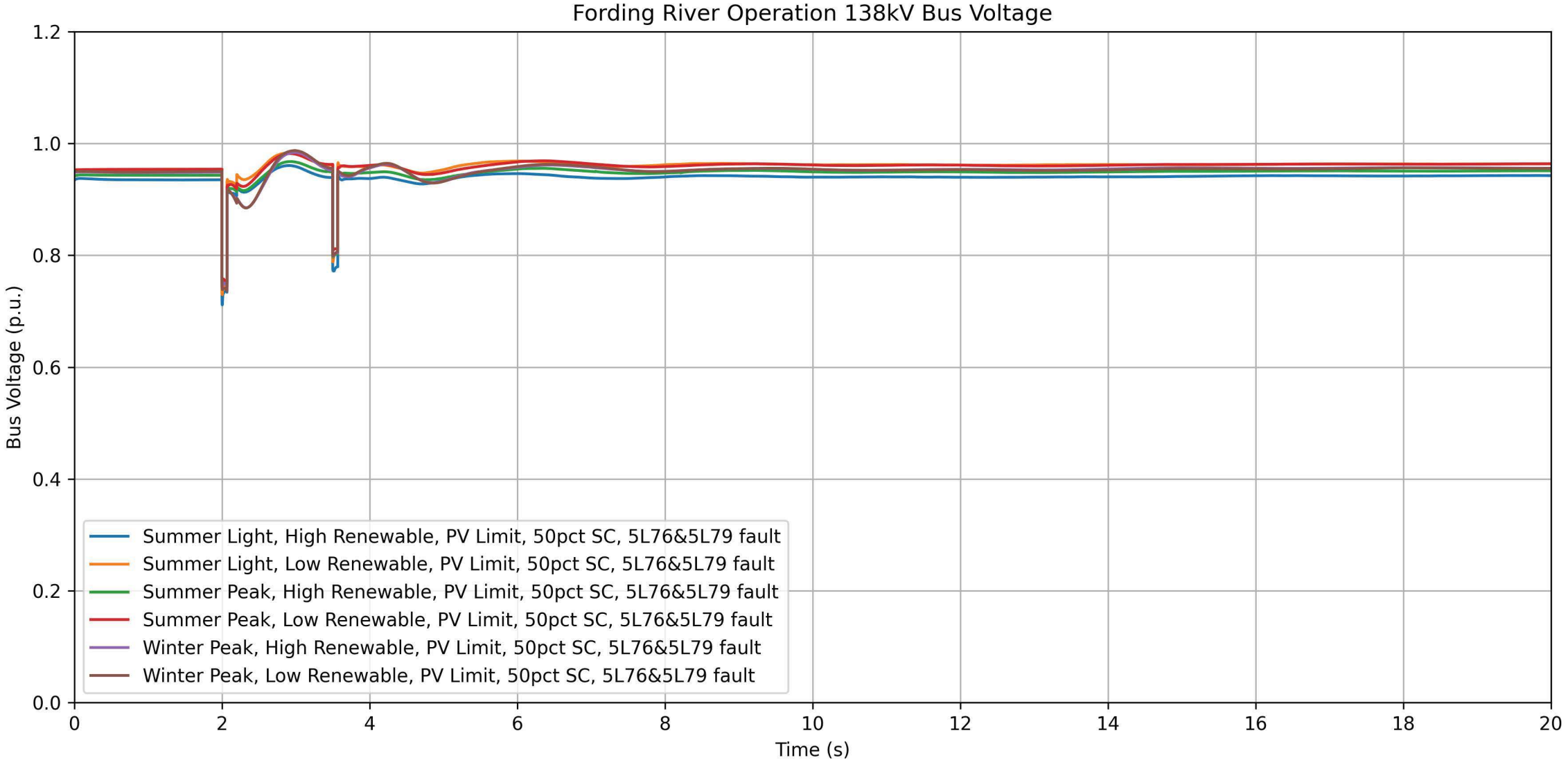

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

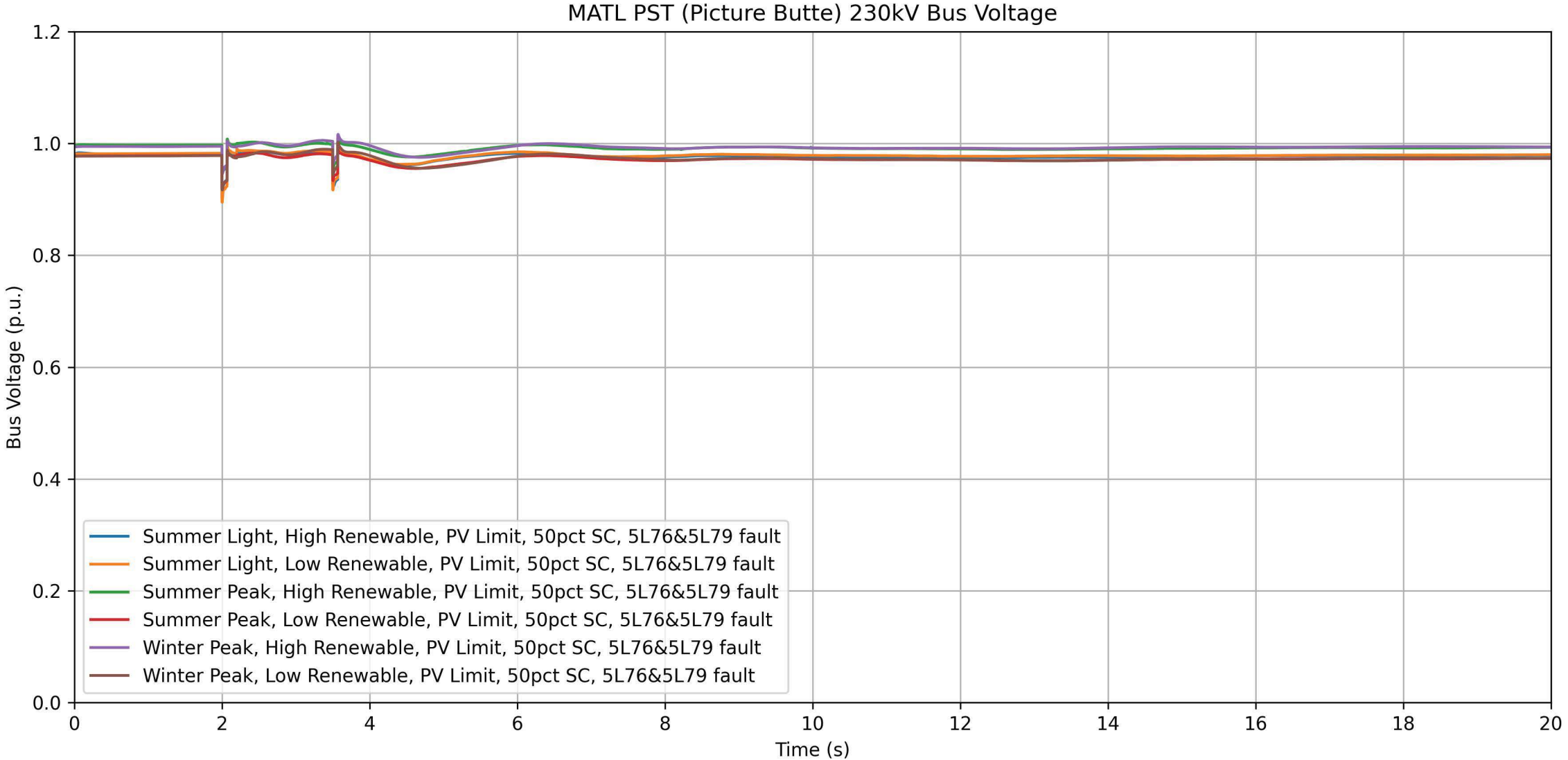

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

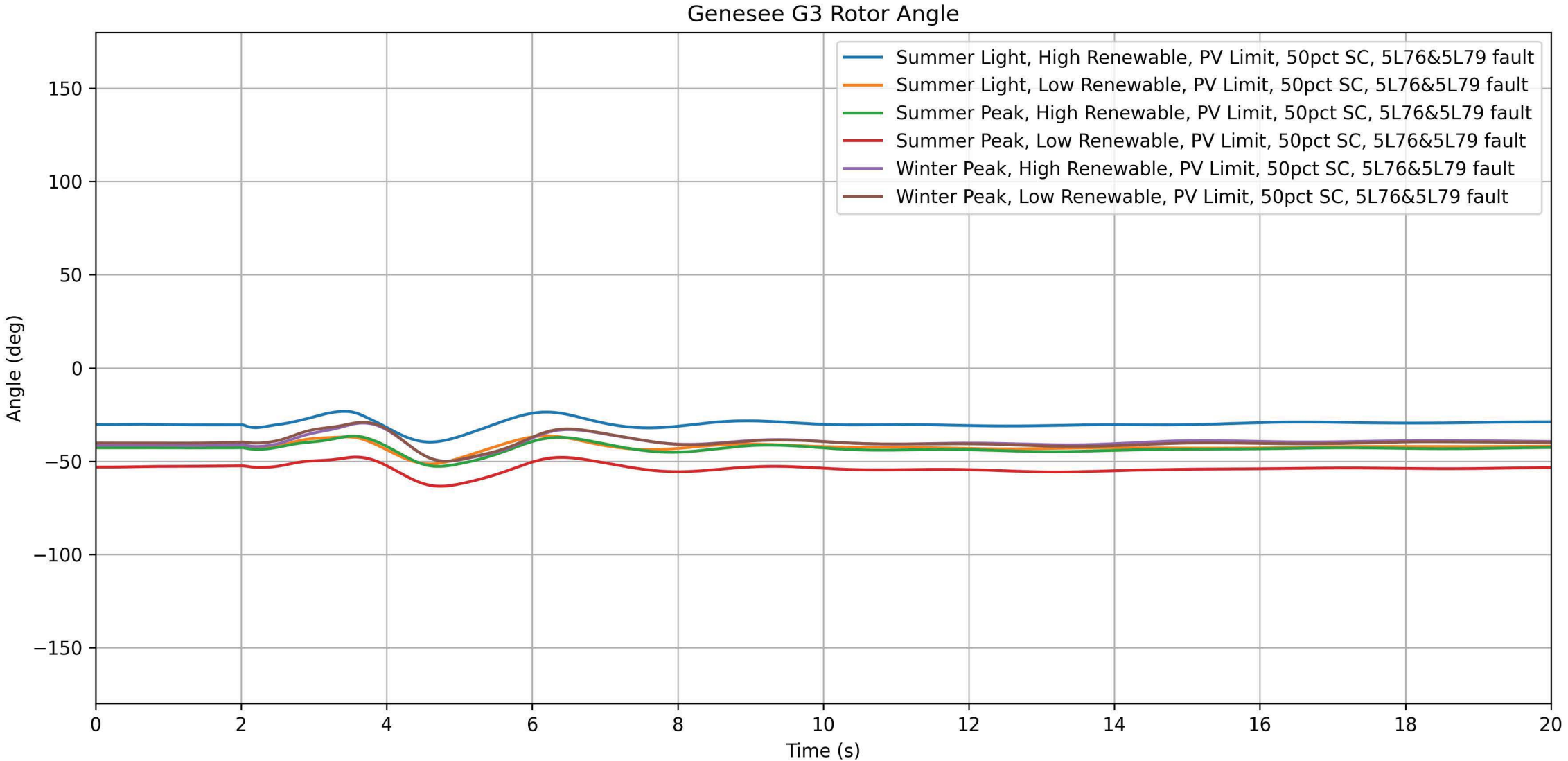

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

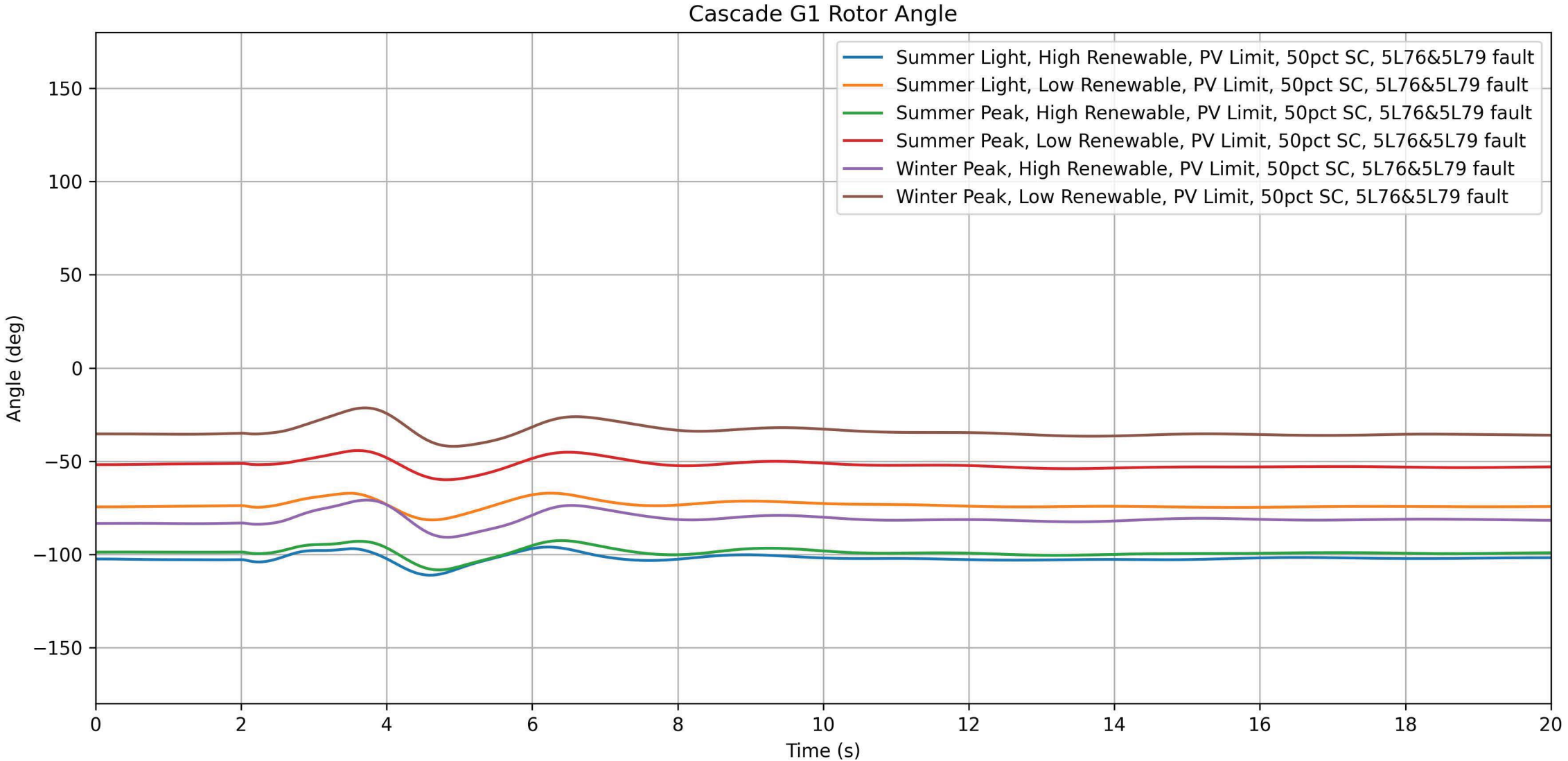

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

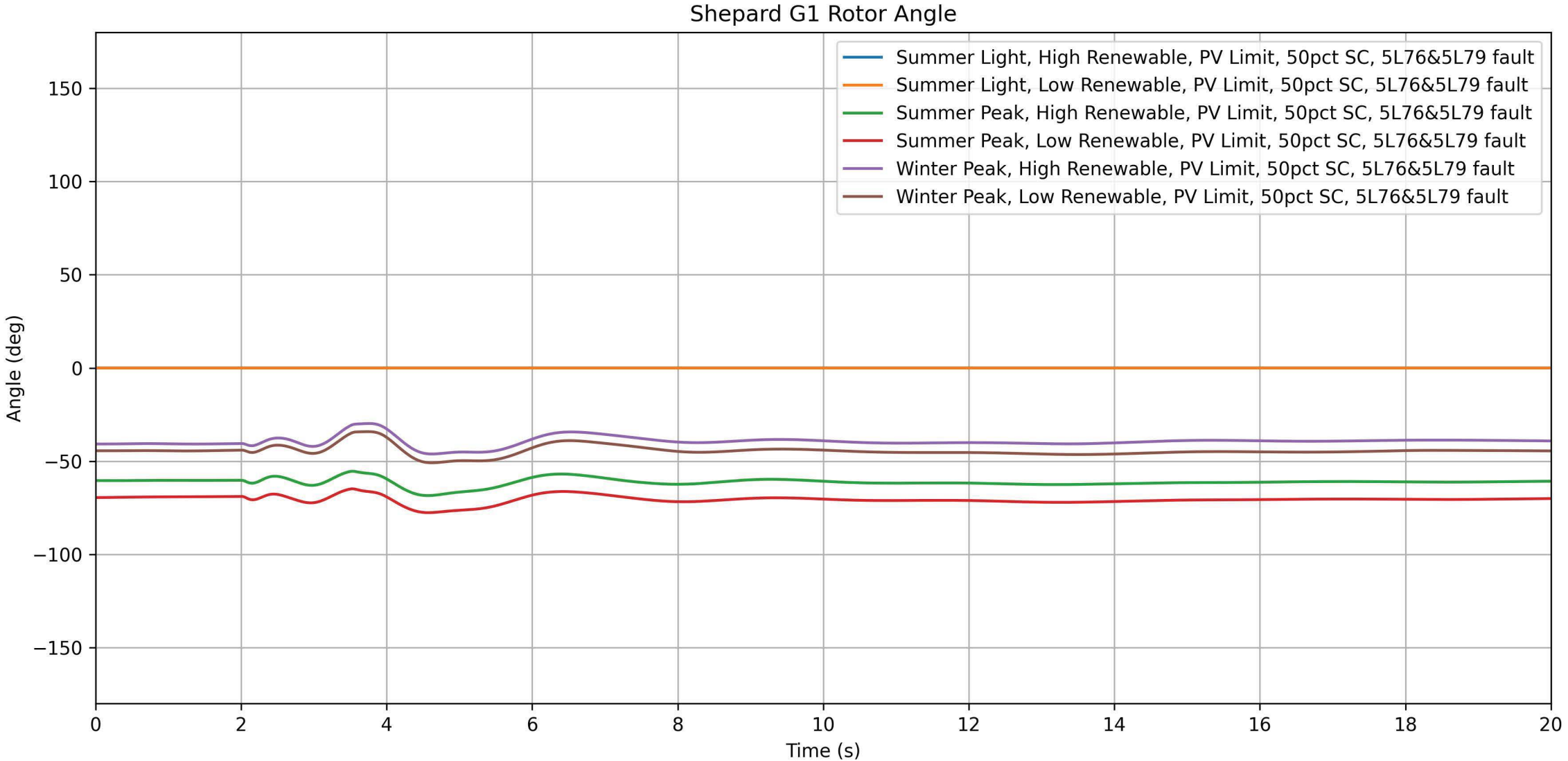

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

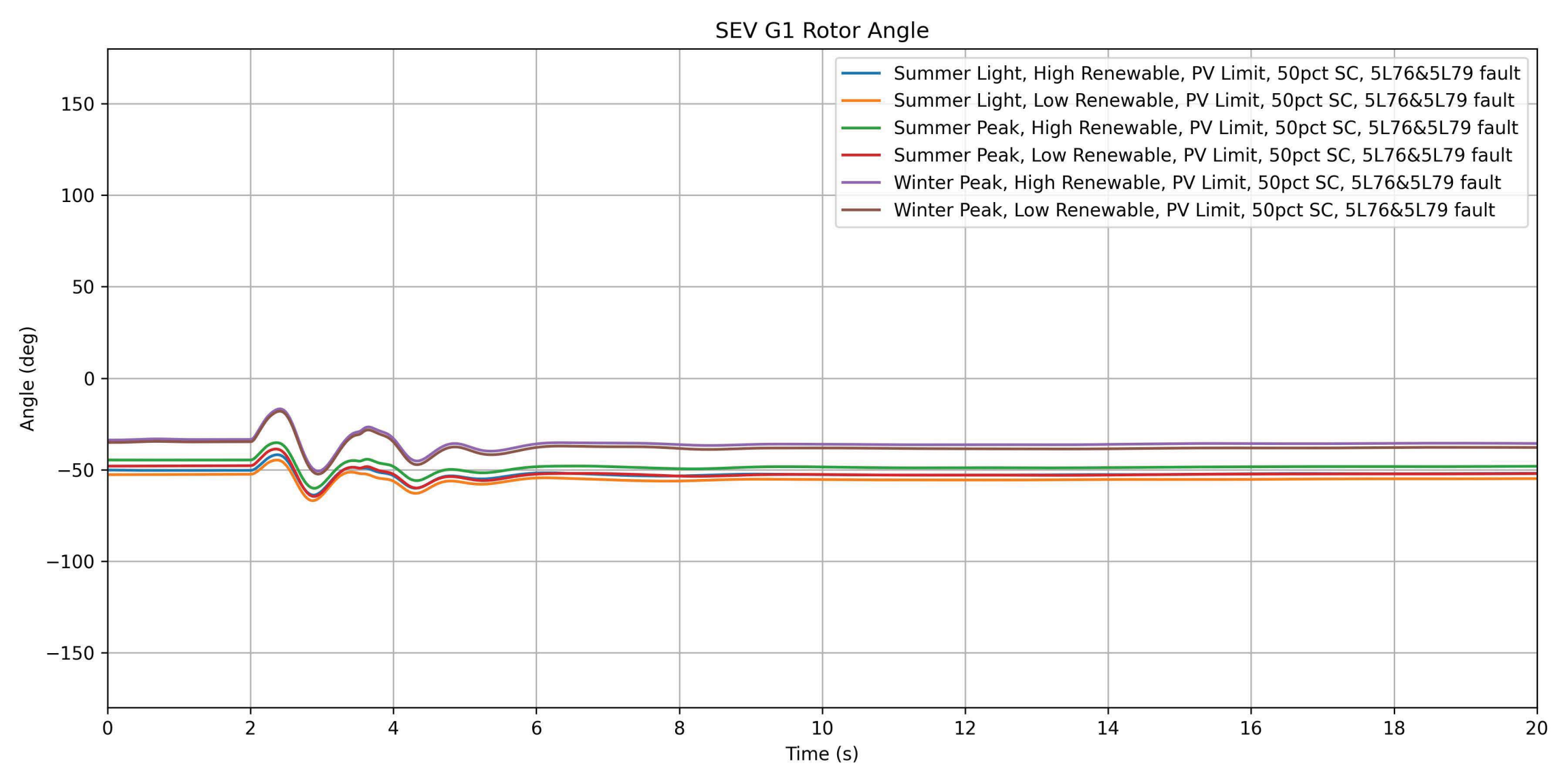

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

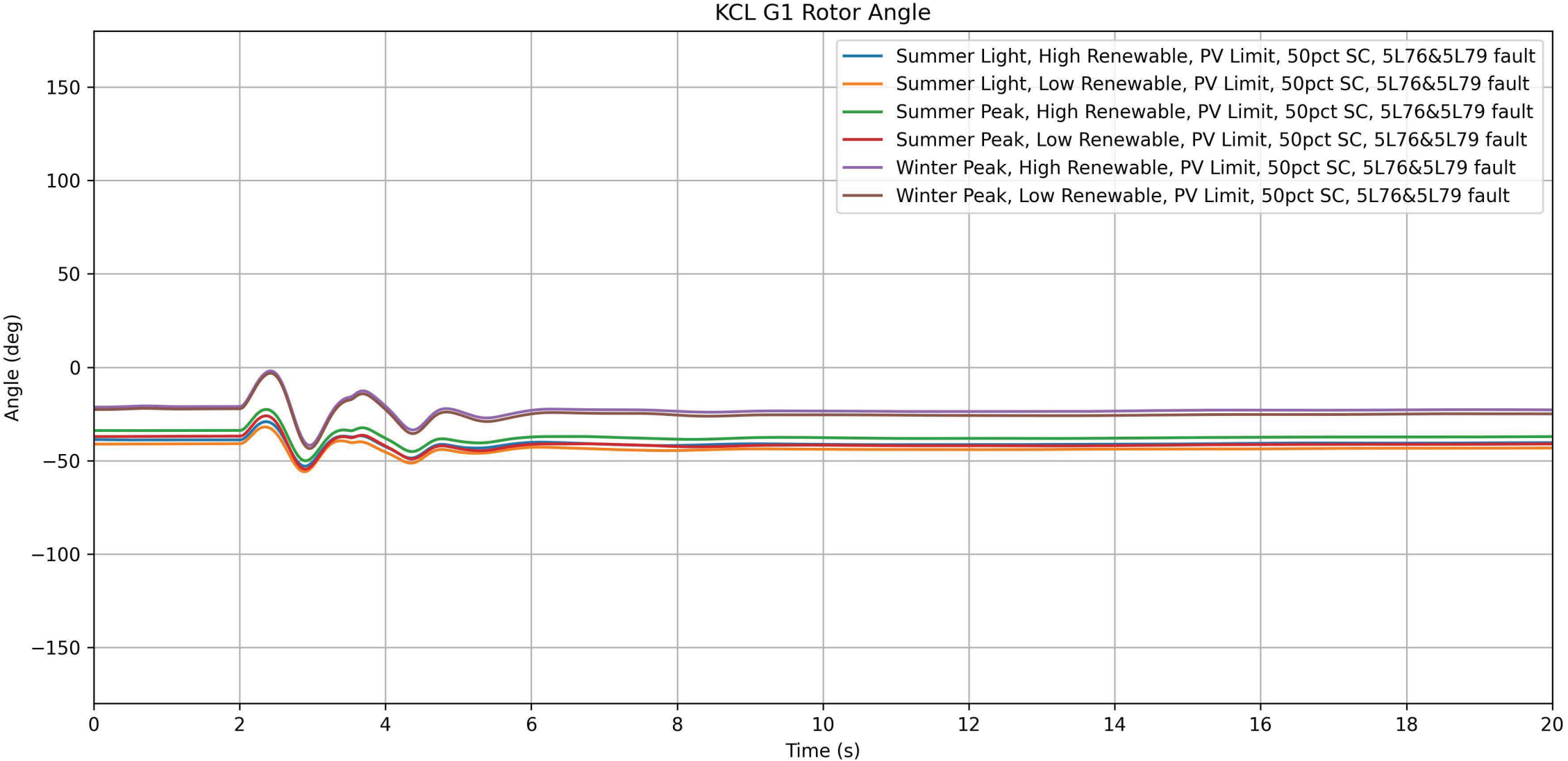

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

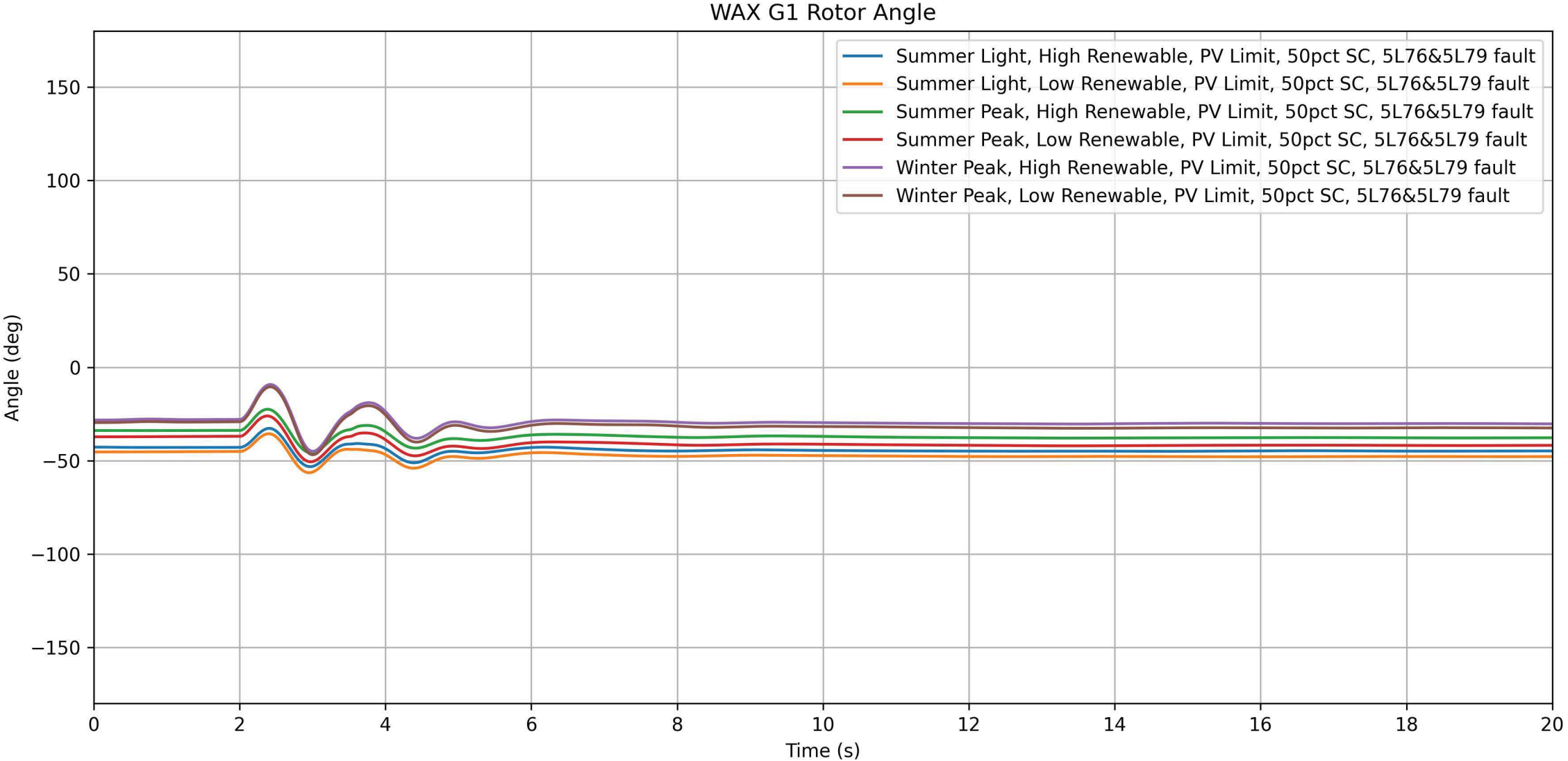

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

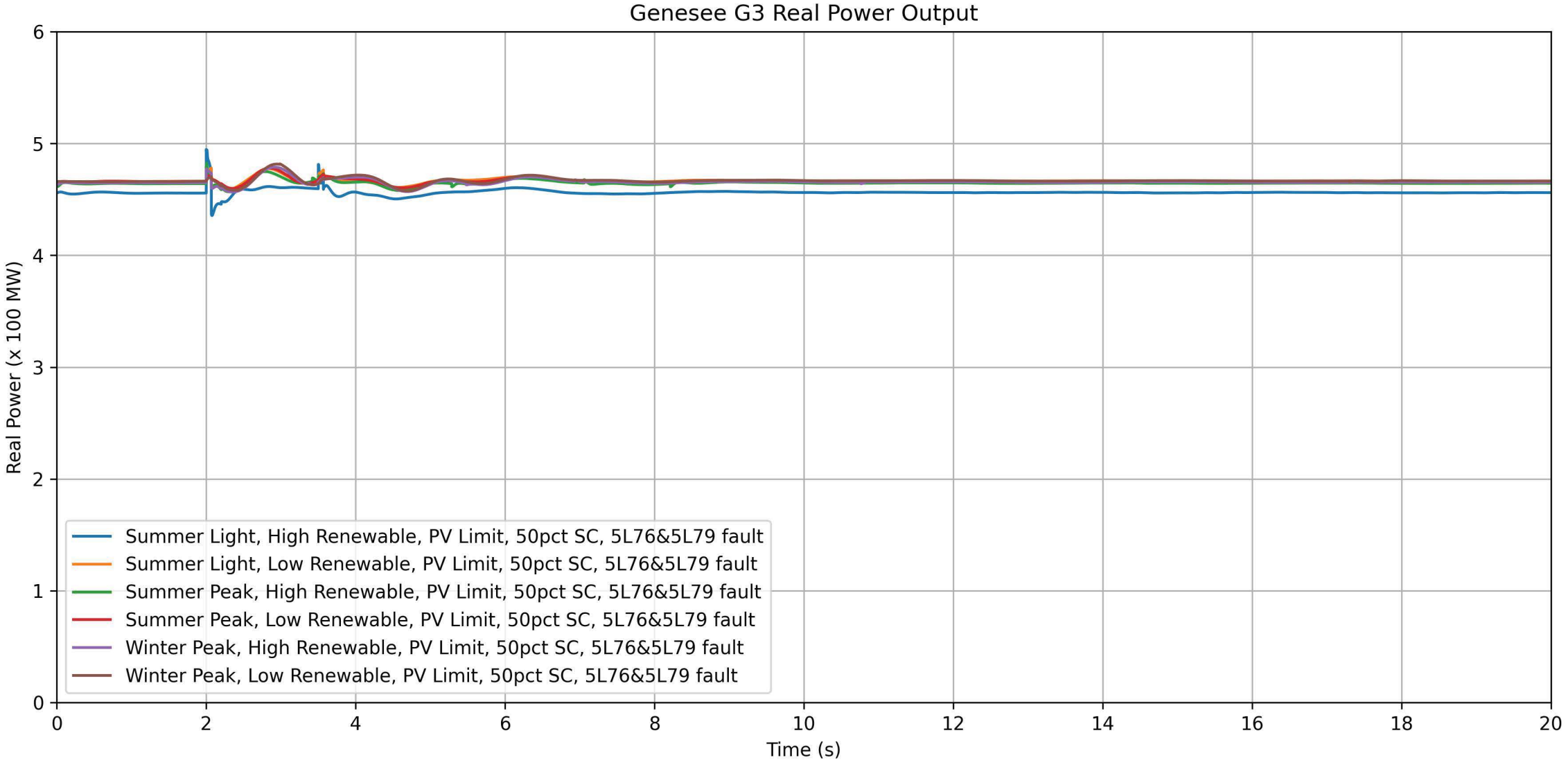

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

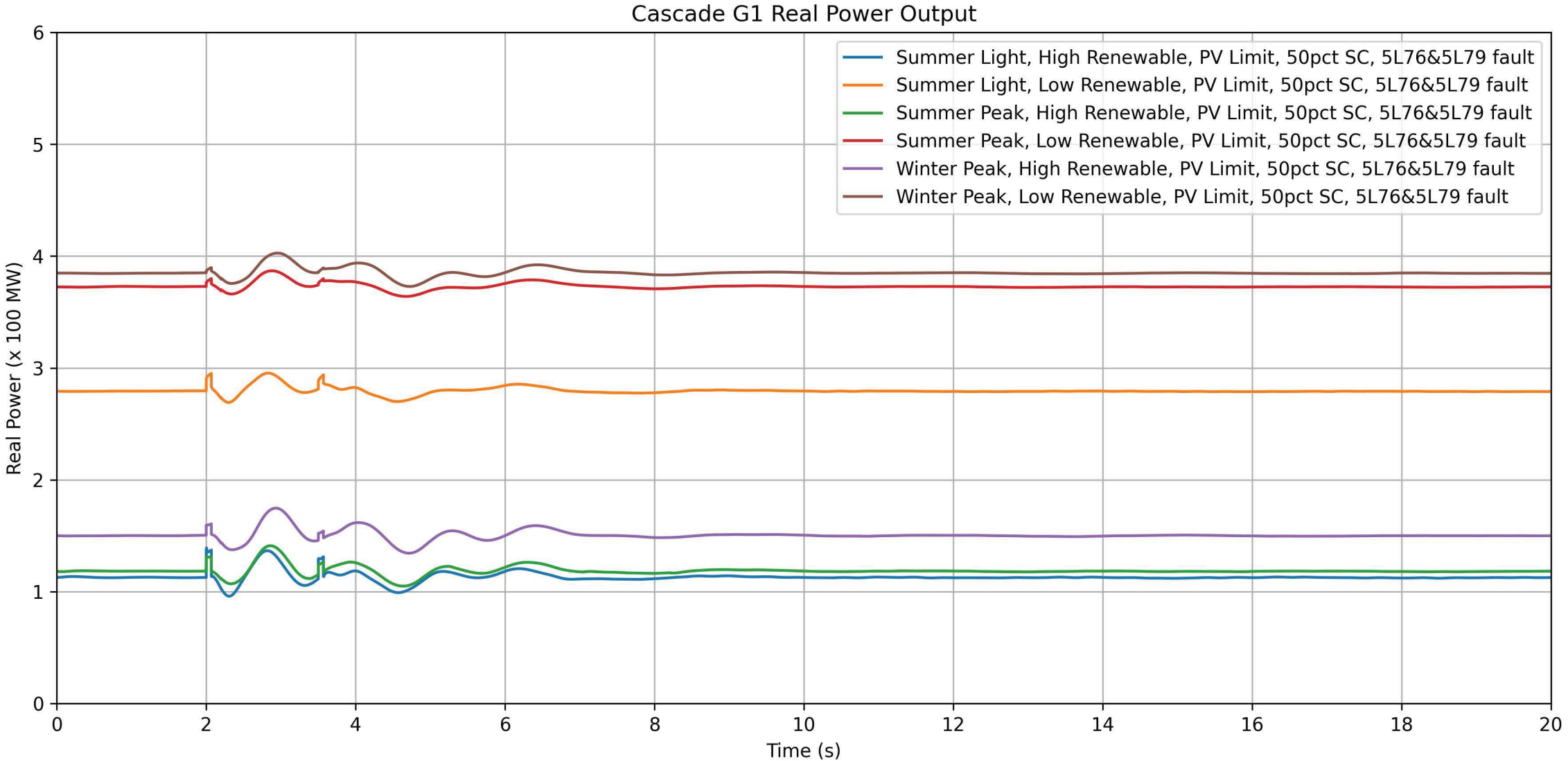

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

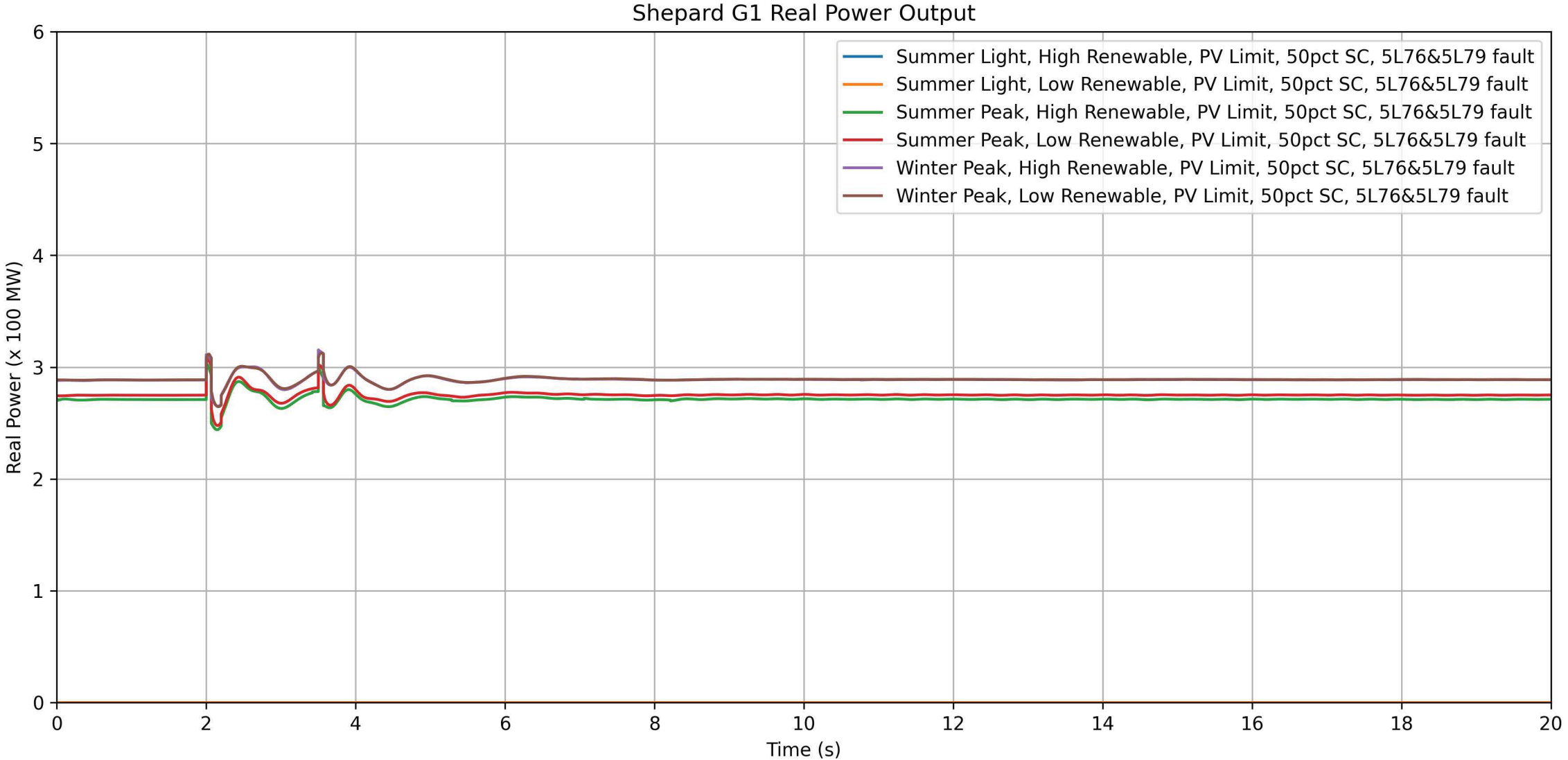

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

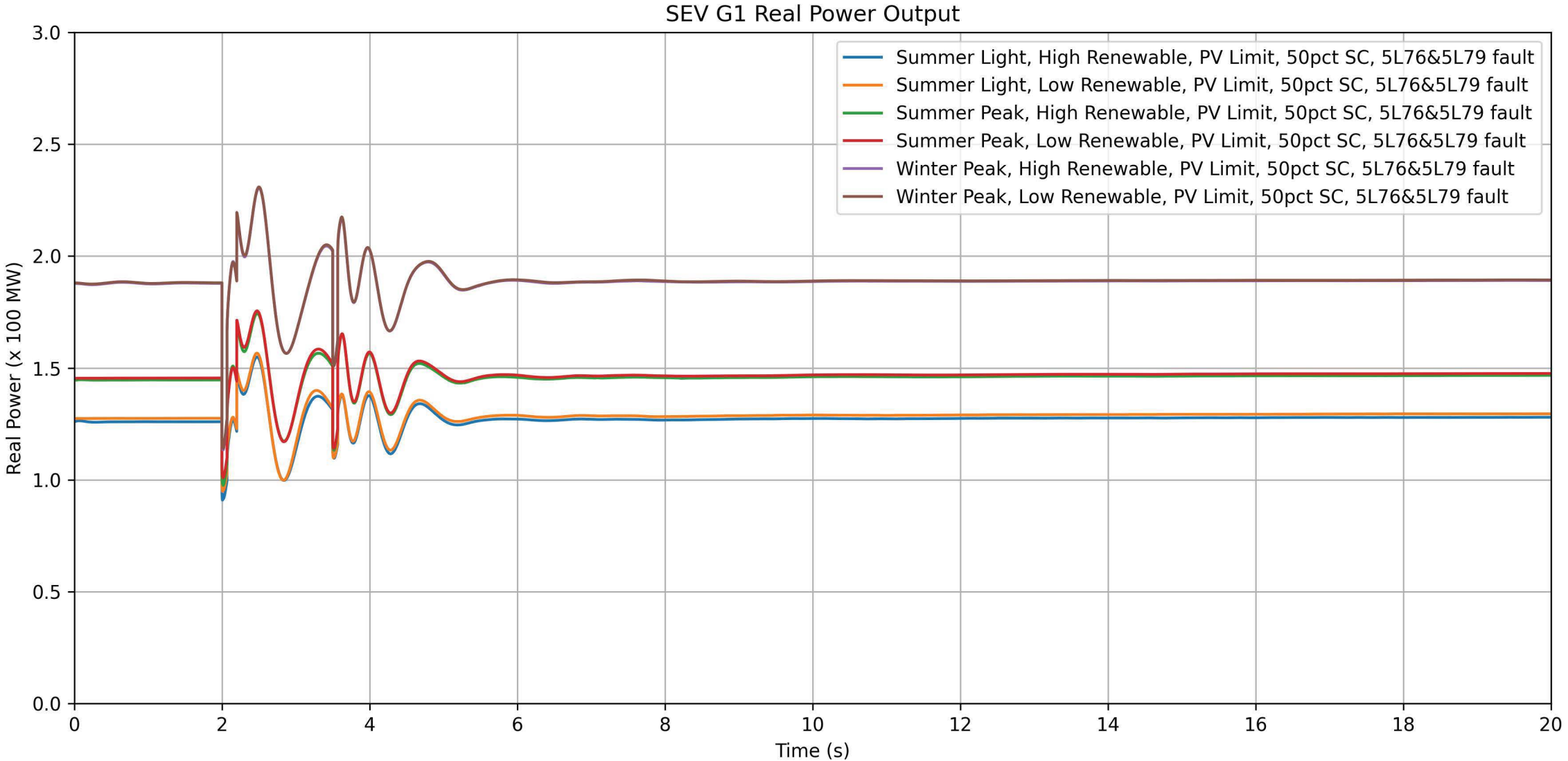

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

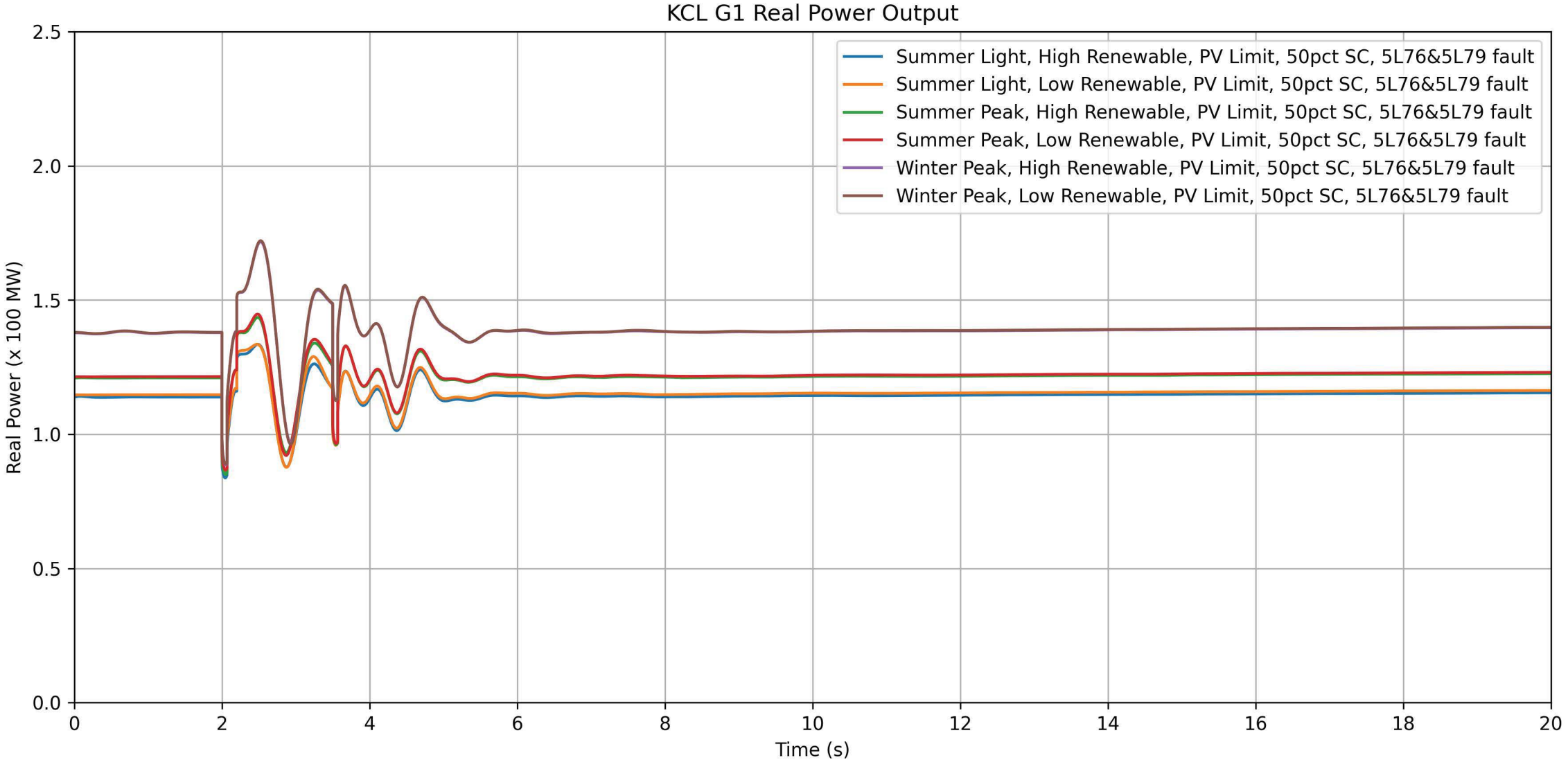

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

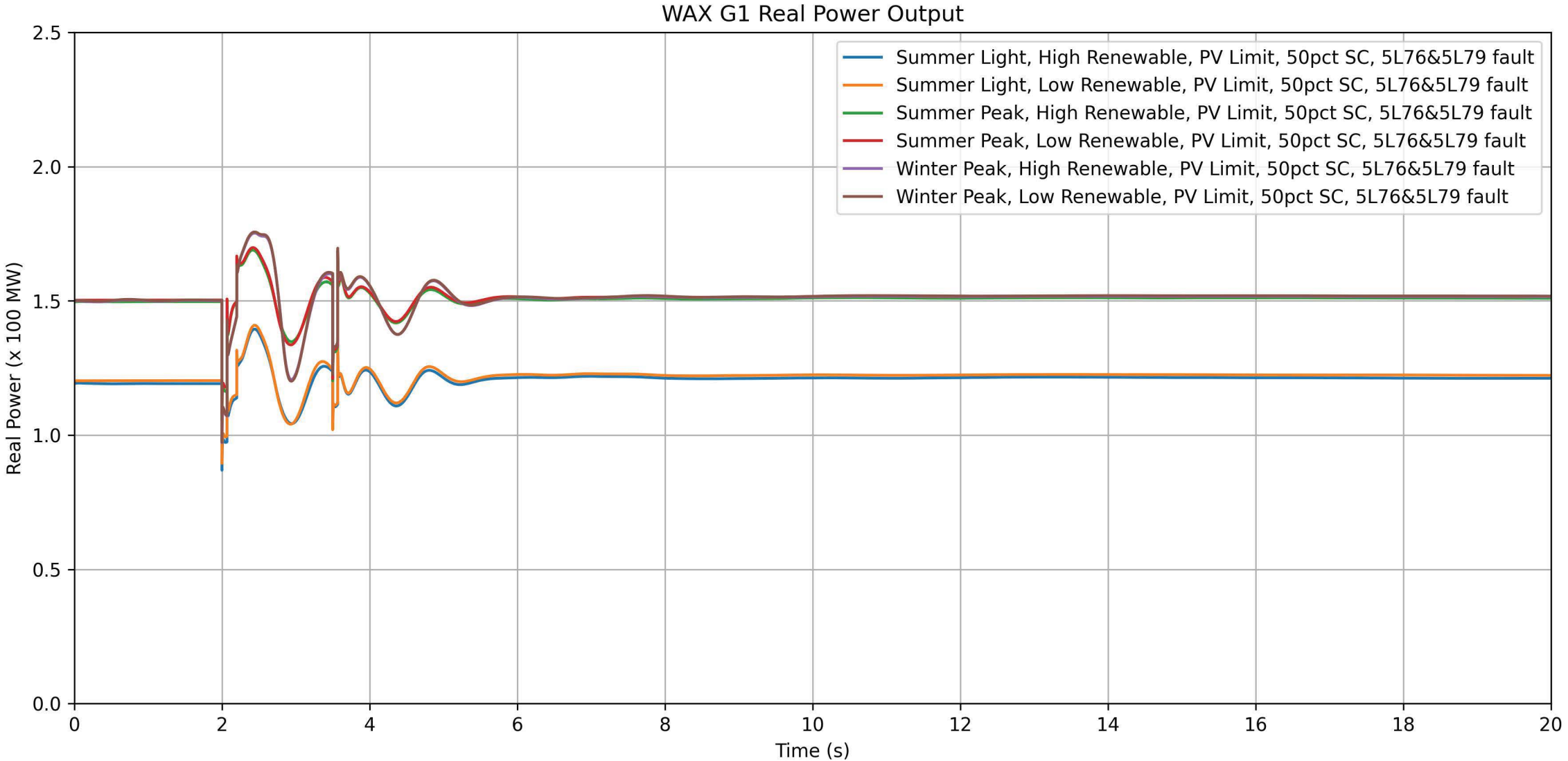

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault

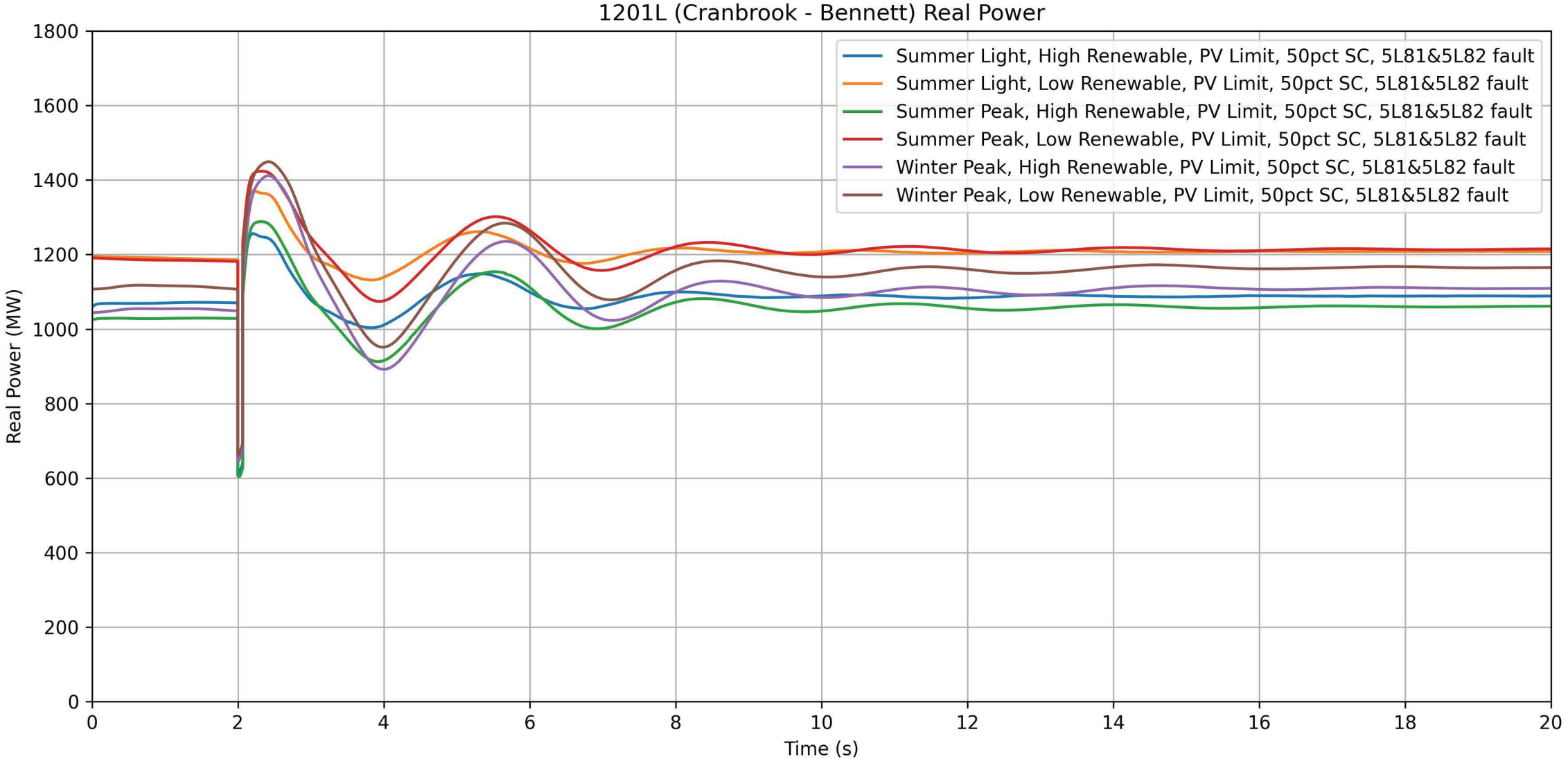

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

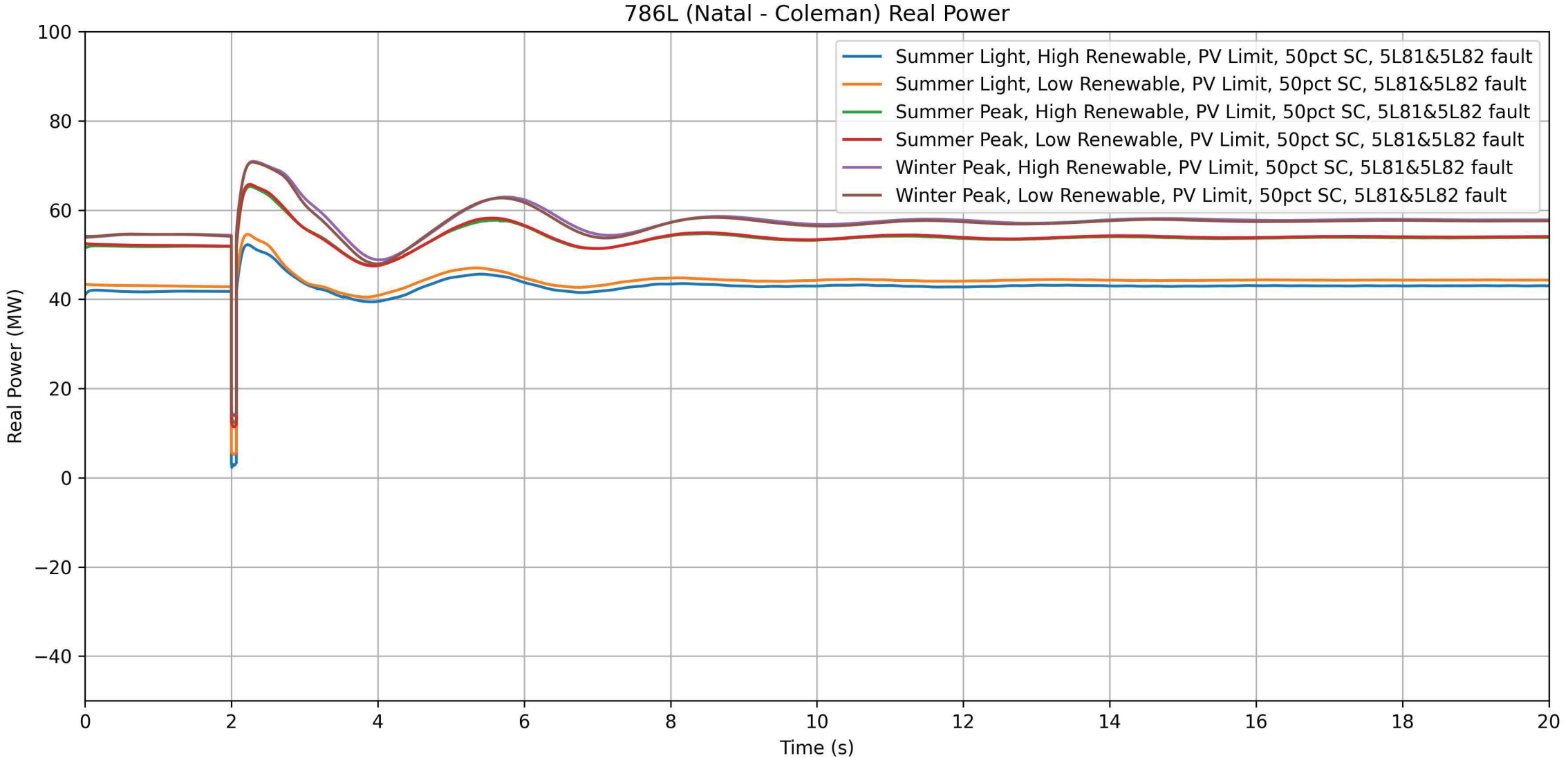

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

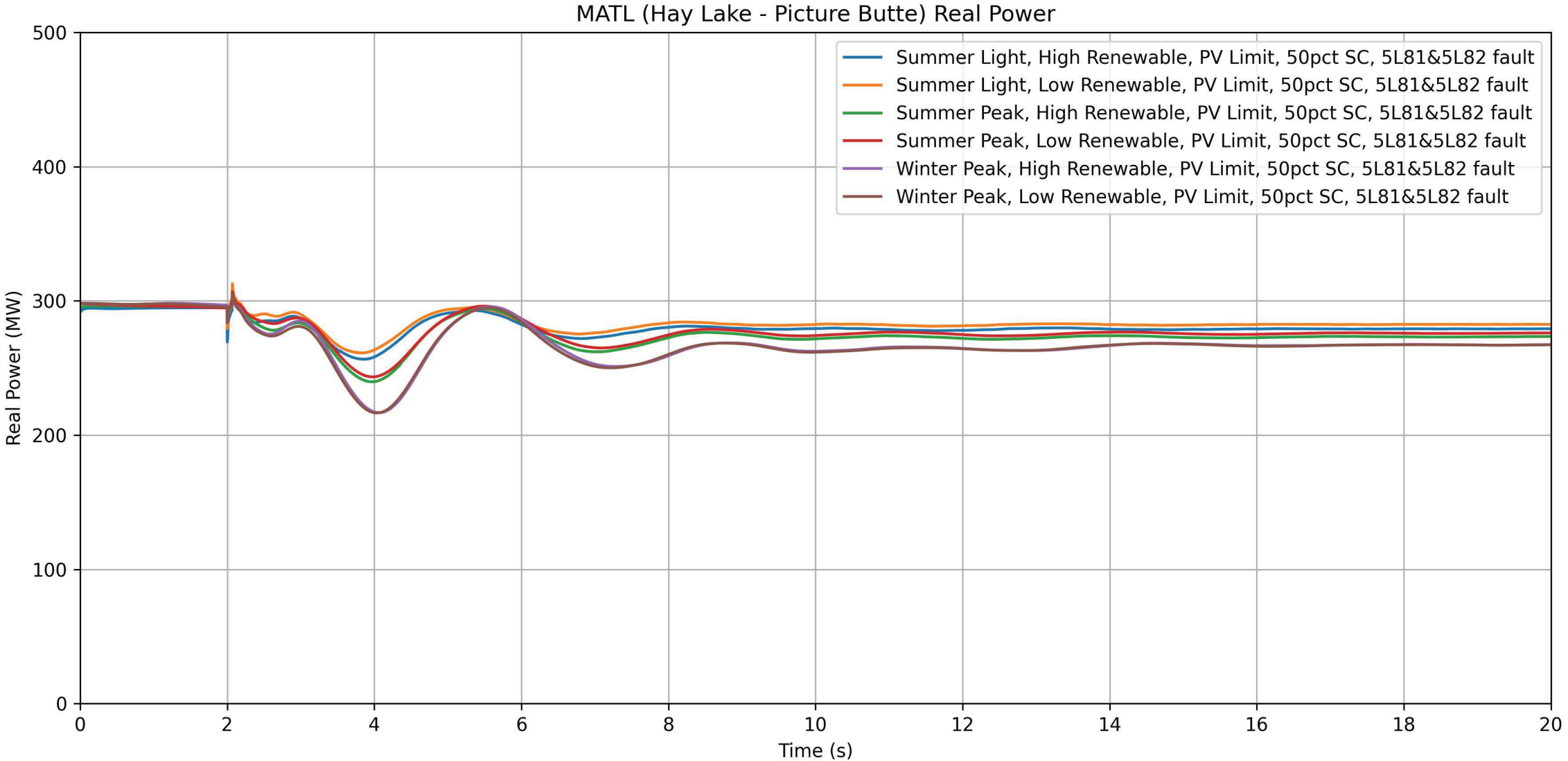

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

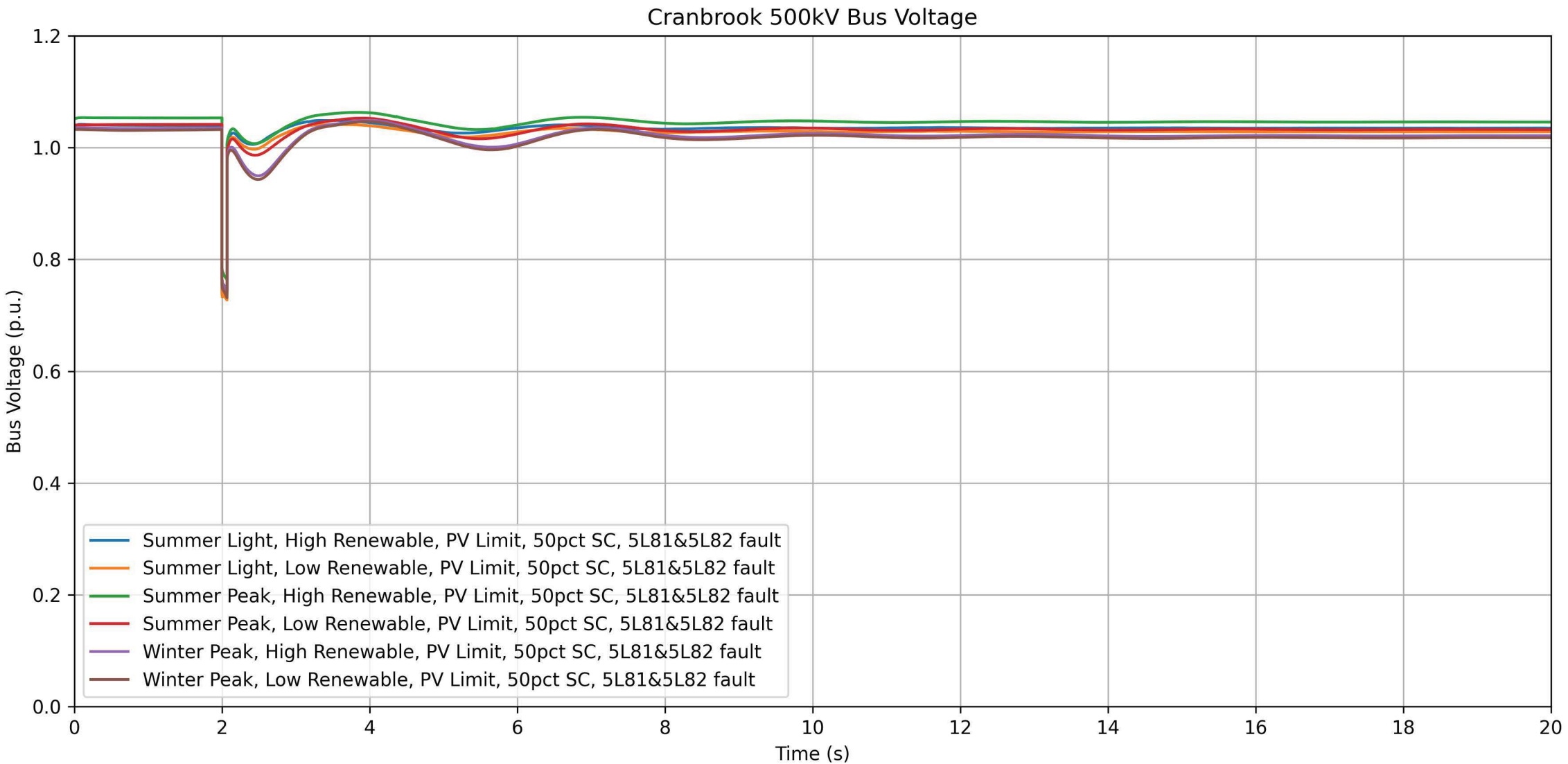

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

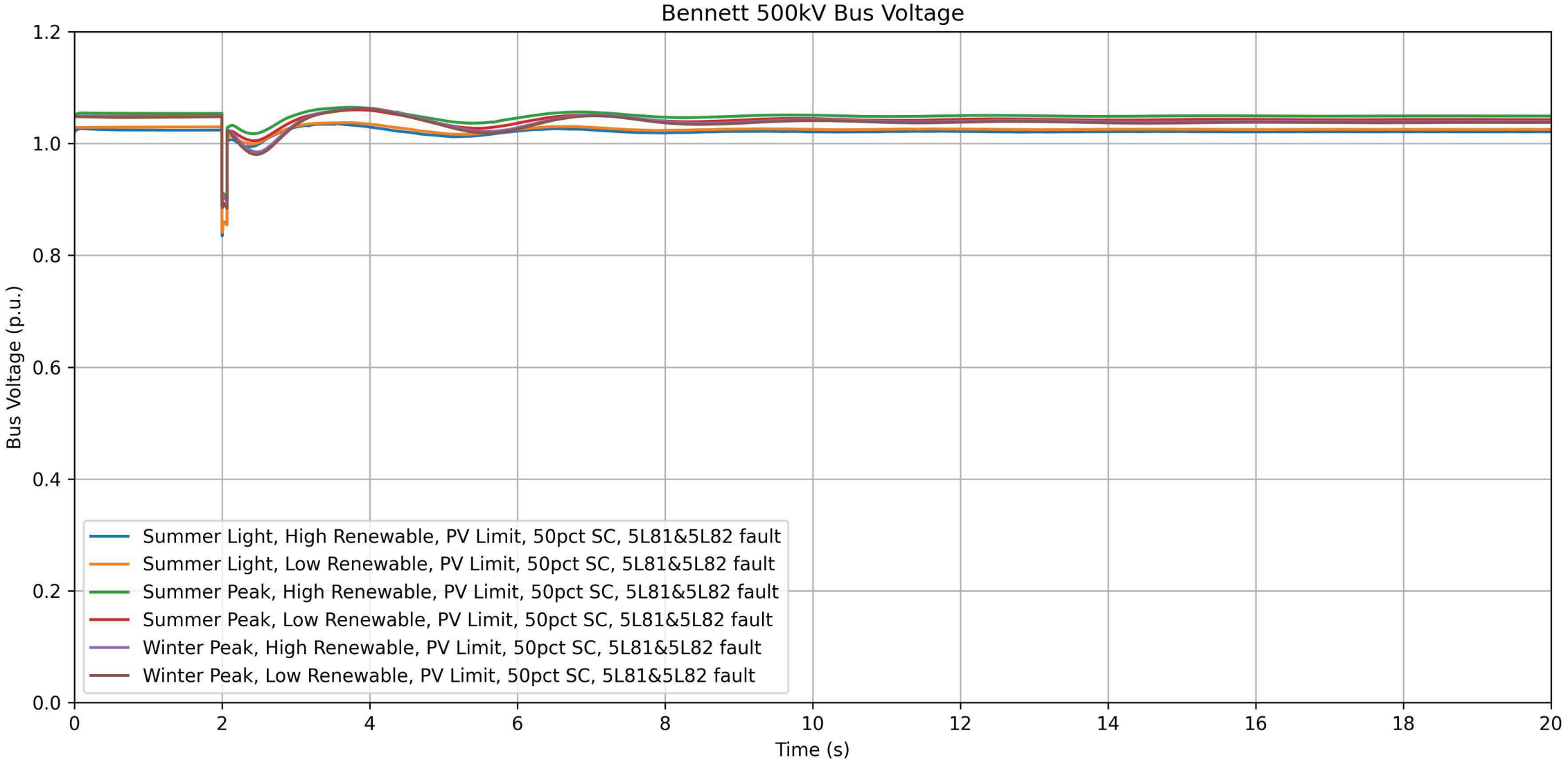

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L76&5L79 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

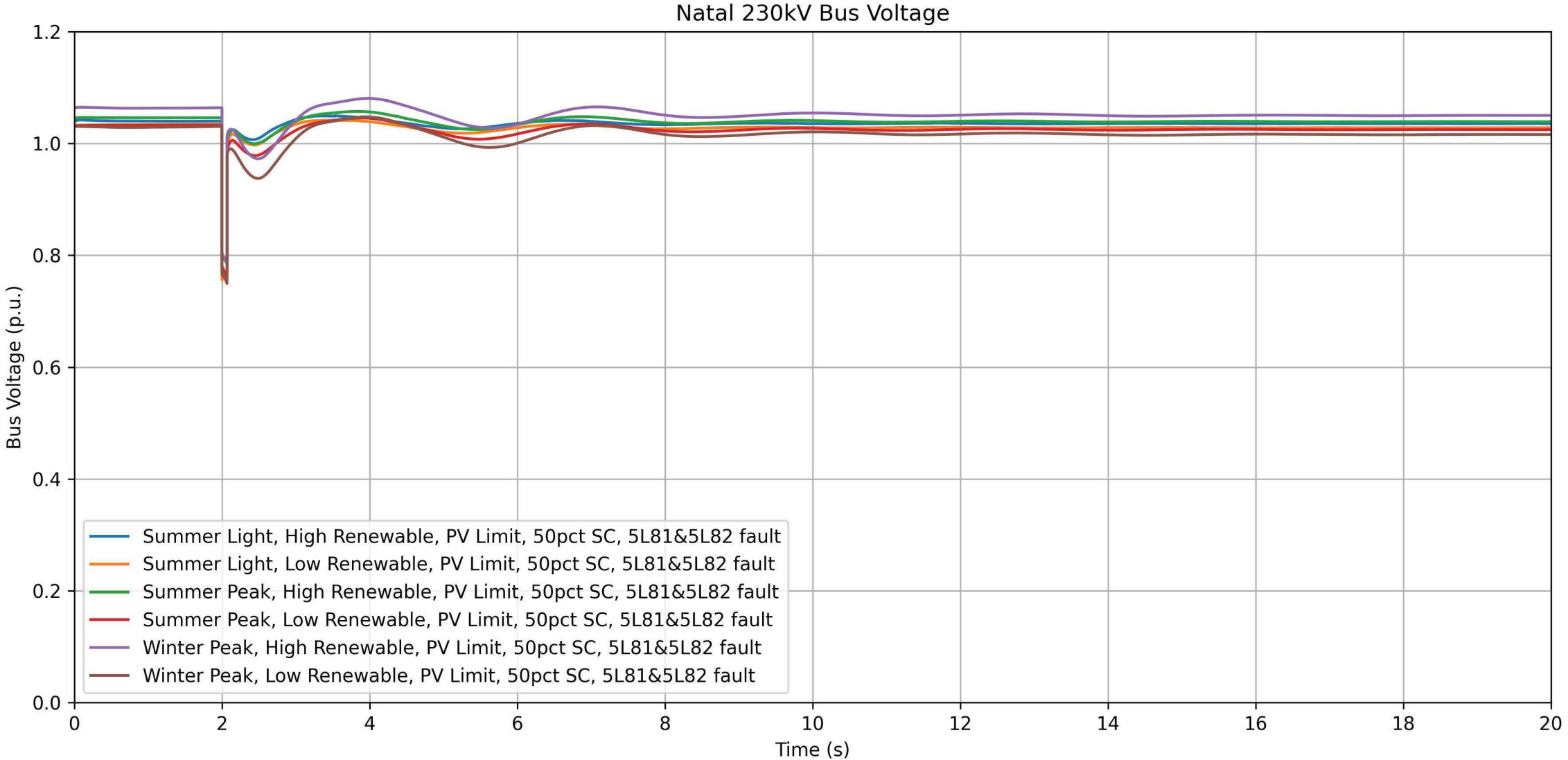

1201L (Cranbrook - Bennett) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

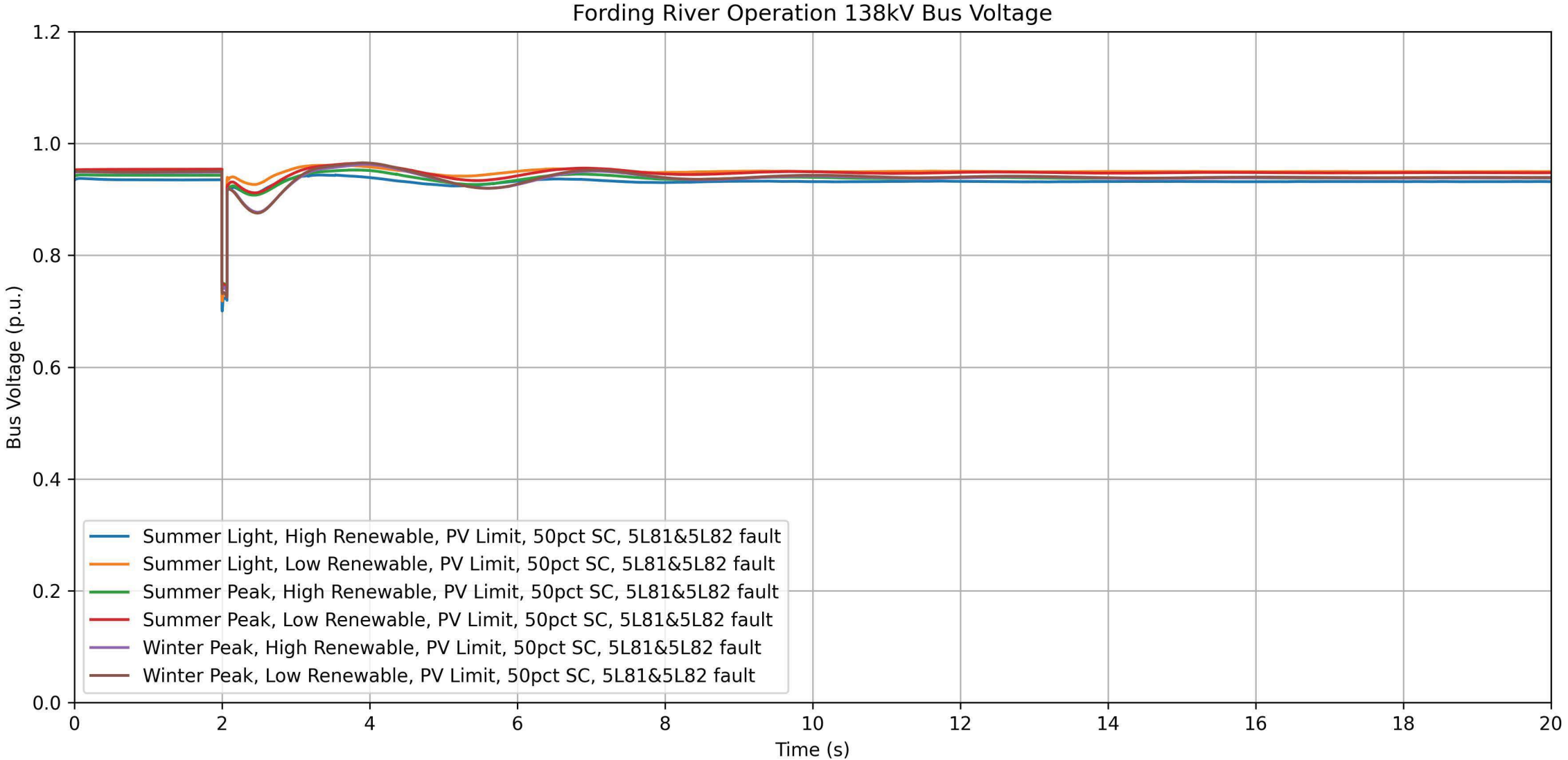

786L (Natal - Coleman) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

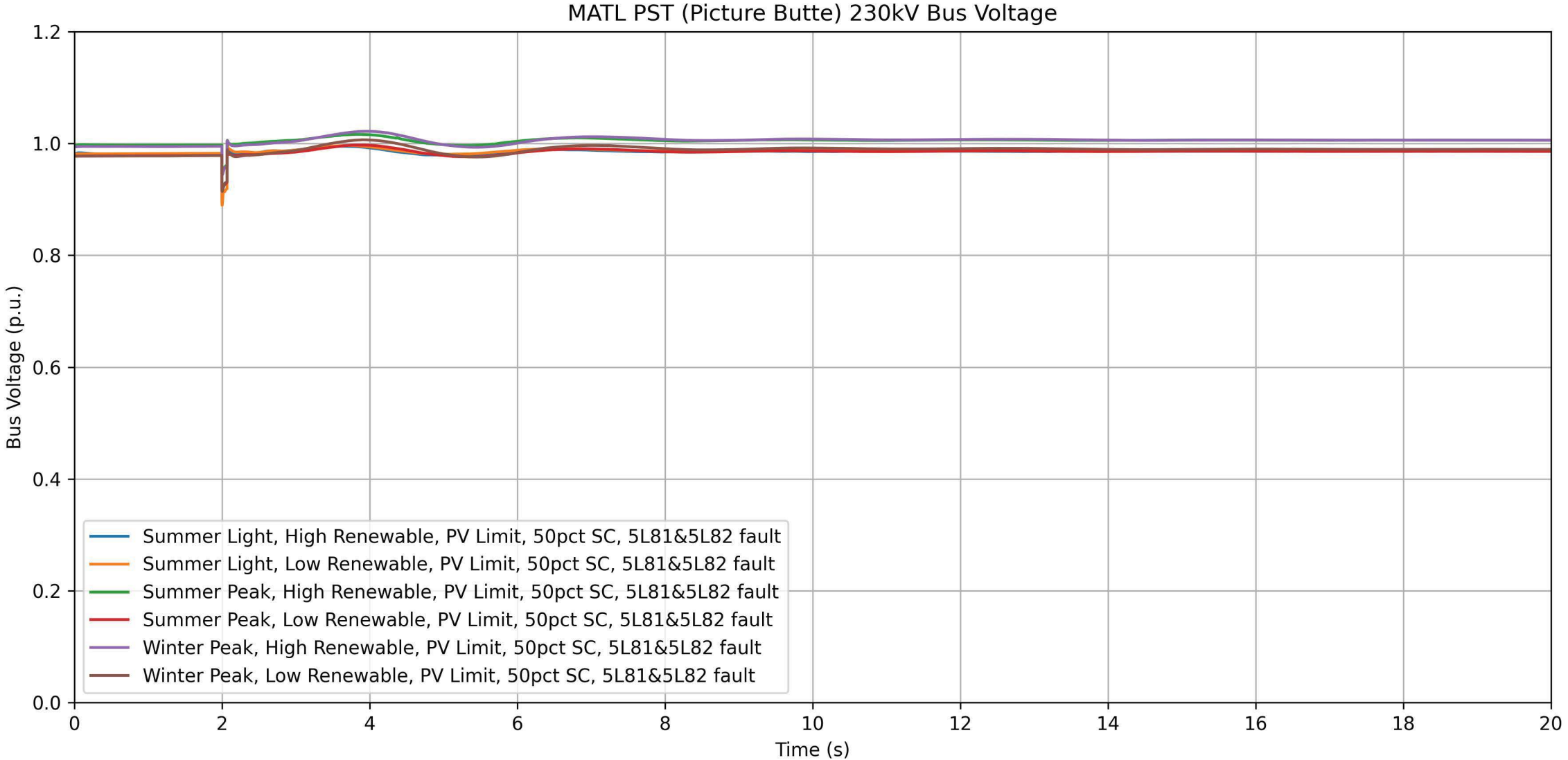

MATL (Hay Lake - Picture Butte) Real Power
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (MW)
0
100
200
300
400
500
Time (s)
0
2
4
6
8
10
12
14
16
18
20

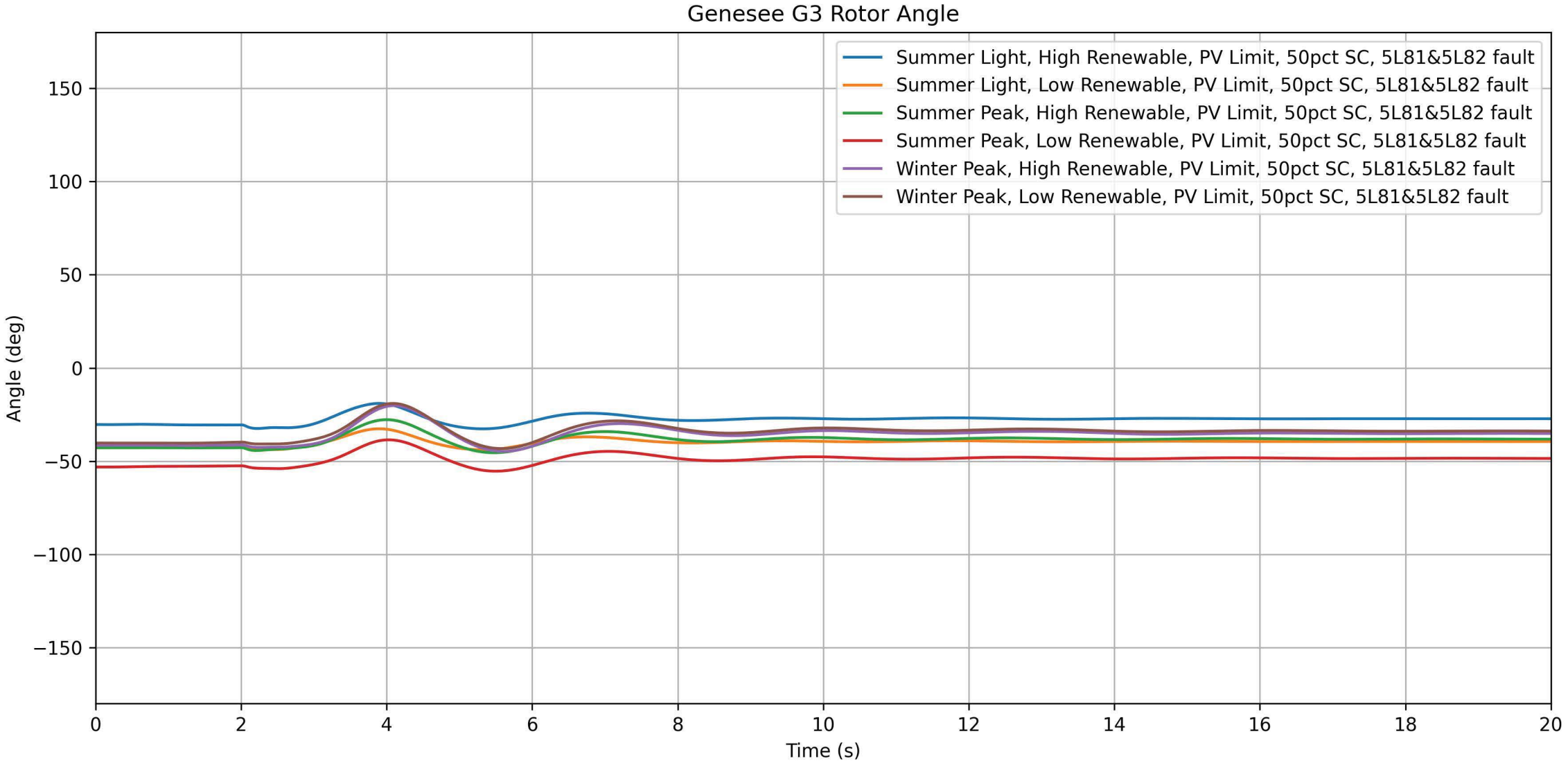

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

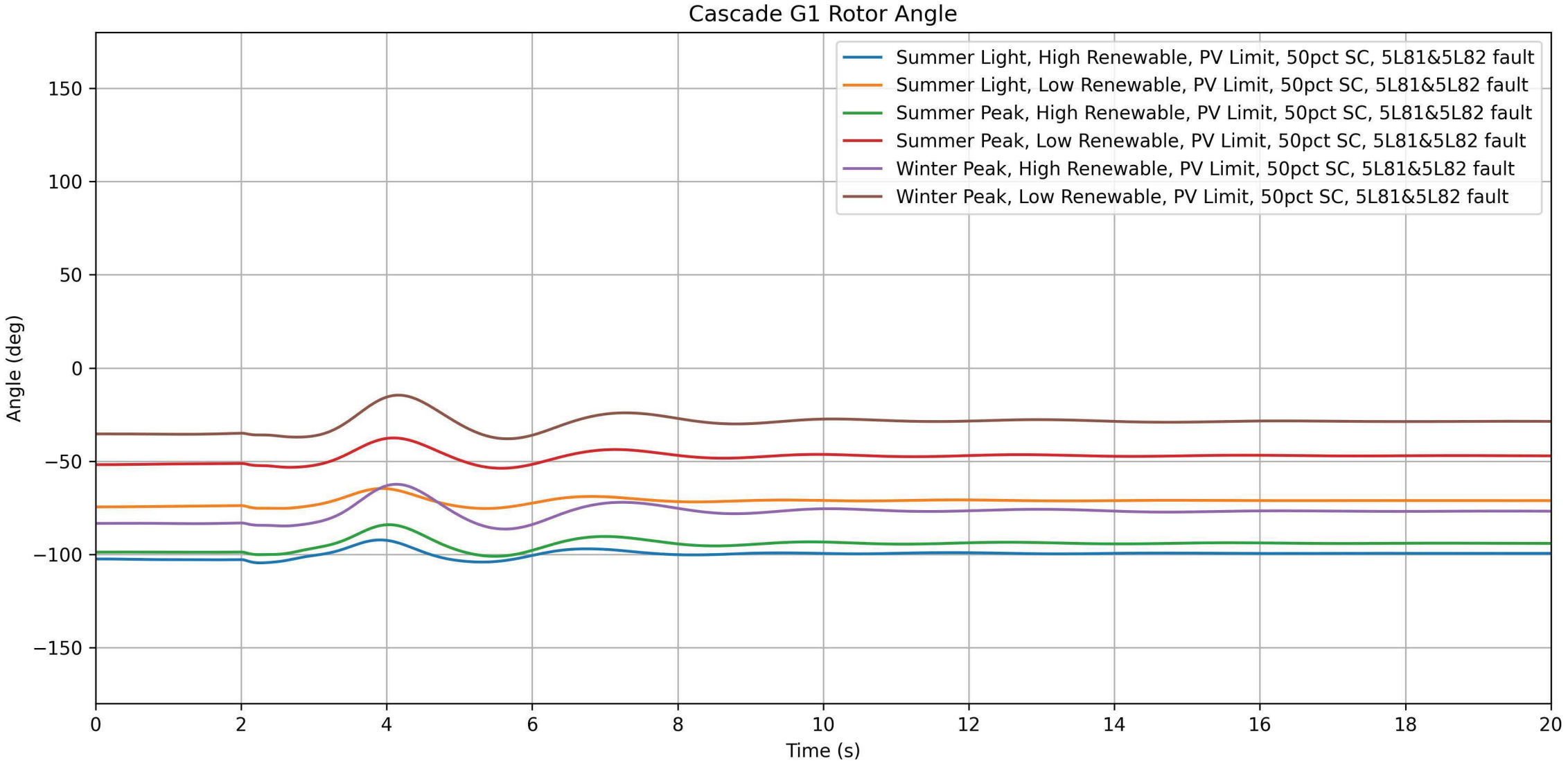

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

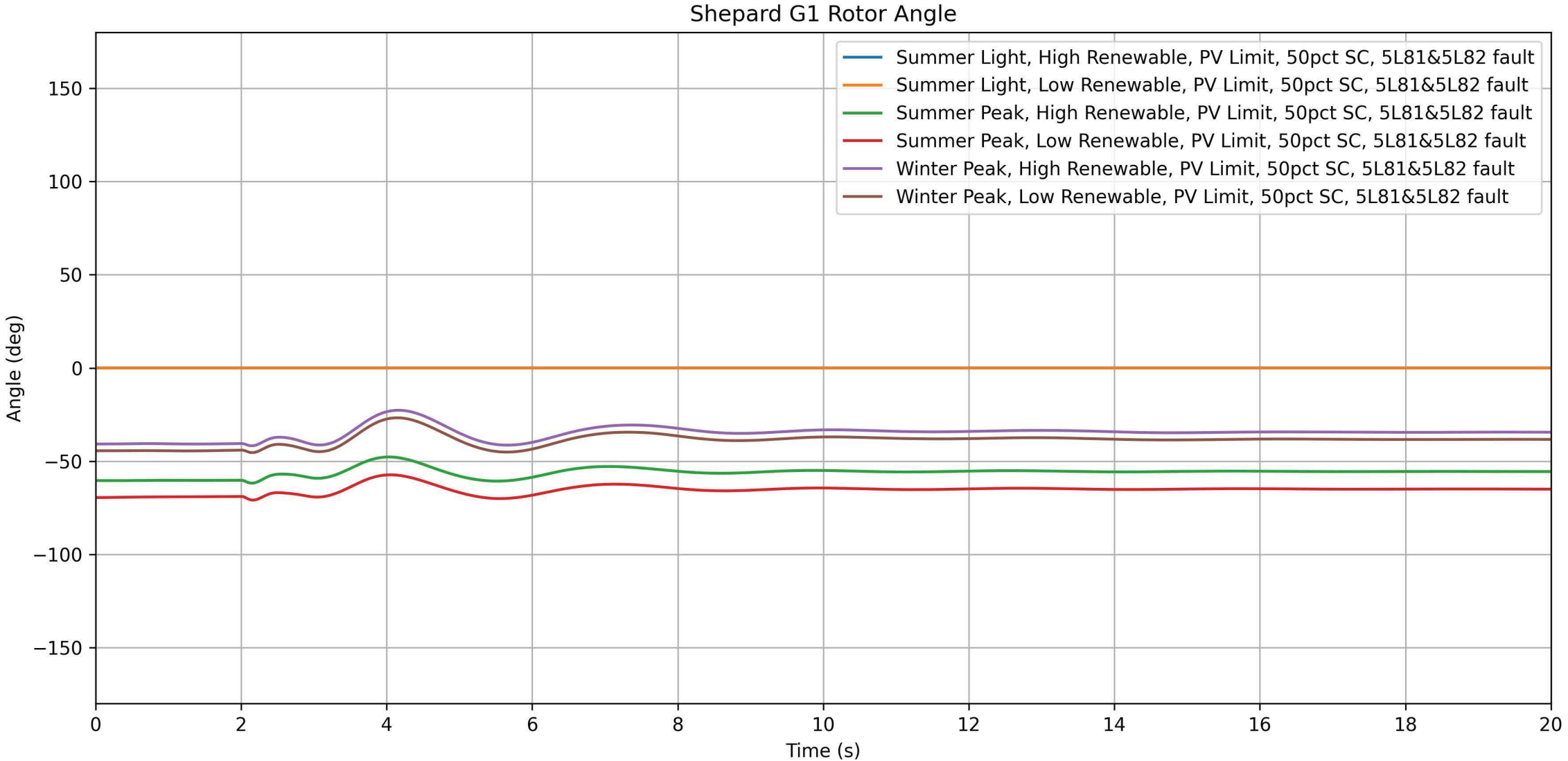

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

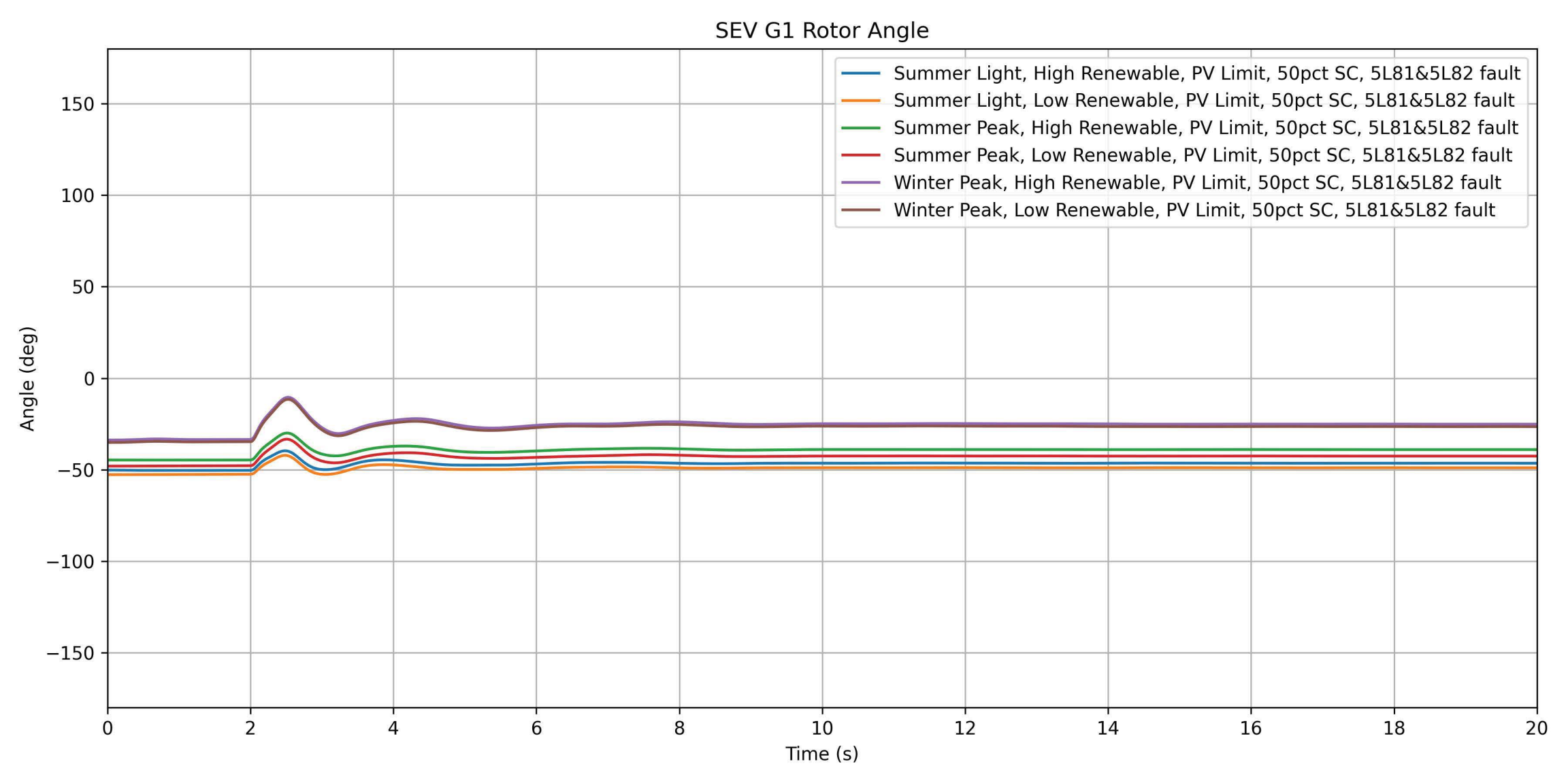

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

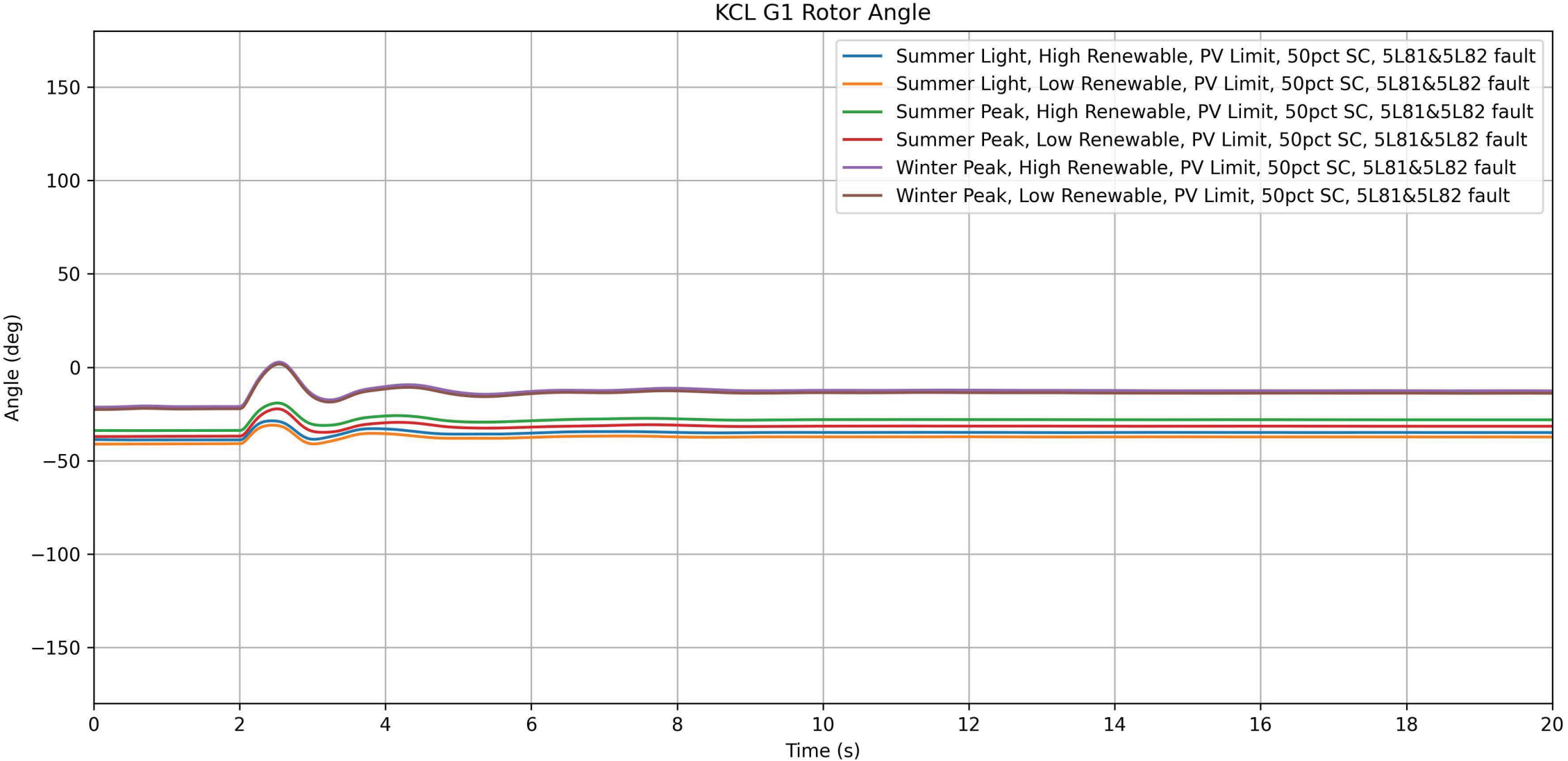

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

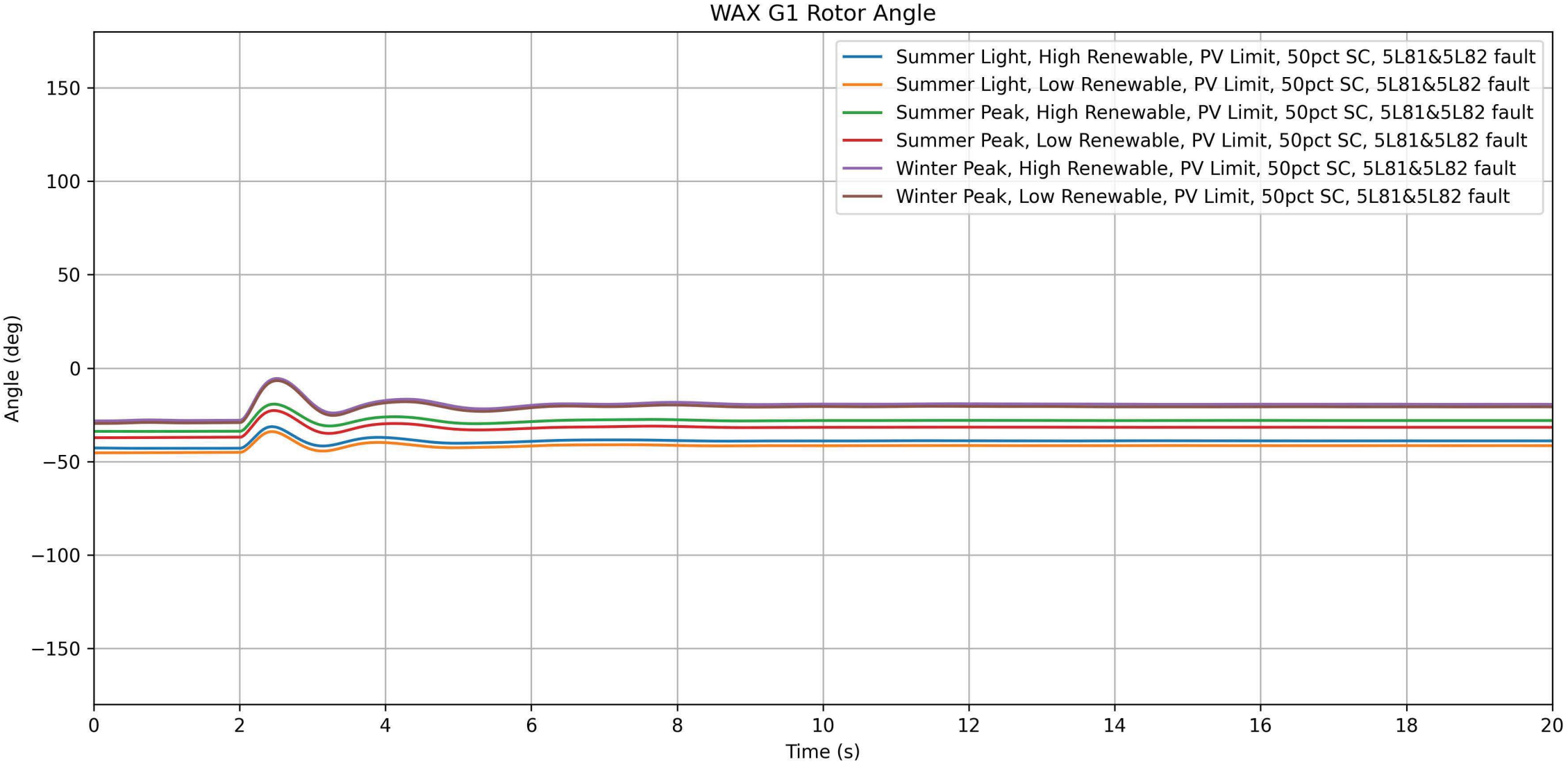

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

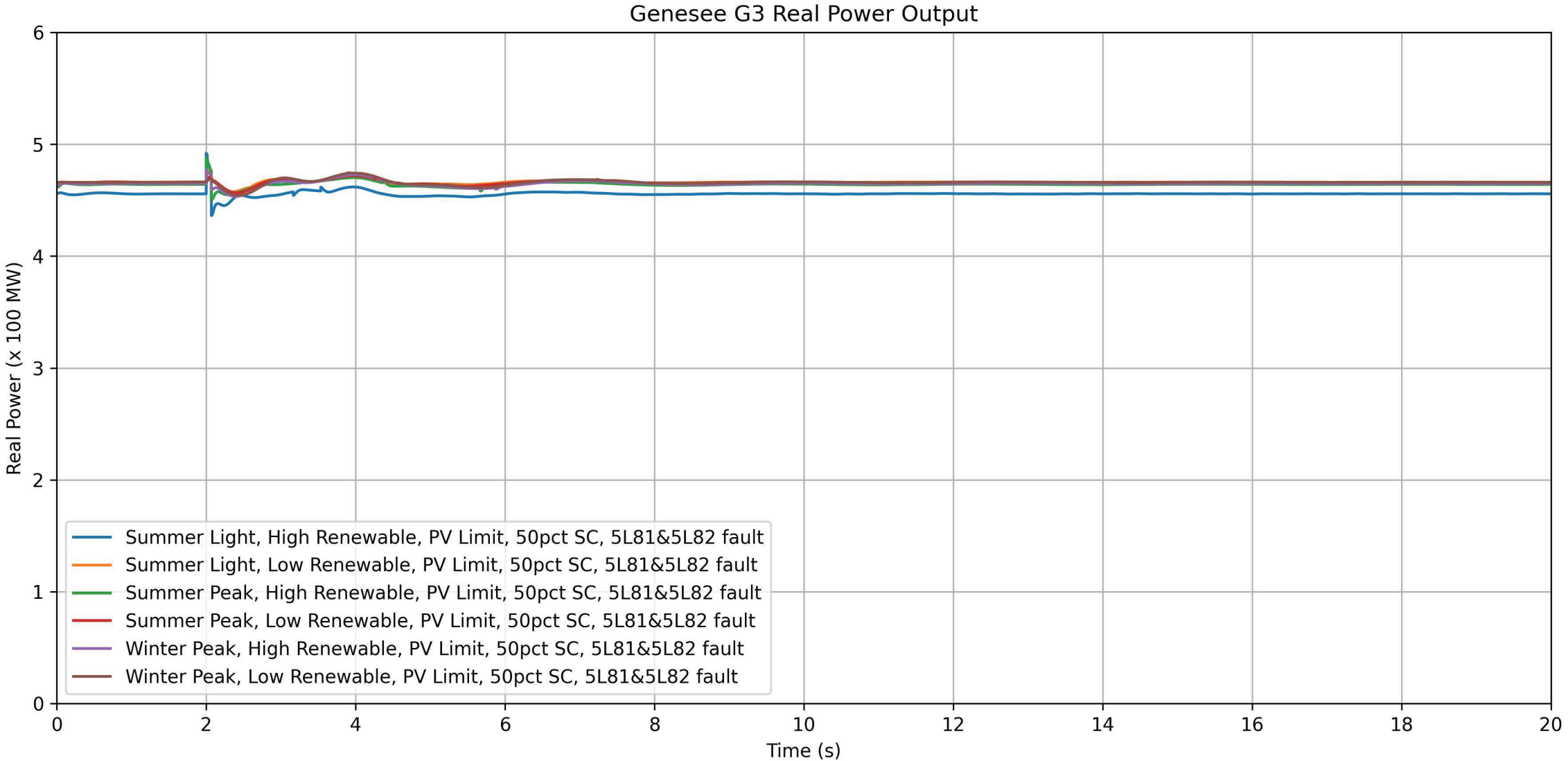

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

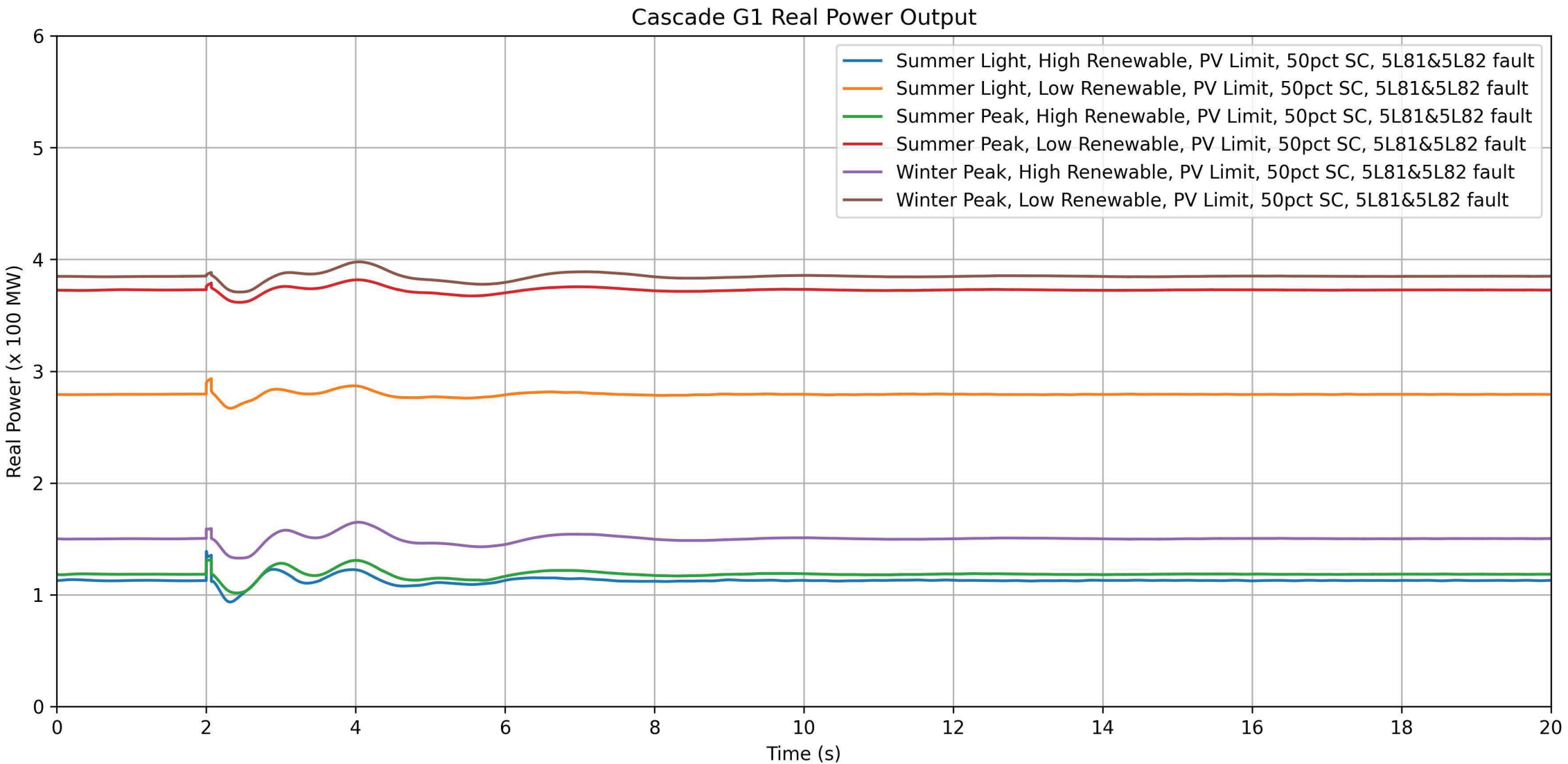

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

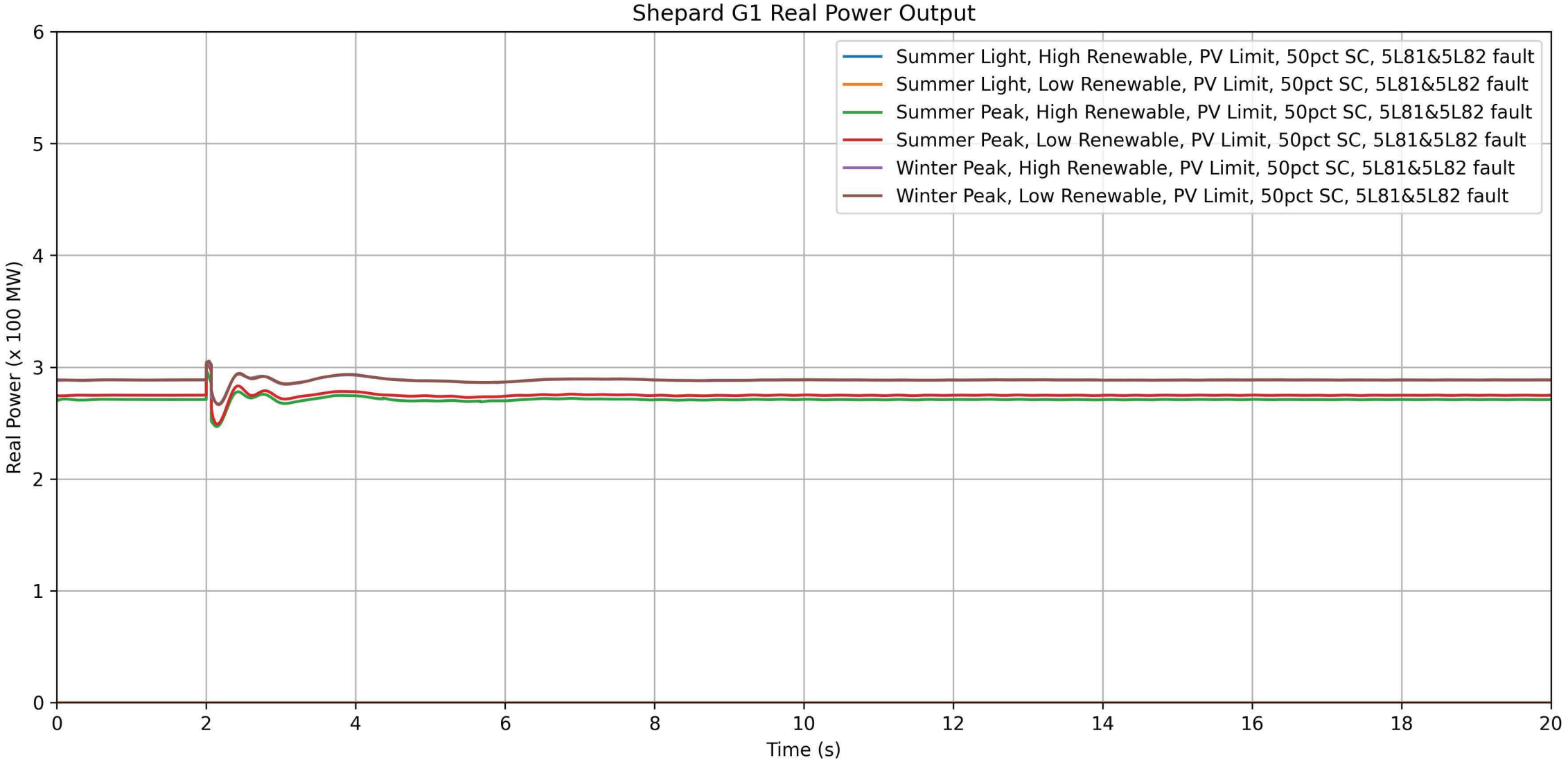

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

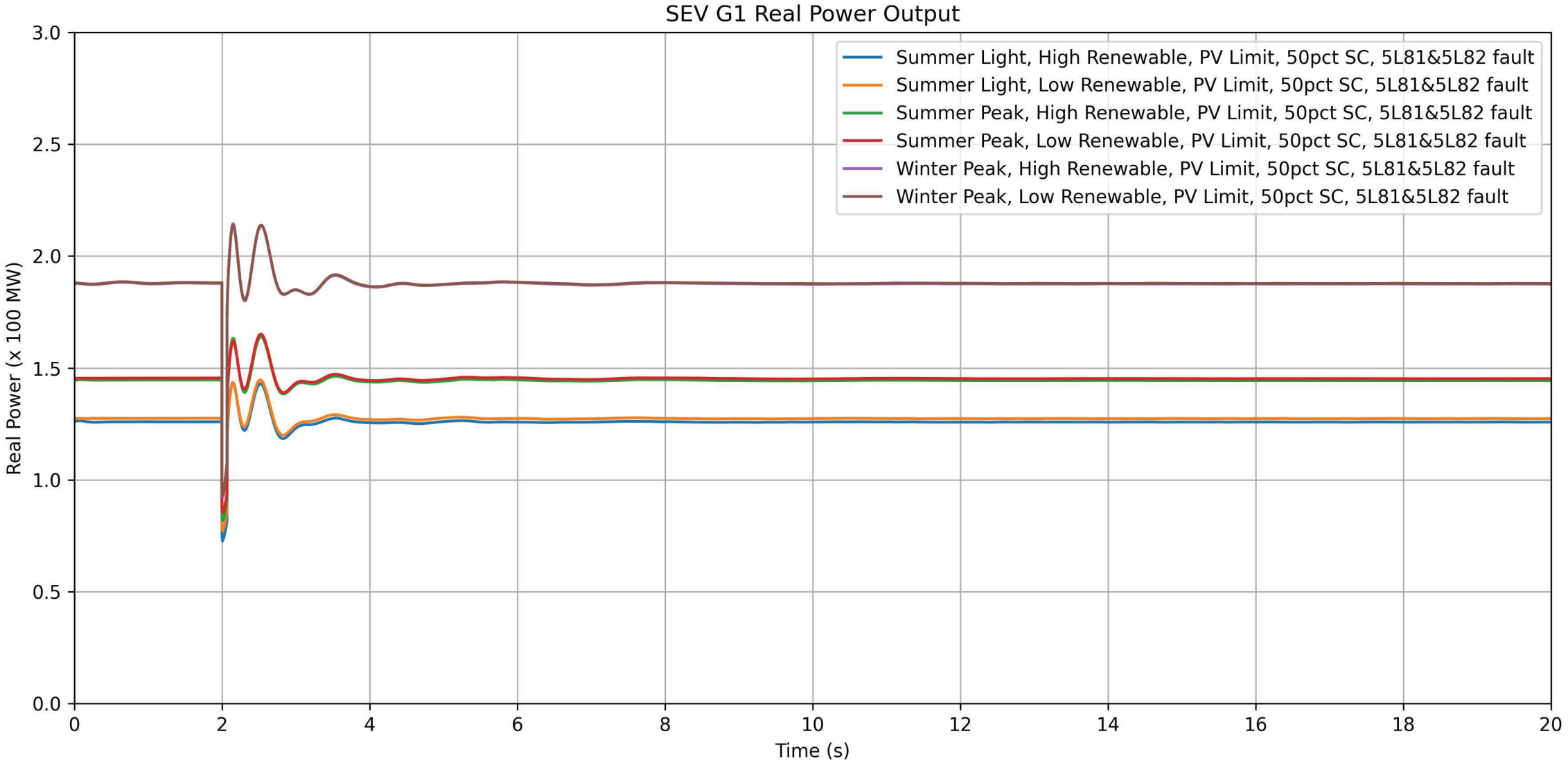

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

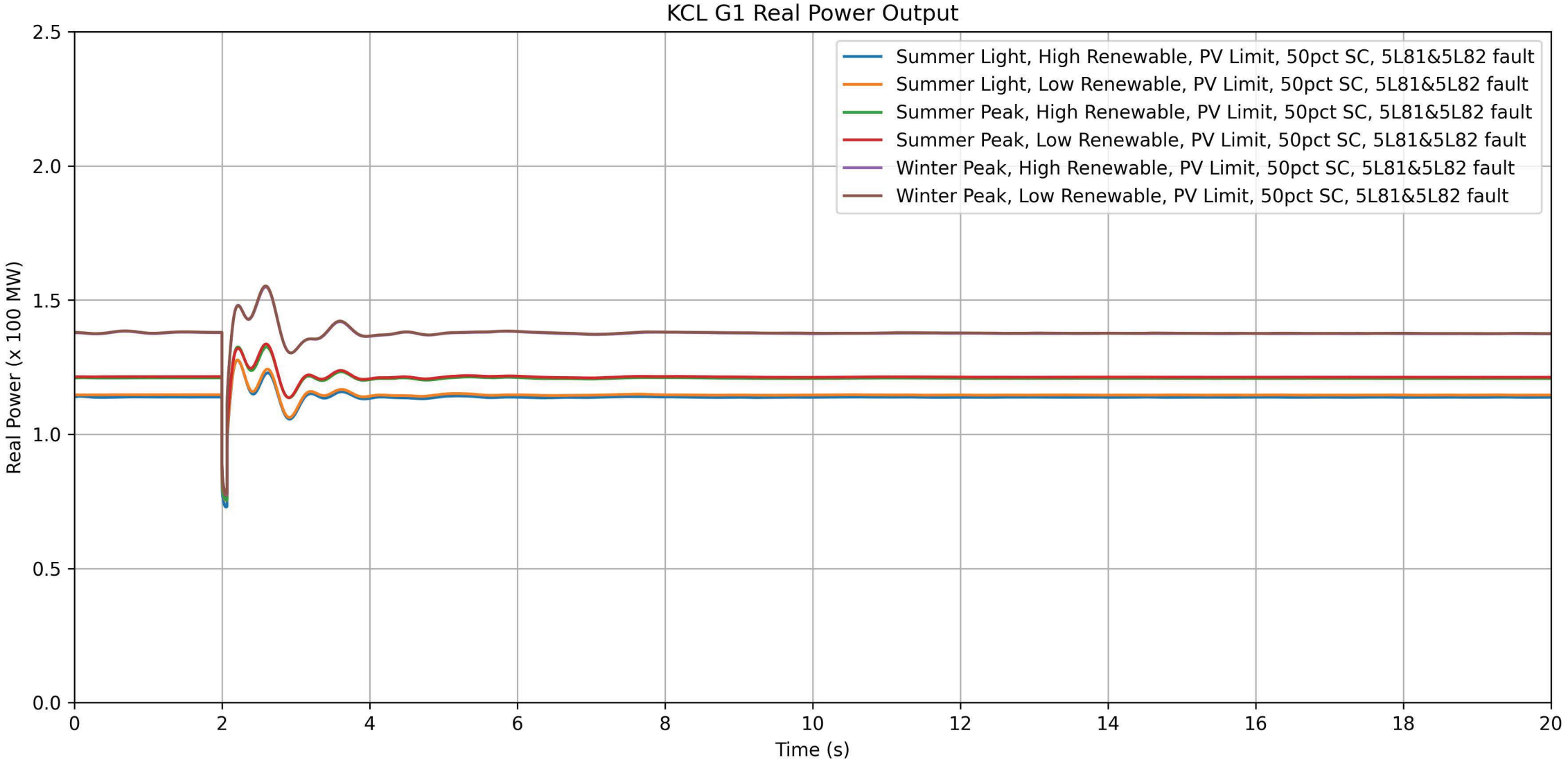

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

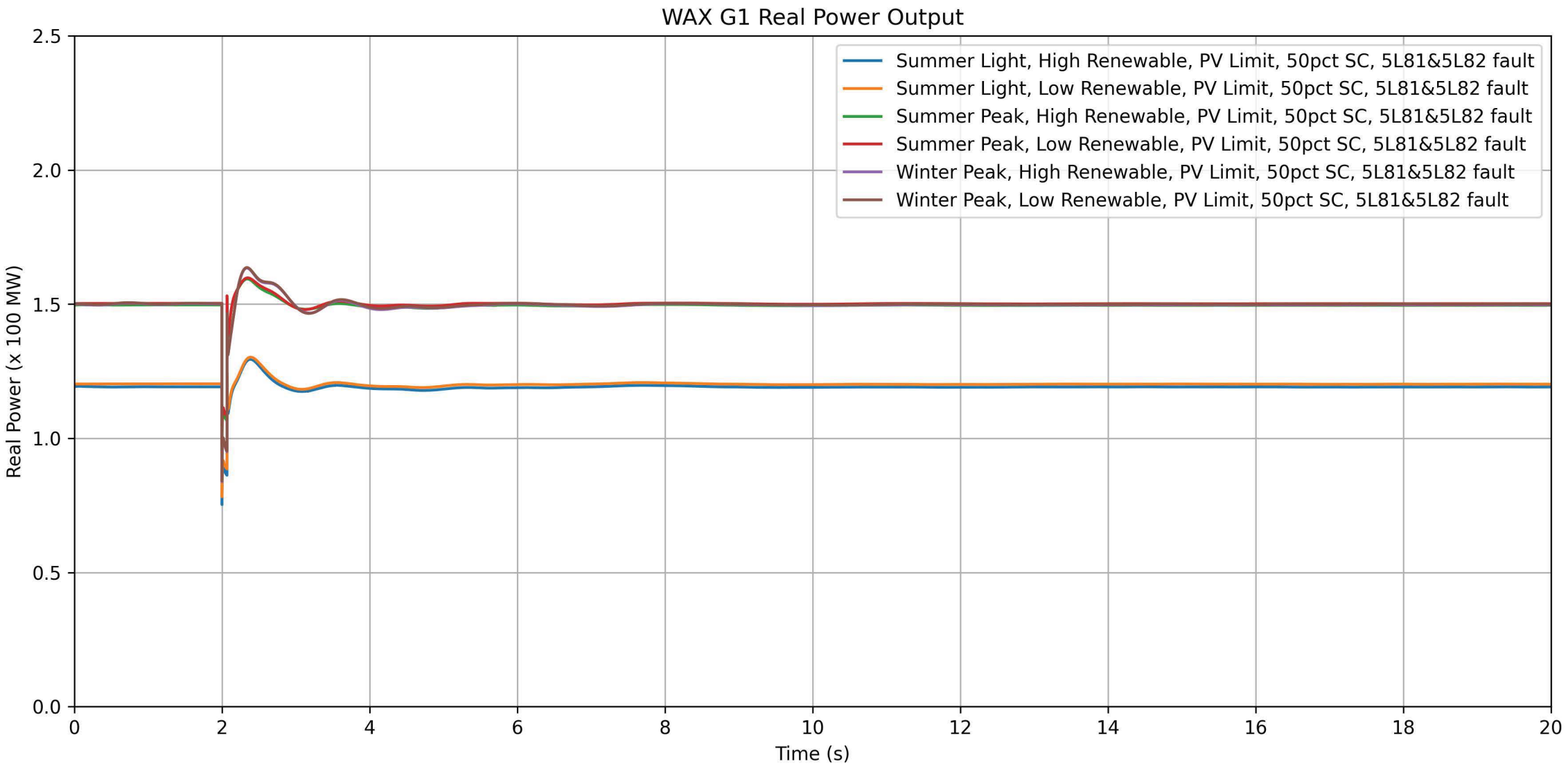

Genesee G3 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault

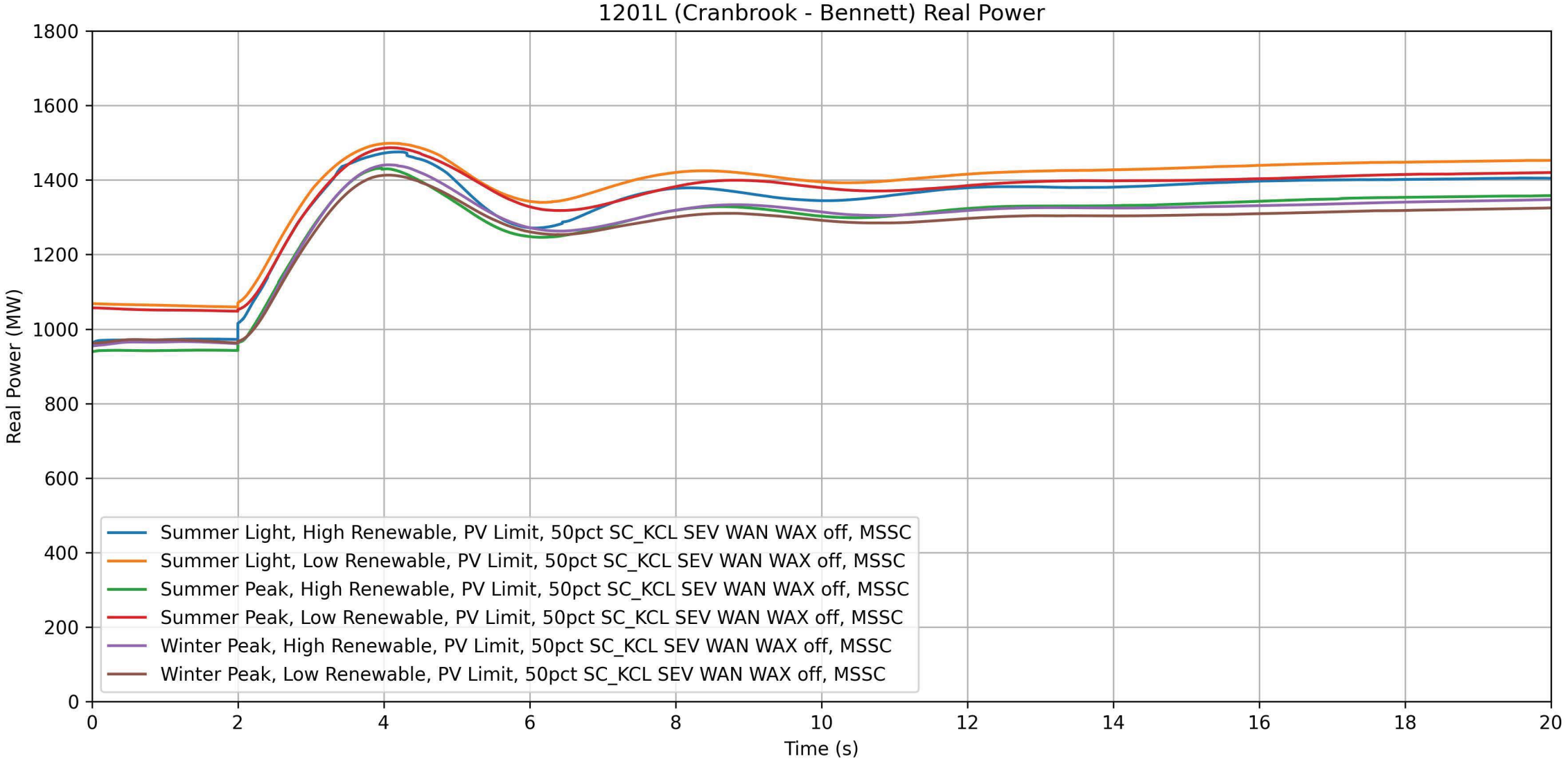

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

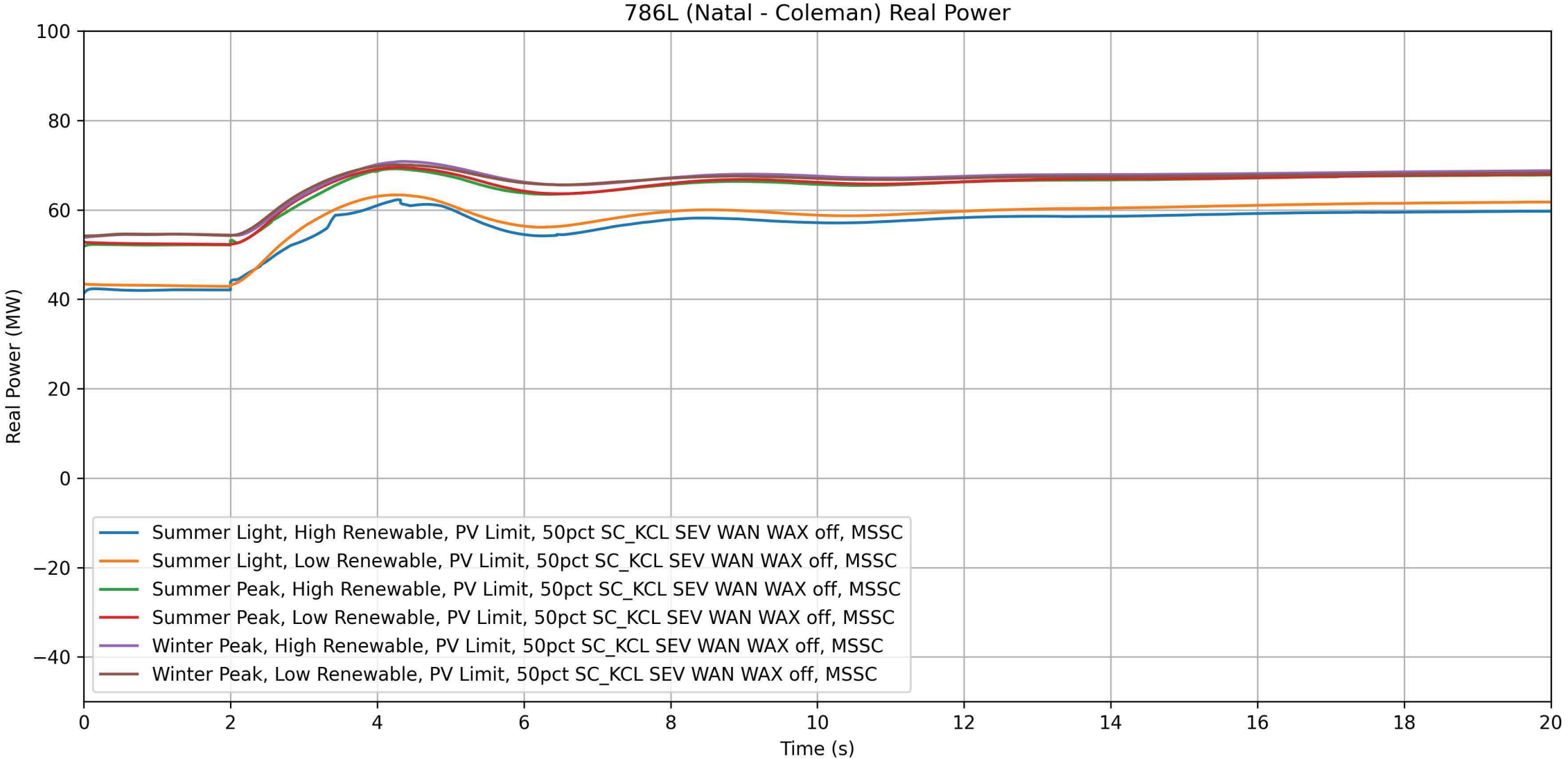

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

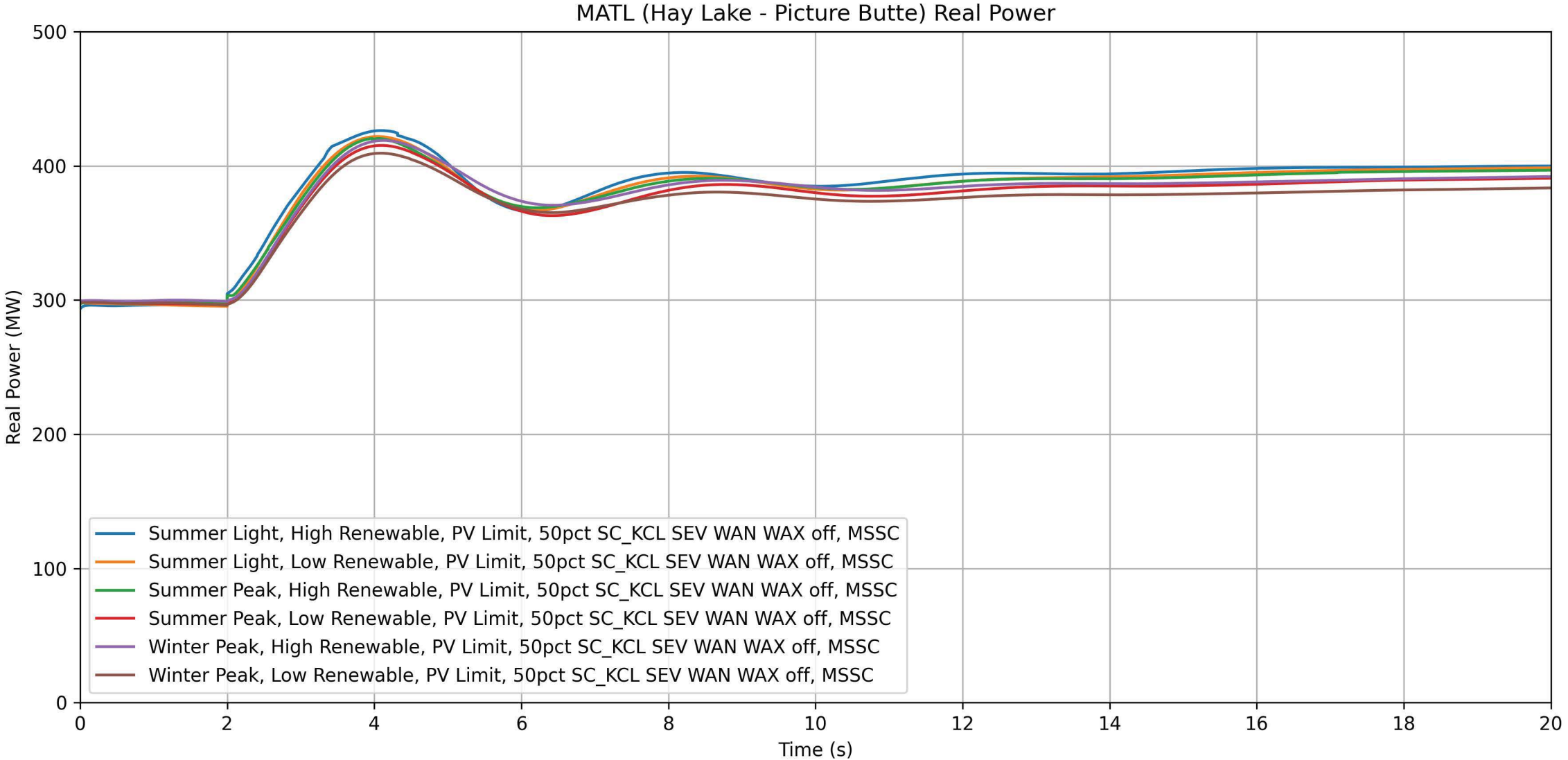

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

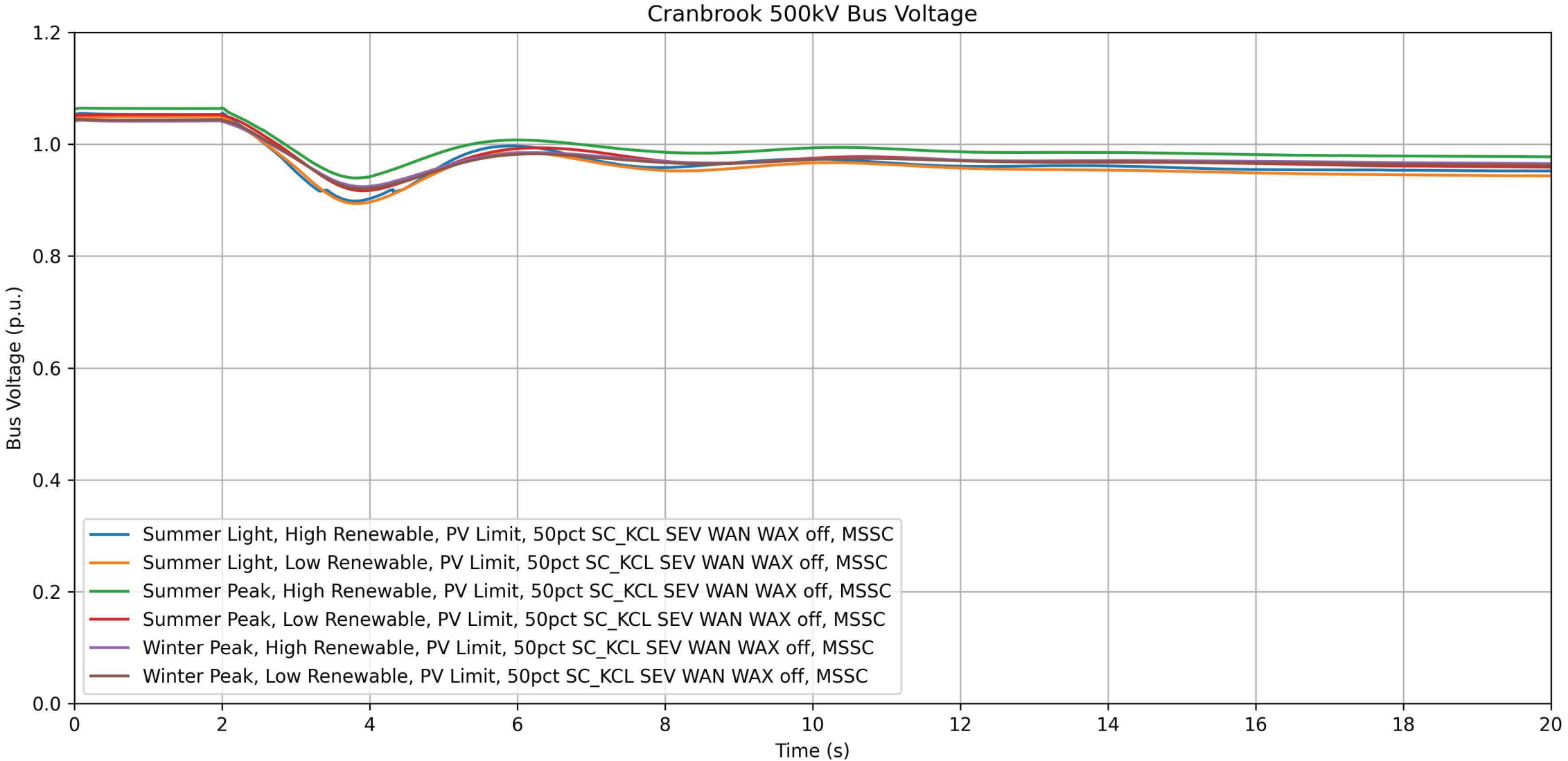

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

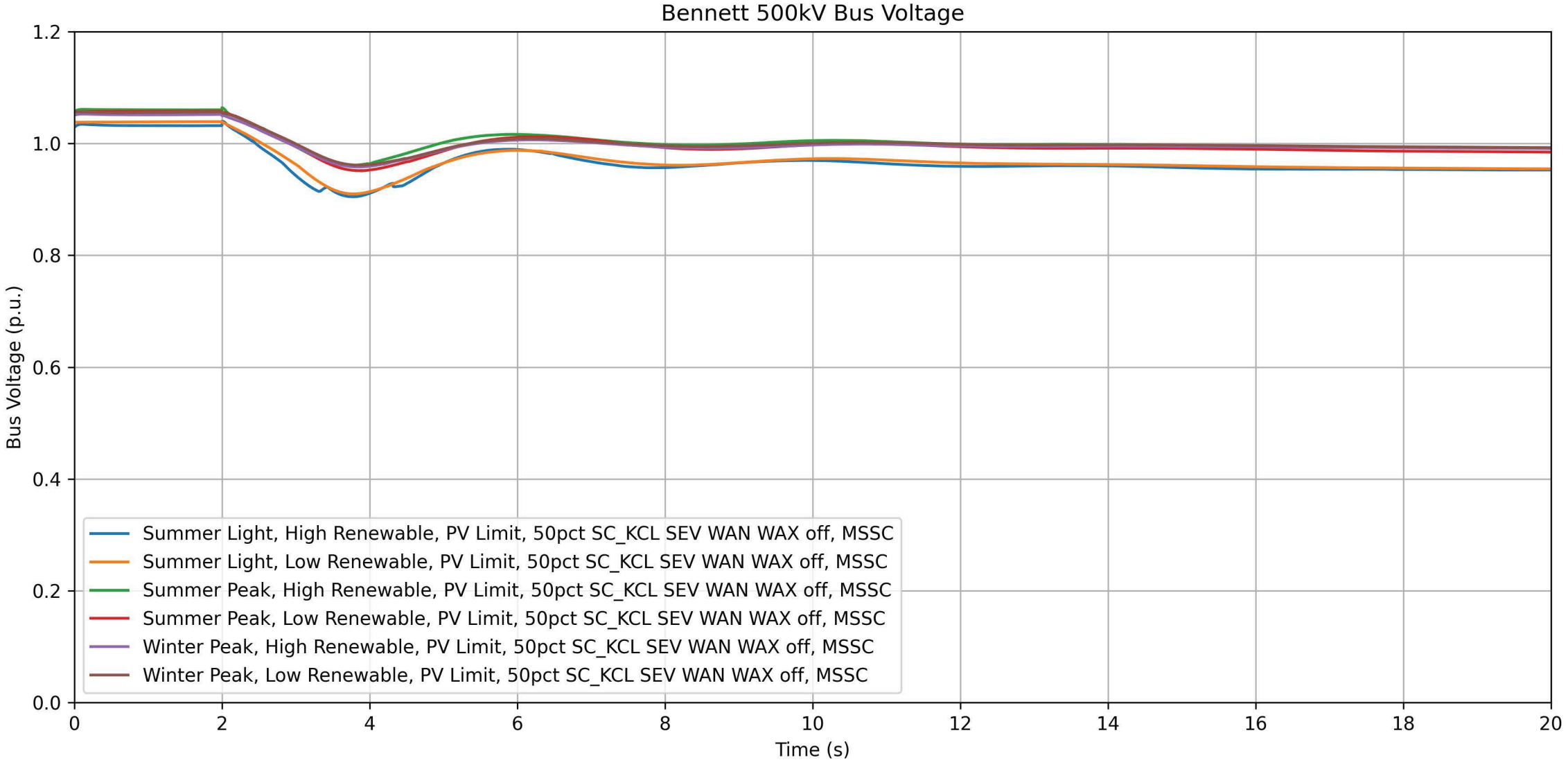

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Light, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Summer Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, High Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Winter Peak, Low Renewable, PV Limit, 50pct SC, 5L81&5L82 fault
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

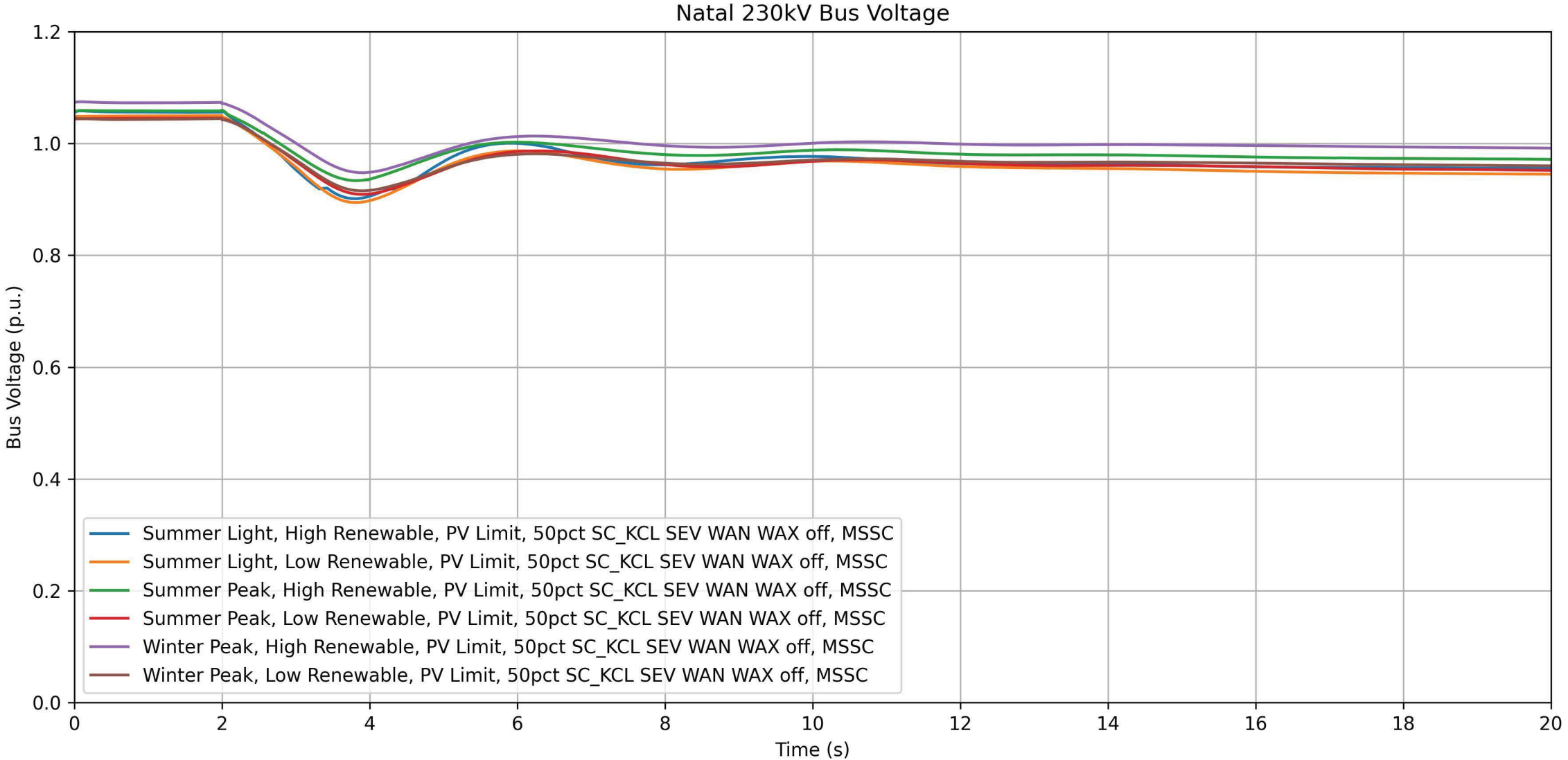

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

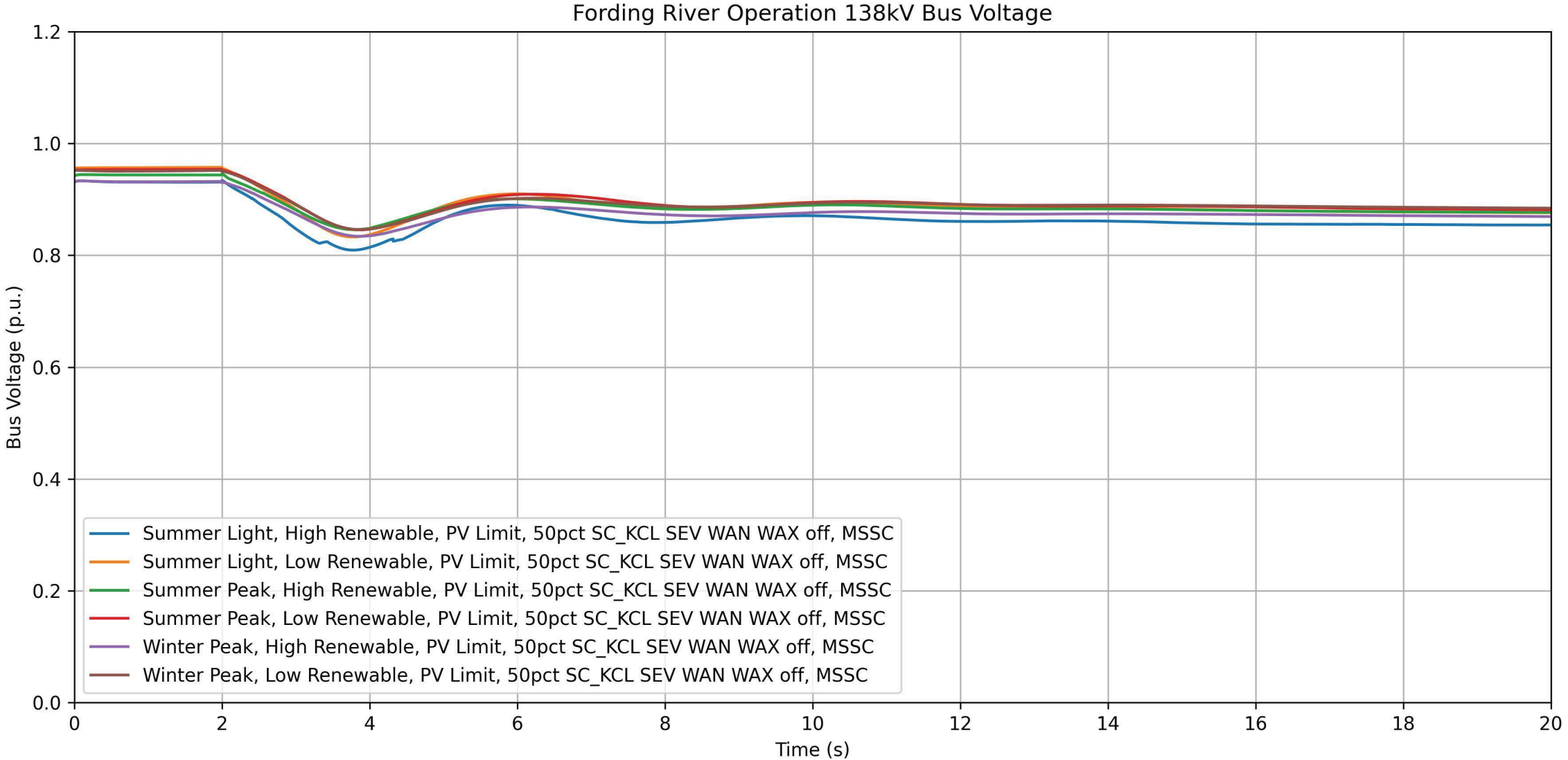

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

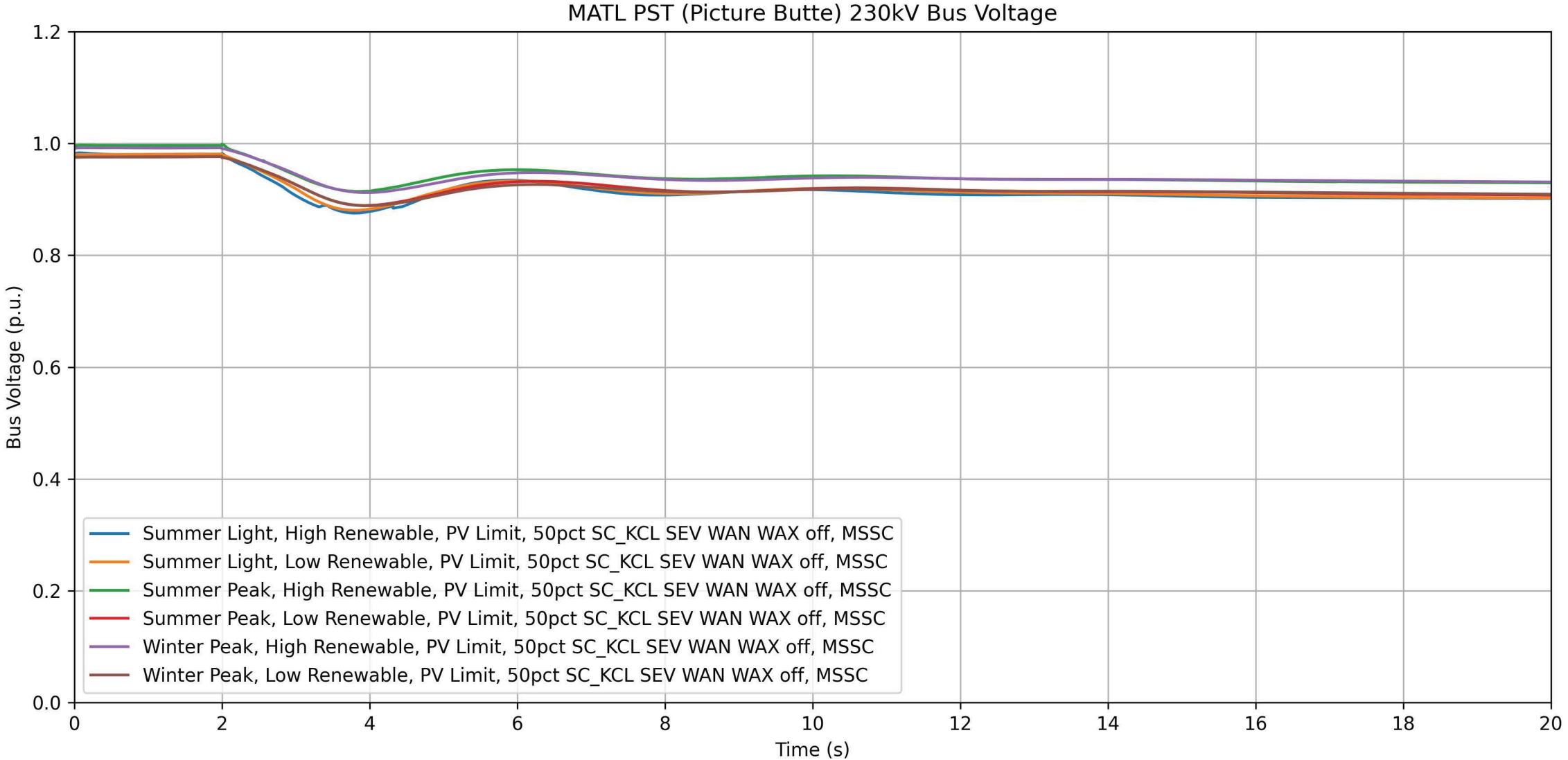

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

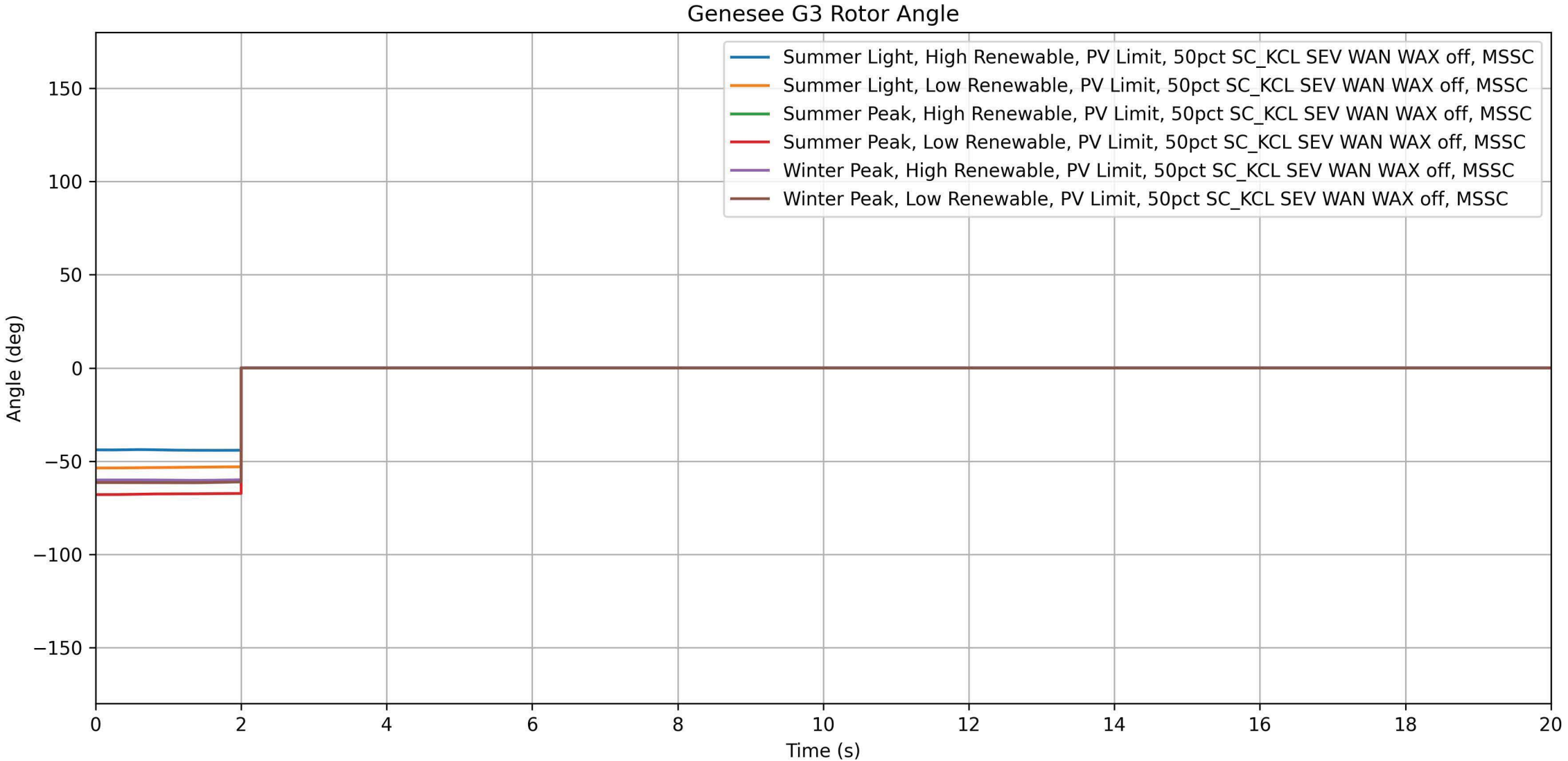

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

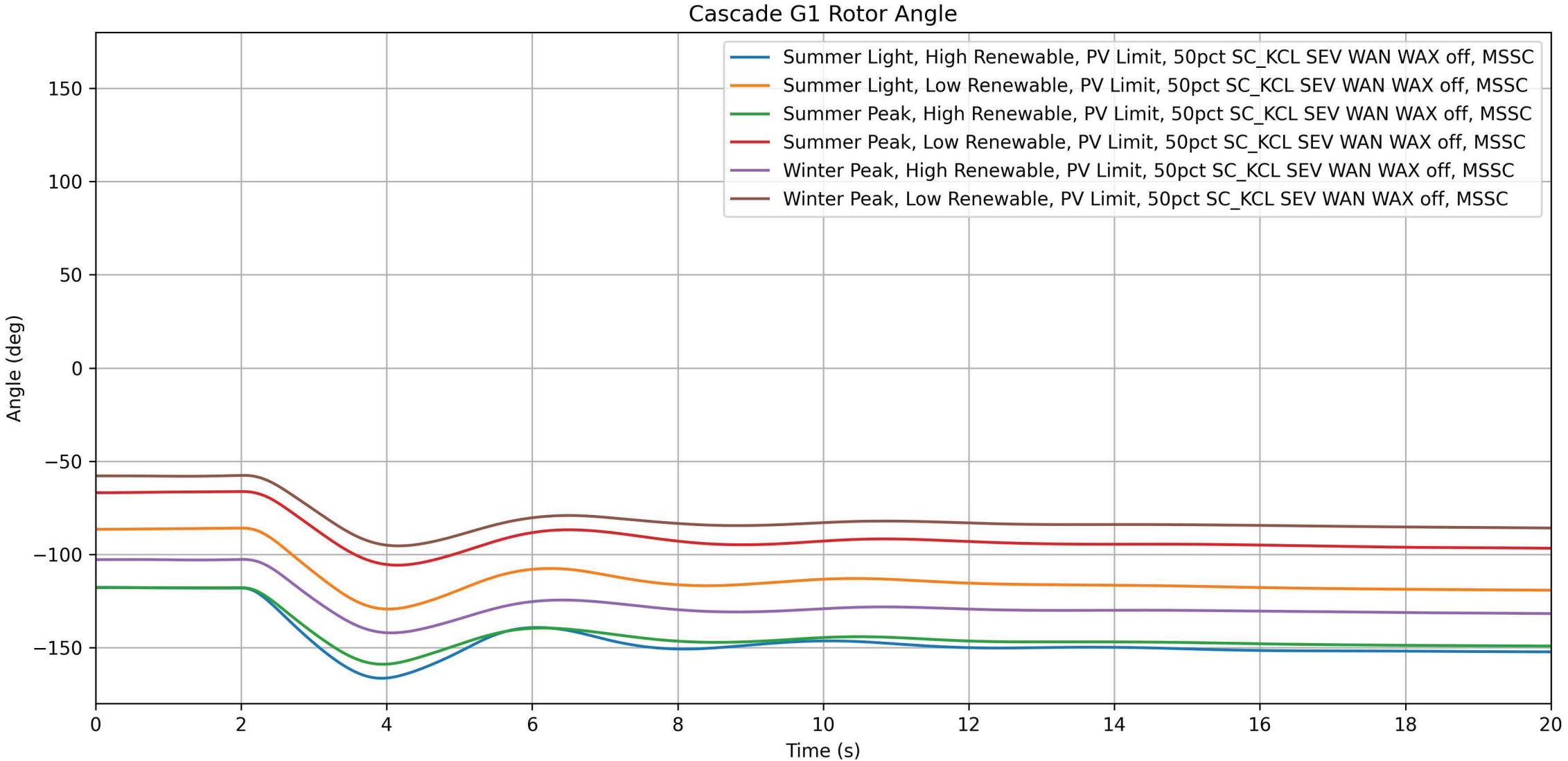

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

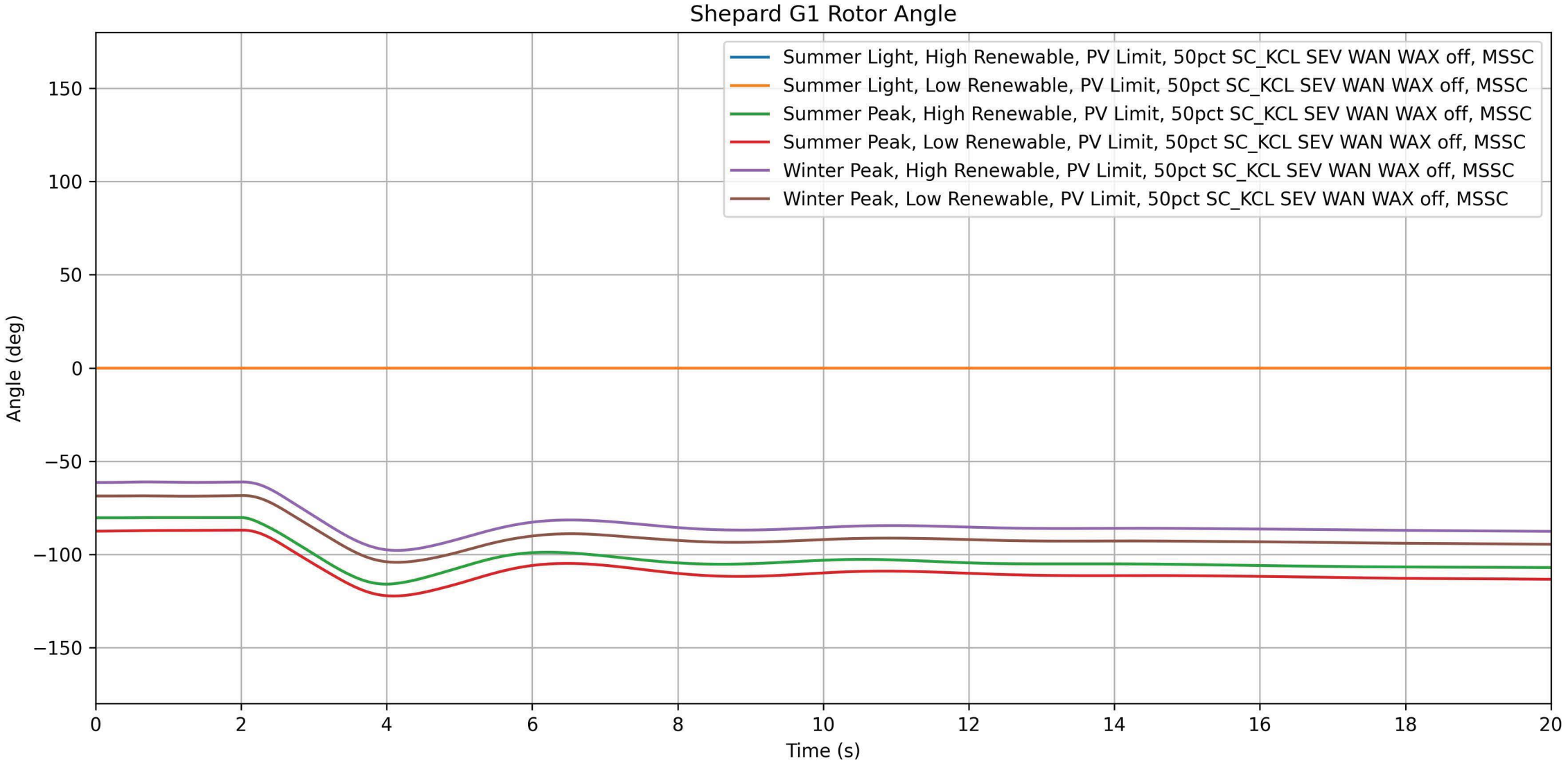

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

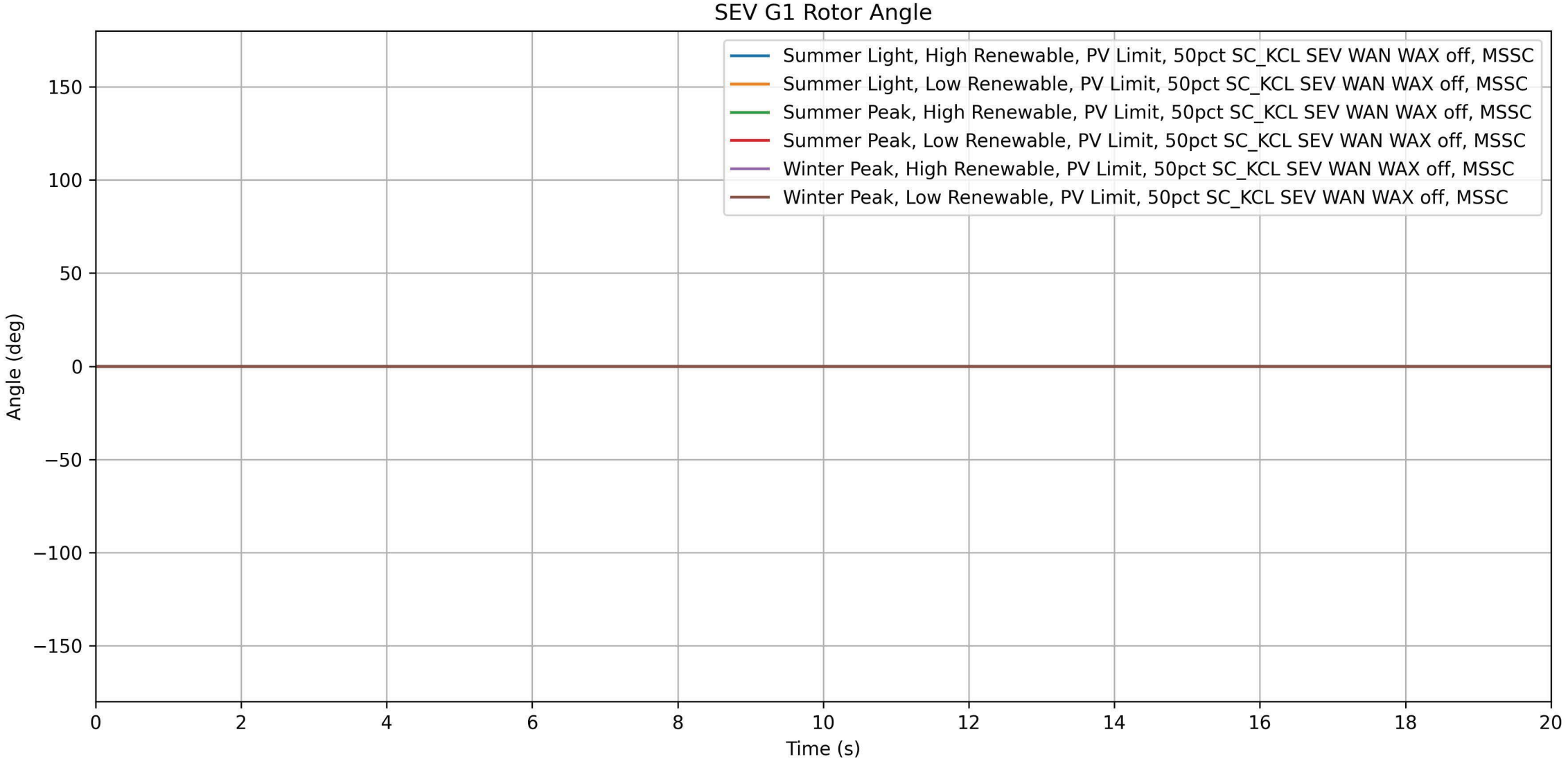

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

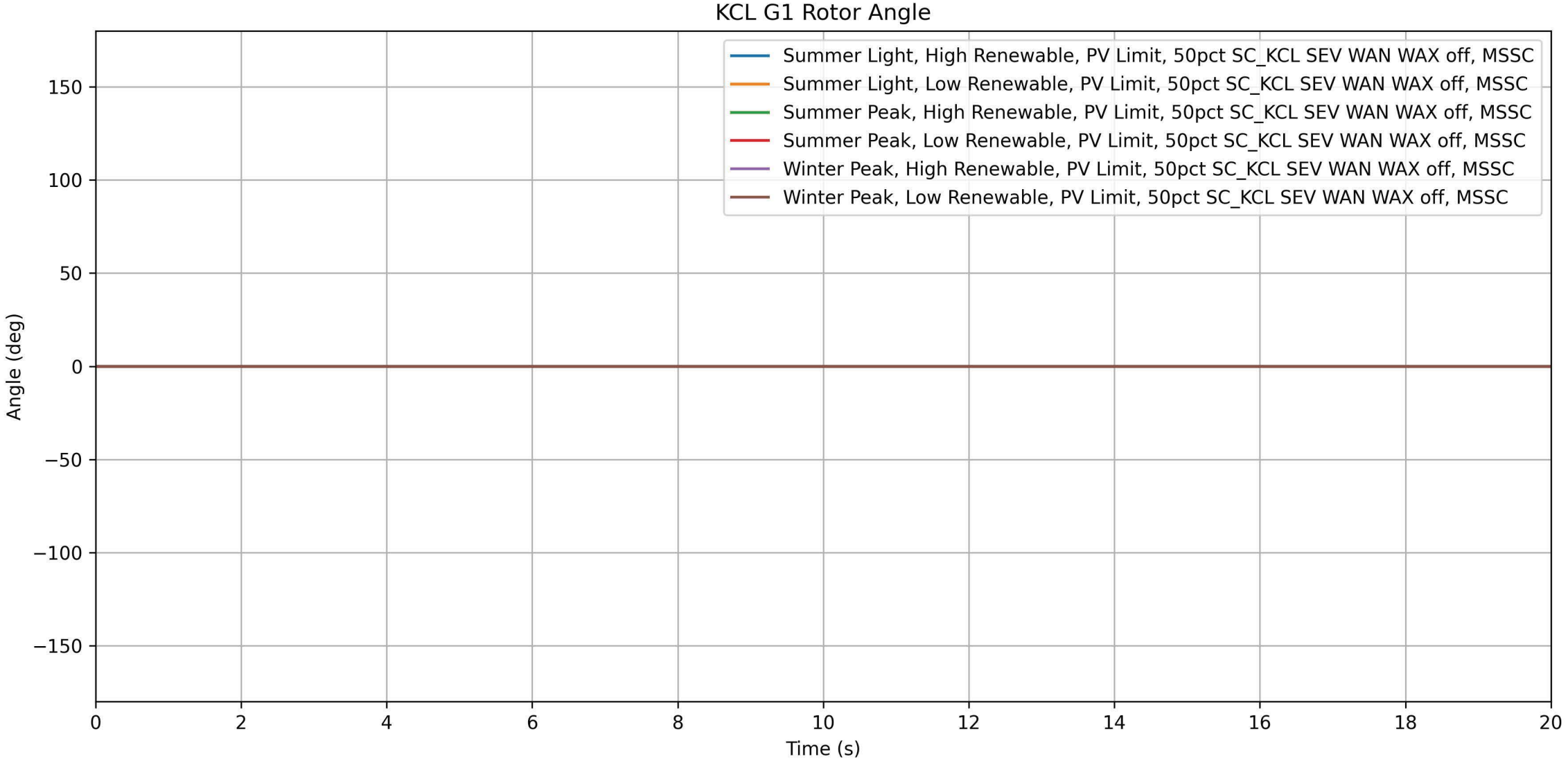

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC

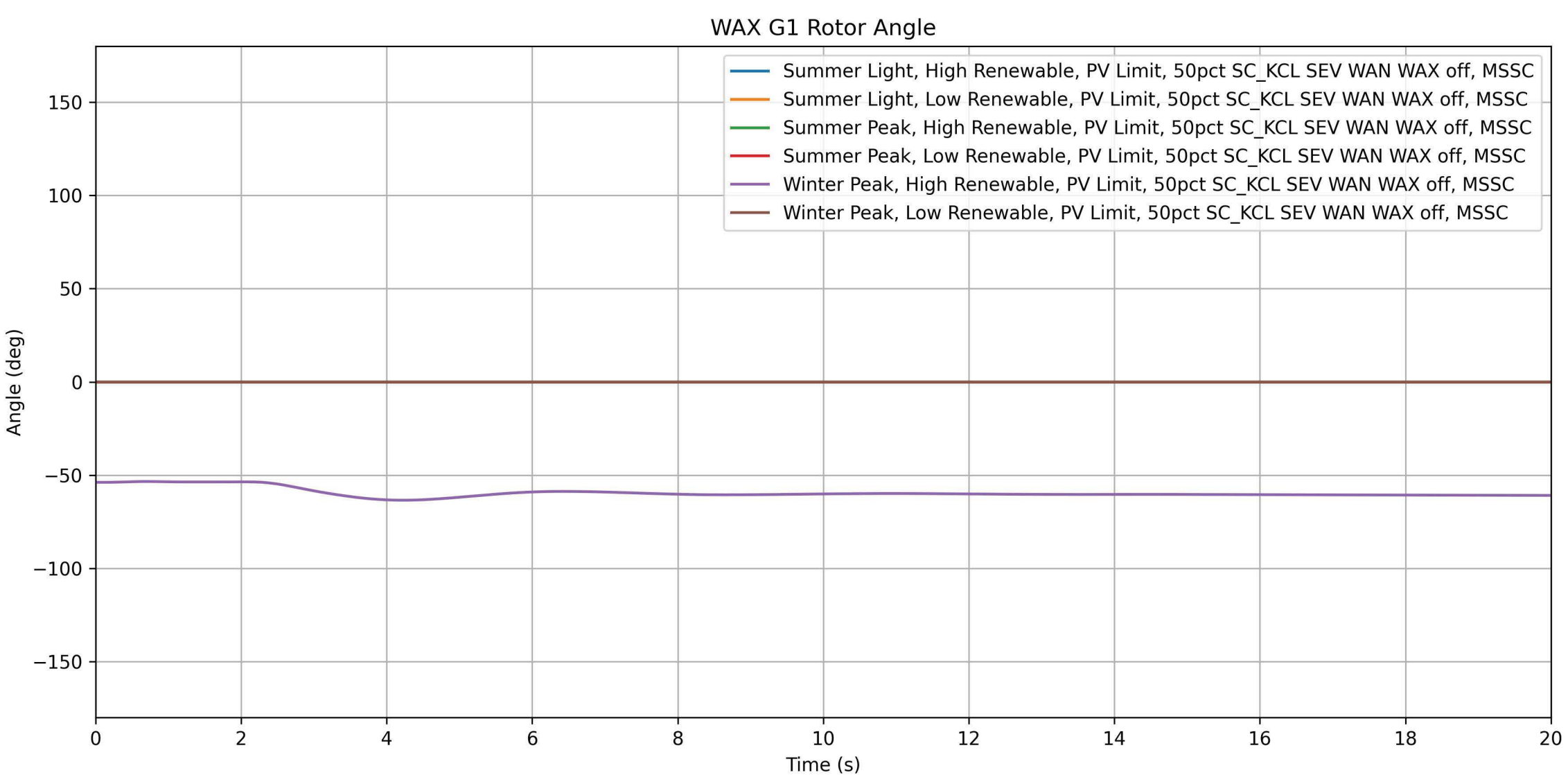

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

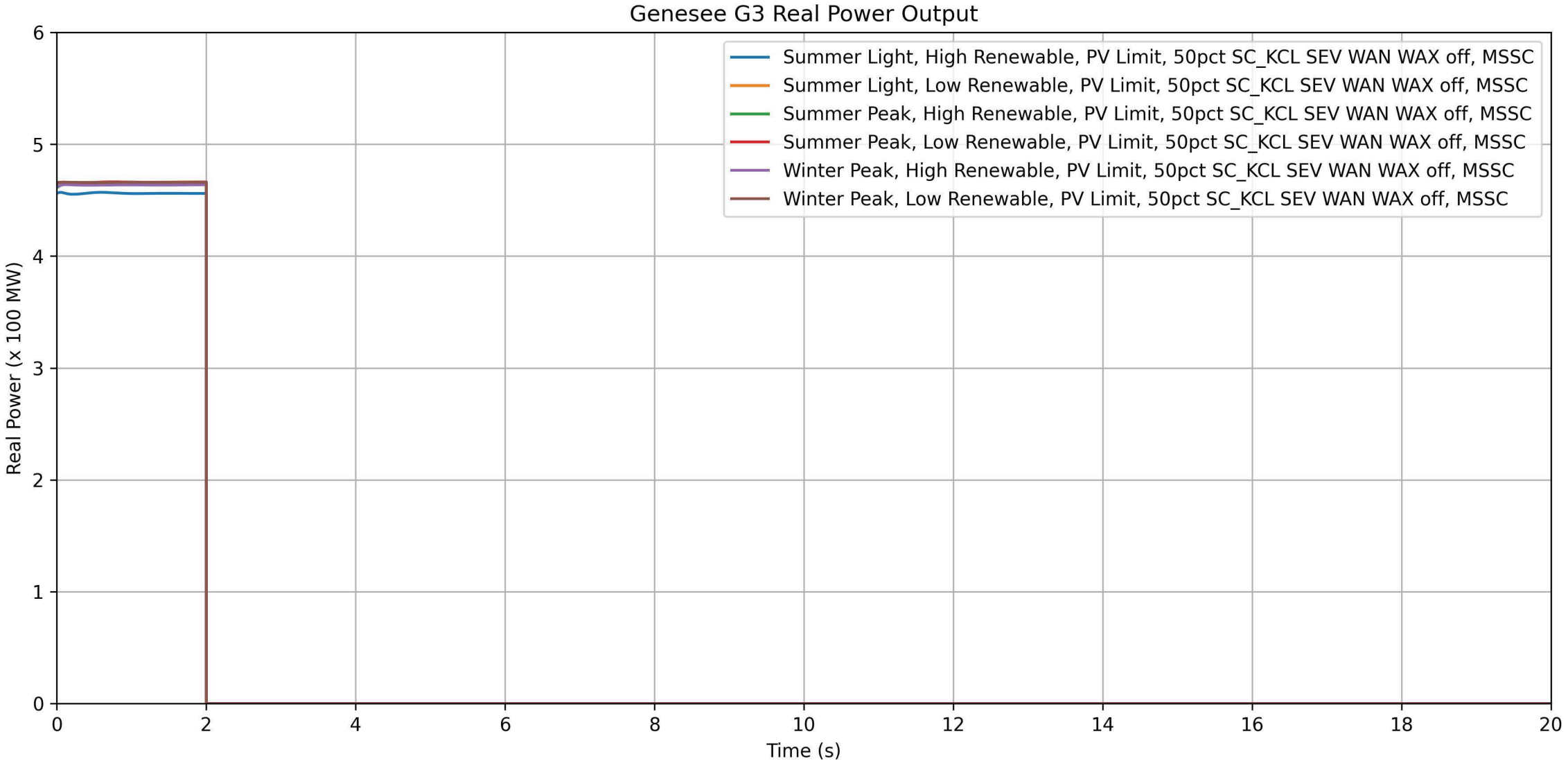

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

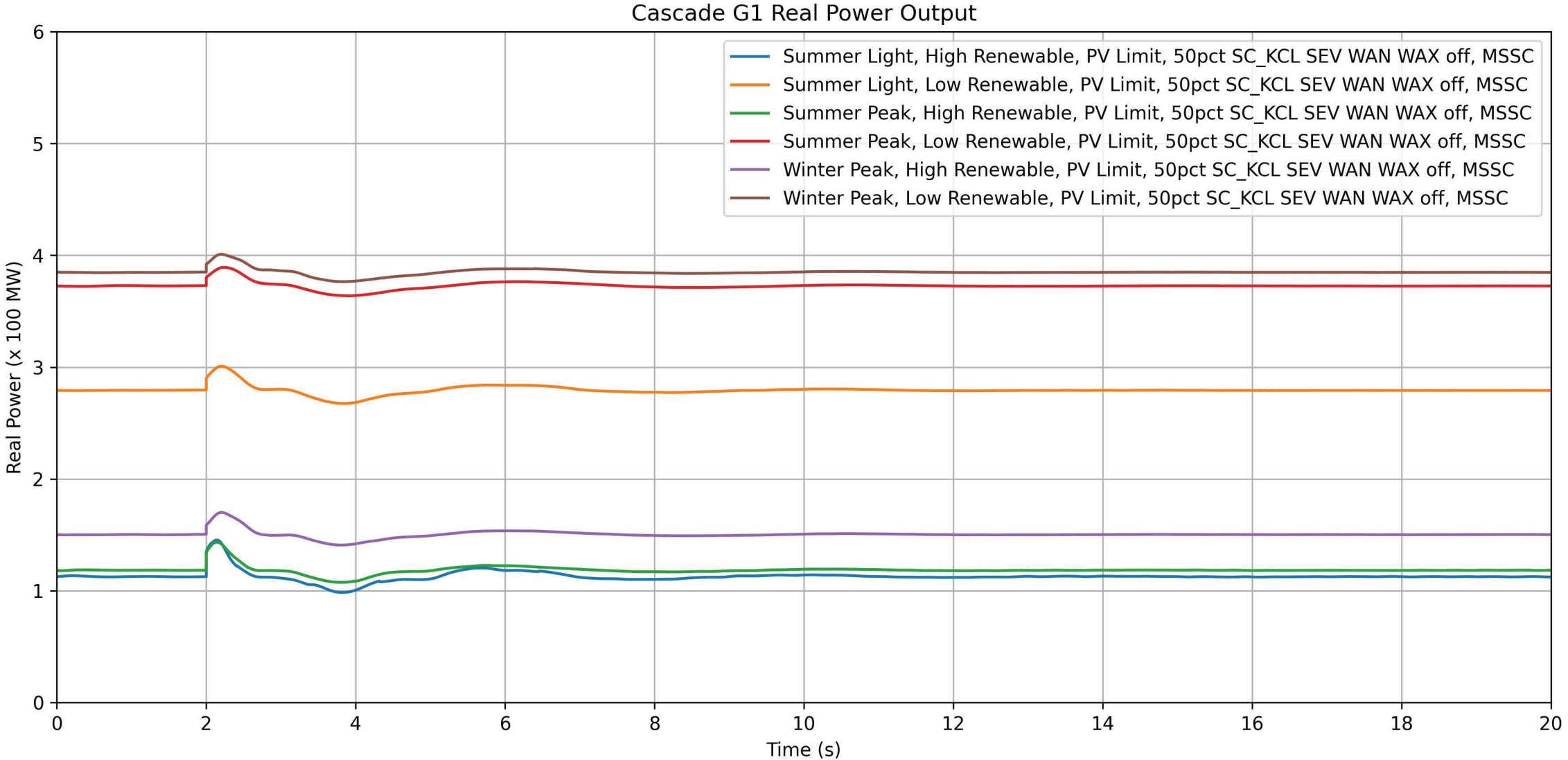

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

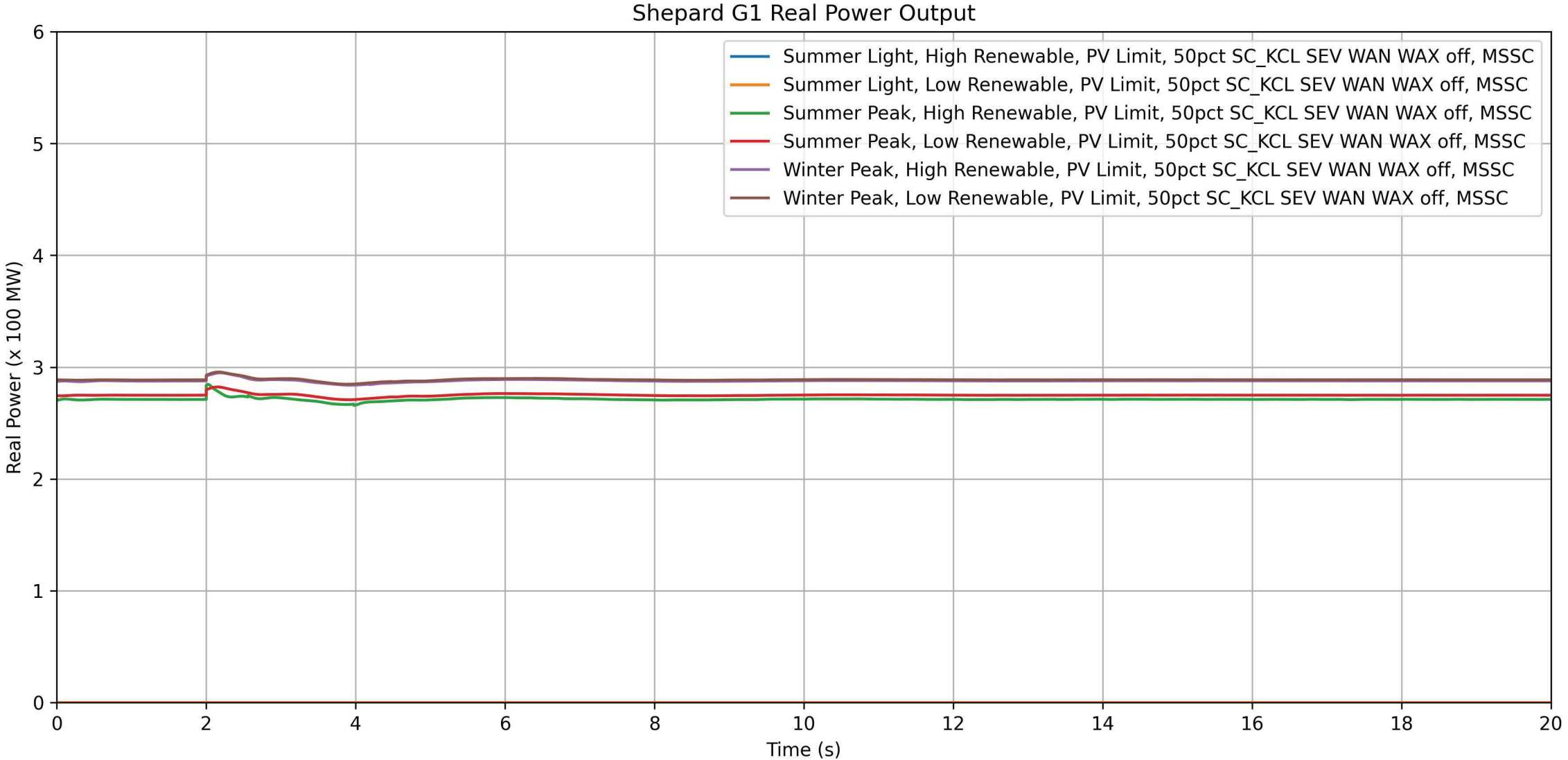

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

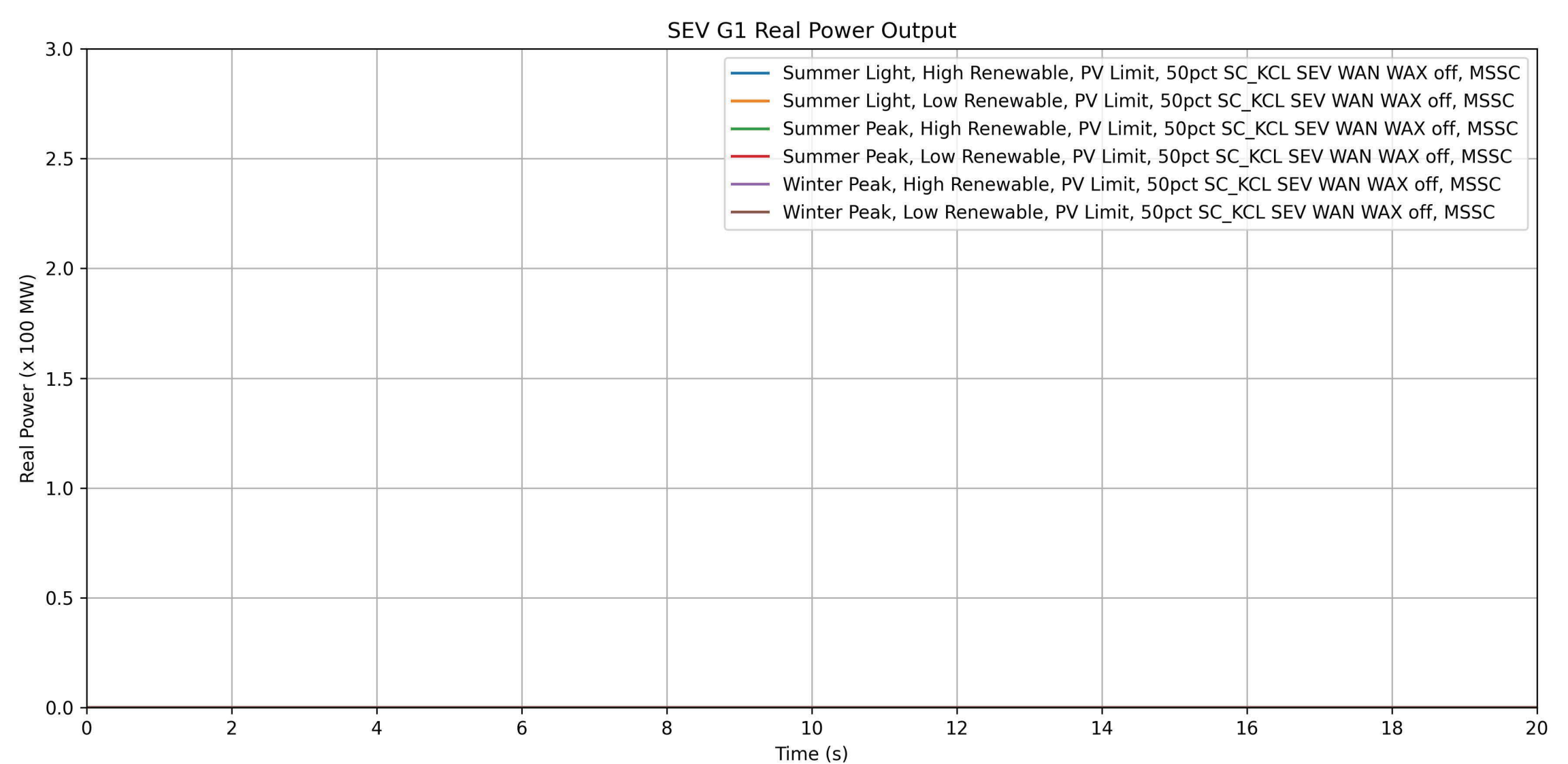

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

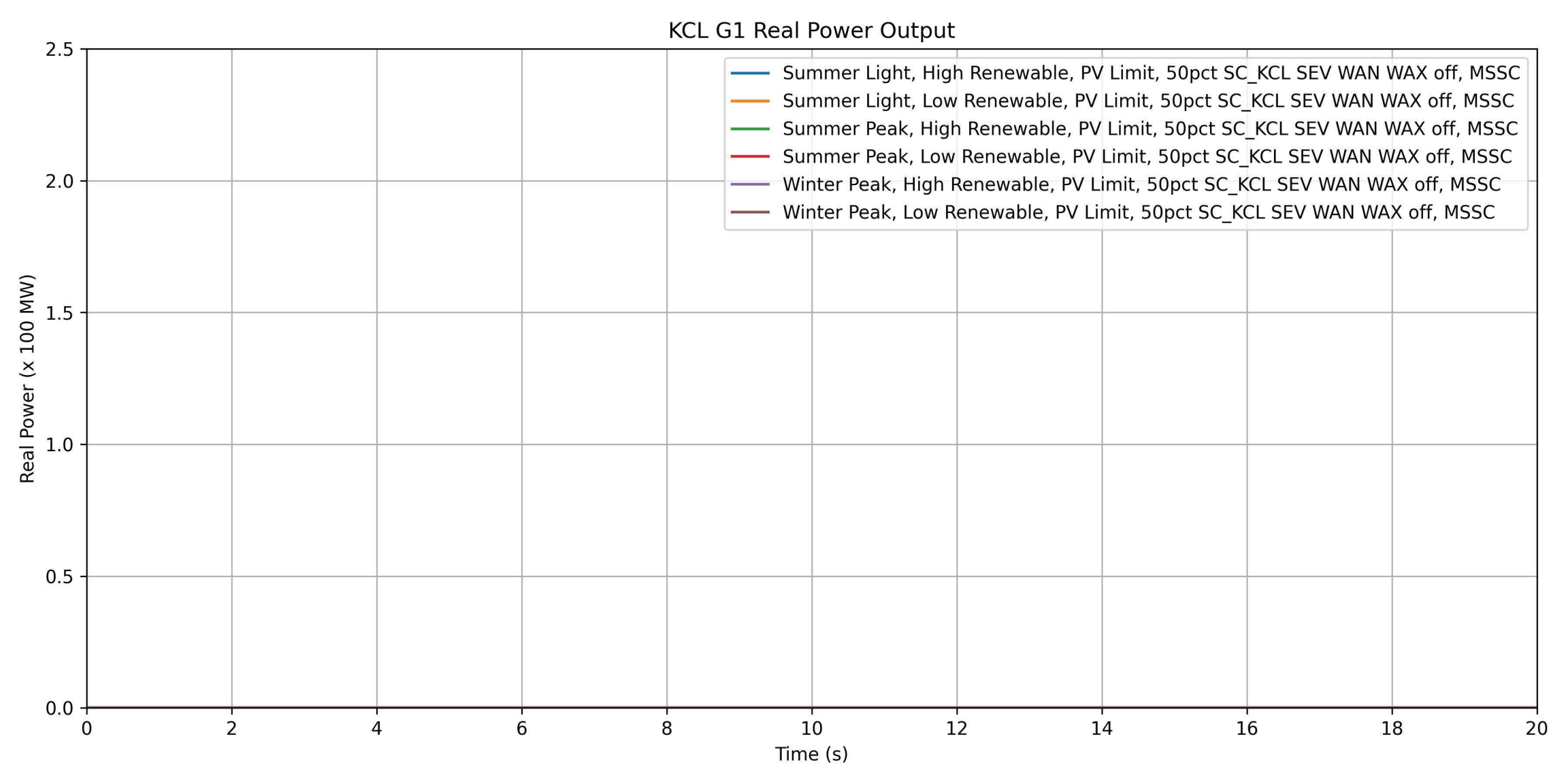

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

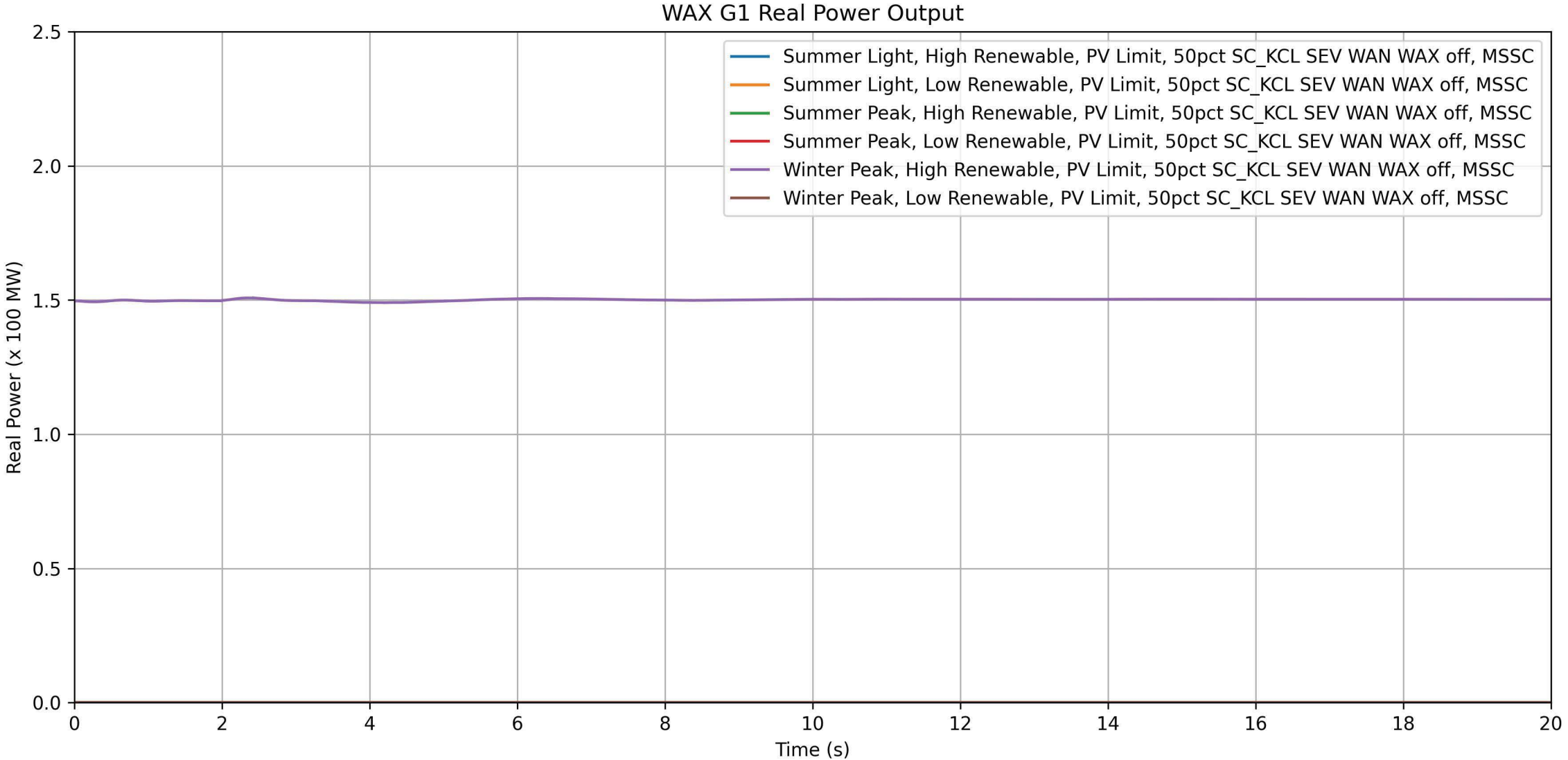

Genesee G3 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

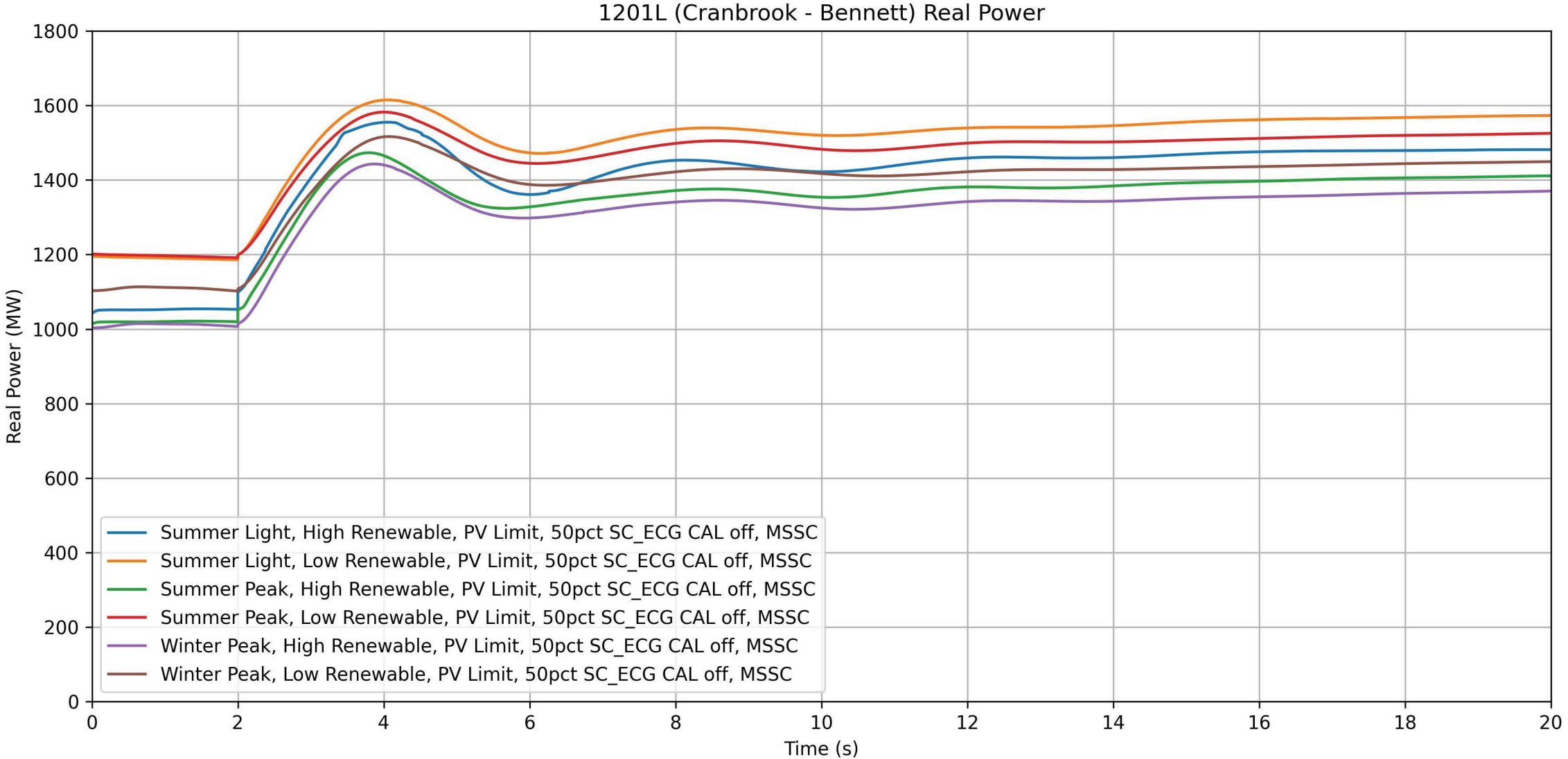

Cascade G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

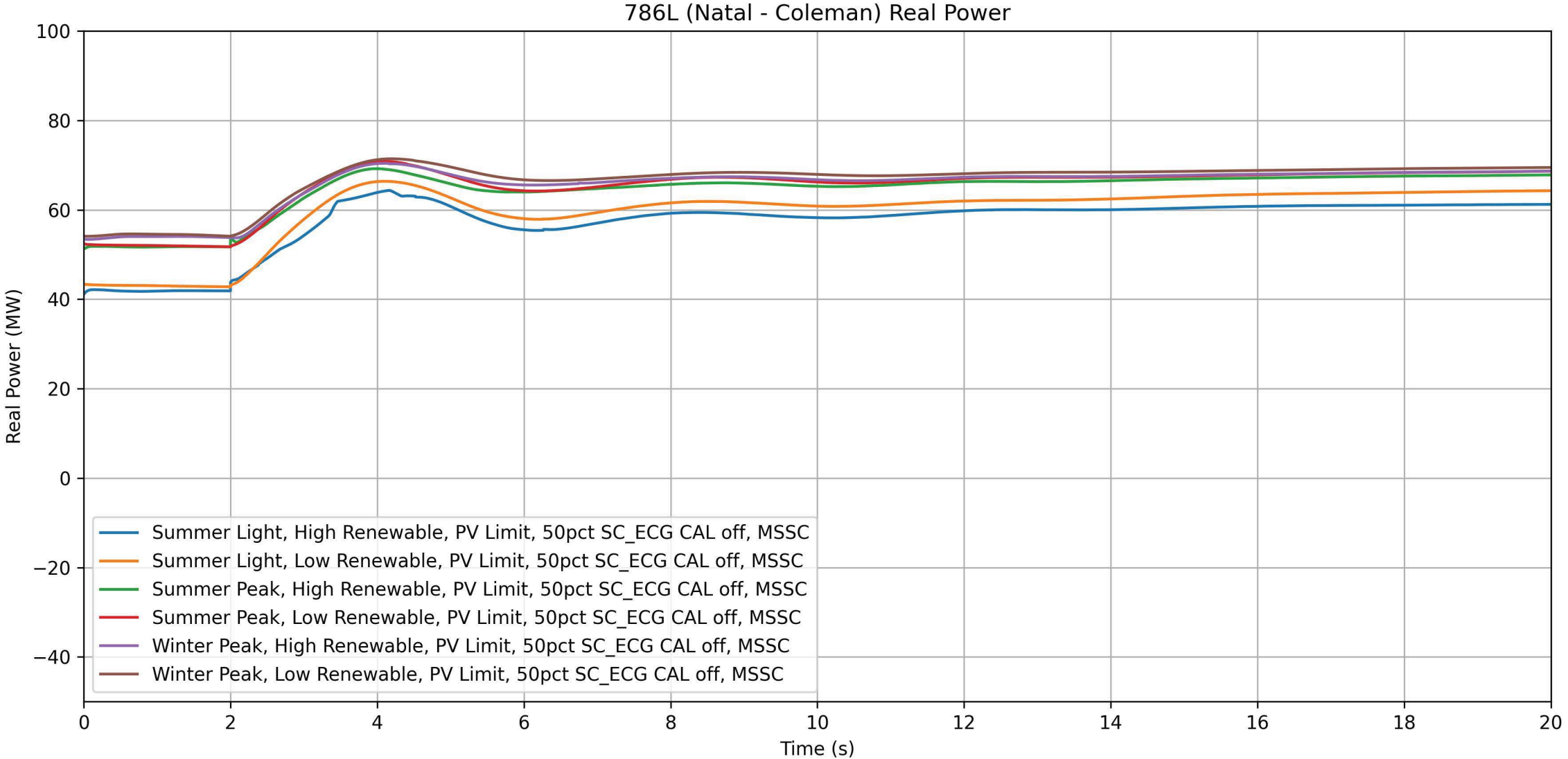

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

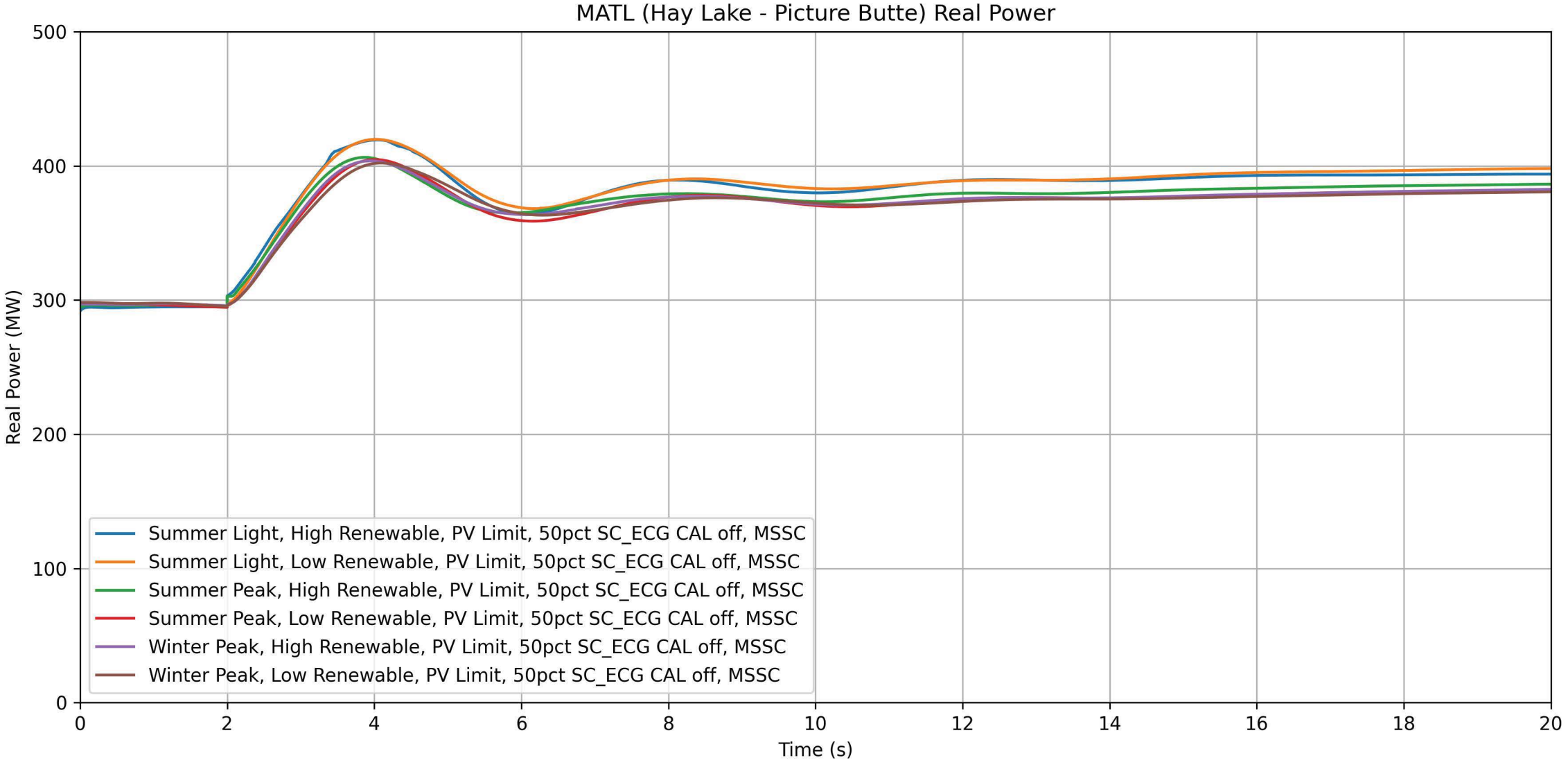

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

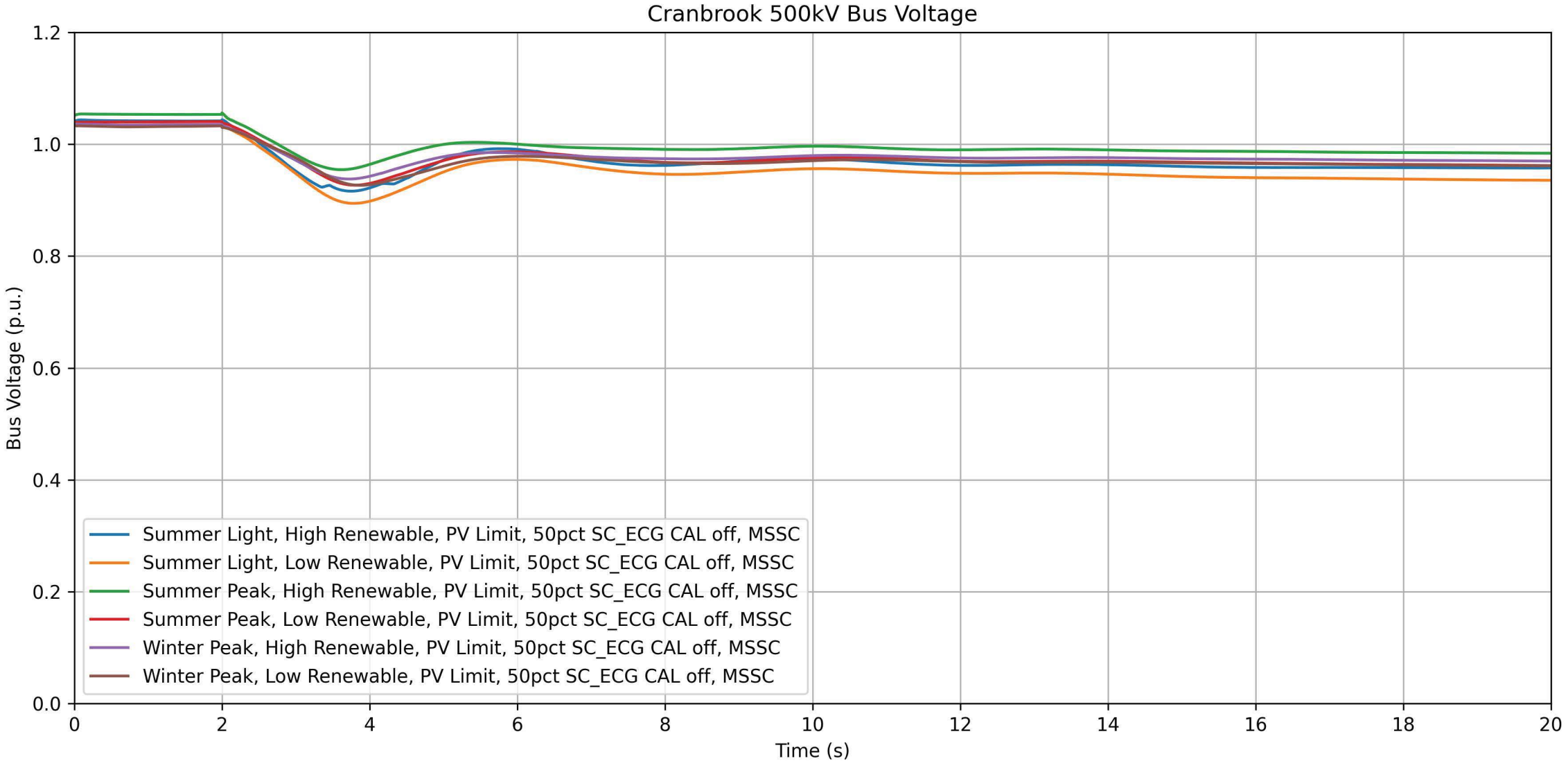

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

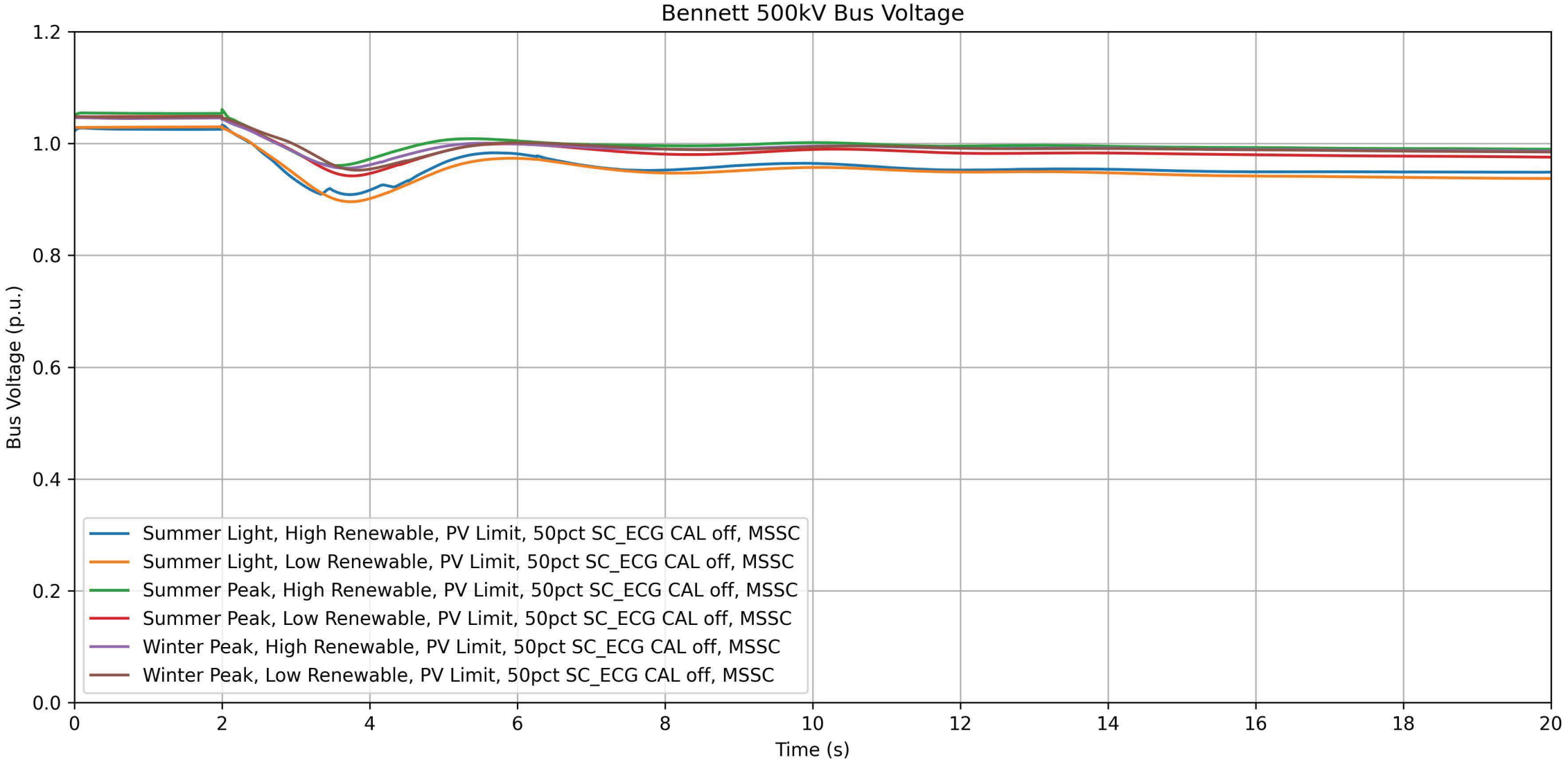

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_KCL SEV WAN WAX off, MSSC
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

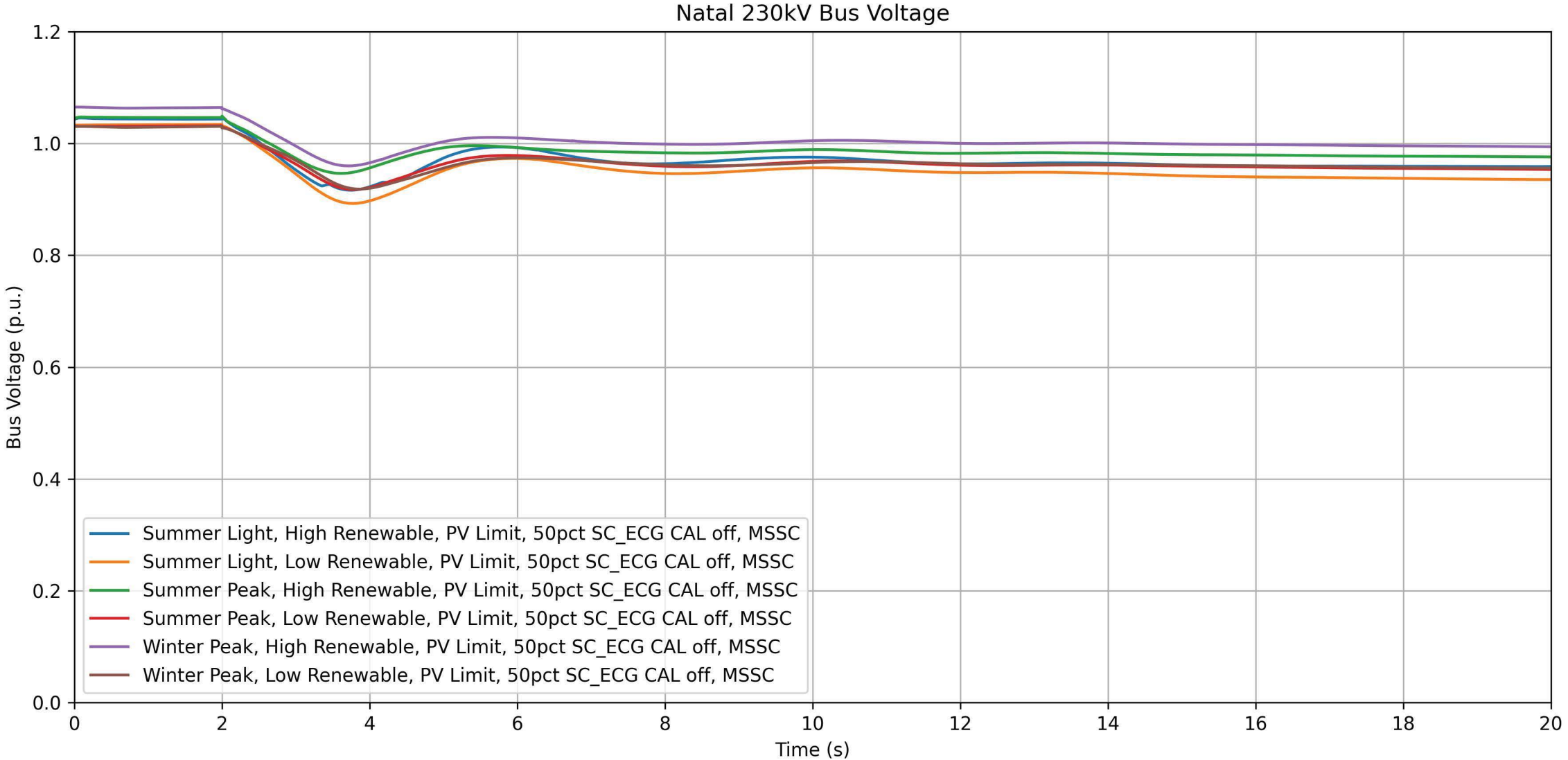

1201L (Cranbrook - Bennett) Real Power
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

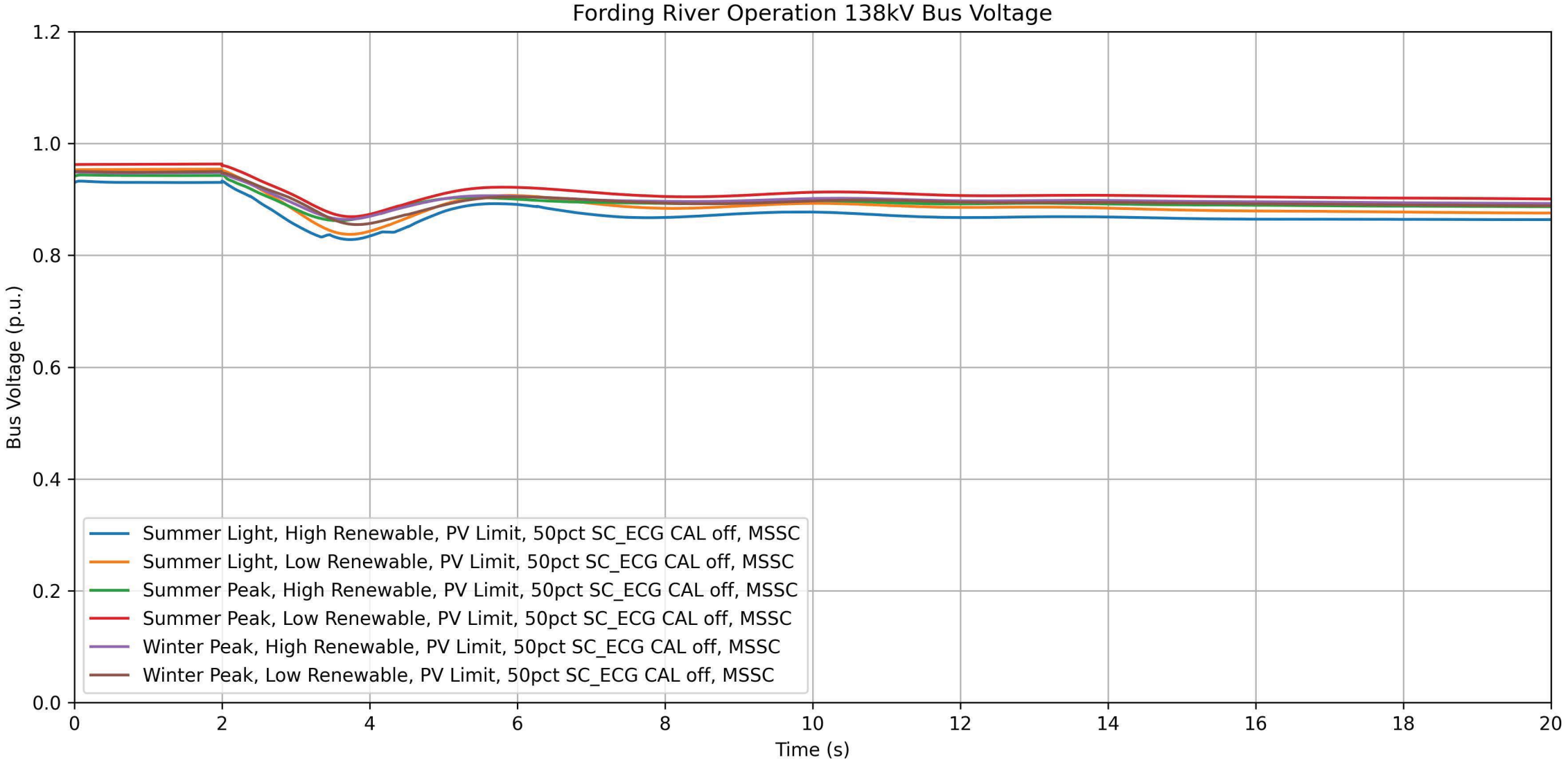

786L (Natal - Coleman) Real Power
Real Power (MW)
Time (s)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

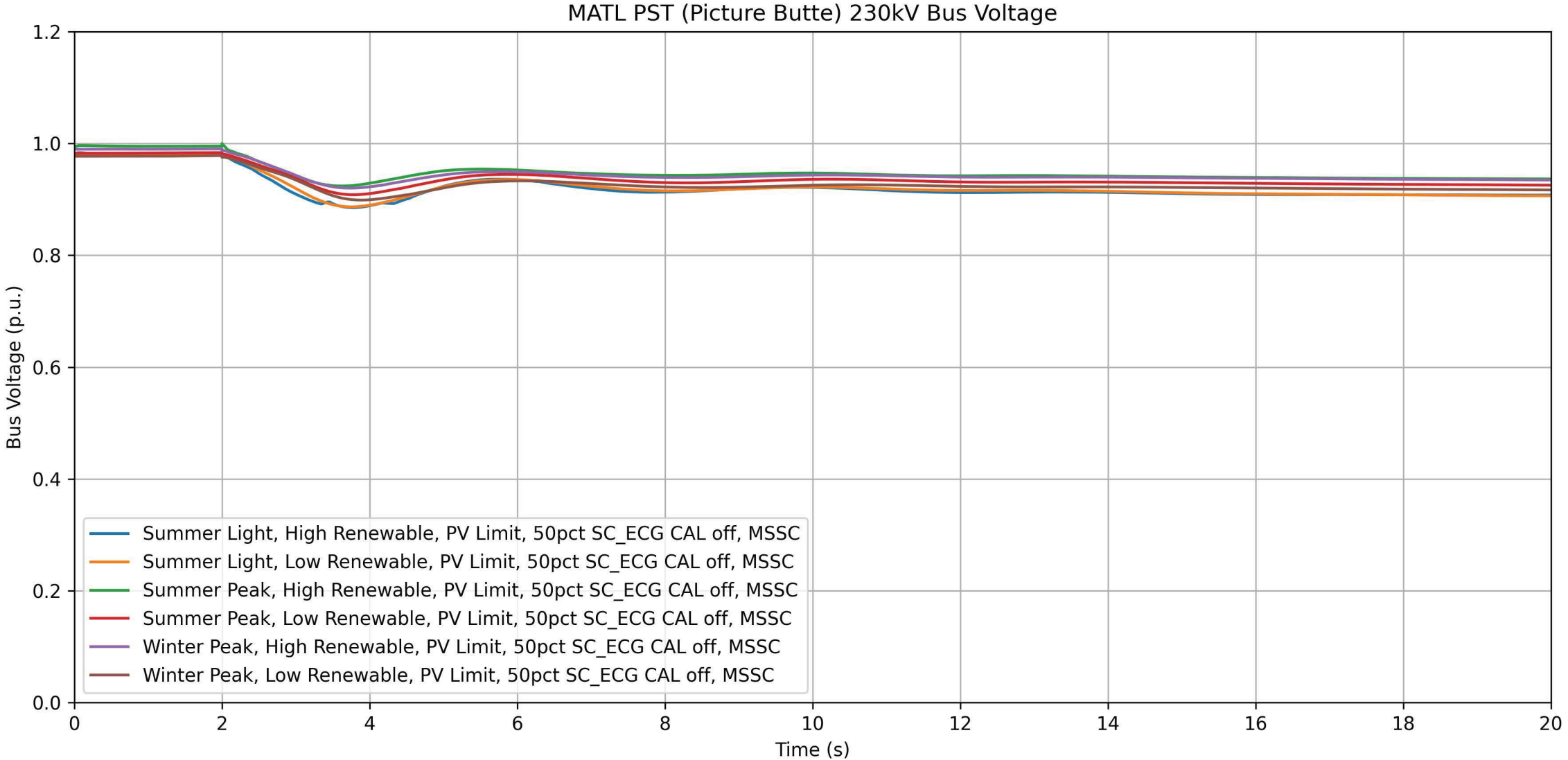

MATL (Hay Lake - Picture Butte) Real Power
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

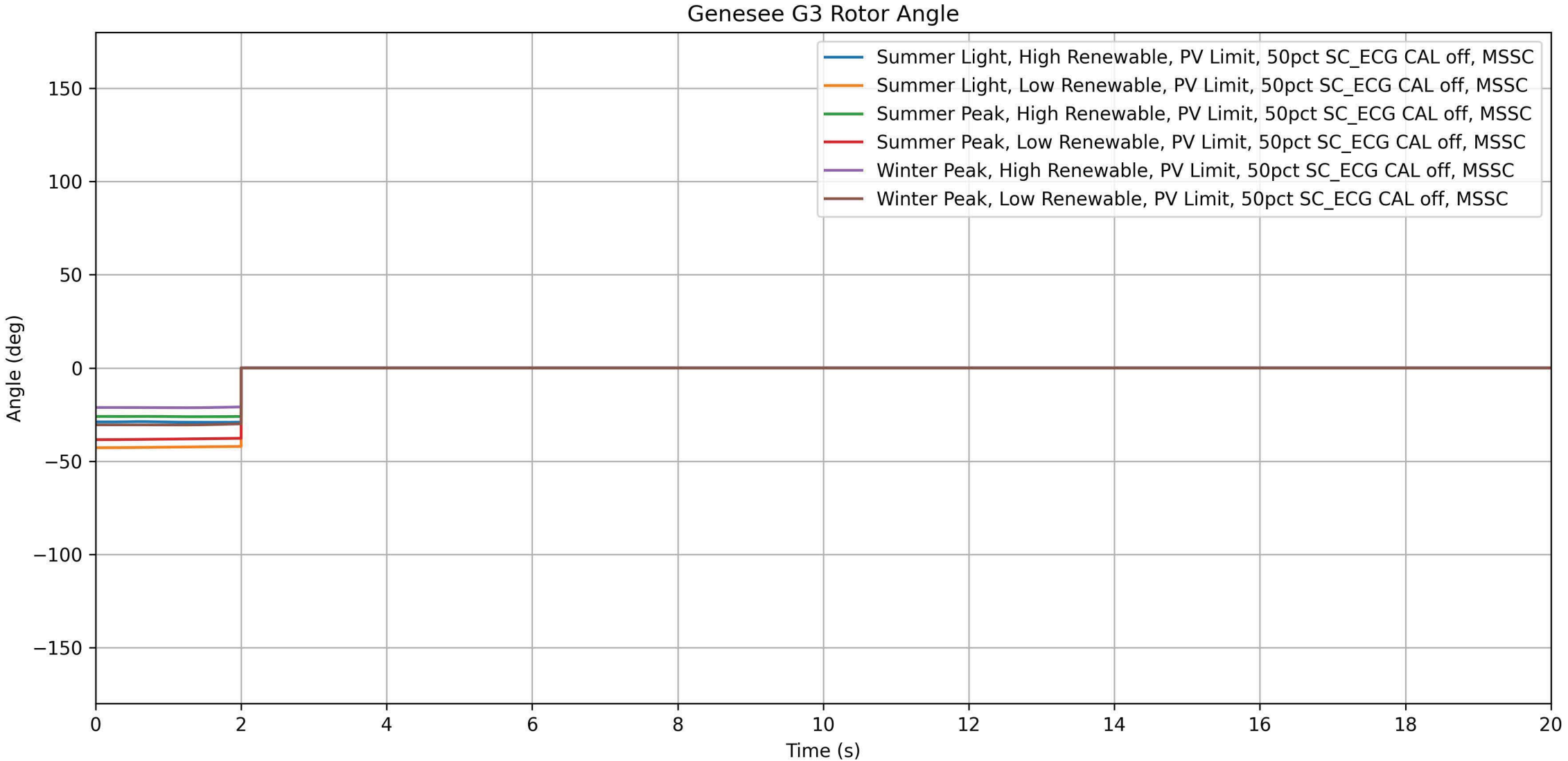

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

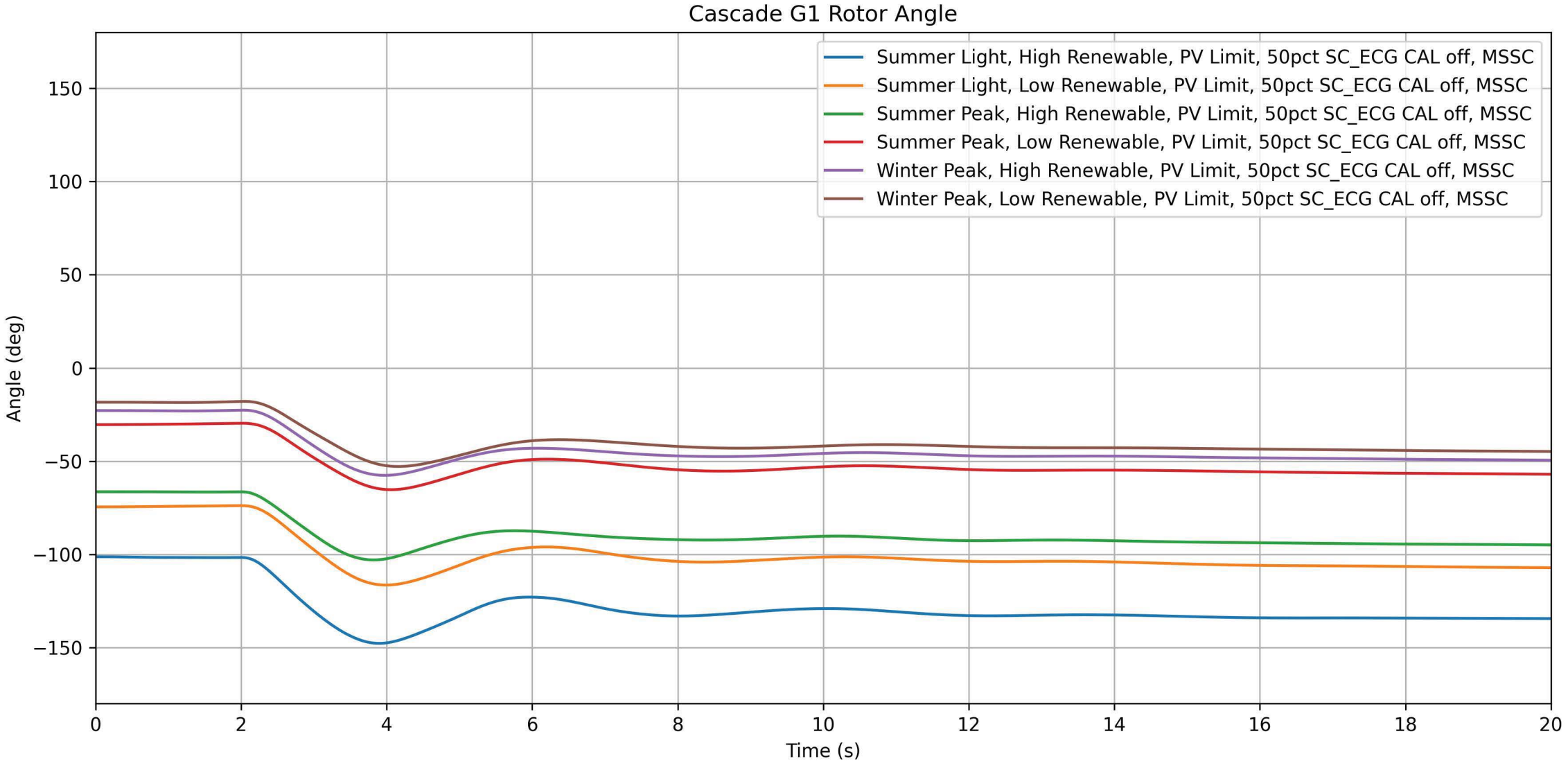

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

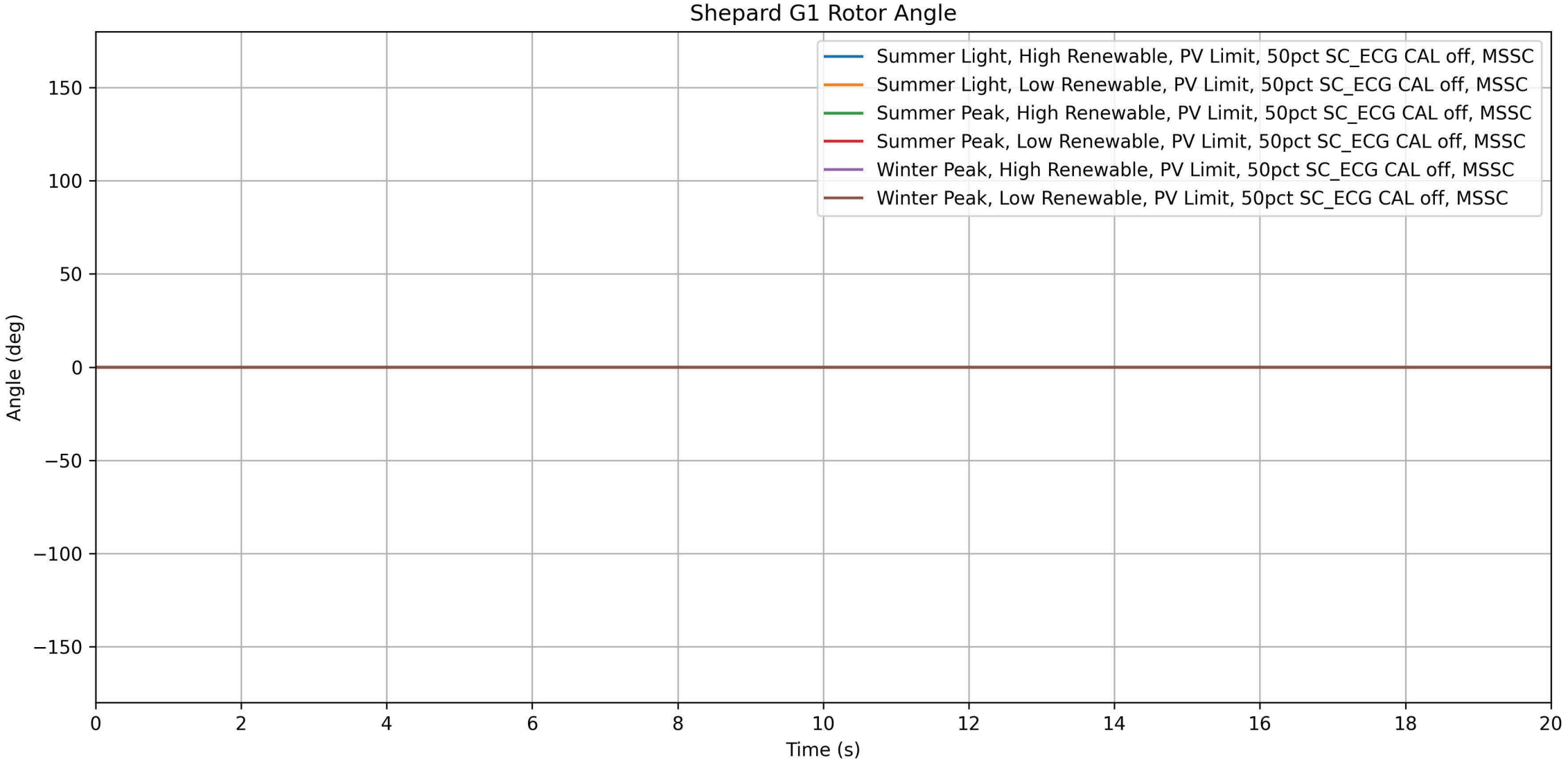

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

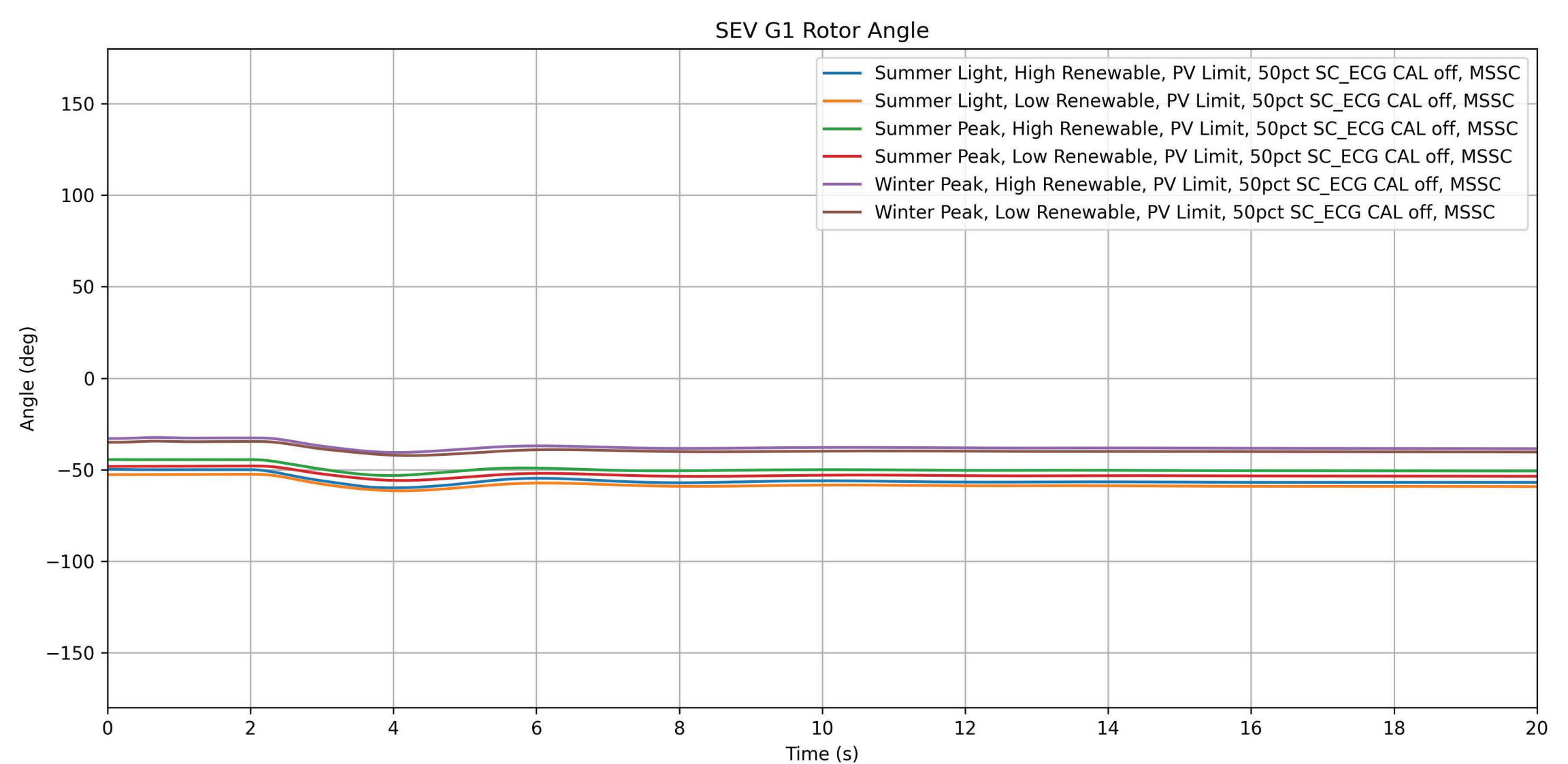

Fording River Operation 138kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

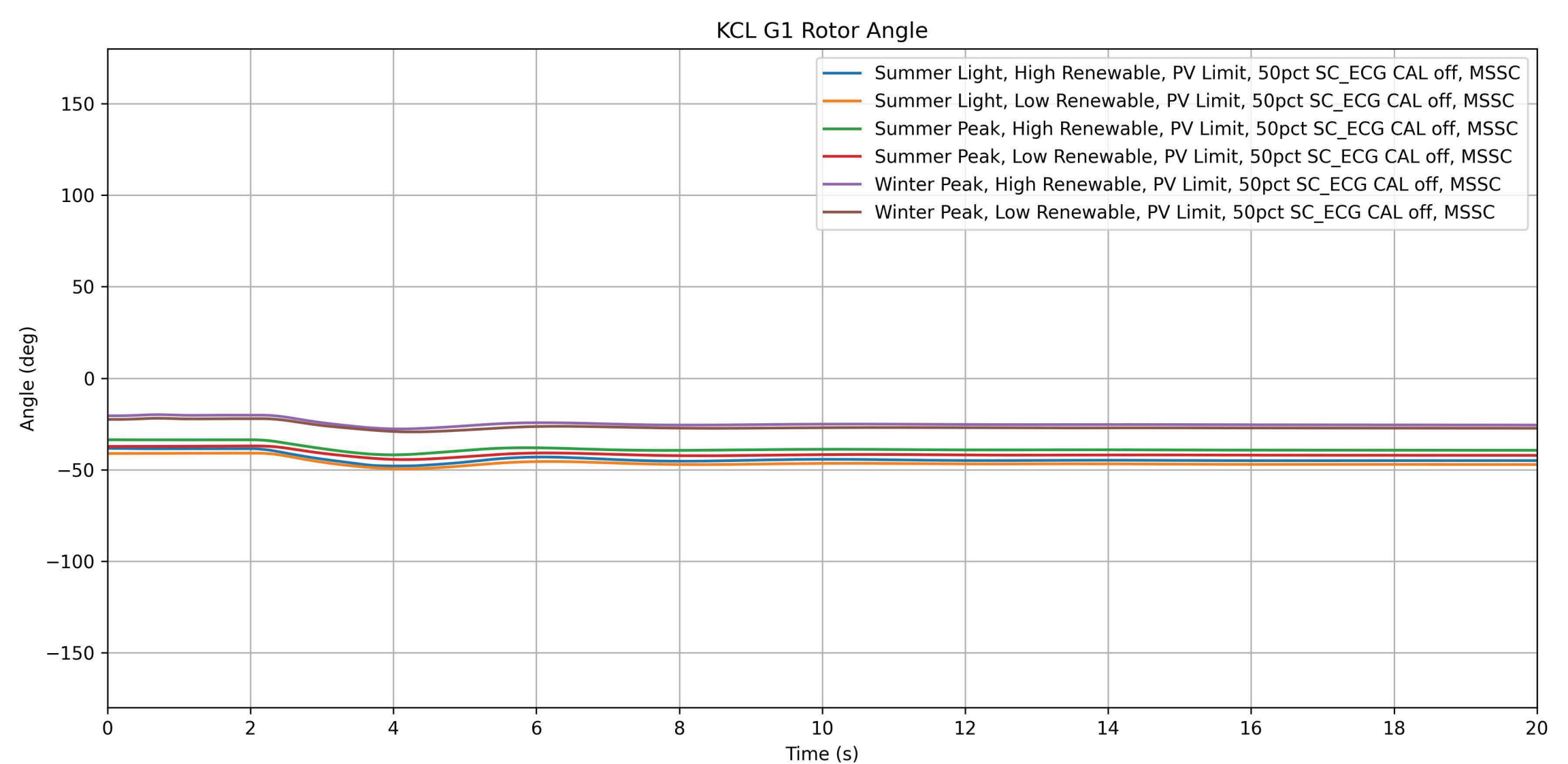

MATL PST (Picture Butte) 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

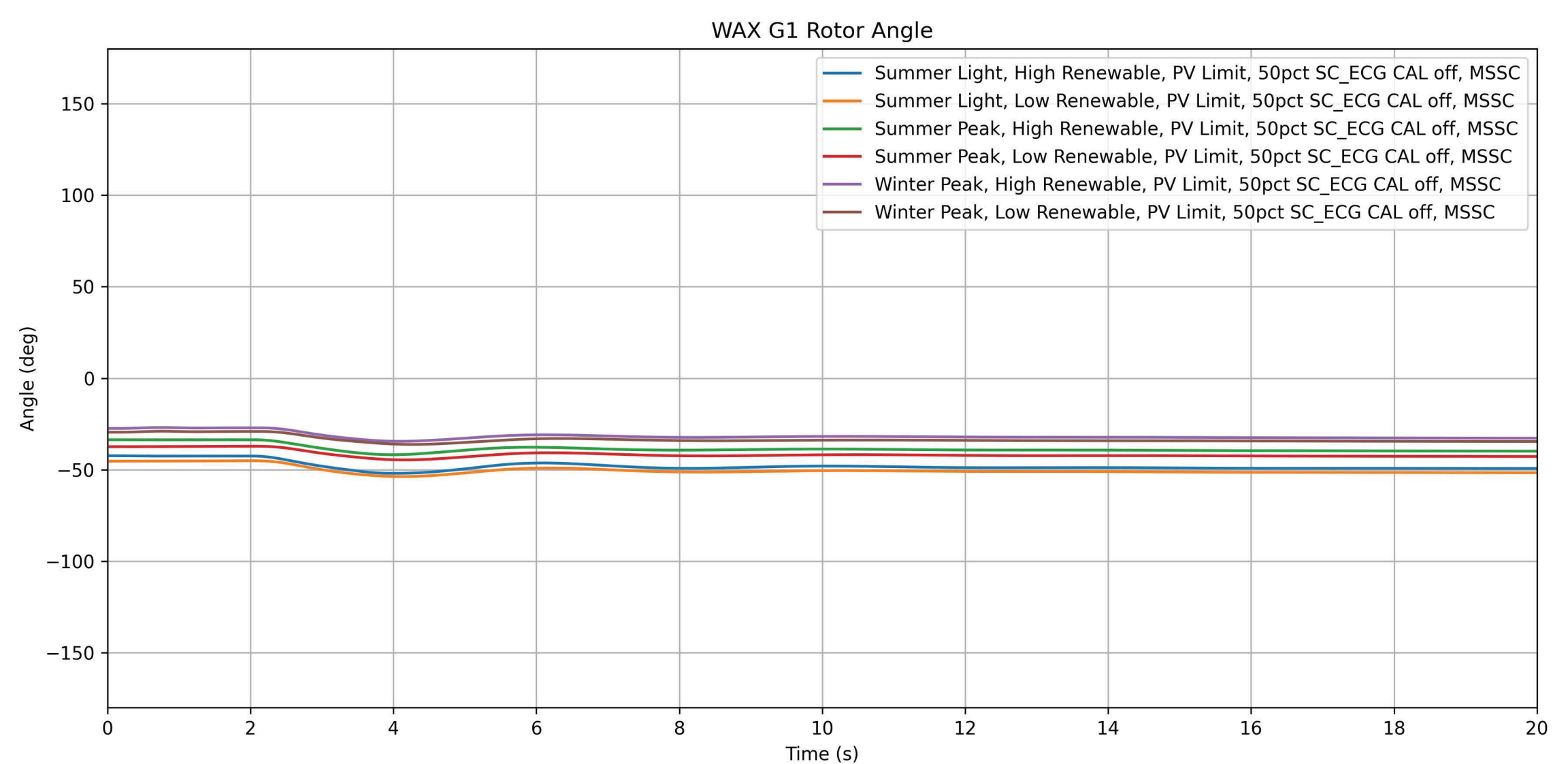

Genesee G3 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

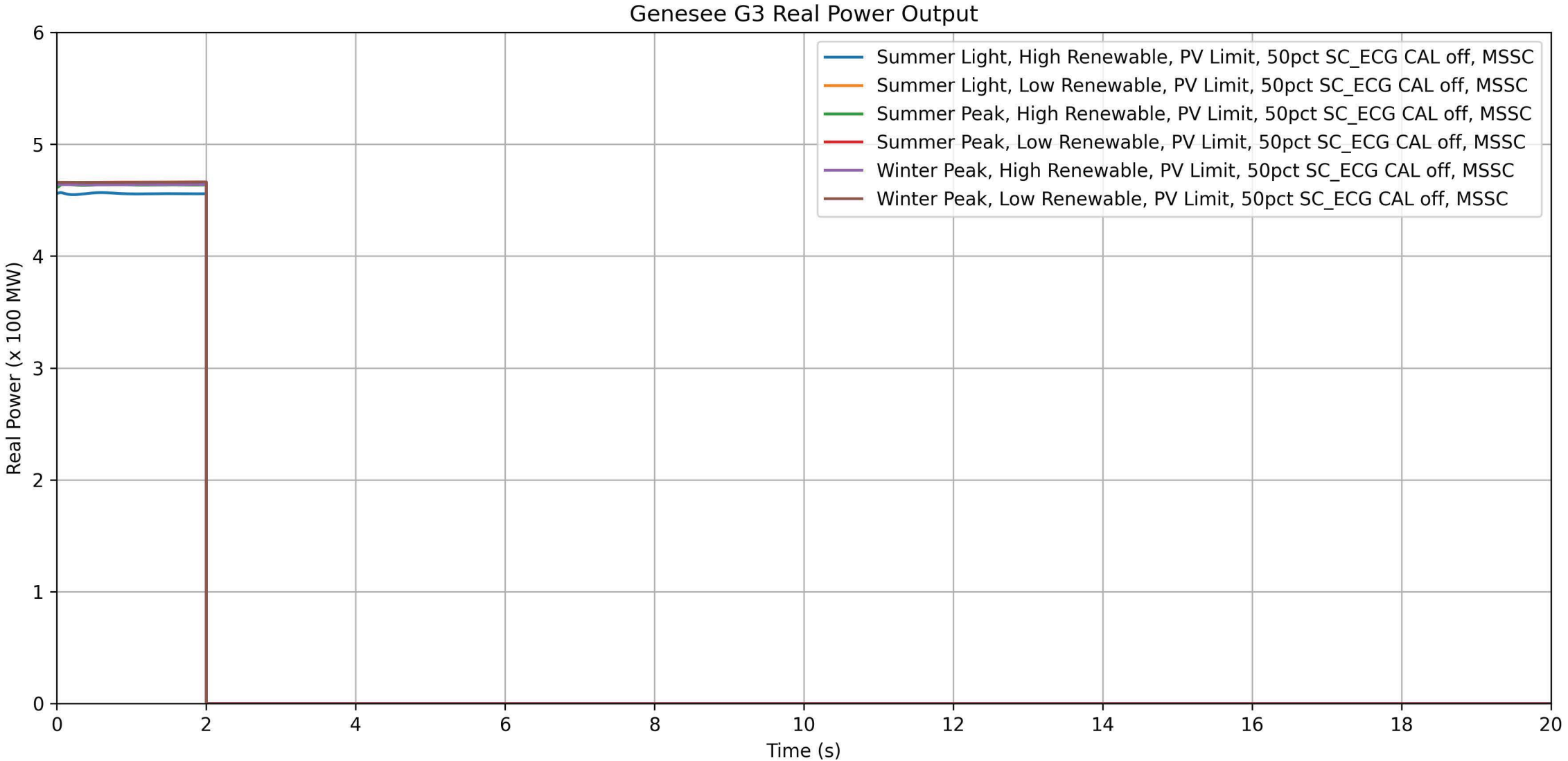

Cascade G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

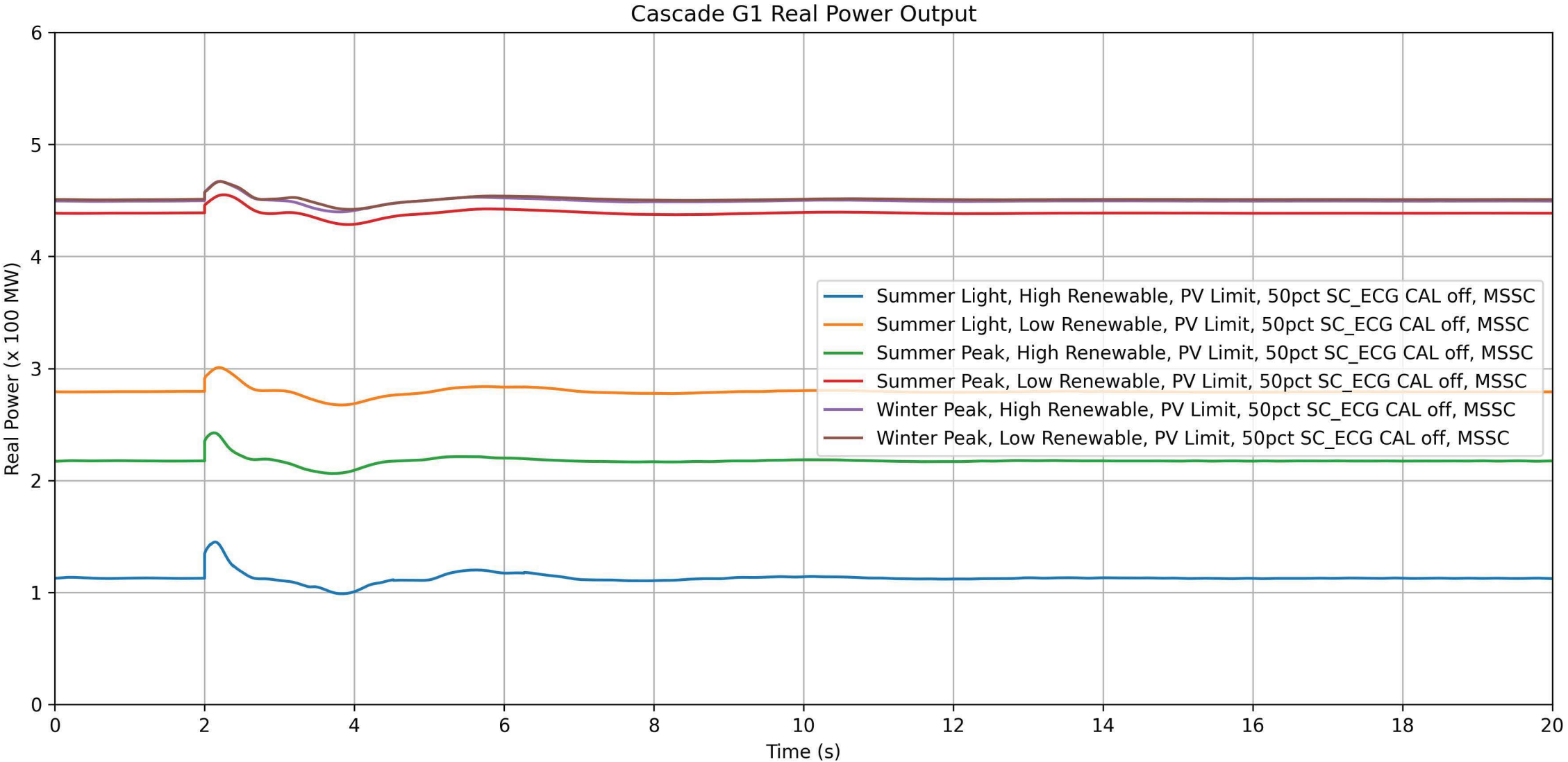

Shepard G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

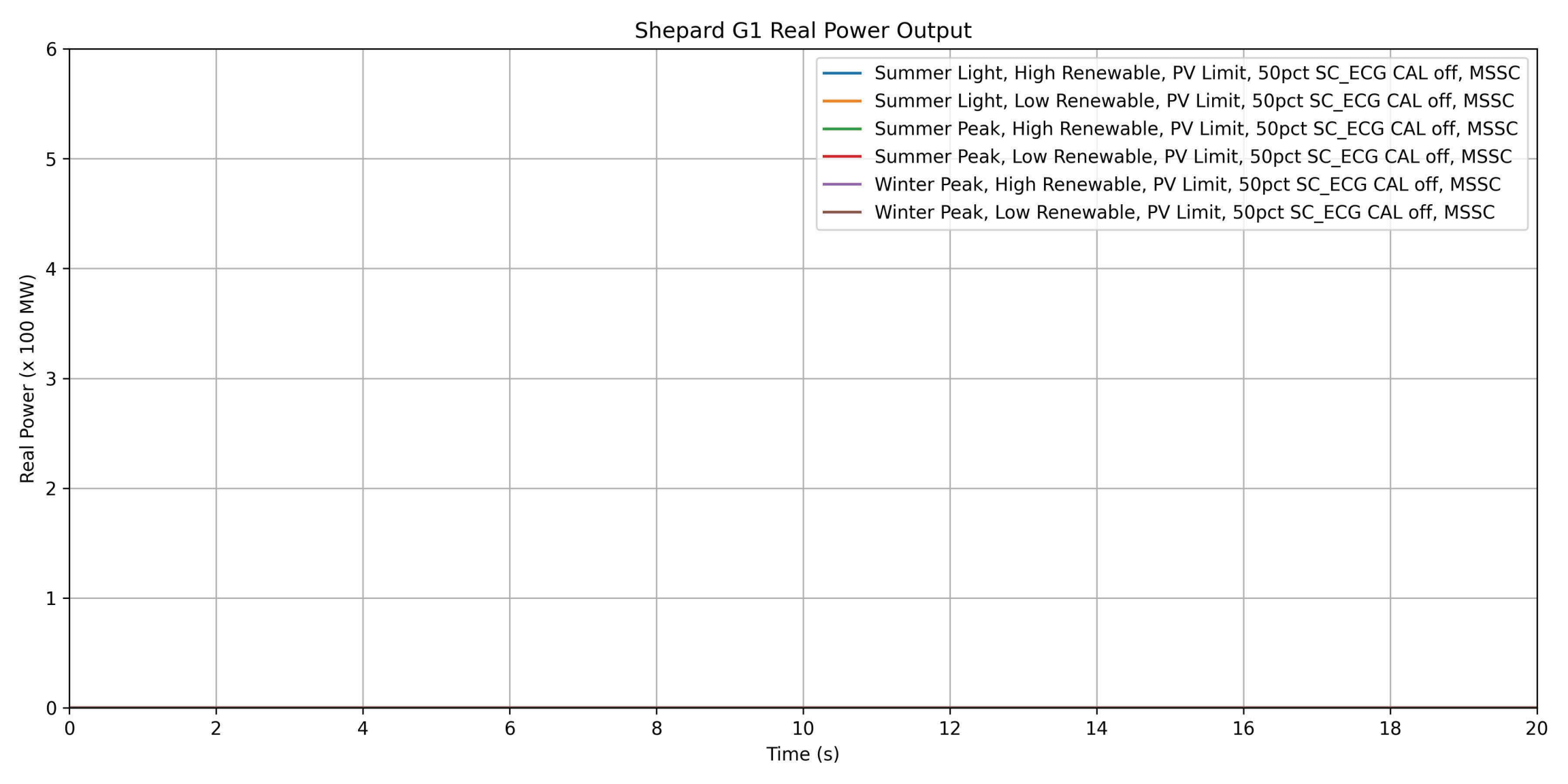

SEV G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

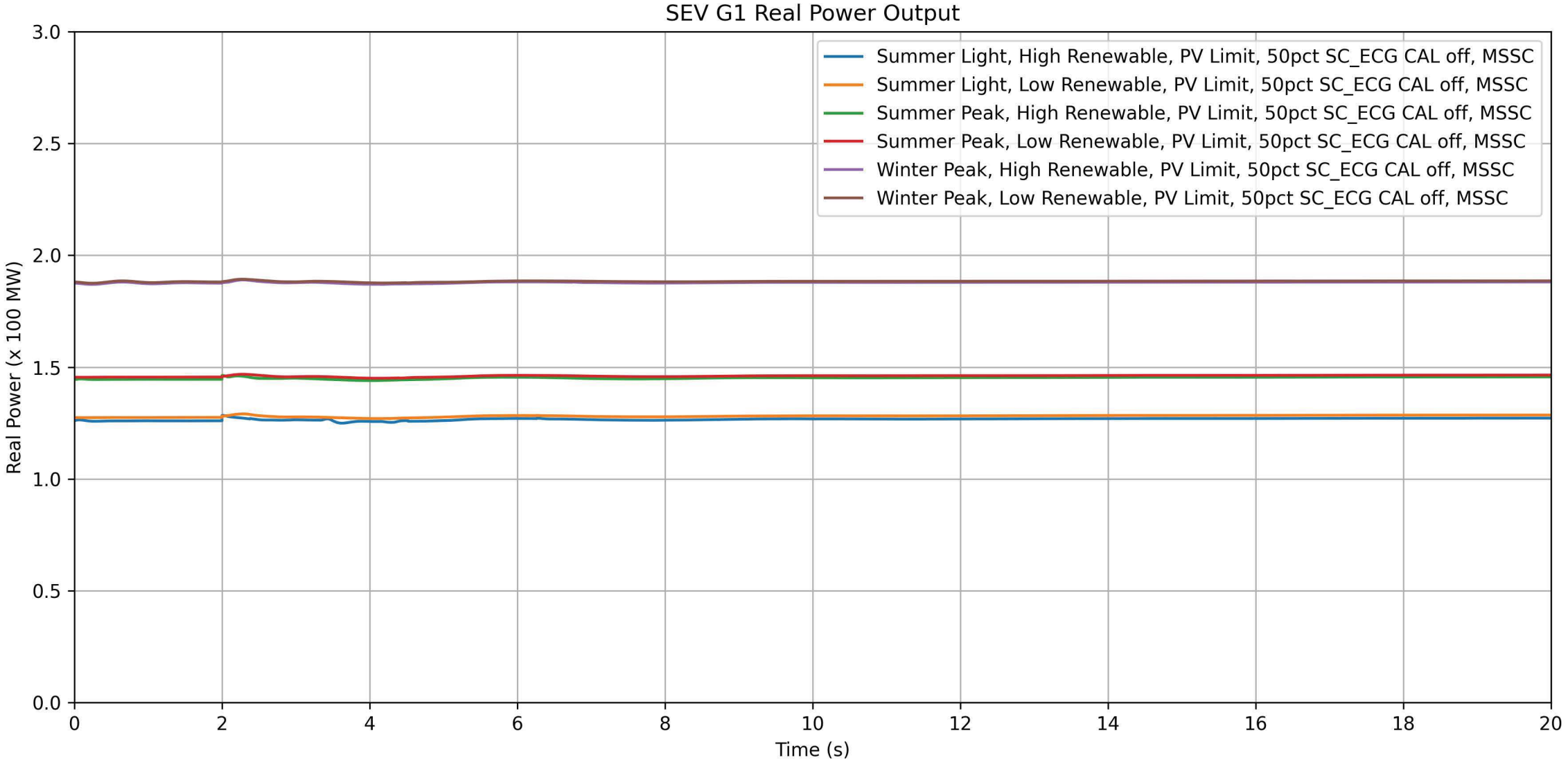

KCL G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

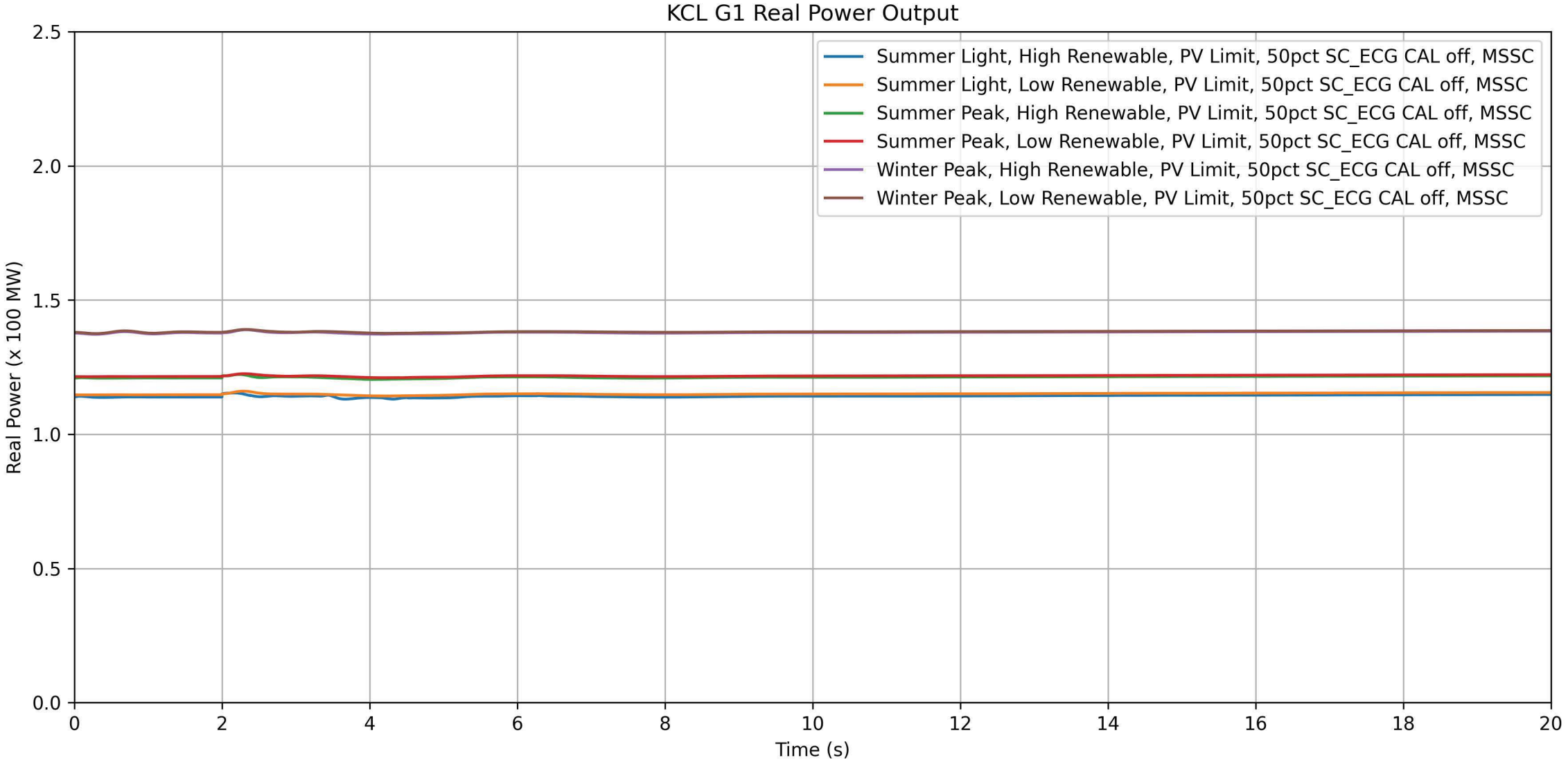

WAX G1 Rotor Angle
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

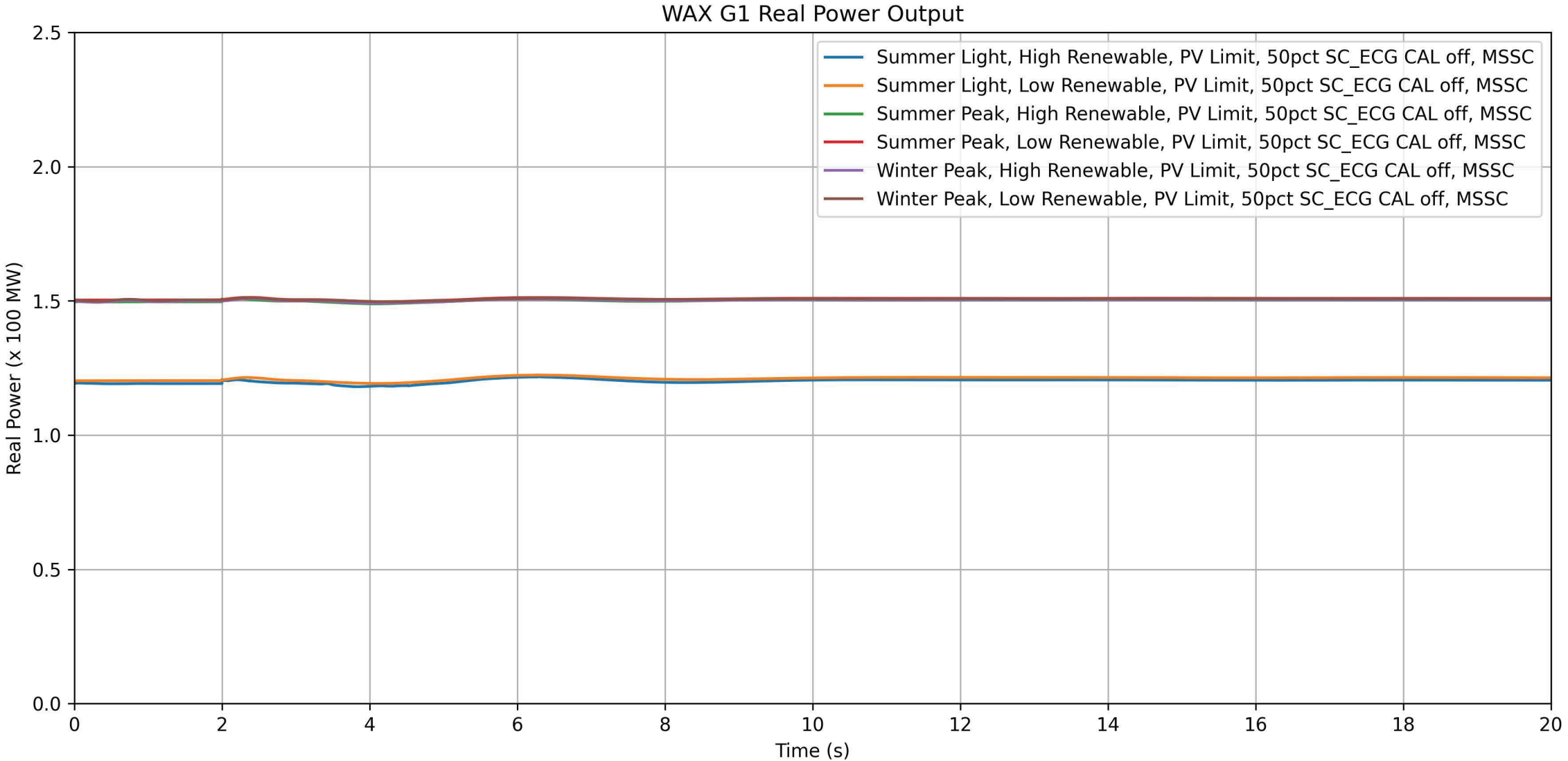

Genesee G3 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20

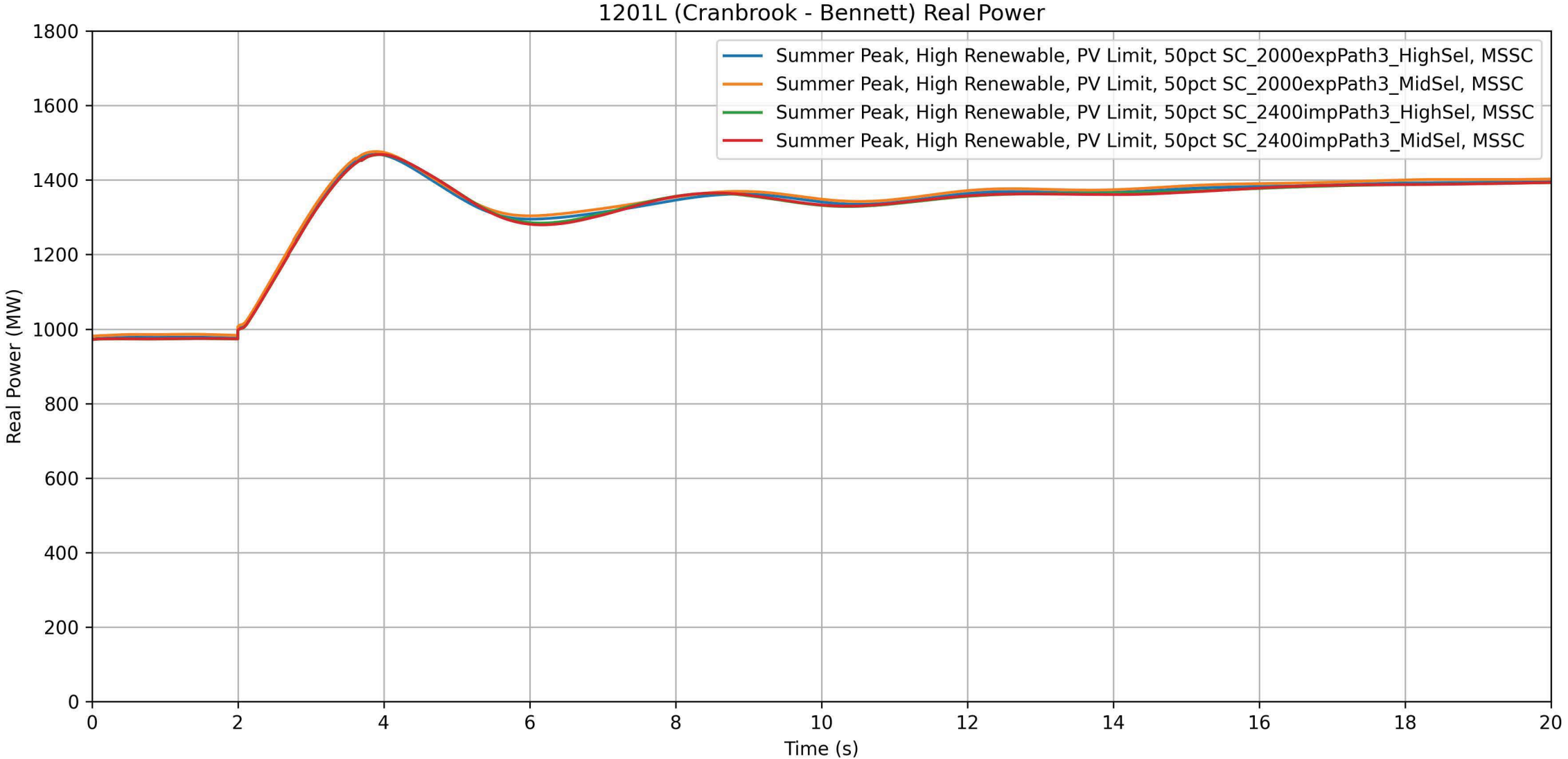

Cascade G1 Real Power Output
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC

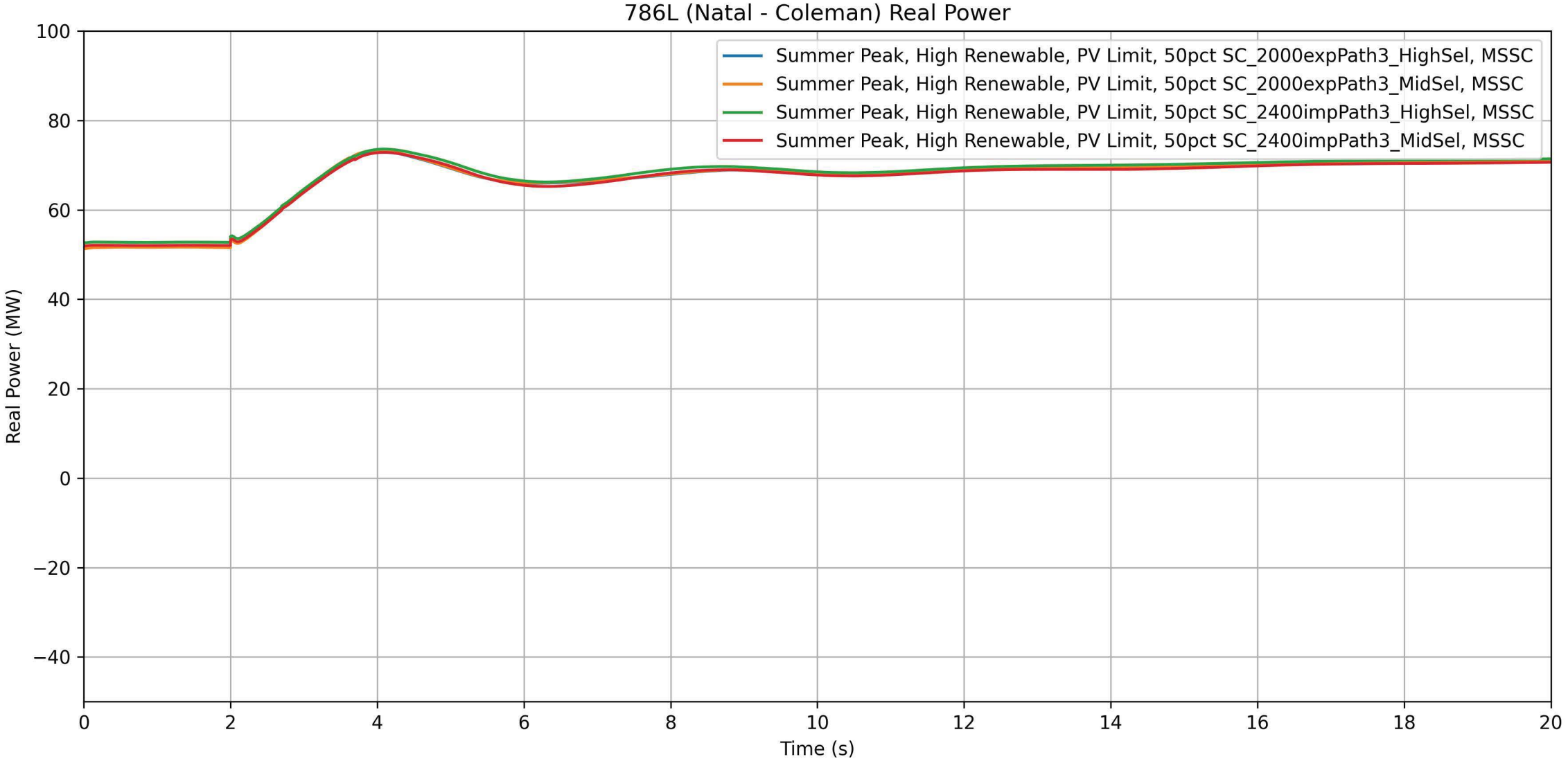

Shepard G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Real Power (x 100 MW)
0
1
2
3
4
5
6
Time (s)
0
2
4
6
8
10
12
14
16
18
20

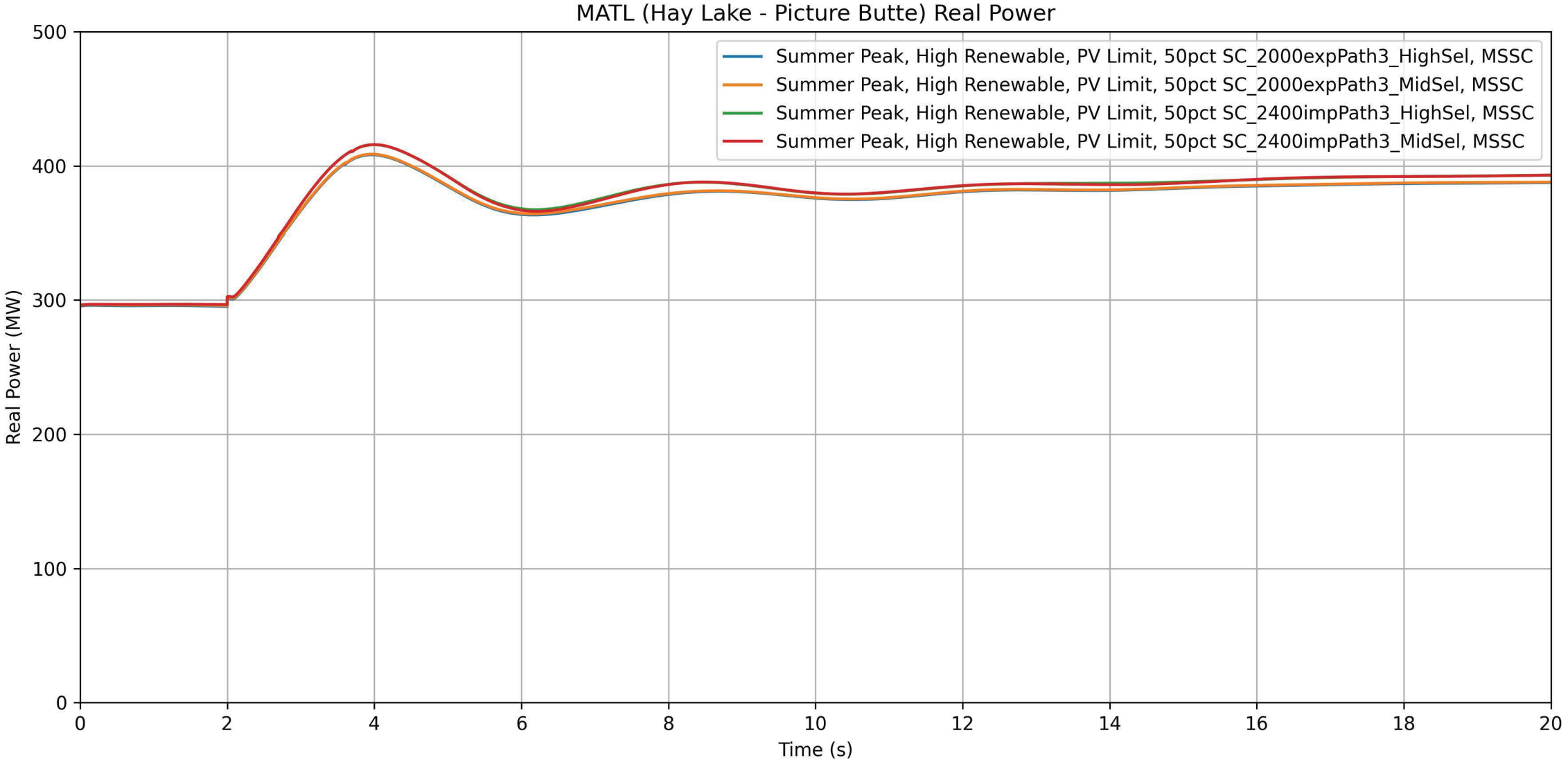

SEV G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
2
4
6
8
10
12
14
16
18
20

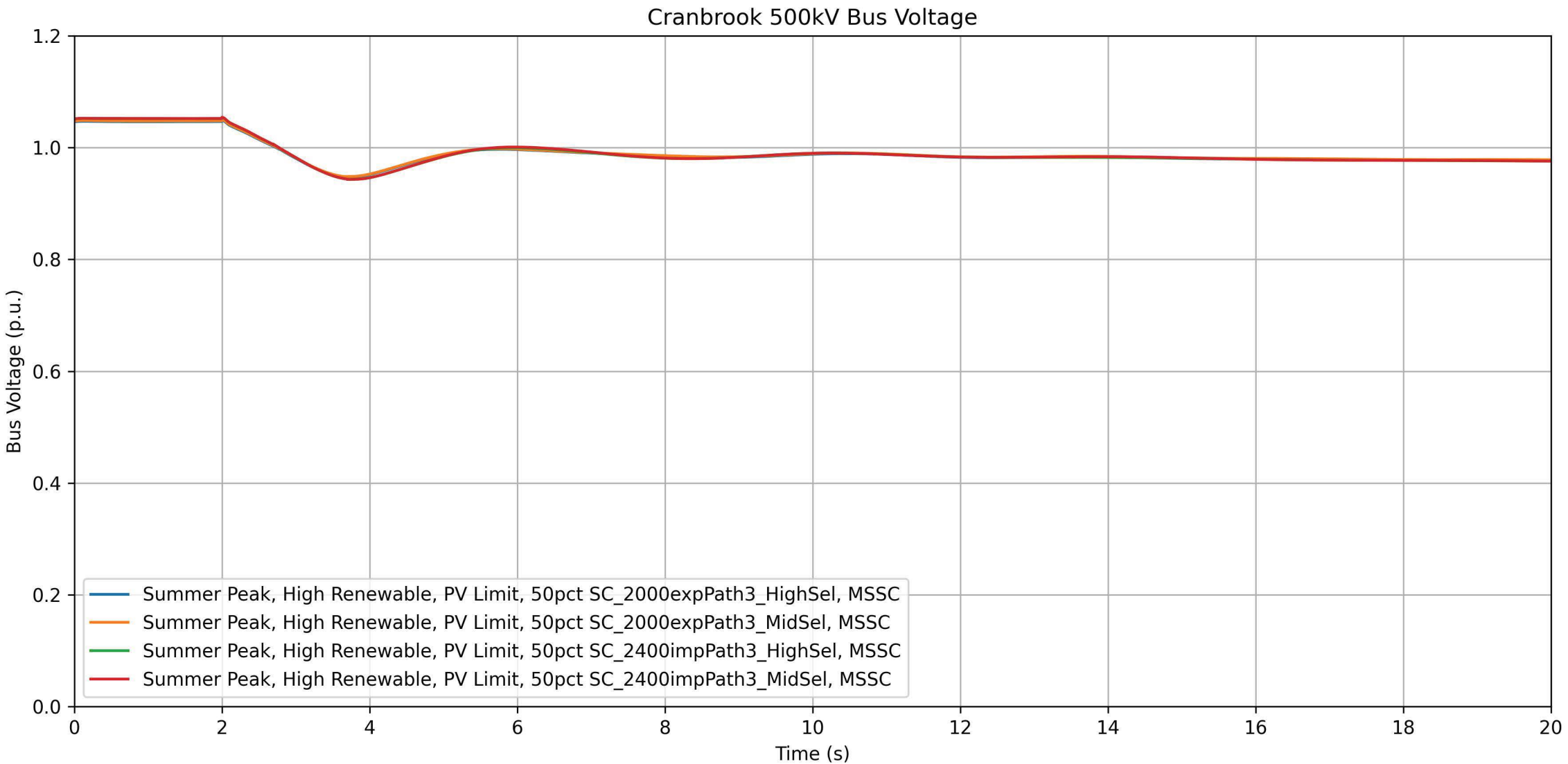

KCL G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

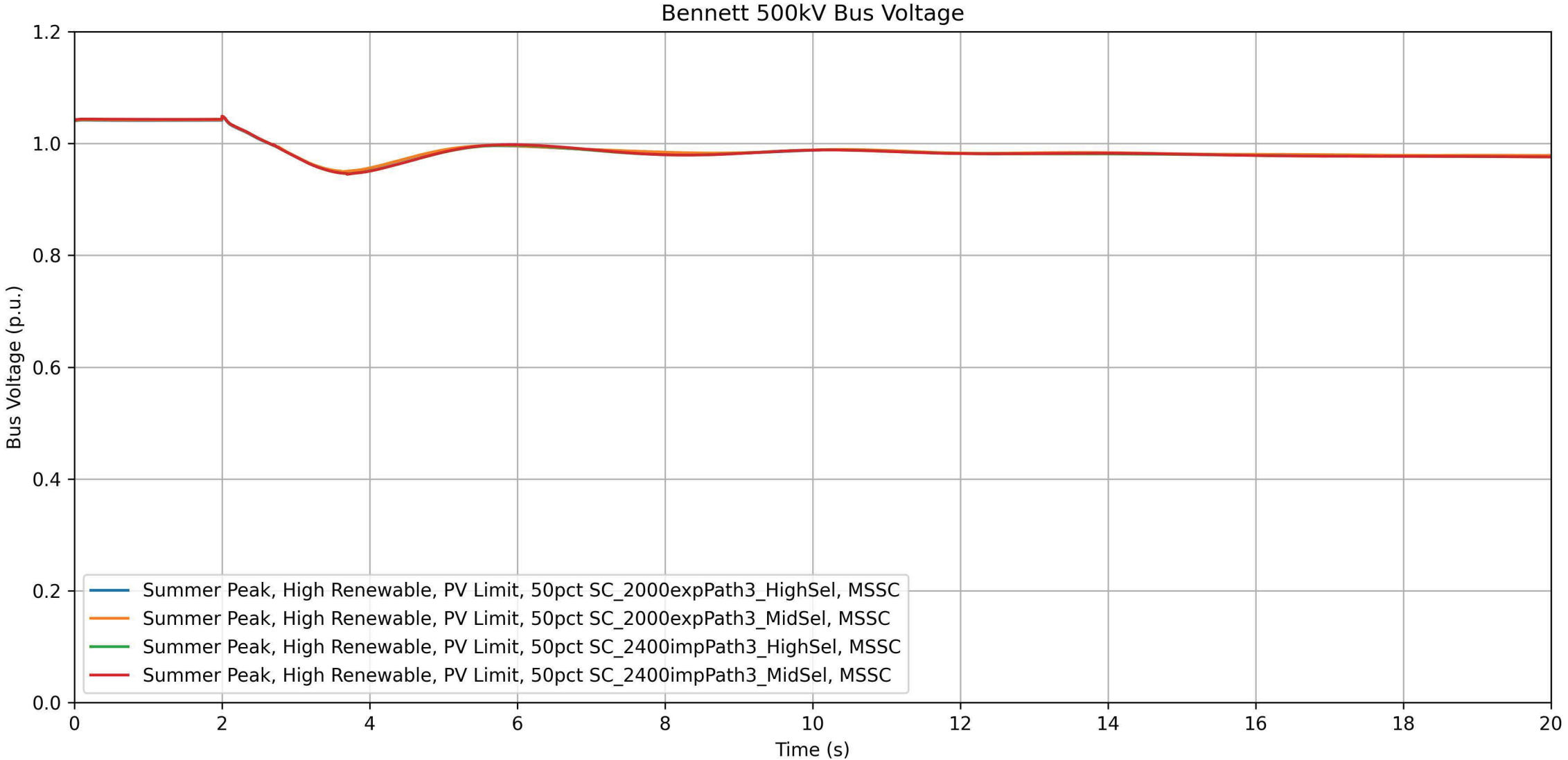

WAX G1 Real Power Output
Summer Light, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Light, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Summer Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, High Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Winter Peak, Low Renewable, PV Limit, 50pct SC_ECG CAL off, MSSC
Real Power (x 100 MW)
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)

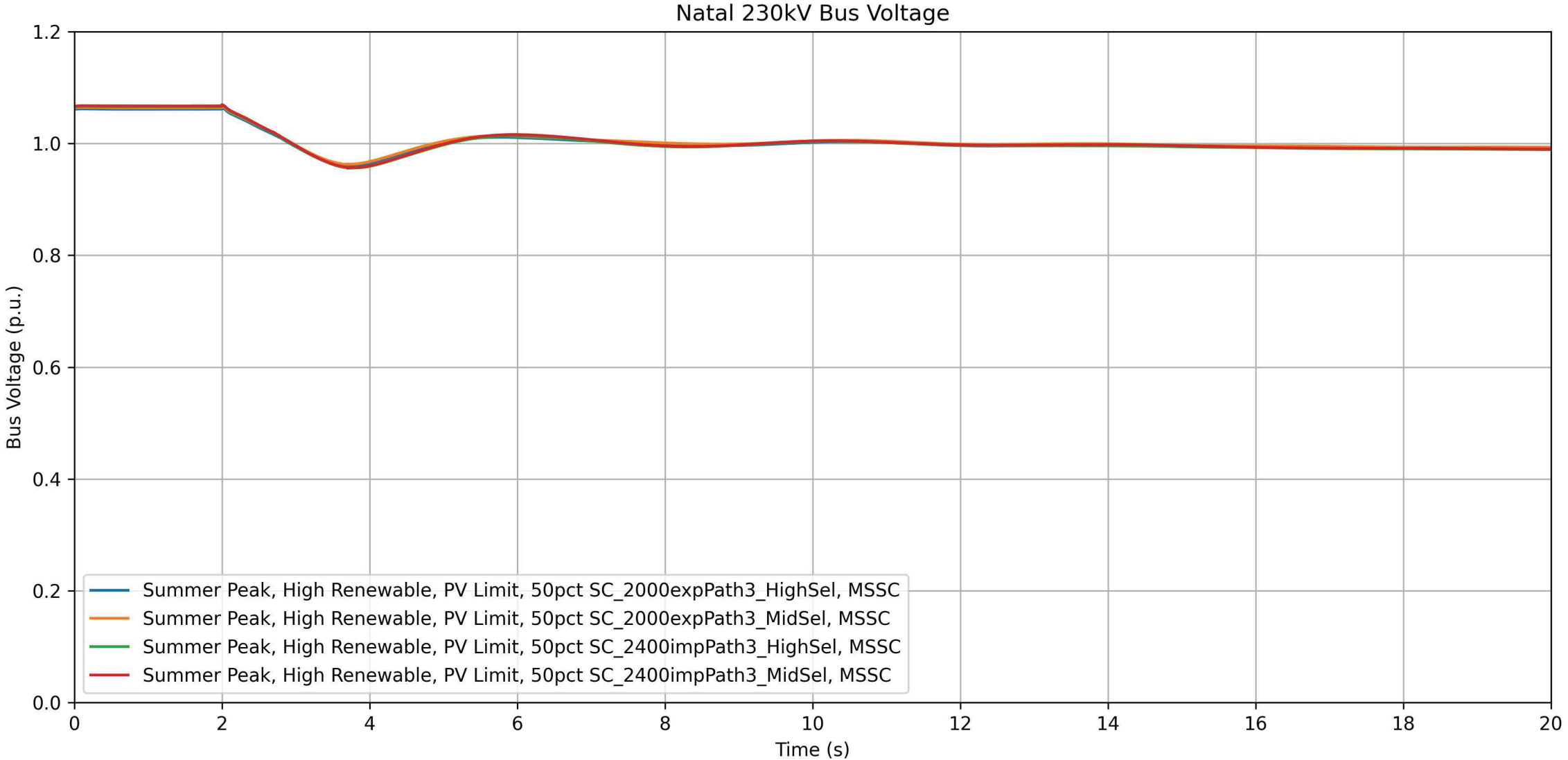

1201L (Cranbrook - Bennett) Real Power
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (MW)
Time (s)
0
200
400
600
800
1000
1200
1400
1600
1800
0
2
4
6
8
10
12
14
16
18
20

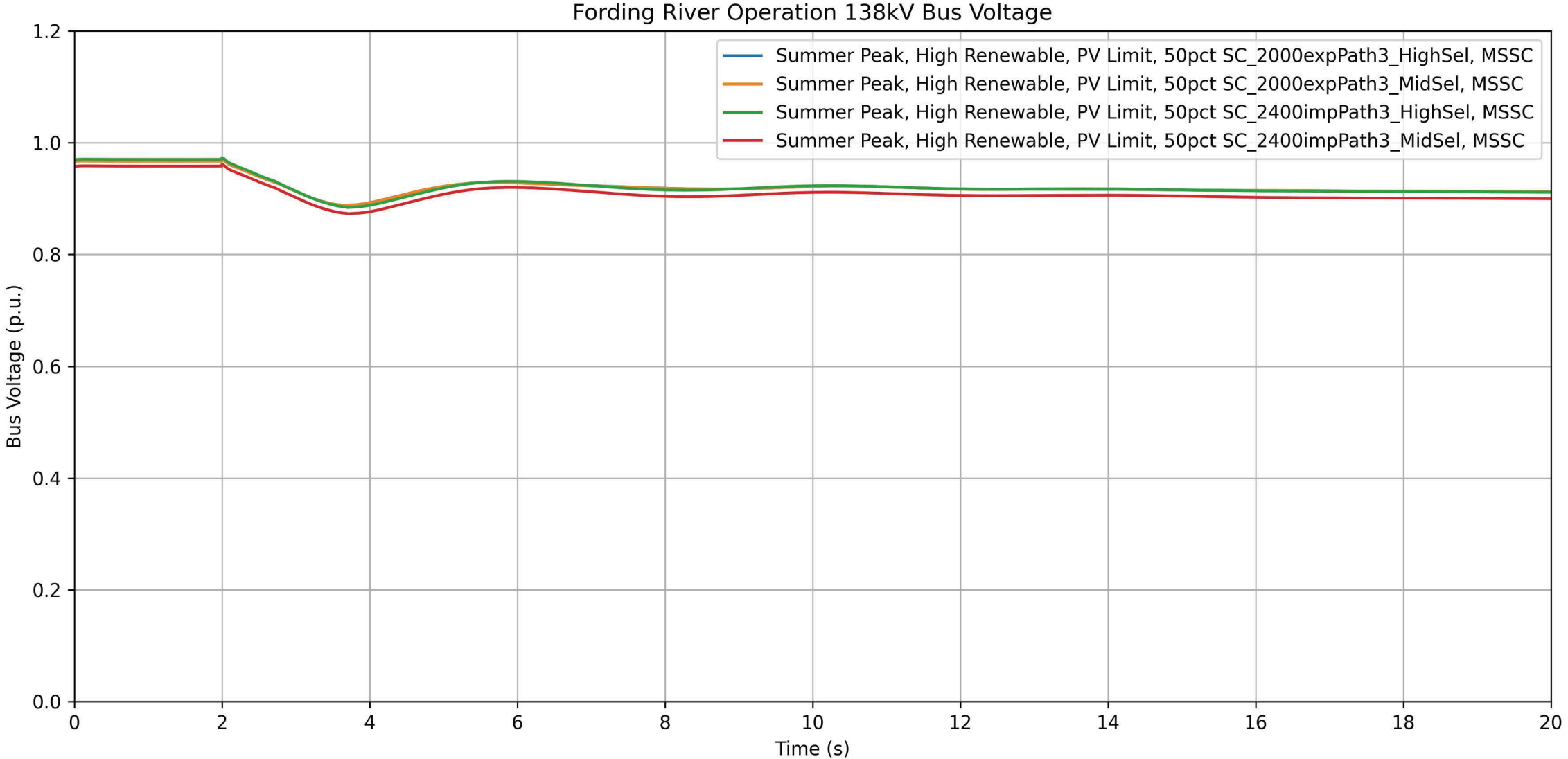

786L (Natal - Coleman) Real Power
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (MW)
100
80
60
40
20
0
−20
−40
0
2
4
6
8
10
12
14
16
18
20
Time (s)

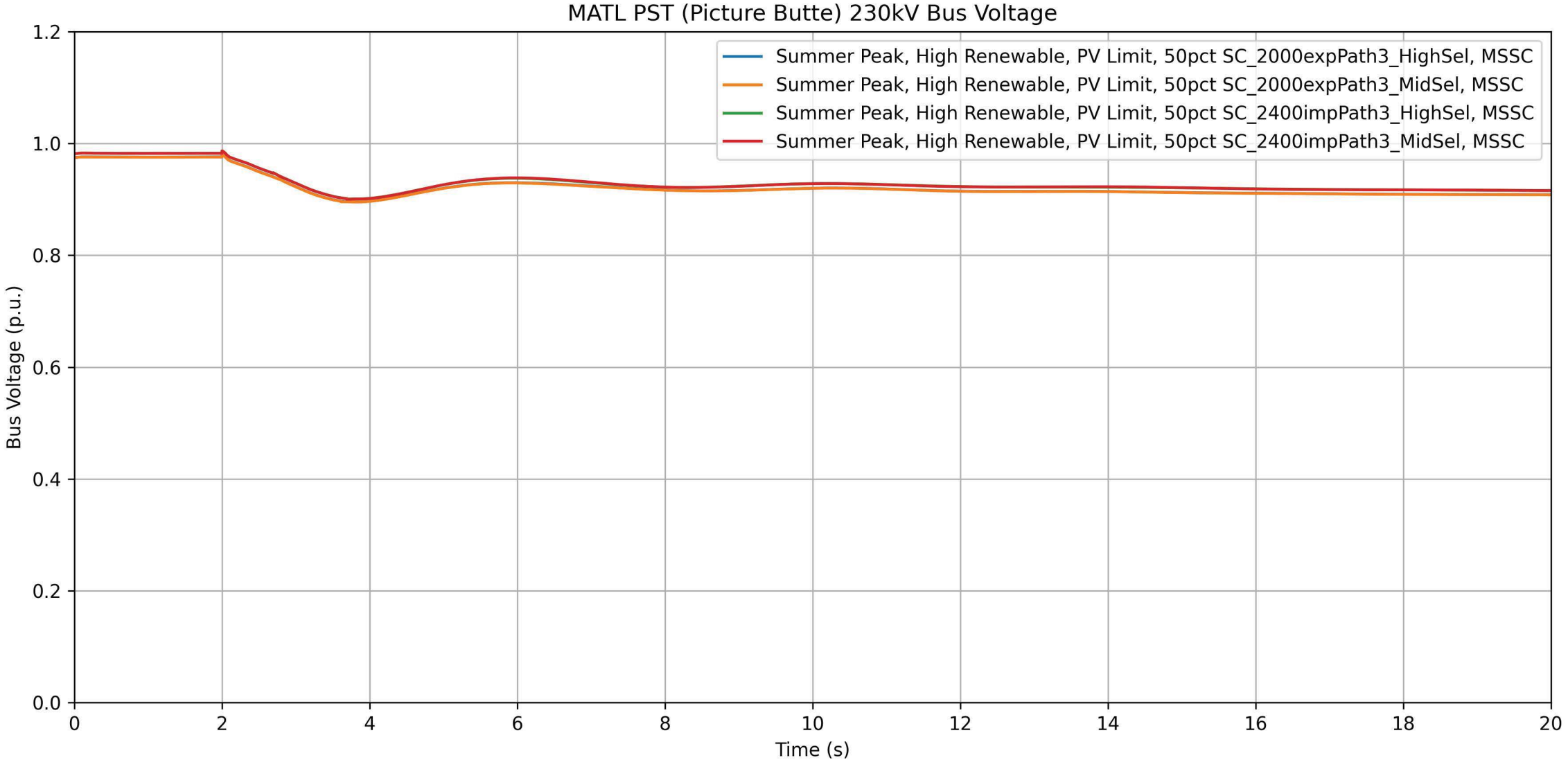

MATL (Hay Lake - Picture Butte) Real Power
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (MW)
Time (s)
0
100
200
300
400
500
0
2
4
6
8
10
12
14
16
18
20

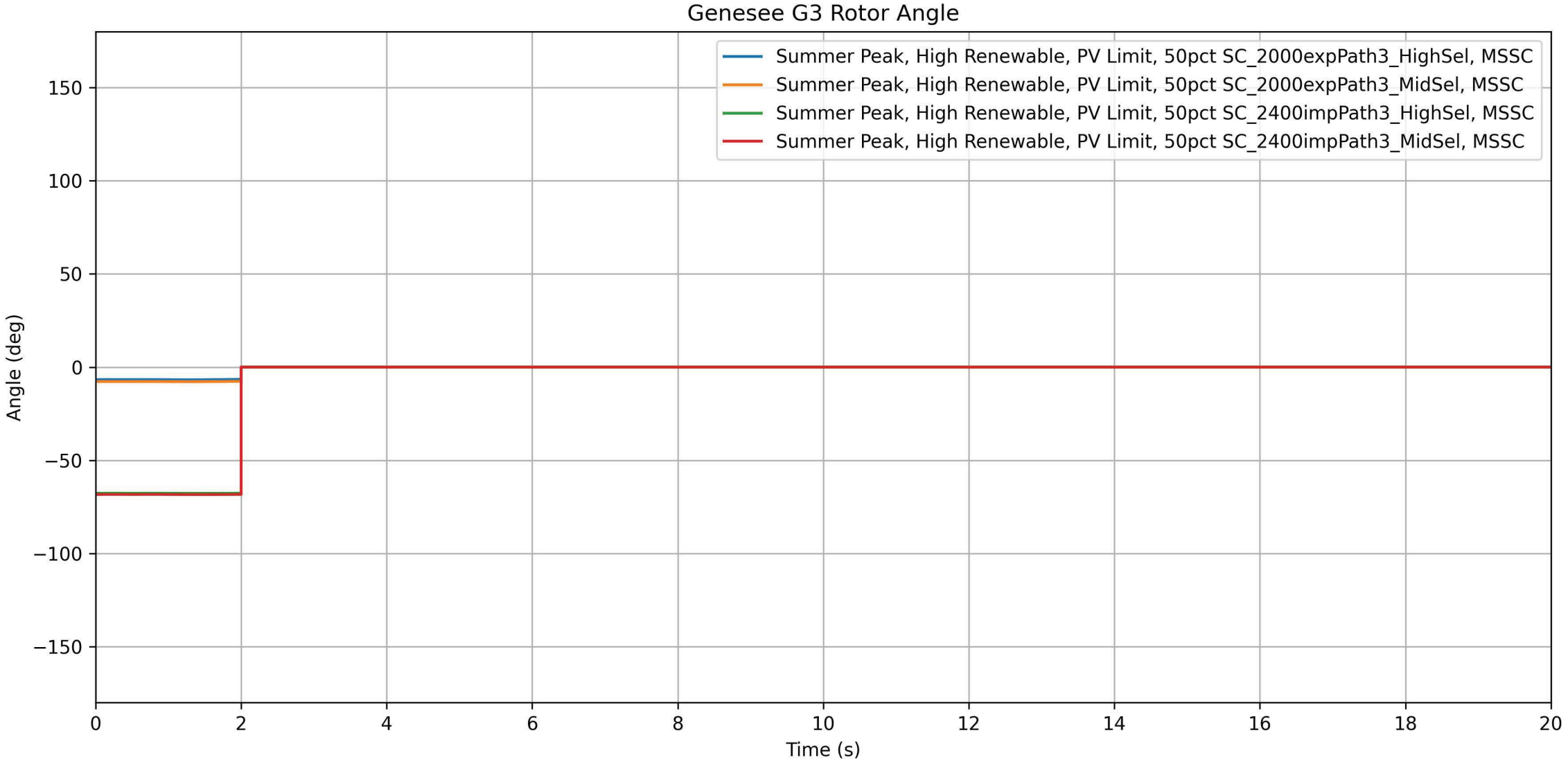

Cranbrook 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC

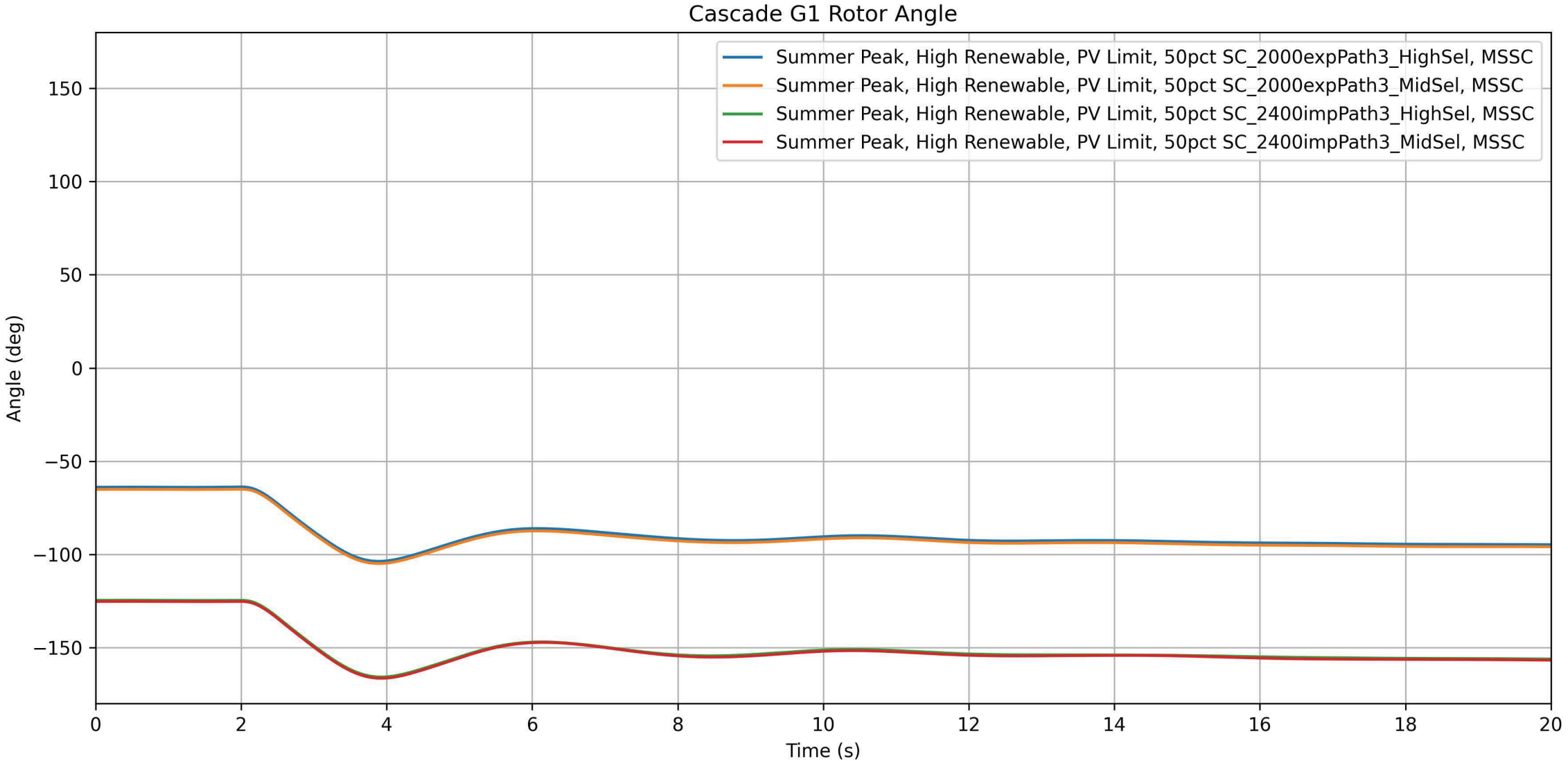

Bennett 500kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC

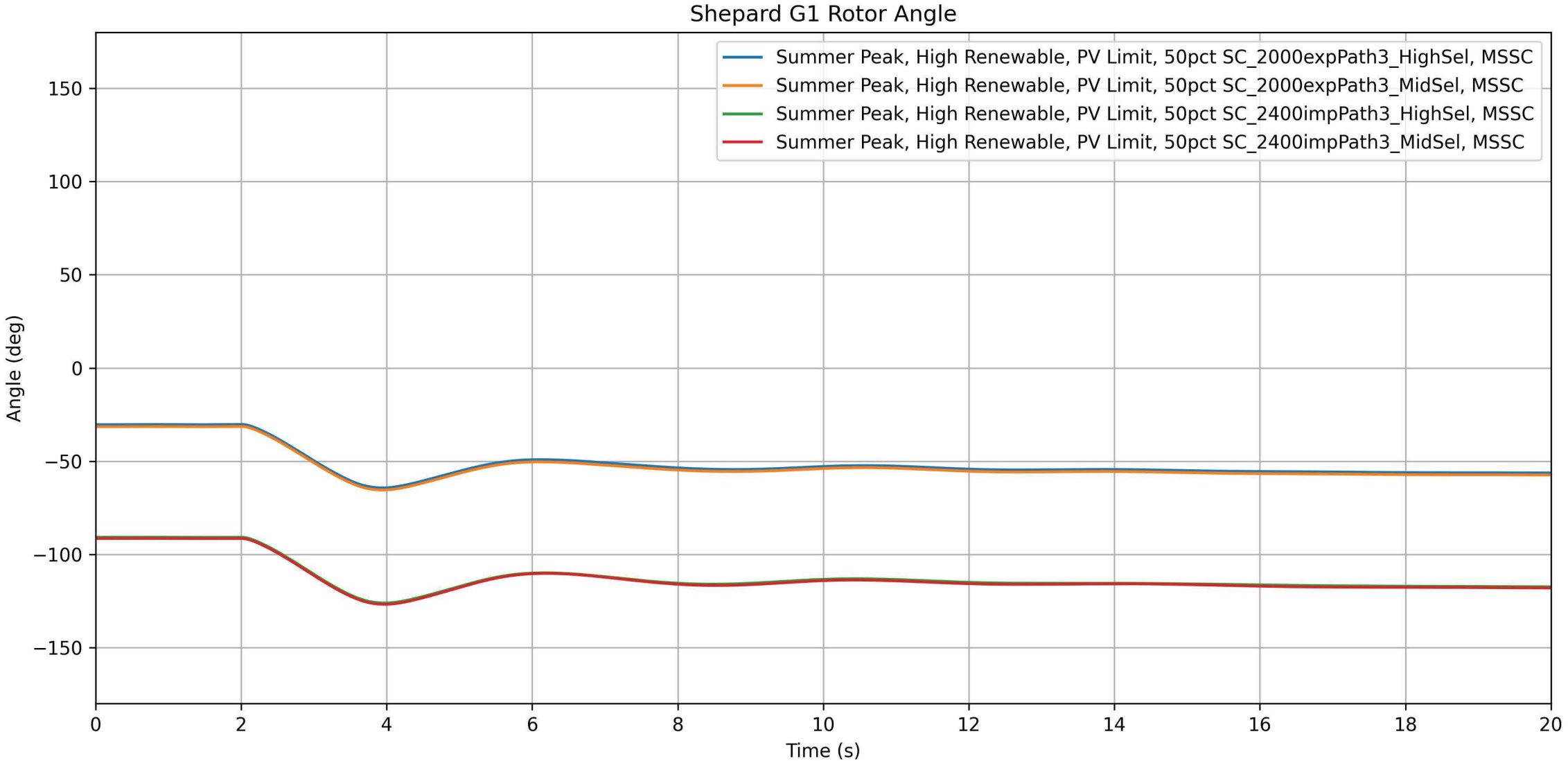

Natal 230kV Bus Voltage
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC

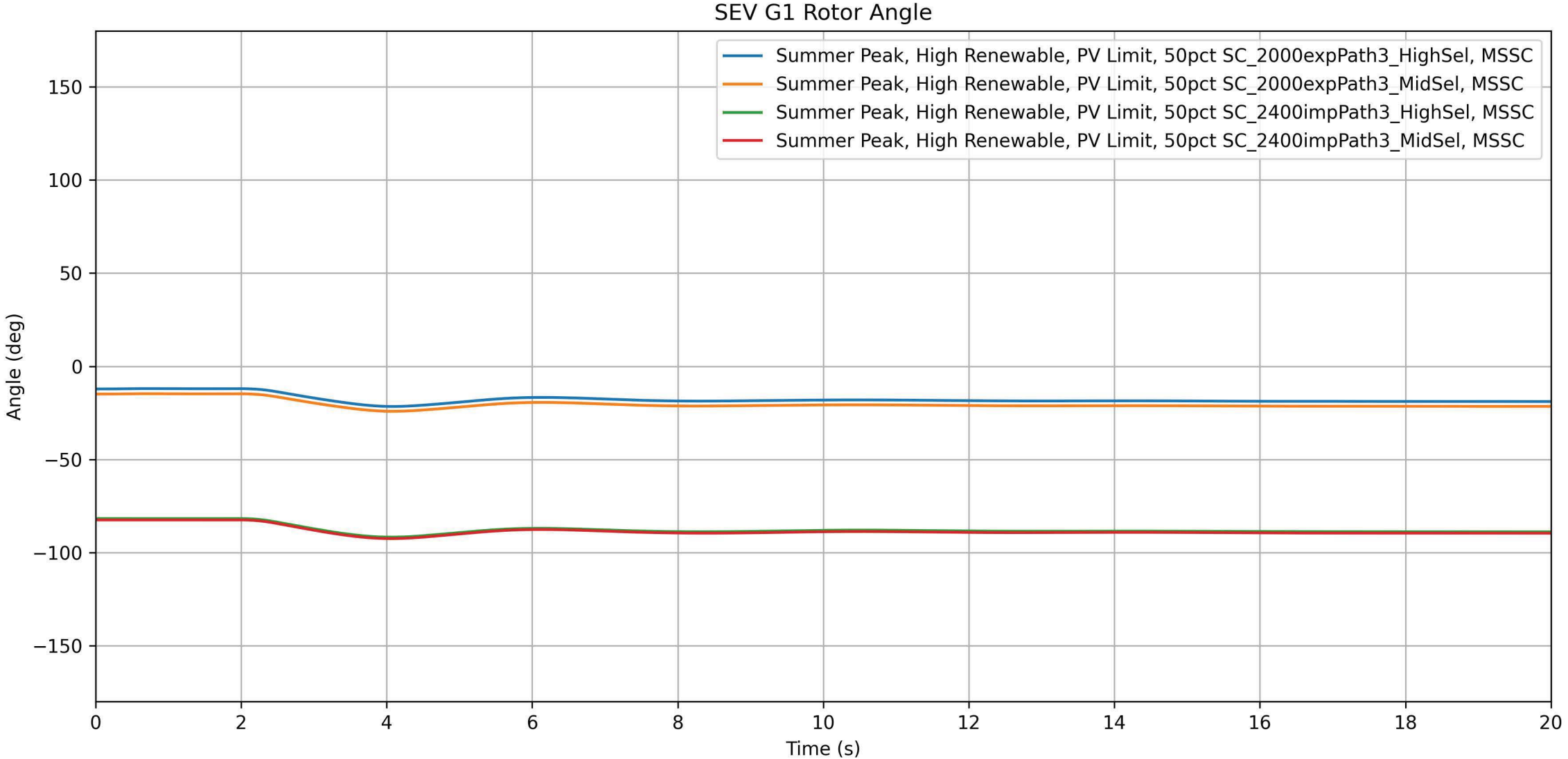

Fording River Operation 138kV Bus Voltage
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Bus Voltage (p.u.)
Time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20

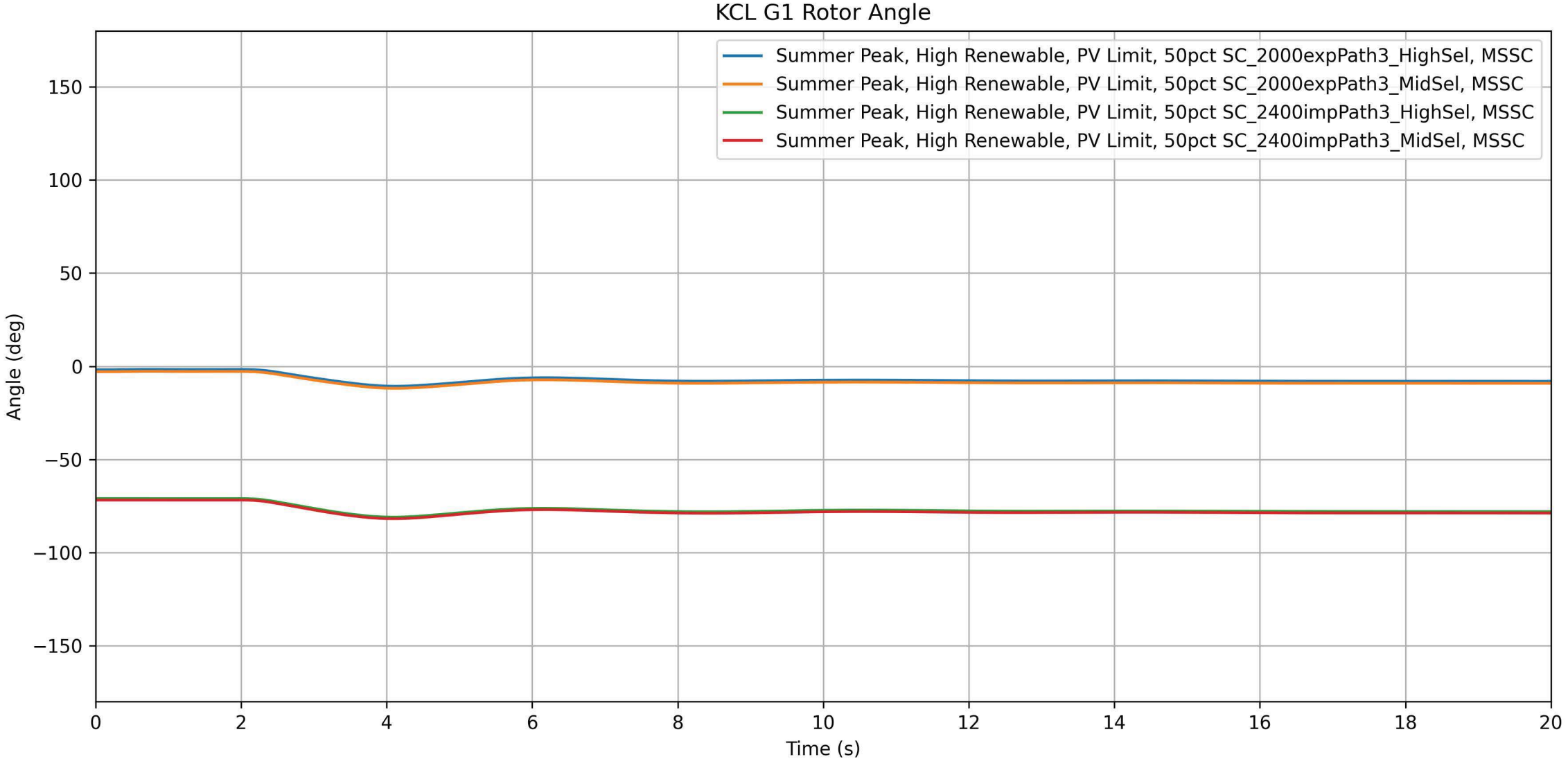

MATL PST (Picture Butte) 230kV Bus Voltage
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Bus Voltage (p.u.)
Time (s)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20

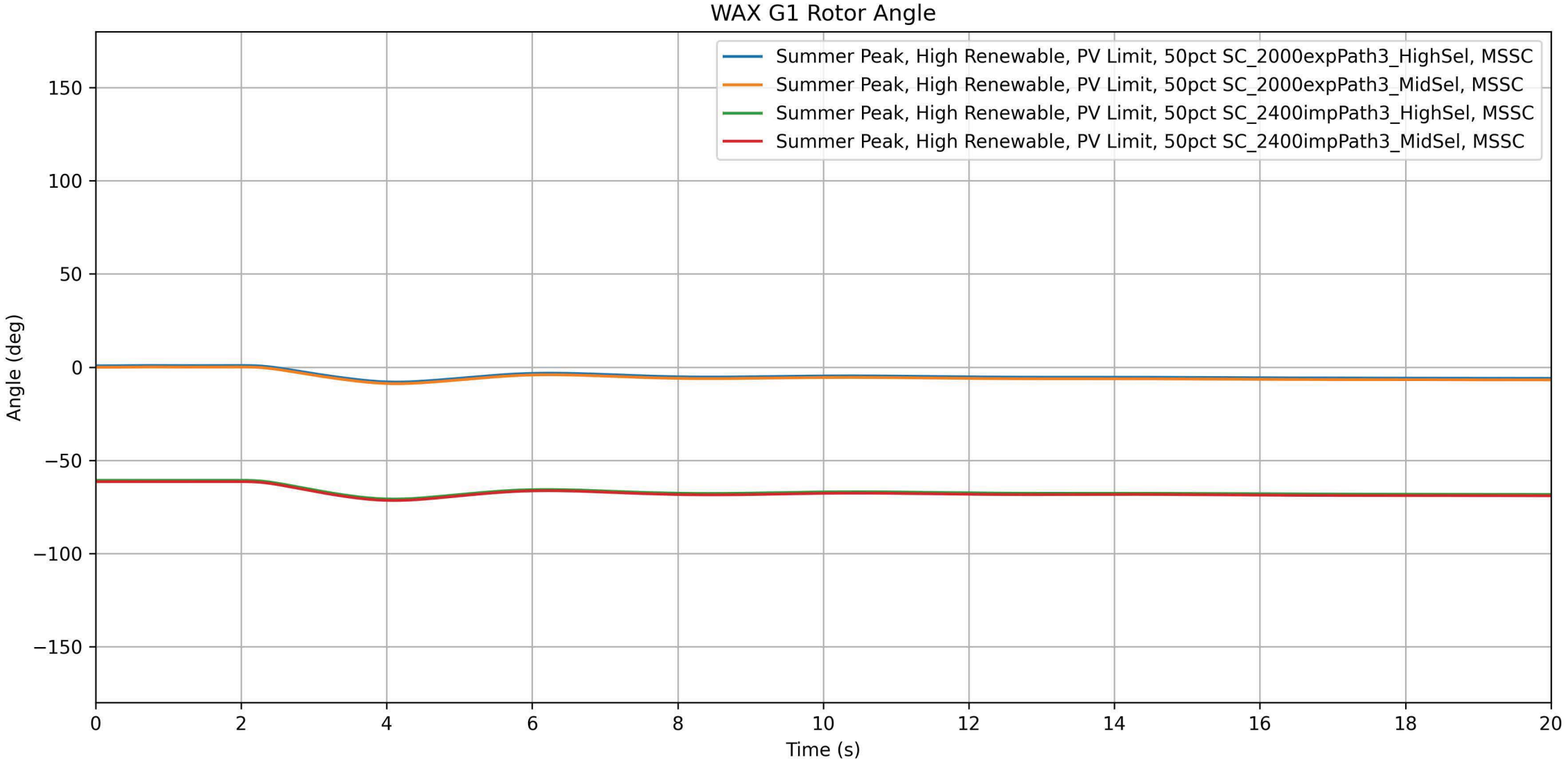

Genesee G3 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

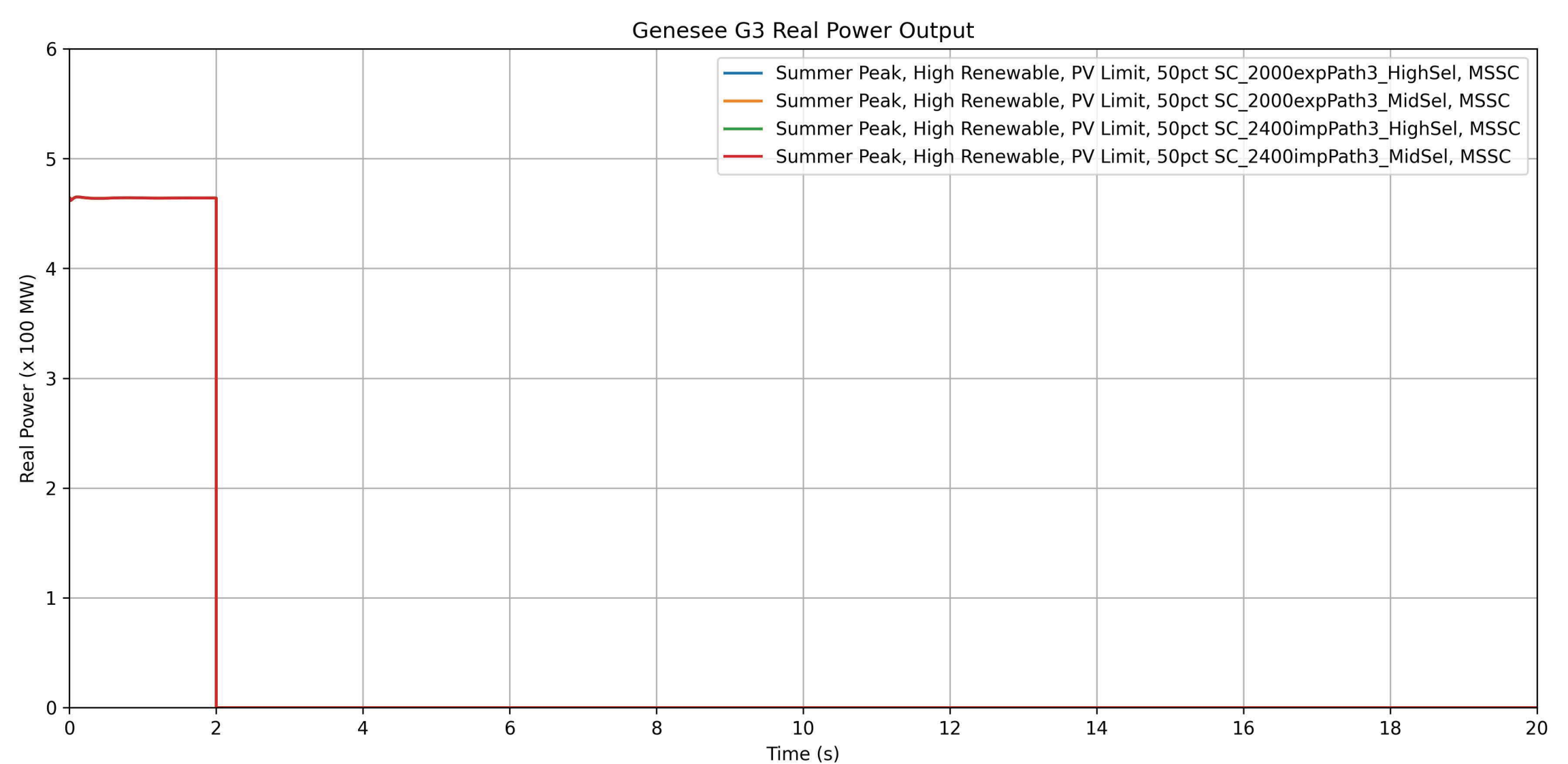

Cascade G1 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

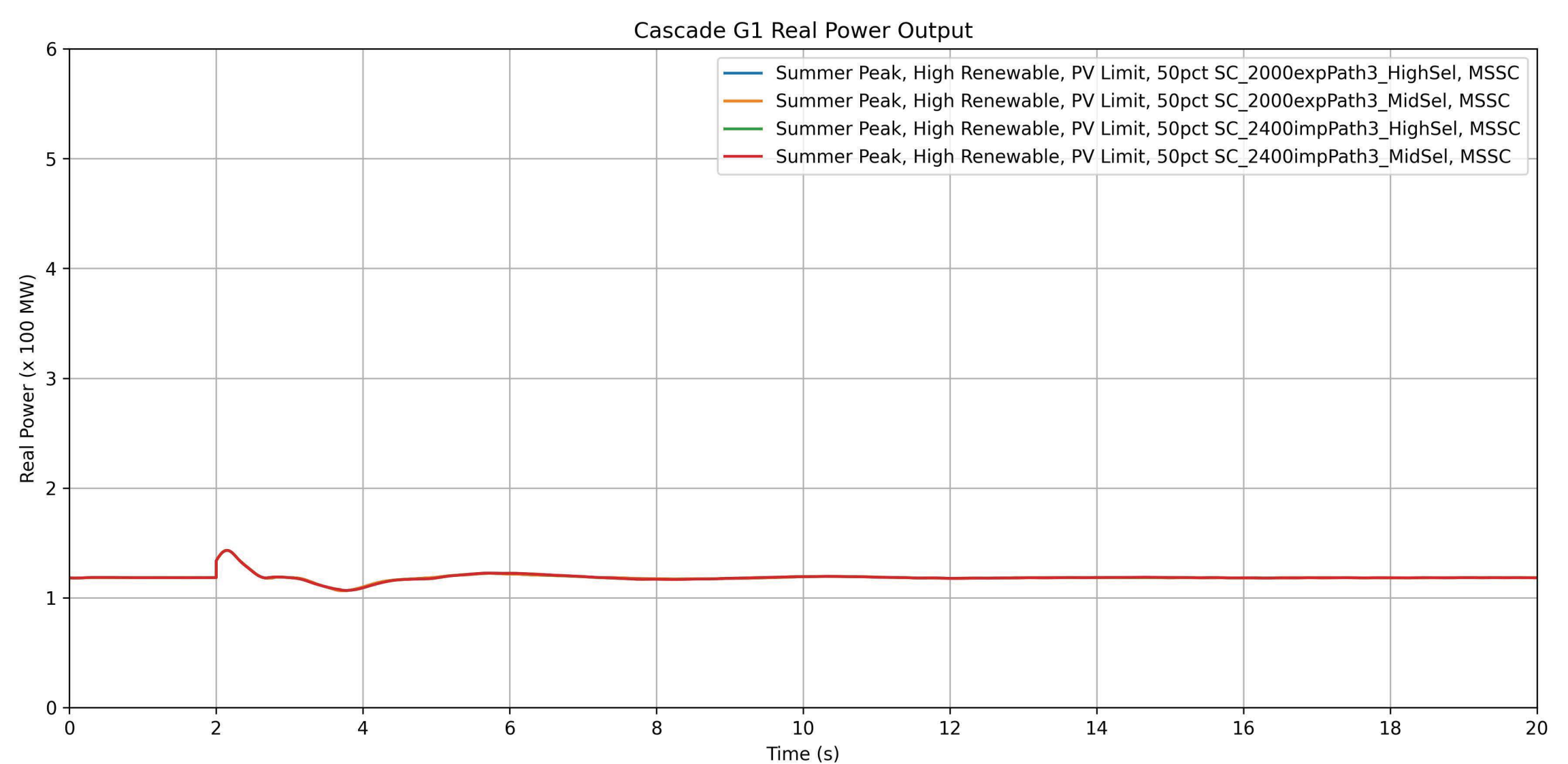

Shepard G1 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

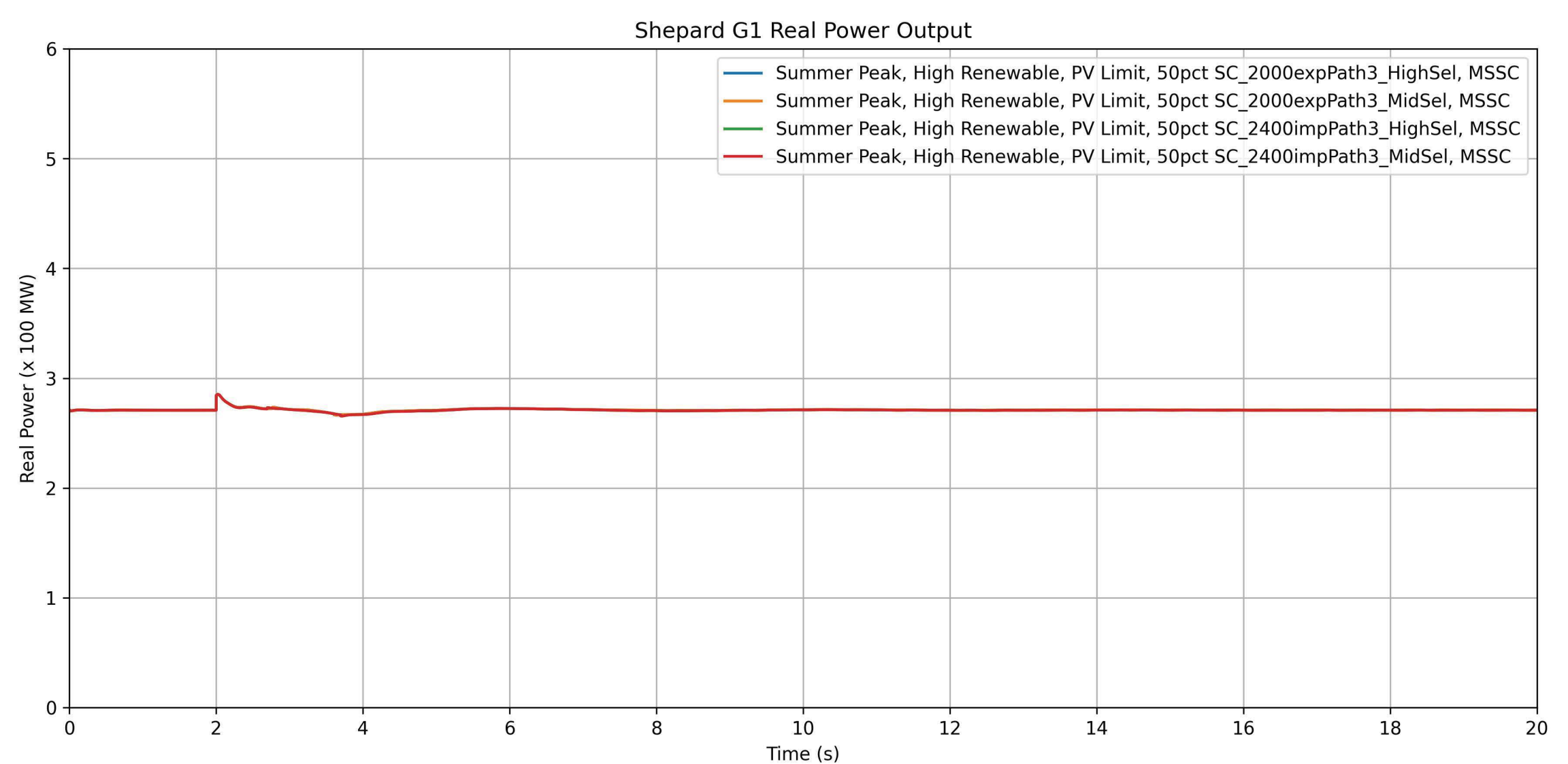

SEV G1 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
150
100
50
0
−50
−100
−150
Angle (deg)
0
2
4
6
8
10
12
14
16
18
20
Time (s)

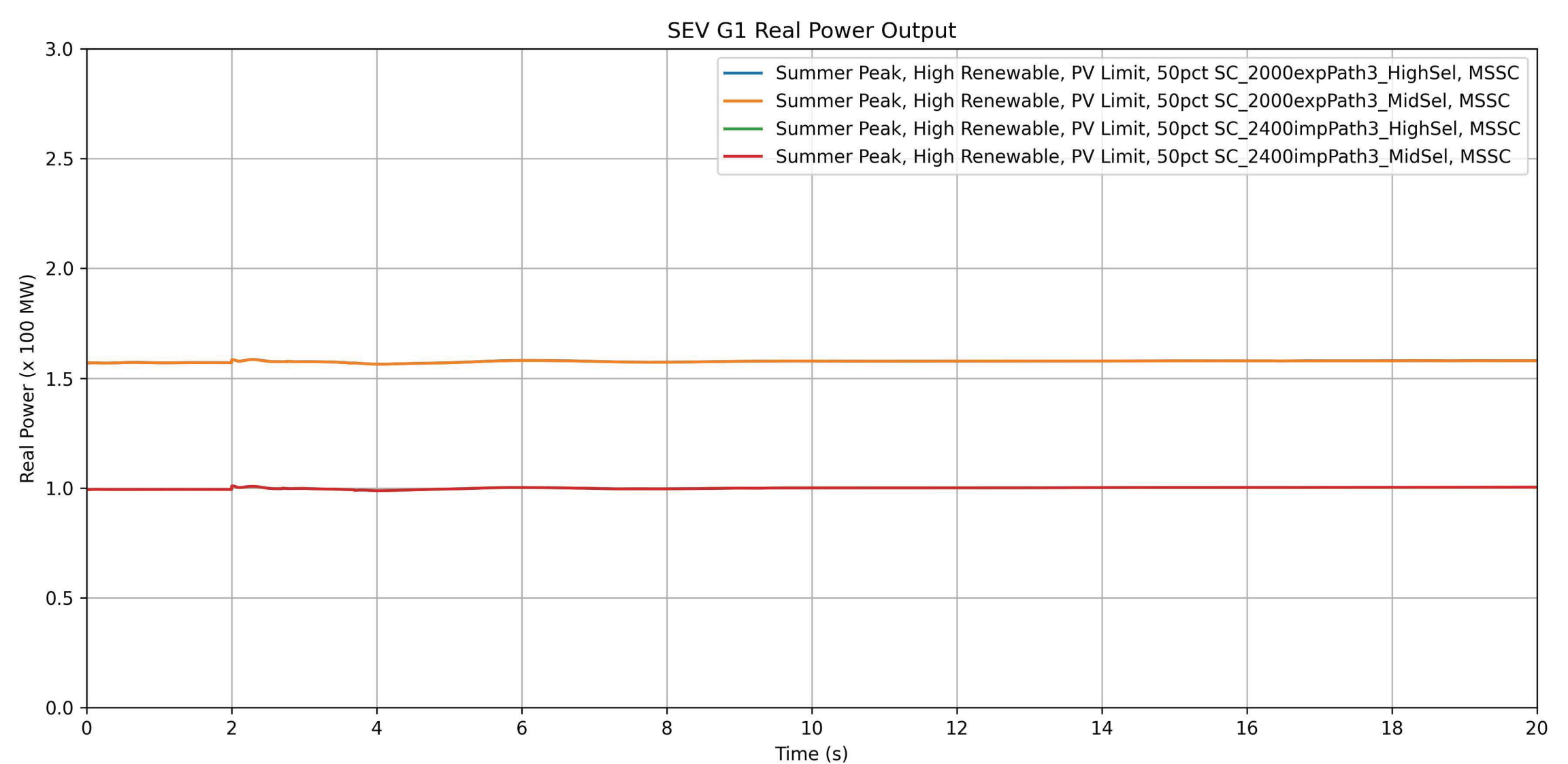

KCL G1 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

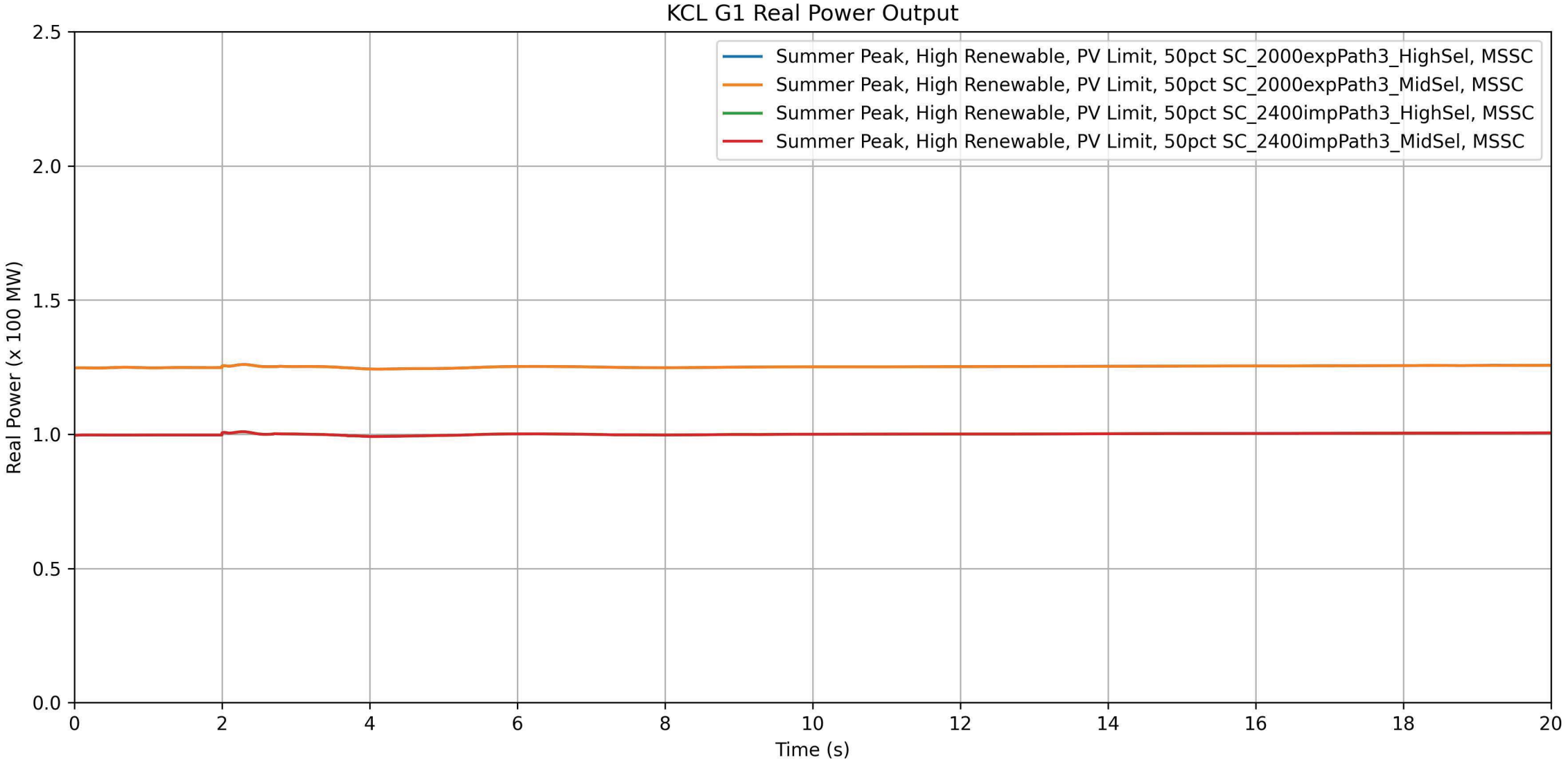

WAX G1 Rotor Angle
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Angle (deg)
150
100
50
0
−50
−100
−150
0
2
4
6
8
10
12
14
16
18
20
Time (s)

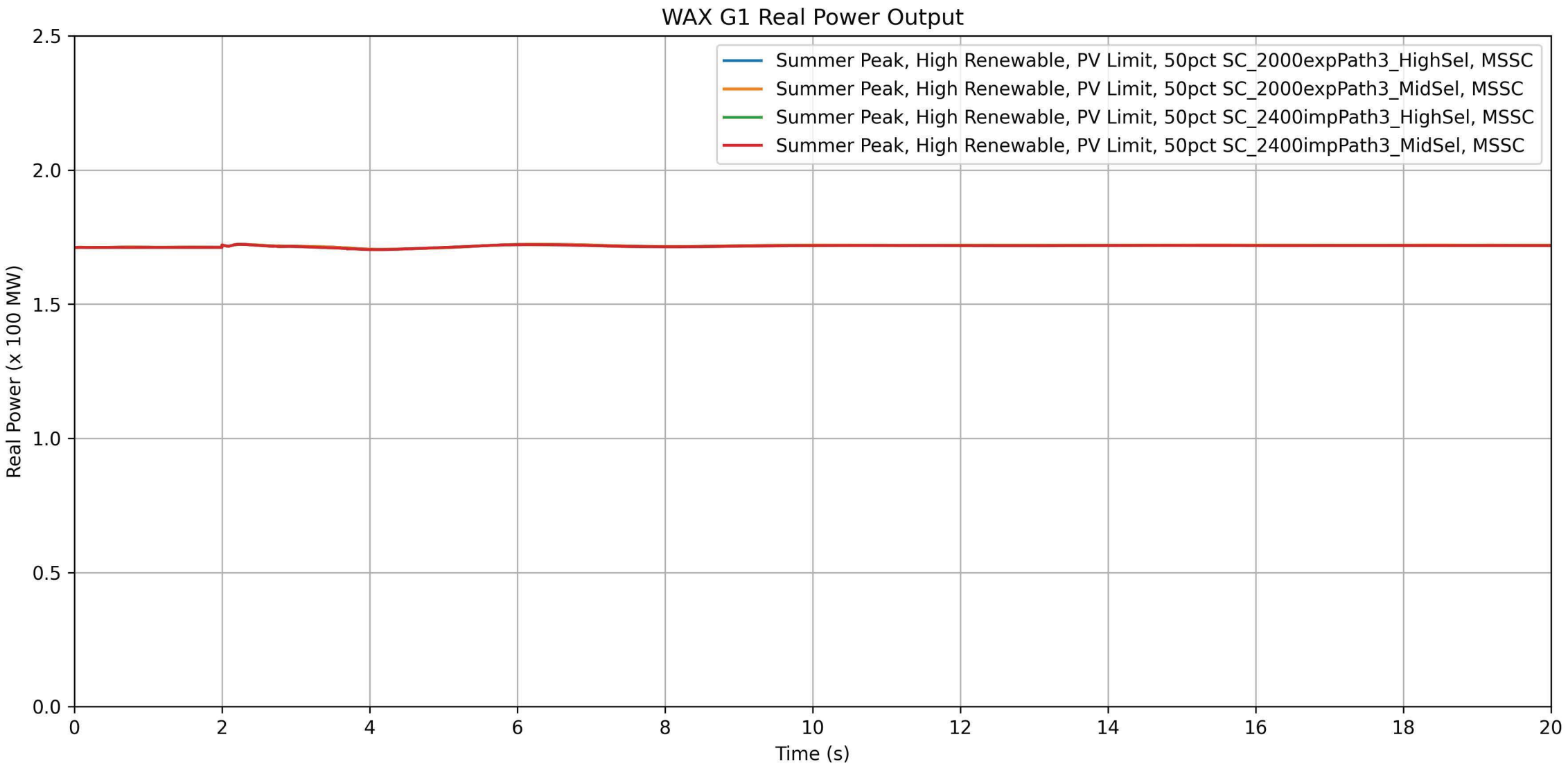

Genesee G3 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20


Cascade G1 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20


Shepard G1 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
Time (s)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20


SEV G1 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
16
18
20
Time (s)


KCL G1 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20


WAX G1 Real Power Output
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2000expPath3_MidSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_HighSel, MSSC
Summer Peak, High Renewable, PV Limit, 50pct SC_2400impPath3_MidSel, MSSC
Real Power (x 100 MW)
Time (s)
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
16
18
20

Attachment C:

Outage Schedule

ALTALINK | 2611 3rd AVE SE, CALGARY, ALBERTA, T2A 7W7
WWW.ALTALINK.CA

September 15, 2026

Imran Wyeen, P.Eng., MBA, PMP, RMP
Senior Project Manager, System Projects, Grid Reliability
Alberta Electric System Operator (AESO)

Dear Imran:

RE: P7006 Alberta Intertie Restoration (AIR) NID Submission Outage Schedules

In response to your request for issuance of the proposed outage schedules for the various NID Options for this project, we can provide the following high level details.

Please keep in mind outage requirements identified below are preliminary information only. More detailed analysis on the outage impact will need to be conducted during the Service Proposal stage

Option 1A, B & C: Outage

Estimated 2 week outage required on 1201L to complete the in and out connection to 1201L to the Series Compensator

Option 2A & B: Outage

Option 2A:

Outage Element	Outage Duration	Work Description
500 kV Bus, T1, and 1114L	7 days (1 day switching, 6 days for substation and T1 work, 1 buffer day)	Connect new T1. Connect the new bus connection to the new T1 to the existing bus connection. Install 3 screw piles and bus support structures. Make 240 kV connections to 1114L and T1. Energize T1 (final commissioning and soak).

Option 2B:

Outage Element	Outage Duration	Work Description
500 kV Bus, T1, and 1114L	11 days total, divided into 3 segments over 40 days. Two -3-day outages One - 5-day outage	Replace T1-3

500 kV Bus, T1, and 1114L	5 days total in one outage	Replace T1-4
500 kV Bus, T1, and 1114L	11 days total, divided into 3 segments over 40 days. Two -3-day outages One - 5-day outage	Replace T1-2, reconductor 1114L
500 kV Bus, T1, and 1114L	2 days total, divided into 2 segments over 3 days. Two -1-day outages	Replace T1-1

Option 3A & B: Outage

Each tower replacement is estimated at a two-day outage. The number of spans to mitigate ranges from 3 to 6 depending on the Option chosen.

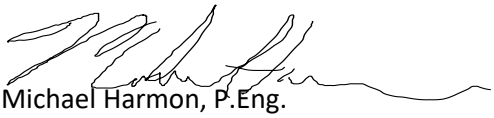
1201L typically has one (1) week long outage per year occurring in early Spring (and occasionally an additional week long outage in later Fall), the intention would be to leverage these planned outages for the tower replacements during the construction period.

Option 4A & B: Outage

Estimated 2 week outage required on 1201L to complete the in and out connection to 1201L to the Series Compensator

If you have any further questions please feel free to contact me.

Sincerely,



Michael Harmon, P.Eng.
Specialist Project Manager

Attachment D:

APEGA Authentication

Section 54(1) of the *Engineers and Geoscience Professions General Regulation* requires licensed professionals to authenticate their professional work products (PWP), showing their professional responsibility for the PWP. If multiple licensed professionals within the same single discipline share responsibility for and authenticate their portions of the PWP individually, the boundaries and limitations of each authentication must clearly show which licensed professional is taking accountability for which part of the PWP.[1]

The boundaries of each authentication are:

- Lai Jiang, P. Eng is accountable for
  - Section 1
  - Sections 3.1, 3.2, 3.4, 3.5, and 3.11
  - Section 5.2
  - Sections 6.1, 6.2.2, and 6.2.4
  - Sections 7 - 11
  - Sections 12.1. 12.3.2, and 12.4.2
  - Sections 13, 15, and 16
- Cheng Li, P. Eng is accountable for all other sections

[1] Section 2.1 and 4.3 of *APEGA Authenticating Professional Work Products*, Nov 1, 2024