

Long Term Adequacy Metrics

Aug 2018



Introduction

The following report provides information on the long term adequacy of the Alberta electric energy market. The report contains metrics that include tables on generation projects under development and generation retirements, an annual reserve margin with a five year forecast period, a two year daily supply cushion, and a two year probabilistic assessment of the Alberta Interconnected Electric System (AIES). The Long Term Adequacy (LTA) Metrics provide an assessment and information that can be used to facilitate further assessments of long term adequacy. This report is updated quarterly in February, May, August, and November. Inquiries on the report can be made at forecast@aesO.ca.

Summary of Changes since Previous Report

New Generation and Retirements Metric

Projects completed and removed from list:

- Medicine Hat CMH 16

Generation Projects moved to “Active Construction”:

- Fortis Genalta Bellshills

Generation projects moved to “Regulatory Approval”:

- Fortis Spring Coulee 385S Solar DG
- Fortis Alberta Blackfalds 198S Gas 1
- Fortis Enchant 447S DER Solar
- Fortis Krafte 257S Hull DER Solar
- City of Calgary Bonnybrook Cogen Expansion

Generation projects that have been added to “Announced, Applied for AESO Interconnection, and/or Applied for Regulatory Approval”:

- Enterprise Bighorn MPC Wind
- Fortis Alberta Taber 83S DER Solar
- Fortis Alberta Blackfalds 198S Gas
- Fortis Alberta Blackfalds 198S Gas
- Suncor Base Plant Cogen
- Fortis Alberta Brooks 121S DER Solar
- Fortis Alberta Brooks 121S DER Solar
- Fortis Alberta High River 65S DER Solar
- Fortis Alberta High River 65S DER Solar
- EDP Renewables Blue Bridge Solar
- Fortis Alberta Innisfail 214S DER Solar
- TransAlta Tempest MPC Wind
- Elemental Energy WD MPC Wind
- Aura Power Big Bend Solar

Generation projects that have been removed:

- BluEarth Renewables Brooks JBS
- BluEarth Renewables Yellow Lake DG PV
- Fortis Bullshead 523S Solar DER
- Enterprise Bighorn WAGF
- EDF EN Cyress WAGF
- Aira Forty Mile Wind

Other changes to generation projects:

| Project | Change |
|---|-----------------------------------|
| Capital Power – Genesee 4 | New ISD of Feb-2021 from Sep-2019 |
| RESC – McLaughlin WAGF | New ISD of Dec-2020 from Aug-2020 |
| Joss Wind – Jenner Wind | New ISD of Jun-2019 from Dec-2019 |
| Inter Pipeline – Strathcona Cogeneration | New ISD of Oct-2020 from May-2019 |
| Fortis – Genalta Bellshill | New ISD of Aug-2018 from Jun-2019 |
| Maxim Power – HR Milner Expansion Gas | New ISD of Sep-2019 from Feb-2020 |
| Fortis – Coaldale Cogen DER | New ISD of May-2020 from Jan-2999 |
| Imperial Oil – Edmonton 95S Cogen | New ISD of Oct-2019 from Jan-2999 |
| Alberta Wind Energy – Old Elm & Pothole Creek | New ISD of Dec-2019 from Jul-2019 |
| Suncor – Forty Mile WAGF | New ISD of Sep-2020 from Oct-2019 |
| RESC – Forty Mile WAGF | New ISD of Jun-2020 from Jul-2019 |
| NextEra – Red Deer Battery Energy Storage | New ISD of Dec-2020 from Jul-2019 |
| NextEra – Ghost Pine Battery ES System | New ISD of Dec-2020 from Dec-2018 |
| Invenergy – Schuler Windfarm | New ISD of Aug-2019 from Dec-2019 |
| Sequoia Energy – Oyen WAGF | New ISD of Dec-2021 from Sep-2019 |
| Sequoia Energy – Schuler WAGF | New ISD of Jan-2020 from Sep-2020 |
| RESC – Oyen Wind Power Project | New ISD of Jun-2021 from Sep-2019 |

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| Suncor – Forty Mile Granlea WAGF | New ISD of Jun-2020 from Jul-2021 |
| Fortis – Burdett 368S DG P/V | New ISD of Jun-2019 from Jul-2018 |
| Enterprise – Prosperity WAGF | New ISD of Sep-2019 from Dec-2019 |
| Fortis – Spring Coulee 385S Solar DG | New ISD of Apr-2019 from Dec-2018 |
| BowArk Energy – Drywood Gas Generator | New ISD of Oct-2019 from Dec-2018 |
| Fortis – Warner 344S DER Solar | New ISD of May-2019 from Jul-2018 |
| EDF EN – Red Rock WAGF | New ISD of Aug-2019 from Jun-2020 |
| NextEra – Red Deer River Solar | New ISD of Dec-2020 from May-2020 |
| TransAlta – Cowley Ridge 1 Wind | New ISD of Apr-2019 from Sep-2019 |
| Fortis – Conrad DER Solar | New ISD of Jul-2019 from Apr-2020 |
| Fortis – Vauxhall Solar DER | New ISD of Jun-2019 from Nov-2019 |
| RealPart – Calgary Area Solar | New ISD of Mar-2020 from May-2019 |
| Fortis – Conrad DER Solar 2 | New ISD of Nov-2019 from Jan-2019 |
| Fortis – Duchess DER Solar | New ISD of May-2019 from May-2019 |
| EPCOR – WSI DG Solar | New ISD of Nov-2019 from Nov-2020 |
| ENMAX – Taber Wind Farm | New ISD of Dec-2020 from Dec-2018 |
| Pattern Development – Lanfine South Wind | New ISD of Sep-2020 from Dec-2020 |
| BluEarth – Hand Hills Wind Phase 2 | New ISD of Sep-2020 from May-2019 |
| Pengrowth – Cold Lake Area Energy Centre | New ISD of Jun-2020 from May-2019 |
| FortisAlberta – Willesdengreen DER Gas Turbine | New ISD of Nov-2018 from Jun-2020 |
| TransAlta – Ardenville Expansion Wind | New ISD of Nov-2020 from Oct-2019 |
| FortisAlberta – Bullshead 523S DER Solar 2 | New ISD of Jul-2019 from Sep-2019 |
| E.ON – Grizzly Bear Wind Phase 2 | New ISD of Mar-2021 from May-2019 |

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|--|-----------------------------------|
| Four Rivers – Four Rivers Wind | New ISD of Mar-2021 from Mar-2019 |
| City of Calgary – Bonnybrook Cogen Expansion | New ISD of Dec-2020 from Sep-2020 |
| Fortis – Tilley 498S DG Gas | New ISD of Nov-2019 from Jul-2018 |
| Fortis – 255S Vulcan Faribault Farms PV | New ISD of Aug-2020 from Jul-2018 |
| Fortis - Coaldale 254S DER Solar 3 | New ISD of Aug-2020 from Jul-2018 |
| Fortis - Monarch 492S DER Solar | New ISD of Aug-2020 from Jul-2018 |
| Fortis - Stavely 349S DER Solar | New ISD of Aug-2020 from Jul-2018 |

Reserve Margin Metric

The reserve margin has been updated to reflect changes to the project list.

Supply Cushion Metric

The forecast supply cushion has been updated to reflect the new time period.

Two Year Probability of Supply Adequacy Shortfall Metric

New values for the metric have been calculated with Total Energy Not Served equaling 113 MWh. This value is below the 1,600 MWh threshold.

New Generation Projects and Retirements Metric

The New Generation Projects and Retirements Metric is a summary of generation at various stages of development in Alberta and is shown in Tables 1 to 4 below. In Alberta’s deregulated electricity market competitive forces determine the location, magnitude and timing of new generation additions. Information on prospective generation additions and retirements provides context for the future market in Alberta. The information is drawn from a variety of public sources and includes new generation, changes to existing generation and the retirement of generating units. Changes in project in-service dates (ISDs) and regulatory stages occur as projects move forward and/or market conditions change. Current information on connection project ISDs can be found in the [AESO Project List](#) and information on power plant applications can be found at the [Alberta Utilities Commission](#) website.

Table 1: Generation Projects under Construction

| Sponsor(s) | Project Name | Fuel | Unit Capacity* | ISD* |
|-------------------|-------------------|------|----------------|----------|
| Fortis | Genalta Bellshill | Gas | 5 | Aug-2018 |
| Total (MW) | | | 5 | |

**Unit Capacity – Expected MW capacity; ISD – Estimated in-service date*

Table 2: Generation Projects with Regulatory Approval

| Sponsor(s) | Project Name | Fuel | Unit Capacity | ISD |
|---------------------|------------------------------|-------|---------------|----------|
| Fortis | Krafte 257S Hull DER Solar | Solar | 25 | Nov-2018 |
| EDF EN | Vulcan Solar PV - Phase 1 | Solar | 55 | Dec-2018 |
| EDF EN | Vulcan Solar PV - Phase 2 | Solar | 23 | Dec-2018 |
| Fortis | Enchant 447S DER Solar | Solar | 74 | Dec-2018 |
| Fortis | Buffalo Atlee Cluster 1 WAGF | Wind | 18 | Mar-2019 |
| FortisAlberta | Blackfalds 198S Gas 1 | Gas | 6 | Mar-2019 |
| Fortis | Buffalo Atlee Cluster 3 WAGF | Wind | 17 | Mar-2019 |
| Fortis | Spring Coulee 385S Solar DG | Solar | 29 | Apr-2019 |
| BluEarth Renewables | Burdett DG PV | Solar | 20 | May-2019 |
| Fortis | 498S Tilley DG PV | Solar | 22 | Jun-2019 |
| Fortis | 895S Suffield DG PV | Solar | 22 | Jun-2019 |

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|---------------------|-------------------------------|---------|------|----------|
| Fortis | 275S Jenner Solar DER | Solar | 23 | Jun-2019 |
| Fortis | 158S Vauxhall DG PV | Solar | 16 | Jun-2019 |
| Fortis | 421S Hays DG PV | Solar | 23 | Jun-2019 |
| Enel | Castle Rock Ridge - Phase 2** | Wind | 31 | Jun-2019 |
| Joss Wind | Jenner Wind | Wind | 122 | Jun-2019 |
| Naturener | Wild Rose 2 | Wind | 192 | Jul-2019 |
| Naturener | Wild Rose 1 | Wind | 218 | Jul-2019 |
| Suncor | Hand Hills | Wind | 80 | Sep-2019 |
| Maxim Power | HR Milner Expansion Gas | Gas | 90 | Sep-2019 |
| ATCO | Three Hills 770S DER Solar 1 | Solar | 25 | Sep-2019 |
| Alberta Wind Energy | Windy Point | Wind | 50.4 | Sep-2019 |
| Mustus Energy | Mustus Biomass | Biomass | 41 | Sep-2019 |
| Imperial Oil | Edmonton 95S Cogen | Gas | 46.5 | Oct-2019 |
| Enbridge | WhiteTail Peaking | Gas | 200 | Oct-2019 |
| ATCO | Heartland Power Station 1 | Gas | 510 | Nov-2019 |
| Pteragen | Peace Butte | Wind | 120 | Dec-2019 |
| Eolectric | Welsch Wind | Wind | 69 | Dec-2019 |
| Fortis | Coaldale Cogen DER | Gas | 6 | May-2020 |
| Three Creeks | Three Creeks Unit 1 | Gas | 230 | Jun-2020 |
| Three Creeks | Three Creeks Unit 2 | Gas | 230 | Jun-2020 |
| Three Creeks | Three Creeks Unit 3 | Gas | 230 | Jun-2020 |
| BluEarth Renewables | Hand Hills Wind Farm | Wind | 80 | Sep-2020 |
| BowArk Energy | Queenstown Power Plant | Gas | 80 | Oct-2020 |
| Inter Pipeline | Strathcona Cogeneration | Gas | 101 | Oct-2020 |

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|-------------------|-----------------------------------|-------|-----|----------|
| Maxim Power | Deerland Peaking 1-Phase 1 | Gas | 186 | Dec-2020 |
| Capital Power | Halkirk 2 | Wind | 150 | Dec-2020 |
| ENMAX | Zephyr Wind Farm | Wind | 200 | Dec-2020 |
| E.ON | Grizzly Bear | Wind | 120 | Dec-2020 |
| City of Calgary | Bonnybrook Cogen Expansion | Gas | 10 | Dec-2020 |
| RESC | McLaughlin WAGF | Wind | 47 | Dec-2020 |
| Capital Power | Genesee 4 | Gas | 525 | Mar-2021 |
| NextEra | Heritage Wind | Wind | 291 | Jun-2021 |
| Kineticor | Peace River Power Generator | Gas | 98 | Sep-2021 |
| Enmax | Calgary Energy Centre Peaking | Gas | 150 | Dec-2021 |
| Capital Power | Genesee 5 | Gas | 525 | Mar-2022 |
| C&B Alberta Solar | Newell Solar Project | Solar | 13 | TBD |
| Altagas | Kent Generation-Phase 1 | Gas | 100 | TBD |
| Enmax | Bonnybrook | Gas | 168 | TBD |
| TransCanada | Saddlebrook | Gas | 350 | TBD |
| TransAlta | Sundance 7 | Gas | 850 | TBD |
| PetroChina | MacKay-Phase 1 | Gas | 85 | TBD |
| Maxim Power | Milner 2 Phase 1 | Gas | 260 | TBD |
| Maxim Power | Milner 2 Phase 2 | Gas | 260 | TBD |
| Nexen | Long Lake South | Gas | 85 | TBD |
| Imperial Oil | Kearl - Phase 2 | Gas | 100 | TBD |
| Imperial Oil | Kearl - Phase 3 | Gas | 35 | TBD |
| Kronos Solar | Oyen Solar Park | Solar | 10 | TBD |
| Syncrude | Mildred Lake (Base Plant)-Phase 1 | Gas | 85 | TBD |

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|-------------------|-----------|-----|--------------|-----|
| NAT3 | Jenner DG | Gas | 20 | TBD |
| Total (MW) | | | 7,848 | |

Table 3: Generation Projects that have been Announced, Applied for AESO Connection, and/or Applied for Regulatory Approval

| Sponsor(s) | Project Name | Fuel | Unit Capacity | ISD |
|-------------------|--------------------------------|-------------|---------------|--------------|
| Fortis | Gleichen DG Solar | Solar | 17 | Oct-2018 (A) |
| Fortis | GP Joule Canada Cluny DG | Solar | 5 | Oct-2018 (A) |
| FortisAlberta | Willesdengreen DER Gas Turbine | Gas Turbine | 10 | Nov-2018 (A) |
| Fortis | Stirling 67S DG P/V | Solar | 17 | Nov-2018 (A) |
| Fortis | Namaka DER Solar | Solar | 20 | Nov-2018 (A) |
| Fortis | West Brooks DER Solar | Solar | 23 | Dec-2018 (A) |
| Chiniki | Solar | Solar | 40 | Dec-2018 (A) |
| Fortis | Bassano DER Solar | Solar | 10 | Jan-2019 (A) |
| Fortis | Wainwright DER Solar | Solar | 13 | Jan-2019 (A) |
| Fortis | Provost DER Solar | Solar | 16 | Jan-2019 (A) |
| Fortis | Killarney Lake DER Solar | Solar | 16 | Jan-2019 (A) |
| Seven Generations | Gold Creek Gas Plant | Gas | 32 | Jan-2019 (P) |
| Fortis | Hays 421S DER Solar | Solar | 10 | Jan-2019 (A) |
| TransCanada | Scoria 318S Cogen | Gas | 46 | Jan-2019 (A) |
| Archer | Piikani Solar | Solar | 40 | Jan-2019 (A) |
| ATCO | Coronation 802S Solar DG | Solar | 10 | Mar-2019 (A) |
| ATCO | Vilna 777S DER Solar | Solar | 22.7 | Mar-2019 (A) |
| FortisAlberta | Bullshead 523S DER Solar 1 | Solar | 20 | Mar-2019 (A) |

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|---------------|-------------------------------|-------|------|--------------|
| Fortis | Coaldale 254S DG P/V | Solar | 20 | Mar-2019 (A) |
| Fortis | Coaldale 254S DER Solar 2 | Solar | 20 | Mar-2019 (A) |
| Kronos Solar | Heisler Solar Park | Solar | 20 | Mar-2019 (P) |
| Kronos Solar | Veteran Solar Park | Solar | 10 | Mar-2019 (P) |
| FortisAlberta | Blackfalds 198S Gas 2 | Gas | 4 | Apr-2019 (A) |
| TransAlta | Cowley Ridge 1 Wind | Wind | 21 | Apr-2019 (A) |
| Joss Wind | Jenner Phase 2 | Wind | 180 | May-2019 (A) |
| Fortis | Empress DER Solar | Solar | 23 | May-2019 (A) |
| Fortis | Provost DER Solar | Solar | 23 | May-2019 (A) |
| Fortis | Metiskow DER Solar | Solar | 23 | May-2019 (A) |
| Fortis | Burdett DER Solar 1 | Solar | 8 | May-2019 (A) |
| Fortis | Burdett DER Solar 2 | Solar | 16 | May-2019 (A) |
| Fortis | Taber DER Solar 1 | Solar | 12 | May-2019 (A) |
| Fortis | Taber DER Solar 2 | Solar | 22 | May-2019 (A) |
| Fortis | Fincastle DER Solar | Solar | 20 | May-2019 (A) |
| Fortis | Killarney DER Solar | Solar | 22 | May-2019 (A) |
| Fortis | Duchess DER Solar | Solar | 16 | May-2019 (A) |
| ATCO | Michichi DER Solar | Solar | 75 | May-2019 (A) |
| ATCO | Monitor DER Solar | Solar | 10 | May-2019 (A) |
| FortisAlberta | Taber 83S DER Solar | Solar | 16 | May-2019 (A) |
| FortisAlberta | Empress 394S DER Solar | Solar | 15.6 | May-2019 (A) |
| FortisAlberta | Taber 83S DER Solar | Solar | 19 | May-2019 (A) |
| Fortis | Warner 344S DER Solar | Solar | 20 | May-2019 (A) |
| Keyera | West Pembina 359S Gas Turbine | Gas | 12 | May-2019 (A) |

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|------------------|-------------------------------|-------|------|--------------|
| Suncor | Forty Mile P/V | Solar | 80 | Jun-2019 (A) |
| Fortis | 257S Hull P/V | Solar | 16 | Jun-2019 (A) |
| Enel | Riverview Wind Farm** | Wind | 115 | Jun-2019 (A) |
| Fortis | Burdett 368S DG P/V | Solar | 10 | Jun-2019 (A) |
| Fortis | Vauxhall Solar DER | Solar | 22 | Jun-2019 (A) |
| Irma | Wainwright Wind Project | Wind | 90 | Jul-2019 (A) |
| Greengate Power | Paintearth Wind Farm | Wind | 150 | Jul-2019 (A) |
| Greengate Power | Wheatland Wind | Wind | 120 | Jul-2019 (A) |
| Greengate Power | Stirling Wind | Wind | 115 | Jul-2019 (A) |
| Imperial Oil | Aspen SAGD Project | Gas | 30 | Jul-2019 (A) |
| Fortis | Jenner 275S DER | Gas | 24 | Jul-2019 (A) |
| Fortis | Carseland Solar | Solar | 12 | Jul-2019 (A) |
| FortisAlberta | Bullshead 523S DER Solar 2 | Solar | 20 | Jul-2019 (A) |
| Fortis | Conrad DER Solar | Solar | 23 | Jul-2019 (A) |
| FortisAlberta | Brooks 121S DER Solar 1 | Solar | 15 | Jul-2019 (A) |
| FortisAlberta | Brooks 121S DER Solar 2 | Solar | 15 | Jul-2019 (A) |
| FortisAlberta | High River 65S DER Solar 1 | Solar | 12.5 | Jul-2019 (A) |
| FortisAlberta | High River 65S DER Solar 2 | Solar | 12.5 | Jul-2019 (A) |
| Renewable Energy | Rattlesnake Wind | Wind | 100 | Jul-2019 (A) |
| EDP Renewables | Sharp Hills Wind** | Wind | 300 | Aug-2019 (A) |
| EDF EN | Red Rock WAGF | Wind | 250 | Aug-2019 (A) |
| Fortis | Brooks DER Solar | Solar | 22 | Aug-2019 (A) |
| Invenergy | Schuler Windfarm | Wind | 100 | Aug-2019 (A) |
| Capital Power | Whitla Wind Power - Phase 1** | Wind | 202 | Sep-2019 (A) |

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|----------------|-------------------------------|-------|------|--------------|
| TransAlta | Garden Plain Wind | Wind | 130 | Sep-2019 (A) |
| Altagas | Glenridge Wind | Wind | 150 | Sep-2019 (A) |
| Acciona Energy | Glenwood Area Wind | Wind | 120 | Sep-2019 (A) |
| ATCO | Three Hills 770S DER Solar 2 | Solar | 25 | Sep-2019 (A) |
| ATCO | Michichi Creek 802S DER Solar | Solar | 25 | Sep-2019 (A) |
| FortisAlberta | Innisfail 214S DER Solar | Solar | 24 | Sep-2019 (A) |
| ATCO | Kneehill | Solar | 25 | Sep-2019 (P) |
| NaturEner | Buffalo Trail WAGF | Wind | 100 | Sep-2019 (A) |
| NaturEner | Ross Creek WAGF | Wind | 100 | Sep-2019 (A) |
| RESC | McLaughlin Phase 2 | Solar | 40 | Sep-2019 (A) |
| Enterprise | Prosperity WAGF | Wind | 175 | Sep-2019 (A) |
| FortisAlberta | Namaka 428S DER Solar | Solar | 25 | Sep-2019 (A) |
| EDF EN | Hand Hills WAGF | Wind | 200 | Oct-2019 (A) |
| BowArk Energy | Drywood Gas Generator | Gas | 38 | Oct-2019 (A) |
| Suncor | Schuler Wind | Wind | 80 | Oct-2019 (A) |
| Suncor | Hand Hills Phase 2 | Wind | 80 | Oct-2019 (A) |
| Suncor | Hand Hills Solar | Solar | 80 | Oct-2019 (A) |
| Suncor | Schuler Solar | Solar | 80 | Oct-2019 (A) |
| Suncor | Braconnier Wind | Wind | 80 | Oct-2019 (A) |
| Suncor | Huxley Wind | Wind | 50 | Oct-2019 (A) |
| Fortis | Tilley 498S DG Gas | Gas | 22 | Nov-2019 (A) |
| FortisAlberta | Strathmore 151S DER Solar 1 | Solar | 18 | Nov-2019 (A) |
| FortisAlberta | Strathmore 151S DER Solar 2 | Solar | 22.5 | Nov-2019 (A) |
| Fortis | Conrad DER Solar 2 | Solar | 22 | Nov-2019 (A) |

| | | | | |
|---------------------|---------------------------------|-------|-----|--------------|
| EPCOR | WSI DG Solar | Solar | 12 | Nov-2019 (A) |
| Spirit Pine | Lone Pine WAGF | Wind | 173 | Dec-2019 (A) |
| Alberta Wind Energy | Old Elm & Pothole Creek | Wind | 60 | Dec-2019 (A) |
| NextEra | Buffalo Trail Solar | Solar | 70 | Dec-2019 (A) |
| Northland | Buffalo Trail | Wind | 100 | Dec-2019 (A) |
| Sequoia Energy | Schuler WAGF | Wind | 100 | Jan-2020 (A) |
| Soventix | Forestberg Area Solar | Solar | 40 | Jan-2020 (A) |
| Turning Point Gen | Canyon Creek PHES | Other | 125 | Jan-2020 (A) |
| RealPart | Calgary Area Solar | Solar | 150 | Mar-2020 (A) |
| Solar Krafte | Vauxhall | Solar | 150 | Apr-2020 (A) |
| Solar Krafte | Brooks | Solar | 400 | Apr-2020 (A) |
| HEP Capital | Alderson Solar | Solar | 100 | Apr-2020 (A) |
| BowArk Energy | Lanfine WAGF | Wind | 145 | May-2020 (A) |
| Suncor | Forty Mile Granlea WAGF | Wind | 200 | Jun-2020 (A) |
| TransCanada | Saddlebrook Solar | Solar | 100 | Jun-2020 (A) |
| Pengrowth | Cold Lake Area Energy Centre | Gas | 100 | Jun-2020 (A) |
| RESC | Forty Mile WAGF | Wind | 400 | Jun-2020 (A) |
| Perimeter | Sunset Solar | Solar | 60 | Jun-2020 (A) |
| Perimeter | Claresholm Solar | Solar | 150 | Jun-2020 (A) |
| ENGIE | Duchess Solar | Solar | 90 | Jun-2020 (A) |
| Aura Power | Big Bend Solar | Solar | 65 | Jul-2020 (P) |
| EDF EN | Fort Saskatchewan WAGF | Wind | 300 | Aug-2020 (A) |
| Fortis | 255S Vulcan Faribault Farms P/V | Solar | 13 | Aug-2020 (A) |
| Fortis | Coaldale 254S DER Solar 3 | Solar | 22 | Aug-2020 (A) |

| | | | | |
|---------------------|---------------------------------|-------|-------|--------------|
| Fortis | Monarch 492S DER Solar | Solar | 22 | Aug-2020 (A) |
| Fortis | Stavely 349S DER Solar | Solar | 19 | Aug-2020 (A) |
| Suncor | Forty Mile WAGF | Wind | 200 | Sep-2020 (A) |
| Capital Power | Whitla Wind Power - Phase 2 | Wind | 97.2 | Sep-2020 (A) |
| Pattern Development | Lanfine South Wind | Wind | 140 | Sep-2020 (A) |
| BluEarth | Hand Hills Wind Phase 2 | Wind | 121.8 | Sep-2020 (A) |
| Algonquin | Willow Ridge Wind | Wind | 180 | Oct-2020 (A) |
| EDP Renewables | Blue Bridge Solar | Solar | 150 | Oct-2020 (A) |
| Joss Wind | Northern Lights | Wind | 400 | Nov-2020 (A) |
| TransAlta | Red Rock Wind | Wind | 65 | Nov-2020 (A) |
| TransAlta | Windrise MPC Wind | Wind | 220 | Nov-2020 (A) |
| TransAlta | Ardenville Expansion Wind | Wind | 40 | Nov-2020 (A) |
| Solar Krafte | Rainier | Solar | 450 | Nov-2020 (A) |
| NextEra | Red Deer Battery Energy Storage | Other | 40 | Dec-2020 (A) |
| NextEra | Ghost Pine Battery ES System | Other | 30 | Dec-2020 (A) |
| NextEra | Red Deer River Solar | Solar | 150 | Dec-2020 (A) |
| ENMAX | Taber Wind Farm | Wind | 21 | Dec-2020 (A) |
| Greengate | Lathom Solar | Solar | 120 | Dec-2020 (A) |
| Greengate | Travers Solar | Solar | 400 | Dec-2020 (A) |
| Suncor | Forty Mile Granlea Solar | Solar | 100 | Dec-2020 (A) |
| Enterprise | Bighorn MPC Wind | Wind | 325 | Dec-2020 (A) |
| Cascade | Combined Cycle Phase 2 | Gas | 500 | Jan-2021 (A) |
| E.ON | Grizzly Bear Wind Phase 2 | Wind | 30 | Mar-2021 (A) |
| Four Rivers | Four Rivers Wind | Wind | 450 | Mar-2021 (A) |

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|-------------------|-----------------------------|-------|---------------|--------------|
| Elemental Energy | WD MPC Wind | Wind | 150 | Jun-2021 (A) |
| RESC | Oyen Wind Power Project | Wind | 350 | Jun-2021 (A) |
| TransAlta | Tempest MPC Wind | Wind | 115 | Jun-2021 (A) |
| Suncor | Base Plant Cogen | Gas | 815 | Jul-2021 (A) |
| Kineticor | Peace River Power Upgrade | Gas | 125 | Sep-2021 (A) |
| Sequoia Energy | Oyen WAGF | Wind | 100 | Dec-2021 (A) |
| Cascade | Combined Cycle Phase 1 | Gas | 400 | Jan-2022 (A) |
| AHP Development | Amisk Hydroelectric Project | Hydro | 330 | Dec-2023 (C) |
| Total (MW) | | | 14,344 | |

* - (P):Power Plant application filed with AUC, (A): AESO application in process, (C): Corporate announcement

** - Denotes a project that was successful in the first Renewable Electricity Program competition. Companies successful in this round were awarded a Renewable Electricity Support Agreement and receive support through an Indexed Renewable Energy Credit in exchange for the project's renewable attributes.

Table 4: Generation Projects that have Announced to be Retired

| Sponsor(s) | Project Name | Fuel | Unit Capacity | Retire Date | Status |
|-------------------|--------------|------|---------------|-------------|---------|
| Transalta | Sundance 1 | Coal | 280 | Jan-2018 | Retired |
| Transalta | Sundance 2 | Coal | 280 | Jul-2018 | Retired |
| Total (MW) | | | 280 | | |

Federal Coal Compliance Schedule

In 2012, the federal government approved the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations*. The regulation requires that coal-fired generation units meet a GHG emissions intensity target once it reaches end of life. The AESO has adopted the federal compliance dates as retirement dates to evaluate metrics included in this report. The decision to retire a coal unit could also be impacted by several potential drivers, including the economics of plant operations, contractual agreements, and provincial and federal legislation.

The recent Climate Leadership Plan announced by the Alberta provincial government has not impacted assumptions on retirements in this report. Announcements from the government will continue to be assessed as they are released.

Table 5: Federal Coal Compliance Schedule

| Sponsor(s) | Project Name | Fuel | Unit Capacity | In Service Date | Federal Compliance Date ¹ |
|-------------------|----------------|------|---------------|-----------------|--------------------------------------|
| ATCO | Battle River 3 | Coal | 149 | 1969 | Dec-2019 |
| Maxim | HR Milner | Coal | 144 | 1972 | Dec-2019 |
| Total (MW) | | | 869 | | |

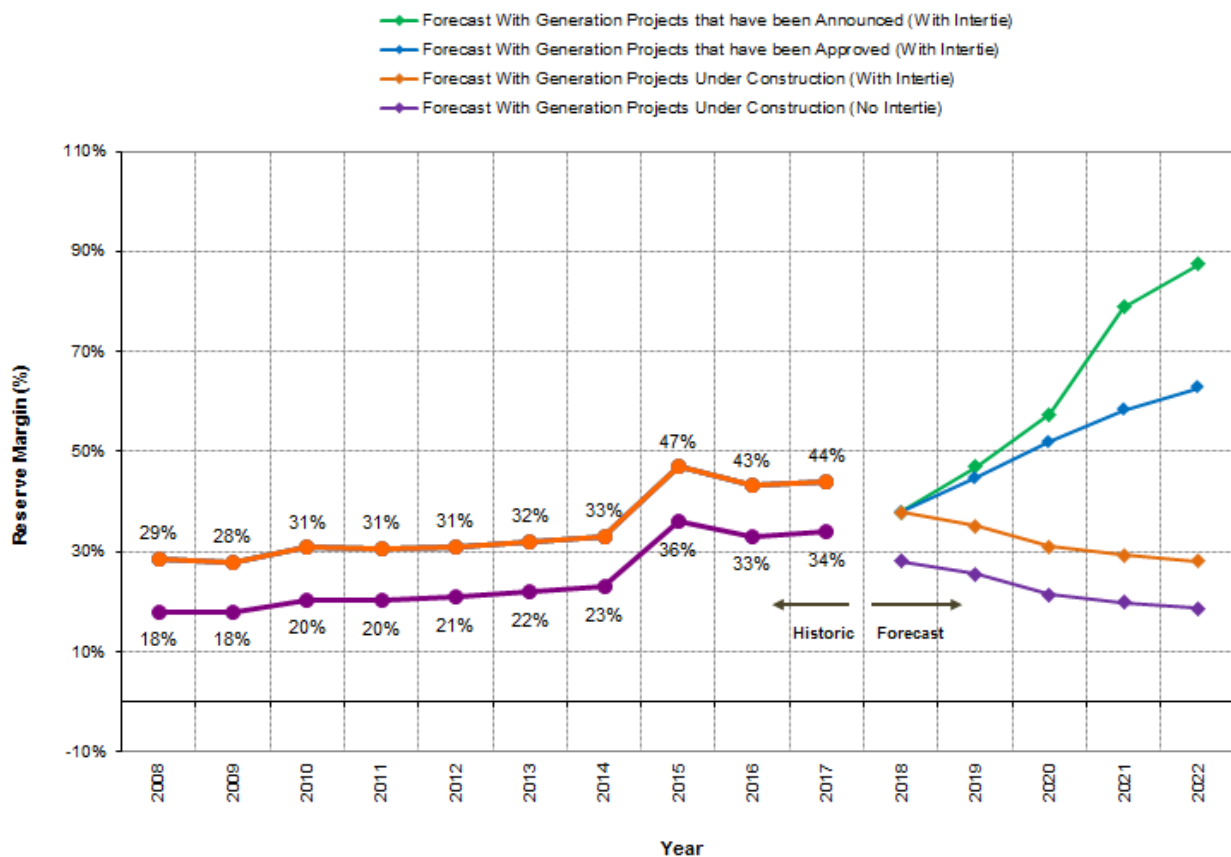
¹ Federal Compliance Dates are based upon the applicable provisions of the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, as set forth in the Canada Gazette Vol. 146, No.19.

Reserve Margin Metric

The Reserve Margin Metric, shown in Figure 1, presents a comparison of generation supply and demand in Alberta. It is a calculation of the firm generation capacity at the time of system peak that is in excess of the system annual peak demand, expressed as a percentage of the system peak. Information on the annual peak demand within the reserve margin can be found on the AESO's [Forecasting](#) web page. Firm generation is defined as installed and future generation capacity, adjusting for seasonal hydro capacity and behind-the-fence demand and generation, and excludes wind and solar capacity. Three forecast reserve margins are presented, each with different future supply additions. The supply additions correspond to the stage of the generation projects in the New Generation Projects and Retirements Metric. The metric is graphed with and without intertie capacity in one reserve margin since full import capability may not always be available at the time of system peak demand.

Capacity from Sundance 1 and 2 has been excluded from the 2011 and 2012 reserve margin. They returned to service in late 2013.

Figure 1: Alberta Interconnected Electric System (AIES) Reserve Margin, 2008 – 2022



Supply Cushion Metric

The Supply Cushion Metric provides visibility of the Alberta Interconnected Electric System’s ability to meet peak demand on a daily basis. The supply cushion is the difference between the daily available firm supply minus daily peak demand. Only existing generation and generation under construction are used within the metric. The supply cushion refines the reserve margin calculation by using daily system peak rather than annual and incorporates planned outages. Figure 2 presents the estimated daily supply cushion for the next two years. Figure 3 presents daily peak demand and firm supply by fuel type, as well as interties, wind and solar which are not included in the supply cushion calculation due to the intermittent or uncertain nature of the supply. When the supply cushion is negative in Figure 2, there is an increased level of reliance on interties and wind, as indicated in Figure 3.

Figure 2: Alberta Interconnected Electric System (AIES) Daily Supply Cushion, Aug 1, 2018 to Jul 31, 2020

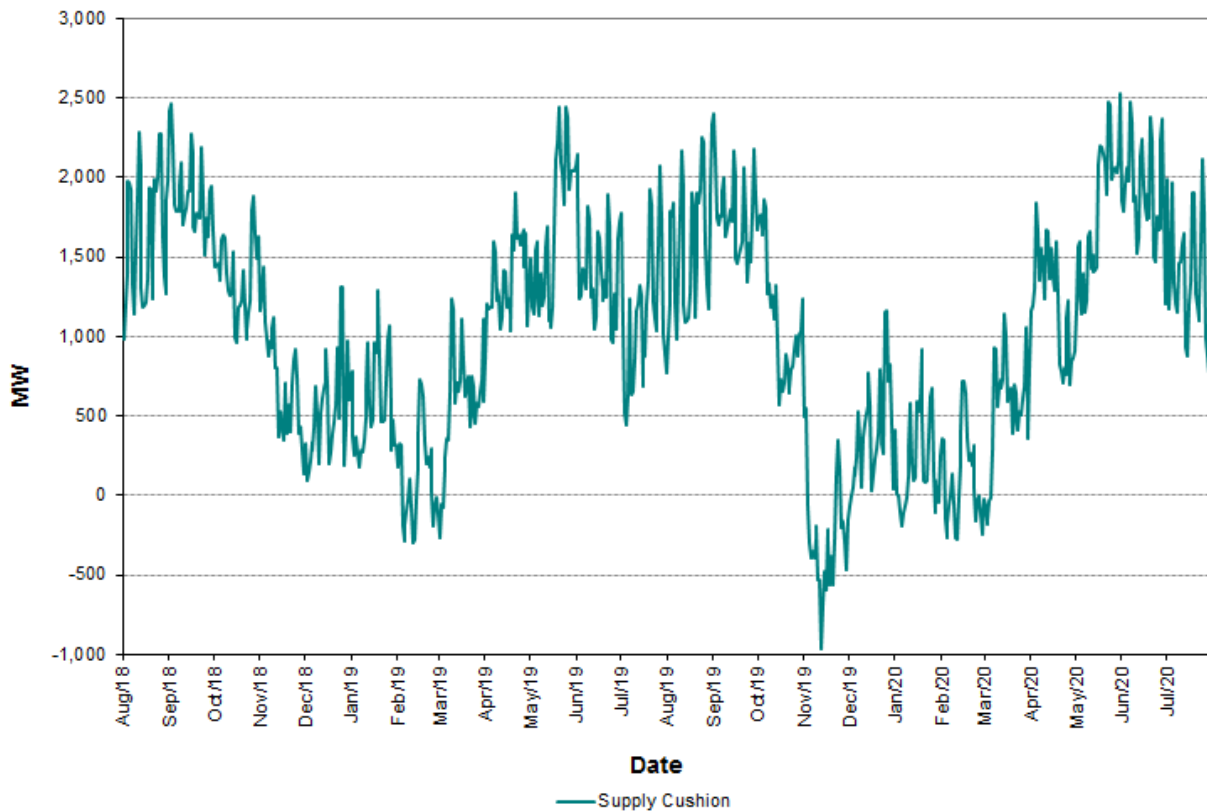
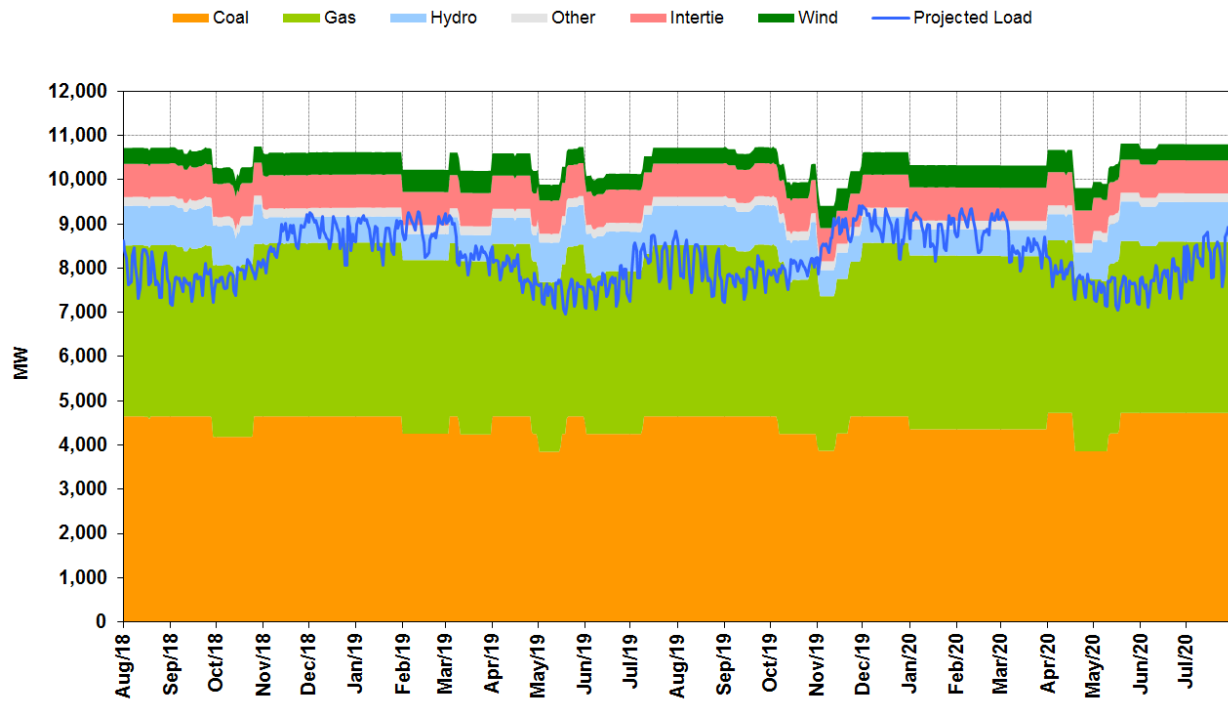


Figure 3: Alberta Interconnected Electric System (AIES) Daily Peak Demand and Available Supply, Aug 1, 2018 to Jul 31, 2020



Outage information as of Jul 20th, 2018

Two Year Probability of Supply Adequacy Shortfall Metric

The Two Year Probability of Supply Adequacy Shortfall Metric is a probabilistic assessment of encountering a supply shortfall over the next two years. It builds on the Supply Cushion Metric by incorporating the probability of wind production, forced generation outages and generation derates into the calculation of hourly firm supply. The calculation estimates, on a probabilistic basis, how much load may go without supply over the next two year period. Based on extensive consultation with stakeholders, when this unserved energy exceeds 1,600 MWh in any two year period (equivalent to one hour 800 MW shortfall in each of the two years), the AESO may take certain actions to bridge the temporary supply adequacy gap while maintaining investor confidence in the market. The total energy not served shown in Table 6 does not reach the threshold.

Table 6: Two Year Probability of Supply Adequacy Shortfall, Aug 1, 2018 to Jul 31, 2020

| Worst Shortfall Hour (MW) | # of Hours in Shortfall | Total Energy Not Served (MWh) |
|---------------------------|-------------------------|-------------------------------|
| 54 | 1 | 113 |

Note: Values are rounded and represent average outputs