

Long Term Adequacy Metrics

Feb 2019



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:

- Fortis Genalta Bellshill

Generation Projects moved to “Active Construction”:

- N/A

Generation projects moved to “Regulatory Approval”:

- Solar Krafte Wrentham Solar Project

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

- ATCO Monitor 774S DER Solar
- RESC Hilda MPC Wind
- Grand Prairie MPC Gas
- FortisAlberta Westfield 107S DER Solar
- Air Liquide Scotford Gas
- Kirkcaldy MPC Solar
- FortisAlberta Acheson 305S DER Solar
- FortisAlberta Red Deer 63S DER Solar
- ATCO Rainbow Lake Gas
- ATCO Fieldgate 824S DER Gas

Generation projects that have been removed:

- EDF EN Vulcan Solar PV
- Invenergy Schuler Windfarm
- Maxim Power HR Milner Expansion Gas
- Acciona Energy Glenwood Area Wind
- Fortis Carseland Solar
- Fortis Duchess DER Solar
- TransAlta Red Rock Wind
- Fortis Alberta Kaybob 3 Cogen
- NextEra Kitscoty MPC Wind

- NGCI Ermineskin Cree Nation MPC Solar
- NextEra Jensen MPC Wind
- ATCO Rainbow Lake Gas
- Altagas Kent Generation – Phase 1
- Seven Generations Gold Creek Gas Plant
- ATCO Kneehill

Other changes to generation projects:

Project	Change
Turning Point Gen – Canyon Creek PHES	New ISD of Aug-2021 from Jan-2020
FortisAlberta – Burdett 368S DG P/V	New ISD of Oct-2019 from Jun-2019
EDF EN – Red Rock WAGF	New ISD of Mar-2019 from May-2021
TransCanada – Scoria 318S Cogen	New ISD of Feb-2019 from Jan-2019
Altagas – Glenridge Wind	New ISD of Oct-2020 from Sep-2019
Fortis – Coaldale Cogen DER	New ISD of Apr-2019 from Nov-2019
Keyera – West Pembina 359S Gas Turbine	New ISD of Nov-2019 from May-2019
Pengrowth – Cold Lake Area Energy Centre	New ISD of Oct-2020 from Aug-2020
FortisAlberta – Bullshead 523S DER Solar 1	New ISD of Sep-2019 from Jul-2019
FortisAlberta – Bullshead 523S DER Solar 2	New ISD of Aug-2019 from Sep-2019
FortisAlberta – Brooks 121S DER Solar 1	New ISD of Dec-2019 from Dec-2019
GP JOULE – Kennedy Farm Solar	New ISD of Jun-2020 from Feb-2022
ACCEL – Morse River Cogen	New ISD of Jun-2020 from Sep-2020
Quill – Rocky Mountain Gas	New ISD of Sep-2020 from Oct-2020
PBC – Paul Band Solar	New ISD of Mar-2021 from Dec-2020
ATCO – Valleyview Gas	New ISD of Sep-2019 from Oct-2019
ATCO – Hanna Solar	New ISD of Mar-2021 from Nov-2020

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 125 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*
TransCanada	Scoria 318S Cogen	Gas	45	Feb-2019
Capital Power	Whitla Wind Power - Phase 1**	Wind	202	Sep-2019
Total (MW)			247	

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

** - 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 2: Generation Projects with Regulatory Approval

Sponsor(s)	Project Name	Fuel	Unit Capacity	ISD
FortisAlberta	Buffalo Atlee Cluster 1 WAGF**	Wind	18	Mar-2019
FortisAlberta	Blackfalds 198S Gas 1	Gas	6	Mar-2019
FortisAlberta	Buffalo Atlee Cluster 3 WAGF**	Wind	17	Mar-2019
FortisAlberta	Stirling 67S DG P/V	Solar	17	Mar-2019
Fortis	Coaldale Cogen DER	Gas	6	Apr-2019
FortisAlberta	Spring Coulee 385S Solar DG	Solar	29	Apr-2019
FortisAlberta	Warner 344S DER Solar	Solar	10	May-2019
BluEarth Renewables	Burdett DG PV	Solar	20	May-2019
FortisAlberta	498S Tilley DG PV	Solar	22	Jun-2019

FortisAlberta	895S Suffield DG PV	Solar	22	Jun-2019
FortisAlberta	275S Jenner Solar DER	Solar	23	Jun-2019
FortisAlberta	158S Vauxhall DG PV	Solar	16	Jun-2019
FortisAlberta	421S Hays DG PV	Solar	23	Jun-2019
Joss Wind	Jenner Wind**	Wind	122	Jun-2019
Enel	Castle Rock Ridge - Phase 2**	Wind	31	Jun-2019
FortisAlberta	Vauxhall Solar DER	Solar	22	Jun-2019
Naturener	Wild Rose 2	Wind	192	Jul-2019
Naturener	Wild Rose 1	Wind	218	Jul-2019
FortisAlberta	Jenner 275S DER	Gas	23	Jul-2019
Enbridge	WhiteTail Peaking	Gas	200	Jul-2019
FortisAlberta	Krafte 257S Hull DER Solar	Solar	25	Jul-2019
FortisAlberta	Enchant 447S DER Solar	Solar	74	Aug-2019
Suncor	Hand Hills	Wind	80	Sep-2019
ATCO	Three Hills 770S DER Solar 1	Solar	25	Sep-2019
Mustus Energy	Mustus Biomass	Biomass	41	Sep-2019
ATCO	Heartland Power Station 1	Gas	510	Nov-2019
Imperial Oil	Edmonton 95S Cogen	Gas	46.5	Nov-2019
Pteragen	Peace Butte	Wind	120	Dec-2019
Greengate Power	Wheatland Wind	Wind	120	Dec-2019
Inter Pipeline	Strathcona Cogeneration	Gas	101	Mar-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

EDP Renewables	Sharp Hills Wind**	Wind	300	Jun-2020
RESC	Forty Mile WAGF	Wind	400	Jun-2020
ENMAX	Zephyr Wind Farm	Wind	200	Aug-2020
NextEra	Heritage Wind	Wind	291	Sep-2020
BluEarth Renewables	Hand Hills Wind Farm	Wind	80	Sep-2020
Capital Power	Whitla Wind Power - Phase 2	Wind	97.2	Sep-2020
Alberta Wind Energy	Windy Point	Wind	50.4	Oct-2020
BowArk Energy	Queenstown Power Plant	Gas	80	Oct-2020
Maxim Power	Deerland Peaking 1-Phase 1	Gas	186	Dec-2020
Capital Power	Halkirk 2	Wind	150	Dec-2020
E.ON	Grizzly Bear	Wind	120	Dec-2020
Eolectric	Welsch Wind	Wind	69	Dec-2020
RESC	McLaughlin WAGF	Wind	47	Dec-2020
Turning Point Gen	Canyon Creek PHES	Other	75	Aug-2021
Kineticor	Peace River Power Generator	Gas	98	Sep-2021
Enmax	Calgary Energy Centre Peaking	Gas	150	Dec-2021
Capital Power	Genesee 4	Gas	525	Mar-2022
Capital Power	Genesee 5	Gas	525	Mar-2023
C&B Alberta Solar	Newell Solar Project	Solar	13	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
City of Calgary	Bonnybrook Cogen Expansion	Gas	10	TBD
Solar Krafte	Wrentham Solar Project	Solar	42	TBD
Syncrude	Mildred Lake (Base Plant)-Phase 1	Gas	85	TBD
NAT3	Jenner DG	Gas	20	TBD
BluEarth Renewables	Yellow Lake Solar Project	Solar	19	TBD
Total (MW)			8,705	

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
FortisAlberta	Willesdengreen DER Gas Turbine	Gas	10	Feb-2018 (A)
Chiniki	Solar	Solar	40	Feb-2018 (A)
FortisAlberta	Bassano DER Solar	Solar	10	Feb-2018 (A)
FortisAlberta	Wainwright DER Solar	Solar	13	Feb-2018 (A)
FortisAlberta	Provost DER Solar	Solar	16	Feb-2018 (A)
FortisAlberta	Killarney Lake DER Solar	Solar	16	Feb-2018 (A)
FortisAlberta	Hays 421S DER Solar	Solar	10	Feb-2018 (A)
EDF EN	Red Rock WAGF	Wind	250	Mar-2019 (A)
ATCO	Coronation 802S Solar DG	Solar	10	Mar-2019 (A)

ATCO	Vilna 777S DER Solar	Solar	22.7	Mar-2019 (A)
FortisAlberta	Coaldale 254S DG P/V	Solar	20	Mar-2019 (A)
FortisAlberta	Coaldale 254S DER Solar 2	Solar	20	Mar-2019 (A)
TransAlta	Cowley Ridge 1 Wind	Wind	21	Apr-2019 (A)
Joss Wind	Jenner Phase 2**	Wind	180	May-2019 (A)
FortisAlberta	Empress DER Solar	Solar	23	May-2019 (A)
FortisAlberta	Provost DER Solar	Solar	23	May-2019 (A)
FortisAlberta	Metiskow DER Solar	Solar	23	May-2019 (A)
FortisAlberta	Burdett DER Solar 1	Solar	8	May-2019 (A)
FortisAlberta	Burdett DER Solar 2	Solar	16	May-2019 (A)
FortisAlberta	Taber DER Solar 1	Solar	12	May-2019 (A)
FortisAlberta	Taber DER Solar 2	Solar	22	May-2019 (A)
FortisAlberta	Fincastle DER Solar	Solar	20	May-2019 (A)
FortisAlberta	Killarney DER Solar	Solar	22	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)
ATCO	Poplar Hill 790S Contract Change	Gas	32	Jun-2019 (A)
FortisAlberta	Namaka DER Solar	Solar	20	Jun-2019 (A)
FortisAlberta	Gleichen DG Solar	Solar	17	Jun-2019 (A)
Enel	Riverview Wind Farm**	Wind	115	Jun-2019 (A)
Irma	Wainwright Wind Project	Wind	90	Jul-2019 (A)

Greengate Power	Paintearth Wind Farm	Wind	150	Jul-2019 (A)
Imperial Oil	Aspen SAGD Project	Cogen	30	Jul-2019 (A)
FortisAlberta	Blackfalds 198S Gas 2	Cogen	4	Jul-2019 (A)
FortisAlberta	Conrad DER Solar	Solar	23	Jul-2019 (A)
ATCO	Fieldgate 824S DER Gas	Gas	15	Jul-2019 (A)
Renewable Energy	Rattlesnake Wind	Wind	100	Jul-2019 (A)
FortisAlberta	Brooks DER Solar	Solar	22	Aug-2019 (A)
FortisAlberta	Bullshead 523S DER Solar 2	Solar	20	Aug-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	Valleyview Gas	Gas	32	Sep-2019 (A)
FortisAlberta	Bullshead 523S DER Solar 1	Solar	20	Sep-2019 (A)
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)
Maxim Power	Milner Change	Gas	196	Oct-2019 (A)
FortisAlberta	West Brooks DER Solar	Solar	23	Oct-2019 (A)
RealPart	Calgary Area Solar	Solar	150	Oct-2019 (A)
FortisAlberta	Burdett 368S DG P/V	Solar	10	Oct-2019 (A)

Alberta Wind Energy	Old Elm & Pothole Creek	Wind	60	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)
FortisAlberta	GP Joule Canada Cluny DG	Solar	5	Oct-2019 (A)
Keyera	West Pembina 359S Gas Turbine	Gas	12	Nov-2019 (A)
FortisAlberta	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)
FortisAlberta	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)
FortisAlberta	Brooks 121S DER Solar 1	Solar	15	Dec-2019 (A)
NextEra	Buffalo Trail Solar	Solar	70	Dec-2019 (A)
Greengate Power	Stirling Wind	Wind	115	Dec-2019 (A)
Sequoia Energy	Schuler WAGF	Wind	100	Dec-2019 (A)
Northland	Buffalo Trail	Wind	100	Dec-2019 (A)
FortisAlberta	Brooks 121S DER Solar 2	Solar	15	Dec-2019 (A)
Air Liquide	Scotford Gas	Other	10	Jan-2020 (A)
Soventix	Forestberg Area Solar	Solar	40	Jan-2020 (A)
TransAlta	Garden Plain Wind	Wind	130	Feb-2020 (A)

HEP Capital	Alderson Solar	Solar	100	Apr-2020 (A)
Solar Krafte	Vauxhall	Solar	150	Apr-2020 (A)
Solar Krafte	Brooks	Solar	400	Apr-2020 (A)
ATCO	Rainbow Lake Gas	Gas	55	Apr-2020 (A)
BowArk Energy	Lanfine WAGF	Wind	145	May-2020 (A)
ATCO	Monitor 774S DER Solar	Solar	30	May-2020 (A)
Suncor	Forty Mile Granlea WAGF	Wind	200	Jun-2020 (A)
TransCanada	Saddlebrook Solar	Solar	100	Jun-2020 (A)
GP JOULE	Kennedy Farm Solar	Solar	100	Jun-2020 (A)
FortisAlberta	Westfield 107S DER Solar	Solar	19	Jun-2020 (A)
FortisAlberta	Acheson 305S DER Solar	Solar	10	Jun-2020 (A)
ACCEL	Morse River Cogen	Cogen	107	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)
Archer	Piikani Solar	Solar	40	Jun-2020 (A)
EDF EN	Fort Saskatchewan WAGF	Wind	300	Aug-2020 (A)
FortisAlberta	255S Vulcan Faribault Farms P/V	Solar	13	Aug-2020 (A)
FortisAlberta	Coaldale 254S DER Solar 3	Solar	22	Aug-2020 (A)
FortisAlberta	Monarch 492S DER Solar	Solar	22	Aug-2020 (A)
FortisAlberta	Stavelly 349S DER Solar	Solar	19	Aug-2020 (A)
Suncor	Forty Mile WAGF	Wind	200	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)

Quill	Rocky Mountain Gas	Gas	295	Sep-2020 (A)
Altagas	Glenridge Wind	Wind	150	Oct-2020 (A)
Pengrowth	Cold Lake Area Energy Centre	Cogen	100	Oct-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)
Northland	Bow City MPC Solar	Solar	400	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)
Enterprise	Bighorn MPC Wind	Wind	325	Dec-2020 (A)
TransAlta	Tempest MPC Wind	Wind	115	Dec-2020 (A)
FortisAlberta	Red Deer 63S DER Solar	Solar	20	Dec-2020 (A)
Cascade	Combined Cycle Phase 1	Gas	500	Jan-2021 (A)
PBC	Paul Band Solar	Solar	45	Mar-2021 (A)
ATCO	Hanna Solar	Solar	120	Mar-2021 (A)
Kirkcaldy	MPC Solar	Solar	65	Mar-2021 (A)
E.ON	Grizzly Bear Wind Phase 2	Wind	30	Mar-2021 (A)

Four Rivers	Four Rivers Wind	Wind	450	Mar-2021 (A)
EDF	Cypress Wind**	Wind	450	Jun-2021 (A)
EDF	Bull Trail MPC Wind	Wind	300	Jun-2021 (A)
Indigena Blood	Pe-na-koam Wind	Wind	200	Jun-2021 (A)
RESC	Oyen Wind Power Project	Wind	350	Jun-2021 (A)
RESC	Hilda MPC Wind	Wind	240	Jun-2021 (A)
Suncor	Base Plant Cogen	Cogen	815	Jul-2021 (A)
Kineticor	Peace River Power Upgrade	Gas	125	Sep-2021 (A)
Grand Prairie	MPC Gas	Gas	300	Oct-2021 (A)
Enerfin	Winnifred MPC Wind	Wind	90	Dec-2021 (A)
Sequoia Energy	Oyen WAGF	Wind	100	Dec-2021 (A)
Elemental Energy	WD MPC Wind	Wind	150	Dec-2021 (A)
Chephren Power	Gas	Gas	600	Dec-2021 (A)
Cascade	Combined Cycle Phase 2	Gas	400	Jan-2022 (A)
AHP Development	Amisk Hydroelectric Project	Hydro	330	Dec-2023 (P)
Total (MW)			16,016	

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

Table 4: Generation Projects that have Announced to be Retired

Sponsor(s)	Project Name	Fuel	Unit Capacity	Retire Date	Status
N/A	N/A	N/A	N/A	N/A	N/A
Total (MW)					

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)			293		

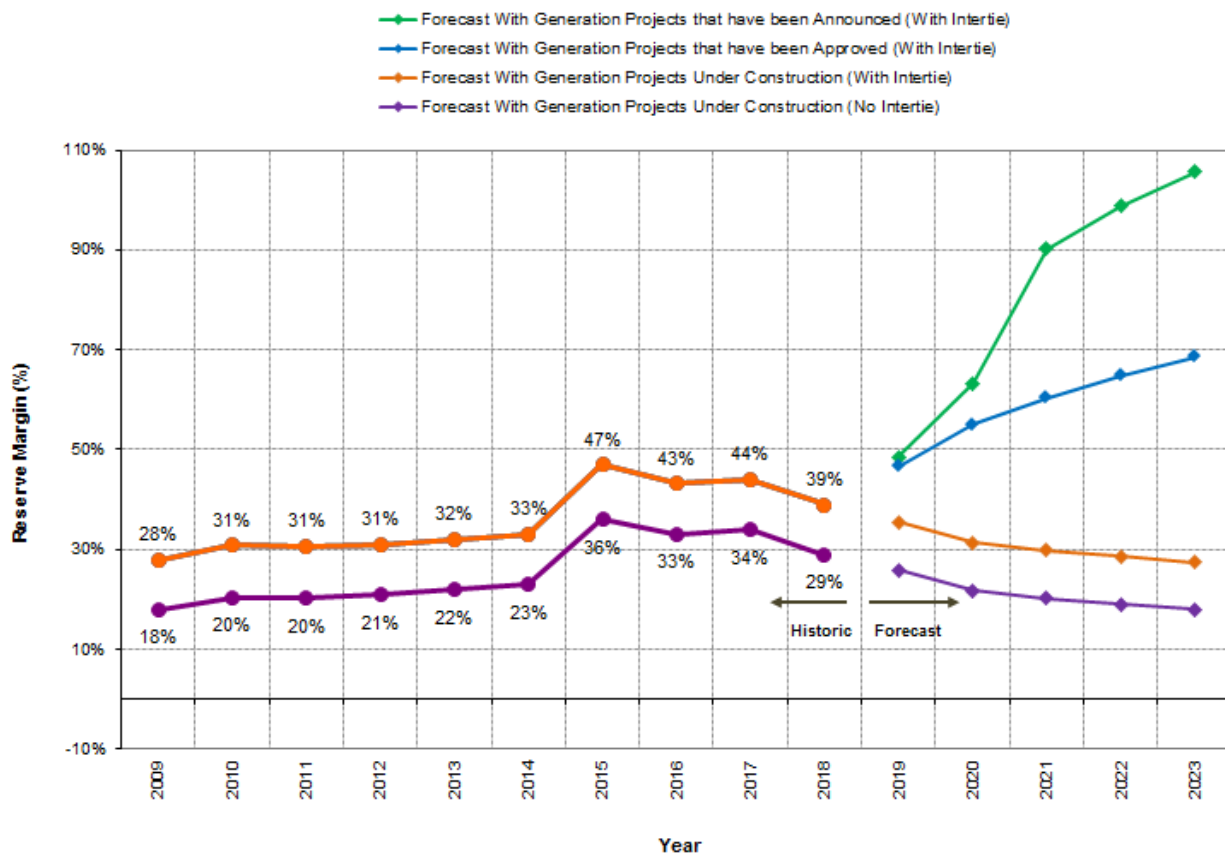
¹ Federal Compliance Dates are based upon the applicable provisions of the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, as set forth in the Canada Gazette Vol. 146, No.19.

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, 2009 – 2023



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, Feb 1, 2019 to Jan 31, 2021

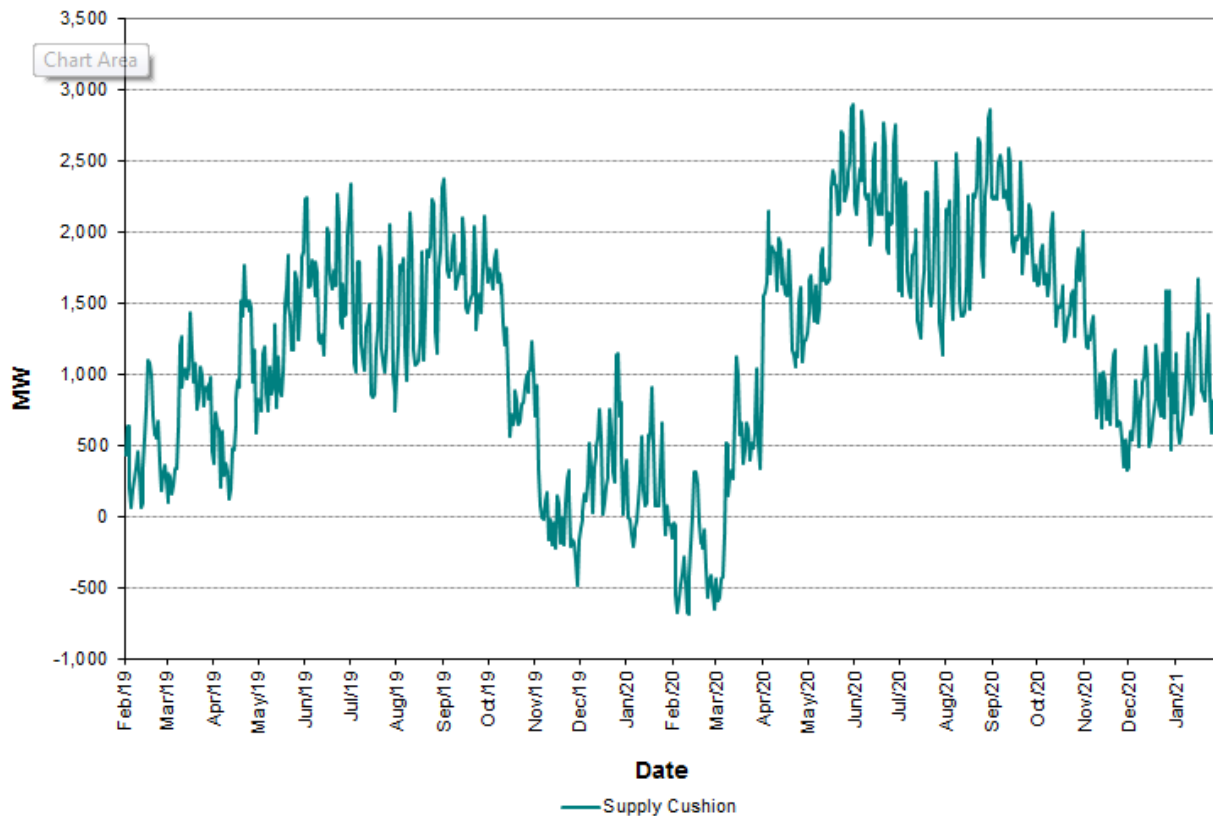
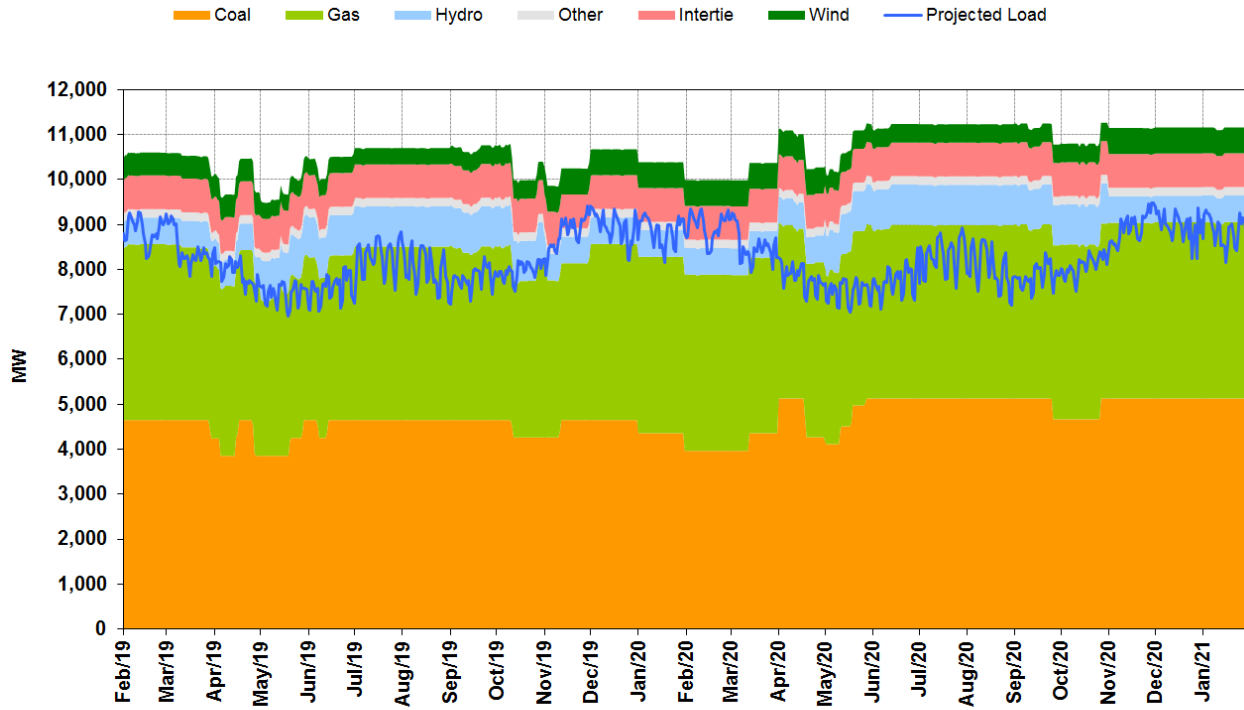


Figure 3: Alberta Interconnected Electric System (AIES) Daily Peak Demand and Available Supply, Feb 1, 2019 to Jan 31, 2021



Outage information as of Jan 28th, 2019

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, Feb 1, 2019 to Jan 31, 2021

Worst Shortfall Hour (MW)	# of Hours in Shortfall	Total Energy Not Served (MWh)
52	1	125

Note: Values are rounded and represent average outputs