

Long Term Adequacy Metrics August 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:

- FortisAlberta Blackfalds 198S DER Gas
- ATCO Mowat DER Gas

Generation Projects moved to “Active Construction”:

- Enel Alberta Castle Rock Wind Farm – phase 2
- Enel Alberta Riverview Wind Farm
- Fengate Strathcona Cogeneration
- Fortis 421S Hays DG PV
- Fortis Krafte 257S Hull DER Solar

Generation projects moved to “Regulatory Approval”:

- Fortis Stavely 349S DER Solar
- FortisAlberta 368S Burdett DER Solar
- Fortis Burdett 368S DG P/V
- Greengate Power Stirling WAGF
- Suncor Forty Mile Maleb WAGF
- Suncor Forty Mile Granlea WAGF
- FortisAlberta Coaldale 254S DER Solar 3
- FortisAlberta Brooks DER Solar

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

- Suncor Meadow Creek Cogen
- ATCO Rycroft 730S Battery DER
- FortisAlberta Chappice Lake 649S DER Solar
- ENGIE Duchess Solar
- CMH AI Rothbauer 321S Contract Change
- ENMAX Crossfield CRS3 Battery Storage
- FortisAlberta Ponoka 331S DER Solar
- ENGIE Buffalo Trail North MPC Wind

- Jenner Wind Phase 3
- Pembina Empress Cogen
- RESC Enterprise MPC Solar
- RESC Forty Mile MPC Wind
- CMH Unit 17 Gas
- ATCO Sarah Lake 743S DER Geothermal
- Prospect Valhalla MPC Gas

Generation projects that have been removed:

- RESC McLaughlin Phase 2 BTF
- Suncor Schuler WAGF
- Suncor Schuler Solar
- Suncor Braconnier Wind
- Suncor Huxley Wind
- EDF EN Fort Saskatchewan WAGF
- EDF EN Hand Hills WAGF
- FortisAlberta 158S Vauxhall DG PV
- FortisAlberta Warner 344S DER Solar
- Perimeter Sunset Solar
- FortisAlberta West Brooks DER Solar
- FortisAlberta Empress DER Solar
- FortisAlberta Provost DER Solar
- FortisAlberta Metiskow DER Solar
- FortisAlberta Burdett DER Solar 1
- FortisAlberta Burdett DER Solar 2
- FortisAlberta Taber DER Solar 1
- FortisAlberta Taber DER Solar 2
- FortisAlberta Fincastle DER Solar
- FortisAlberta Killarney DER Solar
- BluEarth Hand Hills Wind Phase 2
- FortisAlberta Empress 394S DER Solar
- TransCanada Saddlebrook Solar
- FortisAlberta Namaka 428S DER Solar

Other changes to generation projects:

Project	Change
Enel – Castle Rock Ridge - Phase 2**	New ISD of Sep-2019 from Jun-2019
Enel – Riverview Wind Farm**	New ISD of Sep-2019 from Jun-2019
FortisAlberta – Vauxhall Solar DER	New ISD of Nov-2019 from Sep-2019
Shell Canada Limited – Air Liquide Canada Scotford ALS1 Change	New ISD of Nov-2019 from Sep-2019
FortisAlberta – Stirling 67S DG P/V	New ISD of Nov-2019 from Mar-2019
FortisAlberta – 895S Suffield DG PV	New ISD of Feb-2020 from Oct-2019
FortisAlberta – 421S Hays DG PV	New ISD of Mar-2020 from Oct-2019
ATCO – Michichi DER Solar	New ISD of May-2020 from May-2019
Enbridge – South Terminal Gas	New ISD of Jun-2020 from Mar-2020
FortisAlberta – Namaka DER Solar	New ISD of Jun-2020 from Jun-2019
FortisAlberta – Gleichen DG Solar	New ISD of Jun-2020 from Jun-2019
FortisAlberta – Spring Coulee 385S Solar DG	New ISD of Jun-2020 from Aug-2019
ATCO – Poplar Hill 790S Gas Change	New ISD of Jul-2020 from Jun-2019
ATCO – Valleyview Gas	New ISD of Jul-2020 from Sep-2019
PBC – Paul Band Solar	New ISD of Jul-2020 from Mar-2021
Joss Wind – Jenner WAGF - Phase 2	New ISD of Aug-2020 from May-2019
Joss Wind – Jenner WAGF	New ISD of Aug-2020 from Jun-2019
FortisAlberta – Buffalo Atlee Cluster 1 WAGF	New ISD of Sep-2020 from Dec-2020
FortisAlberta – Buffalo Atlee Cluster 3 WAGF	New ISD of Sep-2020 from Dec-2020
FortisAlberta – Buffalo Atlee Cluster 2	New ISD of Sep-2020 from Dec-2020
ATCO – Coronation 773S Solar DG	New ISD of Sep-2020 from Mar-2019

ATCO – Three Hills 770S DER Solar 1	New ISD of Sep-2020 from Sep-2019
ATCO – Three Hills 770S DER Solar 2	New ISD of Sep-2020 from Sep-2019
ATCO – Michichi Creek 802S DER Solar	New ISD of Sep-2020 from Sep-2019
FortisAlberta – 498S Tilley DG PV	New ISD of Oct-2020 from Jun-2019
FortisAlberta – Strathmore 151S DER Solar 1	New ISD of Nov-2020 from Nov-2019
FortisAlberta – Strathmore 151S DER Solar 2	New ISD of Nov-2020 from Nov-2019
EDP Renewables – Sharp Hills Wind**	New ISD of Nov-2020 from Jun-2020
GP JOULE – Kennedy Farm Solar	New ISD of Nov-2020 from Jun-2020
Greengate Power – Stirling WAGF	New ISD of Nov-2020 from Dec-2019
FortisAlberta – Brooks DER Solar	New ISD of Nov-2020 from Aug-2019
RESC – McLaughlin WAGF	New ISD of Nov-2020 from Dec-2020
FortisAlberta – Jenner 275S DER	New ISD of Feb-2021 from Jul-2019
Solar Krafte – Vauxhall	New ISD of Jun-2021 from Apr-2020
Solar Krafte – Brooks	New ISD of Jun-2021 from Apr-2020
FortisAlberta – Tilley 498S DG Gas	New ISD of Jul-2021 from Nov-2019
Sequoia Energy – Schuler WAGF (MPC)	New ISD of Dec-2022 from Dec-2019
ATCO – Heartland Generating Station	New ISD of TBD from Sep-2020
BluEarth Renewables – Hand Hills Wind Project	New ISD of TBD from Nov-2019

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 167 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*
FortisAlberta	Coaldale 254S DER Cogen	Cogen	6	Aug-2019
Capital Power	Whitla Wind Power - Phase 1**	Wind	202	Sep-2019
Enel	Castle Rock Ridge - Phase 2**	Wind	29.5	Sep-2019
Enel	Riverview Wind Farm**	Wind	115	Sep-2019
FortisAlberta	Krafte 257S Hull DER Solar	Solar	25	Oct-2019
FortisAlberta	Vauxhall Solar DER	Solar	22	Nov-2019
Imperial Oil	Edmonton 95S Cogen	Cogen	43	Nov-2019
FortisAlberta	895S Suffield DG PV	Solar	22	Feb-2020
Inter Pipeline	Strathcona Cogeneration	Cogen	96	Mar-2020
FortisAlberta	421S Hays DG PV	Solar	24	Mar-2020
Total (MW)			584.5	

*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
Naturener	Wild Rose 1	Wind	192	Jul-2019
Naturener	Wild Rose 2	Wind	218	Jul-2019
Suncor	Hand Hills Wind Energy Project	Wind	80	Sep-2019
Enbridge	WhiteTail Peaking	Gas	200	Oct-2019
FortisAlberta	Enchant 447S DER Solar	Solar	74	Oct-2019
FortisAlberta	Burdett 368S DG P/V	Solar	10	Oct-2019
Alberta Wind Energy	Old Elm & Pothole Creek	Wind	60	Oct-2019
FortisAlberta	Stirling 67S DG P/V	Solar	17	Nov-2019
EPCOR	WSI DG Solar	Solar	12	Nov-2019
Pteragen	Peace Butte	Wind	120	Dec-2019
Greengate Power	Wheatland WAGF	Wind	120	Dec-2019
Suncor	Forty Mile Granlea WAGF	Wind	200	Jun-2020
FortisAlberta	Spring Coulee 385S Solar DG	Solar	29	Jun-2020
Perimeter	Claresholm Solar	Solar	150	Jun-2020
ATCO	Poplar Hill 790S Gas Change	Gas	32	Jul-2020
FortisAlberta	255S Vulcan Faribault Farms P/V	Solar	13	Aug-2020
FortisAlberta	Coaldale 254S DER Solar 3	Solar	22	Aug-2020
FortisAlberta	Stavelly 349S DER Solar	Solar	19	Aug-2020
Joss Wind	Jenner WAGF	Wind	122	Aug-2020
NextEra	Heritage Wind	Wind	291	Sep-2020
Suncor	Forty Mile Maleb WAGF	Wind	200	Sep-2020
Capital Power	Whitla Wind Power - Phase 2	Wind	97.2	Sep-2020

FortisAlberta	Buffalo Atlee Cluster 1 WAGF	Wind	18	Sep-2020
FortisAlberta	Buffalo Atlee Cluster 3 WAGF	Wind	17	Sep-2020
Alberta Wind Energy	Windy Point WAGF	Wind	50.4	Oct-2020
BowArk Energy	Queenstown Power Plant	Gas	80	Oct-2020
FortisAlberta	498S Tilley DG PV	Solar	22	Oct-2020
FortisAlberta	275S Jenner Solar DER	Solar	23	Nov-2020
EDP Renewables	Sharp Hills Wind**	Wind	300	Nov-2020
Greengate Power	Stirling WAGF	Wind	115	Nov-2020
FortisAlberta	Brooks DER Solar	Solar	22	Nov-2020
RESC	McLaughlin WAGF	Wind	47	Nov-2020
Maxim Power	Deerland Peaking	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
FortisAlberta	Jenner 275S DER	Gas	23	Feb-2021
FortisAlberta	368S Burdett DER Solar	Solar	20	Apr-2021
Three Creeks	Three Creeks Unit 1	Gas	230	Jun-2021
Three Creeks	Three Creeks Unit 2	Gas	230	Jun-2021
Three Creeks	Three Creeks Unit 3	Gas	230	Jun-2021
Suncor	Base Plant Cogen	Cogen	815	Jul-2021
Turning Point Gen	Canyon Creek PHES Storage	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
Imperial Oil	Kearl - Phase 2	Cogen	100	TBD
PetroChina	Mackay-Phase 1	Cogen	85	TBD
Nexen	Long Lake South	Cogen	85	TBD
Imperial Oil	Kearl - Phase 3	Cogen	35	TBD
City of Calgary	Bonnybrook Cogen Expansion	Cogen	10	TBD
Kronos Solar	Oyen Solar Park	Solar	10	TBD
Solar Krafte	Wrentham Solar Project	Solar	42	TBD
Enmax	Bonnybrook	Gas	168	TBD
Maxim Power	Milner 2 Phase 1	Gas	260	TBD
Maxim Power	Milner 2 Phase 2	Gas	260	TBD
TransCanada	Saddlebrook	Gas	350	TBD
TransAlta	Sundance 7	Gas	850	TBD
Syncrude	Mildred Lake (Base Plant)-Phase 1	Cogen	85	TBD
NAT3	Jenner DG	Gas	20	TBD
BluEarth Renewables	Yellow Lake Solar Project	Solar	19	TBD
ATCO	Heartland Generating Station	Gas	510	TBD
BluEarth Renewables	Hand Hills Wind Project	Wind	80	TBD
Total (MW)			9518.6	

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
Irma	Irma Wind Power	Wind	90	Jul-2019 (A)

Greengate Power	Paintearth Wind Farm	Wind	150	Jul-2019 (A)
FortisAlberta	Conrad DER Solar 1	Solar	23	Jul-2019 (A)
FortisAlberta	Willesdengreen DER Gas Turbine	Gas	10	Sep-2019 (A)
ATCO	Fieldgate 824S DER Gas	Gas	18	Sep-2019 (A)
Mustus Energy	Mustus Energy Biomass	Biomass	41	Sep-2019 (A)
Enterprise	Prosperity WAGF	Wind	175	Sep-2019 (A)
Maxim Power	Milner Gas	Gas	196	Oct-2019 (A)
RealPart	Calgary Area Solar	Solar	150	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	Innisfail 214S DER Solar	Solar	24	Nov-2019 (A)
Shell Canada Limited	Air Liquide Canada Scotford ALS1 Change	Gas	10	Nov-2019 (A)
FortisAlberta	Conrad DER Solar 2	Solar	22	Nov-2019 (A)
Spirit Pine	Lone Pine WAGF	Wind	173	Dec-2019 (A)
NextEra	Buffalo Trail Solar	Solar	70	Dec-2019 (A)
Northland	Buffalo Trail	Wind	100	Dec-2019 (A)
TransAlta	Cowley Ridge 1 Wind	Wind	21	Dec-2019 (A)
FortisAlberta	Bassano DER Solar	Solar	10	Dec-2019 (A)
ATCO	Sarah Lake 743S DER Geothermal	Gas	21	Dec-2019 (A)
Soventix	Forestburg Area Solar	Solar	40	Jan-2020 (A)
Medicine Hat	CMH AI Rothbauer 321S Contract Change	Gas	44	Jan-2020 (A)
FortisAlberta	Ponoka 331S DER Solar	Solar	5	Mar-2020 (A)
HEP Capital	Alderson Solar	Solar	100	Apr-2020 (A)
ATCO	Rainbow Lake Gas	Gas	55	Apr-2020 (A)

ENMAX	Crossfield CRS3 Battery Storage	Battery	0	Apr-2020 (A)
BowArk Energy	Lanfine North Wind WAGF	Wind	145	May-2020 (A)
ATCO	Michichi DER Solar	Solar	75	May-2020 (A)
FortisAlberta	Taber 83S DER Solar	Solar	16	May-2020 (A)
FortisAlberta	Taber 83S DER Solar	Solar	19	May-2020 (A)
ATCO	Monitor 2 774S DER Solar	Solar	30	May-2020 (A)
ATCO	Monitor 1 774S DER Solar	Solar	10	May-2020 (A)
FortisAlberta	Westfield 107S DER Solar	Solar	19	Jun-2020 (A)
FortisAlberta	Acheson 305S DER Solar	Solar	10	Jun-2020 (A)
Enbridge	South Terminal Gas	Other	20	Jun-2020 (A)
TransAlta	Garden Plain Wind	Wind	130	Jun-2020 (A)
FortisAlberta	Namaka DER Solar	Solar	20	Jun-2020 (A)
FortisAlberta	Gleichen DG Solar	Solar	17	Jun-2020 (A)
TransAlta	Summerview 2 Battery Storage	Battery	10	Jun-2020 (A)
Archer	Piikani Solar	Solar	40	Jun-2020 (A)
PBC	Paul Band Solar	Solar	45	Jul-2020 (A)
ATCO	Valleyview Gas	Gas	32	Jul-2020 (A)
ATCO	Rycroft 730S Battery DER	Battery	20	Jul-2020 (A)
ATCO	Mercer Hill 728S DER Gas	Gas	0	Jul-2020 (A)
FortisAlberta	198S Blackfalds DER Gas Phase 2	Gas	4	Jul-2020 (A)
FortisAlberta	Monarch 492S DER Solar	Solar	22	Aug-2020 (A)
Joss Wind	Jenner WAGF - Phase 2	Wind	180	Aug-2020 (A)
Joss Wind	Jenner Wind Phase 3	Wind	106	Aug-2020 (A)
Quill	Rocky Mountain Gas	Gas	295	Sep-2020 (A)

FortisAlberta	Buffalo Atlee Cluster 2	Wind	14	Sep-2020 (A)
ENGIE	Duchess Solar	Solar	90	Sep-2020 (A)
ATCO	Coronation 773S Solar DG	Solar	10	Sep-2020 (A)
ATCO	Three Hills 770S DER Solar 1	Solar	25	Sep-2020 (A)
ATCO	Three Hills 770S DER Solar 2	Solar	25	Sep-2020 (A)
ATCO	Michichi Creek 802S DER Solar	Solar	25	Sep-2020 (A)
BowArk Energy	Drywood Gas Generator	Gas	38	Oct-2020 (A)
Altagas	Glenridge Wind	Wind	150	Oct-2020 (A)
Pengrowth	Cold Lake Area Energy Centre	Cogen	100	Oct-2020 (A)
EDP Renewables	Blue Bridge Solar	Solar	150	Oct-2020 (A)
Joss Wind	Northern Lights	Wind	400	Nov-2020 (A)
TransAlta	Windrise MPC Wind	Wind	220	Nov-2020 (A)
Northland	Bow City MPC Solar	Solar	400	Nov-2020 (A)
Solar Krafte	Rainier	Solar	450	Nov-2020 (A)
FortisAlberta	Strathmore 151S DER Solar 1	Solar	18	Nov-2020 (A)
FortisAlberta	Strathmore 151S DER Solar 2	Solar	22.5	Nov-2020 (A)
GP JOULE	Kennedy Farm Solar	Solar	100	Nov-2020 (A)
Chiniki	Chiniki Solar	Solar	40	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)

TransAlta	Tempest MPC Wind	Wind	115	Dec-2020 (A)
ACCEL	Morse River Cogen	Cogen	107	Dec-2020 (A)
FortisAlberta	Brooks 121S DER Solar 1	Solar	14	Dec-2020 (A)
FortisAlberta	Brooks 121S DER Solar 2	Solar	12.5	Dec-2020 (A)
FortisAlberta	Red Deer 63S DER Solar	Solar	20	Dec-2020 (A)
Cascade	Combined Cycle Phase 1	Gas	450	Jan-2021 (A)
FortisAlberta	Fieldgate 824S DER Gas	Solar	6	Mar-2021 (A)
E.ON	Grizzly Bear Wind Phase 2	Wind	30	Mar-2021 (A)
Imperial Oil	Aspen SAGD Project	Cogen	30	Mar-2021 (A)
Four Rivers	Four Rivers Wind	Wind	450	Mar-2021 (A)
FortisAlberta	Chappice Lake 649S DER Solar	Solar	15	Apr-2021 (A)
EDF	Cypress Wind	Wind	450	Jun-2021 (A)
EDF	Bull Trail MPC Wind	Wind	300	Jun-2021 (A)
FortisAlberta	Bassano 435S DER Solar	Solar	11	Jun-2021 (A)
Indigena Blood	Pe-na-koam Wind	Wind	200	Jun-2021 (A)
Solar Krafte	Vauxhall	Solar	150	Jun-2021 (A)
Solar Krafte	Brooks	Solar	400	Jun-2021 (A)
FortisAlberta	Tilley 498S DG Gas	Gas	22	Jul-2021 (A)
ENGIE	Buffalo Trail North MPC Wind	Wind	200	Jul-2021 (A)
RESC	Rattlesnake Ridge MPC Wind	Wind	150	Jul-2021 (A)
Medicine Hat	CMH Unit 17 Gas	Gas	44	Jul-2021 (A)
CKPC	CKPC Petrochemical Facility	Cogen	30	Jul-2021 (A)
Prospect	Valhalla MPC Gas	Gas	94	Aug-2021 (A)
RESC	Enterprise MPC Solar	Solar	80	Aug-2021 (A)

RESC	Forty Mile MPC Wind	Wind	400	Aug-2021 (A)
Kineticor	Peace River Power Upgrade	Gas	125	Sep-2021 (A)
Grand Prairie	Grand Prairie MPC Gas	Gas	360	Oct-2021 (A)
Pembina	Empress Cogen	Cogen	46	Oct-2021 (A)
Enerfin	Winnifred MPC Wind	Wind	90	Dec-2021 (A)
Sequoia Energy	Oyen MPC Wind	Wind	100	Dec-2021 (A)
Chephren Power	Gas	Gas	600	Dec-2021 (A)
ENGIE	Buffalo Trail MPC Wind	Wind	400	Dec-2021 (A)
Cascade	Combined Cycle Phase 2	Gas	450	Jan-2022 (A)
Suncor	Meadow Creek Cogen	Cogen	126	Jul-2022 (A)
NaturEner	Buffalo Trail WAGF	Wind	100	Jul-2022 (A)
NaturEner	Ross Creek WAGF	Wind	100	Jul-2022 (A)
Pattern Development	Lanfine South Wind	Wind	140	Sep-2022 (A)
Sequoia Energy	Schuler WAGF (MPC)	Wind	100	Dec-2022 (A)
AHP Development	Amisk Hydroelectric Project	Hydro	330	Dec-2023 (P)
Total (MW)			12,716	

* - (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
MFC Energy Corp	High River	Gas	16	2019-05-01	Retired
Total (MW)			16		

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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.

Long Term Adequacy Metrics

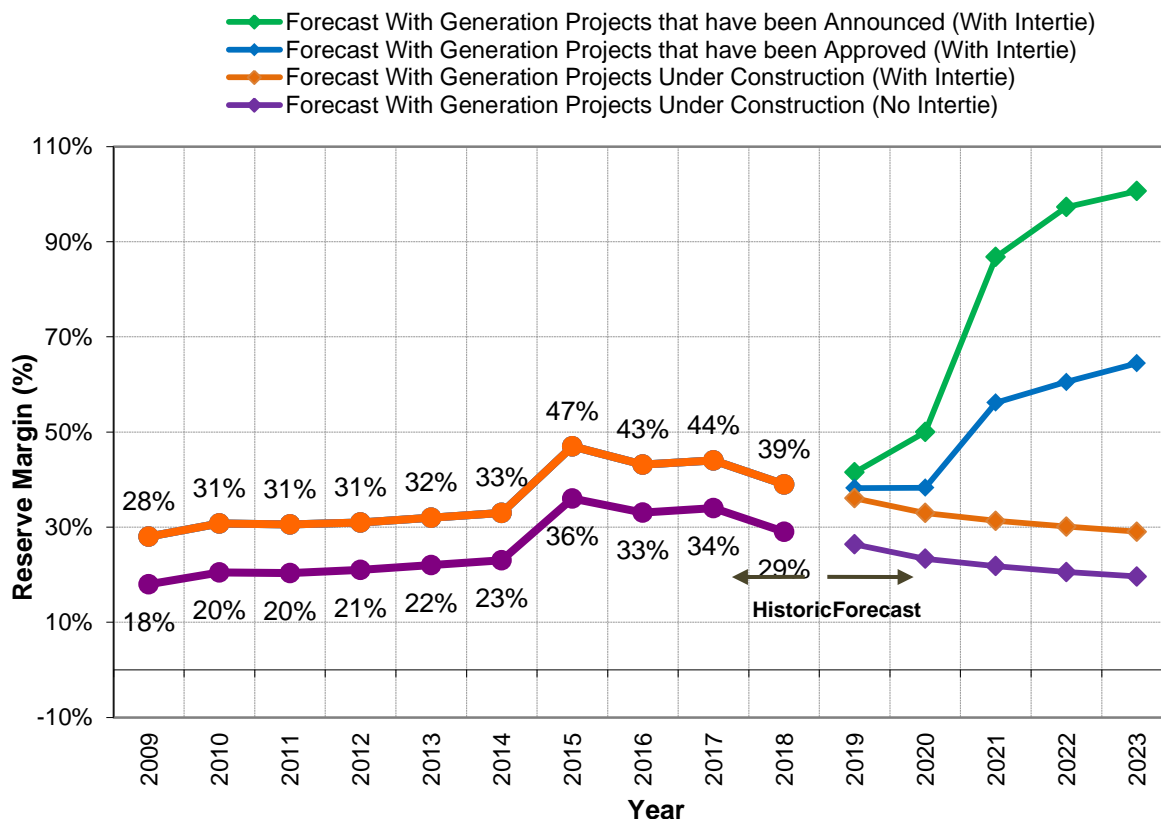
August 2019



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 inertia capacity in one reserve margin since full import capability may not always be available at the time of system peak demand.

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, August 1, 2019 to July 31, 2021

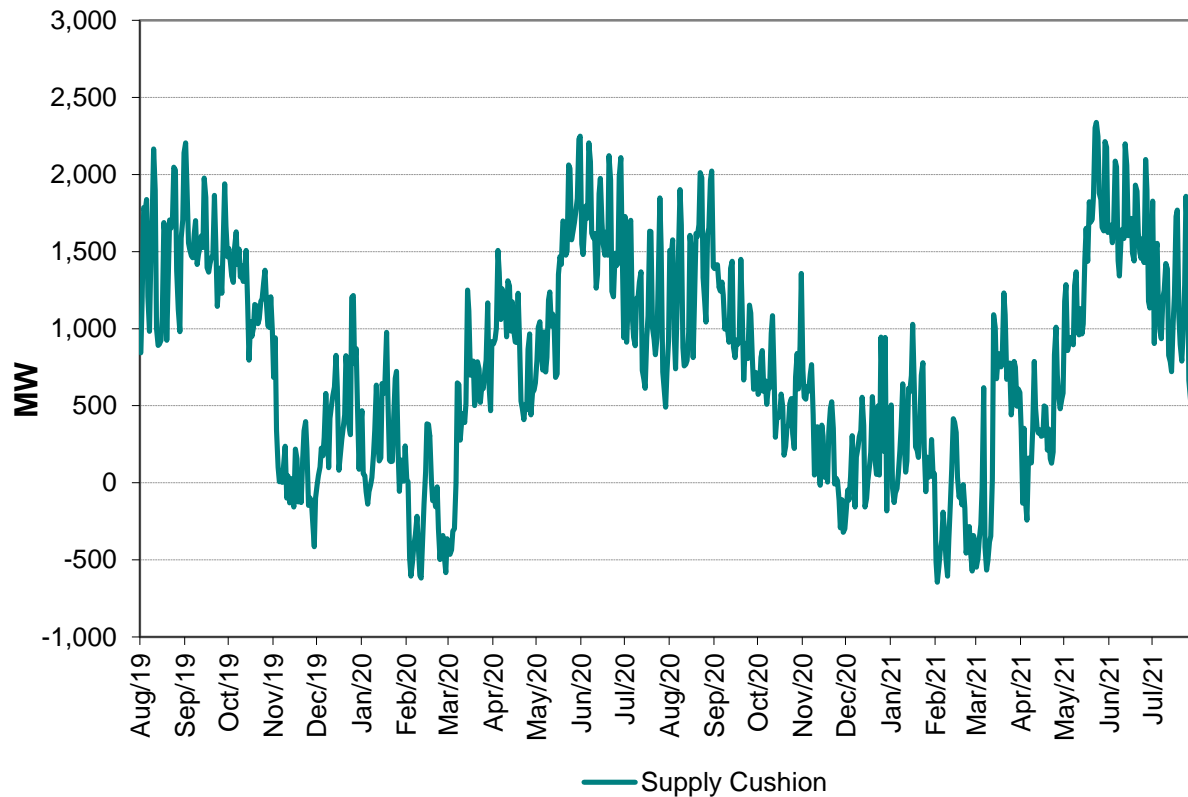
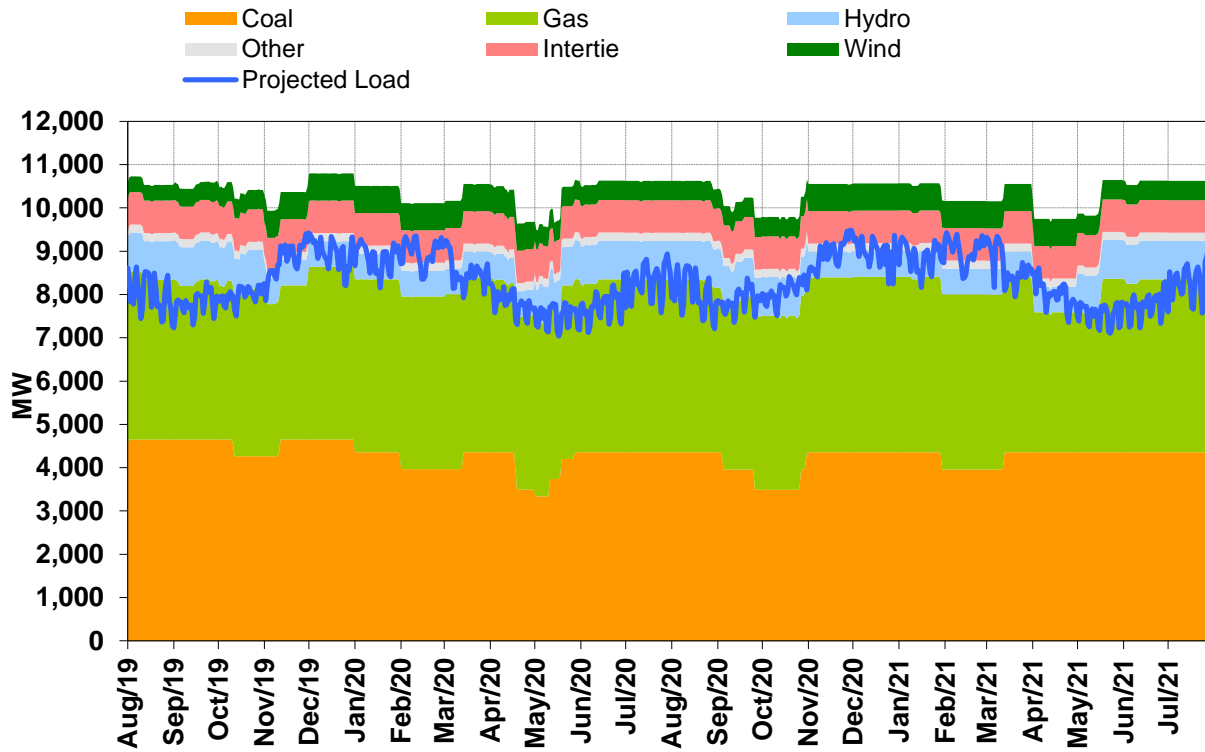


Figure 3: Alberta Interconnected Electric System (AIES) Daily Peak Demand and Available Supply, August 1, 2019 to July 31, 2021



Outage information as of Jul 25th, 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, August 1, 2019 to July 31, 2021

Worst Shortfall Hour (MW)	# of Hours in Shortfall	Total Energy Not Served (MWh)
68	1	167

Note: Values are rounded and represent average outputs