

Long Term Adequacy Metrics

May 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:

- TransCanada Scoria 318S Cogen

Generation Projects moved to “Active Construction”:

- FortisAlberta Coaldale 254S DER Cogen
- FortisAlberta Vauxhall Solar DER
- FortisAlberta 895S Suffield DG PV
- Imperial Oil Edmonton 95S Cogen

Generation projects moved to “Regulatory Approval”:

- ATCO Poplar Hill 790S Gas Change
- Perimeter Claresholm Solar
- Alberta Wind Energy Old Elm Wind Farm
- FortisAlberta 255S Vulcan Faribault Farms DG PV
- EPCOR EDTI DG Solar BTF
- Suncor Base Plant Cogen

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

- FortisAlberta East Crossfield 64S DER Solar
- FortisAlberta Bassano 435S DER Solar
- TransAlta Summerview 2 Battery Storage
- FortisAlberta Buffalo Atlee Cluster 2
- Shell Canada Limited Air Liquide Canada Scotford ALS1 Change
- Enbridge South Terminal Gas
- ATCO Monitor 1 774S DER Solar
- ENGIE Buffalo Trail MPC Wind
- RESC Rattlesnake Ridge MPC Wind
- Transalta Corporation Windcharger Battery Energy Storage

Generation projects that have been removed:

- Eolectric Welsch Wind

- BluEarth Renewables Burdett DG PV
- Suncor Hand Hills Phase 2
- Suncor Hand Hills Solar
- RESC Forty Mile WAGF
- RESC Oyen Wind Power Project
- FortisAlberta Coaldale 254S DG P/V
- FortisAlberta Coaldale 254S DER Solar 2
- EDF EN Red Rock WAGF
- ENGIE Duchess Solar
- FortisAlberta Hays 421S DER Solar
- Renewable Energy Rattlesnake Wind
- ATCO Monitor DER Solar
- Algonquin Willow Ridge Wind
- TransAlta Ardenville Expansion Wind
- ATCO Vilna 777S DER Solar
- FortisAlberta Bullshead 523S DER Solar 1
- FortisAlberta Bullshead 523S DER Solar 2
- Enterprise Bighorn MPC Wind
- Elemental Energy WD MPC Wind
- ATCO Hanna Solar
- RESC Hilda MPC Wind
- Air Liquide Scotford Gas
- Kirkcaldy MPC Solar
- FortisAlberta Wainwright DER Solar
- FortisAlberta Provost DER Solar
- FortisAlberta Killarney Lake DER Solar

Other changes to generation projects:

Project	Change
Enbridge – WhiteTail Peaking	New ISD of Oct-2019 from Jul-2019
Three Creeks – Three Creeks Unit 1	New ISD of Jun-2021 from Jun-2020
Three Creeks – Three Creeks Unit 2	New ISD of Jun-2021 from Jun-2020
Three Creeks – Three Creeks Unit 3	New ISD of Jun-2021 from Jun-2020
Imperial Oil – Aspen SAGD Project	New ISD of Mar-2021 from Jul-2019
FortisAlberta – 895S Suffield DG PV	New ISD of Oct-2019 from Jun-2019
FortisAlberta – 421S Hays DG PV	New ISD of Oct-2019 from Jun-2019

FortisAlberta – 275S Jenner Solar DER	New ISD of Nov-2020 from Jun-2019
FortisAlberta – Buffalo Atlee Cluster 1 WAGF	New ISD of Dec-2020 from Mar-2019
NaturEner – Buffalo Trail WAGF	New ISD of Jul-2022 from Sep-2019
NaturEner – Ross Creek WAGF	New ISD of Jul-2022 from Sep-2019
FortisAlberta – Spring Coulee 385S Solar DG	New ISD of Aug-2019 from Apr-2019
BowArk Energy – Drywood Gas Generator	New ISD of Oct-2020 from Oct-2019
FortisAlberta – Enchant 447S DER Solar	New ISD of Oct-2019 from Aug-2019
FortisAlberta – Krafte 257S Hull DER Solar	New ISD of Oct-2019 from Jul-2019
FortisAlberta – Buffalo Atlee Cluster 3 WAGF	New ISD of Dec-2020 from Mar-2019
TransAlta – Cowley Ridge 1 Wind	New ISD of Dec-2019 from Apr-2019
TransAlta – Garden Plain Wind	New ISD of Jun-2020 from Feb-2020
FortisAlberta – Vauxhall Solar DER	New ISD of Sep-2019 from Jun-2019
FortisAlberta – Bassano DER Solar	New ISD of Dec-2019 from Jan-2019
Pattern Development – Lanfine South Wind	New ISD of Sep-2022 from Sep-2020
Chiniki – Solar	New ISD of Nov-2020 from Dec-2018
FortisAlberta – Coaldale Cogen DER	New ISD of Aug-2019 from Apr-2019
FortisAlberta – Willesdengreen DER Gas Turbine	New ISD of Sep-2019 from Nov-2018
FortisAlberta – Taber 83S DER Solar	New ISD of May-2020 from May-2019
FortisAlberta – Taber 83S DER Solar	New ISD of May-2020 from May-2019
FortisAlberta – Blackfalds 198S Gas 1	New ISD of Jul-2019 from Mar-2019
FortisAlberta – Blackfalds 198S Gas 2	New ISD of Jul-2020 from Jul-2019
FortisAlberta – Brooks 121S DER Solar 1	New ISD of Dec-2020 from Dec-2019
FortisAlberta – Brooks 121S DER Solar 2	New ISD of Dec-2020 from Dec-2019
FortisAlberta – Innisfail 214S DER Solar	New ISD of Nov-2019 from Sep-2019

ACCEL – Morse River Cogen	New ISD of Dec-2020 from Jun-2020
ATCO – Fieldgate 824S DER Gas	New ISD of Sep-2019 from Jul-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 259 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 Cogen DER	Cogen	6	Aug-2019
Capital Power	Whitla Wind Power - Phase 1**	Wind	202	Sep-2019
FortisAlberta	Vauxhall Solar DER	Solar	22	Sep-2019
FortisAlberta	895S Suffield DG PV	Solar	22	Oct-2019
Imperial Oil	Edmonton 95S Cogen	Cogen	46.5	Nov-2019
Total (MW)			298.5	

*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
FortisAlberta	Stirling 67S DG P/V	Solar	17	Mar-2019
FortisAlberta	Warner 344S DER Solar	Solar	10	May-2019
ATCO	Poplar Hill 790S Gas Change	Gas	32	Jun-2019
FortisAlberta	498S Tilley DG PV	Solar	22	Jun-2019
FortisAlberta	158S Vauxhall DG PV	Solar	16	Jun-2019
Joss Wind	Jenner WAGF	Wind	122	Jun-2019

FortisAlberta	Blackfalds 198S Gas 1	Cogen	6	Jul-2019
Naturener	Wild Rose 1	Wind	192	Jul-2019
Naturener	Wild Rose 2	Wind	218	Jul-2019
FortisAlberta	Jenner 275S DER	Gas	23	Jul-2019
FortisAlberta	Spring Coulee 385S Solar DG	Solar	29	Aug-2019
Suncor	Hand Hills	Wind	80	Sep-2019
FortisAlberta	421S Hays DG PV	Solar	23	Oct-2019
FortisAlberta	Krafte 257S Hull DER Solar	Solar	25	Oct-2019
Enbridge	WhiteTail Peaking	Gas	200	Oct-2019
FortisAlberta	Enchant 447S DER Solar	Solar	74	Oct-2019
Alberta Wind Energy	Old Elm & Pothole Creek	Wind	60	Oct-2019
ATCO	Heartland Generating Station	Gas	510	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
Inter Pipeline	Strathcona Cogeneration	Cogen	101	Mar-2020
EDP Renewables	Sharp Hills Wind**	Wind	300	Jun-2020
Perimeter	Claresholm Solar	Solar	150	Jun-2020
FortisAlberta	255S Vulcan Faribault Farms P/V	Solar	13	Aug-2020
NextEra	Heritage Wind	Wind	291	Sep-2020
BluEarth Renewables	Hand Hills Wind Project	Wind	80	Sep-2020
Capital Power	Whitla Wind Power - Phase 2	Wind	97.2	Sep-2020
Alberta Wind Energy	Windy Point WAGF	Wind	50.4	Oct-2020
BowArk Energy	Queenstown Power Plant	Gas	80	Oct-2020

FortisAlberta	275S Jenner Solar DER	Solar	23	Nov-2020
Maxim Power	Deerland Peaking	Gas	186	Dec-2020
Capital Power	Halkirk 2	Wind	150	Dec-2020
FortisAlberta	Buffalo Atlee Cluster 1 WAGF	Wind	18	Dec-2020
FortisAlberta	Buffalo Atlee Cluster 3 WAGF	Wind	17	Dec-2020
ENMAX	Zephyr Wind Farm	Wind	200	Dec-2020
E.ON	Grizzly Bear	Wind	120	Dec-2020
RESC	McLaughlin WAGF	Wind	47	Dec-2020
Three Creeks	Three Creeks Unit 1	Cogen	230	Jun-2021
Three Creeks	Three Creeks Unit 2	Cogen	230	Jun-2021
Three Creeks	Three Creeks Unit 3	Cogen	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
C&B Alberta Solar	Newell Solar Project	Solar	13	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
Total (MW)			9,104.6	

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
ATCO	Coronation 773S Solar DG	Solar	10	Mar-2019 (A)
Joss Wind	Jenner WAGF - 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)
FortisAlberta	Empress 394S DER Solar	Solar	15.6	May-2019 (A)
FortisAlberta	Namaka DER Solar	Solar	20	Jun-2019 (A)
FortisAlberta	Gleichen DG Solar	Solar	17	Jun-2019 (A)
Enel	Castle Rock Ridge - Phase 2**	Wind	31	Jun-2019 (A)
Enel	Riverview Wind Farm**	Wind	115	Jun-2019 (A)
Irma	Irma Wind Power	Wind	90	Jul-2019 (A)
Greengate Power	Paintearth Wind Farm	Wind	150	Jul-2019 (A)
FortisAlberta	Conrad DER Solar	Solar	23	Jul-2019 (A)
FortisAlberta	Brooks DER Solar	Solar	22	Aug-2019 (A)
FortisAlberta	Willesdengreen DER Gas Turbine	Gas	10	Sep-2019 (A)
ATCO	Three Hills 770S DER Solar 1	Solar	25	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)
ATCO	Valleyview Gas	Gas	32	Sep-2019 (A)
ATCO	Fieldgate 824S DER Gas	Gas	18	Sep-2019 (A)
Shell Canada Limited	Air Liquide Canada Scotford ALS1 Change	Gas	10	Sep-2019 (A)
Mustus Energy	Mustus Energy Biomass	Biomass	41	Sep-2019 (A)
RESC	McLaughlin Phase 2 BTF	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)
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)
Suncor	Schuler WAGF	Wind	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	Innisfail 214S DER Solar	Solar	24	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)
Spirit Pine	Lone Pine WAGF	Wind	173	Dec-2019 (A)
NextEra	Buffalo Trail Solar	Solar	70	Dec-2019 (A)
Greengate Power	Stirling WAGF	Wind	115	Dec-2019 (A)
Sequoia Energy	Schuler WAGF (MPC)	Wind	100	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)
Soventix	Forestberg Area Solar	Solar	40	Jan-2020 (A)
Enbridge	South Terminal Gas	Other	20	Mar-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)
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)
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)
Transalta Corporation	Windcharger Battery Energy Storage	Battery	10	Jun-2020 (A)
TransAlta	Garden Plain Wind	Wind	130	Jun-2020 (A)
TransAlta	Summerview 2 Battery Storage	Battery	10	Jun-2020 (A)
Perimeter	Sunset Solar	Solar	60	Jun-2020 (A)
Archer	Piikani Solar	Solar	40	Jun-2020 (A)
FortisAlberta	Blackfalds 198S Gas 2	Cogen	4	Jul-2020 (A)
EDF EN	Fort Saskatchewan WAGF	Wind	300	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 Maleb WAGF	Wind	200	Sep-2020 (A)

BluEarth	Hand Hills Wind Phase 2	Wind	121.8	Sep-2020 (A)
Quill	Rocky Mountain Gas	Gas	295	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)
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)
FortisAlberta	Buffalo Atlee Cluster 2	Wind	14	Dec-2020 (A)
ACCEL	Morse River Cogen	Cogen	107	Dec-2020 (A)
FortisAlberta	Brooks 121S DER Solar 1	Solar	15	Dec-2020 (A)
FortisAlberta	Brooks 121S DER Solar 2	Solar	15	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)
FortisAlberta	East Crossfield 64S DER Solar	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)
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)
RESC	Rattlesnake Ridge MPC Wind	Wind	150	Jul-2021 (A)
Kineticor	Peace River Power Upgrade	Gas	125	Sep-2021 (A)
Grand Prairie	MPC Gas	Gas	360	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	400	Jan-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)
AHP Development	Amisk Hydroelectric Project	Hydro	330	Dec-2023 (P)
Total (MW)			13,486.9	

* - (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		

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

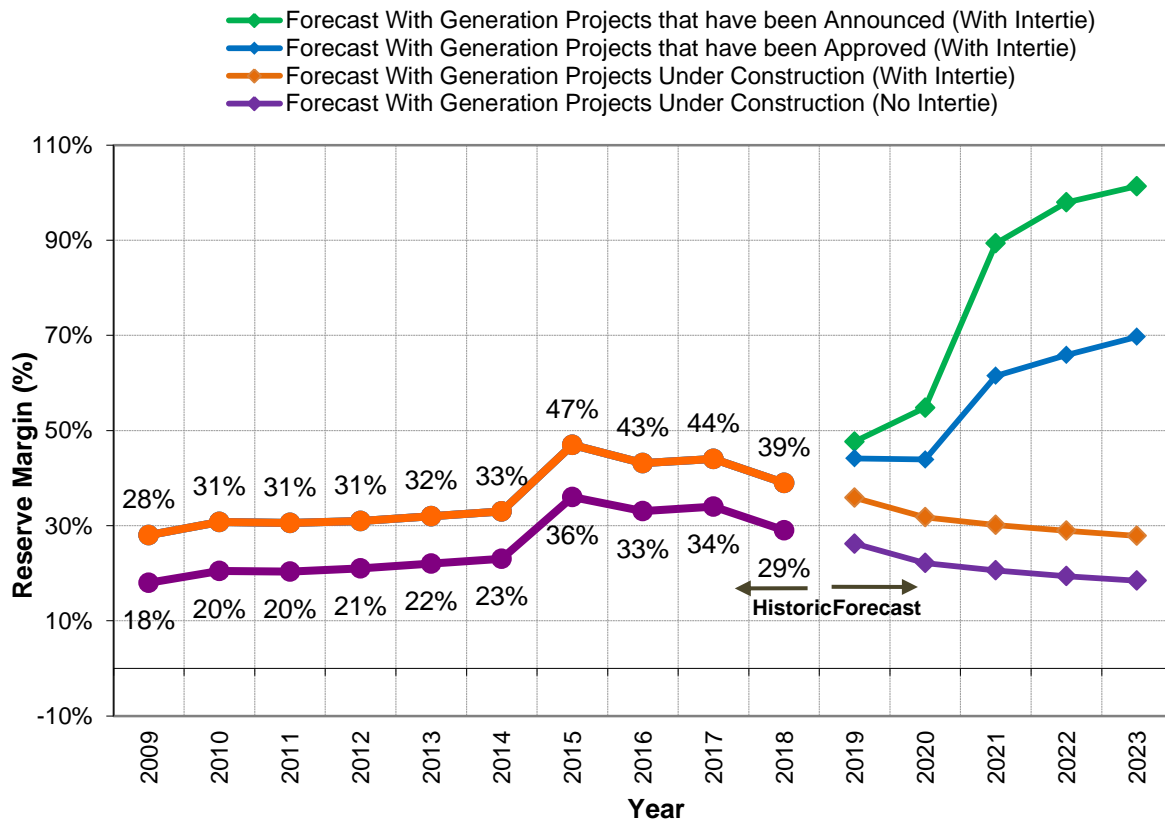
Sponsor(s)	Project Name	Fuel	Unit Capacity	In Service Date	Federal Compliance Date ¹
ATCO	Battle River 3	Coal	149	1969	Dec-2019
Maxim	HR Milner	Coal	144	1972	Dec-2019
Total (MW)			293		

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.

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, May 1, 2019 to April 30, 2021

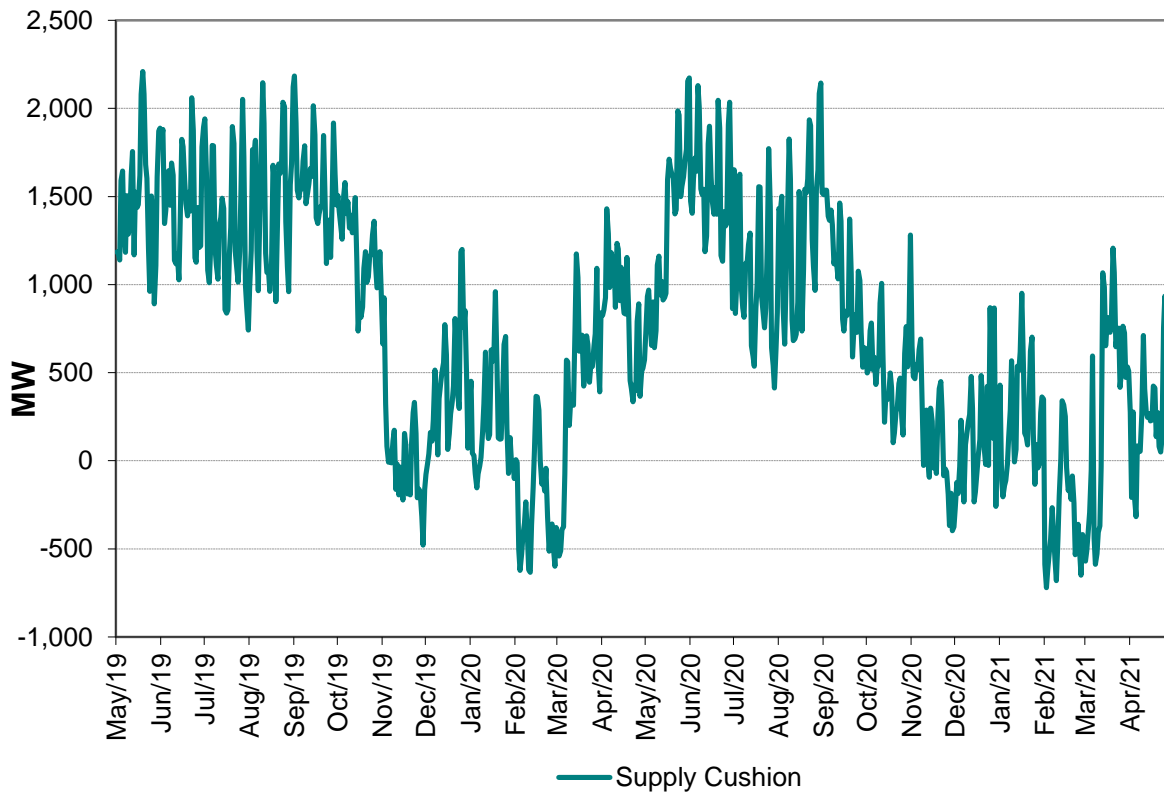
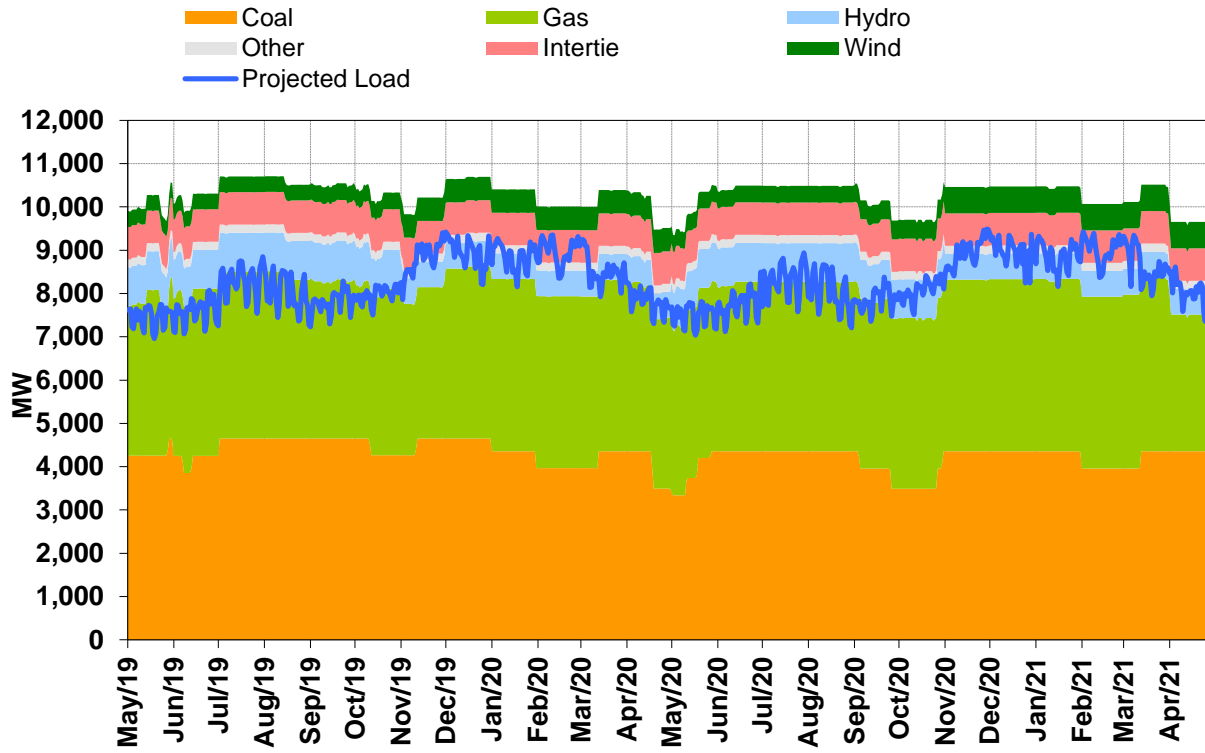


Figure 3: Alberta Interconnected Electric System (AIES) Daily Peak Demand and Available Supply, May 1, 2019 to April 30, 2021



Outage information as of Apr 23rd, 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, May 1, 2019 to April 30, 2021

Worst Shortfall Hour (MW)	# of Hours in Shortfall	Total Energy Not Served (MWh)
97	2	259

Note: Values are rounded and represent average outputs