Central East Transfer-out (CETO) Transmission Development Technical Session

December 8, 2020

Notice

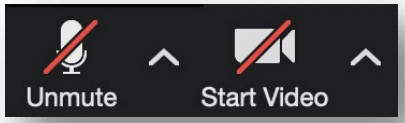
- In accordance with its mandate to operate in the public interest, the AESO will record and transcribe the session, and file these transcripts on the record. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

- The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Central East Transfer-out (CETO) Transmission Development Needs Identification Document (NID) regulatory proceedings. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4 or by telephone at 403-539-2528.

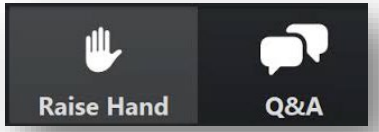
How to ask questions

Using Zoom – asking questions

- All attendees join the webinar in listen-only mode. Cameras will be disabled and microphones muted.



- Two options to ask questions via computer or smartphone:
  1. Click the “Q&A” button at any time.
     - Type your questions into the Q&A window. You’re able to up-vote questions that have been already asked.
  2. During the Q&A session
     - Click the icon to raise your hand and the host will see that you have raised your hand.
     - The host will unmute your microphone and you, in turn, will need to unmute your microphone and then you can ask your question.
     - Your name will appear on the screen, but your camera will remain turned off.



- When asking a question, please state:
  - Your first and last name, and the organization you work for
  - If you are a landowner, your first and last name

Using Zoom – access controls

2-in-1 / PC / MAC Computer	Smartphone	Telephone/ Conference Call
Hover your cursor over the bottom area of the Zoom app and the Controls will appear		
Click/tap “Raise Hand” and the host will be notified that you would like to ask a question		To raise your hand, on your phone’s dial pad, press *9; the host will be notified
Click/tap “Lower Hand” if your question has been answered		To toggle between mute and unmute, on your phone’s dial pad, press *6
or Click/tap the “Q&A” button and type questions		
If your question (or similar) has already been asked, click/tap “Up-vote” – the question will be prioritized, i.e., shifted to the top of the queue		

Welcome and introductions

Welcome to webinar participants & observers

- Alberta Electric System Operator (AESO)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- ATCO Electric Ltd.
- Capital Power
- Consumers' Coalition of Alberta (CCA)
- Industrial Power Consumers Association of Alberta (IPCAA)
- Landowners
- Landowners Opposed to Route C (LORC)

Agenda

Time	Discussion Item
10:00 a.m.	Welcome and introductions
	Role of the AESO
	Technical session objectives
	1. Need for transmission development
	• Q&A
	2. CETO construction milestone
	• Q&A
Noon	Break
1:00 p.m.	3. CETO transmission development options
	• Q&A
	4. Congestion assessment
	• Q&A
	Closing

AESO mandate

- Responsible for safe, reliable, economic planning and operation of Alberta Interconnected Electric System (AIES)
- AESO is a not-for-profit, statutory corporation; independent of government and industry:
  - Governed by independent board appointed by Minister of Energy
  - Must operate in the public interest
  - No financial interest in any generation unit, transmission or distribution infrastructure
  - No government funding; costs recovered from Alberta ratepayers
- We operate a fair, efficient and openly competitive electricity market, we do not centrally plan generation

Objectives for this session

- Seek an opportunity to enhance efficiencies in the proceeding process by:
  - providing explanations in key question areas received to-date
  - answering as many specific questions as we can today
  - reducing the number of future written Information Requests
- Offer a forum for intervenors to gain a better understanding of the information contained in the AESO's CETO NID Application, including the:
  - planning results supporting the need
  - milestone design
  - alternative solutions considered
  - congestion assessment results
- Maintain focus on the technical aspects of the AESO's application
  - questions related to the transmission facility owners' (TFO) Facility Applications will not be addressed, e.g., siting, routing, construction and operation of transmission facilities
- Contribute to the formal NID proceeding
  - the AESO is recording the session and filing transcripts on the record, where they will be accessible to the public

Key takeaways

- The CETO project provides needed transfer-out capability to enable an additional approximately 700-900 MW of renewable generation in the broad resource-rich Central East (CE) and South East (SE) subregions to compete in our electricity market.
- The CETO project addresses anticipated congestion ensuring that 100 per cent of in-merit generation has access to compete in our market, under normal system conditions.
- A broad and reasonable range of future scenarios were assessed in order to determine the need and preferred development.
- The AESO is attempting to balance the timing of need with ensuring market access through use of a milestones approach.
- The milestone approach ties the level of incremental sufficiently certain generation, and a congestion assessment reaffirming congestion in the Study Area, to the start of construction.
- The milestone approach effectively manages forecast and timing risks.

Key takeaways

- The AESO is optimizing the use of the existing system by applying remedial action schemes (RAS) first, in order to connect incremental generation and address overloads during outage conditions (N-1 congestion risks).
- Our congestion assessment results assume 100 per cent asset rating capability. Operators will curtail generation in real time before these levels are reached.
- The earliest possible energization for the $322 million CETO project and the approximate $0.50 per MWH impact to transmission rates is in 2024/2025.
- Energizing CETO one-year early would cost transmission ratepayers $10 Million
- We will focus on answering questions received related to these theme areas:
  - Development options considered
  - Range of scenarios studied
  - Congestion results
  - Milestone approach

Need for transmission development

Need for transmission development
Key considerations

- With a forecasted increase in renewables generation development in the CE and SE sub-regions of Alberta (the Study Area), an expansion of the transfer-out capability of the transmission system is needed to enable surplus generation to be transferred from the Study Area to adjacent load centres.

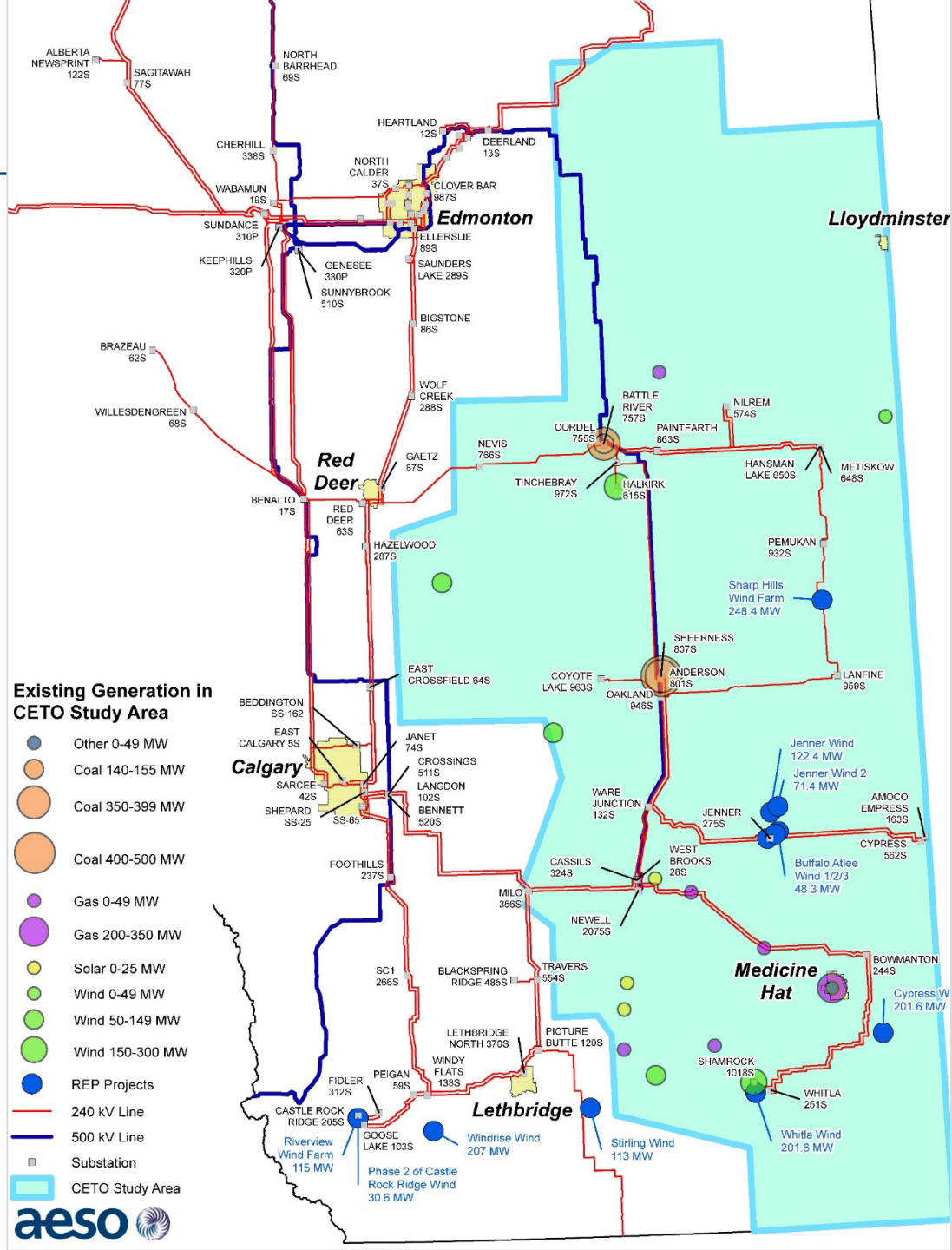
- The existing transmission system in the Study Area is being operated with the help of RAS that result in generation curtailment, reconfiguration of transmission lines, and High Voltage Direct Current (HVDC) re-dispatch to mitigate transmission constraints.

- The AESO is balancing the timing and cost of building transmission infrastructure while providing market participants with reasonable system access service and opportunity to participate in the electricity markets. The AESO's planning practices includes:
  - optimizing the use of existing transmission before building new
  - enhancing planning practices through the use of congestion assessments
  - use of construction milestones to help manage uncertainties associated with the timing of the need for transmission infrastructure

Study Area

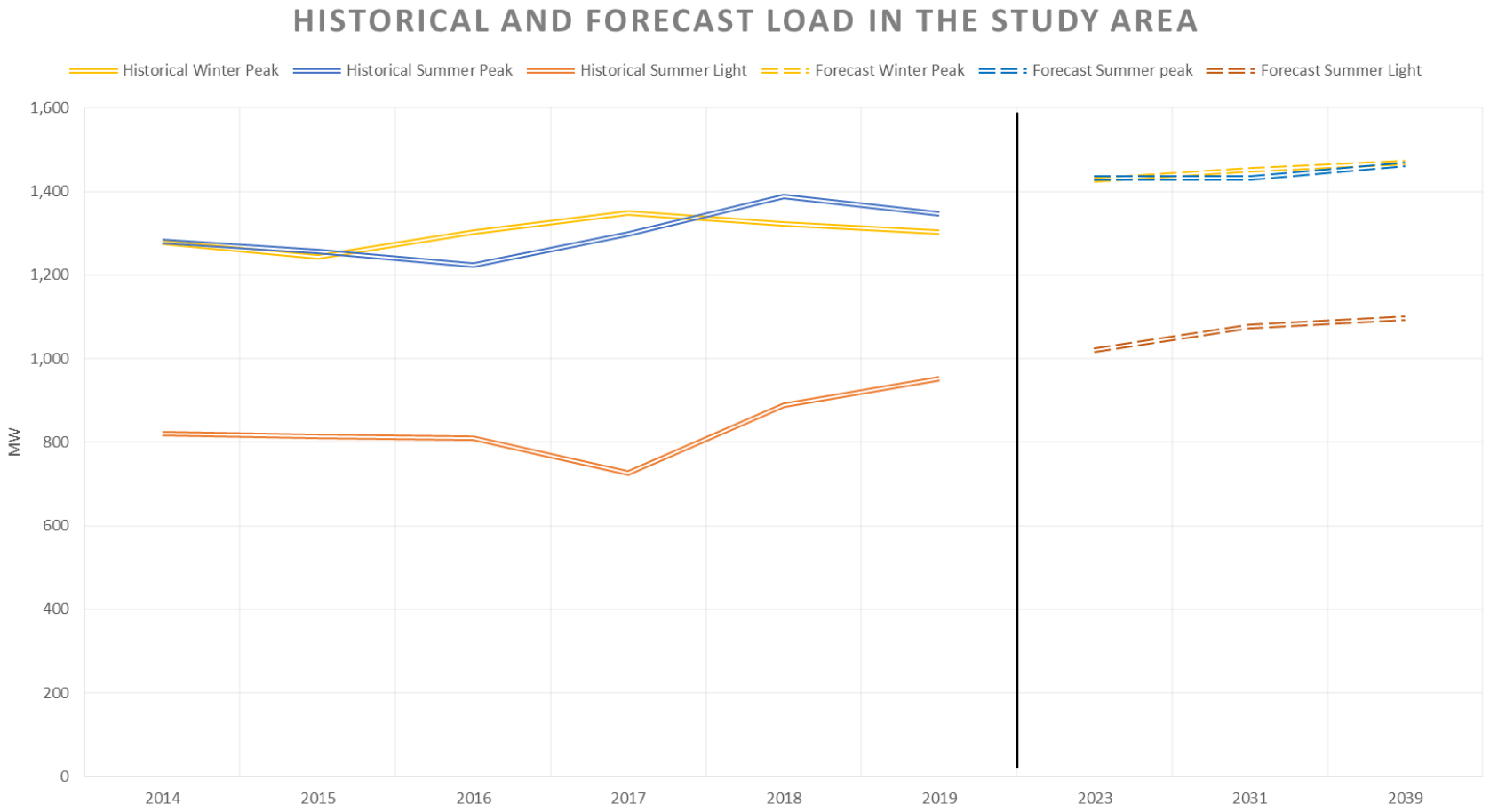
AESO planning areas included in the Study Area

CE sub-region	SE sub-region
Lloydminster (Area 13)	Medicine Hat (Area 4)
Alliance/Battle River (Area 36)	Sheerness (Area 43)
Wainwright (Area 32)	Brooks (Area 47)
Provost (Area 37)	Empress (Area 48)
Hanna (Area 42)	Vauxhall (Area 52)
Vegreville (Area 56)	

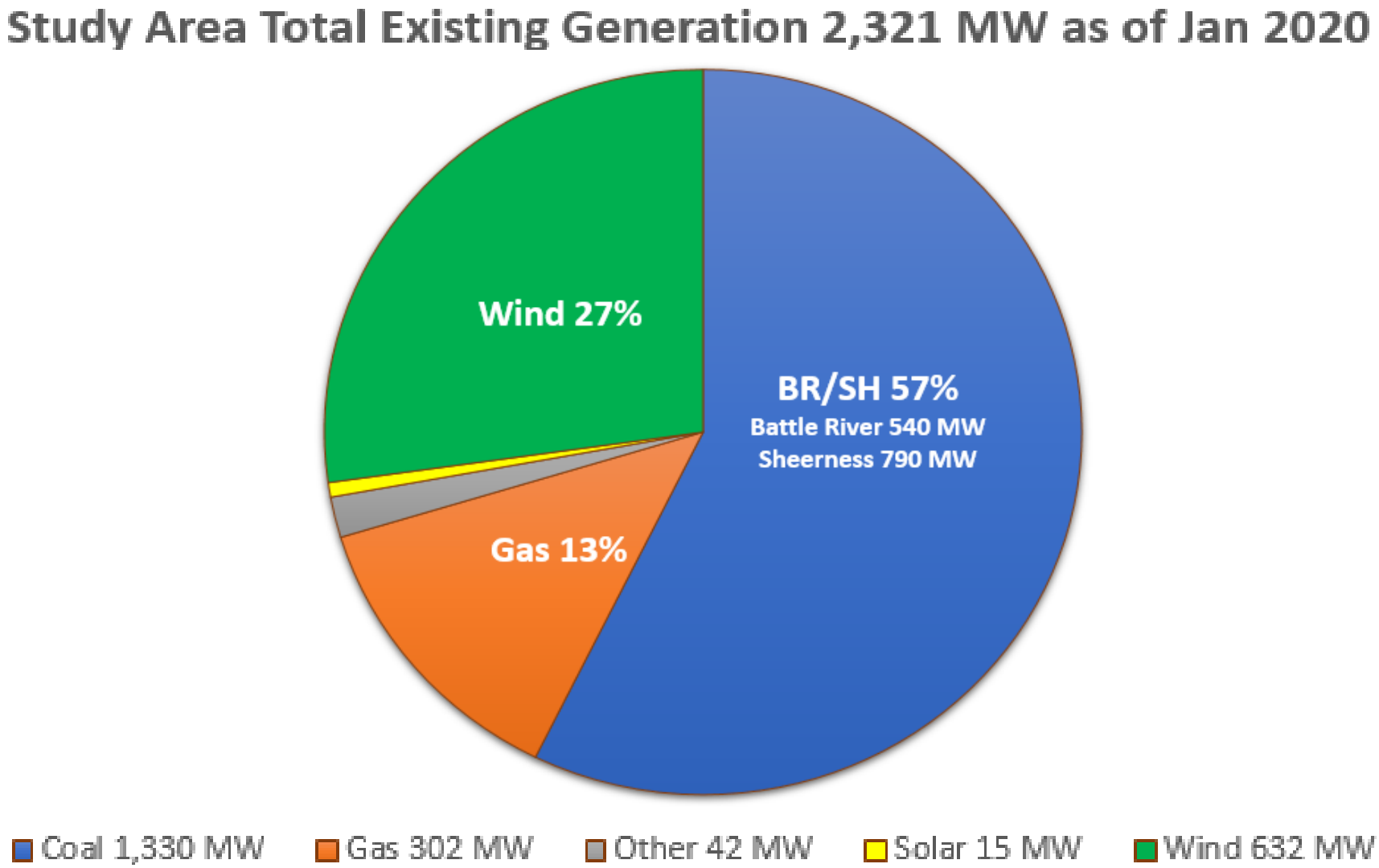


Customer demand is *not* the driver of the need

- Relatively flat growth in the past with small growth expected in the next 20 years (annual growth rate 0.6% for Winter Peak, 0.4% for Summer Peak)
- Oil price and pandemic has minor impacts to the demand growth in the Study Area



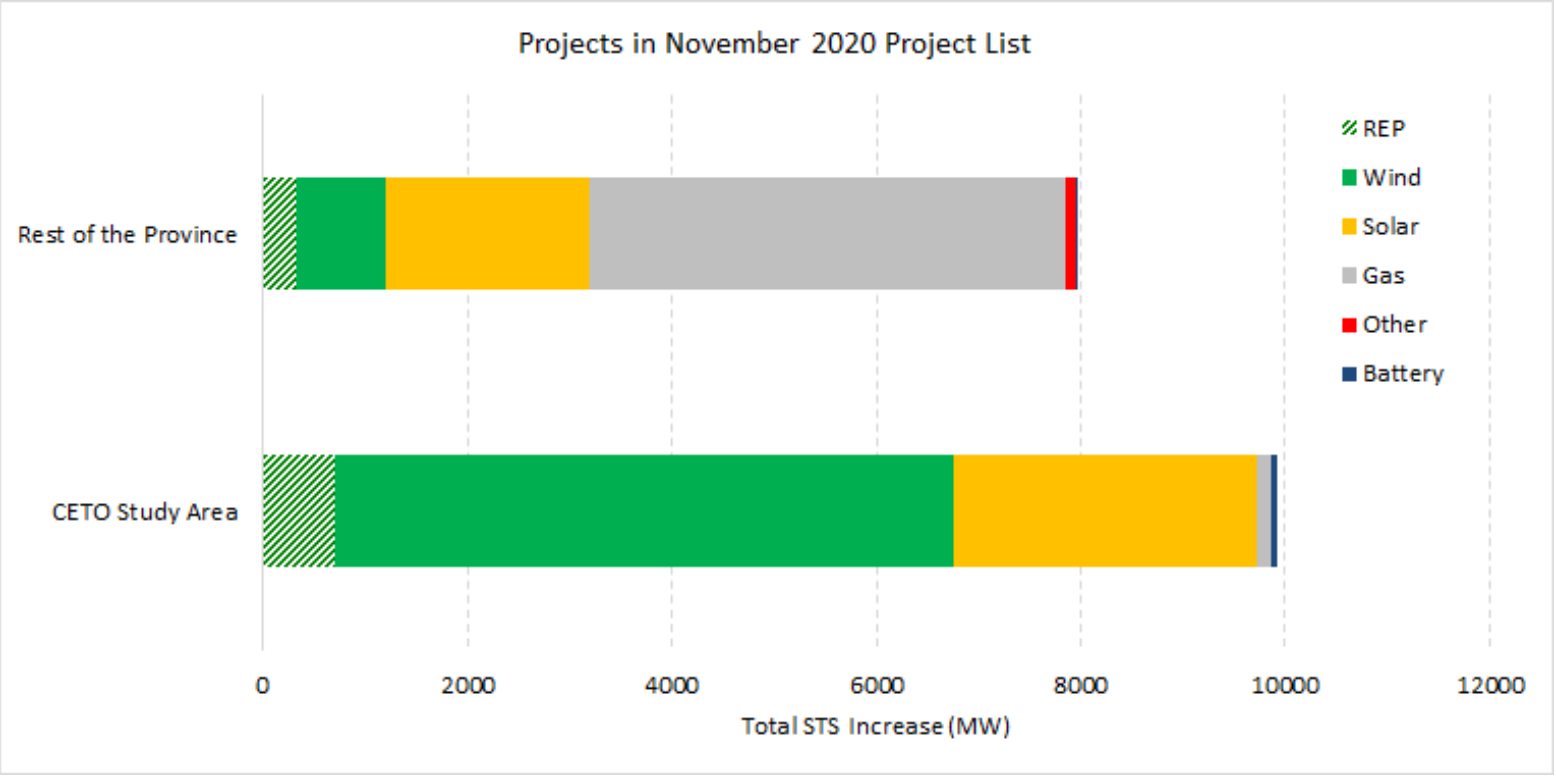
Existing generation capacity in the Study Area



Development interest in Study Area

- High renewables development interest based on high-quality wind and solar resources.
- Generation in the AESO November 2020 project list*:
  - 91 renewables generation projects seeking connection including 2,977 MW solar and 6,747 MW wind

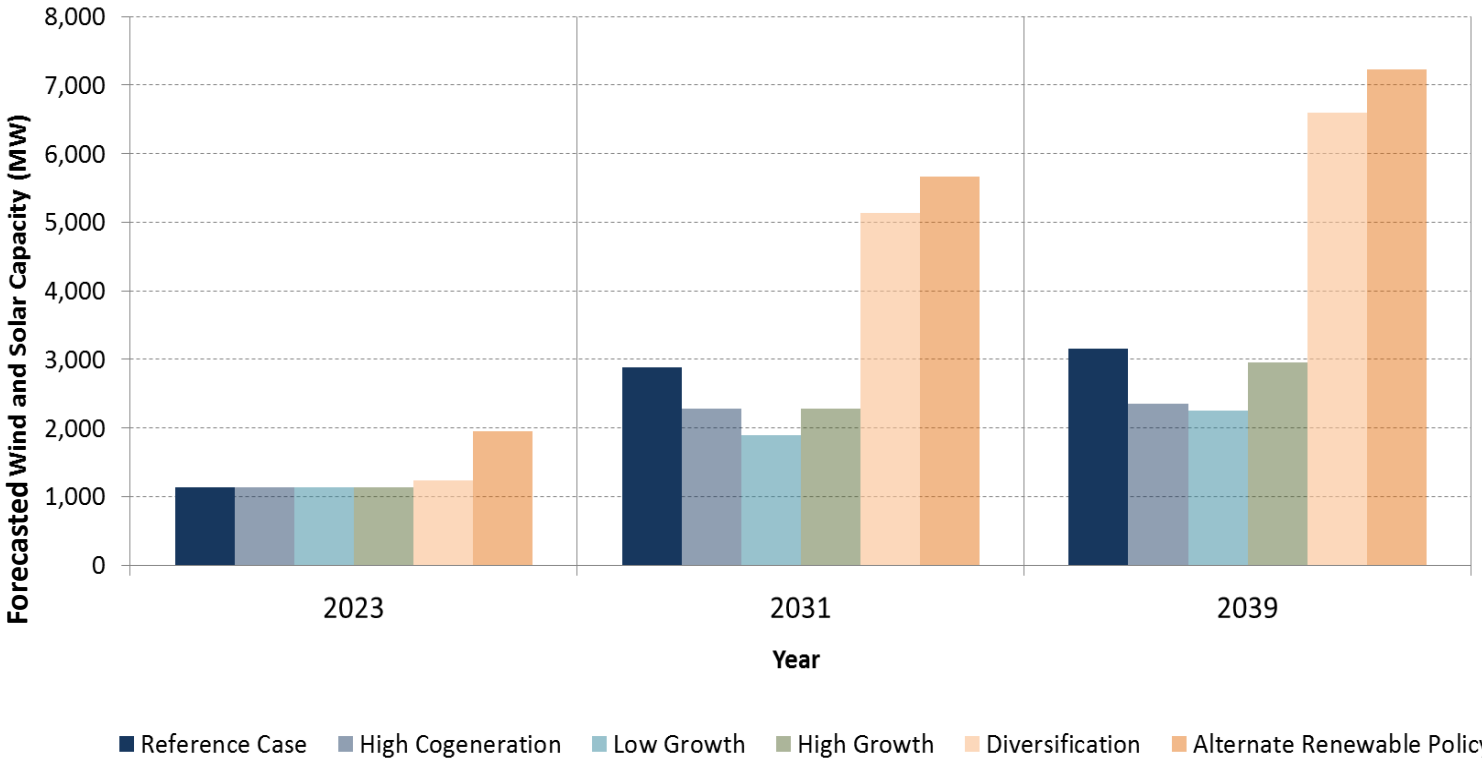
Wind and Solar Connection Projects in the Study Area Compared to the Rest of Alberta



**AESO Project List: www.aeso.ca/grid/projects/project-reports/*

Renewable generation is forecasted to continue to grow in Alberta

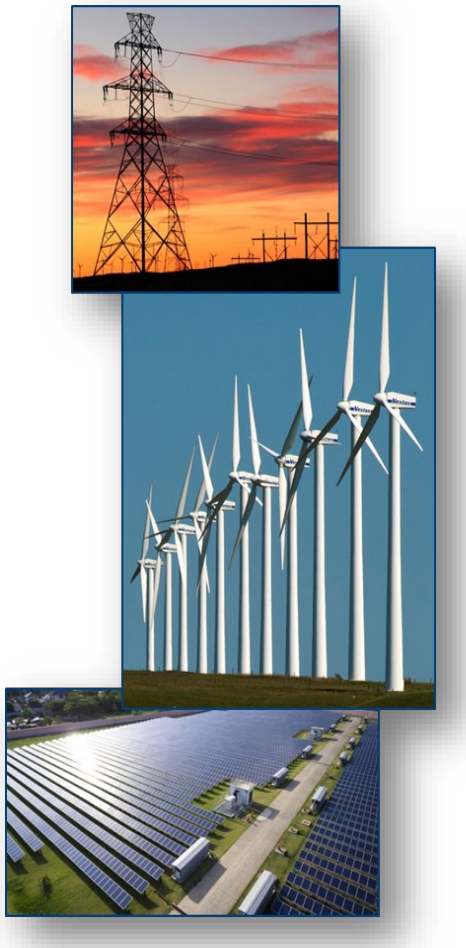
- All scenarios forecast at least a doubling of renewables in the next 10 years.
- The magnitude and pace of development is dependent on a variety of drivers including gas prices, carbon prices, and government policies.



Note: the figure lists the *AESO 2019 Long-term Outlook* (2019 LTO) scenarios and the range of potential future wind and solar additions in Alberta, incremental to the existing 1,796 MW of wind and solar generation

AESO planning methodology

- Conducted generation integration capability assessments to identify the need for development and evaluate the performance of Transmission Development options:
  - generation integration capability assessments: a holistic approach that optimizes capability for Study Area and SW
- Preferred Transmission Development selected based on:
  - technical merits, including integration capability
  - environmental and land use effects
  - cost estimates
- Performed hourly congestion analysis for a range of scenarios in order to estimate the probability of congestion because of:
  - transfer-out issues
  - to inform the establishment of construction milestones



Two broad scenarios were studied for the existing thermal generation in the Study Area

- Scenario 1: Lower total future capacity, with primarily coal to gas conversion.
- Scenario 2: Higher total future capacity, with new gas replacement.

Generating Unit Asset ID	Existing Capacity (MW)	Scenario 1		Scenario 2	
		2023	2031	2023	2031
BR3	149	Retired	Retired	New Simple Cycle	New Simple Cycle
BR4	155	Co-firing [b]	Retired		
BR5	385	Conversion	New Combined Cycle (479MW)	Conversion	New Combined Cycle (479MW)
SH1	400	Conversion	Conversion	Conversion	New Combined Cycle (790MW)
SH2	390	Conversion	Conversion	Conversion	
Total Capacity (MW)	1,479	1,330	1,269	1,479	1,573

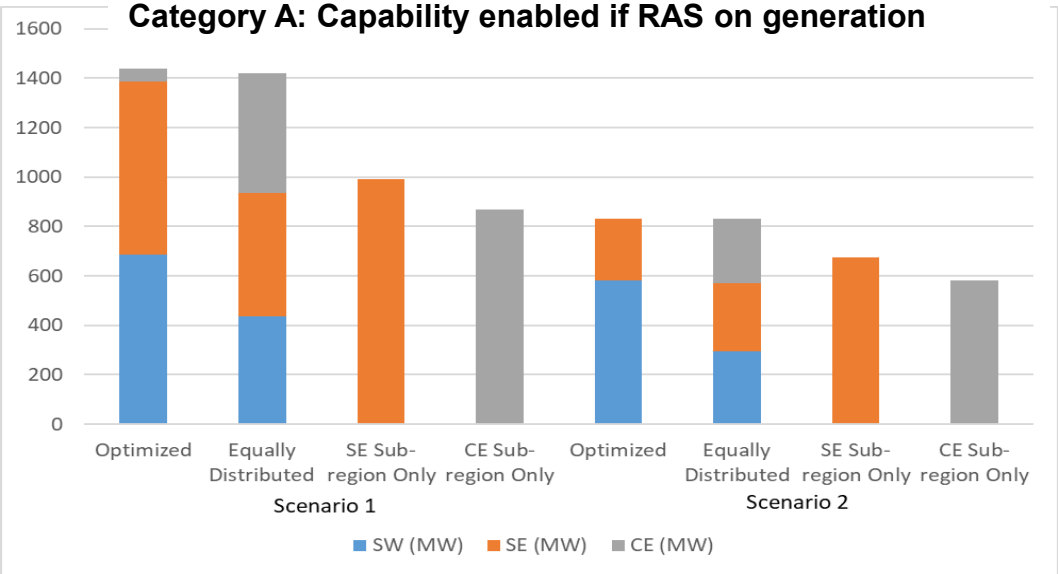
Notes: [a] The future facility capacity is the same as the existing facility capacity if a capacity size is not specified in the table.
[b] Alterations to the Battle River Power Plant to allow additional natural gas as a supplemental fuel in the Battle River 4.

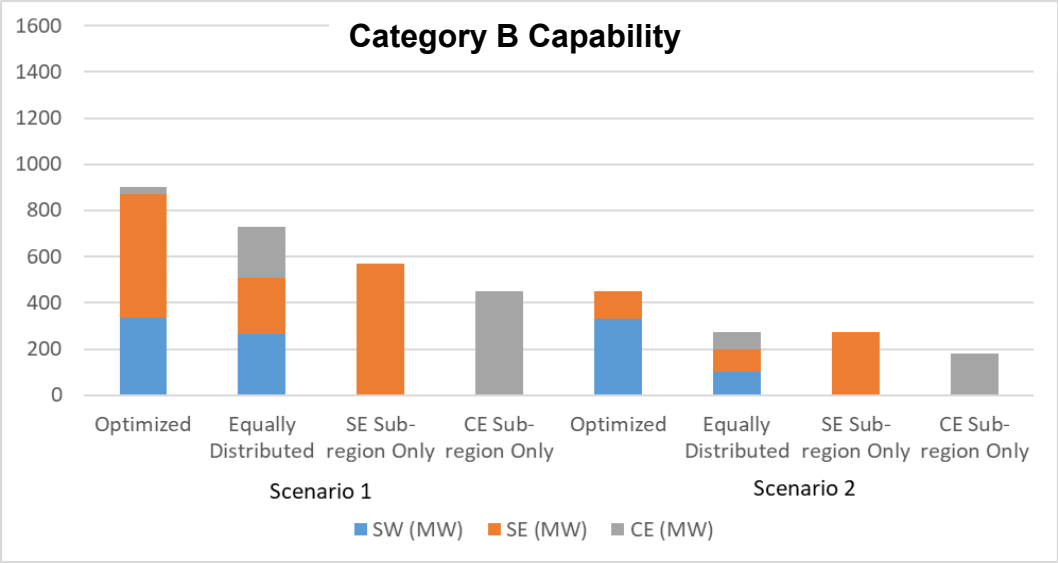
Thermal generation already converted to gas capability

Asset	Current Co-firing Capability	Estimated Timing
BR4	50 per cent natural gas capable	Complete
BR5	100 per cent natural gas capable	Complete
SH1	Not yet	Q3 2021
SH2	100 per cent natural gas capable	Complete

Pre-project system integration capability is dependent on where new renewables connect

- The AESO does not determine where generation locates.
- Various location scenarios were studied, including the SW region.
- Capability level is similar between optimized and equally distributed.
- Capability level is about 400 MW lower if generation locates all in the SE or all in the CE.
- Capability is about 500 MW higher if generation is on RAS to address N-1 contingencies, which the AESO is enabling before CETO is triggered.





The existing integration capability will be exceeded within the 10-year planning horizon

- Generation integration capability in only the Study Area (excluding SW):

Category	Scenario 1	Scenario 2
A (enabled by generation RAS)	755 MW – 990 MW	250 MW – 675 MW
B	450 MW – 565 MW	120 MW – 280 MW

- Thermal constraints occur on existing CE transfer-out paths including 912L, 9L20, 174L, and 701L.
- Forecasted renewable generation in the 2019 LTO:
  - Up to ~ 900 MW (above the existing renewables generation and Renewable Electricity Program [REP] projects) of renewable generation could develop by 2023
  - Up to ~ 4,600 MW (above the existing renewable generation and REP projects) of renewable generation could develop by 2031
- It is expected that a significant portion of the forecasted new renewable generation would be developed in the resource-rich Study Area.
- Without transmission development, the transmission system in the Study Area does not have sufficient capability to integrate the forecasted renewable generation in the 10-year planning horizon.

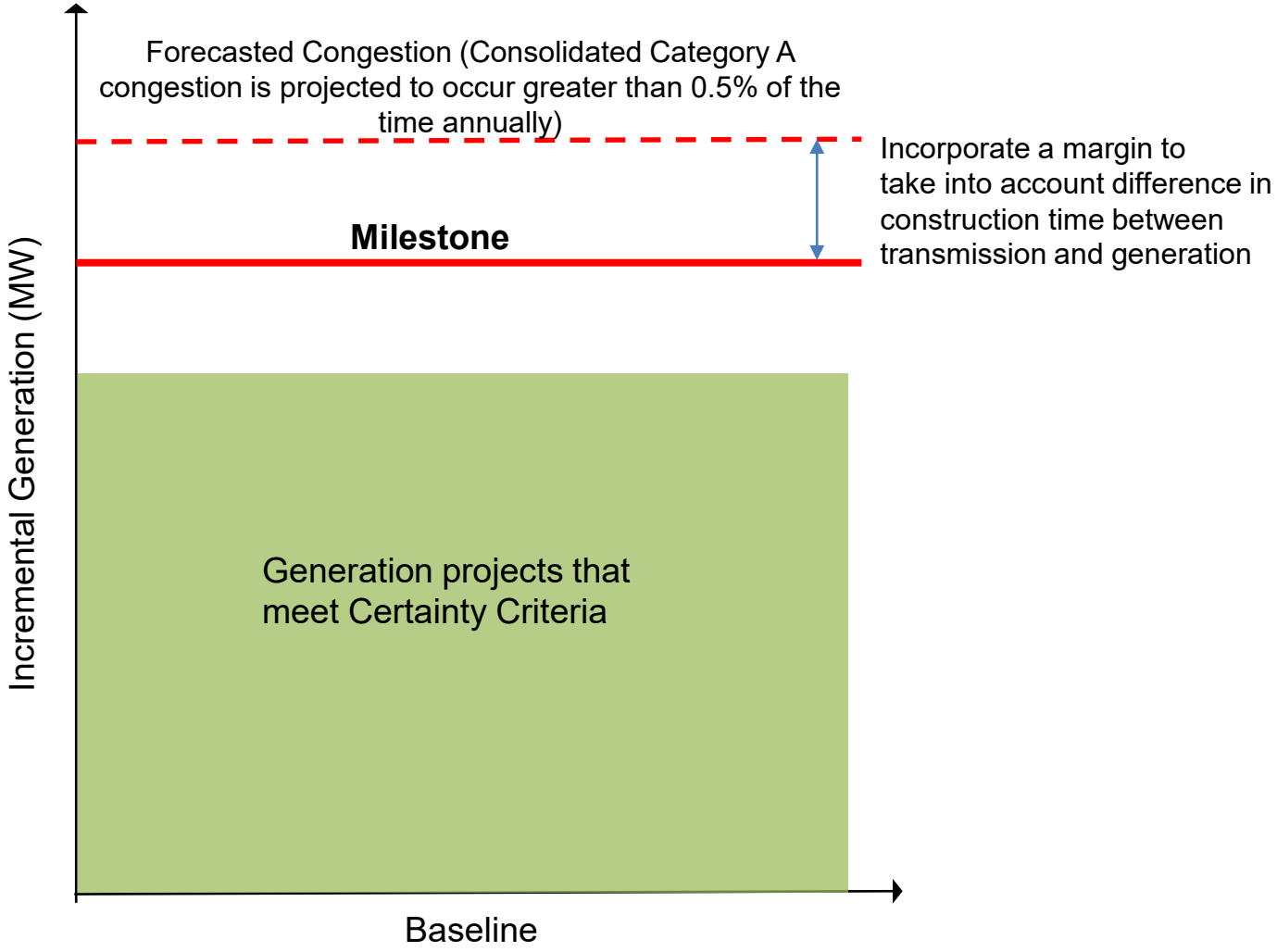
Q&A

CETO construction milestone

Construction milestones
Key considerations

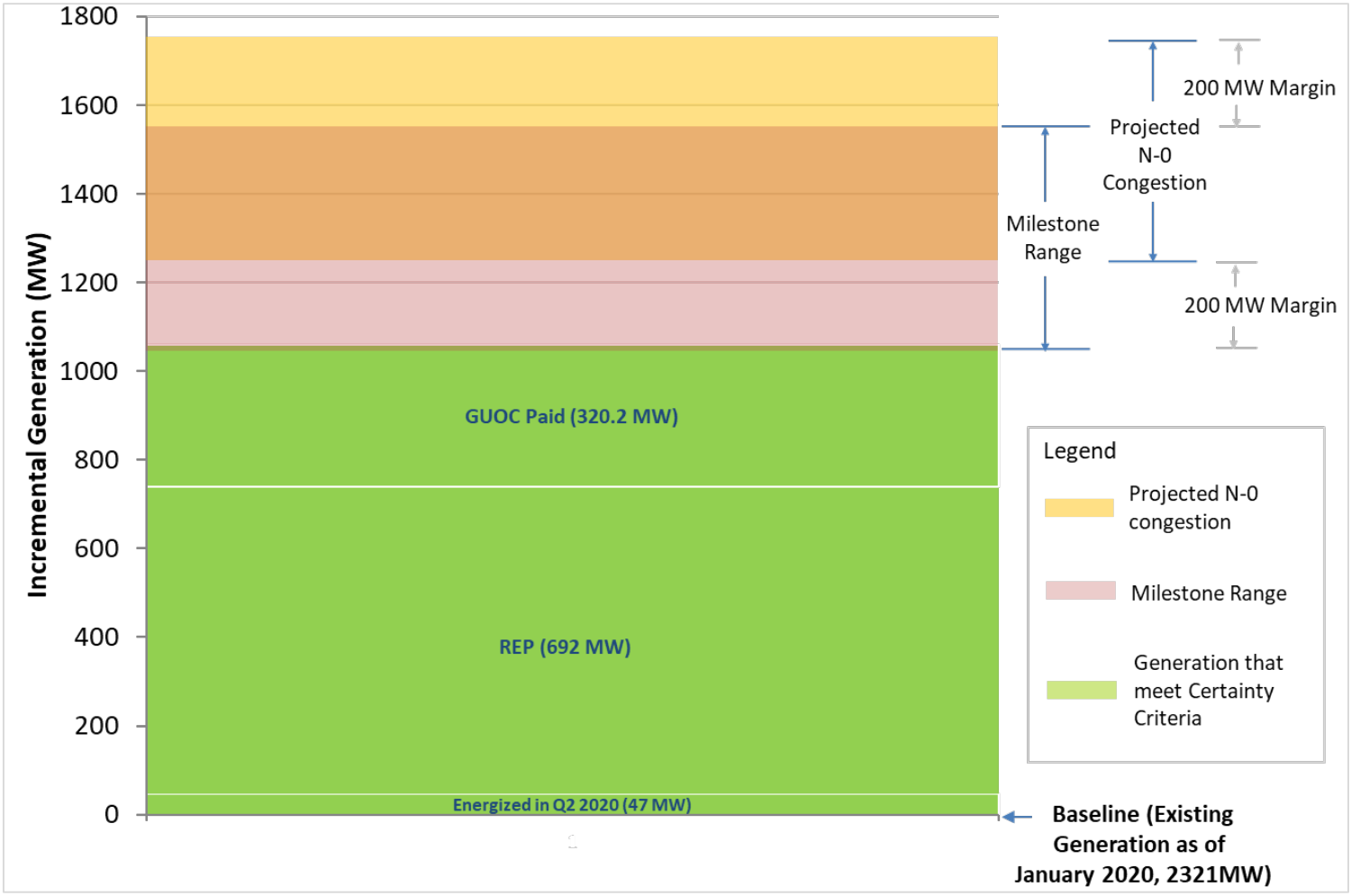
- The congestion assessment determined the range of incremental renewable generation additions that would result in congestion in the Study Area.
- The AESO used these results to design its proposed construction milestones for each stage of the two-stage CETO transmission development.
- As part of this milestone approach, the AESO will re-affirm the need to trigger construction by re-performing the congestion assessment studies using the location, size, and type of generation that meets the certainty criteria, at the time of the re-affirmation study.

Utilizing congestion assessment to design milestone



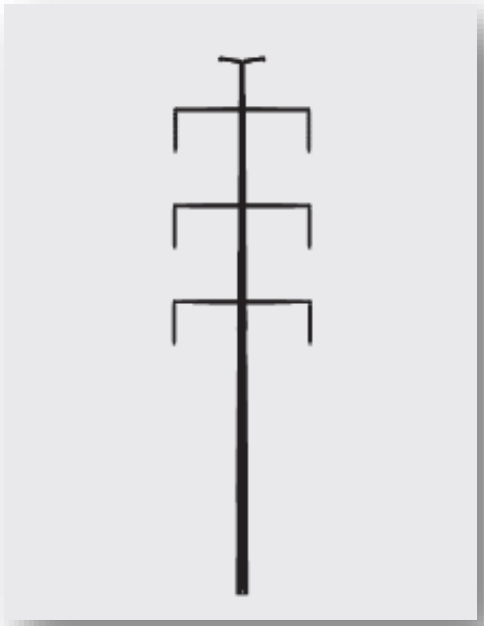
Stage 1 construction milestone range
1,050 MW to 1,550 MW of incremental generation

- Total of ~1,060 MW generation had met the certainty criteria before NID filing (Aug. 2020).
- Total of ~1,175 MW has met the certainty criteria as of November 1, 2020.



Stage 2 construction milestone range
1,700 MW to 2,150 MW incremental generation

- post-energization of first circuit, Category A congestion is forecast to occur when there is 1,900 MW to 2,350 MW incremental generation (from the baseline of Jan. 2020) in CE and SE from baseline generation
- milestone range includes the same 200 MW reduction
- milestone range is 1,700 MW to 2,150 MW of incremental generation that meet the AESO's certainty criteria in the Study Area
- the AESO will undertake a congestion assessment to re-affirm the congestion forecast before triggering construction



Lunch break

CETO transmission development options

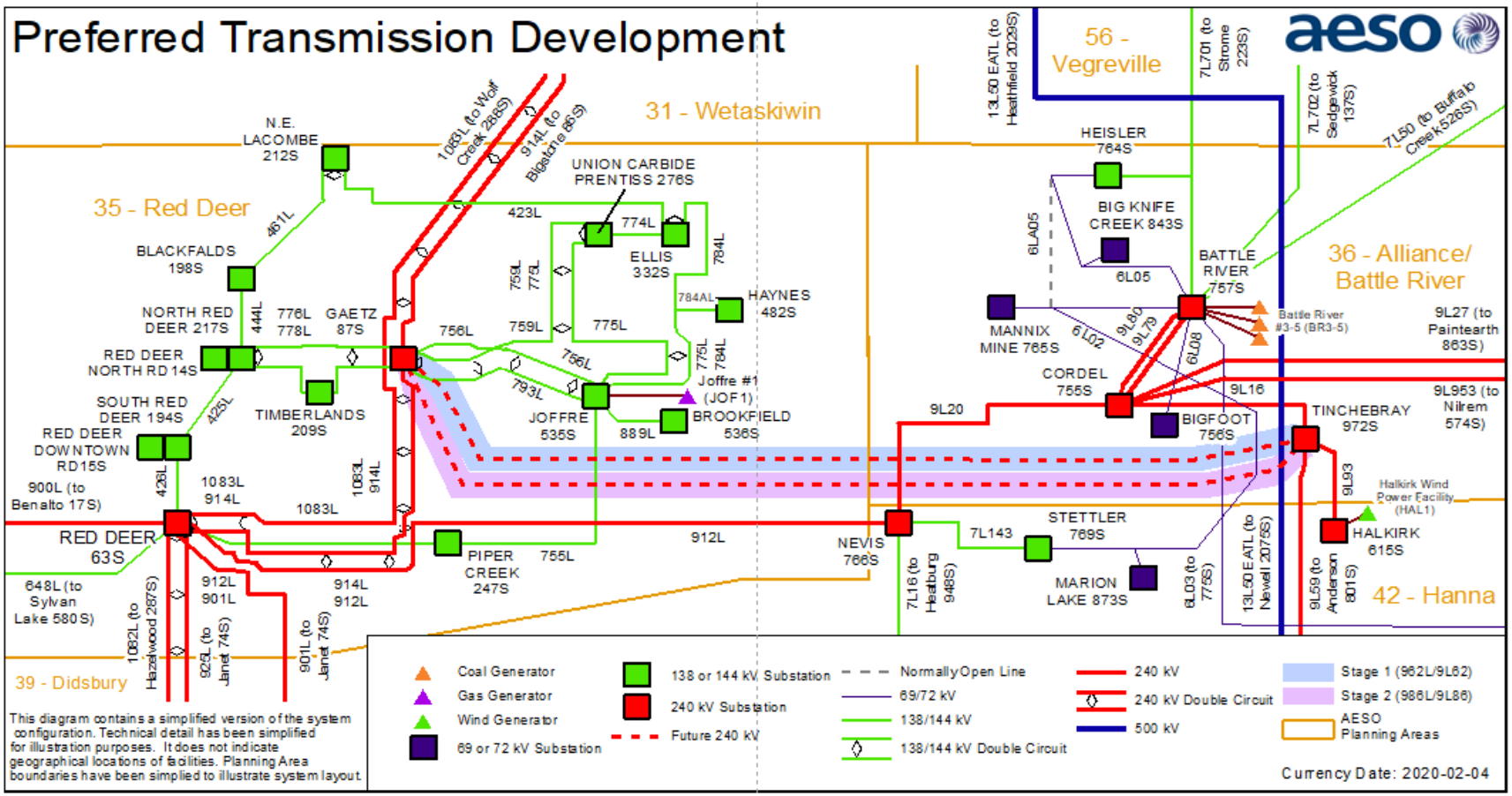
Transmission development options
Key considerations

- The AESO stages transmission development using milestones to ensure construction of transmission facilities is based on the **actual** pace of generation development.
- The AESO must consider both near-term and long-term transmission needs when designing the development options.

- Various transmission development options to alleviate transmission constraints on the CE transfer-out path were considered.
- The options were compared based on technical, environmental land-use effects, and costs.
- The preferred transmission development option is adding two 240 kilovolt (kV) circuits between Tinchebray 972S and Gaetz 87S substations.

Preferred Transmission Development

- Add two 240 kV circuit between existing Tinchebray 972S and Gaetz 87S substations.



Transmission development options
Screening process

- The AESO considered a wide range of transmission development options as part of its screening process, including adding transfer paths from CE sub-region to:
  - load centres in Calgary and Airdrie areas (to the south)
  - Red Deer and Edmonton (west and northwest)
  - Heartland and Cold Lake (northeast and Cold Lake areas)
- Through a series of assessments and evaluation of performance of each option, most of the options were discarded, based on the comparison criteria:
  - technical performance
  - capital costs
  - high-level land impact assessment
- The screening process confirmed that a new transfer-out path from the CE sub-region to the Red Deer area would be the most effective transfer-out path.
- Six options connecting the CE sub-region to the Red Deer area were developed.

Six transmission development options

Option	Description
1	Add two new 240 kV circuits between Tinchebray 972S and Gaetz 87S substations
2	Add two new 240 kV circuits between Tinchebray 972S and Wolf Creek 288S substations
3	Add one new 240 kV circuit between Tinchebray 972S and Gaetz 87S substations and upgrade existing 912L and 9L20
4	Add one new 500 kV circuit between Tinchebray 972S and Gaetz 87S substations
5	Convert Eastern Alberta Transmission Line (EATL) to bi-pole
6	Add one new 240 kV circuit between Cordel 755S and Gaetz 87S substations and add one new 240 kV circuit between Tinchebray 972S and Gaetz 87S substations

Comparison results of the six options

Option	Description	Technical Assessment		Cost Estimates	Environmental and Land Use Effects
		Generation Integration Capability in Study Area	Operational Limitations		
1	Add two 240 kV circuits between the Tinchebray 972S and Gaetz 87S Substations	Provides approximately 820 MW incremental capability.	N/A	The estimated cost is lower than Options 2 and 6.	Lower potential land impact than Options 2 and 6.
2	Add two 240 kV circuits between the Tinchebray 972S and Wolf Creek 288S Substations	Incremental capability is lower (~160 MW) than Option 1.	N/A	The estimated cost (+30/-30%) is higher (~$26M) than Option 1.	Higher potential land impact than Option 1.
3	Add one 240 kV circuit between the Tinchebray 972S and Gaetz 87S Substations and upgrade 240 kV transmission lines 912L/9L20	Incremental capability is lower (~130 MW) than Option 1.	Line rebuilds generally would require lengthy outages. Therefore, this option is expected to require a lengthy outage on 912L and 9L20 resulting in operational complexity. Under outage of the new 240kV circuit, 912L, or 9L20, renewable generation can be dispatched for this option would be lower (~300 MW) than Option 1.	N/A	N/A
4	Add one 500 kV circuit between the Tinchebray 972S and Gaetz 87S Substations	Incremental capability is lower (~130 MW) than Option 1.	Under outage of the new 500 kV circuit, renewable generation dispatched for this option would be significantly (~500 MW) lower than Option 1.	N/A	N/A
5	Convert EATL to bi-pole	Incremental capability is significantly lower (~600 MW) than Option 1.	N/A	N/A	N/A
6	Add one 240 kV circuit between the Gaetz 87S and Cordel 755S Substations and add one 240 kV circuit between the Gaetz 87S and Tinchebray 972S Substations	Provides similar level of integration capability as Option 1, however, provides less flexibility to integrate generation in the west Hanna area where there is strong market interest for renewable development	N/A	The estimated cost (+30/-30%) is higher (~$9M) than Option 1.	Higher potential land impact than Option 1.

Option 1 was selected as the Preferred Transmission Development Option

- The AESO compared the proposed options in terms of:
  - technical performance
  - capital cost
  - environmental and land-use effects

- Option 1 is the Preferred Transmission Development Option because it:
  - is **technically superior** to other options in terms of generation integration capability and operational flexibility
  - has **lower estimated cost**
  - has **lower potential environmental and land use effects**

Three development configurations were considered by the TFOs

Config	Description
1	• Add two 240 kV circuits on a double circuit structure with the conductors tied together in Stage 1. The first circuit to be energized and designated as 962L/9L62, between the existing Tinchebray 972S substation and the existing Gaetz 87S substation. • The second circuit to be untied and energized when the Stage 2 milestone is met and designated as 986L/9L86, between the existing Tinchebray 972S substation and the existing Gaetz 87S substation.
2	• Add one 240 kV circuit on a double circuit structure in Stage 1 with a second circuit added when the Stage 2 milestone is met. The first circuit to be energized and designated as 962L/9L62, between the existing Tinchebray 972S substation and the existing Gaetz 87S substation. • The second circuit to be installed, energized, and designated as 986L/9L86, between the existing Tinchebray 972S substation and the existing Gaetz 87S substation.
3	• Add one 240 kV circuit on a single circuit structure in Stage 1. The circuit is to be energized and designated as 962L/9L62, between the existing Tinchebray 972S substation and the existing Gaetz 87S substation. • Add an additional 240 kV circuit when deemed required on a separate single circuit structure for Stage 2 and file under a separate Facility Proposal.

Both TFOs recommended Configuration 1 as the preferred configuration

- The AESO supports the TFO's recommended Configuration 1 based on the following considerations:
  - reduced overall land and environmental impacts
  - reduced landowner impacts
  - lower construction costs
  - lower net-present-value (NPV) if Stage 2 triggered within 4 years after Stage 1
    - Incremental generation capacity enabled by Stage 1 is approximately 400 MW to 600 MW
    - Reasonable probability this level of incremental generation will connect within the few years period considering the significant market interests and potential in the Study Area

Dynamic Thermal Line Rating (DTLR)

- The AESO will seek opportunities to use DTLR as an operational optimization tool, not as a planning solution, because:
  - DTLRs change dynamically based on weather conditions and therefore can be higher or lower than static ratings, on an hour-to-hour basis
  - an entire line is exposed to different weather conditions, especially longer lines, making it difficult to predict an effective rating dynamically
  - transmission system plans address long-term, broad regional needs
  - it is impossible to predict the hourly weather 5-to-10 years in the future

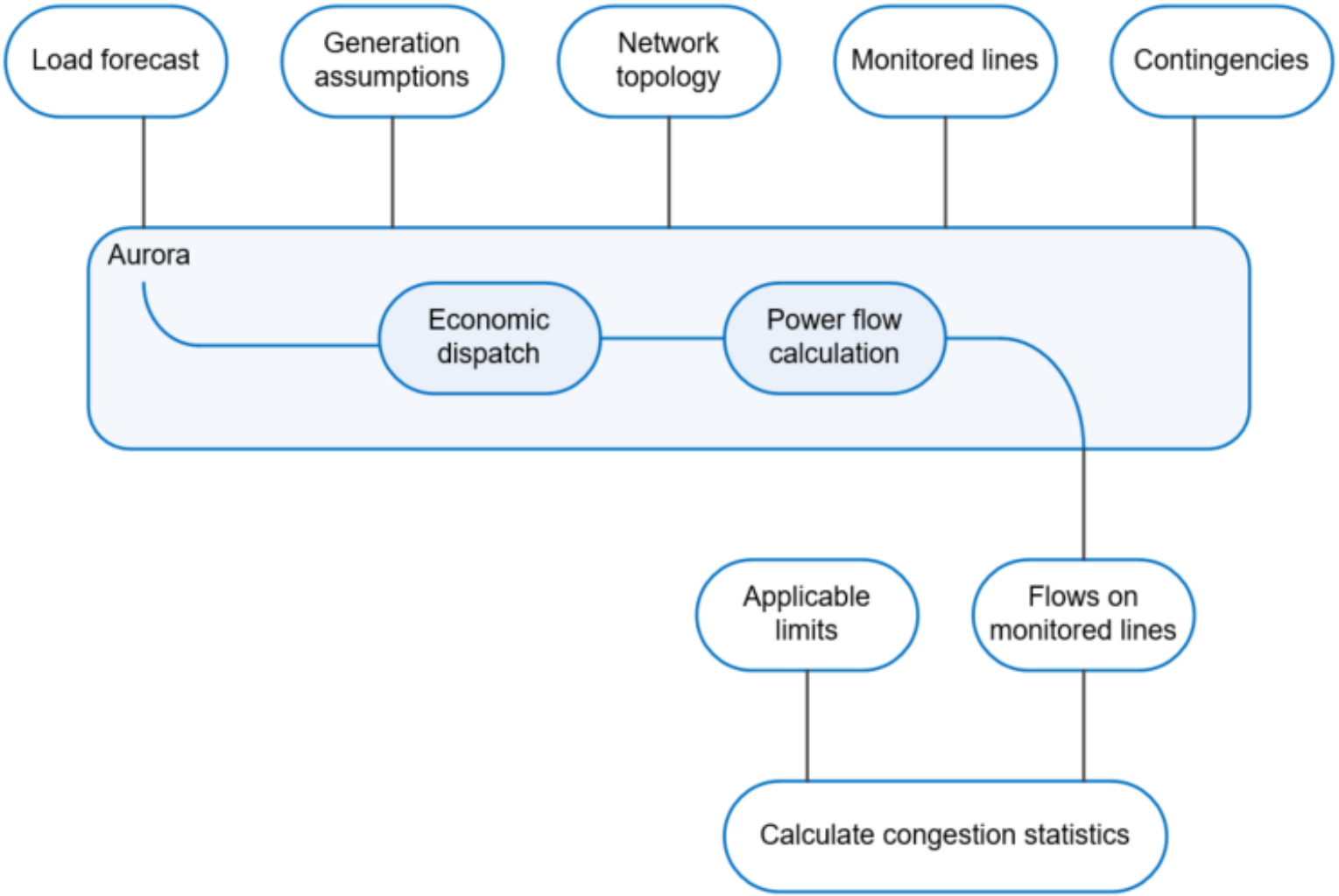
Q&A

Congestion assessment

Congestion assessment
Key considerations

- The congestion assessment used a wide range of renewable capacity levels with broad thermal dispatch scenarios.
- The congestion assessment provides the:
  - overall congestion trend as future generation continues to develop
  - level of incremental generation where congestion begins, guiding the establishment of construction milestone ranges
- The re-affirmation congestion assessment will use the most recent location, size, and type of generation information.

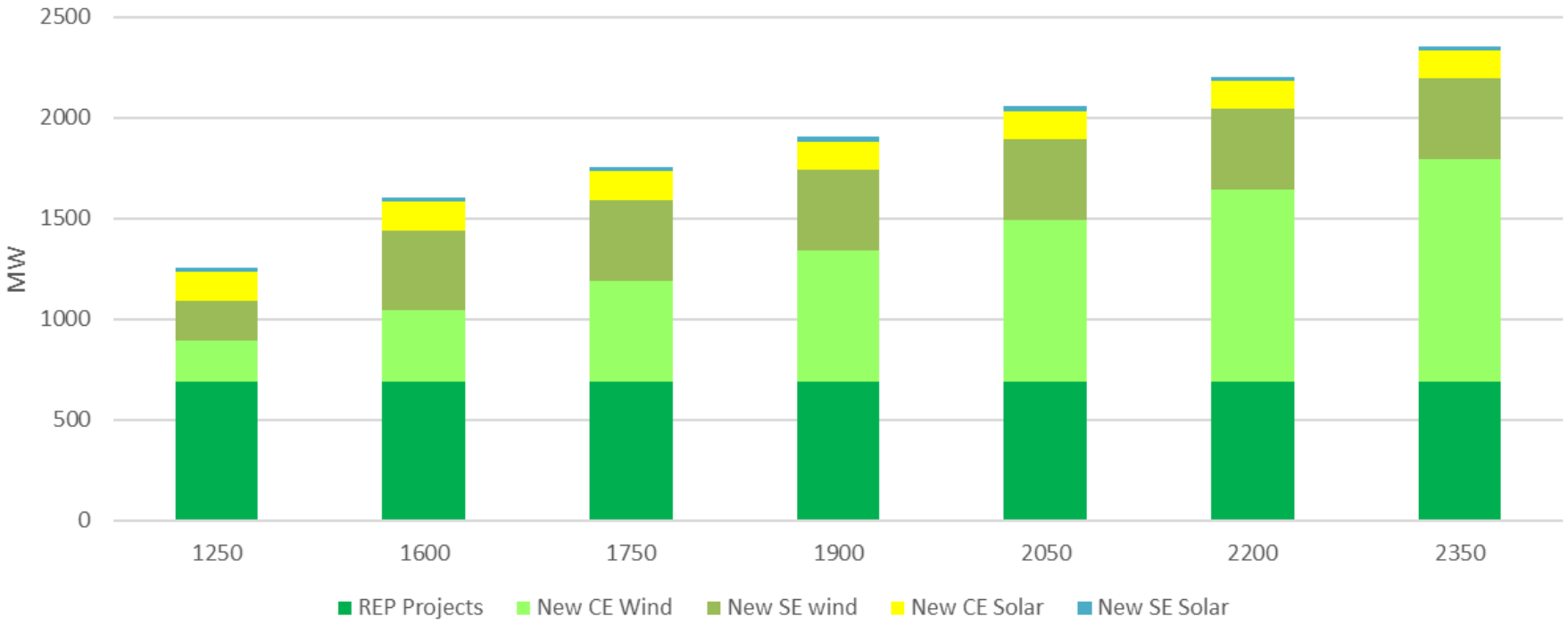
Congestion assessment diagram



Different levels of incremental renewable generation were studied

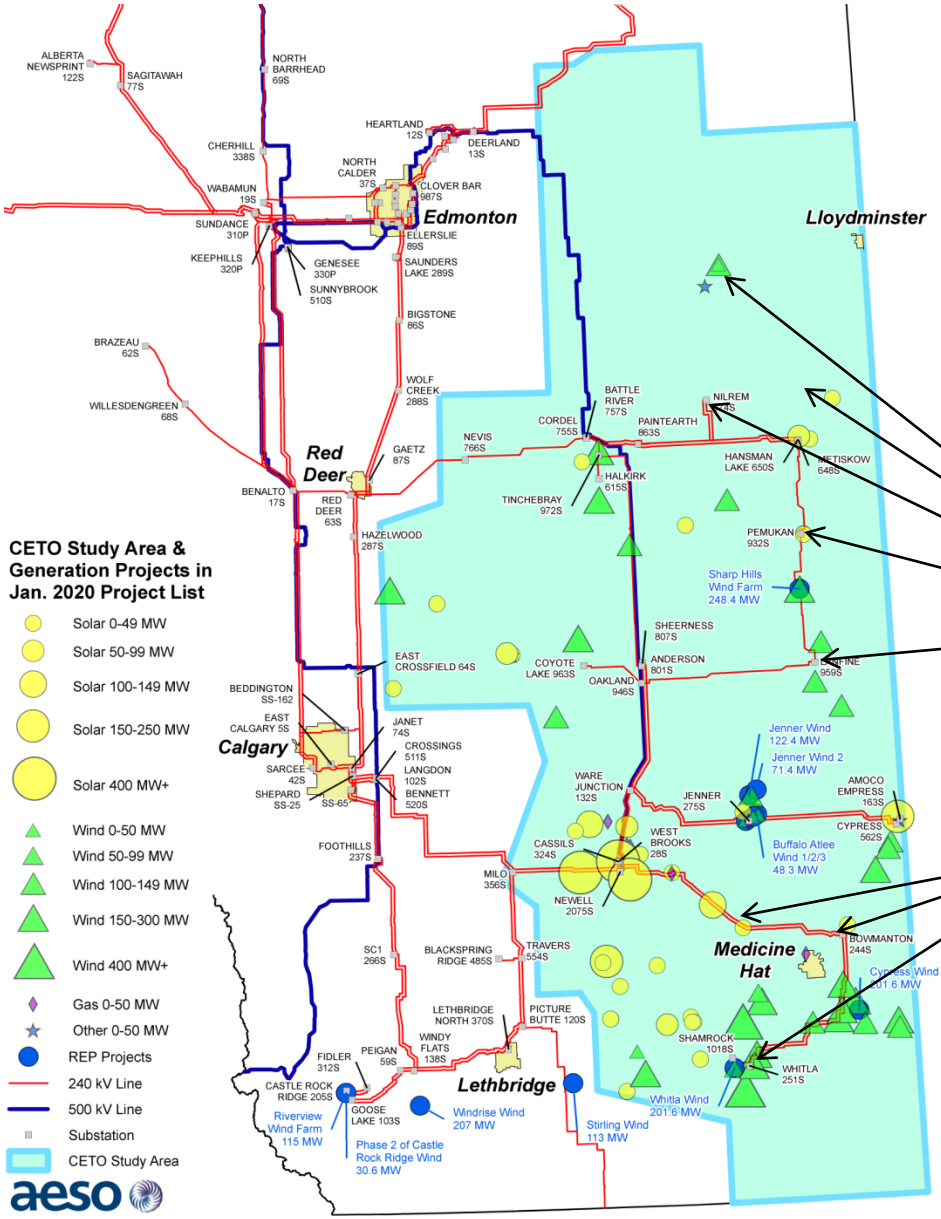
- Different incremental renewable levels in the Study Area were used to evaluate the relationship between percentage of time with congestion and incremental additions

Incremental renewable generation levels studied*



Incremental to generation existing as of Jan. 2020 (2321 MW)

Incremental renewables were located across the CE and SE areas



Assumed CE locations

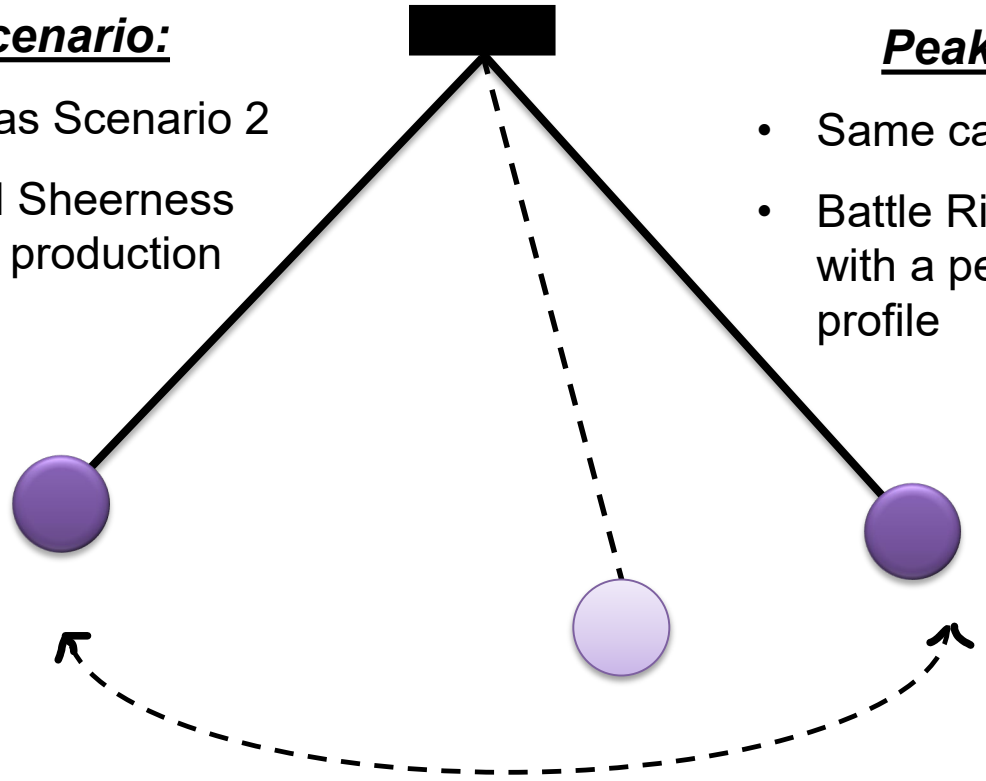
Assumed SE locations

Two broad thermal dispatch scenarios were assessed for existing generation

- Two broad scenarios were used to capture the production range of the existing thermal generation in the Study Area:

Baseload Scenario:

- Same capacity as Scenario 2
- Battle River and Sheerness with a baseload production profile



Peaking Scenario:

- Same capacity as Scenario 1
- Battle River and Sheerness with a peaking production profile

The two thermal scenarios cover reasonable production profile ranges

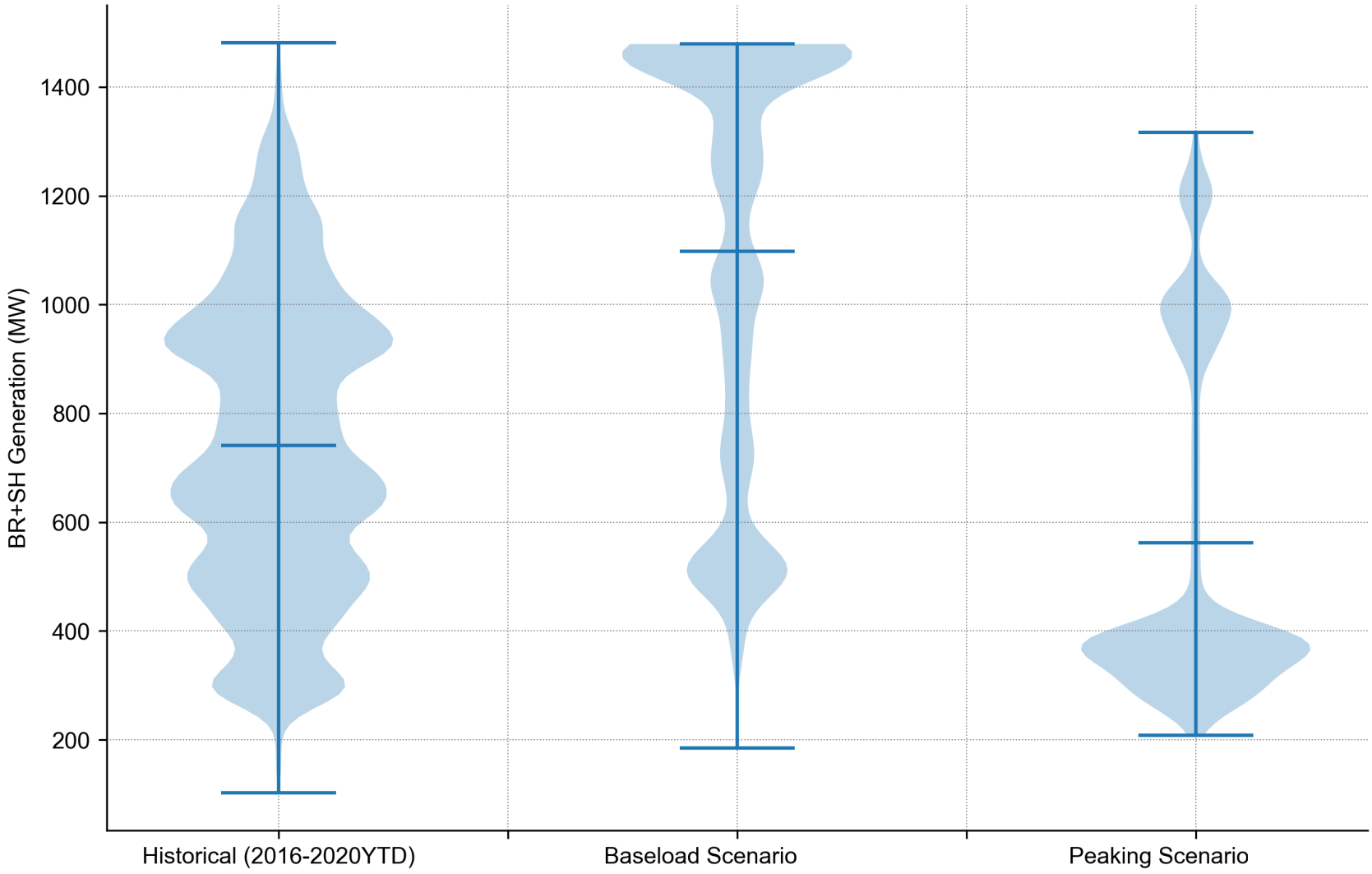


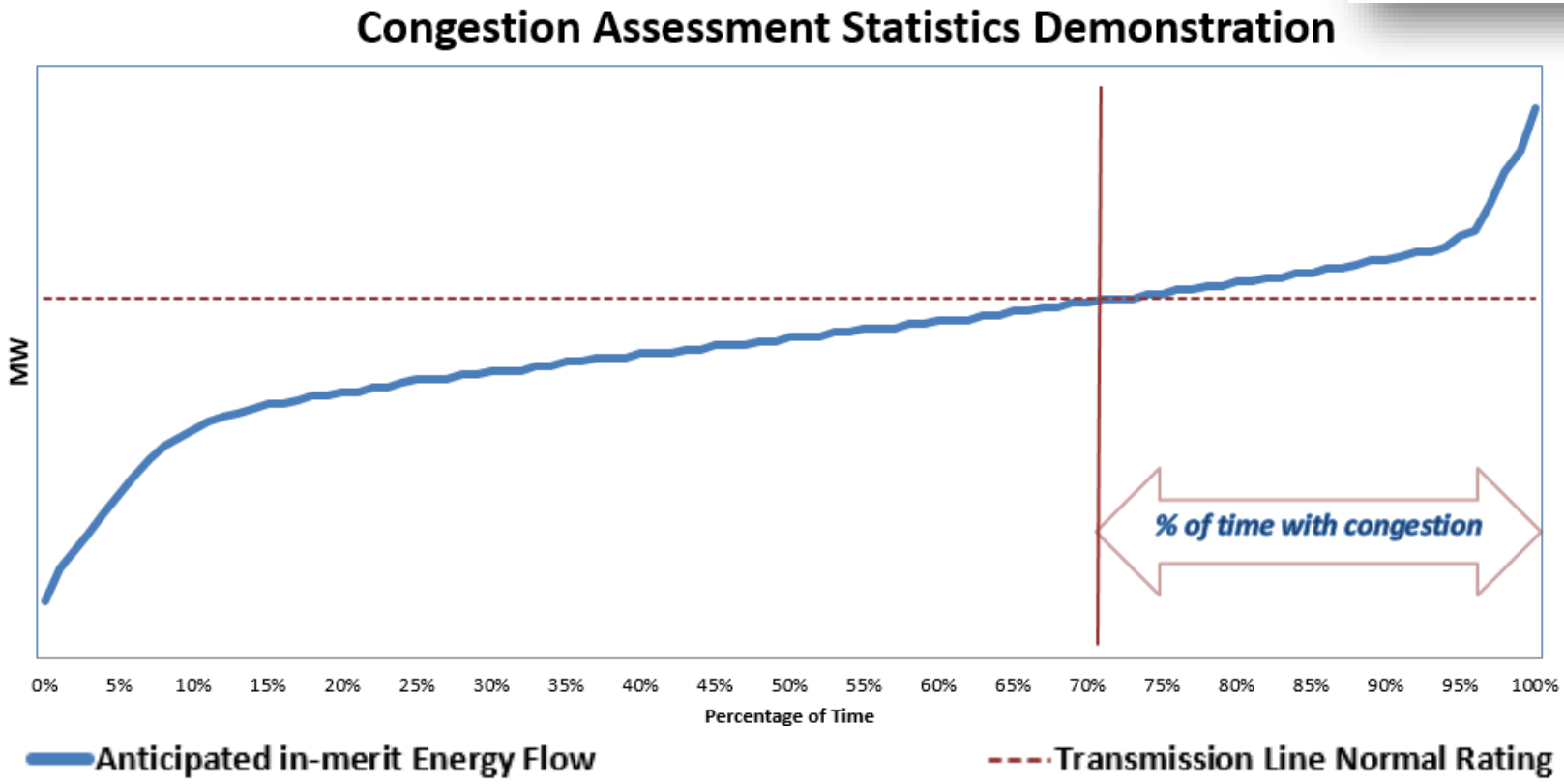
Illustration on how congestion statistics are measured

- Per cent of time with congestion is calculated: related to the AESO's obligations under Section 15(1) (e) of the *Transmission Regulation,*
  - taking into consideration the characteristics and expected availability of generating units, plan a transmission system that
  - (i) is sufficiently robust so that 100% of the time, transmission of all anticipated in-merit electric energy [...] when all transmission facilities are in service [...]

Province of Alberta

ELECTRIC UTILITIES ACT

TRANSMISSION REGULATION

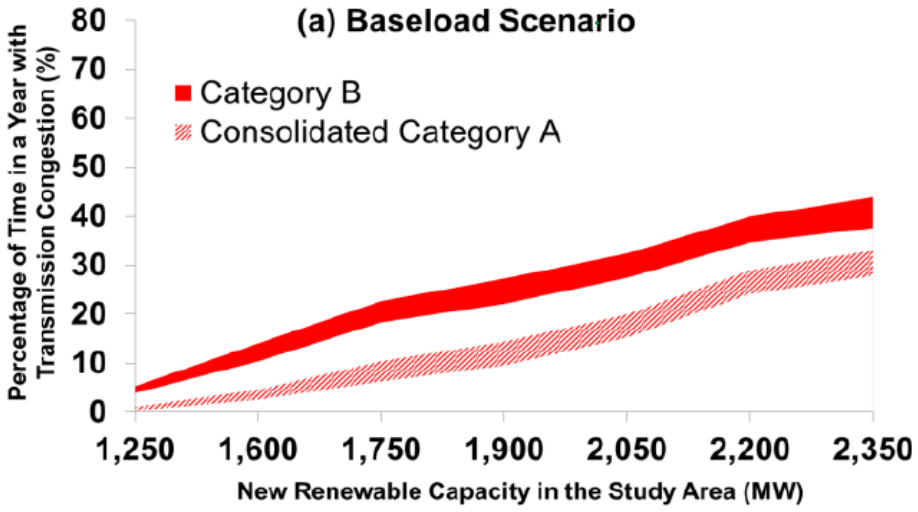


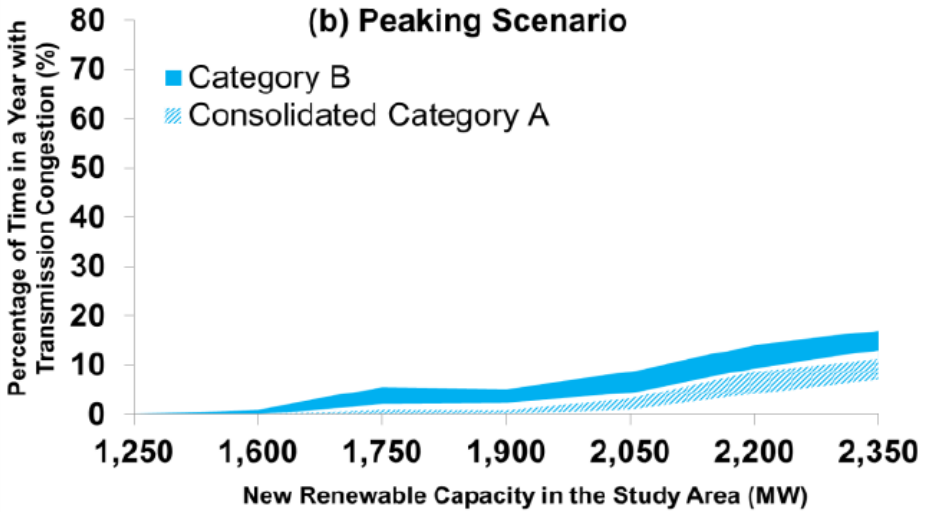
Congestion is assessed for different system conditions

- **Category A Condition**, includes:
  - Category A Congestion
    - Assumes there are **no** system elements out of service (a state that rarely exists)
  - Category A – Most Severe Single Contingency (MSSC) Congestion
    - Occurs when a potential contingency requires the AESO to pre-curtail generation before the contingency occurs, such as due to the contingency tripping more than the MSSC level
  - The results from Category A and Category A-MSSC are consolidated and are referred as **Consolidated Category A** which is used to inform milestones
- **Category B Condition**
  - Congestion that occurs due to a single contingency

Pre-CETO congestion assessment using 100 per cent line rating

- Five iterations of market simulation were performed for each new renewables capacity development level, using the weather-synchronized load and wind profiles





	New Renewables Capacity in the Study Area (MW)						
	1,250	1,600	1,750	1,900	2,050	2,200	2,350
Category B	4.6	12.5	20.8	24.8	30.0	37.7	41.2
Consolidated Category A	0.8	3.8	8.7	12.4	17.6	26.0	30.2
• Category A-MSSC	0.7	3.1	7.6	10.9	15.8	24.7	28.8
• Category A	0.5	2.2	4.8	6.1	10.0	17.6	22.6

(a) Baseload Scenario

	New Renewables Capacity in the Study Area (MW)						
	1,250	1,600	1,750	1,900	2,050	2,200	2,350
Category B	0.1	0.6	3.8	3.8	6.4	11.9	15.5
Consolidated Category A	-	0.0	0.6	0.7	2.2	6.2	9.2
• Category A-MSSC	-	0.0	0.6	0.7	2.2	6.2	9.2
• Category A	-	-	-	0.0	0.1	0.5	4.0

(b) Peaking Scenario

Pre-CETO congestion assessment using 95 per cent line rating

- Operators may need to curtail generation before transmission line loadings reach or exceed ratings in real-time operation.

	New Renewables Capacity in the Study Area (MW)						
	1,250	1,600	1,750	1,900	2,050	2,200	2,350
Category B	7.6	17.3	26.1	30.6	35.1	42.1	45.4
Consolidated Category A	1.9	6.6	12.8	16.9	22.3	30.5	34.5
• Category A-MSSC	1.4	5.3	11.2	15.1	20.4	29.0	32.7
• Category A	1.3	4.3	7.4	9.1	13.9	21.8	26.5

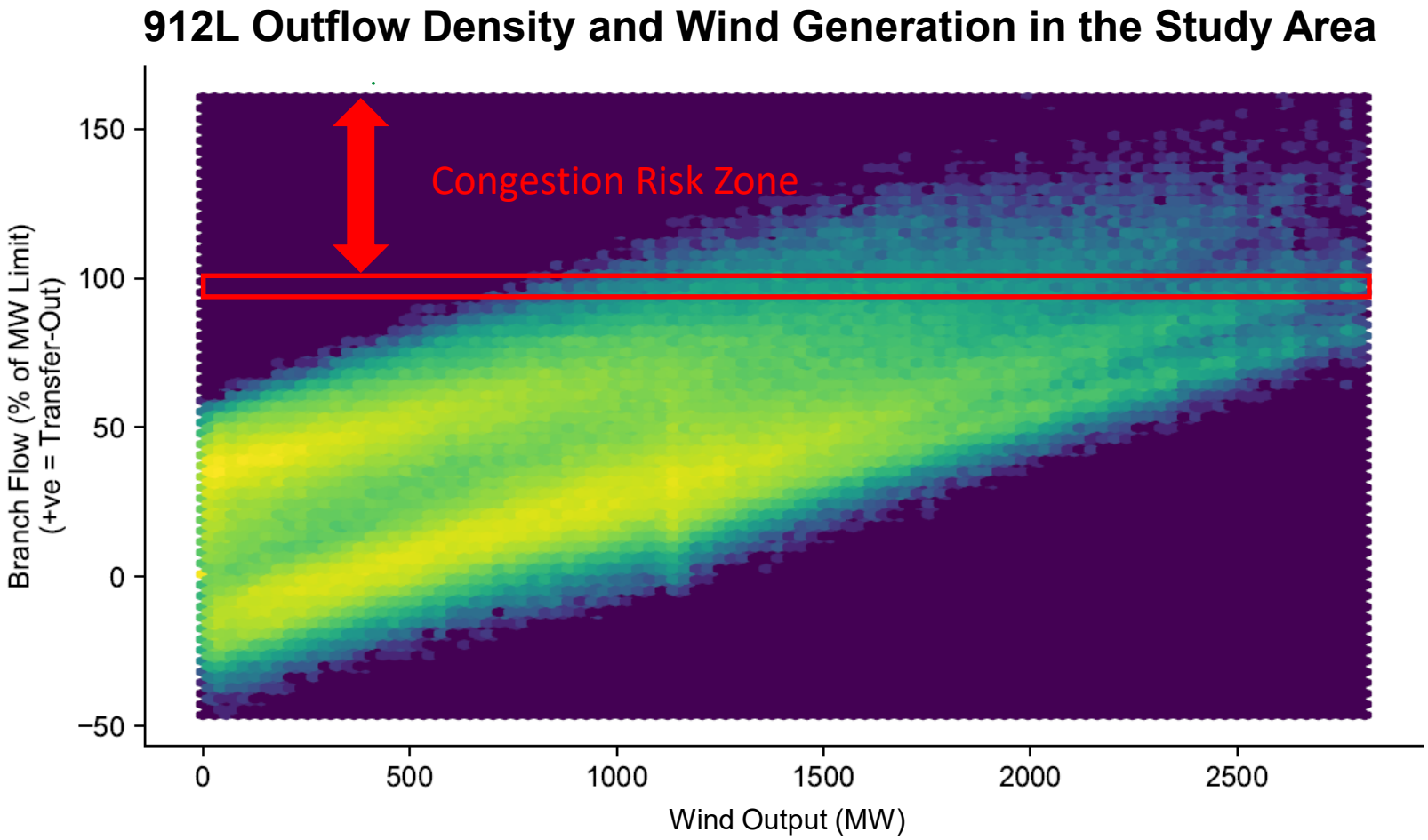
(a) Baseload Scenario

	New Renewables Capacity in the Study Area (MW)						
	1,250	1,600	1,750	1,900	2,050	2,200	2,350
Category B	0.2	1.2	5.2	5.1	8.0	14.1	17.8
Consolidated Category A	0.0	0.1	1.4	1.4	3.5	7.9	11.2
• Category A-MSSC	0.0	0.1	1.4	1.4	3.5	7.9	11.2
• Category A	-	-	0.0	0.0	0.3	2.7	5.9

(b) Peaking Scenario

Impact of renewables trends on outflow

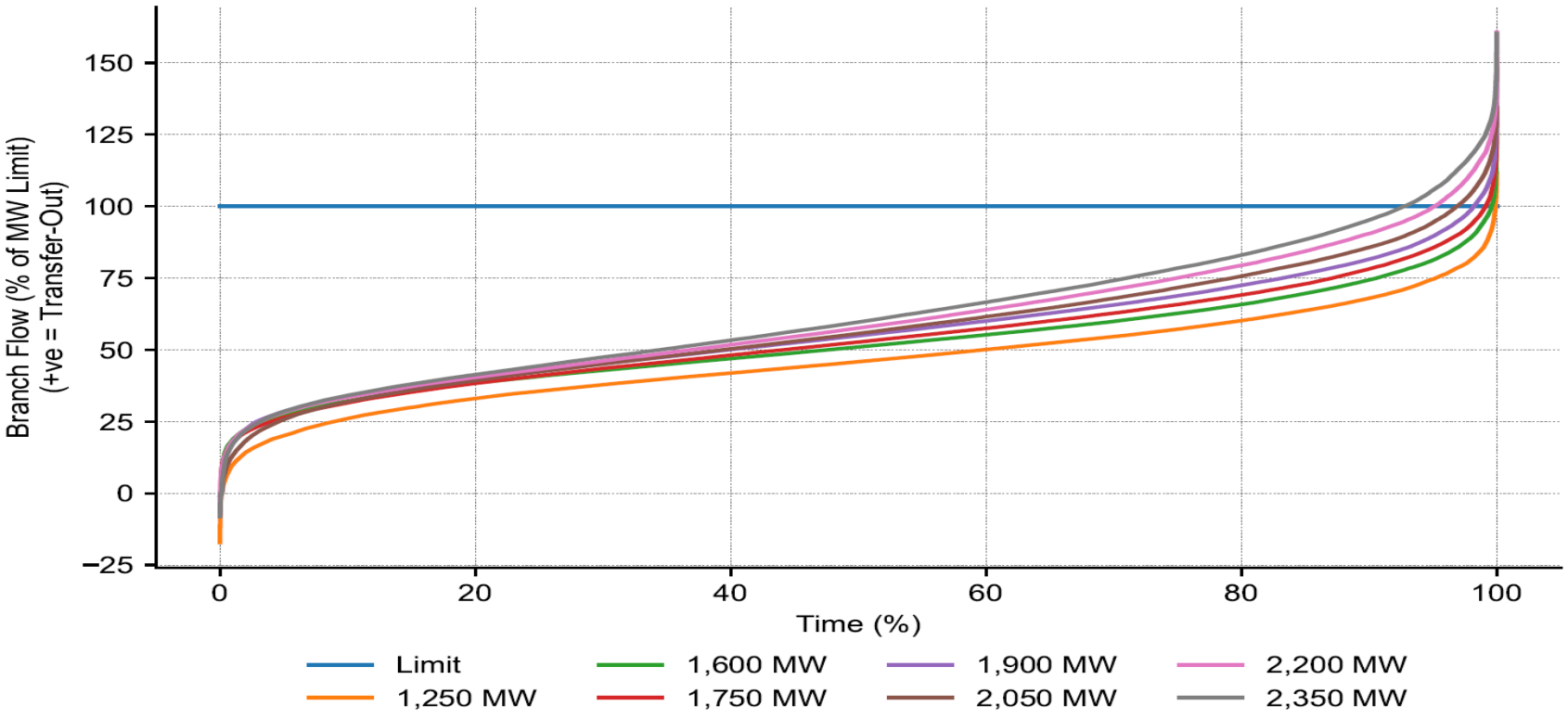
- Positive correlation between outflows and wind generation



The amount of generation that needs to be curtailed to address congestion has an effectiveness factor

- Depending on the location of generation, the effectiveness to reduce the line overflows will vary:
  - 1 MW of congestion on the 138 kV transmission lines 174L and 701L, the average generation curtailment in the Study Area would be approximately 20 MW and 27 MW, respectively.
  - 1 MW of congestion on the 240 kV transmission lines 912L and 9L20, the average generation curtailment in the Study Area would be approximately 4 MW.

Figure A4a - 912L Line Loading



Results to inform milestone

Summary of Consolidated Category A Congestion Results (Average % of Time with Congestion)

		New Renewables Capacity in the Study Area (MW)						
CETO Status	**Scenario**	**1,250**	**1,600**	**1,750**	**1,900**	**2,050**	**2,200**	**2,350**
Pre-Project	**Baseload**	0.8	3.8	8.7	12.4	17.6	26.0	30.2
	Peaking	-	0.0	0.6	0.7	2.2	6.2	9.2
Post-CETO First Circuit	**Baseload**	-	0.0	0.3	0.5	1.8	7.8	12.3
	Peaking	-		-	-	0.0	0.2	1.0
Post-CETO Second Circuit	**Baseload**	-		-	0.0	0.0	0.2	1.0
	Peaking	-		-	-	-	-	-

- The amount of congestion depends on both thermal and renewable generation.
- As generation continues to develop in the Study Area, congestion will increase.
- Energizing the first circuit of CETO reduces congestion.
- The second circuit will further reduce congestion.

Q&A

In summary

- The AESO has proposed the CETO project ($322M) to meet its planning obligations to address anticipated congestion and to ensure a large renewable rich region of the province will have transmission capacity to enable competitive generation to access the market.
- The AESO is balancing the timing of the need with ensuring market access through use of a milestones approach where the milestone approach effectively manages forecast and timing risks.
- The AESO's milestone approach manages forecast uncertainty by committing to reaffirm congestion study results before triggering construction.
- The timing of construction is an asymmetrical risk
  - $10 million per year cost to ratepayers if triggered one year early
  - A large resource rich region constrained from competitive development

Cross Reference of Slides to Intervener Questions Received (1)

Slide #	Related Questions
14-17	CCA Q7; LORC 1
18	CCA Q9-15, Q29
19	CCA Q28
21	CCA Q30-31, Q34-35, Q106-107
22	CCA Q35, Q46
23	CCA Q77;
24	CCA Q80, Q104
28-29	CCA Q3-5, Q78, Q87-88, Q90-91, Q101-103
35	CCA Q1, Q79, Q82
39 - 40	CCA Q92- 95
41	IPCAA 2

Continued (2)

Slide #	Related Questions
45	CCA Q13, Q36-37, Q42, Q53, Q63, Q98, LORC 12-13, 16
46, 47	CCA Q21-23, Q32
48, 49	CCA Q31, Q50-51, Q62, LORC 16
51	LORC 12
50, 52, 53, 56	CCA Q41, Q99, Q101-103
54	LORC 14
55	LORC 15

Resources that Address Other Intervenor Questions Received

Topic	Resource
Forecasting Load and Generation Details	General: *AESO's 2019 Long-term Outlook* (see: https://www.aeso.ca/grid/forecasting/) CETO Project-Specific: Appendix B of the CETO NID, *Load and Generation Forecast* (Exhibit 25469_X0195)
AESO's CETO Participant Involvement Program	Appendix F of the CETO NID Application, *AESO PIP Summary* (Exhibit 25469_X0199)
Central East Transfer-Out Transmission Development Facility Siting and Routing	ATCO Facility Application, *Central East Transfer-Out Transmission Development Project* (Applications 25469_A002 to 25469_A007) AltaLink Facility Application, *Central East Transfer-Out Transmission Development* (Applications 25469_A008 to 25469_A010)
Project Cost Allocation	ISO tariff and related IDs (see: https://www.aeso.ca/rules-standards-and-tariff/tariff/)
AESO's Connection Project List Details	AESO's Project List (https://www.aeso.ca/grid/projects/project-reports/)

Q&A

Thank you

Contact the AESO

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