Central East Transfer-out (CETO)

Final Assumptions for the Reaffirmation Study

March 10, 2022

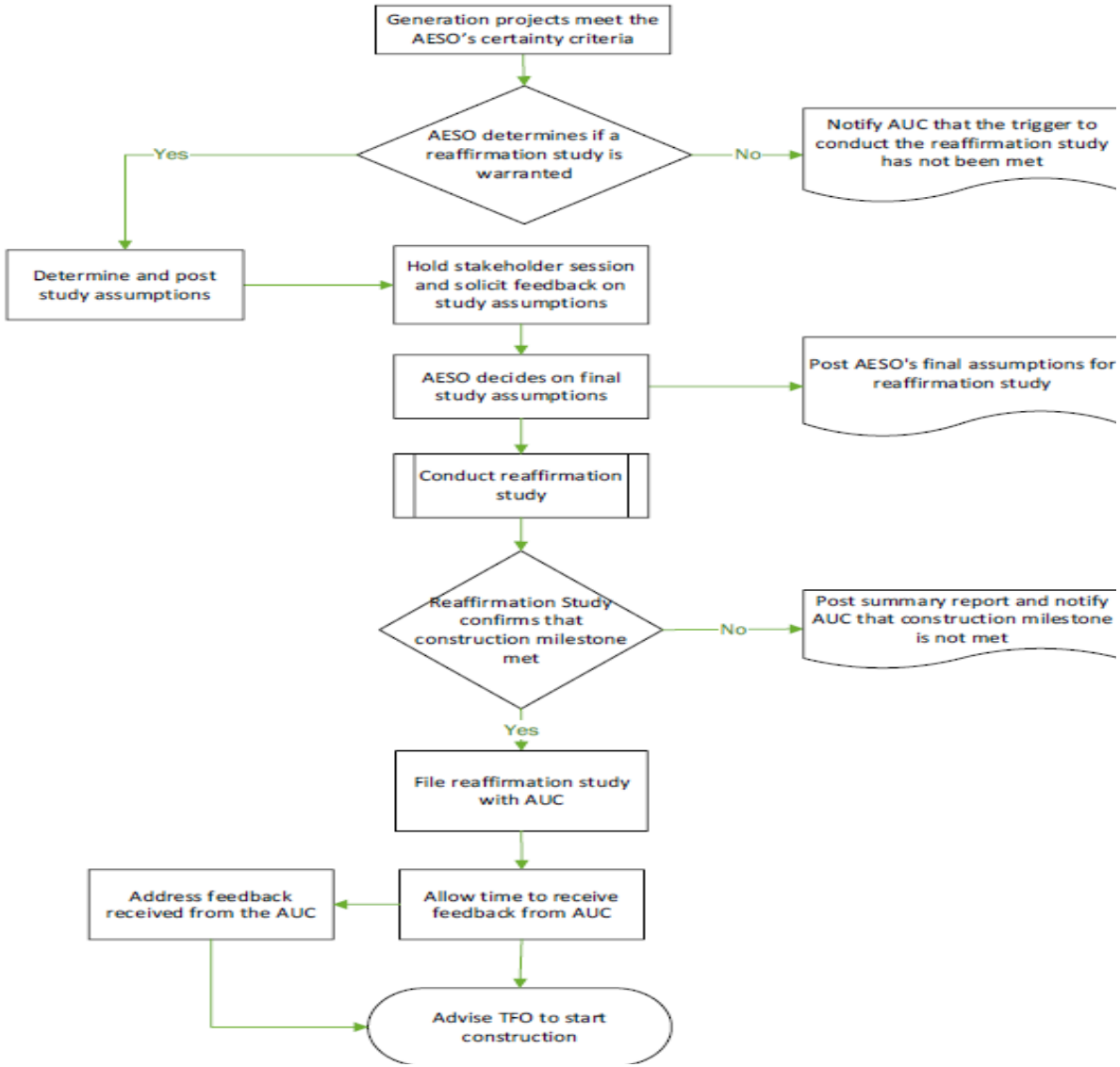
Background for reaffirmation study

- The AESO's Needs Identification Document and the transmission facility owners' Facility Applications were approved by the Alberta Utilities Commission in August 2021

- The CETO milestone upper limit (generation projects met certainty criteria) was reached as of October 2021

- The AESO will perform the reaffirmation study using the most up-to-date information to provide an updated forecast of congestion
  - Process steps will be shown in the next slide

CETO reaffirmation process (as filed)



CETO Reaffirmation Study – Final Assumptions

System assumptions

- Study Area includes Central East (CE) and Southeast (SE)
- Years 2024 and 2030 will be studied
  - The earliest in-service date for CETO is anticipated to be 2024 timeframe
  - Year 2030 will be assessed only when the 2024 study (with sufficiently certain projects) confirms that CETO needs to be triggered
- 2021 Long Term Outlook Reference Case load forecast will be used
  - Five correlated hourly load and renewable profiles
- System project
  - Provost-to-Edgerton and Nilrem-to-Vermillion (PENV) will be included to align with CETO application; sensitivity will be performed without PENV
- Facility ratings

Transmission Line	Voltage Class (kV)	Summer Rating (MVA)	Winter Rating (MVA)
912L	240	507	624
9L20	240	489*	540
174L	138	120	145
701L	138	119	146

*: TCM works required

Thermal generation

- Thermal generation, i.e., Battle River / Sheerness, impacts the potential congestion in the CE transmission system
- The Battle River / Sheerness units have transitioned to gas, and the anticipated retirement year of these units would be 2030 or beyond
- Sensitivity scenario assuming the retirement of all BR/SH units will be considered

Reaffirmation Study

Facility	Capacity (MW)	Scenario 1 (all units in service)		Scenario 2 (all units retired)	
		2024	2030	2024	2030
BR4	155	Dual fuel (peaking)		Retired	
BR5	385	Gas fired steam (peaking)		Retired	
SH1	400	Gas fired steam (peaking)		Retired	
SH2	400	Gas fired steam (peaking)		Retired	

CETO NID

Facility	Capacity	2023	2024	2025	2026	2027	2028	2029
BR3	149	New gas-fired generation Baseload unit						
BR4	155	New gas-fired generation Baseload unit						
BR5	385	Baseload unit						
SH1	400	Baseload unit						
SH2	390	Baseload unit						
Total (MW)	1,479	1,479						

(a) Baseload Scenario

Facility	Capacity	2023	2024	2025	2026	2027	2028	2029
BR3	149	Retired						
BR4	155	Peaking unit			Retired			
BR5	385	Peaking unit						
SH1	400	Peaking unit						
SH2	390	Peaking unit						
Total (MW)	1,479	1,330			1,175			

(b) Peaking Scenario

Battle River/Sheerness assumptions

Value		Unit	BR4 (CtG)	BR5 (CtG)	SH1 (CtG)	SH2 (CtG)
Capacity	Zero Dollar Capacity	% of Nameplate	20%	24%	35%	35%
	Incremental Capacity	% of Nameplate	80%	76%	65%	65%
Emission Intensity	Zero Dollar Capacity Emission Intensity	t/MWh	0.82	0.75	0.65	0.65
	Incremental Capacity Emission Intensity	t/MWh	0.58	0.59	0.55	0.55
Offer Strategy	Zero Dollar Offer Strategy	Block 0	$0 Block	$0 Block	$0 Block	$0 Block
	Incremental Capacity Offer Strategy	Block 1	32% at (1.2 x Variable Cost)	28% at (1.1 x Variable Cost)	15% at (1.26 x Variable Cost)	15% at (1.26 x Variable Cost)
		Block 2	21% at (1.28 x Variable Cost)	12% at (1.25 x Variable Cost)	13% at (1.36 x Variable Cost)	13% at (1.36 x Variable Cost)
		Block 3	10% at (1.31 x Variable Cost)	13% at (1.28 x Variable Cost)	12% at (1.37 x Variable Cost)	12% at (1.37 x Variable Cost)
		Block 4	17% at (1.32 x Variable Cost)	12% at (1.3 x Variable Cost)	8% at (1.4 x Variable Cost)	8% at (1.4 x Variable Cost)
		Block 5		11% at (1.32 x Variable Cost)	9% at (1.41 x Variable Cost)	9% at (1.41 x Variable Cost)
		Block 6			8% at (1.42 x Variable Cost)	8% at (1.42 x Variable Cost)
Other	Initial Simulated Capacity Factor in 2023		6%	19%	34%	30%
	Full Load Heat Rate (gross)	GJ/MWh	10.45	10.37	10.00	10.00
	VO&M	2019 $/MWh	4.17	4.17	4.17	4.17
	Fixed O&M	2019 $/kW	31.09	31.09	31.09	31.09

Items in green are updates reflecting feedback received from/after the stakeholder session

Other assumptions

- Natural gas
  - 2023-2030: $3.05/GJ to $3.40/GJ [updated reflecting feedback received from/after the stakeholder session]
- Carbon price and policy
  - 2022-2030: $50/tonne to $170/tonne
  - TIER with benchmark of 0.37t/MWh
- Generation outside of Study Area
  - Only existing generation and generation projects meeting certainty criteria included
  - For the SW area:
    - Installed renewables generation totaling 1,900 MW
    - Generation projects meeting certainty criteria totaling 400 MW

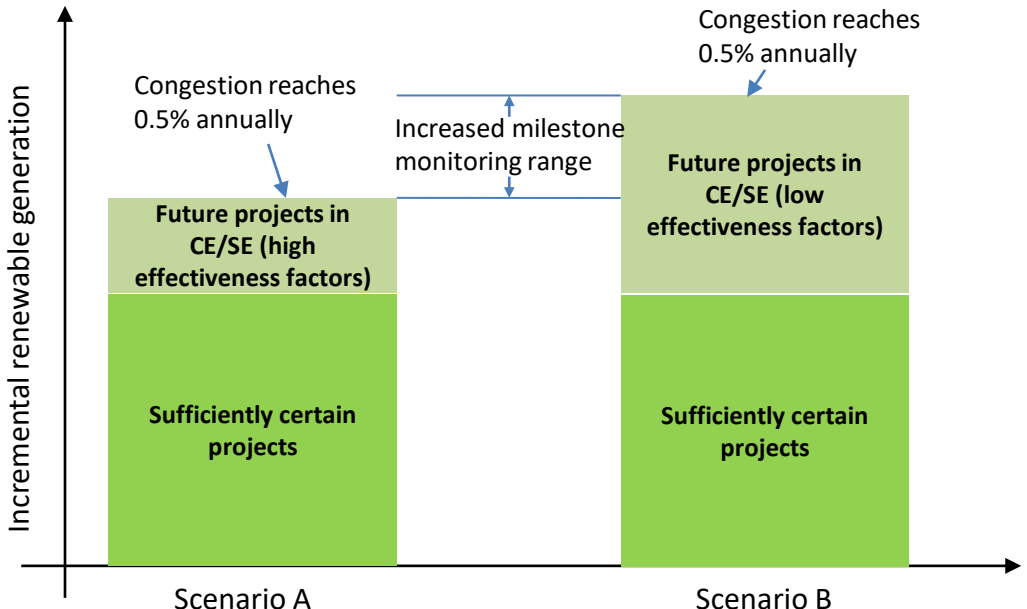
Renewables generation assumptions

- Use generation information as of Jan. 2022
  - Installed renewables generation in the CE and SE totaling 1,100 MW
  - Generation projects that met inclusion criteria totaling 1,400 MW
- Future scenarios to examine congestion trend and to inform updated milestone monitoring range if required
  - Additional 2,400 MW generation
  - Technology and location split are based on project list

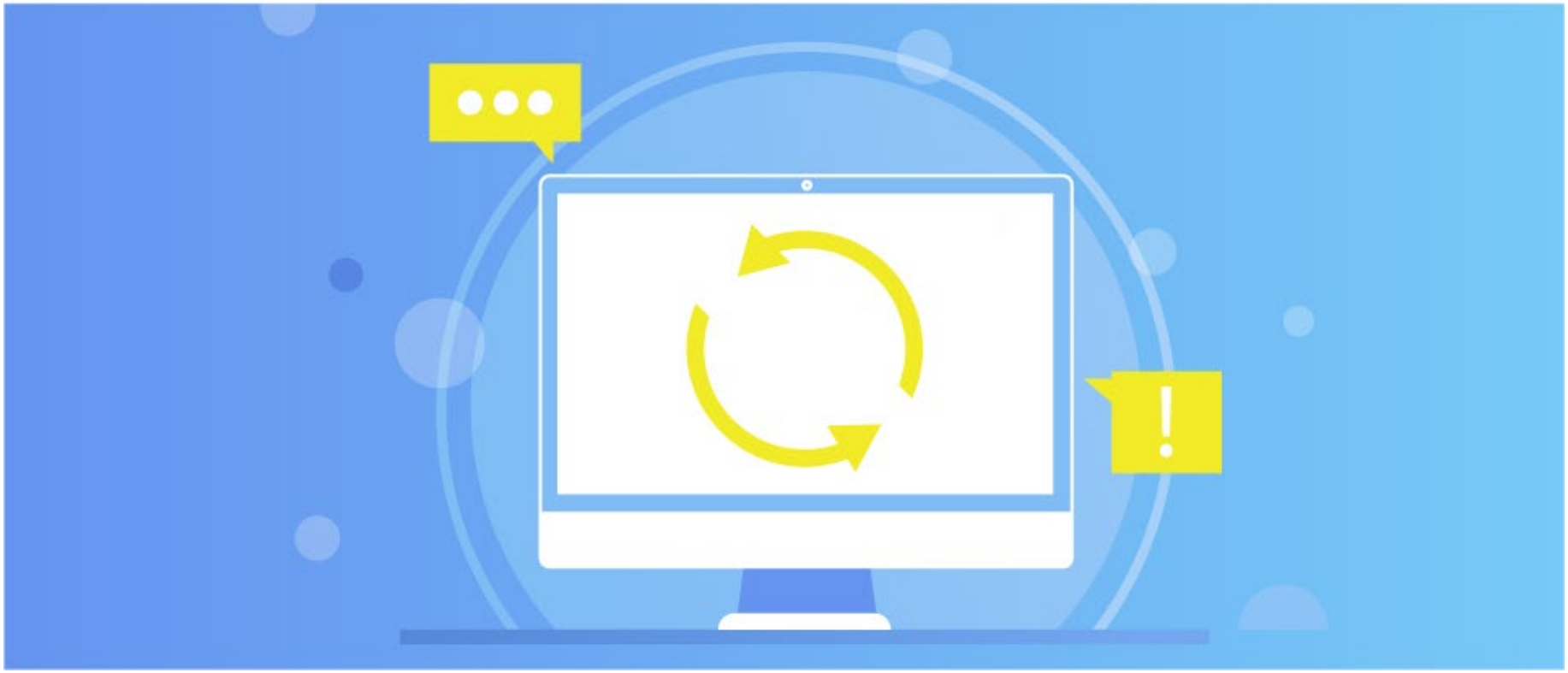
Renewables generation assumptions

- Future renewables generation projects will be added based on actual projects in AESO's connection list
  - Sufficiently certain: projects meeting inclusion criteria
  - Incremental 1: the proponent has indicated its commitment to advance the project by securing required financing
  - Incremental 2: the proponent has indicated it is in the final stages of securing its required financing
- Should sufficiently certain projects not trigger the construction, new milestone monitoring range will be established based on project effectiveness factor

Scenario	Future Renewable Generation in CETO Study Area		
	CE (MW)	SE (MW)	Study Area Total (MW)
Sufficiently certain	350	1057	1407
Incremental 1 (in addition to sufficiently certain projects)	610	975	1585
Incremental 2 (in addition to Incremental 1 scenario)	60	705	765



Contact the AESO



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Thank you