2021 Long-term Outlook Scenarios – December, 2020

2021 Long-term Outlook Stakeholder Feedback

Period of Comment:	December 15, 2020	through	January 15, 2021
Comments From:	Pembina Institute		
Date:	2021/01/14		

[redacted]

Keeping with the mandate of providing safe, reliable and economic operation of the Alberta electricity system while facilitating a fair, efficient and competitive market for electricity, the AESO is developing the 2021 Long-term Outlook (LTO).

Given the challenges faced as a result of the COVID-19 pandemic and the low oil price, feedback provided to the AESO will be an important input into how we forecast Alberta's the near to long-term electricity. The AESO will use scenarios as a means of stress testing various market, technological, consumer behaviour, policy and economic outcomes, to assist stakeholders in understanding potential long-term future outcomes in the Alberta electricity market.

Please fill email your completed questionnaire to forecast@aeso.ca by January 15, 2021.

We value stakeholder input and thank you for sharing your perspective. In alignment with our Stakeholder Engagement Framework (link) all stakeholder submissions, in their original state with personal information redacted, will be published online at www.aeso.ca

Further stakeholder engagement on LTO scenarios and preliminary results can be expected as the AESO makes progress toward the anticipated publication date in Q2 of 2021.

Preliminary results will be based in part from stakeholder feedback received in June 2020.

The AESO thanks you for your time and appreciates your input.

The AESO is seeking comments from Stakeholders with regard to the following matters:

	Questions	Stakeholder Comments

1.	a) Do the proposed LTO scenarios cover a reasonable range of plausible future outcomes? b) Which scenario do you think is more likely? c) Which one is less likely?	*a) While the proposed scenarios offer a wide range of future outcomes, edits to the reference scenario and the addition of new scenarios would cover a greater reasonable range of plausible future outcomes.* *According to slide 9, the reference scenario of the 2021 LTO results in a renewable generation percentage of 22% in 2030. This contradicts Alberta's legislated target to generate 30% of its electricity from renewable sources by 2030, as set by the Renewable Electricity Act.[1] Given the existence of this legislated target, all the LTO scenarios adopted by the AESO should achieve or exceed 30% renewable generation in 2030.* *The federal government's* A Healthy Environment and a Healthy Economy[2] *includes significant measures such as an increase in the carbon price by $15 / tonne per year from 2022 to 2030, reaching $170 / tonne then.* *The federal government also committed to review and strengthen the output-based standards applied to all industrial sectors, which include electricity generation.[3] This could impact the output-based allocation in TIER, currently set at 0.370 tonne / MWh.* *The federal government is also exploring a potential "clean electricity performance standard."[4]* *Such measures, along with the continuing fall in the price of wind, solar and storage, would accelerate the deployment of zero- and low-emitting technologies in Alberta.* *b) Among the current scenarios listed by the AESO, the "Clean Tech" scenario is more likely. This scenario assumes a carbon price reaching $100/tonne in 2030, whereas the federal climate plan announced on December 11, 2020 sets the carbon price at $170/tonne in 2030.* *It is difficult to comment on the AESO's assumptions on the cost projections of wind and solar because the AESO has not released these quantitative estimates. To validate assumptions on the cost projections for*

[1] Province of Alberta, *Renewable Electricity Act*, S. 2016, R-16.5. https://www.qp.alberta.ca/documents/Acts/r16p5.pdf

[2] Environment and Climate Change Canada, *A Healthy Environment and a Healthy Economy* (2020). https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/climate-plan/healthy_environment_healthy_economy_plan.pdf

[3] Environment and Climate Change Canada, *A Healthy Environment and a Healthy Economy Annex: Pricing carbon pollution* (2020), 3. https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/climate-plan/annex_pricing_carbon_pollution.pdf

[4] Environment and Climate Change Canada, *A Healthy Environment and a Healthy Economy Annex: Clean electricity* (2020), 3. https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/climate-plan/annex_clean_electricity.pdf

		renewable electricity, we recommend the AESO compare AWS Truepower cost projections with other sources such as the Annual Technology Baseline *of the National Renewable Energy Laboratory.*[5] *The reference case scenario significantly underestimates the growth of renewable corporate PPAs. Based on the corporate deals announced in 2019 and 2020, we know that 117.6 MW of wind and 278.5 MW of solar (totaling 396.1 MW of renewables) will be installed in 2021-2022. These announcements exceed the AESO's current assumption for the reference scenario (250 MW by 2030). In addition, given the momentum in the corporate procurement world along with the growth in ESG interests, it is reasonable to expect more corporate PPAs to be announced in 2021 and beyond. The Business Renewables Centre Canada, a joint initiative of the Pembina Institute and the Rocky Mountain Institute, is a non-profit initiative seeking to catalyze the market for non-utility procurement in Canada. Its goal is to see 2 GW of announced deals by 2025. The fact that the Clean Tech scenario assumes a higher number of renewable corporate PPAs also makes it a more likely scenario.* *c) See answer to question 4.*
2.	Does the "Clean-Tech" scenario focus on the appropriate technologies and policies?	*Overall, the "Clean-Tech" scenario focuses on the right technologies. To refine the scenario, we recommend the addition of greater energy efficiency improvements. A more significant growth in the adoption of demand-side management technologies (including heat pumps) should be included in the scenario.*

[5] National Renewable Energy Laboratory, "ATB Electricity Data Overview." https://atb.nrel.gov/electricity/2020/index.php?t=in

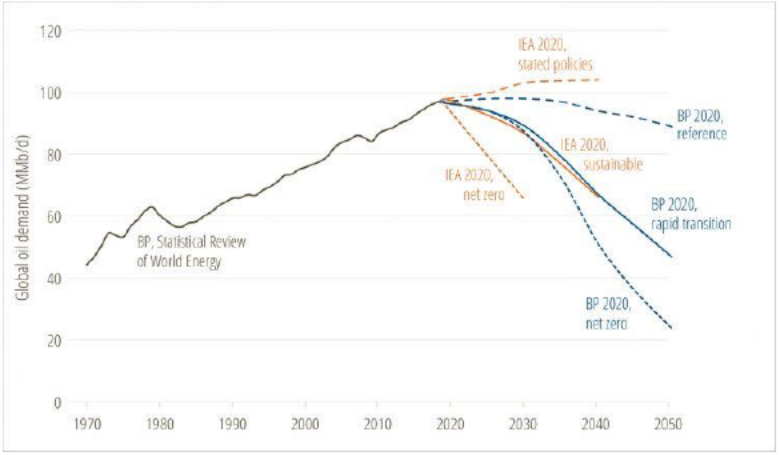
3.	Are there different scenarios that warrant inclusion?	*There is currently no scenario in line with Canada's target to reduce greenhouse gas (GHG) emissions across the economy and the electricity grid to net-zero by 2050 as outlined in the federal climate plan announced on December 11, 2020 and in line with Canada's goal of 90% emissions-free electricity by 2030.* *For example, Nova Scotia Power's latest Integrated Resource Plan[6] includes scenarios that "achieve between 87 and 95 percent reductions in greenhouse gas emissions from the Nova Scotia Power electricity system by 2045."[7] In addition, major organizations with extensive experience in developing forward-looking analyses such as the International Energy Agency[8] and BP[9] developed scenarios that meet the goals of the Paris Agreement. While the LTO does not project to 2050, we recommend the addition of a scenario to 2040 in which the trajectory the GHG emissions from Alberta's electricity generation is on track to reach net-zero by 2050.*

[6] Nova Scotia Power, Integrated Resource Plan (2020). https://irp.nspower.ca/

[7] Nova Scotia Power, *Powering a green Nova Scotia together: 2020 Integrated Resource Plan Summary*, 5. https://irp.nspower.ca/files/key-documents/E3_NS-Power-2020-IRP-Report_Summary_Nov-27-2020.pdf

[8] International Energy Agency, "World Energy Model – Sustainable Development Scenario," 2020. https://www.iea.org/reports/world-energy-model/sustainable-development-scenario

[9] BP, "Energy Outlook," 2020. https://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html

4.	What long-term hydrocarbon demand projections do you think are reasonable for the Robust and Stagnant Global Oil & Gas Demand scenarios?	*Oil companies like BP and Equinor, as well as consultancy McKinsey, all predict oil demand peaking within the next few decades, even without more ambitious climate action. And each year the projections of peak oil demand edge closer and closer. More importantly, a number of scenarios suggest oil demand might have already reached its peak and could experience a steep drop in coming years, in no small part due to co-ordinated action to limit global warming to 1.5ºC and prevent irreversible damage to ecosystems and communities. If this restructuring happens at the faster pace needed to achieve net-zero GHG emissions, as the IEA's recent World Energy Outlook shows (see Figure 1 below), demand for oil will drop over time. Either way, the oil and gas sector is unlikely to experience the rapid growth of decades past.*  *Figure 1. Global oil demand outlooks from the IEA and BP*[10] *The Robust Global Oil & Gas Demand (High Growth) scenario, if it comes to pass, is likely to result in an increased electricity demand from Alberta's oil and gas sector. With the pressure from investors requiring better ESG (environmental, social,*

[10] Benjamin Insraël, "For Canadian oil companies, time to decarbonize is running out," *Pembina Institute*, November 23, 2020. https://www.pembina.org/blog/canadian-oil-companies-time-decarbonize-running-out

		governance) performance from all businesses, it is reasonable to expect a higher number of oil-industry-led corporate PPAs supporting more renewable electricity projects.
5.	Are there additional generation technologies that warrant inclusion in the 2021 Long Term Outlook Scenarios?	*The following generation and grid flexibility technologies could be included in any LTO scenario, especially the "Clean-Tech" scenario, a "net-zero" scenario, and the reference scenario.* • *Geothermal power, particularly with the new* Geothermal Resource Development Act *receiving royal assent on December 9, 2020,*[11] • *Demand-side response and vehicle-to-grid technologies,* • *Increased transmission capacity to adjacent jurisdictions should also be examined in some of the scenarios.* *Additionally, the development of long-duration storage such as vanadium redox flow batteries should be included in the "Clean-Tech" and "net-zero" scenarios.*
6.	Do you disagree with any of the assumptions in Slide 4 for any of the scenarios? If so, what would you propose?	*Our understanding is that the question refers to slide 5, titled "Key drivers of AIL growth: economic indicators, oilsands, COVID-19."* *See answer to question 4 regarding the assumption of oil and gas supply.* *We particularly agree with the assumption that increasing energy efficiency leads to a lower electricity demand growth correlated with economic growth.*

[11] Government of Alberta, "Clearing a path for geothermal resource development," 2020. https://www.alberta.ca/clearing-a-path-for-geothermal-resource-development.aspx

7.	The AESO has not yet determined the quantum of change in the scenario variables. Do you agree directionally with the scenario assumptions? Do you have insights regarding the magnitude of scenario changes?	*Under emerging trend assumptions, the adoption of demand-side response technologies should be added. In conjunction with electric vehicle adoption growth, the adoption of vehicle-to-grid technologies should be added. Electric vehicle adoption is expected to occur not only for passenger vehicles, but also for public/mass transit and freight.* *The growth in the adoption of heat pumps should be considered.* *Increased interprovincial trade should be added as well, in line with the federal climate plan and the Canada Infrastructure Bank's program.*