Friday, April 24, 2020

Supplement to Long Term Adequacy Metrics – May 2020: Sensitivity Analysis for Long Term Adequacy Metrics with effects to load and generation from COVID-19 and GDP shocks

Alberta is going through unprecedented times. The global spread of COVID-19 has forced federal/provincial/local governments and corresponding public health agencies to impose stay-at-home measures that have significantly limited normal day-to-day life and impacted economic activities for all Albertans. At the same time, a 30% reduction in global oil demand combined with significant oil production from OPEC countries and Russia has sent oil prices to levels well below Alberta domestic costs.

The May 2020 Long Term Adequacy Metrics have been tested for sensitivities around the impact of the anticipated reduction in demand and potential temporary removal of generation resulting from the response to COVID-19 and oil price reductions. The sensitivities were designed as stress cases to supplement the 2019 LTO load forecast which forms the basis of the May 2020 Long Term Adequacy Metric report. The tested sensitivity cases show no supply adequacy concerns.

This sensitivity analysis updates the AESO's load forecast with recently updated projections for GDP and unemployment rate sourced from credible publicly available third-party forecasters[1]. These forecasts aim to reflect the economic impacts of the pandemic and low oil prices.

Table 1: Two year forward forecast of system load (May 2020 – Apr 2022)

	2019 LTO – May LTA	Sensitivity Case
Forecast Peak Load	9,752	8,944
Average Load	7,752	7,039

The Sensitivity Case load forecast was used to test two variations of temporary thermal generation shocks on supply adequacy, Scenario 1 removes 450 MW of thermal generation and Scenario 2 removes 900 MW of thermal generation. These scenarios are intended to test the loss of significant supply of either coal or gas (combined cycle or cogeneration) and have removed them for the forward 6 month period[2]

[1] Alberta economy: a decline in real GDP of 5.5% coupled with an increase to the annual unemployment rate to 9.5% in 2020, followed by improvements in 2021 with a 3.2% growth in real GDP and drop in unemployment to 7.9%. TD Economics, "Provincial Forecast Update: No Province Spared from COVID-19 Impacts", released on March 27, 2020. URL: https://economics.td.com/domains/economics.td.com/documents/reports/forecast/Provincial_Forecast_Update_Mar2020.pdf

[2] The period running May-October 2020. Such outages may be the result of extended forced outages or curtailment of production at oilsands operations for example. The assumption of 6 months was made as if the units were expected to be offline longer and there were supply adequacy concerns, the AESO has sufficient time to direct the return of any units on mothball outages under ISO Rule 306.7 and prepare any further threshold actions under ISO Rule 202.6. Future LTA updates can also be used to assess the impact of outages occurring past the end of this period.

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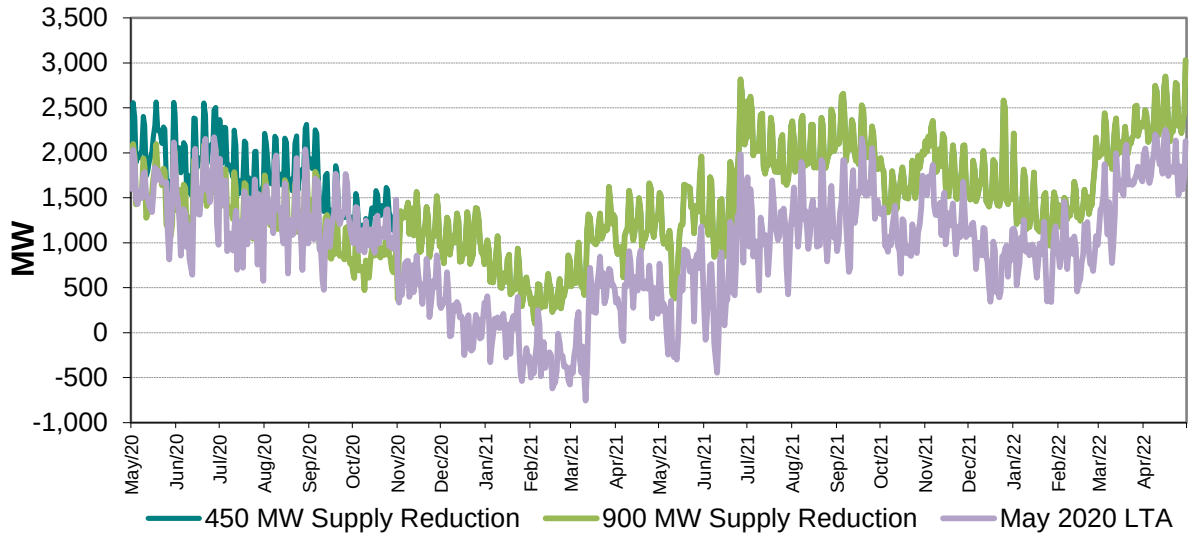
Supply Adequacy Scenarios:

When it comes to assessing risks to supply adequacy, declines in load while supply remains largely unchanged translate into overall reliability improvements, all else equal.[3] Declines in load improve hourly supply cushion and therefore the probability of energy not being served declines as well. On the other hand, a reduction in generation supply would be a risk for supply adequacy as it tightens the supply cushion.

For this reason, we evaluate the two scenarios relative to the May LTA that reflect both a demand reduction accompanied with the removal of thermal generation assets from the system.[4] Figure 1 and Table 2 provide a view to the effects on the forecasted supply cushions and total energy not served under both scenarios. Results show that while it is expected that the removal of a portion of supply would lead to a period of tighter supply cushion relative to later in the forecast period, neither scenario is as tight as the May 2020 LTA base case result. The expected value of total energy not served is still significantly below the threshold standard[5] and is not a concern for supply adequacy at this time.

Figure 1: Supply Cushion Metric



[3] Of course, market behaviour may alter this assessment – for example, a reduction in load may be accompanied with lower pool prices which in turn may prompt mothball decisions that would offset improvements in supply adequacy.

[4] The sensitivity forecast load profiles were evaluated utilizing the same model as the quarterly Long Term Adequacy Metrics, to understand the effects on estimated supply cushion and total energy not served.

[5] As defined in ISO Rule 202.6 – Adequacy of Supply

Table 2: **Total Energy Not Served (Probability of Supply Adequacy Shortfall (PSAS))**

	Total Energy Not Served (MWh)	Worst Shortfall Hour (MW)	# of Hours in Shortfall	Threshold (MWh)
Sensitivity Case with 6 month 450 MW Supply Reduction	0.7	0.3	0.05	1,901
Sensitivity Case with 6 month 900 MW Supply Reduction	0.2	0.1	0.02	1,901

Given the directionality of these results, it would take further reductions in generation for longer periods to cause any deterioration in supply adequacy. The reduction in load is the primary driver of this decreased risk to supply adequacy. Further, the representation of the supply cushion in Figure 1 does not incorporate additional capability that is usually provided by interconnections, non-firm generation such as wind and solar resources, and currently mothballed generation assets; as such these probabilistic estimates are deliberately designed to stress test scenarios with lack of domestic firm supply that may or may not materialize.

The AESO will continue to monitor the long-term supply adequacy of electricity in the province and will publish sensitivities of the metrics from time to time when it is deemed necessary.