

Impacts of the COVID-19 Pandemic and Low Oil Prices on Alberta's Power System

Introduction

As the steward of Alberta's power system, the Alberta Electric System Operator (AESO) is carefully monitoring the current environment and conducting ongoing analysis to assess potential future risks to the reliability of electricity supply in the province.

Alberta is going through unprecedented times. The global spread of COVID-19 has forced federal, provincial and local governments and corresponding public health agencies to impose stay-at-home measures that have limited normal day-to-day activities for all Albertans. At the same time, a 30 per cent reduction in global oil demand combined with a lack of resolution between Organization of the Petroleum Exporting Countries (OPEC) and Russia on oil production has led Saudi Arabia to start an overproduction strategy that has sent oil prices to levels below Alberta domestic production costs.

The following provides an overview of how power consumption patterns in Alberta have been impacted to date by the pandemic and low oil price.

Pandemic and oil price impacts to power consumption patterns

COVID-19 began impacting Alberta directly at the beginning of March 2020. As the situation in the province escalated, government actions to contain the spread increased. This included the cancellation of K-12 classes, mandated closure of licensed child care programs and in-person post-secondary classes followed by the mandatory closure of all non-essential businesses and other restrictions. Albertans have been strongly encouraged by all levels of government to stay at home as much as possible. These steps have affected power consumption across the province.

The warmer temperatures and changes in daylight times can be a driver of trends in power consumption. As such, it is best to compare recent data to the same time-frame in 2019 to tease out the effects of seasonality. Figure 1 shows the weekly average power consumption, also referred to as the Alberta Internal Load (AIL), for 2019 and 2020 to date. This chart shows how power consumption has declined in 2020 at a faster rate compared to the same period in 2019: AIL has dropped by 10 per cent in the five weeks since the week of March 16, 2020, when the majority of pandemic-related measures were first put in place, compared to the same five-week period in 2019 when AIL decreased by four per cent.

The most noticeable impact has been in urban centers, which comprise of 30 per cent of AIL.¹ Figure 2 shows the average daily consumption over a six-week period: starting the week of March 8, prior to stay-at-home measures, and the weeks since March 16 through April 19. This chart indicates that stay-at-home actions have flattened the morning ramp (typically power consumption increases more rapidly in the early morning between the hours of 6 and 9 a.m. as Albertans start their day at work and school). With the reduction in business hours and limited evening entertainment options (restaurants, theaters, etc.) afternoon peak consumption patterns have also shifted with peak consumption happening earlier in the day (peak hours are usually between 6 and 9 p.m. and are now concentrated at around 6 p.m.). Weekend power consumption has also decreased as malls and other commercial activities are closed and/or have reduced hours of operation.

¹ Urban centers include planning areas Edmonton (60), Calgary (6), Lethbridge (54), Red Deer (35, excludes Joffre) and Airdrie (57).

FIGURE 1: Observed AIL by Week, 2019-2020

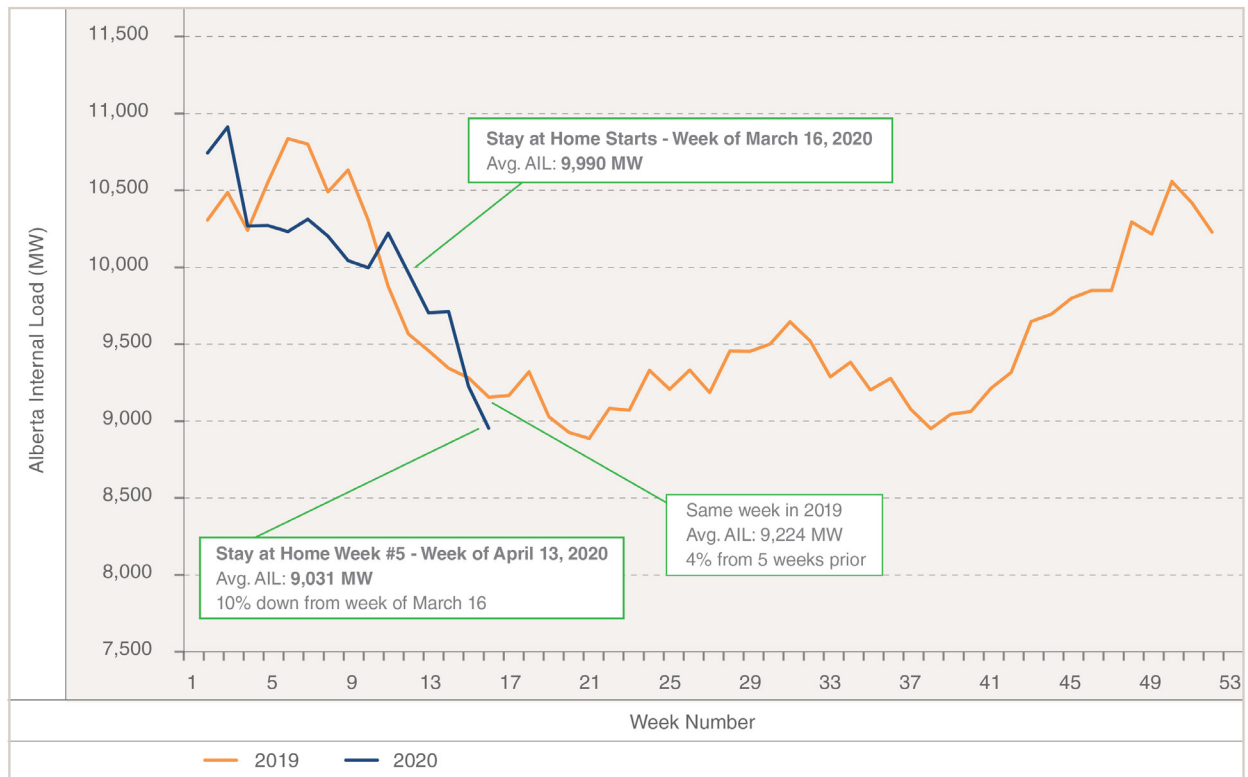
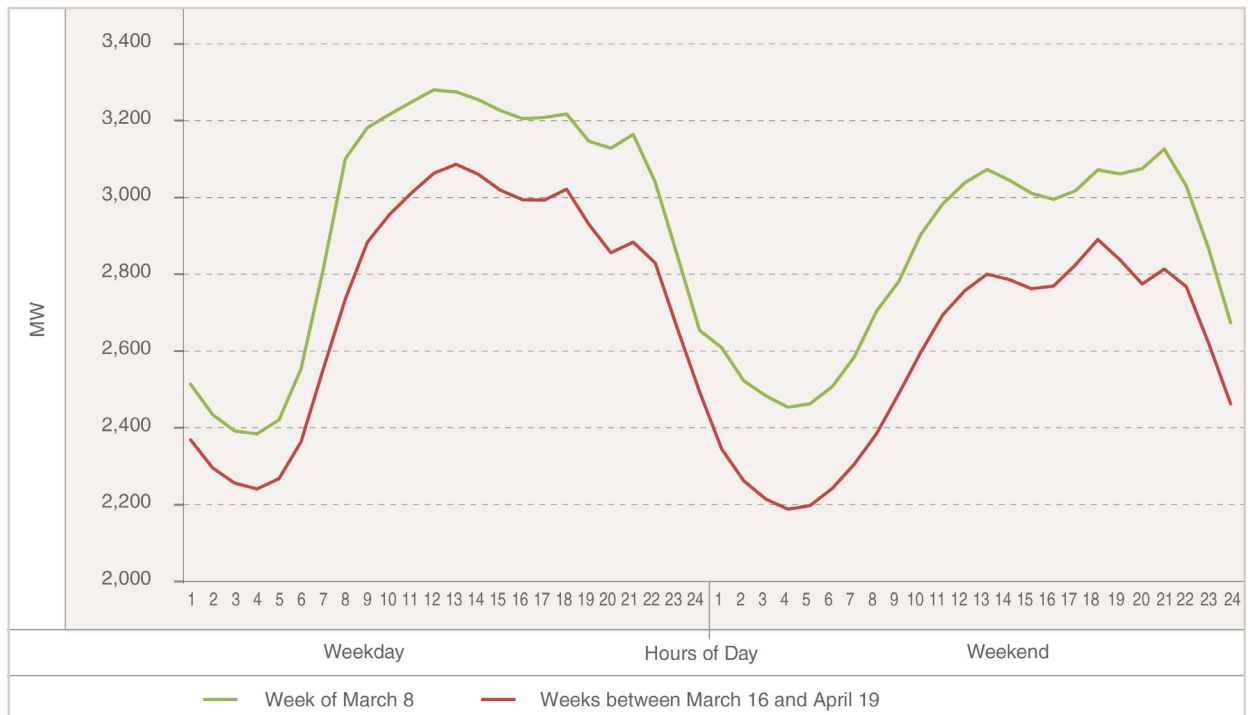


FIGURE 2: Daily Shapes of Urban Loads, March 8 thru April 19



Non-urban loads (industrial and rural consumption), the remaining 70 per cent of AIL, have also declined. Figure 3 shows these loads split into three groups – Fort McMurray (FMM), non-FMM Industrials, and Other (including rural central and southern Alberta).

FIGURE 3: Industrial and Rural Loads since the Start of 2020



This chart displays hourly load with averages shown as horizontal straight lines during each period. Although the spring months are characterized with lower industrial loads due to maintenance cycles, the load declines across the three groups seem to also be a reaction to low oil prices and pandemic response. For instance, a moderate decrease in average load began to register following the March 9 drop in West Texas Intermediate (WTI) prices as a result of Saudi Arabia increasing its production. As the COVID-19 pandemic began to have a direct impact on global oil demand and prospects of excess oil storage capacity being filled up across North America, the Canadian crude differentials to WTI began to widen to levels below domestic producers' costs. Further declines in load have occurred since March 30, when Western Canadian Select (WCS) prices fell below US\$4/bbl. Given that expectations for the global oil markets remain weak due to the demand destruction caused by the COVID-19 pandemic and the supply glut caused by OPEC countries, even after announced production cuts, some oil sands facilities have already announced partial shutdown of operations until WCS prices climb back up to US\$35-40/bbl.²

Potential future impacts to power system reliability

This unprecedented situation of a public health emergency induced mass isolation which has significantly reduced economic activity and western Canadian oil prices being lower than the marginal production cost raises a number of uncertainties for projecting provincial load and power generation supply. Economic forecasts for the province already point to a steep contraction in real Gross Domestic Product and decline in employment numbers in 2020, with a full recovery not expected until 2022-23. To date, the energy sector has announced over \$9 billion in cuts to capital expenditures linked to the oil price environment while also managing staff reductions to contain COVID-19 outbreaks in certain facilities.

The AESO develops *Long-term adequacy metrics reports* with industry input and our analysis to help monitor the available supply of electricity in the province and ensure it is adequate to meet demand moving forward. The AESO's May 2020 report (forthcoming) finds no immediate reliability risks due to the pandemic or low oil price.

We continue to monitor trends impacting the reliability of Alberta's power system and will provide updates should future concerns emerge.

² For instance, Athabasca Oil suspended operations at Hangingstone SAGD while Suncor shut in one of the trains to reduce production at the Fort Hills mine, which combined translates into a production decline of 200,000 barrels of oil per day; URL :<https://www.cbc.ca/news/canada/calgary/athabasca-oil-hangingstone-sagd-oilsands-project-shut-down-staff-cut-1.5520923>; <https://www.bloomberg.com/news/articles/2020-03-24/in-rare-step-oil-sands-giant-shuts-some-output-to-weather-rout>

Alberta Electric System Operator

2500, 330-5th Avenue SW
Calgary, AB T2P 0L4
Phone: 403-539-2450
www.aeso.ca

