

ENERGY & ENVIRONMENTAL POLICY TRENDS

April 2020

POWER DEMAND IN THE TIME OF COVID-19

In response to COVID-19, governments across Canada and around the world have instituted various degrees of physical distancing restrictions. While these are essential to protecting public health and limit ultimate economic damage, they have led to a contraction of near-term economic activity.

Waiting for economic data can be frustratingly slow. Employment data, which has already shown an unprecedented drop in jobs during the month of March, only tell us what has happened well after-the-fact.

Electricity data, however, offer a near-real-time glimpse into economic activity. In this Policy Trends, we look at how the response to COVID-19 has affected electricity demand in four provinces with readily accessible electricity data in near-real-time: British Columbia, Alberta, Ontario and New Brunswick.

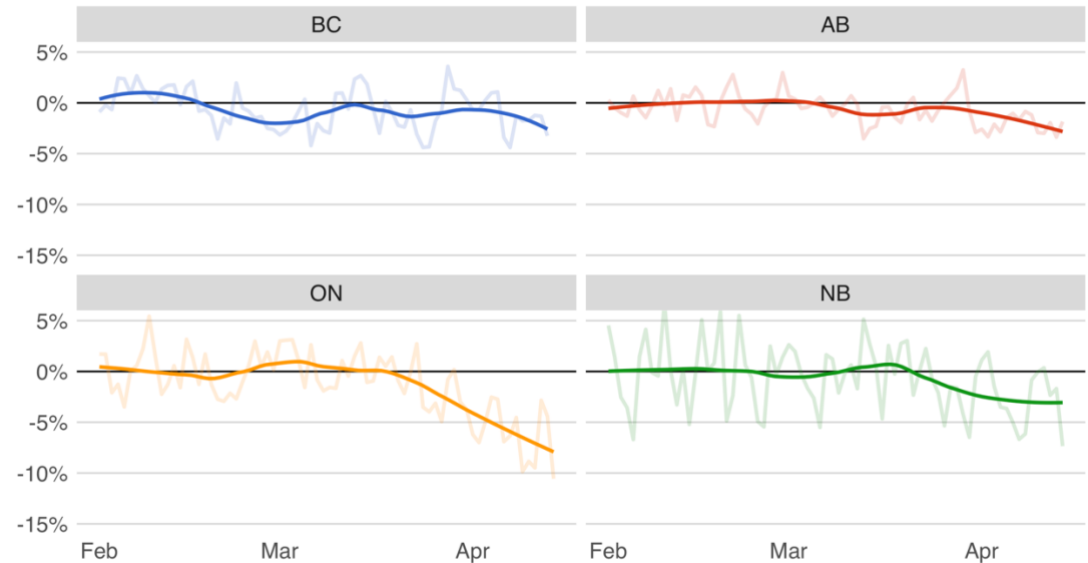
To do so, we construct a “counterfactual” demand scenario, using hourly data over several years, controlling for factors such as temperature, week of the year (to control for seasonal patterns), day of the week, holidays, and hour of the day. We can then compare how actual demand differs from expectations. This standard method follows similar recent work by [Steve Cicala \(2020\)](#).

The results differ significantly across the four Canadian provinces with available data. Since the onset of COVID-19 distancing restrictions in mid-March, we see very little noticeable difference between expected and actual electricity demand in British Columbia, a small reduction in New Brunswick, and hints at the start of a decline in Alberta.

Ontario, however, is a different story. In Canada’s most populous province, electricity demand is down nearly 10%. This compares to Cicala’s (2020) findings of an aggregate US decline of roughly 8% (as of April 8) and much larger declines in hard-hit Italy of over 25%.

Power demand in the time of COVID-19

Percent change in daily electricity demand relative to seasonally and weather adjusted expectations. Solid line represents best fit through the daily data.



Sources: BC Hydro, AESO, IESO, NB Power. Accessed via NRGSTREAM. Methods follow Cicala (2020). Chart by @bcshaffer

What explains these differences?

One possibility could be greater stringency of its COVID-19 response, with stricter restrictions on public gatherings and non-essential business activities. The effect of which can be seen in data such as [Google’s mobility report](#), showing a larger reduction in retail activity in Ontario as compared to most other provinces.

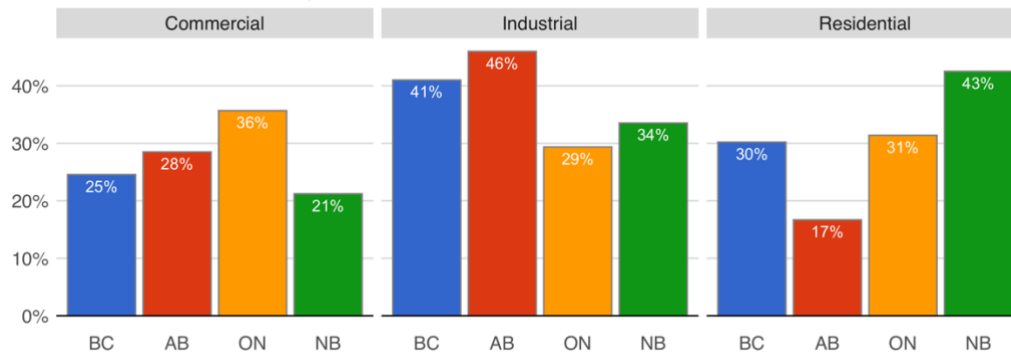
Another explanation has to do with how the provinces differ in their use of electricity, specifically the differences in their shares of total demand across residential, commercial and industrial sectors.

Ontario has the largest share of commercial sector demand of the 4 provinces. It is here where one would expect the largest declines in electricity demand, with many small businesses and institutions shuttered during the pandemic. In contrast, Alberta and British Columbia have a high share of demand from industry, such as oil and gas, where despite a fall in prices, activity has been less impacted.

The residential sector is unlikely to see the same decline in electricity demand as commercial and industrial. In fact, detailed [household-level analysis](#) in Texas has shown residential electricity demand is on the rise (Pecan Street 2020). This makes sense, with more people working from home and using more electricity through the middle of the day.

Electricity demand by sector

Share of total demand within each province



Source: Statistics Canada. Table 25-10-0030. May not include all behind-the-fence generation and consumption. Chart by @bcshaffer

What can changes in electricity demand tell us about the future?

First, in addition to providing insight about reductions in economic activity, reductions in electricity demand have direct implications for rate payers. While it may be hard to fathom in this period of low demand and low energy prices, the fall in electricity demand could ultimately lead to higher electricity rates.

While the cost to produce electricity has indeed fallen, the cost to deliver it remains largely unchanged. Grid costs—for transmission and distribution—are mostly fixed, at least in the short run, yet utilities tend to recover these fixed costs through variable rates which will be insufficient in this period of lower-than-expected consumption. As regulated utilities, funding shortfalls can be recovered through future rate increases. Regulatory hearings over the next year should be interesting, as utility commissions will have to decide whether and how to divide up the cost of these funding shortfalls. As most of Canada’s provinces have provincially owned utilities, the possibility of taxpayers, rather than rate payers, bearing this cost looms large.

Second, and perhaps more optimistically, as many of us have our eyes glued to daily epidemiological charts to track the spread of the virus and look, hopefully, for signs of “flattening the curve”, so too can we watch electricity data for early signs of economic recovery before we see it almost anywhere else. We hope to be able to share that news with you in the near future.

Sources:

- [BC Hydro](#), [AESO](#), [IESO](#), [NB Power](#). Accessed via NRGSTREAM.

References:

- Cicala, Steve (2020). *Early Economic Impacts of COVID-19 in Europe: A View from the Grid*.
- Google (2020). *COVID-19 Community Mobility Reports*. <http://google.com/covid19/mobility>
- Pecan Street (2019). *COVID-19 is Changing Residential Electricity Demand*. <http://pecanstreet.org/2020/04/covid>