Intelligence MEMOS

From: Blake Shaffer

To: Alberta and Ontario Energy Regulators

Date: October 18, 2019

Re: **Using Forward Contracts to Deliver Reliable and Affordable Power**

Alberta recently cancelled the previous government's plan for a "capacity market" for electricity that would have paid generators both for the energy they produce and their capability to do so ("steel in the ground"). Ontario has also paused its roll-out of a capacity market while it considers other options.

Alberta was right to maintain its existing market design, under which producers are paid only for the energy they produce and the operating reserves they provide. Nevertheless, some changes are needed to ensure reliability of the electric grid. I discuss options and propose mandated standardized forward-contract markets, not dissimilar to commodity futures markets, as the least-cost way to ensure long-term system reliability.

The first question one might ask in evaluating options is why electricity markets require regulatory intervention to ensure long-term reliability.

Consumers want to be able to use electricity when they need it, just like other goods and services. Electricity is arguably not so fundamentally different from other products that it requires paying suppliers for production capacity.

For example, consumers want cars, but they do not pay for automobile assembly plants. They want point-to-point air travel, but they do not pay for airplanes. They want a loaf of bread, but do not pay for the existence of a bakery.

Like power generation, these industries involve high upfront costs but relatively low marginal costs. Firms earn their return on capital invested by selling at a price above variable cost without the need for regulatory intervention to ensure sufficient production capacity to meet demand.

What is different about electricity that necessitates a long-term resource adequacy mechanism, such as a capacity market?

In short: a "reliability externality."

This externality exists for two reasons. First, a cap on the market-clearing price for electricity limits consumers' exposure to price spikes, leading to under-procurement in forward markets and more reliance on spot power.

Second, when demand exceeds supply, system operators randomly apply curtailments, known as rolling blackouts. Even if a consumer contracts for sufficient supply in the forward market, they are equally likely to be curtailed as those who have not. Random rolling blackouts mean consumers do not necessarily bear the full cost of inadequate supply, again leading to under-procurement of power in the forward market relative to their expected needs.

There are several options to resolve this "reliability externality."

1 Capacity markets

A capacity market empowers the system operator to procure an explicit amount of capacity to supply the system. However, capacity markets face several challenges. First, the system operator must determine how much to procure (with a natural bias towards over-procurement) and what is eligible capacity (an increasingly important issue in systems with growing shares of renewables). Second, procuring capacity increases reserve margins, the amount of available capacity above expected peak demand, which in turn lowers energy prices, leading to increasing dependence on revenues from the capacity market. But these only provide a small fraction of the expected revenues needed for the financial viability of a project.

2 Raise the price cap

The price cap discourages consumers from procuring power in forward markets. This wedge between consumers' true willingness to pay for electricity and capped prices results in under-procurement in the forward market for energy.

Raising the price cap to a level closer to consumers' willingness to pay for electricity can improve efficiency. But most consumers do not face the hourly wholesale price for their consumption during the hour. Without widespread deployment of "smart" interval meters that record hourly consumption, consumers cannot observe and respond to high hourly prices. Without demand response, producers can exercise significant market power during stressed system conditions, raising prices well beyond efficient levels.

3 Mandate forward-contracting for energy

A forward-contract for energy approach requires load-serving entities and large consumers to procure a certain percentage of their energy demand on a long-term and rolling basis. Generators (or financial intermediaries) compete for standardized forward contracts for blocks of energy.

This has several advantages: First, it provides price certainty for the bulk of consumers' demand while maintaining the short-term price signal at the margin. Consumers still have incentive to respond to short-term prices, optimizing consumption away from high-priced to low-priced hours.

Second, compared to annual capacity contracts, forward contracts offer price certainty for generators over a longer time horizon. This reduces risk and lowers hurdle rates for new generation, encouraging and enabling new investment, as well as discouraging exercise of market power by producers in the short-term market by reducing their exposure to spot prices.

Third, forward-contracting is less complicated than a capacity market. Generators determine their own generation mix to meet their forward market energy obligations and bear the risk of doing so. Forward-contracting requires less intervention from regulators – and reduces regulatory uncertainty for investors.

As Alberta and Ontario go back to the drawing board, a mandated standardized forward contract mechanism represents the preferred design. It resolves the "reliability externality" at low cost while minimizing complexity and regulatory intervention.

Blake Shaffer is an Energy Policy Fellow at the C.D. Howe Institute and Adjunct Professor of Economics at the University of Calgary. He co-authored a report to the Alberta government on options to address long-term resource adequacy in Alberta's electricity market.

To send a comment or leave feedback, email us at blog@cdhowe.org.