

How Alberta's new electricity sector will work

by Sara Hastings-Simon & Binnu Jeyakumar | December, 2016

Summary

The Climate Leadership Plan will change Alberta's electricity market in six major ways. This factsheet outlines the most important details of the province's new electricity sector and suggests how the transition should be implemented to create the best system for all Albertans.

The new market

During "electricity week" in the Alberta legislature, the Province fully outlined its approach to reduce emissions from the electricity grid, as set out in the Climate Leadership Plan. The most recent announcements fill in the details on how pollution from coal will be phased out, and complement earlier renewable procurement details.

This is a solid plan that will enable Alberta to deliver on the promise of reliable, low cost, low carbon, low pollution energy. It builds from consultations with stakeholders across the sector in the province, as well as external experts, including Terry Boston, the former head of the largest competitive wholesale electricity market in North America (PJM).

The plan has six key components:

1. Legislated target of 30% renewable energy by 2030
2. Renewable electricity program (REP)
3. Cap on the price of electricity
4. Creation of a capacity market in 2021
5. A phase-out of pollution from coal-fired power by 2030
6. Treatment of the electricity sector under the carbon levy for large industrial emitters

Like most policy, the devil is in the details. There are a few areas to watch closely as the plan moves forward to ensure it delivers the full benefits to Albertans.

1. Legislated target of 30% renewable energy by 2030

Bill 27 sets a legislated target for 30% of electricity generation in Alberta to come from renewable sources by 2030. As outlined in an October 2016 [open letter](#) to the provincial government, the case to legislate a firm target to 2030 is a strong one. Markets are most

efficient where clear signals exist. Legislating the target will lead to the creation of a more stable energy market, increased confidence for investors, increased competition, lower costs for renewables, creation of long-term jobs, better informed operations and lower power system costs for the Alberta Electric System Operator (AESO) and wires companies.

Recommendation

The Renewable Energy Program is defined for 5,000 MW of utility-scale renewables. The 30% generation target will require additional renewable generation capacity (depending on the province's electricity load increase), which can be achieved through a combination of small and community-scale generation as well as additional utility-scale renewable generation.

- Policies and programs to support development of distributed and community renewables could include a move from net billing to net metering, the introduction of virtual net metering, an increase of the microgeneration cap, as well as direct support from the carbon levy, similar to the utility scale programs.
- Alongside the Renewable Electricity Program, market mechanisms such as output-based allocations (OBAs) could also help to bring more utility-scale renewables on board by allowing the monetization of the renewable energy credits, or attributes.

2. Renewable electricity program

Renewables will be developed under the [Renewable Electricity Program](#) (REP), run by the system operator, AESO, with the government procuring renewable attributes for 200-400MW of renewable power per year. The first competition is scheduled for 2017. The first round of the program will use an indexed renewable energy credit (REC) approach. An indexed REC uses a competitive bidding process to determine the winning bid price in \$/MWhr. Then each month, if the price received in the market (the pool price) is below the bid price, the renewable energy generator will receive a payment for the difference. If the pool price exceeds the bid price the generator will pay back the difference above the pool price, thus returning profits to Albertans if power prices rise. The indexed approach will ensure lower cost of capital and therefore the lowest cost renewables.

In addition to the competitive approach that will deliver the lowest prices, Alberta will benefit now from lower cost renewable energy technology as global prices have fallen dramatically in recent years. Average prices for wind energy today are over 50% cheaper than they were in 2008 and solar panel costs have fallen 80% in the same period.

The indexed REC will be funded by revenue from the carbon levy payments by large industrial emitters, and will not be added to electricity bills.

Recommendation

In future rounds, Albertans would benefit from a transition to a modified indexed REC, thereby ensuring a diversity of renewable energy generation resources (type, location, etc) is constructed under the program approach in the long run.

3. A cap on the price of electricity

In Alberta's deregulated electricity market, the price for electricity is set by the market, based on supply and demand in each hour. Electricity was deregulated in 1996, and in 2001 Albertan individuals, families and small businesses were given a choice as to where and how to purchase their electricity. They could continue to purchase electricity from a retailer regulated by the Alberta Utilities Commission (the Regulated Rate Option, or RRO), or enter into a contract with a competitive retailer. The RRO was originally introduced when the electricity market was deregulated as a way to protect consumers and help them adjust to the new market during a period of transition. Today, the price for electricity under the RRO varies from month to month and is based on the market price for power. Contracts with competitive retailers can take many forms, with prices locked in for a specific term or floating based on the market price. The majority of Albertans have chosen to stay on the RRO.

The price cap introduced in November 2016 will apply only to the RRO option, and will function as a ceiling. If market prices stay below 6.8¢/KWhr the RRO will remain at market price. If they rise above 6.8¢ the price cap will apply. Figure 1 shows the price cap compared to the historical average prices.

Similar to the spirit of the RRO when it was introduced, the intention of this cap is to assist consumers by providing certainty during a period of market transition. It should be noted, however, that projections show that electricity prices are not expected to exceed 6.8¢ over the time period of the cap.

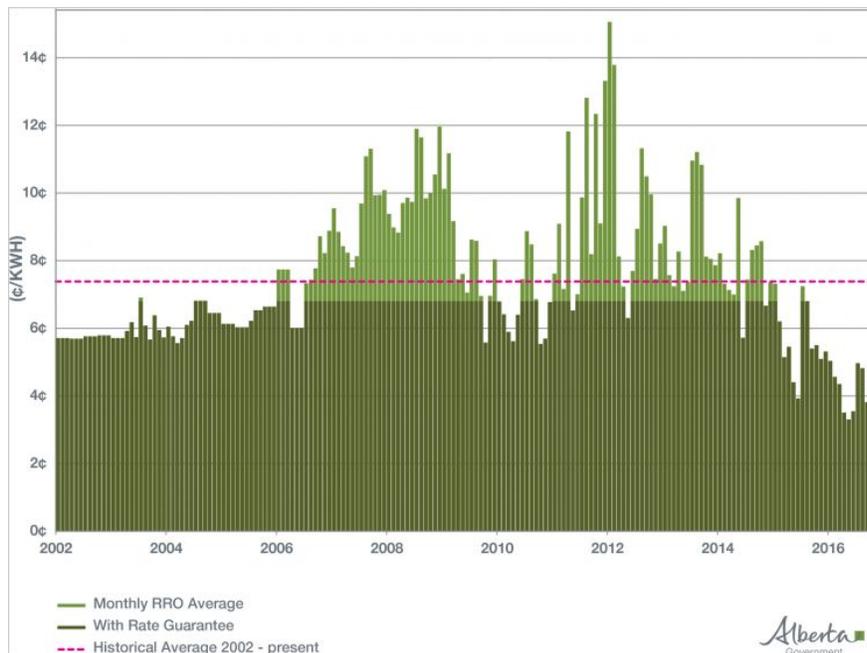


Figure 1. Courtesy Government of Alberta

4. The creation of a capacity market in 2021

As the electricity system operator outlined in its report, there are **four options** for electricity systems to ensure reliability and sufficient generation capacity. Two are market-based systems: an energy-only market where generators are paid only for electricity sold (currently used in Alberta and Texas), and a capacity market which introduces a second revenue stream for making capacity available on demand (all other deregulated markets in North America). The other two are regulated systems: a long-term contract system where generation is centrally planned and generators enter into 20-30 year contracts at fixed prices (as in Ontario), and a cost-of-service model where an allowed rate of return is added to the operating expenses to set rates (as in BC, Manitoba, and Saskatchewan).

In choosing among the options for Alberta, the goal was to provide reliability and a high level of environmental performance while maintaining a reasonable cost to consumers, driving economic development and encouraging an orderly transition.

Comparing the two market-based systems (energy-only versus capacity), the key difference is the creation of a second stream of revenue for making capacity available on demand.

Capacity is the ability to generate electricity. In the energy-only market this component of an electricity system is ensured by allowing prices to spike to high levels for short periods, creating an incentive to build more generation capacity to meet peak demand and capture those high prices. In the capacity market the amount of required capacity is directly defined by the system operator and obtained via short-term contracts (typically 1-5 years).

Electricity structure	Approach	Key Feature	Examples
Energy-only market	Market based	Generators paid for electricity sold	Current Alberta market, Texas
Capacity market	Market based	Two revenue streams – electricity sold and available capacity	All other North American deregulated markets (e.g., New York)
Long term contract	Regulated	20-30 year contracts at fixed price	Ontario
Cost of service regulation	Regulated	Rate of return added to operating costs	BC, Manitoba, and Saskatchewan

The only remaining energy-only market in North America is in Texas, where regulators have opted to raise the wholesale energy price cap to \$9,000 per megawatt-hour (compared with \$1,000 per megawatt-hour in Alberta). This is the alternative to a capacity market as it incentivizes generators to invest in new capacity to capture the high peak prices, and has delivered on goals for Texas.

The option of raising the wholesale energy price cap in Alberta and maintaining the energy-only market was considered and found to pose too many risks here. While we can draw many comparisons between the two regions, a crucial difference for optimal market design is the size of the two grids. With over 100 GW of installed generating capacity, the electricity system in Texas is roughly 10 times the size of Alberta's. The ability to attract investment to the market through sheer size as well as scale needed to create hedges and other financial instruments is clearly different between the two regions.

Recommendation

In order to ensure the capacity market delivers the necessary generation but remains efficient, care must be taken in its design. Key principles include:

- Limiting the length of time capacity contracts cover to ensure prices remain low and avoid locking in unnecessary capacity in the long-term.
- The market must allow the cheapest forms of capacity to compete. Typically, energy efficiency, demand-side management and potentially storage can compete to deliver the lowest cost.

- The market should align the price paid for generation capacity with the system's reliability requirements to provide reliability at the lowest cost. [This can be done](#) by defining how much of each type of capacity is required (e.g., fast ramping/load following and supplemental reserve as opposed to base capacity) and paying a price for capacity that reflects the contribution of a resource to the reliability objective.
- To protect consumers economic withholding should be prohibited. Generators must bid their generation at the marginal cost, ensuring the lowest-priced electricity for consumers.

5. A phase out of pollution from coal fired power by 2030

The original announcement on the CLP required that all pollution from coal fired power in the province be phased-out by 2030. Looking at the full balance sheet of costs to the government and society shows that the [coal phase out will benefit Albertans](#) – resulting in a healthier population and reduced healthcare costs, more [jobs in renewables](#) and a smoother transition, in addition to the climate benefits that establish Alberta as a climate leader in Canada and abroad.

An [agreement for transition payments](#) to the companies that were originally slated to operate their coal-fired units beyond 2030 was reached and pollution from coal-fired generation will be phased out by the end of 2030. Payments will be used for RE development, and companies have committed to helping workers transition.

Payments will be funded from the carbon levy on large industrial emitters and no costs will be seen on consumer bills. The \$97 million annual payments ultimately translate to less than \$10 per tonne for carbon emissions avoided. At this price, the coal phase out is one of the most cost-efficient emission reduction options in the province and [significantly lower than carbon capture and storage \(CCS\) technology](#).

As an alternative to shutting down plants, some facilities could be repowered with natural gas instead of coal. This could provide short-term “bridge” natural gas generation with a lower investment hurdle than a new plant, and it would take advantage of existing infrastructure at brownfield sites.

Additional health benefits and savings, as well as better support for the workforce transitioning out of the coal industry, could be realized from an [accelerated coal phase out](#), delivering a total of 618 avoided premature deaths and creating over \$3 billion in savings.

Recommendations

The regulations for conversion of coal plants to gas must consider that natural gas is a 'cleaner' transitional fossil fuel that will ultimately need to be phased out itself. These rules must include operational timelines for such plants to allow time to recoup investment but avoid locking into natural gas infrastructure in the long term.

6. Treatment of the electricity sector under the carbon levy for large industrial emitters

Currently, emissions from generators above 100,000 T/year are priced under the Specified Gas Emitters Regulation (SGER) system. In 2018, the pricing will transition from SGER, which sets emissions targets standard for each facility individually as a function of historical performance, to output-based allocation (OBA) that sets a common standard of CO₂/MWhr for all electricity producers. As a result, coal generators can expect to pay the carbon levy on a higher percentage of their emissions, raising their costs. Meanwhile, many natural gas generators will see the total cost of carbon emissions from their facilities fall. As natural gas increasingly becomes the price-setter in the electricity market the impact on electricity prices will be **negligible and potentially negative**.

Technical consultations are underway to define details of the OBA system, including the emissions target standard and how the target will evolve over time.

Recommendation

The emission standards for electricity should reflect the best available technology today and gradually become more stringent, with a clear path to pricing the total carbon emissions over time.

This reflects the principles of OBAs, which are a transitional tool for emissions-intensive trade exposed industries. The nature of the electricity sector in Alberta is not inherently emissions-intensive, as non-zero emitting generation technologies exist. Moreover, the significantly limited transmission capacity into the province ensures the sector is not trade exposed.

A clear, decreasing standard will create market certainty around future requirements for natural gas plants – avoiding the creation of a future liability for the province with additional stranded fossil fuel assets. Any natural gas generation built today must consider future carbon requirements and long-term competitiveness in an increasingly decarbonized electricity system.

For any facility to receive an exemption or different treatment under the OBA it must prove material greater reductions in emissions than without the exemption. This should include coal to gas conversions.

Cogeneration typically provides more efficient energy production, but that is dependent on the system's design. Therefore, treatment of cogeneration plants must fairly reflect actual efficiency gains over other forms of generation and should account for all cogeneration emissions. Cogeneration systems would therefore benefit from any efficiencies from use of the technology but not be allocated special credits unrelated to actual performance.

Creation of offsets for renewables should allow for the carbon benefits of renewables to be monetized while adhering to international standards.