

## **ALBERTA ELECTRICAL INDUSTRY RESTRUCTURING – RENEWABLE ELECTRICITY PROGRAM**

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### **EXECUTIVE SUMMARY**

The Government of Alberta has announced a major restructuring of the Alberta electricity industry, and this report is intended to describe the first major component of the overhaul to be implemented so far. It details the Alberta Renewable Electricity Program (REP), which is a critical component of the Provincial Government's Climate Leadership Plan. It is expected to be very costly, but will result in the procurement of a substantial amount of renewable power capacity. A thorough understanding of the REP is essential in order to evaluate the overall impact of the electricity sector restructuring that is underway in Alberta. Further reports to describe other aspects of the industry overhaul will be provided as information becomes available.

### **ADMINISTRATION RECOMMENDATION(S)**

That the Gas, Power and Telecommunications Committee receive this report for information.

### **PREVIOUS COUNCIL DIRECTION / POLICY**

Gas, Power and Telecommunications Committee (GPT) has directed Administration to keep committee informed of developments in the Provincial Climate Leadership strategy.

### **BACKGROUND**

The Government of Alberta (GoA) has announced a major restructuring of the Alberta electricity market. The Provincial Government's Climate Leadership Plan, which was introduced in late 2015, called for up to one third of Alberta's installed electricity generation capacity to be from renewable sources by 2030. Because Alberta's current energy-only market structure is unable to encourage sufficient investment in renewable power generation, the GoA directed the Alberta Electric System Operator (AESO) to design and implement a plan to incent the development of new renewable generation projects by 2030. Accordingly, the AESO has recommended a REP that will yield 5,000 MW of renewable capacity over the next 13 years. In late 2016, the GoA announced that it would adopt these recommendations.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

The AESO conducted a review of a variety of payment mechanisms that could be used to incent the development of renewable electricity generation. Its recommendation is that the province employ an Indexed Renewable Energy Credit (REC) mechanism. Under an Indexed REC program, the province would put out a call for competitive bids to build renewable capacity. Any winning bidder is granted a contract where they will receive a \$/MWh payment for all renewable power produced over the contract term. In the case of an Indexed REC, a bidder bids a price that is its lowest acceptable cost for the renewable project they plan to advance. The dollar value of support paid to the winning bidder is calculated by subtracting a reference price (in this case the pool price) from the bid price. As the pool price rises, the support payment declines, and vice-versa. If the bid price exceeds the pool price, the surplus goes to the government. This provides the generator with a considerable level of revenue certainty.

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### *Sample Calculation*

<b>BID PRICE</b>	–	<b>POOL PRICE</b>	=	<b>SUPPORT PAYMENT \$ VALUE</b>
\$80/MWh		\$30/MWh		\$50/MWh

The Indexed REC model would allocate any market price risk to the Government of Alberta, while construction risk and ongoing operations and maintenance risk would continue to reside with the developer. The AESO has indicated that its rationale for favouring the Indexed REC was mainly that it would attract the greatest number of bidders, and the resulting competition would drive prices down. The Indexed REC mechanism is proposed to have a contract term of 20 years.

In its report to Government, the AESO stated that it is expecting bids between \$79/MWh to \$101/MWh for wind projects. These bids are meant to recoup the cost (including return on capital) of that source of generation over its expected life based on an assumed capacity utilization factor. The estimated capacity utilization factor for wind, which is the percentage of time a turbine will be generating power, is 35 to 45 per cent. Solar project bids would likely come in from \$118/MWh to \$194/MWh, with an assumed capacity utilization factor of 16 to 20 per cent. Hydro power was not explored in detail in the AESO's report.

### *Program Costs*

The cost of this program will be sizable. The following example considers a REC contract of 100 MW, which would constitute just 2 per cent of the GoA's target of 5,000 MW.

At the AESO's expected capacity utilization factors, a 100 MW wind project would generate approximately 300,000 – 400,000 MWh of electricity annually.<sup>1</sup> If the generator is guaranteed \$80/MWh under the Indexed REC program, they will be eligible to receive Government funds for every hour of every day that the Power Pool price is below \$80/MWh on the volume of electricity it generates.

Currently, the electricity market is oversupplied and the Power Pool price is trending around \$20/MWh. The Government's cost to support a 100 MW facility at current prices would be \$18 million to \$23 million per year. EDC Associates, a major Alberta market forecasting firm, is

<sup>1</sup> To calculate the amount of power produced from a generation facility, the capacity of the facility is multiplied its capacity utilization factor and then by the number of hours it operates within a given time horizon. In this case, assuming a 35 per cent capacity utilization factor, the calculation was: 100 MW x 0.35 x 24 hours x 365 days.

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currently predicting that average Power Pool prices to climb to \$43/MWh by 2019<sup>2</sup>, when the first REC-funded facilities are expected to be in operation. At that price, 100 MW of capacity would require \$11 million to \$16 million per year for the length of the contract term. Relative to the total amount of power generated in Alberta, these support payments would be to subsidise roughly 0.4 per cent of supply.

Because the plan is to procure 5,000 MW of capacity with 20 year contract terms, the potential cost of the program is extremely high. The structure of an Indexed REC will impose all market price risk on taxpayers, which would create considerable uncertainty in terms of the Province's financial obligations. If pool prices were to remain persistently low, the cost of subsidizing 5,000 MW of renewable power could top \$1 billion annually. The table below presents the potential cost of the full program at a variety of power pool prices. Administration is concerned that the financial obligations being assumed by the province could constrain the GoA's capacity to fund other projects within Alberta.

Pool Price (\$/MWh)	Annual Support Payments for 5,000 MW (\$ million) <i>Assumes \$80/MW REC bid and 35% - 45% capacity utilization factor</i>
\$80.00	\$0
\$60.00	\$307 - \$394
\$40.00	\$613 - \$788
\$20.00	\$920 - \$1,183
\$0.00	\$1,226 - \$1,577

The risk of lower Power Pool prices (and higher support payments) will be exacerbated by the nature of intermittent renewable power. As a result of weather patterns in Alberta, wind power tends to come online almost all at once or not at all. This deluge of supply causes the pool prices to fall. This is reflected by the long term average discount on wind power of 24 per cent relative to average pool prices.<sup>3</sup> As more wind generation capacity comes online, the supply impact to pool prices is expected to be magnified, and the average discount on wind power will rise. The cost of the renewable energy program will follow suit.

The Province intends to pay the indexed credits using carbon tax revenues, which will prevent the costs from being reflected on customers' bills. Consequently, there will be no direct impact from the REC program subsidies upon The City's franchise fee revenue.

### *The First Renewable Energy Program Competition*

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<sup>2</sup> EDC Associates Ltd. Quarterly Forecast Update - First Quarter 2017. p. 219. Table 55.

<sup>3</sup> EDC Associates Ltd. Quarterly Forecast Update - First Quarter 2017. p. 148.

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The AESO has adopted a three-stage competitive process for its renewable power procurements:

1. Request for Expressions of Interest – designed to attract interest in the competition and inform the market of key aspects of the competition.
2. Request for Qualifications – allows the AESO to identify, among the interested participants, the participants and projects eligible to participate in the final stage of the competition.
3. Request for Proposals – essentially a pricing stage, where the AESO will evaluate participants based on their bids. The successful participants will be given the opportunity to enter into a renewable electricity support agreement.

The first of the AESO's renewables competitions began in late March with a request for expressions of interest. This round is intended to procure up to 400 MW of renewable electricity capacity that must be operational by 2019. Only new or expanded projects within Alberta are eligible to compete, and all projects must utilize the existing transmission and/or distribution system. The successful projects will be selected in December 2017, and the contract term will be for 20 years. Because of the supply uncertainty brought on by the coal emissions phase-out plan, the schedule for further renewables competitions over the coming years has not been finalized.

### *Additional Power Market Considerations*

Due to the intermittent nature of most renewable power sources available within Alberta, the new renewable generation will need to be backed up by enough auxiliary power to ensure that the grid can meet peak electricity demand at any given time. This will likely come either in the form of peaker natural gas-fired facilities, or power imported from outside the province. Additional baseload power will be required to counterbalance the elimination of 6,000 MW of coal-fired generation by 2030, although some coal facilities will convert to natural gas.

Current electricity prices will do little to incent the construction of natural-gas fired facilities, and the introduction of intermittent power sources such as wind will likely lead to an increase in pool price volatility. Once the province transitions to a capacity market, capacity payments for new generators will need to be high enough to make up for volatile prices in the wholesale market.

Unlike the RECs, these auxiliary and baseload power additions will likely appear on consumers' bills in the form of capacity payments. These charges would most likely be captured by the franchise fee.

### **Stakeholder Engagement, Research, and Communication**

As this is an information report to GPT, no stakeholder engagement or communication is required.

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**Strategic Alignment**

This report is in alignment with the mandate of the Gas, Power, and Telecommunications Committee.

**Social, Environmental, Economic (External)**

No implications were identified.

**Financial Capacity**

**Current and Future Operating Budget:**

This report does not propose a decision and there is no direct budget or business plan implication.

**Current and Future Capital Budget:**

No implications were identified.

**Risk Assessment**

No risks to The City associated with this report were identified.

**REASON(S) FOR RECOMMENDATION(S):**

There are no decisions required and it is therefore recommended that the report be received for information.

**ATTACHMENT(S)**

None