

## AESO Quarterly Stakeholder Report

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### Q1 2019

- Initiative Updates
- Financial Highlights

## Quarterly Stakeholder Report – First Quarter (January - March) 2019

The purpose of this section of the quarterly report is to provide stakeholders with an update on the Alberta Electric System Operator’s (AESO) progress on the initiatives outlined in its 2019 Business Plan and Budget (Business Plan). The reader of this report should reference the Business Plan published on the AESO’s website for additional information to fully understand the various progress updates provided.

### I. Reporting on Business Plan Initiatives by Activity Group

| Electric System Operations   |  |  |   |
|--|--|--|---|
| Business Initiative  | Current Status   | Next Milestone   | Target  |
| <b>SCC Expansion Project</b>   | SCC Expansion Project (implementation phase) as construction is underway   | None   | Construction to be completed and building operational in Q4 2019  |
| <b>EMS Sustainment</b>   | Continuing to evolve and sustain our EMS system by identifying implementation options, process changes and system impact assessment to support the market transition | EMS Core advancement completed as per 2019 project phase schedule                    | Advance EMS Core according to planned schedule, utilizing key features and functionality while maintaining system performance, security and compliance<br><br>Design and implementation plan of the EMS application upgrade to advance the application layer of EMS to support reliability and operation of the evolving, complex market and electric systems |
| <b>Western Interconnection Reliability Coordinator (RC) Initiative</b> | Initiated coordination work for Western Interconnection RC Initiative  | Planning to file standards for approval with Alberta Utilities Commission in Q3 2019 | Complete required work for agreements, modelling, data exchange, RC to RC coordination, tools, and staff training   |

| Electric System Development                   |   |  |  |
|---|---|--|--|
| Business Initiatives                          | Current Status  | Next Milestone   | Target   |
| <b>Intertie Restoration</b>                   | AESO has completed design and development of intertie requirements and consultation started in Q1 2018. Public consultations were held on October 23-25, 2018 | Second round of public consultations will be held in June 2019 | Ongoing  |
| <b>Competitive Process (for transmission)</b> | The Fort McMurray West Project was energized in Q1 2019   | None   | None   |
|   | Based on the current economic environment, the AESO has deferred the launch date of the Fort McMurray East 500kV Transmission Project (East Project)          | None   | Reassessment of launch date of the East Project is ongoing |

| Electric System Development - Continued  |  |   |  |
|--|--|---|--|
| Business Initiative  | Current Status   | Next Milestone  | Target   |
| <b>Tariff:</b><br><br><b>General tariff application</b>  | In Q3 2017, the AESO filed the 2018 ISO tariff application (formerly referred to as the 2017 ISO Tariff Application) with the Alberta Utilities Commission (AUC). The AESO filed a revised 2018 ISO tariff application in August 2018  | Ongoing   | AUC decision expected before August 15, 2019   |
|  | In Q4 2018, the AESO filed the 2019 ISO tariff <u>update</u> application. Approval was provided by the AUC in Q4 2018 on a final basis with a Q1 2019 implementation   | The AESO expects to file the 2020 tariff <u>update</u> in Q4 2019 | Expected AUC approval for the 2020 tariff <u>update</u> from the AUC in Q4 2019 on a final basis with a Q1 2020 implementation   |
| <b>Tariff cost allocation for capacity market and review of bulk and regional transmission rate design</b> | In Q2 2018, the AESO proposed to the AUC a comprehensive consultation process to review bulk and regional transmission rate design as well as the design for allocation of capacity market costs. The AUC approved the AESO's proposal to begin the consultation process. AESO initiated the consultation process in Q3 2018 | The AESO will continue with consultation process                  | The AESO expects to finish the combined consultation process in 12-18 months concluding with applications to the AUC for capacity market cost recovery tariff design June 2019 and any proposed changes to bulk and regional transmission tariff design in Q1 2020 |

| Market Development  |   |                               |  |
|---|---|-------------------------------|--|
| Business Initiative   | Current Status  | Next Milestone                | Target   |
| <b>Capacity market technical design</b>                     | Capacity market rules filed with AUC in Q1 2019   | AUC decision on market rules  | AUC decision on market rules expected by July 31, 2019   |
| <b>Capacity procurement process</b>                         | Implementation underway with continued development of process and guidelines  | Ongoing                       | The AESO to commence opening first capacity procurement process in 2019  |
| <b>IT systems and solutions for market evolution</b>        | <p>Continuing major program to implement systems to support the capacity market, including projects for:</p> <ul style="list-style-type: none"> <li>Calculation of Unforced Capacity (UCAP) of market participants</li> <li>Capacity market auction solution(s) encompassing pre-auction, auction and rebalancing</li> <li>Settlement and performance</li> <li>Related energy and ancillary service market changes</li> <li>Required tools, enhancements, and process for market evolution and sustainment of existing systems</li> <li>Develop and deliver market participant education program</li> </ul> | Ongoing                       | IT system solutions, required tools, processes and market participant education to be delivered as per the capacity market schedule and requirements     |
| <b>Renewable Electricity Program (REP) - Rounds 1, 2, 3</b> | <p>AESO launched the first Renewable Electricity Program (REP) competition - REP Round 1 in Q1 2017</p> <p>In Q4 2017, the AESO announced REP Round 1 successfully delivered nearly 600 MW of wind generation at a weighted average bid price of \$37/MWh</p> <p>In Q4 2018, the AESO announced REP Round 2 successfully delivered 363 MW of wind generation at a weighted average bid price of \$38.69/MWh. The AESO also announced REP Round 3 successfully delivered 400 MW of wind generation at a weighted average bid price of \$40.14/MWh</p>  | <p>Ongoing</p> <p>Ongoing</p> | <p>The target in-service date for REP Round 1 projects is in Q4 2019</p> <p>The target in-service dates for REP Round 2 and 3 projects is in Q2 2021</p> |

| Customer Access Services  |  |  |   |
|---|--|--|---|
| Business Initiative   | Current Status   | Next Milestone   | Target  |
| <b>Advance customer connection projects within the connection queue<sup>1</sup></b> | AESO facilitating the advancement of approved System Access Service Requests for customer connection projects  | Support customer projects facilitating the in-service date (ISD) | Ongoing support of customer FAs, certifications and FA hearings |
|   | 14 customer energizations (including Connection, Contract and Behind-the-Fence projects) completed as of March 31, 2018  | Ongoing  | Ongoing   |
|   | No customer connection Abbreviated Need Identification Documents (ANID)s filed with the AUC and no Abbreviated Needs Approval Process (ANAP) customer connection projects were approved as of March 31, 2018 | NID development and filings as per schedule                      | Ongoing   |

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<sup>1</sup> See [www.aeso.ca](http://www.aeso.ca) > Grid > Connecting to the grid > Connection project list - for a complete list of projects in the connection queue and the current status.

## II. Financial Update – As of March 31, 2019

### Transmission Operating Costs (\$ million)

|   | 2019<br>Actual | 2019<br>Forecast | 2018<br>Actual |
|---|----------------|------------------|----------------|
| Wires costs                               | 444.0          | 458.6            | 439.8          |
| Operating reserves                        | 58.6           | 93.2             | 30.7           |
| Transmission line losses                  | 35.3           | 41.8             | 18.5           |
| Other ancillary service costs             | 5.8            | 10.8             | 10.3           |
| <b>Total Transmission Operating Costs</b> | <b>543.8</b>   | <b>604.4</b>     | <b>499.3</b>   |

*Numbers may not add due to rounding*

**Wires costs** – Wires costs represent the amounts paid primarily to transmission facility owners (TFOs) in accordance with their Alberta Utilities Commission (AUC)-approved tariffs and are not controllable costs of the AESO.

Wires costs in 2019 are \$444.0 million, which is \$4.2 million or 1 per cent higher than the 2018 costs of \$439.8 million due to higher regulated rates charged by the TFOs for the current year.

**Operating reserves** – Operating reserves are generating capacity or load that is held in reserve and made available to the System Controller to manage the transmission system supply-demand balance in real time. Operating reserves are procured through an online, day-ahead exchange, where offer prices are indexed to the pool price. While the prices of operating reserves procured through the online exchange are indexed to the pool price, changes to the average pool price do not result in proportional changes to the operating reserve costs; the pool price for each hour has a significant impact on the operating reserve costs for that hour.

Operating reserve costs in 2019 are \$58.6 million, which is \$27.9 million or 91 per cent higher than the 2018 costs of \$30.7 million. The cost of operating reserves is impacted by actual volumes, hourly pool prices and operating reserve prices. The average hourly pool price is \$69 per megawatt hour (MWh) in 2019 compared to \$35 per MWh in 2018, representing an increase of 97 per cent. Operating reserve volumes financially settled in 2019 are 1,926 gigawatt hours (GWh) compared to 1,999 GWh in 2018, representing a four per cent decrease. The cost variance is mainly attributable to higher pool prices, offset by lower volumes and changes in offer behavior.

**Transmission line losses** – Transmission line losses represent the volume of energy that is lost as a result of electrical resistance on the transmission lines. Volumes associated with line losses are determined through the energy market settlement process as the difference between generation and import volumes, less consumption and export volumes. The hourly volumes of line losses vary based on load and export levels, generation (baseload, peaking units and imports) available to serve load, weather conditions, and changes in the transmission topology. System maintenance schedules, unexpected failures, dispatch decisions on the Alberta Interconnected Electric System (AIES), and short-term system measures (such as demand response) may also affect the volume of losses. The value of line losses is calculated based on the hourly pool price.

The cost of transmission line losses in 2019 is \$35.3 million, which is \$16.8 million or 91 per cent higher than the 2018 cost of \$18.5 million due to the impact of a 97 per cent higher average pool price and higher line loss volumes in 2019. Line loss volumes financially settled in 2019 are 525 GWh compared to 524 GWh in 2018.

**Other ancillary services costs** – The AESO procures other ancillary services for the secure and reliable operation of the AIES. These services are procured through a competitive procurement process where possible, or in instances where such procurement processes may not be feasible, through bilateral negotiations.

#### Other Ancillary Services Costs (\$ million)

|                                       | 2019<br>Actual | 2019<br>Forecast | 2018<br>Actual |
|---------------------------------------|----------------|------------------|----------------|
| Load shed service for imports         | 3.1            | 8.2              | 7.4            |
| Transmission must-run                 |                |                  |                |
| Contracted                            | 0.8            | 0.8              | 0.8            |
| Conscripted                           | 0.0            | 0.1              | 0.1            |
| Reliability services                  | 0.7            | 0.7              | 0.7            |
| Poplar Hill                           | 0.4            | 0.4              | 0.7            |
| Black start                           | 0.6            | 0.6              | 0.5            |
| Transmission constraint rebalancing   | 0.3            | 0.0              | 0.0            |
| <b>Total Other Ancillary Services</b> | <b>5.8</b>     | <b>10.8</b>      | <b>10.3</b>    |

*Numbers may not add due to rounding*

Load shed service for imports (LSSi) is interruptible load that can be armed to trip, either automatically or manually, on the loss of the Alberta-British Columbia intertie to allow for increased import available transfer capability (ATC). The 2019 costs for LSSi are \$3.1 million, which is \$4.3 million or 58 per cent lower than the 2018 costs of \$7.4 million. LSSi costs are impacted by volume availability, contract prices and AIES requirements for arming and tripping.

Transmission must-run (TMR) occurs when generation is required to mitigate the overloading of transmission lines associated with line outages, system conditions in real time or the loss of generation in an area. The AESO contracts with a generator in Northwest Alberta to provide TMR services which cost \$0.8 million in 2019 and 2018. In circumstances when this service is required for an unforeseeable event and there is no contracted TMR, non-contracted generators may be dispatched to provide this service (referred to as conscripted TMR).

Reliability services are procured for grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall.

The Poplar Hill generator provides voltage support (VAr) in addition to power (MW), to support the transmission system reliability in the Northwest part of the province.

Black start services are provided by generators that are able to restart their generation facility with no outside source of power. In the event of a system-wide black-out, black start services are used to re-energize the transmission system and provide start-up power to generators who cannot self-start. Black start providers are required in specific areas of the AIES to ensure the entire system has adequate start-up power.

Transmission constraint rebalancing costs are incurred when the transmission system is unable to deliver electricity from a generator to a given electricity consuming area without contravening reliability requirements. When this occurs, a market participant downstream of a constraint may be dispatched for purposes of transmission constraint rebalancing under the Independent System Operator (ISO) Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose.



### Other Industry Costs (\$ million)

|   | 2019<br>Actual | 2019<br>Budget | 2018<br>Actual |
|---|----------------|----------------|----------------|
| Alberta Utilities Commission (AUC) fee – Transmission | 2.9            | 3.0            | 2.6            |
| AUC fee – Energy Market                               | 1.8            | 1.6            | 1.4            |
| WECC/NWPP/NERC costs                                  | 0.5            | 0.6            | 0.5            |
| Regulatory process costs                              | 1.1            | 0.7            | 0.1            |
| <b>Total Other Industry Costs</b>                     | <b>6.2</b>     | <b>6.0</b>     | <b>4.6</b>     |

*Numbers may not add due to rounding*

Other industry costs represent fees or costs paid based on regulatory requirements or membership fees for industry organizations, which are not under the direct control of the AESO. These costs relate to the annual administration fee for the AUC, the AESO's share of Western Electricity Coordinating Council (WECC), Northwest Power Pool (NWPP) and North American Electric Reliability Corporation membership (NERC) fees and regulatory process costs. Regulatory process costs are associated with the AESO's involvement in an AUC proceeding to hear objections and complaints to ISO Rules or a regulatory application and costs incurred to respond to specific agency-related directions or recommendations that are beyond the routine operations of the AESO; this does not include application preparation costs.

Other industry costs in 2019 are \$6.2 million, which is \$1.6 million or 35 per cent higher than 2018 costs of \$4.6 million. The increase is mainly attributable to increased regulatory process costs in 2019, including proceeding costs related to the AUC's review and approval of new rules to launch the capacity market and additional cost orders.

### General and Administrative Costs (\$ million)

|   | 2019<br>Actual | 2019<br>Budget | 2018<br>Actual |
|---|----------------|----------------|----------------|
| Staff costs                                   | 19.5           | 18.2           | 18.3           |
| Contract services and consultants             | 2.1            | 2.9            | 3.5            |
| Facilities                                    | 1.0            | 1.0            | 1.8            |
| Administration                                | 1.1            | 1.2            | 1.0            |
| Computer services and maintenance             | 2.9            | 2.9            | 2.6            |
| Telecommunications                            | 0.4            | 0.4            | 0.4            |
| <b>Total General and Administrative Costs</b> | <b>26.9</b>    | <b>26.5</b>    | <b>27.7</b>    |

*Numbers may not add due to rounding*

Facilities costs have decreased from 2018 due to the adoption of International Financial Reporting Standard 16 - Leases, which reclassifies the costs of various facility leases to amortization of right-of-use assets and interest expense.

**Interest and Amortization (\$ million)**

|  | 2019<br>Actual | 2019<br>Budget | 2018<br>Actual |
|--|----------------|----------------|----------------|
| Amortization of right-of-use assets, intangible assets and depreciation of property, plant and equipment | 5.9            | 6.2            | 6.2            |
| Interest   | 1.1            | 1.1            | 0.4            |

**Capital Expenditure Update – As of March 31, 2019**
**Capital Program (\$ million)**

|   | Total<br>Project<br>Approved | Prior<br>Year(s)<br>Actual | Spent<br>in 2019<br>to date | ETC<br>in 2019 | ETC<br>Future<br>Yr.(s) | Total<br>Cost Est. | Variance<br>Approved<br>to Total<br>Cost Est. |
|---|------------------------------|----------------------------|-----------------------------|----------------|-------------------------|--------------------|---|
| <b>Key Capital Initiatives <sup>2</sup></b>                     |                              |                            |                             |                |                         |                    |   |
| Capacity Market   | 30.3                         | 0.8                        | 1.7                         | 16.5           | 10.9                    | 29.9               | 0.4   |
| EMS Sustainment   | 20.1                         | 2.1                        | 1.6                         | 4.6            | 11.6                    | 19.9               | 0.2   |
| CIP   | 0.2                          | -                          | 0.0                         | 0.2            | -                       | 0.2                | -   |
| Cyber and Physical Security Advancements                        | 0.7                          | -                          | 0.0                         | 0.6            | -                       | 0.7                | 0.0   |
| Interties   | 0.2                          | 0.2                        | 0.0                         | -              | -                       | 0.2                | 0.0   |
| Market Evolution - Other  | 1.3                          | 0.2                        | 0.2                         | 0.8            | -                       | 1.2                | 0.1   |
| <b>Other Capital Initiatives</b>                                | 5.2                          | 1.6                        | 0.8                         | 2.4            | 0.1                     | 5.0                | 0.2   |
| <b>Life Cycle Funding</b>                                       | 3.2                          | 0.0                        | 1.0                         | 2.2            | -                       | 3.2                | 0.0   |
| <b>Subtotal General Capital</b>                                 | 61.3                         | 4.9                        | 5.5                         | 27.4           | 22.5                    | 60.3               | 1.0   |
| <b>Major Project Capital – SCC** Expansion – Implementation</b> | 21.9                         | 9.9                        | 3.6                         | 7.8            | -                       | 21.3               | 0.6   |
| <b>Total Capital</b>  | 83.2                         | 14.8                       | 9.1                         | 35.1           | 22.5                    | 81.6               | 1.6   |

Note: Differences may exist due to rounding

\* Market Systems Replacement and Re-engineering

\*\*System Coordination Centre Expansion

**General Capital Program (\$ million)**

|   |             |
|---|-------------|
| Spent to March 31, 2019                                 | 5.5         |
| Estimate to Complete (ETC) in 2018                      | 27.4        |
| <b>Subtotal</b>   | <b>32.8</b> |
| AESO Board Decision Document – General Capital approved | 40.4        |
| 2018 budget remaining                                   | 7.6         |

<sup>2</sup> Section Appendix I - Notes which provide a summary of financial variances or changes to the (key) capital initiatives

## Appendix I - Notes

The following appendix provides further detail on major project progress for key capital programs (e.g., approved business case or change-orders).

| Key Capital Initiatives                    |                                |   |
|--|--------------------------------|---|
| Energy Management System (EMS) Sustainment | <b>Description</b>             | The EMS is used by System Controllers in grid operations to monitor, control and optimize the performance of the power system. Upgrades relating to the sustainment and optimization requirements of the EMS evergreen strategy includes vendor software upgrades and improved analysis and reporting capabilities  |
|  | <b>2019 Plans and Progress</b> | <p>Continue to evolve and sustain our EMS system by identifying implementation options , process changes and system impact assessment to support the market transition</p> <p>Advance EMS Core according to planned schedule, utilizing key features and functionality while maintaining system performance, security and compliance</p> <p>Initiate design and implementation of EMS application upgrade to advance the application layer of EMS: to support reliability and operation of the evolving, complex market and electric systems</p>  |
| Capacity Market                            | <b>Description</b>             | IT systems and solutions for market evolution. The development and implementation of tools to accommodate an evolving market due to the implementation of a capacity market   |
|  | <b>2019 Plans and Progress</b> | <p>Continued major program to design and implement systems to support the capacity market, including projects for:</p> <p>Calculation of Unforced Capacity (UCAP) for market participant assets – Currently in implementation phase</p> <p>Capacity market auction solution(s) encompassing pre-auction, auction and rebalancing – Currently in implementation phase</p> <p>Settlement and Performance of the capacity market in accordance with ISO Rules – Currently in design phase</p> <p>Related Energy and Ancillary Service market changes as required – Currently in design phase</p> <p>Required tools, enhancements, and process for market evolution and sustainment of existing systems – currently in design and implementation phase depending on the required timing of the projects</p> |

| Key Capital Initiatives  |                                |   |
|--|--------------------------------|---|
| <b>Alberta Reliability Standards Critical Infrastructure Protection (CIP) Implementation</b> | <b>Description</b>             | Implementation of facility upgrades, changes to AESO sites and/or systems that are required to support CIP V5 implementation and compliance requirements  |
|  | <b>2019 Plans and Progress</b> | Implementing technology and process changes to reduce compliance risk and improve efficiencies  |
| <b>Cyber and Physical Security Advancements</b>  | <b>Description</b>             | Upgrade AESO systems and processes to reduce the risk of cyber security breaches and facilitate AESO compliance to CIP V5 requirements  |
|  | <b>2019 Plans and Progress</b> | <p>Continuing advancement of the multi-year Identity and Access Management (IAM) projects</p> <p>Continuing implementation of additional controls to prevent, detect, respond to, and recover from incidents</p> <p>Focusing on people cyber security through implementing best practices for passwords, increasing staff awareness and assessing the expansion of personal risk assessment</p>           |
| <b>Market Evolution – Other</b>  | <b>Description</b>             | The identification, development and implementation of tools in support of market optimization and/or performance improvements. As well as system changes to support increased amount of renewables. Includes system changes for wind and solar aggregated generating facility forecasting rules, REP settlement and system changes to enable increased flexibility for Operating Reserve (OR) procurement |
|  | <b>2019 Plans and Progress</b> | <p>Projects have been initiated to implement market rules changes: design and system development and are progressing as planned</p> <p>Implementing system changes to accommodate REP settlement</p>  |
| <b>Key Initiatives</b>   |                                | <b>2019 Budget \$28.5 million</b>   |