AESO Quarterly Stakeholder Report

Q3 2018

- Initiative Updates
- Financial Highlights

Quarterly Stakeholder Report – Third Quarter (July – September) 2018

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 2017-2018 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
Alberta Reliability Standards (ARS) Critical Infrastructure Protection (CIP)	AESO became CIP compliant as of October 1, 2017 AESO completed Western Electricity Coordinating Council (WECC) CIP audit of AESO compliance with standards in Q1 2018	None None	None None
	ARS CIP Standard CIP-014-AB-02 (Physical Security) filed with the Alberta Utilities Commission (AUC) July 2018. Stakeholder objections filed with the AUC	Awaiting decision from the AUC on stakeholder objections to ARS CIP Standard	AUC approval of ARS CIP Standard CIP-014-AB-2 expected in Q4 2018
Alberta Interconnected Electrical System (AIES) – enhancements (reliability and integration)	SCC Expansion Project (implementation phase) as construction is underway	Building external structure completion expected in Q4 2018	Project completion expected in Q4 2019

Electric System Development			
Business Initiative	Current Status	Next Milestone	Target
Advance system and regional transmission projects identified in the LTP	Facility Application (FA) filed for the Calgary Downtown Reinforcement Project by ENMAX on November 30, 2017 and is going through AUC hearing process	AUC decision on the Calgary Downtown Reinforcement FA is expected in Q4 2018	Ongoing
	The Provost to Edgerton and Nilrem to Vermillion (PENV) AUC decision on PENV NID filing was received on January 12, 2018. AUC requested AESO to revise the NID submission. The revised NID was filed with the AUC on March 26, 2018. Project NID is in regulatory proceeding	NID hearing is scheduled for November 5, 2018.	AUC decision on PENV project NID is expected in Q1 2019
	AUC categorized the AESO NID (filed Q4 2017) for the Rycroft Transmission Reinforcement NID, a component of the NW transmission plan as a category 2 project	NID hearing is scheduled for October 29, 2018.	AUC decision on Rycroft project NID is expected in Q1 2019.
	AESO completed design and development of Chapel Rock-Castel Rock Ridge project requirements and consultation started in Q1 2018	AESO will continue public consultation throughout 2018	Ongoing

Electric System Development - continued			
Business Initiatives	Current Status	Next Milestone	Target
Intertie Restoration	AESO has completed design and development of intertie requirements and consultation started in Q1 2018.	AESO will continue public consultation throughout 2018	Ongoing
Competitive Process (for transmission)	The Fort McMurray West Project is currently under construction. Alberta Powerline (APL) filed a tariff with the AUC which was approved January 23, 2018	None	Target in-service date for the Project is 2019
	Based on the current economic environment, the AESO is deferring 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**
	In Q3 2017, the AESO filed the Rider C, *Deferral Account Adjustment Rider*, amendment application for changes to Rider C and the deferral account reconciliation methodology on an interim refundable basis. This application was filed as part of the 2018 ISO tariff application. Approval was provided by the Alberta Utilities Commission (AUC) on an interim basis in Q4 2017 with a Q1 2018 implementation	AUC approval of Rider C and deferral account methodology on a final basis in 2018/19	The AESO plans to file a 2017-2018 deferral account reconciliation application in Q2 2019 as the AESO requires time to make system changes for deferral account methodology changes
Tariff rate information and updates	In Q3 2017, the AESO filed the 2018 ISO tariff application (formerly referred to as the 2017 ISO Tariff Application) The AESO filed a revised 2018 ISO tariff application in August 2018	Ongoing	Ongoing
	An updated Transmission Rate Projection (TRP) model, to incorporate the LTP results, was published and filed with the AUC in Q2 2018. The updated bill estimator information document was posted to AESO website in Q3 2018	Ongoing	Ongoing
	In Q3 2017, the AESO filed the 2018 ISO tariff update application. Approval was provided by the Alberta Utilities Commission in Q4 2017 on a final basis with a Q1 2018 implementation	The AESO expects to file the 2019 tariff update in November 2018	Expected approval for the 2019 tariff update from the AUC in Q4 2018 on a final basis with a Q1 2019 implementation
	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 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

Customer Access Services			
Business Initiative	**Current Status**	**Next Milestone**	**Target**
Advance customer connection projects within the connection queue[1]	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
	24 customer energizations (including Connection, Contract and Behind-the-Fence projects) completed as of September 30, 2018	Ongoing	Ongoing
	11 customer connection Abbreviated Need Identification Documents (ANID)s filed with the AUC (one of which was a Market Participant Choice project) and two Abbreviated Needs Approval Process (ANAP) customer connection projects were approved as of September 30, 2018	NID development and filings as per schedule	Ongoing

[1] See 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.

Market Development			
Business Initiative	**Current Status**	**Next Milestone**	**Target**
Market system replacement and re-engineering (MSR) project	Successfully completed medium-term sustainment measures for 2017	Not applicable	Not applicable
Climate change program	AESO launched the first Renewable Electricity Program (REP) competition - REP Round 1 in Q1 2017 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	Ongoing	The target in-service date for REP Round 1 projects is in Q4 2019
	The AESO opened REP Rounds 2 and 3, Request for Proposals stage on September 17, 2018	Qualified proponents were invited to submit a proposal prior to October 23, 2018	The AESO plans to award Renewable Electricity Support Agreements associated with REP Rounds 2 and 3 by the end of 2018
Capacity Market	Final Comprehensive Market Design (CMD Final) posted to AESO website. Design stage completed. Stakeholder engagement on rules (including demand curve components) and cost allocation commenced in Q3 2018	Continue drafting of ISO Rules to reflect market design contained in CMD Final. Development of capacity cost allocation tariff	Capacity market rules filed with AUC in Q1 2019

II. Financial Update – As of September 30, 2018

Transmission Operating Costs ($ million)

	2018 Actual	2018 Forecast	2017 Actual
Wires costs	1,283.6	1,292.3	1,262.3
Operating reserves	186.9	117.1	61.4
Transmission line losses	71.2	71.6	38.6
Other ancillary service costs	34.7	24.7	26.7
Total Transmission Operating Costs	**1,576.5**	**1,505.7**	**1,389.0**

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.

The 2018 forecast is based on TFO tariffs approved or applied-for as of April 2017 primarily based on: i) a filing for a 2018 tariff; ii) a compliance filing for a 2017 tariff; or iii) AUC approvals for 2017 tariffs.

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.

Year-to-date 2018 operating reserve costs are higher than forecasted primarily due to higher volumes and pricing. Higher pool prices, particularly during May of 2018, were attributable to gas and coal outages and increased demand. Higher volumes and pricing during the period from January to July 2018 were also due to higher imports. The year-to-date September 2018 average pool price is $49 per megawatt hour (MWh) compared to a forecast of $43 per MWh and 2017 actual year-to-date September average pool price of $22 per MWh.

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.

Year-to-date 2018 transmission line loss costs are slightly higher than the budgeted expectation. While costs have been impacted by a higher pool price, the effect has been offset by lower than forecasted volumes.

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)

	2018 Actual	2018 Forecast	2017 Actual
Load shed service for imports	26.5	13.3	18.3
Transmission must-run			
Contracted	2.3	2.5	2.3
Conscripted	0.1	1.5	0.3
Reliability services	2.1	2.1	2.1
Poplar Hill	2.0	2.1	2.1
Black start	1.7	3.2	1.6
Transmission constraint rebalancing	0.0	0.1	0.0
Total Other Ancillary Services	**34.7**	**24.7**	**26.7**

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). LSSi costs are impacted by volume availability, contract prices and AIES system requirements for arming and tripping requirements. Higher actual costs than forecast due to high imports requiring arming of LSSi, so far in 2018.

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. 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). In 2018 to date, costs for conscripted TMR are lower due to fewer actual events than forecasted requiring TMR.

Reliability services are provided through an agreement with Powerex Corp. 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 (VArs) 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. Black start costs are lower than forecast in 2018 as additional black start resource services have not been procured in 2018 as was initially planned.

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)

	2018 Actual	2018 Budget	2017 Actual
Alberta Utilities Commission (AUC) fee – Transmission	8.6	9.6	8.6
AUC fee – Energy Market	4.6	4.9	4.4
WECC/NWPP/NERC costs	1.6	1.7	1.6
Regulatory process costs	1.8	1.1	1.0
Total Other Industry Costs	**16.6**	**17.3**	**15.6**

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 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.

General and Administrative Costs ($ million)

	2018 Actual	2018 Budget	2017 Actual
Staff costs	54.5	54.1	48.9
Contract services and consultants	10.4	11.5	9.7
Facilities	5.7	5.6	5.2
Administration	3.3	2.9	2.9
Computer services and maintenance	8.1	8.2	7.7
Telecommunications	1.3	1.0	1.0
Total General and Administrative Costs	**83.2**	**83.3**	**75.4**

Numbers may not add due to rounding

Interest and Amortization ($ million)

	2018 Actual	2018 Budget	2017 Actual
Amortization of intangible assets and depreciation of property, plant and equipment	18.6	15.0	15.0
Interest	1.3	1.1	0.6

Capital Expenditure Update – As of September 30, 2018

Capital Program ($ million)	Total Project Approved	Prior Year(s) Actual	Spent in 2018 to date	ETC in 2018	ETC Future Yr.(s)	Total Cost Est.	Variance Approved to Total Cost Est.
Key Capital Initiatives [2]							
IT/Cyber Security	2.3	0.5	1.1	0.4	-	2.1	0.2
CIP Implementation	0.2	-	0.0	0.2	-	0.2	0.0
MSR* Sustainment	3.0	2.9	0.2	-	-	3.1	(0.1)
Market Evolution	2.7	0.1	0.9	0.9	0.6	2.3	0.4
Reliability (other – non-EMS)	0.5	-	0.4	0.0	-	0.4	0.1
Facilities	1.4	1.3	0.0	-	-	1.3	0.1
Other Capital Initiatives	8.5	1.1	4.7	1.4	0.7	7.9	0.6
Life Cycle Funding	4.9	-	2.9	2.1	-	5.0	0.1
Subtotal General Capital	23.6	5.8	10.3	5.0	1.3	22.4	1.2
Major Project Capital – SCC Expansion – Implementation**	21.9	1.8	4.8	5.2	9.4	21.2	0.7
Total Capital	45.5	7.6	15.1	10.3	10.7	43.6	1.9

Note: Differences may exist due to rounding

** Market Systems Replacement and Re-engineering*
***System Coordination Centre Expansion*

General Capital Program ($ million)

Actual Spent to September 30, 2018	10.3
Estimate to Complete (ETC) in 2018	6.7
Subtotal	17.0
AESO Board Decision Document – General Capital approved budget	18.4
2018 budget remaining	1.4

[2] 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 the key capital programs (e.g., approved business case or change-orders).

Key Capital Initiatives		
Reliability Program – Energy Management System (EMS)	**Description**	The EMS is used by System Controllers in grid operations to monitor, control and optimize the performance of the power system. The EMS is comprised of two major components, the Application Suite and IT Infrastructure. Both components have reached end of life and will no longer be supported by their respective vendors. In order to ensure reliable grid operations, be Critical Infrastructure Protection (CIP) compliant and have supported hardware and software, it was deemed prudent to proceed with an upgrade to the AESO EMS
	2017 Progress	The implementation phase of the EMS Upgrade project is a multi-year project. The project was deployed into production in Q3 2017. The project was completed in Q4 2017 See Business Plans 2015-2017 Appendix F: Major Projects for more information
	2018 Plans and Progress	Not applicable – completed in 2017. Sustainment and optimization phases following the completion of the implementation phase will form part of the AESO's ongoing general capital program for 2018
Reliability Program - Other Components (non-EMS)	**Description**	Grid management projects that are intended to enhance the efficiency and improve the ability to reliably run the Alberta Interconnected Electric System (AIES)
	2017 Progress	The primary focus for 2017 was the continued phased migration of Transmission Facility Owners (TFOs) and Independent Power Producer (IPP) to the new network for the Supervisory Control and Data Acquisition (SCADA)/Wide Area Network (WAN) communications service which became fully operational in Q4 2017 – completed
	2018 Plans and Progress	ISO Rule 304.3 (Wind Power Ramp Up Management) has been amended, primarily to include Solar aggregated generating facilities; effective September 1, 2018. The EMS and downstream applications must be modified and tested to ensure compliance Updates to existing systems were successfully deployed and compliance with ISO Rule 304.3 as of September 1, 2018 has been met. The project has been completed

Key Capital Initiatives		
Alberta Reliability Standards Critical Infrastructure Protection (CIP) Implementation	**Description**	Implementation of facility upgrades, changes to AESO sites and/or systems that are required to support CIP V5 implementation and compliance requirements
	2017 Progress	Implemented CIP processes, security controls and system changes required to ensure CIP compliance readiness
	2018 Plans and Progress	Institutionalizing the AESO sustainment program for compliance with CIP standards. Applying efficiencies and optimizations to the AESO's CIP process to ensure sustainability
IT / Cyber Security Advancements	**Description**	Upgrade AESO systems and processes to reduce the risk of cyber security breaches and facilitate AESO compliance to CIP V5 requirements
	2017 Progress	The first and second sets of enhancements to AESO's advanced threat management capabilities are completed
	2018 Plans and Progress	Continuing advancement of the multi-year Identity and Access Management (IAM) projects Continuing the implementation of additional system controls to prevent, detect, respond to, and recover from incidents
Market Systems Replacement and Reengineering (MSR) - Implementation (Sustainment)	**Description**	The MSR Implementation program is based on a multi-year phased approach designed to address the operating requirements of the AESO's market systems Many of these systems have been stretched past their useful life and in many cases, have become increasingly difficult and costly to change and operate reliably Focus is to sustain current market system reliability and security through medium-term measures
	2017 Progress	Medium-term sustainment measures were successfully completed
	2018 Plans and Progress	Not applicable – completed in 2017

Key Capital Initiatives		
Market Evolution	**Description**	The identification, development and implementation of tools in support of market optimization and/or performance improvements. This includes system changes for wind and solar aggregated generating facility forecasting rules, and system changes to enable increased flexibility for Operating Reserve (OR) procurement Also included are system changes to support an evolving market due to implementation of a capacity market and increased amounts of renewables
	2017 Progress	OR procurement system changes business case is completed. Based on business case review, no system changes were required, at this time Business case for system changes for Wind and Solar Aggregated Generating Facility Forecasting rules are completed
	2018 Plans and Progress	System changes supporting the revised Wind and Solar Aggregated Generating Facility Forecasting Rules implemented Developing business case for tools to support capacity delivery (settlement, performance measurement) and energy market changes for first capacity delivery period Reliability model to support development of capacity market demand curve implemented. High level design for capacity market auction tools in development
Facilities	**Description**	Implement physical access control (security) improvements at the System Coordination Centre (SCC) to enhance security and safety for personnel. Supports SCC Expansion initiative
	2017 Progress	Project completed
	2018 Plans and Progress	Not applicable – completed in 2017
Key Initiatives		**2017 Approved Budget $6.4 million** **2018 Approved Budget $4.5 million**