

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.

Reporting on Business Plan Initiatives by Activity Group

Electric System Operations			
<i>Business Initiative</i>	<i>Current Status</i>	<i>Next Milestone</i>	<i>Target</i>
SCC Expansion Project	SCC Expansion Project (implementation phase) as construction is underway and near complete as of Q3 2019	None	Construction completed and building operational in Q4 2019
EMS Sustainment	Continuing to evolve and sustain our EMS system by identifying implementation options, process changes and system impact assessment	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 Design and implementation plan for the EMS application upgrade to advance the application layer of EMS to support reliability and operation of the electric system
Western Interconnection (WI) Reliability Coordination (RC) Initiative	Continued coordination with RCs related to the WI RC Initiative and changes to the RC structure in the WI. Submission of RC-related reliability standards to the AUC was completed in Q2 2019, and on July 11, 2019 the AUC issued Decision 24638-D01-2019 approving the AESO's submission. RC Agreements with neighboring RCs have been executed, and procedures and models have been updated to reflect the RC changes.	Ongoing	Complete deliverables for RC agreements, modelling, data exchange, RC to RC coordination, tools, and staff training

Electric System Operations			
<i>Business Initiative</i>	<i>Current Status</i>	<i>Next Milestone</i>	<i>Target</i>
Intertie Restoration	AESO has completed design and development of intertie requirements and public notifications were held in October 2018 and June 2019	The filing date for the Needs Identification Document (NID) is to be confirmed	Ongoing
Competitive Process (for transmission)	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
Tariff: General Tariff Application (GTA)	In Q3 2017, the AESO filed the 2018 GTA (formerly referred to as the 2017 ISO Tariff Application) with the Alberta Utilities Commission (AUC). The AESO filed a revised 2018 GTA application in August 2018.	The AESO expects to file the 2018 GTA compliance filing in January 2020	Expected AUC approval for the 2018 GTA compliance filing in Q2 or Q3 2020
	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 January 2020	Expected AUC approval for the 2020 tariff <u>update</u> in Q1 or Q2 2020 on a final basis with a Q2 2020 implementation
Tariff: Review of bulk and regional transmission rate design	In Q2 2018, the AESO proposed to the AUC a consultation process to review bulk and regional transmission rate design. The AUC approved the AESO's proposal to begin the consultation process. AESO initiated the consultation process in Q3 2018	Ongoing	The AESO expects to finish the consultation process for the bulk and regional transmission tariff design in 12-18 months concluding with an application to the AUC for any proposed changes in Q2 /Q3 2020

Market Development			
<i>Business Initiative</i>	<i>Current Status</i>	<i>Next Milestone</i>	<i>Target</i>
<p>Capacity market technical design</p> <p>Tariff cost allocation for capacity market</p> <p>Capacity procurement process</p> <p>IT systems and solutions for market evolution</p>	<p>On July 24, 2019, the Government of Alberta announced that Alberta will not transition to a capacity market and will continue with an energy-only market. Therefore, the AESO is not proceeding further with capacity market implementation activities</p>	<p>None</p>	<p>None</p>
<p>Renewable Electricity Program (REP) - Rounds 1, 2, 3</p>	<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 Q4 2019</p> <p>The target in-service dates for REP Round 2 and 3 projects is in Q2 2021</p>

Customer Access Services			
<i>Business Initiative</i>	<i>Current Status</i>	<i>Next Milestone</i>	<i>Target</i>
Advance customer connection projects within the connection queue¹	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
	32 customer energizations (including Connection, Contract and Behind-the-Fence projects) completed as of September 30, 2019	Ongoing	Ongoing
	4 customer connection Abbreviated Need Identification Documents (ANID)s filed with the AUC (1 of which was a Market Participant Choice project) and no new Abbreviated Needs Approval Process (ANAP) customer connection projects were approved as of September 30, 2019	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.

Financial Update – As of September 30, 2019

Transmission Operating Costs (\$ million)			
	2019	2019	2018
	Actual	Forecast	Actual
Wires costs	1,387.7	1,375.9	1,283.6
Operating reserves	151.8	221.2	186.9
Transmission line losses	86.3	98.6	71.2
Other ancillary service costs	20.3	32.4	34.7
Total Transmission Operating Costs	1,646.1	1,728.2	1,576.5

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 \$1,387.7 million, which is \$104.1 million or 8 per cent higher than the 2018 costs of \$1,283.6 million due to higher regulated rates charged by the TFOs for the current year and completion of the Fort McMurray West 50kV Transmission Project, which was energized on March 28, 2019.

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 \$151.8 million, which is \$35.1 million or 19 per cent lower than the 2018 costs of \$186.9 million. The cost of operating reserves is impacted by actual volumes, hourly pool prices and operating reserve prices. The average hourly pool price is \$58 per megawatt hour (MWh) in 2019 compared to \$50 per MWh in 2018, representing an increase of 16 per cent. Operating reserve volumes financially settled in 2019 are 5,941 gigawatt hours (GWh) compared to 6,106 GWh in 2018, representing a 3 per cent decrease. The cost variance is mainly attributable to less standby reserves activated, combined with reduced standby premiums. The decrease in standby activation is due to decreased import activity and relatively stable on-peak pool prices.

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 \$86.3 million, which is \$15.1 million or 21 per cent higher than the 2018 cost of \$71.2 million, primarily due to the impact of a 16 per cent higher average pool price. Line loss volumes financially settled in 2019 are 1,410.1 GWh compared to 1,387.6 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	2019	2018
	Actual	Forecast	Actual
Load shed service for imports	12.7	32.9	26.5
Transmission must-run			
Contracted	2.1	3.2	2.3
Conscripted	0.5	0.2	0.1
Reliability services	2.1	2.9	2.1
Poplar Hill	0.9	1.7	2.0
Black start	1.7	2.3	1.7
Transmission constraint rebalancing	0.3	0.1	0.0
Total Other Ancillary Services	20.3	43.2	34.7

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). The 2019 costs for LSSi are \$12.7 million, which is \$13.8 million or 52 per cent lower than the 2018 costs of \$26.5 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 \$2.1 million in 2019 and \$2.3 million in 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 (VARs) in addition to power (MW), to support the transmission system reliability in the Northwest part of the province. The contract with Poplar Hill was terminated in July of 2019, resulting in a \$1.1 million decrease from the 2018 costs of \$2.0 million.

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	2019	2018
	Actual	Budget	Actual
Alberta Utilities Commission (AUC) fee – Transmission	8.6	9.1	8.6
AUC fee – Energy Market	5.9	4.8	4.6
WECC/NWPP/NERC costs	1.6	1.8	1.6
Regulatory process costs	4.1	2.1	1.8
Total Other Industry Costs	20.2	17.9	16.6

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 (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 \$20.2 million, which is \$3.6 million or 22 per cent higher than 2018 costs of \$16.6 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 the ISO General Tariff.

General and Administrative Costs (\$ million)			
	2019	2019	2018
	Actual	Budget	Actual
Staff costs	57.0	54.5	54.5
Contract services and consultants	4.0	8.6	10.4
Facilities	2.9	3.1	5.7
Administration	3.1	3.5	3.3
Computer services and maintenance	8.5	8.6	8.1
Telecommunications	1.2	1.1	1.2
Total General and Administrative Costs	76.6	79.5	83.2

Numbers may not add due to rounding

Contract services and consultants have decreased from the 2019 Budget and 2018 actuals primarily due to the July 24, 2019 announcement by the Government of Alberta that Alberta will not transition to a capacity market.

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	2019	2018
	Actual	Budget	Actual
Amortization of right-of-use assets, intangible assets and depreciation of property, plant and equipment	28.9	18.5	18.6
Interest	3.8	3.3	1.3

Amortization of intangible assets and depreciation of property, plant and equipment have exceeded budgeted expectations and 2018 actual costs due primarily to the write-off of capacity market assets which no longer hold expected future value.

Capital Expenditure Update – As of September 30, 2019

Capital Program (\$ million)							
	Total Project Approved	Prior Year(s) Actual	Spent in 2019 to date	ETC in 2019	ETC Future Yr.(s)	Total Cost Est.	Variance Approved to Total Cost Est.
Key Capital Initiatives ²							
Capacity Market	30.7	0.8	9.1	0.0	0.0	10.0	20.7
EMS Sustainment	20.7	2.1	4.7	1.2	9.1	17.0	3.6
CIP	0.6	-	0.1	0.2	-	0.3	0.3
Cyber and Physical Security Advancements	1.4	-	0.8	0.4	-	1.2	0.2
Interties	0.2	0.2	0.0	-	-	0.2	0.0
Market Evolution - Other	2.6	0.2	1.1	0.8	0.4	2.5	0.1
Other Capital Initiatives	8.5	1.6	2.3	2.2	1.5	7.7	0.8
Life Cycle Funding	9.6	0.0	3.5	2.6	3.2	9.4	0.2
Subtotal General Capital	74.2	4.9	21.7	7.4	14.2	48.2	26.0
Major Project Capital – SCC** Expansion – Implementation	21.9	9.9	10.0	1.7	-	21.6	0.3
Total Capital	96.1	14.8	31.7	9.1	14.2	69.8	26.3

Note: Differences may exist due to rounding

** Market Systems Replacement and Re-engineering*

***System Coordination Centre Expansion*

General Capital Program (\$ million)	
Spent to September 30, 2019	21.7
Estimate to Complete (ETC) in 2019	7.4
Subtotal	29.1
General Capital approved	32.9
2019 budget remaining	3.8

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

Key Capital Initiatives		
Energy Management System (EMS) Sustainment	Description	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
	2019 Plans and Progress	Advance EMS Core according to planned schedule, utilizing key features and functionality while maintaining system performance, security and compliance. Initiate design and implementation of EMS application upgrade to advance the application layer of EMS: to support reliability and operation of the electric system.
Capacity Market	Description	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.
	2019 Plans and Progress	On July 24, 2019, the Government of Alberta announced that Alberta will not transition to a capacity market and will continue with an energy-only market. Therefore, the AESO is not proceeding further with capacity market implementation activities.

Key Capital Initiatives		
Alberta Reliability Standards and 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
	2019 Plans and Progress	Implementing technology and process changes to reduce compliance risk and improve efficiencies
Cyber and Physical Security Advancements	Description	Upgrade AESO systems and processes to reduce the risk of cyber security breaches and facilitate AESO compliance to CIP V5 requirements
	2019 Plans and Progress	<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 though implementing best practices for passwords, increasing staff awareness and assessing the expansion of personal risk assessment procedures</p>
Market Evolution Other	Description	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
	2019 Plans and Progress	<p>Projects have been initiated to implement energy storage technology into various systems</p> <p>Continuing to implement system changes to accommodate REP settlement</p>
Key Initiatives		2019 Budget \$28.5 million