AESO 2017-2018
Business Plan and Budget Proposal

Memo

To: AESO Board
From: Vice President, Finance
Date: May 29, 2017
Subject: **AESO 2017-2018 Busines Plan and Budget Proposal**

Enclosed is the AESO 2017-2018 Business Plan and Budget Proposal (Business Plan). This document was prepared by AESO Management in consultation with stakeholders and outlines:

- The process employed to develop the Business Plan;
- The AESO's proposed 2017-2018 business initiatives;
- The proposed 2018 forecasts/budgets for:
  - wires costs;
  - transmission line losses costs;
  - ancillary services costs; and
  - other industry costs
- The proposed own costs budgets (i.e., general and administrative, interest costs, amortization, and capital) for 2017 as revised to reflect a twelve month budget and 2018.

At the June AESO Board meeting, AESO Management will be requesting that the Board approve, or amend and approve, as appropriate, the items outlined in Section 1 of this document.

Prior to the meeting, stakeholders may request the opportunity to meet with you to discuss their written comments related to the information provided. As you are aware, these meetings are scheduled for June 6, 2017.

Should you have any questions or additional information requirements please let me know.

Yours truly,

Todd Fior

Vice President, Finance

cc: David Erickson, President and Chief Executive Officer
Mike Law, Senior Vice President and Chief Operating Officer
Greg Spence, Director, Business Planning
Carol Moline, Director, Accounting and Treasury
Interested Stakeholders

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Section 1

Board Decision Items - Executive Summary

In the fall of 2016, due to the uncertainty that the Government of Alberta's Climate Leadership Plan (CLP) would have on the AESO's 2017 business initiatives and own costs[1], the AESO decided to roll forward its 2016 business initiatives into the first half of 2017 and the related own costs budgets would be budgeted at 50 per cent of AESO's 2016 budgeted own cost amounts. This allowed the AESO additional time to assess the impacts of the CLP initiatives on the AESO's operations and more specifically, the impacts of the November 2016 announcement by the Government of Alberta that Alberta would be transitioning to a new framework that includes both an energy market and new capacity market. The forecasts for transmission operating costs[2] were forecasted for the full 2017 calendar year.

As a result, over the last several months, the proposed business initiatives for 2017 and 2018, which indicate the planned direction and the focus of the operations have been reviewed and discussed with stakeholders and the AESO Board. The business initiatives being proposed, which have not changed materially from the 2016 business initiatives as the AESO's business initiative tend to be multi-year initiatives, combined with the day-to-day operational activities form the foundation from which the 2017 and 2018 own costs budgets and 2018 forecasts for transmission operating costs have been developed. The AESO's business initiatives and own costs have been revised for 2017 to reflect a 12-month operating period, as opposed to the previous six-month budgets and will supersede the AESO Board's December 2016 approvals.

The budgeted costs are based on the funding required to achieve the business initiatives and maintain business operations as outlined in the Business Plan. In addition to this, wires, transmission line losses and ancillary services cost forecasts for 2018 are provided which are within the AESO Board's mandate for approval. These forecasts have been developed internally and have been included in the process to engage stakeholders for review and comment, consistent with other budgeted costs.

Throughout the process, stakeholders interested in reviewing the proposed initiatives, budgets and forecasts have been engaged and in return, have provided their comments. This consultation process, referred to as the Budget Review Process (BRP), allows the AESO to prepare a business plan and budget that has been reviewed, and at times challenged before it is proposed to the AESO Board for approval. As a part of this proposal to the AESO Board, stakeholder written comments which have been received to date and the AESO's responses to those comments are included. The purpose of providing these comments and responses is for the AESO Board to gain insight into the feedback that the AESO received during the stakeholder consultation. The AESO continues to believe that this open and transparent process enables the preparation of a thorough and comprehensive Business Plan, which receives stakeholder support of this inclusive process. The end result is a well communicated and understood Business Plan.

[1] general and administrative, capital, interest and amortization

[2] wires, ancillary services, transmission line losses, other industry

The following are the approvals that we will be requesting from the AESO Board.

AESO Board is requested to:

1. Approve the 2017 and 2018 business initiatives as outlined in the Business Plan.

2. Approve the following proposed 2017 and 2018 forecast and budget amounts as outlined in the Business Plan and summarized as follows:

	Budget Category/Year		Page Reference[3]	Revenue Source ($ million)				
				Trans-mission	Energy Market	Renew-ables	Load Settlement	Total
Own Costs	General and Administrative	2017	18	70.1	22.7	4.6	1.1	98.5
		2018		70.6	23.0	4.6	1.1	99.3
	Interest	2017	19	0.3	0.5	0.1	0.0	0.9
		2018		0.7	0.6	0.2	0.0	1.5
	Amortization	2017	19	12.7	6.0	-	0.1	18.8
		2018		14.1	5.7	-	0.1	19.9
	Capital	2017	21					26.9
		2018						34.4
Transmission Operating Costs	Wires	2018	12	1,723.0	-	-	-	1,723.0
	Transmission Line Losses	2018	12	96.8	-	-	-	96.8
	Ancillary Services	2018	12	179.2	-	-	-	179.2
	Other Industry Costs	2018	14	15.5	7.6	-	-	23.0
Summary	Own Costs	2017		83.1	29.1	4.7	1.2	118.2
		2018		85.4	29.3	4.8	1.2	120.7
	Capital	2017						26.9
		2018						34.4
	Transmission Operating Costs	2018		2,014.5	7.6	-	-	2,022.1

Differences are due to rounding

[3] Details provided on the referenced pages in Section 4 of the Proposal

Section 2

Stakeholder Presentations to the AESO Board

Stakeholder presentations to the AESO Board to be inserted when received.

Section 3

Stakeholder Consultation Undertaken

The *Transmission Regulation*[1] (T-Reg) includes provisions addressing the approval of the AESO's own costs, transmission line losses costs and ancillary services costs. The T-Reg provides that the AESO must consult with stakeholders with respect to the proposed costs to be approved by the AESO Board. It also provides that these costs, once approved by the AESO Board, must be considered by the Alberta Utilities Commission (AUC) as 'prudent' unless interested persons satisfy the AUC otherwise.

The practice that has been established to carry out this consultation is the Budget Review Process (BRP). The BRP is a transparent process which provides a level of prudence review with input from stakeholders. At the conclusion of the BRP, AESO Management makes a recommendation with respect to own costs (general and administrative, interest, amortization, capital and other industry costs), wires, transmission line losses costs and ancillary services costs to the AESO Board for approval.

The BRP overview, terms of reference and a calendar providing the BRP milestone activities leading up to an AESO Board decision (the calendar was revised during the process to accommodate process changes and schedules) has been posted on the AESO's website. These documents have been included as Appendices A to C to this Section. At a high level, the BRP steps followed are:

- AESO Issues Notices to Stakeholders
- AESO Develops Business Initiatives
- AESO Develops Own Costs Budget and Ancillary Services and Transmission Line Losses Cost Forecasts
- AESO Reviews Business Initiatives with Stakeholders
- AESO Reviews Own Costs Budget, Ancillary Services and Transmission Line Losses Costs Forecasts with Stakeholders
- AESO Board Decision Is Made

As with prior years' BRP, the process has been open to all stakeholders and the process has been transparent as all presentation materials, stakeholder comments (if any) and the AESO's responses have been posted on the AESO's website. Through this process, all stakeholders have had an opportunity to provide input. The BRP will be re-evaluated with stakeholders at its conclusion and refinements made to the process going forward as required.

[1] A/R 86/2007

Appendix A –

Terms of Reference for Budget Review Process (BRP)

March 6, 2017

Transparency is the overarching principle in the BRP. The following will help ensure transparency to stakeholders during this process.

- The process should be open to all stakeholders that are interested.
- The size of the group should not be limited.
- Stakeholders are encouraged to register as participants at the outset of each year's process in order to ensure a consistent understanding and to minimize inefficiencies.
- During stakeholder meetings, verbal comments are encouraged as they provide valuable input for general discussion and consideration.
- Written comments will be responded to by the AESO and shared with all stakeholders (i.e., posted to AESO website). As well, stakeholders will have the opportunity to comment on each other's comments.
- Written comment submissions are a requisite during the technical consultation period in order to be entitled to present to the AESO Board on the same comments.
- The written decision rendered by the AESO Board on these matters will contain reasons / rationale.
- Throughout the process, the AESO will endeavor to provide as much information as is reasonably possible to ensure stakeholders have all information relevant to the subject matters under review. However, the AESO and stakeholders will need to agree on the level of detail to discuss (including confidential information), on an issue by issue basis, in an effort to be most effective and efficient.
- At the end of each AESO budget process review cycle, the AESO and stakeholders will evaluate the effectiveness of the process and make appropriate changes if required for the following year.

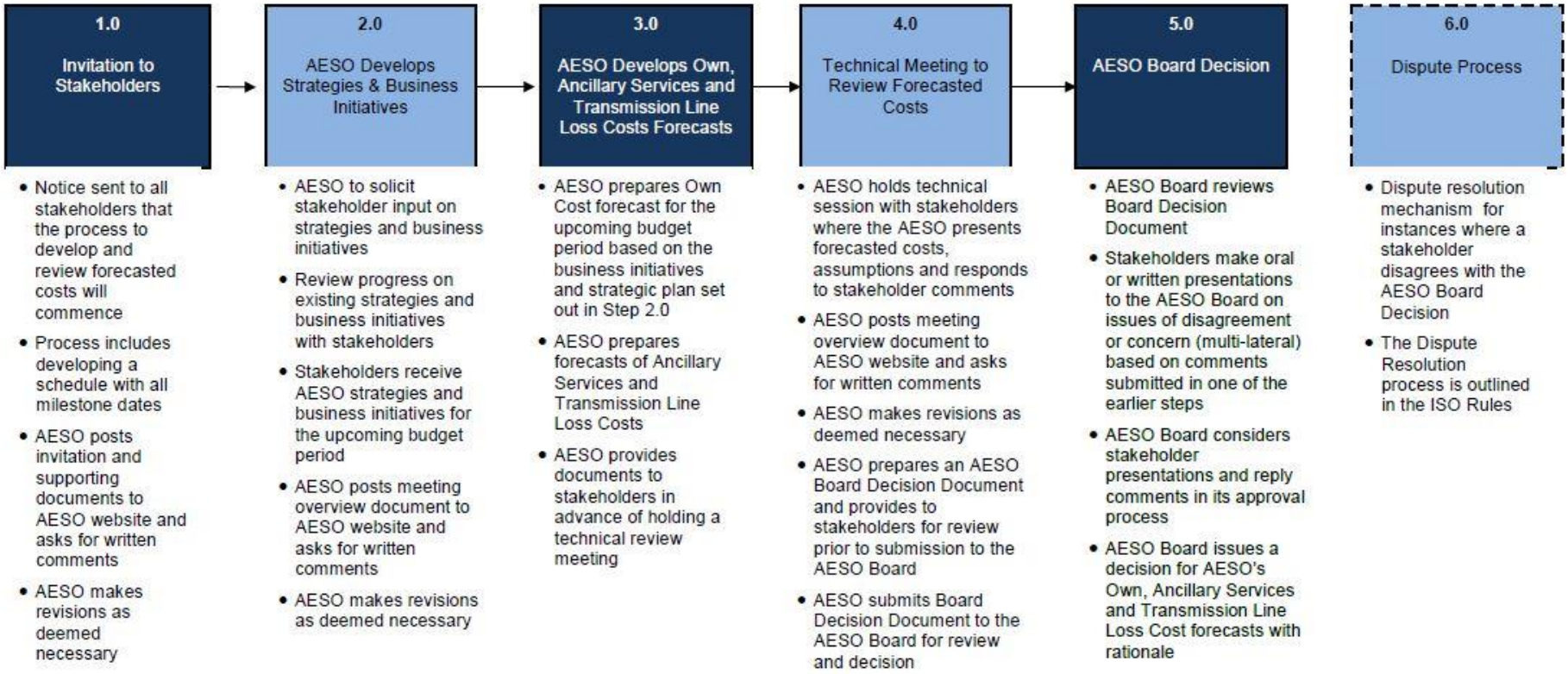
In Addition:

- Everyone is able to present their views.
- Everyone must work within the timeline agreed upon at the start of the process.
- This process is not a negotiated settlement
- The material to be delivered to the AESO Board in order to prepare a decision does not have to be agreed upon unanimously.

- Information will be provided to all stakeholders in a timely manner.
- Stakeholders will have a reasonable time period to review and respond to AESO material
- Nothing will preclude the opportunity for stakeholders to ultimately appeal any decision using the dispute mechanism outlined in the ISO Rules.

Appendix B –

Budget Review Process



Appendix C –

Budget Review Process Schedule

Consultation Material Distributed
Stakeholder Meetings
Stakeholder Comments Requested
Stakeholder Comments Received
AESO Posts Meeting Comments/ Response Summary

	MARCH						APRIL						MAY				
	Mon	Tues	Wed	Thurs	Fri		Mon	Tues	Wed	Thurs	Fri		Mon	Tues	Wed	Thurs	Fri
			1	2	3		3	4	5	6	7		1	2	3	4	5
							Distribution of materials for Business Strategies / Initiatives mtg. (Step 2)						Tech. Mtg. (Forecasts and Own Costs) Calgary (Step 4)	Web posting for comments on Forecasts and Own Costs (Step 4)			
	6	7	8	9	10		10	11	12	13	14		8	9	10	11	12
	Distribution of Invitation to Stakeholders and Process Materials (Step 1)	Web posting for comments on Invitation and Process Materials (Step 1)					Business Strategies / Initiatives Meeting (Step 2)	Web posting for comments on Business Strategies / Initiatives (Step 2)			Holiday					Receive Stakeholder comments on Forecasts and Own Costs (Step 4)	
	13	14	15	16	17		17	18	19	20	21		15	16	17	18	19
					Receive Stakeholder comments on Invitation and Process Materials (Step 1)		AESO Day Off		Receive Stakeholder comments on Business Strategies / Initiatives (Step 2)								AESO Day Off
	20	21	22	23	24		24	25	26	27	28		22	23	24	25	26
								Distribution of materials for Tech Mtg (Forecasts and Own Costs) (Step 4)			Web posting of comments on Business Strategies / Initiatives (Step 2)		Holiday		Web posting of 2017-2018 Draft Business Plan and Budget (Step 4)	Web posting of comments on Forecasts and Own Costs (Step 4)	
	27	28	29	30	31								29	30	31		
				Web posting of comments on Invitation (Step 1)											Receive Stakeholder written submissions for AESO Board (Step 5)		

Section 4

AESO 2017-2018 Business Plan and Budget Proposal

The information contained in this document is published in accordance with the AESO's legislative obligations and is for information purposes only. As such, the AESO makes no warranties or representations as to the accuracy, completeness or fitness for any particular purpose with respect to the information contained herein, whether expressed or implied. While the AESO has made every attempt to ensure the information contained herein is timely and accurate, the AESO is not responsible for any errors or omissions. Consequently, any reliance placed on the information contained herein is at the reader's sole risk.

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2017-2018 Business Plan

The AESO's annual business planning process is guided by the *Alberta Electric System Operator 2014-2018 Strategic Plan* which is used to set the multi-year focus for the organization to ensure ongoing strategic alignment and organizational advancement. This strategic plan guides the AESO to pursue three key objectives: build on the success of the current electricity framework; provide value to Albertans as an organization; and retain and attract the right people[1]. It is through this focus that the AESO can effectively deliver on its mandate and adapt to change.

The Government of Alberta's *Climate Leadership Plan* (CLP) is the foundation for a comprehensive set of policy measures to reduce Alberta's greenhouse gas emissions. While preparing the *2017 Business Plan and Budget Proposal* in the fall of 2016, the objectives of the CLP and the impact that they may have on the AESO's operations were still being assessed. As a result, AESO Management adapted its annual planning process to allow for additional time to obtain further clarity and in the interim, focused on in-progress initiatives and ongoing operations.

Through the CLP, the AESO was tasked by the provincial government with two main activities in support of meeting its CLP objectives: the design and implementation of the Renewable Electricity Program (REP) and the design and implementation of a new framework supporting a revised energy market and a new capacity market. These significant undertakings have already started and will continue to advance throughout 2017, 2018 and beyond.

REP is intended to ensure the development of 5,000 MW of renewable electricity generation projects that will be connected to the Alberta grid by 2030, while maintaining the reliability of Alberta's transmission system. This will be done through a series of competitions that will incent the development of renewable electricity generation. The first competition opened in early 2017 with the successful bidder(s) to be announced at the end of 2017. The development and implementation of the second competition is currently planned to occur in 2018.

The design and implementation of a new framework that includes a revised energy market and a capacity market began in early 2017. With the proposed framework, generators can compete to receive revenue from a market-determined capacity payment for the ability to provide energy when required by the system (capacity) as well as revenue from selling into the energy and ancillary services markets (energy and ancillary services). The process for the design and implementation of the capacity market is expected to take three years with the initial procurement to commence in 2019. The first delivery of the capacity product is expected to start in 2021.

The *AESO 2017-2018 Business Plan and Budget Proposal* (Business Plan) has been prepared to include the CLP changes and the impact they have on the organization for 2017 and 2018.

Over the past few years, significant change has occurred in the provincial economy, the electricity industry and also within the AESO. The AESO has been asked to deliver on significant initiatives on behalf of the Government of Alberta. Its comprehensive understanding of electricity in Alberta, in-depth expertise, strong leadership and focus will be instrumental to the AESO's success.

At the same time, the security and reliability of the Alberta Interconnected Electric System (AIES) remains the cornerstone of the AESO's mandate and the focus for business operations. Two significant multi-year initiatives designed to strengthen the protection of the AIES are underway: the implementation of the Energy Management System (EMS) Upgrade project and implementation of Critical Infrastructure Protection (CIP) Alberta Reliability Standards.

[1] Refer to Appendix A for additional details on the three strategic objectives from the AESO's strategic plan.

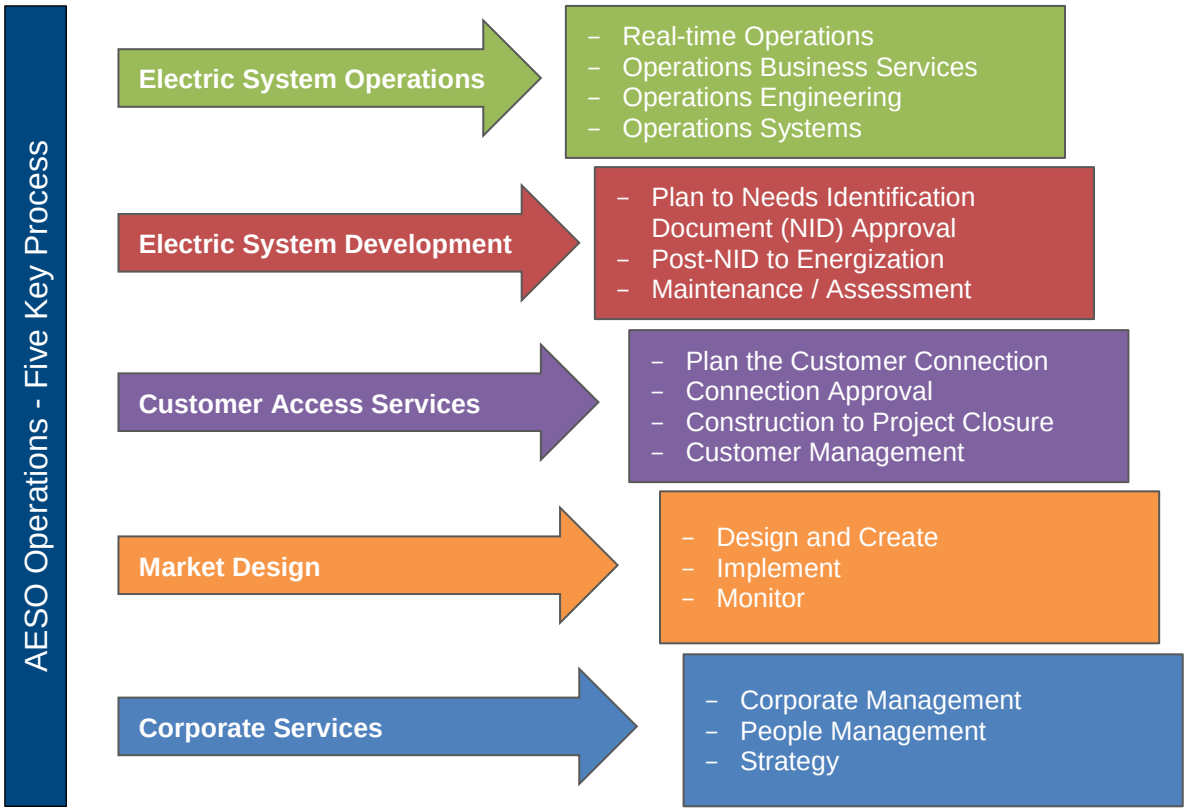
The following Business Plan proposes a general and administrative budget for the 2017 calendar year of $98.5 million and $99.3 million for 2018. Along with this, is the proposed capital budget for the 2017 calendar year of $26.9 million and $34.4 million for 2018.

The business initiatives and financial considerations in this Business Plan have been reviewed and discussed with stakeholders as part of our open and transparent Budget Review Process (BRP). This input is an important part of the BRP and the resulting Business Plan.

AESO Operations

The AESO's operations are described using five key processes which allow for a more detailed understanding of the AESO's activities and organizational awareness to ensure the operations are as efficient and focused as they should be.

The following pages provide a brief update on the progress and plans for the business initiatives in 2017 and 2018 by key process. These business initiatives are multi-year in nature and continue to advance the AESO's strategic objectives.



Electric System Operations

Optimal management of electric system operations is a primary focus and essential part of the AESO's mandate.

Effectively maximizing the use of transmission capacity and monitoring transmission system performance is critical to ensure the reliability of the Alberta Interconnected Electric System (AIES).

The AESO operates the AIES and competitive market in accordance with Alberta Reliability Standards.

ACHIEVEMENTS AND PLANS BY ACTIVITY

Real-time Operations	Operations Business Services	Operations Engineering	Operations Systems
2017 Progress as of March 31			
Continued phased migrations of the transmission facility operators (TFOs) to a new SCADA Wide Area Network (WAN)	Internal compliance program requirements and market participant compliance program for Alberta reliability standards Critical Infrastructure Protection (CIP) implementation advanced Continued implementation phase for System Coordination Centre (SCC) expansion – detailed design		Advanced the Energy Management System (EMS) Upgrade project implementation
2017 Plans			
Continue/complete phased TFO migrations to the new SCADA WAN and continue to advance related Independent Power Producer migrations	Complete implementation of internal CIP compliance requirements by October 1, 2017 and continue to establish market participant compliance program Complete detailed design and building permit submitted for SCC expansion; award construction contract by year-end	General operations focus	Complete EMS Upgrade project, expected by Q3
2018 Plans			
Complete Independent Power Producer migrations to the new WAN creating diversity and enhancing communication	Complete Western Electricity Coordinating Council (WECC) CIP audit of AESO compliance with standards; market participant compliance program operationalized; internal CIP sustainment program initiated Commence SCC construction activities	General operations focus	Implement EMS sustainment and optimization programs

Electric System Development

One of the AESO's core business activities is to plan a transmission system which reliably meets the electricity needs within the province.

The AESO's Long-term Outlook and Long-term Transmission Plan documents communicate Alberta's expected future demand and energy requirements, expected generation capacity to meet those requirements, and the transmission system enhancements needed to meet these demand and generation requirements. These forecasts and plans form the basis for advancing transmission system projects for regulatory approval and support the integration of market participant projects into the AIES.

ACHIEVEMENTS AND PLANS BY ACTIVITY

Plan to NID Approval	Post-NID to Energization	Maintenance	Assessment
2017 Progress as of March 31			
Advancement of the design and development of the 2018 General Tariff Application (GTA) Continued to advance loss factor rule, Alberta reliability standards and technical rules	Development of program to manage the Fort McMurray West (FMW) project post energization; advancement of the debt funding competition related to the project		
2017 Plans			
Continue required design and development activities for the GTA Continue to advance design/development of loss factor rule, Alberta reliability standards and technical rules Implementation of loss factors Advance system and regional transmission projects identified in the Long Term Plan (LTP)	Continue to integrate and manage the contract requirements for the FMW project; develop programs to manage the FMW project post energization; complete debt funding competition	General operations focus	Initiate development of needed regulatory approvals for restoring current interties (finalize options to achieve simultaneous transmission ratings)
2018 Plans			
Implementation of approved tariff Continue to advance Alberta reliability standards and technical rules development, as required Continue implementation of loss factors, as required Advance system and regional transmission projects identified in the LTP	Continue to integrate and manage the contract requirements for the FMW project; develop programs to manage the FMW project post energization expected in 2019	General operations focus	Continue design/ development of intertie requirements and initiate needed regulatory approvals

Customer Access Services

The primary function of Customer Access Services is to efficiently connect customers to the transmission system and provide solution-oriented customer service throughout the process.

ACHIEVEMENTS AND PLANS BY ACTIVITY			
Plan the Customer Connection	**Connection Approval**	**Construction to Project Closure**	**Customer Management**
2017 Progress as of March 31			
Two customer connection Abbreviated Need Identification Documents (ANID) filed with the AUC (none of which were Market Participant Choice (MPC) projects)	Abbreviated needs approval process in effect (ANAP)	Seven customer energizations (including Connection, Contract and Behind-the-Fence projects) completed	
2017 Plans			
Continue to enhance connection process efficiency opportunities as well as align processes with the requirements of the renewable electricity and program	Continue to monitor ANAP	Continue to monitor MPC process	General operations focus
2018 Plans			
Continue to enhance connection process efficiency opportunities	Continue to monitor ANAP	Continue to monitor MPC process	General operations focus

Market Development

The wholesale electricity market evolves along with changes in industry, technology and other relevant influences or circumstances.

The AESO monitors developments and evaluates the impact of these changes to identify appropriate courses of action. When addressing market changes, the principle objective is to maintain a fair, efficient, and openly competitive (FEOC) market.

The AESO has implemented two new work streams responding to recent government mandates; the development and implementation of the Renewable Electricity Program (REP) and the design and implementation of a new framework that includes both an energy market and a capacity market.

ACHIEVEMENTS AND PLANS BY ACTIVITY

Design and Create	Implement	Monitor
2017 Progress as of March 31		
Capacity market consultation and design initiated	REP Round 1 initiated in March Continuation of market system replacement and reengineering (MSR) sustainment initiatives	
2017 Plans		
Commence design of second REP competition Capacity market design activities; stakeholder consultation supporting design development initiated	First competition for the REP program complete; projects awarded with the first competition to be in-service in 2019 Implementation of medium-term MSR measures to help sustain reliability of legacy systems	General operations
2018 Plans		
Complete design of second REP competition Continue capacity market consultation for any outstanding elements; incorporation of design requirements into ISO rules, contracts and/or legislation as required Initiate design of future market systems transition program in support of capacity market and ongoing market evolution	Implementation of second REP competition Implementation of approved capacity market design components	General operations

Corporate Services

The general business operations are coordinated through the various activities by the AESO's corporate services departments.

This key process provides various organization-wide support services such as human resources, finance, legal, communications and senior management for establishing the strategic direction of the AESO.

ACHIEVEMENTS AND PLANS BY ACTIVITY

Corporate Management	People Management	Strategy
2017 Progress as of March 31		
Performed ongoing reviews of AESO activities, processes and information technologies to determine where business efficiencies can be realized Continued to advance IT and cyber security program	Increased workforce capabilities by broadening knowledge across the organization through quarterly training programs, staff secondments and continued use of cross-functional teams	Continued to advance strategic initiatives Initiate development of 2019-2023 strategic plan
2017 Plans		
Continue to perform ongoing reviews of AESO activities, existing/new processes and information technologies to determine where business efficiencies can be realized Continue to advance IT and cyber security program through best practices and continued evolution	Continue to increase workforce capabilities to advance evolving strategic initiatives	Continue to advance strategic initiatives Continue development of 2019-2023 strategic plan
2018 Plans		
Continue to perform ongoing reviews of AESO activities, existing/new processes and information technologies to determine where business efficiencies can be realized Advance IT and cyber security program through best practices and continued evolution to adapt to new and changing threats	Continue to increase workforce capabilities to advance evolving strategic initiatives	Continue to advance strategic initiatives Complete development of 2019-2023 strategic plan

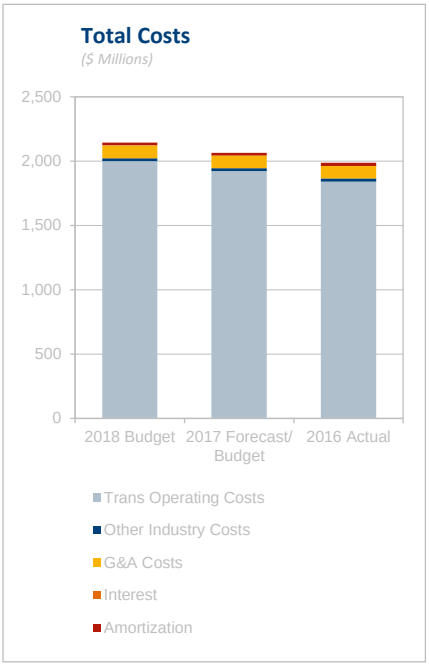
Financial Highlights

As part of this *2017-2018 Business Plan and Budget Proposal*, the AESO is presenting the forecasts and budgets which are required to meet the needs of the organization to deliver on its commitments and to demonstrate that financial management continues to be a focus.

The financial information is presented in the following four sections:

- **Section I** - Transmission Operating and Other Industry Costs
  A. Year-to-date March 2017, including 2017 projection; and
  B. 2018 forecast.
- **Section II** - General and Administrative, Interest and Amortization Costs
  A. Year-to-date March 2017; and
  B. 12-month budgets for 2017 and 2018.
- **Section III** – Capital Costs
  A. Year-to-date March 2017; and
  B. 12-month budgets for 2017 and 2018.
- **Section IV** – Revenue

Additional information is included in Appendices B to H.



($ million) ~ by production year

	2018 Forecast/ Budget	2017 Projection[2]/ Budget	2017 Forecast/ Budget[3]	2016 Actual
Transmission Operating Costs	1,999.1	1,842.6	1,922.3	1,841.4
Other Industry Costs	23.0	21.5	23.2	22.6
General and Administrative	99.3	98.5	98.5	97.5
Interest Costs	1.5	0.9	0.9	0.8
Amortization	19.9	18.8	18.8	24.3
Capital Expenditures	34.4	26.9	26.9	31.4

Differences are due to rounding

[2] Transmission Operating and Other Industry Costs are the current projection for 2017 costs (based on year-to-date March actuals and a nine-month forecast); the remaining cost categories are 12-month budgets currently for AESO Board approval

[3] Transmission Operating and Other Industry Costs from the 2017 BRP; the remaining cost categories are 12-month budgets currently for AESO Board approval

SECTION I – TRANSMISSION OPERATING AND OTHER INDUSTRY COSTS

A. Year-to-Date March 2017

The following table provides a summary of actual costs as of March 2017 compared to the 2017 forecast. Additional information on year-to-date costs and a cost projection for 2017 is provided in Appendix B (Year-to-Date March 2017 Financial Results Detail).

Year-to-Date March 2017 Costs ($ million) ~ by production year

	YTD March Actual	YTD March Forecast	YTD March Variance	2017 Projection	2017 Forecast
Wires Costs	424.9	432.3	(7.4)	1,697.1	1,729.3
Transmission Line Losses	13.5	17.5	(4.0)	53.5	74.1
Operating Reserves	15.1	21.3	(6.2)	60.7	88.2
Other Ancillary Service Costs	7.8	7.7	0.1	31.3	30.7
Transmission Operating Costs	461.3	478.8	(17.5)	1,842.6	1,922.3
Other Industry Costs	3.9	5.8	(1.9)	21.5	23.2

Differences are due to rounding

B. 2018 Forecast

Transmission Operating Costs

The following table provides a summary of transmission operating costs.

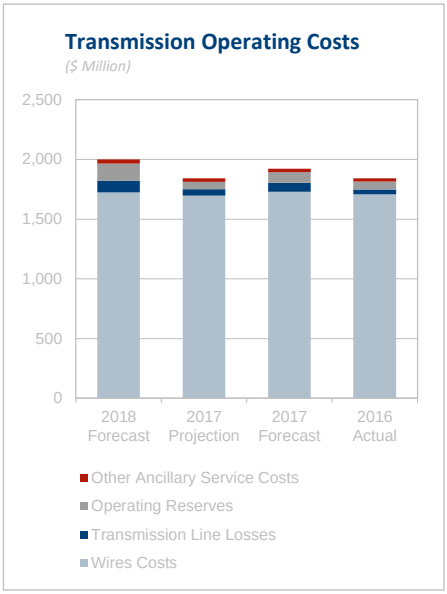
Transmission Operating Costs ($ million) ~ by production year

	2018 Forecast	2017 Projection	2017 Forecast	2016 Actual	2015 Actual
Wires Costs	**1,723.0**	1,697.1	1,729.3	1,707.0	1,565.9
Transmission Line Losses	**96.8**	53.5	74.1	41.3	75.8
Operating Reserves	**146.6**	60.7	88.2	66.4	137.3
Other Ancillary Service Costs	**32.6**	31.3	30.7	26.7	33.8
Transmission Operating Costs	**1,999.1**	1,842.6	1,922.3	1,841.4	1,812.8

Differences are due to rounding

Additional information on the 2018 forecast methodology and descriptions of the cost categories is provided in Appendix C (Transmission Operating Cost Definitions).

Wires



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 include long-term contracts related to Invitation to Bid on Credit (IBOC) and Location Based Credit Standing Offer (LBC SO) programs, since these programs were initiated as incentives for generation to locate closer to major load centres and provide a non-wires solution to transmission wires issues in Alberta.

The 2018 forecast for wires costs is $1,723.0 million, which is $26.0 million or two per cent higher than the 2017 projection of $1,697.1 million. The 2018 forecast is based on TFO tariffs ($1,717.6 million) and the AESO's forecast for IBOC and LBC SO costs ($5.4 million).

The 2017 projection is based on TFO tariffs approved or applied-for as of April 2017 with a majority of the cost projection reflecting: i) a negotiated settlement for a 2017 tariff; ii) a compliance filing for a 2017 tariff; or iii) AUC approvals for 2017 tariffs.

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.

Transmission Line Losses

The 2018 forecast for transmission line losses is $96.8 million, which is $43.3 million or 81 per cent higher than the 2017 cost projection of $53.5 million, primarily due to a forecast increase in pool prices. Transmission line losses costs were originally forecast to be $74.1 million for 2017.

The 2018 transmission line losses volume forecast is 2,225 gigawatt hours, which is 42 gigawatt hours or two per cent lower than the 2017 projection of 2,267 gigawatt hours. The volume of losses is expected to remain consistent from 2017 to 2018 despite load growth due in part to transmission system enhancements.

The average pool price used for the 2018 forecast is $43 per MWh, which is 81 per cent higher than the 2017 projection of $24 per MWh. The 2017 forecast was based on a $32 per MWh average pool price for 2017.

Operating Reserves

The 2018 forecast for operating reserves costs is $146.6 million, which is $86.0 million or 141 per cent higher than the 2017 cost projection of $60.7 million.

The average pool price used for the 2018 forecast is $43 per MWh, which is 81 per cent higher than the 2017 projection of $24 per MWh.

Contributing to higher operating reserve costs is the impact of the active operating reserves prices, which are the most significant operating reserve costs, which are derived from pool price and a premium or discount to pool price. During the period from 2015 to 2017 when the projected average pool price is $25 per MWh, the discounts reflect the offer strategies associated with the lower pool prices, which are low or small discounts. In periods of higher pool prices, the discounts will typically increase to correspond with

the higher pool prices. With the forecast pool price increase in 2018, the lower historical discounts used in the cost forecast contribute to higher operating reserve costs. The discounts used in the 2018 forecast follow the established forecast methodology.

The 2018 operating reserves volume forecast is 7,495 gigawatt hours, which is 66 gigawatt hours or one per cent higher than the 2017 projection of 7,429 gigawatt hours associated with a forecast increase in load volumes.

Operating reserves costs were originally forecast to be $88.2 million for 2017 which was based on a $32 per MWh average pool price for 2017.

Other Ancillary Services

The AESO procures other ancillary services for the secure and reliable operation of the Alberta Interconnected Electric System (AIES). These services are procured through a competitive procurement process where possible, or in such instances where procurements may not be feasible, through bilateral negotiations.

Other Ancillary Services Costs ($ million) ~ by production year

	2018 Forecast	2017 Projection	2017 Forecast	2016 Actual	2015 Actual
Load Shed Service for Imports	**17.3**	18.1	18.1	18.2	17.4
Contracted Transmission Must-run	**3.3**	3.3	2.8	-	-
Conscripted Transmission Must-run	**2.0**	2.0	2.0	0.7	9.6
Reliability Services	**2.9**	2.9	2.9	2.9	2.1
Poplar Hill	**2.8**	2.8	2.8	2.8	2.6
Black Start	**4.3**	2.1	2.1	2.1	2.1
Transmission Constraint Rebalancing	**0.1**	0.1	0.1	0.0	-
Other Ancillary Service Costs	**32.6**	31.3	30.7	26.7	33.8

Differences are due to rounding

The 2018 forecast for other ancillary services costs is $32.6 million, which is $1.3 million or four per cent higher than the 2017 cost projection of $31.3 million.

In early 2017, the AESO entered into a new contract for transmission must-run services to address specific reliability requirements in Northern Alberta until transmission reinforcements are in place to address reliability concerns.

In 2018, the AESO is anticipating a new black start supplier for services in Northern Alberta. Based on the AESO's long-term system restoration strategy, black start services are required in each region of the province though supplier availability may be limited in certain regions. The AESO expects contracted services to be in place with a potential supplier in 2018.

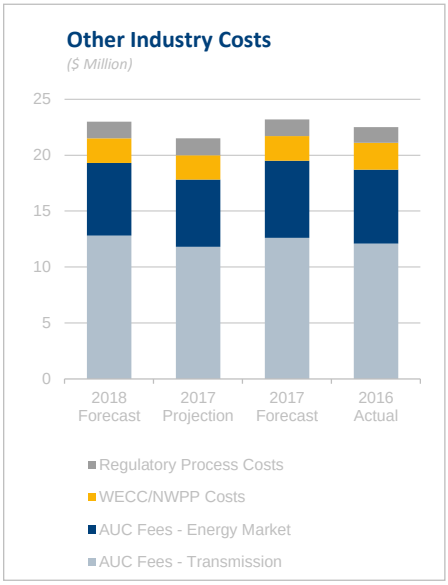
Other Industry Costs

Other industry costs represent fees or costs paid based on regulatory requirements or membership fees for industry organizations; the amounts or requirement for the costs 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) and Northwest Power Pool (NWPP) 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.

Other Industry Costs ($ million)

	2018 Forecast	2017 Projection	2017 Forecast	2016 Actual	2015 Actual
AUC Fees – Transmission	**12.8**	11.8	12.6	12.1	12.5
AUC Fees – Energy Market	**6.5**	6.0	6.9	6.6	6.8
WECC/NWPP Costs[4]	**2.2**	2.2	2.2	2.4	1.9
Regulatory Process Costs	**1.5**	1.5	1.5	1.4	1.4
Other Industry Costs	**23.0**	21.5	23.2	22.6	22.6

Differences are due to rounding



AUC Fees

The AESO is required to pay annual administration fees to the AUC. The AUC recovers its operating and capital costs through an administration fee imposed on the natural gas and electricity market participants that it has jurisdiction over or any person to whom the AUC provides services. The AUC uses a cost assessment model to allocate its costs to the various classes and categories of utilities and persons, and to determine the amount of the administration fee. Two classes of fees are paid to the AUC – one related to transmission operations and the other to energy market operations.

WECC/NWPP Fees

The AESO is an active member of the WECC, the organization that fosters and promotes reliability and efficient coordination in the Western Interconnection. Its members coordinate the day-to-day interconnected system operations and long-range planning required to provide reliable electric service in the WECC region that extends from Canada to Mexico and includes the provinces of Alberta and British Columbia, the northern portion of Baja California Norte, Mexico, and all or portions of the 14 Western states between.

The 2018 forecast for WECC assessments to the AESO is $2.2 million, which is consistent with the 2016 actual costs; no additional information is available.

[4] Western Electricity Coordinating Council/Northwest Power Pool

The AESO is also a member of the NWPP, which operates to achieve maximum benefits of coordinated operations for its member organizations. Participation in the NWPP allows the AESO to take advantage of their Reserve Sharing Group, thereby reducing Alberta's reserve requirements at times. The annual budget for NWPP fees is $0.1 million, which is consistent with prior years.

Regulatory Process Costs

The costs associated with the AESO's involvement in an AUC proceeding to hear objections and complaints to ISO Rules or any regulatory application are included in the cost category regulatory process costs; this does not include application preparation costs. These proceedings become a high priority relative to other business initiatives that were identified in the business planning process, and the level of AESO resources required to address these matters brought before the AUC is difficult to determine in advance of a budget year. To ensure ongoing focus and achievement of the planned business initiatives and to avoid constraints on the general and administrative budget management, these costs appear as other industry costs. Intervener costs that received AUC cost order approval are also included in this category.

The 2018 forecast for regulatory process costs is $1.5 million, which is consistent with prior years.

SECTION II – GENERAL & ADMINISTRATIVE, INTEREST AND AMORTIZATION COSTS

A. Year-to-Date March 2017

The following table provides a summary of actual costs as of March 2017 compared to the same period in 2016. Additional information on year-to-date costs is provided in Appendix B (Year-to-Date March 2017 Financial Results Detail).

Year-to-Date March 2017 Costs ($ million)

	YTD Mar 2017 Actual	YTD Mar 2016 Actual	Year-Over-Year Variance	2017 Budget[5]
General and Administrative Costs	25.2	24.9	0.3	98.5
Interest	0.2	0.3	(0.1)	0.9
Amortization of Intangible and Capital Assets	5.0	5.7	(0.7)	18.8

Differences are due to rounding

B. 2017 and 2018 Budgets

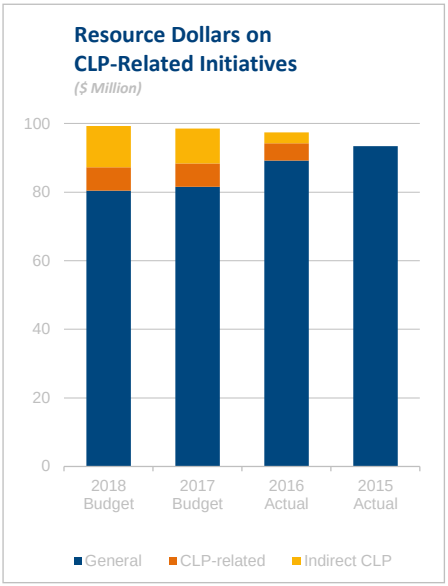
In the *2017 Business Plan and Budget Proposal*, AESO Management did not introduce new business initiatives for 2017 and limited the proposed budgets for general and administrative, interest and amortization to 50 per cent of the 2016 budget to enable a continuation of business operations on an as-is basis for a short period. This approach allowed for additional time for AESO Management to gain a better understanding of the CLP impacts to the organization prior to submitting a proposal for the 2017 calendar year. In the past six months, the information that is available has been used to prepare the budget requirements for the full 24-month period from January 2017 to December 2018, which is the basis for the following discussion.

The internal budget discussions focused on three areas: the impact of new and changing initiatives and operations; continued focus on identifying process efficiencies and further identification of the best value options for general expenditures.

For both the industry and the AESO, the implementation of the electricity sector's components of the CLP will have the most significant impact since the deregulation of the electricity market 20 years ago. The AESO has been tasked to design and implement the REP and design and implement a new framework to support a revised energy market and new capacity market. These major initiatives will require significant industry participation and support and will require appropriate funding for the AESO to ensure resources are available to successfully deliver on these initiatives. For these two initiatives in particular, the organizational impact has been determined to be far-reaching. To effectively manage these initiatives, a

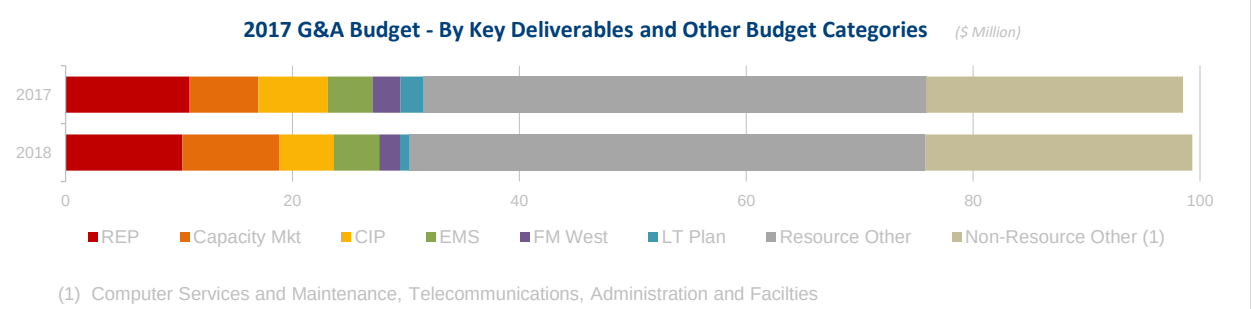
[5] In AESO Board Decision 2017-BRP-001 issued December 2016, a six-month budget was approved. These amounts represent the full 12-month budget requirements.

core team has been established that will lead the project deliverables and stakeholder engagement with internal support provided by every department within the AESO, in some capacity. As shown in the chart 'Resource Dollars on CLP-Related Initiatives', the decrease in size of the blue bar by 15 per cent from 2015 to 2017 indicates that resources previously focused on other operational areas will be reassigned to contribute, in some part, to the CLP initiatives going forward. This reassignment of resources is achieved through efficiency opportunities (renewed focus on value-add deliverables) and adapting to industry needs (i.e., reduction in the number of customer connections associated with the general economic conditions in Alberta allows staff to refocus on REP).



In addition, there are several other key deliverables that will be the AESO's focus in either, or both, 2017 and 2018:

- Critical Infrastructure Protection (CIP) implementation;
- EMS Upgrade commissioning and sustainment;
- Fort McMurray West Debt Funding Competition; and
- Long-term Transmission Plan.



(1) Computer Services and Maintenance, Telecommunications, Administration and Facilties

These notable initiatives have varying impacts on the general and administrative budgets. For example, CIP implementation of standards and related processes will occur by October 1, 2017 and the EMS Upgrade will be commissioned in the third quarter of 2017. Following these key milestones, ongoing sustainment will be part of the annual budgets. The Fort McMurray West Debt Funding Competition is a significant contract milestone in a one-off competitive contract that is progressing through the initial stages of contract management. The execution of the six key deliverables represents approximately 30 per cent of the AESO's 2017 general and administrative budget, with the remaining budget representing the numerous 'smaller' initiatives and ongoing operations within the AESO that are integral to the successful achievement of the AESO's mandate.

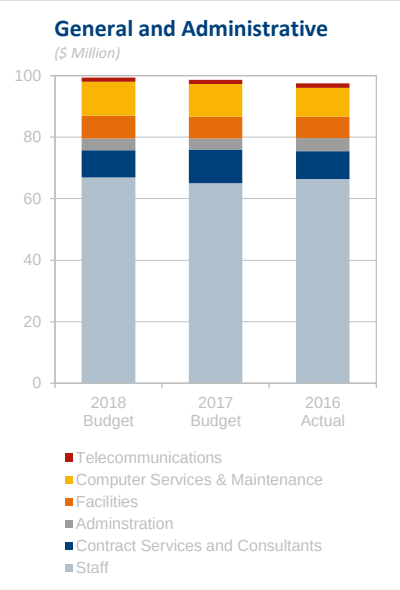
In preparing the 2017 and 2018 Business Plan, AESO Management considered the information currently available to assess the impact on both the business initiatives and budget requirements. As time progresses, new information or events may require a change to the AESO's planned activities that if material in nature, may require further stakeholder and AESO Board consideration on the impact. Appendix H highlights the circumstances and processes that would be undertaken in these circumstances.

General and Administrative Costs

General and Administrative Costs ($ million)

	2018 Budget	**2017 Budget**[5]	2016 Actual	2015 Actual
Staff	**66.9**	**65.0**	66.4	64.8
Contract Services and Consultants	**8.8**	**10.9**	9.0	6.5
Administration	**3.9**	**3.7**	4.3	4.1
Facilities	**7.4**	**7.1**	7.0	7.6
Computer Services and Maintenance	**11.0**	**10.6**	9.3	9.0
Telecommunications	**1.3**	**1.3**	1.5	1.4
General and Administrative Costs	**99.3**	**98.5**	97.5	93.4

Differences are due to rounding



On an ongoing basis, the AESO adapts to new and changing initiatives while maintaining reliable operations of the AIES and other core AESO functions. During the three year period starting in 2016, the funding for the corporate operations has increased by less than two per cent; this has been achieved through a conscious effort and focus on financial management without compromise to the operations.

While Appendix D (2017 and 2018 General and Administrative Cost Detail) provides additional narrative on the specific cost areas, there are several notable changes in the 2017 and 2018 budgets.

The staff costs will average $66.1 million in the three year period from 2016 to 2018. The 2017 and 2018 budgets incorporate: additional staff in each year which are focused on the delivery of the key corporate initiatives; offset by a higher vacancy rate based on market expectations and in 2017, additional staff allocated to the EMS Upgrade capital project in its final pre-commissioning stage.

Contract services and consultants costs typically vary from year-to-year as the AESO hires these resources to supplement staff when it is not practical to permanently retain staff with specific skill sets that may only be required for certain initiatives and to address workload peaks to maintain seamless operations. Approximately 60 per cent of the contract services and consultants costs in both 2017 and 2018 are associated with the key deliverables, namely: to develop and implement REP, assist with the Fort McMurray West Debt Funding Competition and begin the design of a revised energy market and new capacity market. A further 20 per cent of the budget each year is associated with information technology operations, with the remaining 20 per cent used for general business purposes.

On an annual basis, the AESO invests in software applications and systems to support the business and IT infrastructure needs which then require ongoing maintenance and licence agreement for support. In the three year period from 2016 to 2018, these costs are anticipated to increase by approximately 20 per

cent with the most significant contributor associated with the ongoing support requirements for the EMS Upgrade project which will be commissioned by the third quarter of 2017.

The re-allocations and budget changes are summarized as follows:

($ million)

2016 Approved Budget		**$ 97.5**
Staff	(1.1)	
Contract Services and Consultants	1.5	
Administration	(0.6)	
Facilities	0.1	
Computer Services and Maintenance & Telecommunications	1.1	**1.0**
2017 Proposed Budget		**$ 98.5**
Staff	1.9	
Contract Services and Consultants	(2.0)	
Administration	0.1	
Facilities	0.4	
Computer Services and Maintenance & Telecommunications	0.4	**0.8**
2018 Proposed Budget		**$ 99.3**

Differences are due to rounding

Interest Costs and Amortization

Interest Costs and Amortization ($ million)

	2018 Budget	**2017 Budget**[6]	2016 Actual	2015 Actual
Interest	**1.5**	**0.9**	0.8	0.4
Amortization of Intangible and Capital Assets	**19.9**	**18.8**	24.3	26.0

Interest expense is incurred as a result of bank debt held throughout the year and the associated borrowing rate. Bank debt is issued to fund intangible and capital asset purchases, prepayments of future expenses and working capital deficiencies due to timing differences in the collection of revenues and payment of expenses. Intangible and capital assets are financed through the AESO's credit facilities and recovered over the useful lives of the assets (included in amortization).

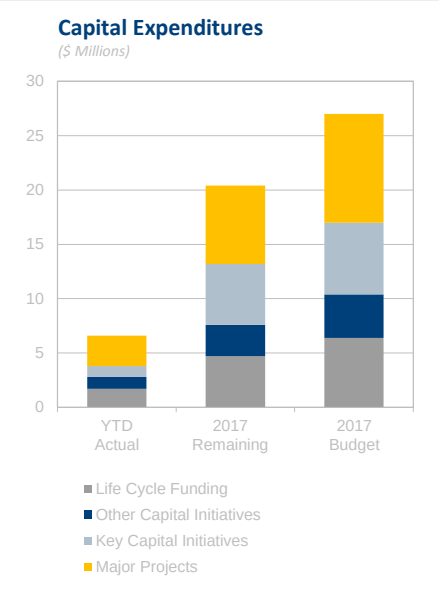
Additional interest costs are forecast for 2018 related to financing capital projects and the timing difference for the recovery of costs related to the renewable electricity programs.

Intangible and capital assets are amortized over their estimated useful lives in accordance with generally accepted accounting principles and reviewed on an annual basis. The lower amortization in 2017 and 2018 is mainly due a reduced depreciable asset base and a change to the estimated useful lives of the certain assets in 2016.

Additional information on the AESO's 2017 and 2018 capital projects is provided in Appendix E (2017 - 2018 Capital Projects).

SECTION III – CAPITAL EXPENDITURES

A. Year-to-Date March 2017



The capital spend for the first three months of 2017 is $6.6 million. In general, the AESO's capital projects, which are predominately multi-year in nature, have continued to progress as planned. The most notable of these being the continuation of the EMS Upgrade project which remains on schedule for completion in Q3 2017 and the initiation of the SCC Expansion project implementation phase.

The following table provides a summary of the current capital project investment for 2017.

Additional information on the status and progress of specific projects is provided in the following section, Appendix B (Year-to-Date March 2017 Financial Results Detail) and Appendix E (2017 and 2018 Capital Projects).

Capital Expenditures ($ million)

	2017 YTD March Actual	2017 Remaining	**2017 Budget**[6]
General Capital[7]	3.8	13.2	**16.9**
Major Projects[8]	2.8	7.2	**10.0**
Total Capital Spending	6.6	20.4	**26.9**

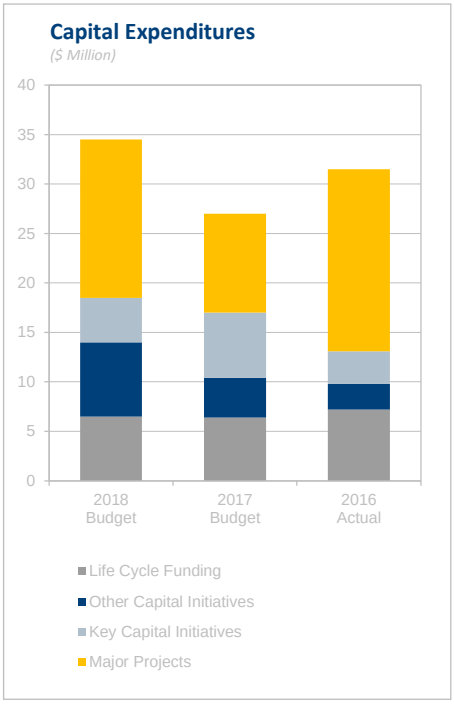
Differences are due to rounding

[6] Revised – Spent to date (March actuals) plus estimate to complete in current year

[7] General capital includes the project categories of key, other and life cycle

[8] Major capital includes programs or projects that due to their size (generally greater than $1 million and multiple years in duration) cannot be managed within the general capital budget

B. 2017 and 2018 Budget



A detailed review of the capital requirements for 2017 and 2018 takes into consideration the progress that has been made on the inflight projects that are multi-year in nature, the new requirements for 2017 and 2018 and the AESO's capacity to design and implement system solutions. Based on these findings, the capital budget is $26.9 million for 2017 and $34.4 million for 2018. The variance between the 2016 and 2017 capital budget is a decrease of $4.5 from $31.4 million to $26.9 million, in 2017. The decrease is mainly attributable to the EMS Upgrade project completion which is to complete in Q3 2017.

The variance between the 2017 and 2018 budgets is an increase of $7.5 million. The related general capital budget variance is an increase of $1.5 million, mainly attributable to the initiation of the EMS reliability and other reliability programs. The related major capital budget variance is an increase of $6.0 million, mainly attributable to the SCC Expansion Construction Phase occurring in 2018, offset by the EMS Implementation Phase completion in 2017.

The AESO considers the budgeting process for capital expenditures as the determination for the annual level of capital expenditures for use in the internal portfolio management process; not the review and approval of specific capital projects. All capital projects initiated by the AESO are reviewed and approved through the portfolio management process. This process is led by senior management and facilitates a regular review and prioritization of major projects to ensure business requirements are met and, at the same time, achieve the most beneficial and cost-effective results. This process also allows for the flexibility to re-evaluate capital plans throughout the year.

The following table identifies a preliminary list of projects that are planned for 2017 and 2018 based on current operations and the business initiatives. As time progresses across the identified planning period, requirements and circumstances may change and the portfolio management process will be used to manage these changes throughout the period.

Additional information on the 2017 and 2018 capital projects is provided in Appendix E (2017 and 2018 Capital Projects).

Capital Expenditures ($ million)

	2018 Budget	2017 Budget[9]	2016 Actual
Key Capital Initiatives			
1. Reliability (EMS[10] elements)	0.3	0.0	-
Reliability (other – non-EMS elements)	0.1	0.0	0.7
2. Critical Infrastructure Protection	0.5	0.6	0.3
3. IT & Cyber Security	2.0	1.7	1.7
4. MSR[11] - Sustainment	-	3.0	-
5. Market Evolution	1.2	0.1	-
6. AESO Website Replacement	-	-	0.6
7. Technology Solutions	0.5	0.2	-
8. Facilities	-	1.0	-
Total Key Capital Initiatives	4.5	6.6	3.3
Other Capital Initiatives	7.5	4.0	2.6
Life Cycle Funding	6.5	6.4	7.2
Sub-total Capital	**18.4**	**16.9**	13.0
Major – EMS	**-**	**7.1**	15.4
Major – MSR	**-**	**-**	2.3
Major – SCC[12]	**16.0**	**2.9**	0.7
Total Capital	**34.4**	**26.9**	31.4

Differences are due to rounding

Key Capital Initiatives represent the most critical capital projects over the planning period that must be completed within the identified timeframe.

Other Capital Initiatives are also necessary projects; however, there is more flexibility in planning or delivery so timing is not as critical as the Key Capital Initiatives.

Life Cycle Initiatives are typically replacement of end-of-life IT hardware and recurring software upgrades.

Major Project Initiatives are programs or projects that due to their size (generally greater than $1 million and multiple years in duration) cannot be managed within the general capital budget. These programs or projects require stakeholder consultation and AESO Board approval.

[9] Revised – Spent to date (March actuals) plus estimate to complete in current year

[10] Energy Management System

[11] Market System Replacement and Reengineering

[12] System Control Centre Expansion

SECTION IV – REVENUE

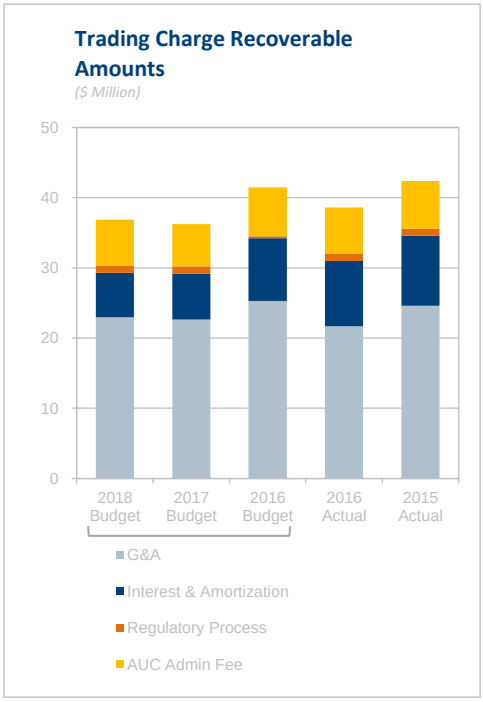
The AESO recovers its operating and capital costs through four separate revenue sources. Each is designed to recover the costs directly related to a specific service as well as a portion of the shared corporate services costs. The AESO's operations integrate the functions of transmission, energy market, renewables and load settlement to maximize benefits under the *Electric Utilities Act* (EUA). This integration results in cost allocations in many parts of the organization for the purpose of cost recovery. In determining the revenue requirement on a function-by-function basis, all AESO costs are assigned or allocated to one of the four functions. Additional information on the cost allocation methodology is provided in Appendix G (Allocation of Costs).

Transmission

The AESO is responsible for paying the costs of the provincial transmission system and recovering the costs through a tariff approved by the Alberta Utilities Commission (AUC). The ISO tariff is designed to allocate the costs to all users of the transmission system based on level of usage. The budget costs related to the transmission function will be incorporated into the AESO's tariff rates.

Energy Market

The AESO recovers the costs of operating the real-time energy market through an energy market trading charge on all MWhs traded. Based on the 2017 and 2018 budgets and a current trading volume forecast, an energy market trading charge of 20.9¢ per MWh traded is required to recover the cumulative costs for the period from January 2017 to December 2018 less collections prior to the rate change proposed to start on September 1, 2017.



The updated trading charge, which is proposed for the period from September 2017 to December 2018 is 34 per cent lower than the current 2017 trading charge of 31.5¢ per MWh traded.

In 2016, a review of the cost recovery allocations associated with the EMS and AESO facilities resulted in a higher allocation percentage being assigned to the transmission service area and less to energy market. Also impacting the assignment of costs to service areas was the creation of the renewables cost recovery service area.

These trading charge amounts are independent of the Market Surveillance Administrator (MSA) charge. The MSA cost recovery amount is approved by the Chair of the AUC in an independent budget process.

Trading Charge Recoverable Amounts ($ million)

	AESO Portion	AUC Portion	**Total**
Energy Market-Related Costs			
2017	29.1	7.1	**36.2**
2018	29.3	7.6	**36.9**
Total	58.5	14.6	**73.1**
Collections Prior to Sept 2017[13]	(29.2)	(7.3)	**(36.5)**
Amounts Outstanding	29.2	7.3	**36.5**
¢ per MWh	**16.7¢**	**4.2¢**	**20.9¢**

Differences are due to rounding

Renewables

The AESO is responsible to develop, implement and administer renewable electricity programs and recover the costs through fees charged to participants in the competitive process and generators that receive renewable energy credits. The budget costs related to the renewables function will be incorporated into future REP charges.

Load Settlement

Expenses that the AESO incurs to provide services related to administering provincial load settlement are charged to the owners of electric distribution systems and wire service providers conducting load settlement under AUC Rule 21 *Settlement System Code Rules*.

[13] Collections include energy market trading charge collections from January to August 2017 and the estimated collection surplus as of August 31, 2017 from the current and prior year.

Appendix A: 2014-2018 Strategic Plan

The AESO reviews its strategic plan on an annual basis and amends the plan accordingly. The *Alberta Electric System Operator 2014–2018 Strategic Plan* serves as the starting point for the development of this business plan, and the subsequent business plans and budgets that will follow.

AESO Mission

> *The AESO facilitates a fair, efficient and openly competitive market for electricity and provides for the safe, reliable, economic operation of the Alberta Interconnected Electric System.*

AESO Vision

> *The AESO is the trusted leader in the advancement of the electricity framework by ensuring reliability, facilitating competition, enabling Alberta's economic growth, and enhancing the quality of life for Albertans.*

Strategic Objectives

The AESO pursues three key objectives; build on the success of the current electricity framework that has been successful to date, provide value to Albertans as an organization, and retain and attract the right people. The objectives have been captured within three strategic objectives, and are summarized under the headings Framework, Value, and People.

The three strategic objectives are as follows:

Framework

> *We will enable Albertans to continue to realize the value provided by robust competition and reliable operations, while providing our stakeholders with confidence to invest in the province as we guide the evolution of the electricity framework.*

Value

> *We will drive value throughout all that we do in the execution of our mandate by maintaining focus, striving for exceptional delivery, and upholding high standards of excellence while being adaptable to change.*

People

> *We will continue to strengthen our workforce capacity and talent to enable the AESO to meet the changing needs of the organization.*

These objectives are interrelated and interdependent; and by achieving them, the AESO will continue to operate in the public interest of all Albertans and ultimately realize our vision.

Appendix B: Year-to-Date March 2017 Financial Results Detail

Year-to-Date March 2017 Transmission Operating Costs ($ million) ~ by production year

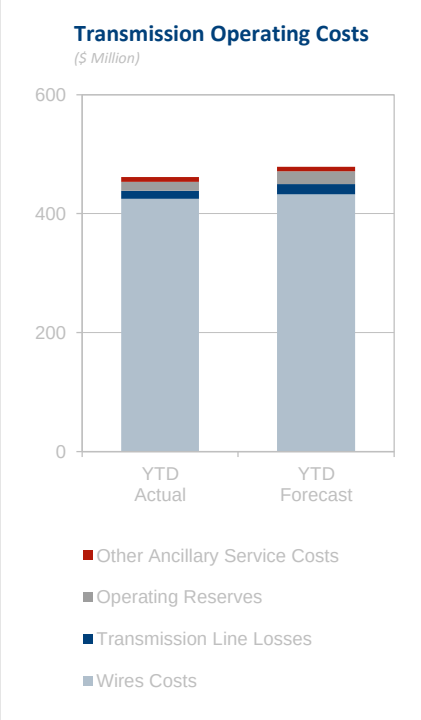
	YTD Mar Actual	YTD Mar Forecast	YTD Mar Variance	2017 Projection[14]	2017 Forecast
Wires Costs	424.9	432.3	(7.4)	1,697.1	1,729.3
Transmission Line Losses	13.5	17.5	(4.0)	53.5	74.1
Operating Reserves	15.1	21.3	(6.2)	60.7	88.2
Other Ancillary Service Costs	7.8	7.7	0.1	31.3	30.7
Transmission Operating Costs	461.3	478.8	(17.5)	1,842.6	1,922.3

Differences are due to rounding

Transmission Operating Costs

The table above provides the transmission operating costs as of March 2017 compared to the forecast.

Transmission operating costs represent wires, transmission line losses and ancillary services costs. As of March 2017, actual costs of $461.3 million are $17.5 million or four per cent lower than the forecast costs of $478.8 million.



Wires Costs

Wires costs as of March 2017 $424.9 million are $7.4 million or two per cent lower than the forecast costs of $432.3 million based on the amounts paid primarily to the TFOs in accordance with their AUC-approved tariffs.

Transmission Line Losses

Transmission line losses costs at the end of March 2017 are $13.5 million, which is $3.9 million or 22 per cent lower than the forecast of $17.5 million. The cost of transmission line losses is impacted by the pool price and losses volumes. Transmission line losses costs are projected to be $53.5 million for 2017.

The year-to-date March 2017 actual average hourly pool price is $22 per MWh compared to the forecast of $30 per MWh and the annual projected pool price of $24.

Transmission line losses volumes to the end of March 2017 are 588 gigawatt hours, which is eight gigawatt hours or one per cent higher than the March 2017 forecast volumes of 579 gigawatt hours. The higher transmission line losses volumes are due primarily to higher demand. In comparison, the March 2016 transmission line losses volumes were 567 gigawatt hours.

[14] Transmission Operating and Other Industry Costs are the current projection for 2017 costs (based on year-to-date March actuals and a nine-month forecast); the remaining cost categories are 12-month budgets currently for AESO Board approval

Operating Reserves

Operating reserve costs at the end of March 2017 are $15.1 million, which is $6.2 million or 29 per cent lower than the year-to-date March 2017 forecast of $21.3 million. The cost of operating reserves is impacted by actual volumes, hourly pool prices and operating reserve prices. Operating reserve costs are projected to be $60.7 million for 2017.

The cost variance as of March 2017 is mainly attributable lower pool prices, which are $22 per MWh or 24 per cent lower than the year-to-date March 2017 forecast of $30 per MWh.

Operating reserves volumes to the end of March 2017 are 1,866 gigawatt hours, which is 14 gigawatt hours or less than one per cent lower than the March 2017 forecast volumes of 1,881 gigawatt hours. In comparison, the March 2016 operating reserves volumes were 1,877 gigawatt hours.

Other Ancillary Service 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 such instances where procurements may not be feasible, through bilateral negotiations.

Other ancillary services costs at the end of March 2017 are $7.8 million, which is $0.1 million or two per cent lower than the March forecast of $7.7 million.

Other Ancillary Services Costs ($ million) ~ by production year

	YTD Mar Actual	YTD Mar Budget	YTD Mar Variance	2017 Projection	2017 Forecast
Load Shed Service for Imports	5.0	4.5	0.5	18.1	18.1
Contracted Transmission Must-run	0.8	0.7	0.1	3.3	2.8
Conscripted Transmission Must-run	0.0	0.5	(0.5)	2.0	2.0
Reliability Services	0.7	0.7	0.0	2.9	2.9
Poplar Hill	0.7	0.7	0.0	2.8	2.8
Black Start	0.5	0.5	0.0	2.1	2.1
Transmission Constraint Rebalancing	0.0	0.0	(0.0)	0.1	0.1
Other Ancillary Service Costs	7.8	7.7	0.1	31.3	30.7

Differences are 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). As of March 31, 2017, LSSi costs are $5.0 million, which is $0.5 million or 11 per cent higher than the forecast of $4.5 million due to higher availability associated with the lower average pool price and a higher number of arming events related to higher import volumes.

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).

Other Industry Costs

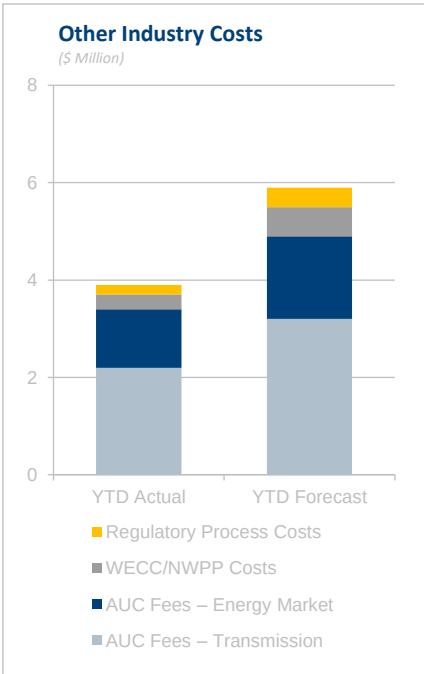
The following table provides other industry costs as of March 2017 compared to the forecast.

Year-to-Date March 2017 Other Industry Costs ($ million)

	YTD Mar Actual	YTD Mar Forecast	YTD Mar Variance	2017 Projection	2017 Forecast
AUC Fees – Transmission	2.2	3.2	(0.9)	11.8	12.6
AUC Fees – Energy Market	1.2	1.7	(0.6)	6.0	6.9
WECC/NWPP Costs	0.3	0.6	(0.3)	2.2	2.2
Regulatory Process Costs	0.2	0.4	(0.1)	1.5	1.5
Other Industry Costs	3.9	5.8	(1.9)	21.5	23.2

Differences are due to rounding

Other industry costs represent fees or costs paid based on regulatory requirements or membership fees for industry organizations; the amounts or requirement for the costs are not under the direct control of the AESO. These costs relate to the annual administration fee for the Alberta Utilities Commission (AUC); the AESO's share of Western Electricity Coordinating Council (WECC) and Northwest Power Pool (NWPP) membership fees; and regulatory process costs.



Based on current estimates, it is anticipated that actual other industry costs in 2017 will be $21.5 million, which is $1.7 million or seven per cent lower than the 2017 forecast of $23.2 million.

AUC fees at the end of March 2017 are $3.4 million, which is $1.5 million or 31 per cent lower than the forecast of $4.9 million. The 2017 forecast was based on the 2016 AUC fees while the actual 2017 fees are lower; it is estimated that the 2017 fees will be $1.0 million or five per cent lower than 2016 actual costs.

The WECC/NWPP fees at the end of March 2017 are $0.3 million, which is $0.3 million lower than the forecast of $0.6 million. It is estimated that the 2017 fees will be consistent with the 2017 forecast of $2.2 million, which is $0.2 million lower than the 2016 actuals.

The 2017 cost projection for regulatory processes is $1.5 million, which is consistent with prior years.

General and Administrative Costs

The following table provides the general and administrative costs as of March 2017 compared to the same period in 2016.

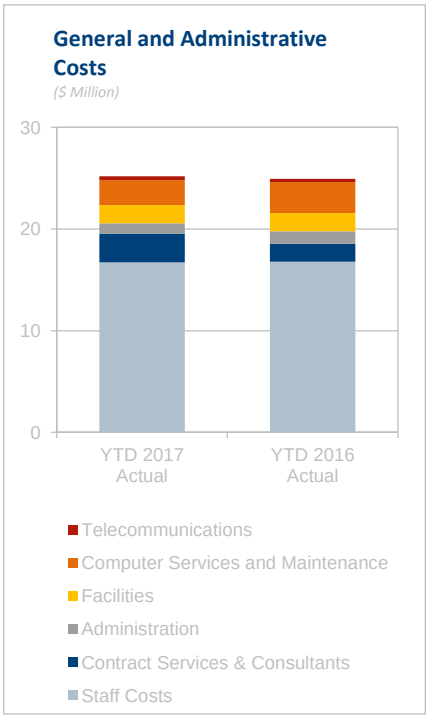
Year-to-Date March 2017 General and Administrative Costs ($ million)

	YTD Mar 2017 Actual	YTD Mar 2016 Actual	Year-Over-Year Variance	2017 Budget[15]
Staff Costs	16.7	16.8	(0.0)	65.0
Contract Services and Consultants	2.8	1.8	1.0	10.9
Administration	1.0	1.2	(0.2)	3.7
Facilities	1.8	1.8	0.0	7.1
Computer Services and Maintenance	2.4	3.1	(0.6)	10.6
Telecommunications	0.4	0.3	0.1	1.3
General and Administrative Costs	25.2	24.9	0.3	98.5

Differences are due to rounding

Staff Costs

The AESO maintains market-based compensation for staff which incorporates a benefits plan and a performance-based incentive. It is anticipated that staff costs will be $65.0 million, which is $1.4 million or two per cent lower than 2016 actual costs. The vacancy rate for 2017 and 2018 is expected to be eight per cent compared to the actual six per cent vacancy rate that occurred in 2016.



Contract Services and Consultants

The contract services and consultants costs are anticipated to be $10.9 million, which is $1.9 million or 20 per cent higher than 2016 actual costs of $9.0 million which is associated with several of the key deliverables in 2017.

Administration

Administration costs include travel and training, AESO Board fees, office costs, insurance and recruiting that present the general operating costs of the organization. Based on current estimates, it is anticipated that actual costs in 2017 will be $3.7 million, which is $0.6 million or 14 per cent lower than the 2016 actual costs of $4.3 million. The lower costs are associated with additional cost management practices to reduce the general corporate administrative expenditures.

[15] In AESO Board Decision 2017-BRP-001 issued December 2016, a six-month budget was approved. These amounts represent the full 12-month budget currently for AESO Board approval

Facilities

Facility costs include rent and operating costs for three AESO locations. The facility costs in 2017 will be $7.1 million, which is consistent with the 2016 actual costs.

Computer Services and Maintenance

Ongoing costs are incurred to purchase annual software operating licences and maintenance agreements for the AESO's information technology systems. Based on current estimates, it is anticipated that actual costs in 2017 will be $10.6 million, which is $1.3 million or 14 per cent higher than 2016 actual costs of $9.3 million primarily associated with the support requirements for the EMS Upgrade project which will be commissioned by the third quarter of 2017.

Telecommunications

The AESO incurs costs for network systems and telecommunications to support general business operations and, to a much larger extent, to support real-time operations. Based on current estimates, it is anticipated that actual costs in 2017 will be $1.3 million, which is $0.2 million or 13 per cent lower than 2016 actual costs of $1.5 million.

Interest and Amortization Costs

The following table provides the interest and amortization costs as of March 2017 compared to the budget.

Year-to-Date March 2017 Costs ($ million)

	YTD Mar 2017 Actual	YTD Mar 2016 Actual	Year-Over-Year Variance	2017 Budget
Interest	0.2	0.3	(0.1)	0.9
Amortization of Intangible and Capital Assets	5.0	5.7	(0.7)	18.8

Differences are due to rounding

Interest

Interest expense is incurred as a result of bank debt held throughout the year and the associated borrowing rate. Bank debt is issued to fund intangible and capital asset purchases, prepayments of future expenses and working capital deficiencies due to timing differences in the collection of revenues and payment of expenses.

Amortization

The lower amortization in 2017 and 2018 is mainly due a reduced depreciable asset base and a change to the estimated useful lives of the certain assets in 2016.

Capital Expenditures

The AESO has three main asset categories: people, technology and processes. While investment occurs in all three areas, only the technology assets (computer systems and System Coordination Centre) are the focus for capital expenditures, with a very small percentage being allocated to leasehold improvements. The development and acquisition of capital assets is a major budget component given the AESO's significant reliance on IT infrastructure and applications for business operations. As with all IT-intensive organizations, the challenge is to find the right balance between implementing technology advancements, determining the level of IT development that can be supported by business operations and then establishing the funding requirements to make it all happen.

To address these challenges, a vetting and prioritization process has been implemented and continues to be enhanced to ensure capital expenditures achieve the most beneficial and cost-effective results to continue to meet operating requirements. This is referred to as the portfolio management process. Throughout the year, capital projects are reviewed on an ongoing basis to assess progress and budget spending and identify potential issues. Any new or modified requirements are also reviewed and prioritized to determine how they align with existing work. This is a continual process to ensure alignment of priorities and business needs.

The estimated capital expenditure is $26.9 million for 2017 and $34.4 million for 2018. Additional information on capital projects is provided in Appendix E (2017 Capital Projects).

Capital Expenditures ($ million)

	2017 YTD Mar Actual	2017 Remaining	**2017 Budget**
Key Capital Initiatives	1.0	5.6	**6.6**
Other Capital Initiatives	1.1	2.9	**4.0**
Life Cycle Funding	1.7	4.7	**6.4**
Major Project – Energy Management System	2.6	4.5	**7.1**
Major Project – System Coordination Centre Expansion	0.2	2.7	**2.9**
Total Capital Spending	6.6	20.4	**26.9**

Differences are due to rounding

Key Capital Initiatives represent the most critical capital projects over the planning period that must be completed within the identified timeframe.

Other Capital Initiatives are also necessary projects; however, there is more flexibility in planning or delivery so timing is not as critical as the Key Capital Initiatives.

Life Cycle Initiatives are typically replacement of end-of-life IT hardware and recurring software upgrades.

Major Project Initiatives are programs or projects that due to their size (generally greater than $1 million and multiple years in duration) cannot be managed within the general capital budget. These programs or projects require stakeholder consultation and AESO Board approval.

Appendix C: Transmission Operating Cost Definitions

2018 Pool Price Forecast Methodology

Consistent with the 2017 BRP, the AESO has chosen to use the EDC Associates' hourly pool price forecast for 2018. While the AESO has prepared an internal hourly pool price forecast in recent years, competing priorities for the staff resources contributed to the decision to continue to use EDC for the 2018 BRP. The hourly pool price forecast is used as an input to calculate the ancillary services and transmission line losses costs.

There are numerous variables and assumptions used in the hourly pool price forecast and it is understood that the following assumptions have been considered by EDC:

- expectation that more generating assets will be offered at close to marginal costs for 2017 with a return of strategic offer behavior in 2018;
- no impact for accelerated coal unit retirements in 2017 and 2018; and
- pricing impacts associated with the new carbon performance standard in Alberta will increase in January 2018.

It should be noted that the EDC 2018 forecast does not incorporate the April 2017 announcement from TransAlta regarding the retirement of Sundance 1 or mothballing Sundance 2 for up to two years (both effective Jan 2018) which may impact the 2018 pool prices. The transmission tariff rate riders ensure a timely correction to tariff rates to incorporate variances in cost forecasts, including from pool price variances.

The 2018 average pool price is forecast to be $43 per MWh compared to the 2017 projected average pool price of $24, an increase of 81 per cent. The higher pool prices anticipated for 2018 are due to:

- anticipated return of strategic offer behavior;
- implementation of a new carbon performance standard; and
- higher demand.

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 import) available to serve load, weather conditions, and changes in the transmission topology. System maintenance schedules, unexpected failures, dispatch decisions on the AIES, and short-term system measures (such as demand response) may also affect the volume of losses.

The annual volume forecast for transmission line losses is based on the hourly forecast losses volumes, which are based on:

- statistical models that use forecast load as an input; and
- normal weather.

The annual forecast for transmission line losses costs is the aggregate of the hourly forecast losses volumes multiplied by the hourly forecast pool prices. As such, the transmission line losses costs are highly correlated with the pool price forecast.

Ancillary Services

Ancillary services are procured by the AESO to ensure reliability of the transmission system and include operating reserves and services with generation capacity and load reduction capabilities. Ancillary services are procured through various methods including a daily competitive exchange for operating reserves and competitive processes that result in contracts for other types of ancillary services.

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. The procurement of operating reserve volumes is directly correlated to load and generation. Operating reserves are procured through an online, day-ahead exchange. In exchange for this payment, the AESO obtains the right to utilize the provider's energy and/or capacity as reserves. Over-the-counter contracts are used only as a back up to procure operating reserves in the absence of the availability of the online exchange. All providers who sell volumes over-the-counter are paid their offer price.

The AESO procures the different types of operating reserves in two forms: active and standby.

Categories of Operating Reserves

1) **Active operating reserves:**
   - required to automatically balance small changes in supply and demand
   - required to maintain system reliability during unplanned events such as the loss of a generator, loss of a transmission line, or a sudden increase in demand
   - Alberta Reliability Standards (ARS) define the minimum levels that must be procured
   - costs are the product of volumes procured multiplied by operating reserve price, which is indexed to the hourly pool price
   - represents approximately 80 per cent of total operating reserves costs
   - costs are impacted by pool price fluctuations, supply of offered reserves and market participant offer behavior
2) **Standby operating reserves:**
   - provide additional reserves when the active operating reserves are insufficient to ensure system reliability
   - pricing includes two components: i) an option premium, paid for the capability to activate the standby reserves; and ii) an activation price, paid only if the standby reserves are activated
   - represents less than 20 per cent of total operating reserves costs

Operating Reserve Products (in both the active and standby markets)

1) **Regulating reserves** – The generation capacity, energy and maneuverability responsive to the AESO's automatic generation control (AGC) system that is required to automatically balance supply and demand on a minute-to-minute basis in real time.

2) **Spinning reserves** – Unloaded generation that is synchronized to the transmission system, automatically responsive to frequency deviation and ready to provide additional energy in response to an AESO System Controller directive. Spinning reserve suppliers must be able to ramp up their generator within 10 minutes of receiving a System Controller directive.

3) **Supplemental reserves** – While similar to spinning reserves, supplemental reserves are not required to respond to frequency deviations. They include unloaded generation, off-line

generation or system load that is ready to serve additional energy (generator) or reduce energy (load) within 10 minutes of receiving a System Controller directive.

Other Ancillary Services

The AESO procures other ancillary services for the secure and reliable operation of the Alberta Interconnected Electric System (AIES). These services are procured through a competitive procurement process where possible, or in such instances where such procurements may not be feasible, through bilateral negotiations.

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).

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 Alberta Interconnected Electrical System (AIES) to ensure the entire system has adequate start-up power.

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 the event of foreseeable TMR, the AESO may enter into a contract with a generator to provide TMR services.

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

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 agreement came into effect on April 1, 2015.

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 ISO Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose. Transmission constraint rebalancing came into effect on November 26, 2015.

Appendix D: 2017-2018 General and Administrative Cost Detail

Human Resources

Human Resources ($ million)

	2018 Budget	2017 Budget	2016 Actual	2015 Actual
Staff	**66.9**	**65.0**	66.4	64.8
Consulting	**7.7**	**9.0**	6.8	6.0
Legal	**1.1**	**1.8**	2.1	0.3
Audit	**0.1**	**0.1**	0.1	0.1
Human Resources	**75.8**	**75.9**	75.4	71.3

Differences are due to rounding

Staff Costs – These costs are based on several key budget variables or factors:

- **Base pay for performance adjustments for existing staff or an overall change in the AESO's compensation philosophy** –The AESO continues to review the general economic indicators and salary survey information to determine the impact on the base salary rates. Near the end of the year, management will recommend a base salary adjustment to the AESO Board's Human Resources Committee (HRC) for final approval. Prior to a decision by the HRC, no adjustment has been reflected in the 2018 budget (there was no base pay adjustment in 2016 and 2017).
- **Short-term (annual) incentive plan** – The AESO's short-term incentive plan is based on an assessment of corporate and individual performance, as aligned to corporate goals. In preparing the budgets for 2017 and 2018, the AESO has confidence in its approach to successfully deliver on its goals and has reflected this in its incentive compensation at a per cent of one's eligibility, which is consistent with prior years.
- **Vacancy rate** – The AESO has included an eight per cent vacancy rate for 2017 and 2018 which is higher than the 2016 actual vacancy rate of six per cent. This update takes into account the expected changes in employment patterns anticipated with the economic recovery.
- **Benefit costs** – In addition to their salary, each employee participates in the organization's comprehensive benefit plan. For the organization, this represents costs such as health and dental coverage, defined contributions for retirement savings and federal payroll taxes. These costs are presented as a percentage of salary costs to determine the "benefits load factor" which has been budgeted at 22 per cent of salary costs in 2017 and 2018, which is consistent with prior years.

Consulting – The AESO hires consultants to supplement staff resources for two general purposes. It is not practical to permanently retain staff with specific skill sets that may only be required for certain initiatives. In these circumstances, consultants are utilized to either complete the work or assist in training AESO staff. Consultants are also used to address workload peaks to maintain seamless operations and continual progression on key initiatives.

Legal – Legal counsel is retained to support general business operations by supplementing in-house legal resources and to provide expertise on regulatory filings and more complex commercial matters. Costs associated with the AESO's involvement in an AUC proceeding to hear objections and complaints to ISO Rules or any regulatory application are included in the cost category regulatory process costs, as opposed to the general and administrative cost category.

Audit/Review – To conduct audits or reviews on AESO processes, systems or reporting, the professional services of third parties are used to assist with these initiatives.

Administration

Administration ($ million)

	2018 Budget	**2017 Budget**	2016 Actual	2015 Actual
Travel and Training	**1.3**	**1.1**	1.8	1.7
Insurance	**0.6**	**0.6**	0.5	0.6
AESO Board Fees	**0.5**	**0.5**	0.5	0.5
Other Administrative	**1.5**	**1.5**	1.5	1.3
Administration	**3.9**	**3.7**	4.3	4.1

Differences are due to rounding

AESO Board Member Fees – The AESO is governed by the AESO Board whose members are appointed by the Alberta Minister of Energy. While the number of Board members can vary from time to time, there can be no more than nine members, with their compensation based on a retainer fee and additional fees based on their Board committee involvement and time spent on corporate matters.

Travel and Training – The travel and training category covers costs incurred for general business travel, staff training and associated travel, corporate meetings and related meals, including costs related to stakeholder consultation sessions. The lower costs in 2017 and 2018 are associated with additional cost management practices to reduce the general corporate administrative expenditures.

Insurance – The *Electric Utilities Act* (EUA) provides limited statutory protection for the business risks of the AESO organization, directors, officers and staff. To ensure business risks are properly insured, the AESO carries insurance for exposures not covered by the EUA, specifically for direct damages resulting from negligence. The AESO has statutory protection for indirect damages, which would typically be the most costly damages that would occur for business interruption and lost revenue.

Other Administrative Costs – This category includes corporate subscriptions/memberships and professional membership fees, general office costs, printing and recruiting.

Facilities

Facilities ($ million)

	2018 Budget	2017 Budget	2016 Actual	2015 Actual
Rent	**3.7**	**3.7**	3.7	3.7
Operating Costs	**3.7**	**3.3**	3.3	3.9
Facilities	**7.4**	**7.1**	7.0	7.6

Facility costs are associated with three office locations: i) the main offices in downtown Calgary which are leased through long-term lease arrangements, ii) the System Coordination Centre which is owned and operated by the AESO, and iii) additional space for the AESO's Backup Coordination Centre to accommodate redundant computer systems to support seamless operating performance in the event of a disruption to the operations at the System Coordination Centre.

To accommodate staff and contract resources in the main offices, 105,000 square feet of office space is currently leased through agreements that will expire in 2024.

In 2017 and 2018, higher operating costs related to the AESO's downtown office space are anticipated, however, 2017 is offset by a refund that has been received related to over-charges of operating costs in prior years.

Computer Services and Maintenance

Computer Services and Maintenance ($ million)

	2018 Budget	2017 Budget	2016 Actual	2015 Actual
IT Maintenance and Services	**11.0**	**10.6**	9.3	9.0

As the AESO continues to invest in IT infrastructure to support its business operations, ongoing costs are incurred to purchase annual software and hardware operating licences and maintenance agreements for these systems with high availability requirements supported by appropriate class maintenance and support agreements. The AESO operates with a managed services model[16] for IT infrastructure operating support (e.g., network, server and database).

In the three year period from 2016 to 2018, these costs are anticipated to increase by approximately 20 per cent with the most significant contributor associated with the ongoing support requirements for the EMS Upgrade project which will be commissioned by the third quarter of 2017.

[16] A managed service model is where the AESO transfers the day-to-day management and operations of a support function (not the strategic management) to a third-party provider. With this support approach the AESO would be able to leverage available technical resources and tools to provide more effective support for its critical processes. The managed services approach will facilitate resource efficiencies and improve reliability.

Telecommunications

Telecommunications ($ million)

	2018 Budget	**2017 Budget**	2016 Actual	2015 Actual
Telecommunications	**1.3**	**1.3**	1.5	1.4

The AESO incurs costs for network systems and telecommunications to support general business operations and, to a much larger extent, to support real-time operations. The strategy for developing and maintaining the telecommunication infrastructure is based upon the requirement for high availability, which necessitates redundancies of services and equipment.

Appendix E: 2017 and 2018 Capital Projects

The following tables provide information on the AESO's current capital plan for 2017 and 2018. Actual projects to be completed during this period will vary, and include the addition of projects yet to be determined, deferral of projects in this plan, or elimination of projects deemed no longer necessary.

Key Capital Initiatives

These are the most critical capital projects over the planning period that the AESO believes must be completed within the identified timeframe.

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 which is proceeding to plan. The project completion is expected in Q3 2017. See Business Plans 2015-2017 Appendix F: Major Projects for more information.
	2017 and 2018 Plan	Sustainment and optimization phases will follow the completion of the implementation phase and related costs will become part of the ongoing general capital program.

Key Capital Initiatives		
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 has been 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.
	2017 and 2018 Plan	The AESO plans to continue and complete TFO and IPP migrations to the new EMS (SCADA) WAN enhancing communications.
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	Continued to implement remaining facility access, security controls and system changes required to ensure compliance readiness including: implementation of various physical security system upgrades. In addition, the AESO completed a CIP information security project addressing bulk electric systems (BES) cyber system requirements.
	2017 and 2018 Plan	In 2017 implement remaining facility access, security controls and system changes required to ensure compliance readiness. In 2018 implement 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	Management approved a business case supporting the enhancement of AESO's advanced threat management capabilities. Progress has been made toward this project which is expected to complete early in 2017. The multi-year Identity and Access Management (IAM) projects are continuing.
	2017 and 2018 Plan	Continue to advance the multi-year (IAM) projects. Implement additional controls to prevent, detect, respond to, and recover from incidents

Key Capital Initiatives		
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	Continuing medium-term sustainment measures.
	2017 and 2018 Plan	Successfully complete medium-term sustainment measures by end of year 2017. The MSR sustainment initiative will be completed at this time. Future reengineering or replacement of the AESO's existing market systems will be part of a new market systems transition program (to be defined) with capital investment expected to start in the second half of 2018 or early in 2019. This major initiative will transition the AESO's existing market systems to support the capacity market and the Renewable Energy Program (REP) requirements. This approach allows for the coordination between the changes required due to market evolution and the changes required to address lifecycle needs of the existing market systems.

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	Forecasting system changes business case under development and OR procurement data analysis completed.
	2017 and 2018 Plan	Start implementation of the forecasting system changes in September 2017. Implementation target to be completed by end of Q2 2018 for the forecasting system and end of 2018 for the OR system changes. In 2018, begin initial development and implementation steps to accommodate capacity market and other market evolution elements.
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	Access control design nearing completion. The construction phase is expected to go to tender in Q2; project currently on schedule.
	2017 Plans	Complete access control construction work at the SCC by the end of 2017.
Key Initiatives		2017 Budget $6.4 million 2018 Budget $4.5 million

Other Capital Initiatives ($ million)

These are necessary projects that have more flexibility in planning or delivery so timing is not as critical as the Key Capital Initiatives.

Other Capital Initiatives	Description	2018 Budget	2017 Budget
Reliability - EMS	Upgrades relating to the sustainment and optimization requirements of the EMS evergreen strategy - includes vendor software upgrades and improved analysis and reporting capabilities.	3.8	1.0
Reliability - Other	Upgrades to existing SCC, Back-up Coordination Centre and control room systems and technologies.	1.4	0.3
Business Technology Solutions	Implementation of technology solutions to improve operating effectiveness/efficiency and controls – includes planned upgrades to the AESO's forecasting, records management and financial reporting systems.	1.1	1.4
System Enhancement Program	Ongoing high priority minor enhancements to production applications.	1.0	1.0
Leasehold Improvements	Office furniture purchase, replacement and other leasehold improvements.	0.1	0.1
Miscellaneous	Other minor system projects not exceeding $0.1 million.	0.0	0.2
Other Capital Initiatives		**7.5**	**4.0**

Differences are due to rounding

Life Cycle Initiatives ($ million)

These are typically replacement of end-of-life hardware and recurring software upgrades.

Life Cycle Initiatives	Description	2018 Budget	2017 Budget
Network Upgrades	Upgrade AESO voice and data networks to ensure vendor support, meet reliability requirements and address increased capacity needs. This includes data switches, remote access capabilities, and redundancy of critical network services.	1.2	0.4
Server Upgrades	Retire and replace corporate server hardware/software based on a pre-determined corporate retirement plan. Priority replacements include critical database servers and servers within the development environment.	1.1	1.3
Enterprise Services	Upgrades to the AESO critical application server platform to provide for a reliable, performant and vendor supported environment.	0.9	1.3
End User Computing	Upgrade activities that keep the end user computing platform current.	0.7	0.3
Database Upgrade	Upgrade to the database environment that supports the AESO's critical applications.	0.5	0.6
Storage Upgrade	Implement selected storage infrastructure upgrades to address existing end-of-life cycle considerations, support the high-performance storage requirements of on-line stakeholder systems and increase the reliability/availability of critical data systems between the AESO's data centres.	0.5	1.5
Monitoring Solutions	Upgrade and integration of disparate monitoring solutions for a more holistic view of infrastructure and application performance.	0.5	0.0
Communications	Upgrade, optimization and consolidation of voice (telephone) systems to ensure continued reliability.	0.5	0.4
Applications Lifecycle	Upgrades to the underlying technologies that support the AESO's corporate and enterprise applications.	0.4	0.4
Non-project Capital	Ongoing investment in desk side systems, productivity tools, services and mobile devices to replace aging software and equipment and accommodate resource growth (e.g., data storage).	0.3	0.3
Life Cycle Initiatives		**6.5**	**6.4**

Differences are due to rounding

Appendix F: Major Projects

System Coordination Centre (SCC) Expansion

System Coordination Centre Expansion	
Description	In 2006, the AESO built a new System Coordination Centre (SCC) to coordinate the Alberta Interconnected Electric System (AIES). Due to the increase in the number of programs and initiatives provided by AESO Operations, the number of employees required at the SCC has grown to exceed the current capacity. Temporary actions have been taken to accommodate this growth however there are a number of risks associated with this situation and AESO personnel continue to work in less than ideal conditions. The overall plan to move forward is to: correct the existing issues as well as consider future operational requirements; address the inherent loss of efficiency in support of grid operations when the personnel are not physically located at the SCC; and take into account Alberta Reliability Standards (ARS) Critical Infrastructure Protection (CIP) Standards.
Scope of the SCC Expansion	Expansion of the SCC facility that includes personnel workspace, meeting room space, data centre, dispatch training and storage.
Project Approach	A multi-year phased approach has been proposed to incrementally address the SCC expansion requirements. A phased implementation approach will: • Reduce project uncertainty with respect to requirements, costs and timing estimates through the progressive elaboration of details • Improve management's confidence in the requirements and estimates provided • Provide for a more systematic (gated) management and approval process <u>Phase I – Validation (completed)</u> The Validation Phase was completed in 2015 and provided a preliminary high level overview of the project including the identification of the business requirements; project scope; options to be considered; and initial cost and timing estimates. In December 2015, the AESO Board approved the recommendation to proceed to the next phase (Definition) <u>Phase II – Definition Phase (completed)</u> The Definition Phase was completed in 2016. Different options were developed and presented to address the overcapacity at the SCC and co-location of Operations personnel, at a cost comparable to leasing space; in December 2016, the AESO Board approved the recommendation to proceed to the next phase (Implementation - construction) and expand the existing

System Coordination Centre Expansion	
	facility. <u>Phase III – Implementation (construction)</u> The implementation phase was initiated in January 2017. It is a multi-year initiative with a capital cost estimate of $21.9M and target completion date of Q4 2019. Major activities include design completion; tendering of the construction to a general contractor/construction firm; commencement of construction; installation of AESO IT infrastructure (furniture, cabling, meeting room spaces, security, etc.); followed by occupancy and deficiency correction.

Appendix G: Allocation of Costs

Management reviews allocation percentages twice a year. The percentages are reviewed when the annual budget is prepared and at year-end when the allocations are finalized based on actual activities and costs for each department.

Cost Type	Allocation Methodology
Direct Operating	Individual department review/analysis for current year work focus
Shared Services – Corporate Services[17]	Based on allocation of direct operating group costs
Shared Services – Information Technology	Activity-based analysis on system and resource costs
Shared Services – Office Leases	Based on AESO staff count
Capital	Assigned on a project-by-project basis
Other Industry Costs – Fees and Memberships	Based on related function
Other Industry Costs – Regulatory Process Costs	Individual review/assessment for each proceeding

[17] Corporate Services includes departments such as: Accounting, Settlement and Credit, Human Resources, Corporate Communications, Legal, etc.

Appendix H: Budget Amendments

As part of the established BRP process, should an unplanned funding requirement be identified during the budget period (i.e. 2017 and 2018) and a material budget amendment required, management will proceed following the steps outlined in the following table.

Results of Forecast	Related Budget Process
If the forecast is below or in line with the previously approved budget amount	At management's discretion, any under-budget amounts will be used to advance future year business priorities or will be accumulated in the deferral accounts
If the forecast is above the previously approved budget amount and the amount is determined to be a 'manageable variance'	Management will review the new funding requirements with stakeholders, followed by a request for approval from the AESO Board
If the forecast is above the previously approved budgeted amount and the amount is in excess of a 'manageable variance'	Management will review the new funding requirements with stakeholders, followed by a request for approval from the AESO Board
A '**manageable variance**' is a forecast to actual variance that would be: • Less than 10 per cent of budgeted general and administrative expenditures • Less than 20 per cent of budgeted capital	

Section 5

Stakeholder Comments and AESO Responses

Throughout the current year Budget Review Process (BRP), the AESO held meetings with stakeholders to discuss the business plan, budget and forecast materials and provided stakeholders with an opportunity to provide comments on this information.

The following table lists the companies that participated in the current year BRP and the meeting dates they attended.

Stakeholders in the Budget Review Process		April 10 Business Initiatives Calgary	May 1 Budget/ Forecast Calgary
Alberta Direct Connects (ADC)	Attendance	√	√
AltaLink	Attendance	√	
Capital Power Corporation	Attendance	√	√
F.K. Matulionis and Associates	Attendance	√	
Hill + Knowlton Strategies	Attendance	√	√
Industrial Power Consumers Association of Alberta (IPCAA)	Attendance	√	√
TransAlta Corporation	Attendance		√
Utilities Consumer Advocate	Attendance	√	√

The following table identifies the key BRP dates in 2017.

Key BRP Dates in 2017	Purpose
March 6	Notice to stakeholders – A notice was distributed to stakeholders regarding the initiation of the BRP (i.e., stakeholder consultation process), an overview of the process steps, terms of reference, and proposed process schedule.
April 10	First stakeholder meeting – Stakeholder meeting to discuss the preliminary list of business initiatives proposed for 2017 and 2018.
May 1	Second stakeholder meeting – A technical review meeting to discuss the preliminary own costs budgets (general and administrative and capital) proposed for 2017 and 2018 and the transmission line losses and ancillary services costs forecasts for 2018.
June 6	Stakeholder and AESO Board meetings (as required).

Following stakeholder meetings and/or the posting of BRP information on the AESO's website, we asked stakeholders for their comments. Stakeholder comments and AESO responses to those comments are enclosed.

Stakeholder Comment and AESO Replies Matrix

AESO Consultation – 2017-2018 Budget Review Process (2017-18 BRP), Invitation to Stakeholders and Supporting Material

March 30, 2017

The AESO has asked market participants and interested parties to participate in the AESO's consultation regarding its 2017-18 Business Plan and Budget. Related stakeholder comments regarding the invitation and supporting material are provided in the following matrix. The matrix also includes AESO management's response to those comments.

Invitation to Participate
Do stakeholders accept the invitation to participate in the 2017-18 BRP?
Alberta Direct Connect (ADC) ADC accepts the invitation to participate in the 2017-2018 BRP. **AltaLink Management Limited (AltaLink)** AltaLink accepts the invitation to participate in the 2017-18 BRP. **Capital Power Corporation (Capital Power)** Capital Power accepts the invitation to participate in the AESO's 2017-2018 BRP. **Industrial Power Consumers Association of Alberta (IPCAA)** Yes. **Utilities Consumer Advocate (UCA)** Yes **AESO Response** Comments noted. The Alberta Electric System Operator (AESO) thanks stakeholders for their participation, commitment and support of the process.

Terms of Reference
Do stakeholders agree with or have comments on the principles set out in the Terms of Reference?
ADC ADC is supportive of the principles. **AltaLink** AltaLink agrees with the principles set out in the Terms of Reference. AltaLink has no comments on the Terms of Reference. **Capital Power** Capital Power has no comments. **IPCAA** Yes – agree. No comments at this time. **UCA** Agree **AESO Response** Comments noted.

Process Steps
Do stakeholders agree with or have comments on the steps identified in the 2017-18 BRP?
ADC ADC supports the steps outlined in the process. **AltaLink** AltaLink agrees with the steps identified in the 2017-18 BRP Process. AltaLink has no comments on the 2017-18 BRP steps. **Capital Power Corporation** Capital Power has no comments. **IPCAA** Yes – agree. No comments at this time. **UCA** Agree **AESO Response** Comments noted.

Calendar and Schedule
Do stakeholders agree with the proposed BRP stakeholder calendar? Are there any comments regarding the meetings scheduled?

ADC

ADC can work within the proposed calendar. Please arrange for remote or web access for Calgary meetings.

AESO Response

Comment noted. The AESO will arrange for remote access for the Calgary meetings.

AltaLink

AltaLink is in agreement with the proposed BRP stakeholder calendar regarding the meetings scheduled.

AESO Response

Comment noted.

Capital Power Corporation

Please confirm specific activities addressing the 2018 forecasts of Transmission Line Losses and Ancillary Services Costs (item (i) in the Invitation) begin on April 25th and are included in those activities that include “Forecasts and Own Costs” in the activity descriptor. If not, please provide the first activity that involves the Transmission Line Losses and Ancillary Services Costs review.

AESO Response

Comment confirmed.

Capital Power Corporation

Capital Power requests that the AESO also provide stakeholders with an estimated Energy Market Trading Charge as early as possible in the BRP Process.

AESO Response

Comment noted.

IPCAA

IPCAA can make the proposed stakeholder calendar work.

AESO Response

Comment noted.

UCA

Agree. No comments

AESO Response

Comment noted.

Other Comments
Do stakeholders have any other comments to offer at this time?

ADC

ADC appreciates the opportunity to participate.

AESO Response

Comment noted.

AltaLink

In the AESO's March 6, 2017 BRP – Invitation to Stakeholders Letter, paragraph 1, the AESO states "The AESO is extending an invitation to stakeholders who have an interest in participating in the continuation of the Budget Review Process (BRP), which will be used to establish the AESO's business plan and budget for July 2017 – December 2018 and possibly beyond." Can the AESO elaborate on what it means by "possibly beyond"?

AESO Response

Comment noted. The reference to "possibly beyond" means that during the process some of the business initiatives identified may be multi-year in nature and have a related lifecycle that spans beyond the 2017-18 planning period.

Capital Power Corporation

Capital Power appreciates the opportunity to participate in the AESO's 2017-2018 BRP.

ASEO Response

Comment noted.

IPCAA

No.

ASEO Response

Comment noted.

UCA

No comments

ASEO Response

Comment noted.

Stakeholder Comment and AESO Replies Matrix

AESO Consultation – 2017-2018 Budget Review Process
Meeting April 10, 2017 – AESO's Preliminary List of 2017-2018 Business Initiatives

April 28, 2017

The AESO has asked market participants and interested parties to comment on the Preliminary List of 2017-18 Business Initiatives presentation given at the Budget Review Process (BRP) stakeholder review meeting on April 10, 2017. Related stakeholder comments regarding the business initiatives and supporting material are provided in the following matrix. The matrix also includes AESO management's response to stakeholder comments.

Preliminary List of 2017-18 Business Initiatives – April 10, 2017 meeting
Do stakeholders have any comments on the AESO's Business Initiatives proposed for 2017-18?
Alberta Direct Connect (ADC) ADC supports the business initiatives of the AESO. While there are many competing priorities for the AESO, the ADC urges the AESO to file the Rider C modification with the AUC in order to meet a July 1 implementation date. **AESO Response** **Noted. The AESO is working to complete and file its Rider C amendments application as soon as possible. The application will include a request for approval to be effective as early as practical in 2017.** **Altalink Management Ltd (Altalink)** AltaLink supports the AESO's business initiatives proposed for 2017-18, but has the following comments concerning some of the initiatives based on the AESO's April 10, 2017 discussion: **Comment 1** Market Systems Replacement and Reengineering At this session stakeholders asked if the AESO would be building flexibility into the system for sub-hour settlement. AltaLink supports the AESO building in flexibility into the design of a new system to accommodate the future energy, capacity and ancillary services markets.

AESO Response

Comment 1

Noted. The desired requirement has been identified previously and the AESO will review and evaluate it along with the other design elements.

Altalink

Comment 2

General Tariff Application (GTA)

Please confirm that the AESO's GTA 2018 plan includes activities related to the design of the capacity cost allocation as the AESO's capacity market design needs to be incorporated into ISO rules, contracts, or legislation by the end of 2018 for the first capacity procurement in 2019. If not, can the AESO explain how the capacity cost allocation will be implemented in 2018 and within which initiative?

AESO Response

Comment 2

As the AESO discussed with stakeholders at its tariff consultation session on April 10, 2017, the AESO plans to investigate capacity market cost allocation and recovery after completion of the 2018 ISO tariff proceeding. The AESO is currently consulting with stakeholders on the design and implementation of the capacity market. The capacity market is anticipated to be in place by 2021, until which time no capacity market costs will be incurred or need to be allocated.

Altalink

Comment 3

Intertie Restoration

When the AESO completes its assessment of its intertie restoration project, AltaLink would support the AESO holding an information session with stakeholders to share their results and conclusions and to allow for any questions or comments prior to the AESO proceeding with their plans.

As well, AltaLink requests that the AESO update stakeholders on the status and schedule of the Regional Electricity Cooperation & Strategic Infrastructure Initiative and also share the findings from that report.

AESO Response

Comment 3

Noted. When the AESO completes its intertie restoration review and if a need is identified the AESO will consider an information session with stakeholders to share the results. The AESO may find that a needs identification document (NID) application is necessary and may proceed on that basis.

With respect to the Regional Electricity Cooperation & Strategic Infrastructure Initiative, the AESO will take this request to Natural Resources Canada for consideration.

Independent Power Consumers Association of Alberta (IPCAA)

None at this time

AESO Response

Noted.

TransAlta Corp. (TransAlta)

TransAlta believes that a key priority in 2017 will be the capacity market design consultation. The budget should ensure that this initiative is properly resourced and funded to achieve its timelines; a delay will have significant impacts on the wholesale electricity market.

AESO Response

Agreed. This initiative is very early in its lifecycle and AESO Management expects requirements will evolve considerably over time and the AESO will budget accordingly. If additional resource requirements are identified as this initiative progresses (i.e. through stakeholder consultation, assessment of other ISO implementations, etc.) they will be addressed. Management also notes that as in prior years, any major project variance exceeding the established BRP limits (i.e. 10% for G&A and 20% for capital) requires approval outside of the annual BRP and Management will consult with stakeholders as part of a separate process.

Utilities Consumer Advocate (UCA)

Intertie Restoration: The UCA suggests that the AESO consult with stakeholders as part of the intertie restoration initiative before finalizing the options and continuing with design and development of the requirements. The UCA has concern about the cost-effectiveness of this initiative and how it will benefit consumers.

AESO Response

Noted. See AESO Response to Altalink Comment 3, page 2.

Other Comments
Do stakeholders have any other comments to offer at this time?

ADC

ADC appreciates the opportunity to participate in the BRP.

AESO Response

Noted. The AESO appreciates stakeholder participation in the BRP process.

Altalink

AltaLink has no other comments at this time.

AESO Response

Noted.

IPCAA

Comment 1

It would be useful in understanding where business efficiencies have been found in Corporate Services.

AESO Response

Comment 1

The AESO continues to focus on process improvements in an effort to realize additional efficiency and effectiveness improvements. Management notes the enterprise portfolio management office (EPMO) project as an example of one of the most significant continuous improvement projects advanced in 2016. Essentially the objective of the EPMO project was to identify and implement enhancements intended to optimize the existing corporate portfolio management process. Upon completion, there was a clear improvement in resource efficiency and resource management. These improvements were attributed to the simplification of the various process (project lifecycle) steps and an improvement in reporting and forecasting capabilities. Ongoing EPMO operations continue to provide evidence of resource (staff and capital) management and project delivery (number of projects/programs delivered on time and budget) improvements without a corresponding compromise in management controls.

IPCAA

Comment 2

IPCAA has concerns in the Capacity market about the length of time taken and originally understood all consultation for the design would take place in 2017, but the Budget now considers consultation into 2018.

AESO Response

Comment 2

The AESO continues to refine capacity market development timelines based on additional feedback from stakeholders. Specifically, in response to stakeholder feedback requesting increased use of working groups, the AESO is reviewing its' consultation model. It is expected that a revised consultation model which involves greater engagement of stakeholders in the front-end design process will reduce time requirements during the formalization, or rule development stage.

TransAlta

The AESO has included the design and development of loss factor rule in its business initiatives in 2017. Loss factors include development of the loss factors for 2017 as well as loss factors that apply to the historical period (2006-2016). The development of loss factors is complicated by the ongoing regulatory proceeding and the multiple years that need to be calculated. It is important that the AESO has the available resources to produce the loss factors in a timely fashion given that delays in receiving this information have added to the complexity of the regulatory proceeding (i.e. other methods being proposed to expedite the settlement).

AESO Response

Noted: The loss factor rule is currently in a regulatory process. For the 2017-18 BRP, AESO Management has developed a related resource estimate based on its current understanding of the likely requirements. Should the regulatory process identify additional requirements that differ significantly from those included in the budget estimate, AESO Management will reassess its resourcing plans and options in order to meet mandated timelines.

UCA

As a general comment, the UCA suggests that it would be helpful to obtain more information from the AESO regarding the preliminary list of business initiatives as presented at this stage in the Budget Review Process. For example, it would be helpful if specific information regarding the decision process for selecting these priority business initiatives were provided, including:

- What is the objective of each initiative? What problem will the initiative solve?
- Why are these objectives/problems identified as a priority for the AESO this year?
- What other options or initiatives were considered by the AESO to meet these objectives (if applicable)? How were the alternatives evaluated?

This background information would allow the UCA to better understand the initiatives that are being presented at this stage of the Budget Review Process and to provide more valuable feedback.

AESO Response

The following summary table (*Table 1*) has been prepared in an effort to provide additional business planning information to that presented/discussed at the April 10 stakeholder meeting. This includes a brief objective/problem description, the rationale/justification for prioritization and additional background reference material for each of the business initiatives identified.

Table 1
Preliminary list of business initiatives and related business planning information

Legend
Business Initiative - name
Objective/Problem – stated separately or intrinsic and combined
Priority – why was the business initiative considered a priority
Background reference – published material covering background, options/alternatives and other pertinent information

Business Initiative	Objective/Problem	Priority rationale	Background reference
1. Renewable Electricity Program	**Develop and implement a renewable electricity program**	**Government of Alberta (GoA) mandated**	**https://www.aeso.ca/market/renewable-electricity-program/**
2. Capacity Market	**Design and implement a capacity market**	**GoA mandated /Supply adequacy**	**https://www.aeso.ca/market/capacity-market-transition/**
3. Market Systems Replacement and Reengineering	**Energy market reliability/supporting systems and IT infrastructure reached end of life (not supported by vendor)**	**Energy market system reliability**	**https://www.aeso.ca/market/market-system-replacement/** **See AESO business plan and budget 2015 – 2017**
4. General Tariff Application	**Submit a comprehensive ISO tariff application every 2-3 years**	**Electric Utilities Act (EUA) requirement**	**https://www.aeso.ca/rules-standards-and-tariff/tariff/**

5. Alberta Reliability Standards (ARS), technical rules and loss factor rule	**ARS – Ensure Alberta Interconnected Electric System (AIES) reliability and compatibility with the rest of North America** **Technical rules – Ensure connection requirements are current and maintain AIES reliability** **Loss Factor – Ensure compliance with AUC decisions in Proceeding 790**	**Mandated/ System reliability**	**https://www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/** **https://www.aeso.ca/rules-standards-and-tariff/iso-rules/** **https://www.aeso.ca/grid/loss-factors/**
6. Intertie Restoration	**Restore the interties to achieve their simultaneous transmission ratings**	**Transmission Regulation**	**https://www.aeso.ca/market/current-market-initiatives/intertie-restoration/**
7. Advancement of Fort McMurray West (FMW) Project	**Manage FMW project and ongoing operations contract terms**	**Transmission Regulation/ Meet demand requirements**	**https://www.aeso.ca/grid/competitive-process/fort-mcmurray-west-500-kv-transmission-project/**
8. Energy Management System (EMS) Upgrade	**Reliability and CIP compliance/EMS technology reached end of life conditions**	**System reliability/ARS critical infrastructure protection (CIP) standard compliance**	**https://www.aeso.ca/aeso/about-the-aeso/business-planning-and-financial-reporting/** **See AESO business plan and budgets 2015 – 2017**
9. SCADA/Wide Area Network (WAN)	**Reliability - WAN technology reached end of life (obsolete, not supported by telecommunications provider)**	**System reliability - Required to collect real time data for EMS/CIP compliance**	**https://www.aeso.ca/market/market-updates/wide-area-network-update-telco-announces-the-discontinuation-of-atm-network-services/**
10. System Control Centre (SCC) Facility Expansion	**SCC resource expanded as a result of operational requirements that have increased since the facility was built. The current facility is substantially past its design capacity**	**System reliability and personnel safety - Interim workarounds exhausted**	**https://www.aeso.ca/aeso/about-the-aeso/business-planning-and-financial-reporting/** **See AESO business plan and budgets 2016 – 2017**

11.	**Critical Infrastructure Protection (CIP) Implementation**	**Reliability of the Transmission System**	**Mandated/ System reliability**	**https://www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/**
12.	**IT and Cyber Security**	**Risk management of cyber security threats**	**Systems reliability - Protect the integrity and security of our grid, market and corporate systems**	**https://www.aeso.ca/aeso/about-the-aeso/business-planning-and-financial-reporting/** **See AESO business plan and budgets 2015 – 2017**
13.	**Connection Process Efficiency**	**Implement a more efficient process that aligns with the REP and the Capacity Market programs**	**Stakeholder impact - important to monitor the progress of this initiative**	**https://www.aeso.ca/grid/connecting-to-the-grid/** **https://www.aeso.ca/market/renewable-electricity-program/first-competition/** **https://www.aeso.ca/market/capacity-market-transition/**
14.	**Workforce capabilities**	**Retain valuable employees and broaden staff knowledge and capabilities**	**Facilitate the successful delivery of AESO requirements**	
15.	**Ongoing review of processes**	**Improve AESO business operations through greater effectiveness and efficiency**	**Realize additional value**	

Stakeholder Comment and AESO Replies Matrix
AESO Consultation: 2017-2018 Budget Review Process (BRP)

Technical Meeting May 1, 2017

Preliminary AESO's 2018 Forecasts (Pool Price, Ancillary Services, Transmission Line Losses) and 2017-2018 Own Costs Budget

The AESO has asked market participants and interested parties to comment on the Preliminary AESO's 2018 Forecasts and 2017-2018 Own Costs Budget. The related information was presented to stakeholders on May 1, 2017 at the BRP technical meeting in Calgary. Stakeholder comments received are provided in the following matrix. The matrix also includes AESO management's response to these comments.

AESO's Ancillary Service Forecast
Update from May 1 Technical Meeting

Subsequent to the May 1 stakeholder technical meeting, an internal review of all budget/forecast information was performed for due diligence prior to the completion of the AESO 2017-2018 Business Plan and Budget Proposal for final submission to the AESO Board for review and approval. In that review process, it was identified that a revision to the 2018 Operating Reserve Forecast was required.

The following table indicates the change that has been made post-May 1 technical meeting. The variance explanations are provided in Section 4 of the AESO 2017-2018 Business Plan and Budget Proposal (Section I – Transmission Operating and Other Industry Costs, subsection B. 2018 Forecast).

	2018 Forecast		2017 Projection[1]	2017 BRP[1]
	Final BRP	May 1 Presentation	May 1 Presentation	May 1 Presentation
Operating Reserve Costs ($M)	146.6	96.8	60.8	88.2
Operating Reserve Volumes (GWh)	7,495	7,495	7,429	7,338
Pool Price (per MWh)	$42.58	$42.58	$23.51	$31.82

[1] Unchanged from May 1 technical meeting

Pool Price and Load Forecasts for 2018

Do stakeholders have any comments on the Pool Price and Load forecasts for the upcoming year?

Alberta Direct Connect (ADC)

Only suggestion is to also include the DTS load forecast for the upcoming year. This would provide a better sense of the unit cost for wires and ancillary services.

AESO Response

For the purposes of preparing the BRP for the approval of AESO transmission operating costs and energy market cost recoveries, the volume forecasts for items 1 and 2 in the table below are taken into consideration to forecast operating reserves and transmission line losses, and to allocate energy market costs.

In comparison, DTS energy volumes, in part, determine the allocation of transmission costs to DTS customers through the AESO's transmission tariff rate design; the principles of which are based on cost causation. As the AESO indicated in its 2017 General Tariff Application, the DTS energy volumes are the basis for the recovery of less than 10 per cent of the transmission costs; DTS demand (megawatts) is the most significant cost allocator.

Given the focus of the BRP, it does not involve an analysis of the DTS load forecast.

Volumes	Process	Approval
1. Net-to-grid load and generation[1]	• Active OR forecast	Transmission Operating Costs - approved by AESO Board
2. Trading charge volumes[2]	• Energy Market Trading Charge	Allocation of energy market costs to determine per MWh charge
3. AIL[3]	• Standby OR forecast • Transmission line loss forecast	Transmission Operating Costs - approved by AESO Board
4. DTS[4] energy and demand	• Tariff rates and billings	Tariff application approved by AUC; transmission operating costs approved by AESO Board, excluding wires costs for rate setting

[1] Net-to-grid load: total volumes taken from the grid (includes imports) or system load without transmission line losses. Net-to-grid generation: total generation supplied to the grid (includes exports).

[2] Net-to-grid load, net-to-grid generation and transmission line losses.

[3] Alberta Internal Load (AIL): total electricity consumption within Alberta including "behind-the-fence" load, the City of Medicine Hat and losses (transmission and distribution).

[4] Demand Transmission Service (DTS): recovery of transmission-related costs is based on the amount of electricity consumed by a load participant on a per megawatt hour basis (energy) and/or a charge for the megawatt capacity (demand).

Altalink Limited Partnership (Altalink)

AltaLink has no comments on the Pool Price and Load forecasts for the upcoming year.

AESO Response – Noted.

Industrial Power Consumers Association of Alberta (IPCAA) – Refer to the information provided by IPCAA in Appendix 1

As discussed in the meeting, the AESO has put significant effort into forecasting the AIL in this process. However, the critical load that pays for transmission is the system load, predominantly Rate DTS. The AIL, which includes industrial load served by behind-the-fence generation, is growing at a much faster pace than the DTS load. This will likely continue due to the pricing of carbon, increasing cost of transmission and the new capacity market.

Attached is a graph (Appendix 1) showing the difference in both size and growth between AIL and DTS load. If the AESO were to focus strictly on the AIL it would tend to over-forecast load growth. In other jurisdictions, due to increased efficiency and distributed generation at the consumer level, load is actually flat or falling.

AESO Response

See AESO response to ADC comment, page 2.

Utilities Consumer Advocate (UCA)

The UCA submits that the load forecast seems very optimistic, especially considering the expected growth in distributed generation and behind the fence generation that will reduce overall demand on the transmission system. The UCA is concerned that if the AESO load forecast is higher than actual growth and timing of electricity demand that this will result in unnecessary transmission costs being charged to consumers.

AESO Response

With regard to the comments on load being served by distributed and behind the fence generation, the load forecast displayed in the presentation (slide 15) is Alberta Internal Load (AIL), which includes behind-the-fence load. The 2017 BRP's load forecast is now coming in lower than actuals, and the upward revision of the 2018 forecast is more in line with 2017 year-to-date actuals. This trend in 2017 actuals aligns with the load growth forecast presented. Management notes that additional information regarding the rationale

used in this load growth forecast is provided in the Supplementary 2018 Forecast Information document (i.e. section 3. Load Forecast, page 3), which was distributed in advance of the presentation. In regards to future transmission developments, demand forecasts used in determining future transmission needs forecast 20 years into the future and are presented in the AESO's Long-term Outlook and corresponding Need Identification Documents, not the BRP.

AESO Wires, Ancillary Services and Transmission Line Losses Costs Forecasts for 2018

Do stakeholders have any comments on the Wires, Ancillary Services and/or Transmission Line Losses costs forecasts for the upcoming year?

ADC

No comment

AESO Response – Noted.

AltaLink

AltaLink has no comments on the Wires, Ancillary Services and/or Transmission Line Losses costs forecasts for the upcoming year.

AESO Response – Noted.

IPCAA: Comment 1

The AESO seems to have used the AIL forecast for prediction of ancillary services and line losses. Why was the system load not used instead?

AESO Response: Comment 1

While the AIL forecast was presented for information in the presentation material, the AESO used a net-to-grid load and net-to-grid generation forecast to derive the active contingency reserve volumes in line with BAL-002-WECC requirements. The AIL forecast was in fact used to forecast standby activations. The AESO estimated the historic probability of standby activation for a given level of AIL, and then used this relationship to forecast standby activations. AIL was also used in the losses forecast, as the AESO found that losses volumes had a stronger statistical relationship to AIL than system load.

AESO Wires, Ancillary Services and Transmission Line Losses Costs Forecasts for 2018

IPCAA: Comment 2

Slide 19: Can the AESO explain the $2.2M increase in Black Start costs from 2017 to 2018?

AESO Response: Comment 2

In 2018, the AESO is anticipating a new black start supplier for services in Northern Alberta. Based on the AESO's long-term system restoration strategy, black start services are required in each region of the province though supplier availability may be limited in certain regions. The AESO expects contracted services to be in place with a potential supplier in 2018.

UCA: Comment 1

The UCA would like to request more transparency around the need and costs for Contracted Transmission Must-Run Service, Black Start Service, and Reliability Service

Contracted TMR
The UCA is concerned that the contracted TMR costs forecast has increased from $2.8M to $3.3M for the upcoming year. Can the AESO explain the details of the events that would require contracted services in 2018? Please explain why the new contract for TMR services came in $500,000 higher than forecasted in the 2017 BRP. Can the AESO disclose the length of the term of the TMR contract?

AESO Response: Comment 1

In early 2017, the AESO entered into a new contract for transmission must-run services to address specific reliability requirements in Northern Alberta. TMR contracts, including this one, will be in place until transmission reinforcements are in place to address reliability concerns.

UCA: Comment 2

The UCA would like to understand the extent to which the AESO has considered changes in the electricity market in the forecasted TMR costs. In what ways have you considered potential growth of distributed generation and behind the fence generation (i.e. cogeneration) in the area when determining the need for the TMR contract?

AESO Response: Comment 2

The AESO considers the existing system state (operational and transmission constraints, outage management) as well as future system state (load forecasts, transmission plans based on the AESO's Long Term Plans, etc.) when determining the need for TMR services and costs.

AESO Wires, Ancillary Services and Transmission Line Losses Costs Forecasts for 2018

UCA: Comment 3

Black Start

The UCA is concerned that the Black Start costs forecast has increased from $2.1M to $4.3M. We understand that this increase is because there is a new contract planned for 2018 and that the AESO has been seeking this contract for several years. Can the AESO explain what the impact has been on Albertan's to not have this contract in place? Can the AESO explain the specific benefits that Albertan's will receive for this service that we would not be (and have not been) receiving before this contract is in place?

AESO Response: Comment 3

Refer to AESO response to IPPCA comment 2, page 5.

UCA: Comment 4

Reliability Service

The UCA is concerned that the Reliability Service agreement is forecasted to cost $2.9M annually for the duration of the contract regardless of whether these services are needed in that time or not. The UCA would like to understand if there is a reduced need for the Reliability Service agreement now that we are expanding Black Start capabilities in Alberta and this would appear to overlap with the restoration services already being paid for in the Reliability Service agreement. Will the costs associated with the Reliability Service agreement be reduced once the new Black Start contract is in place? How long are we committed to paying for the Reliability Service agreement?

AESO Response: Comment 4

In 2015, the AESO entered into a 15-year Reliability Services Agreement (RSA) with Powerex Corp. for the provision of certain emergency energy services from British Columbia, including grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall. The total cost of the agreement is $42.9 million payable in equal amounts in the three-year period from 2015 to 2017. As the payments are made, they are recognized as long-term prepaids on the statement of financial position and amortized on a straight-line basis over the 15-year term of the agreement. The reliability services agreement with Powerex does not overlap with the AESO expanding its black start capabilities. In fact, these services complement each other to ensure the AESO meets its strategic long-term system restoration objectives. Prior to entering into the RSA, the AESO assessed the long-term needs of the AIES which has not changed since 2015 when the agreement was signed.

AESO Own Costs Budget for 2017-2018
Do stakeholders have any comments on the Preliminary 2017 and 2018 General and Administrative Budget information presented?
ADC No comment **AESO Response – Noted.** **Altalink** AltaLink has no comments on the 2017 and 2018 Preliminary General and Administrative Budget information presented. **AESO Response – Noted.** **IPCAA: Comment 1** Slide 27: Under the Renewable Electricity Program (REP) should there be an item called Implement REP 2 Auction? Is the AESO anticipating facilitating one REP auction per year? **AESO Response: Comment 1** **REP 2 is currently planned to start development in 2017 with implementation starting in 2018. The slide has been updated accordingly to accurately reflect the implementation starting in 2018. The frequency of REP completions are dependent on the related mandates provided by the Government of Alberta.** **IPCAA: Comment 2** Slide 31: IPCAA notes that the 2018 preliminary G&A budget is $99.3M. The AESO should consider including this as part of their tariff for review by the AUC process going forward. At $100M, G&A should be subject to an external review process. **AESO Response: Comment 2** **The stakeholder consultation through BRP was established to find efficiencies to facilitate the regulatory process with respect to the approval of the AESO's Own Costs. The Transmission Regulation establishes several relevant provisions in this regard. The BRP participants, comprising of the AESO and stakeholders, began this process in 2005 to provide stakeholders with greater transparency of the AESO's planning processes and an increased understanding of the operations of the organization. Also, this process facilitates the AESO Board receiving stakeholder comments prior to making a decision in respect of the AESO's budgeted Own Costs, forecasted Ancillary Services costs and forecasted Transmission Line Loss costs. The AESO is committed to providing transparency**

AESO Own Costs Budget for 2017-2018
and allowing for a comprehensive review of its Own Costs through the BRP **IPCAA: Comment 3** Slide 31: Can the AESO provide a breakdown of the increased staff costs from 2016 to 2017 to 2018? How many additional FTEs were/will be hired in what departments? **AESO Response: Comment 3** **The AESO made organizational changes in early 2017 to allow for the successful delivery of two new multi-year initiatives; namely, capacity market and renewable electricity program design, implementation and ongoing administration. As a result of these changes, department-level comparisons are difficult to make between 2016 and 2017/2018. Additional information on the budget details (mainly staff and contract services and consultants) for the key deliverables has been provided in Section 4 of the AESO 2017-2018 Business Plan and Budget Proposal. The AESO has made a conscious effort to align resources to meet our deliverable commitments on the key corporate initiatives.** **UCA** The UCA understands that the AESO plans to provide more details on the specific budget for each key corporate initiative, including direct and indirect cost forecasts. The UCA would like the opportunity to review and comment on this information when it is provided. **AESO Response – Refer to AESO response to IPPCA comment 3, above.**
Do stakeholders have any comments on the 2017 and 2018 Preliminary Capital Budget information presented?
ADC No comment **AESO Response – Noted.** **AltaLink** AltaLink has no comments on the 2017 and 2018 Preliminary Capital Budget information presented. **AESO Response – Noted.**

AESO Own Costs Budget for 2017-2018

IPCAA

Slide 46: Considering the early re-fueling of the coal plants to natural gas, the IT systems associated with upgraded energy and ancillary services will be likely required sooner than proposed by the AESO.

AESO Response

Slide 46 is intended to focus on the introduction and design of the new capacity market, the related systems' impacts and the initiation of a new multi-year major capital project. It is not intended to suggest that there will not be any Climate Leadership Plan (CLP) related system changes in the interim. The AESO has in fact included capital funding in 2017 and 2018 to support pending interim market systems (Market Evolution) and real time systems (EMS) changes such as those suggested by IPCAA (also see AESO's response to UCA comment, below.)

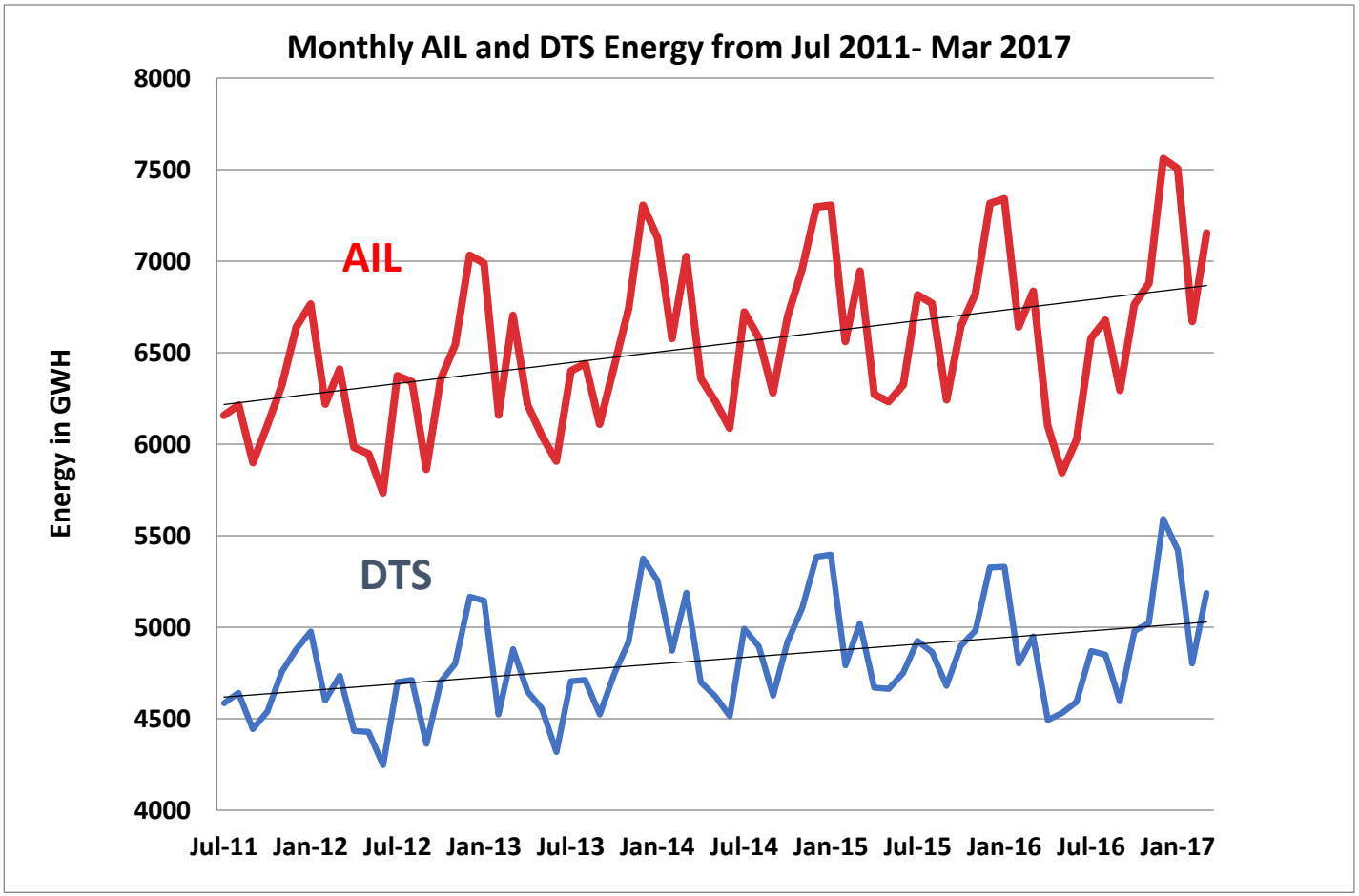
UCA

The UCA would like to understand if the changes that are anticipated in Alberta's electricity market have been considered in the AESO's major capital projects for 2018. Please explain if and how these energy market changes are reflected in the 2017 and 2018 Preliminary Capital Budget information.

AESO Response

The AESO has considered the anticipated changes in Alberta's electricity markets and the impact to its 2017 and 2018 capital requirements. These considerations were presented during the May 1 stakeholder presentation, see slides 38, 45 and 46. To summarize, initiation of the market systems transition major project is dependent on the progress of stakeholder consultation on the capacity market and its related market design and rules development activities. With this in mind, the major (capital) project is not currently expected to begin until 2019. There is a possibility that some of this work may be advanced into the second half of 2018 but this would be communicated to stakeholders in accordance with the established process (i.e. management will review the new funding requirements with stakeholders followed by a request for approval from the AESO Board). In the interim, an amount of funding has been provided for markets systems sustainment (MSR) and new market systems preparatory activities. This includes $3.0 million in 2017 for MSR sustainment work and $1.2 million in 2018 for Market Evolution ($0.5 million relates to capacity market work supporting pre-major project requirements).

Other Comments
Do stakeholders have any other comments to offer at this time?
ADC The ADC understands the AESO has many activities that need to be resourced over the next year for many competing priorities. The ADC has raised that the timely filing of the Rider C application is a priority for our members as well as many other DTS customers. Further delays in filing have a significant financial consequence to the ADC as members are overpaying DTS charges and are then having to wait in excess of a year before having the money returned through the deferral account process. **AESO Response** **The AESO is working to complete and file its Rider C amendments application as soon as possible. The application will include a request for approval to be effective as early as practical in 2017.** **Altalink** AltaLink has no other comments at this time. **AESO Response - Noted.** **IPCAA** No comments other than to thank the AESO for allowing us to participate in this Budget Review Process. **AESO Response** **The AESO appreciates stakeholder participation in the BRP process.** **UCA** The UCA has no other comments at this time. **AESO Response - Noted.**

APPENDIX 1

As provided by Industrial Power Consumers Association of Alberta (IPCAA) regarding their question on Pool Price and Load Forecasts for 2018