Memo

To: AESO Board
From: Vice-President, Finance
Date: November 13, 2018
Subject: ***AESO 2019 Busines Plan and Budget Proposal***

The AESO published to its website the *2019 Business Plan and Budget Proposal* document dated October 31, 2018. The AESO subsequently determined that the total forecast wires costs described in the document is incorrect, as the amounts resulting from payments to Alberta PowerLine L.P. (Alberta PowerLine) for the Fort McMurray West 500-kilovolt (kV) Transmission project were inadvertently excluded.

The AESO has amended its *2019 Business Plan and Budget Proposal* to include total forecast wires costs of $1,834.6 million, by way of revisions to the following Sections:

1. Section 1 - Board Decision Items - Executive Summary (page 2)
2. Section 4 - AESO 2019 Business Plan and Budget Proposal (pages 11-13)

Please let me know should you have any questions or require additional information.

Sincerely,

Todd Fior

Vice-President, Finance

cc: David Erickson, President and Chief Executive Officer
Mike Law, Chief Operating Officer
Nicole Kinch, Director, Accounting & Treasury
Karen Campbell, Director, Settlement, Credit & Business Planning
Interested Stakeholders

2500, 330-5th Avenue SW, Calgary, Alberta T2P 0L4 Phone: 403-539-2450 Fax: 403-539-2949
www.aeso.ca www.poweringalberta.com

Memo

To: AESO Board
From: Vice-President, Finance
Date: October 31, 2018
Subject: **AESO 2019 Busines Plan and Budget Proposal**

Enclosed is the AESO 2019 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 2019 business initiatives;
- The proposed 2019 budgets/forecasts for:
  - wires costs;
  - transmission line losses costs;
  - ancillary services costs;
  - other industry costs;
  - general and administrative and interest costs and amortization; and
  - capital costs.

AESO Management will be requesting at the December AESO Board meeting 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 November 14, 2018.

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, Chief Operating Officer
Nicole Kinch, Director, Accounting & Treasury
Karen Campbell, Director, Settlement, Credit & Business Planning
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AESO 2019
Business Plan and Budget Proposal

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Section 1

Board Decision Items - Executive Summary

Over the last several months, we have reviewed and discussed with stakeholders and the AESO Board, our proposed business initiatives for 2019 which indicate our planned direction and the focus of our operations in the upcoming year. The business initiatives being proposed and our day-to-day operational activities form the foundation from which we have developed our 2019 budgeted costs (general and administrative, interest, amortization, capital and other industry costs). This *AESO 2019 Business Plan and Budget Proposal* (Business Plan) provides an overview of our proposed business initiatives and business activities that will enable us to meet our mandate[1] and advance our strategic plan.

Our budgeted costs are based on the funding we require to achieve our business initiatives and maintain our business operations as outlined in the Business Plan. In addition to this, we are also providing transmission line losses and ancillary services cost forecasts for 2019 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 our budgeted costs.

We have openly engaged stakeholders interested in reviewing our proposed initiatives, budgets and forecasts and in return stakeholders have provided us with their comments as we worked through this process. This consultation process, referred to as the Budget Review Process (BRP), allows us to prepare a business plan and budget that has been reviewed and discussed. As a part of this proposal to the AESO Board, we are providing the stakeholder written comments we have received to date and our responses to those comments. The purpose of providing these comments and responses is for the AESO Board to gain insight into some of the areas that created discussion throughout this process. We continue to believe that this open and transparent process enables us to prepare a thorough and comprehensive Business Plan, and we believe our stakeholders continue to appreciate this inclusive process. The end result is a well communicated and understood Business Plan that will provide us direction in the coming year. The following are the approvals that we will be requesting from the AESO Board.

[1] The Alberta Electric System Operator (AESO) is responsible for the safe, reliable and economic planning and operation of the Alberta interconnected electric system (AIES) and the facilitation of a fair, efficient and openly competitive electricity market.

AESO Board is requested to:

1. Endorse the 2019 business initiatives as outlined in the Business Plan.

2. Approve the following proposed 2019 budget and forecast amounts as outlined in the Business Plan and summarized as follows:

	Budget Category/Year		Page Refer-ence[2]	Revenue Source ($ million)				
				Trans-mission	Energy Market	Renew-ables	Load Settlement	Total
OWN COSTS	General and Administrative	2019	18	65.8	38.0	4.8	1.0	109.7
	Interest	2019	22	2.2	1.2	0.3	0.0	3.6
	Amortization	2019	22	15.6	5.6	0.0	0.1	21.2
	Capital	2019	24					49.4
	Other Industry Costs	2019	16	15.5	8.3	-	-	23.8
TRANSMISSION OPERATING COSTS	Wires	2019	13	1,834.6	-	-	-	1,834.6
	Transmission Line Losses	2019	13	126.2	-	-	-	126.2
	Ancillary Services	2019	13	313.8	-	-	-	313.8
SUMMARY	Own Costs	2019		83.6	44.8	5.1	1.1	134.6
	Transmission Operating Costs	2019		2,274.5	-	-	-	2,274.5

Differences are due to rounding

[2] 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)

August 2, 2018

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

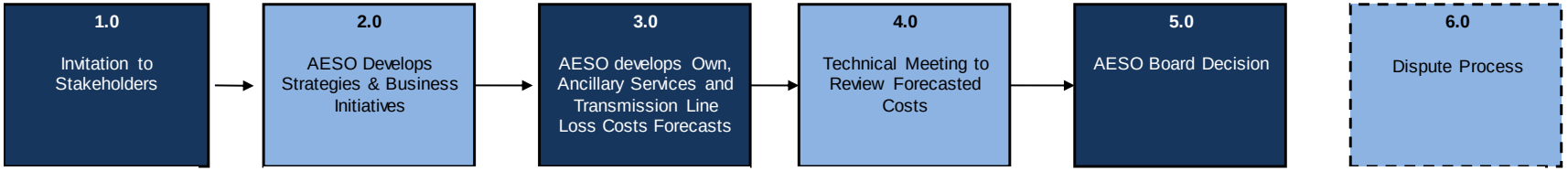
- The process should be open to all stakeholders that are interested.
- The size of the group should not be limited.
- Stakeholders are encouraged to register as participants at the outset of each year's process in order to ensure a consistent understanding and to minimize inefficiencies.
- During stakeholder 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.

Appendix B –

Budget Review Process



- Notice sent to all stakeholders that the process to develop and review forecasted costs will commence
- Process includes developing a schedule with all milestone dates
- AESO posts invitation and supporting documents to AESO website and asks for written comments
- AESO makes revisions as deemed necessary

- AESO to solicit stakeholder input on strategies and business initiatives
- Review progress on existing strategies and business initiatives with stakeholders
- Stakeholders receive AESO strategies and business initiatives for the upcoming budget period
- AESO posts meeting overview document to AESO website and asks for written comments
- AESO makes revisions as deemed necessary

- AESO prepares Own Cost forecast for the upcoming budget period based on the business initiatives and strategic plan set out in Step 2.0
- AESO prepares forecasts of Ancillary Services and Transmission Line Loss Costs
- AESO provides documents to stakeholders in advance of holding a technical review meeting

- AESO holds technical session with stakeholders where the AESO presents forecasted costs, assumptions and responds to stakeholder comments
- AESO posts meeting overview document to AESO website and asks for written comments
- AESO makes revisions as deemed necessary
- AESO prepares an AESO Board Decision Document and provides to stakeholders for review prior to submission to the AESO Board
- AESO submits Board Decision Document to the AESO Board for review and decision

- AESO Board reviews Board Decision Document
- Stakeholders make oral or written presentations to the AESO Board on issues of disagreement or concern (multi-lateral) based on comments submitted in one of the earlier steps
- AESO Board considers stakeholder presentations and reply comments in its approval process
- AESO Board issues a decision for AESO's Own, Ancillary Services and Transmission Line Loss Cost forecasts with rationale

- Dispute resolution mechanism for instances where a stakeholder disagrees with the AESO Board Decision
- The Dispute Resolution process is outlined in the ISO Rules

Appendix C –

Budget Review Process Schedule

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

AUGUST

Mon	Tues	Wed	Thurs	Fri
		1	2	3
			Distribution of Invitation to Stakeholders and Process Materials (Step 1)	Web posting for comments on Invitation and Process Materials (Step 1)
6	7	8	9	10
Holiday				
13	14	15	16	17
			Receive Stakeholder comments on Invitation and Process Materials (Step 1)	
20	21	22	23	24
27	28	29	30	31
	Web posting AESO Replies & Comments on Invitation (Step 1)			

SEPTEMBER

Mon	Tues	Wed	Thurs	Fri
3	4	5	6	7
Holiday				
10	11	12	13	14
				Distribution of materials for Business Strategies / Initiatives mtg. (Step 2)
17	18	19	20	21
	Business Strategies / Initiatives Meeting (Step 2)	Web posting for comments on Business Strategies / Initiatives (Step 2)		
24	25	26	27	28
				Receive Stakeholder comments on Business Strategies / Initiatives (Step 2)

OCTOBER

Mon	Tues	Wed	Thurs	Fri
1	2	3	4	5
				Distribution of materials Tech. Mtg. (Forecasts and Own Costs) (Step 4)
8	9	10	11	12
Holiday		Tech. Mtg. (Forecasts and Own Costs) Calgary (Step 4)	Web posting for comments on Forecasts and Own Costs (Step 4)	Web posting AESO Replies & Comments Business Strategies / Initiatives (Step 2)
15	16	17	18	19
				Receive Stakeholder comments on Forecasts and Own Costs (Step 4)
22	23	24	25	26
29	30	31		
	Web posting of 2019 Draft - Business Plan and Budget (Step 4)	Web posting of responses on Forecasts and Own Costs (Step 4)		

NOVEMBER

Mon	Tues	Wed	Thurs	Fri
			1	2
5	6	7	8	9
		Receive Stakeholder written submissions for AESO Board (Step 5)		
12	13	14	15	16
Holiday		Board Meeting w/ Stakeholders p.m.		
19	20	21	22	23
	Web posting of written submissions for AESO Board (Step 5)			
26	27	28	29	30

Oral Presentation to AESO Board or Board Committee (Step 5) pm

Section 4

AESO 2019 Business Plan and Budget Proposal

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2019 Business Plan

The AESO's *2019 Business Plan and Budget Proposal* provides an overview of the business initiatives and expenditures the AESO proposes for the forthcoming year. It also charts the AESO's organizational approach to the objectives outlined within the *Alberta Electric System Operator 2019–2023 Strategic Plan.*

The strategic plan establishes our objectives for the next five years, and this business plan and budget outlines the specific tasks we will focus on in 2019 to meet those objectives. Some initiatives will be completed in 2019; others will require more than one year to complete. The Business Plan provides transparency as to which initiatives we will focus on in 2019.

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 major initiatives on behalf of the Government of Alberta. Our comprehensive understanding of electricity in Alberta, in-depth expertise, strong leadership and focus will be instrumental to our success.

The AESO will continue to advance Alberta's electricity framework as it executes its mandate, maintaining reliability, driving increased value through all of its processes, and developing its workforce to meet changing needs.

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 first delivery of capacity is expected to occur in 2021.

In 2018, several critical milestones were reached or are expected to be reached by year end, with advancement of the design and implementation of the capacity market. After significant stakeholder consultation, on June 29, 2018 the AESO issued its final Comprehensive Market Design (CMD). The CMD outlines the design elements of the new capacity market. Simultaneously and subsequent to the completion of the CMD, the AESO has focused on the drafting and consulting of the ISO Rules related to the new capacity market. In early 2019, the AESO expects to file the ISO Rules with the Alberta Utilities Commission (AUC) who will consider and if appropriate, approve the rules.

In 2019, the AESO will be clearly focused on the continued implementation of the capacity market with the first auction scheduled to occur in late 2019. For 2019, the AESO will focus on the following key activities related to this initiative:

- Filing of the proposed ISO rules with the AUC to obtain required regulatory approval
- Advancing the initial set of ISO Rules through the preliminary AUC proceeding process
- Preparing for and advancing the ISO Rules through the comprehensive AUC proceeding process
- Development and implementation of required information technology tools
- Positioning the AESO for the first capacity procurement process to occur in late 2019
- Continued consultation regarding the ISO tariff design for allocating capacity procurement costs and bulk and regional transmission system costs and filing the tariff application with the AUC

Also, by the end of 2018, building on the successful completion of the Renewable Energy Program (REP), Round 1, the AESO expects the successful completion of REP Rounds 2 and 3. REP Round 2 has a procurement target of up to 300 MW and includes a minimum 25 per cent Indigenous equity ownership requirement. REP Round 3 has a procurement target of up to 400 MW. For 2019, the AESO

plans the continued implementation and design of required tools and processes in line with the target in-service date for REP Round 1 projects in 2019 and for REP 2 and 3 projects in 2021.

In addition, the AESO remains focused on both electric system reliability and electricity market evolution, and continues to proceed on a number of important initiatives. These include ongoing work on the completion of processes, tools and engineering work prior to the Fort McMurray West transmission project energization, completion of the AESO's System Coordination Centre (SCC) Expansion project, continued focus on Critical Infrastructure Protection (CIP) standards and cyber security requirements, advancement of the AESO's Energy Management System (EMS) sustainment program and development of technology roadmaps for flexibility, storage and distributed energy resources.

The AESO continues to execute on activities that create value for stakeholders and the province as a whole, emphasizing efficiency and effectiveness. In keeping with this, the AESO's proposed 2019 general and administrative budget is $109.7 million which is $1.4 million lower than the 2018 budget of $111.1 million. The 2019 proposed capital budget is $49.4 million, reflecting an increase in the amount required for key projects, EMS sustainment and capacity market tools, and the completion of the AESO's SCC Expansion project in late 2019.

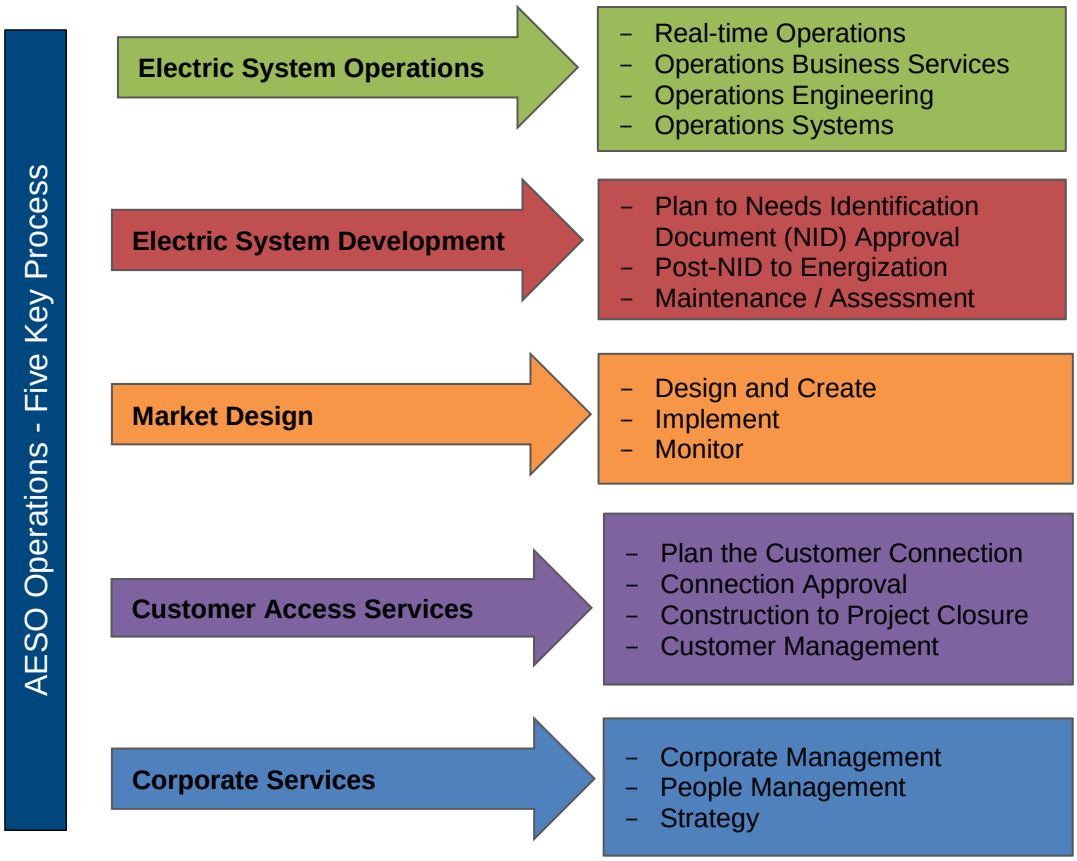
Overall, the business plan continues to focus on moving the electricity framework and the AESO forward, delivering on our public interest mandate and providing ongoing industry leadership.

By performing the work defined within the *2019 Business Plan and Budget Proposal,* the AESO will continue to demonstrate that Albertans can look to it for electricity industry leadership, and that they can be confident the transmission system and electricity framework are managed efficiently and reliably every day.

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 2019 by key process. These business initiatives are multi-year in nature and continue to advance the AESO's strategic objectives.



2019 AESO Business Initiatives

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.

Business Initiatives Related AESO Operation	**Expected Achievement in 2018**	**Plan 2019**
SCC Expansion project	**Implementation** Building exterior structure to be completed in Q4 2018	**Implementation** Construction to be completed and building operational in Q4 2019
EMS Sustainment	**Design** Completion of definition work for EMS Core and project validation work for EMS Application upgrade	**Design, Implementation** Continue design and implementation of EMS Core upgrade to maintain sustainability of the EMS system Initiate design and implementation of EMS application upgrade to advance the application layer of EMS: to support reliability and operation of the evolving, complex market and electric systems
Western Interconnection Reliability Coordinator (RC) Initiative	**Design** With the announcement of the change to the provision of RC services in the Western Interconnection: Coordinate with current RC in the Western Interconnection (Peak Reliability Inc.), and future RCs (California Independent System Operator, BC Hydro, Southwest Power Pool) Developed implementation plan to transition RC services from Peak Reliability to relevant future RCs, and commenced implementation of plan	**Implementation** Complete required work for modelling, data exchange, RC to RC coordination, tool development, training and compliance

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.

Business Initiatives Related AESO Operation	**Expected Achievement in 2018**	**Plan 2019**
Intertie restoration	**Design** Complete design and development of intertie requirements Initiate stakeholder consultation on intertie requirements Complete Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI) project studies in coordination with National Resources Canada (NRCAN)	**Implementation** Initiate needed regulatory approvals to implement the intertie restoration requirements
Advancement of the Fort McMurray West project	**Design, Implementation** The Fort McMurray West project is currently under construction. Alberta Powerline (APL) filed a tariff with the AUC which was approved in January 2018 Integration and management of the Fort McMurray West commercial agreement: Development of programs to commercially manage the Fort McMurray West project post energization Independent Certifier engaged to perform certification work prior to energization	**Implementation** Implementation of required tools and process with the target in-service date for the Fort McMurray West Project in 2019 Ensure energization criteria is met prior to the first monthly payment

Business Initiatives Related AESO Operation	**Expected Achievement in 2018**	**Plan 2019**
Tariff : **General Tariff Application** **Tariff Cost Allocation for Capacity Market**	**Design, Implementation** Implementation of the 2018 ISO tariff update application Filed the 2018 ISO tariff application with the Alberta Utilities Commission (AUC) Initiate comprehensive consultation process to review bulk and regional transmission rate design as well as the design for allocation of capacity market costs	**Design, Implementation** Continue tariff approval process and implementation of the 2018 ISO tariff application Continue comprehensive consultation process to review bulk and regional transmission rate design as well as the design for allocation of capacity market costs

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.

Business Initiatives Related AESO Operation	**Expected Achievement in 2018**	**Plan 2019**
Capacity market technical design	**Design, Implementation** Final Comprehensive Market Design (CMD Final) posted to AESO website Drafting of ISO Rules in progress, to reflect market design contained in CMD Final Finalization of demand curve approach. Development of capacity cost allocation tariff in progress Stakeholder engagement on rules and cost allocation commenced in July 2018	**Design, Implementation** Continue Stakeholder Engagement (i.e. ISO Rules, ISO Tariff, etc.) Capacity market rules filed with the AUC and obtain regulatory approval of ISO rules that reflect capacity market design
IT systems and solutions for market evolution	**Design, Implementation** Initiated development of tools to support capacity delivery (settlement, performance measurement) and energy market changes for first capacity delivery period Reliability model to support development of capacity market demand curve implemented. High level design for capacity market auction tools in development	**Design, Implementation** Continue major program to design and implement systems to support the capacity market, including projects for : • Calculation of Unforced Capacity (UCAP) of market participants • Capacity market auction solution(s) encompassing pre-auction, auction and rebalancing • Settlement and performance • Related energy and ancillary service market changes Required tools, enhancements, and process for market evolution and sustainment of existing systems Develop and deliver market participant education program

Business Initiatives Related AESO Operation	Expected Achievement in 2018	Plan 2019
Capacity procurement process	**Design** Commenced development of processes, tools and guidelines	**Design, Implementation** Continue development of process, guidelines, tools and education Implementation to position AESO to commence opening first capacity procurement process in Q4 2019
Renewable Electricity Program (REP)	**Design, Implementation** Progress towards design and implementation of required tools (settlement, etc.) and processes in line with the target in-service date for REP Round 1 projects of Q4 2019 Implementation of REP Rounds 2 and 3 with associated Renewable Electricity Support Agreements awarded by the end of Q4 2018 (through request for proposal process)	**Design, Implementation** Continue implementation and design of required tools and processes in line with the target in-service date for REP Round 1 projects of Q4 2019 Continue implementation of REP Round 2 and 3 with the target in-service dates in 2021

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.

Customer Service Access	Expected Achievement in 2018	Plan 2019
Advance customer connection projects within the connection queue	**Implementation** 24 customer energizations (including connection, contract and behind-the-fence projects) completed as of September 30, 2018 11 customer connection Abbreviated Need Identification Documents (ANID)s filed with the AUC (1 of which were Market Participant Choice projects) and 2 new Abbreviated Needs Approval Process (ANAP) customer connection projects were approved as of September 30, 2018	**Implementation** Advancement of customer connection projects in accordance with connection queue

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.

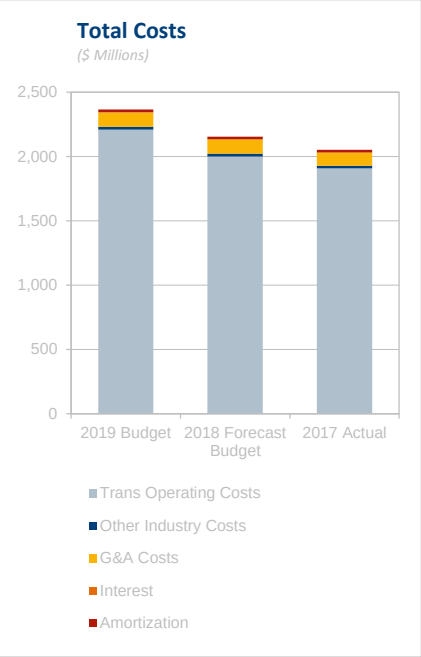
Corporate Services	Expected Achievement in 2018	Plan 2019
Strategic Plan and initiatives	**Design, Implementation** Continued to advance strategic initiatives Completed development of the *2019-2023 Strategic Plan*	**Implementation** Continue to advance the strategic initiatives as per the *2019-2023 Strategic Plan*

Financial Highlights

As part of this *2019 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 August, including 2018 projection; and
  B. 2019 forecast.
- **Section II** - General and Administrative, Interest, Amortization Costs
  A. Year-to-date August 2018; and
  B. 2019 budgets.
- **Section III** – Capital Costs
  A. Year-to-date August 2018; and
  B. 2019 budgets.
- **Section IV** – Revenue



Additional information is included in Appendices B to H.

($ million) ~ by production year

	2019 Forecast/ Budget	2018 Projection[1]	2018 Forecast/ Budget[2]	2017 Actual
Transmission Operating Costs	**2,274.5**	2,112.1	1,999.0	1,907.2
Other Industry Costs	**23.8**	22.4	23.0	21.2
General and Administrative	**109.7**	111.4	111.1	103.0
Interest Costs	**3.6**	1.5	1.5	0.5
Amortization	**21.2**	22.4	19.9	20.4
Capital Expenditures	**49.4**	29.1	34.4	23.7

Differences are due to rounding

[1] Amounts are the current projection for 2018 costs

[2] Amounts are from the 2018 BRP (budgets and forecasts currently AESO Board approved)

SECTION I – TRANSMISSION OPERATING AND OTHER INDUSTRY COSTS

A. Year-to-Date August 2018

The following table provides a summary of actual costs as of August 2018 compared to the 2018 budget/forecast amounts. Additional information on year-to-date costs and a cost projection for 2018 is provided in Appendix B (Year-to-Date August 2018 Financial Results Detail).

Year-to-Date August 2018 Costs ($ million) ~ by production year

	YTD August Actual	YTD August Forecast	YTD August Variance	2018 Projection	2018 Forecast
Wires Costs	1,136.4	1,148.7	(12.3)	1,712.7	1,723.0
Transmission Line Losses	65.7	60.5	5.2	105.2	96.8
Operating Reserves	180.1	97.3	82.8	250.4	146.6
Other Ancillary Service Costs	32.8	22.1	10.7	43.9	32.6
Transmission Operating Costs	1,415.0	1,328.6	86.4	2,112.1	1,999.0
Other Industry Costs	14.6	15.3	(0.8)	22.4	23.0

Differences are due to rounding

B. 2019 Forecast

Transmission Operating Costs

The following table provides a summary of transmission operating costs.

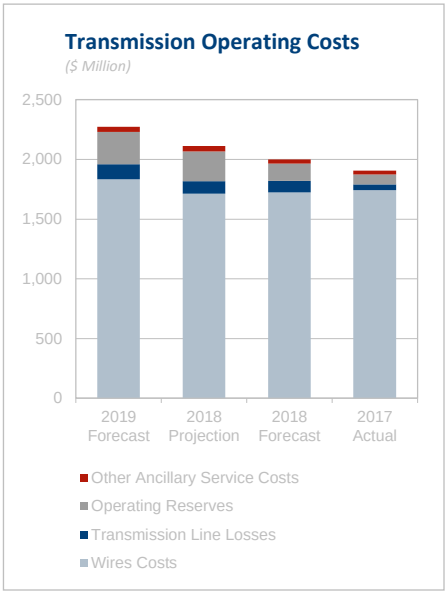
Transmission Operating Costs ($ million) ~ by production year

	2019 Forecast	2018 Projection	2018 Forecast	2017 Actual	2016 Actual
Wires Costs	**1,834.6**	1,712.7	1,723.0	1,741.8	1,724.4
Transmission Line Losses	**126.1**	105.2	96.8	50.4	41.3
Operating Reserves	**270.6**	250.4	146.6	80.7	66.4
Other Ancillary Service Costs	**43.2**	43.9	32.6	34.3	26.8
Transmission Operating Costs	**2,274.5**	2,112.1	1,999.0	1,907.2	1,858.9

Differences are due to rounding

Additional information on the 2019 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 2019 forecast for wires costs is $1,834.6 million, which is $121.9 million or seven per cent higher than the 2018 projection of $1,712.7 million. The 2019 forecast is based on TFO tariffs ($1,830.1 million) and the AESO's forecast for IBOC and LBC SO costs ($4.6 million).

The 2018 projection is based on TFO tariffs approved or applied-for as of August 2018 with a majority of the projection reflecting: i) filed 2018 tariffs; ii) AUC approved 2018 interim tariffs; or iii) AUC approvals for 2018 and 2017 tariffs.

The 2019 forecast is based on TFO tariffs approved or applied-for as of October 2018 with a majority of the forecast reflecting: i) filed 2018 and 2019 tariffs; or ii) AUC approvals for 2017 tariffs and 2018 interim approved tariffs.

Transmission Line Losses

The 2019 forecast for transmission line losses is $126.1 million, which is $20.9 million or 20 per cent higher than the 2018 cost projection of $105.2 million, primarily due to a forecast increase in pool prices. Transmission line losses costs were originally forecast to be $96.8 million for 2018.

The 2019 transmission line losses volume forecast is 2,110 gigawatt hours, which is 98 gigawatt hours or five per cent higher than the 2018 projection of 2,012 gigawatt hours. The volume of losses is expected to increase from 2018 to 2019 due to forecasted load growth.

The average pool price used for the 2019 forecast is $58 per MWh, which is 16 per cent higher than the 2018 projection of $50 per MWh. The 2018 forecast was based on a $43 per MWh average pool price. The higher pool price is due in part to higher expected demand and continued strategic offer behavior in the market by market participants.

Operating Reserves

The 2019 forecast for operating reserves costs is $270.6 million, which is $20.3 million or eight per cent higher than the 2018 cost projection of $250.4 million.

The average pool price used for the 2019 forecast is $58 per MWh, which is 16 per cent higher than the 2018 projection of $50 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 periods of low pool prices, the discounts offered 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. While the prices of operating reserves procured are indexed to the pool price, changes to the average pool price do not result in proportional changes to the operating reserve costs. The discounts used in the 2019 forecast follow the established forecast methodology.

The 2019 operating reserves volume forecast is 7.9 terawatt hours, which is 0.2 terawatt hours or three per cent lower than the 2018 projection of 8.1 terawatt hours associated with a forecast decrease in import volumes compared to 2018.

Operating reserves costs were originally forecast to be $146.6 million for 2018 which was based on a $43 per MWh average pool price for 2018.

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

	2019 Forecast	2018 Projection	2018 Forecast	2017 Actual	2016 Actual
Load Shed Service for Imports	**32.8**	32.8	17.3	22.9	18.2
Contracted Transmission Must-run	**3.2**	3.0	3.3	3.0	-
Conscripted Transmission Must-run	**0.2**	0.2	2.0	0.5	0.7
Reliability Services	**2.9**	2.9	2.9	2.9	2.9
Poplar Hill	**1.7**	2.7	2.8	2.8	2.8
Black Start	**2.3**	2.2	4.3	2.1	2.1
Transmission Constraint Rebalancing	**0.1**	0.1	0.1	0.0	-
Other Ancillary Service Costs	**43.2**	43.9	32.6	34.3	26.8

Differences are due to rounding

The 2019 forecast for other ancillary services costs is $43.2 million, which is $0.7 million or two per cent lower than the 2018 cost projection of $43.9 million.

Load shed service for imports (LSSi) is interruptible load that can be armed to trip, either automatically or manually, on the loss of the Alberta-British Columbia intertie to allow for increased import available transfer capability (ATC). LSSi costs are projected to be $32.8 million, which is $15.5 million or 90 per cent higher than the forecast of $17.3 million. This is due to higher LSSi utilization in 2018 than forecasted due to higher import volumes than were anticipated. The higher import volumes result from higher prices in Alberta compared to Mid-C in 2018. The 2019 forecast is based on the expected operations of the transmission system in 2019 and reflects contract pricing as result of the competitive process recently completed for LSSi services.

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. A generator can be contracted to provide such services in an area or 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). For 2018 year to date, there have been fewer events requiring constricted TMR than was anticipated in the 2018 forecast. The 2019 forecast includes generators under contract and conscripted TMR is anticipated to be consistent with 2018 projected amounts based on similar operating conditions in 2019 with 2018.

The Poplar Hill generator provides voltage support (VArs) in addition to power (MW), to support the transmission system reliability in the Northwest part of the province. For 2019, the operational conditions are expected to be similar to 2018, however the contract terms changed late in 2018 resulting in lower fixed payments under the contract in 2019, resulting in a lower forecasted cost for 2019.

In 2018, the AESO was anticipating a new black start supplier for services. 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 2018 forecast had contemplated additional black start agreements; however no additional agreements have been formalized at this time and are not planned for 2019.

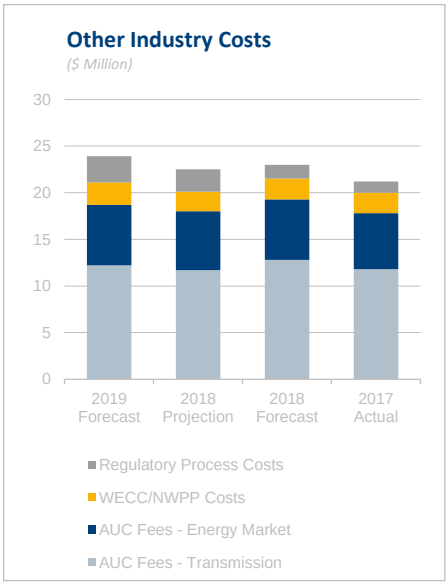
Other Industry Costs

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)

	2019 Forecast	2018 Projection	2018 Forecast	2017 Actual	2016 Actual
AUC Fees – Transmission	**12.2**	11.7	12.8	11.8	12.1
AUC Fees – Energy Market	**6.5**	6.3	6.5	6.0	6.6
WECC/NWPP/NERC Costs[3]	**2.4**	2.1	2.2	2.2	2.4
Regulatory Process Costs	**2.8**	2.4	1.5	1.2	1.4
Other Industry Costs	**23.8**	22.4	23.0	21.2	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/NERC 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.

[3] Western Electricity Coordinating Council/Northwest Power Pool/North American Electric Reliability Corporation

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.

In addition, the AESO is also a member of the NERC and supports their organization for the development of reliability standards for the North American electricity grid.

The 2019 forecast for AESO's fees is $2.4 million, which is consistent with the 2018 forecast and prior year amounts.

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 2019 forecast for regulatory process costs is $2.8 million, which is 0.4 million or 17 per cent higher than the 2018 projection of $2.4 million. The AESO is expected to involved in several significant regulatory proceeding in 2019 including: capacity market – provisional proceeding; capacity market – comprehensive proceeding; capacity market – tariff cost allocation proceeding; 2018 ISO tariff proceeding; and various Need Identification Document (NID) proceedings.

SECTION II – GENERAL & ADMINISTRATIVE, INTEREST AND AMORTIZATION COSTS

A. Year-to-Date August 2018

The following table provides a summary of actual costs as of August 2018 compared to the same period for the 2018 budget. Additional information on year-to-date costs is provided in Appendix B (Year-to-Date August 2018 Financial Results Detail).

Year-to-Date August 2018 Costs ($ million)

	YTD Aug 2018 Actual	YTD Aug 2018 Budget	YTD Variance	2018 Budget[4]
General and Administrative Costs	74.4	74.0	0.2	111.1
Interest	1.2	1.0	0.2	1.5
Amortization of Intangible and Capital Assets	16.5	13.3	3.2	19.9

Differences are due to rounding

B. 2019 Budgets

In the *2019 Business Plan and Budget Proposal (Proposal)*, AESO Management continues to focus on the key business initiatives in 2019 as outlined earlier in this Proposal. The key business initiatives are multi-year in nature and are at various stages of development or implementation. The internal budget discussions focused on the delivery of these key initiatives while continuing to provide the safe, reliable and economic operation of the electric system in Alberta.

For 2019 the AESO Management focused on the required resources internally and externally to deliver the key initiatives while considering various criteria. The criteria that were focused on, but not limited to, included:

- Resources required to deliver on the key business initiatives;
- Consideration of specialized knowledge, skills or cost effective resources;
- Resource constraints due to workflow and timing of initiatives; and
- Risk management requirements.

The Government of Alberta's *Climate Leadership Plan* (CLP) dated November 20th, 2015 is the foundation for a comprehensive set of policy measures to reduce Alberta's greenhouse gas emissions. 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 design and implementation of a new framework supporting a revised energy market and a new capacity market was initiated in 2016. 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

[4] In AESO Board Decision 2018-BRP-001.

(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.

On June 29, 2018 the AESO issued its final Comprehensive Market Design (CMD). The CMD outlines the design elements of the new capacity market. Simultaneously and subsequent to the completion of the CMD, the AESO has focused on the drafting and consulting on the related ISO Rules.

The focus in 2019 for the AESO will be the continued design and implement of the new framework. This major initiative requires significant industry participation and support and will require appropriate continued funding for the AESO to ensure resources are available to successfully deliver on this important initiative. For 2019, this initiative will be focused on the following activities:

- Filing of the proposed ISO rules with the AUC to obtain required regulatory approval
- Development and implementation of required information technology tools
- Position the AESO for the first capacity procurement process to occur in late 2019
- Continued consultation regarding the ISO tariff design for allocating capacity procurement costs and bulk and regional transmission system costs and filing the tariff application with the AUC

In addition, throughout 2019 the AESO will be developing and implementing various process and guidelines along with providing related internal and external education and training programs on these processes and guidelines as it relates to the capacity market.

To effectively manage this initiative, a 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.

In addition, there are several other key deliverables that will be the AESO's focus in 2019:

- Advancement of REP rounds 1,2 and 3 and funding for various other REP initiatives;
- Required process, tool and engineering work for Fort McMurray West energization to occur in 2019;
- Completion of AESO's SCC Expansion project ;
- Continued focus on CIP standards and cyber security requirements; and
- Development of technology roadmaps (flexibility, storage and distributed energy resources) and engineering studies.

In preparing the 2019 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

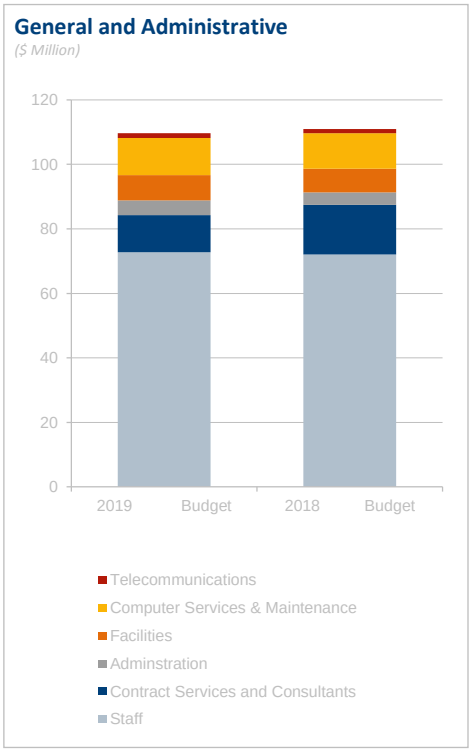
General and Administrative Costs ($ million)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Staff	**72.8**	72.1	67.3	66.4
Contract Services and Consultants	**11.5**	15.3	13.3	9.0
Administration	**4.5**	3.9	3.9	4.3
Facilities	**7.8**	7.4	6.9	7.0
Computer Services and Maintenance	**11.5**	11.0	10.2	9.3
Telecommunications	**1.5**	1.3	1.4	1.5
General and Administrative Costs	**109.7**	111.1	103.0	97.5

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 2017, the funding for the AESO's operations has increased to deliver on key business initiatives (designing of implementation of new market framework, design and implementation of REP program, implementation of CIP Standards and operations of a new EMS). In 2019, the AESO's proposed general and administrative budget is $109.7 million, a decrease of $1.4 million or one per cent lower than the 2018 budget of $111.1 million.

Appendix D of this Proposal (2019 General and Administrative Cost Detail) provides additional narrative on the specific cost areas.



The staff costs are $72.8 million in 2019, an increase of $0.7 million over the prior year. The increase is a result of a proposed staff compensation increase to adjust staff compensation to align with market compensation plus additional staff for capacity market implementation (specifically the initial procurement) and CIP requirements; offset by higher capitalized staff costs as the AESO focuses on development and implementation of various capacity market IT tools in 2019 required to support the UCAP, capacity market auction and settlement processes (see Section III – Capital Expenditures of this Proposal).

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. Contractor and consulting cost are expected to decrease in 2019 as result of reduced

requirements for services related to the capacity market design as the AESO focuses on ISO Rule approval processes and the development and implementation of IT tools related to the capacity market and as currently no future REP rounds are being proposed for 2019, no funds have been budgeted in 2019 for additional REP rounds.

Administrative costs primarily relate to for general business travel, staff training and associated travel, corporate meetings and related meals, including costs related to stakeholder consultation sessions. The higher budgeted costs in 2019 compared to 2018 are primarily associated with: additional internal and external training and costs related to the capacity market implementation; costs associated to the AESO's participation in the RC initiative; internal training related to various new IT applications and tools and CIP requirements; and additional market participant consultation costs related to various other AESO initiatives.

Facilities costs relate to office space rent, based and operating costs, and operating costs relate to the AESO SCC. The increase in 2019 is primarily result of higher expected operating costs due to a sublease entered into in 2018 by the AESO for additional downtown office space and the inclusion of operating costs in the 2019 budget for the completion of the AESO's SCC Expansion project which is expected to be operational in Q4 2019.

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. The increase is a result of continued growth of required licenses, subscriptions and maintenance costs for new applications and as a result of higher vendor costs from inflation adjustments for licenses and contracted costs

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

($ million)

2018 Approved Budget		**$ 111.1**
Staff	0.7	
Contract Services and Consultants	(3.9)	
Administration	0.6	
Facilities	0.4	
Computer Services and Maintenance & Telecommunications	0.8	**(1.4)**
2019 Proposed Budget		**$ 109.7**

Differences are due to rounding

Interest Costs and Amortization

Interest Costs and Amortization ($ million)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Interest	**3.6**	1.5	0.5	0.8
Amortization of Intangible and Capital Assets	**21.2**	19.9	20.4	24.3

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).

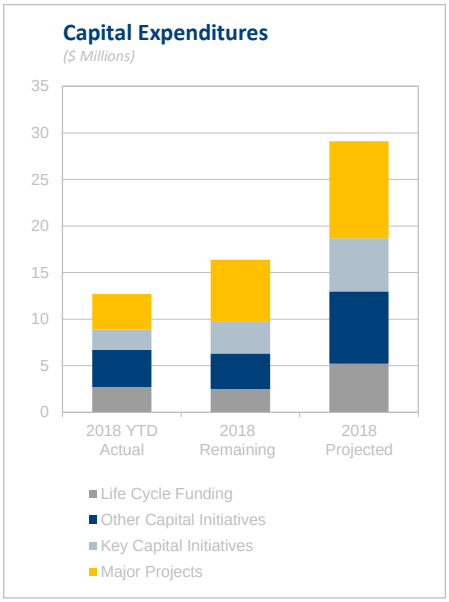
Additional interest costs are budgeted for 2019 (compared to 2018) related to development of a payment plan for recalculated losses factors for the years 2006 thru 2016 as a result of an AUC proceeding (AUC Decision 790-D06-2017). A payment plan is to be made available, to extend the period of time that charges can be recovered from market participants. Market participants must request the deferral of payment and meet certain requirements to quality. An amount of $1.5 million has been included in interest expense for 2019 for the plan. The actual interest expense may vary significantly as a result of settlement results for the years being resettled and once the market participants who qualify are determined. This will determine the amount required to be financed by the AESO. The actual interest costs will be recovered from market participants who participate in the payment plan.

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 higher amortization in 2019 is mainly due to a higher depreciable asset base in 2019 over 2018.

Additional information on the AESO's 2019 capital projects is provided in Appendix E (2019 Capital Projects).

SECTION III – CAPITAL EXPENDITURES

A. Year-to-Date August 2018



The capital spend for the first eight months of 2018 is $12.6 million. In general, the AESO's capital projects, which are predominately multi-year in nature, have continued to progress as planned. The continuation of the SCC Expansion project implementation phase which remains on schedule for completion in Q4 2019.

The following table provides a summary of the current capital project investment for 2018.

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

Capital Expenditures ($ million)

	2018 YTD August Actual	2018 Remaining	2018 Projected[5]
General Capital[6]	8.9	9.8	18.7
Major Projects[7]	3.8	6.6	10.4
Total Capital Spending	12.6	16.5	29.1

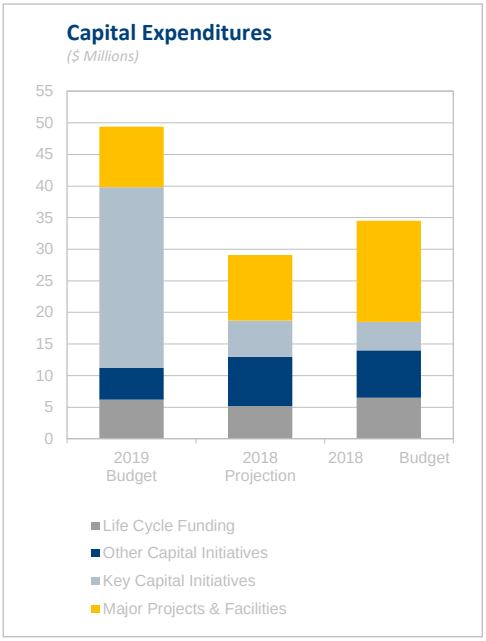
Differences are due to rounding

[5] Projection – Spent to date plus estimate to complete current year

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

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

B. 2019 Budget



A detailed review of the capital requirements for 2019 takes into consideration the progress that has been made on the inflight projects that are multi-year in nature, the new requirements for 2019 and the AESO's capacity to design and implement system solutions. Based on these findings, the capital budget is $49.4 million for 2018.

The variance between the 2018 and 2019 capital budgets is an increase of $15.0 million from $34.4 million to $49.4 million. The increase is mainly attributable to the Key Capital initiatives related to the EMS sustainment and the capacity market implementation.

The variance between the 2018 projection and 2018 budgets is a net decrease of $5.3 million. The related general capital budget has a slight variance with an increase of $0.3 million, to $18.7 million compared to $18.4 million which is mainly attributable to the AESO accelerating some of the capital projects related to the capacity market initiative to meet the initial procurement timeline of Q4 2019. The related major capital budget variance is a decrease of $5.6 million to $10.4 million from $16.0 million. This is attributable to the SCC Expansion project timing, as certain work is to occur in 2019 which was expected to occur in late 2018.The continuation of the SCC Expansion project implementation phase remains on budget and on schedule for completion in Q4 2019.

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 2019 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 2019 capital projects is provided in Appendix E (2019 Capital Projects).

Capital Expenditures ($ million)

	2019 Budget	2018 Budget	2017 Actual
Key Capital Initiatives - Capacity Market	**11.0**	0.5	-
Key Capital Initiatives – EMS[8] Sustainment	**13.0**	-	-
Key Capital Initiatives - Other	**5.0**	4.0	4.4
1. Reliability (non-EMS)	**-**	0.4	-
2. Critical Infrastructure Protection	**1.0**	0.5	0.1
3. Cyber and Physical Security Advancements	**2.0**	2.0	1.3
4. MSR[9] - Sustainment	**-**	-	2.9
5. Market Evolution – Other	**1.5**	0.7	0.1
6. Technology Solutions	**-**	0.5	-
Total Key Capital Initiatives	**28.5**	4.5	4.4
Other Capital Initiatives	**5.0**	7.5	3.6
Life Cycle Funding	**6.2**	6.5	6.1
Sub-total General Capital	**39.8**	18.4	14.0
Major – EMS	**-**	-	6.6
Major – SCC [10]	**9.0**	16.0	1.8
Facilities	**0.6**	-	1.3
Total Capital	**49.4**	34.4	23.7

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 single project, 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.

[8] Energy Management System

[9] Market System Replacement and Reengineering

[10] System Coordination 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 2019 budget and a current trading volume forecast, an energy market trading charge of 42.6¢ per MWh traded is required to recover the AESO's budgeted costs for 2019.

The trading charge for 2019 is higher than 2018 as a result of additional costs being incurred to design and implement the capacity market in 2019 and as a result of a shortfall in collections for 2018. In February 2018 the AESO's budget was amended to accommodate additional costs for capacity market initiatives. The 2018 trading charge was not adjusted for the budget amendment. It was indicated during the BRP that the trading charge would not be amended and any shortfall would be recovered through future trading charge adjustments. The AESO plans to recover the shortfall over the period 2019 thru 2021. In addition, the 2019 trading charge includes the recovery of certain administrative costs related the recalculation of loss factors for years 2006 thru 2016 (in accordance with AUC Decision 790) and the AESO's required calculation of annual loss factors for 2019.

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)

	2019	2018	2017	2016	2015	2014
AESO Costs	**46.8**	30.4	30.2	34.5	35.6	37.2
Energy Market Shortfall / (Surplus)	**4.0**	(7.0)	-	-	4.3	4.0
AESO Component	**50.8**	23.4	30.2	34.5	39.9	41.2
AUC's Portion of Energy Market Administration Fee	**6.5**	6.5	6.0	7.0	7.2	7.2
Total Recoverable Amount	**57.3**	29.9	36.2	41.5	47.1	48.4

Differences are due to rounding

Trading Charge (¢ per MWh)

	2019	2018	2017	2016	2015	2014
AESO Costs	**34.7**	23.7	26.2	26.2	27.0	29.1
Energy Market Shortfall / (Surplus)	**3.0**	(5.5)	-	-	3.2	3.1
AESO Component	**37.7**	18.2	26.2	26.2	30.3	32.3
AUC's Portion of Energy Market Administration Fee	**4.8**	5.1	5.3	5.3	5.5	5.6
Total	**42.6**	23.3	31.5	31.5	35.8	37.9

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*.

Appendix A: Alberta Electric System Operator 2019-2023 Strategic Plan

The AESO develops a new strategic plan every four to five years, which serves as a foundational document for defining and communicating the direction and focus of the organization for the strategic plan timeframe. The *Alberta Electric System Operator 2019–2023 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 provides for the safe, reliable and economic operation of the Alberta electricity system while facilitating a fair, efficient and openly competitive market for electricity.

AESO Vision

As the trusted leader, the AESO is shaping the transformation of Alberta's electricity future to deliver reliability and enhance the quality of life for Albertans.

Strategic Objectives

The AESO pursues the following three key objectives:

People

We will be a more dynamic organization with the expertise and agility to adapt to transformative change.

This is about people and process – ensuring we are positioned to meet future demands.

Framework

We will deliver a stable electricity framework that provides reliability at lowest cost through competition as we bridge from the current transition to the broader industry transformation.

With the implementation of a new market structure, changes in transmission policy and an evolving generation fleet, we are focused on creating a foundation that provides clarity to investors creating investor confidence.

Technology

We will provide optionality for consumers and industry to integrate new technologies and approaches while we maintain the overall reliability of the grid.

Changes in social demands and consumer preferences will drive new and innovative technologies across the entire electricity value chain; we will position the electricity system to accommodate the influx of new technologies.

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.

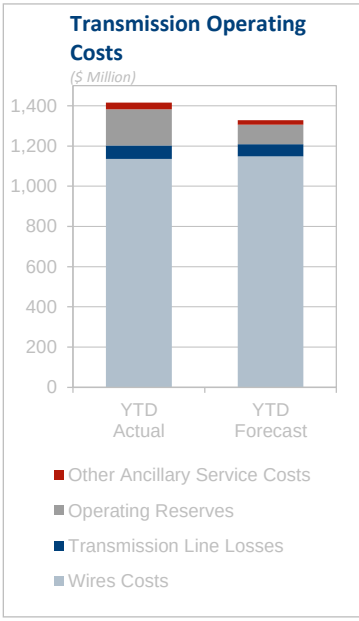
Appendix B: Year-to-Date August 2018 Financial Results Detail

Year-to-Date August 2018 Transmission Operating Costs ($ million)

	YTD Aug Actual	YTD Aug Forecast	YTD Variance	2018 Projection[11]	2018 Forecast
Wires Costs	1,136.4	1,148.7	(12.3)	1,712.7	1,723.0
Transmission Line Losses	65.7	60.5	5.2	105.2	96.8
Operating Reserves	180.1	97.3	82.8	250.4	146.6
Other Ancillary Service Costs	32.8	22.1	10.7	43.9	32.6
Transmission Operating Costs	1,415.0	1,328.6	86.4	2,112.1	1,999.0

Differences are due to rounding

Transmission Operating Costs



The table above provides the transmission operating costs as of August 2018 compared to the forecast.

Transmission operating costs represent wires, transmission line losses and ancillary services costs. As of August 2018, actual costs of $1,415.0 million are $86.4 million or six per cent higher than the forecast costs of $1,328.6 million.

Wires Costs

Wires costs as of August 2018 $1,136.4 million are $12.3 million or one per cent lower than the forecast costs of $1,148.7 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 August 2018 are $65.7 million, which is $5.2 million or nine per cent higher than the forecast of $60.5 million. The cost of transmission line losses is impacted by the pool price and losses volumes. Transmission line losses costs are projected to be $105.2 million for 2018.

The year-to-date August 2018 actual average hourly pool price is $50 per MWh compared to the forecast of $41 per MWh and the annual projected pool price of $50.

Transmission line losses volumes to the end of August are 1,256 gigawatt hours, which is 178 gigawatt hours or 12 per cent lower than the August 2018 forecast volumes of 1,434 gigawatt hours. The lower transmission line losses volumes are due primarily from changes in generation dispatches from higher imports and gas-fired generation in conjunction with lower coal generation.

[11] Transmission Operating and Other Industry Costs are the current projection for 2018 costs

Operating Reserves

Operating reserve costs at the end of August 2018 are $180.1 million, which is $82.8 million or 85 per cent higher than the year-to-date August 2018 forecast of $97.3 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 $250.4 million for 2018.

The cost variance as of August 2018 is mainly attributable higher pool prices, which are $50 per MWh or 22 per cent higher than the year-to-date August 2018 forecast of $41 per MWh and as result of higher volumes resulting from higher load and import volumes. Operating reserves volumes to the end of August 2018 are 5,511 gigawatt hours, which is 580 gigawatt hours higher or 12 per cent higher than the August 2018 forecast volumes of 4,931 gigawatt hours.

In addition, pool price volatility in 2018 has contributed to a large increase in the number of hours of prices exceeding $100/MWh compared to the previous forecast. The 2018 forecast had 88 hours of prices above $100/MWh, and the current projection for 2018 has 359 hours above $100/MWh. While the prices of operating reserves procured through the online exchange are indexed to the pool price, changes to the average pool price do not result in proportional changes to the operating reserve costs; the pool price for each hour has a significant impact on the operating reserve costs for that hour.

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 August 2018 are $32.8 million, which is $10.7 million or 48 per cent higher than the August forecast of $22.1 million.

Other Ancillary Services Costs ($ million)

	YTD Aug Actual	YTD Aug Budget	YTD Aug Variance	2018 Projection	2018 Forecast
Load Shed Service for Imports	25.5	11.9	13.6	32.8	17.3
Contracted Transmission Must-run	2.0	2.2	(0.2)	3.0	3.3
Conscripted Transmission Must-run	0.0	1.3	(1.3)	0.2	2.0
Reliability Services	1.9	1.9	0.0	2.9	2.9
Poplar Hill	1.8	1.9	(0.1)	2.7	2.8
Black Start	1.5	2.8	(1.3)	2.1	4.3
Transmission Constraint Rebalancing	0.0	0.1	(0.1)	0.1	0.1
Other Ancillary Service Costs	32.8	22.1	10.7	43.9	32.6

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 August 31, 2018, LSSi costs are $25.5 million, which is $13.6 million or 11.4 per cent higher than the forecast of $11.9 million. This is due to higher LSSi utilization in 2018 than

forecasted due to higher import volumes than were anticipated resulting from higher prices in Alberta compared to Mid-C.

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. A generator can be contracted to provide such services in an area or 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). For 2018 year to date, there have been fewer events requiring constricted TMR than was anticipated in the 2018 forecast.

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. The 2018 forecast had contemplated additional black start agreements; however no additional agreements have been formalized at this time.

Other Industry Costs

The following table provides other industry costs as of August 2018 compared to the forecast.

Year-to-Date August 2018 Other Industry Costs ($ million)

	YTD Aug Actual	YTD Aug Forecast	YTD Aug Variance	2018 Projection	2018 Budget
AUC Fees – Transmission	7.6	8.5	(0.9)	11.7	12.8
AUC Fees – Energy Market	4.1	4.3	(0.2)	6.3	6.5
WECC/NWPP/NERC Costs	1.4	1.5	(0.1)	2.4	2.2
Regulatory Process Costs	1.4	1.0	0.4	2.1	1.5
Other Industry Costs	14.6	15.3	(0.8)	22.4	23.0

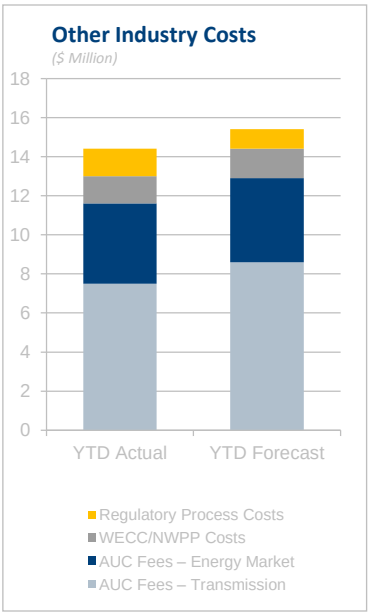
Differences are due to rounding

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 2018 will be $22.4 million, which is $0.6 million or three per cent lower than the 2018 budget of $23.0 million.

AUC fees at the end of August 2018 are $11.7 million, which is $1.2 million or nine per cent lower than the forecast of $12.9 million.

The WECC/NWPP/NERC fees are projected to be in alignment with the 2018 budgeted amount.



The 2018 cost projection for regulatory processes is $2.1 million, which is estimated to be $0.6 million higher than the 2018 budget. The increase is due to regulatory proceedings and related cost orders.

General and Administrative Costs

The following table provides the general and administrative costs as of August 2018 compared to the same period in 2018 budget.

Year-to-Date August 2018 General and Administrative Costs ($ million)

	YTD Aug 2018 Actual	YTD Aug 2018 Budget	YTD Variance	2018 Budget
Staff Costs	48.6	48.1	0.5	72.1
Contract Services and Consultants	9.5	10.2	(0.7)	15.3
Administration	3.0	2.6	0.4	3.9
Facilities	5.1	5.0	0.1	7.4
Computer Services and Maintenance	7.2	7.3	(0.1)	11.0
Telecommunications	1.0	0.8	0.2	1.3
General and Administrative Costs	74.4	74.0	0.4	111.1

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. Staff costs to August 31, 2018 are $48.6 million, which is $0.5 million or one per cent higher than 2018 budget of $48.1 million. Actual staff costs for 2018 are projected to be consistent with the 2018 budget.

Contract Services and Consultants

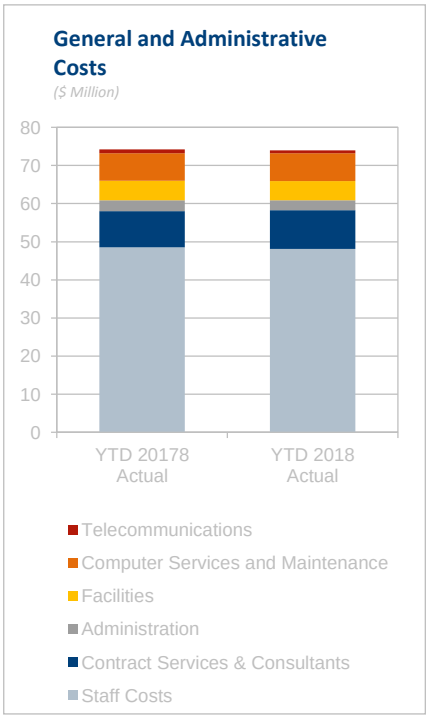
The contract services and consultants costs to August 31, 2018 are $9.5 million, which is $0.7 million or seven per cent lower than 2018 budget of $10.2 million. The amount is below budget due to certain initiatives requiring reduced contract and consulting services than initially anticipated.

Administration

Administration costs include travel and training, AESO Board fees, office costs, insurance and recruiting that present the general operating costs of the organization. Administrative costs to August 31, 2018 are $3.0 million, which is $0.4 million or 14 per cent higher than 2018 budget of $2.6 million. The higher costs are associated with additional costs related to market participant consultation activities related to the capacity market design and associated ISO Rules consultation activities which were not anticipated.

Facilities

Facility costs include rent and operating costs for three AESO locations. Actual facility costs to August 31, 2018 are consistent with the 2018 budgeted 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. Actual computer services and maintenance costs to August 31, 2018 are consistent with the 2018 budgeted costs. It is anticipated that these costs, based on current projections for 2018, will be consistent with the 2018 budget.

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. It is anticipated that actual costs in 2018 will be $1.6 million, which is $0.3 million or 23 per cent higher than 2018 budgeted costs of $1.3 million, due to higher contracted costs for telecommunications.

Interest and Amortization and Depreciation Costs

The following table provides the interest and amortization and depreciation costs as of August 2018 compared to the budget.

Year-to-Date August 2018 Costs ($ million)

	YTD Aug 2018 Actual	YTD Aug 2018 Budget	YTD Variance	2018 Budget
Interest	1.2	1.0	0.2	1.5
Amortization of Intangible and Depreciation of Property, Plant and Equipment	16.5	13.3	3.2	19.9

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 of Intangible Assets and Depreciation of Property, Plant and Equipment

Intangible assets are amortized and PP&E is depreciated over their estimated useful lives. Intangible assets include the AESO's computer software purchases and development costs. Amounts are calculated in accordance with International Financial Reporting Standards.

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 projection of capital expenditure is $29.1 million for 2018. The AESO's 2018 projected general capital budget of $18.7 million (key, other, life cycle) and is expected to be consistent with AESO's approved general capital budget of $18.4 million for 2018.

Additional information is provided in Appendix E (2019 Capital Projects)

Capital Expenditures ($ million)

	2018 YTD Aug Actual	2018 Remaining	2018 Projection
Key Capital Initiatives	2.2	3.5	5.7
Other Capital Initiatives	4.0	3.8	7.8
Life Cycle Funding	2.7	2.5	5.2
Major Project – System Coordination Centre Expansion	3.7	6.6	10.4
Total Capital Spending	12.6	16.5	29.1

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 single projects, 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

2019 Pool Price Forecast Methodology

Consistent with the 2018 BRP, the AESO has chosen to use the EDC Associates' hourly pool price forecast for 2019. 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:

- recent market fundamentals
- the impact of the Carbon Competitiveness Incentive Regulation (CCIR) and
- pricing impacts associated with retirements/mothballs, and Renewable Electricity Program (REP) round one additions.

The 2019 average pool price is forecast to be $58 per MWh compared to the 2018 projected average pool price of $50, an increase of 16 per cent. The higher pool prices anticipated for 2019 are in part due to expected continued strategic offer behavior by market participants 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.

Categories of Operating Reserves

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

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 approximately 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.

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.

Appendix D: 2019 General and Administrative Cost Detail

Human Resources

Human Resources ($ million)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Staff	**72.8**	72.1	67.3	66.4
Consulting	**10.0**	13.1	10.7	6.8
Legal	**1.4**	2.1	2.5	2.1
Audit	**0.1**	0.1	0.1	0.1
Human Resources	**84.3**	87.5	80.6	75.4

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 employee compensation. AESO Management will recommend to the AESO Board's Human Resources Committee (HRC) for separate approval any amount related to salary adjustments to align the AESO's compensation with the current market. An amount of $1.2 million has been reflected in the 2019 budget to adjust employee salary compensation (there was no base salary pay adjustments in 2016, 2017 and 2018 and in 2018 an amount of $1.0 was approved to adjust employee compensation that was considered out of alignment with the market).

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 budget for 2019, 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 2019 which is consistent with the prior year budgeted vacancy rate.

Benefit costs - In addition to their salary, each employee participates in the organization's comprehensive benefit plan. 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 a "benefits load factor" which has been budgeted at 22 per cent 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)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Travel and Training	**1.9**	1.2	1.4	1.8
Insurance	**0.5**	0.6	0.5	0.5
AESO Board Fees	**0.5**	0.5	0.5	0.5
Other Administrative	**1.6**	1.5	1.5	1.5
Administration	**4.5**	3.9	3.9	4.3

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 higher budgeted costs in 2019 compared to 2018 are associated with additional training and costs related primarily to the capacity market implementation costs associated to the AESO's participation in the RC initiative; internal training related to various new IT applications and tools; and additional market participant consultation costs related to various other AESO initiatives.

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)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Rent	**3.9**	3.7	3.7	3.7
Operating Costs	**4.0**	3.7	3.2	3.3
Facilities	**7.8**	7.4	6.9	7.0

Differences are due to rounding

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 SCC 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 SCC.

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. An additional 12,000 square feet of office space was subleased in 2018 by the AESO to accommodate additional staff and contract resources required for AESO business initiatives resulting in the higher rent in 2019. The sublease expires in October 2019.

Operating costs are anticipated to increase as a result of the sublease entered into in 2018 by the AESO for additional office space and the inclusion of operating costs in the 2019 budget as a result of the completion the AESO System Coordination Centre Expansion project which is expected to be operational in Q4 2019.

Computer Services and Maintenance

Computer Services and Maintenance ($ million)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
IT Maintenance and Services	**11.5**	11.0	10.2	9.3

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[12] for IT infrastructure operating support (e.g., network, server and database).

[12] 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.

These costs are anticipated to increase by approximately five per cent in 2019 over 2018 as a result of continued growth of required licenses, subscriptions and maintenance costs for new applications and as a result of higher vendor costs from inflation adjustments for licenses and contracted costs.

Telecommunications

Telecommunications ($ million)

	2019 Budget	2018 Budget	2017 Actual	2016 Actual
Telecommunications	**1.5**	1.3	1.4	1.5

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. The 2019 budgeted costs are consistent with prior year amounts.

Appendix E: 2019 Capital Projects

The following tables provide information on the AESO's current capital plan for 2019. 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		
Capacity Market	**Description**	IT systems and solutions for market evolution. The development and implementation of tools to accommodate an evolving market due to the implementation of a capacity market.
	2018 Progress	Initiated development of tools to support capacity delivery (settlement, performance measurement) and energy market changes for first capacity delivery period Reliability model to support development of capacity market demand curve implemented. High level design for capacity market auction tools in development
	2019 Plan	Continue major program to design and implement systems to support the capacity market, including projects for: Calculation of Unforced Capacity (UCAP) for market participant assets Capacity market auction solution(s) encompassing pre-auction, auction and rebalancing Settlement and Performance of the capacity market in accordance with ISO Rules Related Energy and Ancillary Service market changes as required Required tools, enhancements, and process for market evolution and sustainment of existing systems

Key Capital Initiatives		
Energy Management System (EMS) Sustainment	**Description**	The EMS is used by System Controllers in grid operations to monitor, control and optimize the performance of the power system. Upgrades relating to the sustainment and optimization requirements of the EMS evergreen strategy - includes vendor software upgrades and improved analysis and reporting capabilities
	2018 Progress	Sustainment initiated with completion of definition work for EMS Core and project validation work for EMS Application upgrade
	2019 Plan	EMS sustainment to continue with design and implementation of EMS Core upgrade to maintain sustainability of the EMS system Initiate design and implementation of EMS application upgrade to advance the application layer of EMS: to support reliability and operation of the evolving, complex market and electric systems
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
	2018 Plans and Progress	Institutionalizing the AESO sustainment program for compliance with CIP standards. Applying efficiencies and optimizations to the AESO's CIP process to ensure sustainability
	2019 Plan	Implementing technology and process changes to reduce compliance risk and improve efficiencies
Cyber and Physical Security Advancements	**Description**	Upgrade AESO systems and processes to reduce the risk of cyber security breaches and facilitate AESO compliance to CIP V5 requirements
	2018 Plans and Progress	Continuing advancement of the multi-year Identity and Access Management (IAM) projects Continuing implementation of additional controls to prevent, detect, respond to, and recover from incidents
	2019 Plan	Continuing advancement of the multi-year Identity and Access Management (IAM) projects Continuing implementation of additional controls to prevent, detect, respond to, and recover from incidents
Market Evolution – Other	**Description**	The identification, development and implementation of tools in support of market optimization and/or performance improvements. As well as system changes to support increased amount of renewables. Includes system changes for wind and solar aggregated generating facility forecasting rules, REP settlement and system changes to enable increased flexibility for Operating

Key Capital Initiatives		
		Reserve (OR) procurement.
	2018 Plans and Progress	OR procurement system changes business case is completed. Based on business case review, no system changes were required, at this time. Business case for system changes for Wind and Solar Aggregated Generating Facility Forecasting rules are completed Implementing system changes supporting the Wind and Solar Aggregated Generating Facility Forecasting Rules effective date of new rule requirements
	2019 Plans	Implementing system changes to accommodate REP settlement Integration of storage technology projects into the various systems Implementing system changes to accommodate any market rule changes
Key Initiatives		**2018 Projection $5.7 million** **2019 Budget $28.5 million**

Other Capital Initiatives and Facilities ($ 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
Business Technology Solutions	Implementation of technology solutions to improve operating effectiveness, efficiency and controls – includes planned upgrades to AESO's human resources system, records management, contract management and financial reporting systems.	1.7
Reliability - Other	Upgrades to existing SCC, Back-up Coordination Centre and control room systems and technologies.	2.5
System Enhancement Program	Ongoing high priority minor enhancements to production applications.	0.8
Other Capital Initiatives		**5.0**
Facilities	Life cycle replacement of chillers as well as generator and switchgear control system at the System Coordination Centre (SCC). Also includes office furniture purchase, replacement and other leasehold improvements.	**0.6**

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	2019 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	0.8
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	1.2
Enterprise Services	Upgrades to the AESO critical middleware platforms to provide for a reliable, performant and vendor supported environment	0.9
End User Computing	Upgrade activities that keep the end user computing platform current	1.5
Database Upgrade	Upgrade to the database environment that supports the AESO's critical applications	0.2
Storage Upgrade	Implement selected storage infrastructure upgrades to address existing end-of-life cycle considerations	0.6
Applications Lifecycle	Upgrades to the underlying technologies that support the AESO's corporate and enterprise applications	0.5
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)	0.6
Life Cycle Initiatives		**6.2**

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. Project currently anticipated to be delivered on budget and on time.

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[13]	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

[13] 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		September 18 Business Initiatives	October 10 Budget/ Forecast
Alberta Direct Connects (ADC)	Attendance	√	√
Capital Power Corporation	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 2019.

Key BRP Dates in 2019	Purpose
August 2	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.
September 18	First stakeholder meeting – Stakeholder meeting to discuss the preliminary list of business initiatives proposed for 2019.
October 10	Second stakeholder meeting – A technical review meeting to discuss transmission line losses and ancillary services costs forecasts for 2019 and the preliminary own costs budgets (general and administrative and capital) proposed for 2019.
November 14	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 – 2019 Budget Review Process (2019 BRP), Invitation to Stakeholders and Supporting Material

August 28, 2018

The AESO has asked market participants and interested parties to participate in the AESO's consultation regarding its 2019 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 2019 BRP?
Alberta Direct Connect (ADC) Yes, ADC accepts the invitation to participate **ENMAX Corporation (ENMAX)** At this time, ENMAX requests the opportunity to be made aware of any developments relating to the AESO's 2019 Budget Review Process. Should certain issues arise that appear to be material, ENMAX may choose to actively participate in the consultation. **Industrial Power Consumers Association of Alberta (IPCAA)** Yes. **TransAlta Corporation (TransAlta)** TransAlta Corporation (TransAlta) accepts the AESO's invitation to participate in the 2019 Budget Review Process. **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 Agree **ENMAX** - **IPCAA** Yes – agree. No comments at this time. **TransAlta** We agree with transparency concepts and principles outlined in the terms of reference. We strongly support an open and transparent process for setting the AESO's budgets. **UCA** The UCA agrees with the principles. **AESO Response** Comments noted.

Process Steps
Do stakeholders agree with or have comments on the steps identified in the 2019 BRP?
ADC Agree **ENMAX** - **IPCAA** Yes – agree. No comments at this time. **TransAlta** We generally agree with steps outlined in the AESO 2019 Budget Review Process Overview. **UCA** No additional comments on the steps identified. **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 Looks good, no comments at this time. **ENMAX** - **IPCAA** IPCAA has no immediate concerns with the proposed calendar. The AESO should ensure its upcoming capacity market meetings do not overlap with the BRP meetings. **TransAlta** We have no comments at this time about the proposed BRP stakeholder calendar. **UCA** No concern with calendar. **AESO Response** Comments noted. Confirmed, the AESO does not have any capacity market consultation meetings scheduled at the same time as the proposed 2019 BRP stakeholders meetings. The AESO has internally shared the 2019 BRP stakeholder meeting schedule to ensure conflicts do not arise.

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

ADC

ADC appreciates the opportunity to participate.

ENMAX

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IPCAA

N/A

TransAlta

We request more information about the capacity market development costs. We would like more detail about these costs of the various activities associated with the implementation of the capacity market.

UCA

No additional comments.

ASEO Response

Comments noted.

Stakeholder Comment and AESO Replies Matrix

AESO Consultation 2019 Budget Review Process (BRP)
Meeting September 18, 2018 – AESO's Preliminary List of 2019 Business Initiatives

October 12, 2018

The AESO has asked market participants and interested parties to comment on the Preliminary List of 2019 Business Initiatives presentation given at the Budget Review Process (BRP) stakeholder review meeting on September 18, 2018 . 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 2019 Business Initiatives –September 18, 2018 meeting
Do stakeholders have any comments on the AESO's Business Initiatives proposed for 2019?
Independent Power Consumers Association of Alberta (IPCAA) **Comment 1** Intertie Restoration: Can the AESO confirm the additional capacity that will be made available via this initiative, as well as the timing and whether this volume has been incorporated into the resource adequacy model for the capacity market? Also, is the AESO able to produce a cost-benefit analysis for this project? It is an expensive transmission project – and customers would like to know that the benefits we receive are worth the dollars that are being spent. **AESO Response** **Comment 1** **One of the goals of the 2019 Intertie Restoration initiative is to "complete design and development of intertie requirements". The AESO expects that more information regarding increased transfer capability will be available at that time, along with the benefits and a cost estimate. The AESO has considered intertie capacity allocation in light of this Intertie Restoration business initiative. This related increased transfer capability has not been incorporated into the resource adequacy model for the 2021/2022 and 2022/2023 procurement volume determination.** **IPCAA** **Comment 2** Advancement of the Fort McMurray West Project: IPCAA recommends that the AESO produce a report for consumers summarizing the value of the competitive process for this project. It would be useful to compare these transmission costs to others

from the AESO's database. Consumers would like to understand if the competitive process was a worthwhile venture in this instance, and highlight any lessons learned for potential future use.

AESO Response

Comment 2

Noted. At this time the AESO does not intend on producing such a report.

IPCAA

Comment 3

Capacity Procurement Process: IPCAA would like to be of assistance in the AESO's education efforts. If there is any information we can disseminate via newsletter or if a symposium for load and cogeneration participants would be helpful, please let us know.

AESO Response

Comment 3

Noted. Thank you for your offer.

IPCAA

Comment 4

Tariff: Can the AESO provide additional information on (i) timing for filing of the 2019 Tariff Update; and (ii) timing for filing for the 2017 Deferral Account Reconciliation? Can the AESO commit to a schedule for updating the Transmission Rate Projection (TRP)? IPCAA Members would appreciate an update every six months if that is possible.

AESO Response

Comment 4

(i) The AESO is planning on filing the 2019 ISO tariff update application in October 2018

(ii) The timing for the AESO filing the 2017-2018 deferral account reconciliation application is Q2 2019.

(iii) The AESO has committed to update the Transmission Rate Project (TRP) annually. The latest TRP was posted in March 2018. The TRP workbook is to be included as part of an comprehensive ISO tariff application only. The most recent TRP workbook was filed with the Alberta Utilities Commission on March 23, 2018 in Proceeding 22942, Exhibit X0126.

IPCAA

Comment 5

REP: Can the AESO provide any information on how it will address a REP4 process given election uncertainty?

AESO Response

Comment 5

The AESO has allocated funds in the preliminary 2019 Budget for the continued development of the Renewable Electricity Program (REP), given the Government of Alberta target, set out in Section 2 of the Renewable Electricity Act that at least 30% of the electric energy produced in Alberta will be produced from renewable energy resources by the end of 2030. The development work is not for a specific competition (e.g., REP Round 4). All REP costs will be recovered in line with the provisions of the Renewable Electricity Act.

Utilities Consumer Advocate (UCA)

The UCA is looking forward to receiving capital cost estimates for the list of 2019 proposed business initiatives. This will provide a more comprehensive review of the initiatives as well as their overall impact to consumers.

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AESO Response

Noted. The AESO presented the 2019 Transmission Operating Costs Forecasts (ancillary services and transmission line losses) and Preliminary Own Costs Budget at the stakeholder meeting on Wednesday, October 10, 2018.

Other Comments
Do stakeholders have any other comments to offer at this time?
IPCAA **Comment 1** Customer Connections: Can the AESO provide a breakdown of the 49 customer energizations in 2017? How many were load and how many were generation? **AESO Response** **Comment 1** **The breakdown of customer connections is as follows:** **Generation – 9 (including 3 Supply Transmission Service (STS) adjustments)** **Load or Other – 40 (including 19 Demand Transmission Services (DTS) adjustments)** **Note: Projects may have multiple energizations which are classified based on if the overall project is a generator or load, not based on the specific energizations. Also "Load" may include projects that relate to replacing equipment, or other similar work, that is not actually adding any load or generation.** **IPCAA** **Comment 2** Distribution Cost Oversight: As mentioned at the meeting, IPCAA members are concerned with the increasing distribution costs in Alberta. On average, DFO revenue requirement increased around 7% annually from 2009 to 2017, with average load growth that was less than 1%. This indicates a problem. In fact, the revenue requirement for FortisAlberta, from 2009 to 2017, increased at an annual rate that was 23 times faster than the annual rate of load growth on distribution system. Is the AESO able to provide some better information for customers on why this disconnect is occurring? Can the AESO allocate some resources to examining if there is anything the AESO itself is able to do to help remedy this disconnect, or at least provide more transparent data? **AESO Response** **Comment 2** **It is not part of the AESO's mandate to provide Distribution Cost Oversight. Therefore, it would not be appropriate for the AESO to allocate resources or provide related data. The AESO acknowledges that distribution cost concerns are a concern raised through the Transmission Facilities Cost Monitoring Committee (TFCMC), of which the AESO is a member.**

IPCAA

Comment 3

Overall AESO Budget: As stated through several years of AESO budget review processes, IPCAA submits that given the AESO's G&A costs are now above $100M per year, these should be filed with the AUC as part of the ISO Tariff Application. There should be a limit to the consumer costs that can be approved without regulatory review.

AESO Response

Comment 3

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 and allowing for a comprehensive review of its Own Costs through the BRP. The AESO does not intend to submit these costs for AUC approval.

Utilities Consumer Advocate (UCA)

No additional comments at this time.

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AESO Response

Noted.

Stakeholder Comment and AESO Replies Matrix

AESO Consultation: 2019 Budget Review Process (BRP)

Technical Meeting October 10, 2018 - AESO's 2019 Forecasts (Ancillary Services, Transmission Line Losses) and Preliminary Own Costs Budget

The AESO has asked market participants and interested parties to comment on the Preliminary AESO's 2019 Forecasts and Preliminary Own Costs Budget. The related information was presented on October 10, 2018 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.

Pool Price Forecast and Load Outlook for 2019
Do stakeholders have any comments on the Pool Price forecast and Load outlook for the upcoming year?
Industrial Power Consumers Association of Alberta (IPCAA) The AESO has stated: "2018 AIL is projected to be higher than 2018 BRP due to: the addition of new cryptocurrency mining load and faster than expected ramp-up of oilsands projects." **IPCAA** **Comment 1** Can the AESO provide a breakdown of the new load additions in 2018, with particular attention to the cryptocurrency mining load? **AESO Response** **Comment 1** • **Load associated with the *Fort Hills* oilsands project ramped up at the end of 2017 as did the load associated with the *Northwest upgrader* oilsands project, which combined contributed to roughly 200 MW of growth.** • **Load associated with three different cryptocurrency mines have come on in late 2017 and early 2018, an estimated 105 MW of total load.** • **Other incremental expansions at oilsands facilities, an estimated 50 MW.** • **Economic growth causing general load growth.**

IPCAA

Comment 2

Can the AESO provide additional information regarding how cryptocurrency mining load (CML) is expected to contribute to the 2019 load forecast?

AESO Response

Comment 2

There are no explicit increases in the 2019 load forecast for cryptocurrency. The forecast is based on recent data and includes history in which the CML is present. The impact that these new loads have on the model parameters implicitly contribute to the 2019 load forecast.

IPCAA

Comment 3

Is the CML load increasing the DTS load (the load that is actually paying transmission costs), or is it simply reducing the generation that is available to satisfy Alberta load because it is locating on generation sites?

AESO Response

Comment 3

The AESO is aware of 3 cryptocurrency mining operations in Alberta, none of which have connected on the transmission system nor on a transmission-connected generation site. Two of the sites are connected to the distribution system. One of the three sites has increased their Rate DTS contract level. The other two sites have not requested contract level increases.

IPCAA

Comment 4

What is the projected growth in the DTS forecast rather than the AIL forecast? IPCAA is interested in understanding the growth in load that uses the transmission system, rather than the total electricity generated in the province.

AESO Response

Comment 4

The AESO has not prepared a DTS forecast for the purposes of the 2019 BRP. The AESO did conduct a net-to-grid load forecast for the purposes of AS cost forecasting. Net-to-grid is very similar to the DTS measure. The AESO is expecting 2.8% growth of net-to-grid load for 2018 over 2017, and 0% for 2019 over 2018. 2018 had more net-to-grid load growth than expected; therefore, the growth from 2018 to 2019 is modest. Please also refer to the 2017 Long Term Outlook (LTO) DTS forecast. The BRP forecast is in-line with the DTS forecast in the 2017 LTO for 2019 DTS energy.

Utilities Consumer Advocate (UCA)

The UCA appreciates the opportunity to participate in and comment on the AESO's 2019 Business Plan and Budget Review Process.

UCA

Comment 1

The UCA is interested in obtaining a better understanding of the AESO's proposed load outlook, particularly the expected oil sands production for 2018/2019. Currently, Western Canada Select (WCS) is trading at a $47/bbl discount to West Texas Intermediate (WTI), and that is prior to taking into consideration diluent costs for moving bitumen. Suffice to say, pipeline constraints and transportation bottlenecks are suppressing prices and could continue to do so until the underlying issues are resolved. Please explain how much oil sands growth has been built into the 2018 Projected and 2019 Forecast load outlook on Page 12.

AESO Response

Comment 1

The AESO used the CAPP 2018 oilsands production forecast as an input for the load outlook, which has just over 3 million barrels a day of total oilsands production forecasted for 2019. This is 400,000 barrels per day above 2017 levels, or a compound annual growth rate of 8% . We included this oilsands production outlook by incorporating it as an independent variable in our AIL load forecasting model. This process is described in detail in the following memo: https://www.aeso.ca/assets/Uploads/Capacity-market-load-forecast-model-description-and-process.pdf All assumptions regarding price and transportation, and other information regarding the oilsands outlook can be found here: https://www.capp.ca/publications-and-statistics/publications/320294.

UCA

Comment 2

Does the AESO have a 2021 price forecast available which incorporates capacity market costs? If yes, please provide.

AESO Response

Comment 2

The AESO does not have a 2021 pool price forecast (with or without capacity costs) at this point, as the AESO only provides a pool price forecast for the upcoming year. The 2021 pool price forecast would be included in the 2021 BRP process to occur in 2020. For the 2019 BRP the pool price forecast was obtained from EDC and Associates' as per slide 6 of the AESO stakeholder presentation.

AESO Wires, Ancillary Services and Transmission Line Losses Costs Forecasts for 2019
Do stakeholders have any comments on the Wires, Ancillary Services and/or Transmission Line Losses costs forecasts for the upcoming year?
IPCAA **Comment 1** Can the AESO confirm that AESO own costs related to line losses are charged to generators? **AESO Response** **Comment 1** **AESO costs related to the Alberta Utilities Commission (AUC) Proceeding 790, ISO Transmission Loss Factor Rule and Loss Factor Methodology are recovered through the AESO trading charge, which is levied on generators and consumers. AUC Decision 790-D06-2017 also addressed the recovery of certain interest and administration costs related to the recalculation and settlement of historical loss charges for the years 2006 through 2016. Those costs will be recovered through the energy market trading charge or directly from specific market participants who pay loss charges, in accordance with that decision.** **For 2018 and 2019, the AESO's Own Costs incurred related to determining annual loss factor calculations are to be recovered through the energy market trading charge in alignment with the AUC Decision referenced above regarding Proceeding 790.** **IPCAA** **Comment 2** Can the AESO provide a graph of Wires and Ancillary Services costs for the past 10 years? **AESO Response** **Comment 2** **Please see Appendix 1**

IPCAA

Comment 3

Does the AESO have any information on the line loss savings achieved through the construction of the HVDC lines?

AESO Response

Comment 3

HVDC flows were adjusted more than 250 times in 2017. Approximately 40% of the time the changes were made for loss optimization and approximately 55% the purpose was mitigating reliability and/or congestion. The remaining flow changes were related to outages and other causes. The AESO does not estimate line losses for past years based on status or utilization of transmission facilities.

IPCAA

Comment 4

With the HVDC lines in place, can the AESO provide an estimate of the 2017 economic benefits that can be attributed to the lines?

AESO Response

Comment 4

The expected benefits of reinforcing the bulk transmission system, including the HVDC lines, include improved power system reliability, reduced constraints including constraints that result in congestion, and loss savings. These benefits are being realized and are expected to continue over the life of the facilities.

In the case of the HVDC facilities, our long term transmission plan identifies the benefit of using the HVDC flow control in a south to north direction, which effectively adds transmission capability for generation development in southern and the central east portions of Alberta. The south and central east areas of the province area have the best wind and solar resource potential for renewable generation. The HVDC lines add transmission capability that will help Alberta achieve its renewable energy target with the most efficient solar and wind generation.

IPCAA

Comment 5

Does the AESO plan to conduct a review of the competitiveness of the AS markets in advance of the capacity market implementation? When was the most recent review conducted?

AESO Response

Comment 5

The AESO has no current plans to specifically review the competitiveness of the AS markets prior to implementation of the capacity market. However, as part of its mandate to ensure an efficiently functioning wholesale energy market, the AESO regularly monitors the overall functioning of the energy and ancillary services markets. As part of the work conducted by the Energy and Ancillary Services (EAS) working group during the CMD development process, as well as during the SAM process prior to that, the interaction between the energy and ancillary services markets was reviewed and the potential for the introduction of additional ancillary services products was examined. The conclusion of this work was that no changes to the structure of the ancillary services market or new products were required at this time. Prior to this, the AESO reviewed the functioning of the ancillary services market in 2015.

IPCAA

Comment 6

Can the AESO provide an analysis of the benefit Alberta receives from the BC Reliability Service contract?

AESO Response

Comment 6

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. 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 Alberta Interconnected Electric System (AIES), which has not changed since 2015 when the agreement was signed.

IPCAA

Comment 7

Can the AESO provide dates when the IBOC and LBC SO credits will end?

AESO Response

Comment 7

The Invitation to Bid on Credit (IBOC) contract expires in 2021 and the Location Based Credit Standing Offer (LBC SO) contracts expire in 2022 and 2024.

UCA

Comment 1

The UCA seeks additional information regarding the $2.9MM reliability service payment line item in the 2019 Ancillary Services Cost Summary table on page 17. This appears to be an annual fixed payment amount. Please explain what is provided/received for the payment amount and how much longer the $2.9MM payment is expected to continue. If the reliability service was discontinued would it have an impact on reliability? If yes, please fully explain the impact. Powerex explained at one of the AESO capacity market consultation sessions that the service provided was on a "best effort basis." If we didn't pay the $2.9MM would we not get everything provided in the agreement on a best effort basis?

AESO Response

Comment 1

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. 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.

UCA

Comment 2

Please explain if upgrades to the electricity system negate the need for the reliability service.

AESO Response

Comment 2

Upgrades in the electric system do not negate the need for reliability services. The need for grid restoration balancing support services in the event of an Alberta blackout or the need for emergency energy in the event of supply shortfall would still be required.

AESO Own Costs Budget for 2019
Do stakeholders have any comments on the 2019 Preliminary General and Administrative Budget information presented?

IPCAA

Comment 1

Can the AESO provide specific information on how much is the capacity market design and implementation is expected to cost, including, internal costs, IT/infrastructure and external consultants (since inception)?

AESO Response

Comment 1

The AESO estimated cumulative general and administrative costs (for years 2017, 2018 and 2019) related to capacity market design and implementation activities to be in the range of $30 to $35 million, which includes staff, consulting and IT costs. These are amounts that are directly related to capacity market activities and do not include any allocation for indirect costs (e.g. office space rent, AESO Board costs, accounting, etc.). Indirect costs would generally need to be incurred by the AESO whether the capacity market initiative was undertaken or not. Included in the overall estimate are approximately $9 million of consulting services (excluding IT) and $4 million of IT related costs (staff and consulting costs). The amounts are estimates and can vary significantly from actual results as 2018 and 2019 costs are forecasted and budgeted amounts respectively.

The Capacity Market IT systems work to design and implement systems to support the capacity market, including projects for:

- **Calculation of Unforced Capacity (UCAP) for market participant assets**
- **Capacity market auction solution(s) encompassing pre-auction, auction and rebalancing**
- **Settlement and Performance of the capacity market in accordance with ISO Rules**
- **Related Energy and Ancillary Service market changes as required**

The cumulative estimated capital costs for these systems is $35 to $40 million for 2018 to 2021 (as per slide 42 per the stakeholder presentation from the October 10, 2018 BRP meeting). The projects are currently at various level of business case development, and as a result budgeted and actual costs may vary significantly from this estimated range.

IPCAA

Comment 2

Can the AESO identify the spend-to-date on Brattle consulting for the capacity market?

AESO Response

Comment 2

The AESO is not able to provide information on the specific spend with an individual consultant due to contract confidentiality requirements. Since January 1, 2017 to September 30, 2018 the AESO has spent approximately $4.7 million in consulting services related to capacity market design activities.

IPCAA

Comment 3

Can the AESO provide a graph of AESO General and Administrative Costs for the past 10 years?

AESO Response

Comment 3

Please see Appendix 2.

IPCAA

Comment 4

As stated previously, IPCAA submits that given the AESO's 2019 G&A budget is set at $109.7M, these costs should be filed with the AUC as part of the ISO Tariff Application. There should be a limit to the consumer costs that can be approved without regulatory review.

AESO Response

Comment 4

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 and allowing for a comprehensive review of its Own Costs through the BRP. The AESO does not intend to submit these costs for AUC approval.

IPCAA

Comment 5

Does the AESO plan on conducting a settlement operations audit in 2019? Can the AESO provide the date of the last complete settlement audit that included examination of the controls, processes and procedures? For example, these are the types of audits done in other ISOs:

PJM: http://insidelines.pjm.com/pjm-successfully-passes-ssae-16-audit/

IESO: http://www.ieso.ca/en/sector-participants/ieso-news/2017/09/ieso-receives-clean-audit-for-settlement-operations

AESO Response

Comment 5

The AESO does not plan on performing an audit of settlement operations in 2019 nor has the AESO had such an audit performed historically. These audits use significant resources and are costly to perform. Given the AESO's focus on capacity market implementation activities in 2019, internal settlement resource will be focused on settlement requirements within the capacity market initiative. The AESO does conduct an annual assessment of the design and effectiveness of its internal controls over financial reporting based on an accepted industry framework. The framework adopted by the AESO for this assessment is the Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, AESO Management has concluded that, as of December 31, 2017, the AESO maintained effective internal controls over financial reporting. The AESO will consider having various settlement audits performed when the capacity market processes and settlement tools are implemented, which would be a more effective use of resources than performing a controls audit on existing processes and settlement tools in 2019.

UCA

Comment 1

The UCA seeks more clarity around the reason for the $2.1MM increase in interest charges between the 2018 Projected and the 2019 Preliminary Budget on page 23.

AESO Response

Comment 1

Additional interest costs are budgeted for 2019 (increase compared to 2018 projected interest costs) in anticipation of implementation of a payment plan being developed for recalculated losses factors for the years 2006 thru 2016 as a result of an AUC proceeding (AUC Decision 790-D06-2017). A payment plan is to be made available, to extend the period of time that charges can be recovered from market participants. Market participants must request the deferral of payment and meet certain requirements to qualify. An amount of $1.5 million has been included in interest expense for 2019 for the plan. The actual interest expense may vary significantly as a result of settlement results for the years being resettled and once the market participants who qualify are determined. This will determine the amount required to be financed by the AESO. The actual interest costs will be recovered from market participants who participate in the payment plan.

UCA

Comment 2

The UCA requests additional information on the reason for the $600k increase in Administrative costs between the 2018 BRP and 2019 Budget on page 31. Please provide a breakdown of the increase.

AESO Response

Comment 2

The increase in administration costs is driven primarily by additional capacity market training and stakeholder consultation sessions, required ISO rules, tariff and reliability standard stakeholder consultation sessions and costs for travel, accommodation and meals related to the WECC Reliability Coordinator initiative. Additional training and education cost increases relate to various AESO internal training requirements primarily due to AESO IT tools and applications being developed and implemented in 2019 (See AESO 2019 Capital Budget on slide 35 of the AESO stakeholder presentation) and as a result of an increase in corporate subscriptions costs related to required Critical Infrastructure Protection training.

Significant Variances in Administrative Costs (in thousands)

2018 to 2019 Budget

Training, Conferences and Education	$ 368.7
Travel, Accommodations and Related Costs	198.8
Corporate Subscriptions and Professional Memberships	65.7
Other	(57.8)
Total	**$ 575.4**

UCA

Comment 3

The UCA seeks clarification as to why the inclusion of 11 FTE results in a decrease in the budget by $1.5MM, whereas the addition of 5.4 FTE results in an increase in budget expenses by $1.1MM. This information can be found on page 32.

AESO Response

Comment 3

The variance in cost of capital labor versus increased employee counts is directly correlated to changes in average salary rates by department, which is utilized in the budget calculations. Each department will have a different average salary rate, with only specific departments impacted by staff increases or capital initiatives in each year. In addition, the average salary rates by department will fluctuate from year to year due to movement between departments, promotions and new employees hired at market rates.

UCA

Comment 4

The UCA would appreciate further elaboration on the Contract Services and Consultants costs as illustrated in the table on page 32. In particular, what portion of the $3.9MM was related to the capacity market transition and how many consultants were acquired through these costs.

AESO Response

Comment 4

The AESO uses various specialized service providers and individual consultants to provide capacity market design and implementation consulting services, which the AESO does not have internally. Service providers make up the majority of the consulting costs related to the capacity market consulting and legal services. Of the $3.9 million budget reduction from 2018 to 2019, consulting services related to the capacity market make up $2.4 million of the reduction. In 2019 AESO resources will be primarily focused on capacity market regulatory proceedings and IT tool development to support the implementation of the capacity market. As the majority of capacity market consulting services are provided by service firms, the services provided by firm staff are at various rates for various durations and in certain cases contracts for services may be for fixed price amounts. Any head count of consultants involved in providing these services is not meaningful.

Do stakeholders have any comments on the 2019 Preliminary Capital Budget information presented?

IPCAA

In its presentation material, under "*Key Capital – Capacity Market Implementation IT Systems and Solutions for Market Evolution*," the AESO includes "*2019 Capacity Market IT systems work continued… Related Energy and Ancillary Service market changes as required*."

IPCAA

Comment 1

Can the AESO provide more information on this, including information from the business case for this project?

AESO Response

Comment 1

The AESO has not yet completed a business case for this project. The AESO will update market participants, as required on this initiative.

IPCAA

Comment 2

IPCAA is particularly interested in the change to 15-minute settlement for the Energy and AS markets. How much will this cost and what is the schedule associated with it?

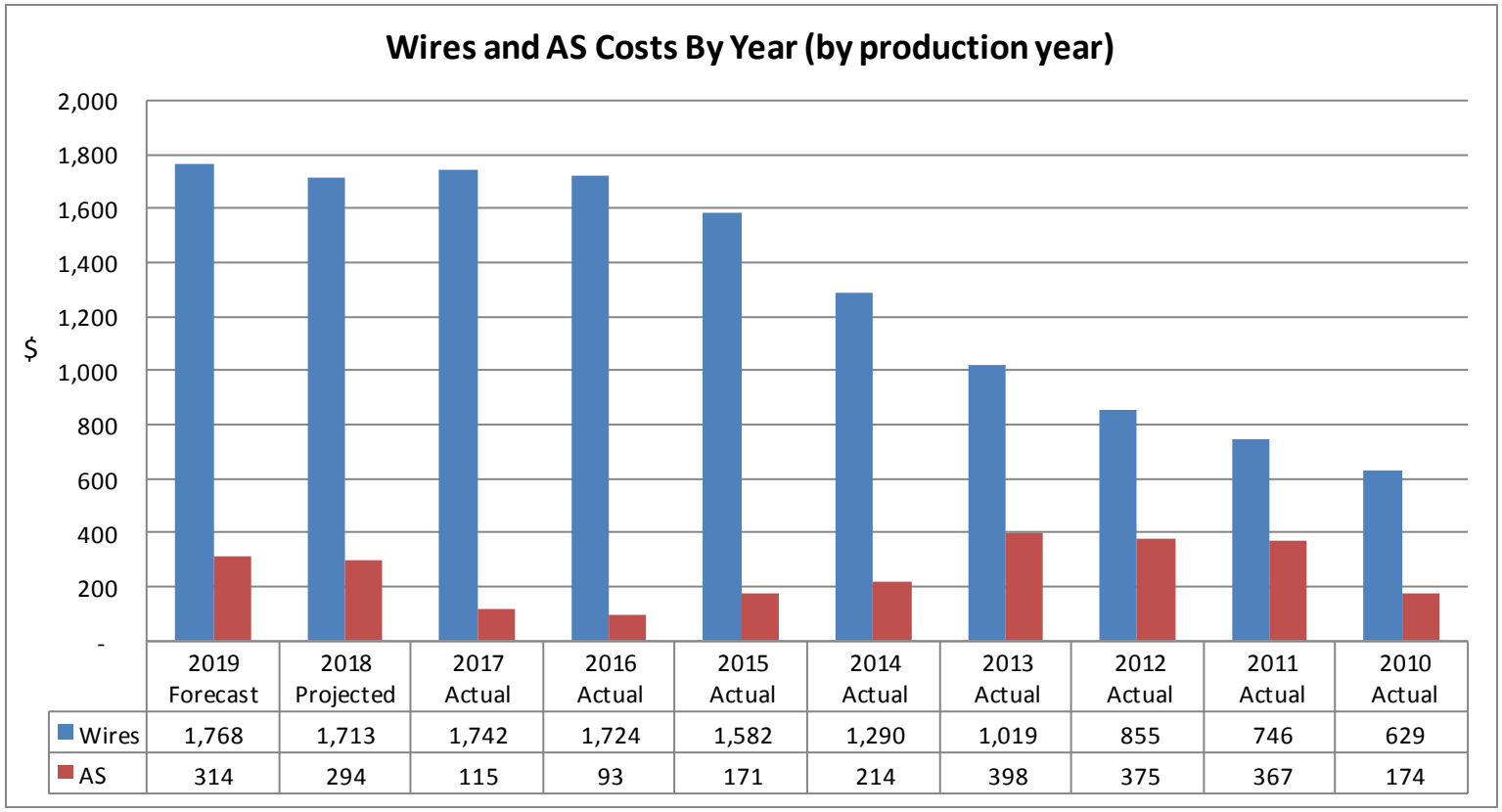
AESO Response

Comment 2

Timing and scope of any changes to settlement frequency have not yet been determined. This topic was identified for further exploration as an item on the roadmap for the evolution of the energy and ancillary services markets in the cover letter for CMD Final and additional discussions on timing and scope are expected to occur in 2019. Development expenditures on this item are expected to be minimal in 2019.

APPENDIX 1

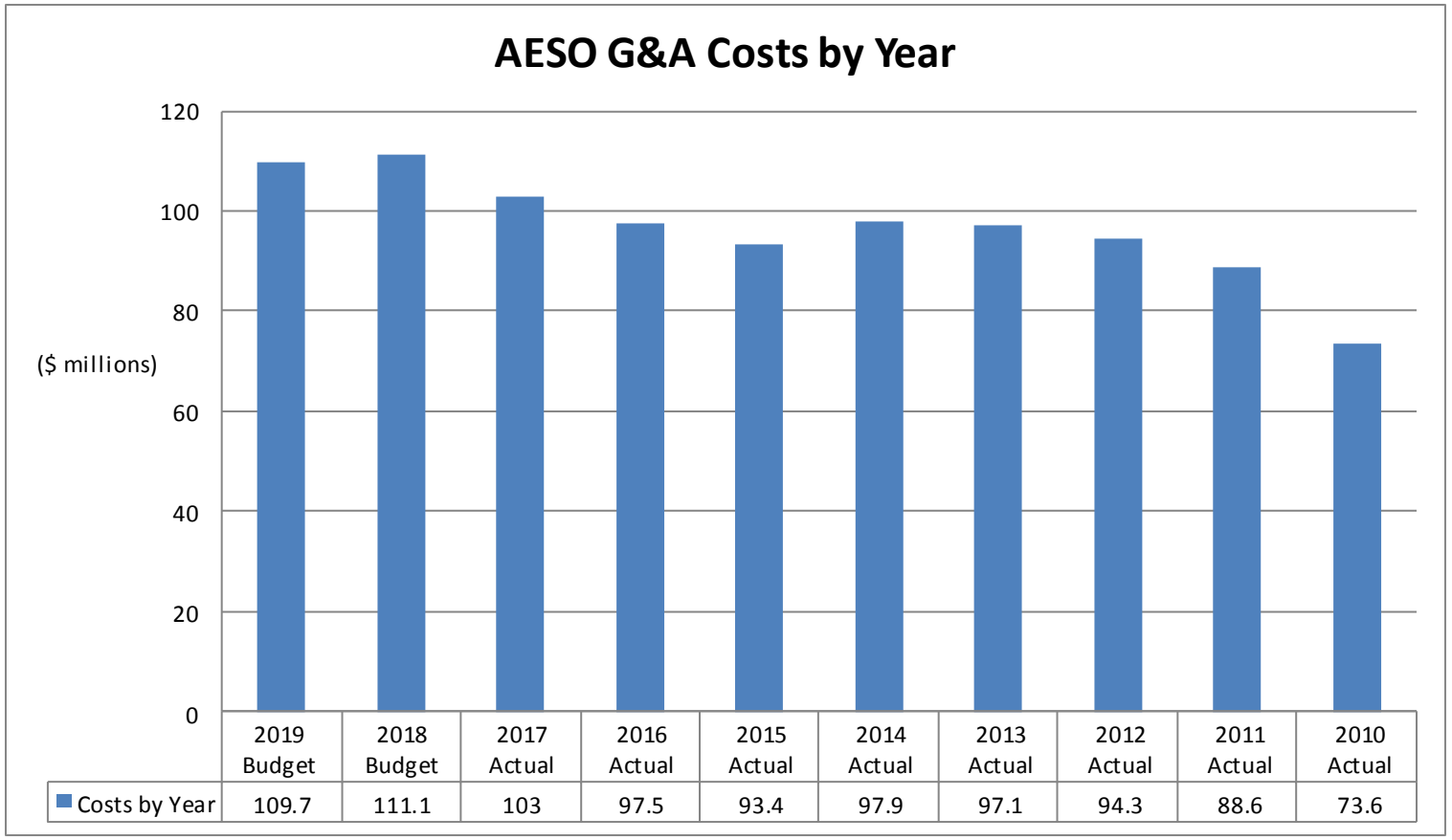
Provided regarding Industrial Power Consumers Association of Alberta (IPCAA) question on historical Wires and AS Costs (IPCAA Comment 2)



	2019 Forecast	2018 Projected	2017 Actual	2016 Actual	2015 Actual	2014 Actual	2013 Actual	2012 Actual	2011 Actual	2010 Actual
Wires	1,768	1,713	1,742	1,724	1,582	1,290	1,019	855	746	629
AS	314	294	115	93	171	214	398	375	367	174

APPENDIX 2

Provided regarding Industrial Power Consumers Association of Alberta (IPCAA) question on historical G&A Costs (IPCAA Comment 3)



	2019 Budget	2018 Budget	2017 Actual	2016 Actual	2015 Actual	2014 Actual	2013 Actual	2012 Actual	2011 Actual	2010 Actual
Costs by Year	109.7	111.1	103	97.5	93.4	97.9	97.1	94.3	88.6	73.6