Memo

To: AESO Board
From: Vice-President, Finance
Date: October 29, 2015
Subject: **AESO 2016 Busines Plan and Budget Proposal**

Enclosed is the AESO 2016 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 2016 business initiatives;
- The proposed 2016 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 20, 2015.

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
Greg Spence, Director, Business Planning
Carol Moline, Director, Accounting and Treasury
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

AESO 2016
Business Plan and Budget Proposal

Table of Contents

Section 1 Board Decision Items – Executive Summary

Section 2 Stakeholder Presentations to the AESO Board

Section 3 Stakeholder Consultation Undertaken

- Terms of Reference for Budget Review Process
- Budget Review Process
- Budget Review Process Schedule

Section 4 AESO 2016 Business Plan and Budget Proposal

- Wires Costs
- Transmission Line Losses Costs
- Ancillary Services Costs
- Other Industry Costs
- General & Administrative and Interest Costs and Amortization
- Capital Costs

Section 5 Stakeholder Comments and AESO Responses

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 2016 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 2016 budgeted costs (general and administrative, interest, amortization, capital and other industry costs). This *AESO 2016 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 wires, transmission line losses and ancillary services cost forecasts for 2016 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, discussed and at times challenged before we reach this point. 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 2016 business initiatives as outlined in the Business Plan.

2. Approve the following proposed 2016 budget and forecast amounts as outlined in the Business Plan and summarized as follows:

Budget/Forecast Category	Revenue Source ($ million)			
	Trans-mission	Energy Market	Load Settlement	2016 Budget
General and Administrative[1]	67.4	25.3	1.3	94.0
Interest[2]	(0.2)	0.6	0.0	0.4
Amortization[2]	15.7	8.4	0.2	24.4
Other Industry[3]	15.5	7.3	-	22.8
Wires[4]	1,684.8	-	-	1,684.8
Transmission Line Losses[5]	111.9	-	-	111.9
Ancillary Services[5]	182.6	-	-	182.6
Total Operating Costs	2,077.8	41.5	1.5	2,120.8
Capital[6]				38.0
Total Budget	2,077.8	41.5	1.5	2,158.8

Differences are due to rounding

Details provided on the following Pages in the Proposal (Section II: [1]Page 23, [2]Page 25, [3]Page 21, [4]Page 18, [5]Page 19, [6]Page 26).

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 our 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 we have 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, we make a recommendation with respect to our 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.

We have posted 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). These documents have been included as Appendices A to C to this Section. At a high level, the BRP steps followed are:

- Notice to stakeholders
- AESO Develop 2016 Business Initiatives
- AESO Develops Own Costs Budgets and Ancillary Services and Transmission Line Losses Cost Forecasts
- Review 2016 Business Initiatives with stakeholders
- Technical Meeting(s) to Review the Own Cost Budget, Ancillary Services and Transmission Line Losses Costs Forecasts for 2016
- AESO Board Decision

As with prior years' BRP, the process has been open to all stakeholders and the process had been transparent as all presentation materials, stakeholder comments (if any) and our responses have been posted on the AESO's website. Through this process, we have ensured that 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

August 21, 2015

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

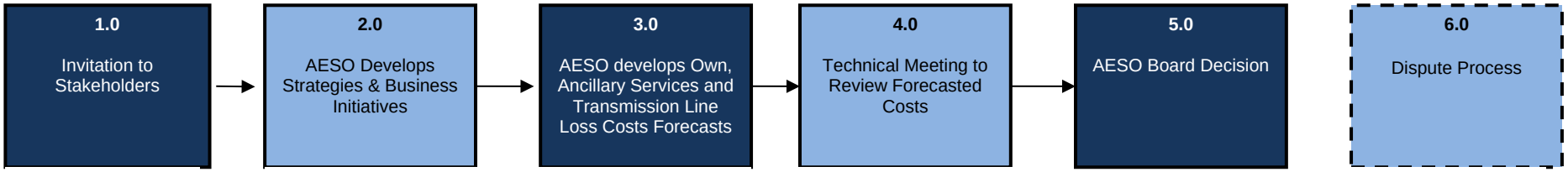
- The process should be open to all stakeholders that are interested.
- The size of the group should not be limited.
- Stakeholders are encouraged to register as participants at the outset of each year's process in order to ensure a consistent understanding and to minimize inefficiencies.
- Comments will be collected in written form only, and will be responded to by the AESO and shared with all stakeholders (i.e., posted to AESO's website). As well, stakeholders will have the opportunity to comment on others' comments.
- 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 or rationale.
- Throughout the process, the AESO will endeavor to provide as much information as 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 BRP cycle, the AESO and stakeholders will evaluate the effectiveness of the process and make appropriate changes if required for the following year.

In Addition:

- Everyone is able to present their views.
- Everyone must work within the timeline agreed upon at the start of the process.
- This process is not a negotiated settlement.
- The material to be delivered to the AESO Board in order to prepare a decision does not have to be agreed upon unanimously.
- Information will be provided to all stakeholders in a timely manner.
- Stakeholders will have a reasonable time period to review and respond to AESO material.
- Nothing will preclude the opportunity for stakeholders to ultimately appeal any decision using the dispute mechanism outlined in the Independent System Operator (ISO) Rules.

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 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 year

- AESO prepares Own Cost forecast for the upcoming year 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(s) 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 step 4.0
- 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

Meeting Material Distributed
Stakeholder Mtgs
Stakeholder Comments Requested
Stakeholder Comments Received
AESO Posts Meeting Summary
AESO Board Meeting

JULY

Mon	Tues	Wed	Thurs	Fri
		1 Holiday	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	31

AUGUST

Mon	Tues	Wed	Thurs	Fri
3 Holiday	4	5	6	7
10	11	12	13	14
17	18	19	20	21 Distribution of Invitation to Stakeholders and Process Materials (Step 1)
24 Web posting for comments on Invitation and Process Materials (Step 1)	25	26	27	28

SEPTEMBER

Mon	Tues	Wed	Thurs	Fri
	1	2	3	4
7 Holiday	8 Receive Stakeholder comments on Invitation and Process Materials (Step 1)	9	10 Distribution of materials for Business Strategies / Initiatives mtg. (Step 2)	11
14	15 Web posting of comments on Invitation and Process Materials (Step 1)	16	17	18
21 Business Strategies / Initiatives Meeting (Step 2)	22 Web posting for comments on Business Strategies / Initiatives (Step 2)	23	24	25
28 Receive Stakeholder comments on Business Strategies / Initiatives (Step 2)	29 Distribution of materials for Tech Mtg (Forecasts and Own Costs) (Step 4)	30		

Budget Review Process Schedule (continued)

- Meeting Material Distributed
- Stakeholder Mtgs
- Stakeholder Comments Requested
- Stakeholder Comments Received
- AESO Posts Meeting Summary
- AESO Board Meeting

OCTOBER

Mon	Tues	Wed	Thurs	Fri
			1	2
5	6	7	8	9
Tech. Mtg. (Forecasts and Own Costs) Calgary (Step 4)	Web posting of comments on Business Strategies / Initiatives (Step 2)	Tech. Mtg. (Forecasts and Own Costs) Edmonton (Step 4)	Web posting for comments on Forecasts and Own Costs (Step 4)	
12	13	14	15	16
Holiday				Receive Stakeholder comments on Forecasts and Own Costs (Step 4)
19	20	21	22	23
26	27	28	29	30
	Web posting of comments on Forecasts and Own Costs (Step 4)	Web posting of 2016 Draft – Business Plan and Budget (Step 4)		

NOVEMBER

Mon	Tues	Wed	Thurs	Fri
2	3	4	5	6
9	10	11	12	13
Receive Stakeholder written submissions for AESO Board (Step 5)	Web posting of written submissions for AESO Board (Step 5)	Holiday		
16	17	18	19	20
				Budget Process Mtg w/Stakeholders
23	24	25	26	Oral Presentation to AESO Board or Board Committee (Step 5.2)
30				

DECEMBER

Mon	Tues	Wed	Thurs	Fri
	1	2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	25
				Holiday
28	29	30	31	
Holiday				

Section 4

AESO 2016 Business Plan and Budget Proposal

Table of Contents

Executive Summary **2**
2016 Business Plan **3**
AESO Operations **4**
Electric System Operations 5
2015 Achievements *6*
2016 Plans *6*
Electric System Development 7
2015 Achievements *8*
2016 Plans *8*
Customer Access Services 9
2015 Achievements *10*
2016 Plans *10*
Market Development 11
2015 Achievements *12*
2016 Plans *12*
Corporate Services 13
2015 Achievements *14*
2016 Plans *14*
Financial Highlights **15**
Section I – 2015 15
Section II – 2016 17
Appendix A: 2014-2018 Strategic Plan **31**
Appendix B: Year-to-Date August 2015 Financial Results Detail **32**
Appendix C: Transmission Operating Cost Definitions **39**
Appendix D: 2016 General and Administrative Cost Detail **42**
Appendix E: 2016 Capital Projects **46**
Appendix F: Major Projects **51**
Market Systems Replacement and Reengineering (MSR) Project 51
Energy Management System (EMS) Implementation 54
System Coordination Centre (SCC) Expansion Project 57
Appendix G: Allocation of Costs **59**

Executive Summary

The AESO's *2016 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 its *2014–2018 Strategic Plan.*

This business plan marks the second year of implementation of the strategic plan. 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. As the province moves through a period of uncertainty from the impact of lower oil prices and clarification of government policy direction, the strategic plan has served the AESO well; enabling it to make key decisions and respond to a changing environment.

The AESO continually reviews its initiatives to ensure that its ongoing work satisfies the right need at the right time. With the delivery of certain projects requiring a multi-year timeframe, the AESO has assessed many of its projects relative to the current uncertainty and in some cases, deferring projects or scaling them back where it has been considered prudent. One example is the Market Systems Replacement and Reengineering (MSR) project. For 2016, the AESO's MSR work will focus on maintaining the sustainability and reliability of the current market systems and will not include longer-term solutions.

At all times, the AESO remains focused on both electric system reliability and electricity market evolution, and continues to proceed on a number of important foundational projects. These include ongoing work on the Energy Management System, implementation of Critical Infrastructure Protection (CIP) Standards and advancement of the MSR project.

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 2016 general and administrative budget is $94 million which is unchanged from the 2015 budget despite the addition of major initiatives such as CIP. The 2016 proposed capital budget is $38 million, reflecting an increase in the amount required for major projects already in progress.

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 in the *2016 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 wholesale electricity market are managed efficiently and reliably every day.

2016 Business Plan

The AESO 2016 Business Plan and Budget Proposal has been created in direct support of the *2014-2018 Strategic Plan* which establishes the strategies charting the AESO's intended direction over a five-year period. The three strategic objectives from the AESO's strategic plan are provided in Appendix A (2014-2018 Strategic Plan).

The *AESO 2016 Business Plan and Budget Proposal* is a comprehensive plan outlining how the AESO will approach the objectives laid out within the *2014–2018 Strategic Plan* for the upcoming year through the execution of the proposed 2016 business initiatives and associated budgets.

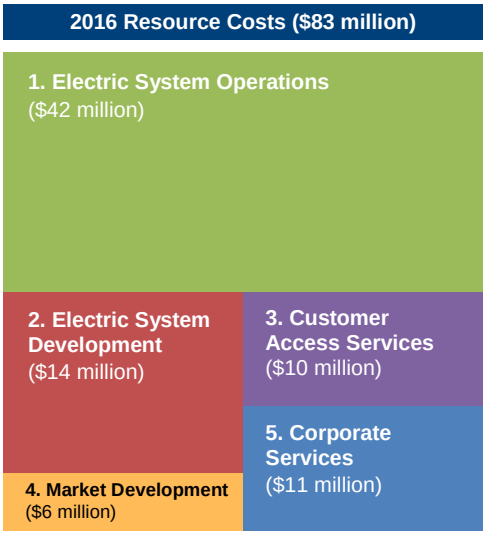
Delivery of some objectives may require a timeframe beyond the span of a single year. It is often necessary to address such objectives as a series of initiatives to be completed in succession. The 2016 Business Plan and Budget serves as a vital tool in this regard detailing the initiatives that will be the focus for 2016. This will position the organization to ultimately complete the broader objectives laid out within the *2014–2018 Strategic Plan*.

The AESO's annual business plan and budget is presented to industry through the Budget Review Process for valued feedback. The initiatives presented within this document reflect that consultation.

AESO Operations

Providing reliable electricity for Albertans requires constant planning and ongoing vigilance in the day-to-day operation of the electrical system. The AESO's operations have been purposefully designed to ensure this level of reliability continues. Day-to-day activities include operation of Alberta's fair, efficient and openly competitive energy-only electricity market; determining the order of dispatch of electric energy and ancillary services; providing system access service on the transmission system; directing the safe, reliable and economic operation of the interconnected electric system, planning the capability of the transmission system to meet future needs; and administering load settlement.

The AESO's operations are described using five key processes: Electric System Operations, Electric System Development, Customer Access Services, Market Development, and Corporate Services. With a focus on the activities and outcomes, the AESO associates business initiatives and operating costs with these key processes. This analysis allows for a more detailed understanding of the AESO operations and organizational awareness to ensure the operations are as efficient and focused as they should be.



Of the $94 million general and administrative budget for 2016, this analysis incorporates $83 million or 87 per cent of the general and administrative costs[1].

Over the last three years in considering the AESO's operations in this manner, the results have consistently shown that the AESO's primary focus is to ensure Albertans have reliable access to electricity with close to half of the AESO's resources dedicated specifically to these efforts. While annual changes may have subtle impacts, the impact from material changes in the AESO's operations will be more evident over time for changes to the operational emphasis and possible reallocation of resources to best serve Albertans.

[1] The administrative and facility costs were not associated with a key process ($11 million in the 2016 budget).

Electric System Operations

Optimal management of electric system operations continues to be 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.

By the end of 2015, the AIES is scheduled to have its first high-voltage direct current (HVDC) transmission line in operation after considerable planning and development activities by the AESO and the transmission facility owner (TFO). The integration of this technology has involved engineering studies and operating procedure development to ensure the reliability of the AIES is uncompromised and the potential benefits are realized. Other notable achievements in 2015 are the completion of the next phase of the Energy Management System (EMS) upgrade project; continued advancement of the Critical Infrastructure Protection (CIP) Program; and approval of Reliability Coordinator(RC)-related Alberta Reliability Standards (ARS), including a North American Electric Reliability Corporation (NERC) review of AESO compliance to be completed by year end.

The AESO conducts Electric System Operations through four primary activity groups: Real-time Operations, Operations Business Services, Operations Engineering, and Operations Systems.

Electric System Operations Costs

$42 million to deliver

51% of total AESO resource dollars

Real-time Operations for the AIES and the electricity market to ensure reliable operations 24 hours a day facilitated by critical information technology infrastructure and resources to support these systems. This established infrastructure is dependent on the licences, maintenance agreements, managed service program, and telecommunications to enable the operations.

Operations Business Services includes the resources dedicated to developing and implementing the Alberta Reliability Standards (ARS) and monitoring both the AESO and external market participants to ensure the operations are in compliance with these standards. Other areas of focus include maintaining System Controller procedures and training, managing and facilitating energy market settlement and credit, as well as procuring ancillary services. The energy market settlement process is supported by the information technology infrastructure to ensure accurate and reliable operations.

Operations Engineering is required for the development of operational plans and engineering studies to support transmission system planning, real-time operations, project delivery and market services. Resources are also focused on the coordination of all transmission system outages and the power system restoration plan to ensure ongoing system reliability.

Operations Systems focuses on the Energy Management System (EMS) application to provide real-time support and modifications resulting from changes to the AIES, as well as the project management required for operations system changes.

Achievements and Plans

In addition to the ongoing Electric System Operations activities, the following table outlines the notable achievements completed or expected to be completed in 2015 and planned initiatives for 2016 categorized by activity group.

Real-time Operations	Operations Business Services	Operations Engineering	Operations Systems
2015 Achievements			
Operational assessment by NERC of the AESO's compliance with RC-related standards to be completed by year end Integration of High-Voltage Direct Current (HVDC) lines into Alberta Interconnected Electrical System (AIES) operations planned to be completed by year end	Developed, filed and received AUC approval for Reliability Coordinator (RC) related Alberta Reliability Standards (ARS) Continued to advance Security / Critical Infrastructure Protection (CIP) program CIP Standards were approved by the AUC with an effective date of October 1, 2017 and October 1, 2018	HVDC operations: – Prepared operations engineering studies and implemented recommendations – Revised operating procedures Review and revision of technical standards for interties, ancillary services and generators is expected by year end	Completed the Definition Phase of the Energy Management System (EMS) Upgrade Project; Initiated related build activities (Implementation Phase)
2016 Plans			
Complete implementation of Wide Area Network/ Supervisory Control and Data Acquisition (SCADA) replacement project	Advance CIP Standards implementation Initiate System Coordination Centre Expansion design activities (Definition Phase)	General operations focused	Continue to advance system build activities (Implementation Phase) for the EMS Upgrade Project

Electric System Development

One of the AESO's core business activities is to plan a reliable and unconstrained transmission system that can keep pace with the growing demand for electricity 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.

By the end of the year, the AESO's updated transmission system plan, the *2015 Long-term Transmission Plan* (LTP), is scheduled to be published. The LTP serves as the blueprint for the development of Alberta's electric transmission grid to support continued provincial economic growth over the next 20 years. The AESO publishes an updated LTP every two years. The process of updating the LTP takes 18 to 24 months and involves comprehensive engineering assessments to identify transmission constraints or limitations and recommend when and where the transmission system needs to be expanded or reinforced, specifically identifying required transmission projects. The 2015 LTP is based on the demand and generation forecasts in the *2014 Long-term Outlook*, which was released mid-2014.

Electric System Development is comprised of three primary activity groups: Plan to Need Identification Document (NID) Approval, Post-NID Approval to Energization, and Maintenance.

Electric System Development Costs

$14 million to deliver

17% of total AESO resource dollars

Plan to NID Approval encompasses the activities that support transmission system planning, including the development of demand and generation forecasts, the development and maintenance of the long-term transmission plans, and the development and support of Need Identification Documents (NIDs) that are submitted by the AESO to the Alberta Utilities Commission (AUC) for regulatory approval of specific transmission system projects. These activities occur prior to receiving NID approval and include engineering studies, stakeholder consultation and regulatory processes for transmission system projects.

Post-NID Approval to Energization involves the work completed after a NID is approved by the AUC and includes all of the activities leading up to the energization of a transmission facility such as: creating functional specifications; providing project management support and monitoring; project benchmarking and cost reviews; communication strategies; and developing and implementing the Competitive Process for certain transmission projects.

Maintenance involves the collection and management of transmission system equipment data and the maintenance of power system and transmission-related market models.

Achievements and Plans

In addition to the ongoing Electric System Development activities, the following table outlines the notable achievements completed or expected to be completed in 2015 and planned initiatives for 2016 categorized by activity group.

Plan to NID Approval	System NID Approval to Energization	Maintenance
2015 Achievements		
Continue implementation of the updated *2013 Long-term Transmission Plan* and advanced regional and system transmission projects Advanced development of the *2015 Long-term Transmission Plan* which is expected to be completed by year end	Evaluated and confirmed the deferral of the Competitive Process for the Fort McMurray East 500 kV Transmission Project Ongoing implementation of recommendations from the Department of Energy's *Transmission Cost Management Policy* and related *Deficiency Regulation* Completed Cost Oversight Management pilot participation Enhanced processes with transmission facility owners (TFOs) to coordinate and prioritize customer projects with system projects	General operations focused
2016 Plans		
Advance projects identified in the *2015 Long-term Transmission Plan* Update the Transmission Rate Impact Projection (TRIP) workbook in support of the 2017 Tariff Application	Continue to integrate and manage the contract requirements for the Fort McMurray West 500 kV Transmission Project Assess the timing of the Competitive Process for Fort McMurray East 500 kV Transmission Project Implement changes to ISO Rule 9.1 *Transmission Facility Projects*	General operations focus

Customer Access Services

The primary function of Customer Access Services is to efficiently connect customers and provide excellent customer service throughout the process.

During 2015, the AESO received AUC-approval for the Abbreviated Needs Approval Process (ANAP) and implemented the Market Participant Choice (MPC) process both of which will provide efficiencies and benefits to the industry and the AESO. The customer service initiative that has been a multi-year focus continues to progress with a new stakeholder training program offered to market participants. Maturing the connection process to identify and implement further process efficiencies has continued with several priority enhancements integrated in 2015. The AESO remains committed to improving the overall customer experience.

The AESO provides customer access services through four primary activity groups: Plan the Customer Connection, Connection Approvals, Construction to Project Closure, and Customer Management.

Customer Access Services Costs

$10 million to deliver

12% of total AESO resource dollars

Plan the Customer Connection focuses on the analysis and project management performed by the AESO. It involves application processing and acceptance; studies and technical reviews of alternatives and the selection of a preferred alternative; proposal development; functional specification development; and the financial aspect of tariff requirements.

Connection Approval involves developing and filing a Need Identification Document (NID) to meet regulatory requirements, including hearing management and subsequent regulatory processes.

Construction to Project Closure coordinates with the transmission facility owner (TFO) on various aspects of the customer connection through to project closure and facilitates the energization of a customer project to grid operations.

Customer Management includes the development and maintenance of connection processes, practices and tools; consultation and development of the AESO regulatory processes including the tariff; and financial transactions (transmission settlement and credit management).

Achievements and Plans

In addition to the ongoing Customer Access Services activities, the following table outlines the notable achievements completed or expected to be completed in 2015 and planned initiatives for 2016 categorized by activity group.

Plan the Customer Connection	Connection Approval	Construction to Project Closure	Customer Management
2015 Achievements			
Coordinated industry consultation through the Connection Process Working Group Prioritized options for connection process enhancements and implemented priority items	Received approval of the Abbreviated Needs Approval Process (ANAP)	Implemented Market Participant Choice (MPC) process	Advanced customer service initiative and provided stakeholder training
2016 Plans			
Continue to enhance Connection Process efficiency opportunities	Monitor ANAP processes	Monitor MPC processes	General operations focus

Market Development

The wholesale electricity market evolves along with changes in industry, technology and other relevant influences or circumstances. The AESO monitors developments and evaluates the impact of these changes to identify appropriate courses of action. When addressing market changes, the principle objective is to maintain a fair, efficient, and openly competitive (FEOC) market.

Stakeholder engagement is vital to the success of market changes. At all times, an emphasis on stakeholder engagement is maintained — industry experience is essential to identifying and testing issues, opportunities, and solutions regarding market refinements.

During 2015, the AESO finalized the rules related to transmission constraint management which has been a multi-year process with the AUC and industry. The new rules are expected to become effective on November 26, 2015. Several initiatives were implemented in 2015 to enhance the intertie capabilities, including revised seasonal limits and re-contracting for Load Shed Service for Imports (LSSi) volumes. Further to this, a pilot project for the provision of regulating reserves across the intertie was initiated. The AESO continues its work on the design and development on new technology initiatives, such as energy storage.

The AESO supports market development through three primary activity groups: Design and Create, Implement, and Monitor.

Market Development Costs

$6 million to deliver

7% of total AESO resource dollars

Design and Create involves identifying market evolution initiatives and determining the AESO's position and implementation plan through stakeholder consultation. Also included are activities to draft required authoritative documents (e.g., rules, standards, tariff) or business practices to implement new policy positions, and identify changes to existing business processes, procedures or information technology systems.

Implement includes stakeholder consultation and execution of the implementation plan determined in the Design and Create activities as well as preparing and participating in any required regulatory filings. Additional activities include the development of compliance expectations and monitoring procedures for new or changing rules.

Monitor encompasses the compliance monitoring of market participants through audits and assessments in addition to monitoring market performance and operations (market metrics) for issues and required changes.

Achievements and Plans

In addition to the ongoing Market Development activities, the following table outlines the notable achievements completed or expected to be completed in 2015 and planned initiatives for 2016 categorized by activity group.

Design and Create	Implement	Monitor
2015 Achievements		
Continued design and development plans to facilitate integration of energy storage technologies Market Systems Replacement and Reengineering (MSR) Project Implementation (Iteration 1) design activities expected to be completed by year end Frequency response validation activities to be completed by year end Reviewed potential improvements to ATC posting process and procurement of contingency reserves for intertie schedules Assessed options for mitigating joint scheduling constraint on AB-BC and MATL interties	Interties: – Completed implementation of new Load Shed Service for Imports (LSSi) contracts – Implemented revised seasonal limits – Initiated pilot project activities for provision of regulating reserve across the interties Transmission Constraints Rebalancing (TCR) rule and related system changes are expected to become effective on November 26, 2015	General operations focused
2016 Plans		
Initiate consultation for Voluntary Extended Generator Withdrawal From Energy Market Merit Order program Review impact of intermittent generation on operating reserve requirements Initiate consultation on solution for mitigating joint scheduling constraint on AB-BC and MATL interties	Initiate implementation of storage technology rules and system changes Continue to implement and monitor intertie restoration solutions including: – Contingency Reserve product and procurement – Implementation of ATC posting improvements Complete Market Systems Replacement and Reengineering (MSR) Project Implementation activities to sustain reliability of existing systems	Monitor Transmission Constraints Rebalancing (TCR) implementation Continue to monitor and assess the ongoing stability of the market framework

Corporate Services

The business operations of the AESO are coordinated through the various activities of the corporate services departments. This 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.

Several IT cyber-related security projects were advanced in 2015 to provide further security to the AESO's information technology systems. Internally, enhancements were made to the integrated human resource management program and information technology system to allow for more efficient and effective management of the AESO's people resources.

The AESO's Corporate Services are provided through three primary activity groups: Corporate Management, People Management and Strategy.

Corporate Services Costs

$11 million to deliver

13% of total AESO resource dollars

Corporate Management includes the operations of corporate service functions including legal, accounting, security, facilities management, internal audit, project management and corporate communication.

People Management describes frameworks and programs such as workforce planning, compensation, talent acquisition, development, and organizational effectiveness.

Strategy compasses general strategy development and leadership of the AESO. Executive resources are also associated with other key processes.

Achievements and Plans

In addition to the ongoing Corporate Services activities, the following table outlines the notable achievements completed or expected to be completed in 2015 and planned initiatives for 2016 categorized by activity group.

Corporate Management	People Management	Strategy
2015 Achievements		
Advanced several IT/cyber security projects Initiated review of AESO website and capabilities Completed selected AESO process activity enhancements	Completed implementation of integrated human resource management system and program	Continued to advance strategies defined in *2014–2018 Strategic Plan*
2016 Plans		
Continue refinement and execution of strategic communications planning, and continually assess the effectiveness of communications policies and practices Complete AESO website design and build activities Continue to advance IT/cyber security plans Perform ongoing reviews of AESO activities, processes and information technologies to determine where business efficiencies can be realized	Develop initiatives supporting organization effectiveness and agility for staff resources – development of (cross functional) learning opportunities – enhancement of learning programs	Continue to advance strategic initiatives

Financial Highlights

As part of this 2016 Business Plan, the AESO is also presenting its 2016 budget that meets 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 two sections: Section I reviews the 2015 financial results for year-to-date August and Section II provides budget information for 2016. Additional information is included in Appendices B to G.

Section I – 2015

Costs

The following table provides a summary of costs as of August 2015 compared to the 2015 budget.

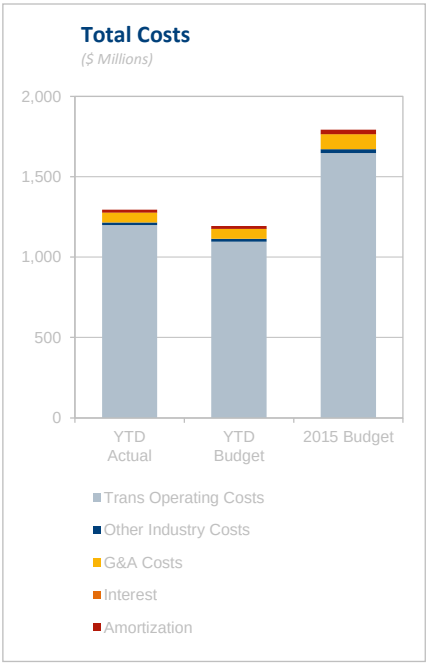
Year-to-Date August 2015 Costs ($ million) ~ by production year

	YTD August Actual	YTD August Budget[2]	YTD August Variance	2015 Budget
Transmission Operating Costs	1,200.2	1,096.8	103.4	1,647.1
Other Industry Costs	15.1	16.3	(1.2)	24.4
General and Administrative Costs	61.2	62.7	(1.4)	94.0
Interest	0.5	0.2	0.3	0.3
Amortization of Intangible and Capital Assets	18.0	17.9	0.1	26.9

Differences are due to rounding

The notable variance in the year-to-date results relates to transmission operating costs and more specifically, wires and operating reserves costs being higher than forecast offset by lower actual transmission line losses costs.

Additional information on year-to-date costs is provided in Appendix B (Year-to-Date August 2015 Financial Results Detail).



[2] Updated for AESO Board approval given in October 2015 for the 2015 Ancillary Services forecast.

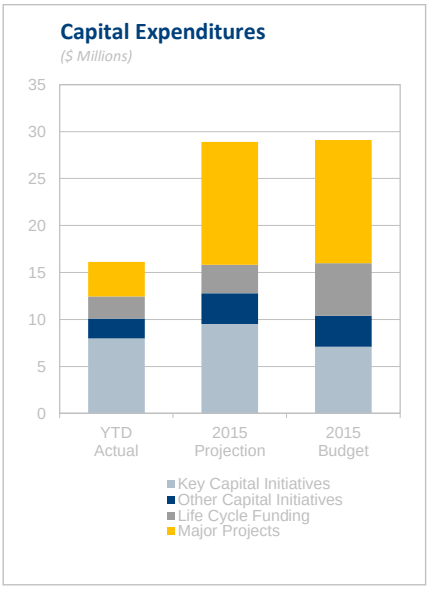
Capital Expenditures

The projected capital expenditures in 2015 are $29.0 million which is consistent with the 2015 amended budget.

In general, the AESO's capital projects, which are predominately multi-year in nature, have continued to progress or have been completed in 2015. Additional detailed information on the status and progress of specific projects is provided in Appendix E (2016 Capital Projects).

A notable update to the 2015 capital budget occurred in September 2015 for the addition of the Energy Management System (EMS) Implementation project; this major multi-year project is expected to be completed in 2017.

The following table provides a summary of the current capital project investment for 2015.



Capital Expenditures ($ million)

	2015 YTD Aug Actual	2015 Remaining	**2015 Projection**
Key Capital Initiatives	8.0	1.5	**9.5**
Other Capital Initiatives	2.1	1.2	**3.3**
Life Cycle Funding	2.3	0.7	**3.0**
Major Project – MSR Phase III	3.7	1.2	**4.9**
Major Project – EMS Phase III	-	8.2	**8.2**
Total Capital Spending	16.1	12.8	**29.0**

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 leasehold improvements, replacement of end-of-life IT hardware and recurring software upgrades.

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

Additional detailed information on capital projects is provided in Appendix E (2016 Capital Projects).

Financial Outlook

In planning for 2016, the following cost categories are reviewed:

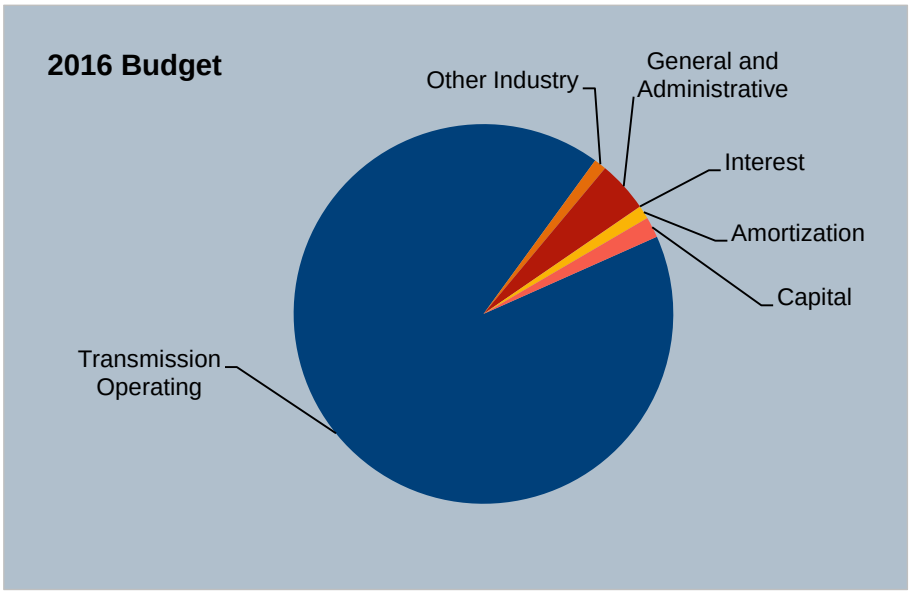
- Transmission Operating Costs (i.e., wires, transmission losses, ancillary services)
- Other Industry Costs
- General and Administrative and Interest Costs and Amortization
- Capital Expenditures

The focus of the following section is to highlight the changes from the 2015 budgets.

($ million)

	2016 Budget	2015 Budget[3]
Transmission Operating Costs	**1,979.3**	1,647.1
Other Industry Costs	**22.8**	24.4
General and Administrative	**94.0**	94.0
Interest Costs	**0.4**	0.3
Amortization	**24.4**	26.9
Capital Expenditures	**38.0**	29.0

Differences are due to rounding



[3] Updated for AESO Board approval in September 2015 for Energy Management System (EMS) Capital Project Implementation and in October 2015 for 2015 Ancillary Services forecast amendments

Transmission Operating Costs

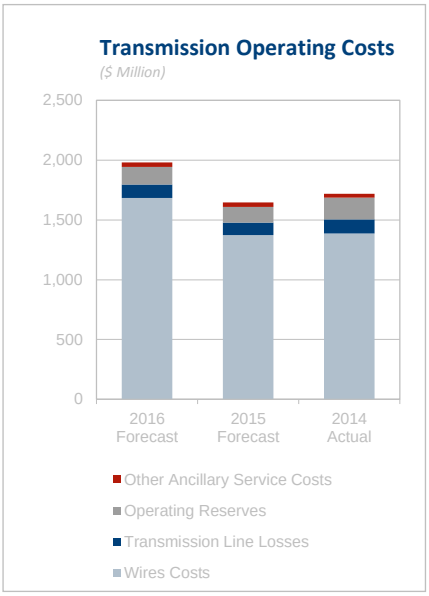
The following table provides a summary of transmission operating costs.

Transmission Operating Costs ($ million) ~ by production year

	2016 Forecast	2015 Projection	2015 Forecast[4]	2014 Actual	2013 Actual
Wires Costs	**1,684.8**	1,521.6	1,373.7	1,387.0	1,123.8
Transmission Line Losses	**111.9**	88.6	105.3	118.2	181.7
Operating Reserves	**147.1**	150.1	130.5	180.9	362.2
Other Ancillary Service Costs	**35.5**	32.4	37.6	33.0	35.9
Transmission Operating Costs	**1,979.3**	1,792.7	1,647.1	1,719.1	1,703.8

Differences are due to rounding

Additional information on the 2016 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.

The 2016 forecast for wires costs is $1,684.8 million which is $163.2 million or 11 per cent higher than the 2015 projection of $1,521.6 million. The 2016 forecast is based on the current applied-for or AUC-approved TFO tariffs ($1,679.3 million) and the AESO's forecast for Invitation to Bid on Credit (IBOC) and Location Based Credit Standing Offer (LBC SO) costs ($5.5 million).

The 2015 forecast was based on TFO tariffs approved or applied-for in late 2014 when the forecast was prepared. At that time, the majority of the forecast reflected AUC approvals for 2014, that being the most recent year for which tariffs had been approved. The 2015 projection costs reflect applications and decisions that have been filed or approved since late 2014 when the 2015 forecast was prepared.

The AESO understands that the higher TFO tariffs reflect capital and operating costs associated with projects providing additional transmission system capacity as well as higher costs to operate and maintain existing transmission facilities.

Wires costs include long-term contracts related to IBOC and 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.

[4] Updated for AESO Board approval in October 2015 for 2015 Ancillary Services forecast amendments

Transmission Line Losses

The 2016 forecast for transmission line losses is $111.9 million which is $6.6 million or six per cent higher than the 2015 forecast of $105.3 million. The cost of transmission line losses is impacted by the pool price and losses volumes.

The average pool price used for the 2016 forecast is $41 per MWh which remains unchanged from the 2015 forecast. The cost of transmission line losses is priced at the hourly pool price; the annual average does not directly correlate to hourly costs.

The 2016 forecast is based on 2.6 terrawatt hours of energy, which is 0.1 terrawatt hours or four per cent higher than the 2015 forecast of 2.5 terrawatt hours of energy. The increase in volumes is a reflection of the forecast increase in total demand for 2016.

Operating Reserves

The 2016 forecast for operating reserves costs is $147.1 million which is $16.6 million or 13 per cent higher than the 2015 forecast of $130.5 million.

The 2016 operating reserves volume forecast is 8.1 terawatt hours, which is 0.2 terrawatt hours or two per cent higher than the 2015 forecast of 7.9 terrawatt hours. The procurement of operating reserves is directly correlated to load and generation which are forecasted to grow in 2016 which results in higher forecasted reserve volumes.

The average pool price used for the 2016 forecast is $41 per MWh which remains unchanged from the 2015 forecast. For the 2016 pool price forecast, the methodology incorporates new enhancements to better reflect the typical price volatility in the Alberta market which impacts operating reserve costs during periods of high pool prices.

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

	2016 Forecast	2015 Projection	2015 Forecast[5]	2014 Actual	2013 Actual
Load Shed Service for Imports	**20.0**	19.0	25.0	24.4	21.2
Black Start	**2.1**	2.1	5.0	1.0	1.0
Contracted Transmission Must-run	**-**	-	-	-	2.6
Conscripted Transmission Must-run	**4.0**	6.0	3.0	4.8	8.7
Poplar Hill	**2.5**	2.7	2.5	2.8	2.5
Reliability Services	**2.9**	2.1	2.1	n/a	n/a
Transmission Constraint Rebalancing	**4.0**	0.5	-	n/a	n/a
Other Ancillary Service Costs	**35.5**	32.4	37.6	33.0	35.9

Differences are due to rounding

[5] Updated for AESO Board approval in October 2015 for 2015 Ancillary Services forecast amendments

The 2016 forecast for these services is $35.5 million, which is $2.1 million or six per cent lower than the 2015 forecast of $37.6 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). The 2016 forecast for LSSi costs is $20.0 million which is $5.0 million or 20 per cent lower than the 2015 forecast of $25.0 million due to a lower number of required arming and tripping events anticipated.

The first 12-month period for which reliability services and transmission constraint rebalancing costs will be incurred will be in 2016.

Reliability services are provided through an agreement with Powerex Corp. for grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall. The agreement came into effect on April 1, 2015.

Transmission constraint rebalancing costs are incurred when the transmission system is unable to deliver electricity from a generator to a given electricity consuming area without contravening reliability requirements. When this occurs, a market participant downstream of a constraint may be dispatched for purposes of transmission constraint rebalancing under the ISO Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose. The costs of transmission constraint rebalancing will be recovered from loads through the ISO tariff, in accordance with AUC directions in Decision 2013-135. The rule and tariff changes to implement transmission constraint rebalancing are expected to become effective on November 26, 2015.

The 2016 forecast for black start services is $2.1 million, which is $2.9 million or 58 per cent lower than the 2015 forecast of $5.0 million. Additional black start services are procured with the reliability services which offset this decrease.

Other Industry Costs

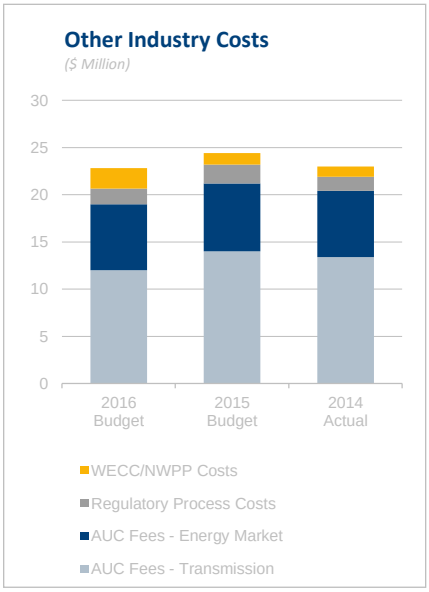
Other industry costs represent fees or costs paid based on regulatory requirements or membership fees for industry organizations; the amounts or requirement for the costs are not under the direct control of the AESO. These costs relate to regulatory process costs, the annual administration fee for the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

Other Industry Costs ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
AUC Fees – Transmission	**12.0**	12.3	14.0	13.4	13.2
AUC Fees – Energy Market	**7.0**	6.7	7.2	7.0	6.9
Regulatory Process Costs	**1.7**	1.3	2.0	1.5	2.0
WECC/NWPP Costs[6]	**2.2**	1.9	1.2	1.1	2.8
Other Industry Costs	**22.8**	22.2	24.4	23.0	24.9

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.

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 2016 budget for regulatory process costs is $1.7 million compared to the 2015 budget of $2.0 million.

[6] Western Electricity Coordinating Council/Northwest Power Pool

WECC/NWPP Fees

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

The 2016 budget for WECC assessments to the AESO is $2.0 million compared to the 2015 projection of $1.8 million. The 2015 budget was $1.1 million and did not incorporate all WECC-related costs; this was an oversight in the budget preparation process.

The AESO is also a member of the Northwest Power Pool (NWPP), which operates to achieve maximum benefits of coordinated operations for its member organizations. Participation in the NWPP allows the AESO to take advantage of their Reserve Sharing Group, thereby reducing Alberta's reserve requirements at times. The annual budget for NWPP fees is $0.1 million for 2016, which is consistent with 2015.

General and Administrative Costs

In determining the 2016 budget for general and administrative costs, the AESO continues to focus on identifying ways to improve the delivery of the business operations and to identify efficiencies. Similar to many businesses, the operations of the AESO encompass work initiatives that are essential to the general operations with an emphasis on reliable and efficient processes to provide value. These general operations are impacted on an ongoing basis by the need to assess and implement new initiatives. An example would be the implementation of Critical Infrastructure Protection (CIP) standards and processes. Throughout the business planning process that was undertaken this fall, the most efficient utilization of all AESO resources was considered with redeployment of existing resources to consider the alignment of workloads and technical expertise to incorporate the work on new initiatives. The outcome of the 2016 planning process was the determination that there would be a successful delivery of the business initiatives without requiring a change to the AESO's overall general and administrative budget.

In 2015, the general and administrative budget was $94.0 million which was a $2 million reduction from 2014. As 2015 has progressed, it has become evident that the AESO is able to manage its priorities, advance initiatives and operate successfully within this budget. The operational requirements for 2016 will be managed within the same budget.

The budget adjustments for 2016 are summarized as follows:

2015 Approved G&A Budget ($ million)		**$ 94.0**
Staff Costs	3.4	
Contract Services and Consultants	(3.9)	
Administration	(0.2)	
Facilities	(0.1)	
Computer Services and Maintenance & Telecommunications	0.8	**(0.0)**
2016 Budget		**$ 94.0**

Differences are due to rounding

There are several notable changes in the 2016 budget.

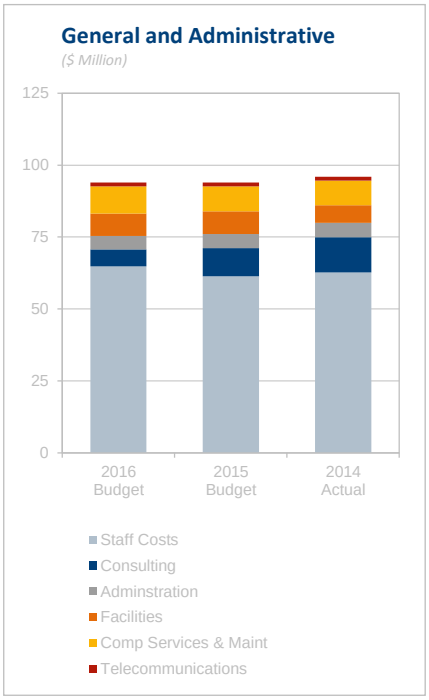
The staff costs in 2016 will increase by $3.4 million to include additional resources to supplement staff on key business initiatives (i.e., Critical Infrastructure Protection (CIP)) and succession planning; an anticipated decrease in the staff vacancy rate; and the conversion of consulting dollars to permanent staff positions.

During the 2016 budget process, where necessary, resources were reassigned to new or modified roles to align to the business initiatives and changes to general staff requirements. At the conclusion of that process, requests for new staff positions remained and were deemed critical for the effective delivery of the AESO's business operations and initiatives and could not simply be absorbed into department activities.

For the last several years, consultation and development of the Alberta Reliability Standards (ARS) for CIP occurred. These standards will impact many of the core operations of the AESO during 2016 as the AESO's efforts will be to further advance CIP implementation. To supplement existing resources working on the delivery of the CIP program, the 2016 budget incorporates seven new staff positions for CIP-related activities in the Operations and Information Technology areas.

Specific resources at the AESO hold in-depth knowledge and experience in technical and industry matters. Given the current age demographic of these employees, many are starting to plan for their career retirement. To proactively manage this within the engineering and system controller functions, several temporary training positions will be established to develop employees to enable career progression within the AESO. For the System Controllers in particular, the certification process will take several years to be fully qualified in the role. Once an individual associated with this succession planning has been assigned to a role within the department hierarchy, the training role will not be re-hired.

The contract services and consultants costs in 2016 will decrease by $3.9 million. The AESO uses consultants to supplement staff resources with specialized skill sets and to address workload peaks to maintain seamless operations and continual progression on key initiatives. In 2016, the reliance on consultants will decrease as a result of several non-recurring initiatives from 2015 and from the development of internal staff to address specific needs. The most notable non-recurring project from the 2015 budget is associated with the competitive process for the Fort McMurray East 500 kV Transmission Project. This competitive process did not begin as planned in 2015 and an assessment of the project will occur in the first quarter of 2016.



The computer services and maintenance costs will increase by $0.8 million as a result of additional requirements or new negotiated agreements and the higher Canadian to US dollar exchange rate as several of the major licence and maintenance agreements are denominated in US dollars.

It must be noted that the 2016 budget of $94.0 million incorporates the business initiatives as identified during the business plan and budget process. The Fort McMurray East 500 kV Transmission Project is an example of an initiative with uncertain timing that has not been fully funded within the 2016 budget. Any potential impact to the AESO's operations from current industry discussions on market evolution scenarios is another example. Similar to prior budgets, should it be assessed that additional budget amounts are required to deliver on the AESO's business initiatives, future discussions will occur with stakeholders and the AESO Board.

General and Administrative Costs ($ million)

	2016 Budget	2015 Budget	2014 Actual	2013 Actual
Staff	**64.8**	61.4	62.7	60.5
Contract Services and Consultants	**5.9**	9.8	12.2	13.3
Administration	**4.7**	4.9	5.0	5.0
Facilities	**7.8**	7.9	6.2	6.9
Computer Services and Maintenance	**9.4**	8.6	8.5	8.9
Telecommunications	**1.4**	1.4	1.4	1.6
General and Administrative Costs	**94.0**	94.0	96.1	96.2

Differences are due to rounding

Interest Costs and Amortization

Interest Costs and Amortization ($ million)

	2016 Budget	2015 Budget	2014 Actual	2013 Actual
Interest	**0.4**	0.3	0.1	0.8
Amortization of Intangible and Capital Assets	**24.4**	26.9	26.9	22.6

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 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).

The AESO's working capital includes deposits for generating unit owner's contributions that are held by the AESO and refunded to generators in accordance with the terms and conditions within the ISO tariff. For 2016, these deposits are estimated to be approximately $70 million and are used to offset otherwise required borrowings until such time as they are refunded.

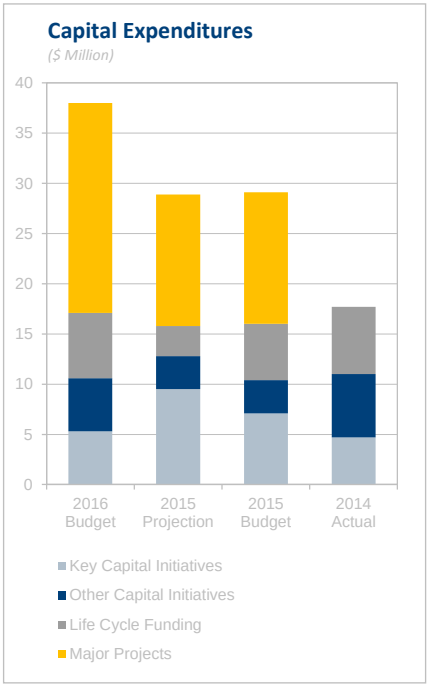
Amortization of Intangible and Capital Assets

Intangible and capital assets are amortized over their estimated useful lives in accordance with generally accepted accounting principles and reviewed on an annual basis.

Additional information on the AESO's 2016 capital projects is provided in Appendix E (2016 Capital Projects).

Capital Expenditures

A detailed review of the capital requirements for 2016 takes into consideration the progress that has been made on the 2015 projects that are multi-year in nature, the new requirements for 2016 and the AESO's capacity to design and implement system solutions. Based on these findings, the 2016 capital budget is $38.0 million.



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 2016 based on current operations and the business initiatives. As time progresses in 2016, requirements and circumstances may change and the portfolio management process will be used to manage these changes throughout the year.

Additional information on the 2016 capital projects is provided in Appendix E (2016 Capital Projects).

Capital Expenditures ($ million)

	2016 Budget	2015 Projection[7]	2015 Budget[8]	2014 Actual	2013 Actual
Key Capital Initiatives					
1. Reliability (EMS components)	-	6.0	3.6	1.0	0.5
Reliability (HVDC[9] & other components)	0.7	0.3	0.3	1.4	1.5
2. Critical Infrastructure Protection	0.7	0.2	0.4	-	-
3. IT/Cyber Security	2.5	0.7	1.2	-	-
4. Wind Integration	-	-	-	0.8	0.0
5. FEOC[10] Regulation Implementation	-	-	-	-	0.2
6. Market Evolution (Incorporates TCM[11])	0.5	1.8	1.2	0.3	0.6
7. Demand Response	-	-	-	0.3	0.1
8. Intertie Framework	0.3	0.3	0.4	0.4	2.3
9. Operating Reserve	-	-	-	0.4	0.2
10. Transmission Cost Accountability	0.0	0.2	0.0	0.1	-
11. BUCC[12] Replacement	-	-	-	-	2.4
12. Technology Review (website refresh)	0.6	-	-	-	-
Total Key Capital Initiatives[13]	**5.3**	9.5	7.1	4.7	7.8
Other Capital Initiatives	**5.3**	3.3	3.3	6.3	7.9
Life Cycle Funding	**6.5**	3.0	5.6	6.7	6.2
Sub-total Capital	**17.1**	15.8	16.0	17.6	22.0
Major Project – MSR[14]	**2.5**	4.9	4.9	-	-
Major Project – EMS[8]	**17.1**	8.2	8.2	-	-
Major Project – SCC[15]	**1.3**	-	-	-	-
Total Capital	**38.0**	29.0	29.0	17.6	22.0

Differences are due to rounding

[7] August 31, 2015 spent plus estimate to complete for current year

[8] Updated for AESO Board approval in September 2015 for Energy Management System (EMS) Implementation Project

[9] High-Voltage Direct Current (HVDC)

[10] Fair Efficient Open Competitive (FEOC) multi-year project completed

[11] Transmission Constraints Management (TCM) –TCM project components specifically relating to HVDC were reclassified to the Reliability HVDC & Other category

[12] Back-up Control Centre (BUCC) multi-year project completed

[13] Information Management Program – reclassified; Key and Other category subtotals adjusted in 2013

[14] Market Systems Replacement and Reengineering (MSR) Implementation Project

[15] System Coordination Centre (SCC) Expansion Project Definition Phase

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 leasehold improvements, replacement of end-of-life IT hardware and recurring software upgrades.

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

Additional detailed information on capital projects is provided in Appendix E (2016 Capital Projects).

Revenue

The AESO recovers its operating and capital costs through three 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, 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 three functions. Additional information on the 2016 cost allocation methodology is provided in Appendix G (Allocation of Costs).

Transmission

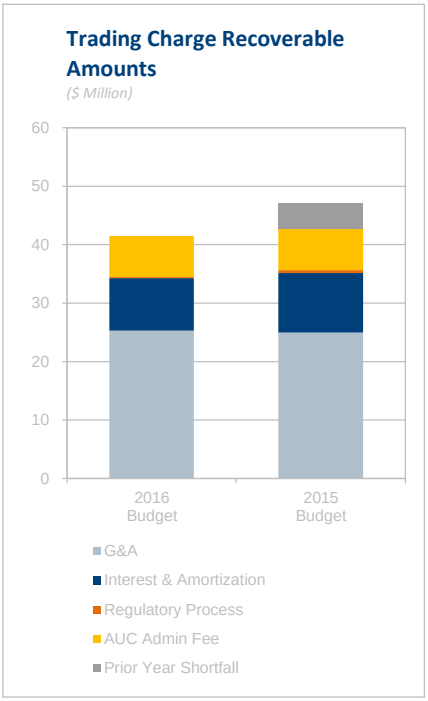
The AESO is responsible for paying the costs of the provincial transmission system and recovering the costs through a tariff approved by the Alberta Utilities Commission (AUC). The ISO tariff is designed to allocate the costs to all users of the transmission system based on level of usage. The 2016 budgeted 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 2016 budget and a current trading volume forecast, an energy market trading charge of 31.5¢ per MWh traded is required for 2016.

The 2016 trading charge is lower than the 2015 trading charge due to the prior year collection shortfall that was incorporated into the 2015 trading charge; there is no surplus or shortfall amount estimated to be carried over from 2015 to 2016.

These trading charge amounts are independent of the Market Surveillance Administrator (MSA) charge. The 2016 MSA cost recovery amount will be communicated to the AESO in the latter part of 2015. The MSA cost recovery amount is approved by the Chair of the AUC in an independent budget process.



Trading Charge Recoverable Amounts ($ million)

	2016 Budget	2015 Budget	2014 Budget
AESO Costs	**34.5**	35.6	37.2
Energy Market Shortfall / (Surplus)	**0.0**	4.3	4.0
AESO Component	**34.5**	39.9	41.2
AUC's Portion of Energy Market Administration Fee	**7.0**	7.2	7.2
Total Recoverable Amount	**41.5**	47.1	48.4

Differences are due to rounding

Trading Charge (¢ per MWh)

	2016 Budget	2015 Budget	2014 Budget
AESO Costs	**26.2¢**	27.0¢	29.1¢
Energy Market Shortfall / (Surplus)	**-**	3.2	3.1
AESO Component	**26.2**	30.3	32.3
AUC's Portion of Energy Market Administration Fee	**5.3**	5.5	5.6
Total	**31.5¢**	35.8¢	37.9¢

Differences are due to rounding

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: 2014-2018 Strategic Plan

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

AESO Mission

Alberta's need for fairness and efficiency in an openly competitive marketplace will continue, as will the need for safe, reliable, and economic operation of the provincial transmission system. Meeting these needs is the AESO's mission. As such, our mission remains the same as in previous years:

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

AESO Vision

The manner in which we execute our mandate must continually evolve in order to consistently serve Albertans. With that firmly in mind, the AESO's vision contains similar themes to the previous AESO vision, but with an emphasis on being a trusted leader based on our credibility, expertise and maturation as an organization to advance the electricity framework:

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

Strategic Objectives

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

The three strategic objectives, which have been simplified from the AESO's previous eight strategic objectives, are as follows:

Framework

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

Value

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

People

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

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

Appendix B: Year-to-Date August 2015 Financial Results Detail

Costs

Year-to-Date August 2015 Transmission Operating Costs ($ million) ~ by production year

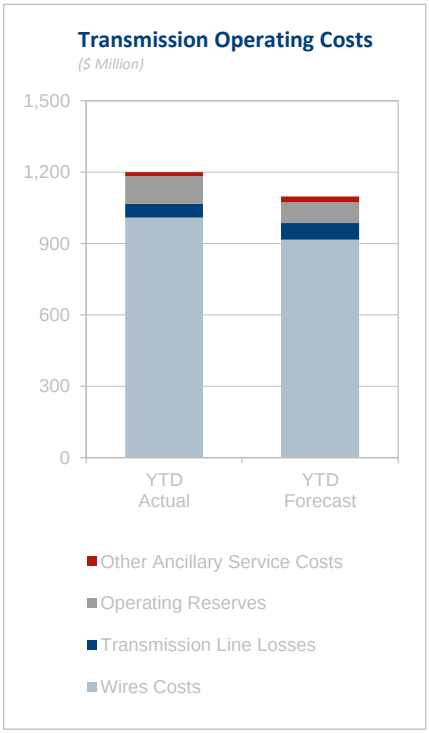
	YTD Aug Actual	YTD Aug Forecast	YTD Aug Variance	2015 Projection	2015 Forecast[16]
Wires Costs	1,008.2	915.8	92.4	1,521.6	1,373.7
Transmission Line Losses	57.6	70.2	(12.6)	88.6	105.3
Operating Reserves	117.5	86.8	30.7	150.1	130.5
Other Ancillary Service Costs	16.8	23.9	(7.1)	32.4	37.6
Transmission Operating Costs	**1,200.2**	**1,096.8**	**103.4**	**1,792.7**	**1,647.1**

Differences are due to rounding

Transmission Operating Costs

The table above provides the transmission operating costs as of August 2015 compared to the forecast.

Transmission operating costs represent wires, transmission line losses and ancillary services costs. As of August 2015, actual costs of $1,200.2 million are $103.4 million or nine per cent higher than the forecast costs of $1,096.8 million. This variance is attributable to variances in wires and operating reserves offset by transmission line losses.



Wires Costs

Wires costs as of August 2015 are $1,008.2 million, which is $92.4 million or 10 per cent higher than the forecast of $915.8 million based on the amounts paid primarily to the transmission facility owners (TFOs) in accordance with their AUC-approved tariffs.

The 2015 projection is anticipating actual wires costs of $1,521.6 million, which is $147.9 million or 11 per cent higher than the 2015 forecast of $1,373.7 million. The 2015 forecast was based on TFO tariffs approved or applied-for in late 2014 when the forecast was prepared. At that time, the majority of the forecast reflected AUC approvals for 2014, that being the most recent year for which tariffs had been approved.

The year-to-date and 2015 projection costs reflect applications and decisions that have been filed or approved since late 2014 when the 2015 forecast was prepared.

[16] Updated for AESO Board approval in October 2015 for 2015 Ancillary Services forecast amendments

Transmission Line Losses

Transmission line losses costs at the end of August 2015 are $57.6 million, which is $12.6 million or 18 per cent lower than the forecast of $70.2 million. The cost of transmission line losses is impacted by the pool price and losses volumes.

The year-to-date actual average hourly pool price has been $39 per MWh compared to a forecast of $41 per MWh. The lower average pool price is mainly due to moderate demand growth in 2015 and lower than anticipated gas prices.

Transmission line losses volumes to the end of August 2015 are 1.5 terawatt hours which is 0.1 terawatt hours or nine per cent lower than the forecast volumes of 1.6 terawatt hours. The lower transmission line losses volumes are due to lower than expected system load from a milder winter and unexpected project cancellations or delays.

The 2015 projection anticipates transmission line losses costs of $88.6 million, which is $16.7 million or 16 per cent lower than the 2015 forecast of $105.3 million due to a lower average pool price and transmission line losses volumes.

Operating Reserves

Operating reserve costs at the end of August 2015 are $117.5 million, which is $30.7 million or 35 per cent higher than the forecast of $86.8 million. This variance is in part attributable to the costs of operating reserves during periods of much higher than average pool prices. In the time period from January to August 2015, there were 15 days when the on-peak average pool price was above $200 per MWh. The operating reserve costs associated with these days was $58.2 million or approximately 49 per cent of the costs. Operating reserve costs are indexed to the hourly pool price and high pool prices can be associated with periods of planned and unplanned generation outages and transmission system constraints.

Actual operating reserve volumes to the end of August 2015 are 5.1 terawatt hours which is 0.2 terawatt hours or three per cent lower than the forecast volumes of 5.2 terawatt hours.

The 2015 projection is anticipating actual operating reserve costs of $150.1 million, which is $19.6 million or 15 per cent higher than the 2015 forecast of $130.5 million mainly attributable to pool price volatility.

Other Ancillary Service Costs

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 at the end of August 2015 are $16.8 million, which is $7.1 million or 30 per cent lower than the forecast of $23.9.

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

	YTD Aug Actual	YTD Aug Budget	YTD Aug Variance	2015 Projection	2015 Forecast[17]
Load Shed Service for Imports	12.2	16.7	(4.5)	19.0	25.0
Black Start	1.4	2.4	(1.0)	2.1	5.0
Contracted Transmission Must-run	-	-	-	-	-
Conscripted Transmission Must-run	0.3	2.0	(1.8)	6.0	3.0
Poplar Hill	1.7	1.7	0.1	2.7	2.5
Reliability Services	1.2	1.2	0.0	2.1	2.1
Transmission Constraint Rebalancing	-	-	-	0.5	-
Other Ancillary Service Costs	**16.8**	**23.9**	**(7.1)**	**32.4**	**37.6**

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, 2015, LSSi costs are $12.2 million, which is $4.5 million or 27 per cent lower than the forecast of $16.7 million due to a lower number of arming and tripping events required for operational purposes.

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).

Reliability services are provided through an agreement with Powerex Corp. for grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall. The agreement came into effect on April 1, 2015.

Transmission constraint rebalancing costs are incurred when the transmission system is unable to deliver electricity from a generator to a given electricity consuming area without contravening reliability requirements. When this occurs, a market participant downstream of a constraint may be dispatched for purposes of transmission constraint rebalancing under the ISO Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose. The costs of transmission constraint rebalancing will be recovered from loads through the ISO tariff, in accordance with AUC directions in Decision 2013-135. The rule and tariff changes to implement transmission constraint rebalancing are expected to become effective on November 26, 2015.

[17] Updated for AESO Board approval in October 2015 for 2015 Ancillary Services forecast amendments

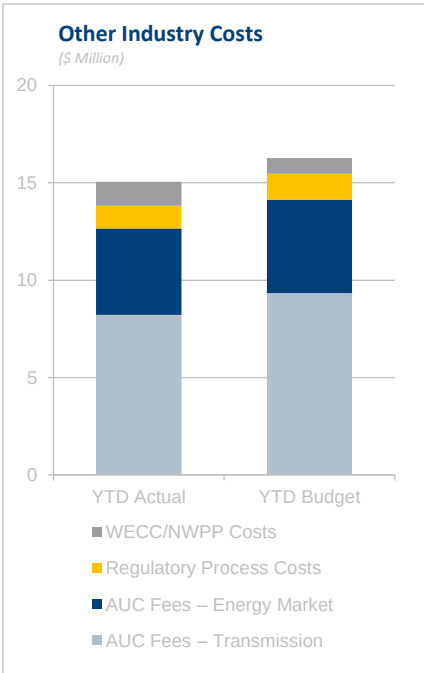
Other Industry Costs

The following table provides other industry costs as of August 2015 compared to the budget.

Year-to-Date August 2015 Other Industry Costs ($ million)

	YTD Aug Actual	YTD Aug Budget	YTD Aug Variance	2015 Projection	2015 Budget
AUC Fees – Transmission	8.2	9.3	(1.1)	12.3	14.0
AUC Fees – Energy Market	4.4	4.8	(0.4)	6.7	7.2
Regulatory Process Costs	1.2	1.3	(0.2)	1.3	2.0
WECC/NWPP Costs[3]	1.2	0.8	0.4	1.9	1.2
Other Industry Costs	**15.1**	**16.3**	**(1.2)**	**22.2**	**24.4**

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 regulatory process costs, the annual administration fee for the Alberta Utilities Commission (AUC), and the AESO's share of Western Electricity Coordinating Council (WECC) and Northwest Power Pool (NWPP) membership fees.

Based on current estimates, it is anticipated that actual other industry costs in 2015 will be $22.2 million, which is $2.2 million or nine per cent lower than the 2015 budget of $24.4 million.

AUC fees at the end of August 2015 are $12.7 million, which is $1.5 million or 10 per cent lower than the forecast of $14.1 million. The 2015 budget was based on the 2014 AUC fees while the actual 2015 fees are lower.

Based on the regulatory proceedings that have occurred in 2015, the 2015 projection is $1.3 million, which is $0.7 million or 35 per cent lower than the 2015 budget of $2.0 million.

The 2015 budget for the WECC fee assessment was $1.1 million which was understated from the actual fees when the NERC-related cost component was not communicated to the AESO. The 2015 projection of $1.8 million captures all fees applicable to the AESO.

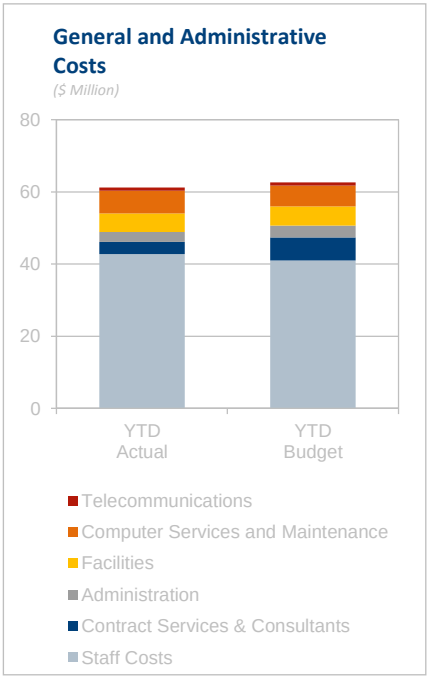
General and Administrative Costs

The following table provides the general and administrative costs as of August 2015 compared to the budget.

Year-to-Date August 2015 General and Administrative Costs ($ million)

	YTD Aug Actual	YTD Aug Budget	YTD Aug Variance	2015 Projection	2015 Budget
Staff Costs	42.8	41.0	1.8	65.4	61.4
Contract Services and Consultants	3.4	6.5	(3.1)	5.5	9.8
Administration	2.7	3.3	(0.6)	4.3	4.9
Facilities	5.1	5.3	(0.1)	7.7	7.9
Computer Services and Maintenance	6.3	5.8	0.5	8.8	8.6
Telecommunications	0.9	0.9	(0.0)	1.4	1.4
General and Administrative Costs	**61.2**	**62.7**	**(1.4)**	**93.1**	**94.0**

Differences are due to rounding



Staff Costs

The AESO maintains market-based compensation for staff which incorporates a benefits plan and a performance-based incentive. It is anticipated that staff costs will be $65.4 million, which is $3.9 million or six per cent higher than budget due to a lower actual vacancy rate compared to the 2015 budget. It is anticipated that the 2015 actual vacancy rate will average three per cent compared to an eight per cent budget.

Contract Services and Consultants

The contract services and consultants costs are anticipated to be $5.5 million, which is $4.2 million or 43 per cent lower than the 2015 budget of $9.7 million mainly due to the postponement or deferral of planned initiatives.

Administration

Administration costs include corporate communications, recruiting, travel and training, AESO Board fees, and office costs that present the general operating costs of the organization. Based on current estimates, it is anticipated that actual costs in 2015 will be $4.3 million, which is $0.6 million or 12 per cent lower than the 2015 budget of $4.9 million.

Facilities

Facility costs include rent and operating costs for three AESO locations. The facility costs in 2015 are anticipated to be consistent with the 2015 budget.

Computer Services and Maintenance

Ongoing costs are incurred to purchase annual software operating licences and maintenance agreements for the AESO's information technology systems. Based on current estimates, it is anticipated that actual costs for 2015 will be consistent with the 2015 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. Based on current estimates, it is anticipated that actual costs for telecommunications for 2015 will be consistent with the 2015 budget.

Interest and Amortization Costs

The following table provides the interest and amortization costs as of August 2015 compared to the budget.

Year-to-Date August 2015 Costs ($ million)

	YTD Aug Actual	YTD Aug Budget	YTD Aug Variance	2015 Projection	2015 Budget
Interest	0.5	0.2	0.3	0.8	0.3
Amortization of Intangible and Capital Assets	18.0	17.9	0.1	27.0	26.9

Differences are due to rounding

Interest

Actual interest costs are higher than budget for 2015 due to higher borrowing requirements. The higher borrowing requirements are attributable to collections less than costs resulting in a cash shortfall. Borrowing requirements for working capital, deferral account balances and intangible and capital asset purchases are offset by generating unit owner's contribution deposits.

Amortization

A number of variables are taken into consideration in developing the annual amortization budget. These variables include the asset addition types (impacting the estimated useful life), the purchase amount, and the timing (commissioning date) of asset additions. Based on current estimates, it is anticipated that the actual amortization for 2015 will be $27.0 million compared to the budget of $26.9 million.

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. 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 unanticipated issues. Any new or modified requirements are also reviewed and prioritized to determine how they align with existing work. This is a continual process to ensure alignment of priorities and business needs.

The estimated capital expenditures in 2015 are $29.0 million which is consistent with the 2015 budget.

Additional information on capital projects is provided in Appendix E (2016 Capital Projects).

Capital Expenditures ($ million)

	2015 YTD Aug Actual	2015 Remaining	**2015 Projection**
Key Capital Initiatives	8.0	1.5	**9.5**
Other Capital Initiatives	2.1	1.2	**3.3**
Life Cycle Funding	2.3	0.7	**3.0**
Major Project – MSR Phase III	3.7	1.2	**4.9**
Major Project – EMS Phase III	-	8.2	**8.2**
Total Capital Spending	16.1	12.8	**29.0**

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 leasehold improvements, replacement of end-of-life IT hardware and recurring software upgrades.

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

Additional detailed information on capital projects is provided in Appendix E (2016 Capital Projects).

Appendix C: Transmission Operating Cost Definitions

2016 Pool Price Forecast Methodology

The AESO has prepared its 2016 pool price forecast using the AURORAxmp Power Market Model, which reflects Alberta market fundamentals. The most up-to-date information available on future supply, demand and market fundamentals, as well as random variables including forced outages, weather-related demand fluctuations, gas prices, wind profiles and dynamic pricing are used to generate price volatility in the forecast. However, many planned outages can change in duration and timing throughout the year and this will impact the hourly pool price in ways that the AESO cannot predict. The AESO has run 1,001 simulations of the hourly pool price forecast, producing price distributions that reflect the volatility seen in the Alberta market.

The AESO has selected the results from the 50 percentile of the 1,001 simulations as the 2016 pool price forecast. The average hourly pool price forecast for 2016 of $41 per MWh is consistent with the 2015 average hourly pool price forecast of $41 per MWh. The 2016 average hourly pool price forecast was derived using the same model and methodology as 2015 though enhancements were made to the model to incorporate random wind profiles and dynamic pricing. These new enhancements improved the forecast price volatility and allowed for the 50 percentile prices to be used as opposed to the 95th percentile used in 2015.

The 2016 average hourly pool price forecast is used as an input to calculate the transmission line losses and ancillary services costs forecasts.

Transmission Line Losses

Transmission line losses represent the amount 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 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 Alberta Interconnected Electric System (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 calculated based on the following:

- Historical actual losses volumes from the AESO’s settlement system, incorporating post-final restated metering data; and
- A forecasting model using the historical data.

The annual forecast for transmission line losses costs is the accumulation 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. For 2016, the AESO has applied the 50 percentile of the 1,001 simulations of the hourly pool price forecast, as discussed above, to the forecast transmission line losses volumes to create a projected cost curve for the transmission line losses cost 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. Operating reserves are procured through an online exchange, where offer prices are indexed to the pool price. 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.

While the prices of operating reserves procured through the online exchange are indexed to the hourly 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. Additionally, during periods of high hourly pool prices, the less expensive operating reserve suppliers may not be available which results in higher operating reserve costs.

The AESO procures the different types of operating reserves in two forms: active and standby. Active operating reserves are the operating reserves that are forecast by the AESO as necessary to operate the AIES securely and meet the AESO's reliability obligations. Standby operating reserves provide additional reserves for use when the resources available under the active portfolio are insufficient. Payments for standby reserves include a premium for the option to activate the standby reserves and an activation price that is paid if the reserves are activated.

Active operating reserves are comprised of the following three types with the minimum levels required for each type of operating reserve based on standards governed by Alberta Reliability Standards (ARS) using the contingency reserve standard BAL-002-WECC-AB:

- **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.
- **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.
- **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.

The annual forecast for operating reserves costs is based on the forecast annual operating reserves volumes (governed by ARS requirements, specifically the contingency reserve standard in BAL-002-WECC-AB), the distribution curve for the forecast pool price and historical premiums/discounts. The hourly premium/discount estimates are derived from a rolling window of 24 months of historical data. A probabilistic analysis using 1,001 simulations is then performed on the input parameters to establish monthly and annual cost curve projections. For 2016, the AESO has used the summation of the 50 percentile of the monthly cost forecasts to establish the annual operating reserves cost forecast. This methodology allows the AESO to better capture monthly and seasonal volatilities.

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.

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).

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).

Reliability services are provided through an agreement with Powerex Corp. for grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall. The agreement came into effect on April 1, 2015.

Transmission constraint rebalancing costs are incurred when the transmission system is unable to deliver electricity from a generator to a given electricity consuming area without contravening reliability requirements. When this occurs, a market participant downstream of a constraint may be dispatched for purposes of transmission constraint rebalancing under the ISO Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose. The costs of transmission constraint rebalancing will be recovered from loads through the ISO tariff, in accordance with AUC directions in Decision 2013-135. The rule and tariff changes to implement transmission constraint rebalancing are expected to become effective on November 26, 2015.

Appendix D: 2016 General and Administrative Cost Detail

Human Resources

Human Resources ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
Staff	**64.8**	65.4	61.4	62.7	60.5
Consulting	**5.4**	5.1	9.0	9.9	11.4
Legal	**0.3**	0.3	0.5	2.3	1.8
Audit/Reviews	**0.2**	0.1	0.2	0.1	0.1
Human Resources	**70.7**	70.9	71.2	74.9	73.8

Differences are due to rounding

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

- **Base pay for performance adjustments for existing staff or an overall change in the AESO's compensation philosophy** –The AESO continues to review the general economic indicators and salary survey information to determine the impact on the base salary rates. Near the end of the year, management will recommend a base salary adjustment to the AESO Board's Human Resources Committee (HRC) for final approval. Prior to a decision by the HRC, no adjustment has been reflected in the 2016 budget (the base pay adjustment was a three and half per cent increase in 2015).

- **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, the AESO has confidence in its approach to successfully deliver on its goals and has reflected this in its incentive compensation at 60 per cent of eligibility which is consistent with 2015.

- **Vacancy rate** – The AESO has included a six per cent vacancy rate for 2016 (eight per cent vacancy rate used in the 2015 budget). The reduced vacancy rate reflects lower turnover of AESO staff that has occurred in 2015 which is expected to continue in 2016. The AESO's recruitment strategy is to target an actual vacancy rate close to zero per cent. The AESO anticipates a three per cent vacancy rate in 2015.

- **Benefit costs** – In addition to their salary, each employee participates in the organization's comprehensive benefit plan. For the organization, this represents costs such as health and dental coverage, defined contributions for retirement savings and government payroll costs. These costs are presented as a percentage of salary costs to determine the "benefits load factor" which has been budgeted at 22 per cent of salary costs in 2016 which is consistent with the 2015 budget.

Consulting – The AESO uses consultants to supplement staff resources for two general purposes. It is not practical to retain staff that have all of the skill sets that may be required from time to time. 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 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 others is used to assist with these initiatives.

Administration

Administration Costs ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
AESO Board Fees	**0.5**	0.5	0.5	0.5	0.5
Travel and Training	**1.8**	1.8	1.8	2.1	2.0
Insurance	**0.7**	0.6	0.6	0.6	0.6
Other Administrative	**1.7**	1.4	2.0	1.8	1.9
Administration	**4.7**	4.3	4.9	5.0	5.0

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 and open houses for proposed transmission projects.

Insurance – The 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 relations, general office costs, printing, recruiting, corporate subscriptions/memberships and professional membership fees. The 2016 budget incorporates a more cost effective approach for hosting open houses on proposed transmission projects.

Facilities

Facilities Costs ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
Rent	**7.8**	7.7	7.9	6.2	6.9

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

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

In 2015, higher base rent and operating costs related to the AESO's downtown office space occurred. No additional office space has been planned for 2016.

Computer Services and Maintenance

Computer Services and Maintenance ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
IT Maintenance and Services	**9.4**	8.8	8.6	8.5	8.9

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

The software and hardware operating licences and maintenance agreements for the systems are a combination of a core base infrastructure system and applications that change as new projects are approved. In 2016, costs for IT maintenance and services are anticipated to increase due to additional requirements or new negotiated agreements. Also impacting the costs in both 2015 and 2016 is the higher Canadian to US dollar exchange rate as several of the major licence and maintenance agreements are denominated in US dollars.

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

Telecommunications

Telecommunication ($ million)

	2016 Budget	2015 Projection	2015 Budget	2014 Actual	2013 Actual
Telecommunications	**1.4**	1.4	1.4	1.4	1.6

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

Appendix E: 2016 Capital Projects

The following tables provide information on the AESO's current capital plan for 2016. Actual projects to be completed in 2016 will vary, and include the addition of projects yet to be determined, deferral of projects in this plan, or elimination of projects deemed no longer necessary.

Key Capital Initiatives

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

Key Capital Initiatives		
Reliability Program – Energy Management System (EMS) Upgrade	**Description**	The EMS is used by System Controllers in grid operations to monitor, control and optimize the performance of the power system. The EMS is comprised of two major components the Application suite and Infrastructure. Both components have reached end of life and will no longer be supported by their respective vendors. In order to ensure reliable grid operations, be CIP compliant and have supported hardware and software, it was deemed prudent to proceed with an upgrade to the AESO EMS.
	2015 Progress	The key deliverable for 2015 was the completion of EMS Phase II, the Definition Phase. This phase defined the detailed business and design requirements and helped provide a higher degree of certainty for the subsequent implementation phase. The AESO Board approved management's recommendation to proceed with Implementation phase of the project in September.
	2016 Plan	The implementation phase is a multi-year project expected to conclude in 2017. See Appendix F (Major Projects) for additional details on the EMS Phase III Implementation project.
Reliability Program - Other Components (non-EMS)	**Description**	Grid management projects that are intended to enhance the efficiency and improve the ability to reliably run the Alberta Interconnected Electrical System (AIES).
	2015 Progress	A number of system developments and enhancements have been progressed to enhance the reliability of the AIES to support HVDC commissioning activities and ongoing operations. These include: expansion of the outage planning software to correct existing business processes with System Controller Procedures and outage coordination, and the upgrade of the PhasorPoint application software to provide System Controllers the ability to observe system stability conditions in real time, and run studies for various HVDC loading scenarios.

Key Capital Initiatives		
Reliability Program - Other Components (non-EMS) ***(continued)***	**2016 Plan**	The primary focus for 2016 is the replacement of the Supervisory Control and Data Acquisition (SCADA)/Wide Area Network (WAN) communications service. The SCADA/WAN communications service is the conduit for obtaining real-time AIES grid data used by AESO operations. The SCADA/WAN replacement project is intended to replace the existing TELUS Asynchronous Transfer Mode (ATM) managed service (to be discontinued – effective Q3, 2016) with a new service offering, Multiprotocol Label Switching (MPLS). This project will require the participation and support of a number of transmission facility owners.
Alberta Reliability Standards Critical Infrastructure Protection (CIP) Implementation	**Description**	Implementation of facility upgrades and/or changes to AESO sites that are required to support CIP V5 implementation and compliance requirements.
	2015 Progress	Implemented a number of facility access upgrades according to the work plan.
	2016 Plan	Continue to advance facility access and security controls and complete any required system changes to selected market applications to ensure Bulk Electric System (BES) asset compliance.
IT / Cyber Security Advancements	**Description**	Upgrade systems and processes to reduce the risk of cyber security breaches and facilitate AESO compliance to CIP V5 requirements.
	2015 Progress	Completed the Intrusion Detection System implementation; Database Hardening Audit; Firewall Rule Management Validation; Network Advanced Threat Management; and an initial Ethernet Port Lock deployment to the highest risk access points. An EMS Endpoint Security (SEP) upgrades, Browser Upgrade, and an initial Distributed Denial-of-Service (DDoS) implementation are all scheduled to complete by year end.
	2016 Plan	Advance the AESO's IT security posture with implementations in key target areas: implement Continuous Vulnerability Management, Access Control (foundation layer for Identity & Access Management (IAM)), Operational Security (Advanced Threat Management for email), and Communications Security (complete Firewall reinforcement, secure the remaining Ethernet ports, and implement a Firewall Rule management tool).
Market Evolution	**Description**	The identification, development and implementation of tools in support of market optimization and/or performance improvements. This includes the ongoing review (assessment and consultation) of the market design and its structural elements in consideration with the Market Systems Replacement and Reengineering (MSR) Project.

Key Capital Initiatives		
	2015 Progress	Information technology and other operating procedure changes supporting the new Transmission Constraints Management (TCM) Rule are expected to be completed by year end.
	2016 Plan	Refine Transmission Constraints Management related systems changes if necessary. Initiate changes to support storage integration. Complete Alberta Load Forecast reporting system enhancements.
Intertie Development	**Description**	Develop and implement a framework and tools that support increased transfer capacity with neighbouring jurisdictions. This includes, but is not limited to, restoring existing intertie capacity, support for merchant transmission additions and implementation of dynamic scheduling solutions.
	2015 Progress	Implemented system changes in support of the new LSSi contracts. Completed implementation of revised operating limits.
	2016 Plan	A number of system changes are planned to support restoration of intertie capacity. These include: improvements to available transfer capacity (ATC) posting information (e.g. include Operating Reserve (OR) volumes, enhancement of commenting capabilities, modify manual posting); implementation of EMS or other changes to address OR requirements for interties; and implementation of changes required to support Regulating Reserves over the Interties.
Technology Review (Website tools and Content)	**Description**	Replacement of discontinued web hosting technology in support of hosting AESO.ca
	2015 Progress	Completed high level planning and requirements activities including the initial assessment of the current state and external options. Work is underway on content strategy analysis and development and related clean-up and pre-transition activities. Complete detailed requirements and definition activities, which includes business and end-user research
	2016 Plans	Complete content strategy and develop the new end-user interface; transition and test the internal (Watercooler) and external corporate (AESO.CA) websites in their new environments; retire the old websites; and provide end-user training.
Key Initiatives		**$5.3 million**

Other Capital Initiatives ($ million)

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

Other Capital Initiatives	Description	2016 Capital Budget Total
Oracle Environment Refresh	Refresh the database platform that supports the AESO's critical systems. This refresh includes a software upgrade, an infrastructure refresh and data migration.	2.5
System Enhancement Program	Ongoing high priority minor enhancements to production applications.	0.9
EMS Real Time Congestion Forecasting	Upgrade of the EMS Look Ahead module to support congestion mitigation analysis. The module averts incorrect curtailments and reliability issues from occurring.	0.4
Financial System Upgrade	Upgrade of the corporate financial system (commercial software package) and system changes supporting deferral reporting (roll-forward) requirements.	0.4
PI Historian Upgrade Implementation	Upgrade of the real-time reporting software. The upgrade includes software, infrastructure and integration requirements. EMS upgrade is dependent on the completion of this project.	0.3
Compliance Reporting Enhancements	Data provisioning enhancements to upload selected production data into the corporate information management platform to support compliance analysis and reporting.	0.2
Leasehold Improvements	Office furniture purchase, replacement and other leasehold improvements.	0.1
Miscellaneous	Other system projects not exceeding $0.1 million.	0.4
Other Capital Initiatives		**5.3**

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	2016 Capital Budget Total
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
Network Upgrades	Upgrade AESO voice and data networks to ensure vendor support, meet reliability requirements and address increased capacity needs. This includes data switches, remote access capabilities, and redundancy of critical network services.	1.2
Storage Upgrade	Implement selected storage infrastructure upgrades to address existing end-of-life cycle considerations, support the high-performance storage requirements of on-line stakeholder systems and increase the reliability/availability of critical data systems between the AESO's data centres.	0.9
Enterprise Services	Upgrades to the AESO inter-application messaging platform to ensure consistent and accurate data is exchanged.	0.6
Monitoring Solutions	Upgrade and integration of disparate monitoring solutions for a more holistic view of infrastructure and application performance.	0.6
Communications	Upgrade, optimization and consolidation of voice (telephone) systems to ensure continued reliability.	0.5
Applications Lifecycle	Upgrades to the underlying technologies that support the AESO's corporate and enterprise applications.	0.5
End User Computing	Upgrade activities that keep the end user computing platform current.	0.4
Database Upgrade	Upgrade to the database environment that supports the AESO's critical applications.	0.2
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).	0.4
Life Cycle Initiatives		**6.5**

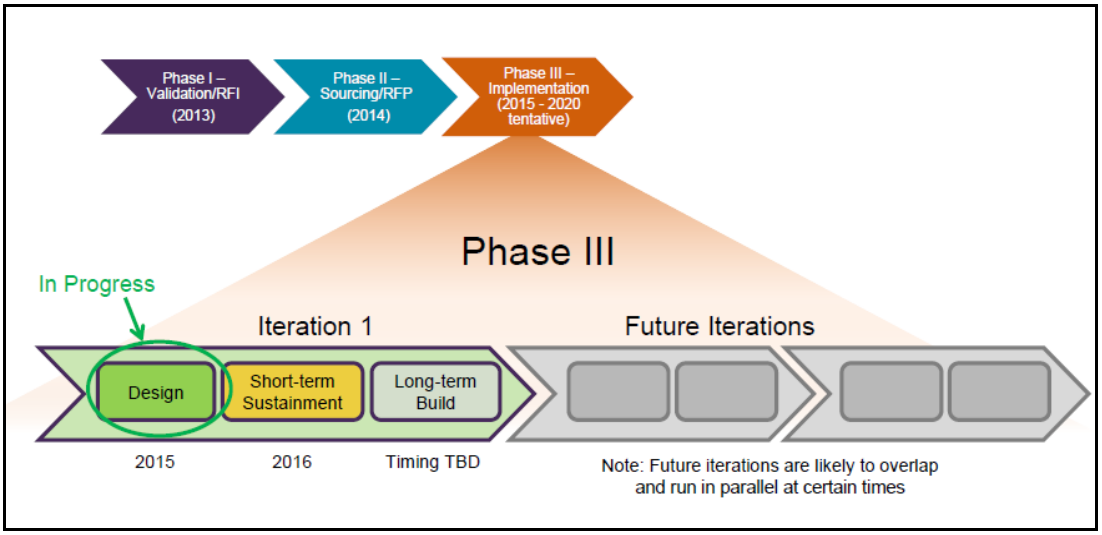
Differences are due to rounding

Appendix F: Major Projects

Market Systems Replacement and Reengineering (MSR) Project

MSR Project Overview	
Description	Reliable operation of the wholesale electricity market and timely evolution of the market both require reliable and flexible AESO market systems. The AESO's market systems have endured a significant amount of change and growth over the past several years including enablement of the DDS (Dispatch Down Service) market, wind management, LSSi (Load Shed Service for Imports), congestion management, supply surplus, multiple intertie projects and others. Many systems have been stretched past their useful life and in many cases, have become increasingly difficult and costly to change and operate reliably. An end-to-end system replacement requires a solution with broad flexibility to mitigate uncertainty of future market scenarios. Phase I research suggested that available solutions do not have this flexibility and Phase II activities confirmed this understanding.
Scope of the Market Systems	Multiple interrelated market systems are in scope for this project. This includes the AESO's Energy Trading System (ETS), Ancillary Services Procurement system (ASP), Dispatch Tool (DT), settlement systems and other market related tools. The market components of the Energy Management System (EMS) are also included.
Project Approach	A multi-year phased approach is recommended to incrementally address the AESO's highest priorities with a minimum amount of change rather than an all-at-once replacement (i.e., the AESO is not doing what is sometimes known as a "big bang" implementation). A phased implementation approach will: • Minimize the business impact by reducing the learning curve for end-users and the number of requirements (processes, people and technology) that need to be in place. • Ensure the AESO replaces only what is needed which may help to reduce the overall costs. • Allow for multiple and frequent decision points to ensure the AESO is delivering the right priorities at the right time. • Provide the opportunity to assess impacts of each phase and incorporate learnings into subsequent phases to allow for better planning of future releases. <u>Phase I – Validation (completed December 2013)</u> This phase included project definition, understanding long-term business drivers and requirements, business process analysis, high-level solution option analysis, narrowing the list of potential implementation partners, and business

MSR Project Overview	
	case development. MSR Phase I clearly identified the need for change to the AESO's market systems is significant and growing. As the status quo for these systems will not meet the industry's and the AESO's future needs, it is appropriate that the AESO proceeds with MSR Phase II. This will mitigate growing technology risk, address market evolution scenarios and meet ongoing expectations for reliability of market operations and systems. <u>Phase II – Sourcing / Request for Proposal (completed December 2014)</u> MSR Phase II objectives are: • Refine the target state of what market systems should be to meet the industry's future needs by further defining business and technical requirements • Determine candidate vendors, execute and evaluate RFP • Establish sequencing and implementation plan for MSR Phase III On December 9, 2014, the AESO Board approved Phase III of the MSR project to address the long-term lifecycle needs of the market systems. <u>Phase III – Implementation</u> 2015 Accomplishments: • Progressed the design of a long-term market systems foundation enabling sustained and improved reliability • Progressed the requirements for market systems capabilities that would address the most likely market evolution scenarios in the long-term • As a result of external uncertainties, additional focus was placed on the planning and design of short-term measures to sustain the reliability of the our current market systems The MSR project was reviewed as part of its ongoing evaluation of the strategy, priorities and timeline to ensure the project continues to be managed prudently and the AESO delivers the right solutions at the right time. The AESO's Phase III implementation strategy has always been to incrementally and iteratively address highest priorities with minimum change. With the current external environment there is less certainty of what the future market scenarios may be. Given this, the AESO is deferring the implementation of longer-term solutions in 2016. The focus for implementation efforts will be on the short-term measures designed in 2015 to sustain the reliability of current market systems. Longer-term solutions will be evaluated in 2016. The preliminary estimate for 2016 is $2.5 million capital.


Phase I – Validation/RFI (2013)
Phase II – Sourcing/RFP (2014)
Phase III – Implementation (2015 - 2020 tentative)
Phase III
In Progress
Iteration 1
Future Iterations
Design
Short-term Sustainment
Long-term Build
2015
2016
Timing TBD
Note: Future iterations are likely to overlap and run in parallel at certain times

Energy Management System (EMS) Implementation

EMS Implementation Project Overview	
Description	The Energy Management System (EMS) is a critical control system used by the AESO to manage and operate the Alberta Interconnected Electric System (AIES). The existing EMS 2.5 system was implemented in 2009 and is approaching a state where it will no longer be supported by the vendor. The current hardware and software is referred to as system end-of-life and vendor support shall cease in 2016. It has become increasingly complex to maintain and increasingly costly to ensure its reliable and secure operation. In addition, the current EMS system will not meet the compliance requirements when the Critical Infrastructure Protection (CIP) regulations take effect in 2017. Although the AESO has taken steps to ensure the current system continues to meet reliability standards, it cannot fully mitigate the natural consequences of an aging system and the limitations of a non-supported EMS platform. More costly and frequent break-fixes are occurring and the risk of critical outages continues to grow. In response, the AESO started the EMS 3.0 Program to begin planning the upgrade to the current system. Due to the complexity and criticality of the initiative the Program initiated a 12 month Definition Phase in September 2014 to complete all the detailed requirements: costing, planning and design activities required before embarking on the Implementation Phase. The objective of the Implementation Phase is to complete the installation of both the Alstom EMS 3.0 application and new infrastructure. EMS 3.0 will be built new-on-new, meaning a new version of the application software configured on a new server, networking and security infrastructure. This allows the new system to be brought online in parallel with the current system and undergo thorough testing before cut over. EMS 3.0 will provide like-for-like functionality with the current system but with a number of the existing customizations now included as core functions. The second objective is to implement a fully integrated EMS lifecycle management plan to manage the new system and ensure the reliable and efficient operation of the AESO EMS 3.0. All CIP compliance requirements will also be met.

EMS Implementation Project Overview	
Scope of the EMS 3.0 Program	The EMS 3.0 Program scope includes the implementation of all core application functionality (Core Services, Network Applications, SCADA, Generation, Dispatch Training Simulator (DTS), E-Terrasource modeling, and User Interface updates) and integration with AESO external systems. It also includes installing all new infrastructure such as servers, storage, security and networking equipment. Following the cutover of the new system, the program will complete the decommissioning of the current EMS 2.5. To optimize the operational sustainment of the EMS system the Program will also implement an EMS lifecycle management plan to manage the operational processes as well as the scheduling and costs of system maintenance, upgrades and enhancements (both application and infrastructure) throughout its lifecycle until 2021.
Program Approach	A multi-year phased approach has been proposed to incrementally address the EMS 3.0 Program. <u>Phase I – Validation (completed 2014)</u> During the Validation Phase evaluation of the environment as well as a technical assessment of the EMS 2.5 system was completed, the remainder of the EMS 3.0 program was then broken down into a Definition and Implementation Phase. <u>Phase II – Definition Phase (completed Q3 2015)</u> The objective of the Definition Phase was to complete the detailed requirements, design, cost and schedule estimates and planning documents necessary to ensure successful delivery. A System Integrator with expertise in the planning and delivery of large-scale projects in the Energy Management sector was engaged to support the internal resources and to ensure all necessary deliverables were completed. The resulting Definition Phase recommendation to proceed with the EMS implementation was approved by the AESO Board September 2015. <u>Phase III – Implementation (tentative completion Q2 2017)</u> The implementation project will be structured into two parallel streams, Application and Infrastructure. The streams have been broken into eight phases: Development and integration; Pre-Factory Acceptance Testing; Factory Acceptance Testing (FAT); Site Acceptance Testing (SAT); User Acceptance Testing (UAT); Deployment; Warranty; and Decommissioning. The implementation has a target go-live date of June 2017. The estimated cost is $31.7 million (excludes capitalized borrowing costs). The testing phases last for a total of 10 months. Testing begins with Pre-FAT and FAT. During these phases, the vendor Alstom and AESO test the individual components. Once FAT is complete, the teams test the system end-to-end during SAT and UAT. For each testing phase specific acceptance

EMS Implementation Project Overview	
	criteria must be met. At the end of testing, EMS 3.0 will be deployed to Production in a phased cutover and will run in parallel to EMS 2.5 for 1,000 hours. On successful completion of this availability test, the cutover to EMS 3.0 will be completed and EMS 2.5 decommissioning can start. The Implementation Phase also includes extensive training, life-cycle management planning and documentation, process definition and knowledge transfer to transition to the System Controllers and operational teams for real-time support, and ongoing operational sustainment.

System Coordination Centre (SCC) Expansion Project

System Coordination Centre Expansion Project	
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 SCC 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 room, storage and backup control centre facilities.
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 June 2015)</u> The Validation Phase is intended to provide 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. This phase was completed in June 2015. It recommended the execution of the Definition Phase for a full scale SCC Expansion. The cost estimate for this next phase is $1.3 million in capital with completion scheduled for Q3 2016. <u>Phase II – Definition Phase</u> The Definition Phase will serve as a prerequisite for the full scale SCC expansion. Activities planned include detailed business requirements, detailed design, resource requirements and timeline for the remainder of the expansion, and identify cost estimates with a higher degree of confidence for

System Coordination Centre Expansion Project	
	the Implementation Phase. The information developed during the Definition Phase will be used to prepare a separate business case for the Implementation Phase. <u>Phase III – Implementation (tentatively 2016/2018)</u> If approved, the Implementation Phase will include the tendering of the construction to a general contractor/construction firm, commencement of construction, AESO IT infrastructure, furniture, cabling, meeting room spaces, security, commissioning of the site and warranty activities. The preliminary cost estimate for the Implementation Phase is $17.0 million to $25.0 million in capital with completion scheduled for 2018.

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[19]	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

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

Section 5

Stakeholder Comments and AESO Responses

Throughout the current year Budget Review Process (BRP), we held meetings with stakeholders to discuss our 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		Sept 21 Business Initiatives Calgary	Oct 5 Budgets/ Forecast Calgary	Oct 7 Budgets/ Forecast Edmonton
Alberta Direct Connects (ADC)	Attendance	√		√
AltaLink	Attendance	√	√	
ATCO Electric	Attendance	√		√
Artic Institute of North America (AINA)	Attendance	√	√	
BP Canada	Attendance	√	√	
Capital Power Corporation	Attendance	√	√	
City of Calgary	Attendance	√		
DOW Chemical	Attendance			√
ENERNOC	Attendance	√		
Industrial Power Consumers Association of Alberta (IPCAA)	Attendance	√	√	
TransCanada	Attendance	√		
Utilities Consumer Advocate	Attendance	√	√	

The following table identifies the key BRP dates in 2015.

Key BRP Dates in 2015	Purpose
August 21	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 21	First stakeholder meeting – Stakeholder meeting to discuss the 2016 business initiatives.
October 5 (Calgary)	First technical meeting - Stakeholder meeting to review the 2016 own costs budgets (general and administrative, interest, amortization, capital and other industry costs) and for transmission line losses and ancillary services costs.
October 7 (Edmonton)	Second technical meeting - Stakeholder meeting to review the 2016 own costs budgets (general and administrative, interest, amortization, capital and other industry costs) and for transmission line losses and ancillary services costs
November 20	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 – 2016 Budget Review Process, Invitation to Stakeholders and Supporting Material

August 21, 2015

The AESO has asked market participants and interested parties to participate in the AESO's consultation regarding its 2016 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 2016 Budget Review Process (BRP)?
Alberta Direct Connect (ADC) Yes, the ADC accepts the invitation and appreciates the opportunity to participate. AltaLink Plans to participate in the 2016 BRP. Arctic Institute of North America, University of Calgary (ANIA) and International Energy, Environment and Legal Services Ltd. (IEELS) Accepts the invitation to participate in the BRP. ATCO Electric Yes, ATCO Electric intends to participate in the AESO's 2016 BRP. Independent Best Consulting Solutions (BCS) accepts the invitation to participate. Capital Power Corporation Capital Power accepts the invitation to participate in the 2016 BRP. EnerNOC Expects to participate as an observer to the process.

Industrial Power Consumers Association of Alberta (IPCAA)
Yes. IPCAA will participate in the 2016 AESO Budget Review Process.

TRANSALTA Corporation (TAC)
Plans to participate in the 2016 process.

Utilities Consumer Advocate (UCA)
Yes, the UCA intends to have a representative at the September 18th and the October 5 meetings.

The Alberta Electric System Operator (AESO) thanks stakeholders for their commitment and support to the process

Terms of Reference
Do stakeholders agree with or have comments on the principles set out in the in the Terms of Reference?

ADC agrees with the Terms of Reference.

ATCO Electric supports the principles set out in the Terms of Reference.

BCS – agrees with the Terms of Reference.

Capital Power agrees with the principles set out in the Terms of Reference.

IPCAA will comply with the Terms of Reference, as written. The AESO could be willing to accept comments from meetings as well as written comments, instead of restricting the process to written comments only.

Noted. The BRP is a consultative process. The AESO agrees that verbal comments are important and are always encouraged as they provide valuable input for discussion and consideration. Written comments will continue to be requested following a stakeholder meeting as they facilitate process transparency and allow for the greatest consideration of stakeholder viewpoints by management and the AESO Board.

The UCA has no issues with the Terms of Reference.

Process Steps
Do stakeholders agree with or have comments on the steps identified in the BRP Process?
The ADC supports the identified steps in the process. ATCO Electric agrees with the steps identified as they are consistent with those used successfully in previous BRPs. BCS – Process is similar to what we as an industry have developed over the past few years and as such seems reasonable, fair and efficient. Capital Power has no comments on the BRP Process at this time. IPCAA is familiar with the AESO's BRP steps and has no comments on the process. The UCA has no issues with the steps identified in the BRP Process. **Comments noted.**
Calendar and Schedule
Do stakeholders agree with the proposed BRP stakeholder calendar? Are there any comments regarding the meetings scheduled? Would stakeholders attend the proposed Forecasts and Own Costs meeting in Edmonton?
ADC is planning on attending the Edmonton session. ATCO Electric does not have any concerns with the proposed BRP stakeholder calendar. ATCO Electric intends to attend the proposed Forecasts and Own Costs meeting in Edmonton on October 7. BCS – May need to dial into the September 18th session. Capital Power will attend the proposed Forecasts and Own Costs meeting in Edmonton and appreciates the option of location. IPCAA notes that - The Business Strategies / Initiatives Meeting, scheduled for September 18th is at the same time as the September Transmission Facilities Cost Monitoring Committee (TFCMC) meeting in Edmonton. The oral presentations to the AESO Board (which seem to be scheduled for November 20th) are at the same time as the November TFCMC meeting, also in Edmonton. These dates will likely affect a few stakeholders. IPCAA will attend the Forecasts and Own Costs meeting in Calgary on October 5th.

Noted. The AESO has reviewed the external scheduling conflicts identified and followed up with alternative options. With this in mind, the AESO would like to highlight that the Business Strategies and Initiatives meeting has been rescheduled from Friday, September 18 to Monday, September 21.

The UCA has no issues with the proposed BRP stakeholder calendar. The UCA does not intend to attend the Forecasts and Own Costs meeting in Edmonton.

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

ADC - None

ATCO Electric appreciates the opportunity to participate and has no additional comments at this time.

Capital Power requests that the AESO provide stakeholders with the estimated 2016 Energy Market Trading Charge as part of the Forecasts and Own Costs materials to be distributed on September 29, 2015.

Noted. The target date for publishing the estimated 2016 Energy Market Trading Charge is October 28th. A number of considerations prevent the presentation of an estimate projection at the Technical Meeting. This includes receipt of flow-through costs from external parties and the development of the allocation model (which requires a review of all the budget costs and then determines the percentage to be allocated to the Energy Market Trading Charge). Regardless, AESO management recognizes the importance of this information in supporting the stakeholder budgeting process and will make an effort to provide a high-level indication of the trading charge direction, e.g. increase/decrease at the Technical Meeting.

Capital Power requests that the AESO provide an update on the current status of the Market System Replacement (MSR) project, including the most recent cost projections, at the proposed September 18, 2015 Business Strategies/ Initiatives meeting.

Noted. The AESO intends to provide summary information regarding its major projects including the MSR as part of the Own Costs presentation (October 5 – Calgary and October 7 Edmonton). Stakeholders can also access the AESO website to obtain ongoing project information updates by following the navigation path > Market > Market Systems Replacement Project or by selecting <here>.

IPCAA - No additional comments.

The UCA has no further comments at this time.

Stakeholder Comments and AESO Replies Matrix

AESO Consultation – 2016 Budget Review Process: Meeting September 21nd - AESO's Preliminary List of 2016 Business Initiatives

The following information is intended to summarize AESO management's response to stakeholder comments on the AESO's preliminary list of 2016 Business Initiatives. This information was presented to stakeholders at the September 21st Budget Review Process (BRP) meeting in Calgary

Preliminary List of 2016 Business Initiatives – September 21, 2015 meeting
Do stakeholders have any comments on the AESO's Business Initiatives proposed for 2016?

ATCO Electric

1. ATCO Electric is in overall support of the AESO's Business Initiatives proposed for 2016. In particular, ATCO commends the AESO for its innovative initiative to recommend and review the potential for principle-based project procurement rules with industry stakeholders in an effort to promote greater regulatory efficiency and reduce the regulatory burden and cost to ratepayers of lengthy compliance audits by the AESO.

   Comment 1. Noted

2. ATCO Electric also supports the AESO's plan to run the stakeholder consultation on procurement principles simultaneously with the other AESO Rule 9.1 consultation on its new draft Rule for project cost estimating.

   Comment 2. Noted

3. ATCO Electric also appreciates the AESO amending its 2016 business initiatives list to more accurately identify the scope of its work in promoting greater regulatory efficiency through both the new Abbreviated Need Application Process (ANAP) and the new Abbreviated Need Information Documents requirements, as well as the differences between ANAP and ANID versus the standard NID process and AUC Rule 7 information requirements.

Comment 3. Noted

Capital Power

Capital Power is supportive of the AESO's annual Budget Review Process (BRP) and appreciates the overview provided by the AESO of its preliminary list of business initiatives for 2016. Capital Power trusts that the AESO will continue to engage in constructive and meaningful consultation with stakeholders on individual initiatives as they are identified and progress from development through to implementation.

Noted. The BRP is designed to identify the business initiatives that the AESO plans to initiate or progress in 2016. Detailed plans for each initiative are shared with stakeholders when the initiative is initiated which includes stakeholder engagement.

The information provided by the AESO in the BRP allows Capital Power to gain a better understanding of the AESO's priorities for the upcoming year. The details that emerge through this process are valuable inputs into Capital Power's own internal business planning and resource management. In this context, Capital Power would appreciate further information from the AESO on the following elements:

1. At the stakeholder review session hosted on September 21, 2015, the AESO communicated that it plans on issuing further information regarding next steps of the **Market System Replacement (MSR)** initiative in the coming weeks. Given that the MSR project could potentially have significant impacts for market participants and the systems they currently have in place, the AESO should provide market participants with information regarding key design priorities and implementation timelines. Capital Power encourages the AESO to continue to include workshops at each design phase similar to the AESO session hosted on May 26, 2015. This previous workshop was insightful and, going forward, will provide a forum for subject matter experts from the AESO and stakeholders alike to discuss design details and potential implementation issues or solutions. Capital Power submits that these types of collaborative efforts will facilitate and expedite each iteration.

Comment 1. Agreed. Stakeholder consultation is a fundamental AESO principle. A market participant stakeholder project status update is to be published on the AESO website in October. In addition, the AESO intends to provide summary information regarding all of its major projects including MSR as part of the upcoming Own Costs presentation (October 5 – Calgary and

October 7 Edmonton). The AESO does not expect MSR to have a significant impact on stakeholders in 2016 as the project will be focused on the sustainment of existing systems.

2. As part of the **Intertie Restoration** initiative, the AESO notes several expected achievements in 2015 including a review of regulating reserve. Capital Power understands that the AESO is currently conducting a pilot study to determine whether current systems can support the scheduling of regulating reserves over the BC intertie. Details regarding this pilot do not appear to be well documented or communicated on the AESO's website. Capital Power would appreciate the AESO providing clarification regarding the expected next steps of the pilot (and any other Intertie Restoration initiative related activity), information regarding the processes envisioned to provide updates to market participants and the prospect for stakeholders to provide feedback on any proposed actions being considered as part of the pilot and review.

Comment 2. The Regulating Reserves Over the Intertie(RROI) validation project goal is to determine whether the current version of the Dynamic Scheduling System ("DSS") can support the scheduling of regulating reserves over an intertie. As part of this project, the AESO sent a letter to the Alberta MSA requesting exemption to subsection 9 of section 205.4 of the ISO rules. The exemption was requested for the period between August 15, 2015 through December 31, 2015. The MSA granted the requested exemption by way of a letter dated July 30, 2015. Both letters could be found posted on the MSA website. The project is currently awaiting the release of the latest version of the DSS system from OATI prior to initiating the validation testing. The release of the latest version of the DSS system has seen a delay at this point. As such no testing has been commenced/completed to date. If the "DSS" technology solution is found to be feasible, the AESO will proceed with the necessary consultation and rule making process.

3. The AESO maintained that it continues to prepare for the operation of the HVDC transmission lines which are both expected to begin service in Q4/2015. According to the AESO's presentation, this preparation also includes supporting transmission facility owners with commissioning activity. I) Capital Power urges the AESO to communicate its plans regarding testing and commissioning to all stakeholders where these activities may potentially impact or disrupt the normal operation of the market. In addition, II) Capital Power suggests that updates to a 2013 document issued by the AESO on HVDC integration and operation with additional details in each of the sections.

Comment 3.

I) Outage information associated with the planned HVDC commissioning activities are maintained and published on the AESO website.

II) **There are no plans to update to the 2013 document issued by the AESO on HVDC integration and operation. The document sections remain current other than the Targeted Integration Milestones section. Management plans to publish a notice in October that will broadly outline the commissioning schedule and planned in service date (ISD)s. Industry participants will be advised to call the AESO if they have more detailed questions.**

The *Preliminary List of 2016 Business Initiatives* presentation (the "Presentation") highlights several drivers of planning uncertainty that may impact identified business initiatives contemplated for the 2015/2016 timeframe. Capital Power respects that the AESO may need to adjust the 2016 budget as a result of these drivers; however, Capital Power has serious concerns regarding the development of any initiative in advance of and absent any policy direction from the Government of Alberta.

4. A new business initiative identified by the AESO titled "Voluntary Extended Generator Withdrawal from Energy Market Merit Order" was expressed as being a priority for 2015. The initiative itself was described in the stakeholder session as the "Mothballing" of generating facilities and conceptually, would be similar to very long lead time assets. In the case of "mothballed" generating units, the available capacity of these units would not be part of the energy market merit order but could be called upon to generate power to address reliability and potentially resolve short term supply shortfall. According to the Presentation, the initiative's expected achievement for 2015 is to conduct consultation with interested stakeholders.

   Capital Power believes it would be premature and inappropriate for the AESO to initiate consultation on this issue prior to clarification by the Government of Alberta on its climate change policy direction regarding the electricity sector. The forthcoming Government of Alberta announcement may specify measures that stand to impact the operating status of thermal generating units and could provide important direction and expectations regarding standards for coal generating units, including the terms, if any, under which units could be "mothballed." In this regard, Capital Power submits that the issue of mothballing of units, versus outright retirement, invokes broader policy issues relating to environmental standards and permitting requirements that, respectfully, are outside of the AESO's mandate and that Capital Power believes would need to be resolved prior to consideration by the AESO of the terms under which mothballing might be operationalized within the AESO rules framework.

   In addition to this fundamental concern, Capital Power also notes that any AESO efforts regarding this business initiative, to the extent it nevertheless decides to proceed at this time, must be premised on any "mothballed" unit complying with existing environmental compliance requirements including those under the Clean Air Strategic Alliance and federal regulations regarding capital stock turnover relative to emission performance standards for greenhouse gases and critical air contaminants.

   Further, "mothballed" units would present serious challenges and risks both from a rules and integration perspective, and with respect to fundamental principles underlying the market. Mothballed units will not bid into the market and consequently cannot align with the current Must Offer Must Comply obligations. Special treatment for mothballed units in this context raises issues of equity and fairness for all other units and participants. To the extent discussion of any new framework governing mothballed units can be expected to include arguments that some level of compensation be made available to ensure mothballed capacity remains accessible to the AESO, rather than retired, Capital Power notes such compensation would represent a de facto capacity payment that would be inappropriate in Alberta's market design, create inequities among and between generators, and distort investment and retirement signals.

Comment 4. Management highlights that this business initiative is not in response to potential changes in climate change policy, although the resulting recommendations may become relevant at some time in the future. At the request of stakeholders, the Voluntary Extended Generator Withdrawal from Energy Market Merit Order business initiative has been identified in recognition of the current economic environment, the related market pricing trends and the potential economic-withdrawal of units having (must offer/must supply) obligations within Alberta's FEOC based market. Clarification of the related market participant's obligations is in fact one of the key deliverable of this business initiative.

It also is important to note that this business initiative is early in its lifecycle as the program scope has not been fully defined. Ongoing consultation will provide additional details to stakeholders.

Industrial Power Consumers Association of Alberta

1. **Transmission Rate Impact Projection –** IPCAA members are interested in consistent, updated information on transmission rates forecast at least on an annual basis, preferably a semi-annual basis. Waiting for the AESO's Long Term Update in Q1 2016 means a considerable gap. The last public TRIP update was June 2014.

Comment 1. Noted. The AESO is currently reviewing the Transmission Rate Impact Projection (TRIP) workbook development process of providing periodic updates. The AESO has committed to publishing an updated TRIP with the upcoming 2017 Tariff Application.

2. Re: **Market Participant Choice**: it would be beneficial to release information to the market regarding uptake of this program. Also, a (potentially informal) survey of market participants could identify reasons for low uptake and any potential problems with the program.

Comment 2. Noted. AESO practice is to conduct a process review 12-18 months after the implementation of a new product or service. Management will review the request to publish results at that time.

3. IPCAA is supportive of the **AESO Website Refresh** project.

Comment 3. Noted

4. Re: **Energy Management System (EMS) Upgrade**: It is our understanding that the new EMS implementation will allow for increased efficiencies within the Alberta electricity market including:

   Dynamic Scheduling to allow for more responsive interties, which will provide for:
   A more competitive marketplace; and
   Ultimately, a reduced cost of electricity.

   Dynamic Line Ratings, which should increase the transmission capability of the Alberta electricity system, especially in areas of wind generation without the need for new transmission lines or sub-stations. This means a potentially large cost savings, leading to:
   Enhanced reliability;
   Reduced cost of electricity;
   Reduced cost of transmission; and
   Improved access to renewable energy.

   Since the EMS system will be in-place in mid 2017, will the AESO begin immediate stakeholdering on these two important AESO initiatives in order to maximize the benefit to the Alberta market, rather than waiting until after the EMS is implemented? Meshing the implementation of these initiatives with the EMS would certainly go a long way towards enhancing both the benefit of the EMS upgrade and ameliorating the increased costs.

Comment 4. Noted. There are no immediate plans to make Dynamic Scheduling or Dynamic Line Rating stakeholdering initiatives a priority within the 2016 Business Plan. Management has reviewed and reconfirmed the priorities of the business initiatives proposed and believes that its finite pool of resources will be fully committed due to the related magnitude of work. Should the actual resourcing demands of the business initiatives proposed be less than planned, the opportunity to initiate these two requests will be reevaluated.

TransCanada Energy

1. TCE looks forward to participating in the new initiative dealing with the voluntary extended generator withdrawal from the EMO

Comment 1. Noted

Utilities Consumer Advocate

1. The list of Business Initiatives is comprehensive. The UCA will look to address issues in the next phase of the BRP consultation or in the individual initiative consultations.

Comment 1. Noted

Other Comments

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

ATCO Electric appreciates the AESO's plan to hold a Budget and Own costs presentation in Edmonton as well as Calgary.

Noted.

Capital Power remains interested in understanding the **priority** assigned to the various Business Initiatives proposed by the AESO for 2015/2016 and the AESO's basis for determining such priorities. The AESO should provide this information to stakeholders at the earliest opportunity in the BRP process.

Noted. Management reiterates that the business initiatives identified in the BRP Business Initiatives presentation are considered its priorities for 2016. This includes a high level overview of the associated scope of work and timing proposed. In addition, ongoing progress updates for each of the business initiatives identified is published on the AESO website on a quarterly basis (see Quarterly Financial Reporting).

IPCAA - No additional comments.

Noted.

TCE requests the AESO conduct the necessary internal assessment, including implementation, to post the dispatch levels for the HVDC lines. The flows on the HVDC transmission lines, assumed to be part of the SOK cut plane, are key for TCE understanding the:

a. Impact on energy flows in central and southern Alberta, including flows out of the Sheerness Generating Units 1 and 2;
b. Impacts on any other generation capacity owned or under TCE's control, including Saddlebrook, Carseland, Sundance 1 to 4, Redwater, imports and exports;

c. Impact on energy flows that could impact TCE future generation development(s);
d. Impact on energy flows that could impact potential TCE acquisitions;
e. Impact on ancillary services and energy markets; and
f. Impact on transmission losses from Q4 of 2015 and onwards.

Noted. Management will review the need and factors associated with this request.

TCE understands that the AESO will "dispatch" the HVDC lines (direction of flow and volume of flow) which are akin to dispatching a generator in a specific area of the province. (i.e. flows from north to south purposely increase "load" (by injecting into the HVDC system) in the north and increases supply (through withdrawal from the HVDC system) in the south.

In addition, for January 1, 2013 and onwards, TCE requests that the AESO provide historical hourly flows on the SOK 240 kV cut plane which TCE assumes will include the HVDC transmission lines after Commissioning.

The AESO notes that the previous posting of SOK flows from 2006 to 2013 were to assist in market participant's ability to model intertie capability. As noted in the AESO letter of Nov 15th, 2013, the SOK flows are no longer relevant to intertie capability.

Thank you for accommodating the UCA when we were unable to attend the group session.

Noted.

Stakeholder Comment and AESO Replies Matrix

AESO Consultation – 2016 Budget Review Process (BRP):

Technical Meeting October 5th and October 7th
AESO's 2016 Forecasts (Pool Price, Ancillary Services, Transmission Line Losses) and Draft Own Costs (G&A, Capital) Budget

The following information is intended to summarize AESO's response to stakeholder comments on the AESO's 2016 Forecasts and draft Own Costs Budget. The related information was presented at the October 5th and 7th BRP technical meeting(s) in Calgary and Edmonton.

AESO Pool Price Forecast for 2016
Do stakeholders have any comments on the Pool Price forecast for the upcoming year?
Alberta Direct Connects (ADC) 1. Will the AESO update the pool price forecast once the 2016 LTO is available? **Comment 1. The AESO develops its pool price forecast solely in support of the annual BRP technical meeting(s). It does not intend to update the pool price forecast until the next BRP cycle.** **Industrial Power Consumers Association of Alberta (IPCAA)** 1. Has the AESO changed its forecasting methodology at all in the past few years (since EDC stopped providing the forecasts)? **Comment 1. The AESO has enhanced its forecasting methodology, it has not been changed. The enhancements were highlighted during the 2016 Pool Price Forecast portion of the technical meeting. The enhancements include:** • **Wind – the addition of random selection of historical wind profiles and** • **Dynamic Pricing – incorporation of offer strategies when supply conditions are tight** **Utilities Consumer Advocate (UCA)** 1. Has the AESO considered using the forward curve for gas to estimate gas prices for 2016? Or has the AESO undertaken some analysis that shows that their use of a lognormal distribution produces more accurate forecasts of monthly spot prices than the forward market? If not, could the AESO undertake a forecast using natural gas forward curves? **Comment 1. The AESO uses the forward curve for gas prices and applies a lognormal distribution to it for the Monte Carlo analysis.**

AESO Ancillary Services Cost Forecast for 2016

Do stakeholders have any comments on the Ancillary Services Costs forecasts for the upcoming year?

ADC

1. Can the AESO explain the reasoning for the $22M variance of 2015 forecast to projected operating reserve costs? The AESO pool price forecast for 2015 is close to actual and we were anticipating a reduced requirement for operating reserves with the BAL-002. Can you provide the detailed breakdown for Regulating, spinning, supplemental, and standby reserves for 2014 actual, 2015 projected and 2016 Forecast?

Comment 1.

The variance in operating reserve costs in 2015 is mainly attributable to the costs of active regulating reserves. In the time period from January to August 2015, there were 15 days when the on-peak average pool price was above $200 per MWh. The operating reserve costs associated with these days was $58.2 million or approximately 49 per cent of the total operating reserve costs. Operating reserve costs are indexed to the hourly pool price and high pool prices can be associated with periods of planned and unplanned generation outages and transmission system constraints.

Starting in 2015, the forecast for operating reserves costs was based on the forecast operating reserves volumes governed by Alberta Reliability Standards using the contingency reserve standard BAL-002-WECC-AB.

($ million)	2016 Forecast	2015 Projection	2015 Forecast	2014 Actual
Regulating (active)	27.2	31.0	15.7	41.8
Spinning (active)	57.7	48.1	49.4	72.0
Supplemental (active)	40.7	28.8	23.9	54.0
Standby (activated and premiums)	22.7	43.6	41.6	16.8
Non-Compliance and Liquidated Damages	-	-	-	(4.4)
Trading Fees	0.7	0.7	-	0.7
Sub-Total (agrees to BRP presentation)	**149.1**	**152.1**	**130.5**	**180.9**
Non-Compliance and Liquidated Damages	(2.0)	(2.0)	Not forecasted	Included above
Trading Fees	Included above	Included above	Not forecasted	Included above
Total (agrees to BRP proposal document)	**147.1**	**150.1**	**130.5**	**180.9**

Differences are due to rounding

UCA

1. The AESO has mentioned that their forecast predicts a decrease in OR volumes, and the AESO predicts that pool price will also slightly decrease from the 2015 estimate. However, OR costs are predicted to increase by $18.6 million. The UCA understands from the MSA's 2015 Q2 report that standby activated costs escalated from an average of $37.77/MWh in Q1 2015 to $221.16/MWh on average in Q2. The UCA shares the same concerns with the MSA that standby reserves are not indexed to pool price and that when utilizing standby for better import capability, you are taking MW of internal generation out of the merit order in order to enable that same amount of MW to come back in the merit order as imports, while paying to take the standby MW out. The net benefit of this operation to consumers is not clear to the UCA. If the generator offering standby is in merit, then the imports enabled through this standby will not reduce price, and load still pays for the additional standby reserves.

Comment 1. The AESO aware of the concern regarding standby reserves. It is currently investigating alternatives to ensure that the AESO's obligation to restore intertie capability is met in the most cost efficient manner possible while minimizing any potential negative effects to energy and operating reserve market efficiency.

2. Doesn't the use of standby reserves in the way outlined in the MSA report undermine the competitive nature of the active OR market, i.e., if more reserves are required for the normal operation of the market then shouldn't they be acquired through the daily competition for OR and paid for in a similar manner? Please explain.

Comment 2. See the AESO's response to comment 1 above.

3. The UCA would like to see a review of the use of reserves to increase import ATC, including the use of standby reserves themselves. Specifically, an analysis of the price impacts from the additional imports enabled by standby activation versus the cost.

Comment 3. Noted. See the AESO's response to comment 1 above. The AESO will consider this request.

4. The UCA understands the "reliability services" charge to be a payment to BC Hydro for providing some sort of reliability services. The UCA also understands that the annual payments in 2015 and 2016 are essentially a retainer as incremental costs would be incurred if the "service" from BC Hydro was actually utilized. Please confirm our understanding and if you can't please provide details of the reliability services being provided.

Comment 4. The AESO cannot discuss the payment terms of the agreement as they are covered through a confidentiality clause. The reliability services are comprised of grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall.

5. Can you please provide the full agreement for review?

Comment 5. The AESO is unable to fulfill this request. The terms and contents of the agreement are subject to a confidentiality clause.

6. The UCA has a number of questions regarding the reliability service agreement:
   - Is the term of the agreement 15 years? If not, what is the term of the agreement?
   - What are the annual costs in the remaining years of the agreement?
   - What is the total cost to Albertan's in terms of the annual fixed costs?
   - What additional costs will Albertan's pay for actually using reliability services?

Comment 6. Terms and contents of the agreement are subject to a confidentiality clause. Annual fixed costs are $2.9 million per year.

7. What additional services do Albertan's receive through this agreement that they don't get from being members of WECC or the NWPP?

Comment 7. The reliability services are comprised of grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall. These services are over and above those available to the AESO as being part of the NWPP, which primarily consists of reserve sharing with a maximum one hour provision. No contracted reliability services are provided through WECC.

8. Albertans pay for emergency energy services received from Saskatchewan on an as required/used basis. Why is it necessary for Albertan's to pay an annual fee to BC for these services especially when Alberta is part of the WECC?

Comment 8. The WECC does not contract for emergency energy services. The agreement provides greater certainty of provision of the services than would be expected without a contract.

9. Does the AESO have a similar arrangement with Montana? If not, why not? If yes, please provide the agreement.

Comment 9. No, the AESO does not have a similar arrangement with Montana.

The provision of reliability services across the AB-BC intertie offers several advantages over an agreement of this type with Montana including:

- **The volume of services which can be provided across the AB-BC intertie is significantly greater than that which can be provided across the interconnection with Montana (the Montana Alberta Tie Line or MATL).**
- **Current operational restrictions mean that MATL must be taken out of service if the AB-BC intertie is out of service while the**

AB-BC intertie can stay in service even if MATL is out of service.

- **All aspects of the provision of reliability services across the AB-BC intertie are within the control of a single organization (BC Hydro and its' subsidiaries) including generation dispatch control, transmission operation and power scheduling.**
- **The BC electrical system is largely hydro-based with generally greater operational flexibility and capability while the Montana electrical system which MATL connects into is largely thermal based with lower overall capacity and operational flexibility.**

10. Alberta provides reliability services to BC and occasionally supports the East Kootenay Region of the province. How much does Alberta charge BC for these services on an annual basis?

Comment 10. The AESO does not charge BC for potential support of the East Kootenay Region as referenced in the question. The AESO is not contracted by any BC entities to provide the reliability services of grid restoration balancing services or emergency energy services and therefore does not charge for such services.

AESO Transmission Line Losses Costs Forecast for 2016
Do stakeholders have any comments on the Transmission Line Losses Costs forecasts for the upcoming year?

ADC

1. Can the AESO provide any comments on the impact the HVDC lines will have on losses once they come into service in 2016?

Comment 1. Generally speaking, the AESO's expectation is that total line losses volumes will not change significantly in 2016.

AESO Own Costs Budget for 2016
Do stakeholders have any comments on the General & Administrative budget proposal for the upcoming year?

ATCO Electric

1. ATCO Electric commends the AESO for its continued efforts to find efficiencies and cost savings in its General & Administrative budget, such as through the conversion of consultants to permanent AESO staff in a softening labour market.

Comment 1. Noted

2. However, ATCO Electric is surprised at the number of new staff proposed in the 2016 budget (7 FTEs for Critical Infrastructure Protection (CIP) program and 8 FTEs for succession program) during a period when many organizations are maintaining stable or reducing their labour pools in response to economic pressures.

Comment 2. During the 2016 budget process, where possible, resources were reassigned to meet new or changing roles to align to the business initiatives and changes to general staff requirements. At the conclusion of that process, the above noted staff additions remained and were deemed critical for the effective delivery of the AESO's business operations and could not simply be absorbed into department activities.

The recruitment for the CIP roles will be targeted to individuals that have previous experience and knowledge in this technical area.

The positions for succession planning are not permanent roles but positions that will be used for training purposes to enable career progression within the AESO when retirements occur. These roles are associated with engineers and system controllers for training programs and certification processes that take several years to complete. Once an individual associated with this succession planning has been assigned to a role within the department hierarchy, the training role will not be re-hired.

3. The AESO had previously stated, in response to stakeholder comments in the 2014 BRP (TransAlta), that "should additional resources be required, a vacant staff position or budget dollars would be transferred from another area." Can any of the additional staff required to support CIP be transferred from another area or added at a later time (e.g. next year)? Has the AESO compared the total number of staff and staff additions dedicated to supporting a CIP program to other Independent System Operators?

Comment 3. Refer to the response provided to comment 2 above. The AESO communicates with other ISOs on the implementation of CIP to share information and learnings. Each jurisdiction and organization is unique and applies their own implementation strategy.

4. Also, in what year does the AESO anticipate the staff additions for succession planning to be fully offset by related staff reductions through retirements?

Comment 4. The succession planning anticipates that notable retirement impacts to the engineering and system controller roles may start to occur within the next two years.

IPCAA

1. According to the 2015 AESO Own Costs Budget, "Notable Changes in 2015" included beginning the Fort McMurray East transmission line process. Since this did not happen in 2015, can the AESO provide:

    A. the cost savings associated with not beginning this process in 2015?; and
    B. the costs related to starting this process in 2016?

Comment 1.

A. In 2015, the costs associated with consultants and legal services is anticipated to be $1.3 million less than budgeted due to the postponement of the Fort McMurray East process.

B. The 2016 budget does not include any notable costs associated with a competitive process been undertaken by the AESO. The budget impact for a competitive process would need to be assessed based on the specific project details.

2. Can the AESO provide the number of staff allocated to transmission cost monitoring and oversight, as well as any contract resources and capital investment?

Comment 2. Refer to table below.

Transmission Cost Monitoring and Oversight	2016 Plan	2015 Plan	2014 Plan	2013 Plan
Staff (number of resources)	3	3	3	4
Contract resources ($ million)	0.1	0.1	0.1	0.5
Capital investment ($ million)	-	0.2	0.2	0.3

3. In 2016, the AESO is forecasting $1.7 M in Regulatory Process Costs. Can the AESO provide a breakdown of which proceedings these costs will relate to? Can the AESO provide some information on the split between transmission and market allocations for these costs?

Comment 3. The budget for Regulatory Process Costs is not developed through an analysis of specific proceedings given the uncertain nature of the issues that may present themselves during 2016. The following table provides additional details on the 2016 budget:

Regulatory Process Costs	$ million	Budget Cost Allocation
AB Reliability Standards	$0.3	Split
ISO Rules	$0.6	Primarily Transmission
ISO Tariff	$0.4	Transmission
Need Identification Documents	$0.4	Transmission
Total	**$1.7**	

UCA

1. The UCA understands that this reduction in cost is because of the delays in the process for bidding on the second Fort McMurray line. Does the AESO anticipate that this cost will be shifted into the 2017 budget?

Comment 1. This will be assessed as part of the 2017 AESO BRP.

2. The UCA understands that the AESO is currently depreciating software and hardware on a 5 year lifecycle. Has the AESO undertaken any depreciation studies that warrant the current life of hardware and software?

Comment 2. Based on accounting principles and the AESO's assessment of the estimated useful life of the assets, computer hardware is amortized over four years and software is amortized over a period of five to seven years depending on the asset. Major IT systems, such as EMS or MSR, may have different amortization periods. These amortization periods are reviewed each year as part of the AESO's external financial statement audit. The amortization period for computer hardware was changed in 2013 from a three year amortization period to four years to better align to the average useful life of the AESO's hardware assets.

Do stakeholders have any comments on the Capital Budget proposal for the upcoming year?
No stakeholder comments

Special Projects Comments
Do stakeholders have any comments on the Market Systems Replacement and Reengineering (MSR), Energy Management System (EMS) or System Coordination Centre (SCC) Expansion program plans?

ADC

1. One of the items discussed was an AESO Website enhancement project. As the website has become an integral part of our Energy Cost management efforts, what plans does the AESO have to engage market participants in the upgrade?

Comment 1. The AESO will ensure a survey is available for all users of the website to share input and provide advice on how best to update aeso.ca. The survey will also allow respondents to request follow up should they wish to discuss their input in greater detail. This work will be complete before changes are made to the site. It is important to note that ETS is out-of-scope for this project.

ATCO Electric

1. ATCO Electric supports the AESO's decision to defer the design of a long-term market systems foundation given the current uncertainty on future market scenarios.

Comment 1. Noted

Capital Power

1. Capital Power appreciates the updates provided by the AESO regarding the MSR, EMS and SCC initiatives. Given the significance of these initiatives and the potential impacts for market participants, the AESO should take steps to engage and consult with stakeholders in all phases of development and implementation.

Comment 1. Noted. Stakeholder consultation is a fundamental AESO principle. Also, see the AESO's response to ADC comment 1 above.

IPCAA

1. IPCAA is disappointed that the AESO has no immediate plans to make Dynamic Scheduling or Dynamic Line Rating stakeholdering initiatives a priority within the 2016 Business Plan. Is there any recourse for this decision? Could a market participant provide a business case for moving forward with a Dynamic Line Rating initiative?

Comment 1. Noted. The AESO acknowledges IPCAA's offer to develop a related business case for Dynamic Line Ratings but notes that resources are currently not available to move forward with the initiative. The AESO reiterates that should the actual resourcing demands of the 2016 business initiatives be less than planned, the opportunity to initiate these two requests will be reevaluated. The AESO also highlights that the Transmission Facilities Cost Monitoring Committee is engaged in discussion on existing and potential uses of Dynamic Line Ratings in Alberta. Furthermore, the AESO notes that it has initiated a pilot project to test the current version of the Dynamic Scheduling System for Regulating Reserves over the intertie, which may result in more-timely Dynamic Scheduling capabilities being possible if successful.

UCA

1. Given the uncertainty in the industry, which the AESO seems to acknowledge in the MSR project, has the AESO considered canceling or postponing the EMS project or any of the parts of the EMS project?

Comment 1. The AESO did consider both of these alternatives in its decision to proceed with the EMS project. Alternative analysis determined that if the AESO pursued either alternative it would not be able to ensure the timely completion of the EMS upgrade and guarantee the continued support of the system by the vendor and meet the CIP standard effective date and its related requirements. Given the function of the EMS in monitoring and coordinating the grid, the requirements of the EMS upgrade program are unlikely to be impacted by any uncertainty or policy change that affects the industry.

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

ADC

1. One of the ADC concerns is the time it took the AESO to complete the 2013 and 2014 deferral account reconciliation. The delay has cost our members several hundred thousand $ in foregone interest as our refunds exceed $7M. ADC requests the AESO allocate appropriate resources to complete the 2015 deferral account reconciliation in a timely manner and also work to resolve the underlying Rider C problem that is causing the large amount of reconciliation among DTS customers.

Comment 1. The AESO acknowledges ADC's comment regarding the impact of the 2013-2014 deferral account reconciliation on their members. The AESO is working on a resource plan and schedule which would enable the filing of the 2015 deferral account reconciliation as soon as reasonable in 2016. The AESO is forming a working group to further investigate Rider C structure and deferral accounts reconciliation methodology.

2. ADC appreciates that the AESO presented this material in Edmonton.

Comment 2. Noted.

AltaLink

1. What will the AESO require from TFOs to meet some of their objectives? There are several initiatives (including additional new ones, specifically the SCADA WAN and the Frequency Response assessment) that may require substantial support from AltaLink and other industry partners for the AESO to achieve their objectives. It would be helpful if the AESO could provide at an indicative assessment of the support/resources the AESO will be expecting, if any, from AltaLink (and other industry participants) for each of the initiatives.

Comment 1. Noted. As part of its normal consultation process the AESO will engage its stakeholders to discuss the related business impact, including resourcing and timing requirements, for any project or service offering under development. The AESO highlights that the stakeholders (e.g. transmission facility owners, AltaLink) who will be impacted by the SCADA/ Wide Area Network project have been contacted and are currently engaged in the project. Frequency Response assessment and related initiatives are in the early stages of their lifecycle. As a result, required stakeholder consultation has not been determined.

ATCO Electric

1. ATCO values the opportunity to participate in the AESO's BRP and appreciates the information that the AESO has shared.

Comment 1. Noted.

Capital Power

1. Capital Power appreciates the AESO providing the option to stakeholders to attend the Technical Meeting in both Edmonton and Calgary and hopes that the AESO will continue to provide this option in the future whenever practicable.

Comment 1. Noted.

2. Capital Power appreciates and is supportive of the efforts made by the AESO to provide a preliminary Energy Market Trading Charge for 2016 prior to the release of the Draft Business Plan and Budget. The AESO should continue this practice and aim to provide such information as early as possible in the BRP Process.

Comment 2. Noted.