EB-2017-0150
ONTARIO ENERGY BOARD

IN THE MATTER OF subsection 25.(1) of the *Electricity Act, 1998*;

AND IN THE MATTER OF a Submission by the Independent Electricity System Operator to the Ontario Energy Board for the review of its proposed expenditure and revenue requirements for the fiscal year 2017 and the fees it proposes to charge during the fiscal year 2017.

SUBMISSION FOR REVIEW

1. The Independent Electricity System Operator ("IESO") submitted its 2017-2019 Business Plan to the Minister of Energy ("Minister") for approval pursuant to section 24 (1) of the *Electricity Act, 1998* as amended ("Act") and the IESO received a letter from the Minister approving the Business Plan.

2. The IESO hereby submits to the Ontario Energy Board (the "Board") its proposed 2017 expenditure and revenue requirement and the fees it proposes to charge in 2017 (the "2017 Revenue Requirement Submission" or "Submission") for review and approval pursuant to subsection 25 (1) of the Act.

3. The IESO proposes a 2017 revenue requirement, excluding forecast revenue, of $191.4 million and a net revenue requirement of $190.8 million.

4. The current IESO usage fees of $1.1636/MWh for domestic customers and $0.9603/MWh for export customers were made interim effective January 1, 2017 by a December 29, 2016 Board Decision and Order (EB-2015-0275). The IESO proposes usage fees for the same customer classes approved by the Board in EB-2015-0275, of

$1.2187/MWh for domestic customers and $0.9872/MWh for export customers effective January 1, 2017. Domestic customers include all withdrawals for consumption in Ontario and embedded generation.

5. Pursuant to subsection 25 (1) of the Act, the IESO is seeking the following approvals from the Board:

   a) Approval of the proposed IESO usage fees of $1.2187/MWh for domestic customers (including embedded generation) and $0.9872/MWh for export customers to be paid commencing January 1, 2017.

   b) Approval of its proposed 2017 capital expenditure envelope of $25 million for capital projects.

   c) Approval to charge (or rebate) market participants the difference between the 2017 IESO usage fees approved by the Board and the interim usage fee they paid, if any, based on their proportionate quantity of energy withdrawn until the end of the month in which Board approval is received for the 2017 usage fees. Any such charges (or rebates) will be provided in the next billing cycle following the month in which Board approval is received.

   d) Approval to rely on and use the information provided to the IESO by LDCs on the amount of embedded generation in their service territory under O. Reg. 429/04 in calculating the total usage fee to be billed to each LDC each billing period.

e) Approval of the proposed 2017 revenue requirement, excluding forecast revenue, of $191.4 million and the proposed net revenue requirement, including forecast revenue, of $190.8 million.

f) Approval to retain $10 million as an operating reserve in the Forecast Variance Deferral Account ("FVDA").

g) Approval to rebate $12.5 million, which is the year-end balance in the FVDA above the $10 million operating reserve, based on the IESO's audited 2016 financial statements as approved by the IESO Board. The IESO will rebate the $12.5 million surplus to market participants proportionate to the fees collected in 2016. The rebates will be provided in the next billing cycle following the month in which Board approval is received.

h) Approval to retain, in proportionate quantities, up to $5 million above the proposed 2017 revenue requirement received from each of the two customer classes to be used to fund Market Renewal costs that occur in 2018.

i) Approval to continue to charge registration fees of up to $10,000 per proposal for electricity supply and capacity procurements, including conservation and load management procurements.

j) Approval to continue to charge non-refundable application fees for the Feed-in Tariff ("FIT") program of $0.50/kW of proposed Contract Capacity, having a minimum of $500 and to a maximum of $5,000.

k) Approval to continue charging $1,000 for the IESO's market participation application fee.

l) All necessary interim orders, orders and directions, pursuant to the *Ontario Energy Board Act, 1998* and the Board's Rules of Practice and Procedure, as may be necessary in relation to this Submission and execution of the approvals requested in the IESO's 2017-2019 Business Plan.

6. The IESO proposes that the Board review of the Submission proceed by way of a written hearing.

7. The IESO may amend its pre-filed evidence from time to time, prior to and during the course of the Board proceeding. Furthermore, the IESO may seek to have additional meetings with Board Staff and intervenors in order to identify and address any further issues arising from this Submission, with a view to an early settlement and disposition of this proceeding.

8. The IESO requests that a copy of all documents filed with the Board by each party to this proceeding, be served on the IESO and the IESO's counsel in this proceeding as follows:

a) The Independent Electricity System Operator	Ms. Miriam Heinz Senior Regulatory Advisor
Courier Address:	120 Adelaide Street West, Suite 1600 Toronto, ON, M5H 1T1
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b)	Aird & Berlis LLP	Mr. Fred D. Cass Counsel
	Courier Address:	Brookfield Place, Suite 1800 181 Bay Street Toronto, ON, M5J 2T9
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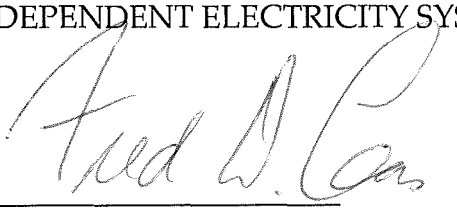
	Fax:	416-863-1515
	E-mail:	fcass@airdberlis.com

DATED at Toronto, Ontario, this 21st of April, 2017

INDEPENDENT ELECTRICITY SYSTEM OPERATOR



by its counsel in this proceeding
Fred D. Cass

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INDEPENDENT ELECTRICITY SYSTEM OPERATOR
2017 REVENUE REQUIREMENT SUBMISSION (EB-2017-0150)

EXHIBIT LIST

Exhibit	Tab	Schedule	Description
A – ADMINISTRATION			
A	**1**	**1**	Submission
A	**1**	**2**	Exhibit List
A	**2**	**1**	IESO's Letter to the Minister Requesting Approval of the 2017-2019 Business Plan – February 1, 2017
A	**2**	**2**	2017-2019 Business Plan – February 1, 2017
A	**2**	**3**	Minister's Letter Approving the 2017-2019 Business Plan – March 21, 2017
A	**3**	**1**	2016 Annual Report
B – REVENUE REQUIREMENT, FEES AND DEFERRAL AND VARIANCE ACCOUNTS			
B	**1**	**1**	2017 Revenue Requirement and Usage Fee Methodology
B	**2**	**1**	2017 Registration and Application Fees, the Forecast Variance Deferral Account and Capital Expenses
B	**3**	**1**	2016 Year End Financial, Surplus and Staffing
C – EVIDENCE RESPONDING TO BOARD DECISIONS AND SETTLEMENT			
C	**1**	**1**	IESO Regulatory Scorecard
C	**2**	**1**	Development of Four Standard Financial Reporting Forms Attachment 1 - Appendix 2-AA (Capital Projects) Attachment 2 - Appendix 2-Jb (O&A Cost Drivers) Attachment 3 - Appendix 2-Jc (O&A Programs) Attachment 4 - Appendix 2-K (Employee Costs)

Exhibit	Tab	Schedule	**Description**
C	**3**	**1**	IESO Costs and Savings to Implementing Ontario Government Greenhouse Gas Cap-and-Trade Initiative
C	**4**	**1**	Cost Benchmarking
C	**5**	**1**	Conservation Information Provided to Intervenors

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Powering Tomorrow.

February 1, 2017

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The Honourable Glenn Thibeault
Minister of Energy
900 Bay Street
Hearst Block, 4th Floor
Toronto, Ontario M7A 2E1

Dear Minister Thibeault:

Re: Revised IESO 2017-2019 Business Plan

Further to your letter of December 8, 2016, I am pleased to resubmit the IESO's proposed three-year Business Plan. As requested, the Business Plan has been revised to include resourcing for the IESO's Market Renewal project.

To prepare for the electricity sector of tomorrow, the IESO is working with stakeholders to pursue fundamental and enduring changes to Ontario's electricity market that will address known inefficiencies and put downward pressure on electricity costs. These foundational changes will provide opportunities for all participants in Ontario's electricity market, with increased competition, flexibility and transparency resulting in material efficiency gains for the entire electricity sector, including both customers and suppliers.

Working with stakeholders, this project will include evolving the wholesale energy market and introducing incremental capacity auctions to competitively and efficiently procure resources, while continuing to meet emerging operability challenges. The additional work associated with Market Renewal will require a temporary increase in resources for the duration of the project. However, at the conclusion of the project, Market Renewal is not expected to have a significant impact on the current staffing level of the underlying business.

The IESO anticipates a four per cent increase is required in its usage fees relative to its initial Business Plan submission to support the Market Renewal work. For 2017, the organization's proposed expenses of $191.4 million are expected to be funded by usage fee revenues of $190.8 million and registration fees of $0.6 million. As you know, significant synergies were obtained through the January 1, 2015 merger with the Ontario Power Authority. The IESO's anticipated usage fees will continue to reflect these synergies and even with the additional resources associated with market renewal, remain lower than pre-merger levels.

Please do not hesitate to contact me should you wish to discuss any aspect of the IESO's proposed 2017-2019 Business Plan.

Sincerely,

Bruce B. Campbell

c: Tim O'Neill, Chair, IESO
Serge Imbrogno, Deputy Minister
Michael Reid, ADM, Strategic Network & Agency Policy

Bruce B. Campbell
President and CEO
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Business Plan 2017-2019

Independent Electricity System Operator

February 1, 2017

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Contents

Introduction

The Independent Electricity System Operator (IESO) operates within a complex and changing energy sector environment. Its broad mandate includes real-time operations of Ontario's bulk power system, province-wide and regional planning, conservation, resource development and contract management. Changes occurring in many different areas can be expected to affect its operations in both the near and long terms. These changes include an evolving supply mix, with nuclear units coming offline for refurbishment, continued increases in renewable energy connected to both the transmission and distribution systems, as well as expected increases in conservation and demand response.

At the system level, electricity demand is expected to decline slightly or remain relatively flat over the business planning period as growth in demand from economic expansion and population growth will be mostly offset by conservation. However, since demand depends on many factors and there is uncertainty in any demand forecast, the IESO's planning considers a range of outlooks for electricity demand in Ontario, from below current levels to significantly higher demands driven by different levels of electrification.

In addition to the underlying supply and demand factors, emerging technologies, an increasing role for consumers, climate change actions, potential electrification, including of transportation, and evolving stakeholder expectations will also impact the IESO's operations over the business planning period and beyond.

To prepare for the electricity sector of tomorrow, the IESO is working with stakeholders to pursue fundamental and enduring changes to Ontario's electricity market that will address known inefficiencies and put downward pressure on electricity costs. These foundational changes will provide opportunities for all participants in Ontario's electricity market, with increased competition, flexibility and transparency resulting in material efficiency gains for the entire electricity sector, including customers and suppliers. This work includes evolving the wholesale electricity market and adopting new procurement practices through the introduction of an incremental capacity auction to competitively and efficiently acquire resources to meet reliability and adequacy requirements. The Market Renewal project will require efforts from business units across the IESO, external resources and input from a wide range of stakeholders.

Context for Market Renewal

The current electricity market was designed in the late 1990s and introduced in 2002, when the electricity landscape looked very different from today. The elimination of coal, integration of

renewables, increase in distributed resources, and growing role of demand-side resources has dramatically changed the dynamics of Ontario's electricity system. Inefficiencies with the current market have been identified over the years through the work of the Market Surveillance Panel, the Electricity Market Forum, IESO studies, and stakeholder input.

While the IESO and its stakeholders have worked together over the last decade to incrementally improve different aspects of the market, it is apparent that more foundational market changes are necessary to meet the very different circumstances of today and tomorrow's electricity marketplace. Maintaining the status quo would lock in current inefficiencies and gaming opportunities of our current design, drive higher than necessary costs, and limit the ability of the market to integrate new, emerging technologies reliably and cost effectively. Ontario is now in a stable supply situation that is expected to continue into the mid-2020s, making this an opportune time to consider and implement needed market design changes that would realize significant benefits for the province.

Operating the grid effectively has become more complex as the sector has transitioned from a model of centralized, conventional generation to an increasingly diverse, clean supply mix. However, the current market design is premised on scheduling and dispatching much of the energy in real- time providing very little flexibility should system conditions deviate from forecasts. Improving the dispatch and commitment of resources is expected to result in material benefits by using our assets in a more efficient manner, supporting reliable and more efficient operations as more renewables and decentralized resources are added to the grid.

Just as the energy and operability initiatives under Market Renewal are designed to address inefficiencies with our current market design, introducing an incremental capacity market would allow non-traditional resources (such as demand response, distributed energy resources including in LDCs, upgrades to existing assets, and imports) to compete on a level playing field with existing assets, resulting in lower cost solutions and potentially avoiding or defering the need for costly new build. Capacity markets also result in greater transparency and certainty, providing participants with greater certainty to plan their business. At the same time, annual auctions provide greater flexibility in meeting system needs and help avoid the cost and risk of locking in resources for extensive periods when they might not be required.

To meet these objectives, the project scope will include improvements to the way the IESO schedules energy, procures supply resources, and manages variability - in particular:

- A single-schedule market;
- A financially binding Day-ahead Market;
- Enhanced real-time unit commitment;

- A capacity auction including the import and export of capacity;
- More frequent intertie scheduling; and
- Other operability enhancements as identified by the IESO and its stakeholders.

Many of these changes will result in increased opportunities for both consumers and generators by introducing stable competitive mechanisms to meet a variety of system needs. These market structures are well-proven in other electricity markets and Ontario will be able to benefit from the best practices that have emerged in those markets over the past two decades. However, there is significant work ahead for the IESO and its stakeholders to design a market that best meets Ontario's needs.

It is within this context that the IESO has planned its business activities and initiatives for the 2017-2019 period.

The IESO's Business Plan provides an overview of the organization's near-term activities and associated resourcing requirements needed in two areas: to maintain the high level of performance required to deliver its core electricity system responsibilities; and in parallel to execute the Market Renewal project. The additional work associated with Market Renewal will require a temporary increase in resources for the duration of the project, with the objective that at the conclusion of the project, Market Renewal would not have a significant impact on the staffing level of the underlying business.

The IESO anticipates a four per cent increase is required in its usage fees to support the Market Renewal work. For 2017, the organization's proposed expenses of $191.4 million are expected to be funded by usage fee revenues of $190.8 million and registration fees of $0.6 million.

In 2017, the IESO is planning a capital envelope of $25 million to facilitate the delivery of corporate priorities associated with its current core business. Further details are included in Appendix 4.

Addressing Future Uncertainty

Ontario's transition off coal to a more renewable, yet more variable supply mix, combined with the increasing implementation of embedded resources in the distribution system, has brought about increasing complexity in directing the reliable operation of the provincial power system. Addressing that ongoing transition and complexity, responding effectively to government policy initiatives, continued technology change and increasing cyber security risks will require

ongoing reassessment of the IESO's current resource complement, particularly in the following areas:

(i) Technology, Industry Change and Electrification

Technology developments will continue to change the landscape of the traditional bulk power system with communities and customers taking more control of meeting their energy needs. Our planning efforts are expected to grow as a result. We are now seeing a need for an increased focus on regional planning, leading or supporting efforts to help communities consider non-wires supply options such as conservation and distributed energy resources. At the same time, the IESO will need to develop new policies and processes with provincial and municipal governments to procure transmission rights of way and facilities where they provide the best solution for local needs. The increasing amount of resources being embedded in the distribution system will also lead to increased coordination efforts with LDCs, a transformation that will need to be carefully managed to ensure that reliability of the bulk power system and the local area system is not compromised.

The publication of the IESO's 2016 Ontario Planning Outlook also marks a significant role for the IESO going forward. This technical report is the first step in a process that will move through a Ministry-led consultation phase, and development by the Ministry of a new Long-Term Energy Plan, with IESO support anticipated for both phases. Following plan approval, it is anticipated that the IESO may be required to develop an implementation plan, and upon its approval, proceed with implementation. The draw on IESO resources is expected to be significant throughout this process, particularly given the focus on increased electrification in meeting climate change objectives.

(ii) Cyber Security and Maintaining Reliable Operations

Cyber security is one of the fastest changing areas in the electricity sector with an ever-increasing number and complexity of tools being deployed (preventative, detective, and analytical). A mature cyber security posture requires not only measures aimed at preventing an attack, but the ability to respond to an event when it occurs. If cyber security risks continue to grow as forecast, additional resources will be needed to sufficiently mitigate these risks. Although not as critical as cyber security, we can also expect ongoing mandated upgrading of physical security levels. The industry's work in further defining mandatory standards for essential reliability services to maintain reliable interconnected grid operations is also an area that may require future investments in resources.

(iii) Changing Demographics

Challenges and risks are expected to occur at a time when the IESO could see significant changes in its work force. Over the next five years, 27 per cent of the IESO managerial staff and 12 per cent of the senior professional level staff will be eligible for retirement with unreduced pensions. Well over half of these staff are in Information and Technology Services and Market and System Operations. Recruiting, developing and retaining skilled staff will be an ongoing priority for adapting to future uncertainties.

(iv) Provincial Government Initiatives

Provincial government initiatives such as the new cap-and-trade program and the Climate Change Action Plan (CCAP) are already impacting the IESO's current scope of work.

Cap-and-trade is now requiring the IESO to assess the impact on and negotiate amendments to a number of its major procurement contracts. At the same time, the cap-and-trade initiative is requiring new business processes to be developed and put in place to address increased monitoring of emissions, manage transactions involving carbon costs, and develop and manage, on an ongoing basis, new and complex settlement arrangements including rebate processes for various customer rate classes.

The IESO already plays a lead role in the province-wide implementation of the government's conservation first policies, including management of the local distribution company (LDC)-delivered Conservation First Framework (CFF) and the Industrial Accelerator Program for transmission-connected customers. Recent directives aimed at improving the effectiveness of the CFF will result in increased responsibility for the IESO. And it is reasonable to expect that as the six-year conservation framework approaches its midpoint in 2018, there will be additional enhancements including the need to engage a broader range of customers in energy efficiency. Given the potential overlap with initiatives contemplated under the CCAP, there may also be opportunity for the IESO to help address the need for coordination between the energy efficiency programs offered under the conservation framework and the CCAP programs implemented across the province.

Market Renewal

As noted earlier, the IESO is working with stakeholders on the development of a Market Renewal project. This includes evolving the wholesale energy market and introducing capacity auctions to competitively and efficiently procure resources, while continuing to meet emerging

operability challenges. The project will foster increased transparency, flexibility and competition in the electricity marketplace with opportunities for broader participation from both suppliers and consumers, providing significant value for Ontario`s ratepayers and better addressing the ongoing changes across the sector.

Throughout 2016, the IESO has worked closely with its stakeholders to (1) discuss the appropriate scope for the project and (2) develop a benefits case that assesses the potential range of outcomes from the identified scope.

The scope for the project will include improvements to the way we schedule energy, procure supply resources, and manage variability. In particular, the project will include:

- A single-schedule market;
- A financially binding Day-ahead Market;
- Enhanced real-time unit commitment;
- A capacity auction including the import and export of capacity;
- More frequent intertie scheduling; and
- Other operability enhancements as identified by the IESO and its stakeholders.

The IESO has been working with stakeholders for over a year to lay the foundation for this evolution of Ontario's electricity market, and has more recently been supporting this effort with the development of a benefits case. The benefits case will examine the potential scale of these benefits and the associated costs. The analysis draws on past Ontario studies and the experience of other jurisdictions that have gone through similar market redesign processes. The benefits case is expected to be complete by the end of Q1 2017.

Early findings show potential for cost savings that are expected to be realized by both consumers and suppliers, with a baseline estimate of $3.7 billion (net present value) over a ten year period from 2021-2030. These savings represent a net efficiency benefit, meaning the total commodity cost of electricity (ie. energy, Global Adjustment and uplifts) is reduced by that amount. The majority of savings are expected to flow to consumers, while the rest would flow to other market participants. Costs for the project are estimated to fall in the range of $150 - $200 million. While these are only initial findings and are expected to change as the IESO works with stakeholders in Q1 2017 to finalize the analysis, the numbers demonstrate that the range of reasonably expected benefits far outweighs the likely costs of the project.

Cost savings are achieved through the better utilization of existing assets, greater competition among resources, a reduced need to build new resources, and a more flexible procurement process that will better reflect system needs. Over half of the expected benefits are attributable

to lower capacity costs from the introduction of a capacity auction while the remainder comes from lower production costs through the energy and operability work streams. The exact timing and magnitude of cost savings will largely depend on the timing of Market Renewal initiatives.

The IESO will continue its work with stakeholders to work through key design elements for the various elements of the project, as well as a more detailed project plan for the overall program.

Enhancing the Value of Smart Meter Data

Smart meters have enabled the collection of vast amounts of data that can be leveraged to create innovative products and services. The IESO, as the Smart Metering Entity (SME), is leading efforts to expand the types of data it collects through its Meter Data Management and Repository (MDM/R) and to facilitate third party access to fully capture the value of this data. The MDM/R currently provides a common platform for processing, storing and managing all smart meter data in the province.

The Ontario Energy Board renewed the SME's license on November 24, 2016 for a five-year period and established the scope of information flowing into the MDM/R. The IESO is now moving to define the rules for how third parties can gain access to that data while protecting privacy and confidentiality. Although the work of the SME is reflected in a separate rate case from the IESO's core business, these efforts contribute to the IESO's overall theme of providing public value and have sector-wide implications, including for the future development of conservation programs.

Stakeholder Input

Engagement remains a priority for the IESO; seeking out and responding to input from communities, customers and stakeholders to inform IESO's decision-making is one of the organization's strategic objectives. The Stakeholder Advisory Committee (SAC) has an important role to provide the IESO with input and feedback on proposed decisions or changes that affect all stakeholders. Stakeholder and community interviews and/or surveys will indicate the level of satisfaction with the engagement process and whether the IESO has demonstrated appropriate consideration of stakeholder input in decisions.

Through input from the SAC, stakeholder priorities have been considered in the development of the business plan. These include a focus on transparency and data, conservation, gas-electric coordination, cap-and-trade, costs, education, Market Renewal, planning, stakeholder engagement, corporate vision and reliability.

The IESO has established corporate performance measures (CPMs) for its key initiatives across the organization, which assesses progress toward the achievement of its core mandate and strategic objectives. The targets for 2017 have been developed to be specific, measurable, achievable, relevant and time-bound. They also reflect input received from the SAC to make the CPMs both outcome-oriented and externally focused. More information on the IESO's CPMs for the planning period is found in Appendix 1.

The IESO has also assessed its key areas of risk, developed mitigation plans and put in place a robust risk framework to continue to identify and manage risk, which includes monitoring and reporting. More information on the IESO's key risks and how they will be dealt with during the planning period is available in Appendix 2.

Strategic Plan

Business activities and initiatives will be guided by the IESO's Strategic Plan for the 2016-2020 period. The Strategic Plan was released in mid-2016 and will inform the development of annual business plans and enable a clear focus on priorities, success drivers and measures. Establishing the organization's corporate strategy is an important milestone in the evolution of the IESO, and the strategy will help focus attention and effort on achieving our vision: powering a reliable and sustainable energy future for Ontario. The Strategic Plan is organized around the IESO's strategic themes and is guided by its corporate vision, mission and values. A summary of the IESO's goals and objectives from the Strategic Plan can be found in Appendix 3.

Financial Overview

The IESO's Business Plan outlines the resourcing requirements needed to deliver corporate priorities including the Market Renewal project. The IESO proposes an increase of four percent in usage fees to support this emerging priority. For 2017, the organization's proposed expenses of $191.4 million are expected to be funded by usage fee revenues of $190.8 million and registration fees of $0.6 million.

The 2017 proposed operating expenses are $9.3 million above the 2016 budget expenses as per the 2016-2018 Business Plan. The higher operating expenses are primarily due to the impact of Market Renewal and higher pension and other post-employment expenses.

Market Renewal (as described on page 6 and 7) will result in fundamental changes to Ontario's electricity market that will require efforts from business units across the IESO. The project will require incremental temporary resources to support the design of various Market Renewal initiatives, to create new business processes and IT systems, to conduct ongoing stakeholder engagement, and to address impacts on other IESO functions such as contract management and legal.

Pension and other post-employment expense increases in the planning period are due to a lower discount rate, which increases future liabilities, and reduced asset valuations resulting in a higher funding requirement. The higher expenses are partially offset by increases in the management group pension contributions and pension benefit changes, which take effect in 2017.

Further increases in 2017 operating expenses include the impact of foreign exchange rates and higher than anticipated fees for the OEB. Operating expenses also reflect increases in computer services contracts, and amortization expenses that will increase due to a number of significant systems being put into service.

The proposed 2017 budget includes the IESO's core and strategic activities, including Market Renewal, but no allowance has been made for other policy initiatives.

For 2017, the IESO anticipates an average headcount of 687 for core operations and an incremental 25 headcount, for a total of 712. The incremental resources will be required to deliver the IESO's core business and Market Renewal.

The IESO has made changes, including revisions to management pension and compensation, as well as the negotiated contracts with its unions, in order to manage the IESO's overall costs in the longer term. Expense increases in each year include annual compensation escalations according to current collective agreements and expected estimates of annual pension and post-retirement expenses.

Detailed Financials

The following table outlines the operating revenues and expenses over the business planning period.

Pro Forma Statement of Operations
For the Year Ended December 31
(in Millions of Canadian Dollars)

Budget ($ Millions)	**2016**	**2017**	**2018**	**2019**
Revenues	182.1	191.4	196.1	189.4
Expenses				
Operating Expenses	163.9	162.4	164.0	167.4
Amortization	17.5	18.4	19.6	19.0
Net Interest	0.7	(1.4)	(1.5)	(3.0)
Total Core Operations	182.1	179.4	182.1	183.4
Market Renewal	-	12.0	14.0	6.0
Total Expenses	182.1	191.4	196.1	189.4
Operating Surplus/(Deficit)	-	-	-	-
Accumulated Operating Surplus	10.0	10.0	10.0	10.0

A further breakdown by expenditure category is provided in the table below.

2017-19 Financial Review

Budget ($ Millions)	2016	2017	2018	2019
Core Operating Expenses				
Compensation & Benefits	110.3	109.2	110.7	113.8
Professional & Consulting Fees	20.1	17.8	17.7	17.7
Operating & Administration	33.5	35.4	35.6	35.9
Amortization	17.5	18.4	19.6	19.0
Net Interest	0.7	(1.4)	(1.5)	(3.0)
Total Core Operations	182.1	179.4	182.1	183.4
Total Market Renewal Expenses	0.0	12.0	14.0	6.0
Total Expenses	182.1	191.4	196.1	189.4

The IESO regularly prioritizes capital initiatives. The business planning process establishes an appropriate capital envelope with commitments approved individually on an ongoing basis. This practice is consistent with prior years. The table below provides a summary of the capital envelope. Project details and associated descriptions are included within Appendix 4.

Capital ($ Millions)	2016	2017	2018	2019
Core Operations Initiatives	28.4	25.0	25.0	23.2
Market Renewal	-	-	20.0	40.0
Total Capital Envelope	**28.4**	**25.0**	**45.0**	**63.2**

Total average FTEs are expected to increase in the 2017-2019 planning period due to temporary resourcing required in support of Market Renewal. A reduction of one percent in the core operations staffing budget is anticipated to occur over the planning period as merger synergies are maintained and other efficiencies are realized.

Staffing Budget (Average)	2016	2017	2018	2019
Core FTEs	688	687	685	681
Incremental FTEs	-	25	75	75
Total FTEs	**688**	**712**	**760**	**756**

The Market Renewal project will utilize a variety of resourcing approaches to most effectively manage project delivery timelines, cost, and to mitigate risk. Resourcing approaches will include competitive contracting with suppliers, as well as seconding key internal IESO resources for different durations based on the specific skills needed as the project moves through the various phases (e.g. design, implementation, testing, etc.) until the project is complete. The incremental FTEs will be required to deliver the IESO's core business and Market Renewal.

Functional Areas

Operations

The IESO's Market and System Operations business unit manages real-time operations, balances supply and demand for electricity, directs the flow of electricity across transmission lines, and connects generators that produce power, transmitters that send power across the province, local utilities that deliver it to people's homes and businesses, and directly connected industrial companies.

During the 2017-2019 business planning period, Market and System Operations will be working to maintain and improve the operability of the power system through transparent mechanisms in three key areas:

- **Regulation** – The IESO is seeking to expand the depth of the regulation service market in Ontario. A Request for Information was issued in mid-2016, and a subsequent Request for Proposals is expected to be issued in early 2017.
- **Voltage control** – Studies and recommendations on the need and location of voltage control devices to address issues in the Greater Toronto Area and eastern Ontario are underway and are expected to be completed in 2017. The IESO will also collaborate on an implementation plan with transmitters.
- **Flexibility** – A need has been identified for up to 300 megawatts (MW) of flexible resources by the end of 2017 and up to an additional 700 MW by the end of 2018. The IESO is working with stakeholders to assess how this need could be met by existing generation assets, as well as from loads, demand response and new emerging technologies.

This business unit will also implement the situational awareness initiative, enhancing the IESO's modelling capability and providing the control room with more visibility and better post-event analysis. In support of the IESO's 2016–2020 Strategic Plan, another project is

underway that will enable a better two-way exchange of information for enhanced decision-making through coordination with LDCs.
Market and System Operations will also continue the Operations Readiness Initiatives over the planning period. This will provide an operational framework to enable the IESO to adapt to the evolving environment while maintaining the same level of performance and risk tolerance associated with managing the reliability of the grid. It will involve knowledge transfer, enhanced processes, improved work platforms and the continuation of operational training and development.

Planning

The IESO's Planning group, responsible for long-term and regional electricity planning for the province, is now operating under the recently proclaimed *Energy Statute Amendment Act,* which has replaced the Integrated Power System Plan framework. The IESO is now responsible for the development of a technical report, which it completed in 2016. The IESO is also now responsible for an implementation plan following the release of the LTEP in 2017. The Planning group also provides, on an ongoing basis, information on evolving trends in the electricity sector to the government, stakeholders and communities.

Regional planning remains a priority for the IESO. For the 2017-2019 business planning period, the IESO is committed to continuing to provide an opportunity to all First Nations communities and Métis councils to be engaged in regional planning and Local Advisory Committees where they are set up. Engagements with communities, municipal governments and stakeholders will adhere to IESO core stakeholder principles of creating transparency, engaging early and often, and bringing communities to the table to enhance the success of regional plans. Incremental conservation and distributed generation opportunities will continue to be considered in regional plans. In addition, the IESO's Planning group will ensure that the implementation of recommendations from completed plans is supported.

The Planning group will also participate in engagement activities with remote communities to support the implementation plan to connect remote communities as well as support potential transmitters and priority transmission projects at the OEB.

Market and Resource Development

The Market and Resource Development business unit, in addition to leading the analysis in support of the development of the Market Renewal project, will continue to pursue other select market-based projects, such as enhancing the demand response auction and supporting capacity exports. In addition, Market and Resource Development is responsible for the ongoing

management of generation contracts, which include natural gas, wind, solar, hydroelectric, biomass and nuclear, and range in size from microFIT contracts that are less than 10 kilowatts to the Bruce Power Nuclear contract, which secures 6,300 MW of supply. In addition to generation contracts, Market and Resource Development also manages storage contracts as part of pilot program procurements. As of December 31, 2016, the IESO was managing more than 27,350 contracts that account for more than 27,350 MW of generation. These include contracts for approximately 24,500 microFIT projects (representing 216 MW) and 3,950 Feed-in Tariff or FIT projects (representing 4,750 MW). The majority of those contracts are in operation with 1,050 projects (or 3,281 MW) under development. Renewable energy projects account for 43 percent of contracted capacity (52 percent wind, 21 percent hydro, 23 percent solar, 4 percent bioenergy), with natural gas at 34 percent and nuclear at 23 percent. This business unit is also responsible for the settlement of transmission-connected generator contracts.

Other initiatives that will be undertaken during this period include evolving the design of the demand response auction to increase available demand-side resources, including enabling the participation of residential customers, in conjunction with and as well as continuing work on capacity auction mechanisms in Market Renewal by further engaging stakeholders. This business unit will also continue to clarify the impact on the IESO's resources and contracts of the new cap-and-trade policy and Climate Change Action Plan. In addition, Market and Resource Development will continue to monitor developments of distributed energy resources in other jurisdictions, in coordination with other business units, as the IESO works to foster an open and competitive electricity marketplace with broad participation. At the same time, under recent changes to the *Electricity Act*, the IESO was given a new accountability for transmission procurement.

Information and Technology Services

The Information and Technology Services business unit meets the ongoing and daily needs of the IESO and its customers, including 24x7 support to help maintain the reliable operation of the IESO-controlled grid and the IESO-administered markets.

Through the IESO Cyber Security Forum, this business unit will continue to promote cyber security best practices by sharing information, hosting conferences and collaborating with participants to help manage cyber risk, including supporting standards being developed by the OEB.

During the 2017-2019 business planning period, Information and Technology Services will collaborate with other IESO business units (e.g., Conservation and Corporate Relations, Market

and System Operations, and Corporate Services) on a number of projects to support the evolving needs of both stakeholders and the IESO. Examples include a consolidated corporate website, continued implementation of the Conservation and Demand Management Information System (CDM-IS) to support the Conservation First Framework, support of the Operations Readiness Initiatives, and the replacement of the Market Information System and Commercial Reconciliation (or settlement) system.

In addition, Information and Technology Services will also implement a variety of prioritized projects to mitigate the rapidly evolving cyber security landscape and to ensure the underlying infrastructure remains current. Examples of projects include Enterprise Cyber Security Management Refresh, Tier 1 Storage Refresh and Oracle Archetype Expansion.

Conservation

Over the 2017-2019 business planning period, the IESO's Conservation group will continue to oversee the implementation of the provincial government's Conservation First Framework. Covering the period from 2015 to 2020, the framework aims to achieve 7 terawatt-hours (TWh) of electricity savings through programs and initiatives offered to all customer segments. The framework also includes delivering 1.7 TWh of energy savings through the Industrial Accelerator Program, which has been designed to help transmission-connected customers achieve energy savings.

A mid-term review began in 2016 and will continue through 2017. The focus of the review will be cost-effective delivery of both LDC and transmission-connected customer conservation programs, and assurance that LDC and directly connected customer program progress are in line to achieve the 2020 energy-savings targets. The review will also consider the deployment of innovative new programs that did not exist prior to the framework and that were developed through pilot programs funded by the IESO.

Based on preliminary unverified results, as of Q3 2016, LDCs have collectively achieved 23 percent of the 2020 provincial Conservation First Framework target, or 1.63 TWh of the 7 TWh target. Additionally, the Industrial Accelerator Program has achieved 0.171 TWh of the 1.7 TWh target, or 10 percent of the 2020 target. This number is expected to increase as more projects are verified and implemented.

The group will continue to administer both a $70 million LDC Innovation Fund and a $9.5 million Conservation Fund, to provide funding for research and development into new, innovative technologies, energy management practices and programs.

The Conservation group will also focus on the transparency and reliability of cost-effective conservation activities during this planning period. This will be achieved through accurate and transparent reporting of conservation efforts to all stakeholders according to committed timelines. In addition, rigorous counterparty compliance and evaluation, measurement and verification will continue to be completed by independent third parties. Reporting will include monthly progress reports to LDCs, quarterly conservation progress reports and annual verified results reports posted on the IESO website by July 1 of each year.

Market Assessment and Compliance

Compliance with the market rules is key to the operation of an efficient and reliable electricity market and system. The Market Assessment and Compliance business unit is responsible for monitoring compliance with the market rules by market participants, as well as compliance by the IESO. This is achieved through a variety of activities including prevention through education and interpretation, monitoring for and investigation of possible violations, along with enforcement actions in cases of determined violations, where appropriate.

For the 2017-2019 business planning period, this business unit will continue to identify market rules where breaches would have the most significant impact on either the market or reliability and take appropriate enforcement actions in response to alleged violations. It also plans to conduct audits to better detect reliability standards violations and assess risk areas to guide enforcement activities.

Market Assessment and Compliance will also continue to provide market rule interpretations upon request and in 2017 expects to finalize a formal market rule interpretation process. This will include completing performance measures and preparing process guidelines and templates to provide interpretations that offer greater clarity on the meaning, application and implementation of the market rules.

Enabling Services

Various IESO business units provide services to enable the overall organization to achieve its core mandate and strategic goals and objectives. These services include communications and stakeholder relations, settlements, finance, human resources, internal audit, First Nations and Métis relations, legal and regulatory affairs.

For the business planning period, the stakeholder and public affairs group will continue to solicit and respond to input from stakeholders, government and communities on all major

initiatives, using consistent stakeholder engagement principles and processes (e.g., Stakeholder Advisory Committee, Technical Panel, Local Advisory Committees). This group will also continue to communicate regularly with employees, respond to customer and media inquiries, and participate in customer outreach. A near-term deliverable is the launch of a new and consolidated corporate website in mid-2017.

Projects for 2017 to achieve greater efficiency and cost-effectiveness among the settlements and finance groups are to replace the Commercial Reconciliation system, review payroll processes and tools and continue to evolve and enhance the business planning, corporate performance measures and enterprise risk management processes. The human resources group will implement a talent management system that includes enhanced recruitment and selection capabilities, a suite of comprehensive learning and development programs, organizational development services, and reward and recognition plans. In addition, this group will continue to administer the annual employee engagement survey, and design and facilitate processes for action planning at the organizational, business unit and group levels. Human resources will have a significant role in supporting the Market Renewal project, particularly in regard to labour relations and staffing.

The IESO's Internal Audit group provides independent, objective insight and assurance on governance, risk management, and controls to management and the Board of Directors. The IESO Internal Audit function works collaboratively and respectfully with the business units in order to provide value and contribute to the overall success of the organization.

The First Nation and Métis relations group works to ensure all Indigenous communities are aware of the IESO's funding programs, upcoming procurements and electricity planning and that they have an opportunity to provide input and feedback. The First Nation and Métis relations group is also committed to continuing to be a trusted and accessible resource in the electricity sector and to building capacity in Indigenous communities across Ontario.

The IESO's law group provides timely and responsive legal services, leveraging internal counsel knowledge of the organization to enhance value. Over the business planning period, the law group will continue to partner with business units to deliver major initiatives, including developing a market rule legal framework to help evolve the Ontario market through Market Renewal, and leverage lessons and experience from the Conservation First Framework mid-term review. It will also continue to direct and manage the processing of Freedom of Information requests and other document disclosure obligations. This group is also responsible for ensuring that the IESO Board of Directors is well supported and works with other parts of

the organization to ensure that high standards of governance for the organization are maintained.

The organization's regulatory affairs group leads the IESO's interactions with sector regulators--the OEB, the National Energy Board, the North American Electric Reliability Corporation and the Federal Energy Regulatory Commission -- working to obtain desired outcomes in regulatory filings and in the positive evolution of the sector. Over the business planning period, the regulatory group will continue to lead the IESO's participation in and monitoring of key regulatory proceedings and policy development processes in Ontario and other jurisdictions. The regulatory group will also direct the IESO's annual revenue requirement submission with the OEB.

Appendix 1: Corporate Performance Measures (CPMs)

The IESO's work is focused on achieving the outcomes of the 2017-2019 Business Plan. Corporate performance measures (CPMs) are established annually to help translate the strategic goals, objectives and business plan into action so the IESO can continue providing public value, respecting and valuing our stakeholders and building corporate resilience.

The 2017 CPMs consider input from the IESO's Stakeholder Advisory Committee, representing the voices of the sector, as well as working collaboratively with the subject matter experts of the IESO itself. The CPMs were developed to be results and outcome-oriented, externally focused, measureable, specific and achievable.

The 10 CPMs defined below provide a gauge on key focus areas for the IESO in 2017. These CPMs look to sustaining the IESO's excellence in operating the grid, promoting cyber security across the sector, exploring Market Renewal to support future price efficiencies, operability, transparency and innovation, as well as striving towards improved price impacts by fostering broader market participation, transparent execution of competitive procurements and cost-effective delivery of LDC conservation programs.

CPM	2017 Target
1. The IESO executes its strategic plan	Overall progress to achievement of the 2016-2020 strategic plan
Strategic Goal: Deliver superior reliability performance in a changing environment	
2. Ontario's electricity service is reliable	100% compliance to North American Electricity Reliability Corporation high violation risk factor reliability standard requirements (including audit requirements) is self-certified by the IESO, demonstrating ability to sustain the reliability of the power system
3. The provincial power system is well planned	Implementation of key recommendations in regional and bulk system power plans is on track according to their suggested timelines1 to meet the Ontario resource and transmission assessment criteria and support the planning and management of the provincial power system, whereby: • 100% of the 44 key recommendations for 2017 are progressing on track for the 15 Integrated Regional Resource Plans • 100% of the five priority and key transmission projects in Northwest Ontario from provincial plan(s) (2013 Long Term Energy Plan) are progressing on track, along with associated milestones with timelines in 2017

[1] Subject to change to reflect more current information

CPM	2017 Target
4. Operations are well co-ordinated with LDC partners	One major LDC is actively engaged in two-way communication by end of 2017, including sharing of operational data to support coordinated and consistent operation decision making; discussion underway with additional two LDCs
5. Cybersecurity leadership is demonstrated across the sector	Cybersecurity excellence is promoted by: • The objectives contained in the 2016 – 2017 cybersecurity forum work plan are accomplished • Supporting the OEB objectives for completion of standards development by the end of 2017 • Increasing the IESO's internal cybersecurity capabilities by implementing an advanced malware technology solution that is designed to improve our capability to detect and deter new and complex cyber-attacks and completing cybersecurity process enhancements by Q1 2017
Strategic Goal: Drive to a more efficient and sustainable marketplace	
6. The electricity market is efficiently delivered	The IESO continues to focus on price efficient outcomes via: • Design and development of a renewed market structure project built on stakeholder input that lays the foundation for improved price efficiencies, operability, transparency and innovation includes: o A robust, well stakeholdered cost/ benefit analysis completed by end of Q1, 2017 o Well attended, at a minimum quarterly meetings (including information sessions) with stakeholders to discuss, review and educate stakeholders on high level market design elements o A detailed project plan developed by the end of Q3 which defines project scope (detailed design work to be undertaken), schedule and cost (including internal/external resourcing requirements) o A project level risk assessment and Key Performance Indicators completed by end of Q3 • Directed procurements (FIT and microFIT) are completed through transparent, consistent and efficient processes with posted standard contract, rules and prices. The processes are validated by a Fairness Commissioner to be executed with consistency and integrity. The costs are at or below the government's cost projections included in the 2013 LTEP • Cost-effective delivery of LDC conservation programs undertaken within 4 cents/kWh. LDC and direct-connect customer program progress is in line with achieving the 2020 energy savings target of 8.7 TWh, with 50% (3.5 TWh) of 7 TWh Conservation First target forecasted to be achieved and 46% (0.78 TWh) of

CPM	2017 Target
	the 1.7 TWh Industrial Accelerator Program (IAP) target contracted by the end of 2017
7. The marketplace for electricity is innovative and competitive	Broader, competitive and more innovative sector participation is enabled by end of 2017 through: • Formal mid-term review of Conservation First Framework and Industrial Accelerator Program has been initiated by June 1, 2017 and on track to be completed no later than June 1, 2018 • At least $50M (3%) of the Conservation First Framework Conservation and Demand Management Plan budget committed to full deployment of innovative new programs • The demand response (DR) auction enables the participation of a broad range of participants, including residential DR by the end of 2017, and meets the objectives of the DR working group • The SME will enhance the value of electricity data by expanding the type of access to smart meter data received by the IESO's systems
Strategic Goal: Be recognized as a trusted advisor, informed by engagement	
8. Stakeholders and communities are confident with the engagement process for making informed decisions	2% improvement in satisfaction with the engagement process is achieved from the 2016 customer satisfaction survey baseline of 65%; demonstrating continuous improvement in the IESO's consideration of stakeholder input in its decisions
Strategic Goal: Invest in our people and processes to meet the needs of the sector	
9. IESO employees are engaged	A two point increase in employee engagement is achieved from the baseline of 71% set in 2016 and all business units successfully implement their action plans resulting from the survey.
10. IESO resources are utilized effectively and	Expanded operational capacity is realized by: • All priorities in 2017 are being achieved within the IESO's approved budget

CPM	2017 Target
efficiently	• 80% of priority change initiatives progressing according to their approved business case, on time and budget and completed projects meeting all of their defined business objectives • 100% of the Operations Readiness Initiatives (ORI) progressing according to their approved business case, meeting all of their defined business objectives to achieve a headcount reduction of six FTEs by end of 2018

Appendix 2: Key 2017 Risks

The IESO's established risk framework is in place to identify and mitigate risks that the IESO faces in achieving the organization's strategic goals and objectives as well as in the effective execution of the 2017-2019 Business Plan.

The IESO assesses risks to the business at least annually and has identified nine key risks in the areas of reliable operation of the grid, stakeholder engagement and corporate resilience including workforce capacity and engagement.

Risks that continue to be key into 2017 pertain to the breadth and pace of change in Ontario's evolving energy environment, cyber security and the effective prevention of market rule and reliability standard violations. The risk of insufficient support from key stakeholders has shifted in focus and relates more to supporting specific key 2017 initiatives, including Market Renewal, as opposed to the IESO's broader stakeholder engagement efforts. New key risks in 2017 include resourcing constraints, employee engagement, complexities with regard to the management of procurement contracts, conservation funding and grid operability limitations.

Mitigation plans have been defined and are in place for each of the 2017 risks. The IESO's Corporate Risk Team, representing members from each of the organization's business units, is leveraged for their subject matter expertise to support the effective assessment of risks and execution of the mitigation plans. Reporting of key risks is provided to the Audit Committee of IESO's Board of Directors quarterly to monitor and report on the progress of mitigation plans.

Risks related to Market Renewal will continue to evolve over the lifecycle of the project and will include stakeholder, resourcing, integration and implementation risks. In 2017, Market Renewal will be impacted by stakeholder and resourcing risk. To manage stakeholder risk, an effective stakeholder process will be executed to complete the Market Renewal cost/ benefit analysis and the IESO will provide ongoing sessions to discuss, review and inform stakeholders on high level market design elements to ensure stakeholder feedback is incorporated in order to obtain the required stakeholder support. From a resourcing perspective, Market Renewal will face challenges securing appropriate subject matter experts, effectively backfilling resources to minimize the impact to other aspects of the business, and obtaining resources within the timelines required. The IESO will establish processes to competitively secure external resources and second key internal resources in order to manage internal and external resourcing requirements while minimizing the overall impact to permanent headcount and other IESO initiatives.

Beyond 2017, the IESO anticipates increased integration and implementation risk as well as continued stakeholder risk. Integration risk will require organization-wide changes including

adopting and adapting new processes, systems and tools into the existing framework. Implementation risk includes managing project scope, costs and schedules.

The IESO will monitor Market Renewal risks on a continuous basis, performing risk assessments during the various phases of the project as required and developing a risk register to track risks and related mitigation plans that will be reported to the Audit Committee of the IESO Board of Directors.

The key risks for 2017 are as follows:

1	The breadth and pace of change of Ontario's evolving energy environment challenges the IESO's ability to maintain grid reliability and efficiently integrate new entrants and technologies into the operation of the grid
2	Grid requirements for regulation, voltage control and flexibility lead to challenges in maintaining grid reliability and achieving efficient market operations
3	A significant cyber security event occurs that disrupts the operation of the IESO
4	Current workforce capacity and allocation does not support the IESO's ability to effectively execute its mission, strategy and expanding responsibilities
5	Market rule and reliability standard violations significantly impact markets and reliability
6	The volume, complexity, length and financial materiality of contracts under IESO's management exposes the organization to contract compliance and litigation risks that could erode public confidence in the IESO and in the sector
7	Insufficient support from key stakeholders impedes the IESO's ability to effectively pursue key initiatives
8	Failure of critical Control Room tools challenges the IESO's ability to effectively manage grid reliability and market operations
9	Lower than desired employee engagement impedes the efficient and effective execution of initiatives and priorities

Appendix 3: Strategic Plan Framework

The Strategic Plan is organized around the IESO's strategic themes and is guided by its corporate vision, mission and values. Below is a summary of the IESO's strategic goals and objectives:

Themes (What we do)	Providing public value		Respecting and valuing our communities, customers and stakeholders	Building corporate resilience
Goals (What we want to achieve in the next five years)	Deliver superior reliability performance in a changing environment	Drive to a more efficient and sustainable marketplace	Be recognized as a trusted advisor, informed by engagement	Invest in our people and processes to meet the needs of the sector
Strategic Objectives (How we will achieve our goals)	• Plan and manage the power system so Ontarians have power when and where they need it. • Enhance reliability and efficiency through coordination of IESO- and LDC-controlled resources. • Promote robust cyber security practices across the sector.	• Evolve the IESO markets to increase market efficiency and value for consumers. • Foster an open and competitive electricity marketplace with broad participation.	• Enhance public confidence in the IESO and the sector to facilitate informed customer choice. • Work effectively with government to support policy development and IESO's excellence in implementation. • Seek out and respond to input from communities, customers and stakeholders to inform IESO decisions.	• Strengthen the development and engagement of our employees. • Attract and retain the best talent. • Be a focused and flexible organization positioned to support the ongoing transformation of our industry.

The full plan document can be found at http://www.ieso.ca/Documents/corp/IESO-Strategic-Plan_2016-2020.pdf.

Appendix 4: IESO Capital Spending

Summary of 2017 – 2019 Capital Spending

Change Initiatives/Projects ($ Millions)	2017 Plan	2018 Plan	2019 Plan
Identity Access Management	2.1		
Operations Readiness Initiatives	2.5	3.0	
Market Information System (MIS) Refresh	2.0	1.7	
Infrastructure Refresh (building services, software licenses & computer hardware)	2.5	2.5	2.3
Enterprise Cyber Security Management Refresh	2.0		
Conservation Demand Management Information System (CDM IS)	1.0	0.4	1.0
Corporate Website including consolidation and enhancement to Save-on-Energy	1.5	1.0	1.5
CRS Replacement & Migration	1.0	2.0	2.0
Financial Systems Upgrade	1.0	1.5	1.0
MACD Enforcement Support Tool and related projects	1.0	0.5	1.0
FIT, microFIT and other upgrades	1.0	0.7	0.4
Oracle Archetype Expansion and Oracle batch	1.0	1.0	
Wallboard Refresh	1.0		
System Logging and Analysis Upgrade Qradar		2.0	
Tier 1 Storage Refresh			2.0
ETP Refresh			1.0
Capital ($1M & above)	**19.6**	**16.3**	**12.2**
Other Capital Initiatives/Projects	5.4	8.7	11.0
Core Operations Capital	**25.0**	**25.0**	**23.2**
Market Renewal	-	20.0	40.0
Total Capital including Market Renewal	**25.0**	**45.0**	**63.2**

Capital Change Initiatives/Project Descriptions

2017 – 2019 Capital Plan Details

Change Initiatives/Projects	Descriptions
Identity Access Management	The Identity Access Management (IAM) project will implement an IAM solution for both Bulk Electricity System (BES) cyber and non-BES cyber assets. This will reduce the risk of non-compliance by substantially reducing the amount of manual intervention in addition to reducing the effort required to generate and validate access reports for future critical infrastructure protection (CIP) audits. This will also improve the efficiency of onboarding, off-boarding and cross-boarding processes from the user's perspective.
Operations Readiness Initiatives	This includes a holistic review of all the processes and tools in Market and System Operations with the intent to sustain the level of services to meet reliability standards with the efficient use of resources.
Market Information System (MIS) Refresh	The MIS, which calculates the Market Clearing Price for settlement purposes, is used by the IESO to meet its primary obligations to determine dispatch schedules in both real-time and pre-dispatch timeframes, while satisfying operating reserve requirements and respecting transmission and security limits. This project will update both the application and underlying infrastructure to support future years while taking advantage of improvements in the most recent product.
Infrastructure Refresh (building services, software licenses & computer hardware)	To procure Racks and Enclosures to expand the IESO's blade server rack and enclosure infrastructure, which will facilitate the requirements of emerging projects. This project also includes miscellaneous building services and software license renewals.
Enterprise Cyber Security Management Refresh	This project will include enhancements to cyber security analytical capabilities, procurement of new technology to address advanced malware, and sourcing of additional cybersecurity intelligence. This project also includes a refresh of cyber security technologies.
Conservation Demand Management Information System (CDM IS)	Supports the delivery of reliable, cost-effective conservation (7 TWh through the Conservation First Framework and 1.7 TWh through the Industrial Accelerator Program), while meeting the IESO's fiduciary and contract management accountabilities through a solid contracting infrastructure, rigorous program reporting, strong evaluation, measurement and verification and counterparty compliance programs, and enabling technology platforms.
Corporate Website including consolidation and enhancement to Save on Energy	Corporate website upgrade to help proactively manage the IESO's reputation through its communications to and relationships with stakeholders, customers, employees and others to position the organization as a leader in the electricity sector.
CRS Replacement & Migration	The existing settlements system is an internally developed calculation engine of charge types to settle the electricity market. The IESO plans to review and replace this system with a standard software application.
Financial Systems Upgrade	Payroll process and tools upgrade and Separation of Corporate and Market Financial Transactions

Capital Change Initiatives/Project Descriptions Continued

2017 – 2019 Capital Plan Details

Change Initiative/Projects	Descriptions
MACD Enforcement Support Tool and related projects	Implement an enhanced, IT-supported information solution to help MACD effectively and reliably conduct its enforcement activities in Ontario and mitigate the risks to the IESO's regulatory obligations in the next 18- 24 months.
FIT, microFIT and other upgrades	A replacement/replatforming of the existing FIT and microFIT system based on program requirements and business needs and an upgrade the existing CRM platform.
Oracle Archetype Expansion and Oracle batch	The Oracle Exadata appliance is the IESO's enterprise Oracle database server. This project will add both disk and CPU capacity to support additional applications and further database growth of existing applications.
Wallboard Refresh	This project proposes to replace all wallboard projector components in the Control Room with a unified vendor solution that can be managed efficiently by the IESO and reduce costs associated with wallboard display changes. Wallboard projectors have exceeded their intended supported service life.
System Logging and Analysis Upgrade (Qradar)	Qradar is a security information and event management system that is used to collect and store all security logs in a centralized location for analysis and correlation. This project will refresh Qradar with the latest software and hardware appliances to ensure the IESO is effectively able to monitor for the latest security threats.
Tier 1 Storage Refresh	This project proposes to procure Tier 1 Storage and the fiber channel SAN infrastructure for the IESO's critical applications to meet IESO needs for the next 4 years. It includes the purchase and installation of additional Storage and Fibre Channel ports at the Clarkson and Backup Operations Centre (BOC) sites and migration of all servers.
Enterprise Threat Prevention (ETP) Refresh	The IESO uses HP's Tipping Point solution to detect and block network-borne malicious code and cyber-attacks. This project proposes to refresh the software and hardware appliances to ensure that we continue to protect the organization from threats and risks that may impact our business operation.
Market Renewal	The Market Renewal project will evolve the wholesale energy market and introducing capacity auctions to competitively and efficiently procure resources, while continuing to meet emerging operability challenges. The Market Renewal initiatives include: • A single-schedule market; • A financially binding Day-ahead Market; • Enhanced real-time unit commitment; • A capacity auction including the import and export of capacity; • More frequent intertie scheduling; and • Other operability enhancements as identified by the IESO and its stakeholders

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Ontario

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Office of the President & CEO
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MAR 24 2017
Independent Electricity System Operator

Mr. Bruce Campbell
President and CEO
The Independent Electricity System Operator
1600–120 Adelaide Street West
Toronto ON M5H 1T1

Dear Mr. Campbell: Bruce

Thank you for resubmitting the Independent Electricity System Operator's (IESO) 2017-2019 Business Plan (the Plan) on February 1, 2017, for my review.

The ministry has reviewed the revised Business Plan and Budget, which included augmented consideration for the emerging priorities related to the Market Renewal project.

In my recent letter of February 13, 2017, I requested the IESO to be prepared in supporting the establishment of a new entity, the Ontario Climate Change Solutions Deployment Corporation of the Ministry of the Environment and Climate Change (MOECC). I expect the IESO will seek to prioritize its core business plan activities while ensuring this joint initiative with the MOECC is well supported to realize the shared objective of ensuring low-carbon energy choices.

I am satisfied that the IESO's proposed plan for the 2017 budget and related activities reflect the appropriate scope and resourcing to advance the Market Renewal, as well as meeting the responsibilities of its core mandate. I expect future market renewal resourcing beyond 2017 will be further reassessed in future business plans and revenue requirements applications with the Ontario Energy Board as required.

This letter constitutes my approval of the IESO's 2017 budget of the Plan in accordance with my authority under subsection 24(2) of the *Electricity Act, 1998*.

I look forward to working with the IESO in the opportunities that lie ahead.

Sincerely,

Glenn Thibeault
Minister

c: Tim O'Neill, Chair, IESO
Serge Imbrogno, Deputy Minister of Energy
Michael Reid, Assistant Deputy Minister, Strategic, Network and Agency Policy Division, Ministry of Energy

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2016 ANNUAL REPORT

Reliability in a Changing Sector

ieso
Connecting Today.
Powering Tomorrow.

CORPORATE PROFILE

Vision: Powering a Reliable and Sustainable Energy Future for Ontario

Reliability **– it is at the heart of everything the Independent Electricity System Operator (IESO) does, from managing the flow of electricity across Ontario in real time, to planning and procuring for the province's emerging and future energy needs, and leading a culture of conservation.**

The IESO has a broad mandate and uses its unique position in the power system to ensure reliability now and in the future.

With this mandate, the IESO has a unique opportunity to engage with a broad cross-section of Ontarians. As it works to shape a more sustainable and reliable electricity system, the IESO strives to be a trusted source of transparent, accessible and timely electricity sector data and information. The IESO values the diversity of its stakeholders and the communities with which it engages, as they assist the organization in making informed decisions. To support its efforts, the IESO applies engagement principles to its wide-ranging initiatives to ensure stakeholders and communities have the opportunity to provide input on matters that impact them.

IESO Strategic Plan 2016-2020

In 2016, the IESO released a five-year corporate strategy centred on its vision, mission and corporate values. The IESO 2016-2020 Strategic Plan describes some of the opportunities and challenges the organization anticipates in the coming years. It considers a range of environmental factors that are expected to affect the organization, including climate change, emerging technologies, operability challenges, consumer engagement and cybersecurity, among others

The strategic plan provides a roadmap for the IESO's activities over the next five years. It will help set the priorities for the organization and inform the development of the IESO's annual business plans.

This annual report, *Reliability in a Changing Sector*, includes a look at some of the core initiatives that the IESO undertook in 2016, as well as a look forward to the coming year and beyond and is structured around three overarching strategic goals:

- **Deliver superior reliability performance in a changing environment**
- **Drive to a more efficient and sustainable marketplace**
- **Be recognized as a trusted advisor, informed by engagement.**

The IESO's fourth strategic goal, **to invest in our people and processes to meet the needs of the sector**, is intended to ensure that the IESO is well-equipped to fulfil its mandate. Realizing this goal is key in meeting the IESO's first three strategic goals.

2016: Ontario's Electricity Sector At a Glance

36,070 MW
Installed generation capacity

23,213 MW
Highest recorded 2016 peak demand, on September 7

4.9 million
Customers served

137 TWh
Total demand

21,858 GWh
Total exports

7,995 GWh
Total imports

$14 billion
Financial transactions in the IESO wholesale market

684,000 MWh
Net energy savings from conservation programs delivered by local distribution companies (LDCs) and the IESO

1.66¢/kWh
Weighted wholesale price of electricity (Hourly Ontario Energy Price)

9.65¢/kWh
Average global adjustment Class B rate

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Letter from the President & CEO and Chair

Bruce B. Campbell
President and
Chief Executive Officer

Tim O'Neill
Chairman of the Board

During 2016, we continued to see accelerated change and transformation across all reaches of the electricity sector. From microgrids to the continued adoption of new energy technologies, our system is evolving in a way that is enabling more customers and stakeholders to play a more active role in the production, management, delivery and use of electricity. For the IESO, 2016 further underscored the organization's ability to adapt to a changing energy landscape and the important role it will play in the ongoing evolution of the sector.

The IESO's 2016 Annual Report outlines the strategic objectives and achievements of the IESO, together with its industry partners. It also describes how we will continue to provide superior reliability in a changing environment, create a culture of conservation in Ontario and renew our electricity markets, all while working with our stakeholders and communities.

Establishing the IESO 2016-2020 Strategic Plan was an important milestone in the evolution of the IESO, one that both defines the organization's goals and strategic objectives and establishes a framework for how the IESO will evolve to meet the growing energy needs of Ontarians. For the IESO, providing public value is a core priority in our rapidly evolving sector.

The IESO is the steward of a system that supports all Ontarians. In this year's report, we outline active initiatives and engagements, but equally important, we identify how you can get engaged. The next chapter of Ontario's electricity sector is already being written, and it's one in which many customers and stakeholders are playing an increasingly key role.

To navigate this transition over the coming years, our decision-making relies on the guidance and collective views of customers, large and small, commercial and residential, communities and stakeholders, as well as our industry partners.

Strengthening the future framework of Ontario's energy system will also be enabled through robust planning and implementation. In September 2016, the IESO published the *Ontario Planning Outlook*, a 20-year outlook for Ontario's electricity sector. Looking forward, the IESO will be developing an implementation plan to support the upcoming Long-Term Energy Plan and completing a mid-term review of the Conservation First Framework. This work is aimed at better preparing the IESO, and the sector generally, for the future challenges and opportunities ahead.

Through the market renewal program, the IESO is proposing to redesign Ontario's wholesale electricity markets to provide greater transparency, promote competition and deliver more efficient outcomes. This project will engage a wide range of stakeholders, external resources and business units across the IESO.

Supporting transformation also means ensuring that we are investing in our people and processes to meet the needs of the sector. Succession planning and continued capability building will assist us in becoming a more agile and resilient organization.

The coming year also brings additional change to the structure of the organization, with the transition to a new President and Chief Executive Officer, who will lead the IESO's efforts to achieve its mandate and strategic objectives for the balance of this year and beyond.

We would like to thank and acknowledge the hard work of our employees. In 2016 we launched a large number of initiatives, supported policy development, undertook province-wide engagement efforts and worked closely with communities and consumers. We extend our congratulations and our thanks to IESO employees for their efforts over a very busy year. We would also like to recognize the significant contributions of Kim Warren, our former Vice-President, Market and System Operations, and Chief Operating Officer, who retired in December.

We look forward to helping Ontario effectively address the opportunities and challenges facing our electricity system going forward.

Bruce B. Campbell
President and
Chief Executive Officer

Tim O'Neill
Chairman of the Board

2016 Timeline

January

IESO/Bruce Power **amended supply and refurbishment agreement** takes effect

February

IESO hosts executive conference to address cybersecurity

March

16 contracts representing 455 MW of renewable energy projects announced under the Large Renewable Procurement I

April

Launch of province-wide Save on Energy Spring Coupon Event

Kilowatt *Way*

Launch of interactive residential energy-efficiency tool, **kilowattway.ca**

Stakeholder engagement for market renewal program begins

May

IESO and Ryerson Centre for Urban Energy release discussion papers on the future of energy consumption, sustainability and integrated utility delivery models

ENERGY STAR

IESO receives ENERGY STAR Canada award for encouraging energy conservation through consumer incentive programs and promotional campaigns

June

936

IESO announces **936 contract offers** for 241 MW under the Feed-in Tariff Program, version 4

SAVE ON ENERGY
POWER WHAT'S NEXT

Launch of Save on Energy awareness campaign, **Power What's Next**

July

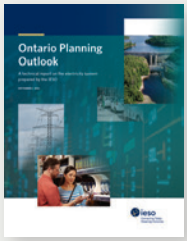
IESO/LDC Working Group issue 2016 conservation *Achievable Potential Study*

August

IESO and New York Independent System Operator (NYISO) reach agreement that enables **Ontario generators to offer capacity into future NYISO installed capacity auctions**

September

Release of IESO's electricity system technical report, the ***Ontario Planning Outlook***



23,213 MW
September 7, 2016

Reliable management of grid through extreme weather and highest peak day

October

Launch of province-wide Save on Energy Fall Coupon Event

November

$100,000 +
Amount raised by IESO's workplace campaign for United Way

IESO hosts second executive conference on cybersecurity

December

DR

Second annual demand response auction results in **prices 12 to 17 percent lower than 2015**

New electricity trade agreement with Quebec takes effect, which will help to limit greenhouse gas emissions in Ontario

Delivering Superior Reliability Performance in a Changing Environment

While operating the power system has always been a balancing act, maintaining that balance in an era of accelerated change across the sector presents new challenges in a number of areas.

Ontario relies on a diverse range of energy resources, both in terms of the generation portfolio itself, but also through the strategic use of conservation and energy efficiency, demand response, clean energy imports and emerging technologies such as storage.

With increases in variable generation and distributed energy resources, as well as nuclear refurbishment outages over the planning horizon and changing customer demand patterns, Ontario's system is becoming increasingly complex to operate on a day-to-day basis.

So what does all of this mean? In part, it means the way the IESO plans and operates the electricity system requires a greater level of agility than ever before. It also means an increased focus on collaboration. This includes collaboration with local distribution companies (LDCs) and other electricity sector partners to establish new pathways to reliability. It also calls for engaging in dialogues with the IESO's system operator counterparts in other jurisdictions to share best practices and leverage the new tools and techniques at its disposal to plan for and adapt to future sector evolutions.

Addressing Long-Term Energy Needs

In June 2016, the *Energy Statute Amendment Act* received Royal Assent in the provincial legislature. Among its amendments, the Act replaced the Integrated Power System Plan framework and put in place a requirement for the IESO to develop an electricity system technical report. In its role as long-term planner for Ontario's electricity system, the IESO produced a report on September 1, 2016, called the *Ontario Planning Outlook* (OPO). The report provides a 10-year review (2005-2015) and a 20-year outlook (2016-2035) for Ontario's electricity system. With four different demand outlooks, the OPO considers a range for annual electricity demand over the next 20 years, from as high as 197 terawatt-hours (TWh) to as low as 133 TWh. This technical report also helped to guide the consultations for the province's next Long-Term Energy Plan (LTEP), which is expected to be published in 2017.

Under the *Energy Statute Amendment Act*, the IESO is also now responsible for an implementation plan following the release of the province's LTEP, which will be a priority for the IESO in 2017. The organization will also continue to provide, on an ongoing basis, information on evolving needs and trends in the electricity sector to government, stakeholders and communities.

Responding to Changing Grid Conditions

Addressing Emerging and Near-Term Reliability Needs

All across North America, system operators are addressing new challenges as their supply mixes evolve. Some of the adjustments include integrating variable forms of generation, as well as gaining more visibility into electricity systems at the bulk and distribution levels.

In 2016, the IESO completed an operability assessment, which looked at the continuum of complex and interrelated factors at play in Ontario's power system. It focused on changes that are expected on the system in the next few years and addressed the potential operating challenges they represent.

Among the findings, the report identified that the continued growth and integration of variable generation will have a considerable effect on the operability of the system in the next three to five years. This is mainly due to the variability of certain fuel sources, for example, wind or sunlight, which make them less predictable than conventional forms of generation. This results in greater forecast uncertainty from a system operation perspective.

The findings of the *2016 IESO Operability Assessment* led to the formation of a stakeholder engagement focused on enabling system flexibility. In 2017, the IESO will continue its work to maintain and improve the operability of the power system through transparent mechanisms in three key areas:

Item	Need	Why	What the IESO is doing
Frequency Regulation	Additional frequency regulation capability, or the ability to balance total system supply with total system load, on a second-by-second basis.	To correct for short-term changes in electricity use that alter the supply and demand balance. Some of these changes include increases in variable generation as well as non-traditional demand patterns.	The IESO is seeking to expand the depth of the regulation services market in Ontario. The IESO issued a draft Request for Proposal (RFP) for regulation services for comment in late 2016, with a final RFP scheduled to be released in the spring 2017.
Voltage Control	Reactive control devices, which are designed to ensure stable levels of electric power voltage by maintaining voltage levels within pre-determined ranges set by equipment manufacturers.	To better manage voltage levels affecting the bulk power system as a result of the transformation of the province's supply mix, transmission infrastructure, and as increased quantities of supply resources are connected to the distribution system. Studies are underway to determine where the greatest needs exist, including the Greater Toronto Area and eastern Ontario.	In 2017, the IESO will collaborate on an implementation plan with transmitters and seek input from the IESO's Stakeholder Advisory Committee.
Flexibility	Increased flexibility from supply resources to be able to address supply and demand imbalances that arise within an hour.	To maintain a balance of supply and demand, increased resource flexibility is needed to respond to short-term supply and demand imbalances. Forecast accuracy improves significantly as it gets closer to real-time. As a result, any inaccuracies in supply or demand forecasts will become evident close to real-time when it's sometimes too late to schedule less flexible resources. Solutions considered will need to be cost-effective and competitive, transparent and technology-neutral, allowing for the use of new technology and/or existing assets.	The IESO has initiated a stakeholder engagement to determine potential solutions that can enable and achieve flexibility to meet the evolving needs of the system. This could include getting more flexibility out of existing resources and/or enhancing market mechanisms through the IESO's market renewal program.

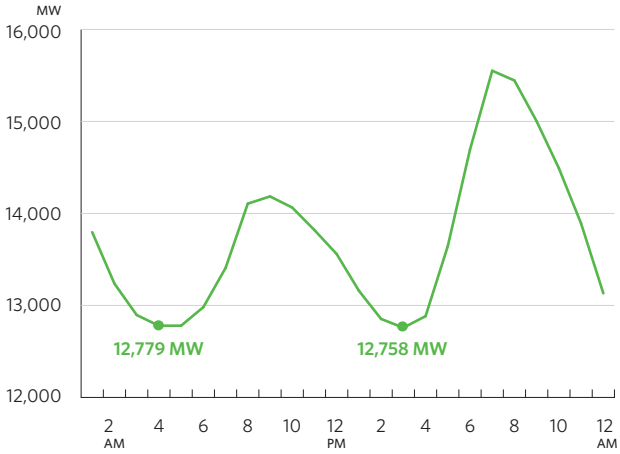
These efforts to improve operability will build on previous efforts such as the Renewable Integration Initiative, which brought in centralized forecasting of wind and solar generation and the capability to dispatch transmission-connected variable generators. There is also a growing array of emerging technologies that can be leveraged to address these operability issues, discussed on pages 6 and 7.

Ontario Demand – February 18, 2017

Below is an example that illustrates how Ontario's transforming electricity system is impacting grid operations and presenting new challenges to system operators.

On Saturday, February 18, 2017, which fell on the Family Day weekend, the confluence of unseasonably warm temperatures and bright sunshine resulted in what's called a "duck curve" load pattern, a distinctive shape (resembling the profile of duck) in which demand falls significantly in the middle of the day.

On February 18, this pattern occurred as a result of already low daytime grid demands being further reduced to overnight lows, due to solar resources embedded in the distribution system generating at full, or close to full, capacity. As the evening approached, solar generation output declined, temperatures fell, lights came on, and grid demand climbed sharply and required other resources to ramp-up to meet the increased system demand. While not yet a common occurrence, the duck curve scenario demonstrates both the challenges associated with forecasting demand for power from the grid due to embedded variable resources and the need to have sufficient flexible resources online to meet these ramping events.



Grid-LDC Coordination Initiative

The IESO and LDCs are taking collaborative steps to enhance reliability and efficiency to get a more integrated picture of how emerging technologies and distributed generation might impact the operation of the province-wide power system. The Grid-LDC Coordination initiative is working to refine a framework for data sharing between the IESO and all LDCs, to assist in real time with managing the system more effectively.

This initiative explored the feasibility of residential solar and energy storage technologies using PowerStream's (now Alectra's) POWER.HOUSE project, a "virtual power plant" in Vaughan and soon in Northern Ontario through a partnership with Thunder Bay Hydro. Next the initiative will look at how to enhance reliability and efficiency through coordination of IESO- and LDC-controlled resources. These projects will help gain insights into how upcoming changes at both the grid and distribution levels can impact system operations and identify practical ways to leverage these opportunities.

In addition, in late 2016, Veridian announced the deployment of a residential microgrid involving homebuilders – managed and operated by Veridian's 24/7 System Control Centre and controlled by Opus One's GridOS® Microgrid Energy Management System – which may provide another opportunity to better understand and inform data sharing and real-time system coordination between LDCs and the IESO.

Harnessing the Potential of Storage

Energy storage is another tool the IESO is exploring to assist with providing resource flexibility to help mitigate the effects of variable output. Energy storage facilities have the potential to provide a range of services to support reliability, including regulation, voltage control, operating reserve and flexibility – provided that they are the right type of facility and in the right location. The variety of benefits associated with storage can include:

- **Smoothing out fluctuations** of variable generation resources, bringing added stability to the electricity system
- **Easing points of congestion** in transmission and distribution networks
- **Helping move clean energy** to peak demand periods
- **Providing reliability** services that support voltage and frequency on the system.

The IESO is already using storage technologies as a source of frequency regulation, with two projects in operation: NRStor Inc., in partnership with Temporal Power, is providing two megawatts of regulation using flywheel technologies, and Renewable Energy Systems Canada Inc. delivers Ontario's first battery regulation service with four megawatts of capability.

To further support and understand the integration of storage into the electricity system, in 2015 the IESO completed a two-phase energy storage procurement, securing approximately 50 MW in total. Soon, energy storage assets procured under Phase I will begin providing ancillary services to Ontario's electricity system in various locations across the province. Although it's still early days for these projects, as the first of these facilities is expected to come into operation in 2017, together they will build up the IESO's direct experience with the various technologies. The IESO looks forward to working with all of the project proponents to confirm and capture the value of storage.

Growing Role of Interconnections to Strengthen Reliability

Participating in an interconnected power system enables the IESO to respond and assist in maintaining the reliable operation of the entire North American grid, and enables Ontario to receive and benefit from similar assistance from its interconnected reliability partners. Ontario currently has interconnections with five of its neighbours: Quebec, Manitoba, Minnesota, Michigan and New York. These interconnections facilitate the economic import and export of electricity and provide operational and planning flexibility that enhance the reliability and cost-effectiveness of Ontario's electricity system.

The IESO is working on enhancing the use of its interties to better meet system needs.

The provincial government recently concluded two electricity trade agreements with Quebec. The most recent agreement provides for Ontario to import 2.3 TWh of energy from Quebec in addition to regular wholesale energy trading. These imports will displace dispatchable Ontario-based gas-fired generation with lower-cost and lower greenhouse gas-emitting energy from the Quebec grid. The agreement provides value by displacing higher-emission gas generation and makes use of existing intertie and transmission system capability.

In 2016, the IESO enabled capacity exports, with one Ontario facility participating in and clearing the New York Independent System Operator's (NYISO) auction. In August 2016, a Memorandum of Understanding was signed between the IESO and NYISO, designed to support specific projects on a transitional basis to gain experience and learn lessons for a long-term solution, including the implementation of an incremental capacity auction in Ontario. Joint processes with the NYISO are being established to coordinate operations. Development of the information technology functions to support related control room operations were also initiated in 2016.

In addition to capacity exports, the IESO is also considering moving to 15-minute intertie scheduling as part of the market renewal program (see page 8). This has now become a regulatory standard in the United States. In 2013, the IESO released a study paper concluding that more frequent intertie scheduling would provide system benefits and increase market efficiency by lowering the overall system costs of meeting demand. This will also enable Ontario to schedule resources and meet its adequacy requirements in a more cost-effective manner in the future.

Cybersecurity

Maintaining system reliability involves keeping Ontario's critical electricity infrastructure secure. As has been widely reported, Ukraine recently experienced a confirmed instance of a cyber-attack causing a blackout. Governments and industry in Canada are working together to develop coordinated cybersecurity strategies and to form organizations specifically focused on cyber defence.

Cybersecurity is a material part of the IESO's business, particularly when one considers the breadth of data the IESO collects on a given day – more than 20,000 data points every three seconds – to support the reliable flow of electricity across the province and its borders. The IESO has put into place robust cybersecurity and cyber incident response programs to mitigate threats to critical business operations.

The IESO is also responsible for the application and enforcement of North American Electricity Reliability Corporation (NERC) cybersecurity standards for critical electricity infrastructure connected to the bulk electricity system in Ontario.

Beyond its regulated requirements, the IESO has also been working closely with market participants and stakeholders to deepen the sector's understanding of cyber risks. These efforts include increasing information sharing between the sector and government partners, exchanging information on respective approaches to mitigating the effects of cyber-attacks, creating a stronger incident response capability and enhancing the awareness of cybersecurity at the executive and board levels of organizations. The IESO held two cybersecurity conferences and hosted two executive/board level cybersecurity briefings in 2016. These forums were attended by electricity industry leaders and cybersecurity experts from around the world and included productive, forward-looking dialogue on matters related to best practices, policy framework, government support and other key areas of cybersecurity. Further meetings are being planned, including an executive briefing scheduled for late 2017. The IESO will continue to invest in advanced technologies and more robust cybersecurity technologies as part of its ongoing cyber threat mitigation efforts.

Driving to a More Efficient and Sustainable Marketplace: Market Renewal

The IESO, together with stakeholders, have begun a market renewal program to improve the efficiency and performance of the wholesale electricity market. It will enhance the way energy is scheduled and priced, evolve how resources are acquired and drive greater system flexibility.

Nearly 15 years ago, on May 1, 2002, Ontario's electricity market opened for the first time. It marked a major milestone for Ontario's electricity system – the process to match supply and demand would now be based on competition, where electricity would be bought and sold on a spot market at competitive prices. The IESO maintains the wholesale electricity market and directs the operation of Ontario's bulk power system. The market was designed to efficiently dispatch Ontario's supply mix resources, which, at market opening, consisted of mainly coal, nuclear and hydroelectric.

Since then, Ontario's system has seen a significant resource transformation. In a relatively short period, the province experienced a substantial net growth in electricity supply and a material transition to a cleaner energy system. Over six gigawatts (GW) of installed coal-fired capacity was shut down and replaced with more than 14 GW of renewable, natural gas-fired, nuclear and demand response resources. Combined, this new supply mix has changed the dynamics of Ontario's electricity system.

Over the last decade, inefficiencies with the current market were identified through the work of the Electricity Market Forum, the Market Surveillance Panel, IESO studies and stakeholder input. The IESO made a series of enhancements to adapt its market design to the changes in the supply mix.

While the IESO has maintained reliability throughout these changes and adopted new approaches to increase flexibility and resiliency into the provincial power grid, it has also become evident that the current market design needs more foundational changes.

Where Are We Now?

The IESO has identified the need to evolve Ontario's electricity market to address known inefficiencies and lay the foundation for a more dynamic marketplace in the future. As noted in last year's *Ontario Planning Outlook*, the province is in a stable supply situation that is expected to continue until the beginning of the next decade, making this an opportune time to consider and implement needed market design changes.

To advance these efforts, the IESO and stakeholders are examining the benefits and costs of evolving and improving the market. Market renewal, as the program is called, will be a major undertaking both for the IESO and for Ontario's electricity sector, and it represents the most significant enhancement of Ontario's market since it first opened in 2002.

Market Renewal Principles

In 2016, when the IESO launched a stakeholder engagement for market renewal, it appointed members for a working group representing a broad cross-section of market participants and stakeholders to help guide the market renewal process. Comprised of experienced individuals representing generators, traders, consumers and emerging technologies, the working group is a key stakeholder forum for this project.

The IESO also engaged an economic consulting firm, the Brattle Group, to develop a benefits case for the market renewal program, supported by input from the working group and stakeholders. The analysis draws on previous Ontario studies and the experience of other jurisdictions that have gone through similar market redesign processes. The final benefits case is expected to be posted on the IESO website in April 2017.

Early findings show potential for cost savings, with a baseline estimate of $3.4 billion (net present value) over a 10-year period from 2021-2030. These savings represent a net efficiency benefit, meaning the total commodity cost of electricity (i.e., energy, global adjustment and uplifts) is reduced by that amount. The majority of savings are expected to flow to consumers, while the rest would flow to other market participants. Costs for the project are estimated to fall in the range of $200 million to $300 million. While these are only initial findings, the numbers demonstrate that the range of reasonably expected benefits far outweighs the likely costs of the project (see sidebar on page 10).

Benefits of Transitioning to More Efficient Market-Based Platforms

Market renewal is expected to provide value for Ontario's ratepayers by putting downward pressure on costs while fostering an open and competitive marketplace with broad participation. Effective markets provide clear signals for the value of needed services, and they enable all resources – whether new or existing – to compete to meet those needs. Effective markets, where prices accurately reflect underlying system conditions, also enable individual resources and consumers to make informed decisions, capturing innovation and better managing costs and risks.

Proposed changes to the market include:

- moving from scheduling and dispatching primarily in real time to a financially binding day-ahead market that will provide the IESO and market participants more certainty
  - A day-ahead market will require replacing the current two-schedule system (where prices are determined under one schedule and energy is dispatched under another) with a more efficient single-schedule market.
- introducing an incremental capacity auction where all resources will compete on a level playing field, resulting in lower costs and potentially avoiding or deferring the need to build new resources
- delivering greater flexibility from existing assets and from interties
- other operability enhancements as identified by the IESO and its stakeholders.

The Evolution of Capacity Procurement

COMPETITIVE PROCUREMENTS

Ontario has used many different procurement mechanisms: competitive RFPs, standard offer programs and bilateral negotiations. Broad and open competitive RFPs have yielded the best value for consumers.

DEMAND RESPONSE AUCTION

The demand response auction has been a first step in testing out an auction platform. It provides an annual mechanism for resources to compete transparently. It has attracted a number of new entrants and innovative approaches.

CAPACITY AUCTION

A capacity auction will provide a stable and enduring platform where existing assets and new entrants can compete on a regular basis for incremental capacity needs. Transparent price signals will lead to improved investment decisions.

The energy and operability initiatives under market renewal are designed to address inefficiencies with the current market design and improve the way the IESO schedules energy. Market renewal also proposes to introduce an incremental capacity auction that would allow non-traditional resources (such as demand response, distributed energy resources, upgrades to existing assets, and imports) to compete with existing assets. A capacity auction would function similarly to Ontario's existing demand response auction (see next page) but would include broader participation. This mechanism has been used in a number of North American markets, as well as globally, to cost-effectively meet the capacity needs of modern electricity systems.

The IESO benefits from almost 15 years of experience with Ontario's electricity market and can also draw upon decades of best practices in other jurisdictions. The IESO will work with stakeholders to reset Ontario's market in a way that both addresses existing challenges and unlocks future possibilities.

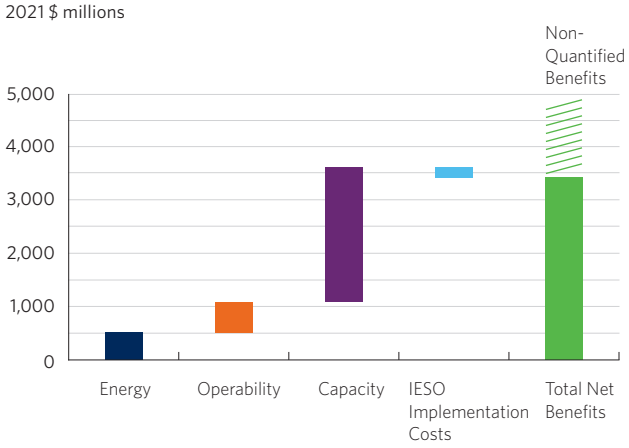
A work plan for market renewal will be developed in 2017 through engagement with stakeholders. It will identify specific market design changes for implementation over the coming years and identify target timelines for completing design and implementation work.

The Case for Market Renewal

This graph is from the March 2017 draft report, *A Benefits Case Assessment of the Market Renewal Project*, prepared for the IESO by the Brattle Group. It includes the estimated benefits and costs of market renewal for the period of 2021–2030, based on present value of quantified benefits from the three work streams: energy, operability and capacity. The report estimates that market renewal will produce benefits with a present value of approximately $510 million from energy market reforms, $580 million from operability reforms and $2.53 billion from capacity auction reforms. Realized benefits will likely be greater if the existing contracted resources are more responsive to market prices than assumed in the analysis and considering that the value of many benefits has not been quantified. As shown, the estimated benefits are offset by $200 million in estimated IESO implementation costs.

Present Value of Benefits and Costs

2021 $ millions



Work Streams	Primary Objective	Initiatives
Energy	Reduce cost and gain efficiency scheduling energy to meet provincial demand	• Single-schedule system • Day-ahead market • Enhanced real-time unit commitment
Operability	Increase flexibility to reliably and cost-effectively integrate variable resources	• More frequent intertie scheduling • Investigate other opportunities
Capacity	Reduce cost of procuring resources to meet long-term demand	• Capacity trade • Incremental capacity auction

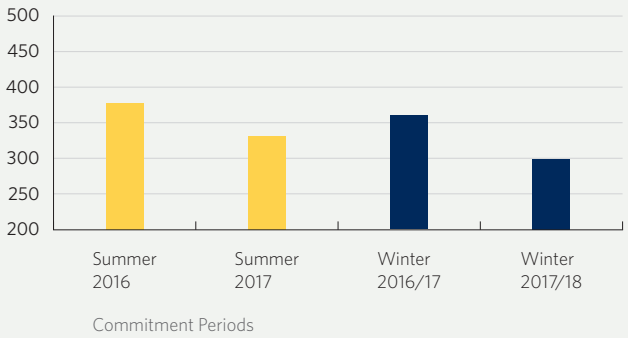
Demand Response Auction

For a number of years, the IESO has been exploring what types of flexible, responsive mechanisms could be introduced to complement the existing market structure. The IESO's annual demand response (DR) auction is part of those ongoing efforts and has helped to expand Ontario's DR capabilities and transition to a more cost-effective, market-based platform for this resource. DR has been introduced into the market where it can be called upon like other resources to meet provincial needs and can reduce the need to build costly generating facilities by reducing electricity usage during the hours of highest demand, typically on hot summer days. The first DR auction, conducted in December 2015, contributed 391.5 MW during the 2016 summer season and 403.7 MW for the 2016–17 winter season.

The outcome of the second annual DR auction was announced in December 2016 and resulted in both increased participation as well as prices for demand response capacity that were 12 to 17 percent lower than those achieved in 2015. The amount of DR procured through the auction increased by 16 percent in the summer to 455.2 MW and 18 percent in the winter to 477.5 MW compared to the previous year. The next DR auction will be held in December 2017, for delivery of DR capacity between May 2018 and April 2019. The successful DR providers will be integrated into the electricity market along with generators and will help provide capacity to ensure the province's energy needs are met during peak hours. Lessons learned from the DR auction will be applied to the design of an incremental capacity auction.

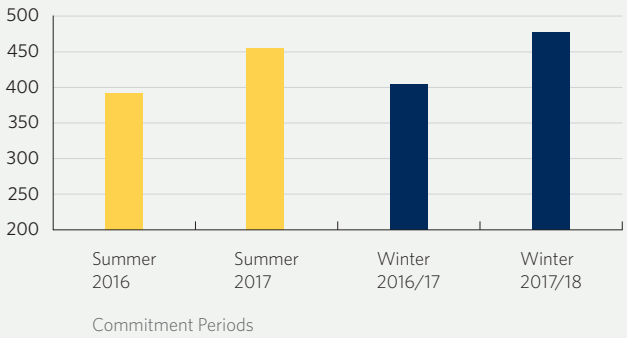
DR Auction Results – Clearing Prices

Price $/MW-day



DR Auction Results – Cleared Quantities

MW



Engagement Plans for 2017

The market renewal project has a broad reach and will address the way the IESO schedules energy, procures capacity and meets operability needs in the province. The IESO recognizes that these proposed changes will impact market participants and contract counterparties. The IESO will work collaboratively to understand and address the impacts, as required. At the same time, the market renewal program is not a traditional stakeholder engagement, as it encompasses various work streams and will require engagement on various levels, including:

- education for the broader sector
- strategic discussions to focus on policy and key issues
- design discussions to determine, together with stakeholders, the optimal approach for Ontario
- technical dialogues with subject matter experts
- development of market rules and manuals.

The project will also require an enduring stakeholder commitment over a number of years.

To undertake this work, the IESO will use existing and newly created stakeholder engagement forums to seek input from both the traditional, sector-focused stakeholders and the broader stakeholder community. For example, the IESO will:

- Use existing stakeholder forums including the IESO Stakeholder Advisory Committee (SAC) and the Technical Panel.
- Institute a CEO's Executive Roundtable to ensure awareness and discussion on high-level issues related to the project.
- As the project progresses, engage the broader stakeholder community to ensure they are informed and able to provide input into the decision-making process.

The Market Renewal Working Group has been established to provide expertise and advice to support the development and implementation of market renewal initiatives.

Transparency will be a key component in the stakeholder engagement process. All materials that have been presented and provided to the IESO Market Renewal Working Group are available on the market renewal section of the IESO's website. The IESO encourages all interested parties, or their representatives, to participate in this engagement.

Driving to a More Efficient and Sustainable Marketplace: Conservation and Energy Efficiency

Energy conservation in Ontario has gone through a considerable evolution, and its contribution will continue to grow as Ontario's system becomes more dynamic and interconnected.

Today, energy efficiency and conservation are playing increasingly important roles in the energy landscape, both at the system level to meet electricity needs and also as an effective tool for consumers of all sizes to help reduce their own energy costs. From optimizing energy-efficient products to supporting certified energy manager training, conservation programs are helping Ontario businesses and residential customers better understand what energy-efficient options are available for them. In turn, these programs are contributing to better quality and more efficient homes, improving day-to-day operations in businesses and enabling a more reliable and sustainable system for future generations.

In 2016, the IESO continued its role in the advancement of a conservation culture in Ontario, working with local distribution companies (LDCs) and others to connect end-use customers to energy-efficient solutions. The past year saw continued progress against the province's six-year (2015-2020) Conservation First Framework (CFF), designed to provide LDCs with greater flexibility to design and deliver conservation programs that meet local community needs, strengthen regional collaboration and benefit both customers and the provincial grid.

Approved conservation and demand management (CDM) plans are now in place for all LDCs in the province, which in total account for the achievement of the seven terawatt-hour (TWh) CFF target. An additional 1.7 TWh of energy savings are to be achieved through the Industrial Accelerator Program, which has been designed to help transmission-connected customers achieve energy savings. At the same time, efforts continue to ensure programs are delivered in a cost-effective manner by applying rigorous third-party evaluation, measurement and verification of program results, which are made publicly available on the IESO's website.

With the introduction of the province's *Climate Change Action Plan*, the IESO and the province are exploring the potential to build on the existing suite of conservation programs to support and coordinate with the implementation and delivery of the plan's low-carbon objectives.

Conservation for the Long Term

Investing in Conservation

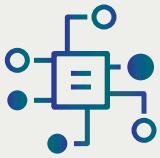
Ontario is a recognized leader in its commitment to conservation and energy efficiency; it is the cleanest and most cost-effective resource available. For every dollar invested in energy-efficiency programs, Ontarians have saved two dollars in avoided energy costs.

Communities

Conservation investments are being made in existing infrastructure owned by consumers in Ontario.

Homes

Ontario is a leader in setting energy-efficiency standards and supporting energy initiatives.



Innovation

The IESO's Conservation Fund is supporting new and innovative electricity conservation initiatives.

Knowledge

Training initiatives help drive participation in energy-efficiency programs.

Progress in Conservation

Conservation and energy efficiency is the first resource considered in planning Ontario's electricity system. The IESO, local distribution companies and other partners deliver programs across Ontario that result in measurable and verifiable savings toward the province's conservation targets. A lot has been achieved since 2006.

2006-2010

Customer incentives available for reducing energy use

2011-2015

Coordinated province-wide effort to deliver conservation

2015-2020

Conservation First approach to ensuring reliability

Programs delivered for under 4¢/kWh

9.5 million coupons redeemed across the province

2015 – 2016 energy savings achieved equivalent to powering 213,694 homes for one year

13 TWh of energy saved over 10 years

2020 Energy-Savings Targets:

Conservation First Framework

7 TWh

Industrial Accelerator Program

1.7 TWh

Conservation First Framework: By the Numbers

Consumers of all sizes throughout the province continue to take advantage of the range of energy conservation tools, resources and incentives tailored to Ontario homes and businesses through the Save on Energy programs delivered with LDCs. These include incentives for lighting upgrades, purchasing energy-efficient products and replacing inefficient equipment. Businesses of all sizes continue to access program funding that is helping to improve production efficiency, upgrade equipment and train their staff in energy management, which in turn is resulting in improved productivity, better work environments and lower operating costs.

In the first two years of the Conservation First Framework, these results have been achieved:

Residential

451 GWh
of **energy savings***

17.8 million
energy-efficiency **products** purchased

4,100
energy-efficient homes built through the New Home Construction Program

224,000
installations through the Heating and Cooling Program

Business

1,463 GWh
of **energy savings***

450
projects completed through the Energy Managers Program

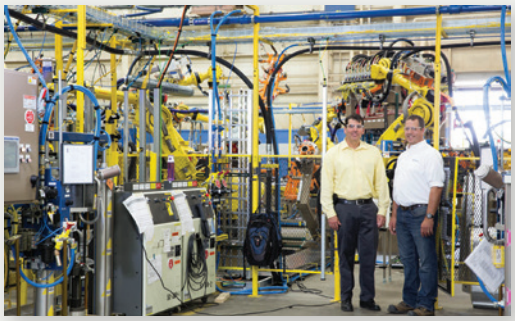
20,600
projects completed through the Small Business Lighting Program

19,700
projects taken on through the Retrofit Program

*Energy savings achieved are persisting to 2020.

Preliminary unverified results indicate that LDCs had collectively achieved 27 percent of the provincial CFF target, or 1.92 TWh of the seven TWh target in 2015-2016. These savings represent enough electricity to power a city about the size of Guelph for a year. In addition, the Industrial Accelerator Program has achieved 0.20 TWh of the 1.7 TWh target in 2015-2016, or 12 percent of the 2020 target. This number will increase as additional projects currently under contract are expected to be implemented over the coming period.

Energy Efficiency in Action



Valiant TMS, a Windsor-based company that designs and manufactures welding, assembly and material handling systems for the automotive and aerospace industry, upgraded its lighting, compressors, and heating and cooling systems, resulting in savings of four million kilowatt-hours annually, which represents 25 percent of its annual energy consumption.

The **Thunder Bay Regional Health Sciences Centre**, a 375-bed acute care hospital, emergency centre and research facility, lowered its electricity consumption by 22 percent thanks to Save on Energy incentives. Its energy-efficiency upgrades resulted in $660,000 in annual cost savings, which could be reinvested into patient and family care services.

More information on these projects, along with other testimonials and case studies, is available at **saveonenergy.ca**.

Getting to 2020 and Beyond

Conservation First Framework Mid-Term Review

In late 2016, the IESO launched a public engagement process to seek feedback from stakeholders to inform the mid-term review of both the 2015 – 2020 Conservation First Framework and the Industrial Accelerator Program. The mid-term review will focus on a range of key issues, including the allocation of budgets and targets among LDCs, lessons learned regarding LDC funding models, customer needs and satisfaction, conservation integration with regional planning and alignment with Ontario's *Climate Change Action Plan*.

This review will examine opportunities for achieving conservation objectives to 2020 and beyond, as well as consider using innovative new programs that did not exist prior to the framework and that were developed through pilot programs funded by the IESO.

Input from stakeholders and communities through public engagement meetings will be a key component leading up to and throughout the review. Comprehensive, open engagement that aligns with the IESO's Engagement Principles will help ensure that all LDCs, customers, channel partners and other interested parties have meaningful opportunities to provide feedback on the framework's success and challenges.

A Mid-Term Review Advisory Group, comprised of a variety of stakeholder representatives, has been assembled to tackle more detailed discussions.

Conservation and energy efficiency require a sustained commitment to achieve persistent savings over the long term, and the mid-term review will be an important marker in setting the next phase of conservation in the province. In early 2018, a final report will be submitted to the Minister of Energy and published on the IESO's website. For more information on this stakeholder initiative, please visit the IESO's Conservation Framework Mid-Term Review webpage or email **engagement@ieso.ca**.

Driving Innovation in Conservation, Energy Efficiency and Demand Management

In addition to the energy-efficiency programs delivered through the LDCs, the IESO is committed to encouraging new, innovative solutions and technologies that will help Ontario meets its conservation targets.

The IESO's Conservation Fund helps transform the market by supporting innovative energy-saving pilots and bringing ground-breaking new processes, technologies and policies to market. In 2016, the Conservation Fund committed $9.5 million to five initiatives. Project examples include:

- LDC achievable potential studies for their service territories
- enhancing CanmetENERGY's RETScreen energy-efficiency software, which provides project feasibility and energy performance analysis
- supporting an energy conservation study on commercial freezer temperature modification
- implementing a smart electric vehicle charging pilot for workplaces.

The LDC Innovation Fund is helping utilities explore new technologies that can contribute to a modern and efficient grid. The fund supports program design and testing of new initiatives, providing LDCs the opportunity to market test the delivery mechanisms and savings potential of new innovative program offerings before including them in their CDM plan and budget. These pilots are also assessed for their potential to be developed into local, regional or province-wide programs. Results of pilot programs are shared with other LDCs and the public so that the LDC community can collaborate and take away key learnings for their own projects.

Achievable Potential Study

In June 2016, the IESO completed an Achievable Potential Study to assess electricity conservation potential in Ontario. Supported by input from a working group comprised of 12 LDCs and expert industry observers, the study considered the potential for energy-efficiency programs and behind-the-meter generation projects. It concluded that, within the current assumptions, approximately 7.4 TWh of conservation can be achieved by LDCs by 2020. It also found that in the longer term, about 19.5 TWh can be achieved from distribution- and transmission-connected customers by 2035, assuming the same administrative costs and incentive levels. The Achievable Potential Study will be used to inform the Conservation Framework Mid-Term Review (see above) and will be a useful tool in informing program development as well as regional and long-term energy planning.

Photo: Innergex Renewable Energy Inc.

Engaging Stakeholders, Communities and Consumers

Responding to change in a rapidly evolving sector has become a constant part of the IESO's work. As Ontario's electricity system becomes more interconnected and regionally focused, the IESO's traditional forms of engagement will continue to expand as new generators, customers, Indigenous peoples and communities become more actively involved in the sector.

With this evolving landscape, the IESO's ability to achieve its goals will be dependent on the valuable input it receives.

The IESO's Engagement Principles provide an effective framework for ensuring stakeholders and communities have the opportunity to provide input on matters that impact them. Input was considered in the development of the principles, and both the IESO and the public have come to rely on these to guide open, transparent and meaningful opportunities for input. The Engagement Principles also provide a foundation for the IESO's engagement with Indigenous communities.

The IESO will continue to provide broad engagement channels and processes to ensure that its initiatives are guided by collective engagement. This was re-affirmed in the IESO 2016-2020 Strategic Plan: Seeking out and responding to input from communities, customers and stakeholders to inform IESO's decision-making has been adopted as one of the organization's strategic objectives.

At the same time, to be effective and meaningful, engagement must also go through a process of continuous improvement and measurement. The IESO will continue to undertake stakeholder and community interviews and/or surveys, which will indicate the level of satisfaction with the engagement process and whether the IESO has demonstrated appropriate consideration of input in decisions.

The Stakeholder Advisory Committee (SAC) has an important role in providing the IESO with input and feedback on proposed decisions or changes that affect all communities and stakeholders. Through input from the SAC, stakeholder priorities are considered in the development of the organization's core corporate planning documents, including the IESO's latest business plan. The IESO has established corporate performance measures (CPMs) for its key initiatives across the organization, designed to assess progress toward the achievement of its core mandate and strategic objectives. These targets have been developed to be specific, measurable, achievable, relevant and time-bound. They also reflect input received from the SAC to make the CPMs both outcome-oriented and externally focused.

Going forward, the IESO will continue to evolve its engagement processes and procedures, as well as their application, to meet the needs of its expanding stakeholder and community base.

Engaging Communities and Consumers

Technology developments are continuing to change the landscape of the traditional bulk power system, creating a larger role for the consumer within the broader system and offering a wider range of possibility for meeting their energy needs. Customers are becoming increasingly engaged and involved in managing their energy consumption through things such as:

- smart home technologies and innovative software applications
- community microgrids
- distributed energy resources
- electric vehicles
- storage technologies
- heat pumps
- residential demand management resources
- energy audits and retrofits.

At the same time, communities are becoming more focused on how to meet their energy needs through the development of community energy plans. As part of this, municipalities and Indigenous communities are working with their local utilities, community members and key stakeholders to establish an energy vision and develop plans to achieve this vision.

The result is that consumers and communities are taking an increasingly active role in how their energy needs are being met, and they are exploring local resources that can also meet regional reliability needs. This could take the form of non-wires supply options, such as conservation and distributed energy resources, as well as other innovative solutions. In its role to support this progress, the IESO will continue to expand its outreach efforts to include a broader vision of community engagement.

Identifying Regional Energy Needs

All of these activities contribute to the development of regional electricity plans across the province, plans that are designed to ensure a reliable supply of electricity over the next 20 years. These regional electricity plans ensure that community-based solutions, which are technically viable, economic and consistent with the values of the local community, are accounted for in the plans needed to meet capacity and reliability needs in a local area.

Meetings with municipalities and communities, as well as feedback received from the 11 Local Advisory Committees (LACs) across the province, contribute a local voice and help identify local priorities in the development of regional plans. LACs are comprised of municipal, First Nation, Métis, environmental, business, sustainability and community representatives and are an effective model for the IESO to engage communities in the regional planning process. All LAC meetings are open to the public.

Local Advisory Committees have been formed in the following areas as part of the IESO's regional planning process:

Greenstone-Marathon
Sub-region of Northwest Ontario (community)

Greenstone-Marathon
Sub-region of Northwest Ontario (First Nation)

West of Thunder Bay
Sub-region of Northwest Ontario (community)

West of Thunder Bay
Sub-region of Northwest Ontario (First Nation)

Thunder Bay
Sub-region of Northwest Ontario

Parry Sound/Muskoka
Sub-region of South Georgian Bay/Muskoka

Barrie/Innisfil
Sub-region of South Georgian Bay/Muskoka

York Region
Sub-region of GTA North

Toronto

GTA East

Ottawa

All 21 planning regions in the province have had the first five-year cycle of the regional planning process completed; this means that their needs have been examined and, where required, Integrated Regional Resource Plans have been developed. In the first round of regional planning, 16 plans were completed and are posted on the IESO website. Moving forward, the IESO will continue to work collaboratively with all communities to help best address their energy priorities and system needs and to ensure that the implementation of recommendations from completed plans is supported.

Indigenous Engagement

From First Nation-led transmission companies that are working to connect remote communities, to providing substantive input at Local Advisory Committees, to equity partners in over 1,000 MW of renewable projects, Indigenous communities are important partners in supporting Ontario's sustainable energy future.

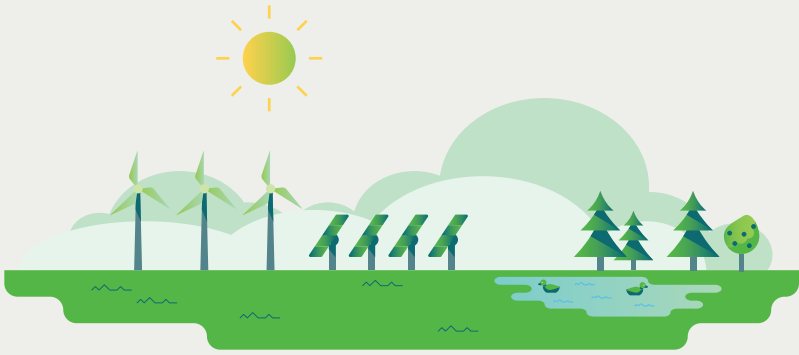
To assist with capacity building, the IESO works to ensure all Indigenous communities are aware of funding programs, upcoming procurements and electricity planning, have the opportunity to provide input and feedback, and that all feedback is considered in the development of programs and procurements.

In 2016, the IESO continued to receive advice and guidance on the development of programs and initiatives through the Aboriginal Energy Working Group, comprised of First Nation and Métis community members who reside across the province and are active in Ontario's electricity industry. Representatives from the IESO also spoke at 13 Indigenous conferences or community meetings, attended 13 additional conferences and assemblies and met with communities on more than 70 occasions.

Also in 2016, the IESO supported the Ministry of Energy in engaging Indigenous communities from across Ontario to provide input to the next Long-Term Energy Plan (LTEP). This included a customized series of regional Indigenous sessions, structured around an LTEP Indigenous engagement workbook. These sessions were part of the ongoing dialogues with Indigenous communities on everything from energy policy development to program delivery.

In 2016, the two-year capacity agreements with the Chiefs of Ontario and the Métis Nation of Ontario for the funding of an Energy Analyst position came to an end. Both of these agreements have been renewed for two additional years based on feedback from the organizations on the benefits of this position and the continued need to have a dedicated resource able to focus on energy issues.

Throughout 2016, the IESO continued efforts to reduce the dependence on diesel in all remote communities. This work included continuing to support the implementation of the Remote Communities Connection Plan. This plan informed an Order-in-Council from the provincial government in 2016, confirming the need to connect these 21 remote communities. The IESO has continued to support the current project to connect 16 of the communities through various regulatory processes and assessments. Work has also continued to build capacity in the communities as they prepare for connection, and the IESO has supported discussions with the federal government on project funding.

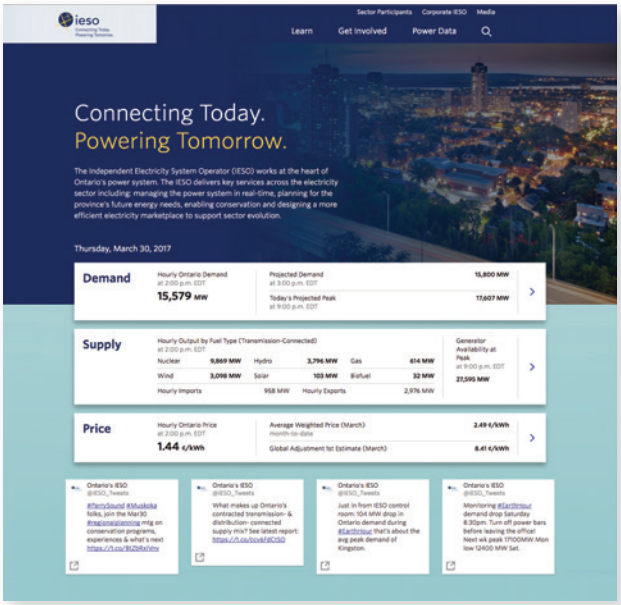


The IESO has also established an energy working group with the Matawa communities, which include the remaining five remote communities that are economic to connect to the bulk electricity system. Additionally, in 2016 the IESO launched the Energy Partnerships Program, which will support both the connection of remote communities as well as the effort to reduce reliance on diesel in the four remote communities that are not currently economic to connect.

In 2017 and beyond, the IESO will continue to engage First Nation and Métis communities through one-on-one, face-to-face meetings, customized engagement plans, working groups, capacity-building initiatives, social media and participating at various Indigenous events. Customized engagement will ensure that communities have the opportunity to participate in relevant electricity matters, including regional planning, new marketplace mechanisms, procurements, funds and conservation initiatives. In addition, the IESO will work to ensure that programs are established with considered input from communities and that any identified barriers are removed.

Expanding the Tools of Engagement

In 2017, the IESO is launching initiatives to engage Ontarians in some new and different ways.



IESO's New Corporate Website

The IESO's recently launched new corporate website was designed to better reflect all parts of the IESO's expanding mandate. With more than one million interactions each year, the site will continue to provide timely, trusted and vital sector data to market participants, stakeholders, communities and members of the public.

It has also been designed to be more accessible, engaging and with a more intuitive navigation. By taking a more customer-centric approach to design and content development, the IESO's website will further enable customers to make well-informed energy decisions, explore new content areas and gain further insights into the workings of Ontario's electricity sector. The redesign of the IESO's website has been a collaborative project and has included input from external users as well as representatives from across all of the IESO's service groups to ensure it meets a wide range of needs.

Energy Show at the Ontario Science Centre

The IESO and the Ontario Science Centre have embarked on a five-year partnership to help bring energy knowledge and understanding to all Ontarians. Under this agreement, the IESO is the lead supporter of the **Energy Show**, as well as a supporter of the Centre's two energy-related school programs. Building upon the Science Centre's iconic electricity demonstration, the **Energy Show** is a family-friendly 30-minute presentation that delves deeper into the principles and concepts of energy. Through interactive and animated investigation, experimentation and collaboration, guests of all ages learn about the different sources of renewable and non-renewable energy and are encouraged to think about the way they use energy in their daily lives.

Photo: Ontario Science Centre

Province-wide Summit and Regional Forums

The IESO will host a Stakeholder Summit in Toronto and four Regional Forums in 2017 to be held across the province. These events will explore the future direction of the electricity sector, while also engaging communities in local issues that matter most to them. **More information about these events, when it is available, can be found on ieso.ca in the Engagement Initiatives section.**

Executive Leadership Team, Board of Directors and Advisory Committees to the Board

The IESO is a not-for-profit corporate entity established in the *Electricity Act, 1998*, and is led by an Executive Leadership Team responsible for implementing the strategic direction and initiatives for the organization.

The IESO is governed by an independent Board of Directors that oversees its business and affairs. The Stakeholder Advisory Committee is a forum for appointed stakeholder representatives to provide advice and recommendations to the IESO's Board of Directors and Leadership Team. The Technical Panel proposes and reviews amendments to the Market Rules, and, as requested, advises the Board of Directors on specific technical issues relating to the operation of the IESO-administered markets.

As of December 31, 2016

Executive Leadership Team

Bruce Campbell
President and
Chief Executive Officer

JoAnne Butler
Vice-President, Market and Resource Development

Leonard Kula
Vice-President, Market and System Operations, and Chief Operating Officer

Michael Lyle
Vice-President, Planning, Legal, Indigenous Relations and Regulatory Affairs

Kimberly Marshall
Vice-President, Corporate Services, and Chief Financial Officer

Doug Thomas
Vice-President, Information and Technology Services, and Chief Information Officer

Terry Young
Vice-President, Conservation and Corporate Relations

Board of Directors

Tim O'Neill
Chairman of the Board
Retired from BMO Financial Group, where he served as Executive Vice-President and Chief Economist; President of O'Neill Strategic Economics

Bruce Campbell
President and Chief Executive Officer, Independent Electricity System Operator

Cynthia Chaplin
Director
Former Vice-Chair of the Ontario Energy Board

Murray Elston
Director
Former Chair of the Electricity Distribution Panel; former President of the Canadian Nuclear Association; former Ontario Minister of Health

Susanna Han
Director
Chief Financial Officer, LiUNA Local 183

Ronald L. Jamieson
Director and Chair, Audit Committee
Retired from BMO Financial Group, where he was Senior Vice-President, Aboriginal Banking; Director, Nuclear Waste Management Organization and Denendeh Investments Inc.; Member, Order of Canada; Appointee, Order of Ontario

Margaret Kelch
Director and Chair, Human Resources and Governance Committee
Director of the Board, DST Engineering Group, Chair of the Human Resources and Governance Committee; Former Board member Nature Conservancy of Canada, Chair of the Conservation Committee; Former Board member Electrical Safety Authority, Chair of the Regulatory and Human Resources and Governance Committees; Former Board member Guelph Hydro; other various board assignments

Bruce Lourie
Director
President of Ivey Foundation; Director of Canadians for Clean Prosperity, Clean Economy Fund, Philanthropic Foundations Canada and Advisory Board of Ecofiscal Commission

William Museler
Director
Former President and Chief Executive Officer of the New York Independent System Operator

Deborah S. Whale
Director
Vice-President, Clovermead Farms Inc.; Past Vice-President, Ontario Farm Products Marketing Commission; Vice-President, Grand River Raceway; Livestock Research and Innovation Corporation, Emerging and Critical Issues Committee

Carole Workman
Director
Former Chair of the Ottawa Hospital Board of Directors; Board member of Allstate Insurance of Canada; former Director of Hydro Ottawa and several other organizations

Stakeholder Advisory Committee

Brian Bentz (Chair)
President and Chief Executive Officer, PowerStream
Representing: Distributors & Transmitters

Steve Baker
President, Union Gas Limited
Representing: Related Businesses/ Services

John Beaucage
Principal, Counsel Public Affairs Inc.
Representing: Ontario Communities

Darlene Bradley
Director, Technical Services, Hydro One Networks Inc.
Representing: Distributors & Transmitters

Jack Burkom
Senior Vice-President, Commercial Development, Brookfield Energy Marketing Inc.
Representing: Related Businesses/ Services

David Butters
President and Chief Executive Officer, Association of Power Producers of Ontario
Representing: Generators

Jared Donald
President, Synergist Energy
Representing: Generators

Julie Girvan
Consumers Council of Canada
Representing: Consumers

Valerie Helbronner
Partner, Torys LLP – Infrastructure and Energy Practice
Representing: Generators

Geoff Lupton
Director, Energy, Fleet & Traffic, City of Hamilton
Representing: Ontario Communities

Rob Mace
President and Chief Executive Officer, Thunder Bay Hydro Electricity Distribution Inc.
Representing: Distributors & Transmitters

Mark Passi
Manager, Energy, Glencore
Representing: Consumers

Mark Schembri
Vice President, Supermarket Systems & Store Maintenance, Loblaw Properties Limited
Representing: Consumers

James Scongack
Vice President, Corporate Affairs, Bruce Power
Representing: Generators

Ersilia Serafini (Vice-Chair)
President, Summerhill
Representing: Ontario Communities

Paul Shervill
Vice President, Strategic Initiatives, Rodan Energy
Representing: Related Businesses/ Services

Todd Wilcox
Chief Operating Officer, North Bay Hydro
Representing: Distributors & Transmitters

Terry Young
Vice-President, Conservation & Corporate Relations, Independent Electricity System Operator
Representing: IESO

Technical Panel

Chuck Farmer (Chair)
Director, Stakeholder & Public Affairs, Independent Electricity System Operator

Shelly Cunningham
Senior Vice-President, Engineering Services, PowerStream Inc.
Representing: Distributors

David Dent
Manager, Strategic and Power Markets, Union Gas Limited
Representing: Natural Gas

Barbara Ellard
Director, Markets, Independent Electricity System Operator
Representing: IESO

Paul Huebener
Managing Director, DIF Management
Representing: Financial Industry

Brian Kelly
Manager, Indigenous Relations, Eastern Canada, TransCanada Energy Ltd.
Representing: Generators

Robert Lake
Representing: Residential Consumers

Martin Longlade
Representing: Industrial Consumers

Luis Marti
Director, Reliability Studies, Strategy and Compliance, Hydro One Networks
Representing: Transmitters

Peter Rowles
Representing: Commercial Consumers

Bill Wilbur
Director, Generation and Revenue Planning, Ontario Power Generation
Representing: Generators

Julien Wu
Manager, Regulatory Affairs, Quebec-Ontario, Brookfield Energy Marketing
Representing: Wholesalers

Ontario Energy Board Liaison

David Brown
Senior Policy Advisor, Wholesale Power Policy, Regulatory Policy Development, Ontario Energy Board

Technical Panel Secretariat

Susan Harrison

John Rattray

Independent Electricity System Operator
1600–120 Adelaide Street West
Toronto, ON M5H 1T1

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Connecting Today.
Powering Tomorrow.

2016 ANNUAL REPORT

Financial Statements

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Table of Contents

Management Report

Management's Responsibility for Financial Reporting

The accompanying financial statements of the Independent Electricity System Operator are the responsibility of management and have been prepared in accordance with Canadian public sector accounting standards. The significant accounting policies followed by the Independent Electricity System Operator are described in the Summary of Significant Accounting Policies contained in Note 2 in the financial statements. The preparation of financial statements necessarily involves the use of estimates based on management's judgement, particularly when transactions affecting the current accounting period cannot be finalized with certainty until future periods. The financial statements have been prepared within reasonable limits of materiality and in light of information available up to March 22, 2017.

Management maintained a system of internal controls designed to provide reasonable assurance that the assets were safeguarded and that reliable information was available on a timely basis. The system included formal policies and procedures and an organizational structure that provided for the appropriate delegation of authority and segregation of responsibilities.

These financial statements have been examined by KPMG LLP, a firm of independent external auditors appointed by the Board of Directors. The external auditors' responsibility is to express their opinion on whether the financial statements are fairly presented in accordance with generally accepted accounting principles in Canada. The Auditors' Report, which follows, outlines the scope of their examination and their opinion.

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

On behalf of management,

Bruce Campbell
President and Chief Executive Officer
Toronto, Canada
March 22, 2017

Kimberly Marshall
Vice President, Corporate Services
and Chief Financial Officer
Toronto, Canada
March 22, 2017

Independent Auditors' Report

To the Board of Directors of the Independent Electricity System Operator (IESO)

We have audited the accompanying financial statements of IESO, which comprise the statement of financial position as at December 31, 2016, the statements of operations and accumulated deficit, remeasurement gains and losses, change in net debt and cash flows for the year then ended, and notes, comprising a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of IESO as at December 31, 2016, and its results of operations and the changes in its net debt and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

KPMG LLP

Chartered Professional Accountants, Licensed Public Accountants

March 22, 2017
Waterloo, Canada

Statement of Financial Position

As at (in thousands of Canadian dollars)	December 31, 2016	December 31, 2015
		(restated Note 3)
	$	$
FINANCIAL ASSETS		
Cash and cash equivalents	33,005	14,715
Accounts receivable	31,103	33,199
Regulated assets **(Note 3)**	65,064	88,202
Long-term investments **(Note 4)**	40,355	37,318
Market accounts – assets **(Note 3)**	1,636,201	1,443,121
TOTAL FINANCIAL ASSETS	**1,805,728**	**1,616,555**
LIABILITIES		
Accounts payable and accrued liabilities **(Note 5)**	38,963	48,868
Accrued interest on debt	315	315
Rebates due to market participants **(Note 6)**	12,551	9,595
Debt **(Note 7)**	90,000	90,000
Accrued pension liability **(Note 8)**	34,620	36,062
Accrued liability for employee future benefits other than pension **(Note 8)**	90,251	84,501
Market accounts – liabilities **(Note 3)**	1,636,201	1,443,121
TOTAL LIABILITIES	**1,902,901**	**1,712,462**
NET DEBT	(97,173)	(95,907)
NON-FINANCIAL ASSETS		
Net tangible capital assets **(Note 9)**	105,047	103,716
Prepaid expenses	6,614	6,197
TOTAL NON-FINANCIAL ASSETS	**111,661**	**109,913**
ACCUMULATED SURPLUS		
Accumulated surplus from operations **(Note 6)**	6,582	6,348
Accumulated remeasurement gains	7,906	7,658
ACCUMULATED SURPLUS	**14,488**	**14,006**

On behalf of the Board:

Tim O'Neill
Chair
Toronto, Canada

Carole Workman
Director
Toronto, Canada

Statement of Operations and Accumulated Surplus

For the year ended December 31 (in thousands of Canadian dollars)	2016 Budget $	2016 Actual $	2015 Actual (restated Note 3) $
IESO CORE OPERATIONS			
System fees	177,219	185,531	186,187
Other revenue **(Note 10)**	1,000	2,531	5,377
Interest and investment income	–	2,157	1,430
Core operation revenues	**178,219**	**190,219**	**192,994**
Compensation and benefits	(106,361)	(105,570)	(104,994)
Professional and consulting	(20,118)	(16,844)	(21,461)
Operating and administration	(33,502)	(34,336)	(35,005)
Core operating expenses	**(159,981)**	**(156,750)**	**(161,460)**
Amortization	(17,500)	(19,577)	(17,933)
Interest	(738)	(1,341)	(1,610)
Core expenses	**(178,219)**	**(177,668)**	**(181,003)**
Core operations annual surplus before rebates	**–**	**12,551**	**11,991**
Rebates due to market participants	–	(12,551)	(9,595)
Core operations annual surplus	**–**	**–**	**2,396**
MARKET SANCTIONS AND PAYMENT ADJUSTMENTS			
Market sanctions and payment adjustments	4,341	3,889	6,021
Compensation and benefits	(2,981)	(2,180)	(3,094)
Professional and consulting	(1,515)	(770)	(1,351)
Operating and administration	(150)	(705)	(114)
Customer education and market enforcement expenses	**(4,646)**	**(3,655)**	**(4,559)**
Market sanctions and payment adjustments annual surplus/(deficit)	**(305)**	**234**	**1,462**
SMART METERING ENTITY			
Smart metering charge	32,244	27,426	26,185
Compensation and benefits	(3,567)	(2,661)	(2,607)
Professional and consulting	(18,763)	(14,659)	(14,902)
Operating and administration	(2,364)	(5,705)	(4,200)
Smart metering operating expenses	**(24,694)**	**(23,025)**	**(21,709)**
Amortization	(4,491)	(3,861)	(3,524)
Interest	(3,059)	(540)	(952)
Smart metering expenses	**(32,244)**	**(27,426)**	**(26,185)**
Smart metering entity annual surplus	**–**	**–**	**–**
ANNUAL SURPLUS/(DEFICIT)	**(305)**	**234**	**3,858**
ACCUMULATED SURPLUS FROM OPERATIONS, BEGINNING OF PERIOD	6,348	6,348	2,490
ACCUMULATED SURPLUS FROM OPERATIONS, END OF PERIOD	**6,043**	**6,582**	**6,348**

Statement of Remeasurement Gains and Losses

For the year ended December 31 (in thousands of Canadian dollars)	2016	2015
	Actual $	Actual (restated Note 3) $
ACCUMULATED REMEASUREMENT GAINS, BEGINNING OF PERIOD	**7,658**	**6,362**
UNREALIZED GAINS ATTRIBUTABLE TO:		
Foreign exchange – other	477	515
Portfolio investments **(Note 4)**	286	1,372
AMOUNTS RECLASSIFIED TO THE STATEMENT OF OPERATIONS:		
Foreign exchange – other	(515)	(591)
NET REMEASUREMENT GAINS FOR THE PERIOD	**248**	**1,296**
ACCUMULATED REMEASUREMENT GAINS, END OF PERIOD	**7,906**	**7,658**

Statement of Change in Net Debt

For the year ended December 31 (in thousands of Canadian dollars)	2016 Budget $	2016 Actual $	2015 Actual (restated Note 3) $
ANNUAL SURPLUS/(DEFICIT)	**(305)**	**234**	**3,858**
CHANGE IN NON-FINANCIAL ASSETS			
Acquisition of tangible capital assets	(30,706)	(24,769)	(25,624)
Amortization of tangible capital assets	21,991	23,438	21,457
Change in prepaid expenses	–	(417)	(27)
TOTAL CHANGE IN NON-FINANCIAL ASSETS	**(8,715)**	**(1,748)**	**(4,194)**
NET REMEASUREMENT GAINS FOR THE PERIOD	–	248	1,296
CHANGE IN NET DEBT	**(9,020)**	**(1,266)**	**960**
NET DEBT, BEGINNING OF PERIOD	(95,907)	(95,907)	(96,867)
NET DEBT, END OF PERIOD	**(104,927)**	**(97,173)**	**(95,907)**

Statement of Cash Flows

For the year ended December 31 (in thousands of Canadian dollars)	2016	2015
	$	(restated Note 3) $
OPERATING TRANSACTIONS		
Change in accumulated surplus:		
Annual surplus	234	3,858
	234	3,858
Changes in non-cash items:		
Amortization	23,438	21,457
Pension expense	11,610	11,970
Other employee future benefits expense	8,127	6,901
	43,175	40,328
Changes in non-cash balances related to operations:		
Change in accounts payable and accrued liabilities	(7,495)	(775)
Change in accounts receivable	2,096	(10,145)
Change in rebates due to market participants	2,956	9,595
Change in regulated assets	23,138	23,942
Change in prepaid expenses	(417)	(27)
	20,278	22,590
Other:		
Contribution to pension fund	(13,052)	(12,851)
Payment of employee future benefits	(2,377)	(2,314)
	(15,429)	(15,165)
Cash provided by operating transactions	**48,258**	**51,611**
CAPITAL TRANSACTIONS		
Acquisition of tangible capital assets	(24,769)	(25,624)
Change in accounts payable and accrued liabilities	(2,410)	(1,569)
Cash applied to capital transactions	**(27,179)**	**(27,193)**
INVESTING TRANSACTIONS		
Purchase of long-term investments	(2,751)	(1,967)
Cash applied to investing transactions	**(2,751)**	**(1,967)**
FINANCING TRANSACTIONS		
Debt repayment	–	(39,000)
Cash applied to financing transactions	**–**	**(39,000)**
INCREASE/(DECREASE) IN CASH AND CASH EQUIVALENTS	**18,328**	**(16,549)**
CASH AND CASH EQUIVALENTS – BEGINNING OF PERIOD	14,715	31,340
Unrealized foreign exchange losses for the period	(38)	(76)
CASH AND CASH EQUIVALENTS – END OF PERIOD	**33,005**	**14,715**

Notes to Financial Statements

1. NATURE OF OPERATIONS

a) The Independent Electricity System Operator (IESO) is a not-for-profit, non-taxable, corporation established pursuant to Part II of the *Electricity Act, 1998*. The predecessor Independent Electricity System Operator and the Ontario Power Authority (OPA) were amalgamated by statute effective on January 1, 2015, and continued as the Independent Electricity System Operator. As set out in the *Electricity Act, 1998*, the IESO operates pursuant to a licence granted by the Ontario Energy Board (OEB). The amalgamation was effected pursuant to Bill 14, *Building Opportunity and Securing Our Future Act (Budget Measures), 2014*, which received Royal Assent on July 24, 2014. Schedule 7 of the Bill amended the *Electricity Act, 1998*, by amalgamating the two predecessor corporations and by continuing them as the Independent Electricity System Operator. The transitional provision, dealing with corporate matters, provides, among other things, that the predecessor IESO and OPA cease to exist as entities separate from the amalgamated IESO and all their rights, properties and assets become the rights, properties and assets of the amalgamated IESO, as do all outstanding debts, liabilities and obligations of the predecessor IESO and OPA. Schedule 7 of Bill 14 came into force on January 1, 2015. The objects of the IESO as contained in the *Electricity Act, 1998*, and Ontario Regulation 288/14 are as follows:

- to exercise the powers and perform the duties assigned to it under this Act, the regulations, directions, the market rules and its licence;
- to enter into agreements with transmitters to give it authority to direct the operation of their transmission systems;
- to direct the operation and maintain the reliability of the IESO-controlled grid to promote the purposes of this Act;
- to participate in the development by any standards authority of criteria and standards relating to the reliability of the integrated power system;
- to establish and enforce criteria and standards relating to the reliability of the integrated power system;
- to work with the responsible authorities outside of Ontario to co-ordinate the IESO's activities with the activities of those authorities;
- to operate the IESO-administered markets to promote the purposes of this Act;
- to engage in activities related to contracting for the procurement of electricity supply, electricity capacity and conservation resources;
- to engage in activities related to settlements, payments under a contract entered into under the authority of this Act and payments provided for under this Act or the *Ontario Energy Board Act, 1998*;
- to engage in activities in support of the goal of ensuring adequate, reliable and secure electricity supply and resources in Ontario;
- to forecast electricity demand and the adequacy and reliability of electricity resources for Ontario for the short term, medium term and long term;
- to conduct independent planning for electricity generation, demand management, conservation and transmission;
- to engage in activities to facilitate the diversification of sources of electricity supply by promoting the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources;
- to engage in activities in support of system-wide goals for the amount of electricity to be produced from different energy sources;
- to engage in activities that facilitate load management;
- to engage in activities that promote electricity conservation and the efficient use of electricity;
- to assist the Board by facilitating stability in rates for certain types of consumers;
- to collect and make public information relating to the short-term, medium-term and long-term electricity needs of Ontario and the adequacy and reliability of the integrated power system to meet those needs; and
- to engage in such other objects as may be prescribed by the regulations.

b) The IESO was designated the Smart Metering Entity (SME) by Ontario Regulation 393/07 under the *Electricity Act, 1998*, on March 28, 2007. The regulation came into effect on July 26, 2007.

The objects of the Smart Metering Entity, as contained in the *Electricity Act, 1998*, are as follows:

- to plan and implement and, on an ongoing basis, oversee, administer and deliver any part of the smart metering initiative as required by regulation under this or any Act or directive made pursuant to sections 28.3 or 28.4 of the *Ontario Energy Board Act, 1998*, and, if so authorized, to have the exclusive authority to conduct these activities;
- to collect and manage and to facilitate the collection and management of information and data and to store the information and data related to the metering of consumers' consumption or use of electricity in Ontario, including data collected from distributors and, if so authorized, to have the exclusive authority to collect, manage and store the data;
- to establish, to own or lease and to operate one or more databases to facilitate collecting, managing, storing and retrieving smart metering data;
- to provide and promote non-discriminatory access, on appropriate terms and subject to any conditions in its licence relating to the protection of privacy, by distributors, retailers and other persons,
    i. to the information and data referred to above, and
    ii. to the telecommunication system that permits the Smart Metering Entity to transfer data about the consumption or use of electricity to and from its databases, including access to its telecommunication equipment, systems and technology and associated equipment, systems and technologies;
- to own or to lease and to operate equipment, systems and technology, including telecommunication equipment, systems and technology that permit the Smart Metering Entity to transfer data about the consumption or use of electricity to and from its databases, including owning, leasing or operating such equipment, systems and technology and associated equipment, systems and technologies, directly or indirectly, including through one or more subsidiaries, if the Smart Metering Entity is a corporation;
- to engage in such competitive procurement activities as are necessary to fulfill its objects or business activities;
- to procure, as and when necessary, meters, metering equipment, systems and technology and any associated equipment, systems and technologies on behalf of distributors, as an agent or otherwise, directly or indirectly, including through one or more subsidiaries, if the Smart Metering Entity is a corporation;
- to recover, through just and reasonable rates, the costs and an appropriate return approved by the Ontario Energy Board associated with the conduct of its activities; and
- to undertake any other objects that are prescribed by associated regulation.

c) The IESO is required to submit its proposed expenditures, revenue requirements and fees for the coming year to the OEB for review and approval. The submission may be made only with the approval or deemed approval of the IESO business plan by the Minister of Energy (Minister).

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

a) Basis of financial statement preparation

The accompanying financial statements have been prepared on a going concern basis and in accordance with Canadian public sector accounting standards (PSAB) and reflect the following significant accounting policies.

b) Revenue recognition

System fees earned by the IESO are based on approved rates for each megawatt of electricity withdrawn from the IESO-controlled grid (including scheduled exports) and embedded generation. System fees are recognized as revenue at the time the electricity is withdrawn. Rebates are recognized in the year in which the regulatory deferral account, before such rebates, exceeds regulated limits.

For 2015, the system fee for the then newly amalgamated IESO was comprised of the combined rate calculations of the respective pre-amalgamation entities. Specifically, the former IESO rate base was calculated on electricity withdrawn from the IESO-controlled grid (including scheduled exports and embedded generation), whereas the former OPA rate base only considered Ontario electricity consumers. The OEB approved the continued use of this combined rate calculation for 2016 in an interim order issued on December 22, 2015.

These financial statements do not include the revenue and expenses of the financial transactions of market participants within the IESO-administered markets (IAM).

Other revenue represents amounts that accrue to the IESO relating to investment income on funds passing through market settlement accounts, as well as application fees. Such revenue is recognized as it is earned.

Interest and investment income represents realized interest income and investment gains or losses on cash, cash equivalents, short-term investments and long-term investments.

Market sanctions represent funds received to offset payments disbursed related to penalties, damages, fines and payment adjustments arising from resolved settlement disputes.

c) Financial instruments

The IESO records cash and cash equivalents, investment portfolio and foreign currency exchange forward contracts at fair value. The cumulative change in fair value of these financial instruments is recorded in accumulated surplus as remeasurement gains and losses and is included in the value of the respective financial instrument shown in the statement of financial position and the statement of remeasurement gains and losses. Upon disposition of the financial instruments, the cumulative remeasurement gains and losses are reclassified to the statement of operations and all other gains and losses associated with the disposition of the financial instrument are recorded in the statement of operations. Transaction costs are charged to operations as incurred.

Cash and cash equivalents comprise cash, term deposits and other short-term, highly rated investments with original maturity dates of less than 90 days.

The IESO records accounts receivable, accounts payable and debt at amortized cost.

d) Regulated assets and liabilities

As a rate-regulated entity, the IESO, in appropriate circumstances establishes regulated assets or liabilities and thereby defers the impact on the statement of operations of certain expenses or revenues because they are probable to be collected or refunded to market participants through future billings. The IESO has applied guidance from United States Generally Accepted Accounting Principles (US GAAP) Topic 980, *Regulated Operations*, in this policy.

e) Market accounts – assets and liabilities

The IESO records the market accounts assets, liabilities and amounts due to and from market participants held on behalf of the IESO-administered markets in its statements of financial position. The IESO-administered markets is a balancing system, and as such, the net position of market accounts will settle to a $nil balance in accordance with market rules.

f) Tangible capital assets

Tangible capital assets are recorded at cost, which includes all amounts directly attributable to the acquisition, construction, development or betterment of the asset. The IESO capitalizes applicable interest as part of the cost of tangible capital assets.

g) Assets under construction

Assets under construction generally relates to the costs of physical facilities, hardware and software, and includes costs paid to vendors, internal and external labour, consultants and interest related to funds borrowed to finance the project. Costs relating to assets under construction are transferred to tangible capital assets when the asset under construction is deemed to be ready for use.

h) Amortization

The capital cost of tangible capital assets in service is amortized on a straight-line basis over their estimated service lives.

The estimated service lives in years, from the date the assets were acquired, are:

Class	Estimated Average Service Life 2016	Estimated Average Service Life 2015
Facilities	37	37
Market systems and applications	4 to 12	4 to 12
Infrastructure and other assets	4 to 10	4 to 7
Meter data management/repository	10	10

Gains and losses on sales or premature retirements of tangible capital assets are charged to operations.

The estimated service lives of tangible capital assets are subject to periodic review. The effects of changes in the estimated lives are amortized on a prospective basis. The most recent review was completed in fiscal 2016.

i) Pension, other post-employment benefits and compensated absences

The IESO's post-employment benefit programs include pension, group life insurance, health care, long-term disability and workers' compensation benefits.

The IESO accrues obligations under pension and other post-employment benefit (OPEB) plans and the related costs, net of plan assets. Pension and OPEB expenses and obligations are determined annually by independent actuaries using the projected benefit method and management's best estimate of expected return on plan assets, salary escalation, retirement ages of employees, mortality and expected health-care costs. The discount rate used to value liabilities is based on the expected rate of return on plan assets as at the measurement date of September 30.

The expected return on plan assets is based on management's long-term best estimate using a market-related value of plan assets. The market-related value of plan assets is determined using the average value of assets over three years as at the measurement date of September 30.

Pension and OPEB expenses are recorded during the year in which employees render services. Pension and OPEB expenses consist of current service costs, interest expense on liabilities, expected return on plan assets and the cost of plan amendments in the period. Actuarial gains/(losses) arise from, among other things, the difference between the actual rate of return on plan assets for a period and the expected long-term rate of return on plan assets for that period or from changes in actuarial assumptions used to determine the accrued benefit obligations. Actuarial gains/(losses) are amortized over the expected average remaining service life of the employees covered by the plan.

The expected average remaining service life of employees covered by the pension plans is 15 years (2015 – 15 years) and OPEB plan is 16.2 years (2015 – 14.7 years).

The IESO sick pay benefits accumulate but do not vest. The IESO accrues sick pay benefits based on the expectation of future utilization and records the accrual within accounts payable and accrued liabilities.

j) Foreign currency exchange

Transactions denominated in foreign currencies are translated into Canadian dollars at the rate of exchange prevailing on the date of the transaction. Items on the statement of financial position denominated in foreign currency are translated to Canadian dollars at the rate of exchange as of the financial statements date. The cumulative unrealized foreign currency exchange gains and losses of items continuing to be recognized on the statement of financial position are recorded in accumulated deficit as remeasurement gains and losses and shown in the statement of financial position and the statement of remeasurement gains and losses. Upon settlement of the item denominated in a foreign currency, the cumulative remeasurement gains and losses are reclassified to the statement of operations, and all other gains and losses associated with the disposition of the financial instrument are recorded in the statement of operations.

k) Use of estimates

The preparation of the financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities and the disclosure of contingent assets and liabilities as at the date of the financial statements. The IESO's accounts that involve a greater degree of uncertainty include the carrying values of tangible capital assets, accrued pension liability and accrual for employee future benefits other than pensions. Actual results could differ from those estimates.

3. NEW ACCOUNTING POLICIES

As of January 1, 2016, the IESO changed its accounting policy regarding the recognition of assets and liabilities subject to rate regulation. The change was made to better reflect the economic substance of certain types of expenses that may not be directly recovered through the normal revenue requirement model. This change has been applied retroactively and has increased amounts previously unrecorded for regulatory assets and decreased amounts previously reported for accumulated deficit.

The IESO recognizes two regulated assets: 1) unrecovered smart metering expenses and 2) unrecovered PSAB transition items.

The smart metering expenses result from the IESO's role as the Smart Metering Entity. As such, the IESO funds its SME operating costs and capital investment in the meter data management/repository (MDM/R) through fees from users of smart meters in Ontario. The OEB approves the Smart Metering Entity charge and the charge is intended to cover the costs of developing and operating the MDM/R.

The unrecovered PSAB transition items result from the IESO's adoption of Canadian public sector accounting standards effective January 1, 2011. The adoption of PSAB was accounted for by retroactive application with restatement of prior periods subject to the requirements in Section PS 2125, *First-time Adoption by Government Organizations*. The corresponding change to pension and other post-employment benefits resulted in previously unrecognized actuarial losses and past service costs of $80,617 thousand at the date of transition.

Regulated assets consist of the following:

As of December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Unrecovered smart metering expenses	21,623	40,849
Unrecovered PSAB transition items	43,441	47,353
Closing balance	**65,064**	**88,202**

In addition, as of January 1, 2016, the IESO changed its accounting policy regarding the recognition of market accounts assets and liabilities on the statement of financial position. The change was made to better reflect the assets and liabilities and amounts due to and from market participants held by the IESO on behalf of the IAM at year end. This change has been applied retroactively and has increased amounts previously unrecorded for market accounts assets and liabilities. There is no impact to the accumulated deficit or revenues and expenses as the IESO is not party to these transactions as per the market rules.

Components of the market accounts are as follows:

As of December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Cash, restricted for market activities	244,755	271,574
Amounts due from market participants	1,391,260	1,171,389
Interest receivable	186	158
Revolving line of credit	(150,501)	(12,739)
HST receivable	25,531	20,247
Amounts due to market participants	(1,392,643)	(1,380,086)
Other liabilities	(118,588)	(70,543)
Closing balance	**–**	**–**

Comparative figures

A detailed reconciliation of the IESO's restated statement of financial position as at December 31, 2015, as follows:

As of (in thousands of Canadian dollars)	December 31, 2015 (as reported) $	December 31, 2015 adjustments $	December 31, 2015 (as restated) $
FINANCIAL ASSETS			
Cash and cash equivalents	14,715	–	14,715
Accounts receivable	33,199	–	33,199
Long-term investments	37,318	–	37,318
Regulated assets	–	88,202	88,202
Market accounts – assets	–	1,443,121	1,443,121
TOTAL FINANCIAL ASSETS	**85,232**	**1,531,323**	**1,616,555**
LIABILITIES			
Accounts payable and accrued liabilities	48,868	–	48,868
Accrued interest on debt	315	–	315
Rebates due to market participants	9,595	–	9,595
Debt	90,000	–	90,000
Accrued pension liability	36,062	–	36,062
Accrued liability for employee future benefits other than pension	84,501	–	84,501
Market accounts – liabilities	–	1,443,121	1,443,121
TOTAL LIABILITIES	**269,341**	**1,443,121**	**1,712,462**
NET DEBT	**(184,109)**	**88,202**	**(95,907)**
NON-FINANCIAL ASSETS			
Net tangible capital assets	103,716	–	103,716
Prepaid expenses	6,197	–	6,197
TOTAL NON-FINANCIAL ASSETS	**109,913**	**–**	**109,913**
ACCUMULATED SURPLUS/(DEFICIT)			
Accumulated surplus/(deficit) from operations	(81,854)	88,202	6,348
Accumulated remeasurement gains	7,658	–	7,658
ACCUMULATED SURPLUS/(DEFICIT)	**(74,196)**	**88,202**	**14,006**

A detailed reconciliation of the IESO's restated statement of operations for the year ended December 31, 2015, is as follows:

For the year ended (in thousands of Canadian dollars)	December 31, 2015 (as reported) $	December 31, 2015 adjustments $	December 31, 2015 (as restated) $
IESO CORE OPERATIONS			
System fees	190,099	(3,912)	186,187
Other revenue	5,377	–	5,377
Interest and investment income	1,430	–	1,430
Core operations revenues	**196,906**	**(3,912)**	**192,994**
Compensation and benefits	(104,994)	–	(104.994)
Professional and consulting	(21,461)	–	(21,461)
Operating and administration	(35,005)	–	(35,005)
Core operating expenses	**(161,460)**	**–**	**(161,460)**
Amortization	(17,933)	–	(17,933)
Interest	(1,610)	–	(1,610)
Core expenses	**(181,003)**	**–**	**(181,003)**
Core operations annual surplus before rebates	**15,903**	**(3,912)**	**11,991**
Rebates due to market participants	(9,595)	–	(9,595)
Core operations annual surplus	**6,308**	**(3,912)**	**2,396**
MARKET SANCTIONS AND PAYMENT ADJUSTMENTS			
Market sanctions and payment adjustment	6,021	–	6,021
Compensation and benefits	(3,094)	–	(3,094)
Professional and consulting	(1,351)	–	(1,351)
Operating and administrative	(114)	–	(114)
Customer education and market enforcement expenses	**(4,559)**	**–**	**(4,559)**
Market sanctions and payment adjustments annual surplus	**1,462**	**–**	**1,462**
SMART METERING ENTITY			
Smart metering charge	**46,215**	**(20,030)**	**26,185**
Compensation and benefits	(2,607)	–	(2,607)
Professional and consulting	(14,902)	–	(14,902)
Operating and administration	(4,200)	–	(4,200)
Smart metering operating expenses	**(21,709)**	**–**	**(21,709)**
Amortization	(3,524)	–	(3,524)
Interest	(952)	–	(952)
Smart metering expenses	**(26,185)**	**–**	**(26,185)**
Smart metering entity annual surplus	**20,030**	**(20,030)**	**–**
ANNUAL SURPLUS	**27,800**	**(23,942)**	**3,858**
ACCUMULATED SURPLUS/(DEFICIT) FROM OPERATIONS, BEGINNING OF PERIOD	(109,654)	112,144	2,490
ACCUMULATED SURPLUS/(DEFICIT) FROM OPERATIONS, END OF PERIOD	**(81,854)**	**88,202**	**6,348**

4. LONG-TERM INVESTMENTS

Long-term investments in a balanced portfolio of pooled funds are valued by the pooled funds manager based on published price quotations and amount to $39,972 thousand (2015 – $37,019 thousand). As at December 31, the market value allocation of these long-term investments was 62.3% equity securities and 37.7% debt securities (2015 – 56.0% and 44.0% respectively).

Balanced portfolio of pooled funds

As at December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Opening balance	37,019	33,758
Net purchase of investments	2,667	1,889
Change in fair value	286	1,372
Closing balance	**39,972**	**37,019**

In addition to the balanced portfolio of pooled funds, the IESO has a long-term deposit with Canada Revenue Agency in the amount of $383 thousand (2015 – $299 thousand) pertaining to the Retirement Compensation Arrangements Trust (Note 7).

5. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

As at December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Relating to operations	35,630	43,125
Relating to tangible capital assets	3,333	5,743
Closing balance	**38,963**	**48,868**

6. REBATES DUE TO MARKET PARTICIPANTS AND ACCUMULATED SURPLUS

In 2016, the IESO recognized $12,551 thousand in rebates due to market participants of system fees (2015 – $9,595). As at December 31, 2016, rebates due to market participants were $22,146 thousand, with the 2015 portion of $9,595 thousand rebated in January 2017.

The IESO's approved regulatory deferral account balance has been historically maintained at a maximum of $10.0 million. The 2016 approved regulatory deferral account balance at $10.0 million was approved by the OEB on December 1, 2016.

Prior to 2014, unrealized gains and losses from portfolio investments and foreign exchange were included in the balance of the regulatory deferral account (life-to-date total $4,144 thousand). As of January 1, 2014, only realized gains and losses are included in this balance.

As at December 31, the components of the accumulated surplus were as follows:

Accumulated Surplus

As at December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Regulatory deferral account (a)	10,000	10,000
Accumulated market sanctions and payment adjustments (b)	726	492
Remeasurement gains	3,762	3,514
Accumulated surplus – end of year	**14,488**	**14,006**

a) Regulatory Deferral Account

As at December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Accumulated surplus – beginning of year	10,000	7,604
Revenues (before rebates due to market participants)	190,219	192,994
Rebates due to market participants	(12,551)	(9,595)
Core operation expenses	(177,668)	(181,003)
Accumulated surplus – end of year	**10,000**	**10,000**

b) Accumulated Market Sanctions and Payment Adjustments

As at December 31 (in thousands of Canadian dollars)	2016	2015
	$	$
Accumulated surplus/(deficit) – beginning of year	492	(970)
Market sanctions and payment adjustments	3,889	6,021
Customer education and market enforcement expenses	(3,655)	(4,559)
Accumulated surplus – end of year	**726**	**492**

7. DEBT

Note payable to Ontario Electricity Financial Corporation (OEFC)

In April 2014, the IESO entered into a three-year note payable with the OEFC. The note payable is unsecured, bears interest at a fixed rate of 2.046% per annum and is repayable in full on April 30, 2017. Interest accrues daily and is payable in arrears semi-annually in April and October of each year. As at December 31, 2016, the note payable to the OEFC was $90.0 million (December 31, 2015 – $90.0 million).

For the year ended December 31, 2016, the interest expense on the note payable was $1,841 thousand (2015 – $1,841 thousand).

Credit facility

The IESO has an unsecured credit facility agreement with the OEFC, which will make available to the IESO an amount up to $95.0 million. Advances are payable at a variable interest rate equal to the Province of Ontario's cost of borrowing for a 30-day term plus 0.50% per annum, with draws, repayments and interest payments due monthly. The credit facility expires April 30, 2017. As at December 31, 2016, no amount was drawn on the credit facility (December 31, 2015 – $nil).

For the year ended December 31, 2016, the interest expense on the credit facility was $nil (2015 – $279 thousand).

Retirement Compensation Arrangements Trust

In July 2013, the IESO established a Retirement Compensation Arrangements (RCA) Trust to provide security for the IESO's obligations under the terms of the supplemental employee retirement plan for its employees. As at December 31, 2016, the IESO has provided the RCA trustee with a bank letter of credit of $30,466 thousand (2015 – $28,408 thousand) the trustee can draw on if the IESO is in default under the terms of this plan.

8. POST-EMPLOYMENT BENEFIT PLANS

The IESO provides pension and other employee post-employment benefits, comprising group life insurance, long-term disability and group medical and dental plans, for the benefit of current and retired employees.

Pension plans

The IESO provides a contributory defined benefit, indexed, registered pension plan. In addition to the funded, registered pension plan, the IESO provides certain non-registered defined benefit pensions through an unfunded, indexed, non-registered plan.

Other employee future benefits

The group life insurance, long-term disability and group medical and dental benefits are provided through unfunded, non-registered defined benefit plans.

Summary of accrued benefit obligations and plan assets

(in thousands of Canadian dollars)	2016 Pension Benefits	2015 Pension Benefits	2016 Other Benefits	2015 Other Benefits
	$	$	$	$
Accrued benefit obligation	507,724	482,994	91,014	83,455
Fair value of plan assets	523,756	475,714	–	–
Funded status as of measurement date	16,032	(7,280)	(91,014)	(83,455)
Employer contribution/other benefits payments after measurement date	2,416	427	588	582
Unrecognized actuarial (gain)/loss	(53,068)	(29,209)	175	(1,628)
Accrued liability recognized in the statement of financial position	**(34,620)**	**(36,062)**	**(90,251)**	**(84,501)**

Registered pension plan assets

As at the measurement date of September 30, the proportion of the fair value of registered pension plan assets held in each asset class was as follows:

	2016	2015
Canadian equity securities	20.2%	19.9%
Foreign equity securities	39.9%	41.8%
Canadian debt securities	39.8%	39.0%
Cash equivalents	0.4%	0.6%
Forward foreign exchange contracts	(0.3%)	(1.3%)
	100.0%	**100.0%**

Principal assumptions used to calculate benefit obligations at the end of the year are determined at that time and are as follows:

	2016 Pension Benefits	2015 Pension Benefits	2016 Other Benefits	2015 Other Benefits
Discount rate at the end of the period	5.75%	6.00%	5.75%	6.00%
Rate of compensation increase	3.50%	3.75%	3.50%	3.75%
Rate of indexing	2.00%	2.25%	2.00%	2.25%

The assumed prescription drug inflation was 8.00% for 2016, grading down to an ultimate rate 4.50% per year in 2030. Dental costs are assumed to increase by 4.00% per year.

Benefit costs and plan contributions for pension and other plans are summarized as follows:

(in thousands of Canadian dollars)	2016 Pension Benefits	2015 Pension Benefits	2016 Other Benefits	2015 Other Benefits
	$	$	$	$
Current service cost (employer)	11,117	10,547	3,107	2,857
Interest cost	29,292	28,143	5,120	4,797
Expected return on plan assets	(27,626)	(26,053)	–	–
Amortization of net actuarial loss	(1,173)	(667)	(100)	(753)
Benefit cost	**11,610**	**11,970**	**8,127**	**6,901**

(in thousands of Canadian dollars)	2016 Pension Benefits	2015 Pension Benefits	2016 Other Benefits	2015 Other Benefits
	$	$	$	$
Employer contribution/other benefit payments	13,052	12,851	2,377	2,314
Plan participants' contributions	5,811	5,162	–	–
Benefits paid	23,317	21,155	2,377	2,314

The most recent actuarial valuation of the registered pension plan for funding purposes was at January 1, 2014, and the next required valuation is to be effective January 1, 2017.

Principal assumptions used to calculate benefit costs for the year are determined at the beginning of the period and are as follows:

	2016 Pension Benefits	2015 Pension Benefits	2016 Other Benefits	2015 Other Benefits
Discount rate at the beginning of the period	6.00%	6.15%	6.00%	6.15%
Rate of compensation increase	3.75%	3.75%	3.75%	3.75%
Rate of indexing	2.25%	2.25%	2.25%	2.25%

9. TANGIBLE CAPITAL ASSETS

Net tangible capital assets consist of the following:

Tangible Capital Assets

(in thousands of Canadian dollars)	As at December 31, 2015	Additions	Disposals	As at December 31, 2016
	$	$	$	$
Facilities	52,281	3,692	–	55,973
Market systems and applications	278,458	28,535	–	306,993
Infrastructure and other assets	60,180	3,175	–	63,355
Meter data management/repository	35,900	1,011	–	36,911
Total cost	**426,819**	**36,413**	**–**	**463,232**

Accumulated Amortization

(in thousands of Canadian dollars)	As at December 31, 2015	Amortization Expense	Disposals	As at December 31, 2016
	$	$	$	$
Facilities	(22,604)	(1,697)	–	(24,301)
Market systems and applications	(251,210)	(12,336)	–	(263,546)
Infrastructure and other assets	(47,228)	(5,544)	–	(52,772)
Meter data management/repository	(25,329)	(3,861)	–	(29,190)
Total accumulated amortization	**(346,371)**	**(23,438)**	**–**	**(369,809)**

Net Book Value

(in thousands of Canadian dollars)	As at December 31, 2015	As at December 31, 2016
	$	$
Facilities	29,677	31,672
Market systems and applications	27,248	43,447
Infrastructure and other assets	12,952	10,583
Meter data management/repository	10,571	7,721
Total net book value	**80,448**	**93,423**
Assets under construction	23,268	11,624
Net tangible capital assets	**103,716**	**105,047**

In 2016, there were no adjustments to management's estimates of remaining asset service lives (2015 – decrease of $653 thousand).

Interest capitalized to assets under construction during 2016 was $260 thousand (2015 – $263 thousand).

10. OTHER REVENUE

In its administration of the IESO-administered markets, the IESO directs the investment of market funds in highly rated, short-term investments throughout the settlement cycle. The IESO is entitled to receive the investment interest and investment gains, net of investment losses earned on funds passing through the real-time market settlement accounts. The IESO is not entitled to the principal on real-time market investments.

The IESO recognized investment income earned in the market settlement accounts of $2,508 thousand in 2016 (2015 – $3,212 thousand).

11. RELATED PARTY TRANSACTIONS

The Province of Ontario is a related party as it is the controlling entity of the IESO. The OEFC, OEB, Hydro One and Ontario Power Generation Inc. (OPG) are related parties of the IESO, through the common control of the Province of Ontario. Transactions between these parties and the IESO were as follows:

The IESO holds a note payable and an unsecured credit facility agreement with the OEFC (Note 7). Interest payments made by the IESO in 2016 for the note payable were $1,841 thousand (2015 – $1,841 thousand) and for the credit facility were $nil (2015 – $328 thousand). As of December 31, 2016, the IESO had an accrued interest payable balance with the OEFC of $315 thousand (2015 – $315 thousand).

Under the *Ontario Energy Board Act, 1998*, the IESO incurs registration and license fees. The total of the transactions with the OEB was $1,747 thousand in 2016 (2015 – $1,671 thousand).

The IESO performed connection and bulk electric system exception assessments for Hydro One in 2016. In 2016, the IESO invoiced Hydro One $610 thousand (2015 – $310 thousand).

The IESO procures short circuit studies and protection impact assessments as part of connection assessments, approvals and meter services on IESO-owned interconnected revenue meters from Hydro One. Additionally, the IESO paid Hydro One for the removal of the microwave tower at the Clarkson location. In 2016, the IESO incurred costs of $188 thousand (2015 – $525 thousand) for these services. As of December 31, 2016, the IESO had a net payable balance with Hydro One of $4 thousand (2015 – $149 thousand).

The IESO performed connection assessment and approvals for OPG, administered telecommunication services to market participants to connect to the real-time market systems and provides market-related training courses. In 2016, OPG was invoiced $124 thousand (2015 – $137 thousand). As of December 31, 2016, the IESO had a net receivable balance with OPG of $5 thousand (2015 – $4 thousand).

12. FINANCIAL RISK MANAGEMENT

The IESO is exposed to financial risks in the normal course of its business operations, including market risks resulting from volatilities in equity, debt and foreign currency exchange markets, as well as credit risk and liquidity risk. The nature of the financial risks and the IESO's strategy for managing these risks have not changed significantly from the prior year.

a) Market Risk

Market risk refers to the risk that the fair value or future cash flows of a financial instrument will fluctuate to cause changes in market prices. The IESO is primarily exposed to three types of market risk: currency risk, interest rate risk and equity risk. The IESO monitors its exposure to market risk fluctuations and may use financial instruments to manage these risks as it considers appropriate. The IESO does not use derivative instruments for trading or speculative purposes.

i) Currency Risk

The IESO conducts certain transactions in U.S. dollars, primarily related to vendors' payments, and maintains a U.S. dollar-denominated bank account. From time to time, the IESO may utilize forward purchase contracts to purchase U.S. dollars for delivery at a specified date in the future at a fixed exchange rate. In addition, the IESO utilizes U.S. dollar spot rate purchases in order to satisfy any current accounts. As at December 31, 2016, the IESO did not have any outstanding forward purchase contracts.

ii) Interest Rate Risk

The IESO is exposed to movements or changes in interest rates primarily through its short-term variable rate credit facility, cash equivalents' securities and long-term investments. Long-term investments include investments in a pooled Canadian bond fund. The potential impact to the securities' value had the prevailing interest rates changed by 25 basis points, assuming a parallel shift in the yield curve with all other variables held constant, is estimated at $0.6 million as at December 31, 2016 (2015 – $0.6 million).

iii) Equity Risk

The IESO is exposed to changes in equity prices through its long-term investments. Long-term investments include investments in pooled equity funds. A 30% change in the valuation of equities as at December 31, 2016, would have resulted in a change for the year of approximately $7.5 million (2015 – $6.8 million). The fair values of all financial instruments measured at fair value are derived from quoted prices (unadjusted) in active markets for identical assets.

b) Credit Risk

Credit risk refers to the risk that one party to a financial instrument may cause a financial loss for the other party by failing to meet its obligations under the terms of the financial instrument. The IESO is exposed directly to credit risk related to cash equivalents' securities and accounts receivable, and indirectly through its exposure to the long-term investments in a Canadian bond pooled fund. The IESO manages credit risk associated with cash equivalents' securities through an approved management policy that limits investments to primarily investment-grade investments with counterparty-specific limits. The accounts receivable balance as at December 31, 2016, included no material items past due and substantially all of the balance was collected within 30 days from December 31, 2016. The long-term Canadian bond pooled fund is comprised of primarily investment-grade securities.

c) Liquidity Risk

Liquidity risk refers to the risk that the IESO will encounter financial difficulty in meeting obligations associated with its financial liabilities when due. The IESO manages liquidity risk by forecasting cash flows to identify cash flows and financing requirements. Cash flows from operations, short-term investments, long-term investments and maintaining appropriate credit facilities help to reduce liquidity risk. The IESO's long-term investments are normally able to be redeemed within three business days; however, the investment manager of the pooled funds has the authority to require a redemption in-kind rather than cash and has the ability to suspend redemptions if deemed necessary.

13. COMMITMENTS

Operating commitments

The obligations of the IESO with respect to non-cancellable operating leases over the next four years are as follows:

As at December 31 (thousands of Canadian dollars)	
	$
2017	5,489
2018	5,004
2019	3,919
2020	3,195

14. CONTINGENCIES

The IESO is subject to various claims, legal actions and investigations that arise in the normal course of business. While the final outcome of such matters cannot be predicted with certainty, management believes that the resolution of such claims, actions and investigations will not have a material impact on the IESO's financial position or results of operations.

15. COMPARATIVE FIGURES

Certain comparative figures have been reclassified to conform with the financial statement presentation adopted in 2016.

Executive Compensation at the IESO

Program Objectives

The IESO compensation program for executives was designed to attract, retain and motivate the calibre of executives required to support the achievement of the IESO's statutory mandate, business objectives and corporate vision. Accordingly, the compensation philosophy and programs were built on the following objectives:

- to focus executives on meeting the IESO's business objectives
- to attract and retain qualified and talented staff needed to carry out the IESO's mandate
- to have the flexibility to reward results and demonstrated competencies
- to have compensation levels that are appropriate and defensible to stakeholders and customers.

The philosophy underlying these objectives is that total compensation for executives should be adequate enough to attract and retain the skills and competencies necessary to carry out the IESO's mandate.

Program Governance

The IESO Board establishes the compensation objectives for the following year's program. They delegate the responsibility to thoroughly review the compensation objectives, policies and programs to the Human Resources and Governance Committee (HRGC) of the Board, which make recommendations to the full Board for approval.

The Board is comprised of 10 independent, external Board members, appointed by the Minister of Energy, with broad experience in the electricity industry and public sector organizations, and the President and Chief Executive Officer of the IESO. Their experience includes many years of dealing with human resource matters including the setting and implementation of compensation policies and programs.

In carrying out their mandate, the Board members have access to management's analysis and recommendations as well as those of expert consultants in the compensation field. These programs are reviewed annually with regard to business needs, program objectives and design, industry compensation trends, internal compensation relativities and external market relativities.

The Board also assesses risks associated with the establishment and implementation of compensation policies and programs. Annually the Board presides over and approves the IESO's business plan. An important component of this process is consideration of, and the implementation of, mitigating actions associated with enterprise risk management. This latter overarching process includes the assessment of all significant risks to the IESO, including risks associated with its compensation policies and programs.

In addition to the formal governance and oversight structure in place for compensation matters, the IESO discloses compensation levels annually for staff earning $100,000 or more as part of its public sector salary disclosure. For the IESO, a further level of public review and assurance is provided through a statutorily required annual review of the IESO's expenditures, revenue requirements and fees. Information related to compensation matters, including executive/management compensation and market relativities, is subject to the Ontario Energy Board review. A range of small and large consumers, assisted by their legal and professional advisors, are represented in these public proceedings.

Market Comparisons

The IESO reviews the competitiveness of the executive compensation levels in relation to a peer group of Canadian organizations and general industry companies every other year at a minimum. The objective is to compare IESO executive compensation levels to those in the marketplace particularly in relation to the median of the market.

Prior to the amalgamation of the IESO with the OPA, the Ministry of Energy had retained the Hay Group, a global management consulting firm, to evaluate and market price the CEO position for the new organization. Following Mr. Campbell's appointment to the CEO position on January 1, 2015, the decision was made to adopt a similar approach to evaluate and market price all other executive roles using the Hay point system.

As part of this process, the comparator group was redefined consistent with the recommendations of the Agency Review Panel (the Arnett report) and is comprised of 13 public sector and 11 private sector organizations, with the comparator data weighted on a 50/50 public/private sector basis. The comparator group represents a range of industries, core business activities and roles that are similar to IESO: electricity, energy, asset management, financial services, infrastructure procurement, engineering and large-scale, complex IT functions. The list of organizations can be viewed in the 2015 Annual Report.

The Broader Public Sector Executive Compensation Framework regulation (O. Reg 304/16) came into force in 2016 for implementation in 2017. The IESO's executive compensation program will be reviewed in accordance with this regulation and made available on the IESO's website by September 2017.

The job evaluation was independently conducted by the Hay Group using its point system and the following executive positions were covered by this review:

- President & CEO
- VP Corporate Services & CFO
- VP Market & Resource Development
- VP Market & System Operations & COO
- VP Conservation & Corporate Relations
- VP Information and Technology Services and CIO
- VP Planning, Law & Aboriginal Relations.

The Hay Group evaluated the Vice-President positions based on the job documents and additional information gathered from the CEO. Based on the evaluation points, a new salary structure was developed. The executive positions were then mapped into the new structure based upon their evaluated points.

Using the market information from the above peer group, the mid-point of the range of points for each executive salary grade was determined as the market price point for comparison purposes.

The mid-points of the new salary ranges were defined as the total direct cash compensation (annual base salaries plus annual short-term and long-term target incentive awards) of the hybrid market's price point at the 50th percentile for each salary grade.

The minimums and maximums of each salary range were calculated using typical salary range spreads at executive levels. In accordance with the *Broader Public Sector Accountability Act* (2010), executive compensation rates have remained the same in 2016 and will be reviewed against the Executive Compensation Framework regulation in 2017.

Program Description

The IESO program includes fixed and variable compensation, core and flex benefit plans, and pension provisions. IESO Human Resources staff participate in and review results from various compensation surveys and monitor economic trends, such as inflation and unemployment rates, which impact on compensation, as well as internal compensation relativities. Based on this data and the IESO business priorities, Human Resources staff develop recommendations on compensation programs. External specialized compensation, benefit and pension consultants are utilized to ensure accurate, representative market compensation data is obtained, that current industry compensation trends are being utilized, as well as provide insight and recommended adjustments to current programs.

Program Description – Fixed Compensation

Within the IESO salary ranges, individuals are assessed relative to an established competency model. This model consists of behavioural competencies such as strategic agility, building effective teams, command skills, sizing up people, political savvy and managing vision and purpose. Assessments are based upon demonstrated competency. Each individual is awarded a fixed compensation level within his or her band based upon his or her assessed competency.

Program Description – Variable Compensation

In order to promote a results orientation in the executive team, the variable pay plan forms part of the total compensation of executives. The IESO Board annually establishes a robust set of performance measures, which are evaluated each year.

The IESO Board assesses the corporate performance results and the CEO's individual performance results. Under the plan, having assessed the results against target, the Board has the ability to use some discretion in determining the final performance rating – however in the past, apart from one occasion, the Board has relied upon the directly assessed results to award variable compensation.

The variable compensation award for the CEO and Vice-Presidents is capped at 10% of fixed compensation. The plan provides for awards below the capped amount depending on the performance results achieved. The 2016 annual award was paid on December 30, 2016.

Program Description – Group Benefits

The group benefit plan provides a core level of health and dental benefits, life insurance, disability coverage and vacation, which can be adjusted by individual executives through a flexible component within the plan. The flexible element provides executives the option of adjusting their benefits to meet their individual/family needs, including vacation above core amounts, levels of life insurance, health coverage and other components.

Program Description – Pension Plan

A defined benefit pension plan provides annual retirement income calculated as 2% of pensionable earnings during the highest paid 60 consecutive months of service multiplied by years of service (36 months for the pension earned prior to January 1, 2017, by the former IESO executives), to a maximum of 35 years. The pension formula is integrated with the Canada Pension Plan (CPP) to provide a level income stream before and after age 65, when the IESO pension is reduced to reflect benefits from CPP. The plan also has early retirement provisions as well as commuted value, pension deferral and reciprocal transfer options.

The plan provides a maximum benefit of 70% of highest paid, pre-retirement pensionable earnings. As the Canadian Revenue Agency limits the amount of pension payable from a registered plan, the IESO has a secured supplemental employee retirement plan to provide required pension income to meet the commitments of the plan above that payable from the registered plan.

The plan also provides several options including member's life only or joint and survivor pensions, as well as pre-retirement death benefits to provide benefits to surviving spouses or beneficiaries.

Performance Measures & Impact on Compensation

The IESO annually establishes corporate performance measures relating to its business priorities during the business planning process. These are approved, monitored and assessed by the IESO Board of Directors each year. Individual performance measures supporting one or more corporate performance measures are also developed for each executive. As outlined above, the corporate results achieved each year impact on each executive's variable pay.

For 2016, the Board assessed the corporate results and determined that the IESO met all expectations. In addition to the corporate measures, each executive also had an individual set of measures and targets for the year, which aligned with the corporate performance objectives and IESO's business priorities, and these were similarly assessed. The Board assessed the results of the CEO's performance and the CEO assessed the performance of the Vice-Presidents, which were also reviewed with the Board.

Other Considerations

Compensation decisions may at times be impacted by market factors – such as the recruitment of an executive with specialized skills/competencies or possessing unique talents within the industry. To this end, individual incumbent arrangements are sometimes established relating to terms of employment and the possibility of future termination.

The VP Market & Systems Operations and COO retired in December 2016 and was replaced by an internal senior-level employee after a thorough internal and external search was completed.

Compensation Restraints

The IESO executive compensation has been significantly impacted by the compensation restraint legislation in Ontario since 2010. The *Broader Public Sector Accountability Act* (BPSAA) imposes a general freeze on designated executives' salary, variable pay, benefits and perquisites subject to very limited exceptions.

Following the amalgamation of the two former organizations (IESO and OPA) on January 1, 2015, the total 2015 variable performance pay amount awarded to all employees and office holders became the cap for total variable performance pay to be paid out in future years as long as the BPSAA remains in effect. The total variable compensation paid in 2016 was within this maximum.

Executive Compensation Structure Alignment

With the appointment on January 1, 2015, of Mr. Campbell as the CEO of the merged organization, the IESO aligned the compensation plan for its Vice-Presidents with the structure established for the new CEO. Accordingly, in both cases, the variable pay component was capped at 10% of fixed compensation with no deferral. There were no salary adjustments for executives in 2016. .

The figures reported as 2016 "Salary Paid" in the 2016 Public Sector Salary Disclosure for the executives include the 2016 earned variable compensation that was paid on December 30, 2016.

Executive Compensation Statement

The table below details the annual compensation for the year ended December 30, 2016, for the executives listed.

2016 Summary Compensation Table

Name & Position	Base Salary	Variable Pay[1]	Other Annual Compensation[2]	Total Cash Compensation[3]
Bruce Campbell President & CEO	$536,364	$53,636	$32,527	$622,527
Kimberly Marshall VP Corporate Services & CFO	$268,460	$13,423	$5,305	$287,188
JoAnne Butler VP Market & Resource Development	$339,968	$30,600	$1,037	$371,605
Kim Warren *(retired Dec. 31, 2016)* VP Market & System Operations & COO	$319,228	$30,330	$15,893	$365,451
Terence Young VP Conservation & Corporate Relations	$307,037	$29,170	$22,065	$358,272

1. 2016 earned variable compensation was paid in December 2016
2. Represents remaining flex credits paid out at year end as taxable income
3. These amounts will be reported as "Salary Paid" under the Annual Public Sector Salary Disclosure

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2017 REVENUE REQUIREMENT AND USAGE FEE METHODOLOGY

Methodology for Calculating the IESO's 2017 Usage Fee

2017 Net Revenue Requirement

The first step required to calculate the IESO's 2017 proposed usage fee is to determine the net revenue required. A summary of the net revenue requirement is provided in Table 1.

Table 1: IESO's 2017 Revenue Requirement ($ millions)

Revenue Requirement Calculation for IESO Usage Fee	
($ million)	**2017**
Operating costs	191.4
Less: Registration fees revenues	0.6
2017 Net Revenue Requirement	**190.8**

Operating Costs

The IESO's proposed 2017 operating costs of $191.4 million are described more fully in the 2017-2019 Business Plan. On March 24, 2017, the President & CEO of the IESO received a letter from the Minister of Energy approving the Business Plan , which is included in this application as Exhibit A-2-3.

IESO Revenue Adjustments

In addition to the usage fees, the OEB approved the following registration fees in its 2016 revenue requirement submission:

- Registration fees of up to $10,000 per proposal for electricity supply and capacity procurements, including conservation and load management,

- The Feed-in Tariff ("FIT") program application fee of $0.50/kW of proposed Contract Capacity, having a minimum of $500 and to a maximum of $5,000,
- The Large Renewable Procurement ("LRP") qualification submission fee, and
- The application fee of $1,000 per application for market participants.

The IESO intends to continue with these registration fees unchanged in 2017 except for the LRP fee which the IESO is not seeking approval for in 2017.

The IESO forecasts it will receive $0.6 million in registration fees revenue in 2017. The IESO expects the majority of these revenues to be collected from FIT program applications with approximately $25,000 being collected from other fees. With the suspension of LRP II procurement[1], the IESO is not seeking to continue the Large Renewable Procurement fee in 2017.

Charge Determinants

The second step in calculating the IESO's 2017 usage fees is to calculate the domestic and export usage fees. The domestic usage fee will be charged based on the total forecast Allocated Quantity of Energy Withdrawn ("AQEW") plus generation embedded in local distribution networks less associated transmission line losses. The export usage fee will be charged based on the Scheduled Quantity of Energy Withdrawn ("SQEW") less associated transmission line losses. In prior years, the IESO fee was calculated by the following formula: AQEW + SQEW + embedded generation – transmission losses. As the IESO now has two usage fees, export and domestic, it proposes to split losses between domestic and export customer classes based on their proportion of the total 2017 forecast energy volumes before losses. The calculation is shown in Table 2 below. The domestic forecast for this

[1] September 27, 2016 Directive from the Minister calling for the IESO to suspend the LRP II and Energy-from-Waste procurements.

calculation does not include generation from embedded generation as energy from embedded generation is not transmitted through the IESO controlled grid and, as such, does not yield transmission losses.

Table 2: Forecast losses per customer class

	Demand, not including losses (TWh)	Total energy volumes, not including losses (TWh)	Proportion of total energy volumes	Total losses (TWh)	Resulting associated losses (TWh)
Domestic	135.9	155.7	87.3%	3	2.6
Export	19.8		12.7%		0.4

Total 2017 transmission losses are forecast at 3.0 TWh. Domestic customers will be allocated 87.3% of these losses, which amounts to 2.6 TWh, and export customers will be allocated 12.7%, which amounts to 0.4 TWh.

The IESO therefore proposes to calculate the two usage fees using the energy volumes as shown in Table 3 below.

Table 3: Calculation of associated energy volumes for 2017 IESO Usage Fees

	2017 – Domestic (TWh)	2017 – Export (TWh)
18 Month Outlook demand forecast	135.9	19.8
Embedded generation	7.5	
Domestic transmission losses	-2.6	
Exports transmission losses		-0.4
Energy Volumes	**140.8**	**19.4**
Total Energy Volumes	**160.2**	

Calculation of the Usage Fees

The next step in determining the IESO's usage fee is the calculation of the domestic and export usage fees. The IESO's Board-approved 2016 fees for domestic and export customers were calculated for the IESO by Elenchus using a model they developed to allocate costs between these two customer classes. To calculate the 2017 usage fees, the IESO requested Elenchus to rerun its model using 2017 business unit budgets and energy as described above. With these inputs, the Elenchus model calculated the domestic and export usage fees as shown in Table 4 below:

Table 4: IESO domestic and export customer fees as calculated by Elenchus

	2017 Usage Fee
Domestic	$1.2187/MWh
Export	$0.9872/MWh

Implementation of the 2017 Usage Fee

On December 29, 2016, the Board issued its decision approving the IESO's 2016 domestic and export usage fees of $1.1636/MWh for domestic customers and $0.9603/MWh for export customers, and made these interim effective January 1, 2017. The IESO proposes to

continue to charge both interim usage fees to the same pools of market participants the Board approved in EB-2015-0275 until the end of the month in which Board approval is received for the 2017 usage fees. Once Board approval of the IESO's 2017 domestic and export fees is received, the IESO proposes to charge (or rebate) market participants the difference between the 2017 IESO usage fees approved by the Board and the interim usage fees they paid, if any, based on their proportionate quantity of energy withdrawn until the end of the month in which Board approval is received for the 2017 usage fees. Any such charges (or rebates) will be provided in the next billing cycle following the month in which Board approval is received.

The IESO's Market Renewal Program

The IESO's Market Renewal Program is a multi-year project that is anticipated to provide benefits to Ontario's electricity market and customers. Early findings show potential for cost savings from the Market Renewal Program to be realized by consumers and suppliers of approximately $3.4 billion over the 2021-2030 period. These savings represent a net efficiency benefit, meaning the total commodity cost of electricity (i.e., energy, Global Adjustment and uplifts) is reduced by that amount[2]. Unquantified benefits are also expected from the Market Renewal Program; for example, energy market prices that more accurately and transparently reflect marginal production costs (including all costs associated with system constraints) will reduce uplift payments, the potential for inefficient bidding, and opportunities for gaming[3].

The Market Renewal Program is also expected to reduce current market inefficiencies. For example, the current day-ahead commitment process does not incorporate appropriate

[2] IESO 2017-2019 Business Plan, page 6
[3] Page 40, April 20, 2017 Brattle Group report

incentives for exports to be scheduled on a day-ahead basis. A financially-binding day-ahead market would provide participants the financial security of knowing in advance what price they will receive for their supply or pay for their consumption, reducing risk and encouraging greater participation from exports, hydro, and pumped storage resources[4].

The IESO began initial work on the Market Renewal Program in 2016 with a stakeholder meeting on April 19, 2016 and the formation of a Market Renewal Working Group ("MRWG") in July 2016. A schedule of all activities, engagement and work with stakeholders is available on the IESO's website[5].

On March 6, 2017, a draft report prepared by the Brattle Group, hired to assist with the Market Renewal Program, titled "The Future of Ontario's Electricity Market, A Benefits Case Assessment of the Market Renewal Program" was shared and posted on the IESO's website. With the publication of the draft report, as had been previously discussed with the IESO's SAC, the IESO began transition to Market Renewal design work. On April 20, 2017, the Brattle Group provided its final report and the IESO posted this on the same day[6].

In its final report, the Brattle Group described some of the benefits that will result from the Market Renewal Program, including:

> … quantifiable impacts of Market Renewal's energy, operability, and capacity reforms would yield expected gross efficiency benefits of hundreds of millions of dollars per year. Furthermore, the benefits of Market Renewal would pay back its

[4] Page 24, Brattle Group Report, April 20, 2017
[5] http://www.ieso.ca/sitecore/content/ieso/home/sector-participants/engagement-initiatives/engagements/market-renewal.
[6] http://www.ieso.ca/-/media/files/ieso/document-library/engage/me/benefits-case-assessment-market-renewal-project-clean-20170420.pdf?la=en.

implementation cost in just over a year. Benefits would continue to increase and accrue in subsequent years[7].

The IESO has sought to have balanced representation on the MRWG with representation from the following groups:

Generators:

- Gas, wind, hydro and nuclear
- Contracted and regulated parties

Consumers:

- Industrial, commercial and low volume consumers

Other:

- Traders, demand response, Market Surveillance Panel, licenced electricity distributors and emerging technologies

The IESO has worked closely with the MRWG and stakeholders to develop an agreed upon objective and set of principles for Market Renewal:

Objective of the Market Renewal Program:

Market Renewal will deliver a more efficient, stable marketplace with competitive and transparent mechanisms that meet system and participant needs at lowest cost.

Principles of the Market Renewal Program:

- Efficiency,
- Competition,
- Implementability,
- Certainty, and
- Transparency.

[7] **The Future of Ontario's Electricity Market,** A Benefits Case Assessment of the Market Renewal Program, April 20, 2017, Prepared by the Brattle Group, Page 97.

The IESO's 2017-2019 Business Plan provides a description of the Market Renewal Program, including its projected cost and benefit estimates and affirms that the IESO has been and will continue to work with stakeholders on this project.

As the Market Renewal Program is anticipated to benefit both domestic and export customer classes, the IESO is proposing to recover the costs associated with the Market Renewal Program from both customer classes on a proportionate basis based on TWh. These costs are a component in the proposed 2017 fees as calculated by Elenchus. The IESO has a forecast $12 million of operating costs due to the Market Renewal Program in 2017 as shown in Table 5 below.

Table 5: Market Renewal 2017 Operations Budget

	($ million)
Compensation & Benefits	8.3
Professional & Consulting	3.3
Operating & Administration	0.4
Total	12.0

Of the $12 million in forecast 2017 costs, the IESO is proposing to allocate $3.0 million from its budget for core business operations, from the IESO redeploying consulting support as well as impacts of hiring timing and staffing rates, with the remaining $9.0 million being additional funds. The IESO and stakeholders are cognizant that given the scope and expectations of the Market Renewal Program that it requires a robust project management plan and the Brattle report speaks to the need for implementing strong project management practices to effectively manage stakeholder relations, timeline, workstream dependencies, and IT system integration based on the experiences of other ISO's to

successfully implement changes[8]. In managing the Market Renewal Program, the IESO will utilize a variety of resourcing approaches to most effectively manage project delivery timelines, cost, and to mitigate risk. Resourcing approaches will include competitive contracting with suppliers, as well as seconding key internal IESO resources for different durations based on the specific skills needed as the project moves through the various phases (e.g., design, implementation, testing, etc.).

There are no planned capital expenses in 2017 related to the Market Renewal Program.

The IESO's 2017 Operating Reserve

In EB-2015-0275, the Board approved the IESO retaining $10 million as an operating reserve. As the scope and complexity of the IESO's mandate continues to expand, the IESO recognizes the potential for additional unplanned work activities that may be material in scope and are beyond the control of management. This potential work is described below under the heading, Risks. In response to this potential volatility in spending driven by changes in the volume of activities and the external environment, the IESO seeks approval to continue to retain an operating reserve of $10 million in 2017. The operating reserve will be retained in the Forecast Variance Deferral Account ("FVDA").

The $10 million operating reserve proposed is approximately 5% of the IESO's proposed 2017 net revenue requirement, which is a similar percentage to the amount of operating reserve retained in 2016 and prior years.

[8] Page 90, April 20, 2017, Brattle Group report.

Work performed by IESO but not funded through its fees

The IESO will be supporting the Ontario Climate Change Solutions Deployment Corporation ("OCCSDC"), a provincial crown corporation, by providing staff to perform work on behalf of the OCCSDC. IESO staff will utilize IESO office space and infrastructure while performing this work. All IESO staff time spent on OCCSDC related work will be tracked, and the IESO will charge a fully allocated cost for this staff time; the IESO will not be financing the work performed by its staff on behalf of the OCCSDC. It is currently expected that the IESO will be performing the following functions:

- Initial launch of the OCCSD website in the spring of 2017 and a subsequent upgrade in the fall of 2017,
- Providing customer call centre support, and
- Program design and development.

As the IESO will be charging fully allocated costs for work performed on behalf of the OCCSDC, no amounts for the IESO's support of the OCCSDC are included in the IESO's 2017 expenditure and revenue requirements.

Risks

The IESO faces risks in both its revenues and operating expenses. The IESO's expenses and revenues are forecast based on both the experience of IESO staff and the best information available when the Business Plan is being developed. The 2017-2019 Business Plan was constructed over a matter of months. The approved Business Plan was resubmitted to the Minister on February 1, 2017 and included the forecast additional resourcing requirements for the Market Renewal Program, and reflect the elimination of the Large Renewable Procurement and redeployment of procurement staff accordingly. The IESO strives to reduce uncertainty in the inputs in order to make the resulting Business Plan as robust as

possible. However, all forecasts are inherently uncertain: they take the best information available at the time and attempt to predict the future. At the time of business planning, some of the potential risks the IESO faces in a given year may be anticipated but not quantifiable, while others are simply not known.

A number of risks to the IESO's forecasts have been identified and these include:

- The US-Canada exchange rate, which has, and will potentially further impact the IESO's operating expenses including NERC and NPCC membership and through invoices billed in US dollars.
- Ontario's cap-and-trade policy may result in new programs and ministerial directives requiring additional work to be performed by the IESO which may require additional resources.
- The Long-Term Energy Plan may result in ministerial directives requiring additional work to be performed by the IESO which may require additional resources.
- The potential impacts of fulfilling new directives from the Minister and managing the work associated with new contracts, whether for new supply, conservation or the import and export of power.
- Fluctuations in total demand as compared to the IESO's forecast, which impacts the revenue recovered through the IESO's two usage fees.
- Market Renewal Program:
    - Stakeholder and resourcing risks are key risks for the early phase of the project.
    - As the project progresses beyond 2017, it will also trigger both integration and implementation risks, as well as continued stakeholder risk.
    - Integration risk includes integrating new processes, systems and tools into existing frameworks. Implementation risks includes managing project scope, costs and schedules.

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2017 REGISTRATION AND APPLICATION FEES, THE FORECAST VARIANCE DEFERRAL ACCOUNT AND CAPITAL EXPENSES

2017 Registration and Application Fees

The IESO proposes to continue charging the registration and application fees as previously approved by the Board and as described below:

a) Approval to continue to charge registration fees of up to $10,000 per proposal for electricity supply and capacity procurements, including conservation and load management procurements.

b) Approval to continue to charge non-refundable application fees for the Feed-in Tariff ("FIT") program of $0.50/kW of proposed Contract Capacity, having a minimum of $500 and to a maximum of $5,000.

c) Approval to continue charging $1,000 for the IESO's market participation application fee.

All fees listed above received approval through a Board decision dated December 1, 2016 (EB-2015-0275).

The IESO is not seeking to continue the Large Renewable Procurement fee in 2017.

The Forecast Variance Deferral Account

In its 2016 Revenue Requirement Submission, the IESO sought, and the Board approved, the continuation of the Forecast Variance Deferral Account ("FVDA").

The IESO requests approval to continue to use the FVDA. The IESO's revenue requirement is a fixed amount approved by the Board with the IESO usage fees determined based on a forecast of withdrawals from the IESO controlled grid, embedded generation and exports. While the IESO provides a forecast of these

withdrawals, there is inherently a variance between the forecast withdrawals and actual withdrawals. Similarly, it is to be expected that there will generally be some variance between actual revenues and expenses and the Board-approved revenue requirement. The IESO proposes to continue to track these variances through the FVDA.

Retaining revenues received in 2017 above the proposed 2017 Revenue Requirement

In addition to the $10 million operating reserve, the IESO is seeking approval to retain up to $5 million in excess revenues received in 2017 to minimize fee increases as a result of the Market Renewal Program in 2018. These excess revenues would include those above the proposed 2017 net revenue requirement of $190.8 million as allocated by Elenchus to each customer, or underspent in 2017. Any retained revenues or underspend would be used to minimize potential fee increases for domestic and export usage fees in 2018. As this is not intended to result in a cross subsidy, any retained 2017 revenues or underspend would be tracked for each customer type, domestic and export, and applied only to their respective 2018 usage fee. The 2017 allocated revenue requirement for each customer class as calculated by Elenchus is shown in Table 1 below:

Table 1: 2017 Allocated Revenue Requirement by customer class

	2017 allocated revenue requirement as calculated by Elenchus
Domestic	$171.6 million
Export	$19.2 million

Any 2017 funds retained or underspent will be tracked in the FVDA and reported on in the IESO's next Revenue Requirement Submission. As stated earlier, any retained funds will be used to minimize fee increases related to the Market Renewal Program in 2018. As shown in Table 2 below, the projected operating costs for the Market Renewal Program are forecast to increase in 2018 over 2017 costs. This increase, when combined with the $3 million of 2017 Market Renewal costs the IESO is proposing to allocate from its budget for core business operations as described on page 9 of Exhibit B-1-1 equals the $5 million the IESO is proposing to be allowed to retain

Table 2: Market Renewal forecast operating costs

	2016	2017	2018	2019
Market Renewal ($ millions)	$0	$12	$14	$6

The $5 million the IESO is proposing to retain represents approximately 3% of the IESO's 2017 revenue requirement and if returned to customers would be less than $0.0001/KWh as shown in Table 3 below, which is substantially lower than the $0.001/KWh threshold the OEB has set for the clearance of LDCs Group 1 audited account balances[1]. Additionally, while the Board's filing requirements place the onus on LDCs as to why any account balance in excess of the threshold should not be disposed, there does not appear to be any provision for an LDC to clear the accounts when the balance is lower than the threshold.

[1] Ontario Energy Board, Filing Requirements For Electricity Distribution Rate Applications - 2016 Edition for 2017 Rate Applications - Chapter 3, Incentive Rate-Setting Applications, Page 10, http://www.ontarioenergyboard.ca/oeb/_Documents/2017EDR/OEB_Filing_Requirements_2017Rates_Chapter03.pdf.

Table 3: $5 million represented as IESO usage fee/KWh

	Proposed usage Fee/KWh	3% of the proposed fee/KWh
Domestic	$ 0.001220	$ 0.00003660
Export	$ 0.000990	$ 0.00002970

The IESO recognizes that this request is unusual. However, as described in Exhibit B-1-1, in the IESO's approved 2017-2019 Business Plan and on the IESO's website, the Market Renewal Program is a multi-year project benefitting all customers with a net efficiency benefit of up to $3.4 billion from 2021 to 2030, including $3.0 billion net consumer benefit, as explained below. Given the long-term benefits that are forecast to result from the Market Renewal Program, the IESO believes it is efficient and fair to customers to retain funds received in 2017 in order to minimize rate increases in 2018. As the IESO is proposing that a limited amount of any excess revenues collected or any underspend in one year be used to minimize an increase in usage fees in only the following year, the IESO believes that this proposal does not represent rate inequity and will not create subsidization between customer classes.

As discussed more thoroughly in Exhibit B-1-1 the Market Renewal Program is anticipated to benefit domestic and export customers. Early findings show potential for cost savings that are expected to be realized by both consumers and suppliers from the Market Renewal Program, with a baseline estimate of $3.4 billion over the 2021-2030 period. The Market Renewal Program is also expected to reduce inefficiencies which currently exist, an example being the non-market day-ahead commitment process which does not incorporate appropriate incentives for exports to be scheduled on a day-ahead basis.

Capital Expenses

The IESO is seeking approval of its proposed 2017 capital expenditure envelope of $25 million for capital projects. A summary of capital spending and associated project descriptions is included in Appendix 4 of the IESO's approved 2017–2019 Business Plan and the forecast 2017 capital envelope compared to 2015 and 2016 is shown in Table 4 below:

Table 4: 2017 Capital Envelope compared to 2015 and 2016[2]

Planned Projects ($ millions)	**2015**	**2016**	**2017**
Total Capital Projects	29.4	28.4	25.0

The IESO utilizes the four strategic goals described in its 2016 – 2020 Strategic Plan[3] to determine capital project priorities. The IESO's four strategic goals are:

- Deliver superior reliability performance in a changing environment
- Drive to a more efficient and sustainable marketplace
- Be recognized as a trusted advisor, informed by engagement
- Invest in our people and processes to meet the needs of the sector

Accounting Change

The IESO has made changes to its accounting policies to increase transparency and to report certain costs as regulated assets, consistent with the accounting policies of other regulated entities in North America. These changes are reflected in Note 3 on page 13 of

[2] 2015 and 2016 information taken from the IESO 2016-2018 Business Plan: EB-2015-0275, Exhibit A-2-2, Page 13 of 20.

[3] http://www.ieso.ca/sector-participants/ieso-news/2016/06/ieso-releases-its-2016-2020-strategic-plan.

the IESO's 2016 Annual Report, which is filed as Exhibit A-3-1. The changes include the recognition of rate regulated assets as well as the recognition of market accounts assets and liabilities on the statement of financial positions.

The IESO operates and settles the electricity market, where sums of money are constantly flowing to and from market participants, such as consumers and generators. The IESO is not party to these market transactions but facilitates them, which requires it to temporarily hold and move funds. These financial transactions in no way impact the IESO's accumulated deficit or revenues and expenses. After a review of its accounting practices, the IESO decided to include year-end market account balances on its financial statements in an effort to increase transparency.

Additionally, the IESO has changed its accounting policy to report certain costs as regulated assets, specifically unrecovered smart metering expenses and unrecovered PSAB transition items, to be consistent with the accounting policies of other regulated entities in North America. These are costs that are being recovered through Board-approved fees and it is common practice among regulated entities to treat such costs as regulatory assets for accounting purposes. It is important to note that no matter which way the IESO reports these costs, the cost and the impact on ratepayers does not change. These costs have been in the IESO's publicly issued audited financial statements for years and the decision to move to the new accounting policy was made to better reflect the nature of these costs. The reporting of these costs has always been public and the new reporting is simply a function of change in accounting policy.

2016 YEAR-END FINANCIALS, SURPLUS & STAFFING

Actual 2016 Financial Results

Table 1 below outlines the IESO's 2016 actual results and variances against the 2016 budget.

Table 1

	2016		
($ Millions)	Actual	Budget	Variance
Revenues	194.1	182.1	12.0
Costs			
Operating Costs	160.7	163.9	(3.2)
Amortization	19.6	17.5	2.1
Interest	1.3	0.7	0.6
Total Costs	181.6	182.1	(0.5)
Operating Surplus/(Deficit)	12.5	-	12.5
Accumulated Operating Surplus (opening balance)	10.0	10.0	10.0
Proposed Rebates to Market Participants	(12.5)	-	(12.5)
Accumulated Operating Surplus (closing balance)	10.0	10.0	10.0

Surplus to be rebated to Usage Fee Payers

The accumulated surplus proposed to be rebated to usage fee payers is $12.5 million.

The $12.5 million accumulated surplus is due to actual revenue being $12.0 million higher than planned and total costs being $0.5 million lower than planned.

The positive revenue variance was mainly the result of higher than planned fee revenues.

In 2016, the IESO operated with two approved fees based on the two predecessor organizations. The Board -approved 2016 fees in the IESO's 2016 revenue requirement were approved on December 29, 2016 with an effective date of January 1, 2017. The difference

between the fees and actual and budgeted demand resulted in increased fee revenue collected from domestic and export demand which was offset by lower fee revenue collected from embedded demand as described below:

1. Domestic demand – the domestic demand variance made up the majority of the fee revenue variance. Domestic demand was lower than forecast, resulting in less fee revenue. The variance in fee revenue is due to domestic demand being charged the combined predecessor rates in 2016, which was significantly higher than the rate submitted in the IESO's 2016 Revenue Requirement Submission.
2. Export demand – export demand was higher than forecast, resulting in additional fee revenue. This was partially offset by a lower predecessor fee than budgeted.
3. Embedded demand – actual embedded demand was as forecast; however, the predecessor fee was lower than planned resulting in lower fees collected.

Staffing

As of December 31, 2016, there were 675 staff including 639 regular staff and 36 temporary staff which is 13 staff lower than budget. The lower staff levels in 2016 were primarily due to government direction to conclude renewable procurement initiatives and hiring lags.

The government direction to conclude renewable procurement initiatives such as Large Renewable Procurement in 2016 resulted in staff vacancies. These vacancies were maintained within 2016 in anticipation of needing additional staff in support of the Market Renewal Program.

At any given time the IESO operates with ongoing hiring lags due to staff movements within the organization resulting in some staff variances.

Table 2

Staff	**Actual**	**Budget**	**Variance**
Regular	639	663	(24)
Temp	36	25	11
Total	**675**	**688**	**(13)**

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IESO REGULATORY SCORECARD

In the Board-approved Settlement for the IESO's 2016 Revenue Requirement Submission (EB-2015-0275), Section 6.2, the IESO agreed:

- To consult with intervenors to develop a scorecard for filing in its next Revenue Requirement Submission filed with the Board;
- That the scorecard is intended to be a tool for the Board and intervenors to use in evaluating the IESO's proposed expenditure and revenue requirement; and
- To engage an expert to assist with this work.

Elenchus Research Associates Inc. ("Elenchus") was the successful proponent, procured through a competitive Request For Proposal process, to assist the IESO with this work. Elenchus facilitated two group meetings and conducted one-on-one interviews with interested intervenors. Elenchus has also circulated for comment a set of draft measures developed by the IESO at the request of participating intervenors.

Status and Next Steps:

Elenchus is evaluating the comments and feedback from the participants and is developing a draft report which will include recommended scorecard measures.

The draft report will be circulated by Elenchus to the participating intervenors for review and comment; Elenchus will consider input received on the draft report to develop the final report.

Once the IESO receives the final report from Elenchus, IESO will develop the scorecard, populate measures with available information, and submit it to the Board along with the final Elenchus report, as soon as possible after they are completed.

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DEVELOPMENT OF FOUR STANDARD FINANCIAL REPORTING FORMS

In the Board-approved Settlement for the IESO's 2016 Revenue Requirement Submission ("RRS") (EB-2015-0275), Section 1.1, item 2) the IESO agreed to file information in the format of the Chapter 2 Appendices issued by the Board for the purposes of electricity distributors' 2017 Cost of Service applications, modified as necessary and appropriate to reflect the particular circumstances of the IESO, and to consult with intervenors in the development of these. The forms agreed to in the settlement were:

- (a) Appendix 2-AA (Capital Projects);
- (b) Appendix 2-JB (O&A Cost Drivers);
- (c) Appendix 2-JC (O&A Programs); and
- (d) Appendix -2K (Employee Costs).

On March 10, 2017, the IESO sent draft Appendices to all parties in its 2016 RRS, seeking their feedback. The IESO offered, if there was interest, to host a meeting, in person and via teleconference, to review the draft Appendices, to answer questions and to receive further input on the draft Appendices. In offering to host this meeting, the IESO also offered to reimburse intervenors that the Board deemed eligible for costs in its 2016 RRS and according to the OEB's Practice Direction on Cost Awards.

As no parties expressed interest in a meeting, the IESO incorporated recommendations it received into the draft Appendices which are filed as attachments to this exhibit as follows:

- Attachment 1 - Appendix 2-AA (Capital Projects);
- Attachment 2 - Appendix 2-JB (O&A Cost Drivers);
- Attachment 3 - Appendix 2-JC (O&A Programs); and
- Attachment 4 - Appendix 2-K (Employee Costs).

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Appendix 2-AA

Capital Projects Table (Note 1)

Change Initiatives/Projects (in millions)	2016 Actual	2017 Plan	2018 Plan	2019 Plan
Energy Management System (EMS) Refresh	2.8	-	-	-
Capacity Auction & DR Auction	3.0	-	-	-
NERC CIP Projects	5.0	-	-	-
Outage Management System Replacement	1.2	-	-	-
Identity Access Management	-	2.1	-	-
Operations Readiness Initiatives	0.5	2.5	3.0	-
Market Information System (MIS) Refresh	1.9	2.0	1.7	-
Infrastructure refresh (building services, software licenses & computer hardware)	0.5	2.5	2.5	2.3
Enterprise Cyber Security Management Refresh	-	2.0	-	-
Conservation Demand Management Information System (CDM IS)	0.4	1.0	0.4	1.0
Corporate Website including consolidation and enhancement to Save-on-Energy	1.6	1.5	1.0	1.5
CRS Replacement & Migration	-	1.0	2.0	2.0
Financial Systems Upgrade	1.4	1.0	1.5	1.0
MACD Enforcement Support Tool and related projects	-	1.0	0.5	1.0
FIT, microFIT and other upgrades	-	1.0	0.7	0.4
Oracle Archetype Expansion and Oracle batch	-	1.0	1.0	-
Wallboard Refresh	-	1.0	-	-
System Logging and Analysis Upgrade Qradar	-	-	2.0	-
Tier 1 Storage Refresh	-	-	-	2.0
ETP Refresh	-	-	-	1.0
Total Capital Projects ($1M and above)	**18.4**	**19.6**	**16.3**	**12.2**
Other Capital Projects	5.4	5.4	8.7	11.0
Market Renewal	-	-	20.0	40.0
Total Capital Projects	**23.8**	**25.0**	**45.0**	**63.2**

Note 1: 2017-2019 Plan replicates the IESO 2017-2019 Business Plan, see Exhibit A-2-2

APPENDIX 2-JB COST DRIVERS

Planned operating expenses in 2017 have increased by approximately $9.8 million when compared with 2016 actual operating expenses. The increase is due to a combination of the addition of the Market Renewal Program and annual inflationary pressures.

Of the $12 million in forecast 2017 costs, the IESO is proposing to allocate $3.0 million from its budget for core business operations, and the remaining $9.0 million being additional funds. As described in Exhibit B-1-1 the IESO is proposing to allocate $3.0 million from its budget for core business operations, from the IESO redeploying consulting support as well as impacts of hiring timing and staffing rates.

Appendix 2-JB
Cost Driver Table (Note 1)

(in thousands)	2016 Actual	2017 Budget
Compensation & Benefits	109,483	117,459
Professional & Consulting Fees	16,844	20,963
Operating & Administration	34,336	35,954
Amortization	19,577	18,350
Interest	1,341	(1,362)
Total Operating	**181,581**	**191,364**

Appendix 2-JC
Operating Programs Table

Operating (in thousands)	2016 Actual	2017 Budget
CEO	7,304	7,258
Market and System Operations	31,969	33,016
Market and Resource Development	18,239	20,022
Conservation and Corporate Relations	16,554	17,591
Information and Technology Services	46,341	45,783
Planning, Legal, Indigenous Relations & Regulatory Affairs	14,506	16,187
Corporate Services	16,773	16,399
Market Assessments and Compliance Division	2,980	3,835
Market Renewal	0	12,000
Corporate Adjustments	26,916	19,274
Total OM&A	**181,581**	**191,364**

Appendix 2-K
Employee Costs

(in thousands)	2016 Actual	2017 Budget
Number of Employees (FTEs)		
Management	109	117
All Non-Management	556	595
Total	**665**	**712**
Total Salary and Wages		
Management	18,846	21,380
All Non-Management	60,022	68,468
Total	**78,868**	**89,848**
Total Benefits		
Management	7,749	6,661
All Non-Management	22,866	20,950
Total	**30,615**	**27,611**
Total Compensation (Salary, Wages & Benefits)		
Management	26,595	28,041
All Non-Management	82,888	89,418
Total	**109,483**	**117,459**

Notes:
"Non-Management" represents employees represented under collective bargaining units;
"Management" includes executive.

IESO COSTS AND SAVINGS TO IMPLEMENTING ONTARIO GOVERNMENTGREENHOUSE GAS CAP-AND-TRADE INITIATIVE AND ANY NEW OR CHANGING REQUIREMENTS ARISING FROM BILL 135

In the Board-approved Settlement for the IESO's 2016 Revenue Requirement Submission (EB-2015-0275), Section 1.1, item 3) the Parties accepted that the IESO's fiscal 2016 net revenue requirement of $182.1 million was appropriate, subject to the following terms:

3) The IESO will use its best efforts to estimate its costs and savings, if any, associated with the Ontario government's greenhouse gas cap-and-trade initiative and any new or changing requirements arising from Bill 135 (the *Energy Statute Law Amendment Act, 2016* given Royal assent on June 9, 2016). The IESO agrees to provide a reasonable estimate for internal costs or savings, and actual costs or savings for external costs associated with each of these initiatives in its next Revenue Requirement Submission filed with the Board.

Estimated Costs and Savings

Greenhouse gas cap-and-trade initiative

The internal 2016 costs associated with the Ontario government's greenhouse gas cap-and-trade initiative is approximately $500,000. These incremental costs were for external counsel and consultants that were retained to assist the IESO to review and negotiate amendments to supply contracts where appropriate.

There have not been any costs thus far in 2017 associated with the greenhouse gas cap-and-trade initiative and, at this time, the IESO does not estimate any specific costs or savings for the IESO as result of the cap-and-trade initiative. However, the IESO does identify this as a potential risk to its operating expenses (see Exhibit B-1-1).

Bill 135 (*Energy Statute Law Amendment Act, 2016*)

The primary deliverable stemming from Bill 135 was the Ontario Planning Outlook technical report, which was published on September 1, 2016. This report responded to the June 10, 2016 request from the Minister of Energy for the IESO to provide a technical report pursuant to Section 25.29 (3) of the *Electricity Act, 1998* on the adequacy and reliability of Ontario's electricity resources in support of the government's development of the Long-Term Energy Plan (LTEP). There were no additional costs as all efforts associated with developing the report were funded within the existing approved budget.

Bill 135 also requires the IESO, if so directed, to develop an implementation plan for the LTEP. 2017 activities are focused on the development of the implementation plan which the IESO expects to fulfill with existing resources. Bill 135 also provides for the IESO to undertake work related to the development of or enter into contracts with respect to the procurement of transmission. The IESO expects to be able to undertake work related to transmission procurement within its existing budget.

COST BENCHMARKING

In the Board-approved Settlement for the IESO's 2016 Revenue Requirement Submission (EB-2015-0275), Section 1.1, item 1) the Parties accepted that the IESO's fiscal 2016 net revenue requirement of $182.1 million was appropriate, subject to the following terms:

1) Intervenors believe that benchmarking of some or all of the IESO's activities would also be beneficial in informing the Parties and the Board with regard to the reasonableness of the IESO's proposed expenditures and requested fees. The IESO agrees to consider the issue of undertaking cost benchmarking of its activities, and to file with its next Revenue Requirement Submission filed with the Board either benchmarking information, or a rationale for why the IESO believes that benchmarking is not possible or appropriate.

The IESO examined the opportunity to undertake cost benchmarking of some or all of its activities for the purpose of informing the Parties and the Board with regard to the reasonableness of the IESO's proposed expenditures and requested fees. This review included identification of possible appropriate comparable entities to the IESO, outreach to these comparable entities to understand how the IESO is similar to or is materially different from them, to identify where similar benchmarking activities have already taken place or suitable information is available, and examination of available information. The IESO also leveraged the parallel regulatory scorecard development activities (see Exhibit C-1-1) to inform its conclusions.

Comparable Entities

As the independent system operator for the province of Ontario, and because the structure of the Ontario electricity sector ensures the accountabilities and responsibilities of the

agencies and companies are clearly defined with no overlap, no comparable Ontario entities to the IESO were identified. In Canada, only Alberta has structured their sector to include an independent system operator (Alberta Electricity System Operator or AESO), with the remaining provinces structuring their sector primarily as integrated utilities.

The IESO is also a member of the ISO/RTO Council (of which the AESO is a member), which is made up of the North American Independent System Operators ("ISO") and Regional Transmission Operators ("RTO"). These entities were examined as the closest comparable entities to the IESO.

Observations

ISO/RTOs under Federal Energy Regulatory Commission ("FERC") jurisdiction submit information annually on a voluntary basis to participate in the *ISO/RTO Common Metrics Report* (Docket No. AD14-15). The metrics in scope of the initiative are primarily reliability and system operations activities and other market-specific data. FERC staff publishes a *Common Metrics Report* based on analysis of the information collected. The most recent Staff Report was published in October 2016, available at https://www.ferc.gov/legal/staff-reports/2016/08-09-common-metrics.pdf. The IESO reviewed the staff report and identified that limited cost-benchmarking information was included.

FERC staff identified caveats to using the information collected for comparing entities in a meaningful way, specifically:

> The metrics used in this report pertain to both RTOs and ISOs and non-RTOs and ISOs. However, several limitations preclude all but the most basic observations about the metrics submitted by RTOs and ISOs relative to those submitted by non-RTOs and ISOs. While the intent behind these metrics is to compare areas in which RTOs and ISOs and non-RTOs and ISOs perform identical functions, Commission staff notes that there are significant

> differences in the scale of operations performed by the largest RTOs and ISOs as compared to non-RTO and ISO respondents with relatively smaller service territories (e.g., PJM's footprint covers territory in 13 states and the District of Columbia, whereas Arizona Public Service Company's territory covers 11 counties in Arizona). These data limitations and differences must be carefully considered when comparing metrics-related information submitted by RTOs and ISOs and non-RTOs and ISOs. As such, Commission staff has largely avoided drawing these types of comparisons. In addition, these metrics do not capture some of the potential benefits that are difficult to isolate and measure, e.g., benefits created by providing opportunities for input by a broad range of stakeholders.

On further discussions with representatives of the ISO/RTOs, which occurred after the FERC report was made public, the challenges of comparing ISO/RTOs to one another were seen to include:

- Lack of assurance of information quality or completeness because of the voluntary collection basis and lack of standardization of tools, scope and methodologies to collect information at the entity level.
- Inherent variations in market design, system size and complexity, geography and footprint, operating conditions (such as weather patterns), generation mix, policy and regulatory environments, and NERC functional model registration, among other possible differences that can have a material impact on underlying costs.
- Application of accounting policies and procedures to collect and report costs may vary.

The participating ISO/RTOs also noted that:

- They do not rely on the ISO/RTO Common Metrics Report for comparing or benchmarking against other entities.
- Providing additional organizational cost information to FERC under this initiative was not done to protect the confidentiality of the information.
- Significant effort (and cost) is required to collect the information for submission to FERC.

The IESO also notes that during the work with an expert and stakeholders to develop an IESO regulatory scorecard [see Exhibit C-1-1], Elenchus Research Associates Inc. ("Elenchus") and participating stakeholders did not identify any entities with sufficient comparability for relevant scorecard measures. The IESO believes this lack of comparability results from the unique mandate of the IESO compared to other ISOs/RTOs such as the responsibility for contracting and overseeing Ontario's Conservation First Framework.

Cost Benchmarking

The *ISO/RTO Common Metrics Report* includes the following information items (in US dollars):

- Normalized five year average capital costs as a percentage of budgeted costs
- Normalized five year average non-capital costs as a percentage of budgeted costs
- Five year average administrative cost/MWh.

The IESO is continuing to work with Elenchus and stakeholders to develop an IESO regulatory scorecard. The IESO is considering including measures similar to the cost metrics included in the *ISO/RTO Common Metrics Report.* The IESO wishes to emphasize that despite the availability of this information, the IESO shares the concerns of FERC staff and of the participating FERC jurisdictional ISO/RTOs that using the information to compare or to benchmark against these entities in a meaningful way is of limited value. Useful comparison is further limited because of the need to make assumptions to estimate the conversion of the FERC-jurisdictional ISO/RTO information to Canadian dollars.

Conclusion

The IESO understands and appreciates the underlying desire for the Board and the Parties to look to the potential for cost benchmarking of some or all of its activities for the purpose of understanding the reasonableness of the IESO's proposed expenditures and usage fees. However, based on the analysis above, the IESO respectfully submits that such an activity is not appropriate due to the lack of available information and the lack of suitable comparable entities to benchmark costs against.

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CONSERVATION INFORMATION PROVIDED TO INTERVENORS

In the Board-approved Settlement for the IESO's 2016 Revenue Requirement Submission (EB-2015-0275), Section 1.1, item 4) , the IESO agreed to provide the following information to intervenors by November 1, 2016:

(a) An analysis that will identify which conservation programs have been 100% per cent fully meter-measured as part of the IESO's EM&V process and that will indicate, in addition to the number of programs, the dollar value of these programs that are fully meter-measured. Also, the analysis will show the total number of industrial, commercial and institutional programs that are meter measured as a percentage of the full program portfolio, both in terms of dollar value and in terms of the number of programs.

(b) The estimated useful lives for each conservation measure that the IESO supports.

As the Board decision approving the Settlement Proposal was not issued by November 1, 2016, the IESO, with the agreement of intervenors, did not provide this information by November 1, 2016.

This information was provided by e-mail to all parties on January 18, 2017, and is provided again below for ease of reference.

January 18, 2017 e-mail

The IESO is providing the following information according to Issue 1.1 (4) of the settlement agreement, as approved by the Board on December 1, 2016:

(a) An analysis that will identify which conservation programs have been 100% per cent fully meter-measured as part of the IESO's EM&V process and that will indicate, in addition to the number of programs, the dollar value of these programs that are fully meter-measured. Also, the analysis will show the total number of industrial, commercial and institutional programs that are meter measured as a percentage of the full program portfolio, both in terms of dollar value and in terms of the number of programs.

In 2015, the conservation programs that have been 100% fully meter-measured as part of the IESO's Evaluation Measurement & Verification (EM&V) process are:

#	Program	2015 Spending ($M)
1	*peaksaver* PLUS Program (Residential & Small Business)	19.5
2	Retrofit Program (Large Projects with Custom Measures and Large Custom Projects only)	41.1
3	Existing Building Commissioning Program	1.3
4	Process and Systems Upgrades Program	68.8
5	Monitoring and Targeting Program	0.7
6	Industrial Accelerator Program (Capital Incentives Track only)	0.07
		131.50
Total fully metered Residential Programs (1)		19.5
Total fully metered Industrial, Commercial and Institutional Programs (2 - 6)		112.0
Total fully metered programs		**131.50**

- The total number of industrial, commercial and institutional programs that are meter-measured as a percentage of the full program portfolio, in terms of dollar value is 25% ($112M of $453.8M).
- The total number of industrial, commercial and institutional programs that are meter-measured as a percentage of the full program portfolio, in terms of the count of programs is 25% (5 of 20).

(b) The estimated useful lives for each conservation measure that the IESO supports.

The Measures and Assumptions List, which contains the effective useful life of each conservation measure, is attached. This list, in .xlsx and .pdf formats can be found here: http://www.powerauthority.on.ca/opa-conservation/conservation-information-hub/evaluation-measurement-verification/measures-assumptions-lists.