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2020 SUBMISSION

EB-2020-0230

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 2020 and the fees it proposes to charge during the fiscal year 2020.

2020 SUBMISSION FOR REVIEW

1. The Independent Electricity System Operator (IESO) submitted its 2020-2022 Business Plan to the Minister of Energy, Northern Development and Mines (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 2020-2022 Business Plan and the budget for 2020.
2. The IESO hereby submits to the Ontario Energy Board (OEB) its 2020 expenditure and revenue requirements and the fees charged in 2020 (the "2020 Revenue Requirement Submission" or "2020 Submission") for review and approval pursuant to subsection 25 (1) of the Act.
3. The IESO proposes a 2020 revenue requirement of \$188.6 million, below the level from the previous three years (2019 to 2017).
4. The current IESO interim usage fees of \$1.227/MWh for domestic customers and \$1.0125/MWh for export customers were made effective January 1, 2020 by a December 17, 2019 OEB Decision on interim fees (EB-2019-0300). The IESO proposes that the interim usage fees be made final fees for the period January 1, 2020 to December 31, 2020. Domestic customers include all withdrawals for consumption in Ontario and embedded generation.

- 1 5. Pursuant to subsection 25 (1) of the Act, the IESO is seeking the following approvals from
2 the OEB:
- 3 a) Approval of the proposed 2020 revenue requirement of \$188.6 million.
- 4 b) Approval of the proposal to make the IESO's interim usage fees, \$1.227/MWh for
5 domestic customers (including embedded generation) and \$1.0125 MWh for export
6 customers, the final usage fees for the period January 1, 2020 to December 31, 2020.
- 7 c) Approval of its 2020 capital expenditure of \$52 million for capital projects.
- 8 d) Approval to rely on and use the information provided to the IESO by Local Distribution
9 Companies (LDCs) on the amount of embedded generation in their service territory
10 under O. Reg. 429/04 in calculating the total usage fee to be billed to each LDC each
11 billing period.
- 12 e) All necessary interim orders, orders and directions, pursuant to the *Ontario Energy*
13 *Board Act, 1998* and the OEB's Rules of Practice and Procedure, as may be necessary in
14 relation to this 2020 Submission.
- 15 6. The IESO proposes that the OEB review of the 2020 Submission proceed by way of a
16 written hearing.
- 17 7. The IESO may amend its pre-filed evidence from time to time, prior to and during the
18 course of the OEB proceeding. Furthermore, the IESO may seek to have additional
19 meetings with OEB Staff and intervenors in order to identify and address any further issues
20 arising from this 2020 Submission, with a view to an early settlement and disposition of this
21 proceeding.
- 22 8. The IESO requests that a copy of all documents filed with the OEB by each party to this
23 proceeding, be served on the IESO and the IESO's counsel in this proceeding as follows:

a) Independent Electricity System Operator Ms. Miriam Heinz
Advisor, Regulatory Affairs

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1 DATED at Toronto, Ontario, this 27th day of May 2021

2 INDEPENDENT ELECTRICITY SYSTEM OPERATOR

3 

4 by its counsel in this proceeding
5 Fred D. Cass

2021 SUBMISSION

EB-2020-0230

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 2021 and the fees it proposes to charge during the fiscal year 2021.

2021 SUBMISSION FOR REVIEW

1. The Independent Electricity System Operator (IESO) submitted its 2020-2022 Business Plan to the Minister of Energy, Northern Development and Mines (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 2020-2022 Business Plan and the budget for 2021.
2. The IESO hereby submits to the Ontario Energy Board (OEB) its proposed 2021 expenditure and revenue requirements and the fees it proposes to charge in 2021 (the "2021 Revenue Requirement Submission" or "2021 Submission") for review and approval pursuant to subsection 25 (1) of the Act.
3. The IESO proposes a 2021 revenue requirement of \$191.8 million, which is a 0.2% annualized increase compared to the IESO's last approved revenue requirement in 2019.
4. The current IESO interim usage fees of \$1.227/MWh for domestic customers and \$1.0125/MWh for export customers were made effective January 1, 2020 by a December 17, 2019 OEB Decision on interim fees, and remain interim until final fees are approved by the OEB. The IESO proposes usage fees for the same customer classes approved by the OEB in EB-2019-0002, of \$1.271/MWh for domestic customers and \$1.0943/MWh for export customers effective January 1, 2021. Domestic customers include all withdrawals for consumption in Ontario and embedded generation.

- 1 5. Pursuant to subsection 25 (1) of the Act, the IESO is seeking the following approvals from
2 the OEB:
 - 3 a) Approval of the proposed 2021 revenue requirement of \$191.8 million.
 - 4 b) Approval of the proposed IESO usage fees of \$1.271/MWh for domestic customers
5 (including embedded generation) and \$1.0943 MWh for export customers to be paid
6 effective January 1, 2021.
 - 7 c) Approval of its proposed 2021 capital expenditure envelope of \$68.6 million for capital
8 projects.
 - 9 d) Approval to charge (or rebate) market participants the difference between the 2021
10 IESO usage fees approved by the OEB and the interim usage fee they paid, if any,
11 based on their proportionate quantity of energy withdrawn until the end of the month in
12 which OEB approval is received for the 2021 usage fees. Any such charges (or rebates)
13 will be provided in the next billing cycle following the month in which OEB approval is
14 received.
 - 15 e) Approval to rely on and use the information provided to the IESO by Local Distribution
16 Companies (LDCs) on the amount of embedded generation in their service territory
17 under O. Reg. 429/04 in calculating the total usage fee to be billed to each LDC each
18 billing period.
 - 19 f) Approval to charge registration fees of up to \$50,000 per proposal for electricity supply
20 and capacity procurements, including ancillary services.
 - 21 g) All necessary interim orders, orders and directions, pursuant to the *Ontario Energy*
22 *Board, OEB Act, 1998* and the OEB's Rules of Practice and Procedure, as may be
23 necessary in relation to this 2021 Submission.
- 24 6. The IESO proposes that the OEB review of the 2021 Submission proceed by way of a
25 written hearing.

h) Approval to rely on and use the information provided to the IESO by Local Distribution Companies (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.

i) All necessary interim orders, orders and directions, pursuant to the *Ontario Energy Board Act, 1998* and the OEB's Rules of Practice and Procedure, as may be necessary in relation to this 2020 Submission.

7. The IESO proposes that the OEB review of the 2020 Submission proceed by way of a written hearing.

8. The IESO may amend its pre-filed evidence from time to time, prior to and during the course of the OEB proceeding. Furthermore, the IESO may seek to have additional meetings with OEB Staff and intervenors in order to identify and address any further issues arising from this 2020 Submission, with a view to an early settlement and disposition of this proceeding.

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

a) Independent Electricity System Operator Ms. Miriam Heinz
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1 DATED at Toronto, Ontario, this 27th day of May 2021

2 INDEPENDENT ELECTRICITY SYSTEM OPERATOR

3 

4 by its counsel in this proceeding

5 Fred D. Cass

EXECUTIVE SUMMARY

Introduction

The Independent Electricity System Operator (IESO) is a not-for-profit, non-taxable corporation established pursuant to Part II of the *Electricity Act, 1998* (Act). As set out in the Act, the IESO operates pursuant to a licence (EI-2013-0066) granted by the Ontario Energy Board (OEB).

The IESO's mandate is contained in the Act and associated Ontario regulations.

The IESO ensures the reliability of the province's power system on behalf of all Ontarians, leveraging its expertise and purposeful engagement to advance energy policy that cost effectively achieves this goal. As part of its mandate, the IESO operates Ontario's electricity grid in real-time, governs electricity markets, prepares for the future to ensure electricity will be available when and where it is needed, and helps inform the decisions that will be critical to shaping the future of the sector.

Timing of Submission

The 2020-2022 Business Plan (Business Plan) underwent revisions during the planning cycle, impacting approval timing and allowing the IESO the flexibility to adapt the Business Plan to changes in the external environment. In response to the COVID-19 pandemic and the impacts on Ontario's electricity demand, the IESO revised its Business Plan to reduce its budgeted revenue requirement. The revised Business Plan was submitted to the Minister of Energy, Northern Development and Mines (Minister) on December 9, 2020 for approval. As per legislation, the IESO requires Ministerial approval of its Business Plan before it can file a revenue requirement submission with the OEB. The Minister approved the Business Plan on April 28, 2021.

Revenue Requirement and Fees

The Business Plan sets out the IESO's revenue requirement and capital spending needed to maintain its critical responsibilities over the three-year period. However, in light of the timing of the IESO's submission the IESO proposes a reduced 2020 revenue requirement of \$188.6 million.

1 The IESO is requesting to have the current OEB-approved 2020 interim usage fees of
2 \$1.227/MWh for domestic customers (including embedded generation) and \$1.0125/MWh for
3 export customers approved as final usage fees for the period January 1, 2020 to December 31,
4 2020.

5 In keeping with the IESO's commitment to delivering value through organizational efficiencies
6 and by investing in priority projects, the IESO proposes a return to pre-COVID-19 pandemic
7 funding levels for 2021 and a revenue requirement of \$191.8 million. The IESO proposes usage
8 fees of \$1.271/MWh for domestic customers (including embedded generation) and
9 \$1.0943/MWh for export customers effective January 1, 2021.

10 **Organizational Efficiency and Prioritization of Investments**

11 The IESO has maintained flat revenue requirement levels from 2017 to 2019 through prudent
12 investments in its priorities, while focusing on process enhancements, leveraging organizational
13 efficiencies and closely managing cost pressures. In response to the emergence of the
14 COVID-19 pandemic, the IESO revisited its Business Plan and reduced its 2020 revenue
15 requirement. This reduction was achieved while incurring one-time COVID-19 pandemic
16 expenses and continuing to implement the IESO's highest priority initiatives.

17 The IESO utilizes a project portfolio management process to evaluate capital projects' alignment
18 with the organization's strategic objectives and rank projects relative to each other to determine
19 priority and ensure resources are focused on critical work. Through this process, the IESO may
20 defer initiatives in recognition of organizational capacity and resource limits and to manage
21 budget impacts in the short term.

22 **Operations, Maintenance and Administration (OM&A) Expense**

23 The IESO's operating expenses are in support of work programs that ensure the reliability of the
24 province's power system, through the operation of Ontario's electricity grid in real time,
25 governance of the electricity markets, preparedness for the future availability of electricity when
26 and where it is needed, and helping inform decisions that will be critical to shape the future of
27 the sector.

1 The IESO has historically been able to maintain its expenses within inflation rates despite
2 staffing cost pressures from collective agreements and higher pension liabilities. In 2020, the
3 IESO managed to reduce spending by \$5.9 million compared to 2019 while continuing to deliver
4 on important system enhancements within the core operational project portfolio and Market
5 Renewal Program (MRP).

6 The main drivers for the reduced spending were the cancellation of the Incremental Capacity
7 Auction work-stream, non-repeatable 2019 expenditures, deferral of MRP external support for
8 market rule amendments, increased labour capitalization rates, higher overhead cost recovery
9 and other savings from lower litigation and consulting activity and from COVID-19 pandemic
10 impact to limited travel and in-person meetings. To offset the savings, there was incremental
11 spending related to the collective agreements, revisions to actuarial pension liability
12 assumptions and additional spending to ensure the safety of staff working on site.

13 The 2021 budgeted OM&A expenses represent an increase of \$3.9 million from the 2020 actual
14 expenses, mainly driven by the impact of collective agreement escalations and the impact of
15 work to enable a more competitive electricity marketplace and market rule and manual
16 amendments. These increases will mostly be offset through judicious management of
17 resources and labour capitalization (aligned to higher capital portfolio in accordance to IESO
18 capitalization practices), reduction of COVID-19 pandemic expenses, and an update of cost
19 allocation rates to reflect IESO's overhead cost reality. In addition, management will be limiting
20 other operating cost impacts by shifting more work in-house, absorbing incremental work with
21 existing staff, and reprioritizing and adjusting the timelines of discretionary projects that can be
22 deferred with minimal risk.

23 **Staffing Costs**

24 Over the past few years, the IESO's efforts to remain cost-effective in delivering its critical
25 responsibilities include absorbing inflationary costs, mostly related to compensation and
26 benefits, which are the IESO's single largest expense as an organization of knowledge workers.
27 The IESO is taking action to manage the overall growth rate of compensation and benefits.

1 The OEB's decision in EB-2019-0002 requires the IESO to report on actions taken towards
2 reaching the 50th percentile for total compensation. Since the 2019 Revenue Requirement
3 Submission, the IESO has continued to implement initiatives and safeguards to ensure
4 compensation, benefits and pension plans are cost effective and in line with the 50th percentile;
5 while continuing to ensure that it remains competitive in the recruitment and retention of its
6 employees.

7 **Capital Expenditures**

8 The IESO's business planning process establishes an appropriate capital envelope for core
9 operating initiatives with commitments approved individually on an ongoing basis. This practice
10 is consistent with prior years. The IESO's 2019 OEB approved capital expenditures for core
11 operations was \$17.3 million while the budget for MRP was \$26 million, for a total of
12 \$43.3 million. In 2019, the IESO's actual capital expenditures for core operations was
13 \$20.5 million and \$10.3 million for MRP totalling \$30.8 million.

14 The 2020 capital budget focus was directed toward refresh projects to replace or upgrade aging
15 systems and infrastructure, including carryover of in-flight projects from 2019. In 2020, the
16 IESO budgeted a \$25.6 million capital envelope to work on a number of priority projects under
17 the core IESO capital portfolio, however, a net new high priority project and slightly higher than
18 anticipated spending on other carry-over projects resulted in capital spending of \$27.0 million in
19 2020. In 2020 MRP capital spend was \$25.0 million, which was \$0.9 million lower than
20 planned. Spending was lower than planned due to the delayed onboarding of implementation
21 resources (including the IESO's external vendor for the Dispatch Scheduling Optimization (DSO)
22 tool development) and unused contingency.

23 The proposed capital budget for 2021 is \$32.6 million for core capital and \$36 million for MRP.
24 The core capital funding envelope represents an increase from 2020 to support projects
25 designed to enable a more competitive electricity marketplace and ensure system reliability.
26 For MRP, the funding is focused on the implementation phase of the project.

Forecast Variance and Deferral Account

In the OEB's decision (EB-2019-0002) on the IESO's 2019 Revenue Requirement Submission, the IESO received approval to retain an operating reserve of \$10 million. The OEB concluded that a period of stability was appropriate and ordered that the level of the operating reserve would not be reviewed again for five years unless there is a material change to the operations of the IESO.

The actual balance of the operating reserve is recorded in the Forecast Variance Deferral Account (FVDA). The 2020 opening balance of the FVDA was in a deficit position of \$1.0 million. The IESO is proposing a 2020 revenue requirement that would retain the 2020 operating surplus of \$2.3 million in the FVDA as an incremental first step towards the recovery of the IESO's operating reserve. An operating reserve recovery strategy will be further evaluated as part of the next business plan filing and subsequent revenue requirement submission.

Market Renewal Program

The MRP presents an opportunity to implement much needed reforms to the Ontario electricity market. The expected benefits will span the sector, enabling the IESO to realize significant operational improvements, reduce costs for market participants, address known inefficiencies, and establish a robust market to integrate emerging and new technologies. A financial assessment of the new market design has concluded that the program is financially viable, delivering \$800 million in net financial benefits to Ontario consumers over the first 10 years of implementation. The MRP business case estimates a cost to deliver the project, including contingency, within a range from \$151 million to \$194 million.

MRP has progressed into the implementation phase. This work will proceed with broad support across the organization and will include a significant complement of IT resources to support implementation while managing the inter-related nature of other significant IESO initiatives.

MRP activities funded through operating costs include market rule amendments and related stakeholder activities, change management planning and coordination, and updates to internal

- 1 and external manuals. The annual MRP costs from 2020-2022 are consistent with the business
- 2 case, with some adjustments in timing and dollars between years.

IESO STAKEHOLDER ENGAGEMENT

Stakeholder Engagement

Stakeholder input is essential to the IESO's decision-making process, and in May 2020 the IESO launched its new Stakeholder Engagement Framework (Framework) which is available publicly on the IESO web-site.¹ Stakeholders from all industry groups are encouraged to be part of the stakeholder engagement process, including but not limited to transmitters, distributors, generators, consumers, energy related businesses and emerging technologies. Representatives from First Nation and Métis communities, as well as regional and local municipalities are also encouraged to participate.

The Framework is aimed at enhancing the IESO's engagement process by:

- Providing greater certainty on the timing of engagement meetings allowing for enhanced preparedness and participation from stakeholders
- Supporting an understanding of linkages between initiatives
- Addressing concerns about stakeholder fatigue with fewer overall engagement meetings
- Supporting a foundation for more comprehensive and integrated updates for Stakeholder Advisory Committee (SAC) and the IESO Board of Directors

The Framework is built upon a meeting schedule of monthly designated engagement days with increased time to review materials in advance (2 weeks), along with extended feedback windows (minimum of 3 weeks). During the engagement days, topics are grouped together where possible to clarify linkages between initiatives and support information sharing.

In fall 2020, the Framework was further enhanced with the introduction of four new engagement categories based on how stakeholders interact with the IESO. The four categories are: forecasting and planning, resource acquisition, operations, and sector evolution. Each of these categories have a specific area of focus, and can be seen as being linked as a cycle to recognize how they all work together, as shown below.

¹ Link to IESO [Stakeholder Engagement Framework](#)

1 **Figure 1 – Engagement Framework Categories**



2

3 New monthly engagement updates have also been introduced to share the current status and
4 next steps on all the IESO's active engagements.

5 Initial feedback from stakeholders on the new format has been positive with 58 percent

6 indicating that the changes introduced by the Framework are much more/somewhat effective,
7 and 65 percent indicating the Framework adapted very well to the COVID-19 pandemic.

8 Overall, the majority (81 percent) of stakeholders report that their experience with IESO

9 engagement has met or exceeded expectations.² Additional improvements have already been

10 introduced based on stakeholder feedback including a public chat, video of presenters, and lists
11 of all registered attendees.

12 Engagement Process

13 The IESO has established a standard process across all of its active engagements so that

14 stakeholders are aware of what they can expect as part of the process, and know how and

² Link to [Stakeholder Advisory Committee, February 17, 2021, Agenda Item #5 – Stakeholder Survey Results](#)

when their feedback will be considered as part of this process. Steps included in this process are:

- launching a new engagement stream with a dedicated engagement page on the IESO website
- posting a draft engagement plan and schedule for stakeholder feedback
- posting meeting materials two weeks in advance of an engagement meeting
- providing notification of the meeting in the IESO's weekly Bulletin
- hosting the engagement meeting, and posting archives of online meetings
- providing three weeks for the submission of stakeholder feedback
- posting the submitted stakeholder feedback along with the IESO's response to the feedback

This process is documented for the current engagements listed below (as of May 2021) on their dedicated engagement webpage. Links are available to all of the IESO's current engagements on the active engagements webpage.³

Forecasting and Planning:

- Formalizing the Integrated Bulk System Planning Process
- Gas Phase-Out Impact Assessment
- Regional Planning – Northwest
- Regional Planning – Ottawa Area Sub-Region
- Regional Planning – Peel/Halton (GTA West)
- Regional Planning – Peterborough to Kingston
- Regional Planning – South Georgian Bay/Muskoka
- Regional Planning – Southern Huron Perth (Greater Bruce Huron)
- Regional Planning – Windsor Essex
- Transmission Losses

Resource Acquisition:

- Development of an IESO Competitive Transmission Procurement Process
- Enabling Resources

³ Link to IESO's [active engagements webpage](#)

- Hybrid Integration Project

- Resource Adequacy

Operations:

- Improving Accessibility of the Operating Reserve
- Improving Awareness of System Operating Conditions
- Market Renewal Program (MRP) - Detailed Design
- Market Renewal Program (MRP) - Implementation
- Options to Address Uninsured Liability Risk
- Transmission Rights Market Review
- Updates to IESO Monitoring Requirements: Phasor Data

Sector Evolution:

- Distributed Energy Resources Survey
- Energy Efficiency Opportunities for Grid-Connected First Nation Communities
- Innovation and Sector Evolution White Papers
- IESO York Region Non-Wires Alternatives Demonstration Project

In addition to collecting feedback through the individual active engagement streams, feedback was also sought from the IESO's Stakeholder Advisory Committee,⁴ which consists of representatives from distributors, generators, consumers, transmitters, energy related businesses and services and Ontario communities. Three SAC meetings were held in 2020 to collect feedback on key initiatives and the IESO's plans and priorities, including the IESO's Business Plan. At the August 2020 SAC meeting, members were taken through an update on the 2020-2022 Business Plan (Item #4), including the impacts related to COVID-19 pandemic. Key points of feedback included discussion about the corporate performance metrics and the five core strategies for 2021. This engagement follows the IESO's standard practice of having an annual discussion with SAC members, and the general public, about the IESO Business Plan and other strategic initiatives.

⁴ Link to IESO's [Stakeholder Advisory Committee](#)

1 First Nations and Métis Relations

2 The IESO has also made efforts to enhance its relationships with Indigenous peoples and in
3 capacity building in support of equitable participation in the electricity sector. The IESO
4 routinely undertakes extensive work with Indigenous communities to promote meaningful
5 outcomes and has introduced a new Corporate Indigenous Policy⁵ to affirm this work and
6 commit the organization to further actions. The IESO Corporate Indigenous Policy also commits
7 the IESO to moving towards a culture and workforce shift by incorporating company-wide
8 cultural and awareness training, increasing opportunities for Indigenous youth and better
9 integrating Indigenous businesses in IESO procurement opportunities. The policy aligns with
10 the IESO core strategy of advancing sector leadership and its commitment to an affordable and
11 reliable supply of electricity, by demonstrating IESO's leadership in community-led capacity
12 building in the Indigenous energy space.

13 Acting on Stakeholder Feedback

14 Stakeholder and community engagement is integral to the IESO's decision-making process and
15 the goal of the process is to provide individuals and organizations with the opportunity to
16 provide input and feedback about proposed decisions or changes that affect them. As such, the
17 IESO uses the perspectives brought forward in this process to inform its decision making.

18 In order to incorporate stakeholder feedback as early as possible in the engagement process,
19 the IESO recently introduced a forward-looking schedule to the Stakeholder Advisory
20 Committee⁶ engagement updates, as well as the engagement updates⁷ posted as part of the
21 monthly engagement days. Information is provided on the anticipated launch and timing for
22 new and upcoming engagements so that early input from stakeholders can help plan and
23 prioritize IESO's engagements.

24 As noted previously, part of the standard engagement process is to post submitted stakeholder
25 feedback along with the IESO's response to the feedback and how it will be used to inform

⁵ Link to IESO's [Corporate Indigenous Policy](#)

⁶ Link to IESO's [Stakeholder Advisory Committee](#)

⁷ Link to IESO's [engagement updates](#)

1 decision making. This information is shared in the "IESO Response to Feedback" documents
2 found on the various engagement webpages, including those linked above.

3 To illustrate how the IESO has incorporated stakeholder feedback in its decision-making, three
4 recent examples are provided below.

5 *1. Resource Adequacy*

6 The IESO remains committed to transitioning to the use of competitive mechanisms to meet
7 Ontario's resource adequacy needs and understands that stakeholder input is critical to inform
8 this transition. Engagement on the Incremental Capacity Auction⁸ (ICA) High-Level Design, and
9 discussions with stakeholders identified some key feedback themes that informed the IESO's
10 development of a draft, high-level Resource Adequacy (RA) framework as a starting point for the
11 Resource Adequacy engagement.⁹ The ICA work stream was cancelled in 2019 and
12 engagement transitioned to the RA engagement. The draft, high-level Resource Adequacy
13 framework was developed based on the following key feedback themes that emerged through
14 these discussions with stakeholders:

- 15 • Recognition that a "one-size-fits-all" approach won't be sufficient to balance supplier,
16 ratepayer and system operator risks and cost-effectively meet all of our needs
- 17 • Different resource types have different risks, requirements and timelines for
18 development that should be considered
- 19 • Different tools are better suited to different resource types
- 20 • Some resources are not suited to competitive acquisition mechanisms
- 21 • System planning forecasts will have to align with resource adequacy strategy, and
- 22 • Increased risk in Ontario markets due to regulatory and political uncertainty

23 The draft, high-level Resource Adequacy framework proposed that resource adequacy needs
24 should be planned and acquired in three timeframes - the short, mid and long term, using
25 different acquisition mechanisms for each timeframe. Through stakeholder feedback received
26 through the Resource Adequacy engagement, stakeholders indicated their support for the draft,
27 high-level framework leading to approval of the high-level framework by the IESO Board of

⁸ Link to IESO's [Incremental Capacity Auction](#)

⁹ Link to IESO's [Resource Adequacy engagement](#)

1 Directors in December 2020. The IESO is continuing to engage with stakeholders on a regular
2 basis on how the framework will be further developed and operationalized.

3 *2. Energy Efficiency Auction Pilot*

4 A number of adjustments and revisions were made to the Energy Efficiency Auction Pilot¹⁰
5 (EEAP) in response to stakeholder feedback. Key modifications included:

- 6 • changing the auction date from September 2019 to March 2021 (for delivery starting in
7 winter 2022 and summer 2023),
- 8 • amending the meter data requirements subject to resources having appropriate
9 alternative Measurement & Verification arrangements, and
- 10 • changing the language in the detailed design document that excluded “technically
11 dispatchable” measures from the EEAP and updating restrictions on participating in both
12 the EEAP and Capacity Auction to clarify/modify this language and remove these
13 restrictions on measure and participant eligibility.

14 The Final Engagement Summary Report was posted on February 17, 2021. This report details
15 the eight adjustments and revisions made in response to stakeholder feedback received in
16 Phase 1 of the engagement, and an additional eight adjustments and revisions made in
17 response to stakeholder feedback received in Phase 2 of the engagement.

18 *3. Market Renewal Project (MRP) – Detailed Design*

19 As part of the MRP Detailed Design engagement,¹¹ stakeholders submitted 843 comments and
20 questions to the IESO on the 14 MRP detailed design documents. This feedback, and the
21 IESO’s responses are documented on the engagement page. Where stakeholders requested
22 changes to the design, the IESO has accepted or partially accepted 63 per cent of requests.
23 Examples include:

- 24 • Adjusted conduct and impact test thresholds for Market Power Mitigation
- 25 • New Independent Review Process for reference levels
- 26 • Revisions to new hydro dispatch data parameters
- 27 • Greater flexibility in how pseudo-units provide energy and operating reserve
- 28 • New exceptions to the availability declaration envelope

¹⁰ Link to IESO’s [Energy Efficiency Auction Pilot](#)

¹¹ Link to IESO’s [MRP Detailed Design engagement](#)

- 1 • Modified timing of mitigation processes, and
- 2 • Additional reporting of market data

3 The IESO has also posted a Design Change tracker to point out all of the areas that stakeholder
4 input has improved and updated the detailed design and included a list of the considerations
5 being brought forward to be addressed in the implementation phase. The Detailed Design
6 phase is now complete, and the next stage of stakeholder engagement carries on through the
7 Implementation phase, with the review of Market Manuals and Market Rules, among other
8 engagement opportunities.

9 Through the engagement activities described above, individuals and organizations have the
10 opportunity to provide input and feedback about proposed decisions or changes that affect
11 them. This input is integral to the decision-making process and has helped to inform the work
12 of the IESO.

ORGANIZATIONAL EFFICIENCY AND PRIORITIZATION OF INVESTMENTS

Overview

The IESO continuously strives to maintain the high levels of performance necessary to deliver on its core responsibilities, as well as execute key strategies, including ensuring cost-effective system reliability, enabling competition, driving business transformation, advancing sector leadership and preparing for the future of the sector.

The IESO has maintained flat revenue requirement levels from 2017-2019 through prudent investments in its priorities, while focusing on process enhancements, leveraging organizational efficiencies and closely managing cost pressures. In response to the emergence of the COVID-19 pandemic, the IESO revisited its 2020-2022 Business Plan in light of impacts on Ontario's electricity demand and reduced its revenue requirement. This reduction was achieved while incurring one-time COVID-19 pandemic expenses and continuing to implement the IESO's highest priority initiatives. In 2021, the IESO proposes a return to pre-COVID-19 pandemic funding levels (representing a 0.2% compound annual growth rate increase compared to 2019 levels). See Exhibit C-1-1 – Revenue Requirement and Usage Fee Methodology.

Organizational Efficiency

Since 2017, the IESO has maintained performance on the majority of metrics specified within the Regulatory Scorecard (Exhibit G-2-3) while both maintaining a flat revenue requirement and absorbing inflationary costs (see Exhibit D-1-1 – OMA Overview), mostly related to compensation and benefits, the IESO's single largest expense as an organization of knowledge workers. The IESO is also taking action to manage the overall growth rate of compensation and benefits (see Exhibit D-1-3 – Staffing and Compensation).

The IESO has taken steps to improve organizational efficiency by shifting more work in-house, and absorbing new incremental work with existing staff (see Exhibit D-1-3). The IESO also limited the overall impact to compensation and benefits costs by managing vacancies and temporary positions. The IESO has also started an assessment of office space needs in response to the COVID-19 pandemic impact, which has the potential to allow the IESO to

reconfigure and reduce overall office footprint by exploring a hybrid working model for returning to the office.

Performance Measurement

The IESO has developed a new five-year strategic measures and targets monitoring framework to ensure ongoing performance is tracked and aligned to the priorities of the organization. This new approach will allow better measurement of the IESO's performance with regard to service delivery and meeting the needs and expectations of stakeholders over time.

This approach is transitional for the organization and represents an advancement in the maturity of the IESO's performance management. The measures are intended to support monitoring of performance toward the five-year strategic objectives. Going forward, the IESO will track annual performance against targets, as well as continually assess the measures to ensure they drive performance and track progress against strategic objectives. This approach provides for an expanded view of measuring and monitoring performance not just within the IESO but on a broader sector scale, in the context of supporting advice to the market and in our stakeholder engagements. This change is expected to have significant advantages for aligning behaviours and driving actions for desirable long-term performance outcomes. The measures are listed in Attachment 1 - Five-Year Performance Measures and Targets to this exhibit.

Prioritization of Investments

The IESO utilizes a project portfolio management process in order to evaluate capital projects alignment with the organization's strategic objectives and rank projects relative to each other to determine priority and ensure resources are focused on critical work (see Exhibit E-1-2 – Capital Expenditures and Planning Process Overview). Through this process, the IESO may defer initiatives in recognition of organizational capacity and resource limits and to manage budget impacts in the short term. In response to the COVID-19 pandemic, the IESO deferred a number of lower priority projects. Despite the operational challenges associated with the COVID-19 pandemic, and in-part due to the prioritization of resources discussed above, the IESO was able to maintain progress and continue to deliver on a number of priority projects in 2020 (see Exhibit E-1-2, Attachment 1 - Appendix 2-AA - Capital Projects).

1 Outside of the project portfolio management process for capital projects, the IESO was also
2 able to deliver on other priority work linked to the achievement of strategic objectives (see
3 Exhibit D-1-2 - OMA Work Program Detail).

4 While the IESO's efforts to prioritize investments did allow for the management of costs while
5 continuing to deliver core responsibilities and priority initiatives, this approach also came with
6 impacts. Impacts included: slower delivery of discretionary initiatives (with potential
7 reputational and stakeholder risks from not moving forward on these initiatives as quickly as
8 stakeholders would like) as well as creating a backlog of work that will need to be completed in
9 future years.

IESO Five Year Performance Measures & Targets

For the Strategic Planning Period: 2021 - 2025

Internal Measures (Page 1)

5-Year Strategic Objectives	5-Year Measure	5-Year Strategic Outcome (Strategic Achievement Defined)	2021	2022	2023	2024	2025
Culture & Workforce Transformation Align culture, mindset, skills and capabilities to deliver on strategy	1. Employee engagement - Commitment to the execution of enterprise priorities	Annual employee pulse survey results for specific initiatives reflect noticeable differences for employees (baseline established by previous survey) and sustain a 4% incremental achievement.	4%	4%	4%	4%	4%
Culture & Workforce Transformation Align culture, mindset, skills and capabilities to deliver on strategy	2. Organizational Agility - Openness to Change	Employee feedback on the Openness to Change scale from the annual survey improves each year to a result of 65%.	63%	65%	67%	69%	71%
Culture & Workforce Transformation Align culture, mindset, skills and capabilities to deliver on strategy	3. Operational Efficiency - Percentage of Strategic Initiatives that are completed on time	90% of Strategic Initiatives are completed on time (i.e. within 50% of assigned schedule contingency) as established by the internal IESO Integrated Project Plan and Project Charter. Strategic Initiatives are a newly defined measure attribute, therefore 2021 will be the first time this is being measured.	80%	80%	85%	90%	90%

Internal Measures (Page 2)

5-Year Strategic Objectives	5-Year Measure	5-Year Strategic Outcome (Strategic Achievement Defined)	2021	2022	2023	2024	2025
Stakeholder Trust Enhance stakeholders' trust in IESO to operate in best interests of Ontario	4. Stakeholder Satisfaction – Engagement process	A 5-year target of 84% is achieved and indicates a year-over-year improvement in stakeholder's confidence in the process that the IESO uses to arrive at decisions.	80%	80%	82%	83%	84%

Internal Measures (Page 3)

5-Year Strategic Objectives	5-Year Measure	5-Year Strategic Outcome (Strategic Achievement Defined)	2021	2022	2023	2024	2025
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	5. Cost Effectiveness – Forecast accuracy	Performance target is to have annual forecast error within +/- 2.5% (actual vs. forecast).	+/- 2.25%	+/- 2.25%	+/- 2.25%	+/- 2.25%	+/- 2.25%
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	6. Cost Effectiveness – Resource balance: Energy Curtailments to total production	10% outcome improvement is desired to 'right size' the system and achieve resource adequacy and effectiveness of meeting energy and ancillary services needs for Ontario.	1.76%	1.72%	1.69%	1.65%	1.62%
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	7. Cost Effectiveness – Resource balance: annual energy / operating reserve shortage frequency	10% outcome improvement is desired to 'right size' the system and achieve resource adequacy and effectiveness of meeting energy and ancillary services needs for Ontario.	0.049%	0.048%	0.047%	0.046%	0.045%

External Measures (Page 4)

5-Year Strategic Objectives	5-Year Measure	5-Year Strategic Outcome (Strategic Achievement Defined)	2021	2022	2023	2024	2025
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	8. Reliability – Number of forced outages to resources above 250 MW and the length of time they are out	The performance of the thermal resource fleet, as calculated by the probability that a generating unit will not be available when required due to forced outages and forced de-ratings, is targeted to be below 9.2%. The 9.2% represents 2 standard deviations from the 5-year historical baseline average.	<9.2%	<9.2%	<9.2%	<9.2%	<9.2%

External Measures (Page 5)

5-Year Strategic Objectives	5-Year Measure	5-Year Strategic Outcome (Strategic Achievement Defined)	2021	2022	2023	2024	2025
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	9. Reliability – Number of extended forced outages to transmission facilities above 230 kV and length of time they are out	The performance of Bulk transmission system performance based on forced outages and extensions to outages over 4 hours in duration to significant transmission elements is below 334 which is the five year historical high.	<334	<334	<334	<334	<334
Affordability, Reliability, Sustainability Deliver optimized balance to ensure best overall electricity outcomes for Ontario	10. Market Efficiency – Market cost/revenue transparency index	The transparency index increases by 1% and represents the proportion of revenues received by suppliers (or payments from consumers) for electricity in the wholesale market to the total costs of supplying the electricity. Performance improves as market revenues increase and non-market uplifts shrink.	19.2%	19.4%	19.6%	19.8%	20%



December 9, 2020

The Honourable Greg Rickford
Minister of Energy, Northern Development and Mines
99 Wellesley St. W., Room 5630
Toronto, ON M7A 1W1

Independent Electricity System Operator

1600-120 Adelaide Street West
Toronto, ON M5H 1T1
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The Honourable Bill Walker
Associate Minister of Energy
77 Grenville St., 10th Floor
Toronto, ON M7A 2C1

Dear Minister Rickford and Associate Minister Walker:

I am pleased to submit to you the IESO's updated 2020-2022 Business Plan (the Business Plan). Following my appointment to the role of Interim President and CEO, I initiated a review of the Business Plan to ensure it appropriately reflects the cost challenges facing Ontario's ratepayers and the IESO, particularly through the COVID-19 pandemic.

After completing my review, I am confident that the Business Plan appropriately reflects these challenges. As part of this plan, I am deferring the recovery of the IESO's depleted operating reserves. The IESO will focus its funding toward initiatives that provide value for ratepayers today rather than address future uncertainty for the IESO. While not having operating reserve funds does introduce some risks to the IESO, I am confident in the organization's ability to manage any operational challenges that may arise.

The Business Plan will reflect a total revenue requirement of \$189.6M, \$191.8M, and \$193.7M in years 2020, 2021, and 2022 respectively or a 1.4% increase in funding over the three-years when compared to 2019. As of the date of this letter, the IESO is on track to spend towards our forecasted revenue requirement of \$189.6M in 2020.

Cost increases have been contained to 1.4% by deferring lower priority projects, reducing temporary staff, and reducing the use of consultants by moving more work in-house utilizing existing resources. This decision was made recognizing that it will potentially decrease the pace of some of the IESO's initiatives. While deferring the recovery of the IESO's operating reserves will help mitigate some of this risk, some residual risk remains which we will monitor and mitigate as appropriate. This plan ensures that the IESO is able to carry out its core responsibility of maintaining a reliable electricity system while striking the right balance between

the burden placed on today's ratepayers and the need to make investments to create a more efficient system for future ratepayers.

Please do not hesitate to contact me should you wish to discuss further.

Regards,

A handwritten signature in black ink, appearing to read 'Terry Young', with a stylized flourish at the end.

Terry Young
Interim President and Chief Executive Officer
Independent Electricity System Operator

Cc: Aaron Silver, Chief of Staff to the Hon. Greg Rickford, Minister of Energy, Northern Development and Mines
Dominic Roszac, Chief of Staff to the Hon. Bill Walker, Associate Minister of Energy
Stephen Rhodes, Deputy Minister of Energy, Northern Development and Mines
The Hon. Joe Oliver, Chair, Independent Electricity System Operator

Business Plan 2020-2022

Independent Electricity System Operator

DECEMBER 9, 2020



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- 13** Appendix 2: Enterprise Risk Management
- 14** Appendix 3: Capital Spending

Letter from the Interim President & CEO

Over the past few years, our efforts to maintain a cost-effective and reliable electricity system have been shaped, in part, by electricity sector transformation – more resources, new business models, emerging technology, and demands for more choice in how we produce and consume electricity.

In 2020, the emergence of COVID-19 added another layer of complexity to operating the grid, reminding us how factors outside the sector can have a significant impact on Ontario's electricity system. As the province continues to recover in the months and years ahead, ensuring Ontario residents and businesses receive reliable and affordable electricity will be especially important. It is within this context that the IESO presents its 2020-2022 Business Plan.

This plan lays out how we will deliver on our core strategic priorities, sets out the initiatives and investments that are integral to achieving them, articulates the risks that inform our decision-making and establishes the performance measures that will demonstrate our success.

Looking ahead, Ontario's electricity system is well-positioned for the future, with enough existing and available resources to meet electricity demand until the mid-2020s. Over the course of the planning period, enhancements to our bulk and regional planning processes, planning and reliability tools, and cybersecurity sector services will play an important role in ensuring cost-effective and risk-adjusted grid reliability in real-time and longer term.

To help ensure electricity is affordable, enabling greater competition in our electricity markets will continue to be a priority. In Q3 2020, we began engaging with stakeholders on the development of a strategy for the competitive acquisition of resources to meet short-, medium- and long-term electricity system capacity needs, recognizing that not all resources can participate in our annual capacity auction. To further competition, we will build on a previous scoping and assessment exercise to enable the participation of several resource types such as storage, hybrid facilities, demand response and distributed energy resources and intertie transactions to deliver capacity into the real-time energy market.

With greater uncertainty and ongoing sector transformation, the IESO is continuing to make innovation a priority by leading or supporting initiatives that can increase the reliability or cost-effectiveness of the electricity system. This will include addressing calls for greater community choice and alternatives to traditional transmission infrastructure by testing whether using distributed energy resources can help meet fast-growing needs and drive down costs in the province's York Region. Another priority is Windsor Essex, where electricity demand is expected to double over the next five years as a result of the expected growth in the greenhouse industry. Working with greenhouse growers and others, the IESO is supporting a number of initiatives that will help improve capacity in the area.

Whether ensuring reliability or enabling competition to reduce costs, working with stakeholders and communities across the province will become even more important to helping us meet the challenges associated with ongoing disruption. Bringing together these different perspectives helps lead to better outcomes. Recognizing this, in 2020 we introduced a new framework to make it easier for stakeholders to engage with us. Over the course of this planning cycle, we will use our early experiences to evolve this new streamlined approach to stakeholder engagement.

In preparing for the future, our recent experiences with COVID-19 and working from home underline the need to sharpen our focus on reducing our own costs, and on developing a flexible workforce strategy. Positioning the IESO to meet the challenges ahead involves developing a more cohesive and inclusive culture, and a more agile and engaged workforce – and building new capabilities that will drive performance, now and in the years ahead. The latter includes harnessing the value of internal data to improve fact-based decision-making for both the IESO and our market participants and stakeholders.

The 2020-2022 Business Plan sets out the IESO revenue requirement and capital spending needed to maintain our critical responsibilities over the three-year period. The move to a three-year cycle, which is consistent with the practice of other regulated entities in the Ontario electricity sector, will reduce costs associated with an annual filing. Updates to this plan will be submitted on an annual basis to account for required deviations from established program parameters, timelines or funding envelopes.

With our commitment to delivering value through organizational efficiencies and by investing in priority projects, the IESO maintained flat revenue requirement levels from 2017-2019. In early 2020, in response to the emergence of COVID-19, the IESO reduced its revenue requirement inclusive of one-time pandemic-related expenses. The IESO proposes a return to pre-COVID-19 funding levels for 2021 and a 1.4% increase in funding over the three years when compared to 2019.

Funding for capital projects to facilitate the delivery of the tools, technology and programs that are required to achieve our strategic objectives, including cybersecurity enhancements and the multi-year Market Renewal – Energy project, will be \$51.5 million in 2020, \$77.2 million in 2021 and \$67.6 million in 2022.

As the province continues to recover from the effects of the pandemic, the IESO remains committed to ensuring Ontarians benefit from a reliable, affordable and sustainable electricity system.

A handwritten signature in black ink, appearing to read 'Terry Young', with a stylized flourish at the end.

Terry Young
Interim President and Chief Executive Officer

About the IESO

Every minute of every day, the Independent Electricity System Operator ensures the reliability and efficiency of the province's electricity system, providing Ontarians with the power they need when they need it – and at the lowest cost.

We do this by balancing supply and demand for electricity on a second-by-second basis, governing Ontario's electricity markets to ensure fair and open access to the grid, and preparing for the future by undertaking comprehensive and transparent planning. Given the scope of our mandate and the far-reaching implications of our decisions, engagement to inform – and be informed – remains central to everything we do. It's why we are committed to sharing our expertise, data and insights and why consulting with stakeholders – whether market participants, municipalities, or policy-makers – is so fundamental both to advancing our work and influencing the evolution of the energy sector.

The IESO is guided by the following core strategies:

- Ensure cost-effective reliability
- Enable competition
- Advance sector leadership
- Drive business transformation
- Prepare for the sector of the future

At a Glance: Priority Initiatives

The 2020-2022 Business Plan will help support the following priority initiatives, among others.

- **Driving business transformation** across the enterprise by investing in initiatives that will increase organizational agility and performance, and prepare the IESO – and our people – to meet the challenges associated with ongoing disruption in the electricity sector. This work will be guided by a three-year HR strategic roadmap and include continued support for the development of people leaders, and a culture built on shared values.
- **Establishing a resource adequacy framework** that, in developing competitive mechanisms to meet future capacity needs in the short, medium and long term, will better balance ratepayer and supplier risks, improve planning certainty, and drive down costs. An engagement was launched in Q3 2020 and will continue into 2021.
- **Enabling resources** to participate more fully in the IESO-administered markets. This will help ensure that resources like energy storage and distributed energy resources are able to compete to deliver power system reliability services in a cost-efficient manner. In addition to ongoing efforts, a work plan will be released in Q1 2021 and lead to subsequent stakeholder engagements.
- **Upgrading or replacing the information systems** that we rely on to help ensure grid reliability and performance, as well as administer the more than \$18 billion marketplace and meet changing settlement requirements. This includes a five-year project to replace the IESO's settlement system, with the first two phases slated for completion in 2022.
- **Planning for the future** to enhance transparency and help market participants make more informed decisions, while **evolving our bulk and regional planning processes** to increase effectiveness and accommodate ongoing change.
- **Building a data excellence program** that will increase our data and analytics maturity level and help us deliver new operational efficiencies and insights. This includes implementation of a data management and analytics framework that is underway and expected to continue into 2022.
- **Maintaining strong cyber security partnerships** with industry leaders, including through the IESO's cyber security situational awareness and information-sharing service. As part of our multifaceted approach to tackling cyber security, we will also continue to **enhance threat detection and response** by investing in advanced technology to elevate our security posture.

Financial Overview

The 2020-2022 Business Plan provides an overview of the resources required to maintain the high levels of performance necessary for the IESO to deliver on its core responsibilities, as well as to execute key strategies, including ensuring cost-effective system reliability, enabling competition, driving business transformation, advancing sector leadership and preparing for the future of the sector. The IESO has maintained flat revenue requirement levels from 2017-2019 through prudent investments in its priorities, while focusing on process enhancements, leveraging organizational efficiencies and closely managing cost pressures.

In early 2020, in response to the emergence of COVID-19, the IESO revisited its business plan in light of evolving system needs and reduced its revenue requirement to \$189.6 million. The Business Plan includes a total revenue requirement of \$191.8 million and \$193.7 million in 2021 and 2022, representing a 1.4% increase from 2019 to 2022.

In 2020, the IESO managed COVID-19-related impacts, including one-time expenses as pandemic plans were executed to ensure the safety of staff working on-site to support grid operations and the reliability of the electricity system. The IESO took steps to prioritize new projects and initiatives to manage costs, while continuing to deliver on important system enhancements within the Market Renewal – Energy project (MRP) and other multi-year projects.

Cost drivers in 2021 include the impact of deferring 2020 projects, and work to enable a more competitive electricity marketplace and market rule and manual amendments; these will mostly be offset through judicious management of resources, process efficiencies and re-engineering how the IESO delivers on its core mandate. Cost increases in 2022 resulting from higher pension liabilities, and continuation of market-related projects, will be partially offset by savings as the IESO reconfigures its overall footprint, and seeks further operating efficiencies within the 2020-2022 planning period.

The IESO remains committed to enabling a more competitive electricity marketplace, through the delivery of the capacity auction in 2020, working with its stakeholders to develop a competitive resource acquisition strategy for short-, medium- and long-term capacity needs and by enabling more resources to participate. Internally, the IESO will drive business transformation by implementing a workplace strategy aimed at enhancing its culture and people practices to accelerate performance, and by establishing a technology and data roadmap to enable better analytics, achieve new efficiencies and deliver value to the sector.

As part of its mandate, the IESO operates several programs that are funded from other sources and are not included in this business plan: the smart metering entity, market rule enforcement and education, and energy-efficiency programs.

For 2020, the IESO anticipates an average of 779 full-time employees to deliver on core electricity system responsibilities, as well as to support the Market Renewal – Energy project. After rigorous review, staffing levels will remain relatively flat over the planning period, with a few strategic positions added to support key initiatives.

Detailed Financials

The following table outlines 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)

(\$ Millions)	2019 Actual	2020 Budget	2021 Budget	2022 Budget
Revenue				
IESO Usage Fee	191.0	189.6	191.8	193.7
Total Revenue	191.0	189.6	191.8	193.7
Expenses				
Compensation & Benefits	117.5	122.4	122.6	126.8
Professional & Consulting Fees	15.4	13.3	12.9	12.9
Operating & Administration	35.7	34.5	36.0	34.2
Capacity Market Design	-	0.9	-	-
Operating Expenses	168.6	171.1	171.5	173.9
Amortization	19.1	19.7	19.2	19.1
Net Interest	(9.0)	(3.3)	(2.5)	(3.5)
Total Core Operations	178.7	187.5	188.2	189.5
Market Renewal - Energy	3.1	2.1	3.6	4.2
Market Renewal - Capacity (ICA)	5.5	-	-	-
Total Expenses	187.3	189.6	191.8	193.7
Operating Surplus/(Deficit)	3.7	-	-	-

Capital

The IESO regularly prioritizes capital initiatives. The business planning process establishes an appropriate capital envelope for core operating initiatives with commitments approved individually on an ongoing basis. This practice is consistent with prior years. The capital implementation stage of the Market Renewal – Energy project (MRP), which began in 2018, will continue through the planning period.

The 2020 capital focus is directed toward refresh projects to replace or upgrade aging systems and infrastructure, including carryover of in-flight projects from 2019. The increase in capital funding in 2021 will support projects – such as Wide Area Visualization Environment, Market Analysis and Simulation Toolset, and Data Warehouse – to ensure system reliability and enable a more competitive electricity marketplace.

The Market Renewal – Energy project business case was approved in 2019, and the table below includes the forecasted spend for 2020 and business case budgets for 2021 and 2022, as well as a summary of the total capital spending required in this plan. Project details and associated descriptions are included in Appendix 3.

Capital (\$ Millions)	2019 Actual	2020 Budget	2021 Budget	2022 Budget
Core Operations Initiatives	20.6	25.6	32.6	30.0
Market Renewal – Energy	10.3	25.9	44.6	37.6
Total Capital Envelope	30.9	51.5	77.2	67.6

Staffing

In 2020, 709 full time positions support the IESO’s core initiatives. Staffing levels in 2021 and 2022 (713 and 716 employees respectively) are required to support new initiatives to enable resources, and the reallocation of previously externally funded staff back to core operations. In 2020, 70 employees will be required to enable Market Renewal – Energy market design and implementation; this number will increase slightly in 2021 and 2022 to support market rule amendments and documentation work.

The 2019 decision to cease the incremental capacity auction (ICA) work under the Market Renewal Program resulted in no further related hires, with existing staff being redeployed to capacity market design, the MRP energy work stream and the IESO’s core operations.

Average FTEs

Full Time Equivalents (FTEs)	2019 Actual	2020 Budget	2021 Budget	2022 Budget
Core Operations	689	709	713	716
Market Renewal – Energy	49	70	81	81
Market Renewal – Capacity (ICA)	31	-	-	-
Total FTEs	769	779	794	797

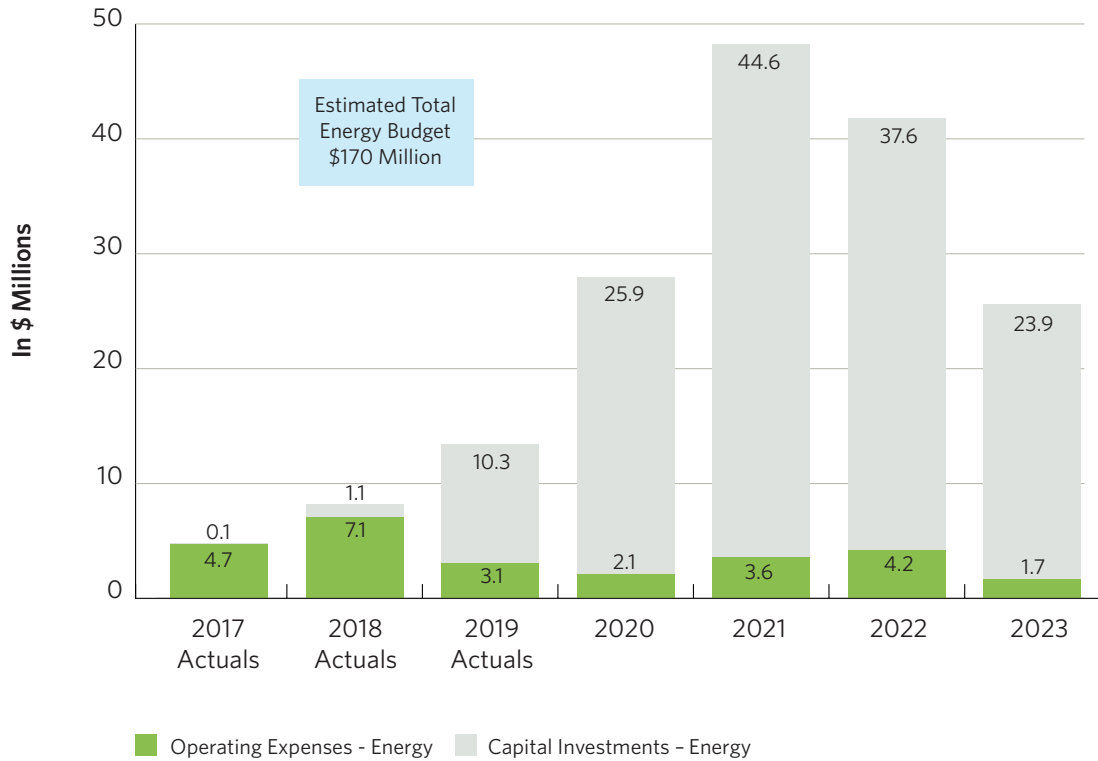
Market Renewal Financials

Market Renewal will continue with the delivery of the energy work stream during this business planning period. The current cost estimate, which includes the delivery of the energy work stream, and the cost of the capacity work stream up until the end of 2019, is approximately \$192 million.

Market Renewal – Energy Business Case Approval

The business case for the Market Renewal – Energy work stream was approved by the IESO Board on October 23, 2019. The estimated cost to deliver the project, including contingency, ranges from \$151 million to \$194 million. The business plan financials reflect the mid-range number of \$170 million.

Market Renewal – Energy Business Case Financials



Market Renewal – Energy Funding Update

Market Renewal will continue the detailed design and implementation phases of the energy work stream, which are classified as capital spending. This work will proceed with broad support across the organization and will include a significant complement of IT resources to support implementation of the energy deliverables, while managing the inter-related nature of other significant IESO initiatives. Market Renewal activities funded through operating costs include market rule amendments and related stakeholder activities, change management planning and coordination, and updates to internal and external manuals.

Market Renewal Financial Summary

(\$ Millions)	2019 Actual	2020 Budget	2021 Budget	2022 Budget
Market Renewal Program – Operating				
Market Renewal – Energy	3.1	2.1	3.6	4.2
Market Renewal – Capacity (ICA)	5.5	-	-	-
Total Operating Expenses	8.6	2.1	3.6	4.2
Total Capital Expenses	10.3	25.9	44.6	37.6

The annual Market Renewal – Energy project costs from 2020-2022 are consistent with the business case, with some adjustments in timing and dollars between years.

Appendix 1: IESO Performance Management – Measures and Targets

In tandem with its updated strategic plan, the IESO developed a five-year strategic measures and targets monitoring framework to ensure ongoing alignment to the priorities of the organization. This approach is transitional for the organization and represents an advancement in the maturity of the IESO's Performance Management. The measures are intended to support monitoring of performance toward the five-year strategic objectives. Going forward, the IESO will track annual performance against targets, as well as continually assess the measures to ensure they drive performance and track progress against strategic objectives.

This approach provides for an expanded view of measuring and monitoring performance not just within the IESO but on a broader sector scale, in the context of supporting advice to the market and in our stakeholder engagements. This change is expected to have significant advantages for aligning behaviours and driving actions for desirable long-term performance outcomes. The framework guides our efforts to ensure that the measurements and targets developed are relevant to the business context and aligned with the IESO's strategic objectives.

Five-Year Strategic Objectives	Metrics	Five-Year Targets	What the Measure Means	Link to Strategic Objective
Culture & Workforce Transformation	1. Employee Engagement Commitment to the execution of enterprise priorities	<ul style="list-style-type: none"> 4% annual increase from baseline as established by previous employee survey 	<ul style="list-style-type: none"> The IESO's workforce is increasingly committed to the goals of the organization, as demonstrated by improved annual survey results from the baseline. 	<ul style="list-style-type: none"> The five-year strategic objective is to align culture, mindset, skills and capabilities to deliver on strategy. Having a highly engaged workforce will be a critical differentiator in achieving this objective.
	2. Organizational Agility Openness to Change	<ul style="list-style-type: none"> 65% positive employee feedback on the Openness to Change scale on employee survey 	<ul style="list-style-type: none"> Employees are aware of the rationale for change and view it positively. Survey results will confirm if overall employee feedback is above target on the measurement scale. 	<ul style="list-style-type: none"> Openness to change is a core value of the organization and is seen as critical to responding to and achieving culture and workforce transformation.
	3. Operational Efficiency Percentage of Strategic Initiatives that are completed on time	<ul style="list-style-type: none"> 90% of Strategic Initiatives are completed within timelines established by the Integrated Project Plan and Project Charter 	<ul style="list-style-type: none"> Demonstrates a commitment and accountability to cost efficiency, and signals that we are using our workforce effectively in pursuit of objectives. 	<ul style="list-style-type: none"> To be able to deliver on strategy, we need to demonstrate that Strategic Initiatives are completed on time.
Stakeholder Trust	4. Stakeholder Satisfaction Engagement process	<ul style="list-style-type: none"> By 2023, 84% of stakeholders indicate the IESO's engagement meets or exceeds their expectations 	<ul style="list-style-type: none"> The IESO effectively educates and involves stakeholders in its activities and decisions. Positive responses indicate stakeholders' experience with the IESO's engagement process is building long-term trust. 	<ul style="list-style-type: none"> This measure links to enhancing stakeholders' trust in the IESO to operate in the best interests of Ontario.
Affordability, Reliability, Sustainability	5. Cost-Effectiveness Forecast accuracy	<ul style="list-style-type: none"> Annual forecast error within +/- 2.5% (actual vs. forecast) 	<ul style="list-style-type: none"> As load forecasting affects resource commitment, load forecast accuracy impacts commitment costs. The more accurate a forecasting load, the greater the likelihood the IESO can commit sufficient resources in a cost-effective manner that avoids over-commitment of resources, inefficient commitment of short lead time resources, and under-utilization of available resources. 	<ul style="list-style-type: none"> Having accurate short-term forecasts and performing consistently within a range shows how the IESO is promoting reliability by effectively planning loads and driving affordability through effective resource utilization. Optimizes balance to ensure best overall electricity outcomes for Ontario.

Affordability, Reliability, Sustainability	6. Cost-Effectiveness Resource balance: energy curtailments to total production	<ul style="list-style-type: none"> 10% outcome improvement to "right size" the system 	<ul style="list-style-type: none"> This measure is intended to drive performance toward "right sizing" the system and achieving resource adequacy goals by effectively meeting energy and ancillary services needs. 	<ul style="list-style-type: none"> Optimizes balance to ensure best overall electricity outcomes for Ontario.
	7. Cost-Effectiveness Resource balance: annual energy/operating reserve shortage frequency			
	8. Reliability Number of forced outages to resources above 250 MW and the length of time they are out	<ul style="list-style-type: none"> Below 9.2% (the figure that represents two standard deviations from the five-year historical baseline average) 	<ul style="list-style-type: none"> Measures bulk transmission system performance beyond four hours in duration. The performance of the thermal resource fleet as calculated by the probability that a generating unit will not be available when required due to forced outages and forced de-ratings. 	
	9. Reliability Number of extended forced outages to transmission facilities above 230 kV and length of time they are out	<ul style="list-style-type: none"> Below 334 total annualized outages 	<ul style="list-style-type: none"> Measures bulk transmission system performance based on forced outages and extensions to outages over four hours in duration to significant transmission elements (below 334 which is the five-year historical high). 	
	10. Market Efficiency Market cost/revenue transparency index	<ul style="list-style-type: none"> Improve index by 1% by 2024 	<ul style="list-style-type: none"> Represents the proportion of revenues received by suppliers (or payments from consumers) for electricity in the wholesale market to the total costs of supplying the electricity. Performance improves as market revenues increase and non-market uplifts shrink. 	

Appendix 2: Enterprise Risk Management

The IESO's established enterprise risk management (ERM) program supports the identification, assessment and mitigation of risks that the organization faces in achieving its strategic objectives. This business plan has aligned priorities and resources across key areas of the IESO to support informed decision-making in the consideration and mitigation of the strategic risks identified below.

Risk Event Description	Strategic Objectives		
	Affordability, reliability, sustainability	Culture and workforce transformation	Stakeholder trust
The IESO develops tools/mechanisms to acquire resources, but the design and integration of the tools do not effectively balance ratepayer and supplier risk.	×		×
Supply and demand are significantly mismatched over the longer term.	×		×
Conditions for market power, such as a further increase in the concentration of generation ownership, are enhanced.	×		×
Operating in a constrained environment defers and delays advancement of key initiatives to innovate the business and electricity sector.	×	×	×
Users of the IESO's information technology systems are subject to cyberattacks.	×	×	×
The IESO's information systems are subject to intentional and unintentional exfiltration of sensitive data.	×	×	×
The IESO's ability to facilitate cybersecurity situational awareness and information exchange across Ontario's electricity sector is diminished.	×		×
A regulatory decision is invoked that is contrary to the delivery of enhanced competitive mechanisms.	×		×
Non-electricity sector entrants cause significant disruption in energy market dynamics.	×		
Availability of human capital with required skills is inconsistent with the IESO's need for talent in hard-to-fill roles.	×	×	
The IESO is unable to retain critical staff or transition employees into emerging roles.	×	×	
An extreme weather event significantly damages generation or transmission assets.	×		

Appendix 3: Capital Spending

Summary for 2020-2022 capital spending

Change Initiatives/Projects (\$ Millions)	2020 Plan	2021 Plan	2022 Plan
Centralized Alarm Management System Replacement		2.5	1.1
Replacement of the Settlement Systems	8.4	8.8	10.9
SCADA/Energy Management System (EMS) Upgrade	5.7	5.6	0.6
Corporate PBX Phone System Refresh	1.2		
Data Excellence Program	0.5	1.3	1.8
Dispatch Data Management Systems Refresh	1.5	0.1	
Capacity Auction	1.7	0.1	
External Identity Management (Portal)	1.1	0.3	
Wide Area Visualization Environment (WAVE) - Phase 2	0.5	1.2	0.4
Enabling Resources to Deliver on Capacity/Participate in Markets		0.5	2.4
Addressing Market Surveillance Panel (MSP) Recommendations		1.8	1.6
Data Warehouse		0.5	1.0
Dynamic Limits in Real-Time		1.1	1.2
New Capacity/Resource Acquisition Initiatives		1.0	2.0
Network Performance Monitoring and Diagnostic			2.5
Capital (\$1 million & above)	20.6	24.8	25.5
Other Initiatives/Projects (Less than \$1 million)	5.0	7.8	4.5
Total Without Market Renewal - Energy project	25.6	32.6	30.0
Market Renewal Program - Energy project	25.9	44.6	37.6
Total Including Market Renewal - Energy project	51.5	77.2	67.6

2020-2022 Capital Budget Details

Project	Description
Centralized Alarm Management System (CAMS) Replacement	The CAMS project will ensure IESO operators can continue to manage alarms and events that are important indicators of change by implementing a solution to software that will no longer be supported by the vendor.
Replacement of the Settlement Systems	In replacing settlement systems that have been in operation since market opening in 2002, this project will address market re-design needs associated with implementation of the Market Renewal Program and enable the system to meet current and future business needs.
Supervisory Control and Data Acquisition (SCADA) / Energy Management System (EMS) Upgrade	This project will upgrade the SCADA/EMS, the primary system operators use to monitor and manage the IESO-controlled grid. The resulting improvements will enable custom applications to run on the latest version of the vendor's software and improve the ability of energy storage resources to become integrated suppliers of regulation services.
Corporate PBX Phone System Refresh	This refresh project will replace and consolidate the existing Avaya PBX system with a new phone system featuring enhanced mobility capabilities.
Data Excellence Program	To help harness the full value of IESO data, this program will establish a data management and analytics framework that will support IESO business needs, and enhance third-party access to data and information.
Dispatch Data Management Systems (DDMS) Refresh	This project will move the DDMS to a vendor-supported hardware and software platform and introduce a number of upgrades to address reliability and performance concerns and enhance functionality of the current DDMS.
Capacity Auction	As the mechanism for procuring capacity in the short term (see New Capacity/Resource Acquisition Initiatives), the IESO's capacity auction, which launched in December 2020, will evolve over time, delivering more efficient and cost-effective outcomes through improved processes and expanded participation.
External Identity Management (Portal)	The IESO external portal is used as an entry point for participants to multiple market-facing applications and collaboration communities. This project will replace the existing portal, which is at end of life, and enable the delivery of efficient services to IESO staff and external customers.
Wide Area Visualization Environment (WAVE) - Phase 2	This project will improve situational awareness and maintain ongoing compliance with NERC IRO standards by expanding modelling to neighbouring power systems (NYISO, PJM and Hydro Quebec), improving the IESO's ability to monitor and respond to real-time conditions that may affect the IESO-controlled grid.
Enabling Resources to Deliver on Capacity/Participate in Markets	The IESO will increase the number of resource types that can participate in the IESO markets to deliver energy, capacity and ancillary services. Increasing supply options will lower the total cost of meeting system needs.
Addressing Market Surveillance Panel (MSP) Recommendations	This project is proposed as a portfolio of initiatives to develop, evolve and address inefficiencies in the electricity market in response to observations by the MSP and other stakeholders.
Data Warehouse	In use since market opening, the IESO's current market data warehouse has limited data utilization/reporting/management functionality. This project will implement an updated data warehouse strategy and supporting applications, enabling the IESO to effectively manage and leverage the data it collects.
Dynamic Limits in Real-Time (DLRT)	In enabling the continuous assessment of real-time grid conditions, the DLRT Project will significantly improve the utilization of Ontario's transmission system, resulting in market and system operations efficiencies, and increased system security and resiliency.

New Capacity/Resource Acquisition Initiatives

As part of its commitment to transition to the long-term use of competitive mechanisms to meet Ontario's resource adequacy needs, the IESO is working with stakeholders to develop a resource adequacy framework with mechanisms to procure capacity in three distinct time frames (short, medium and long term). In addition to facilitating competition, this work aims to better balance supplier, ratepayer and IESO risks, reduce costs, and provide business planning certainty.

Network Performance Monitoring and Diagnostic (NPMD)

The IESO's Core and Data Centre networks provide the backbone of the IESO's network infrastructure connecting all systems and locations in a robust and reliable high performance network. The NPMD solution will provide the capabilities to monitor network devices, analyze network packets for enhance visibility, reducing troubleshooting effort and time to resolution and predictive failure analysis.

Independent Electricity

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MC-994-2021-320

April 28, 2021

Mr. Terry Young
Interim President and CEO
Independent Electricity System Operator
1600—120 Adelaide Street West
Toronto ON M5H 1T1

Dear Mr. Young:

I would like to thank the Independent Electricity System Operator (IESO) for its leadership in co-ordinating the electricity sector's emergency response during the COVID-19 pandemic. This work has been instrumental in ensuring that Ontarians can depend on a reliable electricity system. I expect the IESO will continue to provide a safe operating environment for its employees and follow guidelines from public health officials to keep the electricity system operating effectively for the duration of the pandemic.

I am writing to provide my concurrence of the 2020-2022 consolidated business plan ("Consolidated Business Plan"), resubmitted on December 9, 2020, and to outline my expectations for the IESO's next business plan.

The IESO has an important role in reducing electricity system costs for electricity customers in Ontario. This aligns with our government's focus on providing value for energy consumers and putting Ontario families and businesses first. The Province supports IESO's role in facilitating a well-functioning electricity sector in Ontario.

I am pleased that the business plan reflects a reasonable revenue requirement without compromising the IESO's ability to deliver on its mandate to ensure the reliability of Ontario's electricity system. I know that the IESO will work hard to implement the strategic initiatives outlined in the business plan.

.../cont'd

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Government Expectations for the IESO's Next Business Plan

I expect the IESO will submit its next business plan in September 2021 and will work with the ministry during its ongoing development.

The IESO should always act in the best interests of Ontarians by being efficient, effective and providing value for money to electricity customers. I expect the next business plan will elaborate on how it meets these government priorities:

- a) Competitiveness, Sustainability and Expenditure Management
- b) Transparency and Accountability
- c) Risk Management
- d) Workforce Management
- e) Data Collection
- f) Digital Delivery and Customer Service

Ministry staff will provide details of the expectations in this regard.

In addition to these government-wide priorities, I expect the IESO business plan to provide updates on:

1. Progress with market renewal, electricity planning, the development of a competitive framework for resource procurement and the development of a competitive transmission procurement process.
2. Progress on addressing barriers to the full participation of energy storage and enabling greater resource participation in the IESO-administered markets.
3. Implementation and mid-term review of the 2021-2024 energy efficiency program framework that helps to reduce system costs and realize savings for consumers.
4. Cybersecurity, climate resilience and the integrity of the grid.
5. Mitigation plan for identified risks to meet objectives of the Plan, including consideration of potential reforms to market oversight requirements.
6. Collective bargaining and alignment with broader government priorities on broader public sector compensation.

I am supportive of the IESO's proposal to develop a new approval process for future business plans. I understand this would amend the current business plan and fees application approval process from an annual approvals approach to a three-year concurrent approvals approach, and that this would potentially be implemented for the IESO's next business plan. Please work with my staff and the Ontario Energy Board on further exploring implementation of this process.

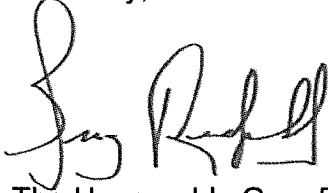
This letter constitutes my approval of the Consolidated Business Plan and the budgets for each of the 2020 and 2021 in accordance with my authority under subsection 24(2) of the *Electricity Act*, 1998 and as provided under the current MOU between the IESO and the Ministry dated May 15, 2017.

.../cont'd

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Thank you for the Consolidated Business Plan and for the good work of the IESO and its staff. Please accept my best wishes.

Sincerely,

A handwritten signature in black ink, appearing to read "Greg Rickford". The signature is fluid and cursive, with the first name "Greg" and last name "Rickford" clearly distinguishable.

The Honourable Greg Rickford
Minister of Energy, Northern Development and Mines

- c: Joe Oliver, Chair of the Board of Directors, Independent Electricity System Operator
Hon. Bill Walker, Associate Minister of Energy, Ministry of Energy, Northern Development and Mines
Stephen Rhodes, Deputy Minister, Ministry of Energy, Northern Development and Mines
Aaron Silver, Chief of Staff, Minister's Office, Ministry of Energy, Northern Development and Mines
Dominic Roszak, Chief of Staff, Associate Minister's Office, Ministry of Energy, Northern Development and Mines
Steen Hume, Assistant Deputy Minister, Ministry of Energy, Northern Development and Mines

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

2019 Annual Report

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Message from the President & CEO



Working together for a reliable and affordable electricity future

As I write this message, the coronavirus (COVID-19) situation is changing daily, and it's difficult to predict what the economic impact will mean for future electricity demand. While this global health threat has added new layers of complexity to an already shifting energy landscape, our focus has stayed the same: ensuring Ontarians have affordable electricity, where and when they need it.

To deliver on this promise, we are having daily conversations with generators, transmitters and distributors to share information and ensure we are collectively prepared. We are also in close contact with the North American Electric Reliability Corporation and the Electric Subsector Coordinating Council, to ensure a coordinated response across the provincial and North American grids.

Engaging with stakeholders on initiatives to make our system more affordable and reliable in turbulent times is vital – but it was also core to our progress in 2019. Thanks to our focus on finding solutions that work for the IESO and for the sector, we found new efficiencies, drove down costs, and made the investments required to produce long-term benefits for the system, and ultimately all consumers.

In an industry with more disruption, more participants and more diverse viewpoints, working effectively with all players requires us to leverage our unique vantage point at the centre of the sector to better respond to new realities and the needs of a growing number of stakeholders. Last year, this meant shifting our planned approach to procuring capacity, advancing our efforts to address barriers to participation in our markets, as well as inviting feedback on our planning processes and products and sharing the assumptions that underpin them.

All of this work allowed us to achieve new milestones, even as we continued to deliver value for every dollar, and operate within a fee structure that has remained flat for the last three years.

While we can take pride in our accomplishments in 2019, these successes didn't happen by accident. They were the result of the efforts of many organizations which, like the IESO, continue to be inspired by what's possible when we work together to create a stronger electricity future for all Ontarians.

A stylized, handwritten signature in black ink, appearing to read 'Peter Gregg'.

Peter Gregg
President & CEO

2019 Year in Review

Ensuring the reliability and resilience of the electricity system at the lowest cost every minute of every day is critical to supporting Ontario's economy – and our way of life. In 2019, the IESO continued to deliver on its mandate, improving market design to deliver more efficient outcomes, facilitating innovation to support system needs, and navigating through the day-to-day challenges and complexities of a sector in transition.

Proving that there is no “business as usual,” the IESO started the year by responding to seven days of cold weather alerts, which increased consumer demand and challenged generator availability, paving the way for changes in the assessment of generator outage requests. While January saw a loss of 2,100 megawatts (MW) of generator capacity in two hours due to cold weather, volatile weather systems influenced IESO operations throughout the year – one mid-day storm in July resulted in a 1,300 MW dip in demand, reinforcing the importance of constant vigilance and effective training, tools and processes.

With year-over-year decreases in overall demand becoming the new norm – at 135.1 TWh, demand in 2019 was the second lowest over the past 25 years – the IESO focused on anticipating and addressing emerging needs and responding to a changing electricity landscape by:

- Advancing efforts to ensure customers receive reliable electricity at lowest cost through market reforms to create a more transparent and competitive marketplace and unlock the value of new and existing resources
- Leading resilience discussions by developing and sharing resilience principles that will inform IESO decisions, while helping system participants identify where to focus their efforts – and contribute to a broader consensus on what constitutes a resilient power system
- Hosting engagements on the next cycle of regional planning, and enabling interested parties to provide input into the development of integrated regional resource plans for the Windsor-Essex, York and Toronto regions, as well as the Hamilton and Ottawa sub-regions
- Ensuring the effective oversight of Ontario's electricity markets by considering market compliance during the evolution of market renewal activities, and increasing guidance and monitoring activities
- Addressing greenhouse growth in southwestern Ontario by issuing a call for innovative solutions to reduce peak demand and launching an enhanced LED incentive program for greenhouse customers
- Assuming responsibility for the centralized delivery of Save on Energy programs, and continuing to deliver strong results, even during the transition to a new energy-efficiency framework
- Introducing regional networks to enable customers to be part of important conversations about electricity and regional planning, and providing perspectives on current issues through new communications channels, including a Powering Tomorrow podcast
- Continuing to stimulate dialogue on emerging issues through IESO events – such as the annual Cybersecurity Executive Briefing, Electricity Summit, and First Nations Energy Symposium – and engagement initiatives to ensure stakeholder perspectives are reflected, resulting in better outcomes

This report is not meant to be an exhaustive summary of the organization's progress in 2019. It does, however, include additional details about some of the above accomplishments, as well as a discussion of other initiatives that are enabling the IESO to create value now, while helping shape the future of the grid in ways that will benefit all Ontarians.

Preparing for a reliable energy future

Ensuring a reliable and affordable supply of electricity today, and for generations to come, is central to everything the IESO does – and effectively planning and preparing for the future is core to delivering on that mandate. This requires the coordination of a large number of moving parts, the consideration of multiple perspectives on how to meet the province's energy needs, a commitment to continuous improvement and a single-minded focus on identifying ways to keep costs in check.

Demonstrating transparency through long-term planning

Throughout 2019, the IESO focused on research, analysis and engagement to support the development of its first Annual Planning Outlook (APO), which serves as a roadmap of system needs and provides more and better information to the stakeholders who depend on value-added data and analysis. A 20-year forecast for Ontario's electricity system, the APO identifies the province's energy and capacity needs far into the future by considering projected electricity demand, resource adequacy requirements, transmission needs and performance indicators. Future editions of the report will continue to inform investment and operational decision-making, while evolving to reflect changing stakeholder needs and expectations and refinements to the IESO's existing processes and standards.

Managing change to protect the continued reliability of the grid

Together with adequacy and security, operability is a vital attribute of a reliable and resilient power system. The IESO's operability assessments consider recent operating experiences, evaluate our ability to operate the grid into the future, and identify changes to market design, mechanisms, and tools that address concerns. In 2019, distributed energy resources (DERs) were identified as a focus, and, for the first time, as an emerging risk and a potential major system contingency by 2025. In the wake of these findings, the IESO will be working with the Ontario Energy Board (OEB) and local utilities to update performance requirements and develop an implementation plan for existing and future DER connections and behind-the-meter conservation and demand management technologies to meet these new requirements.

Enhancing situational awareness beyond Ontario's borders

One of the real strengths of Ontario's electricity grid is that it's integrated into a larger, continent-wide power system. By enabling the flow of energy and investment across multiple jurisdictions, these interconnections deliver significant benefits in terms of reliability, resilience and economic efficiency. The flip side is that they could pose risks in the absence of ongoing monitoring and post-event analysis. With the introduction of real-time visibility into and wide-area monitoring of three neighbouring areas – Manitoba, Minnesota and Michigan – the IESO achieved an important milestone in its efforts to enhance awareness of conditions affecting the grid beyond Ontario's borders. The next phase will improve visibility into operations in Quebec, New York and the territory served by PJM, the regional transmission organization for all or parts of 13 states.

Refining bulk and regional planning processes

In a changing environment, planning Ontario's power system to meet the needs of today and tomorrow requires foresight, technical and analytical expertise, and intuition, as well as a commitment to being transparent and inclusive. There are significant overlaps and differences between the types of planning conducted at the provincial, regional and local levels. Over the past year, the IESO has been actively exploring ways to enhance the bulk and regional planning processes and establish a robust yet efficient planning framework that responds to customer needs, addresses various acquisition mechanisms, considers opportunities for improved coordination and encourages the participation of existing and emerging resources. This work will continue into 2020, with stakeholder input being sought at various points through multiple engagements.

Simplifying the connection process

Coordinating how resources connect to the grid, and determining how and when to do this without impacting the reliability or stability of the province's electricity system is complex – but navigating the process shouldn't have to be. That's why the IESO, equipped with an understanding of current difficulties in a variety of scenarios, set out to develop a comprehensive roadmap to help clarify the connection process. Now posted on the IESO's website, the roadmap addresses common obstacles by guiding applicants through every step of the process, from intention to connect, through to finalization of the connection, and outlining interactions with and among all organizations (transmitters, distributors and the IESO), including their respective responsibilities.

Driving value through competition

Enhancing the competitiveness of Ontario's electricity markets is critical to producing value for consumers, suppliers, and the electricity system. While the transition to a more competitive marketplace won't happen overnight, in 2019 the IESO focused on a number of initiatives that will produce better price outcomes by opening the door to greater participation, and increasing the number of reliability services acquired through competition.

Achieving savings through market redesign

The IESO made substantive progress on three initiatives under its Market Renewal Program – the day-ahead market, single-schedule market and enhanced real-time unit commitment – that will improve how we commit, schedule and price resources to balance supply and demand in real-time. Together, these reforms will introduce greater operational and financial certainty, and create transparent price signals that, in reflecting system conditions, support more open and robust competition among market participants. This, in turn, will deliver significant efficiencies – an estimated \$800 million in net benefits in the first 10 years alone – for the system and, ultimately, for the 14.5 million Ontarians who depend on affordable and reliable power every day.

Unlocking the value of DERs

Creating efficient markets also depends on participation models that enable new and existing resources to cost-effectively meet system needs. With this in mind, the IESO continued exploring how to effectively integrate distributed energy resources (DERs) into its markets with a white paper on conceptual models for DER participation. Building on this work, the IESO also engaged with stakeholders on papers outlining the potential value of DERs as non-wires alternatives at both the transmission and distribution levels, and on how to realize the benefits of growing numbers of DERs, while maintaining safety and reliability.

Enabling energy storage

At the end of 2018, the IESO published a series of recommendations aimed at promoting fair competition for energy storage resources. Armed with a better understanding of the role of these resources within markets and the barriers they face, in 2019 the IESO launched a project to develop an interim design for storage participation in the existing IESO markets and a vision for storage participation in the redesigned markets. With input from the IESO's Energy Storage Advisory Group, this initiative will introduce changes to market rules, and existing tools and processes to maximize the value energy storage can bring to the power system, and support its growing role in developing a more flexible and efficient grid.

Evolving the demand-response auction

Following stakeholder feedback and updated forecasts that suggested the need for new capacity is smaller than originally projected, the IESO halted further work on the incremental capacity auction (ICA) midway through 2019. Instead, leveraging its investment in the high-level design of the ICA, the IESO began work on evolving the existing demand-response auction, which has provided a transparent and effective way to reduce costs and increase participation since its inception in 2015. The resulting capacity auction, which takes a phased approach to opening participation to new entrants, will provide a more flexible and equitable approach to meeting the province's future capacity needs.

Reviewing resource adequacy

While the capacity auction will play an important role in meeting future capacity needs, it is not a one-size-fits-all tool, and will not work for all resource types. With more than 200 contracts (representing 11,000 MW) expiring over the next decade, the IESO committed to explore when and how to use other approaches to acquire and reacquire resources – before the capacity need is imminent. To that end, the IESO will work closely with stakeholders to introduce a more holistic approach to addressing supplier and ratepayer risks by considering alternative procurement approaches, and by introducing separate competitive processes for acquiring capacity, energy and ancillary services.

Enabling innovation to support system effectiveness

Broadly speaking, ongoing transformation in the electricity sector means shorter technology and project cycles, more agile thinking and an understanding that business as usual is no longer an option. As the province's electricity system operator, the IESO aligns its goals in this area with its mandate, facilitating innovation that will help ensure a cost-effective and reliable electricity system into the future.

Setting innovation priorities

In 2019, following stakeholder feedback, the IESO released its first Innovation Roadmap, which prioritized the areas of focus that will guide its efforts to continue providing a stable and affordable electricity system in the face of ongoing transformation. In setting out its approach to enabling innovation, the IESO aimed to ensure the strategic allocation of funds, while developing a robust work plan to guide project development. The Roadmap positions the IESO to act on these priorities, while undertaking, supporting or participating in projects that will benefit the sector, and result in the lowest cost to consumers.

Exploring the role of DERs in the IESO's electricity markets

As the cost and capabilities of distributed energy resources (DERs) continue to improve, it's no surprise that these resources emerged as a top focus in the IESO's innovation priorities. The future role of DERs in electricity markets was the subject of three engagements involving IESO white papers, part of a series to address barriers to market participation and inform policy, planning and investment decisions. Following research that explored conceptual models for DER participation, the IESO released two additional papers – one outlining options for using DERs as non-wires alternatives, and the other addressing the need for an optimal transmission-distribution interoperability model and potential roles for both distribution and transmission system operators within that framework.

Addressing non-traditional approaches to reduce local demand

While the IESO white papers map out possibilities, they also helped shape the design of a two-year demonstration project in the fast-growing York Region. Supported by the IESO's Grid Innovation Fund and NRCan's Smart Grid Program, the project will test whether using DERs as non-wires alternatives can help manage increasing demand and provide a cost-effective alternative to building new infrastructure. Identifying innovative approaches to meeting local system needs was also the catalyst behind the Fund's targeted call for proposals for non-wires solutions to manage electricity demand from indoor agriculture facilities. This rapidly expanding segment is challenging the province's electricity system, particularly in southwestern Ontario, where more than 1,300 MW of greenhouse load is seeking to connect by 2025.

Strengthening cybersecurity across the sector

Given the high-stakes nature of cyberattacks in the electricity sector and the growing frequency and sophistication of cyberthreats, the Innovation Roadmap identified mitigating emerging cybersecurity risks as a top priority. Through a first-of-its-kind partnership with the Canadian Centre for Cyber Security, the IESO launched an information-sharing service that provides participating local distribution companies (LDCs) with alerts and updates about threats facing Ontario's electricity sector. This solution contributes to the ability to see and react to these threats as a sector, all in near real-time. By the end of the year, coverage extended to 75 per cent of the service delivery points represented by LDCs, and a plan was underway to recruit and onboard more participants.

Harnessing the value of energy efficiency

In 2019, with the introduction of an interim framework for energy efficiency, the IESO assumed responsibility for the centralized delivery of services that help businesses contribute to their bottom line by lowering consumption and reducing electricity demand throughout the province. Today, the IESO is taking steps toward a longer-term vision that will enable this proven cost-effective resource to compete to meet both local and bulk system needs. As part of this transition, the IESO is exploring new procurement options, including an energy-efficiency auction. The pilot has, among its goals, understanding the receptivity of different sectors to participate in market-based mechanisms, discovering the price under competitive conditions, assessing the benefits to the system and identifying potential implementation issues.

Powering community growth to produce better outcomes

The IESO manages a province-wide electricity system, which is itself part of a larger, integrated network serving large parts of North America, yet most electricity users consider energy a local matter. They view reliability and cost-effectiveness in the context of their own consumption and needs. They are also best suited to identify local needs, priorities and solutions – which, in turn, impact consumption patterns, power flows and energy requirements on a province-wide basis. And that's why it's important for the IESO to seek their input when planning and operating Ontario's power system.

Leveraging community input to plan for the future

Addressing the electricity issues that matter most to local residents, business owners, municipal officials and others was the catalyst behind the IESO's launch of five regional electricity networks in 2019. A platform for ongoing dialogue, these networks enable customers across the province to be part of important conversations about electricity and regional planning, and support the IESO's efforts to plan a reliable and affordable future electricity system. In addition to receiving information from the IESO, network members can attend an annual regional electricity forum, provide input and feedback on plans, learn what's working in other jurisdictions, and contribute to local energy decisions.

Developing local solutions to local challenges: the Windsor-Essex region

One region with very specific energy needs is Windsor-Essex, thanks to unprecedented growth in indoor agriculture, particularly in the Kingsville-Leamington area. Over the past year, the IESO worked closely with the municipality, greenhouse growers, industry associations and other utilities to identify options in a way that balances cost, reliability and speed of implementation. In addition to informing interim measures to connect customers before permanent reinforcements were in place, targeted community outreach helped lay the foundation for other local initiatives, including an enhanced incentive for LED lighting to help both the province better manage growing energy needs and greenhouse owners reduce their energy costs.

Accelerating First Nations participation in Ontario's electricity sector

The IESO hosted its third annual First Nations Energy Symposium, a forum for learning, engagement and sharing of energy-related success stories from First Nation communities across Ontario. Since its inception, the Symposium has brought together community members, organizational representatives and industry experts to share their expertise and experience in energy matters. Over two full days, sessions in 2019 covered project management, certification programs, supply chain management for energy projects, planning for contingencies and related content. In this way, the IESO contributed to skills development and knowledge exchange.

Enhancing affordability through energy-efficiency programs for Indigenous communities

The IESO launched the Remote First Nations Energy Efficiency Pilot Program to help make electricity more affordable for remote Indigenous communities that are soon to be connected to the grid. Participating customers will receive a home energy audit and installation of energy-efficient products. Energy-efficiency measures will also be available for other types of buildings. The IESO also assumed responsibility for delivering the First Nations Conservation Program, which helps qualified on-reserve First Nation customers improve the energy efficiency of their homes and manage their energy use more effectively. This program complements an existing IESO-funded program called Conservation on the Coast, which serves residents of three communities along the James Bay coast.

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 judgment, 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 February 26, 2020.

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 Grant Thornton LLP, a firm of independent external auditors appointed by the Board of Directors. The auditor's responsibility is to express an opinion on whether the financial statements are fairly presented in accordance with generally accepted accounting principles in Canada. The Independent Auditor's Report, which follows, outlines the scope of their examination and their opinion.

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

On behalf of management,



Peter Gregg
President and Chief Executive Officer
Toronto, Ontario
February 26, 2020



Barbara Anderson
Chief Financial Officer and Vice-President,
Corporate Services
Toronto, Ontario
February 26, 2020

Independent Auditor's Report

To the Board of Directors of the Independent Electricity System Operator

Opinion

We have audited the financial statements of the Independent Electricity System Operator (IESO), which comprise the statement of financial position as at December 31, 2019, and 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 to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the IESO as at December 31, 2019, and its results of operations, remeasurement gains and losses, changes in its net debt, and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the IESO in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Matter

The financial statements of the IESO for the year ended December 31, 2018 were audited by another auditor who expressed an unmodified opinion on those statements on February 27, 2019.

Responsibilities of Management and Those Charged with Governance 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.

In preparing the financial statements, management is responsible for assessing the IESO's ability to continue as a going concern, disclosing, as applicable, matters related to a going concern and using the going concern basis of accounting unless management either intends to liquidate the IESO or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the IESO's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit 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 IESO's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the IESO's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the IESO to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

The logo for Grant Thornton LLP, featuring the company name in a stylized, cursive script.

Grant Thornton, LLP

A Canadian Member of Grant Thornton International Ltd
Chartered Professional Accountants
Licensed Public Accountants

Mississauga, Canada
February 26, 2020

Statement of Financial Position

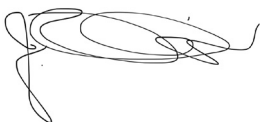
As at (in thousands of Canadian dollars)

December 31, 2019

December 31, 2018

	\$	\$
FINANCIAL ASSETS		
Cash	69,049	156,124
Accounts receivable (Note 3)	142,582	111,257
Long-term investments (Note 4)	50,316	43,670
TOTAL FINANCIAL ASSETS	261,947	311,051
LIABILITIES		
Accounts payable and accrued liabilities (Note 5)	130,647	61,382
Debt (Note 7)	120,000	245,000
Accrued pension liability (Note 8)	26,296	30,566
Accrued liability for employee future benefits other than pension (Note 8)	140,841	131,524
TOTAL LIABILITIES	417,784	468,472
NET DEBT	(155,837)	(157,421)
NON-FINANCIAL ASSETS		
Tangible capital assets (Note 9)	116,567	103,952
Prepaid expenses	8,312	6,234
TOTAL NON-FINANCIAL ASSETS	124,879	110,186
ACCUMULATED DEFICIT		
Accumulated deficit from operations	(43,014)	(54,804)
Accumulated remeasurement gains	12,056	7,569
ACCUMULATED DEFICIT (Note 6)	(30,958)	(47,235)
Commitments (Note 14)		
Contingencies (Note 15)		
See accompanying notes to financial statements		

On behalf of the Board:



Joe Oliver
Chair
Toronto, Canada



Cynthia Chaplin
Director
Toronto, Canada

Statement of Operations and Accumulated Deficit

For the year ended December 31 (in thousands of Canadian dollars)	2019	2019	2018
	Budget \$	Actual \$	Actual \$
IESO CORE OPERATIONS			
System fees	190,803	190,950	194,341
Other revenue (Note 10)	6,800	6,888	5,027
Interest and investment income	600	4,772	2,996
Core operation revenues	198,203	202,610	202,364
Core operation expenses (Note 11)	(198,203)	(194,990)	(197,153)
Core operations surplus	-	7,620	5,211
OTHER GOVERNMENT PROGRAMS			
Government transfer	-	105,631	289,204
Government transfer expenses (Note 11)	-	(105,631)	(289,204)
Government transfer surplus	-	-	-
SMART METERING ENTITY			
Smart metering charge	33,779	34,911	34,542
Smart metering expenses (Note 11)	(31,312)	(30,622)	(28,433)
Smart metering entity surplus	2,467	4,289	6,109
MARKET SANCTIONS AND PAYMENT ADJUSTMENTS			
Market sanctions and payment adjustments	9,651	9,067	6,244
Customer education and market enforcement expenses (Note 11)	(9,916)	(9,186)	(6,383)
Market sanctions and payment adjustments deficit	(265)	(119)	(139)
SURPLUS	2,202	11,790	11,181
ACCUMULATED DEFICIT FROM OPERATIONS, BEGINNING OF PERIOD	(54,804)	(54,804)	(65,985)
ACCUMULATED DEFICIT FROM OPERATIONS, END OF PERIOD	(52,602)	(43,014)	(54,804)

See accompanying notes to financial statements

Statement of Remeasurement Gains and Losses

For the year ended December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
ACCUMULATED REMEASUREMENT GAINS, BEGINNING OF PERIOD	7,569	10,484
UNREALIZED GAINS/LOSSES ATTRIBUTABLE TO:		
Foreign exchange - other	562	579
Portfolio investments	5,344	(2,465)
AMOUNTS RECLASSIFIED TO THE STATEMENT OF OPERATIONS:		
Foreign exchange - other	(579)	(456)
Portfolio investments	(840)	(573)
NET REMEASUREMENT GAINS (LOSSES) FOR THE PERIOD	4,487	(2,915)
ACCUMULATED REMEASUREMENT GAINS, END OF PERIOD	12,056	7,569

See accompanying notes to financial statements

Statement of Change in Net Debt

For the year ended December 31 (in thousands of Canadian dollars)	2019	2019	2018
	Budget \$	Actual \$	Actual \$
SURPLUS	2,202	11,790	11,181
CHANGE IN NON-FINANCIAL ASSETS			
Acquisition of tangible capital assets	(62,915)	(36,541)	(27,293)
Amortization of tangible capital assets	22,959	23,926	24,135
Change in prepaid expenses	-	(2,078)	575
TOTAL CHANGE IN NON-FINANCIAL ASSETS	(39,956)	(14,693)	(2,583)
NET REMEASUREMENT GAINS (LOSSES) FOR THE PERIOD	-	4,487	(2,915)
CHANGE IN NET DEBT	(37,754)	1,584	5,683
NET DEBT, BEGINNING OF PERIOD	(157,421)	(157,421)	(163,104)
NET DEBT, END OF PERIOD	(195,175)	(155,837)	(157,421)

See accompanying notes to financial statements

Statement of Cash Flows

For the year ended December 31 (in thousands of Canadian dollars)

	2019	2018
	\$	\$
OPERATING TRANSACTIONS		
Change in accumulated surplus:		
Surplus	11,790	11,181
	11,790	11,181
Changes in non-cash items:		
Amortization	23,926	24,135
Unrealized foreign exchange (losses)/gains for the period	(17)	123
Pension expense	9,258	10,898
Other employee future benefits expense	11,976	11,206
Gain on disposal of long-term investments	(840)	(573)
	44,303	45,789
Changes in non-cash balances related to operations:		
Change in accounts payable and accrued liabilities	68,493	22,873
Change in accounts receivable	(31,325)	(69,828)
Change in prepaid expenses	(2,078)	575
	35,090	(46,380)
Other:		
Contributions to pension fund	(13,528)	(14,214)
Payment of employee future benefits	(2,659)	(2,559)
	(16,187)	(16,773)
Cash provided/applied to operating transactions	74,996	(6,183)
CAPITAL TRANSACTIONS		
Acquisition of tangible capital assets	(36,541)	(27,293)
Change in accounts payable and accrued liabilities related to tangible capital assets	772	1,245
Cash applied to capital transactions	(35,769)	(26,048)
INVESTING TRANSACTIONS		
Purchase of long-term investments	(2,425)	(1,697)
Proceeds on sale of long-term investments	1,123	838
Cash applied to investing transactions	(1,302)	(859)
FINANCING TRANSACTIONS		
Debt Repayment or Issuance	(125,000)	125,000
Cash applied/provided by financing transactions	(125,000)	125,000
(DECREASE) INCREASE IN CASH	(87,075)	91,910
CASH - BEGINNING OF PERIOD	156,124	64,214
CASH - END OF PERIOD	69,049	156,124

See accompanying notes to financial statements

Notes to Financial Statements

1. NATURE OF OPERATIONS

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 Act). As set out in the Act, the IESO operates pursuant to a licence granted by the Ontario Energy Board (OEB).

The IESO operates the IESO administered markets and the OEB has regulatory oversight of electricity matters in Ontario. In addition, in 2007 the IESO was designated the Smart Metering Entity (SME) by Ontario statute. In its role as the SME, the IESO maintains and operates the province's smart metering data repository, the central hub for processing, storing and protecting electricity consumption data used for consumer billing by local distribution companies.

In 2018, the IESO's licence was amended to require the organization to provide and promote centralized cyber-security information services in conjunction with licenced transmitters and distributors. Under the amendment, these services include providing situational awareness of potential threats that may affect the electricity sector, and developing an information exchange mechanism for sharing cybersecurity best practices to improve sector understanding of associated risks and solutions.

The objects of the IESO are contained in the Act and associated Ontario regulations. The IESO ensures the reliability of the province's power system on behalf of all Ontarians, leveraging its expertise and purposeful engagement to advance energy policy that cost effectively achieves this goal. As part of its mandate, the IESO operates Ontario's electricity grid in real-time, governs electricity markets, prepares for the future to ensure electricity will be available when and where it is needed and helps inform the decisions that will be critical to shaping the future of the sector.

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 (PSAS) and reflect the following significant accounting policies.

These financial statements do not include the financial accounts and Government transfers for the IESO administered markets. A separate and distinct set of financial statements are prepared for the IESO administered markets. The IESO administered markets means the markets as prescribed by the Act and associated Ontario regulations.

b) Revenue recognition

System fees earned by the IESO are based on rates approved by the OEB for each megawatt of electricity withdrawn from the IESO controlled grid. System fees are recognized as revenue at the time the electricity is withdrawn.

The SME's charge that is earned by the IESO is based on rates approved by the OEB for each installed smart meter in the province. Revenue is recognized in the year as it is earned.

Other revenue represents amounts that accrue to the IESO relating to investment income on funds passing through market settlement accounts, program revenue, 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.

Government transfers are recognized as revenues in the financial statements in the period in which the events giving rise to the transfer occur, providing the transfers are authorized, any eligibility criteria have been met and reasonable estimates of the amounts can be made.

Market sanctions represent funds received to offset payments disbursed related to penalties, damages, fines and payment adjustments arising from resolved settlement disputes. Such revenue is recognized as it is earned.

c) Financial instruments

The IESO records cash and cash equivalents, long-term investments and foreign currency exchange forward contracts at fair value. The cumulative change in fair value of these financial instruments is recorded in accumulated deficit 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) 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.

e) Assets under construction

Assets under construction generally relates to the costs of physical facilities, information technology 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. The IESO capitalizes applicable interest as part of the cost of tangible capital assets.

f) 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 2019	Estimated Average Service Life 2018
Facilities	5 to 50	5 to 50
Market systems and applications	4 to 12	4 to 12
Information technology hardware and other assets	4 to 10	4 to 10
Meter data management/repository	4 to 10	4 to 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 2019.

g) 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 plans and the related costs, net of plan assets. Pension and other post-employment benefit 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 rates utilized to value liabilities as at the measurement date of September 30 are based on the expected rate of return on plan assets for the registered pension plan and the IESO's estimated cost of borrowing for the supplemental employee retirement and other post-employment benefit plans.

The expected return on plan assets is based on management's long-term best estimate using a market-related value of registered pension 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 other post-employment benefit expenses are recorded during the year in which employees render services. Pension and other post-employment benefit 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 14.5 years (2018 - 14.5 years) and other post-employment benefit plan is 16.7 years (2018 - 16.7 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.

h) Foreign currency exchange

Transactions denominated in foreign currencies are converted 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 converted to Canadian dollars at the rate of exchange as of the date of the financial statements. 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.

i) 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, accrual for contract cancellation costs (Note 12 (f)), accrued pension liability and accrual for employee future benefits other than pensions. Actual results could differ from those estimates.

3. ACCOUNTS RECEIVABLE

Accounts receivable includes an amount of \$40,080 thousand (2018 - \$41,113 thousand) due from the IESO administered markets.

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 \$49,707 thousand (2018 - \$43,131 thousand). As at December 31, the market value allocation of these long-term investments was 62.1% equity securities and 37.9% debt securities (2018 - 61.3% and 38.7%, respectively). In addition to the balanced portfolio of pooled funds, the IESO has a long-term deposit with Canada Revenue Agency in the amount of \$609 thousand (2018 - \$539 thousand) pertaining to the Retirement Compensation Arrangements Trust (Note 7).

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Opening balance - pooled funds	43,131	44,811
Purchase of investments	2,355	1,623
Sale of Investments	(1,123)	(838)
Change in fair value	5,344	(2,465)
Sub-total - Balanced portfolio of pooled funds' closing balance	49,707	43,131
Canada Revenue Agency's Retirement Compensation Arrangements' amount	609	539
Total	50,316	43,670

Fair value measurements of long-term investments are categorized using a fair value hierarchy that reflects the significance of inputs used in determining the fair values.

- Level 1: unadjusted quoted prices in active markets for identical assets or liabilities;
- Level 2: inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly; and
- Level 3: inputs for assets and liabilities that are not based on observable market data.

There were no transfers from Level 1, Level 2, or Level 3 during fiscal 2019 or during 2018.

The following tables illustrate the classification of the long-term investments within the fair value hierarchy as at year-end:

Fair value as at December 31, 2019

(in thousands of Canadian dollars)	Level 1	Level 2	Level 3	Total
Cash Deposits - Canada Revenue Agency	609	-	-	609
TD Emerald Pooled Funds	-	49,707	-	49,707
	609	49,707	-	50,316

Fair value as at December 31, 2018

(in thousands of Canadian dollars)	Level 1	Level 2	Level 3	Total
Cash Deposits - Canada Revenue Agency	539	-	-	539
TD Emerald Pooled Funds	-	43,131	-	43,131
	539	43,131	-	43,670

5. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Relating to operations	127,081	58,588
Relating to tangible capital assets	3,566	2,794
Closing balance	130,647	61,382

6. ACCUMULATED DEFICIT

The IESO's regulatory deferral account balance is subject to OEB orders. During 2019, the IESO received a decision and order by the OEB to maintain the regulatory deferral account at a maximum of \$10,000 thousand (2018 - \$6,000 thousand).

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

Total - Accumulated Deficit

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Regulatory deferral account (a)	(1,020)	(4,728)
Smart Metering Entity (b)	11,337	7,048
Accumulated market sanctions and payment adjustments (c)	383	502
Remeasurement gains (d)	7,912	3,425
PSAS transition items (e)	(49,570)	(53,482)
Accumulated deficit - end of year	(30,958)	(47,235)

a) Regulatory Deferral Account - Accumulated Deficit

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Accumulated deficit - beginning of year	(4,728)	(6,027)
Core operation revenues	202,610	202,364
Core operation expenses	(194,990)	(197,153)
Recovery of PSAS transition items	(3,912)	(3,912)
Accumulated deficit - end of year	(1,020)	(4,728)

b) Smart Metering Entity Account – Accumulated Surplus

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Accumulated surplus – beginning of year	7,048	939
Smart metering charge	34,911	34,542
Smart metering expenses	(30,622)	(28,433)
Accumulated surplus – end of year	11,337	7,048

c) Market Sanctions and Payment Adjustments – Accumulated Surplus

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Accumulated surplus – beginning of year	502	641
Market sanctions and payment adjustments	9,067	6,244
Customer education and market enforcement expenses	(9,186)	(6,383)
Accumulated surplus – end of year	383	502

d) Remeasurement Gains

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Accumulated remeasurement gains – beginning of year	3,425	6,340
Net remeasurement gains (losses)	4,487	(2,915)
Accumulated remeasurement gains – end of period	7,912	3,425

e) PSAS Transition Item – Accumulated Deficit

As at December 31 (in thousands of Canadian dollars)	2019	2018
	\$	\$
Accumulated deficit – beginning of year	(53,482)	(57,394)
Recovery of PSAS transition items	3,912	3,912
Accumulated deficit – end of year	(49,570)	(53,482)

Effective January 1, 2011, the IESO adopted Canadian public sector accounting standards (PSAS) with a transition date of January 1, 2010. The adoption of PSAS 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 \$98,832 thousand at the date of transition being charged to the accumulated deficit. The IESO includes the annual amortization of the accumulated deficit resulting from the PSAS transition items in the IESO's annual expenditures reported to the OEB for recovery through system fees.

7. DEBT

Note payable to Ontario Electricity Financial Corporation (OEFC)

In April 2017, the IESO entered into a note payable with the OEFC. The note payable is unsecured, bears interest at a fixed rate of 1.767% per annum and is repayable in full on June 30, 2020. Interest accrues daily and is payable in arrears semi-annually in June and December of each year. As at December 31, 2019, the note payable to the OEFC was \$120,000 thousand (2018 – \$120,000 thousand). For the year ended December 31, 2019, the interest expense on the note payable was \$2,120 thousand (2018 – \$2,120 thousand).

Credit facility with OEFC

The IESO has an unsecured credit facility agreement with the OEFC, which will make available to the IESO an amount up to \$160,000 thousand. Advances and monthly rollover amounts 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. The credit facility expires June 30, 2020. As at December 31, 2019, the credit facility payable to the OEFC was \$nil (2018 – \$125,000 thousand).

For the year ended December 31, 2019, the interest expense on the credit facility was \$269 thousand (2018 – \$761 thousand).

Retirement Compensation Arrangements Trust

In July 2013, the IESO established a Retirement Compensation Arrangements 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, 2019, the IESO has provided the Retirement Compensation Arrangements' trustee with a bank letter of credit of \$35,171 thousand (2018 – \$33,205 thousand) the trustee can draw upon if the IESO is in default under the terms of this plan.

Workplace and Safety Insurance Board – Ontario

During 2019, the IESO provided the Workplace and Safety Insurance Board with a bank letter of credit of \$20 thousand (2018 – \$20 thousand) for the IESO's obligation under the Workplace Safety and Insurance Act.

8. POST-EMPLOYMENT BENEFIT PLANS

The IESO provides pensions 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, the IESO provides certain non-registered defined benefit pensions through an unfunded, indexed, supplemental employee retirement 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)	2019 Pension Benefits	2018 Pension Benefits	2019 Other Benefits	2018 Other Benefits
	\$	\$	\$	\$
Accrued benefit obligation	(618,876)	(577,467)	(145,316)	(140,074)
Fair value of plan assets	632,234	584,607	-	-
Funded status as of measurement date	13,358	7,140	(145,316)	(140,074)
Employer contribution/other benefit payments after measurement date	2,584	3,580	644	585
Deferred asset (gain)	(18,100)	(9,618)	-	-
Unamortized actuarial (gain) loss subject to amortization	(24,138)	(31,668)	3,831	7,965
Accrued liability recognized in the statement of financial position	(26,296)	(30,566)	(140,841)	(131,524)
Market related value of plan assets (as at September 30)	614,134	574,989	-	-

Registered pension plan assets

The one year actual return on registered pension plan's assets as at September 30, 2019 was 9.3% per annum (2018: 8.3% per annum).

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:

	2019	2018
Canadian equity securities	16.3%	17.1%
Foreign equity securities	34.4%	36.1%
Canadian debt securities	30.3%	32.0%
Global infrastructure	9.2%	7.1%
Canadian real estate	9.3%	6.7%
Cash equivalents	0.6%	0.6%
Forward foreign exchange contracts	-0.1%	0.4%
	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:

	2019 Registered Pension Benefits	2018 Registered Pension Benefits	2019 Supplemental Pension Benefits	2018 Supplemental Pension Benefits	2019 Other Benefits	2018 Other Benefits
Discount rate at the end of the period	5.50%	5.50%	2.90%	4.00%	2.90%	4.00%
Rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Rate of indexing	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

The assumed prescription drug inflation was 6.40% in 2019, grading down to an ultimate rate of 4.00% per year in 2031. 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)	2019 Pension Benefits	2018 Pension Benefits	2019 Other Benefits	2018 Other Benefits
	\$	\$	\$	\$
Current service cost (employer)	11,317	11,442	5,723	5,503
Interest cost	31,668	30,317	5,776	5,349
Expected return on plan assets	(31,543)	(29,456)	-	-
Amortization of net actuarial (gain) loss	(2,184)	(1,405)	477	354
Benefit cost	9,258	10,898	11,976	11,206

(in thousands of Canadian dollars) (as at September 30)	2019 Pension Benefits	2018 Pension Benefits	2019 Other Benefits	2018 Other Benefits
	\$	\$	\$	\$
Employer contribution/other benefit payments	14,524	13,052	2,600	2,727
Plan participants' contributions	8,313	7,468	-	-
Benefits paid	26,262	26,051	2,600	2,727

The most recent actuarial valuation of the IESO registered pension plan for regulatory funding purposes was completed as at January 1, 2019.

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

	2019 Registered Pension Benefits	2018 Registered Pension Benefits	2019 Supplemental Pension Benefits	2018 Supplemental Pension Benefits	2019 Other Benefits	2018 Other Benefits
Discount rate at the beginning of the period	5.50%	5.50%	4.00%	4.00%	4.00%	4.00%
Rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Rate of indexing	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

9. TANGIBLE CAPITAL ASSETS

Net tangible capital assets consist of the following:

Cost of Tangible Capital Assets

(in thousands of Canadian dollars)	As at December 31, 2018	Additions	Disposals	As at December 31, 2019
	\$	\$	\$	\$
Facilities	56,731	4	(311)	56,424
Market systems and applications	329,829	8,576	-	338,405
Information technology hardware and other assets	68,312	10,064	(1,367)	77,009
Meter data management/repository	45,636	-	-	45,636
Total cost	500,508	18,644	(1,678)	517,474

Accumulated Amortization

(in thousands of Canadian dollars)	As at December 31, 2018	Amortization Expense	Disposals	As at December 31, 2019
	\$	\$	\$	\$
Facilities	(27,411)	(1,394)	311	(28,494)
Market systems and applications	(289,612)	(13,289)	-	(302,901)
Information technology hardware and other assets	(61,278)	(4,377)	1,367	(64,288)
Meter data management/repository	(36,533)	(4,866)	-	(41,399)
Total accumulated amortization	(414,834)	(23,926)	1,678	(437,082)

Net Book Value

(in thousands of Canadian dollars)	As at December 31, 2018	As at December 31, 2019
	\$	\$
Facilities	29,320	27,930
Market systems and applications	40,217	35,504
Information technology hardware and other assets	7,034	12,721
Meter data management/repository	9,103	4,237
Total net book value	85,674	80,392
Assets under construction	18,278	36,175
Net tangible capital assets	103,952	116,567

In 2019, there were no adjustments to management's estimates of remaining asset service lives. Interest capitalized to assets under construction during 2019 was \$467 thousand (2018 - \$254 thousand).

10. OTHER REVENUE

In its administration of the IESO administered markets, the IESO directs the investment of market funds in investments throughout the IESO administered markets settlement cycle. The IESO is entitled to receive the investment income and investment gains, net of investment losses earned on funds passing through the IESO administered markets settlement accounts. The IESO is not entitled to the principal on IESO administered markets investments.

The IESO recognized investment income earned in the settlement accounts of \$6,266 thousand in 2019 (2018 - \$5,024 thousand).

The IESO also recognized application fees of \$22 thousand in 2019 (2018 - \$3 thousand) and program revenue of \$600 thousand (2018 - \$nil).

11. SEGMENT EXPENSES

Expenses related to each segment are apportioned based on the following:

Core Operations – IESO operational expenses based on the fee order approved by the OEB.

Other Government Programs – program expenses administered by the IESO in which the government compensates the IESO for all expenses.

Smart Metering Entity – SME operational expenses based on the fee order approved by the OEB.

Market Sanctions and Payment Adjustments – expenses incurred for market enforcement and education activities which are recoverable from the IESO administered markets.

Expenses by object for 2019 are comprised of the following:

(in thousands of Canadian dollars)	2019 Core Operations	2019 Other Government Programs	2019 Smart Metering Entity	2019 Market Sanctions & Payment Adjustments	2019 Total
	\$	\$	\$	\$	\$
Compensation and benefits	122,334	632	3,112	5,402	131,480
Professional and consulting	18,133	2,522	16,488	1,927	39,070
Operating and administration	36,871	164	6,136	1,857	45,028
Amortization	19,060	-	4,866	-	23,926
Interest	2,064	87	20	-	2,171
Foreign exchange gain	(9)	-	-	-	(9)
Contract cancellation costs (Note 12 (f))	-	102,226	-	-	102,226
Less: Recoveries	(3,463)	-	-	-	(3,463)
Total Expenses	194,990	105,631	30,622	9,186	340,429

Expenses by object for 2018 are comprised of the following:

(in thousands of Canadian dollars)	2018 Core Operations	2018 Other Government Programs	2018 Smart Metering Entity	2018 Market Sanctions & Payment Adjustments	2018 Total
	\$	\$	\$	\$	\$
Compensation and benefits	123,880	1,799	2,840	4,388	132,907
Professional and consulting	20,004	285,067	15,742	1,198	322,011
Operating and administration	36,418	1,424	5,283	797	43,922
Amortization	19,616	-	4,519	-	24,135
Interest	1,978	914	49	-	2,941
Foreign exchange gain	(386)	-	-	-	(386)
Less: Recoveries	(4,357)	-	-	-	(4,357)
Total Expenses	197,153	289,204	28,433	6,383	521,173

12. RELATED PARTY TRANSACTIONS

The Province of Ontario controls the IESO by virtue of its ability to appoint the IESO's Board of Directors.

The OEFC, OEB, Hydro One, Ontario Power Generation, the Ministry of Energy, Northern Development and Mines (ENDM), and the Ministry of the Environment, Conservation and Parks (MOECP) are related parties of the IESO through the common control of the Province of Ontario. Transactions between related parties and the IESO are outlined below.

All related party transactions were measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

- a) The IESO holds a note payable and an unsecured credit facility agreement with the OEFC (Note 7). Interest payments made by the IESO in 2019 for the note payable were \$2,120 thousand (2018 - \$2,120 thousand) and for the credit facility were \$269 thousand (2018 - \$761 thousand). As of December 31, 2019, the IESO had an accrued interest payable balance with the OEFC of \$nil (2018 - \$225 thousand).
- b) Under the *Ontario Energy Board Act, 1998*, the IESO incurs registration and license fees. The total of the transactions with the OEB was \$1,728 thousand in 2019 (2018 - \$1,648 thousand).
- c) The IESO performed connection and bulk electric system exception assessments for Hydro One in 2019, and invoiced Hydro One \$188 thousand (2018 - \$197 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. In 2019, the IESO incurred costs of \$157 thousand (2018 - \$139 thousand) for these services and as of December 31, 2019, had a net receivable balance with Hydro One of \$52 thousand (2018 - \$10 thousand).
- d) The IESO performs connection assessment and approvals for Ontario Power Generation, delivers telecommunication services to market participants to connect to the real-time market systems and provides market-related training courses. In 2019, Ontario Power Generation was invoiced \$112 thousand (2018 - \$94 thousand) and as of December 31, 2019, the IESO had a net receivable balance with Ontario Power Generation of \$44 thousand (2018 - \$32 thousand).
- e) The IESO has entered into transfer payment agreements with the MOECP to design and deliver, directly or through contracted third parties, various programs funded through the Green Ontario Fund. For 2019, under these agreements, the IESO accrued or received amounts from MOECP of \$1,925 thousand (2018 - \$289,204 thousand) and as of December 31, 2019, the IESO had a net receivable balance with MOECP of \$53 thousand (2018 - \$69,199 thousand).
- f) In 2018, under the directive from the ENDM, the IESO exercised its termination rights under certain renewable energy contracts that had not yet reached an advanced stage in their development. The IESO and ENDM entered into agreements in which ENDM will compensate for the related costs to support the termination of these contracts. For 2019, under these agreements, the IESO accrued or received amounts from ENDM of \$104,305 thousand (2018 - \$nil) and as of December 31, 2019 the IESO had a net receivable balance with ENDM of \$100,424 thousand (2018 - \$nil). The IESO may be liable under additional terminated renewable energy contracts to a maximum of \$6,816 thousand; however, the likelihood or amount of any liability under these contracts cannot be reasonably determined and therefore no liability has been accrued in these financial statements.

13. 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 has 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, 2019 (2018 - \$nil), 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 \$777 thousand as at December 31, 2019 (2018 - \$664 thousand).

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, 2019, would have resulted in a change for the year of approximately \$9,261 thousand (2018 - \$7,927 thousand). 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, 2019, included no material items past due and substantially all of the balance is expected to be collected within 60 days from December 31, 2019. 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 two 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.

14. COMMITMENTS**Operating commitments**

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

As at December 31 (in thousands of Canadian dollars)

	\$
2020	6,529
2021	6,700
2022	5,645
2023	5,669
2024 and thereafter	10,508
Total	35,051

15. 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.

Executive Compensation at the IESO

Program Objectives

The IESO's executive compensation program 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 employees needed to carry out the IESO's mandate;
- To have the flexibility to reward results and demonstrated competencies; and
- To have compensation levels that are reasonable, responsible and in compliance with provincial regulations.

The philosophy underlying these objectives is that total compensation for executives should be sufficient 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. It delegates the responsibility to thoroughly review the compensation objectives, policies and programs to its Human Resources and Governance Committee (HRGC), which makes recommendations to the full Board for approval.

The Board is composed of nine independent, external Directors, appointed by the Minister of Energy, Northern Development and Mines, and the President and Chief Executive Officer of the IESO. Directors have broad experience in the electricity industry and public sector organizations, as well as significant experience dealing with human resource matters, including the setting and implementation of compensation policies and programs.

In carrying out its mandate, the Board has access to management's analysis, as well as the recommendations 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 establishing and implementing compensation policies and programs. Each year, the Board presides over and approves the IESO's Business Plan. An important component of this process involves the consideration of enterprise risk, together with implementation of mitigating actions. The latter encompasses the assessment of all significant risks to the IESO, including those related to 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 review by the Ontario Energy Board. A range of small and large consumers, assisted by their legal and professional advisors, is represented in these public proceedings.

Market Comparisons

The IESO reviews the competitiveness of 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 Ontario Power Authority, the Ministry of Energy retained the Korn Ferry Hay Group, a global management consulting firm, to evaluate the CEO position for the new organization and establish a market-based salary range. Subsequent to the CEO's appointment 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. The Hay job evaluation methodology continues to be used for the executive and management group.

The current comparator group was amended in 2018 from a hybrid of public and private sector employers to 19 Canadian public sector organizations. This change was required under the regulations in effect at that time under the *Broader Public Sector Executive Compensation Act, 2014* (2016 Executive Compensation Framework Regulation).

The comparator group represents organizations across a range of industries (such as electricity, energy, asset management, financial services, infrastructure, procurement and engineering), with core business activities and roles that are similar to those at the IESO. These include:

Alberta Electric System Operator	Oakville Hydro Corporation
Alectra Inc.	Ontario Financing Authority
CPP Investment Board	Ontario Lottery and Gaming Corporation
CSA Group	Ontario Pension Board
Canada Deposit Insurance Corporation	Ontario Power Generation Inc.
Canada Lands Company CLC Limited	Ontario Teachers' Pension Plan Board
Deposit Insurance Corporation of Ontario	Toronto Hydro-Electric System Limited
Hydro One Inc.	Veridian Corporation
Hydro Ottawa Limited	Waterfront Toronto
Metrolinx	

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

- President and Chief Executive Officer
- VP, Corporate Services and Chief Financial Officer
- VP, Planning, Acquisition and Operations and Chief Operating Officer
- VP, Policy, Engagement and Innovation
- VP, Information and Technology Services and Chief Information Officer
- VP, Legal Resources and Corporate Governance
- VP, Human Resources

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

Using the market information from the above peer group, the maximums for each executive salary grade were determined as the market price point for comparison purposes.

The maximums 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 target 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.

As part of the 2016 Executive Compensation Framework Regulation, the IESO posted its approved Executive Compensation Framework on its website in February 2018 and provided retroactive compensation increases in accordance with this Regulation. Subsequently, the IESO complied with the new 2018 Compensation Framework Regulation that came into effect on August 13, 2018, and required the IESO to freeze executive compensation as of that date. It is expected that the Ontario government will provide a revised Executive Compensation Framework in 2020.

Program Description

The IESO's 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) that affect compensation, as well as internal compensation relativities. Based on this data and the IESO's business priorities, Human Resources develops recommendations on compensation programs. External specialized compensation, benefit and pension consultants are engaged to ensure accurate, representative market compensation data is obtained and current industry compensation trends are being considered, as well as to 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 and managing vision and purpose. Assessments are based upon demonstrated competency. Each individual is awarded a fixed compensation level within their band based upon their assessed competency.

Program Description – Variable Compensation

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 corporate performance results and the CEO's individual performance results. Under the plan, having assessed the results against target, the Board has discretion in determining the final performance rating. The Board considers the assessed results, which have been verified through an internal audit process, 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 at or below the capped amount depending on the performance results achieved. The 2019 annual award was paid on December 13, 2019.

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 employees through a flexible component within the plan. The flexible element gives executives and all other non-represented employees the flexibility to adjust their benefits, including vacation, life insurance, and health coverage, to meet their individual/family needs.

Program Description – Pension Plan

The IESO's 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 Canada Revenue Agency limits the amount of pension payable from a registered plan, the IESO has a secured supplemental employee retirement plan (SERP) to provide required pension income to meet the commitments of the plan above that payable from the registered plan.

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

Performance Measures & Impact on Compensation

The IESO establishes corporate performance measures aligned with its business priorities during its annual 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 previously, the corporate results achieved each year impact each executive's variable pay.

For 2019, the Board assessed corporate results and determined that overall the IESO met expectations for the measures and targets specified. In addition to the corporate measures, each executive also had an individual set of measures and targets aligned with the corporate performance objectives and IESO business priorities, which were similarly assessed. The Board assessed the results of the CEO's performance. The CEO evaluated the performance of the Vice-Presidents and these assessments 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, if required, approval of individual arrangements relating to terms of employment may be sought and established.

Compensation Restraints

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

The BPSAA was superseded by the *Broader Public Sector Executive Compensation Act, 2014* (BPSECA). The 2016 Executive Compensation Framework Regulation under the BPSECA came into effect for the IESO in February 2018 and permitted retroactive compensation adjustments to September 1, 2017. Government subsequently repealed this Framework Regulation and replaced it with the 2018 Compensation Framework Regulation, which imposed a compensation freeze on executive compensation at the levels in effect on August 13, 2018. It is expected that the government's review of this compensation restraint will be complete in 2020.

Executive Compensation Statement

The 2019 Summary Compensation Table details the annual compensation for the year ended December 31, 2019 for the executives listed. Note: The figures reported as 2019 "Salary Paid" in the 2019 Public Sector Salary Disclosure for executives include the 2019 earned variable compensation, and deferred benefits, such as 2019 vacation that was paid on December 13, 2019.

2019 SUMMARY COMPENSATION TABLE

Name & Position	Base Salary	Variable Pay ¹	Other Annual Compensation ²	Total Cash Compensation ³
Peter Gregg President & CEO	\$630,000	\$52,605	\$43,218	\$725,823
Barbara Anderson VP, Corporate Services and CFO	\$295,000	\$24,485	\$286	\$319,771
Leonard Kula VP, Planning, Acquisition & Operations and COO	\$385,000	\$29,934	\$12,845	\$427,779
Terence Young VP, Policy, Engagement & Innovation	\$338,500	\$27,486	\$21,136	\$387,122
Alex Foord VP, Information & Technology Services and CIO	\$318,000	\$25,679	\$0.72	\$343,680

1. 2019 earned variable compensation is calculated on annualized base pay and was paid in December 2019.

2. Represents remaining flex benefit credits, including deferred earned vacation, paid out at year end as taxable income.

3. These amounts will be reported as "Salary Paid" under the Annual Public Sector Salary Disclosure (PSSD).

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

Executive Leadership Team

Peter Gregg
President and Chief Executive Officer

Barbara Anderson
Chief Financial Officer and
Vice-President, Corporate Services

Alex Foord
Chief Information Officer and
Vice-President, Information and
Technology Services

Leonard Kula
Chief Operating Officer and
Vice-President, Planning,
Acquisition and Operations

Michael Lyle
Vice-President, Legal Resources and
Corporate Governance

Glenn McDonald
Vice-President
Market Assessment and Compliance

Robin Riddell
Vice-President, Human Resources

Terence Young
Vice-President, Policy, Engagement
and Innovation

Board of Directors

Joe Oliver
Chairman of the Board
*Former Minister of Finance, Minister
of Natural Resources, Minister
Responsible for the GTA and MP for
Eglinton-Lawrence. Chairman of
Echelon Wealth Partners, PlantExt
and Independent Review Committee
of RP Strategic Income Fund*

Peter Gregg
President and Chief Executive Officer
Independent Electricity System
Operator

Steve Baker
Director
Former president of Union Gas, Enbridge

Michael Bernstein
Director
*President of Juno Advisors Ltd.;
chair of CircuitMeter Inc., and
a director of Biome Renewable*

Simon Chapelle
Director
*Corporate Director, The Chapelle Group;
Kingston City Councillor*

Cynthia Chaplin
Director
*Executive Director of CAMPUT; former
vice-chair of the Ontario Energy Board*

Margaret Kelch
Director and Chair, Human Resources
and Governance Committee
*Owner, Margaret Kelch & Associates;
former director, Electrical Safety
Authority, Guelph Hydro Electric
Systems Inc.*

Patricia Koval
Director
*Former adjunct professor, University of
Toronto; retired senior partner, Torys LLP*

David Sinclair
Director
*Former president and CEO of Kenora
Hydro-Electric Corporation Ltd.;
former chair of the Ontario Municipal
Electric Association (now Electricity
Distributors Association)*

Richard Wilson
Director
*Partner, Cybersecurity & Privacy,
PwC Canada*

Stakeholder Advisory Committee

Brian Bentz (Chair)

President & Chief Executive Officer
Alectra
Representing: Distributors and Transmitters

Nicolas Bossé

Senior Vice-President
Governmental & Regulatory Affairs
Brookfield Renewable
Representing: Energy-related Businesses and Services

David Butters

President & Chief Executive Officer
Association of Power Producers of Ontario
Representing: Generators

Pat Chilton

Chief Executive Officer
Five Nations Energy Inc.
Representing: Ontario Communities

Judy Dezell

Director, Enterprise Centre,
Business Partnerships & LAS
Association of Municipalities of Ontario
Representing: Ontario Communities

Brandy Giannetta

Regional Director
Canadian Wind Energy Association
Representing: Generators

Malini Giridhar

Vice-President, Business Development & Regulatory Affairs
Enbridge Gas Inc.
Representing: Energy-related Businesses and Services

Julie Girvan

Consumers Council of Canada
Representing: Consumers

Jim Hogan

President & Chief Executive Officer
Entegrus
Representing: Distributors and Transmitters

Rachel Ingram

Vice-President & General Counsel
Rodan Energy Solutions
Representing: Energy-related Businesses and Services

Bruno Jesus

Vice-President of Planning & Engineering
Hydro One Networks Inc.
Representing: Distributors and Transmitters

Frank Kallonen

President & Chief Executive Officer
Greater Sudbury Hydro
Representing: Distributors and Transmitters

Paul Norris

President
Ontario Waterpower Association
Representing: Generators

Mark Passi

Manager, Energy
Glencore
Representing: Consumers

Mark Schembri

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

James Scongack (Vice-Chair)

Executive Vice-President, Corporate Affairs & Operational Services
Bruce Power
Representing: Generators

Hari Suthan

Chief Strategic Growth & Policy Officer
Opus One Solutions
Representing: Energy-related Businesses and Services

Annette Verschuren

Chair & CEO
NRStor Inc.
Representing: Energy-related Businesses and Services

Terence Young

Vice-President, Policy, Engagement & Innovation
Independent Electricity System Operator
Representing: IESO

Stakeholder Advisory Committee Secretariat

Trevor Esdaile

Technical Panel

Michael Lyle (Chair)

Vice-President, Legal Resources
& Corporate Governance
Independent Electricity System
Operator

Representing: IESO

Robert Bieler

Representing: Consumers

Ron Collins

President & Chief Executive Officer
Sinopa Energy Inc.

*Representing: Energy-related
Businesses and Services*

Rob Coulbeck

Special Advisor
Nexus Energy Canada

Representing: Retailers or Wholesalers

David Forsyth

Technical Specialist
Association of Major Power
Consumers in Ontario
*Representing: Market Participant
Consumers*

Sarah Griffiths

Director, Regulatory Affairs
Enel X North America
Representing: Other Market Participants

Robert Lake

Representing: Residential Consumers

Phil Lasek

Senior Electrical Engineer
Shell Canada Products
*Representing: Market Participant
Consumers*

Robert Reinmuller

Director, Transmission
System Planning
Hydro One Networks Inc.
Representing: Transmitters

Sushil Samant

Director, Gas & Electricity Marketing
Northland Power
*Representing: Market Participant
Generators*

Joe Saunders

Vice-President, Regulatory
Compliance & Asset Management
Burlington Hydro
Representing: Distributors

Jessica Savage

Director, Corporate &
Regulatory Affairs
Independent Electricity System
Operator
Representing: IESO

Vlad Urukov

Director, Generation
Revenue & Planning
Ontario Power Generation
*Representing: Market Participant
Generators*

Technical Panel Secretariat

Jason Grbavac

Ontario Energy Board Liaison

David Brown

Senior Advisor, Strategic Policy
Ontario Energy Board

Independent Electricity

System Operator

1600-120 Adelaide Street West
Toronto, ON M5H 1T1

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 @IESO_Tweets

 OntarioIESO

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ieso.ca

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

2020 Annual Report

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Message from the Interim President and CEO



With the impacts of COVID-19 upending virtually every aspect of our society and our lives, 2020 was a year like no other in recent memory. Despite the many challenges posed by the pandemic, the IESO remained focused on ensuring Ontario could count on a reliable, sustainable and cost-effective electricity system.

From the beginning, we prioritized the health and welfare of our employees. In mid-March, non-essential staff started working from home, with access to our three office locations restricted. We relied on guidance from public health officials as well as our existing pandemic planning protocols and took all precautions necessary to ensure that IESO staff could safely support the ongoing operation of the power grid and the wholesale electricity markets. In addition, we implemented new technologies to safely and securely support remote work, including new communication and collaboration tools, as well as measures to mitigate against emerging cybersecurity risks.

Ensuring the safe and reliable operation of Ontario's power system requires us to work with partners across the sector, including generators, transmitters, distributors, energy service providers and large consumers, among others. Managing the effects of COVID-19 has been a sector-wide priority, and we've come together to share vital information about resource availability, system conditions and emerging demand patterns. This collaboration was critical to maintaining the reliability of the electricity system.

Forecasting demand for electricity during the year was a challenge but patterns gradually emerged, with agricultural and residential consumption increasing, commercial and institutional demand decreasing, and industrial usage staying fairly flat. Although total electricity consumption dropped by 2.1% as a result of prolonged stay-at-home measures, the hourly demand peak in 2020 reached 24,446 megawatts on

July 9 – the highest hourly peak since 2013. This can be attributed in part to higher-than-normal air conditioning load as people worked from home during a prolonged period of hot weather as well as a temporary hiatus of the Industrial Conservation Initiative.

Despite the challenges associated with managing the pandemic from an operational perspective, the IESO remained steadfast in our focus on delivering value. Costs have been contained by deferring lower priority projects, actively managing staffing requirements and reducing expenditures. After maintaining flat revenue requirement levels from 2017-2019, the IESO reduced its revenue requirement for 2020 in response to the emergence of COVID-19.

We have a long history of working proactively with stakeholders and communities, whose input helps us make better decisions and achieve better outcomes. In response to feedback about our engagement processes, we developed a new framework that provides more clarity and predictability to stakeholders. To ensure the safety and wellbeing of our participants during the pandemic, all stakeholder engagements were moved online, resulting in a 40% increase in participation.

Although the IESO's stakeholder engagement framework has been very effective in helping us reach our core audience of market participants and other industry representatives, the ongoing changes in the sector – which include greater consumer and community engagement – have made it important for us to broaden our reach.

In late December 2020, we launched IESO Connects, an online engagement platform to enable ongoing discussions with Regional Electricity Network members and Indigenous communities across Ontario about their region-specific electricity issues and priorities. The new platform offers a variety of features, including a forum for providing feedback that will deepen our understanding of local energy needs. Prior to launching the platform, we also hosted two well-attended webinars to engage with First Nations across the province. Attendee feedback will directly inform the design of new First Nations programming, including conservation.

Effective engagement is one of the prerequisites for advancing our priorities, which also include enabling competition and accelerating the evolution of Ontario's electricity markets. Through an active,

multi-year engagement process, the Market Renewal - Energy project reached a major milestone in 2020 by publishing the final detailed design documents that describe the structure and processes of the renewed market. When fully implemented, the initiative is expected to deliver \$800 million in net benefits in the first 10 years alone.

The IESO is committed to expanding participation in the electricity markets and using competition to drive down costs. Building on the existing Demand Response Auction, we implemented a Capacity Auction in the fall of 2020 that attracted participation from energy storage, non-contracted generators, demand response and imports – resulting in a 26% decrease in the clearing price for the summer 2021 obligation period. Going forward, capacity auctions will be a vital mechanism to help us meet the province's near-term needs.

While capacity auctions will be the primary mechanism to meet short-term needs, it is clear that a variety of solutions are needed to address the province's growing capacity needs. The release of the Annual Planning Outlook in December shows that capacity needs will grow mid-decade as generator contracts expire and the Pickering Nuclear Generating Station retires. In 2020, the IESO worked with stakeholders to develop a high-level resource adequacy framework to competitively acquire capacity to meet system needs across all time frames.

We also continued to invest in innovative projects that could help defer the need for new infrastructure while enabling businesses to earn new revenue streams. For example, homeowners, supermarket operators, manufacturers and other organizations competed and were selected to participate in a pilot project in York Region. By generating electricity on site or reducing their electricity use, these resources will help test how these new supply options could address growing demand in the region.

The IESO's Save on Energy conservation programs also played a key role in meeting system needs in 2020. Businesses and institutions, Indigenous peoples, and income-eligible residential customers participating in Save on Energy conservation programs helped to reduce or delay the need for new infrastructure, while lowering their own energy costs. The IESO adjusted program delivery to stop all home and business visits due to the pandemic, and spent most of 2020 preparing to implement a new conservation framework that was launched in January 2021. Over the next four years, up to \$692 million will be invested, enabling Ontario's electricity consumers to improve the energy efficiency of their homes, businesses, institutions and industrial facilities.

Looking ahead, ensuring a reliable and cost-effective supply of electricity will be critical to individual, organizational and community well-being in 2021. We will continue to engage with stakeholders and communities, provide clear and transparent insights into our operations, explore new and different ways of doing our work more efficiently, and ensure Ontario has the electricity where and when it is needed to help put the province firmly on the path to a sustainable economic recovery.



Terry Young,
Interim President and Chief Executive Officer

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 10, 2021.

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 Grant Thornton LLP, a firm of independent external auditors appointed by the Board of Directors. The auditor's responsibility is to express an opinion on whether the financial statements are fairly presented in accordance with generally accepted accounting principles in Canada. The Independent Auditor's Report, which follows, outlines the scope of their examination and opinion.

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

On behalf of management,



Terry Young
Interim President and Chief Executive Officer
Toronto, Canada
March 10, 2021



Barbara Anderson
Chief Financial Officer and Vice-President,
Corporate Services
Toronto, Canada
March 10, 2021

Independent Auditor's Report

To the Board of Directors of the Independent Electricity System Operator

Opinion

We have audited the financial statements of the Independent Electricity System Operator ("IESO"), which comprise the statement of financial position as at December 31, 2020, and 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 to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the IESO as at December 31, 2020, and its results of operations, remeasurement gains and losses, changes in its net debt, and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the IESO in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance 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.

In preparing the financial statements, management is responsible for assessing the IESO's ability to continue as a going concern, disclosing, as applicable, matters related to a going concern and using the going concern basis of accounting unless management either intends to liquidate the IESO or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the IESO's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit 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 IESO's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the IESO's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the IESO to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

The logo for Grant Thornton LLP, featuring the company name in a stylized, cursive script.

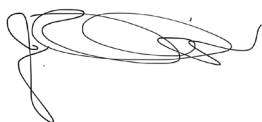
Grant Thornton, LLP
Chartered Professional Accountants
Licensed Public Accountants

Mississauga, Canada
March 10, 2021

Statement of Financial Position

As at (in thousands of Canadian dollars)	December 31, 2020	December 31, 2019
	\$	\$
FINANCIAL ASSETS		
Cash	79,355	69,049
Accounts receivable (Note 3)	104,951	142,582
Long-term investments (Note 4)	55,570	50,316
TOTAL FINANCIAL ASSETS	239,876	261,947
LIABILITIES		
Accounts payable and accrued liabilities (Note 5)	116,103	130,647
Rebates due to market participants (Note 7)	2,459	-
Debt (Note 8)	120,000	120,000
Accrued pension liability (Note 9)	25,120	26,296
Accrued liability for employee future benefits other than pension (Note 9)	150,961	140,841
TOTAL LIABILITIES	414,643	417,784
NET DEBT	(174,767)	(155,837)
NON-FINANCIAL ASSETS		
Tangible capital assets (Note 10)	149,813	116,567
Prepaid expenses	8,695	8,312
TOTAL NON-FINANCIAL ASSETS	158,508	124,879
ACCUMULATED DEFICIT		
Accumulated deficit from operations	(31,076)	(43,014)
Accumulated remeasurement gains	14,817	12,056
ACCUMULATED DEFICIT (Note 6)	(16,259)	(30,958)
Commitments (Note 15)		
Contingencies (Note 16)		
See accompanying notes to financial statements		

On behalf of the Board:



Joe Oliver
Chair
Toronto, Canada



Cynthia Chaplin
Director
Toronto, Canada

Statement of Operations and Accumulated Deficit

For the year ended December 31 (in thousands of Canadian dollars)	2020	2020	2019
	Budget \$	Actual \$	Actual \$
IESO CORE OPERATIONS			
System fees	189,568	188,602	190,950
Other revenue (Note 11)	2,780	3,651	6,888
Interest and investment income	2,004	2,989	4,772
Core operation revenues	194,352	195,242	202,610
Core operation expenses (Note 12)	(194,352)	(189,714)	(194,990)
Core operations surplus	-	5,528	7,620
OTHER GOVERNMENT PROGRAMS			
Government transfer	-	888	105,631
Government transfer expenses (Note 12)	-	(888)	(105,631)
Government transfer surplus	-	-	-
SMART METERING ENTITY			
Smart metering charge	34,116	35,249	34,911
Smart metering expenses (Note 12)	(33,318)	(25,997)	(30,622)
Smart metering entity surplus before rebates	798	9,252	4,289
Rebates issued to market participants (Note 7)	-	(2,459)	-
Smart metering entity surplus	798	6,793	4,289
MARKET SANCTIONS AND PAYMENT ADJUSTMENTS			
Market sanctions and payment adjustments	11,080	10,056	9,067
Customer education and market enforcement expenses (Note 12)	(11,080)	(10,439)	(9,186)
Market sanctions and payment adjustments deficit	-	(383)	(119)
SURPLUS	798	11,938	11,790
ACCUMULATED DEFICIT FROM OPERATIONS, BEGINNING OF PERIOD	(43,014)	(43,014)	(54,804)
ACCUMULATED DEFICIT FROM OPERATIONS, END OF PERIOD	(42,216)	(31,076)	(43,014)

See accompanying notes to financial statements

Statement of Remeasurement Gains and Losses

For the year ended December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
ACCUMULATED REMEASUREMENT GAINS, BEGINNING OF PERIOD	12,056	7,569
UNREALIZED GAINS/LOSSES ATTRIBUTABLE TO:		
Foreign exchange - other	567	562
Portfolio investments	2,756	5,344
AMOUNTS RECLASSIFIED TO THE STATEMENT OF OPERATIONS:		
Foreign exchange - other	(562)	(579)
Portfolio investments	-	(840)
NET REMEASUREMENT GAINS FOR THE PERIOD	2,761	4,487
ACCUMULATED REMEASUREMENT GAINS, END OF PERIOD	14,817	12,056
See accompanying notes to financial statements		

Statement of Change in Net Debt

For the year ended December 31 (in thousands of Canadian dollars)	2020	2020	2019
	Budget \$	Actual \$	Actual \$
SURPLUS	798	11,938	11,790
CHANGE IN NON-FINANCIAL ASSETS			
Acquisition of tangible capital assets	(53,500)	(56,292)	(36,541)
Amortization of tangible capital assets	24,979	23,046	23,926
Change in prepaid expenses	-	(383)	(2,078)
TOTAL CHANGE IN NON-FINANCIAL ASSETS	(28,521)	(33,629)	(14,693)
NET REMEASUREMENT GAINS FOR THE PERIOD	-	2,761	4,487
CHANGE IN NET DEBT	(27,723)	(18,930)	1,584
NET DEBT, BEGINNING OF PERIOD	(155,837)	(155,837)	(157,421)
NET DEBT, END OF PERIOD	(183,560)	(174,767)	(155,837)

See accompanying notes to financial statements

Statement of Cash Flows

For the year ended December 31 (in thousands of Canadian dollars)

	2020	2019
	\$	\$
OPERATING TRANSACTIONS		
Surplus	11,938	11,790
Changes in non-cash items:		
Amortization	23,046	23,926
Unrealized foreign exchange gains/(losses) for the period	5	(17)
Pension expense	(1,176)	(4,270)
Other employee future benefits expense	10,120	9,317
Gain on disposal of long-term investments	-	(840)
	31,995	28,116
Changes in non-cash balances related to operations:		
Change in accounts payable and accrued liabilities	(15,896)	68,493
Change in accounts receivable	37,631	(31,325)
Change in rebates due to market participants	2,459	-
Change in prepaid expenses	(383)	(2,078)
	23,811	35,090
Cash provided by operating transactions	67,744	74,996
CAPITAL TRANSACTIONS		
Acquisition of tangible capital assets	(56,292)	(36,541)
Change in accounts payable and accrued liabilities related to tangible capital assets	1,352	772
Cash applied to capital transactions	(54,940)	(35,769)
INVESTING TRANSACTIONS		
Purchase of long-term investments	(2,498)	(2,425)
Proceeds on sale of long-term investments	-	1,123
Cash applied to investing transactions	(2,498)	(1,302)
FINANCING TRANSACTIONS		
Debt Repayment	-	(125,000)
Cash applied to financing transactions	-	(125,000)
INCREASE (DECREASE) IN CASH	10,306	(87,075)
CASH - BEGINNING OF PERIOD	69,049	156,124
CASH - END OF PERIOD	79,355	69,049

See accompanying notes to financial statements

Notes to Financial Statements

1. NATURE OF OPERATIONS

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 Act). As set out in the Act, the IESO operates pursuant to a licence granted by the Ontario Energy Board (OEB).

The objects of the IESO are contained in the Act and associated Ontario regulations. The IESO ensures the reliability of the province's power system on behalf of all Ontarians, leveraging its expertise and purposeful engagement to advance energy policy that cost effectively achieves this goal. As part of its mandate, the IESO operates Ontario's electricity grid in real-time, governs electricity markets, prepares for the future to ensure electricity will be available when and where it is needed, and helps inform the decisions that will be critical to shaping the future of the sector.

The IESO operates the IESO-administered markets and the OEB has regulatory oversight of electricity matters in Ontario. In addition, in 2007 the IESO was designated the Smart Metering Entity (SME) by Ontario statute. In its role as the SME, the IESO maintains and operates the province's smart metering data repository, the central hub for processing, storing and protecting electricity consumption data used for consumer billing by local distribution companies.

In 2018, the IESO's licence was amended to require the organization to provide and promote centralized cybersecurity information services in conjunction with licenced transmitters and distributors. Under the amendment, these services include providing situational awareness of potential threats that may affect the electricity sector, and developing an information exchange mechanism for sharing cybersecurity best practices to improve sector understanding of associated risks and solutions.

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 (PSAS) and reflect the following significant accounting policies.

These financial statements do not include the financial accounts and Government transfers for the IESO-administered markets as the IESO is an intermediary to facilitate the settlement of these transactions. A separate and distinct set of financial statements is prepared for the IESO-administered markets. The IESO-administered markets is as prescribed by the Act and associated Ontario regulations.

b) Revenue recognition

System fees earned by the IESO are based on rates approved by the OEB for each megawatt of electricity withdrawn from the IESO-controlled grid. System fees are recognized as revenue at the time the electricity is withdrawn.

The SME's charge is based on rates approved by the OEB for each installed smart meter in the province. Revenue is recognized by charging the OEB approved rate per smart meter per month.

Other revenue represents amounts that accrue to the IESO relating to investment income on funds passing through market settlement accounts, program revenue, as well as application fees. Investment income is recognized monthly. Program revenue and application fees are recognized when service is provided.

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

Government transfers are recognized as revenue in the financial statements in the period in which the events giving rise to the transfer occur, providing the transfers are authorized, any eligibility criteria have been met and reasonable estimates of the amounts can be made.

Market sanctions represent funds received to offset payments disbursed related to penalties, damages, fines and payment adjustments. Such revenue is recognized when settlement disputes are resolved.

c) Financial instruments

The IESO records cash and cash equivalents, long-term investments and foreign currency exchange forward contracts at fair value. The cumulative change in fair value of these financial instruments is recorded in accumulated deficit 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) 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 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 2020.

An impairment loss on tangible capital assets is recognized when conditions indicate that the asset no longer contributes to the IESO's ability to provide services, or that the value of the future economic benefit associated with the tangible capital asset is less than its net book value.

Assets under construction generally relates to the costs of physical facilities, information technology 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. The IESO capitalizes applicable interest as part of the cost of tangible capital assets.

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 2020	Estimated Average Service Life 2019
Facilities and leasehold improvements	5 to 50	5 to 50
Market systems and applications	3 to 12	4 to 12
Information technology hardware and other assets	3 to 10	4 to 10
Meter data management / repository	4 to 10	4 to 10

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

e) 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 plans and the related costs, net of plan assets. Pension and other post-employment benefit 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 rates utilized to value liabilities as at the measurement date of September 30 are based on the expected rate of return on plan assets for the registered pension plan and the IESO's estimated cost of borrowing for the supplemental employee retirement and other post-employment benefit plans.

The expected return on plan assets is based on management's long-term best estimate using a market-related value of registered pension 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 other post-employment benefit expenses are recorded during the year in which employees render services. Pension and other post-employment benefit 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 14.5 years (2019 - 14.5 years) and other post-employment benefit plan is 17.2 years (2019 - 16.7 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.

f) Foreign currency exchange

Transactions denominated in foreign currencies are converted 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 converted to Canadian dollars at the rate of exchange as of the date of the financial statements. The cumulative unrealized foreign currency exchange gains and losses of items continuing to be recognized on the statement of financial position are recorded in 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.

g) 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, accrual for contract cancellation costs (Note 13 (f)), accrued pension liability and accrual for employee future benefits other than pensions. Actual results could differ from those estimates.

3. ACCOUNTS RECEIVABLE

Accounts receivable includes an amount of \$25,222 thousand (2019 - \$40,080 thousand) due from the IESO-administered markets which are managed by the IESO.

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 \$54,834 thousand (2019 - \$49,707 thousand). As at December 31, the market value allocation of these long-term investments was 61.6% equity securities and 38.4% debt securities (2019 - 62.1% and 37.9%, respectively). In addition to the balanced portfolio of pooled funds, the IESO has a long-term deposit with Canada Revenue Agency in the amount of \$736 thousand (2019 - \$609 thousand) pertaining to the Retirement Compensation Arrangements Trust (Note 8).

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Opening balance - pooled funds	49,707	43,131
Purchase of investments	2,371	2,355
Sale of investments	-	(1,123)
Change in fair value	2,756	5,344
Sub-total - Balanced portfolio of pooled funds' closing balance	54,834	49,707
Canada Revenue Agency's Retirement Compensation Arrangements amount	736	609
Total	55,570	50,316

Fair value measurements of long-term investments are categorized using a fair value hierarchy that reflects the significance of inputs used in determining the fair values.

- Level 1: unadjusted quoted prices in active markets for identical assets or liabilities;
- Level 2 : inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly; and
- Level 3: inputs for assets and liabilities that are not based on observable market data.

There were no transfers from Level 1, Level 2, or Level 3 during fiscal 2020 or during fiscal 2019.

The following tables illustrate the classification of the long-term investments within the fair value hierarchy as at year-end:

Fair value as at December 31, 2020

(in thousands of Canadian dollars)	Level 1	Level 2	Level 3	Total
Cash Deposits - Canada Revenue Agency	736	-	-	736
TD Emerald Pooled Funds	-	54,834	-	54,834
	736	54,834	-	55,570

Fair value as at December 31, 2019

(in thousands of Canadian dollars)	Level 1	Level 2	Level 3	Total
Cash Deposits - Canada Revenue Agency	609	-	-	609
TD Emerald Pooled Funds	-	49,707	-	49,707
	609	49,707	-	50,316

5. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Relating to operations	111,185	127,081
Relating to tangible capital assets	4,918	3,566
Closing balance	116,103	130,647

6. ACCUMULATED DEFICIT

The IESO's regulatory deferral account balance is subject to OEB orders. During 2020, the IESO received a decision and order by the OEB to maintain the regulatory deferral account at a maximum of \$10,000 thousand (2019 - \$10,000 thousand).

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

Total - Accumulated Deficit

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Regulatory deferral account (a)	1,250	(1,020)
Smart Metering Entity (b)	18,130	11,337
Accumulated market sanctions and payment adjustments (c)	-	383
Remeasurement gains (d)	10,673	7,912
PSAS transition items (e)	(46,312)	(49,570)
Accumulated deficit - end of year	(16,259)	(30,958)

a) Regulatory Deferral Account - Accumulated Surplus/(Deficit)

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Accumulated deficit - beginning of year	(1,020)	(4,728)
Core operation revenues	195,242	202,610
Core operation expenses	(189,714)	(194,990)
Recovery of annual PSAS transition items*	(3,258)	(3,912)
Accumulated surplus / (deficit) - end of year	1,250	(1,020)

b) Smart Metering Entity Account – Accumulated Surplus

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Accumulated surplus – beginning of year	11,337	7,048
Smart metering charge (before rebates due to market participants)	35,249	34,911
Smart metering expenses	(25,997)	(30,622)
Rebates due to market participants (Note 7)	(2,459)	-
Accumulated surplus – end of year	18,130	11,337

c) Market Sanctions and Payment Adjustments – Accumulated Surplus

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Accumulated surplus – beginning of year	383	502
Market sanctions and payment adjustments	10,056	9,067
Customer education and market enforcement expenses	(10,439)	(9,186)
Accumulated surplus – end of year	-	383

d) Remeasurement Gains

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Accumulated remeasurement gains – beginning of year	7,912	3,425
Net remeasurement gains	2,761	4,487
Accumulated remeasurement gains – end of period	10,673	7,912

e) PSAS Transition Item – Accumulated Deficit

As at December 31 (in thousands of Canadian dollars)	2020	2019
	\$	\$
Accumulated deficit – beginning of year	(49,570)	(53,482)
Recovery of annual PSAS transition items*	3,258	3,912
Accumulated deficit – end of year	(46,312)	(49,570)

*Effective January 1, 2011, the IESO adopted Canadian public sector accounting standards (PSAS) with a transition date of January 1, 2010. The adoption of PSAS 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 \$98,832 thousand at the date of transition being charged to the PSAS Transition Item's accumulated deficit. Each year, the IESO recovers a portion of the PSAS Transition Item's deficit through the IESO's annual system fees revenue. The annual amount recovered is transferred from the Regulatory Deferral Account to the PSAS Transition Item accumulated deficit each year.

7. REBATES DUE TO MARKET PARTICIPANTS

In 2020, the IESO recognized \$2,459 thousand (2019 - \$nil) in rebates due to market participants regarding the SME in accordance with an OEB order. The OEB has ordered that the SME can accumulate up to a maximum operating reserve balance including certain OEB approved adjustments and timelines. The OEB will regularly order the SME to rebate to market participants any amount that exceeds the maximum operating reserve balance. As at December 31, 2020, the rebates due to market participants were \$2,459 thousand (2019 - \$nil).

8. DEBT

Note payable to Ontario Electricity Financial Corporation (OEFC)

In June 2020, the IESO entered into a note payable with the OEFC. The note payable is unsecured, bears interest at a fixed rate of 1.132% per annum and is repayable in full on June 30, 2023. Interest accrues daily and is payable in arrears semi-annually in June and December of each year. As at December 31, 2020, the note payable to the OEFC was \$120,000 thousand (2019 - \$120,000 thousand). For the year ended December 31, 2020, the interest expense on the note payable was \$1,739 thousand (2019 - \$2,120 thousand).

Credit facility with OEFC

The IESO has an unsecured credit facility agreement with the OEFC, which will make available to the IESO an amount up to \$160,000 thousand. Advances and monthly rollover amounts 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. The credit facility expires June 30, 2023. As at December 31, 2020, the credit facility payable to the OEFC was \$nil (2019 - \$nil).

For the year ended December 31, 2020, the interest expense on the credit facility was \$nil thousand (2019 - \$269 thousand).

Retirement Compensation Arrangements Trust

In July 2013, the IESO established a Retirement Compensation Arrangements 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, 2020, the IESO has provided the Retirement Compensation Arrangements' trustee with a bank letter of credit of \$42,390 thousand (2019 - \$35,171 thousand) the trustee can draw upon if the IESO is in default under the terms of this plan.

Workplace Safety and Insurance Board - Ontario

During 2020, the IESO provided the Workplace Safety and Insurance Board with a bank letter of credit of \$20 thousand (2019 - \$20 thousand) for the IESO's obligation under the *Workplace Safety and Insurance Act*.

9. POST-EMPLOYMENT BENEFIT PLANS

The IESO provides pensions 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, the IESO provides certain non-registered defined benefit pensions through an unfunded, indexed, supplemental employee retirement 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)	2020 Pension Benefits	2019 Pension Benefits	2020 Other Benefits	2019 Other Benefits
	\$	\$	\$	\$
Accrued benefit obligation	(650,289)	(618,876)	(165,698)	(145,316)
Fair value of plan assets	663,464	632,234	-	-
Funded status as of measurement date	13,175	13,358	(165,698)	(145,316)
Employer contribution/other benefit payments after measurement date	346	2,584	614	644
Deferred asset (gain)	(7,689)	(18,100)	-	-
Unamortized actuarial (gain) loss subject to amortization	(30,952)	(24,138)	14,123	3,831
Accrued liability recognized in the statement of financial position	(25,120)	(26,296)	(150,961)	(140,841)
Actuarial value of plan assets (as at September 30)	655,774	614,134	-	-

Registered pension plan assets

The one-year actual return on the registered pension plan's assets as at September 30, 2020 was 6.2% per annum (2019: 9.3% per annum).

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:

	2020	2019
Canadian equity securities	15.4%	16.3%
Foreign equity securities	35.7%	34.4%
Canadian debt securities	30.2%	30.3%
Global infrastructure	9.3%	9.2%
Canadian real estate	8.9%	9.3%
Cash equivalents	0.3%	0.6%
Forward foreign exchange contracts	0.2%	-0.1%
	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:

	2020 Registered Pension Benefits	2019 Registered Pension Benefits	2020 Supplemental Pension Benefits	2019 Supplemental Pension Benefits	2020 Other Benefits	2019 Other Benefits
Discount rate at the end of the period	5.50%	5.50%	2.60%	2.90%	2.60%	2.90%
Rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Rate of indexing	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

The assumed prescription drug inflation was 6.20% in 2020, grading down to an ultimate rate of 4.00% per year in 2031. 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)	2020 Pension Benefits	2019 Pension Benefits	2020 Other Benefits	2019 Other Benefits
	\$	\$	\$	\$
Current service cost (employer)	13,942	11,317	7,629	5,723
Interest cost	33,311	31,668	4,396	5,776
Expected return on plan assets	(33,612)	(31,543)	-	-
Amortization of net actuarial (gain) loss	(1,665)	(2,184)	223	477
Benefit cost	11,976	9,258	12,248	11,976

(in thousands of Canadian dollars) (as at September 30)	2020 Pension Benefits	2019 Pension Benefits	2020 Other Benefits	2019 Other Benefits
	\$	\$	\$	\$
Employer contribution/other benefit payments	15,390	14,524	2,158	2,600
Plan participants' contributions	8,793	8,313	-	-
Benefits paid	30,181	26,262	2,158	2,600

The most recent actuarial valuation of the IESO registered pension plan for regulatory funding purposes was completed as at January 1, 2019.

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

	2020 Registered Pension Benefits	2019 Registered Pension Benefits	2020 Supplemental Pension Benefits	2019 Supplemental Pension Benefits	2020 Other Benefits	2019 Other Benefits
Discount rate at the beginning of the period	5.50%	5.50%	2.90%	4.00%	2.90%	4.00%
Rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Rate of indexing	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

10. TANGIBLE CAPITAL ASSETS

Net tangible capital assets consist of the following:

Cost of Tangible Capital Assets

(in thousands of Canadian dollars)	As at December 31, 2019	Additions	Disposals	As at December 31, 2020
	\$	\$	\$	\$
Facilities and leasehold improvements	56,424	-	-	56,424
Market systems and applications	338,405	8,587	-	346,992
Information technology hardware and other assets	77,009	6,734	(120)	83,623
Meter data management/repository	45,636	13,936	-	59,572
Total cost	517,474	29,257	(120)	546,611

Accumulated Amortization

(in thousands of Canadian dollars)	As at December 31, 2019	Amortization Expense	Disposals	As at December 31, 2020
	\$	\$	\$	\$
Facilities and leasehold improvements	(28,494)	(1,459)	-	(29,953)
Market systems and applications	(302,901)	(13,346)	-	(316,247)
Information technology hardware and other assets	(64,288)	(4,842)	120	(69,010)
Meter data management/repository	(41,399)	(3,399)	-	(44,798)
Total accumulated amortization	(437,082)	(23,046)	120	(460,008)

Net Book Value

(in thousands of Canadian dollars)	As at December 31, 2019	As at December 31, 2020
	\$	\$
Facilities and leasehold improvements	27,930	26,471
Market systems and applications	35,504	30,745
Information technology hardware and other assets	12,721	14,613
Meter data management/repository	4,237	14,774
Total net book value	80,392	86,603
Assets under construction	36,175	63,210
Net tangible capital assets	116,567	149,813

In 2020, there were no adjustments to management's estimates of remaining asset service lives. Interest capitalized to assets under construction during 2020 was \$668 thousand (2019 - \$467 thousand).

11. OTHER REVENUE

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

The IESO recognized investment income earned in the settlement accounts of \$2,938 thousand in 2020 (2019 - \$6,266 thousand).

The IESO also recognized application fees of \$23 thousand in 2020 (2019 - \$22 thousand) and program revenue of \$690 thousand (2019 - \$600 thousand).

12. EXPENSES BY OBJECT

Expenses by object for 2020 are comprised of the following:

(in thousands of Canadian dollars)	2020 Core Operations	2020 Other Government Programs	2020 Smart Metering Entity	2020 Market Sanctions & Payment Adjustments	2020 Total
	\$	\$	\$	\$	\$
Compensation and benefits	126,768	340	3,777	6,655	137,540
Professional and consulting	13,099	715	12,992	1,697	28,503
Operating and administration	34,144	62	5,829	2,087	42,122
Amortization	19,647	-	3,399	-	23,046
Interest	1,216	-	-	-	1,216
Foreign exchange gain	110	-	-	-	110
Contract cancellation costs (Note 13 (f))	-	(229)	-	-	(229)
Less: Recoveries	(5,270)	-	-	-	(5,270)
Total Expenses	189,714	888	25,997	10,439	227,038

Expenses by object for 2019 are comprised of the following:

(in thousands of Canadian dollars)	2019 Core Operations	2019 Other Government Programs	2019 Smart Metering Entity	2019 Market Sanctions & Payment Adjustments	2019 Total
	\$	\$	\$	\$	\$
Compensation and benefits	122,334	632	3,112	5,402	131,480
Professional and consulting	18,133	2,522	16,488	1,927	39,070
Operating and administration	36,871	164	6,136	1,857	45,028
Amortization	19,060	-	4,866	-	23,926
Interest	2,064	87	20	-	2,171
Foreign exchange gain	(9)	-	-	-	(9)
Contract cancellation costs (Note 13 (f))	-	102,226	-	-	102,226
Less: Recoveries	(3,463)	-	-	-	(3,463)
Total Expenses	194,990	105,631	30,622	9,186	340,429

13. RELATED PARTY TRANSACTIONS

The Province of Ontario controls the IESO by virtue of its ability to appoint the IESO's Board of Directors.

The OEFC, OEB, Hydro One, Ontario Power Generation, the Ministry of Energy, Northern Development and Mines (ENDM), and the Ministry of the Environment, Conservation and Parks (MECP) are related parties of the IESO through the common control of the Province of Ontario. Transactions between related parties and the IESO are outlined below.

All related party transactions were measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

- a) The IESO holds a note payable and an unsecured credit facility agreement with the OEFC (Note 8). Interest payments made by the IESO in 2020 for the note payable were \$1,739 thousand (2019 - \$2,120 thousand) and for the credit facility were \$nil (2019 - \$269 thousand). As of December 31, 2020, the IESO had an accrued interest payable balance with the OEFC of \$nil (2019 - \$nil).
- b) Under the *Ontario Energy Board Act, 1998*, the IESO incurs registration and license fees. The total of the transactions with the OEB was \$1,803 thousand in 2020 (2019 - \$1,728 thousand).
- c) The IESO performed connection and bulk electric system exception assessments for Hydro One in 2020, and invoiced Hydro One \$560 thousand (2019 - \$188 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. In 2020, the IESO incurred costs of \$128 thousand (2019 - \$157 thousand) for these services and as of December 31, 2020, had a net payable balance with Hydro One of \$12 thousand (2019 - \$52 thousand net receivable).
- d) The IESO performs connection assessment and approvals for Ontario Power Generation, delivers telecommunication services to market participants to connect to the real-time market systems and provides market-related training courses. In 2020, Ontario Power Generation was invoiced \$87 thousand (2019 - \$112 thousand) and as of December 31, 2020, the IESO had a receivable balance with Ontario Power Generation of \$nil (2019 - \$44 thousand).
- e) The IESO has entered into transfer payment agreements with the MECP to design and deliver, directly or through contracted third parties, various programs funded through the Green Ontario Fund. For 2020, under these agreements, the IESO accrued or received amounts from MECP of \$17 thousand (2019 - \$1,925 thousand) and as of December 31, 2020, the IESO had a net receivable balance with MECP of \$17 thousand (2019 - \$53 thousand).
- f) In 2018, under the directive from the ENDM, the IESO exercised its termination rights under certain renewable energy contracts that had not yet reached an advanced stage in their development. The IESO and ENDM entered into agreements in which ENDM will compensate for the related costs to support the termination of these contracts. For 2020, under these agreements, the IESO accrued from ENDM \$874 thousand (2019 - \$104,305 thousand) and as of December 31, 2020 the IESO had a net receivable balance with ENDM of \$77,018 thousand (2019 - \$100,424 thousand).

14. 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 has 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, 2020 (2019 - \$nil), 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 \$899 thousand as at December 31, 2020 (2019 - \$777 thousand).

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, 2020, would have resulted in a change for the year of approximately \$10,139 thousand (2019 - \$9,261 thousand). 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, 2020 included no material items past due and substantially all of the balance is expected to be collected within 60 days from December 31, 2020. 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 two 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.

The maturities for accounts payable and accrued liabilities generally range between 30 days to 365 days, and the maturities of other financial liabilities are provided in the notes to financial statements related to these liabilities.

15. COMMITMENTS**Operating commitments**

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

As at December 31 (in thousands of Canadian dollars)

	\$
2021	7,100
2022	6,857
2023	6,857
2024	6,624
2025 and thereafter	4,779
Total	32,217

16. 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.

The 2020 system fees are based on 2019 rates approved by the OEB for electricity withdrawn from the IESO-controlled grid during 2020. The 2020 rates have not yet been approved by the OEB. The estimated impact to 2021 system fees with the pending OEB approval is \$966 thousand.

The IESO may be liable under additional terminated renewable energy contracts to a maximum of \$3,580 thousand; however, the likelihood or amount of any liability under these contracts cannot be reasonably determined and therefore no liability has been accrued in these financial statements.

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 employees needed to carry out the IESO's mandate;
- To have the flexibility to reward results and demonstrated competencies; and,
- To have compensation levels that are reasonable, responsible and in compliance with provincial regulations.

The philosophy underlying these objectives is that total compensation for executives should enable the IESO to recruit and retain strong leaders with the skills and competencies necessary to carry out the organization's mandate.

Program Governance

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

The Board is composed of eight independent, external Directors, appointed by the Minister of Energy, Northern Development and Mines, and the President and Chief Executive Officer of the IESO. The Board has broad experience in the electricity industry and public sector organizations, as well as in dealing with human resource matters, including the setting and implementation of compensation policies and programs.

In carrying out its mandate, the Board has access to management's analysis, as well as the recommendations 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. Each year, 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 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 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 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. The IESO uses the Hay job evaluation methodology for both the executive and management group. The most recent review was completed in 2020.

Prior to 2018, the comparator group used to benchmark the executive jobs was a hybrid of public and private sector employers. Based on changes required under the *Broader Public Sector Executive Compensation Act, 2014* (the “2016 Executive Compensation Framework Regulation”), the comparator group was changed to Canadian Public Sector organizations.

The comparator group represents a range of industries, core business activities and roles that are similar to the IESO: electricity, energy, asset management, financial services, infrastructure procurement, engineering and large-scale, complex IT functions.

To comply with the 2016 Executive Compensation Framework, the job evaluation was independently conducted by the Korn Ferry Hay Group using its point system. The Korn Ferry 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 salary structure was developed, and executive positions were mapped into it.

Using the market information from the Canadian Public Sector peer group, the maximums for each executive salary grade were determined as the market price point for comparison purposes. The maximums of the salary ranges are defined as the total direct cash compensation (annual base salaries plus annual short-term and long-term target incentive awards) of the target market’s price point at the 50th percentile for each salary grade. The minimums and maximums of each salary range are calculated using typical salary range spreads at executive levels.

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) that affect compensation, as well as internal compensation relativities. Based on this data and the IESO business priorities, Human Resources develops recommendations on compensation programs. External specialized compensation, benefit and pension consultants are engaged to ensure accurate, representative market compensation data is obtained and that current industry compensation trends are being considered, as well as to 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 and managing with vision and purpose. Assessments are based upon demonstrated competencies. Each individual is awarded a fixed compensation level within their band based upon their assessed competencies.

Program Description – Variable Compensation

To promote a results orientation, the variable pay plan forms part of the total executive compensation package. The IESO Board annually establishes a robust set of performance measures, which are evaluated each year.

The IESO Board assesses corporate performance results and the CEO's individual performance results. Under the plan, having assessed the results against target, the Board has discretion in determining the final performance rating. The Board considers the assessed results, which have been verified through an internal audit process, 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 at or below the capped amount depending on the performance results achieved.

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 employees through a flexible component within the plan. This element gives executives and all other non-represented employees the flexibility to adjust their benefits to meet their individual/family needs.

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 Canada Revenue Agency limits the amount of pension payable from a registered plan, the IESO has a secured supplemental employee retirement plan (SERP) to provide required pension income to meet the commitments of the Plan above that payable from the registered plan.

The Plan also provides other options, including member's life only or joint and survivor pensions, as well as pre-retirement death benefits for surviving spouses or beneficiaries.

Performance Measures & Impact on Compensation

The IESO establishes corporate performance measures aligned with its business priorities during its annual 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 previously, the corporate results achieved each year impact each executive's variable pay.

For 2020, the Board assessed the corporate results and determined that overall the IESO met expectations for the measures and targets specified. In addition to the corporate measures, each executive also had an individual set of measures and targets aligned with the corporate performance objectives and the IESO's business priorities, which were similarly assessed. The Board assessed the results of the CEO's and Interim CEO's performance and the Interim CEO assessed the performance of the Vice-Presidents which was 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, if required, approval of individual arrangements relating to terms of employment may be sought and established.

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, 2010* (BPSAA) imposed a general freeze on designated executives' salary, variable pay and benefits and subject to very limited exceptions.

The BPSAA was superseded by the *Broader Public Sector Executive Compensation Act, 2014* (BPSECA). The 2016 Executive Compensation Framework Regulation under the BPSECA came into effect for the IESO in February 2018 and permitted retroactive compensation adjustments to September 1, 2017. Subsequent to this, the government repealed this Framework Regulation and replaced it with the 2018 *Compensation Framework Regulation*, which imposed a compensation freeze on executive compensation at the levels in effect on August 13, 2018.

Executive Compensation Statement

The 2020 Summary Compensation Table details the annual compensation for the year ended December 31, 2020 for the executives listed. Note: The figures reported as 2020 "Salary Paid" in the 2020 Public Sector Salary Disclosure for the executives include the 2020 earned variable compensation, and deferred benefits such as 2020 vacation.

2020 SUMMARY COMPENSATION TABLE

Name & Position	Base Salary (2020 earnings)	Variable Pay Awarded ¹	Other Annual Compensation ²	Total Cash Compensation ³
Peter Gregg President and CEO	\$503,589 ⁴	\$34,334	\$26,303	\$564,226
Terence (Terry) Young VP, Policy, Engagement & Innovation/ Interim President and CEO	\$413,618 ⁵	\$28,024	\$21,210	\$462,851
Barbara Anderson VP, Corporate Services and CFO	\$296,134	\$23,331	\$0.46	\$319,466
Leonard Kula VP, Planning, Acquisition & Operations and COO	\$385,000	\$31,873	\$18,834	\$435,707
Alex Foord VP, Information & Technology Services and CIO	\$318,000	\$25,738	\$0.73	\$343,739

1. 2020 earned variable compensation is calculated on annualized base pay

2. Represents remaining flex benefit credits, including deferred earned vacation, paid out at year end as taxable income

3. These amounts will be reported as "Salary Paid" under the annual Public Sector Salary Disclosure (PSSD)

4. Peter Gregg's base salary prorated amount

5. Terence (Terry) Young's base salary includes an increase to compensate him for assuming the Interim President/CEO role, in September 2020

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

Executive Leadership Team

Terry Young
Interim President and Chief Executive Officer

Barbara Anderson
Chief Financial Officer and Vice-President, Corporate Services

Alex Foord
Chief Information Officer and Vice-President, Information and Technology Services

Leonard Kula
Vice-President, Planning, Acquisition and Operations, and Chief Operating Officer

Michael Lyle
Vice-President, Legal Resources and Corporate Governance

Glenn McDonald
Vice-President, Market Assessment and Compliance

Julia McNally
Director, Internal Audit

Robin Riddell
Vice-President, Human Resources

Jessica Savage
Program Delivery Executive, Market Renewal Program

Board of Directors

Joe Oliver
Chairman of the Board
Former federal Minister of Finance, Minister of Natural Resources, Minister Responsible for the GTA and Member of Parliament for Eglinton-Lawrence; former president and CEO of the Investment Dealers Association of Canada and executive director of the Ontario Securities Commission, and founding CEO of the Mutual Fund Dealers Association

Terry Young
Interim President and Chief Executive Officer, Independent Electricity System Operator

Steve Baker
Director
Former president of Union Gas, Enbridge

Michael Bernstein
Director
President of Juno Advisors Ltd.; chair of CircuitMeter Inc., and a director of Biome Renewable

Tabatha Bull
Director
President and CEO, Canadian Council for Aboriginal Business

Simon Chapelle
Director
Corporate Director, The Chapelle Group; Kingston City Councillor

Cynthia Chaplin
Director
Executive Director of CAMPUT; former vice-chair of the Ontario Energy Board

Patricia Koval
Director
Former adjunct professor, University of Toronto; retired senior partner, Torys LLP

David Sinclair
Director
Former president and CEO of Kenora Hydro-Electric Corporation Ltd.; former chair of the Ontario Municipal Electric Association (now Electricity Distributors Association)

Stakeholder Advisory Committee

Brian Bentz (Chair)
President and Chief Executive Officer Alectra
Representing: Distributors and Transmitters

Nicolas Bossé
Senior Vice-President, Governmental & Regulatory Affairs
Brookfield Renewable
Representing: Energy-related Businesses and Services

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

Judy Dezell
Director, Enterprise Centre, Business Partnerships & LAS
Association of Municipalities of Ontario
Representing: Ontario Communities

Brandy Giannetta
Senior Director, Ontario and Atlantic Canada
Canadian Renewable Energy Association
Representing: Generators

Malini Giridhar
Vice-President, Business Development and Regulatory Affairs
Enbridge Gas Inc.
Representing: Energy-related Businesses and Services

Julie Girvan
Consumers Council of Canada
Representing: Consumers

Jim Hogan
President and Chief Executive Officer Entegrus
Representing: Distributors and Transmitters

Rachel Ingram
Vice-President and General Counsel
Rodan Energy Group
Representing: Energy-related Businesses and Services

Bruno Jesus

Vice-President of Planning and Engineering
Hydro One Networks Inc.
Representing: Distributors and Transmitters

Frank Kallonen

President and Chief Executive Officer
Greater Sudbury Hydro
Representing: Distributors and Transmitters

Paul Norris

President
Ontario Waterpower Association
Representing: Generators

Mark Passi

Manager, Energy
Glencore
Representing: Consumers

Mark Schembri

Vice-President, Supermarket Systems and Store Maintenance
Loblaw Properties Limited
Representing: Consumers

James Scongack (Vice-Chair)

Executive Vice-President, Corporate Affairs and Operational Services
Bruce Power
Representing: Generators

Hari Suthan

Chief Strategic Growth and Policy Officer
Opus One Solutions
Representing: Energy-related Businesses and Services

Annette Verschuren

Chair and CEO
NRStor Inc.
Representing: Energy-related Businesses and Services

Terry Young

Interim President and CEO
Independent Electricity System Operator
Representing: IESO

Technical Panel

Michael Lyle (Chair)

Vice-President, Legal Resources and
Corporate Governance
Independent Electricity System
Operator
Representing: IESO

Jason Chee-Aloy

Managing Director
Power Advisory LLC
Representing: Renewable Generators

Ron Collins

President and Chief Executive Officer
Sinopa Energy Inc.
*Representing: Energy-related Businesses
and Services*

Rob Coulbeck

Special Advisor
Nexus Energy Canada
Representing: Importers/Exporters

Emma Coyle

Director of Regulatory and
Environmental Policy
Capital Power
*Representing: Market Participant
Generators*

David Forsyth

Technical Specialist
Association of Major Power
Consumers in Ontario
*Representing: Market Participant
Consumers*

Sarah Griffiths

Director, Regulatory Affairs
Enel X
Representing: Demand Response

Jennifer Jayapalan

Director, Energy Markets, Operations
and Strategy
Workbench Energy
Representing: Energy Storage

Robert Reinmuller

Director, Transmission System
Planning
Hydro One Networks Inc.
Representing: Transmitters

Joe Saunders

Vice-President, Regulatory
Compliance and Asset Management
Burlington Hydro
Representing: Distributors

Jessica Savage

Program Delivery Executive, Market
Renewal Program
Independent Electricity System
Operator
Representing: IESO

Vlad Urukov

Director, Generation Revenue and
Planning
Ontario Power Generation
*Representing: Market Participant
Generators*

Technical Panel Secretariat

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REVENUE REQUIREMENT AND USAGE FEE METHODOLOGY

The IESO's revenue requirement is a fixed amount approved by the OEB with the IESO usage fees determined based on a forecast of withdrawals from the IESO controlled grid, embedded generation and exports. The IESO calculates its usage fees, both domestic and export, by following the steps below, which include first determining the required revenue requirement and then the charge determinant information.

Business Planning Cycle

The annual business planning cycle begins with an operating environment assessment that identifies key business drivers and industry trends. The IESO takes these inputs and moves into the strategic planning phase. The strategic planning phase involves a review and validation of existing strategy to confirm its continued relevance, or a refresh of the strategy to take into account changes in the business or industry environment. The strategic planning phase has a 5-year outlook that establishes the IESO's strategic objectives, core strategies and priority initiatives, which are found in the 2020-2022 Business Plan (Business Plan).

Once the strategy has been confirmed, the IESO then moves into the divisional planning phase. Divisional planning incorporates both ongoing core requirements of the business unit, as well as new and incremental initiatives. Divisional planning considers staffing requirements for the business unit, funding for operations and for capital projects, and ensures alignment with core strategies and strategic objectives. Following divisional planning, the IESO develops the 3-year operating and capital budgets which are included in the Business Plan and submitted to the Minister of Energy, Northern Development and Mines (Minister) for approval.

Revenue Requirement

The first step required to calculate the IESO's proposed usage fee is to determine the proposed revenue requirement. However, in light of the timing of the IESO's 2020 Submission, and in an effort to reach an early resolution on the IESO's 2020 usage fees, the IESO is requesting to have the current OEB approved 2020 interim usage fees approved as the final usage fees for 2020. Under this proposal, the actual operating expenditures in 2020 and operating surplus to be retained in the Forecast Variance and Deferral Account would equate to the revenue

requirement. With this approach there will be no variance between the revenue requirement and the revenue collected in 2020. The IESO's revenue requirement is provided in Table 1 below.

Table 1: IESO's Revenue Requirements (\$ millions)

	2019 OEB Approved	2020 IESO Proposed	2021 IESO Proposed
Revenue Requirement	190.8	188.6	191.8

Charge Determinants

The second step in calculating the IESO's proposed usage fees is to determine the volume forecasts that will be used. The domestic usage fee is calculated using the most recent IESO forecast of withdrawals for use in Ontario, less estimated losses, plus generation embedded in local distribution networks. The export usage fee is calculated using the most recent forecast of exports. Line losses are split between export and domestic customers based on their proportion of the total forecast energy volumes. The domestic forecast for this 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.

See Attachment 1 - Load and Forecast Volumes to this exhibit for inputs used to calculate the usage fee.

Calculation of the Usage Fees

The final step is the calculation of the domestic and export usage fees based on the inputs noted above. The IESO's OEB approved fees for domestic and export customers is calculated for the IESO by Elenchus using a model developed and approved through the 2016 Revenue Requirement Submission proceeding (EB-2015-0275) to allocate costs between these two customer classes. This allocation assigns the costs to the appropriate customer class based on functional categories (business unit and department). The organizational structure of the IESO has remained consistent since the adoption of the cost allocation methodology. To calculate the 2021 usage fee, the IESO requested Elenchus to rerun its model using the Business Plan and energy forecast as described above.

1 Refer to Exhibits C-2-1 and C-2-2 for additional information on the 2020 usage fee and
2 calculation of the 2021 usage fee respectively.

3 **Risks**

4 The IESO's forecasts of its revenues and operating expenses include inherent risks associated
5 with forecasting uncertainty (e.g. exchange rate, change in total demand, COVID-19 pandemic).
6 The IESO's expenses and revenues are forecast based on both the experience of IESO staff and
7 the best information available when the Business Plan was developed. The Business Plan was
8 submitted to the Minister on December 9, 2020 and approved by the Minister on April 28, 2021.
9 The IESO strives to reduce uncertainty in the inputs in order to make the resulting Business
10 Plan as robust as possible. As the Business Plan is being developed, some of the potential risks
11 to the IESO may be anticipated but not quantifiable, while others are simply not known.

12 Along with the risks to the revenue requirement noted above, the IESO also faces a number of
13 key strategic and operational risks in achieving the organization's strategic objectives. For a
14 complete list of these key risks, see Exhibit B-1-2 and Appendix 2 – Enterprise Risk
15 Management of the Business Plan.

2020 REVENUE REQUIREMENT AND USAGE FEES SUBMISSION

2020 Revenue Requirement

On April 28, 2021, the Interim President & CEO of the IESO received a letter from the Minister of Energy, Northern Development and Mines (Minister) approving the IESO's 2020-2022 Business Plan (Business Plan) filed at Exhibit B-1-2.

The Business Plan set out a 2020 revenue requirement of \$189.6 million. However, in light of the timing of the IESO's 2020 submission, the IESO is requesting to have the current OEB-approved 2020 interim usage fees¹ approved as final usage fees for 2020. Under this proposal, the IESO requests approval of a 2020 revenue requirement of \$188.6 million. The IESO's 2020 revenue requirement is based on 2020 actual operating expenditures of \$186.3 million and, given the deficit in the IESO's operating reserve², retaining an operating surplus of \$2.3 million in the IESO's Forecast Variance and Deferral Account (FVDA). With this approach there will be no variance between the revenue requirement and the revenue collected in 2020. The IESO is not proposing higher usage fees based on the Business Plan.

Table 1: IESO's 2020 Revenue Requirement (\$ millions)

	2019 OEB Approved	2020 IESO Proposed
Revenue Requirement	190.8	188.6

Operating Costs

In response to the emergence of the COVID-19 pandemic, the IESO revisited its Business Plan in light of evolving system and sector needs. The IESO also took steps to reprioritize projects and initiatives to manage costs, while continuing to deliver on important system enhancements within the Market Renewal – Energy project and other multi-year projects. The IESO reduced its revenue requirement while continuing to meet its objectives and priorities. This included a

¹ On December 12, 2019, the OEB issued its decision approving the IESO's 2019 usage fees of \$1.227/MWh for domestic customers and \$1.0125/MWh for export customers, to be used on an interim basis effective January 1, 2020.

² See Exhibit F-1-1 for more details on the IESO's operating reserve and FVDA.

number of priorities related to the COVID-19 pandemic. See Exhibit D-1-1 for an overview on the IESO's operating costs.

The IESO is proposing to retain a 2020 operating surplus of \$2.3 million in the FVDA as an initial step towards the recovery of the IESO's approved operating reserve amount of \$10 million.³ Including the 2020 operating surplus, the FVDA holds a balance of \$1.3 million as of December 31, 2020. See Exhibit F-1-1 – Forecast Variance Deferral Account.

COVID-19 Pandemic Costs

In 2020, the IESO managed COVID-19 pandemic-related impacts, including \$1.0 million of one-time expenses as COVID-19 pandemic plans were executed to ensure the safety of staff working on-site to support grid operations and the reliability of the electricity system. These costs related to the COVID-19 pandemic are included in the 2020 revenue requirement actual spend and excluded from future years' 2021 revenue requirement, as the majority of the spend is expected to have enduring benefits against any future waves (e.g. self-screening app, health services tools, technology to enable effective work from home).

³ See EB-2019-0002, OEB Decision and Order, December 5, 2019 approving the IESO's 2019 Revenue Requirement.

2021 REVENUE REQUIREMENT AND USAGE FEES SUBMISSION

2021 Revenue Requirement

As outlined in Exhibit C-1-1 - Revenue Requirement and Usage Fee Methodology, the IESO calculates its usage fee by determining its revenue requirement and then the charge determinant information. The first step is to calculate the IESO's 2021 proposed usage fee to determine the revenue requirement, which is based on the 2020-2022 Business Plan (Business Plan) approved by the Minister of Energy, Northern Development and Mines (Minister) for 2021 in which the IESO proposes to return to pre-COVID-19 pandemic levels with a proposed revenue requirement of \$191.8 million. See Table 1 below:

Table 1: IESO's 2021 Revenue Requirement (\$ millions)

	2019 OEB Approved	2020 Proposed	2021 Proposed
Revenue Requirement	190.8	188.6	191.8

Operating Costs

The IESO requests approval of its revenue requirement of \$191.8 million for 2021. The IESO's proposed 2021 revenue requirement is described in the Business Plan (Exhibit B-1-2) and Exhibit D-1-1 – OMA Overview. On April 28, 2021, the Interim President & CEO of the IESO received a letter from the Minister approving the Business Plan, (see Exhibit B-1-3).

Charge Determinants (domestic and export usage fees)

The domestic usage fee is calculated using the most recent forecast of withdrawals in 2021 for use in Ontario, less estimated losses, plus generation embedded in local distribution networks. The export usage fee is calculated using the most recent forecast of exports in 2021, less estimated losses. The calculation of line losses is split between export and domestic customers based on their proportion of the total 2021 forecast energy volume. as shown in Table 2 below. The domestic forecast for this calculation does not include 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	132	149	88.6%	2.9	2.6
Export	17.0		11.4%		0.33

Total 2021 transmission losses are forecast at 2.9 TWh. Domestic customers are allocated 88.6% of these losses, which amounts to 2.6 TWh, and export customers are allocated 11.4%, which amounts to 0.33 TWh.

The IESO 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 2021 Usage Fees

	2021 – Domestic (TWh)	2021– Export (TWh)
Demand forecast	132	17.0
Embedded generation	6.8	
Domestic transmission losses	-2.6	
Exports transmission losses		-0.3
Energy Volumes	136.2	16.7
Total Energy Volumes	152.9	

Calculation of the Usage Fees

The IESO's OEB-approved fees for domestic and export customers for the past three years were calculated for the IESO by Elenchus Research Associates Inc. (Elenchus) using a model developed and approved through the 2016 revenue requirement submission proceeding (EB-2015-0275) to allocate costs between these two customer classes. To calculate the 2021 usage fees, the IESO requested Elenchus to rerun its model using 2021 business unit budgets and energy as described above. The organizational structure of the IESO has not gone through

any material changes since the approval of the cost allocation methodology (see Exhibit D-1-2, Attachment 1 – Organizational Chart). 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 usage fees as calculated by Elenchus

	2021 Usage Fee
Domestic	\$1.271/MWh
Export	\$1.0943/MWh

Implementation of the 2021 Usage Fees

On December 4, 2020, the IESO filed a letter with the OEB to confirm that the 2020 interim fee ordered by the OEB on December 17, 2019 will remain in effect after December 31, 2020 and will continue to remain in effect until final fees are approved by the OEB. On December 21, 2020, the IESO received OEB notification that the 2020 interim fees will continue to remain in effect for 2021 until final fees are approved by the OEB.

The IESO requests approval of a domestic usage fee of 1.271/MWh and export usage fee of 1.0943/MWh to be paid commencing January 1, 2021. Once OEB approval of the IESO's 2021 domestic and export fees is received, the IESO proposes to charge (or rebate) market participants the difference between the 2021 IESO usage fees approved by the OEB and the interim usage fees they paid on the approved effective date, if any, based on their proportionate quantity of energy withdrawn until the end of the month in which OEB approval is received for the 2021 usage fees. Any such, charges (or rebates) will be provided in the next billing cycle following the month in which OEB approval is received.

OTHER FUNDING AND FEES

Registration Fee

In addition to the IESO's 2021 usage fees, the IESO requests approval for the following fee:

- A fee of up to \$50,000 per proposal for electricity supply and capacity procurements, including ancillary services

The IESO requests approval of an increase to the \$10,000 registration fee approved in the IESO's 2019 Revenue Requirement Submission (EB-2019-0002). The IESO has identified that the current registration fee will be inadequate to recover costs for IESO work entailed for future procurements.

The IESO expects that in the near-term these fees will be charged in late 2021 and early 2022 primarily in relation to the mid- and long-term procurements contemplated under the IESO's Resource Adequacy framework. Further details on the IESO's Resource Adequacy activities and stakeholder engagement can be found on the IESO's Resource Adequacy Engagement webpage.¹

The fees are meant to cover costs the IESO incurs to process procurement applications and administer Requests for Proposals including costs related to external advisors such as fairness, legal, technical and financial. These revenues are not expected to materially affect the IESO's revenue requirement.

Cost Recovery

As part of its mandate, the IESO performs work that is funded from other sources and not included in the revenue requirement: The Smart Metering Entity (SME), market rule enforcement and education, conservation programs, and programs that the IESO delivers in partnership with organizations within the energy sector.

In accordance to conclusions from the cost allocation study submitted as part of IESO's 2017 Revenue Requirement Submission (EB-2017-0150), any work conducted by the IESO in support of its function as the SME is fully allocated to the SME. In addition, through the Package

¹ <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Resource-Adequacy-Engagement>

1 Settlement in EB-2017-0150, the IESO agreed to apply the same cost allocation principles used
2 for the SME to the market rule enforcement and education (MACD Enforcement) activities, as
3 well as to the conservation programs. While these activities were not included in the cost
4 allocation study, it was agreed that they are of a similar type of non-fees funded activity of the
5 IESO. Therefore, costs the IESO incurs for work and staff time in support of MACD Enforcement
6 and conservation programs are charged to MACD Enforcement and other programs,
7 respectively, in the same manner as such work done to support the SME is charged to the SME.

8 When market participants apply to connect new facilities or modify existing facilities, the IESO
9 performs system impact assessments. Planned connection of new facilities and modifications to
10 existing facilities must be assessed to identify and mitigate any potential adverse effect on the
11 reliability of the electricity grid and its existing customers. The IESO undertakes this work for a
12 connection applicant on a cost recovery basis as outlined in the Market Rules.² Pursuant to
13 Chapter 4 of the Market Rules, the IESO also charges market participants that request the IESO
14 undertake a technical feasibility study for a project. This optional, confidential service is
15 provided on a cost-recovery basis to identify and mitigate potential issues with various
16 connection options, and help participants select a final connection option. These IESO costs are
17 variable and dictated by the scope and number of market participant requests.

² Market Rules, Chapter 4, Grid Connection Requirements, Section 6, Establishing or Modifying IESO Controlled Grid Facilities and Connections

OM&A OVERVIEW

OM&A Overview

The IESO's operating expenses are in support of work programs that ensure the reliability of Ontario's power system, through the operation of the electricity grid, governance of the electricity markets, preparedness for the future availability of electricity when and where it is needed, and helping inform decisions that will be critical to shape the future of the sector.

The details of these work programs and associated initiatives are provided in Attachment 3, Appendix 2-JC – OMA Programs Table to this exhibit. The overall OM&A amounts from the period of 2019 to 2021 are provided in the following table.

Table 1: OM&A Costs 2019-2021 (\$ Millions)

2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
178.3	177.2	171.3	175.2

The IESO historically has been able to maintain its expenses, excluding Market Renewal Program (MRP), within inflation rates despite staffing cost pressures from collective agreements and higher pension liabilities (see Attachment 1 – Summary of OM&A Expenses). The business case for the MRP was approved by the IESO Board on October 23, 2019 and the Business Plan financials reflect the mid-range estimates (see Exhibit G-2-1 – Market Renewal Cost Report).

The main drivers for the year over year variances are discussed below and can be found in Attachment 2 - Appendix 2-JB – OMA Cost Driver Table to this exhibit.

2019 Actual vs 2019 OEB Approved Budget

Expenses in 2019 were \$1.1 million below the OEB approved budget, driven by a \$1.5 million savings from the cancellation of the Incremental Capacity Auction (ICA) portion of the MRP that was halted as a result of stakeholder feedback; delay of \$1.5 million of external support for MRP market rule amendments; additional \$1.1 million for higher than expected overhead cost allocation rate (overhead is allocated to other areas such as MACD or Smart Metering Entity, which lowers the IESO's costs on the core operations); and various other \$0.7 million lower spend. These savings were partially offset by \$3.6 million higher spending due to actuarial pension liability update and higher medical/dental benefit usage.

1 **Table 2: 2019 OM&A Expenses**

(\$ Millions)	2019
2019 OEB Approved OM&A Expenses	178.3
Increased costs of employee benefits	3.6
Cancellation of Capacity work stream	(1.5)
MRP deferral of external support for market rule amendments	(1.5)
Legal & consulting fees	(0.3)
Higher overhead cost allocation	(1.1)
Various other	(0.4)
Actual OM&A Expenses	177.2

2

3 **2020 Actual vs 2019 Actual**

4 In 2020, despite labour cost pressures and one-time COVID-19 pandemic expenses, the IESO
5 managed to reduce spending by \$5.9 million compared to 2019 while continuing to deliver on
6 important system enhancements within the core operational project portfolio and MRP.

7 In 2020 there were \$13.1 million in savings relative to 2019 from: no further work on the ICA
8 work-stream (\$4.0 million), non-repeatable 2019 expenditures (\$2.7 million), deferral of MRP
9 external support for market rule amendments (\$1.9 million), increased labour capitalization rates
10 (\$1.3 million), higher cost allocation (costs are allocated to other areas such as MACD or Smart
11 Metering Entity, which lowers the IESO's costs on the core operations) (\$0.5 million), and other
12 savings (\$2.75 million) from lower litigation and consulting activity and COVID-19 pandemic
13 impact including limited travel, and in-person meetings.

14 Offsetting the above savings, there was \$7.25 million incremental spending driven by collective
15 agreement escalations (\$3.0 million), revisions to actuarial pension liability assumptions due to
16 the COVID-19 pandemic (\$3.0 million), and additional spending required to ensure the safety of
17 staff working on-site to support grid operations and the reliability of the electricity system
18 (\$1.2 million).

1 **Table 3: 2020 OM&A Expenses**

(\$ Millions)	2020 Actual
Opening OM&A Expenses	177.2
Collective agreements/escalations	3.0
Increased costs of employee benefits	3.0
COVID-19 pandemic related costs	1.2
Cancellation of Incremental Capacity Auction (ICA) work stream	(4.0)
Non repeatable legal/consulting/cost recovery	(2.7)
MRP deferral of external support for market rule amendments	(1.9)
Staffing costs capitalization	(1.3)
Higher overhead cost allocation	(0.5)
Legal & consulting fees	(1.1)
Various other	(1.6)
Actual OM&A Expenses	171.3

2

3 **2021 Budget vs 2020 Actual**

4 The 2021 budgeted OM&A expenses of \$175.2 million, represent an increase of \$3.9 million

5 from the 2020 actual results, mainly driven by the impact of collective agreement escalations

6 and the impact of work to enable a more competitive electricity marketplace and market rule

7 and manual amendments. These increases will mostly be offset through judicious management

8 of resources and labour capitalization (aligned to a higher capital portfolio in accordance to

9 IESO capitalization practices), reduction of pandemic related expenses, and update of cost

10 allocation rate to reflect IESO's overhead cost reality. In addition, management will be limiting

11 other operating cost impacts by shifting more work in-house, absorbing incremental work with

12 existing staff, and reprioritizing and adjusting the timelines of discretionary projects that can be

13 deferred with minimal risk.

1 **Table 4: 2021 OM&A Expenses**

(\$ Millions)	2021 Budget
Opening OM&A Expenses	171.3
Collective agreements/escalations	3.4
Increased costs of employee benefits	0.6
MRP deferral of external support for market rule amendments	0.6
Non-repeatable legal cost recovery	0.8
Telecommunications and computer services/Hardware/Software for new projects	2.2
Staffing costs capitalization	(1.5)
Non repeatable COVID-19 pandemic-related costs	(1.2)
Higher overhead cost allocation	(0.5)
Various other	(0.5)
Application Year Budget OM&A Expenses	175.2

2

OM&A WORK PROGRAM DETAIL

The IESO is expected to deliver its mandate through the work programs outlined below
(see Exhibit D-1-1, Attachment 3, Appendix 2-JC - OMA Programs Table):

Table 1: Summary of OM&A Programs

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Planning, Acquisitions and Operations	44.2	41.3	47.0	48.5
Policy, Engagement and Innovation	24.5	23.3	26.8	24.1
Information and Technology Services	41.8	40.6	40.0	43.1
Legal Resources and Corporate Governance	14.1	17.5	16.8	19.1
Market Assessment and Compliance Division	2.0	1.8	1.4	1.3
Chief Executive Office	7.7	7.5	3.0	3.1
Corporate Services	24.4	25.3	26.1	26.3
Human Resources	5.0	4.2	4.3	4.5
Corporate Adjustment	2.8	7.0	3.7	1.6
Market Renewal Program	11.7	8.6	2.1	3.6
Total OM&A Expenses	178.3	177.2	171.3	175.2

Attachment 1 to this exhibit is the organizational chart, for the IESO's business units' structure.

Planning, Acquisition and Operations (PAO)

PAO is responsible for the IESO's reliability and market design efforts including system planning,
resource and transmission procurement, real-time operations of the market and engineering.

This also includes registration of entities into the market and system impact assessments.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Planning, Acquisitions and Operations	44.2	41.3	47.0	48.5

2019 actual results were \$2.9 million lower than OEB approved budget, mainly due to prolonged work on Transmission Rights Clearing Account in response to stakeholder feedback which delayed work on other \$1.3 million budgeted initiatives (e.g. transmission rights review, transmission procurement, load forecasting support), and \$1.6 million lower staffing costs as resources were required to support the Market Renewal Program (MRP) stakeholder engagement high level design and business case development.

In 2020 PAO expenses increased \$5.7 million compared to 2019, driven by efforts redirected from MRP support to core initiatives (\$2.6 million), collective agreement escalations (\$1.5 million), work for capacity market design (\$1.0 million), COVID-19 pandemic expenses (\$0.4 million), and Northeast Power Coordinating Council (NPCC) operation and planning audit preparation work (\$0.2 million). The IESO continued with the implementation of a capacity auction that would enable existing and available resources, such as imports and generators coming off contract, to compete alongside demand response to meet capacity needs over the next decade. As a result, staff focused on engagement with stakeholders to determine how feedback received from the IESO's MRP Incremental Capacity Auction efforts should be reflected in plans going forward and which features from the original high-level design will support resource adequacy needs and inform changes to future capacity auction design.

The PAO's budgeted costs are \$48.5 million in 2021. The increase of \$1.5 million in budget compared to 2020 actual results is mainly driven by incremental funding requirement (\$1.4 million) for Markets and Procurement to support two key business priorities: (1) enabling resources to ensure they can deliver capacity into the real-time energy market by improving the participation of storage, hybrids, demand response, distributed energy resources (DER) and intertie transactions, and (2) establishing a resource adequacy framework that will better balance ratepayer and supplier risks and improve planning certainty and drive down costs by developing competitive mechanisms to meet future capacity needs in the short, medium and long term.

Policy, Engagement and Innovation (PEI)

The PEI group is responsible for stakeholder and community engagement, communications, indigenous relations, energy efficiency and implementation of effective energy policy.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Policy, Engagement and Innovation	24.5	23.3	26.8	24.1

In 2019, PEI spending was \$1.2 million below OEB approved budget due to delayed Innovation, Research & Development work related to DER integration.

2020 results of \$26.8 million were higher than 2019 by \$3.5 million due to the North American Electric Reliability Corporation (NERC) membership fee of \$4.8 million being reported under this group, instead of the CEO's group, in order to better align with the nature of the expense; and were partially offset by \$1.3 million reduced expenses due to the COVID-19 pandemic impact on in-person meetings with stakeholders.

PEI's budgeted costs are \$24.3 million in 2021, which is \$2.7 million lower than 2020 mainly due to organizational restructuring whereby the Regulatory Affairs unit was transferred from PEI to Legal, Resources and Corporate Governance team for better alignment of functions (\$2.8 million), which includes \$1.0 million in Annual OEB Cost Assessment.

Information and Technology Services (I&TS)

The I&TS group provides for information technology solutions & strategies, cybersecurity management.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Information and Technology Services	41.8	40.6	40.0	43.1

The I&TS 2019 results are \$1.2 million lower than budget mainly due to insourcing and reduced scope of enterprise architecture services (\$0.7 million), and organizational restructuring of

Information Governance unit transferred to General Counsel in Legal, Resource and Corporate Governance (\$0.8 million); partially offset by one-time spend for data strategy study (\$0.4 million).

2020 results are lower than 2019 by \$0.6 million driven by non-repeatable 2019 spend on data strategy (\$0.4 million), higher labour capitalization (\$1.2 million); partially offset by salary escalations and staffing of vacancies (\$1.0 million).

The 2021 budgeted costs are \$43.1 million in 2021, an increase of \$3.1 million compared to 2020 due to incremental telecommunication, support and maintenance costs (\$2.2 million) mainly for new assets expected to come into service or to be significantly completed by 2021 and staffing changes with escalation impacts (\$0.9 million).

Legal, Resource and Corporate Governance (LRCG)

LRCG is responsible for legal services, support for the IESO Board of Directors, contract management, maintenance of Market Rules and from 2021 onwards is also accountable for regulatory affairs.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Legal Resources and Corporate Governance	14.1	17.5	16.8	19.1

2019 LRCG spending was \$3.4 million higher than OEB approved budget due to higher litigation spending for employee matters, Feed-in Tariff litigation, Market Rules dispute resolution and organizational transfer of the Information Governance unit from I&TS. The 2020 results for LRCG reflect a one-time litigation cost indemnity awarded to IESO (\$0.8 million).

LRCG's 2021 budgeted costs are \$19.1 million, an increase of \$2.3 million compared to 2020, due to organizational transfer of the Regulatory Affairs unit from PEI (\$2.8 million which included \$1.0 million in annual OEB Cost Assessment and non-repeatable saving from 2020 (\$0.8 million); partially offset by expected savings from insourcing legal work on procurement and trade files (\$1.3 million).

Market Assessment and Compliance Division (MACD)

MACD is accountable for enforcement of Market Rules and NERC reliability standards, compliance guidance, rule interpretations & enforcement guidelines, support for the Market Surveillance Panel.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Market Assessment and Compliance Division	2.0	1.8	1.4	1.3

The 2020 MACD's expenses are lower than 2019 and have been trending lower year over year due to reprioritization of resources to improve investigation timelines, which is a trend reflected in the 2021 budgeted costs of \$1.3 million.

Chief Executive Office (CEO)

The CEO is comprised of the President and Chief Executive Officer and staff and Internal Audit, which is responsible for bringing a systematic, disciplined approach to evaluating and improving the effectiveness of controls at the enterprise and process levels to help the IESO achieve its objectives.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Chief Executive Office	7.7	7.5	3.0	3.1

The NERC and NPCC Memberships of \$4.6 million were reported under this group until 2019 and from 2020 onwards they are reported under the PEI.

Corporate Services (CS)

CS is responsible for financial planning and analysis, corporate controllership, treasury and pension operations, market settlements, project management, organizational procurement and facilities management. About one third of the spending of this group is related to IESO's office lease agreements, maintenance, insurance and property taxes.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Corporate Services	24.4	25.3	26.1	26.3

2019 expenses were \$0.9 million higher than OEB approved due to lower than expected capital labour levels as ICA work was cancelled. 2020 expenses increased \$0.8 million from 2019 levels, primarily driven by expansion of security coverage in compliance with NERC/ NPCC standards (\$0.4 million), partial impact of facilities lease renewal at higher market rates (\$0.2 million), and non-repeatable COVID-19 pandemic costs (\$0.2 million).

CS's budgeted costs are \$26.3 million in 2021, which is consistent with previous years as collective agreement escalations and increased lease costs are offset by non-repeatable COVID-19 pandemic costs savings, and management of vacancies and discretionary expenses.

Human Resources (HR)

HR is responsible for talent acquisition, learning and development, performance management, succession planning, compensation and benefits, employee and labour relations.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Human Resources	5.0	4.2	4.3	4.5

HR's 2019 results were \$0.8 million below OEB approved budget due to unfilled vacancies and delay in implementation of learning and development program. The 2021 budgeted costs are \$4.5 million, which is essentially in line with prior year spending and includes funding to support HR strategic roadmap.

Corporate Adjustments

Corporate Adjustments are mainly comprised of the annual amortization of the accumulated deficit resulting from the Public Sector Accounting Standards (PSAS) transition item corresponding to change in pension and other-post employment benefits; partially offset by the overhead cost recovery from other funding sources.

IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Corporate Adjustment	2.8	7.0	3.7	1.6

The \$4.2 million variance in 2019 results vs OEB approved budget is related to higher than expected pension/OPEB liability evaluation and other one-time benefit adjustments; partially offset by higher cost allocation rate than anticipated.

Compared to 2019 results, 2020 reflects a \$3.3 million reduction due to PSAS amortization rate change, and non-repeatable 2019 one-time health/dental benefit costs. The 2021 budget costs of \$1.6 million are lower than 2020 by \$2.1 million mainly driven by reclassification of pension/OPEB adjustment to each work program individual budget and higher cost allocation due to higher overhead rate.

Market Renewal Program (MRP)

MRP represents a set of enhancements to Ontario's electricity market design, to address known issues with the existing market design and deliver ratepayer value by meeting system needs more cost-effectively. MRP is about improving the way electricity is priced, scheduled and procured in order to meet Ontario's current and future electricity needs reliably, transparently, efficiently and at lowest cost.

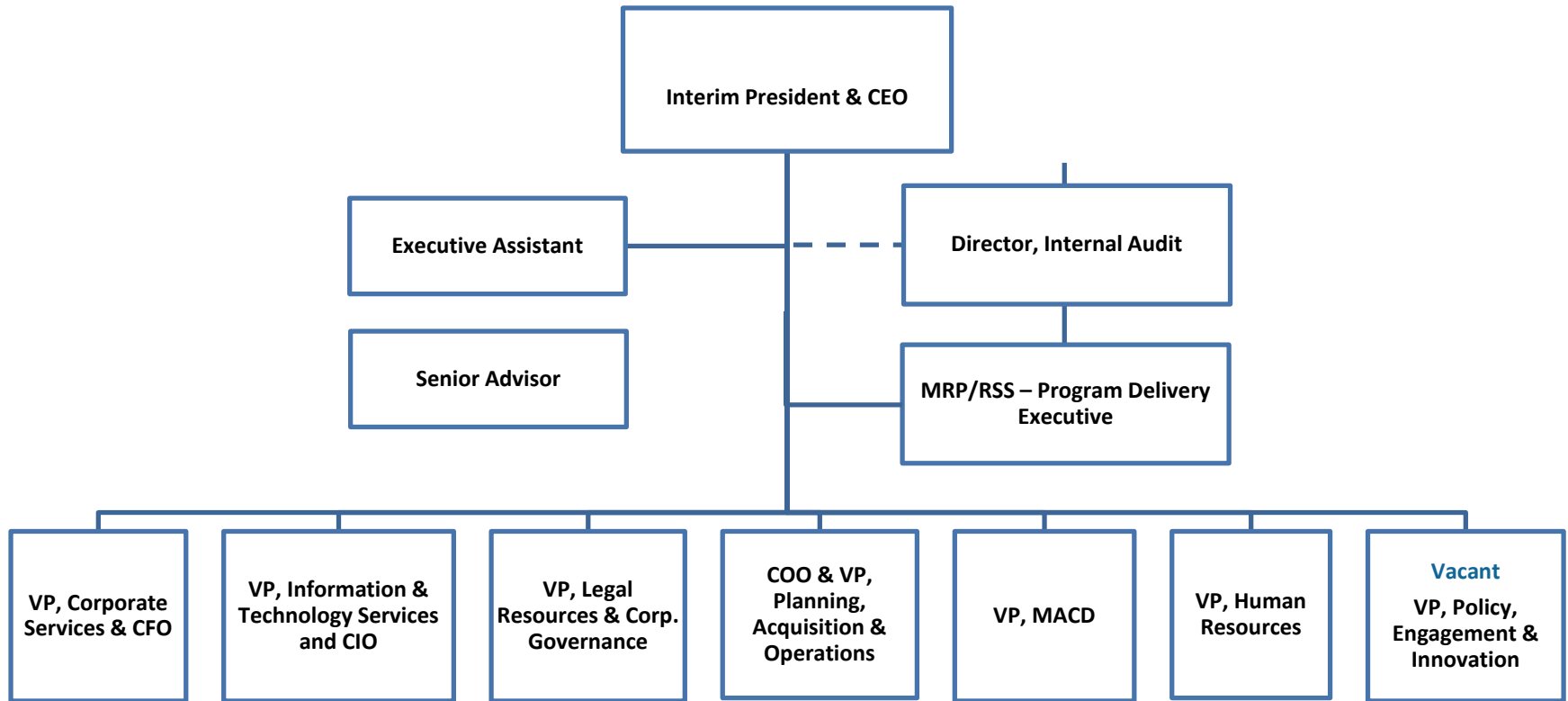
IESO Business Unit (\$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Market Renewal	11.7	8.6	2.1	3.6

While MRP originally included both energy and capacity projects, in July 2019, progress on the Incremental Capacity Auction (ICA) portion of the program was cancelled. This resulted in

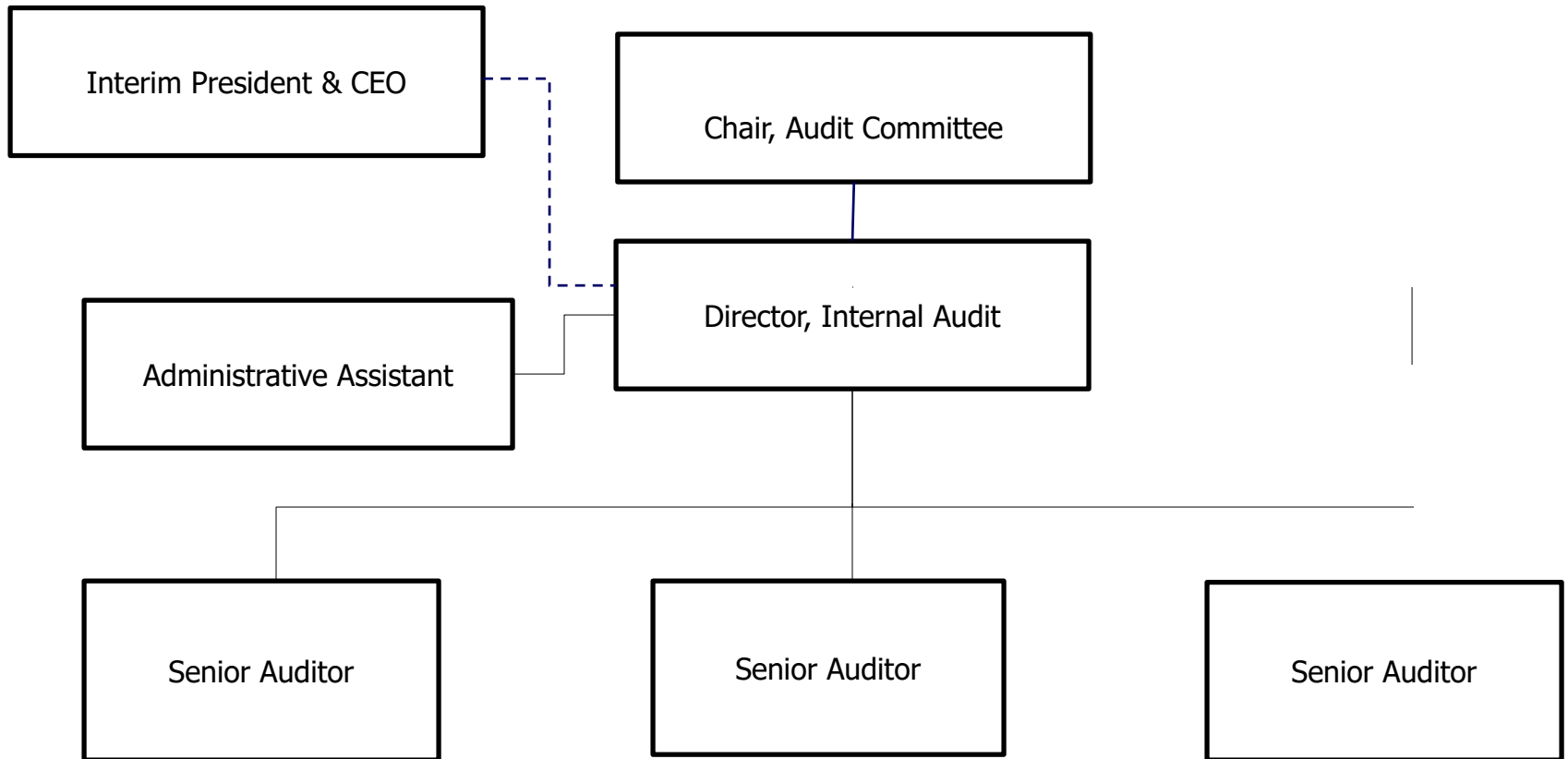
1 \$1.5 million in savings compared to 2019 OEB approved budget, with the remaining \$1.6 million
2 variance driven by deferral of external support for Market Rule amendments. This also resulted
3 in savings in 2020 compared to 2019 of \$4.0 million due to ICA and \$2.0 million for Market Rule
4 amendments.

5 MRP's budgeted costs are \$3.6 million in 2021. Operating funding for MRP is associated to the
6 activities being executed over time that qualify for operating expense treatment and is
7 consistent with the approved business case.

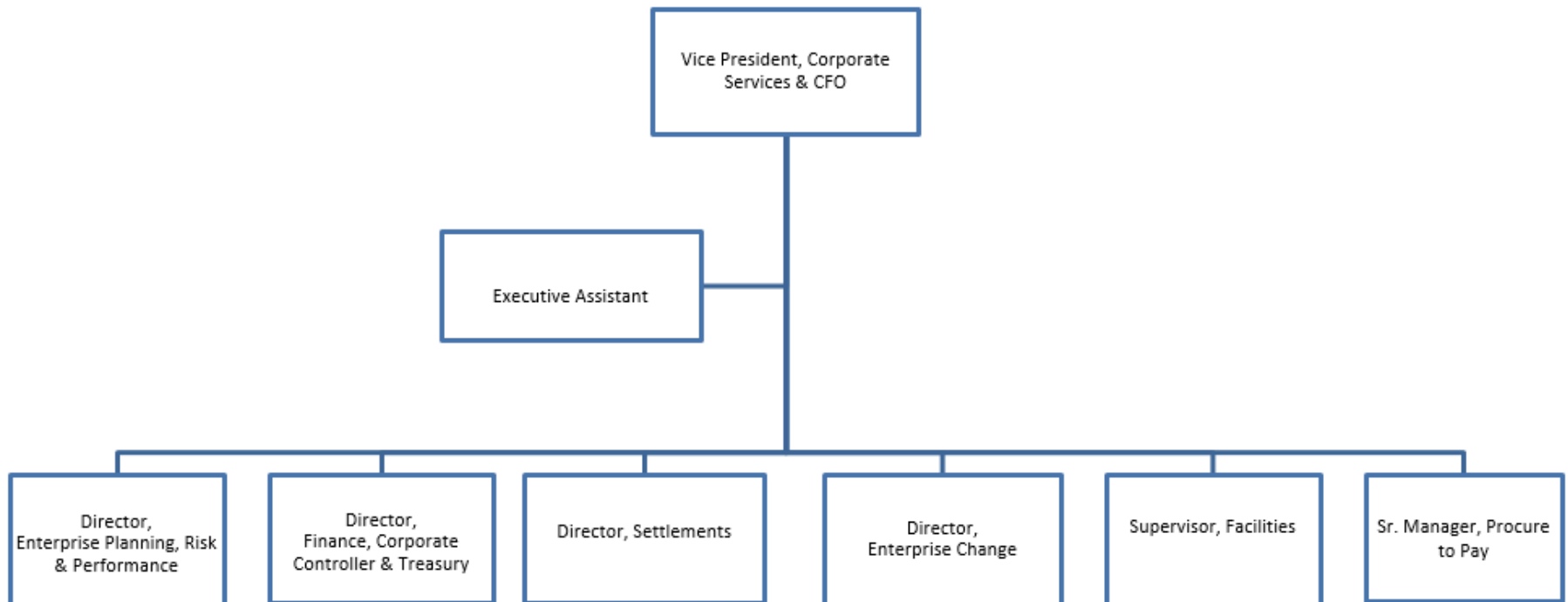
IESO



Internal Audit Organization

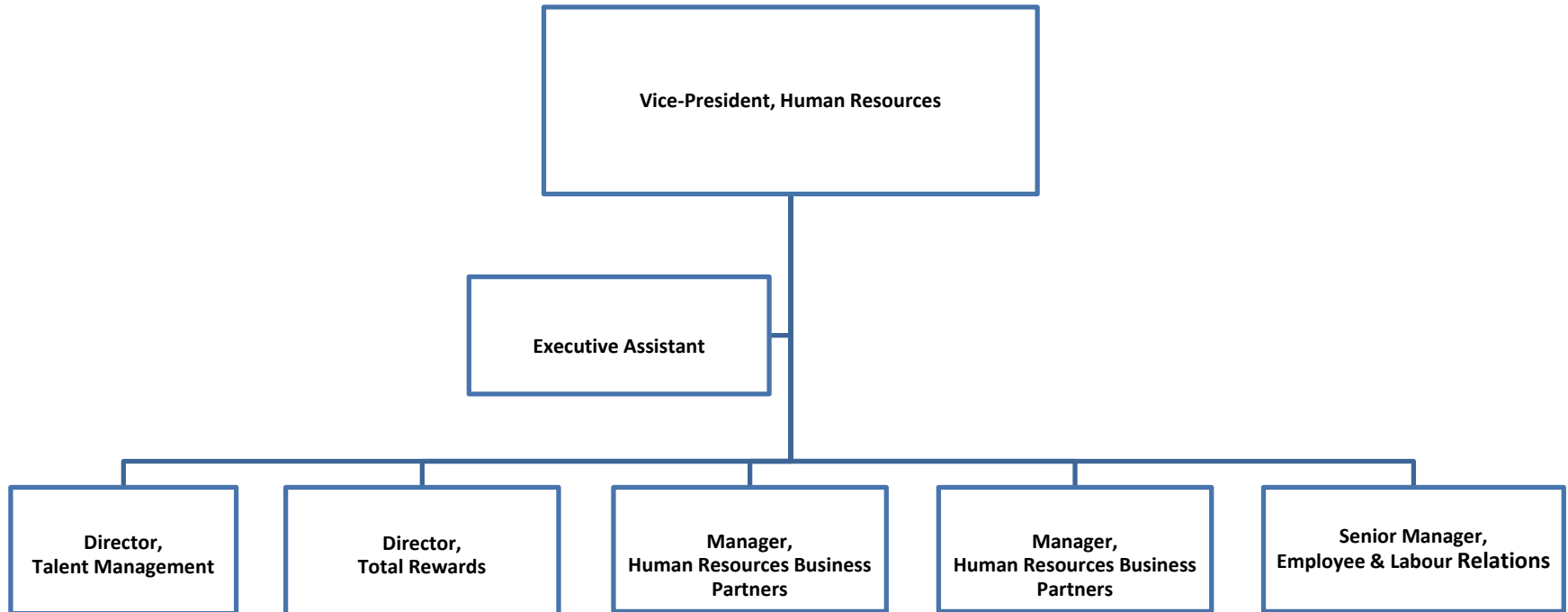


CORPORATE SERVICES

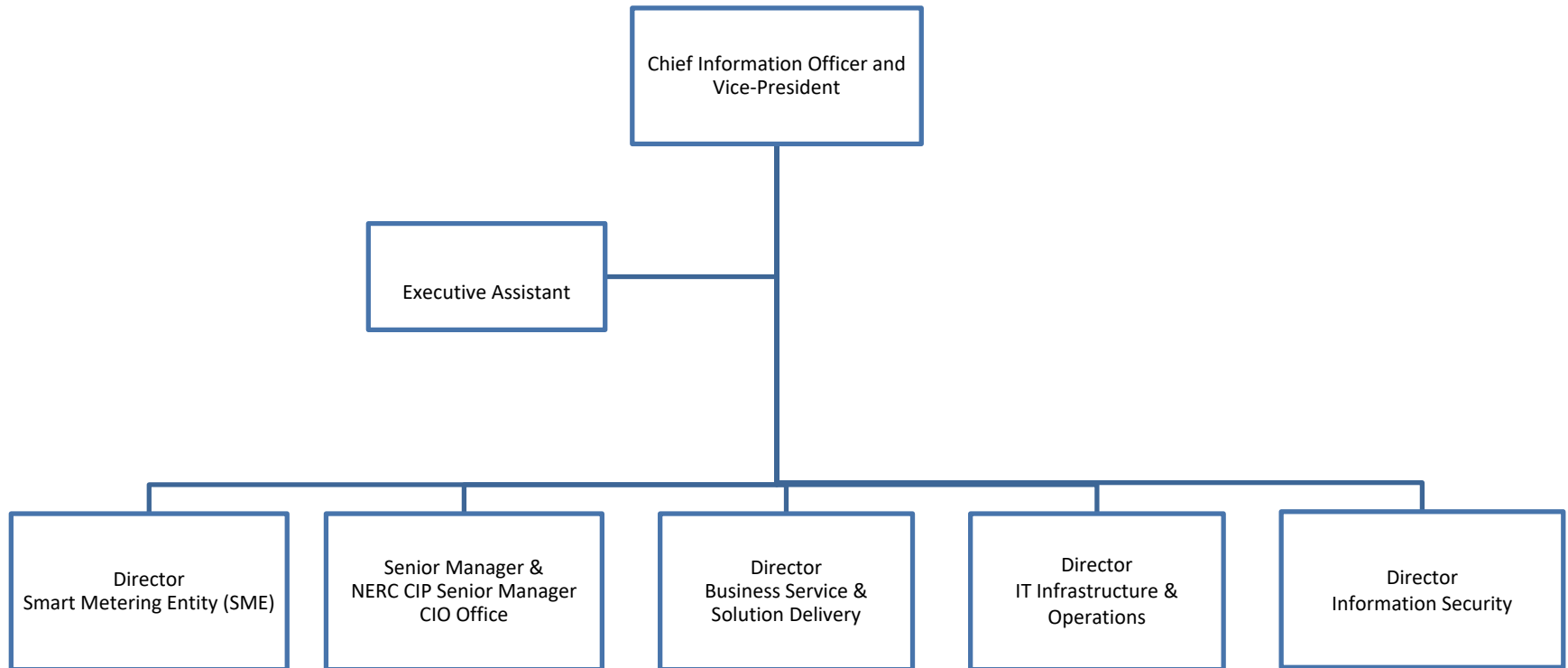


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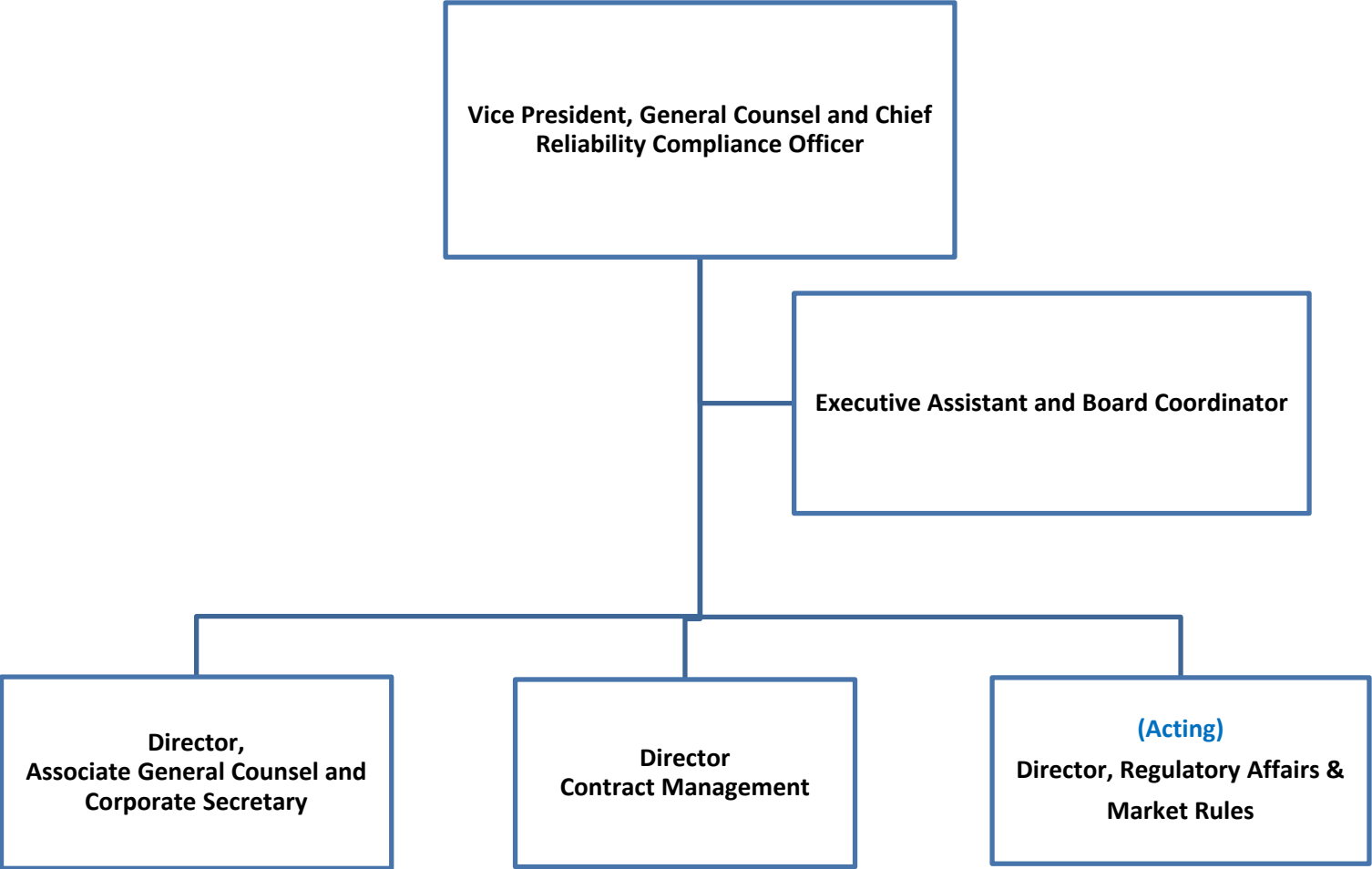
HUMAN RESOURCES



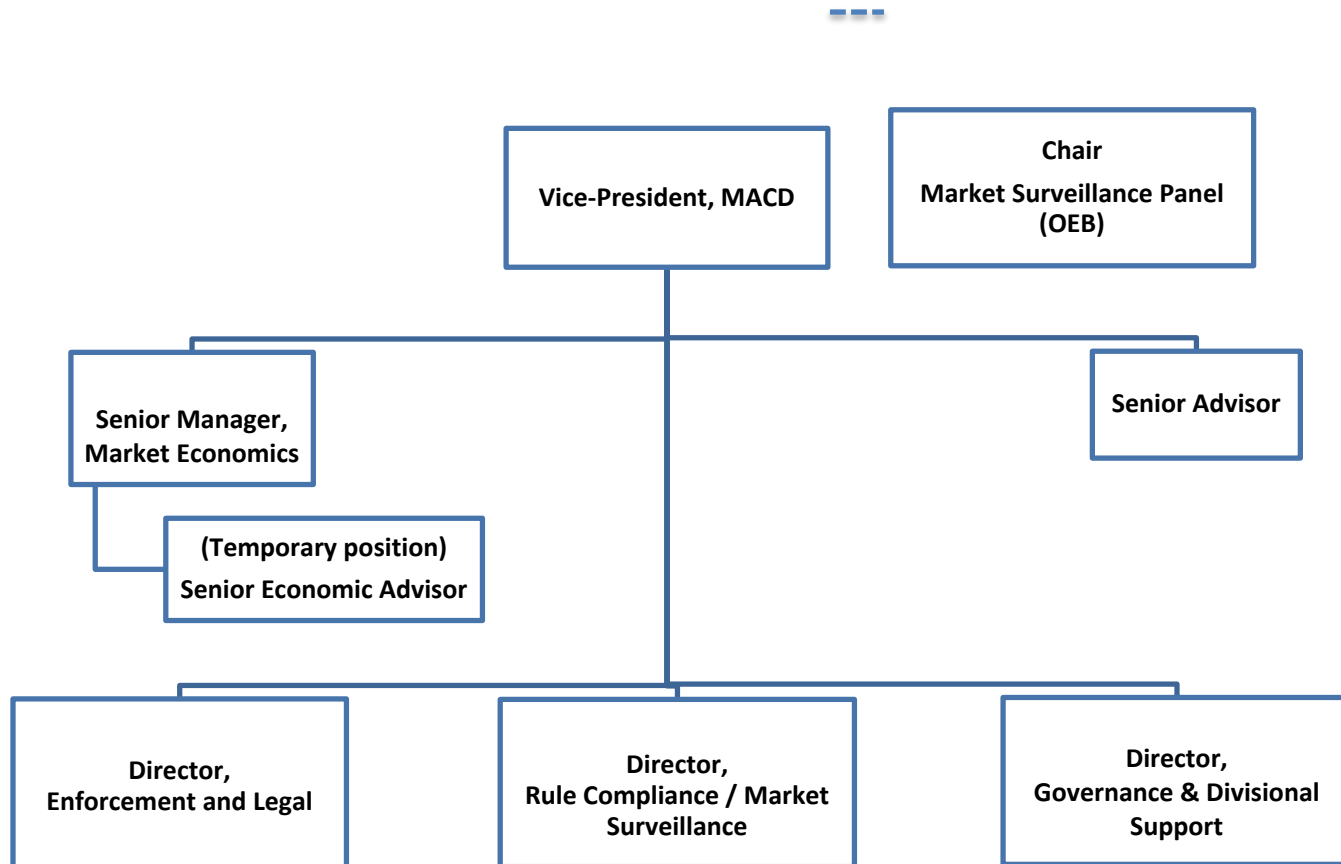
INFORMATION & TECHNOLOGY SERVICES



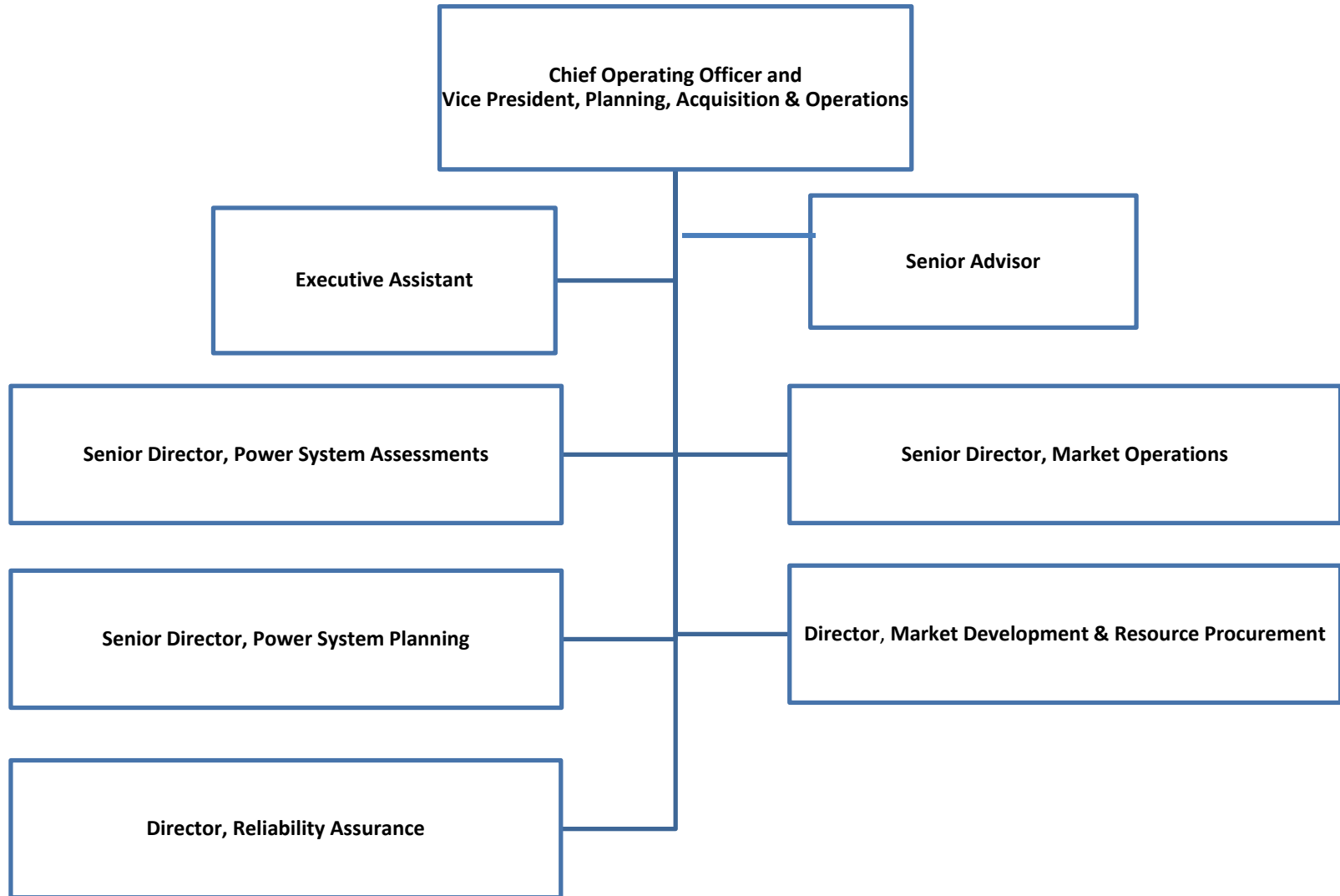
LEGAL RESOURCES AND CORPORATE GOVERNANCE



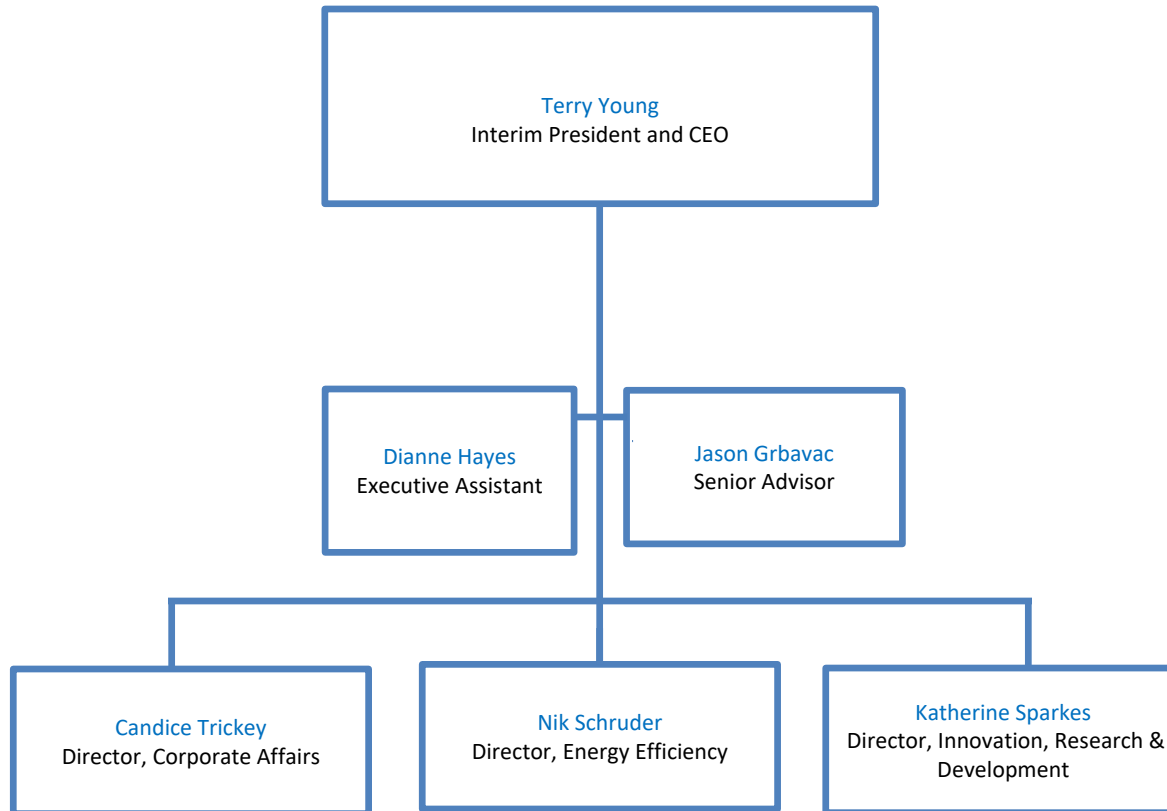
MARKET ASSESSMENT AND COMPLIANCE DIVISION



PLANNING, ACQUISITION AND OPERATIONS



POLICY, ENGAGEMENT & INNOVATION



Effective Date: May 10, 2021

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STAFFING AND COMPENSATION

Staffing and Compensation

The IESO's 2019 decision to cancel the incremental capacity auction (ICA) work under the Market Renewal Program (MRP) resulted in not proceeding with 73 budgeted FTEs, most of which were expected to be capital labour costs, and with existing staff being redeployed in 2020 to capacity market design, to the MRP energy work stream and the IESO's core operations.

In 2020, an average of 772 FTEs was required to support IESO's core operations initiatives and MRP, this is a total increase of 3 FTEs on average compared to 2019 average FTEs.

An additional 22 FTEs on average are required in 2021, mainly to support market rule amendments and documentation work support (19 FTEs on average) and to support work related to enabling resources (3 FTEs on average).

Table 1: Staffing and Operating Compensation Expenses

	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Average Number of Employees (Capital and Operating expenses FTEs)				
Executive	7	7	7	7
Management	132	129	134	127
Non-Management Regular	633	545	557	596
Non-Management Temporary	71	88	74	64
Total	842	769	772	794
Operating expenses figures below are in \$ millions				
Total Compensation (Salary, Wages & Benefits)				
Executive and Board	4.3	4.3	4.4	4.5
Management	23.2	26.3	27.2	25.6
Non-Management Regular	85.6	83.4	86.7	89.8
Non-Management Temporary	5.9	9.2	7.5	5.4
Total	118.9	123.2	125.8	125.3

Enhanced Compensation Details (see Attachment 1 - Appendix 2-K - Employee Costs to this exhibit). An increase of \$3.6 million in employee benefits costs drove most of the \$4.3 million variance in operating expenses compared to the budget in 2019.

1 Compensation and benefits expenses in 2020 are 2% or \$2.6 million higher than 2019, due to
2 collective agreement escalation impact (\$3.0 million), pension liability actuarial update
3 (\$3.0 million) and other compensation costs (\$0.6 million – mostly related to the COVID-19
4 pandemic); which is mostly offset by savings from the cancelled ICA work (\$4.0 million).

5 The 2021 budgeted expenses are essentially aligned to 2020 results, driven by an increased
6 level of capital labour costs and active management of vacancies in order to offset impact from
7 salary escalations. The IESO's vacancy rate over the past 12 – 24 months has been
8 approximately 3%. This vacancy rate is included in 2021 budget assumptions along with other
9 vacancy timing adjustments such as provisions for a higher internal hiring rate and hiring lags
10 to minimize the impact of additional resource requirements.

11 Employee benefits, as an expense category, represents the components of compensation and
12 benefits related to health and dental benefit coverage, pension plan expenses, and other (non-
13 pension) post-employment and post-retirement benefit expenses (OPEB). 2019 and 2020
14 actual compensation and benefit costs were approximately 35% and 36% respectively,
15 consistent with the 2021 budget assumption of 37%. The increase in cost reflects the IESO's
16 actuarial provider assumption for increased benefit claims costs, updated mortality tables which
17 assumes employees will draw on the pension plan longer, and higher pension expenses due to
18 expected lower performance on pension plan assets due to current market conditions.

19 **Report on Total Compensation**

20 As part of the OEB's Decision in EB-2019-0002, the IESO is to report on the progress made
21 towards reaching the 50th percentile for total compensation. The table below provides a
22 summary of the current and potential initiatives and negotiated changes that continue to help
23 bring IESO total remuneration in line with the 50th percentile.

Table 2: Summary of progress towards 50th percentile for total compensation

Target Area	Ongoing and planned efforts to align Total Remuneration to the 50 th percentile
Compensation	<p>Reduction in number of Society employees compensated above revised salary range maximum</p> <p>Through attrition, the number of Society employees paid above Step 10 of collective agreement pay schedule, is reducing. Over the last 3 years 13 of 35 (37%) Society employees that have left the organization (voluntary or involuntary) have been employees with salary rates above Step 10.</p> <p>Over the next 5 years, 55% of Society employees above Step 10 will be eligible to retire. New hires will be compensated within the salary range that caps at Step 10. New Hire compensation is based on years of relevant experience. Savings will vary based on the salary rate of the exiting employee and that of the individual replacing them.</p>
Compensation	<p>Cap economic annual increases</p> <p>Bill 124 places a 1% cap on across the board economic increases upon expiry of the Collective Agreements, for a three-year moderation period.</p> <p>PWU's Collective Agreement expired as of April 1, 2020. The cap now applies to the PWU wage considerations. Collective Bargaining will resume in October and this restriction will be part of the negotiations.</p> <p>Society's Collective Agreement expires as of January 1, 2022 at which time the cap will apply.</p>
Compensation	<p>Guidelines and oversight</p> <p>Negotiated salaries follow a predetermined set of guidelines and best practice principles. These guidelines restrict the amount of compensation that can be applied to the various requests for consideration (new hires, promotions). See attachment 2 – IESO Compensation Guides for additional information.</p>
Compensation	<p>Benchmarking Surveys</p> <p>Continue to conduct compensation benchmarking surveys every 2-3 years to ensure alignment with the Energy sector and the 50th percentile. The next benchmarking survey will be conducted in the Summer 2021.</p>
Pension	<p>Negotiated Plan changes, not yet implemented, that will have a positive impact on our future cost containment.</p>

	<ul style="list-style-type: none"> • Effective March 31, 2025 the undiscounted early retirement rule for PWU and SOC will change to reflect the Rule of 85 (age & service) from the Rule of 82. • Effective March 31, 2025 an averaging period of 60 months, rather than 36 months, will determine pensionable earnings for both PWU and Society
Pension	<p>The following implemented plan provisions are amendments that continue to have a positive impact on future cost containment/sharing.</p> <ul style="list-style-type: none"> • Effective September 1, 2017 the non-represented/Management employee pension contributions were increased to the current 9% up to the Year's Maximum Pensionable Earnings (YMPE) covered by CPP and 11% above the YMPE. This increase in "employee" pension contributions in turn decreases the required employer contributions. • Effective January 1, 2007 plan provisions were amended for non-represented/Management members hired on or after that date to the following: <ul style="list-style-type: none"> ➤ averaging period of 60 months rather than 36 months for pensionable earnings; ➤ indexation of benefits in payment of 75% of the increase in CPI with no carry forward rather than 100% of CPI with carry forward provisions; ➤ benefits are not indexed in the deferral period for members who terminate employment prior to pension commencement eligibility; ➤ unreduced retirement at 90 age-plus-service points rather than 84 age-plus-service points. • Effective January 1, 2017 the plan was amended to extend the changes above (60 month averaging period for earnings, 75% indexation and 90-point unreduced retirement date) to all non-represented/Management members for benefits earned for service on and after January 1, 2017. • Effective Jan 1, 2020 the PWU employee pension contributions increased to 9% up to the Year's Maximum Pensionable Earnings (YMPE) covered by CPP and 11% above the YMPE aligning PWU contributions with non-represented/Management employees' pension contributions. This increase in "employee" pension contributions in turn decreases the required employer contributions.

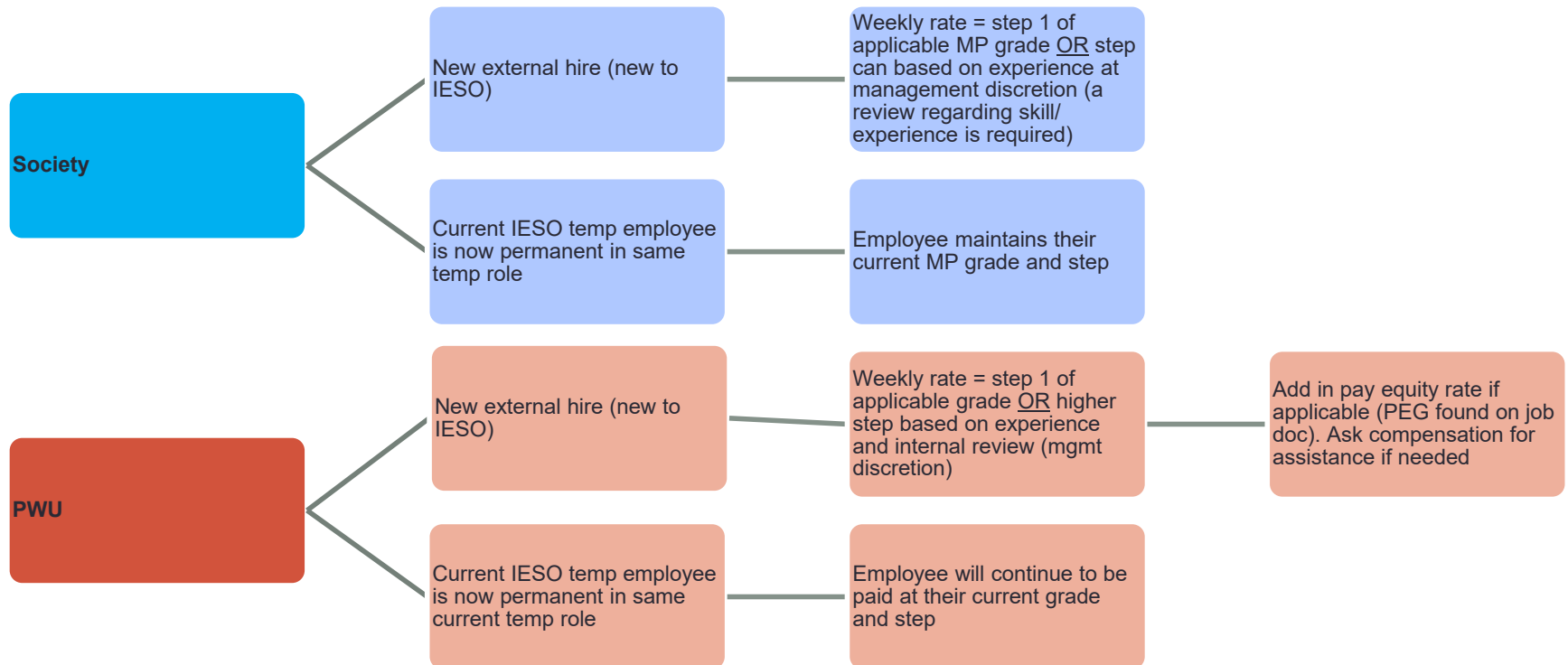
Pension	Potential future negotiation items <ul style="list-style-type: none"> • Society employee pension plan contributions equal to 9% up to the Year's Maximum Pensionable Earnings (YMPE) covered by CPP and 11% above the YMPE to align with PWU and non-represented/Management pension contributions. This increase in "employee" pension contributions would in turn decrease the required employer contributions. • Integration of new CPP Bridge formula to reflect CPP enhancement that will fully come into effect as of Jan 1, 2025. • Decrease indexing to 75% on the pension plan for both PWU and Society to align with Management. • Increasing employee pension contributions and cost-saving pension plan proposals will be tabled by the IESO as part of future collective bargaining. • Note: In the absence of a negotiated agreement between the Society and IESO, the Parties are bound to the Interest Arbitration process.
Benefits	Recent negotiated Benefits Changes Society Collective Agreement – Interest Arbitration Award (Jan 1, 2019 – Dec 31, 2021) <ul style="list-style-type: none"> • Eligibility for post-retirement benefits increased from 7 years' service to 10 years' service (to align with Management and PWU) • Eye exam reduction from annual to biennial coverage
Benefits	Potential future negotiation items <ul style="list-style-type: none"> • Increase employee cost contribution (cost sharing) • Identify and implement lower caps on some benefits coverage
Benefits	Implementation of preventative measures in support employee wellness <ul style="list-style-type: none"> • Provide employees and leaders with CAMH led training on Managing Mental Health • Provide EFAP services as well as online wellness video library/education/tools that support health and wellness • Through a dedicated page on the IESO intranet site we provide IESO with a wealth of resources on wellness and mental health. This page is regularly updated and promoted throughout the organization.
Culture and Values	Continue to focus on initiatives that support engagement, productivity and help retain and attract a diverse workforce <ul style="list-style-type: none"> • Ongoing embedment of the IESO Values • Roll out of the employee Recognition Program

	<ul style="list-style-type: none">• Learning and Development Framework Implementation and embedment• Diversity and Inclusion Strategy and Implementation• Labour Relations Strategy that continues to recognize the principles of aligning Total Remuneration to the 50th percentile
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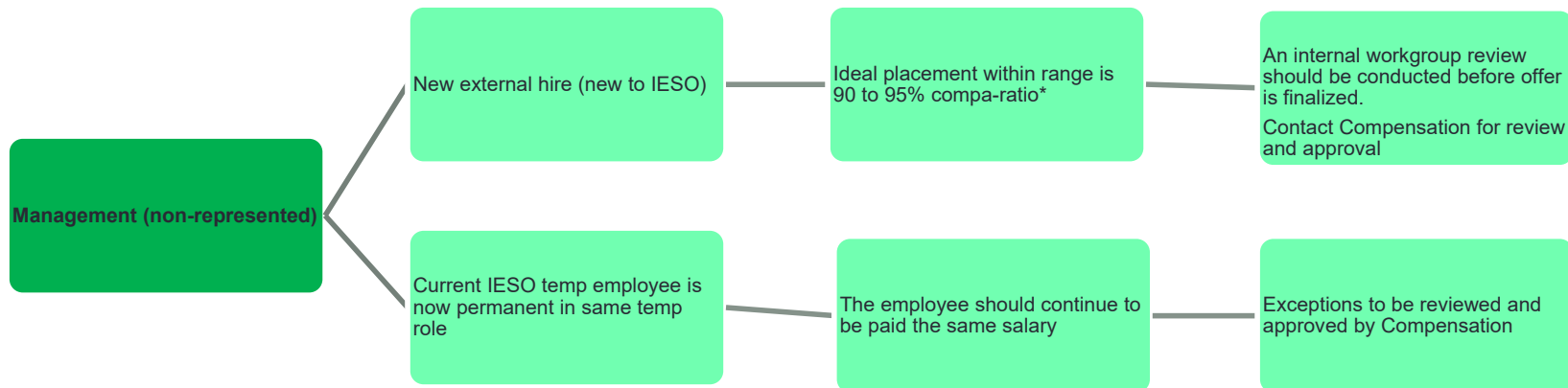
IESO COMPENSATION GUIDELINES

- **Management (non-represented)**
- **Society**
- **PWU**

External New Hires and Conversions from Temp to Permanent (same role) - Society & PWU -



External New Hires and Conversions from Temp to Permanent (same role) - Management -



Important note regarding rounding

Once the weekly rate has been calculated by dividing the annual salary by 52 and rounding to the nearest penny, it is important to multiply that rate once again by 52 to determine if the result is greater or less than the annual salary stated in the offer letter. If the resulting annual salary is less than that stated in the offer letter, a penny should be added to the weekly rate. This will ensure that the annual salary amount is equal or greater than that stated in the offer letter.

Example:

The employee offer letter states that the annual salary = \$125,600. When the salary is divided by 52 to determine the weekly rate it equals \$2415.384. Using rounding rules this would now equal \$2415.38 weekly.

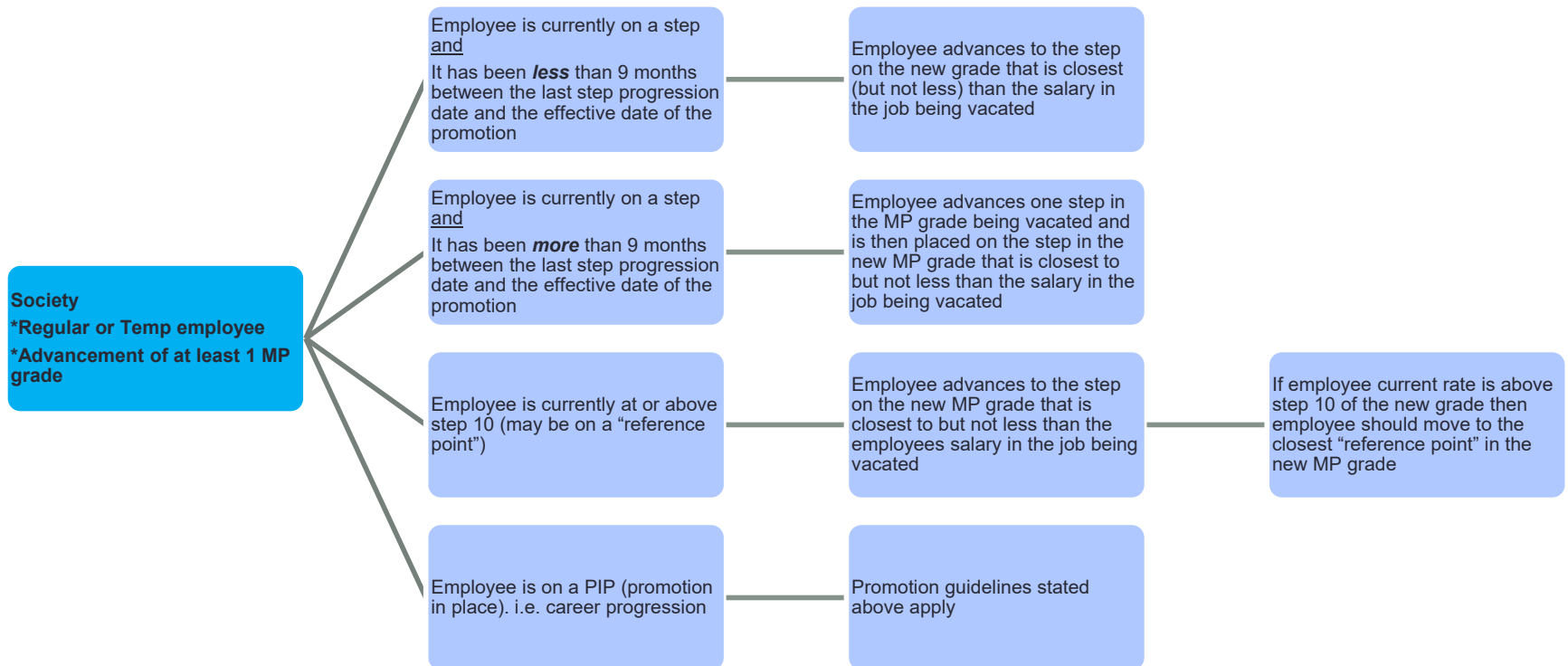
Issue = since the employee's weekly rate is entered in SFs, the annual salary amount may be greater or less than what is stated in the offer. This is a result of rounding.

In the example above - \$2415.38 weekly multiplied by 52 weeks = \$125,599.76. This is now less than the annual salary stated in the offer letter.

Therefore a penny should be added to the weekly rate (\$2415.39) and multiplied by 52. Result is now \$125,600.28.

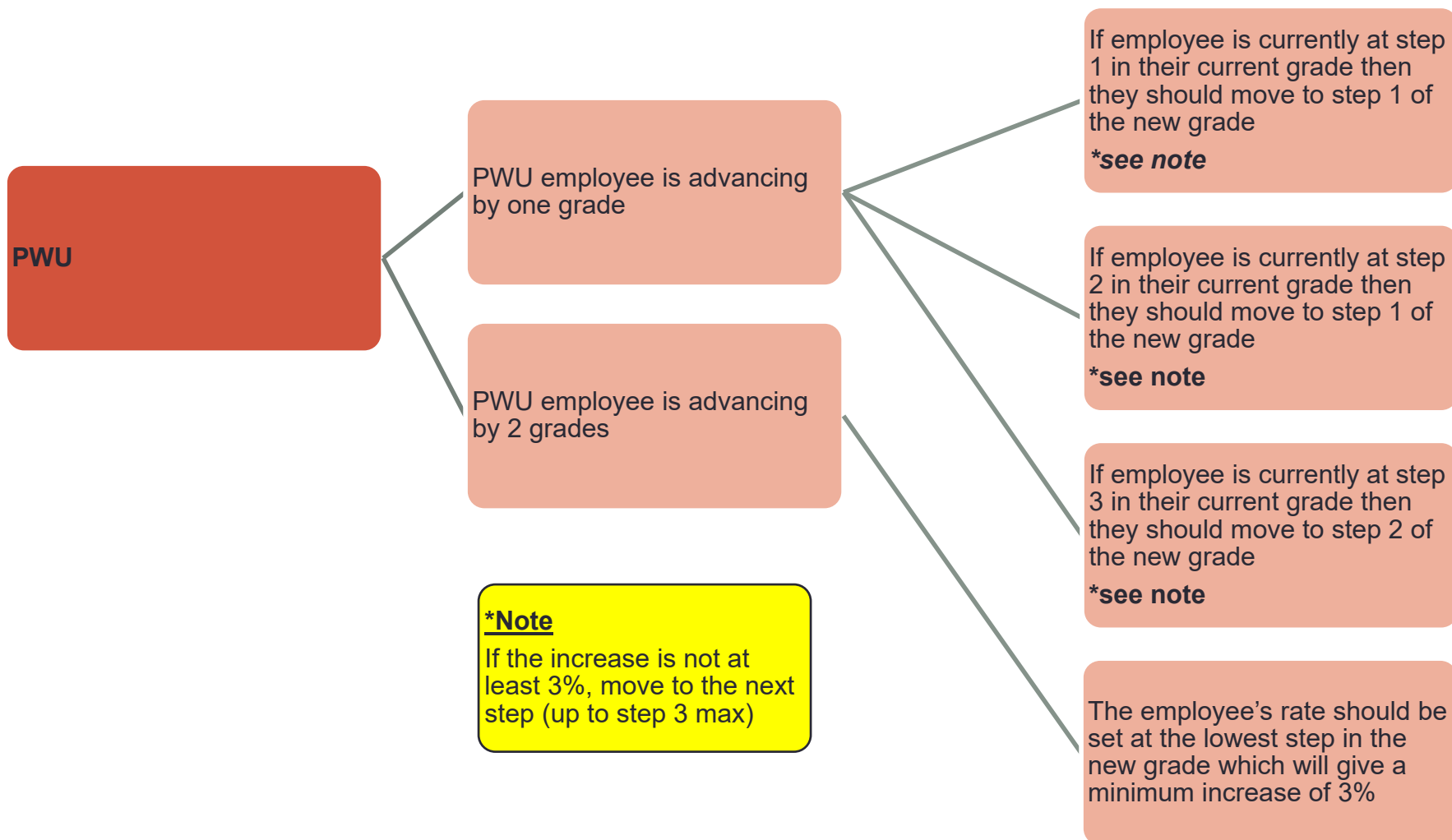
Promotions

- Society -



Promotions

- PWU -



Promotions

- Management -

Management (non-represented)

Typically 5-10% increase and target placement in new Band is 90 – 95% compa-ratio*

Contact Compensation for review and approval (internal equity review is required)

Important note regarding rounding

Once the weekly rate has been calculated by dividing the annual salary by 52 and rounding to the nearest penny, it is important to multiply that rate once again by 52 to determine if the result is greater or less than the annual salary stated in the offer letter. If the resulting annual salary is less than that stated in the offer letter, a penny should be added to the weekly rate. This will ensure that the annual salary amount is equal or greater than that stated in the offer letter.

Example:

The employee offer letter states that the annual salary = \$125,600. When the salary is divided by 52 to determine the weekly rate it equals \$2415.384. Using rounding rules this would now equal \$2415.38 weekly.

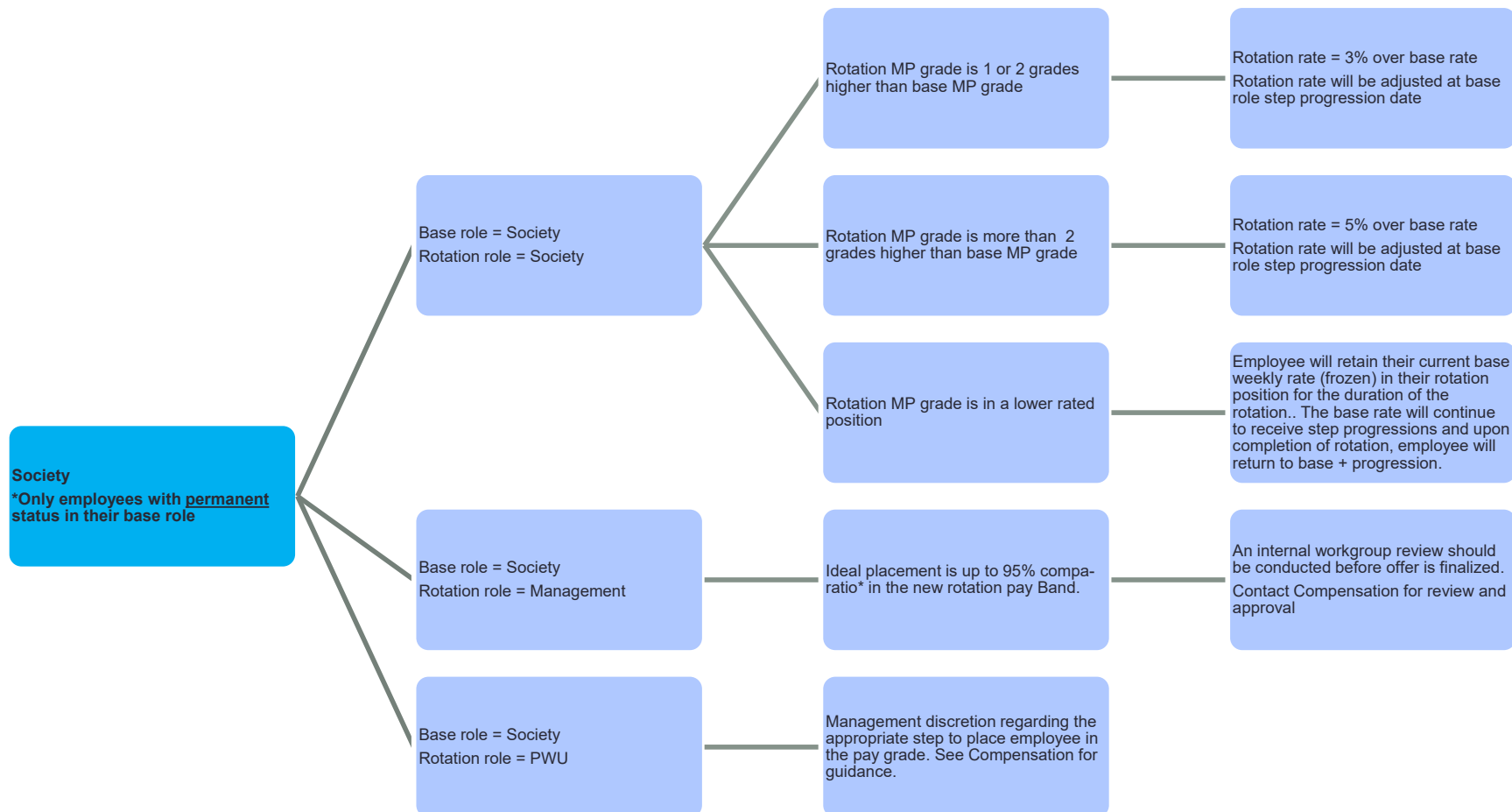
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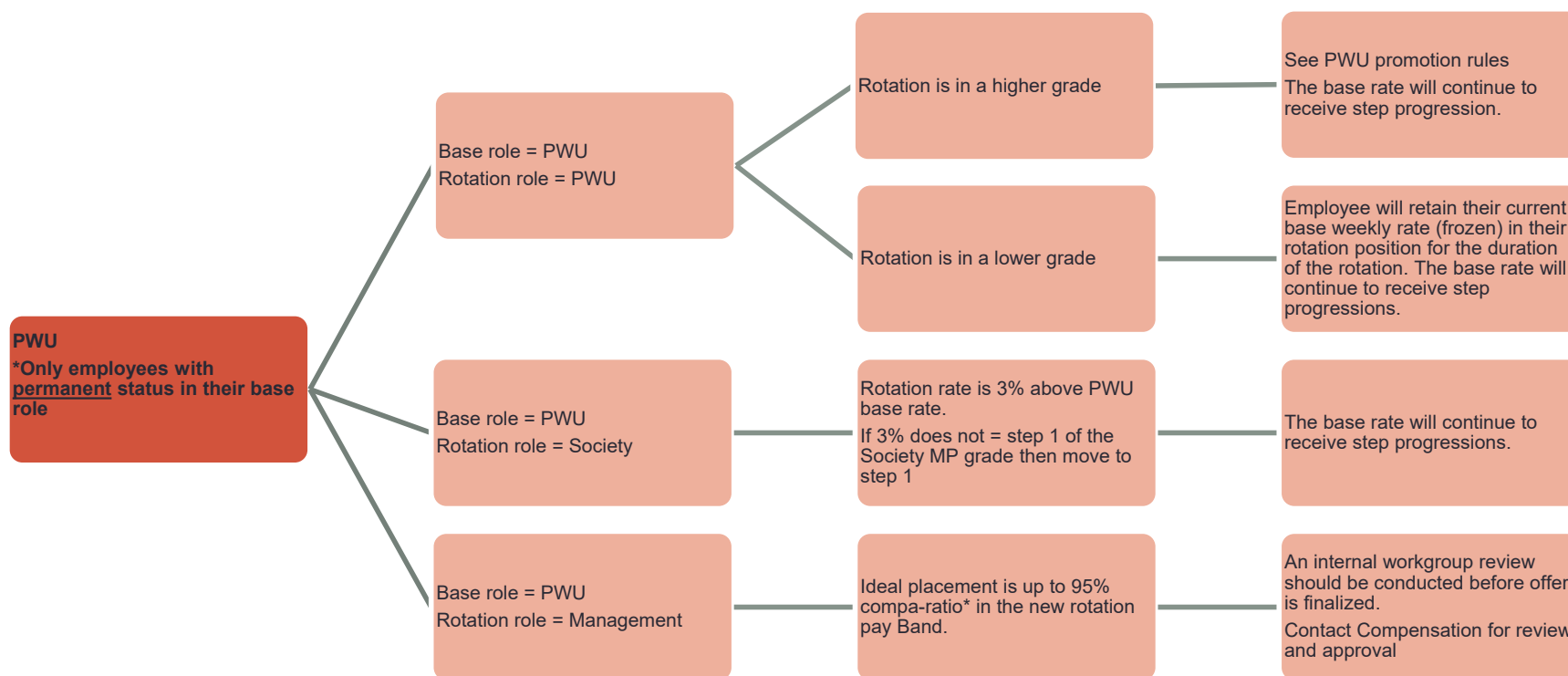
Rotations (temporary assignments)

- Society -



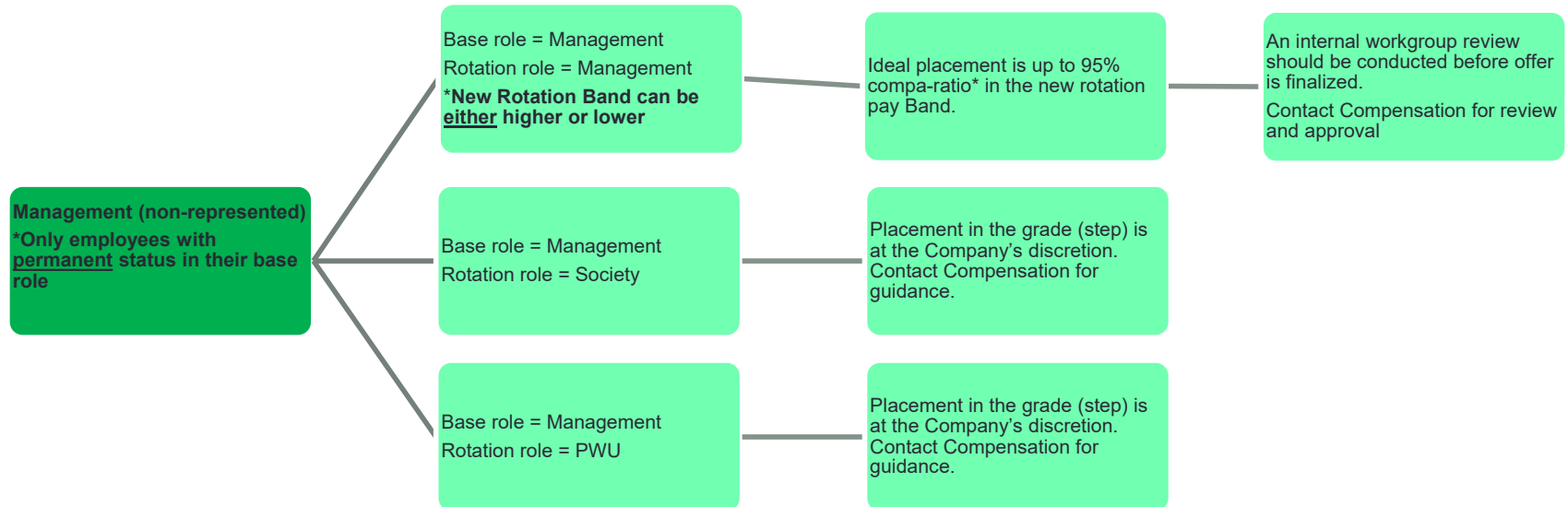
Rotations (temporary assignments)

- PWU -



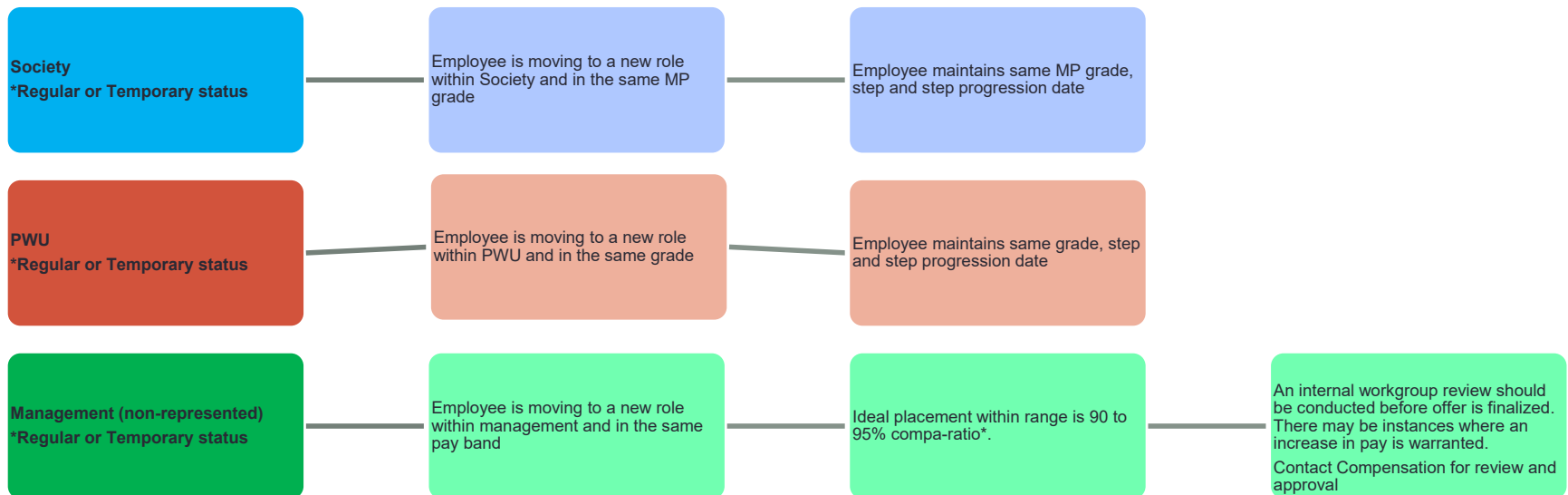
Rotations (temporary assignments)

- Management -



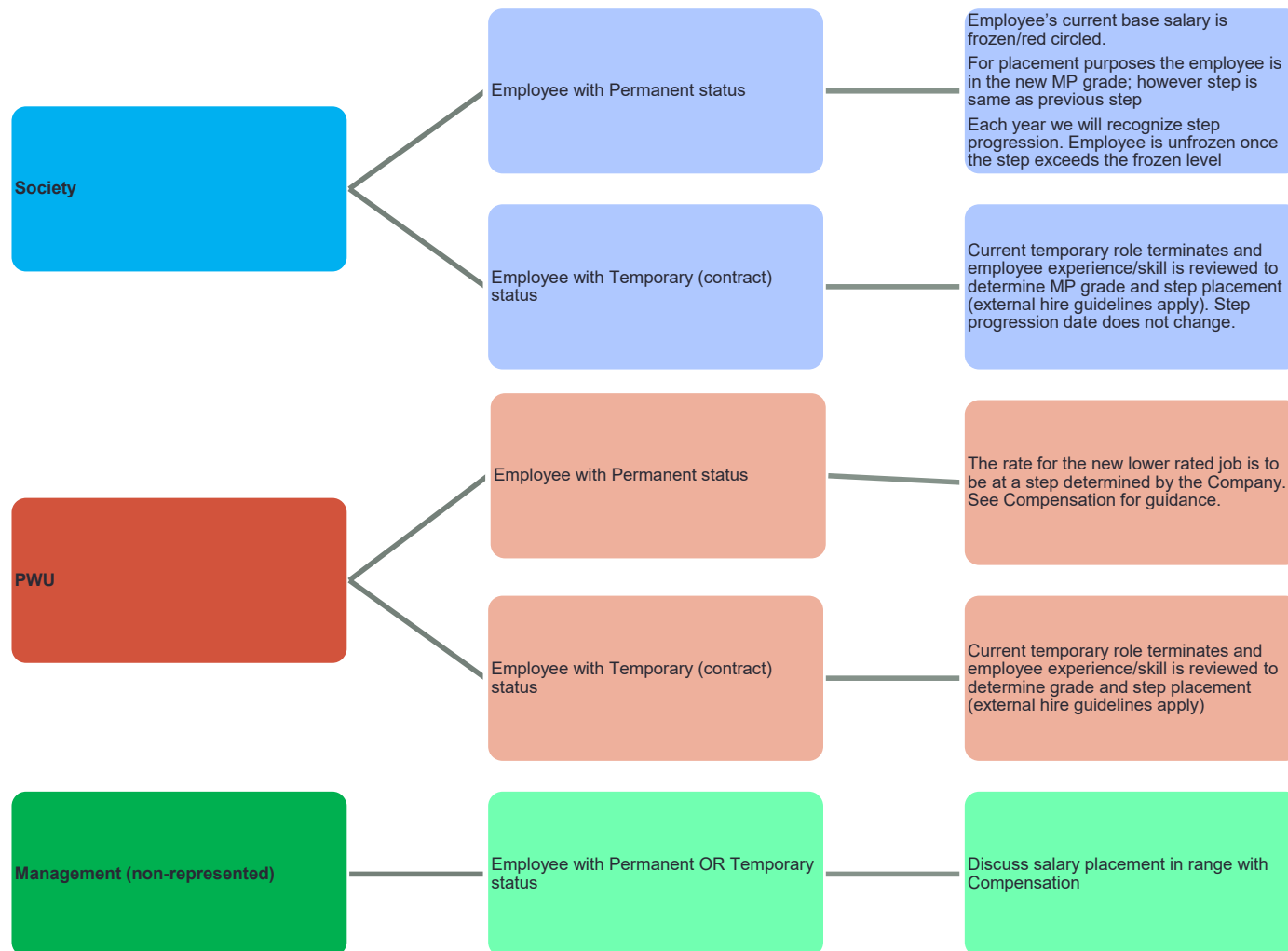
Lateral Move

- All Jurisdictions -



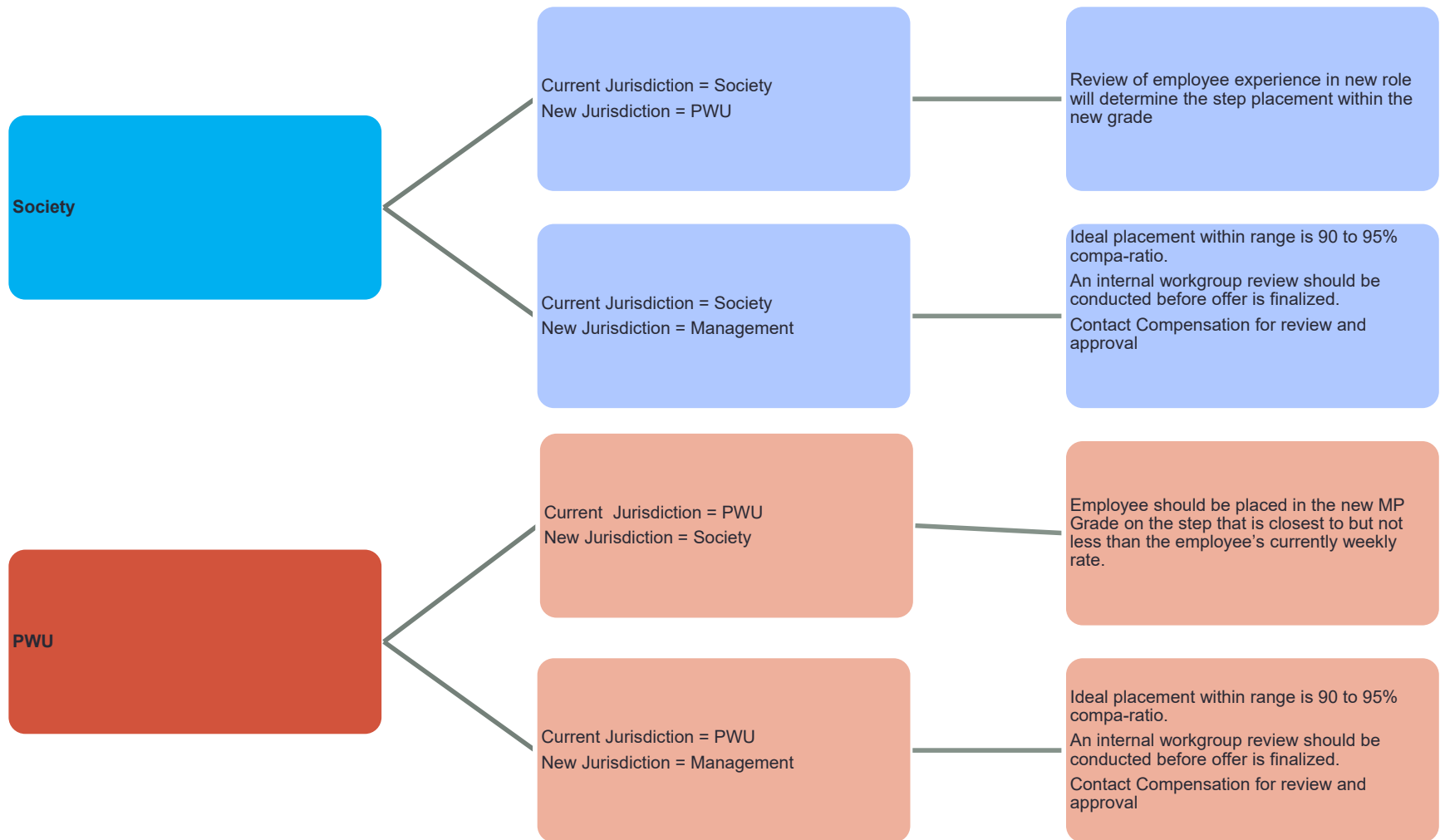
Demotions (moving into a role at a lower grade/band)

- All Jurisdictions -



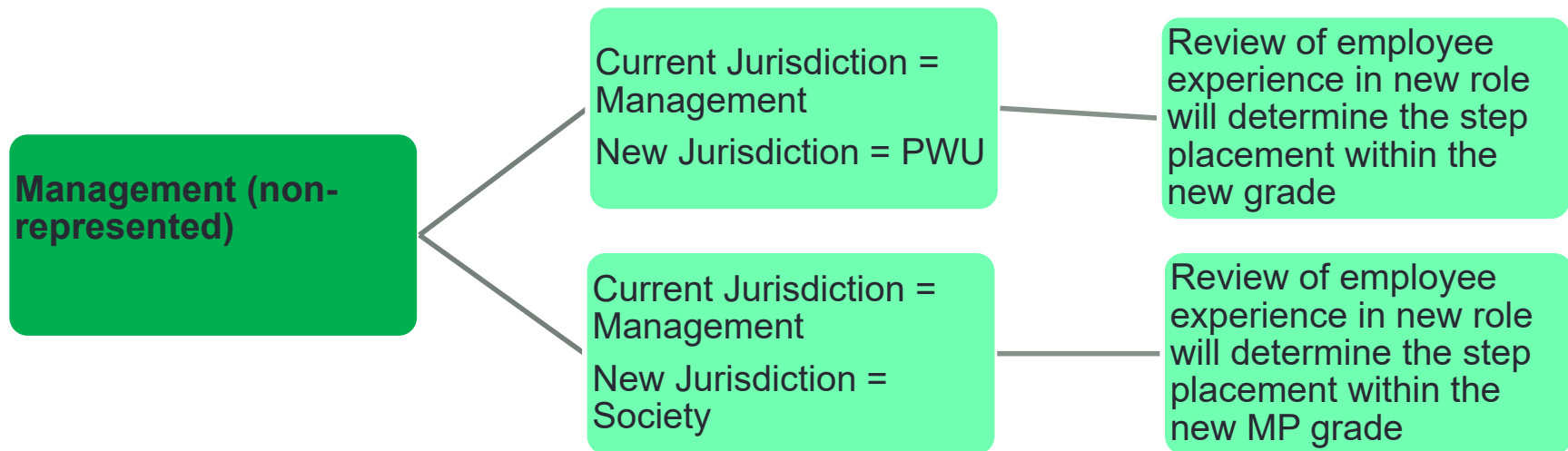
Jurisdictional Moves

- Society & PWU -



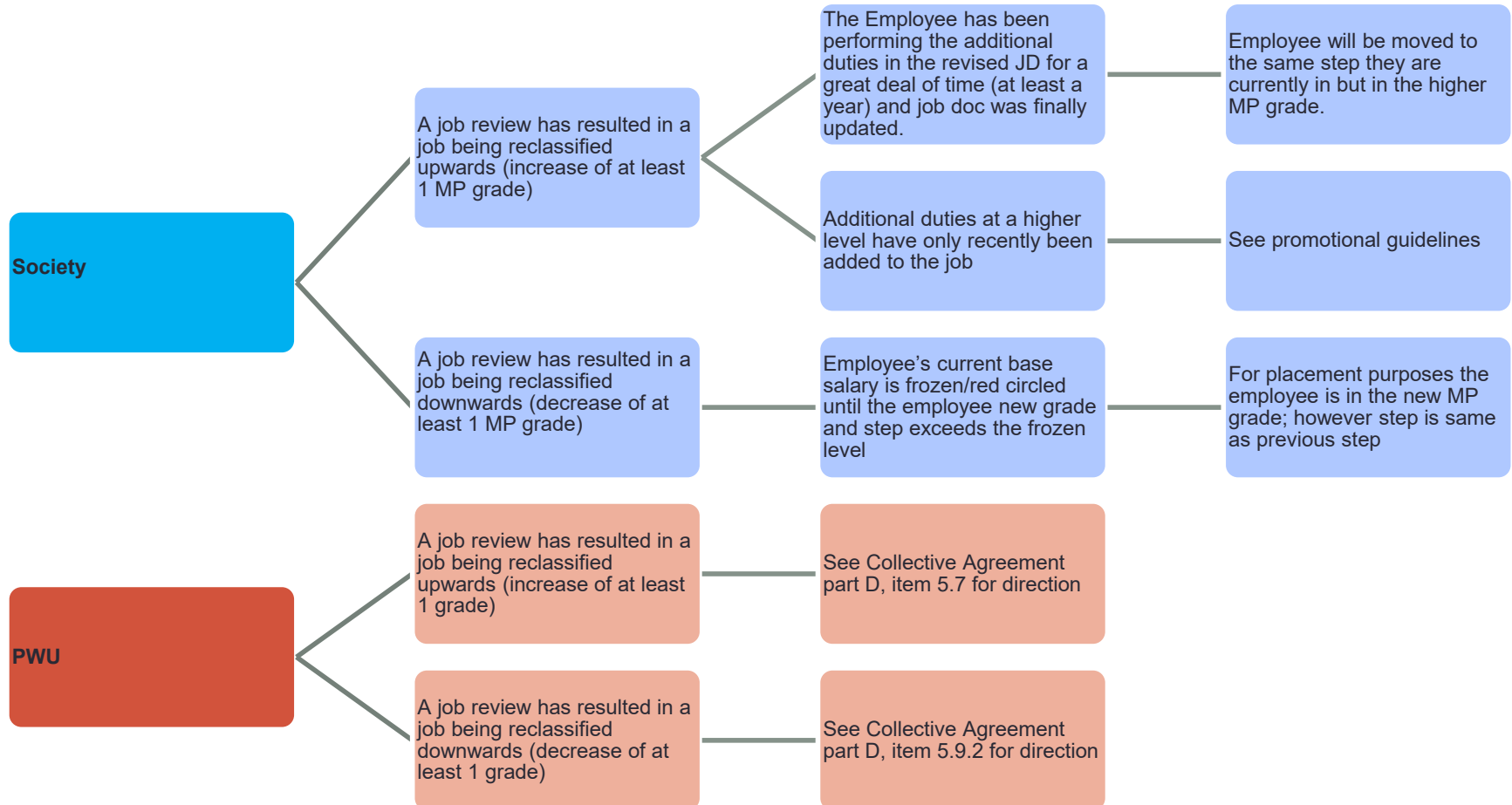
Jurisdictional Moves

- Management -



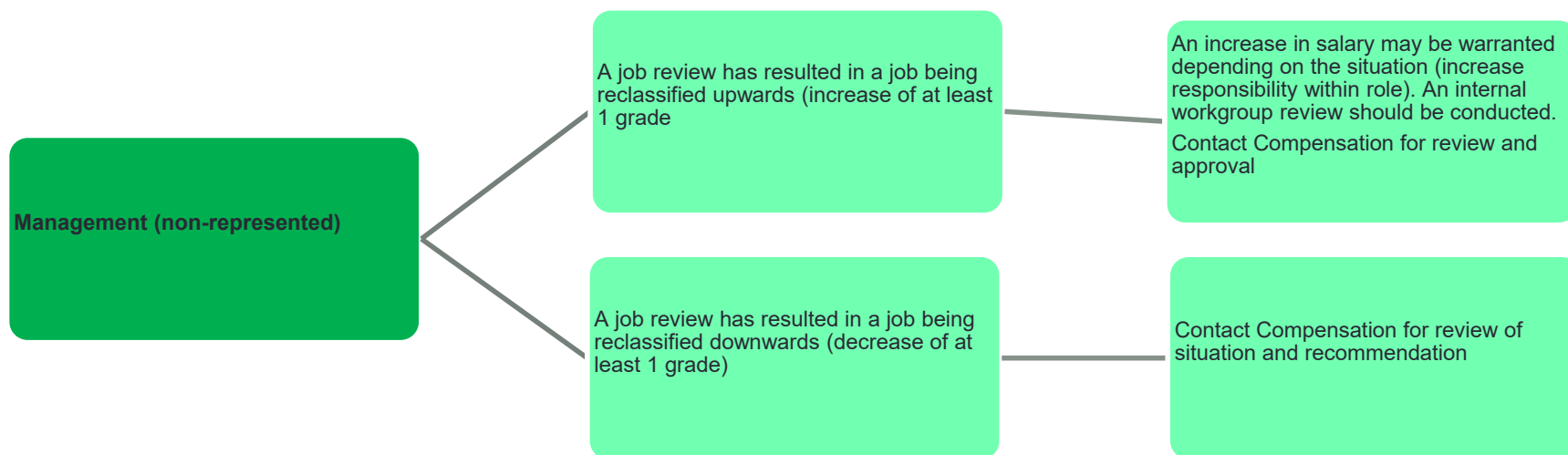
Job Reclassification (due to JE)

- Society -



Job Reclassification (due to JE)

- Management -



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CORPORATE POLICY ON PROCUREMENT

The IESO's procurement policy is provided as Attachment 1 to this exhibit. This policy provides direction for the purchase of goods and/or services and its objective is to ensure that the IESO acquires the goods and services required to meet its business needs in the most economical and efficient manner. A number of principles inform the policy such as, but not limited to, value for money, vendor access, transparency and fairness, responsible management and an open and competitive procurement process. The IESO confirms that all procurement has been consistent with the stated procurement policy.

All vendors who are engaged to provide goods or services to the IESO are required to comply with the IESO's procurement policy.

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1.0 Purpose

This policy provides direction for the purchase of goods and/or services on behalf of the IESO in accordance with all applicable law, regulation, directives and trade agreements.

The objective of this policy is to ensure that the IESO acquires the goods and/or services required to meet its business needs in the most economical and efficient manner through Procurement processes that conform to the following principles:

(a) Value for money:

- Goods and/or services are to be procured only after consideration of IESO-wide business requirements, alternatives, timing, supply strategy, and Procurement method;
- An Open Competitive Procurement process should be used to the greatest extent possible.

(b) Vendor access, transparency and fairness:

- Access for qualified Vendors to compete for IESO business must be fair and the procurement process must be conducted in a transparent manner, providing equal treatment to Vendors;
- Conflicts of interest, both real and perceived, are to be avoided during the Procurement process and the ensuing contract is managed in accordance with IESO policies; and
- Relationships that result in continuous reliance on a particular Vendor for a particular kind of work must not be created.

(c) Responsible management:

- Goods and/or services procured by the IESO must be responsibly and effectively managed.

(d) Geographic Neutrality and Reciprocal Non-Discrimination:

- Vendors have equal access to compete for IESO business regardless of their location.

Terms that are defined under Definitions of this Policy are capitalized where they appear throughout the body of the document.

2.0 Scope

2.1 Application and Exceptions

This policy applies to the planning and acquisition of all goods and/or services procured by the IESO, including the Procurement of goods and/or services in support of Contracts under the *Electricity Act, 1998*, regardless of value, with the following exceptions:

- (a) External legal services, support for legal services, services of expert witnesses or factual witnesses used in court or legal proceedings;
- (b) Financial services respecting the management of IESO financial assets and liabilities (i.e. treasury, lending and banking services)¹;
- (c) Advertising space and media buy, except as further outlined in Appendix D: Additional Procurement Considerations Checklist;
- (d) Realty, including acquisition or rental of land, existing buildings, or other immovable property or the rights thereon;
- (e) Utilities;
- (f) Reimbursable employee expenses provided such purchases are made in accordance with the IESO's Business Expense Standard;
- (g) Educational courses that are:
 - Required for maintaining professional designations;
 - Offered by accredited post-secondary institutions; or
 - Industry conferences, courses, and seminars that are not customized, developed, or arranged specifically for IESO staff.
- (h) Contracts for goods and/or services between IESO and another government, government department, agency or Ministry;
- (i) Goods and/or services from philanthropic institutions or non-profit organizations; and
- (j) Services related to employee pension benefits.

2.2 Out of Scope

This policy does not apply to the following:

¹ Canadian Free Trade Agreement, Chapter Five - Government Procurement.

- (a) Contracts authorized or required under the *Electricity Act, 1998* or any regulations or directives made thereto, as amended, including without limitation, electricity supply or capacity, including supply or capacity to be generated using alternative energy sources and renewable energy sources; the management of electricity demand, including the reduction or conservation in electricity demand; generation; storage; transmission; distribution; and load-management infrastructure;
- (b) The operation and maintenance of the IESO-controlled grid and operating the IESO-administered markets, as described in the *Electricity Act, 1998*, including, but not limited to actions taken to amend, administer or enforce the market rules;
- (c) Measures that will manage electricity demand or result in the improved management of electricity demand on an on-going or emergency basis, including:
 - Contracts between the IESO and any standards authorities relating to the reliability of the integrated power system (e.g. NERC, NERP);
 - Enforcing criteria and standards relating to the integrated power system;
 - Settlements and payments under a contract authorized by the *Electricity Act, 1998* and with respect to payments provided for under the *Ontario Energy Board Act, 1998* (including contribution and funding agreements); and
 - Ontario Energy Board and other regulatory fees pursuant to the *Electricity Act, 1998*.

3.0 Policy Statements

3.1 Governance

This policy complies with the following, including, as required:

- (a) *Electricity Act, 1998*, S.O. 1998, c. 15 Schedule A and any applicable regulations;
- (b) *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, Sched. B and any applicable regulations;
- (c) *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31 and any applicable regulations;
- (d) *Accessibility for Ontarians with Disabilities Act, 2005*, S.O. 2005, c. 11 and any applicable regulations;
- (e) The Ontario Public Service (OPS) Procurement Directive (December 2014) as an “Other Included Entity”, and associated Interim Measures (March 2019);
- (f) The Canadian Free Trade Agreement (CFTA) as a “procuring entity”; and

(g) Management Board of Cabinet (MBC) Travel, Meals and Hospitality Expense Directive.

3.2 Policy Exemptions

The IESO, as an Other Included Entity, must receive prior Management Board of Cabinet (MBC) approval when seeking an Exemption from the mandatory sections of the *Ontario Public Service Procurement Directive* that apply to the IESO. Any such Exemptions must then be reflected in the IESO's Memorandum of Understanding.

In some cases, the Procurement of goods and/or services that are subject to the *Ontario Public Sector Procurement Directive* are exempted from the associated *Interim Measures (March 2019)*, including:

- (a) Goods and/or services valued at less than \$25,000;
- (b) Goods and/or services that are directly related to the delivery of electricity or the delivery of electricity systems";
- (c) Goods and/or services where IESO has specifically requested an Exemption that has been granted by Government; and/or
- (d) Procurements related to construction.

From time to time, the IESO may be directed, in writing, to undertake a Procurement process or enter into a Contract, including non-competitive methods, through a letter of direction from the Government or other written direction or minute endorsed by the Management Board of Cabinet or such other Ministry within the Government having authority to direct IESO. To the extent that those written directions and/or instruments contain specific instructions about the Procurement process or Vendor to be selected, those instructions shall supersede the applicable provisions and operation of this policy.

4.0 Responsibilities

4.1 Policy Owner

The CEO appoints the Chief Financial Officer (CFO) as owner of this Policy and as recorded in the Master Policy. The owner is the sole approver of this Policy.

4.2 Policy Steward

The Policy owner may delegate day-to-day responsibility for one or more aspects of a Policy, possibly including implementation, periodic review, or compliance to a Policy steward.

The Policy owner delegates the Senior Manager, Procure-to-Pay as the steward of this Policy and as recorded in the Master Policy.

5.0 Planning

Procurement planning is an integral part of the procurement process in identifying potential supply sources, procurement methods, as well as, what and when approvals are needed.

The Business Unit shall ensure that sufficient Procurement planning is conducted to support the IESO's business requirements and ensure that sufficient time is allowed to complete the Procurement process.²

The Business Unit and the Procurement Unit will undertake Procurement planning on an annual basis, in line with business planning, in order to:

- (a) Identify goods and/or services needed to meet the IESO's business requirements;
- (b) Identify opportunities to aggregate spending or combine Procurements to support enterprise-wide purchasing; and
- (c) Determine the appropriate resourcing plan, timing and Procurement method.

The Business Unit will engage with the Procurement Unit on no less than a quarterly basis to confirm the status of planned Procurements, and identify Procurements that were not planned during the annual planning process.

Business Units may be required to reprioritize procurement needs to accommodate unplanned procurement activity.

² OPS Procurement Directive, Section 8.2.

5.1 Conducting Market Research

The IESO may engage in formal and/or informal market research activities prior to initiating a Procurement, as further described in Appendix I: Guidelines for Conducting Market Research .

5.2 Unsolicited Research Proposals

The IESO may accept unsolicited research proposals where the IESO's interests would not be better served by conducting a Competitive Procurement process for a project and may be used as a first good and/or service for a pilot if the following parameters are met:

- Used for a planned activity (e.g., a pilot or demonstration project) and not for wide-scale Procurement;
- Used for the purpose of trying a new or innovative solution;
- The planned activity will be followed by an evaluation on its effectiveness and suitability for continued/expanded use that will be documented; and
- All required approvals have been obtained.

The Procurement Unit must be consulted and approval must be sought prior to entering into a Contract. All such agreements must be documented. Subsequent purchases, including continued or expanded use of these services must be procured through a competitive process in accordance with this policy.

5.3 Establishing Contract Term

The Business Unit, with the guidance of the Procurement Unit, must identify the Contract Term for every Procurement.

Extension options should always be included where there is a real or perceived risk of exceeding the initial term. A Contract Term that is extended beyond the terms set out in the original Procurement Document is considered Non-Competitive and must be supported by an Allowable Exception, as further detailed in [Appendix F: Allowable Exceptions to Competitive Procurement](#)

If the Procurement relates to goods and/or services that fall within the scope of the Interim Measures, the Contract Term may not exceed two (2) years, unless the Procurement is issued under a Government VOR Arrangement, in which case the Contract Term may align with that Government VOR Arrangement.

If the Procurement relates to goods and/or services that are exempted from the Interim Measures, the Contract Term will be determined at the IESO's discretion.

Where the IESO is establishing its own VOR Agreement, the Contract Term is subject to the following additional requirements³:

- (a) For a Contract Term of more than three (3) years, the Request for Vendors of Record (RVOR) must be posted annually to allow for the possibility of new Vendors to qualify;
- (b) VOR's with a Contract Term of (3) years or less is only required to be posted once and may not be extended.

5.4 Establishing the Total Procurement Value

The Business Unit must prepare an estimate of the Total Procurement Value for every Procurement, with the exception of Requests for Vendors of Record where a Second Stage Competition will establish a Total Procurement Value.

The Procurement Unit will use the Total Procurement Value to inform the appropriate Procurement method and Approving Authority under the OAR.

The Total Procurement Value must include all costs associated with entering into a Contract (collectively, the "Costs"), including, but not limited to:

- (a) The price or cost of the goods and/or services;
- (b) One-time costs such as site preparation, delivery, installation and documentation;
- (c) Ongoing operating costs including training, accommodation, licenses, support and maintenance;
- (d) Applicable duties, premiums, fees, commissions, disposition costs, allowable price escalations and interest;
- (e) Options to extend or renew the Contract;
- (f) Direct payments by the IESO to the Vendor(s);
- (g) Indirect payments by third parties to the Vendor(s);

³ Canadian Free Trade Agreement, Chapter Five - Government Procurement.

- (h) Any contingency values for unforeseen circumstances, including price impacts resulting from internal or external delays; and
- (i) Any Conferred Value.⁴

Where an individual project involves multiple related Procurements (such as design and build, phased projects, or maintenance and support services), the project's estimated Total Procurement Value is determined by the cumulative value of all related Procurements, including, any potential Contract renewals or extensions.

Business Units are encouraged to include a contingency budget for the purpose of managing Total Procurement Value Increases.

5.4.1 No Splitting

A Business Unit undertaking Procurement at the IESO must not take any action to reduce the estimated Total Procurement Value for the purpose of avoiding any requirements of this policy or the OAR (such as subdividing projects, Procurements, or Contracts and awarding multiple consecutive Contracts to the same Vendor).

The award of multiple consecutive Contracts to the same Vendor may only be made where each project is unique and the Procurement of those projects are awarded a Contract in accordance with this policy. For clarity, subdivision of a single scope of goods and/or services across multiple Procurements or Contracts is only permitted where approval for the Total Procurement Value is disclosed and sought in the first instance.

5.4.2 Increases to the Total Procurement Value

When the Total Procurement Value increases prior to issuing a Procurement document, the following applies:

- (a) Business Units must ensure they have obtained the Approving Authority in respect of the increased TPV for the Procurement; and

⁴ OPS Procurement Directive, Section 8.3.

- (b) The Procurement Unit must determine if an alternate Procurement method must be used as a result of the increase in Total Procurement Value.

When the Total Procurement Value increases after a Contract has been entered into, the Procurement Unit will assess the impact and may determine that re-Procurement of the goods and/or services is necessary depending on:

- The amount of the Total Procurement Value increase relative to the original Total Procurement Value;
- The reason for the increase;
- Whether the increase causes the revised Total Procurement Value to exceed the threshold for the original Approving Authority; and
- Whether the increased Total Procurement Value would result in a different Procurement method than the one originally used.

Amendments to the scope of goods and/or services outlined in a Contract may be permissible if the additional scope is related to or is follow-on to the services provided for in the Contract and the need for such related or follow-on additional scope was not reasonably foreseeable at the time of the Procurement.

Business Units must ensure they have obtained the approval from the Approving Authority for the increased Total Procurement Value prior to the commencement of any service or delivery of any goods. This is especially important when an increase causes the Total Procurement Value to exceed the threshold of the original Approving Authority or Procurement method. Approved Total Procurement Value increases must be documented and changes in Total Procurement Value must be reflected through a Contract Amendment, if required.

Total Procurement Value increases shall not be permitted where a Vendor under an existing Contract is requested to:

- (a) Provide additional goods and/or services that are:

- Entirely unrelated to;
- Not a follow-on good and/or service; and
- Not explicitly contemplated within the original scope of goods and/or services outlined in the Contract.

- (b) Retain another third party sub-contractor on behalf of the IESO for a scope of goods and/or services that is:
- Entirely unrelated to;
 - Not a follow-on good and/or service; and
 - Not explicitly contemplated within the original scope of goods and/or services outlined in the Contract.

5.4.3 Follow-on Agreements

A Follow-On Agreement is one that follows and is related to an already completed Agreement. Follow-On Agreements allow the IESO to structure a Procurement into several smaller portions for reasons of complexity, size, uncertainty or improved management control.

Follow-On Agreements are permitted only where an Open Competitive Procurement or VOR Arrangement has been used to select a Vendor.

Prior to entering into a Follow-On Agreement, the following activities must have taken place:

- (a) appropriate approval has been obtained prior to entering the original Contract;
- (b) the Approving Authority has been based on the Total Procurement Value of all of the work in the original Contract and the Follow-On Agreements;
- (c) the terms of the original Contract were fulfilled and Vendor performance was satisfactory;
- (d) the appropriate procurement method was used for the original Contract such as through a VOR Arrangement or an Open Competitive Procurement; and
- (e) the Procurement documents for the original work disclosed the total potential scope of work to be completed.

5.4.4 Separation of Design and Build in Procurement Process

Additional requirements for Procurements that involve design and build phases are outlined in [Appendix D: Additional Procurement Considerations Checklist](#) of this document. Note that if the 'design' is undertaken without including the 'build' in the Procurement, any Vendor engaged in the design phase may not participate in the subsequent build phase.

5.4.5 Drafting Requirements

All Procurements must be in writing and must include sufficient details concerning the Response requirements to enable the fair and transparent comparison of responses. A checklist of requirements is outlined in [Appendix C: Procurement Document Requirements Checklist](#) of this document.

5.4.6 Determining the Type of Procurement Document

The Procurement Unit is responsible for determining the most appropriate type of Procurement document to use based on the needs of the Business Unit.

The types of Procurement documents that IESO uses include, but are not limited to:

- (a) Request for Information (RFI) – used for market research only, to elicit industry information on particular products and/or services from the Vendor community, as further described in Appendix I: Guidelines for Conducting Market Research ;
- (b) Request for Proposal (RFP) – used when seeking a solutions-based proposal to meet business needs, usually for the provision of professional services and/or complex products;
- (c) Request for Quotation (RFQ) – used when seeking quotations for a fully defined scope of work, or for purchasing goods and/or services where the evaluation criteria is simple and/or only based on price;
- (d) Request for Vendors of Record (RVOR) - used to develop a short-list of qualified Vendors to enter into VOR Agreements for specific categories of work or to provide specific types of goods and/or services;
- (e) Request for Vendor Qualification (RFVQ) – used to request technical information and evidence of financial stability and goods and/or or service in order to pre-qualify or short list Vendors. An RFVQ may also be used to pre-qualify Vendors to respond to a particular RFP or RFQ; and
- (f) Request for Services (RFS) – used during a Second Stage Competition to request submissions from one or more pre-qualified Vendors.

5.5 Obtaining Approvals

Business Units are required to seek the guidance of the Procurement Unit before engaging a Vendor in any manner that would result in a binding Contract or that may provide a Vendor

with an unfair advantage when responding to a Procurement opportunity. For certainty, Business Units must consult with the Procurement Unit before directly engaging in any Non-Competitive Procurement activity to ensure that it aligns with this policy or any Allowable Exceptions.

The Business Unit will prepare an estimated Total Procurement Value and seek approvals from the Approving Authority in writing before:

- (a) Commencing a Procurement (including any Non-Competitive Procurement or competitive Procurement that establishes or uses a VOR Agreement); and
- (b) Executing a Contract procured pursuant to an IESO Procurement process (including any Contract that was procured pursuant to a Second Stage Competition under a VOR Agreement).

The Approving Authority will be determined by the OAR, as amended from time to time. Agreements that do not commit the IESO to any financial obligations, such as a parent agreement for a VOR Arrangement, may be authorized by the Vice President. For certainty, the Approving Authority for any Statements of Work resulting from a Second Stage Competition will be determined by the OAR.

Note that, as per the OAR, the Non-Competitive Procurement of Consulting Services may, depending on the Total Procurement Value, require additional approvals from both the Deputy Minister and Minister; the Management Board of Cabinet and the Treasury Board. Business Units must ensure they consult the OAR and the Procurement Unit to ensure compliance. The Business Unit will work with the Procurement Unit to determine any additional approvals or reviews that are required prior to initiating the Procurement, including, as necessary, Executive Leadership for Procurement and the Business Unit, or their delegate(s).

Additional approvals or reviews may be required, including but not limited to:

- (a) Contracting outside of the IESO's collective agreement;
- (b) Stakeholder committees;
- (c) Where the Procurement relates to legal services, the Procurement must also be approved by the Vice President, Legal & Corporate Governance or their delegate; and
- (d) Where the Procurement relates to information systems, IT, information provisioning services, IT Consulting Services, hardware and business equipment, the Procurement must also be

approved by the Vice President, Information & Technology Services and Chief Information Officer or their delegate;

- (e) Where the Procurement is for the provision of external audit services or for services to be performed by the IESO's External Auditor, the Procurement unit must be consulted. A Procurement for external audit services must be carried out in accordance with Section 6.4.7 of [Appendix D: Additional Procurement Requirements Consideration Checklist](#).

Procurement documents may require review by Legal Services prior to issuance, including but not limited to where:

- (a) The method for obtaining submissions may create Procurement process obligations on the IESO (for example, Invitations to Tender and Non-Negotiated formats);
- (b) The IESO may be collecting personal information to ensure the IESO meets its obligations under the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31;
- (c) Where there are deviations requested to previously approved standard terms and conditions contained in Procurement documents and/or Contracts;
- (d) Where, in the opinion of the Procurement Unit, there is a risk or complexity in the Procurement method; or
- (e) Where the expected Total Procurement Value would substantially increase the inherent risk of the Procurement process, at the sole determination of the Procurement Unit.

5.6 Conducting a Procurement

5.6.1 Determining the Procurement Method

The Procurement Unit will determine the appropriate Procurement method(s) and will provide one or more options to the Business Unit, including:

- (a) Invitational Competitive Procurement;
- (b) Open Competitive Procurement;
- (c) Vendor of Record Arrangement;
- (d) Non-Competitive Procurement; or
- (e) Such other Procurement methods, as determined by the Procurement Unit, that are consistent with the provisions of this policy and, for certainty, applicable law.

The Procurement method will depend on the type of service (Consulting, Non-Consulting or goods) and the Total Procurement Value. Together with the Procurement Unit, the Business Unit will determine if the goods and/or services being procured are Consulting or Non-consulting as defined in this Policy. The minimum Procurement Method thresholds are set out in [Appendix B: Procurement Methods & Thresholds](#).

5.6.2 Competitive Procurements

Competitive Procurement methods are conducted either in an Open Competitive or an Invitational Competitive manner:

- (a) Open Competitive is accomplished through a public posting of the Procurement.
- (b) An Invitational Competitive Procurement may proceed as follows:
 - By way of a direct invitation to identified Vendors; or,
 - By way of a VOR Agreement, in which an Open Competitive pre-qualification or establishment of a source list of Vendors precedes either a Second Stage Competition or a rotational award of Contracts to pre-qualified Vendors.

A Procurement for goods and/or Non-Consulting Services less than \$25,000 procured in accordance with this policy shall, for the purposes of this policy, be treated as if it had been competitively procured.

5.6.3 Using Vendor of Record Arrangements

The IESO must use Government VOR Arrangements where available and appropriate. The Procurement Unit is responsible for reviewing the guidelines for each Government VOR Arrangement to assess the availability, applicability and appropriateness of a Government VOR Arrangement.

Where no Government VOR Arrangement is available or appropriate, the IESO may choose to establish its own VOR Agreement in accordance with the requirements set out below:

- (a) VOR Agreements must be established through an Open Competitive Procurement and should be established considering the potential application of scope of goods and/or services across the IESO and should not specifically identify any Business Unit. VOR Agreements are encouraged where regular ad-hoc goods and/or services or repeat purchases are required;
- (b) Procurement documents establishing a VOR Agreement must clearly outline:

- That only Vendors who ultimately enter into a VOR Agreement with the IESO will receive invitations to provide the goods and/or services that are the subject of the VOR Agreement;
 - The length of the Contract Term of the VOR Agreement;
 - The method for terminating the VOR Agreement where the Contract Term of the VOR Agreement is undefined;
 - The process by which Vendors will be qualified, including:
 - The criteria that will be used to select Vendors of Record;
 - The frequency by which new Vendors may be pre-qualified (e.g. on an annual basis if the Contract Term exceeds three years).
 - The process and methodology by which unique assignments will be awarded, usually through a Second Stage Competition or Rostering process, including any limitation on the number of Vendors that may be invited to participate in a Second Stage Competition and the method under which those Vendors will be identified;
 - The pricing structure, including any allowable set or negotiable fee increases (e.g. in line with Consumer Price Index, or other).
- (c) IESO must enter into a Contract with each successful Vendor selected through the RVOR Procurement process;
- (d) A Statement of Work must be executed in consultation with the Procurement Unit for each Second Stage Competition or Rostering award and must be filed with the VOR Agreement;
- (e) Second Stage Competition or Rostering requirements are as follows:
- The Business Unit must seek guidance from the Procurement Unit prior to engaging Vendors of Record;
 - For VOR Agreements where there are multiple Vendors, IESO must engage in a further Second Stage Competition or use the established Rostering process to ensure that the best value for money is obtained;
 - The Second Stage Competition must be managed in accordance with the process outlined in the original Procurement document;
 - Approval must be obtained in accordance with the OAR prior to initiating the Second Stage Competition. The Approving Authority is based on the estimated Total Procurement Value of the Procurement being conducted under the Second Stage Competition;

- The IESO will issue a written Procurement document as a part of a Second Stage Competition. The Procurement document must include appropriate selection criteria, an evaluation process, and the type of Contract to be used, as applicable;
- When selecting Vendors through Rostering, such selection will be made in accordance with the applicable VOR Guide or in consultation with the Procurement Unit where no VOR Guide exists; and
- The Procurement Unit is responsible for verifying that the proposed pricing in the Second Stage Competition does not exceed the maximum price set out in the applicable VOR Agreement.

5.6.4 Non-Competitive Procurements⁵

Non-Competitive Procurements occur when:

- (a) IESO directly awards a Contract to a single Vendor with a Total Procurement Value greater than \$0 for Consulting Services and \$25,000 or greater for goods and Non-Consulting Services without a competition; or,
- (b) The terms of a Contract are amended for the addition of scope, time and/or value that is material in nature and that was not contemplated in the original Procurement and Contract.

A competitive process should be the standard method for acquiring goods and/or services. The onus is on the Business Unit to justify any decision to award a Contract outside of a competitive process, and seek the appropriate approvals prior to engaging a Vendor.

Non-Competitive Procurements are only allowed when:

- (a) An Allowable Exception to competition is available, as identified in [Appendix F: Allowable Exceptions to Competitive Procurement](#);
- (b) Pre-approval to proceed with a Non-Competitive Procurement has been obtained from the Procurement Unit and the Approving Authority, prior to and engaging any Vendor(s) and/or making any commitments on behalf of the IESO;
- (c) The Contract is not being awarded to a Vendor who has previously been awarded the same Contract non-competitively;

⁵ OPS Procurement Directive, Sections 4.4.4, 4.4.6 and 8.6.

- (d) A negotiation strategy has been considered and documented, where appropriate, to ensure value for money; and,
- (e) The Vendor has not been previously retained to advise on or to develop the technical specifications of the required goods and/or services that are the subject of the Procurement, as further described in [Appendix D: Additional Procurement Considerations Checklist](#).

The need for compatibility with existing goods and/or services is not sufficient to justify a Non-Competitive Procurement unless it is clear that there is only one Vendor capable of offering compatible goods and/or services. Other potential Vendors should be given the opportunity to meet compatibility requirements through a competitive Procurement.

A decision to bypass a competitive Procurement cannot be justified based on a presumption that no other Vendor would be competitive. That presumption needs to be tested through a competitive Procurement.

Non-Competitive Procurements without an approved Allowable Exception are non-compliant with this policy and will be reported to the IESO's Audit Committee and the Ministry through the IESO's annual attestation process. For certainty, the IESO should not engage in Procurement practices that are not in compliance with this policy.

5.6.5 Establishing Response Times

The IESO must provide sufficient time for Vendors to prepare and submit Responses in view of all relevant factors such as, but not limited to, time needed by the Vendor to properly disseminate the information, complexity, risk, seasonality, and best practices within the relevant industry.⁶

The IESO will use the following Response times:

- (a) For Procurements with a Total Procurement Value of less than \$100,000, or that are conducted through a VOR Agreement, the IESO will provide Vendors with sufficient time to respond, as described above;

⁶ OPS Procurement Directive, Section 5.4.

- (b) A minimum of 15 calendar days will be provided for all Procurements that are not conducted through a VOR Agreement and have a Total Procurement Value between \$100,000 and \$548,699;
- (c) A minimum of 30 calendar days will be provided for all Procurements that are not conducted through a VOR Agreement and have a Total Procurement Value greater than or equal to \$548,700; and
- (d) Additional time to respond should be provided where the Procurement is complex or high profile in nature.

Any exception to the noted Response times must be approved by the CFO, or their delegate.

5.6.6 Electronic Tendering

Open Competitive Procurements and Requests for Information (RFI) will be posted on a recognized electronic tendering system, as identified by the Procurement Unit.

5.6.7 The Use of Fairness Monitors

The IESO may choose to use external Fairness Monitors for Procurements that:

- (a) Are complex in either the scope of the Procurement or the methodology of the Procurement process; and/or
- (b) Are for the renewal or re-Procurement of goods and/or services where the incumbent may have, or may be perceived to have, an unfair advantage.

Where applicable, a Fairness Monitor should be retained before the commencement of the Procurement and the issuance of a Procurement document. Business Units must consult with the Procurement Unit prior to engaging a Fairness Monitor to ensure the appropriate management of such arrangements, in a fair and unbiased manner.

Recommendations and reports from the retained Fairness Monitor must be submitted directly to the IESO's Director of Internal Audit.

5.6.8 The Use of Non-Disclosure Agreements

The IESO may use confidentiality or non-disclosure agreements during a Procurement process, as follows:

- (a) Prior to undertaking any Procurement of goods and/or or services that may result in the disclosure of information that is confidential or personal, the Business Unit will conduct a risk assessment on the disclosure of that information to the general public;
- (b) Any information that is to be disclosed must comply with applicable legislation and IESO's policies, processes, and procedures concerning personal and confidential information;
- (c) Where the disclosure of IESO confidential or personal information is necessary to ensure the success of a Procurement, the IESO will enter into a confidentiality or non-disclosure agreement with any prospective Vendors prior to the disclosure of confidential or personal information; and
- (d) Wherever possible, personal or confidential information should be separated from the body of the Procurement document and set out as a separate schedule or if it is embedded in a Procurement document but the confidential or personal information is not needed for the Procurement, it should be redacted.

5.6.9 Communication with Vendors during a Procurement Process

Communications between Vendors and IESO's employees, agents, directors or contractors related to a Procurement process must be avoided at all times. Vendors must be directed to the contact person(s) identified in the Procurement documents in order to:

- (a) Maintain the integrity of the Procurement process;
- (b) Ensure that all Vendors are provided with consistent information; and
- (c) Ensure that the information given does not change the intended meaning of the Procurement document or any part therein. Failure to comply may result in Vendor disqualification.

5.6.10 Issuing Additional Information during the Procurement Process

Any additional information that clarifies or modifies the Procurement documents must be provided in the same manner as the originally issued Procurement document via an addendum.

Addenda, including responses to question and answer periods, must be issued within a reasonable amount of time prior to the deadline for Response to the Procurement document to allow sufficient time for a Vendor to address the content of the addenda in its Response.

Addenda that are issued after the disclosed deadline to issue addenda must also include an appropriate and reasonable extension to the submission deadline as is necessary for the Vendor to address the changes to the Procurement documents.

Procurement documents must make clear that any amendments to the Procurement documents shall only be made by addendum. Information supplied to Vendors through general notices, written responses to questions, requests for information, or other communications that are separate from the Procurement documents shall not constitute part of the Procurement documents.

All Procurements should provide sufficient time for Vendors to ask questions for clarification regarding the Procurement documents, evaluation criteria and contractual requirements. During the question and answer period of the Procurement:

- (a) It is presumed that the answer to a question posed by any particular Vendor should be communicated to all Vendors participating in the applicable Procurement process, unless a determination is otherwise made by the IESO that the question posed is commercially confidential to the Vendor;
- (b) Where a Vendor asserts that a question it is posing is commercially confidential in nature, then:
 - Where the IESO agrees that the question is commercially confidential, the response to such question will only be communicated to that Vendor;
 - Where the IESO determines that the question is not commercially confidential, then the Vendor shall be provided the opportunity to withdraw the question and either no response shall be given; or, if in the IESO's determination, the question and response is materially relevant to the Procurement, the IESO shall have the discretion to issue a response or communication to all Vendors on the substance of the question without specifically identifying the Vendor who asked it; or
 - The Vendor may agree to reclassify or revise the question so it is not considered commercially confidential, allowing a response to be given to all Vendors.

The IESO shall retain the discretion to determine whether a question is commercially confidential in nature and requires a commercially confidential response, whether or not the Vendor identified its question as being general or commercially confidential in nature.

5.7 Evaluation

5.7.1 Evaluation Criteria

The IESO will establish evaluation criteria as follows:

- (a) Evaluation criteria should be developed in consideration of the Procurement method and the principles set out in this policy;
- (b) Business Units should consult with the Procurement Unit to ensure that Mandatory Requirements are used only where absolutely necessary and not for the purposes of limiting or restricting the number of qualified submissions to be reviewed;
- (c) Evaluation criteria must not be developed in a way that creates hidden evaluation measures and the IESO shall not cause disclosed evaluation criteria to be further divided into undisclosed scoring sub-categories;
- (d) Evaluation criteria should take into account price, quality, quantity, delivery, servicing, experience, financial capacity of the Vendor, and any other criteria directly related to the individual Procurement;
- (e) Price submissions must be requested in separate electronic files from all other submission documents, and the evaluation of price must be undertaken by the Procurement Unit after the completion of the evaluation of the Mandatory Requirements and any other rated criteria, unless otherwise specified in the Procurement documents;
- (f) The IESO should not request information from Vendors that will not be evaluated or affect the evaluation process; and
- (g) Where a VOR Arrangement has been established, the IESO should not include evaluation criteria in a Second Stage Competition that was already evaluated during the initial VOR Arrangement evaluation, with the exception of price.

The IESO must fully disclose in the Procurement documents the evaluation criteria to be used in assessing a Vendors' Response. A full disclosure of the evaluation criteria includes, but is not limited to:

- A clear articulation of any Mandatory Requirements;
- A clear articulation of rated criteria, including all weighting and sub-weightings, where applicable;

- Descriptions of any short-listing processes, including, any required Minimum Thresholds for rated criteria and the tie-breaking mechanism that will be used;
- The role and weighting of reference checks and, if applicable, oral interviews, site visits, demonstrations, alternative strategies or solutions, and value-added services; and
- Descriptions of the pricing evaluation methodology, including the use of mathematical formulas that will be used to determine pricing for specific volumes and/or service levels or to calculate scoring.

Where IESO supports the proposal of alternative strategies or solutions, the Procurement document must expressly request alternative solutions and describe how alternatives will be considered in the evaluation process.

5.7.2 Evaluation Process

Responses must be evaluated in accordance with the evaluation process, criteria, rating and methodology set out in the Procurement document.

Where only one Vendor has submitted an eligible Response to a Procurement process, the Evaluation Committee must evaluate that Response in accordance with the evaluation process disclosed in the Procurement document to ensure that the Response meets the requirements of the Procurement.

Working with the Business Unit, the Procurement Unit will establish the evaluation framework for each Procurement in accordance with this policy. The evaluation framework will act as a guideline for how a Procurement will be evaluated and those participating in the evaluation are expected to comply with the evaluation framework. The evaluation framework may be an informal communication with the Evaluation Committee or may be provided in a formal guideline document. The degree to which the contents of an evaluation framework are disclosed, if at all, as part of the Procurement documents, shall remain at IESO's discretion. Evaluation decisions will be reached in accordance with the process outlined in the evaluation framework.

Individuals participating in the evaluation of Responses to a Procurement process must declare any potential or actual Conflict(s) of Interest. If potential or actual Conflicts of Interest are declared, written approval must be obtained from Legal Services to remain on the evaluation team.

Where a Vendor is disqualified for non-compliance with a Mandatory Requirement or fails to meet a Minimum Threshold (if any) as set out in the Procurement document, no further evaluation of that Vendors' Response will take place.

Following the evaluation process, the IESO may select only the highest ranked Response(s) that have met all Mandatory Requirements and/or Minimum Thresholds. Unless otherwise specified in the Procurement documents, in the event of a tie, the Response with the highest technical score will be deemed to be the highest ranked Response. Unless expressly stated in the Procurement documents, the IESO must not consider alternative products, specifications or solutions proposed by a Vendor.

5.7.3 Evaluation Committees & Sub-Committees

The responsibility of the Evaluation Committee is to ensure that the evaluation process is conducted in accordance with the evaluation framework, including reviewing and approving the evaluation framework, overseeing the activities of all participants associated with the evaluation process, and ensuring that all required due diligence necessary to carry out the evaluation process has been conducted.

No member of an Evaluation Committee may disclose any contents of the evaluation process except where necessary to escalate above the level of authority granted to an Evaluation Committee. In such cases, confidential information should not be disclosed except:

- (a) Where there is any occurrence of wrongdoing or other actions or omissions, which if not disclosed, could compromise the integrity and fairness of the evaluation process;
- (b) Where information obtained in the course of the evaluation process could represent a material enterprise-wide risk to the IESO outside of the context of the Procurement; or
- (c) In the event that the Evaluation Committee is at an impasse and requires the input or guidance of a higher authority within the IESO in order to resolve such impasse.

In all such cases, communication may only be made through and facilitated by the Procurement Unit.

In some Procurements, the evaluation requirements or contractual requirements may be sufficiently complex to warrant subdividing the Evaluation Committee into sub-committees. Each sub-committee will be responsible for evaluating the relevant information as it relates to their expertise (e.g. project management approach, financial or technical analysis, etc.).

5.7.4 Subject Matter Experts

Subject matter experts are those participants in an evaluation process who have particular expertise with respect to certain content contained within the submissions and may be called upon to assist the Evaluation Committee.

Subject matter experts may provide reports to support Evaluation Committee members in their scoring of Responses or to identify failures on the part of a Vendor to meet Rated Criteria which should be addressed during the negotiation period. This may include, but is not limited to, specific technical assessments for which the Evaluation Committee does not possess the subject matter expertise to adequately evaluate the Responses.

5.7.5 Vendor Performance

IESO may, consistent with the principles set out in this policy, including consideration of the public interest, value for money and responsible management, take into consideration a Vendor's past performance in the evaluation of a Procurement process provided that IESO has demonstrated due regard to the following factors:

- (a) the objectivity of the methodology for rating the past performance of a Vendor, and to what degree the past performance is relevant to the scored evaluation criteria in the Procurement;
- (b) the transparency and disclosure of a pre-established Vendor performance monitoring system or program that is fair, well documented, unbiased, free of conflict of interest, and specifically identifies (with supporting details) the failures of performance of a Vendor;
- (c) the ability of the performance monitoring system to maintain a fair process for Vendors who have never contracted with IESO;
- (d) the situations in which the Vendor performance monitoring system or program applies to an individual, as opposed to a firm or team; and
- (e) the general fairness and due process afforded to Vendors in the administration of the Vendor performance monitoring system or program.

The presence or lack thereof of a Vendor performance program does not prevent or preclude IESO from including evaluation criteria in a Procurement that takes into consideration past performance or other reference checking based on past experience, provided that such criteria satisfies the requirements of evaluation criteria generally set out in this policy.

5.7.6 Award Notifications

Vendors must be promptly informed of contract award decisions. Notification to a Vendor whose Response is rejected or disqualified should be made directly to the Vendor within a reasonable time after the decision to reject or disqualify has been made by IESO and must cite the reasons for rejection or disqualification.

Within 72 calendar days of awarding any Contract on behalf of the IESO with a Total Procurement Value of \$500,000 or greater, a notice of award must be published on a publicly accessible website (such website to be determined by the Procurement Unit as appropriate to the Procurement method) and must remain readily accessible for a reasonable period of time. The notice must include:

- (a) A description of the goods and/or services procured;
- (b) The name and address of the IESO;
- (c) The name and address of the successful Vendor;
- (d) The value of the awarded Contract; and
- (e) The date of the award.⁷

In the case of Contracts awarded on a time and material basis, the value of the awarded Contract shall be the approved Total Procurement Value.

A notice of award is not required for goods and/or services acquired through a Non-Competitive Procurement regarding matters of a confidential or privileged nature.

5.7.7 Vendor Debriefings

For all Procurements with an estimated Total Procurement Value greater than \$500,000, the IESO shall offer debriefings upon request from a Vendor and will inform all unsuccessful Vendors who

⁷ Canadian Free Trade Agreement, Chapter Five - Government Procurement

participated in the Procurement of the option to request a debriefing session. Vendor debriefings may be scheduled only after the Contract between the Preferred Vendor(s) and the IESO have been executed, or the shortlisting of Vendors following a Vendor of record Procurement process.⁸

For Procurements valued at \$500,000 or less, debriefings will be held or delivered at IESO's discretion. The Procurement documents should clearly state whether debriefings will be offered and, if so, the timeline within which a Vendor must request a debriefing in order to be eligible to receive such debriefing. The method of debriefing will be determined and delivered at IESO's discretion.

In conducting debriefings, the Procurement Unit may only:

- (a) Provide a general overview of the evaluation process as set out in the Procurement document;
- (b) Provide the name of the successful Vendor;
- (c) Discuss the strengths and weaknesses of the Vendor's submission in relation to the specific evaluation criteria and the Vendor's evaluated score. If more than price is evaluated, the IESO may provide the Vendor's evaluation score and their ranking relative to others without disclosing the actual ranking of other Vendors;
- (d) Provide suggestions on how the Vendor may improve future submissions;
- (e) Receive feedback from the Vendor on current Procurement processes/practices; and
- (f) Address specific questions and issues raised by the Vendor in relation to its submission.

The Procurement Unit may not disclose information concerning other Vendor, other than as specified above. If a Vendor makes such a request, they must be advised that a formal Freedom of Information (FOI) request can be submitted to the IESO's Privacy Office. During a debriefing, the Procurement Unit must not respond to any questions that are unrelated to the Procurement process and must note such questions as being out of scope in accordance with the debriefing process outlined in the Procurement documents.

⁸ Canadian Free Trade Agreement, Chapter Five - Government Procurement

The process of debriefing ensures that the Procurement process adheres to the principles of this policy. The purpose of a debriefing session is to give the unsuccessful Vendors an opportunity to receive feedback on the strengths and areas for improvement of their submissions.

5.8 Entering into a Contract

The following steps are required when entering into a Contract:

- (a) A Contract must be signed by all parties before the provision of goods and/or services commences. If only a Purchase Order will be issued, it must be issued before the provision of goods and/or services commences, as further described in Appendix H: Purchase Requisition and Purchase Order Requirements;
- (b) The Contract must be finalized using the form of Contract that was disclosed with the Procurement document, if any;
- (c) The Contract Term, including and any options to extend, must align with the term that was set out in the Procurement document;
- (d) The Contract must clearly state the financial commitments of the engagement, including permitted price increases as set out in the Procurement documents and any contract ceiling price;
- (e) Where a negotiated Contract is not required to be executed at the close of a Procurement process, the Purchase Order will form the binding agreement between the IESO and the Vendor and will be accompanied by the IESO's standard Contract terms and conditions;
- (f) All non-standard Contracts must be submitted to Legal Services for review prior to execution, regardless of the dollar value or the length of term of the Contract. This includes third party Contracts and any deviations to previously approved clauses to IESO Contracts and commercial terms; and
- (g) When executing a Contract, the IESO should obtain the Vendor's signature prior to seeking the signature of the Approving Authority.

5.9 Contract Management

The Business Unit is responsible for the management of the Contract, in accordance with [Appendix G: Contract Management](#).

5.10 Providing Vendor References

Employees may provide personal references in respect of Vendors that are factual, accurate, fair, pertinent, and verifiable; however, it must be clear that the comments made are in their personal capacity and are not those of the IESO. Employees cannot give personal references on IESO letterhead or otherwise suggest that they are given on behalf of the IESO.

5.11 Complaint Process

Vendor complaints regarding the IESO's Procurement process(es) must be submitted to the Procurement Unit to be managed in accordance with applicable laws.

6.0 Appendices

6.1 Appendix A: Procurement Document Retention Requirements

The Procurement Unit shall ensure that all Procurement decisions and decision-making processes are recorded to account for and support the reconstruction of facts related to a Procurement, including but not limited to:

- (a) Retaining Procurement records in compliance with the IESO's records management policies and processes;
- (b) Establishing a file naming convention that will permit related Procurement documents to be associated with each other; and
- (c) Managing Procurement documentation to ensure that the IESO is able to respond to any requests for information, Vendor inquiries, debriefing requests, audits and/or legal challenges in a relevant, reliable, comprehensive and timely fashion.

The Procurement Unit shall retain the following documentation related to the Procurement process:

- (a) A copy of the Procurement justification or business case, as applicable;
- (b) Information regarding all relevant Vendor consultations, market research and any RFI's undertaken in the development of the Procurement business case and/or Procurement documents;
- (c) Evidence that all required approvals were obtained;
- (d) Copies of all Procurement documents used to qualify and select a Vendor, including, as applicable, all correspondence received and provided during a Procurement process and all addenda issued with the Procurement documents;
- (e) A VOR Guide describing the terms of use, where applicable;
- (f) Where the Procurement was conducted through a VOR Agreement, information regarding the Second Stage Competition used to select the successful Vendor(s), if applicable;
- (g) Copies of all advertisements of Procurement documents;
- (h) Information relating to compliance with the *Accessibility for Ontarians with Disabilities Act, 2005*, where applicable;
- (i) Copies of all Responses to Procurement documents, including Conflict of Interest declarations and registration forms;

- (j) Information regarding any issues that arose during the Procurement process, including all correspondence related to any complaints or disputes;
- (k) All records of evaluation, kept in accordance with applicable law and recordkeeping policies of the Evaluation Committee and its members. The records of evaluation include, but are not limited to:
 - Individual scoring notes and individual evaluator worksheets;
 - Consolidated notes, scores and all other evaluation records, including presentations prepared for the purposes of obtaining approval of evaluation results;
 - Presentations materials prepared by Vendors and notes taken by evaluators where an interview process is included in the evaluation process;
 - All decisions of any Evaluation Committee, as convened in accordance with the evaluation framework for the Procurement;
 - Information regarding all Vendor debriefings, including documentation of the Vendor's request for a debrief, where applicable;
 - Copies of all award letters, notices and posted announcements;
 - Copies of the Contract(s), including executed Contracts and proof of communication of Contracts to the Vendor including where the form of Contract is a Purchase Order;
 - Information regarding all changes or negotiations to the terms and conditions of the Contract;
 - Information regarding any risk assessments performed (such as cybersecurity risk, privacy risks and financial risk) and any resulting recommendations, where applicable;
 - Information regarding all disputes or complaints from Vendors regarding the Procurement; and
 - Contractor security screening decisions, where applicable.
- (l) Any other relevant documentation as identified.

6.2 Appendix B: Procurement Methods & Thresholds

The Procurement method will be determined by the Procurement Unit based on several factors, including the minimum requirements as set out below. In the case of an invitational competitive procurement, where the IESO is unable to identify the minimum number of Vendors required to be invited as specified below, an Open Competitive Procurement must take place.

Procurement Type	Total Procurement Value	Procurement Method
Consulting Services	\$0 - \$100,000	Invitational to a minimum of three (3) Vendors.
	\$100,001 and greater	Open Competitive Procurement.
Goods & Non-Consulting Services	\$0 - \$25,000	Invitational to a minimum of one (1) Vendor.
	\$25,001 - \$200,000	Invitational to a minimum of three (3) Vendors.
	\$200,001 and greater	Open Competitive Procurement.
Establishing a VOR Agreement	Any value	Open Competitive Procurement.
Second Stage Competition to a VOR	Less than \$25,000	A minimum of 1 or more Vendors.
	\$25,000 - \$249,999	A minimum of 3 or more Vendors (or all qualified Vendors if there are less than then numbers specified).
	\$250,000 - \$599,999	A minimum of 5 or more Vendors (or all qualified Vendors if there are less than then numbers specified).
	\$600,000 and above	All qualified Vendors.
Requests for Information (RFI)	All RFIs must be posted publically on an electronic tendering site in accordance with this policy.	
Non-competitive	In accordance with this Policy and with prior approval from the Procurement Unit and the Approving Authority.	

6.3 Appendix C: Procurement Document Requirements Checklist

All Procurement opportunities must be communicated in writing and include sufficient details concerning the Response requirements to enable the fair and transparent comparison of Responses. For clarity, the Procurement of goods and/or services may not be made through verbal requests for quotations or proposals.

The Procurement documents must contain all material information relevant to the Procurement, including the following, where applicable:

- (a) A complete description of the goods and/or services, including the nature, and any optional components that are being priced separately;
- (b) The quantity or estimated quantity where the quantity of goods and/or services is unknown;
- (c) Any requirements to be fulfilled, including any technical specifications, requirements for servicing or warranty, transition costs (if applicable), applicable conformity assessment certification, plans, drawings or instructional materials. For these specifications:
 - Generic and non-brand-specific requirements should always be used when possible. In such cases the specifications should include information with respect to minimum performance requirements; and
 - In any case where references to particular trademarks or trade names, patents, copyrights, designs, type, specific origin, producer or supplier are made, the Procurement documents must allow for equivalents.
- (d) Any conditions for participation, specifically any Mandatory Requirements, including a list of information and documents that Vendors are required to submit in connection with the conditions for participation in any Procurement process;
- (e) A clear description of the evaluation criteria and process to be used in assessing Responses, including the weighting and, if applicable, sub-weighting of all criteria and any Minimum Threshold requirements;
- (f) Clear submission instructions;
- (g) If applicable, a description of the process that will be used to seek clarification and/or allow the correction of unintentional errors in Vendor submissions after the submission deadline;
- (h) The Contract Term (which includes all extension and/or renewal options);
- (i) The framework under which price increases will be permitted, including, without limitation, the frequency of the price increases, allowable amounts of increases and any benchmarks that will be used to confirm the price increases, as applicable;

- (j) Any dates for the delivery of goods or the supply of services, which must take into account such factors as the complexity of the Procurement, the extent of subcontracting anticipated and the realistic time required for production, de-stocking and transport of goods from the point of supply or for supply of services;
- (k) The timeline for the Procurement process, including posting date, deadlines for submitting questions and posting Addenda and the closing date; and
- (l) Any other applicable requirements as set out in [Appendix D: Additional Procurement Considerations Checklist](#) and [Appendix E: Additional Requirements for IT Procurements](#).

In the case of a Procurement document to establish a VOR Agreement, the Procurement document will also include:

- (a) A description of how purchases will be made under the VOR Agreement;
- (b) The criteria that will be used to evaluate submissions;
- (c) A statement that only the Vendors engaged in the VOR Agreement will receive further notices of Procurements under the VOR Agreement;
- (d) The Contract Term of the VOR Agreement, including the frequency that the VOR Agreement will be re-opened for new submissions (if applicable). If there is no Contract Term for the VOR Agreement, the Procurement document must also indicate the method by which notice will be given of the termination of the VOR Agreement; and
- (e) If applicable, any limitation on the number of Vendors that will be permitted to participate in the Second Stage Competition and the criteria for selecting the limited number of Vendors.

The Procurement documents will exclude:

- (a) Conditions for participation that are not essential to ensuring that a Vendor has the legal and financial capacities and the commercial and technical abilities to provide the goods and/or services;
- (b) Any criteria designed to favour Vendors from a particular location (province, territory, region) or goods and/or services of a particular geographic location (excluding, where applicable, requirements within Canada);
- (c) Any requirement to have prior experience with the IESO or within Ontario; and
- (d) Any requirement or feature that could unfairly create an advantage for certain Vendors.

6.4 Appendix D: Additional Procurement Considerations Checklist

6.4.1 Business Unit Obligations

The Business Unit must communicate the impact of any of the following additional considerations to the Procurement Unit when undertaking a Procurement.

6.4.2 Protection of Personal and Sensitive Information

Prior to undertaking any Procurement of goods and/or services that may result in the collection, use or disclosure of personal information, the Business Unit will obtain legal advice as to whether the collection, use and disclosure is compliant with applicable legislation. The Business Unit may be required to conduct a privacy impact assessment. Any information that is to be collected, used and disclosed must comply with applicable privacy legislation and the applicable IESO privacy policies, processes and procedures.⁹

6.4.3 Consulting Services Contracts¹⁰

Effective September 1, 2020 and in accordance with Appendix B of the OPS Procurement Directive, all Consulting services contracts, regardless of the Total Procurement Value, must provide a cost for each deliverable provided by the Consultant, with the exception of the development of a qualified Vendor of Record list.

New VOR Agreements may use per hour or per diem rates which will be used to determine the costs of deliverables that are defined in a second-stage competition.

6.4.4 Design & Build Procurements

For Procurements that involve design and build phases, the IESO should either:

- (a) Conduct a single Procurement with the build phase being subject to the successful completion of the design phase; or
- (b) Conduct separate Procurements for the design and build phases.

Where the Business Unit determines it is appropriate to conduct a single Procurement, whereby the same Vendor would provide both design and build services, the Business Unit must validate

⁹ OPS Procurement Directive, Section 8.14 (mandatory).

¹⁰ OPS Procurement Directive, Appendix B, Section 5 (mandatory)

the satisfactory completion of the design phase before proceeding with the build phase. The Business Unit must clearly define the criteria by which satisfactory completion will be measured. The Procurement Unit must ensure that the Procurement documents, especially the Agreement, clearly outline the measurement criteria.

Where the Procurement of design and build phases will be conducted separately, the Procurements are subject to the following requirements:

- (a) Any Vendor engaged in the design phase of the Procurement may not participate in the subsequent build phase of the Procurement. This must be clearly disclosed in both Procurement documents; and
- (b) The Business Unit is responsible for informing the Procurement Unit of any subsequent or future Procurements that may involve the design services being procured.

6.4.5 Independent Contractors

Contracts with Independent Contractors who are not former IESO employees are subject to a maximum contiguous term of 36 months (including any extensions) based on 6000 hours (2000 hours per year). Prior approval by the CFO or their delegate is required for any such Contract that extends beyond 36 months (6000 hours).

Individual Independent Contractors who are not incorporated will be issued a T4A slip in compliance with the IESO's obligations to Canada Revenue Agency requirements and such requirements must be communicated to the Individual Independent Contractor and included in the Contract terms and conditions, as appropriate.

Former Employees who retired or were eligible for retirement but were terminated and either withdrew some or all of their pension benefits and/or received a severance package:

- (a) Will not be sourced through a Non-Competitive Procurement; and
- (b) Are not eligible to be awarded a Procurement opportunity for a minimum period of six months following the date of their retirement or termination of employment or final severance payment (whichever comes later) from the IESO.

In either case, the Contract will be subject to a maximum term of eighteen months, following which the Independent Contractor will not be eligible to participate in another IESO Procurement process until a further six month waiting period has elapsed.

6.4.6 Collective Agreements

Procurements may be subject to specific terms or conditions within the IESO's collective agreements with the Society of Energy Professionals and the Power Workers Union, as are amended from time to time. This may include, but is not limited to Contracting Out Notifications or Purchased Services Agreements. In these cases, Business Units are responsible for consulting with the IESO's Human Resources Department prior to commencing a Procurement.

6.4.7 Expense Reimbursement

Contracts must only allow for the reimbursement of expenses in accordance with the *OPS Travel, Meal and Hospitality Expense Directive*, as amended from time to time. The IESO will not reimburse expenses that are specifically excluded, including but not limited to food (meals, snacks and beverages), hospitality and incidentals.

6.4.8 External Audit Services and the IESO's External Auditor

The Procurement Unit must be consulted when engaging a Vendor to conduct audit services or when engaging the IESO's External Auditor to perform any services, regardless of the Total Procurement Value. All non-audit services to be performed by the IESO's External Auditors must be reviewed and approved by the Audit Committee before such work is commenced.

The independence required of an External Auditor is predicated on three principles: (a) an auditor cannot function in the role of management; (b) an auditor cannot audit their own work; and (c) an auditor cannot serve in an advocacy role for the IESO (the "Auditor Principles"). The IESO's External Auditor may only provide the services listed below:

- (a) Audit and review of financial statements;
- (b) Annual audit of the design and operating effectiveness of internal controls over financial reporting;
- (c) Prospectus work;
- (d) Audit of pension plans;

- (e) Special audits on control procedures;
- (f) Accounting research and advice;
- (g) Due diligence on mergers and acquisitions;
- (h) Tax compliance and Consulting Services; and
- (i) Other services not specifically prohibited in the following sections.

The IESO's External Auditor cannot provide any of the following services:

- (a) Bookkeeping services or other services related to accounting records or financial statements;
- (b) Financial information systems design and implementation;
- (c) Appraisal or valuation services, fairness opinions, or contribution-in-kind reports;
- (d) Actuarial services;
- (e) Outsourced internal audit services that conflict with the Auditor Principles of independence listed above;
- (f) Management functions;
- (g) Human resources functions;
- (h) Broker-dealer, investment advisor or investment banking services;
- (i) Legal services;
- (j) Expert witness services unrelated to the audit;
- (k) Consulting Services that conflict with the Auditor Principles listed above;
- (l) Recommend aggressive or confidential tax transactions; and
- (m) Personal tax services to persons in financial reporting oversight roles.

6.4.9 Contractor Security Screening

Contractor security clearance may be required for Vendors selected to provide goods and/or services to the IESO. At the start of any Procurement process, Business Units must complete a contractor security risk assessment to assess the nature of Contract risks involved and determine the need, if any, and level of contractor security screening involved. Where contractor security clearance is required, it is the obligation of the Business Unit to ensure that clearance is received.

6.4.10 Additional Considerations for Advertising, Public and Media Relations and Creative Communication Services

In determining the appropriate Procurement method and approvals for the Procurement of advertising, public and media relations, and creative communication services, Business Units must consult with the Procurement Unit and consideration must be given to the estimated Total Procurement Value of the services, including fees paid to the agency for its creative work and coordination, as well as the costs of production, including third-party costs.

A Contract with a Vendor for such services must include a provision that, when third-party production services are to be acquired by the Vendor, the Vendor must carry out a competitive process that adheres to the requirements of this Policy. The provision should outline the expectations and requirements for conducting the competitive process, including but not limited to, value thresholds, record retention, and IESO approval requirements.

6.4.11 IESO Code of Conduct

When procuring goods and/or services, the Procurement Unit must ensure that a copy of the current Code of Conduct must be made available to Vendors in accordance with the Procurement documents, as compliance with the Code of Conduct is a condition of association with the IESO for its business partners, consultants and contractors.

6.4.12 Related Party Transactions

When procuring goods and/or services, any Contracts and subsequent financial transactions that are awarded to Related Parties must be disclosed on the IESO's financial statements and such awards must be reported by the Procurement Unit to the CFO or his/her delegate prior to the execution of any such Contracts.

6.4.13 Accessibility Obligations

The Procurement Unit must ensure that IESO complies with the *Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, c. 11 (AODA)* and its regulations, as well as related IESO policies when procuring goods and/or services.¹¹

The IESO must incorporate accessibility criteria and features into its Procurement processes,

¹¹ OPS Procurement Directive, Section 8.13 (mandatory)

except where it is not practicable to do so. Where applicable, Procurement documents must specify the desired accessibility standards to be met and the related submission requirements, and provide guidelines for the evaluation of proposals in respect of those requirements.

6.4.14 Additional Considerations for Legacy Contracts

Additional review and consideration may be required for Procurement activities affecting Contracts that were procured by a predecessor IESO entity using the predecessor entity's procurement policies and processes, and which continue to be administered by the IESO. Examples may include the administration of existing VOR Agreements, and Contract Amendments. Legacy Contracts will be reviewed on a case-by-case basis.

6.5 Appendix E: Additional Requirements for IT Procurements

In addition to the requirements outlined in [Appendix C: Procurement Document Requirements Checklist](#) and in [Appendix D: Additional Procurement Considerations Checklist](#), Business Units must also include the following considerations for IT Procurements, where applicable:

6.5.1 Cybersecurity

Prior to undertaking any Procurement of goods and/or services that may involve i) access to IESO systems or data, ii) software or application development services, iii), installation or use of new software or cloud based services; the Business Unit will discuss their requirements with IESO's Information Security team. Information Security may be required to perform a formal evaluation and/or conduct a risk assessment on the requirements in order to determine the impact and necessary requirements related to the Procurement. Procurement activities must adhere to IESO Information Security policies, standards, processes, and procedures.

6.5.2 Quality Assurance

Prior to undertaking any Procurement of IT related goods and/or services; the Business Unit will discuss their requirements with IESO's Quality Assurance Business Unit. The Quality Assurance Business Unit may provide requirements and/or considerations for the Business Unit to include in Procurement activities.

6.5.3 Commercial-Off-The-Shelf (COTS) Software & Related Services

Commercial-Off-The-Shelf (COTS) Software Related Services includes, but is not limited to, maintenance, technical support services, installation, training, configuration and implementation services but excluding Consulting Services, equipment and hardware.¹²

In consultation with the Procurement Unit, it may be determined that the most effective method of selecting a type of COTS Software is to undertake a COTS Evaluation, rather than a call for proposals. In a COTS Evaluation, requirements must be documented in functional terms and evaluations should examine the fit of potentially suitable software to meet those functional requirements. The software product that meets the documented functional requirements and has the lowest evaluated Cost is the preferred product. All relevant Costs and benefits must be considered to determine the Total Procurement Value.

The COTS Evaluation is only related to the process of evaluating broad software solutions to identify a preferred solution that will meet the needs of the IESO's business requirements. A COTS Evaluation may not be used for:

- (a) The purchase or acquisition of a COTS solution where multiple resellers or distributors exist; or
- (b) The purchase of professional services for the integration, implementation, configuration or other related services associated with or required for the COTS solution.

Once a COTS solution has been identified through the COTS Evaluation process, the IESO must first determine if a Government VOR Arrangement or Volume Licensing Agreement (VLA) is available for the preferred solution. Where a COTS product is available through a government VLA, the IESO may award the Contract directly, subject to the requirements of the VLA. Where the preferred solution is not available through a Government VOR Arrangement or VLA, the IESO may leverage an existing IESO VOR, if available; otherwise, a Competitive Procurement process must be used to engage resellers and/or direct sellers.

Where the Procurement Unit determines that a COTS Evaluation is appropriate and the Business Unit elects to proceed with the evaluation, they must:

- (a) Engage the Procurement Unit prior to conducting any evaluations, demonstrations or discussions with potential Vendors;

¹² OPS Procurement Directive, Section 10.

- (b) Evaluate all potential software solutions against the same criteria and maintain records to support this evaluation; and
- (c) Complete a COTS Evaluation memo, outlining the evaluation process, requirements and selection justification. The COTS Evaluation memo must be reviewed by the Procurement Unit and approved by the Approving Authority listed under the OAR and the CFO prior to entering into a Contract.

6.5.4 Volume Licensing Agreements¹³

Some Volume Licensing Agreements (VLAs) have been established with certain COTS product Vendors to enable the IESO to take advantage of discounts and the opportunity to license COTS products under common negotiated terms. Prior to using a VLA, the Procurement Unit must review and follow the VLA guidelines, terms and conditions including, but not limited to, reporting and audit requirements set out by the Government.

IESO must note that since VLAs have not been established using an open competition process, they are not considered a substitute for competition. IESO may be required to seek non-competitive approvals, as appropriate, for Procurements of COTS software and related services using a VLA.

6.5.5 Maintenance and Support

The Business Unit must consider the acquisition of maintenance and/or support over the estimated useful life of the IT installation as part of the Total Procurement Value and either include it in the Procurement for the software, or procure it separately, where necessary and appropriate. Splitting or sub-dividing of maintenance and support services for the purposes of avoiding the requirements of this policy is not allowed. IT Contracts must include appropriate contractual provisions for maintenance and support services for the estimated useful life of the IT installation.

For already installed software or hardware, where maintenance and/or support was not included in the Procurement approval or where maintenance and/or support services will expire, IESO must seek the appropriate Procurement approvals for the balance of the intended installation period or next anniversary of the installation when maintenance and/or support will be required.

¹³ OPS Procurement Directive, Section 4.3.1

6.6 Appendix F: Allowable Exceptions to Competitive Procurement

The Allowable Exceptions are as follows¹⁴:

- (a) Where there is an absence of Responses to a competitive Procurement process that has been conducted in compliance with this policy, including where:
 - No Responses submitted;
 - No submissions to the Procurement met the Mandatory Requirements or Minimum Thresholds of the Procurement; or
 - The submitted Responses were collusive. Procurements directly awarded under this exception must include the same requirements of the original Procurement.
- (b) Where only one Vendor is able to meet the requirements and no reasonable alternative or substitute goods and/or services exist for one or more of the following reasons:
 - To ensure compatibility with existing products or goods and/or services. Compatibility with existing products or goods and/or services may not be allowable if the reason for compatibility is the result of one or more previous Non-Competitive Procurements;
 - The protection of copyright, patent rights, or other exclusive rights or to maintain specialized products that must be maintained by the manufacturer or its representatives; or
 - The supply of goods and/or services is controlled by a Vendor that is a statutory monopoly.
- (c) For work to be performed on property by a contractor according to provisions of a warranty or guarantee held in respect of the property or original work;
- (d) For work to be performed on or about a leased building or portions thereof that may be performed only by the lessor;
- (e) For the Procurement of (electronic) subscriptions to newspapers, magazines or other periodicals;
- (f) For the Procurement of original works of art;
- (g) For additional deliveries by the original Vendor of goods and/or services that were not included in the initial Procurement where a change of Vendor:
 - Cannot be made for economic or technical reasons such as requirements of interchangeability or interoperability with existing equipment, software, services or installations procured under the initial Procurement; and

¹⁴ OPS Procurement Directive, Section 4.4.4.2

- Would cause significant inconvenience or substantial duplication of Costs for the IESO.¹⁵
- (h) Where a situation of urgency exists brought about by events unforeseeable by the IESO and the goods and/or services cannot be obtained by means of a competitive Procurement process. A situation of urgency does not occur where the IESO has failed to allow sufficient time to conduct a competitive process;
- (i) For the purchase of goods and/or services on a commodity market;
- (j) For the Procurement of a prototype or a first goods and/or services to be developed in the course of research, experiment, study or original development but not for any subsequent purchases;
- (k) For purchases made under exceptionally advantageous circumstances that only arise in the very short term in the case of unusual disposals such as liquidation, bankruptcy or receivership, but not for routine purchases from regular Vendors;
- (l) Where goods, Consulting or Non-Consulting Services regarding matters of a confidential or privileged nature are to be purchased and the disclosure of those matters through a competitive Procurement process could reasonably be expected to compromise IESO's confidentiality, result in the waiver of privilege, cause economic disruption or otherwise be contrary to the public interest; and
- (m) For a Contract to be awarded to the winner of a design contest provided that (i) the contest has been organized in a manner that is consistent with the principles of this policy; and, (ii) the participants are judged by an independent jury with a view to a design contract being awarded to a winner.

¹⁵ Canadian Free Trade Agreement, Chapter Five - Government Procurement

6.7 Appendix G: Contract Management

The Business Unit is responsible for the management of the Contract, including but not limited to the following:

- (a) Submitting the Purchase Requisition(s) to the Procurement Unit through the Online Financial Management System within 5 business days of contract execution or within 5 days of notice to Award where the Purchase Order forms the Contract, in accordance with [Appendix H: Purchase Requisition and Purchase Order Requirements](#).

Managing the financial commitments of the Contract, ensuring that:

- (a) Payments are approved in accordance with the provisions of the Contract and are done so in a timely manner through the IESO's financial management tool;
- (b) Payments for applicable expenses are in accordance with the Management Board of Cabinet Travel, Meal and Hospitality Expenses Directive, as amended from time to time; and
- (c) Over-payments are identified to Accounts Payable for recovery.

Ensuring Vendor compliance against the delivery of the goods and/or services in accordance with the terms and conditions set out in the executed Contract, including but not limited to scope of work and milestone management and Vendor performance.

Requesting Contract Amendments in a timely manner, including but not limited to:

- (a) Identifying any change requests to the scope, term or deliverables and working with the Procurement Unit to assess any impacts on Costs, terms, and, if applicable, determining whether such changes require non-competitive justification or re-Procurement;
- (b) Initiating requests for amendments or for the execution of extension options through the Procurement Unit at least one month in advance of expiry;
- (c) Submitting timely revisions to the Purchase Order through the Online Financial Management System to ensure that the Approving Authority is in place prior to the changes taking effect; and
- (d) Ensuring that the delivery of goods and/or services do not continue beyond the expiration date of a Contract without an approved Contract Amendment executed through the Procurement Unit.

6.8 Appendix H: Purchase Requisition & Purchase Order Requirements

6.8.1 Purchase Requisition vs. Purchase Order

Purchase Requisition means a request for approval to initiate a Purchase Order for the purchase of goods and/or services through the IESO's Online Financial Management System.

Purchase Order means an authorized record for the purchase of goods and/or services issued by the IESO to a Vendor issued from the IESO's Online Financial Management System.

6.8.2 When you need a Purchase Order:

- (a) A Purchase Order is required for all Consulting Services purchases, regardless of the Total Procurement Value;
- (b) A Purchase Order is required for all goods and Non-Consulting Services with a Total Procurement Value greater than or equal to \$25,000;
- (c) A Purchase Order is required for goods and Non-Consulting Services with a Total Procurement Value less than \$25,000, where:
 - A stand-alone Contract is required;
 - A Contracting Out Notification (CON) or Purchased Services Agreement (PSA) is required; and/or,
 - The goods and/or services are related to software, hardware and business equipment greater than \$10,000 (Purchases of this nature must be initiated by IT Services);
- (d) A Purchase Order will not be issued until all the appropriate approvals have been obtained under the OAR.

6.8.3 Purchase Requisition Requirements:

The Purchase Requisition must include all relevant details of the purchase, including but not limited to:

- (a) A brief description of the goods and/or services to be provided, including whether they are goods, Consulting Services or Non-Consulting Services;
- (b) The Procurement method used (Invitational or Open Competition or Non-Competitive);
- (c) The Contract Term, including any options to extend or renew the Contract;

- (d) The Total Procurement Value;
- (e) The amount payable to the Vendor for the delivery of those goods and/or services;
- (f) Any timelines or deadlines for providing the goods and/or services;
- (g) A copy of the proposal, quotation or submission from the Vendor, including, as appropriate, documentation to support adherence to the provisions of this policy;
- (h) Where applicable, a copy of the executed Contract; and
- (i) Any other instructions or information related to the purchase or delivery of the goods and/or services.

6.9 Appendix I: Guidelines for Conducting Market Research

6.9.1 What is market research as it relates to Procurement?

Market research is the process of gathering information through independent research and/or Vendor consultation in advance of a Procurement process to:

- (a) Identify potential Vendors that provide or sell the desired goods and/or services;
- (b) Find out if there are products that have the capability or functionality to achieve the business objective;
- (c) Discover characteristics or functions that are available that may be incorporated into a specification; and
- (d) Acquire high-level budget estimates that may be used in establishing a Total Procurement Value, to improve accuracy and secure funding approval, as further described in Section 6.9.5 of this Appendix).

6.9.2 When is market research appropriate?

Market research and/or Vendor consultation is only appropriate prior to the initiation of a competitive Procurement. Once the IESO has initiated a competitive Procurement process, communication with Vendors is only permitted through the Procurement Unit, in line with this policy and with the terms and conditions set out in the Procurement document (i.e. RFP, etc.).

6.9.3 What market research methods are available?

Depending on the goal of the consultation, the IESO may engage in the following types of market research activities: *(a comparison of these activities is presented in Table 1 of this Appendix)*

- (a) Conduct informal market research where high level and generic needs are communicated to Vendors through preliminary discussions for the sole purpose of gathering pricing information or high level information on available goods and/or services to improve planning and budgetary activities. This type of research may also include internet research, generic email enquiries, trade shows, white paper reviews, etc. and does not require the assistance of the Procurement Unit provided that they are conducted in line with the IESO Procurement Policy and this Appendix);
- (b) Issue a Request for Information (RFI) to gather detailed information and feedback from a broad base of Vendors. This may include outlining a potential requirement and requesting feedback on Vendor capabilities and suggestions on how a subsequent Procurement may be

structured. These must be written documents that are publically posted on the IESO's e-tendering site via the Procurement Unit, soliciting written Responses from the marketplace;

- (c) Issue a draft Request for Proposal (RFP) when a detailed Procurement document is available and the intention is to gather feedback on the details of a Procurement need, approach and general documentation. These must also be written documents that are publically posted on the IESO's e-tendering site via the Procurement Unit, soliciting written Responses from the marketplace.

6.9.4 What are the “rules of engagement” when it comes to informal market research?

The Business Unit is responsible for ensuring that any market research activities that are undertaken directly, without the Procurement Unit, are conducted in line with the IESO Procurement Policy, maintaining the principles of fairness and transparency and:

- (a) Provides no advantage to any Vendor, by ensuring that:
 - All Vendors are provided with the same information within a similar timeframe;
 - Information provided to Vendors does not unnecessarily reveal IESO's requirements and/or needs to the extent that it could create an advantage to any one Vendor; and,
 - Market research findings do not result in any bias nor the development of any requirements that could perceivably favour any particular potential Vendor or group of Vendors.
- (b) Creates no obligation or commitment between the IESO and any Vendor during the consultation or market research phase;
- (c) Clearly communicates to Vendors that market research is not a substitute for a competitive Procurement and that the engagement is not intended to result in Vendors expending significant cost or effort; and
- (d) Any free trials of software or online subscription services are not be implemented without first engaging with Information & Technology Services and Legal to the extent there are any associated agreements, including “click-through” agreements.

6.9.5 What information can IESO gather on pricing ahead of a procurement process?

- (a) IESO may obtain high level budget estimates, including:
 - Standard price lists that the Vendor publishes broadly;
 - Discount volume thresholds and rates; and/or,
 - General hourly rate ranges for specific services or skill sets (i.e. labour rates, etc.).

- (b) When seeking information on volume discount levels, it is important not to reveal the IESO's volume needs; instead, ask "what break-points exist for volume purchases." Note that each Vendor may have their own ranges for discounts (e.g. 0-99, 100-249, 250-999, etc.);
- (c) Encourage Vendors to quote commercial rates that any customer would expect to receive at the specified volume discount levels and dissuade them from simply quoting list prices, which tend to be far higher than real-world commercial prices.. This will improve budget accuracy; and
- (d) Market research should not result in formalized quotes or proposals from a Vendor or multiple Vendors. Formal quotations must be sought through a competitive Procurement process.

6.9.6 What to consider before conducting market research

Before approaching the market for information, Business Units should consider the following:

- (a) The objective of the research – i.e. whether it is to determine what products or services exist, or to aid in developing budget estimates;
- (b) Which market or segment of the market place is being targeted;
- (c) The number of Vendors to be engaged noting that the number should be proportionate to the number of potential Vendors in the market. This will help to ensure that the process is not overburdened by speaking to every conceivable potential Vendor, but is broad enough to capture a wide array of information;
- (d) How much time and effort will be spent on market research, including understanding critical deadlines for sourcing the goods and/or services;
- (e) The method for conducting the market research; and
- (f) Confidentiality – the Business Unit is responsible for ensuring that:
 - The commercial confidentiality of any information received during discussions with Vendors is protected and maintained; and
 - Appropriate Non-Disclosure Agreements are in place to protect the IESO's confidentiality and security (note that these should only be used in circumstances where the disclosure of IESO information is critical to the discussions and must be administered through the Procurement Unit).

6.9.7 Comparing market research methods

Table 1: Market Research Methods – General Overview

	RFI/Draft RFP	Informal Market Research
Conducted in line with the principles of this policy.	Yes	Yes
Used to gather information or to test a scope of work or approach.	Yes	No
Used to gather high level pricing information for budgeting purposes.	Yes	Yes
May disclose specific details of the IESO's requirements or specifications.	Yes	No
Issued publically on IESO's e-tendering site.	Yes	No
Vendor Responses must be submitted in writing.	Yes	No
Does not result in an obligation or commitment.	Yes	Yes
Does not create any advantage for any Vendor.	Yes	Yes
May replace a competitive process.	No	No
Used as a condition of participating in a competitive procurement.	No	No

7.0 Definitions

Unless otherwise defined in this policy, the following definitions have the following meanings:

Allowable Exception means specific situations set out in this policy where the use of a Non-Competitive Procurement process is allowable for the Procurement of goods, Consulting, or Non-Consulting Services, provided that prior approval is received in accordance with the Approving Authorities specified in the OAR.¹⁶

Approving Authority means the individual authorized to approve transactions with financial consequence. The authority is delegated by the IESO Board of Directors through the Organizational Authority Register (OAR) based on both dollar value and the specific nature of the transaction.

Business Unit refers to the department or functional area within the IESO that has requested and initiated a Procurement.

Commercial-Off-The-Shelf (COTS) Evaluation means an internal evaluation process of COTS products based on a pre-defined set of criteria to identify a preferred software solution. This evaluation process requires a formal document (“memo”) outlining the business rationale, process, and recommendation to be approved by the Approving Authority prior to engaging a Vendor for the provision of a Commercial-Off-the-Shelf Software or software package. A competitive procurement must follow a COTS Evaluation where multiple resellers and/or distributors of the preferred product exist, except where a Government Volume Licensing Agreement (VLA) is available for use.

Conferred Value includes, but is not limited to:

- (a) The exchange of goods and/or services by the IESO in return for other goods and/or services.
- (b) Revenue generating opportunities.
- (c) Partnership Agreements with non-profit organizations¹⁷.

Conflict of Interest occurs when personal interests interfere with, or may appear to interfere with, an individuals’ primary business loyalty to the IESO, as further described in the IESO Code of Conduct.

Consulting Services means the provision of expertise or strategic advice by specially trained and qualified professionals for the purpose of providing recommendations to the IESO for decision-making, including activities relating to critical and/or commercial analysis, the formulation and/or implementation of recommendations relevant to the IESO’s business. This includes:

¹⁶ OPS Procurement Directive, Section 10.

¹⁷ OPS Procurement Directive, Section 8.3.

- (a) Management consulting (e.g., helping management improve their performance, primarily through the analysis of existing problems and development of plans for improvement. This includes organizational change management assistance and strategy development);
 - (b) Information Technology consulting (e.g., advisory services that help clients assess different technology strategies, including aligning their technology strategy with their business or process strategy);
 - (c) Technical consulting (e.g., activities related to actuarial science, appraisal, community planning, health sciences, interior design, realty, social sciences);
 - (d) Research and development (e.g., investigative study for the purpose of increasing the available store of knowledge and/or information on particular subject);
 - (e) Policy consulting (e.g., advisory services to provide policy options, analysis and evaluation);
 - (f) Communication consulting (e.g., the provision of strategy and advice in conveying information through various channels and media):
- For clarity, Consulting Services do not include services in which the physical component of an activity would predominate: for example, services for the operation and maintenance of a facility or plant; water-testing services; exploratory drilling services; surveying; temporary help services; training/education instructors; employee placement; auditing services; and aerial photography;
 - Consulting Services also do not include any licensed professional services provided by medical doctors, dentists, nurses, pharmacists, veterinarians, engineers, land surveyors, architects, accountants, lawyers and notaries in their regulated capacities.¹⁸

Contract means the formal written document that will be entered into between the IESO and successful Vendor(s) at the end of the Procurement process.¹⁹ A Contract may be either a Purchase Order or a Contract signed by both parties.

Contract Amendment means an alteration or change to an existing Contract by way of formal written documentation, which may include a change to the term (including leveraging extension options), value or scope of the Contract, made by mutual agreement between both the Vendor and the IESO.

Contract Term means the total length of time a Contract may be in effect, including any exclusions provided for in the contract.

¹⁸ OPS Procurement Directive, Sections 4.1.1 and 10.

¹⁹ OPS Procurement Directive, Section 10.

Contracting Out Notification means a notification provided to the Society of United Professionals that the IESO proposes, or in the case of emergencies, decides, to contract out work within the jurisdiction of the bargaining unit.²⁰

Costs has the meaning set out in Section 5.4 of this document.

Evaluation Committee means the group of individuals that are responsible for evaluating Vendor submissions following a competitive Procurement in line with the process set out in the solicitation document.

Exemption means an exclusion from a specific requirement of this policy, provided that prior approval is obtained from the Approving Authority as set out in this policy and the OAR.²¹

External Auditor means an independent third party engaged in a regulated capacity to complete audit services for the IESO.

Fairness Monitor means an independent and impartial third party engaged by the IESO to monitor whether the Procurement process was carried out in accordance with the Procurement documents and to ensure that the Procurement practices are transparent, objective, impartial and fair.

Follow-On Agreement means a Contract that follows and is related to an already completed Contract.

Former Employee means a former employee of the IESO or its predecessor organizations, which for greater certainty, includes the Ontario Power Authority.

Government means the Government of Ontario.

Government Vendor of Record or VOR Arrangement means a Procurement arrangement established by the Ministry of Government & Consumer Services that authorizes one or more qualified Vendors to provide goods and/or services for a defined time period that the IESO may use to source goods and/or services under the terms and conditions established for Provincially Funded Organizations.

Independent Contractor means a self-employed person who provides certain services under a Contract and is not under the control, guidance or influence of the IESO.

Information Technology or IT means the equipment, software, services and processes used to create, store, process, communicate and manage information.²²

²⁰ Collective Agreement between IESO and the Society of Energy Professionals, January 1, 2013-December 31, 2014, as amended, Article 65.

²¹ OPS Procurement Directive, Section 10.

²² OPS Procurement Directive, Sections 6.1 and 10.

Interim Measures means the Interim Measures enacted on March 18, 2019 as related to the “Ontario Public Service Procurement Directive.”

Invitational Competitive Procurement means a Procurement method of inviting a minimum of three (3) Vendors to respond in writing to a request by the IESO for the supply of goods, Non-Consulting or Consulting Services.²³

Mandatory Requirements means evaluation criteria included in a Procurement document that must be met by all Vendors and is verified on a pass or fail basis.

Minimum Threshold means a minimum required score that an evaluated proposal must meet in order to proceed to the next stage(s) of the evaluation process, usually requiring the Vendor to meet a minimum technical score before proceeding to price evaluation.

Non-Competitive Procurement means a Contract awarded outside of a competitive process.

Non-Consulting Services means the provision of services that do not provide expert or strategic advice for consideration and decision-making, but rather deliver a tangible product/service that results in a tactical or operational outcome.

OAR means the IESO’s Organizational Authority Register, as amended from time to time.

Online Financial Management System means the IESO’s electronic financial management tool. For the purpose of this policy, the electronic financial management tool specifically relates to the tool used for the management and issuance of Purchase Orders.

Ontario Public Service or OPS Procurement Directive means the Management Board of Cabinet Procurement Directive dated December 2014, and as amended from time to time.

Open Competitive Procurement means a Procurement that is open to all in accordance with its terms and includes publicly posted Procurement document(s) outlining the opportunity.

Other Included Entity means the status accorded to the IESO under the OPS Procurement Directive, as confirmed by the Memorandum of Understanding.

Privacy Office means the IESO’s Business Unit responsible for receiving and responding to Freedom of Information requests and can be contacted at:

Independent Electricity System Operator
Attention: Privacy Office
120 Adelaide Street West, Suite 1600
Toronto, ON M5H 1T1
Phone: 416-969-6277
Fax: 416-969-6383
email: privacy@ieso.ca

²³ OPS Procurement Directive, Section 10.

Procurement means the act of obtaining goods and/or services per this policy.

Procurement Unit refers to the functional business area responsible for providing centralized Procurement services to enable the acquisition of goods and/or services at the IESO.

Purchase Order means an authorized record for the purchase of goods and/or services issued by the IESO to a Vendor issued from the IESO's Online Financial Management system.

Purchase Requisition means a request for approval to initiate a Purchase Order for the purchase of goods and/or services through the IESO's Online Financial Management system.

Purchased Services Agreement means an agreement between the IESO and the Power Workers Union to use purchased services for work which may be within the jurisdiction of the bargaining unit.²⁴

Related Party (or Related Parties) means an entity or an individual (person) that is related to the IESO that possesses an element of control (whether complete, common or shared) or influence of the IESO and/or key personnel (including Board Members or close family members of key personnel). Contracts between the IESO and a Related Party, such as a Contract for the board member's company or affiliated company to deliver services to the IESO must be disclosed on the IESO's financial statements.

Request for Information or RFI means a market research Procurement document that is used to elicit industry information on particular goods and/or services from the Vendor community.

Request for Proposal or RFP means a Procurement document that requests Vendors to supply solutions for the delivery of a product or service or to provide alternative options for solutions.

Request for Quotation or RFQ means a Procurement document that requests Vendors to provide goods and/or services where the scope is fully defined and where the selection is typically based on price or simple evaluation criteria.

Request for Services or RFS means a Procurement document used during the Second Stage Competition to request submissions from one or more Vendors listed on a VOR Agreement.

Request for Vendor Qualification or RFVQ means a Procurement document used to request technical information and evidence of financial stability and product or service suitability from Vendors in order to pre-qualify or short list Vendors to provide specific types of goods and/or services.

Request for Vendors of Record or RVOR means a Procurement document used to develop a short-list of qualified Vendors to enter into a VOR Agreement for specific categories of work or to provide specific types of goods and/or services.

²⁴ Collective Agreement between the IESO and Power Workers Union, Canadian Union of Public Employees (CLC), Local 1000, April 1-2014-March 31, 2017, Article 12.

Responses means Copies of all responses, submissions, proposals, questions and answers received in response to Procurement documents, including conflict of interest declarations and registration forms.

Rostering means the use of a pre-defined process for selecting a Vendor of Record in connection with a VOR Agreement that does not require a Second Stage Competition. The Rostering method may include, but is not limited to, unit pricing, successive order selection, or rotation.

Second Stage Competition means an Invitational Competitive Procurement issued to qualified Vendors of Record.

Statement of Work means a written document that sets out the scope of work under a Contract or that sets out an agreement to provide goods or services under a VOR Agreement. A Statement of Work must be agreed to by both parties to a Contract.

Total Procurement Value means all costs and conferred value associated with a contractual relationship with a third party. Where a project involves multiple related procurements, the project's Procurement Value would be determined by cumulative value of each related Procurement.

Vendor means a person or company offering goods and/or services for sale.

Vendors of Record means those Vendors that have entered into a VOR Agreement.

VOR Agreement means a Vendor of record Procurement arrangement that authorizes one or more qualified Vendors to provide goods and/or services for a defined time period on pre-negotiated terms and conditions.

VOR Guide means a user guide that provides users with information about a VOR Agreement such as Vendor contact information, pricing, specific requirements, details pertaining to the Second Stage Competition or Rostering process, or any other such information as may be necessary for the management of the VOR Agreement.

Volume Licensing Agreement (VLA) means a software licensing program that software publishers provide to large customers, offering significant price discounts and common business and legal terms and conditions. VLAs are not VOR Arrangements and have not been established competitively.

8.0 Approval

8.1 Policy Owner and Approver

8.1.1 Name: Barbara Anderson

8.1.2 Organizational Position: Vice President Corporate Services & Chief Financial Officer **Date Approved:** September 1, 2019

Schedule A: Baseline

Revision History

Rev. #	Reason for Revision	Revision Author	Date
01	Initial Release		September 10, 2019
1.1	Revision to incorporate changes to the OPS Procurement Directive Interim Measures	Megan Filey	September 1, 2020
1.2	Revision to approval authority for exceptions to posting timelines	Megan Filey	October 19, 2020

References

Document Title	Document ID
Ontario Public Service Procurement Directive	
Canadian Free Trade Agreement	
Electricity Act, 1998	
Ontario Energy Board Act, 1998	
Travel, Meals and Hospitality Expenses Directive	
IIESO Code of Conduct	IIESO_COC_0001 v11.0
IIESO's Organizational Authority Register (OAR)	

Related Documents

Document Title	Document ID
Procure Goods & Services Process Specification	PRCS-45

Document Title	Document ID
Issue Goods & Services Purchase Order	PRCS-46
Amend Goods & Services Purchase Agreement	PRCS-47

INTEREST AND INVESTMENT INCOME

The table below reflects the components that make up net interest from 2019 – 2021.

Table 1: Net Interest Expense from 2019 – 2021

Net Interest Expense (In \$ millions)	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Interest OEFC/Credit Facility	2.1	2.3	1.7	1.5
Capitalized Interest	(0.9)	(0.5)	(0.7)	(0.8)
Financing Charges	0.3	0.3	0.3	0.3
Short Term Investment Income	(5.9)	(7.9)	(3.5)	(2.1)
Long Term Investment Income	(1.5)	(3.2)	(2.4)	(1.3)
Total	(5.9)	(9.0)	(4.6)	(1.6)

Interest OEFC/Credit Facility

The IESO has entered a note payable and credit facility with the Ontario Electricity Financial Corporation (OEFC) which is used to fund capital projects and the cost of past projects that have not been collected through the IESO fee. In 2019, the interest expense on this debt was \$2.3 million and will decrease going forward as the IESO renewed the terms of the agreements at a lower interest rate as of June 30, 2020.

Capitalized Interest

As per the IESO capitalization guidelines, all capital project interest expense is capitalized until the particular project is put in service. Capitalized interest in 2019 was lower than the OEB approved amount due to the delayed capital costs related to the MRP and the cancellation of the capital portion of the Incremental Capacity Auction. The annual increase in capitalized interest going forward reflects the continued investment in long term capital projects, specifically MRP.

Financing Charges

Financing charges are an aggregated cost of all the transaction and account maintenance fees and are combined with the IESO's net interest expense.

Short-Term Investment Income

Short-term investment income is a combination of market interest income and corporate interest income. Market interest income is the amount of interest earned on funds passing through the IESO wholesale market in accordance with the Market Rules and corporate interest income is the amount of interest earned on IESO short-term money market investments.

In 2019, the IESO earned \$2.0 million more than the OEB approved budget due to higher funds passing through the IESO wholesale market and corporate investments. In 2020, interest income was significantly reduced. Continued reduction in interest income is reflected in the 2021 budget as impacts of the COVID-19 pandemic have pushed the Bank of Canada to drop their target overnight rate to 0.25%.

Long-Term Investment Income

The long-term investment income is earned on a balanced portfolio of pooled funds. These funds are used to support our supplemental employee retirement plan and other IESO's general solvency needs. In 2019, income earned on the IESO's long-term investments exceeded the OEB approved budget by \$1.7 million due to market performance and portfolio rebalancing which resulted in capital gains being realized. In 2020, the IESO realized similar market performance upside. In 2021, the budget was developed with the assumption that market conditions would be impacted by the COVID-19 pandemic, reducing interest income.

ASSET MANAGEMENT PROCESS OVERVIEW

Introduction

The IESO's IT systems must be maintained and updated on a regular basis to sustain reliability, performance, availability requirements, add capacity, and keep pace with information security improvements. The classes of assets and their lifecycle details include:

- **Hardware:** Servers, network switches, desktops, etc. have a specific life expectancy when purchased. After the specified life expectancy of the hardware is reached, vendor support costs increase, failure rates increase, and the availability of spare parts decreases.
- **Software:** Software encompasses everything from specific in-house developed tools, to major commercial products, to different operating systems and databases. All new proprietary software is regularly updated by the vendors to address any defects, add new features, and address information security requirements. Eventually, for a variety of commercial reasons, vendors discontinue support for older versions of a product and new releases and "patches" are no longer provided; depending on the software and where it sits within the IESO security architecture, the loss of up to date security patches is a major consideration in its replacement. Use of unsupported, yet stable versions of software would require the IESO to mitigate any defects or vulnerabilities identified – and to do so without support from the vendor.

Managing Hardware Asset Lifecycle

Hardware lifecycle management is the process of assessing and planning for the overall design, roll-out and maintenance of IT infrastructure. The IESO understands that lifecycle management is important to consider before the first component is ever purchased and as such considers the ongoing maintenance and future replacement of hardware assets early on in the process.

Planning of hardware assets and their respective lifecycle timelines drive future project activities and are necessary to maintain IT infrastructure. The approach to this planning includes:

- Forecasting the replacement of hardware at the end of its normal lifecycle (every 4–5 years);
- Forecasting expansion and/or replacement of hardware based on expected data growth and/or computing power consumption needs;
- Minimizing impacts to the business and gaining efficiencies in implementation by continuing to assess hardware condition and aligning hardware replacements with key business solution changes; and
- Monitoring operational statistics and third party support availability to determine what hardware can be taken beyond its normal lifecycle (if required).

1 This approach ensures that the IESO minimizes the potential for technical debt (i.e. the number
2 of aging systems with minimal or no support) and levels of forecast spend for hardware
3 replacements.

4 Hardware assets are typically forecast for replacement after 4–5 years of service life but can be
5 extended based on the following criteria:

- 6 • The business solution that leverages the infrastructure is planned to be
7 upgraded/refreshed/replaced within 1-2 years (and so hardware replacements will
8 coincide with that work for efficiencies);
- 9 • The operational statistics of the hardware are such that minimal outages and/or
10 technical issues have been experienced within the last 12-24 months; and
- 11 • Third party support is available for the hardware at a reasonable cost (such as
12 firmware upgrades, security patch releases and part replacements).

13 **Managing Software Asset Lifecycle**

14 Software lifecycle management is the process of assessing and planning for the overall design,
15 roll-out and maintenance of software. The IESO understands that lifecycle management is
16 important to consider when deploying new solutions as the activities associated with lifecycle
17 management of software are a significant factor in the total cost of ownership of the software.

18 Part of this process involves the planning and documenting of software assets and their
19 respective lifecycle timelines. The process also drives future project activities that are
20 necessary to maintain the software. The approach to this planning includes:

- 21 • Planning the appropriate timelines for upgrading the software to the latest software
22 release as well as deciding when it would be appropriate to replace the software.
23 Timelines are based on many factors including: stability of the software; the speed
24 at which the vendor delivers product enhancements; effort and cost to transition to
25 another vendor and the availability of competitive products. Timing for upgrades
26 can be between 1-5 year intervals while replacement timing can be between 5-
27 20 years;
- 28 • Alignment with supporting infrastructure software (operating systems, application
29 server software and libraries and database management software) vendor support
30 dates;
- 31 • Alignment with supporting hardware lifecycles; and
- 32 • Alignment with business change. This is particularly appropriate when replacing the
33 software.

1 This approach ensures that the IESO minimizes the risk to the business, that the software
2 services required to operate the business remain operational and that cyber vulnerabilities can
3 be mitigated in a timely manner.

4 For valid business reasons, planned upgrades/replacements of software may be deferred
5 beyond optimal timelines. Rationale for deferral includes:

- 6 • To accommodate a planned business change which will be making changes to the
7 software;
- 8 • Making trade offs between the technology debt risks and business improvement
9 opportunities within the project portfolio; and
- 10 • To coordinate hardware and software upgrades, to accomplish both upgrades more
11 effectively.

12 **Prioritization of Asset Investments and Inclusion in the Capital Portfolio**

13 The results of the above assessments act as an input into the annual business planning cycle
14 and the development of the capital project portfolio (Exhibit E-2-1). The asset investments
15 (upgrades or replacements) are considered in conjunction with other proposed initiatives that
16 are required to drive business transformation, meet regulatory requirements or advance the
17 IESO's strategic objectives. Through the prioritization exercise the IESO assesses the resource
18 requirements (capital, operating expense and people) to achieve these investments and makes
19 appropriate risk informed trade-offs to ensure we develop a balanced portfolio that addresses
20 the various priorities.

21 For the 2020-2022 Business Plan, the following refresh projects have been included in the
22 capital portfolio at Exhibit E-2-1:

- 23 • Centralized Alarm Management System Replacement
- 24 • Replacement of the Settlement Systems
- 25 • SCADA/Energy Management System Upgrade
- 26 • Corporate PBX Phone System Replacement
- 27 • Dispatch Data Management System Refresh
- 28 • External Identity Management (Portal)

29 More detail related to how the IESO develops its capital plan is provided in Exhibit E-1-2 –
30 Capital Expenditure Planning Process Overview.

CAPITAL EXPENDITURE PLANNING OVERVIEW

Introduction

As part of IESO's annual business planning cycle, business units identify initiatives that they plan to undertake to maintain service, meet or maintain compliance with regulatory requirements, or advance corporate strategic priorities. This includes submissions to manage and invest in assets (as outlined in Exhibit E-1-1 - Asset Management Overview).

Project and Portfolio Management Approach

For initiatives requiring capital investments, business units outline the reasons for undertaking the initiative, its alignment with the organization's core strategies, and an estimate of costs, timelines and resource requirements to deliver the initiative. This information is used to assess the project against a set of criteria as well as the associated timing and capital needs. This information is presented to a cross-functional Project Portfolio Management Team (PPMT) who discuss the merits and relative priority of the new submissions and recommends a project portfolio which:

- balances the various needs of the organization and stakeholders; and
- reflects the resource capacity of the organization to support change above day to day operational activities.

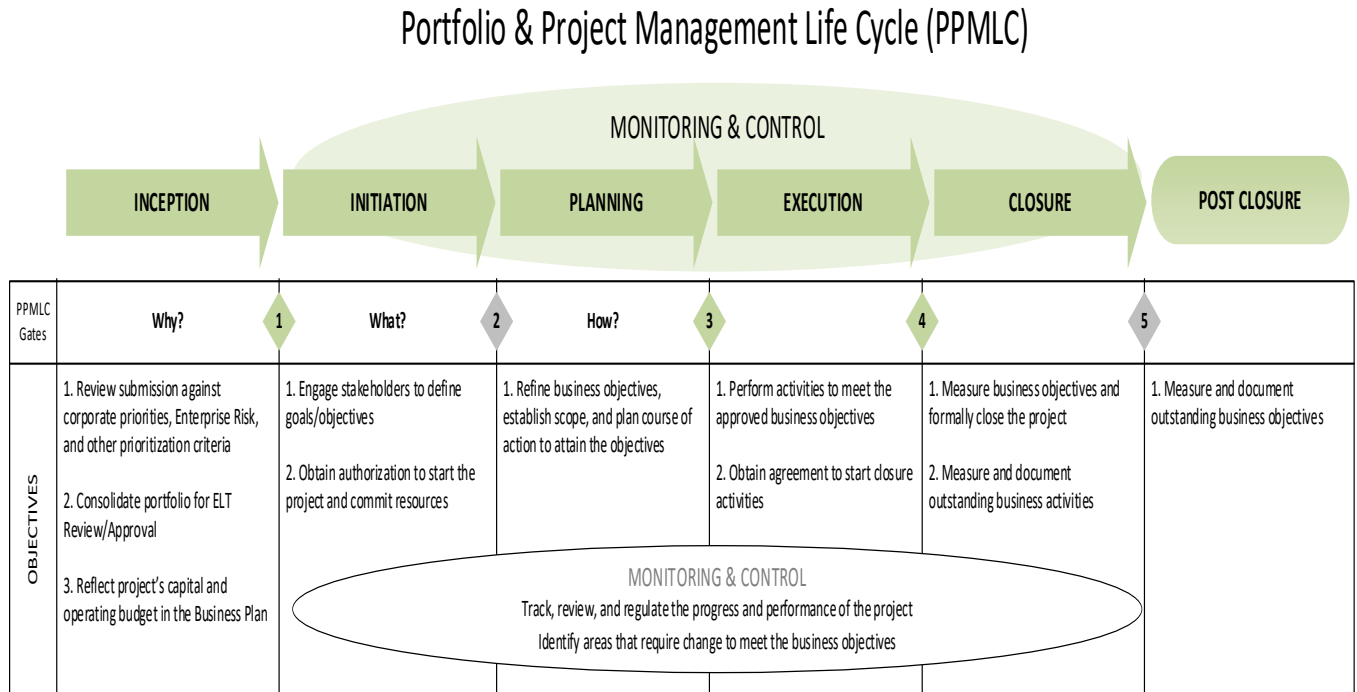
Most of the IESO's projects are multi-year initiatives and, as such, annual project portfolios are made up of both new initiatives and in-flight projects. The project portfolio establishes the capital envelope and operating expense budget to advance these projects over the business planning timeframe¹. The project portfolio is managed within the approved capital envelope with commitments approved individually on an ongoing basis. Although many of the projects span multiple years, the IESO works within the approved capital expenditure envelope for each calendar year.

The IESO closely monitors each of the individual projects within the portfolio and uses the PPMT to assess and adjust the specific projects in the portfolio as appropriate to meet

¹ The IESO's capital portfolio is outlined in Attachment 1, Appendix 2-AA and Attachment 2, Appendix 3: Capital Expenditure Summary to this exhibit.

1 evolving needs. This could include adding and withdrawing projects as well as advancing and
2 deferring projects.

3 **Figure 1: Portfolio and Project Management Life Cycle**



4 5 **IESO Portfolio and Project Management Lifecycle**

6 The IESO prioritizes, governs and delivers enterprise change through a portfolio and project
7 management lifecycle (PPMLC) approach. This approach ensures that projects are
8 appropriately prioritized, governed, achieve objectives and realize benefits. The PPMLC
9 developed by the IESO aligns with industry best practice and provides a streamlined, scalable
10 set of processes that strike the appropriate balance between control and flexibility.

11 The IESO's PPMLC consists of the following phases:

- 12 • Inception
- 13 • Initiation
- 14 • Planning
- 15 • Execution

- Closure
- Post Closure

During the inception phase, the IESO assesses project submissions against a set of criteria, which consider: strategic objectives, mitigation of strategic risk, business value and deliverability. The IESO then scores, ranks and prioritizes the projects accordingly. After assessing the resource needs for each of the projects and considering IESO's resource capacity to support these enterprise projects, the IESO establishes an annual project portfolio. This exercise is performed annually as part of business planning and establishes an appropriate capital envelope for each year within the business planning outlook. At this stage of the project lifecycle, project estimates are "order of magnitude" estimates, reflecting a higher level of uncertainty.

During the initiation phase of each project, resources are confirmed, costs and schedules are refined prior to entering the planning phase. In determining the categorization of the project costs, the IESO adheres to Canadian Public Sector Accounting Standards for Tangible Capital Assets. At this point, cost and time estimates are refined but could still be in the order of +/- 50%. Throughout the project phases, the IESO continues monitoring and control activities to identify areas that may require changes in order to achieve business objectives. Prior to the execution phase, the IESO further refines the costs and schedule of the project. At this point, cost and schedule estimates are typically in the order of +/- 20%.

Actual cost and schedule performance is measured against approved values during the project closure phase along with the reason or variances. Verification that the business objectives have been achieved and lessons learned are also captured during this phase. The post closure phase is utilized whenever business objectives cannot be verified until some time after project closure. This allows the measurement of business objectives to happen following project completion.

REPLACEMENT OF SETTLEMENT SYSTEMS CAPITAL PROJECT

Executive Summary

The existing settlement solution, known as the Commercial Reconciliation System (CRS), was developed and put into operation as part of the opening of the Ontario's electricity market in May 2002. Over the years, the CRS was modified to meet new settlement requirements which resulted from incremental improvements to the design of IESO-administered markets and new government policies, directives and regulations. Due to technological limitations of the CRS, the IESO has had to rely upon end user computing (EUC) tools created outside of the CRS. The number of EUC tools has grown significantly over time to address the IESO's needs. The use of EUC tools has introduced an increased risk of error and solution failures and has made it difficult to manage technologies, train staff to use and keep the system and tools up-to-date. These limitations pose a critical risk to achieving the design and schedule of the Market Renewal Program (MRP) settlement due to the CRS's lack of flexibility and aging technology, and requires mitigation.

This project supports IESO's core strategy to drive business transformation to meet the needs of an evolving industry and business environment.

The Need for the Project

The Replacement of Settlement System (RSS) project is a strategic project that will sustain and integrate IESO's settlements services by addressing limitations with the existing settlement solution, create transparency and efficiencies in the process to address settlement statement disagreements, and enable the implementation of the new settlement design requirements required to deliver settlements for the MRP.

The scope of the RSS project has been expanded to satisfy the new design and implementation requirements of MRP. The new settlements system will incorporate a business rules engine to enable enhanced flexibility for future changes, as well as integrate the EUC tools currently required to settle the Ontario market. The project deliverables include a new settlement system, new Market Rules, documentation (manuals, procedures and guides), training, and new/revised process models and specifications.

Cost and Schedule

The project has an IESO Board of Directors approved budget of \$38.5 million including \$8.9 million of project contingency. The project is expected to take up to 67 months to complete, including 9 months of time contingency to account for scheduling uncertainty. The project commenced in September 2019 and is scheduled to be complete by 2025, including contingency.

Table 1: Cost and Schedule

(\$ Millions)	2019 Budget	2019 Actuals	2020 Budget	2020 Actuals	2021 Budget	2022 Budget	2023 Budget	2024 Budget	Total Incl. Contingency
Capital Expenditure	\$1.5	\$0.8	\$8.4	\$8.3	\$8.8	\$6.9	\$3.8		\$36.8
Operating Expenditure	\$0.0	\$0.4	\$0.2	\$0.3	\$0.4	\$0.3	\$0.1	\$0.1	\$1.7
Total	\$1.5	\$1.2	\$8.6	\$8.6	\$9.2	\$7.2	\$3.9	\$0.1	\$38.5

Business Goals/Objectives

The project will achieve the following business objectives:

1. Implement a settlement solution to better support IESO Settlements' division needs for the IESO administered markets and programs, as well as changes from government policies, directives and regulations, today and in the future.
2. Improve the settlement control framework through enhancing the automated preventive, detective and corrective controls.
3. Improve settlement solution flexibility and maintainability through new architecture design and underlying technologies.
4. Increase the efficiency and effectiveness of addressing and resolving settlement inquiries and disagreements by improving the processes, Market Rules and systems.

Alternatives Considered

Alternative 1 – Replacement of Settlement System

Retire the existing CRS and replace it with a new system, that will allow the implementation of new charge types resulting from the MRP and will be flexible enough to adapt to future changes or requirements of the market.

Alternative 2 – Do not replace Settlement System and build MRP into existing system

Build new charge types resulting from the MRP into the existing CRS.

Alternative 3 – Do not replace Settlement System and develop a new MRP platform

Continue to settle existing charges types in the existing CRS and build a second system to operate in parallel to settle new charge types resulting from MRP.

Alternative 4 – Do not replace the Settlement System, develop a new MRP platform and update the system for remaining functions following implementation of MRP

Continue to settle existing charges types in CRS and build a second system to operate in parallel to settle new charge types resulting from MRP. Once the new system is completed, the new system will be updated with existing charges and CRS will be retired.

Table 2: Appraisal of Alternatives

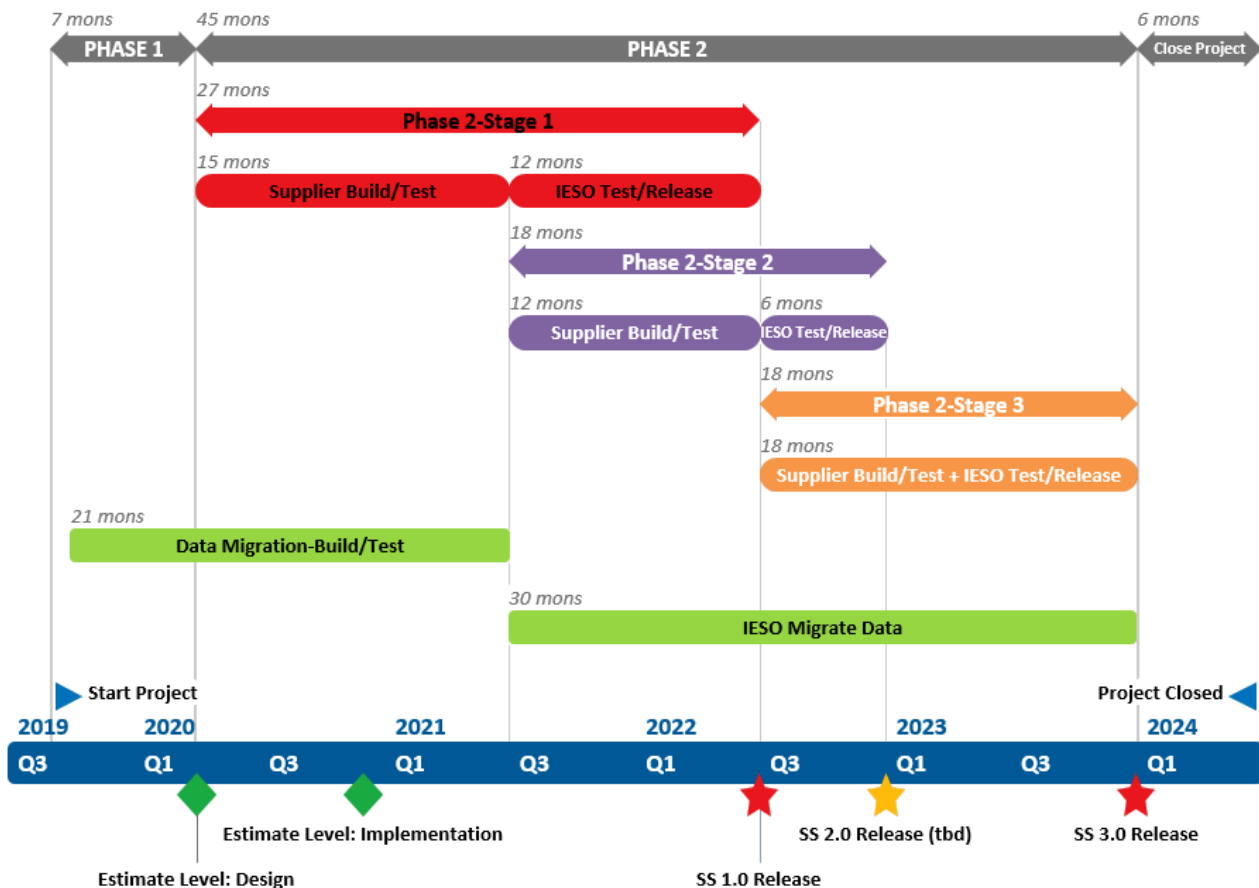
Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
1	Replacement of Settlement System	This meets all of the business objectives noted above. In addition, this alternative creates a foundational platform and core engine to be utilized by MRP	Risks associated with this alternative are outlined in the Risk table below.	Recommended
2	Do not replace Settlement System and build MRP into existing system	<ul style="list-style-type: none"> Does not meet any of the business objectives and will not result in system flexibility or efficiency gains. 	<ul style="list-style-type: none"> Would continue to rely on end user computing tools, which are susceptible to error. Does not meet the MRP requested deliverable to allow for a user to modify 	Not Viable

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
			<p>or configure new charge codes, and results in continued reliance on IT services.</p> <ul style="list-style-type: none"> Does not meet the MRP requested deliverable to allow for offline calculation simulation. 	
3	Do not replace Settlement System and develop a new MRP platform	<ul style="list-style-type: none"> Will not achieve most of the business objectives. 	<ul style="list-style-type: none"> Will require maintenance of two settlement systems. This will increase the complexity of the solution. The IT resources include IESO application support, infrastructure support (patching, backups, etc.) and possibly new external resources (to support the new platform and existing external resources to support the existing platform). Will not be able to take advantage of efficiencies provided by the new platform for charge types not associated with Day Ahead or Real Time. 	Not Recommended
4	Do not replace Settlement System, develop a new MRP platform and update the system for remaining functions following implementation of MRP	<ul style="list-style-type: none"> Similar to Option 3, this will not achieve most of the business objectives in the short term. However, by 2025 all business objectives should be met. 	<ul style="list-style-type: none"> Will require maintenance of two settlement systems for the short term. There will also be added complexity due to data migration as the remaining charge types associated to 	Not Recommended.

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
			<p>that data are transferred over.</p> <ul style="list-style-type: none"> Assuming the new platform provides an easier solution for configuring new charge types, this would help in transferring over the remaining charge type calculations from the existing CRS platform. 	

Delivery Approach

Figure 1: Delivery Schedule



The recommended approach commenced in 2019. The IESO engaged an external vendor to build a solution to replace the existing settlement system and end user computing tools. The project will be delivered in three major phases:

- Phase 1 will design, build/customize and test the settlement solution - base product, current settlement charge types and related settlement forms
- Phase 2 will design, build and test a number of settlement charge types and equations to support the production go-live and cutover of the renewed energy market as part of the MRP, and;
- Phase 3 will design and build transformation scripts for historical data migration and to support the decommissioning of the existing CRS.

Risk Assessment

The RSS project risks and mitigation strategies are developed in alignment with IESO's Enterprise Risk Management (ERM) Framework¹, the corporate process for conducting risk assessments. The ERM Framework supports risk assessment, analysis, mitigation and monitoring.

The following are the key risks identified that need to be managed as part of the RSS project. The IESO will continue to evaluate risks and appropriate mitigation plans throughout the project lifecycle.

Table 3: Risk Assessment

Risk	Inherent Risk Level	Mitigation Activities	Residual Risk Level
Integration with Legacy Systems - During unit or system testing, missing interface in the design architecture is discovered.	High	Charge Type Requirements Development: Templates ensure consistent identification of inputs and outputs, and interdependencies with upstream and downstream systems as well as inclusion of relevant test data. Incremental Software Development and Testing for Core platform: Incremental	Medium

¹ For more information on the ERM, see Exhibit B-1-2, Appendix 3 of the 2020-2022 Business Plan

Risk	Inherent Risk Level	Mitigation Activities	Residual Risk Level
		software delivery and testing performed on a six-week cadence. Development and testing of Extraction, Transformation and Load (ETL) – software: Development and testing for the software that is used to blend data from multiple sources. Acceptance (End to End) Testing: One year of end to end testing for Core platform and ETL software	

Project Governance Structure

The project is adhering to IESO's Project Management Lifecycle² and associated project management controls which includes monthly progress reporting, project steering committees and exception reporting for material deviations in cost, schedule and objectives. The Project Sponsor and Project Steering Committee (made up of key internal stakeholders) provide oversight of the project. The Project Sponsor reports into the Vice President, Corporate Services and Chief Financial Officer.

Progress updates, including key messages, cost and schedule summaries and an assessment of key risks, are presented to the Audit Committee of the Board of Directors throughout the year.

² As described in Exhibit E-1-2.

SUPERVISORY CONTROL AND DATA ACQUISITION/ENERGY MANAGEMENT SYSTEM UPGRADE CAPITAL PROJECT

Executive Summary

An Energy Management System (EMS) is a system of computer-aided tools used by operators of electric utility grids to monitor, control and optimize the performance of the generation and transmission system. This capital project will extend the life of the current Supervisory Control and Data Acquisition (SCADA)/EMS solution and make changes to the Automatic Generator Control (AGC) tool.

The SCADA/EMS solution will be upgraded to the latest baseline version of the vendor platform. IESO custom applications will be integrated where baseline applications cannot meet requirements. In addition, the SCADA/EMS will be sized to enable planned network model growth and support other core business projects, such as Wide Area Visualization Environment (WAVE) Phase 2. The baseline version of the AGC Tool within SCADA/EMS, which manages Regulation Service, currently incorporates additional resource types including energy storage. There are many changes needed to integrate energy storage resources into the IESO Controlled Grid (ICG) and the IESO Administered Markets (IAM). The ongoing initiative to integrate storage resources and the related innovation roadmap will address these changes. The SCADA/EMS Upgrade project is one of a number of elements required to fully integrate storage resources into regulation and wholesale Energy/Operating Reserve markets.

The Need for the Project

The current SCADA/EMS solution is scheduled for a hardware upgrade given that the operating system will be out of vendor support by November 2021. The last SCADA/EMS refresh went in service in July 2016. The project is required to extend the life of the current SCADA/EMS solution and to address the ongoing integration of storage resources into the ICG and IAM. In addition, the project will support and test software changes that will be introduced as part of implementation of the Market Renewal Program (MRP) and will provide network modelling sizes required to support future growth and strategic initiatives.

Estimated Cost and Schedule

A total expenditure of \$15 million is needed to complete the project of which \$14.3 million is capital. The project capital budget includes a contingency of \$2.4 million which reflects the level of uncertainty given this project is currently in the execution phase.

The project started August 28, 2019 and is expected to take 3.5 years to complete, including 12 months of contingency to account for scheduling uncertainties.

The SCADA/EMS Upgrade project needs to be complete by 2023 in order to enable/support downstream and parallel projects/programs e.g. MRP and Wide Area Visualization Environment (WAVE) Phase 2 project.

Table 1: Cost and Schedule

Capital (\$ Millions)	2019 Budget	2019 Actuals	2020 Budget	2020 Actuals	2021 Budget	2022 Budget	Total Budget, incl. contingency
Capital Expenditure	\$0.0	\$0.0	\$5.7	\$5.8	\$5.6	\$0.6	\$14.3
Operating Expenditure	\$0.2	\$0.2	\$0.2	\$0.1	\$0.2	\$0.1	\$0.7
Total	\$0.2	\$0.2	\$5.9	\$5.9	\$5.8	\$0.7	\$15

Business Goals/Objectives

The SCADA/EMS Upgrade project will:

1. Extend the life of SCADA/EMS platform for a minimum of 5 years from the in-service date, sustain the related services, and improve reliability and resilience.
2. Reduce operational complexity by using the latest version of the vendor's SCADA/EMS platform. This will improve the ability to operate the ICG according to industry standards. All enhancements to reduce operational complexity will be balanced against the project timelines and resource limitations.

1 The SCADA/EMS Upgrade project will ensure that:

- 2 a. Energy storage resources providing regulation service can be modeled within the AGC
- 3 tool; and,
- 4 b. The AGC tool can account for an energy storage facility's state-of-charge when
- 5 providing regulation services.

6 **Alternatives Considered**

7 **Alternative 1 – Do Nothing**

8 The SCADA/EMS and associated Power System Simulator (PSS) are used by IESO system
9 operations staff to monitor the status of the ICG and are critical pieces of the infrastructure
10 used by the IESO to maintain reliability of the grid. These applications are also subject to
11 audits by the North American Electric Reliability Corporation (NERC). Maintenance of the
12 SCADA/EMS lifecycle is a key activity that enables the IESO to be compliant with the regulatory
13 standards published by NERC.

14 SCADA/EMS and the PSS are proprietary products that have been heavily customized since they
15 were initially introduced. As of December 2020, components of the current SCADA/EMS and
16 PSS are operating on hardware and operating systems that are currently on extended support.
17 A refresh of this system is required to mitigate the risk associated with operating from an
18 unsupported platform.

19 **Alternative 2 – SCADA/EMS replacement - Competitive Procurement**

20 Changes to the design of the SCADA/EMS and the PSS are planned to occur over the next
21 5-7 years that would result in duplication of effort and costs that would be associated with a
22 competitive procurement of a new SCADA/EMS and PSS at the current time

23 The SCADA/EMS and PSS are highly customized for the IESO and built into the ABB Network
24 Manager platform. ABB is the only vendor that has the ability to upgrade the Network Manager
25 platform as it is a proprietary product. Changing the vendor through a competitive
26 procurement is not viable at this time.

1 **Alternative 3 – SCADA/EMS Upgrade - Sole Source Procurement**

2 As outlined in two previous alternatives, based on current IESO capabilities and business
3 priorities the IESO will engage ABB to upgrade the current SCADA/EMS platform.

4 **Table 2: Appraisal of Alternatives**

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
1	Do Nothing	This alternative does not achieve any of the stated business objectives	Planning Acquisition & Operations (PA&O) ability to manage reliability of the ICG will be negatively impacted given potential for reduced SCADA/EMS solution reliability and availability. Increased likelihood that the IESO will not be able to meet minimum requirements included in NERC Reliability and Cyber standards.	Not Viable
2	SCADA/EMS Replacement - Competitive Procurement	This option is not feasible as outlined above and so does not achieve any of the stated business objectives	Strategic initiatives will be deferred due to procurement schedule delays resulting in duplication of effort and increased risk to the ICG and IAM. Increased likelihood that the SCADA/EMS replacement will impact the IESO's ability to deliver the MRP.	Not Viable
3	SCADA/EMS refresh - Sole Source Procurement	This option addresses all of the stated business objectives	No High or Critical Risks.	Recommended

Delivery Approach

The project will upgrade the current SCADA/EMS platform with the existing SCADA/EMS vendor as the applications are highly customized for the IESO and built into the ABB Network Manager platform.

The enhancements to AGC tools required for storage resources will be implemented as part of the SCADA/EMS application delivery.

Risk Assessment

The SCADA/EMS Upgrade project risks and mitigation strategies are developed in alignment with IESO's Enterprise Risk Management (ERM) Framework¹, the corporate process for conducting risk assessments. The ERM Framework supports risk assessment, analysis, mitigation and monitoring.

There are currently no project risks identified that have a high or critical residual risk level that need to be managed as part of the SCADA/EMS Upgrade project. The IESO will continue to evaluate risks and appropriate mitigation plans throughout the project lifecycle.

Table 3: Risk Assessment

Risk	Inherent Risk Level	Mitigation Plan	Residual Risk Level
The vendor is unable to deliver the system on schedule as agreed upon in the Statement of Work (SOW)	Critical	A) Have vendor provide a detailed schedule and status for previously delayed tasks. (Status: Completed) B) IESO to closely monitor vendor progress. (Status: On-going) C) Vendor to include demonstration of the features (e.g. model and displays conversion) and work performed during project initiation and execution (Status: On-going) D) The project has included time contingency that would be utilized should this risk materialize.(Status: Completed)	Medium

¹ See Exhibit B-1-2, Appendix 2, of the 2020-2022 Business Plan for further details on the ERM Framework

Risk	Inherent Risk Level	Mitigation Plan	Residual Risk Level
Other in-flight projects (e.g. WAVE Phase 2, MRP, etc.) may require the addition of new data/ functionalities during the project lifecycle which may impact or cause changes in the SCADA/EMS project scope and design	High	A) Where possible postpone implementation of proposed scope changes until the future EMS platform replacement project (Status: On-going) B) Identify potential projects/ initiatives that may impact the EMS scope of work and regularly monitor any impacts. Other projects shall consider the cost of their impacts to the EMS project. (Status: On-going) C) Use change management process to assess the change and accommodate (Status: On-going) D) The project has included time contingency that would be utilized should this risk materialize. (Status: Completed)	Medium

Project Governance Structure

The project will adhere to IESO's Project Management Lifecycle² and associated project management controls. The Project Sponsor and Project Steering Committee (made up of key internal stakeholders) provides oversight of the project. The Project Sponsor reports into the Vice President of Information & Technology Services and Chief Information Officer.

Summary progress reports including key performance indicators, cost and schedule summaries and an assessment of key risks are presented to the Audit Committee of the Board of Directors throughout the year. There are currently no risks identified that have a residual risk rating of high or critical for the SCADA/EMS project to report to the Audit Committee.

² See Exhibit E-1-2 for more information on the Project Management Lifecycle

CENTRALIZED ALARM MANAGEMENT SYSTEM REPLACEMENT PROJECT

Executive Summary

The Central Alarm Management System (CAMS) is used to collate and manage events from IT systems and present operators with informational alarms. CAMS is used extensively by control room staff as well as IT Operations. This project will replace the existing underlying infrastructure, software and business logic that currently forms the CAMS solution. This project will procure and deploy Commercial Off-the-Shelf (COTS) software that will meet the business requirements, integrate the COTS solution with other IESO systems to collect the information required to support the business rules that provide the alarms needed by various business users.

The Need for the Project

CAMS is a solution that is important for reliable operation of the IESO Controlled Grid and efficient operation of the IESO Administered Markets. The current CAMS and supporting infrastructure is past its expected 5-year service life. When the project was first identified it was assumed that the current CAMS could be upgraded from its current version. As such the project was originally budgeted at an overall cost of less than \$1.0 million and expected to be completed in 12-18 months. Since that time, the IESO was informed that the COTS product that is currently being used to support CAMS is being phased-out by the vendor. As a result, this project will be responsible for bringing in a new vendor solution to deliver the business requirements currently enabled by CAMS.

Estimated Cost and Schedule

A total expenditure of \$6.0 million is needed to complete the project, of which \$5.2 million is capital. The capital budget includes a contingency of \$0.9 million which reflects the level of uncertainty given the project is currently in the planning phase. The project costs are higher than currently identified in the 2020-2022 Business Plan and reflect vendor pricing received through the recent Request for Proposal process. The IESO will manage these increased costs through offsets in other areas of the capital portfolio.

The project commenced in 2019 and forecasts an overall completion date of March 2023 including seven months of contingency to reflect scheduling uncertainties.

Table 1: Cost and Schedule

(\$ Millions)	2020 Budget	2020 Actuals	2021 Budget	2022 Budget	2023 Budget	Total Budget, Incl. Contingency
Capital Expenditure		-	\$2.5	\$1.1	\$0.7	\$5.2
Operating Expenditure	\$0.1	\$0.3	\$0.2	\$0.2	\$0.1	\$0.8
Total	\$0.1	\$0.3	\$2.7	\$1.3	\$0.8	\$6.0

Business Goals/Objectives

The CAMS replacement project will improve the IESO's alarm capabilities while maintaining compliance with North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards by:

- a) Replacing CAMS with a vendor supported alarm solution;
- b) Realizing internal efficiency gains as the effort to support the replacement CAMS will be reduced;
- c) Improving the agility and flexibility in deploying and maintaining alarms; and
- d) Ensuring the new CAMS retains a centralized design.

Alternatives Considered

Alternative 1 – Do Nothing

The CAMS provides system operations with an integrated view of alarms from many real time systems such as Supervisory Control and Data Acquisition (SCADA), Market Interface System (MIS), Information Publishing System & Dispatch Data Management System (DDMS). The IESO uses NetIQ's Novell Operations Centre (NOC) software as the key component of its current CAMS solution.

Recently, there have been multiple incidents where NetIQ's NOC failures have impacted CAMS availability and reduced system operations' situational awareness of the IESO-Controlled grid. It is not viable to accept this ongoing risk to the IESO's core strategy of ensuring system reliability. A CAMS replacement will help mitigate the following key corporate risk: "A significant cybersecurity event occurs that disrupts the operation of the IESO – including reliable grid operations and efficient market operations – for extended periods of time."

Alternative 2 – CAMS refresh

A CAMS refresh project was included as part of the approved 2019 IESO Project Portfolio, where it was initially estimated to be complete within 12-18 months with an overall project cost of \$500,000.

During the project initiation, the IESO determined that the CAMS vendor was phasing out support of the NOC application. It was therefore necessary to change the project scope from a refresh to a full replacement of CAMS.

Alternative 3 – CAMS replacement

As outlined in the two previous alternatives and based on current CAMS vendor direction and IESO business priorities, the project will replace the current CAMS.

Table 2: Appraisal of Alternatives

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
1	Do Nothing	This alternative does not achieve any of the stated business objectives	Potential failures of current system and reduced system operations situational awareness	Not Viable
2	CAMS Refresh	This alternative does not achieve any of the stated business objectives	Potential failures of current system and reduced System Operations situational awareness	Not Viable

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
3	CAMS Replacement	This option addresses all of the stated business objectives	Survey of potential vendors confirms solutions are available that will meet critical IESO requirements for a centralized alarm management capability. IESO resources are committed to the project schedule.	Recommended

1

2 **Delivery Approach**

3 The IESO procured a CAMS solution from an external vendor to replace the existing solution
4 through a competitive procurement process. The selected vendor will integrate the new CAMS
5 solution with existing IESO applications to support the IESO control room operations.

6 **Risk Assessment**

7 The CAMS project risks and mitigation strategies are developed in alignment with IESO's
8 Enterprise Risk Management (ERM) framework¹, the corporate process for conducting risk
9 assessments. The ERM framework supports risk assessment, analysis, mitigation and
10 monitoring.

11 There are currently no project risks identified that have a high or critical residual risk level that
12 need to be managed as part of the CAMS Replacement project. The IESO will continue to
13 evaluate risks and appropriate mitigation plans throughout the project lifecycle.

14 **Project Governance Structure**

15 The project adheres to the IESO's Project Management Lifecycle² and associated project
16 management controls. The Project Sponsor and Project Steering Committee (made up of key
17 internal stakeholders) provide oversight of the project. The Project Sponsor reports into the
18 Vice President of Information & Technology Services and Chief Information Officer. Progress

¹ See Exhibit B-1-2, Appendix 2: Enterprise Risk Management of the 2020-2022 Business Plan

² See Exhibit E-1-2 for more information on the Project Management Lifecycle process

- 1 reports including key performance indicators, cost and schedule summaries and an assessment
- 2 of key risks is presented to the Project Steering Committee.

CAPACITY AUCTION CAPITAL PROJECT

Executive Summary

Background on Resource Adequacy and the Capacity Auction

In the context of the IESO-administered markets, "capacity" represents the set of supply resources acquired so that they are *available* to deliver energy and other services (e.g. operating reserve, frequency regulation and voltage control) in real-time to ensure power system reliability. Capacity is measured in megawatts, and can be provided by supply resources through energy injections or from loads in the form of demand response. The IESO seeks to acquire an adequate quantity of capacity to meet peak demand under various system conditions identified by IESO planning outlooks.

Following its history of acquiring capacity needs through long-term contracts with suppliers, the IESO has launched a Resource Adequacy (RA) framework to ensure system needs are met cost-effectively. The strategy includes utilizing a stable annual capacity auction to secure capacity resources in the short term and developing complementary mechanisms to support the acquisition strategy over the mid and longer term.

Ontario's experience with competitive capacity auction mechanisms started in 2015 and has progressed through the following steps:

- The IESO has conducted an annual Demand Resource Auction (DRA) since 2015 and ran its first Capacity Auction, including expanded participation from certain generation types, in December 2020.
- The IESO launched the development of the Incremental Capacity Auction (ICA) in 2016, as part of the Market Renewal Program (MRP), to acquire capacity from both new build and existing resources (except large hydro and nuclear), and to work alongside the existing contracts and rate regulation mechanisms to maintain resource adequacy in Ontario.

- 1 • In order to bridge the gap between the DRA and the ICA, the IESO launched a
2 Transitional Capacity Auction (TCA) project in the Fall of 2018 to address interim
3 capacity needs (expected to emerge in 2021), and to begin the transition of the DRA
4 into the ICA. This project later became known as the Capacity Auction Project.
- 5 • In July 2019, the IESO made the decision to stop all work related to the ICA due to:
 - 6 ○ (i) revised resource adequacy assessments showing a limited need for new
7 capacity over the next decade, and;
 - 8 ○ (ii) stakeholder concerns with the published ICA high level design.
- 9 • The IESO continued to implement and evolve the annual capacity auction, and engage
10 with stakeholders around approaches for maintaining resource adequacy through
11 complementary capacity acquisition mechanisms.
- 12 • Due to the impacts of the COVID-19 pandemic, the IESO made a decision to defer the
13 first capacity auction to be held in June 2020, until December 2020. The December
14 2020 capacity auction cleared 992.1 MW for the 2021 summer obligation period.
- 15 • Overall, the data shows that direct participation has increased from 9 participants in
16 2015 to over 32 participants in 2020.
- 17 • Indirectly over 800 individual Ontario contributors from a wide range of businesses and
18 industries participate in aggregator portfolios.
- 19 • As the number of participants has increased, the auction clearing price has generally
20 decreased. For example, the summer clearing price for the 2015 auction decreased
21 from \$378/MW-day down to \$234/MW-day in the 2018 auction (38%), before
22 increasing slightly to \$268/MW-day in 2019. The total cost of the DRA is significantly
23 less than the previous DR portfolio that was procured through RFPs and contracts.
- 24 • Across the same time period the level of qualified capacity has increased across each
25 electrical zone in Ontario, with the most significant MW increase occurring in load
26 centres, such as Toronto and Southwest Ontario.

1 In addition to the current Capacity Auction, the IESO has recently launched an RA Engagement¹
2 that aims to establish a New Capacity/Resource Acquisition Initiative to competitively acquire
3 capacity to meet short, mid, and long-term system needs in a way that effectively balances cost
4 and risk, and that ensures full implementation in time to address larger capacity needs are
5 forecasted in future years.

6 **The Capacity Auction Project**

7 In alignment with the RA framework, the IESO will continue to hold annual capacity auctions to
8 meet short-term system needs. The Capacity Auction currently enables non-contracted and
9 non-regulated Ontario generators and imports to participate alongside dispatchable loads and
10 hourly demand response resources. The purpose of a Capacity Auction is to create a market-
11 based mechanism that secures incremental capacity to help ensure that Ontario's reliability
12 needs are met in a cost-effective manner. The successful participants in the Capacity Auction
13 will be required to become authorized as Capacity Market Participants, which will enable them
14 to register resources with the IESO to deliver on their capacity obligations. Capacity Auction
15 participants will receive availability payments for providing auction capacity, subject to non-
16 performance charges.

17 The Capacity Auction will continue to evolve to ensure it integrates seamlessly with the other
18 mechanisms and is also designed to deliver cost-effective outcomes. It is therefore critical that
19 the IESO evolve its capacity auction in a manner that promotes confidence in the auction
20 process amongst existing and potential auction participants. A phased implementation of
21 changes will help promote that confidence and is consistent with the IESO's general practice for
22 prudently evolving market design incrementally.

23 Progressing in a phased approach allows the IESO to:

- 24 a) introduce new resource types into the auction gradually;

¹ More information on the Resource Adequacy Engagement can be found here: <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Resource-Adequacy-Engagement>

- b) assess and respond to how new resource types behave in the capacity auction and adjust based on lessons learned;
- c) provide participants with an opportunity to develop and test business processes and business models;
- d) transition toward a qualification process that assesses resource availability at times of need;
- e) ensure that committed capacity resources are capable of satisfying their capacity obligations;
- f) provide sufficient time to assess and evolve auction design features, informed by stakeholder input;
- g) align the auction with the complementary mechanisms and evolving planning products;
- h) allocate the necessary resources to implement new auction design features in manageable steps; and
- i) monitor and identify unforeseen consequences arising from new auction design features.

Over the long term the Capacity Auction is expected to continue to evolve to meet system and sector needs and play an important role as the IESO operationalizes the Resource Adequacy framework.

Estimated Cost and Schedule

The original Capacity Auction project was approved with total expenditure of \$10 million to complete the initial scope of the Capacity Auction Project, of which \$7.4 million is capital. The project budget included a contingency of \$2.6 million. A decision was made to reduce the scope of the Capacity Auction Project to deliver only the new auction engine, processes and settlement tool changes to support the December 2020 Capacity Auction and to conduct further capacity auction enhancements under the New Capacity/Resource Acquisition Initiative.

The Capacity Auction Project is currently in the Execution Phase and the current forecast to complete this work is \$6.6 million, \$5.6 million of which is capital and the work is expected to be completed by August 2021.

Table 1: Cost and Schedule

(\$ Millions)	2019 Budget	2019 Actuals	2020 Budget	2020 Actuals	2021 Budget
Capital Expenditure	\$3.7	\$3.6	\$1.7	\$1.8	\$0.1
Operating Expenditure	\$0.6	\$0.7	\$1.3	\$0.3	\$0.0
Total	\$4.3	\$4.3	\$3.0	\$2.1	\$0.1

Business Goals/Objectives

Upon completion of the Capacity Auction Project the following business objectives are expected to be achieved:

1. Increase competition and lower costs by enabling dispatchable, non-committed generators, system backed imports, resource backed imports, storage and greater load side participation to deliver capacity to meet May 2021 to April 2022 capacity needs; and
2. Improve reliability and performance by introducing a capacity qualification process and evolving current obligations and assessments.

Table 2: Appraisal of Alternatives

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
1	Do Nothing	This alternative does not achieve the stated business objectives.	Insufficient capacity potentially causing: - a reliability issue - the need for long-term contracts, or short-term Reliability Must Run Contracts	Not viable given reliability impacts

Ref #	Alternative	Achievement of Business Objectives	Risk	Consideration
			- lack of flexibility compared to markets ² increasing ratepayer costs.	
2	Capacity Auction	This alternative meets the stated business objectives.	This option allows the IESO to build off the learning from the development of the Incremental Capacity High Level Design	Recommended
3	Other Procurement Mechanism	This alternative achieves the stated business objectives	Potential increase to ratepayer costs. The need for long-term contracts or short-term Reliability Must Run Contracts which are less competitive (i.e. less benefits to rate payers) and lack flexibility compared to markets which will increase ratepayer costs.	Not Recommended for short duration capacity needs that adjust on an annual basis in response to changing system conditions

1

2 **Delivery Approach**

3 The approach is to build the registration and settlements changes in the existing IESO tools and
4 procure an external vendor to build a new auction engine. A new auction engine is required as
5 the existing DRA software is insufficient to support the new Capacity Auction functionality.

² See "A Benefits Case Assessment for the Market Renewal Project" by The Brattle Group, linked

Risk Assessment

The Capacity Auction project risks and mitigation strategies are developed in alignment with IESO's Enterprise Risk Management (ERM) framework³, the corporate process for conducting risk assessments. The ERM framework supports risk assessment, analysis, mitigation and monitoring.

The following are the key risks identified that still need to be managed as part of the Capacity Auction project. The IESO will continue to evaluate risks and appropriate mitigation plans throughout the project lifecycle.

Table 3: Risk Assessment

Risk	Inherent Risk level	Mitigation Plan	Residual Risk level
Market participants might be uncomfortable committing to the Capacity Auction with uncertainty on broader Resource Adequacy engagement.	Critical	IESO has initiated a Resource Adequacy engagement to consult with stakeholders on a comprehensive competitive acquisition strategy The strategy includes the Capacity Auction and a commitment to continue to run it on an annual basis and make incremental improvements (Status: Ongoing)	Low
Revenue uncertainty for participants due to the changeover from the current market to the renewed energy market), as the latter Capacity Auction commitment periods overlap with the renewed market.	High	Coordinate with MRP to communicate the following to market participants before go-live: 1) any changes to obligations into the energy market 2) impact to participants (Status : Ongoing)	High

³ See 2020-2022 IESO Business Plan Appendix 2: Enterprise Risk Management

Project Governance Structure

The project adheres to IESO's Project Management Lifecycle⁴ and associated project management controls. The Project Sponsor and Project Steering Committee (made up of key internal stakeholders) provide oversight of the project. The Project Sponsor also provides regular updates to the Chief Operating Officer and Vice President of Planning, Acquisitions and Operations.

⁴ See Exhibit E-1-2 for more detail on the Project Management Lifecycle

CAPITAL BUDGET OVERVIEW

The capital expenditure planning process, outlined in Exhibit E-1-2, establishes a capital envelope for core operating initiatives with commitments approved individually on an ongoing basis. Although many of the projects span multiple years, the IESO works within the approved capital expenditure envelope for each calendar year and prioritizes projects to support IESO's core strategies and to maintain the current capabilities of the business.

Table 1: Summary of 2019 Capital Results

Summary of 2019 IESO Capital Portfolio	2019 Capital Budget	2019 OEB Approved Capital Budget	2019 Actuals	2019 Variance to OEB Approved
Market Renewal Program Energy Stream (MRP)	\$26.0M	\$26.0M	\$10.3M	(\$15.7M)
MRP Capacity Stream - Incremental Capacity Auction	\$12.0M	-	-	(\$12.0M)
IESO Core Project Portfolio	\$17.3M	\$17.3M	\$20.6M	\$3.3M
Total	55.3M	\$43.3M	\$30.9M	(\$24.4M)

In 2019, the IESO received OEB approval for a capital budget of \$43.3 million, which was made up of \$17.3 million for core operations and \$26 million for MRP. Actual 2019 total capital expenditures were \$30.9 million, largely attributable to a deferral of a planned \$10 million MRP software procurement from late 2019 to 2020 (see 2019 MRP capital results below) and the cancellation of the Incremental Capacity Auction as described in the table above and in the IESO's 2019 Revenue Requirement Submission¹.

Working within the overall approved capital envelope, the IESO allocated available funds to core capital projects in order to accommodate four higher priority projects (Cybersecurity Monitoring, Network Performance Monitoring Diagnostic, Corporate PBX Phone Systems Refresh, and

¹ EB-2019-0002 Exhibit C-2-2 Update on Status of Incremental Capacity Auction

Capacity Auction) and deferring three projects (Oracle 12c Technical Refresh, IT Service Management and PMU Phase 3) resulting in an increase in core capital expenditures.

Table 2: 2019 MRP Energy Stream Capital Results

(In \$ Millions)	2019	2019	2019
	Actual	Budget	Variance
Compensation & Benefits	6.8	8.6	(1.8)
Professional & Consulting	2.5	4.4	(1.9)
Operating & Administration	0.9	10.1	(9.2)
Interest	0.1	0.2	(0.1)
Sub-Total	10.3	23.3	(13.0)
Contingency	-	2.7	(2.7)
Total Capital Expenses	10.3	26.0	(15.7)

Actual 2019 capital expenditures for the MRP were \$10.3 million, which was \$15.7 million lower than planned. This underspend included:

- the impacts of reduced estimates for resources to complete detailed design;
- delays in onboarding detailed design external support, and;
- a change in the payment structure for the Dispatch Scheduling Optimization (DSO) procurement (which moved a \$10 million upfront payment budgeted for 2019 into smaller milestone payments starting in 2020).

Table 3: Summary of IESO Capital Projects

Change Initiatives/Projects (\$ Millions)	2019 OEB Approved Capital Budget ²	2019 Actuals	2020 Minister Approved Capital Budget ³	2020 Actuals	2021 Capital Budget
Corporate PBX Phone Systems Refresh		\$0.4	\$1.2	\$0.9	
Operations Readiness Initiative (ORI Program)	\$0.3	\$0.9			
Wallboard Refresh	\$2.0	\$1.7			
Infrastructure Refresh Project	\$2.6	\$1.2			

² Reflects the OEB approved budget in EB-2019-0002

³ Reflects the budget included in the 2020-2022 Business Plan

Change Initiatives/Projects (\$ Millions)	2019 OEB Approved Capital Budget²	2019 Actuals	2020 Minister Approved Capital Budget³	2020 Actuals	2021 Capital Budget
FIT & microFIT Tool Redevelopment and Integration Project	\$0.2	\$1.1			
Aspen Refresh Project	\$0.2	\$0.0			
IESO Simulator Project – Phase 2	\$0.3	\$0.1			
Wide Area View	\$0.5	\$0.7		\$0.1	
Tier 1 Storage Refresh	\$0.1	\$1.7			
Control Room Upgrade	\$1.5	\$0.4			
IT Service Management (ITSM)	\$0.2				
Oracle 12c Technical Refresh	\$1.4				
PMU Phase 3	\$1.0				
Replacement of the Settlement Systems	\$1.5	\$0.8	\$8.4	\$8.3	\$8.8
SCADA/Energy Management System (EMS) Upgrade			\$5.7	\$5.8	\$5.6
Data Excellence Program			\$0.5	\$0.5	\$1.3
Dispatch Data Management Systems Refresh	\$0.7	\$1.0	\$1.5	\$1.5	\$0.1
External Identity Management (Portal)		\$0.1	\$1.1	\$0.8	\$0.3
Cybersecurity Monitoring		\$1.6	\$0.5	\$0.5	
Network Performance Monitoring and Diagnostic		\$0.9	\$0.3	\$0.4	
Enabling Resources to Deliver on Capacity / Participate in Markets					\$0.5
Addressing Market Surveillance Panel (MSP) Recommendations					\$1.8
Data Warehouse					\$0.5
Dynamic Limits in Real-Time					\$1.1
New Capacity/Resource Acquisition Initiatives					\$1.0
Intrusion Prevention System (IPS) Refresh				\$1.1	
Capacity Auction		\$3.7		\$1.8	\$0.1

Change Initiatives/Projects (\$ Millions)	2019 OEB Approved Capital Budget ²	2019 Actuals	2020 Minister Approved Capital Budget ³	2020 Actuals	2021 Capital Budget
			\$1.7		
Wide Area Visualization Environment (WAVE) - Phase 2			\$0.5	\$0.2	\$1.2
Centralized Alarm Management System Replacement					\$2.5
Subtotal: Capital Projects (\$1 million and above)	\$12.5	\$16.3	\$21.4	\$21.9	\$24.8
Other Initiatives/Projects (Less than \$1 million)	\$4.8	\$4.3	\$4.2	\$5.1	\$7.8
Total Core IESO Capital Portfolio	\$17.3	\$20.6	\$25.6	\$27.0	\$32.6
Market Renewal Program	\$26.0	\$10.3	\$25.9	\$25.0	\$36.0
Total Capital Including Market Renewal	\$43.3	\$30.9	\$51.5	\$52.0	\$68.6

2020-2021 Capital Budget

In 2020, core operations capital spending was directed toward projects to replace or upgrade aging systems and infrastructure, including carryover of in-flight projects from 2019 including:

- Replacement of the Settlement Systems;
- Supervisory Control and Data Acquisition (SCADA)/Energy Management System (EMS) Upgrade; and
- The Dispatch Data Management Systems Refresh projects.

In 2020, the IESO budgeted a \$25.6 million capital envelope to work on a number of priority projects under the core IESO capital portfolio, however, the required inclusion of the Intrusion Prevention System, a net new high priority project and slightly higher than anticipated spending on other carry-over projects resulted in capital spend of \$27.0 million in 2020 for an overall variance of \$1.4 million.

In 2020 MRP capital spend was \$25.0 million, which was \$0.9 million lower than planned. Spending was lower than planned due to the delayed onboarding of implementation resources (including the external vendor for the DSO tool development) and unused contingency. For additional information on the MRP see Exhibit G-2-1 - MRP Cost Report. For more information

on projects that are underway, the capital spent to date and capital budget allocation in 2021 see Exhibit E-2-2 - Progress on Previously Approved Capital Projects.

The proposed capital funding envelope for 2021 is an increase in capital funding from 2020 to support projects designed to enable a more competitive electricity marketplace and ensure system reliability. These include the final implementation phase of MRP, Enabling Resources to Deliver on Capacity/Participate in Markets, Addressing Market Surveillance Panel Recommendations, Dynamic Limits in Real-Time project, New Capacity/Resource Acquisition initiatives, Data Warehouse and Centralized Alarm Management System (CAMS) Replacement project.

Material Capital Projects

In the OEB's Decision on the IESO's 2019 Revenue Requirement Submission (EB-2019-0002), the OEB ordered that:

"a materiality threshold of \$4 million is appropriate for the IESO. For clarity, the materiality threshold applies to the total cost of multi-year projects, not just the spending in the year for which the IESO is seeking expenditure approval."

As per the 2019 Decision, the IESO has listed material capital projects that are planned over the business planning timeframe and whose total capital budget is in excess of the IESO's \$4 million materiality threshold in the table below.

Table 4: Material Capital Projects

Material Capital Projects (\$ Millions)	2019 OEB Approved Capital Budget	2019 Actuals	2020 Minister Approved Budget	2020 Actuals	2021 Capital Budget	2022 Capital Budget
Market Renewal Program	\$26M	\$10.3M	\$25.9M	\$25M	\$36M	\$42M
Replacement of Settlement Systems	\$1.5M	\$0.8M	\$8.4M	\$8.3M	\$8.8M	\$10.9M
SCADA/EMS Upgrade	\$0.0M		\$5.7M	\$5.8M	\$5.6M	\$0.6M
Capacity Auction		\$3.7M	\$1.7M	\$1.8M	\$0.1M	
CAMS Replacement		\$0.0M	\$0.4M	\$0.0M	\$2.5M	\$1.1M

Total Material Capital Projects	\$27.5M	\$14.8M	\$42.1M	\$40.9M	\$53M	\$54.6M
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Additional business case information for the material capital projects can be found in the referenced attachments:

- Market Renewal Program - Exhibit G-2-1 - Market Renewal Program Cost Report; and Exhibit G-2-1, Attachment 1 - Market Renewal Program Energy Stream Business Case
 - The Market Renewal Program is a project to implement reforms to the Ontario electricity market. The expected benefits will span the sector, enabling the IESO to realize significant operational improvements, reduce costs for market participants, address known inefficiencies, and establish a robust market to integrate emerging and new technologies.
- Replacement of Settlement Systems – Exhibit E-2-1, Attachment 1 - Material Capital Projects
 - The RSS project is a strategic project that will sustain and integrate IESO's settlements services by addressing limitations with the existing settlement solution, create transparency and efficiencies in the process to address settlement statement disagreements, and enable the implementation of the new settlement design requirements required to deliver settlements for the MRP.
- SCADA/EMS Upgrade – Exhibit E-2-1, Attachment 2 - Material Capital Projects,
 - An EMS is a system of computer-aided tools used by operators of electric utility grids to monitor, control, and optimize the performance of the generation or transmission system. This project will extend the life of current SCADA/EMS solution and will make changes to the Automatic Generator Control tool.
- CAMS Replacement – Exhibit E-2-1, Attachment 3 - Material Capital Projects,
 - CAMS is used to collate and manage events from IT systems and present operators with informational alarms. CAMS is used extensively by control room staff as well as IT Operations. This project will replace the existing underlying

1 infrastructure, software and business logic that currently forms the CAMS
2 solution.

- 3 • Capacity Auction – Exhibit E-2-1, Attachment 4 - Material Capital Projects,
 - 4 ○ The IESO acquires adequate quantities of capacity to meet peak demand under
 - 5 various system conditions identified by IESO planning outlooks. The Capacity
 - 6 Auction project creates a market-based mechanism that secures incremental
 - 7 capacity to help ensure that Ontario's reliability needs are met in a cost-effective
 - 8 manner.

PROGRESS ON CAPITAL PROJECTS

The following table provides an update on in-flight capital programs and projects previously approved, including approved amounts and spending to date. The table includes both material capital projects and those capital projects that fall under the IESO's materiality threshold¹ with the exception of the Market Renewal Program (MRP). More details on MRP can be found at Exhibit G-2-1.

Table 1: Status Update on Capital Projects

Change Initiatives/Projects (\$ Millions)	Status	2019 OEB Approved Capital Budget	2019 Actuals	2020 Minister Approved Capital Budget	2020 Actuals	2021 Capital Budget	Status Notes
Corporate PBX Phone Systems Refresh	Completed		\$0.4M	\$1.2M	\$0.9M		Project completed in 2020.
Operations Readiness Initiative	Completed	\$0.3M	\$0.9M				Project completed on budget.
Wallboard Refresh	Completed	\$2.0M	\$1.7M				Project completed under budget.
Infrastructure Refresh	Completed	\$2.6M	\$1.2M				Project completed under budget.
FIT & microFIT Tool Redevelopment and Integration	Completed	\$0.2M	\$1.1M				Variance primarily due to including the scope of another related project.
Aspen Refresh	Completed	\$0.2M	\$0.0M				Project completed ahead of schedule.
IESO Simulator - Phase 2	Completed	\$0.3M	\$0.1M				Project completed under budget.
Wide Area View Environment	Completed	\$0.5M	\$0.7M		\$0.1M		Increase in project cost due to changes required to meet new NERC standards requirements.
Tier 1 Storage Refresh	Completed	\$0.1M	\$1.7M				Additional capital expenditure was advanced to meet high priority needs.
Control Room Upgrade	Completed	\$1.5M	\$0.4M		\$0.5M		Project completed under budget.
IT Service Management	Completed	\$0.2M	\$0.0M				Project completed under budget.
Cybersecurity Monitoring	Completed		\$1.6M	\$0.5M	\$0.5M		High priority project not anticipated in the 2019 business plan.
Network Performance Monitoring	Completed		\$0.9M	\$0.3M	\$0.4M		High priority project not anticipated in the 2019 business plan.

¹ IESO materiality threshold set at \$4 million total capital cost of project, as per OEB Decision and Order, EB-2019-0002, December 5, 2019.

Change Initiatives/Projects (\$ Millions)	Status	2019 OEB Approved Capital Budget	2019 Actuals	2020 Minister Approved Capital Budget	2020 Actuals	2021 Capital Budget	Status Notes
Diagnostic Taps – Phase 1							
Oracle 12c Technical Refresh	Deferred to 2021	\$1.4M	\$0.0M				Project deferred to 2021 due to other higher priority work.
PMU Phase 3	Deferred to 2023	\$1.0M	\$0.0M				Project deferred to 2023 due to other higher priority work.
Replacement of the Settlement Systems	In-Flight	\$1.5M	\$0.8M	\$8.4M	\$8.3M	\$8.8M	Project progressing according to the project plan with an expected in-service date of April 2025 and an overall capital cost of \$36.8M ² .
SCADA/EMS Upgrade	In-Flight	\$0.0M		\$5.7M	\$5.8M	\$5.6M	Project progressing according to the project plan. The project has an expected in-service date of February 2023 and overall capital cost of \$14.3M ³ .
Data Excellence Program	In-Flight			\$0.5M	\$0.5M	\$1.3M	Program remains on schedule and on budget with an expected completion date of December 2022 and overall capital cost of \$3M.
Dispatch Data Management Systems Refresh	In-Flight	\$0.7M	\$1.0M	\$1.5M	\$1.5M	\$0.1M	The minor variance in 2019 reflects an earlier than anticipated start for the project. The project has an overall capital cost of \$2.6M.
External Identity Management	In-Flight		\$0.1M	\$1.1M	\$0.8M	\$0.3M	The project is expected to complete in Q4 2021 for a total overall capital cost of \$1.4M.
Capacity Auction	In-Flight		\$3.7M	\$1.7M	\$1.8M	\$0.1M	Introduced in 2019 after cancellation of MRP Capacity work stream and ICA. This unanticipated expenditure was offset by a capital underspend on the Market Renewal Program. The project has an expected in-service date of

² See Exhibit E-2-1, Attachment 1 for more detail

³ See Exhibit E-2-1, Attachment 2 for more detail

Change Initiatives/Projects (\$ Millions)	Status	2019 OEB Approved Capital Budget	2019 Actuals	2020 Minister Approved Capital Budget	2020 Actuals	2021 Capital Budget	Status Notes
							Q3 2021 and a total capital cost of \$5.6M ⁴ .
Wide Area Visualization Environment -Phase 2	In-Flight			\$0.5M	\$0.2M	\$1.2M	The project has an expected in-service date of Q4 2024 and a total capital cost of \$3.2M.
Centralized Alarm Management System Replacement	In-Flight		\$0.0M		\$0.0M	\$2.5M	The project has an expected in-service date of Q4 2022 and a total capital cost of \$5M ⁵ .
Enabling Resources to Deliver on Capacity/Participate in Markets	Planned					\$0.5M	
Addressing Market Surveillance Panel Recommendations	Planned					\$1.8M	
Data Warehouse	Planned					\$0.5M	
Dynamic Limits in Real-Time	Planned		\$0.0M		\$0.0M	\$1.1M	
New Capacity/Resource Acquisition Initiatives	Planned					\$1.0M	
Network Performance Monitoring and Diagnostic – Phase 2	Planned					\$0.0M	

⁴ See Exhibit E-2-1, Attachment 4 for more detail

⁵ See Exhibit E-2-1, Attachment 3 for more detail

GROSS ASSETS AND AMORTIZATION

The IESO's gross assets reflect tangible capital assets recorded at cost, including 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.

Asset additions represent assets under construction that are placed in service during the budget period, including some capital projects listed in Appendix 3 of the 2020-2022 Business Plan (Exhibit B-1-2), in accordance with their expected in-service date. Assets under construction generally relates to the cost of physical facilities, information technology hardware and software, and includes amounts 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.

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 of tangible capital assets are subject to periodic review, as described in Exhibit E-1-1 - Asset Management Process Overview. The effects of changes in the estimated lives are amortized on a prospective basis. Amortization of new asset additions is also according to assigned service lives and the in-service date available during business plan development. The in-service dates are determined as part of the Capital Expenditure Planning Process (see Exhibit E-1-2).

Any gains and losses on sales or premature retirements of tangible capital assets are charged to operations. There were no gains or losses on retirement of tangible assets in 2020 and there are none in the 2021 budget.

1 **Amortization Expense**

2 The budgeted costs of tangible capital assets expected to be in service are amortized on a
3 straight-line basis over their estimated service lives. The 2020-2022 Business Plan amortization
4 is based on a projection of ongoing amortization of existing assets budgeted to be completed as
5 of January 1, 2021 and the projected amortization of new asset additions after January 1, 2021
6 in accordance to the projected in-service dates and service life determined during the capital
7 expenditure planning process. The budgeted average service life of existing and new assets, as
8 reflected in Attachment 1- Service Life Comparison and Amortization Expense to this exhibit, is
9 in line with the 2019 and 2020 average.

10 The 2020 amortization expense is \$17.6 million for existing assets and \$2.0 million associated
11 with new assets placed into service throughout the year.

12 The 2021 amortization budget is comprised of \$17.8 million for existing assets and \$1.3 million
13 for new additions coming into service. New additions are mostly driven by amortization of the
14 Capacity Auction project with a projected service life of 5 years and a total capital value of
15 \$5.5 million.

FORECAST VARIANCE DEFERRAL ACCOUNT

The IESO's operating reserve is used to fund operations in the event of revenue shortfalls or unanticipated expenditures and helps minimize rate fluctuations to market participants as the result of such events. The balance of the operating reserve is recorded in the Forecast Variance Deferral Account (FVDA).

The IESO's revenue requirement is a fixed amount approved by the OEB with 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, a variance between the forecast withdrawals and actual withdrawals is to be expected. Therefore, it is also expected that there will be some variance between actual revenues and expenses and the OEB-approved revenue requirement. This variance is reflected as either a deficit or surplus in the IESO's core operation financial results. Surplus variances are collected in the IESO's operating reserve and recorded in the FVDA. Deficit variances draw on the operating reserve and are similarly recorded in the FVDA.

In the OEB's 2019 Decision on the IESO's 2019 Revenue Requirement, the IESO received approval to retain an operating reserve of \$10 million. The OEB concluded that a period of stability was appropriate and ordered that the level of the operating reserve would not be reviewed again for five years unless there was a material change to the IESO's operations. The IESO's practice is to seek OEB approval to return any surplus in excess of the reserve threshold of \$10 million to market participants. The IESO's operating reserve and balance in the FVDA as of January 1, 2021 is \$1.3 million. Currently, there is no reasonable prospect that the FVDA balance will be in surplus beyond \$10 million at the end of 2021.

Balance of the Forecast Variance Deferral Account

In the IESO's 2019 revenue requirement submission a \$4.7 million deficit balance was recorded in the FVDA. In 2019 and 2020, the IESO's core operations were in a surplus position resulting in a \$3.7 million and \$2.3 million surplus, respectively. These operating surpluses accumulated in the FVDA which, as of January 1, 2021, has a balance of \$1.3 million.

1 The table below provides the historical balances and operating variances through the FVDA:

2 **Table 1: 2019 -2021 balances and transactions through the FVDA**

Operating Reserve Balance (FVDA)	2019 Actual	2020 Proposed	2021 Proposed
Opening Balance	(4.7)	(1.0)	1.3
Core Operations Surplus	3.7	2.3	-
Closing Balance	(1.0)	1.3	1.3

3

4 **Operating Reserve Recovery**

5 In early 2020, in response to the emergence of the COVID-19 pandemic, the IESO revisited its
6 2020-2022 Business Plan in light of evolving system and sector needs and reduced its revenue
7 requirement. This decision included deferring the planned recovery of the depleted operating
8 reserve. The current balance of the FVDA is \$8.7 million lower than the OEB approved funding
9 level. The IESO has proposed a 2020 revenue requirement that would retain the 2020
10 operating surplus of \$2.3 million in the FVDA as an incremental first step towards the recovery
11 of the IESO's depleted operating reserve. An operating reserve recovery approach will be
12 evaluated as part of the next business plan filing and subsequent revenue requirement
13 submission.

14 Given the scope and complexity of its mandate, the IESO recognizes the potential for additional
15 unplanned events that may be material in scope and cost. When costs exceed the current level
16 of the operating reserve the IESO has to fund these events by either reducing invested funds or
17 increasing borrowings, both of which have net interest impacts that negatively effect market
18 participants. While not having a fully funded operating reserve does introduce the above noted
19 risks, the IESO is confident in its ability to manage operational challenges that may arise in the
20 short term to minimize the impact on market participants until such time as the \$10 million
21 operating reserve can be restored.

SUMMARY OF RESPONSES TO OEB DECISIONS AND POLICY INITIATIVES

This exhibit includes specific reference to prior OEB decisions and/or settlement agreements with outstanding commitments that directed the IESO to provide information or undertake specific studies, analysis or engagements.

Enhanced 2020-2021 Submission

In the OEB's Decision on the IESO's 2019 Revenue Requirement the OEB identified enhancements to IESO's future rate applications such as better information on the calculation of the revenue requirement and confirmed the IESO's commitment to provide enhanced clarity on the IESO's Adjustment Account. The information on the calculation of the IESO's revenue requirement is filed at Exhibit C-1-1 - Revenue Requirement and Usage Fee Methodology. The enhanced clarity on the IESO's Adjustment Account can be found at Exhibit G-1-2.

In addition, in response to the 2019 OEB Decision and intervenor comments, the IESO has re-organized its overall filing to improve transparency and provide additional information where it would assist with the regulatory review process.

IESO Materiality Threshold

In the OEB's 2019 Decision, the OEB concluded that a materiality threshold of \$4 million was appropriate for the IESO. The OEB found that for any project that exceeds this materiality threshold, the IESO will provide business case information that includes: the purpose of the project, the outcomes that the IESO is expecting, the rationale to proceed with the project, options considered, the approach to completing the project, a risk assessment, and the governance for the project including performance reporting.

The above information for all of the IESO's core capital projects that exceed the IESO's materiality threshold can be found in Exhibit E-2-1, Attachments 1-4. See Exhibit G-2-1 for the Market Renewal Program capital project.

1 2019 OEB Decision and Order (EB-2019-0002)

2 In the OEB's EB-2019-0002 Decision and Order on the IESO's 2019 Revenue Requirement and
3 Fees the OEB ordered that:

4 1. The IESO shall file a business case for the Market Renewal Program with its application
5 for 2020 expenditures, revenue requirement and fees.

6 Response: See Exhibit G-2-1 Market Renewal Program (MRP) Cost Report, Attachment 1 - MRP
7 Energy Stream Business Case.

8 2. The IESO shall develop an overall baseline budget and schedule for each year of the
9 Market Renewal Project, and include Cost Project Index and Schedule Performance Index
10 metrics against this baseline schedule and budget in its 2020 Application, and in subsequent
11 applications as applicable.

12 Response: See Exhibit G-2-1 MRP Cost Report, Attachment 2 - MRP Baseline Schedule.

13 3. The IESO shall, as part of all future expenditures, revenue requirement, and fees
14 applications, report on the progress made towards reaching the 50th percentile for total
15 compensation.

16 Response: See Exhibit D-1-3 - Staffing and Compensation.

17 4. The IESO shall dispose of the 2018 year-end balance in the forecast variance deferral
18 account amounts in excess of the approved \$10 million operating reserve, if the balance is
19 in a credit amount in favour of customers, in the manner proposed in the application.

20 Response: The IESO's forecast variance deferral account at 2018 year-end was less than the
21 approved \$10 million operating reserve level. Since then, the account balance has also
22 remained below the \$10 million approved operating reserve level. See Exhibit F-1-1 - Forecast
23 Variance Deferral Account for more detail.

24 5. The IESO shall rebate or charge market participants the difference between the IESO
25 usage fees approved in item 1 of this Order and the interim usage fees they paid in 2019, if
26 any, in the manner proposed in the application.

27 Response: The IESO charged the difference between the IESO usage fees approved in the 2019
28 Decision and the interim fees paid in 2019 at the end of December 2019, the month in which
29 the IESO received approval for its 2019 usage fees.

2018 Settlement Agreement (EB-2018-0143)

1. Auditor General Recommendations

To increase transparency and accountability, the IESO agreed to include a status report on certain recommendations to the IESO included in Chapter 3 of the Auditor General's 2017 Annual Report related to market oversight and cybersecurity (Attachment 1 to the Settlement Agreement). The IESO agreed to file an updated status report in the same format with the OEB each year in its revenue requirement submission or by June 1st, whichever is earlier, until one year after all recommendations have been addressed.

Response: See Exhibit G-2-2 for the IESO's response to the Auditor General's recommendations.

2. Timing of Filing of Revenue Requirement Submission

As part of the 2018 Package Settlement, the IESO agreed to do all it reasonably could to ensure that it filed a full revenue requirement submission 60 days before the beginning of the fiscal year as set out in section 25 (1) of the *Electricity Act, 1998*.

Response: The IESO has investigated the potential for a multi-year application and discussed an approach with stakeholders and with staff at the Ministry of Energy, Northern Development and Mines. On April 28, 2021, the Interim President & CEO of the IESO received a letter from the Minister of Energy, Northern Development and Mines (Minister) approving the 2020-2022 Business Plan, which included the Minister's support for a new multi-year approval process for future business plans. As requested by the Minister, the IESO will work the Minister's staff and the OEB on further exploring the implementation of a new approval process.

3. Transmission Losses Engagement

As part of the 2018 Package Settlement the IESO agreed to engage with stakeholders regarding the IESO's transmission losses work/report (similar to the 2017 engagement the IESO undertook on the development of its regulatory scorecard), including a discussion of the transmission losses processes used by National Grid UK, the recommendations of the Council of European Energy Regulators, and methodologies to assess the cost effectiveness of transmission loss reduction measures.

Response: The IESO launched the Transmission Losses stakeholder engagement to review IESO and Hydro One's practices on how transmission losses are considered in planning and operation

1 of the system, a comparison of these practices to those used in other jurisdictions, and seek
2 stakeholder feedback on potential improvements to these practices¹. The implementation of
3 this engagement was in accordance with the IESO's engagement principles².

4 The first Transmission Losses stakeholder engagement was held in September 2019³. Following
5 a delay due to the COVID-19 pandemic and in response to stakeholder feedback on how to
6 improve the engagement's process, a second stakeholder meeting was held in September
7 2020⁴.

8 As part of the September 2020 engagement session, the IESO, with Hydro One's assistance,
9 prepared supporting materials that informed stakeholders on how transmission system losses
10 are considered during planning of the transmission system in Ontario.

11 The IESO and Hydro One have agreed to document and outline each organization's internal
12 guidelines and processes on transmission losses. The IESO expects to present its transmission
13 losses guidelines document in advance of the next stakeholder session. The IESO will then
14 finalize its transmission losses guidelines following consideration of stakeholder feedback.

¹ <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Transmission-Losses>

² <https://www.ieso.ca/en/sector-participants/engagement-initiatives/overview/engagement-principles>

³ <https://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/tl/transmission-losses-20190906-presentation.ashx>

⁴ <https://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/tl/tl-20200930-presentation.ashx>

IESO ADJUSTMENT ACCOUNT

The IESO Adjustment Account is established by the Market Rules to (i) receive and disburse payments related to penalties, damages, fines, and payment adjustments arising from resolved settlement disputes and (ii) reimburse the IESO for associated costs. The Market Rules provide that any balance remaining in the Adjustment Account may be retained within the account, applied to special education projects or initiatives or be distributed to market participants on a basis determined by the IESO Board of Directors (IESO Board).¹

Activities and Reimbursement

The IESO's Market Assessment and Compliance Division (MACD) conducts the bulk of the activities that lead to the payments deposited into the account². MACD enforces the Market Rules and makes determinations on whether market participants and the IESO are in compliance with them. These determinations can lead to market participants or the IESO being ordered to pay penalties. In addition, payment adjustments may arise from resolved disputed enforcement matters. These monies are deposited into the Adjustment Account, as prescribed by the Market Rules.

Associated costs with respect to Adjustment Account activities are recovered through the IESO's expense reimbursement mechanism. These reimbursements fund MACD's enforcement and compliance activities, as well as work conducted by the Settlements unit that leads to the resolution of settlement disputes.

Surplus and Disbursements

The IESO annually reviews any surplus in the IESO Adjustment Account which remains after reimbursement, to determine allocation of funds for annual review by the IESO Board. The

¹ Market Rules, Chapter 9, section 6.18.6.

² Other IESO business units such as IESO Legal Services and Settlements divisions perform complementary and ancillary functions related to enforcement of the Market Rules

IESO Board may direct that some or all of the surplus be disbursed to the market and market participants or used for special education projects or initiatives.

Special education initiatives which have received disbursements from the surplus funds have focused on explaining how the market price is set, and how customers can take advantage of variable pricing. They have also included the development of educational materials, partnerships with associations and outreach across the province to hold business seminars about market prices and the Global Adjustment.

The inflows and outflows for the Adjustment Account in 2019 and 2020 are represented below:

Table 1: IESO Adjustment Account Inflows and Outflows (in thousands)

Transaction Description	Balance at December 31, 2018	2019 Net Cash Flow	Balance at December 31, 2019	2020 Net Cash Flow	Balance at December 31, 2020
Received from Market Participants as a result of penalties, fines, damages, and payment adjustments	\$188,252	\$32,240	\$220,493	\$2,766	\$223,259
Transferred to IESO	(\$23,438)	(\$8,585)	(\$32,023)	(\$10,673)	(\$42,696)
Returned to Market & all Market Participants	(\$136,248)	(\$10,282)	(\$146,530)	(\$7,504)	(154,034)
IESO Board Mandated Reserve	(\$20,000)		(\$20,000)		(\$20,000)
Available for future distribution (IESO or Market)	\$8,566	\$13,373	\$21,940	(\$15,411)	\$6,529

Disbursements directed by the IESO Board to the market and market participants are distributed to Loads and Exporters in Ontario based on consumption from the past six months.

The amounts transferred to the IESO are reimbursements as defined above. The Adjustment

1 Account holds an IESO Board mandated minimum reserve of \$20 million to support ongoing
2 enforcement activities.

3 **Tie-Ins To Strategic Objectives**

4 The Adjustment Account's reimbursement of MACD's enforcement and compliance costs
5 enhances MACD's independent ability to enforce the Market Rules, including enforcement of the
6 IESO's obligations. Access to this separate financial framework was highlighted in the Office of
7 the Auditor General of Ontario recommendations in 2017 as essential to the effectiveness of
8 MACD's role³. In addition, market enforcement needs cannot be reliably projected through
9 ordinary business planning cycles and processes. Where conduct arises which can negatively
10 impact Ontario ratepayers, including impacts on the reliability and efficiency of the province's
11 power grid, the availability of these funds is critical to remediation.

12 As evidenced by the accounting of inflows and outflows (see Table 1 above), nearly
13 \$150 million has been returned to the market as a result of these activities. Use of the
14 Adjustment Account for these purposes is a cost efficient way to deliver value for money.

³ http://www.auditor.on.ca/en/content/annualreports/arreports/en17/v1_306en17.pdf

MARKET RENEWAL PROGRAM COST REPORT

The Market Renewal Program (MRP) Cost Report is a separate cost centre related specifically to spending that was established through the IESO's 2017 Revenue Requirement Submission. The MRP will address known issues with the existing market design and deliver significant ratepayer value by meeting system needs more cost-effectively. Market renewal is about improving the way electricity is priced and scheduled in order to meet Ontario's electricity needs reliably, transparently, efficiently and at lowest cost.

MRP high level design began with two streams: the energy stream and the capacity stream (known as the Incremental Capacity Auction (ICA)). In July 2019, further work on the ICA portion of the program was stopped as a result of updated planning assumptions and in response to stakeholder feedback. In this cost report, MRP refers to the energy portion of the program.

Summary of Activities

Since posting the final high-level design documents in August 2019, the IESO has shifted its focus both internally and with its active stakeholder community on developing the specific changes and details required to implement these initiatives in the IESO-administered market.

High Level Design

To understand the impacts and ensure the new designs are both efficient and implementable, the IESO has worked closely with stakeholders since the program launched. A dedicated forum was established with cross-sector participation as well as individual stakeholder engagements. Education sessions, webinars, and tailored outreach enabled specific issues to be addressed for different stakeholder groups. The comprehensive engagement process ensured stakeholder feedback was incorporated into key design decisions and issues were addressed collaboratively.

The culmination of the high-level design phase was the publication of three high-level design documents for the MRP's Single Schedule Market, Day-Ahead Market and Enhanced Real-Time Unit Commitment projects. The high-level designs were developed based on agreed-upon

principles to balance the best theoretical design with practical realities faced by the IESO and market participants.

Detailed Design and Implementation

In August 2019 the detailed design stakeholder engagement began with the posting of the engagement plan. Since then the IESO has released 13 final detailed design documents, conducted 10 technical sessions and 9 webinars. In total the IESO received and responded to over 800 detailed and constructive comments from stakeholders. The final detailed design was published in January of 2021¹.

With the final detailed designed documents published, the focus is now to codify these designs into rules, manuals, processes and tools as part of the implementation phase. The IESO developed the first batch of MRP market rules and market manuals for stakeholder review. This first batch of rules, which addresses market entry and prudential security, was provisionally recommended by the IESO's Technical Panel in April 2021. Given the interconnected nature of the suite of MRP Market Rules, the IESO will not be seeking a formal recommendation from the Technical Panel until all of the Market Rules (5 batches in total) have been completed and reviewed by stakeholders.

In addition to the detailed design work and the development of Market Rules and manuals, the IESO also worked to create internal documentation, bring on vendor support, and begin solution development deliverables. Further, the IESO is beginning to engage stakeholders on the technical aspects of the changes Market Renewal will bring, including the training, testing, and market trial aspects of Implementation.

Response to OEB Decisions

In the OEB's Decision and Order in EB-2019-0002, the OEB established that:

- The IESO shall file a business case for MRP with its 2020 submission; and
- The IESO shall develop an overall baseline budget and schedule for each year of MRP, and include Cost Performance Index (CPI) and Schedule Performance Index (SPI)

¹ <https://www.ieso.ca/en/Market-Renewal/Energy-Stream-Designs/Detailed-Design>

metrics against this baseline schedule and budget in its next submission, and in subsequent applications as applicable.

MRP Business Case

With high-level designs complete, the IESO was in a position to deliver a detailed MRP Business Case (Attachment 1) that assesses the operational, reliability and financial benefits and costs associated with implementing the new energy market. The goal of the business case was to represent an accurate picture of the impacts of the MRP on the electricity sector in Ontario, supported by strong and verifiable evidence.

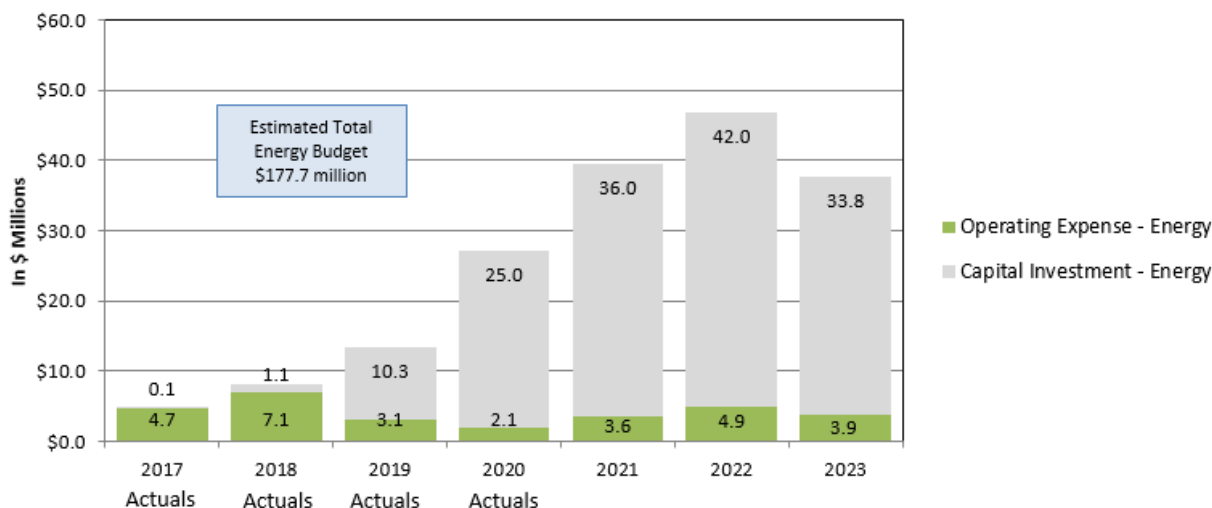
The MRP Business Case was approved by the IESO Board of Directors (IESO Board) on October 23, 2019. The business case estimates \$800 million in net system benefits expected to be realized in the first 10 years after implementation and a cost to deliver the project, including contingency, within a range from \$151 million to \$194 million.

Baseline Schedule and Budget

As the IESO transitioned from detailed design to implementation, it provided a natural point of review of the schedule, budget, and risks – a common practice based on project management principles. In March 2021, the IESO Board approved a revised budget and schedule, including a new go live date of November 2023 with six months of contingency. This baseline schedule incorporates lessons learned from the high-level and detailed-design phases of the project, makes best use of existing resources, while delivering a high-quality program.

The new go live date is an extension of eight months relative to the March 2023 go live date estimated in the MRP Business Case. The updated cost estimate for the delivery of MRP is \$177.7 million, including contingency, and within the estimated range in the 2020-2022 Business Plan. Please see the table below:

1 **Table 1: Updated cost estimate for MRP delivery**



2
3 The new schedule is a result of a number of factors, including the need to take into account
4 design considerations influenced by stakeholder feedback, vendor related constraints and the
5 resulting impact on the development of Market Rules and manuals.

6 The extension of the go live date will not affect the estimated \$800 million in net system
7 benefits. The projected value of MRP to the system, the sector and ultimately Ontario
8 consumers remains unchanged.

9 As of 2021, MRP has entered the implementation, and final, phase of the initiative. The baseline
10 schedule at Attachment 2 to this exhibit, reflects planned activities for 2021 through to the go
11 live date of the renewed market in November 2023. The schedule provides a summary of the
12 major pieces of work during the 2021 to 2023 timeframe. Underpinning these schedules are
13 detailed activities carried out by individuals or groups on a monthly, weekly, or daily basis as
14 applicable.

15 The baseline budget associated with the baseline schedule is outlined below. The budget is
16 divided by operating and capital costs. These costs are broken down into the main cost
17 categories of expenditure. Subsequent applications will report against this budget.

1 **Table 2: MRP baseline budget by operating and capital costs**

(In \$ millions)	2021 Budget	2022 Budget	2023 Budget
Operating Expenses			
Compensation & Benefits	2.6	3.6	3.0
Professional & Consulting	0.9	1.2	0.8
Operating & Administration	0.1	0.1	0.1
Total Operating Expenses	3.6	4.9	3.9
Capital Expenses			
Compensation & Benefits	13.3	14.1	12.1
Professional & Consulting	4.1	4.8	4.3
Operating & Administration	14.1	17.7	10.7
Interest	1.0	2.3	3.3
Contingency	3.5	3.1	3.4
Total Capital Expenses	36.0	42.0	33.8
Total MRP Expenses	39.6	46.9	37.7

2
3 **Performance Reporting**

4 The baseline schedule and budget represent the planned cost and schedule of the project and
5 are used as a standard against which actual performance is measured. The IESO reports on CPI
6 and SPI, against the MRP baseline budget and schedule. A value of 1.0 indicates that the cost
7 and/or schedule is tracking to baseline plan. An SPI under 1.0 indicates that the project is
8 behind schedule while a CPI under 1.0 indicates the project is overspent.

9 Below is the annual CPI and SPI for the MRP work performed in 2019 and 2020, which is
10 evaluated against the budget and schedule included in the business case for the detailed design
11 phase. As noted above, the baseline schedule and budget will apply to future CPI and SPI
12 reporting.

13 **Table 3: CPI and SPI for 2019 and 2020**

	2019	2020
<i>CPI</i>	1.63	0.90
<i>SPI</i>	0.81	0.86

The underspend in the CPI for 2019 was the result of cost savings and reduction in spending, which included reduced resources to complete the detailed design documents and delays for onboarding detailed design consultants. The SPI for MRP was below target due to delays associated with IT vendor contract negotiations and detailed design documents development, which impacted dependency tasks such as static testing and process design work.

The large variation in CPI from 2019 to 2020 is due to vendor costs that were planned for 2019 and not realized until 2020.

Project Governance

Governance of the MRP is provided by the IESO Board who approve business objectives and an envelope on schedule and budget. An Executive Steering Committee (ESC), comprised of the IESO Executive Leadership Team, works within this envelope to provide strategic direction to the project team and approve scope and delivery strategy. The ESC and the project team are supported by an advisory group comprised of senior leaders throughout the organization who provide guidance and direction for the successful delivery of the program.

2019 Budget and Actual Operating Expense and Capital Costs

Table 4: 2019 Operating Results

(In \$ Millions)	2019 Budget	2019 Actual	2019 Variance
Compensation & Benefits	1.5	1.7	0.2
Professional & Consulting	2.6	1.2	(1.4)
Operating & Administration	0.6	0.2	(0.4)
Total Operating Costs	4.7	3.1	(1.6)

2019 operating expenses are \$3.1 million, which was \$1.6 million lower than planned. The operating expense includes a slightly higher than budgeted effort to complete the business case, and is offset by the impacts of delays in adding resources to the program during the development of the detailed design, the deferral of external support required for Market Rule amendments.

Table 5: 2019 Capital Results

(In \$ Millions)	2019 Budget	2019 Actual	2019 Variance
Compensation & Benefits	8.6	6.8	(1.8)
Professional & Consulting	4.4	2.5	(1.9)
Operating & Administration	10.1	0.9	(9.2)
Interest	0.2	0.1	(0.1)
Sub-Total	23.3	10.3	(13.0)
Contingency	2.7	-	(2.7)
Total Capital Expenses	26.0	10.3	(15.7)

Capital spending for 2019 was \$10.3 million, which was \$15.7 million lower than planned. The capital expenses were lower due to reduced resources to complete detailed design, delays in onboarding detailed design external support, and a change in the payment structure for the Dispatch Scheduling Optimization (DSO) procurement which moved a \$10 million upfront payment budgeted for 2019 into smaller milestone payments starting in 2020.

Closure of Capacity Stream – 2019 Results

Capacity stream 2019 operating expenses were \$5.5 million, which was \$1.5 million lower than planned. High level design was completed earlier than planned and with fewer resources which resulted in underspend in the first half of the year. The underspend was partially offset by the closure of the capacity stream and \$0.7 million of the detailed design costs that were previously capitalized were reclassified as operating expenses and relevant components were transferred to the capital portion of the evolution of the demand response auction (\$0.8 million). Capital spending for 2019 was zero.

2020 Budget and Actual Operating Expense and Capital Costs

Table 6: 2020 Operating Results

(In \$ Millions)	2020 Actual	2020 Budget	2020 Variance
Compensation & Benefits	1.6	1.4	0.2
Professional & Consulting	0.4	0.5	(0.1)
Operating & Administration	0.1	0.1	-
Total Operating Costs	2.1	2.0	0.1

2020 operating expenses were \$0.1 million higher than planned. This increase is a result of an additional \$0.2 million in compensation and benefits for resources required for the implementation phase, including additional resources to support market manual and Market Rule drafting, and a \$0.1 million decrease in professional and consulting.

Table 7: 2020 Capital Results

(In \$ Millions)	2020 Actual	2020 Budget	2020 Variance
Compensation & Benefits	10.2	10.6	(0.4)
Professional & Consulting	2.7	2.8	(0.1)
Operating & Administration	11.8	11.8	-
Interest	0.3	0.4	(0.1)
Subtotal	25.0	25.6	(0.6)
Contingency	-	0.3	(0.3)
Total Capital Expenses	25.0	25.9	(0.9)

2020 capital spending was \$25.0 million, which was \$0.9 million lower than planned. Spending was lower than planned due to the delayed onboarding of implementation resources, including the external vendor for the DSO tool development.

2021 Budget Operating Expense and Capital Costs

Table 8: 2021 Budget Operating Expense

(In \$ millions)	2021 Budget
Compensation & Benefits	2.6
Professional & Consulting	0.9
Operating & Administration	0.1
Total Operating Expenses	3.6

Operating activities reflected in the planning period include Market Rule and market manual drafting, change management activities, training and documentation. The operating budget cost of this work is expected to be \$3.6 million in 2021.

Table 9: 2021 Capital Budget

(In \$ millions)	2021 Budget
Compensation & Benefits	13.3
Professional & Consulting	4.1
Operating & Administration	14.1
Interest	1.0
Contingency	3.5
Total Capital Expenses	36.0

Capital activities reflected in the planning period include the completion of the detailed design chapters (completed in Q1 2021), business requirement documentation and 2021 vendor costs for the DSO tool. The capital budget cost of this work is expected to be \$36 million in 2021, including contingency. This submission is requesting a capital budget for 2021 that is less than the IESO business plan.

Staffing Levels

The MRP staffing requirements include both incremental MRP core resources as well as MRP support resources from the IESO's core operations. A description of each of these resources is provided below.

- MRP core resources are resources assigned directly to the MRP, either through rotations from the IESO's core operations or external hires on temporary contracts.
- MRP support resources are resources within the IESO's core operations whose roles include supporting market development initiatives corporate wide, such as information and technology services, legal, finance, and human resources.

Table 10: 2019 – 2021 Full Time Equivalents

MRP FTEs	2019 OEB Approved	2019 Actual	2020 Actual	2021 Budget
Regular	35	36	36	45
Temporary	16	4	9	7
MRP Core FTEs	51	40	45	52
MRP Support FTEs	12	14	28	42
MRP FTEs Total	63	54	73	94

1 In 2019, the IESO delivered the detailed design chapters for the program using less resources
2 than in the OEB approved plan, which reflects in the CPI showing above 1. However, having
3 less resources resulted in the work taking longer than planned, which reflects in the SPI
4 showing below 1. In 2020, the program moved to the implementation phase which required
5 the addition of support resources. The 2021 budget reflects the core resources and support
6 resources that are needed to deliver on the planned work.

Market Renewal Program

Energy Stream Business Case

OCTOBER, 22 2019

Document ID Number: BC-165

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List of Abbreviations

Abbreviation	Description
CMSC	Congestion Management Settlement Credits
DAM	Day-Ahead Market
DD	Detailed Design
DSO	Dispatch Scheduling and Optimization
EDAC	Enhanced Day-Ahead Commitment Process
ERM	Enterprise Risk Management
ERUC	Enhanced Real-Time Unit Commitment
FTE	Full Time Equivalent
HLD	High-Level Design
HOEP	Hourly Average Energy Price
ICP	Intertie Congestion Price
IESO	Independent Electricity System Operator
IT	Information Technology
LDC	Local Distribution Companies
LMP	Locational Marginal Price
MCP	Market Clearing Price
MISO	Midcontinent Independent System Operator
MRP	Market Renewal Program
NPV	Net Present Value
NQS	Non Quick Start
OEB	Ontario Energy Board
RFP	Request For Proposals
RT-GCG	Real-Time Generator Cost Guarantee
SSM	Single Schedule Market

1. Executive Summary

The Independent Electricity System Operator (IESO) works at the heart of Ontario's power system. The IESO delivers key services across the electricity sector including: managing the power system, planning for the province's future energy needs, enabling conservation and designing a more efficient electricity marketplace to support sector evolution. To balance supply and demand¹ in real-time the IESO administers a wholesale electricity market to efficiently allocate resources from many suppliers under a wide range of system conditions. The design of the wholesale market is a critical factor in the ability of the IESO to meet its power system reliability objectives.

The Market Renewal Program Energy Stream presents an opportunity to implement much needed reforms to the Ontario electricity market. The expected benefits will span the sector, enabling the IESO to realize significant operational improvements, reduce costs for market participants, address known inefficiencies, and establish a robust market to integrate emerging and new technologies. A thorough financial assessment of the new market design has concluded that the program is financially viable, delivering at least \$750 million in net financial benefits to Ontario consumers over the first 10 years of implementation.

Today's Electricity Market

The wholesale electricity market was introduced in 2002 and designed to be a competitive market that would ensure power system reliability at lowest cost. The electricity market design was expected to deliver key advantages compared to the previous cost-based approach: transparent market rules to enable competition between existing and new suppliers; effective clearing prices that reflect the cost of producing power on an hourly basis; and an efficient way for the IESO to meet its reliability requirements in Ontario.

This market design has met many of its objectives and enabled the IESO to manage the grid reliably during an era of structural changes to Ontario's supply mix including the phase-out of coal fired generation and the emergence of new technologies and participants. However, the wholesale market design remains largely unchanged since 2002 while industry best practices have advanced. The challenges and complexity of Ontario's unique two-scheduling system results in a misalignment

¹ Demand refers to the amount of electricity required in Ontario at any given moment, or over a period of time. Demand is measured at the points where the load connects to the bulk electric system.

between price and dispatch and requires the IESO to rely on extensive out-of-market programs and payments to ensure reliability. This design has hindered opportunities to drive efficiencies and implement enhancements, including a day-ahead market that has proven effective in improving operational certainty and in reducing costs in electricity markets across North America and globally.

These market design issues are well-documented by the IESO, Ontario Energy Board's Market Surveillance Panel, Ontario's Auditor General and others. Considerable time and resources have been devoted to implementing one-off solutions that, at best, address individual issues, without fixing the underlying problem – the two-schedule system. It is for good reason that no other North American system operator uses a two-schedule system; all have implemented, or transitioned to a simpler design where prices and dispatch² are aligned and set by a single schedule. Without acting to fix these issues, the problems and inefficiencies associated with the current design will persist into the future, increasing costs for consumers and severely limiting the IESO's ability to effectively operate the grid.

Market Renewal Program

In 2016, the IESO launched a **Market Renewal Program** with a series of projects that will deliver a more efficient electricity market.

1. Replace the two-schedule market with a **Single Schedule Market** that will address current misalignments between price and dispatch, eliminating the need for most out-of-market payments.
2. Introduce a **Day-Ahead Market** that will provide greater operational certainty to the IESO and greater financial certainty to market participants, lowering the cost of producing electricity and ensuring we commit only the resources required to meet system needs.
3. Reduce the cost of scheduling and dispatching resources to meet demand as it changes from the day-ahead to real-time through the **Enhanced Real-Time Unit Commitment** project.

Any program that involves significant change has the potential to be both challenging and disruptive to the sector. To understand the impacts and ensure the new designs are both efficient and implementable, the IESO has worked closely with stakeholders since the program launched. A dedicated forum, the Market Renewal Working Group, was established with cross-sector participation as well as individual stakeholder engagements for each project. Education sessions, webinars, and tailored outreach, such as the Non-Emitting Resource Subcommittee, enabled specific issues to be

² Dispatch indicates the process by which the IESO directs the real-time operation of registered facilities to cause a specified amount of electric energy or ancillary service to be provided to or taken off the electricity system

addressed for different stakeholder groups. The comprehensive engagement process ensured stakeholder feedback was incorporated into key design decisions and issues were addressed collaboratively.

The culmination of the high-level design phase³ was the publication of three high-level design documents for the Energy Stream's Single Schedule Market, Day-Ahead Market and Enhanced Real-Time Unit Commitment projects. The high-level designs were developed based on agreed-upon principles to balance the best theoretical design with practical realities faced by the IESO and Market Participants.

Market Renewal Program Business Case

In 2017, the IESO commissioned an independent report⁴ assessing the potential benefits for market renewal. The report drew from past Ontario studies and the experience of jurisdictions that had implemented similar market changes. The top-down report highlighted the significant potential of the market reforms but was not based on specific design decisions, or a detailed knowledge of IESO operations.

Now that the Market Renewal Program is well underway and the high-level designs are complete, the IESO is in a position to deliver a detailed MRP Business Case that assesses the operational, reliability and financial benefits and costs associated with implementing the new energy market.

The goal of the Business Case was to represent an accurate picture of the impacts of the Market Renewal Program on the electricity sector in Ontario, supported by strong and verifiable evidence. The approach started with a thorough assessment of the potential benefits and how they would impact the IESO's ability to operate the system, enhance reliability and lead to more efficient outcomes. Through this exercise it became apparent that some benefits could be quantified with a high degree of certainty, whilst other benefits were very likely but the scale of benefits was uncertain and some benefits could only be assessed on a qualitative basis. To ensure a complete analysis, both the quantitative and qualitative benefits have been comprehensively assessed.

The reader should note that many of the benefits discussed qualitatively, such as reliability risk and future opportunities for greater participation and new technologies, are essential to the IESO's core functions and the long-term health of Ontario's electricity markets.

³ The program is structured into three major phases: 1) high-level design; 2) detailed design; and 3) testing and implementation.

⁴ The Future of Ontario's Electricity Market - A Benefits Case Assessment of the Market Renewal Project, The Brattle Group, April 20, 2017

The financial analysis focuses on a subset of benefits where there is a high degree of certainty, uses conservative assumptions, reflects stakeholder feedback, and includes characterizations of uncertainty where appropriate. The assessment also only focuses on the first 10 years of operation; however, the reforms being proposed and the corresponding benefits that will be accrued will last much longer.

Finally, unlike the 2017 report on potential benefits, this Business Case was developed by IESO staff, drawing on expertise from across the organization, ensuring the assessment was grounded using detailed knowledge and experience of the unique characteristics of the Ontario market.

Expected Benefits

The new energy market design, which moves away from the existing two-schedule market to a single schedule market with locational pricing, is expected to enhance reliability, increase operational certainty, and significantly reduce system costs paid for by consumers.

1. *Enhanced reliability*

The current two-schedule design relies heavily on two complex and costly out-of-market programs to ensure a reliable power system: the Real-Time Generator Cost Guarantee program and Congestion Management Settlement Credits. Experience from other markets shows that without these types of programs the reliability of Ontario's electricity system would be at risk⁵ and North American power system reliability standards would not be met.

Although these programs are necessary for reliability they are costly and administratively complex. In December 2017, the Auditor General released a report that was critical of these two programs⁶, drawing heavily from previous Market Surveillance Panel reports. Although the IESO has addressed individual issues as they have arisen, the Market Renewal Program Energy Stream is the fundamental change needed to replace these programs.

The introduction of a Single Schedule Market with locational prices aligned with dispatch will ensure resources are responding to the right incentives and price signals for dispatch, reducing costs and enabling better decision-making. The new design will ensure a greater share of system costs are reflected in market prices, eliminating the need for most out-of-market payments.

⁵ W.W. Hogan, "Electricity Market Restructuring: Reforms of Reforms," 20th Annual Conference Center for Research in Regulated Industries, Rutgers University, May 25, 2001.

⁶ http://www.auditor.on.ca/en/content/annualreports/arreports/en17/v1_306en17.pdf

2. Operational certainty for IESO and Market Participants

The implementation of a Day-Ahead Market will provide financially-binding schedules for participating resources one day in advance of operation. This will encourage all resources to participate more fully and efficiently in the day-ahead timeframe and will provide far greater clarity to the IESO on next day operations.

Enhanced Real-Time Unit Commitment will optimize the system with a look-ahead period of up to 27 hours, rather than the current 1-hour optimization, reducing the number of commitments⁷ to the benefit of the IESO, Market Participants and Ontario consumers.

3. Increased system efficiency

The Market Renewal Program Energy Stream will address known inefficiencies as well as create the conditions for a more efficient bulk electrical system⁸ including improved scheduling and dispatch, better use of Ontario's interties and competitive incentives for generators to reduce costs.

- Existing Ontario generators will benefit from a more transparent and competitive platform for their operating costs.
- Better scheduling and commitment of resources in the real-time operating timeframe delivering system-wide efficiency benefits of over \$500 million over the first 10 years of operating the new market design.
- Elimination of approximately \$450 million of unnecessary Congestion Management Settlement Credits over the first 10 years of operating the new market design. These benefits will accrue directly to Ontario consumers.

4. Address instances of gaming

Eliminating most out-of-market programs and payments will significantly reduce opportunities for gaming that have resulted in clawbacks⁹ of over \$360 million in recent years. In addition, instances of gaming have proven to be costly to recover, intrusive for business, litigious and have generally undermined confidence in the wholesale electricity market.

⁷ Commitment is the process of deciding when and which non-quick start resources should come online in order to maintain reliability and meet demand at lowest overall cost.

⁸ The Bulk Electricity System is defined as the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher.

⁹ A clawback refers to the recovery of money that has already been disbursed. Instances of gaming in Ontario's electricity market are investigated by the Market Assessment and Compliance Division (MACD) which is a ring-fenced business unit within the IESO.

5. Broader market benefits

The new design will be based on accurate locational prices that will provide valuable information to system planners, potential developers and investors on the state of the local grid and the cost of supplying or consuming power. In some parts of the province, such as northwest Ontario, the low cost of local, hydro generation is not reflected in the market price today. Moving to a Single Schedule Market will provide opportunities for customers and could positively impact future investment decisions.

6. Enabling future markets

Changes introduced by the new energy market design will provide a robust platform to address emerging power system needs:

- The Single Schedule Market design changes will ensure that costs are transparently reflected in price thereby enabling resources, including new technologies such as energy storage and demand response, to more actively participate in the market and make more informed decisions when supplying and withdrawing energy.
- Increased certainty from the changes introduced by the Day-Ahead Market will help all Market Participants manage risk and costs. Locking-in prices day ahead will reduce their exposure to real-time price volatility. Large consumers will have the option to register as price responsive loads and lock-in energy prices day ahead, reducing their exposure to real-time price volatility.

Taken together, the Market Renewal Program Energy Stream changes will create a more efficient and flexible platform that allows Ontario to better utilize its existing assets. The changes will also enable existing and future Market Participants to anticipate future needs and incentivize innovative solutions to meet emerging challenges.

Financial Assessment

As identified above, the Market Renewal Program Energy Stream is expected to deliver a range of significant benefits. For the purpose of the analysis only the elimination of unnecessary congestion management settlement credits and the market efficiencies were included as these could be quantified with the greatest certainty. Together, these two categories of benefits are expected to total approximately \$1 billion over the first 10 years of implementation.

The financial benefits associated with a day-ahead market, improved consumption and investment, hydro and system optimization, reduced gaming opportunities as well as those associated with future improvements and enabling greater and diverse market participation have not been quantified. These

benefits are expected to be real, but the scale of benefits will be influenced by many factors that make them difficult to predict with certainty.

Expected Costs

The cost of implementing the Market Renewal Program Energy Stream has been estimated at \$170 million (including \$16 million contingency) with a range of \$151 million to \$194 million based on best available information.

The post-implementation costs of the program over the following 10 years are expected to be an additional \$6 million. Based on a bottom-up estimating process, the Go Live date of the Market Renewal Program Energy Stream will be March 2023.

Net Present Value Calculations

The IESO developed an expected case along with low and high cases for the total expected benefits, and conducted a Net Present Value analysis using a range of benefits and costs for these cases.¹⁰ Based on this analysis, the Net Present Value for the Market Renewal Program Energy Stream has been assessed at \$290 million - \$450 million with a Benefits-to-Costs Ratio of 2.7 - 4.3. A strongly positive Net Present Value and a robust Benefits-to-Costs Ratio indicate the MRP Energy Stream is a financially sound program.

The analysis uses conservative assumptions and many potential benefits have not been quantified. Overall, the IESO is confident that the realized value of the Market Renewal Program Energy Stream will exceed the benefits that are presented in this Business Case.

Summary

The Market Renewal Program Energy Stream will fundamentally address long standing issues that have challenged the Ontario electricity market. Transitioning to a more efficient design will deliver benefits that far outweigh the costs of the program, even using conservative assumptions. The high-level designs are made-in-Ontario, but they are founded on proven concepts that have demonstrated their value many times over in multiple markets. The IESO is confident that implementation of the Market Renewal Program Energy Stream will benefit Ontario consumers well beyond the 10 years assessed in this Business Case.

¹⁰ Please see Chapter 5 for further information on the Net Present Value calculation including key assumptions

The IESO would like to thank stakeholders for their time, commitment and dedication to developing and implementing the Market Renewal Program which has only been possible through the collective input and expertise of the sector.

2. Background and Overview

2.1 The Need for the Market Renewal Program Energy Stream

As Ontario's system operator, the IESO is responsible for the reliability and security of Ontario's electricity grid, for administering Ontario's electricity markets, and for providing businesses, communities and consumers with reliable power where and when they need it. The IESO is committed to these responsibilities and has been achieving them through an open and transparent wholesale electricity market.¹¹

The fundamental objective of Ontario's electricity market, like all energy markets, is to allocate resources efficiently to maintain power system reliability at the lowest cost. This means that tools and incentives should align the physical system with market operations minimizing the need for operator intervention. However, the current tools and incentives do not effectively meet system or the IESO's requirements and have needed to be supplemented by out-of-market programs and payments.

In an ideal world, all system costs would be reflected in market prices ensuring participants can make the best possible decisions in the most transparent way. However, in practice the electricity system and all market participants cannot be perfectly modeled and there will be times when the system operator must intervene in the market for operational or reliability reasons. Despite the IESO using well defined procedures, the cost of these actions is not always visible to market participants creating uncertainty and risk. If these costs had been reflected in market prices suppliers and consumers may have made different decisions. Aside from this inefficiency, the recovery of these costs is important. In a market where the system operator makes many out-of-market actions and allocates costs after the fact, this will not incentivize participants to respond efficiently, and potentially not participate in the long run. Therefore, it is in the interest of the IESO, consumers and the province as a whole to ensure that out-of-market actions and payments are minimized and only used when absolutely necessary. By contrast, the current energy market design inherently relies on out-of-market payments, necessary for reliability, but costly to the market as a whole.

The present design has fundamental flaws:

- **Congestion Risk and Reliability:** The two-schedule design results in a risk that suppliers may not follow dispatch if prices are misaligned with offers to supply, creating an unacceptable reliability risk. In order to ensure resources follow dispatch based upon

¹¹ <http://www.ieso.ca/Corporate-IESO/Corporate-Strategy-and-Business-Planning/Corporate-Performance>

technical constraints, the IESO has used extensive out-of-market payments known as Congestion Management Settlement Credits (CMSC);

- **Operational Certainty:** the current design provides an incomplete operational view of both the day ahead and the operating day and as a result requires out-of-market cost guarantee programs to ensure resources are available when needed.

2.2 Congestion Risk and Reliability

The current market design is based on two pricing schedules:

1. A hypothetical process to determine a uniform market clearing price that ignores most physical constraints within Ontario. The purpose of the unconstrained schedule is to determine which resources are economic, independent of system conditions; and
2. A constrained dispatch schedule for each five-minute interval for Market Participants. This schedule does consider transmission constraints and other key operational constraints such as plant operating characteristics. This schedule is used to dispatch resources based on locational prices at each node¹² but crucially the locational prices are not used for settlement.

Under the current design, Market Participants are dispatched based on a locational price, but are settled on a uniform market price. Any mismatch between locational prices and the uniform market clearing price reflects the degree of congestion on the system. Congestion introduces a risk for Market Participants since the market clearing price may or may not be sufficient to recover their operating costs. If prices generated by the two schedules deviate significantly Market Participants may be deterred from following dispatch instructions creating a serious reliability concern.^{13,14}

The PJM market provides a cautionary tale on the severity of not managing congestion risk. At market opening, the original PJM market used a uniform price, like Ontario, but without constrained-off payments. Within a year the market had to be abandoned as generators self-scheduled creating a cascading effect that left the system operator unable to manage the power system reliably.

In New England, the original market based on a uniform price without constrained-off payments lasted a bit longer but only because the uniform price was set so low that no generators were constrained-off and many generators were paid to be constrained-on. New England quickly transitioned to locational pricing and a single schedule design.

¹² The locational price at the node is sometimes referred to as a "shadow" price.

¹³ See W.W. Hogan, "Electricity Market Restructuring: Reforms of Reforms", 20th Annual Conference Center for Research in Regulated Industries, Rutgers University, May 25, 2001, for a brief history of PJM's use of a uniform market price.

Since Market Participants are unable to hedge differences in prices resulting from real-time congestion, the only solution under the current two-schedule design is to rely on extensive out-of-market CMSC¹⁵ to keep them whole. These make whole payments ensure Market Participants follow dispatch instructions when pricing incentives are inaccurate and do not appropriately reflect system needs.

2.2.1 Congestion Management Settlement Credits

Since its inception, and in nearly all of its 30 monitoring reports to date, the Market Surveillance Panel of the Ontario Energy Board has commented on anomalous or unwarranted CMSC payments due to the two-schedule system and described in Section 2.2. No element of Ontario's wholesale electricity markets has attracted the attention and concern of the Market Surveillance Panel more

The current pricing design was originally intended to persist for only 18 months, as a transitional mechanism toward implementing a single-schedule system with locational marginal pricing (LMP) or "locational pricing."

than CMSC payments since market opening. Similar comments have been noted by the Electricity Market Forum, the IESO, stakeholders, and Ontario's Auditor General.^{16,17,18}

It is important to note that the Market Design Committee¹⁹ was a strong proponent for the eventual implementation of locational pricing. It emphasized that the "two-schedule" system should be temporary and had concerns that it would create inefficient and sometimes perverse incentives for generation, consumption, and investment decisions if kept in place for an extended period. It also noted that the benefits

of locational pricing could be substantial for Ontario, and developed recommendations for implementation.^{20,21,22}

¹⁴ See Market Surveillance Panel, "Congestion Management Settlement Credits (CMSC) in the IMO-Administered Electricity Market", for a brief discussion on New England's uniform pricing design.

¹⁵ CMSC consists of constrained-on and constrained-off payments to dispatchable Market Participants in order to manage localized supply/demand imbalances resulting from transmission constraints. In addition, the 3- times ramp rate multiplier, slow ramping of fossil-fired units and technical / regulatory limitations can each give rise to CMSC payments. CMSC payments can also be "self-induced" through, for example, voluntary ramping actions by dispatchable loads or generators.

¹⁶ <https://www.oeb.ca/utility-performance-and-monitoring/electricity-market-surveillance/panel-reports>, Accessed June 25, 2019

¹⁷ "3.06 Independent Electricity System Operator—Market Oversight and Cybersecurity" Office of the Auditor General of Ontario, 2017, pg. 328

¹⁸ Reconnecting Supply and Demand: How Improving Electricity Prices Can Help Integrate A Changing Supply Mix, Increasing Efficiency and Empowering Customers, Report of the Chair of the Electricity Market Forum, George Vegh, December 2011

¹⁹ The Market Design Committee drafted the initial comprehensive set of rules for the competitive market for electricity in Ontario from 1998 to 1999

²⁰ Market Design Committee, Second Interim Report, June 30, 1998, pg. 3-13.

Some CMSC payments are necessary such as those that enhance reliability. However, the CMSC construct creates incentives for unwarranted payments, manipulation and gaming and, as such, has been questioned by the Market Surveillance Panel, Auditor General and others. CMSCs have been exploited by all segments of the market at various times – generators, loads, exporters and importers. Over the years the IESO has addressed many individual issues, often referred to as one-off solutions but the fundamental problems with the two-schedule design persist, and CMSC payments will continue to be necessary unless the current design is replaced.

Aside from CMSC issues, the two-schedule system is very complex and these complexities have proven to be a barrier to evolving the market. For example, as long as the two-schedule system is in place the IESO will not be able to implement a financially-binding day-ahead market.²³ Without a financially-binding day-ahead market, there will not be a process to provide efficient incentives that ensure that all generation resources commit to providing energy and ancillary services ahead of the operating time frame.²⁴

2.3 Operational Certainty

2.3.1 Real-Time Uncertainty

When Ontario's electricity market was designed in the late 1990s, electricity markets were relatively new and day-ahead markets were not yet the common feature they are today. Although a voluntary day-ahead forward market for purely financial contracts was recommended prior to market opening²⁵, Ontario's electricity market was launched in 2002 without a day-ahead scheduling process.

The need for increased certainty prior to real-time emerged at the outset of the market as Ontario was facing tight supply conditions. The IESO began exploring the potential for a day-ahead market in 2003. However, despite significant effort, Ontario's unique two-schedule system proved to be a major barrier towards its implementation. As a result, the IESO opted for a second-best solution and introduced the Day-Ahead Commitment Process in 2006.

The Day-Ahead Commitment Process was improved through the Enhanced Day-Ahead Commitment Process (EDAC) project in 2011 to address some key issues with the original design. The schedule

²¹ Market Design Committee, Final Report, January 1999

²² First Interim Report of the Market Design Committee, March 31, 1998

²³ In 2003 the IESO did explore a day-ahead market but concluded that although it would be possible in theory, it would not be practical due to the complexity of the two-schedule design.

²⁴ The Future of Ontario's Electricity Market - A Benefits Case Assessment of the Market Renewal Project, The Brattle Group, April 20, 2017, pg. 2

²⁵ Market Design Committee, Final Report, January 1999

that results from today's day-ahead commitment process provides a view of what the next day looks like; however, due to the lack of financial commitment and the lack of exports participating, the day-ahead process remains sub-optimal.

The shortcomings of the EDAC process means that control room operators only have a partial view of the next day's operation, creating significant uncertainty and a reliance on forecasts and assumptions, rather than firm commitments. Control room operators have an obligation to prepare an operating plan one day ahead and must supplement the EDAC process with additional technical assessments. Operational certainty is critical for the IESO to maintain a reliable grid, but the lack of certainty from EDAC and inefficiencies with pre-dispatch and the Real-Time Generator Cost Guarantee (RT-GCG)²⁶ program means that most scheduling and operational decisions need to be managed within real-time. An incomplete view of the next day's demand and supply adds administrative burden when additional operational and reserve assessments are needed. The pre-dispatch and the RT-GCG program aid with scheduling in the hours before real-time; however, these tools are inefficient and make decisions that are short-sighted and costly.

The IESO maintains reliability by supplementing current processes by operator actions and out-of-market decisions. Although these actions are vital, the lack of transparency can create uncertainty for Market Participants and limit opportunities for new and emerging participants when these conditions arise.

2.3.2 Inefficiencies Associated with Unit Commitment

When today's market was being designed, Ontario had five coal-fired generating stations, comprised of 19 units totaling about 8,800 MW.²⁷ Scheduling such large conventional assets with known and predictable dispatchability meant that simpler commitment and scheduling tools would suffice.

Today the majority of Ontario's electricity production comes from a diversity of resources with less flexible operating characteristics and from assets that have less predictable fuel inputs (like wind and solar). Ontario's existing assets, in particular the natural gas-fired units, are able to provide the needed flexibility services in many hours, but those flexibility services often need to be handled through out-of-market mechanisms. While Ontario currently has a diverse fleet and is interconnected

²⁶ The Real Time-Generator Cost Guarantee (RT-GCG) program is a reliability measure that ensures sufficient generation is available to meet Ontario's demand for electricity. The program provides eligible resources the guaranteed recovery of certain start-up costs to the extent the costs could not be recovered through market revenues. Introduced as the Spare Generation Online Program in 2003 the program has evolved over time and is known today as the RT-GCG.

²⁷ "The End of Coal", Government of Ontario archived website, <https://www.ontario.ca/page/end-coal>, accessed August 21, 2019

to access resources in neighbouring systems through interties, the current market design and tools are unable to fully utilize these resources.

A key shortcoming of the existing pre-dispatch mechanism is that it only optimizes resource scheduling over one hour at a time. This approach is sub-optimal as it fails to recognize the operational linkages from hour to hour. Furthermore, the hourly optimization does not accurately take all generator costs into account. This means that the pre-dispatch optimization falls short in accurately assessing how to best to meet system needs, which is inefficient and leads to higher system costs.

Furthermore, Non-Quick Start (NQS)²⁸ resources can take significant time to start-up and must remain online for a minimum amount of time to avoid damaging equipment. In order to manage the lack of financial certainty that both the current day-ahead, pre-dispatch and real-time bring, the RT-GCG program was introduced to guarantee that NQS resources, when committed, will be scheduled to meet their physical requirements and will not have to operate at a loss if conditions change in real-time.

Unit commitment decisions in the RT-GCG program are currently based on energy costs alone looking out at a single hour, while the start-up and speed no-load costs of NQS resources are not taken into account. This means that a resource with lower energy costs but higher start-up costs may be committed over resources with lower total costs, resulting in inefficient outcomes. Another key concern of the program had been that start-up costs were able to be submitted after the fact, and a substantial audit of these costs had found several systemic issues and abuses of the program. While the RT-GCG program is an essential tool for meeting reliability needs its current design has also been criticized in several Market Surveillance Panel reports, as well as an Auditor General report, due to its inefficiency, costs and lack of transparency.^{29,30} Similar to the CSMCs, the IESO implemented solutions to manage and contain specific issues as they were identified. However, these changes could not address the root cause of the problem which is the current design optimizes using partial information, rather than all information. Until this fundamental issue is addressed the inefficiencies associated with unit commitment will persist.

²⁸ A Non-Quick Start resource is a generator with a lead time of at least one hour, and that must remain operating at its minimum loading point for its minimum generation block run-time.

²⁹ "3.06 Independent Electricity System Operator—Market Oversight and Cybersecurity" Office of the Auditor General of Ontario, 2017, pg. 328

³⁰ <https://www.oeb.ca/utility-performance-and-monitoring/electricity-market-surveillance/panel-reports>, Accessed June 25, 2019

2.4 MRP Energy Stream Scope and Structure

In 2016, the IESO committed to re-designing the market by leveraging the best practices in other jurisdictions while ensuring a made-in-Ontario approach. The MRP Energy Stream is a coordinated set

MRP Mission Statement

"Deliver a more efficient, stable marketplace with competitive and transparent mechanisms that meet system and participant needs at lowest cost."

of projects that will reform the electricity market with that aim to support reliable operations and address inefficiencies with the current design. It is also a unique opportunity for the IESO to use learnings from the experiences in other markets to build a more cost-effective Ontario electricity market.

The IESO worked with stakeholders to develop a core mission statement and a number of guiding principles to provide a framework for this re-design against which the MRP Energy Stream deliverables and engagement will be measured. The guiding principles included:

- **Efficiency:** lower out-of-market payments and focus on delivering efficient outcomes to reduce system costs
- **Competition:** provide open, fair, non-discriminatory competitive opportunities for participants to help meet evolving system needs
- **Implementability:** work together with our stakeholders to evolve the market in a feasible and practical manner
- **Certainty:** establish stable, enduring market-based mechanisms that send clear, efficient price signals
- **Transparency:** accurate, timely and relevant information is available and accessible to Market Participants to enable their effective participation in the market

The MRP Energy Stream has three projects as shown below in

Figure 2-1.

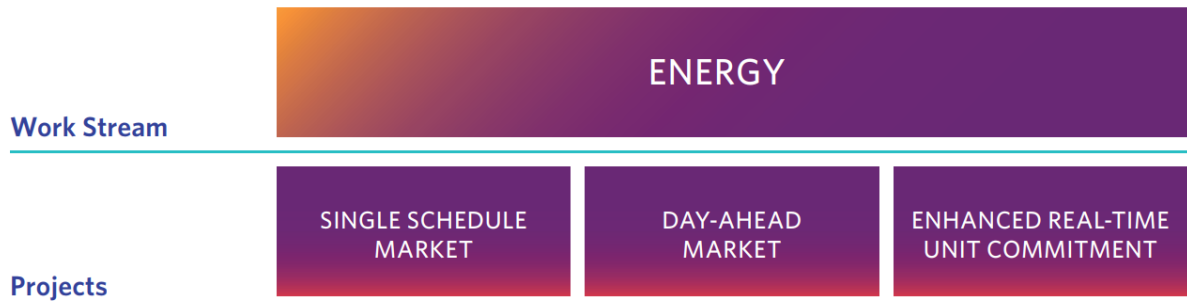


Figure 2-1: The MRP Energy Stream Structure

- The Single Schedule Market (SSM) which will address misalignments between price and dispatch
- The Day-Ahead Market (DAM) which will provide greater operational certainty to the IESO and greater financial certainty to Market Participants
- The Enhanced Real-Time Unit Commitment (ERUC) which will reduce the cost of scheduling and dispatching resources to meet demand

To complete these projects, the IESO has established a dedicated internal MRP Energy Stream team, supported by a Project Management Office. For the purposes of risk management, project management, and expenditures, and to ensure a cohesive design, the MRP Energy Stream work has been broken down into three distinct phases: High-Level Design (HLD), Detailed Design (DD), and Testing and Implementation. The project design phases are shown in

Figure 2-2.



Figure 2-2: MRP Energy Project Design Phases

In September and December 2018, the IESO released the HLD documents for SSM, DAM, and ERUC for stakeholder review and feedback. These projects are outlined in detail in each of the HLDs available via the Market Renewal section on the IESO website³¹ and described briefly below.

The HLDs together outline the blueprint for Ontario's future market that will make the best use of resources available, where price signals are accurate and transparent and through which suppliers and users can make informed decisions and are able to respond. Though the elements of each project are unique, they are inter-related and design and implementation decisions made in each require careful coordination. All three projects have been combined into a single MRP Energy Stream for the detailed design and implementation phases in recognition of their integrated nature.

2.5 The Single Schedule Market Project

The SSM project will replace the two-schedule system with a single schedule that aligns dispatch and prices. This means that rather than a uniform market price, Ontario will implement locational prices.

In addition, the introduction of a SSM will facilitate the implementation of other important changes to the energy markets, such as the establishment of a DAM and ERUC, and set the foundation for further market enhancements in the future. By sending price signals that are accurate, the SSM project is a critical step forward in aligning our market design with operational and system needs.

³¹ <http://www.ieso.ca/en/Market-Renewal/High-Level-Designs/Energy-Stream-High-Level-Designs>

2.6 The Day-Ahead Market Project

The introduction of a DAM will provide financially-binding schedules for participating resources a day in advance of operation. This will encourage all resources to participate more fully and efficiently in the day-ahead timeframe. Almost all other North American electricity markets include DAMs and most of the supply is typically scheduled and settled in the DAM whereas the real-time market is used to balance deviations that occur between day-ahead and real-time. Resources that participate in the DAM benefit from a hedge against price volatility in the real-time market caused by changes in supply and demand, and consumers benefit from more efficient and cost-effective decisions overall. For the IESO it means operators will be able to rely on firm resource commitments reducing uncertainty in pre-dispatch and real-time.

2.7 The Enhanced Real-Time Unit Commitment Project

The ERUC project will be a security-constrained unit commitment process³² that will replace both the current pre-dispatch process and the RT-GCG program and will help to ensure that when changes in system needs arise in the pre-dispatch time frame, the most cost-effective set of resources will still be available to meet demand in real-time. It will result in pre-dispatch schedules and unit commitments that better reflect the total cost of NQS resources that are based on a longer, more efficient optimization timeframe.

ERUC will introduce three-part offers into the unit commitment process including energy, start-up and speed-no-load costs which will also increase transparency and competition within the commitment process. It will improve the efficiency of commitment decisions in the intra-day timeframe by optimizing over multiple hours rather than solving for each hour independently. It will jointly optimize energy and operating reserves to determine the optimal mix of resources to meet load and it will produce binding start-up instructions and operational commitments. The differences between the existing programs and the programs under ERUC are shown below in Figure 2-3.

³² A security-constrained commitment process considers key system operational constraints in order to optimize dispatch while maintaining system security. These constraints include reserve requirements, transmission security constraints and generation limitations

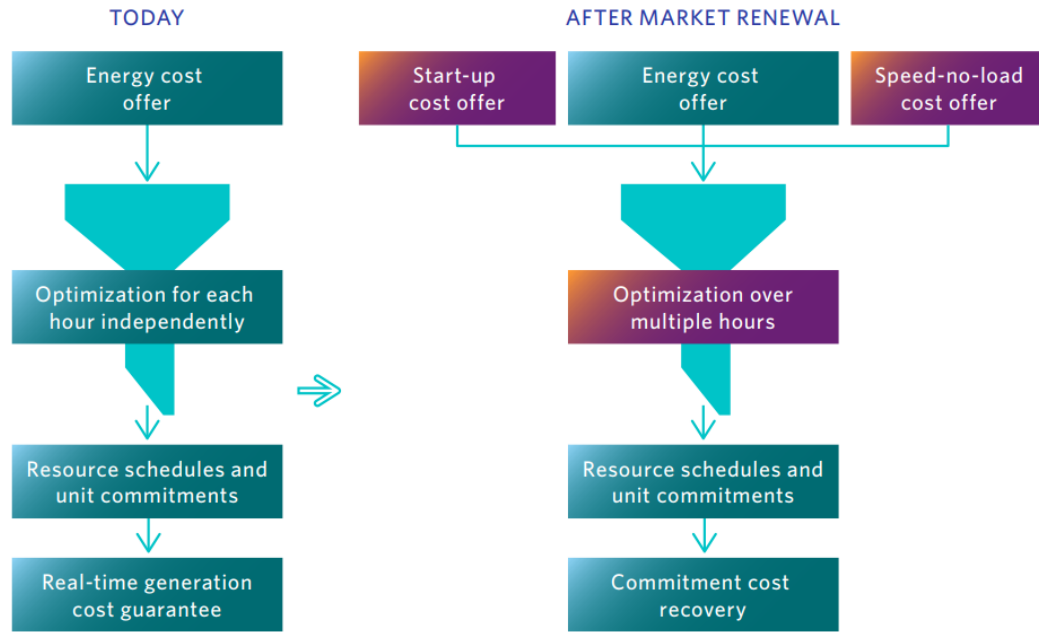


Figure 2-3: Changes to the Unit Commitment Process

3. MRP Energy Stream Benefits

3.1 Introduction

This chapter describes the key benefits associated with the MRP Energy Stream projects, and is divided into the following sections:

- Operational, Reliability and Efficiency Benefits
- Addressing Out-of-Market Payments
- Reduced Gaming Opportunities
- Enabling the Future Market
- Broader Market Benefits
- Financial Benefits

3.2 Operational, Reliability and Efficiency Benefits

The IESO is the reliability coordinator, balancing authority, transmission operator and market administrator for Ontario and is required to ensure that reliable electricity is available where and when people need it. This work has become more challenging as the supply mix has evolved in recent years. Resources are more variable and the system is less flexible, and demand profiles have been changing significantly which has made efficient operation of the system challenging.

These issues are compounded by the IESO's current market design. As described in further detail below, design changes introduced by the SSM, DAM, and ERUC projects will provide wide ranging improvements to system operations and will help to better manage reliability in the future.

3.2.1 Operational, Reliability and Efficiency Benefits from the SSM

As described in Chapter 2, the current energy market includes a number of flawed design features including the misalignment of price and dispatch, sub-optimal day-ahead scheduling and single-hour pre-dispatch optimization. During unexpected events in particular, inaccurate pricing and inefficient scheduling and commitment can exacerbate reliability concerns for the IESO. To mitigate the shortcomings of the current design, the IESO must rely on complex out-of-market programs and payments, and be prepared to manually intervene in the market if needed.

Benefits of a SSM

The SSM will provide the foundation for better market operations as it will send accurate locational prices to Market Participants (suppliers and price responsive loads) that better reflect system needs and constraints. The SSM will eliminate the two-schedule system and the need for out-of-market real time congestion payments by introducing locational prices that create alignment between pricing and dispatch on the system. Market prices will account for congestion and losses and will reflect the true costs of producing electricity at a given place and time. These transparent price signals will enhance open competition between Market Participants and therefore lead to more efficient outcomes across the system.

SSM Summary

- Better alignment of prices with system needs leads to improved operations and reliability as conditions change
- Elimination of unnecessary and unwarranted CMSC payments
- Improved visibility of operator interventions

The SSM also includes improvements to pricing signals during out-of-market operations when required. This will improve the visibility of operator interventions in the market and allow Market Participants to respond accordingly.

In addition, the introduction of a SSM will establish the foundation for the IESO to implement other important changes to the energy markets.

3.2.2 Operational, Reliability and Efficiency Benefits from the DAM

A sound operating plan is the key to being reliable in real-time. Real-time market operations begin

DAM Summary

- Additional operational certainty and reduced risks for the IESO
- Improved Market Participant certainty
- Better coordination with neighbouring jurisdictions
- A hedge against price volatility in the real-time market for suppliers and loads
- More efficient dispatch and lower system costs

with this operating plan and are adjusted as necessary to take into account actual and evolving system and market conditions. All market and system operators in the US³³ create an operating plan for the next day by using cleared bids and offers from day-ahead markets for

³³ For the purpose of the business case "system operators" refer to Independent System Operators and Reginal Transmission Operators

energy.^{34,35} Planning for next day operations in many other jurisdictions involves creating an “Operating Plan Analysis” that allows for an understanding of system conditions including power flows, the identification of system operation limits that require monitoring, the development of contingencies, and coordination of mitigation plans. Resources financially commit to supply or purchase power day ahead, providing confidence to the system operator that they know which resources will be available to meet real-time demand.

The IESO, in contrast, creates its plans using the EDAC which only provides partial information in the day-ahead timeframe due to a lack of participation of some resources (e.g. exports). IESO operations must then fill in the gaps with patterns of Market Participant behaviour from previous days, but actual participation in real-time remains uncertain and there is no guarantee or incentive to ensure resources will actually be available on the next day. Since the day-ahead schedule is based upon a sub-optimal design, the IESO’s real-time operational assessments consistently differ from the day-ahead schedule. When the operating plan significantly deviates from system conditions in real-time it can signal and result in operational challenges for the IESO. These challenges introduce hard to quantify risks that become more apparent when system conditions tighten or unforeseen circumstances arise. This is illustrated in the following example from the IESO Control Room.

Case Study #1

The EDAC Fails to Commit Sufficient Resources and System Conditions Change

On July 7, 2017, the EDAC process had committed only one NQS resource. The number of NQS resources committed by the EDAC is often low because exports tend not to bid in the day-ahead timeframe given that they do not receive financially-binding schedules. As such EDAC does not provide a complete picture of market demand for the following day. This can be a problem because when exports do materialize it creates uncertainty closer to real-time and the IESO Control Room has fewer internal resources that have already been committed and scheduled available that have the flexibility to respond to unanticipated system conditions. Although the IESO has many control actions it can utilize, these are typically second best options compared to using the energy market to efficiently schedule and dispatch resources.

On this day, at 08:17, only one other NQS resource had committed itself through the RT-GCG program, a pre-dispatch engine that does not optimize over the entire day and does not recognize the characteristics of NQS generators. However, system conditions had started to change significantly. Demand started to rise beyond what was forecasted and 187 MW of total reserve

³⁴ The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018”, 2019 FERC and NERC Staff Report, July 2019.

³⁵ “Normal Operations Planning Process”, CAISO, July 12, 2018, <https://www.caiso.com/Documents/3200.pdf>

shortfalls were materializing into the next hour. By 08:37, reserve shortfalls were forecasted to continue. Demand was running approximately 250 MW higher than expected and wind production was approximately 600 MW below pre-dispatch results.

The IESO Control Room did not have sufficient NQS resources readily available to mitigate the reserve shortfalls without resorting to manual control actions. It had to curtail 302 MW of exports, manually dispatch two generators, adjust the wind forecast, and increase the demand forecast by up to 500 MW for future hours. These control actions were necessary and effective in meeting demand and ensuring reliability, but costly compared to a more efficient market design. With exports committed in a DAM the IESO would have had a more complete picture of market demand for the following day, and would likely have committed and scheduled additional internal resources providing increased flexibility and operational certainty for the IESO Control Room, potentially avoiding the need for as many control actions. An improved pre-dispatch and real-time unit commitment would have also provided better tools to manage the changes from day-ahead to real-time.

The Benefits of a DAM

A DAM is a recognized best practice among other system operators for introducing additional certainty and reducing risks in operations, and a DAM will provide this same benefit to the IESO. In the future, developing a sound operational plan will largely be an outcome of the DAM.

All Market Participants, especially gas and hydro resources, will also benefit from the improved certainty provided by a DAM in their own operations. The IESO will time the completion of the DAM specifically for the timely gas nomination window to provide gas generators with more certainty on gas procurements, and hydro resources will be able to benefit from better information to support more effective water management. All resources participating in the DAM will benefit from better certainty in day-to-day operations such as other operational and staffing needs. More broadly, Ontario will also benefit from better coordination of exports and imports of electricity with neighbouring jurisdictions.³⁶ Under the current design, an exporter will not know the actual purchase price for power bought from the Ontario market until after it has been scheduled. This creates significant risk which must be factored into trading decisions, increasing the cost of trade and diminishing the potential benefits to the system from efficient trading.

Experience from other wholesale electricity markets shows that the introduction of a financially-binding DAM is a key tool for ensuring reliable operations and can produce significant efficiency gains. For example, Southwest Power Pool is a large market with a high penetration of intermittent wind generation and faces similar operational challenges to the Ontario market such as large swings

³⁶ "Congestion Payments in Ontario's Wholesale Electricity Market: An Argument for Market Reform", Market Surveillance Panel, December 2016

in demand over the course of a day. Southwest Power Pool introduced energy market reforms in 2014 including a day-ahead market which has had a dramatic impact. It has been estimated that approximately 5,000 MW of generation was being inefficiently committed under the old design³⁷ in the absence of a day-ahead market. The new design provided a material improvement to operator certainty reducing the need to over commit resources.

3.2.3 Operational, Reliability and Efficiency Benefits from the ERUC

Ontario's electricity market uses a pre-dispatch mechanism to aid in creating scheduling certainty ahead of real-time. As such, pre-dispatch helps to transition cost-effectively from day-ahead scheduling to reliable real-time operations as conditions such as demand and supply change. Pre-dispatch does not produce a financial guarantee for most resources but provides information on how they will likely be dispatched so that they can prepare for real-time operations.

ERUC will introduce three-part offers into the unit commitment process including energy, start-up and speed-no-load costs which will increase transparency and competition within the commitment process. It will improve the efficiency of commitment decisions in the intra-day timeframe by optimizing over multiple hours rather than solving for each hour independently. Just like the DAM, it will jointly optimize energy and operating reserves to determine the optimal mix of resources to meet load and it will produce binding start-up instructions and operational commitments.

Pre-dispatch currently only looks at each hour in isolation, it does not optimize over multiple hours and it therefore does not consider critical resource characteristics such as ramp rates. This means that the current pre-dispatch process produces infeasible dispatch schedules, and IESO Operations has to do significant work to fill in the gaps. This is illustrated by an example from the IESO Control Room.

ERUC Summary

- Considers all hours in the look-ahead period
- Includes realistic resource characteristics
- Relies on internal resources first for supply and demand differences
- More efficient dispatch that reflects all supplier information including incremental energy, start-up, and speed-no-load offers

³⁷ The Future of Ontario's Electricity Market - A Benefits Case Assessment of the Market Renewal Project, The Brattle Group, April 20, 2017, pg. 36.

Case Study # 2

Pre-Dispatch Produces Infeasible Schedules

January 20, 2019 was cold and windy, with temperatures forecasted to reach -20°C and a wind chill of -33°C in the Greater Toronto Area. Between 3,500 MW and 3,900 MW of wind was scheduled, and there was significant demand uncertainty as there were no similar representative days to use for demand forecasting. As a result, the IESO added 200 MW of Flex Operating Reserve to the 30 minute Operating Reserve Requirement from 08:00 to 22:00.³⁸ Pre-dispatch scheduled several NQS units to provide this reserve, but the current energy market algorithms scheduled these resources below their minimum load point which was technically infeasible. Units cannot operate below their minimum load point but pre-dispatch had ignored these technical constraints and scheduled them for the minimum amount necessary to satisfy the energy or operating reserve needs of the system. In order to resolve this issue and maintain reliability, the IESO Control Room was required to perform an adequacy and reliability assessment and to take manual actions to avoid any potential problems.

Pre-dispatch also showed exports to the Outaouais region of western Quebec all day. On the previous day, Hydro Quebec was experiencing tight conditions and declared an Energy Emergency Alert 3, meaning that some load shedding was in progress, and Hydro Quebec was anticipating January 20 would be another tight day. The IESO Control Room contacted Hydro Quebec to ask what impact curtailing Outaouais exports would have on them. Hydro Quebec indicated that this could potentially cause them to have to shed additional load.

In this example, the current design produced an infeasible schedule that not only impacted the Ontario market, but also had the potential to impact Ontario's neighbours. Pre-dispatch would likely have carried on producing infeasible schedules throughout the day if the IESO operators did not take manual actions. In this case, the IESO Control Room managed the situation by constraining on one of the NQS resources to provide reserve and flexibility from 17:00 to 20:00. ERUC will avoid these types of issues by recognizing NQS characteristics and also by optimizing the schedule throughout the day, reducing the frequency of manual operator interventions.

The Benefits of ERUC

In terms of providing improved certainty to IESO Operations, ERUC has similar benefits to the DAM, but over a different time frame. ERUC will consider all hours in the look-ahead period (from the DAM schedule to real-time) and will include resource characteristics including realistic ramp rates, which will create conditions that require fewer operator actions. ERUC also excludes intertie transactions

³⁸ For an overview of the IESO's Flex Operating Reserve, see "Enabling System Flexibility Using Operating Reserve", IESO, June 27, 2019. Available at: <http://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/mdag/MDAG-20190627-Enabling-System-Flexibility.pdf?la=en>

more than 2 hours out unless they are scheduled in the DAM, which means that Ontario will rely on internal resources first to resolve differences in forecasted supply and demand instead of external resources, which is considered more reliable by the IESO.

This design change will result in more efficient scheduling of resources and lower system costs. As an example of this, the new look-ahead period will enable energy limited resources (e.g., hydro generators) to be dispatched at a time that is both optimal for the system and within the bounds of the resource's daily energy limits.

3.3 Hydro Modelling

Certain types of hydro resources (e.g., cascade hydroelectric generating units) have unique operating characteristics³⁹ which will be respected in the new energy market design. These resources represent nearly one-quarter of Ontario's available capacity and it is important for broader market efficiency that the design enables them to be effectively optimized.

In the current market, the EDAC does not recognize the unique operating characteristics of hydro resources, but it provides them a resubmission window to revise offers to allow them to manage infeasible schedules. Retaining this resubmission window in the new market design is not possible as the day-ahead is financially-binding and by allowing hydro resources to improve their DAM settlements after-the-fact, provides an unfair advantage over other resources.

To address these concerns, the new market design will model additional hydro resource characteristics in both the day-ahead and pre-dispatch timeframes. Modelling these additional resource characteristics will improve resource optimization and increase the likelihood that hydro resources receive feasible schedules. In this regard, additional modelling of hydro resources will provide a number of benefits including:

- Supporting fair competition and avoiding the requirement for a resubmission window
- Providing the IESO and Market Participants with greater operational and financial certainty
- Reducing system costs as better scheduling and dispatch of hydro resources is likely to displace higher cost resources

Overall, additional modelling of hydro resources will provide greater certainty and improve transparency to help reduce costs across the whole system.

³⁹ Hydroelectric resources have unique operating characteristics as a result of physical equipment limitations, regulatory requirements and environmental requirements

3.4 Reduced Gaming Opportunities

The complexity of the current system and significant number of administrative and non-transparent workarounds creates opportunities for gaming and unwarranted transfer payments. These actions may include market manipulation or the exploitation of an existing market defect. Both the Market Surveillance Panel and the IESO have found that identifying and addressing the many types of

Gaming Design Flaws:

- In recent years the IESO has analyzed, investigated and clawed back over \$360 million in inappropriate payments from Market Participants
- These issues will persist while we rely on the current two-schedule system

gaming behaviour and unwarranted transfer payments is difficult and time-consuming. Since market opening, the IESO and the Market Surveillance Panel have conducted several investigations into gaming and recovered significant sums which have been returned to electricity customers. These investigations highlight the scale of gaming and of the exploitation of market defects occurring in Ontario's markets under the current market design.

The implementation of the MRP Energy Stream will eliminate the two-schedule system and the need for unnecessary CMSC payments, and it will also lead to a more transparent and

competitive platform for NQS commitments by ensuring dispatch reflects incremental energy, start-up, and speed-no-load offers. By eliminating CMSC payments and by introducing energy market prices that more accurately and transparently reflect marginal production costs, the potential for gaming CMSC through inefficient bidding and from exploiting flaws in the RT-GCG program will be eliminated.

3.5 Enabling the Future Market

Changes introduced by the new energy market design will provide a robust platform to meet the uncertainty of future need to evolve the energy markets to address emerging power system needs. Policy and technological change have transformed the Ontario electricity system and further evolution can be expected with the growth of new emerging, intermittent and distributed resources. The current market design with its well documented inefficiencies is inadequate to support the future changes. The new energy design will support further market enhancement down the road regardless of how future needs evolve.

Reducing out-of-market actions and payments means that more costs flow through the market in a transparent manner. Increased transparency and operational certainty will create a better investment environment for existing and new market participants. The changes will also enable Market

Participants to better anticipate future needs and incentivize innovative solutions to meet emerging challenges. Chapter 6 will further explore how these benefits are impacted under a range of potential future market scenarios.

3.6 Broader Market Benefits

Other qualitative benefits provided by the new energy market design include:

- **Supporting investment signals and competition:** transparent locational prices will provide improved signals for locating resource and infrastructure investments in areas where it can provide the most value. As an example, investment in new generation and/or transmission will be attracted by higher locational prices in zones that are import-constrained. Over time, system costs would be expected to fall as the new investment helps to reduce system constraints. More accurate and robust price signals will also help new entrants determine their competitiveness relative to conventional resources.
- **Improved price signal for flexibility:** under the current two-schedule design, price signals for resources to provide flexibility by ramping up or down to meet demand fluctuations are muted and based on an unconstrained system. With the introduction of SSM, the use of actual resource ramp rates and consideration of system constraints will produce accurate and transparent prices that will better value flexibility and incentivize resources to respond and invest to meet ramping needs.
- **Reduced curtailment and spilling:** inefficient price signals in the current market result in unnecessary curtailment and spilling of low-marginal-cost resources such as hydro, wind, and nuclear generation. More efficient pricing will better incent demand to respond to low prices and reduce curtailment and spilling, which in turn could reduce system costs. Reduced spilling from hydro resources should also increase taxpayer revenues from hydro rental charges.⁴⁰

3.7 Financial Benefits

The IESO investigated and assessed the potential financial benefits associated with the MRP Energy Stream.⁴¹ These assessments included the development of models to estimate improvements in

⁴⁰ The Province of Ontario collects a hydro rental charge on behalf of the taxpayer for the use of water by hydroelectric resources. These charges cannot be collected when hydro resources spill water. On this basis, less hydro spilling as a result of the new market design should increase revenues from the hydro rental charge.

⁴¹ The financial benefits numbers presented in this section are on a nominal basis.

market efficiencies and the reduction of CMSC payments, as well as the collection of information on issues such as gaming and the benefits achieved through similar market changes in other jurisdictions. These financial benefits are discussed in the following sections.

3.7.1 Quantifiable Market Efficiencies

The quantified market efficiencies are the reduction in total costs incurred to meet the electricity requirements of Ontario. Examples of these costs include the fuel needed to produce energy, fees incurred to acquire and store fuel, and other expenses necessary to operate a resource for electricity production.

The MRP Energy Stream aims to reduce system costs by eliminating the inefficiencies of the current market. The quantifiable system benefits of the MRP Energy Stream are derived from three main areas that remedy the sources of today's market inefficiencies:

1. More efficient unit commitment;
2. Improved intertie pricing; and
3. Locational pricing incentivizing increased resource competition

The next sections describe the approach to calculate the benefits from each of these areas.

More Efficient Unit Commitment

Resource commitment plays an important role in the electricity market as it provides time and certainty to NQS resources, such as a combined-cycle gas turbine facility, to make necessary arrangements to produce energy. As explained previously, the current commitment process does not take all this information into account when making commitments, leading to inefficient resource selections. The more efficient commitment process will be designed to consider all resource costs and respect individual operational characteristics over multiple hours of the day. As a result, the inefficiency costs associated with today's commitment process will be eliminated.

As a proxy of the inefficiency costs of today's commitment process, over 1,300 historical resource commitments were individually inspected. A re-dispatch of resources to meet demand was undertaken with each individual resource commitment removed and replaced by resources that were available and not previously scheduled. The total costs to meet demand from the re-dispatched case were compared against the total costs with the original commitment and its start-up costs. If the re-dispatched costs were lower, the inefficiency cost of the commitment was the difference between the two values, otherwise, the commitment was efficient. A rate of commitment inefficiency was

calculated by summation of the costs of inefficient commitments and dividing this total cost by the total volume of energy produced by NQS in the year. The analysis indicated that about 1 in 6 commitments have been inefficient and resulted in additional \$0.80/MWh costs. Based on IESO's 2019 System Planning Outlook projections of energy produced by NQS, ERUC is expected to deliver savings of approximately \$190 million in its first 10 years of operation.

This saving is a conservative assessment since it did not include the inefficiencies associated with the singular hourly commitment by the pre-dispatch scheduling process compared to the multi-hour commitment under ERUC. A pre-dispatch model with multi-hour commitment is to be designed in MRP and was not available to be used to calculate these inefficiencies. For this reason it was not possible to calculate the value of this inefficiency.

Improved Intertie Pricing

Imports are efficient if it is cheaper to bring less expensive energy into Ontario from a neighbouring market than to use a resource in the province that costs more to generate the electricity. Exports out of Ontario are efficient if the price that can be received from the destination market is greater than the costs to generate the additional energy for trade across the intertie. In today's market the price of imports and exports is based on an unconstrained price that at times overvalues or undervalues the energy flowing across the intertie. The price at an intertie is calculated as the sum of Intertie Congestion Price (ICP) which represents the cost of transmission congestion through the intertie and the unconstrained Market Clearing Price (MCP) valuing energy produced or consumed in Ontario. If the locational marginal price near the intertie is different than the Ontario MCP because of internal⁴² congestion, the intertie price calculated will not be accurate and may result in higher costs. The MRP Energy Stream will correct the pricing at the interties by factoring in the locational marginal price at the intertie in addition to the ICP. To further explain the inefficiency of the current calculation of intertie prices consider the proceeding example shown in Figure 3-1, which illustrates an inefficient export flowing from Ontario to the Midcontinent Independent System Operator (MISO) market:

⁴² Not to be confused with congestion through the intertie valued at ICP.

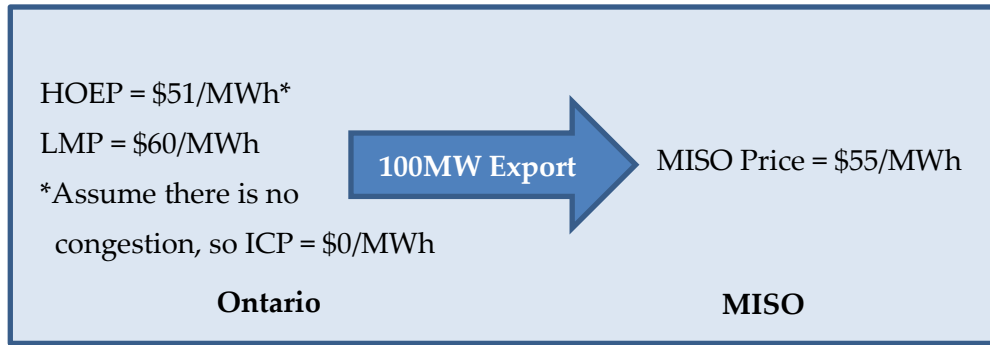


Figure 3-1: Example of Inefficient Export from Ontario to the MISO market

The Ontario unconstrained Hourly Average Energy Price (HOEP) clears at \$51/MWh. There is no export congestion at the tie resulting in an ICP of \$0/MWh. Exports flowing to MISO would be charged \$51/MWh+\$0MWh. In this case the 100MWh scheduled to flow to MISO is seemingly efficient given that the MISO price for energy flowing from Ontario would be paid \$55/MWh. However, for that export, a more reflective price is the cost of generation at the locational price (LMP) adjacent to the interface. In this example the LMP is \$60/MWh. Using this LMP as the correct price for the value of the export, a cost of $(\$60/\text{MWh} - \$51/\text{MWh}) \times 100\text{MWh} = \900 is incurred. If the correct intertie pricing based on the LMP was used, this export would have not occurred. This calculation does not include commitment costs that may have been incurred for the inefficient export. If the correct price was used at the intertie, this export would not have occurred and the costs of the generation needed to serve the export would have been incurred.

As the volume of intertie transactions can vary over the years, an assessment of intertie transactions of several years from 2015 to 2018⁴³ was done. The assessment indicated that on average 9% and 13% of net exports to MISO and the New York Independent System Operator respectively have been inefficient. These rates of inefficiency translate to about \$4.60 and \$3.10 of costs incurred per MWh of net exports to MISO and New York Independent System Operator respectively.

Projecting the inefficiency costs of net exports⁴⁴ avoided with improved pricing at the interties, a total of approximately \$285 million is expected to be saved over the first 10 years MRP is in operation.

⁴³ Intertie transactions were assessed over this time period due to availability of data

⁴⁴ Based on System Planning Outlook projections, Ontario will continue to be energy adequate and a net exporter of energy in the 10 years studied for calculation of benefits. Therefore, the analysis does not include inefficiencies associated with imports

Locational Pricing Incentivizing Increased Resource Competition

As described in section 2.2.1, CMSC is a necessary by-product of the two-schedule energy market to ensure resources follow dispatch should the unconstrained price be insufficient and result in lost operating profits. Since CMSC is settled after-the-fact and separate from the pricing signal, the value of energy production and consumption is muted. With a muted pricing signal and CMSC compensating for lost operating profits, market participants have little reason to seek additional revenue opportunities by competing against other resources. Under locational pricing, market participants would have a strong incentive to be infra-marginal (to maximize revenue/profits) and not just recover their operating costs. Studies have indicated that well-functioning organized electricity markets have incentivized resources to improve their processes to become more efficient and competitive in the market. One paper particularly relevant to Ontario given the similar shift to locational pricing is the experience in the Electric Reliability Council of Texas where moving to a LMP electricity market led to over 2% reduction in costs⁴⁵.

To calculate the impact of increased incentives for competition with LMP for dispatchable resources in Ontario, a simulation of market outcomes was performed. Since many resources in Ontario are effectively hedged and receive fixed-rates for their production of energy, the simulation performed was adjusted to only include a subset of Ontario electricity resources that have an opportunity to increase revenue by being more competitive. A simulation assuming a subset of such resources located in an uncongested area reducing their offers by 2% was performed. This is a very conservative assumption to apply the offer reduction at the low end of estimates to a few applicable resources that represent less than 10% of the total supply capacity in Ontario. The results indicated that increased competition resulting from locational pricing would deliver approximately \$50 million of savings in the first 10 years.

Total Quantifiable Market Efficiencies

In sum, the new market design with the MRP Energy Stream in place is expected to deliver a total of \$525 million in system related market efficiencies in the first 10 years and would persist thereafter.

The efficiencies are sensitive to supply and demand variations so the market efficiencies were assessed against the supply and demand outlooks contained in the IESO's System Planning Outlook. The combinations of supply and demand outlooks that bookend the high and low benefit estimates are shown in Table 3.1.

⁴⁵ Zarnikau, J., C.K. Woo, and R. Baldick. "Did the introduction of nodal market structure impact wholesale electricity prices in the Texas market?" *Journal of Regulatory Economics* 45.2 (2014).

Table 3-1: Combinations of Supply and Demand Outlooks

High Resource Requirement	Low Resource Requirement
<ul style="list-style-type: none"> • Less energy efficiency activity resulting in overall increased net demand • Lower envelope of supply availability 	<ul style="list-style-type: none"> • Sustained energy efficiency • Higher envelope of supply availability

Using the bookend combinations of outlooks, the market efficiencies ranged from \$500 million on the low end to \$550 million on the high end. The narrow range of the benefits can be explained by how the variables in the models are inter-related. In the High Resource Requirement Case, the increased demand requires more supply resources to meet Ontario needs. The use of more supply requires more commitments and higher benefits would result from using improved commitments. The higher requirement of supply also means competition would be more intense. Finally, a higher demand requirement in Ontario is also likely to result in lower net exports out of Ontario. With reduced net exports, the benefits from improved intertie pricing would be lower. On balance, the High Resource Requirement case results in the lower bound of benefits. The Lower Resource Requirement has the opposite effect and this case results in the higher bound of benefits.

Both scenarios contained factors that could increase and decrease the potential benefits. On the one hand these offsetting factors results in a relatively tight range of benefits. On the other, the narrow range provides a high degree of confidence that even under different system conditions the market efficiencies would be realized. Overall, the net impact on the total market efficiencies from different supply and demand outlooks should be minimal. The cumulative total system market efficiencies are shown below in Figure 3-2.

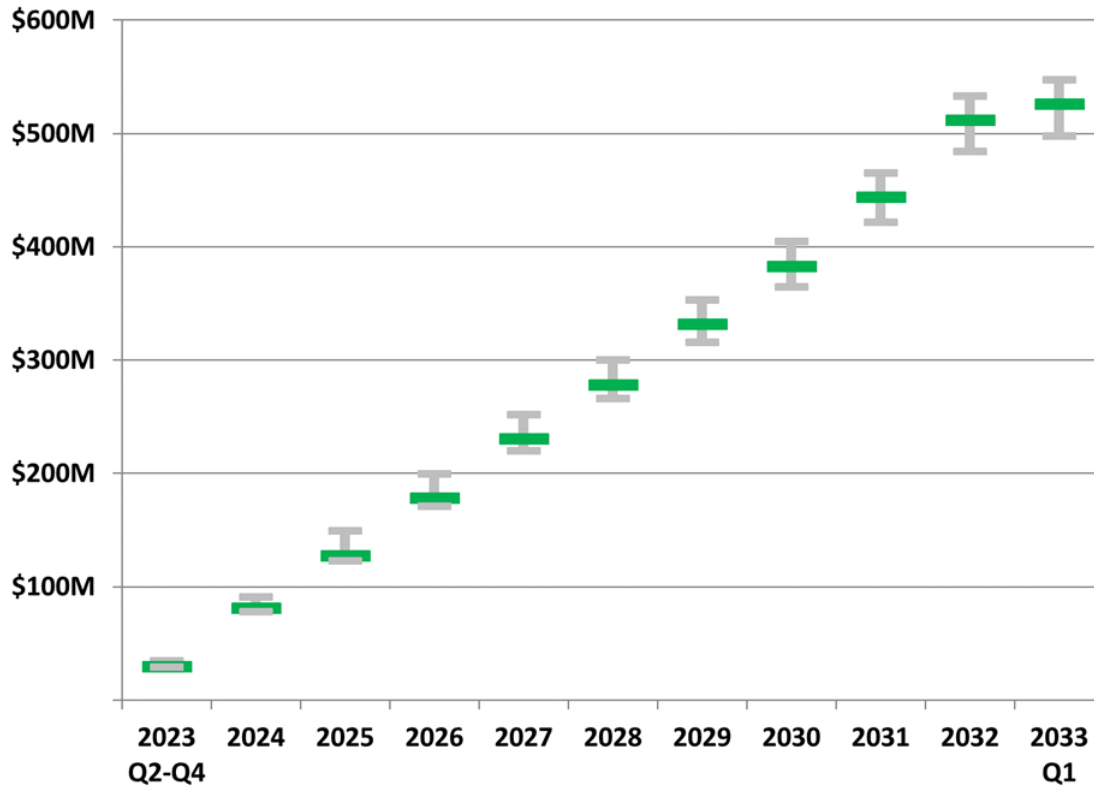


Figure 3-2: Cumulative Total Market Efficiencies

3.7.2 Quantifiable Reductions in CMSC Payments

In addition to and separate from the market efficiencies described above, the MRP Energy Stream will bring about direct customer benefits through the elimination of CMSCs, which are recovered through uplift and paid by all consumers including market participant loads. Using historical data, the IESO estimated that over the first 10 years of the new market, \$900 million in CMSC payments would be incurred if Ontario kept its current market design. As shown in Figure 3-3, these consist primarily of constrained-off and constrained-on CMSC payments.

Potential	Treatment in Business Case
\$450 million Constrained-on	Under the two-schedule system generators would receive about \$450 million in constrained-on payments, but the extent of these types of payments in the new market will depend on many factors including contracts and/or the regulatory framework, as well as the impact of hydro-modelling.
\$450 million Constrained-off	Constrained-off payments will be eliminated in the new market as these are only necessary with a two-schedule design.

Figure 3-3: Key Components of CMSC Analysis 2023-33

In the new market all of the constrained-off CMSC payments would be avoided, and the IESO has a high degree of confidence that the \$450 million of constrained-off CMSC avoided represents a direct benefit to customers of the new market design.

Constrained-on CMSC payments will also be eliminated. However, some of these costs will be more transparent and represented in locational prices and others will be dependent on their treatment in contracts and the regulatory framework. Others will be reflected in make whole payments for reliability.⁴⁶ It is uncertain the exact proportion of these costs that will be incurred by customers as payments in a different form. Due to this uncertainty, the benefits from constrained-on CMSC have been excluded.

⁴⁶ Make-Whole payments will be required under a limited set of conditions (e.g., constraint violations, co-optimization with operating reserve or emergency control actions) where locational prices are not always able to reflect the cost of balancing the system. The need for make-whole payments under the new design is expected to be infrequent and immaterial.

3.7.3 Unquantified Financial Benefits

Before describing the total financial benefits, it is worth discussing several other categories of financial benefits that are meaningful but difficult to determine with a high degree of confidence. These include the financial benefits associated with a day-ahead market in the Ontario context, the financial benefits from improved consumption and investment, as well as those associated with the availability to do future improvements in the market.

Previous IESO analysis as well as analysis from other jurisdictions points to potentially significant financial benefits associated with the implementation of a day-ahead market. In 2008, the IESO estimated that a DAM would create efficiency savings of approximately \$24 million per year.⁴⁷ Experience from other jurisdictions points to even higher benefits. Southwest Power Pool's 2014 market reforms generated benefits of approximately USD \$260 million per year, most of which were associated with the introduction of a DAM through a 10% reduction in the over-commitment of generating capacity. Brattle has estimated that on the high end, Ontario could realize as much as 75% of these benefits by implementing a DAM.⁴⁸

These numbers indicate the potential magnitude of direct benefits from a DAM. Due to differences between the Southwest Power Pool market and Ontario it is unclear what share of these potential benefits would be realized by consumers. As such, they were viewed as too uncertain for inclusion in the financial analysis.

Other benefits from a day-ahead market such as improved day-ahead signaling, hedging for embedded and distributed resources, improved intertie scheduling, further improvements to in-province day-ahead dispatch, and increasing benefits at high intermittent resource levels have not been quantified and are not addressed further here.

In the renewed market, unwarranted out-of-market payments – both CMSC and the RT-GCG program and improper behaviour by Market Participants - will also be eliminated. To date, the IESO has clawed back about \$360 million of unwarranted CMSC and RT-GCG associated with gaming behaviours occurring within the current two-schedule system. Actions have been taken to address inappropriate market behaviours in a variety of forms, but gaming behaviours continue and can be difficult to catch and eliminate.

⁴⁷ IESO, "Day-ahead Market Evolution Preliminary Assessment" May 6, 2008. Converted to 2021 CAD. This value includes \$5 million per year for reduced over-commitment, \$16 million per year for reductions in natural gas fuel procurement costs, and an additional \$3 million per year from demand response due to improved day-ahead price forecasts.

⁴⁸ The Brattle Group, "The Future of Ontario's Electricity Market - A Benefits Case Assessment of the Market Renewal Project" April 20, 2017, pg. 36 and 39.

The IESO also expects financial benefits from improved consumption and more efficient investment decisions. Without the new market, the IESO will be unable to take full advantage of new technologies, respond effectively to an evolving operating and regulatory environment, or benefit from changing technology costs that are transforming the energy sector elsewhere. However, due to the large inherent uncertainties in these benefits, they have not been quantified at this time.

3.7.4 Total Expected Financial Benefits

As described throughout this chapter, the IESO has identified a number of broad categories of potential benefits from the MRP Energy Stream. Several of these categories, such as market efficiency benefits and avoided CMSC payments, can be quantified and represent direct benefits to consumers in Ontario.

Quantifying benefits where possible has allowed the IESO to be able to estimate a conservative lower bound on the total expected financial benefits of the MRP Energy Stream. The process that the IESO used to determine this estimate is summarized below in Figure 3-4. As shown in the Figure, savings from the MRP Energy Stream were calculated by excluding benefits that cannot be quantified with a high level of confidence and only including benefits it expects to realize with a high degree of certainty.

Using certainty as a guideline, the IESO calculates that the MRP Energy Stream is expected to conservatively yield financial benefits of just under \$1 billion. This consists of the full suite of market efficiency benefits (\$525 million, 54% of total expected savings), and constrained-off CMSC (\$450 million, 46% of total expected savings). The full amount of constrained-on CMSC, the benefits from a day-ahead market, improved consumption and more efficient investment decisions, avoided gaming, future improvements, and previously discussed qualitative benefits from multi-hour optimization, hydro modelling, have all been excluded from the estimate.

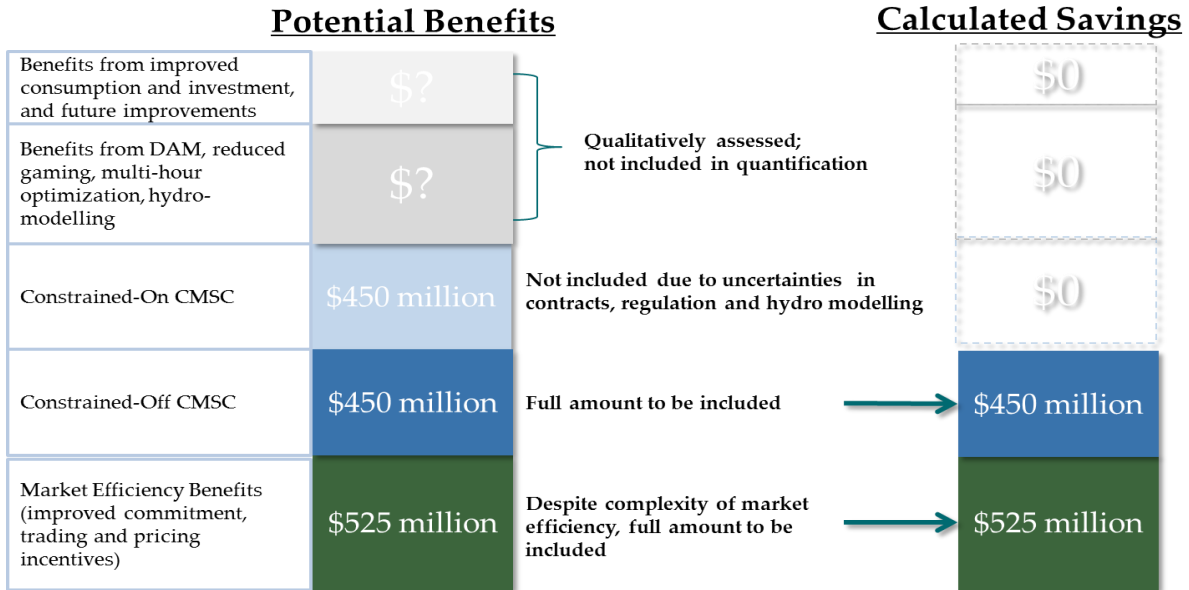


Figure 3-4: Summary of Expected Financial Benefits Included and Not Included

The source of the expected financial benefits is summarized in Figure 3-5 below. As described in this figure, constrained-off CMSC payments are separate from regulated and contract payments, and will no longer be paid in the new market. This in effect represents a direct benefit to consumers.

Finally, the IESO expects several different sources of financial savings from market efficiencies. These consist of the savings from ERUC, improved intertie pricing, and locational pricing incentivizing increased resource competition as detailed earlier in this chapter.

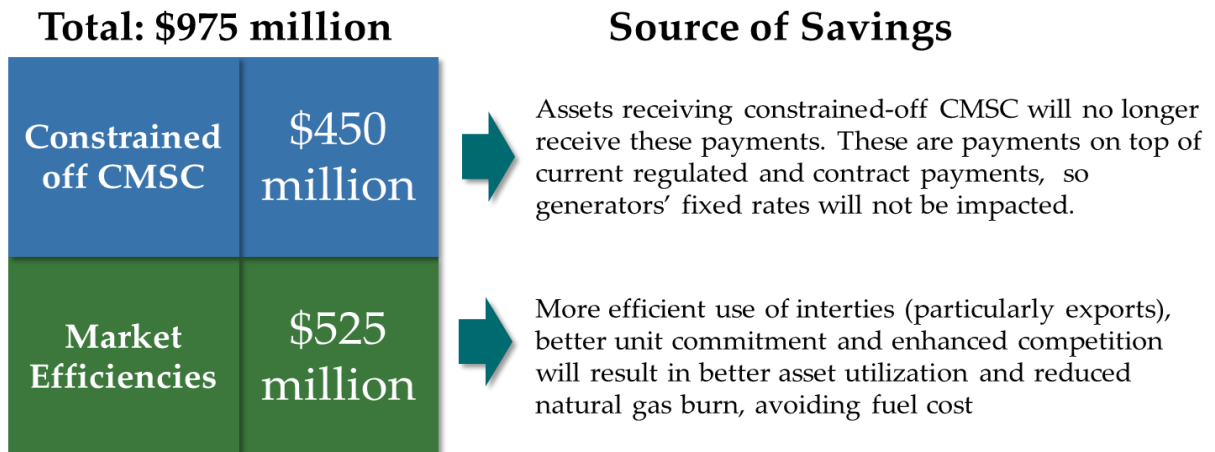


Figure 3-5: Summary of Total Benefits

4. Expected Costs and Implementation

4.1 Process

In 2019, the IESO performed a bottom-up work planning and scheduling exercise spanning the remainder of the program timeframe. This exercise allowed for greater confidence in the cost estimates than previously available through other estimating methods. With any multi-year program, detailed scheduling and planning can evolve over time so the information included in the MRP Business Case is based on the latest information available.

4.2 Schedule

The MRP Energy Stream is labour intensive throughout the program. The combination of the effort required to complete the various activities along with recruiting available resources with the requisite specialized skills (both within and external to the IESO) has had a major impact on the resulting program schedule.

This culminates in the importance of the Go Live date when the new markets are turned on and all of the supporting Information Technology (IT) solutions, systems, market rules and processes become active. The bottom-up estimating process described has resulted in a scheduled Go Live date of March 2023, and a Program closure of September 30, 2023 with six months of contingency.

Figure 4-1 provides information on the Energy Stream schedule to the Go Live date.

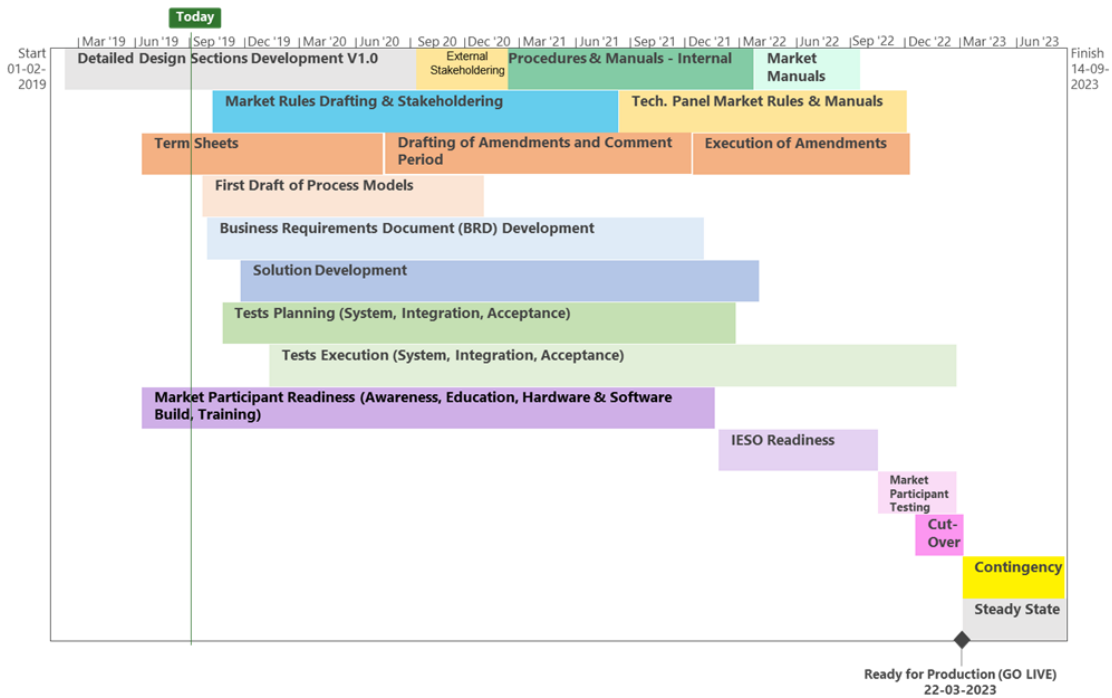


Figure 4-1: MRP Energy Stream Schedule

4.3 Included Costs

For the purposes of this business case, the IESO examined direct program-related costs incurred by the IESO associated with designing, implementing, testing and operationalizing the new market structures. Actual costs incurred cover the period from January 1, 2017 – June 30, 2019. Estimates of future costs cover the period from July 1, 2019 through to Go Live in March 2023.

For the purposes of the Net Present Value (NPV) calculation, an examination of IESO avoided costs has been performed. This looked at both the period during which the program is under development, as well as the 10-year period following Go Live coincident with the benefits modelling.

The result of this work revealed that during development of the program, there was no significant net avoided cost to capture. While the IESO may have some avoided costs by not pursuing otherwise regularly scheduled IT maintenance or changes, those cost savings would be offset by costs associated with implementing ad hoc fixes during the period until the new systems were in place. While there may be some minor savings and costs, the net result of combining the two was negligible, and not material to the costs otherwise presented.

For the period following Go Live, the IESO included costs associated with the steady state period, up to one year following Go Live. Those costs are captured in the direct program costs. For the

remainder of the post Go Live benefits modelling period, the IESO looked for avoided costs to capture, but similar to the program development period, did not identify any significant avoided costs to include in the NPV calculations.

4.4 Identified Impacts Not Included

Throughout the high-level design phase, stakeholders have expressed diverse views and varied expectations as to what costs they feel should be included in the MRP Energy Stream business case. The IESO acknowledges that Market Participants may need to make changes to IT hardware or software, change existing processes, and add new processes or retire old processes.

At the time of developing the business case, as a result of the detailed design phase being under development, there was not enough information available for stakeholders to fully assess how they might be impacted either through increased costs or realized savings.

The IESO looked to other system operators who have completed significant market change programs to determine if they had any insight into participant costs that might be leveraged. For various reasons, including the nature of the market change programs completed and different market participation models, it was found that market participant costs varied considerably.

As a result, the IESO has no effective way of estimating potential cost or saving impacts to stakeholders at this time. The IESO cannot track Market Participant costs and therefore these impacts have not been included as part of the costs in the business case.

4.5 Market Renewal Cost Accounting

The MRP Energy Stream uses an activity-based accounting framework. There are core resources assigned to the program, and there are various corporate shared services (e.g. administration, procurement and resourcing/recruiting) that charge their costs to the program for the direct support they provide. Support provided to facilitate the extensive stakeholder engagement activities and communications required are also included. These costs include IESO labour, rental fees for stakeholder engagement venues, audio visual equipment rental and support to facilitate interactive web-participation and recording as required.

The MRP also required additional office space to be leased for the dedicated program team to work out of. Physical overhead costs including rent, furniture, relocation, and telephone/IT assets have all been included in the program costs. In cases where the IESO has incurred or plans to incur

incremental costs above and beyond our normal level of operation, those incremental costs have been captured in the MRP cost estimates.

4.6 Date for Cost Estimates

The cost estimate portion of the MRP Energy Stream Business Case has been prepared as of June 30, 2019. All costs covering the period of January 1, 2017 – June 30, 2019 are actual costs directly attributed to the MRP Energy Stream and costs that were previously shared between the Energy Stream and Capacity Stream, the latter of which is no longer part of the Market Renewal Program⁴⁹. For 2019, these shared costs were referred to as the General stream. For the period of January 1, 2017 – June 30, 2019, all common shared MRP costs not directly captured under Energy or Capacity have been apportioned to the MRP Energy Stream at 50%.

⁴⁹ In July 2019, the IESO announced it would stop further work on the current High-Level Design for the Capacity Stream. For further information please see: <http://ieso.ca/-/media/Files/IESO/Document-Library/engage/ica/2019/MRP-20190716-Communication.pdf?la=en>

4.7 Estimating Uncertainty

Estimating uncertainty reflects the fact that costs are being estimated over the next 4 years with imperfect information. The HLD's were finalized and published on August 8, 2019, and the detailed design engagement process will begin during Q3-Q4 2019. Figure 4-2 highlights some of the key MRP Energy Stream milestones against a *Cone of Uncertainty*.

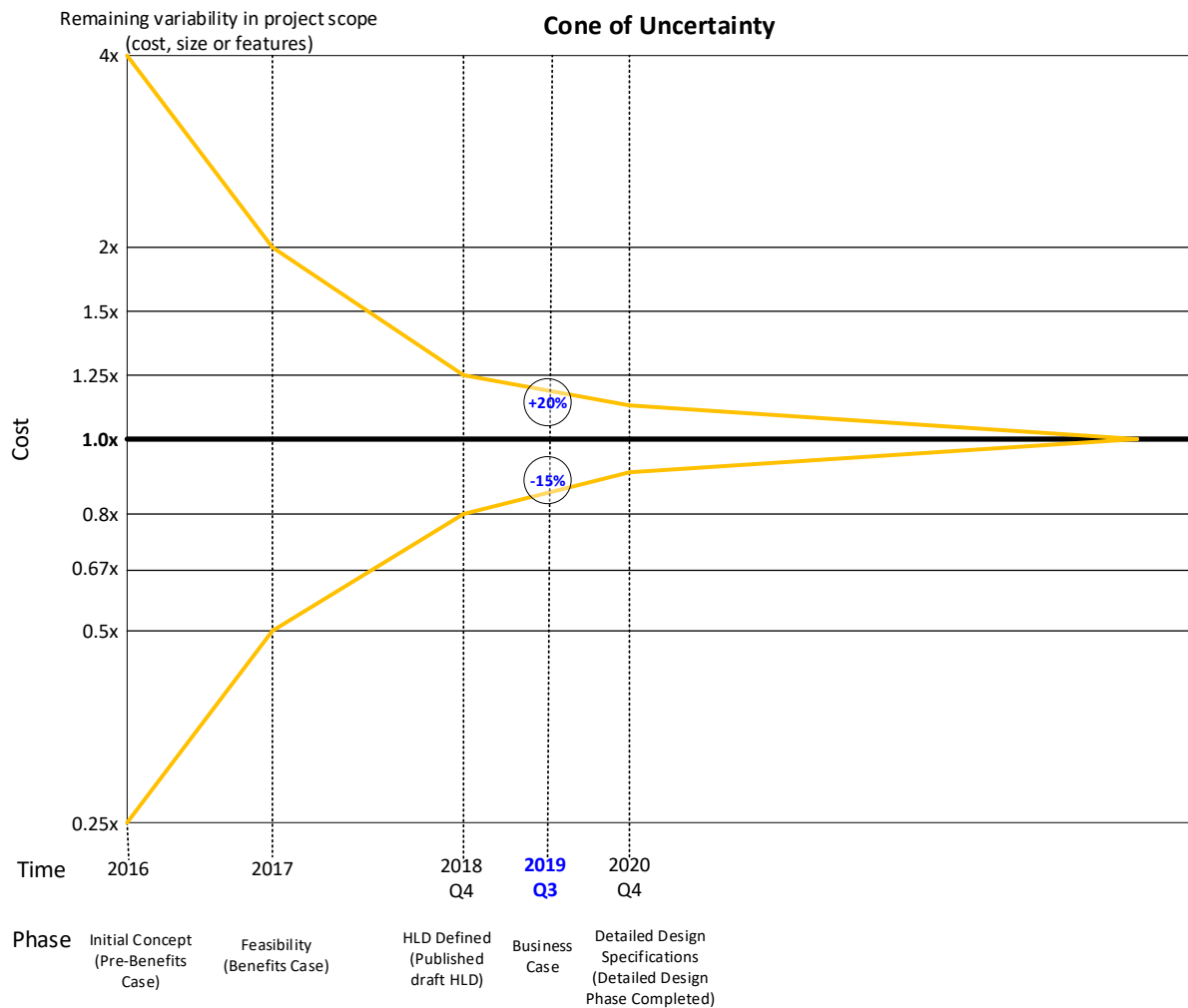


Figure 4-2: MRP Energy Stream Cost Category

The inclusion of a range of estimated costs is prudent for this business case and consistent with industry practice.

4.8 Program Cost Summary

The Market Renewal Program will cost \$170 million (including \$16 million contingency) in capital and operating funds, and will be implemented over of seven years (includes 6 months contingency) from January 2017 to September 2023.

The budgeted cost of the program ranges from \$151 million to \$194 million based on an uncertainty cost estimation tolerance of **- 15% to +20%**,⁵⁰ due to the Detailed Design phase targeted to be completed in 2020. The summary details are shown in Figure 4-3.

The capital component of the program cost is \$131 million (excludes \$15 million contingency). The operating component of the program cost will be \$23 million (excludes \$1 million contingency).

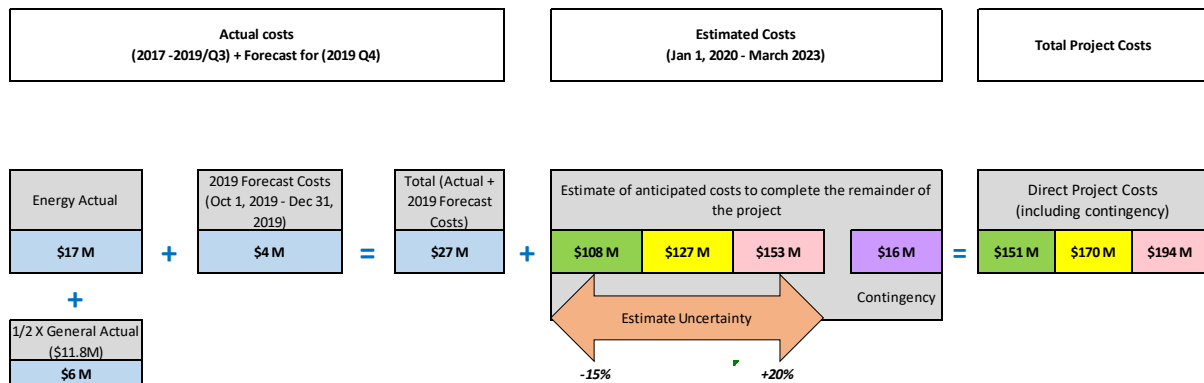


Figure 4-3: MRP Energy Stream Cost Summary

⁵⁰ The range of -15% to +20% is consistent with the current level of uncertainty, see Figure 4-2.

4.9 Program Cost Details

4.9.1 Capital and Operating cost breakdown

Based on the approval for \$170 million (including \$16 million contingency) of capital and operating funds to implement MRP. The program costs are comprised of both capital and operating components as shown in Figure 4-4.



Figure 4-4: MRP Energy Stream Capital and Operating Costs Summary

4.9.2 Annual Capital and Operating Cost Breakdown

These costs cover the period from January 1, 2017 through to September 30, 2023. The annual breakdown of costs is shown in Figure 4-5.⁵¹

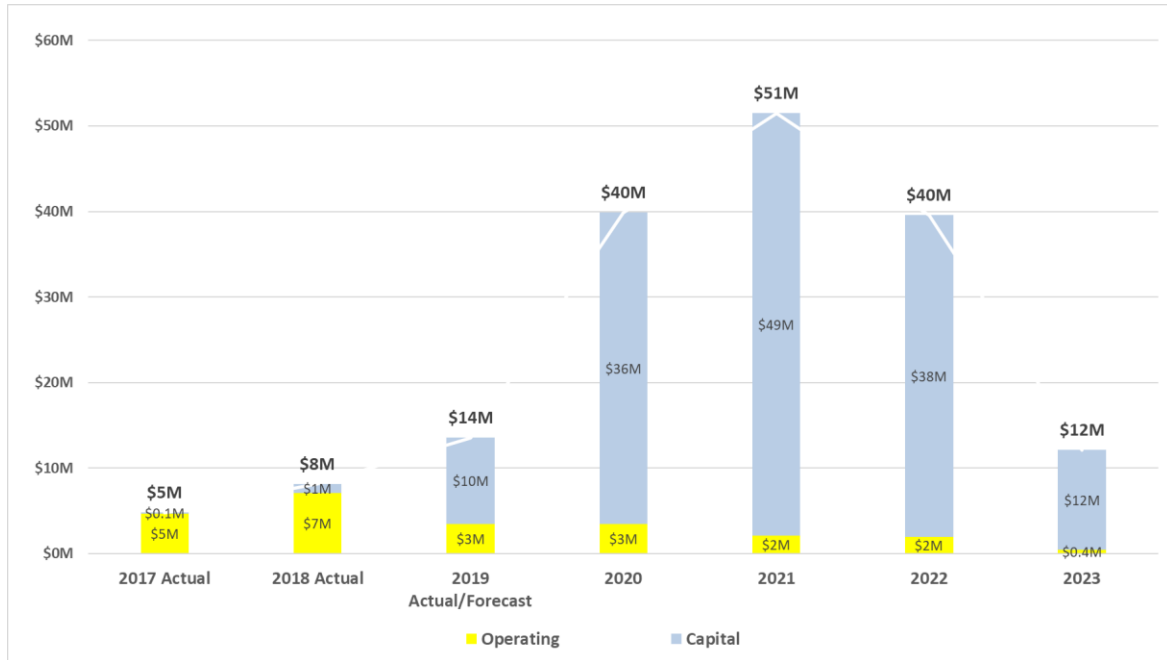


Figure 4-5: MRP Energy Stream Annual Cost Breakdown

⁵¹ Note that the summary numbers in Figure 4-5 are rounded.

4.9.3 Program Phase Cost Breakdown

The costs have also been allocated by program phase as shown in Figure 4-6.⁵² The implementation phase is estimated to be the largest phase with investment costs at \$111 million, accounting for 65% of the total program estimate, followed by the detailed design phase estimated at \$28 million which accounts for 16%.

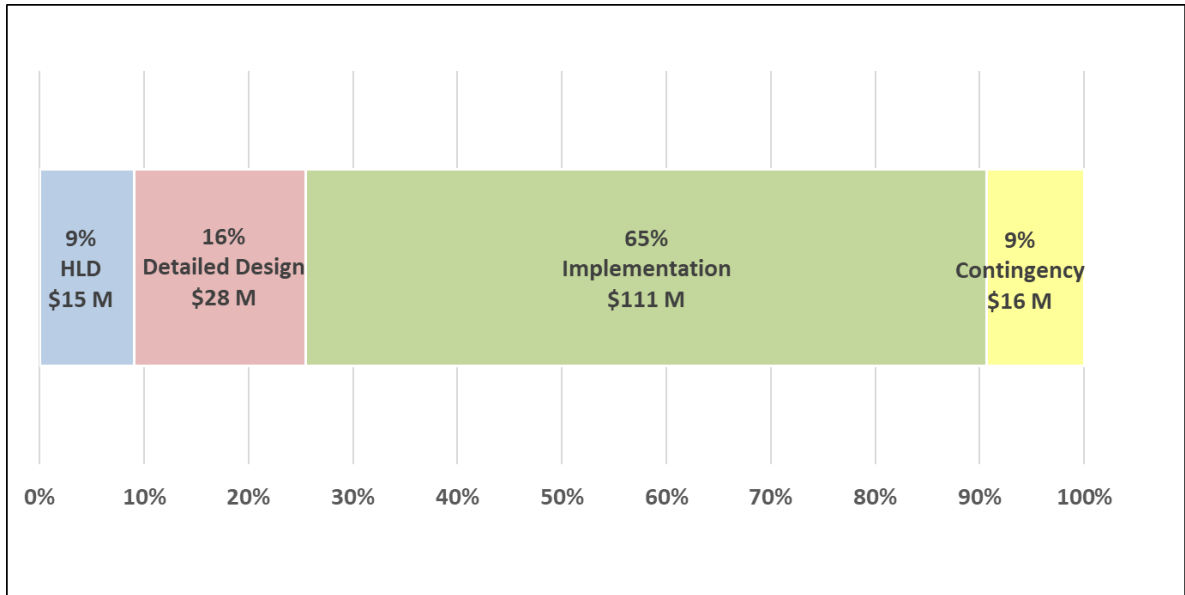


Figure 4-6: MRP Energy Stream Cost per Phase

⁵² Note that the numbers have been rounded

4.9.4 Program Cost Category Components

The program costs are divided into five category components namely: IESO Labour, IT (Hardware and Software), Professional and Consulting, Contingency and Other (Interest and Rent) as shown in Figure 4-7.

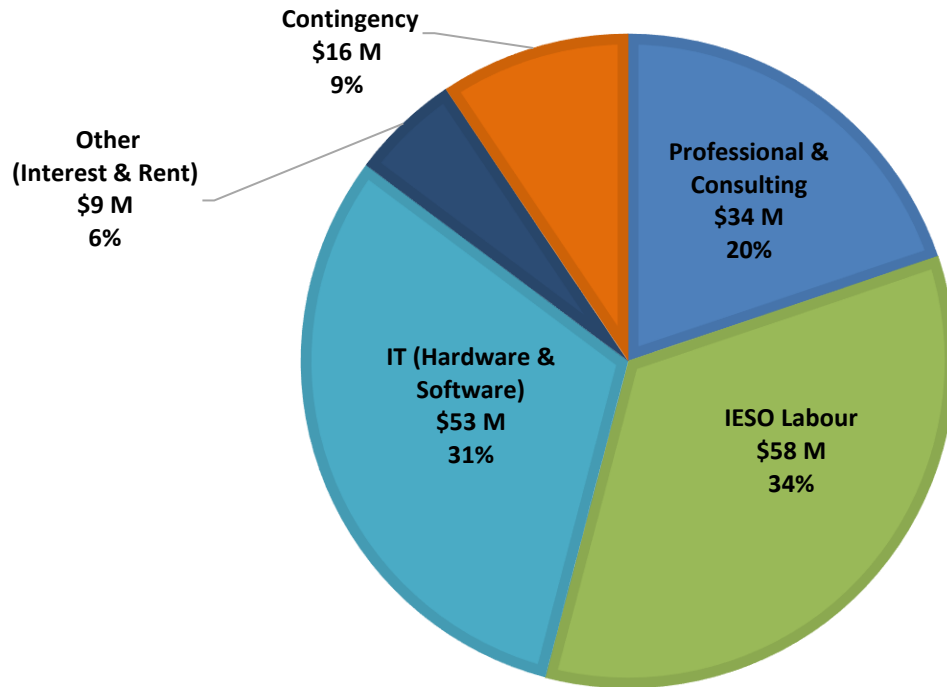


Figure 4-7: MRP Energy Stream Cost per Category

IESO Labour Costs

The total labour cost of \$58 million is comprised of the actual labour costs to date plus the annual average full time equivalent (FTE).

The IESO does not have sufficient specialized resources to implement a program on the scale of the MRP Energy Stream while at the same time continuing to deliver on our core mandate obligations. IESO labour costs described above include both full time regular staff and temporary contract staff. Even with the addition of temporary staff, the IESO requires specialized knowledge and skills which are not available through a temporary employment relationship.

Professional and Consulting Costs

The estimated costs for professional and consulting support are \$34 million, which is further broken down in Figure 4-8.⁵³

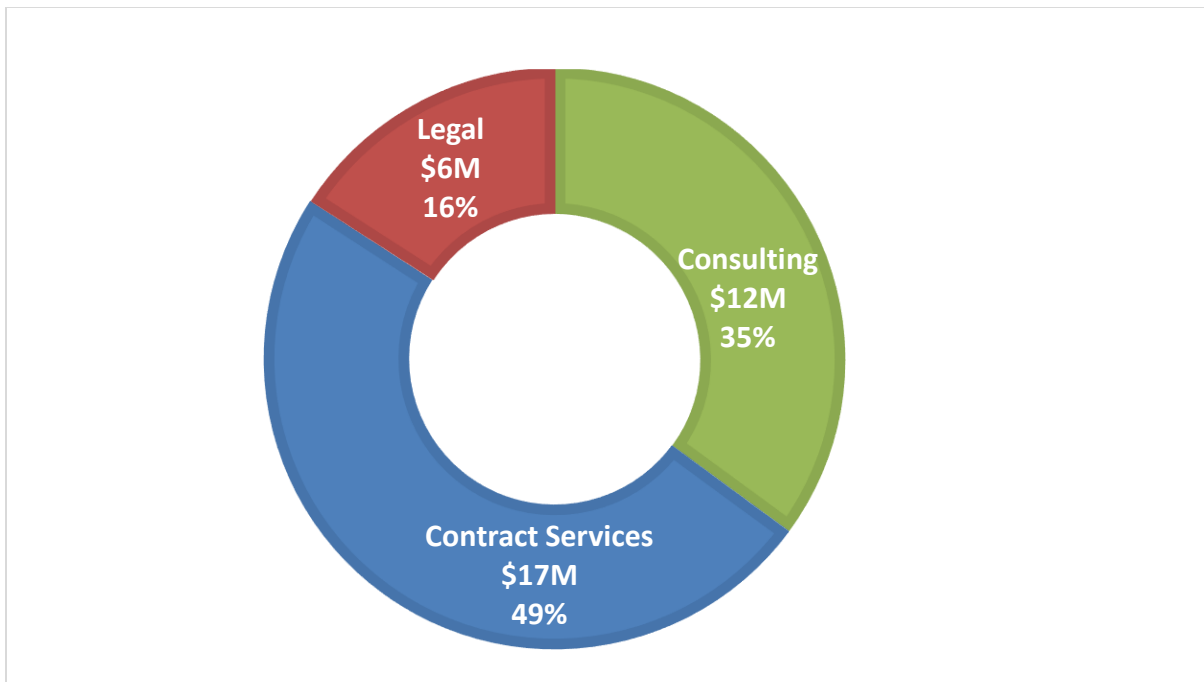


Figure 4-8: MRP Energy Stream P&C Breakdown

The consulting category includes North American or global consulting firms specializing in energy market design. This expert support augments the IESO labour effort. Contract Services includes areas where the IESO can augment its team with outsourced or insourced contractors. Examples of the

⁵³ Note that the summary numbers in Figure 4-8 are rounded.

services include specialist contractors covering topics such as optimization, Ontario energy market participation, electricity grid and market operation, generation operation, design and system integration, and market rules drafting. Resources such as project management support, business analysis, quality assurance and testing will be secured on short-term arrangements through agencies to augment IESO temporary direct hires and offer temporary surge capacity for program peaks. Various audit services including risk, Dispatch Scheduling and Optimization (DSO) calculation, and settlement calculation are included. Legal services include: Legal Support for MRP designs, electricity supply contract changes and governance.

IT (Hardware/Software) Costs

IT costs for both hardware and software comprise \$53 million of the program costs for a total of 18 systems. The largest single cost component is the DSO solution, representing 58% of the total IT costs. Figure 4-9 provides a breakdown of the various components of this cost category.

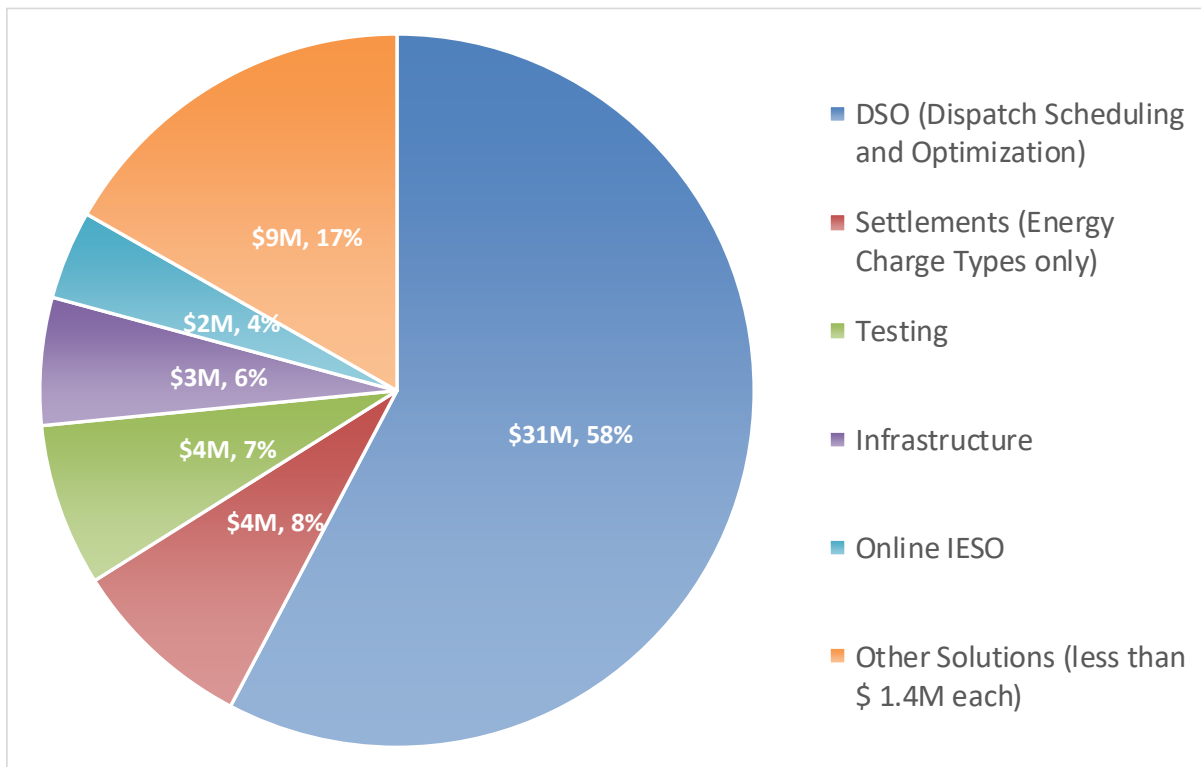


Figure 4-9: MRP Energy Stream IT (Hardware/Software) Breakdown

Contingency Costs

Contingency is a sum of money set aside at the start of a program to be used in case of need, for example, to offset unforeseen increases in costs. The amount of contingency carried depends on the level of risk the program faces and also on the overall program budget itself. Contingency has been examined based on the different cost categories, and is summarized in Table 4-1.

Table 4-1: MRP Energy Stream Contingency Breakdown

Cost Category	Estimated Costs (Without Contingency)	Contingency	Estimated Contingency Amount
IESO Labour	\$42M	5%	\$2M
IT (Hardware and Software)	\$53M	23%	\$12M
Other (Funding Interest, Rent)	\$7M	0%	\$0M
Professional and Consulting (P&C)	\$25M	8%	\$2M
Total	\$127M	13%	\$16M

The MRP Energy Stream has three overlapping phases. There is not a hard line delineating the detailed design and implementation phases. In order to effectively manage both the work and the resources required to complete it, some implementation activities will begin during the detailed design phase, while some detailed design activities will continue into the implementation phase.

An example of this is creation and finalization of the detailed design document. The schedule identifies that the first complete version of the detailed design document will be available for stakeholder review by the end of March 2020. The IESO is currently planning that in the weeks and months following, the IESO and stakeholders will work together to further explain and address any issues or concerns identified with the detailed design document. By September 2020, the IESO expects to have a final detailed design complete that incorporates any changes resulting from the detailed design process. This time period would effectively be identified as falling within the detailed design phase.

At the same time, there are elements of the detailed design that may not have any impact on Market Participants, but rather impact internal IESO processes or systems. Subject to resource availability, the IESO will look to begin work on implementation activities where practicable during the detailed design phase in order to help expedite the schedule.

The implementation phase will commence in 2020 and is anticipated to take approximately 36 months, concluding with the MRP Energy Stream Go Live estimated in March 2023.

4.10 IESO Implementation

The implementation phase of the MRP Energy Stream will include development of market rules, development of market manuals, development of internal or external facing processes and procedures, development or modification of IT systems and solutions, including software and hardware, testing, preparation for Go Live and system “cut-over”, and finally Go Live with all of the new tools and processes.

The IESO will also be engaging with Market Participants and stakeholders throughout this phase. Market rules will be developed and shared with stakeholders as they move from drafting through to the technical panel review process. Similarly, the IESO will be engaging Market Participants specifically with respect to how IESO system and process tool changes will affect them, and what Market Participant changes may be required in order to participate effectively with the new markets. Plans and details on how this stakeholder engagement will unfold will be shared with stakeholders once they have been sufficiently developed.

4.11 Market Participant Support and Readiness

In addition to the implementation activities for the IESO set out in the previous section, Market Participants will need to have their own individual plans to prepare their organizations and facilities for the new energy market. Similar to the IESO, Market Participants will need to understand how the market changes may impact their own IT solutions (hardware, software), internal processes and procedures and other areas of interest to their businesses.

While the IESO is not in a position to develop or execute these Market Participant plans, the IESO has a responsibility to ensure that we are providing Market Participants with timely, relevant information to allow Market Participants to implement their own plans on a timeline that is consistent with the IESO’s activities and ultimately the Go Live date.

This will be a highly interactive process. It will start during the Detailed Design, with the work on specifying data requirements, and will continue with work on technical IT interfaces, and finish with multiple stages of testing.

The IESO will be providing test environment(s) for Market Participant testing and market trials. The IESO will also be supporting and coordinating the testing. There will be multiple stages of testing, starting from basic connectivity testing, through more complex test cases, to end-to-end testing.

4.12 Contract Management

The IESO acknowledges that there are many stakeholders with IESO contracts where specific details or provisions in those contracts will need to change as a result of the changes contemplated by the MRP Energy Stream. An example is the elimination of the HOEP with the introduction of the SSM.

While the contract management processes, including amending contracts, are not formally part of the MRP Energy Stream scope, the IESO acknowledges that the two processes – energy design and implementation, and contract management, need to move together in a coordinated fashion in order for the IESO and stakeholders to be ready for Go Live. As a result, the IESO has shown contract management activities on the overall program schedule, as they are of significant interest to stakeholders.

4.13 Post-Implementation Costs

After the program has been implemented there is expected to be some additional ongoing incremental maintenance costs. These post-implementation costs over the first 10 years following implementation have been estimated to be an additional \$6 million.

The total of the program and post-implementation costs taken together have been estimated at \$176 million, with a range of \$157 million to \$200 million. Chapter 5 uses these totals in the financial assessment of the MRP Energy work stream.

5. MRP Energy Stream Financial Assessment

5.1 Introduction

The expected financial benefits of the MRP Energy Stream were outlined in Chapter 3, and the associated costs of the program have been described in Chapter 4. In this chapter, these benefits and costs have been incorporated together in an NPV analysis to estimate the net financial benefits of the program.

NPV analysis is a valuation tool used for determining the value of a capital program. It calculates the difference between the present value of all future financial benefits and costs of a program. If the NPV is positive, it indicates that the financial value of the benefits in today's dollars is greater than the program costs. While other unquantified benefits and costs or non-financial factors need to be considered, a strongly positive NPV and associated benefit-to-cost ratio is often a good indication that a program makes financial sense.

This Business Case has recognized the importance of uncertainty in estimating the benefits and costs in previous chapters, and the financial assessment presented in this chapter takes a similar approach. The IESO has developed an Expected NPV Case along with a Low NPV Case and a High NPV Case for the costs and benefits in order to determine a realistic range for the total net benefits of the MRP Energy Stream, as well as for the NPV analysis. To quantify the sensitivity to key inputs and capture the potential for lower probability outcomes, a Monte Carlo simulation was conducted to further stress test these results.

5.2 NPV Results

Three cases were developed to capture the potential ranges of the benefits and costs of the MRP Program as well as the NPV results including: 1) an Expected NPV Case, 2) a Low NPV Case and 3) a High NPV Case. The Expected NPV Case represents the IESO's best estimate of the net financial benefits from the MRP Energy Stream, while the Low NPV Case and the High NPV Case were developed to capture the potential ranges for market efficiencies, program and implementation costs and savings from constrained-off CMSC presented in previous chapters. The resulting range of total net benefits is shown in Figure 5-1. As shown in the figure, this range is \$660 million to \$930 million.

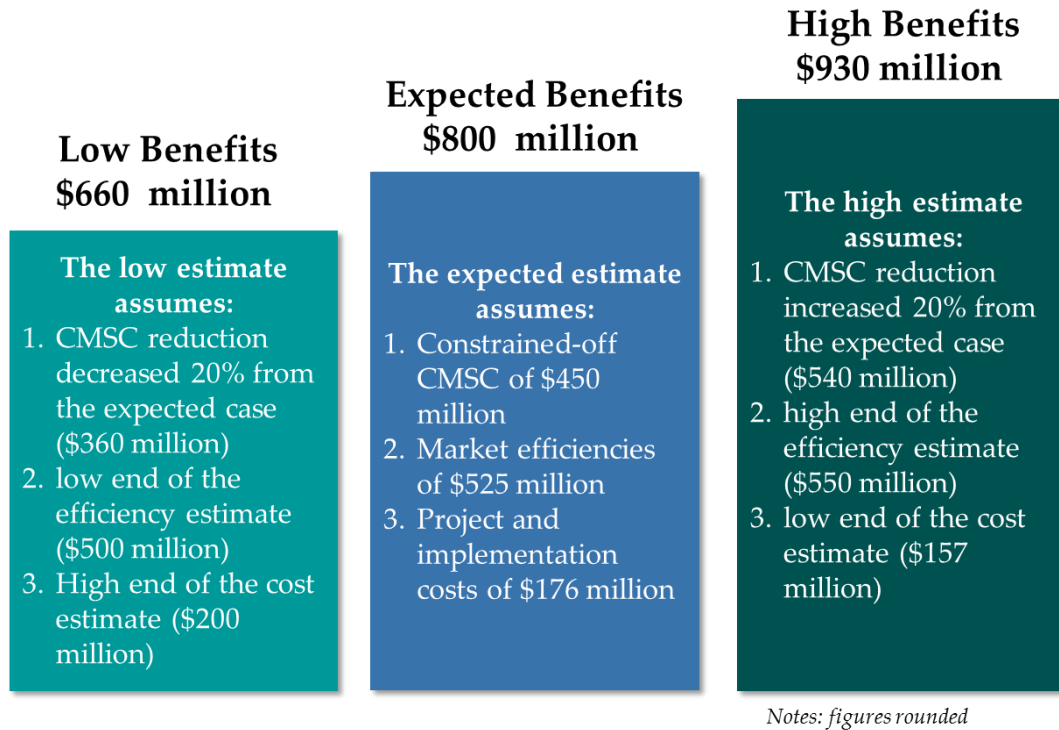


Figure 5-1: Total Expected Net Benefits Range

To calculate the NPV of these benefits, a financial model was developed. The model uses a time frame that captures all the relevant costs for the program life cycle from 2017-2023, and the first 10 years of estimated benefits from 2023-2033, along with associated incremental implementation costs for these years. The model also uses weighted average cost of capital assumptions for different years as the discount rate used to assess the present value of future benefits and costs. The IESO's actual weighted average costs of capital for years in which MRP has already been in development (2017-2019) ranges from 1.8% to 2%. A cost of borrowing of 4% is used for the years remaining until implementation of MRP is completed (2020-2022). Finally, a higher discount rate of 6% is used for later years consistent with longer term borrowing costs (2023-2033).⁵⁴ These assumptions are outlined in Table 5-1.

⁵⁴A discount rate of 6% is consistent with the social cost of capital used by the province for large capital projects in the public sector by non-profit entities. Commercial entities typically use a higher discount rate to reflect the higher costs of borrowing and profit expectations.

Table 5-1: Assumptions Used in the NPV Analysis

Assumptions	Value	Range
Starting Year (Year 0)	2017	n/a
Years of Project Development (2017-2023)	7	n/a
Numbers of Years of Benefits (2023-2033)	10	n/a
Cost of Capital (2017)	1.9%	n/a
Cost of Capital (2018)	1.8%	n/a
Cost of Capital (2019)	2.0%	n/a
Cost of Capital (Years 2020-2022)	4%	n/a
Cost of Capital (Years 2023-2033)	6%	n/a
Total Project and Implementation Costs	\$176 million	\$157M- \$200M
Constrained-Off CMSC	\$450 million	±20% (\$360M - \$540M)
Market Efficiencies	\$525 million	\$500M - \$550M

The calculated NPV results of the three cases are shown in the Table 5-2 below. Based on this analysis, the NPV range for the MRP Energy Stream has been assessed at approximately \$290 million - \$450 million with a Benefits-to-Costs Ratio of 2.7-4.3.

Table 5-2: NPV Summary

	Low NPV Case	Expected NPV Case	High NPV Case
Total Project & Post Implementation Costs	\$200M ¹	\$176M	\$157M ²
Total Project Benefits	\$860M	\$975M	\$1,090M
Present Value of Project Costs	\$170M	\$150M	\$135M
Present Value of Project Benefits	\$460M	\$525M	\$585M
Net Present Value	\$290M	\$375M	\$450M
Benefits-to-Costs Ratio	2.7	3.5	4.3

¹Low NPV Case includes the highest project costs estimate

²High NPV Case includes the lowest project cost estimate

Additional notes: some figures rounded

The range of estimated benefits from low to high reflects uncertainty around future market conditions and Market Participant behaviour. For example, the benefits arising from reduced CMSC will be determined by a range of considerations such as the wholesale market clearing price and the supply mix. Payments of CMSC are directly related to the amount of transmission congestion in the system. Transmission and supply outages, growth in demand in a local zone with limited supply can exacerbate the bottling of supply causing constrained-off payments to increase. Conversely,

transmission upgrades or growth in demand in an area with excess supply can decrease the amount of constrained-off payments reducing the potential benefits.

Variability in the efficiency benefits is explained by the different market outcomes as discussed in section 3.7.1. The benefits associated with a Day-Ahead Market and the broader market benefits are expected to be considerable but not quantified as part of the NPV assessment. In practice, the IESO is confident that the value of the MRP Energy Stream is at least as high as calculated in the Business Case and likely to be higher which would be consistent with the experience of other system operators who implemented similar reforms.

5.3 Monte Carlo Simulation of the NPV Calculation

The low and the high NPV values were derived using best estimates of the variables, including their ranges. However, in practice, some variables are more uncertain than others and have low probabilities at even higher or lower values.

A probabilistic analysis using a Monte Carlo model was undertaken to more realistically characterize the impact of uncertainty on the NPV calculation. The intent of this analysis was to stress test the NPV results. Probability distributions were used to represent the uncertainty for key variables, as shown in the Table 5-3 below:

Table 5-3: NPV Assumptions - Monte Carlo Simulation

Assumptions	Nominal (x)	Values (or standard deviation as % of x)
Cost of Capital - Years 3-6 (2020-2022)	4%	Normal(x, 10%)
Cost of Capital - Year 7-17 (2023-2033)	6%	Normal(x, 20%)
Energy Project and Incremental Costs	\$176 million	Triangular(\$157M, \$176M, \$250M)*
Constrained-Off CMSC	\$450 million	Uniform(\$340M, \$560M)*
Market Efficiencies	\$525 million	Uniform(\$500M, \$550M)

**Notes: ranges extend beyond the low and high estimates to stress test the results*

The simulation used 10,000 runs and the resulting probability distribution of the program NPV was calculated as shown in Figure 5-2 below. This probability distribution indicates that there will be a 90% probability that the program NPV will be between \$250 million and \$490 million. A key take-away from the Monte Carlo simulation is that the net benefits are strongly positive under assumptions that have been stress tested, which is a good indication of the financial viability of MRP.

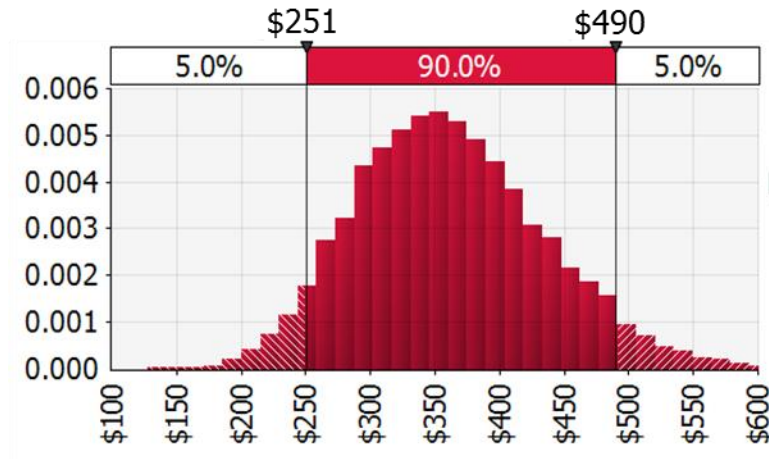


Figure 5-2: Probability Distribution of the NPV (\$M)

A tornado graph of this Monte Carlo distribution was also produced, which ranks the impact of the variables on the NPV results. As shown in Figure 5-3, assumptions on cost of capital and constrained-off CMSC have the most impact on the results, in both the negative and positive directions.

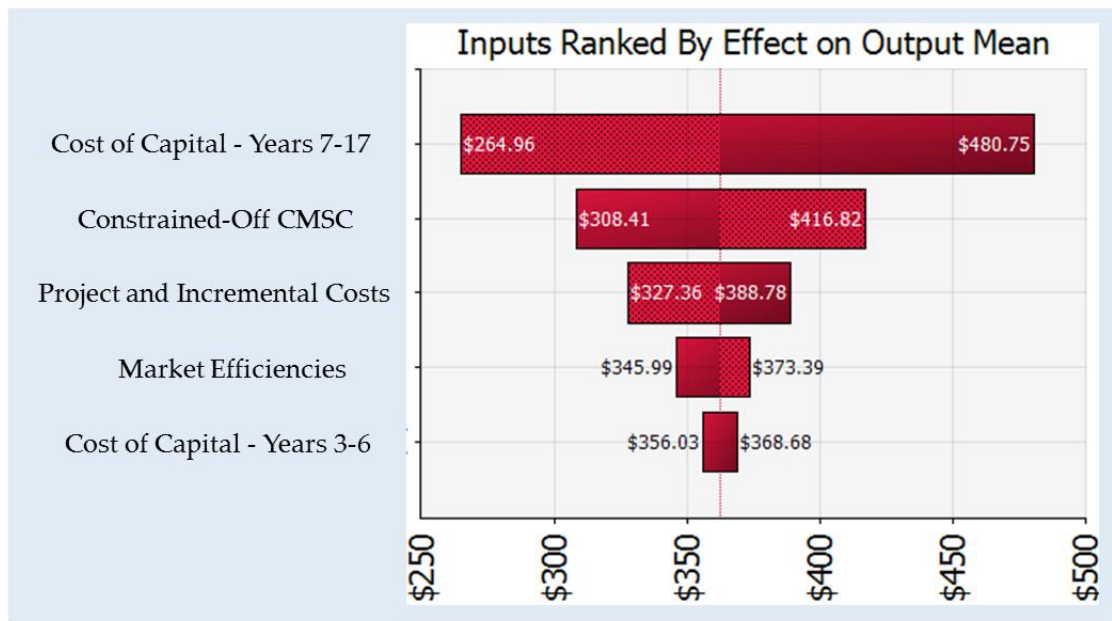


Figure 5-3: Tornado Graph Ranking the Impact of the Variables on the NPV Results (\$M)

5.4 Conclusion

This chapter has presented results of a financial assessment on the MRP Energy Stream, including an NPV analysis on low and high cases, and a corresponding Monte Carlo simulation to stress test the results. The Low and High cases indicate that the NPV has a range of \$290 million to \$450 million with a Benefits-to-Costs Ratio of 2.7-4.3. The Monte Carlo simulation further indicates that the NPV will be between \$250 million and \$490 million with a 90% probability. These cases and the Monte Carlo simulation taken together indicate with a high likelihood that the MRP Energy Stream will return a significant net benefit within this range.

6. Future Market Assessment

6.1 Introduction and Context

The MRP Energy Stream represents a significant advancement and modernization for Ontario's electricity market. It is needed, in part, in response to the rapid transformation of the broader electricity sector that continues to impact Ontario and neighboring jurisdictions.

Large changes to the supply mix have occurred through the phase out of coal and introduction of renewables. The costs for distributed energy resources are declining, and the emergence of new technologies and other innovations are disrupting traditional models of generating and distributing electricity. Further, structural change in Ontario's economy is shifting where and when demand occurs, as well as the overall demand for electricity.⁵⁵ In the future, new technologies will enable consumers to take a more active role in the market, becoming "prosumers" and blurring the lines between distributors, producers and consumers. With this changing landscape in mind, it is important that the benefits of the MRP Energy Stream are robust and enduring even as the sector evolves.

6.2 Approach

The Future Market Assessment assesses the benefits of the new market design, relative to the Business Case expectations, across three potential future market scenarios. The future market scenarios have been defined to cover a range of outcomes and are informed by previous IESO analysis and stakeholder engagements including the Non-Emitting Resources Subcommittee. The assessment groups the new market design benefits into three categories including: 1) Operational, Reliability and Efficiency Benefits, 2) Broader Market Benefits and 3) Financial Benefits. The Future Market Assessment exercise qualitatively assesses the impact of the three future market scenarios, relative to the Business Case expectations, across each of benefit categories.

6.3 Future Market Scenarios

The benefits of the MRP Energy Stream have been assessed across three potential future market scenarios: 1) Low Net Demand, 2) Low Cost Clean Grid and 3) Decentralized Future. These scenarios

⁵⁵ The overall demand for electricity in Ontario has declined significantly. Historic data from IESO indicates that in 2005, the annual demand was 157 TWh, whereas in 2018 the annual demand was 137.4 TWh. For details please review <http://www.ieso.ca/en/Power-Data/Demand-Overview/Historical-Demand>

are not intended to be an exhaustive set of potential outcomes but rather have been selected to represent a range of possibilities. A description of each scenario is presented below in the Figure 6-1



Figure 6-1: Future Market Scenarios

6.4 Future Market Outcomes

The three future market scenarios have different impacts on the different benefit categories of the MRP Energy Stream. These impacts are presented below in Figure 6-2, Figure 6-3 and Figure 6-4 for each future market scenario. The impact on each benefit category is illustrated as an increase, decrease or remains the same as that projected in the Business Case. The tables also include an explanation of the key impacts on benefits in each category.








Future Market Scenario 1: Low Net Demand 		
Benefit category	Impact on Benefits	IESO Assessment
Operational, reliability and efficiency		<ul style="list-style-type: none"> A similar level of operational, efficiency and reliability benefits will be realized under the low net demand scenario: <ul style="list-style-type: none"> More accurate price signals will continue to provide benefits for dispatch and consumption, and lower system costs Increased transparency of operator actions will also continue to be a benefit
Broader market benefits		<ul style="list-style-type: none"> Under the Low Net Demand scenario, improved signals for flexibility and investment, and reduced curtailment will provide a similar level of benefits
Financial benefits		<ul style="list-style-type: none"> Reduced demand in Ontario means there will be more opportunity for export of energy when available which would increase benefits from improved intertie pricing Benefits from improved commitment and increased competition are likely to be less with lower demand, but these reductions would not fully offset the benefits from more exports Benefits will still be realized from avoided CMSC
<div> <div>Increase in benefits: </div> <div>Decrease in benefits: </div> <div>Benefits remain the same: </div> </div>		

Figure 6-2: Low Net Demand Scenario








Future Market Scenario 2: Low Cost Clean Grid 		
Benefit category	Impact on Benefits	IESO Assessment
Operational, reliability and efficiency		<ul style="list-style-type: none"> A Low Cost Clean Grid will include more variable generation (VG) which is likely to increase price volatility. This will mean increased benefit from the operational certainty provided by the introduction of a DAM The Low Cost Clean Grid could also increase benefits from improved hydro optimization if hydro storage assets are utilized more to support the intermittent output from VGs
Broader market benefits		<ul style="list-style-type: none"> The Low Cost Clean Grid scenario would be expected to include new investment in VG resources. This means the benefits from the improved investment signals could be greater under this scenario
Financial benefits		<ul style="list-style-type: none"> Increased supply from VGs means there will be more energy to export which would increase benefits from improved intertie pricing Benefits from improved dispatch could increase as resources are maneuvered more frequently to support output from VG Benefits will continue to be realized from avoided CMSC
<div> <div>Increase in benefits: </div> <div>Decrease in benefits: </div> <div>Benefits remain the same: </div> </div>		

Figure 6-3: Low Cost Clean Grid







Future Market Scenario 3: Decentralized Future		
Benefit Category	Impact on Benefits	IESO Assessment
Operational, reliability and efficiency		<ul style="list-style-type: none"> With a greater number of resources connected to the system, the Decentralized Future scenario could have larger benefits from more accurate price signals and more efficient dispatch Both the IESO and Market Participants will continue to benefit from the improved operational certainty provided by the introduction of a DAM
Broader market benefits		<ul style="list-style-type: none"> The Decentralized Future scenario would include new investment in a range of distributed energy resources. This means the benefits from the improved investment signals could be greater under this scenario
Financial benefits		<ul style="list-style-type: none"> Benefits from improved resource commitment and increased competition may decrease as supply shifts from the wholesale market to the distribution level Benefits will continue to be realized from avoided CMSC
<div> <div>Increase in benefits: </div> <div>Decrease in benefits: </div> <div>Benefits remain the same: </div> </div>		

Figure 6-4: Decentralized Future

6.5 Summary of Findings

The Future Markets Assessment illustrates there may be some variation in magnitude of benefits across the different scenarios:

- Under the Low Net Demand scenario, financial benefits could be higher than expected as there would be opportunity to export more energy and therefore derive greater value from improved intertie pricing.
- Under the Low Cost Clean Grid scenario, benefits could be higher than estimated for several reasons, including that with changes in the supply mix output could become more variable resulting in more prices volatility. Increased price volatility will mean more benefit attributable to the operational certainty that is provided by the introduction of a DAM. Infrastructure spending to transition to the Low Cost Clean Grid could also mean higher than expected benefits from improved investment signals under this scenario.
- For the Decentralized Future scenario, benefits could be higher than expected across several benefit categories. In particular, with a higher number of resources connected to the system the benefit of more accurate price signals and efficient dispatch could be greater than expected. Equally, the financial benefits from improved commitment and competition could be lower than expected as the expansion of distributed resources reduces the role of traditional generators from which these benefits are attributable.

In summary, the future market assessment demonstrates that whilst the extent of some individual benefits may vary by scenario, overall the benefits of the new market design are relevant and robust across a range of realistic scenarios.

7. Program Risks

7.1 Key Program Risks and Mitigation Plans

The MRP Energy Stream leverages IESO's Enterprise Risk Management (ERM) framework to proactively identify, analyze, monitor and mitigate risks as they arise. The ERM framework is embedded within an overall enterprise planning framework to enable risk-informed inputs into integrated organizational planning, risk and performance management to map key elements required to implement the program's strategic objectives - including key annual priorities, resource allocation, and detailed budgets, as encompassed in IESO's three-year business plan.

MRP Energy risks have been catalogued into strategic and project categories, with recommendations for risk remediation developed for each risk. Strategic risks are overarching risks that impact the overall success of the MRP Energy program. Their interdependent nature requires they be addressed strategically and remediation strategies are developed and implemented in an integrated fashion. The establishment of the Program Governance Framework, which outlines where types of decisions should be made, supports this risk mitigation.

The following four strategic risks have been identified in relation to MRP Energy execution:

- Delivery Risk
- Resourcing Risk
- Regulatory and Public Policy Risk
- Stakeholder Risk

Each of these risks have been assessed and their mitigation plans have been defined and are being actively executed. These strategic risks will be the focus of quarterly risk updates provided to the Market Renewal Executive Steering Committee and the IESO's board to support a disciplined, structured and accountability based approach for achieving MRP objectives.

The sections below provide an overview of mitigations plans at the end of Q3, 2019.

7.1.1 Delivery Risk

Table 7-1: Key Strategic Delivery Risk

Risk Grouping	Strategic Risk Description	Risk Owner	Residual Risk Impact	Residual Risk Likelihood	Risk level	Mitigation Plans (based on Contributing Factor)
Delivery Risk	IESO does not have recent demonstrated capability to deliver highly complex transformational programs of similar size to MRP	Leonard Kula	Significant	Possible	High	IESO mitigating actions include the onboarding of a Program Delivery Executive as part of implementing a Program Governance Framework. Further, the IESO will integrate its IT Strategy, including IT resourcing within its program plans. Impact assessments for MRP Energy have been completed, with associated resourcing requirements identified. Resourcing remains to be deployed.
	Market participants are unprepared for system operation at go-live date	Terry Young	Significant	Possible	High	IESO will develop and implement a Market Participant Readiness Plan to ensure effective and timely engagement that will allow market participants to secure funding and resources to implement required changes.

7.1.2 Resourcing Risk

Table 7-2: Key Resourcing Risk

Risk Grouping	Strategic Risk Description	Risk Owner	Residual Risk Impact	Residual Risk Likelihood	Risk level	Mitigation Plans (based on Contributing Factor)
Resourcing Risk	Inability to secure qualified external resources for detailed design and Implementation	Robin Riddell	Moderate	Possible	Medium	The challenges of a constrained labour market are mitigated by the IESO through a strategic talent acquisition process including a competitive value proposition for temporary resources. Procurement for specialized resources such as Project Manager, Business Analyst and Quality Assurance staff and others is supported through a Vendor of Record (VOR) for appropriate agencies to efficiently onboard staff.

7.1.3 Regulatory and Public Policy Management Risk

Table 7-3: Key Regulatory and Public Policy Management Risk

Risk Grouping	Strategic Risk Description	Risk Owner	Residual Risk Impact	Residual Risk Likelihood	Risk level	Mitigation Plans (based on Contributing Factor)
Regulatory and Public Policy Risk	Government and/or regulator (OEB) does not support IESO's direction, resulting in non- approval of IESO's funding or other barriers	Terry Young	Significant	Unlikely	Medium	IESO continues outreach and education to support its demonstrated value for money in the MRP Energy business case. Additionally, the IESO delivers a strong implementation plan and effective execution of MRP to ensure government/regulator continues to prioritize MRP within IESO's portfolio of funded priorities.

7.1.4 Stakeholder Management Risk

Table 7-4: Key Stakeholder Management Risk

Risk Grouping	Strategic Risk Description	Risk Owner	Residual Risk Impact	Residual Risk Likelihood	Risk level	Mitigation Plans (based on Contributing Factor)
Stakeholder Risk	Stakeholders' dissatisfaction results in lack of support of MRP initiative	Terry Young	Significant	Unlikely	Medium	In response to stakeholder disagreement with IESO's approach, load pricing issues were addressed by the IESO in June. To increase its effective participation with stakeholders so they feel heard or responded to clearly, IESO is preparing specific outreach plans for impacted stakeholders as potential issues are identified. Specific examples include contract management, OPG.

7.1.5 Risk Monitor and Control

The ERM framework also entails effective project governance that continuously monitors progress of program initiatives and reports updates accordingly on a timely basis to the Market Renewal Executive Steering Committee along with consistent and repeatable risk identification and prioritization to uncover and address risk root causes. Project risks include events that have an effect on one or more project outcomes such as:

- Project objectives met within approved project parameters
- Achievement of benefits/payback
- Stakeholder engagement and support
- Integration/interdependencies with other projects

- Change management
- Resourcing

7.1.6 Project Level Risk

The project level risks have also been identified and assessed, with mitigation plans prepared and executed for each of the risks. The program Project Management Office maintains a detailed log of project risks and mitigation plans. All risks are monitored and managed, with high or critical-rated risks reported regularly to Market Renewal Executive Steering Committee on a quarterly basis. A summary of the project risk log count is provided below:

Table 7-5: Project Risk Count Summary

MRP Energy Project Risk Overview				
	High	Medium	Low	Grand Total
External	8	20	21	49
Mitigated	8	17	14	39
Resolved		3	7	10
Process	6	7	12	25
Identified	1			1
Mitigated	4	3	6	13
Resolved	1	4	6	11
Resource		4	6	10
Mitigated		3	2	5
Resolved		1	4	5
Technology & Integration	1	8	3	12
Mitigated	1	8	3	12
Grand Total	15	39	42	96

Legend	
Identified	A discovered risk which could potentially prevent the project from achieving its objectives. Risk response are yet to be developed.
Mitigated	Specific measures have been established to potentially minimize the likelihood or severity of the risk.
Resolved	Risk is closed and is no longer a concern.

At the end of Q3, 2019, 16 percent of the project risks have a residual rating that is 'high'. Project risks are monitored and reported on through a project status summary, including progress updates on project objectives, financial and schedule health. Risks are reported at initially assessed levels, detailed mitigation plans are addressed and a residual risk level is then reflected. Updates are provided to the Market Renewal Executive Steering Committee on a monthly basis, with critical/high-rated risks and mitigation activities being a focus area for management discussion. Finally, in addition to the internal review and monitoring of risks, the IESO has also engaged a third party to review

different areas of the program to provide insight with respect to existing as well as emerging risks across the program. All findings are actively addressed.

8. Stakeholder Engagement Summary

8.1 Engagement Description / Background

The IESO is committed to giving stakeholders access to engagement opportunities in order to provide input into the review and decision-making process for facilitating required changes.

Active stakeholder participation and perspectives are used to inform IESO decision-making. As a result, a defined engagement process with a clear set of principles exists to ensure inclusiveness, sincerity, respect and fairness in IESO engagement initiatives. There are seven core principles that guide the engagement process at the IESO, which include: analyze opportunities for engagement, ensure inclusive and adequate representation, provide effective communication and information, promote openness and transparency, provide effective facilitation, communicate outcomes and measure satisfaction.

With the launch of the MRP Energy Stream, this stakeholder engagement process and principles were implemented to guide the manner in which interaction with stakeholders would take place.

Since May 2017, the IESO has been leading an active stakeholder engagement process on the development of the MRP Energy Stream design phase and will continue through to implementation.

The first phase of engagement on the MRP Energy Stream set out to develop the high-level design for SSM, DAM, and ERUC. These HLDs were required to establish the foundation for the detailed design sections that are the necessary for implementing the new design constructs into the IESO Administered Market. Over the course of the HLD phase of the engagement from May 2017 to August 2019, the IESO hosted 29 formal engagement sessions, with an average of almost 50 attendees per session. In addition to these formal engagement sessions open to all stakeholders, the IESO also took part in a number of one-on-one meetings to help inform and clarify design concepts for specific stakeholders from across the sector. The IESO also established the Market Renewal Working Group to help the IESO maintain the progress of the MRP Energy Stream high-level design phase. The HLD engagement process was considered complete with the release of the finalized HLDs on August 8, 2019.

The detailed design engagement process begins in Q3-Q4 2019 with an engagement plan shared with stakeholders in August 2019 that outlined the approach and main objectives of engaging on the detailed design sections of the MRP Energy Stream. This engagement will continue through to the development of draft market rules and manuals that will be reviewed at the engagement level with proposed rule amendments submitted for review through the Technical Panel process.

The IESO required a separate engagement process to consult with stakeholders on the MRP Energy Stream Business Case for the period between the HLD and detailed design phases. As a result, the IESO utilized its MRP Update Meetings to bring the Business Case discussion to stakeholders and seek input and perspectives on the development of the document. Meetings on the MRP Energy Stream Business Case took place monthly from April 2019 through to the completion of the MRP Energy Stream Business Case in October 2019.

In the future, the IESO will lead engagement and training to prepare for the implementation of MRP to ensure that Market Participants are prepared for the changes that accompany the renewed market. The IESO will begin a Market Participant support and readiness initiative which includes engagement and awareness with stakeholders and will focus on training, market trials and IT changes that will be required to understand and ensure that all active participants in the IESO Administered Market are prepared for implementation.

8.2 Engagement Objective

8.2.1 Engagement Approach

In order to achieve the objectives set out in the engagement phases of the MRP Energy Stream, a series of in-person engagement sessions, webinars, one-on-one stakeholder meetings, direct stakeholder emails, IESO Bulletins, recorded and printed information packages were all utilized to provide an accessible engagement opportunity for stakeholders on the MRP Energy Stream.

Throughout the MRP Energy Stream engagement process, stakeholders relied on meeting materials in advance of the sessions to support their education and understanding on design concepts to have productive interaction with IESO staff on various design concepts and proposals.

In addition to these engagement sessions, the IESO conducted specific education and awareness building workshops in the fall and winter of 2018 that were tailored to particular resource types (i.e., Local Distribution Companies, generators, loads). These sessions were intended to raise the level of knowledge and understanding of the MRP Energy Stream for stakeholders who were not actively involved in the earlier engagement process.

8.2.2 Stakeholder Participation

A diverse set of stakeholders have been engaged in all phases of the engagement on the MRP Energy Stream engagement and represent a very broad and diverse range of constituencies within the

electricity sector. The MRP Energy stream has received feedback, both written and verbal during sessions, which has helped advance the design and overall progress of Market Renewal.

The IESO received a significant amount of feedback from stakeholders which will be outlined in the next section. At the time of posting the three HLDs, there were no outstanding design issues with stakeholders on the MRP Energy Stream.

8.2.3 Stakeholder Input

The input that was received from stakeholders, both during the engagement sessions and through written feedback, helped ensure that the IESO produced design documents that were informed by stakeholder feedback.

For reference, each of the three projects within the MRP Energy Stream HLDs include an engagement summary that identifies specific design topics where stakeholder input directly shaped the final design.⁵⁶

At times, feedback from stakeholders challenged the IESO design proposal which required further discussion at the engagement level to understand the merits of the design proposals and rationale for proceeding in any one particular direction.

For example, the approach to load pricing was a design item that received particular attention from stakeholders in the SSM HLD. In this instance, concern was focused on how loads would be priced in the renewed energy market. Further engagement and one-on-one meetings were required to clearly understand the concern which led to the modification of the original design proposal.

In the end, the IESO relied on stakeholder engagement and input from many active participants to produce informed MRP Energy Stream design documents.

⁵⁶ Those summaries are included towards the end of each HLD and can be reviewed here: <http://www.ieso.ca/en/Market-Renewal/High-Level-Designs/Energy-Stream-High-Level-Designs>.

9. Appendix

9.1 Additional Details on the NPV Analysis

In order to provide more detail on the NPV analysis, a breakdown of the costs and benefits by year has been included for the three NPV Cases as shown in Table 9-1, Table 9-2, and Table 9-3 below. Using the NPV assumptions outlined in Table 5-1, the NPV results in Table 5-2 and cited elsewhere in this document should be reproducible with these details.

Table 9-1: Low NPV Case Cost and Benefits Summary

Year	Total Costs	Total Benefits
2017	\$5M	
2018	\$8M	
2019	\$14M	
2020	\$47M	
2021	\$60M	
2022	\$46M	
2023	\$14M	\$56M
2024	\$2M	\$85M
2025	\$1M	\$81M
2026	\$1M	\$85M
2027	\$1M	\$85M
2028	\$1M	\$82M
2029		\$86M
2030		\$85M
2031		\$93M
2032		\$99M
2033		\$23M
Total	\$200M	\$860M
Net Total		\$660M
NPV		\$290M

Notes: summary figures in bold are rounded

Table 9-2: Expected NPV Case Cost and Benefits Summary

Year	Total Costs	Total Benefits
2017	\$5M	
2018	\$8M	
2019	\$14M	
2020	\$40M	
2021	\$51M	
2022	\$40M	
2023	\$12M	\$64M
2024	\$2M	\$97M
2025	\$1M	\$92M
2026	\$1M	\$96M
2027	\$1M	\$97M
2028	\$1M	\$93M
2029		\$98M
2030		\$96M
2031		\$105M
2032		\$111M
2033		\$26M
Total	\$176M	\$975M
Net Total		\$800M
NPV		\$375M

Notes: summary figures in bold are rounded

Table 9-3: High NPV Case Cost and Benefits Summary

Year	Total Costs	Total Benefits
2017	\$5M	
2018	\$8M	
2019	\$14M	
2020	\$35M	
2021	\$45M	
2022	\$34M	
2023	\$10M	\$75M
2024	\$2M	\$110M
2025	\$1M	\$112M
2026	\$1M	\$105M
2027	\$1M	\$106M
2028	\$1M	\$102M
2029		\$107M
2030		\$105M
2031		\$115M
2032		\$122M
2033		\$28M
Total	\$157M	\$1090M
Net Total		\$930M
NPV		\$450M

Notes: summary figures in bold are rounded

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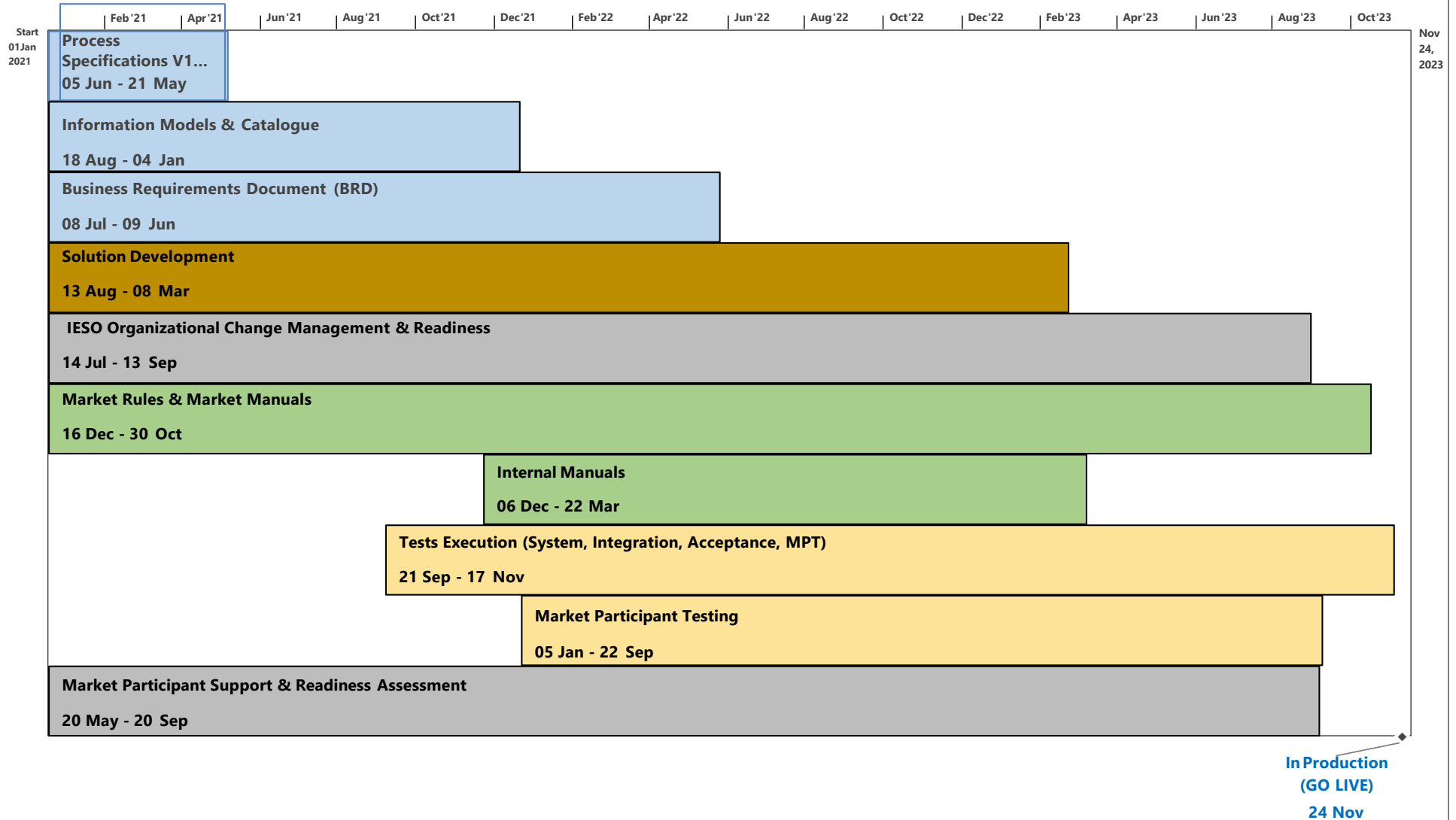
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ANNUAL STATUS REPORT ON 2017 AUDITOR GENERAL REPORT RECOMMENDATIONS

In its Settlement Proposal to the 2018 Revenue Requirement Submission (EB-2018-0143), the IESO agreed to include a status report on certain recommendations to the IESO included in Chapter 3 of the Auditor General's 2017 Annual Report related to market oversight and cybersecurity. This was done to increase transparency and accountability. The Settlement Proposal states: "*The IESO agrees to file an updated status report in the same format with the OEB each year in its revenue requirement submission or by June 1st, whichever is earlier, until one year after all recommendations have been addressed.*" Below is the updated status.

No.	Auditor's Recommendation	IESO Accepting Recommendation (In-Full / In-Part / Not at All)	Status of Implementation	Expected Date of Completion	IESO Explanatory Notes
1 Part (1)	<p>To ensure that ratepayers' interests are protected and that recommendations made by the Ontario Energy Board Market Surveillance Panel to improve market rules are addressed, we recommend that the Independent Electricity System Operator (IESO):</p> <ul style="list-style-type: none"> Implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations in an effective and timely way; and 	In-Full	<p>In Process of Being Implemented</p> <p>OAGO's 2017 VFM report references a suite of OEB Panel recommendations related to both the Real-Time Generation Cost Guarantee (RT-GCG) (referred to as the Standby Cost Recovery Program in the OAGO Report) and Congestion Management Settlement Credits (CMSC) payments (referred to as the Lost Profit Recovery Program in the OAGO Report) in arriving at this recommendation.</p> <p>As identified in the OAGO's 2019 follow up report on the 2017 VFM Report, the IESO has made progress on some of the OEB Panel's recommendations related to the RT-GCG and CMSC payments.</p> <p>The RT-GCG program and CMSC payments will be eliminated as part of the IESO's Market Renewal Program (MRP).</p>	The Market Renewal Program is expected to be in service in November 2023.	

	Implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations in an effective and timely way; and				
1 Part (2)	<p>To ensure that ratepayers' interests are protected and that recommendations made by the Ontario Energy Board Market Surveillance Panel to improve market rules are addressed, we recommend that the Independent Electricity System Operator (IESO):</p> <ul style="list-style-type: none"> Where the OEB Panel submits a report to the Independent Electricity System Operator that contains recommendations relating to the misuse, abuse or possible abuse of market power, the IESO should use its authority to amend the market rule immediately and submit it to the Ontario Energy Board for its review. 	In-Full	<p>Since the OAGO report was published in December 2017, the IESO has not received a recommendation from the OEB Panel that identifies the misuse, abuse or possible abuse of market power.</p> <p>In the event that a recommendation of this nature was made by the OEB Panel, the Independent Electricity System Operator (IESO) has taken a number of steps to ensure that recommendations are considered and implemented in an effective and timely fashion. These steps include:</p> <ul style="list-style-type: none"> Providing a public response from the IESO's President and CEO to new OEB Panel recommendations within 30 days of the publication of the recommendations. Providing the Ontario Energy Board (OEB) with an annual update on the status of actions taken to address recommendations made in the last five years (per a condition of the IESO's OEB license) and publishing the update to the IESO's website. <p>These processes ensure the IESO has appropriate controls and accountabilities in place to respond effectively and in a timely way to OEB panel recommendations and to report on progress in addressing recommendations to the appropriate oversight bodies.</p>	This recommendation is no longer applicable.	<ul style="list-style-type: none"> The IESO has identified this recommendation as "No Longer Applicable" to the Auditor General due to: The MSP not having made a recommendation relating to the misuse, abuse or possible abuse of market power since the OAGO report was published; and The IESO having implemented processes (as described in the "status of implementation") to ensure any such future recommendations are considered and implemented in an effective and timely fashion.

6	To ensure that ratepayers are not charged for unnecessary costs, we recommend that, if the Independent Electricity System Operator does not cancel the Standby Cost Recovery Program, it fully implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations and not reimburse generators for operating and maintenance costs under the Program.	In-Full	<p>In Process of being implemented.</p> <p>The Independent Electricity System Operator (IESO) is making fundamental changes to the wholesale electricity markets through the Market Renewal Program (MRP) to improve how we supply, schedule and price electricity to meet Ontario's future needs.</p> <p>As part of MRP, the IESO is eliminating the Real-Time Generation Cost Guarantee (RT-GCG) (referred to as the Standby Cost Recovery Program in the OAGO Report) and implementing an Enhanced Real-Time Unit Commitment (ERUC) process.</p> <p>Instead of compensating generators based on pre-approved costs, ERUC will make use of three-part offer optimization to help ensure that lower cost resources are committed ahead of higher cost options to meet reliability needs.</p> <p>The IESO has completed the Detailed Design for MRP and is engaging stakeholders in developing the associated rules, manuals, processes and tools to implement the renewed energy markets.</p>	MRP is expected to be in service in November 2023.	
7	To ensure that ratepayers are not charged for unnecessary costs associated with the Lost Profit Recovery Program, we recommend that the Independent Electricity System Operator (IESO) implement the recommendations of the Ontario Energy Board Market Surveillance Panel (OEB Panel) regarding this Program.	In-Full	<p>In Process of Being Implemented</p> <p>The Independent Electricity System Operator (IESO) is making fundamental changes to the wholesale electricity markets through the Market Renewal Program (MRP) to improve how we supply, schedule and price electricity to meet Ontario's future needs.</p> <p>These changes include replacing Ontario's current two schedule market with a Single Schedule Market (SSM). The SSM will eliminate the Congestion Management Settlement Credits (CMSC) payments (referred to as the Lost Profit Recovery Program in the OAGO Report).</p>	MRP is expected to be in service in November 2023.	

			The IESO has completed the Detailed Design for MRP and is engaging stakeholders in developing the associated rules, manuals, processes and tools to implement the renewed energy markets.		
17	<p>To reduce the cybersecurity risk of the Independent Electricity System Operator (IESO), we recommend that:</p> <ul style="list-style-type: none"> the IESO establish an external vendor cybersecurity policy; and the cybersecurity team conduct a regular assessment of the security risk that external vendors pose to the IESO. 	In-Full	<p>In Process of Being Implemented</p> <p>The IESO established a formal policy relating to external vendor procurement and revised its procurement process documentation to include a cybersecurity risk assessment (see PRCS-45). In other words, a cyber security vendor risk assessment is triggered throughout the IESO's procurement process.</p> <p>The IESO's Security Standard was updated to reflect the policy of performing cybersecurity evaluations on all cloud vendors, who represent higher cyber risks to IESO relative to hardware and software vendors. The Security Standard update also includes provisions to manage external vendor cyber security risks to comply with North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection Supply Chain risk standards.</p>	<p>Integrate NERC CIP-13 Supply Chain Risk Management scope into existing IESO cyber vendor risk assessment process</p> <p>Implemented July 2020</p> <p>Risk rank list of IESO non-cloud software vendors to be included in assessment scope</p> <p>Implemented December 2020</p>	

IESO REGULATORY SCORECARD

The IESO's 2020 and 2021 Regulatory Scorecard (Scorecard) is provided as Attachment 1 to this exhibit. The Scorecard has been updated to reflect 2019 and 2020 actual results for each of the measures, as well as 2021 targets. The Scorecard also includes explanations of the measures and discussion and analysis of targets and results for 2019 and 2020.

Modified and New Energy Efficiency Measure

The IESO is requesting the OEB approve the substitution of the existing Conservation First Framework (CFF) measure with a new Conservation and Demand Management (CDM) Framework Program Plan measure. The Minister of Energy, Northern Development and Mines directed the IESO to implement the CDM Framework Program Plan on September 30, 2020¹. The 2021-2024 CDM Framework Program Plan will help the province cost-effectively meet its electricity system needs through the delivery of programs, training and other mechanisms that enable Ontario's electricity consumers to improve the energy efficiency of their homes, businesses, institutions and industrial facilities.

The IESO is also requesting the OEB approve the modification of the existing CFF energy savings target measure to reflect the addition of the Interim Framework Program Plan and its use, in conjunction with the CFF, to achieve the 8.7 TWh energy savings target².

Modified Planning and Reliability Measure

The IESO is requesting the OEB approve the modification of the existing measure related to Key initiatives from the 2017 Long-Term Energy Plan. This measure was previously titled, "Key initiatives from the 2017 Long-Term Energy Plan (LTEP) are progressing on time and budget". The IESO is proposing to rename this measure to reflect that while the IESO is continuing

¹ Minister's directive, September 30, 2020: <https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework>.

² Minister's directive, Interim Framework Program Plan: <https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/Interim-Framework-for-the-delivery-of-Energy-Efficiency-Programs>.

- 1 internal planning initiatives that were directed as a part of the LTEP, the scope, timelines and
- 2 budget associated with the LTEP are no longer in effect.