

**AMPCO INTERROGATORY 20**

Issue 4.0 Market Renewal Program (MRP)

4.0-AMPCO-20

**INTERROGATORY**

Reference: Exhibit B-1-2 - 2023-2025 Business Plan, p.19

Preamble: The IESO's Business Plan states "A recent review of the MRP business case determined the renewed market will deliver substantial net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation."

Ref: September 22, 2022 Memo Re: Market Renewal Program Business Case Validation, p.1

Preamble: The memo to the MRP Implementation Engagement Stakeholders states "The review included an assessment of whether the expected benefits, costs, and other underlying assumptions have materially changed given a refreshed MRP project schedule and budget, as well as an updated view of the IESO's forecasted demand and supply projections. The updated net benefits are lower than the 2019 calculated estimate of \$800 million as implementation and costs to operate the new market have increased by \$92 million, as some of these costs were unknown during the 2019 Business Case preparation."

Questions:

a) Please provide a variance analysis of the updated net benefits of \$700 million compared to the 2019 calculated estimate of \$800 million.

b) Please identify year 1 at which time the new market will begin to generate savings.

**RESPONSE**

- a) The 2019 MRP Business Case estimated market benefits to be in the range of \$975 million and estimated \$178 million in project and implementation costs, resulting in at least ~\$800 million in net benefits over the first 10 years.

**Table 1: MRP Market Efficiency over 10 Years**

Market Efficiency	10 Years of Efficiency Benefits (\$M)
More Efficient Unit Commitment	\$190
Improved Intertie Pricing	\$285
Increased Resource Competition	\$50
Total Efficiency Benefits	\$525
Total Constrained off Congestion Management Settlement Credits (CMSC)	\$450
Efficiency Benefits + Constrained off CMSC	\$975

After completion of the MRP Detailed Design in 2021, the IESO identified approximately \$35 million over 10 years of ongoing operation costs following the May 2025 in-service date as the new market introduces new features and tools that require additional resources for market operations, monitoring and ongoing maintenance and support in the IESO's Markets and Reliability and Market Assessment and Compliance divisions. As such, the business plan includes resources for additional staff, technical consultants and support and maintenance to operate the renewed market. These staff are required for the ongoing running of the Day-Ahead Market, Market Power Mitigation, and forecasting-related functions.

The 2022 MRP Business Case validation found that the expected market benefits would remain as estimated in 2019 since the project scope did not change, with benefits

starting to accrue in 2025 due to the revised project schedule. Also, the project and implementation costs were revised to \$233 million, a \$55 million increase from the 2019 Business Case. Therefore, the net benefit is now estimated at approximately \$700 million, see Table 2 below for reconciliation.

**Table 2 – MRP Net Benefits Variance**

<b>\$ Thousands</b>	<b>2019 Business Case</b>	<b>2022 Business Case</b>	<b>Variance</b>
Market Benefits over 10 Years	975	975	-
Project and Implementation Costs	(178)	(233)	55
Ongoing Operation	-	(35)	35
Net Benefits	797 or ~800	707 or ~700	90 or ~100

b) The first year in which the new market will generate benefits is 2025.

1 **AMPCO INTERROGATORY 21**

2 Issue 4.0 Market Renewal Program (MRP)

3 4.0-AMPCO-21

4 **INTERROGATORY**

5 Reference: September 22, 2022 Memo Re: Market Renewal Program Business Case  
6 Validation, p.3-4

7 Preamble: The memo states "After the program had been implemented there was expected  
8 to be ongoing incremental maintenance costs, estimated at an additional \$6 million over the  
9 first 10 years following implementation. At the time of developing the Business Case in 2019,  
10 it was not yet known if incremental staff would be required to operate the new market. With  
11 more certain costs and development schedules confirmed by vendors, the implementation  
12 timeline has been extended to 2025 with a new implementation cost estimate of \$233  
13 million. Further, the completion of the MRP Detailed Design in 2021 has also allowed for  
14 more accurate assessment of the ongoing costs over the first 10 years of operations. The  
15 total implementation and operation cost estimate, including the additional staff for ongoing  
16 operation of the renewed market is \$268 million or \$92 million more than assumed in 2019."

17  
18 Questions:

19 a) Please confirm ongoing maintenance costs are now estimated at \$35 million over the first  
20 ten years.

21 b) Please provide a breakdown of the ongoing maintenance costs allocated to OM&A and  
22 Capital by year.

- 1 c) Please provide details of the additional staff required over the first ten years for ongoing  
2 operation of the renewed market and map the FTEs to the IESO's Business Units.

3  
4 **RESPONSE**

- 5 a) Confirmed.

- 6 b) The IESO's costs ten years after MRP's in-service date are not within the scope of this  
7 proceeding, however the OM&A costs are equally comprised of staff required to run the  
8 Day-Ahead Market, Market Power Mitigation, and Forecasting-related functions. Capital  
9 costs are not expected to be material for this time period.

- 10 c) The FTEs required ten years after 2025 MRP go-live are not within the scope of this  
11 proceeding, however, it is roughly estimated that 20 FTEs will remain post-MRP  
12 implementation. The new market will introduce new features and tools that require  
13 additional resources for market operations, monitoring and ongoing maintenance and  
14 support in the IESO's Markets and Reliability, Information Technology and Services, and  
15 Market Assessment and Compliance divisions.

**EP INTERROGATORY 11**

4.0 Market Renewal Program (MRP)

4.0-EP-11

**INTERROGATORY**

**Reference:** Exhibit A-2-2, Attachment 1, 2023-2025 Performance Measures, Page 1

**Preamble:** Measure 1 Market Renewal Program delivery: Percentage of key milestones completed according to implementation plan target for 2023 is 60%.

Questions:

a) What is the total number of milestones and are they all similar in scope and difficulty of completion?

b) What percentage of key milestones were completed according to plan in 2022?

c) For 2023, what percentage of milestones have been completed so far this year?

**RESPONSE**

a) In August of 2022, the project team established 61 milestones as part of the new Baseline. Milestones are critical project deliverables which the IESO intends to deliver by go-live. Each deliverable is unique and varies in duration and complexity.

b) 100% of the planned milestones were completed in 2022.

c) Of the 61 milestones, 25 milestones are planned for 2023. As of April 2023, 7 out of 25 or 28% of the 2023 milestones have been completed.

**EP INTERROGATORY 12**

4.0 Market Renewal Program (MRP)

4.0-EP-12

**INTERROGATORY**

**Reference:** Exhibit B-1-2, 2023-2025 Business Plan, Page 25

**Preamble:** Under the Risk Assessment High, Mitigating Actions there is listed "Design, development and testing of mechanisms as such as Market Power Mitigation under the Market Renewal Program."

Questions:

- a) Please explain what is Market Power Mitigation mechanism and how is it expected to work?

**RESPONSE**

- a) A market thrives when there is open and fair competition among many resources. Competition becomes unfair when market participants exercise their "market power" by either economically or physically withholding energy from the market to increase the price. The IESO has always had a framework to address the potential exercise of market power. Under the current system, however, market power mitigation is carried out after it occurs, and so is based on actual values rather than estimates. With the alignment of price and dispatch under Market Renewal, after the fact mitigation will no longer be viable. Instead, the IESO will move to an approach that mitigates "before-the-fact" for economic withholding, a shift that prevents offers that are too high from affecting dispatch schedules and market prices. This approach is in keeping with the one used by other North American system operators.

- 1 For more information please see the Market Power Mitigation webpage<sup>1</sup>. For more
- 2 information on Market Oversight, see the IESO's Market Oversight webpage<sup>2</sup>.

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<sup>1</sup> <https://www.ieso.ca/en/Market-Renewal/Energy-Stream-Designs/Implementation-phase-documents>

<sup>2</sup> <https://www.ieso.ca/en/Sector-Participants/Market-Oversight>



**EP INTERROGATORY 13**

4.0 Market Renewal Program (MRP)

4.0-EP-13

**INTERROGATORY**

**Reference:** Exhibit B-1-2, Business Plan, Page 20

**Preamble:** "In August 2022, the IESO Board approved revised program funding and a refreshed schedule, including an in-service date of May 2025."

Questions:

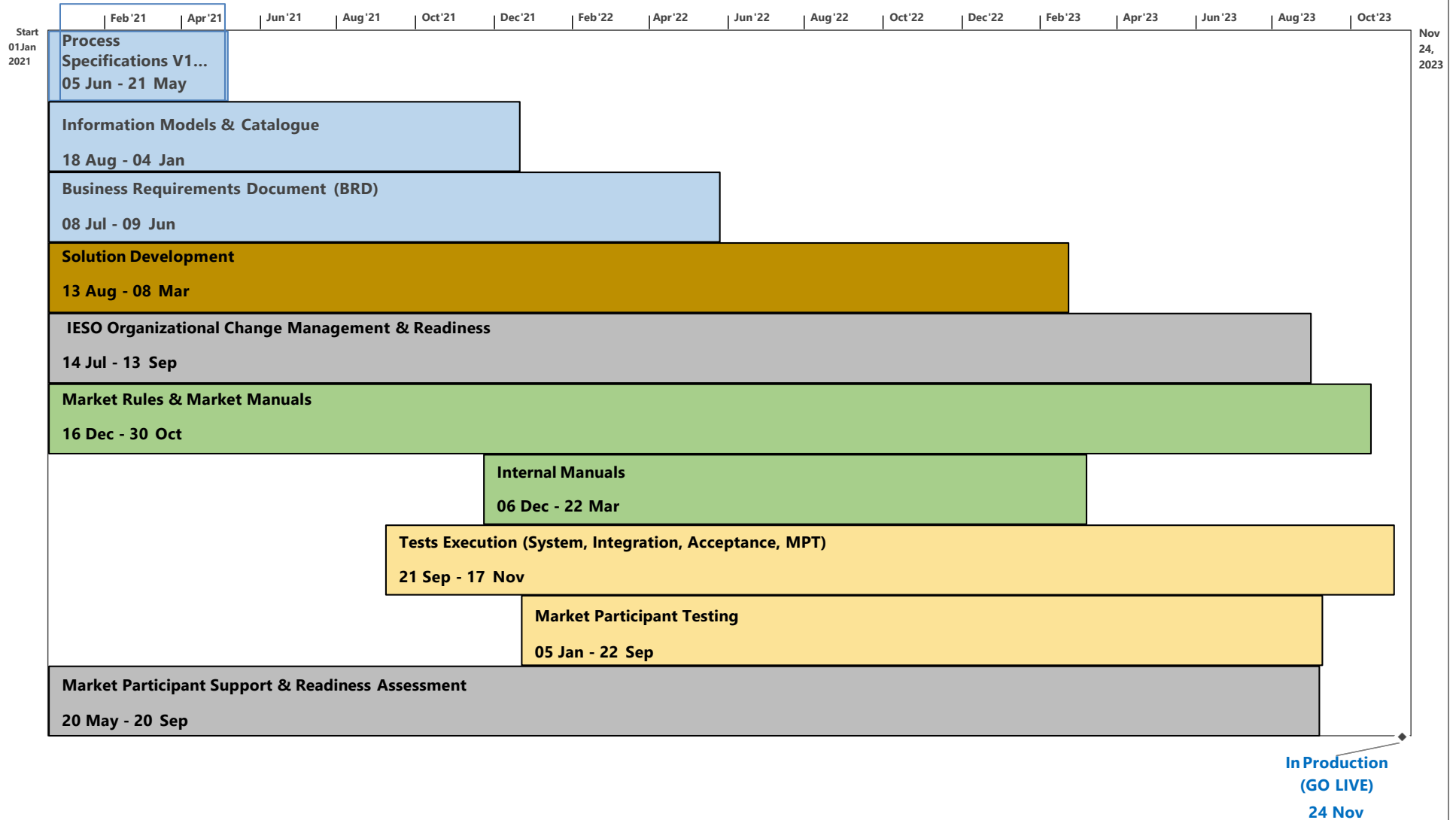
a) Please file the program schedule and funding prior to the revisions and refreshing approved by the IESO Board in August 2022 and compare it to the refreshed schedule and funding explaining all changes.

b) Please explain why the program schedule and funding were changed by the IESO Board in August 2022.

**RESPONSE**

a) Please see Attachment 1 – 2022 RRS MRP Baseline Schedule and Attachment 2 – 2022 RRS G-2-1 MRP Cost Report, to this response and please see 4.1 SEC Interrogatory 24.

b) Please see the response to 4.1 SEC Interrogatory 23 a).



# 1                                    **MARKET RENEWAL PROGRAM COST REPORT**

2    The Market Renewal Program (MRP) Cost Report is a separate cost centre related specifically to  
 3    spending that was established through the IESO's 2017 Revenue Requirement Submission. The  
 4    MRP will address known issues with the existing market design and deliver significant ratepayer  
 5    value by meeting system needs more cost-effectively. MRP is about improving the way  
 6    electricity is priced and scheduled in order to meet Ontario's electricity needs reliably,  
 7    transparently, efficiently and at lowest cost.

## 8    **Summary of Activities**

9    Since posting the final high-level design documents in August 2019 and completing the final  
 10   Detailed Design documents in January of 2021, the IESO has shifted its focus, both internally  
 11   and with its stakeholder community, to developing the specific changes and details required to  
 12   implement MRP in the IESO-Administered Market.

## 13   **Implementation**

14   The IESO is currently codifying the Detailed Designs into rules, manuals, processes and tools as  
 15   part of the implementation phase. The implementation phase includes critical steps including:  
 16   building and finalizing the business requirements and internal manuals for the IESO, developing  
 17   and issuing vendor requirements for building IT systems, and, the section most visible to  
 18   stakeholders, the finalization of Market Rules and Market Manuals. The IESO has developed the  
 19   first batch of MRP Market Rules and Market Manuals, which addresses market entry and  
 20   prudential security, for stakeholder review. This first batch of rules was provisionally  
 21   recommended by the IESO's Technical Panel in April 2021. The IESO has also developed the  
 22   MRP Market Rules and Market Manuals for Market Power Mitigation for stakeholder and  
 23   Technical Panel review.

24   In February 2022, the IESO posted the batch of Market Rules related to the calculation engines  
 25   for stakeholder review and will also be developing the Market Rules and Market Manuals related  
 26   to settlements for stakeholder review in Q3 2022.

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.

Further, the IESO is engaging stakeholders on planning and preparing for the technical aspects of the changes Market Renewal will bring, including training, testing, and market trials.

### **Market Participant Readiness**

Recognizing the importance of change management and adoption through the Market Renewal journey, the IESO is also working on Market Participant Readiness activities. This work builds upon the Detailed Design chapters that outlined the primary concepts and the changes that Market Participants can expect from the renewed market, including the market design, process changes and the new data flows that will be required.

Throughout the latter half of 2021, a cross-section of market participants volunteered to provide their advice and input on testing and training activities, which has guided the planning and approach used for Market Participant Readiness. Materials for this Technical Advisory Group are posted on the MRP implementation webpage.

This engagement effort has led to the creation of a Market Participant Readiness Plan that has been posted for stakeholder review and advice on the MRP implementation webpage.<sup>1</sup> This plan outlines the key approach and timelines for Market Participant Readiness activities, and will form the foundation of the specific tactical planning that is being created to support market participants through the Market Renewal transition.

### **Response to OEB Decisions**

In the OEB's Decision and Order in EB-2020-0230, the OEB approved the settlement proposal in which the IESO agreed to the following:

1. *"The IESO agrees that the reporting requirements set out in the 2019 OEB Decision (EB-2019-0002) continue to apply, with the exception of the MRP Business Case."*

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<sup>1</sup> <https://www.ieso.ca/en/Market-Renewal/Stakeholder-Engagements/Implementation-Engagement-Market-Rules-and-Market-Manuals>

The reporting requirements set out in the 2019 OEB Decision and Order (EB-2019-0002) include the filing of a baseline budget and schedule for each year of MRP, including Cost Performance Index (CPI) and Schedule Performance Index (SPI) metrics against the baseline budget and schedule. The baseline budget for MRP, CPI and SPI metrics are included in this exhibit. The baseline schedule for MRP is included in Exhibit G-2-1 Attachment 1 – MRP Baseline Schedule.

2. *"The IESO agrees to file a more detailed breakdown of MRP OM&A spending in any future Revenue Requirement Submission that contains MRP OM&A spending."*

A more detailed breakdown of MRP OM&A spending is included in Table 6 of this exhibit.

3. *"With respect to market participant readiness, the IESO agrees that it will provide its plan for market participant readiness publicly by the end of 2021."*

The Market Participant Readiness Plan has been posted publicly for stakeholder review and advice on the MRP webpage.<sup>2</sup>

## **Baseline Schedule and Budget**

The IESO Board approved a revised budget and schedule in March 2021, including a go-live date of November 2023 plus 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.

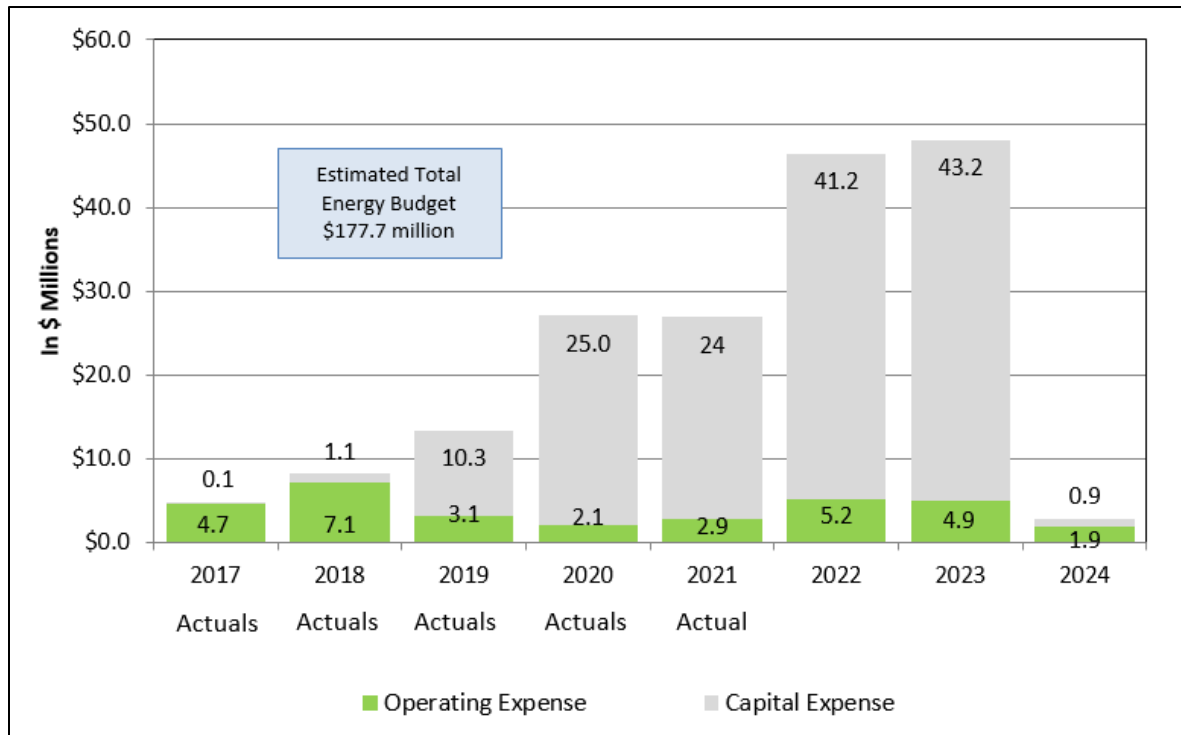
The baseline schedule in Exhibit G-2-1 Attachment 1 - MRP Baseline Schedule, reflects planned implementation activities for 2022 through to the go-live date of the renewed market. The schedule provides a summary of the major pieces of work for the balance of the project. Underpinning this schedule are detailed activities carried out by individuals or groups on a monthly, weekly, or daily basis as applicable.

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<sup>2</sup> <https://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/imrm/imrm-20211216-market-participant-readiness-plan.ashx>

1 The cost estimate for the delivery of MRP is \$177.7 million, which is within the projections from  
2 the MRP Business Case (a range of \$151 million to \$194 million). Please see Table 1 below.

3 **Table 1: Cost Estimate for MRP**



4  
5 The baseline budget associated with the baseline schedule is outlined in Table 2 below. The  
6 budget is divided by operating and capital costs. These costs are broken down into the main  
7 cost categories of expenditure.

8 After the deployment of MRP, the IESO will incur costs to deliver market participant support and  
9 training, complete internal document updates, and start project closure activities while  
10 maintaining a capital budget for additional vendor support and internal IT costs for tool changes  
11 identified after the in-service date.

**Table 2: MRP Baseline Budget by Operating and Capital Expenses**

(\$ millions)	2022 Budget	2023 Budget	2024 Budget
<b>Operating Expenses</b>			
Compensation & Benefits	3.9	3.6	0.7
Professional & Consulting	1.2	1.6	0.2
Operating & Administration	0.1	0.1	-
<b>Total Operating Expenses</b>	<b>5.2</b>	<b>5.3</b>	<b>0.9</b>
<b>Capital Expenses</b>			
Compensation & Benefits	12.7	13.9	0.9
Professional & Consulting	4.1	3.0	-
Operating & Administration	20.3	17.9	1.0
Interest	0.9	1.2	-
Contingency	3.2	6.8	-
<b>Total Capital Expenses</b>	<b>41.2</b>	<b>42.8</b>	<b>1.9</b>
<b>Total MRP Expenses</b>	<b>46.4</b>	<b>48.1</b>	<b>2.8</b>

**2021 Budget and Actual Operating Expenses and Capital Expenses**

**Table 3: 2021 Operating Results**

(\$ millions)	2021 OEB Approved	2021 Actual	2021 Variance
Compensation & Benefits	2.6	2.4	(0.2)
Professional & Consulting	0.9	0.5	(0.4)
Operating & Administration	0.1	0.1	-
<b>Total Operating Expenses</b>	<b>3.6</b>	<b>3.0</b>	<b>(0.6)</b>

2021 operating expenses were \$0.6 million lower than budgeted. The overall decrease in spending was a result of a reduced need for external legal support for market rule and internal market manual drafting.

**Table 4: 2021 Capital Results**

(\$ Millions)	2021 OEB Approved	2021 Actual	2021 Variance
Compensation & Benefits	13.3	11.8	(1.5)
Professional & Consulting	4.1	1.2	(2.9)
Operating & Administration	14.1	10.5	(3.6)
Interest	1.0	0.5	(0.5)
<b>Subtotal</b>	<b>32.5</b>	<b>24.0</b>	<b>(8.5)</b>
Contingency	3.5	-	(3.5)
<b>Total Capital Expenses</b>	<b>36.0</b>	<b>24.0</b>	<b>(12.0)</b>

2021 capital expenses were \$12.0 million lower than budgeted due to a set of variances, including:

- Delays in gathering business and vendor requirements, which has resulted in the deferral of internal and external IT implementation costs;
- Reduced contractor costs;
- Lower corporate financing rates resulting in lower interest expense; and
- Unused contingency.

## Performance Reporting

The baseline schedule and budget represent the planned cost and schedule of the project and are used as a standard against which actual performance is measured. The IESO reports on CPI and SPI, against the MRP baseline budget and schedule. A value of 1.0 indicates that the cost and/or schedule is tracking to baseline plan. A SPI under 1.0 indicates that the project is behind schedule while a CPI under 1.0 indicates the project is overspent.

Below is the annual CPI and SPI for the MRP work performed in 2020 and 2021, which is evaluated against the budget and schedule included in the business case for the detailed design phase. The baseline schedule and budget will apply to future CPI and SPI reporting.



**Table 5: CPI and SPI for 2020 and 2021**

	<b>2020</b>	<b>2021</b>
<b>CPI</b>	0.90	1.14
<b>SPI</b>	0.86	0.82

MRP, as a complex and interdependent project, has a Schedule Performance Index (SPI) which is below target, as the project had to reprioritize some work to accelerate vendor requirements gathering, which impacted dependency tasks. The IESO expects that adjustments to timelines will be needed as the project moves closer to in-service. The IESO is working to finalize the delivery schedule informed by our vendors, stakeholder input, and consideration of the impact on other dependent initiatives, and will re-engage with stakeholders in a timely manner when further information is available

## **2022 Budget Operating Expense and Capital Expenses**

**Table 6: 2022 Operating Budget**

<b>(\$ millions)</b>	<b>2022 Budget</b>
<b>Market Rules &amp; Market Manuals</b>	
Compensation & Benefits	2.5
External Legal support	0.9
<b>Internal Documents &amp; Manuals</b>	
Compensation & Benefits	0.8
<b>Change Management and Training</b>	
Compensation and Benefits	0.6
Contract Services - Training materials	0.2
<b>Generator Contract Review support</b>	<b>0.1</b>
<b>Operating &amp; Administration</b>	<b>0.1</b>
<b>Total Operating Expenses</b>	<b>5.2</b>

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 \$5.2 million in 2022.

**Table 7: 2022 Capital Budget**

<b>(\$ millions)</b>	<b>2022 Budget</b>
Compensation & Benefits	12.7
Professional & Consulting	4.1
Operating & Administration	20.3
Interest	0.9
Contingency	3.2
<b>Total Capital Expenses</b>	<b>41.2</b>

Capital activities reflected in the planning period include the completion of business requirements, vendor costs for the dispatch scheduling and optimization tool as well as other solution development deliverables (reflected in Operating & Administration). The capital budget cost of this work is expected to be \$41.2 million in 2022, including contingency.

### **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 8: 2021 - 2022 Full Time Equivalents**

<b>MRP FTEs</b>	<b>2021 Budget</b>	<b>2021 Actual</b>	<b>2022 Budget</b>
Regular	45	35	42
Temporary	7	14	10
<b>MRP Core FTEs</b>	<b>52</b>	<b>49</b>	<b>52</b>
MRP Support FTEs	42	32	45
<b>MRP FTEs Total</b>	<b>94</b>	<b>81</b>	<b>97</b>

1 The 2022 budget reflects the core resources and support resources that are needed to deliver  
2 on the planned work.

### 3 **Project Governance**

4 Governance of the MRP is provided by the IESO Board who approve business objectives and an  
5 envelope for schedule and budget. An Executive Steering Committee (ESC), comprised of the  
6 IESO Executive Leadership Team, works within this envelope to provide strategic direction to  
7 the project team and approve scope and delivery strategy. The ESC and the project team are  
8 supported by an advisory group comprised of senior leaders throughout the organization who  
9 provide guidance and direction for the successful delivery of the program.

**OEB STAFF INTERROGATORY 24**

ISSUE 4: Market Renewal Program (MRP)

4.0-OEB STAFF-24

**INTERROGATORY**

Reference:

- a. Exhibit G / Tab 1 / Schedule 1 / p. 7
- b. EB-2022-0002 Exhibit I / Tab 1 / Schedule 1 / p. 15
- c. <https://www.ieso.ca/en/Market-Renewal/Background/Market-Renewal-Program-Project-Status>, as accessed May 19, 2023

Preamble:

In reference a. the IESO provides its response to the commitment made in the EB-2022-0002 Settlement Agreement as part of Issue 4.1. As per reference b., the IESO agreed to provide a quarterly report on MRP financial and operational performance, and to make it public. Reference a. provides two links: a link to the public website, which is also reference c, and a link to the Q3 2022 report.

Questions:

- a) Please explain why historical reports are not easily accessible from reference c.
- b) Please explain how interested parties could access historical reports. If the reports are not freely accessible and require contacting someone at the IESO, please explain the IESO's view as to how this meets the Settlement Agreement's intent of providing transparency on MRP's financial and operational performance?
- c) Please provide all available reports that the IESO has published to fulfill its commitment made in the EB-2022-0002 Settlement Agreement in relation to this item as attachments to this interrogatory response.

1 **RESPONSE**

2 a) The historical reports have now been linked at the bottom of the Market Renewal  
3 Program Project Status webpage<sup>1</sup>.

4 b) See a) above.

5 c) Please see the following attachments to this response:

- 6 • Attachment 1 - MRP Project Status Report Q3 2022
- 7 • Attachment 2 - MRP Project Status Report Q4 2022
- 8 • Attachment 3 - MRP Project Status Report Q1 2023

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<sup>1</sup> <https://www.ieso.ca/en/Market-Renewal/Background/Market-Renewal-Program-Project-Status>

# Market Renewal Program Quarterly Project Status Report

## Quarterly Report on the Market Renewal Program Status

As of September 30, 2022 (Q3 2022)

This report provides a quarterly update on the Market Renewal Program (MRP) schedule and cost, covering:

1. Schedule Performance Index<sup>i</sup> and Cost Performance Index<sup>ii</sup> relative to the in-effect baseline schedule and budget.
2. Schedule against baseline 4<sup>iii</sup> and the in-effect baseline schedule<sup>iv</sup>.
3. Year-to-date actual spend vs annual budget, and total actual spend vs total budget, using the cost categories from Table 2 of the MRP Cost Report for baseline 4 and the in-effect baseline budget.
4. Any changes to cost forecast, schedule forecast, or changes to project scope.

### #1, #2: As of September 30, 2022: project performance

	Schedule Performance Index (Current BL5)	Cost Performance Index (Current BL5)	Actual Progress (Calculated as earned value/total value)	Planned Progress (Current BL5) (Calculated as planned value/total value)	Planned Progress (Previous BL4) (Calculated as planned value/total value)
Q3 2022	1.00	1.00	51%	51%	87%

<sup>i</sup>The Schedule Performance Index (SPI) is a measure of the conformance of actual (earned) progress to the planned progress and is calculated as:  $SPI = \text{earned value} / \text{planned value}$ .

<sup>ii</sup>The Cost Performance Index (CPI) calculates the cost efficiency of the project through the following formula:  $CPI = \text{earned value} / \text{actual cost}$ .

<sup>iii</sup>Previous baseline (BL4) is the MRP project schedule which estimated a go-live date of November 2023.

<sup>iv</sup>The in-effect baseline schedule, also referred to as current baseline 5 (BL5), estimates a May 2025 go-live date.

### #3: As of September 30, 2022: project spend

Q3 2022 (In \$ Millions)	Year-To-Date Actual Spend	Annual Budget (Current BL5)	Annual Budget (Previous BL4)	Total Actual Spend	Total Budget (Current BL5)	Total Budget (Previous BL4)
Operating: Compensation & Benefits	2.9	3.9	3.6	15.7	26.5	19.6
Operating: Professional & Consulting	0.4	0.6	1.2	6.5	9.7	8.6
Operating: Operating & Administration	-	0.2	0.1	0.9	1.6	1.2
<b>Total Operating Expenses</b>	<b>3.3</b>	<b>4.7</b>	<b>4.9</b>	<b>23.1</b>	<b>37.8</b>	<b>29.4</b>
Capital: Compensation & Benefits	8.3	12.6	14.1	37.7	79.4	57.1
Capital: Professional & Consulting	1.2	2.1	4.8	8.0	13.9	18.7
Capital: Operating & Administration	7.5	21.6	17.7	30.9	79.2	55.5
Capital: Interest	0.6	0.8	2.3	1.5	8.0	7.0
Capital: Contingency	-	-	3.1	-	15.0	10.0
<b>Total Capital Expenses</b>	<b>17.6</b>	<b>37.1</b>	<b>42.0</b>	<b>78.1</b>	<b>195.5</b>	<b>148.3</b>
<b>Total MRP Expenses</b>	<b>20.9</b>	<b>41.8</b>	<b>46.9</b>	<b>101.2</b>	<b>233.3</b>	<b>177.7</b>

#### **#4: Update September 2022: Changes to the project schedule and budget**

In September 2022, the IESO announced the in-service date of November 2023 (previous baseline 4) is no longer feasible. Integrating the foundational changes across the more than 10 legacy systems that work together to dispatch and settle the wholesale electricity market required more time for solution development and testing than anticipated.

The project reached a stage where the information necessary to more accurately build the schedule was available, including the detailed system requirements and the associated vendor validated solution development times. This allowed IESO to complete a thorough review of the schedule and resulted in a revised in-service date of May 2025, and a forecast budget of \$233 million (current baseline 5).

The revised budget estimate of \$233 million, including contingency, is \$55 million higher than the previously approved budget of \$178 million. The revised budget is higher due to increased costs to modify the IESO's IT systems, and increased labour costs arising from the longer project duration.

The scope of the project has not changed, and a [review of the MRP business case](#) shows the renewed market will deliver at least \$700 million in net financial benefits to Ontario consumers over the first 10 years of operation.

The IESO is confident this schedule is achievable as many of the previous uncertainties have been addressed through completion of business requirements, vendor validation of timelines, and a peer review of the overall schedule. Further, the revised schedule provides stakeholders with additional time for review of Market Rule amendments and to complete their own readiness activities.



# Market Renewal Program Quarterly Project Status Report

## Quarterly Report on the Market Renewal Program Status

As of December 31, 2022 (Q4 2022)

This report provides a quarterly update on the Market Renewal Program (MRP) schedule and cost, covering:

1. Schedule Performance Index<sup>i</sup> and Cost Performance Index<sup>ii</sup> relative to the in-effect baseline schedule and budget.
2. Schedule against baseline 4<sup>iii</sup> and the in-effect baseline schedule<sup>iv</sup>.
3. Year-to-date actual spend vs annual budget, and total actual spend vs total budget, using the cost categories from Table 2 of the MRP Cost Report for baseline 4 and the in-effect baseline budget.
4. Any changes to cost forecast, schedule forecast, or changes to project scope.

### #1, #2: As of December 31, 2022: project performance

	Schedule Performance Index (Current BL5)	Cost Performance Index (Current BL5)	Actual Progress (Calculated as earned value/total value)	Planned Progress (Current BL5) (Calculated as planned value/total value)	Planned Progress (Previous BL4) (Calculated as planned value/total value)
Q4 2022	1.00	1.21	66%	66%	91%

<sup>i</sup>The Schedule Performance Index (SPI) is a measure of the conformance of actual (earned) progress to the planned progress and is calculated as:  $SPI = \text{earned value} / \text{planned value}$ .

<sup>ii</sup>The Cost Performance Index (CPI) calculates the cost efficiency of the project through the following formula:  $CPI = \text{earned value} / \text{actual cost}$ .

<sup>iii</sup>Previous baseline (BL4) is the MRP project schedule which estimated a go-live date of November 2023.

<sup>iv</sup>The in-effect baseline schedule, also referred to as current baseline 5 (BL5), estimates a May 2025 go-live date.

### #3: As of December 31, 2022: project spend

Q4 2022 - for Current BL5 (In \$ Millions)	Year-To-Date Actual <sup>v</sup> Spend	Annual Budget (Current BL5)	Annual Budget (Previous BL4)	Total Actual <sup>vi</sup> Spend	Total Budget (Current BL5)	Total Budget (Previous BL4)
Operating: Compensation & Benefits	4.2	3.9	3.6	17.0	26.5	19.6
Operating: Professional & Consulting	0.6	0.6	1.2	6.7	9.7	8.6
Operating: Operating & Administration	0.1	0.2	0.1	1.0	1.6	1.2
<b>Total Operating Expenses</b>	<b>4.9</b>	<b>4.7</b>	<b>4.9</b>	<b>24.7</b>	<b>37.8</b>	<b>29.4</b>
Capital: Compensation & Benefits	11.5	12.6	14.1	40.9	78.0	57.1
Capital: Professional & Consulting	1.7	2.1	4.8	8.5	13.9	18.7
Capital: Operating & Administration	19.9	19.9	17.7	43.3	80.6	55.5
Capital: Interest	0.8	0.8	2.3	1.7	8.0	7.0
Capital: Contingency	-	-	3.1	-	15.0	10.0
<b>Total Capital Expenses</b>	<b>33.9</b>	<b>35.4</b>	<b>42.0</b>	<b>94.4</b>	<b>195.5</b>	<b>148.3</b>
<b>Total MRP Expenses</b>	<b>38.8</b>	<b>40.1</b>	<b>46.9</b>	<b>119.1</b>	<b>233.3</b>	<b>177.7</b>

<sup>v</sup> Year-to-date actual spend values are unlikely to change, but may be subject to year-end auditing and financial procedures.

<sup>vi</sup> Total actual spend values are unlikely to change, but may be subject to year-end auditing and financial procedures.

#### **#4: Update - December 2022**

Since publishing the Q3 2022 Project Status Report, there were no changes to the overall project cost forecast, schedule forecast, or project scope. In finalizing the budget allocations, there were two adjustments: \$1.7M from the 2022 budget for Capital: Operating & Administration was moved to future periods, and within the total budget, \$1.4M was reallocated from Capital: Compensation & Benefits to Capital: Operating & Administration.

# Market Renewal Program Quarterly Project Status Report

## Quarterly Report on the Market Renewal Program Status

As of March 31, 2023 (Q1 2023)

This report provides a quarterly update on the Market Renewal Program (MRP) schedule and cost, covering:

1. Schedule Performance Index<sup>i</sup> and Cost Performance Index<sup>ii</sup> relative to the in-effect baseline schedule and budget.
2. Schedule against baseline 4<sup>iii</sup> and the in-effect baseline schedule<sup>iv</sup>.
3. Year-to-date actual spend vs annual budget, and total actual spend vs total budget, using the cost categories from Table 2 of the MRP Cost Report for baseline 4 and the in-effect baseline budget.
4. Any changes to cost forecast, schedule forecast, or changes to project scope.

### #1, #2: As of March 31, 2023: project performance

	Schedule Performance Index (Current BL5)	Cost Performance Index (Current BL5)	Actual Progress (Calculated as earned value/total value)	Planned Progress (Current BL5) (Calculated as planned value/total value)	Planned Progress (Previous BL4) (Calculated as planned value/total value)
Q1 2023	1.00	1.21	70%	70%	96%

<sup>i</sup>The Schedule Performance Index (SPI) is a measure of the conformance of actual (earned) progress to the planned progress and is calculated as:  $SPI = \text{earned value} / \text{planned value}$ .

<sup>ii</sup>The Cost Performance Index (CPI) calculates the cost efficiency of the project through the following formula:  $CPI = \text{earned value} / \text{actual cost}$ .

<sup>iii</sup>Previous baseline (BL4) is the MRP project schedule which estimated a go-live date of November 2023. As 2023 was the last year of the program the BL4 annual budget column is no longer being reported.

<sup>iv</sup>The in-effect baseline schedule, also referred to as current baseline 5 (BL5), estimates a May 2025 go-live date.

### #3: As of March 31, 2023: project spend

Q1 2023 - for Current BL5 (In \$ Millions)	Year-To-Date Actual <sup>v</sup> Spend	Annual Budget (Current BL5)	Total Actual <sup>vi</sup> Spend	Total Budget (Current BL5)	Total Budget (Previous BL4)
Operating: Compensation & Benefits	1.0	3.8	17.9	25.7	19.6
Operating: Professional & Consulting	0.1	1.4	6.8	10.3	8.6
Operating: Operating & Administration	0.0	0.1	1.1	1.4	1.2
<b>Total Operating Expenses</b>	<b>1.1</b>	<b>5.3</b>	<b>25.8</b>	<b>37.4</b>	<b>29.4</b>
Capital: Compensation & Benefits	2.6	15.8	43.6	79.2	57.1
Capital: Professional & Consulting	0.4	3.7	8.6	15.6	18.7
Capital: Operating & Administration	2.1	22.7	45.7	78.0	55.5
Capital: Interest	0.4	1.7	2.1	8.1	7.0
Capital: Contingency	-	-	-	15.0	10.0
<b>Total Capital Expenses</b>	<b>5.5</b>	<b>43.9</b>	<b>100.0</b>	<b>195.9</b>	<b>148.3</b>
<b>Total MRP Expenses</b>	<b>6.6</b>	<b>49.2</b>	<b>125.8</b>	<b>233.3</b>	<b>177.7</b>

### #4: Update – March 2023

Since publishing the Q4 2022 Project Status Report, there were no changes to the overall project cost forecast, schedule forecast, or project scope. In finalizing the budget allocations, there were a few minor refinements to categorization of expenditures: a net \$0.4M was moved from Operating expenses to Capital.

<sup>v</sup> Year-to-date actual spend values are unlikely to change, but may be subject to year-end auditing and financial procedures.

<sup>vi</sup> Total actual spend values are unlikely to change, but may be subject to year-end auditing and financial procedures.

1 **VECC INTERROGATORY 14**

2 Issue 4.0 Market Renewal Program

3 4.0-VECC-14

4 **INTERROGATORY**

5 **Reference:** Exhibit G, Tab 2, Schedule 1

6 **Preamble:** "The revised budget estimate of \$233 million, including contingency, is \$55  
7 million higher than 25 the previously approved budget of \$178 million."

8 Questions:

- 9 a) The MRP is significantly over budget. What new initiatives have been established which  
10 will improve the probability of the project staying within the current estimated budget to  
11 completion.

12  
13 **RESPONSE**

- 14 a) In 2022 the project reached a stage where the information necessary to more  
15 accurately build the schedule was available, including the detailed system requirements  
16 and the associated vendor validated solution development times. This allowed IESO to  
17 complete a thorough review of the schedule and resulted in a revised in-service date of  
18 May 2025, and a forecast budget of \$233 million (current baseline 5). The IESO is  
19 taking steps for greater transparency and accountability to the project schedule and  
20 budget. A number of strategies have been developed to mitigate future delays  
21 including contingency time to address defects, more time for stakeholder and Technical  
22 Panel review of Market Rule amendments and the option to stage some non-critical  
23 elements for a later deployment if needed. The IESO also introduced several additional

1 controls to carefully manage the project schedule and scope including limiting design  
2 changes and escalating schedule changes to appropriate levels of project management  
3 staff depending on the impact of the change. The IESO is confident this schedule is  
4 achievable as many of the previous uncertainties have been addressed through  
5 completion of business requirements, vendor validation of timelines, and a peer review  
6 of the overall schedule. Further, the revised schedule provides stakeholders with  
7 additional time to complete their own readiness activities.

1 **AMPCO INTERROGATORY 22**

2 Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

3 4.0-AMPCO-22

4 **INTERROGATORY**

5 Reference: EB-2022-0002 G-2-1 Attachment 1

6 Preamble: At the above reference, the baseline schedule for MRP is included.

7 Questions:

8 a) Please provide an update of Attachment 1 to reflect the BL5 schedule.

9  
10 **RESPONSE**

11 a) Please see the response to 4.1 SEC Interrogatory 24 c) Attachment 2 – MRP Schedule  
12 and Milestones.



**APPrO INTERROGATORY 14**

Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

4.1-APPrO-14

**INTERROGATORY**

**Reference:** Exhibit G, Tab 2, Schedule 1, Pages 1 and 2 of 10; Exhibit G, Tab 2, Schedule 1, Page 4 of 10, footnote 9.

**Preamble:** The application evidence states that “[t]he revised budget estimate of \$233 million, including contingency, is \$55 million higher than the previously approved budget of \$178 million ... due to increased costs to modify the IESO’s IT systems, and increased labour costs arising from the longer project duration” [revised in-service date of May 2025 from previously communicated in-service date of November 2023].

Questions:

- a) If project costs have increased by \$55 million, please explain why there is not a commensurate decrease in the estimated net financial benefits of \$700 million from the 2019 business case estimated benefits of \$800 million? In other words, why is the current estimated net financial benefits over the first 10 years of operation not \$745 million instead of \$700 million where the total quantifiable benefits estimate of \$975 million over the first 10 years has not changed since the 2019 Business Case calculation (as stated in the September 22, 2022 validation memo)?
- b) What will the impact be on the MRP net financial benefit estimate if the MRP go-live date is further delayed?
- c) What mitigation measures has the IESO put in place to ensure the MRP go-live date is not further delayed?

**RESPONSE**

- a) Please see response to 4.1 SEC Interrogatory 22 b).
- b) The IESO does not speculate on how hypothetical delays may impact the cost of completing the project but would continue to expect that the benefits would remain intact. As noted in the business case validation published in September 2022, and in the response to 4.1 SEC Interrogatory 22 b), the new market is still expected to yield the same benefits from quantifiable market efficiencies and the elimination of unnecessary congestion management settlement credits (CMSC) of \$975 million over the first 10 years despite the revised go-live date announced in 2022. The validation also noted that other benefits, through optimization and operational certainty, that were not quantified in the Business Case are expected to increase as the sector is evolving to include new and more diverse resource types, such as storage and hybrids.
- c) The IESO is taking steps for greater transparency and accountability to the project schedule and budget. A number of strategies have been developed to mitigate future delays including contingency time to address defects, more time for stakeholder and Technical Panel review of Market Rule amendments and the option to stage some non-critical elements for later deployment if needed. The IESO also introduced several additional controls to carefully manage the project schedule and scope including limiting design changes and escalating schedule changes to appropriate levels of project management staff depending on the impact of the change. The IESO is confident this schedule is achievable as many of the previous uncertainties have been addressed through completion of business requirements, vendor validation of timelines, and a peer review of the overall schedule. Further, the revised schedule provides stakeholders with additional time to complete their own readiness activities.

**APPrO INTERROGATORY 15**

Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

4.1-APPrO-15

**INTERROGATORY**

**Reference:** Exhibit G, Tab 2, Schedule 1, Pages 1 and 2 of 10; Exhibit G, Tab 2, Schedule 1, Page 4 of 10, footnote 9.

**Preamble:** The application evidence states that “[t]he revised budget estimate of \$233 million, including contingency, is \$55 million higher than the previously approved budget of \$178 million ... due to increased costs to modify the IESO’s IT systems, and increased labour costs arising from the longer project duration” [revised in-service date of May 2025 from previously communicated in-service date of November 2023]. But the September 22, 2022 validation memo states in part that the “total implementation and operation cost estimate, including the additional staff for ongoing operation of the renewed market is \$268 million or \$92 million more than assumed in 2019”.

Questions:

- a) Please identify the source of the difference between the \$55 million increase in estimated project costs and the \$92 million increase in estimated implementation and operation cost estimate.
- b) Is the difference entirely comprised of the cost of ongoing operation of the renewed market following the May 2025 in-service date?
- c) If so, where are these costs captured in Exhibit D, Tab 1, Schedule 1, Page 6 of 9, Table 5: 2025 OM&A Expenses (or elsewhere in the application)?
- d) What will the impact be on the MRP budget estimate if the MRP go-live date is further delayed?

**RESPONSE**

- a) The source of the difference is the post MRP in-service date implementation costs. The ongoing costs of operation of the new MRP market is estimated at \$36.4 million over the first 10 years after MRP is in service.
- b) Yes.
- c) The costs for ongoing operation of new functions resulting from MRP implementation are shown in Exhibit D, Tab 1, Schedule 1, Page 6 of 9, Table 5: 2025 OM&A Expenses under the category "MRP - ongoing operation of new functions", and also under the same category in Table 3 and 4 for preparing processes to accept changes as well as additional staff to continue operating the new functions required post-MRP.
- d) The IESO cannot speculate on this hypothetical scenario but is confident that the schedule is achievable. The IESO has introduced several additional controls to carefully manage the project schedule, additional contingency time to address defects, more time for stakeholder and Technical Panel review of Market Rule amendments and the option to stage some non-critical elements for a later deployment if needed.

**PWU INTERROGATORY 7**

Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

4.1-PWU-7

**INTERROGATORY**

Preamble: Exhibit A/Tab 1/Schedule 5 Page 6 of 7

In August 2022, the IESO's Board of Directors approved a revised project schedule which included a revised in-service date of May 2025, and a forecast budget of \$233 million.

Questions:

- a) What were the reasons why the previously communicated in-service date of November 2023 (baseline 4 or BL4) was no longer feasible?
- b) How many times has the IESO revised the MRP project schedule and cost since its inception?
- c) How confident is the IESO that the May 2025 in-service date will be met? Please identify and describe any risks that could delay the proposed in-service date and/or increase the forecast budget of \$233 million.

**RESPONSE**

- a) Please see the response to 4.1 SEC Interrogatory 23 and 4.1 SEC Interrogatory 24.
- b) The forecast in-service date for MRP has been revised twice since the first IESO Board approved schedule and budget. The initial forecast in-service date was March 2023, which was revised to November 2023, and finally May 2025.
- c) The IESO is confident the revised schedule will be met as more than 90% of the solution costs and associated development timelines have been validated by vendors. Some of the key issues affecting the schedule were the time required for vendors to develop software, and the testing that needs to take place on each of those systems; much of these details were only finalized in 2022. However, now that further progress was made on the project

1 coupled with more detailed vendor estimates, there are fewer uncertainties, increasing  
2 confidence the revised schedule is achievable. The strategic risks that the project is  
3 monitoring are provided in 4.1 SEC Interrogatory 25 Attachment 2 – MRP Strategic Risk  
4 Review.

1 **SEC INTERROGATORY 22**

2 Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

3 4.0-SEC-22

4 **INTERROGATORY**

5 **Reference:** [G-1-1, p.8]

6 **Preamble:** With respect to the Market Renewal Program Business Case Validation  
7 Memorandum:

8 Questions:

9 a) Please file a copy of the memorandum.

10 b) Page 4 of the Memorandum states: "Using the updated implementation and operating  
11 cost values and the same benefits, the net financial assessment of the Business Case  
12 was recalculated". Please provide a copy (with formulas intact) of the model used to  
13 determine the recalculated net financial assessment.

14 c) Please provide a probability distribution of the Net Present Value ("NPV") for the Market  
15 Renewal Program based on the 2022 updated values.  
16

17 **RESPONSE**

18 a) Please see Attachment 1 – MRP Business Case Validation Memo to this response. The  
19 Memorandum has also been posted on the IESO's website<sup>1</sup>.

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<sup>1</sup> <https://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/imrm/imrm-20220922-mrp-business-case-validation-memo.ashx>

- 1 b) Please see Attachment 2 – MRP Net Financial Assessment to this response. The model  
2 uses an updated timeframe that captures all the relevant costs for the program life cycle  
3 from 2017 to 2025, and the estimated benefits for the first 10 years from 2025 to 2035,  
4 along with associated incremental implementation costs for these years. As shown in the  
5 model, the new market is assumed to yield the same benefits from quantifiable market  
6 efficiencies and the elimination of unnecessary congestion management settlement  
7 credits of \$975 million over the first 10 years, starting in 2025. The key assumptions that  
8 were stakeholdered during the preparation of the 2019 MRP Business Case remain  
9 unchanged, with the exception of updated costs and the timeframe in which the benefits  
10 occur.
- 11 c) Please see Attachment 3 – Probability Distribution NPV 2022 Values to this response. As  
12 described in b) above, the new market is assumed to yield the same benefits, but the  
13 updated net present value of the program including the updated costs is \$266 million,  
14 which falls within the 90% probability range of NPV values that were calculated for the  
15 MRP Business Case completed in 2019. The IESO used a conservative approach in  
16 developing the MRP Business Case and certain key benefits, including enhanced  
17 optimization and operational certainty, were not quantified, though they are expected to  
18 increase as the sector is evolving to include new and more diverse resource types, such  
19 as storage and hybrids. The probability distribution of the Net Present Value (“NPV”) for  
20 the Market Renewal Program based on the 2022 updated values demonstrates that even  
21 from a conservative viewpoint, the NPV remains strongly positive with the updated costs  
22 of the MRP included. More information on why the benefits remain valid is detailed in the  
23 business case validation memo provided as Attachment 1 to this response.





Independent Electricity System Operator

1600-120 Adelaide Street West

Toronto, ON M5H 1T1

t 416.967.7474

[www.ieso.ca](http://www.ieso.ca)

# Memorandum

**To:** MRP Implementation Engagement Stakeholders

**From:** Tom Chapman, Sr. Manager, Wholesale Market Development

**Date:** September 22, 2022

**Re:** Market Renewal Program Business Case Validation

Following the establishment of a new project schedule and budget, the IESO undertook a review of the MRP Business Case originally developed in 2019. The IESO concluded that the Business Case remains sound, and the renewed market will deliver substantial net financial benefits of at least \$700 million to Ontario consumers over the first 10 years of operation.

The review included an assessment of whether the expected benefits, costs, and other underlying assumptions have materially changed given a refreshed MRP project schedule and budget, as well as an updated view of the IESO's forecasted demand and supply projections. The updated net benefits are lower than the 2019 calculated estimate of \$800 million as implementation and costs to operate the new market have increased by \$92 million, as some of these costs were unknown during the 2019 Business Case preparation. The new market will still yield the same benefits from quantifiable market efficiencies and the elimination of unnecessary congestion management settlement credits (CMSC) of \$975 million over the first 10 years. The updated net present value of the program is \$266 million which falls within the 90% probability range of NPV values that were calculated for the 2019 Business Case. Other benefits, through optimization and operational certainty, that were not quantified in the Business Case are expected to increase as the sector is evolving to include new and more diverse resource types, such as storage and hybrids.

The renewed market will build on and enhance the IESO's ability to deliver on core priorities of preparing for future transformation of the sector and ensuring cost-effective reliability of the Ontario electricity system. Efficient operation of existing resources and effective integration of new resource types is dependent on the foundational improvements MRP will deliver – prices that reflect costs in the different regions across the province and significantly improved optimization of supply resource scheduling and dispatch. Effective integration of storage and other new resource technologies would not be possible in today's two-schedule market without significant compromise to their potential and increased integration costs, especially with

growing future uncertainties related to fuel and resource development costs. Together the improvements delivered by MRP will significantly improve our ability to provide optimal use of resources available on any given day, and send clear signals to identify where additional resources are needed in the future.

## Key Updates and Findings of the Validation of the MRP Business Case

### 1. Quantifiable Benefits

The estimated total benefits of \$975M from 10 years of operating the new market remain the same with a shift in the launch of the new market from 2023 to 2025. These benefits include \$525M from market efficiency improvements and \$450M from avoiding unnecessary congestion management settlement credit payments.

#### *Market Efficiency Benefits*

The calculated market efficiency benefits of \$525 million in the first 10 years are achieved through more efficient unit commitment and optimization, improved intertie pricing, and locational pricing incentivizing increased resource competition. These benefits are not affected by any schedule and budget changes, or changes in the sector and the associated forecasts because the design of the market has not fundamentally changed. Each of the quantified benefits are tabulated in the table below and further discussed.

Market Efficiency	10 Years of Efficiency Benefits (\$M)
More Efficient Unit Commitment	\$190
Improved Intertie Pricing	\$285
Increased Resource Competition	\$50
Total Efficiency Benefits	\$525

The benefits of more efficient unit commitment were determined based on assessing the inefficiency of the existing process to commit resources that require lead time to come on-line and minimum operating runtimes once connected to the grid. This calculation is still valid as there will continue to be non-quick-start resources with start-up costs and minimum operational requirements that would be inefficiently scheduled in the absence of MRP. With the potential for a decarbonized and decentralized resource mix, the renewed market will be necessary for driving efficient outcomes and managing resources' operational requirements.

The benefits of improved intertie pricing also do not change with the refreshed project schedule. The Ontario market is directly connected to the Mid-Continent Independent System Operator (MISO) and New York Independent System Operator (NYISO) electricity markets and indirectly to the Independent System Operator of New England (ISO-NE) and the PJM Interconnect. These links to external markets remain and will require efficient price signals to

indicate when it is economic to export or import energy. The current two-schedule pricing market sends incorrect signals leading to volumes of energy flowing out of Ontario settled at a price that does not match the costs to produce the energy. These inefficiencies were modelled in the 2019 Business Case and recent monitoring shows that these inefficiencies continue to occur where the annual estimate used in the Business Case is a lower bound of the potential benefits.

The benefits from increased resource competition also do not change with the refreshed project schedule. These benefits were determined by assuming a subset of the resource fleet would be more proactive and respond more aggressively to transparent prices. The 2% reduction in offer prices was already, and continues to be, a conservative estimate based on published literature on increased competition from market design enhancements, and from updated projections on the future demand forecast.

#### *Elimination of Unwarranted Congestion Payments*

The new market would avoid \$450 million of unwarranted congestion management settlement credit (CMSC) payments in the first 10 years. The current market incurs congestion management settlement credits of which unnecessary constrained-off payments will be eliminated by the new market. The elimination of these payments are not affected by any schedule and budget changes over the first 10-year period of operating the new market. On an average annual basis, \$45 million would be avoided by Ontario consumers. This level of avoided payment with the new market is consistent with the amount of constrained off payments charged to Ontario consumers in 2021.

#### *Total Benefits*

The total benefit to Ontario consumers from MRP is the sum of market efficiency benefits and the elimination of unwarranted congestion management settlement credit payments. With the IESO's conservative assessment of the total benefits, in the first ten years of operating the new market the total benefits are unchanged from the 2019 Business Case calculation and amount to \$975 million.

Total Benefits	10 Years of Benefits (\$M)
Market Efficiency Benefits	\$525
Eliminated CMSC Benefits	\$450
Total Quantifiable Benefits	\$975

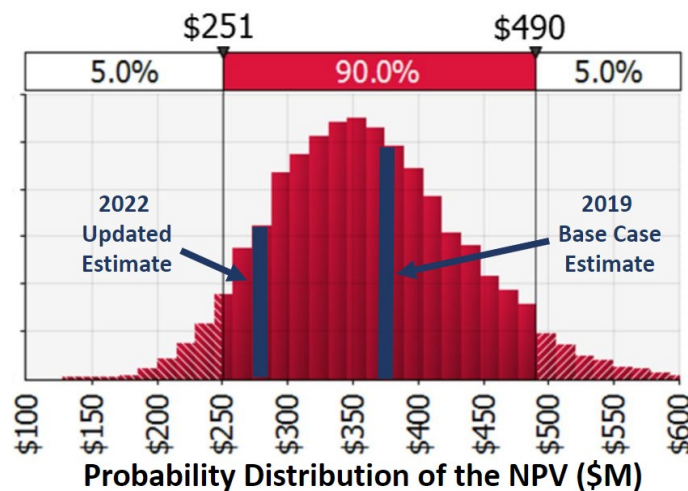
## **2. Implementation and Operating Costs**

In the original 2019 Business Case, MRP was expected to cost \$170 million and be implemented in 2023. After the program had been implemented there was expected to be ongoing incremental maintenance costs, estimated at an additional \$6 million over the first 10 years following implementation. At the time of developing the Business Case in 2019, it was not yet known if incremental staff would be required to operate the new market. With more certain costs and development schedules confirmed by vendors, the implementation timeline has been

extended to 2025 with a new implementation cost estimate of \$233 million. Further, the completion of the MRP Detailed Design in 2021 has also allowed for more accurate assessment of the ongoing costs over the first 10 years of operations. The total implementation and operation cost estimate, including the additional staff<sup>1</sup> for ongoing operation of the renewed market is \$268 million or \$92 million more than assumed in 2019.

### 3. Net Financial Assessment

Using the updated implementation and operating cost values and the same benefits, the net financial assessment of the Business Case was recalculated. The updated net present value of MRP is \$266 million which falls within the 90% probability range of NPV values, which are between \$251 million and \$490 million as calculated for the 2019 Business Case. Despite increased cost estimates, the NPV of MRP remains strong, and underscores the value to ratepayers for implementing MRP. The figure below compares the original 2019 probability distribution of the NPV for MRP, with the 2019 base case value and the 2022 updated value estimate illustrated.



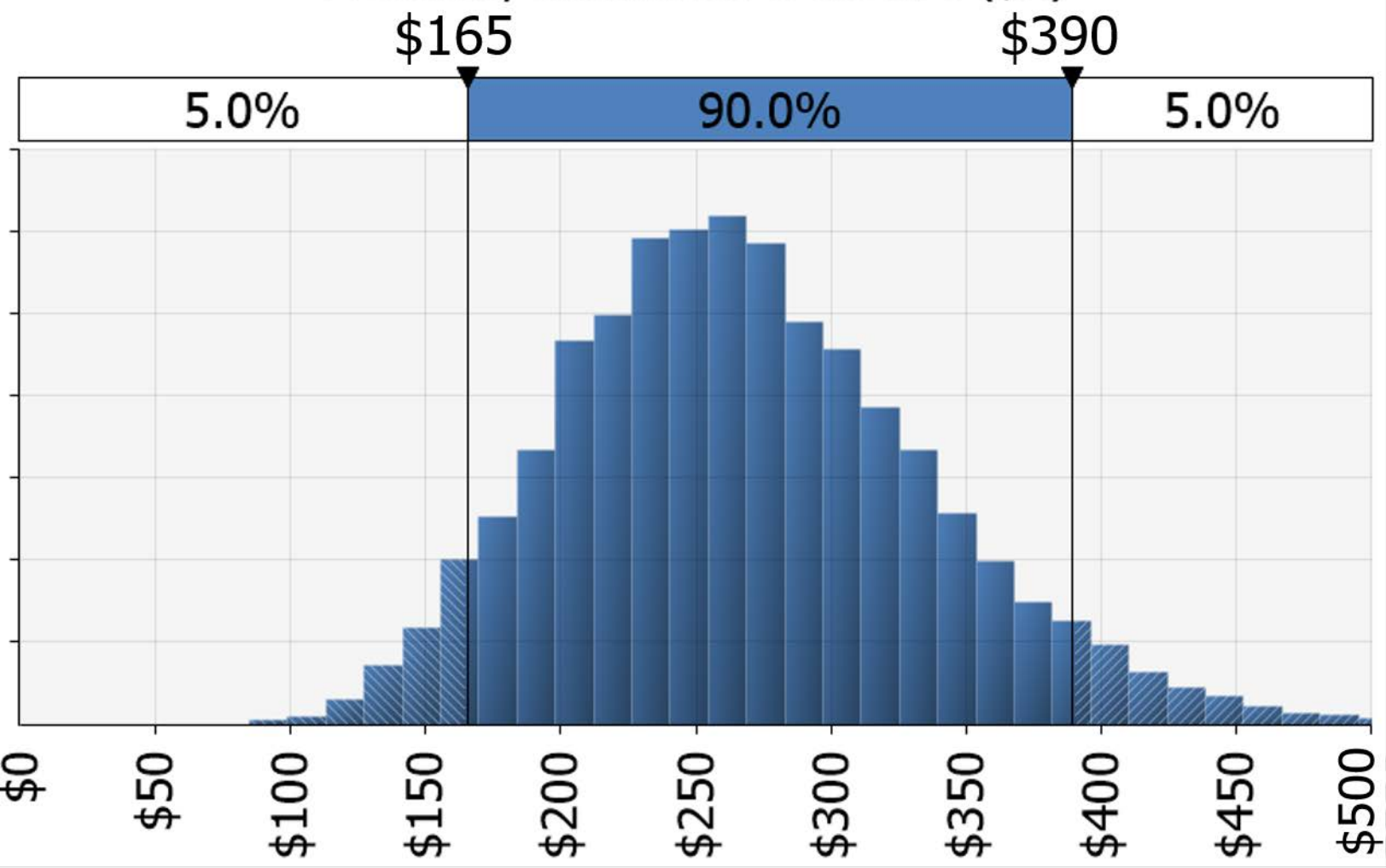
### 4. Benefits Not Quantified

The 2019 MRP Business Case included case studies and discussion of qualitative benefits. These included better operational and financial certainty with a day-ahead market and broader market benefits. The broader market benefits include improved signals for supporting investment and competition, indicating the need for system flexibility, and reduced energy curtailment and spilling. Given the need to acquire incremental capacity to meet increasing system needs and the focus on investigating pathways to decarbonize the electricity fleet, these unquantified benefits are expected to be even larger and of increased importance since 2019 when the Business Case was published.

<sup>1</sup> MRP will introduce new features and tools that require additional resources for market operations, monitoring and ongoing maintenance and support.

In particular, with the larger anticipated volume of storage resources, the single schedule design of MRP is essential. The current IESO initiatives for storage integration and enabling new resources will be facilitated with the single schedule design as storage and other emerging resources require clear locational price signals to know when to operate economically.

# Probability Distribution of the NPV (\$M)



1 **SEC INTERROGATORY 23**

2 Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

3 4.0-SEC-23

4 **INTERROGATORY**

5 **Reference:** [G-2-1]

6 **Preamble:**

7 The IESO's application provides very limited information regarding the specific issues that  
8 the IESO has encountered implementing the Market Renewal Program, which has led to a  
9 substantial cost increase and schedule delay.

10 Questions:

- 11 a) Please provide more information so parties can assess the reasonableness of the revised  
12 budget and schedule.

13  
14 **RESPONSE**

- 15 a) MRP is a large and complex project, including changes to many IT systems. The IESO  
16 worked with vendors and stakeholders to refine and translate the design into system  
17 requirements and rules needed to finalize the delivery schedule for MRP. Some of the  
18 key issues affecting the schedule were the time required for vendors to develop  
19 software, and the testing needed to take place on each of those systems; many of these  
20 details were only finalized in mid-2022. Now that the project has made more progress  
21 and with more detailed estimates from vendors, the IESO is confident this revised  
22 schedule is achievable. Please see the response to 4.1 SEC Interrogatory 24 a) and b)  
23 for more details.

**SEC INTERROGATORY 24**

Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

4.1-SEC-24

**INTERROGATORY**

**Reference:** [G-2-1]

**Preamble:**

With respect to the Market Renewal Program (MRP):

Questions:

- a) Please provide a detailed comparison of the BL4 and BL5 schedules, and an explanation of the specific changes.
- b) Please provide a detailed comparison of the BL4 and BL5 budgets, and an explanation of the changes.
- c) Please provide a copy of all information provided to the IESO Board of Directors for the purposes of their approval of the BL5 budget and schedule.
- d) Please provide a copy of the last reports provided to the IESO senior management related to the MRP before the approval of the BL5 schedule, and the budget related to MRP cost performance, schedule performance, and risk.



## **RESPONSE**

a) In September 2022, the IESO announced that the in-service date of November 2023 (previous Baseline 4) is no longer feasible. The project reached a stage where the information necessary to more accurately build the schedule was available, including the detailed system requirements and the associated vendor validated solution development times. The previous schedule was built on projected vendor timeline estimates, but the IESO was able to incorporate more level of detail and the schedule was rebuilt with more precise timeline estimates. This allowed IESO to complete a thorough review of the schedule and resulted in a revised in-service date of May 2025 (current Baseline 5). Key areas of the schedule include more time is provided includes the total time planned for participants to complete their own readiness activities (approximately four months longer) as well as participants will have the technical specifications required to make their conforming changes further in advance of testing giving them at least an additional six months to complete this work.

b) See Table 1 below for comparison between Baseline 4 and Baseline 5 budget.

**Table 1 – MRP BL4 and BL5 Budget Variance**

(\$ millions)	BL4	BL5	Variance
<b>Operating Expenses</b>			
Compensation & Benefits	19.6	25.7	6.1
Professional & Consulting	8.6	10.3	1.7
Operating & Administration	1.2	1.4	0.2
<b>Total Operating Expenses</b>	<b>29.4</b>	<b>37.4</b>	<b>8.0</b>
<b>Capital Expenses</b>			
Compensation & Benefits	57.1	79.2	22.1
Professional & Consulting	18.7	15.6	3.1
Operating & Administration	55.5	78.0	22.5
Interest	7.0	8.1	1.1
Contingency	10.0	15.0	5.0
<b>Total Capital Expenses</b>	<b>148.3</b>	<b>195.9</b>	<b>47.6</b>
<b>Total MRP Expenses</b>	<b>177.7</b>	<b>233.3</b>	<b>55.6</b>

1  
2 The revised budget estimate of \$233.3 million, including contingency, is approximately  
3 \$55 million higher than the previously approved budget of \$177.7 million, driven by  
4 increased costs to modify the IESO's IT systems and the longer project duration as per  
5 the schedule updates described in a) above. The impact of these changes is reflected in  
6 the higher Operating and Administration and Compensation and Benefits costs  
7 categories, as well as the higher Contingency amount.

8 c) Please see the following attachments to this response:

- 9
- Attachment 1 - MRP Schedule and Budget August MC Memo
  - 10 • Attachment 2 - MRP Schedule and Milestones
  - 11 • Attachment 3 – MRP Southwest Power Pool Engagement
  - 12 • Attachment 4 – MRPIWG Business Case Validation Memo
  - 13 • Attachment 5 – MRP Schedule Refresh Communication Strategy
  - 14 • Attachment 6 – MRP Schedule and Budget August BOD Memo
  - 15 • Attachment 7 – MRP Schedule and Budget BOD Resolution
  - 16 • Attachment 8 – MRP Schedule and Budget MC Memo Appendix

17 d) Please see Attachment 9 – MRP Status Update to this response.



Independent Electricity System Operator  
1600-120 Adelaide Street West  
Toronto, ON M5H 1T1  
t 416.967.7474  
[www.ieso.ca](http://www.ieso.ca)

# Memorandum

**To:** **Markets Committee of the IESO Board of Directors**

**Presenters:** Jessica Savage, Program Delivery Executive – MRP  
Candice Trickey, Director – MRP Readiness  
Anja Vukovic, Senior Manager – MRP Program Management & Integration

**Date:** August 23, 2022

**Re:** Market Renewal – Energy Project: Schedule and Budget

**Purpose of Item:** Recommendation for approval by the Board

## **Executive Summary:**

IESO Management is recommending that the IESO Board approve a revised in-service date for the Market Renewal – Energy Project (MRP) of May 2025 and an expanded budget envelope of \$233 million (\$218 million plus \$15 million contingency). The revised schedule and budget now include vendor validation of more than 90% of the solution costs and associated timelines, are confirmed to be consistent with a comparable initiative implemented by Southwest Power Pool in 2014, and have schedule reserve periods strategically placed to mitigate the risk of unforeseen delays. The MRP Business Case, developed in 2019, has also been reviewed and remains sound, where the renewed market will deliver net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation. Finally, a communications plan has been developed to mitigate the reputational risks of the delay. It will reinforce why MRP is essential to support the transformation of Ontario's electricity system and highlight efforts to increase accountability by providing more transparency on our progress with key milestones tracked on a project progress webpage.

This memorandum summarizes the underlying assumptions, remaining uncertainties, risks and mitigations underpinning the revised budget and schedule and the milestones to be used for project tracking and reporting. Supplementary information items are also provided in Diligent Boards with details on the IESO-Southwest Power Pool engagement, the MRP Business Case validation and the schedule refresh communications strategy.

### **Significant Issues, Risks and Opportunities:**

The forecasted go-live date of May 2025 is a significant delay relative to the original in-service date of March 2023 (plus six months contingency) put forth when the Board approved the MRP Business Case in October 2019. Likewise, the revised budget is a significant increase relative to the original estimate of \$170 million. While the delay and increase in budget will have reputational impacts that need to be carefully managed, we must position ourselves to ensure the project delivers the significant ratepayer savings it was originally designed for, and that are now essential to support the transformation of Ontario's electricity system. To mitigate the reputational impacts which could lead to diminished stakeholder support for the program, we have developed a comprehensive communications and engagement plan and validated that the MRP business case remains sound.

We are confident that the newly-validated schedule is achievable for the following reasons:

- More than 90 per cent of the solution costs and associated development timelines have been validated by our vendors.
- Embedded in the schedule are strategically placed reserve periods that provide additional time for critical tasks and allow us to redeploy resources to critical path activities if those activities start to fall behind.
- The project worked with vendors to advance testing phases to identify and correct defects sooner.
- Several elements could be staged for a later deployment if required to de-risk the project and free up resources to focus on higher priority core systems and functionality

- Market rule amendment timelines reflect additional time for stakeholder and Technical Panel review based on recent lessons learned while still driving to a final approvals date that is well in advance of MRP in-service date, thus mitigating the risk that an Ontario Energy Board market rule review delays the in-service date.
- The revised timeline provides participants with more time for readiness activities, in particular for development of their conforming changes.

Further, the peer review conducted by Southwest Power Pool (SPP)<sup>1</sup> validated our key planning assumptions for solution development, testing, and readiness activities and that the revised timelines for MRP implementation are reasonable and achievable. The discussions with SPP project executives also identified a number of opportunities to incorporate lessons learned from their project into plans to support successful delivery and implementation of MRP. The MRP Project Team has already taken action on most of the SPP recommendations, including exploring options to onboard an external resource to help support vendor management and working with Internal Audit to take on the contract management and oversight role for independent, external assurance that the project is on track.

### **Background:**

The IESO Board of Directors first approved the MRP budget of \$170 million and a target in-service date of March 2023 when it approved the MRP Business Case in October 2019 based on the High-Level Design. A revised budget of \$177.7 million and target in-service date of November 2023 was subsequently approved by the IESO Board in March of 2021 following a schedule validation review once more details about the design were known.

<sup>1</sup>The Southwest Power Pool is an independent system operator and regional transmission organization responsible for supply of power, transmission and a competitive marketplace across 17 states in the United States. Their Integrated Marketplace Project included introducing a day-ahead market, a reliability commitment process, and a real-time balancing market.

In December 2021, the MRP team identified to the Markets Committee the risk of material changes to the schedule and budget due to the remaining uncertainty on other vendor costs and development schedules given the requirements yet to be completed. Work to develop process models, business requirements, and vendor specifications took longer than estimated for several reasons. First, significant solution complexity surfaced through requirements elicitation so the estimates for requirements development were too optimistic. Second, the degree of parallelism in the schedule resulted in key resources being over-allocated which compounded delays in completing business requirements, which are the precursor to vendor specifications and solution development.

In March 2022, the MRP team confirmed that a go-live date prior to May 2024 (November 2023 target plus six-months contingency) was not feasible as the required time to complete the core functionality extended beyond the contingency period and reported back to the Markets Committee in June on options for a revised, costed, and risk-informed schedule.

### **Discussion:**

The project team has done significant work to validate the underlying assumptions and identify the residual risks associated with the revised schedule and budget. More than 90% of the solution costs and associated timelines have been validated by vendors. Over the last two months, the MRP team worked with vendors to prioritize critical functionality and market participant facing solutions, and split up solution releases into smaller feature sets to start testing earlier.

Within the proposed go-live date of May 2025, the project team has incorporated a schedule reserve of approximately seven months which is allocated across various points on critical path milestones that will be tracked and monitored. During these reserve periods, resources will continue to work on deliverables not on the critical path and will be redeployed to critical path activities if needed to maintain the May 2025 in-service date. The schedule reserve periods have been strategically placed after key solution testing efforts to mitigate the risk of unforeseen delays due to defect management, an area of the project where some uncertainty remains given that systems testing has not yet begun. A priority list of items that could be staged for later deployment have also been identified if required to free up resources to focus on higher priority core systems and functionality.

The refreshed project schedule reflects durations for testing that are rooted in established best practices and past experience, and represent key controls in mitigating the strategic risk of unintended market consequences. The testing timelines are also consistent with the testing timelines that Southwest Power Pool experienced with their Integrated Marketplace Project.

Refer to the Appendix for a view of the MRP project schedule and key deliverables/milestones.

The overall project budget for which approval is being sought is \$233 million (\$218 million plus \$15 million contingency). The increase in costs of \$63 million from the original budget are due to increased costs to modify our legacy IT systems now that we have vendor-validated estimates and IESO labour costs associated with the delayed in-service date.

The recommended budget contingency of \$15 million, or 7% of overall program budget, has been established to cover the potential for overtime costs and/or additional resources to preserve the May 2025 in-service date, and to address critical solution defects.

The life-to-date spend to the end of June 30, 2022 is \$94.5 million and forecasted costs based on a May 2025 go-live date are shown in Figure One.

**Figure One – Actual and Forecast Costs**





## **MRP Business Case Validation**

The IESO has validated that the MRP Business Case (originally published in November 2019) remains sound. Using updated schedule and budget information, and taking into account projected demand and supply changes, the result is that the renewed market will deliver substantial net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation. The renewed market will still yield the same benefits of \$975 million over the first 10 years but increased costs have reduced the net financial benefit from the \$800 million estimated in the 2019 Business Case. The updated net present value of the program is \$266 million which falls within the 90% probability range of net present values that were calculated for the 2019 Business Case.

The validation also highlights that broader market benefits that were not quantified in the business case are expected to increase as the sector is evolving to include new and more diverse resource types such as storage and hybrids. Effective integration of storage and other new resource technologies would not be possible in today's two-schedule market without significant compromise to their potential and increased integration costs, especially with growing future uncertainties related to fuel and resource development costs.

Overall, the improvements delivered by MRP will significantly improve our ability to provide optimal use of resources available on any given day, and send clear signals to identify where additional resources are needed in the future. The project is planning to review the MRP Business Case validation with the recently created MRP Implementation Working Group and with the broader stakeholder community in mid-September. A copy of the MRP Business Case validation memo to be shared with stakeholders is provided as an information item in Diligent Boards (Information Item B).

## **Stakeholder Engagement and Communications**

The project has developed a comprehensive communications plan to support the release of the refreshed schedule and to mitigate the potential reputational risk of the delay. The narrative is focused around two primary themes: the first is a review of why MRP is critical, including preparing for sector transformation, and the significant benefits of the project. The second theme acknowledges the reasons for the schedule refresh, and highlights efforts to increase accountability and transparency, and the additional time for

participant readiness. Pending Board approval of the revised schedule and budget, the external communications will begin in early September and include leveraging current venues for engagements alongside executive outreach opportunities. Additional detail on the communications rollout plan and key messages is provided as an information item in Diligent Boards (Information Item C). We have also begun to engage government on the schedule and budget changes alongside the impact on the IESO's 2023 – 2025 business plan, reinforcing the significant ratepayer savings and how this project will provide the foundation that is essential to support the transformation of Ontario's electricity system.

## **Recommendation**

The Committee is asked to approve the following resolution:

WHEREAS the Independent Electricity System Operator (IESO) formally initiated the MRP in January of 2017;

AND WHEREAS in October 2019, the Board of Directors approved the MRP Business Case and approved a cost estimate of \$149 million for the remainder of the MRP Energy project for an overall MRP budget of \$170 million (\$154 million plus \$16 million contingency);

AND WHEREAS the Board of Directors approved the target in-service date of March 2023 in October 2019;

AND WHEREAS the IESO completed a validation of the project schedule and budget in February 2021;

AND WHEREAS in March 2021, the Board of Directors approved an extension to the target in-service date of November 2023 plus 6 months schedule contingency and a revised budget of \$177.7 million (\$167.7 million + \$10 million contingency);

AND WHEREAS the IESO completed a subsequent validation of the project schedule and budget in July 2022 informed by vendor-validated estimates and market participant feedback to establish a fully costed and risk-informed project schedule;

AND WHEREAS the Markets Committee has reviewed the revised schedule and expanded budget envelope;

**NOW THEREFORE BE IT RESOLVED THAT** the Markets Committee recommends that the Board of Directors approve a revised in-service date of May 2025 and an expanded budget envelope of \$233 million (\$218 million + \$15 million contingency).

### **Next Steps**

Subject to Board approval of the revised MRP schedule and budget, the project team will continue to report to the Markets Committee on project status, including tracking of budget and schedule. We will also provide ongoing updates regarding progress on mitigations to address MRP strategic risks.

The project team is also looking to onboard an external resource to help support vendor management given technology integration has been identified as a strategic risk for MRP. The role description and terms of engagement are currently being drafted. As a starting point, candidates who qualified previously as vendors of record for MRP under the Project Management services category will be considered.

Lastly, the project team is considering ways to provide independent, external assurance to the Board that the project is on track. Options include repurposing the remaining Gartner engagements or engaging another firm. The project team will work with Internal Audit to scope out options where Internal Audit would take on the contract management and oversight role for the assurance reviews. We will report back to the Market Committee in October on the status of options being considered.

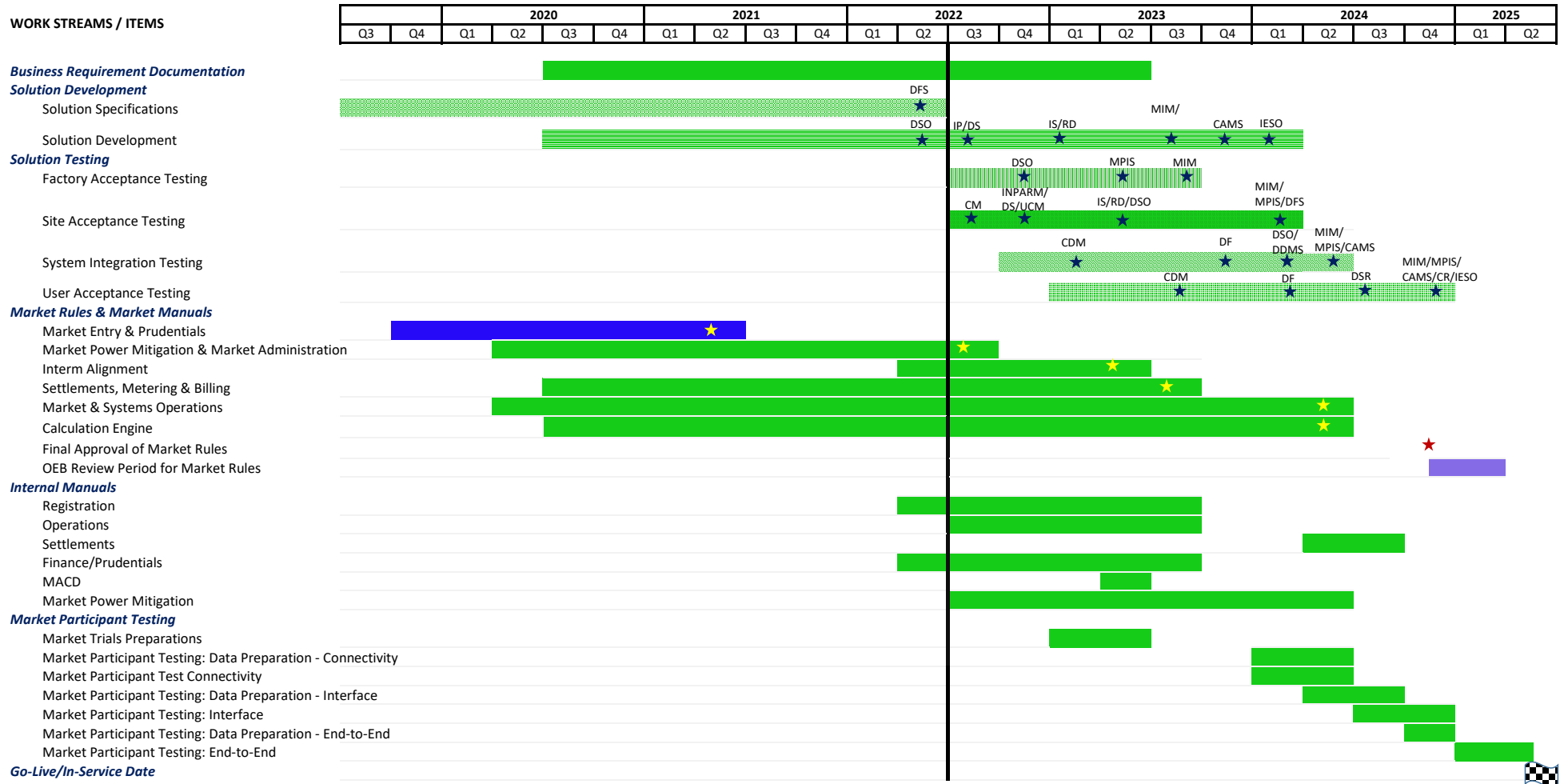
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Appendix – MRP Schedule and Milestones

Information items in Diligent Boards:

- a. IESO-Southwest Power Pool Engagement
- b. Market Renewal Program Business Case Validation
- c. MRP Schedule Refresh Communications Strategy




MARKET RENEWAL PROGRAM - INTERNAL MILESTONES





**Status Legend**

On Track   
 Complete   
 At Risk 







**Milestones Legend**

Interim Milestone   
 Provisional Board Approval   
 Final Board Approval 

**Other Legend**

120 days - OEB review of Market Rules Challenged   
 Go-Live Date 

**Solution Legend**



Solution Specifications   
 Solution Development   
 Factory Acceptance Testing   
 Site Acceptance Testing   
 System Integration Testing   
 User Acceptance Testing 

**Solution Acronyms**

DSO - Dispatch Scheduling & Optimization  
 MIM - Market Information Management  
 MPIS - Market Power Information System  
 DDMS - Data Management System:  
 IS - Interchange Scheduler  
 INPARM - Input Parameters  
 DS - Dispatch Services  
 CM - Contract Manager  
 UCM - Unit Commitment Manager  
 RS - Resource Dispatch

DFS - Demand Forecast  
 CAMS - Central Alarm Management System  
 CDM - Customer Data Management  
 CR - Customer Reconciliation  
 IESO - Online IESO  
 DS&R - Data Storage & Reports  
 AR - Adequacy Reports

Work Streams/Items	2022				2023				2024				2025			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Market Participant Readiness Plan</b>	★															
<b>Day-in-Life (role-based summary of work)</b>		★														
<b>Technical Specifications</b>																
Market Information Management (MIM-I/F) API					★											
Dispatch Service API					★											
<b>Participants Build Conforming System Changes</b>																
<b>MP Training &amp; Education</b>																
<b>System Testing</b>																
Connectivity Testing																
Market Trials																
End-to-End Testing																
<b>MP Submissions/Validation</b>																
<b>Market Rules Approved</b>																
<b>Registration Go-Live</b>																
<b>Market Systems Go-Live</b>																

**Legend**  
 Phase of Work   
 Key Milestones 

# IESO-Southwest Power Pool Engagement (July 19 -20)

## Objective

- Peer review of proposed MRP schedule and underlying assumptions to validate that the timelines for MRP are reasonable and achievable based on Southwest Power Pool's (SPP)'s experience with their Integrated Marketplace Project (IMP)
- Opportunity for the IESO to incorporate relevant lessons learned from SPP's IMP into plans to support successful delivery and implementation of MRP

## Overview

SPP's IMP is comparable in scope and scale to MRP in that it introduced a day-ahead market, a reliability unit commitment process, and a real-time balancing market. The initial budget was US\$105 million and the actual spend was US \$115 million, which did not include SPP staff time.

Over the course of a day and a half, MRP met with the former IMP's project delivery executive and leads for customer relations, technology, and project management to review the following topics: project management practices; key risks and mitigations; solution development and quality assurance; and readiness activities.

## Schedule Comparison

- MRP's revised go-live date is just under three years from now where requirements are substantially complete and solution costs and development timelines have been validated by vendors
  - This is consistent with the implementation phase for SPP's IMP which took three years – from March 2011 to March 2014
- MRP's testing timelines are consistent with SPP's experience where testing took approximately 20 months

- SPP also cautioned against reducing testing timelines if falling behind; instead, look for opportunities to scale back or defer elsewhere. For example, SPP planned for a separate project that commenced immediately after the launch of IMP to address the solutions/systems that were deferred.
- The lead time provided to IESO Market Participants to build/adapt their tool sets is greater than IMP benchmarks, and the timeline for participant structured and unstructured testing is consistent with IMP readiness activities

## Lessons Learned from SPP for IESO to Consider

### *IESO - Vendor Executive Alignment*

**SPP Recommendation:** Continue to meet regularly with executives from Hitachi, including the IESO CEO, to ensure alignment and importance of deliverables being on time and on budget. Vendor should also share responsibility for the reputational impacts associated with any delays. This recommendation is based on SPP's experience dealing with their biggest vendor (General Electric).

**MRP Project Team Response:** The project team meets at least monthly with the Hitachi executives on MRP to discuss status and address any issues that have been escalated by the project team. The Program Delivery Executive will work with the VP, Information & Technology to support the IESO CEO's participation in future meetings with the Hitachi Executive team.

### *Factory Acceptance Testing*

**SPP Recommendation:** Attend Factory Acceptance Testing on site to ensure the vendor understands the design and to gain an earlier view into potential issues before Site Acceptance Testing begins.

**MRP Project Team Response:** The project team will be sending several people to Hitachi throughout Factory Acceptance Testing which takes place between September - November 2022.

### *Market Participant Communication*

**SPP Recommendation:** Establish communications with key stakeholder executives to provide assurance organizations are on track and sufficiently prepared and included in the go-live determination.

**MRP Project Team Response:** In conjunction with the communication and engagement activities planned to support the announcement of the revised schedule and budget, an executive outreach plan is under development to maintain support for the project. As market readiness activities ramp up in 2023, we will leverage these executive-level relationships to ensure organizations are being proactive about their own readiness.

### *Stakeholder Working Group*

**SPP Recommendation:** Establish a Change Working Group comprised of market participants to understand each other's challenges, review testing results, etc.

**MRP Project Team Response:** In July, the project team launched the MRP Implementation Working Group to provide advice on navigating implementation issues and participant readiness activities.

### *Internal Audit*

**SPP Recommendation:** Potential role for Internal Audit to assist with providing assurance that the project is on track (SPP's internal audit team provided quarterly updates to the project sponsor (the CEO)).

**MRP Project Team Response:** The project team is considering ways to provide independent, external assurance to the Board that the project is on track. The project team will work with Internal Audit to take on the contract management and oversight role for the assurance reviews, whether the Gartner engagement is repurposed or another firm is engaged.

### *IESO Internal Communication*

**SPP Recommendation:** Need for frequent internal communication, to i) unite around the goal and provide recognition for the roles for all internal staff, including those who are not on the project but are part of core operations and ii) maintain a sense of urgency to deliver on time and on budget. SPP refreshed the IMP themes annually to keep the organization



engaged with IMP. The themes for 2011, 2012, and 2013 were “Why not today”, “How can I help?”, and “Finish strong”, respectively.

***MRP Project Team Response:*** The refreshed MRP narrative was launched internally in the spring 2022 along with the IESO’s new strategic plan – aligning MRP with the sector transformation that is the focus of the new corporate strategy and demonstrating the continued importance of this project. The revised schedule will be a launching point for the next phase of the refreshed internal communication and engagement plan which will educate indirectly impacted teams on the changes MRP will bring.

### ***Project Progress Reporting***

**SPP Recommendation:** Transparency in reporting on project progress and challenges the project is facing will help build trust and momentum with stakeholders.

***MRP Project Team Response:*** The IESO will be launching a Project Status Report webpage on the corporate website that will house information on upcoming key project milestones and a quarterly report synthesizing project management details. By committing to publicly disclose a level of project management detail not yet seen, the IESO can demonstrate the revised schedule is achievable and rebuild stakeholder trust in the revised timelines.

### ***Technology Integration***

**SPP Recommendation:** Important to have robust mitigation and controls for MRP’s strategic risk on “technology integration” where having strong vendor management practices are key to staying on time and on budget.

***MRP Project Team Response:*** The MRP project team is looking to onboard an external resource to help support vendor management. Drafting of the role description and terms of engagement is underway.



Independent Electricity System Operator

1600-120 Adelaide Street West  
Toronto, ON M5H 1T1  
t 416.967.7474

[www.ieso.ca](http://www.ieso.ca)

# Memorandum

**To:** MRP Implementation Working Group

**Re:** Market Renewal Program Business Case Validation

The IESO completed a review of the MRP Energy Stream financial forecast, and refreshed schedule and budget information to validate the MRP Business Case (published in November 2019, following stakeholder input). The result of that validation confirmed that the Business Case remains sound, and the renewed market will deliver substantial net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation.

The review included an assessment of whether the expected benefits, costs, and other underlying assumptions have materially changed given a refreshed MRP project schedule and budget, and an updated view of demand and supply projections over the assessment period. The updated net benefits are lower than the 2019 calculated estimate of \$800 million as implementation and costs to operate the new market have increased by \$92 million, as some of these costs were unknown during the 2019 Business Case preparation. The new market will still yield the same benefits from quantifiable market efficiencies and the elimination of unnecessary congestion management settlement credits (CMSC) of \$975 million over the first 10 years. The updated net present value of the program is \$266 million which falls within the 90% probability range of NPV values that were calculated for the 2019 Business Case. Other benefits, through optimization and operational certainty, that were not quantified in the Business

Case are expected to increase as the sector is evolving to include new and more diverse resource types, such as storage and hybrids.

The renewed market will build on and enhance the IESO's ability to deliver on core priorities of preparing for future transformation of the sector and ensuring cost-effective reliability of the Ontario electricity system. Efficient operation of existing resources and effective integration of new resource types is dependent on the foundational improvements MRP will deliver – prices that reflect costs in the different regions across the province and significantly improved optimization of supply resource scheduling and dispatch. Effective integration of storage and other new resource technologies would not be possible in today's two-schedule market without significant compromise to their potential and increased integration costs, especially with growing future uncertainties related to fuel and resource development costs. Together the improvements delivered by MRP will significantly improve our ability to provide optimal use of resources available on any given day, and send clear signals to identify where additional resources are needed in the future.

## **Key Updates and Findings of the Validation of the MRP Business Case**

### **1. Quantifiable Benefits**

The estimated total benefits of \$975M from 10 years of operating the new market remain the same with a shift in the launch of the new market from 2023 to 2025. These benefits include \$525M from market efficiency improvements and \$450M from avoiding unnecessary congestion management settlement credit payments.

#### *Market Efficiency Benefits*

The calculated market efficiency benefits of \$525 million in the first 10 years are achieved through more efficient unit commitment and optimization, improved intertie pricing, and locational pricing incentivizing increased resource competition. These benefits are not affected by any schedule and budget changes, or changes in the sector and the associated forecasts because the design of the market has not fundamentally changed. Each of the quantified benefits are tabulated in the table below and further discussed.

Market Efficiency	10 Years of Efficiency Benefits (\$M)
More Efficient Unit Commitment	\$190
Improved Intertie Pricing	\$285
Increased Resource Competition	\$50
Total Efficiency Benefits	\$525

The benefits of more efficient unit commitment were determined based on assessing the inefficiency of the existing process to commit resources that require lead time to come on-line and minimum operating runtimes once connected to the grid. This calculation is still valid as there will continue to be non-quick-start resources with start-up costs and minimum operational requirements that would be inefficiently scheduled in the absence of MRP. With the potential for a decarbonized and decentralized resource mix, the renewed market will be necessary for driving efficient outcomes and managing resources' operational requirements.

The benefits of improved intertie pricing also do not change with the refreshed project schedule. The Ontario market is directly connected to the Mid-Continent Independent System Operator (MISO) and New York Independent System Operator (NYISO) electricity markets and indirectly to the Independent System Operator of New England (ISO-NE) and the PJM Interconnect. These links to external markets remain and will require efficient price signals to indicate when it is economic to export or import energy. The current two-schedule pricing market sends incorrect signals leading to volumes of energy flowing out of Ontario settled at a price that does not match the costs to produce the energy. These inefficiencies were modelled in the 2019 Business Case and recent monitoring shows that these inefficiencies continue to occur where the annual estimate used in the Business Case is a lower bound of the potential benefits.

The benefits from increased resource competition also do not change with the refreshed project schedule. These benefits were determined by assuming a subset of the resource fleet would be more proactive and respond more aggressively to transparent

prices. The 2% reduction in offer prices was already, and continues to be, a conservative estimate based on published literature on increased competition from market design enhancements, and from updated projections on the future demand forecast.

#### *Elimination of Unwarranted Congestion Payments*

The new market would avoid \$450 million of unwarranted congestion management settlement credit (CMSC) payments in the first 10 years. The current market incurs congestion management settlement credits of which unnecessary constrained-off payments will be eliminated by the new market. The elimination of these payments are not affected by any schedule and budget changes over the first 10-year period of operating the new market. On an average annual basis, \$45 million would be avoided by Ontario consumers. This level of avoided payment with the new market is consistent with the amount of constrained off payments charged to Ontario consumers in 2021.

#### *Total Benefits*

The total benefit to Ontario consumers from MRP is the sum of market efficiency benefits and the elimination of unwarranted congestion management settlement credit payments. With the IESO's conservative assessment of the total benefits, in the first ten years of operating the new market the total benefits are unchanged from the 2019 Business Case calculation and amount to \$975 million.

Total Benefits	10 Years of Benefits (\$M)
Market Efficiency Benefits	\$525
Eliminated CMSC Benefits	\$450
Total Quantifiable Benefits	\$975

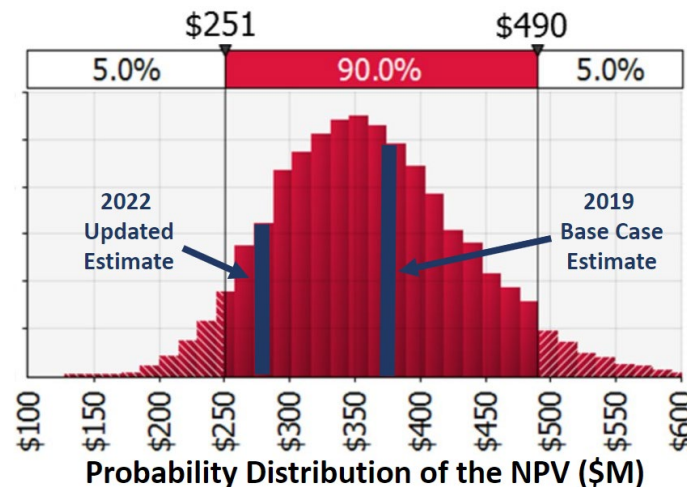
## **2. Implementation and Operating Costs**

In the original 2019 Business Case, MRP was expected to cost \$170 million and be implemented in 2023. After the program had been implemented there was expected to be ongoing incremental maintenance costs, estimated at an additional \$6 million over the first 10 years following implementation. At the time of developing the Business Case in 2019, it was not yet known if incremental staff would be required to operate the new market. With more certain costs and development schedules confirmed

by vendors, the implementation timeline has been extended to 2025 with a new implementation cost estimate of \$233 million. Further, the completion of the MRP Detailed Design in 2021 has also allowed for more accurate assessment of the ongoing costs over the first 10 years of operations. The total implementation and operation cost estimate, including the additional staff<sup>1</sup> for ongoing operation of the renewed market is \$268 million or \$92 million more than assumed in 2019.

### 3. Net Financial Assessment

Using the updated implementation and operating cost values and the same benefits, the net financial assessment of the Business Case was recalculated. The updated net present value of MRP is \$266 million which falls within the 90% probability range of NPV values, which are between \$251 million and \$490 million as calculated for the 2019 Business Case. Despite increased cost estimates, the NPV of MRP remains strong, and underscores the value to ratepayers for implementing MRP. The figure below compares the original 2019 probability distribution of the NPV for MRP, with the 2019 base case value and the 2022 updated value estimate illustrated.



<sup>1</sup> MRP will introduce new features and tools that require additional resources for market operations, monitoring and ongoing maintenance and support.

#### **4. Benefits Not Quantified**

The 2019 MRP Business Case included case studies and discussion of qualitative benefits. These included better operational and financial certainty with a day-ahead market and broader market benefits. The broader market benefits include improved signals for supporting investment and competition, indicating the need for system flexibility, and reduced energy curtailment and spilling. Given the need to acquire incremental capacity to meet increasing system needs and the focus on investigating pathways to decarbonize the electricity fleet, these unquantified benefits are expected to be even larger and of increased importance since 2019 when the Business Case was published.

In particular, with the larger anticipated volume of storage resources, the single schedule design of MRP is essential. The current IESO initiatives for storage integration and enabling new resources will be facilitated with the single schedule design as storage and other emerging resources require clear locational price signals to know when to operate economically.

## **MRP Schedule Refresh Communications Strategy**

A comprehensive communications plan has been prepared to carefully coordinate the release of the refreshed project schedule and budget information, including messaging, to mitigate reputational risk by addressing the reasons for the delay, providing more accountability and transparency on the schedule going forward and focusing on how MRP is foundational to enable sector transformation.

### **Strategic Communications Approach**

The IESO will clearly and transparently communicate the refreshed project schedule and budget, explain why there is delay and that there is a solid path forward while continuing to reinforce the overall project benefits and need for renewing Ontario's wholesale electricity markets. All communications will be grounded in reinforcing the importance and relevance of the MRP project.

Two core message areas will guide the narrative reflecting the refreshed MRP project schedule:

**1. Reinforce “why” we are renewing our market: (1) The business case remains sound with significant ratepayer savings, and (2) MRP is necessary to ensure continued reliable operations as the system becomes more diversified and complex.**

- Ontario benefits from a wholesale electricity market that has enabled reliable and cost-effective operation of the electricity system over the past 20 years.
- The Market Renewal Program is designed to address existing inefficiencies, which will deliver significant ratepayer savings.
- MRP is also essential to modernize the wholesale electricity market in order to support the integration of an increasingly diverse and decentralized mix of resources.
- Together, these changes will deliver significant ratepayer savings, ensure continued reliable operations of the system, and support the transformation underway within the electricity sector.



- MRP has made considerable progress to date with efforts currently focused on delivering substantial enhancements to more than 10 legacy IT systems that work together to ensure day-to-day reliability, integrity and cost-effectiveness of Ontario's electricity system and markets.

**2. An explanation on why we are refreshing our schedule now and what this means for specific audiences.**

- Since completing the detailed design phase, we have been working with our vendors and stakeholders to refine and translate the design into the system requirements and rules needed to finalize the delivery schedule for MRP.
- The revised forecasted in-service date for the Market Renewal Program is May 2025 and the forecasted project budget is ~\$230M.
- Some of the key issues affecting the schedule are the time required for vendors to develop software, and the testing that needs to take place on each of those systems where many of those details were only recently finalized. However, now that we have made further progress on the project, coupled with more detailed vendor estimates and the information needed to create a comprehensive project plan, there are fewer uncertainties which gives us confidence the refreshed schedule is achievable.
- The project scope remains intact: recognizing the highly integrated nature of the core design elements of MRP – single schedule market, day-ahead market, and enhanced real-time unit commitment – and the advanced stage of development, reducing project scope now would result in additional delays.
- The refreshed project schedule provides stakeholders with additional time to complete readiness activities, and the IESO has launched an Implementation Working Group to provide strategic advice on navigating implementation issues, participant readiness timelines in the project schedule, and other matters.

Government Affairs is engaging the Ministry of Energy to reinforce the significant ratepayer savings and how this project will provide the foundation that is now essential to support the transformation of Ontario's electricity system. Efforts are underway to brief them on the schedule and budget changes, alongside the impact on the IESO's 2023 – 2025 business plan.

The timing to communicate the revised MRP schedule will commence early September. First, an in-camera meeting of the Stakeholder Advisory Committee (SAC) will occur to walk committee members through the revised schedule, respond to questions and obtain their support on our path forward.

The IESO has launched the MRP Implementation Working Group, and is currently soliciting volunteers. This working group will provide advice on navigating implementation issues, participant readiness activities, and timelines in the project schedule, and can ultimately act as ambassadors for the project. The refreshed project schedule and MRP Business Case validation efforts will be shared through this channel in mid-September.

Following that, the refreshed schedule will be shared at the September Stakeholder Engagement Days through an interactive engagement session walking participants through the changes, reminding them of the project benefits and tailoring the information on what this means for them. It is anticipated stakeholder comments will be focused on gaining assurance this is a realistic and achievable schedule and budget.

In conjunction, an executive outreach strategy is under development to further mitigate any reputational risks by leveraging existing executive-level relationships to key stakeholders in the sector.

Expectations will be high that this revised schedule is accurate, so in our efforts to be accountable and transparent, the IESO will launch a Project Status Report webpage on the corporate website that will house high-level information on upcoming key project milestones and a quarterly report synthesizing project management details. By committing to publicly disclose a level of project management detail not yet seen, the IESO can demonstrate its commitment to accountability, instill a high-level of confidence and quality in the revised schedule, rebuild stakeholder trust, and also meet the terms of the settlement agreement from the IESO's Revenue Requirement Submission.

IESO staff will be engaged and equipped with updated messaging so they can continue to champion our broader communications efforts.



Independent Electricity System Operator  
1600-120 Adelaide Street West  
Toronto, ON M5H 1T1  
t 416.967.7474  
[www.ieso.ca](http://www.ieso.ca)

# Memorandum

**To:** The IESO Board of Directors

**Presenters:** Jessica Savage, Program Delivery Executive – MRP  
Candice Trickey, Director – MRP Readiness  
Anja Vukovic, Senior Manager – MRP Program Management & Integration

**Date:** August 24, 2022

**Re:** Market Renewal – Energy Project: Schedule and Budget

**Purpose of Item:** Decision

## Executive Summary:

The purpose of this memorandum is to seek the Board of Directors' approval, as recommended by the Markets Committee, of a revised in-service date for the Market Renewal – Energy Project (MRP) of May 2025 and an expanded budget envelope of \$233 million (\$218 million plus \$15 million contingency). The revised schedule and budget now include vendor validation of more than 90% of the solution costs and associated timelines, are confirmed to be consistent with a comparable initiative implemented by Southwest Power Pool in 2014, and have schedule reserve periods strategically placed to mitigate the risk of unforeseen delays. The MRP Business Case, developed in 2019, has also been reviewed and remains sound, where the renewed market will deliver net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation. Finally, a communications plan has been developed to mitigate the reputational risks of the delay. It will reinforce why MRP is essential to support the transformation of

Ontario's electricity system and highlight efforts to increase accountability by providing more transparency on our progress with key milestones tracked on a project progress webpage.

This memorandum summarizes the underlying assumptions, remaining uncertainties, risks and mitigations underpinning the revised budget and schedule. Supplementary information items provided to the Markets Committee include the key milestones, details on the IESO-Southwest Power Pool engagement, the MRP Business Case validation, and the schedule refresh communications strategy. These items are included as links in the Appendix item.

### **Significant Issues, Risks and Opportunities:**

The forecasted go-live date of May 2025 is a significant delay relative to the original in-service date of March 2023 (plus six months contingency) put forth when the Board approved the MRP Business Case in October 2019. Likewise, the revised budget is a significant increase relative to the original estimate of \$170 million. While the delay and increase in budget will have reputational impacts that need to be carefully managed, we must position ourselves to ensure the project delivers the significant ratepayer savings it was originally designed for, and that are now essential to support the transformation of Ontario's electricity system. To mitigate the reputational impacts which could lead to diminished stakeholder support for the program, we have developed a comprehensive communications and engagement plan and validated that the MRP Business Case remains sound.

We are confident that the newly-validated schedule is achievable for the following reasons:

- More than 90 per cent of the solution costs and associated development timelines have been validated by our vendors.
- Embedded in the schedule are strategically placed reserve periods that provide additional time for critical tasks and allow us to redeploy resources to critical path activities if those activities start to fall behind.
- The project worked with vendors to advance testing phases to identify and correct defects sooner.

- Several elements could be staged for a later deployment if required to de-risk the project and free up resources to focus on higher priority core systems and functionality
- Market rule amendment timelines reflect additional time for stakeholder and Technical Panel review based on recent lessons learned while still driving to a final approvals date that is well in advance of MRP in-service date, thus mitigating the risk that an Ontario Energy Board market rule review delays the in-service date.
- The revised timeline provides participants with more time for readiness activities, in particular for development of their conforming changes.

Further, the peer review conducted by Southwest Power Pool (SPP)<sup>1</sup> validated our key planning assumptions for solution development, testing, and readiness activities and that the revised timelines for MRP implementation are reasonable and achievable. The discussions with SPP project executives also identified a number of opportunities to incorporate lessons learned from their project into plans to support successful delivery and implementation of MRP. The MRP Project Team has already taken action on most of the SPP recommendations, including exploring options to onboard an external resource to help support vendor management and working with Internal Audit to take on the contract management and oversight role for independent, external assurance that the project is on track.

### **Background:**

The IESO Board of Directors first approved the MRP budget of \$170 million and a target in-service date of March 2023 when it approved the MRP Business Case in October 2019 based on the High-Level Design. A revised budget of \$177.7 million and target in-

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<sup>1</sup>The Southwest Power Pool is an independent system operator and regional transmission organization responsible for supply of power, transmission and a competitive marketplace across 17 states in the United States. Their Integrated Marketplace Project included introducing a day-ahead market, a reliability commitment process, and a real-time balancing market.

service date of November 2023 was subsequently approved by the IESO Board in March of 2021 following a schedule validation review once more details about the design were known.

In December 2021, the MRP team identified to the Markets Committee the risk of material changes to the schedule and budget due to the remaining uncertainty on other vendor costs and development schedules given the requirements yet to be completed. Work to develop process models, business requirements, and vendor specifications took longer than estimated for several reasons. First, significant solution complexity surfaced through requirements elicitation so the estimates for requirements development were too optimistic. Second, the degree of parallelism in the schedule resulted in key resources being over-allocated which compounded delays in completing business requirements, which are the precursor to vendor specifications and solution development.

In March 2022, the MRP team confirmed that a go-live date prior to May 2024 (November 2023 target plus six-months contingency) was not feasible as the required time to complete the core functionality extended beyond the contingency period and reported back to the Markets Committee in June on options for a revised, costed, and risk-informed schedule.

### **Discussion:**

The project team has done significant work to validate the underlying assumptions and identify the residual risks associated with the revised schedule and budget. More than 90% of the solution costs and associated timelines have been validated by vendors. Over the last two months, the MRP team worked with vendors to prioritize critical functionality and market participant facing solutions, and split up solution releases into smaller feature sets to start testing earlier.

Within the proposed go-live date of May 2025, the project team has incorporated a schedule reserve of approximately seven months which is allocated across various points on critical path milestones that will be tracked and monitored. During these reserve periods, resources will continue to work on deliverables not on the critical path and will be redeployed to critical path activities if needed to maintain the May 2025 in-service date. The schedule reserve periods have been strategically placed after key solution testing efforts to mitigate the risk of unforeseen delays due to defect management, an area of the project where some uncertainty remains given

that systems testing has not yet begun. A priority list of items that could be staged for later deployment have also been identified if required to free up resources to focus on higher priority core systems and functionality.

The refreshed project schedule reflects durations for testing that are rooted in established best practices and past experience, and represent key controls in mitigating the strategic risk of unintended market consequences. The testing timelines are also consistent with the testing timelines that Southwest Power Pool experienced with their Integrated Marketplace Project.

The overall project budget for which approval is being sought is \$233 million (\$218 million plus \$15 million contingency). The increase in costs of \$63 million from the original budget are due to increased costs to modify our legacy IT systems now that we have vendor-validated estimates and IESO labour costs associated with the delayed in-service date.

The recommended budget contingency of \$15 million, or 7% of overall program budget, has been established to cover the potential for overtime costs and/or additional resources to preserve the May 2025 in-service date, and to address critical solution defects.

The life-to-date spend to the end of June 30, 2022 is \$94.5 million and forecasted costs based on a May 2025 go-live date are shown in Figure One.

**Figure One – Actual and Forecast Costs**





## **MRP Business Case Validation**

The IESO has validated that the MRP Business Case (originally published in November 2019) remains sound. Using updated schedule and budget information, and taking into account projected demand and supply changes, the result is that the renewed market will deliver substantial net financial benefits of over \$700 million to Ontario consumers over the first 10 years of operation. The renewed market will still yield the same benefits of \$975 million over the first 10 years but increased costs have reduced the net financial benefit from the \$800 million estimated in the 2019 Business Case. The updated net present value of the program is \$266 million which falls within the 90% probability range of net present values that were calculated for the 2019 Business Case.

The validation also highlights that broader market benefits that were not quantified in the business case are expected to increase as the sector is evolving to include new and more diverse resource types such as storage and hybrids. Effective integration of storage and other new resource technologies would not be possible in today's two-schedule market without significant compromise to their potential and increased integration costs, especially with growing future uncertainties related to fuel and resource development costs.

Overall, the improvements delivered by MRP will significantly improve our ability to provide optimal use of resources available on any given day, and send clear signals to identify where additional resources are needed in the future. The project is planning to review the MRP Business Case validation with the recently created MRP Implementation Working Group and with the broader stakeholder community in mid-September.

## **Stakeholder Engagement and Communications**

The project has developed a comprehensive communications plan to support the release of the refreshed schedule and to mitigate the potential reputational risk of the delay. The narrative is focused around two primary themes: the first is a review of why MRP is critical, including preparing for sector transformation, and the significant benefits of the project. The second theme acknowledges the reasons for the schedule refresh, and highlights efforts to increase accountability and transparency, and the additional time for participant readiness. Pending Board approval of the revised schedule and budget, the external communications will begin in early

September and include leveraging current venues for engagements alongside executive outreach opportunities. We have also begun to engage government on the schedule and budget changes alongside the impact on the IESO's 2023 – 2025 business plan, reinforcing the significant ratepayer savings and how this project will provide the foundation that is essential to support the transformation of Ontario's electricity system.

## **Next Steps**

Subject to Board approval of the revised MRP schedule and budget, the project team will continue to report to the Markets Committee on project status, including tracking of budget and schedule. We will also provide ongoing updates regarding progress on mitigations to address MRP strategic risks.

The project team is also looking to onboard an external resource to help support vendor management given technology integration has been identified as a strategic risk for MRP. The role description and terms of engagement are currently being drafted. As a starting point, candidates who qualified previously as vendors of record for MRP under the Project Management services category will be considered.

Lastly, the project team is considering ways to provide independent, external assurance to the Board that the project is on track. Options include repurposing the remaining Gartner engagements or engaging another firm. The project team will work with Internal Audit to scope out options where Internal Audit would take on the contract management and oversight role for the assurance reviews. We will report back to the Market Committee in October on the status of options being considered.

Encls.

Board Resolution - Market Renewal Program (MRP) - Energy Budget and Schedule

Appendix – Links to supplementary information items provided to Markets Committee

# **Resolution of the Board of Directors**

## **Independent Electricity System Operator**

**August 24, 2022**

### **In Respect of Market Renewal Program (MRP) - Energy Budget and Schedule**

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WHEREAS the Independent Electricity System Operator (IESO) formally initiated the MRP in January of 2017;

AND WHEREAS in October 2019, the Board of Directors approved the MRP Business Case and approved a cost estimate of \$149 million for the remainder of the MRP Energy project for an overall MRP budget of \$170 million (\$154 million plus \$16 million contingency);

AND WHEREAS the Board of Directors approved the target in-service date of March 2023 in October 2019;

AND WHEREAS the IESO completed a validation of the project schedule and budget in February 2021;

AND WHEREAS in March 2021, the Board of Directors approved an extension to the target in-service date of November 2023 plus 6 months schedule contingency and a revised budget of \$177.7 million (\$167.7 million + \$10 million contingency);

AND WHEREAS the IESO completed a subsequent validation of the project schedule and budget in July 2022 informed by vendor-validated estimates and market participant feedback to establish a fully costed and risk-informed project schedule;

AND WHEREAS the Markets Committee has reviewed the revised schedule and expanded budget envelope and recommended approval to the Board of Directors;

**NOW THEREFORE BE IT RESOLVED THAT** the Board of Directors, as recommended by the Markets Committee, approves a revised in-service date of May 2025 and an expanded budget envelope of \$233 million (\$218 million + \$15 million contingency).

**Market Renewal Program Schedule and Budget - Appendix – Links to supplementary information items provided to Markets Committee**

1. MRP Schedule and Milestones
2. IESO-Southwest Power Pool Engagement
3. Market Renewal Program Business Case Validation
4. MRP Schedule Refresh Communications Strategy

**MAY 16, 2022**

# MRP Update

# Activity Status Update

- Completion of VCRs for Market Information Management (MIM): outputs, technical refresh, validation rules (inputs)
- Completion and approval in principle of three additional business requirement documents, bringing the total percent complete to 75%
- Completion of Market Power Information System (MPIS) Online IESO Sprint 1
- Completion of the Dispatch Services VCR. Completion of the MPIS VCR with First Derivatives and Market Participant Prudential System (MPPS) VCR with Accenture
- Development of the MIM Energy Market Administrator Tool, Dispatch Data Management System (DDMS) Spare Energy Monitor, and DDMS INPARM VCRs
- Kickoff of Commercial Model development work
- Continuation of MPIS Online IESO Development

# Milestones - Legend

Legend - Available Slack	
Critical Path	Milestone has 0-10 working days of available slack
Near Critical Path	Milestone has 11-30 working days of available slack
Approaching Critical Path	Milestone has 31-60 working days of available slack
Not on Critical Path	Milestone has greater than 60 working days of available slack
Legend - Trend to Meet Forecasted Completion Date	
Ahead of Forecast Completion	Progress is anticipated to be ahead of the forecast completion date, no issues to raise
Trending to Forecast Completion	Progress is on schedule to meet the forecast completion date, no issues to raise
Potential Delay to Forecast Completion	A delay greater than 10 working days to the forecast completion date of the milestone has materialized, and mitigations are under development to correct the delay
Delay to Forecast Completion	A delay greater than 10 working days to the forecast completion date of the milestone has materialized, with no established mitigations to correct the delay



# Milestones

				← Past	↓ Present	↗ Trending	→ Future		
ID	Schedule Subphase	Milestone	Available Slack	Planned Completion (Baseline 4)	Forecast Completion Date	Variance from Baseline (Days)	Trend to Meet Forecast Completion Date	Comments	
1	Requirements	MIM inputs VCR completed	N/A	N/A	18-Jan-22	N/A	Completed		
2	Requirements	DDMS IS VCR completed	N/A	N/A	7-Mar-22	N/A	Completed		
3	Market Rules/Market Manuals Approval	MPM & Market Administration (Batch 2) Technical Panel Meeting - Vote to Recommend	N/A	15-Feb-22	22-Mar-22	24	Completed	At the request of Technical Panel members for additional review time of materials, the February Technical Panel meeting was repurposed as a review meeting and the Vote to Recommend was held at the subsequent TP meeting.	
4	Requirements	MIM output VCR completed	N/A	N/A	25-Mar-22	N/A	Completed		
5	Requirements	DDMS INPARM VCR completed	Not on Critical Path	N/A	10-May-22	N/A	Potential Delay to Forecast Completion	Due to resourcing issues (vacations, etc.), the start of the DDMS INPARM VCR was delayed, potentially impacting VCR completion.	

# Milestones Cont.

ID	Schedule Subphase	Milestone	Available Slack	← Past	↓ Present	↗ Trending	→ Future	Comments
				Planned Completion (Baseline 4)	Forecast Completion Date	Variance from Baseline (Days)	Trend to Meet Forecast Completion Date	
6	Requirements	DDMS SEM VCR completed	Not on Critical Path	N/A	17-May-22	N/A	Potential Delay to Forecast Completion	Due to resourcing issues (vacations, etc.), the start of the DDMS SEM VCR was delayed, potentially impacting VCR completion.
7	Readiness	Start of Gartner readiness assessment review #3	Not on Critical Path	N/A	25-Jul-22	N/A	Potential Delay to Forecast Completion	The start date for this milestone may be reviewed in consideration of the schedule validation exercise.
8	Market Rules/Market Manuals Approval	Calculation Engine (Batch 3) Technical Panel Meeting - Vote to Recommend	Not on Critical Path	N/A	13-Sep-22	N/A	Trending to Forecast Completion	
9	Requirements	All MPM BRD Completed	Near Critical Path	19-Oct-21	26-Sep-22	235	Potential Delay to Forecast Completion	The project continues to evaluate the requirements for implementation feasibility which is contributing to a potential delay.
10	Quality Assurance	DSO Milestone 10 Complete DSO FAT	Not on Critical Path	N/A	11-Nov-22	N/A	Trending to Forecast Completion	
11	Readiness	Start of Gartner readiness assessment review #4	Not on Critical Path	N/A	28-Nov-22	N/A	Potential Delay to Forecast Completion	The start date for this milestone may be reviewed in consideration of the schedule validation exercise.

# MRP Strategic Risk Update

- Risk statements, risk scores, risk owners, and mitigations were reviewed and updated to better align with the feedback shared by the ESC members during the March 17<sup>th</sup> ESC Risk Review meeting.
- Three sessions were scheduled with a subset of the ESC team to go over the following risks which needed more clarity following March 17<sup>th</sup>'s meeting:
  - **Session 1** (with team and Mike L.) reviewed: SR2 – Market Rules Challenges at OEB
  - **Session 2** (with team and Barb A., Leonard K., and Alex F.) reviewed: SR3 – Design & Implementation Flaw Discovery Pre Go-Live & SR6 – Post Go-Live Response
  - **Session 3** (with team and Alex F.) reviewed: SR4 – Technology Integration

## MRP Strategic Risk Update Cont.

- All changes and updates to both risks and mitigations will be reflected in the upcoming risk report which will be submitted as part of June's Audit and Markets Committee materials

## ESC Subset Meeting Update

- As agreed to at the March 29, 2022 MRP-RSS ESC meeting, the project has met with a subset of the ESC to discuss the ongoing schedule validation efforts:
- **April 11** – Alex, Barb and Len
- **April 25** – Lesley, Alex and Len
- **April 29** – Alex, Barb, Len and Glenn
- **May 10** – Lesley, Barb, Alex and Len

# ESC Subset Meeting Update Cont.

- Topics of discussion at these meetings included:
  - The current project schedule
  - Contributing factors to the revised schedule
  - The schedule certainty
  - An assessment of options to stage/de-scope the project
  - The options to reduce the scope of Market Power Mitigation were discussed as part of the April 29 meeting

## Next Steps

- MRP Update for the Markets Committee has been moved to the special Markets Committee meeting in June
- The full Executive Leadership Team will have an opportunity to discuss the materials for the Markets Committee in advance of submission
  - This review has been scheduled for the morning of May 26

**SEC INTERROGATORY 25**

Issue 4.1 Is the reporting on financial and operational performance of the MRP appropriate?

4.1-SEC-25

**INTERROGATORY**

**Reference:** [G-2-1]

**Preamble:**

With respect to the Market Renewal Program (MRP):

Questions:

a) Please provide a copy of the most recent MRP cost performance, schedule performance, and risk reporting.

b) In addition to your response to part (a), Please provide a copy of any other MRP reporting information provided to the IESO Board of Directors and executive management team in the last 60 days.

c) Please provide a copy of all third-party assessments or reviews regarding MRP implementation that have been undertaken to date, that have not been produced in a previous fees application.

d) Please detail any changes made since the last application regarding the MRP governance and project oversight.





1    **RESPONSE**

- 2       a) Please see Attachment 1 – MRP Status Update ESC April 2023 and Attachment 2 – MRP  
3       Strategic Risk Review to this response.
- 4       b) In addition to a) above, please see Attachment 3 – MRP Status Update ESC March 2023 to  
5       this response.
- 6       c) No such third-party assessments or reviews of MRP implementation have been completed.
- 7       d) No such changes have been made.

**APRIL 26, 2023**

# MRP Status Update: MRP-RSS Executive Steering Committee

# Key Messages

Highlights and Key Messages	
Focus Area	Description
 <b>Key Messages</b>	<ul style="list-style-type: none"> <li>▪ <b>Financials:</b> We have completed the validation of the labour and non-labour forecast. We have identified some instances where resources from the line of business are not charging their time to the project which has the effect of overstating the delta between actual and budgeted/forecasted headcount. We have re-enforced with the project team the need for accurate timekeeping.</li> <li>▪ <b>Milestones:</b> All three of the planned milestones for the month of March have been completed on time. By end of April, we have one planned milestone (currently at 97%) which we expect to complete on time.</li> <li>▪ <b>Risk Update:</b> <ul style="list-style-type: none"> <li>• The team is progressing with the requirements validation exercise to determine the impact of MRP Settlement Packages developed in 2021 and is closely working with the vendor to finalize the schedule.</li> </ul> </li> </ul>
 <b>Decisions Required</b>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>

# Progress Summary

Filed: June 15, 2023, EB-2022-0318, Exhibit H. Tab 4.1, Schedule 11.25 – 4.1 SEC 25, Attachment 1, Page 3 of 9

## Financial Summary (as at Mar 31, 2023)

Total Project Budget: \$233.3M		Total Project Costs: \$125.8M		
Year-To-Date Cost		Year-End Cost Forecast	Contingency	
Monthly Actual	Year to Date Actual	Annual Forecast	Approved	Used
\$1.7M	\$6.6M	\$43.5M	\$15.0M	\$0

### Commentary - Financial

Labour and non-labour expense forecasts validation is complete. Our latest forecast is \$5.7M less than the 2023 total budge. This variance is due to the many positions that have not been filled, merged positions, and resources from the line of business who have time allocated to the project but have not been charging to the project.

## Schedule Summary

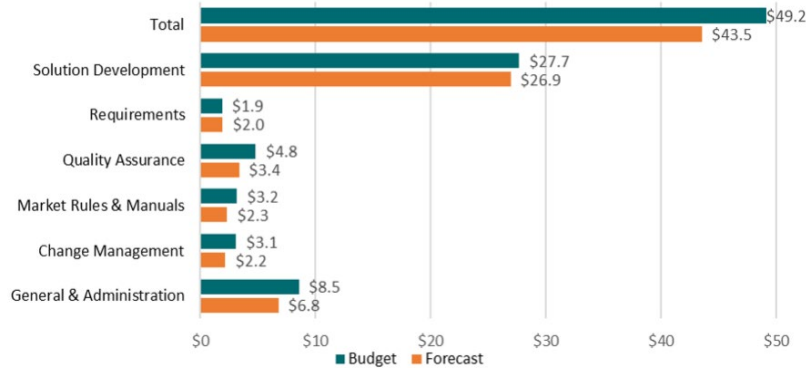
% Complete - Current Month (Mar 31)		% Complete - Year End		Total Schedule Reserve	
Planned	Actual	Planned	Actual	Days Available	Days Used
70%	70%	80%	TBD	132	0

### Commentary

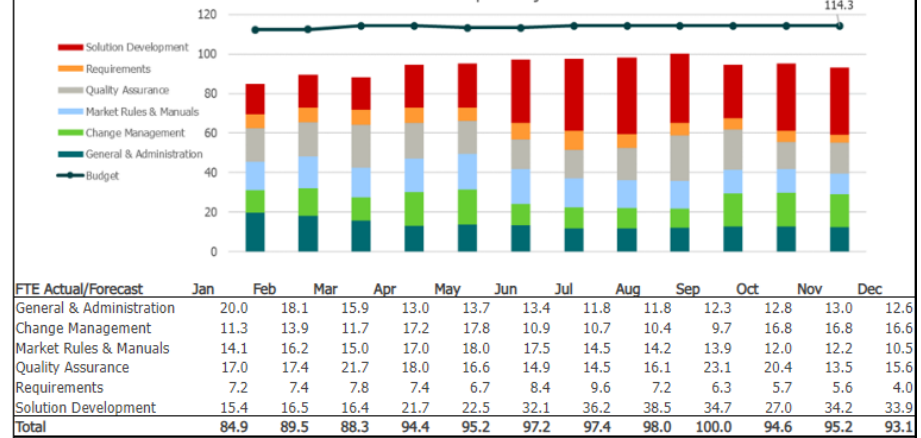
- **Market Power Mitigation Business Requirement** document has been completed.
- **User Acceptance Testing of Market Registration Process** has concluded with the execution of 250 test cases. There has been no significant open defects reported, team is currently drafting the test closure report.
- **Dispatch Scheduling & Optimization Site Acceptance Testing (DSO SAT)** for release one is tracking to plan, with 69 defects outstanding (1 critical, 25 high, 39 medium, and 4 low) as of Apr 17,2023. Hitachi has provided fixes for many of these defects and IESO team needs to retest.
- **Demand Forecast System, Centralized Forecast System, Primary/Secondary Weather Provider Site Acceptance Testing** is complete and the final report has been published.

# Project Financial Forecast

2023 Total Expenses per Project Area (\$ Millions)



2023 FTE Allocation per Project Area



The lower than budget forecast is primarily due to the lower than budget headcount and lower than budgeted legal services spend.

**Status Legend****In Progress/On Track** - Deliverable is underway and is tracking to schedule**Complete** - Deliverable is complete**Not Started** - Deliverable start date is in the future and effort has not started.**At Risk** - Start and/or completion of deliverable is delayed, and project team does not yet have a mitigation plan.

Filed: June 15, 2023, EB-2022-0318, Exhibit H. Tab 4.1, Schedule 125 Deliverable 20 Attachment 1, Page 5 of 9

# Upcoming Milestones

The following slides provide a list and update on key milestones that are due in: March 2023, April 2023, May 2023 & June 2023:

Project Area	Milestone	% Complete	Start Date	End Date	Status
Solution Testing	<b>Factory Acceptance Testing (FAT):</b> Market Information Management System (MIM) 1st Release	0%	May 2023	Jun 2023	Not Started
	Dispatch Data Management System (DDMS)	69%	Feb 2022	Jun 2023	In Progress
	<b>System Integration Testing (SIT):</b> Group 2: Demand Forecast System, Primary/Secondary	100%	Mar 2023	Mar 2023	Complete
	Weather Provider SIT				
	<b>User Acceptance Testing (UAT):</b> Market Registration Process (Online IESO)	97%	Jan 2023	Apr 2023	In Progress
Business Requirements	Market Power Mitigation (MPM) Business Requirement Documents	100%	Feb 2021	Mar 2023	Complete
Training	Change Impact Assessments (Internal & External)	100%	Mar 2022	Mar 2023	Complete
Market Rules & Manuals	Market & Systems Operations – Interim Alignment	76%	Sep 2022	Jun 2023	In Progress
Internal Manuals	Internal Manual Series 5 – Market Assessment & Compliance Division (MACD)	0%	May 2023	Jun 2023	Not Started

# Upcoming Milestones

Filed: June 15, 2023, EB-2022-0318, Exhibit H. Tab 4.1, Schedule 125 Deliverable 20 Attachment 1, Page 6 of 9

## Status Legend

**In Progress/On Track** - Deliverable is underway and is tracking to schedule

**Completed** - Deliverable is complete

**Not Started** - Deliverable start date is in the future and effort has not started.

**At Risk** - Start and/or completion of deliverable is delayed, and project team does not yet have a mitigation plan.

Project Area	Milestone	% Complete	Start Date	End Date	Status
Solution Development	Dispatch Data Management System (DDMS)	80%	Feb 2022	Jun 2023	In Progress
	Market Information Management System (MIM) 1st Release	78%	Dec 2022	May 2023	In Progress
	Energy Market Administration Tool (EMAT)	70%	Sep 2022	Jun 2023	In Progress
	Energy Market Interface (EMI)	41%	Feb 2023	Jun 2023	In Progress
	Market Power Information System (MPIS)	49%	Sep 2022	Jun 2023	In Progress

# Milestones – Other

**The following milestones are currently underway and are tracking to schedule:**

- Dispatch Data Management System (DDMS) tools
  - Site Acceptance Testing [56%] – *due Jul 2023*
- Dispatch Scheduling & Optimization (DSO)
  - Site Acceptance Testing – Release 1 [73%] – *due May 2023*
  - Site Acceptance Testing – Releases 2 – *due Oct 2023*
- Drafting of Internal Manuals
  - Registration [59%] – *due Nov 2023*
  - Operations [26%] – *due Jan 2024*
  - Market Power Mitigation [21%] – *due Mar 2024*

## **Other efforts currently underway:**

- Market Rules & Manuals – Settlements, Metering & Billing [86%] – *due Aug 2023*
- Market Power Information System (MPIS) Agile development [35%] – *due Feb 2024*
- Market Rules & Manuals – Market & Systems Operations [73%] – *due Jun 2024*



# Risk Follow Up

This report provides an update on two program risks:

1. Realized Risk: **MRP Settlement Delivery**

Incomplete MRP settlement requirement packages delay completion of development efforts

2. Emerging Risk: Project Staff Retention

Inability to retain key staff on MRP poses a risk to on time delivery [to be discussed as part of agenda #6. MRP Strategic Risk Review]

# 1. MRP Settlement Delivery

Calculation requirements for 35 charges were developed by Symphono without complete requirements from upstream/downstream systems. This package is referred to as Package 2021.

## Current Plan:

- Package 2021 was split into two - Package A (focus on CDMS) & Package B (focus on MIM). Validation of Package A has concluded and shared with the vendor for development. Package B requirements validation is underway, close to completion- Target completion date is by May 2023.

Additional Context: Symphono has confirmed availability of additional developers to support Package 2021 re-work in parallel with planned work.

## MRP Strategic Risks: Expected Timing of Risk Score Reductions

[illegible]



## MRP Strategic Risks: Status of Risk Mitigations

Risk#	Risk Event Description	Residual Risk	Target Risk	Mitigation	Previous % Complete	Current % Complete
1	Market Participants are unprepared for technology and market operation at go-live date.	High	Low	<p>MARKET READINESS ACTIVITIES</p> <p>A) Two Readiness Assessment templates under development: 1) IESO's assessment of Market Participant Readiness and 2) Market Participant Readiness Checklist</p> <p>B) Market Participant Readiness Assessments via survey</p> <p>MARKET PARTICIPANT TESTING</p>	<p>70%</p> <p>N/A</p> <p>N/A</p>	<p>80%</p> <p>0%</p> <p>0%</p>
2	A challenge to a MRP market rule amendment that has a material impact on project benefits or schedule.	High	Medium	<p>REVISING APPROACH TO MARKET RULE APPROVALS</p> <p>IESO could revise the timing or order in which it seeks IESO Board approval based on the nature and the number of challenges ultimately anticipated in advance of go-live. This could assist the IESO in managing prospective disputes and avoiding an occurrence of this Risk Event.</p> <p>PREPARING ANTICIPATORY OEB CHALLENGE RESPONSE MATERIALS</p> <p>The IESO can prepare draft response materials to anticipated OEB challenges before those challenges are initiated to reduce the burden on the IESO of responding to unanticipated challenges during the challenge period and reduce the likelihood of a Risk Event.</p>	<p>N/A</p> <p>N/A</p>	<p>N/A</p> <p>N/A</p>

	Market systems and related processes produce materially unexpected or unacceptable results pre go-live.	High	Low	<p>LESSON LEARNED WORKSHOPS</p> <p>Establish the processes, tools and approach for on-going lessons learned workshops following the delivery of key milestones to identify, assess, and implement opportunities or mitigations to improve deliverability of remaining MRP activities</p>	0%	100%
				<p>FREEZE PERIODS AND SYNCHRONOIZATION PLAN</p> <p>The plan will identify the MRP processes and tool changes that would benefit from a Line of Business (LOB) freeze period or synchronization plan to ensure system robustness and minimize data sync issues prior to each production deployment"</p>	10%	15%
4	IESO is unable to effectively integrate technical solutions given complexity and volume.	High	Low	<p>REQUIREMENT TRACEABILITY</p> <p>Requirement traceability ensures that the detailed design is implemented in both processes and solutions. Requirements continue to be added to the traceability tool</p>	80%	80%
				<p>SOLUTION ARCHITECTURE MAPPING</p> <p>Solution architecture mapping ensures that interactions between solutions and data flows are consistent</p>	10%	50%
				<p>SYSTEM INTEGRATION TESTING</p>	0%	5%

5	IESO is unable to implement MRP Energy on time and on budget due to unexpected deliverable delays, uncertainties in forecasting task details and time estimates.	Critical	Low	<p>Solution Integration and Interfaces Testing confirms exchange of data between solutions as per requirements</p> <p>USER ACCEPTANCE TESTING (UAT) User Acceptance Testing assures that all business processes can be executed as designed, and that all solutions and procedures that support those processes are in place</p> <p>*Market Registration Processes (Online IESO) 26% N/A 100% N/A</p> <p>*DFS Soft Launch N/A N/A</p> <p>*Operational Tools (part 1) N/A N/A</p> <p>*Operational Tools (part 2) N/A N/A</p> <p>*Settlements N/A N/A</p> <p>*Reports</p>		
				<p>MRP TRANSITION PLAN The plan contains detailed information on project activities leading up to go-live and outlines the deliverables, in terms of systems, documentation as well as training needs. It also documents timelines and roles and responsibilities for the various activates, thus mitigating the risk of uncertainty around forecasting task details and time estimates.</p> <p>The MRP Transition Plan will be a consolidated document, including impacted business processes such as:</p> <p>* Market Registration 90% 100%</p> <p>* Demand Forecasting System (DFS) 40% 75%</p> <p>* Finance and Prudentials 0% 0%</p> <p>* Day Ahead Operations 0% 0%</p>		

				<ul style="list-style-type: none"> <li>* Real-time Operations</li> <li>* Market Settlements</li> <li>* Market Assessment and Compliance</li> </ul>	0% 0% 0%	0% 0% 0%
				RESOURCE RISK MANAGEMENT Develop an on-going resource assessment process by which resource availability, knowledge gaps, and potential sources of single point of failure on the program are proactively identified and resource risk mitigated	40%	100%
				MRP INTERDEPENDENCY ANALYSIS Conduct a periodic review and assessment of other IESO initiatives to proactively identify potential impacts to MRP deliverables.	10%	15%
6	IESO is unprepared to respond to unforeseen design and/or implementation flaws post go-live.	High	Medium	[Risk has been transitioned to operational risk management under Markets & Reliability]	N/A	N/A
7	Internal IESO is unprepared to use technology solutions and operate the market.	High	Low	TRAINING DELIVERY AND ASSESSMENTS Executing the training strategy. Delivering training to impacted stakeholders on: <ul style="list-style-type: none"> <li>*Foundational MRP concepts</li> <li>*New and updated processes</li> <li>*New and updated tools and data</li> </ul> GO-LIVE SUPPORT PLAN This plan articulates the support that will be needed during the cutover to the new market. It includes having project resources support transition activities and describes	10%  0%	15%  0%



			<p>the support the project will continue to deliver in the months following MRP go-live.</p> <p>USER ACCEPTANCE TESTING (UAT) User Acceptance Testing assures that all business processes can be executed as designed, and that all solutions and procedures that support those processes are in place. UAT is also an early indicator of sufficiency of training."</p> <p>*Market Registration Processes (Online IESO) *DFS Soft Launch *Operational Tools (part 1) *Operational Tools (part 2) *Settlements *Reports</p> <p>GO-LIVE ACCEPTANCE CRITERIA A document identifying all project deliverables that will need to be accepted by the line-of-business prior to go-live, in order to ensure readiness. Deliverables are bucketed by; Processes, Tools and People (training), and indicates a status for each deliverable. Acceptance Criteria will be reviewed by LOB to confirm alignment and set expectations for what MRP will deliver to them.</p>	<p>26% N/A N/A N/A N/A N/A</p> <p>New Mitigation</p>	<p>100% N/A N/A N/A N/A N/A</p> <p>15%</p>
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**MARCH 27, 2023**

# MRP Status Update: MRP-RSS Executive Steering Committee

**Anja Vukovic**

Senior Manager, Project Management and Integration

# Key Messages

Highlights and Key Messages	
Focus Area	Description
 <b>Key Messages</b>	<ul style="list-style-type: none"> <li>▪ <b>Financials:</b> We have validated resource costs against resource budget and schedule, and we are nearing completion in validating IT costs against contractual obligations. Following this validation, risk and opportunities graph will be included in the April ESC package.</li> <li>▪ <b>Milestones:</b> In the month of February there were 0 planned milestones. In the month of March, there are 3 planned milestones, out of which 2 have already been completed and 1 is near complete.</li> <li>▪ <b>Risk Update:</b> <ul style="list-style-type: none"> <li>• The team continues to assess the impact and identify mitigating actions to address the risk of re-work of MRP Settlement Packages developed in 2021.</li> <li>• The team is developing risk mitigations associated with the risk of schedule delays due to unexpected volume of change requests.</li> </ul> </li> </ul>
 <b>Decisions Required</b>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>

# Progress Summary

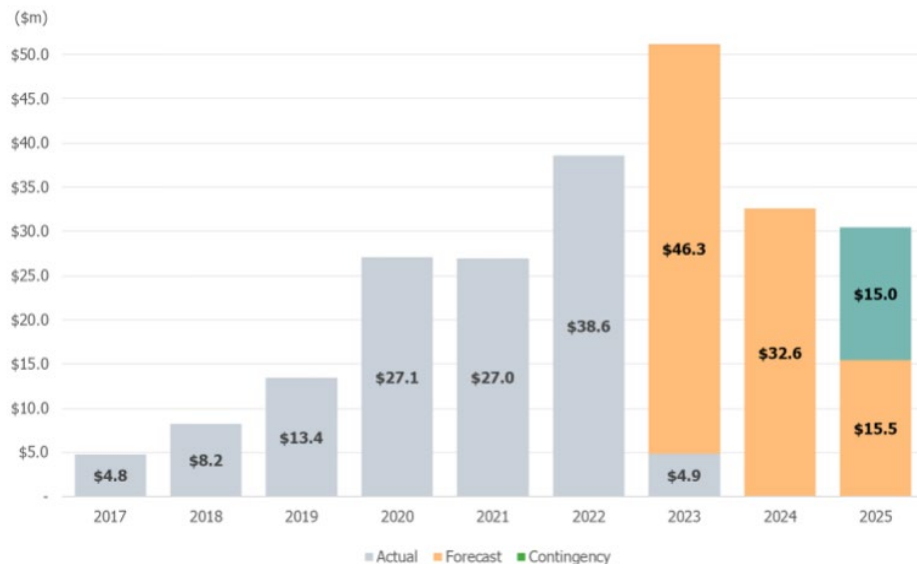
## Financial Summary (as at Feb 28, 2023)

Total Project Budget: \$233.3M		Total Project Costs: \$119.1M			
Year-To-Date Cost		Year-End Cost Forecast		Contingency	
Monthly Forecast	Monthly Actual	Annual Budget	Annual Actual	Approved	Used
N/A	\$1.8M	\$51.2M	TBD	\$15.0M	\$0
<b>Commentary - Financial</b>					
Resource/compensation expense forecasts are complete and included within this report. Vendor-related expense validations (i.e. contractors, services, and equipment) are underway. We expect to have a month-to-month forecast available in the next reporting cycle.					

## Schedule Summary

% Complete - Current Month (Feb 28)		% Complete - Year End		Total Schedule Reserve	
Planned	Actual	Planned	Actual	Days Available	Days Used
68%	68%	80%	TBD	132	0
<b>Commentary</b>					
<ul style="list-style-type: none"> <li><b>User Acceptance Testing of Market Registration Process</b> is tracking to plan with a forecast completion of April 28th 2023.No blockers have been reported. A progress update was provided to the line of business on February 24th 2023.</li> <li><b>Dispatch Scheduling &amp; Optimization Site Acceptance Testing (DSO SAT)</b> for release one is tracking to plan, with 18 bugs outstanding (2 high, 15 medium, and 1 low). All open bugs are either IESO environment related and/or network model build data issues; all of which will be addressed by IESO.</li> <li><b>Demand Forecast System, Primary/Secondary Weather Provider Site Acceptance Testing and System Integration Testing</b> is complete and all that remains is publication of the final report.</li> </ul>					

# Project Financial Status



	2017	2018	2019	2020	2021	2022	2023	2024	2025	Grand Total
Actual	\$4.8	\$8.2	\$13.4	\$27.1	\$27.0	\$38.6	\$4.9			\$124.0
Forecast							\$46.3	\$32.6	\$15.5	\$94.3
Contingency									\$15.0	\$15.0
Grand Total	\$4.8	\$8.2	\$13.4	\$27.1	\$27.0	\$38.6	\$51.2	\$32.6	\$30.5	\$233.3

# Upcoming Milestones

The following slides provide a list and update on key milestones that are due in the upcoming months - March 2023, April 2023, May 2023 & June 2023:

Project Area	Milestone	% Complete	Start Date	End Date	Status
Solution Testing	<b>Factory Acceptance Testing (FAT):</b> Market Information Management System (MIM) 1st Release	0%	May 2023	Jun 2023	Not Started
	Dispatch Data Management System (DDMS)	75%	Feb 2022	Jun 2023	In Progress
	<b>Site Acceptance Testing (SAT):</b> Group 2: Dispatch Scheduling & Optimization (DSO)	73%	Dec 2022	May 2023	In Progress
	<b>System Integration Testing (SIT):</b> Group 2: Demand Forecast System, Primary/Secondary	100%	Mar 2023	Mar 2023	Complete
	Weather Provider SIT				
	<b>User Acceptance Testing (UAT):</b> Market Registration Process (Online IESO)	93%	Jan 2023	Apr 2023	In Progress
Business Requirements	Market Power Mitigation (MPM) Business Requirement Documents	100%	Feb 2021	Mar 2023	Complete
Training	Change Impact Assessments (Internal & External)	98%	Mar 2022	Mar 2023	In Progress
Market Rules & Manuals	Market & Systems Operations – Interim Alignment	76%	Sep 2022	Jun 2023	In Progress
Internal Manuals	Internal Manual Series 5 – Market Assessment & Compliance Division (MACD)	0%	May 2023	Jun 2023	Not Started

# Upcoming Milestones

Project Area	Milestone	% Complete	Start Date	End Date	Status
Solution Development	Dispatch Data Management System (DDMS)	75%	Feb 2022	May 2023	In Progress
	Market Information Management System (MIM) 1st Release	37%	Dec 2022	May 2023	In Progress
	Energy Market Administration Tool (EMAT)	15%	Sep 2022	Jun 2023	In Progress
	Energy Market Interface (EMI)	30%	Feb 2023	Jun 2023	In Progress
	Market Power Information System (MPIS)	41%	Sep 2022	Jun 2023	In Progress

# Milestones – Other

- Site Acceptance Testing [43%] – *due Jul 2023*
- Registration [63%] – *due Nov 2023*
- Operations [32%] – *due Jan 2024*
- Market Power Mitigation [25%] – *due Mar 2024*



# Risk Follow Up

This report provides an update on two program risks:

1. Realized Risk: **MRP Settlement Delivery**

Incomplete MRP settlement requirement packages delay completion of development efforts.

2. Potential Risk: **Change Request Management**

Unexpected volume of change requests causes schedule delays.

# 1. MRP Settlement Delivery

Calculation requirements for 35 charges were developed by Symphono without complete requirements from upstream/downstream systems. This package is referred to as Package 2021.

## Current Plan:

- Package 2021 has been split into two - Package A (focus on CDMS) & Package B (focus on MIM). MRP Settlement team is working with the MRP IT team to validate CDMS and MIM requirements and the necessary changes/updates needed for Package 2021.
- MRP Settlement team intends to deliver an updated Package 2021 A to Symphono by end of March 2023. [On Track]
- Package 2021 B is planned to be delivered to Symphono in April 2023 following which MRP team will work with Symphono to validate MRP Settlement charge type completion by Nov 2023.

Additional Context: MRP Settlement team continues to deliver the remaining packages as per schedule to Symphono. Symphono has confirmed availability of additional developers to support Package 2021 re-work in parallel with planned work.

## 2. Change Request Management

Release	Description	Release Delivery Date	SAT Completion Date
Release 1	Initial DSO requirements and a set of Change Requests essential for execution of FAT (Daily Energy Limit, Hour 1 startup, ramp rate changes, modifications to Market Power Mitigation)	Dec 2022	May 2023
Release 2	Change Requests not essential for execution of FAT (DSO interface changes, save case/study changes)	Feb 2023	May 2023
Release 3	Change Requests not essential for execution of FAT (modifications to Commercial Model, breakpoint changes, enhanced start-up cost logic, intertie reason codes, penalty price input curve for scheduling pass)	May 2023	Jul 2023
Release 4 (TBC)	Change Requests identified during FAT and SAT	Jul 2023 (TBC)	Oct 2023 (TBC)

Release 2, 3, and a potential release 4 are phases of work which have been purposefully planned in the schedule as a mitigation to address unexpected changes needed to satisfy DSO requirements/functionality.

## 2. Change Request Management Cont'd

1 **AMPCO INTERROGATORY 23**

2 Issue 4.2 Are the IESO's forecast 2023, 2024 and 2025 operational costs for the MRP  
3 appropriate in the context of the scope and timing of the overall project?

4 4.2-AMPCO-23

5 **INTERROGATORY**

6 **Reference:** G-1-2 p.3

7 **Preamble:** The evidence in the current application indicates the IESO Board approved a  
8 new baseline 5 schedule (BL5) in August 2022, including a new MRP program budget of  
9 \$233.3 million, inclusive of \$15 million contingency, and a new Go-Live date of May 2025.

10 Questions:

11 a) Please provide the current schedule contingency beyond May 2025.

12 b) The scope of the project has not changed<sup>2</sup>. Please explain the current uncertainties and  
13 need for a \$5 million increase in contingency from \$10 million to \$15 million in the current  
14 budget.

15  
16 **RESPONSE**

17 a) Within the revised go-live date of May 2025, the project team has incorporated a  
18 schedule reserve of approximately seven months which is allocated across various points  
19 on the critical path that will be tracked and monitored. During these reserve periods,  
20 resources will continue to work on deliverables not on the critical path and will be  
21 redeployed to critical path activities if needed to maintain the May 2025 in-service date.

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<sup>2</sup> Quarterly Report on the Market Renewal Program Status Q3 2022 p. 3

- 1        The schedule reserve periods have been strategically placed after key solution testing  
2        efforts to mitigate the risk of unforeseen delays due to defect management. Use of this  
3        schedule reserve period will not result in a change to the go-live date.
- 4        b) The budget contingency of \$15 million, or 7% of overall program budget, has been  
5        established to cover the potential for overtime costs and/or additional resources to  
6        preserve the May 2025 in-service date, and to address critical solution defects.

**AMPCO INTERROGATORY 24**

Issue 4.2 Are the IESO's forecast 2023, 2024 and 2025 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.0-AMPCO-24

**INTERROGATORY**

Reference: G-2-1 p.2

Preamble: The IESO is confident this schedule is achievable as many of the previous uncertainties have been addressed through completion of business requirements and vendor validation of timelines to complete system development and testing. Further, the revised schedule provides stakeholders with additional time to complete their own readiness activities.

Questions:

a) Please discuss the nature of the previous uncertainties and provide details of how each uncertainty has now been addressed.

b) Please provide the Class of Estimate for the current MRP budget based on the AACE International Cost Estimate Classification System.

c) Please compare the time in the schedule for stakeholders to complete their own readiness activities compared to the previous BL4 schedule.

**RESPONSE**

a) Some of the key issues affecting the schedule were the time required for vendors to develop software, and the testing that needs to take place on each of those systems.

1 Many of these details were finalized in 2022. With further progress made on the project  
2 and more detailed vendor estimates, there are fewer uncertainties, increasing confidence  
3 the revised schedule is achievable.

4 b) The Market Renewal Program budget was not established based on the AACE  
5 International Cost Estimate Classification System. However, the latest budget aligns with  
6 the definition of a Class 2 Estimate.

7 c) The total elapsed time planned for participants to complete their own readiness activities  
8 is approximately four months longer in the BL5 schedule than it was in the BL4 schedule.  
9 In addition, participants will have the technical specifications required to make their  
10 conforming changes further in advance of testing in the BL5 schedule than in the BL4  
11 schedule giving them at least an additional six months to complete this work.



1 **AMPCO INTERROGATORY 25**

2 Issue 4.2 Are the IESO's forecast 2023, 2024 and 2025 operational costs for the MRP  
3 appropriate in the context of the scope and timing of the overall project?

4 4.2-AMPCO-25

5 **INTERROGATORY**

6 Reference: G2-21 p.3

7 Preamble: The evidence states "Recognizing the importance of change management and  
8 adoption through the Market Renewal journey, the IESO continues to work on Market  
9 Participant Readiness activities.

10 Questions:

- 11 a) Please advise if there have been any updates to the Market Renewal Program: Market  
12 Participant Readiness Plan.

13  
14 **RESPONSE**

- 15 a) The IESO has delivered Market Participant Readiness items such as a readiness checklist,  
16 to assist participants in understanding the scope and timing of what they will need to do,  
17 what they will be trained on, and the actions they will need to take to be prepared for  
18 MRP go-live. As well, the API Technical Specifications for Dispatch Services and Market  
19 Information Management system were released so participants can begin working on  
20 changes to their systems. More training, education and testing materials will be released  
21 later in 2023 and 2024.

1 **AMPCO INTERROGATORY 26**

2 Issue 4.2 Are the IESO's forecast 2023, 2024 and 2025 operational costs for the MRP  
3 appropriate in the context of the scope and timing of the overall project?

4 4.0-AMPCO-26

5 **INTERROGATORY**

6 **Reference:** G-2-1 p.6

7 **Preamble:**

8 Questions:

- 9 a) Please provide a breakdown of the Professional and Consulting operating expenses for  
10 the years 2023 to 2025.

11  
12 **RESPONSE**

- 13 a) There is no further breakdown as the IESO's Professional and Consulting operating  
14 expenses for the years 2023 to 2025 are wholly comprised of Legal support, primarily on  
15 Market Rules matters.

**AMPCO INTERROGATORY 27**

Issue 4.2 Are the IESO's forecast 2023, 2024 and 2025 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.2-AMPCO-27

**INTERROGATORY**

**Reference:** G-2-1 p.10

**Preamble:**

Table 9 below shows the number of Full Time Equivalents (FTEs) allocated to MRP decreases from 109 in 2023 to 88 in 2024 and 44 in 2025.

MRP FTEs	2023 Budget	2024 Budget	2025 Budget
Total Regular	49	38	18
Temporary	14	13	6
<b>MRP Core FTEs</b>	<b>63</b>	<b>51</b>	<b>24</b>
MRP Support FTEs	46	37	20
<b>MRP FTEs Total</b>	<b>109</b>	<b>88</b>	<b>44</b>

Questions:

- a) For each FTE category, please provide the status of the FTEs no longer allocated to MRP in 2024 and 2025.

**RESPONSE**

- a) The MRP Core FTEs no longer allocated to MRP in 2024 and 2025 will return to their home-based role if they are a regular employee, or if they are a temporary employee

- 1 their employment at the IESO will end. The status of MRP support FTEs will not change
- 2 as they will be assigned to support other projects.

**AMPCO INTERROGATORY 28**

Issue 4.3 Are the IESO's forecast 2023, 2024, 2025 capital costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.0-AMPCO-28

**INTERROGATORY**

**Reference:** G-2-1 p.6

**Preamble:**

Questions:

- a) Please provide a breakdown of the Professional and Consulting capital expenses for the years 2023 to 2025.

**RESPONSE**

- a) Please see Table 1 below:

**Table 1: Professional and Consulting Capital Expenses**

(\$ millions)	2023 Budget	2024 Budget	2025 Budget
<b>Audit</b>	0.6	-	-
<b>Contractor services</b>	2.3	0.7	1.7
<b>Legal services</b>	0.8	0.8	0.2
<b>Total</b>	<b>3.7</b>	<b>1.5</b>	<b>1.9</b>

**AMPCO INTERROGATORY 29**

Issue 4.3 Are the IESO's forecast 2023, 2024, 2025 capital costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.3-AMPCO-29

**INTERROGATORY**

**Reference:** G-2-1 p.9

**Preamble:** The IESO provides the MRP capital budget as follows:

(In \$ millions)	2023 Budget	2024 Budget	2025 Budget
<b>Capital Expenses</b>			
Compensation & Benefits	15.8	14.6	7.0
Professional & Consulting	3.7	1.5	1.9
Operating & Administration	22.7	9.7	1.9
Interest	1.7	2.4	2.2
Contingency	-	-	15.0
<b>Total Capital Expenses</b>	<b>43.9</b>	<b>28.2</b>	<b>28.0</b>

Questions:

- a) Please provide a more detailed breakdown of the capital budget by work activity for the years 2023 to 2025

**RESPONSE**

- a) Please see Table 1 below:

1

2 **Table 1: Capital Budget 2023 – 2025 (in \$ millions)**

<b>Total CAPEX</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
General & Administration	3.4	3.5	2.4
Change Management	3.0	2.6	1.3
Market Rules & Manuals	3.2	2.8	1.4
Quality Assurance	4.8	4.5	2.7
Requirements	1.9	1.3	0.7
Solution Development	27.7	13.5	4.5
Contingency			15.0
<b>Total</b>	<b>43.9</b>	<b>28.2</b>	<b>28.0</b>

3