

AMPCO INTERROGATORY 10

Issue 4.0 Market Renewal Program (MRP)

4.0-AMPCO-10

INTERROGATORY

Ref 1: G-2-1 P5 Table 2

a) Please add the forecast and actual spending on MRP for all previous years to the table.

b) Please confirm the following:

- Total MRP program costs are estimated at \$177.7 million
- Total MRP capital costs are estimated at \$146.3 million
- Total MRP operating costs are estimated at \$29.4 million
- The new go live date is November 2023 with six months of contingency

RESPONSE

a. Actual spending from 2017 – 2021 is included in Table 1 below.

Table 1: MRP Actual and Forecast Spending

(\$ millions)	2017 Actual	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Budget	2023 Budget	2024 Budget	Total
Operating Expenses									
Compensation & Benefits	2.6	4.5	1.7	1.6	2.4	3.9	3.6	0.7	21.0
Professional & Consulting	1.9	2.2	1.2	0.4	0.5	1.2	1.6	0.2	9.2
Operating & Administration	0.2	0.4	0.2	0.1	0.1	0.1	0.1	-	1.2
Total Operating Expenses	4.7	7.1	3.1	2.1	3.0	5.2	5.3	0.9	31.4
Capital Expenses									
Compensation & Benefits	-	0.6	6.8	10.2	11.8	12.7	13.9	0.9	56.8
Professional & Consulting	-	0.2	2.5	2.7	1.2	4.1	3.0	-	13.7
Operating & Administration	0.1	0.3	0.9	11.8	10.5	20.3	17.9	1.0	62.8
Interest	-	-	0.1	0.3	0.5	0.9	1.2	-	3.0
Contingency	-	-	-	-	-	3.2	6.8	-	10.0
Total Capital Expenses	0.1	1.1	10.3	25.0	24.0	41.2	42.8	1.9	146.3
Total MRP Expenses	4.8	8.2	13.4	27.1	27.0	46.4	48.1	2.8	177.7

- b.
- i. Total MRP program cost estimate continues to be \$177.7 million.
 - ii. Total MRP capital costs have been revised to an estimate of \$146.3 million.
 - iii. Total MRP operating costs have been revised to an estimate of \$31.4 million.
 - iv. See response to Schedule 1 – 4.1 OEB STAFF 19(a).

AMPCO INTERROGATORY 11

Issue 4.0 Market Renewal Program (MRP)

4.0-AMPCO-11

INTERROGATORY

Ref 1: G-2-1 P4

Ref 2: Market Renewal Program Energy Stream Business Case October 22, 2019 P55

a) Please provide a breakdown of the expected MRP Costs per phase:

MRP Approved Costs Per Phase	\$M	%
High Level Design		
Detailed Design		
Implementation		
Contingency		
Total		100

b) Please provide the start date of the implementation phase and how many months it will take to complete.

RESPONSE

a) Table 1 below provides a breakdown of the estimated MRP costs per phase.

Table 1: Estimated MRP Costs per Phase

MRP Approved Costs Per Phase	\$M	%
High Level Design	12.2	7%
Detailed Design	24.5	14%
Implementation	131.0	74%
Contingency	10.0	6%
Total	177.7	100%

Note: the IESO does not specifically track work allocated to each phase, this table represents best estimates.

b) Due to the dynamic nature of the project, there could be concurrent activities to support the high-level design, the detailed design, or the implementation phases. With regard to the IESO's stakeholder engagement activities, the Implementation phase commenced

- 1 following the final posting of the Detailed Design of the Energy Stream in January 2021.
- 2 The Implementation phase will conclude when Market Renewal is brought in-service.

AMPCO INTERROGATORY 12

Issue 4.0 Market Renewal Program (MRP)

4.0-AMPCO-12

INTERROGATORY

Ref: EB-2020-0230 Exhibit I Tab 4.5 Schedule 2 – 4.5 AMPCO 32

The response states "To date, the IESO has used \$6 million of the contingency by allocating this amount to the program budget. Through the schedule and budget update exercise, the IESO expanded the program budget envelope from \$170M (\$154M + \$16M contingency) to \$177.7M (\$167.7M + \$10M contingency)."

a) Please provide the allocation of the \$10 M contingency.

b) Please discuss how the \$10 M contingency has been used to date.

RESPONSE

a) The \$10 million in contingency is budgeted over 2022 and 2023.

Table 1: MRP Contingency Budgeting

(\$ millions)	2022 Budget	2023 Budget	2024 Budget
Capital Expenses			
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	-
Total Capital Expenses	41.2	42.8	1.9

b) To date, none of the \$10 million contingency has been used.

AMPCO INTERROGATORY 13

Issue 4.0 Market Renewal Program (MRP)

4.0-AMPCO-13

INTERROGATORY

Ref 1: G-2-1 P4

Ref 2: Market Renewal Program Energy Stream Business Case October 22, 2019 P56

- a) Please provide a breakdown of the expected MRP Costs per Program Cost Category Components:

MRP Approved Costs Per Phase	\$M	%
IESO Labour		
IT (Hardware & Software)		
Professional & Consulting		
Other (Interest & Rent)		
Total		100

RESPONSE

- a) See Table 1 below.

Table 1: MRP Cost Category (Not including Contingency)

MRP Cost Category	\$ millions	%
IESO Labour	77.8	46%
IT (Hardware & Software)	58.8	35%
Professional & Consulting	22.9	14%
Other (Interest & Rent)	8.2	5%
Total	167.7	100%

CCMBC INTERROGATORY 7

Issue 4.0 Market Renewal Program (MRP)

4-CCMBC-7

INTERROGATORY

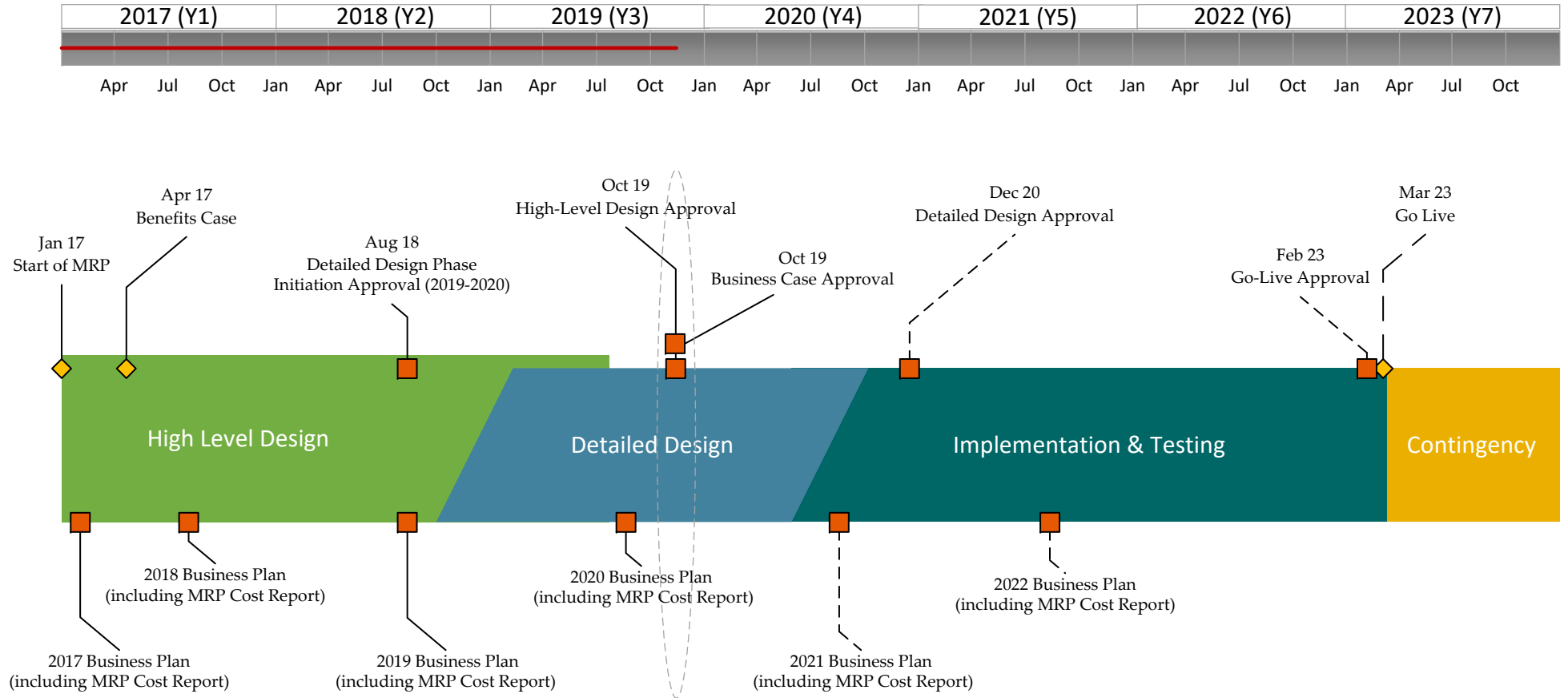
Reference: Exhibit G-2-1, Attach. 1, Market Renewal Program (MRP) Baseline Schedule



- a) Did the MRP actually start on New Year's Day, January 1, 2021, as indicated in the schedule or did it start on an earlier day?
- b) Why do colour bars for some of the activities not correspond with the dates of those activities? For example, the colour bar for Solution Development starts at January 1, 2021, but the dates for Solution Development shown are 13 August 2021 to 8 March 2022.
- c) When was the MRP first approved by IESO Board of Directors?
- d) Please file the original MRP schedule when it was first approved by the IESO Board of Directors.
- e) Does the IESO track its spending versus results achieved for the MRP? If the IESO uses earned value analysis, please file it. If it does not, please prepare an earned value diagram for the MRP that shows money spent compared to results achieved on the same chart and file it.

RESPONSE

- a) The Market Renewal Project began with sets of stakeholder discussions, as documented on the IESO's Stakeholder Engagement webpages, as far back as 2016. MRP achieved significant milestones like the completion of the High-Level Design in August of 2019, and the completion of the Detailed Design in January of 2021. January 2021 indicates the start of the MRP implementation phase.
- b) The baseline schedule referenced in the interrogatory starts in 2021 but many of the constituent activities started in 2020. If the bar line illustratively begins in January, but the identified month is something other than January, this means that activity started in the identified month of the previous year.
- c) The Market Renewal Program was approved by the IESO Board of Directors as part of the 2017 Business Plan, followed by the Minister of Energy's approval of the business plan, where the business plan specifically includes a separated item for the Market Renewal Program.
- d) See Attachment 1 to this Exhibit.
- e) The IESO tracks earned value through its Schedule Performance Index (SPI) and Cost Performance Index (CPI) reporting. CPI (earned value / actual cost) represents the cost efficiency of the project, while SPI (earned value / planned value) represents how much work was done compared to plan. See response to Schedule 2 – 4.1 AMPCO 14(b).

MARKET RENEWAL PROGRAM ENERGY MILESTONES



Legend	
	Board Approvals
	Milestone

EDA INTERROGATORY 11

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.3 Are the IESO's forecast 2022 capital costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4.0-EDA-11

INTERROGATORY

Evidence Reference: ExG-T2-S1- Pg 4/9 - *Table 1: Cost Estimate for MRP*

Preamble

MRP has been underway since 2017.

Question

a) Please populate the table below with annual Operating Expense and Capital Expense beginning in 2017 and ending in 2024.

b) Please explain any differences between the actual values set out at Exhibit G, Tab 2, Schedule 1, Table 1 "Cost Estimate for MRP" and the actual values provided in the requested table.

c) For all amounts identified at line (C) of the table please describe how the funds were applied, the year in which they were applied.

d) Please describe the decision-making process that resulted in the funds being applied as identified in the response to part c).

Year	20xx <insert 9 columns>
OEB Total approved IESO Fee	
MRP Costs to be recovered through the OEB approved Fee (A)	
OM&A	
Capital	
MRP Actual spend (B)	

OM&A	
Capital	
C= (A) – (B)	
Treatment of C	
OM&A	
Capital	
(D) Carried Forward to next period to support MRP	
(E) Redirect to non-MRP activities of the year	
(F) Recorded in an account (e.g. Variance Account) BVA/FDVA	
(G) Other	

1 **RESPONSE**

- 2 a) See Table 1 below. The IESO has modified the table included in the Interrogatory for
3 accuracy and alignment with the IESO's budgeting practices.

4 **Table 1: MRP Operating and Capital (2017-2024)**

	2017	2018	2019	2020	2021	2022 Budget	2023 Budget	2024 Budget
(\$ millions)								
IESO Revenue Requirement	190.8	190.8	190.8	188.6	191.8	201.5	204.0	209.3
MRP Portion of Revenue Requirement (A)								
Operating ¹	12.0	12.7	4.7	2.0	3.6	5.2	5.3	0.9
Capital ²	-	4.0	26.0	25.9	36.0	41.2	42.8	1.8
MRP Actual spend (B)								
Operating	4.7	7.1	3.1	2.1	3.0	-	-	-

Capital	0.1	1.1	10.3	25.0	24.0	-	-	-
Variance C= (A) – (B)								
Operating	7.3	5.6	1.6	(0.1)	0.6	-	-	-
Capital	(0.1)	2.9	15.7	0.9	12.0	-	-	-
Treatment of C								
MRP Budget Impacts								
(D) MRP Business Case budget carried Forward to next period to support MRP	-	-	-	0.8	12.6	-	-	-
(E) Budget not required	4.0	0.6	17.3	-	-	-	-	-
(F) Work performed on the capacity auction	3.2	7.9	-	-	-	-	-	-
(G) Redirect to non-MRP activities of the year	-	-	-	-	-	-	-	-
Regulatory Impacts								
(H) Recorded in FVDA	4.1	(2.3)	1.6	(0.1)	0.6	-	-	-
(I) Other	(0.1)	2.9	15.7	0.9	12.0	-	-	-

1 – The MRP Portion of Revenue Requirement operating costs in 2017 & 2018 are inclusive of both the incremental capacity auction and energy work stream funding. Operating costs from 2019 to 2024 are for MRP energy only.

2 – Capital costs are not recovered through the Usage Fee each year. They will be recovered through the Usage Fee post implementation through amortization expense.

b) There is no difference between the values for historical program costs in Table 1 above and the values for historical program costs included in Exhibit G-2-1 – Market Renewal Program Cost Report, Table 1.

c) MRP funds in section (C) have been grouped by their treatment with respect to the MRP budget as well as the regulatory treatment for ease of explanation.

MRP Budget Treatment

The MRP Business Case was approved by the IESO Board in October 2019. It included actual costs up to the end of 2019 and an estimate of costs for the remainder of the program.

1 From a budgeting perspective, after business case approval (2020 – 2024), any annual
2 operating and capital underspend from the MRP Business Case budget has been carried
3 forward to the next period to support MRP as shown in row (D) as it is included in the
4 total budget for MRP. These amounts will still be used in later years.

5 Prior to business case approval, any variance in operating and capital budget that was
6 no longer required is shown in row (E). In 2017 & 2018, the operating funding amount
7 was inclusive of work on the capacity and energy work streams, therefore costs
8 associated with the capacity auction are shown in row (F). No operating or capital
9 budget was redirected to non-MRP activities as shown in row (G).

10 The regulatory treatment of any unused funding is described below.

11 **Regulatory Treatment**

12 Operating funding variances that came from the Usage Fee were recorded in the FVDA,
13 as shown in row (H). Any new or deferred funding would be requested in a subsequent
14 revenue requirement submission. This is the IESO's normal practice for operating
15 underspend or overspend relative to budget.

16 MRP Capital funding variances were simply not used and not borrowed as shown in row
17 (I).

18 d) See response to c).

EDA INTERROGATORY 12

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4.0-EDA-12

INTERROGATORY

Evidence Reference: ExG-T2-S1-Attachment 1

Preamble

Currently the IESO plans to deploy MRP November 2023.

Question

Please assume that MRP's deployment is:

a) delayed by 6 months until April 2024

b) delayed by 12 months until November 2024

Please explain and quantify the impacts to the IESO's revenue requirement for 2022, 2023 and 2024; please be detailed, state all assumptions and simplifying facts and provide all supporting data.

RESPONSE

a) It would be inappropriate to speculate on hypothetical situations, but the IESO will continue to report on schedule and cost impacts as the project continues. See response to Schedule 1 – 4.1 OEB STAFF 19(a).

b) See response to a).

EP INTERROGATORY 12

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4.0-Energy Probe-12

INTERROGATORY

Ref.: Exhibit G Tab 2 Schedule 1 Plus Attachment(s) - Market Renewal Program

Preamble: In March 2021, the IESO Board approved a revised budget and schedule, including a new go live date of November 2023 with six months of contingency. This baseline schedule incorporates lessons learned from the high-level and detailed-design phases of the project, makes best use of existing resources, while delivering a high-quality program.

- a) Confirm the revised MRP capital and operating cost estimate and go live dates.
- b) Please provide the 2022 YTD Capital Expense
- c) Will there be capital and operating costs in 2024? If so please provide an estimate.
- d) Please provide the updated/most recent Benefits Realization Report. Compare this to the prior version(s).
- e) Confirm the MRP without the Capacity Auction Option net benefit.

RESPONSE

- a) See response to Schedule 2 – 4.0 AMPCO 10(b) and to Schedule 1 – 4.1 OEB STAFF 19(a).
- b) See response to Schedule 13 – 4.1 SEC 16(d).
- c) Forecast MRP operating and capital costs are included in Exhibit G-2-1 – Market Renewal Program Cost Report, Table 2. Also see response to Schedule 2 – 4.0 AMPCO 10(b).
- d) The referenced 2017 MRP Benefits Case "Brattle Group Report" was an initial study to confirm directionally that MRP would provide sufficient benefits and to guide the IESO to pursue a more formal business case. The subsequent 2019 MRP Business Case is more relevant given it used information specific to Ontario as inputs for the financial assessment of benefits. The IESO included the MRP Business Case within its 2020/2021 Revenue Requirement Submission (EB-2020-0230). There have been no updates to the benefits realization report or business case.
- e) The quantifiable benefits as identified in the 2019 MRP Business Case were derived from more efficient unit commitment, improved intertie pricing, increased resource competition, and elimination of unwarranted Congestion Management Settlement Credits

1 (CMSC) payments. These benefits would result from the implementation of MRP
2 regardless of the Capacity Auction.

EP INTERROGATORY 13

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4.0-Energy Probe-13

INTERROGATORY

Ref.: Exhibit G Tab 2 Schedule 1 Plus Attachment(s)

Please provide a schedule showing approximate FTEs and related compensation costs related to MRP 2018-21 and forecast for 2022 and 2023 and if appropriate 2023.

a) Indicate if the FTEs are Permanent or temporary.

b) Please provide the costs of external resources and provide a list of major contractors and amounts disbursed in 2018-2021.

RESPONSE

a) See Table 1 below. All MRP resources are non-permanent program resources. Upon the closure of MRP, all implementation resources will return to their home positions, shared resources will be assigned to other initiatives and temporary staff will be terminated.

Table 1: MRP FTEs and Compensation

Compensation & Benefits (\$ millions)	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Budget	2023 Budget	2024 Budget
Operating Expenses	4.5	1.7	1.6	2.4	3.9	3.6	0.7
Capital Expenses	0.6	6.8	10.2	11.8	12.7	13.9	0.9
Total MRP Expenses	5.1	8.5	11.8	14.2	16.6	17.5	1.5
MRP FTEs							
Regular	26	36	36	35	42	40	3
Temporary	6	4	9	14	10	12	2
MRP Core FTEs	32	40	45	49	52	52	5
MRP Support FTEs	7	14	28	32	45	49	5
MRP FTEs Total	38	54	73	81	97	101	10

b) See Table 2 below.

Table 2: MRP Major Contractors

Major Contractor	Services Provided	Procurement Type	2018 Actual	2019 Actual	2020 Actual	2021 Budget	2021 Actual
Operating Expenses							
The Brattle Group	Consultant support for high level design	Competitive	0.3	0.3	-	-	-
FTI Consulting	Consultant support for high level design	Competitive	0.7	0.3	-	-	-
Charles River Associates	Review of MRPs impact on existing supply contracts	Competitive	0.4	0.1	-	0.2	0.1
Stikeman Elliott LLP	Legal support for market rule amendments	Competitive	-	-	0.4	0.7	0.4
Hunton Andrews Kurth LLP	Legal support for designs, supply contract inputs & governance	Competitive	0.2	-	-	-	-
Stikeman Elliott LLP	Legal support for designs, supply contract inputs & governance	Competitive	0.1	0.1	-	-	-
Torlys LLP	Legal support for designs, supply contract inputs & governance	Competitive	0.3	-	-	-	-

Major Contractor	Services Provided	Procurement Type	2018 Actual	2019 Actual	2020 Actual	2021 Budget	2021 Actual
Capital Expenses							
FTI Consulting	Consultant support for detailed design	Competitive	-	0.5	0.3	0.1	-
The Brattle Group	Consultant support for detailed design	Competitive	-	0.1	0.3	-	-
Hatch Ltd	Engineering Study Consultations	Competitive	-	-	0.3	0.4	0.2
EMS GROUP NA, LLC	Design Integration Support	Non-Competitive	0.1	0.5	0.4	0.5	0.2
SMCS LLC	Technical Integration Support	Non-Competitive	0.1	0.6	0.4	0.5	0.1
Paul Gribik Consulting LLC	Consultant support for optimization expertise	Competitive	-	-	0.3	0.3	0.3
Stoneman Consulting	Consultant hired for program delivery	Competitive	-	0.1	0.2	-	-
Gartner Consulting	Readiness Audit Vendor	Competitive	-	-	-	0.4	0.1
Kaihen Inc	Control Room Specialist	Competitive	-	-	-	0.4	0.3
Torlys LLP	Legal support for designs, supply contract inputs & governance	Competitive	-	0.4	0.3	0.2	-
Stikeman Elliott LLP	Legal support for designs, supply contract inputs & governance	Competitive	-	-	-	0.2	-
Osler, Hoskin & Harcourt LLP	Legal support for designs, supply contract inputs & governance	Competitive	-	0.2	-	0.2	-
Hunton Andrews Kurth LLP	Legal support for designs, supply contract inputs & governance	Competitive	-	0.1	-	-	-
Hitachi ABB Power Grids	Dispatch Scheduler & Optimization vendor	Competitive	-	-	10.8	10.0	9.5
Symphono	Development of market charge types	Competitive	-	-	-	1.6	-

ED INTERROGATORY 17

Issue 4.0 Market Renewal Program (MRP)

4.0-ED-17

INTERROGATORY

Reference: Exhibit G-2-1

Preamble:

MRP high level design began with two streams: the energy stream and the capacity stream (known as the Incremental Capacity Auction (ICA)). In July 2019, further work on the ICA portion of the program was stopped as a result of updated planning assumptions and in response to stakeholder feedback.

Questions:

- a) In light of increasing capacity gaps expected in the future, is the IESO considering resuming the Incremental Capacity Auction stream of market renewal? If not now, what conditions would convince the IESO to resume this stream?

RESPONSE

- a) The Market Renewal Program is focused on the Energy Stream to bring significant benefits to participants and ratepayers. The Market Renewal Program Energy Stream presents an opportunity to implement much needed reforms to the Ontario electricity market. The expected benefits will span the sector, enabling the IESO to realize significant operational improvements, reduce costs for market participants, address known inefficiencies, and establish a robust market to integrate emerging and new technologies. The IESO is not considering resuming the Incremental Capacity Auction. The IESO is taking a number of steps to address future supply needs through the Resource Adequacy Framework.¹

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

OSEA INTERROGATORY 4

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

Issue 4.3 Are the IESO's forecast 2022 capital costs for the MRP appropriate in the context of the scope and timing of the overall project?

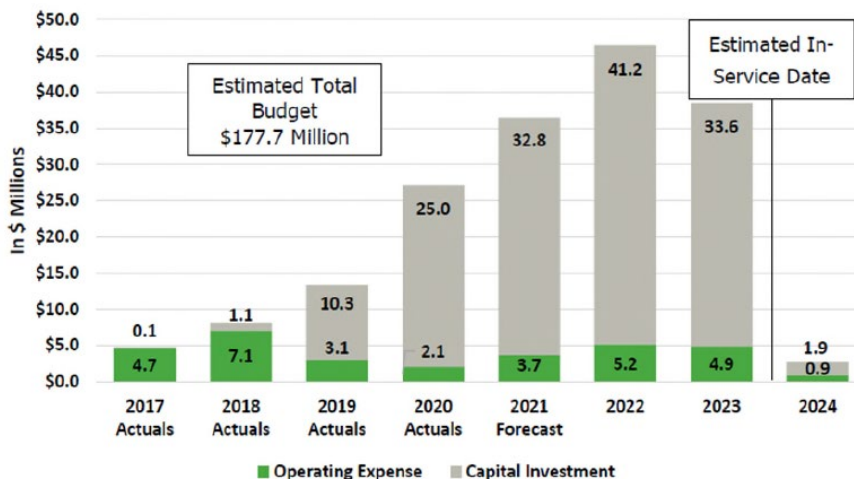
Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4-OSEA-4

INTERROGATORY

Reference: Exhibit B-1-2

Preamble: The IESO Market Renewal Program ("MRP") expects to spend almost \$100 million over the next the next three years.



Source: EB-2022-0002 Exhibit B-1-2 page 22 of 36

At the same time, the IESO has expanded procurement targets to ~6,000 MW through multiple RFPs. The first three procurements are described by the IESO in their April 22, 2022, presentation.¹

¹ <https://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/long-term-rfp/ltrfp-20220420-presentation.ashx>

	LT1 RFP	Expedited Procurement	Expansion
Target capacity	2,500 MW of effective capacity	~500 to ~1000 MW of effective capacity	~500 to ~1000 MW of effective capacity
Term Start	No later than 2027	2025	2025
Term length	15 year term with potential additional term available for resources able to come online early	Minimum of 15 year base term	New contract or extension of existing contracts. Length of contract/extension dependent on stakeholder feedback
Locational considerations	Global need with strong preference for resources in the West and East of FETT zones	Targeted at meeting global need	Targeted at meeting global need
Eligible Resources	Technology agnostic; new-build resources at greenfield sites or co-located at existing sites able to achieve commercial operation no later than 2027.	Technology agnostic; new-build resources at greenfield sites or co-located at existing sites; must achieve commercial operation by 2025.	Expansions or uprates to existing resources that are under contract and operating in IESO-administered markets. Expansion or uprate must be the same technology as the existing resource and able to achieve commercial operation in 2025.
Qualification	Participation in LT1 RFQ Required	Participation in LT1 RFQ Required	Existing counterparty in good standing with existing contract

The IESO is offering a long-term contract (i.e., 15+ years) through a contract-for-differences structure that protects new or expanded facilities from uncertainty in market revenue. The contract structure is required to attract capital to Ontario for the development of new resources. OSEA is interested in the impact of the procurement schedule on the MRP benefits, project plan, and future market activities. In particular, OSEA is interested on the impact of potential project economics to small and community projects expected to operate within Ontario's wholesale electricity market.

Questions:

- a) Please provide documentation and analysis supporting the IESO's assessment of the impact of the proposed contract structures for the procurement targets on MRP benefits case.
 - i. If an assessment of the impact has not been completed, please explain why, and provide a high-level estimation of the potential impact on MRP benefits from the contract for differences structure.
- b) Please describe any adjustments in capital expenditures and operating expenditures for the MRP program related to the IESO's procurement decisions.
- c) Following the conclusion in 2029 of the procurements streams (i.e., the three described in the table above), please provide an estimate of the amount of supply resources (i.e., % of installed capacity of market participants) by the following categories:
 - i. Rate-regulated assets
 - ii. Contracted with the IESO
 - iii. Merchant (i.e., not rate-regulated or contracted with the IESO)

RESPONSE

- a) The IESO has not performed an assessment of the impact to the MRP benefits case from proposed procurement contract terms because the quantifiable benefits were derived from more efficient unit commitment, improved intertie pricing, increased resource competition, and elimination of unwarranted Congestion Management Settlement Credits (CMSC) payments. These benefits will accrue regardless of whether resources are contracted, rate regulated, or operating on a merchant basis. This is due to the benefits of MRP coming from reducing the inefficiencies of the current energy market through better scheduling and commitment (i.e. choosing the least cost set of resources to meet system needs).
- b) The IESO has not adjusted the MRP budget related to proposed procurements as these are to address future capacity needs and the design of MRP is independent of these procurements. MRP's expenditures would be accrued regardless of the procurement decisions in order to implement the renewed market.
- c) The IESO's 2022 Revenue Requirement Submission is based on a Business Plan that has been reviewed and approved by the Minister of Energy and the review of the IESO's application should be focused on the IESO's OM&A and capital expenditures. The proportion of capacity that will be rate regulated, contracted, or merchant in 2029 is not within scope of the IESO's 2022 Revenue Requirement Submission. Further, the IESO is unable to comment on the amount of capacity that would be approved for rate regulation, or if market participants will continue to participate in IESO markets as merchant should they not participate in procurements.

PWU INTERROGATORY 6

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

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

4-PWU-6

INTERROGATORY

Ref. 1: Exhibit G/Tab 2/Schedule 1/P. 8

Table 8: 2021 - 2022 Full Time Equivalents

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

Ref.2: Exhibit G/Tab 2/Schedule 1/Page 7 of 9:

Table 5: CPI and SPI for 2020 and 2021

	2020	2021
CPI	0.90	1.14
SPI	0.86	0.82

Ref 3: Exhibit B/Tab 1/Schedule 2/Page 21

In March 2021, the IESO Board approved a revised program funding and schedule, including a new in-service date of November 2023, with six months of schedule contingency.

Questions:

- For MRP Core FTEs in Ref.1, please indicate how many were external hires and how many were achieved through rotations from the IESO's core operations.
- In Ref 3, what was the original cost and in-service date that got updated in March 2021
- In Ref.2, please describe the reasons for the lower than target [1] performance in CPI and SPI in 2020 and the SPI in 2021

- 1 d) Given that the IESO Board approved a revised budget and schedule in March 2021,
2 please confirm that future CPI and SPI numbers will be based on the revised budget and
3 schedule, and if so, how can the IESO be able to undertake a trend analysis of its
4 performance starting with the 2020 and 2021 numbers that are reported in Ref.2?

5 **RESPONSE**

- 6 a) The temporary staff were external hires while regular staff are internal to the IESO.

- 7 b) The original cost and in-service date that was updated in March 2021 was an overall
8 MRP budget of \$170 million (\$154 million plus \$16 million in contingency) with an in
9 service date of March 2023.

- 10 c) The large variation in CPI from 2019 to 2020 is due to vendor costs that were planned
11 for 2019 and not realized until 2020. The SPI for MRP was below target due to delays
12 associated with IT vendor contract negotiations and detailed design documents
13 development, which impacted dependency tasks such as static testing and process
14 design work.

15 In 2021, MRP, as a complex and interdependent project, has a Schedule Performance
16 Index (SPI) which is below target, as the project had to reprioritize some work to
17 accelerate vendor requirements gathering, which impacted dependency tasks.

- 18 d) The annual CPI and SPI for the MRP work performed in 2020 and 2021, was evaluated
19 against the budget and schedule included in the business case for the detailed design
20 phase. The baseline schedule and budget will apply to future CPI and SPI reporting. If
21 there is a new baseline, the CPI and SPI will be reset to 1.0 and ongoing trend analysis
22 will start from that reference point – meaning there is no trend analysis between
23 baselines, only within a baseline. Comparisons can still be made to the originally
24 approved MRP budget and schedule.

OEB STAFF INTERROGATORY 18

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

4-Staff-18

INTERROGATORY

a. Exhibit B / Tab 1 / Schedule 2 / p. 15

b. Exhibit G/ Tab 2/ Schedule 1 / p. 5

Preamble: On page 15 of the IESO's 2022-2024 business plan, the IESO states that it will complete its \$178 million dollar investment in the MRP by the of end 2023.

Questions:

- a) Please provide a table with two columns that demonstrates the IESO's **total actual and budgeted MRP operating and capital spending to-date**. Please provide the financial information in a format consistent with Table 2 found at Exhibit G-2-1, p. 5 of the MRP Cost Report. I.e., list actual and budgeted spending by the same lines items shown in Table 2.

RESPONSE

- a) See Table 1 below.

Table 1: Total MRP Actual and Budget OM&A and Capital Spending

(\$ millions)	Total Project		
	Actual	Budget	Variance
Operating Expenses			
Compensation & Benefits	13.7	21.0	(7.3)
Professional & Consulting	6.4	9.2	(2.8)
Operating & Administration	1.0	1.2	(0.2)
Total Operating Expenses	21.1	31.4	(10.3)
Capital Expenses			
Compensation & Benefits	32.2	56.8	(24.6)
Professional & Consulting	6.9	13.7	(6.8)

Operating & Administration	28.4	62.8	(34.4)
Interest	1.1	3.0	(1.9)
Contingency	0.0	10.0	(10.0)
Total Capital Expenses	68.6	146.3	(77.7)
Total MRP Expenses	89.7	177.7	(88.0)

OEB STAFF INTERROGATORY 19

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

4-Staff-19

INTERROGATORY

a. Exhibit G/ Tab 2/ Schedule 1

Preamble: Exhibit G-2-1 is the IESO's MRP Cost Report. At Exhibit G-2-1, p. 3 the IESO states that "[t]he IESO Board approved a revised [MRP] budget and schedule in March 2021, including a go-live date of November 2023 plus six months of contingency."

At Exhibit G-2-1, p. 7 the IESO states that it "expects that adjustments to timelines will be needed as the project moves closer to in-service" and a similar statement is made at Exhibit A, Tab 1, Schedule 3, p. 5.

Questions:

- a) Please clarify the IESO's statement "adjustments to timelines will be needed as the project moves closer to in-service". That is, does the IESO foresee challenges in achieving a go-live date of November 2023 (plus six months of contingency).
- b) If different from November 2023 (plus six months of contingency), what is the IESO's most recent projection for when MRP will go-live?
 - i. If applicable, please fully describe the reasons for any delays in implementation as well as the potential impacts of delays on MRP budgets and/or the MRP's benefits case.
 - ii. If applicable, please provide a revised Schedule Performance Index score for 2021 based on the IESO's revised go-live projection.
- c) At Exhibit G-2-1, p. 6 the IESO lists the four factors which resulted in its capital expenses being \$12 million lower than budget in 2021. Amongst those factors, the IESO listed "[d]elays in gathering business and vendor requirements, which has resulted in the deferral of internal and external IT implementation costs" as a reason.
 - i. Please describe the reasons for these delays as well as any steps the IESO plans to take to mitigate these delays in future years.
 - ii. If applicable, please describe the relationship between these delays and any challenges associated with achieving the targeted MRP go-live date of November 2023.
 - iii. Please describe how much of the \$12 million underspend in 2021 will be made-up for in 2022 and beyond.

RESPONSE

a) Since completing the detailed design phase, the IESO has 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. This includes delivering substantial enhancements to more than ten legacy IT systems that work together to ensure day-to-day reliability, integrity and cost-effectiveness of Ontario's electricity system and markets.

Through this work, the IESO has identified there will be a delay to the November 2023 in-service date. The IESO is currently compiling the information necessary to more accurately build out an updated timeline. The IESO will share changes to the project schedule with stakeholders towards the end of Q3.

As we work through this process, we will ensure the project delivers the significant benefits it was originally designed for, and that are also now essential to support the transformation of Ontario's electricity system.

b) See response to a).

c)

i. These delays in gathering business and vendor requirements were a result of delays in completing the detailed design, as well as taking longer than expected once started. This delayed the start of vendor work on their specifications. In order to mitigate these delays, MRP has introduced a number of 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. Requirements are expected to be completed in 2022.

ii. See response to a).

iii. The \$12.0 million capital underspend in 2021 will be made-up for in (1) deferred implementation costs to 2023 and (2) an estimate of costs in 2024 for market participant support and training, completing internal document updates, and starting project closure activities while maintaining a capital budget for additional vendor support and internal IT costs for tool changes identified after the in-service date. The 2022 budget remains unchanged.

OEB STAFF INTERROGATORY 20

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

4-Staff-20

INTERROGATORY

a. Exhibit G/ Tab 2/ Schedule 1 / pp. 8

Preamble: Table 8 at the above reference demonstrates that MRP FTEs will increase by 16 in 2022 compared to 2021 actuals, and 3 when compared to budget.

Questions:

- a) Please describe the relationship, if any, between the IESO's significantly lower than budgeted FTE complement in 2021 and MRP implementation delays.
 - i. As part of its response, the IESO is requested to specifically describe the direct impacts of the lower-than-budgeted headcount on MRP rollout.
- b) Please indicate how many of the planned 97 FTEs for 2022 the IESO hired to-date.
 - i. Has the IESO revised its budgeted number of MRP FTEs for 2022? If so, please provide the revised FTE projection as well as the impact of the revised projection on the IESO's 2022 MRP compensation and benefits budget.

RESPONSE

- a) The reason for the delay was extended Dispatch Scheduling and Optimization (DSO) vendor negotiations, which triggered delays in onboarding internal IT resources. The lower than expected headcount numbers are a deferral, not a reduction. The delay impacts on cost and schedule have been reflected in the revised schedule and budget included in the 2021 Revenue Requirement Submission. This takes into consideration updated cost estimates for the delivery of the Dispatch Scheduling Optimization (DSO) and the extended time to deliver MRP. See response to Schedule 1 – 4.1 OEB STAFF 19(a).
- b) As of March 31, 2022 the IESO has hired 95 of the 97 planned FTEs and is expected to hire the budgeted staff by year end. There has been no change to the compensation and benefit budget. See Table 1 below.

1 **Table 1: MRP FTEs**

MRP FTEs	2022 Budget	March 2022 Actual	2022 Variance
Regular	42	45	3
Temporary	10	11	1
MRP Core FTEs	52	56	4
MRP Support FTEs	45	39	(6)
MRP FTEs Total	97	95	(2)

2

AMPCO INTERROGATORY 14

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

4.1-AMPCO-14

INTERROGATORY

Ref: G-2-1 P6

The IESO reports on CPI and SPI, against the MRP baseline budget and schedule.

- a) Please confirm the MRP baseline budget and schedule used to calculate CPI and SPI in 2020 and 2021.
- b) Please provide the calculations that underpin the CPI and SPI amounts in Table 5.
- c) Please discuss the variation in CPI results.
- d) Please confirm the MRP baseline budget and schedule used for CPI and SPI in 2022.
- e) Please discuss the anticipated CPI and SPI results for 2022 and 2023.

RESPONSE

- a) The annual CPI and SPI for the MRP work performed in 2020 and 2021 was evaluated against the budget and schedule included in the business case for the detailed design phase.
- b) Table 1 below includes the calculations that underpin the CPI and SPI amounts in the referenced Table.

Table 1: CPI and SPI Calculations

Year	Earned Value (In \$ millions) (EV)	Planned Value (In \$ millions) (PV)	Actual Cost (In \$ millions) (AC)	SPI= EV/PV	CPI = EV/AC
2020	48.0	55.8	53.4	0.86	0.90
2021	91.5	112.1	80.4	0.82	1.14

- c) The variance in CPI is a result of business requirement work taking longer than expected, and thus solution development work not occurring when expected, as described in more detail in the IESO's 2020/2021 Revenue Requirement Submission, Exhibit G-2-1 – Market Renewal Program Cost Report and in Exhibit G-2-1 – Market Renewal Program Cost Report from this application.
- d) 2022 CPI and SPI will be evaluated against the baseline schedule and budget in effect at the time the 2022 CPI and SPI results are calculated. The current MRP baseline budget is included in Exhibit G-2-1 – Market Renewal Program Cost Report, Table 2, and the current MRP baseline schedule is included in Exhibit G-2-1 Attachment 1 – MRP Baseline Schedule.

- 1 e) See response to Schedule 1 – 4.1 OEB STAFF 19(a).

AMPCO INTERROGATORY 15

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

4.1-AMPCO-15

INTERROGATORY

Ref: G-2-1 P6

MRP has a Schedule Performance Index (SPI) which is below target, as the project had to reprioritize some work to vendor requirements gathering, which impacted dependency tasks.

- a) Please provide further details on the work that was reprioritized.
- b) Please provide further details on the impacted dependency tasks.
- c) Please discuss any other drivers to explain the MRP SPI below target.

RESPONSE

- a) The IESO prioritized work on the detailed business requirements so that vendors could begin their vendor specifications.
- b) As a result of the reprioritization referenced in response to a), solution development was delayed.
- c) The drivers discussed in response to a) (delays in business requirement gathering and vendor specification) are those that are impacting the SPI in 2022.

EDA INTERROGATORY 10

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

4.1-EDA-10

INTERROGATORY

Evidence Reference: ExD-T1-S1- Pg 2/6

Please clearly describe how the OM&A savings realized because of MRP market rule amendments requiring reduced external support were achieved, e.g., if activity(s) were deferred, activity(s) were cancelled, activity(s) were scoped differently and/or for other reasons. Please provide a worked example of how a specific saving was achieved.

RESPONSE

- a) The IESO required less than budgeted external legal support for drafting MRP market rules and manuals in 2021 based on scheduled drafting being deferred. The IESO will still need to complete all MRP market rule and manual drafting, and will use external legal support for those activities in future years.

SEC INTERROGATORY 16

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

4.1-SEC-16

INTERROGATORY

[G-2-2] With respect to the Market Renewal Program ("MRP"):

- a) [p.2] The IESO states that it will not be seeking a formal recommendation from the Technical Panel on MRP Market Rules until all have been completed by stakeholders. Please provide the forecast schedule for review of each batch, and when a formal recommendation from the Technical Panel will be sought.
- b) [p.7] Please confirm, based on the 2021 CPI and SPI scores, if the MRP is behind schedule and overbudget. Please provide an explanation for why this is occurring.
- c) Please provide the most recent reporting of MRP made to the IESO: i) executive leadership, ii) Board of Directors.
- d) Please provide a copy of the most recent: i) Monthly Cost Report, ii) Monthly Schedule Report, and iii) Monthly Risk Report.
- e) Please detail all material changes since EB-2020-0230 regarding MRP, i) design/scope, ii) cost, and iii) schedule. Please also provide all material provided to the IESO Board of Directors and/or senior management for their decision to approve the change.

RESPONSE

- a) The latest forecast schedule is publicly available on the Technical Panel engagement webpage.¹
- b) In 2021, MRP, as a complex and interdependent project, has a Schedule Performance Index (SPI) which is below target or behind schedule, as the project had to reprioritize some work to accelerate vendor requirements gathering, which took longer than expected, which in turn impacted dependency tasks. CPI was above 1, which means the project was underspent. This was a result of deferred costs that MRP will incur in the future.
- c) See the following attachments to this Exhibit:
 - i. Attachment 1: MRP Update to Executive Steering Committee (ESC)
 - ii. Attachment 2: MRP Strategic Risk Update to IESO Board
 - iii. Attachment 3: MRP Strategic Risk Update to IESO Board (Appendix)
- d) See Table 1 below and Attachment 4: MRP Schedule Report. Attachments 2 and 3 provided in response to c) above cover the risk reporting for MRP.

¹ Technical Panel: <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Technical-Panel/Meetings-and-Materials>

1 **Table 1: MRP 2022 Cost Update as of March 31, 2022**

(\$ millions)	As of March 31, 2022		
	Actual	Budget	Variance
Operating Expenses			
Compensation & Benefits	0.9	0.7	0.2
Professional & Consulting	0.2	0.3	(0.1)
Operating & Administration	0.0	0.0	0.0
Total Operating Expenses	1.1	1.0	0.1
Capital Expenses			
Compensation & Benefits	2.8	2.9	(0.1)
Professional & Consulting	0.3	0.8	(0.5)
Operating & Administration	4.8	5.4	(0.6)
Interest	0.2	0.2	0.0
Contingency	0.0	0.0	0.0
Total Capital Expenses	8.1	9.3	(1.2)
Total MRP Expenses	9.2	10.3	(1.1)

- 2 e) There have been no material changes since the IESO's 2020/2021 Revenue Requirement
3 Submission. The IESO's 2022 budget for MRP remains unchanged. See response to
4 Schedule 1 – 4.1 OEB STAFF 19(a).

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

<div> <div>←</div> <div>↓</div> <div>↗</div> <div>→</div> <div>Past</div> <div>Present</div> <div>Trending</div> <div>Future</div> </div>								
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 17th 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 17th'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

MAY 30, 2022

Market Renewal Program (MRP) Strategic Risk Mitigation Progress Report

Steven Chopowick

Director, Risk, Performance, Resilience and Internal Audit

Purpose and Summary

- **Purpose of Item:** Provide information to the Audit Committee on the activities being undertaken to mitigate risks and implement controls to help move Market Renewal Program (“MRP”) Strategic Risks to target levels.
- **Executive Summary:** The report helps link mitigation actions with action timelines, resource requirements and priorities. For upfront context, this report includes a summary of the MRP’s most critical strategic risks. Substantive mitigation progress reports are included in an information appendix.

Market Renewal Program (MRP) Strategic Risks

Risk#	Risk Event Description	Residual Risk	Target Risk	Mitigation	Mitigation Status	
					% Complete	% of Contribution/100
1	Market Participants are unprepared for technology and market operation at go-live date.	High	Low	1. MARKET READINESS ACTIVITIES	5%	100%
2	A challenge to a MRP market rule amendment that has a material impact on project benefits or schedule.	High	Medium	1. REVISING APPROACH TO MARKET RULE APPROVALS	TBD	TBD
3	Market systems and related processes produce materially unexpected or unacceptable results pre go-live.	High	Low	1.GO-LIVE ACCEPTANCE CRITERIA 2."BAD ACTOR"/SCENARIO TESTING	5% 0%	35% 35%
4	IESO is unable to effectively integrate technical solutions given complexity and volume.	High	Medium	1. SOLUTION DESIGN 2. REQUIREMENTS TRACEABILITY 3. TEST PLANNING 4. STATIC TESTING 5. SYSTEM INTEGRATION TESTING 6. USER ACCEPTANCE TESTING (UAT)	58% 66% 2% 73% 0% 0%	15% 20% 5% 10% 15% 20%
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	Medium	1. GO-LIVE STAGING (EXPLORATORY)	100%	25%
6	IESO is unprepared to respond to unforeseen design and/or implementation flaws post go-live.	High	Medium	1. MRP TRANSITION PLAN 2. HUMAN & FINANCIAL RESOURCE AVAILABILITY 3. DEPARTMENT SPECIFIC EDUCATION & TRAINING 4. POST GO-LIVE SIMULATOR	0% 20% 20% 11%	5% 40% 20% 20%
7	Internal IESO is unprepared to use technology solutions and operate the market.	High	Low	1. INTERNAL READINESS ACTIVITIES 2. SUPPORT RESOURCE 3. USER ACCEPTANCE TESTING (UAT)	35% 10% 0%	50% 15% 25%

Note: In most instances, the outlined mitigations are activities in the MRP Program Schedule. Where this is the case, the percent of completion is reflective of the percent completion captured in the MRP Program Schedule. Otherwise, the best estimate was used to determine the percent of completion.

Key Efforts Completed

- Risk Statements
 - Risk Owners
 - Residual and Target Risk Scores
 - Controls, and
 - Mitigations
-
- Strategic Risk #1 – Updated Mitigation: Market Readiness Activities.
 - Strategic Risk #2 – Added Mitigation: Revising Approach to Market Rule Approvals.
 - Strategic Risk #3 – Added Mitigation: “Bad Actor”/Scenario Testing
 - Strategic Risk #4 – Added Mitigation: Test Planning
 - Strategic Risk #5 – Completed Mitigation: Go-Live Staging (Exploratory)
 - Strategic Risk #7 – Updated Mitigation: Internal Readiness Activities.

Mitigation Highlights

Risk #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.

- Scheduled delivery of MRP remains at a critical risk level.
- Mitigation steps to-date have included: working with vendors to find schedule opportunities, reprioritization of resources and exploring staging options for go-live.
- Although these mitigating steps have been taken, the program team has identified that the current in-service date is not feasible.
- The project team will report back to the Markets Committee in June on options for a revised, costed, and risk-informed schedule.

Risk Context Form Updates

- Previous Status (as in last reporting % completion values)
- Current Status (current % completion based on latest schedule and/or best estimate (if item is not on MRP program schedule))
- Mitigation Status Descriptions (as seen in Appendix A – Exhibit A) have been changed to:
 - At Risk
 - Developing
 - In Progress
 - Completed

Next steps

- Conduct resource risk assessment across each team on the MRP project.
- Continue with monthly risk review cycle which entails the following:
 - Identifying new risks impacting the overall program.
 - Identifying actionable mitigations and report on their progress, respectively.
 - Assessing the effectiveness of identified controls.
 - Engaging with the team leads and Subject Matter Experts.
 - Work with project managers to prioritize scheduled efforts, on a month-to-month basis, with a risk-informed approach.

Appendix A –Mitigation Progress Status Reports

[incorporated as an information appendix]

MAY 30, 2022

Appendix A

Market Renewal Program (MRP) Strategic Risk Mitigation Progress Report

Mitigation Dashboard

Risk#	Risk Event Description	Residual Risk	Target Risk	Mitigation	Mitigation Status	
					% Complete	% of Contribution/100
1	Market Participants are unprepared for technology and market operation at go-live date.	High	Low	1. MARKET READINESS ACTIVITIES	5%	100%
2	A challenge to a MRP market rule amendment that has a material impact on project benefits or schedule.	High	Medium	1. REVISING APPROACH TO MARKET RULE APPROVALS	TBD	TBD
3	Market systems and related processes produce materially unexpected or unacceptable results pre go-live.	High	Low	1.GO-LIVE ACCEPTANCE CRITERIA 2."BAD ACTOR"/SCENARIO TESTING	5% 0%	35% 35%
4	IESO is unable to effectively integrate technical solutions given complexity and volume.	High	Medium	1. SOLUTION DESIGN 2. REQUIREMENTS TRACEABILITY 3. TEST PLANNING 4. STATIC TESTING 5. SYSTEM INTEGRATION TESTING 6. USER ACCEPTANCE TESTING (UAT)	58% 66% 2% 73% 0% 0%	15% 20% 5% 10% 15% 20%
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	Medium	1. GO-LIVE STAGING (EXPLORATORY)	100%	25%
6	IESO is unprepared to respond to unforeseen design and/or implementation flaws post go-live.	High	Medium	1. MRP TRANSITION PLAN 2. HUMAN & FINANCIAL RESOURCE AVAILABILITY 3. DEPARTMENT SPECIFIC EDUCATION & TRAINING 4. POST GO-LIVE SIMULATOR	0% 20% 20% 11%	5% 40% 20% 20%
7	Internal IESO is unprepared to use technology solutions and operate the market.	High	Low	1. INTERNAL READINESS ACTIVITIES 2. SUPPORT RESOURCES 3. USER ACCEPTANCE TESTING (UAT)	35% 10% 0%	50% 15% 25%

Risk #1

Market Participants are unprepared for technology and market operation at go-live date.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/OPPORTUNITIES
MARKET READINESS ACTIVITIES (Preventative)	<p>1) Draft internal strategic account management plans have been developed.</p> <p>2) Draft "Day-In-The-Life" documents have been created and are proceeding through internal review, prior to posting publicly in June.</p>	<p>Next key deliverable (in Q2 2022) will be the "Day-In-The-Life" for segmented participants, followed by creating the training documentation, and building the readiness assessment.</p>

Risk #2

A challenge to a MRP market rule amendment that has a material impact on project benefits or schedule.

MITIGATIONS

REVISING APPROACH TO MARKET RULE APPROVALS

IESO could revise the timing or order in which it seeks IESO Board approval based on the nature and number of challenges ultimately anticipated in advance of Go-live.

CHALLENGES/GAPS/ OPPORTUNITIES

- The timing and order in which the IESO Board formally approves market rules impacts the timing of the window in which those market rules may be challenged at the OEB.
- Opportunity to assist IESO in managing prospective disputes and avoiding an occurrence of a Risk Event.
- The optimal approach to seeking Board approval of MRP market rules can only be determined once the ultimate nature and number of anticipated challenges are more clearly established.

Risk #3

Market systems and related processes produce materially unexpected or unacceptable results pre go-live.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/ OPPORTUNITIES
GO-LIVE ACCEPTANCE CRITERIA (Preventative):	The first draft has been started.	This will be a living document throughout the program which will outline the acceptor and acceptance criteria for each MRP deliverable. As such, it will be stakeholdered within the program as well as with the LOB. The first draft is planned to be approved by Q4 2023.
"BAD ACTOR"/SCENARIO TESTING (Detective/Preventative)	No actions completed.	The following mitigation was recently added. The team has commenced preliminary discussions with Markets and MACD to understand scope of work and objectives of effort.

Risk #4

Filed: June 3, 2022, EB-2022-0002, Exhibit H, Tab 4.1, Schedule 13 - 4.1 SEC 16, Attachment 3, Page 6 of 18
IESO is unable to effectively integrate technical solutions given complexity and volume.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/OPPORTUNITIES
SOLUTION DESIGN (Preventative):	Detailed solution design and technical specifications to vendors have advanced and are at half point to completion	<p>Solution design consists of three components:</p> <ul style="list-style-type: none"> • Mapping of the requirements to solution • Detailed solution design per IT solution • Technical specifications per IT solution <p>Initial mapping of requirements to solutions was completed in the previous reporting cycle and is being updated as the requirements become available. Detailed solution design and technical specifications have advanced and closely follow available requirements. The team is focussing to complete detailed solution design and technical specifications for key IT solutions by Q3 of this year.</p>
REQUIREMENTS TRACEABILITY (Preventative):	<p>Business Requirement Documents for both system and report development are at 80% and 0% completion, respectively. These same documents are then mapped as per solution design and managed inside the requirement traceability tool.</p> <p>100% of all approved Business Requirement Documents have been migrated into the requirement's traceability tool, JIRA.</p>	<p>All approved Business Requirements Documents (BRDs) have been uploaded into the requirements traceability tool, JIRA. As further BRDs are approved, they will be uploaded on an on-going basis.</p> <p>The team is focusing on the following to ensure successful setup and use of requirements traceability tool:</p> <ul style="list-style-type: none"> • Prepare the requirements traceability such that it can be easily utilized to track testing execution, proposed changes, and decisions • On-going oversight and consultation with key partners (e.g. IT, QA, PMO) to ensure that downstream documentation is linked to business requirements as more BRDs are uploaded.
TEST PLANNING (Preventative):	Test Planning, inclusive of Test Scenarios, is completed before scheduled Test Execution commencement. The majority of planning to-date has been completed for Agile development work.	Test Plans clarify fulfillment of Test Roles beyond the QA team. Test data is specified, generated and populated before testing begins, and automation of this can bring future benefits to test depth and breadth in upcoming test cycles. Opportunities for re-use of test cases from other related projects can benefit the testing that occurs under MRP.
STATIC TESTING (Preventative):	Static Testing is at 73% completion; 3 weeks from originally forecasted schedule.	Static Testing has progressed since last reporting cycle, using an approach to identify how testing is to be performed against requirements outlined in BRDs and VCRs, in parallel with review of those documents.
SYSTEM INTEGRATION TESTING (Preventative):	No actions completed. Phase of work not yet started.	Effort is scheduled to commence later in the schedule with longer lead time, with expected completion in 2023 respectively.
USER ACCEPTANCE TESTING (UAT) (Preventative):	No actions completed. Phase of work not yet started.	Effort is scheduled to commence later in the schedule with longer lead time, with expected completion in 2023 respectively.

Risk #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.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/ OPPORTUNITIES
GO-LIVE STAGING (EXPLORATORY) (Preventative):	<p>A schedule validation exercise has been initiated, including potential staging options, to identify opportunities to mitigate further delays in the schedule. Several gaps have been identified and changes incorporated based on lessons learned from past projects. Solution development timelines have been reviewed by internal IT teams. Several workshops have been completed to assess the feasibility of staging deliverables into production.</p> <p>The schedule validation exercise has been completed. The new forecasted go-live date and options for staging are under review with a subset of ESC members and their feedback is being incorporated.</p>	<p>Options for staging of deliverables are being explored. Staged deployment will present opportunities to advance go-live for critical components. Teams will be challenged to rework their plans in order to incorporate the staged deliveries.</p> <p>Some vendor responses are still pending. The team continues to explore options to advance go-live by engaging with the vendors.</p>

Risk #6

IESO is unprepared to respond to unforeseen design and/or implementation flaws post go-live.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/ OPPORTUNITIES
MRP TRANSITION PLAN (Preventative):	Draft has been started.	<p>The Markets team has made considerable progress with MRP team to identify key design issues they will need to monitor as well as data requirements in order to monitor and analyze the new market.</p> <p>This document will outline the handover strategy for each process being impacted by MRP. As such, it will be stakeholdered within the program as well as with the LOB. It is planned to be approved by Q4 2023.</p>
HUMAN & FINANCIAL RESOURCE AVAILABILITY (Preventative):	No updates since last report.	<p>Requirements outlined in 2022-2024 IESO Business Plan reflects the incremental resourcing requirements and assumptions to operate the renewed market.</p> <p>Receipt of the MRP Transition Plan will help identify when resources from the MRP project will be handed back to the Home Unit.</p>
DEPARTMENT SPECIFIC EDUCATION & TRAINING (Detective)	<p>External market design technical consultants have been retained for a 3 to 5 year term, which includes Go-Live support to address unforeseen design issues.</p> <p>A training plan for Markets SMEs/staff has been developed in conjunction with the MRP team for roll out in 2022.</p> <p>An issues list has been developed to identify potential design risks.</p>	None to report.
POST GO-LIVE SIMULATOR (Preventative):	The project charter has been approved. Requirements gathering and vendor engagement has commenced.	None to report.

Risk #7

Internal IESO is unprepared to use technology solutions and operate the market.

MITIGATIONS	ACTIONS COMPLETED	CHALLENGES/GAPS/ OPPORTUNITIES
INTERNAL READINESS ACTIVITIES (Detective):	<ul style="list-style-type: none"> Conducted detailed change impact assessments to discover business change impact and degree of change across internal stakeholder groups at the IESO. Refresh stakeholder assessment - Expected May 2022 	<ul style="list-style-type: none"> Opportunity to inform engagement activities, communications, unified learning and development across all internal audiences at the IESO based on degree of change impact. Opportunity to build awareness across the IESO on what's changing, how these changes impact our work and your role in adopting the new ways of working to support the future Market technology and solution needs.
SUPPORT RESOURCE (Preventative):	<ul style="list-style-type: none"> Developed integrated Change Management Internal Readiness Strategy & Plan. Developed Internal Organizational Readiness Assessment. 	<ul style="list-style-type: none"> Challenge: Program Workstream project plan dates and activities in various planning & implementation phases. Challenge: Limited organizational wide engagement of change impacts and degree of impacts communicated. Focus area of engagement has been on highly impacted stakeholders as a result of the outcomes of the change impact assessment.
USER ACCEPTANCE TESTING (UAT) (Preventative):	No actions completed. Phase of work not yet started.	User Acceptance Testing is dependent on Static Testing, Factory Acceptance Testing, Site Acceptance Testing, and System Integration. This effort will not begin before Q3 of 2023.

Exhibit A – Control Status Scale

The following control status scale is used to measure the effectiveness of the control identified to mitigate a risk. It is important to note that the scales 1 to 4 are NOT to be considered in silo. For example, for a control to have a score of 4, it is a control that also has a score of 1, 2, and 3. The more oversight, management, analysis, and awareness of the control – the more effective the control.



1

- Reactive
- Repetitive Task/ Review
- No particular resource dedicated to effort
- Managed by Team
- Compliance
- Personal Protective Equipment (PPE)



2

- Reactive
- Periodic Task/ Review
- One resource dedicated to effort
- Managed by Department
- Operational
- Administrative Controls
- Engineering Controls



3

- Proactive
- Planned Task/ Review
- A few resources dedicated to effort
- Executive oversight/Approval
- Consulting
- Substitution (replace the hazard)



4

- Proactive
- Random Scheduled Task/Review
- Many resources dedicated to effort
- CEO/Board oversight
- Control Self-Assessment
- Elimination (physically remove the hazard)

Exhibit B - Mitigation Trend Status Scale

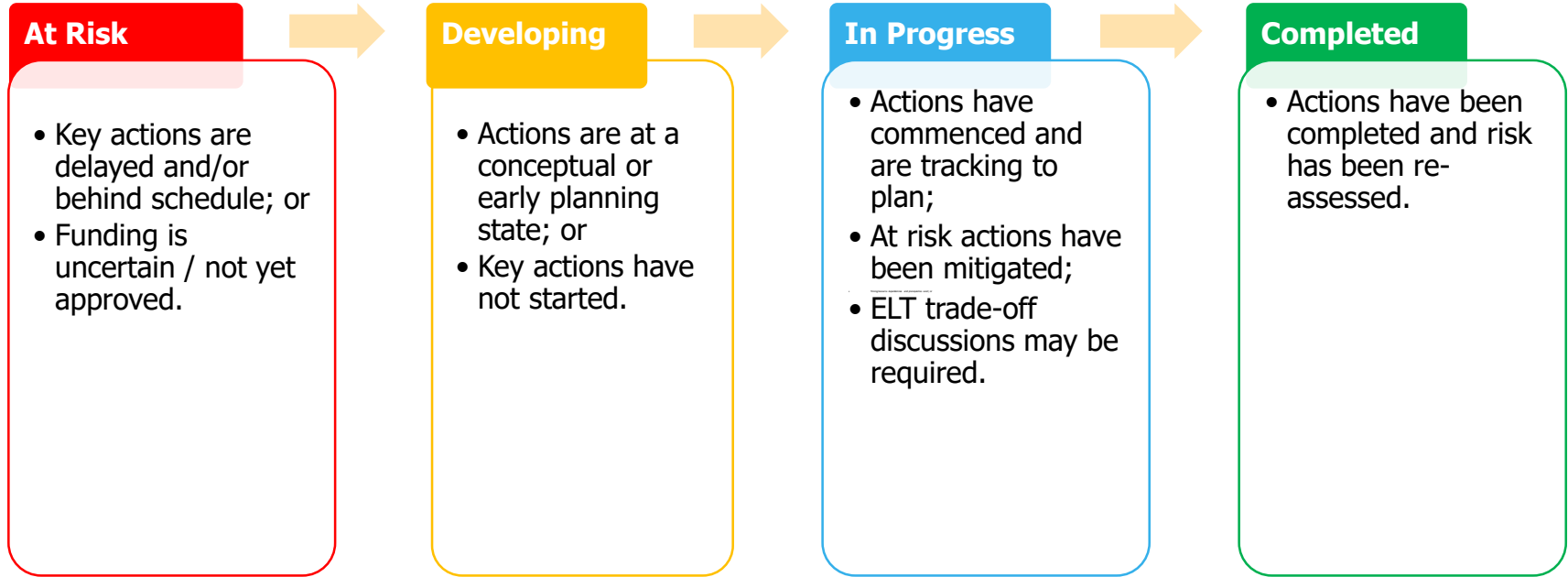


Exhibit C – Risk Criteria

Exhibit C: Risk Criteria

Impact Criteria – Strategic & Operational

Impact Score	Impact Level	Impact of Occurrence					
		Financial	Reputation	Legal / Regulatory	Workforce	Competitive Marketplace	Reliability & Resiliency
5	Critical	<ul style="list-style-type: none"> Financial impact greater than 21% of budget > \$40 Million 	<ul style="list-style-type: none"> Concerns raised by multiple influential stakeholders Decision and control is contrary to IESO mandate 	<ul style="list-style-type: none"> Deliberate non-compliance with legal obligations including market rules, that has a material impact on market participants or ratepayers 	<ul style="list-style-type: none"> Broad reduction in staff engagement Inability to attract / retain skilled staff to execute all core strategies Widespread (e.g. pandemic) incidence of mental/physical injury 	<ul style="list-style-type: none"> Market inefficiencies continue and with continued material long-term ratepayer costs 	<ul style="list-style-type: none"> Wide-scale disruption to critical infrastructure, services and bulk electricity system reliability lasting greater than two days
4	Significant	<ul style="list-style-type: none"> Financial impact between 11% to 20% of budget \$11M to \$40M 	<ul style="list-style-type: none"> Concerns raised by at least one influential stakeholder 	<ul style="list-style-type: none"> Non-compliance with legal obligations, including market rules, or negligence that has significant impact on market participants or ratepayers 	<ul style="list-style-type: none"> Sustained reduction in staff engagement Inability to attract / retain skilled staff to execute one core strategy Sporadic and localized mental/physical injury 	<ul style="list-style-type: none"> Significant market inefficiencies persist and mid-term ratepayer costs are further escalated 	<ul style="list-style-type: none"> Significant disruption to critical infrastructure, services and local area electricity system reliability lasting up to two days
3	Moderate	<ul style="list-style-type: none"> Financial impact between 5% to 10% of budget \$5M to \$10M 	<ul style="list-style-type: none"> Concerns raised by a group of moderately influential stakeholders 	<ul style="list-style-type: none"> Non-compliance with legal obligations, including market rules, or negligence that has moderate impact on market participants or ratepayers 	<ul style="list-style-type: none"> Sporadic reduction in staff engagement Inability to attract / retain skilled staff to execute department objectives Injury with permanent work restrictions 	<ul style="list-style-type: none"> Moderate market inefficiencies and short-term increase in ratepayer costs 	<ul style="list-style-type: none"> Temporary disruption to critical infrastructure and services isolated to local area electricity system reliability lasting up to one day
2	Minor	<ul style="list-style-type: none"> Financial impact less than 2.5% of budget < \$5 Million 	<ul style="list-style-type: none"> Concerns raised by a single, moderately influential stakeholder 	<ul style="list-style-type: none"> Non-compliance with legal obligations, including market rules, or negligence that has minimal impact on market participants or ratepayers 	<ul style="list-style-type: none"> Isolated reduction in staff engagement Inability to attract / retain skilled staff execute section deliverables Injury with temporary work restrictions 	<ul style="list-style-type: none"> Immaterial market inefficiencies and impacts to minor ratepayer costs 	<ul style="list-style-type: none"> Negligible disruption to critical infrastructure and services with minor electricity system inefficiencies
1	Insignificant	<ul style="list-style-type: none"> No financial impact 	<ul style="list-style-type: none"> Occasional questions raised by stakeholders seeking general information 	<ul style="list-style-type: none"> Non-compliance with legal obligations, including market rules, or negligence that has no impact on market participants or ratepayers 	<ul style="list-style-type: none"> Anticipated reductions in engagement for specific roles Anticipated attraction or retention issues for specific roles Isolated, no/minor injury 	<ul style="list-style-type: none"> Isolated impacts or impediments to competitive markets that are fully anticipated 	<ul style="list-style-type: none"> Insignificant impacts that can be addressed through existing operational controls

Impact Criteria – Project

Impact Score	Impact Level	Impact of Occurrence			
		Cost*	Schedule	Stakeholder Value	Objectives
5	Critical	<ul style="list-style-type: none"> Financial impact over 20% of approved budget 	<ul style="list-style-type: none"> Schedule delay or missed milestone exceeds allocated contingency and/or impacts the delivery of other projects Lesser of >20% time increase or >3 months 	<ul style="list-style-type: none"> Mission critical impact to deliverable quality Widespread reputational impact: substantial negative media coverage, reaction from Ministry/government 	<ul style="list-style-type: none"> Critical impact to achieving majority of Project's Objectives leading to Project failure Impact to delivery of other projects and/or operational interdependencies Benefits would not be realized
4	Significant	<ul style="list-style-type: none"> Financial impact between 10-20% over approved budget 	<ul style="list-style-type: none"> Schedule delay or missed milestone which impacts critical path activities and schedule exceeds allocated contingency Lesser of 10% - 20% time increase or 3 months 	<ul style="list-style-type: none"> Significant impact to deliverable quality Minimal impact to external brand and stakeholders 	<ul style="list-style-type: none"> Impact to achieving two or more of the Project's Objectives Benefits realization uncertain Missed compliance with Directives and/or Accountability Agreements
3	Moderate	<ul style="list-style-type: none"> Financial impact of 5-10% over approved budget 	<ul style="list-style-type: none"> Schedule delay or missed milestone which impacts critical path activities however slippage remains within project schedule contingency Lesser of 5% - 10% time increase or 2 months 	<ul style="list-style-type: none"> Moderate impact to deliverable quality that can be addressed within Project parameters (quality/cost/schedule) Potential external impact to stakeholders 	<ul style="list-style-type: none"> Moderate disruption in achieving one of the Project's Objectives Benefits will be realized later than anticipated Potential impact to brand internally
2	Minor	<ul style="list-style-type: none"> Financial impact of 3-5% over approved budget 	<ul style="list-style-type: none"> Schedule delay or missed milestone with minor impact the on project's critical path and course corrected in short period Lesser of 3%-5% time increase or 1 month 	<ul style="list-style-type: none"> Minor impact on deliverable quality Minor external impacts to stakeholders 	<ul style="list-style-type: none"> Minor impact on the achievement of any of the Project's Objectives
1	Insignificant	<ul style="list-style-type: none"> Insignificant cost impact - <3% 	<ul style="list-style-type: none"> Schedule delay or missed milestone which does not impact the project's critical path Lesser of time increase - <3% or 2 weeks 	<ul style="list-style-type: none"> No impact on deliverable quality No external impacts to stakeholders 	<ul style="list-style-type: none"> No impact on the achievement of any of the Project's Objectives

Likelihood Criteria – Strategic/Operational/Project

Likelihood Score	Description	Likelihood Value	Factors to consider that drive likelihood
5	Almost Certain	95% to 100%	<ul style="list-style-type: none"> • Maturity / complexity of the process or system • Past occurrences of the risk event • External factors (economic, competitive, regulatory) • Experience of management / employees / board • Performance indicators / industry trends • Regulatory changes • Effectiveness of training • Adherence to policies & procedures • Current controls, or lack of controls • Management's understanding of / focus on the risk
4	Likely	65% to 95%	
3	Possible	35% to 65%	
2	Unlikely	5% to 35%	
1	Rare	0% to 5%	

Exhibit C: Risk Criteria

Filed: June 3, 2022, EB-2022-0002, Exhibit H, Tab 4.1, Schedule 13 - 4.1 SEC 16, Attachment 3, Page 18 of 18

Risk Criteria Matrix

		<u>Impact Criteria</u>				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Significant	Critical
<u>Likelihood Criteria</u>	5 Almost Certain	Low	High	Critical	Critical	Critical
	4 Likely	Low	Medium	High	Critical	Critical
	3 Possible	Insignificant	Low	Medium	High	Critical
	2 Unlikely	Insignificant	Insignificant	Low	Medium	High
	1 Rare	Insignificant	Insignificant	Low	Medium	Medium



Program: MRP-Market Renewal Program

Project: Energy Work Stream

Schedule Report

April 29, 2022

Document Ref. No.: ENERGY_Wk16_29-04-2022
(MSR#04)

Project Commencement Reporting Date: Jan 1, 2022
Project Completion Reporting Date: Nov 30, 2023

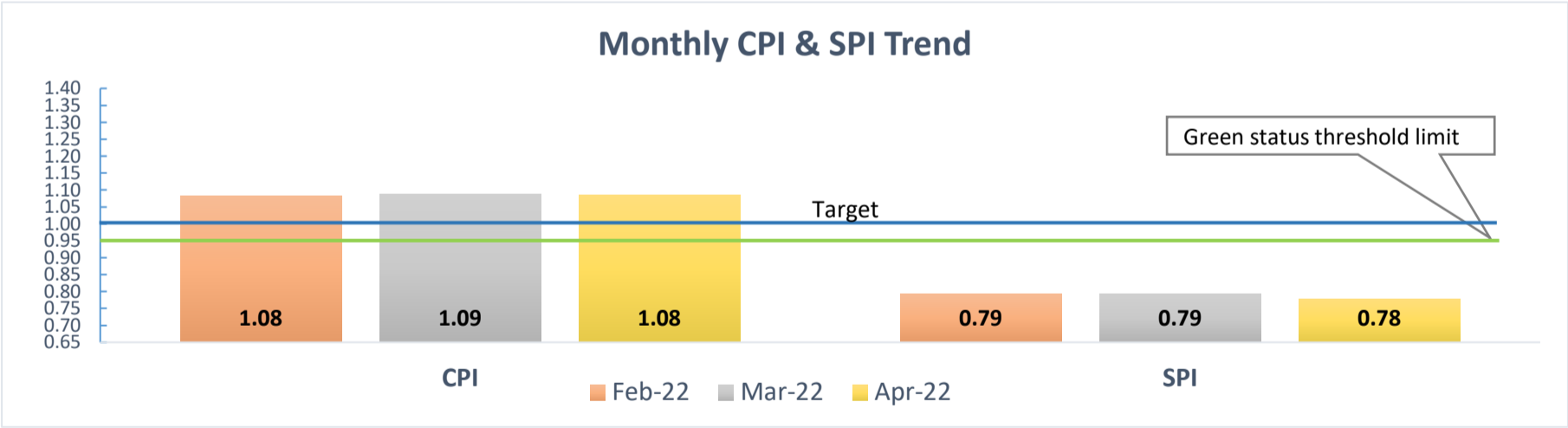
Reporting Range Period	From January 3, 2022	<<<<<<	>>>>>>	To April 29, 2022
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For Week ending	April 29, 2022	Reporting Date	April 29, 2022
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Project Schedule Status

Schedule	Accumulative Planned % (Baseline BL-4)	Accumulative Actual %	Variance %	Variance in Business days ⁽²⁾	Schedule Variance ⁽¹⁾
Baseline Schedule BL -4	75.50%	58.6%	(-16.9%)	-122	Alarming
Schedule Forecast BL-4	65.8%	58.6%	(-7.1%)	-51	Under Threshold

Schedule Performance (Based on BL-4)	Planned Value (PV)	Earned Value (EV)	Schedule Performance Index (SPI) ⁽³⁾ (EV/PV)	Schedule Status ⁽³⁾
	\$126,617	\$98,446	0.78	Behind Schedule



Legend for Status:

(1)Schedule Variance: Defined as "Under Threshold" if Variance % (delta between Actual Progress Percentage Vs Baseline Planned Percentage) < -10%, "Alarming" if Variance % (delta between Actual Progress Percentage Vs Baseline Planned Percentage) is >= -10%, then the Baseline Schedule should be Re-baseline via program change control process.

(2) Variance in Business days: Net annual working days of 720 days(From Jan, 2021 to Nov 2023) taken into account to convert variance % to variance in business days.

(3). Schedule Status: defined as "Behind Schedule" SPI<1, if SPI>1 "Ahead of Schedule" or if SPI=1 "On Schedule". Threshold limits are green if SPI is above 0.9, Yellow between 0.80 to 0.9, and Red <0.80

(4).Budget: defined as "Under Budget" If CPI >1, if CPI <1 "Over Budget" or if CPI=1 "On Budget". Threshold limits are green if CPI is above 0.90, Yellow between 0.80 to 0.90, and Red <0.80

Note: SPI & CPI will be calculated on Monthly Basis based on YTD actuals and BL Plan%

Prepared By: Vijay Pawar (Project Scheduler MRP)

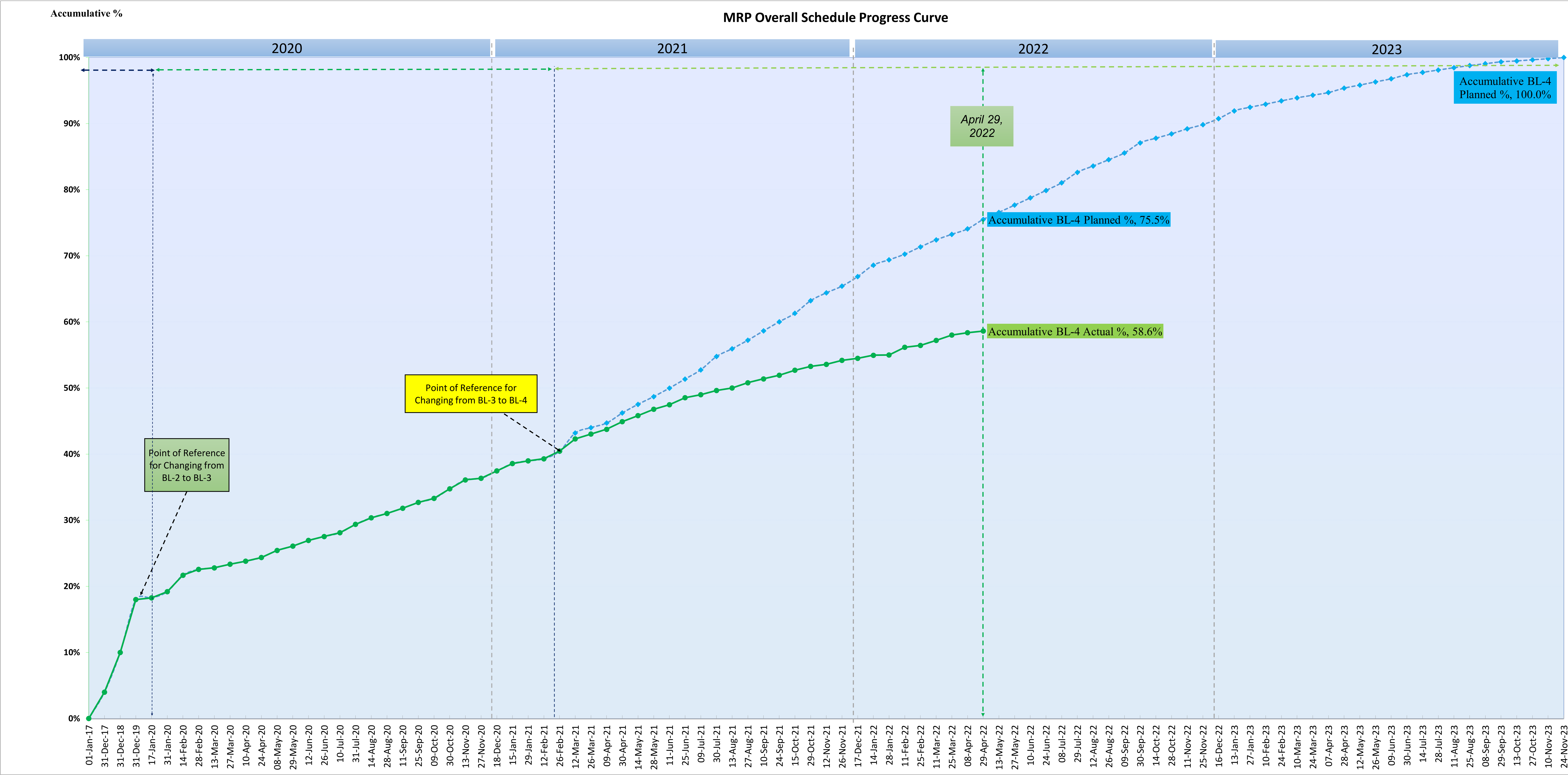


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DISTRIBUTION LIST

Program Delivery Executive	Monthly (CPI & SPI)	Jessica Savage
Program Manager	Bi-Weekly	Nicola Presutti
Project Manager	Bi-Weekly	Andria Mitches, Jennifer Tsai
Work Stream Leads	Bi-Weekly	Rado Jovic, Jo Chung, Jessica Tang, Gordon Drake, Ahmed Rashwan
Design Supervisors	Bi-Weekly	Mark Gojmerac, Tim Cary, Martin Lodyga, Patricia Murray
Others	Monthly (CPI & SPI)	Declan Doyle, Marlene Kadin, Anja Vukovic



MRP- Energy Business Analyst-Process Design/BRD/Info Model Progress Status

Week 16 of 52, 2022

Requirements Life Cycle	Completion Stages	Stages Completed	COMPLETION STAGES						Comments
			Process Models Drafted	Process Models Approved	Business Requirement Document Drafted	Business Requirement Document Approved	Information Models Drafted	Information Models Approved	
% Completed									
Authorization & Participation									
A&P Virtual Transaction	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
A&P Market Associates	6	0							
Facility & Registration	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
Prudential Security									
Set Prudential Security requirements - Virtuals	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
Set Prudential Security requirements - Physical	6	2			Completed	Completed			
Monitor Prudential Security requirements	6	4	Completed	Completed	Completed	Completed			
Market Settlements Feature Stories									
Feature Stories & Test Data ID 7 (14 CT)	2	2			Completed	Completed			
Feature Stories & Test Data ID BP (14 CT)	2	2			Completed	Completed			
Feature Stories & Test Data ID 12 (21 CT)	2	0							
Feature Stories & Test Data ID 13 (15 CT)	2	0							
Market Power Mitigation									
1.Maintain MPM Parameters	6	2	Completed	Completed	Not Started	Not Started	Not Started	Not Started	
2.Manage Uncompetitive Interties	6	2	Completed	Completed	Not Started	Not Started	Not Started	Not Started	
3.Maintain Constrained Areas	6	2	Completed	Completed	In Progress	Not Started	Not Started	Not Started	
4.Establish RL & RQ	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
5.Calculate CBRLs and RQ Values	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
6. Conduct Ex post MPM assessment	6	5	Completed	Completed	Completed	Not Started	Completed	Completed	
7.Simulation Expost Market Outcomes Process	6	3	Completed	Completed	Completed	Not Started	In Progress	Not Started	
OBDI									
1.Forecast Demand	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
2. Submit Market Transaction	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
3. Derive Violation Curves	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
4.Network Model	6	5	Completed	Completed	Completed	In Progress	Completed	Completed	
GMO									
Direct DAM Ops	6	6	Completed	Completed	Completed	Completed	Completed	Completed	
Direct Short Term Ops	6	2	Completed	Completed	In Progress	In Progress	In Progress	Not Started	
Expost Operations	6	4	Completed	Completed	Completed	In Progress	Completed	Not Started	
Reports									
Prudential (2)	2	0			Not Started	Not Started			
MPM (17)	2	0			Not Started	Not Started			
Market Participant Input Confirmation (Demand, Supply) 12	2	0			Not Started	Not Started			
DAM (to include associated OR, Price and Scheduling) 22	2	0			Not Started	Not Started			
PD (OR, Price, Adequacy & Scheduling) 19	2	0			Not Started	Not Started			
RT (OR, Price and Scheduling) 37	2	0			Not Started	Not Started			

MRP- Energy - Market Rules and Market Manuals Progress Status

Week 16 of 52, 2022

Market Rules Chapters Name	Completion Stages	Batches	Stages Completed	COMPLETION STAGES								
				1a. Market Rules Prelim Drafting	1b. Market Manuals Prelim Drafting	1c. Market Rules and Manuals Alignment	2. Internal Engagement	4. External Stakeholder Review & Comments Incorporated	5. Technical Panel 1 & 2 (Intro & Education)	6. Technical Panel 3 Complete (Vote to Post)	7. Technical Panel 4 Complete (Vote to Recommend)	8. MC/BOD Conditional approval
% Completed												
Authorization & Participation	9	1	8	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
Prudential Security	9	1	8	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
Facility & Registration	9	1	8	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
Market Power Mitigation - Energy & Ancillary Services	8	2	6	Completed	Completed	Completed		Completed	Completed	Completed	Completed	16-Jun-22
Offers, Bids, Data input	9	3	1	Completed	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	TBD
Grid & Market Operations	9	3	1	Completed	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	TBD
Market Settlements	9	4	0	In Progress	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	18-Aug-23
Wholesale Revenue Metering	7	4	1	Completed			Not Started	Not Started	Not Started	Not Started	Not Started	18-Aug-23
Market Billing and Funds Admin	9	4	2	Completed	Completed	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	18-Aug-23
DAM Calculation Engine	7	5	2	Completed			Completed	In Progress	Not Started	Not Started	Not Started	21-Oct-22
PD Calculation Engine	7	5	2	Completed			Completed	In Progress	Not Started	Not Started	Not Started	21-Oct-22
RTM Calculation Engine	7	5	2	Completed			Completed	In Progress	Not Started	Not Started	Not Started	21-Oct-22



MRP- Energy IT Development Progress Status

Week 16 of 52, 2022

Process	IT System	Vendor	Completion Stages	Stages Completed	COMPLETION STAGES						Comments
					Technical Specifications/VCR	Code Development	System Testing	Integration Testing	Acceptance Testing	Ready for Production	
% Completed					<div><div style="width: 13%;">13%</div></div>	<div><div style="width: 40%;">40%</div></div>	<div><div style="width: 40%;">40%</div></div>	<div><div style="width: 0%;">0%</div></div>	<div><div style="width: 0%;">0%</div></div>	<div><div style="width: 0%;">0%</div></div>	
Authorization & Participation	Virtual Transactions		5	2		Completed	Completed	Not Started	Not Started	Not Started	
	Market Control Entity		5	2		Completed	Completed	Not Started	Not Started	Not Started	
Facility & Registration	Suppliers/Loads		5	2		Completed	Completed	Not Started	Not Started	Not Started	
	Set Reference Levels (MCE)		2	2		Completed	Completed				
Prudential Security	PSO Calculation	Internal IESO online	5	2		Completed	Completed	Not Started	Not Started	Not Started	
	Set Prudentials	Internal IESO online	5	2		Completed	Completed	Not Started	Not Started	Not Started	
	Monitor Prudentials	MPPS	6	0	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	
	Reports	TBA	6	0	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started	
MPM	MPIS (Market Power Information System)	TBA	6	0	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started	
OBDI and GMO	DSO (Dispatch Scheduling & Optimization)	ABB	6	1	Completed	In Progress	Not Started	Not Started	Not Started	Not Started	
	CAMS (Centralized Alarm Management System)	Internal	5	0		Not Started	Not Started	Not Started	Not Started	Not Started	
	DDMS (Dispatch Data Management System)	FD	6	0	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	
	MIM (Market Information Management)	ABB	6	0	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	
	DFS (Demand Forecast System)	TBA	6	0	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	
	ETLs	Accenture	6	0	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started	

REASCWA INTERROGATORY 4

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.2-REASCWA-4

INTERROGATORY

Reference: Exhibit A Tab 1, Schedule 3, Pages 4 and 5

Preamble: Since the start of the MRP in 2016, the MRP has undergone numerous scope and timing changes that should impact the benefits of implementing the MRP (e.g., last schedule adjustment cites the MRP being implemented by November 30, 2023 with a six-month contingency). The MRP Benefits Case concluded in 2017 an estimated 10-year present value of net benefits ranging from \$2,200 million to \$5,200 million. In 2019, an IESO Business Case adjusted that value and concluded that the net benefits of implementing the MRP were expected to total approximately \$800 million over the first 10 years of its implementation. In its 2022-24 Business Plan, the IESO states expectations that adjustments to MRP implementation timeliness will be needed, as the MRP moves closer to its planned implementation date. To assess the appropriateness of the IESO's forecast of the MRP's OM&A and capital costs in the context of the scope and timing of the overall project, stakeholders will need to be informed of any pending changes in the MRP's scope and timing to deliver the project to implementation. For example, market participants (e.g., generators, energy storage providers, distributors, electricity customers directly connected the IESO-controlled grid, etc.) all need to undertake costs and plans to be ready for MRP's implementation.

The IESO states: "The IESO expects that adjustments to timelines will be needed as the project moves closer to in-service. Adjustments will be informed by vendors, stakeholder input, and consideration of other dependent initiatives (see Exhibit G-2-1 – Market Renewal Program Cost Report)."

- a) Given that the IESO expects adjustments to the timelines to implement the MRP, what accompanying analysis will be prepared for stakeholder review and input to describe the impacts of additional schedule or scope changes to:
- i. the 2022 MRP budget, and
 - ii. the now three-year old Business Case that estimated the benefits of implementing the MRP?

RESPONSE

- a) See response to Schedule 1 – 4.1 OEB STAFF 19. The IESO is unable to speculate on what accompanying analysis would be provided for stakeholder review before compiling the information necessary to more accurately build out an updated timeline. The IESO's

- 1 goal is to share any changes to the project with stakeholders towards the end of Q3.
- 2 For clarity, the IESO is not proposing changes to the 2022 MRP budget.

EDA INTERROGATORY 9

Issue 4.2 Are the IESO's forecast 2022 operational costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.2-EDA-9

INTERROGATORY

Evidence Reference: ExB-T1-S2 / Exhibit E-T2-S1

Preamble

Capacity issues have emerged as a more pressing priority than when MRP commenced.

- a) Please describe how the IESO quantifies the forecast level of capacity of each scenario for planning purposes:
 - a stand-alone 1500kW windmill
 - a 1500kW windmill paired with a 500kW electricity storage device
 - a 1500kW windmill paired with a 1000kW electricity storage device
 - a 1500kW windmill paired with a 1500 kW electricity storage device
- b) Please state all assumptions and identify all additional data required to complete the quantification of capacity for planning purposes.
- c) Please quantify the impacts to MRP's 2022 and future year's costs and timelines if the project's schedule is altered to advance the work on storage and Hybrid Integration; please state all assumptions and provide all supporting facts.

RESPONSE

- a) The IESO's 2022 Revenue Requirement Submission is based on a Business Plan that has been reviewed and approved by the Minister of Energy and the review of the IESO's application should be focused on the IESO's OM&A and capital expenditures. Analysis on capacity qualification of resources is not within scope of the IESO's 2022 Revenue Requirement Submission. Additionally, MRP is scoped to the Energy Stream, as indicated in the Business Case and through the IESO's stakeholder engagement activities. For information related to capacity qualification under the Resource Adequacy Framework, refer to the Resource Adequacy Engagement on the IESO's website.¹
- b) See response to a).
- c) MRP's cost and schedule included within the IESO's 2022 Revenue Requirement Submission are based on the current scope of work. The IESO cannot speculate on impacts to future costs and timelines based on a hypothetical, undefined, change in work priorities that is not part of the IESO's 2022-2024 Business Plan.

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

AMPCO INTERROGATORY 16

Issue 4.3 Are the IESO's forecast 2022 capital costs for the MRP appropriate in the context of the scope and timing of the overall project?

4.3-AMPCO-16

INTERROGATORY

Ref 1: G-2-1 P6

The IESO indicates 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.
- a) Please provide a breakdown of the \$12.0 M variance based on the above categories.
- b) Please explain the nature of the delays in gathering business and vendor requirements. Please discuss if this issue continues to persist in 2022 (and beyond) and the potential impact on cost and schedule in 2022 and beyond.
- c) Please explain the reason for reduced contractor costs and discuss the impact on the workplan schedule.

RESPONSE

- a) See Table 1 below.

Table 1: 2021 Capital Cost Variances

Capital Cost Variances	(\$ millions)	%
Deferral of internal IT resources	1.5	13%
Deferral of external IT implementation costs	3.6	30%
Reduced contractor costs	2.9	24%
Lower interest expense	0.5	4%
Unused contingency	3.5	29%
Total	12.0	100%

- b) See response to Schedule 1 – OEB STAFF 19(c) and Schedule 1 – OEB STAFF 19(a).

- 1 c) The project was able to reduce contractor costs through bringing work in house and
- 2 leveraging project staff. See response to Schedule 1 – 4.1 OEB STAFF 19(a).

AMPCO INTERROGATORY 17

Issue 4.4 Is the IESO's MRP Baseline Schedule and Budget for each year of the MRP appropriate?

4.4-AMPCO-17

INTERROGATORY

Ref: G-2-1 P7

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.

- a) Please discuss the work activities and timelines impacted
- b) Please provide and discuss the key issues impacting the delivery schedule.
- c) Please provide the IESO's plan to finalize the delivery schedule.
- d) Please provide the IESO's plan to engage stakeholders and the timing.
- e) Please discuss how an extension of the go live date will affect the estimated \$800 million in net system benefits.
- f) Please update the MRP schedule at G-2-1 Attachment 1.

RESPONSE

- a) See response to Schedule 1 – 4.1 OEB STAFF 19(a).
- b) 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.
- c) See response to a).
- d) Stakeholder engagement is integral to the Market Renewal Program, and the IESO will share more information with stakeholders as we revisit our timelines to ensure the project's success and to deliver the significant benefits ratepayers can expect upon completion. See response to a).
- e) See response to a).
- f) The referenced schedule is the latest MRP schedule. See response to a).