

Memorandum

To: MRP Implementation Engagement Stakeholders

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

Date: September 22, 2022

Re: Market Renewal Program Business Case Validation

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

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

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

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

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

1. Quantifiable Benefits

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

Market Efficiency Benefits

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

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

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

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

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

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

Elimination of Unwarranted Congestion Payments

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

Total Benefits

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

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

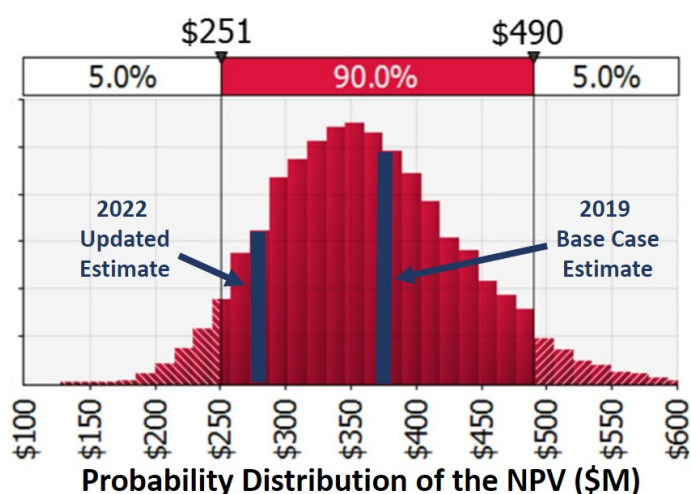
2. Implementation and Operating Costs

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

extended to 2025 with a new implementation cost estimate of \$233 million. Further, the completion of the MRP Detailed Design in 2021 has also allowed for more accurate assessment of the ongoing costs over the first 10 years of operations. The total implementation and operation cost estimate, including the additional staff¹ for ongoing operation of the renewed market is \$268 million or \$92 million more than assumed in 2019.

3. Net Financial Assessment

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



4. Benefits Not Quantified

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

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

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