Market Renewal
Response to Stakeholder Feedback

Following the February 24 stakeholder meeting, the IESO asked stakeholders to provide their feedback, comments and questions on the Draft Benefits Case prepared by the Brattle Group.

The IESO received feedback from:

Association of Major Power Consumers of Ontario (AMPCO)
Association of Power Producers of Ontario (APPrO)
Brookfield
Bruce Power
Enbridge
EnerNOC
ITC Holdings
Market Intelligence & Data Analysis Corporation (MIDAC)
Market Surveillance Panel (MSP)
NextEra Energy
Ontario Power Generation (OPG)
Powerful Solutions

This feedback has been posted on the IESO stakeholder webpage for this engagement.

The IESO has provided a detailed summary table below, which outlines specific feedback and the corresponding IESO responses.

Introduction

At a general level stakeholders appear supportive in principle of the Market Renewal Program and in many cases feel that the Benefits Case provides a substantial foundation to move to the next phase of the Market Renewal Program. In cases where stakeholders had specific questions or concerns with the content or analysis contained in the document, the IESO has worked with Brattle to address these concerns.

The IESO also received feedback that was not specific to the Benefits Case but raises important issues that should be addressed going forward. This particular feedback included issues related to governance and policy frameworks, design-specific issues, and program management.

Governance and Policy Framework
Stakeholders identified a need to address the issues of governance and contract implications early in this process. The IESO fully agrees and has identified each of these topics as key areas for discussion with the Market Renewal Working Group and stakeholders during design work.

Design-Specific Issues
We have also heard that stakeholders perceive a gap with respect to pricing and tracking the environmental attributes of electricity supply in order to efficiently deliver on environmental policy objectives. While the IESO notes that the Market Renewal initiatives will be designed within the context of Ontario's low emission supply mix, we agree and have acknowledged that this is an important piece of the puzzle and we are committed to engaging with stakeholders on this issue as we move into design discussions.

Similarly, stakeholders have stated that while an incremental capacity auction is an efficient mechanism to meet reliability requirements, on its own it is likely not the right tool to procure certain resource types including nuclear and large hydro facilities. The IESO agrees with this viewpoint and recognizes that further discussion is required with stakeholders to assess how to best incent future investments in large hydro and nuclear resources, if and when needed.

Program Management
Stakeholders noted that given the scope of Market Renewal and the early stage of the program, the IESO needs to refine its cost estimates and provide a more comprehensive program management framework. The IESO is in full agreement with both of these ideas. The IESO will be working on a more robust project plan for Market Renewal in 2017. We will engage with stakeholders on this particular item, which will include a process and timeline for providing updated cost estimates

Based on feedback to date and discussions with stakeholders both within the engagement and with the Market Renewal Working Group, the IESO feels confident in moving forward together with stakeholders to the design phase of this project. The IESO expects to publish the final Benefits Case shortly. At the April 12 Market Renewal stakeholder engagement meeting we will discuss a schedule for moving forward with the development of high level designs for the following projects:

- Day-ahead Market (DAM)
- Single Schedule Market (SSM)
- Enhanced Real-Time Unit Commitment (ERUC)
- More Frequent Intertie Scheduling (MFIS)
- Incremental Capacity Auction (ICA)

Stakeholder comments and IESO responses

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Benefits Case Analysis: General	AMPCO	There appears to be little proof as to whether these benefits can simply be summed together to arrive at a total benefit number, or if there is any double-counting in doing so. There likewise appears to be little consideration as to whether these benefits can stand alone. This gives rise to the question of whether all of the Market Renewal components need to be executed in a comprehensive fashion, or if high benefit items could be "cherry picked". AMPCO is not suggesting that project scope be shed arbitrarily, but suggests that additional justification for a comprehensive undertaking of all aspects of Market Renewal should be provided. AMPCO questions whether the benefits associated with the energy and operability streams would be sufficiently robust by themselves to warrant execution, in the absence of the Capacity workstream. This question is particularly meaningful given how long it will take to migrate from a contracted approach to a capacity auction approach. The only market renewal benefits that will possibly be available	The Brattle team developed the benefits for the energy, operability, and capacity workstreams separately and took caution to avoid double counting the same types of benefits across multiple workstreams. For example, the energy benefits were based on previous studies that quantified the benefits of implementing day-ahead markets in other jurisdictions; these reforms did not include improved ancillary service products or improvements to more efficiently use interties (see sections III.B and C of the benefits case report). Similarly, the operability estimates were developed based on previously-quantified benefits from specific reforms that are not included in the energy workstream, including larger future flexibility needs in other markets (Sections IV.B, C, and D). While the energy and operability sections quantify benefits related to better utilizing the existing assets and decreasing operating costs related to generation and interties, the capacity benefits derive from lowering investment-related costs by more effectively procuring or retaining resources. Thus, the benefit estimates for each workstream are additive without any double-counting. A new break-out box has now been added in section I.C of the report to discuss this point. The net present value of each workstream individually outweighs the net present value of the implementation costs, based on the quantified

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		for many years are those associated with energy and operability.	benefits alone, it would be cost effective to implement Market Renewal even if the capacity workstream benefits could not be realized. The unquantified benefits of the program are also substantial. Market Renewal will help to efficiently manage future change, support innovation, and reduce administrative burden for the IESO and stakeholders. These and other unquantified benefits as set out in the report should not be overlooked. The benefit streams are interdependent in the sense that addressing flexibility needs and improving intertie utilization will deliver the greatest benefit if those initiatives can be built on a more efficient energy market. Similarly, the effectiveness of investment signals for resource adequacy through a capacity auction will be improved if combined with more efficient pricing in energy and ancillary services markets. Market Renewal is best configured as a holistic market overhaul that includes all three workstreams, as reflected in the Brattle report and outlined by the IESO at several presentations and discussions with stakeholders.
Benefits Case Analysis: General	AMPCO	Brattle asserts that Market Renewal will enable integration of new and emerging technologies. Similarly, statements are made in respect of how Market Renewal will facilitate distributed resources. AMPCO sees no evidence in the paper that supports either of these statements, and would appreciate some additional details.	Prices that more accurately reflect marginal costs on the system, including location-specific costs, can support stakeholders' desire to use market signals to inform future investment and usage decisions for innovative new technologies. Brattle discusses the importance of enabling and integrating emerging technologies in all workstreams to facilitate full participation in energy, operability, and capacity. The importance of minimizing barriers to participation and fully integrating these resources into price-setting are now more fully conveyed in the recommendations section of Brattle's report. **Energy market** integration issues are discussed in section III.D.2 of the Brattle report. As experience in other regional markets has shown, more efficient wholesale energy and ancillary service markets in conjunction

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			with a capacity auction will enable Ontario to more cost-effectively integrate increasing amounts of demand response and other types of distributed energy resources, because market prices—and therefore market participants' incentives—will more accurately reflect system costs and conditions. **Operability reforms** will also need to be designed specifically to enable integration of emerging technologies and distributed resources. Through Market Renewal, the IESO also has the opportunity to implement changes that capitalize the value provided by new technologies. For example, some technologies (e.g., storage) provide value not currently recognized by ancillary services. New ancillary service product definitions, such as fast regulation (as already used in some other jurisdictions), would enable Ontario to realize the full benefits of these technologies. Section IV.C.2 of the Brattle report discusses product innovations, pricing innovations, and changes in resource qualification in other jurisdictions and discusses how they can benefit emerging technologies. A more flexible grid will also be better able to integrate increasing penetration of distributed and intermittent resources. Supporting studies are discussed in section IV.C.1 of the Brattle report. The experience in other jurisdictions indicates that capacity auctions are able to attract new types of demand response and non-traditional resources by creating a more level playing field and better capitalizing on the value provided by these resources. For example, how capacity auctions can attract low-cost non-traditional supply is discussed in section V.C.1 of the report.
Benefits Case Analysis: General	AMPCO	Page 31, Figure 3 appears to be the core evidence for the fundamental calculation of benefits. AMPCO wonders if the	AMPCO is correct that market prices, and thus market price duration curves, are affected by both demand and supply. Across all markets, the

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		demand curve has as much to do with the price duration curve as the supply curve does. In order to make the leap to using the outcomes of other market studies as a proxy for Ontario benefits, AMPCO believes that there needs to be more development of this section.	demand curve in any given hour is very steep and inelastic, but system demand shifts significantly across hours. If these patterns in demand were significantly different across markets, they could partially explain the difference in price duration curves illustrated in Figure 3. In preparing the analysis, the Brattle team examined the shape of the load duration curves for each market and relevant year included in the figure and found them to be relatively similar, with the exception that ERCOT has lower load factor (higher peak to average load). However, ERCOT's steeper load shape does not translate into a steeper price duration curve (in fact ERCOT's price duration curve is relatively flatter than the others, consistent with its relatively flat supply curve). This suggests that differences in supply, not demand, are driving differences in the price duration curves. A note will be added to the report (footnote number 48 in section III.C.2) clarifying this point.
Benefits Case Analysis: General	AMPCO	The section outlining Capacity Auction Benefits would be improved if the format and layout was consistent with the sections relating to Energy and Operability.	Our approach to the Capacity Auction Benefits section was somewhat different from our approach to estimating energy and operability benefits because of the nature of available studies and approach to estimating benefits. Rather than reviewing studies that estimated the benefits of reform in other markets, Brattle examined the actual outcomes of their capacity auctions. This approach, which was not possible in the other sections, allowed Brattle to more precisely estimate the benefits to Ontario. The format and layout of the section reflects this differing approach.
Benefits Case Analysis: General	ITC	An additional 1,000 MW intertie to PJM would add significantly to Ontario's interties and thus further increase the benefit of market renewal.	The Market Renewal effort considers improving the Ontario market design; its scope does not include other policy or planning options, such as specific resource or intertie related investments. Enhancements to the market approach to intertie utilization for energy, operability, and capacity will improve the value not only of existing interties, but also any future interties that may be developed (such benefits are not included in the benefits case estimate however).

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Benefits Case Analysis: General	APPrO, NextEra	APPrO believes that benefits calculated by Brattle may be significantly overstated, partially because of the approach and methodology used to calculate benefits, and partly because the unique characteristics of the Ontario supply situation together with very different constitutional, political and electricity governance issues and risks likely militate against the magnitude suggested, unless a very Ontario-specific approach and design is employed. In addition, and because of the strong interrelationship between market energy prices and the Global Adjustment, there is a strong potential to mute the forecasted efficiency benefits from energy market reform in the near to medium term until the terms of contracted assets have fully expired beyond what has been forecasted. The draft Benefits Case Report should in some way address the differences within Ontario's wholesale electricity market and comment on whether these differences could impact the result of the benefits case.	The IESO worked closely with stakeholders, particularly the MRWG, on the methodology for the benefits case. Because a number of important design choices have not yet been made, it is not practical to conduct a detailed production cost modeling exercise or similar detailed estimate of specific design changes in the Ontario context. The approach taken with the Market Renewal benefits case is to identify a reasonable range of potential benefits and a reasonable range of projected costs and to consider whether the delta between the two - in conjunction with non-quantifiable benefits - is sufficient to move forward with the program. Given the scope of potential benefits identified in the report, the benefits case makes a compelling case for moving forward. The benefit analysis leverages experiences from other markets that faced similar challenges to those faced in Ontario. Brattle's analysis considers that translating the results from other jurisdictions is subject to uncertainty. Section I.D of the benefits case discusses how a number of Ontario's unique elements were considered, including the degree to which Ontario relies on long-term contracts and rate-regulated assets; Ontario's regulatory context and greenhouse gas regulations; regulatory risk; fleet characteristics; the characteristics of the transmission system; and the nature of Ontario's system needs. The review of studies shows that very different markets (all with their own unique features, fleet composition, and regulatory context) have achieved similar benefits from similar changes in market design. We agree that there is a strong relationship between energy market prices and the Global adjustment, and that existing contracts will mute the benefits of energy market reform for a transitional period. The benefits estimates are adjusted to account for this important consideration. Further discussion is provided in section VI.B of the

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			benefits case report.
Benefits Case Analysis: General	APPrO	We continue to support the need for forward looking modeling of potential outcomes, which acknowledges Ontario's unique characteristics, identifying potential benefits to all market participants in support of a final decision by the IESO and its stakeholders as to how they wish to prioritize initiatives and proceed to detailed market redesign.	The IESO believes that the benefits case provides a robust, forward-looking projection of the range of benefits that Market Renewal can deliver to Ontario and a rationale to move to the next phase. The report makes a compelling case for moving forward with the high-level design of a day-ahead market, a single schedule market, enhanced real-time unit commitment, more frequent intertie scheduling, and an incremental capacity auction. The IESO will continue to refine its cost estimates for Market Renewal moving forward and will implement a comprehensive program management framework to ensure the project delivers value to the sector. We will also work closely with stakeholders to design a market that reflects Ontario's unique features while delivering practical solutions and capturing potential benefits. In addition, we anticipate that for specific design decisions further analysis may be required in order to make informed design decisions.
Benefits Case Analysis: Energy Workstream	Powerful Solutions	Page 23 of the report states "Transparent prices that accurately reflect the marginal costs of the power system are critical to competitive outcomes and market efficiency in both the short and long terms." (Page 23). How are marginal costs critical to outcomes, and where do actual costs of each participant weigh into the calculation of overall energy cost to consumers?	Power markets aim to maintain reliability cost effectively by utilizing mechanisms that procure the capacity (i.e., generation facilities) that a system needs as well as schedule and dispatch the energy produced by those facilities on a real-time basis. Once capacity is purchased the fixed costs (construction, financing, etc.) must be paid down regardless of how much power is produced. However, the cost of producing energy is a variable cost (typically fuel and some operating and maintenance costs) and is avoidable if the energy is not needed, or is not competitive relative to the output from other facilities. In competitive power markets such as Ontario all facilities have to offer their power into the market. The market provides a very strong incentive for a resource to offer its power at its best price in order to be scheduled, generate and get paid. As long as a facility is covering its variable, or marginal costs, it will be economic to produce

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			power. Competition amongst resources, who all have the same strong incentive to offer at their marginal cost, leads to lowest cost energy production. At the end of the month a financial settlement takes place to account for any difference between market revenues and contracted or regulated rates that are owed to resources to cover their fixed costs. Regardless of the settlement process, the energy market which incents marginal cost production plays a very important role in ensuring that the cost of producing electricity is minimized at any moment in time. An efficient market design where market prices accurately reflect the cost of producing power provides a strong signal for suppliers and wholesale consumers to make the optimal decisions when and when not to produce or consumer power, leading to lowest overall cost. Under the current market design, that is not always the case. As explained in section III.A of the Brattle report, for example, day-ahead commitments are not financially binding and the energy price does not consider all of the physical constraints present on the system. As a result suppliers must be paid out of market payments to compensate them for costs that are not reflected in the energy price. This creates a small but important price distortion that leads to inefficiencies over the longer term.
Benefits Case Analysis: Energy Workstream	AMPCO	Comments are made regarding out of merit generation being the result of a two schedule system. AMPCO is unconvinced that this causal relationship exists. Currently generation is dispatched in the constrained sequence, which should be consistent with a single schedule nodal system. Ontario's system of cost guarantees is a significant source of expensive generation running out of merit – probably more so than the constrained sequence.	The inconsistency between commitment and settlement that exists in the two schedule system means the prices suppliers receive do not always reflect true marginal costs, and they are sometimes compensated for operating out of merit order. Suppliers receive uplift payments that ensure they recover their costs and receive other settlements such as CMSC payments (discussed in section III.A of the report). In some cases, these payments incentivize suppliers to offer their power at prices that do not reflect their true costs, thereby inefficiently creating out of merit generation. Another example is the real-time unit commitment approach that uses a heuristic approach that incentivizes additional unit

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			commitments based on variable costs, but not considering the decisions that would minimize start-up plus dispatch costs. Thus the nature of the two-schedule system itself can lead to inefficient levels of out of merit generation. This relationship will be clarified in section III.A of the report.
Benefits Case Analysis: Energy Workstream	Powerful Solutions	On Page 41 "...the system operator must curtail near zero marginal cost output from hydro, wind or solar resources." Please clarify - most wind and solar resources are paid a fixed $/MWhr rate - why would they have near zero marginal cost to the power system?	Most hydroelectric, wind and solar resources are paid a fixed regulated or contracted $/MWh rate. The price they receive covers the fixed costs of building and financing the facility and is typically based on the life of the plant and its expected energy production. The marginal or variable cost of producing power is close to zero for most of these types of facilities since there is little to no fuel cost. Since the facility wants to generate as much as possible in order to receive its regulated or contractual rate they will typically offer at zero, or close to zero in the case of some hydro to ensure they are scheduled and dispatched. However, there are times when output from baseload nuclear and must run hydroelectric can exceed demand in which case even zero marginal cost output from hydro, wind or solar, might need to be curtailed in order to avoid a more costly outcome such as a nuclear shutdown. Likewise, it would be inefficient to curtail these resources in favor of other resources that have higher marginal cost, such as a gas plant for example. A footnote will be added to the report (number 62 in section IV.A) clarifying this point.
Benefits Case Analysis: Day-ahead Market	Powerful Solutions	A day-ahead market under Market Renewal is expected to provide significant savings. The report states that a barrier to this is that "most market participants are not able to obtain a financially-binding day ahead schedule" (Page 2 last paragraph). What is meant by this and why does this need to be a financially binding transaction? If this barrier can be overcome, then what further savings might be able to be achieved through week ahead scheduling for power	A financially-binding day-ahead market provides participants the financial security of knowing in advance what price they will receive for their supply or pay for their consumption. This reduction of risk would encourage greater participation in the day-ahead commitment process, especially from exports, hydro, and pumped storage resources, thereby creating a more efficient commitment and dispatch. This point will be clarified in section III.A of the report.

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		generation resources? This would minimize UBG, simplify production scheduling, (reduce start up costs, facilitate fuel procurement), and provide the ability to optimize pumped storage, peaking hydro, and DR resources to minimize overall cost.	Week-ahead scheduling is outside the scope of this analysis as the IESO is not currently considering any forward markets beyond one day ahead.
Benefits Case Analysis: Operability Workstream	APPrO, NextEra	Insufficient analysis has been undertaken to determine what potential operability reforms are needed. For this reason, we consider that Brattle's approach, methodology, and results for operability reforms are even more subjective than for the energy market enhancements. However, in light of Ontario's growing need for flexible resources and products, APPrO supports exploring the implementation of new flexible products and the expansion of the ancillary market. APPrO would also suggest that these products need to be procured competitively.	As Brattle acknowledges in the report, the specific design changes under the operability workstream are not yet fully defined and are therefore (as the comment notes) subject to significant uncertainty. While the IESO has indicated that increased intertie scheduling frequency would be part of this workstream, the Enabling System Flexibility Stakeholder Engagement is still ongoing, and stakeholders are discussing further options. The benefits case report provides an overview of the issues with the current market design and opportunities for improvement in section IV.A. At the same time, the operability-related issues with Ontario's current market are not unique, and several other jurisdictions have already begun to address these issues in their own markets. Brattle's analysis leverages prior analysis of Ontario's market (focused on intertie-related enhancements) as well as studies in other jurisdictions examining the benefits of other operability-related reforms. These reforms include: improved scheduling of hydro resources against real-time system conditions; multiple changes to enhance flexibility to enable increasing penetration of intermittent resources; ancillary service market reforms including product innovations, pricing innovations, and changes to resource qualification; and a range of potential intertie-related reforms. These market design changes are all options that could be implemented in Ontario, though they do not represent the full spectrum of potential options. As a result, the operability workstream benefits estimate is indicative of what Ontario could achieve, though the benefits actually

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			realized will depend crucially on the set of reforms the IESO and stakeholders decide are best suited for the Ontario context.
Benefits Case Analysis: Capacity Workstream	APPrO, NextEra	APPrO considers that Ontario-specific costs and risks vis-à-vis other markets and jurisdictions must be accounted for when doing comparisons of contract prices and capacity prices. In APPrO's view, the case for the introduction of an incremental capacity auction for maintaining resource adequacy is less clear and the benefits case for it should be the focus of more investigation.	To maximize capacity auction benefits it will be key to minimize and mitigate the potential impacts of regulatory risks through appropriate market design structures, enhanced governance, and ensuring that capacity auction design adequately accounts for policy objectives. Though the specific nature of the challenges that Ontario faces in this respect are somewhat different from other markets, there are similarities. Other capacity auctions have also needed to address regulatory risks and the potential impacts of out-of-market actions and their approaches can be used to identify available options. But ultimately, the solutions used in Ontario must reflect the province's unique situation. More discussion is provided in section V.C.3 and the recommendations in Section IX of the benefits case report. While there is a need for the IESO and stakeholders to work together to manage regulatory risk, Brattle's analysis and the IESO's previous assessment of the potential benefits of an incremental capacity auction demonstrate clearly that the introduction of an open and competitive auction mechanism can be expected to deliver substantial benefits for Ontario.
Benefits Case Analysis: Capacity Workstream	APPrO	Should in depth consideration to the development of capacity markets be considered as part of market renewal then risk allocation and cost to manage that risk should be important parameters to be evaluated. Brattle is correct in stating that the risk to new investment in capacity has been largely borne by consumers through the previous procurement model; however, those investments have been secured at competitively priced and competitive returns on capital. APPrO submits that in a capacity market where the	Brattle agrees that shifting risk from consumers to suppliers may increase the cost of capital required to attract new capacity. However, based on the experience in other capacity auctions to date, this effect (if any) is minor compared to the much larger efficiency and customer benefits to be gained from competition, reduced over-procurement, and better selection of resource type. As the examples provided in the Brattle report indicate, the experience to date has shown that new generation investments made in capacity auctions have been priced significantly below prices obtained in directed long-term procurements.

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		risk on supply fundamentals shifts to the suppliers, the return on investment required to attract capital may be higher. For a capital intensive industry, this has the potential to not be aligned with the interests of the consumer.	This does, however, assume effective governance and market design that mitigate the otherwise potentially high regulatory risks associated with capacity auctions.
Benefits Case Analysis: Capacity Workstream	APPrO	Since no US-style capacity market was in place in Ontario at the time, a retrospective comparison of existing Ontario contracts to similarly vintaged capacity-type contracts in other jurisdictions is not very useful. Given the uncertainty about the future of Ontario's supply and demand dynamics and going forward, it also suggests that future costs savings Brattle projects around capacity auctions are conjectural.	Brattle's analysis compares the cost of new capacity expected under the current procurement structure to the cost other capacity auctions have realized. Since the IESO should be able to realize similar costs when moving to a capacity auction, this is the relevant comparison to make when calculating benefits of a capacity auction. Further, price reductions realized through the Demand Response Auction help to illustrate the benefits that a competitive auction mechanism can deliver. Brattle agrees that there is significant uncertainty regarding the future supply and demand dynamics in Ontario and that these dynamics are crucial to the projections of cost savings. The high and low scenarios attempt to capture the range of possible savings given these uncertainties. This point will be clarified in section V.D.1 of the final report.
Benefits Case Analysis: Capacity Workstream	NextEra	We are concerned that the Brattle analysis of capacity benefits does not sufficiently normalize capacity costs across the compared markets as developing and operating projects in Ontario is more expensive than in the jurisdictions studied by Brattle.	See response above
Benefits Case Analysis: Capacity Workstream	AMPCO	AMPCO remains uncertain that intermittent resources, within the context of a capacity market, have been adequately considered from a benefit perspective. AMPCO would like some additional information on how these resources participate and how the overall benefit is affected by the inclusion of resources that require physical backup.	Brattle's analysis assumes no capacity from existing or planned resources, including renewable resources, would participate in the incremental capacity auction. These resources would continue to be paid the contracted rate in the "status quo" world. Existing resources would be able to compete in the auction if they were able to identify additional MWs that satisfied auction requirements, through uprates, or firming up

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		This is likely a design phase issue.	intermittent generation for example and successfully cleared the auction. In order to not presuppose future decisions regarding renewable generation that comes off contract, the MWs associated with existing and planned renewables was maintained throughout the period of the study and not considered incremental. Brattle assumes that the capacity contributions and resource requirement reported in the Ontario Planning Outlook account for the backup needs of intermittent resources. The capacity auction would likely provide additional non-quantified benefits by providing more accurate accounting for effective capacity value by resource type and location, mitigating the potential for over-procurement. While Brattle did not assess the benefits based on different penetrations of intermittent generation, in general terms the greater the share of intermittent generation or other factors that introduce uncertainty the greater the expected benefits. Market renewal is in large part all to do with making the power system more flexible and more responsive to system conditions and managing future uncertainty cost effectively.
Benefits Case Analysis: Implementation Costs	AMPCO	AMPCO understands that, as currently presented in the Benefits Case, forecasted costs are currently eclipsed by forecasted benefits. However, given that the amount of both remains questionable, AMPCO feels that better quantification of all costs is appropriate. AMPCO believes that the stated IESO implementation costs associated with the Market Renewal project are too low. Brattle's suggested contingency of 20% on a $200M base - at this stage in the project - is insufficient, given the lack of	The $200M estimate is the baseline estimate in the Market Renewal benefits case and represents the best estimate of likely implementation costs based on the information currently available. A high-end estimate of costs was also included in the report in order to stress test program benefits. Nonetheless, the IESO agrees with the need to refine program cost estimates as more detailed information becomes available. As we begin to develop a more robust project plan, we will continue to work towards a more detailed breakdown of program costs.

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		project definition. Brattle's later increase to $300M is likely closer, but also serves to illustrate the point that lack of definition prohibits a robust cost estimate at this time.	
Benefits Case Analysis: Implementation Costs	AMPCO, NextEra	AMPCO remains concerned about market participant costs, which have not been estimated at all. In AMPCO's submission, prior to any design decisions being made, all costs need to be assessed whether they are attributable to generators, loads or the system operator, since ultimately these costs will be borne by loads. We encourage IESO to work with stakeholders and market participants early in the next stage of the Market Renewal Initiative process to determine a reasonable range of likely implementation costs for market participants.	We appreciate concerns about the costs stakeholders may incur through this program. While it is expected that all market participants (MPs) may incur some costs to participate in the new market structure, not all costs will be borne exclusively by loads. Some stakeholder costs will also only be incurred by MPs who are pursuing new revenue opportunities. Further, many costs associated with the program may not be 'net new' as they overlap with standard costs of business including training of staff and investment in hardware or software that regularly occurs, regardless of market design changes. However, the IESO is committed to delivering practical solutions and will work with stakeholders towards enhancing the potential benefits while managing project costs.
Benefits Case Analysis: Cost Recovery	AMPCO	The Benefits case describes the IESO project costs as being mostly capital with costs recovered from consumers during the first ten years of project in-service. However, IESO projects have traditionally been 50 to 70% capital funded, leaving $60M to $100M OM&A expenditure to be managed over the 4 years of the project timeframe through the IESO rate case (assuming $200M project cost). Some comment on how this will be managed by the IESO may be warranted.	Our current expectation is that the large majority of project costs will be capitalized (in the range of 70%-75%) and not recovered until the project is in place and benefits are being realized. The remainder of the costs are operational and will be recovered on an ongoing basis as the various elements of Market Renewal are designed and implemented. These costs will be a part of the IESO's business plans, submitted for the Minister's approval annually, and would later form part of the IESO's annual revenue requirement submission to the Ontario Energy Board.
Benefits Case Analysis: Regulatory Risk	AMPCO, APPrO, NextEra	Despite Brattle's assertions that their analyses have been appropriately normalized for the Ontario context, AMPCO sees little evidence of serious consideration of regulatory matters. For example, Ontario's dominant supplier is rate-regulated. If the results of Market Renewal can be undermined by regulatory changes impacting OPG, this presents a significant and apparently unmitigated risk. Further, the capacity auction (the single largest source of	As identified in the benefits case, there is potential for regulatory interventions to affect some of the assessed benefits. The IESO has begun this discussion with the MRWG to address questions regarding governance as raised by a range of stakeholders to date. The fact that a significant portion of Ontario's supply is rate-regulated is consistent with many other markets. For example, a large portion of the supply in CAISO, most of the supply in MISO, and all of SPP remains

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		Market Renewal benefit) could be rendered ineffective by further supply directives issued by government. These material risks do not appear to have been appropriately dealt with in the analysis. Market renewal will require important improvements in sector and IESO governance. Therefore the path forward must be undertaken carefully, reflect Ontario's unique features and attributes, and include appropriate mitigation strategies during any transition. A more effective governance framework than currently exists must therefore be adopted to better ensure the accountability, transparency, and workability of the IESO-administered wholesale electricity market going forward. The framework must include consideration of how rules should be made.	rate regulated. As the Brattle report documents, the rate regulated nature of the supply has not prevented these markets from realizing significant benefits from market reform initiatives similar to those now contemplated in Ontario. The analysis of the capacity auction calculates benefits based on the expected capacity shortfall after accounting for existing contracts, renewables, and regulated units. This analysis did not estimate any savings on rate regulated units or renewables. The analysis however assumes that the incremental capacity auction can operate within a clearly defined scope and alongside Government policy. Market Renewal offers a unique opportunity to align policy goals with market structures in order to deliver more efficient outcomes than would otherwise be possible. In Section V.C.3 of the report, Brattle explains how continued out-of-market contracting would affect the benefits from a capacity auction and that maximizing benefits will require a transition toward market-based investment decisions, and that benefits will be maximized if the capacity auction and governance structure are established in ways that minimize regulatory risks and if market structures are aligned with policy objectives such as decarbonization.
Benefits Case Analysis: Ontario Context	APPrO, NextEra	The fundamental differences between Ontario's electricity market structure and other organized electricity markets in North America or elsewhere, must be reflected in a Market Renewal Business Case. We are not persuaded that they do so, yet. This omission could potentially inflate benefits. For example: • Ontario Power Generation (OPG) is Ontario Government-owned, the dominant supplier, and most of its generation is	Brattle's analysis considers that there are some fundamental differences between Ontario's market structure and those of other organized electricity markets. The benefits estimate assumes only incremental capacity needs will be met through the capacity auction. This ensures that we do not count benefits that cannot be realized due to existing resources (such as long-term contracts on nuclear units and rate-regulated hydro). Responding to each of the individual points raised here:

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		rate-regulated by OEB; • Generator market participants are all hedged either by procurement contracts or regulated rates; • Very few 'active market buyers' because most load customers are hedged through default supply rates or special rates, where no Load-Serving Entities (LSEs) exist with obligations to serve any Ontario loads; • Because of the lack of generators and loads exposed to Ontario's wholesale electricity market and its prices, bilateral contracting is very illiquid; • IESO's market rule amendment process has relatively weaker governance compared to the oversight of the US Federal Energy Regulatory Commission (FERC) over ISO wholesale markets (except ERCOT), along with more robust stakeholder participation regarding ISO market design and rule changes.	1. Brattle's analysis specifically accounts for OPG's regulated assets by assuming that these resources (like contracted assets with fixed supply prices) will not change their operational behaviour in response to improved market incentives. This reduces Brattle's assessment of energy and operability benefits (as described in section VI of the benefits case). However, in reality it is likely that OPG will at least partly respond to enhanced price incentives with more efficient operational decisions, which would result in greater efficiency gains than the benefits case currently considers. 2. Brattle's analysis considers the proportion of resources by type that is exposed or not exposed to energy, ancillary, and capacity auction incentives, and therefore that would be expected to incrementally enhance the efficiency of their operations and investment decisions (see Sections V and VI). 3. The fact that only a small minority of customers participate in Ontario's wholesale market is not unusual. In the energy and ancillary workstreams, the majority of the immediate benefits estimated in studies of other markets materialized from changes to supply-side behavior (i.e. independent of customer-side changes). Only over time as barriers to participation are addressed and familiarity with new designs are achieved would more active customer-side participation be expected to materialize; these benefits are not included in the benefits case estimate and so should be considered unquantified potential benefits. In the capacity auction workstream, the benefits case analysis does incorporate an expectation of customer-side participation (whether direct or via aggregator), a reasonable expectation given the recent levels and growth of DR participation experienced in Ontario to date.

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			4. It is very common for electricity markets (including all of those examined in the benefits case study) to have relatively illiquid bilateral markets and few forward contracting opportunities. Often there are opportunities to engage in some forward hedging up to one or two years forward, but farther-forward and long-term contracts are relatively rare in regions that rely on market-based investments. 5. The IESO acknowledges that governance is a key concern for stakeholders and is committed to working together to address this issue. This is most important for achieving capacity auction benefits because those are directly affected by regulatory risks (energy and operability benefits are not likely to be materially impacted).
Market Design: Energy Market	Brookfield	The IESO should develop robust and co-optimized energy and ancillary services markets that reflect the true average loss-of-load price, with meaningful scarcity pricing to incent efficient dispatch. At the same time, the IESO should refrain from trying to secure many of these services free of charge under its 5-minute dispatch. Brookfield also urges the IESO to implement the Extended LMP concept, which ensures that a majority of uplift payments are included directly in the energy price. As such, energy prices would reveal the true cost to dispatch the next megawatt of energy, without the need for additional out-of-market payments. Integrating these out-of-market payments (e.g. generator start-up costs) into the energy price would not only serve to ensure efficient dispatch, but would also promote many emerging technologies with the flexibility to respond to immediate system needs that the government is	Thank you for your comments. The scope of near-term design work for each workstream will be discussed with stakeholders at the relevant stakeholder engagement, beginning with the single schedule market and incremental capacity auction this coming May. This will later be followed by the day-ahead market, enhanced real-time unit commitment, and more-frequent intertie scheduling. The IESO will also continue to work with stakeholders to identify additional opportunities to efficiently meet Ontario's operability requirements.

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		targeting (e.g. batteries and storage).	
Market Design: Incremental Capacity Auction	Brookfield	The IESO should commit to transitioning its entire capacity supply to be procured by capacity market. It should also require that all resource types would need to participate in said capacity market. This configuration would produce least cost results that truly reflect Ontario's going-forward capacity cost.	The IESO will be working with stakeholders to design an incremental capacity auction to meet Ontario's incremental capacity needs. This will be a competitive mechanism to meet our reliability requirements – over and above contracted and regulated capacity - at lowest cost. The IESO foresees that the auction will be enhanced over time as the volume of capacity that is included in the capacity auction grows.
Market Design: Incremental Capacity Auction	ITC	The draft Benefits Case does not explicitly address the benefits of importing capacity but it is important to note that allowing capacity imports from neighboring jurisdictions and enabling this external capacity to be eligible as a resource for maintaining the reliability of Ontario's power system would provide more planning and operational flexibility. This will allow Ontario to access more competitive, likely cheaper external capacity resources to help meet its reliability requirements rather than committing to potentially more expensive internal resources. It also creates a market for the export of Ontario capacity and resulting financial benefits.	The IESO agrees that enabling the trade of capacity between jurisdictions will help to deliver more efficient outcomes through enhanced competition and flexibility. While Brattle's analysis does not explicitly account for any benefits from importing capacity, the analysis accounts for the ability to import low cost resources from other markets.
Market Design: Incremental Capacity Auction	ITC	As the IESO designs market rules and operating protocols for capacity exports and imports, those rules and protocols should be designed to support transactions with PJM as well. Such market rules and operating protocols to facilitate capacity export and import transactions can be made and implemented ahead of the IESO's planned timeframe of 2020 for the first Incremental Capacity Auction. Ontario will more quickly receive benefits from intertie capacity transactions if applicable market design and rule changes are made ahead of the implementation of an Incremental Capacity Auction.	The IESO intends to investigate additional opportunities for the trade of capacity with neighbouring jurisdictions. We agree that increased trade can help to drive more efficient outcomes for all parties. Opportunities for trade may, however, be limited by the compatibility of IESO and neighbouring reliability requirements and market structures. This discussion is currently occurring through the Capacity Exports stakeholder engagement.

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Market Design: Incremental Capacity Auction	APPrO, Bruce Power	Capacity markets may be beneficial to those resources coming off contract as it provides a source of revenue stream; however, capacity markets may not be the best way or only way to source new investments. Given their foundational nature, nuclear and baseload hydro resources that require such long term capital commitments and include other benefits and/or considerations will require a long term regulatory or contractual framework outside of a capacity framework.	The IESO is proposing an incremental capacity auction to meet Ontario's incremental capacity needs. The IESO strongly believes that a stable, competitive and transparent capacity auction is the best approach to improve the efficiency of investment decisions in Ontario. However, the IESO agrees that a capacity auction by itself may not be the appropriate tool to deliver on all policy objectives and that additional mechanisms or incentives may be needed to cost-effectively deliver on policy goals. The IESO is committed to working with the MRWG and other stakeholders towards advancing this discussion as we design and implement an incremental capacity auction for Ontario.
Market Design: Demand Side Participation	Powerful Solutions	It is suggested that Market Renewal include cost-neutral consumer pricing plans that incent off-peak and weekend energy use. These broadly applied Demand Side measures could mitigate congestion and optimize utilization of existing transmission infrastructure. Stable time of use rate plans will enable commercial and institutional consumers to make business decisions regarding Conservation Demand initiatives that lower their costs by reducing energy use and shifting energy use from higher priced peak rates to lower cost rates overnight and on weekends. Furthermore, technological advancements such as the smart grid, apps that coordinate the recharging of electric vehicles and other initiatives can provide additional resources to the IESO to manage operability of the system and reduce costs/compensate consumers for participating.	The IESO agrees that opportunities to include the demand-side more fully in the IESO administered markets can help to drive more efficient outcomes. The introduction of a Demand Response auction has been an important step in this direction and we will continue to work with stakeholders towards growing the role for the demand-side. Market Renewal is focused on efficiencies that can be realized through changes to the IESO administered markets. Regulated pricing plans are established by the Ontario Energy Board (OEB). The IESO will continue to engage with the OEB to understand how we might build upon and align the work of the two organizations to better support demand-side participation.
Environmental Objectives	Brookfield, MIDAC, ITC, NextEra	Market Renewal should ensure that reliability, cost, and emission objectives are met together via sustainable competitive markets. Narrowly focusing on incremental capacity markets and the two-schedule system will be detrimental to long-term emission targets, and eventually	The IESO is committed to working with stakeholders to develop a market design that can help to deliver on policy objectives (including environmental goals) in an efficient manner. This will be an important topic of discussion with stakeholders over the coming months and will initially be taken up with the MRWG.

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		lead to out-of-market interventions and rising costs. The draft Benefit Case should therefore include recommendations and quantify associated cost and benefits to satisfy these three objectives concurrently. The draft Benefits Case should quantify the costs of maintaining, replacing, and expanding Ontario's emissions-free supply, and offer market-based recommendations for stakeholders to review; whereas Market Renewal should consider valuing non-emitting generation attributes immediately. Specifically, Brookfield recommends that non-emitting generation attributes pricing be included in Ontario's energy market. There is a unique opportunity for Ontario to include this component in the energy market from the onset. This would ensure that cost, reliability, and environmental objectives would be met in both the near- and the long-term, in a least cost manner based upon market signals and market competition. It is flawed to conclude that the law of one price should apply to energy and capacity markets to achieve least-cost outcomes, but not also to environmental attributes: which are increasingly the center of attention for both rate-payers and policymakers when considering where to source their electricity. To achieve Ontario's long-term carbon emission reduction goals in other sectors, low emission electricity will need to be used to displace fossil fuels in those sectors. Relying too heavily on a short-term incremental capacity market may interfere with the province's goal of reducing carbon emissions in other sectors. Short-term incremental capacity	The IESO believes that the implementation of a mechanism to price environmental attributes should be considered after the foundational changes are designed and developed. We will, however, want to ensure that the design and implementation decisions we make now will facilitate this potential future change. We look forward to working with the MRWG and stakeholders to ensure we are managing this challenge effectively. In the benefits case analysis, a mechanism for pricing environmental attributes is out of scope for the quantified benefits in the report. Rather, these potential benefits are captured in the unquantified benefits of managing future change and better aligning market design and policy decisions. Realizing these unquantified benefits will serve to increase the range of benefits quantified in the report.

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		markets tend to procure fossil fuelled generation because of its low fixed cost. As the Market Renewal Initiative moves to the design phase, ITC suggests that the IESO emphasizes enabling the 'unlocking' of EAs/RECs and facilitate the trade of renewable generation and these environmental products over interties to other markets, including PJM (a market that already tracks and trades RECs from other markets). This would be supportive of Government climate change policies in Ontario and other jurisdictions and offer further benefits to the province from its investment in non-emitting generation.	
Environmental Objectives	MIDAC	It is important for the IESO, Minister of Energy and Minister of the Environment and Climate Change to develop a more comprehensive integrated energy planning process including changes to markets other than the wholesale electricity market so that we achieve our Climate Change Action Plan goals.	The IESO has been an active participant in the development of the Government of Ontario's Climate Change Action Plan and will continue to provide advice and input into government decision making as requested. It is important to note that under Market Renewal, the IESO's focus is not on pre-determining outcomes but rather on putting in place efficient market mechanisms that will allow Ontario to deliver reliable electricity at lowest cost under a range of policy scenarios and regardless of the amount of electrification that may take place in the province.
Project Management	OPG, APPrO, NextEra	The scope and impact to the Ontario electricity sector of this project is much greater than past market re-design initiatives. For this reason, OPG would like to reinforce that it is important to manage this initiative as a project with a project management plan; schedule; tracking of performance measures; risk identification and mitigation plans; and checkpoints or off ramps. These tools will assist in demonstrating and achieving project success not only from an oversight perspective but also by improving	The IESO agrees that in order to be successful, Market Renewal requires a robust program management framework. We also appreciate that stakeholders are keen to understand the framework and measures that will be put in place. The IESO will work closely with the stakeholders as we develop a project plan for Market Renewal to ensure that the IESO's processes are well understood and that stakeholders and the IESO are all working together towards a shared vision for a successful project.

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		transparency and buy-in from all stakeholders. OPG agrees with Brattle that the implementation risks of such a large project need to be proactively managed with stakeholders. Brattle views the following as significant risks: "(a) cross-system and cross-vendor system integration, (b) interactions with existing contracts, (c) mid-stream or late-stage scope and design changes, and (d) stakeholder readiness and buy-in." The IESO has stated they plan to discuss some of these issues early in the process which is promising; however, the remaining also need to be addressed upfront in order to develop appropriate mitigation plans. APPrO believes that the Market Renewal Benefits Case should be both carefully reviewed and if it is to move forward to the design stage, it be carefully managed through a well-developed and robust project management process in order to achieve measurable goals within a carefully considered timeline and project management cost envelope, and to minimize contracted supplier impacts. Off-ramps and options must form part of this project management approach. From APPrO's perspective this will, together with a reasonable and balanced approach to contract amendments, be an essential condition for success in the initiative. The Initiative as presently defined is essentially a re-design of Ontario's wholesale electricity market and such a fundamental change cannot occur all at once for various	

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		reasons. Therefore, to be pragmatic, priority market renewal initiatives should be addressed first.	
Contracts	APPrO, NextEra, Enbridge	APPrO encourages the IESO to start engaging suppliers at the onset when it is clearer as to the impacts MR will have on contracted assets. Potential changes to implement LMP, DAM, Capacity Market, etc., all have far reaching impacts to future wholesale market operations and revenues, along with triggering contract amendments which could adversely affect supplier economics if not fairly treated. Without a clear understanding of what these are, their timing, and a commitment to impact mitigation and a strategy from the IESO to keep suppliers economics whole in any transition, it may be challenging for all suppliers to support such a broad market renewal effort. There needs to be greater acknowledgment and understanding of how key procurement contract provisions may be triggered and addressed resulting from changes to market design and market rules.	The IESO appreciates that the contract impacts of Market Renewal are a very significant consideration for contract counterparties. We are committed to working with them and the MRWG towards managing this challenge in an effective and collaborative manner. Contract implications will be a key focus area for the MRWG moving forward.
Contracts	NextEra	Any move to LMP and a DAM must be assessed not only with the goal of improving market efficiencies but also with regard to procurement contracts and their applicable provisions.	See response above
General	AMPCO	AMPCO wishes to advance the following objective statement which it feels more properly emphasizes the cost control nature of the Market Renewal Initiative. *"Market Renewal will achieve a reduction in costs to consumers*	The IESO has worked closely with the Market Renewal Working Group over three meetings to finalize the objective and principles for the Market Renewal Program, reflecting input from the entire group and the broader stakeholder community. While the final objective may differ to a degree from some stakeholders' preferred language, we believe the

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		by delivering a more efficient, stable marketplace with competitive and transparent mechanisms that meet system and participant needs."	proposed is a sound, inclusive and balanced objective and principles and reflects the key concerns we have heard.
General	OPG	We reinforce Brattle's statement that "Market Renewal could incorporate modern software enhancements that are uniquely valuable in Ontario's context .....such as advanced modeling of cascading hydro systems, pumped storage, or optimized gas combined cycle modeling." OPG encourages the IESO to purchase a software platform that has the ability to capture Ontario's unique resources to achieve even greater benefits from Market Renewal.	The IESO looks forward to working with stakeholders in the design phase towards developing efficient design and IT solutions.
General	ITC	The changes that contribute to the estimated $32 million/year benefits can be made well in advance of 2021 and we encourage the IESO to consider earlier implementation. While IT systems for market renewal are developed, changes could be facilitated manually and therefore efficiency gains from intertie scheduling enhancements could be realized sooner.	Market Renewal is a very substantial undertaking and will require significant time and effort from the IESO and stakeholders. While some changes could potentially be expedited we have to consider the impact of that increased effort on the other initiatives. The IESO has begun work to define project milestones and timelines and this discussion will continue at the April 12 Market Renewal SE meeting.
General	MIDAC	MIDAC suggests that to utilize most of the available surplus zero emission capacity both in Ontario and from adjoining power systems, Ontario should develop an "interruptible retail electricity market". Zero emission electricity that would otherwise be wasted can be purchased on an interruptible basis at its marginal cost of production on the wholesale market and used to displace fossil fuels in other sectors using fuel switching technologies. This will help Ontario meet its Climate Change Action Plan goals more economically. By utilizing spare zero emission electrical capacity, there	The IESO agrees that an increased role for consumers to participate in the IESO administered markets can help to drive more efficient outcomes. We are committed to removing barriers to entry where possible and to providing open and transparent market mechanisms that can help consumers to participate. If significant electrification of Ontario's economy does occur, an efficient electricity market will be essential to ensure that efficient investment and operational decisions contribute to meeting policy goals at the lowest possible cost.

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		would be less need to add electrical capacity specifically to reduce carbon emissions in other sectors.	
General	OPG	OPG submits that going forward, a revised regulated payments structure, subject to the approval of the Ontario Energy Board, may need to be developed to reflect the new market design changes implemented as part of Market Renewal. Once the market design framework is known, OPG is willing to discuss potential changes that may be required to the regulated payments structure to increase the efficiency of the market and benefits to the ratepayer.	The IESO agrees that exploring options to align regulated and market incentives would be a beneficial undertaking. Changes that make regulated assets more responsive to price signals would help to magnify the projected efficiency benefits of Market Renewal.
General	MIDAC	The IESO should consult with the Minister of Energy and Minister of Finance to redesign how water use taxes are applied so the wholesale market can operate efficiently and not disadvantage OPG's larger hydroelectric facilities.	There may be an opportunity to deliver more efficient outcomes by exploring changes to water use taxes. This issue however falls outside the scope of Market Renewal. As it is a policy decision, this feedback will be shared with the Ministry of Energy.
General	NextEra	Because of the scope of potential market design and rule changes, and the importance of future decisions, more frequent stakeholder meetings are needed along with additional membership in the MRWG.	The IESO presented an enhanced engagement framework at its April 12 meeting which includes an ambitious meeting schedule and stakeholdering process for market design. The MRWG has also been expanded to reflect greater diversity and expertise.
General	Enbridge	For Enbridge to adequately assess the impact of the different Market Renewal options being considered in this stakeholdering initiative the IESO will need to provide greater level of detail to intermittent as well as other generation types. We remain concerned that the IESO is pursuing Market Renewal Options without having provided Market Participants sufficient detailed information with which to assess the impacts of said Market Renewal, possibly not even having carried out True costing. We ask the IESO to provide the information requested and identified by us several times during our comments and conversations before proceeding too far down a particular	Market participant impacts will be an important consideration as we move to the design phases for Market Renewal. It is the design phase wherein the IESO will work collaboratively with stakeholders to develop a high-level design within each of the workstreams. During this phase, impacts to individual market participants or resource types will be considered and discuss in further detail.

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		Market Renewal path so that Market Participants can make informed decisions.	