

Date: March 24, 2017
To: IESO
From: Brookfield Renewable
RE: Market Renewal Draft Benefit Case Comments

Brookfield Renewable (“Brookfield”) appreciates the opportunity to provide comments on the draft Benefits Case. Brookfield strongly supports well-functioning, wholesale market-based approaches that properly value energy, capacity, ancillary services as well as attributes from non-emitting generation. It is our fundamental belief that competitive markets produce lower cost outcomes for ratepayers than command-and-control interventions. We therefore generally support transitioning away from a centrally-planned marketplace, to one that relies on transparent dissemination of information, and robust market price signals. Market-based approaches would provide non-emitting generation, flexible products and services, and reliability on a least-cost basis to ratepayers. While the draft Benefits Case is an encouraging step in the right direction, we believe that it is deficient as it does not address appropriate price signals to incent and maintain both non-emitting generation and flexible products and services. In a marketplace that is over 90% non-emitting today and struggling with flexibility and ancillary service issues, we believe these omissions are a fatal flaw to any meaningful and comprehensive approach to market redesign in the province.

Specifically, importing U.S.-based electricity market designs without considering and properly addressing Ontario’s unique supply stack and objectives will inevitably result in inefficient market outcomes. As a result, central planners will again be required to take long term, costly decisions on behalf of ratepayers instead of passing the costs and risks of capital deployment to the private sector. The centralized, regional markets of ISO-NE, NYISO and PJM have evolved over time, and Ontario can indeed learn from the many challenges they have faced in the past. But the IESO should not ignore challenges that U.S. markets are facing today. In particular, valuing non-emitting generation attributes via market constructs is currently a central consideration for U.S. markets both at the Regional Transmission Organization level and for the

U.S. Federal Energy Regulatory Commission (“FERC”). Brattle is intimately involved in this forward-looking re-design process, and can include advice and analysis in the Benefits Case.

Today, Ontario’s re-design process is targeting the 2020/2025 implementation timeframe. Ontario should therefore not simply adopt U.S. market designs of 2017, but first look ahead to where U.S. markets are aiming to be in 2020/2025, and then formulate Ontario specific solutions that leapfrog others to set industry standards. The IESO should not lose sight of Ontario’s long-term reliability, cost, and environmental goals. In this context, Brookfield highlights three major concerns that should be included and analyzed in the draft Benefit Case.

1. Proper valuation of non-emitting generation attributes
2. Proper price-formation in the energy market
3. Pitfalls of an incremental capacity market that does not encompass all resources in the province

Proper valuation for non-emitting generation attributes

Market Renewal will be fundamentally flawed if as outlined at the February 1st 2017 Stakeholder Advisory Committee meeting, “clean energy or environmental attributes” were left to be implemented in the future.

Page 4 of the draft Benefit Case indicated that: *“Going forward, the government’s Climate Change Action Plan outlines measures to reduce economy-wide greenhouse gas emissions by 15% by 2020, 37% by 2030, and 80% by 2050 (all compared to 1990 emissions levels). Most of Ontario’s greenhouse gas emissions come from the transportation industry and buildings sectors now that the electricity system is largely decarbonized. To continue on this path, the electricity sector may need to support growing electrification of other industries and maintain or replace existing clean energy resources.”*

“Clean energy or environmental attributes” are thus a key driver for Ontario to continue meeting its established emission targets. In this context, Ontario’s future electricity market –via Market Renewal– must include mechanisms to maintain, replace and expand Ontario’s emissions-free supply stack. Otherwise, Ontario’s electricity priorities (i.e. reliability and cost)

and environmental goals will inevitably clash. To meet Ontario's overall policy goals, Market Renewal must ensure that reliability, cost, and environmental objectives are optimized concurrently as equally important variables of the same equation. Failing to do so will lead to out-of-market interventions to achieve emissions outcomes; as has already occurred at an extremely high cost over the last decade.

If the IESO does not consider how to effectively price environmental attributes based upon some least-cost proxy method at the outset, the province is virtually certain to see its emissions increase dramatically during the decade of nuclear refurbishments. The carbon price established via Cap-and-Trade and the Western Climate Initiative does not come close to reflecting the value of non-emitting generation in the province. If environmental attributes are not priced fairly, the province will be forced to rely on natural gas generation or U.S. system power to meet reliability needs. While natural gas is a potential interim solution for U.S. markets that wish to advance their non-emitting targets, and who still generate significant electricity from coal power, it is not an acceptable solution for coal-free Ontario. Ontario's nuclear capacity under refurbishment or entering retirement must be replaced with non-emitting generation. We believe the government of Ontario understands this dilemma, and it is the primary reason behind import contracts with Hydro-Quebec. However, the IESO can now demonstrate strong leadership by providing the government with an alternative solution: open, competitive, and transparent markets to allow all market participants to compete to provide non-emitting generation during the decade of expected nuclear refurbishments.

The draft Benefits Case should therefore 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.

Proper price-formation in the energy market

Energy market price formation has been on the radar for FERC over the last few years. While American centralized wholesale markets have been operational for close to two decades, they required significant effort and trial-and-error to properly *reflect the marginal cost of the marginal megawatt*. While this price-formation exercise may seem intuitive at the onset, major components such as uplift (e.g. CMSC payments) and operator actions are often left out of the energy market, which will undermine efficient dispatch.

Today, the IESO relies on its 5-minute dispatch to effectively procure flexibility and ancillary services. Furthermore, the IESO has acknowledged that it takes advantage of existing assets under contract, such as wind facilities with curtailment agreements, for their highly valuable flexibility and ancillary capabilities. Yet these flexibility and ancillary instruments are not priced in any ancillary market. 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. To be clear, any incremental ancillary service revenues that might accrue to certain facilities under contract can be dealt with during contract keep-whole negotiations. 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 targeting (e.g. batteries and storage).

Pitfalls of an incremental capacity market that does not encompass all resources in the province

A properly designed capacity market maintains the well-functioning of a wholesale market by solving the “missing money” problem. Together with energy and ancillary markets, a capacity market ensures that resource adequacy is procured on a least cost basis. If, as proposed, only a subset (i.e. 4GW) of total resources will be procured via the capacity market, then the true demand and supply of the electricity sector would not be reflected, and this will produce suboptimal outcomes. The large missing piece will be the sizable amount of the generation fleet, regulated or otherwise, that will not be accounted for to reflect Ontario’s true going forward cost.

The IESO should therefore 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.

Conclusion

Existing procurement mechanisms and market designs have not offered a solution where cost, reliability, and emission targets intersect. This is why, as the draft Benefits Case pointed out, American markets are currently struggling with this thesis. Today, Ontario is in the enviable position where de-carbonization is largely complete. And barring any contingencies, there is no immediate supply gap on the horizon. Ontario has therefore room to deliberately design market mechanisms that can be emulated and exported as blueprint to other Canadian, US and international jurisdictions.

In addition, since Ontario’s de-carbonized capacity has already been contracted and paid for, introducing mechanisms that adequately price environmental attributes would not generate additional costs for rate-payers. This is a luxury that U.S. markets do not enjoy, as environmental attributes pricing in these jurisdictions would inevitably translate into some level of additional costs. If Ontario priced environmental attributes today in its energy market, its emissions-free supply stack can be gradually and seamlessly transitioned from contracts to full

capacity markets procurement with carbon pricing, without causing a price shock or an increase in emissions intensity.

In sum, 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 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. Brookfield encourages Market Renewal to design a long term vision, including guiding principles and supported by market-based approaches to meet Ontario's long term needs.