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Attention: Tom Chapman, Senior Manager, Market Development

**Re: IESO Non-Emitting Resource Subcommittee (NERSC) Meeting of July 24 and August 16, 2018
Feedback on the Modelling Exercise**

Dear Tom,

Thank you for the invitation and the opportunity to participate in the Non-Emitting Resource Subcommittee (NERSC) meetings on July 24 and August 16, 2018. We appreciate the opportunity to provide input into this important forum and we look forward to participating in the next session.

TransCanada believes that there was sufficient feedback from stakeholders at the session about the modelling exercise and particularly about the fundamental assumptions for that modelling, that the IESO should consider holding a follow-up webinar or meeting in mid-September to ensure final alignment before the modelling is completed.

Further to comments made by TransCanada at these recent meetings, we thought it would be useful to follow up with more detail and rationale for our comments. We believe our comments and recommendations on amendments to the overall objectives and approach to the NERSC modelling will improve the results and provide more relevant information for decision makers to consider. Some of these recommendations were previously made in our February 21 letter to the NERSC.

Need to include an estimate of Total System Costs

Firstly, while the mandate of the NERSC has not officially been amended, it is abundantly clear that the new government elected on June 7 is interested in addressing the high cost of electricity. TransCanada recommends that the objectives of the modelling simulation be modified to include an estimate of the overall system cost associated with each scenario. This cost estimate should represent the actual total system costs and ensure that it is not distorted by the effects of cost shifting. It should delineate the incremental system cost associated with each NERSC modelling scenario.

Need for a reference or expected case

Further to the above, we would recommend that an expected case scenario be developed as a reference for the comparison of the impacts associated with the other scenarios and particularly with respect to cost. It would be our recommendation that this reference case be developed from the most recent public IESO information in the form of the modules released in March of this year underlying the 2017 Long Term Energy Plan (www.ontarioenergyreport.ca/data-catalogue.php#LTEP Modules) with adjustments for changes that have occurred since October 2017 and for changes that can be reasonably anticipated given stated government policy.

Since the release of the 2017 LTEP in October of 2017 there have been several changes implemented by the government that need to be reflected in the expected case reference scenario:

1. On July 13, the Government of Ontario through the Honourable Greg Rickford, Minister of Energy, Northern Development and Mines, and Minister of Indigenous Affairs, announced the immediate winding-down of FIT 2, 3, 4 and 5 contracts that have not been issued Notice to Proceed (NTP), and the winding down of all LRP I contracts where the IESO has not notified the contract holder that Key Development Milestones (KDMs) have been met. The announcement cancels and winds down 758 renewable energy contracts which will reduce the forecast supply of energy, and the capacity available at system peak from what was stated in the 2017 LTEP.
2. On July 17, the Honourable Greg Rickford, Ontario's Minister of Energy, Northern Development and Mines, tabled the *Urgent Priorities Act, 2018* which amongst other things cancelled the "associated contracts and agreements between the IESO and wpd White Pines Wind Incorporated [related to the 18.45MW FIT-contracted wind power facility in Prince Edward County] and other related parties, as well as associated permits and permissions issued to wpd White Pines Wind Incorporated are terminated and revoked", retroactive to July 10, 2018. While effects will be smaller they will similarly reduce the forecast supply of energy and the capacity available at system peak as forecast in the 2017 LTEP.
3. On July 27 Ontario Power Generation and the Independent Electricity System Operator announced the Thunder Bay Generating Station will be closed after significant corrosion to the boiler was found earlier this year, leaving the plant non-operational since late May. The closure will reduce the available capacity at time of system peak and marginally reduce energy production.

In addition to the above actions the Government has stated it plans to proceed with additional measures that will impact the expected case reference scenario:

4. The Government has also announced its intention to transfer the Conservation First and Industrial Accelerator Program (IAP) program to the tax base and it is widely believed that it will be eliminated. This will have the effect of increasing energy consumption and peak demand and should be reflected in the expected case scenario.
5. In addition to the impacts of the elimination of conservation, the Government has set a target to reduce the cost of electricity by 12% from the current levels and eliminate the Cap and Trade program. These measures will have an impact on Ontario's economy and electricity consumption and demand and should be reviewed to determine if adjustments to the 2017 consumption and demand forecasts are needed.

Plausible Scenarios

Throughout the meeting on August 16 and in the presentation prepared to discuss the modelling, the five scenarios developed during the July 24th meeting were described as plausible. We would challenge this assumption. These scenarios were developed through a brainstorming session on July 24 and not sufficiently vetted to determine plausibility. TransCanada would recommend a more conventional and rigorous approach to developing scenarios based on deviations from an expected case along broad themes that would bracket the range of outcomes for the benefit of stakeholders and decisions makers. Firstly, we would recommend only three of the five scenarios be pursued namely 1. Low Net Demand, 3. Booming Economy & Electrification and 5. Decentralized Future. These represent a reasonable range of potential outcomes. In addition, we would challenge the approach of fixing so many input variables. The key variables to each scenario are the market conditions and Government policy. Fuel prices, supply mix, carbon prices and other variables identified in the matrix may be more truly outputs to the two main inputs rather than controlled inputs, and to the extent they are inputs (i.e. natural gas prices), these inputs should align with long term planning documents or be subject to sensitivity testing. Treatment of system reserve adequacy margins (currently 18% on peak demand) as well as supply contribution at peak (capacity) needs to be verified and modelled appropriately in each scenario considering specific supply mix and system attributes. Specifically, we believe that demand response and distributed

energy resources should not net out demand and instead should be treated as supply resources with appropriate ICAP and UCAP ratings¹ or similar and appropriate reserve margin allocation.

We would be happy to discuss our thoughts on this matter further if invited.

Modelling Resolution

As we have stated previously, while we appreciate the interest in minimizing the modelling effort by taking a higher level indicative view (i.e., not a granular minute by minute / node by node modelling exercise), we note that a large value driver for utility scale storage is through reducing price volatility. Volatility will not be picked up without granular modelling. In our experience, it is very difficult for conventional energy forecasting software to effectively model the impact of volatility. The reduction of volatility is a major contributor to reducing ratepayer costs and to the evaluation of NERSC options thus needs to be assessed as part of the modelling exercise.

As an alternative, we would recommend the IESO consider an assessment of the potential to reduce volatility by looking at actual granular data for an appropriate specific time period and compare energy prices under each of the three scenarios. This data could then be extrapolated over the planning horizon to approximate the long-term value.

Timeframe for the Analysis

Finally, with respect to the proposed timeframe for the analysis, TransCanada would recommend the IESO consider extending the time span by at least 10 years to effectively capture the opportunity presented by large capital-intensive infrastructure such as utility scale storage. These types of assets have working lifespans of greater than 50 years. They are capital intensive and thus their contribution needs to be compared over a longer timescale.

Again, we thank the IESO for the opportunity to participate in the NERSC process and we look forward to continuing discussions. We respectfully provide our comments in the spirit of assisting the IESO in its efforts to model the potential of Non-Emitting Resources to contribute to the future Ontario electrical system. Should you have any questions about this letter, please do not hesitate to contact us.

Sincerely,



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Director, Eastern Power Development

Cc: Margaret Kuntz, TransCanada
Nathan Ford, TransCanada

¹ ICAP and UCAP are defined in the Incremental Capacity Auction market renewal initiative and refers to the supply contribution at peak demand adjusted for expected resource performance.