TORONTO

Environment & Climate Division

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Re: City of Toronto staff comments on Toronto IRRP Forecasting Methodology

Thank you for the continued engagement with the City of Toronto in this IRRP process. Staff from the Environment & Climate Division have reviewed the Toronto IRRP Forecasting Methodology document (the "Methodology") circulated in April and provide the following comments:

1. **The Methodology may not be fully aligned with the City of Toronto's plans for eventual implementation of Emission Performance Standards (EPS) for buildings**

The City of Toronto is developing Emission Performance Standards (EPS) for buildings pursuant to Council direction. The EPS are a key aspect of the City's Existing Buildings Net Zero Strategy and are expected to enhance certainty around the pace of retrofits.

The City would like to review and comment on the methodology used to develop average and extreme weather electricity demand scenarios, including exploring alignment with the most recent TransformTO modelling covering expected impacts from electrification as well as the weather extremes used.

While not transparent as to modelling assumptions, the data tables accompanying the Methodology suggest that the high-electrification extreme weather demand in Table 10 approaches the *average* demand expected under the Net Zero Existing Buildings Strategy approach of fuel switching and enclosure improvements. Thus, there may be a gap between the demand projection here and in the City's Net Zero Existing Buildings Strategy based on average versus extreme weather. Also, if more building owners choose to pursue only fuel switching, this gap would likely increase significantly.

City staff leading the development of EPS would benefit from further information from Toronto Hydro about the demand forecast and could also discuss with Toronto Hydro and IESO reasonable expectations for how EPS will affect the pace of retrofits, which is noted in the Methodology as a source of uncertainty (p. 10).

2. Future temperature assumptions could better incorporate the impact of climate change.

The Methodology states that "[a] probability distribution for temperature was developed from 17-year historical data." Giving weight to the most recent historical data has recently been noted as an emerging best practice for electric utility planning because it helps account for recent changes due to climate change.[1] This approach can be complemented by two other analyses:

i. Applying trends in the number and magnitude of heating-degree and cooling-degree days to future year forecasts rather than using historical averages; and

ii. Evaluating modeling scenarios that reflect trends in the availability of generating resources, water availability, wind and solar variations, or temperature.

A second approach is downscaling global climate simulations (GCM). This is noted in the literature as more complicated but valuable for resilience planning:

> … the use of downscaled GCMs is considered a best practice for electric utility climate resilience planning. However, downscaling GCMs can be time consuming and expensive. For this reason, utilities often team up with regional organizations and university partners to perform downscaling or otherwise apply GCM data to their service territory.[2]

3. Minor clarifications

Clarity on minor wording in the Methodology is required as outlined below:

1. The Methodology states that "GDP is forecasted to be constant for years 6 and onward" (p. 4) however, it is not clear whether this means a constant rate of growth or a constant flat level.
2. The Methodology presents Electrified Heating Adoption Rates by "Residential (Dwellings)" (Table 4, p. 8) however it is unclear as to whether:
    - Dwellings refers to residential units?
    - What 100% adoption refers to and whether this includes adoption according to the renewal cycle?
3. The TTC's Green Bus Program is now projecting 100% fleet electrification by 2037 (p. 9)[3]

[1] Pacific Northwest National Laboratory, "Emerging Best Practices for Electric Utility Planning with Climate Variability: A Resource for Utilities and Regulators" (May 2023), prepared for the U.S. Department of Energy, see section 2.1 "Forecasting Based on Recent Historical Data or Trends".
[2] *Ibid*, see section 2.2 "Using Downscaled General Circulation Models".
[3] TTC Green Bus Program Update (Dec 2023).

Should you have questions regarding this submission, please contact me.

Best Regards,

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