GTA North IRRP Forecasting Methodology

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1. Alectra Methodology

The Alectra Utilities long-term load forecast provides an indication as to where and how much the load increases are occurring. An increase in the peak demand is normally the biggest factor in driving the requirement for reinforcement of the system. Alectra Utilities performs a load forecasting exercise annually. Alectra Utilities performs a combination of two methods of forecasting to determine the long-term system capacity adequacy assessment:

- End-use analysis using the latest information available from municipal report; and
- Past system peak performance and trend (statistical) analysis.

1.1 End-Use Analysis Using the Latest Information

Alectra Utilities reviews economic development and outlook for different regions that include Ontario Government development, population growth and job growth projections, municipal economic analysis report, past housing completion statistics and future housing projection, ICI building activities and news from media.

- **Population Growth**: Historical annual population growth is obtained from Regional Annual Economic and Municipal Development Review Reports. Long-term annual population projection is obtained from provincial and municipal official plan reports published by Ontario government, and regional/municipal government.
- **Employment Growth**: Historical employment and economic growth statistics reports published by Provincial and Municipal governments are used to extract the historic economic development and growth rates. Employment growth and structure projection are used to develop long-term employment forecast potentially categorized by the sector, industry and service types.
- **Housing Activities**: Number of housing completions, mix of housing completions, vacancy rate and building permit activities in the Region and Municipal boundaries and residential developments plan are reviewed for long-term capacity need forecast. Plans of subdivision and condominiums are obtained and analyzed to develop the long-term load forecast.
- **ICI Building Activity**: Industrial and Commercial development rate, commercial vacancy rate, industrial sale prices per square feet, total ICI construction and commercial/industrial building permits are obtained and compiled to develop the long-term load forecast for the region.

1.2 Weather Correction

Alectra uses weighted 3-day moving average temperature to correlate the peak demand and weather. Peak demand weather normalization is the process for estimating what peak demand would have occurred in a given time period if the weather had been normal (1 in 2). The weather normalized peak demand is used as the starting point for the forecast. Alectra uses “1-in-10” (extreme) weather scenario for system planning purposes to contemplate the impact of extreme weather (i.e. high temperatures) on peak demand.

1.3 Other Factors

The other contributing factors to long-term load projections are CDM, DG contribution and other government incentives and programs (i.e. Global Adjustment), emerging industrial technologies (i.e. Microgrid, battery

storage, CHP, etc.), newly introduced load types (i.e., electric vehicles, fleets) that are reviewed and assessed in load forecast procedure.

- **DG:** Alectra Utilities forecast considers the existing DG and DG connections forecasted over the horizon period.
- **Electrification of Transportation:** Alectra Utilities continues to monitor the uptake of EV vehicles and projects related to electrification of transportation to better understand and determine the impact on local electricity needs. Alectra Utilities uses the available information on EV adoption and evaluates the impact of the EV's at the peak.
- **Decarbonization:** Alectra Utilities continues to monitor the uptake of decarbonization of residential and non-residential sectors to better understand and determine the impact on local electricity needs. Alectra Utilities uses the available information on heat pump adoption and evaluates the impact of the decarbonization's at the peak.

1.4 Past System Peak Performance and Trend Analysis

The trend analysis is performed to forecast the system peak from historical peak demand results. The purpose of the trend analysis is to compare the results with end-use method to obtain more realistic long-term load projections considering the historical demand peak.

1.5 Conclusion

There is a level of uncertainty with respect to any forecasting exercise. Any major unexpected changes to assumptions, economic pressure or crisis events, government directives and other social/economic/political events that can impose changes and that were not contemplated at the time of forecasting are reviewed and forecast is adjusted annually accordingly to reflect the changes.

2. Hydro One Distribution Methodology

Hydro One Distribution uses Econometric and end-use approaches to arrive at forecasts for IRRPs.

Provincial load forecast is used to arrive at load forecasts for each station in the study area, considering historical relation between the two. Zonal and local information are also considered in developing the forecast. This includes Municipal Energy Plans, Official Plans, local and zonal demographic and economic factors.

Key provincial information used to develop the forecast include Ontario GDP and Housing Starts. When requested by IESO, a low and high forecast is also provided in line with the corresponding economic and demographic information.

EVs and Electrification assumptions are based on latest government mandates and initiatives in this regard.

We have an aggregate forecast of electrification, which includes heat pumps, alternative use of electricity for heating load and transit system. This aggregate forecast helps to have a consistent and robust forecast for a variety of heating options.

For example, if natural gas combined with hydrogen is used in place of heat pump, then electricity used for making the hydrogen is counted for in the aggregate in place of electricity usage of heat pumps.

For historical period, CDM is added back to actual load. Then a forecast is developed on gross basis. Finally, the cumulative CDM up to and including last year of actual load (i.e., forecast starting point) is deducted from forecast. Thus, the gross forecast reflects the incremental CDM relative to last year of actual load. Same method is also used for incorporating embedded generation into the forecast.

The main forecast drivers are:

- Ontario GDP, housing starts, etc.
- Load growth in the area relative to provincial trends at the aggregate level and zones
- Local information including community/municipal energy plans

3. Newmarket-Tay Hydro Methodology

3.1 Introduction

Newmarket-Tay Power Distribution Ltd. ("NT Power") owns and operates the electricity distribution system within its Ontario Energy Board (OEB) licensed service area. This area includes the Town of Newmarket, along with small sections bordering the municipalities of King and East Gwillimbury in the Regional Municipality of York (Newmarket Service Area), as well as the communities of Port McNicoll, Victoria Harbour, and Waubaushene in Simcoe County, which are part of the Township of Tay (Tay Service Area), and the Town of Midland (Midland Service Area). NT Power is an embedded distributor of Hydro One in the Tay Service Area and certain locations within the Midland Service Area. The forecasted embedded load for these areas has been included in Hydro One's study. In this York Region IRRP load forecast, the focus is only on the Newmarket Service Area.

3.2 Forecast Starting Point

In preparing the forecast, NT Power utilized a combination of historical growth trends, end-use scenarios, and trend analyses, incorporating the latest information from the municipality and developer connection requests in the Town of Newmarket. The 2023 Historical Coincident Normal Weather-Corrected Peak, including DG data, served as the starting point for the current load forecast. Several factors were considered and evaluated in developing the forecast to accurately determine potential growth within the service area.

3.3 Base Forecast: Trend and End-Use Analysis

When the anticipated connected load is not provided in the Town of Newmarket's current planning applications, an analysis of end-use consumption is performed, with demand allocated across residential and industrial/commercial/institutional (ICI) categories. Using standard historical usage data for various end-use customers—such as single-family dwellings versus apartment complexes, and warehouses versus data centers—serves as a basis for forecasting demand and load growth across both residential and ICI sectors. Assuming that current applications listed on the Town of Newmarket's website will be completed within the next 10 years (2024–2032), trend analysis is applied to project the load forecast for 2033 to 2043.

3.4 End-Use Analysis Assumptions

Customer connection requests and anticipated loads from the Town of Newmarket's current planning applications have been incorporated into the IRRP forecasts, based on the assumption that these projects will proceed. The timing and demand of these development loads have been estimated, with construction expected to be completed and energized within the next 10 years. Each customer connection request provides specific timing and demand estimates for individual connections, as requested by the customer.

3.5 Electrification Forecast

With the accelerated adoption of electric vehicles and the implementation of new building electrification policies, an estimation of electrification load is incorporated into the forecast, calculated as a percentage of total system peak demand based on relevant public policies. Once electrification demand trends for both summer and winter are established, the forecasted demand is integrated into the base forecast, which was previously calculated using end-use and trend analysis, resulting in the final 20-year system forecast for the Newmarket service area.

3.6 Reference Plans

The following documents were utilized in the development of this IRRP forecast:

- Urban Centres Secondary Plan, Town of Newmarket
- Pathways to Decarbonization, IESO
- 2022 Annual Planning Outlook, IESO
- Canada's Zero-Emission vehicle sales targets, Transport Canada

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