Reference: Volume 2, Customer, Energy and Demand Forecast

Q. Volume 2, Customer, Energy and Demand Forecast, page 3. Explain why Newfoundland Power selected to reduce the period from fifteen to five years of historical data for system peak demand, rather than another period such as ten years or three years.

A. **A. General**

Newfoundland Power forecasts its native peak demand ("peak demand") to estimate its expected purchased power costs from Newfoundland and Labrador Hydro ("Hydro"). A system load factor methodology has been used by the Company to forecast peak demand since 2005 when demand charges were first introduced as a component to Newfoundland Power's Utility rate from Hydro.[1]

Prior to 2016, Newfoundland Power experienced relatively consistent growth on its electricity system. This includes growth in energy sales as well as growth in peak demand.[2] Beginning in 2016, Newfoundland Power has been experiencing annual declines in energy sales.[3] The Company has also begun to experience greater variance in its peak demand.[4] This indicates that the load on Newfoundland Power's electrical system is changing.

B. Historical Data

Using an *average* load factor that encompasses multiple years of historical data is necessary to ensure that the Company's peak demand forecast is not biased from results in any single year.

For example, if Newfoundland Power's peak demand forecast was based on the load factor experienced in 2019, the Company's peak demand forecast would be approximately 19 MW lower.[5] Similarly, if the Company's peak demand forecast was

[1] Load factor is the ratio of the average demand on the electrical system to the peak demand on the system. Newfoundland Power's typical load factor is approximately 50%. Conceptually, this implies that the peak demand Newfoundland Power will expect in a year will be approximately twice the average demand for the year.

[2] For example, from 2006 to 2015 Newfoundland Power's weather normalized energy sales grew from 4,995 GWh to 5,957 GWh, an increase of approximately 19%. Similarly, the Company's weather adjusted native peak was 1,169 MW in the 2006-2007 winter season and 1,381 MW in the 2015-2016 winter season, an increase of approximately 18%.

[3] Since 2015 Newfoundland Power's energy sales have declined from 5,957 GWh to 5,729 GWh, a decrease of approximately 4%.

[4] For example, in the 2016-2017 winter season, Newfoundland Power's weather adjusted native peak reached 1,445.9 MW, a historical high. In the 2019-2020 winter season, and prior to the onset of COVID-19, the Company's weather adjusted native peak was 1,367.3 MW, the lowest peak experienced since the 2013-2014 winter season.

[5] Newfoundland Power's peak demand forecast for the 2022-2023 winter season is 1,350.3 MW. Using the load factor experienced in 2019 would result in a peak demand forecast of 1,331.4 MW for the same winter season.

based on the load factor experienced in 2018, the peak demand forecast would be approximately 45 MW higher.[6] While both outcomes are possible, an approach that uses an average load factor is more likely to accurately forecast Newfoundland Power's peak demand.

Determining the amount of historical data to use in the calculation of Newfoundland Power's average load factor requires a balance between (i) a sufficiently long period to effectively reduce any forecast bias due to high or low load factors that can occur in a year; and (ii) whether the load factors experienced in the historical period reflect load factors that can be expected in the future.

An average load factor that uses 15 years of historical data would change very little from one year to the next as annual data reflects only 1/15th of the historical data used to calculate the average load factor. As a result, a peak demand forecast based on a 15-year average load factor is more likely to reflect a longer-term relationship between energy sales and peak demand.

Alternatively, an average load factor that uses 1 or 3 years of historical data would change more prominently from one year to the next since annual data would reflect all or 1/3rd of the historical data. However, since only recent historical data is used, the forecast would be more likely to reflect the most recent relationship between energy sales and peak demand.

C. 15-Year to a 5-Year Average Load Factor

The most recent 15-year period that would be used to determine Newfoundland Power's 15-year average load factor is 2005 to 2019.[7] For the period 2005 to 2015, the Company experienced relatively consistent growth in energy sales and peak demand. From 2016 to 2019, the Company experienced annual energy sales declines and greater variance in peak demand.

Newfoundland Power does not consider the system conditions that occurred in the 2005 to 2015 period to be reflective of system conditions that are most likely to occur in the forecast period. If a 15-year average load factor was used, approximately 2/3^{rds} of the historical data used in the calculation would be represented by this time period.

The use of a 5-year average load factor captures the more recent relationship between Newfoundland Power's actual system peaks and actual system energy usage. It also

[6] Using the load factor experienced in 2018 would result in a peak demand forecast of 1,395.0 MW for the 2022-2023 winter season.

[7] The load factor experienced in 2020 was the highest recorded system load factor in at least 30 years and was influenced by public health measures in effect to manage the COVID-19 pandemic. It was therefore excluded in determining Newfoundland Power's average load factor.

includes enough historical data to reduce bias towards higher or lower peak demand that may occur in any single year.[8]

In addition to changes in Newfoundland Power's load that demonstrate the appropriateness in adopting a 5-year average load factor, the Company surveyed other Canadian utilities to understand their peak demand forecasting methodologies. The results showed that the 5-year average load factor was consistent with sound public utility practice.[9]

[8] The variance of forecast peak demand using the 15-year average system load factor from actual peak demand ranged from -3.3% to 3.5% over the 2011 to 2019 period. The variance of forecast peak demand using the 5-year average system load factor from actual peak demand ranged from -3.1% to 2.6% over the same period.

[9] Of the 6 utilities that use the same approach as Newfoundland Power, 1 utility uses 1 year of historical data, 3 utilities use 3-5 years of historical data, and 2 utilities use 10 years of historical data. No utilities other than Newfoundland Power used 15-years of historical data.