1   **Q.**   **Describe, for developing capital load growth projects, how Newfoundland Power**
2   **forecasts peak demands, in the medium and long term, for each feeder, each**
3   **substation, and each transmission line. State the levels (e.g. 95%, 100%, or 105% of**
4   **ratings) of anticipated forecast loads on feeders, substations, or transmission lines**
5   **that trigger load growth projects.**
6
7   **A.**   Newfoundland Power annually completes four medium term (five year) peak demand
8   forecasts. When required, the Company will complete long term (typically 20 year) peak
9   demand forecasts for a particular portion of the power system.[1]
10
11   The following describes the four annual peak demand forecasts that are used to assess
12   when capacity upgrades are required on Newfoundland Power's system.
13
14   *The Customer, Energy and Demand forecast.*
15
16   The Customer, Energy and Demand forecast provides the five year forecast of the overall
17   peak demand required for Newfoundland Power. The methods used for completing this
18   forecast are provided in response to Request for Information PUB-NP-006.[2]
19
20   *The Infeed Load forecast.*
21
22   The Infeed Load forecast provides a five year forecast of the peak demand required at
23   each of the locations where Newfoundland Power purchases power from Hydro ("Infeed
24   locations"). This forecast is based on the forecast energy requirements for each of 20
25   supply areas provided by the Customer, Energy and Demand forecast. The peak demand
26   for each Infeed location is determined by using the supply area energy forecast and a 15
27   year historic average historic load factor for each Infeed location.
28
29   *The Substation Transformer Load forecast.*
30
31   The Substation Transformer Load forecast provides a five year forecast of the peak
32   demand required to be supplied through each of Newfoundland Power's Substation
33   Transformers. This load forecast is also used to review transmission line loading levels.[3]
34   The Substation Transformer Load forecast is completed using the forecast energy
35   requirements for each of the 20 supply areas, historical transformer peak demands, five
36   year historic worst case load factors for each supply area, and local knowledge of load

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[1]   Long range forecasts typically are required when evaluating alternatives for supplying future loads.
[2]   The Customer, Energy and Demand forecast also provides a five year forecast of energy required at each of 20
      supply areas.
[3]   Transmission system load flow models are used to predict transmission line peak load levels. Forecasted
      Substation transformer peak loads are input into the load flow model when transmission system load levels are
      reviewed.

growth within each supply area. The process for completing the load forecast involves
the following.

1. Determine the base peak load on each transformer for the most recent year. This
   requires reviewing historic peak demand data to remove peak loads that were caused
   by abnormal system conditions, including cold load pickup. This results in estimates
   of existing transformer peak demand under normal operating conditions.
2. Determining an adjustment factor for the transformer base peak demand. This adjusts
   the actual peak load to reflect the extent to which the worst case supply area load
   factor was different from the actual load factor that occurred in the previous winter
   season. This tends to result in a forecast of peak demands that is higher than what
   would be expected under typical or average peak load conditions.
3. The adjusted base transformer peak demand for each substation transformer is
   projected into the future using the supply area energy forecast, and local knowledge
   of locations with higher and/or lower than average growth rates.

Feeder Peak Load Forecasts

Where required, Newfoundland Power completes a five year forecast of the peak load for
feeders that may become overloaded in the near term.[4] The method used is based on
projecting the existing base peak demand for the feeder into the future using the
Substation Transformer load forecast, and local knowledge of areas with higher and/or
lower than average growth rates.

Long Term Forecasts

Long term forecasts are developed as required to evaluate alternatives for addressing
potential equipment overloads. These forecasts are typically based on extending the five
year peak demand forecasts using the growth rates during the last couple of years in the
five year load forecast.[5] High and low growth sensitivity analysis is completed to ensure
the recommended system changes are reasonable given potential forecast error.

Trigger for Load Growth Projects

The need for additions due to load growth is triggered when the Company's planning
criteria is exceeded as determined based on actual demand or using the Company's peak

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[4]   Recently, completing feeder peak load forecast for St. Johns area has been a focus because of higher load
      growth and larger numbers of feeders that are reaching capacity limits. See response to Request for Information
      PUB-NP-277.
[5]   Where required, local knowledge of potential changes in future load growth will be used to modify the load
      forecast in the last few years of the five year forecasts.

1   demand forecast for substation transformers and/or distribution feeders.[6] This trigger
2   point can be regarded as the point when 100% of the planning criteria/rating is exceeded.

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[6]   The planning criteria and planning processes used by Newfoundland Power is provided in response to Request
       for Information PUB-NP-147, PUB-NP-155 and PUB-NP-157.

Newfoundland Power