Q. Please provide information showing how many megawatts of demand Newfoundland Power estimates that it can shed by the exercise of its voltage reduction capabilities.

A. Newfoundland Power's *actual* peak demand for 2013 was 1,378 MW.[1] Voltage reduction can be initiated on approximately 73% of Newfoundland Power's customer base.[2] This roughly translates into voltage reduction capabilities on a total load of approximately 1,005 MW.[3]

Newfoundland Power's wholesale electricity rate structure changed on January 1, 2005 to include a demand component and an energy component.[4] To better manage demand costs, the Company implemented measures to reduce system voltage and curtail load during periods where Newfoundland Power customer load was peaking.

To better understand the impact of reducing voltage on the electrical system, Newfoundland Power conducted a voltage reduction test. The test involved requesting Hydro to reduce the voltage on its Hardwoods and Oxen Pond 230 kV in-feeds on the Avalon Peninsula by 5%. The test was conducted between 3:00 am and 4:00 am on December 30, 2006.[5]

Chart 1 on the following page shows the results of Newfoundland Power's voltage reduction test on December 30, 2006.

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1 See the response to Request for Information PUB-NP-006, page 4, lines 5-6.

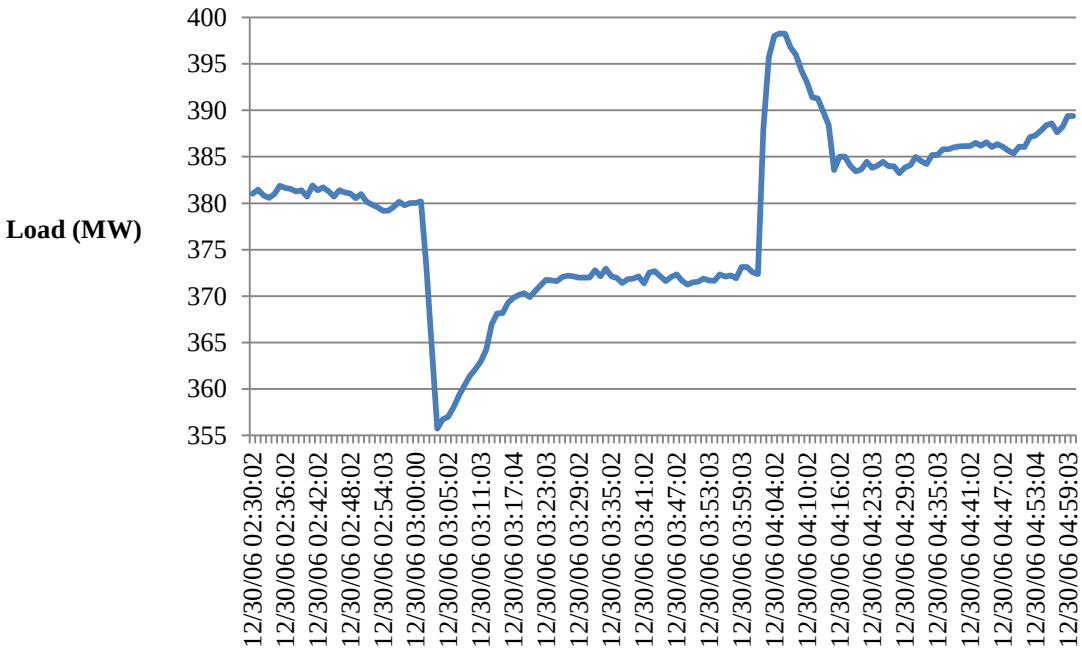
2 Voltage reduction is available on feeders that serve approximately 186,000 of Newfoundland Power's 255,000 customers (186,000 / 255,000 = 0.729).

3 (1,378 MW x 0.729 = 1,004.6 MW). For the purposes of providing an estimate of the amount of load that can be shed, it is assumed that the proportion of customers with voltage reduction capabilities represents the same proportion of Newfoundland Power's overall customer demand.

4 In Order No. P.U. 14 (2004) the Board found that the implementation of a demand and energy rate for Newfoundland Power's wholesale power purchases from Hydro was appropriate. The Board based its findings on the ability of a demand and energy rate to send the proper price signal by tracking system costs as they occur and the resulting potential for improved efficiency on the system overall. In Order No. P.U.44 (2004) the Board Ordered Hydro to charge Newfoundland Power a demand and energy rate. Prior to 2005, Newfoundland Power was charged an energy only rate.

5 The 1-hour period between 3:00 am and 4:00 am was selected for the voltage reduction test since the load during these hours is relatively static. Changes to the electrical load can therefore be primarily attributed to voltage reduction and not changes in customer energy usage.

Chart 1
Voltage Reduction Test, December 30, 2006



At the time when voltage reduction was initiated at 3:00 am on December 30, 2006 the electrical load was approximately 380 MW. When voltage was reduced by 5% the load reduced to approximately 355 MW. This represents an immediate decline in electrical load of 6.6%.[6]

Between 3:25 am and 4:00 am the electrical load stabilized at approximately 373 MW. When normal voltage levels were re-established at 4:00 am the load initially increased to approximately 398 MW but settled to approximately 383 MW after about 15 minutes. The difference between the stabilized electrical loads of 373 MW and 383 MW represents a sustained reduction in electrical load of approximately 2.6%.[7]

Extrapolating the results of the December 30, 2006 voltage reduction test to Newfoundland Power's 2013 peak load can be used to estimate the amount of load that Newfoundland Power can shed using its voltage reduction techniques.[8] Based on the

[6] 1 – (355/380) = 0.0657

[7] 1 – (373/383) = 0.0261

[8] Extrapolating the results of the December 30, 2006 voltage reduction test to determine an estimate of Newfoundland Power's current overall voltage reduction capabilities assumes (i) a uniform response to voltage reduction across all of the Company's electrical load; (ii) the load reduction response that occurred during the 3:00 am – 4:00 am time frame is similar to load reduction that would occur during peak loads; and (iii) the voltage immediately before voltage reduction occurs allows for an average of 5% voltage reduction while maintaining CSA voltage standards for customers.

results of the December 30, 2006 voltage reduction test and the estimate of 1,005 MW of peak load available for voltage reduction in the winter of 2013, it is estimated that Newfoundland Power's voltage reduction activities can provide an immediate load reduction of approximately 66 MW and a sustained load reduction of approximately 26 MW.[9]

[9] 1,005 MW x .066 = 66.33 MW; 1,005 MW x .026 = 26.13 MW.