

1 **Undertaking Request (U-79)**

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3 ***Transcript Reference: Thursday, July 26, 2018, Pg. 38, line 3 to Pg. 40, line 2***

4 Undertake to advise if there were any elasticity studies performed over the last five years  
5 (2012-2018).

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7 **Undertaking Response**

8 Hydro is interpreting this request to be in relation to the price elasticity of Island  
9 Interconnected system electricity consumption. During the time frame in question Hydro  
10 has used its long-term planning load forecast model, which incorporates both short-term  
11 and long-term price elasticity effects, to update forecasts of longer term energy  
12 requirements to reflect annual updates to the provincial economic forecast as well as  
13 updates to forecasted energy prices including electricity prices.

14

15 The impact of energy price changes on electricity consumption are estimated in Hydro's  
16 long-term planning load forecasts via its econometric based load forecast models<sup>1</sup>. The  
17 energy consumption forecasts that are determined by the econometric models include  
18 electricity price as an explanatory variable of customer's consumption levels for those  
19 customer groups where the electricity price has been empirically established by Hydro as a  
20 statistically significant factor. As per Hydro's forecast model specification, annual changes  
21 in electricity consumption associated with changes in the average annual electricity price  
22 level are quantified and provide an estimate of short-term own-price<sup>2</sup> elasticity. Hydro's  
23 load forecast models have generally been updated on an annual basis resulting in a

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<sup>1</sup> The forecasted load requirements for Newfoundland Power included in Hydro's GRA load forecast reflect the price elasticities of Newfoundland Power's load forecast models.

<sup>2</sup> "Own" price elasticity of demand is a measure of the percentage change in the quantity of a product demanded caused by a percentage change in the price of the product. The own-price elasticity of demand is often simply called the price elasticity. This is in contrast to measuring the responsiveness of the good's demand to a change in price for some other good (a complement or substitute), which is called the cross-price elasticity of demand.

1 continual estimation process for determining price elasticities. The price elasticity for the  
2 residential customer class has been quantified by Hydro’s models to be approximately -0.3  
3 in the short-term.<sup>i</sup>

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5 In the longer term, electricity consumption can be expected to be more responsive to price  
6 changes as relative energy prices and technologies change. Hydro’s load forecasts predict  
7 the longer term electricity price impacts on electricity consumption in the residential sector  
8 through models which forecast the penetration of electric heating in new customer  
9 additions and forecast conversions of electric heating systems to and from non-electric  
10 heating systems. These models rely on the cross-price<sup>2</sup> effects of furnace oil<sup>3</sup> or the relative  
11 price of electricity to furnace oil to predict the annual market share for electric heat and  
12 resulting impacts on electricity consumption levels. These models are reviewed and  
13 updated on an annual basis. Hydro has not quantified the long term price elasticities of its  
14 load forecast model specification.

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16 Hydro’s load forecast updates include alternate electricity price forecasts reflecting  
17 mitigated rate scenarios. The most recently completed load forecast update by Hydro was  
18 in 2017. In conjunction with the load forecast update in 2017, Hydro prepared load  
19 forecast scenarios based on alternative electricity price projections. The residential retail  
20 electricity price projections ranged from 16 cents per kWh to 25 cents per kWh<sup>4</sup>. The  
21 following table provides summarized results of the forecasted energy sales to be served by  
22 Hydro based on the alternate electricity price projections. The differences in the forecasted  
23 load at the different time intervals are indicative of the price elasticity impacts as  
24 determined by Hydro’s load forecast models.

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<sup>3</sup> Furnace oil is the primary heating fuel substitute for electricity on the Island of Newfoundland and serves as a proxy for other fuels.

<sup>4</sup> The pricing referenced reflects a forecasted pre-tax average residential rate in 2021. The post 2021 period price forecasts reflected rate increases equal to the rate of inflation.

**FORECAST TOTAL NLH ENERGY SALES (Gwh) <sup>1,2</sup>**

<b>Rate Case <sup>3,4</sup></b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
<b>16 cents per kWh</b>	6,967	7,097	7,463	7,677
<b>18 cents per kWh</b>	6,964	6,883	7,201	7,370
<b>20 cents per kWh</b>	6,960	6,664	6,932	7,052
<b>24 cents per kWh</b>	6,950	6,110	6,244	6,240

- Notes:
1. Excludes NLH system losses and station service requirements.
  2. Forecasted sales as per NLH planning load forecast models and assumptions, Spring 2017.
  3. Rates reflect forecast annual average residential price excluding taxes in 2021.
  4. Forecast electricity price increases post 2021 for all rate cases equal the inflation rate.

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<sup>i</sup> A -0.3 price elasticity means that a 1% price increase results in a 0.3% decrease in electricity consumption or conversely, a 1% decrease in price results in a 0.3% increase in electricity consumption.