

Customer Bill Impacts of Generation Sources in Ontario

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Executive Summary

Introduction and Purpose

In the last few years, wind generation has contributed an increasing proportion of the total supply of electricity in Ontario. This increase has occurred in accordance with the policy of the Ontario government to encourage more use of renewable resources for electricity generation, as Ontario moves ahead with its plans to be coal-free by 2014.

The Canadian Wind Energy Association commissioned Power Advisory LLC (Power Advisory) to evaluate and better understand the impact of increased amounts of wind generation on Ontario electricity customers' bills. Power Advisory has assessed the degree to which wind generation has been and/or is a major contributor to higher electricity costs in Ontario.

Conclusions

Our analysis of customer electricity bills was carried out by evaluating the electricity bill of a residential customer of Burlington Hydro with an average consumption of 1,000 kWh per month (the provincial average for household consumption). This analysis showed that electricity supply costs account for about half of the total average monthly bill of \$154.42 for 2012. Delivery costs made up 30% of the total bill, taxes 12%, and the rest was split up between Regulatory Charges and the Debt Retirement Charge. Of the supply costs, about half (49%) is paid to nuclear generators, 18% is for generation from hydroelectric sources, 15% is for gas-fired generation, and 6% is for coal. Wind is 5% of the total supply cost and solar, biomass and other sources make up the remaining 7%.

Power Advisory also analyzed the increase in the total annual cost of electricity for the representative Burlington Hydro customer. From 2009 to 2012, the total cost increased by about \$236 per year (\$19.65 per month), after the impact of the Clean Energy Benefit had been taken into account. About 50% of the total bill increase came from an increase in the electricity supply cost, which came from several sources. These included higher payments to OPG to continue to maintain the coal plants to supply energy when needed and higher payments to other generation resources such as gas-fired plants that came into operation during the period. The total cost of wind generation also increased from 2009 to 2012, due to more wind generation coming into service. In all, the increased cost of wind generation accounted for about 5% of the increase in the total customer bill, or about 10% of the increase in the cost of electricity supply.

1. Introduction and Purpose

Wind generation is contributing an increasing proportion of the total supply of electricity in Ontario. This increase is in accordance with the policy of the Ontario government to encourage more use of renewable resources for electricity generation, replacing the environmentally damaging coal resources that the province relied on in the past.¹

1.1 Purpose

The Canadian Wind Energy Association commissioned Power Advisory LLC (Power Advisory) to evaluate the impact of increased amounts of wind generation on Ontario electricity customers' bills. The purpose of this report is to provide an independent review and assessment of the relative contributions of the various cost components that make up a typical residential customer's electricity bill. Within this analysis, we assess the degree to which wind generation has been and/or is a major contributor to higher electricity costs in Ontario.

1.2 Report Outline

This first chapter represents the introduction and provides a brief description of the report and its main objectives. The second chapter reviews the major components of a typical residential customer's electricity bill and breaks down the supply component by generation source. Further, we analyze the average residential bill increase for a representative customer from 2009 to 2012.

1.3 Summary of Conclusions

Our analysis of bills for a representative residential customer showed that electricity supply costs account for about half of the total cost. The total bill would have increased by about a third from 2009 to 2012, but the impact was mitigated by the provincial Clean Energy Benefit, which reduced the effective increase to about 19%. Of the rise, about half derived from increases in the cost of electricity supply. The next largest contributor to the bill increase, at 28% of the total, came from increased taxes. Higher delivery charges accounted for the rest of the increase, 22% of the total.

The growing number of wind power projects and their rising share of the total meant that the cost of wind power accounted for about 5% of the total growth in the customer bill and about 10% of the overall growth in the commodity cost of electricity.

¹ Ontario Ministry of Energy, Long Term Energy Plan (LTEP), pages 6-7

2. Analysis of Customer Electricity Bills

This section analyzes the total bill for a typical residential electricity customer in Ontario, quantifies the changes in the bill from 2009 to 2012, and identifies their sources.

Over that period, average residential customer bills in Ontario have increased by about 17%, or \$236 per year (\$19.65 per month). Almost half of that increase was due to an increase in the cost of electricity supply, of which wind was a relatively small contributor. Half was due to other factors, including higher delivery charges and taxes.

2.1 Components of the Residential Customer Electricity Bill

Residential consumers receive a bill from their local electricity distribution company which breaks their total costs down into its component items: electricity supply costs, the cost of delivering the electricity to the customer, regulatory charges, the Debt Retirement Charge, and taxes.

The largest component is the cost of the electricity supply, i.e., the cost to generate the electricity. Under the current hybrid electricity system in Ontario, most of the generation is ultimately priced according to contractual or regulatory provisions. All of the electricity is traded in the wholesale market at prices set by market conditions. Then additional payments are made to bring the effective price paid to the producer up to the contractual or regulated level. These additional payments are added to the market-based cost as the Global Adjustment. Retail customers do not pay the Global Adjustment separately; it is included in the commodity cost analyzed below. In 2012, the Global Adjustment was larger than the market-based cost.

The next largest charge on a residential customer's bill is for delivery. This includes the cost of delivering the electricity from its source to the local distribution company through the bulk electricity transmission network plus the cost of the wires and distribution infrastructure needed by the local distribution company, in our example Burlington Hydro, to deliver the power to the customer.

Regulatory charges on the customer bill pay the cost of services provided by the Independent Electricity System Operator to operate the wholesale electricity market, the administrative costs of the Ontario Power Authority, and costs incurred by local distribution companies to connect renewable generation to the grid and to provide retail supply to customers.²

Listed separately on the customer bill is the Debt Retirement Charge (DRC), a fixed amount per unit of electricity consumed. This goes to the Ontario Electricity Financial Corporation (OEFC) to pay down the debt left over from the restructuring of the former Ontario Hydro. Specifically, when Ontario opened its electricity market in May 2002, there were costs incurred by Ontario Hydro that could not be recovered in the competitive market that were assigned to OEFC to be recovered through the DRC.

Finally, the consumer is subject to sales taxes. As of July 1, 2010 electricity bills in Ontario were subject to the Harmonized Sales Tax (HST). Before that date, they paid only the federal Goods and Services Tax. The HST raised the electricity bill by 8%.

² The *Green Energy and Green Economy Act* allowed local distributors that have connected significant amounts of renewable generation to their distribution network to share these costs across the Province since the generation was built to service provincial requirements. Therefore, there is a separate Regulatory Charge to enable the sharing of these costs.

The Ontario government has instituted a temporary measure to help small customers pay for electricity. The Ontario Clean Energy Benefit provides for a 10% reduction in electricity bills for residential consumers, up to a maximum of 300 MWh per month. The Clean Energy Benefit is shown separately as a credit on the customer's bill.

2.2 Customer Bill Determinants

Most of the charges residential customers pay are assessed on a per-unit basis for electricity consumed. Some charges are fixed amounts per month. The distribution charges are specific to each local distribution utility.

For this project, we have chosen to analyze the electricity bill of a residential customer of Burlington Hydro with an average consumption of 1,000 kWh per month,³ which the Ontario Power Authority suggests is about the provincial average for household consumption. In the time frame of this analysis, consumers paid for electricity supply on a tiered price schedule where prices varied based on monthly consumption levels.⁴ Higher prices were assessed for consumption over a fixed amount per month, with the fixed amount higher in the winter than in the summer.⁵ This average household is assumed to have higher consumption in the summer than the winter months, and higher in the winter than the shoulder months.⁶

2.3 Customer Bills

2.3.1 Customer Bill Components

Figure 1 below analyzes the electricity bill components of the average residential customer of Burlington Hydro in 2012. Half of the customer's total cost is electricity supply. Of the other half, delivery costs dominate at 30% of the total bill. The next largest component is taxes, making up 12% of the total bill. The DRC and the Regulatory Charges make up the rest.

Of the supply costs, nearly half (49%) is paid to nuclear generators owned and operated by Ontario Power Generation (OPG) and Bruce Power.⁷ About 18% is for generation from hydroelectric sources, mostly those owned by OPG. Gas-fired generation accounts for 15% of total supply costs and coal for 6%. Wind is 5% of the total supply cost and solar, biomass and other sources make up 7%.

³ Ontario Power Authority, "Save the Watt Wednesday", Press Release, May, 2008.

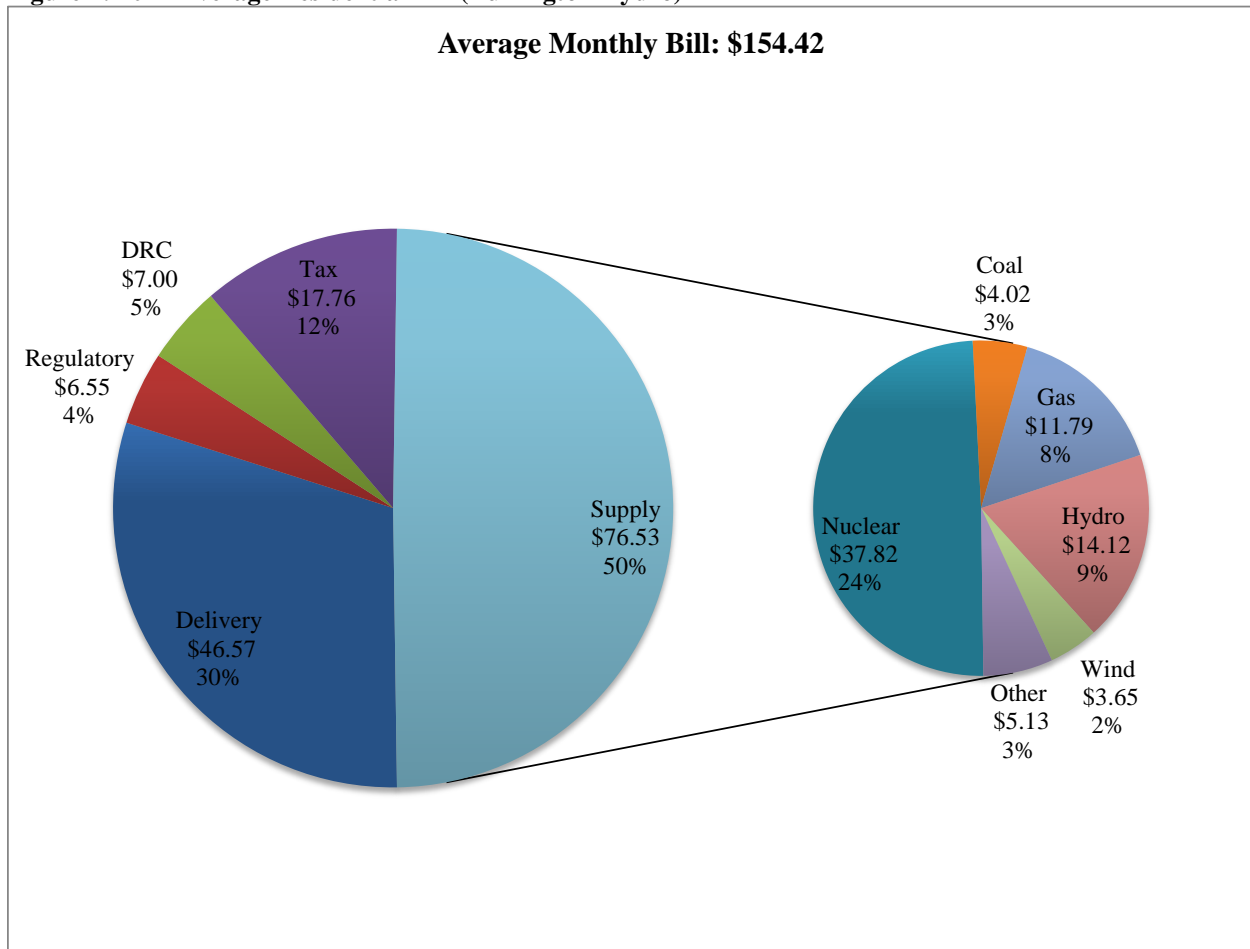
⁴ To simplify the analysis, we have assumed that the consumer continued to pay under the tiered pricing system, rather than under the time of use rates, throughout the period.

⁵ So as not to penalize consumers with electric home heating, while charging higher rates for consumers using air conditioning in the summer.

⁶ The winter months are December through March and the summer months are June through September. The other months are shoulder months.

⁷ The percentage shares referenced in the text are of the total supply costs, whereas those shown in Figure 1 are for the total electricity bill.

Figure 1: 2012 Average Residential Bill (Burlington Hydro)

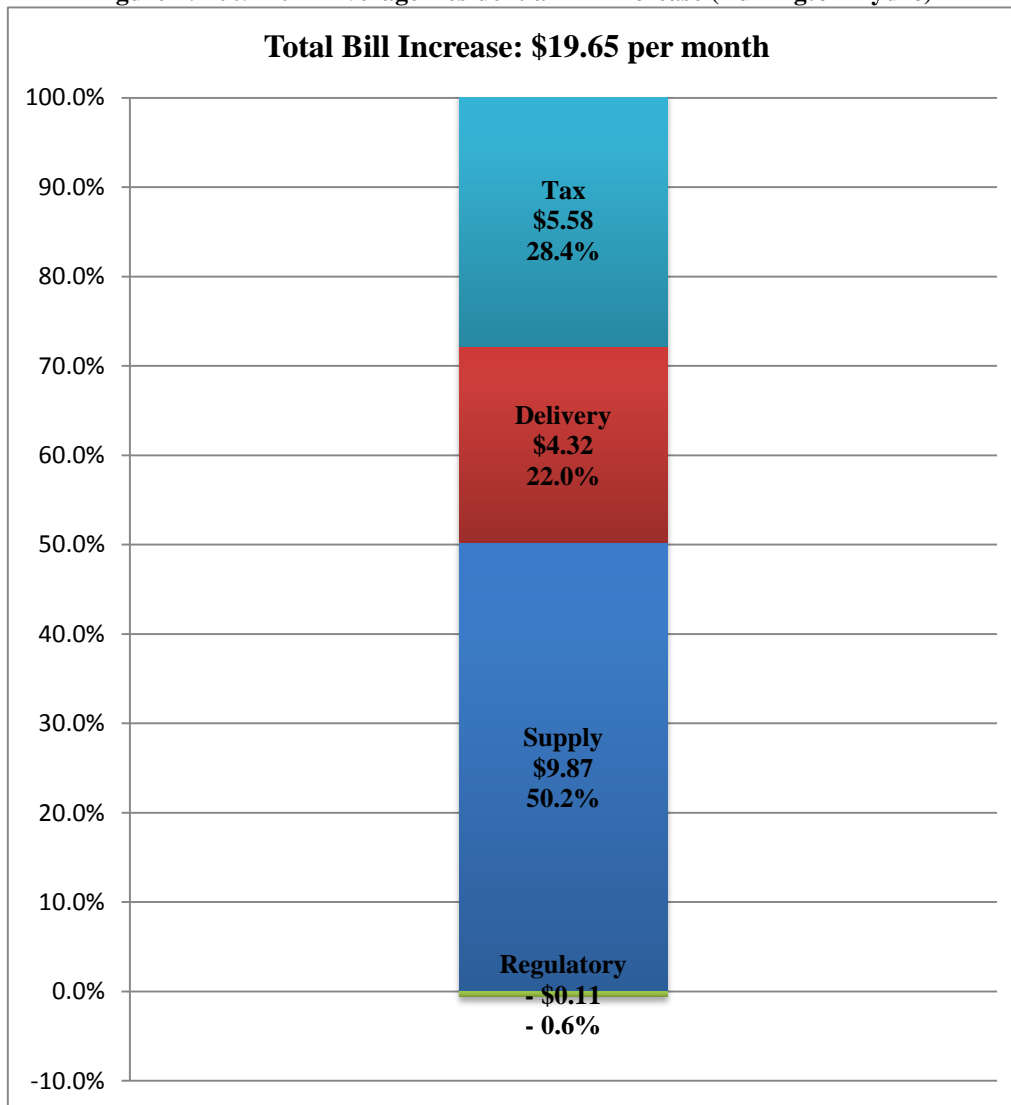


Source: Power Advisory analysis of Burlington Hydro data

2.4 Increases in Customer Bills

Power Advisory analyzed the increase in the annual total cost of electricity for the representative customer of Burlington Hydro. From 2009 to 2012, the total cost increased by about \$420 per year (\$35 per month), or about 30%, before the application of the Clean Energy Benefit which reduced the total cost increase to about \$236 per year (\$19.65 per month), or about 17%. Figure 2 below shows the contribution of the bill components (taking into account the impact of the Clean Energy Benefit) to this cost increase.

Figure 2: 2009-2012 Average Residential Bill Increase (Burlington Hydro)



Source: Power Advisory

Half of the total increase in the bill, about 50%, came from an increase in the electricity supply cost. The next largest contributor to the bill increase, at 28% of the total, came from increased taxes. Taxes on electricity bills increased with the introduction in Ontario of the HST. Previously, electricity bills had not been subject to the provincial sales tax. The switch to the HST therefore raised the total taxes applied to the bills. Higher delivery charges accounted for the rest of the increase, 22% of the total.

The increase in the commodity cost came from several sources. These included higher payments to OPG to continue to maintain the coal plants to supply energy when needed, although they are being phased out, and higher payments to other generation resources such as gas-fired plants which came into operation during the period.

The total cost of wind generation also increased from 2009 to 2012. This was due primarily to more wind generation coming into service. In all, the increased cost of wind generation accounted for about 5% of the increase in the total customer bill, or about 10% of the increase in the cost of electricity supply.