

Policy Changes That Could Lower Electricity Bills for Consumers:

IESO has reported that in 2015 the power system had a total cost of \$20.5 billion. About \$13.1 billion was for generation costs and \$7.4 billion was for transmission, distribution and other costs. In addition, consumers paid about \$2.7 billion dollars in HST.

Residential consumers in urban areas pay about 19.8 cents/kWh on average over the whole month (17.5 for electricity and 2.3 for HST). Residential consumers in low-density rural areas pay about 27.5 cents/kWh on average over the whole month (24.4 for electricity and 3.2 for HST). Average residential customers use about 750 kWh per month so urban consumers pay about \$150/month, low-density rural consumers pay about \$200/month.

Medium sized (Class B) and very large (Class A) businesses can pay additional charges for peak demand capacity and poor power factor. Class A customers can join the Industrial Conservation Incentive (ICI) program and earn discounts by lowering their demand on the highest 5 demand days. On average in 2015 Class A ICI customers achieved a reduction of about 4.1 cents/kWh over the whole year (3.6 for electricity and 0.5 for HST).

The Ontario government plans to remove the PST portion of the HST beginning in January 2017. The PST portion is 8%, the GST portion is 5%. Currently (Nov 2016) the combined PST+GST or HST rate is 13%.

Electricity rates are set in order to recover total costs from the total demand in the system. Different rates apply to different consumer classes. In general regulators try not to transfer costs unfairly between rate classes. North American rules for trading electricity between power systems can affect rates in Ontario. Trading of interruptible electricity is done in the wholesale market at the marginal production cost not the full production cost. Ontario consumers must pay for the difference through what is called the global adjustment in retail rates.

Electricity is currently about 6 times more expensive than the cost of natural gas on an energy content basis in urban areas. Low-density rural areas do not have easy access to natural gas and typically use other carbon based fuels such as propane. Achieving low emissions across the entire economy will require some migration from higher emission natural gas to lower emission electricity. Unfortunately, electricity will not displace natural gas at current retail prices for electricity and natural gas. The difference in price can be reduced by either lowering the price of electricity or by increasing the price of natural gas or a combination of the two.

There are four ways to reduce the price of electricity for Ontario consumers:

- A. Reduce operating costs or increase revenue from the sale of surplus electricity.
- B. Move existing costs not directly associated with producing electricity into tax-supported accounts.
- C. Transfer market risks from electricity consumers to investors.
- D. Remove government sales and water use taxes on electricity.

There is one way to increase the price of natural gas without imposing costs on the economy:

- E. Introduce a tax or price on carbon dioxide emissions but rebate the revenue back to consumers.

A - Options that reduce electricity bills by reducing costs or increasing revenue:

Actions to Reduce Rates	Approx. Savings	Remarks	Background Notes
A1. Stop adding planned (directed) capacity to an over supplied system.	100 M\$/yr in 2017 up to 500 M\$/yr in 2025	Excess capacity drives rates up. The savings accumulate yearly until 2025 when planned capacity increases stop. Estimate is based on 2,500 MW of excess directed capacity by 2025.	The 2008-09 recession, rising electricity rates and conservation programs have permanently changed the demand growth rate. This has not been adequately reflected in planned capacity additions. The recent LRP-II deferral by the government only impacts about 1/3 of the excess planned (directed) capacity.
A2. Cancel committed capacity contracts that have not been built that have cancellation benefits or that are not in compliance with contractual in-service requirements.	200 M\$/yr	Excess capacity drives rates up. Estimate assumes about 1,000 MW of higher cost committed capacity can be cancelled.	Currently we have 8% excess overall capacity. However, what nameplate capacity is cancelled will affect carbon dioxide emissions differently because each technology has a different capacity factor. Nuclear operates at about 85% capacity factor and displaces the most carbon dioxide per kW installed, hydroelectric operates at about 50%, wind operates at about 30% and solar operates at about 15% and displaces the least carbon dioxide per installed kW.
A3. Enter into firm delivery contracts for surplus clean energy supply to adjoining power grids instead of using the wholesale (spot) market	0 up to 350 M\$/yr	Upper estimate is based on 50% of the 17.3 TWh of surplus clean supply can be sold on a firm basis at \$40/MWh more than the wholesale price for	Interruptible power is priced at the marginal cost of production (essentially the fuel cost), uninterruptible power is charged at the full cost of production (includes capacity and labour costs) by agreement in North American. Providing firm clean electricity to adjoining jurisdictions means some of Ontario's

for interruptible electricity.		interruptible power.	domestic demand will have to be supplied by natural gas generation instead of clean electricity.
A4. Allow Ontario consumers to buy interruptible surplus clean electricity at 1 cent/kWh like adjoining power grids do on the wholesale (spot) market.	0 up to 200 M\$/y	Reduces consumers' fossil fuel costs (not their electrical costs). Also reduces CO2 emissions by up to 3 million tonnes/yr. Estimate based on a 1.2 cent/kWh price differential between surplus electricity and natural gas at the home.	Choosing option A4 exclusively over option A3 indicates that reducing Ontario's CO2 emissions is a higher priority than reducing electricity rates. Note that item A3 and A4 are mutually exclusive because they use the same energy.
A5. Allow Ontario consumers to buy interruptible surplus natural gas-fired electricity at its marginal fuel cost (approx. 3 cents/kWh).	0 M\$/yr up to 300 M\$/yr	Would reduce self-generation by consumers with less efficient fossil fueled equipment. Savings depend on amount of self-generation present in Ontario.	Option A5 should only be available to consumers who can demonstrate that they will use the grid supplied gas-fired electricity to achieve lower CO2 emissions compared to their current production practices.
A6. Do not mandate technology choices on the power system. Allow the cap-and-trade program to determine technology choices.	\$200/tonne CO2 savings (annual savings are included in other items in this table)	Will lower future costs of reducing carbon emissions from the present \$250/tonne to \$50/tonne by 2025. The \$250/tonne cost is from the Ontario Auditor General 2015 report on the cost of reducing emissions in the electricity sector using renewable energy generating capacity.	Trading allowances in a cap-and-trade program effectively allows lower cost carbon reduction technologies to satisfy the emission reduction targets regardless of the sector in which they are installed.

Note: Items A4 and A5 would require a special electricity price plan and smart controllers to correctly enable the energy flow and billing. The special plan should be voluntary for those consumers who have or will purchase the required automation and other equipment to use surplus electricity effectively. The special plan should remain in effect until the equipment capital costs are recovered – 10 years is suggested.

B - Options that reduce electricity bills by moving costs to more appropriate accounts:

Actions to Reduce Rates	Approx. Savings	Remarks	Background Notes
B1. Adopt the USA approach to subsidizing higher cost clean energy technologies (eg: use tax rebates not global adjustment to pay for extra costs for renewables).	1,700 M\$/yr	Estimate is based on 14% additional total costs for renewables in 2017 compared to conventional generation.	Using different rules than our NAFTA trade partner USA to subsidize renewable energy development increases electricity costs in Ontario and makes Ontario businesses less competitive. Move those excess costs from the electricity account to a tax supported account.
B2. Write off poor investment decisions in a tax account rather than the electricity account.	100 M\$/yr	Estimate is based on non-productive costs like gas plant relocation, etc. that are not covered in the other items in this list.	Consumers should not be expected to pay for planning errors. In private power systems investors pay for those errors. In a public power system, the taxpayer should pay for those errors so that electricity rates remain competitive for businesses that compete in the NAFTA trading zone.
B3. Write off surplus capacity costs in a tax supported account rather than the electricity account.	1,000 M\$/yr (850 M\$/yr if option B1 is adopted)	Current system has 8% excess installed generating capacity at peak demand. Estimate is based on generation costs only.	Consumers should not be expected to pay for planning errors. In private power systems investors pay for those errors. In a public power system, the taxpayer should pay for those errors so that electricity rates remain competitive for businesses that compete in the NAFTA trading zone.
B4. Remove stranded debt charge from larger electricity consumers.	500 M\$/yr	Estimate is based on 70 TWh/yr that is subject to the stranded debt charge of 0.7 cents/kWh.	Consumers should not be expected to pay for planning errors. In private power systems investors pay for those errors. In a public power system, the taxpayer should pay for those errors so that electricity rates remain competitive for businesses that compete in the NAFTA trading zone.
B5. Transfer the conservation costs to a tax supported account rather than the electricity account.	400 M\$/yr	Estimate based on IESO annual budget for conservation.	Conservation costs are not part of electricity production costs and with surplus capacity this charge in not helping to reduce electricity costs. In fact, conservation costs in the presence of excess capacity actually raises electricity rates.

Note: Ensuring that Ontario businesses are competitive in a free trade zone like NAFTA, CETA or TTP is important so that Ontario does not lose the sales, jobs, employment income and government income tax revenue.

C - Options that reduce electricity bills by transferring risks from consumers to investors:

Actions to Reduce Rates	Approx. Savings	Remarks	Background Notes
C1. Pay full production costs only for delivered energy to Ontario consumers.	0 to 850 M\$/yr	The maximum savings are estimated assuming the excess costs due to take-or-pay provisions in the contracts is 50% of the total production costs on 17.3 TWh of surplus energy.	Stop signing take-or-pay contracts at full production costs. Build anticipated curtailment into the contract price so that investors assume the risk of future market demand changes or technology changes. Options C1 and B3 are mutually exclusive. Only the savings for one of the options applies even if both options are adopted.

D - Options that reduce electricity bills by eliminating government sales taxes and water use taxes on electrical energy:

Actions to Reduce Rates	Approx. Benefit	Remarks	Background Notes
D1. Eliminate hydroelectric production tax for water use.	400 M\$/yr	Estimate based on hydroelectric production of 36.3 TWh and average tax of 1.1 cents/kWh.	Lower tax revenue will impact negatively on Ontario deficits and debt and funding for municipalities near hydroelectric facilities.
D2. Eliminate PST on electricity consumption.	1,600 M\$/yr	Affects provincial tax revenues.	Ontario has already announced the elimination of the PST on Jan 1, 2017. This will impact negatively on Ontario's deficit and debt.
D3. Eliminate GST on electricity consumption.	1,000 M\$/yr	Affects federal tax revenues.	This will impact negatively on federal deficit and debt.

E - Options that increase the price of natural gas (and gas-fired electricity) to effect reductions in carbon dioxide emissions:

Actions to Reduce Rates	Approx. Savings	Remarks	Background Notes
E1. Introduce a price on carbon dioxide emissions but rebate the cap-and-trade program revenue on a per capita basis to those families with less than \$100,000/yr family income	-100 M\$/yr in 2017 to -350 M\$/yr in 2025	Higher gas costs will raise the price of electricity for the 10% of electricity produced by natural gas plants. The estimate assumes a carbon price of \$15/tonne in 2017 to \$50/tonne by 2025. The estimated \$2 billion/yr in cap-and-trade revenues in the early years will be cost neutral to the economy if the funds are rebated to consumers.	Consumers can choose to spend the money on emission reduction technologies to reduce their future carbon emission costs or on general consumer expenditures. Both will result in additional economic activity that will offset reduced economic activity and income tax revenue losses due to the carbon price. Mid and low income consumers are likely to spend most of the refund amounts on consumption rather than saving it. Consequently, refunding the cap-and-trade revenue to consumers is likely to produce similar economic benefits as compared to the government purchasing carbon reduction technologies. Refunding the cap-and-trade revenue will likely give consumers more satisfaction because they can allocate the funds to the highest family needs. Emission reductions could be greater if the government spends the cap-and-trade revenues on the most cost effective carbon reduction technologies.

Electricity Price Impact of CCAP plan to deploy electrical space heating.

The government's Climate Change Action Plan (CCAP) proposes to deploy electric heat pumps for winter space heating. Heat pumps are more efficient than electric resistance heaters but at a higher capital cost. However, installing low-emission electrical capacity to meet the additional demand of space heating in the winter will result in a significant upward pressure on electricity rates. The reason is that electrical capacity dedicated for space heating will operate at approximately 30 to 35% capacity factor rather than the present 65 to 70% capacity factor for the grid overall. During the spring, summer and fall that dedicated capacity will be idle unless we find other uses for the surplus electricity. At half the operating capacity factor the levelized cost of that dedicated capacity will be double the current production costs. That will drive electricity rates higher. Carbon prices will have to be very high, in excess of \$600/tonne at current gas commodity prices to make natural gas retail prices comparable to electricity retail prices in order to displace natural gas in the industrial sector. We can price surplus low emission electricity at its marginal cost of production (approximately 1 cents/kWh) to encourage displacement of natural gas in various industrial sectors. However, this means most of the production cost of that surplus electricity must still be borne by the electricity consumer. A comprehensive cost study should be

undertaken before deploying dedicated electrical capacity to meet the needs of space heating loads. That study should include an hour-by-hour supply and demand simulation analysis of the power system to correctly quantify the amount of surplus low emission electricity that will be created.

Summary

In 2015 the cost of operating the power system was about \$20.5 billion and consumers paid an additional \$2.7 billion in HST. Policy changes can reduce the price of electricity in Ontario to levels that are similar to competing jurisdictions in the NAFTA trading zone. Adjusting for mutually exclusive items the financial implications of adopting all of the proposed policy changes are:

Consumer electricity bill reductions = \$6.8 to 7.6 billion/yr

Impact on provincial government tax revenue = -\$2 billion/yr

Impact on federal government tax revenue = -\$1 billion/yr

Impact on provincial government revenue due to write-offs and transfers = -\$3.6 billion/yr

Total impact on provincial government revenues = -\$5.6 billion/yr

Total impact on federal government revenues = -\$1 billion/yr

Cap-and-trade discretionary new funding = \$2 billion/yr (based on 2017 carbon price and emissions)