

Tax Shift



Eliminating Subsidies and
Moving to Full Cost
Electricity Pricing



Ontario Clean Air Alliance Research Inc.

MARCH 3, 2008

Forewards

Ontario is at a crossroads. We have a choice of taking the nostalgic path (propped up by cheap energy and a not-so-cheap dollar) to economic oblivion, leading to the rust-belt status of our Great Lake neighbour Ohio. Or we can break free from our Stygian dependency on cheap taxpayer-subsidized energy that suffocates the kind of innovation and productivity achieved by states like Massachusetts.

Currently, Ontario subsidizes electricity to the rate of \$7.9 billion annually, or about 10 per cent of the total provincial government expenditures of \$88 billion in the most recent fiscal year. And this may be a conservative estimate as it does not count the full cost of the global warming emissions from Ontario's coal-fired power generators (which emitted 24,650,820 tonnes of greenhouse gases in 2006, which at \$50/tonne damaged the atmosphere to the tune of \$1,232,541,000).

In typical Jack Gibbons' style, *Tax Shift: Eliminating Subsidies and Moving to Full Cost Electricity Pricing* meticulously lays out the basis for taking the second path, with a straightforward tax shift that would kick out the subsidized cheap energy crutch that the Ontario economy has been using to hobble along, and put that money to good use by putting it in Ontarians' pockets and making low-cost financing available for a more efficient economy.

Charging customers the full cost for electricity will create ferocious resistance, but in the face of globalization, nothing less than the province's future competitiveness hangs in the balance. Cheap energy and low productivity make a vicious circle, with one justifying the other. The steep appreciation of the Canadian dollar on the back of a sustained commodity boom makes it untenable to beat our low-cost Asian competitors in the market for mass production, low-margin manufactured goods and other low-value-added products that we have tried to prop up with subsidized energy. Letting go of the past is difficult, and will require bridge-building so that a just transition can be made, but if we don't get our energy prices right, our economy risks being stranded on a forlorn rusted-out island.

So this report is not for the politically faint of heart, or for those who prefer the comfort of taking decisions that are popular in the short-term. Instead it is an appeal to cool rationality and leadership that is concerned with where Ontario will be 20 years from now.

Pierre Elliott Trudeau famously said, "The essential ingredient of politics is timing."

Now is the time for Ontario's government to decide if it wants to lead change or follow change. The stakes couldn't be higher. For those with the courage to take Gibbons up on this report's challenge, there is an opportunity to help Ontario's economy let go of the past and vault forward on our strengths of advanced manufacturing, innovation, and unparalleled human capital.

Toby Heaps

*President and Editor
Corporate Knights*

The Canadian Environmental Law Association (CELA) has long advocated full cost approaches to energy and water utilities as part of an environmentally sustainable future. As a society we cannot continue to maintain provision of utility services with environmental costs that are not reflected in the rates and prices paid by consumers. We have also argued that more appropriate prices will provide additional incentives for conservation and reduce the drain on our environmental resources that those services demand. Other benefits include a reduced demand for expanded supply of utility services; reduced demand for expanded networks of pipes and transmission lines; and more appropriate use of land across the province.

However, as a legal aid clinic, we are also highly concerned about ensuring that low income con-

. . . continued

sumers can fairly participate in and benefit from conservation efforts for energy and water. In that respect, CELA was a founding member of the Low Income Energy Network which advocates for a series of policy initiatives and decisions that ensure both equitable supply of those services and participation in conservation efforts. For example, as part of LIEN we have argued that in addition to emergency support for energy supply in times of crisis, that low income households also have access to rate assistance programs, conservation education programs, and importantly, the ability to participate in the conservation efforts and programs that can help lower demand for the utility services in the household. For more information, LIEN maintains a website at www.lowincomeenergynetwork.ca.

CELA has also been concerned for many years about the issues raised by the variety of inequitable subsidies such as those outlined in this report, which have skewed the electricity supply system in Ontario toward the most unsustainable forms of energy. For example, CELA agrees that the Nuclear Liability Act limitation on liability should be ended. Furthermore, CELA has expressed grave concern about the unsustainable legacy of toxic radioactive waste and other consequences of the nuclear fuel cycle which will, as the Nuclear Waste Management Organization has found, remain deadly for hundreds of thousands of years.

Moving the pricing of energy supplies to true full cost, including these examples of unsustainable environmental and other subsidies is imperative for a robust energy future which will last beyond our children and grandchildren. However, in doing so, it is essential to ensure participation by low income and vulnerable consumers in the benefits of that energy vision. This report provides for both a more sustainable economic and environmental approach to pricing electricity supplies, while also ensuring that low income consumers, among others, will receive the benefits of lower utility bills.

Theresa McClenaghan

Executive Director and Counsel for the Canadian Environmental Law Association and steering committee member of the Low Income Energy Network

This report sets out how electricity is priced in Ontario. Contrast this with how most other things are priced. Apart from monopolies or fire sales most things are priced using a simple idea: replacement cost pricing. Groceries prices reflect what food will cost in the future, so grocers can replace their stock and have goods to sell next week. They look ahead; trying to be sustainable. Farmers aim to price at replacement costs so they will be in business next year. What needs to be replaced? Seed, equipment, water and soil nutrients. If prices allow all things used to be replaced, farming is sustainable.

So too with electricity; if it is priced so the 'ingredients' used to make it can be replaced, then electricity and the air and water that is incidentally used, and living in Ontario can be made more sustainable. If people ignore replacement costs, then they should at least know what they are giving up; that won't be replaced, that won't be sustained. It's not a 'total cure', but with wiser use and replacement prices for electricity, we could keep some of those things. The OCAA and Jack Gibbons are doing a service by pointing this out.

Ted Cowan

Research Staff

Ontario Federation of Agriculture

Tax Shift: Eliminating Subsidies and Moving to Full Cost Electricity Pricing

This report was written by Jack Gibbons with research assistance by Jessica Fracassi. Editing and design by Green Living Communications.

We would like to thank John Grant, Judith Maxwell, James Milway, David Poch, and Mark Winfield for reviewing a draft of this report and providing helpful comments. However, the reviewers bear no responsibility for any remaining errors or the report's conclusions.

Thanks to the EJLB Foundation, the Helen McCrea Peacock Foundation at the Toronto Community Foundation, the Laidlaw Foundation and the Taylor Irwin Family Fund at the Toronto Community Foundation for their financial support.

This report was produced by the Ontario Clean Air Alliance Research Inc. Suite 402, 625 Church Street, Toronto M4Y 2G1

Telephone: 416-926-1907 ext. 245

An electronic copy of this report can be downloaded from the Ontario Clean Air Alliance's web site: www.cleanairalliance.org

Introduction

Ontario's electricity service needs (e.g., lighting, air conditioning, refrigeration) have traditionally been met by large centralized electricity generation stations (e.g., coal, nuclear) and high-voltage transmission lines that bring grid-supplied electricity to residential, commercial and industrial consumers.

In the 21st century, however, our electricity service needs can increasingly be met by energy conservation and efficiency measures combined with small-scale distributed generation options (e.g., hybrid solar/electric water heaters, solar photo-voltaic, geothermal, biomass and natural gas-fired combined heat and power plants) located in or near the electricity consumers' homes, offices and/or factories. These smaller-scale solutions can result in lower long-term costs while reducing polluting emissions, including greenhouse gases, associated with electricity generation.

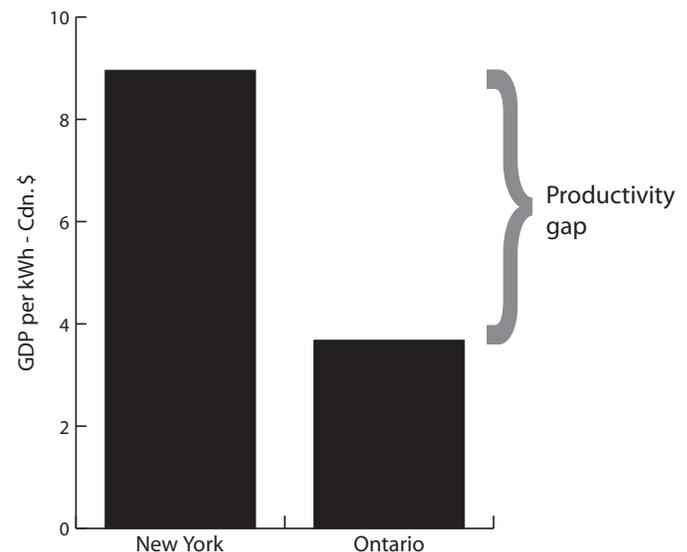
But in order to ensure that Ontario's electricity service needs are met at the lowest possible total cost, energy conservation and small-scale distributed generation options must be able to compete with large scale-centralized generation and transmission options on a level playing field. Over the past 100 years, however, Ontario has adopted policies that provide huge hidden subsidies for coal and nuclear generation, which also encourage high levels of consumption of grid-supplied electricity. These hidden subsidies have two perverse impacts:

- First, by discouraging investment in many low-cost options to meet our electricity needs (e.g., energy conservation and small-scale distributed generation), these subsidies are lowering our energy productivity (GDP per kWh of electricity consumed), lowering our standard of living (by reducing economic competitiveness), and increasing our emissions of toxic air pollutants and greenhouse gases. As Premier Dalton McGuinty himself noted in a letter to the Priorities for Ontario Coalition in September 2007, "[we] know that artificially reducing electricity prices is the single worst policy you could advocate if you want to see industry and consumers reduce their energy use."¹

- Second, since 67% of Ontario's electricity is consumed by commercial, institutional and industrial consumers, the prime beneficiaries of these subsidies are not Ontario's residential consumers, whose taxes help to pay for them.²

Along with exacerbating the significant health and climate impacts of electricity generation, encouraging excessive electricity consumption also undermines the incentive for industries and businesses to use electricity efficiently or to "engineer out" excessive energy use in production processes and materials. The result is that it takes more than twice as much electricity to produce a dollar's worth of GDP in Ontario as it takes our leading competitors and neighbours, such as New York State. Figure 1 demonstrates the large productivity gap created, in part, by artificially low electricity prices in Ontario.

Figure 1: Electricity productivity comparison for New York State and Ontario - 2006



In this report we will:

- describe the policies that subsidize coal and nuclear generation and promote excessive consumption of grid-supplied electricity;
- quantify, where possible, the magnitude of the subsidies for grid-supplied electricity;
- analyze the impact of these subsidies and policies on Ontario's electricity consumption, electricity productivity, standard of living and air pollutant emissions;

- describe a pragmatic strategy to eliminate these subsidies by, in essence, “recycling” or shifting the monies currently spent on subsidies in a way that creates an incentive to reduce electricity consumption.
- describe how full cost pricing can actually lead to a net financial benefit for residential customers
- describe an adaptation strategy for businesses that will ensure that they remain competitive.

This report identifies ten major subsidies that artificially reduce the cost of electricity in Ontario. Table 1 below provides a list of these subsidies and estimates of their values where possible.

Table 1: Subsidies for Grid-Supplied Electricity

Subsidy	Value
Subsidy #1 - Below-Market Water Royalty Rates	\$1.9 billion
Subsidy #2 - OPG’s Below-Market Return on Equity	\$0.851 billion
Subsidy #3 - Corporate Income Tax Revenue Subsidy for Nuclear Debt	\$0.949 billion
Subsidy #4 - Sales Tax Exemption	\$1.085 billion
Subsidy #5 - Northern Pulp and Paper Electricity Transition Program	\$0.047 billion
Subsidy #6 - Public Health and Environmental Subsidy for Coal-Fired Generation	\$3.1 billion
Subsidy #7 - Subsidies for Nuclear Reactor Decommissioning and Long-Term Storage of Radioactive Nuclear Wastes	Unknown
Subsidy #8: - Nuclear Liability Act	Unknown
Subsidy #9: Average Cost Pricing	Unknown
Subsidy #10: Bulk Metering	Unknown
TOTAL	\$7.932 billion

Subsidies for Grid-Supplied Electricity

Subsidy #1: Below-Market Water Royalty Rates

Ontario Power Generation (OPG), Brookfield Power and other hydro-electric companies use the province's water resources to produce hydro-electricity. These water royalties are directly analogous to royalties paid by companies for use of other Crown energy assets, such as oil and gas reserves. While historically, the government may have chosen to keep royalty rates low as a way of promoting industrialization, this strategy is not in keeping with current efforts to promote efficiency and to reduce the environmental and health costs of unnecessary electricity consumption. A low royalty regime also prevents the public owners of the resource (in this case, water) from accruing the full financial and societal benefits of these increasingly valuable assets.

The market value of Ontario's water resources equals the difference between the cost of producing electricity from our hydro-electric generating stations and the cost of producing electricity from Ontario's lowest-cost source of new electricity supply.³

The cost of producing electricity from a new power plant is at least 7 cents per kWh.⁴ However, the average cost of producing electricity from our heritage hydro-electric generating stations is approximately 0.69 cents per kWh. Therefore, in 2006, the market value of the province's water resources that were used to produce 35 billion kWh of grid-supplied hydro-electricity was approximately \$2.2 billion [35 billion kWh x (7.0 cents per kWh – 0.69 cents per kWh)].⁵ However, in 2006 the Government of Ontario only charged hydro-electric generating companies approximately \$333 million to use public water resources to produce electricity.⁶ Therefore our actual water royalty rates were approximately \$1.9 billion below their market value.

The price of grid-supplied electricity is a weighted average of our cost of grid-supplied hydro-electric-

ity, nuclear electricity, coal electricity and natural gas-fired electricity. As a result, the Government of Ontario's \$1.9 billion per year subsidy for hydro-electric generation subsidizes the price of grid-supplied electricity by \$1.9 billion per year. In other words, by keeping hydro-electric production costs artificially low with a low water royalty rate, the government also artificially decreases the overall average price for electricity.

Subsidy #2: OPG's Below-Market Return on Equity

In 2006, OPG's after-tax return on equity was 8.5%.⁷ On the other hand, according to CIBC World Markets, the after-tax required return on equity for Bruce Power, Canada's only investor-owned nuclear power company, is 13.7 to 18.0%.⁸ Moreover, in 2006, Hydro Quebec's return on equity was 20.7%.⁹

Assuming a marginal corporate income tax rate of 36%, OPG's pre-tax return on equity would have to be raised by 14.8 percentage points to provide it with an after-tax return on equity of 18.0%. This means that in 2006, OPG's actual return on equity was approximately \$851 million below its risk-adjusted market cost of equity capital.¹⁰

OPG's failure to earn a commercial rate of return on equity for its shareholders (the people of Ontario through the Government of Ontario) provided an \$851 million subsidy for grid-supplied electricity in 2006. Again, by foregoing a more competitive return on equity, the provincial government artificially depresses electricity rates.

Subsidy #3: Corporate Income Tax Revenues Used to Subsidize \$19.3 Billion Nuclear Debt

Instead of being used to pay for public services (e.g., hospitals, schools and universities) all of the corporate income tax revenues from OPG, Hydro One and Ontario's municipal electric utilities are used to subsidize the interest expenses of the former Ontario Hydro's \$19.3 billion stranded nuclear debt. Specifically, in 2006, \$949 million of corporate income tax revenues were used to subsidize the \$1.8 billion annual interest costs of the \$19.3

billion nuclear debt.¹¹ Without these subsidies, the true cost of carrying this debt would have to be reflected in electricity rates (either through the rate itself or the per kWh debt retirement charge).

Subsidy #4: Provincial Sales Tax Exemption

Electricity sales are exempt from Ontario's 8% provincial sales tax. In 2006 the total value of our grid-supplied electricity sales equaled \$13.566 billion.¹² Therefore the magnitude of the PST exemption subsidy for grid-supplied electricity was \$1.085 billion ($\$13.566 \text{ billion} \times .08$) in 2006.

Subsidy #5: Northern Pulp and Paper Electricity Transition Program

The Government of Ontario has established the Northern Pulp and Paper Electricity Transition Program to reduce the cost of electricity for northern Ontario pulp and paper mills by approximately 15% between October 1, 2006 and September 30, 2009. The annual cost of this program to the Ontario taxpayer is approximately \$46.7 million.¹³

Subsidy #6: Public Health and Environmental Subsidy for Coal-Fired Electricity Generation

According to a report prepared for the Government of Ontario, each kWh of coal-fired electricity generation creates 12.7 cents in health and environmental costs (e.g., costs to our health care system, reduced worker productivity, crop damage).¹⁴

In 2006, OPG produced 24.726 billion kWh of coal-fired electricity generation.¹⁵ Therefore the public health and environmental costs of OPG's coal-fired generation in 2006 was at least \$3.1 billion. As a consequence, the Government of Ontario's failure to require OPG to compensate the people of Ontario for the health and environmental costs of its coal-fired power plants provided a \$3.1 billion subsidy for grid-supplied electricity in 2006.

Subsidy #7: Subsidies for Nuclear Reactor Decommissioning and Long-Term Storage of Radioactive Nuclear Wastes

According to OPG, Ontario's liabilities with respect to nuclear reactor decommissioning and the storage of its radioactive nuclear wastes during the next 151 years is approximately \$24 billion.

"Nuclear and fossil-fuel plant closures are projected to occur over the next six to 33 years. The Reference Plan includes cash flow estimates to 2073 for decommissioning nuclear stations and to approximately 2159 for nuclear used fuel management. The undiscounted amount of the estimated cash flows associated with the liabilities expected to be incurred up to and upon closure of generating stations is approximately \$24 billion."¹⁶

It is important to note that OPG is also responsible for decommissioning Bruce Power's nuclear reactors and the long-term storage of its nuclear wastes.¹⁷

However, the Ontario Nuclear Funds Agreement caps OPG's total financial exposure with respect to the long-term storage of highly radioactive nuclear wastes at \$6.0 billion. Liabilities in excess of \$6.0 billion are the responsibility of the Province of Ontario.¹⁸

In addition, in return for an annual fee of \$8 million, the Government of Ontario has guaranteed OPG's liabilities for up to \$1.51 billion with respect to nuclear reactor decommissioning and the long-term storage of low and intermediate level radioactive nuclear waste. According to OPG, "This is a guarantee that there will be sufficient funds available to discharge the current nuclear decommissioning and waste management liabilities. The provincial guarantee will supplement the Used Fuel Fund and the Decommissioning Fund until they have accumulated sufficient funds to cover the accumulated liabilities for nuclear decommissioning and waste management. The guarantee, taken together with the Used Fuel Fund and Decommissioning Fund, was in satisfaction of OPG's nuclear licensing requirements with the CNSC (Canadian Nuclear Safety Commission)."¹⁹

By signing the Ontario Nuclear Funds Agreement, the Government of Ontario has incurred potentially huge liabilities with respect to OPG's nuclear

decommissioning and waste storage costs. However, we have not attempted to calculate the dollar value of these taxpayer subsidies due to the large unknowns around actual decommissioning and waste-disposal costs.

Subsidy #8: Nuclear Liability Act

The Government of Canada's *Nuclear Liability Act* limits the civil liability of OPG and/or Bruce Power in the event of a nuclear accident to \$75 million.

We have not attempted to calculate the dollar value of this subsidy from Canadian taxpayers to OPG and Bruce Power. However, the probability that liabilities in the event of a serious nuclear accident would range beyond \$75 million is extremely high. In essence, the federal government is acting as an insurer of last resort without the high fee structure normally associated with such a role.

Subsidy #9: Average Cost Pricing

The costs of supplying electricity during the peak demand hours on hot summer days is dramatically higher than the average annual cost of providing electricity for a number of reasons.

- First, electricity transmission, distribution and transformer losses at the time of peak demand are much higher than the average annual losses. On an annual basis approximately 7.5% of Ontario's electricity output is lost before it reaches electricity consumers.²⁰ However, during a year's top 88 peak demand hours, at least 16.1% of our electricity output is lost by the electricity grid system before it reaches the consumers.²¹
- Second, the cost per kWh of meeting peak day demands is very high since the electricity generation, transmission and distribution capacity that is built to meet peak day demands is idle for 99% of the year or more.
- Third, the cost of importing coal-fired electricity from the U.S. to meet our peak day demands can be very high.

The costs of peak day electricity, however, are not fully reflected in the price of peak day electric-

ity since some or all of the above noted costs are recovered from customers on the basis of their average monthly, semi-annual or annual electricity consumption, not their peak hour consumption.²² Therefore, there is little incentive among electricity consumers to reduce demand in peak periods, which leads to unnecessarily high peak demand levels that must be met with a high-cost dedicated infrastructure.

According to the Ontario Power Authority, the actual cost of meeting our electricity demand during the top 88 demand hours of the year (top 1%) with new electricity infrastructure is \$1.64 per kWh²³ or approximately 16 times the residential price of electricity.

Subsidy #10: Bulk Metering

Approximately 1,020,000 apartment units and approximately 400,000 condominium units in Ontario are not individually metered. As a result, the incremental direct cost of consuming an extra kWh of electricity for approximately 1.4 million Ontario homes is virtually zero for occupants or unit owners. In other words, unit owners or occupants can increase their electricity usage at no immediate cost to themselves.

It has been estimated that individual metering would reduce the demand for electricity in currently bulk metered apartment and condominium units by 25 to 33% or more.²⁴

Total Magnitude of Subsidies for Grid-Supplied Electricity

Table 2 shows the dollar value of the six Ontario's subsidies for grid supplied electricity for which it is possible to develop accurate estimates. The total value of these subsidies is \$7.9 billion. If these subsidies were to be immediately eliminated, electricity rates would rise by approximately 60%.²⁵

Table 2: Summary of Six Subsidies for Grid-Supplied Electricity

Subsidy	Description	Value
Subsidy #1	Below-Market Water Royalty Rates	\$1.9 billion
Subsidy #2	OPG's Below-Market Return on Equity	\$0.851 billion
Subsidy #3	Corporate Income Tax Revenue Subsidy for Nuclear Debt	\$0.949 billion
Subsidy #4	Sales Tax Exemption	\$1.085 billion
Subsidy #5	Northern Pulp and Paper Electricity Transition Program	\$0.047 billion
Subsidy #6	Public Health and Environmental Subsidy for Coal-Fired Generation	\$3.1 billion
TOTAL		\$7.932 billion

Adverse Impacts of Subsidies for Grid-Supplied Electricity

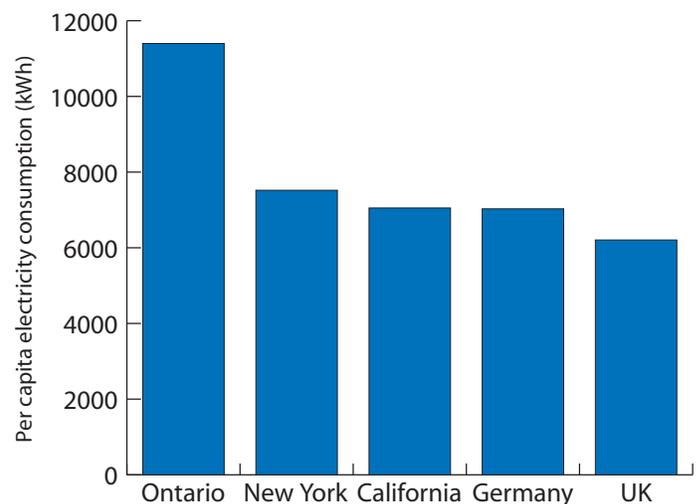
Ontario's subsidies for grid-supplied electricity are:

- Promoting excessive electricity consumption;
- Lowering our electricity productivity;
- Lowering our standard of living; and
- Promoting excessive air pollution.

Promoting Excessive Electricity Consumption

Figure 2 below compares Ontario's electricity consumption per capita with that of New York State, California, Germany and the United Kingdom.

Figure 2: Per capita electricity consumption in 2004 ³⁵



Our electricity consumption per person is 52% higher than that of New York State. While some of this difference could be attributed to different business weightings, it is equally likely that a long history of electricity subsidization in Ontario has shaped our economy toward energy-intensive industries and higher overall electricity consumption levels.

Lowering Our Electricity Productivity

Ontarians enjoy one of the most prosperous economies in the world. And yet we are not living up to our full economic potential.²⁶ While our electricity productivity matches that of rust-belt states like Ohio and Illinois, we have an ongoing electricity productivity gap with North America's leading knowledge-based jurisdictions, such as California, Massachusetts, New Jersey, New York and Virginia. For example, the electricity productivity (dollars of output or gross domestic product per kWh of electricity) of California and New York is more than double that of Ontario. See Figure 3.

Ontario's low electricity productivity is largely due to our low electricity prices, which provide little incentive to reduce consumption or improve efficiency.

Figure 3: Electricity Productivity - 2006³⁶

State/Province	GDP per kWh
California	9.76
Massachusetts	9.12
New Jersey	9.10
New York	8.96
Virginia	6.26
Michigan	4.15
Florida	3.92
Illinois	3.76
Ontario	3.68
Ohio	3.68
North Carolina	3.66
Georgia	3.37
Texas	3.27
Pennsylvania	2.88
Indiana	2.35
Quebec	1.70

State/Province	Price per kWh (CD \$)
Massachusetts	0.1746
New York	0.1575
California	0.1456
New Jersey	0.1346
Florida	0.1181
Texas	0.1168
Pennsylvania	0.0979
Ontario	0.0971
Michigan	0.0950
Georgia	0.0876
Ohio	0.0874
North Carolina	0.0855
Illinois	0.0807
Virginia	0.0777
Indiana	0.0734
Quebec	0.0562

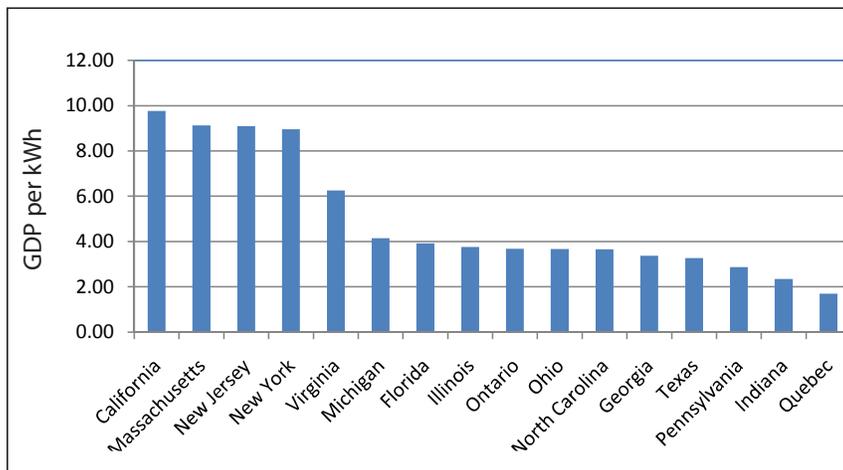
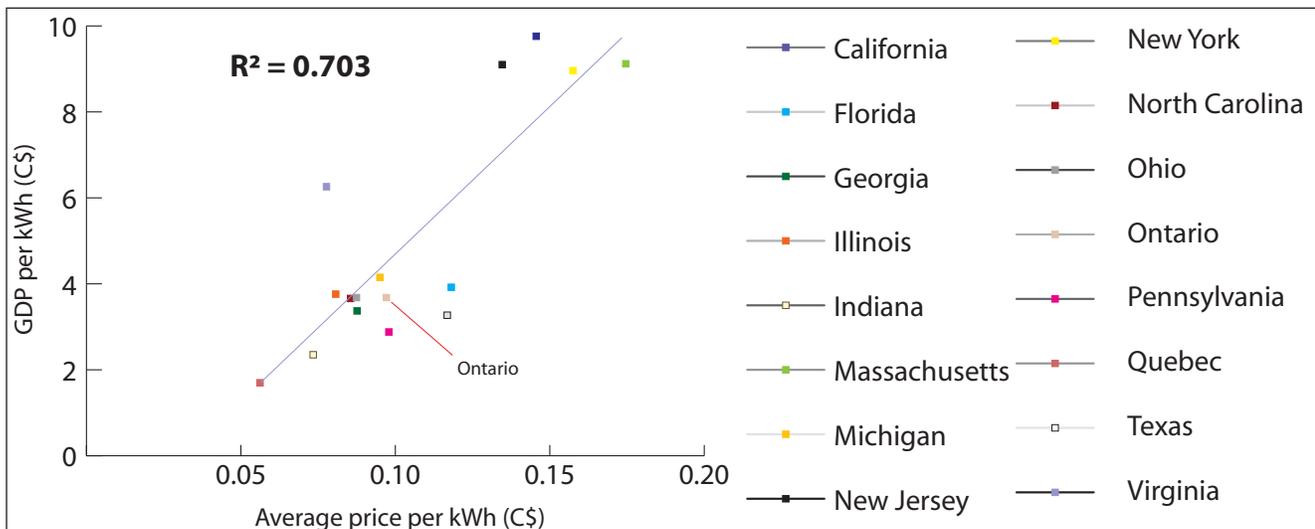


Figure 4 shows the relationship between electricity prices and electricity productivity for the set of North American peer jurisdictions that most closely resemble our own — the 16 largest states and jurisdictions in North America with half of Ontario's population or greater.²⁷

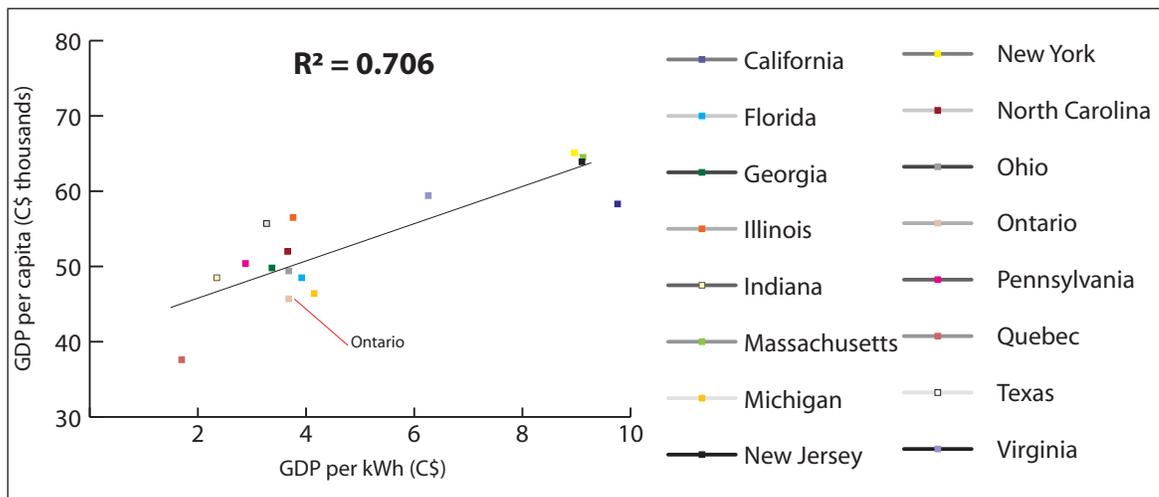
Figure 4: Relationship between electricity prices and electricity productivity³⁶



Lowering Our Standard of Living

Figure 5 below shows the relationship between electricity productivity and living standards (Gross Domestic Product or GDP per capita) for Ontario and its North American peer jurisdictions. Jurisdictions with high standards of living by and large also boast high electricity productivity. By increasing our electricity productivity we can become more prosperous.

Figure 5: Relationship between electricity productivity and GDP per capita ³⁶



Promoting Excessive Air Pollution

Subsidies for grid-supplied electricity cause excessive air pollution by stimulating the demand for coal-fired electricity and by discouraging investments in energy conservation and clean, small-scale local power production.

Energy conservation and renewable energy are the cleanest options to phase-out dirty coal-fired electricity generation. However, increasing the energy efficiency of our natural gas consumption can also help to phase-out coal and dramatically reduce air pollution. For example, virtually every school, recreation centre, hospital, shopping mall, apartment building, office tower and factory in Ontario uses natural gas for just one service, namely, heating. It is much more efficient to use these same volumes of natural gas to simultaneously produce two services, i.e., heat and power. A natural-gas fired combined heat and power plant can have an over-

all energy efficiency of 80 to 90% versus the 34% energy efficiency of our coal plants.²⁸

Table 3 below compares the greenhouse gas emission rate per kWh of Ontario's Nanticoke coal-fired power plant and a high-efficiency natural gas-fired combined heat and power plant.

Table 3: Greenhouse Gas Emission Rate per kWh of Electricity Generated²⁹

Nanticoke Coal-Fired Power Plant	Natural Gas-Fired Combined Heat and Power Plant
1003 grams per kWh	202 to 227 grams per kWh

Specifically, the greenhouse gas emission rate of a natural gas-fired combined heat and power plant can be 80% lower than that of the Nanticoke coal-fired power plant.

Subsidy Beneficiaries

As noted in Table 1, the total annual value of just six of the subsidies for grid-supplied electricity is \$7.9 billion. Since residential consumers are responsible for 33% of Ontario's total annual electricity consumption, the value of this subsidy for residential consumers is approximately \$2.6 billion, while for non-residential consumers it is \$5.3 billion.

However, the subsidy system is not in the best interests of Ontario's citizens for a number of reasons. First, as we have already noted, the subsidies lower our electricity productivity, lower our standard of living and increase air pollution. Second, the significant subsidies for grid-supplied electricity consumption deprive the Government of Ontario of billions of dollars of annual tax revenues that could be used to finance tax reductions or pay for better schools and hospitals or other public services.

Eliminating the Subsidies and Moving to Full Cost Pricing

Eliminating the Public Health and Environmental Subsidy for Coal-Fired Generation

The single largest subsidy for grid-supplied electricity is the \$3.1 billion public health and environmental subsidy for coal-fired electricity generation.

In August 2007, the Province of Ontario issued a legally binding regulation that requires the phase-out of coal-fired generation -- and hence this subsidy -- by December 31, 2014. However, if the Ontario Power Authority's (OPA's) forecasts are correct, Ontario could phase-out its coal-fired power plants by 2010. A coal phase-out by 2010 would raise Ontario's electricity rates by up to 3.3%.³⁰

We believe that the best option to eliminate the public health and environmental subsidy for coal-fired generation is to phase-out coal burning as soon as possible.

Eliminating the Taxpayer Subsidy for Northern Ontario Pulp and Paper Mills

The "transitional" \$46.7 million per year subsidy for northern Ontario pulp and paper mills is scheduled to expire in September 2009.

Eliminating the Remaining Taxpayer Subsidies for Grid-Supplied Electricity

Residential Consumers

The total dollar value of Table 1's four remaining taxpayer financed subsidies for grid-supplied electricity is \$4.785 billion per year. If these subsidies were to be immediately eliminated, electricity rates would rise by approximately 35%.³¹

The annual average electricity bill of residential consumers served by our municipal electric utilities (e.g., Hydro Ottawa) is \$1438.20.³² Therefore, a 35% increase in electricity rates would raise the

electricity bill of the average residential consumer by approximately \$503 per year. However, the Government of Ontario could use the resulting \$4.785 billion increase in its tax revenues to finance a Hydro Rebate Tax Credit for all Ontario citizens. Since Ontario's population is approximately 12.4 million people, the \$4.785 billion of increased tax revenues could be used to finance an annual Hydro Rebate Tax Credit of \$386 per person.

By combining the rate increase with a Hydro Rebate Tax Credit, the Government of Ontario can ensure that the move to full cost pricing will lead to a net reduction in the electricity bills of virtually all of Ontario's residential electricity consumers. Table 3 shows the annual Hydro Rebate Tax Credit for families with one to six members.

Table 4: Annual Hydro Rebate Tax Credit

Family Size	Hydro Rebate Tax Credit
1 person	\$386
2 people	\$772
3 people	\$1158
4 people	\$1544
5 people	\$1930
6 people	\$2316

As noted above, a 35% rate increase would raise the annual electricity bill of an "average" residential home by \$503 per year. If this average home has two adults and two children, its electricity bill, net of the Hydro Tax Credit, will fall by \$1041 per year (\$503 increase - \$1544 credit). Furthermore, if residential consumers reduce their electricity consumption in response to the rise in electricity rates, their net bill reductions will be even greater.

Farmers

Ontario has approximately 88,000 small farms and approximately 1,000 large farms.

The average annual electricity consumption and bills of small farms is about 20,000 kWh and \$2,500 respectively.

The average annual electricity consumption and bills of large farms is about 360,000 kWh and \$50,000 respectively.³³

A 35% electricity rate increase would increase the electricity bill of the average small farmer by approximately \$875 per year. However, if the rate increase is combined with a Hydro Rebate Tax Credit, the Government of Ontario can ensure that moving to full cost pricing will lead to a net reduction in electricity bills for most of our small farmers. For example, the electricity bill, net of the Hydro Rebate, of an average small farm with two adults and only one child will fall by \$283 per year (\$875 increase - \$1158 credit).

Large Farmers and Commercial, Institutional and Industrial Consumers

In the short-term, a 35% increase in the electricity rates for large farmers, commercial, institutional and industrial consumers would raise their electricity bills since they will not be able to immediately reduce their electricity consumption by 35% by investing in energy efficiency. Therefore to ensure that higher electricity rates do not lead to higher electricity bills for non-residential consumers, we can take the following four steps.

1. Phase-in the rate increase over ten years. Instead of raising electricity rates by 35% in year one; raise them by 3.5 percentage points each year for ten years. This will give users the time they need to make the energy efficiency investments that will prevent their electricity bills from rising.
2. Pay large consumers to reduce their electricity consumption during peak demand periods. As we have previously noted, it will cost Ontario up to \$1.64 per kWh or more to meet our electricity needs during peak demand periods. By paying customers up to \$1.64 per kWh to reduce their consumption during peak periods, we can simultaneously reduce their electricity bills and the need for very high-cost new electricity infrastructure while providing companies with a new source of revenue.
3. Pay large users to install biomass and natural gas-fired combined heat and power plants on farms and in schools, hospitals, shopping malls, offices and factories. Virtually every building in Ontario uses natural gas to produce just one service, i.e., heat. It is much more efficient to use the same volume of natural gas to simultaneously produce two services, namely, heat and power. A natural gas-fired combined heat and power plant

can have an overall energy efficiency of 80 to 90% versus the 34% efficiency of a coal plant and the 30% efficiency of a nuclear reactor. By paying consumers to install combined heat and power plants, we can simultaneously help them to reduce their electricity bill and reduce the need for new high-cost nuclear power plants.

4. Get municipal electric utilities and Hydro One to provide low-interest on-bill financing for their customers' energy efficiency investments. For example, Woodstock Hydro entered into a partnership with CIT Bank that provided low-interest rate financing for its corporate customers.³⁴

Impact of 10 Year Phase-In Period for Residential Bills and Annual Hydro Rebate Tax Credit

Eliminating the above-noted taxpayer financed subsidies over ten years could be achieved by raising electricity rates by 3.5% per year during each of the next ten years. Under this scenario, the average annual residential electricity bill increase (assuming no reduction in consumption) would be \$50.30 per year and the annual Hydro Rebate Tax Credit would rise by \$38.60 per year. Table 5 below shows the annual net bill, for an average four person family, of phasing-in full-cost pricing over each of the next 10 years.

Table 5: Net Bill Impact Per Year for Average Four Person Family

Year	Cumulative Gross Bill Increase	Hydro Rebate Tax Credit	Net Bill Reduction
1st	\$50.30	\$154.40	\$104.10
2nd	\$100.60	\$308.80	\$208.20
3rd	\$150.90	\$463.20	\$312.30
4th	\$201.20	\$617.60	\$416.40
5th	\$251.50	\$772.00	\$520.50
6th	\$301.80	\$926.40	\$624.60
7th	\$352.10	\$1080.80	\$728.70
8th	\$402.40	\$1235.20	\$832.80
9th	\$452.70	\$1389.60	\$936.90
10th	\$503.00	\$1544.00	\$1041.00

As previously noted, the net bill reductions will be even greater for families that reduce their electricity consumption in response to higher electricity prices.

Eliminating Bulk Metering

Switching from bulk to individual metering and billing for apartment and condominium units could lead to a reduction in their electricity consumption of 25 to 33% or more. Therefore a switch to individual metering will lead to a net reduction in the average electricity bills of these units if their rental rates and condominium fees are simultaneously reduced to reflect the fact that their electricity costs are no longer paid by the apartment owner or the condominium corporation.

Eliminating Average Cost Pricing

As we have noted above, the cost of supplying electricity during the top 88 peak demand hours of the year is approximately 16 times greater than the average residential price of electricity. This huge disparity between price and cost is due to the fact that many of the costs of meeting peak day demand are recovered from customers on the basis of their average monthly, semi-annual or annual electricity consumption. By eliminating average cost pricing, we can bring the price of peak hour electricity consumption closer to its full cost.

On an annual basis, the higher peak hour prices will be offset by lower off-peak prices. By bringing peak and off-peak prices closer to their costs of production, consumers will be rewarded for shifting their consumption to lower cost periods. Over time, this will lead to lower electricity costs and bills for all consumers.

Eliminating the Taxpayer Subsidies for Nuclear Reactor Decommissioning and Long-Term Storage of Radioactive Nuclear Wastes

These subsidies can be eliminated by amending the Ontario Nuclear Fund Agreement between Ontario Power Generation and the Government

of Ontario to delete the Government of Ontario's potential liabilities with respect to nuclear reactor decommissioning and the long-term storage of radioactive nuclear wastes. At a minimum, the Government could facilitate the move to full-cost pricing by eliminating these taxpayer subsidies for: a) new nuclear reactors; and b) existing nuclear reactors if and when they are re-built.

Eliminating the Civil Liability Cap

The Government of Canada's Nuclear Liability Act limits the civil liability of OPG and/or Bruce Power in the event of a nuclear accident to \$75 million. This subsidy can be eliminated by removing the cap on these companies' civil liability. If the Government wants to gradually eliminate this subsidy, it could remove the civil liability cap with respect to: a) new nuclear reactors; and b) existing nuclear reactors if and when they are re-built.

Summary of Benefits

Phasing out the subsidies for grid-supplied electricity and moving to full cost pricing will provide multiple benefits for Ontario.

1. It will raise our electricity productivity and make Ontario's industries more competitive.
2. It will lower our electricity bills.
3. It will raise our standard of living.
4. It will reduce air pollution and greenhouse gas emissions.
5. It will encourage a culture of conservation and small-scale local power generation.
6. It will reduce the need for new high-cost nuclear reactors.

In essence, a full-cost pricing strategy represents a tax shift from subsidizing wasteful consumption to rewarding efficiency, which in turn is a much more economically efficient and beneficial use of government revenues.

Endnotes

- 1 Letter from Premier Dalton McGuinty to Priorities for Ontario Coalition, c/o Jennifer Foulds, September 25, 2007.
- 2 According to the Ontario Power Authority, residential, commercial and industrial consumers are responsible for 33%, 36% and 31% of Ontario's total annual electricity consumption respectively. Chief Conservation Officer, Ontario Power Authority, Annual Report 2006: Ontario- a new era in electricity conservation, (November 1, 2006), Appendix 1, Figure 2.
- 3 Mitchell Rothman, Measuring and Apportioning Rents from Hydroelectric Power Developments. World Bank Discussion Paper No. 419 (July 2000).
- 4 According to the Ontario Power Authority, assuming a weighted average cost of capital of 11.5% and a gas cost of \$8 per MMBtu, the cost of producing electricity from a new natural gas-fired combined-cycle plant is 7 cents per kWh. Ontario Power Authority, Supply Mix Analysis Report, Vol. 2, (December 2005), p. 238.
- 5 According to Ontario Hydro its average cost of producing hydro-electricity in 1998 was 0.69 cents per kWh. In 2006, Ontario Power Generation, an Ontario Hydro successor company, produced approximately 95% of Ontario's grid-supplied hydro-electricity. Ontario Hydro, Final Annual Report: January 1998 – March 1999, p. 67; Independent Electricity System Operator, 2007 Ontario Market Outlook, Volume 1, p. 10; OPG, Sustainable Development 2006 Report, pp. 38 & 39; and email from Peter Lafoyiannis, Market Information Services, Independent Electricity System Operator to Jack Gibbons (January 16, 2007).
- 6 In 2006 OPG's water royalty payments were approximately \$333 million. Unfortunately, the Government of Ontario has refused to provide us with its total water royalty revenues. However, we believe that they are approximately \$333 million since OPG produced virtually all (approximately 95%) of Ontario's grid-supplied hydro-electricity in 2006. Ontario Power Generation, 2006 Annual Report, pp. 34 & 35; email from Mark Luschuk, Senior Tax Advisory Specialist, Motor Fuels Tobacco and Land Tax Section, Tax Advisory Services Branch, Ontario Ministry of Revenue to Jack Gibbons, November 15, 2007; and email from Peter Lafoyiannis, Market Information Services, Independent Electricity System Operator to Jack Gibbons (January 16, 2007).
- 7 In 2006 OPG's net income was \$490 million and its shareholder's equity was \$5,749 million. OPG, Ontario Power Generation Reports 2006 Financial Results, (February 16, 2007), pp. 81 & 85.
- 8 Letter from CIBC World Markets Inc. to James Gillis, Deputy Minister, Ontario Ministry of Energy, (October 17, 2005).
- 9 Hydro Quebec, Annual Report 2006, p. 2.
- 10 In 2006 OPG's shareholder equity was \$5,749 million. $\$5,749 \text{ million} \times .148 = \851 million . Ontario Power Generation Reports 2006 Financial Results, p. 85.
- 11 Ontario Electricity Financial Corporation, 2006 Annual Report, p. 17.
- 12 Independent Electricity System Operator, 2007 Ontario Market Outlook, Volume 1, pp. 3 & 10; and Ontario Energy Board, 2006 Yearbook of Electricity Distributors, (August 31, 2007), p. 7.
- 13 Ontario Ministry of Natural Resources, Northern Pulp and Paper Electricity Transition Program.
- 14 DSS Management Consultants Inc. and RWDI Air Inc., Cost Benefit Analysis: Replacing Coal-Fired Electricity Generation, Prepared for Ontario Ministry of Energy, (April 2005), p. ii. DDS' estimate of the environmental cost of coal generation is based on the implicit assumption that the cost of greenhouse gas emissions is approximately \$11.40 per tonne. Cost Benefit Analysis, pp. 4 & 45; and Ontario Power Generation, Sustainable Development 2005 Report, p. 36.
- 15 OPG, Sustainable Development 2006 Report, p. 37.
- 16 Ontario Power Generation Reports 2006 Financial Results, p. 102.
- 17 Ontario Power Generation Reports 2006 Financial Results, p. 103.
- 18 Ontario Power Generation Reports 2006 Financial Results, p. 104.
- 19 Ontario Power Generation Reports 2006 Financial Results, p. 104.
- 20 Ontario Energy Board 2003-04 Annual Report, p. 19.
- 21 Ontario Energy Board Docket No. EB-2006-0233, Supplemental Settlement Proposal, Exhibit S-1-2, Issue 1, Item 1.6, pages 1 & 2.
- 22 The hourly costs of electricity losses and electricity imports are recovered from large volume customers on an hourly basis; however for small volume and institutional customers these costs are recovered on the basis of their total electricity consumption during six month periods. Small volume and institutional customers are responsible for 46% of Ontario's electricity consumption. Independent Electricity System Operator, 2007 Ontario Market Outlook, Volume 1, pp. 3 & 4.

- 23 Ontario Energy Board Docket No. EB-2006-0233, Supplemental Settlement Proposal, Exhibit S-1-2, Issue 1, Item 1.6, pages 1 & 2.
- 24 Email from Morgan Ste. Marie, National Sales Manager, Stratacon Inc. to Jack Gibbons, September 26, 2007.
- 25 In 2006 Ontario's electricity consumers paid \$13.566 billion for grid-supplied electricity. Independent Electricity System Operator, 2007 Ontario Market Outlook, Volume 1, pp. 3 & 10; and Ontario Energy Board, 2006 Yearbook of Electricity Distributors, (August 31, 2007), p. 7.
- 26 Task Force on Competitiveness, Productivity and Economic Progress, Agenda for our prosperity: Fifth Annual Report, November 2006, pp. 7, 8 & 9.
- 27 Task Force on Competitiveness, Productivity and Economic Progress, Agenda for our prosperity: Fifth Annual Report, November 2006, p. 7.
- 28 Danny Harvey, "Clean building: contribution from cogeneration, trigeneration and district energy", Cogeneration and On Site Power Production, (September-October 2006), pp. 108, 110; Ontario Power Authority, Supply Mix Analysis Report, Volume 2, (December 2005), pp. 210 & 212; and Ontario Ministry of the Environment, Coal-Fired Electricity Generation In Ontario, (March 2001), p. 42.
- 29 OPG, Sustainable Development 2006 Report, p. 37; and Ontario Clean Air Alliance, The Ontario Power Authority's Coal Phase-Out Strategy: A Critical Review, (September 2007), p. 2.
- 30 Ontario Clean Air Alliance, The Ontario Power Authority's Coal Phase-Out Strategy: A Critical Review, (September 2007).
- 31 In 2006 Ontario's electricity consumers paid \$13.566 billion for grid-supplied electricity. Independent Electricity System Operator, 2007 Ontario Market Outlook, Volume 1, pp. 3 & 10; and Ontario Energy Board, 2006 Yearbook of Electricity Distributors, (August 31, 2007), p. 7.
- 32 According to the Ontario Energy Board, the average monthly bill of residential consumers served by Ontario's municipal electric utilities is \$119.85. http://www.oeb.gov.on.ca/html/en/consumers/understanding/bill_comparison.htm. Downloaded September 20, 2007.
- 33 Emails from Al Manchee, Media Relations, Hydro One to Jack Gibbons, October 25, 2007.
- 34 http://www.woodstockhydro.com/index.php?menu_id=3933. Downloaded October 25, 2007.
- 35 ON population: <http://www40.statcan.ca/l01/cst01/demo02a.htm?searchstrdisabled=2004%20population&filename=demo02a.htm&lan=eng>
 US state population: <http://www.census.gov/popest/states/tables/NST-EST2006-01.xls>. Downloaded October 2007
 Europe population and kWh per capita: <http://devdata.worldbank.org/data-query/>
 US retail electricity sales: http://www.eia.doe.gov/emeu/states/sep_sum/html/rank_use_per_cap.html
 ON energy demand (http://www.ieso.ca/imoweb/media/md_demand.asp) in 2004, 153 TWh. Multiply by 0.925 to get consumption to account for line losses, etc.
- 36 US state population: http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&_sse=on
 ON and QC population: <http://www12.statcan.ca/english/census06/data/highlights/agesex/pages/Print.cfm?Lang=E&Geo=PR&Code=01&Table=1&Data=Count&Sex=1&StartRec=1&Sort=2&Display=Page&CSDFilter=5000>
 US State GDP: <http://www.bea.gov/regional/gsp/>
 ON and QC GDP: <http://www40.statcan.ca/l01/cst01/econ15.htm>
 Purchasing Power Parity from US \$ to Cd \$: 1.23, from the OECD, <http://www.oecd.org/dataoecd/61/56/1876133.xls> Downloaded October 2007.
 US Electricity Production Figures: http://www.eia.doe.gov/cneaf/electricity/epm/epm_ex_bkis.html, March 2007 Table 1.6.B
 ON Electricity figure from http://www.ieso.ca/imoweb/media/md_demand.asp
 QC Electricity figure from Hydro Quebec, Annual Report 2006, p. 95, http://www.hydroquebec.com/publications/en/annual_report/2006/index.html
 US Retail Price: http://www.eia.doe.gov/cneaf/electricity/page/sales_revenue.xls
 Exchange rate, Bank of Canada, http://www.bank-banque-canada.ca/en/rates/exchange_avg_pdf.html
 ON Retail Price: in 2006 the total cost of electricity for Ontario consumers was \$13.566 billion. IESO, 2007 Ontario Market Outlook, volume 1, pp 3 & 10; and Ontario Energy Board, 2006 Yearbook of Electricity Distributors, (August 31, 2007), p.7. (13.566/151*.925) Multiply by 0.925 to get consumption to account for line losses, etc.
 QC Electricity rate from Hydro Quebec, Annual Report 2006, p. 60, http://www.hydroquebec.com/publications/en/annual_report/2006/index.html



Ontario Clean Air Alliance Research Inc.

625 Church Street, Suite 402

Toronto M4Y 2G1

Tel: (416) 926-1907 ext. 245

Fax: (416) 926-1601