The Failure of Crown Run Electricity in Ontario

Cavin Morton

Introduction

Ontario's Crown-dominated electricity policy has resulted in a failure floated by the province's taxpayers. This bad situation has been exacerbated by a government-imposed rate cap designed to hide the true costs of hydro. The forces of scarcity have been ignored under a policy that shifts the financial burden from ratepayers to taxpayers. This has resulted in an even less efficient and less responsive system. This paper will examine the schemes imposed by successive Ontario governments in their attempts to bolster popular support by shielding voters from the true costs of consumption.

Particular attention will be devoted to examining the recent imposition of a 4.3 cent per kwh[1] rate cap on electrical consumption. The imposition of rate caps, like other price controls, has imposed an unnatural ceiling on prices. It has eliminated incentives for new private investment into the now undersupplied market. Further, by lessening the cost of consumption, it has discouraged conservation.

The benefits of a deregulated, privatized market will be contrasted with the costs of the current, Crown-dominated structure. The various arguments used to support government intervention in the industry will be considered and refuted. It will be argued that the problems of managerial inefficiency that have plagued government- run hydro and the allocative inefficiency associated with price caps can only be resolved by the deregulation and privatization of the industry.

Can the Economist's Efficiency Rationale be used to Justify Government Intervention in the Electricity Market?

Economists generally accept government involvement in markets in certain instances where normative rationales exist. Those who favour government intervention in the electricity market often defend their positions by citing such rationales. Is there a normative rationale to justify government intervention in the electricity market? One justification often used involves cases of public goods. A public good consists of something that no one can be excluded from using through economic means. Further, its consumption by one person involves no cost to others. A lighthouse is a commonly-used example of a public good. Unlike the lighthouse that can be used by all, electricity is certainly excludible. Further, since electricity is a scarce resource, it is rival. Therefore, electricity cannot be considered a public good and intervention cannot be justified by using the public good argument.

Mitigation of negative externalities is often used as a rationale for market intervention. This rationale is sometimes cited by proponents of government intervention in the electrical industry. Central to this rationale is the belief that only through government control can energy emissions be reduced and the environment protected. This line of argument fails to take into account the fact that the negative externalities associated within industry can be dealt with in ways that do not distort the market. The optimal solution would be one that defines the property right to pollute. Barring that, an incentive program or tax on emissions could be used to mitigate the effects of negative externalities without resorting to Crown ownership.

Intervention is generally accepted in cases involving a natural monopoly. This, according to economist James Brander, occurs "when any feasible level of demand can be met at lower cost by a single firm than by two or more firms."[2] In the case of some facets of electricity industry, the argument of a natural monopoly is reasonable. It would likely be inefficient to build two separate generating stations at Niagara Falls. However, fueled by technological innovation, natural monopolies often evolve into pluralistic, competitive markets. Bell Canada was once considered a natural monopoly until technology increased and other firms were permitted entry into the industry.[3] The very prospect of breaking a natural monopoly provides incentives for private industry to invest in the research and development that is needed to capture market share. For this reason alone, time is not on the side of those who justify intervention in the electricity market by deeming it to be a natural monopoly.

Information problems are often used to justify intervention in the market. Under this

scenario, intervention by government is used to redress the information imbalance between producers and consumers. Information problems are inherent in the electricity industry and are cited by those who favour government intervention in the electricity market. Electricity cannot be stored so consumers in a deregulated market would pay the fluctuating hourly spot rate for power. Consumers would not be able to anticipate costs of consumption at any given time with these constantly fluctuating prices and would therefore not be able to make informed decisions based on marginal costs and benefits. This argument fails to take into account innovations currently in use in other deregulated markets that effectively relay price signals. These will be described in greater detail later in this paper.

Highlights of the History of the Ontario Market

Public involvement in the electricity market began as a response to a critical need for an energy supply – a need that was not being addressed by the private sector. From the onset, however, public involvement was shaped by political needs. These political needs often generated short-sightedness that generated huge distortions in the energy market.

At the turn of the century, Ontario had a private power system. During this time, private investment into generation and transmission was limited. Business was reluctant to invest in capital intensive projects when returns were greater in other areas. In response, in 1906 the government chose to introduce a Crown corporation, known as The Hydro Electric Power Commission, which could borrow at highly favourable rates backed by the provincial government.[4] Its mandate was to supply electricity to the province "at cost" rather than through the use of price and entry regulation techniques. The commission also enacted legislation that mandated uniform hydro rates across the province (subsidization). Those regions that faced higher marginal costs of electricity would be subsidized by lower cost regions.[5] This basic method of meeting energy needs through public ownership and price controls (or yearly average pricing) continued throughout the twentieth century.

By November of 1997, the conservative provincial government faced mounting concerns regarding the inefficiency and insolvency of the Crown Corporation known at this point as Ontario Hydro. In response, the government put forward plans to sell public assets, to allow entry by private firms and to deregulate the Ontario electricity. Ontario Hydro was broken into three segments: Ontario Power Generation (OPG), Hydro One (responsible for transmission), and the independent market operator responsible (IMO) for predicting demand, operating and regulating the new wholesale electricity market, thereby ensuring a fair and effective system[6] *(Figure* 1). In addition, a new corporation, Ontario Electricity Financial Corporation (tax payers) assumed much of the debt of OPG and Hydro One thus making the two companies more attractive to sell. The market was deregulated in May of 2002 under a scheme that sought to fix the twin problems that had plagued the public power system, managerial inefficiency and allocative inefficiencies.

Consumers were given the choice between paying floating rates or locking into a fixed contract supplied by an energy trading company. Prices were stable throughout the summer but went up during the fall months.[7] In response to ratepayer outcry, the government imposed a price cap of 4.3 cents per kwh retroactive to May 2002 for ratepayers who used less than 250000 kwh per year with some exception.[8] The recently elected Liberal government has promised not to sell any public power assets and keep the cap on till 2006.[9] Deregulation of the market is now officially on the shelf.

Managerial Inefficiency of Ontario Hydro

Through successive Liberal, Conservative and NDP regimes, Crown-owned energy has been poorly managed, resulting in lack of supply for Ontario and a crippling debt. Solutions to energy problems have been shortsighted. When hydroelectric sites became scarce, the company switched to a reliance on coal imported from the United States.[10] This move led to new problems with the threat of power shortages and dependence on foreign coal suppliers whose price had to be controlled.[11] When air pollution and coal availability emerged as problems, the Canadian nuclear power industry was born.

Proponents of the nuclear industry promised power "too cheap to meter."[12] Through advertising that encouraged consumption, Ontario Hydro essentially bolstered demand for its own product in order to justify the building of the nuclear power industry. Furthermore, they made unrealistically high predictions of future demand to justify their expansion. In the 1970's, Ontario

Hydro predicted that, by the year 2000, daily demand in Ontario would be around 90 000 MW.[13] By 2000 actual demand was still under 25000MW.[14]

Inefficient management and politically motivated decisions at Ontario Hydro were responsible for problems involving financing and supply. The Darlington Nuclear Facility originally estimated at four billion dollars, ended up costing 14.3 billion dollars and ran several years overdue. Faced with runaway costs, a profit-maximizing firm would have recognized these as sunk costs, stopped the project and cut its losses.[15] The government, placing greater weight on political priorities, was disinclined to stop the project. A more recent example of short short-sighted policymaking involves a decision made under Bob Rae's NDPs to slash jobs in the nuclear industry in the early 1990's.[16] This has resulted in the need for frequent retrofits and shutdowns and has contributed to the supply problems now facing Ontarians.

By the time deregulation was being implemented by the Conservatives, the debt of Ontario Hydro had risen to approximately 38 billion dollars.[17] This debt was labeled as stranded and was separated to make the newly constituted assets more attractive to potential buyers.[18] The stranded debt is currently being paid down by rate payers. Clearly Ontario Hydro has not acted like a cost minimizing firm.

Price Regulation: Transfer of Wealth and Allocational Inefficiency

When the Ontario government decided to regulate the price of hydro at 4.3 per kwh, the price of generating and distributing electricity did not magically change. Some generation facilities such as hydroelectric plants produce hydro at a marginal cost far less than 4.3 cents per kwh.[19] Low cost sources provide Ontario's base load power. However, within business hours, as demand for power increases, the marginal cost of an extra unit of electricity rises well above 4.3 cents per kwh. Marginal Costs of electricity minus 4.3 cents multiplied by the number of kilowatts used in a given time period represent a transfer of wealth between taxpayers and ratepayers, since the government refunds the difference to retailers for residential consumers and other qualifying ratepayers. Estimates of the increased tax burden are as follows: $358 M for energy only, at least $50 M for IMO uplift,[20] Ontario Electricity Financial Corporation's debt will increase $652 M within 3 years after rate cap, and overall increase in tax burden is estimated to be $650 M for FY 2003[21] *(Figure* 2).

The rate cap imposes a misallocation of the economy's resources as well as a financial burden on taxpayers. Pareto or Allocative Efficiency arises when resources are distributed in such a way that it is impossible to make anyone better off without making at least one person worse off *(Figure* 3). Even if power were sold "at cost" and if perfect managerial efficiency were possible, there would still be an allocative inefficiency and a resulting dead weight loss that could be redistributed to both consumers or producers.

Privatization of OPG

If electricity in the Ontario market is eventually deregulated, OPG must be privatized in order to attract the necessary private investment, to put downward pressure on prices and to ensure adequate supply. Likely, this would take the form of selling the corporation off in small pieces rather than selling it as a single unit.[22]

One of the primary complaints of new potential generation investors into the market is the subsidization of Ontario's nuclear stations. When the nuclear stations are running, the marginal cost of supplying a kwh of electricity are around 4-5 cents kwh.[23] However, this marginal cost of supplying an extra unit does not take into account the large fixed costs of financing, insuring and maintaining the nuclear stations. Tom Adams, Executive director of Energyprobe, has repeatedly gone on record saying nuclear plants are not economically viable. If the government subsidizes a nuclear plant to get it running and then the plant can sell electricity for 2 cents cheaper per kwh compared to a natural gas plant whose MC is roughly 6-6.5 cents per kwh,[24] the nuclear plant will now be able to sell all of its power and crowd out the private plant (which has much lower average costs) for Ontario's baseline power[25] *(Figure* 4). This is evidenced in the objections of the private energy sector to the retrofitting of the Pickering A station. Potential investor Duane Cramer, vice-president of development at New York electricity giant Sithe Energies, sees the rate cap and the subsidization of Ontario's nuclear industry as huge deterrents to private investors.[26]

Without a level playing field, investors will be disinclined to commit capital to build new natural gas plants. Natural gas plants, the option preferred by private sector investors, are deemed

to be the best economic and environmental option for Ontario given the shortage of new hydro electric sites.[27]

Privatization of Hydro One

Hydro One shares with OPO much of the blame for the old Ontario Hydro debt. Inefficiencies and a lack of accountability have contributed to mounting problems. Eleanor Clitheroe, Hydro One's CEO, racked up enormous luxury expense accounts on taxpayer money.[28] This case, not uncommon in among politically-motivated appointments, provides yet another example of why the industry needs to be de-politicized.

When privatizing Hydro One, some regulatory controls should be retained since it represents approximately 97% of Ontario's transmission assets.[29] The regulations could be similar to those imposed on Bell Canada's long distance telephone network. The new owners would need to be guaranteed a reasonable rate of return, but unable to charge monopoly prices. Two approaches could be taken: rate-of-return on assets regulation or price cap regulation. Rate of return regulation would likely result in an Averch-Johnson side effect.[30] If the government allowed for a certain percentage return on assets, the new owners would keep increasing assets to generate more profits leading to an inefficient capital/labour ratio.[31]

Unlike the recently introduced retail and wholesale rate cap, an inflation-adjusted price cap on transmission would likely be the most desirable method of regulation. This method would put a ceiling on transmission charges and encourage the firm to be more efficient and innovative. Some type of regulation would be necessary even if Hydro One were sold in pieces. Since most geographic areas would not have sets of redundant transmission lines owned by separate firms, monopoly power would result by any profit maximizing firm that took hold on the lines.

Current Conservation and Investment Incentives

The Ernie Eves government gave and then took away the most unbiased and efficient method of conservation, the price mechanism. When the demand for energy increases, prices go up in a deregulated market. By imposing a rate cap, the government made the entire daily marginal cost curve that the ratepayer faces flat. Without an upward sloping supply curve, higher consumption does not lead to higher prices. This creates a disincentive for consumers (who act in their own self interest) to conserve. By reversing course, the Eves government concentrated on less effective more costly forms of conservation such as PST rebates on energy efficient appliances. This placed increased pressure on dirty coal generating stations which could be fired up at short notice to meet peak demand.[32] This lack of incentives to conserve has resulted in unnecessary environmental damage during peak times.

As was the case at the retail level of the rate cap, the interests of taxpayers have been sacrificed for those of ratepayers in encouraging new private generation. The government has concentrated on tax incentives to attract new investment. Ironically, this has not caught on because of the uncertainty over the rate cap and continued subsidization of nuclear plants.[33]

Price Instability

One of the primary benefits of a deregulated market is that prices would be allowed to float. The IMO would send out new prices on an hourly basis. The major argument against deregulation is that it is prone to spikes in electricity prices.[34] This is also the main argument for deregulation. Rather than paying a capped rate which does not reflect the true marginal costs of usage, ratepayers would pay the marginal cost for the units of electricity they consume. This would not only allocate efficiently, it would also discourage usage during peak times and thus, take much of the load of the system.

Use of peak load pricing is not a new thing. Bell Canada's most popular long distance plan charges 50 cents per minute during business hours, then drops the rate to 10 cents at night. The logic behind this peak load pricing is simple: The marginal cost is very low until the telephone grid reaches capacity, then there is a loss in quality and eventually the system cannot handle any more callers.[35]

This is similar to the power market in Ontario. The base load power has a low marginal cost. However, as demand increases during business hours, especially in the hot summer, more peaking stations that have higher marginal costs must be turned on. These costs should be allocated to those who incur them.

Those who are against allowing for price fluctuation claim that rates should be either capped or averaged throughout the course of a year or longer. NDP leader Howard Hampton claims a major flaw with a deregulated market is that it is "a terribly blunt instrument" and that it is unfair that the rich would be able to consume electricity to power an air conditioner on a hot day and the poor would not.[36] This argument may have some merit from the perspective of a social democrat whose sense of fairness is based on his perception of equity. However, distorting the market to subsidize certain lower income earners is not an efficient solution. One means of ensuring affordable energy of sufficient quantity to cover basic needs would be to give low income earners a subsidy or tax credit. This would respect their consumer sovereignty by allowing them to choose their own priorities rather than controlling their choices in an inefficient, paternalistic manner.

Another concern Hampton raises is that, since electricity must be consumed as soon as it is produced, people cannot know what costs they are incurring until after the fact.[37] This information problem undermines the consumers' ability to act in their own self interest by consuming electricity up until the point where marginal benefit equals marginal cost.

This line of reasoning underestimates the consumer's capacity to understand some simple conservation principals such as the fact that power is more expensive during peak hours. Further, in the deregulated U.K., interval meters that display the hourly spot rate for electricity are used successfully.[38] These would be tied into local distribution companies to give consumers up-to-date information on prices. Tom Adams of EnergyProbe also points out that this technology would also point out to local utilities stress points in their distribution systems so they could correct problems before they result in outages. The cost of the units range from $250 to $800 dollars but a large order could drastically cut the price of these meters.[39]

Many would argue that spikes in power reduce a home or businesses' ability to forecast or budget for a given period. In the short time that Ontario was a deregulated market, over five hundred thousand of Ontario's residential customers switched to a fixed rate by signing up with a company that sells energy contracts such as British Direct Energy.[40] This represents the market working properly with risk adverse individuals paying a premium for stability.

Summary and Recommendations

Government involvement in the energy industry may have been initiated in response to market expedients, but it has been shaped, to a large extent, by political expedients. This reality has often been clouded by normative rationales aimed at justifying intervention. Insofar as the electricity market is concerned, such rationales are unconvincing.

A survey of government intervention illustrates how political expedients such as regional equity and ratepayer satisfaction have led to allocational and managerial inefficiencies. Conservation of resources as well as fairness to taxpayers and investors have been compromised by the political expedient of shielding ratepayers form the realities of the market. Long term issues of solvency and supply have, in turn, been compromised by this process. Imposition of the 4.3 cent per kwh rate cap exemplifies the willingness of politicians to make the compromises described above and underscores the need for a depoliticized energy market.

Deregulation and privatization of the energy market are needed to redress these difficulties. OPG should be privatized and likely split into smaller units. This would create a level playing field among suppliers, and do much to allay concerns of investors frustrated with the preferential treatment given to the Crown-owned nuclear power plants. Hydro One should also to be privatized but regulated to prevent the new owners from charging monopoly prices. In a deregulated market, prices would be allowed to float. Consumer education aimed at fostering the ratepayers' understanding of peak load pricing coupled with new technology such as interval meters would enable ratepayers to make informed choices and increase the likelihood of conservation.

There is widespread consensus that successful deregulation can take place only in a climate where rules are clear and defined. The idea of clearly-defined property rights goes all the way back to Adam Smith and is central to any competitive market. It is of the utmost importance that the IMO be truly independent (no politicization). The IMO must enforce the rules

and continuously monitor the market for price manipulation.

Deregulation and privatization amount to sound economic policy. Yet any political party that embraces them is subject to huge political risk. The damage caused by politicization, allocational and managerial inefficiencies are long term and largely invisible to voters. Conversely, the shock to the pocketbooks of ratepayers in a newly deregulated market is immediate and readily apparent. It may take considerable time and vicarious exposure to the successes of deregulation in other jurisdictions before voters are willing to tolerate the pain that accompanies the gain of freer markets.

Figure 1
Current Structure of Power Flow

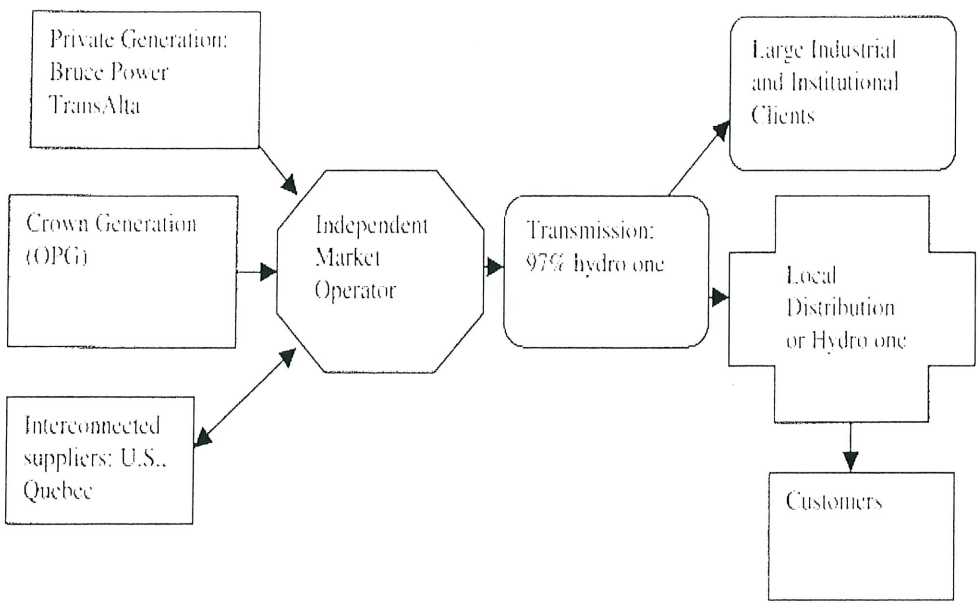
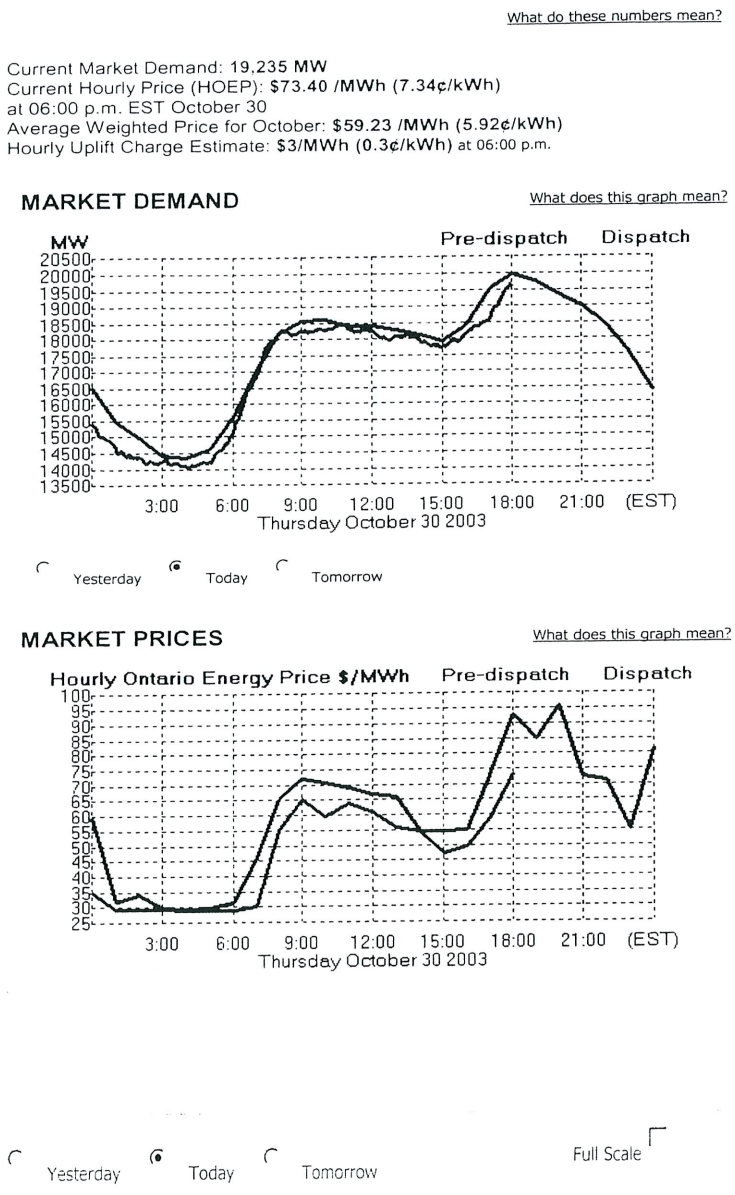


Figure 2
Market Data Taken From Independent Market Operator Website



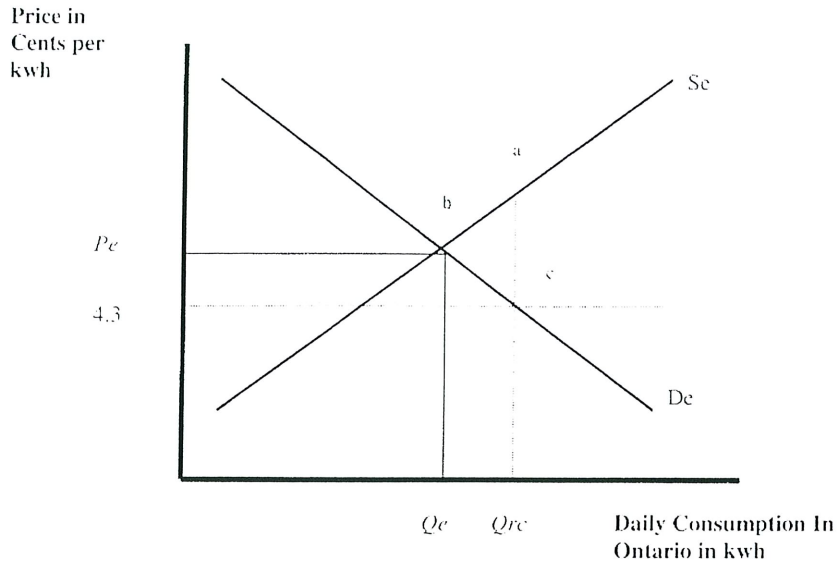
The Data shows both market prices and market demand. The blue curve represents pre dispatch (predicted) prices and quantities per MW of electricity. The Green area shows actual prices and quantities.

The Data was taken from the IMO site on October 30/2003. From the data we can see that the average price for October has been 5.92 cents per kwh.

The Total month transfer from tax payers to rate payers is the average price for the month (5.92 cents) – the capped rate (4.3 cents) – debt retirement charges born by rate payers (.7 cents per kwh)

So with this data taxpayers in the month of October would assume .92 cents of debt for every kwh used in the province plus administration costs of the Ontario Electricity Financial Corporation. Most sources agree the price of electricity for the year will average out at about 6 cents per kwh.

Figure 3
Stylized Intermediate Run Ontario Electricity Market



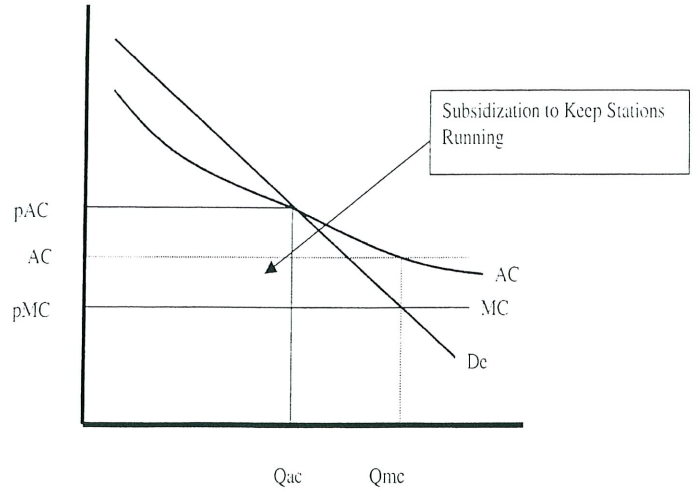
Pe, *Qe* are equilibrium price and quantities
Qrc is quantity under rate cap

The upward sloping supply curve reflects the different marginal costs for different types of generation. For example, the marginal cost of producing electricity from *a* hydro electric generating station is less than that of a natural gas based generating station.

The area from under points *b* to *a* represent the total cost to society while the area under point *b* to point *c* represent the value to society.

The triangle *b, a, c* epresents a dead weight loss to society from over consumption of electricity at an artificially low price. It is estimated that the price cap is responsible for at least 500 MW of over consumption on a daily basis.[41]

Figure 4
Subsidization of Ontario's Nuclear Stations



Nuclear stations are selling at marginal cost which does not take into account their very high fixed costs. The difference between average cost and marginal cost is being subsided by government and in the process crowding out private generation.

Bibliography

Books

Brander, James. *Government Policy Toward Business.* Toronto: John Wiley & Sons Canada, 2000.
Hampton, Howard. *Public Power.* Toronto: Insomniac Press, 2003.

Government Sources

Hydro One (website). *Welcome to Hydro One:* [Online WWW] Available at http://www.hydroone.com/en/
Independent Electricity Market Operator (website). *Todays Market* [Online WWW]. Available: http://www.iemo.com/
Ontario Liberal Party (website). *The Ontario Liberal Plan for a Modern Public Hydro:* [Online WWW] Available at http://www.choosechange.ca/en/platform/Hydro/hydro.cfm#torys
Ontario Ministry of Energy, Science & Technology. *Direction For Change: Charting a Course For Competitive Electricity and Jobs in Ontario:* Whitepaper on Deregulation. ISBN 0-7778-6867-9, November 1997.
Ontario Power Generation (website). *Consolidated Financial Statements.* [Online WWW]. Available: http://www.opg.com/

Newpaper Articles

McFarland, Janet (04/11/02). "Ontario power policy deters projects." *The Globe and Mail* [Online WWW] Available http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=5853
Spears, John. "A real power break - meters help capture low prices." *The Toronto Star*, September 22/2002, [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=5505
Trebilcock, Micheal and Roy Hrab. "Power-less Ontario." *The National Post,* May 29, 2003, [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=7389
Unkown Author. (12/12/01). "Tories privatize Hydro One." *The Toronto Star,* December 12, 2003, [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=2939

Internet Based Material

Adams, Tom (5/3/02). *Guiding Ontario's Future Electricity Transmission System.* Online WWW available http://www.energyprobe.org/energyprobe/images/Ont_Transmission_Future/index.htm
Adams, Tom and Allen Stanbury (04/12/2002). *Electricity Metering Options for Ordinary Consumers in Competitive Electricity Markets.* [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=5688
Adams, Tom (3/17/03). *Re-Regulating Electricity Prices, Ontario's Coming Dark Age.* [Online WWW] Available.
Adams, Tom (07/02/03). *Protecting Consumers: Price Cap Will Stay in Place.* [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=7802
Bartholomew, Ron and Tom Campbell (03/17/03). *How Did we Get into this Mess?* [Online WWW] Available: http://www.energyprobe.org/energyprobe/index.cfm?DSP=content&ContentID=8407
Center for the Advancement of Energy Markets. *Don 't Blame Deregulation* http://www.caem.org/

Mapleleafweb (24/02/03). *Electricity Deregulation in Ontario:* (Online WWW) Available: http://www.mapleleafweb.com/features/economy/deregulation/energy/ontario.html

Richmond Hill Hydro Inc. (06/09/00). *Deregulation:* (Online WWW) Available: http://www.rhhydro.org/debt_retirement.htm

Endnotes

1.kwh stands for kilowatt.

2.Brander, James. *Government Policy Toward Business* (Toronto: John Wiley & Sons Canada, 2000) pg 359.

3.Brander, pg 360.

4.Bartholomew, Ron and Tom Campbell (03/17/03). *How Did we Get into this Mess?* [Online WWW] Available.

5.Bartholomew and Campbell, 2003.

6.Ontario Ministry of Energy, Science & Technology. *Direction For Change: Charting a Course For Competitive Electricity and Jobs in Ontario*: Whitepaper on Deregulation. ISBN 0-7778-6867-9, November 1997.

7.Trebilcock, Micheal and Roy Hrab. "Power-less Ontario." *The National Post*, May 29,2003.

8.Adams, Tom (3/17/03). *Re-Regulating Electricity Prices, Ontario's Coming Dark Age.* [Online WWW] Available.

9.Ontario Liberal Party (website). *The Ontario Liberal Plan for a Modern Public Hydro*: [Online WWW] Available.

10.Trebilcock and Harb, 2003.

11.Hampton, pg 122.

12.Hampton, pg 121.

13.MW stands for Mega Watt = 1000 kilowatts.

14.Hampton, pg 124.

15.Hampton, pg 124.

16.Trebilcock and Harb, 2003.

17.Unkown Author. (12/12/01). "Tories Privatize Hydro One." *The Toronto Star*, December 12, 2003, [Online WWW] Available

18.Richmond Hill Hydro Inc. (06/09/00). *Deregulation*: [Online WWW] Available.

19.McFarland, Janet (04/11/02). "Ontario power policy deters projects." *The Globe and Mail* [Online WWW] Available.

20.See the Independent Market Operator website for detailed information describing daily energy uplift charges.

21.Adams, 3/17/03.

22.Adams, Tom (5/3/02). *Guiding Ontario's Future Electricity Transmission System*. [Online WWW] Available.

23.McFarland, 04/11/02.

24.McFarland, 04/11/02.

25.Brander, pg 361.

26.McFarland, 04/11/02.

27.Center for the Advancement of Energy Markets, [Online WWW] Available.

28.Adams, 5/3/02.

29.Hydro One (website). *Welcome to Hydro One*: [Online WWW] Available.

30.Brander, pg 370, Averch-Johnson effect occurs when ROA regulation causes firms to pursue an inefficient capital/labour ration because the regulation allows them a percentage return on assets.

31.Brander, pg 370.

32.Spears, John. "A real power break -meters help capture low prices." *The Toronto Star*, September 22/2002, [Online WWW] Available.

33.Spears, 09/22/2002.

34.Hampton, pg 221.

35.Brander, pg 368.

36.Hampton, pg 222.

37.Hampton, pg 218.

38.Adams, Tom and Allen Stanbury (04/12/2002). *Electricity Metering Options for Ordinary Consumers in Competitive Electricity Markets*. [Online WWW] Available.

39.Adam and Stanburry, 04/12/2002.

40.Center for the Advancement of Energy Markets.

41.Adams, Tom (07/02/03). *Protecting Consumers: Price Cap Will Stay in Place*. [Online WWW] Available.