CANADIAN UNION OF PUBLIC EMPLOYEES

R-95 part 1 - Public Electricity Utilities

Privatisation and Deregulation of the Electricity Industry: What Impact for Taxpayers?

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This research deals with the impact of the deregulation and privatisation of electricity utilities in Canada. A theoretical analysis of the industry in a natural monopolistic situation and a study of the monopolists' rent were undertaken in order to show the reader that, every year, hundreds of millions of dollars slip through the fingers of Canadian taxpayers.

SUMMARY

INTRODUCTION

Electricity is fundamental to the ensured social and economical development of our societies. It is an indispensable public service for the management of a city's water, for public lighting, hospitals and for many other public utilities. Since a country's electricity industry is that important, good management and good governance in this field are vital so that the cost of production and the prices paid by consumers are the lowest possible.

In Canada, the electricity industry is still primarily publicly owned. In this model, ownership of the assets and management of the industry are handled by companies that are owned by the provinces or even by municipalities. Some private cooperatives, whose members are the clients, are also to be found.

On the other hand, there are also private companies in the electricity industry and some lobbies would prefer that they held a much larger share which, in our opinion, would not improve the industry's efficiency. That is what this research will show in the following pages.

The Canadian Union of Public Employees (CUPE) has opposed the privatisation of public utilities since its creation and CUPE's research service produces material, on the subject, for public utilities in all sectors. This research deals with the impact of the privatisation of electricity utilities in Canada by analysing the question from a theoretical point of view and by attempting to estimate the amount of monopolist's rent that Canadian taxpayers miss out on every year.

Our research into reforms in the countries of the Organisation for Economic Cooperation and Development (OECD) confirms our hypothesis that privatisation and deregulation cannot lead to an improvement in the industry, because of its being a natural monopoly: the prices paid by consumers do not decrease following privatisation and deregulation. It is not possible to show statistically significant results of prices that increase, but the simple fact that they do not

decrease precludes anyone from proposing that privatisation of electricity utilities would be efficient.

The phenomenon is explained from the concept of natural monopoly which in turn ensures that the industry cannot be in perfect competition. Privatisation and deregulation can thus only have the effect of externalising the monopolist's rent towards private interests. The advantage of the public monopoly would, by comparison, internalise the rent that could then be redistributed in a democratic manner, i.e. more fairly. These matters will be addressed in the first part of the research.

The reader will find stylised facts that will enable the development of a portrait of the electricity industry in Canada. Then, in the final section, they will find the results of research into the financial statements of private companies in the electricity industry so they can have an idea of what the private monopolist's rent might represent.

From the information we have analysed in this research, it is clear that the privatisation and deregulation of electricity utilities do not lower costs for consumers and that competition can only be limited, thus creating private monopolists and oligopolists who share a rent that escapes Canadian taxpayers.

IMPACT OF THE PRIVATISATION AND DEREGULATION OF THE ELECTRICITY INDUSTRY

In the 1990s, the concept of "New Public Management" was in vogue in countries of the Organisation for Economic Cooperation and Development (OECD) and directly affected the electricity industry. This concept of public affairs and economic development was one in which the state had a minor role in the economy and in which public monopolies had to be abolished and restructured. Since the electricity industry in OECD countries was characterised by the presence of vertically-integrated public monopolies, it was primarily targeted by these reforms.

Belgium, Spain and the United Kingdom were the first to separate the vertical integration that characterised the industry. The idea of having a single business that produced, transported and distributed electricity was not efficient, according to this "New Public Management". In order to introduce competition in the three sectors, the first thing had to be to create distinct businesses and to allow private businesses to come into each of these markets.

At the same time, the creation of a wholesale market and a retail market had to take place, without which the deregulation of the industry would not be optimal. It was on these bases that the OECD countries, at various paces, began a restructuring of their industry. Below, a table taken from OECD research[1] shows the chronology of the changes, by country:

[1] Hattori, Toru and Miki Tsutsui, 2004. "*Economic Impact of Regulatory Reforms in the Electricity Supply Industry: a Panel Data Analysis for OECD Countries*", Energy Policy, vol. 32, p. 831

Table 3
Regulatory reforms in the electricity supply industry in OECD countries

	Unbundling	Retail access		Wholesale spot market
		Partial	Full	
–1989	BEL, ESP			
1990	GBR	GBR		GBR
1991		NOR	NOR	NOR
1992	NOR, SWE			
1993		NZL		
1994	NZL, POR	AUS	NZL	AUS
1995	AUS	FIN, POR		
1996	CAN	SWE	SWE	CAN, FIN, NZL, SWE
1997	FIN	USA	FIN	
1998	DEN, NED, USA	DEN, GER, ESP	GER, GBR	ESP, USA
1999	ITA	NED, ITA		DEN, NED
2000		*BEL, FRA, IRL, JPN*		*GER*
2001		*CAN,GRE*	*CAN*	*FRA*

Country names: AUS (Australia), BEL (Belgium), CAN (Canada), DEN (Denmark), FIN (Finland), FRA (France), GER (Germany), GRE (Greece), IRL (Ireland), ITA (Italy), JPN (Japan), NED (The Netherlands), NZL (New Zealand), NOR (Norway), POR (Portugal), ESP (Spain), SWE (Sweden), GBR (United Kingdom), USA (United States).
The entries in italics indicate information outside the sample period in this study.

This table lets us show that all countries did not complete the same steps and that there were those who went much further than others, like the United Kingdom that was a pioneer. In addition, all countries did not proceed in the same order. For example, Norway initially created its wholesale market before separating its vertical integration, while the United Kingdom proceeded with these reforms in the same year.

For Canada, the table shows that the separation of vertical integration began in 1996, which corresponds to when the Federal Energy Regulatory Commission rendered its Order 888[2] requiring the separation of vertical integration, thus obliging Canada to conform to it in order to export its electricity to the United States. In United States, it was only undertaken in 1998, as shown by the table.

[2] Federal Energy Regulatory Commission, 2013. "Order No. 888. Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities", http://www.ferc.gov/legal/maj-ord-reg/land-docs/order888.asp

In addition to these reforms, some privatisation of public electricity utilities was desirable in order to introduce competition into each sector. Our research on the 19 countries showed that the privatisation craze was, by and large, more limited but that the majority of these countries by 2006 had a wholesale market and an industry that was separated (following unbundling or de-grouping). On the other hand, for privatisation, less than half the countries had privatised 75% or more of their electricity production. As for Canada, as will be seen further on in the research, private production did not exceed 21.23% in 2010.

Deregulation and Privatisation - A Picture of the 19 OECD Countries

(1987 and 2006)

Reforms	1987	2006
Unbundling (Undoing Integration)	1	16
Retail Competition (All Categories)	0	10
Wholesale Market (At Least One)	0	18
Privatisation (production > 75%)	3	9

The electricity industry reforms did not provide the expected results and many countries slowed down or even stopped their reforms. Some Canadian provinces, even though they had technically separated the vertical integration of their public electricity utilities, nevertheless maintained a *de facto* form of vertical integration, as in Manitoba.

Alberta represents, in its opinion, an industry similar to that expected by the "New Public Management" school, that being an industry in which several businesses coexist in the production and distribution, where electricity is sold on a wholesale

market and the price set by the market. Even retail trade is possible in this province.

Several models exist for the world's electricity industry and there is strong pressure to have the deregulated model apply in all countries of the world.

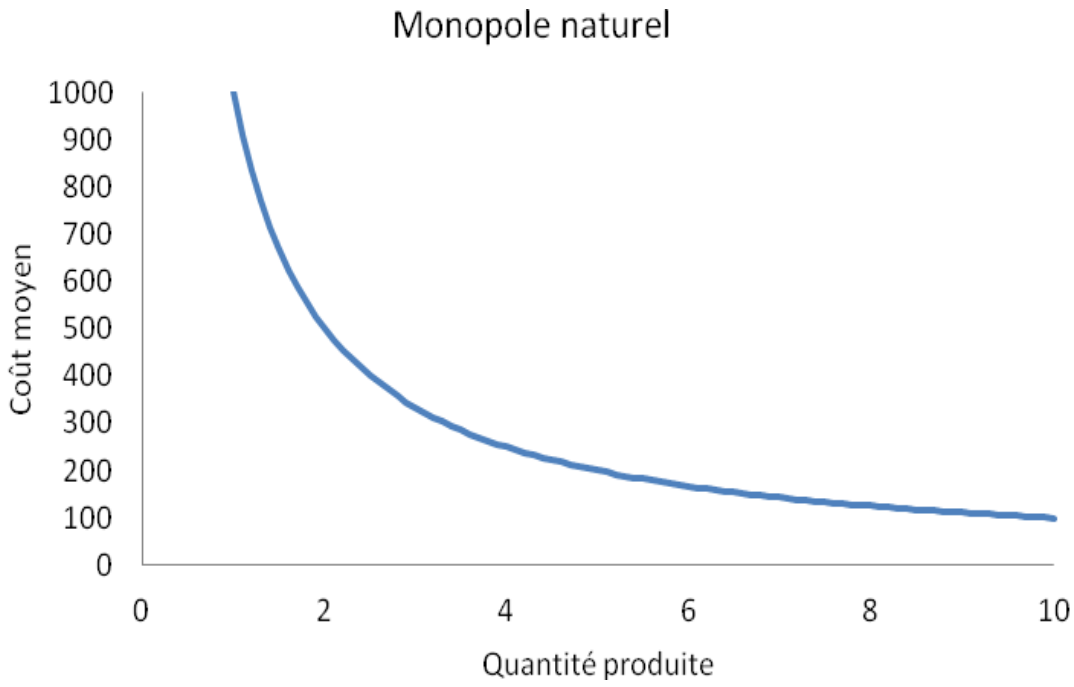
There is resistance due to the difficulty of having competition in the production, transmission and distribution of electricity. As with municipal water service and rail service, the industry is characterised by a natural monopoly that theoretically precludes having strong competition among the various players.

An industry is in a natural monopoly situation when the good produced necessitates fixed costs far greater than the expenditures for variable costs. When it comes to electricity production, the hypothesis under which the industry is in a situation of natural monopoly is easily demonstrated for hydroelectric or wind production but less easily for types of thermal production.

According to Joskow and Schmalensee (1985) in Chebel-Horstmann (2006)[3], the theory of natural monopoly in production no longer holds up if small centrals can be profitable, which is now achievable with new technologies. Now, "if political orientations expect to maintain growth in the size of production units"[4], natural monopoly theory is justified.

[3] Nadia Chebel-Horstmann, *La régulation du marché de l'électricité: Concurrence et accès aux réseaux* (regulation of the electricity market: competition and access to the network) (Google digital books) Harmattan publisher, 2006-06-01 - 502 pages (p.33, note 80)

[4] *Ibid.* p.33



The above graph shows an average cost that decreases as a function of the quantity produced. For transmission and distribution, as is the case for industries that require greater fixed costs than variable costs, this relationship applies.

As previously noted, there is not unanimity for the production of electricity but, for this current work, we believe that the political direction of the public model should support vertical integration and growth in production. For Canadian provinces whose production is primarily hydroelectric, this is not an issue since this type of technology necessitates very great fixed costs.

STYLISED FACTS

In Canada, electricity is a public service that is primarily publicly managed, but many differences exist among the provinces. Manitoba and Québec have Crown corporations that produce, transport and distribute virtually all of their electricity

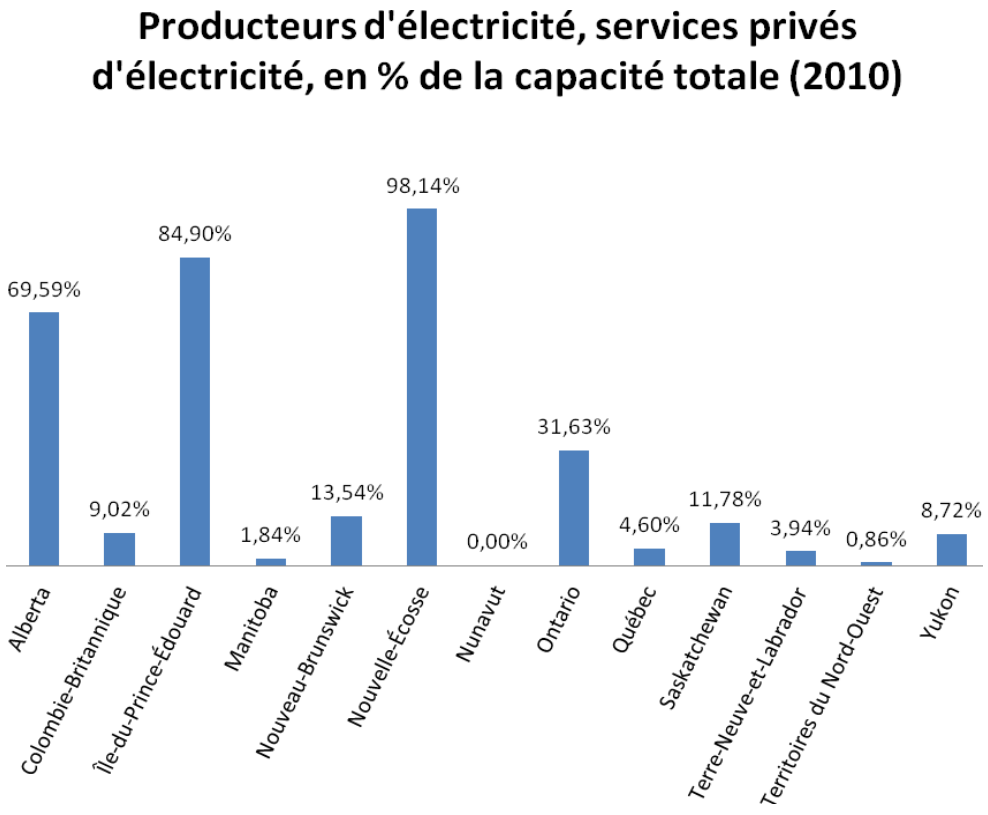
while Alberta and Ontario, following a certain amount of deregulation and privatisation, have Crown corporations, municipal corporations and private companies that trade on a wholesale market administered by an independent operator. A description of provincial industries is shown, below, in order to give the reader a basis for making comparisons among the provinces.

PRIVATE AND PUBLIC PRODUCTION CAPACITY

Statistics Canada data provide information on the kW capacity of industrial, public and private producers in Canada and its provinces. The tables and graphs below give a picture of the industry in terms of installed capacity, in kW or in %, for utilities provided by private and public industries.

Including industrial production in total production capacity, and in calculating the ratio of private production capacity compared to it, by province, here is what we find:

Electricity Producers, Private Electricity Utilities as a % of Total Capacity (2010)



From this graph, we can see that two maritime provinces, Prince Edward Island and Nova Scotia, depend massively on private production. Alberta and Ontario also stand out in having more private production capacity than the other provinces. In the following section, we will also see that the taxpayers in *these* provinces pay a higher price for their electricity than the others.

The table below, which goes back to 2006, shows that the share of private production in Canada has gone from 20.41% in 2006 to 21.23% in 2010 while the public share has gone from 73.04% to 71.87% (including industrial production). This allows us to state that electricity production in Canada is still primarily public.

Electricity Production Capacity in Canada by Category of Producer (kW)[5]

Category	2006	2010
Electricity Producers, Industries [6]	8 062 585	8 995 891
Electricity Producers, Private electricity utilities [7]	25 104 687	27 720 125
Electricity Producers, Public electricity utilities	89 836 132	93 827 466
Total	123 003 404	130 543 482

Some provinces, like Alberta and Ontario, produce more electricity from private electricity utilities than Québec and Manitoba for example. The tables below indicate the changes over time of the private and public portions of electricity production, for the four provinces:

Electricity Production Capacity in Alberta by Category of Producer (%)[5]

Category	2006	2010
Electricity Producers, Industries	14.52%	15.52%
Electricity Producers, Private electricity utilities	81.31%	69.59%
Electricity Producers, Public electricity utilities	4.17%	14.89%

Electricity Production Capacity in Ontario by Category of Producer (%)[5]

Category	2006	2010
Electricity Producers, Industries	2.40%	2.12%
Electricity Producers, Private electricity utilities	27.95%	31.63%
Electricity Producers, Public electricity utilities	69.65%	66.24%

[5] Statistics Canada, 2013. Table 127-0009, Installed generating capacity, by class of electricity producer: annual (kilowatts) http://www5.statcan.gc.ca/cansim/a26?id=1270009&p2=9&p1=-1&tabMode=dataTable&retrLang=eng&srchLan=-1&lang=eng

[6] "Establishments that produce electricity while not being part of the electricity production, transmission and distribution industry (North American Industry Classification (NAICS): 22111)."

[7] "A utility is an organisation whose principal purpose is the production, transmission and/or the distribution of electric energy for sale. It can be either private or public (provincial or municipal)."

Electricity Production Capacity in Manitoba by Category of Producer (%)[5]

	2006	2010
Electricity Producers, Industries	0.39%	0.39%
Electricity Producers, Private electricity utilities	1.85%	1.84%
Electricity Producers, Public electricity utilities	97.76%	97.77%

Electricity Production Capacity in Québec by Category of Producer (%)[5]

	2006	2010
Electricity Producers, Industries	7.20%	7.92%
Electricity Producers, Private electricity utilities	4.86%	4.60%
Electricity Producers, Public electricity utilities	87.94%	87.48%

The picture is thus very different from one province to another. It seems Alberta depends primarily on electricity produced by private companies but that this tendency, in terms of capacity, has fallen from 81% to 70%. For Ontario, almost one third of electricity production capacity is private and that proportion has grown since 2006. Other provinces like Québec and Manitoba produce their electricity primarily from public sources and the picture has changed very little since 2006.

For Canada, Stats Canada has 13 tables on the subject of "Nuclear and Electric Energy" but only one was useful for this current research since none of the other information was classified by category of producer (private or public).

While there was no information on transmission, distribution and retailers, there were, nevertheless, statistics pertinent to this study and a good base point to evaluate the impact of the privatisation of electricity utilities in Canada. In the appendix, a picture of each province and territory has been produced.

ELECTRICITY PRICES IN CANADA AND THE WORLD

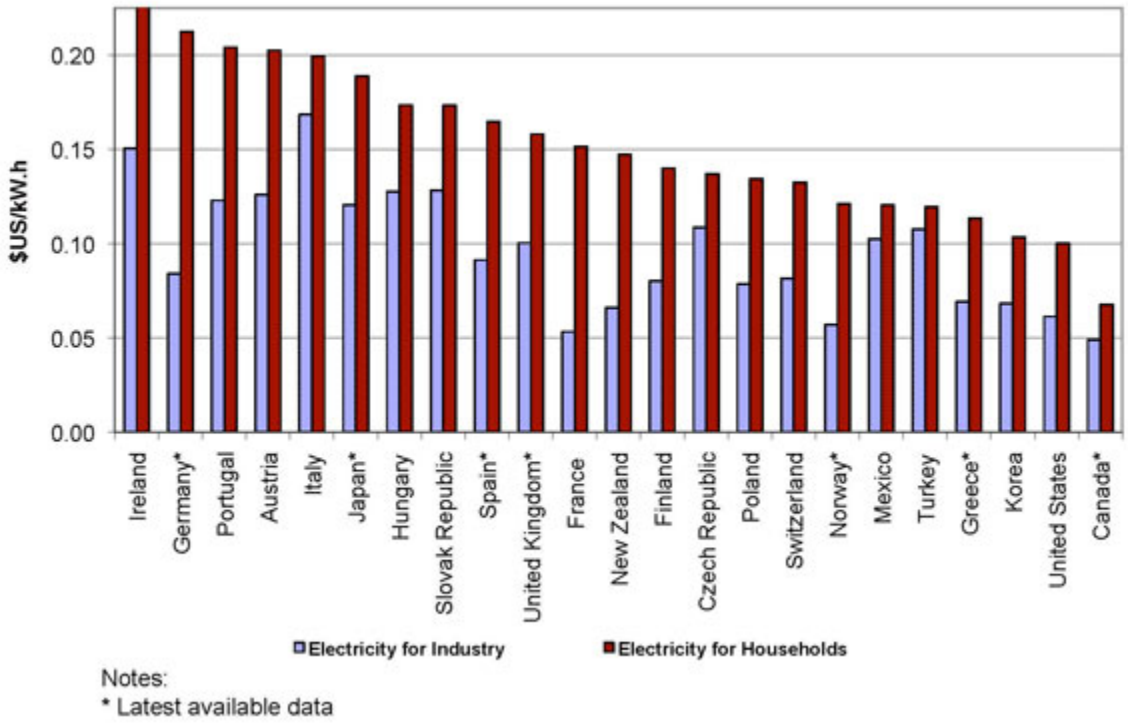
Anyone who is interested in the question of public electricity utilities will dwell on the prices paid by consumers per kWh, which depend on several factors such as the type of production and the prices on wholesale markets. In our opinion, the price can be equally influenced by the type of public or private ownership of the public electricity utilities.

A glimpse at the prices paid by consumers is the first step in trying to see if public electricity utilities offer their electricity at prices higher than private utilities. However, the comparison cannot stop just at the price because other variables must be considered, which will be done in the final part of this research.

Canada's National Energy Board (NEB) site comprises considerable data that are useful for following changes in the country's electricity industry. With data from the International Energy Agency (IEA), the NEB prepares a picture of world electricity prices for the residential and commercial sectors, which clearly shows that Canada is the country in the world where electricity prices are among the lowest, due to "low-cost hydraulic resources and vast sources of coal supply"[8].

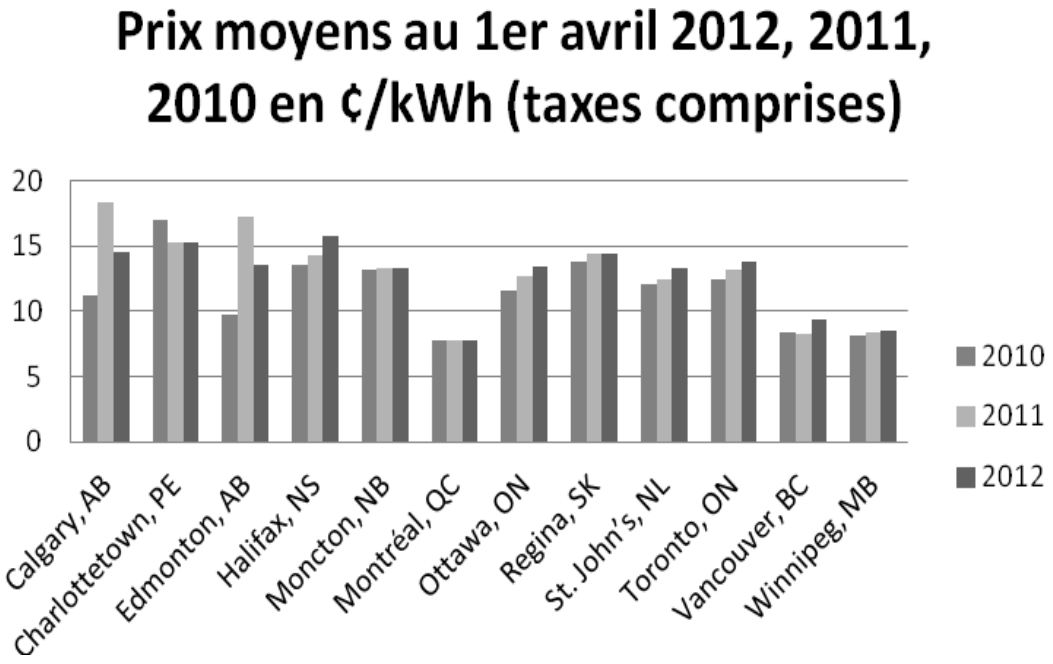
In our opinion, the fact that the Canadian industry is primarily public also has an impact. Moreover, those countries where one pays the most for electricity, on this chart, are also the countries that have a strong private production of electricity.

[8] National Energy Board, 2013. “Electricity – Frequently Asked Questions (FAQ)”, http://www.neb.gc.ca/clf-nsi/rnrgynfmtn/prcng/lctrct/frqntlskdqstn-eng.html



Each year, Hydro-Québec produces price comparisons, among major North American cities[9], which show that the four provinces that have deregulated and/or privatised their industry are also the ones where the residential-sector prices paid by consumers are the highest. This is shown in the following graph:

[9] Hydro Québec, 2012, 2011, 2010. “Comparison of Electricity Prices in Major North American Cities", http://www.hydroquebec.com/publications/fr/comparaison_prix/index.html



AVERAGE PRICE ON APRIL 1, 2012, 2011, 2010 IN ¢/KWH (TAXES INCLUDED)

COMPARATIVE ANALYSIS

The purpose of this part of the research is to estimate which model, private or public, is the most advantageous from the taxpayers' point of view. Two approaches were examined:

1. By measuring the impact of reforms on the price paid by residential and industrial consumers, or on the cost of the electricity delivered, in order to determine if they are effective or not;

2. By identifying the value of the monopolist's rent to estimate the gain or loss incurred as a function of the type of model.

IMPACT ON PRICE AND ON COST

In order to compare the efficiency of various Canadian models for the electricity industry, and to determine if the public has an advantage over the private system, a number of methods can be chosen.

The first consists of utilising data for the cost of producing, transmitting and distributing electricity, positioning it as a dependent variable and testing the effect of privatisation and deregulation on it, while controlling certain other variables like the type of production or the provincial gross domestic product.

The problem with this approach is that the costs of production, transmission and distribution are not available for the private sector and sometimes not even for the public sector. In addition, the costs would have to be available for a sufficiently-long period for the number of observations to allow us to obtain statistically-significant coefficients.

The other option would be to take the final prices paid by residential, commercial and industrial consumers and to redo this analysis. On the other hand, with the method using a cost- or price-dependent variable, a problem arises if it is used only for Canada because the data on the subject, available by province, do not cover a long enough period for us to carry out this type of analysis.

This said, researchers have studied the matter and have produced analysis models to try to identify the impact of electricity industry privatisation and deregulation by using a number of countries over a number of years. The results are somewhat contradictory from one study to the next, for both deregulation variables and privatisation variables, for the industrial and residential sectors.

Effects of Reforms and Privatisation on Industrial Prices
Sample of 19 OECD Countries[10]

	Steiner (2000)[11] from 1986 to 1996 (industrial)	Tsutsui (2004)[12] from 1987 to 1999 (industrial)
Unbundling	Not statistically significant	Not statistically significant
Retail competition (none, some, total)	Not statistically significant	-0.005
Wholesale market (at least one)	-0.005	0.009
Privatisation (+25%)	0.003	-0.009

Using the same econometric model as Steiner and Tsutsui, but adding some years to it, we found a strong positive effect on the price when there was unbundling[13] of the industry and slightly negative when there was retail competition.

That said, since the two reforms only exist interdependently, that's the case in Alberta and Ontario, the conclusion is that they have the effect of raising prices for consumers, which would indicate that the gap between price and marginal cost would be increased. In other words, from an economic point of view, the industry would not be more efficient following the reforms.

[10] Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, New Zealand, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom, United States

[11] Steiner. F. 2000. "*Regulation, Industry Structure and Performance in the Electricity Supply Industry*", OECD Economics Department, Working Paper, 41 p.

[12] Hattori, Toru and Miki Tsutsui, 2004. "*Economic Impact of Regulatory Reforms in the Electricity Supply Industry : a Panel Data Analysis for OECD Countries*", Energy Policy, vol. 32, p. 823-832

[13] Unbundling or de-grouping, term used to describe the separation of the industry's vertical integration.

Effects of Reforms and Privatisation on Residential and Industrial Prices
Sample of 19 OECD Countries

	From 1987 to 2006 (Residential)
Unbundling	0.016
Retail Competition (none, some, total)	-0.008
Short-Term Market (at least one)	Not statistically significant
Privatisation (+25%)	Not statistically significant

A study by Erdogdu, (2011)[14], covering the period from 1982 to 2009 for 63 developed and developing countries, dealt with the impact in the residential and industrial sectors for some combinations of variables. Once again, results for the variables of deregulation were different but as for the privatisation variable the coefficients indicated that there was an increase in the price-cost margins.

The Erdogdu (2011) model is interesting because, contrary to the preceding, it used a dependent variable that took not only price but also cost into account[15], which gives us a better estimate of the impact on efficiency. Nevertheless, the dependent variable is not a measure of profits because, as previously mentioned, it is impossible to obtain, with precision, data on the costs of production, transmission and distribution.

[14] Erkan Erdogdu, 2011. "The Impact of Power Market Reforms on Electricity Price Cost Margins and Cross Subsidy Levels: a Cross Country Panel Data Analysis", Energy Policy, Munich Personal RePEc Archive, http://mpra.ub.uni-muenchen.de/28414/, 34 p.

[15] Price-Cost Margin = Final price of electricity for the consumer less the cost of the fuel. For renewable or nuclear energies, input costs are ignored.

Results of Erdogdu Estimates (2011)

	Developed countries (Industrial)	Developed Countries (Residential)
Dependent Variables	Price-Cost Margin Log	Price-Cost Margin Log
Log of electricity consumption by industry	-0.947	-
Log of electricity consumption by par household	-	1.21
Loss of electricity in percentage	-0.094	0.039
Log of GDP per person	0.617	0.925
Existence of independent producers (IPPs)	-0.116	-
Privatisation	0.188	0.172
Existence of a regulator	-0.238	-
Privatisation and regulator	0.193	-
Privatisation and unbundling	0.28	-
Constant	12.592	14.088

From this table, it is clear that the privatisation of the electricity industry in developed countries has increased the price-cost margin, which shows that the hypothesis that privatisation has no impact is rejected.

For the author: "On their own, privatization increases industrial price-cost margins while existence of an electricity market regulator decreases them. If they exist together, they raise industrial price-cost margins in developed countries."[16]

In addition, for the residential sector: “Our study finds that, on their own, unbundling and privatization raise residential price-cost margins[17].

[16] Erkan Erdogdu, 2011. "The Impact of Power Market Reforms on Electricity Price-Cost Margins and Cross Subsidy Levels: a Cross Country Panel Data Analysis", Energy Policy, Munich Personal RePEc Archive, http://mpra.ub.uni-muenchen.de/28414/ p.21 (4)

[17] *Ibid.* p.21 (10)

From the first part of this comparative analysis we can conclude that the privatisation of public electricity utilities has not reduced the price paid by the consumer for electricity. It is true that in cases where the public utility was nonprofitable and sold at a loss, privatisation that led to an increase in price could indicate that the consumer paid a fair price. This is rarely the case and, in Manitoba or Québec, Crown corporations produced cost efficient and accounting profits, which shows that the price at which electricity is sold allows these businesses to be profitable.

The Erdogdu study goes further, using a dependent variable that takes cost of production, from the price of inputs, into account. The coefficients that he obtained, with regard to privatisation, clearly show that this ratio increases; which is to say that the spread between price and the cost of production, calculated from the price of fuel for thermal generating sites, tends to increase when there is privatisation.

Given that, theoretically, the electricity industry is a natural monopoly and that deregulation accompanied by privatisation does not, in all likelihood, lead to more competition – which can be empirically verified – the rent that the private monopolist takes is thus a loss for all taxpayers and, in the following section, we estimate the value of this loss for the state and its taxpayers, from available data.

VALUE OF THE PRIVATE MONOPOLIST'S RENT

In order to identify who the monopolists in Canada's electricity industry are, a number of bits of information have to be brought together. For production, there are many private businesses that operate small, electric-power generating stations, everywhere in Canada. Information on the income and profit of these

businesses is not available, unless they are listed on the stock exchange. This makes it difficult to gather information on them.

When it comes to transmission, the vast majority of assets belong to provincial, public companies and access to information on them is thus available. For distribution, the businesses are either public (belonging to provinces or municipalities) or private. In Ontario, many private distribution companies have only one shareholder, the municipality that receives its services. In such cases, the monopolist's rent goes to the shareholder, the taxpayers, and it can thus be considered that the rent is not lost to the public. Lastly, retail companies such as Bullfrog Energy, are private.

Because the distribution and transmission sectors are primarily public, the production sector has been targeted in order to estimate a part of the monopolist's rent in Canada, for the production of electricity. According to information from the Canadian Electricity Association[18], provincial electricity regulatory bodies, as well as other industry organisations, more than 100 electricity producers have been catalogued in Canada. A list of the largest private producers is presented below:

Principal Owners of Private Electricity Production Companies in Canada
ATCO Group Limited
Capital Power Corporation
Emera Incorporated

[18] Canadian Electricity Association, 2011. "Leading the Discussion on Electricity in Canada", 50 pages.

Nova Scotia Power Incorporated

TransCanada Corporation

TransAlta Corporation

ATCO Group Limited is a multinational enterprise with 9400 employees[19]. It had revenues of $4.362 billions and assets of $14.315 billions in 2012[20]. Their net profits were $677 millions and the taxes paid by the company amounted to $214 millions. It is an Alberta company that has subsidiaries in logistics, public utilities (pipelines, transportation and distribution of natural gas and electricity), in energy (electricity production, natural gas, storage and extraction) and in technologies[21]:

[19] ATCO Group, 2013. "ATCO Group: Where Excellence Meets Innovation", http://www.atco.com/About-Us/

[20] ATCO Group, 2013. "Consolidated Financial Statements for the Year Ended December 31, 2012", 74 p. pp.1-3.

[21] ATCO Group, 2013. "Consolidated Financial Statements for the Year Ended December 31, 2012", 74 p. pp.6-7.

Main Operations Subsidiaries	Principal Activity
ATCO Structures & Logistics (75.5%)	Construction, logistics and noise reduction
Canadian Utilities Limited (52.9%)	Holding company
CU Inc.	Holding company
ATCO Gas	Natural gas distribution
ATCO Pipelines	Natural gas transportation
ATCO Electric	Electricity transmission and distribution
ATCO Australia	Holding company
ATCO Gas Australia	Natural gas distribution
ATCO Power Australia	Electricity production
ATCO I-Tek Australia	Information systems and technologies
ATCO Power	Electricity production
ATCO Energy Solutions	Natural gas extraction and processing, storage and liquids extraction
ATCO I-Tek	Information Systems and technologies

The ATCO Group's consolidated financial statements contain information for all its subsidiaries. However, we cannot isolate the subsidiaries that are involved in the electricity industry for production, transmission and distribution. Only ATCO Group is on the stock market which means that the subsidiaries do not provide public documentation of their balance sheets and financial statements.

For electricity production, it is the subsidiary, ATCO Power, owned (75.5%) by ATCO Group and its subsidiary Canadian Utilities Limited (24.5%), which we must analyse. However, it is not possible to isolate the net profit of this subsidiary in the consolidated financial statements.

This establishment has electric power generating stations in the United Kingdom and Canada with more than 500 employees[22], income of $900 million and assets

[22] ATCO Power, 2013. "Quick Facts", http://www.atcopower.com/About-Us/Our-Company/Quick-Facts

of $2.2 billion in 2010[23]. It has more than 10 coal, hydro and natural gas power-generating stations in Alberta but also in British Columbia, Saskatchewan and Ontario[24].

Canadian Utilities Limited, an ATCO Group subsidiary, is also an owner of ATCO Power. The company's financial statements[25] show revenues of $3,139 billion and net profits after taxes of $580 million, in 2012

It is not possible to obtain the net profit for ATCO Power, but, we know that its parent companies made 15.5% and 18.5% profits after taxes based on their incomes. When that is applied to the income of ATCO Power, it represents between $140 and $166 million of after-tax profit and, if the stated hypotheses hold, this would be the monopolist's rent (in this case, the oligopolist's).

Alberta has 69.59% of its electricity production capacity coming from power-generating stations owned by private enterprises like ATCO Power. TransAlta is another major Alberta enterprise. As this is a company with widely-held ownership, the financial results can be consulted. However, TransAlta has five subsidiaries such as TransAlta USA inc., which means that the consolidation of profits after taxes prevents us from obtaining the rent for generating stations in Canada.

[23] Canadian Electricity Association, 2011. "Leading the Discussion on Electricity in Canada", 50 pages. pg.23

[24] ATCO Power, 2013. "North American Facilities", http://www.atcopower.com/Our-Facilities/North-American-Facilities

[25] Canadian Utilities Limited, 2013. "Canadian Utilities Limited Consolidated Statement of Earnings, for the Year Ended December 31, 2012", 71 p. p.1

Financial Results [26] for TransAlta, Income, Profits, Taxes (2007-2012) (M$)

	2012	2011	2010	2009	2008	2007
Income	2,262	2,663	2,673	2,770	3,110	2,775
Net Profit	-546	343	280	181	235	309
Taxes	103	106	24	15	23	20

A review of the financial statements also revealed that the company experienced heavy losses after taxes in 2012 – $546 million – representing 24.14% of its income. In 2007 to 2012 inclusively the company achieved profits representing about 5% of its income and 9.6% if 2012 is not considered. The company paid an average of $48.5 million of taxes annually but less than 1% of its income (and less than 10% of its net profits) annually between 2007 and 2010, inclusively. The $133 million of average, annual profit after taxes, which we get for the period 2007 to 2012 inclusively, also comprises the profits from the other subsidiaries.

According to the Canadian Electricity Association, this company has 2,389 employees, has $9.9 billion in assets and produces 48,614 GWh of electricity per year, with a production capacity of 8,026 MW. The production sources include coal, hydro and gas. TransAlta also has wind, biomass and geothermal generating stations.[27]

Alberta entrusts the majority of its electricity distribution to the private firm FortisAlberta. In fact, this firm is responsible for more than 60% of the distribution of low-voltage electricity for the province[28]. A glance at the financial statements of the business shows it had an income of $449.026 million, with a net profit of

[26] TransAlta, 2010. "TransAlta Consolidated Financial Statements December 31, 2009", 53 p. p. 5 TransAlta, 2013. "TransAlta Consolidated Financial Statements December 31, 2012" 72 pgs, p 73/139.

[27] Canadian Electricity Association, 2011. "Leading the Discussion on Electricity in Canada", 50 pages. pg 48

[28] FortisAlberta, 2013. "Quick Facts", http://www.fortisalberta.com/about/company/Pages/Quick-Facts.aspx

$96,167 million or 21.42% of income. 2012 income taxes amounted to $307,000. It is thus possible to separate out the net profits for more than 60% of the distribution of electricity and to identify it as monopolist's rent.

Capital Power Corporation, a private company, has electricity-generating stations in British Columbia, Ontario and Alberta. However, it also has some in Connecticut, Maine, Rhode Island and North Carolina[29], which prevents isolating the net incomes from their consolidated income statements. The company achieved 6.97% of net profits on revenues of $1.291 billion in 2012 and 11.12% on $1.691 billion in 2011[30].

In Ontario, 31.63% of electricity production capacity comes from the private sector. The public utility is Ontario Power Generation (OPG), a company entirely owned by the province of Ontario[31]. With a capacity of 19,014 MW[32], it owns and operates two nuclear, five thermal and 65 hydroelectric stations plus two wind-power turbines[33]. In 2012, OPG generated 83.7 TWh[34] or 55.14% of the electricity produced in Ontario. The net revenue from this business was $367 million in 2012 and $338 million in 2011[35], a rent received entirely by its sole shareholder, the province of Ontario.

[29] Capital Power, 2013. "About Capital Power", http://www.capitalpower.com/About/Pages/default.aspx

[30] Capital Power Corporation, 2013. Consolidated Financial Statements of CAPITAL POWER CORPORATION Years ended December 31, 2012 and 2011 66 pages. p.6

[31] Ontario Power Generation, 2013. "Investor Relations", http://www.opg.com/investor/

[32] Ontario Power Generation, 2013. "Power Generation", http://www.opg.com/power/

[33] Ontario Power Generation, 2013. "About", http://www.opg.com/about/

[34] Ontario Power Generation, 2013. "Power Generation", http://www.opg.com/power/

[35] Ontario Power Generation, 2013. "Annual Report 2012", 154 pages, p.78.

Electricity Production in Ontario, by year and by type (TWh)[36]

Year	Nuclear	Hydro	Coal	Gas	Wind	Other	Total
2012	85.6	33.8	4.3	22.2	4.6	1.3	151.80
	56.40%	22.30%	2.80%	14.60%	3.00%	0.80%	100.00%
2011	85.3	33.3	4.1	22	3.9	1.2	149.80
	56.90%	22.20%	2.70%	14.70%	2.60%	0.80%	100.00%
2010	82.9	30,7	12,6	20,5	2,8	1,3	150.80
	55.00%	20.40%	8.30%	13.60%	1.90%	0.80%	100.00%
2009	82.5	38.1	9.8	15.4	2.3	1.2	149.30
	55.20%	25.50%	6.60%	10.30%	1.60%	0.80%	100.00%
2008	84.4	38.3	23.2	11	1.4	1	159.30
	53.00%	24.10%	14.50%	6.90%	0.90%	0.60%	100.00%

The percentages have been rounded; it is possible that they do not total 100%.

The private corporation, Bruce Power, has a nuclear-energy electricity production site made up of 8 reactors[37]. The company produced 36.55 TWh of electricity in 2011[38] and has a production capacity of 6,300 MW[39]. Bruce Power is a partnership between Cameco Corporation, TransCanada Corporation, Borealis Infrastructure (a trust established by the Ontario Municipal Employees Retirement System trust), the Power Worker's Union (PWU) – a CUPE affiliate – and the Society of Energy Professionals, making Bruce Power Canada's largest producer of nuclear-generated electricity[40].

[36] Independent Electricity System Operator, Ontario, 2013. "Ontario's Independent Electricity System Operator Releases 2012 Electricity Production, Consumption and Price Data", http://www.ieso.ca/imoweb/media/md_newsitem.asp?newsID=6323

[37] Bruce Power, 2013. "Bruce Power is Canada's First Private Nuclear Generator" http://www.brucepower.com/about-us/

[38] Bruce Power 2013. "Bruce Power Annual Review 2011", http://www.brucepower.com/wp-content/uploads/2011/04/2011-BP-AnnualReview-web.pdf 23 pages, p.34

[39] Bruce Power, 2013. "A Look Back at the History of Bruce Power" http://www.brucepower.com/about-us/guide-to-bruce-power/

[40] Bruce Power, 2013. "Bruce Power is Canada's First Private Nuclear Generator" http://www.brucepower.com/about-us/

Cameco is a world-class producer of uranium and has mines in Canada, the United States and Kazakhstan[41]. It is a widely-held corporation but its consolidated financial statements do not allow for the monopolist's rent to be isolated. Cameco owns 31.6% of Bruce Power L.P. (BPLP) which operates the Bruce B group's[42] nuclear reactors. In 2012, the company had a more than 10% net profit but it is not possible to obtain the information for just Bruce Power.

TransCanada Corporation is a Canadian company that owns about 57,000 km of pipeline, gas storage installations, and 19 electricity production facilities (wholly or partially) with a capacity of more than 10,800 MW[43]. The company's income for 2012 was $8.007 billion of which 2.704 came from the energy stream. Income tax expenses were in the order of $466 million and the net profit amounted to $1.472 billion or 18.38% of consolidated income.

Since there are three subsidiaries included in these profits, we cannot separate out the monopolist's rent for the energy sector but, in light of this information, one can nevertheless conclude that the profit margin for TransCanada Corporation is significant. Since only a small part of this rent is returned, through income taxes, to Canadian taxpayers, the vast majority of the profits is completely lost to the public.

[41] Cameco Corporation, 2013. "About CAMECO" http://www.cameco.com/about/

[42] Cameco Corporation, 2013. "Cameco Corporation 2012 Consolidated Financial Statements", 62 pages, p.8

[43] TransCanada Corporation, 2013. "Facts and Figures", http://www.transcanada.com/facts-figures.html

TransCanada also owns other businesses like Cartier Wind Energy[44] that operates wind-power generating sites in Québec and functioning solar-energy generating sites in Ontario.

The company also has a natural-gas generating facility in Bécancour, Québec, which has been closed since its start-up, due to a lack of demand for electricity. Hydro-Québec has "spent more than $900 million on TransCanada"[45], since 2008, and the facility will remain closed until 2016. In Québec, private electricity-generating capacity represents just 4.6% of total capacity. But, the experience of TransCanada's Bécancour facility clearly shows that, in this case, recourse to the private sector has proven to be a failure and that only a small part of the monopolist's rent that is cornered by the public through Hydro-Québec (a public company) was received by the shareholders of TransCanada Corporation.

The two provinces in which the largest capacity of private electricity production is found are Nova Scotia, with 98.14%, and Prince Edward Island, with 84.80%.

Emera's subsidiary, Nova Scotia Power, generates, transports and distributes 95% of Nova Scotia's electricity, providing its 488,000 clients with production of more than 11,000 GWh, annually[46]. The subsidiary's income, in 2012, was $1.237 billion, with net income of $133.9 million and the company paid no income

[44] Cartier Wind Energy, "Company Background", http://www.cartierenergie.com/en/cartier-energie.aspx?sec=1

[45] Pierre Couture, January 22, 2013. "*Hydro: plus de 23 milliards pour acheter de l'électricité*" (Hydro: More Than 23 Billion to Buy Electricity) Le Soleil, http://www.lapresse.ca/le-soleil/affaires/actualite-economique/201301/21/01-4613581-hydro-plus-de-23-milliards-pour-acheter-de-lelectricite.php

[46] Nova Scotia Power Inc , 2013. "Who We Are", http://www.nspower.ca/en/home/aboutnspower/whoweare/default.aspx

taxes; rather, it received $29 million in recoveries[47]. For Emera, net profits amounted to $231.9 million on income of $2.059 billion[48].

Since Nova Scotia Power is a widely-held corporation, the monopolist's rent corresponds to its net profits and, in 2012, the company paid no income taxes. This rent was totally externalised, left to private interests, to the detriment of all of Nova Scotia's taxpayers.

On Prince Edward Island, Maritime Electric company, which produced 1,119 GWh and served 74,300 clients, belongs to Fortis inc. Fortis provides its consolidated results but from them we cannot isolate the monopolist's rent for Maritime Electric.

Having made an overview of private electricity generation in Canada, we find that millions of dollars are lost to Canadian taxpayers. This picture, of a number of private companies that share the electricity market, also tells us that competition is rather weak, confirming our initial hypothesis regarding the natural monopoly that characterises the electricity industry.

The purpose of this part of the research is to isolate the monopolist’s rent in order to proceed with comparative analyses. Since some companies or subsidiaries are not widely held companies, it has not been possible to achieve this goal entirely. However, the compilation of the net profits of private companies for which we have consolidated results gives us a good idea of what the rent collected by private interests might look like.

[47] Nova Scotia Power inc., 2013. "Nova Scotia Power inc. Financial Statements December 31, 2012 and 2011”, 44 pages, p.37.

[48] Emera Incorporated, 2013. "Emera Incorporated Consolidated Financial Statements December 31, 2012 and 2011", 82 pages, pg 77.

We also found that the income tax paid by these private companies does not compensate at all for this rent, because the profits of public companies are returned, in one form or another, to the government, while only a small part of the net profits of private companies comes back to the state.

CONCLUSION

The purpose of this research was to create a picture of the private portion of Canada's electricity industry and to evaluate the impact of these reforms for taxpayers.

From a review of the literature of the principle empirical works on the subject, it has been shown that the deregulation and privatisation of electricity utilities does not lower prices for consumers.

In addition, the theoretical analysis we pursued has shown that the natural monopoly situation characterising the electricity industry limits competition and that the privatisation of electricity utilities will lead to a market monopolised by one or a few businesses.

In doing this, privatisation externalises monopolist’s rent to private interests and the redistribution of this rent cannot be done in a fair and democratic fashion. The financial statements that we were able to consult showed the size of such monopolist’s rent and also showed that the taxes paid by these businesses are not sufficient to replace the loss of this rent.

This research should enable the pursuit of other analyses of electricity production and prices paid by consumers. The econometric models presented here serve to appraise the impact of privatisation and deregulation in Canada by assessing if these variables have resulted in lowering the prices paid by consumers.

For the time being, we can see that the provinces with the greatest amount of private production are also the ones that pay the most for their electricity. But, in order to be as rigorous as possible, we would have to be sure to include other variables that would enable us to obtain a statistically significant result.

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APPENDIX

Electricity Production Capacity in Canada by Category of Producer (%)[5]

	2006	2007	2008	2009	2010
Alberta					
Electricity Producers, Industries (2)	14.52%	15.98%	16.05%	15.47%	15.52%
Electricity Producers, Private Electricity Utilities (1)	81.31%	70.87%	70.54%	69.82%	69,59%
Electricity Producers, Public Electricity Utilities (1)	4.17%	13.15%	13.41%	14.71%	14.89%
British Columbia					
Electricity Producers, Industries (2)	15.83%	15.27%	15.54%	15.92%	15.60%
Electricity Producers, Private Electricity Utilities (1)	8.25%	8.87%	8.76%	9.38%	9.02%
Electricity Producers, Public Electricity Utilities (1)	75.93%	75.86%	75.71%	74.70%	75.37%
Prince Edward Island					
Electricity Producers, Private Electricity Utilities (1)	91.92%	74.75%	78.59%	84.90%	84.90%
Electricity Producers, Public Electricity Utilities (1)	8.08%	25.25%	21.41%	15.10%	15,10%
Manitoba					
Electricity Producers, Industries (2)	0.39%	0.39%	0.39%	0.39%	0.39%
Electricity Producers, Private Electricity Utilities (1)	1.85%	1.85%	1.85%	1.84%	1.84%
Electricity Producers, Public Electricity Utilities (1)	97.76%	97.76%	97.76%	97.77%	97.77%
New Brunswick					
Electricity Producers, Industries (2)	1.75%	2.81%	2.38%	2.78%	2.71%
Electricity Producers, Private Electricity Utilities (1)	8.31%	8.20%	10.14%	12.51%	13.54%
Electricity Producers, Public Electricity Utilities (1)	89.95%	89.00%	87.48%	84.71%	83.75%
Nova Scotia					
Electricity Producers, Industries (2)	1.98%	1.96%	1.96%	1.96%	1.86%
Electricity Producers, Private Electricity Utilities (1)	98.02%	98.04%	98.04%	98.04%	98.14%
Electricity Producers, Public Electricity Utilities (1)	0.00%	0.00%	0.00%	0.00%	0.00%

Electricity Production Capacity in Canada by Category of Producer (%)

	2006	2007	2008	2009	2010
Nunavut					
Electricity Producers, Private Electricity Utilities (1)					0.00%
Electricity Producers, Public Electricity Utilities (1)	100.00%	100.00%	100.00%	100.00%	100.00%
Ontario					
Electricity Producers, Industries (2)	2.40%	2.28%	2.29%	2.07%	2.12%
Electricity Producers, Private Electricity Utilities (1)	27.95%	27.63%	28.38%	31.64%	31.63%
Electricity Producers, Public Electricity Utilities (1)	69.65%	70.09%	69.34%	66.29%	66.24%
Québec					
Electricity Producers, Industries (2)	7.20%	8.13%	7.96%	7.93%	7.92%
Electricity Producers, Private Electricity Utilities (1)	4.86%	4.63%	4.83%	4.48%	4.60%
Electricity Producers, Public Electricity Utilities (1)	87.94%	87.24%	87.21%	87.59%	87.48%
Saskatchewan					
Electricity Producers, Industries (2)	1.07%	1.07%	1.20%	1.14%	1.11%
Electricity Producers, Private Electricity Utilities (1)	12.72%	12.72%	12.85%	12.20%	11.78%
Electricity Producers, Public Electricity Utilities (1)	86.22%	86.22%	85.96%	86.66%	87.11%
Newfoundland and Labrador					
Electricity Producers, Industries (2)	2.14%	1.93%	1.93%	2.24%	2.26%
Electricity Producers, Private Electricity Utilities (1)	3.35%	3.44%	3.44%	4.19%	3.94%
Electricity Producers, Public Electricity Utilities (1)	94.52%	94.63%	94.63%	93.57%	93.80%
Northwest Territories					
Electricity Producers, Industries (2)	48.18%	46.17%	46.20%	50.74%	50,74%
Electricity Producers. Private Electricity Utilities (1)	0.98%	1.00%	0.94%	0.86%	0.86%
Electricity Producers, Public Electricity Utilities (1)	50.85%	52.82%	52.85%	48.40%	48.40%
Yukon					
Electricity Producers, Private Electricity Utilities (1)	8.66%	7.71%	7.71%	6.91%	8.72%
Electricity Producers, Public Electricity Utilities (1)	91.34%	92.29%	92.29%	93.09%	91.28%

(1) "A utility is an organisation whose principal purpose is the production, transmission and/or the distribution of electric energy for sale. It can be either private or public (provincial or municipal)."

(2) "Enterprises that produce electricity while not being part of the electricity production, transmission and distribution industry (North American Industry Classification (NAICS): 22111)."