THE PRICE OF ELECTRICITY IN QUÉBEC: RECONCILING CONFLICTING VIEWS[1]

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The price of electricity is a subject of controversy. Seldom does a month go by without a political, social or research group (among others) making a public statement for or against a hike in electricity prices. There are less frequent requests for a reduction in the price of electricity, although such an option is feasible based strictly on the cost of generating electricity. More formally, the debate takes place every year when Hydro-Québec files its "Demande relative à l'établissement des tarifs d'électricité" (Request relating to the establishment of electricity rates) with the Régie de l'énergie[2]. On this occasion, many stakeholders present their arguments with respect to proposals to revise the rates that have been tabled before this economic

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1. The author thanks the two anonymous reviewers for their comments and suggestions, as well as Martin Pâquet and Stéphane Savard for their editorial work.

2. In 2008-2009, 15 stakeholders expressed an opinion about Hydro-Québec's requested price increase : Association coopérative d'économie familiale de Québec, Association des redistributeurs d'électricité du Québec, Association patronale des entreprises en construction du Québec, Association provinciale des constructeurs d'habitations du Québec, Association québécoise des consommateurs industriels d'électricité et Conseil de l'industrie forestière du Québec, Conseil de la Nation Innu de Matimekush-Lac John, Énergie Brookfield Marketing Inc., Fédération canadienne de l'entreprise indépendante, Groupe de recherche appliquée en macroécologie, Option consommateurs, Regroupement des organismes environnementaux en énergie, Regroupement national des conseils régionaux de l'environnement du Québec, Stratégies énergétiques et Association québécoise de lutte contre la pollution atmosphérique, Union des consommateurs, Union des municipalités du Québec. It should be noted that these stakeholders' expenses are refunded, including their fees (ranging from $30 to $255/hour) for time devoted to these hearings. See *Guide de paiement des frais des intervenants 2009* (Montréal, Régie de l'énergie, June 2009).

regulation agency. In 2009, the Régie de l'énergie authorized an average increase of 1.22 % in electricity rates for 2009-2010[3].

It seems difficult, if not impossible, to find a definitive answer to the pricing issue. Yet for many essential goods and services (like food, clothing, housing, transportation and safety), pricing is not prone to as much controversy ; a balance, while not perfect, is struck between competing social forces. Thus, there are no annual discussions on the price of spaghetti, clothing, housing, etc. By contrast, the conflict with respect to electricity seems inevitably recurrent and very polarized. This is partly due to its unique nature : a form of energy that cannot be easily stored, and is furthermore an integral part of modern society. Any supply disruption completely changes the course of events and disrupts almost all other social and economic activities. But it is not on the specific nature of electricity that divisions crystallize ; in fact, there is a broad consensus which recognizes the nature of electricity and its key role in society.

This article sets out to identify the causes of disputes with respect to the price of electricity. Building on a framework for the analysis of public policy and applying it to the electricity sector, it is possible to identify six issues that must be overcome. They are directly related to the electricity sector : national identity (history and public property), equity, regional and industrial development, economic efficiency, public finances (deficit and debt) and, finally, the environment. Each of these issues is directly or indirectly related to the price of electricity. The analysis is based on the works of different stakeholders in Québec and Canada who have studied the electricity sector. This work shows the difficulty of reconciling specific arguments, each based on a different weighting of the importance of each issue. However, a reconciliation of conflicting interests is possible by looking all of the issues and proposing necessary measures to solve them. A means of achieving this is outlined at the end of the article.

The primary claim of this article is that the price of electricity is the result of public policy (explicit or implicit), within which the different issues are more or less adequately taken into account. The views expressed by the different actors and stakeholders in the electricity sector are often shaped

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3. *Décision relative à l'approbation de la grille tarifaire du Distributeur applicable à compter du 1er avril 2009 – Demande relative à l'établissement des tarifs d'électricité pour l'année tarifaire 2009-2010* [Decision in relation to the approval of the Distributor's price list effective April 1st, 2009 – Request relating to the establishment of electricity tariffs for the rate year 2009-2010] D-2009-021, R-3677-2008, (Montreal, Régie de l'énergie, March 16, 2009).

by those issues that they deem most important. Thus, based on the distance between specific actors and the various issues, their arguments will be more or less sensitive to the stakes involved. Since actors tend to position themselves differently in the face of the six issues that have been identified, they remain more or less deaf to each other's arguments. I will first briefly review Québec's approach to rates and look at the framework of analysis of public policy. I will then study the six issues affecting the pricing of electricity. Finally, I will propose a way of reconciling the different points of view.

THE PRICE OF ELECTRICITY A CHOICE THAT STEMS FROM PUBLIC POLICY

The Regulation of Electricity Prices in Québec

The price of electricity in Québec is re-examined each year by a para-governmental economic regulation agency, the Régie de l'énergie, which makes its decisions in conformity with the rules set forth in the law. The seven commissioners who compose the Régie are named by the government and, in accordance with the Act respecting the Régie de l'énergie[4], it establishes the price of electricity based on "the cost of electric power […] by adding the cost of heritage pool electricity and the actual costs to the electric power distributor of the supply contracts"[5]. The cost of electricity is composed of three important elements : energy production, its transport and its distribution. These elements correspond to the organization of Hydro-Québec into three large divisions : HQ Production, HQ TransÉnergie and HQ Distribution. All distribution and transportation costs must be approved by the Régie de l'énergie, while the energy production cost is set partly by the government, for the "heritage" portion, and partly by the market, for that portion of demand that exceeds the heritage electricity block. Figure 1 illustrates this structure as well as the distribution of the cost of service to residential consumers.

Heritage electricity corresponds to a block of 165 terawatt-hours (TWh) that HQ Production is required to supply to Quebeckers[6] at an average rate that is set by the government at 2.79¢/kWh (the cost will vary depending on the class of consumer, with residential consumers paying more than industrial consumers). Above 165 TWh (in 2007, 177 TWh of

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4. Act respecting the Régie de l'énergie, R.S.Q. c. R-6.01, 2010.
5. Act respecting the Régie de l'énergie, R.S.Q. c. R-6.01, 2010, art. 52.2.
6. Act respecting the Régie de l'énergie, R.S.Q. c. H-2, 2010, art. 22.

electricity were sold in Québec)[7], as stipulated by the law, HQ Distribution must enter into additional supply contracts, which have to reflect the actual cost of electricity. This cost corresponds to the asking price of an unregulated producer, based on market conditions. For instance, in the neighbouring State of New York, the average hourly rate was 5.99US¢/kWh in 2007, 6.77US¢/kWh in 2008, and 3.55US¢/kWh in 2009[8]. Hence, even in a recession year like 2009, the market price was higher than that of heritage electricity. It is at these price levels – more than three times greater than the heritage pool – that additional supply comes into play. To the production price, (regulated) transportation and distribution costs must be added, so that the price for residential consumers is 5.45¢/kWh for the first 30 kWh per day, and the remainder is 7.46¢/kWh (based on the most common rate, Rate D).

Furthermore, the government of Québec requires HQ Distribution to purchase a certain amount of energy at a price that is greater than the market value. For example, in 2009, 150 MW of projects from small hydroelectric plants were commissioned by the government at the authorized price of 7.5¢/kWh[9]. The price paid to private producers (before the addition of transport and distribution costs) is thus higher than what the consumer will pay. Decrees on wind energy and on those resulting from biomass cogeneration also bind HQ Distribution to private producers.

This regulatory approach with respect to the price of electricity is not prone to much controversy. Indeed, few voices have called for a radical reform of the sector or spoken against the role of the Régie de l'énergie. Such reforms are, however, explored in Clark and Leach[10], and Garcia calls for major amendments[11]. However, concerns about price *levels* are often discussed in public debates. The Pour un Québec lucide (For a Lucid Québec) Manifesto is an example of voices that have called for an "increase in

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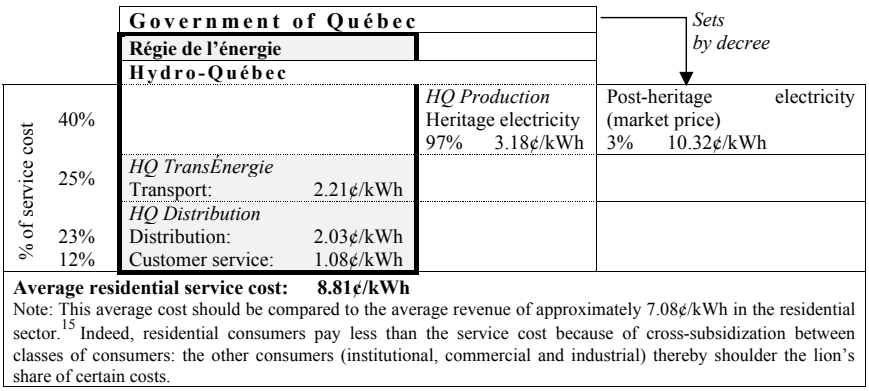
7. Statistics Canada, *Electric Power Generation, Transmission and Distribution*, no. 57-202-X (Ottawa, Statistics Canada, 2009).
8. New York Independent System Operator, *Day-Ahead Market LBMP – Reference Bus,* Custom Reports, Renselaer, NYISO, 2010.
9. *Décision finale – Demande d'approbation du programme d'achat d'électricité provenant de petites centrales hydroélectriques*, [Final Decision – Request for the approval of a purchasing program for electricity from small hydropower plants] D-2009-094, R-3700-2009 (Montréal, Régie de l'énergie, July 13, 2009).
10. C. Robert CLARK and Andrew LEACH, "The Potential for Electricity Market Restructuring in Québec", *Canadian Public Policy/Analyse de Politiques*, 33, 1 (2007) : 1-20.
11. Claude GARCIA, "Comment la privatisation d'Hydro-Québec permettrait-elle, d'enrichir les citoyens québécois ? ", *Les Cahiers de recherche de l'Institut économique de Montréal* (Montréal, Institut économique de Montréal, 2009).

electricity rates […] that are substantial and progressive"[12]. Lisée also argues for such a price increase[13]. Pricing and the arguments used to change it are the principal objects of study in this article.

FIGURE 1 :
STRUCTURE OF QUÉBEC'S ELECTRICITY SECTOR AND ILLUSTRATION OF COSTS TO RESIDENTIAL CONSUMERS (RATE D)[14]



Note: This average cost should be compared to the average revenue of approximately 7.08¢/kWh in the residential sector.[15] Indeed, residential consumers pay less than the service cost because of cross-subsidization between classes of consumers: the other consumers (institutional, commercial and industrial) thereby shoulder the lion's share of certain costs.

Public Policy

Government choices are made, in theory at least, within the framework of public policy. Public policy is defined as "a course of action or inaction chosen by public authorities to address a given problem or interrelated set of problems"[16]. The identification of the issue or issues is thus of primary importance when developing public policy, otherwise the strategy of action is highly likely to be badly directed and to have no impact. Public policy theorists thus place the definition and analysis of problems at the core of the development process[17].

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12. Lucien BOUCHARD, Joseph FACAL, Pierre FORTIN, Robert LACROIX, Sylvie LALANDE, Claude MONTMARQUETTE, André PRATTE, Denise ROBERT, Jean-Claude ROBERT, Guy SAINT-PIERRE, Marie SAINT-PIERRE and Denise VERREAULT, *Pour un Québec lucide,* October 19, 2005, http://www.pour unquebeclucide.info/cgi-cs/cs.waframec3fb.html (accessed 2th December 2010).
13. Jean-François LISÉE, *Pour une gauche efficace* (Montreal, Boréal, 2008).
14. HQ Distribution, Répartition du coût du service autorisé 2009, HQD-11, Document 3 révisé, Demande R-3677 (Montreal, Hydro-Québec, 2008).
15. Rapport annuel 2008 – L'énergie de notre avenir (Montreal, Hydro-Québec, 2009).
16. Leslie A. PAL, *Beyond Policy Analysis – Public Issue Management in Turbulent Times* (Scarborough, Nelson Thomson Learning, 2001 [1997]).
17. David L. WEIMER and Aidan R. VINING, *Policy Analysis – Concepts and Practices* (New Jersey, Upper Saddle River, Prentice Hall, 2005 [1989]).

In the case of the energy sector, many issues have historically guided government action : abuse of market power by non-regulated entities, rural electrification, harmonization of electrical service conditions, universal access to electricity, industrial and regional economic development, environmental protection (air, water, climate change), security or energy independence, minimization of costs, technological development (in the case of nuclear energy, for example), energy efficiency, integration with other jurisdictions, political support, lobbies, etc. This range of issues has not only evolved over time, but has been considered to varying degrees by different governments according to their competence and other priorities. Obviously, all governments do not necessarily carry out an analysis of these issues and they can establish their energy policy based on other elements. For example, in 2006, the Government of Québec built its Stratégie énergétique 2006-2015 (2006-2015 Energy Strategy) on six objectives without even mentioning the issue that was to be resolved[18] : (1) strengthen the security of energy supplies, (2) increase the use of energy as an economic development lever, (3) enhance the role of local and rural communities and First Nations in economic development, (4) use energy more efficiently, (5) become a leader in sustainable development and (6) determine an electricity price in accordance with our interests and good resource management.

There are two inherent difficulties with this approach. Firstly, since no problem is clearly defined, it is impossible to determine whether it has been resolved and whether the strategy has been successful. Thus, these objectives could go on indefinitely, as they are not rooted in well-defined problems. Secondly, it may be difficult to inspire coherent actions : to become a leader in sustainable development (objective 5) could mean strongly opposing economic development based on energy (objectives 2 and 3) since Québec, like all Western countries, consumes much more energy than would be expected given its demographic weight, and this consumption is particularly problematic since it contributes to climate change. Hence, to combat these changes, it will be necessary to reduce energy consumption because in the short and medium term the least expensive option for reducing greenhouse gas (GHG) emissions[19] is to reduce consumption through

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18. Ministère des Ressources naturelles et de la Faune, *L'énergie pour construire le Québec de demain – La stratégie énergétique du Québec 2006-2015* (Québec, Government of Québec, 2006).
19. Per-Anders ENKVIST, Tomas NAUCLÉR and Jerker ROSANDER, "A cost curve for greenhouse gas reduction", *The McKinsey Quaterly*, 1 (2007) : 35-45.

greater energy efficiency, rather than to replace fossil fuels by energy sources that do not emit greenhouse gases. Furthermore, "our interests" remain undefined, so that objective 6 with regard to the price of electricity remains just as vague as if no objective had been given. Industries as well as other consumers want low prices, while owners of the energy resources – Québec's citizens – want a higher price so as to maximize profits.

This second difficulty, concerning the coherence of actions, is closely linked to the range of issues facing the energy and electricity sector. It is difficult to act on one problem without affecting another, and different actions can quickly lead to situations where they are at odds with one another.

However, the purpose of this article is not to analyze the current government's strategy. Rather, it aims to study the principal issues that are currently affecting the price of electricity in Québec. The objective is to better understand the tensions surrounding pricing, to work to eliminate them and to attain a more satisfactory balance for all. The framework of analysis of public policy, which places these issues at the heart of the reflection, aims to show that according to the identified issues, very different actions can be taken. Furthermore, as the issues evolve over time, public policy must also evolve in order to maintain its relevance. In the next section, I will analyze the six issues that have an impact on the price of electricity.

SIX ISSUES AND AN ELECTION CONCERN

These issues were chosen because they dominate deliberations on the subject. Others, like energy sovereignty, are not analyzed here because they are less important in the energy sector[20]. Further issues, such as those related to First Nations peoples, also impact the sector but have no direct effect on fee structures and pricing. This is why they are not discussed here, despite the intrinsic importance of the recognition of First Nations.

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20. Québec is a net exporter of electricity, taking into consideration that the electricity generated at Churchill Falls (located in Labrador) is under Québec's jurisdiction according to the terms of a contract which will expire in 2041 and which confers this electricity to Hydro-Québec (*Rapport annuel 2008 – L'énergie de notre avenir* (Montréal, Hydro-Québec, 2009). Furthermore, various energy sources are yet to be developed in Québec. There is no fear of a shortage of electricity in Québec or that the province will have to turn to external sources beyond ad hoc exchanges with neighbours that benefit Québec.

National Identity

For several decades, the issue of identity has dominated Québec's social and political life. It is a complex subject that has prompted many studies. I will mention only Maclure, for his study on the fragmentation of identity in contemporary Québec[21]. Although fragmented, the Québécois identity remains tied to Hydro-Québec. This is explained by the fact that the company has historically contributed to how Quebeckers see themselves, which makes them very sensitive to questions about electricity.

The creation of Hydro-Québec in 1944 (under the name of the Commission hydroélectrique du Québec) and the nationalization of the sector in 1963, through a campaign led by Jean Lesage under the slogan "Maîtres chez nous" (Masters in our own house), were indeed important measures in support of emerging political, economic and technical French-speaking leaders in sectors that were traditionally dominated by anglophones[22]. Breton presents the nationalization of the sector as an illustration of an economic nationalism that favoured the creation of well-paid jobs for middle-class francophones[23]. Bellavance et al. also regard Hydro-Québec (like the Desjardins Group) as an institution born in reaction to the abuses of power by anglophone-dominated companies, one which made it possible to concretely express Québécois nationalism while modernizing the economy[24]. "More than a simple public utility, [Hydro-Québec] becomes an ideal instrument for promoting symbolic representations of French-speaking Québec[25]" writes Savard, in an article in which Hydro-Québec is portrayed as a significant milestone in the construction of Québécois identity.

This place at the heart of Québécois identity – constantly recalled by the company in its public relations campaigns, through compelling images (such as dams or transmission lines) and by associations with Québécois culture (important sponsorships)[26] – ensures that Quebeckers feel very close to the electricity sector ; to touch it is therefore to impact directly on their identity. The sense of collective ownership is quite well developed,

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21. Jocelyn MACLURE, "Authenticités québécoises. Le Québec et la fragmentation contemporaine de l'identité", *Globe – Revue internationale d'études québécoises*, 1, 1 (1998) : 1-21.
22. Karl FROSCHAUER, *White Gold – Hydroelectric Power in Canada*, Vancouver, UBC Press, 1999.
23. Albert BRETON, "The Economics of Nationalism", *The Journal of Political Economy*, 72, 4 (1964) : 376-386.
24. Claude BELLAVANCE, Roger LEVASSEUR and Yvon ROUSSEAU, "De la lutte antimonopoliste à la promotion de la grande entreprise. L'essor de deux institutions : Hydro-Québec et Desjardins, 1920-1965", *Recherches sociographiques*, 40, 3 (1999) : 551-578.
25. Stéphane SAVARD, "Lieu-de-mémoiriser Hydro-Québec comme symbole des représentations de la nature et de la technologie. Esquisses de réponse et pistes de réflexion", *Conserveries mémorielles*, 2, 4 : 46-64.
26. *Rapport annuel 2008 – L'énergie de notre avenir* (Montreal, Hydro-Québec, 2009).

more so than for other state-owned companies, such as the Société des alcools du Québec (Québec's liquor board), which shares a similar legal structure and also contributes to Québec's public revenues. Thus, contrary to the price of alcohol, a rate hike in the electricity sector is severely frowned upon because there is a real perception that "these low rates are the tangible results of a collective work, a social project[27]", as stated in a report by the Union des consommateurs (Consumers' Union).

Given the question of identity fragmentation mentioned above, it is easy to imagine that the nature of the attachment to Hydro-Québec is increasingly varied and that sensitivity to issues related to this sector have become increasingly diverse. However, as discussed below, Quebeckers, as owners of Hydro-Québec and of hydroelectric power, are more likely to push for their right to enjoy these assets (at a low price) than to prioritize a duty to optimize their use for the greater collective good.

Equity

The creation of Hydro-Québec and the nationalization of private electricity companies in the 1960s derived a great deal of their legitimacy from the abusive rates imposed by the power companies that were operating at the time[28]. Indeed, companies could sell at inflated prices because of their monopoly position in the local market. These high prices and regional disparities (in both prices and the services available) were sources of social friction. Hydro-Québec brought greater equity to the electricity marked, by offering provincial coverage as well as affordable and uniform rates for each class of consumer. It should be noted, however, that the concept of uniform rates for all regions only became law in 2000[29].

In the current context, arguments against raising the price of electricity are often linked to the principal of social equity and are mostly based on the regressive nature of the proposed increases. Indeed, the lower a consumer's income, the greater the impact of price increases, which seems

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27. Union des consommateurs, "Le Québec énergétique de demain. La transparence avant tout", brief submitted to the Commission parlementaire sur l'avenir énergétique du Québec, January 11, 2005.
28. Albert BRETON, "The Economics of Nationalism", *op. cit.* ; Karl FROSCHAUER, *White Gold – Hydroelectric Power in Canada*, *op. cit.* ; Claude BELLAVANCE, Roger LEVASSEUR and Yvon ROUSSEAU, "De la lutte antimonopoliste à la promotion de la grande entreprise…", *op. cit.*
29. National Assembly, *Projet de loi n° 116 Loi modifiant la Loi sur la Régie de l'énergie et d'autres dispositions législatives*, presented by Mr. Jacques Brassard, Minister of Natural Resources (Québec, Éditeur officiel du Québec, 2000). Louis SIMARD, Alain DUPUIS and Luc BERNIER, "Mutation de la gouvernance du secteur de l'énergie. Le cas d'Hydro-Québec", *Cahier de recherche du Centre de recherche sur la gouvernance (Cergo)* (Montréal, Cergo, 2004).

inequitable. This is the type of argument that is made by groups like Option Consommateurs[30] and by researchers such as Couturier and Harvey[31].

A second argument, also based on the principle of equity, is related to the idea that it would be abusive to increase the price of electricity because it is already higher than the cost of production : "Quebeckers currently pay a relatively high price for their electricity compared to its production cost[32]". Indeed, in 2008, Hydro-Québec's average cost of production was 2.2 ¢ per kilowatt-hour[33], whereas the sale price for heritage electricity is 2.79 ¢/kWh on average. It would thus be logical to ask that the price of electricity be lowered, since Hydro-Québec makes a profit (with a return above the standard return on invested capital). It is worth noting, however, that for residential consumers, this principal of a price equal to the average cost could actually be turned against them. Indeed, they benefit from cross-subsidization, which means that to some extent they benefit from the higher rates paid by institutional, commercial and industrial consumers[34].

The social equity issue can also be seen from a third perspective. Québec's hydroelectricity is derived from a natural resource, water power, which belongs to the state. The use and benefit of this natural resource are, as of 2010, granted for a fee of 0.286 ¢/kWh, which must be paid to the government (Watercourses Act, R.S.Q., chapter R-13, article 68). This amount is extremely low in comparison to the market value of a kilowatt-hour (approximately 6 ¢/kWh on average). This means that the government provides a substantial benefit to its users[35]. In the residential sector, it is high-income households that consume the most : for each $10 000 of additional

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30. "Hausses des tarifs d'Hydro-Québec. Il y a d'autres avenues", text from the press conference held by Option consommateurs (Montreal, January 13, 2005). ("Option consommateurs is a not-for-profit association whose mission is to promote and defend the basic rights of consumers and ensure that they are recognized and respected". http://www.option-consommateurs.org/en/who/mission/)

31. Ève-Lyne COUTURIER and Pierre-Antoine HARVEY, "Devrait-on augmenter les tarifs d'électricité ?", *Note socio-économique* (Montreal, Institut de recherche et d'informations socio-économiques (IRIS), 2009).

32. Union des consommateurs, "Le Québec énergétique de demain. La transparence avant tout", brief submitted to the Commission parlementaire sur l'avenir énergétique du Québec (Montreal, January 11, 2005).

33. *Rapport annuel 2008 – L'énergie de notre avenir* (Montreal, Hydro-Québec, 2009).

34. This cross-subsidization is such that residential consumers pay approximately 80 % of the service cost set by the Régie de l'énergie. This principle is set out in the Act respecting the Régie de l'Énergie : "The Régie shall not modify the rates applicable to a class of consumers in order to alleviate the cross-subsidization of rates applicable to classes of consumers". (Act respecting the Régie de l'Énergie, R.S.Q. c. R-6.01, 2010, art. 52.1.).

35. Without the government's intervention, the supply cost for electricity for consumers would be much higher. This directly benefits electricity consumers in Québec. Not because of a production monopoly this time, but rather because buyers and producers are already trading at higher prices. No electricity vendor would choose of its own accord to sell electricity at a price that is lower than the market price.

income, annual consumption increases by approximately 2 000 kWh[36]. The value of this indirect subsidy increases with the level of income, since income increases the capacity to consume. Such a way of sharing the "hydroelectric rent", which results in greater benefits for high-income consumers, is obviously not fair for all citizens. All citizens have a right to an equal dividend, since they all own the natural resource equally. Questions related to this type of inequity are also raised by Rabeau[37], while the payment of such a dividend is examined by Clark and Leach[38].

Regional and Industrial Development

Although the city of Montreal[39] only makes up 0.04 % of Québec's territory, nearly 25 % of the Québec population lives there and the region produces 35 % of the province's GDP. Furthermore, among Québec's 17 regions, 43 % of the factories are located in Montreal and the region ships 37 % of Québec's exports[40]. This imbalance between Montreal and the other regions is a concern, particularly since, based on per capita disposable income, the average standard of living is better in Montreal : $26 605 in Montreal compared to the Québec average of $25 734.

The government of Québec's 2006-2015 Energy Strategy[41] aims to use energy as an economic lever to develop rural areas. This objective is not new : many rural areas, by their remoteness, have had lower economic activity for a long time, due to a lack of industrial activity. Controlling production and the price of energy may provide incentives for attracting industrial development. The guarantee of low electricity prices as a regional and industrial development tool has thus been used in Québec since the

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36. François DUPUIS, Benoit P. DUROCHER, Claude MONTMARQUETTE and Maryse ROBERT, *Le redressement de la situation fiscale du Québec – Un défi à la fois prioritaire et incontournable* (Montréal, Centre interuniversitaire de recherche en analyse des organisations (CIRANO), 2006). This trend is obviously not specific to Québec. For an illustration of this phenomenon in British Columbia and a calculation of the indirect subsidy, per household, brought about by such a regulation, see Pierre-Olivier PINEAU, "Electricity Subsidies in Low Cost Jurisdictions. The Case of British Columbia (Canada) ", *Canadian Public Policy/Analyse de Politiques*, 34, 3 (2008) : 379-394.

37. Yves RABEAU, "Le subventionnement de l'électricité au Québec", brief presented during the "Débat public sur l'énergie au Québec", August 1995.

38. C. Robert CLARK and Andrew LEACH, "The Potential for Electricity Market Restructuring in Québec", *op. cit.*

39. This also corresponds to the Island of Montreal and the "06-Montréal" Region (Institut de la statistique du Québec, 2010).

40. Institut de la statistique du Québec, "Coup d'oeil sur les régions", http://www.stat.gouv.qc.ca/regions/profils/region_00/region_00.htm (accessed 28 January 2010).

41. Ministère des Ressources naturelles et de la Faune, *L'énergie pour construire le Québec de demain – La stratégie énergétique du Québec 2006-2015* (Québec, Government of Québec, 2006).

1960s[42]. This strategy has worked, as now nearly half of Québec's electricity is used by industry (47 %, mostly aluminum and pulp and paper), compared to 22 % in Ontario. Also, the electricity consumption of Québec's industrial clients represents 43 % of all of the industrial electricity consumption in Canada[43]. These numbers show that this policy of offering access to cheap electricity has allowed Québec to attract a greater number of industrial activities to rural areas than in the rest of Canada.

However, this development policy should not be taken for granted. Industrial consumers know that it represents a political choice and they lobby for the maintenance of low prices. For example, the Association québécoise des consommateurs industriels d'électricité (Québec Industrial Electricity Consumers' Association) participates actively in the hearings of the Régie de l'énergie, in addition to making public statements and explaining the advantages of low electricity prices for industrial and regional development[44].

However, industries that are established in Québec, just like residential consumers, receive an indirect subsidy due to the low fee that is charged by the government. Industrial and regional development is consequently done on the basis of an important transfer from the government, manager of the natural resource, to the private industrial companies. In the case of an aluminum smelter, Bélanger and Bernard estimate the total cost of this type of subsidy at "$274 338 per job per year over 35 years for the 740 jobs" created[45].

Economic Efficiency

From the perspective of economic theory, which aims for the optimization of the allocation of resources among economic actors (namely, individuals), marginal cost pricing is the only way to maximize well-being[46]. Marginal cost pricing is the cost of production of an additional kilowatt-hour. At the

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42. Karl FROSCHAUER, *White Gold – Hydroelectric Power in Canada*, *op. cit.*

43. Statistics Canada, *Electric Power Generation, Transmission and Distribution*, no. 57-202-X (Ottawa, Statistics Canada, 2009a).

44. Association québécoise des consommateurs industriels d'électricité, "L'électricité doit prioritairement servir le développement économique régional au Québec", presentation made to the Union des municipalités du Québec (Montreal, November 4, 2009).

45. Gérard BÉLANGER and Jean-Thomas BERNARD, "Les subventions aux alumineries. Des bénéfices qui ne sont pas à la hauteur", *Note économique sur le coût pour la société québécoise de la contribution gouvernementale à des projets d'alumineries* (Montreal, Institut économique de Montréal, April 2007).

46. This is true when marginal production costs are on the rise, which is currently the case in Québec. Indeed, new electricity production sources are more expensive than previous sources.

present time, the price of electricity is based on average costs (including a return on capital), while marginal cost pricing is higher, meaning that the price signal perceived by consumers does not reflect the full reality of production costs : an additional kilowatt-hour costs more to produce than the price paid by consumers. This leads to excessive consumption, which is sub-optimal for the collective well-being[47].

Economists are very sensitive to this type of loss of efficiency. They see it as a bad allocation of resources and feel that society could and should do better by correcting rate structures, specifically by changing the price to make it equal to the marginal cost. In Québec, this would represent an increase which would contribute to bringing prices closer to those in other Canadian provinces and neighbouring American states, approximately 6 ¢/kWh (before the costs of transmission and distribution), or a bit more than 3 ¢ above the heritage price. Economists regularly demonstrate the validity of this argument[48].

It should be noted that the issue of economic efficiency is not directly linked to the others. From a purely theoretical point of view, it is deeply entrenched and independent. The difficulty is with determining whether the change, which would consist of switching from a price based on the average cost to one based on the marginal cost, can be made without doing too much damage to national identity, equity, and regional and industrial development. If many actors are opposed to this type of pricing based on marginal costing, it is not because they reject the economic argument, but because they fear for identity issues (Québec could lose control of the sector), for equity issues (certain citizens would lose out) and for development issues (industries would lose the comparative advantage that they have in Québec).

Public Finances (Deficit and Debt)

Since Hydro-Québec is a public utility, its dividends represent revenue for the government of Québec. In 2008-2009, the $2.86 billion that Hydro-

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47. For the economic demonstration of this phenomenon, see : Charles A. CARRIER, "Hausse des tarifs d'électricité au Québec. Éléments de problématique", Comité des politiques publiques, Document CPP 2004-01 (Montreal, Association des économistes québécois, 2004).

48. Yves RABEAU, "Le subventionnement de l'électricité au Québec", *op. cit.* ; Charles A. CARRIER, "Hausse des tarifs d'électricité au Québec. Éléments de problématique", *op. cit.* ; C. Robert CLARK and Andrew LEACH, "The Potential for Electricity Market Restructuring in Québec", *op. cit.* and Marcel BOYER, "Hausser les tarifs d'électricité afin de valoriser le potentiel énergétique du Québec" *Note économique sur la politique québécoise de tarification de l'électricité* (Montreal, Institut économique de Montréal (IEDM), April 2007).

Québec paid to the provincial government represented 60 % of the income derived from government industries, or 4.5 % of the government's total revenue[49]. With the annual deficit at approximately $5 billion for a budget of approximately $64 billion (2009-2010), and with public debt reaching $148 billion in 2008, the government of Québec is looking for a means to consolidate public finances. Since the price of electricity is largely controlled by the government (through at least two mechanisms : water-power royalties and the price of heritage electricity), it would, in principle, be easy for the government to increase its revenues by increasing the price of electricity. That is what the Charest government did in March 2010, by announcing a "gradual increase of 1 ¢/kWh in the price of heritage electricity over five years, which will take effect in 2014[50]". This idea is not new ; Blais and McRoberts referred to it in addressing a "crisis of public finances[51]". Dupuis et al., as well as the Groupe de travail sur la tarification des services publics (Working group on the pricing of public services), among others, have taken the analysis of a price increase further with a view to improving public finances[52].

Just as the problem of economic efficiency would exist regardless of the responses to the first three issues, the question of Hydro-Québec's contribution to public finances may be addressed regardless of the choices made elsewhere. The government only considers this question because it is looking for sources of income, and because current regulations enable it to generate revenue in this way. If the electricity market were deregulated (like, for example, in the state of New York or the province of Alberta), this option would be less feasible : the government would have to change water-power royalties or create a specific tax on electricity. As current prices are lower than the marginal cost, economists agree with this approach because it also improves the collective well-being. However, even in a period of budget surpluses, economists would want marginal cost pricing. And conversely, if marginal cost pricing was in place and there was still a deficit, they would not call for an increase in the price of electricity to reduce it.

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49. Finances Québec, *Budget 2009-2010 – Plan budgétaire* (Québec, Government of Québec, March 19, 2009).
50. Finances Québec, *Budget 2010-2011 – Plan budgétaire*, (Québec, Government of Québec, March 30, 2010).
51. André BLAIS and Kenneth MCROBERTS, "Dynamique et contraintes des finances publiques au Québec", *Politique*, 3 (1983) : 27-62.
52. François DUPUIS, Benoit P. DUROCHER, Claude MONTMARQUETTE and Maryse ROBERT, *Le redressement de la situation fiscale du Québec…, op. cit.* ; Groupe de travail sur la tarification des services publics, *Rapport – Mieux tarifer pour mieux vivre ensemble* (Québec, Government of Québec, 2008).

Environment

With climate change linked to greenhouse gas emissions, public awareness of global environmental issues is greater than ever. In Canada, in 2007, 82 % of the 746 million tons of CO_2 equivalents produced came from energy consumption. The electricity sector is just behind the road transport sector at the top of the list of those responsible for greenhouse gas emissions[53] : 16.9 % of total emissions for the electricity sector compared to 18.3 % for the road transport sector. These direct emissions from the electricity sector come from coal combustion (83 %), natural gas (11 %) and oil products (6 %). But Québec uses no coal and very little natural gas to produce its electricity. In fact, almost all of Québec's electricity is hydro-electric and does not generate greenhouse gas emissions in its production[54]. When the whole lifecycle is considered (including the flooding of lands and the construction of dams), emissions remain comparatively very low[55]. What, therefore, is the environmental issue with respect to Québec's electricity ? In fact, there are two. First, there is the question of limiting or avoiding project impacts. New projects, just like the old ones, bring major changes to a territory – flooding and river diversions (the Rupert River, for example) – in addition to affecting stream flows and natural habitats of certain unique species (the La Romaine River, for example). Second, Québec's hydroelectricity could make a greater contribution to lowering global greenhouse gas emissions. Indeed, an optimal use of Québec's hydroelectricity locally and in the territories where it is exported would support a reduction in the use of thermal electricity (coal and natural gas), especially outside of Québec.

In both cases, limiting and even reducing the demand for electricity in Québec is an important objective ; indeed, this avoids the necessity of creating new projects and frees up energy for exports. Since hydroelectricity will replace a more expensive solution, namely thermal generation (coal and natural gas), any export of hydroelectricity leads to a decrease in global greenhouse gas emissions.

The price of electricity is a key factor in consumption choices. In the long run, any price increase brings about a decrease in the quantity sold. Figure 2 illustrates this link : consumption in the different Canadian

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53. Environment Canada, *National Inventory Report 1990-2007 : Greenhouse Gas Sources and Sinks in Canada* (Gatineau, Environment Canada, 2009).

54. Statistics Canada, *Electric Power Generation, Transmission and Distribution*, no. 57-202-X (Ottawa, Statistics Canada, 2009a).

55. Daniel Weisser, "A guide to life-cycle greenhouse gas (GHG) emissions from electric supply technologies", *Energy Policy*, 32, 9 (2007) : 1543-1559.

provinces decreases as the average cost paid by the consumer increases. Thus, Québec has the highest residential consumption (an average of 7 855 kWh directly consumed by each Quebecker in 2007) and an average cost among the lowest (6.89 ¢/kWh in 2007). In contrast, Prince Edward Island has a very high price (15.29 ¢/kWh) and very low consumption (1,220 kWh). Obviously, the climate, technological options for heating, average income and other variables also influence consumption. But most definitely, price considerations play a role, if only through the gains realized through energy efficiency choices : if prices are lower, savings resulting from greater efficiency will be low and will not always justify an investment to reduce consumption.

In Québec, at current price levels, reductions in consumption through energy efficiency gains have been estimated at 4 TWh/year in the industrial sector[56] and at 8 TWh/year in the residential sector[57]. Together, these reductions represented 12 TWh, or 6.8 % of electricity sales in Québec in 2007. Given that the La Romaine project, which is currently under construction, will produce 8 TWh annually[58], it is easy to see that such a project could have been cancelled (or postponed) if significant efforts had been made to increase energy efficiency, within a framework of prices that favours their success. In parallel, given that a terawatt-hour of electricity produced from coal is responsible for approximately one million tons of greenhouse gases, the combined 12 TWh of consumption reduction in Québec could prevent 12 million tons of emissions. In Ontario, for example, 31 TWh of electricity were produced from coal combustion in 2007[59]. Canada's record of 746 million tons of greenhouse gases in 2007 could be significantly reduced by such substitutions.

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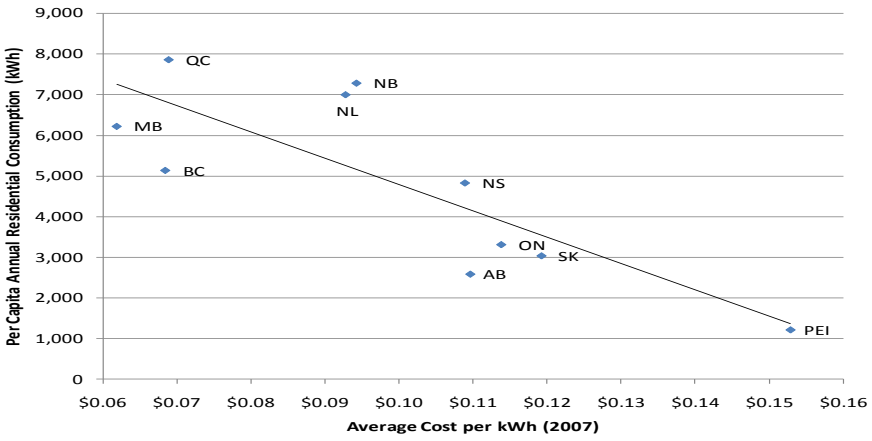
56. Agence de l'efficacité énergétique, *Secteur industriel CAHIER DU PARTICIPANT – Consultation en vue de l'élaboration du plan d'ensemble en efficacité énergétique et nouvelles technologies* (Québec, AEE, 2008a).
57. Agence de l'efficacité énergétique, *Secteur industriel CAHIER DU PARTICIPANT – Consultation en vue de l'élaboration du plan d'ensemble en efficacité énergétique et nouvelles technologies* (Québec, AEE, 2008b).
58. Hydro-Québec, *Complexe de la Romaine en bref* (Montreal, Hydro-Québec, January 2008).
59. Environment Canada, *National Inventory Report 1990-2007 : Greenhouse Gas Sources and Sinks in Canada* (Gatineau, Environment Canada, 2009).

FIGURE 2 :
ILLUSTRATION OF THE RELATION BETWEEN THE AVERAGE COST OF ELECTRICITY AND INDIVIDUAL ANNUAL CONSUMPTION FOR THE 10 CANADIAN PROVINCES, 2007 (STATISTICS CANADA, 2009)



An Election Concern

Because it affects consumers, who are also often voters, the price of electricity is an election concern. Politicians can be reluctant to touch it because they know that voters can be highly sensitive to the question. Thus, electoral concerns are added to any decision that should otherwise be based on a combination of the six other issues outlined above. Such electoral considerations have led to a cross-subsidization for the benefit of residential consumers and to the promise of a freeze on electricity rates that took effect when the Parti Québécois was in power in 1999. The newly elected Liberal government ended the price freeze in 2004[60], presumably thinking that voters would have forgotten about before the next elections (which were held in 2007). Bernard et al. have addressed this issue and have developed a model showing that governments actually strategically manipulate the price of electricity during their term of office[61]. The reason why politicians do not want to

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60. Hydro-Québec, "Histoire de l'électricité au Québec – Faits saillants sur Hydro-Québec", http://www.hydroquebec.com/comprendre/histoire/faits_saillants.html (accessed 27 January 2010).
61. Jean-Thomas BERNARD, Stephen GORDON and José TREMBLAY, "Electricity Prices and Elections in Québec", *The Canadian Journal of Economics/Revue canadienne d'économique*, 30, 3 (1997) : 505-525.

touch the low price of electricity can be explained through median voter theory. Indeed, the median voter (whose income is such that 50 % of voters have lower incomes and 50 % have higher incomes) will want to vote for leaders who will commit to maintaining low electricity rates, if the benefits that they would receive were paid in the form of tax relief. In fact, given the relatively low taxes paid by households with the lowest income, it would be difficult for tax cuts to offset an increase in the price of electricity[62]. In view of this situation, it wouldn't be a good strategy for a politician to propose an increase that would alienate 50 % of voters. This idea has been studied by Bernard and Roland[63]. However, as underlined by Clark and Leach, once you admit that a credible means of redistributing wealth may be considered, such as an equal payment for all citizens, the median voter benefits from an increase in the price of electricity because his or her consumption is below average[64]. In fact, it is high-income households that consume more electricity and which, when looking at the absolute number, will contribute the most to the additional income triggered by a price increase. The distributed dividend that would be equal for everyone would therefore be greater than the increase for the 50 % of households with the lowest energy consumption[65]. Obviously, voter sensitivity toward the other dimensions (regional development, public finances, the environment, national identity, economic efficiency) may also influence the vote. However, in these cases it is indirect and less tangible.

Synthesis : The Six Issues and the Price of Electricity

Thus, the six issues that dominate the arguments with respect to electricity pricing influence each other. While some point to the maintenance of the status quo, others favour a decrease or an increase in price. Hence, as shown in Figure 3, policymakers will avoid making changes to rates so as to avoid igniting sensitivities too close to the question of identity. Some challenges in

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62. In 2008, in Canada, households in the three lowest quintiles paid an average of $ 659, $ 3 705 and $ 8 943, compared to $ 17 070 and $ 4 616 for the two highest quintiles (*Spending Patterns in Canada 2008,* no. 62-202-X, Ottawa, Statistics Canada, 2009).

63. Jean-Thomas BERNARD and Michel ROLAND, "Rent Dissipation through Electricity Prices of Publicity Owned Utilities", *The Canadian Journal of Economics/Revue canadienne d'économique*, 30, 4b (1997) : 1204-1219.

64. C. Robert CLARK and Andrew LEACH, "The Potential for Electricity Market Restructuring in Québec", *op. cit.*

65. This also holds for the households with the lowest income : François DUPUIS, Benoit P. DUROCHER, Claude MONTMARQUETTE and Maryse ROBERT, *Le redressement de la situation fiscale du Québec…*, *op. cit.* ; Pierre-Olivier PINEAU, "Electricity Subsidies in Low Cost Jurisdictions. The Case of British Columbia (Canada)", *op.cit.*

relation to equity and development (regional and industrial) also support the maintenance of the status quo. In such cases, the idea is to avoid making the rates more regressive than they already are and to continue promoting development in remote areas. Forces in favour of the status quo are linked to particular groups of voters : the nationalist electorate with its social sensitivity and voters who come from areas that benefit from energy-intensive industries. Given the groups concerned, it is clear that the status quo dominates in terms of electoral influence, which explains the relative stability of the subject in Québec. This also explains why the debate endures, because certain issues remain unresolved. The argument in favour of a rate decrease is rather isolated, and unrealistic from a taxation point of view ; it has very little impact, few defenders, nor any electoral resonance. Three issues would unambiguously benefit from an increase in the price of electricity : economic efficiency, public finances and the environment (support for energy efficiency efforts). However, voter groups that are sensitive to these arguments are rather limited. Moreover, in the case of environmental advantages, no direct arguments are evoked ; there is rather a string of arguments that it is difficult to impart, namely that distant projects that are avoided and that the emission of greenhouse gases are reduced through the export of electricity to other jurisdictions. In addition, the issue of equity between citizens and natural resource owners also favours a price hike. The monetization of the resulting benefits would enable a better distribution of wealth. This is also a difficult argument to impart, since this wealth remains very abstract for voters when compared to a very concrete electricity bill hike.

FIGURE 3 :
ARGUMENTS RELATED TO THE SIX ISSUES,
THE PRICE OF ELECTRICITY, AND ELECTORAL INFLUENCE

	Impact on the price of electricity	**Electoral impact**
National Identity	↔ sensitivity toward the subject ↔ sense of belonging ↔ emotional dimension	Nationalist vote
Equity	↔ status quo (not increasing the regressive nature of rates) ↘ lowering of the price to that of the cost of production ↗ increase in water-power royalties (more equitable distribution of wealth arising from natural resources)	Socially oriented vote
Regional and Industrial Development	↔ status quo ? re-evaluation based on the real benefits of the development	Regional vote
Economic Efficiency	↗ increase the price so that it is equal to the marginal cost	Economists' vote
Public Finances	↗ increase to help balance the budget	Vote of the advocates for balanced management
Environment	↗ increase in order to help promote energy efficiency	Environmental vote

THE ARGUMENTS

Though the price of electricity is affected by these six issues, it is only central to two of them : economic efficiency and public finances. In these two cases, there is no direct alternative to the price. Nothing but the price can in fact send a message to economic actors (in the present economic system) and nothing but a higher price can generate significant additional gains (as costs are already very low)[66].

However, the price is less central to the other issues. In fact, it is not the price of electricity that contributes to the national identity question, but the history of Hydro-Québec and what it represents as an institution. Equity is influenced by many factors other than the price of electricity, and parallel mechanisms could be put into place to reach the desired level of fairness. In this respect, Nordic countries may be cited as models : there, electricity prices are determined by the market (in accordance with the

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66. Hydro-Québec could achieve production gains (the same way that any organization can increase its efficiency), but such gains would remain marginal in view of the price increase (see for example : Claude GARCIA, "Comment la privatisation d'Hydro-Québec permettrait-elle d'enrichir les citoyens québécois ?" *op. cit.*).

principles of marginal cost pricing), but safeguards ensure that there are few social inequalities. Regional development can be supported in a number of ways ; the price of electricity is far from the only industrial incentive. Other tax advantages could thus be offered, making it possible to better target those regions in need of development assistance. Finally, with respect to the environment, if the price signal is essential for justifying investments in energy efficiency, it is also essential to inform consumers about more energy-efficient options that are available, while mechanisms that facilitate changes in behaviour, equipment and infrastructure must be put into place. Indeed, with only the price signal and without alternatives, consumers could find themselves so dependent that they would not be able to reduce their consumption and would simply have to buy their electricity at a higher price.

These findings point toward an approach that could resolve these six issues. An increase in electricity prices would thus be acceptable from all viewpoints if the following conditions were met :

1. Maintenance of Hydro-Québec's structure (public, with efficiency and innovation incentives), in such a way that the national identity issue would not be affected.

2. Creation of credible financial mechanisms to ensure just compensation (and provided in a timely fashion) for consumers with income under a certain threshold, which remains to be determined. Thus, these households would be able to cope with the price increase without being negatively affected.

3. Introduction of new fiscal tools for the benefit of industries and regions that currently benefit from the low price of electricity. These tools are yet to be determined, but they would lead to a more economical use of electricity, since its price would better reflect its worth (as opposed to the cost of production).

4. Broadening the scope of energy efficiency activities, particularly through an agency like the Agence d'efficacité énergétique (Energy Efficiency Agency), so as to improve the dissemination of information on all available options and to eliminate the other barriers to the adoption of more energy-efficient practices.

With an approach that meets these four conditions, it would be possible to address the six issues identified above. Hence, a balance could be achieved regarding the price of electricity, and attention could be turned to other challenges in our society's transition toward a more sustainable lifestyle.

This article describes the price of electricity as the result of public policy which focuses on certain issues that may come into conflict, because they produce very different arguments. By identifying six of these issues – national identity, equity, regional and industrial development, economic efficiency, public finances and the environment – it becomes possible to better understand the electricity sector, the price of electricity and the debates to which it gives rise. The analysis presented above shows that three of the six issues favour an increase in the price of electricity (economic efficiency, public finances and the environment), while the others either have no impact on price (national identity) or are ambivalent (equity and regional and industrial development). However, since the most important electoral groups are very sensitive to the issue of electricity pricing, any changes are likely to generate a political challenge. Nevertheless, there is a possible path to reconciliation which would bring the positions of all sides closer together with respect to an increase in the price of electricity. Four conditions must be fulfilled in combination : maintenance of Hydro-Québec's structure, creation of support mechanisms for low-income households, tax changes for businesses in rural areas so as to support their development and removal of barriers to energy efficiency. Once these four conditions have been met, an increase in the price of electricity could garner the support of a large majority of citizens and allow Québec to lay a solid foundation for its future, a foundation that respects all the dimensions of sustainable development.

(translation : Joanne Griffith)