Régie de l'énergie, R-3864-2013

Demande d'approbation du Plan d'approvisionnement 2014-2023 d'Hydro-Québec

Insufficient Consideration of Energy Efficiency: An Expert Report to the Régie de l'Énergie Regarding Hydro-Quebec's Proposed 2014-2023 Integrated Supply Plan

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Prepared for:

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I. INTRODUCTIONS AND QUALIFICATIONS

Q: Please state your name, employer and business address.

A: My name is Chris Neme. I am a co-founder and Principal of Energy Futures Group, a consulting firm that provides specialized expertise on energy efficiency markets, programs and policies. My business address is P.O. Box 587, Hinesburg, VT 05461.

Q: Please describe your educational background.

A: As shown in my curriculum vitae, I received a Master of Public Policy (MPP) degree from the University of Michigan (Ann Arbor) in 1986. That is a two-year, multi-disciplinary degree focused on applied economics, statistics and policy development. I also received a Bachelor's degree in Political Science from the University of Michigan (Ann Arbor) in 1985. My first year of graduate school counted towards both my Masters' and Bachelor's degrees.

Q: Please summarize your business and professional experience.

A: As a Principal in Energy Futures Group, I play major roles in a variety of energy efficiency consulting projects. Recent examples include:

- helping the Michigan Public Service Commission staff to assess the relative merits of alternative approaches to defining savings goals for electric and gas utility efficiency programs (focusing on lifetime rather than just first year savings);

- helping to benchmark (relative to other leading jurisdictions) the costs and costs per unit of efficiency savings achieved by a large California utility;

- helping develop a Technical Reference Manual of deemed savings assumptions for Ohio and the Mid-Atlantic states;

- serving as an elected stakeholder representative on an Enbridge Gas' annual Audit Committee as well as a province-wide Technical Evaluation Committee for Ontario's gas efficiency programs;

- serving as co-chair of the Research and Evaluation Committee of the Northeast Energy Efficiency Partnership's (NEEP's) regional Evaluation, Measurement and Verification forum; and

- providing guidance to key stakeholders in Germany, the United Kingdom and other European countries on the design of efficiency policies and programs (on behalf of the Regulatory Assistance Project).

Prior to co-founding Energy Futures Group in 2010 I worked for 17 years for the Vermont Energy Investment Corporation (VEIC), the last 10 as Director of its Consulting Division managing a group of 30 professionals with offices in three states. Most of our consulting work involved critically reviewing, developing and/or supporting the implementation of electric, gas, and multi-fuel energy efficiency programs for clients across North America and beyond. As a member of VEIC's Senior Management Team, I also helped launch Efficiency Vermont in 2000 – a then new statewide "efficiency utility" VEIC was selected to operate – and became intimately familiar with a myriad of issues associated with the day-to-day delivery of energy

efficiency programs. I also helped shape the New England ISO's rules for inclusion of demand resources in its Forward Capacity Market and led the development of VEIC's first bids of peak savings from efficiency programs into that market.

All told, during my career in energy efficiency I have played major roles in developing energy efficiency potential studies in five states and provinces, served as a technical advisor to utility-stakeholder "collaboratives" in ten states, negotiated or supported development of efficiency program performance incentive mechanisms in six different jurisdictions and reviewed or developed efficiency programs for clients in more than 20 states and provinces as well as parts of Europe. I have also led courses on efficiency program design, published widely on a range of efficiency topics and served on numerous national and regional efficiency committees, working groups and forums. A copy of my curriculum vitae is attached as Appendix 1.

Q: Have you previously filed expert witness testimony in a proceeding before the Quebec Régie de l'energie?

A: Yes. I was a co-author of a report on opportunities to accelerate electrical energy efficiency in Quebec that was filed with the Régie in the Spring of 2004 in Case Docket R-3526-2004 (Special Assessment of the Suroit Gas-Fired Power Plant). Together with Philippe Dunsky and my other co-authors, I was part of a panel of experts that was cross-examined on that report.

Q: Have you done other work in Quebec?

A: Yes. Following the Suroit case, I worked on a couple of projects in which I helped Philippe Dunsky to develop recommendations for Hydro Quebec on the design of its energy efficiency programs.

Q: Have you been an expert witness on energy efficiency matters before energy regulators in other provinces or states?

A: Yes, I have filed expert witness testimony on more than 30 other occasions before similar regulatory bodies in nine other states and provinces, including on numerous occasions before the Ontario Energy Board.

II. TESTIMONY OVERVIEW

Q: What is the purpose of your testimony?

A: The principal purpose of my testimony is to comment on the reasonableness and adequacy of the energy efficiency savings estimates embedded in Hydro Quebec's 2014-2023 Integrated Supply Plan. I focus particularly on the period starting in 2016 because it is my understanding that while government policy has already prescribed the level of savings that Hydro Quebec must achieve by the end of 2015, no such direction currently exists for 2016 and beyond.

I also briefly comment on Hydro Quebec's suggestions for how the design of its approach to promoting energy efficiency will evolve in the future.

Consistent with the Régie's decision on the scope of this proceeding, all of my evidence is focused on the "big picture" and the long-term. Put another way, I focus on the strategic direction Hydro Quebec's filing suggests it is taking its energy efficiency efforts. I do not address issues related to individual efficiency programs or measures which might more appropriately be addressed in a future rate case, a hearing dedicated to energy efficiency or any other relevant proceeding.

Q: Please summarize your views on the adequacy of Hydro Quebec's energy efficiency savings estimates in this supply planning case.

A: Hydro Quebec has suggested that it will aim to have its energy efficiency programs reduce load growth by one-third in 2016 and beyond.[1] The Company estimates that will be between 0.6 and 1.0 incremental annual TWh savings per year. However, there does not appear to be any empirical basis for that target. Put another way, the Company does not appear to have done any analysis to suggest that is the optimal level of efficiency. Moreover, there is substantial evidence to suggest that much greater levels of efficiency would be cost-effective. As a result, Hydro Quebec's proposed plan is not a least cost plan for its customers.

Q: What do you recommend the Régie do to address that concern?

A: The Régie should require Hydro Quebec to acquire all cost-effectively achievable energy efficiency resources beginning in 2016, and to revise the other elements of its plan so that they are consistent with that objective.

Q: Please summarize your views regarding how Hydro Quebec plans to change the design of its efficiency programs in the future.

A: Hydro Quebec outlines three features of its future efficiency strategy:

1. It will shift emphasis away from direct financial incentives while increasing emphasis on customer education and awareness-raising;

2. It will emphasize longer-term market transformation; and

[1] Translated version of R-3864-2014, HQD-1, document 1 (C-ROEÉ-0013), p. 17.

3. It will prioritize promotion of efficiency measures that reduce peak demands, particularly space heating and water heating measures.

In general, I would strongly support the second and third of these features. Efficiency strategies that promote long-term market transformation often provide greater long-term net benefits. The same is true of strategies that disproportionately save electricity at the time of system (or local transmission and/or distribution system) peaks.

However, I am very skeptical of the first direction – substituting information and awareness-building for financial incentives. To be sure, customer education and awareness raising that is tailored to specific market needs should play an important role in most efficiency programs. However, the extent of that role should be determined on a case-by-case basis, depending on the nature and severity of different barriers to customers' investment in different efficiency measures. The same is true for financial incentives. In most cases, both customer education and financial incentives are necessary to significantly affect markets. Hydro Quebec has offered no evidence to support a shift away from financial incentives. Indeed, I am not aware of evidence from any jurisdiction which suggests that a significant across-the-board shift away from financial incentives in favor of a much heavier emphasis on customer education would be as effective in promoting cost-effective energy efficiency investments.

Q: What do you recommend the Régie do with respect to Hydro Quebec's proposed new directions for its efficiency efforts?

A: I recommend that the Régie strongly support the proposed emphasis on efficiency measures that reduce peak demands. I also recommend that the Régie support the emphasis on long term

market transformation, provided that Hydro Quebec is prepared to rigorously track and measure such impacts. The bottom line is that real savings need to be achieved. Finally, with respect to the shift from financial incentives to more customer education and awareness-raising, I recommend that the Régie signal to Hydro Quebec that it will not be inclined to support such an approach when reviewing future detailed efficiency program plans except in cases for which the Company can provide empirical data – either from Quebec or other relevant jurisdictions – which clearly demonstrate that an education-heavy program design will achieve as least as much cost-effective savings as a program that places greater emphasis on financial incentives.

III. HYDRO QUEBEC'S PROPOSED EFFICIENCY SAVINGS GOALS

Q: Please summarize the efficiency savings goals that Hydro Quebec has proposed in its 2014-2023 Integrated Supply Plan.

A: Hydro Quebec has estimated that the combination of its efficiency programs, the CaTVar project and the activities of the Bureau de l'efficacite et de l'innovation energitique (BEIE) will produce cumulative annual savings of 10 TWh by 2015. From 2016 onwards, the Company has said it plans to meet one-third of its sales growth through additional energy efficiency programs. That is estimated to be equivalent to between 0.6 and 1.0 TWh of incremental annual savings.

Q: Did Hydro Quebec assess the impact of other, alternative levels of efficiency savings?

A: No. Hydro Quebec was quite clear about this in response to data request from Union des Consommateurs:

"…HQ has not analyzed other energy savings scenarios." [2]

Q: How did Hydro Quebec select its savings target?

A: The Company says very little in its filed plan about how that target was selected. It provides a little more insight in response a data request from ACEF de l'Outaouais:

> *"The Distributors choice to determine its energy efficiency efforts as a proportion of sales growth is based on industry practice. This criterion allows the Distributor to adjust its level of effort in accordance with future requirements while limiting the impact on rates.*
>
> *Furthermore, the Distributor intends to maintain what it has accomplished in terms of energy efficiency and pursue its involvement in the market. The proposed percentage is designed to strike a balance between these factors for the long term."*[3]

However, it does not appears as if any empirical data or analysis has been used to determine whether or not the "balance" for which Hydro Quebec says it was aiming would be struck under an efficiency savings target of one-third of sales growth. Certainly, Hydro Quebec has not provided any empirical data or analysis to support that proposed target.

Q: In your experience, it is "industry practice" to establish energy savings targets as a proportion of sales growth?

A: No. In my experience, savings targets are much more commonly expressed as either a fixed

[2] Loose translation of Hydro-Quebec response to question 9.1 from information request no 1 of Union des Consommateurs : R-3864-2013, HQD-3, document 13, question 9.1.
[3] Translated version of Hydro-Quebec response to question 9.1 from ACEF de l'Outaouais (R-3864-2013, HQD-3, document 2, B-0027), found in C-ROEÉ-0030, question 3.1, footnote no. 2.

volume of savings or as a percent of annual sales. Indeed, it is worth noting that is how Hydro Quebec's own efficiency potential studies express savings potential.[4]

Q: Is setting a savings target as a percentage of growth in demand problematic in any way?

A: Yes. This approach is less than ideal for a couple of reasons.

First, savings targets should be primarily a function of how much savings is cost-effective in the long term. Much of the cost-effective savings in any jurisdiction is associated with existing usage by current customers. While some of that savings may not be cost-effective when load growth is low (e.g. due to lower avoided peak demand costs), much of it will be. Indeed, even if there is no load growth, there will be substantial levels of achievable cost-effective savings. That is partly because there is so much savings that is very inexpensive. Thus, the level of load growth is not a good proxy for levels of savings that are cost-effective.

Second, because load growth can change from year to year, a target pegged to load growth could lead to unpredictable and frequent increases and decreases in the level of effort to acquire efficiency savings. However, to be effective in the long-term requires convincing key market actors (e.g. builders, developers, retailers, equipment vendors, contractors, etc.) to adopt new business models in which they will focus on selling efficiency while building consumer awareness of and demand for such measures. That, in turn, requires some stability in Hydro Quebec's engagement in the market. In contrast, frequent ratcheting up and/or down in rebate

[4] J.Harvey Consultant & Associes, "Potentiel technico-économique d'économies d'énergie électrique des petites, moyennes et grandes industries du Québec", 2011-06-27 and Technosim Inc., "Potentiel technico-économique d'économie d'énergie électrique au Québec: Secteurs résidentiel, commercial et institutionnel et agricole", Juin 2011.

levels and/or other aspects of market involvement in response to fluctuations in load growth will hinder the ability to achieve substantial levels of savings – let alone to transform markets – in the future. Even if avoided costs decline temporarily as load growth slows (e.g. during an economic downturn), it would be a mistake to significantly and immediately reduce efficiency goals because it will be more difficult and expensive to ramp them up later if and when demand growth accelerates and avoided costs jump back up.

Q: You make a point of the fact that Hydro Quebec has not offered any empirical data or analysis to support its proposed efficiency savings target of one-third of sales growth. Why is that important?

A: The Company has developed a supply plan and is asking for regulatory approval for that plan. The plan has significant economic implications for Quebec residents and businesses. In that context it is important that sufficient analysis be done to demonstrate that the plan is, in fact, the economically optimal plan for the province. Since the demand for electricity is a critically important driver of supply-side choices, analysis of the pros and cons of different demand-side options – including different levels of energy efficiency – is necessary to demonstrate that a plan is in the province's best interests. Moreover, with appropriate empirical foundations, the Régie can work with Hydro-Québec and with the intervenors to compare alternative approaches in order to truly assess and if needed improve the plan put forward, and not just say "yes" or "no" to what is proposed.

Q: Is there reason to believe that different levels of energy efficiency would be economically preferable?

A: Yes. Both Hydro Quebec's own efficiency potential studies and the levels of electricity savings being achieved in other jurisdictions suggest that much higher levels of efficiency savings would be cost-effective – i.e. would lower total electricity bills for Quebec residents and businesses, even after accounting for the full cost of the efficiency investments.

Q: Please elaborate on how Hydro Quebec's own efficiency potential studies suggest that much higher levels of savings would be cost-effective.

A: As discussed above, Hydro Quebec's plan suggests that, beginning in 2016, it will achieve an average of about 0.8 TWh of new efficiency savings every year. In comparison, their forecast annual sales (net of the efficiency savings) ranges from 171.1 TWh in 2016 to 182.2 TWh in 2023.[5] Sales without the efficiency efforts would have been ranged from approximately 171.9 TWh in 2016 to 188.6 TWh in 2023. Thus, Hydro Quebec's proposed incremental annual savings is on the order 0.4 to 0.5% of sales. In contrast, Hydro Quebec's most recent efficiency potential studies suggest that economic (i.e. cost-effective) efficiency potential over a 10 year horizon is on the order of 2% per year – more than four times as great.[6]

Q: Those potential studies were completed three years ago when avoided costs were higher than today. How does that affect things?

[5] R-3864-2014, Translated version of HQD-1, document 1 (C-ROEÉ-0013), p. 12 (Table 2-1).

[6] Technical/economic potential over a 10 year horizon was estimated to be 21% for large industry (Tariff L), 23% for small and medium industry (Tariffs M and G), 9% (Tariff L) to 12% (Tariffs M and G) for public utilities and others (J.Harvey Consultant & Associes, "Potentiel technico-économique d'économies d'énergie électrique des petites, moyennes et grandes industries du Québec", 2011-06-27). The weighted average of these values is 21%, or an annual average of 2.1% per year. Technical/economic potential for the residential, commercial institutional and agriculture sectors was estimated to be 20.4 TWh over a ten-year horizon, or an average of 2.04 TWh per year (Technosim Inc., "Potentiel technico-économique d'économie d'énergie électrique au Québec: Secteurs résidentiel, commercial et institutionnel et agricole", Juin 2011). That represents an average of about 1.9% of Hydro Quebec's forecast annual sales to residential, agricultural, commercial and institutional customers (see R-3864-2014, Translated version of HQD-1, document 1 (C-ROEÉ-0013), p. 12 (Table 2-1)).

A: Not much. I say that for several reasons.

First, though the most recently approved avoided costs are a little lower than those used in the 2011 efficiency potential studies, the differences appear to be pretty small. Indeed, as the following table shows, current avoided are mostly just 5% to 12% lower over the first ten years of the forecast than the 2011 avoided costs. The only change outside that range is for off peak usage by Tarif M customers (which is still only 20% lower than in 2011).

Table 1: Comparison of 2014 and 2011 Avoided Costs (cents/kWh)[7]

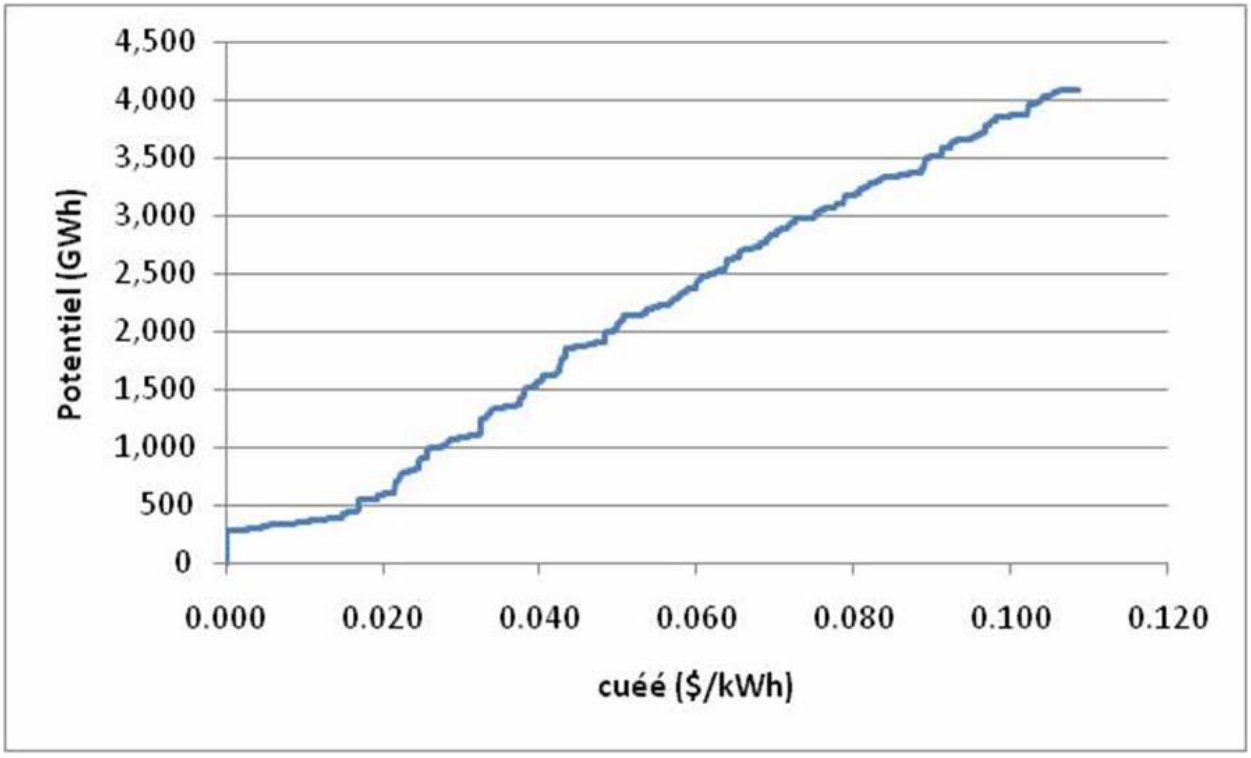
	Annuite Constant 2011-2020	Annuite Constant 2014-2023	% Change
Tarif D			
Chauffage de l'eau	6.41	5.75	-10%
Chauffage des locaux	8.48	8.06	-5%
Tous les usages	7.30	6.69	-8%
Tarif G			
Chauffage des locaux	8.37	7.95	-5%
Tous les usage (sans chauffe)	6.61	6.10	-8%
Tous les usages	6.63	6.07	-8%
Tarif M			
Chauffage des locaux	8.37	7.97	-5%
Tous les usage (sans chauffe)	6.10	5.49	-10%
Tous les usages	6.16	5.49	-11%
Hors pointe	3.97	3.17	-20%
Tarif L			
Tous les usages	5.02	4.42	-12%

Second, though the 2014 to 2023 average annual avoided costs shown in the table above are a little lower than the 2011 to 2020 values, the focus of my comments is on efficiency programs starting in 2016. A ten year average starting in 2016 may well be higher than the 10 year average starting in 2011 because avoided energy costs are currently estimated to increase substantially starting in 2024.

[7] 2011-2020 avoided costs are from Case R-3740-2010, HQD-2, Document 4, pp. 13-14; 2014-2023 avoided costs are from Case R-3854-2013, HQD-3, document 4, pp. 13-14, the document in which Hydro Quebec documented its proposed assumptions. In the end, the Regie approved avoided costs were a little different than those proposed by the Company. Specifically, the Regie lowered the longer-term avoided energy cost from wind from Hydro Quebec's proposed 10.5 cents per kWh to 9.0 cents per kWh, but advanced the year at which those longer-term values would go into effect to 2025 instead of 2026 (R-3854-2013 Phase 1, Decision D-2014-037, par. 129). However, neither of those changes affect the comparison in Table 1 which covers only the first ten years - i.e. through 2023 in the most recent Hydro Quebec filing.

Third, the amount of cost-effective efficiency potential does not seem to be dramatically affected by a modest change in avoided costs. That is, most of the cost-effective efficiency potential does not appear to have only just barely screened under the old avoided costs. Consider, for example, the residential space heating efficiency potential supply curve for the 2011 study (copied and shown below as Figure 1). It clearly suggests that the amount of efficiency potential has a roughly linear relationship with avoided costs. Thus a 5% reduction in the avoided costs would only reduce the cost-effective potential by about 5%.

Figure 1: Residential Space Heating Efficiency Potential from 2011 Study[8]



[8] Figure copied from Technosim Inc., "Potentiel technico-économique d'économie d'énergie électrique au Québec: Secteurs résidentiel, commercial et institutionnel et agricole", Juin 2011, p. 34.

Fourth, it appears as if Hydro Quebec has used an average annual line loss rate (currently estimated to be 7.9%) to estimate the impacts of efficiency on system needs.[9] However, because line losses increase as loads increase, the marginal loss rate – i.e. the losses associated with adding the last kW of demand to the system and any given hour – is higher than the average loss rate. Since efficiency programs affect demand on the margin, those higher marginal loss rates should be used to estimate their impacts and cost-effectiveness. By using average loss factors Hydro Quebec is understating the benefits of efficiency.[10]

Finally, in my experience efficiency potential studies tend to be inherently conservative. That is, they tend to understate actual efficiency potential. One important reason is that they cannot anticipate all significant new technology developments.

Q: How does Hydro Quebec's proposal to pursue enough efficiency potential to offset one-third of load growth compare to what leading jurisdictions are doing?

A: It is much less aggressive. For example, in New England, the independent system operator (ISO-NE) recently estimated that, from 2017 through 2023, the efficiency programs of the six states will not only collectively eliminate all energy load growth in the region but actually lead to slight reductions in annual electricity sales.[11] In my home state of Vermont, the New England ISO is forecasting that annual electricity sales will actually decline by nearly 1% per year.[12]

[9] Translated version Hydro Quebec response to question 2.6 of ROEÉ's information request no. 2 (R-3864-2013, HQD-3, document 11.1, B-0037): C-ROEÉ-0030.
[10] See Lazar, Jim and Xavier Baldwin, "Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements", published by the Regulatory Assistance Project, August 2011 (www.raponline.org/document/download/id/4537).
[11] ISO New England Staff, "Draft Final Energy Efficiency Forecast: 2018-2023", presentation to the Energy Efficiency Forecast Working Group, March 31, 2014, slide 42.
[12] Ibid., slide 80.

Q: You translated the one-third reduction in load growth to an estimate of between 0.4% and 0.5% of sales. How does that compare to leading jurisdictions?

A: Again, it is much less aggressive. In a recent report the American Council for an Energy Efficient Economy estimated that 27 states in the U.S. achieved electricity savings of at least 0.57% of sales in 2011, with one state – Vermont – achieving more than 2% savings.[13] The same report makes clear that savings targets are increasing over time. Indeed, five states – four from New England plus New York – have policies in place that require incremental annual savings of between 2.0% and 2.6% in 2013 and beyond.[14] That is on the order of four to five times greater than Hydro Quebec's proposed target for 2016 and beyond.

Q: Do those states have avoided costs that are similar to Quebec's? If so, is the aggressiveness of their savings targets applicable to Quebec?

A: Avoided costs in New England and New York are generally higher than in Quebec. To be sure, that difference and other differences should be considered when comparing the aggressiveness of energy efficiency efforts. However, available data suggests that the dramatic five-fold difference in the level of aggressiveness with efficiency is not primarily a function of differences in avoided costs. For example, in 2013, when Efficiency Vermont achieved savings of 92,250 MWh, or 1.7% of retail electricity sales, its average levelized TRC cost of saved electricity was only 1.1 cents/kWh.[15] By my calculations, the average levelized TRC cost of saved electricity forecast for Massachusetts' utilities' 2013-2015 plans is also only 1.1

[13] Downs, Annie et al., The 2013 State Energy Efficiency Scorecard, ACEEE Report E13K, November 2013.
[14] Ibid.
[15] Efficiency Vermont, "Savings Claim Summary 2013", April 1, 2014 (https://www.efficiencyvermont.com/docs/about_efficiency_vermont/annual_summaries/2013_savingsclaim_summary.pdf)

cents/kWh. In short, it appears as if a large majority of the very high levels of savings that are being achieved in those jurisdictions would also be highly cost-effective under Quebec's current avoided costs.

The principal difference between the level of aggressiveness in many northeastern states and Hydro Quebec's proposed savings levels is that the aggressive northeastern states are pursuing all (or nearly all) cost effective efficiency; Hydro Quebec is not.

Q: Do leading Canadian jurisdictions and/or other jurisdictions that rely extensively on hydro power also have higher savings goals than Hydro Quebec is currently forecasting?

A: Yes. Each of the following examples has substantially higher savings goals than Hydro Quebec:

- British Columbia has set a target for energy savings that is equal to two-thirds of baseline sales growth – twice as great as Hydro Quebec's proposal for the post-2015 period;[16]

- Efficiency Nova Scotia's 2013-2015 Efficiency Plan called for savings equal to approximately 1.5% of sales[17] – more than three times the rate proposed by Hydro Quebec for the post-2015 period;

- The Ontario Minister of Energy recently issued a new "Conservation First Framework" directive that would have the province acquire average savings from electric efficiency

[16] http://www.empr.gov.bc.ca/EEC/Strategy/DSM/Pages/default.aspx
[17] Efficiency Nova Scotia Corporation, Evidence of the ENSC as DSM Administrator, in the matter of The Public Utilities Act, R.S.N.S. 1989, c.380, as amended and in the matter of An Application to Approve Efficiency Nova Scotia Corporation's Electricity Demand Side Management (DSM) Plan for 2013-2015, revised April 18, 2012.

programs, over the 2015 to 2020 period, of roughly 0.8% per year[18] - nearly twice what Hydro Quebec has proposed; this action was taken against a backdrop of declining or stagnant electricity sales in Ontario since 2005;

- The Bonneville Power Administration Sixth Power Plan, adopted in 2010, has set an energy savings target that would have the effect of eliminating 85% of load growth through efficiency[19] – roughly two and one-half times the target proposed by Hydro Quebec for the post-2015 period.

Q: Hydro Quebec appears to have suggested that limiting rate impacts is one of the factors underlying the selection of its savings targets for 2016 and beyond. How do you respond?

A: First of all, bill impacts – i.e. the product of consumption and rates – are much more important than rate impacts. Any customer would prefer to have a 5% higher electric *rate* if it got a 20% reduction in consumption at the same time (the result would be a total energy bill reduction of 16%). Efficiency investments that pass the total resource cost test will, by definition, reduce the aggregate electric bill of all customers.

Thus, any concern about rate impacts associated with energy efficiency is really an equity concern. That is, it is a concern about the customers who do not participate in efficiency programs. In some cases (e.g. depending on the magnitude of costs associated with acquiring peak capacity and/or transmission and distribution system capacity), such non-participants may see modest rate increases, from the combination of efficiency program spending and lost

[18] Chiarelli, Bob, 2015-2020 Conservation First Framework, letter to Mr. Colin Anderson, CEO of the Ontario Power Authority, March 31, 2014 (http://www.powerauthority.on.ca/sites/default/files/news/MC-2014-856.pdf).
[19] BPA produces a 20 year power plan every 5 years. The 6th Power Plan is the one currently in effect. See: http://www.nwcouncil.org/media/6383/SixthPowerPlan_Overview.pdf.

revenues to the utility, without experiencing the offsetting benefits from those programs. While that can certainly be a legitimate concern if such effects are substantial enough, it is important that careful analysis is conducted to determine how substantial they really are. Moreover, the best way to deal with concerns about rate impacts is not to reduce investment in cost-effective efficiency programs, but rather to ensure that the portfolio of programs is broad and deep enough to offer opportunities for cost-effective savings to *all* customers – and to do so long enough for the vast majority of customers to be able to participate over time.

Finally, I would note that it is not clear that Hydro Quebec has done – or at least not made public – any analysis of the rate and bill impacts of more aggressive levels of efficiency. Without such an analysis, it is not possible to draw informed conclusions about whether any rate impacts associated with additional efficiency would even be substantial enough to merit concern. It is worth noting that a recent analysis of Rhode Island's 2015-2017 efficiency program plan, which would achieve incremental annual savings of about 2.4% per year – more than five times what Hydro Quebec is proposing to achieve, suggests that the average long-term rate impacts of those efforts would vary by customer group but range from just 0.7% to 1.6%.[20] I am not suggesting that analysis is necessarily transferable to Hydro Quebec's situation, but it does suggest that it is possible for very substantial energy efficiency program portfolios to produce very modest rate impacts.

[20] Woolf, Tim and Jenn Kallay, "Findings and Recommendations from Rhode Island Rate, Bill and Participant Analysis", Memorandum to Steve Scialabba et al., updated February 5, 2014.

IV. HYDRO QUEBEC'S PROPOSED EFFICIENCY STRATEGY CHANGES

Q: How has Hydro Quebec characterized its future strategies for promoting energy efficiency?

A: Hydro Quebec outlines three features of its future efficiency strategy:

1. It will shift emphasis away from direct financial incentives while increasing emphasis on customer education and awareness-raising;

2. It will emphasize longer-term market transformation; and

3. It will prioritize promotion of efficiency measures that reduce peak demands, particularly space heating and water heating measures.

Q: What is your view of the proposed shift away from direct financial incentives in favor of greater emphasis on customer education and awareness-raising?

A: As a general, cross-cutting strategy, it is highly problematic.

Q: Why?

A: First, it is important to note that financial incentives themselves are often not just employed to reduce costs to consumers. They often are indirectly critical to facilitating customer education by helping to get customers' attention so that they will read educational materials. They also provide credibility to the efforts of retailers, equipment vendors and others who attempt to educate consumers as part of their sales process.

Second, and more importantly, the design of efficiency programs – including decisions on the magnitude of financial incentives and the amount of effort put into customer education and awareness-building – should be a function of the nature and severity of the market barriers to customer investment in cost-effective efficiency measures. Those barriers vary from measure to measure and market to market. Thus, a *general* strategy of reducing financial incentives in favor of more customer education would only be appropriate if a comprehensive study (or set of studies) of a broad swath of efficiency opportunities and programs had demonstrated that Hydro Quebec currently has a systematic over-reliance on financial incentives (relative to the nature and severity of market barriers and their impact on program participation) and/or a systematic under-investment in customer education (again, relative to the nature and severity of market barriers). Hydro Quebec has not put forward any such study or rationale for its proposed shift in strategy.

Moreover, though I have worked on efficiency program planning in dozens of different jurisdictions across North America over more than twenty years, I have never seen empirical evidence to suggest that a general shift from financial incentives to customer education would lead to greater effectiveness in acquiring cost-effective efficiency savings.

Q: Have you seen evidence in the other direction – that increasing financial incentives can lead to greater savings?

A: Yes. One classic example is the Canadian EcoEnergy (formerly EnergGuide for Houses) program. In the early 2000s, there were no financial incentives available in most of the country and the conversion rate from initial audits/assessments (i.e. the provision of customer

information and awareness-raising) to completed retrofit jobs was dismally low (less than 5% in Quebec through the 2003-2004 federal fiscal year). Once financial incentives began to be offered, conversion rates rose dramatically (averaging over 60% in Quebec from 2007 through 2014).[21]

Q: Are you suggesting that customer education and/or awareness-building is not important?

A: No. Absolutely not. Lack of education and awareness is a barrier to investment in efficiency in many markets. Thus, I strongly support the inclusion of customer education and awareness-building activities in the design of most efficiency programs. However, those efforts need to be tailored to the nature of the barriers they are trying to address, need to be scaled to the severity of the barriers and need to be complements to (rather than substitutes for) other program strategies, including financial incentives. Similarly, the magnitude of financial incentives needs to be a function of the severity of the barriers they are designed to address in each individual market, rather than driven by an over-arching philosophy or ideology.

Q: What is your view of Hydro Quebec's proposal to emphasize market transformation?

A: As a general matter, emphasis on market transformation is good because it has the potential to produce greater long-term investment in efficiency at lower cost. Of course, that will only happen if efficiency programs are carefully designed to meet long-term market transformation goals. That requires the development of market transformation logic models which map out how

[21] Data from Natural Resources Canada.

different program strategy elements will affect different aspects of the market.[22] It also requires a clear definition of what a transformed market means (e.g. adoption of a government code or standard, or a very high market share with little to no market support); the identification of short, medium and long-term market indicators of success; the establishment of performance goals tied to those indicators;[23] careful tracking of progress towards the goals; and a commitment to continually refine program designs based on market feedback.

Q: Has Hydro Quebec proposed such logic models, market indicators and goals?

A: Not in this proceeding. However, that is to be expected. This proceeding is about setting high level strategies, so it would not be appropriate and should not be necessary for Hydro Quebec to present such information right now. Rather, it should be part of future rate or other regulatory cases in which the details of their program offerings are presented.

Q: What is your view of Hydro Quebec's proposed emphasis on energy savings that disproportionately target reductions in winter peak demand?

A: As I stated earlier, I believe it is appropriate for Hydro Quebec to plan to acquire all cost-effective efficiency, both savings that disproportionately reduce peak demand and those that do not. That said, it would not be reasonable to expect Hydro Quebec to reach the "all cost-effective" levels of energy savings immediately. It will take some building of capability and capacity to efficiently ramp up efforts to that level. Experience in other jurisdictions suggest that

[22] For a high level overview of the value of logic models, as well as a summary picture of what they look like, see Peters, Jane (Research into Action), "Evaluation of Market Transformation Programs", presented at the ACEEE Market Transformation conference in Baltimore Maryland, March 30, 2014 (http://www.aceee.org/files/pdf/conferences/mt/2014/101-Peters.pdf).

[23] For example, see the goals for Enbridge Gas' market transformation efficiency programs in Ontario (Enbridge Gas, Update to the 2012 to 2014 Demand Side Management (DSM) Plan, filed with the Ontario Energy Board, Docket EB-2012-0394).

such a ramp up might be ideally achieved over a two to four year period. Since energy savings that disproportionately reduce peak demands have greater economic value (all other things being equal) it would be reasonable to get disproportionately more of the Company's savings during any ramp up period from such measures and programs.

Q: Does this conclude your testimony?

A: Yes.