Témoignage de Mme Judy W. Chang de The Brattle Group sur la politique d'ajouts au réseau de transport

Policy on Network Upgrades

Direct Testimony of Judy W. Chang

On Behalf of Hydro-Québec TransÉnergie

APRIL 30, 2014

Table of Contents

I. Scope, Qualifications and Summary

A. Scope of the testimony

My name is Judy W. Chang. I have been asked by Hydro-Québec TransÉnergie (HQT) to address three of the topics that the Régie de l'énergie (Régie) has raised regarding the Transmission Provider Policy on Network Upgrades (Network Upgrades Policy), provided in the Hydro-Québec Open Access Transmission Tariff (OATT).[1] The purpose and scope of my testimony are to: (1) address three of the topics the Régie has raised; (2) explain the economic and policy rationale supporting HQT's proposed Network Upgrade Policy; and (3) compare the proposed Network Upgrade Policy to those used in transmission tariffs regulated by the Federal Energy Regulatory Commission (FERC) in the United States.

B. Topics Raised by the Régie That are Addressed in This Testimony

The principal topics raised by Régie in previous proceedings[2] that I address in my testimony include:

- Application of HQT's maximum amount (Maximum Allowance) when considering the costs of network upgrades
- Application of HQT's Maximum Allowance when considering network upgrades for integrating generating stations intended to supply power to native load
- HQT's follow-up on service commitments associated with point-to-point transmission customers whose services induced network upgrades.

---

[1] Hydro-Québec Open Access Transmission Tariff, updated on March 20, 2014, English version, is referenced and used within the testimony.

[2] See Decision D-2011-039, paragraphs 462 and 463.

C. QUALIFICATIONS

I am a Principal and Director of The Brattle Group. I am an energy economist and public policy expert with seventeen years of experience and a background in electrical engineering. I have submitted testimonies before the Federal Energy Regulatory Commission (FERC) and have testified before U.S. state regulators and provincial regulators in Alberta, Canada on regulatory topics related to transmission and renewable energy. In recent years, I have authored reports that discuss the economic benefits and costs of transmission, including how to analyze potential transmission investments comprehensively. I have also: (1) assisted system planners with designing and applying effective planning approaches that incorporate future uncertainties into network expansions; (2) estimated potential transmission investments needed to support certain levels of renewable energy penetration; (3) analyzed the potential impact of transmission investments on certain power markets; and (4) assisted private investors in analyzing the regulatory risks associated with certain transmission investments. Further, I have presented to U.S. Congressional staff to help inform legislators about the role of electric transmission in the power industry and associated regulatory background. In addition, I have assisted policy makers in analyzing the potential impact of various levels of renewable energy penetration on a region's transmission needs, market prices, and the need for additional ancillary services.

My business address is 44 Brattle Street, Cambridge, Massachusetts, 02138. I received my Bachelor of Science in Electrical Engineering from the University of California, Davis, and my Master's in Public Policy from Harvard Kennedy School. I am also a Director on the Board of the Massachusetts Clean Energy Center and a member of the Center's Investment Committee. Further details regarding my background, publications, and prior expert testimony are provided in my curriculum vitae.

D. Summary of Findings

After reviewing HQT's proposed Network Upgrade Policy, I conclude that the policy treats all transmission customers requesting network upgrades equitably. The policy also provides a reasonable assurance of adequate cost recovery for network upgrades and promotes fairness and efficiency in transmission investment, while protecting existing transmission customers from excess costs caused by customers requesting transmission service that trigger network upgrades.

The remainder of my report is organized as follows. In Section II, I describe the general principles underlying the network upgrade policies in the U.S. In Section III, I outline the general principles followed by HQT's current and proposed Network Upgrade Policy and in Section IV, I provide a more detailed description of HQT's current and proposed Network Upgrade Policy. In Section V, I explain how HQT's Network Upgrade Policy with modification reinforces protection for existing customers from excess costs associated with customers requesting transmission service that requires network upgrades. In Section VI, I explain how HQT's "follow-up" of the commitments from point-to-point transmission customers who require network upgrades demonstrates that the revenue collected from the those customers covers the rolled-in portion of the network upgrade costs. In Section VII, I show that the HQT's proposed Network Upgrade Policy is consistent with principle espoused by FERC. Finally, in Section VIII, I summarize my conclusions.

II. General Principles Used in Network Upgrade Policies in the U.S. Centers on Open Transmission Access and Protecting Transmission Customers from Undue Cost Burdens

Transmission providers typically recover the costs of network upgrades that result from customers' transmission service requests through charges that are either: a) "rolled-in" with existing transmission costs that all customers pay over time; or b) assigned to and paid for by

the requesting transmission customer, or group of customers, in the form of direct "contributions" or incremental rates. Using these two methods allows transmission providers to distinguish between the costs that are shared across all customers and those assigned to specific users.

The network upgrade policies in the U.S. center on protecting existing transmission customers from excess costs induced by network upgrades associated with customers requesting transmission services. This section describes the high-level principles.

As a part of U.S. electricity industry restructuring in the 1990s, FERC outlined its transmission pricing policy. FERC indicated a desire to ensure that its "transmission pricing policies promote economic efficiency, fairly compensate utilities for providing transmission services, reflect a reasonable allocation of transmission costs among transmission users, and maintain the reliability of the grid."[3] More specifically, FERC identified five principles for evaluating transmission pricing proposals. In a 1995 Order to clarify its 1994 transmission pricing policy, FERC stated the following:

> The first principle is that transmission pricing should conform to the traditional embedded cost revenue requirement. However, the Commission also provided procedures whereby utilities can propose rates that do not conform to the traditional revenue requirement and thus do not meet the first principle, i.e., non-conforming proposals. The second principle requires that any new transmission pricing proposal, conforming or non-conforming, must meet the Commission's comparability standard. The remaining three principles (concerning economic efficiency, fairness, and practicality) reflect goals that an applicant must try to meet, but that may need to be balanced against one another in the Commission's determination of whether the proposed rates are just and reasonable.[4]

At the time of restructuring, FERC's primary policy objective was to ensure that transmission providers offered non-discriminatory open access to the transmission network, particularly

---

[3] See *Policy Statement,* FERC, Docket No. RM93-19-000, October 26, 1994, pp. 1-2.

[4] See *Order on Reconsideration and Clarifying Policy Statement*, FERC Docket No. RM93-19-001, May 22, 1995, pp.1-2, footnote omitted.

for customers that were not traditional native load. However, since native load customers, prior to restructuring, had funded (and were going to continue to fund) the infrastructure that made the delivery of power to them possible, FERC also wanted to ensure that existing transmission users would not be unduly harmed by costs imposed by customers requesting transmission service involving network upgrades that could increase the embedded costs of the system. Thus, FERC's initial "higher of" policy was designed to ensure that existing (and growing) native load was protected, while the wholesale market developed, allowing new customers to interconnect to the existing transmission network that was predominantly funded by existing native load. In a policy statement in the mid-1990s, FERC stated that one of the goals of its new pricing policy was "to hold native load customers harmless."[5]

Under the FERC's "higher of" policy, a transmission customer's service request that requires transmission upgrades would pay the higher of the "embedded cost" or "incremental cost" of the upgrade. As part of its Order No. 890, FERC clarified its position expressed in the earlier restructuring Order No. 888 by stating:

> Under the Commission's "higher of" pricing policy, when the requested transmission service requires network upgrades, the transmission provider should calculate a monthly incremental cost transmission rate using the revenue requirement associated with the required upgrades and compare this to the monthly embedded cost transmission rate, including the expansion costs. This incremental rate should be established by amortizing the cost of the upgrades over the life of the contract.[6]

The FERC transmission policy regarding cost recovery for network upgrades is that a transmission provider can charge a customer, either a new or an existing customer requesting

---

[5] See *Policy Statement,* FERC Docket No. RM93-19-000, October 26, 1994, footnote 7 where the FERC referenced prior decisions that articulated three of its goals governing requests for firm transmission service: (1) to hold native load customers harmless, (2) to provide the lowest reasonable cost-based price to third-party firm transmission customers, and (3) to prevent the collection of monopoly rents by transmission owners and promote efficient transmission decisions.

[6] FERC Order No. 890, February 16, 2007, paragraph 870, pp. 508-509, footnotes omitted.

additional transmission service, the higher of the incremental cost of transmission or the embedded cost, but not both.[7] This means that if the incremental cost transmission rate is greater than the embedded cost transmission rate (including upgrade costs), the transmission provider has the option to charge the requesting customer the incremental cost of the upgrade. If the incremental cost transmission rate is less than the embedded cost transmission rate (including the upgrade cost), the transmission provider can charge the embedded cost transmission rate.

Overall, FERC's "higher of" policy aims to balance the interest of all transmission customers because if the incremental transmission cost of the upgrade is lower than the embedded cost, then the customer requesting the transmission service would pay the same rate for transmission service as all other customers, while reducing the average rate and benefitting all customers. On the other hand, if the incremental transmission cost of the upgrade is greater than the embedded cost of transmission, then the transmission provider could require the customer requesting the transmission service to pay more than the embedded-cost rate, and thereby cover the incremental cost and, thus, protect the interest of all other customers.

III. General Principle of HQT's Network Upgrade Policy Focuses on Ensuring Cost Recovery and Protecting Existing Customers from Excess Costs Associated with Customers Requesting Transmission Services

HQT's Network Upgrade Policy, along with proposed modifications, follows certain basic principles including: i) provide a reasonable assurance of adequate cost recovery from native load and point-to-point customers such that each is protected from excess costs associated with network upgrades triggered by new transmission service requests and ii) treat all customers on the system equitably. HQT's Network Upgrade Policy (as contained in its

[7] See *Policy Statement,* ERC, Docket No. RM93-19-000, October 26, 1994, p. 5.

OATT) applies to transmission investment projects[8] for expanding the network in response to native load growth and transmission service requests from point-to-point customers.

HQT's embedded costs are recovered through a uniform transmission charge that is based on HQT's system cost, net of the amount paid through customers' direct contributions. To provide a reasonable assurance that customers triggering network upgrades do not impose excess costs on other customers of the system by raising the average system charge, HQT has put into place an approach that requires both the native load customer (Hydro-Québec Distribution (HQD)) and point-to-point customers (Hydro-Québec Production (HQP) or third-parties) to pay sufficient contributions to HQT for network upgrade costs that exceed average system costs. To protect existing customers from bearing excess costs for network upgraded associated with a transmission service request, HQT estimates the maximum amount of transmission investment that can be rolled-in to its aggregate revenue requirement (which I will refer to as "Maximum Allowance"). If the cost of certain upgrades needed to fulfill a customer's transmission service request exceeds this maximum, the customer is required to make a direct contribution (which I will refer to as "Contribution") in excess of the Maximum Allowance to HQT to mitigate the impact of the upgrade on HQT's other customers. This treatment is applicable to upgrades associated with native load growth, generation integration, and point-to-point transmission service.

HQT's Network Upgrade Policy also provides a reasonable assurance of adequate revenue from the customers (native load or point-to-point) that request network upgrades. For example, HQT's Network Upgrade Policy requires point-to-point customers to have transmission service agreements and provide revenues that would cover the cost of

[8] HQT's Network Upgrade Policy applies to "transmission investment" projects related to serving native load growth, new generation interconnections and new interconnections (or interties) with neighboring systems. Maintenance projects are not subject to the terms and conditions of the Network Upgrade Policy.

integrating a new generation resource. The network upgrades that the native load triggers are considered using a 20-year load growth forecast.

HQT's Network Upgrade Policy aims to treat all customers equitably. As described above, Maximum Allowance, Contribution, and the requirement for assurance of adequate revenue to cover rolled-in costs are applicable to all types of customer-related upgrades. As a result, all customers are provided protection from excess costs imposed by other customers. That is, native load customers are protected from point-to-point customers and vice versa.

Finally, HQT's Network Upgrade Policy is also a means to promote efficient transmission investments. The policy achieves that through the price/cost signals it provides to customers through the combination of standard transmission charges and Contributions.

IV. HQT's Current Network Upgrade Policy and Proposed Modifications Support the General Principle

In this section, I outline the mechanics used in HQT's Network Upgrade policy, starting with the current policy and followed by the proposed modifications.

A. HQT's Current Network Upgrade Policy

HQT's OATT states in Attachment J, Section E:

> [T]he maximum amount to be borne by the Transmission Provider for Network Upgrades made to meet the requirements for Transmission Services offered under Parts II, III and IV of the *Hydro-Québec Open Access Transmission Tariff [(OATT)]* shall be [the maximum allowance per kW] multiplied by the new maximum capacity in kW to be transmitted on the system.[9]

[9] Hydro-Québec Open Access Transmission Tariff (updated March 20, 2014), Attachment J, Section E, p. 172.

This means that for network upgrade costs resulting from a transmission service request, HQT estimates the maximum amount of upgrade costs that can be rolled-in with the embedded cost transmission tariff (or "Maximum Allowance"). Any upgrade costs above this maximum amount will be paid through a direct Contribution by the requesting transmission customer. As implemented, the key components of the existing approach under the OATT include:

- For network upgrades necessary to respond to growing native load served by HQD, upgrade costs up to a Maximum Allowance are rolled-in with existing system costs. All network upgrades commissioned during a calendar year to support HQD's load growth are aggregated when estimating the Contribution required from HQD.
- For network upgrades necessary for integrating generation resources to serve native load (served by HQD) or those associated with point-to-point transmission service, costs up to a Maximum Allowance are rolled-in with existing system costs.
- For network upgrades necessary to support point-to-point transmission service, network upgrade costs up to a Maximum Allowance are rolled-in with existing transmission costs.
- For all three of these types of network upgrades (to serve native load, to integrate new generation, and to support point-to-point transmission services), costs in excess of the Maximum Allowance are charged to the transmission customer in the form of a Contribution. The Maximum Allowance is based on the length of the service up to a 20-year maximum duration.

The Maximum Allowance sets the amount of the network upgrade costs that can be rolled-in with the embedded costs such that customers with new service requests do not impose excess costs on other customers. HQT's current method for estimating the Maximum Allowance is set out in its OATT, Attachment J, Section E, which states:

> The maximum amount to be borne by the Transmission Provider is calculated from the present value over twenty (20) years of the point-to-point rate for an annual delivery specified in Schedule 9 herein, less 15% to account for the present value over twenty (20) years of operation and maintenance costs for Network

> Upgrades completed, as well as for the amount of the applicable capital tax and public utility tax.
>
> In the case of services for a duration of less than twenty (20) years, the maximum of costs borne by the Transmission Provider is the present value of the customer's term of commitment prorated to the twenty- (20-) year duration, multiplied by the amount indicated above.[10]

As such, under the current Network Upgrade Policy, the Maximum Allowance is estimated by taking the present value of the 20-year per unit revenue requirement (in $/kW) that can be rolled-in with embedded costs. The calculation of the Maximum Allowance assumes a 20-year depreciation schedule for the upgrade cost, and that the return on investment, operating and maintenance costs, and taxes would also be rolled-in with embedded costs. This Maximum Allowance (in $/kW) is then multiplied by the allocation units[11] (in kW or MW) of the requested transmission service to determine the dollar value of the upgrade costs that can be rolled-in with embedded costs. Table 1 below shows the calculation of the Maximum Allowance. The $598/kW value shown in the table is applicable for 2014.[12]

---

[10] Hydro-Québec Open Access Transmission Tariff (updated March 20, 2014), Attachment J, Section E, p. 172.

[11] For the purpose of this testimony, I use "Allocation Units" as consistent with the relevant sections of HQT's OATT, Attachment J. The "Allocation Units" (in kW or MW) used in estimating the Maximum Allowance are set as follows: (i) for network upgrades associated with interconnections with a neighboring system (Section D of Attachment J) and integrating generating stations (Section B of Attachment J), the allocation units are set to the maximum capacity of the generation or transmission project; (ii) for load growth-based network upgrades, the allocation units are set to the projected 20-year load growth forecast.

[12] Hydro-Québec Open Access Transmission Tariff (updated March 20, 2014), Attachment J, Section E, p. 172.

Table 1

Maximum Allowance under 20-Year Depreciation

	Inputs/Output:	
[a]	Total Investment Output ($/kW)	598
[b]	Cost of Capital	5.666%
[c]	PV of O&M Costs	15.00%
[d]	Yearly O&M	1.27%
[e]	Yearly Tax Rate	0.55%
[f]	Years	20

Year	Depreciation	Accum. Depr.	Rate Base	Cost of Capital	Sub Total	O&M	Taxes	Per Unit Revenue Requirement ($/kW)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Start			598					
2014	30	30	568	34	64	8	3	74.65
2015	30	60	538	32	62	8	3	72.79
2016	30	90	508	30	60	8	3	70.93
2017	30	120	478	29	59	8	3	69.08
2018	30	149	448	27	57	8	3	67.22
2019	30	179	418	25	55	8	2	65.36
2020	30	209	389	24	54	8	2	63.50
2021	30	239	359	22	52	8	2	61.65
2022	30	269	329	20	50	8	2	59.79
2023	30	299	299	19	49	8	2	57.93
2024	30	329	269	17	47	8	2	56.07
2025	30	359	239	15	45	8	1	54.21
2026	30	389	209	14	43	8	1	52.36
2027	30	418	179	12	42	8	1	50.50
2028	30	448	149	10	40	8	1	48.64
2029	30	478	120	8	38	8	1	46.78
2030	30	508	90	7	37	8	1	44.93
2031	30	538	60	5	35	8	0	43.07
2032	30	568	30	3	33	8	0	41.21
2033	30	598	0	2	32	8	0	39.35
[g] Present Value					598			

Sources & Notes:

[a]: Output of model. Calculated such that the Per Unit Revenue Requirement ($/kW) in column [9] is equal to the tariff of $74.65/kW in 2014.

[b] to [f]: Cost of Capital in Decision D-2014-049, page 10; PV of O&M Costs and Years in the OATT, Attachment J, section E; Yearly Tax Rate: Public Utilities Tax applicable to HQT.

[g]: present value of column [6] using cost of capital in [b].

To illustrate HQT's application of the Maximum Allowance as it relates to the magnitude of upgrade costs that can be rolled-in with the embedded system costs, along with the

magnitude of the customer's Contribution, Table 2 shows two hypothetical network upgrades.

Table 2

Network Upgrade Policy Approach

	Upgrade Cost ($ million)	Maximum Allowance ($/kW)	Allocation Units (MW)	Maximum Allowance Specified for the Upgrade ($ million)	Contribution Required?	Contribution Amount ($ million)	O&M ($ million)	Total Contribution Amount ($ million)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Network Upgrade A	100	598	100	59.8	Yes	40.2	6.0	46.3
Network Upgrade B	20	598	50	29.9	No	0.0	0.0	0.0

Sources & Notes:

[1] & [3]: Assumed.
[2]: Maximum Allowance under the OATT. See Table 1.
[4] = ([2] x [3]) / 1,000.
[5]: A contribution is required for Network Upgrade A because the project cost is greater than the project Maximum Allowance.
[6] = higher of zero and {[1] - [4]}.
[7] = [6] x 15%.
[8] = [6] + [7].

In these two examples, the cost of each upgrade is compared against a Maximum Allowance.[13] The costs in excess of the Maximum Allowance determine the Contribution from the requesting customer. In the first example, Network Upgrade A has a cost of $100 million and the allocation units for the transmission service are 100 MW. Thus, multiplying the Maximum Amount of $598/kW by the 100 MW allocation units for the requested transmission service, the dollar amount for the Maximum Allowance associated with Upgrade A is $59.8 million. Any upgrade costs in excess of $59.8 million, or in this case, $40.2 million (along with $6.0 million in associated operation and maintenance (O&M) costs), would need to be collected through a Contribution from the requesting customer. In contrast, Network Upgrade B has an upgrade cost of $20 million and the allocation units for the transmission service are 50 MW. This results in a calculated Maximum Allowance of

[13] Note that in this example, I assume a duration of at least 20 years for the relevant transmission service associated with each network upgrade. Thus, the Maximum Allowance of $598/kW is used.

$29.9 million. Because Upgrade B costs less than $29.9 million, all of the $20 million upgrade cost would be rolled-in with the embedded costs and recovered through the standard transmission tariff. The customer that initiated Upgrade B would not need to make a Contribution toward the cost of the upgrade.[14]

B. HQT's Proposed Network Upgrade Policy Related To Generation Used to Serve Native Load

HQT's proposed Network Upgrade Policy continues to treat upgrades related to load growth, generation integration for point-to-point service, and point-to-point interconnections in the same manner as it has under its existing policy. However, HQT proposes to modify the treatment of upgrades related to integration of resource projects used to serve native load.

HQT's proposed Network Upgrade Policy continues to apply the Maximum Allowance to all network upgrades regardless of type of customer or whether the upgrade is related to load growth, generation integration for both point-to-point service and to serve native load, or point-to-point interconnections. Similar to the existing policy, the proposed policy also requires a reasonable assurance from customers that they will pay the transmission rates long enough to adequately cover the costs of the upgrades that HQT rolls into its rate base. Hence, the proposed policy is consistent with the general principles of: i) providing adequate cost recovery such that all customers (native load and point-to-point) are protected from excess costs imposed on the system by upgrades triggered by a transmission service request by either a new or existing customer (in the form of generation interconnection/integration, load growth, or point-to-point service); and ii) equitable treatment of all customers on the system.

[14] Note that this is a simplified example of the existing Network Upgrade Policy. There are some nuances to the policy that will be discussed later in my testimony.

The modification that HQT is proposing is to aggregate all load-serving and generation-related network upgrades necessary to support native load (served by HQD) when estimating the Maximum Allowance,[15] but cap the amount of HQD's resource-related network upgrade costs that can be rolled-in to HQT's rate base (as discussed below). The new aggregation approach would not only include the costs resulting from system upgrades required to serve native load growth, as is currently done, but would also include the costs of upgrades needed to integrate generation resources to serve native load. Effectively, all network upgrade costs resulting from serving native load, irrespective of whether they relate to load growth or native-load-related generation integration, will be combined (pooled) to determine the Contribution from HQD.

Under the proposed approach, when integrating generation resources for native load triggers network upgrades, HQT would, in a first step, determine HQD's Contribution as under the current policy, which is the "assumed" rolled-in amount. This allows equitable treatment to all generation resources. In a second step, HQT would compare the assumed rolled-in portion of the upgrade costs against "credits" associated with HQD's load growth-related upgrades. "Credits" are created when the rolled-in portion of an upgrade cost is less than the Maximum Allowance. This comparison determines whether HQD has accumulated sufficient credits to cover the "assumed" rolled-in portion of the generation resource-related upgrade costs. If there are not enough credits to cover the pooled network upgrade costs needed to serve load and associated generation resources, HQD will be required to make an additional Contribution that covers the remainder of the upgrade costs. Appendix A provides more details by showing an illustrative example of the proposed modification, comparing the proposed modification to the current Network Upgrade Policy.

---

[15] Under HQT's Network Upgrade Policy (current and proposed), load growth is used as the allocation unit to calculate the Maximum Allowance for upgrades to the satellite substations used to serve the load growth. Both policies assign zero allocation units (and thus zero Maximum Allowance) to other upgrades such as to lines and source substations that are also necessary to serve that load growth.

This proposed approach is consistent with the existing application of the Maximum Allowance, including that for generation integration requests by point-to-point customers, and thus is equitable. Under HQT's current and proposed methodology, upgrade costs related to generation integration requests for point-to-point service up to the Maximum Allowance is borne by HQT, while the point-to-point customer makes a Contribution above the Maximum Allowance. This Maximum Allowance is calculated based on the full capacity of the generation unit being integrated. Furthermore, HQT requires the requesting customer to sign at least one point-to-point service agreement that adequately covers the cost of the upgrades related to the generation integration, net of any Contributions already made by the customer. This treatment is in principle similar to that applied to generation integration requested by HQD to serve native load under the proposed policy. That is, the Maximum Allowance for HQD's resource-related network upgrades is also calculated using the full capacity of the generation units; and, similar to the generation integration for point-to-point service, HQT also tests whether there is reasonable assurance of adequate cost recovery from HQD of the rolled-in portion of the upgrade costs, considering load growth in establishing HQD's Contribution.

The proposed modification also recognizes that resource-related transmission upgrades for HQD may not result in additional transmission-service revenue (*i.e.*, "allocation units") beyond HQD load growth. The modified approach thus provides for even greater protection against excess costs for existing customers by providing reasonable assurance that HQD adequately covers the costs of all network upgrades associated with serving its native load, including the costs of the resource-related upgrades.

V. HQT's Network Upgrade Policy with Modification Reinforces Protection for Existing Customers from Excess Costs Associated with Network Upgrades for Transmission Service Customers

In this section, I discuss how HQT's application of the Maximum Allowance, including the proposed modification, allows for sufficient Contributions to cover network upgrade costs and provides additional protection for customers from excess costs associated with network upgrades triggered by new transmission services.

A. HQT's Network Upgrade Policy Subjects Load to the Same Standard as Interconnecting Generators and Point-to-Point Customers

The native load in Québec has funded, and will continue to pay for, the transmission infrastructure in the province. Therefore, a sound policy for Québec would include protection for its existing native load from excess costs imposed by point-to-point transmission customers. However, under HQT's Network Upgrade Policy, upgrade costs associated with serving HQD's native load are *equally* subject to an evaluation of the portion of the costs that can be rolled-in with embedded costs to offer the same protection to existing non-native-load transmission customers. This means that HQT's application of the Maximum Allowance places all customers, load and point-to-point transmission customers, on the same footing—effectively treating native load with the same level of cost causation scrutiny as point-to-point customers.

B. Adjustments to Maximum Allowance Calculation Based on Service Length Results in Equitable Treatment of All Customers

HQT applies the same approach to estimating the Maximum Allowance for the investment amounts to all transmission customers equally, for all system upgrades regardless of the customer or the type of transmission service request. While providing equitable treatment, the actual magnitude of the network upgrade costs that HQT expects to roll-in to its embedded transmission costs (based on the estimated Maximum Allowance) can differ due to

differences in the term of the specific transmission service agreements. As noted earlier, Section E of Attachment J in the OATT states:

> In the case of services for a duration of less than twenty (20) years, the maximum of costs borne by the Transmission Provider is the present value of the customer's term of commitment prorated to the twenty- (20-) year duration, multiplied by the [Maximum Allowance calculated using 20-year].[16]

For example, if a proposed network upgrade resulting from a transmission customer's service request includes a transmission service for five years, the Maximum Allowance will be estimated based on the service's term such that HQT can reasonably expect a full recovery of the cost of the upgrades between the portion rolled-in to the existing tariff and the customer's Contribution. Consequently, this approach would yield a *higher* Contribution for a customer with a five-year service request than for a customer with a 20-year service request, all else equal. Table 3 below illustrates the Maximum Allowance calculation used in Table 1, but with a service that covers a five-year term (rather than twenty).

[16] Hydro-Québec Open Access Transmission Tariff (updated March 20, 2014), Attachment J, Section E, p. 172.

Table 3

Maximum Allowance under 5-Year Service Duration

	Inputs/Output:	
[a]	Total Investment Output ($/kW)	272
[b]	Cost of Capital	5.666%
[c]	Yearly O&M	1.27%
[d]	Yearly Tax Rate	0.55%
[e]	Years	5

Year	Depreciation	Accum. Depr.	Rate Base	Cost of Capital	Sub Total	O&M	Taxes	Per Unit Revenue Requirement ($/kW)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Start			272					
2014	54	54	217	15	70	3	1	74.65
2015	54	109	163	12	67	3	1	71.27
2016	54	163	109	9	64	3	1	67.90
2017	54	217	54	6	60	3	1	64.52
2018	54	272	0	3	57	3	0	61.15
[f] Present Value					272			

Sources & Notes:

[a]: Output of model. Calculated such that the Per Unit Revenue Requirement ($/kW) in column [9] is equal to the tariff of $74.65/kW in 2014.

[b] to [d]: Cost of Capital in Decision D-2014 049, page 10; PV of O&M Costs in the OATT, Attachment J, section E; Yearly Tax Rate: Public Utilities Tax applicable to HQT.

[e]: Assumed, for illustrative purposes.

[f]: present value of column [6] using cost of capital in [b].

By adjusting the Maximum Allowance for transmission customers with relatively short service terms based on the length of the service agreement, HQT is ensuring that the costs of the upgrade will be recovered by requiring a larger Contribution from the requesting customer. This is an important feature of HQT's Network Upgrade Policy that is consistent with the principle of protecting existing customers. This approach, in turn, reduces concerns that there will be stranded costs in the future should the customer discontinue service after the contract that created the need for the upgrade terminates. This is achieved because the Contribution is estimated such that the costs associated with the upgrade are recovered over the term of the contract.

The approach uses the full 20-year period to assess the Contributions for serving native load, since one can reasonably assume that native load (including load and resource-related expansions) would continue to remain on HQT's system indefinitely into the future. Using a 20-year depreciation schedule for estimating the Maximum Allowance conservatively allocates a required Contribution that is higher than if HQT had assumed that load would continue to use the transmission service for a longer term.

C. Limiting Depreciation Assumption to 20-Year in Calculating the Maximum Allowance Yields Conservatively Large Contribution for Customers Requesting Transmission Service that Requires Network Upgrades

As explained above, the Maximum Allowance for network upgrades for all customers is generally estimated over a 20-year depreciation horizon, unless the service duration is less than a 20-year period. This is effectively equivalent to assuming that the cost of the upgrades (up to the Maximum Allowance) would be recovered over 20 years under standard revenue requirement estimation. However, in reality, most of the transmission assets have a useful life greater than 20 years. On average, HQT's transmission assets have a life of 40 years (substations, for example) to 50 years (lines, for example) and are depreciated over the life of the asset when calculating HQT's actual revenue requirement.

Furthermore, as discussed above, the Maximum Allowance is designed to provide reasonable assurance that HQT recovers the cost of a network upgrade through the transmission service revenues (the transmission rate multiplied by the allocation units for the duration of the service associated with the upgrade), with a Contribution if necessary. If a customer can reasonably be expected to pay transmission charges over a very long period of time (longer than 20-years), the calculation of the Maximum Allowance assuming a 20-year life provides a *lower* estimate than what would be otherwise calculated using an assumed life span that exceeds 20 years. For example, if 40 years were used for estimating the Maximum

Allowance, the allowance would be higher, reducing the required Contribution from the customer.

As shown in Table 4 below, using a 40-year depreciation horizon would *increase* the Maximum Allowance provided by HQT that would be available to be rolled-in with embedded costs, and therefore would reduce the Contribution from the customer. Thus, using a 20-year life conservatively assigns a higher Contribution to the requesting customer than estimating the allowance over a 40-year depreciation life, all else equal.[17] The details of the 40-year calculation is provided in Appendix B.

Table 4
Comparison of HQT's Maximum Allowance Under Varying Depreciation

	Year Assumption	Maximum Allowance ($/kW)
[a]	5 Years	272
[b]	20 Years	598
[c]	40 Years	772

Sources & Notes:

[a]: See Table 3.
[b]: See Table 1.
[c]: See Appendix B, Table B1.

D. Aggregating Load-Related Network Upgrades Is Consistent With The Current Practice

The existing policy allows HQD to bundle its load-growth-related network upgrades that are commissioned in any given year. The Contributions calculated for load-growth-related network upgrades are offset against other network upgrades that cost less than the Maximum Allowance. Separately, the Maximum Allowance is applied to each generation resource-related network upgrade to estimate the required Contribution. Thus, the Contributions for

[17] A calculation of the Maximum Allowance using a 40-year depreciation is provided as Appendix B to my report.

the generation resource-related network upgrades currently are estimated separately and potentially independently rolled-in with embedded costs. Table 5 below provides an example of the current pooling method as it relates to network upgrades associated with serving native load (through HQD). The aggregated Contribution from HQD in the illustrative example below is equal to $88.9 million for load growth projects and $46.3 million for the resource-related projects. In its current Network Upgrade Policy and associated Contribution estimation, HQT provides a Maximum Allowance to the generation resource-related network upgrades based on the installed capacity of the generation resource. In the case of a hypothetical wind farm in the example below, 100 MW of installed capacity would yield $59.8 million of Maximum Allowance to be added to HQT's existing costs (shown in row [n] in Table 5) and HQD would be required to make a Contribution of $46.3 million (including the $6.0 million of O&M costs) for the upgrade costs above this Maximum Allowance.

Table 5

Current Pooling Method for Native Load Related Projects ($ Million, unless specified otherwise)

	Project	Network Upgrade Cost
	Projects Associated with Load Growth	
[a]	Satellite Substation A	37.1
[b]	Source Substation B	100.0
[c]	Total Cost	137.1
[d]	Load Growth Associated w/ Projects (MW)	100
[e]	Maximum Allowance Under 20-Year Service ($/kW)	598
[f]	Total Allowance	59.8
[g]	Difference between Total Cost and Total Allowance	77.3
[h]	O&M Fees (15%)	11.6
[i]	Total Contribution for Load Growth-Based Projects	88.9
	Resource-Related Projects	
[j]	Wind Farm	100.0
[k]	Total Cost	100.0
[l]	Load Growth Associated w/ Projects (MW)	100
[m]	Maximum Allowance Under 20-Year Agreement ($/kW)	598
[n]	Total Allowance	59.8
[o]	Difference between Total Cost and Total Allowance	40.2
[p]	O&M Fees (15%)	6.0
[q]	Total Contribution for Resource-Related Projects	46.3
[r]	**Total Contribution from HQD**	**135.2**

Sources & Notes:

[a] to [b], [j]: Assumed project costs.
[c] = [a] + [b].
[d], [l]: Assumed load growth associated with projects.
[e], [m]: Maximum Allowance under the OATT. See Table 1.
[f] = ([d] x [e]) / 1,000
[g] = [c] - [f].
[h] = [g] x 15%.
[i] = [g] + [h].
[k] = [j].
[n] = ([l] x [m]) / 1,000
[o] = [k] - [n].
[p] = [o] x 15%.
[q] = [o] + [p].
[r] = [i] + [q].

HQT is proposing a modified approach that provides a reasonable assurance of adequate cost recovery and further protection for other customers from undue cost burdens from upgrades initiated by the needs of HQD. This modified approach results in HQD's Contributions for the generation resource-related network upgrades being at least equal to or higher than the Contributions that HQD would have made for these projects under the current Network Upgrade Policy.

As described in Section IV. B, under the modified approach, if HQD's aggregated load-growth network upgrade costs exceed the Maximum Allowance, HQD would bear the entire cost associated with the generation resource-related upgrades through Contributions. If some credits remain available from load-growth-related upgrades (in cases when the Maximum Allowance is greater than the upgrade costs), HQD would apply those credits to offset the network upgrade costs associated with the generation-resources, but would cap the application of the credits to the allowance provided under the current approach.

Table 6 below provides an example of the application of the proposed approach under three scenarios with varying amounts of credits available from the load-based network upgrades that can offset the additional Contribution required for HQD's resource-related network upgrades. As shown in the table, in each scenario, HQD makes a minimum Contribution of $46.3 million (including O&M) related to generation resource-related upgrades (*i.e.*, upgrade costs in excess of the resource-related Maximum Allowance) regardless of the amounts of credits available from the load-growth-related upgrades.

In Scenario 1, HQD's Total Contribution related to resource-related network upgrades is $46.3 million (row [v]) as the remaining amount ($59.8 million shown in row [f]) is fully offset by the $139.1 million in credits (row [p]) available from the load-growth-based pool. Therefore, HQD makes a Contribution equal to $46.3 million for resource-related projects (row [v]) and $0 for its load growth-related projects (row [w]) for a combined total

Contribution of $46.3 million (row [x]). In Scenario 2, HQD contributes $46.3 million for generation resource-related upgrades along with an additional amount that is not fully offset by the $39.1 million in credits available (row [p]) for a Total Contribution of $70.0 million (row [x]). And finally, in Scenario 3, there are no credits available from the load growth upgrades (row [p]) and HQD makes a Contribution equal to the entire cost of the upgrades related to its resource projects of $115 million (row [v]). HQD also contributes $70.0 million for its load-growth projects (row [w]) for a total Contribution of $185.0 million (row [x]).

Table 6

Proposed Method for Native Load Projects
($ Million, unless specified otherwise)

	Step 1: Calculate Maximum Allowance Based on Allocation Units of the Resource-Related Projects	Scenario 1	Scenario 2	Scenario 3
[a]	Project Cost	100	100	100
[b]	Allocation Units (MW)	100	100	100
[c]	Maximum Allowance ($/kW)	598	598	598
[d]	Total Maximum Allowance for Resource-Related Project	59.8	59.8	59.8
	Step 2: Calculate Contributions Necessary for Resource-Related Projects			
[e]	Total Contribution*	40.2	40.2	40.2
[f]	Rolled-in Portion of Upgrade Costs	59.8	59.8	59.8
	Step 3: Calculate Contributions/Credits of Other Projects			
[g]	Substation A Project Cost	20	40	60
[h]	Substation B Project Cost	20	40	60
[i]	Substation C Project Cost	20	40	60
[j]	Substation D Project Cost	20	40	60
[k]	Substation E Project Cost	20	40	60
[l]	Total Substation Project Cost	100	200	300
[m]	Allocation Units (MW)	400	400	400
[n]	Maximum Allowance ($/kW)	598	598	598
[o]	Total Maximum Allowance	239.1	239.1	239.1
[p]	Total Contribution (Credit)*	(139.1)	(39.1)	60.9
	Step 4: Measure Credits (if any) Against Remaining Contribution from Resource-Related Projects			
[q]	Are There Credits Leftover from Other Projects in Step 3?	Yes	Yes	No
	Step 5: Calculate Total Contribution			
[r]	Resource-Related Contribution from Step 1	40.2	40.2	40.2
[s]	Rolled-in Portion of Resource-Related Upgrade Cost Not Covered by Load-Based Credits	0.0	20.7	59.8
[t]	Total Resource Project Contribution	40.2	60.9	100.0
[u]	O&M (15%)	6.0	9.1	15.0
[v]	Total Contribution for Resource-Related Project	46.3	70.0	115.0
[w]	Total Contribution for Other Projects	0.0	0.0	70.0
[x]	**Total Contribution (Resource-Related & Other Projects)**	**46.3**	**70.0**	**185.0**

Sources & Notes:

* Before application of 15% O&M.
Note that calculations are the same for each column, with the difference coming from the assumed cost of Total Substation Project Cost highlighted in grey in row [l].

[a] to [b], [g] to [k], [m]: Assumed.
[c], [n]: Maximum Allowance under the OATT. See Table 1.
[d] = ([b] x [c]) / 1,000.
[e] = [a] - [d].
[f] = [d].
[l] = sum of [g] through [k].
[o] = ([m] x [n]) / 1,000.
[p] = [l] - [o].
[q] = Yes if there is a credit available in row [p]. No otherwise.
[r] = [e].
[s]: If there are leftover credits in row [p], then the remaining potential contribution in row [f] will be offset by the credit remaining. For example, in Scenario 1, there is a leftover credit of $139.1 million, which is enough to offset the remaining cost of the resource project.
[t] = [r] + [s].
[u] = [t] x 15%.
[v] = [t] + [u].
[w] = [p] x (1 + 15% O&M) if a Contribution is necessary. Zero otherwise.
[x] = [v] + [w].

HQT's modified approach allows more of the resource-related upgrade costs to be directly assigned to HQD through a direct Contribution than the existing approach, and no longer treats upgrades induced by generation used to serve load as an independent and separate transmission customer when it is ultimately integrated onto the system to serve native load. Furthermore, the modified approach provides a reasonable assurance that HQD covers all upgrade costs associated with load-growth, including the generation needed to serve that load. In that regard, HQT's proposed approach is consistent with the current practice and treats all customers equitably.

VI. HQT's Network Upgrade Policy and Approach for Following-Up of Commitments for Point-to-Point Network Upgrades is Reasonable

In this section, I explain that the method that HQT proposes to use to demonstrate revenue sufficiency for future point-to-point-induced network upgrade costs is reasonable.

The network upgrade costs associated with point-to-point service are currently recovered through the application of the Maximum Allowance and Contribution, when applicable. As explained above, the network upgrade costs up to the Maximum Allowance would be rolled-in with embedded transmission costs and covered through transmission service payments. The amount of network upgrade costs that are above the Maximum Allowance would be paid by the transmission customer through Contributions. Under the current policy, point-to-point transmission service agreements are a means to provide a reasonable assurance that the portion of the network upgrade costs that is rolled-in with the existing transmission costs would be recovered over the term of the service agreements.

Specifically, the combination of using the Maximum Allowance (and Contribution) and the required commitment to pay the associated point-to-point transmission service charges is designed to avoid imposing costs on other transmission customers. If HQT recovers the

incurred costs up to the Maximum Allowance that are rolled-in, it covers its costs, and consequently, the impact on other customers due to the network upgrades is mitigated.

In this context, conducting an annual "follow-up" on the service commitments for point-to-point network upgrades refers to the demonstration that the point-to-point customers have made or are making transmission service contract commitments that are sufficient to allow HQT to recover the rolled-in portion of the network upgrade costs, including O&M costs and applicable taxes. Ultimately, the transmission service contracts are the commitments from point-to-point customers that they will pay sufficient transmission charges through the life of those contracts to provide a reasonable assurance that HQT will recover the rolled-in portion of network upgrade costs necessary to provide the service those customers enjoy.

A. Reconciliation of Costs and Revenues Associated with Point-to-Point Transmission Service

To ensure that point-to-point customers cover the rolled-in portion of the upgrade costs caused by their service request, HQT requires the point-to-point customers to enter into long-term transmission service agreements that, in accordance to the OATT, provide committed revenue that would sufficiently cover the rolled-in upgrade costs. In addition, HQT also conducts a test to determine whether point-to-point transmission service revenues in fact adequately cover the rolled-in portion of the upgrade costs. In the past, HQT has conducted this test using a present value method or an annual follow-up, depending on the terms and conditions applicable to the customer's service request. HQT is now proposing to conduct annual assessments for future customer requests by comparing the annual revenue resulting from the customer's transmission service to the (annual) levelized rolled-in portion of the network upgrade costs incurred in support of the transmission service.

The major components of HQT's proposed methodology for following-up on the service commitments for future point-to-point network upgrades include:

- The customer's annual payments (providing annual revenue to HQT) for its point-to-point transmission service are based on the applicable point-to-point transmission service tariff.
- To estimate the network upgrade costs associated with customer's point-to-point transmission service, HQT estimates the total network upgrade costs that were rolled-in with other transmission costs and adds O&M and applicable taxes.
- The rolled-in portion of the network upgrade costs (including O&M and taxes) are then levelized over a 20-year period using HQT's cost of capital.[18] HQT then compares the annual revenue with the (annual) levelized costs associated with customers' point-to-point transmission service.
- HQT determines that the revenue covers the costs if the revenue is greater than or equal to the levelized annual costs. Otherwise, the revenue does not cover the costs.

B. Determination of the Annual Revenue from Customer's Long-Term Point-to-Point Service

In Table 7 below, I illustrate an example of the calculation of the annual revenue associated with customer's long-term point-to-point service agreements. In this example, I assume that there are three long-term point-to-point service agreements currently in effect that provide HQT the expected revenue from the customer. For a given year, the revenue collected via each service agreement is based on the MW associated with that service agreement multiplied by the yearly point-to-point rate in force that year. The aggregated annual revenue is the sum of the revenue from all service agreements, which in this illustrative example is equal to $448 million.

[18] The levelized cost is updated based on actual cost of the upgrade and the cost of capital approved by Régie at the time the upgrade is put in service.

Table 7

Point-to-Point Annual Revenue Calculation Example

		MWs	Current Tariff Rate ($/kW)	Annual Revenue ($ million)
	[1]	[2]	[3]	[4]
[a]	Service Agreement A	1,000	$74.65	$75
[b]	Service Agreement B	2,000	$74.65	$149
[c]	Service Agreement C	3,000	$74.65	$224
[d]	Total	6,000		$448

Sources & Notes:

[2]: Assumed.
[3]: See Table 1.
[4] = [2] x [3] x 1,000 / (10^6)

C. Determination of Upgrade Costs Associated with a Customer's Point-To-Point Transmission Service

For the purpose of determining the network upgrades allowed to be rolled-in with other system costs, the Maximum Allowance is estimated based on the lesser of a 20-year depreciation period or the service agreement term. The limit of 20 years to estimate the Maximum Allowance is used even though some of the point-to-point service agreements may be for a duration longer than 20 years. The costs that the customer's service agreements should cover include the rolled-in portion of the upgrade costs and associated O&M and taxes.

Table 8 below shows an illustrative example that takes the rolled-in portion of the upgrade costs (including associated O&M and taxes) and estimates the levelized "remaining annual costs" associated with the upgrades. I call them the "remaining annual costs" because the levelized upgrade costs are levelized from the year that the upgrade costs are rolled-in with embedded costs and, thus, from a forward looking perspective, only a certain "remainder" of the twenty years are left. For example, the cost of Upgrade A ($595 million), when levelized over 20-years, is $50 million per year. If the upgrade costs were rolled-in eight years prior,

with only 12 years of annual cost left, the annual cost is equal to 12 years of $50 million per year. That is, after 12 years, there will be no remaining rolled-in costs left to be recovered for Upgrade A. At that point, it will be excluded from the total costs. The annual aggregated remaining cost across all projects is shown in row [j].[19]

Table 8

Levelized Costs Calculation Example

($ million)

	Inputs:	
[a]	Cost of Capital	5.666%
[b]	Levelization Years	20
[c]	O&M	15.00%
[d]	Taxes	3.98%

		Upgrade Cost Net of Contribution	O&M and Taxes	Total Rolled-in Upgrade Costs	Levelized Rolled-In Costs
	[1]	[2]	[3]	[4]	[5]
[e]	Project A	$500	$95	$595	$50
[f]	Project B	$600	$114	$714	$61
[g]	Project C	$700	$133	$833	$71
[h]	Project D	$800	$152	$952	$81
[i]	Project E	$900	$171	$1,071	$91
[j]	Total				$353

Sources & Notes:

[a] to [d], [2]: Assumed.
[3] = [2] x ([c]+ [d]).
[4] = [2] + [3].
[5]: Costs in [4] annualized over 20 years based on cost of capital provided in [a].

[19] In order to simply the calculations in this example, I assume that cost of capital was equal to 5.666% at the time of commissioning of each of these five projects.

D. HQT Compares Revenue from the Customer to Rolled-In Upgrade Costs to Determine Revenue Adequacy

Once the annual revenues and levelized costs are determined, HQT compares them to evaluate whether the revenues adequately cover the rolled-in portion of the upgrade costs. In the hypothetical example shown above in Table 7 and Table 8, the annual revenue of $448 million is sufficient to cover the levelized costs of $353 million in that given year. When the costs of the upgrades are covered by sufficient revenue from the point-to-point customer, other existing customers are not burdened by these costs.

VII. HQT's Proposed Network Upgrade Policy is Consistent with FERC Principles

HQT's proposed Network Upgrade Policy is consistent with the principles associated with FERC's "higher of" transmission pricing policy. Specifically, HQT's proposed Network Upgrade Policy provides a reasonable assurance of adequate cost recovery for HQT for upgrade costs such that existing customers are not unduly harmed by new transmission service requests by new or existing customers. In addition, through the use of Contributions and requiring service agreement commitments, the Network Upgrade Policy promotes efficient transmission investments.

VIII. Conclusions

HQT's Network Upgrade Policy follows the fundamental principle of providing a reasonable assurance that existing transmission customers are not unduly harmed by system upgrade costs imposed by customers' new transmission service needs. HQT does so through the application of Maximum Allowance and customer Contributions, which effectively assigns incremental costs in the form of a Contribution to customers whose upgrades could otherwise create excess costs on other customers. This approach is consistent with similar principles underlying FERC policies and provides a reasonable assurance that HQT collects

adequate Contributions and transmission revenue from its native load and point-to-point customers to cover the cost of the network upgrades that its customers trigger. HQT's proposal to aggregate all of HQD's annual network upgrade costs needed to serve native load (including both load-growth-related and resource-related projects) also enhances the protection for existing transmission customers from excess costs triggered by network upgrades for transmission service requests.

APPENDIX A

Current and Proposed Network Upgrade Policy for Native Load Projects

Appendix A – Current and Proposed Network Upgrade Policy for Native Load Projects

Table A1 below shows an example of the proposed modification, comparing the proposed modification to the current Network Upgrade Policy for upgrades associated with HQD's native load. As shown in the table, the current approach first calculates the Contribution necessary for the network upgrades needed to support load growth (Network Upgrades A, B, and C) and integrating generation resource projects independently. In the example, Network Upgrades B and C provide sufficient credits toward paying for the Contribution associated with Network Upgrade A; thus, the net Contribution after aggregating the three load growth-related Network Upgrades is zero. For the generation resource-related project, under the existing approach HQD would make a Contribution of $40.2 million (and additional $6.0 million in O&M) while $59.8 million are rolled-in to HQT's rate base.

With the proposed Network Upgrade Policy for native load projects, resource-related transmission investments requested by HQD would no longer receive an allowance unless justified by load-growth-related credits. This way, only credits associated with Network Upgrades A, B, and C would be used to pay for the portion of the generation resource-related project costs that are rolled-in under the current approach ($59.8 million). Any amount not covered by these credits would increase HQD's Contribution. In the example below, an additional Contribution of $20.5 million (before O&M) would also be assigned to HQD. With the proposed approach, the Contribution (before O&M) increases to $60.7 million ($40.2 million Contribution from the initial resource-related project, *plus* $20.5 million of additional Contribution to cover the remaining cost of the resource-related project). As shown in Table A1, this proposed modification yields a greater total Contribution from HQD ($69.8 million with O&M) than it would have under the current approach ($46.3 million with O&M) and, thus, enhances the protection of all existing customers from upgrade-related costs induced by projects for the native load.

Table A1

HQT's Current and Proposed Network Upgrade Policy as it Relates to Native Load Projects

	Upgrade Cost ($ million)	Maximum Allowance ($/kW)	Allocation Units (MW)	Maximum Allowance specified for the Upgrade ($ million)	Contribution ($ million)	O&M ($ million)	Total Contribution ($ million)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Current Approach							
Upgrade A	100	598	100	59.8	40.2		
Upgrade B	20	598	100	59.8	-39.8		
Upgrade C	20	598	100	59.8	-39.8		
Upgrade Contribution (max of zero and sum of contributions)					0.0	0.0	0.0
Resource-Related Project	100	598	100	59.8	40.2	6.0	46.3
Total Contribution - Current Approach (Upgrade projects + Resource Project)							46.3
HQT Proposed Approach							
Upgrade A	100	598	100	59.8	40.2		
Upgrade B	20	598	100	59.8	-39.8		
Upgrade C	20	598	100	59.8	-39.8		
Sum of Upgrade Project Contributions or Credit (negative = credit)					-39.3		
Resource-Related Project - Rolled-in Portion					59.8		
Do Upgrades Provide Sufficient Revenue to Cover Rolled-In Resource-Related Project?					No		
Additional Contribution for Resource Projects					20.5	3.1	23.5
Resource-Related Project - Initial Contribution	100	598	100	59.8	40.2	6.0	46.3
Total Contribution - Proposed Approach							69.8

Sources & Notes:

[1], [3]: Assumed.
[2]: Maximum Allowance under the OATT. See Table 1.
[4] = ([2] x [3]) / 1,000.
[5] = [1] - [4], when calculating the Contribution.
[6] = [5] x 15% if the Contribution in column [5] is greater than zero. Zero otherwise.
[7] = [5] + [6], when calculating the Total Contribution.

APPENDIX B

Maximum Investment Under 40-Year Depreciation

Appendix B – Maximum Investment Under 40-Year Depreciation

Table B1

Maximum Investment under 40-Year Depreciation

	Inputs:	
[a]	Total Investment ($/kW)	772
[b]	Cost of Capital	5.666%
[c]	PV of O&M Costs	15.00%
[d]	Yearly O&M	0.96%
[e]	Yearly Tax Rate	0.55%
[f]	Years	40

Year	Depreciation	Accum. Depr.	Rate Base	Cost of Capital	Sub Total	O&M	Taxes	Per Unit Revenue Requirement ($/kW)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Start			772					
2014	19	19	753	44	63	7	4	74.65
2015	19	39	733	43	62	7	4	73.48
2016	19	58	714	42	61	7	4	72.23
2017	19	77	695	40	60	7	4	71.05
2018	19	96	675	39	59	7	4	69.87
2019	19	116	656	38	58	7	4	68.63
2020	19	135	637	37	56	7	4	67.45
2021	19	154	617	36	55	7	4	66.27
2022	19	174	598	35	54	7	3	65.02
2023	19	193	579	34	53	7	3	63.84
2024	19	212	560	33	52	7	3	62.66
2025	19	232	540	32	51	7	3	61.48
2026	19	251	521	31	50	7	3	60.24
2027	19	270	502	30	49	7	3	59.06
2028	19	289	482	28	48	7	3	57.87
2029	19	309	463	27	47	7	3	56.63
2030	19	328	444	26	46	7	3	55.45
2031	19	347	425	25	44	7	2	54.27
2032	19	367	405	24	43	7	2	53.09
2033	19	386	386	23	42	7	2	51.85
2034	19	405	367	22	41	7	2	50.66
2035	19	425	347	21	40	7	2	49.48
2036	19	444	328	20	39	7	2	48.24
2037	19	463	309	19	38	7	2	47.06
2038	19	482	289	18	37	7	2	45.88
2039	19	502	270	16	36	7	2	44.63
2040	19	521	251	15	35	7	1	43.45
2041	19	540	232	14	34	7	1	42.27
2042	19	560	212	13	32	7	1	41.09
2043	19	579	193	12	31	7	1	39.85
2044	19	598	174	11	30	7	1	38.67
2045	19	617	154	10	29	7	1	37.49
2046	19	637	135	9	28	7	1	36.24
2047	19	656	116	8	27	7	1	35.06
2048	19	675	96	7	26	7	1	33.88
2049	19	695	77	5	25	7	1	32.64
2050	19	714	58	4	24	7	0	31.46
2051	19	733	39	3	23	7	0	30.28
2052	19	753	19	2	22	7	0	29.09
2053	19	772	0	1	20	7	0	27.85
[g]	Present Value				772			

Sources & Notes:

[a]: Output of model. Calculated such that the Per Unit Revenue Requirement ($/kW) in column [9] is equal to the tariff of $74.65/kW in 2014.
[b] to [e]: Cost of Capital in Decision D-2014 049, page 10; PV of O&M Costs in the OATT, Attachment J, section E; Yearly Tax Rate: Public Utilities Tax applicable to HQT.
[f]: Assumed, for illustrative purposes.
[g]: present value of column [6] using cost of capital in [b].

APPENDIX C

References

Appendix C – References

Federal Energy Regulatory Commission (FERC), *Order No. 890: Preventing Undue Discrimination and Preference in Transmission Service*, February 16, 2007. Available at: https://www.ferc.gov/whats-new/comm-meet/2007/021507/E-1.pdf

Federal Energy Regulatory Commission (FERC), *Order on Reconsideration and Clarifying Policy Statement*, FERC Docket No. RM93-19-001, May 22, 1995. Available at: https://elibrary.ferc.gov/idmws/file_list.asp?document_id=32995

Federal Energy Regulatory Commission (FERC), *Policy Statement,* FERC Docket No. RM93-19-000, October 26, 1994. Available at: https://elibrary.ferc.gov/idmws/file_list.asp?document_id=4224

Hydro-Québec, *Hydro-Québec Open Access Transmission Tariff*, March 20, 2014. Available at: http://www.oatioasis.com/HQT/HQTdocs/Tarifs_et_conditions_2014_2004-03-20_en.pdf

Régie de l'énergie, Decision D-2011-039, April 6, 2011.