

**Survey of Transmission Tariff Rates and
Cost Allocation by Function
in Canadian Provinces**

Prepared For MECL
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Survey of Transmission Tariff Rates and Cost Allocation by Function in Canadian Provinces

Objective

This paper is intended to provide comparative information regarding the MECL Application relative to other Canadian Provinces and the US Federal Energy Regulatory Commission (FERC) pro forma Open Access Transmission Tariff (OATT). There are two specific areas of interest for MECL in its OATT application as follows:

- What level of discounts are applied for exports relative to in province supply, if any?
- How is the cost of radial lines to supply local loads allocated? Which customer groups incur these costs?

General Overview

Transmission Tariffs in all provinces except Alberta and Ontario are primarily based on the FERC pro forma OATT principles. Terms and conditions are in line with the FERC pro forma OATT and apply postage stamp rates. There are some deviations in cost allocation and in the utilization of the Appalachian method of applying price premiums for daily and hourly rates. Also some provinces provide significant discounts for exports of power relative to in province supply while others do not.

Rate Comparisons

The table on the next page provides recent transmission tariff rates for delivery to in province loads and for export in each jurisdiction. In the FERC pro forma based jurisdictions Network Integration Transmission Service (NITS) is used for in province supply and hourly Point-to-Point (PtP) is used for Export. In Alberta, Demand Transmission Service (DTS) is for in province and Export Opportunity Service (XOS) is used for export. In Ontario in province load is supplied by Uniform Transmission Service (UTS) while export uses the Export Transmission Service (ETS). The in province transmission rates are demand based relative to load ratio share or a monthly demand charge based on coincident peak demand, non-coincident peak or a combination.¹ An estimate of the \$/MWh values in these rates is determined based on expected energy flows in order to compare with hourly export rates.

¹ NB and NS use non-coincident peak loads as the billing determinant but use coincident peak loads for the cost allocation between Network and Point-to-Point Services. MECL propose a monthly demand charge based on coincident peaks. Saskatchewan, Manitoba and Quebec use the coincident peak load ratio share of the Network Revenue Requirement similar to FERC Order 890. Alberta and Ontario use both coincident peaks for Network portions and non-coincident peaks for local portions.

Transmission Tariff Rates for In Province Loads and for Exports(\$/MWh)						
Province	Utility	In Province		Exports		Use of Appalachian
		(Network Service or Other Delivery) ^a		(Point-to-point or ETS)		Price Premiums
		Demand rate	Energy Equiv.	On Peak	Off Peak	For Hourly Export
British Columbia	BC Hydro	\$7.341/kVA-mo ^b	11.27 ^b	3.00-7.93 ^c	1.00-7.93 ^c	None
Alberta	AESO	Demand TS ^d	21.84 ^d	7.12 ^e	7.12 ^e	None
Saskatchewan	Sask Power	Load ratio Share	3.6 ^f	6.84 ^g	6.84 ^g	Both On & Off Peak
Manitoba	Man Hydro (To non MISO)	Load ratio Share	6.87 ^h	9.89 ⁱ	4.70 ^j	On Peak Only
	Man Hydro (To MISO)			0.00 ^j	0.00 ^j	None
Ontario	IESO/Hydro1	\$6.82/kW-mo ^l	11.63 ^j	1.85 ^k	1.85 ^k	None
Quebec	HydroQuebec	Load ratio Share	16.03 ^l	8.25 ^l	8.25 ^l	None
New Brunswick	NB Power	\$1.73/kW-mo ^m	4.15 ^m	6.03 ^m	2.86 ^m	On Peak Only ^o
Nova Scotia	NS Power	\$4.99/kW-mo ⁿ	11.39 ⁿ	14.35 ⁿ	6.84 ⁿ	On Peak Only ^o
Prince Edward Isl	MECL Application	\$2.54/kW-mo ^p	4.34 ^p	3.48 ^q	3.48 ^q	None ^q
<p>a - Indicative rates calculated using \$/MW-mo rates with assumed Load factors, using the indicated Revenue Requirement and annual energy from Annual Reports, or from rate data for assumed load.</p> <p>b - Transmission Service Rate from BCHydro filing with BCUC for 2016 rates Appendix A page 10 available at www.bcuc.com/Documents/Proceedings/2014/DOC_40964_03-07-2014_BCH-F2015-16RevenueRequirementsApplication.pdf Energy equivalent assumes 90% Power Factor and 80% monthly Load Factor</p> <p>c - Point-to-Point rates from Schedule 01 at www.bchydro.com/about/planning_regulatory/tariff_filings/oatt.html#schedules</p> <p>d - Demand Transmission Service rates from http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_(2016-04-01).pdf applied for a 50 MW load.</p> <p>e - Export Opportunity Service rate from http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_(2016-04-01).pdf</p> <p>f - Annual Network Service Rev Req from Sask Power OATT Attachment H equal to \$83,039,704 divided by estimated transmission annual energy of 23,000,000 MWh from Sask Power 2015/16 Annual Report</p> <p>g - Schedule 8 Non Firm rates from http://www.oatioasis.com/SPC/SPCdocs/spc_TariffSep1_11_(new)_branded.pdf</p> <p>h - Annual Network Service Rev Req from Manitoba Hydro OATT Attachment H equal to \$171,686,862 divided by estimated transmission annual energy of 25,000,000 MWh from Manitoba Hydro 2014/15 Annual Report</p> <p>i - Schedule 8 Non Firm rates from http://www.oasis.oati.com/woa/docs/MHEB/MHEBdocs/MH_OATT_Version_37_FINAL.pdf</p> <p>j - Sum of monthly rates for Network, Line Connection and Transformation converted to energy at 80% Load factor. Data taken from Hydro One 2016 filing at http://www.hydroone.com/RegulatoryAffairs/EB20160160/HONI_TxAppUpdate_20160720.pdf</p> <p>k - Export transmission (ETS) rate of \$1.85/MWh from same Hydro One filing Exhibit H2 Attachment 1</p> <p>l - Rev Req of \$2,745,899,940 divided by 171,263,000 MWh load from 2015 Annual Report. Hourly non firm rates from Sched 10 of OATT filing at http://publicsde.regie-energie.qc.ca/projets/318/DocPrj/R-3934-2015-B-0128-Demande-Dec-2016_04_22.pdf</p> <p>m - Network energy rate equal to monthly demand rate times 12 divided by 57% LF of 8760 hrs. Non firm rates from Sched 9 of NBP OATT at http://tso.nbpower.com/Public/en/docs-EN/tariff/TransmissionTariff_20160506_EN.pdf</p> <p>n - Network energy rate equal to monthly demand rate (Schedule 10) times 12 divided by 60% LF of 8760 hrs. Non firm rates derived from \$59,876/MW-yr LT Firm PtP rate provided in MECL evidence. NSPI OATT is not publicly available other than through NSUARB at http://uarb.novascotia.ca/fmi/iwp/cgi?-db=UARBv12&-loadframes</p> <p>o - Both NBP and NSPI apply the OATT rates for contracted flows between provinces but eliminate hourly export transmission charges in order to achieve an economic dispatch of joint resources for their two systems. NBP exports to other systems are according to the OATT rates.</p> <p>p - MECL Network rate applied to coincident peak demand monthly with assumed Load Factor of 80% for estimated hourly rate</p> <p>q - All export is annual firm PtP rate/8760 (No Appalachian) but in province daily & hourly on peak applies Appalachian premium</p>						

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² See Section Reference web sites to be able to directly access specific references.

Relative Export Rates

Export rates in the table concerning discounts relative to in province rates fall into three categories:

- **Deeply Discounted** – Manitoba Hydro charge no tariff for export to MISO. They presumably have a reciprocal agreement with MISO that enables economic dispatch between the respective systems. Ontario has an ETS rate of \$1.85/MWh which is only 16% of the in province charge.³ BC Hydro indicates discounts to \$3/MWh on-peak and \$1/MWh off peak. The Ontario and BC rates provide some opportunity for economic dispatch of resources.
- **Partially Discounted** – Hydro Quebec, MECL’s proposal and the maximum export rate in BC do not apply Appalachian premiums for hourly exports. The export rate is the annual firm PtP rate divided by 8760 hours. NB Power, NS Power, and Manitoba Hydro (for non-MISO exports) do the same but only for off-peak exports. Alberta has an export rate based only on its Network rate pool. However all of the rates except MECL’s proposal and NB Power’s off-peak rate are very high and would reduce the opportunity for economic dispatch of resources.
- **Not Discounted** – Sask Power applies the Appalachian pricing premium for both on and off peak hourly exports so has a rate similar to the BC maximum, Alberta, Manitoba (non-MISO), Quebec and Nova Scotia. It would not encourage economic dispatch on a regional basis.

Cost Allocation by Function

Transmission equipment can be classified into five functional categories – generator step-up transformation, generator connection lines and terminal related assets, the meshed transmission network, load serving radial transmission lines and substation step down transformation to loads. Costs associated with functions are recovered in two main ways. They can be directly assigned to generators and/or distribution loads or they can be recovered through different types of transmission service.

Alberta and Ontario have different transmission services for in province loads and export. All other provinces employ FERC pro forma based OATTs that include Network Service mainly for in province loads and Point-to-Point Service that is primarily for export but also can be used in Province. The table on the following page indicates how the functional costs

³ Determining an appropriate ETS rate was an issue for the 2014 Revenue Requirement Case of HydroOne before the OEB. The Elenchus Research Associates Inc study determined a cost based rate in the range of \$1.22-1.82/MWh would be appropriate and recommended that the rate of \$1.70/MWh should replace the then existing rate of \$2.00/MWh. Several interveners disagreed and a settlement was reached for the rate of \$1.85/MWh which is proposed to continue in HydroOne’s 2016 Revenue Requirement case. Note that the Elenchus report is included as Exhibit H1-3-1 in the application file of HydroOne at http://www.hydroone.com/RegulatoryAffairs/Documents/HONI_Tx%20Rates_Information%20Package.pdf

are allocated and who is responsible for paying them in the different provinces in Canada and in the United States under FERC.

Cost Allocation by Function					
	Substation	Load-Serving	Transmission	Generator	Generator
	Step-Down	Radial	Network	Connection	Step-Up
Jurisdiction	Transformers	Lines		Assets	Transformers
British Columbia	D	D	T	G	G
Alberta	D	D	T	G	G
Saskatchewan	D	T	T	G	G
Manitoba	D	D	T	G	G
Ontario	T	T	T	T	T
Quebec	T	T	T	T	T
New Brunswick	D	T	T	G	G
Nova Scotia	D	T	T	G	G
FERC	D	D/T	T	G	G
MECL Application	D	T	T	G	G
"D" means that the associated costs are allocated directly to Distribution or to an in province Transmission service that is separate from the OATT					
"T" means that the associated costs are allocated to Transmission and collected via the OATT					
"G" means that the associated costs are directly allocated to Generators					

There are several interesting results that follow from the data in the table.

- Only the meshed Transmission Network costs are collected through transmission tariffs in all jurisdictions
- Substation step-down transformers are included in Point-to-Point (or export) service only in Quebec. In all other provinces they are either directly assigned to Distribution loads in most FERC based OATTs or included as in province transmission service to distribution loads in Ontario, Alberta and Manitoba.
- Generator step-up transformer costs are directly assigned to generators in all jurisdictions except Ontario and Quebec. In Quebec the costs are included for

recovery in both Network and Point-to-Point rates. In Ontario they are only included in the Uniform Transmission Service so are paid only by distribution load customers and not exporters.

- Generator connection costs are directly assigned to generators in all jurisdictions except Ontario and Quebec. In Quebec the costs are included for recovery in both Network and Point-to-Point rates. In Ontario they are only included in the Uniform Transmission Service so are paid by distribution load customers and not exporters.
- Load serving radial line costs are included in both Network and Point-to-Point rates in all FERC based OATTs except BC and Manitoba.

Reference Notes

British Columbia – In the BCUC Decision of April 23, 1998 in the BC Hydro Wholesale Transmission Services Application line connection costs are allocated to transmission for voltages of 69 kV or higher; they are allocated to distribution for voltages below 69 kV. Each Transmission line connected to a generator has been examined independently and allocated based on the majority of the function performed by the line. Subsequently BC Transmission Corporation was formed and entered agreements with BC Hydro. The Tariff Supplement 79 preserves the dividing line between generation and transmission assets and is available at

https://www.bchydro.com/about/planning_regulatory/tariff_filings/oatt.html#supplements .

Alberta – The transmission system assets in Alberta are allocated into three functional groups – Bulk system. Regional system and Point of Delivery functions. These do not include Generation transformer or Generator Connection costs which must be borne by the generator under Section 5 of the AESO Tariff in order to get System Access Service as set out at [http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_\(2016-04-01\).pdf](http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_(2016-04-01).pdf) . Details on cost allocation and cost causation are available under the AESO 2016 tariff Update at http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_Update_-_Application.pdf .

Saskatchewan – Data from a survey undertaken by NB Power in 2001 indicates the allocation for Sask Power. Information on its web site under Code of Conduct indicates that the Code and the OATT were implemented in 2002. There appears to have been no changes since. There is no Saskatchewan Utilities Commission so the only reference is at <http://www.saskpower.com/home/how-we-do-business/standards-of-conduct/> .

Manitoba – Refer to the Prospective Cost of Service Study for the year ending March 31, 2014 referenced below. This document is the basis for the input costs that go into the Open Access Transmission Tariff (OATT). All transmission below 100 kV is charged to distribution. Radial transmission lines regardless of voltage are charged to non-tariff transmission (and collected from load customers) if they connect to load; they are charged to generation if they connect to generators. Reference available at https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/cost_of_service_study_submission/appendix_3_1_pco14.pdf .

Ontario - Refer to Hydro One Transmission Rate Application of May 31, 2016 filed with the Ontario Energy Board at www.hydroone.com/RegulatoryAffairs/Pages/TxRates.aspx . Exhibit G “Cost Allocation and Rate Pool Revenue Requirement” explains that there are uniform transmission rates for the Province of Ontario based on three rate pools – Network (used by all customers), Line Connection and Transformation. Each pool includes the costs of transmission facilities of Hydro One and all other transmitters in Ontario. Transformation from above 50 kV to below 50 kV is allocated to the Transformation pool and charged to load (distribution) but not to customers who own their transformation facilities. Radial lines above 50 kV are allocated to Line Connection and charged to load (distribution) but not to customers who own their line connections. All generator step-up transformers and generator line connections including generator switchyards are allocated to Network. There is no Point-to-Point transmission service but there is a separate Export Transmission Service (ETS) that is not related to any of the three rate pools. Rather it is set at \$1.85/MWh of energy exported as per Exhibit H “Overview of Uniform Transmission Rates” and all revenue from it is credited to the Network pool. By comparison the ETS rate is equal to about only 16% of the UTS rate using all rate pools. The overall effect is that load customers in Ontario pay for all transmission related costs from Generator step-up transformers through to and including distribution step down transformers. Generators do not pay for delivery inside Ontario and pay the \$1.85/MWh for export.

Quebec - The HQ allocation for transmission includes everything from the low voltage side of the Generator step up transformers to the low voltage side of the Distribution step down transformers. The original OATT filing (R-3401-98) with decision of the Regie D-2002-95 was upheld regarding cost allocation in case R-3669-2008 Phase 2 with decision D-2012-10. All related documentation is available at the web site <http://www.regie-energie.qc.ca/audiences/TermElecTransTarifsCond.html>

New Brunswick - The NB Power allocation in the table is taken from document NBP 2.17 Attachment F (Cost of Service) as filed with the NB Energy and Utilities Board in Matter 256 available at <http://www.nbeub.ca/opt/M/browserecord.php?-action=browse&-recid=441>. In it radial lines serving load are included in the OATT revenue requirement and collected through Network and Point-to-Point transmission rates. In a recent decision on Matter 271 regarding Class Cost Allocation Study Methodology for NB Power in provinces rates at <http://www.nbeub.ca/opt/M/browserecord.php?-action=browse&-recid=456> the EUB has directed NB Power to allocate radial line costs to the specific rate classes that they serve (Wholesale, Industrial, Residential or General Service). This will result in a \$518,000 reduction for the Wholesale class (SJ Energy and Edmundston Energy) and corresponding increases for the other classes. Meanwhile Perth-Andover (the only other wholesale entity in NB) is not served by NB Power but instead is supplied by Algonquin using Network Service transmission. Whether or not the EUB will alter the OATT when it is reviewed in two years to remove radial lines from it is unknown. WKM believes that it is unlikely because it would increase costs to Perth-Andover and reduce transmission revenues from exports. Both of these results would draw intervention opposition from Perth-

Andover, Algonquin and likely the Public Intervener. NB Power would also likely not be in favour.

Nova Scotia - The NSPI allocation is according to the Settlement Agreement reached between NSPI and its interveners as a result of the OATT filing (Case M06341) with the NSURB in 2005. All documents are available at the NSURB web site under Case M06341 at <http://uarb.novascotia.ca/fmi/iwp/cgi?-db=UARbv12&-loadframes>

FERC - Substation step-down transformers are defined as distribution assets at Section 14b of the FERC Code of Accounts Form 715 Guide. Load-serving radial lines may be transmission or distribution; a ruling for distribution allocation is FERC Initial Decision in the matter of Consumer Energy of January 14, 1999. (86 FERC P63,004). Then existing generator-related transmission assets could have been allocated to transmission or generation but any GRTA's costs since are allocated to generation. Generator step-up transformers used to be allocated to transmission but they are now allocated to generation. See Kentucky Utilities 85 FERC P61,274. In Order 890 (Paragraph 558) FERC required development of transparent cost allocation principles for regional projects but that existing mechanisms to allocate costs for projects that are constructed by a single transmission owner not be modified but be maintained as per the pro forma OATT.

Reference Web Sites

BC

http://www.bcuc.com/Documents/Proceedings/2014/DOC_40964_03-07-2014_BCH-F2015-16RevenueRequirementsApplication.pdf
https://www.bchydro.com/about/planning_regulatory/tariff_filings/oatt.html#schedules
<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/tariff-filings/open-access-transmission-tariff/tariff-supplement-79.pdf>

Alberta

http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_Update_-_Application.pdf
[http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_\(2016-04-01\).pdf](http://www.aeso.ca/downloads/AESO_2016_ISO_Tariff_(2016-04-01).pdf)

Saskatchewan

[http://www.oatioasis.com/SPC/SPCdocs/spc_TariffSep1_11_\(new\)_branded.pdf](http://www.oatioasis.com/SPC/SPCdocs/spc_TariffSep1_11_(new)_branded.pdf)
http://www.saskpower.com/wp-content/uploads/2015-16_SaskPower_annual_report.pdf

Manitoba

http://www.oasis.oati.com/woa/docs/MHEB/MHEBdocs/MH_OATT_Version_37_FINAL.pdf
https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/cost_of_service_study_submission/appendix_3_1_pc_oss14.pdf
https://www.hydro.mb.ca/corporate/ar/2014/annual_report_2014.shtml

Ontario

http://www.hydroone.com/RegulatoryAffairs/EB20160160/HONI_TxAppUpdate_20160720.pdf
http://www.hydroone.com/RegulatoryAffairs/Documents/HONI_Tx%20Rates_Information%20Package.pdf

Quebec

http://publicsde.regie-energie.qc.ca/projets/318/DocPrj/R-3934-2015-B-0128-Demande-Dec-2016_04_22.pdf
http://publicsde.regie-energie.qc.ca/_layouts/publicsite/ProjectPhaseDetail.aspx?ProjectID=318&phase=1&Provenance=B

NB

<http://www.nbeub.ca/opt/M/browserecord.php?-action=browse&-recid=441> Matter 256
http://tso.nbpower.com/Public/en/docs-EN/tariff/TransmissionTariff_20160506_EN.pdf
<http://www.nbeub.ca/opt/M/browserecord.php?-action=browse&-recid=456> Matter 271

NS

<http://uarb.novascotia.ca/fmi/iwp/cgi?-db=UARBV12&-loadframes> Case M06341
Application documents, Settlement Agreement and OATT are available

PEI

<http://www.irac.pe.ca/electric/>