Ontario Energy Board (OEB)

Pole Attachment Rate Model

July 27, 2016

Delivered to

PAWG

Prepared by

Nordicity

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Table of Contents

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Section I

Data Collection Status Update

Data Request and Comments – Pole Specs

Data Item Requested	Toronto Hydro	London Hydro	Hydro Ottawa	Hydro One	Horizon	CHEC
1. Pole Specs (by pole size and class)						
- Power Space (Feet)	Received	Received	Received	Received	Received	Partial
- Separation Space (Feet)	Received	Received	Received	Received	Received	Partial
- Communication Space (Feet)	Received	Received	Received	Received	Received	Partial
- Clearance Space (Feet)	Received	Received	Received	Received	Received	Partial
- Buried Space (Feet)	Received	Received	Received	Received	Received	Partial

- Hydro Ottawa
  - 50' to 65' where 20% are Class 2 (current standard from revised CSA non-linear loading requirements) and 80% are Class 3 (legacy standard).
  - separation, communications, and clearance space do not change very much with short pole spans in urban areas.

- Hydro One
  - 1- In filling out the attached spreadsheet Hydro One has assumed an average of 70m span length and used 3/0 ACSR conductor for both the primary and neutral phases. Note: Sag of conductor increases based on span length which increases separation space based on CSA guidelines. Longer spans are more prevalent in rural areas vs urban settings. -2- Telecom Wireline attachments sag also increases with long spans and when designing the height of the pole, the characteristics of the wire determine max sag. (i.e. power neutral conductors have max sag with thermal loading and telecom conductors have max sag from ice loading. Both need to be determined to calculate the separation space and size of pole to make sure the clearance above the ground is met at max sag for telecom wires).
  - 2 - See the Pole Profile (pdf) that Hydro One has supplied for more detail.

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Data Request and Comments – Pole Population

Data Item Requested	Toronto Hydro	London Hydro	Hydro Ottawa	Hydro One	Horizon	CHEC
2. Pole Population (by pole size and class):						
- Total Number of Poles	Not Received	Received	Received	Received	Received	Partial
- Total Number of Telecom Attachers	Not Received	Received	Received	Aggregate	Received	Partial
- Total Number of Other Attachers	Not Received	Received	Not Received	Aggregate	Received	Partial

- London Hydro
  - These records are aggregated using GIS records and hard copy records of data that is not in GIS yet.
  - London Hydro does not keep records of streetlight in GIS system. The report was produced based on 2015 data using spatial analysis.
  - Average number of attachers per a joint use pole is 1.41.

- Hydro Ottawa
  - Query results for poles 50' to 65' were multiplied by a factor of 0.8 of which the outcome was added to the Class 3 numbers to reflect the historical use of Class 3 poles in these height classes. The remaining 20% were added to the Class 2 column.
  - Height and/or Class of pole unknown.
  - Class breakdowns were as follows:
    - Class 1 - 70' to 80' (some 85' poles included in 80' counts);
    - Class 2* - 50' to 65' where 20% are Class 2 and 80% are Class 3;
    - Class 3* - 40' to 65‘;
    - Class 4 - 35' and under.
  - Poles of intermediate size were included in the closest pole height group (i.e. 37' poles included with 35').
  - pole count for in-service power poles of all materials (wood, steal, concrete, composite).

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Data Request and Comments – Pole Population

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- Hydro Ottawa
  - Hydro Ottawa to run street light attacher data (other attachers category) in its GIS. This pole attacher data will be available by the end of June 2016.
  - Hydro Ottawa GIS data is only current for the date of the query report. There is no historical function to look backwards to other years. Historical pole count in Cost Base table is from an annual production report.

- Hydro One
  - Hydro One Note #1: Hydro One is not able to determine, by class and height, the actual number of attachers per pole using existing GIS data.
  - Hydro One Note #2: All of the information listed above is obtained from Hydro One GIS system.
  - Hydro One Note #3: From a recent filing Hydro One has 767,761 permitted attachments.
  - Hydro One Note #4: From a recent filing, Hydro One has submitted that there are 576,068 poles that support some form of Joint Use Attachment(s).

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Data Request and Comments – Attachments

Data Item Requested	Toronto Hydro	London Hydro	Hydro Ottawa	Hydro One	Horizon	CHEC
3. Attachments (by pole size and class):						
- Maximum Number of Actual Attachments	Not Received	Not Received	Not Received	Not Received	Received	Partial
- Minimum Number of Actual Attachments	Not Received	Not Received	Not Received	Not Received	Received	Partial

- Hydro One
  - 1- Hydro One will not be able to complete this tab as Hydro One tracks permitted attachments on Hydro One owned poles using a data base that is not GIS related. Hydro One does has the ability to search by "attacher" to indicate the number of poles they are attached to, but as permits are not issued per pole, the exercise to try to fill out the table above is too difficult. For example ….. (see notes)
  - Hydro One does not have any easy way to determine if the 50 poles Telecom "b" is attached to is included in part, or all, of the 100 poles that Telecom "a" is attached to on Smith Road without finding, opening, and overlaying each permit on top of each other based on geographical location. Hydro One issues an invoice to third party attachers, based on each pole they are attached to, not how many attachments they have on a pole. For example … (see notes)
  - Telecom "c" then allow Telecom "d" to overlash 2 x 1/2inch fibre cables onto one of their strands and Telecom "e" gets the approval to overlash 1 x 1inch fibre cable on the other strand owned by Telecom "c". Using the attacher theory in place today, each of Telecom "c", "d" and "e" would be charged as an "attacher on the pole", which established in 2005, was $22.35 per pole per year, even though Telecom "c" would have 5 wireline attachments and a large power supply. Telecom "d" has two wireline attachments and Telecom "e" has one wireline attachment.
  - 2- Hydro One uses all third party permitted attachments, divided by the number of Hydro One owned poles that contain attachments, to arrive at its number of attachers per joint use pole.

Data Request and Comments – Pole Costs

Data Item Requested	Toronto Hydro	London Hydro	Hydro Ottawa	Hydro One	Horizon	CHEC
4. Yearly Pole Cost Data (2005-2015):						
- Total Embedded Cost: Gross Book Value ($)	Received	Received	Received	Received	Received	Partial
- Total Net Embedded Cost: Net Book Value ($)	Received	Received	Received	Received	Received	Partial
- Depreciation Method Applied	Received	Received	Received	Received	Received	Partial
- Average Depreciation Rate Used(%)	Received	Received	Received	Received	Received	Partial
- Maintenance Expenses($)	Received	Not Received	Received	Not Received	Not Received	Partial
- Administration Expense ($)	Received	Not Received	Not Received	Not Received	Not Received	Partial
- Loss of Productivity ($)	Not Received	Not Received	Not Received	Not Received	Not Received	Partial
- Capital Carrying Cost Rate(%)	Received	Received	Received	Received	Received	Partial

- Toronto Hydro
  - Pole Maintenance Expense
    - The Pole Maintenance expense captures the cost of various activities undertaken by Toronto Hydro for the purposes of maintaining the structural integrity of its distribution poles.
    - Wood Pole Inspection & Treatment – Scheduled wood pole inspection for decay reduces the risk of exposure, enhances the reliability of the system and balances the expenditure of capital replacement.
    - Pole Inspection Program (Hydro Portion) – The pole inspection program captures data for the purposes of updating records, assessing the condition of overhead assets, and identifying deficiencies.
  - Administration Costs
    - The administration costs represent the estimated operational costs of managing and administering third party attachments and licensed occupancy on Toronto Hydro's distribution plant. These costs capture the following operational expenditures:

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Data Request and Comments – Pole Costs

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  - Payroll Costs – expenditures related to compensation of internal employees;
  - Vehicle Costs – expenditures related to vehicle/fleet usage and maintenance;
  - Inventory & Direct Purchases – expenditures for materials issued and used;
  - Invoicing/Billing Costs (direct labour and mailing costs) – expenditures related to processing of customer invoices;
  - Support Costs (utility communications, office supplies, employee expenses) – expenditures related to electricity usage, water and gas usage, telecommunications, cellular phone and radio charges, postage, courier and freight & duties, computer supplies, photocopy and stationary supplies, printing expenses, and internal employee expenditures required for their employment such as professional dues, membership fees, transportation, parking, conferences and seminars, education fees and subscriptions; and
  - Usage Charges (IT Equipment, Facilities) – expenditures related to using technology assets such as computers, networks and phones and expenditures related to using office and work space within Toronto Hydro.
- "Estimated Total Pole Population" does not include street lighting poles that were transferred from Toronto Hydro Electric System Inc. to Toronto Hydro Electric System Ltd. in 2013 because they are not able to support wireline pole attachments due to their design specification.
- Loss in Productivity: The loss in productivity costs reflect the additional expenditures that Toronto Hydro incurs in carrying out its regular activities, as a result of third party attachers' presence on its poles. These costs include: Pole Replacements - When Toronto Hydro replaces an old pole with a new pole that has telecommunications attachment(s) on it, the old pole cannot be removed until the telecommunications attachment(s) are transferred from the old pole to the new pole. Pole Inspection Program (Third Party Portion) - These costs include the additional expenditures incurred by Toronto Hydro to carry out the Pole Inspection Program due to the presence of the third party attachments.

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Data Request and Comments – Pole Costs

Continued from previous page

- Hydro Ottawa
  - Hydro Ottawa has a 45 year financial life for its power poles.
  - Acceptable routine on-going administrative functions have not been determined which may or may not include: GIS updates, permit review and processing, regulatory.
  - mandated auditing, central registry mapping, pole capacity planning with new roads & ROWs, coordination of overhead to underground conversions, agreement negotiations.
  - invoicing, identification and managing routine attachment maintenance issues.
  - Loss In Productivity (LIP) direct costs category is missing. This cost group activities have not been determined which may or may not include: first responder time for wires low/down.
  - tree in wires, several cost types with delayed transfers off old poles (field verification, returning crews, managing inquiries & complaints), added care for working around existing attachments,
  - Maintenance costs include pole testing, pole repairs, pole straightening but does not include vegetation management.
  - No pole cost reduction applied for determining a bare pole without fixtures (USofA account 1830).
  - Multi-grounded neutral system costs not listed in this spreadsheet (USofA account 1835). See separate attachment for calculations.
  - Land right costs not listed in this spreadsheet (USofA account 1805).

- Horizon Utilities
  - Loss of productivity: Delay of transfer, wire-down calls.

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Data Request and Comments – Pole Costs

Continued from previous page

- Hydro One
  - HONI note #1: Calculated as Total Gross Book Value - Accumulated Depreciation (from USoA Account 1830).
  - HONI note #2: For Maintenance Costs, Hydro One feels that the PAWG must determine, as a group, what will be included prior to suppling dollar values. At a high level, Hydro One feels that the maintenance activities that should be included within this calculation would include; Lines maintenance activities with respect to the pole (patrol, inspection, straightening, repair, maintenance to neutral conductor, downgrounds, ground rods).
  - HONI note #3: For Administrative Costs, Hydro One feels that the PAWG must determine, as a group, what will be included prior to suppling dollar values . At a high level, Hydro One feels that the activities that should be included within the calculation to determine Administrative Costs would include; the costs associated with administering permits, invoicing, administering new permit applications.
  - HONI note #4: Column added for Loss of Productivity as this has been a contributor to the rate calculation in the past and should be considered as well. As the same as in Note #2 and #3 above, Hydro One feels that the PAWG must determine, as a group, what will be included prior to suppling dollar values . At a high level, Hydro One feels that the activities that should be included within the calculation to determine Loss of Productivity could include the following; extra labour working around telecom wires, administering late/non-transfers of telecom conductors after pole changes; return trips to pull poles.
  - HONI note #5: Pole counts 2010-2014 and 2015 attached, are as submitted in recent evidence to the OEB (EB-2015-0141) Pole counts prior to 2010 are not available. Hydro One's extrapolation estimate is an increase of approximately 12,000 pole per year. We have used this extrapolation to fill in the chart for years 2005 to 2009.
  - HONI note #6: 2005 Data not available. Rates were frozen from last Ontario Hydro Filing (could be as far back as 1999).
  - HONI note #7: Values may slightly differ from IR submissions. IR Submissions are mostly from Cost Allocation Model. Values above from pure Fixed Asset Database - only data set available for complete 10 year period.

Section II

Findings from Literature Review

Costing Methodologies

Historical

•A historical costing methodology is generally composed of actual costs or a two to three-year budget. It is often the case that actual costs are employed to reflect short term budget estimates.

Forward Looking

•A forward-looking cost methodology is generally composed of longer term estimates ranging between five and seven years. These estimates may include the total number of poles, km of cable and lines as the attachment quantities for an array of users as well as the number of attachments per user (as well as the user types) and any factors that may incur repair, maintenance or productivity loss costs.

Standard

•A standard, or bench marking methodology, is generally based on a typical industry cost structure as well as comparable jurisdictions which normally excludes extraordinary costs such as those caused by natural disasters.

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Costing Methodology – Historical

- **The historical costing methodology is the most common costing methodology approach employed by regulators and other decision-makers;**
- The OEB's *2005 Decision* employed historical costs to determine the pole attachment rate including both the embedded pole cost as well as the associated depreciation. Accordingly, the approved 2005 rate ($22.35) did not include an annual adjustment factor and thus remained the same over the following years;
- Although Hydro Ottawa's 2016 proposed pole attachment rate did include an annual inflation adjustment rate of 2.1% in 2017 to 2020, it was too based on historical costing;
- Thus while the OEB approved Hydro Ottawa's 2013 historical costs as the basis behind the pole attachment rate for that year to 2020, they rejected the inflation adjustment. The approved rate of $53.00 then will remain in effect unless there is further direction as a result of the OEB's ongoing Policy Review;
- Alongside the OEB, historical costing has been adopted in a range of different decisions across North America including:
  - Federal Communications Commission (FCC) - *2011 Order of Reconsideration;*
  - the New Brunswick Energy and Utilities Board (NBEUB) – *Matter No. 272;*
  - the Nova Scotia Utility and Review Board – In the matter of an application by Nova Scotia Power Incorporated for approval of an increase in its Pole Attachment Charge (2002);
  - Public Utilities Commission of Ohio – In the Matter *of the Adoption of Ohio Administrative Code concerning access to Poles, Ducts, Conduits, and Rights-of-Way by Public Utilities;* and
  - Tennessee Valley Authority – *2016 Proposed Board Resolution.*

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Costing Methodology – Forward Looking

- **While Nordicity's research did not find any decisions that adopted a forward looking costing methodology, intervening parties have recently argued on its behalf;**
- For example, in Nordicity's submission on behalf of F6 Networks during the NB EUB hearings in 2015, Nordicity argued for a forward looking costing methodology. Specifically, Nordicity stated "*One such best practice proportional methodology that might be considered is a forward-looking cost view using a total system approach. In this approach, the development of a forward looking cost model encompasses long term estimates of total number of poles, kilometers of cable and lines, and attachment quantities for each user under each user type and the associated drivers for their recurring repair, maintenance and productivity loss costs*" (p. 37);
- In April 2016, *a motion by the Carriers for Review and Variance of Decision as it relates to the specific charge for Cable and Telecom Companies' Access to power poles (the "Pole Access Charge") by Hydro One Networks Inc*. asserted the pole access charge should be calculated using the 2015 forecast costs (in lieu of the historical costs as prescribed in the 2005 methodology and used by Hydro One in its General Rate Application);
- The Carriers motion was based on the concern that setting the pole attachment rate using historical costs while distribution rates had been set using forecast costs would result in distribution ratepayers subsidizing pole attachers.

Costing Methodology – Standard

- **Nordicity's research did not find any instances of the standard methodology employed by regulators or utility boards, or argued on the part of intervenors.**

Allocation Methodologies

Equal Sharing

•Equal Costing provides a basis for voluntary consent. In this case, it suggests the common costs of the usable pole space should be divided equally among attachers on a "per capita" basis.

Proportional Use

•Proportional use allocation points to a level of contribution predicated on the usage-based allocation of indirect costs.

Incremental

•Incremental allocation occurs when a rate is determined on the incremental space required for telecom attachers relative to the total pole size. In short, incremental allocation would opt for the lowest rate that can be considered economically efficient.

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Allocation Methodology – Equal Sharing

- **Nordicity's research revealed that the equal sharing allocation methodology has been adopted by at least three Energy Boards;**
- In 2000, the Alberta Energy and Utilities Board (AEUB) *Decision 2000-86* sided with arguments put forth by the Transalta Utilities Corporation. TransAlta had proposed a rate based on the 'Shared Use of overhead Facilities' where they calculated a rate based on hypothetical system whereby each utility or carrier had constructed its own system without concern for the duplication of infrastructure;
- In turn, each of the party's combined costs were applied to TransAlta's embedded pole cost to produce a rough estimate of each group's share;
- Another example of equal share costing is found in the Tennessee Valley Authority's (TVA) *2016 Proposed Board Resolution*, "*[u]nder the rate methodology the pole attachment rate is calculated by first establishing the total annual cost of ownership of the pole, which includes administration, depreciation, maintenance, taxes, and return on investment. The total cost is then allocated among pole users based on: the actual number of pole users; an equal allocation of support space among the pole users; an equal allocation of safety space among pole users that are attaching for communication purposes; and an allocation of usable space to each pole user.*";

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Allocation Methodology – Equal Sharing

- The central dispute of the OEB 's *2005 proceedings* was surrounding the appropriate wireline pole attachment rates to charge and the common costs each party should pay;
- Cable carriers suggested that the portion of the common cost they should incur should be based on their proportionate use whereby utility providers suggested that this portion should be equal;
- On March 7th, 2005, the OEB issued a decision and order on the aforementioned application granting access to the poles at a rate of $22.35 per pole attachment. The OEB decided that the common costs should be shared equally amongst all attachers;
- Through this decision, the OEB did not establish a standard pole attachment agreement but rather accepted the agreement reached by intervening parties during settlement discussion.

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Allocation Methodology – Proportional Use

- **The proportional use allocation methodology is the methodology primarily adopted by regulatory bodies;**
- In 2014, the New Brunswick Power Corporation (BM Power) applied to the New Brunswick Energy and Utilities Board (NBEUB) for an order to approve its proposed rates for the 2015/2016 fiscal year;
- The NBEUB concluded that pole owners have the opportunity to take advantage of the market power they hold in pole ownership. However, the NBEUB considered it reasonable that those parties who make use of the pole should pay enough so that NB Power's consumers neither cross-subsidize nor incur a financial penalty any part of their use;
- NBEUB showed a preference for the proportionate sharing of common costs for the allocation of costs in this case. NBEUB suggests that this model portrays a recognition for both the practical and financial gaps between the pole owner and pole attachers in this case;
- As well, NBEUB argued that without ownership rights to the pole, third party attachers are required to apply through a mediator to attach and they are typically offered a less desirable field of the pole. As well, third party attachers are bound to the existing system as it is not economically efficient to duplicate the pole structure.

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Allocation Methodology – Proportional Use

- Other proponents of the proportional sharing approach include the CRTC whose methodology was predicated on the notion that support structure rates should at least "*exceed the incumbents causally attributed incremental costs and make a reasonable contribution to their fixed structure costs*". In *Telecom Order 2009-731*, the CRTC developed the template for this methodology found below. This methodology has since been upheld in *Telecom Decision 2010-900*.
- The Nova Scotia Utility and Review Board follows the CRTC methodology as well.

Step	Variable/Calculation	Explanation
Step 1	(A)	(A) = Average embedded cost per unit for those units to which third parties attach
Step 2	(B) = (A) x (B_1)	(B1) = Percent-communication factor = Percentage of usable space on the pole assigned to communications versus hydro requirements.
Step 3	(C) = (B) x (C1)	(C1) = Percent-utilization factor associated with units to which third parties attach.
Step 4	(D) = (C) x (D1)	(D1) = the number of units to which third parties are attached
Step 5	(E)	(E) = Phase II annual equivalent costs associated with administration and loss of productivity
Step 6	(F) = (D) + (E)	Total annual costs to be recovered from third-party use
Step 7	Rate = (F) / number of billing units	Average annual cost to be recovered for each billing unit

* The CRTC's methodology was initially established in *Telecom Decision 95-13* although the above template was not developed until 2009

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Allocation Methodology – Incremental

- **Nordicity's research has only found the Federal Communications Commission as an exemplar of the incremental allocation methodology;**
- Incremental allocation occurs when a rate is determined on the incremental space required for telecom attachers relative to the total pole size. In short, incremental allocation would opt for the lowest rate that can be considered economically efficiently. This allocation ensures that the wireline pole attachment rate is not providing a subsidy to the attaching entity;
- The Federal Communications Commission (FCC) has offered utility providers the option of selecting multiple formulas – both incremental and proportional – for their rates to telecommunications providers;
- the FCC's *2011 Order of Reconsideration* revised the rate formulas for telecommunications attachers to improve efficiency, accelerate the buildout of broadband networks and better harmonize the rates offered to these two parties;
- The 2011 Order adopted several alternative methods for cost determination submitting that the method which produced the highest rate would be the one opted for the pole owners.
- The first method allowed the pole owner to charge a monthly pole rental rate which offered some contribution to overall capital costs while simultaneously reducing the telecom rate. This method defines costs based on a percentage of the fully-allocated cost of the pole;
- The second method, the incremental allocation, allowed the pole owner to recover its administrative and maintenance costs by way of the telecom rate but no capital costs other than make-ready expenses.

Rate Methodologies

Attacher Base

- A rate methodology based on ‘attachers’ or ‘users’.

Attachment Base

- An rate methodology based on the number of attachments.

Rate Methodology – Attacher Base

- **Nordicity's research found that all reviewed decisions were predicated on an attacher base rate methodology;**
- **Most prominently, these decisions include the CRTC's adopted rate methodology, the FCC, the OEB, and the NBEUB.**
- A rate methodology based on 'attachers' or 'users' is predicated either on the presumptive number of attachers, the actual number of attachers, the presumptive numbers of attachers by geography (rural, urban, sub-urban), the average number of attachers based on actual system data or the attachers by pole type one user (power), two users (power + telco), three users (power + telco + cable/3rd party);
- The FCC's recent *2015 Order on Reconsideration* re: telecommunications wireline pole attachment rates, which follows their 2011 Order on Reconsideration of the same nature, revises the regulator's attacher rate methodology;
- The *2015 Order* introduced new cost allocators for poles with two attaching entities (31% of the cost and four attaching entities (56% of the cost), alongside the 2011 Order's cost allocators for three attaching entities (44% of the cost) and five attaching entities (66% of the cost);
- This was a response to widespread consensus that the numbers provided by the 2011 Order did not match up with the actual number of attaching entities. In actuality, many intervenors suggested that average number of attachers is 2.6;
- This was a movement away from the FCC's previous two designations, two attaching entities as representative of those poles in rural environments and five attaching entities as representative of those poles in urban environments.

Rate Methodology – Attachment Base

- **Nordicity's research did not reveal any reviewed decisions that adopted an attachment base methodology;**
- An attachment base methodology is based on the number of attachments and is predicated either on the presumptive number of attachments, the actual number of attachments, the presumptive numbers of attachments by geography (rural, urban, sub-urban), or the average number of attachments based on actual system data;
- The lack of decisions adopting an attachment base rate methodology is likely due, in part, to a lack of data. It is far easier to monitor the number of attachers on a pole over the number of attachments from each attacher.

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Section III

Preliminary Analysis and Output

Pole Specs

Pole Size (Feet)	All Pole Classes						Province (1)	
	Power Space (Feet)	Sepa. Space (Feet)	Comm. Space (Feet)	Clear. Space (Feet)	Buried Space (Feet)	Total (Feet)	Joint Use Poles	
30	3.86	2.87	1.90	14.91	4.95	28.50	61,047	9%
35	**7.83**	**3.02**	**2.00**	**15.18**	**6.30**	**34.33**	**185,504**	**27%**
40	**11.77**	**3.22**	**2.00**	**14.56**	**7.17**	**38.73**	**192,239**	**28%**
45	**15.44**	**3.17**	**2.54**	**14.05**	**9.59**	**44.79**	**144,981**	**21%**
50	20.96	3.33	2.00	13.99	8.77	49.06	46,437	7%
55	26.45	3.05	2.00	16.00	7.50	55.00	31,490	5%
60	30.64	3.08	2.00	16.28	8.00	60.00	18,725	3%
65	34.26	3.06	2.00	16.13	8.59	64.04	8,695	1%
70	38.79	3.08	2.00	17.13	9.00	70.00	3,086	0%
75	43.58	3.16	2.00	16.75	9.50	74.99	1,608	0%
Sample	**11.39**	**3.14**	**2.15**	**14.64**	**7.53**	**38.85**	**522,724**	**75%**
OEB	**11.50**	**3.25**	**2.00**	**17.25**	**6.00**	**40.00**	n.a.	n.a

(1) The province column only presents the total of all the data already submitted.

Here follow key differences relative to pole specs in OEB's current rate (as per the 2005 Decision)

- **The average power space is 11.39' . This is consistent to the current specs (11.5').**
- The average telecom space (communication + separation) is consistent with the current specs (3.14' vs. 3.25' and 2.15 vs. 2.00).
- The average common space (clearance + buried) is slightly different from the current specs (14.64' vs. 17.25' and 7.53' vs. 6.00').

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Pole Population

Year	Toronto Hydro	London Hydro	Ottawa Hydro	Hydro One	Horizon	Province [2]
2005	159,000	27,700	44,600	1,451,344	n/a	1,682,644
2006	190,816	27,860	46,761	1,463,344	n/a	1,728,781
2007	181,397	28,000	51,582	1,475,344	n/a	1,736,323
2008	142,300	28,000	49,201	1,487,344	52,332	1,759,177
2009	140,771	28,698	48,699	1,499,344	52,146	1,769,658
2010	139,842	29,424	48,574	1,511,344	52,146	1,781,330
2011	140,641	29,384	48,377	1,523,344	52,163	1,793,909
2012	135,986	28,345	48,298	1,535,344	52,031	1,800,004
2013	135,986	27,980	47,978	1,547,344	51,615	1,810,903
2014	135,986	27,680	47,825	1,559,522	51,418	1,822,431
2015	137,172	27,184	48,384	1,571,384	51,390	1,835,514
Average	149,082	28,205	48,207	1,511,364	51,905	1,774,607
CAGR	**-1.47%**	**-0.19%**	**0.82%**	**0.80%**	**-0.26%**	**0.87%**

(1) CAGR: Compound Annual Growth Rate
(2) The province column only presents the total of all the data already submitted.

- Pole stats provided by Hydro One here include all poles (i.e. power-only poles, poles with telecom attachers and poles with other attachers such as street lights).
- Pole stats provided by all other utilities are ASSUMED to be joint use poles.

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Average Attachers per Pole

Pole Size (Feet)	London Hydro	Hydro Ottawa	Horizon	Average Attachers per Pole (excl. Hydro One) (1)
30	1.31	1.78	2.60	2.05
35	**1.83**	**2.04**	**2.39**	**2.19**
40	**2.26**	**2.15**	**2.61**	**2.36**
45	**2.25**	**2.19**	**3.03**	**2.53**
50	3.01	2.08	3.28	2.81
55	2.88	2.28	3.52	2.85
60	1.53	2.41	3.18	2.25
65	1.73	2.26	3.52	2.19
70	1.55	2.09	3.18	1.97
75	1.67	1.70	2.00	1.70
80	n/a	1.52	n/a	1.52
Others	n/a	1.09	n/a	1.09
Sample	**2.13**	**2.13**	**2.70**	**2.37**
Total	**2.23**	**2.09**	**2.73**	**2.40**

- Pole sizes 35’ , 40’ and 45’ represent 75% of the total provincial population – referred to as “sample” group.
- Hydro One, who represents over 85% of the population, did not provide attacher data per each pole size, as requested.
- For the sample group, the average number of attachers per pole is 2.37, excluding Hydro One.
- OEB’s current rate (as per the 2005 Decision) is based on 1.5 average attachers or a total of 2.5 attachers including power.

(1) Average attachers per pole (excluding Hyrdo One), is calculated based on the total number of poles from the above utilities and the number of attachers (i.e. the utility itself, telecom attachers and other attachers). The method used is population-weighted average.

Nordicity

Average Attachers per Pole

		HydroOne		Other		Total	
Number of Poles							
A	Power only	1,001,477	64%	138,960	53%	1,140,437	62%
B	Joint Use	572,185	36%	125,170	47%	697,355	38%
C = B + C	Total	**1,573,662**	100%	**264,130**	100%	**1,837,792**	100%
Attachers							
D = C	Power	1,573,662	68%	264,130	60%	1,837,792	67%
E	Telecom + Other	733,753	32%	175,400	40%	909,153	33%
F = D + E	Total	**2,307,415**	100%	**439,530**	100%	**2,746,945**	100%
Average Attacher Per Pole							
G = E / B + 1	per Joint Use Poles	2.28		2.40		2.30	
H = F / C	per All Poles	1.47		1.66		1.49	

(1) The province column only presents the total of all the data already submitted.

Nordicity

Capital Cost per Pole

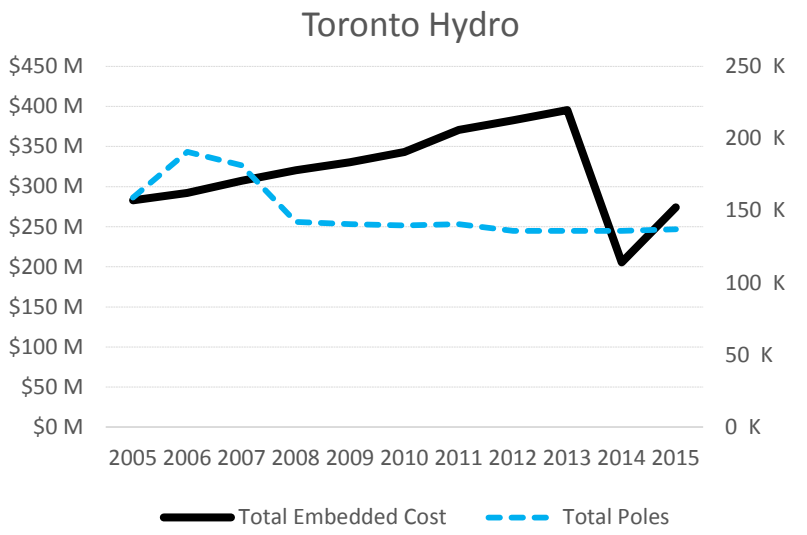
Year	Toronto Hydro		London Hydro		Ottawa Hydro		HydroOne		Horizon		Province [1]	
	Embedded	Net Embedded	Embedded	Net Embedded	Embedded	Net Embedded	Embedded	Net Embedded	Embedded	Net Embedded	Embedded	Net Embedded
2005	$ 1,779	$ 1,083	$ 270	$ 235	$ 2,404	$ 1,122	$ 1,061	$ 550	n/a	n/a	$ 1,151	$ 610
2006	$ 1,530	$ 893	$ 308	$ 263	$ 2,439	$ 1,133	$ 1,116	$ 599	n/a	n/a	$ 1,185	$ 641
2007	$ 1,694	$ 961	$ 369	$ 310	$ 2,328	$ 1,065	$ 1,169	$ 647	n/a	n/a	$ 1,246	$ 687
2008	$ 2,253	$ 1,236	$ 443	$ 369	$ 2,494	$ 1,085	$ 1,231	$ 702	$ 1,206	$ 745	$ 1,335	$ 752
2009	$ 2,348	$ 1,233	$ 1,227	$ 625	$ 2,251	$ 1,087	$ 1,286	$ 754	$ 1,340	$ 841	$ 1,398	$ 802
2010	$ 2,455	$ 1,245	$ 1,208	$ 600	$ 1,092	$ 1,092	$ 1,351	$ 815	$ 1,446	$ 921	$ 1,431	$ 856
2011	$ 2,637	$ 1,393	$ 1,271	$ 630	$ 1,242	$ 1,210	$ 1,423	$ 885	$ 1,634	$ 1,073	$ 1,517	$ 935
2012	$ 2,816	$ 1,483	$ 1,354	$ 699	$ 1,399	$ 1,331	$ 1,490	$ 951	$ 1,222	$ 1,164	$ 1,577	$ 1,003
2013	$ 2,910	$ 1,528	$ 1,420	$ 736	$ 1,582	$ 1,475	$ 1,608	$ 1,067	$ 1,337	$ 1,245	$ 1,694	$ 1,112
2014	$ 1,511	$ 1,463	$ 1,505	$ 792	$ 1,792	$ 1,641	$ 1,750	$ 1,210	$ 1,450	$ 1,322	$ 1,721	$ 1,237
2015	$ 1,999	$ 1,883	$ 1,586	$ 837	$ 2,016	$ 1,819	$ 1,793	$ 1,254	$ 1,587	$ 1,420	$ 1,805	$ 1,314
Average	**$ 2,176**	**$ 1,309**	**$ 997**	**$ 554**	**$ 1,913**	**$ 1,278**	**$ 1,389**	**$ 858**	**$ 1,403**	**$ 1,091**	**$ 1,460**	**$ 905**
CAGR	**1.17%**	**5.69%**	**19.39%**	**13.52%**	**-1.74%**	**4.96%**	**5.39%**	**8.59%**	**4.00%**	**9.64%**	**4.60%**	**7.97%**

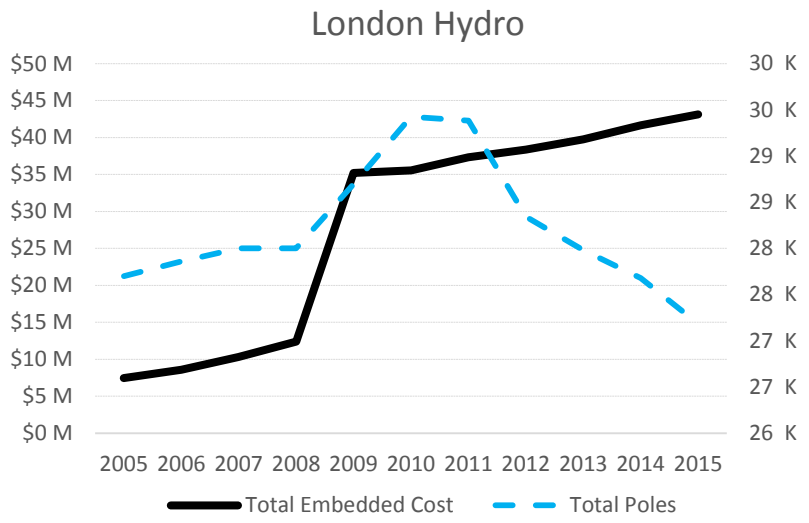
(1) CAGR: Compound Annual Growth Rate
(2) The province column only presents the total of all the data already submitted. Provincial average is calculated based on total costs of all poles and total pole population.

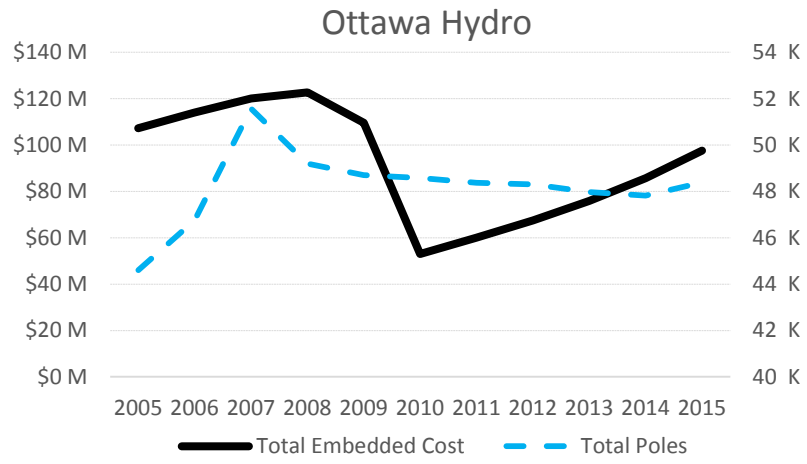
- The provincial average net embedded cost of $905 is almost double the current $478 from 2005 OEB Decision. Average net embedded costs from 2011 and later are ~3 times higher. Cost by utility varies significantly, e.g. $1,309 at Toronto Hydro vs. $554 at London Hydro.
- The provincial pole population increased by 9% (2005 to 2015) vis-à-vis 27% (embedded) and 48% (net embedded). This implies that capital expenditure has primarily been directed toward pole replacements rather than pole growth.
- **Further analysis is required to develop an adequate methodology to determine capital cost per pole.**

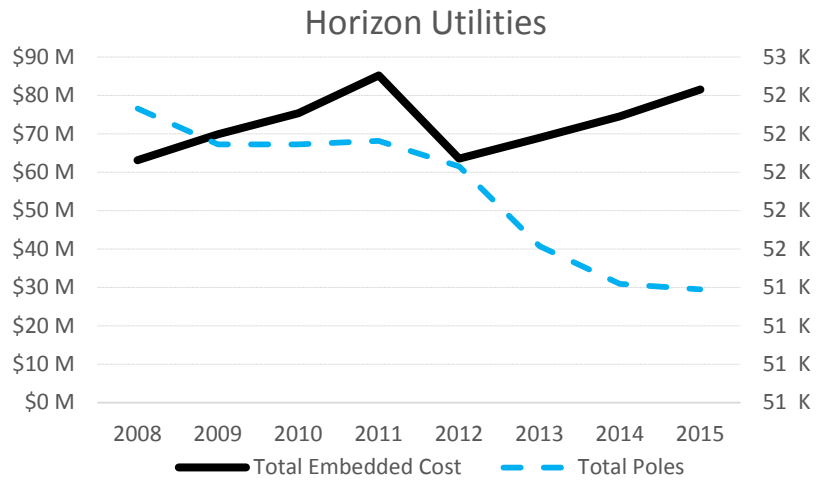
Nordicity

Capital Cost per Pole – Trend



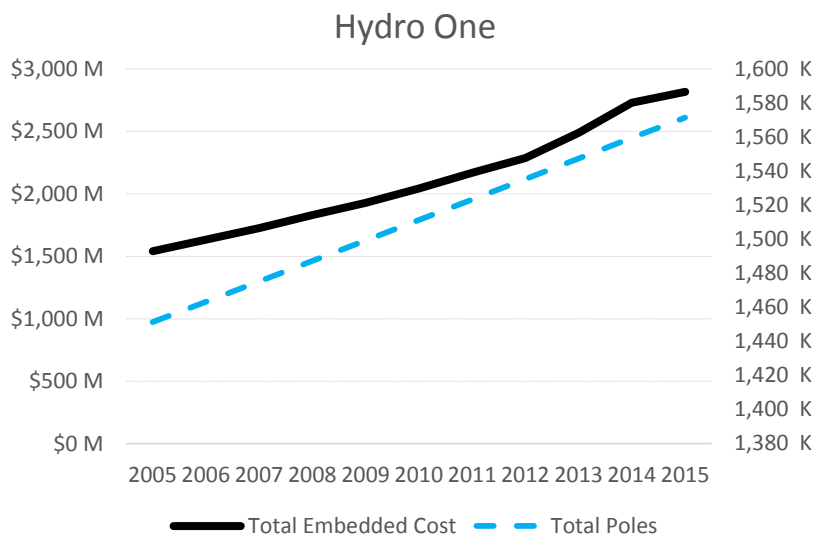


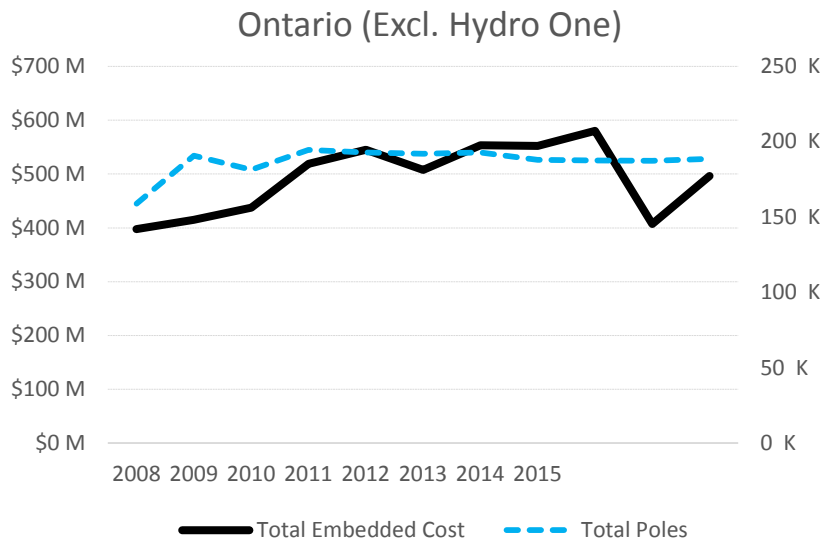


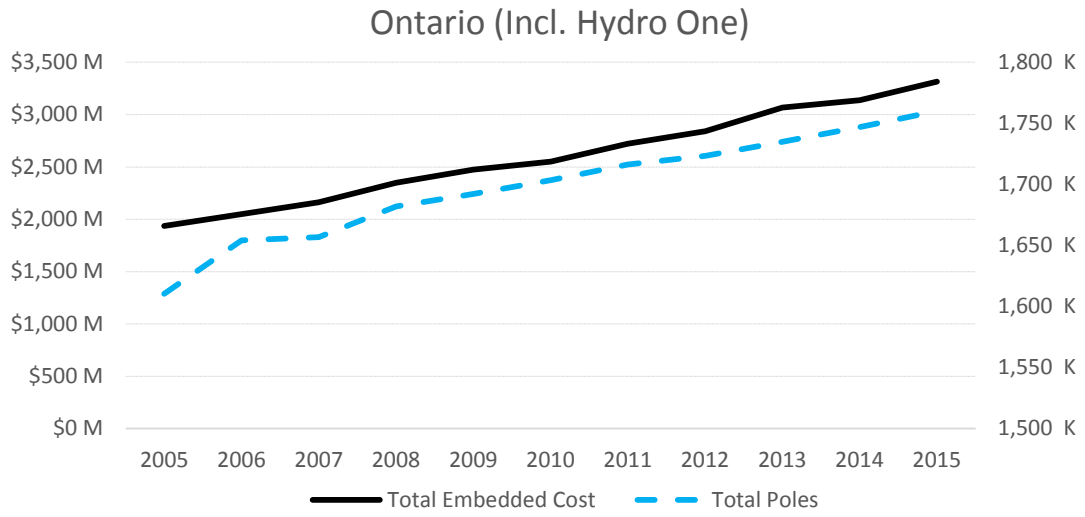


Nordicity

Capital Cost per Pole – Trend







(1) The province column only presents the total of all the data already submitted.

Nordicity

Depreciation – Illustration

Year	Toronto Hydro	London Hydro	Ottawa Hydro	HydroOne	Horizon	Province [1]		
	Dep. Rate	Dep. Rate	Dep. Rate	Dep. Rate	Dep. Rate	Dep. Rate	Useful Years	Unit Dep.
2005	2.25%	4.00%	4.00%	1.83%	4.00%	2.12%	47.12	$ 24.43
2006	2.25%	4.00%	4.00%	1.83%	4.00%	2.12%	47.07	$ 25.16
2007	2.25%	4.00%	4.00%	1.83%	4.00%	2.13%	47.01	$ 26.50
2008	2.25%	4.00%	4.00%	1.83%	4.00%	2.07%	48.30	$ 27.65
2009	2.25%	4.00%	4.00%	1.83%	4.00%	2.07%	48.20	$ 28.99
2010	2.25%	4.00%	4.00%	1.83%	4.00%	2.03%	49.35	$ 29.00
2011	2.25%	4.00%	4.00%	1.83%	4.00%	2.03%	49.19	$ 30.84
2012	2.25%	2.00%	2.20%	1.83%	2.22%	1.91%	52.45	$ 30.08
2013	2.25%	2.00%	2.20%	1.83%	2.22%	1.90%	52.51	$ 32.26
2014	2.25%	2.00%	2.20%	1.83%	2.22%	1.88%	53.21	$ 32.35
2015	2.25%	2.00%	2.20%	1.70%	2.22%	1.78%	56.27	$ 32.08
Average	**2.25%**	**3.27%**	**3.35%**	**1.82%**	**3.35%**	**2.00%**	**50.06**	**$ 29.03**

(1) The province column only presents the total of all the data already submitted.

- The provincial average depreciation rate is derived by simple averaging each utility's depreciation rate for illustration purpose, whereas weighted averaging could be argued to be a more reasonable approach.
- **Further analysis is required to develop an adequate methodology to account for depreciation.**

Nordicity

Maintenance Costs – Illustration

Year	Toronto Hydro		Ottawa Hydro		Province [1]	
	Expense	Unit Exp	Expense	Unit Exp	Expense	Unit Exp
2005	n/a	n/a	$ 18,801	$ 0.42	$ 709,314	$ 0.42
2006	n/a	n/a	$ 55,794	$ 1.19	$ 2,062,736	$ 1.19
2007	$ 50,434	$ 0.28	$ 107,070	$ 2.08	$ 1,173,830	$ 0.68
2008	$ 253,108	$ 1.78	$ 202,443	$ 4.11	$ 4,184,808	$ 2.38
2009	$ 237,854	$ 1.69	$ 302,699	$ 6.22	$ 5,048,788	$ 2.85
2010	$ 209,395	$ 1.50	$ 361,834	$ 7.45	$ 5,400,536	$ 3.03
2011	$ 666,809	$ 4.74	$ 449,361	$ 9.29	$ 10,593,214	$ 5.91
2012	$ 1,621,841	$ 11.93	$ 656,170	$ 13.59	$ 22,250,596	$ 12.36
2013	$ 846,003	$ 6.22	$ 623,971	$ 13.01	$ 14,470,114	$ 7.99
2014	$ 597,485	$ 4.39	$ 531,479	$ 11.11	$ 11,193,341	$ 6.14
2015	$ 220,905	$ 1.61	$ 399,766	$ 8.26	$ 6,139,654	$ 3.34
Average	**$ 522,648**	**$ 3.79**	**$ 337,217**	**$ 6.98**	**$ 7,566,085**	**$ 4.21**

(1) Imputed maintenance costs for the province based on data already submitted.

- For illustration purpose, the provincial average maintenance costs per pole is derived by population-weighted averaging the unit maintenance costs of Toronto and Ottawa Hydro.
- **Further analysis is required to develop an adequate methodology to account for maintenance costs.**

Nordicity

Administration Costs – Illustration

Year	Toronto Hydro		Province [1]	
	Expense	Unit Exp	Expense	Unit Exp
2005	n/a	n/a	n/a	n/a
2006	n/a	n/a	n/a	n/a
2007	n/a	n/a	n/a	n/a
2008	n/a	n/a	n/a	n/a
2009	n/a	n/a	n/a	n/a
2010	n/a	n/a	n/a	n/a
2011	n/a	n/a	n/a	n/a
2012	$ 841,279	$ 6.19	$ 11,135,751	$ 6.19
2013	$ 1,059,574	$ 7.79	$ 14,110,173	$ 7.79
2014	$ 1,258,345	$ 9.25	$ 16,863,841	$ 9.25
2015	$ 1,248,549	$ 9.10	$ 16,706,979	$ 9.10
Average	**$ 1,101,937**	**$ 8.08**	**$ 14,704,186**	**$ 8.08**

(1) Imputed administration costs for the province based on data already submitted.

- For illustration purpose, since administration cost is only provided by Toronto Hydro, its historic average cost per pole is assumed for the province.
- **Further analysis is required to develop an adequate methodology to account for administration costs.**

Nordicity

Capital Carrying Costs – Illustration

Year	Toronto Hydro		Ottawa Hydro		HydroOne		Horizon		Province	
	Rate	Unit Cost	Rate	Unit Cost	Rate	Unit Cost	Rate	Unit Cost	Rate	Unit Cost
2005	n/a	n/a	6.75%	$ 76	n/a	n/a	n/a	n/a	6.75%	$ 41
2006	6.52%	$ 58	6.75%	$ 76	8.66%	$ 52	n/a	n/a	8.37%	$ 54
2007	6.52%	$ 63	6.75%	$ 72	8.66%	$ 56	n/a	n/a	8.38%	$ 58
2008	6.60%	$ 82	6.55%	$ 71	8.75%	$ 61	7.02%	$ 52	8.46%	$ 64
2009	6.34%	$ 78	6.55%	$ 71	8.75%	$ 66	7.02%	$ 59	8.44%	$ 68
2010	7.04%	$ 88	6.55%	$ 72	8.97%	$ 73	7.02%	$ 65	8.69%	$ 74
2011	6.94%	$ 97	6.55%	$ 79	8.49%	$ 75	7.17%	$ 77	8.27%	$ 77
2012	6.94%	$ 103	6.95%	$ 93	8.49%	$ 81	7.17%	$ 83	8.29%	$ 83
2013	6.94%	$ 106	6.70%	$ 99	8.49%	$ 91	7.17%	$ 89	8.29%	$ 92
2014	6.94%	$ 102	7.00%	$ 115	8.49%	$ 103	7.17%	$ 95	8.30%	$ 103
2015	6.17%	$ 116	6.70%	$ 122	7.87%	$ 99	5.75%	$ 82	7.65%	$ 101
Average	**6.70%**	**$ 89**	**6.71%**	**$ 86**	**8.56%**	**$ 76**	**6.94%**	**$ 75**	**8.17%**	**$ 74**

(1) Imputed capital carrying costs for the province based on data already submitted.

- For illustration purpose, provincial average capital carrying cost is derived by population-weighted averaging the costs of capital of the above utilities.
- **Further analysis is required to develop an adequate methodology to account for capital carrying costs.**

Nordicity

Section IV

Economic Return Model

2005 OEB Order - Analysis

Estimation of total imputed revenue per pole based on OEB's 2005 rate order

Telecom Attacher Rate Per Pole

Pole Specs	Joint Pole Length (ft.)		Attachers		Length Per Attacher (ft.)	Explanation
A Power Space	**11.50**	÷	**1.00**	=	**11.50**	**A**
B Communication Space	2.00	÷	2.50	=	0.80	B
C Separation Space	3.25	÷	2.50	=	1.30	C
D Total Usable Space	**16.75**	÷	**3.50**	=	**2.10**	**D = B + C**
E Clearance Space	17.25					E
F Buried Space	6.00					F
G Total Common Space	**23.25**		**3.50**		**6.64**	**G = E + F**
H Total Pole Length	**40.00**				**8.74**	**H = D + G**
I Allocation Rate					**21.9%**	I = 8.74 ÷40.0
J **Common Cost**	**$ 93.31**				**$ 20.43**	J = $93.21 X 21.9%
K **Direct Cost (Admin)**					**$ 1.92**	K
L **Total Rate**					**$ 22.35**	L = J + K

Imputed Revenue Per Pole

	Pole Space Allocation (ft.)		Pole Space Allocation (ft.)		Explanation
Power Space					
Power Usable Space	11.50	*28.8%*			
Common Space	6.64	*16.6%*			
	18.14	***45.4%***	**$ 46.39**	***45.4%***	Imputed = ($55.89/54.6%) x 45.4
Telecom Space					
Communication Space	2.00	*5.0%*			
Seperation Space	3.25	*8.1%*			
Common Space	16.61	*41.5%*			
	21.86	***54.6%***	**$ 55.89**	***54.6%***	= $22.35 x 2.5 attachers
Total	**40.00**	***100.0%***	**$ 102.28**		

Nordicity

2005 OEB Order – Analysis (Scenario 1)

Initial pole cost is not recovered based on revenue imputed at OEB's current rate

A	**Initial Cost Per Pole**	**$ 1,270**	*CRTC 99-13 (196)*
B	Useful Life (Years)	**25**	*CRTC 99-13 196)*
C	Renewal and replacement	**0.0%**	*not applicable*
D	Annual Amortization Factor	**8.17**	
E	Annualised Capital Cost Per Pole	**$ 164.98**	*= (A/D) + (F + G)*
F	Maintenance	**$ 7.61**	*OEB 2005 (Appendix 2)*
G	Productivity Loss	**$ 1.92**	*OEB 2005 (Appendix 2)*
H	Capital Carrying Cost	**11.42%**	*OEB 2005 (Appendix 2)*
I	Revenue Requirement Per Pole	**$ 102.28**	
J	Capital Cost Allowance (CCA) Factor	**TBD**	
K	Income Tax Rate	**TBD**	

Year	Capital Cost 0.0%	Maintenance 0.0%	Productivity 0.0%	Total Cost	Tax Shield TBD	Revenue 0.0%	Net Cash Flow	NPV
0	($ 1,270.00)	-		($ 1,270.00)		-	($ 1,270.00)	($ 1,270.00)
1	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 83.24
2	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 74.71
3	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 67.05
4	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 60.18
5	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 54.01
6	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 48.48
7	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 43.51
8	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 39.05
9	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 35.05
10	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 31.45
11	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 28.23
12	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 25.34
13	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 22.74
14	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 20.41
15	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 18.32
16	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 16.44
17	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 14.75
18	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 13.24
19	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 11.89
20	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 10.67
21	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 9.57
22	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 8.59
23	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 7.71
24	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 6.92
25	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 6.21
	($ 1,270.00)	($ 190.25)	($ 48.00)	($ 1,508.25)		$ 2,556.93	$ 1,048.68	($ 512.25)

Nordicity

2005 OEB Order – Analysis (Scenario 2)

Initial pole cost is not recovered based on revenue imputed at annualized costs

A	**Initial (Replacement) Cost Per Pole**	**$ 1,270**	*CRTC 99-13 (196)*
B	Useful Life (Years)	**25**	*CRTC 99-13 196)*
C	Renewal and replacement	**0.0%**	*Not applicable*
D	Annual Amortization Factor	**8.17**	
E	Annualised Capital Cost Per Pole	**$ 164.98**	*= (A/D) + (F + G)*
F	Maintenance	**$ 7.61**	*OEB 2005 (Appendix 2)*
G	Productivity Loss	**$ 1.92**	*OEB 2005 (Appendix 2)*
H	Capital Carrying Cost	**11.42%**	*OEB 2005 (Appendix 2)*
I	Revenue Requirement Per Pole	**$ 164.98**	*if equals to E above*
J	Capital Cost Allowance (CCA) Factor	**TBD**	
K	Income Tax Rate	**TBD**	

Year	Capital Cost 0.0%	Maintenance 0.0%	Productivity 0.0%	Total Cost	Tax Shield TBD	Revenue 0.0%	Net Cash Flow	NPV
0	($ 1,270.00)	-		**($ 1,270.00)**		-	**($ 1,270.00)**	**($ 1,270.00)**
1	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 139.51**
2	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 125.21**
3	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 112.38**
4	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 100.86**
5	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 90.52**
6	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 81.25**
7	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 72.92**
8	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 65.44**
9	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 58.74**
10	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 52.72**
11	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 47.31**
12	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 42.46**
13	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 38.11**
14	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 34.21**
15	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 30.70**
16	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 27.55**
17	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 24.73**
18	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 22.19**
19	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 19.92**
20	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 17.88**
21	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 16.05**
22	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 14.40**
23	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 12.92**
24	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 11.60**
25	-	($ 7.61)	($ 1.92)	**($ 9.53)**		**$ 164.98**	**$ 155.45**	**$ 10.41**
	($ 1,270.00)	**($ 190.25)**	**($ 48.00)**	**($ 1,508.25)**		**$ 4,124.38**	**$ 2,616.13**	**$ 0.00**

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2005 OEB Order – Analysis (Scenario 3)

If embedded cost is used instead of Initial pole cost, then cost are almost recovered based on revenue imputed at annualized costs

A	**Embedded Cost (Historical)**	**$ 820**	*CRTC 99-13 (196)*
B	Useful Life (Years)	**25**	*CRTC 99-13 196)*
C	Renewal and replacement	**0.0%**	*Not applicable*
D	Annual Amortization Factor	**8.17**	
E	Annualised Capital Cost Per Pole	**$ 109.90**	*= (A/D) + (F + G)*
F	Maintenance	**$ 7.61**	*OEB 2005 (Appendix 2)*
G	Productivity Loss	**$ 1.92**	*OEB 2005 (Appendix 2)*
H	Capital Carrying Cost	**11.42%**	*OEB 2005 (Appendix 2)*
I	Revenue Requirement Per Pole	**$ 102.28**	*Imputed based on $22.35 per attacher*
J	Capital Cost Allowance (CCA) Factor	**TBD**	
K	Income Tax Rate	**TBD**	

Year	Capital Cost 0.0%	Maintenance 0.0%	Productivity 0.0%	Total Cost	Tax Shield TBD	Revenue 0.0%	Net Cash Flow	NPV
0	($ 820.00)	-		($ 820.00)		-	($ 820.00)	($ 820.00)
1	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 83.24
2	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 74.71
3	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 67.05
4	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 60.18
5	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 54.01
6	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 48.48
7	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 43.51
8	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 39.05
9	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 35.05
10	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 31.45
11	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 28.23
12	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 25.34
13	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 22.74
14	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 20.41
15	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 18.32
16	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 16.44
17	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 14.75
18	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 13.24
19	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 11.89
20	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 10.67
21	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 9.57
22	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 8.59
23	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 7.71
24	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 6.92
25	-	($ 7.61)	($ 1.92)	($ 9.53)		$ 102.28	$ 92.75	$ 6.21
	($ 820.00)	**($ 190.25)**	**($ 48.00)**	**($ 1,058.25)**		**$ 2,556.93**	**$ 1,498.68**	**($ 62.25)**

Section V

Key Issues

Key Issues

As Identified at PAWG Meeting # 1 (May 20, 2016)

Framework	Costing Methodology	Allocation Methodology	Rate Methodology
• Rate Framework Approach and Inputs • Transparency with respect to the nature and quantum of the joint use pole-sharing arrangement that exists between the hydro company and the local telephone company • Whether there should be a province-wide rate, flexible rate based e.g. rural vs. urban or a company-specific rate • Relationship between pole attachment rates and electricity rates to consumers • Time period and process for pole rate review • Future Proofing (e.g. rates that are fixed throughout the term of the agreement and should be future proof such as linking to CPI or to make it applicable for 5-10 years)	• Historical versus Forecasted Costs • How power-specific assets on the pole should be treated to ensure that they are not recovered through the pole attachment rate • How special circumstances and events should be treated (ice storms, fires, large pole replacement programs) • Stakeholders' alignment on appropriate cost elements including what factors that drives costs	• Direct and Indirect Costs • Cost Allocation / Accounting Principles/ Cost Sharing Model • How the common costs of a pole should be allocated among the various users of the pole • Appropriate space on a pole that should be allocated to each of the different attachers • Inclusion of municipal street lighting attachments in the rate calculation equation • Standardize joint use poles size and number of possible attachments	• Third Party Attachers / Overlashing / Access (Shared Access) • Number and types of all possible attachers, including actual and potential, third party power and wireless service providers • Joint use poles that are not used by communications attachers

Section VI

Additional (Detailed) Issues

Submitted by Rogers

Additional (Detailed) Issues – *Costing Approach*

Administration costs

1. What should be included in these costs?
   - Processing permits for attachments
     - Need to isolate costs of issuing wireline permits only.
     - Some LDCs charge a separate permit fee.
   - Invoicing pole attachers
   - Updating GIS system; GIS tracking
   - Administering the agreement
2. Should we use an industry wide value?
3. If necessary, need to strip out any costs associated with Bell's use of the poles.

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Additional (Detailed) Issues – *Costing Approach*

Loss in productivity

4. What is included in these costs?
   - Responding to third party wires down
   - Responding to tree on third party wires
   - Pole inspection program
5. How to properly allocate these costs to wireline attachers?
   - Pole replacement (field visit and removal crew trip)
   - If pole replacement costs are already included in the net embedded cost, then there will be double recovery.
   - LDCs claim that, because of the wireline attacher, a second crew visit is necessary
   - Pole replacement costs to accommodate wireline attachers are recovered through make-ready costs.
6. How is this data tracked?
7. How do we account for work related to power assets or Bell facilities? If it is not tracked, how should it be calculated?

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Additional (Detailed) Issues – *Costing Approach*

Net embedded cost per pole

8. Should historical (actual) or forecast costs be used?
9. What portion of the costs of the neutral and secondary, if any, should be allocated to the wireline attachers?
10. Should the value of LDC rights-of-way and easements be included?
11. Pole replacement program – issue of premature pole replacement
12. MIFRS vs. GAAP
13. Average vs. year-end value
14. How should power-only assets be removed from the costs?
15. Opportunity to use benchmarking or average costs for particular regions?

Depreciation expense

16. MIFRS vs. GAAP
17. Deduct power-only assets

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Additional (Detailed) Issues – *Costing Approach*

Pole maintenance expense

18. What should be included in these costs?
    - Costs recorded in Account 5120
    - Vegetation management (line clearing, brush control, land owner contact and job planning)
        - Some LDCs allow the wireline attachers to do their own tree-trimming.
    - Maintenance line (line patrols, pole inspections, defect corrections)
        - Wood pole inspection and treatment
        - Use most recent actuals or 5-year average
    - Pole inspection program (collecting data to update records, assess condition of overhead assets and identify deficiencies).
        - What portion should be allocated to wireline attachers?
19. Need to remove costs associated with power-only assets.
20. Need to understand if the LDC and Bell provide each other with maintenance services and whether the associated costs should be removed.
21. Deduct power-only assets

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Additional (Detailed) Issues – *Rate Methodology*

Average number of attachers per pole

22. Should the pole attachment rate be based on the number of attachments instead of the number of attachers?
    - Is it even possible for the LDCs to determine how many attachments are on each pole?
23. Presumptive no. of attachers vs. actual no. of attachers
24. Include joint use poles that do not have any third party attachers?
25. How to take into account the number and types of all possible attachers, including actual and potential, third party power, and wireless service providers

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Additional (Detailed) Issues – *Allocation Methodology*

Cost allocation methodology

26. What kind of cost-sharing model should be adopted?
    - Equal sharing
    - Nordicity equal sharing
    - Proportionate usage
    - Incremental usage
    - Incremental costs plus mark-up
27. How should the relative spaces on a pole be allocated among the different users?
28. Should the different rights afforded to the different users be taken into consideration (pole owner vs. third party attacher)?
29. Should we look to what are other jurisdictions and utility boards are using?

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Additional (Detailed) Issues – *Miscellaneous*

30. How should the cost and pole-sharing relationship between the LDC and Bell be taken into consideration?
31. Should the revenues third party attachers receive from others overlashing to their strand be taken into consideration?
32. Should make ready costs (in particular, the cost of providing a brand new pole) be incorporated into the pole attachment rate?
33. How should special circumstances and events (ice storms, fires, huge pole replacement programs) be treated?
34. How should clearance poles, overlash attachments and power supplies be treated?
35. Should there be a province-wide rate instead of a company-specific rate?
36. Should the relationship between pole attachment rates and electricity rates to consumers be considered?
37. What is the appropriate time period and process for pole rate review?
38. What role, if any, should benchmarking and taking into account the costs of other pole owners and/or pole rates across the country have?

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