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BY EMAIL AND RESS

June 13, 2022

Ms. Nancy Marconi
Registrar
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Ms. Marconi,

EB-2021-0110 – Custom IR Application (2023-2027) for Hydro One Networks Inc. Transmission and Distribution – Clearspring Energy Advisors and Pacific Economics Group Research Joint Report

Pursuant to Procedural Order No. 5, Clearspring Energy Advisors and Pacific Economics Group have advised that they have now completed their conferral process and they have prepared and issued a joint report to Hydro One and OEB Staff.

Hydro One therefore encloses with this letter the Joint Report of Clearspring and PEG dated June 11, 2022, which was sent to Hydro One and OEB Staff on June 11 under cover of the following email:

From: Steven Fenrick <steve.fenrick@clearspringenergy.com>

Sent: Saturday, June 11, 2022 9:41 PM

To: BURKE Kathleen <Kathleen.Burke@HydroOne.com>; 'Arlen Sternberg' <asternberg@torys.com>;
APESTEGUY-REUX Heloise <Heloise.ApesteGuy-Reux@HydroOne.com>; Keith Ritchie
<Keith.Ritchie@oeb.ca>

Cc: Mark Lowry <mnlowry@pacificeconomicsgroup.com>

Subject: Final Joint Report from PEG and Clearspring

All,

I am sending this e-mail on behalf of Clearspring and PEG. We have now completed the conferring process provided for in PO #5. The process has been productive and has produced the attached completed Joint Report that has been jointly approved as final by both Clearspring and PEG.

Best Regards,
Steve Fenrick

Sincerely,



Kathleen Burke

cc: EB-2021-0110 parties

Clearspring/PEG Joint Report on Hydro One

Benchmarking and Productivity Research

11 June 2022

Hydro One Networks (“Hydro One”) has filed a joint rate application that proposes new custom incentive ratemaking (“CIR”) plans for its power transmission and distribution (“T&D”) services. In this proceeding, Hydro One consultant Clearspring Energy Advisors LLC (“Clearspring”) and Ontario Energy Board (“OEB”) staff consultant Pacific Economics Group Research LLC (“PEG”) have submitted statistical benchmarking and productivity research and testimony that are relevant in determining the T&D revenue escalation formulas. Clearspring’s report was filed in August 2021 while PEG’s report was filed in January 2022. Clearspring filed reply comments in March 2022 which critiqued PEG’s work and responded to PEG’s criticisms of their own work.

In April 2022, the OEB issued its fifth procedural order in the proceeding. Pursuant to Rule 13A.04 of the OEB’s *Rules of Practice and Procedure*, this order calls for Clearspring and PEG “to confer with each other for the purposes of, among other things, narrowing issues and identifying the points on which their views differ or are in agreement.” A joint report should then be issued by the consultants which “shall outline the key issues, and points of agreement and disagreement on these issues, and identify the portions of their respective reports on which Clearspring and PEG will continue to rely.”

Summary of Current Recommendations After Narrowing of Issues

The conferring process has been productive. Both consultants revised their studies in response to the other’s critique and ideas and reached points of agreement. Differences between the research methods and results narrowed materially. The following table provides the high-level summary of the revised recommendations of Clearspring and PEG regarding the parameters of Hydro One’s CIR revenue escalation formulas.

Transmission CIR Revenue Escalation Parameters					
	X-Factor [A+B+C]	Productivity Growth Target [A]	Stretch Factor Resulting from Benchmark Results [B]	Supplemental Incentive Adjustment to Stretch Factor [C]	Extra CIR Capital Stretch Factor
Clearspring	Total: ≤0.0%	Total: ≤0.0%, (MFP = -1.05%)	0.00%	Not Warranted	Company’s Proposed Supplemental SF of 0.15%
PEG	OM&A: +0.33%, Capital: -0.60%	OM&A: -0.12%, Capital: -1.05%	0.15%	0.30%	Company’s Proposed Supplemental SF of 0.15%
Distribution CIR Revenue Escalation Parameters					
	X-Factor [A+B]	Productivity Growth Target [A]	Stretch Factor Resulting from Benchmark Results [B]	Supplemental Incentive Adjustment to Stretch Factor [C]	Extra CIR Capital Stretch Factor
Clearspring	0.45%	0.00%	0.45%	Not Warranted	Company’s Proposed Supplemental SF of 0.15%
PEG	0.45%	0.00%	0.45%	Not Warranted	Company’s Proposed Supplemental SF of 0.15%

*The Company's distribution revenue escalation formula does not include a customer growth term. PEG and Clearspring agree that not including a customer growth term serves as an added stretch factor on distribution OM&A for the Company.¹

General Areas of Productivity and Benchmarking Agreement

Clearspring and PEG have long agreed on many issues pertaining to the use of statistical cost research in utility regulation. These include the following.

- Statistical productivity and benchmarking studies that use publicly available utility industry data can be useful tools in utility regulation.
- Econometric models are useful in benchmarking when large amounts of reliable and standardized data are available. In those cases, the econometric approach tends to be more accurate and fair than unit cost and other peer group-based approaches provided that the econometric model is well-specified.
- The United States and Ontario have both produced large amounts of standardized electric utility operating data which are useful in benchmarking and productivity research. Unusually within Organisation for Economic Co-operation and Development ("OECD") countries, these data permit total cost benchmarking and multifactor productivity ("MFP") studies to be conducted with reasonable accuracy as well as the benchmarking studies of utility operation, maintenance, and administrative ("OM&A") expenses which regulators consider in other countries (e.g., Australia).
- There has also been substantial agreement over general approaches to solving technical problems such as the measurement of capital cost and the appropriate functional forms for cost models.
- Utilities that, like Hydro One, face business conditions that differ markedly from sample norms are more difficult to benchmark accurately. Benchmarking results for such companies can be unusually sensitive to changes in model specification and other methodological choices.
- Negative productivity factors and X-factors should be considered reasonable parameter possibilities within incentive regulation plans if industry data support them.

Power Transmission

Areas of Agreement Resulting from Conferring

During this conferring process, Clearspring and PEG followed the direction of the OEB and made several revisions and upgrades to their research methods which narrowed differences in results compared to those from each consultant's original report in this proceeding. Each consultant acknowledges that the other identified some ways to upgrade their research methods.

¹ The Company forecasts customer growth of approximately 0.7% during the CIR period. Therefore, the implicit stretch factor on distribution OM&A is expected to be 0.7% if the revenue cap index has no customer growth term.

Research Upgrades for Power Transmission Research

PEG

- PEG inadvertently used the wrong value of the ratcheted peak demand variable for Hydro One in their transmission cost benchmarking work and has now corrected this.
- Using new data on the detailed OM&A expenses of Hydro One which Clearspring provided in their reply comments, PEG will add six companies to their transmission benchmarking study which they previously excluded.² However, after further examination when reviewing this change, PEG identified certain years with substantial cost increases due to wildfires for two California utilities. Accordingly, PEG will include the six utilities (including these two utilities) but not include some of the later years in the benchmarking sample for these two utilities due to expense data distortions resulting from wildfires.³ Furthermore, data for these two utilities will be removed entirely from PEG's transmission MFP sample.
- PEG agrees with Clearspring that the construction cost index variable value for the Company should reflect where its transmission lines actually are rather than its full licensed service territory.
- PEG agrees with Clearspring that a nineteen-year MFP sample period is reasonable and will shorten its recommended MFP period to 2000 to 2019 and match that of Clearspring's.⁴
- For its transmission total cost and capital cost models, PEG has replaced its plant-based scope variable with a more defensible scope variable based on operation and maintenance ("O&M") expenses.

Clearspring

- Clearspring acknowledges that improvements suggested by PEG will provide a more accurate independent system operator ("ISO") variable in its transmission cost benchmarking work.
- Clearspring agrees with PEG that the transmission peak load variable more accurately measures transmission peaks and will use this variable in their transmission cost benchmarking research and, accordingly, shorten the start year to 2004 for the benchmarking dataset which aligns with PEG's start year for the transmission benchmark model.
- Clearspring agrees with PEG that the transmission total cost model should include a construction standards index and a forestation variable.
- Clearspring recommended in its Reply Comments that PEG add six companies and exclude transmission dispatching and miscellaneous expenses from the cost definition for both the

² These six are Commonwealth Edison, Kansas Gas & Electric, Oklahoma Gas & Electric, PECO, San Diego Gas & Electric, and Southern California Edison.

³ PEG will not include 2018 and 2019 for Southern California Edison ("SCE") and 2010 to 2019 for San Diego Gas and Electric ("SDG&E").

⁴ Data from the 2000 to 2019 period are used to calculate the 19 changes in productivity, which are then averaged.

benchmarking and productivity samples. PEG has done this and, in turn, Clearspring will also remove those expenses from their cost definition.

- Clearspring reviewed PEG's analysis on the wildfire issue and agrees to remove the same observations in their transmission total cost benchmarking dataset for SCE and SDG&E which PEG has removed. These utilities will also be removed from Clearspring's productivity research.
- In reviewing the O&M transmission scope variable proposed by PEG during the conferring process, Clearspring has no principled objection to it relative to Clearspring and PEG's original plant-based scope variable. The new scope variable does have the advantage of having a higher t-statistic despite having a lower coefficient value than the plant-based scope variable and does have fewer endogeneity concerns. As such, Clearspring will also replace its plant-based scope variable with the O&M-based scope variable proposed by PEG during this process.

Revised Benchmarking and Productivity Results for Power Transmission Research

Here are the revised MFP trend and benchmarking results for the five years of the proposed CIR when each consultant implements all of the above-mentioned corrections and upgrades that have been agreed upon. The new results for both consultants include the inflationary-driven spending increases proposed by Hydro One, the changed peak demand forecasts, and updated inflation projections from the Conference Board of Canada.

PEG

- PEG's recommended transmission industry MFP trend becomes **-0.99%**. The corresponding O&M productivity trend is -0.12%. The corresponding capital productivity trend is -1.05%. Since CIR entails a separate and essentially cost of service treatment of capital cost, only the partial factor productivity trends would be used in the CIR plan design. -0.99% is not an appropriate base productivity growth target for OM&A revenue.
- PEG's total transmission cost benchmarking score for Hydro One is now **-14.1%**. The standard Ontario stretch factor that would be commensurate with this score is **0.15%**. PEG's revised transmission capital cost benchmarking score for the Company is -10.4%. Their revised transmission OM&A cost benchmarking score for Hydro One is -10.0%.

Clearspring

- Clearspring's recommended transmission industry MFP trend becomes **-1.05%**, a result that is similar to PEG's.
- Clearspring's total transmission cost benchmarking score for Hydro One is now **-31.6%**. The standard Ontario stretch factor that would be commensurate with Clearspring's total transmission cost benchmarking remains at **0.0%**.

Areas of Continuing Disagreement for Power Transmission Research

The following are consequential areas of continued disagreement in the transmission research.

Base Productivity Growth Target Should be Negative

PEG advocates for negative productivity growth targets in the transmission plan. Clearspring is recommending a productivity target equal to zero.

PEG's View

PEG believes that CIR for Hydro One's power transmission can reasonably reflect the negative productivity trend of the industry but there is one important caveat: there should be separate ratemaking treatment of OM&A and capital revenue. Based on our research, a -0.12% OM&A productivity growth target is warranted for OM&A revenue, whereas a -1.05% capital productivity growth target makes sense for capital revenue. This would greatly reduce the need for supplemental capital revenue while producing a reasonable X factor for OM&A revenue. Clearspring's alternative recommendation of a 0% MFP growth target leads immediately to the claim that it should have what amounts to cost of service treatment of capital cost. Similar treatment is not warranted on the distribution side because industry O&M and capital productivity trends are more similar there.

Clearspring's View

Clearspring does not disagree with PEG that a negative MFP growth factor should be considered and implemented in Hydro One's transmission escalation formula. A negative productivity target would best align the revenue cap index with the empirical research and economic theory. However, in examining past CIR precedents and OEB decisions, we see direction from the OEB that it has not been inclined to set productivity factors below zero. Clearspring is of the view that a productivity factor set at zero, despite the negative industry MFP trend, is tantamount to a supplemental stretch factor placed on the utility. Clearspring has calculated this extra stretch factor to be equal to approximately 1.0%. This is an extraordinarily large stretch factor and productivity challenge placed upon the utility. Please see Section 6 of the Clearspring Report for a description of our methodology and findings for the transmission productivity target.⁵

Supplemental Stretch Factor

PEG is recommending a supplemental 0.3% stretch factor to be added to the transmission escalation formula. Clearspring recommends not including a 0.3% supplemental stretch factor.

PEG's View

PEG believes that the stretch factor for a utility should be based in part on how the incentive power of its IR plan compares to that which was typical of the regulatory systems under which utilities in the productivity study operated during the sample period of the study. We contend that, for the full sample period that we recommend, a supplemental stretch factor of 0.3% is warranted for Hydro One Transmission on the grounds that sampled U.S. transmitters operated under unusually weak performance incentives. The weak incentives resulted from special incentives (e.g., a premium rate of return, CWIP in rate base, and accelerated depreciation) for some kinds of transmission capex which are permitted under the Energy Policy Act of 2005 and the widespread and growing use of formula rates. In our response to M-Hydro One-5, we presented an extensive discussion of the calculations supporting our 0.30% supplemental stretch factor recommendation.

⁵ The two changes made, due to conferring, from the original report are we have dropped SCE and SDG&E from the sample and excluded dispatching and miscellaneous transmission expenses from the cost definition.

Clearspring's View

Clearspring is of the view that a supplemental stretch factor beyond the Company's proposed 0.15% supplemental stretch factor on capital is not warranted. Clearspring's proposed productivity factor of 0.0% already contains a very large implicit stretch factor of 1.05%. This combined with the Company's proposed supplemental stretch factor of 0.15% on capital already provides an extraordinarily large supplemental stretch factor.

Even absent the presence of the large implicit stretch factor and the Company's proposed supplemental stretch factor, Clearspring is not convinced that a supplemental stretch factor would be warranted. Stretch factors are, ideally, a product of total cost benchmarking results and the Company is a very strong cost performer. Further, Hydro One has an upcoming productivity challenge relative to the U.S. industry due to its older transmission capital age. Please see page 8 of the Clearspring Reply Report for further discussion.

ISO Variable

PEG does not include an ISO variable in its transmission total cost model. Clearspring does include one.

PEG's View

An ISO dummy captures the net effect of all reasons, not adequately addressed by other variables in the econometric model, why costs of ISO members during the sample period tended to differ from sample norms. We acknowledge that the parameter estimate for the ISO is positive and highly significant in Clearspring's revised cost model. However, this could be so because ISO members were less efficient on average, or because variables included in the model measured business conditions poorly, or because other key cost drivers were excluded from the model. A positive estimate for the ISO parameter therefore does not necessarily indicate that American ISOs tend to drive costs of member transmitters higher. Even if they do have this impact, PEG is not convinced that the typical extra cost pressures that U.S. ISO members incurred apply to Hydro One prospectively as a member of Ontario's IESO. We acknowledge that we did use an ISO dummy in our recent Quebec benchmarking study, but only in our model for OM&A expenses. These expenses account for far less than half of total transmission costs.

It can also be argued that the benchmarking research should focus on the costs that will be addressed by the revenue that the revenue cap index actually escalates. In this regard, it is notable that, in addition to a Z factor, Hydro One's proposed CIR includes two variance accounts that might address costs of IESO-mandated construction. Additionally, the IESO bills distributors and not Hydro One for many of its expenses.

Clearspring's View

Both Clearspring and PEG have included an ISO variable in current and past models and cited it as a business condition that Hydro One faces that some other US transmitters do not. Including this variable enables the model to adjust for the cost challenges associated with being a member of an ISO. We note the t-statistic on this variable continues to be highly robust despite Clearspring eliminating dispatching and miscellaneous transmission expenses from the transmission total cost definition. Please see the Clearspring Report pages 16 - 17 and the Clearspring Reply Report on pages 1 - 2 for more discussion on the ISO variable.

Power Distribution

Areas of Agreement Resulting from Conferring

During this conferring process, Clearspring and PEG followed the direction of the OEB and made some revisions and upgrades to their distribution benchmarking methods which narrowed differences relative to each consultant's original report in this proceeding. Each consultant acknowledges that the other identified some ways to upgrade their research methods.

Research Upgrades for Power Distribution Research

PEG

- PEG inadvertently used the wrong value of the ratcheted peak demand variable for Hydro One in their distribution cost benchmarking work and has now corrected this.
- PEG does not accept all of Clearspring's criticisms of the customer dispersion proxy variable (miles of transmission lines) that PEG used in its initial study in this proceeding. Clearspring's alternative area variable is imperfect and the quest for a better variable should continue. PEG nonetheless acknowledges that, since more reasonable estimates of Hydro One's service territory have become available since they filed their January 2022 report, it would be preferable to use Clearspring's area data in the benchmarking research. A notable benefit of the switch is the ability to add numerous companies to PEG's distribution cost sample. PEG will now use the estimate of a 413,277 sq. km. service territory area for Hydro One which PEG developed in response to M-Hydro One-21 d).
- PEG decided to now ratchet peak loads beginning in 1994 using Clearspring's peak load data.
- PEG replaced its plant-based scope variable with an O&M-based scope variable that matches the definition of the new transmission scope variable in their total cost and capital cost models.

Clearspring

- Clearspring acknowledges that the new and lower 529,313 sq. km estimate of the area of Hydro One's service territory which was presented in their Reply Report is preferable to the one we used in our July 2021 report.
- Clearspring is also adopting the use of PEG's new O&M scope variable and including the variable in our total cost distribution model.

Revised Benchmarking Results

Here are the revised distribution cost benchmarking results for the five years of the proposed CIR when each consultant implements the above-mentioned corrections and upgrades that have been agreed upon. These results include the inflation-driven spending increases proposed by Hydro One, the changed peak demand forecasts, and updated inflation projections from the Conference Board of Canada.

PEG

PEG's total distribution cost benchmarking score for Hydro One is now **+23.2%**. The standard Ontario stretch factor that would be commensurate with the new score is **0.45%**. PEG's distribution capital cost benchmarking score for the Company is now +32.8%. Their distribution OM&A cost benchmarking score for Hydro One is now +10.0%.

Clearspring

Clearspring's total distribution cost benchmarking score for Hydro One is now **+13.1%**. The standard Ontario stretch factor that would be commensurate with the new score is **0.45%**.

Areas of Continued Disagreement in Power Distribution Research

The following areas are consequential areas of continued disagreement.

Service Territory Area

PEG uses a Hydro One service area of 413,277 sq. km for Hydro One which PEG developed in response to M-Hydro One-21 (d). Clearspring uses an estimate of 529,313 sq. km for Hydro One developed by Hydro One, with details provided in Clearspring's Reply Report. Both consultants have, in advocating these values, moved towards each other's positions during this conferring process. Both consultants acknowledge the difficulty and challenge in getting a perfect number for this variable.

PEG's View

PEG believes that Hydro One's new estimate of its service territory area is still overstated. The estimate is based on the area of circles surrounding the Company's substations. A single circle with a radius of 100 km has an area of $3.142 \times (100 \times 100) = 31,400$ sq. km. This exceeds the land area of the state of Vermont. Some of the substations that Hydro One uses in these calculations may chiefly be designed to serve remote mining operations. The illustrative map that Clearspring provides indicates that the methodology assigns to Hydro One a distribution service area the size of Vermont in the largely roadless region between Cochrane and Moose Factory near the shore of Hudson Bay.

As for our own area estimate, we explained in our lengthy response to M-Hydro One-21 (d) that service territory area variables bias cost benchmarking studies in favor of rural utilities. Simply put, the area that is not really served increases with the degree of ruralness. Since many utilities in the sample have service territories that are not very rural and/or estimate the area that they serve with some accuracy, a statistical adjustment to the area estimate is needed to reduce bias in the benchmarking results. PEG's 413,277 sq. km estimate of Hydro One's service territory is based on such an adjustment, which is well-explained in the response. The adjustment has the goal of making the area unserved by Hydro One similar to the sample norm.

Clearspring's View

Clearspring believes that the new estimate provided by Hydro One provides a reasonable area that the Company could serve based on the presence of a distribution substation. While there are areas within that estimate where no customers yet exist, the U.S. sample also has plenty of areas where no customers yet exist either. We would expect Hydro One to have the lowest customer per sq. km in the sample since most of the cities and towns near its service territory are being served by other LDCs and Hydro One serving large portions of northern Ontario. The rest of the utilities in the sample do not have most of the cities and towns carved out of their service territory like Hydro One has. Yet despite this,

Hydro One does not have the lowest customer density using Clearspring's 529,313 sq. km measure. Hydro One's customers per sq. km in 2019 is 2.5, whereas Montana Dakota Utilities ("MDU") is measured at 2.2. Clearspring is of the view that Hydro One having a slightly higher customer density than MDU is reasonable.

Clearspring also notes that serving such remote areas as Moose Factory requires far longer travel times and expenses, even requiring helicopter transportation at certain times. The area variable value should adequately account for these cost challenges.

In regard to PEG's estimate of 413,277 sq. km formulated in M-Hydro One-21 (d), Clearspring finds this estimate problematic. PEG uses an ambiguous "tight" sample estimate of 40% for utilities in the sample that chiefly serve towns and cities and a 60% "loose" sample estimate for utilities not in the first designation. It is not clear to Clearspring how PEG made the 40% estimate or why the composition of the sample regarding rural versus suburban utilities should have an impact on Hydro One's estimate for service territory. The estimate should be consistent with how other rural utilities in the sample have their areas estimated. Using a 40% weight based on the areas of other Ontario LDCs (which serve primarily cities and towns) to calculate Hydro One's area does not lead to a proper estimate. Hydro One's actual service territory that it actively serves should not be weighted as 40% of a suburban utility and then 60% as a rural utility. Hydro One's actually-served service territory is nearly all rural. Even if we assume Hydro One is 20% suburban and 80% rural (which is higher on the suburban side than is warranted in Clearspring's opinion), using PEG's calculations result in a service territory estimate of 532,625 sq. km, which is quite near the estimate Clearspring is using.

Please see pages 6-8, and 12 of the Clearspring Reply Report for more information on the 529,313 sq. km. service area estimate.