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April 8, 2019

via RESS

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
PO Box 2319
2300 Yonge Street, 27th floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

**Re: OEB File No. EB-2018-0165 Toronto Hydro-Electric System Limited ("Toronto Hydro")
Custom Incentive Rate-setting ("Custom IR") Application for 2020-2024 Electricity Distribution
Rates and Charges – Interrogatories with Respect to the Pacific Economics Group ("PEG")
March 20, 2019 Report**

On March 20, 2019, in accordance with the Decision on the Filing of Expert Evidence issued by the Ontario Energy Board on February 14, 2019, OEB staff submitted a report prepared by Pacific Economics Group Research LLC ("PEG") entitled "IRM Design for Toronto Hydro-Electric System Limited", which was designated as Exhibit M1 to Toronto Hydro's Custom IR Application. On March 26, 2019, OEB staff also filed the confidential un-redacted working papers used by PEG in the preparation of Exhibit M1 ("PEG Working Papers") with the OEB, and with parties who had filed signed Declarations and Undertakings.

On April 1, 2019, the Board granted Toronto Hydro's previous request of an extension to the date for filing interrogatories on PEG's evidence and ordered Toronto Hydro and intervenors to file such interrogatories with the Board and serve copies on all parties by April 8, 2019.

Please find enclosed Toronto Hydro's interrogatories with respect to Exhibit M1 and the PEG Working Papers. Two physical copies of the interrogatories will be forwarded to the OEB via courier.

Please contact me directly if you have any questions or concerns.

Respectfully,

Andrew J. Sasso
Director, Regulatory Affairs
Toronto Hydro-Electric System Limited

IN THE MATTER OF the *Ontario Energy Board Act 1998*,
Schedule B to the *Energy Competition Act, 1998*, S.O. 1998, c. 15

AND IN THE MATTER OF an Application by Toronto Hydro-
Electric System Limited for an Order or Orders approving just and
reasonable distribution rates and other service charges for the
distribution of electricity, effective January 1, 2020.

**INTERROGATORIES FROM
TORONTO HYDRO-ELECTRIC SYSTEM LIMITED (“Toronto Hydro”)**

Note: All page references in these interrogatories correspond to 1) the Report entitled “IRM Design for Toronto Hydro-Electric System Limited”, as prepared by Pacific Economics Group Research LLC (“PEG”) and submitted by OEB staff on March 20, 2019, and 2) the Working Papers used by PEG in preparation of the Report and submitted by OEB staff on March 26, 2019. “PSE” refers to Power System Engineering Inc., which Toronto Hydro retained to prepare a total cost benchmarking report for its 2020-2024 Custom Incentive Rate-setting Application.

M1-TH-001 *Reference: PEG Report, p. 7, last bullet point: “The calculation of capital costs for the utilities in the econometric study sample is inaccurate.”*

Is the basis for this statement due to PSE having used a 1989 capital benchmark year for the U.S. sample rather than PEG’s 1964 benchmark year?

M1-TH-002 *Reference: PEG Report, p. 7, last paragraph: “Recent research on the cost of U.S. power distributors suggests that their multifactor productivity (“MFP”) growth trend has been positive.”*

Please provide the research report or reports that form the foundation for this assertion.

M1-TH-003 *Reference: PEG Report, p. 7, third paragraph: “PEG also developed experimental models to evaluate Toronto Hydro’s projected/proposed operation, maintenance, and administrative (“OM&A”) expenses, capital cost, and capital expenditures (“capex”).”*

Please define what PEG means by experimental in this context.

M1-TH-004 *Reference: PEG Report, p. 21, third paragraph: “However, we do not believe that PSE has the urban challenge appropriately modelled.”*

Please confirm Toronto Hydro’s understanding that PEG inserted the same percentage congested urban variable in their total cost model that PSE used.

M1-TH-005 *Reference: PEG Report, p. 22, fourth bullet point: “We are not convinced that an undergrounding variable is needed in a total cost model that includes an urban challenge variable.”*

- a) Please explain why an undergrounding (or overhead) variable is needed in PEG's OM&A model despite that model also containing the percent congested urban variable.
- b) Please explain why an undergrounding (or overhead) variable that is interacted with the service territory that is not congested urban is needed in PEG's OM&A model.

M1-TH-006 *Reference: PEG Report, p. 22-23, last bullet point.*

- a) Please explain the equation used by PEG to calculate the plant additions back to 1989 for Toronto Hydro despite plant addition data not being directly available.
- b) Please provide the basis for each of the assumptions in the equation used to calculate the plant additions for Toronto Hydro.
- c) Please provide a comparison of the assumptions (e.g., retirement percentage assumption) in the equation with the average values in the U.S. sample used by PEG in each year from 1989 to 2002. If some years are not available, please provide the years that are available.
- d) Does PEG have concerns regarding the accuracy of the calculated plant additions for Toronto Hydro since these are not directly observed and require assumptions that are not required for the rest of the benchmarking sample?

M1-TH-007 *Reference: PEG Report, p. 23, first bullet point continuing from previous page: "...a 1964 benchmark year is feasible for the U.S. distributors."*

- a) Please provide the raw data source for the capital calculations for all the sampled utilities from 1964 to 1989.
- b) Please list the mergers adjusted for in PEG's capital data from 1964 to 2017.
- c) Please re-run the PEG total cost model using a 1989 benchmark year rather than the 1964. Please provide a revised Table 10, "Year by Year Total Cost Benchmarking Results", showing the change in results.

M1-TH-008 *Reference: PEG Report, p. 24, second paragraph: "Alternative asset price indexes are available. ... Our research showed that this index tracked the EUCPI in its good years better than the HWI with a PPP adjustment."*

- a) Please state the basis for how PEG knows when the EUCPI was in its "good years".
- b) Please provide a table from 1964 to 2017 showing the EUCPI index, the implicit price index for the capital stock of the utility sector used by PEG, and the North Atlantic HWI for Total Distribution.

- c) Please list the utility industries that are included in the implicit price index used by PEG for the asset price index.
- d) Please provide what percentage of each industry comprises the asset price index used by PEG. If exact percentages are not known, please provide an estimate based on PEG's experience.

M1-TH-009 *Reference: PEG Report, p. 27, "Alternative Reliability Models", and p. 28, Table 1, "Econometric Model of SAIFI."*

- a) Please explain the expectation of the coefficient signs for each included variable for both the SAIFI and CAIDI models.
- b) On Table 1, the P-Value for the PCTPOH*PCTFOREST variable is stated as 0.00. The T-Statistic is 1.76. Please confirm that these numbers are correct. If not, please provide the correction.

M1-TH-010 *Reference: PEG Report, p. 37, last paragraph: "The sample period for the econometric cost research was 1995 to 2017."*

- a) Please state the rationale for beginning the sample period in 1995 for the U.S. sample.
- b) Please list all technological or other changes within the electric distribution industry from 1995 to 2019 that PEG is aware of.
- c) Does PEG believe that changes within the industry from 1995 to now may have had an influence on OM&A or capital costs?

M1-TH-011 *Reference: PEG Report, p. 38, Table 5, "Sample of Utilities Used in Econometric Cost Model Development."*

- a) Please confirm that Consolidated Edison is excluded from PEG's capex model.
- b) Please explain why the six Ontario distributors that are included in PSE's total cost model are excluded from PEG's models.

M1-TH-012 *Reference: PEG Report, p. 39, third paragraph: "Pension and benefit expenses can be removed from the data for Toronto Hydro and American IOUs. We have therefore excluded these expenses from this study."*

- a) What amounts for each year were excluded for Toronto Hydro?
- b) What was the data source for this information?

M1-TH-013 *Reference: PEG Report, p. 40, second paragraph: “Capital cost was the sum of depreciation expenses and a return on net plan value less capital gains.”*

- a) PEG did not subtract capital gains in the 4th Generation IR proceeding and in Toronto Hydro’s last Custom IR application for the 2015-2019 period. Please confirm this statement and discuss why it is appropriate to change capital cost methodologies now in this proceeding.

M1-TH-014 *Reference: PEG Report, p. 40, second paragraph: “The labor price levels for U.S. utilities that we obtained from PSE were escalated by regionalized BLS Employment Cost Indexes for salaries and wages.”*

- a) Are the Employment Cost Indexes for the U.S. utilities used by PEG specific to the utility industry, economy-wide, or specific to some other industry?

M1-TH-015 *Reference: PEG Report, p. 40, second last paragraph.*

- a) PEG states that the labour price escalation for Toronto Hydro uses the AWE. Is the AWE that PEG used specific to the utility industry, economy-wide, or specific to some other industry?

M1-TH-016 *Reference: PEG Report, p. 41, “Capital.”*

- a) Please confirm that PEG uses a different rate of return on capital assumption for Toronto Hydro and for the rest of the U.S. sample. If so, please explain the rationale for having different assumptions on the rate of return in a cost benchmarking study and whether this difference will influence the cost benchmarking results.

M1-TH-017 *Reference: PEG Report, p. 41, second paragraph: “We used the Statistics Canada implicit price index for the capital stock of Ontario utilities to deflate the value of plant additions of Toronto Hydro.”*

- a) Please provide a link to the source of this data and any calculations required to calculate the index.
- b) Does PEG agree that one of the drawbacks of using this index, relative to using the Handy-Whitman indexes, is that the implicit price index is not specific to the electric distribution industry?
- c) Is this index an Ontario or Canadian price index?

M1-TH-018 *Reference: PEG Report, p. 42, “Scale Variables.”*

- a) In constructing the ratcheted peak demand, did PEG use different years for Toronto Hydro and for the U.S. sample in the calculation?

- b) What is the start year for determining the maximum demand for the U.S. sample?
- c) What is the start year for determining the maximum demand for Toronto Hydro?

M1-TH-019 *Reference: PEG Report, p. 42, last paragraph: “The challenge of low customer density is captured by the estimated area served that is non urban.”*

- a) Given the low amount of congested urban service territory in most of the sample, in PEG’s opinion, does this variable essentially measure the scale of the service territory of each sampled utility? If so, why is it not considered a scale variable in PEG’s model?
- b) Please list the variables that PEG attempted to include in its models and the reasons why each one was excluded.

M1-TH-020 *Reference: PEG Report, p. 43, second last paragraph: “The capex models also have variables indicating the growth in operating scale and AML.”*

- a) Acknowledging that the congested urban variable was not available to PEG, if the growth in this variable were available, would it have been a reasonable variable to include in PEG’s capex model?

M1-TH-021 *Reference: PEG Report, p. 44, first paragraph: “We were more sparing in the use of extra quadratic and interaction terms than PSE was out of concern [Sic] that too many variables reduce the precision of parameter estimates.”*

- a) Please provide the basis for this statement especially considering the fact the total cost models by both PSE and PEG contain more than 1,300 observations.

M1-TH-022 *Reference: PEG Report, p. 44, footnote 42: “Recollecting the recent benchmark years for estimating capital cost in Ontario, the capital cost and total cost benchmarking results are likely to be more accurate in these three years.”*

- a) Please provide an explanation of what PEG intends to convey with the footnote.

M1-TH-023 *Reference: PEG Report, p. 44, Table 10, “Year by Year Total Cost Benchmarking Results.”*

- a) What data did PEG use to project the input prices for the projected years of 2018 to 2024? Please provide the growth rates used for each component.
- b) What projections for the other variables in PEG’s models were used for Toronto Hydro for the projected years of 2018 to 2024?

M1-TH-024 *Reference: PEG Report, p. 56, Table 11, “Year by Year OM&A Cost Benchmarking Results”; p. 58, Table 12, “Year by Year Capital Cost Benchmarking Results”; and p. 60, Table 13, “Year by Year Capex Benchmarking Results.”*

- a) What data did PEG use to project the input prices for the projected years of 2018 to 2024? Please provide the growth rates used of each component.
- b) What projections for the other variables in PEG’s models were used for Toronto Hydro for the projected years of 2018 to 2024?

M1-TH-025 *Reference: PEG Report, p. 71, third paragraph: “In our econometric work for this proceeding, we have chosen a functional form that is logarithmic only with respect to the two scale variables.”*

- a) Please provide the full equation estimated for PEG’s total cost, OM&A, capital cost, and capex models. Please note which variables were logged in each equation.
- b) Why did PEG not use the traditional translog cost function?
- c) Please discuss the econometric estimation procedure used by PEG for the total cost, OM&A, capital cost, and capex models, respectively.

M1-TH-026 PEG uses the 2008 version of *R. S. Means Heavy Construction Cost Data* to calculate a 2008 capital levelization year for the U.S. sample that adjusts for the differences in construction costs between utilities serving different geographic areas.

- a) Please describe how the 2008 capital levelization was calculated for each utility. Please include in the description what city location factors were mapped to each of the utilities and the city weights used in calculating the levelization for each utility.
- b) Please provide the 2008 R. S. Means location factor for Toronto.
- c) Please confirm that PEG used the Toronto location factor from the 2012 version of *R. S. Means Heavy Construction Cost Data* as the basis for Toronto Hydro’s capital levelization.
- d) Please confirm that PEG inadvertently used a different capital levelization year for Toronto Hydro (2012) and for the rest of the U.S. sample (2008) which produces a capital asset price that is not properly levelized for Toronto Hydro relative to the rest of PEG’s sample in any year. If the difference was intentional, please provide the basis and rationale for using a different year for a comparative index and how the impacts of escalating the index in each year do not distort the levelization.

- e) Please provide a revised Table 6, Table 8, Table 9, Table 10, Table 12, and Table 13 from the PEG Report where no other changes are made to PEG's data and models other than making the capital levelization year consistent for Toronto Hydro and the U.S. sample using 2008 as the levelization year.
- f) Please provide a revised Table 6, Table 8, Table 9, Table 10, Table 12, and Table 13 from the PEG Report where no other changes are made to PEG's data and models other than making the capital levelization year consistent for Toronto Hydro and the U.S. sample using 2012 as the levelization year.

M1-TH-027 Please describe why PEG's capex model has far fewer observations (1,306) than the other three models (1,907). Besides excluding 1995 to attain the growth rates of certain variables, please provide a list of the exclusions made relative to the other three models.

M1-TH-028 For the capex model, did PEG include general plant additions in the dependent variable for the U.S. sample?

M1-TH-029 Please provide the equation for how the variable for "NGROWTH", "PCTAMIGROWTH", and "DGROWTH" are calculated.

M1-TH-030 PEG uses a different asset price escalator for Toronto Hydro and the rest of the sample.

- a) Please confirm that the capital service price ("wkod" in PEG's code) used by PEG for Toronto Hydro increases by an average of 0.5% per year from 2005 to 2017.
- b) Please confirm that every other utility in PEG's dataset has a higher average annual growth rate for the capital service price than Toronto Hydro from 2005 to 2017.
- c) Please confirm that Consolidated Edison's average annual growth rate for the capital service price in PEG's dataset from 2005 to 2017 is 4.8%.
- d) Please confirm that Madison Gas and Electric's average annual growth rate for the capital service price in PEG's dataset from 2005 to 2017 is 4.4%.
- e) Does PEG believe that capital cost increases have been dramatically higher in the United States relative to the City of Toronto? Please explain PEG's rationale for the large discrepancy in the capital price inflation assumptions for Toronto Hydro versus the rest of the sample used by PEG.

M1-TH-031 PEG employs a number of assumptions in constructing the capital service price for each utility, including the R. S. Means levelization, asset price escalators, rate of return assumptions, depreciation rates, and capital gains.

- a) By 2017, Toronto Hydro's capital service price equals 130.2. Please confirm that number accounts for currency differences and can be considered a Canadian input price index.
- b) By 2017, there are a number of utilities that have higher capital service price indexes than Toronto Hydro in PEG's dataset. Despite the fact that the indexes are in each country's currency which, given current exchange rates, should increase the value of Toronto Hydro's index. Examples of utilities with higher 2017 capital service prices are Atlantic City Electric, Commonwealth Edison, Connecticut Light and Power, Consolidated Edison, Detroit Edison, Duquesne Light, Jersey Central Power & Light, Kansas City Gas and Electric, etc. Please provide PEG's rationale on why the capital price assumed for Toronto Hydro is below a large portion of PEG's sample despite the exchange rate and Toronto being a large city that is generally understood to have higher price levels relative to most places in the United States.

M1-TH-032 PEG began the capital series for Toronto Hydro in 1989 using several assumptions and imputations from PEG's 4th Generation IR research. Examining the data there appears to be an implausible increase in distribution plant additions applied to Toronto Hydro in 1996. Plant additions exceeded \$450 million in 1996 in PEG's dataset. This is approximately quadruple the typical number in the 1990's and was not exceeded in any year until 2014. Is this number correct for Toronto Hydro? If not, please provide the revised number. If so, please provide the underlying data and explanation on why PEG believes that Toronto Hydro quadrupled plant additions in 1996 to over \$450 million.