Ontario Energy Board

P.O. Box 2319
2300 Yonge Street
27th Floor
Toronto ON M4P 1E4
Telephone: 416- 481-1967
Facsimile: 416- 440-7656
Toll free: 1-888-632-6273

Commission de l'énergie de l'Ontario

C.P. 2319
2300, rue Yonge
27e étage
Toronto ON M4P 1E4
Téléphone: 416- 481-1967
Télécopieur: 416- 440-7656
Numéro sans frais: 1-888-632-6273

Ontario

BY E-MAIL

February 8, 2017

Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto ON M4P 1E4

Dear Ms. Walli:

Re: Ontario Power Generation Inc.
2017-2021 Payment Amounts
Ontario Energy Board File Number EB-2016-0152

Please find attached the revised response to Exh M2-11.1-EP-2 which was filed on December 14, 2016. The interrogatory response relates to the report prepared by Pacific Economics Group Research LLC entitled "IRM Design for Ontario Power Generation".

OPG and all intervenors have been copied on this filing.

Yours truly,

Original signed by

Violet Binette
Project Advisor, Applications

Attach

Energy Probe Interrogatory #2

Issue Number: 11.1
Issue: Is OPG's approach to incentive rate-setting for establishing the regulated hydroelectric payment amounts appropriate?

Interrogatory:

Reference: Exhibit M2

In Chart 1 at p.2 of its response to Undertaking JT3.24, LEI provided the annual TFP growth rate that it had calculated for each of the 16 companies for each of the 12 years in its sample:

Year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OPG		-3.20%	5.90%	-5.30%	1.10%	-4.20%	11.10%	-1.70%	-16.70%	6.60%	-6.60%	6.10%	0.80%
AB Power		33.60%	-27.00%	0.40%	-37.40%	-82.80%	50.20%	97.00%	-51.40%	-12.00%	-19.20%	72.50%	-40.90%
AP Power		50.70%	-17.70%	-15.20%	-7.00%	-5.20%	-12.10%	19.60%	-6.40%	-3.30%	6.20%	13.80%	-33.30%
Ameren		-8.80%	30.40%	2.70%	-76.70%	46.80%	6.20%	2.60%	8.00%	-6.10%	-26.60%	21.00%	-23.70%
Avista		-14.80%	6.50%	-5.90%	12.40%	-11.30%	3.90%	-3.20%	-6.90%	24.30%	-9.60%	-14.20%	15.10%
Duke		21.50%	-26.70%	8.80%	-12.80%	-6.60%	4.70%	-1.30%	-2.90%	-10.80%	-6.30%	26.50%	-3.10%
GPA		50.70%	-35.70%	8.00%	-35.00%	-18.20%	-36.50%	110.30%	-22.20%	-13.40%	5.80%	65.10%	-38.10%
ID		1.70%	-2.90%	2.80%	39.40%	-40.40%	11.00%	16.30%	-10.00%	40.60%	-32.60%	-34.50%	9.40%
PacifiCorp		5.50%	-16.10%	-3.50%	36.50%	-21.70%	0.00%	-7.00%	8.30%	21.40%	-4.70%	-32.80%	20.40%
PG&E		10.30%	-7.40%	14.50%	17.80%	-61.00%	-0.30%	9.60%	16.10%	13.30%	-50.10%	-2.30%	-25.80%
Portland		-1.30%	3.30%	-9.40%	23.20%	-14.90%	0.10%	-1.10%	6.20%	7.70%	-9.80%	-14.90%	-4.90%
SCE&G		28.90%	-12.20%	12.20%	-26.50%	8.00%	-13.90%	-3.70%	0.80%	-13.40%	6.70%	2.50%	-28.40%
Seattle		-12.90%	-1.10%	-7.50%	19.10%	-4.20%	-4.20%	-6.90%	-2.90%	28.30%	-9.70%	-16.80%	17.10%
SEPA		50.20%	-10.80%	12.20%	-58.70%	-0.90%	-17.20%	28.40%	14.80%	-13.90%	-11.40%	34.60%	-5.70%
SoCal		14.20%	-13.20%	37.20%	-2.50%	-70.10%	2.10%	33.50%	11.30%	9.60%	-48.70%	-20.80%	-24.30%
VA		6.60%	-14.30%	-20.60%	9.50%	15.00%	-40.50%	30.30%	19.80%	-12.50%	48.10%	-38.90%	-1.70%

LEI's Chart 1 also provides the average TFP growth over the entire 2003-2014 period for each company in its sample, referred to as the AVG. For example, the Chart shows that OPG's AVG was -0.49%.

a) Please confirm/disconfirm that OPG's AVG over the 12-year sample period is -0.51% rather than -0.49% as shown in Chart 1. Could the difference simply be due to rounding error? Are there any other instances of such error in Chart 1?

b) Please confirm/disconfirm that the mean of the 16 company AVG's is -1.01% and that the sample standard deviation is 2.37% (using the sample-variance formula in LEI's response to Undertaking JT3.24.

c) P.15 of the PEG reports states: "The productivity growth rates of individual companies tend to be more volatile than the average productivity growth of a group

of companies". The data from Chart 1 above appear to support this statement. The sample standard deviation of the company AVG's is 2.37% (subject to check). However, the range of standard deviations of the individual company AVG's is 7.50% (for OPG) to 54.02% (for AB Power). (PEG may wish to confirm this range.) What accounts for this difference in volatility?

d) The LEI data in Chart 1 can also be averaged over the 12 company TFP's for each of the 16 years. For example, it appears that the mean TFP growth rate over all 16 companies was 14.56% for 2003 and -8.69% for 2004. Please confirm/disconfirm that the mean of those 12 year-averages is also -1.01, and that the sample standard deviation is 10.77%.

e) Taking all the 12-company TFP data for each of 16 years together, please confirm that the total number of TFP growth rate observations is 192, that the mean is -1.01% and that the standard deviation is 26.40%.

f) Please briefly discuss the relationship(s) among the standard deviation for the total sample of 192 observations (26.4%), the standard deviation of the 16 observations of company AVG's (2.37%) and the standard deviation of the 12 observations of the year-averages (10.77%).

g) If there is a relationship among the respective variances (rather than the standard deviations), what is that relationship? For example, can it be concluded that the variability in annual TFP growth rates is partly due to inter-company differences, and partly due to differences between business conditions in different years, apparently leaving a very large portion of the total variability unexplained?

h) What, in PEG's view, are the policy implications of adopting LEI's estimate of -1.01% when so much of the variability in its sample is, apparently, unexplained?

i) As LEI had done, please provide PEG's estimates of annual productivity growth for each company in its sample and for each year in its sample.

Response (Revised):

The following response was provided by PEG:

a) Confirmed. Yes, the difference could be due to rounding error. Yes, there are several other instances of such error. Please see the column labeled "Company AVG" in Tab 3 of Attachment M2-11.1-EP.

b) Confirmed. See tab 3 of Attachment M2-11.1-EP.

c) The Energy Probe calculations compare apples to oranges. PEG was saying that the average year to year growth rates of sample utilities are less volatile than the year to year growth rates of individual utilities.

d) Confirmed. See tab 3 of Attachment M2-11.1-EP

e) Confirmed. See tab 3 of Attachment M2-11.1-EP

f) The standard deviation of the total sample is larger than the standard deviation of the company AVG's and the standard deviation of the year-averages.

g) The relationship among the variances is similar to the relationship among standard deviations in the sense that the variance for the total sample (6.97%) is larger than the variance of the 16 observations of company AVG's (.06%), and the variance of the 12 observations of the year-averages (1.16%). Yes, that is a plausible interpretation of the data. However, it should be noted that both PEG and LEI set out to compute actual observed TFP trends of OPG's peers, not to fully explain the drivers of productivity growth.

h) The working papers provided in response to M2-11.1-OPG-1 contain year-by-year productivity growth rates for the individual companies in the sample.

The working papers file M2-11.1-OPG attachment PEG-WP-1.xlsx contains the results of the productivity calculations for each company and each year on worksheet "Indexes". The growth rates in the "Indexes" worksheet column AE are logarithmic.

PEG provided average annual productivity growth rate data by company for the 1996-2014 period in response to M2-11.1-SEC-2 attachment 1. The productivity values included an allocation of A&G expenses. It is not possible to produce these alternative results using the information in the working papers provided to all parties.