K10.3

EB-2016-0152

CME Compendium

Panel 2Ai

Board Staff Interrogatory #225

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

Interrogatory

Reference:
Ref: Exh A1-3-2 pages 8-9

OPG states that

> With the Niagara Tunnel Project now in service, OPG's regulated hydroelectric generation facilities are in a relatively stable, steady state that is conceptually consistent with a price-cap index form of IR. The company believes that, of the three options set out in the RRFE, the 4GIRM approach is best suited to the state of its regulated hydroelectric generation facilities...
>
> Notwithstanding the negative productivity factor identified by the LEI TFP study, OPG is proposing a productivity factor of zero...
>
> Although LEI's TFP study concludes that a -1% productivity factor is appropriate for OPG's regulated hydroelectric facilities, OPG recognizes that the OEB has declined to accept a negative productivity factor in the context of electricity distribution. OPG therefore proposes a 0% productivity factor for the 2017-2021 IR period. This increase to the productivity factor essentially creates an additional 1% stretch factor for OPG's hydroelectric facilities during each year of the IR period, relative to the industry trend identified in the TFP study.

a) In the aftermath of recent high capex that includes the Niagara Tunnel Project, why shouldn't OPG's hydroelectric operations be poised for unusually slow cost growth?

b) Couldn't this give rise to superior productivity growth and not just industry average growth?

c) Does LEI's physical asset approach to productivity measurement recognize this kind of productivity surge?

d) Is LEI's study designed to capture the productivity trend of a utility that has just concluded capex surge? If not, how can the difference between -1% and 0 be deemed an additional stretch factor?

e) Does LEI employ a method for measuring capital quantity growth that would cause it to slow after a recent capex surge?

Witness Panel: Overview, Rate-setting Framework

Response

The following response has been prepared by LEI.

a) The Niagara Tunnel Project (NTP) has expanded the volume of water flows at OPG's Sir Adam Beck (SAB) generating stations 1 and 2, resulting in a projected 1.5 TWh average increase in net generation.[1] However, there is no change in the maximum continuous rating (MCR) value for these facilities. NTP has also added approximately $100,000 to annual O&M expenses. Due to the specific nature of this asset in relation to OPG's SAB generating complex, this investment is unlikely to reduce the O&M expenses for the other assets in the fleet.[2] As such, although output is increasing, some inputs (O&M) experienced a step-change. However, it is important to note that the NTP provides a small increment in total production for the regulated hydro fleet - 1.5 TWh would account for less than 5% of OPG's portfolio net generation in 2014.

b) Please see answer to a) above. Also, please take note of the fact that NTP is a single, unique opportunity. LEI is not aware of any similar opportunities for OPG in the coming years. It is not a sustainable ramp-up in capex across OPG's hydroelectric fleet. Therefore, it is unlikely that OPG could experience superior productivity growth for an extended period of time from projects like NTP.

c) LEI's TFP study does capture the results of the Niagara Tunnel Project as it was completed in March 2012 and LEI's study goes out to 2014. In the context of the TFP framework in LEI's TFP study, a project like Niagara Tunnel Project would show up as an efficiency gain as output, measured in increasing MWh, while inputs are relatively stable (there would be no change in the capital input measure while O&M costs may be increasing - but not nearly as much as production). It is notable that any positive productivity growth would be over-stated using LEI's physical asset approach and modelling specification.

d) Under LEI's approach, the productivity trend associated with a major increase in capex will be reflected in the physical measure of capital if MCR (capacity) values change by a smaller rate than the increase in outputs (MWh).

e) LEI uses a physical method for measuring capital quantity growth. The Niagara Tunnel Project, would not be represented as a change in capital input quantities because it did not increase generating capacity. There are other projects that have been undertaken in the past that have been represented in the capital input quantity index through increases in the MCR. These projects have also been associated with increases in production and would be reflected in the output index. Under LEI's approach, such investments create a

[1] Ontario Power Generation. *EB-2013-0321 Exhibit D1 Tab 2 Schedule 1. Page 2* September 27, 2013.
[2] Ontario Power Generation. *EB-2013-0321. Appendix B: Niagara Tunnel Financial Model – Assumptions.* September 27, 2013.

one-year TFP improvement but then revert back to steady state in subsequent years, but for variations in hydrological output.

Board Staff Interrogatory #226

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

Interrogatory

Reference:
Ref: Exh A1-3-2 pages 9, 20-22

At page 9, OPG states:

> Total cost benchmarking is an important component of each rate-setting model in the RRFE and plays an important role in OPG's proposed IR frameworks for both hydroelectric and nuclear assets. Under the 4GIRM method, in which OPG's hydroelectric IR proposal is based upon, an applicant's benchmark performance is used to determine the stretch factor in the distributor's price-cap index. Similarly, OPG proposes that the hydroelectric stretch factor be determined based on the hydroelectric total cost benchmarking study conducted by Navigant Energy Consulting Inc. ("Navigant"), which is filed as Attachment 2 to this schedule.

At page 20, OPG states that "Navigant benchmarked approximately 92% of OPG's 2013 costs attributable to its regulated hydroelectric operations against a peer group".

At pages 21-22, OPG states that:

> Navigant identified Partial Function Cost as the key cost metric for benchmarking purposes to assess OPG's relative performance to its peers... OPG has set the proposed hydroelectric stretch factor based on the company's performance on Partial Function Cost.

a) Please confirm that for 4GIRM the OEB uses an *econometric* model of *total* cost to perform benchmarking exercises. Total cost includes the cost of all plant and not just capital expenditures. Total cost would thus be unusually high in the aftermath of a capex surge.

b) In what sense then can the Navigant study be deemed a total cost benchmarking study? Does the study effectively address OPG's recent hydroelectric capex surge?

c) Please explain the basis for the statement that the Navigant study addressed 92% of OPG's cost.

d) Approximately what percentage of OPG's total hydroelectric cost (excluding water fees) is its proposed stretch factor actually based on?

Board Staff Interrogatory #237

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

Interrogatory

Reference:
Ref: Exh A1-3-2 Attachment 1, pages 19, 41-42

At page 19 of its report, LEI states that:

> LEI recognizes that the generation output metric is dependent on hydrology and system operations. However, the longer-term nature (thirteen years) of the TFP study compensates for the year-on-year variability in annual generation, and therefore LEI believes variability in annual hydrology should not be an obstacle to this TFP study.
>
> Using OPG as an example, the average of water flows during the period 2002-2014 is within 1% of the twenty year average (1994-2013).

At pages 42-42 of its report, LEI states:

> average growth rate for capital inputs measured in MW was 0.15% over the 2002-2014 period, with little year over year fluctuations. This result is to be expected for a mature hydroelectric industry as construction of new generation facilities is infrequent.... For output, net generation growth rate was on average -0.64% for the industry.[67] Note year over year fluctuations were much more visible compared to the average, which is to be expected due to varying hydrology cycles during the 2002-2014 period, as well as other factors such as changes in demand and surplus baseload generation conditions.
>
> [67]A negative generation growth rate does not imply the same capital is producing less over time, but rather is related to the hydrology cycles at the start and end years of the study.

a) Please explain the decline in the MWh generated by sampled utilities relative to their generation capacity during the sample period.

b) What grounds are there to support that this trend will continue?

c) Was the trend in MWh generated adjusted for changes in hydrological conditions during the sample period?

Witness Panel: Overview, Rate-setting Framework

d) What are the expected volume/capacity and water flow trends of OPG in the next five years and the following five years?

e) Is the volume/capacity trend of the sampled utilities pertinent to an X-factor for OPG?

f) Can footnote 67 be taken to mean that hydrological conditions are the cause of declines in capital productivity in the study?

g) If the generation growth rate is not related to production over time, then why was generation selected as the measure of output quantity?

h) For a given unit whose availability and capacity does not change, would the measured capital productivity be zero, by definition, under normal hydrological conditions using the LEI methodology?

Response

The following response was provided by LEI, except for the response to part d) which was prepared by OPG.

a) As stated in footnote 67, LEI believes the decline in MWh is likely related to the hydrology in the chosen start and end year of the study. Section 6.2.2 of LEI's report discusses the trend regression method, which can be useful in establishing average trends in instances where a series exhibits volatility at its endpoints. It was found that the trend regression method produced more negative, but otherwise very similar results to the average growth method.

b) Production from year to year will vary with hydrology and climatological conditions. However, over the longer term, it is expected that production, as represented by MWh generated over the course of a year, will trend to long term average levels, assuming climatological conditions remain steady.

c) No. LEI used actual reported net generation without any further adjustments.

d) As described in EB-2013-0321 (Ex. E1-1-1), OPG does not perform volume and water flow forecasts for the next five years. For the Niagara Plants, flow forecast information is only available for up to a two-year period, after which flows are assumed to trend back towards historical monthly median flows. For Saunders GS, forecast flows are only available for 6 months, after which flows are projected with trends from the Niagara River flow forecast. For the remaining 48 plants, water flows can change quickly due significant precipitation events, making them difficult to predict reliably. As a result, OPG uses historical median monthly flows for these plants.

e) The electricity produced is the primary output from OPG's hydroelectric fleet, as has been recognized by the format of the volumetric regulated rate that the OEB has applied to

OPG over the years. As such, LEI believes that the volume of production is a relevant element of determining productivity trends for the industry and the X-factor for OPG. Similarly, the capacity of the hydroelectric assets is a metric that represents the physical quantity of capital deployed and is a relevant element of productivity trends.

f) No, LEI is not suggesting that hydrological conditions drive capital productivity down. The footnote specifically states that "a negative generation growth rate does not imply the same capital is producing less over time". The footnote goes on to state that "hydrology cycles at the start and end years of the study" are driving the trend in generation over the study timeframe. LEI uses a trend-based TFP growth rate to address this type of concern, as described in answer to part a) above. Furthermore, on page 15 of the report, LEI states that "[i]n instances where a series is volatile at its endpoints, it can be argued that the 'trend regression' method may give a better estimate of the underlying TFP growth trend, in that it reduces the weight attached to the first and last years of the study period."

g) Generation is an appropriate metric of output for hydroelectric power plants because it represents the primary output from such facilities; the wholesale power market in Ontario remunerates generation on their MWh of energy; and the OEB has also recognized MWh of production as a key element of the rate for OPG.

h) Conceptually, if there is no change in quantity of capital input, which LEI based on rated capacity of generation facilities, and no change in other inputs and outputs, then overall total factor productivity growth rate would be zero.

SEC Interrogatory #95

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

Interrogatory

Reference:
SEC seeks to understand the interplay between the proposed rate-setting mechanism and the Hydroelectric Capacity Refurbishment Variance Account:

a. Please provide a list of all planned capital projects and their costs that are expected to be in-service between 2017 and 2021 that would be subject to the Hydroelectric Capacity Refurbishment Variance Account.

b. For each year between 2017 and 2021, please provide OPG's forecast total hydroelectric in-service additions.

c. Please explain how OPG has taken into account the Hydroelectric Capacity Refurbishment Variance Account in its determination of the appropriate incentive rate-setting adjustment for hydroelectric payment amounts.

Response

a) b) and c)

Incentive regulation decouples revenues and costs. The CRVA retains the link for a specific category of capital costs (i.e., capital and non-capital costs and firm financial commitments incurred to increase the output of, refurbish, or add operating capacity to a generating facility). The CRVA removes any potential economic disincentive to invest in a category of projects. As such, OPG is of the view that in addition to being required to implement O. Reg. 53/05, the CRVA is consistent with incentive regulation. Current approved rates include an amount associated with CRVA projects which will form the reference amount to be used for the CRVA. OPG's actual costs will be recorded in the CRVA regardless of whether they are included in OPG's current forecasts; therefore forecasts of specific projects or in-service amounts are not relevant. As the CRVA is consistent with IR, and OPG has followed the price-cap option as defined in the RRFE, no adjustment is necessary and none is proposed.

Board Staff Interrogatory #228

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

Interrogatory

Reference:
Ref: Exh A1-3-2 page 22
Ref: *Report of the Board: New Policy Options for the Funding of Capital Investments* (EB-2014-0219), issued September 18, 2014
Ref: *Report of the OEB: New Policy Options for the Funding of Capital Investments: Supplemental Report* (EB-2014-0219), issued January 24, 2016.

In section 2.4, OPG states that it would be eligible to apply for an Incremental Capital Module (ICM) for qualifying hydroelectric projects. OPG states that any such request would be prepared in accordance with OEB policy, and refers to the *Report of the Board: New Policy Options for the Funding of Capital Investments* (EB-2014-0219), issued September 18, 2014 (the ACM Report).

On January 24, 2016, the OEB issued its *Report of the OEB: New Policy Options for the Funding of Capital Investments: Supplemental Report* (EB-2014-0219). This Supplemental Report clarified and revised certain matters, including revising the methodology and the formula for the materiality threshold.

Please explain any differences from the current ACM/ICM policy applicable to electricity distributors that OPG proposes for any ICM or ACM treatment for its prescribed hydroelectric generation assets, if its proposal is approved by the OEB.

Response

OPG expects that any future application for ACM or ICM funding for qualifying hydroelectric capital projects would be prepared in accordance with OEB policy, and will therefore reflect the amendments to the policy as reflected in the January 24, 2016 *Report of the OEB; New Policy Options for the Funding of Capital Investments: Supplemental Report (EB-2014-0219)*, except for the two inapplicable elements of the OEB policy identified in the following paragraph.

There are two main differences in the application of an ACM/ICM to a generation utility. First, since OPG does not have a Distribution System Plan, the baseline for an ICM application would be the capital plan underpinning the company's approved payment amounts. In this application, that would be the capital plan underpinning the hydroelectric EB-2013-0321 payment amount application and decision. Second, the growth factor used to

calculate the ACM/ICM materiality threshold is not applicable to a generator, since it is based on assumptions and metrics that are only relevant for a distributor (e.g., customer numbers).

LPMA Interrogatory #9

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

Interrogatory

Reference:
Ref: Exhibit A1, Tab 3, Schedule 2, page 22

a) Please provide an example of the materiality threshold calculation that would be required for an ICM application for inclusion as a 2020 rate rider.

b) In particular, please identify what figures would be used for each of the variables in the materiality threshold formula as set out in the *Report of the OEB: New Policy Options for the Funding of Capital Investments: Supplemental Report* (EB-2014-0219), issued January 24, 2016. For example, would the rate base, depreciation and growth factors be specific to the regulated hydroelectric assets or would they include the nuclear side of the business as well?

c) Does OPG accept the means test as set out in the *Report of the Board: New Policy Options for the Funding of Capital Investments* (EB-2014-0219), issued September 18, 2014? If no, please explain why not. If yes, please explain why OPG believes that the 300 basis point figure is appropriate for OPG.

d) Would the means test be based on the regulated hydroelectric earnings only or would it be based on the entire company, including the nuclear assets?

Response

a) and b)

An example of the materiality threshold calculation for an ICM application for a 2020 rate rider identifying the figures and their sources is provided below, consistent with the referenced Report of the Board.

An ICM is specific to a 4GIRM indexed price cap, which is the ratemaking approach OPG has proposed for hydroelectric operations to set payment amounts for 2017 to 2021. As such, all values in the example are specific to hydroelectric operations.

Hydroelectric ICM Threshold Calculation

Line No.		2020
		(a)
	Hydroelectric ICM Calculation:	
	Rate Base ($M)[1]	7507.7
	Depreciation Expense Included in Rate Base ($M)[2]	143.2
	Distribution Revenue Change from Load Growth (%)[3]	0.00%
	Price Cap Index (%)[4]	1.50%
	Threshold (%)	188.6%
	Eligibility Threshold ($M)	270.14

Notes:

1 Average of 2014 & 2015 Hydroelectric Rate Base, EB-2013-0321 Payment Amount Order, Appendix A, Tables 1 and 2, line 4.

2 Average of 2014 & 2015 Hydroelectric Depreciation Expense, EB-2013-0321 Payment Amount Order, Appendix A, Tables 1 and 2, line 17

3 Not applicable to electric generators

4 Exhibit I1-2-1 Table 1, line 6

c) Yes, OPG accepts the means test as set out in the referenced Report of the Board. OPG has accepted the requirements of the 4GIRM approach to rate setting provided in the RRFE with modification only as required to address differences in the electricity distribution and generation businesses and to facilitate OPG's initial transition to 4GIRM.

d) OPG believes that a means test should be based on the entirety of the company's regulated earnings.

OPG understands that, under OEB policy, the purpose of a means test is to assess whether a regulated company should be able to fund necessary incremental capital work out of existing cash flow during the IR Term without seeking additional revenue from ratepayers. In the September 18, 2014 Report of the Board, the OEB says the following:

"While a means test that doesn't allow incremental funding if a distributor is earning more than its Board-approved ROE may be a barrier to a distributor seeking efficiency improvements during the IR term, a threshold of 300 basis points retains some flexibility for distributors to maximize their earnings while also recognizing that funding in

advance of the next rebasing is likely not required from a cash flow perspective. Distributors will have the option of explaining any overearnings."[1]

This policy allows distributors to retain earnings below the level that would trigger an off-ramp, but requires them to either fund incremental capital out of any additional earnings (i.e., earnings beyond the 300 BPS threshold), or provide an explanation for the over-earnings.

OPG operates as a single company, with a single cost of capital that covers both the hydroelectric and nuclear generating facilities. OPG believes that the ICM/ACM means test should be consistent with that structure and with the off-ramp proposal in this application, which is based on a combined ROE. A means test based only on hydroelectric earnings would not accurately reflect OPG's cash flow and its ability to fund necessary capital work during the IR term.

[1] *Report of the Board New Policy Options for the Funding of Capital Investments: The Advanced Capital Module*, EB-2014-0219, p. 16.

CCC Interrogatory #47

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

Interrogatory

Reference:
Reference: Ex. A1/T3/S2/p. 22

OPG is proposing that the OEB's policy on unforeseen events would apply during the term of this application (Z-factor) and that the materiality threshold of $10 million would be applied. How was the $10 million derived? Does this represent a cost amount or a revenue requirement amount?

Response

OPG derived the $10M materiality threshold for the Z-factor included as part of its Hydroelectric IRM proposal based on the materiality threshold of $10M that OPG has applied in prior regulatory proceedings to determine whether to update evidence.

The threshold is based on the principle that materiality should be relative to one or more key financial aspects of a company (e.g., rate base, revenue requirement, income). As electricity generation is a capital-intensive business, OPG derived the $10M threshold from the application of a formula to the company's rate base. Specifically, the $10M threshold reflects approximately 0.25% of hydroelectric rate base in existence when the materiality threshold was selected, as illustrated in the following table using the annual rate base amounts approved by the OEB in OPG's initial rate proceeding.

Average Annual Hydroelectric Rate Base ($M)	Materiality Threshold %	Materiality Threshold ($M)
$3,875.1*	0.25%	$9.7

*(EB-2007-0905, Payment Amounts Order, Appendix A, Table 1)

OPG is aware that the OEB also uses a similar formulaic approach to determine materiality for electricity distributors. In the OEB's *Filing Requirements for Electricity Distribution Rate Applications* (July 16, 2015), page 13, the OEB calculates materiality as 0.5% of service revenue requirement.

For context, OPG has calculated the Hydroelectric materiality threshold using a formula that blends the rate base and revenue requirement approaches and incorporates the most recently approved Hydroelectric rate base and revenue requirement figures. As shown in the

table below, using this blended approach the result would be a materiality threshold of $12.7M.

	Note	Formula Value ($M)	Materiality Threshold %	Materiality Threshold ($M)
Revenue Requirement	1	$1,325.6	0.50%	$6.6M
Rate Base	2	$7,507.6	0.25%	$18.8
Average Threshold Value				$12.7

Note 1: EB-2013-0321 Payment Amounts Order, Appendix A, Tables 1 and 2, line 24, column (i) annualized, applying the same 0.5% value used to determine materiality for electricity distributors based on their revenue requirements.
Note 2: EB-2013-0321 Payment Amounts Order, Appendix A, Tables 1 and 2, line 4, column (i) annualized.

Based on the context provided above, OPG believes that $10M remains a reasonable threshold for determining materiality.