

Work plan for an independent productivity study of OPG's prescribed hydroelectric assets

prepared for Ontario Power Generation Inc.

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ECONOMICS**

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1 Understanding of assignment

Certain hydro-electric and nuclear assets owned and operated by OPG became “prescribed assets” effective April 1, 2008 pursuant to O. Reg 53/05 section 3. These “Prescribed Assets” consist of the Darlington and the Pickering nuclear GS as well as the Robert H. Saunders St. Lawrence hydroelectric GS and the Niagara plant hydroelectric group, which includes the Sir Adam Beck 1 and 2 GS, Sir Adam Beck Pump GS, and DeCew 1 and 2 GS. Together, the Prescribed Assets total approximately 9,900 MW of in-service capacity and represent over 50 percent of OPG’s total production capability. Since April 1, 2005, the price received by OPG for generation from the Prescribed Assets has been regulated under the *Ontario Energy Board Act, 1998* and *Ontario Regulation 53/05*. In 2008, the regulatory authority to establish the prices received for generation from the Prescribed Assets was transferred to the Ontario Energy Board (“OEB” or “the Board”). The OEB currently uses cost of service (“CoS”) regulation to establish the prices for the Prescribed Assets, but desires a move to an incentive regulation mechanism (“IRM”).¹

In 2013, pursuant to an anticipated amendment of O. Reg 53/05, the following hydroelectric facilities will also become prescribed assets:

Arnprior	Cameron Falls	Hagues Reach
Barrett Chute	Caribou Falls	Hanna Chute
Calabogie	Kakabeka Falls	High Falls
Mountain Chute	Manitou Falls	Lakefield
Stewartville	Pine Portage	McVittie
Chats Falls	Silver Falls	Merrickville
Chenau	Whitedog Falls	Meyersberg
Des Joachims	Auburn	Nipissing
Otto Holden	Big Chute	Ragged Rapids
Abitibi Canyon	Big Eddy	Ranney Falls
Otter Rapid	Bingham Chute	Seymour
Lower Notch	Coniston	Sidney
Matabitchuan	Crystal Falls	Sills Island
Indian Chute	Elliott Chute	South Falls
Aquasabon	Eugenia Falls	Stinson
Alexander	Frankford	Trethewey Falls

¹ OEB Board Report: A Regulatory Method for Setting Payment Amounts for the Prescribed Generation Assets of Ontario Power Generation Inc. November 30, 2006

1.1 Overview of OEB process to date

LEI presented “Considering Incentive Rate Making Options for OPG’s Prescribed Generation Assets” on behalf of OPG at a stakeholder workshop on August 28, 2012 before the OEB. LEI recommended that it would be possible to proceed with the IRM for OPG’s hydro assets first, and multiple options for applying IRM were introduced by LEI and Power Advisory LLC (“PA”). PA recommended option “H5”, which is a TFP-based price cap (using an externally-derived I-X escalation mechanism). LEI, on the other hand, recommended option “H7”, a variation on H5, with a price trajectory over the IRM term that is based on an embedded productivity target over the revenue requirement (“building block” approach). For the prescribed nuclear fleet, LEI highlighted greater cost and output uncertainty complicated application of an IRM in the near term.

On March 28, 2013, the OEB issued its report “Incentive Rate-making for Ontario Power Generation’s Prescribed Generation Assets EB-2012-0340”. The OEB accepted arguments that the nuclear fleet is subject to significant capital investment and reductions in capacity (and output), which would not favor a “pure” incentive ratemaking regime.

However, for prescribed hydroelectric assets, the OEB stated:

“with the completion of OPG’s major hydroelectric capital project (the Niagara tunnel), the capital investment schedule for the hydroelectric assets will now more closely resemble the “steady state” that is desirable for IR-based payment setting”

Furthermore, the OEB referenced the H7 option, saying:

“OPG also indicated plans to file a further application in 2015 to set payment amounts for those assets based on an IR structure with “building blocks”. That IR structure appears to be similar to the “H7” option recommended by OPG’s consultant, London Economics International LLC”

The OEB noted that it intends to form a Hydroelectric Working Group (HWG) to formulate the details of a future IRM for the prescribed hydroelectric fleet.

The Board has stated that a work plan for a productivity study should be filed with OPG’s next application, though they did not specify formulation or methods to be used in the productivity study.

1.2 What is productivity?

Productivity is a trend variable, based on the ratio of the rate of change in outputs to the rate of change of inputs. For purposes of IR ratemaking, regulators are interested in changes in productivity over time. Note that there are multiple methods in which productivity can be studied, and the OEB has not narrowly recommended total factor productivity (“TFP”) studies. Productivity measures can be generally categorized into single factor productivity measures (or partial productivity factors (“PFP”)), and total factor productivity measures (which are also

known as multifactor productivity measures).² The distinction between the two lies in the number of input measures used – single factor productivity measures (or PFP metrics) relate output(s) to a single input, whereas TFP metrics consider output(s) relative to a number of inputs.

A productivity study could be used to support the determination of an appropriate X factor under a traditional TFP-based (I-X) price cap regime, as proposed for consideration as option H5. A productivity study can also help inform the development of the H7 option, as building blocks approaches can employ an “embedded productivity target over the revenue requirement;”³ the PFP would therefore be useful with the building blocks approach. . LEI proposes to assist OPG in performing a productivity study. However, in recognition of the data issues that have been discussed previously, LEI anticipates that the work plan would not presume from the start that the productivity study would be sufficiently robust to be successfully deployed for ratemaking in an IR mechanism. It will be important for the productivity study to include documentation of the study process, including the obstacles, workarounds, and simplifications, as such documentation will provide valuable context for OPG and stakeholders, regarding the limitations and applications of the productivity study results.

This document proposes a set of terms of reference for completing the Board’s mandate for a productivity study, as described further in the next section.

² OECD. Measuring Productivity: Measurement of aggregate and industry-level productivity growth. 2001.

³ OEB. Incentive Rate-making for Ontario Power Generation’s Prescribed Generation Assets EB-2012-0340. March 28, 2013

2 Specification of work to be performed

LEI proposes to assist OPG in performing a productivity study to fulfill the mandate of the OEB. LEI proposes a structured approach which would address the following topics, and ultimately provide OPG with a productivity study for filing with the OEB. Dates in brackets show an indicative timeline for completion.

1. Lessons learned: Assess economic literature on productivity studies for generation assets
 - a. Review methods employed (and the cited pros/cons of various methods that the authors disclose)
 - b. Review TFP index composition (what inputs used, what outputs used)
2. Challenges of performing a productivity study
 - a. Identify specific challenges of doing a productivity study, both conceptually and technically
 - b. Identify possible limitations of applicability to ratemaking
3. How should productivity be measured for a hydroelectric business?
 - a. What are the inputs?
 - b. What are the outputs?
 - c. Consider how specific benefits that OPG's hydro fleet offers to the province, such as ancillary services, can be quantified as outputs
4. Who would be part of the industry peer group for OPG's hydroelectric business, based on how OPG manages its fleet?
 - a. Set parameters for selecting peer group firms (consider segmentation)
 - b. Gather data and identify data availability and consistency issues for both OPG and peer groups. It is envisioned that data will be obtained from public filings, such as annual reports and regulatory filings, or from benchmarking data, if available; some generators may be surveyed for data (and asked to voluntarily provide data)
5. What methods are available for measuring productivity?
 - a. Discuss methods conceptually – advantages/disadvantages, taking into account the specific facts on data availability for OPG and peer companies

- b. Narrow down the productivity study methods to the most appropriate, based on advantages/disadvantages of each method
6. Perform the productivity study
 - a. Summary of Results for productivity approach chosen (subject to data availability)
 - b. Implications for application of productivity study results to ratemaking
 - i. Are the productivity measures sufficiently robust for ratemaking?
 - ii. How would the productivity measures be applied under a building blocks ratemaking approach (option H7), or a traditional price cap (TFP-based I-X) approach (option H5)?
7. Prepare report documenting the results of the analysis undertaken

In summary, LEI would identify the best practices and challenges in performing a productivity study by perform a survey of economic literature and review of other published productivity studies for generation assets. LEI would then work to identify relevant inputs and outputs to the study, and select a relevant peer group for OPG. Next, LEI would collect the data from OPG and peers. LEI would also recommend selection of the study method in parallel to data collection. LEI has experience with multiple methods and can perform the analysis using any of the commonly accepted productivity methods, subject to data availability.

The timeframe for each of the elements of analysis are summarized in the figure below.

Figure 1. Proposed timeline for productivity study

	Q3 2013	Q4 2013	Q1 2014	Q2 2014
1. Lessons learned: Assess economic literature on productivity studies for generation assets				
2. Challenges of performing a productivity study				
3. How should productivity be measured for a hydroelectric business?				
4. Who would be part of the industry peer group for OPG’s hydroelectric business, based on how OPG manages its fleet?				
5. What methods are available for measuring productivity?				
6. Perform the productivity study				
7. Prepare report				