RATE-SETTING FRAMEWORK

1. OVERVIEW ........................................................................................................... 3

1.1. STAKEHOLDER CONSULTATION ...................................................................... 4

2. HYDROELECTRIC FACILITIES RATE-SETTING PROPOSAL ........................................... 5

2.1. SUMMARY OF HYDROELECTRIC RATE-SETTING PROPOSAL ................................. 5

2.2. OEB & STAKEHOLDER GUIDANCE ...................................................................... 7

2.2.1. OEB Policy ..................................................................................................... 7

2.2.2. Filing Guidelines ............................................................................................ 10

2.3. ANNUAL ADJUSTMENT MECHANISM ................................................................. 10

2.3.1. Inflation Factor ............................................................................................... 12

2.3.2. “Going in” Rates ......................................................................................... 15

2.3.3. X-Factor ....................................................................................................... 16

2.3.3.1. Productivity Factor ................................................................................... 16

2.3.3.2. Stretch Factor .......................................................................................... 20

2.4. INCREMENTAL AND ADVANCE CAPITAL MODULE ELIGIBILITY ......................... 22

2.5. UNFORESEEN EVENTS (Z-FACTOR) .................................................................. 22

2.6. DEFERRAL AND VARIANCE ACCOUNTS ............................................................... 22

2.7. OFF-RAMP ........................................................................................................ 23

3. NUCLEAR FACILITIES RATE-SETTING PROPOSAL .................................................. 23

3.1. SUMMARY OF NUCLEAR RATE-SETTING PROPOSAL ...................................... 23

3.2. STRETCH FACTOR PROPOSAL .......................................................................... 28

3.2.1. Derivation of Proposed Stretch Factor .......................................................... 31

3.2.2. Productivity Factor is Not Applicable ........................................................... 33

3.3. ANNUAL ADOPTION OF OEB PRESCRIBED ROE .............................................. 34

3.4. OPERATIONAL EFFECTIVENESS ...................................................................... 34

3.4.1. Performance-based Business Planning and Benchmarking ................................. 35

3.4.2. Major Nuclear Performance Initiatives ........................................................... 37

3.4.3. Staffing and Compensation .......................................................................... 38

3.4.4. Detailed Planning for DRP and Pickering Extended Operations ....................... 39

4. PERFORMANCE REPORTING .................................................................................. 39

4.1. PROPOSED PERFORMANCE MEASURES ......................................................... 41

4.2. ANNUAL PERFORMANCE REPORTING PROCESS ............................................. 43

5. CUSTOMER ENGAGEMENT .................................................................................. 43

5.1. OVERVIEW ....................................................................................................... 43

5.2. COMMUNITY PARTNERSHIPS .......................................................................... 44

5.2.1. Operational Coordination ............................................................................. 45

5.2.1.1. Nuclear Community Advisory Councils .................................................... 45

5.2.1.2. Community Leader Engagement ............................................................. 46

5.2.1.3. Waterway Coordination ........................................................................... 46

5.2.2. Project Planning and Execution ..................................................................... 47

5.3. ACADEMIC COLLABORATION ...................................................................... 49
5.4. INDIGENOUS COMMUNITY RELATIONS .................................................................49
5.5. EMERGENCY MANAGEMENT AND PUBLIC SAFETY PROGRAMS .....................50
5.6. CUSTOMER ENGAGEMENT AND BUSINESS PLANNING ................................52
1. OVERVIEW

This is the first incentive rate-setting ("IR") application for OPG’s nuclear and hydroelectric generating facilities. In a letter dated February 17, 2015, the OEB indicated that it expected the company’s next payment amounts would be based on the principles outlined in the Renewed Regulatory Framework for Electricity Distributors ("RRFE").¹ The OEB further indicated that the application should include an IR mechanism for the company’s hydroelectric assets. For OPG’s nuclear assets, the OEB set out its view that OPG should take a longer term approach to Custom Incentive Rate-setting ("Custom IR") that focuses on the parameters of a multi-year cost of service application while incorporating elements of IR.²

OPG is proposing forms of IR for setting both nuclear and hydroelectric payment amounts. For the company’s hydroelectric assets, OPG’s proposal is closely aligned to the Fourth Generation IR ("4GIRM") price-cap index method used by most Ontario electricity distributors. For the nuclear assets, OPG’s Custom IR proposal includes a benchmarking-based stretch factor to drive continuous improvement in elements of the company’s operations that can be implemented without jeopardizing safety, reliability, or the execution of the multi-billion dollar nuclear capital work planned for the application period.

OPG designed this application in direct response to the OEB’s letter, and based on input received from stakeholders. This schedule summarizes the ways in which the application reflects the ratemaking approach set out in the RRFE and elsewhere in OEB policy. The schedule is divided between the company’s proposed frameworks for hydroelectric and nuclear assets.

This schedule also reviews OPG’s proposed annual performance reporting and the company’s customer engagement activities.

1.1. Stakeholder Consultation

In late 2014 and early 2015, OPG held a series of stakeholder information sessions regarding its planned application for 2016 payment amounts. During these information sessions, the company presented OEB Staff and other stakeholders with its proposed rate-setting approach for both hydroelectric and nuclear operations. The consultation consisted of a series of three information sessions during which stakeholders were asked to give feedback on the company’s proposed approach. Although OPG ultimately did not file an application for 2016 payment amounts, aspects of the current application were discussed in that stakeholdering process. The agendas for these sessions are provided in Ex. A1-7-1 Attachments 1-3.

OPG also held stakeholder information sessions in connection with the current application on February 8, March 21 and May 19 of 2016. The agendas from these sessions are also provided in Ex. A1-7-1 Attachments 4-6.

Following the consultations, OPG made a number of changes to the planned application, including:

i. Eliminating the proposal to establish hydro base rates using a 2017 forecast test year cost of service review – instead, the filed application escalates existing hydroelectric payment amounts by the proposed price-cap index;

ii. Eliminating the proposed symmetrical earnings sharing mechanism for nuclear and hydroelectric businesses;

iii. Eliminating the New Cost of Capital Variance Account proposed to record differences in hydro return on equity during the IR term;

iv. Modifying the hydroelectric x-factor, increasing the annual productivity adjustment from -1% (as identified by the independent Total Factor Productivity study) to 0%, reflecting OEB policy in the electric distribution sector;
v. Expanding the application of the nuclear stretch factor applied to include corporate support costs; and

vi. Expanding the proposed performance reporting metrics to include all of the key hydroelectric performance areas filed in OPG’s prior payment amounts application (EB-2013-0321, Ex. F1-1-1, Appendix B) and all measures used in annual nuclear benchmarking.

2. HYDROELECTRIC FACILITIES RATE-SETTING PROPOSAL

2.1. Summary of Hydroelectric Rate-setting Proposal

OPG proposes a price-cap index rate-making methodology for the company’s regulated hydroelectric generation assets, modelled closely on 4GIRM method set out in the RRFE. Of the three rate-making methods in the RRFE, OPG believes that a price-cap index is best suited to the circumstances of the company’s hydroelectric generation facilities.

Consistent with the price-cap index methodology in the RRFE, OPG has proposed I- and X-factors to establish the annual price cap adjustment for 2017 to 2021. Consistent with the RRFE, the productivity and stretch factors that comprise the proposed X-factor are based on independent Total Factor Productivity (“TFP”) and total-cost benchmarking studies.

As set out below in Chart 1, the structure of OPG’s hydroelectric ratemaking proposal is largely identical to 4GIRM:
### Chart 1 – Summary of Hydroelectric Ratemaking Proposal

<table>
<thead>
<tr>
<th>Ratemaking Element</th>
<th>4GIRM</th>
<th>OPG Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Going-In” Rates</strong></td>
<td>Determined in a forward test year cost of service review</td>
<td>Determined in cost of service review of 2014/2015 test year (EB-2013-0321)</td>
</tr>
<tr>
<td><strong>Form</strong></td>
<td>Price-cap Index</td>
<td>Price-cap Index</td>
</tr>
<tr>
<td><strong>Coverage</strong></td>
<td>Comprehensive (capital and OM&amp;A)</td>
<td>Comprehensive (capital and OM&amp;A)</td>
</tr>
<tr>
<td><strong>Annual Adjustment Mechanism</strong></td>
<td>1+(I-X)</td>
<td>1+(I-X)</td>
</tr>
<tr>
<td><strong>Inflation:</strong></td>
<td>Composite Index.</td>
<td>Composite Index.</td>
</tr>
<tr>
<td></td>
<td>Distribution Industry weighted Labour Index (Ontario AWE) and Non-Labour index (GDP-IPI-FDD)</td>
<td>Generation Industry weighted Labour Index (Ontario AWE) and Non-Labour index (GDP-IPI-FDD)</td>
</tr>
<tr>
<td></td>
<td><strong>X-factor:</strong> Peer group X-factors comprised of:</td>
<td><strong>X-factor:</strong> Peer group X-factors comprised of:</td>
</tr>
<tr>
<td></td>
<td>1. Distribution industry TFP growth potential; and</td>
<td>1. Hydroelectric generation industry TFP growth potential; and</td>
</tr>
<tr>
<td></td>
<td>2. a Stretch Factor</td>
<td>2. a Stretch Factor</td>
</tr>
<tr>
<td><strong>Role of Benchmarking</strong></td>
<td>1. Assess reasonableness of test year cost forecasts</td>
<td>1. Test year review completed in EB-2013-0321</td>
</tr>
<tr>
<td></td>
<td>2. Determine stretch factor</td>
<td>2. Determine stretch factor</td>
</tr>
<tr>
<td><strong>Sharing of Benefits</strong></td>
<td>Stretch factor of between 0% and 0.6% based on benchmarking</td>
<td>Stretch factor of between 0% and 0.6% based on benchmarking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OPG proposes a stretch factor of 0.3% for the application term, based on the company’s hydroelectric benchmarking</td>
</tr>
<tr>
<td>Ratemaking Element</td>
<td>4GIRM</td>
<td>OPG Proposal</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Term</td>
<td>Five years</td>
<td>Five years</td>
</tr>
<tr>
<td>Incremental and Advance Capital Modules</td>
<td>Available on application</td>
<td>Available on application, OPG is not proposing an Advance Capital Module</td>
</tr>
<tr>
<td>Treatment of Deferral and Variance Accounts</td>
<td>Status quo</td>
<td>Status quo, with addition of a variance account to account for the impact of OEB’s decision on OPG’s request to adjust the common equity ratio</td>
</tr>
<tr>
<td>Performance Reporting / Monitoring and Off-ramps</td>
<td>Annual performance reporting, A regulatory review may be initiated if a distributor’s annual reporting shows performance outside of the ±300 basis points ROE dead band, or if performance erodes to unacceptable measures</td>
<td>Annual performance reporting, A regulatory review may be initiated if OPG’s annual reporting shows performance outside of the ±300 basis points ROE dead band, or if performance erodes to unacceptable measures</td>
</tr>
</tbody>
</table>

### 2.2. OEB & Stakeholder Guidance

#### 2.2.1. OEB Policy
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.

As the RRFE is aimed at rate-making for electricity distributors in Ontario, it is not directly applicable to generators. However, OPG recognizes that many of the objectives and principles addressed in the RRFE can be applied to the generation sector.

The proposed hydroelectric IR framework deviates from 4GIRM only as is necessary to incorporate material differences between the distribution and hydroelectric generation industries and to transition OPG to IR for the first time. Specifically, OPG’s proposed model incorporates the following modifications to the 4GIRM methodology:

1. **Inflation factor:** OPG proposed using the same input sub-indices as the OEB’s 4GIRM I-factor; however the I-factor is weighted appropriately to reflect the input costs of the hydroelectric generation industry (i.e., not the electric distribution industry) as determined independently by London Economics International LLC ("LEI");

2. **Productivity Growth:** The independent Total Factor Productivity ("TFP") study reflects growth potential of the hydroelectric generation industry. However, notwithstanding the negative productivity factor identified by the LEI TFP study, OPG is proposing a productivity factor of zero; and

3. **Stretch factor:** Set once at the beginning of the IR plan term (i.e., not revised annually) to place OPG’s hydroelectric benchmarking performance in the context of the OEB’s 0% to 0.6% stretch factor range.

---

3 Reflects an adjustment to the hydroelectric base rate to remove a 2015 nuclear tax loss (discussed in Section 2.3.2) and a new deferral account to reflect the OEB’s decision on common equity (discussed in Section 2.6).
The RRFE requires an X-Factor to be based on industry TFP growth potential and a stretch factor. In its letter of February 17, 2015, the OEB noted its expectation that OPG’s hydroelectric incentive rate-making framework would take into consideration the independent productivity study performed by LEI and filed with the OEB on December 19, 2014. That productivity study reflected information for the 2002 to 2012 period. An updated version of the study including data for 2013 and 2014 is filed as Attachment 1 to this schedule. The TFP study results were substantially the same, as demonstrated in Chart 2:

**Chart 2 – Summary of Hydroelectric TFP Results**

<table>
<thead>
<tr>
<th>Approach</th>
<th>2002-2012 Information</th>
<th>2013-2014 Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Index</td>
<td>(1.02)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>Trend Regression Index</td>
<td>(1.00)</td>
<td>(1.19)</td>
</tr>
</tbody>
</table>

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.

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, 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.

As discussed in section 2.3 below, the proposed 0.3% stretch factor is based on the company’s hydroelectric benchmarking performance. In determining the value of the stretch...
factor, OPG has adopted the same 0% to 0.6% range applied under the RRFE. As OPG’s benchmarking results will be submitted and reviewed in this proceeding and not updated over the IRM term, OPG proposes that the stretch factor set in this proceeding remain in effect for the five-year IRM term.

2.2.2. Filing Guidelines

The OEB’s Filing Guidelines for OPG’s prescribed generation facilities are based on a cost of service methodology and are therefore not applicable to a price-cap-based application. OPG has structured the hydroelectric payment amounts evidence on the OEB’s 4GIRM Filing Requirements.\(^4\)

OPG has applied the Filing Requirements as appropriate for the generation industry, as set out in Ex. A1-3-1 Attachment 1. For example, since OPG’s payment amounts do not include pass-through amounts, many of the sheets in the OEB’s IRM Rate Generator, such as those relating to Retail Transmission Service Rates, are not applicable to OPG. OPG has incorporated the applicable elements of the IRM Rate Generator in Ex. I1-2-1.

2.3. Annual Adjustment Mechanism

OPG proposes that the company’s existing hydroelectric payment amounts be adjusted annually according to a mechanistic price-cap adjustment according to the same formula as used in 4GIRM:

Base Rates x (1 + I – X)

In this formula:

(i) “I” represents generation-industry inflation, determined annually based on a composite inflation index recommended LEI, using the same indices that the OEB uses to adjust rates for electricity distributors. As in 4GIRM, OPG proposes that the I-factor value would be adjusted mechanistically as part of an annual payment amounts adjustment application.

LEI has calculated a current I-factor value of 1.8% using the most recent Statistics Canada data.\(^5\)

(ii) “X” is the sum of:

a) a productivity factor, and

b) a stretch factor determined by total-cost benchmarking of OPG’s hydroelectric generation facilities.

As described in greater detail below in section 2.3.3.1, the TFP studies conducted by LEI concluded that a -1% productivity factor would be appropriate, based on productivity trends in the North American hydroelectric generation industry. However, in deference to OEB policy, OPG has increased the proposed productivity factor to zero.

Based on a total-cost benchmarking study of OPG’s regulated hydroelectric generation assets by Navigant, OPG proposes a hydroelectric stretch factor of 0.3%, consistent with the range of stretch factors applied by the OEB under 4GIRM.

\(^5\) Derived from sub-index values as of March 31, 2016.
The X-factor would remain consistent over the five-year term of the application. The derivation of the inflation factor and X-factor values are discussed in greater detail in subsections 2.3.1 and 2.3.2, respectively.

2.3.1. Inflation Factor

OPG retained LEI to recommend an appropriate inflation factor for the company’s hydroelectric price-cap framework. LEI recommended a composite index using the same sub-indices that the OEB uses when determining the inflation factor for electricity distributors under 4GIRM:

(i) Canadian Gross Domestic Product Implicit Price Index – Final Domestic Demand ("GDP-IPI FDD") from Statistics Canada; and
(ii) Average Weekly Earnings for Ontario – Industrial Aggregate ("Ontario AWE") from Statistics Canada.

LEI further recommended applying the sub-indices above to the same cost components that the OEB uses when determining the inflation factor for electricity distributors under 4GIRM:

(i) GDP-IPI FDD is applied to capital costs and non-labour O&M costs; and
(ii) Ontario AWE is applied to labour costs.

LEI’s inflation factor analysis was presented to stakeholders during OPG’s stakeholder consultation in late 2014 and early 2015. As discussed at the stakeholder consultation, LEI considered other sub-indices that were more relevant to the capital costs OPG would incur. However, LEI found that these alternative indices were historically less stable. Information presented by LEI on the inflation factor at the stakeholder consultations is provided in Attachment 3.

LEI recommended that OPG’s inflation factor follow a 4GIRM-like composite index approach for several reasons:
1. (i) It is representative of the various basic categories of inputs that affect OPG (labour and non-labour).
2. (ii) It captures labour costs that are specific to the Ontario industrial sector.
3. (iii) Since it represents inflation trends across many firms and industries, it is exogenous to OPG.
4. (iv) It is based on data that is readily available from Statistics Canada.
5. (v) It can be calculated simply and transparently.
6. (vi) It has historically been very stable, leading to more predictable rates.

OPG expects that the proposed approach will result in more stable payment amounts. Given the relative size of the capital for the generation industry (81%) the capital sub-index has a significant impact on the I-factor, and therefore would result in less stable rates. OPG believes that its customers prefer and the public interest favours more stable rates.

OPG asked LEI to identify the appropriate weighting between capital, labour, and non-labour costs for the hydroelectric generation industry and specifically for OPG. LEI used the weighting of capital, labour, and non-labour indices that was suggested by its TFP study.

LEI’s analysis produced the following weightings between capital and OM&A costs in Chart 3:

**Chart 3 – Summary of Hydroelectric I-Factor Weighting**

<table>
<thead>
<tr>
<th>Sub-index</th>
<th>Weight Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industry</td>
</tr>
<tr>
<td>Capital</td>
<td>81%</td>
</tr>
<tr>
<td>OM&amp;A - Non-labour</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total (GDP-IPI FDD)</strong></td>
<td><strong>88%</strong></td>
</tr>
<tr>
<td>OM&amp;A - Labour</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total (Ontario AWE)</strong></td>
<td><strong>12%</strong></td>
</tr>
</tbody>
</table>
In the electricity distribution context, the OEB adopted a weighting of distribution industry sub-indices that was a “reasonable representation for the industry as a whole.” Similarly, OPG’s proposed annual adjustment mechanism uses generation industry weighting to determine the annual inflation factor adjustment.

Based on labour and non-labour sub-index values as of March 31, 2016, LEI calculated an I-factor of 1.8%. The derivation of this value is set out in Chart 4:

**Chart 4 – Summary of Hydroelectric I-Factor Sub-indices, Q1 2016**

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Labour GDP-IPI-FDD - National</th>
<th>Labour AWE - All Employees - Ontario</th>
<th>Composite index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1  Q2  Q3  Q4  Annual  %  Weight</td>
<td>Annual  %  Weight  Annual %  Change</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>112.5 113.2 113.7 114.1 113.375</td>
<td>938.27</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>114.3 114.9 115.8 116.2 115.3 1.7% 88%</td>
<td>962.73 2.6% 12% 1.8%</td>
<td></td>
</tr>
</tbody>
</table>

OPG proposes to make annual adjustments for inflation on the same basis as the OEB does when setting rates for electricity distributors under 4GIRM. As under 4GIRM, OPG’s inflation factor would be updated annually to account for the most current sub-index values. The sub-indices and their weighting would remain constant in each year; only the value of each sub-index would change (i.e., the value of GDP-IPI FDD and Ontario AWE would be updated with the latest Statistics Canada data).

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OPG expects to file annual price-cap adjustment applications in the fall of each year to set the next year’s rate. For example, OPG expects to file an application in the fall of 2017 to determine 2018 rates. That 2018 payment amounts adjustment would be based on the values for the GDP-IPI (FDD) and Ontario AWE at the time of those applications.

2.3.2. “Going in” Rates
OPG proposes that the company’s current hydroelectric payment amounts as approved in EB-2013-0321 be used as the “going in” rates for the 2017-2021 period, adjusted to correct for the one-time allocation of nuclear tax losses to the hydroelectric business in the prior application. The current payment amounts reflect the OEB’s findings in EB-2013-0321 to only allow OPG to recover its cash requirements for pensions and other post employment benefits.7 In its treatment of tax losses in the EB-2013-0321 proceeding, OPG applied the 2015 forecast nuclear tax loss to reduce the 2014 and 2015 nuclear taxable income to $0. OPG then allocated the remaining unused nuclear tax loss of $86.7M to the hydroelectric business.8 This allowed OPG to reduce hydroelectric payment amounts, giving customers the benefit of the nuclear tax losses immediately, rather than carrying the losses forward to offset future nuclear taxable income.

To establish the “going-in” rate for IR, the current hydroelectric payment amounts must be adjusted to remove the impact of applying the 2015 nuclear tax loss to the 2015 hydroelectric revenue requirement. Removal of the nuclear tax loss from the approved hydroelectric rate as illustrated in Ex. I1-2-1 Tables 2 and 2a results in a revised “going-in” hydroelectric rate of $41.09/MWh as derived in Ex. I1-2-1 Table 1a.

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7 EB-2013-0321 Decision With Reasons, Page 87.
The allocation of specific tax losses from the nuclear to the hydroelectric business unit for ratemaking purposes is necessarily a one-time adjustment to payment amounts intended to provide customers the benefit of the nuclear tax loss sooner than would be the case if they were carried forward within the nuclear business unit. Absent the allocation, the OEB approved hydroelectric base rate in EB-2013-0321 would have been the $41.09/MWh discussed above, and the $86.7M would be applied to reduce the nuclear revenue requirements in this application. As customers have received the benefit of the tax losses, these losses are no longer available to reduce nuclear payment amounts in this application. OPG has therefore adjusted the “going in” hydroelectric rates to remove these tax losses.

2.3.3. X-Factor

OPG proposes an X-factor composed of two elements: (i) an industry productivity factor, as calculated by LEI’s TFP study of the North American hydroelectric generation industry, and (ii) a stretch factor based on OPG’s hydroelectric benchmark performance.

2.3.3.1. Productivity Factor

LEI’s TFP study was filed with the OEB as part of the EB-2013-0321 proceeding on December 19, 2014 (the “Initial TFP Study”). LEI updated the Initial TFP Study to include 2013 and 2014 data (the “Updated TFP Study”). Both the Initial TFP Study and the Updated TFP study yielded a productivity factor of -1%. However, for the reasons described below, OPG is proposing a productivity factor of zero in this application.

In late 2013, OPG retained LEI to prepare a hydroelectric generation industry productivity study for OPG’s prescribed hydroelectric assets. LEI was responsible for identifying

\footnote{Since OPG did not apply to adjust payment amounts for 2016, customers have received a benefit associated with the 2015 nuclear tax losses for an additional year}
appropriate methodologies of data compilation and peer selection, as well analyzing the data. 
This subsection briefly reviews LEI’s methodology, the peer group selected, and the study’s conclusions. The Updated TFP study, which is filed as Attachment 1 to this schedule, sets out each stage of LEI’s work in greater detail.

LEI used an index methodology to calculate the industry TFP, like the approach used in the RRFE. An index-based TFP approach measures the ratio of all outputs to all inputs, where input and output indices are constructed using both quantities and prices of outputs and inputs. LEI selected an indexed approach for a number of reasons: it is relatively simple, easy to communicate and ultimately a robust technique that requires significantly fewer observations than other measuring techniques.

The selection of inputs and outputs is an important aspect of designing a TFP study. The inputs and outputs used should be those that accurately reflect actual productivity in the industry, and for which data is readily available and quantifiable. For their study, LEI used two inputs: physical capital (measured in MW), and total O&M (measured in dollars). LEI used a single output: generation (measured in MWh). As a measure, generation also benefits from ubiquity; as it is common to every hydroelectric generator, generation data is readily available and data is generally measured consistently across power plants and companies. LEI also found that generation is the most common measure of output in academic and regulatory studies.

LEI established an appropriate industry peer group based on a “multi-dimensional” set of criteria. Their goal was to identify comparable utilities, while accounting for data-availability issues. They selected firms that have a medium (500-1000 MW) or large (>1000 MW) total hydroelectric capacity. To qualify, peers also needed to have more than one plant, and ideally

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the average age of a peer’s hydroelectric fleet would be comparable to OPG’s prescribed hydroelectric assets. Peers also needed to have specific hydroelectric operations data available for the period from 2002 to 2012. LEI considered a total of 28 North American peers, ultimately including 17 firms in the Initial TFP Study in the industry group, including OPG. In the Updated TFP Study one firm (Alcoa) was removed as it sold hydroelectric assets in 2012 and the remaining hydroelectric capacity was substantially less than the 500 MW capacity criteria used for peer selection. No other changes were made to the peer group.

LEI considered five Canadian peers for inclusion in the industry group, but ultimately was unable to obtain sufficient data related to the hydroelectric-specific O&M expenses. LEI tried to obtain the necessary data in several forums, including StatsCan and NERC databases, annual reports, regulatory filings and other publicly available information. LEI made repeated information requests to all five utilities, but were unable to obtain the information. Consequently, no other Canadian utilities were included in the industry group.

LEI calculated TFP results using two methods: average index growth, and a trend regression approach. The results of the Initial TFP Study and the Updated TFP Study are summarized in Chart 5.

<table>
<thead>
<tr>
<th>Approach</th>
<th>2002-2012 Information</th>
<th>2013-2014 Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Index</td>
<td>(1.02)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>Trend Regression Index</td>
<td>(1.00)</td>
<td>(1.19)</td>
</tr>
</tbody>
</table>

Chart 5 – Summary of Hydroelectric TFP Results
LEI commented on the results, stating that negative TFP results can be expected for a TFP study on a mature hydroelectric industry.\(^{11}\) During the stakeholder consultation in late 2014 and early 2015, LEI explained that a negative productivity factor for the hydroelectric generation industry is expected, given it is an industry with substantially fixed productive capability, fixed capital stock, and increasing operating and maintenance costs that would naturally lead to negative productivity growth.\(^ {12}\)

The results of the TFP studies notwithstanding, OPG has elected to increase the productivity factor to from negative 1% to zero. OPG believes this approach is consistent with OEB policy. In the electricity distribution context, the OEB has elected not to set rates based on negative productivity growth in the electricity distribution context. In its report on the distribution productivity factor under the RRFE, the OEB stated that it “does not believe it appropriate for a rate setting regime to project and entrench declining productivity expectations into the future.”\(^ {13}\) The OEB determined that the productivity factor value would be zero, despite the negative result of the industry TFP study.

While OPG believes that the -1% TFP factor resulting from both the Initial TFP Study and the Updated TFP Study is accurate, it understands the OEB’s policy position and proposes a zero productivity factor in this application.

In effect, increasing the productivity factor to zero creates an additional 1% stretch factor on OPG’s hydroelectric business during the term of this application. OPG’s performance must exceed the TFP trend identified by LEI in order to meet the reduced rates that result from the hydroelectric price cap index adjustment.

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\(^{11}\) Updated TFP Study, p. 48
\(^{12}\) Ex. A1-7-1, Attachment 3, Session notes, p. 4.
\(^{13}\) EB-2010-0379, Report of the Board: Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario’s Electricity Distributors, p. 17.
2.3.3.2. Stretch Factor

OPG proposes to use a 0.3% stretch factor based on OPG’s performance on independent hydroelectric benchmarking. As described in this section, OPG arrived at this proposal by adopting the range of stretch factors used in the OEB’s 4GIRM methodology (i.e., 0%, 0.15%, 0.3%, 0.45% and 0.6%), and identifying a stretch factor that corresponds with the company’s hydroelectric benchmark performance.

As required by the OEB’s decision in EB-2013-0321, OPG retained Navigant to conduct an independent total-cost benchmarking study of its hydroelectric business. A copy of the hydroelectric benchmarking report is filed as Attachment 2 to this schedule.

Navigant benchmarked approximately 92% of OPG’s 2013 costs attributable to its regulated hydroelectric operations against a peer group comprised predominantly of U.S. and Canadian generators that represent approximately 100,000 MW of installed capacity. Facilities comprising the peer group are diverse in size, type and age, and include hydroelectric generation stations with reservoirs, run-of-river generating facilities, and pumped storage stations. Chart 6 summarizes the peer group composition and compares it to OPG’s regulated hydroelectric facilities:

<table>
<thead>
<tr>
<th>Chart 6 – Composition of Peer Group and Comparison to OPG Regulated Hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Group</td>
</tr>
<tr>
<td>No. of Station Groups</td>
</tr>
<tr>
<td>Median Station Age (years)</td>
</tr>
<tr>
<td>Median Station Group Size (MW)</td>
</tr>
<tr>
<td>Median Unit Size (MW)</td>
</tr>
</tbody>
</table>

Navigant excluded costs that were unique to OPG’s regulated hydroelectric operations. Costs not benchmarked include adjustments to centrally held pension and OPEB costs, IESO non-energy charges, costs attributable to electricity sales and trading, and corporate business development costs. Navigant separately benchmarked OPG’s regulated hydro investment costs (i.e., regulatory and sustaining project OM&A and capital investment) and reliability performance (i.e., availability and EFOR).

OPG’s regulated hydroelectric operating costs benchmark in the second quartile relative to the study’s peer group based on Partial Function Cost. Navigant identified Partial Function Cost as the key cost metric for benchmarking purposes to assess OPG’s relative performance to its peers. (The Total Function Cost metric includes Gross Revenue Charges – a regulatory water and property tax not within OPG’s control and which does not apply to others in the peer group). With respect to investment, the regulated hydro facilities benchmark in the second quartile, with marginally lower investment than the median compared to the peer group. The results of the benchmarking are summarized in Chart 7.

<table>
<thead>
<tr>
<th></th>
<th>Partial Function Cost$^{15}$ ($M)$</th>
<th>Total Function Cost$^{16}$ ($M)$</th>
<th>Investment$^{17}$ ($M)$</th>
<th>Availability (%)</th>
<th>Forced Outage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPG Regulated Hydro</td>
<td>201</td>
<td>527</td>
<td>140</td>
<td>92.8</td>
<td>1.3</td>
</tr>
<tr>
<td>1$^{15}$ Quartile</td>
<td>114</td>
<td>142</td>
<td>64</td>
<td>95.7</td>
<td>0.3</td>
</tr>
</tbody>
</table>

$^{15}$ Partial Function Cost includes costs incurred for hydroelectric station operations, maintenance, waterways and dams, buildings and ground, and HTO & Corporate support costs. Navigant identified Partial Function Cost as the key performance indicator of OPG’s regulated hydroelectric facilities.

$^{16}$ Total Function Cost includes Partial Function Cost, as well as costs incurred for Public Affairs and Regulatory which, in the case of OPG, is mostly Gross Revenue Charge payable on hydroelectric production.

$^{17}$ “Investment” includes both Capital and Project OM&A expenditures.
Median  203  318  146  90.7  1.3
3rd Quartile  408  625  444  81.5  4.1

OPG has set the proposed hydroelectric stretch factor based on the company’s performance on Partial Function Cost. Navigant found that OPG’s regulated hydroelectric facilities are effectively at the median for the hydroelectric generation industry on this measure. Using the range of stretch factors applied in the 4GIRM method, OPG’s performance should result in a 0.3% stretch factor.

2.4. Incremental and Advance Capital Module Eligibility

As in 4GIRM, OPG would be eligible to request an Incremental Capital Module (“ICM”) funding for qualifying hydroelectric capital projects. Any such request would be prepared pursuant to OEB policy. Although OPG has not included an Advance Capital Module (“ACM”) in this application, the company’s proposed regulatory framework would permit the use of an ACM or ICM in subsequent applications.

2.5. Unforeseen Events (Z-Factor)

OPG proposes that the OEB’s policy on unforeseen events would apply during the term of this application, as set out in OEB policy. OPG proposes that the company’s regulatory materiality threshold of $10 million apply.

2.6. Deferral and Variance Accounts

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OPG proposes to continue all existing deferral and variance accounts approved by the OEB as discussed in Ex. H1-1-1. As OPG is not rebasing hydroelectric payment amounts, the impact of any change to the company’s common equity ratio approved by the OEB pursuant to OPG’s request in Ex. C1-1-1 would be applied through the proposed Hydroelectric Capital Structure Variance Account described in Ex. H1-1-1.

OPG will continue to report the balances in its deferral and variance accounts as directed by the OEB in EB-2010-0008. OPG intends to monitor these balances and may make an application to dispose of these account balances during the 2017-2021 period.

2.7. Off-Ramp

By June 30 of each year, OPG is required to file an analysis of the actual annual regulatory return, after tax on rate base, both dollars and percentages, for the regulated business (i.e. both hydroelectric and nuclear combined). This analysis includes a comparison of the regulated business’ achieved ROE against the approved ROE included in the payment amounts. OPG proposes that this reporting requirement will be the basis for determining if its actual ROE is outside the +/-300 basis point trigger established by the RRFE for determining whether a regulatory review may be initiated.

3. NUCLEAR FACILITIES RATE-SETTING PROPOSAL

3.1. Summary of Nuclear Rate-setting Proposal

OPG has endeavoured to develop a form of Custom IR that is both consistent with the OEB’s letter of February 17, 2015, and compatible with the state of the company’s nuclear business during the 2017-2021 IR period. As described in this schedule and elsewhere in this

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20 EB-2010-0008 Decision With Reasons, p. 151.
application, both of OPG’s nuclear facilities are entering into a period of significant change. During the IR period, OPG will begin refurbishing the Darlington Nuclear Generating Station. At the same time, the company will carry out the works necessary to extend operations at the Pickering Nuclear Generating Station. Throughout this period, OPG must be able to meet customers’ expectations that the company operate safely and reliably, and to continue generating clean, low-cost electricity.

As there is no prescribed IR regime for OPG’s nuclear facilities, OPG has developed a Custom IR framework that is based on the principles set out in the RRFE, the OEB’s prior guidance on incentive ratemaking, and on stakeholder feedback. The nuclear Custom IR framework is tied to OPG’s performance on the total generating cost benchmarking that underlies the company’s gap-based business planning process. The proposed Custom IR framework applies elements of 4GIRM – in particular, a benchmark-based stretch factor – in a manner that is compatible with OPG’s regulatory and business context.

OPG’s proposed nuclear Custom IR framework has been informed by various sources, including:

(i) The OEB’s 2012/2013 consultation on incentive rate-making at OPG (the “OEB Consultation”)
(ii) The OEB’s Filing Guidelines for OPG (the “Filing Guidelines”)
(iii) The principles reflected in the RRFE;
(iv) application stakeholder consultations; and
(v) Other factors including prior OEB decisions, the Government of Ontario’s Long-Term Energy Plan, O. Reg. 53/05, and OPG’s business planning process.

22 See in particular Ex. A1-3-1, Ex. A1-3-2, and Exhibits D and F.
The major elements of the proposed nuclear Custom IR framework are set out in Chart 8, along with corresponding policy objectives from the RRFE and other sources:

### Chart 8 – Summary of Nuclear Custom IR Framework

<table>
<thead>
<tr>
<th>Policy Objective(s)</th>
<th>Source</th>
<th>Corresponding aspect(s) of Nuclear Rate-making Framework</th>
</tr>
</thead>
</table>
| Adopt a longer-term approach to payment amount-setting based on the parameters for a multi-year Cost of Service application and a Custom IR framework | OEB Consultation Report, p. 9  
OEB Letter of February 17, 2015  
O. Reg. 53/05 | Nuclear Ratemaking proposal includes five future test years with individual forecast revenue requirements. (As noted below, the application layers elements of IR onto this foundation.)  
Elements of the Custom IR framework are detailed below. |
| Include meaningful efficiency incentives derived from external benchmarking | RRFE, p. 17 | Providing up-front benefit to customers through stretch factor reduction of revenue requirement. Stretch factor applied to revenue requirement arising OM&A costs that are independent of the major projects during the IR period. These stretch reductions are incremental to performance improvements resulting from OPG Nuclear’s gap-based business planning process, discussed in Ex. F2-1-1.  
Stretch factor was determined by adopting the range of stretch factor values from 4GIRM and applying the range to OEB-approved nuclear total generating cost benchmarking. |

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26 O. Reg. 53/05, section 6(2)12
27 0% to 0.6%
<table>
<thead>
<tr>
<th>Policy Objective(s)</th>
<th>Source</th>
<th>Corresponding aspect(s) of Nuclear Rate-making Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide tangible benefits and consequences for</td>
<td>OEB Consultation</td>
<td>Stretch reductions persist year-over-year, incenting OPG to find further savings in each year of the application term, as would occur under 4GIRM.</td>
</tr>
<tr>
<td>operating performance</td>
<td>Report, p. 9</td>
<td>The 100% variable rate design of OPG’s payments means that failure to achieve production forecast has direct financial consequences for the company, creating a meaningful incentive to continuously improve productivity.</td>
</tr>
<tr>
<td>Encourage sustainable, year-over-year efficiency gains</td>
<td>RRFE, p. 59</td>
<td></td>
</tr>
<tr>
<td>Be aligned with performance outcomes</td>
<td>RRFE, pp. 3, 59</td>
<td>OPG is proposing annual reporting on the company’s performance to provide meaningful measures of the company’s nuclear performance. The proposed measures reflect identified RRFE performance outcomes.</td>
</tr>
<tr>
<td>Performance measures should be directly linked to</td>
<td></td>
<td>Annual reporting will include all of the measures used in OPG’s nuclear benchmarking.</td>
</tr>
<tr>
<td>desired performance outcomes</td>
<td></td>
<td>Application includes robust evidence of the company’s nuclear operations and project forecasts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The application of off-ramps applies to the achieved return on equity for OPG’s combined regulated operations as discussed in Section 2.7, above.</td>
</tr>
</tbody>
</table>
In 2012 and 2013, the OEB held a consultation to consider how to include elements of incentive regulation within OPG’s rate-making regime. Parties were divided on the appropriate pacing and form of IR for OPG’s nuclear facilities. During the consultation, some stakeholders expressed the view that IR may never become appropriate for nuclear facilities. Others accepted that nuclear IR may be more appropriate after the DRP is complete and the Pickering facility has been shut down.

On March 28, 2013, the OEB issued a report on the outcome of the consultation (the “2013 Report”). In the 2013 Report, the OEB stated that:

> “the large capital expenditures and reduced production associated with the DRP and the Pickering closure do not favour the implementation of a ‘pure IR regime’ (i.e., one based on TFP with input cost indices, Z-factors, and off-ramps) in the immediate future.”

The OEB stated that OPG could move toward “a methodology that achieves some of the same objectives as IR” before Darlington Refurbishment and Pickering closure are complete.

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28 OEB Consultation Report, p. 5.
29 OEB Consultation Report, p. 8 [emphasis added].
complete. The proposed nuclear Custom IR framework attempts to strike such a balance, reflecting the fact that OPG’s capital and operating costs will vary significantly with the refurbishment of the Darlington facility and the extension of operations at Pickering, but also implementing benchmark-driven stretch reductions in aspects of the company’s nuclear operations where it is reasonable to do so.

The proposed nuclear Custom IR framework reflects the OEB’s conclusions. It is based on five individual nuclear revenue requirements, but includes incremental stretch reductions that are sustained, year-over-year, creating a meaningful incentive to continuously improve performance and cost efficiency during the IR period.

3.2. Stretch Factor Proposal

As described above, any form of incentive regulation proposed for OPG’s nuclear assets must be appropriate in the context of the significant programs planned for the company’s nuclear facilities during the IR period. OPG proposes a benchmark-based stretch factor that will provide a meaningful performance incentive during the term of this application.

OPG recognizes the OEB’s expectation that an IR mechanism should incent performance improvements, and should be based on measures that are external to the company’s forecasts. To achieve this, OPG proposes to apply a benchmark-based stretch factor to revenue requirement attributable to the company’s nuclear Base OM&A and allocated corporate support services OM&A. This reduction is in addition to the performance improvement initiatives reflected in the company’s gap-based nuclear business planning process. The proposed stretch reduction has the effect of reducing revenue requirement for these two significant categories of expenditures below forecast.

30 OEB Consultation Report, p. 9.
31 Descriptions of nuclear Base OM&A and corporate support services are available at Ex. F2-2-1 and Ex. F3-1-1, respectively.
The proposed stretch reduction targets elements of the company’s nuclear costs that constitute a significant amount of OPG’s nuclear revenue requirement during this application. The stretch factor applies to an average of $1.7 billion\textsuperscript{32} or approximately 75% of OPG’s total nuclear OM&A in each year of the application.

As discussed in section 3.2.1 below, OPG is proposing a 0.3% stretch factor. The stretch reduction is cumulative, resulting in a greater reduction to applicable revenue requirement each year of the IR period. As illustrated in Figure 1, the stretch factor grows over the term of the application, resulting in a $20.4M stretch reduction in 2021, effectively reducing the revenue requirement for Base and Corporate Support OM&A to the level forecast for the prior year.

\textsuperscript{32} See Chart 10 for annual stretch eligible OM&A costs
Figure 1 – Nuclear Stretch Factor Reductions

OPG views Base OM&A and Corporate Support OM&A as proxies for the overall level of the company’s nuclear operating expenditures where it is reasonable to drive efficiencies. OPG does not expect that all elements of these costs can be reduced. For example, many functions within nuclear Base OM&A are related to safety and legislative requirements. Base OM&A includes several critical, regulated functions including safety, emergency preparedness, inspections, operations and maintenance. While these functions are within Base OM&A (and therefore subject to the stretch reduction), OPG will not compromise functions that are

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33 Many of these functions are required for OPG to comply with the *Nuclear Safety and Control Act* (Canada) and are mandated by the CNSC. Nuclear Base OM&A also includes work dealing with environmental issues.
mandated by the CNSC or that could otherwise increase safety or environmental risks or the risk of non-compliance with legislated requirements.

The proposed stretch reductions are in addition to efficiencies and performance improvements within the company’s business planning processes. OPG continually strives to improve the company’s performance and operational efficiency where it can do so safely within operational requirements (e.g., CNSC requirements) and without affecting reliability. Through the gap-based nuclear business planning process described in Ex. F2-1-1, OPG develops initiatives to meet these goals. The performance initiatives incorporated in the business planning process and the corresponding performance and operational efficiency improvements are reflected in the forecast expenditures in this application.

As noted above, the stretch factor applies to approximately 75% of OPG’s nuclear OM&A. While OPG does not expect to find material efficiencies in the remaining 25% during the term of this application, it will seek to improve performance and reduce costs where it can responsibly do so.

3.2.1. Derivation of Proposed Stretch Factor

OPG proposes a stretch factor of 0.3%, which is based on the methodology used by the OEB to set electricity distribution rates. Under the RRFE, distributors may be subject to a range of stretch factors from 0% to 0.6%,\(^3\) based on their benchmark performance. OPG has adopted the OEB’s range in its proposed ratemaking frameworks for both hydroelectric and nuclear generating facilities.

\(^3\) Under the RRFE, electricity distributors are assigned to one of five performance cohorts based on their forecast costs relative to econometrically predicted benchmark costs. Based on their determined performance cohort, distributors are assigned a stretch factor of 0%, 0.15%, 0.3%, 0.45% or 0.6%.
As set out in the 2015 Nuclear Benchmarking Report, Darlington’s Total Generating Cost per MWh performs in the top quartile, and the Pickering facility is in the fourth quartile. OPG used a production-weighted average to determine a combined stretch factor value of just below 0.3%. Chart 9 illustrates the derivation of OPG’s proposed stretch factor, based on the most recent OEB-approved nuclear production forecast.

**Chart 9 – Derivation of Nuclear Stretch Factor**

<table>
<thead>
<tr>
<th>Input</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEB-approved 2015 Darlington production (TWh)</td>
<td>25.0</td>
</tr>
<tr>
<td>OEB-approved 2015 Pickering production (TWh)</td>
<td>21.6</td>
</tr>
<tr>
<td>Darlington stretch factor (based on benchmark performance)</td>
<td>0.0%</td>
</tr>
<tr>
<td>Pickering stretch factor (based on benchmark performance)</td>
<td>0.6%</td>
</tr>
<tr>
<td>Production-weighted average stretch factor</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

OPG has reduced the requested payment amounts by 0.3 per cent of the company’s nuclear Base OM&A and allocated corporate support OM&A beginning in 2018. The amounts shown in Ex. F2-2-1 reflect the full forecast revenue requirement. The stretch reduction is applied when determining the company’s payment amounts in Ex. I1-3-1.

In order to emulate the effect of the stretch-factor in the OEB’s 4GIRM price-cap framework, OPG has calculated annual stretch reductions such that prior years’ reductions are maintained (i.e., reductions to revenue requirement made in 2018 are carried forward to subsequent...

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35 OPG has used its OEB-approved total generation cost benchmarking performance to determine where the company’s nuclear division should fall on the OEB’s range of stretch factors. OPG’s 2015 Nuclear Benchmarking Report is filed at Ex. F2-1-1, Attachment 1. The Total Generating Cost benchmarking results are on p. 65.
years, on the presumption that the company should be incented to find additional savings each year). Reductions are proposed beginning in 2018, with additional reductions in 2019, 2020, and 2021. This mirrors the operation of the stretch factor under 4GiRM.

Chart 10 shows the product of applying the 0.3% stretch factor to Base OM&A and allocated corporate support OM&A.

<table>
<thead>
<tr>
<th>Chart 10 – Stretch Reduction Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>($M)</td>
</tr>
<tr>
<td>Base &amp; Corporate Support OM&amp;A</td>
</tr>
<tr>
<td>Stretch Factor</td>
</tr>
<tr>
<td>Annual Stretch Reduction to Nuclear Revenue Requirement</td>
</tr>
<tr>
<td>Base &amp; Corporate Support OM&amp;A Used to Determine Payment Amounts</td>
</tr>
</tbody>
</table>

The total reduction over the term of the application is $50.6M. Although the 0.3% stretch reduction is constant, the “snow plow” effect of maintaining prior years’ reductions means that the $20.4M reduction in 2021 is a 1.2% reduction to that year’s stretch-eligible OM&A, or a 0.9% reduction to total nuclear OM&A.

This stretch reduction is incremental to the performance improvements required to achieve OPG’s business plan. Customers will benefit from these “up-front” budget reductions, and OPG will bear the risk of any shortfall.

3.2.2. Productivity Factor is Not Applicable

OPG is not proposing a nuclear industry productivity adjustment as part of the proposed X-factor. The nature and scale of capital work planned for the IR period mean that past productivity trends would not be a reasonable indicator of predicted productivity for OPG during the IR period.
3.3. Annual Adoption of OEB Prescribed ROE

OPG proposes that the company’s annual nuclear Return on Equity (“ROE”) be the OEB’s prescribed ROE as determined by the OEB each year pursuant to the *Report of the Board on the Cost of Capital for Ontario’s Regulated Utilities*, issued December 11, 2009.

The five nuclear revenue requirements filed in this application are based on the OEB’s prescribed ROE of 9.19 per cent for 2016, which was the most current available at the time of filing.

As discussed in Ex. C1-1-1, OPG proposes to use the following methodology to establish the ROE for the nuclear business for the 2017 to 2021 period:

- For the first year of the test period (2017), the ROE will be set using the prevailing ROE specified by the OEB in accordance with the OEB’s Cost of Capital Report as of the effective date of the Payments Amount Order;
- The 2017 ROE will be used to determine the revenue requirement approved by the OEB from 2018 to 2021;
- For the second through fifth year of the test period (2018 to 2021), the ROE will be set annually using the prevailing ROE specified by the OEB in accordance with the OEB’s Cost of Capital Report;
- The revenue requirement impact of the variance between the forecast ROE approved for 2018 to 2021 in this Application and the actual ROE that the OEB will specify annually for 2018 to 2021 will be recorded in the proposed Nuclear ROE Variance Account, as described at Ex. H1-1-1 Section 6.3.

3.4. Operational Effectiveness

“Operational effectiveness” is one of the four outcomes the OEB seeks to promote in the RRFE. The RRFE defines the operational effectiveness outcome as “continuous improvement
in productivity and cost performance is achieved; and utilities deliver on system reliability and quality objectives.”

Achieving operational effectiveness involves balancing two sets of outcomes: continuously improving processes and practices to provide customers with better value for money, while simultaneously delivering the performance outcomes that customers expect.

OPG’s nuclear business balances these outcomes in four ways:

1. A performance-based business planning process that drives the company to achieve safety, reliability, value-for-money, and human performance targets;
2. Annual benchmarking using an OEB-approved methodology to assess the company’s performance;
3. Staffing and compensation strategies designed to ensure key resource are available when needed, to minimize risks, and to ensure safe and efficient operations;
4. Extensive planning to help ensure the Darlington Refurbishment Program (“DRP”) and extended operation of the Pickering Nuclear Generating Station are completed on time and on budget.

3.4.1. Performance-based Business Planning and Benchmarking

Through benchmark-driven performance improvement and value-for-money initiatives, OPG’s nuclear business planning process pushes the company to create budgets that reflect continuous improvement in performance and cost efficiency.

As described in Ex. F2-1-1, benchmark performance is central to OPG’s nuclear business planning process. The company uses annual benchmarking to assess OPG’s performance relative to the industry on a set of key performance indicators, which are divided among the

36 RRFE, page 2.
four cornerstones of OPG’s nuclear business: safety, reliability, value for money, and human performance. OPG determines annual performance targets based on the company’s performance on the benchmarked key performance indicators.

The annual nuclear business planning process starts with internal reviews of the current planning framework, the confirmation and updating of business objectives and priorities, requirements set out in the corporate-wide business planning instructions, a review of the status of operational and performance plans and related capital and OM&A expenditures, and the identification of emerging issues. Out of this process, strategic and performance objectives for OPG nuclear are determined and prioritized.

Once it has set performance objectives, OPG employs performance improvement initiatives to achieve the desired outcomes. OPG’s nuclear business plan currently includes initiatives intended to improve reliability, human performance, and value-for-money. The Nuclear Business Planning and Benchmarking evidence in Ex. F2-1-1 includes three “case studies” of past nuclear performance initiatives that have helped OPG improve its performance in recent years. These are provided at Ex. F2-1-1, section 3.5.

Ultimately, the company measures and assesses its results through the subsequent round of benchmarking. Based on the benchmark outcomes, OPG may set new performance targets and revise its initiatives accordingly. This performance-based planning process allows OPG to track the company’s results against targets, and to set appropriate targets for each successive year, creating a cycle of continuous performance and cost efficiency improvement.

Figure 2 illustrates OPG’s performance-based nuclear business planning process, at a high level.

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37 More information on OPG’s business planning processes is provided in Ex. A2-2-1 and F2-1-1.
38 Some initiatives are intended to address multiple outcomes. For further detail, please see Ex. F2-1-1.
3.4.2. Major Nuclear Performance Initiatives

OPG’s business plan includes four major nuclear performance initiatives that OPG plans to implement during the IR period:

i. Human Performance,
ii. Outage Performance,
iii. Equipment Reliability, and
iv. Parts Improvement.

Details of these initiatives are included in the Nuclear Business Planning and Benchmarking evidence at Ex. F2-1-1.

OPG’s business plan is based on the successful execution of these initiatives. To the extent that OPG does not achieve the targeted benefits from these initiatives, the company’s costs and nuclear generation forecast are at risk. OPG may also develop other initiatives during the
course of the IR period, depending on the outcomes reflected in the annual nuclear
benchmarking report.

3.4.3. Staffing and Compensation

In the period prior to this application, OPG has made significant progress in reducing the
company’s staffing levels and controlling compensations costs. As discussed in Ex. F4-3-1,
OPG’s Business Transformation project involved restructuring the company around a centre-
led model, reducing regular headcount by nearly 2,700 positions between 2011 and 2015,
while avoiding severance package costs. Although the Business Transformation initiative has
concluded, the company still employs a philosophy of continuous improvement in managing
its resources and in regular operations.

OPG has also been successful in controlling upward pressure on compensation costs. The
company has negotiated agreements with both the Power Workers’ Union (“PWU”) and the
Society of Energy Professionals (“Society”) that will keep wage escalation below inflation.
These agreements run from April 1, 2015 - March 31, 2017 for the PWU, and from January 1,
2016 – December 31, 2018 for the Society. Prior to these agreements, typical union salary
increases have been in the range of 2% to 3% for OPG and for other large companies in
Ontario’s electricity sector.

OPG has also controlled compensation costs for non-union (“Management”) employees in
several ways. The company froze base salary for Management employees between 2011 and
2015. In addition, OPG continues to follow legislated requirements restricting compensation
increases to senior Management employees (Vice President and above) and limiting the
company’s performance-based compensation program.

In an independent compensation benchmarking study, Willis Towers Watson has confirmed
that OPG’s overall Total Direct Compensation is now at the market level.
More information on OPG’s compensation, including the Towers Watson benchmarking study, is filed at Ex. F4-3-1.

3.4.4. Detailed Planning for DRP and Pickering Extended Operations

A system of continuous improvement is often based on making incremental refinements to recurring processes, year-over-year. The business planning process described above reflects this form of incremental efficiency improvement. In contrast, the DRP and Pickering extended operations are unique, multi-year projects. Given the size and stand-alone nature of these projects, OPG has taken extensive measures to ensure that the projects deliver the best value for Ontario’s electricity customers.

For more information on the efficiencies and cost performance measures incorporated in the DRP, please see Ex. D2-2-1 through Ex. D2-2-10 and Ex. F2-7-1. For Pickering Extended Operations, please see Ex. F2-2-3.

4. PERFORMANCE REPORTING

OPG understands that the OEB expects utilities to provide meaningful insight into their performance during the course of multi-year applications. Consistent with the RRFE, OPG is proposing to report on a suite of measures that reflect performance on key company outcomes during the term of this application. As discussed in section 4.2, OPG proposes to report annually on the company’s measures during the term of this application. Specifically, OPG proposes to report the company’s performance on each of the measures identified in section 4.1, which are important inputs to OPG’s business planning processes. This reporting would be in addition to OPG’s current reporting as directed in EB-2010-0008.

As discussed in Ex. F2-1-1, OPG uses annual nuclear benchmarking to assess performance against industry peers in the four cornerstones of safety, reliability, value for money and human performance. Benchmarking results contribute to establishing targets to reduce
performance gaps or maintain current performance, as appropriate. OPG believes that the company’s annual benchmark results will be helpful performance reporting measures for the OEB and stakeholders.

The proposed benchmark reporting measures are consistent with the RRFE outcome of operational effectiveness (including measures covering system reliability, cost performance and service quality such as safety and environmental performance). These measures reflect outcomes that are both meaningful to customers and important inputs to the company’s regular business planning processes. In addition, OPG intends to continue the reporting directed by the OEB in EB-2010-0008 which includes achieved regulatory ROE, the principal financial viability outcome included in the RRFE.

OPG does not have measurable performance objectives that are analogous to a distributor’s mandated conservation and demand management targets or renewable generation connections; consequently OPG is not proposing any specific measures of public policy responsiveness. However, OPG understands that the general RRFE definition of this outcome is that “utilities deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).”39 In this regard, OPG is the agent of government/public policy in a direct way, as it is mandated by the Province to support the LTEP and other public policy objectives.

The RRFE Customer Focus outcome is a significant factor in OPG’s planning and operations. OPG is closely engaged with the communities in which it operates, and continues to enhance the role of customer engagement in its business planning process. OPG’s customer engagement activities and plans are discussed separately in section 5, below.

39 RRFE, p. 2.
4.1. Proposed Performance Measures

OPG proposes to report the company’s annual benchmarking performance measures. The hydroelectric performance measures set out in Chart 11 are the same as the key performance areas filed in OPG’s prior payment amounts application (EB-2013-0321, Ex. F1-1-1, Appendix B). The nuclear performance measures in Chart 12 are the benchmarks used in the company’s annual nuclear benchmarking report.

Chart 11: Annual Hydroelectric Performance Measures

<table>
<thead>
<tr>
<th>Category</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>All Injury Rate (per 200k hours)</td>
</tr>
<tr>
<td></td>
<td>Environmental Performance Index (%)</td>
</tr>
<tr>
<td>Reliability</td>
<td>Availability Factor (%)</td>
</tr>
<tr>
<td></td>
<td>Equivalent Forced Outage Rates (%)</td>
</tr>
<tr>
<td>Cost Effectiveness</td>
<td>OM&amp;A Unit Energy Cost ($/MWh)</td>
</tr>
</tbody>
</table>
### Chart 12: Annual Nuclear Performance Measures

**Nuclear Performance Measures**

(Separate measures will be filed for Darlington and Pickering Stations)

<table>
<thead>
<tr>
<th>Category</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety</strong></td>
<td>All Injury Rate (per 200k hours)</td>
</tr>
<tr>
<td></td>
<td>Collective Radiation Exposure (person rem/unit)</td>
</tr>
<tr>
<td></td>
<td>Airborne Tritium Emissions (curies)</td>
</tr>
<tr>
<td></td>
<td>Industrial Safety Accident Rate (#/200k hours)</td>
</tr>
<tr>
<td></td>
<td>Fuel Reliability Index (microcuries /gram)</td>
</tr>
<tr>
<td></td>
<td>2-year Reactor Trip Rate (#/7000 hours)</td>
</tr>
<tr>
<td></td>
<td>3-year Auxiliary Feedwater System Unavailability (#)</td>
</tr>
<tr>
<td></td>
<td>3-year Emergency AC Power Unavailability (#)</td>
</tr>
<tr>
<td></td>
<td>3-year High Pressure Safety Injection Unavailability</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>Forced Loss Rate (%)</td>
</tr>
<tr>
<td></td>
<td>Unit Capability Factor (%)</td>
</tr>
<tr>
<td></td>
<td>Nuclear Performance Index (%)</td>
</tr>
<tr>
<td></td>
<td>On-line Deficient Maintenance Backlog (work orders / unit)</td>
</tr>
<tr>
<td></td>
<td>On-line Corrective Maintenance Backlog (work orders / unit)</td>
</tr>
<tr>
<td></td>
<td>Chemistry Performance Indicator Annual YTD (#)</td>
</tr>
<tr>
<td><strong>Cost Effectiveness</strong></td>
<td>Total Generating Cost per Net MWh ($/MWh)</td>
</tr>
<tr>
<td></td>
<td>Non-Fuel Operating Cost per Net MWh ($/MWh)</td>
</tr>
<tr>
<td></td>
<td>Fuel Cost per Net MWh ($/MWh)</td>
</tr>
<tr>
<td></td>
<td>Capital Cost per MW Design Electrical Rating ($k/MW)</td>
</tr>
<tr>
<td><strong>Human Resources</strong></td>
<td>18-month Human Performance Error Rate (#/10k ISAR hours)</td>
</tr>
</tbody>
</table>
4.2. Annual Performance Reporting Process

OPG proposes an annual written process for reporting on the prior year’s performance and identifying targets for the following year. Beginning in 2017, OPG would file an updated set of performance measures with the OEB annually. The updated measures would include the prior year’s actual performance as well as targets for the new year for each measure.

OPG believes that these measures will give the OEB and interested parties a clear and meaningful view into the company’s operation during the 2017-2021 period. As is the case for electricity distributors, OPG proposes that no rewards or penalties be attached to the company’s performance. In OPG’s view, annual reporting exists to give the OEB and stakeholders a clear view of OPG’s performance during the longer term of this application. The OEB will be able to understand whether OPG is meeting operational targets and financial expectations.

5. CUSTOMER ENGAGEMENT

5.1. Overview

This section reviews the various ways in which OPG engages with the individuals, businesses and institutions that consume electricity in Ontario and considers customers when planning work and operating its generating facilities. This schedule also describes OPG’s ongoing plans to expand the formal role of customer outreach in the company’s business planning process.

The RRFE requires that electricity distributors work to provide services in a manner that responds to identified customer preferences. OPG does not have a direct relationship with electricity consumers, since it sells electricity wholesale into the IESO-controlled market. As a result, OPG does not perform the transactional customer activities that a distributor does. OPG does not manage customer accounts, respond to service calls, or make investment
decisions that directly affect the delivery of electricity to individual customers. Nonetheless, the electricity that OPG generates – and how it generates that electricity – affects all Ontarians. In that sense, the ultimate consumers of electricity in the province are all OPG’s customers.

OPG considers customers’ interests in business planning. As described in this schedule, OPG engages with customers when planning projects, making operational decisions, and participating in communities.

This schedule summarizes the various forms of customer engagement that OPG executes during the course of its normal business operations, divided into three broad categories, each of which is discussed separately in this schedule:

i. Community Partnerships,

ii. Indigenous Community Relations, and

iii. Public Information and Safety Programs.

In addition to these ongoing forms of community and customer engagement, during the IR term OPG intends to expand its work to identify customers’ preferences and to consider them in its business planning process. To that end, OPG plans to launch an expanded customer engagement program to help inform the company’s business planning. Section 5.6 of this schedule provides more information about the company’s customer engagement plans.

5.2. Community Partnerships

OPG is a major presence “on the ground” in many communities across the province. OPG coordinates with and attempts to accommodate the needs and preferences of the communities that may be affected by operational decisions or projects. OPG also works in partnership with many Indigenous communities in which the company’s facilities reside.
This section describes how OPG works with communities to help ensure that the company’s projects are planned and executed in a manner that reflects the preferences of local communities, and that its operations minimally affect local communities.

5.2.1. Operational Coordination

OPG considers and accommodates community feedback in various aspects of its regular operations, including the company’s ongoing Nuclear Community Advisory Councils, Community Leader, and Waterway Coordination programs.

5.2.1.1. Nuclear Community Advisory Councils

OPG’s Nuclear Generating Stations have a significant role to play in the Clarington and Pickering communities. OPG strives to understand host communities’ concerns and to be transparent in providing residents with information about the company’s nuclear facilities. To that end, OPG has established Community Advisory Councils (“CAC”) for both the Darlington and Pickering generating stations.

The Nuclear CACs were established in the 1990s, and are comprised of members from a large number of sectors from across the community. CAC membership includes community associations, municipal government, health, environment, education, youth, business and members at large. CAC members live or work in the vicinity of the plants, and serve on a voluntary basis.

The CACs meet between six and eight times per year. During those meetings, the members receive briefings from OPG staff and other experts. Although meetings focus on environment, public health, safety and economic issues, the topics vary depending on the issues of interest to the community. CAC members have opportunities to question OPG and to discuss what they have heard.
The CACs are an important bridge between OPG and the communities where the company’s Nuclear Generating Stations are located. It allows OPG’s senior management to hear directly from members of the community, giving the community a direct connection to the company and allowing the company to better understand and respond to community questions, concerns and preferences.

5.2.1.2. Community Leader Engagement

In addition to the community engagement processes described above, OPG engages with local leaders in communities where the company’s larger generating facilities are located. Engaging with community leaders helps OPG ensure that it has a clear, unbiased perspective on the issues that matter to major segments of the local community.

OPG identifies local leaders in government, business, academic, media and other sectors that reflect a spectrum of views on OPG’s role in the community. Discussions may cover a number of topics, ranging from safety and environmental issues to upcoming company projects at local facilities. In order to encourage interviewees to speak frankly and comprehensively, OPG commits that any discussions will be kept confidential.

Being qualitative in nature, engagement with community leaders provides directional indication of community views from informed individuals from a spectrum of sectors and interests. OPG’s senior management is able to draw upon these views when making business decisions.

5.2.1.3. Waterway Coordination

OPG’s hydroelectric generating stations rely on the same waterways that many Ontarians live near, and rely on for their water supply, work and leisure. OPG operates its hydroelectric generating facilities in coordination with communities and governmental agencies to support public safety during flood events, emergencies and in the course of normal operations. For
many rivers, Water Management Plans have been established to account for the needs of the
various groups that use and rely on the river. OPG also modifies some of its operations at
hydroelectric generating stations to accommodate other users of Ontario’s waterways both on
an on-going basis and for special events.

OPG coordinates its use of Ontario waterways with organizations including the Ontario
Ministry of Natural Resources and Forestry, local conservation authorities, local municipalities,
Indigenous communities, the Federal Department of Fisheries and Oceans, and Parks
Canada. In times of extreme watershed conditions, OPG may be able to play a moderating
role. In flood-prone conditions, OPG helps to manage the release of water to mitigate risks to
local communities (both up-stream and down-stream from the company’s generating facility,
depending on the location of the flood risk). Similarly, OPG may be called upon during periods
of drought to support conservation efforts and aquatic habitat.

OPG also maintains an extensive Waterway Public Safety Program to mitigate public safety
risks associated with the company’s facilities. Details of this program and OPG’s other public
safety measures are described in section 5.5 of this schedule.

OPG receives requests from users of the waterways regarding special events, such as the
Royal Canadian Henley Regatta. Now in its 134th year, the regatta is one of the largest
amateur rowing tournaments in North America, and it is held on Martindale Pond in St.
Catherine’s. In order to support the community and allow the regatta to proceed, OPG
reduces flows from its DeCew Falls Generating Station for several hours per day throughout
the regatta. Ramping production down and back up is not a trivial endeavour. This process
requires multiple safety inspections and coordination with the community. However, OPG
shares provincial waterways with customers and local communities. As such, the company
takes reasonable steps to support the needs of the customers and communities with which it
shares Ontario’s waterways.

5.2.2. Project Planning and Execution
OPG’s regulated capital projects are often significant endeavours that have the potential to affect local communities in a number of ways.

OPG’s projects have a socioeconomic dimension. Just as the company’s large projects can materially add to Ontario’s economic growth, its projects can also have a positive effect on the local community’s economy.

In addition, OPG’s projects require significant logistical coordination in host communities, such as altering traffic flows or requiring safety-related restrictions on access to areas of land and waterways. Projects often require an influx of personnel, either on a temporary or permanent basis. OPG also takes measures to mitigate risk to a community’s environment, archeological record or heritage sites.

In order to address these various potential effects on host communities, OPG consults with host communities throughout the planning and execution of capital projects. The elements and scale of a project-specific consultation depend on the nature of the project and its potential to affect the local community.

For example, when OPG plans to carry out sustaining capital work at a generating station, the company assesses the potential for the project to affect the local community and identifies what forms of consultation and information sharing may be required. Each project is different, so OPG makes these assessments on a case-by-case basis.

For larger projects, OPG’s community outreach can be quite broad, including town hall meetings to discuss potential impacts and solicit customer input. The specific forms of outreach vary with the nature of the project, its location, and other factors. Where possible, community feedback will be taken into account and reflected in the project plan. OPG also makes use of dedicated websites for major projects, providing information and soliciting input from the widest possible audience.
The appropriate form and the extent of community engagement activities will depend on the circumstances of a given project. Not all projects require dedicated consultations; it would not be efficient or cost effective for OPG to hold town hall meetings for smaller projects that occur exclusively within OPG’s facilities and have no material impact on the community. When OPG identifies a potential community impact in connection with a smaller project, such as road closures, it takes appropriate measures to inform local residents and businesses. As part of this process, OPG provides contact information for customers who may have questions or concerns.

5.3. Academic Collaboration

OPG also works with academic and other industry partners to research and promote public safety in connection with electricity generation. By collaborating and sharing existing information with academic researchers, OPG is able to promote public benefits, like flood prevention. By sharing information, OPG can promote innovation and reduce costs for researchers.

As an example, OPG collaborates with Natural Sciences and Engineering Research Council of Canada (“NSERC”) Canada FloodNet, a multi-disciplinary research network that is partly funded by NSERC. FloodNet allows efficient coordination between stakeholders, connecting researchers from across Canada and pooling data from OPG and other industry and government partners. FloodNet is then able to develop enhanced flood forecast tools and flood management capacity, which ultimately reduce the damage, socio-economic impacts and human distress caused by flooding, and help protect community water systems and the environment.

5.4. Indigenous Community Relations

OPG is committed to building and growing mutually beneficial working relationships with Indigenous communities near its current and future operations. These relationships are built
on a foundation of respect for the culture and customs of Indigenous peoples, and established and maintained through ongoing dialogue aimed at preserving openness, transparency and trust.

Where appropriate, OPG pursues prospective generation-related developments with Indigenous communities that can provide the basis for long-term, mutually beneficial, commercial arrangements.

OPG’s practice of consultation with Indigenous communities pre-dates the statutory duty to consult. OPG’s commitment to consultation has been beneficial to both the company and to Indigenous communities. By working to resolve grievances and to build relationships, OPG believes that future projects and continued operation will be able to proceed more efficiently and deliver the best outcomes for Indigenous communities, customers, and the company.

A copy of OPG’s First Nations and Métis Relations Policy is included as Attachment 4.

5.5. Emergency Management and Public Safety Programs

Public safety is a critical concern for OPG. In addition to the community engagement processes described above, OPG keeps the general public informed about and prepared for emergencies and other safety-related issues through several programs.

- Public safety around OPG’s dams and hydroelectric generating facilities is critical to OPG. In addition to physical safety measures (e.g., signage, fences, booms and buoys), OPG maintains a proactive dam safety communications program. The company’s “Stay Clear, Stay Safe” campaign runs year-round on various media, featuring safety messages tailored to the varying risks between seasons. Designed in coordination with the Centre for Addiction and Mental Health, the campaign targets groups and activities at risk. OPG continues to work closely with the Ontario Provincial Police its public safety campaign.
A copy of OPG’s recent “Stay Clear. Stay Safe.” print brochure is included as Attachment 5. The campaign’s television ads can be viewed online at https://www.youtube.com/user/opgvideos.

Figure 3: The logo of OPG’s waterway public safety campaign

- Each of OPG’s regions has an Emergency Response Plan that is developed and continually maintained in coordination with community leaders (e.g., mayors’ offices, Indigenous Communities, MPPs, fire services and other first responders). OPG meets regularly with these community leaders to review the emergency plans and to help the company’s community partners conduct their own Hazard Identification and Risk Assessment processes.

- OPG also conducts annual dam safety exercises. These exercises are more than planning meetings – they involve simulated emergencies that unfold over a number of hours or even multiple days, requiring responses from OPG and other groups. For
example, a simulated dam leak could require the OPP to set up barricades and road blocks while OPG's teams draw down the dam sluice gates or otherwise respond to the simulated emergency. In order to make the simulation effective, OPG may arrange to have individuals attempt to bypass barricades or otherwise complicate the emergency.

- OPG regionalizes its safety signage to help effectively communicate safety hazards to local communities. The signage in Figure 4 is an Ojibway warning used in northern communities, reading “Danger – Dam Ahead – Keep Out”.

**Figure 4: Ojibway Safety Signage used in Northern Communities**

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5.6. **Customer Engagement and Business Planning**

As Ontario's largest electricity generator, OPG plays an important role in the economic life of the province and in the daily lives of Ontario families, businesses and institutions, and
considers customers’ interests when making business decisions. Although OPG has no formal
customer engagement obligations, it continues to believe that the company can best maintain
the trust of its customers and host communities through business plans that reflect customers’
preferences.

As discussed in Ex. A2-2-1, OPG’s business planning process is currently informed by several
customer-related factors, including the economic climate, trends in electricity costs and
consumers’ ability to pay. However, to date, the company has not conducted structured
customer outreach expressly intended to inform business planning. OPG believes that a more
formal customer engagement process may provide valuable insight into customers’
preferences with respect to the company’s priorities and plans. OPG intends to develop such
a process during the IR period. OPG hopes to build on customer engagement work that other
OEB-regulated companies are conducting and, where possible, may look for opportunities to
collaborate with other regulated entities to engage with customers more effectively.
<table>
<thead>
<tr>
<th>Attachment</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td>Attachment 1: Updated Hydroelectric Total Factor Productivity Study</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Attachment 2: Hydroelectric Benchmarking Study</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Attachment 4: OPG First Nations and Métis Relations Policy</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Attachment 5: “Stay Clear. Stay Safe.” Brochure</td>
</tr>
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