PAYMENT AMOUNT SMOOTHING

1.0 PURPOSE

This evidence sets out OPG's proposal for smoothing payment amounts during the 2022- 2026 IR term.

2.0 OVERVIEW

OPG proposes smoothed weighted average payment amounts ("WAPA")[1] of $74.63/MWh in 2022, $75.38/MWh in 2023, $76.13/MWh in 2024, $76.89/MWh in 2025, and $77.66/MWh in 2026, resulting in entries to the rate smoothing deferral account ("RSDA")[2] of $241.2M in 2022, $299.9M in 2023, $167.0M in 2024, $103.4M in 2025 and $(44.8)M in 2026. This proposal is pursuant to the requirements of O. Reg. 53/05 (the "Regulation") and consistent with principles established in EB-2016-0152. The smoothing proposal is also consistent with customer feedback received during OPG's customer engagement (Ex. A2-2-1).

The average residential customer bill impact of OPG's rate proposal[3] is 0.4% annually or approximately $0.41 on a typical monthly residential customer bill each year. If OPG were to propose a constant WAPA increase that recovered the entire proposed nuclear revenue requirement for the 2022-2026 period, that increase would be approximately 3.1% per year, and the customer bill impact would be 0.7% annually on average or approximately $0.81 on a typical monthly residential customer bill each year.

Section 3.0 summarizes the rate smoothing requirements set out in the Regulation. Section 4.0 describes the inputs into the calculation of the WAPA. Section 5.0 sets out OPG's proposal and customer engagement efforts, evaluates the proposal using the established principles, and compares the proposal against alternatives.

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[1] Ex. I1-1-2 Table 2, line 9
[2] Ex. I1-3-1 Table 1, line 5
[3] Ex. I1-1-2 Table 1, lines 4 and 5

3.0 REQUIREMENTS OF O. REG. 53/05

Ontario Regulation 53/05 (the "Regulation") sets out certain processes and parameters that OPG and the OEB must follow regarding the smoothing of OPG's payment amounts during the deferral period.[4]

The regulation requires that, for each year of the deferral period, the OEB must approve a nuclear revenue requirement and must also determine a portion of that approved revenue requirement to defer.[5] The OEB is required to make this determination with "a view to making more stable the year-over-year changes in the OPG weighted average payment amount over each calculation period."[6] The "calculation period" is defined in s. 0.1(1) of the Regulation as:

> each period for which the Board determines the approved revenue requirements under subparagraph 12 ii of subsection 6 (2) together with the year immediately prior to that period.

Subparagraph 12(ii) of subsection 6(2) of the Regulation requires that the OEB determine nuclear revenue requirements and amounts to be deferred on a five-year basis for the first 10 years of the deferral period (2017-2026). Subparagraph 12(iv) requires that the balance in the Rate Smoothing Deferral Account be recovered on a straight-line basis over a period not to exceed 10 years beginning when the Darlington Refurbishment Program ends.

3.1 Calculation of the Weighted Average Payment Amount

Section 0.1(1) of the Regulation defines OPG's WAPA for a year through the following formula:

$$\frac{((NPA + NPR) \times NPF) + ((HPA + HPR) \times HPF)}{(NPF + HPF)}$$

[4] O. Reg. 53/05 defines the deferral period which commences January 1, 2017 and ends when the Darlington Refurbishment Project ends.
[5] O. Reg. 53/05, s. 5.5 (1).
[6] O. Reg. 53/05, s. 6 (2), sub-para. 12 (i).

NPA (**Nuclear Payment Amount**) is the Board-approved payment amount for the year in respect of the nuclear facilities

NPR (**Nuclear Payment Riders**) is the Board-approved payment amount rider for the year in respect of the recovery of balances recorded in the deferral accounts and variance accounts established for the nuclear facilities, excluding the RSDA

NPF (**Nuclear Production Forecast**) is the Board-approved production forecast for the nuclear facilities for the year

HPA (**Hydroelectric Payment Amount**) is the Board-approved payment amount for the year, or the expected payment amount resulting from a Board-approved rate-setting formula, as applicable, in respect of the [prescribed] hydroelectric facilities

HPR (**Hydroelectric Payment Riders**) is the Board-approved payment amount rider for the year in respect of the recovery of balances recorded in the deferral accounts and variance accounts established for the hydroelectric facilities

HPF (**Hydroelectric Production Forecast**) is the Board-approved production forecast for the hydroelectric facilities for the year

The NPR, NPF, HPA, HPR, and HPF are collectively referred to as the “inputs”, since they are the values that the OEB must approve to determine the annual amounts of nuclear revenue requirement to be recorded in the RSDA for the 2022-2026 period. While the NPA is also approved by the OEB, it is an output (rather than an input) of the prescribed formula since it will reflect the annual deferral of nuclear revenue requirement.

4.0 INPUTS TO RATE SMOOTHING

This section identifies the values for the inputs required to determine annual deferral amounts to be recorded in the RSDA during the IR term.

Each of the following steps is necessary in order to determine the amounts to be deferred in the RSDA:

Step	Action	Basis in O. Reg. 53/05
1	Approve annual nuclear revenue requirements for the five-year IR Term, absent any deferral	s. 5.5(1)(a) s. 6(2)12(ii) s. 6(2)12(iii)
2	Approve required WAPA inputs for each year	
3	Determine the annual change in the WAPA, applying the principles established in EB-2016-0152 to assess options with a view to making more stable the year-over-year changes in the WAPA over each calculation period ("Smoothed WAPA Rate")	s. 0.1(1) s. 6(2)12(i)
4	Using the Smoothed WAPA Rate determined in Step 3 and the inputs approved in Step 2, determine the annual NPA	s. 0.1(1)
5	Determine annual deferred amount to be recorded in RSDA for each year of the five year term [Step 1 - (NPA x NPF)]	s. 5.5(1)(b) s. 6(2)12(i)

The nuclear revenue requirements proposed in this application are summarized in Chart 1 below.

Chart 1: Nuclear Revenue Requirement[7]

	2022	2023	2024	2025	2026
Nuclear Revenue Requirement Net of Stretch Factor ($M)	$3,611.4	$3,540.8	$3,644.2	$3,324.5	$2,550.9

[7] I1-1-1 Table 1, line 26

Hydroelectric Payment Amount (HPA): Per Ex. I1-2-1, the 2022-2026 HPA is $43.88/MWh, being the 2021 hydroelectric payment amount that is to remain in effect during the IR term pursuant to O. Reg. 53/05.

Nuclear Payment Rider (NPR) and Hydroelectric Payment Rider (HPR): Per Ex. H1-2-1, OPG is requesting recovery of certain audited December 31, 2019 balances in the deferral and variance accounts, adjusted for 2020-2021 amortization amounts approved in EB-2016-0152 and EB-2018-0243, through nuclear payment riders and hydroelectric payment riders over the January 1, 2022 to December 31, 2026 period. The proposed nuclear payment rider[8] is $2.34/MWh in 2022, $2.52/MWh in 2023, $2.33/MWh in 2024, $5.50/MWh in 2025, and $7.72/MWh in 2026. The proposed hydroelectric payment rider[9] is $1.33/MWh in 2022, 2023, and 2024, and $0.69/MWh in 2025 and 2026.

The rate smoothing proposal does not reflect payment riders for recovery of deferral and variance account balances after December 31, 2019, as none are proposed in this Application. Any payment riders the OEB may establish for those account balances would be separate from the rate smoothing proposal and would not affect the revenue requirement deferral amounts approved by the OEB in this proceeding. In a subsequent proceeding, the OEB could assess the future bill impact of potential payment riders for recovery (or refund) of any amounts approved.

Determination of Annual Change in WAPA: Pursuant to the Regulation, the calculation period in this application is 2022-2026. OPG calculates WAPA for each year in the calculation period as demonstrated in Ex. I1-1-2, Table 2. The Regulation requires that a rate smoothing proposal result in a WAPA that is more stable than would be the case without deferral of nuclear revenue requirement.[10]

[8] Ex. H1-2-1 Table 2, Line 31
[9] Ex. H1-2-1 Table 1, Line 22
[10] O. Reg. 53/05, s. 6 (2)(12)(i); relative to WAPA as defined in s. 0.1 (1).

Total OPG Regulated Production: Consistent with EB-2016-0152, for the hydroelectric facilities, OPG has used the average of the 2014 and 2015 OEB approved hydroelectric production.[11] For the purpose of WAPA smoothing, this amount is used for each year in the 2022-2026 period. Per Ex. E2-1-1, the nuclear production forecast proposed in this application is 33.2 TWh in 2022, 30.8 TWh in 2023, 33.3 TWh in 2024, 30.2 TWh in 2025, and 21.5 TWh in 2026.

4.1 Post-2026 Projections used in Smoothing Analysis

An understanding of forecast nuclear costs and production for the entire deferral and recovery period is necessary context to determine the appropriate rate smoothing proposal under the Regulation. While it is not possible to forecast revenue requirement and production out 15 years precisely, Chart 2 provides OPG's view of the approximate longer-term nuclear revenue requirements and production, along with indicative average nuclear rates that would result for the 2026-2036 period without smoothing (in nominal dollars).

Chart 2: Nuclear Revenue Requirement, Production and Average Unsmoothed Rate

	2022-2026	2027-2031	2032-2036
Anticipated Revenue Requirement[12] ($B)	$16.7[13]	$15.9	$15.8
Anticipated Production (TWh)	149[14]	134	141
Average Rate ($/MWh)	$112	$119	$112

In consideration of the magnitude of costs being deferred, OPG's smoothing proposal continues to assume that the RSDA balance is recovered over the maximum ten-year period.

The average rate (absent rate smoothing) for the 2032 to 2036 period reflects the stabilization of OPG's operations post completion of the DRP and activities associated with the end of

[11] 33 TWh, per EB-2013-0321, Decision with Reasons, November 20, 2014, p. 9.
[12] Excludes Pickering closure costs that will be recorded in the Pickering Closure Costs Deferral Account.
[13] Sum of 2022-2026 Revenue Requirement net of Stretch Factor from Ex. I1-1-1 Table 1, line 26
[14] Sum of 2022-2026 Production per Ex. E2-1-1

Pickering commercial operations.[15] OPG believes that the average forecast 2032 to 2036 rate is therefore a reasonable proxy for the rate that will prevail after the rate smoothing deferral and recovery cycle (i.e., the "new normal"), that is approximately $112/MWh as forecast in Chart 2 above.

5.0 EVALUATION AND PROPOSAL

5.1 Rate Smoothing Alternatives

Chart 3 provides a summary of the outcomes from a range of rate smoothing alternatives. The alternatives reflect varying degrees of smoothing that achieve year-over-year WAPA increases ranging from 0% to 3%. For each alternative, OPG has provided the approximate peak RSDA account balance, an estimate of the total interest accumulated in the RSDA to the end of the recovery period, projected credit metrics during the deferral period, the rate change both in $/MWh and percentage terms on transition to the assumed steady state rate of $112/MWh following the recovery period, and an estimated average monthly customer bill impact over the full deferral and recovery periods. OPG is proposing Alternative E in this application.

[15] Anticipated production is higher in the 2032-2036 period reflecting the Darlington Vacuum Building Outage scheduled in 2027, and return to 1% target forced loss rate ("FLR") for all units after a period of assumed higher FLR immediately post refurbishment based on industry experience (see Ex. E2-1-1).

Chart 3: Smoothing Alternatives – Outcomes

	A	B	C	D	E (OPG Proposal)
2022-2026 Change in WAPA[16]	0.0%	1.0%	2.0%	3.0%	Y1: 4% Y2-5: 1% AVG: 1.6%
2027-2036 Change in WAPA[8]	3.4%	2.2%	0.9%	(0.4)%	0.9%
Peak RSDA Balance ($B)	$3.0	$2.3	$1.6	$1.2	$1.5
2022-2026 Interest ($M)	$319	$272	$223	$174	$206
Total Interest ($B)	$1.05	$0.84	$0.62	$0.40	$0.60
Interest Cost / Deferred Revenue Ratio	0.5	0.6	0.7	0.7	0.7
Lowest Cash Flow from Operations Pre Working Capital to Debt Ratio (2022-2026)	10.9%	11.3%	11.5%	11.7%	12.0%
Lowest Funds From Operations to Debt Ratio (2022-2026)	10.9%	10.8%	10.7%	10.6%	10.7%
Nuclear Payment Amount Transition Impact Post 2036 ($/MWh)	$(7.03)	$(3.38)	$0.37	$4.21	$0.46
Average Annual Bill Impact (2022-2026)[17] in %	0.00%	0.22%	0.45%	0.68%	0.36%
Average Annual Bill Impact (2022-2026) in $	$0.00	$0.25	$0.51	$0.79	$0.41
Average Annual Bill Impact (2022-2036) in %	0.29%	0.26%	0.24%	0.21%	0.24%
Average Annual Bill Impact (2022-2036) in $	$0.33	$0.30	$0.27	$0.24	$0.27

5.2 Rate Smoothing Principles

In the OEB's Decision and Order in the EB-2016-0152 proceeding, the OEB agreed that the six guiding principles[18] OPG had used to develop its rate smoothing proposals are appropriate, subject to refinements related to rate stability and customer bill impact considerations (discussed below).[19] OPG continues to use these same principles to evaluate rate smoothing alternatives, as outlined below.

5.3 Application of Rate Smoothing Principles

OPG evaluates its proposal against the rate smoothing principles below.

[16] Calculated assuming that hydroelectric payment amounts escalate at an even rate per year throughout the 2027-2036 period. For modeling purposes, the most recent increase in the hydroelectric payment amount of 1.7% in 2021 under the price-cap formula is used. This approach is consistent with EB-2016-0152.
[17] Estimated customer bill impacts shown are for on a typical residential consumer.
[18] OPG's six guiding principles were discussed in EB-2016-0152, Ex. A1-3-3, pp. 3-6.
[19] EB-2016-0152 Decision and Order, p. 155.

Financial Viability (Leverage and Cash Flow Impacts): This criterion focuses on maintaining levels for the company's credit metrics that are adequate to support an investment grade credit rating, and ensuring sufficient cash flow to support the company's debt and interest obligations. An investment grade credit rating is critical to OPG's ability to obtain cost effective financing and affects OPG's cost of debt, which is reflected in the proposed revenue requirements.

OPG used two financial metrics to gauge the potential impact of rate smoothing alternatives on the above objectives: the Funds from Operations ("FFO") to Debt ratio and the Cash Flow from Operations Pre Working Capital ("CFO") to Debt Ratio. These are the primary metrics currently used by S&P Global Rating ("S&P") and Moody's Investors Service ("Moody's), respectively, to evaluate OPG's financial risk as part of their credit rating process.[20,21] The metrics are included in OPG's credit reports issued by these agencies (Ex. A2-3-1). A forecast of less than 13% consistently on the FFO to Debt metric could result in a negative rating action from S&P.[22] A forecast of less than 12% on the Cash Flow to Debt metric on a sustained basis could lead to a downgrade by Moody's.[23]

Higher values for both the FFO to Debt and CFO to Debt metrics reduce financial risk to OPG. OPG's assessment of the rate smoothing alternatives was based on at least one of these two metrics being within threshold at all times during the 2022-2026 period, which OPG's proposal achieves. Some of the

[20] In EB-2016-0152, OPG utilized the Debt-to-Earnings Before Interest Taxes Depreciation and Amortization ("EBITDA") ratio and the Funds from Operations ("FFO") Adjusted Interest Coverage ratio as measures for this criterion. The former metric was one of the main metrics used by S&P at the time; the latter was OPG's own metric as publicly reported in its external financial filings (i.e. Management Discussion and Analysis). Since EB-2016-0152, OPG no longer reports the FFO Adjusted Interest Coverage ratio and now monitors the two primary credit metrics in use by the rating agencies as set out above. The metrics used in this application are those included in OPG's business plan.

[21] As discussed in Ex. A2-3-1, OPG obtained the Moody's credit rating in 2019.

[22] For example, Ex. A2-3-1, Att. 10, p. 3.

[23] For example Ex. A2-3-1, Att. 5, p. 3.

other alternatives fail on this criterion especially during the earlier years of the 2020-2026 Business Plan.

Rate Stability: In addition to being a general ratemaking principle, the goal of greater rate stability is implicit in the rate smoothing requirements of O. Reg. 53/05. Most of the alternatives in Chart 3 results in constant year-over-year change in the WAPA within the 2022-2026 deferral period and within the recovery period. OPG's proposal has a constant year over year change in the WAPA for four of the five years in the rate term. In each alternative, the year-over-year change in WAPA varies between the deferral period and the recovery period. Generally, lower variances between these two points is better, which OPG' proposal achieves.

In its EB-2016-0152 Decision and Order, in refining OPG's proposed rate smoothing principles, the OEB noted that while rate stability is important, the OEB was of the view that "it does not necessarily follow that year over year increases should be constant, as proposed by OPG in its most recent smoothing proposal," stating that OPG "should not consider itself constrained by a straight line increase."[24]

Long-Term Perspective: As a portion of the revenue requirement will be deferred for future collection, the rates set in the current period will necessarily affect rates to be established in the future. OPG believes these future rate effects should be considered when setting rates for the IR term, in order to avoid creating abrupt rate swings in the future. The assessment of this criterion was based on the size of the average year-over-year change in WAPA during the recovery period (closer to 0% is better). Out of the alternatives, OPG's proposal produces the lowest positive delta in the average year-over-year change in WAPA between the two periods.

[24] EB-2016-0152 Decision and Order, p. 155.

Post-Recovery Transition: A rate smoothing proposal should attempt to minimize the impact of transition from smoothed rates to non-smoothed rates at the end of the (assumed maximum ten-year) recovery period for the RSDA balance. Ideally, the smoothed rate at the end of the recovery period should not differ substantially from the 'steady state' rate of $112/MWh discussed above. This would avoid abrupt rate changes following the end of the recovery period. Thus, the assessment was based on the size of the change in the nuclear payment amount from the end of the recovery period to the forecast post-transition payment amount of approximately $112/MWh (smaller is better). With an estimated transition impact of $0.46/MWh, OPG's proposal meets this criterion well, as does Alternative C.

Intergenerational Equity: Rate smoothing involves recovery of costs incurred in one period in a future period. The Regulation provides that costs deferred for recovery will earn OPG's long-term debt interest rate compounded annually as determined by the OEB. The smoothed rate should balance the customer bill impacts of deferred recovery with the carrying costs that will ultimately be borne by customers in subsequent periods as a result of that deferral.

The assessment was based both on the ratio of total interest costs to total amounts deferred (total interest / total amounts deferred), as well as the absolute amount of interest consistent with the OEB's findings in EB-2016-0152. A lower ratio implies a lower cost of deferring revenue under that alternative and a lower absolute amount implies a lower cost overall.

Intergenerational equity involves striking a balance between the benefits of deferring revenue (such as lower customer bill impacts) and the costs of the deferral; therefore OPG's assessment placed value on a ratio that best reflects this balance (i.e., neither the highest nor the lowest ratio). OPG's proposal achieves a balanced outcome in this regard. OPG's proposal also achieves a

lower interest cost than Alternative C, both in the IR term and over the full period to 2036 (assuming a maximum ten-year recovery period).

Customer Bill Impact: All of the customer-focused considerations discussed above ultimately affect the shorter and longer term impacts on customer bills. OPG believes that the magnitude of the customer bill impact should be considered both over the IR term and the full period to 2036. Each alternative was therefore assessed based on the resulting average year-over-year change in a typical residential customer's monthly bill, in both periods. Among the lower cost interest alternatives, OPG's proposal achieves the lowest impact over the IR term and is very close to Alternative C, which has the lowest impact over the full period to 2036.

In EB-2016-0152, the OEB noted that "rate shock" should be avoided in the first year of the rate term.[25] In OPG's view, all of the alternatives analyzed accomplish this goal, as the first year customer bill impact is less than 1%.[26]

5.4 Customer Engagement Feedback

As described in Ex. A2-2-1, OPG engaged Innovative Research Group Inc. ("INNOVATIVE") to conduct a multi-phase customer engagement process to help inform the company's business plan. As part of the second phase of the engagement process, OPG sought customer feedback on specific choices OPG would likely need to consider in its business plan, including its approach to rate smoothing.

INNOVATIVE sought customer input on the value proposition that different rate smoothing options present for customers. INNOVATIVE presented rate smoothing as a trade-off between paying more now (but less over time), or paying less now (but more overall). The workbook presented customers with three illustrative scenarios with varying degrees of smoothing.

[25] EB-2016-0152 Decision with Reasons, p. 155.
[26] The OEB's Handbook for Utility Rate Applications consider there to be a need for a rate mitigation plan when the total bill impact exceeds 10%.

These scenarios were designed to assess customer preferences between different approaches; they were not based on specific deferral amounts and financial impacts.

A majority of both business and residential customers supported at least a moderate level of smoothing, balancing the nearer-term benefit of smoothed rates against the long-term cost. Customer preferences are discussed further in the INNOVATIVE report, Ex. A2-2-1 Attachment 4.

OPG's proposal was selected with these customer preferences in mind and achieves a balance over the deferral and recovery periods between customer benefits and ultimate costs, based on the criteria outlined in section 5.3.

5.5 Proposal

OPG has proposed Alternative E, as it achieves the best balance between financial viability and customer-focused criteria, and, given the financial viability criteria, presents the best alternative amongst the customer-focused criteria.

As noted earlier, OPG's proposal achieves somewhat less rate stability in the first year of the IR term than, for example, Alternative C, but it enables OPG to meet the financial viability criterion, whereas Alternative C does not. As noted in OPG's 2020-2026 Business Plan and Ex. A2-2-1, OPG expects its credit metrics to be under greater pressure during the earlier years of the 2020-2026 Business Plan. Alternative E should be preferred as it best meets the financial viability criteria, which can ultimately affect the cost of borrowing.

Alternatives A and B both fail the financial viability criteria, having the least favourable outcomes on credit metrics. In addition, although they have lower IR term customer bill impacts, they result in the largest amount of interest costs, the largest transition at the end of the recovery period, a larger increase in the average WAPA rate of change and higher average customer bill impacts over the full period to 2036.

Alternative D shows the most favourable credit metrics and results in lowest interest costs, but it carries the largest customer bill impact in the 2022-2026 period, has a large transition impact increase, and results in a larger decrease in the average WAPA rate of change between the IR term and the recovery period.

Like Alternative E, Alternative C also balances many of the above customer-focused considerations relative to Alternatives A, B and D. However, in addition to putting pressure on the credit metrics in the earlier years of the IR term, it carries a somewhat higher interest cost and results in a higher change in the average year-over-year WAPA trajectory between the deferral and recovery periods, compared to Alternative E. On the other hand, as noted above, it provides for somewhat greater rate stability in the IR term.

Both Alternatives E and Alternatives C are consistent with the feedback provided through the customer engagement process outlined in Section 5.4.

Based on this analysis, the proposed nuclear payment amounts presented in Ex. I1-3-1 have been determined based on the preferred Alternative E. OPG therefore proposes to defer the collection of approximately $0.8B in nuclear revenue requirements for 2022 through 2026, which is the sum of the deferred revenue requirement amounts for those years shown in Chart 4.

Chart 4

OPG Proposed Deferred Nuclear Revenue Requirement

	2022	2023	2024	2025	2026
Proposed Revenue Requirement ($M)[27]	$3,611.4	$3,540.8	$3,644.2	$3,324.5	$2,550.9
Forecast Production (TWh)[28]	33.2	30.8	33.3	30.2	21.5
Smoothed Rate ($/MWh)[29]	$101.51	$105.13	$104.42	$106.70	$120.67
Smoothed Revenues ($M)[30]	$3,370.1	$3,240.9	$3,477.2	$3,221.2	$2,595.8
Deferred Revenue Requirement ($M)[31]	$241.2	$299.9	$167.0	$103.4	$(44.8)

[27] Ex I1-1-1 Table 1, line 26
[28] Ex. E2-1-1
[29] Ex. I1-1-2 Table 2, line 4
[30] Ex. I1-3-1 Table 1, line 4
[31] Ex. I1-3-1 Table 1, line 5