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Nuclear Rate Smoothing

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Chris Fralick
Vice President, Regulatory Affairs
Randy Pugh
Director, Regulatory Affairs

Agenda

- Nuclear Rate Smoothing Proposal Overview
- Mechanics of OPG's Rate Smoothing Proposal
- Rate Smoothing Criteria
- Customer Impact Smoothing
- Summary of OPG's Proposal
- Impact of OPG's Proposal
- Appendix
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 - Derivation of the Bill Impact
 - Smoothing Alternatives - Outcomes

Nuclear Rate Smoothing Proposal Overview

Objective of Rate Smoothing

- To stabilize year-over-year change in nuclear payment amounts
- OPG's rate smoothing proposal is consistent with O.Reg. 53/05

OPG's proposal mitigates both rate impact and volatility driven by:

- Reduced production as Darlington units are taken out of service for refurbishment
- Increased revenue requirement impacts from costs associated with the Darlington Refurbishment Program
- Production impacts and costs associated with Pickering

Key terms:

- Deferral period – January 1, 2017 to end of the Darlington Refurbishment Program (2026)
- Recovery period - 10 years, beginning at the end of the deferral period

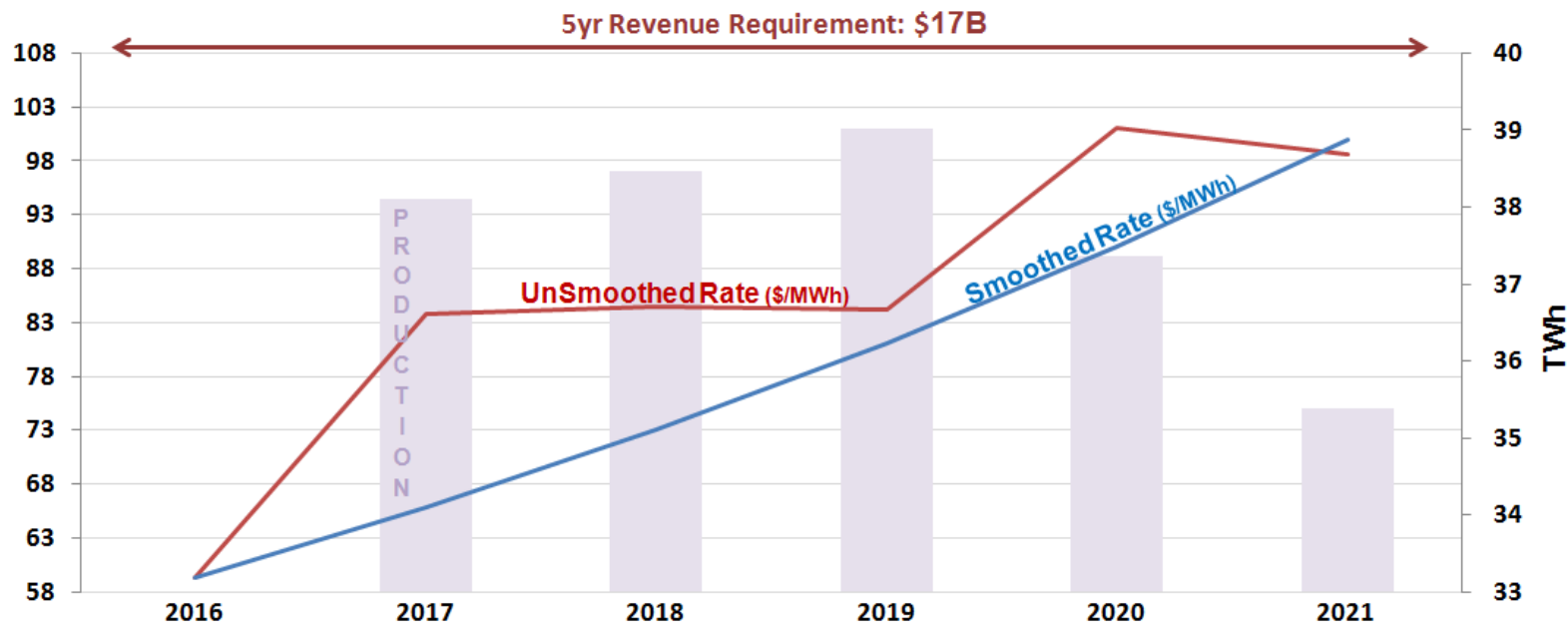
Mechanics of OPG's Rate Smoothing Proposal

Step	Action	O. Reg. 53/05
1	Establish Rate Smoothing Deferral Account ("RSDA")	5.5(1)
2	Approve annual nuclear revenue requirements for five year term without any deferral ("unsmoothed revenue requirements")	5.5(1)(i), 6(2)12(ii), 6(2)12(iii)
3	Approve an annual nuclear production forecast	Required for Step 5
4	Determine the percentage change in the nuclear payment amounts with a view to making the year-over-year change more stable* ("smoothed rate")	6(2)12(i), 0.1, 6(2)12(iv)
5	Determine annual deferred amount to be recorded in RSDA for five year term [Step 2 - (Step 3 x Step 4)]	5.5(1)(ii), 6(2)12(ii)

* OPG has taken a long-term perspective reflecting both the deferral and recovery period as discussed in the following slides

Mechanics of OPG's Rate Smoothing Proposal

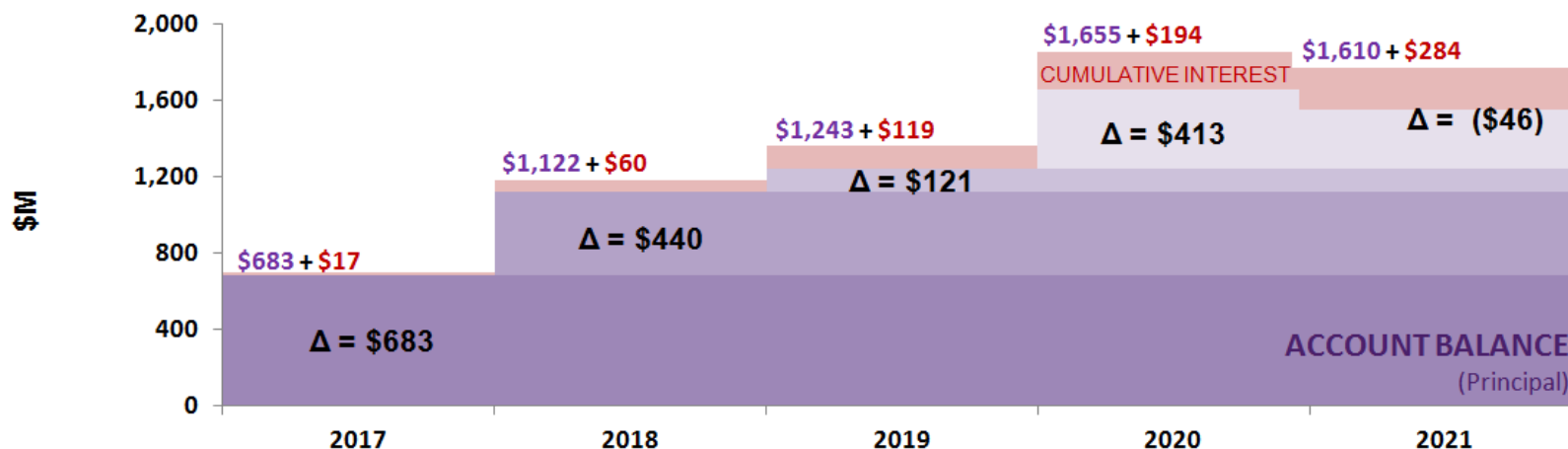
Rate Smoothing Proposal 2017-2021



- 1) Proposed Production (TWh)
- 2) Unsmoothed Rates (\$/MWh)
- 3) Smoothed Rate (\$/MWh)

Mechanics of OPG's Rate Smoothing Proposal

Rate Smoothing Deferral Account 2017-2021



1) Proposed Production (TWh)	38.1	38.5	39.0	37.4	35.4
2) Unsmoothed Rates (\$/MWh)	83.73	84.48	84.17	101.05	98.62
3) Smoothed Rate (\$/MWh)	65.81	73.05	81.09	90.01	99.91
4) Annual Deferred Amt (\$M)	683	440	121	413	(46)
5) Cumulative Deferred Amt (\$M)	683	1,122	1,243	1,655	1,610
6) Est. Interest Expense (\$M)	17	43	59	75	90
7) Est. Cumulative Interest (\$M)	17	60	119	194	284

Rate Smoothing Criteria

OPG evaluated rate smoothing scenarios against six criteria selected to align with RRFE outcomes of Financial Performance and Customer Focus

FINANCIAL PERFORMANCE

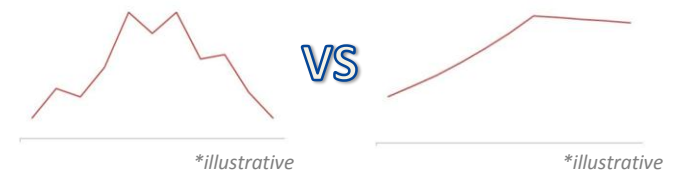
Financial Viability

- Cost effective financing to support debt and interest obligations and ability to obtain cost-effective financing. OPG needs to be able to maintain its investment grade credit rating and ensure sufficient cash flows. Financial viability was assessed using the following financial metrics:
 - Debt-to-Earnings Before Interest Taxes Depreciation and Amortization ratio
 - Funds from Operations (“FFO”) Adjusted Interest Coverage ratio

CUSTOMER FOCUS

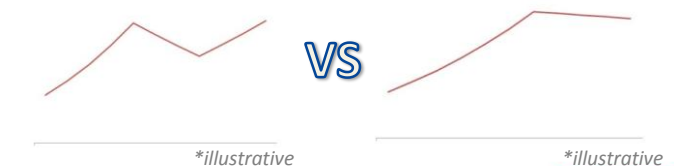
Rate Stability

- OPG’s proposal produces a constant annual rate of change throughout the 5-year term, and was developed by considering rate impacts over the full cost deferral and recovery periods



Long-term Perspective

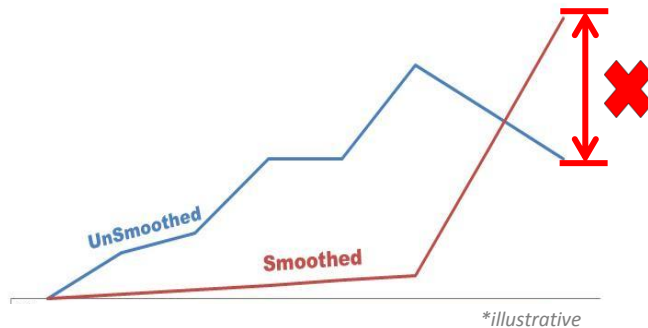
- Avoid abrupt rate swings in the future. Rates should be reasonable considering the full cost deferral and recovery period



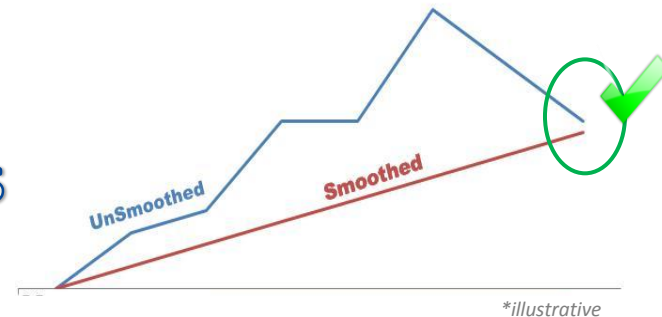
Rate Smoothing Criteria

Post-Recovery Transition

- Rate smoothing should not result in a large step-change in rates at the end of the recovery period. OPG's proposal minimizes the risk of significant customer "rate shock" when the recovery period ends



VS



Intergenerational Equity

- Rate smoothing necessarily involves transferring recovery of certain costs from one period to another. OPG's proposal aims to balance the benefit of stable rates against the carrying costs borne by future customers

Customer Bill Impact

- Rate smoothing is about balancing the short-term and long-term costs and benefits listed above. The magnitude of the customer bill impact over the full deferral and recovery period should be reasonable in the circumstances

Customer Impact Smoothing

Description	2017 Amount	2018 Amount	2019 Amount	2020 Amount	2021 Amount	5 Year Average
(a)	(b)	(c)	(d)	(e)	(f)	
NUCLEAR PAYMENT AMOUNT RATE SMOOTHING (As Filed)						
1 Typical Bill Impact (\$/Month)	(1.29)	1.73	1.07	1.86	1.89	1.05
2 Typical Bill Impact (%)	(0.9%)	1.1%	0.7%	1.2%	1.3%	0.7%
3 Prior Year weighted average rate with proposed payment amounts and riders (\$/MWh)	60.66	57.37	61.76	64.45	69.26	
4 Current Year weighted average rate with proposed payment amounts and riders (\$/MWh)	57.37	61.76	64.45	69.26	74.27	
5 Change in OPG weighted average rate (\$/MWh) (line 4 - line 3)	(3.29)	4.39	2.69	4.81	5.02	
6 Resulting percent change in nuclear rates, year-over-year (%)	11%	11%	11%	11%	11%	
CUSTOMER IMPACT SMOOTHING						
7 Typical Bill Impact (\$/Month)	1.05	1.05	1.05	1.05	1.05	1.05
8 Typical Bill Impact (%)	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
9 Prior Year weighted average rate with proposed payment amounts and riders (\$/MWh)	60.66	63.34	66.01	68.65	71.36	
10 Current Year weighted average rate with proposed payment amounts and riders (\$/MWh)	63.34	66.01	68.65	71.36	74.14	
11 Change in OPG weighted average rate (\$/MWh) (line 10 - line 9)	2.68	2.67	2.63	2.71	2.79	
12 Resulting percent change in nuclear rates, year-over-year (%)	29.1%	5.4%	9.8%	6.0%	6.3%	

Customer Impact Smoothing

OPG contemplated smoothing on a customer impact basis and determined that this is not an appropriate approach for the following reasons:

- Inconsistent with O.Reg. 53/05
- Creates highly variable nuclear payment amounts
- Comingles the hydroelectric payment amount, hydroelectric riders, and nuclear riders with the nuclear payment amounts
- The impact of future deferral and variance account dispositions is not known but will have additional customer impacts
- There is a large diversity of customer classes and billing methodologies throughout Ontario

Summary of OPG's Proposal

Proposal:

- Defer recovery of approximately \$1.6B in proposed 5-year revenue requirement
- Provide a consistent 11% annual rate of change in nuclear payment amounts, beginning January 1, 2017 for the first 5 years of the deferral period

A consistent 11% smoothed rate accomplishes the following:

- **Stabilizes Rates:** Provides customers with stable and predictable year-over-year changes in nuclear rates during the deferral period
- **Smooth Transitions:** Minimizes the transitions between deferral, recovery and the end of the period – there otherwise could be significant step-changes in rates at these transition points
- **Customer Value:** Moderates the cost of deferring revenue requirement, by limiting carrying costs, while still producing stable rates throughout the deferral, recovery, and post-recovery transition periods
- **Maintains Financial Viability:** OPG's 11% proposal ensures that at least one of the financial risk metrics are above threshold for the deferral period and reflects OPG's best attempt to balance OPG's financial risk against customer bill impact and the other Customer Focus criteria

Impact of OPG's Proposal

Projected RSDA balance is approximately \$1.9B at December 31, 2021 reflecting approximately \$0.3B in interest

- Results in a nuclear base payment amount change of 11% per year during the 2017 to 2021 period
- Combined with hydroelectric rates, the total average annual growth over the 5 years is 4.2% per year
- Annual customer impact is slightly less than 0.7% or approximately \$1.05 per month per year on a typical residential customer bill
- Absent the deferral of \$1.6B, the nuclear payment amount would be highly variable, resulting in an equivalent average nuclear base payment amount rate of change of approximately 15% per year. The corresponding annual customer bill impact would be approximately 1.2% per year, or \$1.85 per month per year



Appendix

Typical Bill Calculation

- OPG has computed the average residential customer bill to be \$150.58 in the province of Ontario
- OPG computed this number by taking the average of 83* different distribution company bills as computed using the OEB's bill calculator**
- Impact is calculated based on OPG proportion of typical monthly consumption of 750kWh adjusted for losses
- This calculation was completed based on electricity rates as of May 1, 2016
- This approach is consistent with how OPG has computed the average residential customer bill in prior proceedings

**Excluded remote communities and small utilities that do not have delivery or regulatory charges (i.e., Attawapiskat First Nation, Hydro One Remote Communities Inc, etc.)*

*** <http://www.ontarioenergyboard.ca/oeb/Consumers/Electricity/Your%20Electricity%20Utility>*

Deviation of the Bill Impact

			2017	2018	2019	2020	2021
Rates and Riders							
1	Unsmoothed Payment Amount	(\$/MWh)	83.73	84.48	84.17	101.05	98.62
2	Smoothing % Increase	(%)	11%	11%	11%	11%	11%
3	Smoothed Payment Amount	(\$/MWh)	65.81	73.05	81.09	90.01	99.91
4	Payment Rider	(\$/MWh)	2.85	2.85			
5	Nuclear Rate Including Rider	(\$/MWh)	68.66	75.90	81.09	90.01	99.91
6	Regulated Hydroelectric Rate Including Rider	(\$/MWh)	43.15	43.77	42.97	43.61	44.27
Production							
7	Regulated Hydroelectric Production	(TWh)	30.2	30.2	30.2	30.2	30.2
8	Forecast Nuclear Production	(TWh)	38.1	38.5	39.0	37.4	35.4
9	Total Production	(TWh)	68.3	68.7	69.3	67.6	65.6
Weighted Average Rates							
10	Regulated Hydroelectric Portion of Production-Weighted Average Rate (line 6 x line 7 / line 9)	(\$/MWh)	19.09	19.26	18.75	19.51	20.39
11	Nuclear Portion of Production-Weighted Average Rate (line 5 x line 8 / line 9)	(\$/MWh)	38.28	42.50	45.70	49.75	53.88
12	Total Production-Weighted Average Rate (line 10 + line 11)	(\$/MWh)	57.37	61.76	64.45	69.26	74.27
13	Prior Year weighted average rate with proposed payment amounts and riders	(\$/MWh)	60.66	57.37	61.76	64.45	69.26
14	Change in OPG weighted average rate (line 12 - line 13)	(\$/MWh)	(3.29)	4.39	2.69	4.81	5.02
Bill Impact							
15	Typical Usage of OPG Generation	(kWh/Month)	392	394	397	388	376
16	Typical Bill	(\$/month)	150.58	150.58	150.58	150.58	150.58
17	Typical Bill Impact (line 14 x line 15 / 1000)	(\$/month)	\$(1.29)	\$1.73	\$1.07	\$1.86	\$1.89
18	Typical Bill Impact (line 17 / line 16)	(%)	(0.9)%	1.1%	0.7%	1.2%	1.3%

Smoothing Alternatives - Outcomes

2017 - 2021 Rate Increase	12.0%	11.0%	10.0%	9.0%	8.0%
2022- 2026 Rate Increase	12.0%	11.0%	10.0%	9.0%	8.0%
2027 - 2036 Rate Increase	(6.4)%	(3.4)%	(0.3)%	2.6%	5.4%
Peak Account Balance (\$B)	\$2.4	\$3.5	\$5.0	\$6.9	\$9.5
2017 - 2036 Total Estimated Interest (\$B)	\$0.7	\$1.5	\$3.0	\$4.5	\$5.9
Interest Cost / Deferred Revenues Ratio	0.2	0.5	0.8	0.9	0.9
FFO Interest Coverage > = 3 (2017-2021) / (2022-2026)	3.7 / 6.3	3.6 / 5.3	3.5 / 4.5	3.5 / 3.9	3.4 / 3.3
DEBT to EBITDA < = 5.5 (2017-2021) / (2022-2026)	6.1 / 5.1	6.2 / 5.3	6.3 / 5.5	6.3 / 5.7	6.4 / 6.0
Transition Impact: 2037 Rate Change (\$/MWh / %)	\$26/MWh / 27%	\$2/MWh / 2%	\$(28)/MWh / (19%)	\$(60)/MWh / (33%)	\$(94)/MWh / (44%)
Average Bill Impact: 2017-2036 (%)	0.2%	0.3%	0.4%	0.6%	0.8%
Average Bill Impact: 2017-2036 (\$ / month)	\$0.24	\$0.41	\$0.64	\$0.89	\$1.16

See: Ex. A1-3-3 Chart 3