Ontario

GLOBAL ADJUSTMENT (GA) SMOOTHING

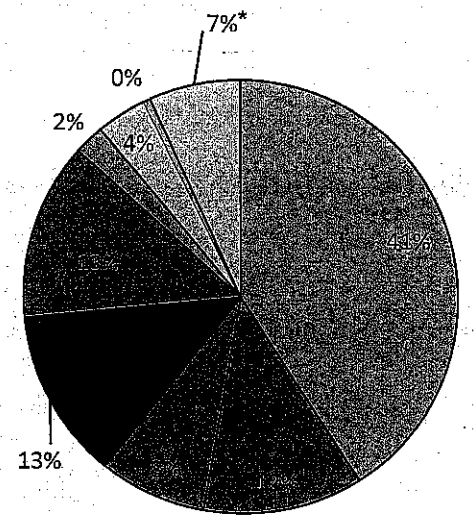
Overview – GA Smoothing

- The Global Adjustment (GA) has risen over the past decade as the province's electricity system has decarbonized.
  - The vast majority of GA costs now stem from greenhouse gas (GHG) emissions-free renewable and nuclear generation facilities, as well as natural gas plants that were constructed to restore system reliability and replace coal-fired capacity.
  - Generators in Ontario received contracted or regulated rates, which are typically designed to recover capital, financing, and fixed operations costs. The GA recovers these fixed costs of running the province's generation fleet, as well as the cost of conservation programs.
- The majority of the province's electricity generators are under 20-year contracts and account for less than half of the GA. Some of these generators will continue to provide value to the electricity system beyond their contract lives (i.e., beyond 20-years).
  - There is an opportunity to recognize the long-term benefit of these assets to the electricity system and "bring forward" that benefit for ratepayers today by deferring some of the current costs.
  - GA Smoothing would spread these costs over a longer period and provide immediate ratepayer relief (i.e., similar to re-financing a mortgage). By recognizing that generation assets are expected to continue to provide residual benefit to future ratepayers, beyond the term of current contracts, future ratepayers are expected to be able to utilize these assets and reduce the need to finance the development of new generation assets.
- The GA Smoothing option under consideration is illustrative and show potential rate mitigation measures to meet a targeted 25% reduction from the projected residential bill in 2017.
  - These residential impacts are based on a forecast for a household connected to Toronto Hydro that consumes 750 kWh per month.
  - Actual ratepayer savings would vary due to differences in consumption patterns.
  - Targeted to Regulated Price Plan (RPP) -eligible;
  - Rate increases would be capped at Consumer Price Index (CPI) for the first four years. Subsequent years would be set above CPI in order to ensure that bill increases due to repayments are capped at around 10% of the total bill.

GA Smoothing – Cost Breakout

- The Global Adjustment (GA) accounts for the fixed costs, including capital costs, of running Ontario's generation fleet, as well as the cost of conservation programs. The GA is instrumental in maintaining a reliable electricity system by ensuring that sufficient generating capacity is available.
  - Generators in Ontario received contracted or regulated rates, which are typically designed to recover capital, financing and fixed operations costs. Most generators are on 20-year contracts with the exception of hydroelectric and nuclear plants. They operate on longer contracts (or are regulated on a cost-of-service basis by the OEB) in recognition of the much longer operating lives of these facilities.
- Chart below shows the breakout of the GA by generator and program types. In 2016, the GA costs were $12.3 billion. These costs will evolve over time as 2,181 MW of previously contracted generation comes online in the coming years.

2016 GA Cost: $12.3 billion



	GA ($M)
Nuclear	5,053
Hydro	1,473
Natural Gas	985
Wind	1,552
Solar	1,630
Biomass, Landfill and Byproduct	278
Conservation	467
IEI Program	60
OEFC*	842

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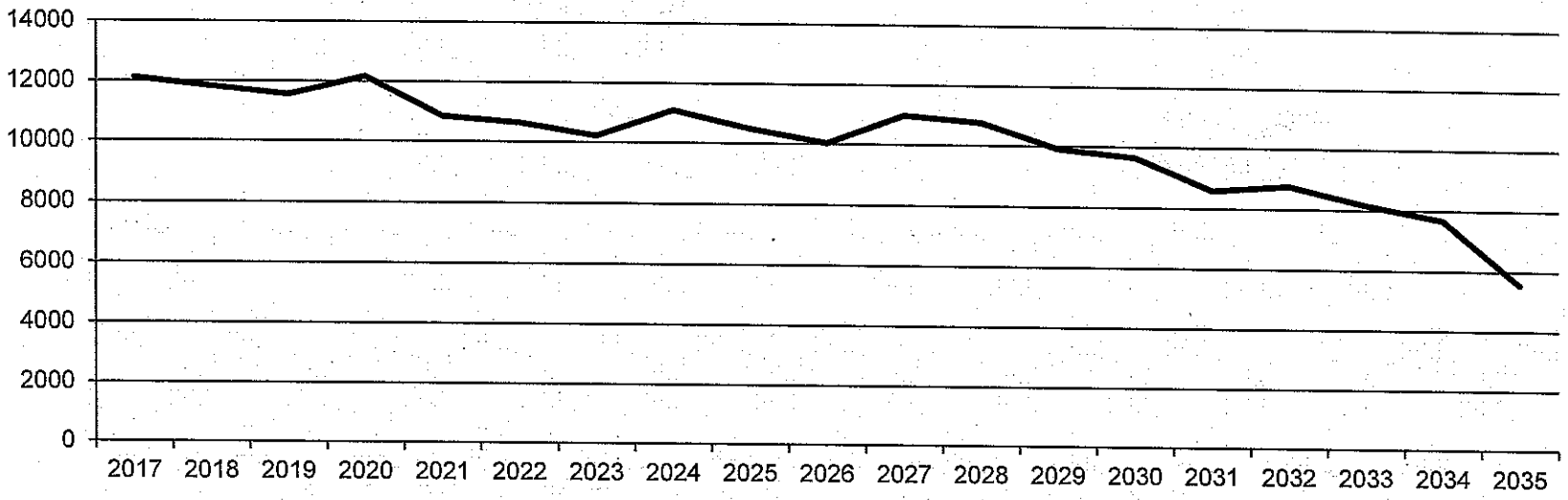
*Note: OEFC indicates the cost of generator contracts managed by the OEFC which include contracts for natural gas, hydro and biomass generators.
** Note: Conservation measures, not quantified here, serve to reduce Ontario energy demand. Actual electricity generation would be larger than 155 TWh in the absence of conservation programs.

GA Smoothing – Global Adjustment Forecast

- The amount of Global Adjustment (GA) is forecast to decrease through the forecast period. Several factors contribute to the decline of GA, including:
  - Expiry of electricity generation contracts;
  - Cost of existing contracts reduced due to Inflation; and
  - Higher wholesale electricity prices due to higher natural gas/carbon prices, higher demand and reduced nuclear generating capacity.

Forecast Global Adjustment Cost (nominal $ million)



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GA Smoothing – Expected Life of Electricity Generating Assets

- Gas, wind and solar generators are typically contracted for a 20-year period (e.g., with the Ontario Electricity System Operator (IESO), etc).
  - Nuclear and hydroelectric generators are contracted for a much longer period or regulated by the Ontario Energy Board (OEB) on a cost-of-service basis.
- While it is likely that gas, wind and solar generators will be able to operate beyond their current contracts, IESO advises that generators will need to decide what level of capital investment is appropriate for ongoing operations (i.e., by replacing and/or refurbishing major facility components).
  - In IESO's 2016 Ontario Planning Outlook (OPO), it was assumed that the service lives of generators could be extended beyond their contract term based on additional investments and ongoing costs. **Note:** This was not an assessment of the cost/benefits or a prediction of what the generators would actually do at the end of their contracts.
- The table below outlines IESO's current estimates for service lives of gas, wind and solar facilities. The ongoing service lives of these facilities depend on: initial facility design & build, operating activities (e.g., hours of operation, etc.) and level of facility maintenance (i.e., ongoing component repair and replacement).

Technology	Contract Life (yrs)	Expected Life (yrs)	Expected Cost Post-Contract Life
Gas	20	Up to 30	Life varies with initial design, how it is operated and maintained.
Wind	20	Up to 30	Older technologies may deteriorate faster. Elements such as foundations and electrical integration can last longer.
Solar	20	Up to 30	Performance deteriorates to about 80% by end of contract. Some facilities built in the initial contract periods may deteriorate more; however, technology is improving rapidly. Components need to replaced 5 to 30 years depending on design.

Source: IESO consultant reports (2014 and 2015)

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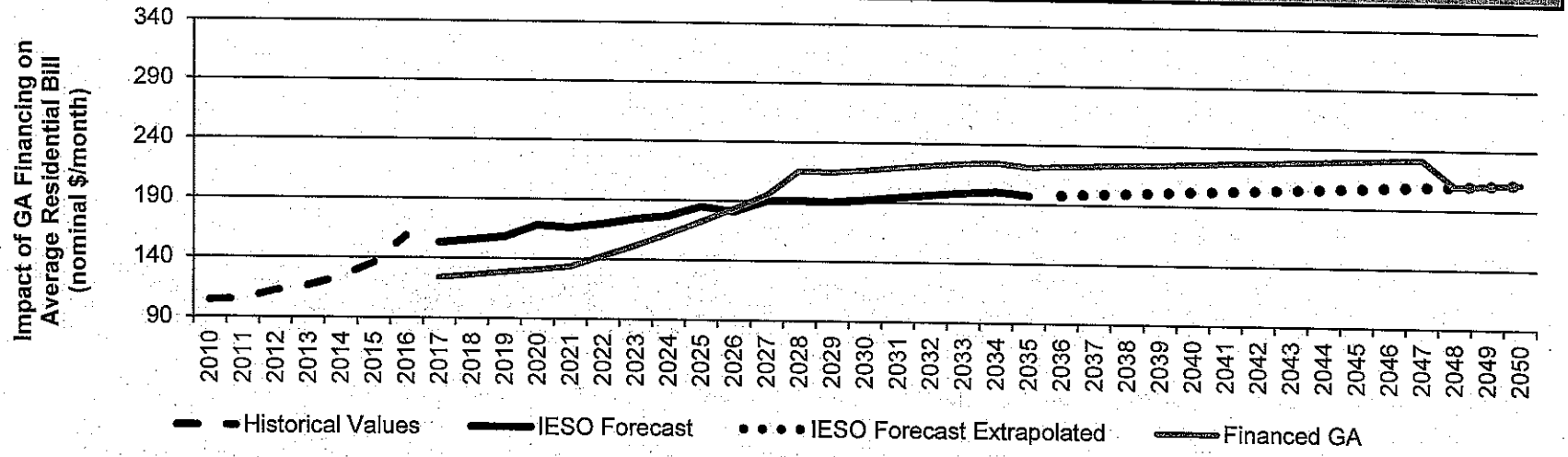
A. GA Smoothing for RPP-Eligible Only (Borrow $2.5 billion in 2017, Residential Bills Lowered 25%, Lower Total Debt)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Average monthly residential bill w GA financing impact and tax *($/month)*	104	105	112	116	124	136	158	123	126	128	131	133	142	151	161	172	183	195	215	214	216	219	221	223	224	221	222	222	223	224	225	226	227	228	229	230	230	231	210
Year-over-year change in bill *(%)*	-	1.0	6.7	3.9	6.1	9.8	16.7	-22.1	2.0	2.0	2.0	2.0	6.5	6.5	6.5	6.5	6.5	6.5	10.5	-0.4	0.9	1.2	1.0	0.8	0.6	-1.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-9.3
Impact of GA financing pre-tax *($/month)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-26.1	-26.1	-26.2	-32.8	-28.7	-23.9	-19.9	-13.5	-11.8	2.0	4.2	21.8	21.8	21.7	21.7	21.5	21.4	21.3	21.0	20.9	20.8	20.7	20.6	20.5	20.4	20.4	20.3	20.2	20.1	20.0	19.9	0.0
Total Accumulated Debt *($ billion)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	5.1	7.9	11.4	14.6	17.8	20.8	23.2	25.6	26.7	27.7	26.8	26.0	25.1	24.1	23.1	22.0	20.9	19.7	18.5	17.2	15.9	14.4	12.9	11.3	9.7	7.9	6.1	4.2	2.1	0.0	0.0
Total Change in Accumulated Debt *($ billion)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	2.8	3.5	3.2	3.2	2.9	2.4	2.4	1.1	0.9	-0.8	-0.9	-0.9	-1.0	-1.0	-1.1	-1.1	-1.2	-1.2	-1.3	-1.4	-1.4	-1.5	-1.6	-1.7	-1.7	-1.8	-1.9	-2.0	-2.1	0.0

Notes: Assumes 30 year financing period and a nominal interest rate of 5% (compounded monthly). Ratepayer GA payments increase annually beyond 2021 such that the average monthly residential electricity bill increases by 6.5% per year with a limit of $2.2 billion above the true cost of GA in any given year to cap repayment charges at around 10% of total bill. IESO forecast is based on IESO's revised OPO forecast as of February 2017. Includes the cancellation of LRP II and EFW, expansion of ICI. Does not include smoothed OPG rates. Above residential bill is based on a 750 kWh per month Toronto Hydro customer.

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