

Lowering electricity bills by restructuring Global Adjustment charges

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There is an opportunity for the government to lower current electricity bills by restructuring global adjustment charges over a longer period of time than is currently scheduled, which would reduce consumer bills in the short to medium term in return for slightly higher bills than otherwise in the long term.

The economic rationale for such a smoothing policy is that the useful productive lives of contracted private sector generation assets – payments for which constitute the majority of global adjustment charges – are in some cases longer than the durations of the contracts. For instance, wind power RESOP, FIT and LRP contracts are structured for 20 years, even though wind turbines and equipment may be expected to operate for 30 years or longer, assuming periodic maintenance and refurbishment is undertaken. Under a 20 year contract the capital costs are amortized too quickly relative to the useful life, leading to higher annual capital charges than would be the case if the amortization period was extended to the full expected life span. Similarly, natural gas generation contracts are for 10-20 year periods, though again the expected life span is up to 30 years or more. Charges to consumers for contracted generation could hence in principle be reduced by stretching capital amortization periods to match the expected productive lives of the assets. In this way, the costs of generation charged on consumer bills would more closely reflect the true economic costs of the assets.

There are three possible ways to accomplish this in Ontario, recognizing that many new contracts with private generators have already been agreed over the last 12 years.

1. Create option for existing generators to bid for new long-term contracts

First, the government may offer generators with existing contracts the opportunity to bid for new contracts that would supersede their current contracts, stipulating that (a) the time horizon for a new contract must extend beyond the current one, and (b) the new purchase price for electricity for the duration of the new contract must be lower than the current contracted rate. If the generator and government reach agreement on new terms, importantly on the contract duration and purchase price, the new contract would replace the original one. Otherwise, the original contract would remain in force.

From the generator's perspective, this provides an opportunity to lengthen the time horizon of financial returns on their investment, and to increase the expected net present value of the project. It also avoids a potentially challenging renegotiation with the government at the end of the original contract when the assets still have productive capabilities but have been fully amortized.

From the government's perspective, generation costs would be smoothed over a longer period of time as determined by individual generators on a case-by-case

basis, lowering average electricity bills in the short to medium term. Importantly, since the government need not accept all new generator contract proposals (due to the possibility that future demand for electricity will decrease), this process would create bidding competition between generators – competitive pressures could lead to much lower average power purchase rates in new long-term contracts.

2. Short-term government subsidization of payments to generators

An alternative approach to smoothing the amortization of generation costs is for the government to subsidize in the short to medium term a portion of annual contracted payments to generators operating under existing contractual terms, and to reduce consumer bills by the corresponding amount. The subsidy each year would equal the difference in annual amortization currently charged (based on the contract duration) and the annual amortization amount calculated using the productive life of the asset. The quid pro quo is that consumers would pay more than otherwise in later years to reflect a longer amortization period, specifically during the years beyond the end of the original contracted period and the useful life of the generation assets. Interest rates on government debt (which would fund the short-term subsidy) are currently very low (2.4% on Ontario's recent 10 year bond issue), making this a relatively cost-effective strategy.

3. Long-term contracting policy

In future contracting exercises, the government could invite generators to submit bids that include the proposed contract duration, and evaluate such bids on the basis of contract duration as well as on purchase price and other factors. Providing flexibility on duration would encourage generators to match the contract period to the expected productive life of the asset, resulting in (lower) annual amortization costs that reflect the true economic cost.

Preliminary estimate of potential impact on electricity bills

Estimating the potential impact on electricity bills from stretching out generation amortization periods requires detailed information on the terms of generator contracts, which are not publicly available. Assumptions based on available OEB and IESO data, however, can lead to approximate estimates, albeit with circumscribed confidence in their accuracy.

Since 2004 the Ontario government has contracted for a significant amount of new private sector generation capacity through competitive procurement exercises, bilateral negotiations, and feed-in tariff programs. By 2006, approximately 3,000MW of newly contracted capacity was operating; by the end of 2016, almost 25,000MW of contracted new nuclear, natural gas, hydro, wind, solar, and bio-energy capacity was in place, representing a dramatic increase in procurement over a 10 year period. New procurement is expected to almost cease in the coming years, so the period 2017-2020 represents the peak of accumulated contract capacity. Figure 1 shows the amount of accumulated contracted capacity for each fuel type from 2005 to 2067.

Figure1: [replicate Fig 5. From Progress Report on Contracted Electricity Supply]

There has been a significant increase in new natural gas contracted generation (representing XXX% of total contracted capacity in 2017), as well as in nuclear (XXX%) and wind (XXX%). Solar, hydro, bio-energy account for XXX% of the 2017 total.

Ontario Energy Board data on the average unit cost of electricity by fuel type, and IESO data on capacity utilization, leads to approximate estimates of the annual cost of contracted generation capacity.¹ In 2016, total payments to contracted generators are estimated to have totaled approximately \$XXX billion.

[Figure 2: Estimated payments to contracted generators]

An important feature of Figures 1 and 2 is that they chart the contractual duration of capacity, not the useful productive lifespan of the generating assets. Contract terms vary from 5 to 21 years for bio-energy, to 31 to 57 years for nuclear units. For natural gas and wind generation, contract periods appear to be somewhat shorter than typical estimates of expected lifespans (see Table 1), though lifespan estimates depend on a multitude of factors such as the specific technology type within a broad category, capacity utilization, and climate conditions. Some caution must thus be used in applying average industry lifespans to the specific case of generators in Ontario.

Table 1: Durations of Generator Contracts and Expected Asset Lifespans²

	IESO contract duration (range)	IESO contract duration (mid point)	IEA (2015) ³	EIA (2016) ⁴
Natural Gas	10-20	15	30	30
Wind	20	20	25	30
Nuclear	31-57	44	60	
Hydro	20-50	35	80	
Solar	20	20	25	30

¹ [Assumptions]

² Retirement ages of generation plants also indicate lifespans. In the U.S., natural gas plants have often reached more than 40 years before retiring (Powell, N. America's Ageing Generation Fleet. Power magazine, 28 January 2013)

³ International Energy Agency. 2015. Projected Costs of Generating Electricity.

⁴ Energy Information Administration. 2016. Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2016. August 2016.

Nonetheless, preliminary estimates of potential bill reductions can be calculated under hypothetical scenarios where generator lifespans are assumed to extend to 30 years for natural gas plants and 30 years also for wind farms. By the end of 2017, contracts for natural gas capacity will be an estimated 8 years old on average, implying that more than 50% of capital costs will have been amortized (assuming 15 year contracts on average). Amortizing the remaining 50% of capital costs over the next 22 years instead of the originally-planned next 7 years suggests a reduction of up to 65% in annual gas generator capital charges may be possible in 2018. For wind power contracts, the equivalent potential reduction in annual capital charges is up to 40% in 2018. The total value of reductions in natural gas and wind capacity capital charges is estimated at approximately \$2 billion in 2018, equivalent to 10% of total expected electricity system costs. The amount of the reduction declines gradually over time in part due to interest costs on the subsidized amount. Additional asset refurbishment expenses in the latter part of the lifespan of generation assets would also reduce the amount of capital charge savings.

These estimates are for Option (2) above in which the government finances the smoothing of contracted generator payments over an extended period, leaving original contracts unchanged. The alternative approach outlined in Option (1), where generators bid competitively for new long term contracts that supersede existing ones, may deliver similar savings if sufficient numbers of generators participate and submit competitive offers.