ONTARIO ENERGY BOARD

EB-2020-0265

IN THE MATTER OF the *Ontario Energy Board Act*, 1998, S. O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF an application by Hydro One Networks Inc. for the Hawthorne to Merivale Reconductoring Project

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Environmental Defence Cross-Examination Compendium

March 15, 2021

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Table 1: 2020 Avoided Costs (2020 Dollars)

Year	2020 Avoided Energy Cost by Season and Time-of-Use Period (2020$/MWh)									2020 Avoided Capacity Costs (2019$/kW-mth)	
										Generation	
	Winter On Peak	Winter Mid-Peak	Winter Off-Peak	Summer On Peak	Summer Mid-Peak	Summer Off-Peak	Shoulder Mid-Peak	Shoulder Off Peak	Annual	Summer (May 1 to October 31)	Winter (November 1 to April 30)
2021	$21	$20	$24	$27	$25	$28	$18	$21	$23	$0	
2022	$25	$22	$23	$29	$29	$21	$24	$17	$23	$3	$0
2023	$35	$33	$29	$30	$30	$30	$27	$22	$29	$8	$8
2024	$31	$30	$28	$30	$29	$22	$27	$27	$27	$6	$0
2025	$36	$33	$30	$32	$33	$23	$27	$23	$28	$10	$5
2026	$41	$40	$34	$43	$38	$29	$29	$25	$33	$10	$10
2027	$42	$37	$35	$37	$37	$30	$29	$24	$32	$10	$9
2028	$42	$36	$31	$39	$39	$31	$30	$28	$33	$9	$10
2029	$48	$40	$33	$37	$38	$30	$28	$25	$33	$10	$9
2030	$44	$36	$33	$57	$49	$31	$32	$28	$36	$10	$9
2031	$54	$41	$34	$43	$39	$31	$32	$29	$36	$10	$9
2032	$51	$40	$34	$41	$41	$30	$30	$25	$34	$10	$10
2033	$49	$41	$35	$40	$41	$30	$31	$27	$35	$11	$8
2034	$46	$40	$34	$47	$44	$32	$30	$22	$34	$10	$10
2035	$49	$39	$33	$50	$59	$36	$31	$25	$37	$10	$9
2036	$52	$40	$35	$53	$57	$37	$30	$26	$38	$10	$9
2037	$57	$46	$38	$49	$51	$36	$31	$25	$39	$10	$9
2038	$55	$45	$39	$59	$58	$38	$35	$26	$41	$10	$10
2039	$60	$47	$42	$59	$66	$39	$34	$31	$44	$10	$8
2040	$70	$51	$43	$67	$74	$41	$36	$28	$47	$10	$8

Conservation & Demand Management Energy Efficiency Cost Effectiveness Guide

Independent Electricity System Operator

March 2015

APPENDIX A

Use to convert real dollars to nominal dollars.

Inflation Rate	2.00 %

Use to calculate the NPV of costs and benefits.

Cost Effectiveness Metric	**Discount Rates (Real)**
Discount Rate	4.00 %

Use to calculate the NPV of costs and benefits.

Base year	2014

Use to calculate savings at the generator level.

Line Losses	**Percentage**
Average Distribution System Losses	4.20 %
Average Transmission System Losses	2.50 %

Costing Period Definitions

Table 1: Seasonal Periods

Season	Months Included
Winter	December – March
Summer	June – September
Shoulder	April, May, October & November

Table 2: Time of Use Periods

	Winter	Summer	Shoulder
On-Peak	0700 – 1100 and 1700 – 2000 weekdays (602 Hours)	1100 – 1700 weekdays (522 hours)	None
Mid-Peak	1100 – 1700 and 2000 – 2200 weekdays (688 hours)	0700 – 1100 and 1700 – 2200 weekdays (783 hours)	0700 – 2200 weekdays (1,305 hours)
Off-Peak	0000 – 0700 and 2200 – 2400 weekdays; All hours weekends and holidays (1,614 hours)	0000 – 0700 and 2200 – 2400 weekdays; All hours weekends and holidays (1,623 hours)	0000 – 0700 and 2200 – 2400 weekdays; All hours weekends and holidays (1,623 hours)

Note: Numbers are the daily hours for the various periods

Avoided Supply Costs

The following avoided supply costs are an output based on the resource mix defined in Ontario's Long-Term Energy Plan[21]

Year	Avoided Cost of Energy Production 2014 $/MWh by TOU Period								Avoided Capacity Costs 2014 $/kW-yr		
	Winter			Summer			Shoulder		At System Peak		
	On-Peak	Mid-Peak	Off-Peak	On-Peak	Mid-Peak	Off-Peak	Mid-Peak	Off-Peak	Generation Capacity	Transmission	Distribution
2015	$46.53	$43.38	$37.76	$33.65	$38.83	$31.87	$47.55	$40.77	-	$3.83	$4.73
2016	$36.08	$31.88	$31.81	$31.39	$36.65	$29.55	$42.24	$35.94	-	$3.83	$4.73
2017	$40.97	$34.96	$28.72	$27.98	$38.38	$30.74	$38.39	$33.51	$162.15	$3.83	$4.73
2018	$41.97	$35.82	$32.69	$25.14	$36.66	$29.75	$31.77	$26.98	$162.15	$3.83	$4.73
2019	$40.71	$38.57	$34.37	$37.43	$43.06	$34.67	$36.72	$32.90	$162.15	$3.83	$4.73
2020	$39.88	$36.86	$34.93	$36.75	$41.06	$33.80	$33.89	$31.23	$162.15	$3.83	$4.73
2021	$47.28	$45.16	$44.50	$43.91	$48.41	$44.82	$40.19	$38.99	$162.15	$3.83	$4.73
2022	$48.33	$47.47	$45.76	$42.48	$46.39	$43.93	$40.97	$39.27	$162.15	$3.83	$4.73
2023	$42.94	$42.84	$42.41	$41.86	$46.18	$42.58	$35.85	$33.64	$162.15	$3.83	$4.73
2024	$43.28	$42.02	$40.73	$41.90	$46.17	$41.61	$34.45	$32.84	$162.15	$3.83	$4.73
2025	$44.37	$43.42	$42.15	$40.28	$43.89	$39.21	$36.29	$36.05	$162.15	$3.83	$4.73
2026	$41.26	$40.08	$39.69	$39.77	$44.01	$38.82	$34.52	$32.62	$162.15	$3.83	$4.73
2027	$44.01	$41.72	$41.89	$39.32	$42.89	$38.96	$41.17	$39.10	$162.15	$3.83	$4.73
2028	$43.82	$42.88	$40.20	$41.56	$45.57	$40.75	$36.94	$33.86	$162.15	$3.83	$4.73
2029	$45.32	$43.69	$41.06	$40.96	$44.43	$40.30	$39.97	$39.19	$162.15	$3.83	$4.73
2030	$44.18	$43.17	$41.25	$42.10	$45.83	$39.88	$36.33	$34.50	$162.15	$3.83	$4.73
2031	$43.53	$42.40	$40.04	$40.95	$43.95	$38.57	$38.45	$37.29	$162.15	$3.83	$4.73
2032	$41.96	$40.90	$39.24	$40.56	$43.38	$38.15	$36.42	$33.61	$162.15	$3.83	$4.73
2033	$41.96	$40.90	$39.24	$40.56	$43.38	$38.15	$36.42	$33.61	$162.15	$3.83	$4.73
2034	$41.96	$40.90	$39.24	$40.56	$43.38	$38.15	$36.42	$33.61	$162.15	$3.83	$4.73

[21] Achieving Balance - Ontario's Long-Term Energy Plan – December 2013 (http://www.energy.gov.on.ca/en/ltep)

Ratepayer Assumptions

Year	Electricity	Natural Gas	Water	Propane	Heating Oil
	2014 $/kWh	2014 $/MMBtu	2014 $/L	2014 $/L	2014 $/L
2015	0.12	0.17	0.000004262	0.39	0.46
2016	0.13	0.17	0.000004262	0.39	0.46
2017	0.13	0.17	0.000004262	0.39	0.46
2018	0.13	0.17	0.000004262	0.39	0.46
2019	0.13	0.17	0.000004262	0.39	0.46
2020	0.13	0.17	0.000004262	0.39	0.46
2021	0.12	0.17	0.000004262	0.39	0.46
2022	0.12	0.17	0.000004262	0.39	0.46
2023	0.12	0.17	0.000004262	0.39	0.46
2024	0.12	0.17	0.000004262	0.39	0.46
2025	0.12	0.17	0.000004262	0.39	0.46
2026	0.12	0.17	0.000004262	0.39	0.46
2027	0.12	0.17	0.000004262	0.39	0.46
2028	0.12	0.17	0.000004262	0.39	0.46
2029	0.12	0.17	0.000004262	0.39	0.46
2030	0.12	0.17	0.000004262	0.39	0.46
2031	0.12	0.17	0.000004262	0.39	0.46
2032	0.12	0.17	0.000004262	0.39	0.46
2033	0.12	0.17	0.000004262	0.39	0.46
2034	0.12	0.17	0.000004262	0.39	0.46
2035	0.12	0.17	0.000004262	0.39	0.46
2036	0.12	0.17	0.000004262	0.39	0.46
2037	0.12	0.17	0.000004262	0.39	0.46
2038	0.12	0.17	0.000004262	0.39	0.46
2039	0.12	0.17	0.000004262	0.39	0.46
2040	0.12	0.17	0.000004262	0.39	0.46
2041	0.12	0.17	0.000004262	0.39	0.46
2042	0.12	0.17	0.000004262	0.39	0.46
2043	0.12	0.17	0.000004262	0.39	0.46
2044	0.12	0.17	0.000004262	0.39	0.46
2045	0.12	0.17	0.000004262	0.39	0.46
2046	0.12	0.17	0.000004262	0.39	0.46
2047	0.12	0.17	0.000004262	0.39	0.46
2048	0.12	0.17	0.000004262	0.39	0.46
2049	0.12	0.17	0.000004262	0.39	0.46
2050	0.12	0.17	0.000004262	0.39	0.46

Revision History

1. Sep 22, 2014 – Label on Avoided Cost of Energy Production table corrected. Summer and Winter labels swapped. Pg. 58.
2. October 27 -15 per cent adder for non-energy benefits inserted in section 4.2.7.

Hydro deal with Quebec to save Ontario electricity grid $70M

7-year agreement will help Ontario move away from natural gas, reduce greenhouse gases, sources says

By Keith Leslie, The Canadian Press Posted: Oct 21, 2016 5:50 AM ET Last Updated: Oct 21, 2016 10:06 PM ET

Ontario will import enough electricity from Quebec to power a city of more than 200,000 people under a seven-year agreement signed Friday, but the provinces won't say how much Ontario is paying Hydro Quebec.

Premiers Kathleen Wynne and Philippe Couillard signed the deal, which will see Ontario import up to two terawatt hours of electricity from Quebec annually, allowing the province to reduce its use of natural gas to generate power.

"We wanted to do this, but I said it would have to be a good deal for the people of Ontario," said Wynne. "And it is a good deal for Ontario, and for Quebec."

The agreement is expected to save Ontario's electricity system about $70 million in costs over the seven years, but the two government's cited "commercial sensitivities" for refusing to say how much Ontario will pay for the electricity.

However, Montreal newspaper *La Presse* reports the agreement is worth $1-billion, and calculates Ontario will pay five cents a kilowatt hour for the electricity.

The agreement will also allow Ontario to reduce its greenhouse gas emissions by one million tonnes a year by replacing gas-fired generation with clean power generated from Quebec's hydro dams.

"The reality about gas plants is that they are peaker, they often sit idle when that power is not needed," and are turned on when there's high demand, said Wynne. "The whole point of the gas plants is they are only used when that power is needed."

Wynne declined to say how much the $70 million in reduced costs would impact electricity bills in Ontario, if at all.

- Ontario Liberals rethink $1.9B cap-and-trade projection in uncertain market
- Environmentalists, automakers applaud Ontario's $8.3B climate change plan
- Ontarians see higher hydro bills as consumption comes down

NDP environment critic Peter Tabuns welcomed the import of more clean power from Quebec, but said the impact on consumers' electricity bills and the actual reduction in greenhouse gas emissions from the agreement will be minuscule.

"Scientists and economists will be able to detect it," said Tabuns, "but ordinary people will not be able to detect it."

Ontario plans to join the cap-and-trade market with Quebec and California next January, and Canada's two largest provinces have been finding more ways to work together on initiatives to combat climate change.

There has long been talk of an east-west power grid in Canada, and Couillard said it only makes sense to start with the two largest, neighbouring provinces.

"We always said when this question was mentioned that first and foremost the priority should be given to regional deals, and Quebec-Ontario is the most obvious example of that," said Couillard.

Environmentalists have long urged Ontario to import more clean power from Quebec's hydro-electric dams, but officials always said that would require huge and expensive upgrades to the transmission lines linking the two provinces.

However, the provinces say the existing transmission lines can support their new power agreement.

"The reality seems to be the transmission lines can handle a fair chunk of power and we should be looking at this as an option to deal with high hydro rates," said Tabuns.

Green Party of Ontario Leader Mike Schreiner called the Quebec deal a step in the right direction, but said the province should not extend the life of the Pickering nuclear station or rebuild the reactors at the Darlington station.

"The Liberals made the right decision to import low cost water power from Quebec," Schreiner said in a release. "Now they need to save billions by closing Pickering on schedule and cancelling the Darlington rebuild."

The new agreement will also allow Ontario to keep up to 500 gigawatt hours of power behind Quebec's dams in what is called a "pump storage" system, which will allow the province to reduce its surplus generation.

Wynne's Liberals face daily attacks from the opposition over soaring electricity prices, and the government is looking to do whatever it can to ease upward pressure on rates.

"This is one in the list of things that we are doing to remove costs from the system, whether it's the suspension of the long-term energy plan, whether it's renegotiating the Samsung (green energy) deal ... and removing the eight per cent provincial portion of the HST (from hydro bills) as of January," she said.

Ontario already has a surplus of power, and has signed 20-year contracts for electricity from two new natural-gas fired generating stations being built in Sarnia and Napanee.

Those gas-fired plants were originally going to be built in Mississauga and Oakville until the Liberals cancelled them days before the 2011 election, which the auditor general said would cost ratepayers up to $1.1 billion.