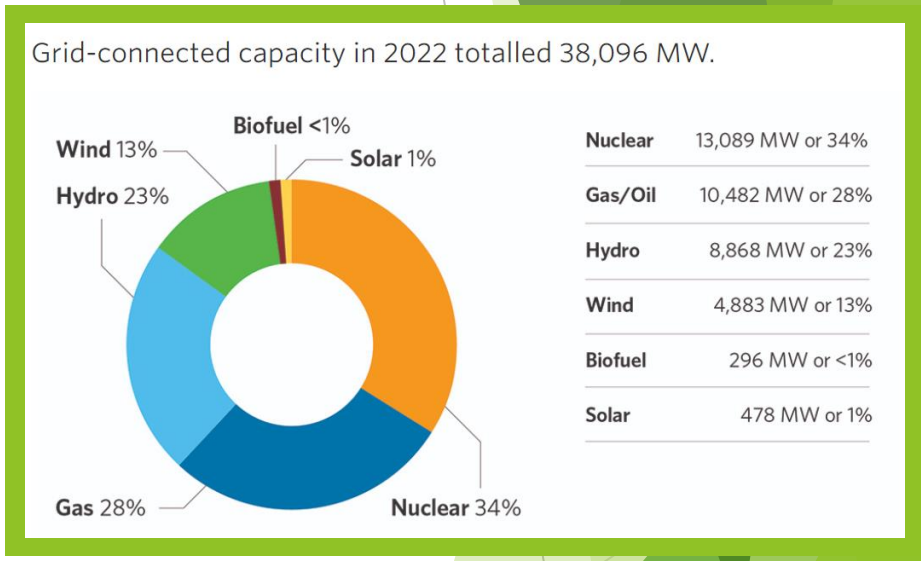
Ontario deserves better than new gas turbines

Introduction & Overview

- Important Questions
  - Do we need new simple cycle gas turbines?
  - Is Renewable Natural Gas (RNG) the solution?
  - How should we think about costs?
- Ontario: How we got here & how we move forward.

Do we need new simple cycle gas turbines?

- The grid is stable today, what is changing?
  - Population? Electrification? Renewable Energy? Industry?
  - Pickering Shutdown 2026 (~1,200MW lost vs. today)
- What is this plant actually for?
  - Enables existing plants to run as baseload instead of peaking to replace nuclear
  - Address concern that energy storage will not be built in time
    - "IESO, however, has identified significant reliability risks associated with supply chain disruptions, tight market conditions which could be particularly impactful for battery storage projects, and new technology integration."
      Resource Eligibility Interim Report October 7, 2022



“Over time, the IESO expects that natural gas generation will be replaced by a portfolio approach that includes new non-emitting generation, storage, as well as demand-side and transmission solutions. As this transition occurs, natural gas can continue to provide stability to the system as new forms of flexible supply are built, tested and connected to the grid.”

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Is RNG the solution?

- RNG is valuable: Limited supply, substantial demand
  - Currently ~10PJ of RNG in Canada (155PJ of RNG theoretical potential)
  - Currently ~4,400PJ natural gas demand in Canada and 1,050 in ON (120PJ electricity)
  - Most Efficient Option: Simple cycle ~40%, combined cycle ~60%, CHP >80%
- What assurance does Thorold have that only RNG will be used?
- This turbine **enables** emissions, direct emissions are of lesser concern
  - Increased emissions will come from **existing** gas plants
  - Northland has confirmed they see RNG as non-viable for existing plants

How should we think about costs?

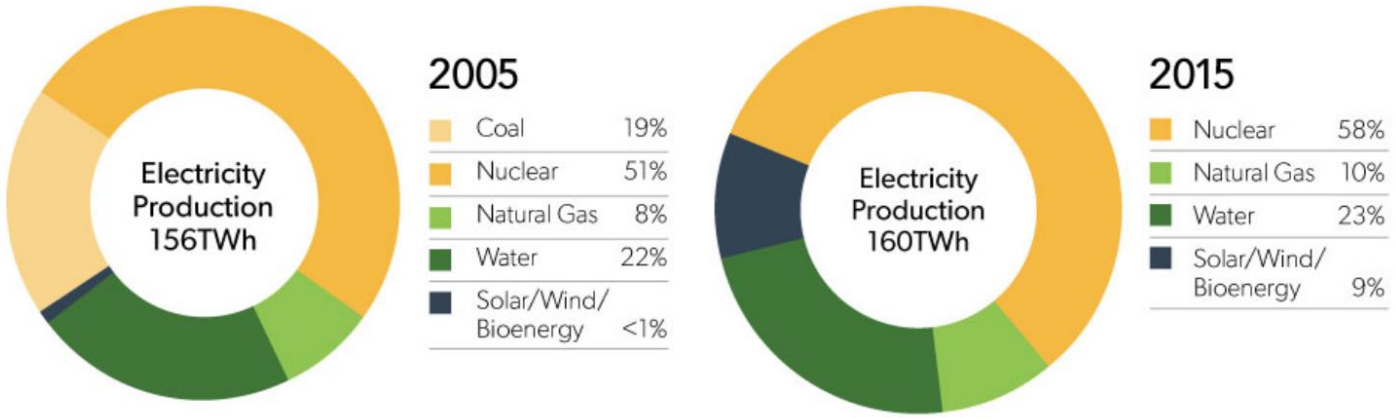
- Investment in community?
- Cost to electricity consumers?
- Does Niagara Region have a supply gap for serving industry?
- Cost proposition for 200MW gas plant
  - $300 million to build
  - Higher than typical O&M costs (RNG is not cheap)
  - Energy provided equivalent to a 10MW wind farm
- Cost per kWh produced?
- Cost of alternatives?
- Additional cost to ratepayers if this turbine is shut down prematurely?

How we got here & how we move forward

"Ontario's Clean Electricity Advantage: Ontario's electricity system is one of the cleanest and most reliable in the world, providing affordable electricity to serve a growing population, attract new investment and continue to power the province's strong economic growth"

Powering Ontario's Growth: Ontario's Plan for a Clean Energy Future, Ministry of Energy (Todd Smith)

Figure 1: Ontario electricity production (Source: Ontario Planning Outlook, 2016)



Count of the Days Thorold Cogen was running (at any output) in each hour of the day as a percentage

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Days running
2023	32%	24%	22%	26%	31%	38%	42%	46%	50%	51%	56%	63%	64%	66%	65%	63%	64%	63%	63%	62%	62%	58%	53%	46%	73%
2022	28%	24%	26%	30%	36%	43%	45%	48%	54%	58%	67%	72%	75%	75%	75%	74%	73%	73%	73%	72%	70%	67%	58%	42%	78%
2021	21%	18%	18%	21%	25%	28%	32%	36%	40%	42%	44%	45%	46%	47%	45%	45%	44%	44%	43%	42%	41%	36%	28%	24%	51%
2020	13%	13%	13%	17%	25%	31%	37%	39%	42%	45%	48%	50%	51%	50%	51%	50%	48%	47%	46%	45%	42%	37%	29%	19%	52%
2019	21%	17%	15%	17%	24%	30%	34%	38%	42%	45%	50%	52%	52%	52%	53%	52%	51%	50%	49%	47%	44%	41%	35%	25%	56%
2018	8%	7%	10%	12%	16%	21%	26%	30%	33%	38%	42%	46%	48%	48%	47%	46%	44%	43%	42%	41%	39%	32%	21%	11%	50%
2017	2%	1%	2%	2%	3%	5%	6%	8%	9%	11%	13%	15%	16%	16%	16%	15%	15%	15%	15%	14%	13%	11%	8%	4%	17%
2016	10%	10%	11%	14%	17%	20%	23%	26%	31%	36%	40%	45%	44%	45%	45%	45%	45%	45%	44%	43%	42%	38%	29%	19%	48%
2015	18%	16%	19%	21%	23%	25%	29%	31%	35%	37%	40%	41%	42%	42%	42%	41%	41%	41%	41%	40%	38%	36%	32%	25%	46%
2014	19%	19%	24%	28%	31%	35%	37%	38%	43%	47%	51%	53%	55%	54%	53%	53%	53%	52%	52%	51%	49%	45%	36%	25%	59%
2013	19%	23%	26%	30%	32%	34%	35%	38%	41%	47%	49%	53%	55%	55%	55%	54%	54%	54%	52%	52%	50%	46%	41%	28%	58%
2012	31%	29%	35%	41%	43%	48%	50%	55%	56%	60%	66%	69%	71%	72%	72%	72%	72%	71%	70%	69%	69%	64%	55%	42%	77%
2011	48%	38%	37%	42%	50%	62%	67%	72%	75%	76%	78%	80%	81%	80%	81%	80%	81%	79%	79%	77%	76%	74%	69%	61%	86%
2010	21%	16%	16%	20%	24%	34%	39%	50%	60%	63%	65%	66%	68%	68%	68%	67%	65%	65%	63%	61%	60%	58%	48%	32%	73%

	ThoroldCGS Production	Capacity Factor
2023	750,000	30%
2022	848,702	34%
2021	522,276	21%
2020	515,295	21%
2019	575,070	23%
2018	408,897	16%
2017	118,048	5%
2016	425,903	17%
2015	487,950	20%
2014	578,922	23%
2013	637,401	26%
2012	890,326	36%
2011	1,128,070	45%
2010	647,555	26%