

Ontario Clean Air Alliance

Meeting Northern York Region's Electricity Needs

The OPA's Proposal

The Ontario Power Authority (OPA) is proposing to contract for the construction of a 350 megawatt (MW) simple-cycle natural gas-fired power plant in northern York Region to meet the electricity needs in the Armitage Transformer Station Service Area.

According to the OPA, the capital cost of this power plant would be approximately \$230 million and it will be operated for only approximately 2.5% of the year.

Simple-cycle gas turbines are the least-efficient gas technology for electricity generation. According to the OPA, simple-cycle gas turbines have an energy efficiency of only 36%.

Natural gas-fired combined-cycle turbines and combined heat and power plants are much more efficient than simple-cycle gas turbines. Specifically, natural gas-fired combined-cycle turbines can have an energy efficiency of 55 to 60%; and natural gas-fired combined heat and power (cogeneration) systems can have energy efficiencies of 80 to 90%.

As shown below, a simple-cycle gas turbine's fuel cost per kWh of electricity produced is much higher than that of a combined-cycle or combined heat and power plant.

Fuel Costs per kWh of Electricity Produced

Simple-Cycle Gas Turbine	Combined-Cycle Gas Turbine	Natural Gas-Fired Combined Heat and Power Plant
7.6 cents per kWh	4.6 to 5.0 cents per kWh	3.0 to 3.4 cents per kWh

As shown in the table below, the greenhouse gas emission rate of a simple-cycle natural gas turbine is more than double that of a combined heat and power plant.

Greenhouse Gas Emission Rate per kWh of Electricity Produced

Simple-Cycle Gas Turbine	Combined-Cycle Gas Turbine	Natural Gas-Fired Combined Heat and Power Plant
506 grams per kWh	303 to 331 grams per kWh	202 to 227 grams per kWh

The Ontario Clean Air Alliance's (OCAA) Recommendation

The OCAA does not believe that simple-cycle gas turbines are a cost-effective or socially responsible option to meet northern York Region's electricity needs.

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The OCAA's preferred options, in order of preference, are:

1. Energy conservation and demand response;
2. Renewable energy;
3. Natural gas-fired combined heat and power; and
4. Natural gas-fired combined-cycle generation.

Questions for the OPA

1. What was the peak demand (MW) in the Armitage Transformer Service Area in 2007? On what day and time did it occur? Please provide your best estimate of the electricity demands by end-use (e.g., residential cooling, commercial cooling, water heating, lighting) in the Armitage Transformer Service Area at the time of its 2007 peak demand.
2. Please state how many MW of demand were curtailed in the Armitage Transformer Service Area at the time of its 2007 peak demand pursuant to your: a) demand response contract with Rodan Energy; b) Peaksaver contract with PowerStream; c) Peaksaver contract with Hydro One; and d) Peaksaver contract with Newmarket Hydro?
3. Please state how many homes in the Armitage Transformer Service Area have: a) central air-conditioning; and b) enrolled their air-conditioners in the Peaksaver programme.
4. Please state how many commercial, institutional and industrial electricity consumers are located in the Armitage Transformer Service Area. Please state how many of these consumers have enrolled in one of the following OPA demand response programmes: Northern York Region/Rodan Energy; DR1; DR2; or DR3.
5. Commercial and institutional customers are now permitted to use natural gas instead of diesel oil for their emergency back-up generators. Natural gas-fired back up generators can serve two functions, namely provide power to a building during a blackout or provide power to the grid during peak demand hours and thereby reduce the need for stand-alone simple-cycle gas generators. How many MW of diesel back up generation capacity currently exists in the Armitage Transformer Service Area?
6. How many dollars has the OPA spent to date to reduce the demand for electricity in the Armitage Transformer Service Area? How many MW of load reductions has it obtained?
7. Please describe the OPA programmes to provide financial support for geothermal cooling (and heating) in the Armitage Transformer Service Area.

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8. Virtually every building in the Armitage Transformer Service Area uses natural gas to produce just one service, namely, heating. It is much more efficient to use the same molecules of natural gas to simultaneously produce two services, i.e., heat and power. The Highland Green condominium in Aurora has recently installed a natural gas-fired combined heat and power system in its building. Furthermore, the OPA will soon be launching a standard offer programme to purchase electricity from small-scale (10 MW or less) combined heat and power systems. What is the total combined heat and power supply potential (MW) in the Armitage Transformer Service Area?
9. What is the current electricity capacity of the Armitage Transformer Service Area? By how many MW will this capacity be increased when the Holland Junction Transformer Station comes into service?

For more information

For more information please download *The Ontario Power Authority's Coal Phase-Out Strategy: A Critical Review* (September 24, 2007) from www.cleanairalliance.org.