



Meeting Toronto's Electricity Supply Needs: ►

*A comparison of the
Portlands Energy
Centre and the
Toronto Waterfront
Clean Energy Centre*

Toronto is one of the largest cities in North America that has no significant electricity generation capacity within its own vicinity — the city generates just 1.2% of the power used within its boundaries while using close to 20% of the power produced in Ontario. Currently, the central city south of Eglinton (between Hwy. 427 and Victoria Park) receives almost its entire electricity supply via two Hydro One transmission corridors. This leaves the city highly reliant on large centralized supply sources outside of the city, such as the Pickering and Darlington nuclear stations and the giant Nanticoke coal-fired station on Lake Erie.

It has been widely recognized that this current power structure leaves the city highly vulnerable to power disruptions while also creating serious system inefficiencies. To address this imbalance, efforts are underway to locate new generation capacity within the city, while also improving overall energy efficiency (Toronto Hydro, for example, has set a goal of reducing peak demand in Toronto by 5% by 2007).

This, in turn, has led to two proposals to build new generation facilities on the eastern waterfront:

- The Portlands Energy Centre (PEC) is a joint venture of Ontario Power Generation and TransCanada that is proposing to build a 550 megawatt (MW) combined-cycle* natural gas power plant near the site of the mothballed Hearn Generating Station. The PEC plan has undergone a complete environmental assessment. On Feb. 10, 2006, Ontario Energy Minister Donna Cansfield directed the Ontario Power Authority (OPA) to enter into a contract with the PEC.
- The Toronto Waterfront Clean Energy Centre (TWCEC) is a joint project of Toronto Hydro and Constellation Energy that is proposing to build a 291 MW simple-cycle natural gas plant within the existing Hearn structure (by assuming the lease of a movie production company currently using the facility). TWCEC submitted its proposal to the OPA on Feb. 23, 2006. The proposal would still require more detailed planning and an environmental assessment.

This fact sheet compares the two proposals in terms of energy efficiency; air emissions; contribution towards the phase-out of coal-burning at Nanticoke; and contribution towards increasing Toronto's security of electricity supply.

Both proposals include provisions for increasing energy efficiency and conservation in the City of Toronto — the PEC through the Conservation Office of the Ontario Power Authority and the TWCEC through programs run by Toronto Hydro. Pursuing energy efficiency improvements should indeed be the No. 1 priority for meeting Toronto's electricity supply needs; however, since the successful delivery of these programs is not dependent on which proposal is chosen and since the proposals may, in fact, include many overlapping elements, we have not included an assessment of the demand reduction aspects.

Energy Efficiency

PEC's combined-cycle power plant would be 27% more energy efficient than the TWCEC's simple-cycle power plant.

| | PEC | TWCEC |
|-------------------|-----|-------|
| Energy Efficiency | 56% | 44% |

Air Emissions

The TWCEC’s nitrogen oxides (smog) emission rate is 37% higher than the PEC’s.

The TWCEC’s carbon dioxide (climate change) emission rate is 25% higher than the PEC’s.

| | PEC | TWCEC |
|---------------------------------|----------------|--------------|
| Nitrogen Oxides (smog) | 0.097 kg/MWh** | 0.133 kg/MWh |
| Carbon Dioxide (climate change) | 360 kg/MWh | 450 kg/MWh |

Contribution towards phase-out of coal burning at Nanticoke

The Government of Ontario has promised to phase-out coal burning at the Nanticoke Generating Station on the north shore of Lake Erie by 2009. Nanticoke is the largest coal-fired power plant in North America and Canada’s #1 air polluter. Its emissions contribute to poor air quality throughout Southern Ontario.

| | Megawatts (MW) | Contribution towards complete phase-out of Nanticoke’s coal-fired generation capacity |
|-----------|----------------|---|
| Nanticoke | 4,000 | |
| PEC | 550 | 13.75% |
| TWCEC | 291 | 7.28% |

Contribution towards increasing Toronto’s security of supply

| | MW | Contribution towards meeting central Toronto’s peak power demand |
|-------------------------------------|-------|--|
| Central Toronto’s Peak Power Demand | 2,350 | |
| PEC | 550 | 23.4% |
| TWCEC | 291 | 12.4% |

Co-generation potential

Both the PEC and TWCEC plants could be converted to co- or tri-generation systems* (systems that produce heat and/or cooling as well as power). TWCEC says that if its system were converted to co-generation, its efficiency level would be comparable to the PEC combined-cycle system. To allow the PEC or TWCEC plant to operate as a co- or tri-generation facility, a district energy network must be built to serve either the waterfront community or other city districts. Currently, however, there is no commitment from the city to develop such a system.

TWCEC also says that its project would be easily expandable, due to its modular nature, to meet increased demand if necessary. However, it is not clear if the space and engineering limitations already identified for the existing Hearn structure would limit such future expansion in any way.

Conclusion

The City of Toronto and the Province of Ontario can address the fragility of Toronto’s current electricity supply while creating significant benefits for residents in terms of both cost savings and better air quality by developing highly efficient and flexible power sources within the city’s boundaries. Such a “distributed” energy system would offer much greater reliability, flexibility and efficiency than the current cumbersome centralized (and largely nuclear dependent) power system.

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The city and province can maximize the benefits of this approach by pursuing both aggressive energy efficiency and conservation initiatives and by making the best possible use of energy generated by actively ensuring that the appropriate infrastructure and incentives are in place for co- and tri-generation systems.

Recommendations:

- Toronto Hydro and the OPA should pursue all practical demand reduction and efficiency initiatives within the City of Toronto no matter which proposal is selected for the eastern waterfront.
- The City of Toronto should ask Enwave Energy Corporation to work with the successful proponent to develop a district energy network that will permit the new power plant to operate as a co- or tri-generation facility.
- The OPA should consider the net emissions displacement benefit vis a vis the Nanticoke generating plant when selecting the successful proponent given the serious impact of Nanticoke's emissions on air quality within the City of Toronto.
- The OPA should consider the contribution to improving Toronto's energy security when selecting the successful proponent.

*A combined-cycle system captures waste heat from a gas turbine and uses it in a steam turbine to boost the plant's power production. A co-generation system captures waste heat to make steam for space or water heating or other industrial uses. It can also extract steam from the combined-cycle steam turbine. A tri-generation system also uses waste heat to drive absorption chillers to produce cold water that can be used for cooling, an important benefit for summer operation to improve the system's economics and to offset peak power demand.

** 1 MWh (megawatt-hour) equals 1,000 kWh (kilowatt-hours)

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