

# Backgrounder

from Ontario Power Generation

## PICKERING WIND GENERATING STATION

- Wind power is one of the fastest growing sources of renewable electricity generation. It produces virtually no emissions and is becoming increasingly cost competitive with more traditional forms of generation.
- In August 2001, Ontario Power Generation (OPG) installed a Vestas 1.8 megawatt wind turbine at its Pickering Nuclear site. It was the largest wind turbine in North America at that time and a prototype for North American conditions. OPG's objectives were to assess how a large wind turbine performs in Ontario's weather and wind conditions and to help increase public awareness of the potential of wind energy.
- The Pickering Wind Generating Station (GS) produced an average of about 2900 megawatt/hours (MW/hr) of electricity a year from 2001 to 2005. It generated about 18% of the electricity it would have if it had operated 24 hours a day for 365 days a year. This 18% "capacity factor" is low compared to other forms of generation and results mainly from the lack of constant strong winds at the Pickering site, as well as the high maintenance required for a prototype unit. Other areas in Ontario have been found to have much stronger "wind regimes." (See: [www.ontariowindatlas.ca](http://www.ontariowindatlas.ca))
- The Pickering Wind GS typically produces enough electricity to supply the annual electricity needs of about 330 average homes. At full power, it can supply about 1,800 homes at any given time. In comparison, any one of the six operating reactors at Pickering Nuclear can supply enough electricity for over 500,000 homes.
- An independent study conducted over 2002 of the impact of the Pickering Wind GS on birds suggests a level of bird mortality at the turbine the same as that at an individual house. It seems that local and migratory birds quickly learned to avoid the new structure. There was no evidence that migratory birds stayed away from the area because of the presence of the structure.
- OPG has been directed by its sole shareholder, the Government of Ontario, to focus on hydroelectric facilities in terms of renewable energy development. For the time being, OPG will continue to operate and maintain the Pickering Wind GS.

Please see the back for more information about the Pickering Wind GS.



## SPECIFICATIONS

- 78 metre steel tower, diameter of 4 metres at the base and 2.3 metres at the top, topped with a generating unit turned by a three-blade rotor. Fiberglass/composite blades are hollow, each is 39 metres long. From ground level to the highest blade tip is 117 metres, about the height of a 30-storey office building.
- Total weight of the tower and turbine unit is about 205 tonnes. Each blade weighs approximately 6.5 tonnes; the weight of the entire blade and hub assembly is about 34.5 tonnes.
- The rotating nacelle (the portion of the unit that houses the major components including the generator, the transmission, the gearbox, and the control panel) atop the tower and at the center of the blades is about the size of a new inter-city bus and weighs about 52 tonnes.

## INSTALLATION

- About 50 truckloads of concrete totalling some 318 tonnes were used to form the steel-reinforced foundation. The wind turbine was shipped in components by sea from the Vestas manufacturing plant in Denmark. A barge delivered the components to the Port of Os-hawa, and the components were trucked from there to the site. Three days were needed to erect the components on the foundation. The power generated is fed via underground cables into the electrical grid system.

## OPERATION

- The amount of electricity produced by the wind turbine depends on the strength and quality of the winds at any given time. The wind speed at which this turbine begins to generate electricity is about 16.9 kmh (10.5 mph). When in operation, the blades turn at a constant speed of 15.7 revolutions per minute. If the wind speed is more than 90 kmh (56 mph), on-board computers stop the turbine to avoid damage to it.
- Technicians can access the generator atop the tower by climbing a ladder inside the hollow tower. Because of this difficult access, public tours of the wind turbine are not permitted.
- The wind turbine's operation is monitored at OPG's Evergreen Energy control room in North Bay 24 hours per day, 7 days a week.

## FOR FURTHER INFORMATION ABOUT WIND POWER:

Ontario Sustainable Energy Association: <http://www.ontario-sea.org>

Canadian Wind Energy Association: <http://www.canwea.ca>

## Cutaway of Vestas V80 Wind Turbine installed at OPG Pickering Nuclear

