



Fact File

Huron winds - friendly and ferocious

The winds on Lake Huron's south shore are some of the most powerful in Ontario. The lake is relatively smooth compared to the land around it and large enough to allow the wind to pick up speed. The wind also absorbs moisture or humidity from the lake, which makes it dense and more powerful than inland wind. This density increases during the cooler months of autumn and winter, which is good for the Huron Wind farm.

Huron Wind sits atop a long, sloping bluff, making it an ideal spot to harness the wind. Its five 1.8-megawatt wind turbines rise high above the trees and buildings, free of turbulence and poised to catch the best breezes. The prevailing winds, which come in from the lake, climb the bluff, compressing energy for release at the top when mixed with higher breezes. The blades of the wind turbines catch this energy and use it to generate electricity.

The wind turbines at Huron Wind are Vestas V80 models. Specifically designed for the North American market, the V80s are fully automatic and one of the world's largest commercial wind turbines. With a Canadian sales office in Kincardine, Ont., Vestas hails from Denmark, where more than 20 per cent of the electricity is supplied by wind turbines.

The power of the wind comes from the sun. The sun heats the air in the atmosphere causing it to rise. The earth's revolution causes it to move. Everything from the temperature, terrain, bodies of water, vegetation, buildings and humans effect its movement. Wind uses up to one or two per cent of the sun's energy on earth. Near Lake Huron, it can be friendly and it can be ferocious, especially when combined with other elements.

More than 250 shipwrecks can be found off the shores of Bruce County as partial testament to the wind's power. A marine gallery in the Bruce County Museum, north of the Huron Wind site, provides ample illustration. The story of the Ann Maria is typical. In 1902, high winds and jammed steering gear forced the two-masted schooner onto a sandbar near Kincardine, throwing its passengers into the lake. A rescue boat was swamped as well, but a second attempt was successful and everyone was saved. The wind was less forgiving in November of 1913, when 19 ships were lost in a blinding snowstorm on Lake Huron. During 72 hours in what became known as the Great Storm of 1913, 244 sailors perished. Shipwrecks are less common in today's world of modern vessels, communications and storm-warning services, but the wind remains as powerful as ever.

The technology used in the Huron Wind turbines to harness the wind is substantial.

Each 78-metre tall tower is anchored to an embedment ring that is secured to a hexagon-shaped foundation. Each foundation is made up of rebar and 230 cubic metres of concrete. Even with the foundations, which are approximately 1.5 metres deep and six metres wide, only five per cent of the property is utilized by the wind turbines. This leaves the rest of the land available for agriculture. Most of the technology is literally up in the air.

A large beacon on top of the nacelle warns aircraft in accordance with air regulations and provides testimony of the turbine's height - 117-metres from ground to blade tip. Three 39-metre blades connect to a bus-sized nacelle, mounted on top of the tower. The nacelle contains the gears, shafts, cooling systems and associated electronics that maintain and drive the generator. On-board instruments direct hydraulic cylinders to turn the nacelle rotor-first into the wind to maximize wind energy. Turbulence is minimized by the distance between the turbines and their circular configuration on the site. Computer models were utilized to help determine the best locations.

The three blades of the rotor sweep in an 80-metre diameter. With a cut-in wind speed of four metres per second and nominal wind speed of 16 metres per second, the turbines shut down for protection at 25 metres per second. The pitch of the blades automatically changes to regulate the flow of the wind for smooth operation. Although Bruce County isn't prone to ice storms, sensors would detect imbalances on the blades or abnormal vibrations in operation and shut down if ice caused concern.

Wind has played an important role in Bruce County since the arrival of the first European settlers. Sailboats were used to transport pioneers and goods and supplies before there were roads or railways. Windmills were used to grind corn and wheat and to pump water. The wind even had a part in the legend of Kincardine's phantom piper. In 1856, when a stranded and lost Donald Sinclair - far from shore - piped what he thought was his last lament, the wind carried the sound of his wind instrument to the beach, initiating a response from another piper - a phantom piper - which provided Sinclair and his family a beacon to safety. The phantom piper can still be heard in the breeze near the Kincardine lighthouse during the summer months as the legend is reenacted.

Bruce County's first attempt to harness the wind for utility-grade electrical generation failed in the mid-1990s, when the wind knocked down a privately owned 85-kilowatt turbine in its second year of production. Lessons learned on the torquing of tower bases

On Aug. 12, 2000, the wind in Bruce County carried Richard P. Synergy's single-stringed kite to a new world record for altitude. The record, 14,509 feet above a field near Kincardine, defeated a previous record of 12,471 feet established by two meteorologists near Boston in 1896. Although August and the other summer months traditionally aren't the best months for wind turbines in Bruce County, the summer breezes are conducive to kite flyers, wind surfers, sail boat enthusiasts and golfers. The warm breezes off Lake Huron have helped to make the area a popular destination for seasonal visitors, campers and vacationers while the stronger winds in the winter months are at a high enough altitude that they don't discourage the winter recreation-seekers. The Huron Wind farm, adjacent the Bruce Power Visitors' Centre and located between two provincial parks, Inverhuron and McGregor Point, has become one more attraction to encourage people to visit the area year-round.



evolved as wind turbine technology evolved. A 600-kilowatt wind turbine, placed in service in 1995 adjacent to the Huron Wind property has been more successful. Originally commissioned by Ontario Hydro, Natural Resources Canada and wind-turbine manufacturer Tacke, the turbine was designed as a demonstrator to specifically stand up to the strong Huron winds and the cold Canadian climate. Now operated by Ontario Power Generation, it will be producing clean electricity for years to come and has provided a rich legacy for its larger cousins at the Huron Wind farm.

Sustainable development is a long-term goal for the Huron Wind partners. Wind power offers a clean, renewable enhancement to generation portfolios. As more wind turbines come on line, electricity consumers will have more of an opportunity to directly influence the environment they live in by selecting wind power as a clean energy source. Huron Wind is proud to be providing the draft in the race to harness the wind in Ontario.

And of course, there are times when the winds do not blow. It is fitting that Ontario's first commercial wind farm is located next to Bruce Power's nuclear generating stations, another source of clean electricity that does not contribute to climate change or global warming.

The Huron Wind website is www.huronwind.com.