Diavik Wind Farm: Wind energy helps reduce carbon footprint

Located on an island in a remote subarctic lake about 300 kilometres northeast of Yellowknife, the 9.2 MW Diavik Wind Farm is the first large-scale wind energy facility in the Northwest Territories. The project was developed by Diavik Diamond Mines Inc. to help diversify the energy supply at the company's mining operation at Lac de Gras.

The four ENERCON wind turbines are integrated into the mine's existing diesel-powered system and will offset diesel use when the wind is blowing, saving the company an estimated \$5-6 million a year in fuel costs. Diavik expects the \$33 million project, which is the world's most northern large scale wind-diesel hybrid power system, to reduce its reliance on diesel by around 10 per cent and lower the mine's carbon footprint by about six per cent.

Local Benefits:

One of Diavik's goals is to demonstrate wind energy as a viable option for the North, and at the same time develop local expertise in the sector. Yellowknife-based Det'on Cho Nahanni Construction, for example, was awarded the civil engineering contract for the wind farm's foundation and concrete work. Diavik also plans to share the knowledge gained from building and operating a wind farm in the challenging subarctic environment with communities looking for renewable energy alternatives. Already, it has donated its meteorological tower to a local partnership studying the wind resource potential outside Yellowknife. The \$450,000 initiative could lead to the use of wind energy in the cleanup of the contaminated Giant Mine site.

When the Diavik mine closes around 2023, there may be options to donate the wind turbines to a Northwest Territories community with a plan for their use.

"We're very pleased with the success of the wind farm, and we're hopeful that other northern sites will consider this as a potential source of renewable energy that they would like to explore. By constructing and operating this facility, we have gained valuable expertise and are keen to share this knowledge with local communities."

- Grant Stewart, Manager, Sustaining Capital Projects
Diavik Diamond Mines Inc.









Innovation:

Diavik's remote location and harsh subarctic climate required an innovative approach to project planning and turbine design. The mine is only accessible by land 8-10 weeks of the year, when lakes freeze to allow construction of an ice road. The 33-metre turbine blades were the longest loads ever to take the 19-hour, 353-kilometre trip along the road to Diavik, and custom-designed trailers had to be used so the trucks could maneuver steep land portages between the lakes. In total, it took 60 truck loads to get the turbine components to the site.

The wind turbines have been designed to operate in temperatures as low as -40 Celsius, exceeding the industry standard of -30 Celsius and building on Canadian expertise in cold-climate wind technology.

"Although projects like this are very challenging technically, and require as many resources as much larger projects, the impact is huge. This project will save more than one million litres of diesel per turbine per year. That is a big gain. And economically, it just makes sense. I think now we've showcased a clear alignment of economic and environmental benefits."

 Marc-Antoine Renaud, Business Development Manager, ENERCON Canada Inc.

"Canada has more than 300 remote off-grid communities, many of which rely on diesel for their energy. The opportunity to replicate what Diavik has done is significant. If we were to apply similar projects in remote communities across Canada where we know there is a reasonably good wind speed, we could be displacing 15 million litres of diesel fuel imported to the North every year. If other industrial sites were included, the number would be much higher."

Tim Weis, Director, Renewable Energy and Efficiency Policy,
 The Pembina Institute

Project at a glance

OPERATING DATA:

Total installed capacity – 9.2 MW Energy production – 17 GWh a year

WIND TURBINES:

Number of wind turbines – 4 Manufacturer – ENERCON Rotor diameter – 71 metres Hub height – 64 metres

BENEFITS:

Reduction in diesel usage of about five million litres a year

Reduction in the annual winter road haul of 100 tanker trucks a year

Reduction in greenhouse gas emissions of 12,000 tonnes of CO2 a year, about six per cent of the mine's total carbon footprint a year

PROJECT TIMELINE:

2008-2010: Wind resource assessment

November 2011–January 2012: Access roads and foundation blasting/excavation

February to March 2012: Component deliveries on ice road

April to September 2012: Construction and commissioning

September 28: Project online and delivers power to mine grid

DEVELOPER, OWNER, OPERATOR:

The project was developed and is owned and operated by Diavik Diamond Mines Inc. Diavik is a joint venture between mining giant Rio Tinto, which holds a 60 per cent stake, and Harry Winston Diamond Corporation, which owns the remaining 40 per cent.





