

# Reliable in Extreme Winds



Mail lorry crashes on the A353



Wind-whipped waves at Blackpool



Tree falls on car on the B452 near Kenilworth

## Robust, Reliable Wind Turbines... Even in Hurricane Force Winds

The stormy week of 26 January through 3 February 2013 brought severe gales and storm force winds to all parts of the United Kingdom. Wind gusts reached 85 mph in northern Scotland and up to 65 mph further south. The highest recorded gust by the Met office reached 135 mph. Waves pounded the coast as high winds battered the country. Vehicles were blown over by strong gusts and trees were uprooted. The heavy rains caused devastating flooding including landslides that caused seaside homes to slump into the sea.

When Mother Nature becomes wild, there is nothing more important than safety. As a testament to the design and engineering behind Northern Power Systems turbines, all 74 units that were in the path of Hurricane Sandy when it blasted through in November 2012, were undamaged by the high winds.

On 24 August, 2011 Hurricane Irene strengthened into a category 3 hurricane as it passed over the Bahamas. The island of Over Yonder Cay took a direct hit as winds reached 107 mph. The two NPS 100 turbines on the island detected the high winds and entered safe mode. Once the winds dropped below dangerous levels, the turbines started generating electricity again without any repairs or damaged components. Following the hurricane, the island owners installed a third Northern Power® turbine to help power the off-grid island.



Over Yonder Cay, Bahamas during Hurricane Irene

**“Having been in the wind business since 1974, we know the ultimate test of a wind turbine is not the design specification, but how well it stands up to extreme winds in real life. Northern Power turbines routinely experience hurricane force winds in Alaska. Their performance during two major hurricanes once again proves their real world reliability.”**

- JONATHAN LYNCH, CHIEF TECHNOLOGY OFFICER AT NORTHERN POWER SYSTEMS

## Case Study

### EVENT HIGH WINDS

#### Hurricane Resistant\*, Reliable, Safe, and Efficient Wind Turbines

With over 2 million run time hours, Northern Power turbines provide customers with clean, cost effective renewable energy. Our quiet, low profile turbines with multiple tower options fit perfectly in remote locations as well as in agricultural and industrial areas. We offer the most reliable small wind turbines with hundreds of units successfully operating on four continents around the world.



Dundee, Scotland



Stranraer, Scotland



Kilmarnock, Scotland



Penwith College, Penzance, England



West Ham Bus Garage, London, England

- >>**Robust:** The Hurricane Resistant™ Northern Power 100 stands up to the strong winds of Scotland – the windiest country in Europe – and also regularly faces hurricane force winds in Alaska and the Caribbean.
- >>**Reliable:** Reinforced blades, gearless design and a track record of ZERO incidents across its entire fleet make Northern Power turbines the most reliable small wind turbines available today.
- >>**Precision Engineering:** An engineering advancement in simplicity and precision, our gearless **Permanent Magnet Direct Drive (PMDD)** technology maximises energy capture, outperforms conventional gearbox designs, and reduces maintenance costs.
- >>**Advanced Safety Features:** Northern Power wind turbines are designed to operate safely in all conditions.

- **Braking:** Northern Power turbines have three brakes of two different types. Any two of the three can stop the turbine when necessary. An emergency shutdown can occur for a variety of reasons, from loss of grid power to high wind situations. If such a situation occurs, the turbine automatically shuts itself off in a controlled fashion. During shutdown the electromechanical brake engages almost instantly – within milliseconds. The two mechanical disc brakes both engage within a half second.
- **Lightning Protection:** By utilising industry best practices for grounding and safety materials in the tower and blades, Northern Power turbines are designed to have a reduced likelihood of a lightning strike. In the unlikely event that a strike does occur, the system is designed to safely direct the energy around the structure and into the ground, effectively protecting the internal components.
- **Fire Safety:** The turbine is constructed with minimal combustible material and material with low flame spread properties.

- >>**Handles All Types of Wind and Weather:** Northern Power wind turbines safely handle all types of weather and wind situations from the blustery conditions of the Scottish Highlands to the windy shores of the Bahamas.



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\*The NPS 100 wind turbine was designed to IEC 61400-1 standards for WTGS Class IIA conditions, including expected extreme wind speed of 59.5 m/s

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