

CASE STUDY: MICHAEL ZWETSLOOT – KINROSSIE, PERTHSHIRE

A large domestic house with a heated indoor swimming pool and a 3 phase power supply.



## INCORPORATES A RANGE OF RENEWABLE TECHNOLOGIES:

- Gaia-Wind 133-11kW turbine
- Ground source heat pump operating from a borehole
- 4kW PV array mounted on a tracking system

Owners goal is to achieve a high level of energy independence.

The heating system includes a large well insulated 1,000 litre tank which supplies hot water for space heating as well as everyday domestic use. The tank is heated primarily using the ground source heat pump but also incorporates a 6kW 3 phase immersion heater which operates whenever the wind or solar generators have excess capacity. This large tank acts as an energy buffer tank thereby smoothing the intermittent energy contribution of the wind and solar generators.

The Gaia-Wind turbine and PV array primarily produce electrical energy for the house. However In order to minimise export, an intelligent switching device (EMMA) motors each electrical phase and diverts any surplus electrical generation to the heating system. If the main tank is fully charged the system can also activate a heating element at the swimming pool. As such almost all the energy generated from the wind and sun is used onsite.

The Gaia-Wind turbine produces around 25 MWh annually.

During the course of a year, the Gaia-Wind turbine has produced 3.8 times more energy than a neighbouring 6kW turbine.



**View a live monitor of selected sites**

<http://www.gaia-wind.com/133-11kw-turbine/live-monitor/>

## ABOUT GAIA-WIND

Gaia-Wind manufactures small wind turbines suitable for agricultural, rural residential and light industrial use. Our clients include working farms, educational institutions, large home owners, offices and other commercial premises.

Our wind turbines incorporate over 20 years of Danish wind industry design experience and offer control and safety features usually found only on larger, utility scale turbines.

The Gaia-Wind turbine is optimised for performance in moderate wind speed regimes (sites with a hub height annual average wind speed in the 5-7m/s range). In such conditions the large rotor allows the turbine to produce more energy than other similarly rated machines thereby offering superior project economics and return on investment.

A Gaia-Wind turbine, generating 30,000 units of green electricity per year, will offset around 17 tonnes of CO<sub>2</sub> emissions from existing energy generation. This is sufficient to erase the carbon footprint of the average 4 person household.