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## NGenTec Ltd exhibits cutting-edge generator technology on the European Stage

NGenTec Ltd, a leading supplier of novel generator technology to the wind industry, is attending this year's EWEA Event, in Vienna to showcase its innovative and cutting-edge applications, and to continue its discussions with potential customers who are interested in harnessing the generator's unique capabilities.

The company, which is poised for commercialisation this year, designs and supplies hybrid and direct drive permanent magnet generators (PMG) for MW-scale wind turbines. NGenTec is the only company in the market currently offering an advanced hybrid solution with an axial flux generator.

The strength of NGenTec's generator is in its' unique modular design that leads to high operational flexibility and simplicity of in-situ maintenance on the PMG. The generator's compact, lightweight and standardised component structure will offer its customers greater availability, lower O&M cost and ease of manufacture and transport, which overall result in a quantifiable lower cost of energy.

Following on from the successful build of the full scale 1MW prototype by NGenTec during 2012, the generator was tested extensively over a seven month period. This demonstrated the unique selling points of the technology, with the results meeting or exceeding all design expectations, and further highlighting to the industry that this technology works at MW scale.

Garrad Hassan (GL-GH), the world's leading renewable energy independent consultancy, conducted a comprehensive simulation of the NGenTec hybrid in a large offshore wind farm comparing it with the state of the art, and confirmed that the benefits of the technology are "substantial".

Dr Makhoulf Benatmane, Chief Executive Officer at NGenTec comments, "For NGenTec, 2013 will provide the key milestone of signing our first agreement with Original Equipment Manufacturers (OEMs). The deal is likely to be focused around our differentiating hybrid technology where we have already experienced substantial interest from multiple potential customers.

"We have a solid foundation for our unique generator technology which is strongly reflected by the success of our 1MW prototype. With wind turbine installations growing substantially and a strong global momentum towards the reduction in the cost of energy, we at NGenTec are well placed to deliver our evolutionary technology that will take wind turbine generators to a whole new level of operation excellence.

"We are looking forward to exhibiting at this year's EWEA Conference and demonstrating that our validated technology not only works but provides a host of advantages for both the wind turbine manufacturers and the industry as a whole, making us a true market leader."

NGenTec CEO, Dr Makhoulf Benatmane and Chief Marketing Officer, Dr Charles R Gamble will be available for interview during the course of the three-day at **stand AJ-50** (part of the Scottish Development International stand).

**ENDS**

For further information please visit [www.ngentec.com](http://www.ngentec.com) or contact:

Buchanan

Carrie Clement

+44 (0) 131 226 4427

Karyn McShane

+44 (0) 131 225 9864

Notes to Editors:

- NGenTec was founded in 2009 as a spin-out of the University of Edinburgh. The technology was invented by Professor Mueller and Dr McDonald from the University's School of Engineering.
- To date a total of £7.4 million has been invested in NGenTec since its establishment for the development of the technology.
- Alongside this investment the company has also been awarded two grants of £800,000 from the UK Department of Energy and Climate Change (DECC).
- NGenTec owns three patents:
  - Generator and Magnetic Flux Conducting Unit – granted in the US and Australia
  - Magnetic Flux Conducting Unit – granted in the US
  - Coil Assemblies for Electric Machines – filed in September 2012 and currently under examination
- NGenTec's generator technology provides lower cost of ownership and energy for the industry by providing the following advantages:
  - Greater reliability and lower weight
  - High efficiency across the full operating range
  - Use of standardised components
  - Zero cogging torque
  - Lower operation and maintenance costs
  - Ease of manufacturing with shorter assembly and installation time
  - Energy yield maximisation
  - Lower costs of wind energy
- The NGenTec axial flux air-cored generator has numerous advantageous design features:
  - There are no magnetic forces between rotating and stationary parts, as the stator is non-ferrous. This results in much lower weight, simple and safe removal or replacement of parts of the machine, even in situ in a turbine.
  - The machine is built up from modules that take advantage of this; they can be removed and replaced or upgraded by the small internal crane in a wind turbine. The modules are also small and light enough to be transported by access boat or helicopter to an offshore turbine, and even stored locally. This is unique in any PMG.
  - The generator is also modular 'along the shaft' where each stage can be configured as an electrical machine. By connecting each of these to converters, enormous operational flexibility results. For instance, stages and converters can be turned off at lower wind speeds, increasing overall efficiency. Secondly, in the event of failure of a converter, the wind turbine can continue to run at reduced output until a weather window and replacement can be effected.

- The generator is insensitive to air gap variation. As there is no magnetic force on the stator, there can be no unbalanced magnetic pull to distort or damage the structure.
- The generator has no slots, so there is no saliency, no cogging torque which reduces electromagnetic noise to zero, and vibration to very low levels.
- The absence of cogging torque can lead to lower starting wind speed for the turbine.
- As the machine has no stator iron, the magnetic circuit is linear, without the saturation normally found in PMGs. The waveform thus has extremely low total harmonic distortion, and a perfectly linear volts/speed curve.
- The air core in the generator provides protection against demagnetisation under fault conditions, thus reducing cost of ownership.
- Machine cooling systems are simple, as a result of the shape and surface exposure of the stator windings

The Garrad Hassan (GL-GH) report mentioned compared the performance of the NGentec generator with state of the art conventional generators, in a 500MW North sea wind farm under accurately simulated operating conditions for 25 years, over 10 scenarios, in a Monte Carlo analysis.