Singapore’s largest wind turbine built on Semakau Island

It marks first time that wind energy is being used to power offshore island’s energy needs

Lim Min Zhang

The Republic’s largest wind turbine was unveiled on Semakau Island yesterday, marking the first time that wind energy is being used to power the offshore island’s energy needs.

The turbine’s three 10.5m long-span rotor blades produce an electrical output of 100 kilowatts, enough to power 45 four-room Housing Board flats.

It is part of the region’s first large-scale, offshore power grid system, called the Renewable Energy Integration Demonstrator (Reids), an initiative by Nanyang Technological University (NTU).

Built by French utility company Engie, the turbine is one of up to seven that will generate power for hybrid microgrids on the landfill south of Singapore, as the nation steers itself towards developing sustainable energy.

Each microgrid integrates multiple renewable energy sources such as photovoltaic (solar) panels.

The first phase, which was completed last year, consisted of installing more than 4,500 sq m of photovoltaic panels and a large-scale lithium-ion energy storage system for the first microgrid.

Said Professor Choo Fook Hoong of NTU’s Energy Research Institute, which manages the initiative: “The role here is to look at how we can explore renewable energy – integrating different sources into microgrids to benefit not only remote islands and villages, but also urban microgrids that will benefit Singapore in the long term as a more stable and resilient power supply.”

The idea behind using microgrids is that they are independent of the main power grid and require low to no maintenance.

The project is supported by the Economic Development Board and National Environment Agency.

Although there is limited potential for wind turbines on the mainland, developing a diverse mix of renewable energy sources is important because each has its own advantages, said Prof Choo.

“When we look at renewable energy integration, we cannot rely entirely on photovoltaics because that will work only when the sun is out.

Wind is different – you have wind at night as well... This allows us to have continuous power supply without having to increase storage capacity, which is not that cheap today,” he explained.

The turbine can generate power with wind speeds as low as 3m per second, up to a maximum of 20m per second.

In the testbed project, up to eight microgrids will eventually cover the size of about nine football fields and will produce enough energy each year to power 100 blocks of four-room HDB flats.

International interest in the project has been growing, with 12 new partners expected to sign agreements with Reids at the Singapore International Energy Week next week to develop and deploy microgrids in the region.

This would mean more than 20 companies have come on board, including founding members Engie, General Electric Grid Solutions and Schneider Electric.

Mr Goh Chee Kiong, executive director for cleantech at the Economic Development Board, said: “The strong presence of leading energy providers and adopters is testament to Reids’ success in developing an ecosystem, to pilot and develop microgrid innovations from Singapore.”

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The wind turbine on Semakau Island is one of up to seven that will generate power for hybrid microgrids on the landfill south of Singapore, as the country moves towards developing sustainable energy.

ABOUT THE TURBINE

• Stands 14 storeys high.
• Comes with three 10.5m long-span rotor blades that produce an electrical output rating of 100 kilowatts, enough to power 45 four-room HDB flats.
• The wind turbine is also sensitive enough to begin generating power with wind speeds as low as 3m/sec, up to a maximum of 20m/sec.