

NTU to build region's first renewable energy integration demonstration micro-grid

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To be developed at Singapore's Semakau Landfill: Region's first demonstration micro-grid that will integrate multiple renewable energy sources. Credit: Nanyang Technological University Singapore

Nanyang Technological University Singapore (NTU Singapore) will be building a hybrid micro-grid which will integrate multiple large-scale renewable energy sources.

The first in the region, the hybrid micro-grid will test and demonstrate the integration of solar, wind, tidal-current, diesel, storage and power-to-gas technologies, and ensure these energy sources operate well together.

To be built under the new Renewable Energy Integration Demonstrator- Singapore (REIDS) initiative, the hybrid micro-grid will be located offshore at Semakau Landfill and is expected to produce power in the megawatt (MW) range, which will be suitable for small islands, isolated villages, and emergency power supplies. This will be able to power around 250 HDB 4-room apartments, which together consume a peak of 1 MW.

This initiative is supported by the Singapore Economic Development Board (EDB), and the National Environment Agency (NEA). The S\$8 million initial micro-grid infrastructure will also

facilitate the development and commercialisation of energy technologies suited for tropical conditions to be developed by NTU Singapore together with 10 world leading companies.

It was launched by Mr S. Iswaran, Singapore's Minister for the Prime Minister's Office and Second Minister for Home Affairs and Trade & Industry, this morning at the Marina Bay Sands Expo and Convention Centre as part of the Singapore International Energy Week 2014.

At the launch ceremony, NTU Singapore President Professor Bertil Andersson, EDB's Assistant Managing Director Mr Lim Kok Kiang and NEA's Group Director for Joint Operations and Technology, Mr Satish Appoo, witnessed a pledge signing ceremony by NTU Singapore, the Sustainable Energy Association of Singapore (SEAS) and 10 leading clean energy companies.

"Sustainability is one of the major pillars of NTU Singapore's research. We have been very active in clean energy research such as in tidal, solar and wind technologies and this new initiative will allow us to apply our research and integrate the different energy sources. In so doing, we hope to develop practical renewable solutions for the energy integration industry," said Prof Andersson.

This initiative is expected to attract \$20 million worth of projects over the next five years, in addition to the initial \$8 million investment in infrastructure on the Semakau Landfill.

The 10 energy and clean tech industry leaders keen to be part of this ground-breaking effort include Accenture, Alstom, Class NK, DLRE, GDF Suez, Renewable Energy Corporation, Schneider Electric, Trina Solar, Varta and Vestas.

"NTU Singapore's REIDS will serve as a strategic living lab for Singapore, encompassing a large scale micro-grid with a plug-and-play setup that clean energy industry leaders can leverage to develop and demonstrate a diverse range of clean energy technologies," said EDB's Assistant Managing Director Mr Lim Kok Kiang.

"By providing industry leaders with a unique platform to innovate and commercialise cutting-edge energy solutions suited for the tropical climate, Singapore will be better positioned to meet the growing demand for renewable energy technologies in the Asian region," Mr Lim added.

Mr S. Satish Appoo, Group Director, Joint Operations and Technology, NEA said, "The REIDS initiative enables the development of renewable energy solutions in Singapore for a sustainable future, which is important for an economy largely dependent on energy imports.

"As Singapore works towards greater self-sufficiency in energy production, the National Environment Agency (NEA) is happy to host REIDS clean energy facilities on Semakau Landfill, and support the national effort to explore renewable energy solutions."

REIDS to be implemented in two phases

In the first phase, a micro-grid facility will be built at the Semakau Landfill that will oversee energy storage facilities, solar photovoltaic panels and wind turbines.

The hybrid micro-grid will provide a full-scale test-bed for Singapore's on-going energy research, working closely with scientists and engineers from both the public and private sectors.

A key problem posed by renewable energy sources is that of intermittent power supply. The hybrid micro-grid aims to ensure a stable and consistent power supply through the integration of a variety of smart energy management and storage systems.

The second phase will involve the development of a

scaled-up tidal energy facility around Semakau Landfill and St. John's Island, which will then be integrated with the first phase.

A key long term goal will see the development of micro-grid technologies that can help provide electricity to overseas communities that do not have access to power. This is in addition to introducing new technologies that can stabilise power grids in urban communities. Both are widely regarded as critical needs across Asia.

Provided by Nanyang Technological University

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