

MEDIA RELEASE

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Singapore's First Virtual Power Plant to Optimise Energy Distribution

Globally, the energy sector is evolving, driven by technological advances and climate change. Distributed energy resources (DERs) such as solar and energy storage systems today complement traditional power plants which generate electricity centrally. Electricity produced from these energy resources at end users' premises can be coordinated intelligently like a "single utility-scale power station". Such a concept is known as a Virtual Power Plant (VPP).

2. The Energy Market Authority (EMA) and Sembcorp Industries (Sembcorp) have jointly awarded a grant to Nanyang Technological University to develop Singapore's first Virtual Power Plant. Using real-time information from a variety of DERs, the VPP will optimise the power output of these resources located across the island. Energy fluctuations due to solar intermittency at different locations could be balanced automatically via the VPP. The VPP is also equipped with demand forecasting and optimisation algorithms that take into account Singapore's power grid and market conditions.

3. VPPs can bring about many advantages such as flexibility, scalability and improved power grid resilience. New DERs can be easily connected to the VPP while the distributed architecture of VPP reduces concentrated risks associated with single point of failures. This enables any fault on a distributed generation system to be quickly isolated, limiting loss of power to end users. A VPP operator could monitor and control the various DER locations, while ensuring a balance between supply and demand.

4. This VPP will contribute towards Singapore's efforts to meet its climate change commitments. It allows for more clean and distributed energy resources such as solar to be integrated into Singapore's energy mix while keeping the power system stable. (Project details are in the Annex A)

5. EMA's Chief Executive, Mr Ngiam Shih Chun said: "The energy landscape is changing and we need solutions that support our economic growth while safeguarding our environment at the same time. This is why solutions such as the virtual power plant are important as it helps us integrate cleaner energy sources into our energy system."

6. "Sembcorp is excited to couple our expertise in energy with EMA and NTU to create a Virtual Power Plant for Singapore. A VPP will benefit Singapore through aggregation of renewable and energy storage resources to more efficiently meet the energy and sustainability needs of the nation," said Mr Matthew Friedman, Sembcorp's Chief Digital Officer.

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About the Energy Market Authority

The Energy Market Authority (EMA) is a statutory board under the Ministry of Trade and Industry. Our main goals are to ensure a reliable and secure energy supply, promote effective competition in the energy market and develop a dynamic energy sector in Singapore. Through our work, the EMA seeks to forge a progressive energy landscape for sustained growth. Please visit www.ema.gov.sg for more information.

About Sembcorp Industries

Sembcorp Industries is a leading energy, marine and urban development group, operating across multiple markets worldwide.

As an integrated energy player, Sembcorp is poised to benefit from the global energy transition. With a strong track record in developing and developed markets, we provide solutions across the energy and utilities value chain, with a focus on the Gas & Power, Renewables & Environment, and Merchant & Retail sectors. We have a balanced energy portfolio of over 12,500 megawatts, including thermal power plants, renewable wind and solar power assets, as well as biomass and energy-from-waste facilities. In

addition, Sembcorp is a world leader in offshore and marine engineering, as well as an established brand name in urban development.

Sembcorp Industries has total assets of over S\$24 billion and over 7,000 employees. Listed on the main board of the Singapore Exchange, it is a component stock of the Straits Times Index, several MSCI and FTSE indices, as well as the SGX Sustainability Leaders Index and the Dow Jones Sustainability Asia Pacific Index.

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PROJECT DETAILS

Title	Description	Project Team
Internet of Energy with Advanced Analytics, Modelling, Optimisation and Digitisation for Energy Storage Solutions and Renewable Energy Sources	<p>Current situation: With lower capital costs and technology advancements, distributed energy resources are increasingly deployed and integrated into Singapore's power grid. There is a growing need to coordinate and control these distributed resources to optimise energy use, mitigate impact to the grid and ensure stability.</p> <p>Aim: To develop a Virtual Power Plant that consists of an energy management system which takes into account our local network configurations, advanced weather forecasting, loads and market trading platforms to coordinate distributed energy resources such as solar and energy storage in an economically sensible manner while ensuring a reliable supply of energy to consumers.</p>	<p>Principal Investigator: Dr Koh Liang Mong, Energy Research Institute @ NTU (ERI@N), Nanyang Technological University</p>