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REIDS-SPORE: Forging the Path to Sustainable Energy and Innovation

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Abstract

REIDS, the Renewable Energy Integrator Demonstrator Singapore, is an innovative initiative showcasing renewable energy integration in Singapore's energy framework. It pioneers the adoption of renewable energy technologies and intelligent grids, featuring diverse microgrids from entities in Semakau Landfill. This aligns with Singapore's commitment to sustainability and climate action.

ENGIE's REIDS-SPORE features a collection of cutting-edge renewable technologies capable of producing up to 550kW of green electricity. It holds the largest wind turbine in Singapore, standing at 100kW, which has the potential to power around 35 apartments. A distinctive component of this platform is a 50kW/2MWh hydrogen power-to-power system that facilitates hydrogen generation through electrolysis and electricity production via fuel cells. Moreover, the generated hydrogen serves dual purposes—it can be used in a refueling station for fuel cell electric vehicles, enhancing mobility in Semakau Landfill. The setup comprises a 200kWp installation with a dual function. One segment, totaling 100kWp, interfaces with the battery energy storage system to accumulate solar energy throughout daylight hours. Simultaneously, another 100kWp unit is linked directly to the grid.

REIDS-SPORE platform unveils insights into scalability for industry integration. Remarkably, since August 2022, the platform has consistently been operating 24/7 with 95% - 99% renewable energy, a significant stride towards a sustainable, low-carbon energy framework. Moreover, REIDS-SPORE extends its impact beyond renewable assets, and will serve as a testbed for innovative cooling solutions.

The objective of the cooling facility is not only to provide about 50kW cooling needs of the REIDS facility but also to test innovative cooling technologies including low Global Warming Potential (GWP) chillers and Phase Change Materials (PCM) based thermal energy storage system. The low GWP chiller is set to operate between 4°C to 12°C with thermal coefficient performance of at least 5.5. The PCM thermal storage, a compact thermal energy storage system, is integrated with the chiller that is designed to offset 20% to 40% peak cooling load demand. The onsite renewable assets would provide green power to the cooling facility, hence demonstrating zero-carbon emissions for the system operations.

In conclusion, REIDS-SPORE stands as a pioneering initiative driving Singapore towards regional leadership in renewable energy adoption, fostering innovation, and offering insights that inspire global efforts toward a sustainable, greener future.

note: This document will be opened to the participants on IERE website before the Forum and opened to the public afterward.