

Annex A

The hybrid microgrids at Semakau Landfill will be implemented in two phases.

The first phase, which has been completed, involved installing a microgrid facility with over 3,000 metre square of photovoltaic (PV) panels as well as a large-scale energy storage system.

The lithium-ion energy storage system (ESS) can store up to 200 kilowatt hour (kWh), similar to the monthly energy consumption of a two-room HDB unit, and will serve as a medium term energy storage.

Currently in the second phase, a 64,400 metre square plot (about 8 soccer fields) was cleared to make way for three separate microgrids which can either be operated separately or be integrated and function as a single power facility.

These separate microgrids will each manage multiple renewable energy sources such as photovoltaic panels, wind turbines, diesel generators and energy storage systems, including supercapacitors.

Supercapacitors differ from normal lithium-ion energy storage as they are able to both quickly store and discharge a large amount of electricity. However, they are unable to hold the electricity over a long period of time, serving as short term energy storage.

Excess energy generated from the microgrid can be used to generate hydrogen that can be stored long-term to be subsequently used in fuel cells which convert hydrogen into electricity, generating far less emissions as compared with oil and gas.