



## TECHNOLOGIES

Discover, Connect & Collaborate at TECHINNOVATION 2021

### Vanadium Redox Flow Battery for Marine Application



#### *Technology Overview*

In the process of marine vessel electrification, energy storage system (ESS) is an important part of the electric propulsion system. Currently, most of the ESS uses lithium-ion battery technology, in which a common challenge is that a long duration is required to recharge the battery. This will limit the operational time for vessels including ferries, water taxi, or harbourcraft. In addition, offshore support vessel which faces uncertainty in operation hours may need to carry a larger ESS, which increases the footprint and capital costs.

Based in Singapore, the technology owner has proposed to develop a vanadium redox flow battery (VRFB) system that is suited for application in vessels that require a quick charging time. The proposed battery system is especially effective for newbuild vessels whereby empty tanks in the vessel may be utilised to store the vanadium electrolyte, enabling the vessel to keep a larger amount of energy reserve onboard. An onshore base station is required to support vessels, by exchanging pre-charged electrolyte with onboard spent/discharge electrolyte via a quick pumping operation. This enables a rapid energy recharge for the vessel.

The technology owner is seeking collaboration with industry partners including ship designers, owners, operators and system integrators to co-develop VRFB ESS and base station to support the electrification of the maritime industry.

### *Technology Features, Specifications and Advantages*

- Up to 25 years lifetime, stable performance with no degradation.
- Zero emission, non-flammable system and very low maintenance requirement.
- Base station can utilise green energy from grids, solar or wind power.

### *Potential Applications*

- Newbuild vessels such as ferries, water taxi, harbourcraft, offshore support vessels.

### *Customer Benefit*

- Short investment payback period.
- Electrolytes can be recycled, thus no harmful waste from the system.