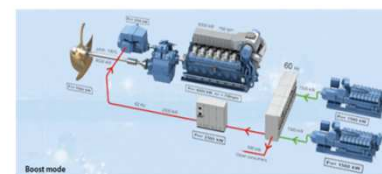


Pilot 1: Cargo Ferry Plug-in Hybrid

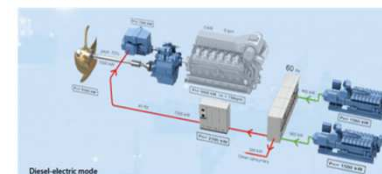
- **Project owner:** Nor Lines
- **Project objective:**
 - Develop the Cargo Ferry plug-in hybrid
 - a profitable shortsea ship concept
 - Plug-in LNG/battery propulsion
 - Zero-emission sailing and operation in port
- **Phase 1:**
 - Develop technical concept
 - Calculate environmental footprint
 - Cost/benefit analysis
 - Plan for further development



A range of operational modes



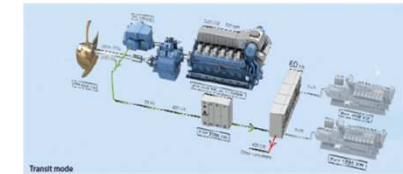
Boost mode



Diesel/gas electric mode



Parallel mode



Transit mode

Pilot 2: Next-generation green shuttle tanker

- **Project owner:** Teekay
- **Project objective:**
Investigate technical solutions for utilisation of batteries and VOC that can be implemented in new-build shuttle tanker projects.
- **Battery**
 - Battery technology has not yet been implemented on shuttle tankers.
 - The pilot will explore how battery technology can contribute to optimization of operation, reduction of the need for installed power, and the possible use of batteries as effective “spinning reserve”.
 - Technical, economical and regulatory feasibility will be assessed.
- **VOC**
 - New technological solutions for utilisation of Volatile Organic Compounds (VOC) generated on board. The aim is to utilize the generated Liquid VOC for on board power generation. The potential and technical maturity of relevant technical solutions will be evaluated.



Ungraded

Pilot 3: Hybrid Ocean Farming vessel

- **Project owner:**
ABB & Fraktefartøyenes rederiforening
- **Project objective:**
Define an optimized hybrid propulsion system achieving a more energy efficient and redundant operation.
- **Phase 1:**
 - Develop technical concept
 - Calculate environmental footprint
 - Cost/benefit analysis
 - Plan for further development



Ungraded

Pilot 4: Conversion; general cargo carrier to hybrid LNG carrier

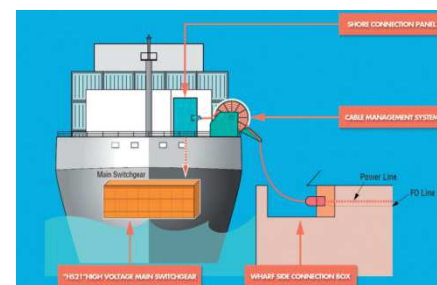
- **Project owner:** Øytank Bunkerservice / Energigass Norge
- **Project objective:**
Conversion of a general cargo carrier to a battery-hybrid LNG carrier
 - a cost efficient LNG distribution concept
 - Hybrid operations: LNG/battery propulsion
 - Zero-emission port operations
- **Phase 1:**
 - Develop technical concept
 - Calculate environmental footprint
 - Cost/benefit analysis
 - Plan for further development



Ungraded

Pilot 5: Green Port - Electrification

- **Project owner:** Risavika Harbour
- **Project objective:**
 - Be a green port pioneer - lower energy consumption and carbon footprint
 - Electrify port operations, including heavy duty vehicles and cranes
 - Smart gates – greener trucking
 - Offer cold ironing services and charging of plug-in hybrid ships
- **Phase 1:**
 - Develop technical concept
 - Calculate environmental footprint
 - Cost/benefit analysis
 - Plan for further development



Source: Terasaki



Ungraded