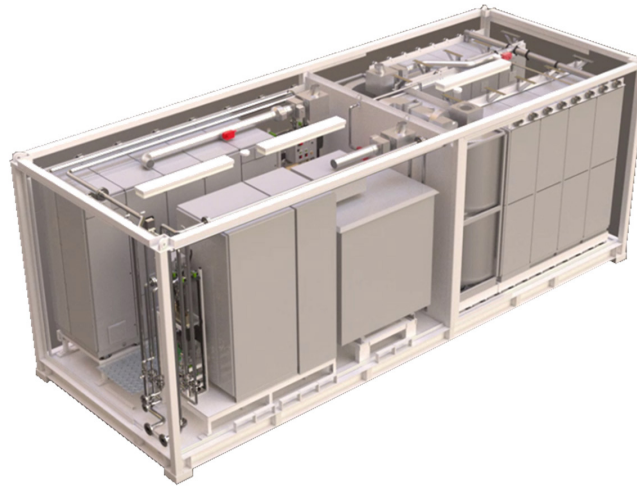


SAVE ENERGY 26' ESS DECKHOUSE



KONGSBERG



KONGSBERG ENERGY STORAGE SYSTEM

26' SAve Energy ESS deckhouse

KONGSBERG has several energy storage containerized solutions to meet the requirements our customers have towards charters and regulators for reduced emissions and safe operation. All solutions are prepared for shore connection according to the new IEC recommendations.

Our unique and patented energy control system for hybrid power systems extracts from and shares information between all components in the digital power layer. Tight synchronized integration delivers unique features at the cutting edge of DP technology.

Core components of the novel Dynamic Hybrid Control system includes Dynamic Load Prediction and Dynamic Inertia Control combined with an automatic start/stop strategy. Predictions of future thruster demand controls the energy production for generators and battery charge / discharge. Load dynamics shared between the batteries and generators ensures optimization for both generator limitations and battery lifetime.

BENEFITS

- Up-to 912 kWh/2000kW in a single container
- 3 safety barriers for protecting against internal and external events
- Enables open and closed bus operation, one gen-set closed bus or two gen-sets open bus in DP2
- Unique and patented energy control system for hybrid power systems

Functions	WITH KONGSBERG ESS		WITHOUT KONGSBERG ESS	
	K-Pos Stand Alone	K-Pos and PMS	K-Pos Stand Alone	K-Pos and PMS
Battery Notation	✓	✓	✓	✓
Island Mode	✓ ²	✓ ²		✓ ²
ESS Droop	✓	✓		✓
Droop/Power Combi Mode	✓ ¹	✓		
DLP (ESS)	✓	✓		
DLP (Gen)	✓ ⁴	✓		
DIC (Full)	✓ ³	✓		
Hybrid Sync Assist	✓ ¹	✓		
Genset Start/Stop	✓ ¹	✓		✓

Increased redundancy, performance and responsiveness, efficient operations and reduced maintenance are some of the other benefits. Our mission is to help our customers lower the lifetime cost and maximizing their investment in hybrid power.

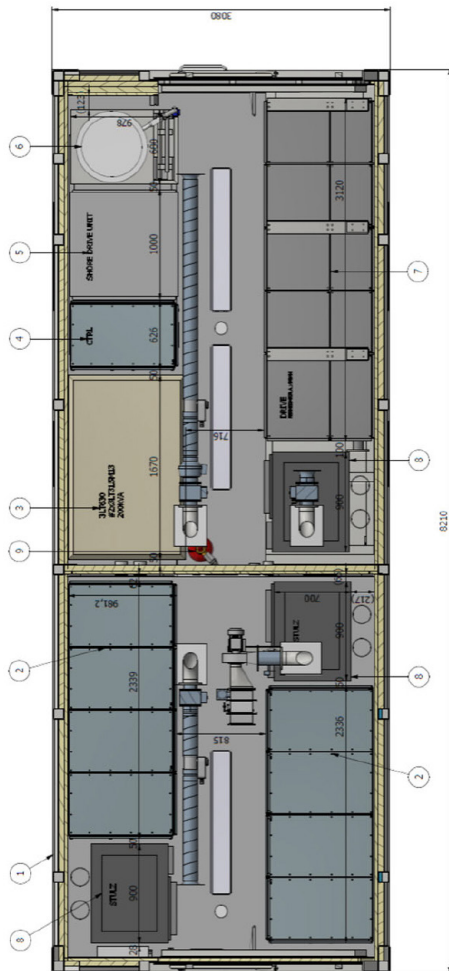


Figure 1 - Deckhouse Topology Example



Figure 2 - Example of Deckhouse installed on vessel

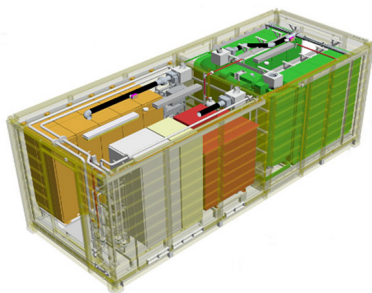
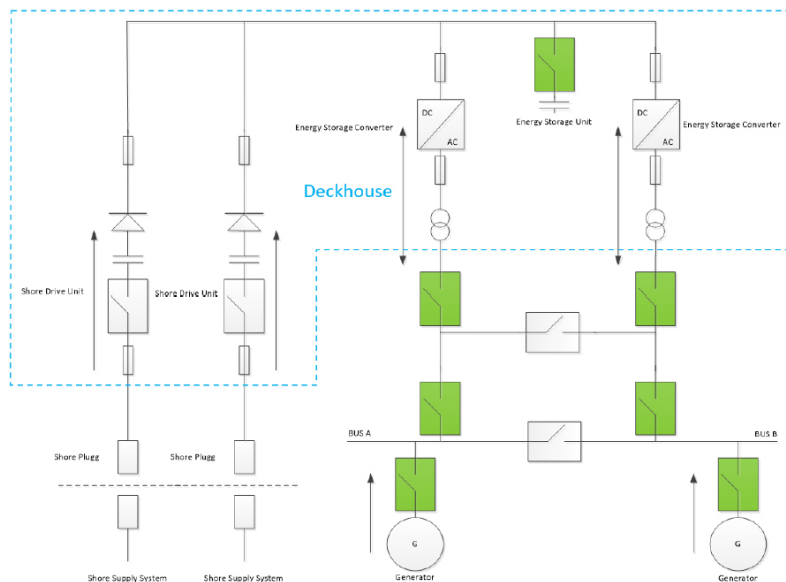


Figure 3 - Animated Deckhouse with colour on different equipment

ESS DECKHOUSE INTEGRATION EXAMPLE



Redundancy that enables open and/or closed bus operation, one gen-set closed bus or two gen-sets open bus in DP2.

DECKHOUSE CONFIGURATION OPTIONS

Battery energy options:

- 532kWh*
- 565kWh
- 608kWh
- 678kWh
- 684kWh
- 750kWh
- 760kWh*
- 784kWh
- 896kWh
- 912kWh*

*Available Q2 2020

Drive power options:

- 2000kW (2x1000kW) Liquid Cooled
- 1900kW (2x950kW) Liquid Cooled
- 1700kW (2x850kW) Liquid Cooled
- 1500kW (2x750kW) Air Cooled

Transformer power options:

- Single Feed 630 KVA
- Dual Feed 2x315 KVA
- Transformer Outside Container (other dimensions available)

Shore connection options:

- Single 1x300kW
- Dual 2x300kW

DECKHOUSE CONFIGURATION OPTIONS

- Dimensions (LxWxH): 8200x3080x3300 mm
- AC Main Supply: 440/690/6,6/11 kV
- Weight: 25-35 t