HYBRID ELECTRIC POWER SYSTEMS

As technology evolves and regulatory complexities increase, vessel owners are faced with the reality of both complying with environmental requirements and meeting operational demands.

To deal with these challenges, owners and operators are turning to additional sources of energy to power and propel vessels. As the industry moves ahead, hybrid electric power systems will play a role in meeting the regulatory and operational demands placed on vessels.

HOW HYBRID ELECTRIC POWER SYSTEMS SUPPORT OFFSHORE OPERATIONS

Current technological advances are increasing the number of options available for owners and operators, which can better suit the specific needs of a vessel for a range of operational circumstances while meeting the current and foreseeable environmental considerations. One alternative to the conventional mechanical propulsion arrangement is an electric propulsion system. An electric propulsion system allows for the propulsion capability of the vessel to be provided by electric propulsion motors, which are supplied by a common set of generators that also supply the asset's hotel loads.

One of the main benefits of electric propulsion systems is the ability to optimize the loading of the prime movers for the generators (i.e., diesel engines, gas turbines, etc.) to obtain maximum efficiency and reduce fuel consumption.

Modern electric propulsion systems are being further enhanced by the incorporation of new technology. One example is the incorporation of alternative electrical power sources such as fuel cells, solar panels and wind turbines. Other designs employ one or more methods of energy storage such as batteries, super-capacitors and flywheels to supply and/or supplement the electrical power needs of the vessel.

HOW ABS CAN HELP

To help guide the industry in the development of new hybrid electric concepts, ABS introduced the ABS Requirements for Hybrid Electric Power Systems for Marine and Offshore Applications. The comprehensive list of technologies addressed in the advisory includes lithium-ion batteries, supercapacitors, shore power and offshore charging, "All-Electric Vessel", "HYBRID Ready" "All-Electric Ready", fuel cells, wind and solar. ABS also released a comprehensive suite of Guides to facilitate effective installation and operation of energy generation, storage and distribution systems:

- ABS *Requirements for Use of Lithium-ion Batteries in the Marine and Offshore Industries*, July 2022
- ABS *Requirements for Use of Supercapacitors in the Marine and Offshore Industries*, July 2022
- ABS *Requirements for Direct Current (DC) Power Distribution Systems for Marine and Offshore Applications*, July 2022
- ABS *Requirements for Fuel Cell Power Systems for Marine and Offshore Applications*, August 2023
- ABS *Requirements for Hybrid Electric Power Systems for Marine and Offshore*, April 2024

Component and Equipment Certification and Type Approval

System Design Approval

ABS offers a full range of services that support the development and integration of hybrid electric power systems

Class approval on hybrid system integration on board a vessel

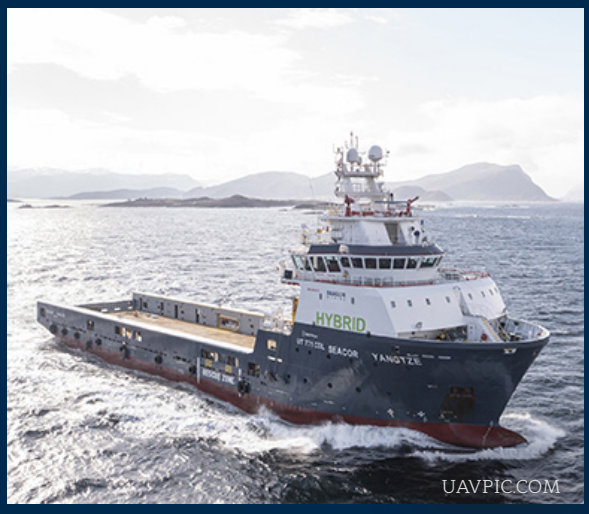
Approval in Principle (AIP)

ENERGY STORAGE TECHNOLOGIES

ABS has also classed vessels with lithium-ion battery installations.

Harvey Energy is the first ABS-classed dual-fuel (LNG/marine diesel) and battery vessel and the first U.S. flagged OSV equipped with a battery/converter system. The installation of a 1,450 kW battery hybrid solution is designed to reduce the Harvey Energy's exhaust emissions, fuel consumption, and noise level. The overall fuel cost savings are expected to be in the range of 10 to 20 percent, according to Harvey Gulf International.

ABS provided survey and engineering review services for the integration of a lithium-ion-based energy storage system into the SEACOR Yangtze platform support vessel (PSV). The upgrade to more sustainable operations was completed in Norway. In addition to the energy storage system, the vessel now utilizes closed bus dynamic positioning (DP) operations, a first in SEACOR Marine's fleet. This upgrade is the next step in optimizing PSV hybrid battery technology by further reducing fuel consumption and engine hours, while providing safe ride-through capabilities. The vessel joins six other SEACOR Marine PSVs having the ABS ESS-LiBATTERY notation. Four additional PSVs, the ABS-classed SEACOR Ohio, SEACOR Alps, SEACOR Andes and the SEACOR Atlas, have also been contracted by SEACOR Marine for hybrid battery-power upgrades.



The ABS-classed SEACOR Yangtze is the company's first battery hybrid vessel capable of closed bus DP operations.

Connect with ABS and learn more about how our team can support your current and future OSV hybridization projects. **Visit eagle.org/offshore or email us at globaloffshore@eagle.org**

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