TECHNOLOGY

New batteries add power to

Seacor Marine using advanced **technology** to increase the **efficiency** and **engine life** of its platform **supply vessels**

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Collaboration: ABS global offshore director Wei Huang (left) and Seacor engineering manager Tim Clerc

TODAY'S ever-improving advanced battery technology has become a hot topic globally as business leaders explore its potential to transform transport around the world.

This year, vessel company Seacor Marine and classification society ABS are bringing some of that innovation to platform supply vessels in the Gulf of Mexico.

The pair is introducing a hybrid PSV that taps battery technology to smooth out peaks and valleys of power use onboard, aimed at improving overall efficiency and reducing fuel consumption.

Seacor has already begun its first adaptation project on the Seacor Maya, a 285-foot dynamically positioned diesel-electric vessel in the fleet of the company's MexMar joint venture in Mexico.

The unit is due to be converted in the coming weeks at Bollinger Shipyards in Morgan City, Louisiana, with sea trials planned for mid-May.

The Louisiana-headquartered vessel company also plans to adapt nine more vessels, three already active in the MexMar unit and six under construction in China.

The company believes the upgrades will give it the world's largest hybrid fleet of its kind.

"With this technology we're best placed to take advantage of an upturn in the market by being able to deliver fuel-efficient vessels," Tim Clerc, manager of engineering for Seacor, tells Upstream.

"Inherent in their fuel efficiency is the ability to significantly reduce emissions."

The technology is also seen as a differentiator in a crowded market flooded with capacity amid the global oil-price downturn, especially as governments tighten emissions standards to fight climate change.

Battery technology has been breaking new ground in the maritime industry in the past few years, and has been one of scant few growth areas for oilfield equipment. Corvus Energy, the British Columbia-based battery manufacturer used by Seacor, said in 2017 the company saw a 350% increase in order intake from the oil and gas sector compared with 2016, including the Seacor order.

Other recent applications have included service vessels in the North Sea and a ferry project.

Growing market

The total market for energy storage systems (ESS) on offshore support vessels grew by 217% across the categories of platform supply vessels, cable-lay units and construction vessels, Corvus said, and interest in 2018 has shown no signs of abating for models such as its Orca ESS.

Offshore supply vessels have traditionally used two main diesel engines driving twin shafts and propellers, with auxiliary generators providing electrical power, Clerc explains. Over time, more efficient diesel-electric models have become more popular, with larger generator sets providing all onboard power including the propulsion and thruster motors.

Hybrid electric power takes the process another step forward. While there are still four generators on board, they are also accompanied by two large Lithium Ion battery banks, which are charged and discharged via the switchboard to modulate the energy use.

The aim is to limit the number of generators in operation, with transient increases in the load being supplied from the batteries and reducing the need to start additional generators.

The technology is designed to keep the generators from running more than necessary, and at their sweet spot of between 75% and 80% of the maximum continuous rating.

At higher power demands, the batteries are supplying power, and at lower power demands the generators are recharging batteries, enabling the generators to run constantly near or at their operational load sweet spot.

"Running at low power is definitely very inefficient and produces significantly more wear and tear on the engine," Clerc explains. "Our goal is to run engines at a constant efficient power level — it's difficult to achieve."

Constant evolution

Seacor implemented diesel-electric systems on anchor handling vessels in the mid-2000s. As it sought to take the next step, the company began meeting with battery manufacturer Corvus seven years ago.

It liked the technology, but saw it as too expensive for commercial application at that time.

A few years later, it became involved with a joint industry project on the subject with another classification society, DNV, collecting data on the Seacor Maya.

But by the 2017 Offshore Technology Conference, Seacor reckoned that the technology had matured and costs had come down sufficiently to begin a project to use it commercially, and started the project with ABS and with vendors.

Seacor proceeded to design the system, with ABS interacting between the vessel owner and vendors Kongsberg Maritime and Corvus, working out how to integrate the battery system with the ship's control system and power management system.

"That's basically ABS's role, the safety consideration, and to provide guidelines for the industry to present this type of new technology," says Wei Huang, director global offshore for the classification society. The ABS focus on the

hybrid PSVs

Photo: ABS

topic has also been deepening. In 2017, it released an advisory on the use of hybrid electric power systems, as well as a guide for the application of lithium batteries in the marine and offshore industries.

The battery, enclosed in a 20-foot shipping container, weighs about 28 tonnes.

Like any technology, the batteries require risk management, including temperature control, power management, backup and redundancy and modulation of charging and discharging. It is surrounded by a heating and cooling system to keep those factors in check.

A battery management system also works to guard against large charges and discharges, modulating the flow of power.

"It's the load levelling and the peak shaving so that the engine can provide a constant load," Huang says. "Which in that case would reduce the engine maintenance cost and hopefully also increase the life of the engine."

Loading out: a battery for the PSV applications being prepared at a facility in Norway Photo: SEACOR

Technology set to be rolled out

SEACOR and classification society ABS recently saw factory acceptance testing of the company's advanced battery technology take place in Norway, and the first battery is now on its way to the US for installation in the Seacor Maya, *writes Kathrine Schmidt.*

Beyond the Maya, Seacor also plans to outfit another trio of recently built supply vessels, the Seacor Azteca, Seacor Viking and Seacor Warrior, with all four conversions expected to be completed by the end of September.

Braemar will work with Seacor on dynamic positioning testing and failure mode analysis.

Seacor will also install the technology onboard six vessels under construction at Cosco shipyard in Guangdong, the first two of which are due for delivery by the end of this year and the rest stretching through 2020.

Seacor declined to discuss the cost or economics of the upgrades, but said the conversions will not impact the dayrates charged for now.

Overall the technology aims to achieve a reduction in fuel usage between 10% and 15% on average.

"We may well see greater or lesser savings depending on the mode of operations," says Seacor engineering manager Tim Clerc. "Our main focus on fuel savings is in dynamic positioning, where the vessels spend a whole lot of time."

The systems will also have remote monitoring capability to track power flow and usage. Overall, those involved with the project see the battery technology as enabling companies to carry out more efficient and low-emission operations in coming years.

Groundbreaking: the Seacor Maya platform supply vessel, the first of the company's fleet to be outfitted with a hybrid-electric power system Photo: SEACOR

ABS has seen an increase in requests about the technology and has also granted approvals in principle, as well as fielding inquiries for designers interested in the technology for newbuild uses.

Other potential applications could include multiple sources of backup power, such as adding a supercapacitor, to refine power usage on vessels with especially high energy requirements like drilling rigs.

Battery applications are also seen for other vessels such as tugs.

"I'm sure that there are going to be a lot of owners following us," Clerc says. "This is key technology towards reducing fuel consumption and emissions."