

MAKE THE SWITCH

Following its success in the renewables sector, The Switch is making its permanent magnet and frequency converter solutions available for marine applications. Business Development Manager Mika Koli told David Porteous that his company's drive train technology can revolutionise the way vessels generate and use energy.

The Switch made its name developing megawatt-class permanent magnet generator (PMG) and full-power converter packages that capture energy effectively from variable sources such as wind and solar. The Finnish company not only delivers the most extensive offering of PMGs to turbine manufacturers globally, but also provides production capacity superior to that of any competitor.

The company is now turning its attention to the marine market, where it believes its technology can dramatically improve the energy efficiency of all kinds of commercial vessels, cutting both operating costs and emission levels.

The shaft generator has been successfully used on board ships for the past 30 years to produce electrical power through the main engines, which have lower fuel consumption and run on cheaper fuel oil compared to auxiliary generators. The downside, however, is that the propulsion machinery can only be run at constant speed.

Alternatively, ships can operate without a shaft generator, taking advantage of the main engine's variable speed operation while auxiliary generators produce the electricity required on board. The disadvantage here is that the ship operator pays a premium in higher fuel costs as well as extra maintenance costs.

Innovative Solution

Now The Switch has developed an innovative solution that offers the best of both worlds. Installing a drive train consisting of a permanent magnet (PM) machine and a frequency converter allows a ship's auxiliary generators to be turned off for long periods, enabling the vessel to operate its main engines at slower speeds while still generating sufficient electricity for its entire network. The system incorporates an accurate and adjustable speed controller, which will keep the network stable regardless of weather conditions. ▀





"If tankers and other merchant ships reduced cruising speeds by just four knots, they could cut their energy consumption by half," said Mika Koli. "These major operational savings are possible for vessels with four-stroke and, in particular, two-stroke engines. By adopting our technology, a ship owner could save up to €50,000 per month in fuel costs, which may add up to a seven per cent increase in profitability per year. Running a ship at lower speeds will also reduce engine maintenance costs.

"Soaring fuel prices, global overcapacity and lower profits are forcing shipbuilders and ship owners to rethink conventional power configurations. Next-generation drive trains from The Switch are game-changers when it comes to improving energy effi-

ciency, lowering the costs of operation and helping merchant vessels comply with future environmental regulations.

High Reliability

"Our technology has been proven in the harsh environments of the wind industry and now we're making it available to the marine sector. Our PM machines offer high reliability and durability even in the most challenging operating conditions. And thanks to their high power density, they are more compact, lighter in weight and smaller in size than traditional systems. This makes it easy to configure solutions that fit within the limited confines of a ship."

A synchronous PM machine contains Neodymium-Iron-Boron (NdFeB) mag-

nets, which are rare-earth materials known for their very high energy density. These deliver excellent performance along with corrosion resistance and temperature tolerance. High flux density makes them ideal for variable speed generators and machines.





PM machines are highly efficient over their entire operating range. Compared with induction machines, they are two to four per cent more efficient at full load and ten per cent more efficient at part loads.

Advanced Technology

The Switch is applying its advanced technology to other marine applications.

It is currently working with operators of diverse vessels - ferries, cruise liners, tugboats and icebreakers - to optimise the fuel consumption of their ships' diesel engines. The company says its PM machine and frequency converter combination is perfect for all kinds of thrusters, including azimuths.

For winch applications, The Switch's technology has better torque than conventional systems and a wider speed range from zero upwards. Additionally, the rugged PM-based solution can withstand extreme temperatures, vibrations and heavy day-to-day use.

"Rather than reinvent the wheel, the marine industry can immediately benefit from the drive train systems we have developed for other industries," added Mr Koli. "We're convinced that the

marine industry will soon start to take note of this advanced technology to lower their operating costs and drive up their profitability.

"Our aim is that within a few years our marine business will be as big as our wind business is now. We want to be the clear choice for customers in all sectors who want advanced drive train technology."

The Switch, which employs 210 people and is headquartered in Vantaa, Finland, was established in 2006. Its volume manufacturing is carried out in locations according to the preferences of its customers and its production units adhere to a flexible 'model factory' concept. This forms part of its 'agile positioning' business model, which allows The Switch and its partners to be more responsive to market changes. ■