Green shipping changes the scenery

Greenhouse gas emissions have, in a short time, become a major concern for shipping, and the regulatory framework on emissions is changing rapidly. Shipowners are struggling with investment decisions, while equipment providers are developing new technologies. How to keep pace with the changing scenery?

Ten years ago, one of the most important concerns in a newbuilding project was the future bunker price — and by bunker, the reference was normally to heavy fuel oil (HFO) and, in some rare cases, marine diesel oil (MDO). Bunker prices followed the oil market fluctuation and the main question involved economics and not CO_2 emissions to a large extent. Ship engines were chosen accordingly.

"Today, the situation is completely different," says Arto Uuskallio, sales manager at Aker Arctic. "There are far more fuel options to choose from, and international regulations now place minimizing CO_2 emissions as the first item on the list. By 2030, CO_2 emissions per transport work (ton-miles of cargo) should be reduced by 40% (from 2008), and, by 2050, the International Maritime Organization has set the ambitious target of a minimum reduction of 50% for greenhouse gases (from 2008)."

Alternative fuels

In the future, shipowners will have to choose from a variety of fuels, each with its advantages and challenges. Ones discussed today are liquefied natural gas (LNG), liquefied petroleum gas (LPG), methanol/ethanol, biofuels, synthetic carbon-based fuels, hydrogen, ammonia and batteries. At the moment, nobody can tell which of these will be the winners, or whether other solutions will be found or reconsidered in the future.

"Nevertheless, it is not only a question of what fuel the future ship will use, but also where that fuel will be available and at what price? How will the infrastructure develop, where will there be production, and what kind of distribution networks will be available by the time the emission restrictions are in place?" Uuskallio emphasizes.

Production methods vary

Additionally, there are different production methods for the various fuels. For example, ammonia and hydrogen can both be produced using fossil energy (blue) or renewable energy (green). Currently, green ammonia is four times the price of blue ammonia.

"It is a huge risk at the investment stage if you don't know what price level a fuel will be available at in the future, and where," says Uuskallio.



Other concerns

Although fuel is a big concern, there are other important things to consider, such as efficiency of hull, propulsion and the machinery systems; ballast water management (BWM); underwater noise; operation related aspects; as well as regulations regarding construction (Energy Efficiency Design Index EEDI), (Carbon Intensity Indicator CII); conversion (Energy Efficiency Existing Ship Index EEXI); and operation (Ship Energy Efficiency Management Plan SEEMP).

"At Aker Arctic, we are constantly following how the regulatory side is evolving in terms of rules for both ice-going and open water vessels. Typically, regulations have always had a start date from which they enter into force, and ships built before that cut-off date are exempted from that rule. However, environmental regulations have begun to follow another pattern: From a particular date onwards, all ships have to conform to a certain rule," Uuskallio explains.

In addition, because vessels are long-lived and the fleet renews slowly, there are currently discussions on whether to impose restrictions also on existing vessels.

Following the development

"As designers, we want to be on top of these developments. Firstly, we need to master the technological side, so that we can design vessels which incorporate new inventions. Even more important is that we have an idea of the economic side to be able to advise our customers," Uuskallio highlights.

Aker Arctic's designers constantly research options and the latest technology in order to lower the risks of investment. One recent innovation was designing a vessel that can change its fuel type at a later stage. This feature has been implemented in some of our recent projects.

"Overall, we strive for energy-efficiency in our projects. We have developed tools to calculate both costs and emissions during the entire life-cycle of a vessel, which can be used to evaluate alternatives at an early stage," Uuskallio says.

In next issue of Arctic Passion News: Alternative fuels – advantages and challenges