

# Biofuel revolution

Engine manufacturers have revealed they are stepping up to the mark to avoid potential problems if ships were to run on biofuels.

At a recent biodiesel symposium held in Vancouver in June, John F Hatley, Americas Vice President of Ship Power for Wärtsilä North America, Inc, spoke of how he saw biofuels as "just another fuel that can be run like any other, as long as precautions were put into place."

The marine engine manufacturer revealed they have accumulated over 100,000 hours of research into the effects of biofuels on engines. The presentation showed the results of the engine components after using biofuels, which were described by Hatley as having "no alarming issues."

"Using biofuels reduces carbon dioxides (CO<sub>2</sub>) by 25-30%, reduces nitrogen oxides (NO<sub>x</sub>) by 85%, there's no sulphur dioxide (SO<sub>2</sub>) emissions as sulphur is removed from fuel when liquified and there's a 50% reduction in particulates (PM).

"I see it as a biofuel revolution. Natural gas can reduce emissions and cents, it's a win-win situation," Hatley stated.

The biofuels approved by Wärtsilä were listed as follows: palm oil, palm stearin, rape seed oil, and transesterified bio oils (bio-diesel). The company did not approve animal based bio oils, di-methyl ether DME, methanol and ethanol and bio oil (alcohol mixes).

Questions arose from industry players, who were concerned about potential issues including contamination, water separation

which accelerates microbial growth, and sludge build-up.

"If you adhere to the right precautions and have the right fuel, you're going to do great - but that's a lot of 'ifs'. The suitability of certain biofuels must be established separately for certain engine types. The biofuels we mention, are more than suitable for our engines," Hatley said in response.

An alliance of pressure groups and aid agencies, including Friends of the Earth and the UK-based charity Oxfam, have recently started campaigning against biofuels, claiming targets by the EU of having 10% of transport fuels come from biofuel by 2020 may threaten important ecosystems and boost food prices.

These heated debates about the impact biofuels is having on food prices has result-

ed in an increased interest in second-generation biofuels.

Experts at the biofuels conference, however, warned that in order to focus efforts on second-generation biofuels it would be necessary to develop the research on first-generation biofuels.

Second-generation biofuels were initially developed because of limitations of first generation and their threat to food supplies and biodiversity. Whereas first generation fuels require the use of crops such as sugar cane, corn, wheat and sugar beet, second generation uses biomass composed of non-food parts and waste and woody materials.

"Where we are now is laying the groundwork for the future. We need to have the first-generation biofuels to progress to the second generation," Brent Searle, special assistant to the director, Oregon Department of Agriculture, said.

A spokesperson for Canadian Bioenergy Corporation told Bunkerworld that when it came to biofuels, it was necessary to "learn to walk before we can run", saying that if we fail to learn from the first generation, we would be unable to progress successfully onto the second generation.

"As we go into second and third generations we'll have issues - we've got to keep everything in perspective," said Searle.

Algae, often considered a third-generation biofuel, came out as the favoured future for biofuels at the presentation offered by Searle, as it is neither land nor climate dependent. In the US, the American Algae Growers Corporation (AAGC) has been working on mass producing algae that uses carbon dioxide to grow and is then processed into biofuel.

Searle warned that there are risks of an increase in greenhouse gas emissions in creating the biofuel.

"There's always a trade-off. There's no perfect fuel out there. Biofuels won't answer every questions; there's just a variety of different pathways," he concluded.



*Food versus fuel debate continuing.*

## Emissions trading in the spotlight

A UK economist has devised a scheme that could address the challenge of reducing carbon emissions from shipping.

Dr. Terry Barker, director of the Centre for Climate Change Mitigation Research (4CMR) at the University of Cambridge and Chairman of Cambridge Econometrics Ltd, has developed the Global Emissions Trading Scheme (GETS), which he believes could help cut emissions from shipping and aviation to zero by 2052.

"The establishment of a World Carbon Authority is an essential feature of the scheme in that, through management of GETS, it will establish the long-term carbon price likely to be needed to decarbonise the global economy," Dr Baker said.

A GETS briefing note highlights challenges of global decarbonisation facing transport, acknowledging that international aviation and shipping are key to the success of the global economy.

The proposals would apply to transport operators, rather than countries, and aim to slowly reduce emissions to net zero between 2013 and 2052 over eight-year periods of emissions capping.

"Comprehensive policies will need to be in place by 2012 with action to 2020 if the rise in transport emissions is to be checked, let alone reversed. Yet agreement on suitable policies and measures, especially for international transport, seems difficult to achieve.

"The IMO has studied options for limiting GHG (greenhouse gas) emissions. However, they have yet been able to devise a suitable framework for implementing effective mitigation policies," Dr Barker concluded.

Credits would be auctioned from limited offsetting through the UN's Clean Development Mechanism, which promotes sustainable development in developing countries, the note added.

In order for GETS to work, Dr Barker says the scheme would require global co-operation.

Revenues from the auctions would then be used to support the proposed Multilateral Climate Change Fund, or new UN Clean Development Mechanism programmes.

But the Chief Operating Officer of DNV Maritime, has instead called for a global commitment to cut vessel sailing speeds.

Tor Svensen said it would be a more practical way for reducing bunker consumption and cutting GHG emissions than CO<sub>2</sub> trading schemes.

Svensen told the Malaysian Shipowners' Association in June that establishing an emissions trading system for CO<sub>2</sub> would be "enormously difficult".

"Instead of starting a system, we should look at speed limits and slowing the speed of ships," Svensen said.

Svensen was quoted saying that a 20%

reduction in speed would cut fuel consumption and emissions by 40%.

"There's a need for a joint effort to try and reduce speeds at sea," he was quoted as saying.

Svensen said he supported a voluntary system, preferably framed by the IMO rather than enforced speed limits.

China Ocean Shipping (Group) Company (COSCO) has become one of the latest major fleet operators to say it was reducing the cruising speed of its ships.

It said it was planning to cut its vessels' cruising speed by 10%, after a slow-steaming pilot scheme launched at the start of the year yielded 'impressive' results.

It is not the first time Svensen has backed slower steaming. Last year he told a shipping seminar in Norway that CO<sub>2</sub> reductions of between 10% and 30% were possible simply by optimizing vessel size, cutting speeds and using relatively simple existing technologies.

## Lower global bunker consumption?

A new study commissioned by the International Maritime Organization (IMO) suggests that global shipping is using less fuel and responsible for less carbon dioxide (CO<sub>2</sub>) emissions than previously thought.

Preliminary figures from the working group preparing an update of the 2000 IMO study on greenhouse gas (GHG) emissions from ships have pegged current CO<sub>2</sub> emissions from shipping at around 847 million tonnes annually.

The latest figures are based on a world fleet of 100,777 ships and a total annual fuel consumption of 310 million metric tonnes (mt).

The study, which was presented at the IMO's intersessional meeting on GHG in June, has not yet been made public or official. The findings were reported by Tradewinds in July, which said it had obtained a copy of the report.

Bunker consumption and CO<sub>2</sub> emission figures in the new report are significantly lower than estimates produced by an IMO-commissioned panel of experts late last year.

Last year's report, which was prepared for the IMO to help the MARPOL Annex VI review process, pegged current global marine fuel consumption at a total of 369 million mt. That fuel consumption figure would put current CO<sub>2</sub> emissions from ships at 1.1 billion mt.

There is little agreement on international demand for marine fuels. Prior to last

year's IMO-commissioned study, the MEPC had been working on an assumption that global bunker fuel demand was around 200 million mt annually.

The International Energy Agency (IEA) said in a recent report that current estimate demands range from 4 million barrels per day (bpd) to 7.5 million bpd, with the IEA's own statistics indicating the lower end of that range.

The GHG working group has until September 1 to submit the final phase 1 report to the IMO for consideration by the 58th meeting of the Marine Environment Protection Committee (MEPC 58) in October this year.

MEPC 58 is expected to formally adopt revisions to MARPOL Annex VI, which were agreed at MEPC 57 in April this year, but still faces a heavy workload on the GHG issue.

The updated GHG study will be used to estimate current and future GHG emissions from shipping as the IMO seeks to formulate international regulations to control and reduce such emissions.

The working group putting together the new report is said to include classification society Det Norske Veritas (DNV), research organisation Marintek, Dalian Maritime University, Japan's National Maritime Research Institute, South Korea's Mokpo National Maritime University and Energy & Environmental Research Associates of the US.

## New low-emissions engines

Wärtsilä Corporation has announced a new partner for trials of its new marine engine that is capable of significantly reducing emissions, without restrictions on the fuel specification.

The marine engine manufacturer said in June that it has joined together with Japan's Mitsubishi Heavy Industries to develop the new RTX-4 low-speed research engine.

The engine plans to improve reliability, produce greater fuel efficiency, reduce carbon dioxide (CO<sub>2</sub>) emissions and reduce the nitrogen oxides (NO<sub>x</sub>) content in the exhaust gases by more than 90%.

In March the US Environmental Protection Agency (US EPA) revealed plans to introduce new emission standards that will reduce the engine-out particulate matter (PM) and NO<sub>x</sub> emissions for new engines beginning in 2009. This excludes the large marine diesel engines known as Category 3, used primarily for propulsion power on ocean-going vessels, such as container ships, tankers, cruise ships and bulk carriers.

The EPA and the International Maritime Organization (IMO) plan to target the reduction of NO<sub>x</sub> emissions from such engines by 15-25%, beginning in 2011. From 2016, these rules would apply to new Category 3 engines and require the use of high-efficiency catalytic after-treatment emission control tech-

nology capable of reducing NO<sub>x</sub> emissions by 80%.

Wärtsilä is focusing its new engine efforts on possible future changes in fuel quality and emissions regulations.

"The research engine can be tested on any type of heavy fuel oil. This is of major importance as research can be undertaken using similar fuels as production engines in actual service," a company report said. "It will allow future research into the capabilities of engines to burn even lower grades of fuel oil, should the quality of future bunkers be expected to deteriorate."

The RTX-4 research engine is a four-cylinder low-speed two-stroke engine of 600 mm cylinder bore. Initially it develops 10,160 kW at a nominal speed of 114 rpm. The design focuses on the control of exhaust gas emissions and is set up to allow the installation of aftertreatment technologies, including particulate filters and scrubbers.

The company believes this will allow for possible future stringent marine regulations.

"The engine will serve as a powerful research tool to pave the way for future technological steps. Wärtsilä is dedicated to improving existing engine designs, to introduce new engines to the market and to explore the technological potential suitable for future market needs," it said.

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