

## SHIPPING 4.0

## The power of the future

What will power the ships of the future? Will the industry manage on its own to transition out of its dependency on heavy fuel oil, or will regulations be needed to force a change? Is LNG the fuel of the future, or more of a placeholder while greener alternatives ramp up? Will the first movers into new technologies inspire others to follow in their wake?

### Participants:

#### Invited guests

Rolf A. Sandvik – CEO, The Fjords  
Dr. Tristan Smith – University College of London Consultants Ltd., and director of the RCUK-funded project Shipping in Changing Climates

#### Journalists

Paul Bartlett – The Motorship and Seatrade Green Shipping Guide  
Paul Berrill – Features Editor, TradeWinds  
Michael Grey, MBE – Freelance journalist  
Paul Gunton – Executive Editor, Marine Propulsion

#### ABB Marine & Ports experts

Janne Kuivalainen – Head of Technology  
John Olav Lindtjørn – Global Product Manager Energy Storage  
Jorulf Nergard – Head of Short Sea Shipping

The session was moderated by Peter Lovegrove, ABB Marine & Ports

To gather some solid perspectives on these and other challenges and opportunities facing shipping as we enter the 4th industrial revolution, ABB Marine & Ports invited four prominent maritime journalists, a progressive shipowner, and a marine emissions and regulations authority to a roundtable discussion with their own experts in London on 28 February 2017. The following is a subjective account of the discussion.

#### Exploring the future

In these days of paradigm shifts and overnight revolutions, where predictability seems to have left the building, perhaps a philosophical approach is a useful supplement to business acumen. The discussion in London was kicked off by University College of London Reader Tristan Smith: “When navigating the regulatory picture, it is important to start in the present and try to see the inevitable future,” he proposed. “Extrapolating on the current state of shipping, we can assume that volumes will grow, while emissions will decrease.”

Emissions are expected to decrease by 60-90 per cent per tonne mile by 2050, he related, adding: “Many things could contribute to this, including slower steaming, new fuels, and other technologies, but fuel will be the main driver.”



Tristan Smith (left) opened the discussion in London

Smith and his colleagues employ this same methodology in much of their work, running scenarios that explore potential future outcomes, and trying to gain an understanding of what they mean. He advises companies to take a lesson from the game of hockey, and “skate to where the puck will be”, or position themselves where they see things moving, based on macro trends and major developments.

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One of those doing just that is tourist shipowner The Fjords, operating out of idyllic Flåm on the

Norwegian west coast, and trafficking the UNESCO-protected Nærøyfjord. CEO Rolf A. Sandvik told of how they came to equip their latest vessel, the “Vision of the Fjords”, with hybrid diesel-battery propulsion: “When we built the hybrid ‘Vision’, the spreadsheet told us we should have chosen pure diesel. But we felt an obligation to respect our presence on this pristine fjord. We wanted to make a difference, but also to stand out from the competition.”

While there could be no contesting their idealistic motives, there was never any guarantee that their investment would pay off. But Sandvik and The Fjords decided to “skate to where the puck will be,” and that has proved to be a decision as prudent as it was bold: “We had faith that travelers would appreciate our decision, and a study to be published in the spring of 2017 has confirmed this assumption, that they are willing to pay for the green advantage.”





The Vision of the Fjords in fact has many advantages, not least its striking design inspired by a winding mountain path, and unmatched viewing experiences, both inside the main cabin and on deck. But gliding silently along Nærøyfjord under battery power is definitely a key selling point in the overall experience, underpinned by the environmental bonus of zero emission cruising. “We have not yet marketed the green aspect with full strength, but we will do so in the future,” he related.

As for positioning themselves where they believe things are headed, Sandvik and The Fjords are way ahead of the puck: “What we have done so far is with zero support from the government. We are doing it because we believe that people want a carbon-free future, and that technological advances will eventually bring costs down.”

#### **What makes change happen?**

A comment from the journalists emphasised the impact of market forces and critical mass. The turning point, they observed, comes when technology converges at an affordable point, for example when an automobile manufacturer can turn out mass-produced models with new technologies at affordable prices.

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Increasing access to knowledge  
is important to driving change.

ABB’s Jon Olav Lindtjørn conferred: “The transfer of technologies from other industries is speeding up conversion processes in shipping. Perhaps we will see major changes in just 10 years?” His postulation received support from Tristan Smith: “The ‘Hydrogen Hypothesis’ predicts 2030 as a turning point, but this involves several trade-offs, including the de-carbonisation of electricity production.”

Here the veteran journalists weighed in with a healthy dose of scepticism: Could it be realistic to hope for such a major reduction in emissions by 2030, or even 2050? And if so, which fuels will enable such a dramatic reduction in just one new generation of ships?

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John Olav Lindtjørn  
with journalists



Tristan Smith replied that fleet renewal would drive much of the change, primarily newbuilds, but with some retrofitting to add to momentum. Still, he cautioned against painting too rosy a picture of an industry not built for rapid change: “Regulations will drive the move to new fuels, but shipping will still be heavily fossil for some time to come.”

Underscoring the slow nature of change in the shipping industry, ABB’s Janne Kuivalainen pointed out one of the major differences between shipping and other transport industries: “Ship construction is more conglomerate than automobiles or planes. This makes it difficult to scale up quickly, because there are so many contributors that have to be on the same page.”

#### In with the new

Moving on to new power sources, Jon Olav Lindtjørn elaborated on the expanding role of batteries onboard: “Batteries can contribute to more than pure propulsion. They can compensate for sub-optimal engine operations, or serve as a backup, reducing the need for auxiliary power, and thus reducing emissions.” He was supported by ABB colleague Jorulf Nergard, who pointed out that batteries have the potential to serve these and many other purposes that can improve a ship’s overall efficiency and economy.

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But batteries need charging, and charging is a challenge, Janne Kuivalainen stated: “We need more cases to achieve standardisation. Each route has its own needs, and the same thing basically applies to each vessel.”

Here Rolf Sandvik turned his attention to regulations as the driver for change: “Regulations are needed to drive standardisation in charging infrastructure. With these in place the industry will adjust, and as we have seen, the customers are willing to pay.”

But regulations can be tricky, especially at the local level, as The Fjords have experienced: “Local politicians are unwilling to implement regulations that could influence competition. If they reward hybrid or zero-emission solutions where we operate, they fear it would give us an unfair advantage. Of course we believe that regulations would push others to move toward greener solutions. Instead, the responsibility is pushed upward, from local to national, then to the international level, and eventually they land with the IMO, where things move slowly.”

“We would like to be able to operate anywhere in the world with our concept, but that requires standardisation, and the road to international standards is a very long one. The industry should take initiatives for standardisation of charging facilities, perhaps working within the ISO regime.”

Sandvik is also looking to other fuel sources in his quest for greener operations: “We are planning to retrofit an older vessel with hydrogen power in a government-funded conversion project, and we have started talks with a west coast yard.”

Janne Kuivalainen pointed out that fuel cells will require further technical development before they take a larger role, emphasising the need for the industry to take control of markets, research, and development. “But for now,” he maintained, “the future is electric.”

#### Seeing the opportunities

Addressing the transition from the old to the new, Jon Olav Lindtjørn reflected on the potential life span of diesel, and the factors that will determine how long it takes to achieve a shift from fossil fuel: “Power will definitely increase in fuel cells, but combustion engines will be around for a long time, if perhaps in smaller dimensions. Batteries last between five and ten years, so costs will drop by the time replacement is required. Battery recycling will also improve, and the second life of batteries in non-critical situations in being considered.”

True to form, the press corps posed another sticky question: Will shipowners be able to convince customers to pay more for transportation without a reward for using green solutions?

Tristan Smith offered a reply: “Cargo owners are demanding green transport, with less carbon. I believe containers will pave the way, as their customers are more concerned with maintaining green and clean profiles. With everything from iPhones to automobiles, manufacturers want to be seen as green along the whole supply chain. Eventually, tankers and bulkers will follow, but I am cynical about market forces alone driving change. Regulations are needed to catalyse the shift.”

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Rounding off with perspectives on the 4th industrial revolution and its impact on the power of the future, Janne Kuivalainen assumed a holistic perspective: “Digitalisation will impact R&D, and thus

influence power systems development not just directly, but by giving industry the chance to try out systems in realistic simulated test situations and model systems more accurately. Performance, lifetime, many factors can be made more predictable. In this way digitalisation can help us gain deeper domain knowledge before we move technologies into the field.”

Tristan Smith agreed, summing up the discussion with an appropriately hybrid approach, merging virtual and physical realities: “Increasing access to knowledge is important to driving change. But each ship is essentially a prototype, and this is both an advantage and a disadvantage, a blessing and a curse. Ships can be designed to purpose, but not easily standardised.”

That would seem a fitting description of the reality of powering ships. When it comes to determining the power of the future, there are as many challenges as there are ships – and as many opportunities.

Roundtable discussion

