34 CEOs from across the maritime value chain and from all around the world signed a call to action in support of decarbonization at the Annual Summit. They are committed to support the IMO strategy and stand ready to work with their peers, the IMO, and governments to help this succeed.

- **Evidence-based**. They accept the scientific rationale for urgent action presented by the IPCC and in the IMO GHG Studies, and they are committed to addressing climate change.
- **Ambitious but achievable**. They recognize that this will require significant reductions in the carbon intensity of vessels to accommodate expected growth in global trade.
- **Innovative**. They believe that a shift to a low-carbon economy by 2050 has the potential to create new opportunities for business through both technological and business model innovation.
- **Leading by example**. They are already pursuing emission reductions in their operations. They will continue to pursue further emission reductions and accept the need for transparency to help drive change.

They recommend that core principles of the “Road map” be:

- **Ambitious**. The Strategy should be consistently in line with the Paris agreement’s temperature goals.
- **Predictable**. Regulations should provide long-term certainty for financiers, builders, owners, and charterers to make the required investments in low-carbon technologies.
- **Market-oriented**. Emissions reduction objectives should be met at the lowest possible cost, and the industry should explore the use of carbon pricing and other mechanisms that can create economic value from GHG emission reductions.
- **Technology-enabling**. The Strategy should accelerate the use of low-carbon technologies and fuels by encouraging significant funding flows for research, development, and deployment.
- **Urgent**. Certain mid- and long-term measures will require work to commence prior to 2023, including the development of zero-emission fuels to enable the implementation of decarbonization solutions by 2030.
- **Coherent**. Solutions implemented should build on and reinforce existing technical, operational, and energy efficiency measures while maintaining or enhancing safety standards. In this context, it is critical that all IMO environmental regulations be compatible with future 2050 regulations.
- **Enforceable**. Legally binding, enforceable actions set by the IMO and enforced by member countries are required to compel the industry to shift.

They support private sector engagement in the continued improvement of the Strategy. They encourage the creation of a concrete agenda of public-private cooperation and they invite other CEOs and maritime industry leaders to join them in seizing the opportunity to innovate and lead the transition to a new shipping industry for the 21st century.

Learn more:
www.globalmaritimeforum.org/initiatives/decarbonization

“Global seaborne trade’s transition to a low-carbon future will propel both technological and business model innovation. The right incentives for accelerated investment into R&D can only come about if we get a global IMO based regulation. We invite stakeholders from the entire maritime spectrum to join us on this new journey.”

Claus V. Hemmingsen, Vice CEO of A.P. Møller – Maersk, Denmark
Assessing the technology options to achieve Zero Emission Vessels by 2030 and the drivers that need to be in place to make them competitive.

Katharine Palmer, Global Sustainability Manager, Marine & Offshore, Lloyd’s Register, United Kingdom

In April 2018, the IMO announced its Initial GHG Strategy with the goal to reduce the industry’s emissions by at least 50% by 2050. This ambitious strategy will require zero-emission vessels to be entering the fleet in 2030 and form a significant portion of newbuilds from then on.

Katharine Palmer presented some of the key findings from a recent report “Zero-Emission Vessels 2030” prepared by Lloyd’s Register in collaboration with academic partner UMAS. The report aims to demonstrate the viability of zero-emission vessels by identifying the drivers that need to be in place to make them a competitive solution for decarbonization.

Katharine Palmer compared this paradigm shift away from technologies that aim to increase efficiency and optimize conditions for conventional engines, to an overarching global aim of ending all use of fossil fuels as similar to one already occurring in the automotive and energy sectors. In the global maritime industry, this means the adoption of zero-emission vessels that can truly emulate the logistics provided by current fleets, but with no operational emissions.

In their report, Lloyd’s Register and UMAS examined seven technology options applied to five different case study ship types, and across three different future scenarios. These options consisted of various combinations of battery, synthetic fuels – such as hydrogen and ammonia – and biofuel for the on-board storage of energy, coupled with either a fuel cell, motor, or internal combustion engine.

The choice of technologies was based on their ability to feasibly replace a conventional ship’s propulsion requirements without major alterations to voyage times, routes, or cargo-carrying arrangements and, crucially, that they could also be considered genuinely zero-emission.

According to Katharine Palmer, the study concluded that biofuel is the most profitable zero-emission solution, followed by synthetic fuels with internal combustion machinery hybrid and electric solutions, which require large quantities of batteries at high capital cost, were deemed to be the least competitive. This is due to the fact that biofuel generally requires no significant extra capital cost when using conventional ship machinery and storage, and the capital costs of the other six options are not sufficiently balanced by higher through-life efficiencies or lower fuel/carbon costs.

Although advanced biofuels appear to be the most attractive zero-emission vessel solution currently available, they present significant challenges of sustainability and availability. Synthetic fuels appear to be the most competitive alternative. However, ultimately, none of the zero-emission options in their current specifications are likely to be profitable relative to a baseline heavy fuel oil ship, though there is certainly potential for a significant portion of the competitiveness gap to be closed as the enabling technologies and infrastructures are further developed.

Katharine Palmer pointed to policy and regulation as important drivers for change where market forces alone appear to be insufficient to close the gap. The industry needs levers that encourages them to invest in greener shipping, as first movers are, otherwise, not likely to profit from such investments. She also emphasized the need for cross-industry collaboration on technological development and investment required to reach the 2050 goals.
Putting a price on pollution

What are the options for carbon pricing in the maritime sector?

Ian Parry, Principal Environmental Fiscal Policy Expert, Fiscal Affairs Department, IMF, USA

In April 2018, the IMO set a target of reducing the sector’s GHG emissions by at least 50% by 2050. Carbon pricing, i.e. putting a price on GHG emissions, counts among the key policy options under consideration to help reach this target. To lay out the options for carbon pricing in the maritime sector, Ian Parry presented the findings of a recent IMF research paper on the topic.

According to Ian Parry, one approach to carbon pricing in international maritime transport is a carbon tax on maritime fuels. From an environmental point of view, a carbon tax provides a clear incentive to increase energy efficiency and set a price signal making low-carbon technologies more attractive. From a fiscal perspective, it raises substantial amounts of revenues to be reinvested in the industry or to be used for international climate finance. Furthermore, a carbon tax appears more effective compared to other mitigation instruments, such as efficiency standards, offset schemes, and emissions trading systems.

Given the high mobility of the tax base and the imperative on non-discriminatory treatment, Ian Parry suggested that a carbon tax in the maritime sector would ideally be applied at the global level, collected from ship operators, and administered by the IMO, and that revenues could go to a new fund.

There are two design options, either a pure carbon tax or a revenue-neutral carbon tax. In the first case, everybody simply pays a charge equivalent to the carbon content of the fuel consumed multiplied with the corresponding price level. In the second case, an average carbon intensity benchmark level is set across the industry and ships, which perform worse than this average, pay the tax, while ships that perform better receive the revenues as a subsidy.

Modeling shows that a 10% fuel price increase results in a 4.5% reduction in fuel use. Using the purely illustrative example of a carbon price of $75/CO2, GHG emissions could be lowered by about 15% and 25% by 2030 and 2040, respectively, compared to a business-as-usual scenario. Of course, these scenarios are still far away from halving emissions by mid-century as prescribed by the IMO’s StVIO Strategy. The revenues raised would amount to $76 bn in 2030 and $135 bn in 2040 and would result in an increase of the average shipping costs at a global level by 0.005–0.075% of global GDP in 2030.

Ian Parry concluded by making the case that, thanks to its effectiveness, a carbon tax on international maritime fuels deserved further consideration, but that revenues should only be raised if they can be used productively and should ideally be linked with investments in research and development for clean shipping technologies. The subsequent discussion focused on whether the shipping industry could pass on the carbon price to the end consumer. Several participants suggested that under current depressed freight rates, full pass-through would be an economic imperative for the industry to remain profitable.

Another question related to the need for compensation for countries vulnerable to increased shipping costs. According to Ian Parry, the additional costs are generally expected to be manageable, but a complementary transfer scheme financed by the IMO Fund could also be imagined. To ensure good governance, the details of the fund administration—both in terms of investments in R&D or compensatory transfers for countries—would need to be carefully worked out.

Several participants suggested that a fund not only support research and development in new technologies, but also the deployment of existing technologies, since transitory subsidies would be useful to reward pioneers and early movers.
Collaboration and leadership to meet IMO’s 2050 goal

Emphasizing the importance of mobilizing the industry to meet the IMO’s 2050 target, this group focused on the need to move beyond competition and self-interest toward a new paradigm of active collaboration and leadership.

The group proposed that leaders in the industry should focus on the long-term survival of the industry, rather than the pursuit of short-term economic opportunities. Speaking in one voice and fostering a closer collaborative relationship with the IMO was considered as essential in developing a global regulatory framework supportive of shared goals.

A structured road map for the industry to adopt zero carbon fuels was discussed as a key objective to meeting the ambitious target set out by the IMO, which will require significant investment in the development and deployment of new technologies, and a funding mechanism (e.g., through a fuel levy) to match.

Significant value could be created by building a “coalition of the willing” with a united voice and clearly defined, shared objectives. The coalition would engage with major stakeholders – the IMO, regulators in key countries, other important sectors – on how to achieve decarbonization on the timescale set out by the IMO’s target.

The group identified immediate next steps to take:

- Launch an industry coalition of diverse stakeholders to explore options (technology options, near-term commercial opportunities, pathway to long-term solutions, funding mechanism etc.)
- Engage with relevant stakeholders who are not already part of the Global Maritime Forum platform (e.g., Asian shipowners, other industries)
- Engage with experts on shipping’s decarbonization to develop a conceptual industry road map to take forward (including technology options, likely cost, scalability, and funding)
- Leverage the initial Call to Action to make industry decarbonization pledge
- Develop proposals to be presented to the IMO for discussion
- Present achievements back to the Global Maritime Forum’s Annual Summit in October 2019

It was emphasized that companies would need to commit resources, including people, in order to make this coalition a reality.

“ One of the biggest challenges is that we have no idea of what technologies can be made available on commercially viable terms to fulfill the IMO 2050 goals.”

Randy Chen, Director and Vice Chairman, Wan Hai Lines, Taiwan
Working group outcomes

Accelerating the transition

The scope for reducing shipping emissions from operational measures appears to be insufficient in isolation. Therefore, reaching even IMO’s goal for 2050 – to reduce the industry’s emissions by at least 50% – will require a transition to zero carbon fuels to happen very quickly. This working group set itself the objective to get to a point where it is financially cost-effective and commercially viable to order a net zero emissions deep-sea vessel within 10 years for delivery in 2030.

The group agreed that to achieve this objective, it will be necessary to (a) make zero carbon fuels available at scale and (b) make zero-carbon powering solutions available and cost-effective to buy and utilize. The group also agreed that it was critical that the objective could be achieved without the use of subsidies and that it was created from within (and through) the maritime sector.

The group proposed two key action areas:
1. Raising the cost or penalty of emitting carbon dioxide.
2. Develop a support mechanism to select, fund, encourage, and reward the development of zero-carbon fuels, associated technology, and uptake.

The group pointed to the UK and German governments’ efforts to drive clean power generation as successful examples of how to bring down the cost of renewable electricity.

Bringing in other industries was identified as critical to making zero carbon fuels available at scale, for example oil & gas majors, the chemical sectors (producers of biofuels and hydrogen) and engine manufacturers. The group suggested that working with other industries could enable a progressive transition, enabling zero carbon fuels such as ammonia and biofuels that could be dropped-in to existing technology.

To incentivize the transition and to fund much needed research, development, and deployment of new technologies, a carbon tax should be established quickly. The right place for the fund needs to be identified too, with perhaps the IMO as the main driver and the funds being put right into projects.

The group proposed the establishment of a dedicated working group on zero-carbon fuels, which could bring together representatives from relevant sectors to develop an industry road map to reaching the IMO goal and to collaborate on its implementation and support the adoption of regulations to advancing this transition.

“...When you think about 2030, it seems like a long way away. However, when you start there and work backwards and think about the time available and what is needed, you realize very quickly that all of the processes have to start today.”

Lasse Kristofferson, President and Chief Executive Officer, Torvald Klaveness, Sweden
Incentivizing shipping’s decarbonization

This working group discussed the role of the financial sector in encouraging the industry to support the IMO’s 2050 target. It pointed to the Poseidon Principles, a set of criteria for integrating climate risk considerations into lending decisions, as a framework to incentivize shipping’s decarbonization, but also to address other environmental and social issues.

The group identified a number of requirements for the initiative to be successful. First, it must have the most impact; it must be global and should include all lending institutions. Second, it should be supported by globally-recognized reporting of data and the use of established, agreed-on metrics. Ideally, classification societies would be involved as neutral arbiters of information. Third, directional targets should be set. For example, for the issue of climate change, the targets could be based on a decarbonization trajectory. Finally, this process should be transparent to encourage trust throughout the system.

The group also pointed to the role of charterers in providing both carrots and sticks by driving business toward greener vessels.

The group also discussed whether this initiative could be used vis-à-vis regulators to seek relief from Basel IV.

Finally, the group encouraged that banks should look to build a single initiative, using the Poseidon Principles as the umbrella to address other issues as well, such as ship recycling and crew welfare, to increase its reach and effectiveness.

“It is very important that we act as an industry, not individually.”

Stephen Fawster, Global Head of Shipping, ING, United Kingdom