A report by

Lloyd's Register

It's time: How to make shipping's 'Decade of Action' a reality.

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Longitude

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It’s not the future – it’s now.

It’s time for the maritime industry to deliver decarbonisation. The pace of change needs to accelerate now.

Our industry is no longer asking ‘if’ or ‘when’ decarbonisation should take place. We know we must act now and many of us are. The question that remains is ‘how’ will the maritime industry deliver meaningful change during this crucial decade of action.

In starting any journey, a focus on the destination is vital. By 2030, zero-carbon vessels capable of crossing oceans need to be the right environmental choice and, crucially, the right commercial choice as well. This will be the spark for a rapid decarbonisation of our industry, setting us on a course for the 2050 goal of all deep-sea vessels running on zero-carbon emitting energy sources, supplied by net-zero supply chains.

This report brings together experts from the public and private sector across global supply chains, along with a broad range of stakeholders, to give their views on what the global maritime industry needs to do to make this decade of change a reality. We sincerely hope it builds collaboration and understanding and becomes a place to convene continuing conversations.

The challenge is immense, but the commitment is real. Every organisation involved in this report has demonstrated enormous willingness to be involved. Time and again, the report’s researchers heard the sentiment that everyone must play their part, with a belief in shared responsibility. There is real determination to make the decade of action a reality, and I thank every organisation involved for taking part in this report.

The prize is a safe, sustainable transition to a zero-carbon future. This report explains how our industry will achieve it, together.

Nick Brown,
Chief Executive Officer, Lloyd’s Register Group

Delivering meaningful action on maritime decarbonisation

"If the rest of the world is decarbonising, and the global shipping sector is not doing its part, there will probably be more draconian measures applied that may be more expensive and disruptive to the sector. If companies want their business model to survive these kinds of changes, they should be building these in their plans already. Otherwise, we are going to see a lot more stranded assets, bankruptcies and failures in the sector."

Mark Lutes,
Senior Advisor, Global Climate Policy,
WWF Climate & Energy

The global race to zero is on.

The August 2021 UN Intergovernmental Panel on Climate Change (IPCC) report, described as a "code red for humanity" by UN secretary general António Guterres, warns of increasingly extreme heatwaves, droughts and flooding.

"If we combine forces now, we can avert climate catastrophe," said Guterres. "But, as today's report makes clear, there is no time for delay and no room for excuses."

Where does that leave shipping?

Between 2012 and 2018, shipping's greenhouse gas (GHG) emissions increased by 9.3% and total greenhouse gases by 9.6%, according to the International Maritime Organization's Fourth Greenhouse Gas Study[1]. By 2018, shipping accounted for 2.89% of global GHG emissions. The study further estimates that, without regulatory interventions, emissions are likely to increase from 90% of 2008 emissions in 2018 to 90-130% of 2008 emissions by 2050.

The carbon challenge continues to be supported by climate science. The IPCC AR6 Summary for Policymakers (SPM) highlights that: "From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net-zero CO_2 emissions, along with strong reductions in other greenhouse gas emissions."[2]

Shipping must pin down the detail around what can and must be done, and how. As Jim Barry, chief investment officer of BlackRock Alternative Investors puts it: "The natural instinct of any industry will be to look to defer regulation, 'How long can I drag it out?' That's the wrong instinct today [and it's] not going to work this time because the climate is changing. There's no ambiguity on that."

The pressure to change is just going to build and build, says Barry, and "the cost of this transition will be less the sooner you get your head around the future roadmap and the sooner you begin the adjustment".

This is a transformation that will depend on the entire maritime ecosystem for its success. Indeed, there is much understanding of what needs to happen to reduce GHG emissions from the shipping sector. But when will it happen? This study seeks to answer the question of what is needed to turn theory into reality; to take the actions needed to deliver the safe and sustainable decarbonisation of maritime supply chains.

"Everybody needs to take responsibility," says Lasse Kristoffersen, CEO at Torvald Klaveness. "The problem is that if everybody needs to do it, nobody feels they have to do it because everybody can point at somebody else. The regulators can point to the industry, and the industry to the fuel makers, and the fuel makers to the shipyards, and so on."

Shipping's Decade of Action.

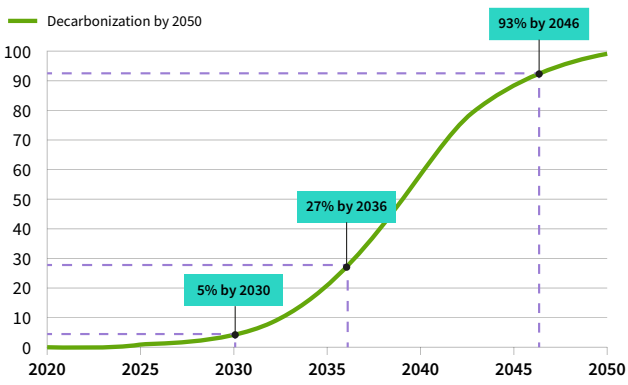
The actions taken between now and 2030 are critical to setting the course for the sector's journey to zero-carbon shipping supplied by net-zero supply chains.

The UN's 'Decade of Action' calls for countries to take, by 2030, urgent steps towards its 17 Sustainable Development Goals (SDGs). For shipping, that means taking urgent action to combat climate change and its impacts (Goal 13) and conserving and sustainably using the oceans, seas and marine resources for sustainable development (Goal 14).

In parallel, the Getting to Zero Coalition (GtZ)[3] – an alliance of more than 150 organisations from across the maritime, energy, infrastructure and finance sectors, supported by key governments and IGOs – aims for the industry to have "commercially viable zero emission vessels operating along deep-sea trade routes by 2030".[4]

Critically, to enable decarbonisation in line with such industry targets, the UN Climate Champions have concluded that zero emission fuels need to make up 5% of international shipping's fuel mix by 2030 as a first step, or 'tipping point', if decarbonisation is to be achieved by 2050.[5]

Zero emission fuel adoption rate Percent of fuel per year



The adoption of zero emission fuels is expected to follow an 'S' curve of three phases: slow emergence, diffusion and reconfiguration.

Five percent may sound small but, considering the size of the sector and the corresponding shore-based infrastructure investment necessary, it is a huge challenge.

To understand exactly what is needed to achieve success, Lloyd's Register (LR), a global professional services organisation specialising in engineering and technology solutions for the maritime industry, partnered with Longitude, a Financial Times company, to conduct a qualitative research study.

We spoke to 13 global experts and thought leaders from across and beyond the shipping sector to better understand the opportunities, benefits and barriers to decarbonisation in shipping and end-to-end supply chain transformation. The aim? To highlight where decarbonisation action is most urgently needed, and to spark conversation and collaboration that move the needle closer to the minimum 5% uptake that is needed between now and 2030.

Our research identified five critically urgent pathways which shipping must navigate in pursuit of its own 'Decade of Action'.

1. Global regulation to support industry-wide action

There is consensus that global regulation and market-based measures (MBMs) are vital to drive forward change. But the current rate of progress may not dissuade national and regional regulators from taking their own initiatives. The risk of fragmentation in terms of policy objectives and regulation is already expected to be realised in the EU from 2023. It is critical for the International Maritime Organization (IMO) to take advantage of its plan to accelerate a review of its Initial GHG Strategy by 2023, and work on measures designed to increase the uptake of low- and zero-carbon fuels. It will be increasingly difficult to defend global regulation as the preferred alternative to proactive national or regional initiatives if this opportunity is not taken.

2. Overcoming barriers to scale infrastructure

While much of the infrastructure and technology needed to decarbonise shipping could be available or is in development, it often remains commercially unviable, even for leading global organisations. Fixing this issue, with a particular focus on fuel alternatives, will help to catalyse change across the wider supply chain.

3. Finance and investment to drive uptake

Finding finance for new innovations and technologies is seen as a key challenge – but there is a flip side, as money is moving fast into 'green' funds and climate is becoming a filter through which investments are being considered. Mounting pressure from consumers and society will continue to deliver new paths to finance and investment. But the longer the sector waits to act, the higher the cost of decarbonisation will be.

4. Data and analytics to deliver efficiency and innovation

Accessing, sharing, analysing and exploiting data and data insights will be key to emissions reductions, because they can improve the efficiency of shipping, port and wider supply chain operations and provide greater transparency for the industry. Future fuel production will also depend on the 'smart' use of renewable energy through digital solutions.

5. Cross-sector partnerships to harness momentum

To unlock global potential, ensure sector-wide alignment and take advantage of new ideas, partnerships must extend beyond shipping and its supply chains. If shipping can build collaborations within and beyond the maritime economy and avoid a silo mentality, it will maximise resources, eliminate duplication of effort and accelerate progress.

1.

Global regulation to support industry-wide action

“We can forget about decarbonisation of deep-sea shipping without regulatory intervention. It simply will not happen.”

Lasse Kristoffersen
CEO, Torvald Klaveness, and International Chamber of Shipping (ICS) Vice Chair

There is consensus that climate change targets and deadlines set for and by the shipping sector will not be met without global regulation.

The IMO's initial GHG strategy is a start, setting a target that total GHG emissions from international shipping should be cut by at least 50% by 2050, based on 2008 levels. The pressure to be more ambitious is rising, as many organisations, such as the Getting to Zero Coalition, businesses and governments announce net-zero targets for 2050.

Global regulation should also create a 'level playing field' for everyone in the sector, wherever they are.

"Shipping is global and IMO regulations are global, so we provide an equal and level playing field. We do not treat certain countries differently," says Roel Hoenders, head of air pollution and energy efficiency at the IMO. "IMO regulations do not lead to distortion of specific trade flows and trade agreements, and, importantly, they do not lead to 'carbon leakage' [a situation where businesses or countries lower their own carbon emissions, but in doing so, transfer those emissions to other actors[6]]."

"It's obvious that because of the climate emergency, there will be a clear call on the IMO to accelerate its efforts and strengthen the levels of ambition in the IMO GHG strategy."

Roel Hoenders,
Head of Air Pollution and Energy Efficiency, IMO

The industry needs uniform rules

Market-based measures (MBMs) – carbon pricing in particular – will help to ensure that decarbonisation is commercially viable.

MBMs place a price on carbon dioxide emissions, or the carbon dioxide equivalent emissions of other GHG like methane and nitrous oxide, providing an economic incentive to pursue less GHG intensive behaviours; reducing fuel consumption and GHG emissions.[7]

"The good news is that it is no longer a question of whether there will be a price on carbon or shipping," says Lasse Kristoffersen of Torvald Klaveness. "Now, it is a question of who would regulate it and who would benefit from the proceeds."

MBMs can also play a role in allowing the industry and individual companies to manage change, reducing the risk of regulatory shocks that could be associated with an approach reliant on prescriptive controls on fossil fuels and GHG emissions. Notwithstanding, combining MBMs with, for example, sustainability criteria on marine fuels and energy sources would serve to avoid MBMs encouraging unsustainable fuel selection behaviours.

"[The] IMO adopted binding measures that will ensure achieving the 2030 carbon intensity reduction target in the [IMO's] Initial GHG Strategy, but it's generally understood that market-based measures, carbon pricing and life-cycle GHG emission guidelines are the regulatory instruments that need to be put in place by [the] IMO to bridge the current price gap between fossil fuels and alternative zero/low carbon fuel options," says Hoenders.

"At the same time, we need to make sure that certain regions, and particular island regions in the world, continue to have access to affordable maritime transport services, because they are entirely reliant on maritime transport while other developing countries also require equitable access to the world's markets to safeguard their exports," he says.

So a global approach is vital. "Uniformity is important to have a level playing field and that's why we prefer global legislation to regional legislation," says Andreas Sohmen-Pao, chairman of BW Group. "Otherwise, you get regulatory arbitrage because we're in a global business where people can move to the place of least resistance."

Is regulation moving far and fast enough?

There are differences of opinion over the extent to which the IMO Initial GHG Strategy is aligned with the global temperature goals of the Paris Agreement.

Mark Lutes, Senior Advisor, Global Climate Policy, at WWF Climate & Energy, describes the decisions in the IMO's Initial GHG Strategy as "extremely disappointing and limited". "They can't even bend the curve downwards in the short term – let alone reach net zero by 2050," he says.

Differences of opinion on the pace of regulation also abound. But the consensus-based approach of the IMO is necessarily time consuming and means that not all states will be happy with the outcome of negotiations. Accelerating regulation will require a greater emphasis on building consensus around net benefits of regulation and mechanisms for addressing disproportionate impacts on some member states.

"The IMO's current target is only a 50% reduction by 2050. That will be revised in 2023," says Lutes. "If the IMO members can't agree to net-zero emissions targets by then, it will fall to individual countries to regulate emissions of national-level shipping, or even international shipping, as the EU is starting to do now."

In any event, the risk of unilateral action is already being realised for ships calling at European ports after 2023 as a result of the maritime elements of the Fit for 55 package published by the European Commission in July this year.[8]

GHG emission reduction measures adopted by the IMO's Marine Environment Protection Committee (MEPC) in June will require all ships to comply with Energy Existing Ship Index (EEXI) to lock in the effects of slow steaming on fuel consumption and prevent rebounds should market conditions support higher operational speeds, and to achieve annual operational carbon intensity reduction targets set and measured using a Carbon Intensity Indicator (CII). Ships will be rated based on their performance. Carbon intensity establishes a link between the social cost of shipping (carbon dioxide emissions) and the social cost benefit of that shipping activity (capacity or actual cargo carried per nautical mile).

Shipping as a catalyst for change

The shipping industry is traditionally conservative by nature. But a 'wait and see' mentality is not an option as pressure grows on value chains to cut GHG emissions. Instead, the industry has an opportunity to lead by setting ambitious targets and piloting and prototyping technology to prove viability and demonstrate scalability.

"By recognising the role that shipping has in the global economy, it can act as a catalyst for decarbonising other industrial sectors, global supply chains and providing opportunities for nations, rather than waiting for other sectors to be the first movers" says Katharine Palmer, shipping lead, UNFCCC High-Level Climate Champions. "Shipping is a good-quality demand sector that can help unlock renewable hydrogen production," she adds.

"The pace of the transition will differ amongst shipping sectors, geographies and countries. Rather than the whole sector moving together, first movers can demonstrate the technology and business models, prove the viability and demonstrate the scalability," Palmer explains. It is these first movers that, she says, help to bring down the cost of new technologies and increase the demand so that others can follow with more certainty.

2.

Overcoming barriers to scale infrastructure

“The biggest advantage would be to adopt the mindset of immediate accountability and to not let the perfect be the enemy of the good. It is important that in our pursuit of finding the best solution we don’t lose sight of what can be done right now.”

Cyril Ducau
CEO, Eastern Pacific Shipping

Developing, launching and scaling sustainable fuel alternatives and the necessary landside infrastructure is one of shipping's leading barriers to decarbonisation.

"If you look at the total lifecycle cost of moving to a lower or zero-carbon fuel, about 80% or 90% of the cost is not down to the ship owner changing their engine and training their crew," says Simon Bennett, general manager for sustainable development at The China Navigation Company. "We need upstream bunkering facilities, infrastructure… There is a lot more investment required onshore than there is with your floating asset.

"If the methanol suppliers, ammonia suppliers and biofuel suppliers are not building the infrastructure, then you can have a lovely, shiny new ship with a shiny new engine, but you cannot sail it anywhere because low or zero-carbon fuel is not available," he says. "So we all have to move in lockstep. The suppliers will only build the infrastructure if they see a need, and we will only build the ships if there is the infrastructure."

Alternative marine fuels are described by Cyril Ducau, CEO of Eastern Pacific Shipping (EPS), as "the biggest opportunity for ship managers and owners to significantly lower their carbon footprint today".

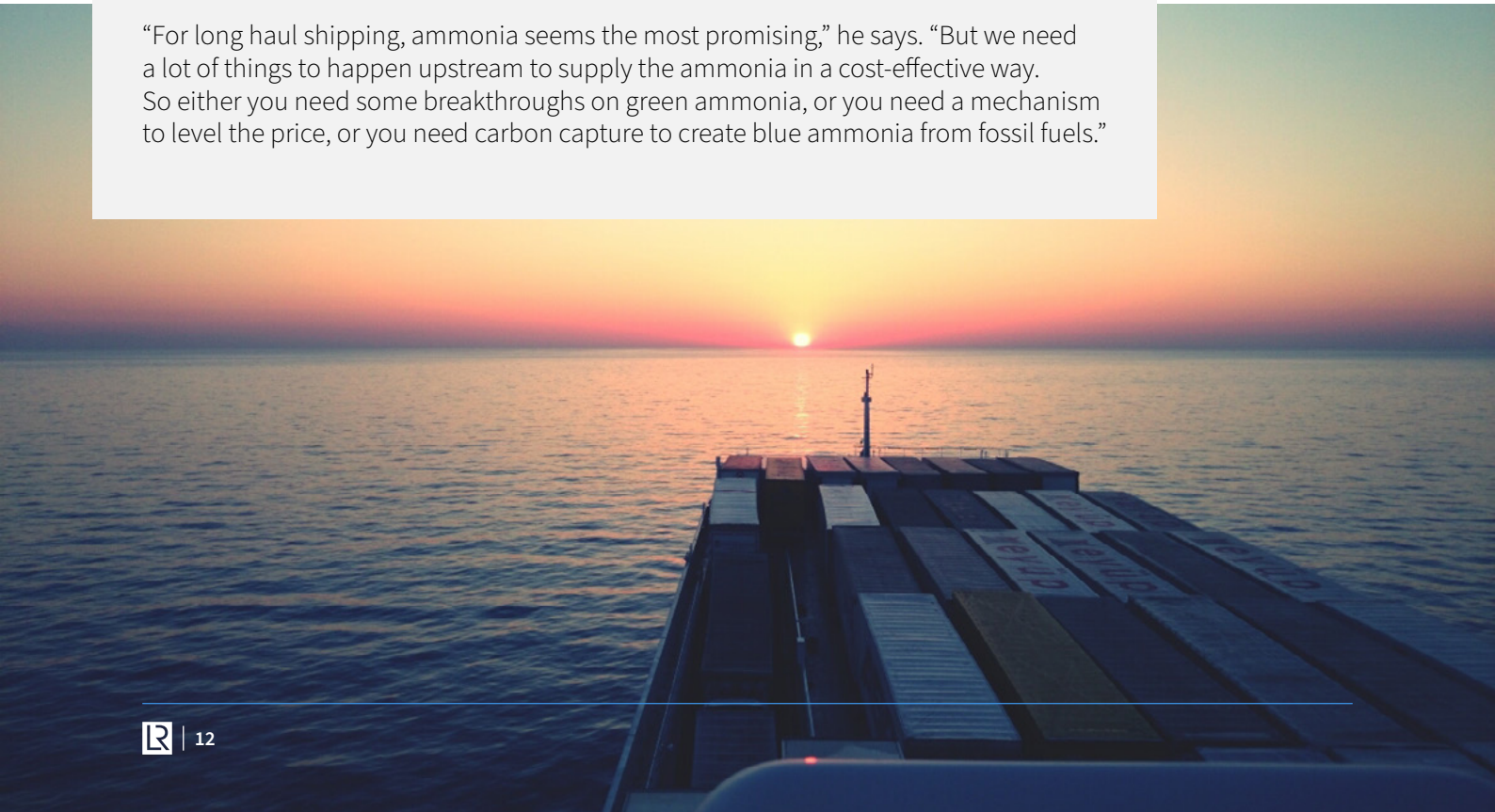
"Contrary to popular belief, there is quite a bit that can be done today to reduce the environmental impact of existing tonnage," he says. "Biofuels, engine retrofits and optimisation technology are options available in the market."

He adds: "Most of EPS's 70 newbuilds will be powered by dual-fuel LNG, LPG, methanol, ammonia and ethane. These fuels are the best solution available in the market today. They are proven to be safe and have an established infrastructure."

The tech that could transform shipping

So, what are the long-term solutions? For short sea shipping, batteries are incredibly effective, says BW Group's Andreas Sohmen-Pao. "Of course, you need the power to come from clean energy sources, and there's a question about the life cycle of batteries and so on. But fundamentally, it's a great solution for ferries, cruise ships and short sea shipping.

"For long haul shipping, ammonia seems the most promising," he says. "But we need a lot of things to happen upstream to supply the ammonia in a cost-effective way. So either you need some breakthroughs on green ammonia, or you need a mechanism to level the price, or you need carbon capture to create blue ammonia from fossil fuels."



A challenge for even the largest companies

While the leaders that can afford it should lead the way, and that is happening to some extent, they are reluctant to put themselves at a huge commercial disadvantage "by always being at the bleeding edge", says Sohmen-Pao.

"The bar needs to keep being raised, uniformly and gradually so that everyone has a chance to adjust," he says. "And [the sector must] figure out ways to channel funds to support those who might either be unduly disadvantaged, or who have the best solutions."

Although progress is slow, that should not mean abandoning all efforts. "BW Group is saying, 'Yes, we want to invest in carbon-free ships'," says Sohmen-Pao. "But if they do not exist or they are not commercially viable, we cannot invest in them – however much we want to. So in parallel, we're investing in wind installation vessels, floating wind, solar, batteries for ships and biofuels."

The forces pushing shipping to innovate

Supply and demand are the levers that have historically shaped the shipping sector. It would therefore be a mistake to assume that the drivers of sustainable innovation will come only from within maritime.

"The pressure to reduce CO_2 and create sustainable supply chains comes from our CEO, our customers and our investors," says Lindsay Zingg, senior director of sustainability at Danish freight and logistics company DSV Panalpina, which specialises in supply chain solutions across air, sea, road and rail. "Our customers are constantly asking what we can do to lower CO_2, and we will launch our green logistics programme later this year. Customers push us, we push our suppliers, and we will make a difference."

DSV Panalpina's sustainable fuel programme is a good example of that 'push' from outside. "We offer our customers the opportunity to purchase marine biofuel to be used in ships," says Zingg. "In this initiative, we purchase the marine biofuel, our fuel partner will put that into an ocean carrier's ship, and we can claim that reduction. It might not be the actual ship carrying that customer's cargo, but we are replacing fossil fuel with marine biofuel."

> **"If you cannot offer a 'green' product, you will lose business – it is an absolute requirement."**

Lindsay Zingg
Senior Director Sustainability,
DSV Panalpina

Case study: Assessing global readiness for decarbonisation

LR created its Maritime Decarbonisation Hub to accelerate the sustainable decarbonisation of the maritime industry, by enabling the delivery and operation of safe, technically feasible and commercially viable zero-emission vessels by 2030.[9]

The Maritime Decarbonisation Hub is also developing an evidence-based framework to assess the readiness of the most promising zero-carbon fuels and related technologies.[10]

The framework addresses three questions fundamental to this shift:

1. How close is the technology to being proven, scalable and safe?
2. Is the business case robust enough to attract investment?
3. How prepared are people and organisations to adopt the new solutions?

By working in partnership with other organisations – including regulators, policymakers, investors, owners, operators, charterers and customers – LR's Maritime Decarbonisation Hub will create and share evidence, insight and knowledge about this transition, demonstrating the costs, benefits, opportunities and risks of potential pathways.

3.

Finance and investment to drive uptake

"Climate is the issue du jour and it's now becoming a filter through which investment is being considered. So, there is going to be increasingly less capital for those industries, for those assets, for those businesses that are more carbon exposed than for those that are carbon free or carbon efficient."

Jim Barry
Chief Investment Officer,
BlackRock Alternative Investors

While finding finance for new innovations and technologies is still seen as a key challenge, there are new opportunities to be taken, as money is moving fast into 'green' funds.

Consumer and societal pressure are among the driving forces behind this shift, as is a growing demand for businesses to be accountable for their ESG and sustainability actions.

To harness the financial opportunities of this momentum, shipping must look at decarbonisation as an essential investment – not a drawn-out cost.

"It's not just the scale of change that's required to address the climate crisis, it's the pace of change," says Jim Barry of BlackRock Alternative Investors. "Not dealing [with climate change] is only going to make the pace and the trauma of change even greater," he warns.

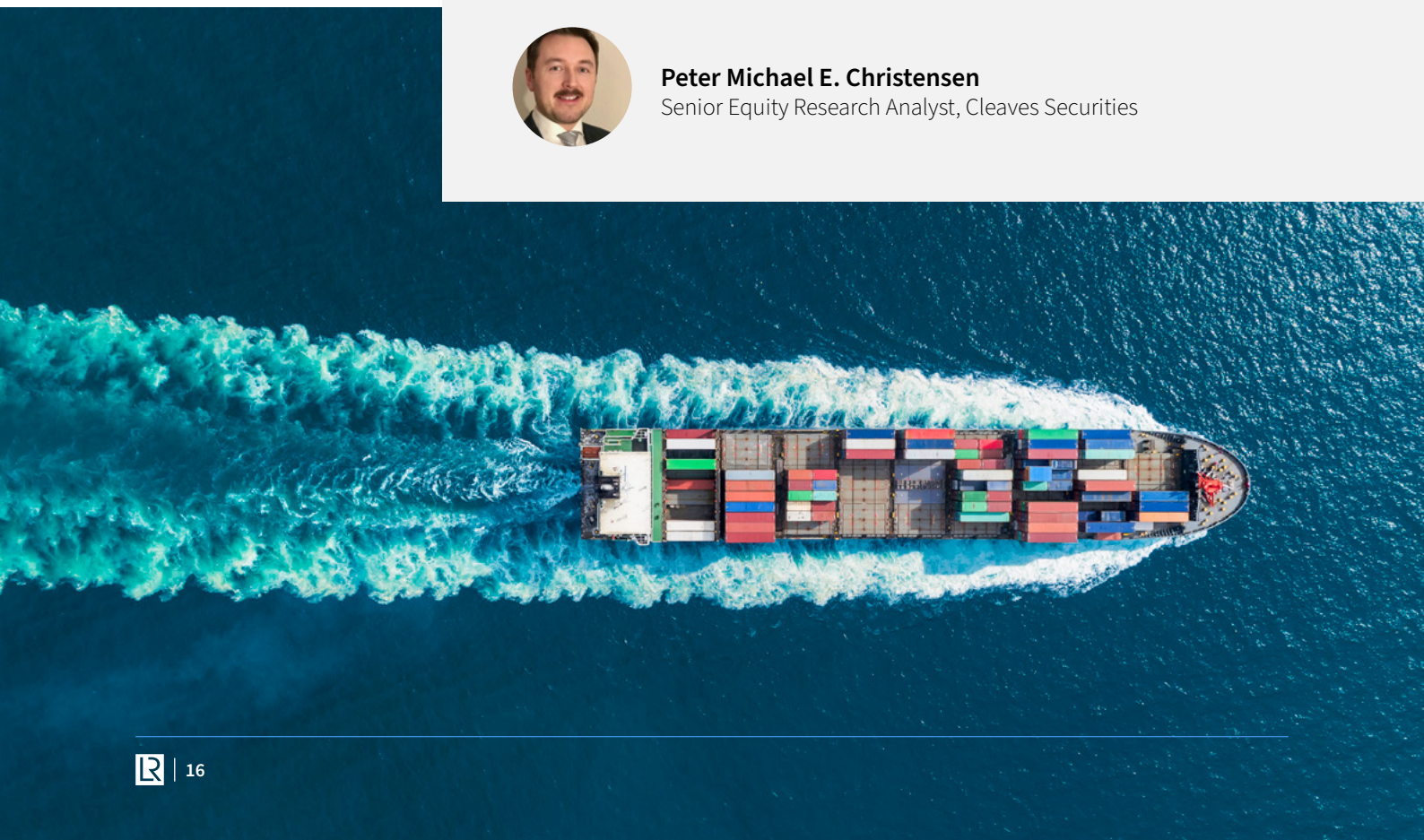
"As we think about investment opportunities, investors won't intentionally look to lose economic value, either in capital or the return. They are going to look for credible opportunities."

Clarity and uniformity are crucial, says Sohmen-Pao of BW Group. "It's important to know what is expected, what we need to achieve and what it's going to cost. That's one of the reasons why I prefer a carbon tax to a traded scheme, because you can't plan investments very well when you don't know what the price of carbon is going to be."

Affordability is also vital, he adds, "because funds will be needed to support investments and to bridge pricing gaps. We do see that the equity market is supporting ESG, banks are helping with green financing, governments are giving grants. But I think the most powerful idea here is if you can establish a tax on carbon, and channel the funds back into the industry, then you've got a self-funding mechanism to accelerate decarbonisation."

"We see a lot of money now moving into green funds. If you want to get a hold of that money, you have to have a green profile."

Peter Michael E. Christensen
Senior Equity Research Analyst, Cleaves Securities



Investment yields new possibilities for growth

The more capital that flows into green funds, the lower the cost of green capital, notes Christiansen. "Companies would then be incentivised to improve their green profile in order to lower their capital cost."

However, he warns: "Many shipping companies are sitting on the fence, with the dry bulk sector a good example. As of late July, they had the lowest order book vs fleet on our records going back to 1996. Companies are hesitant to order ships because they don't know what the next technology will be. If you buy a ship now, you might have to change the engine in 10 or 15 years' time or you risk having to slow steam. It boils down to the fact that we don't really have the technology available that we should have in order to get the results we want."

One possible way forward? Simon Bennett of The China Navigation Company supports the idea that money raised through MBMs goes into a central fund, to then be distributed to the people and projects that really need it.

"Whether from the larger shipping companies, or the larger shipping countries, redistribution from people who have, to people who have not, is the way to go," he says.

Who will pay for decarbonisation?

There is consensus that the cost of decarbonisation will be borne to a large extent by the industry – and particularly the parts of the industry that are keen and have an interest in both corporate social responsibility and reinforcing their market position.

"We expect that the IMO's mandatory CII rating system will drive private sector involvement and will incentivise the most efficient ships to be treated in a preferential way," says IMO's Roel Hoenders. "It will allow the financial sector to be much more involved in international shipping and to look at the ratings of these ships in a way that will steer investment and equity to the most efficient ships."

DSV Panalpina's Lindsay Zingg says that decarbonisation requires the whole supply chain, from ship owners to customers, to come on board. "The customer will have to pay extra – DSV cannot bear the whole cost itself. There is a lot of talk about wanting to go greener and there are some signals that people are happy to pay extra, but the majority may not want to do so."

Ron Jarvis, chief sustainability officer at Home Depot, is not concerned. "My estimation is that with zero-carbon-emissions shipping, initially there may be a bump in price, but then it will fall back into the range of competitive ship rates. And, as with any cost of goods – whether it's a new packaging or a new product or a new size – that is passed down stream through the retailer, but we've seen that cost be very minor in the past."

4.

Data and analytics to deliver efficiency and innovation

> **"If the various parties in the complex world of maritime transport do not speak the same language, the result can be misunderstandings, delays and disruption."**

Hans Rook
Chairman, International Port Community Systems Association (IPCSA)

We know that data, analytics and artificial intelligence (AI) will be central to decarbonisation in both the short and long term.

What is less well known is the need for standardised ways of gathering and measuring data and exchanging information – and the new opportunities this will unleash.

Shipping can tap into a wealth of data to improve efficiencies, speed the flow of information, eliminate bottlenecks, save fuel and money, reduce emissions and deliver transparency and visibility throughout the supply chain. But the big wins will not come from gathering vast quantities of random data.

They will come through ensuring that data from across the supply chain is high-quality, readily available and standardised.

"Harmonisation and standardisation of data are vital to shipping and port efficiency," says Hans Rook, chairman of the International Port Community Systems Association (IPCSA). "A great example of this is the Port Call Optimisation project, which recognises that efficiency and optimisation start with clear communication."

Standardise data or lose out

The end consumer of the goods being transported by sea is increasingly demanding information about the environmental credentials of the shipping element of global supply chains. If the maritime industry is intending to trade on its green credentials, robust data is needed.

"If you talk about sustainability and getting to net zero, you have to account for every step in the value chain," says Jens Schmidt, founder and CEO at ReCarbonX Systems – a company specialising in customised, blockchain-based systems for sustainable, transparent and traceable value chains in manufacturing, playing to a new consumer demand for transparency.

"Blockchain is a key enabler to share data in a distributed value chain where you don't necessarily know all the partners that add data to the system, but you can force everybody to stick to common rules.

"You can make sure that the lifecycle analyses [of a product's footprint] are done according to the same standard. No cheating. No changing of the data… At the same time, the integrated state-of-the-art encryption algorithm for all stored data ensures complete data privacy and protection and allows every partner in the chain full control over what part of their specific data is exposed to whom and what remains 100% private."

"The main hurdle is that if you want to make a statement about your final product to your end consumer or to a business partner, you need to understand the true eco-footprint of your product… You have to basically track, monitor and observe the whole upstream value chain and that's been a huge problem for most companies."

Jens Schmidt
Founder and CEO,
ReCarbonX Systems

The data that could transform shipping

Ports could improve their efficiency and reduce carbon emissions by adopting the Just In Time Arrival concept, where vessels optimise their operating speed so they arrive at the destination port when berthing is available and service providers such as pilots and tugs are ready.[11]

The challenge is that information is not standardised. "The data standards used for port arrival and port logistics are largely those of the United Nations Centre for Trade Facilitation and Electronic Business and the International Organization for Standardization, but standards have diverged over the years," says Rook. "Also, every port has its own berth coding, and there are many definitions of ETA – pilot stage, coastal side, berth, and so on. That lack of clarity undermines attempts at efficiency."

Transparency allows for new opportunities

"One positive thing that might come out of this, especially with the new EEXI and CII frameworks, would be that shipping companies became more transparent," says Cleaves Securities' Peter Michael E. Christiansen. "We have already started asking companies for data that they don't publish which would help us calculate the emission levels on their vessels."

DSV Panalpina has set Science-Based Targets (based on the SBTi partnership[12]) to reduce CO_2, says Zingg. "We are gathering all the data, using clear methodology and setting targets for 10 years that will contribute to reducing CO_2," she says. "As members of the Clean Cargo Working Group, we receive data from the ocean carriers that shows which has the lowest CO_2 in each trade lane, so we can compare ocean carrier with ocean carrier and trade lane with trade lane."

Historically, analysing data from across the shipping supply chain has been "like comparing apples with pears", says Zingg. "Through the Clean Cargo Working Group, we know that the data is standardised, because all the carriers are required to calculate in the same way. We can see apples and apples, and be clear about which carrier has the lowest CO_2."

"We know how many containers we moved last year. We do the calculations and then estimate what the emissions are. From there we can calculate what [a product's] estimated emissions are from the port to its destination."

Ron Jarvis
Chief Sustainability Officer, Home Depot

Case study: Data unlocks efficiency at scale

US home improvement retailer Home Depot introduced its One Supply Chain concept as part of a $1.2 billion investment announced in 2017.[13]

"For many years, Home Depot's model to reduce carbon emissions was focused on working with our suppliers… But we'd end up with a lot of pallets that were less than a truckload," says Ron Jarvis, the company's chief sustainability officer. "So we looked at [our supply chain] and said, 'We have to try to own the process from the factory to the store to the customer or distribution centre, wherever it's going.'"

Jarvis notes the success of One Supply Chain. "We now have better visibility into our products from the factory all the way to its destination," he says. "There are also certain things you can do when you own the product's journey. For example, you can put together a consolidation centre in China. Instead of sending containers that were half full or three quarters full from Shanghai to Long Beach, we can consolidate them. And so now when the containers come over, they are fuller containers. We have a tremendous reduction in containers per year by doing this."

Home Depot started tracking its carbon emissions in transportation in 2009. This data collection and analysis is central to the success of the One Supply Chain model, explains Jarvis. "The role of Home Depot, as is the role of any retailer or company, is number one, to know what your impact is."

5.

Cross-sector partnerships to harness momentum

> **"Amazon already has a material fleet of aeroplanes. One day, somebody at the top is going to ask, 'What about shipping?' And once they make a decision, with their massive cash pot, they will completely destroy the existing shipping model, and they'll do it way quicker than we ever expect, leaving us with a bunch of ships with no cargo."**

Simon Bennett
General Manager for Sustainable Development,
The China Navigation Company

Sector-wide, stakeholders are already decarbonising. But there will be no Decade of Action if they continue to work in silos and action is not aligned across the supply chain.

The shipping industry needs to look at the "coalition of the willing", says Bennett. "For example, the members of the Getting to Zero Coalition[14]," he says. "And the likes of Lloyd's Register, which has set up its own knowledge-sharing organisation."

A broken system?

"To achieve transformative systems change, we need to engage the full value chain in radical collaboration and partnerships between and across sectors of the global economy."

Katharine Palmer
Shipping Lead, UNFCCC High-Level Climate Champions

But Bennett's optimism comes with a word of caution: "I wish there were a global body parcelling out the different initiatives to the organisations that are most competent, experienced and suitable to develop them," he says. "I'm seeing an increasing amount of duplication of very well-intentioned projects, which would benefit from being un-siloed."

Others in the shipping supply chain have noticed this fragmentation. "It is very difficult for logistics companies to lower their CO_2 with no control over their suppliers," says DSV Panalpina's Lindsay Zingg. "We have noticed, for example, that some of our suppliers have developed their own fuel-efficient products and sustainable fuel offerings, but they do not want to collaborate. They are not selling those products to us."

Transparency and collaboration are catalysts for adoption, says EPS's Cyril Ducau. "Historically, shipping has been fragmented, with companies operating in silos. That has slowly changed in recent years as the next generation of shipping professionals have taken leadership positions." He points to a boom in maritime start-ups across the world as entrepreneurs understand the massive opportunity to improve shipping efficiencies. "Our in-house mentorship-based accelerator programme has invested in over 18 start-ups and counting. The mission of the accelerator is to connect entrepreneurs with industry mentors, creating a bridge between innovation and enterprise."

Who will set the pace?

It is unclear which part of the shipping supply chain will prove most critical to accelerating decarbonisation. But if the sector fails to act, external actors could step in.

"The rate of pace of change is always underestimated by people within their own industry, and paradigmatic change in an industry rarely comes from within the industry," says Simon Bennett, general manager for sustainable development, The China Navigation Company. "Zoopla wasn't invented by an estate agency; Airbnb wasn't invented by The Sheraton; Kindles weren't invented by Waterstones."

Recent port and shipping 'hackathons', for example, have generated concepts and products created by digitally savvy start-ups and individuals with no connection to the maritime world.

Everyone has a role in the Decade of Action

> **"If everybody pushes, we will get to where we need to go."**

Andreas Sohmen-Pao
Chairman, BW Group

If there is one message to emerge from our conversations with the industry, it is that responsibility for decarbonising shipping does not rest with a few people, companies or organisations.

"Everyone has a role to play, whether it's banks, customers, regulators, society at large," says BW Group's Sohmen-Pao.

There's certainly no doubt that these groups know what needs to happen. The question now is, how do we make decarbonisation a reality? And how do we do it in a way that is both commercially and environmentally sustainable?

For a sector that must take 25-year bets on its vessels, a successful Decade of Action relies on the entire maritime ecosystem aligning in pursuit of the five critically urgent pathways we have mapped out:

1. Global regulation to support industry-wide action
2. Overcoming barriers to scale infrastructure
3. Finance and investment to drive uptake
4. Data and analytics to deliver efficiency and innovation
5. Cross-industry partnerships to harness momentum

Mark Lutes at WWF Climate & Energy has no doubts about the consequences if the industry is not proactive enough. "The global shipping sector risks becoming a pariah of the global economy if they don't proactively address the emissions issue," he says. "The rest of the world will end up looking for alternatives to shipping as a whole, not just those with different kinds of emissions levels."

But there is cause for optimism alongside the concerns about silos, fragmentation and reluctance to take 'first mover' risks.

"The pace of change needs to be radically accelerated if we are to deliver a healthier, more resilient, zero-carbon world in time," says Katharine Palmer, Shipping Lead for the UN High Level Climate Champions. "There has been an incredible growth in the momentum and understanding of the challenge across the maritime system even during the global pandemic, but this momentum needs to be converted into immediate action and implementation to achieve the 5% tipping point critical for the maritime sector."

Acknowledgements

The insights in this report come from 13 in-depth qualitative interviews conducted by Longitude, a Financial Times company, in July and August 2021.

Participants were selected for their expertise and roles in decarbonising shipping, shipping supply chains and sustainability innovation and investment.

- **Jim Barry,** Chief Investment Officer, BlackRock Alternative Investors
- **Simon Bennett,** General Manager for Sustainable Development, The China Navigation Company
- **Peter Michael E. Christiansen,** Senior Equity Research Analyst, Cleaves Securities
- **Cyril Ducau,** CEO, Eastern Pacific Shipping (EPS)
- **Roel Hoenders,** Head of Air Pollution and Energy Efficiency, International Maritime Organization (IMO)
- **Ron Jarvis,** Chief Sustainability Officer, Home Depot
- **Lasse Kristoffersen,** CEO, Torvald Klaveness
- **Mark Lutes,** Senior Advisor, Global Climate Policy, WWF Climate & Energy
- **Katharine Palmer,** Shipping Lead, UNFCCC High-Level Climate Champions
- **Hans Rook,** Chairman, International Port Community Systems Association (IPCSA)
- **Jens Schmidt,** Founder and CEO, ReCarbonX Systems
- **Andreas Sohmen-Pao,** Chairman, BW Group
- **Lindsay Zingg,** Senior Director Sustainability, DSV Panalpina

Biographies

Simon Bennett
General Manager for Sustainable Development, The China Navigation Company

Simon has more than 35 years global maritime and shipping experience. Today, as general manager for sustainable development at The China Navigation Company, he is focused on the sustainable development of offshore and deep-sea activities. Simon has also been involved with shipping and trade policy for more than a decade.

Roel Hoenders
Head of Air Pollution and Energy Efficiency, International Maritime Organization (IMO)

An experienced maritime policy maker, Roel is leading the team responsible for IMO's regulatory efforts to reduce air pollution and carbon emissions from ships. Prior to joining IMO, Roel held various regulatory and policy roles at the European Commission, the European Maritime Safety Agency and ESPO (European Sea Ports Organisation).

Peter Michael E. Christiansen
Senior Equity Research Analyst, Cleaves Securities

Cleaves is a privately held ship broking firm and financial services group with a presence in Europe, America and Asia. As the firm's resident expert analyst in ESG shipping, Peter brings deep industry and market knowledge to advise his clients.

Cyril Ducau
CEO, Eastern Pacific Shipping (EPS)

EPS is a leading shipping company committed to the green and technology-driven growth of the industry. As CEO, Cyril brings together expertise in finance and management to develop new business opportunities focused around sustainability.

Jim Barry
Chief Investment Officer, BlackRock Alternative Investors

Jim Barry has over 20 years' experience of investing in ESG and speaks regularly on the economic opportunities and risks of decarbonisation. He founded BlackRock's Infrastructure business in 2011 and took responsibility for BlackRock's Global Real Estate Investment business in 2016.

Ron Jarvis
Chief Sustainability Officer, Home Depot

Ron Jarvis has spent two decades driving sustainability improvements at Home Depot. Home Depot has pledged to reduce CO_2 emissions by 2.1% per year, with the ultimate goal of achieving a 50% reduction by 2035.

Lasse Kristoffersen
CEO, Torvald Klaveness

With more than 25 years' experience in shipping, Lasse has held senior leadership and board level roles at a number of globally renowned companies. Today he is CEO at Norwegian-based shipping operator Torvald Klaveness, which recently established ZeroLab – a project dedicated to the decarbonisation of seaborne supply chains.

Katharine Palmer
Shipping Lead, UNFCCC High-Level Climate Champions

Katharine Palmer is LR's global sustainability manager and was recently appointed as the United Nations Climate Change (UNFCCC) High-Level Climate Champion's (HLCC) shipping lead. With more than 20 years' experience in the shipping industry, Katharine is a recognised voice in sustainability, climate change, decarbonisation and the energy transition in the maritime sector.

Mark Lutes
Senior Advisor, Global Climate Policy, WWF Climate & Energy

Mark is a senior advisor for international climate change policy at WWF. He has more than 20 years' national and international climate policy experience in Canada and Brazil. He is currently based in Sao Paulo, Brazil.

Hans Rook
Chairman, International Port Community Systems Association (IPCSA)

Hans Rook has been working in the maritime transport and logistics sector for almost 50 years. For the last 20 years, he has worked to develop Port Community Systems in the Netherlands and globally through his work at Portbase and IPCSA.

Jens Schmidt
Founder and CEO, ReCarbonX Systems

Jens is CEO of ReCarbonX Systems, which specialises in customised, blockchain-based systems for sustainable, transparent and traceable value chains in manufacturing. He has deep international manufacturing experience and is an expert in chemical technologies, global digitisation and sustainability.

Andreas Sohmen-Pao
Chairman, BW Group

Andreas Sohmen-Pao is chairman of BW Group and its entities, including BW Offshore, BW LPG, Hafnia, Epic Gas and BW Energy. He is also the chair of the Singapore Maritime Foundation and a trustee of the Lloyd's Register Foundation. Andreas was recently appointed as chairman of the new Global Centre for Maritime Decarbonisation (GCMD) Governing Board.

Lindsay Zingg
Senior Director Sustainability, DSV Panalpina

Lindsay Zingg is a graduate from Robert Gordons University in Scotland, with an Honors degree in applied Chemistry and over 20 years' experience in the area of Sustainability. After the purchase of Panalpina by DSV in 2019, Lindsay is now responsible for heading up the Global Sustainability program within DSV to implement their ambitious Sustainability strategy. Prior to this, she was the driving force behind Panalpina's Green House Gas reduction programs, implementing the Science Based Targets, achieving an "A" score from Carbon Disclosure Project and leading all global sustainability programs.

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About Longitude

Longitude is a specialist thought leadership agency that is majority owned by the Financial Times Group providing strategy, research and content and activation services that enhance its clients' revenue, relationships and reputation. We work with a wide range of the world's most prestigious B2B brands across Europe, the US and Asia Pacific. Our 60+ clients are concentrated in the professional services, financial services and technology sectors, but also stretch into energy, infrastructure, manufacturing and other sectors.

Headquartered in London, England, the company was founded in 2011 and was selected as one of Chief Marketer 200, Top Marketing Agencies of 2020, an Inc. 5000 Europe in 2018, an FT 1000 company in 2017, and a 2016 Leap 100 high growth UK company by City A.M. and Mishcon de Reya. It is led by founders Rob Mitchell (CEO), James Watson (COO) and Gareth Lofthouse (Chief Revenue Officer).

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