

FUTURE FOELS

Advancing Efficiency and Environment

JANUARY 2022 | PRIVATE CIRCULATION ONLY

SHIPPING- ON PATHWAY TO NETZERO

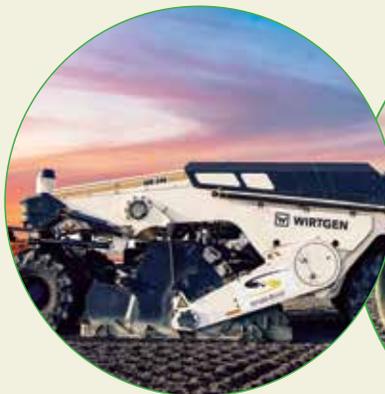
The world's ever-growing global economy runs on shipping, as it moves about 10 billion metric tons of cargo every year across the planet. It is responsible for 2.2 per cent of global carbon emissions. If the emissions continue to move on at the same rate they could increase to 17 per cent by 2050, as the GDP of the world has been growing. Therefore, curbing shipping emissions has become an imperative thing for the industry to act promptly.





**VISHWA
SAMUDRA**
CHALLENGE IT. CHANGE IT.

STABILIZATION / FULL DEPTH RECYCLING TECHNOLOGY with stabilroad – AN APPROACH TO GREEN ENVIRONMENT



STABILIZATION / FULL DEPTH RECYCLING WITH STABILROAD

Fully Mechanized Full Depth Recycling on an average can achieve 1km per day can be complete in and the road can be made operational in 12hrs post completion of work.

Depending upon the existing base composition, need for new Aggregates can be completely avoided

Major saving in transport and environmental costs

Stabilised base can accept lower CBR and hence subbase compaction is seldom required

Mechanised controls and Minimal testing for acceptance criteria

Life cycle cost is reduced. Minimum maintenance costs

Net Zero: Opportunities for India

In the ongoing COP26 Climate Summit being held at Glasgow, the Indian Prime Minister Narendra Modi has surprised everyone with the bold pledge of net zero target for India by 2070. It is considered as a very significant announcement for the green transformation, as India one of the most populous country in the world, is one among the top emitters along with the US and China. However, when the country's per capita energy use is compared to other most developed nations in the world its use of materials such as iron is still modest, and its manufacturing sector is still relatively under-developed. Here therefore, while India's growth will need to factor in higher consumption levels across its population, it has got exceptional opportunity to advance through low or no emissions technologies and mature greenhouse gas (GHG) infrastructure.



India's green transformation is very promising component for its overall economic transformation. But for such transformation five sectors are bound to be necessarily implicated including energy, mobility, industry, green buildings, and agriculture.

The mobility sector in India is extremely reliant on oil and contributes to almost half of India's oil demand. A green transformation of this sector will need a shift in modal mix from road to rail, as well as a broad-based fuel diversification approach to encourage sustainable fuels such as biofuels, CNG, and LNG in the immediate term, apart from the electrification in the medium term and hydrogen-based heavy mobility in the long-term. In order to achieve green transformation immediately in transportation sector, the government can focus on switching over to alternative fuels both for obtaining efficiency and emission standards.

Net zero targets for 2070 could represent a \$15 trillion economic opportunity for India and it can also potentially create more than 50 million net new jobs. With concerted action, \$1 trillion of this opportunity could potentially materialize within this decade.

The green transformation therefore is a great opportunity for the country, and it is right time for the government, the private sector, investors, civil society organizations and individual citizens need to step forward and accelerate the Next Green Revolution in the country.

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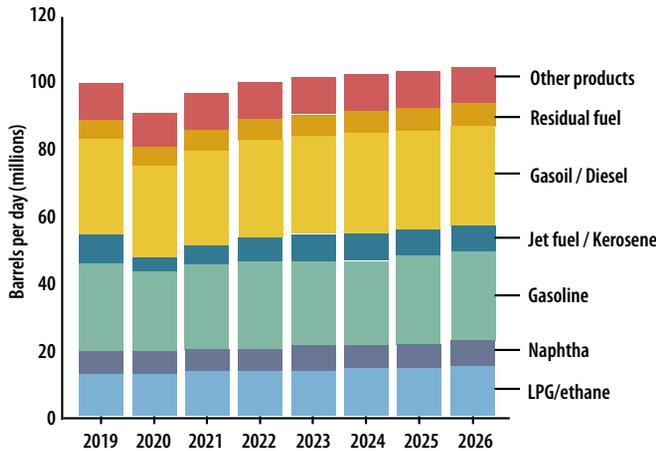
NUMBERS & GRAPHS

OIL DEMAND SET TO REACH NEW HEIGHTS

Despite lasting impacts of the pandemic, the International Energy Agency said global oil demand is expected to climb every year through 2026 and surpass pre-pandemic levels, driven by growing demand from petrochemicals for plastics.

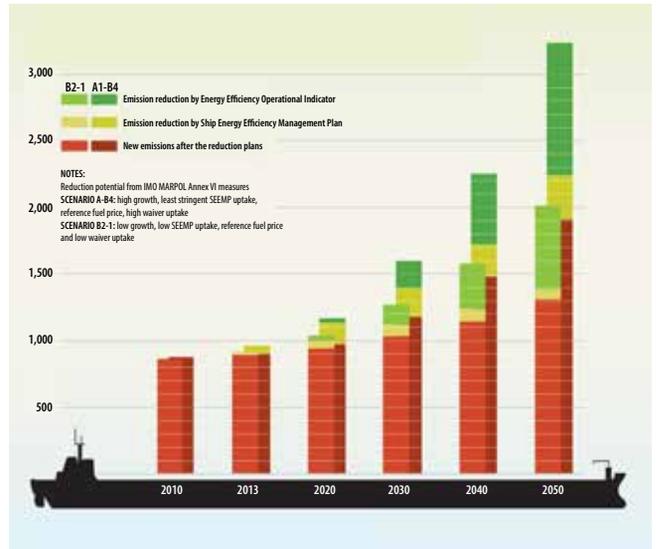
GLOBAL OIL DEMAND BY PRODUCT

In millions of barrels per day, 2019 - 2026 (projected)



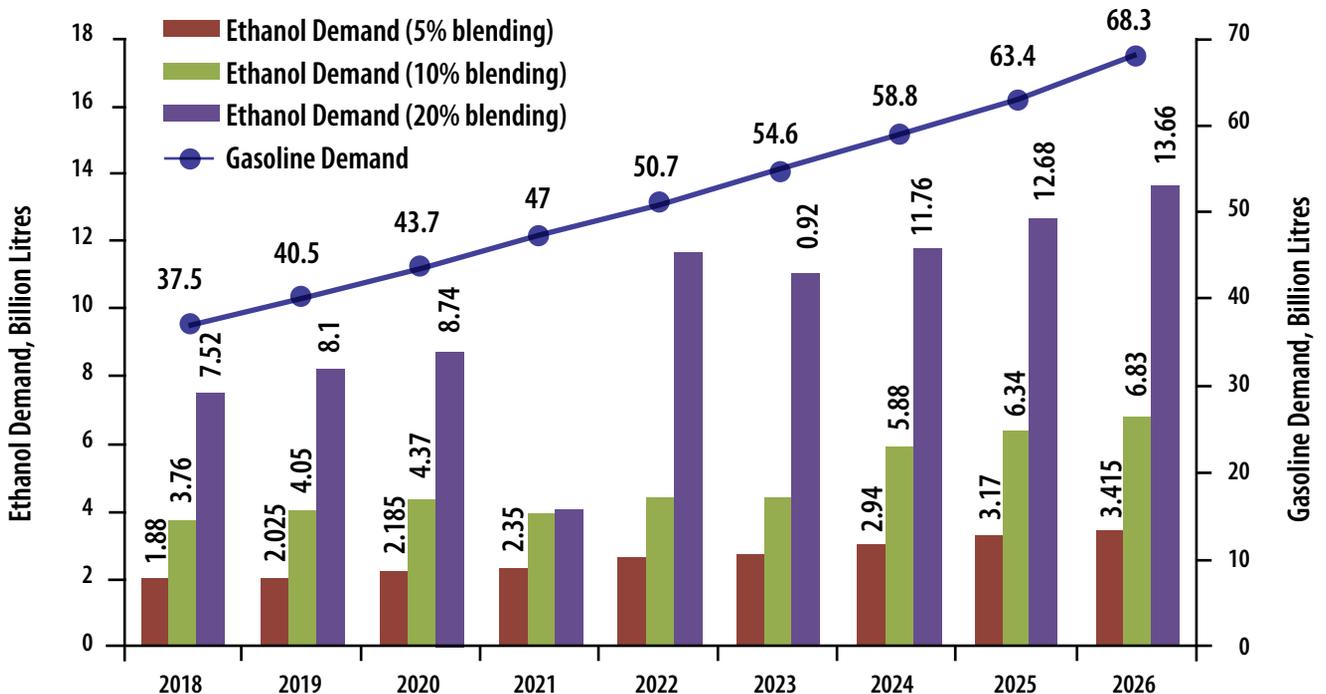
Source: IEA Market report: Oil 2021

PROJECTED ANNUAL CO2 EMISSIONS FROM THE SHIPPING SECTOR (MILLION TONNES)



Source: Lloyd register, NDV, Assessment of IMO Mandated Energy Efficiency Measures for international Shipping

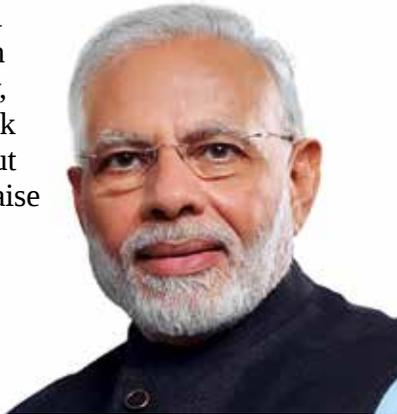
INDIAN SCENERIO OF ETHANOL FUEL AND UTILIZATION IN AUTOMOTIVE SECTOR



QUOTES

“When India took the ambitious pledge of achieving 450 GW installed capacity by 2030 through non-fossil fuel sources, it was seen as over-ambitious. Now, India is not only on track to achieve this target, but has decided to further raise it to 500 GW.”

- **Narendra Modi**
Prime Minister of India



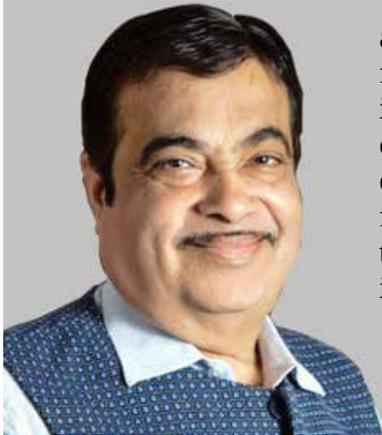
“I feel really encouraged by what we have seen so far, Of course, we’re coming to COP26 with the clear message that the numbers we have in terms of emissions are not good. So that means that we really must come out of here with clarity on how we are going to move forward.”

- **Patricia Espinosa**
Executive secretary of the United Nations Framework Convention on Climate Change



“We are working on alternative for fossil fuel since it is the most important thing for country. We need to expedite the alternative fuel industry and this the time for the country to go in for alternative fuels.”

- **Nitin Gadkari**
Union Minister for Road Transport and Highways



“Our addiction to fossil fuels is pushing humanity to the brink. We face a stark choice: Either we stop it - or it stops us. It’s time to say: enough.”

- **António Guterres**
UN Secretary-General



“There is still a huge amount of work to in turning the ambition of zero carbon shipping into a reality. Big questions still loom over alternative fuel availability, infrastructure, technical and operational safety and pricing.”

- **Knut Orbeck-Nilssen**
CEO of DNV Maritime



MARINE

Shipping still falls short on decarbonisation after climate talks



The main outcome from the recent talks hosted by the United Nations' International Maritime Organization on zero emissions didn't get official approval. And a plan for a small charge on fuel to raise money for research and development into cleaner shipping was deferred to a future meeting. Shipping's current 2050 target falls well short of what's required to align the sector with the Paris Agreement's ambitions on limiting temperature rises. Yet the IMO has yet to set solid rules - or even a target - that would get the industry on track. The main achievement on emissions from the week-long meeting was recognizing the need to "strengthen the ambition" of the IMO's current decarbonisation strategy, which includes pollution-reduction targets.

MSC to test Wartsila retrofit engine conversion

After successful tests working alongside MSC, Wartsila is preparing for

the commercial launch of a future fuel conversion solution that they believe could be a critical piece of the industry need to address existing vessels as part of the effort to reduce and eliminate carbon emissions. After the commercial launch in the first quarter of next year, Wartsila anticipates that the first commercial conversion project will be completed by mid-2023.

Maersk to go green early as new fuel options speed up transition

A.P. Moller-Maersk A/S, one of the world's largest oil consumers, will reach its goal of becoming carbon neutral ahead of a 2050 deadline because the green transition in shipping is turning out to be easier than expected.

Maersk, the world's largest shipping line, consumes about 12 million tons of marine oil per year, roughly equal to all the oil produced in the world in a single day. The company is betting it will be able to replace that with carbon-neutral fuels such as methanol or ammonia, CEO Soren Skou said.

Earlier this year, Maersk ordered eight new ships that can run on methanol, for \$1.4 billion. That's a premium of about 10 per cent to normal vessels, an extra cost that is "manageable," Skou said. In addition, Maersk expects to be able to retrofit existing ships with the new technology.

Hapag-Lloyd eyes new debt to finance decarbonisation

Hapag-Lloyd is considering issuing 300 million euros (\$355 million) in new debt that aims to finance the ocean carrier's goal of cutting its carbon dioxide (CO₂) output by over one-half this decade. The Hamburg-based company said it has hired banks to sound out investors' interest in a new senior debt that will refinance existing debt maturing in 2024.

Hapag-Lloyd said the new debt will go toward lowering the CO₂ output of its fleet in 2030 by 60 per cent relative to its 2008 level. The new debt will be used to purchase ships that run on alternative fuels, phase out older vessels, and take other steps to mitigate its CO₂ output.

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REFINERIES

Most Indian state refineries run at maximum capacity



Most Indian state-controlled refineries are operating at maximum capacity or higher, as transport fuel demand continues to increase with further gains expected in the coming months. MRPL was operating its 300,000 b/d refinery in Mangalore at more than 100 per cent and will continue to operate at these levels this month, while Bharat Petroleum (BPCL) was running its 310,000 b/d plant in Kochi and 240,000 b/d refineries in Mumbai at around 110 per cent. BPCL also operates a 156,000 b/d refinery in Bina, which was running at more than maximum capacity last month but the current rate was unable to be verified. Hindustan Petroleum's 166,000 b/d Visakhapatnam (Vizag) refinery was operating at more than its maximum capacity, while its Mumbai refinery was operating at around 80 per cent of its enhanced capacity of 190,000 b/d. Consumption of diesel and gasoline rose above pre-Covid-19 pandemic levels in October because of festival-induced surge in demand for goods and use of personal transport.

India refiners brace for low carbon future



India's biggest oil refiners are finalizing plans to cut down on emissions from their facilities while remaining optimistic about the future of petroleum fuels in the country. State-run majors from Indian Oil Corp. to Hindustan Petroleum Corp. are opting for low-carbon operations with the use of green hydrogen and clean power. They are also installing thousands of electric vehicle charging points across the country even as they expect gasoline demand to remain robust for some years. "Fossil fuels will continue to play a dominant role as India's overall energy pie is increasing," Shrikant Madhav Vaidya, chairman of Indian Oil, the nation's biggest refiner-cum-fuel retailer, said. "Renewables will not be displacing fossil fuels, but will be supplementing and complementing India's energy basket," he said. The comments follow Prime Minister Narendra Modi's surprise commitment at the Glasgow climate talks to make India a net-zero carbon-emitting nation by 2070, and a range of other targets that would potentially demand a massive revamp in the country's energy use.

MINING

Mining industry is depending on carbon capture technology for climate goals

Industries from mining are creating plans to cap and cut their planet-warming emissions, and many depend on a technology still in development: carbon capture. There are two main types of carbon capture and storage: Point-source carbon capture and storage (CCS) sequesters CO₂ produced at the source, like a smokestack, while direct air capture (DAC) removes carbon dioxide (CO₂) from the atmosphere. Captured CO₂ usually is permanently stored underground, although carbon capture utilization and storage (CCUS) reuses the CO₂. The technology, however, is not yet widely available and is highly expensive. The capacity of CCS projects grew 48 per cent from 75 million tonnes per annum (mpta) at the end of 2020 to 111 mpta by September, according to the Australia-based Global CCS Institute. Large industries, and all major carbon emitters are using CCS technology.

HEAVY OILS

How fossil fuels can help decarbonize the economy

Researchers at Rice University's Carbon Hub are proposing the idea of actually using hydrocarbons to slash carbon dioxide emissions. In an opinion paper published

in the journal Proceedings of the National Academy of Sciences, carbon materials expert Matteo Pasquali and Carl Mesters, retired chief scientist for chemistry and catalysis at Shell, propose splitting hydrocarbon molecules into hydrogen and solid carbon. The hydrogen could be used as a clean-burning fuel that produces no carbon dioxide, while the solid carbon could become a cheap and plentiful source of high-performance materials used by a wide range of industries. According to the scientist, the technology already exists to both split hydrocarbons and make solid carbon materials for broad industry adoption. He has studied carbon nanotubes for almost two decades and pioneered methods for spinning the nanomaterials into sewable, threadlike fibers that conduct electricity as well as copper.

How whisky waste can replace fossil fuels on road to net zero



The founder of a Scottish biotech company is calling for action, not targets. Professor Martin Tangney's company, Celtic Renewables, turns left-over waste from whisky-making into the kind

of everyday chemicals that are normally made in oil refineries, without drilling for fossil fuels. This includes a novel gasoline alternative which is a direct replacement for the petrol that powers most traditional cars. Whisky is made from barley, yeast, and water and leaves behind spent barley grains, known as draff, and sugary water called pot ale. The waste is often disposed of as animal feed or even pumped into the sea. Recently, scotch whisky maker Glenfiddich announced they were processing their waste to produce methane which is then used to power their specially adapted delivery trucks. Celtic Renewables says their product is a direct replacement fuel for a standard, unmodified, petrol engine. The process of converting the waste, known as ABE fermentation, produces acetone, butanol, and ethanol, chemicals that are used daily in everything from fuel and food production to medicine and cosmetics.

Mitsui and GS energy to join Ta'ziz in low-carbon blue ammonia project

Abu Dhabi National Oil Company (ADNOC) and ADQ today announced that Japan's Mitsui & Co., Ltd (Mitsui) and the Republic of Korea's (Korea) GS Energy Corporation (GS Energy) have agreed to partner with TA'ZIZ and Fertiglobe to develop the world-scale low-carbon blue ammonia facility at the TA'ZIZ Industrial Chemicals Zone in Ruwais.

Adnoc signs 'landmark' energy deal to decarbonise its grid power

Abu Dhabi National Oil Company (Adnoc) has inked a 'landmark' clean energy agreement with compatriot Emirates Water and Electricity Company (EWEC) that will see the state-owned giant utilise the latter's clean energy resources. The Emirati giant said in a statement that the "strategic partnership, which is the largest of its kind in the oil and gas industry, will see up to 100 per cent of Adnoc's grid power supplied by EWEC's nuclear and solar clean energy sources" from January next year. The company noted the "new clean energy partnership will accelerate Adnoc's sustainability goal of decreasing its greenhouse gas (GHG) emissions intensity by 25 per cent by 2030". The UAE recently highlighted its ambition to achieve net-zero emissions by 2050 that has triggered a series of clean energy initiatives in the Emirate.

LNG

Bahri's first LNG-ready VLCC classed by ABS

The 319,000 dwt VLCC Rayah, built by International Maritime Industries (IMI) and Hyundai Heavy Industries (HHI) in Ulsan, South Korea has been delivered to Bahri. The Rayah has an LNG Ready

notation from classification society ABS as well the ABS SUSTAIN-1 notation demonstrating adherence to certain UN Sustainable Development Goals related to vessel design, outfitting and layout. Bahri Ship Management President, Abdulaziz Sabri, commented: "ABS is a long-standing business partner of Bahri Ship management and has been very supportive in Bahri's initiatives of building the first of its kind VLCC vessel with SUSTAIN-1 and LNG Ready notations. Their knowledge in Alternative Fuels and Vessel engineering has tremendously helped Bahri in achieving this remarkable milestone."

MAN Energy Solutions and DP World sign cooperation agreement

MAN Energy Solutions has signed a cooperation agreement with DP World, the leading provider of smart logistics solutions. Effective immediately, the agreement targets common progress in the field of decarbonisation and is scheduled to run for five years with an option to extend thereafter. Mutual areas of interest for the two companies include green-fuels infrastructure, future-proof conversions (LNG, methanol, ammonia, etc.), hybrid drives, electric engines R&D and training, and investigation of their respective, global footprints to further reduce the environmental impact of shipping traffic in terms of fuel consumption and emissions.

BUNKER

Bunker fuel market predicted to grow robust at CAGR of 3.1% by 2027



Global bunker fuel market size was valued at \$120.1 billion in 2019, and is projected to reach \$130.1 billion by 2027, growing at a CAGR of 3.1 per cent from 2020 to 2027. Bunker fuel is a type of fuel oil that is used aboard vessels. It is poured into ship's bunkers to power its engines. Bunker fuel gets its name from tanks on ports and in ships that it is stored in. Previously, they were known as coal bunkers but now they are called as bunker fuel tanks. Bunker fuels are used to power their motors, engine, drive, and other equipment in the marine vessels. With the implementation of IMO-2020 regulations on sulfur content in the marine fuel from January 2020, there is increase in attention toward utilization of low sulfur fuel oil from key players operating in this market. However, heavy fuel oil or high sulfur fuel oil can be used on the ships where scrubbers are installed.

Sri Lanka's Colombo, Hambantota ports achieve more bunkering feats

Colombo Port's first supply of delivered high sulfur fuel oil bunker started recently marked another milestone for Sri Lanka, as the country sets out to boost its bunkering prospects while also developing other ports like Hambantota as a dominant marine fuels hub in Asia. Register Now Advantis Bunkering, a subsidiary of Hayleys PLC, became the first supplier of delivered HSFO at Sri Lanka's Colombo Port, banking on the long-term growth in visits by scrubber-fitted ships. The company received clearance from state-owned Ceylon Petroleum Corp and loaded HSFO on a 1,500 mt barge.

Ras al-Khaimah Ports signs deal with bunker supplier firm Monjasa

RAK Ports has signed a strategic partnership with leading bunker supplier Monjasa, with the aim of becoming a significant regional bunkering centre. As a result of the agreement Monjasa will supply a range of marine fuels at all RAK Ports facilities in Ras al Khaimah. The new partnership with Monjasa will enable a comprehensive portfolio of marine fuel services to be offered, both in-port and across RAK Ports' anchorage areas. Monjasa is a major player in the Middle East bunker supply business.

METHANOL

World's first methanol-fuelled towboat to launch in 2023



Maritime Partners in cooperation with Elliott Bay Design Group, e1 Marine, and ABB, announced that the M/V Hydrogen One, the world's first methanol-fuelled towboat, will join Maritime Partners' fleet and become available for charter in 2023 to meet the pressing demand for sustainable towboat operations. Decarbonising the towboat sector poses substantial challenges, particularly due to towboats' inherent size, space, and weight limitations. Batteries are only suitable if you operate on fixed routes and can recharge daily, and a towboat's limited storage capacity restricts the use of pressurised or cryogenically stored gases as fuels. There are also very few dockside facilities to load such marine fuels, which severely constrains a vessel's range and functionality. M/V Hydrogen One will be IMO 2030 compliant, and meet all requirements of the US Coast Guard's Subchapter M regulations.

Methanol to be available for shipowners from 2024

German engine manufacturer MAN Energy Solutions has revealed its plans to work on upgrading its four-stroke engines to run on green future fuels, including methanol and ammonia. The company will in due course enable shipowners to use so-called "future fuels" – such as ammonia, methanol and hydrogen – also produced in a climate-neutral manner. While these fuels are not currently available on the market, their use in MAN units will, however, be possible through the incipient start-up of green-fuel production facilities.

These, in turn, are expected to reduce harmful emissions and meet future, stricter environmental requirements and regulations, according to the company. In August this year, MAN ES has been contracted to supply eight methanol dual-fuel engines for new Maersk's containerhips. The order contains an option for a further four engines with the first of the confirmed vessels due to enter service in the first quarter of 2024.

VLSFO

Firm demand, lower output lift VLSFO market higher

Asia's 0.5 per cent very low-sulphur fuel oil (VLSFO) gained recently as firming utilities and bunkering demand for the fuel weighed on already tightening inventories. VLSFO output has declined

recently as refiners switched to maximising production of higher value refined fuels amid soaring gasoil and gasoline refining margins. The VLSFO cash premium, front-month time spread and crack all inched higher. In the high-sulphur fuel oil (HSFO) market, the front-month time spreads for both 180-cst HSFO and 380-cst HSFO grades climbed higher after steady losses.

BIOFUELS

Gadkari wants farmers to play big role in India's move towards green fuel

Union Minister Nitin Gadkari has repeatedly backed the need for increasing the country's scale of ethanol production and recently underlined that farmers need to turn to ethanol production instead of growing conventional crops to increase profitability as well as enhance supply. Gadkari highlighted that the need for flex fuel is primarily based on the fact that India spends around \$0.11 million each year on importing fuel, a figure that can come down if flex fuels become widespread. And for this, ethanol production needs to be enhanced. "Farmers in the country today give us foodgrains. But they should also start giving energy. The country currently spends \$0.11 million a year on fuel import, and the amount can go up to \$0.33 million in the future. If such a big amount goes to farmers, then they will not commit suicide," he said in Aurangabad.

COMBUSTION CATALYST

'Cleaner' catalytic converter to be developed in partnership with industry



A new synthetic material that accelerates the removal of harmful nitrogen oxides and carbon monoxide from engine fumes is to be tested in a prototype catalytic converter. Scientists at Leeds who developed the material have announced research collaboration with Cats and Pipes, an automotive company in North Wales that designs and manufactures catalytic converters – devices fitted to the exhaust pipes of internal combustion engines to reduce toxic gas emissions. The aim is to have the prototype device fitted to a test vehicle by 2023, enabling its performance to be compared with current catalytic converters under real road conditions. The researchers believe the prototype has the potential to revolutionise catalytic converter technology. Exhaust fumes contribute to poor air quality in urban areas, which in turn is linked to chronic ill health and death. A report from Public Health England in 2019 estimated that between 28,000 and 36,000 people a year die from long-term exposure to air pollution.

FUEL ADDITIVES

No difference in gasoline but brands mix in different additives



There's no difference in gasoline itself but brands mix in different additives, which some studies have shown may impact the quality or wear and tear on engine over time. Gas is a shared commodity, says Gas Buddy petroleum analyst Patrick De Haan, with a handful of refineries storing it in common containers before it's ultimately shipped off to a station near you. That's where different retailers then mix in different additives. Those additives - which can include detergents, friction reducers, corrosion inhibitors - are then marketed under names like 'Techron' at Chevron stations, 'Invigorate' at BP-branded stations, 'V-Power' at Shell stations, among others. The Environmental Protection Agency (EPA) regulates fuel quality and has mandated a minimum level of additive detergent for all gasoline sold in the United States since the mid-1990s. The EPA and state set minimum standards for fuel and additives but many companies exceed minimum requirements.

Do petrol additives in India really enhance the performance?



Petrol additives, also known as fuel supplements, are generally chemicals that are mixed in fuel as they claim to enhance the performance of your motorcycle for a certain time period. There are different types of fuel additives available in the market, which can be used with gasoline like complete engine cleaner, octane booster, and injector cleaner. Almost all of these products can be found at a lubricant store, some of the fuel stations, or a performance parts/accessories shop. Most of the petrol additives offered in India are either engine cleaner type or injector cleaner type, which are actually used for cleaning purposes. The engine cleaner type of additives helps reduce the deposits on the engine's internal parts and clean the fuel supply system of the vehicle. On the other hand, the injector cleaner type is formulated for cleaning the clogged injectors to get them in proper working again. It results in a better response, lower long-term maintenance bills, and reduced engine emissions. However, they don't put a significant effect on the performance of the vehicle.

TECHNOLOGY

ABC unveils multi-fuel engine platform



Anglo Belgian Corporation (ABC) has introduced a multifuel engine platform designed to facilitate the transition from conventional fuel to future fuel types including diesel, biodiesel, MDO, HFO, hydrogen, methanol, LNG and CNG. The first member of the EVOLVE range is a compact 4-cylinder medium speed engine: the 4EL23. The 230mm bore, 310mm stroke engine features speeds from 720 to 1,200 rpm (400 rpm idling), and a nominal power range of 749-1,320kW (1.114-1.795HP). The 4EL23 is described as a compact, strong medium-speed 4-cylinder engine delivering superior engine performance at full and partial load. To support the current energy transition, the 4EL23 is fully optimized to run efficiently on diesel with exhaust after-treatment technology for ultra-low emissions until other fuels are economically available. It has a compact diesel particulate filter and the Selective Catalytic Reduction system is designed with an integrated mixing pipe.

Babcock achieves lower emission with NOx abatement solution

Since implementing one of the first nitrogen oxide (NOx) abatement projects in the country in 2019, Babcock International has completed a further three boiler installations at a large industrial petrochemical plant, reaching emission levels of almost 40 per cent lower than the legal requirements. Nitrogen oxides are harmful gases that form when fuel is burned at high temperatures emitted through combustion of fossil fuels, which remain the primary source of South Africa's power. To improve air quality, nations around the world have committed to lower NOx emissions through legislation that determines acceptable levels of NOx in the atmosphere. In South Africa, the National Environmental Management: Air Quality Act calls for maximum NOx levels of 750 mg/Nm³ for solid fuel combustion installations with a thermal rating of more than 50 MW.

POLICY

Policy makers must accelerate hydrogen rollout

More ambitious and concrete hydrogen policy efforts are needed from governments across Europe and beyond to bridge a wide gap between the current market trajectory and the projects needed to meet net zero targets, the International Energy Agency said.

FuelSpec® - A promising additive for fuel efficiency



FuelSpec® is a patented and proprietary Iron – Magnesium organo metallic compound that is registered with the United States EPA. Jithendra Nimmagadda, CEO, Maritime at Vishwa Samudra Holdings in an exclusive interview speaks about the FuelSpec®, its efficiency and other benefits.

Q. Please tell us about FuelSpec® product is and how it enhances fuel efficiency?

FuelSpec® is a broad-spectrum combustion catalyst that works across a range of fuels - from distillate to residual hydrocarbon fuels. This catalyst when added to the fuels in a ratio of 1:4000, it enhances fuel efficiency & reduces emissions.

During the process of fuel combustion in engines, a part of the fuel is left unburnt and comes out as particulate matter. The working principle of FuelSpec® is to reduce such unburnt portion of the fuel leading to much more complete combustion of the fuel and thereby increasing the fuel efficiency leading to reduced fuel consumption and lower emissions.

Q. What is the composition of FuelSpec®?

FuelSpec® is patented and proprietary Iron – Magnesium organo metallic compound, that is registered with the United States EPA. It has Iron and Magnesium as the main composition. Iron stores energy during the 1st half of combustion phase and

releasing the same in 2nd half, leading to burning of heavy hydrocarbons which needs more time to burn. Combustion process multiplies by parallel action as heat transfer from air to iron and magnesium then again from magnesium to iron finally from iron to aromatic hydrocarbons.

Q. What are the benefits of using FuelSpec® in maritime segment?

Usage of FuelSpec® has following benefits:

- Reduces fuel consumption by 7% to 8%
- Reduces emissions like SOx, NOx, CO, CO2 & particulate matter varying from 15% to 40%
- Reduces the wear & tear of the engine/equipment and hence reduced O&M cost.

Q. Currently, with good revenues carriers focus may not be much on savings. In such scenario what would convince them to use fuel additives for fuel economy?

All the carriers have posted record profits so far this year and most of them are projected to end at an all-

time high revenues/profits in the year 2020. Simultaneously, all the carriers are focussing massively on reducing the emissions and few of them have already declared to become carbon-free by the year 2050. Such a commitment comes with huge challenges when there is no standard or agreed fuel or technology to achieve the same. Some of the projected future fuels are Methane, Ammonia, Blue Hydrogen, etc.

Before an agreement comes up on the usage of which of the above carbon-free fuels can be the standard for shipping, the usage of Fossil fuels will continue to pose a challenge to the carriers and to the environment in general. This is where FuelSpec® comes in play by reducing their current emissions such as CO, NOx, SOx, particulate matter, etc.,

Since fuel contributes to about 50% to 60% of the operational cost of the vessels, even if FuelSpec® can reduce the fuel consumption by 7%, it translates into huge cost savings for the carriers

Q. There are apprehensions about the efficacy of fuel additives. How do you address them?

It is very natural that the customers have apprehensions about any new product which claims to deliver the Twin Advantage of 'Cost Saving' & 'Emission Reduction'. We will work very closely with the customers to jointly conduct field trials. **EF**

SHIPPING- ON PATHWAY TO NETZERO

The world's ever-growing global economy runs on shipping, as it moves about 10 billion metric tons of cargo every year across the planet. It is responsible for 2.2 per cent of global carbon emissions. If the emissions continue to move on at the same rate they could increase to 17 per cent by 2050, as the GDP of the world has been growing. Therefore, curbing shipping emissions has become an imperative thing for the industry to act promptly. Of late, actors in the shipping industry have been working to seek out alternative fuels to shift away from carbon-intensive sources of energy to take the shipping on the pathway to NetZero.



In the recent COP26 climate summit, Arctic Basecamp, a climate advocacy organisation, had a four-ton piece of glacier shipped from Greenland to Glasgow in what was supposed to be a visual reminder of what Arctic warming means for the planet. For this flashy gesture climate advocacy group had to rely on one of the world's dirtiest fuels, this has also highlighted how important shipping is to the global economy.

It is a fact that shipping accounts for 2.2 per cent of annual global greenhouse gas emissions, and if the industry were a country, it would be the sixth largest CO2 emitter in the world, on par with Germany. It therefore underscores the importance of decarbonising shipping.

“The time to act is now, if we are to solve shipping’s climate challenge. This order proves that carbon neutral solutions are available today across container vessel segments and that Maersk stands committed to the growing number of our customers who

look to decarbonise their supply chains. Further, this is a firm signal to fuel producers that sizable market demand for the green fuels of the future is emerging at speed,” said **Soren Skou, CEO, A.P. Moller – Maersk.**



Progress made towards to decarbonisation

However, decarbonisation of shipping won't be easy, largely because the industry still relies almost completely on cheap fossil fuels. About 60,000 heavy ocean-going cargo vessels that spend months at sea transporting global goods largely run on fossil fuels. Currently, there is no real alternative to fossil fuels. Though, Russia has recently developed nuclear-powered ice-breaking vessels to transport goods across the Arctic, but the technology is expensive. Moreover, wind-and-solar powered cargo ships are still decades away. In the meantime, to reduce emissions, cargo companies need a portable, energy-dense solution.

The main outcome from talks hosted by the United Nations' International Maritime Organization (IMO) recently to reach an agreement to revise in 2023, its decarbonisation

strategy, and a non-binding proposal on zero emissions didn't get official approval.

The IMO has said it has made good progress on the short-term greenhouse gas reduction measures with an agreed commitment to revising its GHG strategy by 2023. But that timeline is not seen as fast enough by environmentalists and a number of the IMO's 175 member countries.

IMO Secretary General Kitack Lim said that “strengthening the ambition” of the initial GHG Strategy “will be crucial”.



Among the discussions that will extend into 2022 is a proposal to create a \$5 billion research and development fund to find the right technology to meet the targets.

The discussions could not make much headway on decarbonisation of shipping. According to **Guy Platten, secretary general of the International Chamber of Shipping (ICS) association,** which was one of the proposal's sponsors, Marine Environment and



Protection Committee session “missed the opportunity” to advance GHG reduction measures.

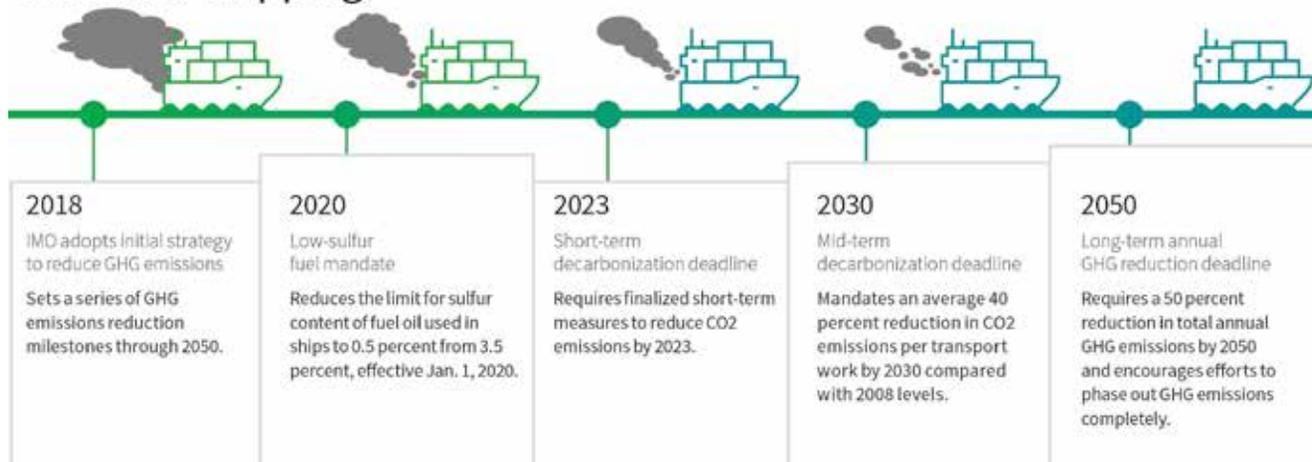
Shipping's current 2050 target falls well short of what's required to align the sector with the earlier Paris Agreement's ambitions on limiting temperature rises. Yet the IMO has yet to set solid rules - or even a target - that would get the industry on track.

The recent COP26 summit also fell short in that it did not deliver enough emissions-cutting pledges from countries to set a clear path to limiting warming to 1.5 Celsius. Instead, it struck a deal for the nearly 200 countries represented at the event to increase their pledges next year to close the gap. However, industry looks to UN climate talks to steer cleaner shipping.

Shipping routes for the transport of iron ore from Australia to Japan and containerized goods from East Asia to Europe are at the centre of plans to slash maritime carbon emissions by 2030. At least six such corridors should be established by the middle of this decade, according to the Clydebank Declaration on green shipping, unveiled recently at the COP26 climate summit in Glasgow, Scotland. It was

Sailing toward zero-emission container shipping

The International Maritime Organization (IMO) has introduced rules aimed at reducing harmful sulfur oxide (SO₂), carbon dioxide (CO₂), and other greenhouse gas (GHG) emissions from ships.



Source: IHS Markit

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GREEN SHIPPING: WHAT IS BEING DONE



- **Mediterranean Shipping Company (MSC)**, the world's second largest container shipping group, has publicly announced its commitment to reach netzero carbon emissions by 2050.
- The MSC Carbon Neutral Programme enables to accelerate the transition to a carbon neutral supply chain, taking responsibility for your cargo's environmental impact and compensating through an offsetting programme. South Pole provides a "Verified Carbon Units Certificate of Retirement" delivered by VCS Registry and a climate action certificate attesting the amount of CO2 compensated by investing in the programme.



- The technology group **Wärtsilä** is a signatory to the Call to Action for Shipping Decarbonisation initiative launched in conjunction with the UN General Assembly.
- Wärtsilä through its technological development delivers greater efficiencies, and also through advanced research into potential future carbon-free fuels. It harnesses vast experience and depth of know-how to achieve a cleaner and greener future for shipping.



- **A.P. Moller – Maersk** will introduce the first in a groundbreaking series of 8 large ocean-going container vessels capable of being operated on carbon neutral methanol in 2024. The vessels will be built by Hyundai Heavy Industries (HHI) and have a nominal capacity of approx. 16,000 containers. "We are very excited about this addition to our fleet, which will offer our customers unique access to carbon neutral transport on the high seas while balancing their needs for competitive slot costs and flexible operations," said **Henriette Hallberg Thygesen, CEO, Fleet & Strategic Brands, A.P. Moller – Maersk.**



- The series will replace older vessels, generating annual CO2 emissions savings of around 1 million tonnes. As an industry first, the vessels will offer Maersk customers truly carbon neutral transportation at scale on the high seas.



- French liner major **CMA CGM** has added 14 new vessels and 32 second-hand vessels to its fleet in 2021 to speed up maritime decarbonisation efforts.
- "We will purchase 12,000 tonnes of biomethane fuel as part of the company's plan of becoming carbon neutral by 2050. That's enough biomethane to power two 1,400 TEU LNG-powered ships for an entire year on the intra-European service," said **Rodolphe Saadé, Chairman and CEO of the CMA CGM Group.**



- **Hapag-Lloyd** too has joined the decarbonisation race as it has initiated steps for the protection of the environment and the preservation of oceans and biodiversity. "We will continue to focus on winning races, ocean science and education, we will work hard to help advance and accelerate the decarbonisation of the shipping industry," said **Hapag-Lloyd CEO Rolf Habben Jansen.**



signed by 19 nations including the US, UK, Japan, France and Germany.

Is shipping heading in the right direction?

Slashing the shipping industry's carbon footprint will require a multitude of solutions. While electric batteries are already starting to play their part for ships on shorter routes, advances in clean fuels are required for larger vessels such as cargo ships and tankers travelling long distances.

"The real challenge with those fuels is that it's very difficult for a whole industry to decide on one flavour and it's not happening fast enough. It can't happen fast enough, because of the vast infrastructure," says **Diane Gilpin, CEO of Smart Green Shipping (SGS).** "It's going to take a long time. And I think that that's a real worry in terms of emissions, because they're still rising from shipping."



Problems associated with shipping decarbonisation

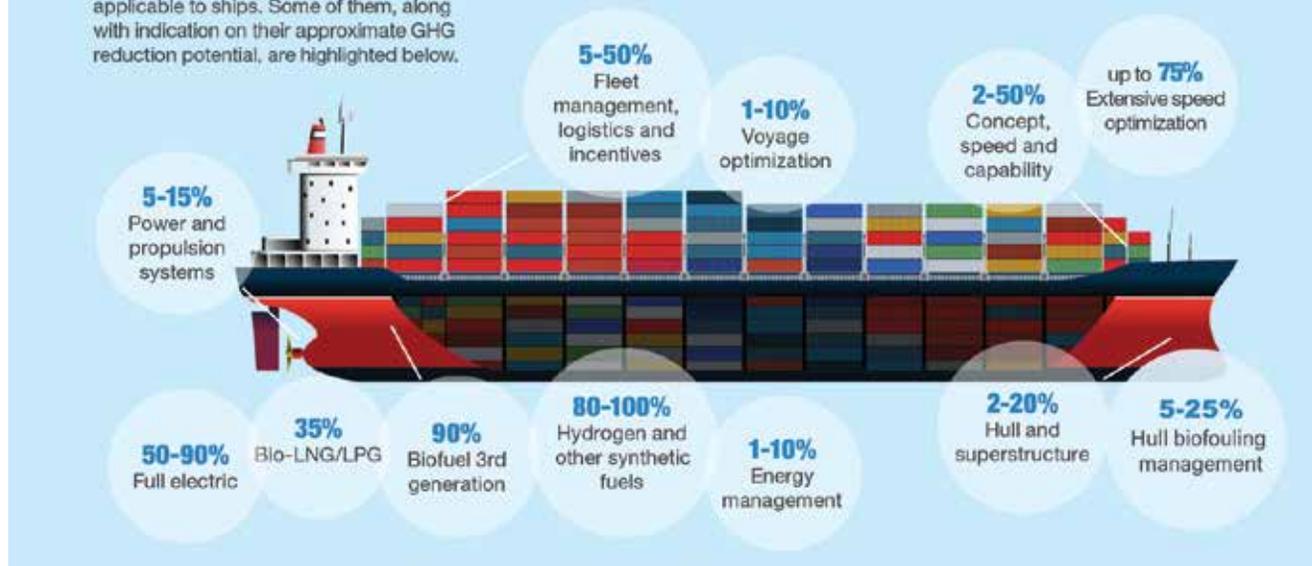
The International Maritime Organization (IMO), a UN body that addresses emissions from ships engaged in international trade. In April 2018, the IMO set a goal of halving greenhouse gas emissions by 2050 from 2008 levels. A lot of efforts have been made by IMO to steer the industry towards lower emissions, but have so far lagged on making the transition to electric power and other long-term measures that would bring the industry to netzero carbon emissions. There are numerous reasons for the slow pace of decarbonisation in shipping industry.

According to a Global Maritime Forum study, decarbonizing the global shipping fleet, which includes land-based port and fuel infrastructure, will cost about \$1.9 trillion over 20 or 30 years. The cost factor is certainly a big impediment for shipping companies to switch over to expensive alternative fuels and technologies.

Ocean Network Express (ONE), a container shipping company headquartered in Singapore and Tokyo,

A wide variety of design, operational and economic solutions

Achieving the goals of the Initial IMO GHG Strategy will require a mix of technical, operational and innovative solutions applicable to ships. Some of them, along with indication on their approximate GHG reduction potential, are highlighted below.



Source: International Maritime Organisation (IMO)

says it could reduce carbon emissions by at least 15 per cent if speeds were lowered by 10 per cent. But slowing ships is not an option for all companies, and it could force some fleets to sail more ships.

Disunity among nations

Shipping is a difficult industry to decarbonise, as it requires vast amounts of fuel for international travel, and the questions of which country is responsible for emissions makes reaching agreements a huge task. Before making any real headway to decarbonise shipping, it is a must to have global unity. It is imperative more member states get on board with the netzero by 2050 declaration.

The IMO needs to set international standards around who's responsible for emissions. Countries with large shipping fleets such as Japan and Greece need to come on board to expedite the process. IMO resolutions take years to develop and even longer to be ratified by its member

countries. A well-funded research and development programme, which the industry has agreed to pay for within a global regulatory framework, needs to commence immediately under the supervision of the IMO.

The heightened interest across the supply chains and at COP26 is an important opportunity for the shipping industry to be on the front foot, and reduce their emissions sooner rather than later.

Level playing field for companies

Representatives of the shipping industry say they need clarity within the next few months on how the regulations on decarbonisation will play out. And those regulations need to be global, and regional regulations do not work in a global sector like shipping.

"The majority of the industry has accepted we need to decarbonise. Industry leadership needs to be followed up with global regulation and policies to ensure industry-

wide transformation. We will not succeed without global regulation," **Jan Dieleman, president of ocean transportation, Cargill.**

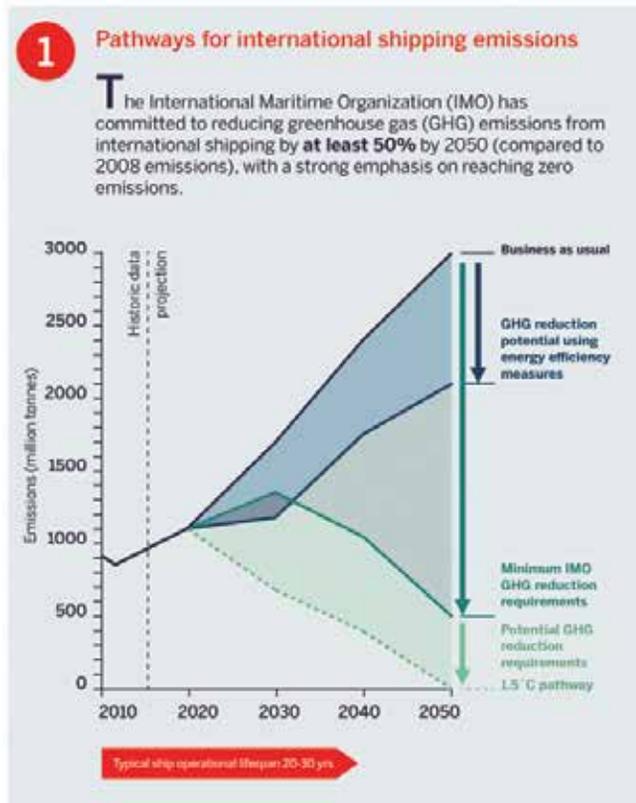


Companies are also asking to operate on a level playing field, so that fleets running on more expensive alternative fuels can compete with those that have not yet moved away from fossil fuels.

Lack of technology

Currently, most ship engines use a low-grade, carbon-heavy fuel oil, which creates significant air pollution. So some shipowners are moving to build new ships or convert existing ships to run on liquefied natural gas (LNG) instead. While this presents a 25 per cent reduction in CO₂ emissions compared to the current low-grade fuel, LNG still releases methane into the atmosphere – a heat-trapping gas roughly 30 times more potent than CO₂.

How can shipping decarbonise?



Source: ICCT (2017)

These points to a big problem getting in the way of decarbonising shipping: zero-carbon technologies that can be applied at scale to large ocean-going ships do not yet exist.

Taking shipping on pathway to netzero

The shipping sector is under pressure to deliver concrete action including a carbon levy. However, in order to get the shipping industry to zero emissions, all it requires is to make the sector accept discouraging itself off oil-derived marine fuels, and use more expensive, less polluting alternatives. Many see a carbon levy as a way to bridge that price gap, but getting agreement at the global level won't be easy.

“To reach that ultimate goal of complete decarbonisation, we must look at a set of solutions. We need

significant advances in research and development and fuel development,” said **Bud Darr, EVP Maritime Policy and Government Affairs, MSC Group**.



There are currently two alternative fuels available for cargo flows including green ammonia, which contains no carbon, and green methanol. Other candidates for alternative fuels include hydrogen, batteries and nuclear power.

According to Guy Platten, secretary general of the International Chamber of Shipping (ICS), “But I've not met anybody in the industry who doesn't recognize we've got to do something. We need to incentivize shipowners to switch and the only way that's going to happen is by having a carbon price, otherwise there would

still be an incentive to burn fossil fuels.”

Commercially viable technologies that create alternative, zero-emissions fuels, such as hydrogen and ammonia, are still in development by ship engine manufacturers. A significant challenge is the requirement for vast fuel storage on board ships, and replenishing these fuels in port, especially after long voyages. Shipping industry is finally starting to see change with businesses placing more emphasis on its contribution to climate change. In October 2021, nine big companies – including Amazon, Ikea, and Unilever – pledged to move their cargo only on ships using zero-carbon fuel by 2040. Three of the world's largest container shipping lines – Maersk, CMA CGM, and MSC – is actively pursuing the use of alternative fuels and aim to be netzero compliant by 2050 or before. **EF**



TECHNOLOGY ALONE DOES NOT DECARBONISE MARITIME

Wartsila, a company in the spearhead of shipping's decarbonisation efforts, expects more to be done in the coming months and years, in terms of accelerating the inevitable need to lower emissions, **Sachin Kulkarni** – Head of Sales, Marine Power, South Asia, Wartsila says, in an exclusive interview.

Q. Wartsila is positioned as a technology company looking to offer solutions towards the shipping industry's decarbonisation process. Which are the main "ingredients" of this undertaking?

As maritime speeds towards decarbonisation, the biggest question of our time is not if or when, but how this will be achieved. The industry is experiencing an unprecedented era of change, but not one of uncertainty. What we need to do is certain and the

time to act is now.

As a company with the most comprehensive portfolio at hand in the industry, Wartsila is turning technology into solutions to enable a sustainable maritime industry.

To drive sustainable shipping, elements like Fuel flexible systems, Energy saving technologies and electrification would take us to reduction in GHG level.

Wärtsilä does this by developing technology and fuel flexibility to create

the path towards decarbonisation of the maritime industry. Our history of delivering innovations and industry firsts when it comes to fuel flexibility includes multi fuel technology.

Transition (with our multi-fuel technology) will not simply consist of a clean swap to one fuel or the other but will include fuel blends and drop-ins.

Wartsila's approach to decarbonisation is to explore future fuel opportunities and methods to improve the efficiency of shipping through digitalisation – while also offering solutions that immediately increase the fuel flexibility and fuel efficiency of vessels. We can do this through engine upgrades and vessel retrofits, along with digital solutions based on connectivity that improve vessel efficiency. These measures also help our customers to comply with frameworks like the Poseidon Principles and Sea Cargo Charter to ensure continued access to finance and cargo.

Q. Do you think that a proposed carbon levy could help speed up the process of shipping's decarbonisation?

We welcome any initiative that accelerates decarbonisation, both on land and sea as these are interconnected when it comes to e.g. fuel availability & infrastructure. I'd also stress here that the problem area is not the availability or maturity of the technology. The technology to drastically reduce emissions already exists today. The challenge is not downstream, it is upstream. Today, we already have the know-how and the technology to drastically reduce maritime emissions and set the industry on an upgrade path towards complete decarbonisation. But the mere existence of technology does not decarbonise maritime alone – action from both the market and regulatory side of the maritime industry is crucial to incentivise investment, build infrastructure, favour the development of the needed fuel supply chain, and legislate to accelerate the adoption of these technologies. Decarbonising maritime will take more than technology. [E&E](#)

Source: *Hellenic Shipping*



Middle East – A powerhouse forging the way to netzero

The Middle East has the fundamentals to allow its energy sector to flourish, creating jobs and energy security.

Middle East nations have reaffirmed their commitments to sustainable fossil fuel development alongside the renewable and hydrogen revolution. Saudi Arabia, the world's biggest oil exporter, has pledged to cut its carbon emissions to netzero by 2060.

Not only the region a historic epicentre of fossil fuels, which will be noted for decades to come, it is also blessed with natural attributes of near eternal sunshine and high-speed winds in some parts of the region.

Research from MEED insight reported that renewable energy contract awards in Middle East and North America (MENA) have eclipsed conventional power plant projects with no contracts awarded for new oil-powered or gas-fuelled power stations in the first half of 2021 in comparison to around \$2.8 billion of renewable energy project contracts in

the region.

Middle East's role in renewable energy

The renewable energy market continues to grow at pace and the cost of these energy sources has fallen. Solar and wind power alone could meet the world's energy demand 100 times over and is already competitive when compared with fossil fuels, which underpins the growing confidence that a greener outlook can work both commercially and environmentally. In fact, the Middle East is already home to some of the world's lowest priced solar projects and has many ambitious developments underway in green markets including solar, wind, and hydrogen. The potential is huge. For example, the highly anticipated 57GW capacity addition in solar panels, concentrated solar power (CSP) and wind power generation

means the region will witness an 18-fold growth in its current capacity by 2025, with @182.3 billion of investments.

The hydrogen revolution

Middle Eastern nations, notably Saudi Arabia, the UAE and Oman, are fully embracing the vast and untapped potential of hydrogen production. As the market develops and the export opportunities are realised, hydrogen will play a pivotal role in reaffirming the region as a global energy provider.

The potential of the market clearly justifies the Middle East's rising appetite, with the global hydrogen investment pipeline up to 2030 already having reached \$500 billion with 359 projects. Saudi Arabia, the world's biggest oil exporter, has already declared its intent to become a global hydrogen hub whilst Oman plans to build the world's largest green hydrogen plant. Meanwhile, the UAE another leading OPEC member, has identified hydrogen as an integral market in its energy outlook and recently launched the Abu Dhabi Hydrogen Alliance where key operators and partners are collaborating to create a low-carbon hydrogen economy. These developments are the tip of the iceberg in terms of activity, but they hint at the level of enthusiasm sweeping the region. [E&E](#)



SHIPPING AND CARBON ZERO

Today, more than 70,000 vessels sail the high seas to ferry goods to nearly every corner of the globe, making up 80% of international trade. Bo Cerup-Simonsen, CEO of the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping explains what it will take for the industry to decarbonize.

Q. Why has decarbonization become so important for the shipping industry?

There is such a strong realization now in the world, regardless of sector, that climate challenge is real and we need to act on it. It's no longer a question of whether we have a problem or not; it's a matter of how fast we can solve it. This is true even in the so-called hard-to-abate sectors, including shipping, which I think has a chance to play a leading role.

A lot of primary stakeholders in shipping are seeing an opportunity – and a responsibility – to act. Increasingly, customers want to see green transportation, employees want to see their companies act responsibly, and new talents come into the industry calling for greater decarbonization. Technology and energy providers are also saying that it's actually possible to decarbonize. So a number of pieces are starting to emerge that make it possible to put the puzzle together. And this is happening at an accelerated speed.

Increasingly, customers want to see green transportation, employees want to see their companies act responsibly, and new talents come into the industry calling for greater decarbonization.

Q. What are the main challenges in the transition to zero carbon—and what solutions have caught your attention?

The challenges are equally about creating a demand for decarbonized shipping as well as developing the energy and technical solutions for the supply. Right now, we're keeping all channels open and are still gathering ideas and exploring new opportunities. We're not converging the funnel yet to focus on specific solutions. The way we're working involves seeing decarbonization in shipping from two sides.

On one side, we need to understand the opportunities to bring clean fuels to shipping. We're living in a world where the energy mix is changing, and we know there's going to be a scarcity of renewable-energy resources because demand will exceed supply. Looking at the next three decades, one big question is how shipping is going to secure its share of clean fuels.

On the other side, there's the technical aspect of implementing these new types of clean fuels. We're seeing five to ten different energy options, from hydrogen and ammonia to methanol and ethanol. Not to mention the various

kinds of biofuels that could be made available – and, of course, solar, wind, hydro, maybe even nuclear. How can more than 70,000 ships decrease their reliance on carbon-based sources and actually take advantage of these new fuel types as they become available? And as we build new ships, how do we decide on the multifuel options and mitigate the risk of stranded assets?

Right, because decarbonization has to make business sense, too.

Yes, we have to add new business models. We can only imagine that there will be completely new ways of setting up the supply chain. We need to understand the different options. We're seeing many different early developments, such as financing schemes, starting to move into place. There's a lot of private capital available, actually, and we're seeing financial institutions and investors who are seeking out green investments. There's also a drive in the public sector to make more money available and absorb at least some of the marginal risks in these new investments.

We're starting to see customers who are willing to pay a premium to get green transportation. Obviously, this is something we have to stimulate, and we

need to understand how we can grow that. We know that at the end of the day, the price of the end product is not really influenced by shipping costs. The cost of shipping in general is miniscule relative to the price of the end product; you can double shipping costs and still hardly see it reflected on the price tag. So there's an opportunity there, but that needs to be thought through very carefully. We want to give the customers a green-delivery option that they can happily pay a slight premium for.

If you put all these elements together, you can see the opportunity to build a green supply chain. The customers want it, the energy resources and technologies are available, as is the financing for investment. We're already at a point where we can kick-start the transition. We'll have to start small at first. At the end of the day, we'll need global regulation as the final lever to pull the rest of the industry along. That's why we're working very closely with the UN member states and the IMO [International Maritime Organization].

Q. How do you go about creating international consensus?

Bo Cerup-Simonsen: The vast majority of shipping takes place in international waters, which presents a unique challenge. There's an interesting intersection between the shipping sector and countries. International shipping doesn't count toward national counts of greenhouse-gas emissions in the individual countries. So who's responsible for global emissions in the shipping industry? Fortunately, the International Maritime Organization has agreed on a strategy to address climate change and greenhouse-gas emissions.

But progress in IMO is slow, and one of the reasons is the uncertainties in the implications of decarbonization. Member states need to have some level of understanding about what it means for their countries when shipping decarbonizes – what does it mean for their own energy productions, for the

competitiveness of exports in global markets, and so on?

The good news is, many countries are on board. In Asia, for example, where around half of the world's maritime trade takes place, we know that China, Korea, Singapore, and Japan want to step ahead and lead the drive toward zero-carbon shipping. The next step is for them and other member states to support processes and strong effective regulations in the IMO. It's really up to member states to go to the IMO to make things happen. Opportunities are emerging. COP26, in Glasgow, features shipping very visibly on the agenda. Member states are supporting a discussion around this very issue, which should lead to a stronger drive within the IMO to promote decarbonization.

Q. What kind of leadership is needed to galvanize this change?

Leadership here is everything, and we're seeing a lot of companies and individuals stepping up and wanting to lead this. Our center is the result of leadership from a number of large companies that have worked together to establish a collaborative platform for the wider industry. It takes leadership to understand that decarbonization is not something any single company can do on its own, yet every company has a role to play.

Leadership is very much about shaping a vision and an overall narrative of how the shipping sector is going to get to carbon zero and then act accordingly. This vision has to be equally shared by a small shipping company with five ships and by a big shipping company with a fleet of 1,000 ships. To do that, you need to bring decarbonization down to a concrete level and be able to understand the risks and implications of transitioning from the technical and financial points of view, and find solutions to mitigate them.

Q. While it's still early days, do you envision a single, winner-takes-all solution for all vessel types, or do you expect a variety of solutions to

emerge?

We will not see a silver-bullet solution doing it all. We need to recognize that there's a time dimension to this, that shipping is composed of many different types of ships and operations and that there is a multitude of competing solutions. The sequence starts with picking the low-hanging fruit, which has already started. We're seeing, for example, ferries that run on batteries. Soon, we'll see more ships powered by fuel cells. And further down the line, we will see larger commercial vessels decarbonizing – for example, Mærsk will launch a ship that will run on methanol. Other vessels will run on ammonia. We'll see more such solutions come into play.

I know we're still very far from this stage, but if you look historically, we know that the better solution—one that has better reliability, lower cost, greater efficiency—will win out and the industry will implement it. Companies will compete to find and innovate radically different solutions. It'll be a long time before the technical and commercial solutions have scaled and matured, and the transition period will require the flexibility and modularity to experiment and test new energy sources and technologies to whatever extent is possible.

Q. What's the center's role in this move toward decarbonization?

Our status as an independent cross-industry, cross-competitor organization presents a unique opportunity. We have designed the center with an open architecture so players across the shipping value chain, including competitors, can join and collaborate on this important social mission. We don't own and protect IP [intellectual property], which, for commercial reasons, would make us biased toward any technology or any fuel or any shipping type. We're able to wholly dedicate our work to this purpose of decarbonization to find out what the best solutions are for the industry and wider society. 

Source: McKinsey



Hydrogen is the pathway to diversifying energy resources

Adipec 2021 presented a forum for global oil and gas industry to develop actionable strategies to address the challenges and opportunities of the energy transition and define the next decade of success for the energy industry.

The Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) 2021, was held between November 15 and 18 has taken place in the wake of the COP26 climate talks and addressed outcomes of the climate conference. It has presented the first opportunity for the global energy industry

to discuss the impact of the key decisions of the UN climate change summit, COP26, and defined energy agenda for next three years. Tayba Al Hashemi, chairperson of Adipec 2021 and CEO of Sour Gas, welcomed the attendees. Adipec 2021 played host to more global government ministers than before.

It has hosted 51 NOCs, IOCs and IECs and 26 international country pavilions, providing an environment for trade across the industry's full value chain. Over 100,000 energy professionals from 167 countries participated in the event. More than 2,000 companies exhibited their products during the event. During a panel discussion at the conference Suhail Al Mazrouei, UAE Minister of Energy and infrastructure said, "We need to diversify our energy sources, but let's not be mistaken, it is not going to be cheaper or the same prices, it will be expensive." He said that UAE is eyeing 25 per cent of hydrogen market. UAE is the third biggest oil producer in OPEC, which has already been working on expanding the presence in hydrogen. The country has already signed agreements with Germany and Japan. Hydrogen has been a subject of interest as an alternative to fossil fuels due to its low carbon. "Algeria, the largest country producing electricity in Africa through natural gas, is working with

Germany and Italy on a pilot project to understand more about the gas,” Mohamed Arkab, Algerian Minister Energy and Mines Minister during the discussion said. He further said that his country is preparing for hydrogen and prices are a challenge for it.

Ugandan Minister of Energy and Mineral development Dr Ruth Nankabirwa Sentamu said that her country is still looking to create further partnerships to attract and attract investors to be able to expand energy, which makes hydrogen a non-urgent topic in terms of diversity. Lesotho, even smaller country in Africa, has neither oil nor gas, the country’s 50 per cent is only connected to electricity. Mohapi Mohapinayene, the Minister of Energy and Meteorology, Lesotho, said that the country has a lot water and air for wind, sun for solar, which are enough to power whole country. Industry experts at Adipeec’s strategic panel discussion opined that skill sharing and new technological advancements are crucial to meet the net zero goals. The industry experts stated that utilisation of petroleum will change as industry explores how to make more friendly, but how such commitment be adapted all over the world will vary.

During the discussion on ‘The Net Zero Model: Delivering Innovation and Value in the Upstream Sector’ Dawn Summers, COO of Wintershall Dea said, “The 50 per cent reduction is certainly a challenge, but I truly believe our industry has the will, it has the technology and it certainly has the skillset in order to deliver on these challenging targets”.

Mele Kolo Kyari, Group MD of NNPC, confirmed Nigeria was committed to net zero by 2060. “When we say net zero, we’re not saying zero hydrocarbons. It means utilisation of petroleum will change as we explore how to make more friendly. This type of commitment



“We need to diversify our energy sources, but let’s not be mistaken, it is not going to be cheaper or the same prices, it will be expensive.”

SUHAIL MOHAMMED FARAJ AL MAZROUI
UAE Minister for Energy



must be adapted all over the world, but the approach will be different” he said.

Zoe Yujnovich, Upstream Director Executive Committee at Shell said, “It is crucial for us as operators to manage our own emissions, and Shell is committed to a 50 per cent decrease by 2030.”

Gustavo Baquero, Senior Vice President Exploration at Production International Equinor, confirmed his firm’s target to reduce emissions by 40 per cent by 2035 and to be net zero by 2050. “In 2017 we were operating in about 30 countries and now we are in about 10, so we’re in fewer places where we can implement strategies that will help us reach our goal” he said.

Equador modified its business in the run up to net zero by scaling down and diversifying. “We are an oil and gas offshore developer and we saw that we could deploy those skills into offshore wind”, said Baquero, whose company is developing the world’s largest offshore wind farm in Scotland.

“We have a project called Empire Wind in the northeast of the US and have also entered South Korea by deploying existing competencies we believe we can be leader in the offshore and wind energy sector”. The audience learned that Amazon Web Services will be zero by 2040

and net zero by 2030, has modified operations, and is investing in hydrogen to make these goals attainable.

“The only reason we are investing in hydrogen is because the grid can not produce enough for us in these locations” explained Bill Vass, Vice President of Engineering at Amazon Web Services.

“For example, one of our fulfilment centres uses 21 times more energy than our data centre, and that isn’t because the conveyor belt needs a lot of power.” It’s the trucks so we bought over 100,000 battery electric delivery trucks and that allows us to move to net zero very quickly.

“But, to do that and handle those spikes when all those things plug in we have to have hydrogen locally to convert that into electricity to change them because the grid can only provide 20-30% of that we need” Ms Yujnovich summed up the race to net zero with two words.

“The first one I would say is volatility. I think part the way we navigate the energy transition is going to create some significant challenges. so even whilst we recognise the role of gas, lets remind ourselves that there are certain jurisdictions where gas is in short supply or prices are elevated so we are going to see these tensions between short-term challenges whilst trying to build a sustainable energy system for the longer term”.

She further added: “The other thing I would say is agility because I think historically the way we have managed volatility is to try and ‘engineer out’ things. What we are going to see now is the need to be agile whether its partnerships that we are working in, technology displacements, leveraging different operating structures.

These two things are going to put us in place to be most successful in navigating the energy transition.” The strategic panel discussion with industry experts concluded with these words. **EF**

Pledges made at COP26 Summit

In the recently concluded COP26 Glasgow Climate Summit negotiation a series of announcements on measures to curb global warming have been taken.



The Glasgow Climate Pact approved by almost 200 countries on the final day of COP26 followed by a long list of promises and announcements aimed at slowing global warming.

The talks began with a promise to focus on four areas – coal, cars, cash, and tress, as UK Boris Johnson put it.

As well as announcements on these, there were landmark promises on greenhouse gas emissions and a surprise deal between two of the world's largest polluters. But many climate activists are sceptical about whether enough has been done.

Reversing deforestation

A pledge by more than 100 countries to reverse forest loss was an early breakthrough.

The UK hailed the promise as a 'landmark commitment' and welcomed the fact that Brazil, which includes much of the Amazon rainforest and is often criticised for its climate policies, was a signatory.

The countries promised to turn the tide on deforestation by 2030 by tackling wildfires, restoring degraded land and protecting the livelihoods of forest dwellers.

Climate activists welcomed the focus on nature but said planting trees was no substitute for cutting

greenhouse gas emissions.

"We want to see nature protection and restoration happening alongside the urgent phasing out of fossil fuels," said Nathalie Pettorelli, a researcher at the Zoological Society of London. "This cannot be seen as strategy to reduce ambition or offset continued emissions."

Cutting Methane emissions

A push by the EU and US to persuade countries to cut their methane emissions led to 103 nations promising a 30 per cent reduction this decade. Leaders said the pledge was significant because the gas is a major contributor towards warming the planet.

Those who did not sign up were invited in the final agreement to “consider further actions” to cut emissions.

US president Joe Biden promised to set an example by fixing the leaky gas pipelines that produce some of America’s methane. But critics said leaders had sidestepped one of the main ways to cut methane emissions – telling people to eat less meat.

Keeping 1.50C alive

Most of the countries involved submitted five-year plans setting out how they plan to reduce emissions.

Under the 2015 Paris Agreement, these should become increasingly ambitious and aim to cap global warming at no higher than 20C, and ideally 1.50C, above preindustrial levels. Scientists say the extra half a degree would have drastic consequences.

India was the last of the world’s major polluters to announce a drive towards net zero emissions, although its target date, 2070, is conspicuously more distant than those of other countries.

With the agreements, there was optimism that the latest proposals could keep the temperature below 20C, but only if they all come into effect.

There was no suggestion that the world is track for 1.50C. By the end of the summit, attention was shifting to how these ambitions could be raised in time for next year’s COP27 summit in Egypt. The final text called on countries to revisit their 2030 proposals next year.

Frans Timmermans, Executive Vice President of the European Commission, said the world needed to be on track for 1.50C by the time of COP27. “We need to make sure major emitters reduce their emissions so that we keep 1.50C alive,” he said.

Setting rivalry aside

Unexpected announcement came during the meeting, when the US and China said they would co-operate more closely on climate change. The



India targets net zero carbon emissions by 2070

- During the UNFCCC’s 26th Conference of Parties (COP26) in Glasgow Prime Minister Narendra Modi pledged that India will achieve net-zero emissions by 2070. The Indian PM also announced that the country would make one billion-tonne reduction in projected emissions from now until 2030.
- The Prime Minister has enhanced India’s target for installed renewable energy capacity by 2030 from 450GW to 500GW, and also said that 50 per cent of India’s total electricity would be generated from renewable energy sources by 2030 – an increase of 10 per cent from the earlier target of 40 per cent.
- Calling the targets the “gift of five elixirs” (panchamrit), Modi also said that India’s emissions intensity, or emissions per unit GDP, will be reduced by at least 45 per cent by 2030 from the 2005 levels. In its existing target, India had promised to reduce its emissions intensity by 33 per cent to 35 per cent by the set deadline.
- Delivering a strong message to the world, Modi stressed India expected developed countries “to make \$1 trillion available as climate finance as soon as possible”. “Today, as we track the progress on climate mitigation, the same way we must track climate finance,” the Prime Minister said.
- During his speech on India’s 75th Independence Day this year, Prime Minister Narendra Modi had also announced the country’s plan to become a net-zero carbon emitter by 2050 and highlighted that work was underway for 100 per cent electrification of Indian Railways.

geo political rivals are two of the world’s biggest polluters and coal users, and have often been accused of inaction on climate change.

Their joint statement said they would co-operate on clean energy, carbon capture and environmental standards. “It was definitely a positive and important signal for the negotiations,” said the World Wide Fund for nature. “But here, too, the focus is now on implementation.”

Advancing agritech

The US and UAE unveiled a joint plan to help the agriculture sector, which accounts for about a quarter of greenhouse gas emissions, to go green.

The agriculture innovation mission for climate has mobilised \$4 billion and the UK hosts. Focus areas include developing climate-

resilient crops and improving water management.

Other supporters include the UN’s Food and Agriculture Organisation and prominent NGOs. “By making clean technology the most affordable, accessible and attractive choice – the default go-to in what are currently the most polluting sectors – we can cut emissions right around the world,” Johnson said.

Cutting coal use

In the run up to COP26, its president, Alok Sharma, repeatedly described the summit as the moment at which coal power should be “consigned to history”.

The UK celebrated a breakthrough when dozens of countries, including major coal users such as Poland, promised for the first time to step away from fossil fuels. **IEA**



CAN HYDROGEN BECOME THE FUEL OF THE FUTURE?

At the conference of the parties meeting in 2015 (COP21), 195 countries signed the Paris Agreement intending to keep the global average temperature rise this century as close as possible to 1.50C above pre-industrial levels. As of date, more than 110 countries, including the USA, UK, EU, and Japan, have pledged to achieve carbon neutrality by 2050 or sooner.

By Silvia Rigato, Yasin Ogras & Shant Deyirmenjian

In achieving these targets, hydrogen is perceived to be the missing link for the energy transition. It could play a pivotal role in the global adoption of sustainable clean energy through the availability, chemical advantages, decreasing costs and applications across industries.

How to win in the hydrogen economy

Despite the high production cost of green and blue hydrogen compared

to traditional sources, ranging from \$ 1.3-\$2.9/kg for blue and \$3-\$6/kg for green hydrogen, the next decade could see large-scale investments. Accenture's recent survey of 179 oil and gas companies concluded that two-thirds of them are planning to entirely change or radically reinvent their businesses over the next three years. Among low-carbon businesses, hydrogen and renewable power were identified as having the

highest growth potential. More than half of the leaders expect hydrogen (cited by 62%) and renewable power (54%) to account for more than 7 per cent of their revenues within the decade. To shape the potential opportunities in hydrogen and position themselves as a leader in the 'new fuel', the GCC economics should take these five critical steps in the coming years:

Develop a comprehensive hydrogen strategy: Each country needs a comprehensive hydrogen strategy to define the long-term vision for hydrogen in building an ecosystem to enable the sector's growth. For example, in the UAE, the hydrogen Alliance (ADNOC, ADQ and Mumbadala) has been mandated to develop a hydrogen economy; however, there is still a need to develop national strategies.

Build a comprehensive advantage in blue hydrogen: While most global research has been focusing on developing green hydrogen through electrolyser technology, its cost structure makes it less feasible in the immediate future. Thus, wide spread adoption of blue hydrogen could be a game-changer for most of the nations to realise their net emission targets.

Invest in piloting green hydrogen technologies: Although the current focus is expected to be on blue hydrogen to instigate the demand in other developed or developing countries, the public sector should continue to pilot and invest in small-scale green hydrogen projects. These could yield significant advantages in the long run beyond 2030.

Develop long-term strategic alliances with the EU and Far East Asia: The GCC economics are currently considered the most exposed and the least resilient to proposed EU carbon tariffs. Investing in hydrogen and exporting ammonia could help the GCC economics establish long-term strategic partnerships with the EU and other developed countries to negate the carbon footprint from exporting hydrocarbons. [E&E](#)



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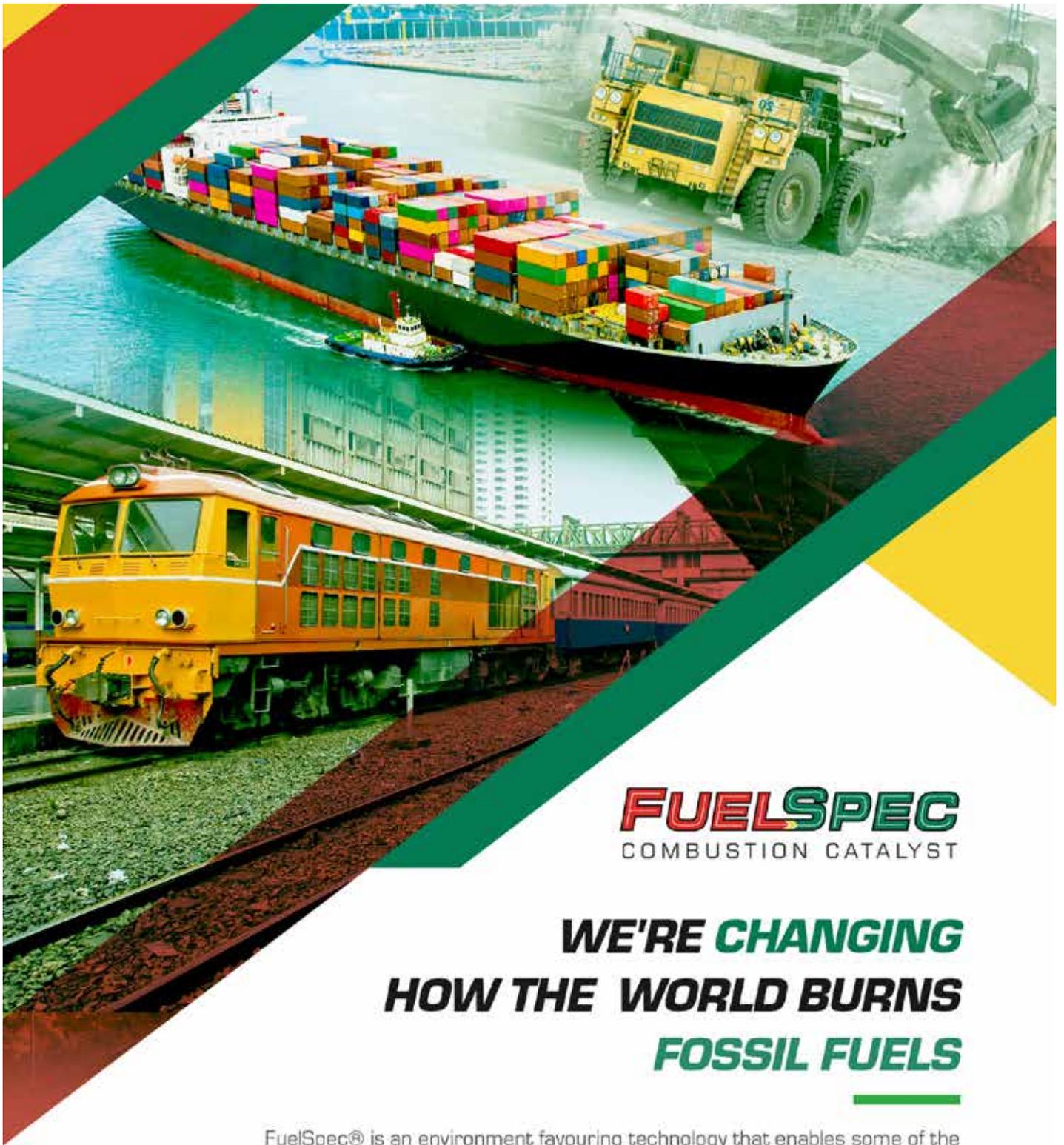
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