May 2021

MARITIME REPORTER AND ENGINEERING NEWS

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GREEN MARINE

THE EMISSION TARGETS FOR MARINE ARE CLEAR, *THE PATH TO ACHIEVE THEM IS NOT*

Since 1939

Number 5 Volume 83

DECARBONIZATION
ERIK HÅNELL, CEO, STENA BULK EXPLAINS THE PLAN, PATH & COST

BATTERIES
AS TECH EVOLVES, SO TOO DOES THE UPTAKE IN MARITIME

PROFILES IN TRAINING
DR. MICHAEL EKOW MANUEL, PROFESSOR, WMU

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Battery Power
Maid of the Mist relies on battery power to carry tourists around Niagara Falls.

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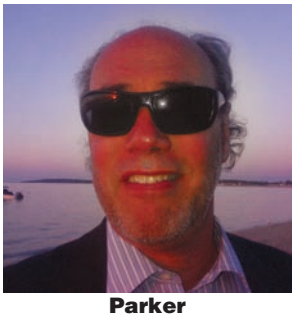

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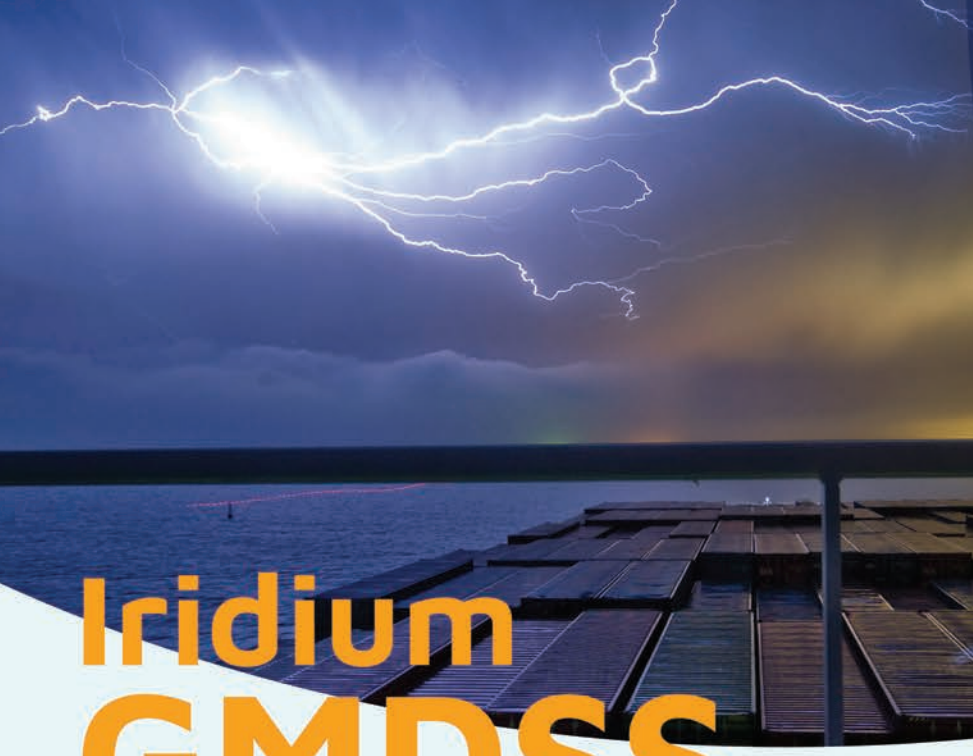

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Winds of change continue to sweep to and through the global maritime industry**,** change premised on the continued push toward decarbonization of this sector. While talk of dramatically reduced emissions, alternative fuels of the future and technology innovations dominate the headlines, the reality is still in business-as-usual.

This edition is touted as our "Green Marine" edition, but to be frank every edition could be the "Green Marine" edition as the volume of information related to slashing maritime greenhouse gas emissions in maritime is staggering. My thanks to Stena Bulk CEO **Erik Hånell** for recording a Maritime Reporter TV (**bit.ly/3nMikNt**) segment recently to break down the company's five-step plan toward decarbonization by 2050. Hånell was candid in discussing the plan, the path and the costs; freely admitting that there remain as many questions as answers. But what he and his team have done is to place five definitive 'stakes in the ground' to chart the path ahead. The print interview with Hånell starts on page 28.

In a continuation of our Profiles in Training segment I was truly pleased to interview **Dr. Michael Ekow Manuel**, professor, World Maritime University, starting on page 20. I've known Micheal for nearly five years via our partnership with WMU and Marine Learning Systems on the annual **MarTID** survey of maritime training practices. A maritime professional with a noted career at sea, and now in a position at WMU to help groom maritime leaders in government and industry globally, I can say without hesitation that Michael is one of the more thoughtful, insightful and intelligent maritime industry insiders that you will ever meet.

This year's **MarTID** survey – the fourth annual – is more important than ever, given the impact that COVID has had on the maritime industry and particularly seafarers. The survey targets ship and boat owners, maritime education and training institutions and seafarers. This is a non-commercial effort, and results are shared freely and globally. The survey takes about 20 minutes to complete and links can be found here: **http://scholar.wmu.se/martid**

Finally, it is with deep personal regret that this month is the last that we will feature our "Government Update" segment from **Dennis Bryant**, who informed me earlier this year that he was turning the page and looking forward to some new endeavors. Dennis has been a regular in our pages – every single edition except one when his grandson was in the hospital – for nearly 20 years, and replacing him is impossible.

I'm from the school of 'find great people and let them do their thing,' and to that point I've never once asked Dennis to deliver a column on a specific topic. Rather he was given free reign to give his unique take on the subject of his choosing, and he has done so 228 times since 1992. His final column "Reflections" starts on page 14.

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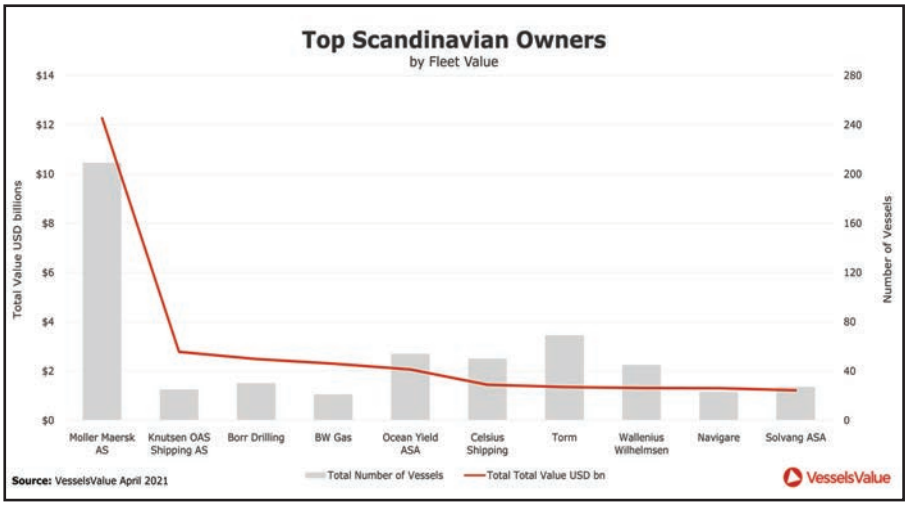
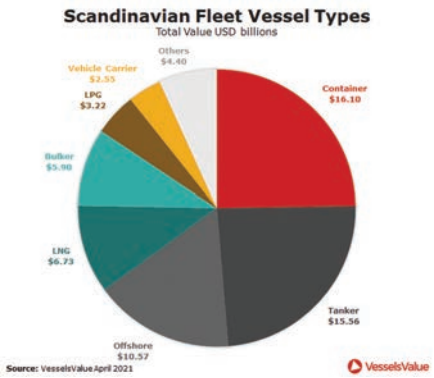
Scandinavia

The May 2021 edition was envisioned, as it is every other year, as the "Norshipping 2021" edition. As you know, COVID has pushed Norshipping to January 2022 in Oslo, but we opted to still present insights on the Scandinavian fleet, as it remains a center of influence for shipping globally. **For insights on one influential Scandinavian ship owner on the path to decarbonization, Erik Hånell, President & CEO, Stena Bulk, turn to page 28.**

Scandinavian Countries Fleet Values

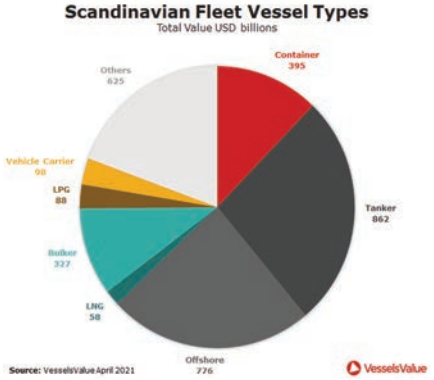
Country	Live		On Order		Total	
	# of Vessels	$B	# of Vessels	$B	# of Vessels	$B
Moller Maersk AS	209	$12.26			209	$12.26
Knutsen OAS Shipping	15	$1.06	10	$1.71	25	$2.77
Borr Drilling	23	$1.53	7	$0.95	30	$2.48
BW Gas	18	$1.75	3	$0.55	21	$2.30
Ocean Yield ASA	54	$2.06	-	-	54	$2.06
Celsius Shipping	48	$1.06	2	$0.38	50	$1.44
Torm	67	$1.24	2	$0.11	69	$1.34
Wallenius Wilhelmsen	44	$1.24	1	$0.07	45	$1.31
Navigare	23	$1.30	-	-	23	$1.30
Solvang ASA	27	$1.22	-	-	27	$1.22

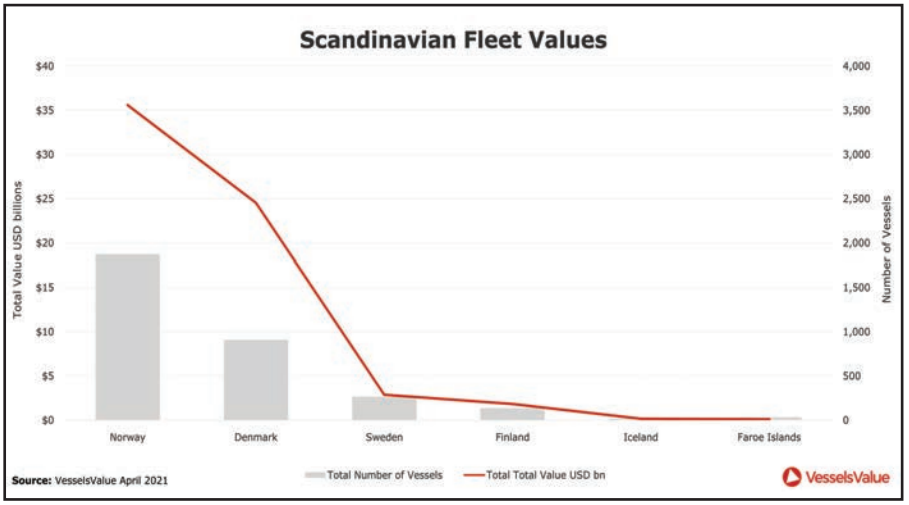




Scandinavian Countries Fleet Values

Country	Live		On Order		Total	
	# of Vessels	$B	# of Vessels	$B	# of Vessels	$B
Norway	1,804	$30.52	66	$5.08	1,870	$35.60
Denmark	882	$23.36	27	$1.17	909	$24.52
Sweden	250	$2.37	15	$0.50	265	$2.86
Finland	126	$1.24	11	$0.58	137	$1.81
Iceland	15	$0.14			15	$0.14
Faroe Islands	33	$0.09			33	$0.09
Grand Total	**3,110**	**$57.71**	**119**	**$7.32**	**3,229**	**$65.03**






BIMCO

"There is a clear tendency that it is the large ships that burn most bunkers which have been preferred for scrubber installations. *As the bunker price spread seems to have found a steady level ... ship owners and investors are increasingly likely to order new ships with a scrubber preinstalled today."*

Peter Sand,
Chief Shipping Analyst, BIMCO

MARITIME REPORTER TV **Watch the full interview with Peter Sand on MR TV: bit.ly/3vLWSv3**

"(Recently) a bank was saying that the RV they're looking two years forward is only $50 per ton. **Keep in mind today that it is almost $500 per ton."**

Dr. Anil Sharma, CEO, GMS,
discussing the rapid escalation of pricing in the ship recycling market

GMS

Stena Bulk

"We have committed to setting science-based targets in accordance with the 1.5 degree pathway ... it will be a game changer. It will have a big impact on how we operate our business, how we run our factories, how we select our suppliers and how we produce our products."

Dorthe Scherling Nielsen,
Head of Sustainability & Government Affairs, Hempel

Hempel

"Today, I would not even guess what it is going to cost to build a ship that is ready for 2050 and beyond. But to give a very rough estimate ... it's going to be an additional cost of around the 30 to 40% compared with today's prices."

Erik Hånell,
President & CEO,
Stena Bulk

Tip #24

Disaster Recovery Plan

Hope for the Best; Plan for the Worst

Photo: © Thitichaya/AdobeStock

Very few people live day-to-day expecting a disaster. However, disasters do happen and a critical component of business continuity is ensuring that when disaster strikes, our critical systems are returned to normal operations as quickly and efficiently as possible. Last month's training tips for ships discussed a catastrophic fire that occurred in France last month at one of the world's largest data centres. This fire took millions of websites offline including the Learning Management System (LMS) for one of the world's largest cruise lines. LMSs are business-critical in that they are relied upon to ensure compliance and safety. This example should immediately cause us to reflect on our business-critical training systems, their importance to our operations, and whether we have a comprehensive and reliable disaster recovery process in place for those systems.

Proper disaster recovery planning requires organizational leadership and action. There should be a disaster recovery team that's responsible for building and continually improving the Disaster Recovery Plan (DRP). That team should identify and assess risks, determine which applications and data are critical to operations, specify processes for backup and recovery, and continually test and update the DRP.

In this article we will focus on one of the core parts of a DRP for our LMS and other technical systems: how do we protect our critical data from loss due to disaster.

Our historical learning data serves as both evidence of compliance and the basis on which all future training is planned. It's therefore critical to operations. Typically, it resides in a combination of our LMS and our crewing or human resource systems. How do we protect this data from loss?

The first goal is to reduce the likelihood of loss wherever possible. Some of the highest risks are hardware failure, cyberattack, and human error. All enterprise-level servers should be configured with a redundant storage architecture such that if one or a small number of disks fail, the system continues to operate, and no data is lost. Another critical component in reducing the possibility of data loss is strict data security processes. Cyber security is a growing concern because cyber attacks which either encrypt or divulge corporate data have become distressingly common. No organization is immune. This is a complex topic in itself but the basic practices of dual-factor authentication, unique and strong passwords, and system segregation are all important here. Finally, comprehensive training and data access policies are also important in reducing the likelihood of data loss resulting from human error.

While attention to the above and other risks is critical, it is never the case that data loss can be prevented absolutely.

Therefore, every DRP incorporates a process for the backup and recovery of data.

One of the core questions that must be asked is "how much data can you afford to lose"? This provides guidance on how often data should be backed up. In general, most organizations cannot afford to lose very much in the way of learning records. Therefore, backups should be frequent. At Marine Learning Systems our backup policy ensures that no more than 15 minutes of data could ever be lost. And in practice, a failure would result in a loss window which is typically much smaller. To ensure this, automated backups are taken every 15 minutes, or more frequently, and are immediately transferred to a location which is geographically distant from the live system. Automated processes are used to test and report on the integrity of the backed-up data daily. We also use a similar automated process to restore this data daily on an operational "hot backup" server. This is a redundant, geographically distant server which is always online and running, ready to take over in the event that the primary server suffers a catastrophic failure. Not only does this provide us with a failover option when necessary, but it serves the dual purpose of fully testing our backup and restore process from end to end every day.

This policy and practice, while it takes time and resources to plan and maintain, served us extremely well when our emergency response team was alerted to the fire in France last month.

Disaster recovery planning is a large and complex topic, made more complex by the decentralized and (often) disconnected nature of maritime operations. However, the goal here is to raise awareness of the need for a proper DRP, and to highlight some of the critical issues that need to be considered for our training infrastructure.

Until next month, sail safely.

The Author

Goldberg

Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators.

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Reflections

By Dennis L. Bryant

This will be my last monthly article for **Maritime Reporter & Engineering News**. *I started writing these articles in early 2002, just over 19 years ago and during that time I have written over 228 articles, missing only one month when my grandson was hospitalized. (I have also written about 6,200 of my (almost) daily newsletters.) Early articles were focused on maritime security, which was still in evolution following the horrific terrorist incidents in New York, Pennsylvania, and Washington, DC. Later, the hot topic was piracy, particularly in waters off Somalia and now shifting to the Gulf of Guinea. For the past year, there have been articles concerning the COVID-19 pandemic and the resulting crew change crisis, which will not be fully resolved until the coronavirus is largely eradicated. A continuing theme, though, has been environmental protection. Prevention of and response to oil spills is a frequent topic of my articles. The maritime industry, and particularly the tanker sector, have made tremendous strides in preventing accidental discharges. But these days there seems to be zero tolerance for maritime spills so that any discharge draws public attention and government scrutiny. Surprisingly, land-based activities continue to enjoy a lesser standard.*

CONTAINERIZATION

Placing cargo in a sealed box has led to an explosion of international trade and a reduction in unit transport costs. Unfortunately, it has also resulted in misdeclaration of cargo, including the non-declaration of dangerous cargo. This has led to a growing number of container shipping casualties and places crew members and response personnel in danger. The industry and the regulators cannot continue to ignore this problem.

AUTOMATION AND AUTONOMY

Radar is an early example of the application of technology to the marine sector. It significantly improved safety, but occasionally led to radar-assisted collisions. The electronic chart display and information system (ECDIS) has been a further major advance in marine safety, but there is no universal standard for its manufacture and operation. With different models being installed on different ships, it is a constant challenge to keep deck officers trained in the proper use of the ECDIS model onboard the ship on which they are currently employed. Required training is sorely lacking. As a result, many ECDIS models on many ships are not being used properly. The problem has gotten worse. Some deck officers look at the screen without fully understanding what it displays – and what it could display if properly utilized. A few years ago a bulker grounded at full sea speed on a small, charted island in the South Atlantic in part because the course programmed into the ECDIS was not carefully checked. The officer on watch assumed that everything was fine and because the ship was far at sea, he could cease checking the radar and examining the horizon.

Most of the time though, the officer on watch will catch things in time and avoid the casualty. What will happen when there is no person on the bridge? Autonomous shipping is being actively explored and great advancements have been made. I worry though. Autonomous shipping relies on sophisticated hardware working properly for extended periods in trying and changing environments. It relies on proper software and programming that also operates properly over extended periods.

My computer seems to require replacing or a major upgrade every few years. This will be a complex process for a ship. Finally, the system relies on programmers who are conversant in both advanced computer programming and in ship operation. Good luck finding that combination.in future years.

OILY WATER SEPARATORS

There is one segment of maritime environmental protection that unnecessarily has been a continuing problem. This relates to misuse and abuse of oily water separators and oil record books. Unfortunately, the separators do not work well over the long haul, requiring frequent maintenance and repair. Owners and operators do not provide their chief engineers with the necessary support and funding to keep these units in operation, with the result that many engineers bypass the system and make improper entries in the vessels' oil record books. Eventually many of these improper entries or inoperable separators are discovered, placing the engineers in difficult legal situations and subjecting owners and operators to potential multi-million-dollar fines. This is avoidable. Owners and operators need to take a round turn on this problem.

EQUALITY

The availability of qualified males is failing to meet the personnel needs of the maritime sector. More women are being attracted to maritime careers. This is an excellent development but will require some cultural adjustment for many men. Get over it! Women are just as capable as men and ask only for proper training and equal opportunity for themselves and attitude adjustment on the part of their male counterparts.

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AIR EMISSIONS

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For many years, air emissions from ships were largely ignored. Not that long ago, some ports in Alaska caused a stir when they established visible smoke standards for visiting cruise ships. That was followed by adoption of MARPOL Annex VI to closely regulate SOx and NOx emissions, particularly in emission control areas (ECAs). Now the focus is shifting to greenhouse gas (GHG) emissions, particularly carbon dioxide (CO2). Currently, the emphasis in the shipping sector is on efficiency measurement and goal setting. GHG emission standards, though, are beginning to follow the path laid by SOx and NOx.

One promising approach to reducing harmful air emissions is to power vessels by means other than the traditional diesel engine. Liquefied natural gas (LNG) is the current leading choice as an alternative. It does not emit either SOx or NOx, but it does emit CO2. Efforts to utilize either hydrogen or ammonia are underway, but it will take years to develop the infrastructure needed worldwide by the maritime industry. Research is also underway regarding fuel cells. Some vessels are being built with battery power, but this is largely limited to those that operate in individual ports, such as tugs, or on fixed short routes, such as ferries. Increasing pressure to reduce air emissions will continue, but the concept of zero emissions is a myth.

To create energy necessary for propulsion, energy has to be expended somewhere else. Energy creation can be done at a refinery; in an LNG, hydrogen, or ammonia plant; or at an electrical generation facility. Even solar panels and wind turbines require energy (and possibly exotic elements and chemicals) for production. Pollution can be minimized and better controlled, but it cannot be fully eliminated.

SALVAGE & MARINE FIREFIGHTING

Since salvage and marine firefighting (SMFF) have been added to the required portions of vessel response plans in the United States, these important operations have garnered the attention that they deserve. Unfortunately, for a variety of reasons, companies providing these services do not receive the ongoing remuneration necessary to attract new personnel and acquire new equipment. The US Coast Guard should mandate that retention agreements be included as an integral part of the already required contracts between vessel operators and SMFF resource providers.

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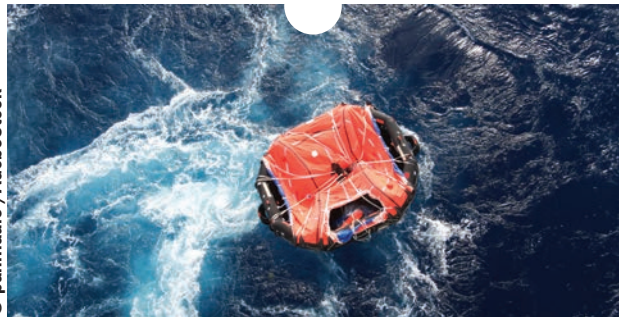
MARITIME SAFETY

Safety in the maritime industry has improved dramatically over the years. The challenges, though, can be different than they were in the past. Increased automation has induced new problems. With equipment now performing many routine tasks, boredom has set in. As a result, warning signs are overlooked and accidents occur. The sea demands constant vigilance.



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Dennis L. Bryant is with Bryant's Maritime Consulting, a regular contributor to *Maritime Reporter & Engineering News.*

Words of Appreciation

I have enjoyed my long association with the *Maritime Reporter and Engineering News.* I have especially enjoyed my collaboration with Greg Trauthwein, the sage Editor of this esteemed magazine. He has allowed me broad freedom to select topics that I think might be of interest six weeks in the future and has withheld criticism when my powers of foresight have proven erroneous. One could not ask for more. I have also enjoyed the many comments received from readers of this fine magazine who have taken the time to write me, sometimes to gently nudge me back to reality.

I will miss you all!

Social Impact of Sustainable Energy, the Really Important Part of the Game.

By Rik van Hemmen

The future could be bright for small island nations. Cheap sustainable energy is the core component of the United Nations Sustainable Development Goals.

Engineers like making things, but rarely think of the social impact that flows from their creations. Today, while we are standing at the threshold of sustainable energy, we should take a moment to reflect on the social impact of sustainable energy. Access to sustainable energy puts us at the threshold of massive social change and, if we play our cards right, we all could win big.

Since human nature and human psychology has not significantly changed in centuries, the world as we know it is simply the result of technological innovation. Engineers like to conclude that our general improvement in livings standards is the result of technological innovations (jointly with medical and purely scientific innovations).

That is really only partly true, because to a much stronger extent the March of Humanity has been driven by available energy. The first improvement came with fire, the next improvement came with animal power and the next improvement came with wind power (Yes, this is where maritime truly changed the world).

Then we had a period of coal and then we had a period of oil and then we had an only partially successful period of nuclear power. The relative reduction in the cost of energy available to each human directly improved our living standards, although adversely it resulted in increased pollution and atmospheric carbon. Access to energy massively improved our lives.

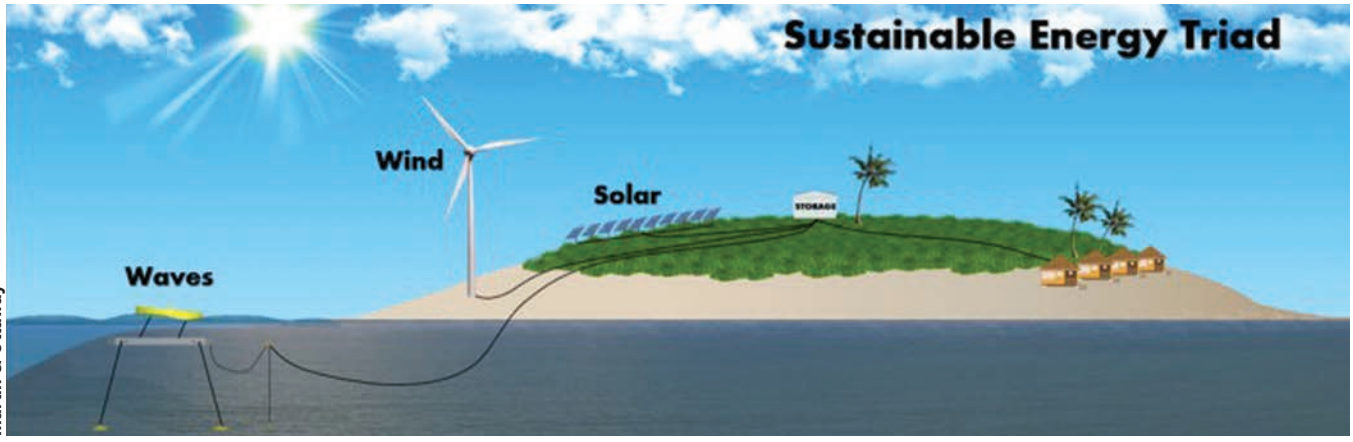
Think of it this way: In 1820 I could only pound enough energy into a horse (food) and get enough work out of it to get me across the country in, at best, two months. Today I can purchase enough energy with a few days' work to fly myself across the country in a few hours.

Make no mistake about it. Money is nothing more than stored energy. We use money to get access to energy to support our life styles. While food uses sunlight to grow, the sunlight is only a tiny fraction of the energy it takes to get it into our mouths. Money is access to available energy, and available energy sustains our lifestyle. Cheap energy makes everything cheaper. Stealing money is stealing energy. Money hoarding is energy access hoarding. Equal access to energy is the core of a fair and just society.

So now we are changing to sustainable energy. Will this lower or raise our standard of living? If sustainable energy becomes cheaper than fossil fuels we can expect our standard of living to improve. A decade ago, it was unclear as to whether sustainable energy would be cheaper than fossil fuels, but today there is massive evidence that we will develop the technologies where sustainable energy becomes cheaper than fossil fuel energy.

That is only the first step in the program though, because it appears that sustainable energy also will produce less pollution which in turn will reduce the cost to remediate pollution damages.

And then there is another benefit. In the last 10,000 or so years the production of energy has trended towards larger and larger corporate and government conglomerates. Our politics, whether on the local, national, or global level, have been largely driven by who has access to energy and who has not. Hence Saudi royal wealth, US wealth, and Russian oligarchs. However, sun, wind, and waves are more equally distributed across the globe than readily accessible fossil fuels, can be directly harvested and are much more difficult to own



Martin & Ottaway

or hoard. That means, not too long from now, the standard of living on small tropical island nations may increase more rapidly than the rate of improvement in first world countries. But make no mistake sustainable energy is a rising tide that will lift many more ships than we have been able to do so far.

On the individual level there is a further opportunity for change. Yes, we can buy our wind energy from large conglomerates and it will probably be quite cheap (My NJ elected energy supplier is a Texas wind farmer and their rate is lower than the standard utility rate). But if for any one reason I am not happy with the man, I can fight back. In the "old" days I could not drill my own oil well and refine the oil, but today I can find a piece of land and plant it with solar panels and, not too long from now, if I want transportable energy, I can collect the rain and turn it into hydrogen too. In other words, for the first time in thousands of years, our dependence on large corporate bodies will go down. That is, as long as there is a continued drive towards egalitarian humanitarian government.

Inherently, sustainable energy will raise our standard of living and while that may sound like fun, reality is little more complicated. The real question is: "Which standard of living?" If it allows a struggling underfed framer to live a little more like me, there is little to argue. But what about me? What would my raised standard of living look like? Bigger cars, bigger homes, more pointless travel, more sprawl, longer vacations at more luxurious resorts, more exotic foods and more debris generation?

Humans have always looked for energy. It is the way they survive and when excess energy becomes available they store it and, if there is no need to store it, they waste it. I know, because I carry about 40 pounds of excess stored energy around my waist, and don't always close the flue in my chimney after I had a fire. So how do we control this urge? With fossil fuels the cost of energy may have provided a little restraint, but what will happen when available energy becomes an order of magnitude cheaper?

Don't get me wrong, I am an engineer and that makes me an unlikely luddite, but an ounce of prevention today may prevent a pound of cure only a few years from now.

I know there are some relatively simple answers, but they need to become deeply ingrained in the human psyche as soon as possible. Too often we think "bigger is better", but, with plentiful energy, we need to begin to think "as small as possible is actually more beautiful" and "efficiency is the real spice of life". And here is where the engineers get to take center stage again. As engineers, let's make "bigger" a dirty word and make energy efficiency, regardless of the cost of energy, our central driver.

It would start a virtuous cycle; if we focus on pure energy efficiency as our central design driver, less of our land and oceans needs to be covered with unnecessarily large homes, roads, solar panels, wind turbines, wave energy generators, pumped hydro storage, hydrogen converters, electric utility towers, hydro dams, hydro reservoirs, nuclear power plants and whatever other sustainable technologies we will be developing. And it will make the rising energy tide for all an even more powerful force.

Profiles in Training

Dr. Michael Ekow MANUEL, Professor, World Maritime University

The global seafarers crisis takes center stage at the World Maritime University (WMU), as Dr. Michael Ekow Manuel discusses the importance of seafarers, seafarer training and the MarTID 2021 survey.

By Greg Trauthwein

While many maritime professionals have the theoretical 'salt in their veins', a career at sea seemingly predestined by family ties and/or geographic proximity, that is not the case for Dr. Michael Manuel, Professor, WMU. Hailing from Ghana, Dr. Manuel from a young age had a fascination with vehicles and everything that moves, but ships were not his focus, rather airplanes. "It was relatively later on in my teen years that I was exposed to shipping, and I became interested in the technical side of it, the fact that these are the largest moving things that man has made," said Dr. Manuel. "Once I got into it I was exposed to other aspects beyond the machinery: the education, the cargo and safety-at-sea. Finally, I 'dropped anchor,' so to speak, in this industry."

Dropping Anchor in Maritime

Today Dr. Manuel works at WMU as a Professor (Nippon Foundation Chair for Maritime Education and Training) and is also the Head of the Maritime Education and Training Specialization of the University, focusing on educational policy and governance as well as organizational behavior and leadership. He and his colleagues at WMU teach and mentor masters and postgraduate level students from all over the world in regards to maritime governance, policy and leadership. "The students are mainly individuals in their middle career, middle and senior management levels who have come to join a network that speaks the same language around maritime governance," said Dr. Manuel. "It starts off with the International Maritime Organization's (IMO) goals in terms of safe, secure, and sus-

"Once I got into it I was exposed to other aspects beyond the machinery: the education, the cargo and safety-at-sea. Finally, I 'dropped anchor,' so to speak, in this industry."

Dr. Michael Manuel, Professor, WMU

World Maritime University

MARITIME REPORTER TV **Watch the full interview with Dr. Manuel on MR TV: bit.ly/2RrKEc2**

tainable shipping. However, maritime governance as a whole in the context of international public policy is where the development of critical skills is targeted"

To be clear, the WMU is not a seafarer training institution; it is a postgraduate university which was set up under the auspices of and is an institution of the IMO. "We educate the people who then go back to their individual jurisdictions and oversee the international and national frameworks that govern, for example, the training of seafarers," he said.

Though Dr. Manuel was not born into the industry, one would be hard pressed to find another maritime professional as passionate or dedicated to all matters maritime. And while his career has taken the path toward academia, he flourished during his career at sea, a critically important piece to his experience that has helped to shape his involvement in maritime education and training.

"My first training at sea was in the context of a national line. There were a lot of people onboard the ship, which created a great environment for training because the crew were not overwhelmed with too much work," said Dr. Manuel.

World Maritime University

"You had all sorts of people that would challenge you in every space when it came to your education. In contrast, by the time I was leaving (seafaring), a ship double the size and with a wider scope of operations had half the crew."

Seafaring, and the way in which seafarers were trained, was changing rapidly.

"In my training days as a cadet, the chief officer recognized his/her role as a trainer, and made the effort to manifest that role," said Dr. Manuel. "In contrast, my last commercial ship was a big container RoRo ship that was on a very tight schedule, quickly in and out of ports with lots of work for all. It was difficult to create an atmosphere for training, for cadets in particular, and even sometimes for the officers."

The Tech Transition

Today is a transcendent period in maritime history, as decarbonization, autonomy and automation, and digitalization all conspire to help shape the near- and long-term future for the way in which the world moves the vast majority of its goods.

Training, too, is at a crossroads, as owners, maritime education and training institutions and seafarers alike depend on increasingly sophisticated simulation technology to help teach skills that were once the province of learning by doing at sea.

"Today there has been a transition to using technology more and more to aid training," said Dr. Manuel. "Simulation has become a greater point of emphasis, and there are ships today that even have simulators onboard specifically for training. The emphasis on onboard practical learning is being challenged because the fidelity of simulators is improving. One can gain competencies related to many practical tasks, particularly in the context of bridge work, on shore, in a school, which was hitherto only possible onboard ship. This kind of onshore exposure makes it easier when you are onboard the ship. You can use the ship to train on other things that are not possible in simulation. Nevertheless, it can be argued that many parts of onboard training re-

Take 30 Minutes for the MarTID Survey

For the past four years, WMU, Marine Learning Systems and New Wave Media, publishers of *Maritime Reporter & Engineering News*, have been engaged in collecting data from ship owners/operators, maritime education and training institutes and seafarers, a non-commercial endeavor that is available for free, to all, upon publication.

"The Maritime Training Insight Database (MarTID) fills a void that's been in existence for quite some time. There's no real context within which you have this kind of data where we are trying to collect the insights from those diverse stakeholders," said Dr. Manuel. "They bring their views so we can better understand some of the issues that are not addressed by legal convention. For instance, training budgets: What kind of specific learning activities are being employed? What's the trend in, for example, online learning in terms of training for the seafarer?"

With COVID still raging globally, the 2021 MarTID survey is arguably more important than ever, and this year there is a special section of the survey that is dedicated to COVID.

"The idea is to have a repository of data that allows us to analyze trends, inquire into best practice and freely share that best practice, because this is a non-commercial, not-for-profit endeavor," said Dr. Manuel. "With this we can learn from one another and have this kind of discourse that has the aim of improving training, and thereby improving conditions in shipping safety, the IMO goals, and the global maritime goals. This year, in particular, we are keen to hear from all stakeholders about how training has been affected by COVID."

Take the 2021 MarTID survey of maritime training practices:

- **Vessel Operators:** https://www.surveymonkey.com/r/MarTID2021-Operator
- **METIs:** https://www.surveymonkey.com/r/MarTID2021-METI
- **Seafarers:** https://www.surveymonkey.com/r/MarTID2021-Seafarer

main valid and necessary for the development of a comprehensive range of skills".

The trend toward increased automation onboard ships to help effectively reduce crew headcount and crew costs is hardly a new trend, with ships growing larger and more automated and crews growing smaller in number over the past 30 years. However, the last 12 months and the COVID-19 pandemic have served to effectively fast track a number of digitalization initiatives, including the delivery of training to seafarers. "You see this macro trend of the increasing "invasion" of technology into the realm of training, and in the last few months, we have seen how COVID has accelerated this trend, for example with cloud-based simulation," said Dr. Manuel.

The Seafarer Crisis

Seafarers, arguably, have shouldered as much if not more burden than any other profession (with the exception of health care workers). Tasked to deliver an estimated 90% of the world's cargo – including food, healthcare materials and equipment, and energy, to name a few – many seafarers' lives have been literally upended with the inability to effectively conduct routine crew changes, leaving hundreds of thousands stuck on ships, contracts expired, with no ability to return to families and homes. Similarly, seafarers shoreside have been unable to embark ships and earn a living.

"Greg, I must say this situation worries me, and in fact it worries all of us at WMU," said Dr. Manuel. "Seafarers have not been treated well at all by the majority of states, companies and stakeholders, and sadly this only accentuates an existing problem. Seafarers have seldom been recognized for their contribution to the world, to commerce and the global economy."

IMO, WMU and a chorus of leaders across the maritime sector have been demanding a solution for more than 12 months, yet still today less than 50% of the port states have taken the simple step of declaring seafarers as key workers.

"COVID has also had impacts on things like training, the extension of seafarer contracts, the conditions in which seafarers live as well as their mental wellbeing," said Dr. Manuel. "You have people staying on ships for extended periods of time in a manner that is almost inhuman, yet corridors are opened for other people who are nowhere near what one would term as 'key workers'."

While there are a multitude of immediate concerns – starting with seafarer mental health and well-being, as well as ship safety – the long-term implications could be even more dire. "People will start finding alternate avenues for employment, and I fear that the repercussion could be a marked decrease in the desire for people to go to sea," said Dr. Manuel.

During the Pandemic Ship Scrapping Prices Soar

__Dr. Anil Sharma__ is a wealth of knowledge on ship scrapping, having started GMS 25 years ago, getting into the business of buying and disposing of old U.S. MarAd and Russian navy ships as a sideline while teaching as a college professor in Maryland. Today his company is dominant in the field, and in the last year he has seen an unprecedented 70% run up on ship scrap prices, approaching $500 per ton. He weighs in on ship scrapping trends and direction.

By Greg Trauthwein

By Dr. Anil Sharma's estimation, GMS is the world's dominant player in the business of buying ships and offshore assets for recycling, by number of ships, about one-third of the world's annual transactions; rising to 40% if measured by lightweight tons. "We tend to do big ships, big projects," said Dr. Sharma. "In terms of annual number of deals, the highest we have done is 300 plus ships in one year … about one ship a day, and our lowest is around 150 ships. So (for GMS) it moves between 150 to 250 (ships per year) depending on how bad the world economy is, depending on which sector is being punished."

The ship disposal business, like maritime itself, is highly cyclical. Today in maritime, both the container shipping and the dry bulk sectors are enjoying strong years, so ship scrapping activity in those two categories will be little to none. Conversely, the tanker, the cruise and the offshore sectors are all being 'punished' and ship scrapping activity is picking up speed, particularly in the offshore sector.

There are many factors that determine the life cycle of a ship, and while life-cycles can vary greatly by sector, conventional wisdom suggests 20 to 25 years of service yields a fairly good return on investment. But life cycles change, and today

commercial pressures in certain sectors, combined with fast-evolving environmental and emission reduction pressures, are conspiring to cut the life of ships in some sectors shorter – in some cases like the offshore market, dramatically so.

"Everything has a life cycle and that life cycle changes," said Dr. Sharma. "For example, cruise ships tend to have the longest life cycles, but when COVID hit, a lot of cruise ships were recycled. Otherwise, the shortest life cycle I'm seeing right now is in the offshore space, where we are seeing vessels 10 years old and even younger units being recycled. It is insane."

The Offshore Conundrum

Looking at the beleaguered offshore sector, Dr. Sharma said in the past he could count the number of offshore assets being scrapped on the fingers of one hand, "or maybe less than ten." But today "the floodgates have now opened and the numbers are large." But there are challenges.

The challenges in the offshore oil and gas industry today are well-recorded, and now you can add to the list the financials behind the decision to scrap or keep, as Dr. Sharma said that generally a ship owner would estimate a residual value of 20% remaining on a vessel after 20 to 25 years of service. "Twenty to 25 years is a long time to amortize 80% (of the purchase cost),' but that doesn't happen in offshore today. The gap between the new build price and the residual value is enormous," he said. For the larger ships with the higher daily cost, the decision to scrap was not difficult. But in the Jack-Up market, for example, owners were at a standstill for nine months or more, worried that if they scrapped and their competitors did not, they would risk missing an opportunity, such as the steadily rising price of oil, which today sits just north of $60 per barrel. "My point is: offshore is a huge unit. This is a where modern ships are being recycled. And when they do recycle, very rarely is it one unit, they sell fleets."

Dr. Sharma sees "offshore" with FPSO, semi-subs, drillships, Jack-Ups and other units, as a big sector when it comes to recycling, while the other related sector that is emerging this year is going to be tankers. He said that the reason for this was because for a long time, "the crude business has not recycled," and now with the value and charter rates coming down, with the contango pretty much disappearing, meaning demand for tankers to serve as storage units dropping.

The COVID Impact

When COVID started impacting the world economy in March and April 2020, Dr. Sharma said that the ship scrapping business reacted much like the rest of the world: a complete standstill. "This is a black Swan event, totally unprecedented," said Dr. Sharma. "When this started, we couldn't see the bottom. For the first time (ever) we stopped quoting prices. I didn't know how to quote because there was no demand."

The recycling yards – the world – were in lockdown, and GMS' business model of taking about 50% of its ships 'as is, where is' proved particularly problematic with the difficulty in air travel globally. "We are constantly having crews fly all over the world, and that became a nightmare because of COVID and canceled flights," said Dr. Sharma. "We were chartering planes, so the costs were going up, and even when we could land, you'd be quarantined for 14 days in hotels. Logistically it was one of the most difficult years, and the crew part has not really gone away."

But while the logistics difficulties mounted, something odd happened. Ship scrapping prices took off.

"In terms of the commercial aspect, it just took off. we gained in prices about 70% increase in residual values and scrap values in a matter of about eight to nine months: that's huge, a 70% increase is unprecedented," said Dr. Sharma. "Somebody was asking me just today, where is this going to stop? Because every day it's a new benchmark, and prices keep on going higher."

Looking Ahead

There are many moving parts in the ship scrapping business, a recycling industry that has historically had an image problem with visions of beached ships, pollution and a dearth of worker safety. Dr. Sharma contends the spotlight is somewhat unfair, and driven by the Hong Kong convention the industry as a whole has improved its practices over the last decade. "I think most of us have accepted Hong Kong convention as the main way for sustainable recycling," said Dr. Sharma. "So from the regulatory perspective, I think things are getting in place in terms of what convention to follow, what defines sustainable recycling. And people are accepting that there are good yards and bad yards everywhere. It is not country specific it is yard specific."

In terms of future pricing, Dr. Sharma can rely on nearly three decades of insight and experience, but at the end of the day there are myriad factors beyond anyone's control that dictate ship scrap prices.

"(Recently) a bank was saying that the RV they're looking two years forward is only $50 per ton. Keep in mind today that it is almost $500 per ton," said Dr. Sharma. "So people are like, really? Personally, I don't see it that low. I normally tell my team a price around $300 per ton is a relatively good price to hedge forward risk. And we go case-by-case, because these cycles are very fast. You don't have those nice gentle cycles because we are in the commodity business."

In the wake of 2012, which was the biggest year in ship recycling premised on the massive fleet build up through 2005 just prior to the global economic crash, Dr. Sharma said "everyone wizened up, and net fleet growth was quite sensible." Instead Dr. Sharma likens the future of ship scrapping to 'kangaroo hops': a surge of business from one sector, then nothing. Then another surge. "It makes our life more interesting."

Here and now: Could Hydrogen Provide an answer to Shipping's Decarbonization Goals?

By Sotirios Mamalis, *ABS Manager, Sustainability, Fuels and Technology*

Climate change and reliable, clean, low emission fuels are the important factors for ship operators since 1 January 2020. Twelve months into the IMO2020 transition and the climate change debate is increasing as the primary discussion point on the world agenda – from industry events to the board rooms of the global corporations. Relative to this is the reliable supply of fuel since changing marine fuel represents a large investment that requires major changes to a typical ship that has a lifetime of approximately 30 years. If a ship adopts a new technology to reduce its environmental impact, the decision has to be considered to ensure that it will benefit the environment during the entire operation lifetime of the vessel.

With the IMO placing more and more stringent restrictions on the emissions of NOx and SOx from ships, and emissions control areas (ECAs), areas such as the North and Baltic sea have been designated more stringent restrictions on the emissions of air pollutants. So how is a change in marine fuels implemented?

From a shipowner perspective, economic criteria is most important, which is not surprising since it affects their business the most. From a fuel provider perspective, technical criteria are a priority. In reality the economy of any industry decides. Even for authorities and governments, economy is important because it affects the amount of subsidies needed for introducing alternative fuels for marine use.

Aspects which influence the economic impact of current day alternative choices in marine fuels is focused on the relative costs of new investment propulsion for a newly built container ship. However, it is also possible to retrofit existing vessels to run on alternative marine fuels. Using retrofits instead of newbuilds can affect the economic viability and step change in use of alternative fuels. Added to this are fuel price fluctuations especially as prices will change in the lead up to 2030. Fuel prices are affected by the selection of alternative marine fuels, as they are likely to have economy of scale and will become less costly when production increases.

In order to reduce the emissions of harmful greenhouse gasses, the search is on for alternative fuels for the maritime shipping industry. The usefulness of hydrogen and hydrogen carriers is being investigated as a fuel for sea going ships. Due to the low volumetric energy density of hydrogen under standard conditions, the need for efficient storage of this fuel is high. And, with world trade and global economic growth highly dependent on shipping, today's 'masters of the seas' transporting over 90% of the volume of all goods by our oceans, means that decoupling transport emissions is one of the largest challenges facing the today's ship operatives.

Already post 12 months into the IMO2020 transition period, good progress is being made, but while there are a number of evolving technologies and energy efficient measures available that decrease air pollution and greenhouse gas emissions, for

the shipping industry to succeed with cutting greenhouse gas emissions, energy efficient measures alone are not enough. Low-emitting alternative fuels in the decarbonizing journey are critical to the industry's transition to a low carbon future.

One possible 'near-term' solution is hydrogen – a zero-carbon fuel that is being considered for use in marine applications. The other zero-carbon fuel is ammonia and the production pathway of the two are very much interlinked. Hydrogen can be produced from many different sources, utilizing conventional or renewable energy, which determine the cost of the fuel to the end user, as well as its lifecycle carbon footprint.

Its extraction can be manufactured from fossil fuels and biomass, or from water, or from a combination of the two. In terms of energy usage, the present-day energy used globally for the production of hydrogen is about 275 Mtoe. This relates to 2% of the world energy demand [IEA, 2019]. Natural gas is the primary source of hydrogen production (gray hydrogen, 75%) and is used widely in the ammonia and methanol industries. The second source of hydrogen production is coal (brown hydrogen, 23%), which is dominant in China. The remaining 2% of global hydrogen production is based on oil and electric power. However, the most interesting future option is the production of green hydrogen through electrolysis of water using fully renewable energy.

Strong dependence on natural gas and coal means that the production of hydrogen is very carbon intensive, ranging between 10 tCO2/tH2 for natural gas to 19 tCO2/tH2 for coal, but these emissions can be reduced with the use of carbon capture and sequestration technology. The extraction of hydrogen from natural gas is achieved through reformation using three methods: (i) steam reforming, which uses water as an oxidant and a source of hydrogen, (ii) partial oxidation, which uses the oxygen in air in the presence of a catalyst, and (iii) autothermal reforming, which is a combination of the first two. In all cases, syngas (CO + H2) is formed and then converted to hydrogen and CO2 through the water-gas shift reaction. However, in order to reduce the carbon intensity of hydrogen production, biomass can be used for production of syngas though gasification, or renewable electric power can be used to electrolyze water. Once produced, hydrogen can be stored as a gas or liquid, depending on the amount, the storage time, and the required discharge rate. Storage is a further area of consideration. Different applications create different storage needs as hydrogen use can range from small-scale mobile and stationary applications, to large-scale intercontinental trade.

The availability and low cost of coal and natural gas make the production of hydrogen more economical in the near-term. The cost of brown and gray hydrogen ranges between $1-4/kg, whereas that of green hydrogen currently ranges between $6-8/kg. The cost of producing green hydrogen since 2015 has fallen by about 50%, and this trend is expected to continue up to 2030 and beyond, as the projects focused on deploying renewable energy for hydrogen production increase. Hydrogen Hubs using a combination of wind, solar and wave energy to lower the cost of production in the medium term are could be commercially viable with proven technology. Reducing the cost of green hydrogen to $2/kg can make it competitive for use in the marine sector.

The heating value of hydrogen is the highest among all candidate marine fuels at 120 MJ/kg. However, its energy density per unit of volume, even when liquefied, is significantly lower than that of distillates. Compressed hydrogen at 700 bar has only ~15% the energy density of diesel, and therefore in storing the same amount of energy onboard requires about 7 times larger tanks. This means that compressed or liquefied storage of pure hydrogen may be practical only for small ships that have frequent access to bunkering stations. The deep-sea fleet may need a different medium as a hydrogen carrier, such as ammonia or Liquid Organic Hydrogen Carriers (LOHC), to limit significant loss of cargo space. Ammonia has higher energy density than hydrogen which reduces the need for larger tanks, but its advantages need to be weighted against the energy losses and additional equipment required for conversion to hydrogen before it is used in the engines or fuel cells [IEA, 2019]. Alternatively, ammonia can be used directly as a liquid fuel in engines, rather than in use as a hydrogen carrier. Reducing the size of the tanks needed for hydrogen storage is an active research area. In addition, hydrogen storage in solid-state materials such as metal and chemical hydrides, is in the very early stages of development but it can enable higher density of hydrogen to be stored at atmospheric pressure.

Then we come to the actual bunkering facilities where costs are expected to be higher than that of LNG facilities, primarily because of the higher cryogenic storage requirement of liquid hydrogen and the material required for tanks, pipes, and seals. The key component costs are the storage and bunker vessels, which need to be scaled based on the number of ships serviced. In smaller ports the on-site availability of hydrogen would be needed given the lower flows and high cost of dedicated hydrogen pipelines. However, ship and infrastructure costs are a relatively small fraction of total shipping costs over a typical 15-20 year lifespan, with the fuel cost being the primary factor [IEA, 2019].

Developing the hydrogen economy is seen in energy and transport sectors as the potential long-term objective to provide a sustainable and clean future. Ship owners, ports and regulatory institutions like the IMO, will have to make strategic choices on the methods of hydrogen storage for shipping. The transition to hydrogen requires its production from clean renewable sources and the commercialization of fuel cells. Fuel supplied directly from hydrogen sources, rather than through the reforming of other hydrogen carriers, is the preferred option. It is an important part of our clean and secure energy future, and a significant contributor to the reduction of energy consumption and greenhouse gas emissions in the maritime sector.

The Green Path

Stena Bulk invests in the future, a future defined by decarbonization. **Erik Hånell, President & CEO**, *discusses the plan, the path and the costs.*

By Greg Trauthwein

While the majority of shipowners still struggle to pick the technological path toward meeting emission reduction targets in the coming 30 years, one company, Stena Bulk which today has about 110 tankers (30% owned, 70% managed) generating about $1.4B in revenue annually, recently unveiled its roadmap toward decarbonization, a plan with targets and dates to serve as its guide to become a net zero business by 2050.

While the path is set, there are sure to be many course adjustments on the three decades journey as technology evolves and markets dictate. Stena Bulk's first 'stake' is in fact already in the ground according to Erik Hånell, President & CEO, Stena Bulk, as in 2020 the company began offering customers low-carbon shipping options with up to a 100% reduction of CO2 emissions. These options are based on the use of biofuels and an internal carbon emissions offsetting program, which allows the it to offer low-carbon options on any voyage, regardless of ports and specific ships used.

Next year Stena Bulk will launch the first of three planned carbon neutral-ready, methanol fueled vessels in collaboration with Proman, a ship that will also be able to be operated on VLFSO and is aimed to come into service 18 years ahead of Stena Bulk's ambition to become one of the first carbon neutral vessel operators in the world by 2040. "From 2020 to 2030, we would not build a ship that cannot have an alternative fuel," said Hånell. "We have another stake in the ground, which is 2035. That is when we say that we're going to build the InfinityMAX."

InfinityMAX *is electric, modular and designed to enable sustainable, zero carbon, efficient and flexible seaborne transportation by 2035.*

Image Courtesy Stena Bulk

> "If we look at our fleet today, we probably have to invest somewhere in between $5 to $6 million for each and every ship between now and 2030 to be able to reach our goals."

Erik Hånell, President & CEO, Stena Bulk

MARITIME REPORTER TV **Watch the interview with Erik Hånell @ bit.ly/3nMikNt**

Meet InfinityMAX

The third milestone in Stena Bulk's decarbonization's journey comes hand-in-hand with the recently unveiled vessel design InfinityMAX concept, which is the company's take on zero emissions, self-sufficient and flexible seaborne transportation. Stena Bulk aims to have a ship with a similar design to the InfinityMAX concept operating on the water by 2035 at the latest.

"That is a concept today, and my view is that we would probably build something similar to it, which means that it's going to be a ship that is carbon neutral," said Hånell. "Then by 2040 our operation should be carbon neutral using zero emission ships, in combination with efficient ships and in combination with carbon emission trading. By 2050, we are then aiming to have a net zero business, using fuels produced by capturing carbon from other sources," with all cargo carried by the Stena Bulk fleet to be climate neutral, too, which will become a shared responsibility between Stena Bulk and its cus-

tomers. The InfinityMAX hybrid bulk carrier concept is electric and modular, designed to enable sustainable, zero carbon, efficient and flexible seaborne transportation. The concept is designed to carry both dry and wet cargoes in modular compartments, and it is built with several new core principles that, according to Stena Bulk, cumulatively represent a paradigm shift in cargo transportation.

A key to this design was the creation of standardized and modular cargo units that can carry dry bulk, liquid bulk or liquified gas products, such as methane, hydrogen or ammonia, that is envisioned to significantly streamline the process of transporting wet and dry bulk cargoes. Each of the InfinityMAX's modular cargo units are designed to be self-sufficient in terms of their energy use, with wind turbines and solar panels generating all the electricity needed for internal systems. The modular units have also been designed to be able to be dropped off outside of ports and picked up by tugs, helping to ease congestion and reduce call times dramatically.

The InfinityMAX concept will use hydrogen as a marine fuel and wind turbines to generate further energy. Collapsible wing sails and a shark skin hull have also been incorporated in the concept design to significantly improve efficiency. Although the vessels will be crewed, Stena Bulk has designed the InfinityMAX concept to be semiautonomous.

> "(Fuel) is, of course, the billion-dollar question. *We strongly believe in methanol"*
> ***Erik Hånell, President & CEO, Stena Bulk***

Managing Risk ... & Paying for It

While it is instructive to have a path charted, there remain many question marks in the coming three decades journey in terms of available and emerging technologies, not to mention the means to pay for it. Hånell sees emerging regulations as helping to add clarity to the path and ultimately to level the playing field. "If we look at our fleet today, a fleet that is built, you can say an average ship, 2015, roughly, we probably have to invest somewhere in between $5 to $6 million for each and every ship between now and 2030 to be able to reach our goals."

"(Fuel) is, of course, the billion dollar question," said Hånell. "We strongly believe in methanol as a potential future fuel going forward," he said, noting its proven track record. "It comes down to making the methanol more environmental friendly."

Looking toward 2050, the math and the path gets even fuzzier, and Hånell admits "Today, I would not even guess what it is going to cost to build a ship that is ready for 2050 and beyond. But to give a broad and a very rough estimate, we assume that with the technology that we see today and what we, how we believe it will be developed, it's going to be an additional cost of around the 30 to 40% compared with today's prices."

On its best day the shipping industry is fraught with risk, and the collision of digitalization, decarbonization and autonomy is collaboratively speeding the transition of technology – and new risk – throughout maritime.

At the time Stena Bulk's plan to 2050 was announced, Hånell said: "The shipping industry collectively faces a challenge where we must consider how we alter our entire energy needs. In order to decarbonize, the maritime community must take risks, push sustainability boundaries, and embrace a partnership approach that enhances collaboration between industry partners and customers."

In his interview with Maritime Reporter TV Hånell added clarification: "The risk here, to a very high degree, is the financial risk. It's going through something new that is probably a little bit untested, and that is the risk that I think shipowners like to share with suppliers and customers."

It is broadly agreed that achieving true decarbonization will require an unprecedented level of cooperation and partnership throughout the maritime and logistics chain.

"We feel it's more important than ever to build on what we have, while also finding new partnerships," said Hånell. As an example, he points to a growing partnership in the development and delivery of the aforementioned three planned carbon neutral-ready, methanol fueled vessels. "We have a new relationship with Proman, the second biggest methanol producer in the world. That's something that we believe in, in respect of a sustainable way going forward when it comes to fuel."

But mot all partnerships are external, and Hånell points to the depth and breadth of the Stena brand. "We have our sister company in Stena Line on the ferry side, where we are cooperating with them as well." Ultimately, Hånell see decarbonization as a global problem that requires a global-sized solution, including cooperation among traditional and new technology stakeholders and regulators. "(Big or small), all ship owners have to work with this," Hånell concludes. "Collaboration between everybody as much as possible (is ideal), making sure that we are working together in a global sense."

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BATTERY

Scandlines/ Horst Dieter Foerster

The past decade has seen tight restrictions on emissions from vessels, notably with a 2015 move to a .10 percent sulfur maximum in Emission Control Areas (ECA) in North America and in northern Europe. As the International Maritime Organization (IMO) now shapes shipping's decarbonization future, shipowners are looking at transitions away from fossil fuels. Among the myriad of alternatives are lithium ion batteries and some early forays into hydrogen fuel cells.

By Barry Parker

POWER

ABB

Yara Corporation

To date, large batteries are used on short runs, mainly as an auxiliary power source in conjunction with traditional fossil fuels, with benefits of load balancing, in a "hybrid" configuration, that is batteries in concert with conventional generators. DNV presents the case for batteries succinctly: "All electric and hybrid ships with energy storage in large Li-ion batteries can provide significant reductions in fuel cost, maintenance and emissions as well as improved responsiveness, regularity and safety."

Batteries have figured in retrofits of existing offshore service vessels. Eidesvik Offshore, active in the North Sea oil and gas arena; has retrofitted multiple diesel electric vessels for battery power beginning in 2015. In the Americas, OSV operators installing battery retrofits have included Seacor, Companhia Brasileira de Offshore, and, more recently, Harvey Gulf Marine, fitting batteries into "tri-fuel" vessels fueled by conventional diesel and LNG.

The current boom in the maritime wind energy sector, where

"For vessels operating at sustained power on long trips, hybrid propulsion only makes sense if there are varying loads where the ESS can be used for peak shaving or as a spinning reserve.

John Waterhouse, Elliott Bay Design Group

a decarbonization posture is de rigueur, has provided a further impetus for battery power in newbuilds. Louis Dreyfus Armateurs, with two Service Operations Vessels built in a Turkish yard, has deployed ABB's Onboard DC Grid. ABB explains that this Electrical Supply System (ESS) "…will integrate two sets of batteries used primarily for spinning reserve and peak shaving. Power peaks during operation can be covered by the battery rather than starting another engine. Again, battery power can act as backup for running generators, reducing the need to run spare generator capacity."

Batteries bring efficiency where the vessels must wait alongside turbines, as the battery power can substitute for inefficient low-rev generators.

Green credentials have also influenced power choices in the ferry sector, with companies' environmental postures now a factor in riders' modal choices, and, more broadly, in carriers' funding sources. In a hybrid situation, one or more diesel powered generators are replaced by batteries, which would then run in port or for load balancing while underway. Ferry specialist naval architects Elliott Bay Design Group (EBDG) Principal, John Waterhouse, explains: "For vessels operating at sustained power on long trips, hybrid propulsion only makes sense if there are varying loads where the ESS can be used for peak shaving or as a spinning reserve." Depending on the configuration, an inverter and step-up transformer would be linked in to bring battery power up to the equivalent voltage as a generator. Waterhouse, notes that: "High speeds or long distances make the use of an ESS less attractive because of the sheer size of the battery installation."

Battery retrofits began in the ferry sector, during 2013 - 2016, with Scandlines (with runs between Denmark and Germany in the Baltic Sea ECA) outfitting six passenger ferries, including two with 1,300 passenger/ 460 vehicle, with lithium ion batteries. In 2019, one of these, Copenhagen, was fitted with a Norsepower Rotor Sail for the Gedser/Rostock route. In North America, Washington State Ferries (WSF) has embarked on a plan to electrify nearly all of its fleet, in line with its 2040 Long Range Plan (LRP), "…which calls for fleet stabilization by delivering 16 new vessels to replace aging vessels and retrofitting six existing vessels," according to WSF's Jan. 2021 System Electrification Plan. WSF has announced plans to converts its three largest ferries, the Jumbo Mark II class, from diesel to a 10.4 MWH hybrid-electric, with system upgrades to be provided by Siemens (which had assisted Scandlines earlier).

Waterhouse notes that EBDG is leading the engineering on the WSF project at Vigor Shipyard.

BC Ferries, serving ports further north, has seen Island Discovery and Island Aurora, the first two of six Island Class hybrids (up to 400 passengers/47 vehicles), constructed at Damen Galati, Romania, enter service in 2020. Four additional newbuilds will be delivered to the Point Hope Maritime yard in Victoria, British Columbia later in 2021 for final preparation work, with the plan to enter service in 2022.

The battery packs (2 @ 400 kWh) are supplied by Corvus Energy, based in Norway but with a BC office.

With quick port turnaround times in populated areas, ferry projects include charging "arms" – autonomous in some cases – that can rapidly hook up to shoreside charging stations. In the case of WSF, shoreside battery charging will offer estimated reductions of 53% greenhouse gas emissions (CO2e) by 2030, and 76% by 2040, compared to a 2005 baseline. EDDG's Waterhouse said "An operation such as the Bridgeport – Port Jefferson ferry might not use an ESS to supplement the propulsion but could use it in port for the hotel loads, allowing zero emissions when docked."

EBDG

ABB, which worked with Louis Dreyfus Armateurs with its SOVs, has also been active in the passenger sector. Most recently, ABB Marine & Ports announced that it would supply Casco Bay Lines (Portland, Maine) with an integrated hybrid-electric power and propulsion package, as well as a shoreside charging apparatus, for a new 599-passenger ferry. Serving the 2.2 nm run to Peaks Island across the Casco Bay, the new vessel would enable carbon emissions from diesel fuel to be eliminated while tied up in port. With ABB's Onboard DC Grid power distribution system, fuel consumption can be optimized for varying loads. In a presentation to the community, CBL said that it had chosen 900kWh hybrid configuration (one of the four choices provided by EBDG, a consultant on the project). The presentation also reveals that the hybrid vessel, with a capital cost of $13.97 million, was $3.7 million more expensive than a diesel-powered vessel, otherwise the same. In April, 2021, ABB announced that it had been tapped to supply power solutions for 10 hybrids to be built for Portuguese operator Transtejo, for fast ferry routes on the Tagus River around Lisbon.

ABB solutions have also been deployed in Niagara Falls, where Maid of the Mist boats carry tourists around the Falls; the 2020 season saw two new all electric boats joining its fleet. "The latest generation Maid of the Mist vessels are welded aluminum catamarans with batteries powering twin electric propulsion motors capable of a total 400 kW output," according to ABB. An onshore charging system complements the ESS afloat.

Fully battery powered vessels are already here, albeit working short runs. In 2015 Ampere, with capacity for the 350 passengers and 120 cars, began operations on Norway's Sognefjord connecting Oppedal and Lavik, a 5.5 km run. With Siemens as integrator, the 1090kWh battery pack (with DC bus voltage of 850 – 1050) can be charged in un-

Zulu Hydrogen powered cargo vessel for River Seine

Photo courtesy Flagships project

der 10 minutes. In Denmark, Ellen, 198 pax/31 cars, connects Fynshav and Søby on a 22 mile run in a protected area in the southern Baltic Sea. Fitted with two motors and a 4.3 MWh battery pack from Leclanché SA, it began service during the summer of 2019. In Canada, BC Ferries has an intention for a future conversion of its Island Class hybrids to full electric operation in the future. In Norway, the fully electric 120 TEU container feeder Yara Birkeland (which is being readied for autonomous operation) is expected to enter service later this year on the Oslofjord, for fertilizer producer Yara Corporation.

An important demonstration project is a fully battery powered bunker tanker designed by e5 Lab Inc., a consortium of seven leading Japanese companies, including Asahi Tanker Co., Ltd. and (with others including Mitsui OSK), which hopes to develop an infrastructure for fully electric vessels. The vessels which will service Tokyo Bay, will be built by Koa Sangyou Ltd.(2022 delivery) and Imura Shipyard Co. Ltd. (2023 delivery). The vessels will be highly maneuverable, with rotating azimuth propellers at the stern (powered by an electric motor), and a bow thruster for moving transversely alongside for bunkering operations.

In late 2020, the consortium chose Kawasaki Heavy Industries (KHI) to build the ship's propulsion system. In March 2021, Corvus Energy (which also supplied the ESS on Ampere) was chosen to provide the ESS for the e5 vessels. Corvus, which will integrate its 3,480 kWh Orca ESS into the tankers; KHI says that battery operations between charges should be six to eight hours.

Looking Ahead: Hydrogen

Forward thinkers are already tackling the infrastructure for distributing hydrogen to the maritime sector. The listed tanker company Ardmore Shipping (ASC), active in moving petroleum products and chemicals (including methanol), announced that it was working to team up with Element 1 (E1), developers of a technology that enables production of hydrogen from methanol, on demand at the point of consumption. As contemplated under a broad mandate to supply the maritime sector, the E1 system could bring hydrogen to fuel cells at docks.

Corvus Energy is thinking along similar lines, with a late 2020 announcement that it was partnering with Toyota, to bring its fuel cell technology to the maritime sector, with plans to develop and produce Proton Exchange Membrane (PEM) fuel cell systems for the global maritime industry.

Scandlines/Peter Therkildsen

With a production plant in Bergen, Norway, it plans to offer fuel cells based on a technology developed by Toyota for automobiles, starting in 2023. The project has received $6.25m in funding from Innovation Norway, a State agency. Corvus is thinking about a robust long-term strategy, saying: "Furthermore, a specific marine control system uniting the battery and fuel cell operation will be developed for easy integration with power management systems from a range of system integrators." EBDG's Waterhouse said "…the efficiency of PEM conversions is over 50% (energy output/energy content of hydrogen) so it's better than an internal combustion engine." He told Maritime Reporter that "Most marine applications need to be in the several MW range. These will likely be based on designs for railroad engines since the railroad market is much larger than the marine market."

Another set of projects is underway in Europe, under the auspices of the E.U. funded Flagships project, a consortium of shipowners, equipment suppliers and service providers seeking to bring hydrogen fueling to marine carriers. One project member, the French inland shipowner Compagnie Fluvial de Transport (CFT), a subsidiary of the Sogestran Group, is set to deploy a hydrogen fueled vessel on the River Seine later in 2021, as part of a new business for urban distribution with transport vessels in the Paris area. Onboard fuel cells will be supplied with compressed hydrogen in cylinders. The consortium is also building a passenger/car ferry at the Ada Shipyard, in Istanbul, to be deployed by the Norwegian owner Norled along the coast near Stavanger.

The Ardmore Shipping hydrogen fuels distribution mandate is worldwide, but it points towards the U.S. Providing a hint of a market with likely high uptake, if the deal moves ahead, Ardmore and E1 would be bringing in Maritime Partners, a financier which has penetrated heavily in to the U.S. inland waterway markets, having financed hundreds of barges for the inland river system.

Smart money with a maritime bent is looking closely at batteries and fuel cells, in conjunction with funding from government. The SW/TCH team (tied to investor Oaktree, and to Clean Marine Energy - backers of early LNG fuel barging efforts) has developed a concept for an all electric ferry around New York's waterways, and is participating in the Golden Gate Zero Emission Marine project, where the ferry Water-Go-Round with construction underway at All American Marine, to be powered by hydrogen fuel cells, is set for a 2021 launch.

Hempel Charts its Growth & Sustainability Course

Hempel announced an ambitious strategy to double its revenue by 2025, with a focus on innovation, digitalization and sustainability. ***Michael Hansen****, EVP & Chief Commercial Officer and* ***Dorthe Scherling Nielsen****, Head of Sustainability & Government Affairs discuss the path ahead.*

By Greg Trauthwein

The year 2020 defined by COVID-19 presented historic challenges for many industries, and even companies such as Hempel – with a 105-year history – were not exempt. While the pandemic was (and continues to be for some) all consuming, it is far from the sole challenge for maritime companies today. The industry is at a transcendent point in its history, with digitalization, decarbonization and autonomy effectively challenging long-established norms and redefining the path ahead.

Hempel is a global coating company founded in Copenhagen, Denmark, present globally in four sectors; maritime, infrastructure, decorative and energy. While it had already begun work on its strategy toward growth and sustainability, COVID-19 and the slowdown in 2020 helped to effectively put those plans on the fast track, as the company is aiming to double revenue through refocused geographical priorities, focused segment leadership positions and M&A, while at the same time accelerating on sustainability, innovation and digitalization. "In 2020 we finished the year with a revenue of around 1.5 billion euros, and set on a course towards doubling in size over the next five years," said Hansen in an interview with Maritime Reporter TV. Hempel was founded in

Michael Hansen, *EVP & COO,* **& Dorthe Scherling Nielsen**, *Head of Sustainability & Government Affairs, Hempel.* **Below:** *The* ***Breclav Bridge is*** *coated by Hempel.*

Photos courtesy Hempel

the maritime sector, and today maritime remains a key legacy business, generating around "400 million euros, or (about) a quarter of our revenue," said Hansen, with energy – both traditional oil and gas the emerging renewables sector – accounting for about 250 million euros per year in turnover, or about 16% of revenues.

Hempel aims to achieve its revenue objective through both acquisitions and organic growth as well as ambitious investments in sustainability, innovation and digitalization, expecting 50 percent of revenue growth to come from M&A, but with a clear-cut emphasis on building market leadership in its four segments. By 2025, Hempel expects more than 50 percent of its revenue to come from sub segments and geographies where it has a leading position, compared to less than 10 percent today.

Among specific targets, Hempel aims to be carbon neutral in own operations by 2025, while helping to reduce the carbon footprint of its customers.

"FUTUREPROOF"

"One of our key ambitions is to drive CO2 emissions for our own operations to zero by 2025 even as we grow," said Scherling Nielsen. "To achieve this, we'll do three things. We'll continue to reduce energy consumption, we'll transition to 100% renewable electricity, and we'll shift to electric vehicles and equipment wherever possible. We're also going to work strategically across our value chain to reduce our impact."

To that end, Hempel launched its sustainability framework dubbed Futureproof, an initiative that lies at the heart of its strategy to double its revenue while dramatically cutting its carbon footprint and that of its clients.

"We have committed to setting science-based targets in accordance with the 1.5 degree pathway. And this will be a really big undertaking for us, a game changer," said Scherling Nielsen. "It will have a big impact on how we operate our business, how we run our factories, how we select our suppliers and how we produce our products."

But Futureproof extends far beyond the walls of Hempel, as Scherling Nielsen said "for our customers, we've committed to reducing CO2 with at least 30 million tons. One driver to achieve this goal is products like Hempaguard X7, antifouling with qualities to reduce hull friction and improve fuel efficiency of the ships."

"Hempaguard X7 is a silicon solution that enables a ship to maintain speed level during the five-year intervals between dockings," said Hansen. "In other words, you reduce your bunker consumption during that period. So here we have the element of sustainability and profitability going hand-in-hand,

we're reducing the operational costs of the fleet, and we're significantly reducing the CO2 emission from the vessels. Over the course of the last six to seven years, more than 2000 ships have applied Hempaguard X7, and in doing so, reducing their emission by more than 20 million tons of CO2."

One of the conundrums facing all maritime companies today is balancing the need to change and generating the revenue needed for investment in new technologies. According to Scherling Nielsen "Sustainability and profitability are not mutually exclusive." and in fact sustainability is good business with inherent savings. At the same time, she said that Hempel's unique ownership structure is a big benefit. "Hempel is owned by the Hempel Foundation, a unique ownership structure that enables us to take a long-term perspective on growth, sustainability, and corporate responsibility."

While the path to sustainability is taking shape, little is crystal clear. "Sometimes bold decisions will need to be made and bigger investments will likely be needed," said Scherling Nielsen. "For example, we've asked all our factories to map how they can phase out fuel driven equipment and transition to electric equipment. Also, we will be redirecting existing funds towards more sustainable options, for example, our R&D function will introduce sustainability criteria into their design process."

R&D

Research and development operations are running at full tilt across industries, as the speed of technology development has effectively cut the lifespan of certain products in half, if not more, during the last decade. Today's complex problems, particularly on decarbonization, in many cases demand a collaboration among industry stakeholders as well as the need to 'think outside the box.'

Hempel, too, is taking a hard look at how it develops and delivers solutions to its four key sectors, establishing technology research programs and harnessing Hempel's new innovation incubator, GrowHub.

Initially Growhub will be an internal effort, as Hempel puts its team together, "but as we progress, we'll be working primarily with our customers to identify the most urgent needs in their respective industries," seeking to combine efforts and resources to mutual gain, said Hansen. "Traditionally, the

Photo courtesy Hempel

coating companies, including Hempel have been incredibly focused on the product side. But with GrowHub we see an opportunity to combine digitization, product development and services too. So if you take these three elements and you put them together in a unique solution, then all of a sudden we can deliver sophisticated solutions supported with data, solutions address both a service need and a product need."

While the view from every C-Suite is clouded in some way today by COVID, Hansen see plentiful opportunities for Hempel as it embarks on its ambitious path.

"Asia Pacific is already today a key market for us, but it's also a market that we continue to see significant opportunities he said. "In North America, we also see opportunities. We do not today have a strong position in North America, but we are engaged with both the development of renewable energy and the traditional oil and gas sector. I think the combination of those two, is something we're going to see much more of in the coming years as well, where the traditional oil and gas majors will also be engaging in offshore activities, renewable activities. So we see North America as a really important opportunity for us in the coming years."

Photo courtesy Hempel

The Scrubber Uptake: Economics & Technologies

Expectations are high that exhaust gas scrubber technology demand will soon be resurge. But what lessons have been learned from installations and which type will dominate?

Installing scrubber systems on ships that were never envisaged to have them on board has brought well documented challenges for older tonnage, with accurate drawings and documents sometimes hard to source. Where class documentation is concerned, meanwhile, different societies can have subtly different requirements and interpretations vary by individual surveyor.

At a time when the owners backing scrubbers over low sulfur content fuels to meet IMO 2020 emissions requirements report faster than expected returns on investment, any lessons learned merit review. Any future oil price recovery will likely reinflate the favorable differential high sulfur content fuels enjoy over their low content counterparts.

Having secured around 60 exhaust gas scrubber references, naval architecture and marine engineering firm Foreship suggests that future projects offers a bountiful packet "lessons learned", from detail design to installation. Its scrubber selection recommendations are fully independent and based on cost, complexity and the ship's operating profile, and its experience base includes open loop, closed loop and hybrid systems, a variety of class rules and yard installations in Europe, North America and Asia.

Melding Economics & Tech

Should the economics driving scrubber uptake appear compelling for an individual owner, they must first consider, for instance, space availability and any structural changes and reinforcements that may be needed, said Olli Somerkallio, COO, Foreship. As well as extra tankage and other heavy components, he said, retrofitting a scrubber can involve re-building parts of a vessel's structure can be complex. "The required modifications can affect damage stability; if tanks are added asymmetrically for example. Passenger ships present particular challenges, where adding a scrubber system can bring the need for a complex recalculation of the vessel stability. If the effect of the installation on the vessel's stability is not carefully considered, it can cause stability challenges for the rest of the ship's service life, especially on cruise ships. Scrubbers also use plenty of power, especially as a proportion of what is available onboard cargo ships, while closed loop or hybrid systems create tank capacity issues that are sometimes passed over."

In addition to finding the space on an existing ship to install a scrubber system, one of the main challenges for cruise ship retrofits has been owners desiring to avoid the 'off-hire cost' of taking working ships out of service.

Therefore, many cruise owners have decided to do most of the work while the vessel is operating. "Changes on the vessel's watertight integrity, like tank modifications and bulkhead penetrations, cannot be done when the ship is at sea," said Somerkallio. "This means that such installations must take place in short bursts when the ship is in port, so that the entire process can take some time. On a cruise ship, there is also guest disturbance to think about: the noise; the smells; and the closure of some public spaces. Some cruise lines also indicate that an additional crew member is required to take care of complex hybrid plant.

Operating lessons

With the number of scrubbers in operation rising, lessons have been accumulating for cargo ship owners too. "DNV has offered its thoughts on corrosion problems in scrubbing water in the discharge piping passing through hull penetrations," said Somerkallio.

The reference is to a well-documented incident where corrosion in SOx scrubber piping between the overboard valve and a ship's hull led to a large quantity of seawater entering a ship engine room. During the damage survey, the spool piece and the diffusor diluting the acidic wash water outflow were found to be heavily corroded, with the most likely cause a flaw in the application of the protective epoxy coating. DNV GL now requires an annual inspection of the spool piece, either by Ultrasonic Thickness Measurements or by a diver.

Cumulatively, installations have also flagged up the heat loads generated by scrubber systems as a problem for machinery spaces. "Fire safety risks also have to be attended to, where scrubber system piping manufactured from combustible materials. In cases where fires have occurred during the installa-

tion phase, these materials might not be the cause, but they can contribute in the fire propagation."

Conversely, the reliability of some scrubber systems can be challenged in ice conditions, Somerkallio says. "If separate sea chests are built for the scrubber system, for example, there is a risk of sea water intake getting clogged when the ship is sailing in ice conditions, as warm scrubber water cannot be recirculated back to the sea chest to keep it free from ice."

Open to Persuasion

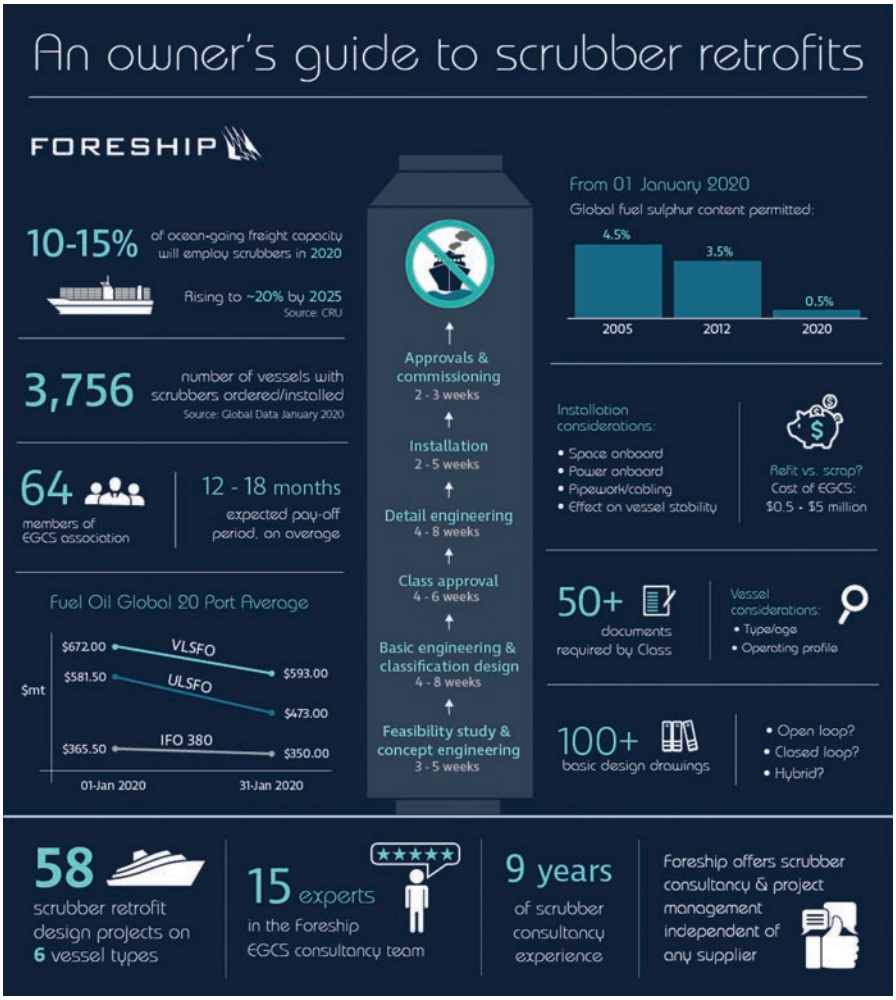
The majority of the hybrid systems the company has worked on have been destined for cruise ships or RoPax vessels, where vessels spend more time operating coastally and in-port. However, lower cost open loop scrubbers have represented a larger part of the company's workload, with owners switching to lower sulfur fuels where port restrictions on washwater demand it.

"It's understandable that some local authorities take a negative view on acidity in washwater and the presence of heavy metals, no matter how low the concentrations, especially where water exchange rates are not high," said Somerkallio. "Hybrid scrubbers that switch to closed loop operations certainly provide one option but the other remains to install an open loop system and manage a switchover to low sulfur fuels in port."

The combination of Covid-19 and cutthroat oil pricing has eaten into the differential between high sulfur and low sulfur content fuel oils, leading demand for scrubbers to stall. The circumstances has also had consequences for future scrubber technology demand, said Somerkallio.

The cruise ships needing hybrid scrubber systems to accommodate closed loop operations in waters identified as especially sensitive had already been equipped, while Covid-19 ad driven some older vessels that might have been hybrid candidates to scrap.

The total cost of open loop scrubbers including equipment and installation is significantly lower than is the case for hybrid systems, and owners that have committed to this technology are reporting returns on investments far more rapid than anticipated, Somerkallio reports. "When oil prices recover, we expect this type of scrubber to attract significant new investment."



Scrubbers stay global

"For cargo ship owners, the fact that the closed loop needs alkali in significant volumes will always make it an expensive option. Although lower fuel cost in port can shift the economics in favor of the hybrid option for some ships, for cargo ships the cost of the closed loop operation kills the economics of the scrubber."

Somerkallio acknowledges that criticisms are leveled at open loop scrubbers based on sulphurous washwater but emphasizes that only specific ports and coastal waters block their use. While the efficiency indexes driving IMO regulations favor LNG over HFO, December's Marine Environment Protection Committee nonetheless pointedly replaced the phrase 'liquid effluents' with 'discharge water' in its latest scrubber guidelines evaluation.

Somerkallio adds that new research from Tampere University, the Finnish Meteorological Institute and the VTT Technical Research Centre show that using exhaust gas cleaning systems in combination with HFO result in lower particulate emissions than marine gas oil.

"Whatever the critics might say, if there was an outright ban on the open loop, I believe there would only be a very small number of scrubber installations altogether each year. I don't believe that would be an environmentally desirable outcome."

Propelled into a Kinder Future

All Photos courtesy Kongsberg

Kongsberg Maritime is devoting much time and effort to the refinement of innovative propulsion solutions which promote sustainability.

With climate change and green operation at the top of the maritime agenda, operators of watercraft ranging from ferries, ice breakers and coast guard boats to offshore support and naval vessels are under immense legal and ethical pressure to adjust their working practices to deliver maximum sustainability. But while regulations may force operators to lower fuel consumption and reduce emissions as a means to lessen damage to marine environments, these changes inevitably bring a corresponding reduction in long-term operating costs. Taking the appropriate proactive steps to safeguard the oceans will increase a company's profit while improving its reputation as a responsible, lawful and far-sighted employer; a rare situation in which everyone and everything benefits.

A fundamental contributor to lowering fuel usage and meeting the UN's Sustainable Development Goals has been the refinement of electric and hybrid power technologies, specifically designed to run cleanly, efficiently and frugally, reduce component wear and produce the smallest carbon footprint possible. Marine systems provider Kongsberg Maritime are a key player in the development of these technologies, and as part of their holistic approach have examined every aspect of the system, from the power source to the final drive. Crucially, considerable research has been devoted to the design and configuration of propeller and propulsion systems which ensure that power and fuel consumption is kept to a minimum.

Efficiency Gain

As a result of extensive analysis and model testing, Kongsberg Maritime is able to offer a variety of flexible propulsion solutions which support the twin goals of optimizing energy usage and mitigating environmental impact. "A good example is our Promas propulsion and maneuvering system," said Göran Grunditz, Head of Kongsberg's Hydrodynamic Research Center. " By integrating the propeller and rudder into a single unit we have been able to streamline water flow, reduce drag and recover energy which would otherwise be wasted, leading to a significant improvement in hydrodynamic efficiency. This efficiency gain is between 2-6% for twin-screw vessels and 3-8% for single-screw craft, with scope for further performance and manoeuvring enhancements, depending on where the rudder is situated in the slipstream."

Hydrodynamic efficiency and operational sustainability are also key design characteristics of Kongsberg Maritime's ELegance pod system range. Each model deploys a permanent magnet electric motor fitted directly onto the propeller shaft and a 'Twin Tail' design devised to decrease the noise, vibration and improving margins against cavitation. Requiring very little lubrication oil and protected with a double barrier seal, the unit's environmental credentials can be further improved with the battery energy storage functionality provided by Kongsberg's SAVe electric systems, which can feed power to the pods con-

Photo left:
The test tank at KONGSBERG's Hydrodynamic Research Center.

Photo below:
ntegrating the propeller and rudder in the Promas unit has reduced drag and boosted efficiency.

Photo on opposite page:
A central CPP and pair of rotatable Azipull mechanical thrusters give the Finnish Coast Guard vessel Turva efficient operation and optimal manoeuvrability.

tinuously, smoothing out the engine load and enabling power-generating capacity to be reduced by up to 30%. The positive ramifications for sustainability are considerable, with the potential for vessels to carry out zero-emissions operations for a given period of time, or to run solely on battery power in environmentally sensitive locations. With their double barrier seals, the pods are VGP (Vessel General Permit) compliant, even without the use of EAL (Environmentally Acceptable Lubricants).

Grunditz looks at the Finnish Coast Guard vessel Turva, equipped with a central CPP (controllable pitch propeller) and a pair of rotatable Azipull mechanical thrusters, as a strong reference for the Kongsber cumulative brand. "Turva needs to be highly maneuverable when undertaking tasks including ice breaking, dynamic positioning and towing, and for this the rotatable thrusters have been found to deliver substantially better positioning accuracy and mobility than would be achievable with a standard twin-screw configuration. When the vessel is carrying out low-speed assignments of this nature, the CPP can be feathered to reduce drag.

"If Turva is operating in frozen conditions," he saidd, "the thrusters can be used to flush ice around the hull while the CPP works to power the vessel through the ice. During high-speed transits, the CPP shares loading between the three propellers while steering is handled by the thrusters. This arrangement boosts performance and reduces fuel consumption; which, in turn, decreases the boat's carbon footprint."

The Triple-Screw Alternative

For RoPax, Kongsberg Maritime also offers a more sustainable, triple-screw alternative to the twin-screw configuration which large ferries have traditionally deployed. In the triple-screw arrangement, a large-diameter, lightly loaded central propeller works in tandem with two open-shaft Promas propulsion and maneuvering systems.

"We have estimated that this combination will reduce power consumption by up to 15% when benchmarked against the twin-screw norm," said Grunditz. "That's an annual saving in the region of $1.8 million. The Promas systems will allow RoPax ferries to spend shorter times in ports and harbors, meaning that lower speeds are required when in transit. This marked overall improvement in energy efficiency is obviously kinder to the environment, allied to the fact that the reduction in propeller loading significantly cuts down on underwater noise which has been shown to have a potentially negative effect upon marine mammals."

These benefits are echoed in another configuration which combines a central controllable pitch propeller in front of an azimuthing thruster with a counter-rotating propeller. This arrangement, designed to regain energy and rotational losses, results in efficiency gains of between 10 and 15% over conventional twin-screw systems.

Methanol Fuel Cell

A carbon-neutral methanol fuel cell system is taking shape at the Alfa Laval Test & Training Center.

Alfa Laval

An HTPEM fuel cell.

A fuel cell system based on high-temperature proton exchange membrane (HTPEM) technology from Blue World Technologies is being constructed for testing at the Alfa Laval Test & Training Center in Aalborg, Denmark. The test installation, which will use methanol as fuel, will explore the technology's potential as a source of marine auxiliary power. Funded by Danish EUDP (Energy Technology Development and Demonstration Program), the project is a joint effort between fuel cell maker Blue World Technologies, Alfa Laval and vessel owners DFDS, Maersk Drilling and Hafnia.

The aim of the project is to establish a highly efficient and cost-effective HTPEM fuel cell solution, giving marine vessels a realistic alternative to combustion-based auxiliary power within the near future. The fuel cell test setup will have a power of 200 kW, but the fully developed and modular design should be possible to scale up incrementally to a level of 5 MW.

AlfaLaval.com

Wind Power

Wallenius Wilhelmsen

Wallenius Wilhelmsen announced plans to design and build the Orcelle Wind, a wind-powered Pure Car and Truck Carrier designed to achieve up to 90% reduced emissions compared to today's best vessels. The goal: have a design ready for contracting with a shipyard by mid-2022, and a finished vessel ready for the high seas by 2025.

While the design is far from complete, the aim is to have a ship that has:

- Overall car capacity of 7,000 vehicles;
- Ability to carry heavy machinery and breakbulk cargo, in addition to cars;
- Length of around 220m and beam (width) of approximately 40m;
- Speeds of 10-12kts under sail that can be increased with the supplemental power system.

According to Erik Noeklebye, EVP and COO Shipping Services at Wallenius Wilhelmsen, "Orcelle Wind will be our technical and operational testbed for zero emission innovation, where we can assess and develop various zero-emission fuels and technology."

WalleniusWilhelmsen.com

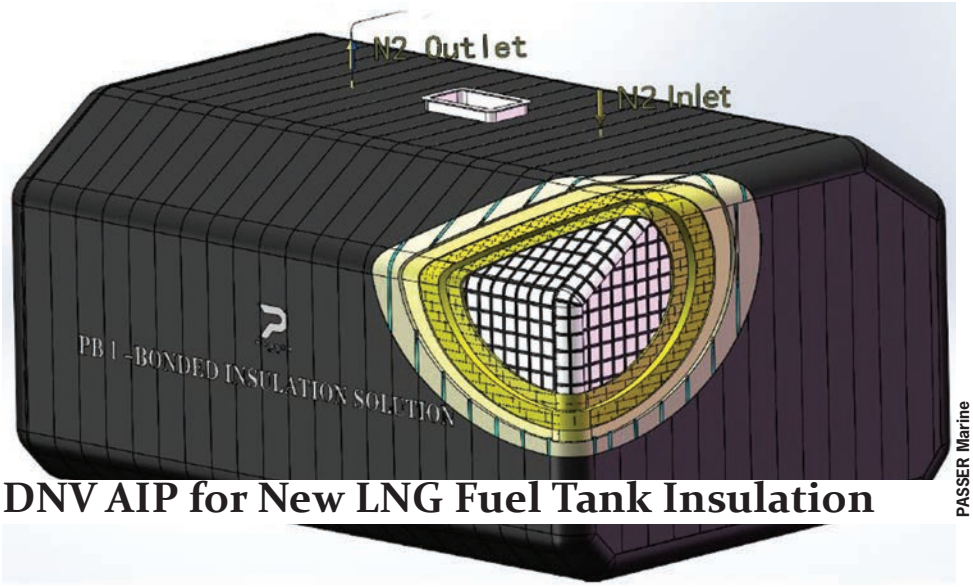
Elektra: Fossil Free Ship Before '30

Photographer: Stena Line/Peter Mild

Stena Line plans to start operating two fossil-free battery powered vessels on the route between Gothenburg and Frederikshavn in Denmark no later than 2030. Stena Line together with Volvo Group, Scania and the Port of Gothenburg, have joined forces in the Tranzero Initiative collaboration project to bring about a significant reduction in carbon emissions linked to the largest port in the Scandinavia. The aim is to cut emissions by 70% by 2030 in the Port of Gothenburg.

Stena Elektra will be the world's first fossil free RoPax vessel of its size and will measure approximately 200 meters and combine a passenger capacity of 1000 with 3000 lane meters freight capacity. The vessel will be built in high tensile steel to lower the weight and increase efficiency and it is estimated the vessel will run on battery power for approximately 50 nautical miles, the distance between Gothenburg and Frederikshavn. The battery capacity will need to be approximately 60-70 MWh and the vessel will be charged in port. Stena Line also looking into combining the electrification with other alternative fossil free fuels such as fuel cells, hydrogen and bio methanol for longer reach of the vessels.

StenaLine.com



PASSER Marine

DNV AIP for New LNG Fuel Tank Insulation

DNV granted an Approval In Principle (AIP) to PASSER Marine for the development of a new LNG fuel tank insulation system.

The new concept is designed for prismatic 'type B' LNG tanks - which according to IMO rules require a partial secondary barrier - and includes a leakage detection system capable of safely managing and containing fuel leaks.

As LNG fueled vessels are increasingly being deployed for deep-sea shipping, fuel tank sizes need to increase from 300-1000 m3 fuel capacity to up to 10,000-20,000 m3 which leaves less room for cargo. As such, there is increased industry interest in alternative fuel tanks – known as 'type B'.

PasserGroup.com

Shell/Penguin International

Shell: Hydrogen Fuel Cells Tested

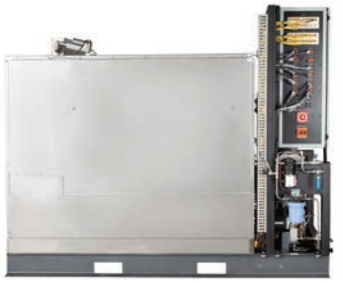
Shell will collaborate on a feasibility study to trial the use of hydrogen fuel cells for ships, the first of its kind for Shell and in Singapore. "This trial is an important step in demonstrating the applicability of hydrogen and fuel cells on ships," said Nick Potter, GM of Shell Shipping and Maritime, Asia Pacific & Middle East. "We see fuel cells and hydrogen as a promising pathway for decarbonizing shipping and working with partners in this way will develop our understanding of this critical technology. Shell, the charterer of the trial vessel and the hydrogen fuel provider, is working with SembCorp Marine Ltd and its wholly owned subsidiary LMG Marin AS, who will design the fuel cell and retrofit the vessel, as well as Penguin International, who owns the roll-on/roll-off vessel.

The trial will develop and install an auxiliary power unit Proton Exchange Membrane (PEM) fuel cell on an existing roll on/roll-off (RoRo) vessel that transports goods, vehicles and equipment on lorries between the mainland and Shell's Pulau Bukom Manufacturing Site.

Shell.com

Mobile Hydrogen Generation

RIX Launches Industry-First Mobile Hydrogen Generation System for marine environments



RIX

RIX Industries offers the mobile hydrogen generation system, the M2H2-Series scalable family of Methanol-to-Hydrogen Power Systems, aiming to bring 'green power' to shipboard and marine environments. With the ability to generate hydrogen onboard and on demand, these systems offer a smaller shipboard volume requirement as compared to high-pressure compressed hydrogen solutions. The RIX M2H2-Series also eliminates the footprint of cryogenic liquid hydrogen storage.

RIX M2H2-Series systems incorporate methanol fuel reforming technology to generate hydrogen. This technology is licensed from Element 1 (dba e1). Supports 30 kW to 120 kW fuel cell solutions, which is scalable and can be combined to support MW applications as well. Deployment does not require major retrofit of ship infrastructure, and existing diesel tanks can instead be used to store liquid methanol at ambient conditions as a feedstock.

rixindustries.com

Tech Files

Innovative products, technologies and concepts

Schottel SYDRIVE-E

Singapore-based Sembcorp Marine chose Schottel's azimuthal hybrid drive system SYDRIVE-E to power the world's first liquefied natural gas (LNG) hybrid tug.

Schottel

With this first in a series of 12 vessels, Sembcorp Marine will build the world's first hybrid LNG-fueled tug fleet. The vessel is designed by LMG Marin, a wholly owned Sembcorp Marine subsidiary, and a leading naval architecture design house in Bergen, Norway, which provides energy efficient solutions. The tug's future operation profile will demand highly variable power ranges. Depending on the desired operating mode and the required propulsion power, the hybrid drive system activates the appropriate power source or both together. The LNG-fueled main engines and the electrical motors are both coupled to the SYDRIVE system and are designed to operate efficiently within their optimal load ranges.

Sembcorp Marine's hybridized Schottel RudderPropellers type SRP 430 will have a power intake capacity of about 2,000 kW each which will be fed by zero emissions electrical motors and/or low-emissions LNG main engines.

Schottel.com

Bubble Tech Clears the Path for 6.6% Fuel Saving

Silverstream Technologies/Shell

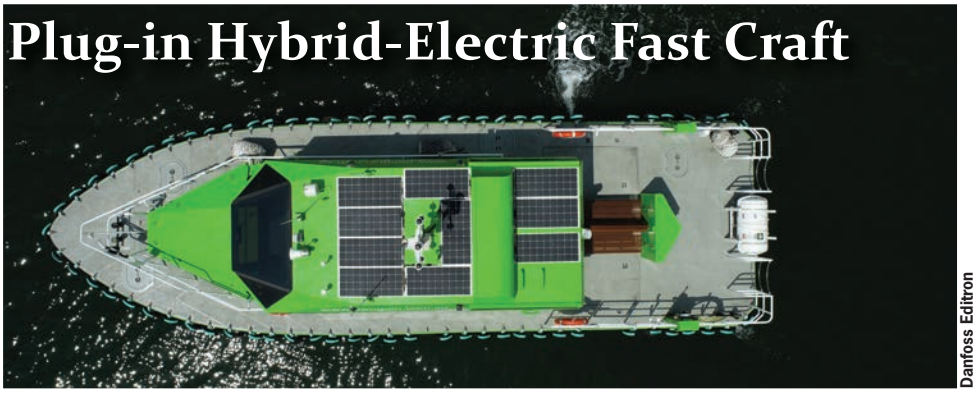
Silverstream Technologies' air lubrication system, the Silverstream System, has reportedly delivered 6.6% fuel and emissions savings during testing on the Shell-chartered 170,000 cbm LNG carrier Methane Patricia Camila.

The Silverstream System is designed to enable fuel and emissions efficiencies by producing a thin layer of microbubbles along the full flat bottom of the vessel, reducing frictional resistance between the water and the hull. The System was successfully retrofitted on the 2010-built LNGC during its October 2020 planned dry docking at the Sembcorp Marine Admiralty Shipyard in Singapore.

The project was installed within the planned dry docking period, and was delivered on budget. From design through to installation the System was reviewed and approved by ABS in accordance with their guidance note for Air Lubrication Technology.

Silverstream-tech.com

Plug-in Hybrid-Electric Fast Craft



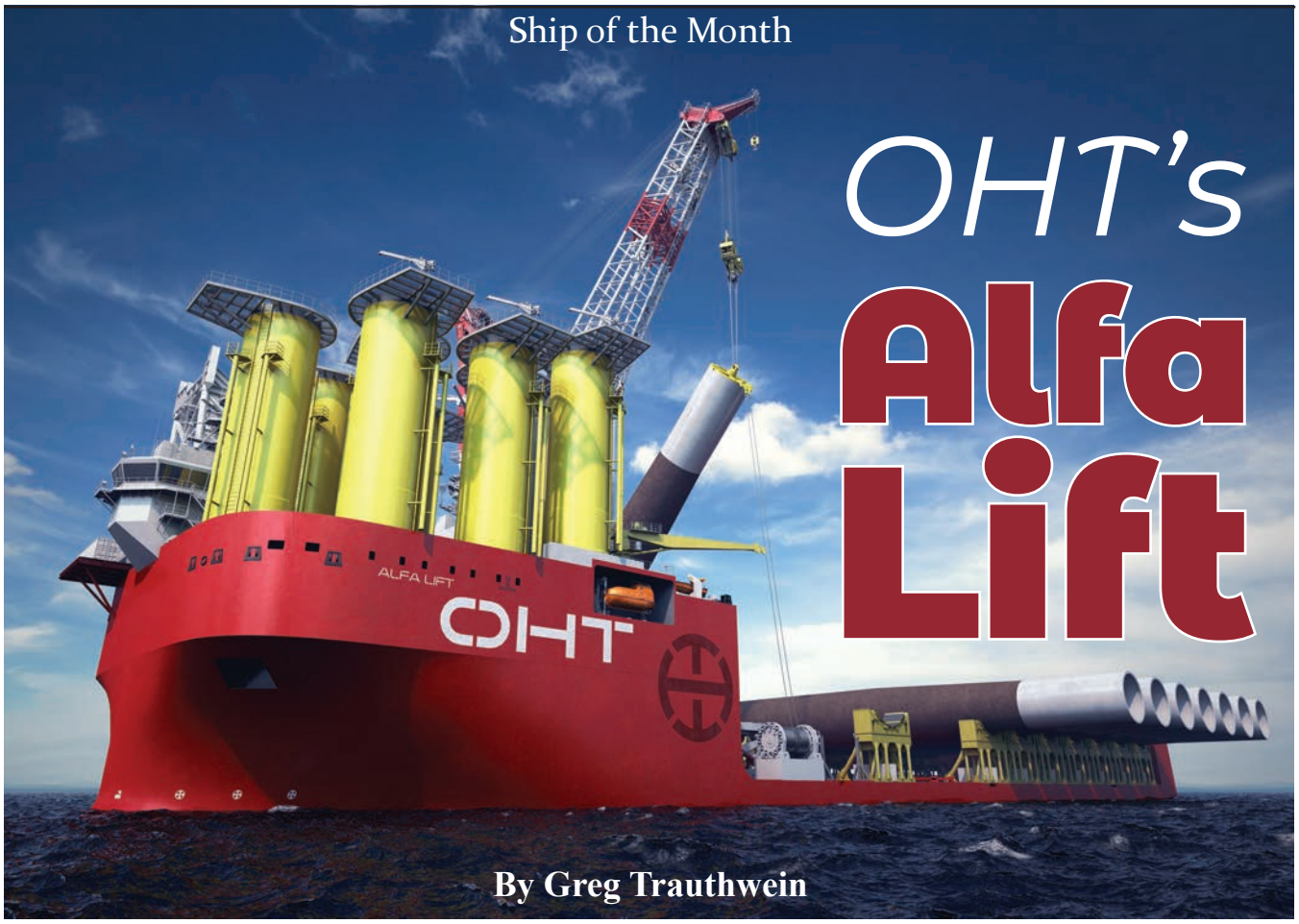
Danfoss Editron

Danfoss Editron was chosen by Sea Forrest Power Solutions to provide the drivetrain system powering Singapore's first plug-in parallel hybrid-electric fast launch vessel. Design, development, construction and delivery involved Penguin International, who built and owns the vessel, Durapower Technology and Bureau Veritas. The 15m vessel will be used to transport personnel to and from Pulau Bukom integrated oil and petrochemicals refinery, with a capacity of 12 passengers and two crew. In hybrid mode, the vessel will be able to travel non-stop for 24 hours between 5-20 knots. Danfoss Editron's hybrid-electric drivetrain system comprises two motors, four inverters and an inductor. SFP has developed the vessel's power management system and Human Machine Interface, which is integrated with and controls Danfoss Editron's power drive train, the hybrid gearbox, and Durapower's energy storage system.

Danfoss.com

Ship of the Month

OHT's Alfa Lift



By Greg Trauthwein

Alfa Lift, the world's largest custom-built offshore wind foundation installation vessel, is a beast.

Measuring 216.3 x 56 m with an 8m draft, Alfa Lift features a Liebherr 3,000-ton main crane and a 10,000+ square meter "smart deck" designed to carry and install up to 14 XL monopiles or 12 jackets per voyage, in water depths up to 35 meters. Kongsberg Maritime, under a contract with MacGregor, will deliver a Pile Gripper Guidance System (PGGS); MAN Energy Solutions won the order to supply the engines. MAN ES will supply four MAN 12V32/44CR GenSets with a total output of 28,800 kW for the ship. All told the ship will have capacity to can carry cargoes of up to 48,500 tons.

Norway's OHT is currently building the Alfa Lift, an Ulstein Design & Solutions BV-designed ship, at China Merchants Heavy Industry (CMHI) shipyard in Jiangsu, China. It was ordered on speculation, but subsequently it secured a contract for work on Dogger Bank phases A&B, which when completed will be the largest offshore wind farm in the world.

Brawn & Brains

Due for delivery at the end of 2021, Alfa Lift is packed with innovation and capability, including the ability to install offshore wind foundations while in Dynamic Positioning (DP) mode. "This was a novel idea, at that point in time (in 2016 when discussions on Alfa Lift began) nobody was doing it. First was software development to analyze the behavior of the total system to help deliver the best solution," said Edwin van Leeuwen, Managing Director, Ulstein Design & Solutions BV. So the design process did not begin with the ship structure, which would be the norm in most projects. "It's human nature to start with what you know, but if you are designing unexplored territory like Alfa Lift, you really need to dig deep (first) into aspects that you don't know."

"We have a unique concept in Alfa Lift, to install monopiles as a conveyor belt-type machine," said Torgeir Ramstad, CEO, OHT, in a recent interview with sister-publication *Offshore Engineer*.

"When we went to the ship designer, we didn't come with the normal standard metrics – this long, this wide, this deadweight (etc.)," said Ramstad. "We went and said, 'Do you think it's possible to design a vessel that can install monopiles in one day? And that includes the positioning, the lowering of the monopiles, the piling, the transition piece installation, the bolting and grouting, and the sailing and the transiting and the loading time. So counting the time from you leave port until you're back fully loaded and ready to leave again."

"For a naval architect, there's always a combination of re-

In the Shipyard

Ship of the Month

Ulstein Design & Solutions

Alfa Lift Main Particulars

Shipyard	China Merchants Heavy Industry (CMHI) Shipyard
Length, o.a.	216.3 m
Length, bpp	204.3 m
Beam (molded)	56 m
Depth (main deck)	12.6 m
Draft (design)	8 m
Draft (submerged max.)	27.6 m
Service speed	13 knots
Installed power	4 x 6,875 kW
Propulsion thrusters	3 x 5,500 kW
Retractable thruster	1 x 3,000 kW
Tunnel thrusters (fwd)	3 x 3,000 kW
Positioning system	DP 2
Class	DNV
Deck strength	30 t/m2
Complement	100 persons

quirements, rules and regulations as well as physical aspects that you have to analyze and design for," said van Leeuwen. "In this particular vessel, there is a multitude of operations that have to be served with the same vessel. Different functions, all leading to different loading conditions. What we designed for was monopile installation and transportation, jacket transportation and installation, submerged lifts, heavy-lift transport with a submerged vessel."

Both Ramstad and van Leeuwen stressed the collaborative nature throughout the design process as central to its ultimate success. The result was a creative process to design a ship that was not only big and strong, but 'smart', too, in its innovative deck handling system and machinery to streamline the handling of foundations on deck.

"This whole story was about thinking in terms of high volumes and repetitive tasks," said Ramstad, with the 'trick' being to do it safely, efficiently, correctly, time and again. The traditional means to install the foundations entailed anchoring the ship on the seabed to stabilize the ship and maintain position. But with the pace of installation targeted to one day per monopile, this approach would have been too time consuming. The solution: installing monopiles in DP mode."

"The whole development of this concept started off with the controls and automation," said Ramstad. "As I like to say, we took the Tesla approach. We didn't start with the car. We started with the software."

"The challenge is to keep the vessel stable enough to achieve very tight tolerances, in terms of verticality for the monopiles," said Ramstad. "You have to stabilize the monopile, which can be a hundred meters high and weigh maybe two and a half thousand tons. You're holding it around the center of gravity or even below it … it's unstable. So we deploy SpaceX algorithms to control it," the same way SpaceX are able to control the rocket's landing on a barge in the middle of the Atlantic Ocean."

Next up was designing a cargo handling system to efficiently move and handle the massive piece of unique and valuable cargo … while buffeted by the notoriously rough North Sea.

"We said: 'In order to mechanize and automate the process of installation, which is actually a serial production or repetitive process, you need to handle things in parallel. You need to

> **"We managed to not only develop this extreme heavy-lift machine, *but we did it at a competitive price.* I think that is an achievement by working together with OHT, the shipyard and our team."**
>
> **Edwin van Leeuwen, Managing Director, Ulstein Design & Solutions BV**

not do everything in sequence. You need to also get rid of the people who are exposed on the main deck doing manual operations," said Ramstad.

In the final concept they placed a crane upfront on the vessel to free up the space on the main deck, and created a mechanized deck transportation system to bring the foundation components up front towards the crane. Since the crane did not need to cover the entire main deck, it offers a shorter, more robust crane boom … and ultimately a cheaper crane, too.

"With this deck transportation system, we can then feed the crane in the upending position, bringing them from the horizontal to the vertical in an efficient way," said Ramstad. "And while installing one monopile, we prepare for the next. And then, of course, in between two monopiles, you do have transition piece, and we decided to carry the transition pieces on the forecastle back. That's normally where you have a big hotel section on the vessel."

With the main deck being prime real estate for efficient foundation handling, the decision was taken to place the hotel portion of the ship underneath, allowing for much freedom in the placing of other valuable bits of equipment including the 900-ton piling hammer. "The piling hammer is a big beast," said Ramstad, and that sits on the forecastle deck along with the transition pieces.

When looking at the project as a whole and it's myriad of challenges, van Leeuwen said, "We managed to not only develop this extreme heavy-lift machine, but we did it at a competitive price. I think that is an achievement, again, by working together with OHT, with the shipyard, and our team."

Alfa Lift II

While the original Alfa Lift is not yet delivered, thoughts have already turned to Alfa Lift 2, which is currently in basic design. "From the early design phases of Alfa Lift, we have seen that the foundations are growing and that the turbines are growing. It is logical that we are reviewing the capacities of the vessel, and Torgeir hinted to it as well.," said van Leeuwen. "She will be adopted for bigger monopiles and bigger jacket foundations. In order to do that, she will probably have a bigger crane and she will be a bit bigger, but we'll do this trying to keep the vessel as identical as possible to Alfa Lift 1."

"We have made certain modifications, essentially in relation to an even longer crane boom," said Ramstad. "This isn't because of heavier foundations; we are well-covered with what we have on Alfa Lift 1 in that respect. But, if the foundations grow higher or longer, for instance, we see jackets standing on the vessel's deck soon becoming the limiting factor, in terms of crane height or hook height." So the team is looking at a bigger crane with a longer crane boom.

"So, probably going from 3,000 tons to 5,000 tons," said Ramstad. And with a bigger crane comes a slightly longer ship to ensure stability during sailing and install. "For most people it would look identical. It's not that big a difference."

In the Shipyard

New vessels, contracts and designs

Glosten © 2021 MBARI

The new RV honors MBARI' founder David Packer.

MISC

VLEC Seri Elbert Delivered to MISC.

Photographer: Mild Design/Stena Line

Stena Livia Joins Baltic Fleet.

MBARI: R/V David Packer

The Monterey Bay Aquarium Research Institute (MBARI) is embarking on a new chapter in its ocean research with the construction of a state-of-the-art ship. The new research vessel will be named in honor of MBARI's founder, David Packard. The R/V David Packard will be 50 meters (164 feet) long and 12.8 meters (42 feet) wide with a draft of 3.7 meters (12 feet). It will support a crew of 12, plus a science crew of 18. MBARI has selected Freire Shipyard in Vigo, Spain, for the construction of the R/V David Packard, Glosten for design work.

The R/V David Packard will replace MBARI's current flagship research vessel, the R/V Western Flyer, which will be retired in fall 2022. MBARI's new research vessel will honor Silicon Valley pioneer David Packard, who founded Hewlett-Packard (HP) in a Palo Alto, California, garage with Bill Hewlett, and is largely credited with sparking the tech revolution. His philanthropic endeavors included funding the creation of the Monterey Bay Aquarium in 1984. Three years later, Packard founded MBARI as an independent institution committed to pursuing cutting-edge ocean science and engineering programs.

VLEC Seri Elbert Delivered to MISC

MISC Berhad (MISC) has taken delivery of its sixth Very Large Ethane Carrier (VLEC) – Seri Elbert, from Hyundai Heavy Industries (HHI) shipyard in Ulsan, South Korea. Seri Elbert and her sister vessels - Seri Everest, Seri Erlang, Seri Emei, Seri Emory and Seri Emperor are a series of second generation VLECs – all of which were acquired by MISC from Zhejiang Satellite Petrochemical Co. Ltd. (STL) in July 2020.

Stena Livia Joins the Baltic Sea Fleet

Stena Line announced the latest addition to its Baltic Sea fleet. The 186m long Visentini RoPax vessel Stena Livia will initially join sister vessel Stena Flavia on the Nynäshamn-Ventspils route from mid-April. Later this year the pair will replace the existing tonnage on the ferry route between Travemünde and Liepaja, adding 40 per cent freight capacity and shorten the crossing time substantially. During 2021 Stena Line is expanding their Baltic Sea operations with modern and large RoPax vessels being added to the two ferry routes from Latvia to Sweden and Germany. The routes, Nynäshamn-Ventspils and Travemünde-Liepaja, was acquired by Stena Line in 2012, and is today an important part of the European logistics network, connecting the Baltics, Russia and CIS countries with Germany and Sweden as well as the rest of Europe.

Stena Livia was built in 2008 at the Cantieri Navale Visentini shipyard in Italy and is a modern large RoPax vessel with capacity of 750 passengers, 200 cars and/or 115 trailers. The vessel has earlier sailed under the names of Étretat and Norman Voyager.

Gondan Delivers Fishing Stern Trawler

Built at Gondan, located in the Asturian Castropol district, north of Spain in the Cantabric Sea and to be operated by Norway's Engenes Fiskeriselskap A/S in Northern Atlantic and Artic waters the Freezing stern trawler Magne Arvesen was recently delivered. Designed by Kongsberg Maritime, the trawler measures 69.9 x 16m, built in steel with aluminium superstructure. With an accommodation for 29 people, the freezing trawler will be operated for heading, gutting, and freezing of whole white fish. and to this end the vessel sports a modern and automated fish processing equipment, and a freezing hold capacity of 1400 cu. m. Magne Arvesen is classified by the DNV and is Ice class certified. Magne Arvesen is the second freezer trawler that Gondan has delivered in the last six months.

Gondan

Gondan delivered the Magne Arvesen.

Strat Cat CTV for Offshore Wind

Strategic Marine's Strat Cat 27 (SC27) combines form with function to meet the increasing demands from the offshore wind industry and offers enhanced vessel capabilities with a reduced environmental footprint and hybrid drive options.

"It is with great pleasure that we announce the SC27 following a close and collaborative approach with our design partner BMT. It is technically advanced with multiple upgrades and propulsion options providing excellent flexibility for our customers," said Strategic Marine's Technical Manager Greg Daniel. The SC27 is an evolution of the Strat Cat 26, featuring an optimized hull design to maximize the waterline length, which improves the operational efficiency across a large range of loading conditions and cuts fuel consumption. It is flexibly designed to be fitted with various engine makes and can reach in excess of 30 knots at full speed. The SC27 is offered with two superstructure options for either 24 or 12 technicians.

Gondan

Strat Cat CTV for Offshore Wind.

Galoni New CEO @ Thordon

Thordon

Galoni New CEO @ Thordon

Anna Galoni was named CEO at Thordon Bearings, following the retirement of **Terry McGowan**, who stepped down after almost 14 years in the CEO role. "I am delighted to announce the appointment of my stepdaughter Anna as our new CEO," said **George (Sandy) A. Thomson**, Thomson-Gordon Group Innovator and Thordon Bearings' Founder. "After three generations of family ownership, the Thomson-Gordon Group and Thordon Bearings is now looking to a fourth-generation family member to safely navigate the company."

Eastern Shipbuilding Group

Lemcool Joins ESG

US Coast Guard

VAdm Fagan Nominated

Dan-Bunkering

Klausen New CEO at Dan-Bunkering

Lemcool Joins ESG

Lance C. Lemcool has accepted the position as Vice President of Commercial Sales and Marketing, Eastern Shipbuilding Group, Inc.

VAdm Fagan Nominated

Vice Adm. Linda L. Fagan has been nominated by the White House to be the next Vice Commandant of the U.S. Coast Guard. Pending confirmation, Fagan is expected to relieve current Vice Commandant of the Coast Guard Adm. Charles W. Ray on June 18.

Klausen New CEO at Dan-Bunkering

Dan-Bunkering announced that **Claus Bulch Klausen** was appointed as its new CEO effective May 1, 2021.

Eske Taped to Lead EBDG

Elliott Bay Design Group's (EBDG) Board of Directors appointed **Robert Ekse** as President of the firm. With more than 30 years of experience in the marine industry, Eske has a diverse background including prior positions with Vigor, Alaska Marine Highway System, Alaska Ship and Drydock, and Crowley Marine Services.

Gonzales Makes Captain at NYK

Filipino seafarer **Liel Gonzales** became the first NYK-TDG Maritime

EBDG

Eske Taped to Lead EBDG

Academy (NTMA) graduate to be appointed to the rank of vessel captain since the academy was created in 2007.

Hjelland to Lead Servogear

Servogear named **Vermund Hjelland** as new CEO starting in August 2021. **Torleif Stokke**, who has held the position of CEO for the last eight years, takes a new position in the company as Business Development Manager.

Nakashima, Becker Make Deal

Japan's Nakashima Propeller Co. has taken a majority stake in the German shipbuilding supplier Becker Marine Systems GmbH.

Glamox acquires Luminell

Glamox AS has entered into an agreement to acquire 100% of the shares in the Norwegian company Luminell Group AS.

HHI Celebrates 154 Apprentice Grads

Huntington Ingalls Industries hosted commencement exercises in April for 154 graduates of its Apprentice School at Newport News Shipbuilding. The following is a profile of the graduating class: 69 completed an optional, advanced program, earning an associate or bachelor's degree; 83 earned honors, a combination of academic and craft grades that determine overall performance; 69 completed the Advanced Shipyard Operations Program; 21 completed Frontline FAST, an accelerated skills training program for potential foremen; 16 completed the World Class Shipbuilder Curriculum and advance optional program with a perfect 4.0 grade point average; 10 are military veterans or are currently serving in the armed services as reservists and guardsmen, representing every branch of the military. The Apprentice School accepts about 225 apprentices per year.

NYK

Gonzales Makes Captain at NYK

National Maritime Day

By Captain Sean P. Tortora

That one sentence sums up National Maritime Day. Inasmuch if it were not for our glorious Merchant Marine and maritime industry, we may not even have been a nation at all.

National Maritime Day is the day we honor our American Merchant Mariners for protecting our freedom and for their dedication to promoting American commerce together with the accomplishments of the U.S. maritime industry. Most importantly, on National Maritime Day we especially honor those fearless mariners who served during times of war and those mariners who have made the ultimate sacrifice for our Nation.

In the interest of those not aware, we celebrate National Maritime Day each year on the 22nd of May, as this was the day in 1819 in which the SS Savannah sailed on the first transoceanic voyage under steam power. It is notable because it was the first crossing of any ocean under steam propulsion, in her case via a side paddlewheel. Now Savannah was a hybrid sailing/steam ship, but it was historic for it brought about the age of the steamship and proved steam propulsion to be the future of shipping. Savannah completed her crossing some nineteen years before the SS Great Western, which was the first purpose-built steam ship to make an ocean crossing and is very well known. The Great Western was British; but the Savannah, once again the first to cross under steam power, was purely American, operated by the American Merchant Marine and built by the American maritime industry. Let us not forget the context of history at the time. The Savannah's transatlantic crossing was only a few short years since the War of 1812, when American Merchant Mariners were impressed by the British. As such, the United States, a country of less than 50-years old, to eclipse what was the greatest maritime nation, England, with such a significant maritime first, was quite an accomplishment for our young maritime industry and Merchant Marine. Therefore, on May 20, 1933, Congress officially enacted National Maritime Day to be celebrated annually on the anniversary of the SS Savannah's departure. Each year on National Maritime Day, the President makes a proclamation and there are numerous celebrations and observances.

Along these lines, we should be reminded our first Navy was our Merchant Marine. They were referred to as "Privateers." In 1776, none other than the most famous signatory of the Declaration of Independence, John Hancock, as the President of the Continental Congress, signed a bill authorizing Masters and Commanders of private merchant vessels to effect captures of British vessels along with their cargoes under the flag of the United States. A notable example was that of Joshua Barney. He was the Master and Commander of the privateer

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ship Hyder Ally, and he captured the British Man of War Monk. Barney was eventually given command of Monk and was later commissioned into the Continental Navy. Notably, Joshua Barney, was a Merchant Mariner first; and a hero Merchant Mariner at that in capturing British warship. Interestingly enough, the two men who share the moniker, "The Father of American Navy," were both Merchant Mariners. It may be a surprise, but none other than John Paul Jones and John Barry, were both Merchant Mariners first before they were Naval Officers. John Paul Jones was first a Merchant Mariner and was Master and Commander of the British brig John prior to immigrating to the Colonial United States and joining the then fledgling Continental Navy. John Barry immigrated to the U.S. from Ireland as a Second Officer, rising to the rank of Captain and was eventually the first and only Master of the U.S. Merchant Ship Black Prince before it was sold to the Continental Navy and renamed the Alfred. Of course, their naval careers are well documented, but it is the fact they were mariners first, which bears mentioning. Like all who serve in the Navy from Admiral to Seaman is a sailor; similarly all who serve in our Merchant Marine, from Master to Ordinary Seaman, is a mariner.

"When final victory is ours there is no organization that will share its credit more deservedly than the Merchant Marine." One of the greatest generals in history as well as the future 34th President of the United States, acknowledged the absolute critical contribution of the U.S. Merchant Marine in the winning of the WWII. Just as General MacArthur had done so, General Eisenhower put the Merchant Marine on equal footing with all other services. Wistfully, the accomplishments of our glorious Merchant Marine are not readily known, not even to the future generals. In 2016, in a visit to a maritime museum, several West Point Cadets asked a retired Master-Mariner in attendance what seemed like a natural question, as most people who are not aware of the Merchant Marine ask, they asked, "What is the Merchant Marine and what do they do?" The retired Master quite nicely explained some of the facts of the U.S. Merchant Mariner sacrifices in WWII and even quoted a few of West Point's most distinguished alumni concerning the Merchant Marine. After which the West Point cadets were clearly moved by this and probably had a newfound respect for the U.S. Merchant Marine along with their service and sacrifice. In this fashion, it requires mentioning WWII and the sacrifices of our U.S. Merchant Marine, for that is where they made their mark. Speaking purely in numbers, our U.S. Merchant Marine lost more lives by percentage than any other service. One of

"I hold no branch in higher esteem, than the Merchant Marine..."

General Douglas MacArthur,
Supreme Allied Commander of the Pacific in WWII.

every twenty-six mariners perished during the War due to enemy action. That is a greater percentage than the U.S. Marine Corps! Think about it… 1614 ships were sunk, 9,521 mariners were killed, and 712 mariners were held as POWs. As mentioned, National Maritime Day celebrates not only the heroic and selflessness of the U.S. Merchant Mariners during time of war, but the entire of the U.S. maritime industry. The flag of the U.S Merchant Marine states, "In Peace and War." Therefore, on National Maritime Day we therefore celebrate the maritime industry's support of our economy by transporting hundreds of billions of dollars in goods and services. This of course includes the shipbuilding industry in addition to both inland and deep-sea shipborne commerce. Again, in referring back to WWII, the maritime industry constructed almost 6,000 cargo ships to bring the fire to the fight.

Sadly, due to purely political forces, our valiant WWII Merchant Mariners were not recognized as full veterans until more than forty years after the War, in 1988, when most of the veterans were at best in their late 60's. Even more egregious was the fact on June 22, 1944, upon signing the G.I. Bill, President Franklin D. Roosevelt, stated, "I trust that the Congress will also soon provide similar opportunities for postwar education and unemployment insurance to the members of the merchant marine, who have risked their lives time and again during this war for the welfare of their country." Tragically, this never came, and thus no U.S. Merchant Marine Veteran ever had the government's financial support to attend college and better themselves or their children. Further, no U.S.Merchant Marine Veteran was rewarded with the privilege to use any of the veteran's benefits (VA) such as a VA home loan, as all other WWII service members were afforded.

Finally, some recognition has been bestowed upon these heroes, albeit late as most of the WWII mariners have sadly passed away. Thanks in large part to American Merchant Marine Veterans (AMMV), and in particular one daughter of a WWII veteran, Ms. Shelia Sova; on March 13, 2020, the 75th Anniversary of the Allied victory in WWII, Congress approved, and the President signed into law the, "Merchant Mariners of World War II Congressional Gold Medal Act of 2020."

But not for this small token of appreciation, appallingly, the travesty of not recognizing U.S. Merchant Mariner veterans of foreign wars continues to this very day. If the good citizens of the United States knew their government was still discriminating against the current U.S. Merchant Mariners in combat zones, they would be equally appalled. In what the general public is probably unaware of, most of the U.S. Navy auxiliary ships, including the ships which are a part of all U.S. Navy carrier strike groups, painted haze gray with a number on the bow, are all manned and operated by U.S. Merchant Mariners of the Military Sealift Command. These ships steam right next to the Navy warships and operate with them alongside in the war zone providing the critical underway replenishment (UNREP) operations; and UNREP is one of the most dangerous evolutions in which a navy ship will experience. This was true for this most recent war, from 2002-2010 as well as Operation Desert Storm/Sortie1991-1992. Astonishingly, all U.S. Navy personnel on these same exact ships, in which were operated by U.S. Merchant Mariners, were granted veteran status; yet the U.S. Merchant Mariners standing right next to them were once again were left out. The U.S. Merchant Marine is known as the "Fourth Arm of Defense." If that is the case, why not recognize these veterans of our latest wars, whilst they are still young enough to take advantage of the hard-earned veteran benefits, such as the G.I. Bill, VA medical access, and VA home loans as true combat veterans? In order to right this wrong, it will take a concerted effort by the citizenry through our elected officials. So, this May 22nd, on National Maritime Day please take a moment to remember the U.S. Merchant Mariners and those in the maritime industry for all their service and sacrifices for our country.

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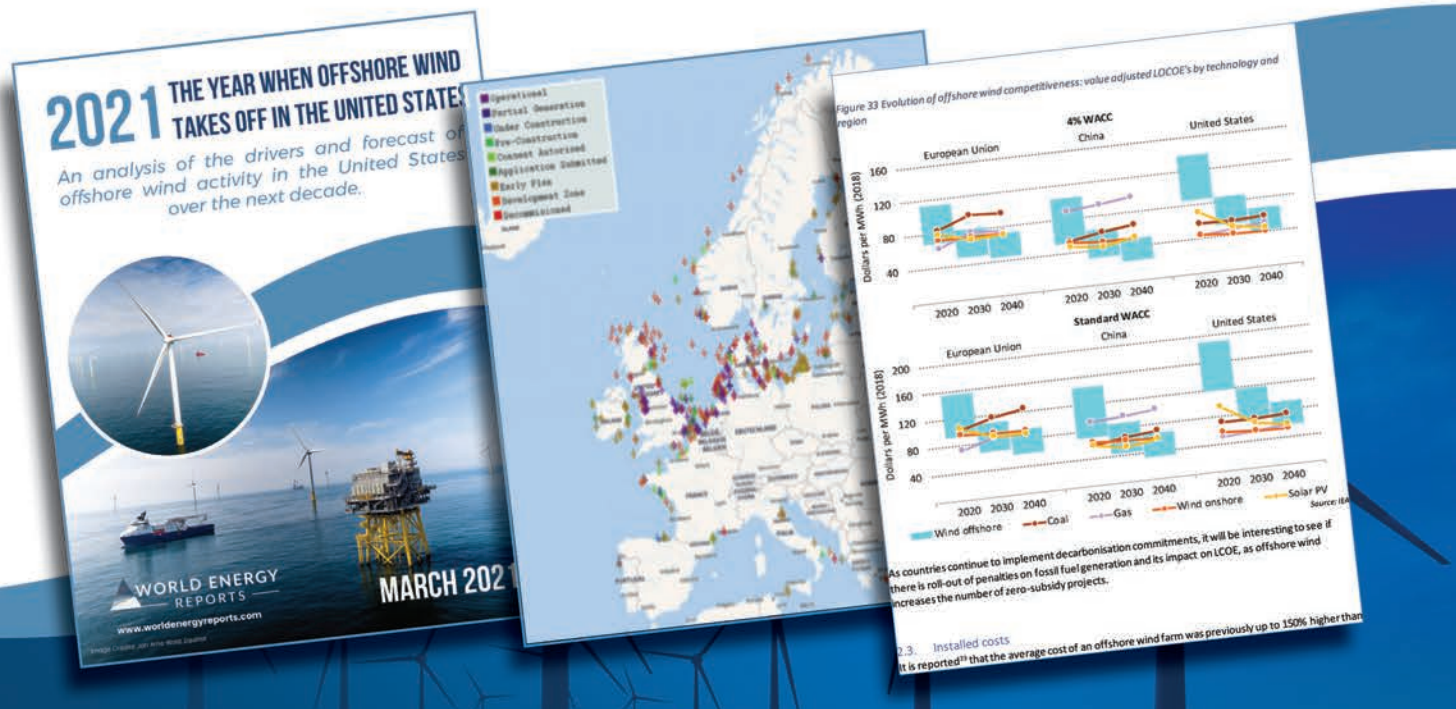

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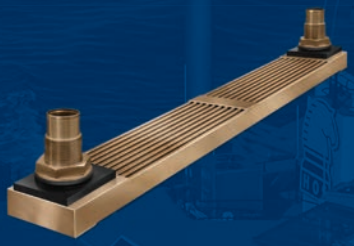

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