



The Port of Opportunities

The Port of HaminaKotka is a versatile Finnish seaport serving trade and industry. The biggest universal port in Finland is an important hub in Europe and in the Baltic Sea region.

Welcome to the Port of HaminaKotka!



Dear Readers,



elcome to the year 2022, in all likelihood sponsored by the letters 'H' and 'I' as in "high inflation." By adding 'U' for "unemployment," we would venture back in time to the early 1990s in Poland and other former Iron Curtain countries, the time of my childhood, so perhaps the current state of affairs isn't so dreary. Some may even find it encouraging to acquaint themselves with the letter 'F' as in "frugalness." Then again, others might choose to Don't Look Up (a highly recommended movie, terrifyingly realistic in parodying the modern world). As such, other letters of the alphabet can come in handy over the coming months, too, like 'V' for "vigilance" or 'M' for "mindfulness," you know, overall 'S'teadfastness in separating the wheat from the chaff.

Amidst the twists & turns of media coverage that more often than not sets the heather on fire (for monetary purposes, what else), maybe it is sensible to throttle back and look at what we as the Baltic transport & logistics industry achieved last year. This way, we can perhaps disperse the negativity and take heart that we are moving in the right direction. The year's starting issue traditionally hosts a round-up of the regional highlights, this time around heavily dominated by the decarbonisation trend in its various shapes and forms.

Sure, transportation won't be humankind's saviour in tackling climate change. That said, our sector has got its homework to do. However, the industry is by no means a monolith. There are different narratives out there. Fortunately enough, we managed to onboard the Global



Shippers Forum to fill us in on the hows and whys of shipping change in 2022. Climate change and the extreme weather events it increasingly brings about is, in turn, explained insurance-wise by our friends from TT Club. We are also in a jubilant mood to welcome Lloyd's Register,

ZeroNorth, and Airseas, all of them explaining the various ways of decarbonising shipping. In the EU, the sector's fate is at stake, with parties from across the board engaged in a heated debate about the fundamentals of shipping's inclusion in the block's Emission Trading System (more about it in the What's in the Cabinet column). On this topic, we feature a piece from Transport & Environment that dwells into the possibility of evasive port calls in the Baltic. A bit on the future blue economy tops the eco-focused theme off, a proposal to reconcile the various human interests with those of the environment.

The coronavirus pandemic has impacted transportation in many ways, but certainly, e-commerce can feel as having picked the winning lottery ticket. Roland Slegers-Leijsten, author of the recently released e-Commerce Logistics in Europe: Integrate or Stagnate, explains the implications it has for the logistics players that serve this rapidly budding market. Au contraire, some may cut their (maintenance and repair) logistics needs by turning to 3D-printed parts. FORCE Technology was bold enough to imagine and then print a propeller blade and compare it with one made classically.

Finally, Transport miscellany with its touch of fine marine art (plus video games, garbage dump-soon-green urban centre, and zeppelins). Oh, and a critical, if not bashing, Collector's corner. Mark my words, nobody can expect to receive a favourable tariff when postal stamps on historical events are concerned!

Przemysław Myszka

Baltic Transport Journal

Publisher

BALTIC PRESS SP. Z O.O. Address: ul. Pułaskiego 8 81-368 Gdynia, Poland office@baltictransportjournal.com

www.baltictransportjournal.com www.europeantransportmaps.com

Board Member

BEATA MIŁOWSKA

Managing Director PRZEMYSŁAW OPŁOCKI

(ZEWITSENW OF LOCK

Editor-in-Chief PRZEMYSŁAW MYSZKA przemek@baltictransportjournal.com

Roving Editor

MAREK BŁUŚ marek@baltictransportjournal.com

> Proofreading Editor EWA KOCHAŃSKA

Contributing Writers

JACOB ARMSTRONG, JAMES HOOKHAM, HANNA KLIMEK, STÉPHANIE LESAGE, PETER TOMMY NIELSEN, CARLO RAUCCI, ANNA SALOMON, ROLAND SLEGERS-LEIJSTEN, PELLE SOMMANSSON, PEREGRINE STORRS-FOX, BEATA SZYMANOWSKA, ANDRZEJ URBAŚ, MARTIN WALLGREN

Art Director/DTP
DANUTA SAWICKA

Head of Marketing & Sales PRZEMYSŁAW OPŁOCKI

PRZEMYSŁAW OPŁOCKI po@baltictransportjournal.com

Marketing & Sales

EWELINA SYNAK ewelina@baltic-press.com

If you wish to share your feedback or have information for us, do not he sitate to contact us at: editorial@baltictransportjournal.com

Contact us:

PRZEMYSŁAW OPŁOCKI tel.: +48 603 520 020

Cover

Photo: Canva



Subscriptions

Go to www.baltictransportjournal.com and click: SUBSCRIPTION or contact us at subscription@baltictransportjournal.com



LINER SERVICE EUROPE

The first and only yearround liner service between Europe and the Great lakes

Quick transit time | Through bills of lading | Onward connections using Spliethoff's European and American logistic network | Line-supplied containers, project, heavy lift, steel, forest products and bulk | Calling various Great Lake ports, including:

- Valleyfield QC
- Cleveland OH Duluth MN
- Ramey's Bend ON Chicago IL
- Monroe MI

www.spliethoff.com or greatlakes@spliethoff.com

CLEVELANDEUROPE OPERATED BY 💌 Spliethoff





- **Editorial**
- 8 BTJ calendar of events
- 10 Market SMS
- 12 What's new?
- 14 Map news
- 16 Made in China
- 17 What's in the Cabinet
- **18** Venture forth
- **20** Chart of the issue Key takeaways from the Poseidon Principles Annual Disclosure Report 2021
- **70** Collector's corner: Dancing oranges instead of bombs by Marek Błuś
- **72** Transport miscellany
- 74 Who is who



22 Filling in the narratives

 The hows and whys of shipping change in 2022 by James Hookham



24 Superior digital endowment

 How a new eco-digital culture shapes the maritime industry

by Martin Wallgren

26 The most sensible way

- Why being an early mover on decarbonisation will pay off - in more ways than one

by Stéphanie Lesage

28 Leaktight

 Carbon leakage in the Baltic Sea region by Jacob Armstrong

30 Ambition into action

– Shipping's decarbonisation: how do we get there? by Carlo Raucci



32 How's the weather?

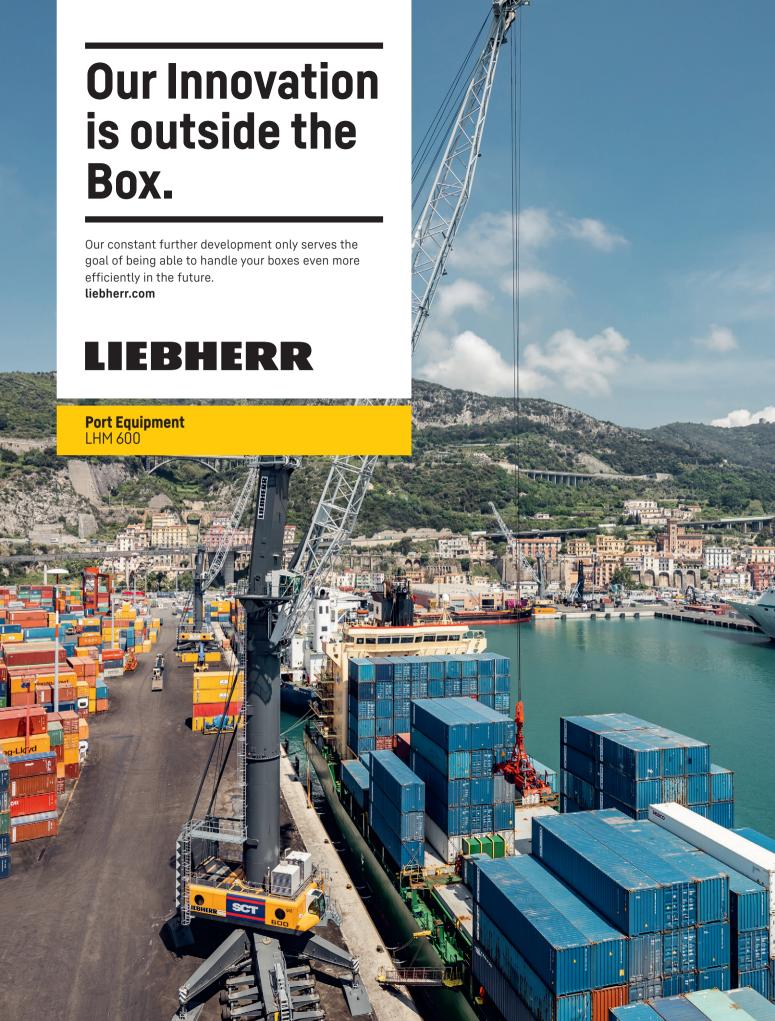
 Changing climatic risk to the global supply chain by Peregrine Storrs-Fox



34 Ocean literacy

- Towards sustainable change with blue engineering, finance, and economy

by Ewa Kochańska



CONTENTS





39 Solid as a rock

 Baltic transport 2021 highlights by Przemysław Myszka



- **60** Challenges addressed comprehensively by Andrzej Urbaś
- **61** Awake.Al joins the BPO by Andrzej Urbaś





62 Small and attractive

The Port of Gdynia tests a floating drone for water research

by Hanna Klimek, Beata Szymanowska, and Anna Salomon

64 Digital voyage analytics to support shipping's decarbonisation

Improving vessel emission performance ahead of the Carbon Intensity Indicator

by Pelle Sommansson

66 Ready to compete

 3D printing propeller blades – towards remarkable high-quality, instant availability, increased sustainability, and lower costs

by Peter Tommy Nielsen



68 Integrate or stagnate

 E-commerce logistics in Europe by Roland Slegers-Leijsten

BTJ CALENDAR OF EVENTS



SIL Barcelona, 31/05-2/06/22, ES/Barcelona, www.silbcn.com/en/index.html

After two years of absence due to the health situation, the Consortium of the Free Zone of Barcelona (CZFB) promotes the celebration of the 22nd edition of the International Logistics and Material Handling Exhibition (SIL), one of the main meetings of the logistics sector in Europe, where the entire logistics chain is represented.



TOC Europe, 14-16/06/22, NL/Rotterdam, www.tocevents-europe.com

Welcome to the AGM for port and cargo supply chain professionals – where the global community will be re-connecting once again face-to-face in 2022! With an unrivalled 40+ year heritage, here is the place to access C-level decision-makers and influencers, engineers, automation leads, digitalisation specialists and more, all hungry to access the latest tech to supercharge their port operation strategies – all underneath one roof. With the industry now keen to get back on the road towards growth, this is the essential event that container supply chain professionals turn to year-on-year to embrace the exciting new tech revolutionising the sector.



Transport Week, 14-15/06/22, PL/Gdynia, www.transportweek.eu

The Transport Week series returns as great speakers and an ever engaged audience gather to get the latest insight on topics defining the shape of the transport industry. Join us during two days filled with presentations and discussions on a broad range of issues, ranging from the impact of the EU's climate policy on the transport sector, through an in-depth analysis of the container, ro-ro and ferry markets, to a closer look at the most exciting infrastructure projects currently underway in the Polish ports.



WOF EXPO, 12-13/10/22, CZ/Prague, wofexpo.com

It will be the second year of the international B2B exhibition focused on the Central & Eastern Europe region. This year around, it will place at PVA Expo Prague. Similar events abroad inspired the organisation of the WOF EXPO, as CEE, a very dynamic region, had none. From the need to an idea to a bustling B2B business platform, an innovative logistics, e-commerce, and supply chain event was born. WOF EXPO will be the ideal spot for anybody seeking and presenting opportunities for the 'New Europe' region – your qo-to networking event.



transport logistic, 9-12/05/23, DE/Munich, www.transportlogistic.de/en

The world's leading trade fair for logistics, mobility, IT, and supply chain management has been taking place in Munich since 1978. The trade fair, accompanied by a conference programme, presents the optimal solutions for every requirement, combining innovative products, technologies, and systems with pooled expertise and a strong sales focus.



THE ALL INCLUSIVE PORT

We move Literally. world, we can be with you all the way.

mountains for our customers.

That's right. Each year, 1,8 million tonnes of iron ore are moved through the Port of Oxelösund. We move, handle and store lots of different commodities. Salt, biofuels, recycled materials, you name it. Our capacity, combined with our skilled, dedicated personnel, makes us a versatile partner who can solve pretty much any challenge. Whatever you want to move, to wherever in the

The Port of Oxelösund is more than a port. We can handle your entire logistics chain and optimize every part of your goods' journey, from start to finish. Our goal is to be the Baltic's leading port terminal, with Europe's best stevedoring services.



DFDS: 43,011k lane metres filled in 2021 (+5.2% yoy)

Counting 18 metres per one unit, the company's fleet transported some 2.39m trucks & trailers and other cargo transport units Europe-wide last year.

DFDS' volumes

Market	2021	yoy
Ro-ro	& ferry cargo traffic	
Channel	19,316k lane metres 1,073.1k cargo units	+1.5%
North Sea	13,769k lm 764.9k	+5.7%
Mediterranean	5,034k lm 279.7k	+24.8%
Baltic Sea	4,467k lm 248.2k	+0.7%
Passenger	425k lm 23.6k	+18.4%
Total	43,011k lm 2,389.5k	+5.2%
Logistics	(thousand cargo ur	nits)
Dry goods	325.4	+8.7%
Cold chain	218.9	-3.1%
Total	544.3	+3.6%
Passenger traf	fic (thousand ferry t	ravellers)
Channel	441	-55.4%
Baltic Sea	214	+2.4%
Baltic Sea Passenger	214	+2.4% -28.7%

The Port of Gdynia: 985,919 *TEUs handled in 2021 (+8.9% yoy)*

Overall, the Polish seaport took care of 26.69mt last year, an increase of 8.2% on the 2020 result.

The Port of Gdynia's volumes (thousand tonnes)

General cargo (excl. timber)	16,206	+14.9%
	4.765	
Grains	4,765	-12.2%
Liquid bulk	2,515	+41.9%
Other dry bulk	1,708	+9.2%
Coal & coke	1,241	-26.4%
Timber	255	+152.5%
Total	26,690	+8.2%

Port of Szczecin--Świnoujście: 33.22mt handled in 2021 (+6.6% yoy)

The Polish ports' leading trade, general cargo (excl. timber), advanced by 8.7% year-on-year to 18.34mt, out of which ferry cargo accounted for 14.92mt (+10.6% yoy).

The Port of Szczecin-Świnoujście's volumes

	2021	yoy
Traffic by cargo group	[thousand	l tonnes]
General cargo (excl. timber), out of which	18,340.9	+8.7%
Ferry cargo	14,923.6	+10.6%
Liquid bulk, out of which LNG	5,250.2 2,872.2	+6.2% +4.1%
Other dry bulk	2,975.2	-5.2%
Coal	2,858.2	+11.8%
Iron ore	1,890.1	+12.2%
Grains	1,786.2	-4.8%
Timber	118.9	+14.3%
Total	33,219.7	+6.6%
Containe	traffic	
TEUs	82,140	-5.4%

The Port of Tallinn:

22.4mt handled in 2021 (+5% yoy)

The wheeled cargo (ro-ro) segment made the biggest advance of 925kt (+16.6% year-on-year), totalling nearly 6.49mt.

The Port of Tallinn's volumes

	2021	yoy
Freight traffic	(thousand ton	nes)
Liquid bulk	8,837	-3.0%
Wheeled (ro-ro)	6,488	+16.6%
Dry bulk	4,693	+6.3%
Containerised	1,893	+4.7%
Break-bulk	485	+18.2%
Non-marine	1.0	-95.2%
Total	22,397	+5.0%
Conta	ainer traffic	
TEUs	226,689	+6.0%
Passenger traffic	c (thousand tra	vellers)
Ferry	3,479	-19.7%
Cruise	63	_*
Total	3,542	-18.2%

^{*} No cruise passengers in 2020

The Port of Antwerp: 239.78mt handled in 2021 (+3.8% yoy)

The Belgian port's leading trade, general cargo, rose by 3.2% year-on-year to 155.21mt. Of it, containerised freight accounted for 138.44mt (-0.5% yoy), followed by 11.48mt of break-bulk (+73.6% yoy) and 5.29mt of wheeled (ro-ro) cargo (+13.9% yoy). Liquid and dry bulk handlings also advanced – by 3.2% yoy to 71.23mt and by 15.4% yoy to 13.34mt, respectively. Antwerp's container traffic noted a minimal 0.1% yoy downtick, having taken care of 12,020,245 TEUs. The port's vehicle logistics business, on the other hand, advanced by 7.7% yoy to 972,200 cars.

The Port of Gdańsk: 2,118k TEUs handled in 2021 (+10.1% yoy)

Tonnage-wise, the Polish seaport's containerised freight traffic amounted to 20.6mt, up 3% on the 2020 result. Overall, 53.2mt (+10.6% yoy) went through Gdańsk last year, a new alltime high, including 23.4mt of general cargo (+5.9% yoy), 18.9mt of liquid bulk (+38% yoy), 4.8mt of coal (-15.8% yoy), 4.5mt of other dry bulk goods (-11.8% yoy), and 1.6mt of grains (+6.7% yoy). Gdańsk's passenger traffic also noted an uptick – of 10.1% yoy to 164k travellers.

The Port of HaminaKotka: 14.71mt handled in 2021 (-1.6% yoy)

The Finnish seaports' last year's volume comprised 11.05mt made in international export (-3.2% year-on-year), 3.52mt in import (+2.9% yoy), and 169.8kt in domestic traffic (+55.3% yoy). A total of 593,550 TEUs went through HaminaKotka's quays in 2021 (-4.5% yoy).

Viking Line:

2,315,137 passengers served in 2021 (+20.1% yoy)

At the same time, the company's ferries carried 442,484 private vehicles (+24% year-on-year) and 129,278 ro-ro cargo units (+2.9% yoy). The Turku-Åland Islands-Stockholm route saw an increase of 51.9% yoy, up to 904,321 passengers. On the other hand, the Helsinki-Åland-Stockholm crossing fell by 11.3% yoy to 153,183 travellers. *Viking Cinderella*, which served the Stockholm-Mariehamn link and embarked on cruises last year, accommodated 261,010 passengers (+26.2%). *Rosella*'s Mariehamn-Kapellskär crossing was up by 81.8% yoy to 348,209 travellers. *Viking XPRS*, plying between Helsinki and Tallinn, carried 21.1% yoy fewer passengers, down to 591,122.

The Port of Kaliningrad:

437,190 TEUs handled in 2021 (+55.4% yoy)

Overall, the Russian Baltic seaport took care of 10.65mt (+2.1% year-on-year). Both dry and liquid bulk handlings contracted – by 2.6% yoy to 4.62mt and 31.7% yoy to 1.47mt, respectively. On the other hand, general cargo turnover advanced by 29% yoy to 4.55mt, including 2.14mt of containerised freight (+54.1% yoy) and 1.14mt of wheeled (ro-ro) cargo (+9.1% yoy). Some 76k ro-ro cargo units went through Kaliningrad's quays (assuming 15t per one truck/trailer/railcar).

The Port of Liepāja:

7.06mt handled in 2021 (+6.9% vov)

Whereas the turnover of dry and liquid bulk contracted (by 1.6% yearon-year and 8.7% yoy to 4.72mt and 545.9kt, respectively), the handling of general cargo went up by 48.4% yoy to 1.79mt. Wheeled (ro-ro) cargo traffic advanced by 61.7% yoy to 1.27mt (an estimated total of 66.9k ro-ro cargo units). Containerised freight increased even more, up 125% vov to 142.7kt (some 9,300 TEUs). The Latvian seaport also served more passengers (+40.5% yoy to 44,576 travellers).

The Port of St. Petersburg:

62.03mt handled in 2021 (+3.6% yoy)

Dry bulk turnover recorded the highest increase of 9.2% year-on-year, totalling 9.24mt. St. Petersburg's main trade, general cargo, advanced by 3.3% yoy to 41.30mt. Containerised freight traffic totted up to 26.07mt, a decrease of 2% yoy. The Russian Baltic seaport took care of 2,042,358 TEUs (-2.7% yoy), including 267,602 reefers (+2.6% yoy). Wheeled cargo traffic amounted to 1.44mt (+25.3% yoy). Counting 15t per one truck/ trailer/railcar, the port handled some 96.4k ro-ro cargo units. Also, more liquid bulk goods were handled, up 0.5% on the 2020 result to 11.49mt.

The Port of Rauma:

5.1mt handled in 2021 (+1.3% yoy)

The Finnish seaport's international cargo traffic totalled 5.03mt (+5.1% year-on-year), including 3.45mt of exports (+3.2% yoy) and 1.58mt of imports (+9.4% yoy). The remaining 66kt was handled in domestic import traffic (-72.6% yoy). The Port of Rauma took care of 209,517 TEUs (-4.1% yoy), out of which 106,950 in foreign export (-4.2% yoy), 99,813 in import (-6% yoy), and 2,754 in domestic import traffic (+354% yoy). Tonnagewise, Rauma's containerised freight traffic totted up to 1.84mt (-2.3% yoy).

China-Europe container rail freight traffic:

1.46m TEUs carried in 2021 (+29% yoy)

The number of trains crossing the New Silk Road(s) rose by 22% year-onyear to 15k. According to the China National Railway Group, the border crossing in Khorgos overtook Alashankou as the main gate for China-Europe rail traffic last year. The former handled 6,362 trains sets vs the latter's 5,848.

Rostock Port:

595.1k ro-ro cargo units handled in 2021 (+16.2% yoy)

A total of 407k trucks (+10.9% year-on-year), 161k trailers (+27.8% yoy), and 27.1k railcars (+41.1% yoy) were taken care of by the German Baltic seaport. Rostock's intermodal rail traffic rose, too, by 33% yoy to 121k cargo units. Overall, the port handled 28.68mt (+14.3% yoy), including 18mt of wheeled (ferry & ro-ro) cargo (+17.6% yoy), 6.9mt of dry bulk (+2.2% yoy), 3.1mt of liquid bulk (+27.6% yoy), and 680kt of other general cargo (+9.7% yoy). Rostock's passenger traffic rose last year, too, up 31.4% yoy to 1.8m travellers. Ferries brought 24.1% yoy more passengers (1.7m), while 47 cruise calls added another 100k. In addition, some 429k private vehicles in ferry traffic (+31% yoy) went through Rostock's quays.

The Port of Kiel:

7.56mt handled in 2021 (+9.3% yoy)

The German Baltic seaport thus hit its new freight traffic record. General cargo handling accounted for 6.35mt (+7.9% year-on-year), out of which ferry cargo – 6.32mt (+7.4% yoy). Kiel's link with Klaipėda totted up to 2.9mt (+9% yoy), Gothenburg - 2.1mt (+16% yoy), and Oslo - 600kt (+2% yoy). Turnover of bulk goods added the remaining 1.21mt (+17.6% yoy). A total of 209,518 trucks & trailers went through Kiel's guays (+10.6% yoy). The port also handled 28,774 TEUs (+22.5% yoy) and 27,376 new vehicles (+27.6% yoy). On the other hand, intermodal rail traffic contracted – by 7.1% yoy to 30,633 units. Kiel's passenger traffic climbed by 78.1% yoy to 919k travellers, including 633k ferry (+31% yoy) and 286k cruise (+738% yoy).

The Port of Ust-Luga:

114.96mt handled in 2021 (+12% yoy)

The Russian Baltic seaport's leading trade, liquid bulk, advanced by 3.9% year-on-year to 56.07mt. With 55.96mt, dry bulk came second, increasing by 21.5% on the 2020 result. General cargo handling rose, too, by 13.2% yoy to 2.9mt. However, Ust-Luga's container traffic decreased – by as much as 41.1% yoy to 29,298 TEUs. On the other hand, the port's wheeled (ro-ro) cargo traffic went up - by 9.3% yoy to 1.14mt. Counting 15t per one truck/ trailer/railcar, some 76k ro-ro cargo units were taken care of.

The Port of Gothenburg:

828k TEUs handled in 2021 (+6.7% yoy)

The Swedish seaport's rail container traffic advanced even faster, up 9% year-on-year to 458k TEUs. At the same time, the handling of ro-ro cargo units rose even more, noting an uptick of 9.9% yoy to 566k trucks & trailers. The vehicle logistics segment grew by 9.4% yoy to 256k units. The Port of Gothenburg also handled 19.1mt (-11.6% yoy) and 250kt (+6.8% yoy) of liquid and dry bulk, respectively. The port served a total of 765k passengers (+29.7% yoy).

The Port of Turku:

1.41m passengers served in 2021 (+28.6% yoy)

The Finnish seaport handled 2.41mt last year (-1.5% year-on-year), out of which international freight traffic totted up to 2.32mt (-2.7% yoy), while domestic - 95.3kt (+38.8% yoy). A total of 123,321 trucks & trailers went through Turku's quays in 2021 (-2.2% yoy). The port also took care of 3,080 TEUs (-8.1% yoy).

The Port of Ventspils: 93,098 ro-ro cargo units handled in 2021 (+6.3% yoy)

The Latvian seaport thus noted its new best wheeled (ro-ro) cargo turnover, which tonnage-wise totted up to nearly 2.27mt (86% of all general cargo handlings). Overall, the Port of Ventspils took care of 11.08mt last year (-14.1% year-on-year), including 5.99mt of liquid bulk (-27.8% yoy), 2.64mt of general cargo (+4.9% yoy), and 2.49mt of dry bulk (+17.8% yoy).



Furetank orders another tanker

China Merchants Jinling Shipyard in Yangzhou has been contracted to build the ninth vessel in the Vinga series, with delivery scheduled for January 2024. The 17,999 dwt tanker will offer a cargo capacity of 20,306 m³ across 12 epoxy-coated tanks. Apart from the possibility to run the dual-fuel newbuild on liquefied natural gas or its bio version, she will be equipped to operate cargo pumps with high voltage (6.6 kV) shore power. The tanker will also have the 1A ice class. The Vinga tankers are operated by the Gothenburg-based Furetank (which owns four) within the also Gothenburg-located Gothia Tanker Alliance.

PIRIOU to build a sailing cargo ship

The French shipyard has been contracted by the also French TransOceanic Wind Transport (TOWT) to design and deliver a hybrid, two-mast freighter. The 81 by 11.9 m ship will offer a capacity of 1,000-1,100t (in bulk on pallets), plus space for 135 225-litre barrels of wine or spirits. Additionally, the ship will offer six double cabins for up to 12 passengers. According to TOWT, the vessel's maximum speed under sail will be over 16 knots, with an average of 10.5. The two mainsails, two jibs, and one Genoa jib will span over 2,500 m². Two turbocharged 4-stroke diesel engines will supplement them. The launching of the vessel is planned for summer 2023. "The sailing cargo ship [...] will make it possible to reduce CO₂ emissions by more than 90% and to economise 20g of CO₂ per tonne transported per kilometre. It will therefore save 3,000 tonnes of CO₂ per year. In addition to the carbon savings, principally wind-powered propulsion will allow a significant reduction in the air pollution caused by the heavy fuel oil generally used by merchant ships," Guillaume Le Grand, Chairman, TOWT, highlighted. As such, the company notes, the ship "[...] will make it possible to massify its environmental impact by transporting up to 20,000 tonnes of goods per year by sail power." TOWT says it has already secured several orders for transporting cocoa, coffee, wine, champagne, and raw sugar. The company intends to open four routes linking the Port of Le Havre with New York, Brazil, Guadelupe, Colombia, Djibouti, and the Ivory Coast.



Helsinki Shipyard to construct an icebreaker for Norilsk Nickel

Constructing the dual-fuel (LNG) diesel-electric vessel, designed in co-op with Aker Arctic Technology, will commence this year, with delivery scheduled ahead of the 2025 icebreaking season. The Arc7 ice class icebreaker will be built according to the lcebreaker 8 class notation of the Russian Maritime Register to break through 2.0 m thick ice, both ahead and astern. Securing access to the Port of Dudinka, the ship will operate in the Yenisei River, the Yenisei Bay, and the Kara Sea. Helsinki Shipyard has recently purchased the main equipment for the icebreaker, plus carried out ice and open water model tests. Norilsk Nickel's icebreaker will be the largest diesel-electric one put together in Finland.



Westport orders Kalmar's CCS Electric Reachstacker

The 45t of lifting capacity machinery, due for delivery in early Q4 2022, will feature a 326 kWh lithium-ion battery pack covered by a five-year warranty and an expected first life of 10-12 years. Accord-



ing to the manufacturer, the battery capacity is sufficient to cover a complete working shift. The charging will be performed during scheduled breaks using combined charging system (CCS) chargers with a maximum capacity of 350 kW, making it the world's first reachstacker to implement this standard. The purchase comes together with five-year-long Kalmar Complete Care that will provide Westport with preventive and corrective maintenance services.

The first sail cargo vessel in EcoClipper's fleet

The Alkmaar-headquartered organisation has bought the 1912-built Dutch clipper *De Tukker*, which will start carrying cargo and passengers across the North Sea later this year after restoration works. The retrofit will bring *De Tukker* back up to commercial standard, including works on her hull, a new deckhouse, and an upgrade of the rigging. Once in sailing condition, the clipper ship will be able to carry 80 m³ of cargo, about 50-70t, while also offering room for 12 travellers. After construction, *De Tukker* worked as a coastal trader before becoming a Dutch sail training vessel in the 1980s. She seized her operations in 2012, requiring significant repairs.



Marseille-Fos' first box carrier LNG bunkering

The 15k TEUs big CMA CGM BALI received around 6,000 m³ of liquefied natural gas (LNG) from Total-Energies' Gas Vitality while handled at the Eurofos container terminal. TotalEnergies operates two 18,600 m³ capacity bunkering ships – Gas Agility at the Port of Rotterdam and Gas Vitality around Marseille-Fos. Both are on charter from Mitsui O.S.K. Lines, Later in 2022, the company will take hold of a third vessel, which will be stationed in Singapore, where TotalEnergies was awarded a five-year supplier licence, starting from 1 January this year, by the Maritime and Port Authority of Singapore.



ABP-Stena Line £100m deal

The two have struck an agreement for erecting a brand-new terminal at the Associated British Ports' (ABP) Port of Immingham, leased by the Swedish ferry line for 50 years. ABP intends to submit an application for a Development Consent Order to the UK's Secretary of State for Transport in early summer, with a view to the new terminal facilities being operational in 2025. Once commissioned, Stena Line's current Immingham freight activities will move to the new site adjacent to Immingham Outer Harbour. "Our freight levels are at record levels and are continuing to increase, so we want to build on this success and provide additional services to our most important business needs, those of our customers, with the development of a brandnew terminal and berths at the Port of Immingham," Niclas Mårtensson, CEO, Stena Line, said.

Hutchison Ports orders 17 Konecranes' ARTGs for Felixstowe

The Finnish manufacturer will deliver the all-electric, busbar-powered, automated rubber-tyred gantry cranes (ARTGs) in three phases, with the delivery of the first six machines expected in Q2 2023. By Q4 2025, all 17 ARTGs will be handed over. In addition, Konecranes will integrate the existing ARTG fleet of Felixstowe with its machinery through remote operating stations (ROS) and the company's Crane Task Management System. Konecranes' Crane Adapter Module will adapt the controls to the ROS and give the work orders to the existing cranes. A single operator at the ROS will remotely handle up to five ARTGs simultaneously across the yard. The Konecranes' 'street bogie' solution will enable fully automated, obstacle-free gantry travel. The producer's TRUCONNECT remote monitoring is also included in the buy, providing remote crane diagnostics.

Polsteam orders new ships

The Polish shipowner has entrusted Dalian Shipbuilding Industry Company (DSIC) with the construction of four bulkers for traffic to and from the Great Lakes. The 37k dwt ships, 199.99 m long and 23.7 m wide, will be delivered by DSIC's yard in Shanghai. Among others, Polsteam's newest 'salties' will be equipped with selective catalytic reduction (SCR) reactors for lowering NO, emissions. The newbuilds will also comply with phase III requirements of the Energy Efficiency Design Index.





Aura Seaways deployed in the Baltic

After arriving from China, DFDS' newbuilding has started serving the Karlshamn-Klaipėda route. The 230 by 32 m ferry offers room for 600 passengers and 4,500 lane metres of cargo capacity (freight-wise, some 80% more than the biggest ship previously serving the course in question). *Aura Seaways*' sister ship, Luna Seaways, is expected to join her in spring 2022. With the help of the EU, the Port of Karlshamn has invested around €25m in a new berth to accommodate DFDS' new tonnage. The Swedish port has also modernised berth no. 2 to receive larger ships, including widening the link-span.



New Germany-Sweden cargo train

The German Spedition Bode will launch a new rail service for both containers and trailers between Lübeck and Halmstad as of April's start. The trainsets will make two weekly calls to Halmstad, chiefly with goods for the food industry. The Port of Halland, the harbour operator in Halmstad, expects to handle some 80 cargo units per week within the new service. "We are saving around 70% $\rm CO_2$ per trailer and container when we shift cargo flows onto rails, at the same time making transport times from the continent faster in comparison to sea shipping. In the longer run, I see Halmstad as a sustainable hub for sea and rail volumes – towards a gateway to other destinations in central Sweden," Stev Etzrodt, CEO, Spedition Bode, highlighted.

A new France-Italy rail link

GEODIS has kicked off a new intermodal route between Noisy-le-Sec in France and Novara in Italy. The thrice a week service offers a weekly loading capacity of 240 ITUs. "We are delighted to be able to offer a road-rail solution to our customers including delivery to or from France, for packaged products as well as liquids or powders; hazardous materials or waste," Daniele Bernardi, Managing Director of the GEODIS Road Transport Line of Business in Italy, commented. He furthered, "A single loading unit is used from the sender to the recipient (swap bodies, box containers and tanks). All our container carriers are equipped with GPS beacons to guarantee safety and real-time information."

Viking Glory arrives in while Amorella leaves Turku

After a five-week-long journey from China, Viking Line's brand-new cruise ferry has called to the Finnish seaport, where she will get outfitted to start serving the Turku-Åland Islands-Stockholm route as of 1 March 2022. The GT 63,813 vessel of the 1A Super ice class is 222.6 m long, offering 922 cabins for 2,800 passengers and 1,500 lane metres of cargo capacity. Like her partner on the route in question, *Viking Grace, Viking Glory* has dual-fuel engines, making it possible to run on liquefied natural gas (LNG) or bioLNG. The newbuild also features other solutions to lower her environmental impact, like heat & cold recovery and dynamic ventilation and lighting. *Amorella*, offering room for 2,480 passengers and 900 lane metres of cargo capacity, was taken off the Stockholm-Åland Islands-Turku service at the end of February. She will, in turn, join *Gabriella* as of 1 April 2022 in serving the Helsinki-Stockholm crossing. As a result, Viking Line will again offer daily departures from the two capitals (however, because *Amorella* is for sale, it is unknown how long she will be linking them).



New rail service Osnabrück-Hamburg

The link offered by TFG Transfracht involves six weekly runs by the company's TFGeco trains that use green electricity only. Cargo handling operations at Container Terminal Osnabrück are also 100% powered by green electricity. "We are delighted to expand our range of shortland feeders with the Osnabrück connection and to meet the growing demand for climate-friendly transport solutions. By expanding rail transport, we are offering a genuine rail alternative to road. In this way, we are shifting another 30,000 TEUs from road to rail in the region and achieving a saving of up to 5,000 tonnes of CO_2 emissions per year for our climate," Frank Gedat, Head of Regional Division North East, TFG Transfracht, highlighted.

Rail Cargo Group links Austria and Sweden via Germany and Denmark

The Austrian rail freight haulier has combined two services, TransFER Linz-Scandinavia-Wels and TransFER Linz-Duisburg-Wels, adding the Rheinkamp-Malmö wagonload link. Following the consolidation, the number of round trips between Linz and Rheinkamp (near Duisburg) and Wels increased by one to six/week. Two continue from Rheinkamp via Maschen to Denmark and the Öresund/Øresund Bridge to Malmö. The return trip goes to Wels. The Linz-Malmö transit time amounts to approximately 61 hours.

New combined rail service Italy-Netherlands

Jan de Rijk Logistics and TX Logistik launched on 5 January a new intermodal service for containers and trailers (incl. P400) between Venlo and Melzo. The service started with five weekly over and back runs, expected to be supplemented by a sixth round trip as of February 2022. The transit time amounts to 24 hours. In the Netherlands, the trains are handled at the Cabooter Railterminal Greenport, while in Italy at Rail Hub Milano.



New Germany-Netherlands intermodal service

Kombiverkehr and TFG Transfracht have partnered to connect the TriCon in Nuremberg and Cobelfret in Rotterdam terminals. The new service runs five times per week. "With the new continental train service, we are giving our freight forwarding customers a clear answer to the scarcity of resources in terms of loading space and truck drivers, which is currently not only found on this corridor in continuous road freight transport," Alexander Ochs, Managing Director, Kombiverkehr, commented.

CLdN's newbuild enters traffic

The gas-run (dual-fuel) *Faustine* has started sailing between the ports of Gothenburg and Zeebrugge. The 217 m long vessel, constructed by Hyundai Mipo Dockyard, offers 5,400 lane metres of cargo capacity. The South Korean shipyard will also deliver *Faustine's* sister ship.

Finnlines boosts its Baltic network

First, as of 24 January 2022, the company's *Finnkraft* and *Finnhawk* ro-ros serve the Gdynia-Hanko crossing more frequently: six times per week. Each vessel offers 1,853 lane metres of cargo capacity. Second, *Finnfellow* was added to the Malmö-Travemünde service. The ro-pax – offering 3,099 lane metres of freight capacity and room for 440 passengers – joined *Finnclipper*, *Finntrader*, and *Finnpartner*, increasing the route's daily round trips from three to four as of 1 February.

New intra-Sweden rail service

From 31 January 2022, the Swedish arm of the German TX Logistik runs a block train between the Port of Trelleborg and the intermodal terminal in Eskilstuna. The four round trips per week connection is a company train for the Austrian LKW WALTER, specialising in full truckloads. A single train offers the capacity of up to 38 units, primarily trailers. Transit time amounts to seven hours. TX Logistik is responsible for traction, terminal handling, and customer service.



MADE IN CHINA

New China-UK rail-sea container service

Bahnoperator has started connecting the Associated British Ports' harbour in Hull with Xi'an via the Baltic Sea Bridge, a sea shipping service between Mukran and Kaliningrad. The weekly round trip offers a transit time of 19-25 days.

New China-Germany rail service - via two Baltic ports

The new route connects Xi'an and Mannheim, with trains crossing the border in Manzhouli-Zabaykalsk towards the Port of St. Petersburg, where the load boards a ship for transhipment in Mukran and final delivery by rail. It takes 16-18 days to cover the 12,800 km long route.

From China to Azerbaijan - by rail

With the help of the Azeri Ministry of Economy and Xi'an Free Trade Port Construction and Cooperation, ADY Container dispatched a 50 forty-foot container train from Xi'an to Baku. The test run went through the Trans-Caspian corridor, including a sea leg over the Caspian Sea. It took 23 days for the shipment to arrive in Azerbaijan, including a few days long weather-caused delay in the Kazakh Port of Aktau. ADY Container intends to turn the Xi'an-Baku link into a regular service later this year.

New Poland-China rail connection

Just before Christmas, DB Cargo Eurasia linked the Port of Gdynia with Xi'an. The end-to-end timetable of the initial service amounted to 24 days.

Gävle added to the New Silk Road

The Finnish Nurminen Logistics has launched a sea-rail service that links the Swedish seaport with Beijing via Kotka. Containers are transported by sea from Gävle to Kotka, from which they move to China by rail. The first train left Kotka on 21 December. The initial offering included five train sets dispatched within three weeks. "This new route will give the customers in Sweden more advantages compared to the traditional deep-sea route, thanks to the availability of Nurminen empty containers in Sweden, regular short-sea connections to Kotka and Helsinki ports in Finland from where trains can depart directly to China with only one day handling time in port, reaching China in two-three weeks depending on the final destination," Nurminen Logistics said.



Heated discussion over the maritime EU ETS

Several organisations have recently expressed their concerns with the current shape of the proposal to include sea shipping in the European Union's Emission Trading System (EU ETS). According to the European Commission's plans, shipowners would need to buy permits covering all their emissions from GT 5,000+ ships inside the EU (incl. emissions at berth) and 50% from international voyages starting and ending in the EU (however, specific non-EU ports will also fall under the first category, e.g., ports of call in Norway, except those on Svarbald, and Iceland, while not all "ports of call under the jurisdiction of a Member State" will be included, e.g., Greenlandic and Faroese seaports). The European Sea Ports Organisation (ESPO) fears that the EU ETS will lead to evasive port calls, a practice aimed at lowering the shipowners' costs but potentially leading to higher emissions. ESPO proposes expanding the proposal's scope by considering the evasive call to/from a non-EU neighbouring port as a call to an EU port to count the EU ETS emissions. In addition, ESPO says, the proposed monitoring mechanism should be strengthened to clearly define evasive trends and foresee the following steps if such trends are identified. "Ships can move, ports cannot. The polluter will not pay but move out where possible, without any emission gains. We cannot just wait and monitor the damage that would result from the current proposal," stressed Isabelle Ryckbost, ESPO's Secretary-General. Meanwhile, the Royal Belgian Shipowners' Association (RBSA) agrees with ESPO that the funds generated by the maritime EU ETS should go back to the industry, the so-called Ocean Fund proposed by Peter Liese, Member of the European Parliament and its EU ETS Rapporteur. According to RBSA, the current support scheme, the Innovation Fund, excludes much of the block's shipping, as it requires vessels to be built in a European yard and sail between European ports (in practice excluding the biggest and most polluting ships trading worldwide and put together in a non-EU shipyard). Last year, no money from the Innovation Fund was granted for a largescale maritime project. At the same time, only two were selected under the small-scale call (one targeting bioLNG and the other hydrogen for inland waterway vessels). RBSA quotes a 2020 UMAS study, which calculated that \$1-1.4tr will be needed to achieve the International Maritime Organization's 2050 target of halving total annual greenhouse gas emissions from international shipping vs the 2008 reference point. Out of this figure, 87% should go to land infrastructure for providing low-to-zero marine fuels, while the remainder should come as green fleet investments (newbuilds and retrofits). RBSA isn't in favour of including ships below GT 5,000 in the maritime EU ETS right now, since it might delay launching the entire initiative (the EU's system for monitoring, reporting and verification of shipping CO_2 emissions, introduced in 2018, includes vessels above GT 5,000 only). This approach stands at odds with Transport & Environment (T&E), according to which the EU ETS should cover GT 400+ vessels, but only those emitting 1,000 tonnes of CO, per year. This way, the organisation argues, 12% more emissions would fall under the EU ETS than the current proposal. Citing one of its latest studies, T&E says that 25.8mt of CO, won't be included if the GT 5,000 threshold holds. That and keeping in place several exemptions, such as for fishing and military vessels, and offshore gas & oil service ships, the organisation adds. "This means just over half of Europe's ships are exempt from the proposal, despite them accounting for nearly 20% of the EU's shipping emissions – double what the Commission originally claimed the exemption would cover," cautions T&E. Jacob Armstrong, Sustainable Shipping Officer, T&E, commented, "It's good that the EU is finally trying to address shipping's appalling climate impact. But its proposal based on arbitrary loopholes lets too many heavily polluting vessels off the hook. The EU must rethink its shipping laws to ensure that millions of tonnes of CO. don't go unregulated."

Guide for Methanol and Ethanol Fueled Vessels published

The latest **guidelines** released by the American Bureau of Shipping (ABS) set out classification criteria for the arrangements, construction, installation, and survey of machinery, equipment, and systems for vessels operating with methanol or ethanol as fuel - with a focus on minimising risks to the vessel, crew, and the environment. Ships are eligible to receive the Low Flashpoint-Fueled Ship (DFD-Methanol) notation when they are arranged to burn methanol for propulsion or auxiliary purposes in accordance with the Guide. "ABS is involved in multiple methanol-fueled projects covering container vessels, bulk carriers and tankers, together with dual-fuel machinery projects, and we are proud to be able to use our experience to support the industry with the



New rules on ship waste delivery

The European Commission has adopted four implementing regulations under the **Directive** on Port Reception Facilities (itself adopted in 2019 to prevent marine pollution from vessels by ensuring that waste generated onboard, and passively fished waste, is not thrown into the sea but returned to land and adequately managed). First, when calling at an EU port, ships must deliver all waste to the port's reception facility, with the exemption made for ships with sufficient capacity to store the waste accumulated during their intended voyage until they reach the next port of call. **Second**, to incentivise waste reduction already aboard, the Directive requires that port fees are lower for ships that produce reduced quantities of waste and manage it in a sustainable and environmentally sound manner. Third, ports must collect passively fished waste, i.e., waste caught in fishing nets during normal fishing vessel operations. So that such waste can be monitored, the Directive requires the EU Member States to report on the amount and characteristics of passively fished waste delivered to their ports. Lastly, EU Member States are required to inspect 15% of ships calling their ports to verify compliance with the waste rules, in the first instance targeting those at the highest risk of non-compliance.



NORTHERN SKAGERRAK TO GO HYBRID

• As of 2022's second quarter, the service ship of Northern Energy & Supply will run on electricity (while its auxiliary engine will be fed by hydrotreated vegetable oil). The conversion will save some 680t of CO₂ emissions. In Q2 2022, the 46 by 9.6 m 700 dwt *Northern Skagerrak* will start collecting sludge from vessels arriving at the Port

of Gothenburg. "When the invitation to tender for sludge collection was issued, the Port of Gothenburg climate objectives were used as a starting point in the evaluation model. Carbon emission mitigation was one of the quality criteria applied when assessing potential service providers," the Gothenburg Port Authority underlined. •

SHELL CONTRACTS THYSSENKRUPP TO INSTALL A GREEN HYDROGEN FACILITY IN THE PORT OF ROTTERDAM

• thyssenkrupp Uhde Chlorine Engineers will engineer, procure, and fabricate a 200 MW electrolysis plant using the company's 20 MW alkaline water electrolysis modules. Construction of the electrolysers will likely begin in spring 2022. Shell's final investment decision to build the Holland Hydrogen I facility is expected later in the year, after which the intended start of production will be in 2024. Green hydrogen will be produced for industry and transport, with electricity

coming from the 759 MW Hollandse Kust Noord offshore wind farm (operational in 2023). It will be possible to transport hydrogen through a 40 km long pipeline from the new plant to Shell's Energy and Chemicals Park Rotterdam. "Net-zero is a number one priority for the plant: reusable construction materials will be applied wherever possible and solar panels will be incorporated in the outside walls of the plant," thyssenkrupp Uhde Chlorine Engineers underlined. •

MOL CARRIES OUT AUTONOMOUS SHIP TRIALS

• Within the MEGURI2040 project, led by The Nippon Foundation, Mitsui O.S.K. Lines (MOL) and its partners have carried out two portto-port autonomous sailings with a coastal container ship and a ferry. The sea trials were conducted on 24-25 January 2022 between the Japanese ports of Tsuruga and Sakai. In October 2021, MOL Marine & Engineering did a safety verification test using its 3D simulator. The consortium behind the trials includes Mitsui E&S Shipbuilding (responsible for developing the 'Judgement' and 'Ship Operation' functions – automated collision avoidance routing, automated ship operation in port, and automatic berthing/unberthing); Furuno Electric (the 'Cognitive' function – integration of sensor information during navigation and at berthing); Imoto Lines and MOL Ferry (providing the container carrier and ferry, respectively, and seafarers and developing the ship operation plans); A.L.I. Technologies (mooring support technology); and MOL Marine & Engineering (simulation software for collision avoidance, navigation, berthing,

and unberthing). The ships safely navigated the routes formulated by the autonomous collision avoidance routing system based on the integrated information. Autonomous berthing and unberthing were executed using information from the Furuno Electric-developed berthing/unberthing support sensor (equipment that calculates and visually displays accurate relative distances and relative angles between the pier and hull from the data gathered by LiDAR/camera/ satellite compass). A robotic flight drone was in charge of the mooring by carrying the heaving line to the pier. During the trials, information on other ships and obstacles/debris on the set route was gathered by the Furuno Electric-developed autonomous surrounding information integration system (which measures and displays positions, speed, types of nearby ships, and position of obstacles/debris by integrating information gained by cognition through radar, AIS, and camera images). The consortium plans further autonomous navigation sea tests using the Sunflower Shiretoko coastal car ferry. •

DRONE TECH-PARTNERSHIP IN HAMBURG

• HHLA Sky and the Hamburg Port Authority (HPA) have teamed up to explore ways automated drones can be used across the German port. "In the event of storm surges, accidents or other unforeseeable disruptions, flying, floating or self-driving robots can be on-site considerably faster and provide high-resolution videos and pictures for an exact overview

of the situation. The time saved can be decisive in an emergency," Jens Meier, Chairman of HPA's Executive Board, illustrated. He added, "Furthermore, they make the maintenance and expansion of the port infrastructure significantly more efficient – for example, in the case of facilities that are difficult, time-consuming or dangerous to reach." •

HY2GEN PLANS A GREEN AMMONIA PLANT IN NORWAY

• Together with its partners Trafigura and Copenhagen Infrastructure Partners, the Wiesbaden-based company has started the Front-End Engineering Design (FEED) phase of a production plant to be located in the Norwegian Municipality of Sauda. With the help of Norconsult, a pre-study was completed in 2021. The project owners have started the FEED stage now, expected to yield a plan for the facility's construction by 2023. Following a final investment decision, the beginning of works is scheduled for the first quarter of 2024, and the facility will be fully operational as of 2027's start. The facility, named

Iverson eFuels, will feature an initial electrolyser capacity of 240 MW to produce 600t of green ammonia as a marine fuel per day. Rasmus Bach Nielsen, Trafigura's Global Head of Fuel Decarbonisation, underscored, "Availability of zero-emission alternative fuels such as green ammonia is an important pre-requisite to decarbonising the global shipping industry. We also urgently need global policy-makers to cost neutralise the use of zero-carbon fuels through carbon pricing measures to drive demand and enable to radically reduce emissions." •

FIRSTBIO2SHIPPING GETS FIT FOR 55 FUNDING

• The project initiated by Titan, Attero, and Nordsol has been awarded €4.3m for setting up a bioLNG and bioCO₂ production plant. The facility at Attero's premises in Wilp is set for completion in 2023. It will produce around 2,400t/year of bioLNG, which Titan, the exclusive long-term off-taker, will supply to the maritime industry as a marine fuel. The plant will also deliver some 5.000t/year of bioCO₃. Attero will produce 6.0m Nm³/year of biogas from domestic biowaste for FirstBio2Shipping. Nordsol will use its iLNG technology to upgrade and liquefy the biogas. The solution is said to produce high-quality bioLNG (without contaminants), eliminate methane slip, and have no high-temperature demands in gas treatment technologies. According to the project partners, the produced bioLNG will reduce greenhouse gas (GHG) emissions by 92%

compared to conventional marine fuel, representing more than 87,500t CO₂₀ net absolute emissions avoided during the first ten years of operation. Jan-Willem Steyvers, Business Developer, Attero, highlighted, "Producing bioLNG out of biogas is the next step in biowaste digestion, leading to higher-end products. BioLNG from biowaste supports the circular economy and helps dealing with yet another global concern: replacing heavy fuel oil applications. By producing bioLNG locally, traceability and transparency are ensured. Our bioLNG will meet ISCC [International Sustainability and Carbon Certification] certification criteria. The Firstbio2shipping project will create more opportunities for local biogas upgrading plants, produce high-quality, sustainably sourced bioLNG, and help decarbonise the maritime industry. It's a no-brainer." •

ØRSTED TAKES STAKE IN LIQUID WIND'S FLAGSHIPONE

• The Danish energy company has purchased 45% shares of the e-methanol project developed by the Swedish power-to-fuel development firm. FlagshipONE will feature a 70 MW electrolyser, making it possible to produce 50kt/year of e-methanol (to be used as a marine fuel) based on renewable hydrogen and biogenic CO₂. Onshore wind will power hydrogen production, while the biogenic CO, will be captured from the combined heat and power plant Hörneborgsverket in Örnsköldsvik in Sweden, where FlagshipONE will also be located. The partners plan to commission FlagshipONE

in 2024, pursuant to a final investment decision that could take place this year. "The interest from Ørsted shows how far Liquid Wind has come and is further evidence for the importance of electro-fuel. Our green fuel will become a dominant fuel for true decarbonisation in the hard to abate shipping sectors, reducing CO₃ emissions by more than 90%. FlagshipONE is the first facility, and it's Liquid Wind's ambition to significantly scale up the number of facilities across the world by 2050," Claes Fredriksson, CEO and Founder, Liquid Wind, stated. •



KEY TAKEAWAYS

The Poseidon Principles (PP) are a framework for assessing and disclosing the climate alignment of ship finance portfolios. The PP apply to lenders, relevant lessors, and financial guarantors (incl. export credit agencies). Signatories must apply the PPs in all business activities that are:

- 1. Credit products including bilateral loans, syndicated loans, club deals, and guarantees secured by vessel mortgages or finance leases secured by the title over vessel or unmortgaged Export Credit Agency loans tied to a vessel.
- 2. Where a vessel or vessels fall under the purview of the International Maritime Organization (IMO; e.g., GT 5,000+ ships which have an established PP trajectory whereby the carbon intensity can be measured with input from the IMO's Data Collection System).

A total of 29 banks, jointly representing approximately \$185b, have to date committed to the PP (with nine parties joining the initiative in 2021). Out of these, 23 institutions publicly disclose their climate alignment scores against a decarbonisation trajectory in this report (eight more than previously).

Signatories have committed to reporting the climate alignment of their portfolios for each calendar year. Underpinning this portfolio score are individual vessel climate alignment scores for vessels in a bank's portfolio. Climate alignment measures the difference (as a percentage) between a vessel's actual carbon intensity and its ship type/size decarbonisation trajectory value, representing the carbon intensity threshold value for its respective type and size per year.

Revisions to the PP decarbonisation trajectories took into account the revised data from the Fourth IMO GHG Study, among others, significant revisions (up-and-downwards) made to the baseline for some ship types. Overall, changes specific to each ship type/size category are due to assumptions on machinery (aux/boiler) power, specific fuel oil consumption, and some vessels being assigned a different engine type (e.g., slow speed).

Revisions to the global decarbonisation trajectories, used for determining the reduction factor required in each year, took account of baseline revisions and revised transport demand projections. It impacted the steepness of the global cargo decarbonisation trajectory, which can mostly be explained by a lower transport demand projection.

While improvements in the carbon intensity of international shipping have not reduced at the same pace each year, 2020 was an extraordinary year for the maritime sector. Overall, UNCTAD predicts that the coronavirus pandemic caused maritime trade to fall by 4.1% in 2020.

Given that some ship types are thought to have experienced particularly large impacts due to COVID-19, it is expected that banks with high exposure to those ship types will experience a distortion in their overall climate alignment score. Therefore, the results reflect the adverse effects of the pandemic, particularly on some ship types, and should not be read as indicative of a lasting trend change but a short-term disruptive event.

FROM THE POSEIDON PRINCIPLES **ANNUAL DISCLOSURE REPORT 2021**

While declines in absolute emissions across different sectors provide a respite to an otherwise increasing trend, this represents latent emissions (suppressed by idling and slow steaming). As markets return to pre-pandemic activity levels, emissions will increase rather than decline along the trajectory needed to meet the IMO's Absolute Target (-50% in GHG emissions by 2050 vs 2008) unless further action is taken to transition the fleet to zero-emission vessels.

The results show that 11 portfolios were aligned with the IMO's Initial GHG Strategy (at least a 40% reduction in the carbon intensity of international shipping by 2030 relative to 2008), representing just under half of the results.

This year's climate alignment scores reflect the heterogeneous impacts of both the trajectory revision and COVID-19 induced impacts on shipping both on different ships and ship types. In absolute terms, the results of 2020 show signs they have been impacted by COVID-19. Most Signatories with worse-than-average climate alignment scores cited the cruise and passenger vessel segments as contributing to their misalignment. Many of these services were suspended from carrying passengers for much of 2020 but still consumed energy (hence causing emissions) whilst waiting for the market to return.

Many of these passenger ships are higher value than freight-carrying ships and can be associated with large debt exposure - so even a portfolio with a small number of passenger vessels can be strongly negatively affected overall.

At the end of the second year of the Poseidon Principles, it is clear that Signatories are using their climate alignment scores to have a more fact-based dialogue with their clients and make more informed lending decisions by integrating climate risk into their portfolio risk management. Some Signatories have reported using the information as an opportunity to create innovative financing solutions which help steer their portfolios along the decarbonisation trajectory, either through financing retrofits. modifications or new buildings or through sustainability-linked loans or leases where the interest rate fluctuates according sustainability criteria such as Annual Efficiency Ratio.

Click the image below to read the whole report, including particular Signatories' scores.



Filling in the narratives

by James Hookham, Director, Global Shippers Forum

Although container shipping capacity remains in short supply, there is no shortage of forecasts for what 2022 holds for the sector and those that rely on its services. Having enjoyed huge profits from an unexpected surge in demand for imported goods into North America and Europe over the past 18 months, most shipping lines and logistics service providers are confidently predicting more of the same this year. That is to be expected – an analysis published last month by the *Financial Times* showed the earnings growth of some shipping lines exceeded that of high-profile tech companies, like Netflix and Amazon. Unsurprisingly, most shipping lines would quite like that trend to continue. Yet, hopes that the 'Great Shipping Crisis of 2021' turns into 'Profits as Usual in 2022' may be premature as carriers overlook the impact of a few factors that look set to dominate this year unless a further variant of COVID-19 engulfs the world.

he working hypothesis of most shipping industry observers is that chronic delays through major ports and congested inland distribution systems, especially in the US, will maintain the upward pressure on shipping rates and transit times globally, much as they did during 2021. There is no new shipping capacity being deployed until 2023 at the earliest and no significant expansion plans being commissioned at the world's major gateway ports. Indeed, possible labour disputes in US and Canadian ports may worsen the situation before it improves.

The acid test

But this scenario presupposes that the demand for imported containerised goods into Europe and North America will remain at, or above, last year's levels and maintain the pressure on congested infrastructure. Absent from this narrative is any recognition of the broader economic developments that are now almost certain to play out over the same period.

For months, central banks and finance ministries have been making clear their intention to increase interest rates with the express purpose of stifling exuberant consumer demand to contain the highest rates of retail price inflation experienced in over three decades (at least in the US and the UK). The OECD has demonstrated that the high cost of shipping goods has contributed directly to these inflationary pressures. The debate is now about how many rate increases will be made in 2022 and their impact on consumer expenditure in importing countries.

There are good reasons why the 'clickfest' of online shopping that triggered the 'Great Shipping Crisis,' and the over-ordering of stock by importers to beat the subsequent delays, could end as quickly as it started. From March or April this year, household expenditure will come under additional pressure as winter energy bills at double or triple last year's rates need to be paid. It will coincide with the first of several predicted rises in interest rates that will start to feed through to higher mortgage interest charges and credit card repayments later in the year. Some governments are also increasing taxes to begin restoring order to their public finances savaged during the coronavirus pandemic. As such, the assumption that the demand for imported containerised goods into Europe and North America will remain at or above last year's levels and maintain the pressure on limited infrastructure looks shaky. Persistently high shipping rates in 2022 are by no means inevitable.

Higher interest rates won't just affect consumers. Businesses will also see the

cost of borrowing rise. The withdrawal of asset purchases (or quantitative easing) by central banks that have made commercial loans relatively cheap and easy to come by for nearly a decade will make rolling over debt more difficult. It will put pressure on businesses' free cash flows, which could trigger reviews of the currently high inventory levels. As early as mid-year, supply chain managers could once again be examining the relative merits of just-in-case and just-in-time supply chains.

A sustained drop in demand for imports, hence traffic volumes, should restore shipping rates and service reliability to more recognisable levels, allowing for a lag of a few weeks for the backlog of containers at major gateway ports to clear. This should, in turn, trigger a re-deployment of shipping capacity, plus reinstating calls at ports habitually skipped by vessels seeking to recover lost time (or were too full to make a call worthwhile) and longer service strings (many of which have been blanked in favour of simpler shuttle movements between ports on more lucrative trades). According to the Container Shipping Market Quarterly Review Q4 2021 done by MDS Transmodal and our organisation, some ports lost a third of the scheduled capacity that was expected to call due to blanked sailings or the port being skipped during 2021.



The pace at which rates adjust and service quality improves will be the acid test of the other shipping industry narrative. According to it, the record rates and poor service quality experienced since mid-2020 have been one-off events solely attributable to the impact and consequences of COVID-19, rather than a permanent resetting of shipping capacity and prices. Shippers will be very closely watching the responsiveness of the market as demand changes.

Tainted with digitalisation?

But this is not to forecast a return to the relative calm of pre-corona conditions. While coping with COVID-19 last year, the container shipping industry also advanced the process of digitalisation of its operations and dealings with customers.

The digitalisation of container shipping is not just substituting paper documents with their e-counterparts. Done correctly, it has the potential to make booking a slot on a container ship no different to reserving a seat on a passenger aircraft. Many of the essential protocols and procedures to allow data exchanges between shipping lines are being, or have

already been, developed by the Digital Container Shipping Association and have started to be deployed. It could very well be the year that the carriers' booking platforms over which these new digital transactions will be conducted achieve take-off, potentially offering a new level of price transparency. How soon before shippers have access to shipping rate comparison sites? The Global Shippers Forum can foresee 'comparetheconsortia.com' becoming a popular site!

Ominously, though, the first deployment of these platforms has been to provide a mandatory spot booking portal for use by smaller forwarders, whom at least two shipping lines have henceforth denied access to contract shipping rates. This has unsurprisingly provoked the wrath of forwarders and

their SME clients. It risks tainting the long overdue benefits of digitalisation in a premature and potentially misjudged step by carriers to rationalise their pricing practices. How the market reacts to this development will be another crucial indicator of shipper (and forwarder) sentiment during 2022.

Another dramatic year of change

The past 24 months will have been the most challenging time of their careers for most shippers. While hoping the fear, and at times the huge stress, of working under the shadow of COVID subsides rapidly, these developments will make 2022 another dramatic year of change – for the container shipping business in general and those relying on it to conduct international trade in particular.



The Global Shippers Forum (GSF) is the worldwide trade body that speaks up, advises and supports shippers and cargo owners in the essential role they perform in national economies and work to make international trade and transport safe, efficient and environmentally sustainable. The organisation participates in meetings of international bodies, offering its opinion and advice on issues that affect the way shippers do their job. GSF also provides its members with exclusive briefings and a

platform for businesses professionals organising the transport of goods to work together, learn from each other and find a common voice. Visit **globalshippersforum.com** to find out more.

Superior digital endowment

by Martin Wallgren, Chief Information Officer, GAC Group

Business leaders are looking to digitalisation to support a return to pre-COVID profitability. But to reap the benefits, management teams need to grasp the technology they use, be it integration, data governance, cybersecurity, blockchain, or Artificial Intelligence. More than that, they need to understand the workforce shaping the future of their trades.

he coronavirus pandemic has triggered a renewed focus on addressing businesses' fundamental problems. The priorities and budgets assigned for digital solutions reflect this. McKinsey & Company has recently acknowledged that accelerating digital adoption during the COVID-19 pandemic has widened the gap between the top and bottom companies: "Competitive differentiation, now more than ever, emerges from superior digital capabilities and technology endowment, more agile delivery, and a progressively more tech-savvy C-suite."

All looking for a competitive edge

It has played out in the maritime and transport markets, which have seen a wave of consolidation, with some players exiting the sector entirely. Those service providers still operating post-pandemic are looking to capture contracts previously awarded to firms no longer in business. Customers seek information, facts, data, and reports to give their executives the insights they need to make timely business-critical decisions. And where static reports once sufficed, they now want a clearer and deeper understanding of their supply chains' performance. But with staff numbers down due to 'The Great Resignation,' such insights can no longer be maintained in-house, and

companies are turning to their suppliers for the data they need.

It places new demands on service providers like GAC – but we are well prepared. We have invested early in creating an accurate data model of the company's business – a significant investment for an incumbent global business. This data model is now paying dividends in many ways, one being the ability to operate as a data transfer business that can pivot in response to market changes (similarly to what Uber did during the pandemic when it shifted from taxi to food delivery services).

Our data model means we can adapt faster and more frequently than competitors operating traditional one-size-fits-all models. Rather than this costing jobs, we have worked hard to retain our global presence and local knowledge. Being physically present is a vital part of our ability to deliver digital solutions – it builds the trust that enables us to roll out services to a wide range of companies, all looking for a competitive edge.

Changing perspectives

This nimble adaptation has resulted in profitability, flexibility, and resilience, making GAC attractive to would-be recruits as we emerge from the pandemic. We don't view 'The Great Resignation' as a threat even though it has become a global phenomenon involving millions of workers rethinking their place in the workforce. There is a shift in the mindset of those starting their careers, with most new entrants having grown up with the Internet. Recruits are already digitally literate and will prove integral to company success through digitalisation.

They are part of a fundamental shift occurring in workforces around the world. The 2020 global research report from Cushman & Wakefield titled Demographic Shifts: The World in 2030 notes that for 2020-2030, Millennials will comprise the largest share of the workforce, representing more than 40% of the global working-age population by 2030. At the same time, 693m Baby Boomers are reaching retirement age, and 1.3b members of Gen Z will enter the labour force over the next decade.

New imperatives

This changing workforce brings new business imperatives. Recovery from the pandemic is being coupled with the need to accelerate environmental, social, and corporate governance (ESG) agendas, driven by 'young blood' perhaps more than any earlier generation.

The Deloitte Global 2021 Millennial and Gen Z Survey found that after a year of intense uncertainty due to the pandemic,



political instability, racial discord, and severe climate events, Millennials and Gen Zs are determined to hold themselves and others accountable for society's most pressing issues. "Climate change and protecting the environment" remains a top issue: no. 1 for Gen Zs and no. 3 for Millennials. They are channelling their energies toward meaningful action. In turn, they expect institutions like businesses and governments to do more to help bring about their vision of a better future.

Our organisation appreciates the importance of ESG for business success and values its staff's focus on it. The GAC Group has recently unveiled its Roadmap to Sustainability, which sets out its commitment to adapt and innovate its activities (also reduce if necessary) while supporting and influencing change in others. We have joined the Eyesea maritime pollution reporting and mapping project and the Ocean Race's CleanSeas initiative as part of our environmental protection and preservation engagement. Both

are in line with the Life Below Water UN Sustainable Development Goal – one of the goals GAC's Roadmap states must be measured by all GAC companies.

We have further demonstrated our commitment to climate change by joining the Call to Action for Shipping Decarbonisation and the Global Maritime Forum's Getting To Zero Coalition. Climate-neutral sea transport should be the default choice by 2030, and GAC supports the decarbonisation of international shipping by mid-century.

A grounded approach

Digitalisation will be critical in supporting decarbonisation. From improving fuel efficiency to integrating and optimising new technologies on board ships and in ports, true digital transformation requires a long-term commitment and a grounded approach. It needs to target achievable and measurable boosts to profit, performance, and safety during the green transition. It requires a solid overarching digital vision, excellence and governance across all knowledge silos, the rollout of digital initiatives that generate business value, and a robust digital culture.

Digitalisation will transform all business areas. We will be in debt to the future generation pioneering the cultural change for taking this step forward. Today's 'young blood' is truly helping address the challenges we all face together.



The GAC Group is a privately-owned company specialising in delivering high-quality shipping, logistics, and marine services to customers worldwide. Emphasising a long-term approach, innovation, ethics, and a strong human touch, GAC offers a flexible and value-adding portfolio to help you achieve your strategic goals. Go to **www.gac.com** to learn more.

The most sensible way

by Stéphanie Lesage, General Counsel and Corporate Secretary, Airseas

Challenged with reducing greenhouse gas emissions, shipping is entering a transformational period, currently led more by the industry than by regulators. For companies, taking climate action has become a no-brainer – for the right thing to do for the planet is also a decision that makes business sense, now and in the long run.

hroughout modern history, a major shift has often come from the grassroots, with people's demands for equal rights, safer working conditions, and an end to child labour, for example, leading to profound changes that have transformed societies and industries for the better. At present, the environmental movement is irrevocably gaining momentum across the globe, demanding immediate climate action and more sustainable practices in the way goods are sourced, produced, and transported. This new reality is transforming the maritime transport playbook, as our customers demand bolder than ever action. As such, shipping companies are increasingly required to demonstrate both retain clients and investors.

The pace of change

The tone of the debate on climate change has fundamentally changed, resulting in a significant level of commitments from the private sector and governments at the recent 26th Conference of the Parties (COP) in Glasgow. Even though this has not yet translated into more ambitious targets and measures by the International Maritime Organization (IMO), it is undeniable that more regulatory pressure is coming – and is needed, too. The industry is already feeling the strain of the IMO's latest regulations, like the Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII), forcing them to improve their energy efficiency through design and operational measures 2023.

Furthermore, voices call for tightening global rules to meet the IMO's own goals and even achieve the increasingly popular vision of net-zero shipping by 2050, as proposed by the Global Maritime Forum. The pace of change may still be slow; yet, the direction is clear: more stringent rules will undoubtedly come, whether from the global, regional, or national regulators – adding up and responding to the pressure from society at large.

Immediate rewards for pioneers

Just like steering a giant container ship into a sharp turn is a delicate operation, transforming the 50,000-big global merchant fleet to achieve net-zero is complex and will take decades to complete. And just like changing the course of a vessel is easier if the necessary manoeuvres have started in time, being a first-mover on decarbonisation will pay off, and today's pioneers will have a more solid foothold on the new playing field for shipping.

The good news is that being an early mover on decarbonisation already makes business sense today, and solutions exist to enable shipowners to reduce their emissions instantly. These come in the shape of a wide range of clean technologies that significantly improve the energy efficiency of vessels, including wind propulsion, air lubrication, and innovative coatings.

The first and most immediate benefit of such technologies is obvious: improved energy efficiency makes ships burn less fuel to achieve the same result; hence, costs go down. For example, our Seawing system, an automated kite that propels commercial vessels, lowers the engine effort by an average of 20% – and up to 40% on favourable routes. Through reduced fuel costs, we estimate that the investment can make a return after two to five years, depending on the service and ship type. Moreover, as the industry is faced

with volatile fuel prices, burning as little as possible is undoubtedly already a considerable advantage. The Seawing was installed on the *Ville de Bordeaux* ro-ro in December last year and is currently undergoing sea trials between France and the US. It demonstrates how quickly new technologies are scaling up to become readily available for newbuild installation or retrofitting.

The long-term vision

The shipping decarbonisation debate has so far been mainly centred on the development of alternative fuels, such as hydrogen and ammonia. Given the level of investment involved, the temptation is high for shipowners to sit back and wait until we have a clearer indication of which fuel will come to dominate the markets. But inaction at this stage would be a tremendous mistake.

The reality is that the future ship will need clean technologies and new fuels. That said, it will be the former that will facilitate the transition to the latter. Indeed, alternative fuels are likely to be more expensive than their fossil counterparts, meaning savings created by energy efficiency technology will make an even more significant difference on companies' bottom lines. Meanwhile, the hill will be steeper for shipowners who have failed to reduce their energy consumption through available technology.

What is more, the top contenders have a much lower energy density than standard fuel oil: about three times for ammonia and, depending on its state, four to eight times for hydrogen. This situation will force owners to buy more fuel, bunker more frequently, or even clear out cargo to make room for additional storage tanks



- all of which will impact profitability. In short, the basic economics of these alternative fuels will intensify the need for each ship and the global fleet to operate using less energy.

Photo: Airseas

Next, it will likely take at least ten years to develop the entire chain: fuels, engines, and infrastructure on the scale necessary to supply the global fleet. In the meantime, clean technologies will enable ships to remain compliant with the energy efficiency regulation landscape as it progressively tightens. For shipowners, it may make the difference between keeping their vessels trading or seeing their assets stranded. Ultimately, investing in clean technologies will buy shipowners some vital 'manoeuvring room' to analyse emerging fuels and market trends, thus making more enlightened decisions when the time comes for critical investment in new vessels and alternative fuels.

All hands on deck

Without immediate action, the shipping business will miss a huge opportunity

to make a difference for the planet. As the world looks to the next climate conference in Egypt (7-18 November 2022), communities around the globe are calling on their political leaders to work together to achieve net-zero. We believe that the same level of collaboration should occur at the industry level, with former competitors joining forces for the greater good.

In the run-up to COP26, we worked with a group of maritime tech leaders to call upon the industry, the IMO, and the European Union to recognise the critical role of energy efficiency and renewable propulsion technologies to decarbonise shipping. While our technologies are different - from wind propulsion and voyage optimisation software to biotech-based coatings agents that reduce friction - we are united by a common goal: to enable immediate and tangible action on climate change.

The history of seafaring is one of optimism, perseverance, and ingenuity in the face of difficulty. Where we stand today, no challenge is greater than the fight against climate change. Moreover, we can no longer ignore downstream factors, such as our clients' environmental, social and (corporate) governance requirements, and the increasing influence of the consumer expressing their opinion in the ballot box and at the checkout. If we can use all the tools we can get today, not only will we get closer to the needed emission reductions, but it's the most sensible way to future-proof newbuilds and the current fleet.



Airseas was founded out of the need to act urgently for our planet and climate. We are committed to providing all ships with the means to harness free and unlimited wind energy. The company's **Seawing**, flying dynamically over 200 m above sea level, is a 1,000 m² wing designed to fully harness the power of the wind, reducing fuel consumption and emissions by 10% to 40%. Please head to www.airseas.com to learn more.

Leaktight

by Jacob Armstrong, Sustainable Shipping Officer, Transport & Environment

The European Commission's (COM) proposal to include maritime transport in the EU Emissions Trading System (EU ETS) has been hailed as the first step for the shipping industry to address its climate problem. Nonetheless, ports have voiced concerns that the EU ETS may lead to carbon leakage, where ships call to non-EU ports before finishing their voyage in an EU port for the sole purpose of avoiding the full carbon cost of their journey. Intuitively, this might sound reasonable, but a closer look at the matter paints a different picture.

sing Automatic Identification System (AIS) data, combined with the EU's Monitoring, Reporting and Verification (MRV) Regulation, we at Transport & Environment (T&E) analysed traffic in the biggest ports in the Baltic EU Member States: Gdańsk, Klaipėda, Riga, Tallinn (Muuga), and Sköldvik. We looked into cost factors earnings, fuel expenses, opportunity costs (the business lost in the time spent evading) and additional port charges - to evaluate whether an evasive call to Ust-Luga (cargo-wise, the region's biggest, and Russia's second busiest overall) would be financially attractive.

A minor risk

The analysis showed that under today's carbon price (€80/tCO₂), there would be a minor 6.1% risk of evasion under the geographic scope proposed by the COM, namely all emissions from voyages between European ports, but only 50% of emissions from voyages between European and non-European ports.

We explored different scenarios that might influence evasion. In the case of high or low earnings (where freight or charter rates differed greatly from historical averages), the risk was 1.4% and 8.6%, respectively. In scenarios of high or low fuel prices (an increase/decrease of fuel prices by 50% compared to historical averages), the risk of evasion was 2.3% and 8.7%, accordingly. Finally, there was a 1.1% risk of evasion under the port congestion scenario.

On the one hand, analysis of actual voyages revealed that vessel size is, indeed,

important. The smallest bulk carriers (below deadweight of 10,000) have no incentive to make an evasive port call from Argentina to Poland for carbon prices under €384/tCO₂. Even the largest vessels on this route (above 200,000 dwt) would not be tempted to evade under €112/tCO₃.

On the other hand, the total length of a voyage plays a risk evasion role. Most voyages to or from the UK, the Middle East, Africa, and the Americas would likely comply with prices under €100/tCO₂. Meanwhile, around half the voyages from East Asia and Oceania – or 16% of the total number of journeys – would be tempted to evade. It should be recalled here that this type of carbon leakage does not result in trade loss for a port (business leakage) as the ships will still visit EU ports at the end of their journey; rather, it means that the EU ETS coverage would be slightly reduced.

Carbon leakage in a broader European context

The Baltic study has interesting parallels with a previous T&E report on the risk of evasion in the three EU ports seemingly most at risk of carbon leakage: Algeciras, Rotterdam, and Piraeus. In it, we showed an 11.9% evasion risk at $680/\text{tCO}_2$ under the base-case scenario, around 5% higher than in the Baltic.

Baltic marine traffic presents several particularities that explain a smaller risk of evasion. These include the draught limit of 15 metres to pass through the Danish straits, meaning that the biggest vessels – which often have a greater incentive to evade – cannot access the region (i.e., when fully laden).

Evasion in practise

While the T&E study can help understand the theoretical risk of evasion, several issues, which would further diminish the risk of noncompliance, found themselves outside the scope of the study. For instance, the possibility that ships adapt their behaviour to reduce emissions and carbon costs – by slow steaming, among others – was not considered but is the intended and likely outcome of the EU ETS.

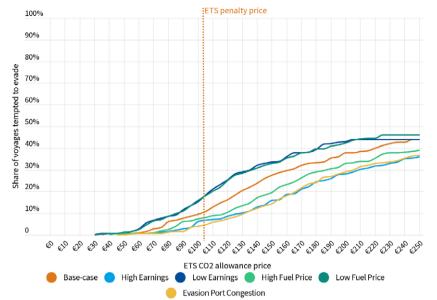
The practical experience of evasion also wasn't considered. In reality, bulkers and tankers (these segments make up two-thirds of Baltic traffic) aren't inclined to make evasive port calls. This is because, under EU rules, a 'port call' must involve trade, and few customers would be willing or able to trade small amounts of dry or liquid bulk goods solely to aid evasion.

The study similarly did not take into account climate regulation outside Europe. The majority of IMO states have declared their intention to mandate zero-emission shipping by 2050. At the same time, both the UK and China have proposed to include shipping in their carbon pricing systems. This move adds to initiatives such as the Clydebank Declaration, where 22 countries gathered to declare their ambition to implement six green shipping corridors by 2030.

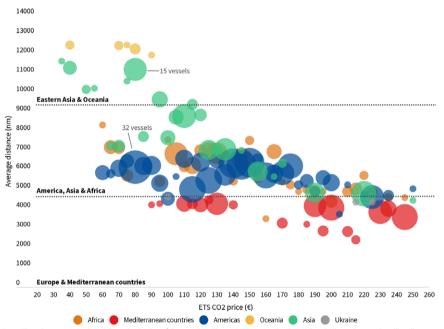
The unlikeness of a modal shift

Carbon leakage in its simplest form is unlikely to result from the EU ETS. Some organisations have suggested that carbon leakage could, nonetheless, occur in the form of modal shift. In the Baltic case, this means goods would be carried by sea to Ust-Luga before being transshipped onto trucks and carried back into the EU.





Note: The dotted line, shown for reference, represents the ETS penalty price of €100/tCO2 (€106 adjusted for annual inflation since 2013).



Note: The colors represent the origin or destination of the vessels calling at Baltic ports. The dotted lines indicate the span in sailing distance between these regions and the Baltics. The size of the bubbles indicates the number of vessels sailing from and to the Baltics that might find it financially attractive to evade at any given CO2 price.

While our study on carbon leakage in the Baltic Sea region did not look into this case, there are many reasons why this situation is unlikely. Firstly, ships carry threequarters of external EU trade - owing to shipping's economies of scale, orders of magnitude higher than road transport. Secondly, there would be a significant increase in red tape, customs costs, and lead time by travelling to Russia to then re-enter the EU, instead of stopping directly at ports with much closer links to the European hinterland (this not even considering the heightened political tension between the

Kremlin and the West in light of the conflict in Ukraine). Finally, the COM has proposed a separate ETS for road transport, so trucks will also have to pay for CO2 costs

under the ETS (in addition to fuel taxes paid at the petrol stations). A mix of these factors led the COM to label the risk of this leakage "inexistent."

It has also been suggested that a modal shift to rail may be incentivised. While this would not constitute carbon leakage, as rail is a greener mode of transport, the difference in rail gauge between Russia and central Europe makes this type of evasion unlikely, putting geography, bureaucracy, and customs to one side. And that's not to mention Ust-Luga's rail & road network directed eastwards to Moscow and the nearby regions with their factories, not the EU market.

Sound – but could be better

The above findings present some valuable lessons for decision-makers. The risk of carbon leakage is negligible for the EU ETS, meaning that the COM's current proposal - to monitor shipping statistics and propose instruments if and when evasion is found – is a sound approach.

Nonetheless, to assuage concerns, policymakers should heed the calls from the European Sea Ports Organisation to institute a full geographical scope EU ETS (to regulate 100% rather than half of the voyages between EU and non-EU ports) and consider extending the EU ETS' range to cover legs past European journeys, something that legal analysis has found legally feasible. It might solve the marginal evasion cases and ensure the EU ETS has the highest environmental ambition possible.

In summary, the EU ETS is a good proposal. Our analysis suggests that it will not result in carbon leakage in Europe, either in the form of port evasion or negative modal shift. Instead, it may finally chart the course to make green shipping a reality by incentivising energy efficiency improvements and generating revenue for investing in port infrastructure and instruments like Carbon Contracts for Difference to ultimately bridge the price gap between clean and dirty fuels.

Known for pioneering eco-friendly innovation, the Baltic sea shipping and port industries may as well start writing new, greener chapters, not worried about how to bite the EU ETS or carbon leakage bullets.

TRANSPORT & **ENVIRONMENT**

Created over 30 years ago, the Transport & Environment (T&E) NGO has shaped some of Europe's most important environmental laws: we got the EU to set the world's most

ambitious CO, standards for cars and trucks; campaigned successfully to end palm oil diesel, secure a global ban on dirty shipping fuels, create the world's biggest carbon market for aviation, and make Uber commit to electrifying much of its European operations; we've also helped uncover the Dieselgate scandal. Head to www.transportenvironment.org to discover our vision of an affordable zero-emission mobility system with a minimal impact on our health, climate, and the environment.

Ambition into action

by Carlo Raucci, Marine Decarbonisation Consultant, Lloyd's Register

The shipping industry's collective commitment to deliver on zero-emission by 2050 was palpable at the Glasgow UN Climate Change Conference of the Parties (COP26) last November. The sector enjoyed a higher profile than at previous COPs, and commitments were signed that placed intention ahead of regulation. Among these was the Clydebank Declaration on Green Corridors. It currently involves 22 countries and allows getting such large-scale demonstrators tested and into service in a controlled, risk-managed-and-mitigated manner.

he initiative put forth by the Clydebank Declaration focuses on major port hubs and specific trade routes, gathering the relevant supply chain actors under one banner. It points to scalable and commercially viable solutions, supports the green transition policy-wise, and encourages targeted public and private investment. The initiative also enables a fuller understanding of where the first land-based new fuel production infrastructure might have the biggest initial impact. The Green Corridors are, without question, essential to encouraging first-mover activity.

Navigating the opportunities and risks

The creation of Green Corridors is tied to another crucial area where pioneers require a helping hand to convert their ambition into action, namely in navigating the opportunities and risks associated with the many transition scenarios out there. That is why we have established the Lloyd's Register (LR) Maritime Decarbonisation Hub.

In December 2021, the Hub launched 'First movers in Shipping's Decarbonisation – a framework for getting started,' an approach that enables a detailed comparison of different fuel transition pathways regardless of vessel type or trade lane. It, among others, focuses on comparing different fuel options and what the evolution of a specific fleet means for the regional supply chain.

It also entails raising critical questions, ranging from "What are the material costs needed by all stakeholders to meet these changes?" and "Are there any synergies across the supply chain once a path is selected?" to "What do we need to keep monitoring to continue improving our strategy?"

Framing the work

The Maritime Decarbonisation Hub framework evaluates the entire supply chain, from fuel production to onboard use, and can be applied to any fleet, revealing the implications of each transition strategy and offering insights to support future fleet investment decisions.

We can pinpoint a common solution by identifying the breakdown of different costs for the supply and fleet sides for a specific fleet and location. This way, we encourage stakeholders to think about what works for them holistically, helping kickstart a scalable transition for other fleets and locations.

Until now, research has either focused on a specific ship and fuel or been too high level and generic to have real relevance for shipping companies. LR's new framework can help the industry move from analysing the entire global shipping fleet to focusing on plausible real cases for large demonstration projects worldwide. By doing this, we can help reduce uncertainty and risk by providing an understanding of the transition pathways open to stakeholders in those

particular demonstrations. This approach can also inform a strong business case for a potential coalition that will support the chosen route ahead.

Lessons already learned

Our first study analysed three transition pathways – for methanol, ammonia, and hydrogen – and applied each potential fuel to the container ship feeder fleet operating regionally between Singapore, Hong Kong, and other nearby Asian economies. The set comprised 222 ships, totalling around 360k TEU capacity, with an annual fuel consumption estimated at 1.4mt of fuel oil equivalent and 4.7mt of CO₂ emitted per year.

We chose that particular region because it is a regular trading route that generates an aggregate demand to specific ports, so much so that fuel providers are more confident to make investment commitments to serve this market. And we wanted to pick an ecosystem or green corridor that can be scalable to other ships serving this port network/region, so the supply chain could, in theory, start the transition here and scale it out. Below is what we found out.

First, different transitions might be suitable for this specific fleet – based on either methanol, ammonia, or hydrogen, which can, in turn, be produced from natural gas, renewable electricity, or in some instances, also sustainable biomass.



Second, similar emission reduction trajectories have different implications for the fuel supply infrastructure. The fleet transitions based on methanol, ammonia, or hydrogen can all meet similar emission reductions; however, this result is achieved using different infrastructures and at varying implications.

Third, the sector must balance early results with strategic planning. The analysis shows a trade-off between early efforts to decarbonise the fleet, which allows for a smoother transition, versus the long-term planning approach, which attempts to find the solution with the lowest overall cost. This balance must be found while providing a growing fuel supply through different feedstock routes without major price fluctuations.

Fourth, both retrofits and newbuilds will be required to meet net-zero by midcentury. In all transition pathways, approximately 26% (by the number of ships up to 2050) of the transition is achieved through retrofitting. It means that replacing vessels near the end of their lives with newbuilds powered by zero-carbon fuels is no longer sufficient to meet the net-zero 2050 target. Instead, younger ships in operation today need to be retrofitted to accelerate the uptake of zero-carbon fuels.

Fifth, fleet costs vary per transition pathway. The total fleet costs up to 2050 are lowest for ammonia (\$44.5b), followed

by methanol (\$51.5b) and then hydrogen (\$69.4b) – compared to the fossil fuel baseline of \$42.3b (incl. carbon cost).

Sixth, voyage expenses dominate the fleet's total costs, representing between 71% and 82% of the cumulative fleet total costs depending on the transition. Therefore, improving vessel energy efficiency and voyage optimisation becomes increasingly instrumental in reducing the cost of decarbonisation.

Seventh, the fleet fuel transition leads to a specific fuel supply. The production location delivering the cheapest fuel production option typically also benefits from being the location with the lowest feedstock prices, except when the cost of transporting that fuel to the fleet becomes too large (e.g., for the hydrogen transition scenario).

Finally, co-location of fuels produced with natural gas and fuels produced with renewable electricity could deliver further cost reductions. Saudi Arabia and Australia are likely production locations because of the relative lower feedstock prices. There can be key economic advantages in plant

co-location, such as de-risking investments and building long-term security of supply capability and associated costs.

Unearth and accelerate

This first step was an exercise to show what the framework can do, i.e., to find a system-based solution that brings the supply and fleet sides together. By focusing on a particular Green Corridor, the framework can highlight issues in advance, helping to identify what we think might work best for a specific fleet and, importantly, reach a common solution that holds good for the majority of stakeholders. The framework can be applied to different fleet types, geographies, and transition strategies outside of the three fuels explored in the report. As we advance, we want to develop the framework further and test it on a real case.

Building on this fuel agnostic framework, the LR Maritime Decarbonisation Hub aims to steer cross-industry alliances that can unearth and accelerate resilient energy transitions, enabling the carry out of Green Corridor projects this decade.



Launched in 2020, the Lloyd's Register Maritime Decarbonisation Hub is a joint initiative between Lloyd's Register Group and Foundation. It brings together thought leaders and subject matter experts with the skills, knowledge and capability to help the maritime industry design, develop and commercialise the pathways to future fuels required for decarbonisation.

Click www.lr.org/en/marine-shipping/maritime-decarbonisation-hub to learn more.

How's the weather?

by Peregrine Storrs-Fox, Risk Management Director, TT Club

The climate is changing and increasingly so towards more extreme weather events. It necessitates greater awareness of weather-related risks in the global supply chain. Let us then look at some of the considerations cargo handling facilities should contemplate in anticipating climatic events and mitigating their potential consequences. In addition, using TT Club's past claims data, let's highlight the extent of wet damage exposure.

veryone is well aware of weather conditions in their locality; those responsible for operating cargo facilities are likely to be acutely conscious of changes in local climatic conditions. Many have seen tidal surges and wind microbursts, while unprecedented rainfalls are becoming increasingly common. Such operators need to keep 'fresh' their assessment of the changing risk profile concerning climate experience to protect personnel, operations, equipment, fixed property and infrastructure, and importantly – customers' goods.

Meteorological comprehension is advancing, and related risk management assistance technologies are equally widely available. The capability to monitor, record and predict weather patterns will continue to develop. None of this will physically protect operations, but when utilised as an integral component of ongoing risk assessments, they may inform decision-making, such as where to position equipment, how best to stack empty containers, and strengthen procurement specifications.

Lovely weather for ducks...

Whilst many storm events are considered geographically seasonal – such as those in the Tropics – the entire supply chain industry must take adequate steps globally to prepare for isolated severe weather events.

Typically wind strength is most ferocious in coastal areas. Yet, the surge and flood risk can often cause greater problems, both on the coastline and further inland. The occurrence of extraordinary volumes of rainfall over short periods in various parts of the globe is increasing, resulting in flash flooding and causing significant damage, including to warehouses and cargo stored within them. However, the fact that more rain fell on a particular day than any other in recorded history does not assure legal defence if a claimant can demonstrate deficiencies in the operator's risk assessment or inadequacies in the steps taken in advance of the weather event.

The associated losses of such incidents can be far-reaching; water can penetrate the tiniest cracks and is unforgiving in damage

it causes. Furthermore, flood water is inevitably dirty, increasing damage and in many instances creating health challenging situations. Our claims data from the last three years suggest that inland operations were subject to damage in 32% of cases, illustrating (unsurprisingly) that operations positioned on or near a coast are more susceptible to weather-related incidents (68% of cases). Some 16% of claims notified through the period involved heavy rainfall that overwhelmed drains and guttering, subsequently flooding buildings and storage facilities. Property damage through strong winds and microbursts was featured in 74% of weatherrelated claims throughout the period.

Extreme weather events can be challenging to predict – and even accurate forecasting may only provide a matter of hours for the respective operators to react. It is essential to ensure that adequate risk assessments are undertaken across the full breadth of the operations to understand the various risks thoroughly and, where appropriate, develop mitigating actions and controls, together with an effective continuity plan (for further

reading, kindly check TT Club's Windstorm II: Practical risk management guidance for marine & inland terminals).

Don't make the weather any heavier

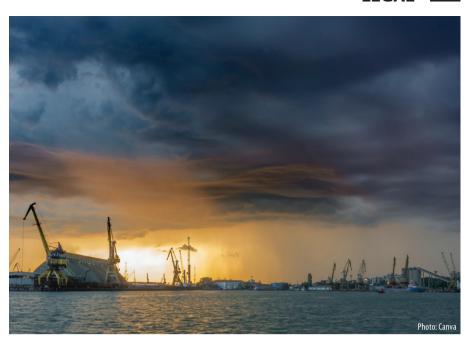
While not necessarily related to extreme weather conditions, claims resulting from wet damage to cargo are all too frequent under more ordinary climatic circumstances. Many of these can be avoided entirely with a robust pre-loading condition checking procedure. While humidity and condensation are inevitable challenges through the supply chain, pre-existing damage to a cargo transport unit (CTU) should be an easy check.

As TT Club regularly articulates, around 65% of cargo damage incidents are attributable in part to the way that goods are packed within the CTU. The CTU Code and the more recent CTU Code – a quick guide and complementary container packing checklist published by the Cargo Integrity Group provide supply chain actors with invaluable risk mitigation guidance.

Pre-packing unit condition checks are critical in protecting the cargo during its journey. Controlling for signs of pests, dust, debris, transferable stains, and odours is vitally important. So too are checks for physical damage, holes, evidence of repairs and items such as rust or water trails that might indicate water ingress. TT Club's claims data for 2020 suggest that 25% of wet cargo damage notifications were caused by water ingress to the CTU through pre-existing damage that probably should have been identified as part of the cargo packing process.

Once the cargo has entered the intermodal supply chain, our data suggest that a further 17% of wet damage claims stem from impact damage to the unit during transportation. Of course, there are many touchpoints throughout the intermodal transit (at the road, rail and maritime terminals) where damage might occur. Road traffic accidents may also expose the shipment to the elements.

The intelligence we gathered indicates the maritime mode poses the most significant risk, accounting for 65% of reported claims. It can be partly explained by the length of time that the cargo is in transit – extending the period of exposure – in addition to the different climatic zones through which the load moves. Road transit was the next most prominent mode at 14%, where shorter journeys, fewer intermodal changes and operator owned units likely influence the better experience. Wet damage arising under air carriage



accounted for only 7% of TT Club's 2020 data reported claims, reflecting shorter transit periods and different handling parameters. Data suggest that the primary exposure, unsurprisingly, rests in-between the airside warehouse and the physical loading to or unloading from the aircraft.

Perhaps less expected, incidents where the cargo was wet-damaged while in storage accounted for 13% of reported claims. Causation varies but includes damage occurring to or within the storage facility itself and, with increasing frequency, the incidence of flooding. Some 31% of these incidents followed sudden heavy rainfall that overcame drain provisions. This latter point highlights the importance of routine maintenance to ensure that drains and drain pipes are clear and undamaged and indicates the prudence of periodic risk assessments to ensure that original building design parameters remain appropriate.

Poor operational practices also attribute to losses, with incidents of cargo temporarily stored entirely unprotected, the shipment being transported on flatbed trailers/flat rack containers with insufficient coverings, and loads being 'cross-stuffed' during periods of rainfall. In too many instances, cargo had been unstuffed from units for customs inspection – laid out on the facility's ground.

Rainfall occurring whilst the goods stand unprotected awaiting examination inevitably causes damage.

Pragmatic yet mindful

While this analysis was limited to 2020 incidents, it was triggered by a deteriorating trend, which indicated a potential increase in risk exposure.

In many instances, fortuitous circumstances resulted in a disproportionate monetary consequence. While the outcomes are necessarily cargo-specific, it is noteworthy that numerous consignments were eventually accepted by the beneficial cargo owner (BCO) with an element of rework, reducing the potential cost of the loss. While such solutions are pragmatic for all concerned, it is clear that all actors in the supply chain need to be mindful of the risks.

While there may be contractual defences to wet damage claims, such as where the bill of lading is noted 'shipper load, stow and count,' there are inevitable consequences when damage is incurred in this way. Having entrusted their cargo into your care, custody and control, the BCO might be expected to be aggrieved when part or all of their valuable cargo has suffered wet damage – regardless of fault. Reputational damage can be extremely challenging to repair.



TT Club specialises in the insurance of intermodal operators, non-vessel owning common carriers, freight forwarders, logistics operators, marine terminals, stevedores, port authorities and ship operators. The company also deals with risk management as well as actively works on increasing safety

claims, underwriting, risk management as well as actively works on increasing safety through the transport & logistics field. Please visit **www.ttclub.com** for more info.



Ocean literacy

by Ewa Kochańska

Last December, the Lloyd's Register Foundation (LRF) released their **Foresight Review of Ocean Safety**, a publication highlighting the world's reliance on the oceans and why the blue economy should be one of the top priorities for global decision-makers. The report lays out recommendations for building a better future for maritime communities: supporting all living organisms, mitigating climate change, and creating effective financial, policy and regulatory frameworks. It also describes ocean engineering as a key sector in the established and emerging ocean industries, especially in the context of just workforce protection and skill transition, marine biotechnology, energy, and ecological sustainability, among others.

s the environmental realities cause more human migration worldwide, the future economy will need an entirely different approach to oceans and blue engineering. While addressing issues such as rising sea levels, pollution, and growing demand in shipping, ocean engineering is battling largely unexplored and unmapped ocean environments, lacklustre regulation, and the absence of transparent governance, data and standards.

Around 71% of our planet is water, and ocean sources produce around half of the Earth's oxygen. Also, about 21% of the greenhouse gas (GHG) reduction expected before 2050 will take place in and around oceans. Yet, the public awareness of the oceans' role in the economy and climate is very limited. Informed advocacy movements can and already have been very influential in drawing attention to climate-related disasters and in situations where infrastructure planning is influenced more by profits than sustainability and safety principles. More community exposure of ocean-related benefits and hurdles is needed from public and charitable organisations.

Outperforming the global economy

Blue engineering comprises many elements such as science, technology, knowledge systems, and relationships between societies and their ecosystems. The report defines the application of ocean engineering as "the design, construction, maintenance and decommissioning of all human activity in the oceans: the structures, platforms, pipelines, boats, ships, underwater vehicles, aquaculture farms, subsea and digital systems necessary to sustain a more populous and safe world."

Similar to other industries, in the blue economy, as the changes pertaining to

environmental sustainability take root, it must be ensured that the new workforce 'leaves no one behind.' Development of new skills, reassignment to different departments or sectors, and upskilling are, among others, necessary for a fair and universally accepted green transition. The right investments and especially informed social policies, along with public engagement, can ease the transition to a sustainable workplace; most importantly, they can protect workers from job losses resulting from shifts to non-polluting technologies and industries.

Furthermore, with the emergence of new ocean industries, such as aquaculture, deep and ultra-deep-water oil and gas, renewable energy, and high-tech marine products and services, a portion of the \$90tr allocated in global infrastructure investments by 2030 will be directed towards the blue economy. Therefore, it's especially important that financial policy facilitates responsible business practices especially concerning the workforce and the environment. The blue economy has amounted to \$1.5tr global gross added value in 2010, is expected to double by 2030, and many of its industries are forecasted to outperform the global economy. Additionally, up to two-thirds of companies depend on healthy oceans and risk losing a combined \$8.4tr if 'business as usual' continues and climate health declines. Therefore, the financial policy must facilitate responsible business practices, especially concerning the workforce and the environment.

As investors start to recognise that maritime industries are indeed growing faster than the rest of the economy, therefore posing attractive investment opportunities, it's critical to divert money away from harmful activities to environmentally sustainable and protective ones. "For this to

happen, there is the need for clear standards and metrics against which investments can be measured to assess that they are indeed being channelled into sustainable ocean uses," says the LRF's report.

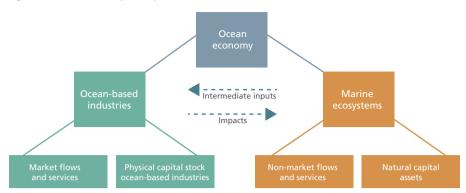
Furthermore, since improved transparency and recognition are required for blue infrastructure investments, more targeted data is needed. Tangible evidence would inform decision-makers, helping with strategic planning. Public trust, awareness, and involvement will increase with foresight and data transparency about ocean activities and their impact.

Unknown and constantly changing environment

The ocean is also a producer of various sources of energy. Currently, they are mainly oil and natural gas, which are being extracted in increasingly deep waters and challenging environments. That creates a demand for new technologies and infrastructure in more rugged terrain that also improves energy output and safety while addressing ecological concerns. The popularity of cleaner energy from solar, wind, wave and tidal has been increasing along with out of the box ideas such as floating nuclear generators (already in use in Russia's Pevek, where one heats the city and provides electricity to the regional power system). While good for GHG emissions reduction, these modern solutions can carry even more safety challenges. That's why the UN's Sustainable Ocean Principles and other regulatory safeguards are crucial in energy development to protect the oceans, the environment, and global populations. In addition, according to the UN's sixth IPCC report, weather and climate extremes affect every part of the world, including ocean infrastructure. While extreme climate events

SUSTAINABILITY

Fig. 1. The ocean economy concept



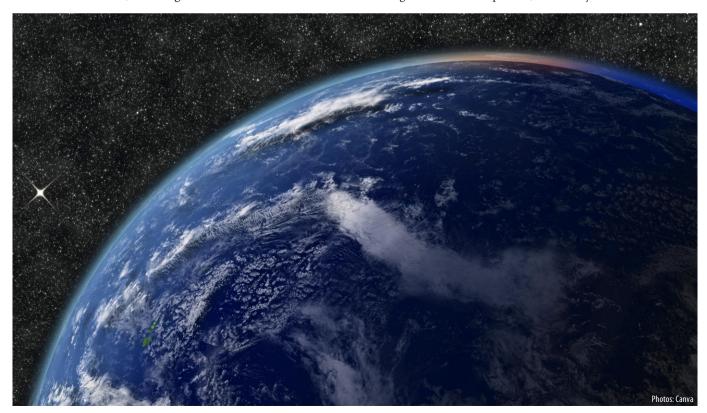
certainly require a proactive approach in engineering, since they are inevitable, ocean engineers must also take action to mitigate the impacts of weather disasters.

One of the main difficulties for ocean engineering is grasping the unknown and constantly changing target environment. Even though oceans cover 71% of Earth's surface and affect the weather and virtually all living beings, just 5% of the ocean floors have been explored. Because of the fluctuating weather systems and resulting changes in the seabed, habitats, and biodiversity, ocean engineers need to adjust their approaches dynamically. As the new and already existing ocean industries try to erect infrastructure in ever deeper and unexplored waters, deepwater technologies such as durable risers, offshore foundations, mooring and safe maintenance technologies are in demand.

Next, with rising global populations and the threat of shrinking habitable space (due to weather disasters), floating liveable space projects, such as Space@Sea and Schoonschip, have started emerging. These initiatives require adequate data and knowledge of local environmental conditions as well as emergency and evacuation planning. "New floating, coupling and mooring technologies are needed to ensure safety and sustainability at every stage of the project, from planning, designing and construction to decommissioning," the LRF's report points out. Moreover, there is no governance framework for habitable floating spaces and islands. Whether these habitats should be overseen by land-based governments or the International Maritime Organization is unclear. Also related to water-based living spaces is the demand for Internet and cloud services which requires expansion of network infrastructure, including underwater fibre optic communication networks. Faster and more reliable web access would benefit current ocean-based industries, too. particularly in deep-sea and polar regions.

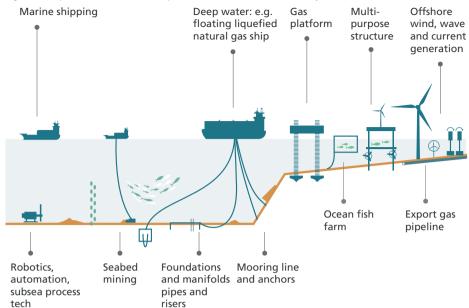
The oceans are also a source of maritime biotechnology, providing material for clean fuel, food manufacturing, and pharmaceuticals, among others. As such, the marine biotechnology sector also needs environmentally creative and safe infrastructure. Similarly, seafloor mining is a growing industry, an attractive income option, especially in less developed nations with fewer economic resources. Deep-sea regions are rich in mineral resources, and the demand for metals is starting to outpace its supply from land sources. "Improved surveying of the ocean surface, advances in deep-sea mining technology (machines are already under development), and clarification of international laws have the potential to grow deep-sea mining into a major industry," according to the report.

Additionally noteworthy is that the oceans serve as the natural employer of the fishing industry and as a significant food source for communities across the world. "Forty percent of the world's population currently consume fish as their primary source of protein, and nearly 120 million seafood



SUSTAINABILITY

Fig. 2. Examples of infrastructure requirements for the ocean economy



workers depend on wild capture fisheries for their livelihood (with nearly 90% of this number working in small scale fisheries)," quotes the report. Its authors also predict a shift from wild capture to aquaculture fish, shellfish, and seaweed within the next few years. While this movement away from traditional capture fishing has environmental

and safety benefits, it adversely affects coastal fishing communities that already feel the pressure of competing with commercial fishing yet lack financial resources for aquaculture transition. This pressure to survive, particularly in developing countries, also creates safety hazards by forcing workers to fish in dangerous sea conditions; even more

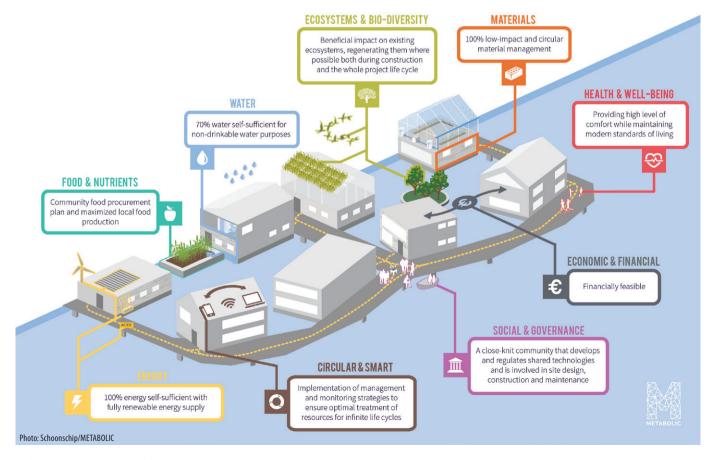
shockingly, by creating forced labour and accommodating human trafficking and modern-day slavery.

Built into design practices

Sea shipping is an essential aspect of the global economy, taking care of about 80% of world trade. The world-wide increase in population and prosperity means that this number will only grow, with some estimates predicting trade will triple by 2050.

The worldwide increase in population and prosperity means that this number will only grow, with some estimates predicting trade will triple by 2050. With heightened pressure and eco-regulations, shipping operators and investors have been turning to innovations such as Artificial Intelligence (e.g., autonomous operations) to optimise their businesses and decrease emissions, in addi-

tion to exploring potentially emissionfree fuels such as ammonia and hydrogen. Interestingly, countries such as South Korea, China, and Japan are also exploring the potential of submerged floating tunnels in oceans. For these technologies to be safe and effective and new ones to emerge, ocean engineers need access to high-quality data



SUSTAINABILITY



about ocean weather patterns, ocean-bed mapping, and other conditions. To that end, adequate technologies and models are necessary to predetermine the frequency and impact of hazards; these will have to come along with globally-uniform safety standards and monitoring of oceanic ecosystems.

Similarly, more robust and resistant materials are needed to replace steel and concrete in, for example, deep-water structures. Advancements in manufacturing, such as 3D printing, can play a significant role in construction and maintenance, particularly in remote conditions, together with new, adaptive design methodologies unique to the ocean industry. "Automation, new materials and sensor technology, remote operations and maintenance practices should be built into design practices rather than being conceived solely as technological add-ons," advises the report.

Unlike current sea and some land infrastructure, future ocean platform facilities must be multi-use, considering the difficulty and cost of erecting and maintaining them, plus factoring in their ecological impact. For instance, this could mean combining aquaculture with energy generation by building seaweed farms around wind turbines. It is also essential that ocean engineers account for decommissioning in their infrastructure design methodologies. Already, thousands of offshore energy facilities will be deactivated in the coming years, which creates a need for creative solutions when it comes to responsible removal or repurposing. "Novel use of ageing infrastructure can provide potentially advantageous solutions - such as when oil

and gas infrastructure is sunk to become artificial reefs that enhance local ecosystems and fisheries or repurposed as futuristic aquaculture facilities," showcases the LRF.

It is also important to underscore one of the most significant challenges in marine transport – the loss of life. Around 3,000 persons a year die in passenger ferry accidents due to crew error, poor training, overcrowding, substandard vessels, lacking life-saving and fire-fighting appliances and equipment, and deficient search and rescue capabilities (SAR). Refugee and migrant trips on the seas have claimed roughly (and most likely underestimated) 46,000 lives since 2014, a statistic that could be at least improved with better SAR technologies and tools.

To protect human life and the environment, we need better guidance. There must be international cooperation and sharing of data, skills, and resources with less developed countries for effective ocean governance. Since blue structures are only going to increase, ocean engineering must "transition from a project-based approach to production-based solutions that can be built and implemented quickly, safely and effectively," according to the report. Additionally, the sector's advances and plans must have public support and approval. The industry should better communicate how their structures and innovative developments will not harm climate, environment, and ocean life. Since crisis management in the ocean environment is very challenging, safety issues regarding blue activities are of utmost importance.

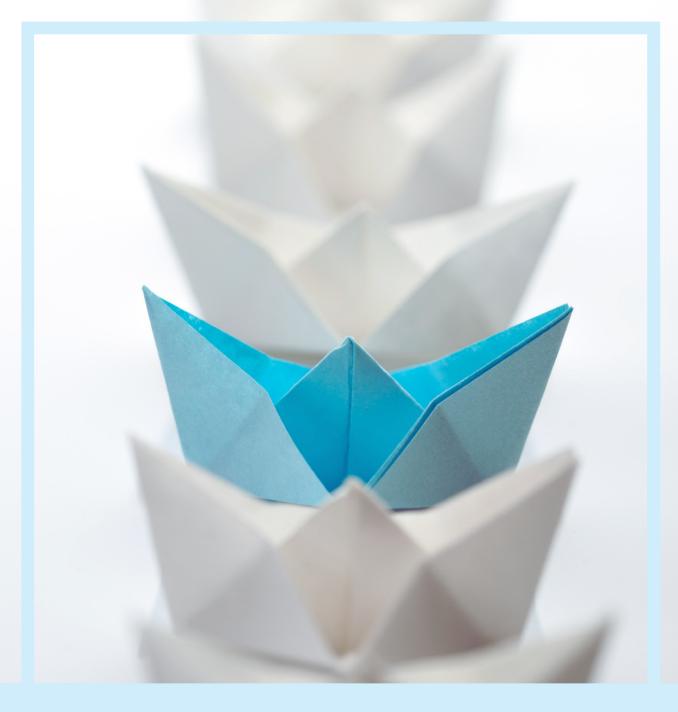
Also worth mentioning is the issue of non-biodegradable debris, especially plastics, as an escalating problem in global oceans, threatening marine life and its entire ecosystem. Innovative clean-up technologies need to be utilised, but more public and charitable funding must be activated for that to occur.

Evaluating the actual costs – material and immaterial – of the ocean economy can be challenging. The methods of estimating those expenses must consider safety, carbon costs, environmental impact, and the absolute sector value added in addition to addressing societal and equity issues. "Research could look at existing or new methodologies to integrate obvious costs (such as capital, operation, decommissioning, clean up, accident, etc.) with those incurred due to risks, intangibles, alternatives, or inaction," recommends the LRF.

Needing assistance

It is essential to remember oceans' pivotal role in our lives, from weather and climate influence, through carbon capture and oxygen production, to food and energy manufacturing. It is also vital to understand that the future global economy will require new and flexible approaches to blue engineering, an industry that needs assistance and governance in facing numerous challenges ahead.

Public awareness, educational pathways, ocean literacy, and international partnerships will be instrumental in bringing about responsible regulation, financing, and business practices in the blue economy.



Baltic Transport



Solid as a rock

by Przemysław Myszka

Although we had to jam another corona year into the Baltic world of transport & logistics, which particularly crossed the ferry & cruise sector, 2021 wasn't lean on the whole. Several themes recurred over the past 12 months, most notably decarbonisation in various forms: alternative fuels, onshore power supply, and offshore wind energy, to name but a few. Port development also kept strong. The seaports of Esbjerg and Gothenburg can reasonably be named as the two most active, with notable mentions of Gdynia and Tallinn for opening brand-new and modern facilities (the latter of a ferry and the former of a cruise terminal). Interestingly, the logistics warehousing industry also took a hefty bite of worthwhile news, especially across Sweden. Traditionally, liquefied natural gas (LNG) and its environmentally-friendlier version (bioLNG) made advances in the regional field. To top it all with shipping, what is said to be the world's northernmost regular passenger service, Wasaline's Umeå-Vaasa route, welcomed (in the teeth of a COVID stumbling) Aurora Botnia. This made-in-Finland spick-andspan ferry has indisputably made crossing the Kvarken an even more unique experience. The Baltic transport & logistics industry continued to catch the wave in 2021 - or more precisely wind, as the region's Norsepower carried on developing its increasingly popular auxiliary wind propulsion system.

DECARBONISATION / FUELS & POWER SOURCES

Starting chronologically, in mid-January, Alfa Laval, DTU Energy, Haldor Topsøe, Svitzer, and the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping launched a project to accelerate the development of the solid oxide fuel cell (SOFC) technology for marine applications. The SOFC4Maritime project, funded through a grant from the **Danish Energy Technology Development** and Demonstration Program, targets optimal utilisation of future green fuels via the application of SOFCs for power production on board vessels. The research will have ammonia-based SOFCs as its starting point. "By electrochemically converting fuel into electricity, SOFCs can potentially produce power with higher efficiency than internal combustion engines running on the same fuel - without creating polluting emissions or particulates. Ammonia-based SOFCs are especially attractive, since ammonia can be produced in large scale using renewable electricity and no biomass resource," the parties said. Alfa Laval will head the development

initiative. Haldor Topsøe will provide the underlying SOFC stack technology, while DTU Energy will support system layout and component testing. Svitzer will bring a shipowner perspective, and the Mærsk McKinney Møller Center for Zero Carbon Shipping will ensure a broad industry overview, end-toend analysis of various energy pathways, and detailed techno-economic analysis. "We are proud to contribute with our competences within SOFC technology and ammonia as a marine fuel in order to reduce carbon emissions from shipping. This is an urgent goal in combatting climate change," Kim Grøn Knudsen, Chief Strategy & Innovation Officer, Haldor Topsøe, commented.

In February 2021, just over the Baltic border, the Canadian-Norwegian Corvus Energy and Toyota partnered to develop and produce sustainable, large-scale, and modularised proton exchange membrane (PEM) fuel cell systems for the international marine market. The initiative is backed by Equinor, Norled, Wilhelmsen, LMG Marin, NCE

Maritime CleanTech, and the University of South-Eastern Norway. The project also received €5.2m from Innovation Norway. Production will be located in Bergen, with Toyota as the mass-produced fuel cell technology supplier. According to the schedule, the first marine fuel cell system will be showcased on a vessel in 2023. The product will be marine-certified and available for commercial delivery from 2024. Corvus' new dedicated fuel cell division will design and certify the marine fuel cell system using Toyota's fuel cell technology as a building block for larger systems. Furthermore, a specific marine control system uniting the battery and fuel cell operation will be developed for integration with power management systems from a range of system integrators. Also in February last year, the Port of Gothenburg, Stena Line, and the Volvo and Scania groups teamed up, launching

the **Tranzero Initiative** to speed up the transition to fossil-free fuels in the transport sector. Specifically, the parties target road transportation to and from the Swedish seaport that generates 55kt of carbon emissions per year. The Gothenburg Port Authority's (GPA) aim is to cut the seaport's emissions by 70% by 2030. To that end, GPA will set up the necessary infrastructure to provide heavy-duty vehicles and vessels with fossilfree energy sources, such as electric power, hydrotreated vegetable oil (HVO), biogas, or hydrogen gas. A market study is being carried out to assess what will work best in the long run. "No single organisation or individual holds the key to meeting the challenges ahead of us. Collaboration is crucial and we are pleased to bring on board two of the world's largest truck manufacturers and the world's largest ferry company. With our collective expertise, breadth, and market presence we can make a real difference," Elvir Dzanic, Chief Executive, GPA, underlined. According to the port authority, "The transition to fossil-free transport to and from the port will need government support for companies that need to upgrade their fleets, for example designated grants, subsidised charging points, and fossil-free fuels." Dzanic commented in this regard, "We have had a long-standing exchange

of views and ideas with the government regarding the challenges we are facing, and our goals are the same. The transport sector needs to move away from its reliance on

fossil fuels and with the Tranzero Initiative we are taking a monumental step forward." Having mentioned Volvo, in October 2021,

the Danish shipping & logistics company







DFDS ordered 100 heavy-duty electric lorries from the Swedish manufacturer, set for delivery in 2022-2023. The 44t of carrying capacity (gross combination weight) FM Electric model can travel up to 300 km when fully charged. The e-trucks will help DFDS cut its carbon footprint by 45% by 2030. "This is a major milestone in our commitment to fossil-free transportation and I am very proud of the partnership we have with DFDS. Together we are showing the world that electrified heavy truck transport is a viable solution already today. I believe this will encourage many more customers to confidently take the first step in their own electrification journey," Roger Alm, President, Volvo Trucks, commented.

Going back to last year's February, Wallenius Wilhelmsen moved forward with its wind-powered ship, re-named Orcelle Wind (ex-Oceanbird). The company is conducting a comprehensive viability assessment to have a design ready by mid-2022 (the original concept was developed with the help of Wallenius Marine, SSPA, and the KTH Royal Institute of Technology); it will be used to contract a shipyard which, in turn, will deliver the vessel in 2025. Orcelle Wind will be a pure car & truck carrier, 220 m-long, 40 m-wide, and able to carry 7,000 vehicles (incl. heavy machinery as well as break-bulk). She will primarily be propelled by wind, harvested using telescopic sails. Wallenius Wilhelmsen speaks of a sailing

speed of 10-12 knots under sail, increased with a supplemental power system if need be. "Since 2008, we have been able to our reduce CO₂ intensity by 33%, which is a significant step. But the journey towards zero emissions requires great strides forward. We believe *Orcelle Wind* is one of them," **Craig Jasienski**, CEO, Wallenius Wilhelmsen, underlined.

At the beginning of March 2021, the Powerto-Ammonia project kicked off. DFDS, Arla, Maersk, Danish Crown, and DLG partnered to increase the availability of green ammonia as an alternative fuel (specifically, as an energy carrier in SOFC). The 50kt of yearly production capacity facility will be based in **Esbjerg** and is expected to become operational in 2026. "Vessels are designed and built for today's fuelling and a green fossil alternative for vessels does not currently exist. That's why we're partnering in projects like Power-to-Ammonia. The ability to establish a vision of an industrialscale sustainable fuel production facility is due to the power of partnerships," Torben Carlsen, CEO, DFDS, highlighted.

Also in March of last year, the IVL Swedish Environmental Research Institute, Sintef, the University of Iceland, Stena Rederi, and Powercell Sweden initiated the HOPE – Hydrogen Fuel Cells Solutions in Shipping in Relation to Other Low Carbon Options project. The initiative concerns a study on how hydrogen and fuel cells stack up against

other alternative fuels for sea shipping. To that end, HOPE will develop and evaluate a concept design of a short sea shipping vessel that uses hydrogen and fuel cells for propulsion. The initiative will also scrutinise the driving forces and barriers for constructing such a ship in the Nordic region, plus how operating such a vessel will impact greenhouse gas emissions and air pollution. "There is a number of different possibilities such as electrification, wind, bio- and electrofuels. The shipping industry is very much interested in new solutions, and hydrogen and fuel cells are a very hot topic now," Julia Hansson, Researcher and Consultant, the IVL Swedish Environmental Research Institute, commented. Per Wimby, Project Leader at Stena Rederi, added, "For us it is crucially important that different alternative fuels are thoroughly studied in order to make sure they are sustainable, cost-effective, and can be really used in practice. Hydrogen can be a very interesting option for our ships that sail between Nordic countries." The HOPE project is financed through a cooperation programme set up by the Norwegian Nordic Energy Research, the Danish Energy Technology Development and Demonstration Program, Business Finland, the Swedish Transport Administration, the Research Council of Norway, the Icelandic Centre for Research, as well as through in-kind contributions from partaking companies.

REPORT

Staying in March 2021, the Swedish Alfa Laval also announced it will scrutinise alternative marine fuels. The company's Test & Training Centre in the Danish Aalborg began looking into methanol and biofuels made from waste in spring 2021. Alfa Laval said it will investigate the fuels' decarbonisation potential and what measures will have to be taken to adapt and develop equipment for the vessel engine rooms. "A number of fuel pathways are on the table in the transition towards zero carbon shipping, but the knowledge about their impact on marine equipment solutions is limited. We want to extend that knowledge through testing," Sameer Kalra, President Marine Division, Alfa Laval, underlined. Working together with MAN Energy Solutions and other partners (the Danish Technological Institute, Technical University of Denmark, and the biofuel producer Nordic Green), Alfa Laval explored the possibility of running the centre's four-stroke, 2.0 MW diesel engine on methanol - without modifications or another pilot fuel. Once the fuel arrived, the first task was to determine how to handle it at scale. Because methanol is a liquid at room temperature, it can be stored in unpressurised tanks. However, a low flashpoint of 7°C makes methanol highly volatile - despite the challenge of igniting it through compression. After working out the handling practicalities, broader tests of methanol in the unmodified engine commenced in April 2021. "At present, combusting methanol requires a pilot ignition with fuel oil. This necessitates two fuel lines and different types of fuel tanks on board. If methanol from renewable sources could be burned directly in standard compression engines, it would offer a shortcut to carbonneutral shipping," Lars Skytte Jørgensen, VP Technology Development, Alfa Laval Marine Division, explained. "Since ships have a lifetime of 20 years or more, zeroemission vessels must begin entering the global fleet by 2030 for a 50% reduction to be achieved by 2050. It is predicted that in 2023 the world's first carbon neutral liner vessel will be launched and that methanolfuelled vessel will be ready for delivery in two years' time," Alfa Laval predicted.

In April 2021, the Finnish shipping line Meriaura informed it will develop a carbon-neutral domestic traffic vessel. The Turku-based shipowner wants to create a hybrid ship to serve lake, canal, and sea feeder traffic while being 100% climateneutral thanks to sailing on sustainably produced bio-oil and electricity stored in batteries. Once constructed, the vessel will be tested in Lake Saimaa (the Saimaa canal



locks are being extended, and the size of the new concept vessel corresponds to the new Saimax dimensions: 93 m-long ships carrying up to 3,500t vs the current 82.5 m). "Lake Saimaa is a perfect pilot area for our concept. The region's strong and progressive industry needs a clear transport route, which will be made possible by the extension of the canal locks. In the future's competition, a cost-effective and environmentally friendly transport chain is needed to ensure the vitality of the Saimaa region [the canal is the only water connection between the lake and the Gulf of Finland]," Jussi Mälkiä, President, the Meriaura Group, commented. In mid-May 2021, the **Port of Helsingborg** partnered with the Swedish Elonroad to test a new electric road system. The solution, trialled since last year's autumn, sees

the port's two e-vehicles charged from a power strip in the road, whether they are parked or on the move. Approximately ten metres long, the power strips are glued to the asphalt and connected to a power source. Since it involves conductive charging, i.e. physical contact between the vehicle and power strip/rail, the cars have sliding contacts that automatically fold down to touch both the positive and negative terminals to transfer the energy and charge the vehicle. According to the parties, conductive charging can transfer high power, up to 300kW per vehicle, with 97.5% efficiency. Öresundskraft is also involved in the project; the municipal energy company wants to gain insights into the new technology and how electrifying the transport sector will impact the energy system. "Testing

ORT

this new electric road system is another step on our journey towards becoming Sweden's most sustainable port. The technology has been tested on public roads, but using it in a port environment to create continuous flows is something entirely new. Perhaps in the future, we could have these power strips by our container cranes and charge the terminal tractors while they wait for the next container," Christina Argelius, Chief Technology Officer, the Port of Helsingborg, commented. Karin Ebbinghaus, CEO, Elonroad, added to this, "An electric road system means better air quality and reduced noise pollution. Our joint initiative with the Port of Helsingborg [...] is primarily focused on port environments and industrial applications. But we also intend to demonstrate how it can be applied throughout the transport sector in the long term, where the same solution can be used both in a port and the city centre." Last for March 2021 was news that the Port of Tallinn went 'e-green.' The Estonian port entered into a renewable energy purchase agreement with Eesti Energia and now consumes only green electricity produced in the country. According to the deal, Eesti Energia supplied the Port of Tallinn with 10 GWh of renewable electricity during 2021 for the port's use. As a result, emitting almost 7,000t of CO₂ was avoided. Leading up to the agreement, the Port of Tallinn invested in measures aimed at electrifying port operations. Those included the installation of onshore power supply facilities (across five piers in the Old City Harbour, a carbon reduction of 100t/month) as well as retrofitting the port's subsidiary **TS Laevad**'s *Töll* into a hybrid passenger ship, making it possible to partly run on electricity on the Virtsu-Kuivastu route (the operator plans to introduce the hybrid technology also on other ferries). In May 2021, the **Port of Södertälje** took hold of a brand-new LHM 420 mobile har-

bour crane - and Liebherr's very first to run on fossil-free, renewable diesel. The 124t of lifting capacity machinery, used for handling containers and project cargo, runs on the HVO100 renewable diesel made from HVO or organic fats. The Swedish seaport has been using HVO100 to run its vehicles, machinery, and cranes since 2016. According to the port authority, Södertälje is the first port in Sweden that switched to fossil-free fuels. However, the new crane only uses its diesel engine to move around the terminal. Once in position, Södertälje's LHM 420 runs the electric motor for cargo handling operations. "Up to 30% of the electricity we consume comes from our own photovoltaic system, which is on the roof of one of our warehouses. The rest is green electricity from sun, wind, and water," Robert Tingvall, CEO, the Port of Södertälje, highlighted.

Also in May last year, the Danish energy company Ørsted began the construction works of the renewable hydrogen production facility H2RES in Copenhagen. Situated on the company's premises on Avedøre Holme, H2RES will have a capacity of 2.0 MW. The project will investigate how to combine an electrolyser with the

fluctuating power supply from offshore wind, using Ørsted's two 3.6 MW turbines at the site. The facility will produce up to 1,000 kg of renewable hydrogen a day to fuel zero-emission road transport in the Greater Copenhagen area and on the island of Zealand. According to the plan, the facility was to produce its first hydrogen in late 2021. "In less than three years, Ørsted has, with partners, established nine renewable hydrogen projects in Denmark, Germany, the Netherlands, and the United Kingdom so far, spanning from demonstration projects like H2RES to industrialscale visions like the potentially 1,300 MW 'Green Fuels for Denmark' project," the company said. Anders Nordstrøm, VP and Head of Ørsted's hydrogen and power-to-x activities, added, "H2RES will be a small, but very important first step in realising Ørsted's large ambitions for renewable hydrogen, which has fast proven itself as a centrepiece in the green transformation of the European economy to net-zero emissions by 2050." He furthered, "At Ørsted, we believe that renewable hydrogen can become an industrial stronghold of several European economies, including Denmark, while also contributing significantly to bringing down emissions from the hardto-abate sectors in transport and industry." The Energy Technology Development and Demonstration Program, under the Danish Energy Agency, awarded DKK34.6m (around €4.65m) to Ørsted for developing the H2RES project together with the company's partners: Everfuel Europe,



REPORT

NEL Hydrogen, Green Hydrogen Systems, DSV, Hydrogen Denmark, and Energinet Elsystemansvar.

In mid-June 2021, the Danish Vordingborg Biofuel announced its DKK2.0b (approx. €270m) plans to erect in the Port of Vordingborg a renewables-powered biomethanol and e-methanol production plant. The company will use straws from wheat grain fields, pressed into briquettes, to make the fuel. During a biofermentation process, the briquettes will be converted partly into biogas and in part into biofertiliser (the latter for use in agriculture). The biogas will then be converted to liquid biomethanol using surplus power from renewable energy sources. Estimates speak of a 300kt/ year production capacity once operations kick off in 2024. "Vordingborg Biofuel is seriously putting action behind the ambitions that Vordingborg Municipality will be Denmark's future center for green transformation with the plan to establish one of the world's largest biomethanol factories at the Port of Vordingborg. We are in full swing to develop the Baltic Sea Offshore Hub at Klintholm Harbour as a center for wind energy, and now the Port of Vordingborg is coming as a center for green fuels. It is a big step in the right direction," Bolette Christensen, Director, **Vordingborg Erhverv** (a local business promotion organisation), said.

Also in the middle of June last year, **Bornholm Bunker Hub** announced it would investigate the potential of establishing a green maritime fuel bunkering station on the Danish island of Bornholm. The consortium's founding parties (Ørsted, **Molslinjen**, Haldor Topsøe, the **Bunker Holding Group**, **Wärtsilä**, **Ramboll**, **Bureau Veritas**, and the **Port of Rønne**)

will carry out a feasibility study to set out the financial potential for supplying sustainable fuels, produced using offshore wind energy, in the Baltic Sea. The project will investigate how local power-to-x can support the need for sustainable fuels for the more than 60k ships that pass Bornholm every year. The project will also answer whether it is appropriate to produce green ammonia locally or if it should be imported. "We see great potential in utilising Bornholm as an energy island to meet the Danish government's ambitious goal of reducing CO, emissions [-70% by 2030 vs the 1990 level]. Denmark has a unique opportunity to create an industrial position of strength within the production of sustainable fuels for heavy transport and to create jobs in the process. Bornholm's strategic location makes it also ideal as a hub for green energy solutions, and we look forward to exploring the potential for delivering sustainable fuels for shipping from Bornholm," Ørsted's Anders Nordstrøm said. Cato Esperø, Wärtsilä's Sales Director in Norway, added, "We see the Bornholm Bunker Hub initiative as very interesting in terms of our ongoing development of multifuel engines and testing future clean fuels for shipping." Gijsbert de Jong, Marine Chief Executive Nordics at Bureau Veritas Marine & Offshore, also commented, "At Bureau Veritas, we will support this exciting project by providing technical and regulatory expertise for the safe storage and handling of alternative green fuels, and by addressing the certification of these fuels to their origins."

Soon afterwards, also the Polish stateowned oil refiner and petrol retailer **Orlen** launched its future fuel initiative. **Hydrogen Eagle** will be a production and distribution chain of low- and zero-emission hydrogen throughout Central Europe. The company intends to build six plants: three in Poland, two in Czechia, and one in Slovakia, with a total production capacity of 50kt by 2030. These electrolysis facilities, 250 MW combined, will be powered by renewable energy sources: solar and wind, including Orlen and Northland Power's Baltic Power offshore farm (the construction works on the potentially 1.2 GW-strong project will start in 2023). The company also plans to erect hydrogen refuelling stations (for individual, public, and cargo transportation needs): 54, 26, and 22 in Poland, Slovakia, and Czechia, respectively (Orlen already operates pilot hydrogen refuelling points at its service stations in Wolfsburg and Müllheim in Germany). With the target total production capacity of over 1,000 kg per hour, the company is building three automotive-grade hydrogen production plants in Poland. In addition, Orlen wants to build three plants for converting municipal waste into low-emission hydrogen: two in Poland and one in Czechia.

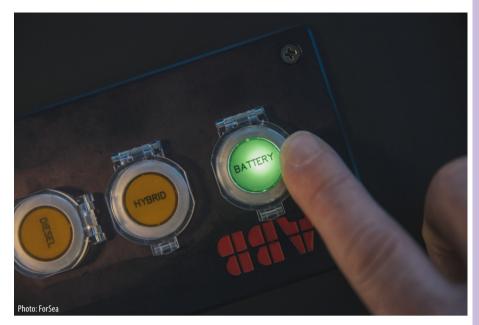
June 2021 was eventful indeed: before the month-end, Stena Line shared that it tested blue methanol as a marine fuel. Within the EU backed **FReSMe** project, the Swedish ferry company ran its *Stena Germanica* ferry on recycled methanol coming from the country's steel industry. The blue methanol used by Stena Line in the trial bunkering was produced from CO₂ recovered from the blast furnace gases from **SSAB**'s steel production in Luleå (another partner of the FReSMe project). "It is a fantastic cooperation between shipping and the steel industry, proof that together we can drastically lower our climate impact. For Stena Line, it



is a further step in our sustainability journey and in exploring future alternative ship fuels," **Erik Lewenhaupt**, back then Stena Line's Group Head of Sustainability, said. The dual-fuel ferry *Stena Germanica*, operating the Gothenburg-Kiel route, has been sailing on methanol since mid-2015.

July 2021 wanted to be in step with the previous month, berrying 'green' news bits. First, it was announced that ForSea's Tycho Brahe would be fitted with the world's largest battery pack. With the help of their technical partner ABB, the Helsingborgbased ferry line planned to increase the ship's battery capacity from 4,160 to 6,400 kWh. The upgrade started in May and was completed later in 2021. Together with her sister ship Aurora, Tycho Brahe has been e-sailing between the Danish Helsingør and the Swedish Helsingborg since autumn 2018. According to the company, this has led to a CO, reduction of 37kt. A fullyautomated and laser-operated robotic arm connects every time the ferries arrive in port, providing enough power to enable the 20-minute-crossing. For Sea underlines that it only uses certified green electricity. "Since the start, ForSea has proven that battery-powered operations are possible on a ferry route like ForSea's. Today, one of our vessels - Aurora - already sails up to 46 departures per day on 99% electric power. Following the upgrade on board Tycho Brahe, at full operation both vessels will achieve a total reduction of carbon dioxide in ForSea's fleet by 65%, a total of 23,000 tonnes," Kristian Durhuus, ForSea's CEO, underlined. He followed up by saying, "That would be an incredible result to achieve, and a powerful driver to continue our realistic dream of becoming one of the world's most climate friendly transportation companies." Sami Lehikoinen, VP, Service, ABB Marine & Ports, added, "As the battery technology matures, increasing both the power capacity and lifetime, together with ForSea, we will be able to ensure that Tycho Brahe will continue operating sustainably for the years to come."

Staying in Denmark, the **Port of Hirtshals** expressed its ambition of becoming a green hydrogen hub. To that end, the Danish seaport signed a memorandum of understanding with the Norwegian **Gen2 Energy** to locally produce green hydrogen and take care of imports from Norway. The agreement also covers the set up of a container factory in Hirtshals for exporting hydrogen, thus demonstrating the security of supply. The parties intend to use electricity generated by wind farms to produce hydrogen. "We are proud that Gen2 Energy



has chosen the Port of Hirtshals as a hub for their logistics activities and transport of green hydrogen, and it will undoubtedly boost our position as an important player in green port development," **Steen Harding Hintze**, Development Director of the Port of Hirtshals' green development company **Greenport North** (launched in September 2021), commented. He added, "At the same time, it gives our existing customers new, green opportunities and leads the way for new companies – especially in the green segment."

Before long, Gothenburg, within the mentioned Tranzero Initiative, said it would house the Nordics' first future fuels station. The open-access facility, which the Norwegian Circle K will run, will provide heavy-duty vehicles with charging points and hydrogen gas and bio-based liquid fuel pumps. The station, located at Vädermotet, will start in 2022 by offering ten charging points, with a maximum power capacity of 350 kW-1.0 MW (when fully developed). The 720 kg (15 trucks/day) of capacity hydrogen gas pump will be put in place in 2023/24. "We have highlighted flows that are particularly suited to the transition process. These are mainly flows that are highly repetitive, involve short distances, and include overnight parking at a depot. By the first half of 2022, we will see electrically powered transport flows in the port area," GPA's Elvir Dzanic explained. He also highlighted, "In the immediate future there will be a series of incentives at the terminals to promote fossil-free transport, and also measures where hauliers, forwarders, goods owners, as well as the government and the region are important partners.

We have established a fruitful dialogue with all parties concerned regarding their roles." The 'decarbonisation' summer of 2021 ended modestly yet laudably, first with the 'plug in' of **Kiel**'s new photovoltaic system. The German seaport installed nearly 300 panels across the gangway roof of its Ostseekai cruise terminal. Each module is 335 W, so the output of the entire set-up is almost 100 kWp, thus making it possible to generate up to 90,000 kWh per year. The port plans to consume around 80% of the generated electricity for its needs, powering the nearby onshore power supply facility and the terminal's LED façade. The remaining portion will be fed to the grid. Together with the existing photovoltaic systems in the Ostuferhafen, the Port of Kiel already generates about 300,000 kWh/year of electricity from solar energy.

Second, Tallinn expressed its intention of establishing a green infrastructure hub. The Estonian seaport and its partners want to contribute to Estonia's climate neutrality by creating infrastructure that would support the uptake of renewables, including wind energy and green hydrogen. Specifically, the Paldiski LNG terminal will house a hydrogen import & export facility with a 25k m³ storage (planned in cooperation with Alexela). Tallinn also wants its Paldiski harbour to become a service base for offshore wind farms, with wind energy used for producing hydrogen. Bunkering hydrogen or other green fuels will be possible at another of Tallinn's harbours, Muuga. The port is also looking into using hydrogen for electricity generation for ships at berth. Tallinn also entered into a co-op with the Port of Hamburg to jointly develop a hydrogen

REPORT

infrastructure value chain. Lastly, together with the Dutch Embassy and Flux, the Port of Tallinn conducted a study on the possibilities of using green hydrogen in the port sector. "The European Green Deal, ambitious climate goals and hydrogen strategy create a very good opportunity to build climate-friendly green infrastructure in Estonia with the support of the European Union. This would contribute to full transformation of the transport sector on the one hand and give a further boost to the renewable energy sector on the other hand, which will provide an incentive to produce green hydrogen, especially in the situations where there is a lot of cheap electricity at the market," Margus Vihman, the Port of Tallinn's CCO and Member of its Management Board, commented.

Other transport-related industries are also looking into greening their activities, hence decreasing their clients' negative environmental impact. In September 2021, Cargotec said it will use SSAB's fossil-free steel for producing its cargo handling equipment. The goal is to reduce the manufacturer's upstream emissions, which account for over one-third of the company's emissions. According to the parties, steel demand will rise in the future, requiring the development and use of fossil-free alternatives. "I am proud that we are paving the way in the cargo handling industry through commitment to using fossil-free steel and have this unique opportunity to work with a forerunner in fossil-free steel development. This is an important step towards our vision of becoming a leader in sustainable cargo flow," Mika Vehviläinen, Cargotec's CEO, said. SSAB's President and CEO, Martin Lindqvist, also commented, "We are happy to welcome Cargotec as a partner for fossilfree steel products. Close collaboration with the development of a fossil-free value chain means we contribute to strengthening our customers' competitiveness and to reducing their carbon footprint. Together, we also ensure the best solutions for end users."

Before September's end, Stena Line, the Municipality of Frederikshavn, and the Port of Frederikshavn launched a green project. The partners aim at making Frederikshavn-Gothenburg the world's first fossil fuel-free ferry service of its kind. Specifically, Stena Line will deploy two battery-powered Stena Elektra ferries (by 2030) while the Danish associates – the necessary charging infrastructure. "Our ambition is to lead the development towards fossil fuel-free shipping and sustainable transport at sea. That is why we are investing in new technologies and various alternative fuels. We

are already ten years ahead of the international shipping industry's target for reducing carbon dioxide emissions, but with Stena *Elektras* we are taking another big step on Stena Line's sustainable journey, on the road to a completely fossil fuel-free operation Stena Line plans to cut its carbon emissions by 30% by 2030 towards becoming fully fossil-free by 2050]," Stena Line's CEO Niclas Mårtensson (who is also a Member of the Swedish Government's Commission for Electrification), said. Mikkel Seedorff Sørensen, CEO, the Port of Frederikshavn, added, "The Port of Frederikshavn shares the high and green ambitions that make this project possible. The city has also shown that it has a unique capacity for change in its DNA, which is evident not least in its sustainability work. When we are now taking steps towards making the Gothenburg-Frederikshavn line completely independent of fossil fuels is not only positive for us, but for the entire Kattegat region." Stena Elektra will be approximately 200 m-long, offering 3,000 lane metres of cargo capacity and room for 1,000 passengers across the three-hour-long Frederikshavn-Gothenburg crossing (with one hour turnaround call/ charging time). She will feature around 60-70 MWh battery capacity, requiring a high voltage shore power cable of about 30-40 MW. Stena Line has already been operating the hybridised Stena Jutlandica across the service in question since 2018. Adding batteries made it possible to cut CO₂ emissions by 1,500t/year.

At the beginning of November 2021, news surfaced about plans to build a hydrogen production plant in Gothenburg. GPA and the Norwegian energy company Statkraft are investigating the set-up of a 4.0 MW facility in the Swedish seaport. The parties are conducting a preliminary study, expected to be completed at the beginning of 2022, chiefly focused on safety aspects. Once inked, the SEK60m (€6.1m) investment can be up and running in 2023, delivering two tonnes of hydrogen per day. "The Port of Gothenburg is Scandinavia's largest port and as a hub for transport by sea, rail, and road, it operates a wide range of heavy freight-handling equipment. Hydrogen has the potential to replace fossil-based diesel for all these items of equipment," Arvid Guthed, VP, Port Development, GPA, commented. He added, "We know there is already significant demand in and around the port for using equipment powered by hydrogen. A number of companies and organisations are ready and waiting, and we are convinced that local production of hydrogen would represent a breakthrough."

Heading east of Gothenburg, Rederi AB Gotland's subsidiary Gotland Tech Development, Helios Nordic Energy, METS Technology, and ABB received financial support to investigate the electrification of Destination Gotland's ferries. The funds, SEK1.2m (€120k) granted through the Swedish Energy Agency's Energy Pilot Gotland programme, will be used for studying the feasibility of replacing ship generators with batteries to provide electricity for aboard use by passengers, including charging e-vehicles. The project aims at reducing the carbon footprint of the ferries that link Gotland with the Swedish mainland by one-tenth. The vessels' 'power banks' will be recharged during port calls from Helios Nordic Energy's solar farms. The company's Project Manager Magnus Rahm commented, "Electrifying large fast ships is a great challenge in itself due to the very large capacity requirements. But in this case, we are also dealing with the heavily constrained grid on Gotland. We're now putting all hands on deck to assist Gotland Tech Development to see how our utilityscale solar parks and batteries combined can loosen the biggest knots on the transmission lines and contribute in the best way possible." Christer Bruzelius, Project Manager, Gotland Tech Development, also noted, "An important step towards both fossil- and emission-free maritime transport is to start electrifying parts of the existing ferries' energy systems."

Also at the beginning of November 2021, the Turkish Cemre Shipyard was entrusted with building the new double-ended hybrid vessel for Scandlines' Puttgarden-Rødby service. The 147.4 by 25.4 m ferry will offer about 1,200 lane metres of cargo capacity, plus room for 140 passengers. The newbuild is due for launch in 2024. Initially, the ship will be charged in Rødby (the charging option in Puttgarden will be added once Scandlines can procure green energy). The crossing will be covered in one hour by sailing on electricity only. The new ferry will be able to work in a hybrid mode, slashing the passage to three quarters. "Scandlines has for several years focused on the entire area of sustainability. The hybrid system was a quantum leap in green ferry operations. Scandlines not only operates the world's largest fleet of hybrid ferries, the system is also being copied worldwide and has been a huge success. Now we are ready to take the next big step and insert the first zeroemission ferry. The next generation of ferries is ready to take over on the Puttgarden-Rødby route," Vagn Sørensen, Chairman of Scandlines' Supervisory Board, said.

DECARBONISATION / ONSHORE POWER SUPPLY

The first onshore power supply (OPS) news brings us back to 2021's start and Gothenburg, where another quay connected to the grid in February. Quay 712 at the Ro-Ro Terminal now offers high voltage (10.7 kW, 1.5 MW at 50 Hz) power supply. The new facility - which fulfils the ISO/IEC/IEEE 80005-1 2019 and IEC 6213-2, 2016, type J requirements – has the potential to cut the port's carbon emissions by 650t/year, according to GPA. "A growing proportion of our ships are being adapted to connect to shoreside power and it will become increasingly important for ports to offer a shoreside power option. The Port of Gothenburg has for a long time been at the forefront in this area, and DFDS has taken a positive view of the expansion that is currently taking place," Poul Woodall, Senior Advisor Climate & Environment, DFDS, commented (the company's Flandria Seaways was the first to make use of the new facility). Moreover, GPA is planning to furnish its Energy Port with OPS (scheduled for commissioning in 2022). As such, the Swedish port could be the first in the world to offer cold ironing to tankers in a hazardous area. Emitting some 2,100t of CO,/year could be avoided thanks to this installation.

Also in February last year, Esbjerg connected a new OPS, capable of serving multiple ships simultaneously (the Danish seaport has already been offering shore power, but to smaller vessels only). The well-stimulation vessel *Island Patriot* became the first to draw electricity from the new 1,300

amp installation. "We want to contribute to reducing carbon emissions and promoting the green transition, and the ship's owners have put their money where their mouth is by investing a considerable sum in readying the vessel to connect to the new green power supply," **Flemming Copsø**, CEO, **Copco**, a supply base company for *Island Patriot*, commented.

Fast forward a few months, and Europe's strongest OPS for cruise ships came online. The 20 MVA facility, located in Rostock-Warnemünde and completed in the summer of 2020, was used for the first time on 10 May 2021. The set-up makes it possible for two cruisers to concurrently draw electricity at the port's berths P7 and P8. The modular OPS has its components stacked inside twenty-foot containers. The installation includes an integrated frequency converter to transform shore electricity to accommodate all standard global shipboard power supply systems (50 and 60 Hz). The Rostock-Warnemünde OPS results from a 2018-initiated co-op between the Hanseatic and University City of Rostock, the federal state of Mecklenburg-Vorpommern, Rostock Port, and AIDA Cruises.

Next, in July 2021, cold ironing was inaugurated in **Nynäshamn**, with the Swedish ferry company Destination Gotland becoming the first to draw electricity from the shore in the **Ports of Stockholm**'s harbour. The OPS investment totalled some SEK8.0m (approx. €780k). It will help the Ports of Stockholm to decrease quay emissions by 25% over 2019-2025.

In October 2021, another Swedish seaport, Gävle, announced it will also set up an OPS facility. Having received support from the country's environmental protection agency to combat climate change, the Port of Gävle plans to make vessels able to 'cold iron' at the energy harbour as of summer 2022. "It is a bit of a chicken and egg situation. We have followed the development domestically and internationally for a long time for the sectors we have in Gävle, namely container, bulk, project, and tanker traffic. It feels incredibly hopeful that shipping lines from the energy sector will now start preparing their newbuilds to draw power from the shore," Niklas Hermansson, responsible for traffic at the Port of Gävle, commented.

Also in October 2021, Copenhagen's first OPS went online. The facility, delivered in a 40-foot container by Actemium at DFDS' terminal on Dampfærgevej, was inaugurated by the shipping line's Pearl Seaways on 26 October. According to the project's technical advisor, COWI, DFDS ferries using cold ironing will reduce annual emissions by some 912t of CO₂, 18t of NO_y (1.6% of Copenhagen's overall vehicle traffic), and 400kg of particulates. DFDS' ferries sail between Copenhagen and Oslo around 700 times in a typical year. During the trial, from end-August to 25 October, CO, emissions were reduced by about 69t and diesel consumption by 154 m3. The 10 kV system, certified with IEC/ISO/IEEE 80005, can deliver 3.0 MVA, corresponding to approx. 2.7 MW. The DKK15m investment (€2.0m) was cofinanced (20%) by the EU's Connecting Europe Facility (CEF). Copenhagen Malmö **Port** plans to provide additional shore power at its cruise facilities in the Danish seaport: at Ydre Nordhavn and Langelinie in Østerbro in 2024. "We are facing the green transition, which is enormously complex, and it is precisely partnerships and joint efforts such as this that are essential when we need to develop green, innovative solutions and move in the right direction," Peder Gellert Pedersen, DFDS' EVP and Head of Ferry Division, underlined.

Finally, the Hansalink 2 project of the ports of Lübeck and Helsinki and the terminal operator Lübecker Hafen-Gesellschaft mbH (LHG) received CEF funding in March 2021. The €3.4m grant will be used for greening the parties' operations, including investing in cold ironing. Two berths in Lübeck-Travemünde's Skandinavienkai will be equipped with OPS, and two in Helsinki. Hansalink 2 will have been completed by June 2023 at the latest.



DECARBONISATION / PORTS & OFFSHORE WIND ENERGY

Providing certain marine fuels and electricity follows the 'what goes in, goes out' pattern, meaning that the end product, say hydrogen, is as pro-ecological as the power used to produce it. Or, as the World Economic Forum (WEF) colourfully puts it, "Depending on production methods, hydrogen can be grey, blue or green - and sometimes even pink, yellow or turquoise - although naming conventions can vary across countries and over time. But green hydrogen is the only type produced in a climate-neutral manner [...]." According to WEF, green hydrogen "[...] currently makes up about 0.1% of overall hydrogen production, but this is expected to rise as the cost of renewable energy continues to fall." Apart from offshore wind energy (OWE) powerhouses like Esbjerg, several Baltic seaports decided in 2021 to tap into the trend of making their harbours wind operations-friendly. That and coupling the venture with the potential of supplying future fuels as a bonus.

In mid-May 2021, Ørsted and the **Port of Gdynia** signed a letter of intent, seeing the two to work on, among others, developing Poland's offshore wind industry. In detail,

the signatories plan to share knowledge, develop business cases, engage in research & development, and form applications for EU co-funded projects. Ørsted and the Polish state-owned PGE intend to install some 2.5 GW of capacity in the Baltic Sea. In total, Poland plans to have 8-11 GW of energy supply coming from offshore wind farms by 2040. "Ørsted [...] intends to invest actively in the development of Polish offshore wind energy. [...] Recognised as the world's most sustainable energy company in 2021, we conduct our investments in cooperation with local companies and communities to ensure that offshore wind development benefits local economic development," Agata Staniewska, Member of the Board, Ørsted Polska OF Services, commented. Following the decision of the Polish government, a part of Gdynia's under construction Outer Port will function as the country's OWE hub. That said, in the middle of June 2021, Equinor chose the Polish Łeba as its offshore wind energy operations & maintenance (O&M) port. The Norwegian stateowned multinational energy company acquired a site at the Port of Łeba to serve

as the base for OWE projects it develops together with Polenergia. Equinor will construct, own, and operate the base, which will support the Bałtyk I, Bałtyk II, and Bałtyk III investments. The decision resulted from Poland's Energy Regulatory Office awarding contracts for difference to the Equinor and Polenergia's Bałtyk II and Bałtyk III 50:50 JVs (1,440 MW of combined potential capacity; Bałtyk I, 1,560 MW, follows a different timeline). Equinor is the projects' operator through the development, construction, and operations phases. The companies said that construction of the wind farms infrastructure could begin as soon as 2024. "We are making a long-term investment in Łeba as a future hub of offshore wind in Poland. We are committed to creating lasting local value through our projects in Poland, and the O&M base means jobs and investment for Łeba and the region. We are excited to contribute to a new chapter in the rich maritime tradition of Łeba and will continue to engage in a dialogue with all stakeholders as Poland's offshore wind industry takes shape," Michał Kołodziejczyk, Equinor's Country Manager in Poland, commented.



Michał Michalski, President of Polenergia's Management Board, added, "We see our offshore wind projects as an important part of the transformation - not only energy-wise but also for the economies of Poland and Europe. Our goal for the projects development is not only reducing emissions and support energy diversification but to create additional jobs, bring a chance for many companies' modernisation, innovation and new competitive advantages of Polish industry as well. Therefore, together with our partner we have created a flagship program to support Polish wind energy industry development and now, while building supply chain for our offshore wind farms, we can implement them step by step. The first and a very important step on that path is selection of the port in Łeba to become operations and maintenance base for Bałtyk II and Bałtyk III projects."

At the end of August 2021, Rønne was selected as Baltic Eagle's installation base. Iberdrola and Vestas will use the Danish seaport for shipping 50 turbines of the V174-9.5 MW model for installation in German waters some 40 km west of Bornholm. The turbines will be pre-assembled and installed out of Rønne in 2024. Once online, the Baltic Eagle offshore wind farm will provide 476 MW of capacity. Coupled with Iberdrola's first German project, the 2017-launched 350 MW Wikinger, 45% of electricity consumption of the Mecklenburg-West Pomerania state will come from Baltic offshore wind. The two farms will make it possible to prevent emitting 1.65mt of CO, per year.

Then, in September 2021, Mukran was picked by Ems Maritime Offshore, Vestas, and Parkwind as the O&M base for the 257 MW offshore wind farm Arcadis Ost 1. A 1,800 m² facility will be set up in the German Baltic port from which 40

professionals will oversee the operations and maintenance of Arcadis Ost 1. Offshore installation works on the wind farm located northeast of the island of Rügen will begin in 2022. Once fully operational one year later, Arcadis Ost 1 will generate energy to power the equivalent of 290k households. Next, in November 2021, the New Offshore Wind Ports in the Nordics (NOW Ports) initiative won Nordic Innovation's Sea Meets Land Mobility Mission. Consequently, the consortium of 11 parties from Denmark, Norway and Sweden, including seaports, will get additional funding of up to NOK3.0m (ca. €300k) to prepare Nordic ports for the expanding offshore wind industry. Specifically, NOW Ports will develop an offshore wind alliance to act as an innovation advisory board for existing ports and industry players in the value chain. In addition, a new multi-purpose site concept for utilising port infrastructure and establishing an optimal supply chain model for supporting future offshore wind ports and sites will be created. The project parties also hope to inspire other regions to learn best practices from leading Nordic offshore wind ports and their supply chains. "As wind turbines are growing in weight and size, great demands are placed on new and existing offshore wind ports alike. In this project, eight Nordic ports and super sites will enter an innovative collaboration with offshore wind players, with a view towards upgrading, redesigning, and adapting existing facilities and decarbonising ports' infrastructure," Nordic Innovation underlined in its verdict. Glenda Napier, CEO, Energy Cluster Denmark, added, "Ports are key players in the offshore wind supply chain because those are the focal point of enabling commissioning and installation as well as operation and maintenance of offshore wind farms. We need to get Nordic ports ready for the expanding offshore wind industry, and we need more collaboration and innovation across the Nordic countries. This project is an important step in that direction." The winning consortium consists of Energy Cluster Denmark, the Norwegian Offshore Wind Cluster, OffshoreVäst, MARLOG, Eigersund Næring og Havn, the Wergeland Group, Westcon Helgeland, the NorSea Group, and the ports of Rønne, Karmsund and Trelleborg.

To top the theme off, the Port of Esbjerg and Valmont SM entered into an OWE co-op in November last year. In detail, the two signed an agreement according to which the former will erect a wind turbine tower factory in the Danish seaport. The investment is scheduled for completion in late 2023. Valmont SM will use it to manufacture wind turbine towers for its client base, including Siemens and Vestas. "The Port of Esbjerg is a leading hub for offshore wind in Denmark and Europe, and we expect the market to grow strongly in the years ahead. Via Esbjerg, we'll get access to the markets in the UK, Germany and the Netherlands. In addition, the port has an efficient infrastructure that has attracted many other businesses as well, including service providers," Niels Brix, CEO, Valmont SM, underlined. The agreement forms part of Esbjerg's larger green master plan. In 2020, the Nordic infrastructure fund Infranode announced a DKK1.0b-big (approx. €130m) investment scheme, following which facilities for manufacturing and warehousing offshore wind components will be set up in the Danish seaport. "These investments will be implemented as producers of wind turbine components and service providers step up their activities," the Port of Esbjerg explained.

DECARBONISATION / AUXILIARY WIND PROPULSION

Last year brought several new contracts for the Finnish Norsepower, a developer of Rotor Sails, an automated auxiliary wind propulsion system. In short, the solution is a spinning cylinder that uses the Magnus effect to use wind power to thrust a ship. In January 2021, the company adapted its installation by making it tiltable. SEA-CARGO's side-door ro-ro SC Connector was outfitted with two 35 m-tall Rotor Sails that can tilt down and back up if the ship needs to sail under a bridge or a power line. According to the parties, up to 25% in fuel savings can be expected from the investment. Moreover, in favourable wind

conditions, SC Connector will be able to maintain regular service speed by sail alone. "Completing the installation has been extremely rewarding, as it reflects how, in taking a collaborative approach with a customer, we can innovate to create solutions that allow Rotor Sails to benefit almost any vessel type or trading route," Tuomas Riski, CEO, Norsepower, commented. He furthered, "As we get closer to 2030 IMO targets [CO, emissions reduced by at least 40% vs. 2008 levels, we are seeing our technology gaining momentum - with the market seeing the flexibility we can provide to suit different vessel requirements.

This installation demonstrates the technology can go a long way to future-proofing IMO GHG compliance, while ensuring significant emissions, and fuel reductions to a variety of vessel profiles today." Ole Sævild, Managing Director, SEA-CARGO, shared his company's perspective, "We are focussing on utilising available renewable energy and using it for direct propulsion to design more environmentally-friendly vessels. The Rotor Sail technology has been proven in the market for a while, but the size is unique for our project. The sails are far more efficient than conventional sails of the same size and the tilting function



is essential to our voyage routes." He also announced, "Given the estimated emission savings, we will use our experience of this full scale project, and proceed to develop it further for other vessels in our fleet." In May 2021, Norsepower revealed that it will fit Vale's VLOC charter with its Rotor Sails, the first dry bulker equipped with the solution. The auxiliary wind propulsion system for the 325k dwt ore carrier, owned by Pan Ocean Ship Management, will comprise five 24 m-tall, 4.0 m in diameter, and tiltable rotors. "Norsepower has analysed the routes for the vessel chartered by Vale and estimates that its technology would be able to achieve an efficiency gain of up to 8% and a consequent reduction of up to 3,400 tonnes of CO, per year,"

said the Finnish tech company. **Rodrigo Bermelho**, Shipping Technical Manager at Vale, added, "If the pilot proves effective, it is estimated that at least 40% of the fleet will be able to use the technology, which would result in a reduction of almost 1.5% of Vale's annual iron ore maritime transport emissions."

After over one year of using the solution aboard *Copenhagen*, the ferry line Scandlines decided in autumn 2021 to equip her sister ship *Berlin* with Norsepower's 30 m-tall and 5 m in diameter sail. The installation is scheduled for 2022. "We expected *Copenhagen*'s Rotor Sail to provide a 4-5% CO₂ reduction. That expectation has been met, so we have now taken the next step and prepared the sister

ferry Berlin for installation," Scandlines' COO, Michael Guldmann Petersen, said. He also underlined, "Our [Gedser-Rostock] route across the Baltic Sea is north/south bound, and the prevailing wind is from the west or east. In other words, our Rotor Sails have optimal conditions." Tuomas Riski also commented, "We are delighted that Scandlines is expanding its use of our Rotor Sail technology after achieving its CO₂ emission reduction targets on its first vessel, Copenhagen. Our Rotor Sail technology is technically applicable to approximately 30,000 vessels in the current global fleet and we hope that this is a further signal to ship owners and operators that confidence is growing in wind propulsion technology."

PORT DEVELOPMENT

Naturally, the Baltic port industry made strides in other fields than OWE or alternative fuels in 2021. For instance, in February last year, the Swedish SCA declared to invest nearly half a billion Swedish crowns in the Port of Sundsvall's Tunadal harbour. With SEK460m (approx. €45.5m) put on the table for 2021-2024, the timber, pulp, and paper manufacturer will set up a new container terminal and other cargo handling areas. The facility, 100k TEUs of yearly handling, will serve

ships with a draft of 15 m (relative to today's 12 m). The company also intends to build land south of the existing port to create new space for cargo handling. "SCA's investments in the Östrand pulp mill, in addition to the ongoing investments in pulp production at the Ortviken industrial site, will more than double the volume of pulp to be shipped from the Sundsvall region. The increased volumes mean that the pulp will be delivered to new and more distant markets. The Tunadal

and Bollsta sawmills are also ramping up their production volumes," the company listed. According to SCA, the volume of containerised trade (incl. pulp and solid-wood products) from the Tunadal harbour has more than doubled over the past five years. "This development has meant that we need to be able to handle larger volumes of containerised cargo than previously and be able to accommodate larger ships – both container ships and break-bulk vessels," Magnus Svensson, President



Sourcing and Logistics, SCA, commented. He added, "With the expanded port, the combined terminal [three 650 m-long tracks, due for completion in 2024] being built by the Municipality of Sundsvall and the improved rail links to the Tunadal port, we will have a transport infrastructure that will move Sundsvall closer to the global export markets and the Scandinavian domestic market, thereby benefiting industry and trade across Northern Sweden."

Also in February 2021, news broke out that the Swedish battery producer Northvolt will establish what it says will be Europe's largest energy storage factory. The \$200m investment in Gdańsk - on the territory of the Pomeranian Investment Centre, near the **Port of Gdańsk** – will encompass a 50k m² facility, erected in two stages, with works on the first scheduled for commencing in autumn 2021. Initially, from 2022, the plant will have an annual output of 5.0 GWh of energy storage modules and packs, up to a total capacity of 12 GWh after completing the second phase. In addition to the production line, an engineering R&D centre of excellence will be created. The factory will receive its supply of lithium-ion battery cells from the Northvolt Ett gigafactory, located in Skellefteå (annual capacity of at least 32 GWh by 2024, with the potential to expand it to 40 GWh). The new factory will be powered with renewables, including on-site energy generation. "Securing battery cell manufacturing capacity in Europe is key to its industrial future, but what is equally critical is the industrial capacity for integrating cells into real-world solutions. It is this that the new factory will deliver - sophisticated, sustainable energy storage systems to support the transformation of Europe's electricity grid and its industry," Peter Carlsson, Co-Founder and CEO, Northvolt, underlined.

Next month, APM Terminals Kalundborg went live. The 50k m² container terminal, offering a yearly handling capacity of 50k TEUs, began operating in the Danish Port of Kalundborg's Ny Vesthavn. The facility offers 500 m of berthing length and a maximum draft of 15 m. Quay operations are carried out using two 100t and one 150t of lifting capacity cranes. There are 100 reefer plugs in the yard. The terminal's reachstackers and tractors run on gas-to-liquid fuel. "This solutions allows for the use of cleaner fuel in conventional diesel engines, practically free of sulphur and aromatics and producing significantly less smoke," APM Terminals stated. The new facility has been included in Maersk's feeder network, instead of the Port of Copenhagen, with two weekly rotations linking the Danish seaport with Bremerhaven, Halmstad, Helsingborg, Aarhus, and Frederica. "We are proud that Maersk as our first customer subsequently

has chosen APM Terminals in Kalundborg to serve as their main point of logistics in the Eastern part of Denmark. With Kalundborg, we see an opportunity to provide customers with a great service and an efficient and competitive product in a strong location which is well connected, accessible and closer to the industry and customers of the port," Dennis Olesen, Managing Director Nordics, APM Terminals, said. **Stig Kirkegaard**, Country Manager Denmark of A.P. Møller-Mærsk, added, "Kalundborg is a port undergoing rapid development and investments and now also with APM Terminals as an operator, we see a great synergy in moving our business to Kalundborg. Also, Kalundborg is situated well to cater for our growth ambitions in Zealand and to manage our current customer base better and more sustainably."

In June 2021, construction started on the **Port of Ust-Luga**'s gas & chemical







complex. The investment comprises an LNG production plant with a yearly output of 13mt. The investors, Gazprom and RusGazDobycha, will also produce liquefied petroleum gas and ethane and pentane-hexane fractions. The annual production capacity of the chemical complex will amount to 6.5mt.

In July 2021, Tallinn's new cruise terminal was opened, with the port authority describing it as "the most modern and multifunctional terminal in the region." The Estonian seaport also said it took numerous steps during construction to ensure the environmental sustainability of the new terminal. Among other things, solar panels, designed to suit the Nordic climate, generate energy, while heating comes from a heat pump using sea power. "These decisions allow the facility to operate outside the cruise season - hosting events, concerts, and conferences," the port said. A new promenade was opened, too, connecting cruise guests from the terminal to the 'culture kilometre,' a direct walkway between the port and numerous historical and leisure areas (incl. the Patarei Sea Fortress, the Seaplane Harbour naval museum, and the seaside cultural area of Noblessner). "The new terminal makes the capital of Estonia and all the city has to offer more accessible - the aim is that all tourists leave with a safe and unforgettable travel experience and that cruise lines are able to reduce their environmental footprint by using environmentally-friendly port facilities," the Port of Tallinn added.

In September 2021, Gdynia's new Public Ferry Terminal was officially commissioned, ready to welcome ships up to 240 m in length. The PLN292m investment (€63.4m), co-financed by the EU (PLN116.8m/€25.3m), lies closer to the open sea than the older terminal, making it possible to handle calls within two hours (from mooring to exiting the port). Also, Gdynia is Poland's first port to offer cold ironing (3.5 MW, 11kV, 50Hz/60Hz).

In November 2021, the construction of Farehamnen in **Varberg** started. The new harbour, offering 300 m of quay wall, is scheduled for commissioning in June 2024. The works kicked off by strengthening the future harbour's area with a 1.5-2 m-high layer of stones coming from the nearby tunnel construction. "It is an improvement for the town, the industry, and the port business. Now the port and the town can develop side by side. We get a unique opportunity to build a harbour from scratch and create optimal solutions for cargo handling for our clients and us," Reine Antonér, Chairman of the Board, the **Port of Halland** (governing the ports in Halmstad and Varberg), underlined. He furthered, "We see many possibilities with the new harbour, not only concerning sustainability. We are future-proofing the operations and moving into higher gear for electrification, automation, and digitalisation for what will become Europe's most modern forest products harbour." Last in 2021 but certainly not least, Vuosaari's fairway became deeper. Terramare not only dredged Helsinki's cargo harbour from 11 to 13 metres but also finished the EU co-financed project on schedule and under budget. The works started in spring 2020 and were officially

completed on 30 November 2021, costing €26.5m (some €10m less than the original estimate). The project was granted 20% co-funding from CEF. "The biggest single factor contributing to staying under budget was that the Vuosaari contract was tendered at the same time as the City of Helsinki's Hernesaari dredging and filling contract, which made it possible to get a good bid for both. The chosen contractor, Terramare, also has high-quality equipment and experienced personnel, which make for efficient work," Seppo Paukkeri, Project Manager, the Finnish Transport Infrastructure Agency, explained. Jukka Kallio, VP Cargo, the Port of Helsinki, added in this regard, "In addition to the concurrence of the two projects, the contractor's previous experience in the construction of the Vuosaari fairway contributed to staying under budget." A total of 1.1m m3 of soil was dredged, and 800kt m³ of rocks were excavated. The latter was transported 21 km by sea to Hernesaari, where it will be used for reclaiming land from the sea for a tourism and leisure residential area, with port and industrial functions moving elsewhere. "The transport by sea significantly reduced lorry traffic on the streets of Helsinki. The solution replaced about 40,000 lorry loads and reduced fuel consumption by 1.1 million litres and carbon emissions by about 2,500 tonnes," Mikko Suominen, Land Mass Coordinator, the City of Helsinki, highlighted. Paukkeri also illustrated, "The Vuosaari fairway has the busiest vessel traffic in Finland. The dredging and excavation work had to be carried out in the fairway in such a way that large cargo ships could safely pass. Every week, we had a joint traffic meeting in which we went through the upcoming work with the pilots of the vessel traffic service, the shipping companies and the contractor and agreed on the rules to ensure safety. Although the work required additional signage and speed restrictions, all parties involved in the project were willing to be flexible and contribute to the safe implementation of the project." Ramboll CM Oy acted as the construction consultant and supervisor. The company also worked as the project's planner, geotechnical, risk management and environmental expert, safety coordinator, and was responsible for communications. Shortly, Vuosaari's buoy gate will be widened. Further works will be carried out in 2022 involving the deepening of the Kuiva Hevonen marina and the construction of a breakwater.

DIGITALISATION

The first major tech announcement took place in May 2021, when Furetank's Fure Vinga received Bureau Veritas' SMART notation - the first time the classification society awarded a full suite of smart ship notations. The tanker, designed by FKAB and built by China Merchants Jinling Shipyard (Yangzhou) Dingheng, is equipped with smart systems for monitoring the ship's hull condition (H) as well as integrated machinery (M) and navigation (N) systems. Fure Vinga's has optimised hull lines, a dual-fuel engine that can run on LNG and bioLNG, a battery pack for hybrid operations, and is fitted with a ducted propeller. The vessel's computer systems incorporate smart functions for collecting, transmitting, analysing, and visualising data to support the crew with informed decision-making to enhance safety and optimise operations and maintenance. The ship also complies with all tier one requirements included in Bureau Veritas' Rule Note Additional Service Feature SMART (NR675); hence it was granted the SMART (H1, M1, N1) notation. "The associated requirements have been specifically developed to set a benchmark for the safe and reliable design and operation of smart systems on-board ships, covering both hardware and software, and includes extensive on-board system and integration testing," the classification society underlined. Bureau Veritas' Gijsbert de Jong added, "As the maritime industry continues its digital transformation journey, improving safety and minimising operational risk using smart technology for monitoring and decision support makes a lot of sense. Furetank has achieved this across the key systems of Fure Vinga, and the ship has become the first BV classed ship to be assigned the full suite of smart notations. This, in turn, provides the shipowner with an additional – digital - differentiator in the charter market." Lars Höglund, Managing Director, Furetank, also underscored, "We always have safety, quality and environmental care as our main priorities. This is why we equip our new vessels with the latest technology in order to be able to deliver the best possible performance to our clients. Our new generation of intermediate sized oil and chemical tankers get us to the next level in terms of on-board system integration. We are happy to work with Bureau Veritas as they support innovative solutions with relevant classification notations and technical requirements, which set new standards in our industry." Also in May last year, the Baltic Future Port kick-started in Lübeck. The Lübeck Port Authority (LPA), together with eight partners, now works on digitalising port operations by establishing a 5G network. To this effect, the German Federal Ministry of Transport and Digital Infrastructure (BMVI) granted the LPA €3.9m to furnish the Skandinavienkai and Seelandkai harbours with the latest-generation broadband cellular technology networks. The Baltic Future Port project's overarching aim is to provide real-time communication, thanks to which ro-ro operations will become more efficient, hence the overall handling capacity will increase. The initiative will run till end-2023. Apart from LPA, the consortium comprises CDO, LHG, TraveKom, Baltic Rail Gate, Titus Research, TT-Line, the **Technical University of Applied Sciences** Lübeck, and the University of Lübeck. In July 2021, another tech (and green) part-

In July 2021, another tech (and green) partnership was struck. The Port of Esbjerg





and the IT company Atos are working on a solution to calculate the carbon footprint of individual routes and specific modes of transport. Once in place, the two expect customers will enter relevant data into the system (such as departure location, final destination, and type of goods) and will then be provided with an overview of the most optimal routes. Customers will be able to pick the ones with the lowest environmental impact while, according to the parties, also achieving a financial gain through lower excise duties. "It's relatively easy to calculate the carbon footprint when you ship goods from A to B. But identifying the best option - in terms of both mode of transport and route - wasn't so simple. We aim to be a carbon-neutral port and therefore would also want to have an influence on the route network. That's why we came up with the idea of developing a system that would provide customers with an overview of the most climate-friendly routes," Dennis Jul Pedersen, the Port Esbjerg's CEO, explained. He went on, "The simulator that we're developing will help our customers make green decisions, and there's nothing like that anywhere in the world. We're very proud to have pitched an idea that some of the best in the world find interesting and want to help us develop." Just before August 2021 ended, Stena Line renewed and stepped up its IT co-op with Surikat, deciding to implement the latter's Lynx software-as-a-service terminal operating system (TOS). The two began working together in 2016, with the initial task to simplify and digitalise the damage checks and claims handling processes across Stena Line's European network. The product range grew until Surikat was supplying Stena Line with a portfolio of tools to aid the running of operations across their 20+ terminals in Europe. "We are very proud to extend our strategic partnership with Stena Line for five more years. Stena Line will now have access to the complete range of features offered in Lynx TOS, and Surikat will continue to benefit from Stena's vast experience and expertise as they contribute to our ongoing roadmap and standard product development," Andreas Karlsson, Surikat's Director, said. Carl-Johan Hellner, Stena Line's Chief Operating Officer, Ports and Digital Transformation, added, "The continuous digitalisation and automation of port operations is vital for both Stena Line and our customers' success in the future. We continue to invest in Surikat's system that enables us to improve the efficiency and streamline our processes in our ports and terminals, to improve the service to our customers."

In mid-September 2021, Stena Line also introduced its in-house developed Artificial Intelligence (AI) Fuel Pilot fuel-saving tool aboard another ship, the *Stena Nordica* ferry plying between Gdynia and Karlskrona. Fuel Pilot is a decision-making support solution that combines data from different sources - including wave, current, wind, depth, given vessel's specifics, and timetable - to propose the optimal speed to cut fuel consumption, hence emissions. "We are working towards reducing fuel consumption on board our existing ships while at the same time developing future technology, vessels, and fuels. It is a shining example of how we can combine modern AI technology with the huge nautical competence our seafarers have to jointly reduce our environmental impact," the company's Erik Lewenhaupt commented.

Remaining in Sweden, the Port of Gothenburg implemented the digital berth planner tool Allberth, developed by the Finnish Awake.AI, in early autumn. "We can now use the same tool to examine the safety parameters to determine whether a ship can moor at a specific berth, to position the ship, and to plan the time," Fredrik Rauer, Traffic Coordinator and Project Leader for Berth Planner at GPA, explained. He furthered, "We can also show external parties the calls that have been coordinated with the terminal and the calls for which we only have an approved vessel notification. Without this status distinction, it will appear as if we have two or three moored vessels overlapping and an outsider would logically put this down to scheduling problems. With Allberth we can give mooring personnel, the ship's agent, and the terminal the opportunity to act immediately on the information that we visualise in the application." Allberth offers two-way integration - for in-house use by berth planning personnel at the Gothenburg Port and external use by the various parties involved in calls.

In September 2021, Awake.AI also won a tender to provide vessel schedule estimates in Finland. Fintraffic, a governmental organisation that controls and manages traffic in Finland, contracted the tech company to implement a new port call schedule system. The Port Call Time Stamp and Estimation Service are based on machine learning and AI data analytics. The forecasts are influenced by many factors analysed using global automatic identification system messages. In addition to automatic classifications, such as where a ship is coming from and where it is going, a ship's estimated arrival time is

influenced by many variable factors, such as its speed and route, the weather, and the ice situation. By utilising machine learning, the service remembers what has happened in the past and how various factors have affected a ship's arrival time. The AI learns the deviations for a particular locality and adjusts its calculations accordingly. "In practice, the new port call schedule service will provide the necessary APIs [application programming interfaces] from which port operators can obtain time data for use in their own systems," Kimmo Kummala, Project Manager and VP of Engineering at Awake.AI, explained. The company also marked, "The service will first be introduced at Finnish ports, but can in practice be used anywhere. This offers global opportunities in a variety of sectors. Finland is a world leader in digital development, and activities such as the port call schedule service will ensure that Finland remains at the forefront of global digitalisation."

To conclude the tech thread, at the beginning of December 2021, BMVI granted funds to establish and operate a digital test field in the Port of Kiel. As part of the **D-TECH-BASE** project, ro-ro terminals in the port's Ostuferhafen and Schwedenkai will become test fields for new 5G communication and traffic control. The €1.75m worth project, to last until 30 June 2024, will see the set-up of a 5G campus network for fast data transmission, allowing for, among others, tagless optical unit tracking. A fleet management system is also planned, enabling the connection and scheduling of all terminal forklift trucks in real-time. Smart multimedia screens are also planned, displaying dynamic content, such as traffic guidance information imported from the gate operating system. As part of the work package for intelligent traffic control, more video scanning gates for trucks and trailers will be installed at both harbours. Gates for rail freight traffic will be erected for the first time. New camera systems with optical character recognition (OCR) will support transport unit data collection. OCR input will be compared with the port's terminal operating system data to minimise distances and reduce mileage-related emissions. At the same time, the Port of Kiel partakes in the Förde 5G project together with the Christian-Albrechts University of Kiel and other partners. Within this initiative, IT systems will be developed on an industrial scale to promote tech-driven gains in tracking, cargo handling, and IT security (solutions developed within Förde 5G specifically aim at optimising storage, transfer, and retrieval processes).

LNG & bioLNG

The bio-version of LNG has been trending for at least two years, capitalising on its sustainability and circularity credentials relative to the 'vanilla' variant (the potential to reduce greenhouse gas emission of which is still a topic of debate). The Baltic gas-powered shipping sector was keen to give it a try, either as a blend or going full bioLNG bunkering. With all the rage about hydrogen and ammonia lately, LNG is persistent in its strive for carving out a greater market share.

Gasum saw the writing on the wall and in February 2021 said it will work towards scaling up the supply. The company intends to make 4.0 TWh of biogas available on the market from its own production and that of certified European partners by 2025. To deliver more biogas, Gasum will set up new facilities, among others, the industrial-scale manure-based plant (120 GWh/ year) in the Swedish Götene, scheduled for completion by the beginning of 2023. The company also plans to build biogas plants in Borlänge and Kalmar in Sweden, and Oulu in Finland. Last year, two sites entered commercial production: Lohja (40 GWh) in Finland and Nymölla (75 GWh) in Sweden. Today, the company operates 17 plants through the two countries. In addition, Gasum is looking into producing other renewable gases in the Nordics

- synthetic methane and green hydrogen. Moreover, Gasum has set a goal of reducing its carbon footprint by one million tonnes. Apart from providing greater availability of biogas, the company will also reduce the emission intensity of its LNG and biogas production chains by 1%/ year. "Biogas is a renewable energy source that can be produced from many kinds of biodegradable waste. Biogas production is a good example of fully utilising raw materials and promoting the circular economy. Circularity is further enhanced by the fact that nutrient residues arising as a by-product in biogas production can be returned to the food chain as a fertiliser or processed for industrial needs to replace mineral or fossil nutrients and fertilisers. The use of biogas as a fuel in road transport can help to reduce carbon dioxide emissions by up to 90% compared to fossil diesel," the company listed the benefits.

Also in February last year, Destination Gotland started bunkering more bioLNG, increasing the share in its bunker blend, supplied by Gasum, from one to ten per cent. The Swedish ferry line said that this move will decrease the company's footprint by some 9,000t/year of CO₂. "It is an extremely important step for us, and I'm proud and happy that we are contributing to the development of shipping

by reducing emissions. We are firmly committed to making Gotland traffic climate-smart, and by 2045, preferably much earlier, it will be entirely fossil-free," Christer Bruzelius, back then Destination Gotland's CEO, commented. He noted, "The price of biogas is still noticeably higher than that of natural gas, and the bunker changeover involves a big investment. The benefit of considerably reducing emissions, however, justifies it."

In April 2021, another news bit came around about Gasum. This time the company secured a bioLNG contract with the Finnish Border Guard. The first delivery took place on 1 April – from a plant in Turku to Helsinki, where it was used to bunker the gas-run patrol vessel *Turva*. Interestingly, the second shipment was delivered from Gasum's facility in the Norwegian Risavika to Finland's capital via the company's terminal in the Port of Pori. "The purpose of these deliveries is to test logistics and practicalities on board as well as demonstrate biogas as a renewable energy source in maritime transport," Gasum explained. Commander Marko Aheristo, Head of Ship Technical Unit, the Finnish Border Guard, commented, "We are happy to be forerunners in environmentally friendly shipping practices. Through these test deliveries we will expect to gain more experience



REPORT



on using biogas and to support further our efforts to reach the carbon neutrality goals Finland has set for 2035." Jacob Granqvist, VP Maritime, Gasum, added, "Gasum has supported the Finnish Border Guard's LNGfuelled offshore patrol vessel Turva since the beginning of her operations, and now we are very happy to continue this journey with bioLNG deliveries. Using biogas alongside with LNG in marine transport is a new step forward in decarbonising the shipping industry and we are looking forward to completing more successful trials with biogas in the near future." Later, in August 2021, Gasum also won a governmental maritime LNG supply contract. The Finnish central purchasing body Hansel chose the company in a competitive tendering process, which will see LNG delivered to the Finnish Transport Infrastructure Agency and the Finnish Border Guard. The 2021-2022 framework agreement includes an option for two more years.

In June 2021, the sea trials of Gazprom Neft's LNG bunkering vessel *Dmitry Mendeleev* were completed ahead of the ship joining the company's fleet in the second half of 2021. The 100 m-long and 19 m-wide *Dmitry Mendeleev* offers 5,800 m³ of storage capacity, providing bunkering services in the Baltic Sea (chiefly to *Marshal Rokossovsky*, Rosmorport's dualfuel ro-ro set to connect the ports of Ust-Luga and Baltiysk). The vessel has the Arc4 iceclass, meaning she can sail independently through 80 cm thick ice. The ship's digital system makes it possible to control *Dmitry Mendeleev* by a single crew member directly from the navigation bridge.

In October 2021, another gas bunkering vessel started operating in the Baltic. The Tallinn-based Infortar investment company took delivery of Optimus, afterwards chartered to Eesti Gaas' Elenger. The 100 m-long, 1A ice-class ship features two type-C tanks for storing up to 6,000 m³ of LNG. Optimus was constructed at DAMEN Shipyards Yichang and completed her gas trials at the DAMEN Verolme Rotterdam ship repair yard. The construction of Optimus was backed through CEF. The vessel has replaced the tank trucks used for bunkering Tallink & Silja Line's Megastar cruise ferry. She will also bunker the shipping company's MyStar set to enter traffic in spring 2022. Elenger also has pre-agreements for LNG supply to other shipowners and operators.

WAREHOUSE LOGISTICS

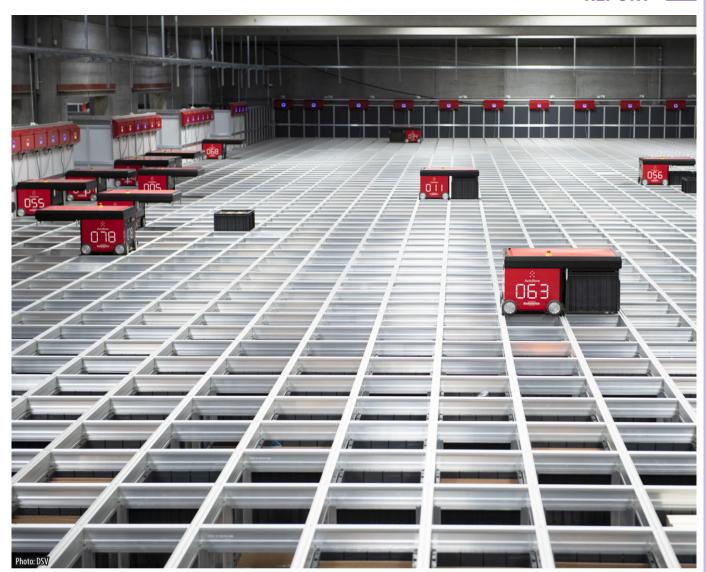
Despite the coronavirus pandemic, or maybe in some instances thanks to it, trade across the Baltic Sea region wasn't short of breath last year. Specific segments (think e-commerce) kept regional logistics going robustly, especially across the Nordics. Perhaps that is why many news items about setting up new warehouses and logistics centres cropped in 2021, particularly across Sweden. Finally, yet importantly, the greening trend has also become the game's name in warehousing. First, in mid-January 2021, DSV started erecting a new logistics centre near Stockholm. The 68k m2 warehouse in Rosersberg, north of the Swedish capital, also comprises 5.0k m2 of cross-docking area, plus office space. "With the new site, we can offer automated robotic storage combined with narrow aisle racking and thus a very efficient and competitive utilisation of the general warehouse space. The capacity

is almost twice that of a conventional warehouse," Ian Swinhoe, Managing Director, DSV Solutions AB, highlighted. Brian Winther Almind, EVP, Group Property and Smarter Storage, DSV, commented on the eco-friendliness of the investment, "We are always looking for sustainable solutions when building new sites. The buildings will be DGNB [the German Sustainable Building Council] certified, 80% of the materials can be reused, solar panels on the roof will provide a large part of the electricity required for the operation and the building's expected lifespan is minimum 50 years."

Next, in February 2021, DFDS leased a new $34,560 \text{ m}^2$ warehouse in Borås, around 70 km east of Gothenburg. The facility was built by the property developer **CH Square** from whom DFDS rented the warehouse for ten years, with an option to extend the agreement after the initial lease period. The new

facility will help DFDS to expand its contract logistics offering.

In summer, the Port of Gothenburg and Castellum formed a 50/50 JV to develop Halvorsäng into a logistics hub. The partnership aims to facilitate planning, development, and construction at Halvorsäng, an approximately 270k m2 plot, with 155k m² reserved for building space. The area lies north of the Port of Gothenburg's container terminal and the adjacent oil depot, next to the Hisingsleden bypass. The parties expected to kick off the construction works in autumn 2021, with commissioning planned after four years. Castellum's initial investment will involve acquiring a 50% interest in the land at an estimated cost of around SEK400-450m (about €39.5-44.5m), with a further development investment of SEK550m (€54.3m).



Also in the summer of 2021, the **Municipality** of Eskilstuna started planning a new area for logistics and industry, situated north of the existing intermodal terminal. The Gunnarskäl park will cover 310 ha, possibly including storage for sun-harvested hydrogen, and feature a 5G network. Talking bout Eskilstuna, a new tenant decided to enter Eskilstuna Logistikpark. The construction company Bockasjö will furnish a 29k m² logistics centre for the e-commerce company GardenStore Nordic. The new facility will come online in February 2023. Its environmental credentials will be verified according to the sustainability validation & certification system **BREEAM**. Bockasjö intends to reach the Excellent mark thanks to, among others, making the facility draw electricity from its own solar panels.

The French multinational **GEODIS** also opened a warehouse in Sweden. The 16k m² facility in Arendal began operating on 1 December 2021 to provide contract logistics

throughout the country. GEODIS offers warehousing and distribution services through it, including receiving goods to a warehouse management system, inventory storage, pick and packing, case palletisation, value-added services, returns processing, quality control, and distribution. The fast-growing retail and e-commerce verticals are the core businesses served. "The GEODIS Freight Forwarding business has been long-established in the country and our traditional customers have been calling for an extension to our services. We will draw on our well-established contract logistics operations capabilities throughout Europe and around the world to help our customers to achieve their ambitions for business growth. It's the ideal stepping-stone for GEODIS growth in Sweden," Thomas Kraus, GEODIS' President & CEO North, East and Central Europe, commented.

Coming full circle, in November 2021, DSV announced it would invest in 20 large-scale multi-user automated warehouses across

Europe, North America, and Asia-Pacific. The facilities, based on AutoStore technology with goods-to-person automated workstations, will be part of the company's larger campuses. The DSV Fulfilment Factories will be connected on a 'string,' meaning that one company can have stock placed in multiple warehouses across regions or continents while at the same time having a unified stock overview. The interconnectivity system will automatically choose the product at the warehouse closest to the delivery point. Four facilities are already operational (in Kolding, Oslo, Helsinki, and Venlo), and six are underway (Northamptonshire, Duisburg, Barcelona, Toronto, Stockholm, and Copenhagen). The remaining ones will be erected in North America and Asia-Pacific in the coming few years. "With DSV, Fulfilment Factory companies do not need to be multinational to get automated, competitive and efficient warehousing," Ronald Poort, EVP, DSV, underlined.

WASALINE & FINNLINES' NEWBUILDS (AND VIKING LINE'S, TOO)

To top Baltic transport 2021 highlights, let's look at the newest ships that sport the green and tech fashions.

First, before the end of summer 2021, Wasaline's Aurora Botnia was christened and ready for her first crossing. The naming ceremony took place in the ferry's homeport of the Finnish Vaasa on 25 August. The €120m-worth newbuild, constructed by Rauma Marine Constructions (RMC), went for her first round-trip between Vaasa and the Swedish Umeå on Saturday 28 August (initially, she was expected to enter traffic in May 2021, but the yard had to fight off corona). The 150 by 26 m gas-run (LNG/bioLNG) ferry offers room for 800 passengers and 1,500 lane metres of cargo capacity. The ferry can also connect to OPS. According to the company, she is "[...] the first car and passenger ferry in the world to meet the criteria of the Clean Design class notation." Peter Ståhlberg, Wasaline's CEO, also highlighted, "Aurora Botnia is the most environmentally friendly large ro-pax ferry in the world, and its degree of domestic origin exceeds 80 per cent." Jyrki Heinimaa, RMC's CEO and President, added, "We've had a wonderful opportunity to build such a magnificent vessel, which is totally unique even from a global perspective. I would like to thank the client for their excellent cooperation, which has

enabled us to successfully complete the project, despite the very challenging conditions." Another modern thing about *Aurora Botnia* is that it offers high-speed Internet via **AecorLink**'s microwave system (a long-distance shore-to-ship, satellite-free connection, the previous version of which was also available aboard Wasaline's previous ferry, *Wasa Express*).

A bit earlier, in April 2021, Finnlines' Finneco I was launched. The first in a series of three brand-new ro-ros was floated out at the Chinese Nanjing Jinling Shipyard, expected to begin connecting Finland with the Bay of Biscay at the turn of the year. The 238 m-long and 34 m-wide freighter, sailing under the Finnish flag, offers 5,800 lane metres of cargo capacity. Additionally, her car decks have a capacity of 5,800 m2, while the weather deck - room for 520 TEUs. As such, the company says, Finneco I can take up to 300 trailers, 150 cars, and half a thousand containers per sailing (about 38% more freight than Finnlines' current largest ro-ros, the Breeze-class vessels). The ships - Finneco II and III will be delivered in 2022 and serve the company's traffic between Finland, Sweden, continental Europe, and the UK – feature lithium-ion batteries (for zero-emission port visits), solar panels, and an air lubrication system for cutting their carbon footprint. They are also equipped with scrubbers to sail within the Sulphur Emission Control Areas and have the 1A Super ice-class to call to north Baltic seaports without icebreaker assistance. Together with two under construction ro-paxes, the Finneco series forms Finnlines' €500m-big Newbuilding Programme. "We are constantly renewing and developing our fleet and the upcoming hybrid ro-ros as well as eco-efficient Superstar ro-paxes are a next step in the evolution of Finnlines' fleet. These new vessels will increase our cargo and passenger capacity significantly. Together with our connections we can meet the needs of our customers better. Our eco-sustainable new vessels will serve our customers, and communities where we operate, long into the future. More than ever, our economies rely on dependable transport links and we are committed to ensure vital sea freight operations in a sustainable way," Emanuele **Grimaldi**, CEO, Finnlines, highlighted. In October 2021, construction started on Finnlines' second new Superstar. Steel cutting began for Finncanopus, the second in a series of two ferries to be delivered by China Merchants Jinling Shipyard (Weihai) in 2023. The 1A Super ice-class ro-pax will be 235 m-long, offering room for 1,100 passengers and 5,200 lane metres of cargo capacity. Together with her sister





ship, *Finnsirius*, *Finncanopus* will sail on the **Naantali-Långnäs-Kapellskär** service. Both will connect to shore power and feature several other emission reduction solutions, including scrubbers, waste heat recovery, a battery pack, and air lubrication. They will also have ballast water treatment systems. To conclude, **Xiamen Shipbuilding Industry** handed over the cruise ferry *Viking*

Glory to Viking Line just before year-end. The 222.55 by 35 m vessel, offering room for 2,800 passengers and 1,500 lane metres of freight capacity, is on her way from China to start serving the Turku-Åland Islands-Stockholm route as of March 2022's beginning. Alike other Baltic shiny new ferries, also Viking Glory will boast several green tech solutions: Wärtsilä's 31DF dual-fuel

gas (LNG/bioLNG) engines, Norsepower's Rotor Sail, waste heat recovery (but also cold recovery, as the first in the world), dynamic air conditioning and lighting system, and ABB's Azipod propulsion. "It is estimated that the ship will consume up to 10% less fuel than *Viking Grace*, which is smaller and was hailed as the world's most eco-friendly ship of its time," the ferry line underlined.





Challenges addressed comprehensively

by Andrzej Urbaś, Communication Manager, BPO

The Baltic Ports Organization's (BPO) Comprehensive Ports Group (CPG) has met for the first time this year. The main topics discussed covered recent records achieved by the ports and growth opportunities in the context of the development of the renewable energy sector, especially wind energy.

ort representatives of Hanko, Kaskinen, Pietarsaari, Stralsund, Ystad, and Saarte Liinid participated in the first 2022 meeting of BPO's CPG, looking back at the previous year and identifying topics that will drive the discussion in the coming months.

Good numbers...

All of the gathered port representatives described 2021 as overall good, with the industry bouncing back from the tribulations of 2020 and the early pandemic-related difficulties that put a severe strain on the global economy.

In many cases, the achieved records were exceedingly good. Saarte Liinid registered one of the three best years in the port company's history, with considerable volumes in passenger travel and vessel calls. These numbers were driven by passenger traffic turning inland due to restrictions on international travel. On the cargo side, the situation remains stable. Yet, the company faces the dilemma of losing nearly a third of its cargo volumes in the next five to ten years due to environmental regulations foreseeing the restoration of wetlands, a source of peat handled in its ports.

The Port of Ystad also had a good year, opening new berths and investing in new fairways. Passenger traffic and cargo turnover grew, presenting a much better picture than in 2020, with 2.3m ferry & cruise travellers and over 3.1mt handled.

For Hanko, the situation improved, too, and is much better than the forecast from 2021's start, as the port registered its second-best year in history. The unitised cargo segment is growing, and the Finnish seaport even enjoyed a few cruise calls, a new development that may present new opportunities in the future.

The records in the Port of Stralsund, similarly to its counterparts, are looking much better than in 2020. That said, the situation isn't close to being as stable as five years ago, with cargo figures promising to remain very volatile. The port lost volumes due to the difficulties faced by the German shipbuilding industry. However, MV Werften – comprised of shipyards in Stralsund, Rostock, and Wismar – filing for bankruptcy also poses some potential opportunities for the port. Taking over the existing infrastructure may allow the port to grow and dip its toes into the offshore industry.

... sometimes aren't enough

Despite registering good numbers, the ports of Kaskinen and Pietarsaari, with the latter noting 20% growth in volumes, have suggested that the future may prove challenging. At this point, it is of utmost importance to note that a problematic situation of a port also means difficulties for the nearby business ecosystem and the development of local economies.

As of right now, to be classified as a Comprehensive Port within the TEN-T,

a seaport must meet one of the following conditions: the total annual passenger traffic volume exceeds 0.1% of the total annual passenger traffic volume of all maritime ports of the EU; the yearly cargo volume exceeds 0.1% of the total annual cargo volume handled in all EU seaports; the port is located on an island and provides the sole point of access to a NUTS 3 region (i.e., small regions for specific diagnoses) in the Comprehensive Network; lastly, the port is located in an outermost region or a peripheral area, outside a radius of 200 km from the nearest other port in the Comprehensive Network.

With the rise of volumes handled by the block's seaports, it becomes more and more difficult for smaller ports to fulfil the criteria. Policymakers must enter a more open dialogue with port representatives to assess the current benchmarks and revise them as necessary.

There are 87 ports in the Baltic Sea region included in the TEN-T. Out of these, 65 are classified as Comprehensive Ports, and 26 are BPO Members. These ports are a vital part of Europe's transport network. They play a crucial role in assuring smooth cargo flows and allowing for the diversification of transportation channels. Additionally, they are critical to the development and growth of local economies.

BPO's CPG plans to meet in May 2022 to discuss further the challenges faced by the TEN-T Comprehensive Port sector.





AWAKE.AI

A Grid / Datacity
Otakaari 5 / Lemminkäisenkatu 14-18C
02150 Espoo / 20520 Turku
Finland
www.awake.ai
info@awake.ai

Awake.AI joins the BPO

by Andrzej Urbaś, Communication Manager, BPO

The Baltic Ports Organization (BPO) is happy to welcome the newest addition to our family, Awake.Al. As a leading software developer for smart ports and shipping, Awake.Al will greatly contribute to BPO's knowledge and expertise pool in an area that is every year becoming increasingly more important to the continued development of the maritime transport sector.

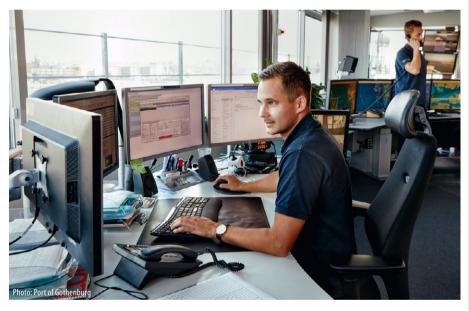
he topic of digitalisation remains among the key interests of the BPO. It is a process that affects every industry, and the maritime sector will not be an exception. It is paramount to the continued competitiveness of ports to remain aware of technological innovation. As such, Awake.AI's decision to join the BPO will benefit all of the Organization's Members.

Awake.Al in a nutshell

The company's founding in 2018 was inspired by the realisation that smart ships cannot interact with the rest of the logistics chain unless the needed digital interfaces and machine learning models are developed and linked to an open platform. It moved the founders to engage in a dialogue with port authorities, operators, and cargo owners determined to become forerunners in maritime digitalisation.

The idea was born to establish a collaborative and data-driven platform supporting port digitalisation and autonomous shipping to address one of the key challenges: improving communication processes among all port stakeholders.

"It was an easy decision since both BPO and Awake. AI mission is to contribute to the sustainable development of maritime transport. We are already improving all the Finnish ports competitiveness by using our AI and machine learning expertise to deliver ETA and Port Call Timestamp service for all Finnish ports. Since we consider



to be part of the Baltic maritime sector, we think it is only natural to offer our expertise and Smart Port technology to other Baltic countries. We are really excited to be a member of BPO," Sami Kaksonen, VP of Sales & Marketing, Awake.AI, commented on their decision to join BPO.

In support of environmental sustainability

Numerous climate and environmental policies, either already implemented or coming into force soon, bring new challenges for the maritime sector to face. Environmental protection is undoubtedly

one of the major aspects shaping the current face of the sector.

As companies in the global maritime transport business must adjust their strategies to comply with more stringent environmental regulations, Awake.AI's tools can help the industry adapt. The company's mission is to lead the transition to sustainable and intelligent maritime logistics, where 10% of global CO₂ emissions from shipping will be reduced by 2030 with the help of ecosystem partners.

The BPO is excited to work together with Awake. Al and is looking forward to all the opportunities for cooperation opening in front of us.

BALTIC PORTS ORGANIZATION • Secretariat Office – Actia Forum Ltd.

ul. Pułaskiego 8, 81-368 Gdynia, POLAND, ph.: +48 58 627 24 67, fax: +48 58 627 24 27, e-mail: bpo.office@actiaforum.pl, bpo.sg@actiaforum.pl, www.bpoports.com

Small and attractive

by Hanna Klimek, Beata Szymanowska, and Anna Salomon, Port of Gdynia

Innovation is about qualitative change, the much-needed novelty and originality that pushes organisations, markets, and agendas forward. Concepts and processes (of technical or other nature) replace the status quo, bringing about progress. Some of the 'breaking news' solutions are grand indeed, think the use of green hydrogen. It, however, doesn't mean that small innovations cannot result in huge advancements. The Port of Gdynia has been testing one such inconspicuous novelty: an autonomous floating drone conducting water research, also known as a hydrodrone.

atellite applications are among the many (technological, social, political, or economic) industrial innovation trends identified by the European Commission. Various sectors, including transport, can use these new solutions developed by the space industry to increase efficiency thanks to, e.g., data-driven process optimisation. Equally important, space-enabled applications can contribute to increasing people's safety or improving the protection of property and the environment. They are already used, among others, in flying and floating drones, road and rail vehicles, and vessels.

The Port of Gdynia is tapping into the global tech innovation trend by trialling a robotic floating platform to conduct water and seabed research in port basins. This device can work fully autonomously, following a planned trajectory, or remotely, which is particularly handy in bodies of water that are impossible or difficult to access by larger vessels and their crews.

On 18 November 2021, in one of the port's basins, the first tests of the robotic unit were held. As part of the trial, the correct functioning of all automated mechanisms used for taking water samples from various depths, bottom sediment probes, and measuring the water pH was verified. Communication systems were tested, too, while safety protocols were checked. The hydrodrone will begin cyclic testing of port waters as of March this year.

The technicalities

The floating drone tested in Gdynia is a catamaran: 4.0 m-long, 2.0 m-wide, and 1.0 m-tall (1.4 m with the antenna gate raised), having 0.5 m of draft. The hull is constructed of acid-resistant steel, while the floats are made of laminate. The unit weighing 300 kg can develop a maximum speed of 14 knots (about 26 km/h), but the measurement speed is best at 3-4 knots (5.5-7.4 km/h). It can be used for hydrographic surveys in port areas,

rivers, lakes, lagoons, or bays. The set of installed batteries (two Torqeedo Cruise 4.0RL 0-4KW motors) allows it to carry our measurement works for up to 12 hrs. The hydrodrone is additionally equipped with two photovoltaic panels. It is environmentally friendly as it emits no harmful substances. Remote control of the device is possible up to 40 km, while transmission of onboard data is up to 6.0 km.

The hydrographic equipment of the drone consists of an inwater sound velocity profiler (AML SVP Base X2), an in-water sound velocity sensor (AML SV Xchange), an inertial navigation system (SBG Ekinox2-D), an interferometric echo sounder (PING 3DSS-DX-450). All of these provide highly accurate measurements of water depths and 3D side images.

The drone's navigation sensors were installed on an automatically folded mast, ensuring the safety of transport of the vessel and access to the measurement area. These include two LW20 laser rangefinders of the UMRR 0C Type 42, a 24 GHz radar (weather insensitive and sunlight independent), a Velodyne Puck VLP-16 LiDAR (used in autonomous vehicles), a Hikvision camera (the water- and dust-proof model DS-2CD2025FWD-I), a Hikvision PTZ camera (model DS-2DE3304W-DE with high quality 3.0 Mpix resolution imaging), an Airma weather station (WX Ultrasonic Weather Station), and two vertical echo sounders (EchoRange 200 kHz).

In addition to typical navigational data, the drone records video (pan and tilt), stores data from the weather station, and measures the battery voltage level and the mast and hydrographic head actuator position. These data sets are transmitted to a shore station, while hydrographic data from the multibeam probe and LiDAR are recorded on in-vehicle industrial computers.

The ashore operator has two control consoles and one hydrographic console with a computer. A dedicated navigation console protects from dust, water and shock, while a small manoeuvring console is used to steer the vessel close to shore, including mooring. Also included is the radio mast required to communicate with the vessel.

Water samples collected by the hydrodrone will be analysed in a laboratory so that the physicochemical profile of the port basin waters can be established during the project. The data obtained during the research, especially the results of observations and analyses, will be included in the final report containing recommendations and indications for the state administration on the use of floating robotic platforms in research work in port waters.

Part of something bigger

The Polish Gdynia-based Marine Technology is the owner and developer of the hydrodrone. Since its inception in 1998, the company has been conducting research & development in the field of technical sciences. Among others, it employs experts in navigation, hydrography, geoinformatics, geodesy and cartography, oceanography, remote sensing, photogrammetry, automation and robotics, computer science and electronics. Marine Technology has carried out many research projects (on modern technologies, including Artificial Intelligence) and filed several patents. In October last year, it won a tender announced by the Port of Gdynia Authority and is now responsible for executing the necessary measurements using the hydrodrone.

The robotic craft for port water research in Gdynia is part of the Monitoring and Observation System for Port Areas Using Floating Unmanned Mobile Research Platforms international R&D project. Its consortium consists of the Port of Gdynia Authority (the Project Lead), Gdańsk University of Technology, Gdynia Maritime University, the Norwegian Institute of Water Research, and the Asker-headquartered Miros AS (a tech company that specialises in measuring the ocean surface). The €1.6m project is sponsored by the Polish National Centre for Research and Development, with the funding support (€1.25m) from the Norwegian Mechanism in its current perspective. The project's main objective is to determine the possibility of obtaining accreditation from state administration units for all research carried out using robotic surface platforms and creating recommendations for technical standardisation in this area.

The deep dive

The essential benefits expected to result from using the hydrodrone include an increase in the effectiveness of research work through the implementation, in cooperation with the Maritime Office and the Harbour Master's Office in Gdynia, of unified rules for the use of robotic platforms in port waters.

With the help of the hydrodrone (hopefully, an entire fleet in the future), we hope to ensure constant surveillance of port waters, including places difficult to access or dangerous for humans. We also want to expand the scope of observations of the marine environment thanks to measurements of water currents and waves together with their modelling, increasing the intensity of performing environmental research (even 24/7). The research will result in reports that will be an important contribution to the emerging legislation on floating robotic crafts.

The hydrodrone innovation fits the EU's policy on climate protection, including the sensitive Baltic waters, through implementing a pro-ecological monitoring system. It will also certainly boost the Port of Gdynia's know-how in ecology and innovation. This small, robotic vessel has truly proven to be an attractive alternative to the solutions used so far, especially concerning water research in difficult and dangerous to access places.









Digital voyage analytics to support shipping's decarbonisation

by Pelle Sommansson, Chief Product Officer, ZeroNorth

At ZeroNorth, we have recently integrated a new service into our platform to provide ship operators with the voyage insights they need to analyse, forecast, and proactively strive for their Carbon Intensity Indicator (CII) goals. Here are my thoughts on why the CII solution – and digital (energy efficiency) technologies in general – will be critical for the future greening of ship operations, including the shift to climate-friendly marine fuels.

s shipping becomes increasingly influenced by charterers, shippers, and consumers seeking to meet decarbonisation targets, it is necessary for the industry to take immediate action. We must also acknowledge that pressing regulatory requirements, including the International Maritime Organization's (IMO) CII, require compliance across the global fleet. Whether this is through designing next-gen vessels, working on the structural frameworks that hold back emission reduction progress, or by implementing new solutions and technologies, there are actions that we can take today that will set us up for success in the future.

Critical to future profitability

Introduced by the IMO at the 76th gathering of its Marine Environment Protection Committee, CII regulations will be implemented in 2023 to support the organisation's longer-term objective of reducing international shipping's carbon intensity by 40% by 2030 vs the 2008 level. It sets out mandatory requirements for all cargo and passenger (Ro-Pax and cruise) vessels above GT 5,000 that trade internationally.

The scheme results in a score (from A to E, like that found on home appliances) that indicates how efficiently a ship transports goods or passengers (measured in grams of CO₂ emitted per cargo-carrying capacity and nautical mile). The rating requirements will become 2% more demanding each year. By the end of 2026, there will be an 11% reduction compared to a reference line of 2019.

Shipowners and operators will be required to record their vessel data via their Ship Energy Efficiency Management Plan (SEEMP). An improvement action

plan must be submitted if a vessel is rated D or E. The reality is that many ships with a low CII rating will cease being commercially attractive. Therefore, shipping players must look beyond compliance to sustain or improve their fleets' operational efficiency or risk losing commercial viability.

The CII will be a critical operational key performance indicator from a regulatory perspective, but beyond that, it will create transparency and force efficiency. It is not an exaggeration to say that CII reporting is critical to future profitability. Doing nothing isn't an option, but accurate accounting can be highly complex and confusing. Luckily, as with many challenges the industry has had to navigate, digital technologies can be deployed to provide part of the solution. In December 2021, ZeroNorth launched a CII analysis and optimisation solution that supports owners and operators by enabling them to proactively implement plans to improve revenue and reduce emissions whilst complying with CII regulatory requirements.

To monitor...

ZeroNorth's emissions optimisation solution is the most comprehensive CII offering on the market to date, and it fits seamlessly together with ZeroNorth's existing cloud-based voyage, vessel and bunker optimisation platform.

The new service enables operators to view recommended voyage routing options to support a vessel's CII rating goal. Because the functionality is integrated with real-time weather route and voyage optimisation, CII recommendations will be made alongside options that reduce emissions and improve revenue, ensuring that owners and operators can prioritise

maximising their competitive advantage – even while sailing.

This flexibility allows for different priorities to be set for separate voyage parts, where, for example, a vessel may need to sail at full speed for one time-critical leg of the journey. After that, reduced speed or alternative routing might be advantageous in reducing the crossing's overall CII.

Beyond the immediate decision-making for specific voyages, historical and year-to-date CII data derived from noon reports is made available for each vessel in an easily understood numerical and graphical format. The calculations consider necessary ship factors, such as type and deadweight, to provide a CII rating for the year-to-date and year-by-year performance monitoring. The solution also generates alerts when a vessel is at risk of non-compliance.

The accumulated data is used to predict each vessel's next CII score, opening the way for ship operators to vary voyage and vessel parameters and instantaneously see what impact their choices have on future CII ratings.

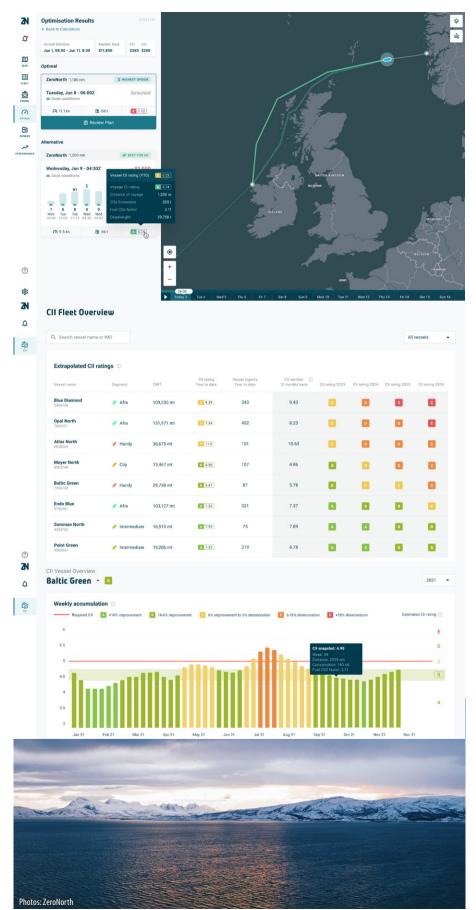
...optimise...

By combining in-depth analysis of all the factors affecting voyage and vessel performance with sophisticated algorithms and human expertise, owners and operators will be provided with an informed decision-making platform to either sustain or strive for their vessels' CII rating goals whilst maintaining a focus on commercial performance.

They will have on-the-spot access to various options based on voyage route, vessel speed, fuel prices, and CII rating, instantly

TECHNOLOGY





seeing the results of their choices through simulation, instead of waiting for the voyage to be underway and historical data gathered.

These functionalities enable operators and charterers to agree on a course of action before signing contracts. Balancing CII requirements while meeting commercial expectations of charterers - not to mention making the most of the market conditions - is not easy. Meanwhile, masters are ultimately responsible for the vessels' safety and actual sailing, so there is a requirement for a space that enables collaboration and joint decision-making. It is one of the pillars that the ZeroNorth platform has been designed around.

A single, comprehensive intelligence platform is important because higherquality data from noon reports and onboard sensors improve ship performance and voyage optimisation. This, in turn, drives better CII reporting and analytics, again enhancing vessel optimisation. Without system integration and powerful data analysis, progress would be impractically slow.

...and lead

ZeroNorth continues to build functionality into the system and incorporate suggestions from shipowners and operators. Although decarbonising shipping is a large and complex task, even daunting, the urgency to act immediately cannot be ignored.

Owners and operators need to find costefficient solutions right now to fund the green transition since future low-to-zero emission marine fuels are likely to be between two and eight times more expensive than what goes in the tank today. Putting it vividly, every dollar we save today in efficiency gains is worth \$2 to \$8 in the near future.

It's nothing less than inspiring to realise that the money saved today via digital solutions can pave the future decarbonisation pathway for our sector.



Born from Maersk Tankers, ZeroNorth was founded to change the shipping

industry through digitalisation. Working alongside our customers and partners, we truly believe that we can support shipping companies worldwide to optimise their business while reducing shipping climate footprint. This is what empowers us, a team made up of some of the most creative and strategic minds in shipping, with over 90 years of experience in the industry. Set a course for **zeronorth.com** to discover more.



Ready to compete

by Peter Tommy Nielsen, Head of Department, 3D Print & AM Technology, FORCE Technology

In the shipping industry, stagnation caused by wear, accidents, or other factors that put a ship out of service is a well-known expense driver. Often a repair service requires specialised and approved operations regulated by classification societies. Though costly, it makes perfect sense, as the best possible service should be applied to reduce the risks of failures outside the service intervals. The question is: can we do better?

e deal with three categories when viewing spare parts. First, the plug & play option, a ready-made spare part component (considered a consumable good to a certain extent). Second, there are high value and 'large' spare part components often manufactured when needed (in some cases, the piece is ready, just in case, due to insurance purposes). Here, refurbishment is possible if the timeline and expected quality allow it or the specified material isn't available. Third, extensive service that includes several parts of the two above.

Imagine

Highly skilled service companies take care of these categories. Although strategically placed worldwide, one still might find the locations 'too distant,' by which we mean service accessibility, material availability, costs, or timeline. Moreover, considering that the typically accepted manufacturing method is based on subtractive technologies, such as turning and milling, it also implies that a larger workpiece should be available. This setup will result in the 'production' of scrap. In other words, these solutions work; yet, there is room for fine-tuning.

Imagine a manufacturing world where all critical components and wear parts are stored as 3D files in the cloud. These blueprints can be downloaded by appointed and qualified additive manufacturing shops, printing the pieces on demand and precisely when the replacements are needed. Think of a print machine that only requires a 3D drawing and build material in the form of wire or powder, which you can shape according to your specific needs.

Additive manufacturing is not limited to polymer materials or space industry applications (or just for the fun of it). Thanks to its flexibility and efficiency (read: lower costs and lead times, plus local availability), 3D printing is a growing market. At FORCE Technology, we have scrutinised many different cases over the past couple of years. For example, print production of a 7.0 kg component for an F35 jet fighter showed reduced material consumption and time of production in the 90% parallel with acceptable quality.

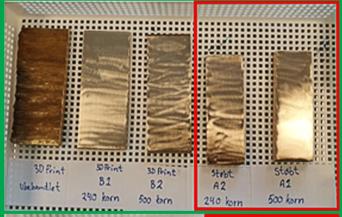
3D printing vs traditional casting

Another study by FORCE Technology compared the wire arc additive manufacturing (WAAM) technology directly with traditional casting. As a production method, WAAM has been known since the 1920s. Today, the technique is utilised with CAD files and a robotic arm, quite a novel combination. WAAM is well-suited for large-scale components, meaning production isn't limited by space but by the robot's reach.

The work focused on propeller blade manufacturing in aluminium bronze (as propeller blades are already a subject

of repairs). We included a bronze cast for direct quality comparison purposes. For casting, the requirements for processing propeller blades include raw material, a crucible, a mould, and post-processing. For 3D printing: wire material, a welding machine, a robot, and post-processing. Although casting has been used for thousands of years, while 3D printing is a new technology, the study delivered compelling findings favouring the 'newcomer.'

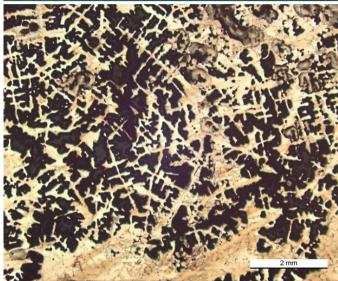
The images show three printed propeller blade samples (left) and two cast samples (right). The latter received some surface finishing, while the former set was taken right out of the 3D printer. Next, we exposed all samples to the same salt mist procedure. As can be seen in the bottom picture, the printed pieces experienced mild oxidation. The oxidation would have been even less if the samples had been subject to surface finishing. The cast samples experienced strong oxidation, independent of surface finishing.





TECHNOLOGY

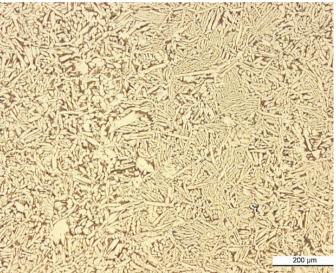




The mechanical properties of the cast and printed samples also showed remarkable differences. Due to defect formation during the casting process, the cast samples did not meet the mechanical properties stated in the standard for the material. The 3D-printed samples, to the contrary, obtained values that were very close to the standard material. The propeller blade samples' visual appearance and microstructure differed notably (left image – cast, right – 3D-printed).







Best of both worlds?

On top of the significant quality benefits, 3D printing is often a more cost-efficient alternative to casting. Additive manufacturing can yield direct production savings compared to casting since there is no need to create and maintain a mould. Furthermore, it can grant a higher degree of design freedom. Finally, 3D printing optimises resource use, with printing powder often made of recycled material.

Looking ahead, working with welding-based additive technologies, hybrid manufacturing – the combination of traditional and additive manufacturing – isn't something unthinkable. Mastering this method would allow for building special features on a turned shaft, saving heaps of material.



FORCE Technology is a tech consultancy and service company that strives to create positive technological change and make the world more sustainable

and safer. The company helps others become technological and sustainable frontrunners for the benefit of society. Each year, thousands of customers entrust us with their products, materials, structures, largest potentials or worst challenges since we create security and value based on impartiality, confidentiality, and knowledge. Go to **forcetechnology.com** to discover more.

Integrate or stagnate

by Roland Slegers-Leijsten, Founder and CEO, Delivery Match

The e-commerce market in all European countries is snowballing. In 2019, it was worth €658m (+10% year-on-year), with the Top 5 accounting for over €440m (with the UK alone hitting €168m in e-sales). The need to shift from a 'push' (closing out stock) into a 'pull' (generating demand) market has already been recognised. Also, more and more combinations of business-to-business (B2B) and business-to-consumer (B2C) sales need to be integrated into the logistics chains. The coronavirus pandemic has only sped things up, with entirely new consumer groups compelled to go shopping online (think, for example, of the elderly who have started making their grocery haul from the relative safety of their living quarters). Like two sides of the same coin, sales and logistics must adapt to this new environment.

perations will always be sales driven, meaning that logistics have to follow and relate to sales concepts. From my perspective, the following sales trends have increasingly impacted logistics operations.

First, we have a combination of B2C and B2B sales. Second, combining onand offline retail. It started with originally Interestingly, the reverse has been happena very capital-intensive strategy). Third, the use of dropship-to-consumer (D2C) and dropship-to-business (D2B) models, letting providers ship the (partial) purchase directly to their customers. Fourth, selling wide). Fifth, also selling outside own sales channels via wholesale platforms. Sixth, manufacturers who directly sell to consumers. Seventh, having a wide product range and sizeable 'long tail' (i.e., selling low voltomers instead of only selling large quantities of a reduced number of popular goods). Eighth, selling products with a wide range sions, breakable, dangerous goods, fresh, etc.). Ninth, in B2B, companies are often working with Service Level Agreement (SLA) and the requested performance of logistic operations is (more or less) known upfront and thus (more or less) predictable; the (B2C) online consumer also expects to learn their specific temporary SLA for each online purchase. Tenth, multi- and omnichannel sales concepts are becoming more and more common. The practical logistics definition of the former would be combining off- and online sales with a distribution concept that enables this; the latter's – selling via every sales channel possible with stock being located 'everywhere and nowhere' (with an enabling distribution concept, of course).

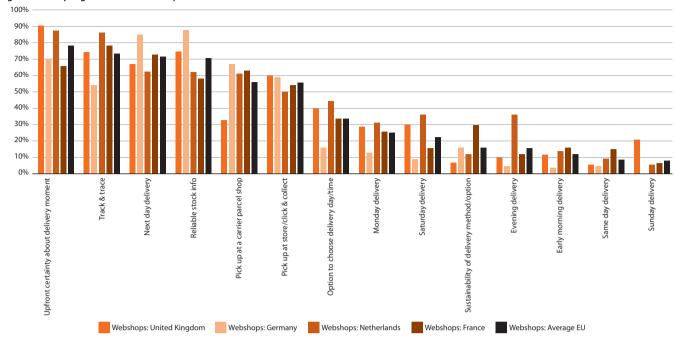
Towards new logistics excellence

As a result, the following challenges occur from a logistics and supply chain point of view. First, the stock needs to be available for multiple sales channels and/ or companies in different countries. It numerous warehouses (maybe of different companies and in many countries). Second, extracting real-time and reliable stock availability, shipping capacity/ options, pick-up capacity/options, and delivery capacity/options of the various warehouses and carriers at the transaction moment is a must – but very complex. It requires an Order Management System and a Transport Management System, realtime functionalities integrated with webshop front-end(s), Warehouse Management

plus the carrier systems. Third, products vary physically. Shipping goods that vary in involving multiple carriers, since, e.g., not all of them have the means to transport high & heavy or dangerous goods. Fourth, many companies struggle to integrate offand online distribution in transport. Fifth, B2C and B2B sales need to be served logistically, and here too many companies grapple with the issue of integrating B2C and B2B distribution in warehouses. Sixth, selllenges regarding stock location, customs requirements, multiple carriers needed, and transport costs that vary significantly per order. And when companies start to combine their sales (offline, online, B2C, forms, all the mentioned logistics challenges become an instant reality. Seventh, when using the D2C and/or D2B solutions to ship a (partial) purchase directly from the supplier to the customer, more systems for stock availability and logistics capacity of the warehouse(s) and carrier(s) must be available in real-time during the purchase process – to offer reliable shipping options

Logistics excellence is a top priority. Failure and service limitation directly and negatively impact revenue by decreasing conversion and retention.

Fig. 1. Webshop logistics services line up



Tab. 1. The gaps between customers' expectations and logistics options offered by online retailers (EU consumer average vs EU webshop average)

Service	What clients expect [%]	What is offered [%]
Reliable stock info	92%	70%
Upfront delivery moment certainty	89%	78%
Option to choose delivery day/time	73%	34%
Track & trace	71%	73%
Sustainability of delivery method/option	53%	16%
Evening delivery	51%	16%
Saturday delivery	47%	23%
Monday delivery	42%	25%
Sunday delivery	32%	8%
Early morning delivery	30%	12%
Pick up at a carrier parcel shop	16%	56%
Pick up at store/click & collect	3%	56%
Next day delivery	3%	72%
Same day delivery	0%	9%

The gaps from checkout to doorbell

These trends and the logistics challenges that come with them stress the need for a seamless real-time flow of products and information from 'checkout to doorbell' because 'the last mile starts with the first click.'

Throughout the logistics chain, the involved retailers, manufacturers, warehouses, and carriers need to be closely and real-time linked/integrated to assure reliable 'first time right' shipping and delivery, also providing the customer with options regarding logistics services.

At the same time, reducing CO, emissions is becoming more and more critical. Our research (more below) showed that sustainability moved up in the ranking compared to earlier research done a few years ago. The good news is that doing the things 'first time right' and offering reliable shipping and delivery options will help increase sales, reduce costs, and lower the negative environmental footprint. Multistore, multi-warehouse and multi-carrier solutions must be in place for this. It is time

to let the logistics chains work as a 'sales engine and costs/CO₂ emission saver.'

However, there is a mismatch between what customers want and what online companies offer. These gaps create quite a challenge; that said, if one can close them, then numerous opportunities spur, letting the logistics chain help increase turnover while reducing logistics costs and emissions for good measure.

We researched Europe's top four e-commerce markets (the UK, Germany, France and the Netherlands) to determine what retailers offer logistics-wise (Tab. 1). Whereas there seem to be no major differences between the countries regarding customers' logistics services and sustainability needs, there are notable deviations concerning online retailers' logistics and sustainable solutions. For instance, next day delivery is pretty much a standard. More premium options are somewhat in the middle of the ranking or are even closing the field because they aren't widely available (e.g., only a little over 32% offer the opportunity to choose a delivery day/ time) or customers do not demand them.



The article is based on Roland Slegers-Leijsten's recently published e-Commerce Logistics in Europe: Integrate or Stagnate (available as a hardback and e-book via info@verloopuitgeverij.nl or Amazon). In it, the gaps between customer expectations concerning logistics related to online shopping and what service providers offer are dissected.

The publication also details how these gaps can be resolved with smart logistics and integration software. Roland Slegers-Leijsten is the Founder and CEO of the Dutch Delivery Match, a developer of an order-, transport-, and shipping management software (OTSMS) that enables control across the entire logistics chain. Visit www.deliverymatch.eu/en to learn more.

Dancing oranges instead of bombs

by Marek Błuś

The newest postal stamp book of the Greenlandic Tusass is the smallest, thinnest, and most modest information-wise of the four such publications released to date by the northernmost post office (known formerly as TELE-POST). Regretfully, Greenland During the Second World War can't hold a candle to the previous editions, the quality of which has set the bar high.



he first book, Ships in Greenlandic Waters Over 1000 Years, published in 2004, came in two volumes, comprising a condensed yet comprehensive essay about navigating to, from, and around Greenland. We had to wait an entire decade for the second publication: Twelve Greenland Expeditions 1818-1978 (subtitled Seen through stamps issued 2003-2014), which included exploration stories. The following Greenland's Civil Aviation History 1960-2015 was a complete encyclopaedia on all aircraft classes used by Greenland companies – depicted using 2016-issued stamps.

All of them are stuffed with stamps: the first has 16 with ships, the second – 12 souvenir sheets with portraits of explorers, their vehicles, and polar landscapes, and the third – 13 stamps presenting aircraft. It is worth emphasizing that all three books are richly illustrated with black & white and colour photos, and even with works of fine art. The artist Martin Mörck – who created all attached stamps and souvenir sheets both as engraver and designer (co-designer in case of some sheets) – binds the editions together.

The latest set, with a subtitle Seen through the eyes of Greenlanders, takes ten stamps from 2016-2020 to tell us about political challenges and social changes the island nation had

to deal with after it was cut off from its metropolis and only trade partner, Denmark, which went under Nazi occupation in 1940. As a result, Greenland turned its whole economic attention to the US and Canada, opening Greenlanders' eyes to the world, until then shut close by the Danish government's policy. Before 1940, Copenhagen was convinced that the indigenous people of Greenland and their culture would be better off staying isolated. While WWII brought hardships and shortages, Greenlanders got the opportunity to taste oranges for the first time ever, as we can learn from the New goods DKK36.50 stamp. That said, the most surprising stamp (DKK 20.50's Catalogue goods) shows two couples dancing to music from a gramophone. The book quotes a Danish official according to whom catalogues from the American mail order store Sears "influenced the development of Greenland's society more than the complete writings of Karl Marx."

Some stamps are covered quite decently, like *Cryolite* (DKK 36.50)

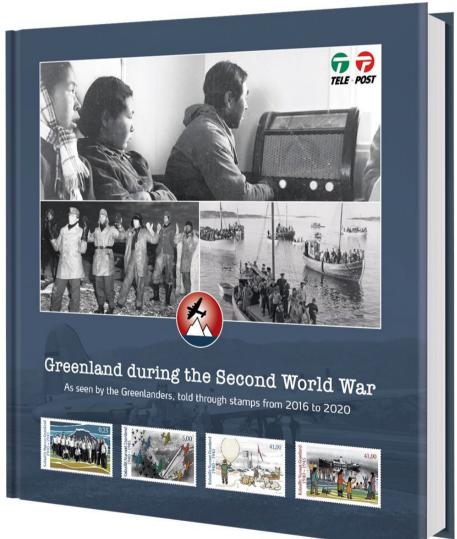












goods were rationed and for how long? From the perspective of continental Europe, WWII wasn't precisely about orange imports...

Greenland During the Second World War is also poorly illustrated. It contains mere 17 photos spread across 49 pages. For comparison, the third book had 49 on 57 pages. Then again, it is the first publication in this series that has enlarged reproductions of all depicted stamps, each with a separate page. If you love Mörck's art – this time integrated into a design by Naja Rosing-Asvid – you will be most pleased.

All mentioned books are still available via Tusass' online shop. However, it seems that in the heavily discounted *Ships in Greenlandic Waters*, the stamp mounts are already empty.

Photos: Tusass

in the *Cryolite and foreign trade* chapter. In contrast, others require referencing additional sources to fully understand a given topic, filling in the gaps and understatements. For instance, specific questions arise when

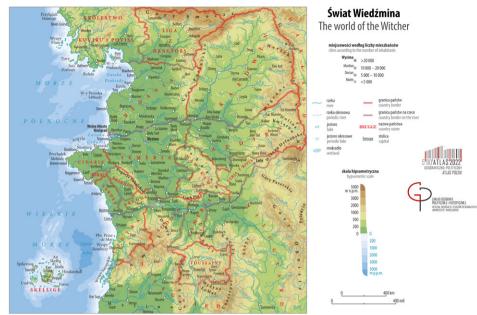
looking at the *New goods* stamp, such as – were oranges available throughout the war or maybe till December 1941 only when the US entered the conflict? Were they commonly available or rationed? By the way, which



TRANSPORT MISCELLANY

Which way to Kaer Morhen?

If you haven't noticed it yet, we are huge fans of charts. Some of us also fancy reading a gripping fantasy novel. And what has our journal to do with this lit genre? Maps, of course! Grab and open any fantasy book, and there is a good chance one will embellish the publication. You know, to get you even more immersed in the given universe. Most recently, the Department of Political and Historical Geography of the University of Warsaw has released The world of the Witcher map. However, it differs from the standard stylised fantasy charts. It is an actual map. with all the political and geographical details such as landforms (incl. height above sea level) or localities depicted according to population. Although there are many Witcher maps out there, among others from the CD Projekt Red video games, this one is the first of its kind. While Geralt's transportation means were more or less confined to Roach(es)



– plus occasional, monster-hacking adventures under sail (oh, and that blasted teleportation, naturally) – the Department's work

brings a wholly new level of nerdiness. Which we map and fantasy enthusiasts greatly appreciate!

The Econtainer Bridge

Photo: Department of Political and Historical Geography of the University of Warsaw

Amidst all the container rumble in 2021, let us start this year by getting back to reporting on the various alternative uses of the shipping box. A 160 m long bridge made of reused containers will clip transportation and ecology together in Israel. The Econtainer Bridge – designed by Yoav Messer Architects – will be a gateway to the Ariel Sharon Park, a new green urban centre the size of three NYC Central Parks (a mountainous garbage dump in the past, 25mt of waste accumulated till shut down in mid-1998...). The passage will be suitable for pedestrians, cyclists, and special vehicles shuttling the public to and from the park. The bridge's pathway will also be made of reused timber. Photovoltaic panels will provide electricity for illuminating the bridge and its surroundings. We just hope that constructors will get their hands on a sufficient number of containers! As the transport industry's insurers from TT Club lately wrote in one of their insights, the market is in such dire straits that "any box will do." Yikes!







TRANSPORT MISCELLANY

Nested







The four first rigid airships made by Ferdinand von Zeppelin (LZ-1-to-LZ-4) were assembled on the water – in floating hangars anchored on Lake Constance, near Friedrichshafen. The hangars' structure resembled a catamaran – a grating of a shed supported on two-side pontoons between which a third movable one was located. Inside the hangar, there was a resting platform while outside – one for starting and landing. Zeppelin chose the lake as the safest place for experimental flights as it was the only spot where the hangar could rotate to be always in line with the wind. The second condition was crucially important because the airship's large side airflow area precluded all manoeuvres with the

wind coming from a different side than its nose. Although this issue was solved later, in 1900, when LZ-1 made its first flight - the 'airship carrier' nested into a floating, covered harbour was the only viable solution. The first hangar and its flying 'stuffing' (on the left) were dismantled after three flights as the wallet of Zeppelin's first company hollowed out. The second business attempt was more successful, even though the new floating hangar's first child, LZ-2, was lost during the second flight. The follower, the 1906-built LZ-3 (the middle and right photos), made a living for the inventor and his invention. After a series of safe flights, it was bought by the German Army, serving until its disposal in 1913.

The (light and) silence of the harbour

Polish lovers of Nordic art can make merry! All thanks to the first-ever exhibition, titled Light and Silence, of the famous Danish painter Vilhelm Hammershøi, presented in the National Museum in Poznań (shortly to be repeated in Cracow). Hammershøi is known chiefly for the 73-big collection of paintings of his home's interiors (located under Strandgade no. 30, literally the "Beach Street" in Danish, in Copenhagen). White doors, windows, mahogany furniture, and, of course, his wife Ida, wearing a long, black dress, were his everyday models. Though Hammershøi's wife is present, the paintings befit the still life genre, as Ida is usually turned back to the spectator, resembling more a mannequin than a living human being. That is probably why Hammershøi is called the "most still and silent (...) painter of pauses, silences and in-between spaces." We seascape lovers can also admire Hammershøi's works, though only four capture what was happening outside the painter's window, a stone's throw from the guays. But he didn't immortalise the usual harbour bustling. Oh, no, the landscapes show ships laid up for the winter! From Christianshavn's Canal depicts three wintering brigs with lower yards cockbilled to protect them from rot by arrested rainwater. The unusual geometry of the resting rigging probably prompted the painter to take up the exceptional topic. Interviewed, he said, "[...] first and foremost it's the lines I look at." Indeed! No life, no motion, only lines, stillness and silence, all frame-frozen between navigation seasons.









WHO IS WHO



YANA GRUNDKE Head of Cruise, Port of Rønne

Grundke, a graduate of Ternopil Academy of National Economy (International Economics) and Hochschule Stralsund – University of Applied Sciences (International Marketing), joins the Danish seaport as Chief Business Officer for Cruise. In 2015, she joined the German Baltic Mukran Port as Manager of Business Development and Marketing Manager for Cruise & Ferry, overseeing the development of tourism cruise concepts across the island of Rügen.



YANA VOYTSEKHOVSKAYA Editor-in-Chief, IAA PortNews

Voytsekhovskaya takes over from Vitaly Chernov, who was in charge of the St. Petersburg-based Information and Analytical Agency PortNews for over a decade and now heads the PortNews Media Group's Analytical Department. Voytsekhovskaya, a graduate of the Lomonosov Moscow State University's Faculty of Journalism and a Master in Business Journalism from St. Petersburg State University, previously worked for *Kommersant*'s St. Petersburg bureau, where she reported on transport, shipbuilding, and city economy.



TUOMAS KANSIKAS COO, Nurminen Logistics

Kansikas, an MSc Econ in Supply Management from LUT University, will join Nurminen Logistics as Chief Operating Officer in March. He will directly manage the multimodal business unit and be responsible for the company's support functions. Kansikas has 15 years of experience in logistics and forwarding, previously working for DHL Global Forwarding Finland's air freight division. He was also a professional football player of HJK Helsinki, the country's biggest and most titled club.



ROBERT ZIEGLER General Manager Europe, Einride

The Swedish tech freight company, the world's first to operate an autonomous electric lorry on a public road (2019) and operator of Europe's largest fleet of heavy-duty e-trucks, appointed Ziegler to help it develop across key European markets. Ziegler brings over 25 years of experience, most recently working for Solutions30 Group as Chief Transformation Officer and CEO of Germany. Previous, he held C-level roles at DHL Freight and Waberer's International, in addition to over 17 years at the global management consultancy Kearney.



PHILIPPOS PHILIS
President, ECSA

The General Assembly of the European Community Shipowners' Associations (ECSA) appointed the Immediate Past President and Member of the Board of Directors of the Cyprus Shipping Chamber as the organisation's new President for a two-year term. Philis is the Founder (1996) of Lemissoler, chairing and managing the Group since 2009. He is an alumnus of Harvard Business School, having also studied mechanical engineering at RWTH Aachen.



ANDRUS AIT CFO, Port of Tallinn

Ait comes from the Riigi Kinnisvara real estate development & management company, where he worked in various financial positions, including as Chief Financial Officer since 2016 and Member of the Management Board as of 2019. He was also a member of the Supervisory Board of the Port of Kärdla. The Supervisory Board of the Estonian seaport also appointed Ait to the management board for a term of five years. Ait holds a master's in Economics from Tallinn University of Technology.



JOOST VANTOMME CEO, ERTICO

Vantomme joins the European Road Transport Telematics Implementation Coordination (ERTICO) from the European Automobile Manufacturers' Association, where he was the Smart Mobility Director. Vantomme, a master in Law and Law/Economics from KU Leuven, has already been part of the Brussels-based intelligent transportation system organisation since mid-2018 as a Member of its Supervisory Board, plus chaired the Strategy Committee from mid-2020 to January 2022.



INGOLF SÆTREVIKBusiness Development Manager, Dualog

Sætrevik's main job will be to help shipowners and managers embrace the integrated ship concept (incl. greater transparency, accountability, and reporting) as part of their business processes. He joined the maritime software provider from Marlink, where he had worked as a Sales Director of Maritime IT Solutions for northern Europe. Earlier, Sætrevik worked at Palantir as a Sales and Marketing Manager for almost 19 years.

170+ operators 620+ ports 1,130+ services 1,150+ terminals



EUROPE:

all over the ro-ro & ferry, container, and rail maps

www.europeantransportmaps.com

