

BUNKERSPOT

OVER THE TOP

OPENING UP THE ARCTIC SEA ROUTES



INSIDE:

POSEIDON PRINCIPLES

COUNTRY FOCUS: VENEZUELA

INLAND WATERWAYS

BUNKER PROCUREMENT

Networking

Governments are increasingly turning to domestic inland waterways to boost transport efficiency. **Rhys Berry** speaks to industry stakeholders in north-west Europe to find out about the advantages of using waterway networks and the potential emergence of more environmentally friendly marine fuels in the sector

International shipping accounts for the carriage of approximately 90% of global trade. Of course, you already knew this. Anyone who has ever attended a maritime conference will be familiar with the statistic. It is used to illustrate shipping's status as the most environmentally efficient method for transporting goods in comparison to other sectors such as aviation, road and rail. This environmental efficiency is now starting to be recognised across the world by governments which, under pressure to reduce CO₂ emissions in line with the targets set at the Paris Agreement, are seeking to utilise existing inland waterway networks for both domestic and intra-country purposes.

The European Union (EU) is keen to harness the 'huge potential' of the 37,000 kilometres of inland waterways in 20 Member States. Around 500 million tonnes of cargo is transported across the network – particularly in densely populated areas of Germany, the Netherlands, France and Belgium in western Europe. According to the European Commission (EC), the energy consumption per km/ton of transported goods for waterway transport is approximately 17% of that of road transport and 50% of rail transport.

In other words; not only is inland waterway transportation a greener means of transportation, it is significantly more economical.

In mid-July, the European Investment Bank (EIB) announced it had signed an ERI-enabled technical assistance grant with Serbia worth €2.7 million to support the development of an inland waterway network on the country's largest rivers – the Danube and Sava. As Serbian Minister of Construction, Transport and Infrastructure Zorana Mihajlovic said: 'The main goal of these investments is to enable a much better use of the Danube as a transport corridor, to have more goods transported by using our inland waterways.'

The grant built on a €100 million loan from the EIB, finalised earlier this year, which aims to support a shift away from road to waterway cargo transportation.

In western Europe, the desire to expand the continent's inland waterway sector was outlined by German Transport Minister Volker Wissing who, in July, emphasised the importance of the Rhine Corridor and its ports for the transport of goods to Rhineland-Palatinate and Europe as a whole. Stretching more than 1,200 kilometres and flowing through six countries, the Rhine accounts

for two-thirds of European cargo volumes transported by the inland waterway sector.

'With the expansion of Europe's largest seaport and the doubling of container throughput, the capacity of hinterland transport must also be increased,' he said.

This modal shift may provide a welcome financial boost to an industry that does not benefit from the same amount of capital investment as the ocean-going sector. This could also spur technical innovation and drive the development of more carbon-neutral technologies. While inland shipping emits significantly less sulphur than ocean-going ships – vessels are not permitted to use fuel with a sulphur content exceeding 0.001% – the marine gasoil typically used by inland waterway vessels does little to mitigate CO₂ emissions.

In June 2017, Netherlands-based PitPoint LNG announced plans to build an LNG bunker station in Cologne, Germany, and the signing of a long-term LNG bunkering agreement with Shell. The oil and gas major currently operates five LNG-fuelled vessels on the Rhine and has plans to extend this number to 15. In addition to LNG-fuelled ships, Shell also operates three LNG bunker barges in Europe, including the *LNG London*, which carried

out its first refuelling in June and is licensed to deliver bunkers at all three ARA ports.

'We sat down with Shell and they said if we were willing to build the station, they would be willing to dedicate some ships,' explains Jan Willem Drijver, Managing Director of PitPoint.LNG.

Such cross-sector cooperation has underpinned much of the development of LNG as a marine fuel in the ocean-going sector but, as Drijver observes, it will also be helped along by lawmakers.

Drijver continues: 'We see a strong push from the EU but also from local governments to see what they can do to contribute to cleaner air in their city or region and what are the alternatives. I think also the realisation starts to kick in in that electric and hydrogen are not foreseen for the coming decade and not for long distances either. LNG remains the only reasonable alternative [to conventional oil-based bunker fuel].'

Co-financed by the Connecting Europe Facility (CEF) of the European Union, PitPoint.LNG's bunker station is part of the European Commission's plans to establish an LNG infrastructure for roads and waterways. Of course, this funding works both ways. In order to develop the LNG-fuelled inland shipping sector, governments will need to incentivise and support local companies shifting to alternative fuels such as LNG, but this is already happening.

'If you have the subsidies of the European Commission and provinces like South Holland and even ports, they give half of the difference in price of the diesel engine in subsidies,' explains Edwin Verbergh, a scientific researcher for the Port of Antwerp and an expert on European inland navigation and innovation. 'There are quite some millions being spent,' he adds, citing the 15 LNG-fuelled vessels ordered by Shell.

Of course, for a company like Shell, such an investment does not pose as much of a risk as it does for smaller inland waterway vessel owners and operators for whom the payback period could be as much as 10 years.

'LNG is a relatively expensive solution as compared to a conventional diesel propulsion system,' says Salih Karaarslan, Project Manager at Netherlands-based Expertise and Innovation Centre Inland Barging (Expertise en InnovatieCentrum Binnenvaart (EICB)). 'We've looked at this and for us the easiest option would be something like €1.2 million to €1.4 million in additional [costs] in comparison to a new diesel configuration. That's basically too much for such companies.'

According to Karaarslan, a lack of a business case is the 'primary reason' for banks'

reluctance to provide financing for LNG projects. Another explanation relates to the fact that much of the inland waterway transportation business is conducted on the spot market rather than on a contractual basis. Just over half of the assignments of ship-owners and operators in Western Europe are traded on a spot market prone to significant price fluctuations. The tendency for smaller waterway sector operators trading on the spot market does not provide banks with enough assurance to invest in the sector. Another potential drawback relates to the conservative nature of the inland shipping sector.

Karaarslan says: 'Inland shipping companies mostly finance their vessels with mortgage loans. Leasing, for example, is not applied much, whereas it is more common in other modalities such as rail, road and air.'

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Karaarslan continues: 'The sector is rather conventional in terms of financing, however the use of new financing instruments could be helpful in financing the energy transition.'

Possible financing instruments and schemes include leasing, pay-per-use or power-by-the-hour, polluter pays initiatives, joint procurement and hedging on the price difference between clean and cheaper alternative fuel.

One of the key differences between ocean-going ships and inland waterway vessels relates to the average lifespan of the vessel. A general cargo vessel will operate from anything between 15 and 30 years before it is sold for scrap whereas for an inland waterway vessel, the lifespan is typically between 40 and 70 years.

This might prove to be a stumbling block for the development of LNG in the inland waterway sector. Although there are clear environmental advantages to using LNG as a marine fuel, it is considered by many in the industry as a 'bridging fuel' as the industry transitions towards carbon-neutral solutions. Might this potential lack of longevity dissuade the EU's inland waterway fleet – roughly 80% of which is operated by owner-operators who work and live with their families on the vessels – from investing in LNG as a marine fuel?

'I think that's one aspect of it,' says

Tanya Ferry, Environment Manager in the Planning and Environment Department at the Port of London Authority. 'You are talking about businesses that are often family-led and who have their training based on what they've been working on.'

Ferry continues: 'And naturally, another thing to some extent is space. Those engine rooms and fuel spaces for the inland fleet are really constrained.'

Of course, LNG is by no means the only alternative fuel solution for the inland waterway sector. Over the last 18 months the ocean-going sector has seen the emergence of hydrogen as well as the development of battery technology. The latter, it could be argued, is ideally suited to inland waterway transport, where journeys are shorter and charging facilities more plentiful.

'If you were to pick a sector to experiment with electric ships then I think inland ships are a better choice for the simple reason that you don't need that much power,' says Edwin van Hassel, senior researcher at the Faculty of Transport and Regional economics, Antwerp University. 'Inland ships are smaller, and their operating speed is much lower.'

Port-Liner CEO Ton van Meegan agrees that the inland shipping sector provides a good opportunity for developing battery technology. The company will start operating a ship on flow battery technology from Q2 2020 and expects to have either three or four vessels using the technology by the end of next year.

'We have 7,300 inland vessels in Europe and every day each ship would need about eight megawatts – it's not possible!' says van Meegan. '[By using flow battery technology], we've solved this problem totally. We don't need charging points in harbours or near the river or canals. It is a real solution for every ship, even ferries or sea going vessels.'

The flow battery is essentially a fuel, says van Meegan.

'You can load it like diesel or gasoline. It's a liquid, like water, and you don't need pressure, you don't need 300 bar or 700 bar tanks.'

Although arguably not as energy efficient as batteries or flow battery technology,

hydrogen is also expected to play a key role in zero-emissions inland waterway shipping, particularly for vessels operating on longer routes. A vision of how this might look was provided by the Port of Amsterdam which, in mid-July, joined H2Ships, a project seeking to determine the essential conditions for a successful market for the introduction of hydrogen as a marine fuel. As part of the pilot, Port of Amsterdam's new management vessel, *De Havenbeheer*, will be sailing on hydrogen in the form of sodium borohydride, a solid form for hydrogen.

'For me, hydrogen is very promising,' says Verbergh. 'The only problem with hydrogen is if you develop hydrogen from methane, you still have a global warming issue. But even that process is being developed and being improved.'

'You are talking about businesses that are often family-led and who have their training based on what they've been working on'

Verbergh continues: 'It's very difficult to predict but if I were to gamble, I would say hydrogen fuel cells and electricity – if you combine them – could be a very positive case for society for the private [inland waterway] owner.'

Ports will also have a role to play in developing these technologies. There have and continue to be a host of incentives offered by port authorities to encourage environmentally friendly shipping. These range from discounts in port fees for vessels using cleaner fuels and emission abatement technology or in some cases, actual financial assistance to those seeking to develop green projects. For its part, Port of London Authority currently offers a 'green' discount for international vessels and it is looking into applying this within the inland sector. In addition, it is working with other organisations that have an interest in air quality in order to facilitate more environmentally-friendly shipping. It is difficult to quantify the precise impact of such initiatives and schemes but, according to the Port of London Authority's Ferry, they have had a positive effect and it is hoped that it can have the same influence on the inland sector.

'We've certainly seen an increase in vessels meeting the standard we set for the international fleet but it's difficult to unpick whether that's an entirely London-centric development or whether there are more vessels coming into the scheme on a global basis.'

According to Ferry, some operators have intimated to the Port of London Authority that they would consider which vessel to send to the port based on the discount they would receive. What's more, by working with a number of international ports, ship operators are able to easily establish potential

discounts and work out the financial benefit of switching certain vessels to different routes.

'It's certainly made operators think about their investments,' says Ferry. 'We've got regular operators on the Thames which would benefit from [the discount] that currently don't because they've got a very old fleet. They're now coming to talk to us about what solutions they might put in place when they commission the construction of their new fleet to make sure they're capitalising effectively on the discount.'

It is also in a port's interest to contribute to the development of inland waterway transport, the importance of which was highlighted by the EC back in 2013: 'The EU's largest ports would never have developed into the highly efficient logistical hubs they are today without inland navigation's contribution. These ports depend on inland navigation to reduce congestion in their hinterland and to further grow.'

In recent months, the three ports comprising the ARA region – Amsterdam, Rotterdam, Antwerp – have each demonstrated their commitment to the sector with several key announcements. In June, the ports of Rotterdam and Amsterdam announced the expansion of the North West Central Corridor. First established in February 2019, the partnership of deep-sea terminals, inland terminals and inland shipping companies on the Amsterdam-Utrecht-Rotterdam route aims to improve capacity utilisation of inland vessels and reduce waiting times at the terminals.

Also in February, it was announced that the Port of Antwerp would be receiving an LNG bunkering pontoon – the *FlexFueller 002*. Owned by Titan LNG, the vessel will provide LNG bunkering services throughout the Antwerp port and region to inland



Image © PitPoint

waterway vessels and small coasters. The project is an example of the potential synergies between larger ports and the inland waterway sector. While LNG-fuelled ocean-going vessels will account for the vast majority of bunker volumes, by having the flexibility to bunker inland vessels as well, the bunker pontoon is expected to play a part in developing the LNG-fuelled inland sector.

Netherlands-based Titan LNG recently took delivery of its first LNG bunker pontoon, *Flexfueller 001*, and the vessel carried out its maiden bunkering in June at the Port of Rotterdam.

‘The charm of having two *FlexFuellers* is that they can act as a back-up for each other which means we can provide operational supply security for our customers,’ says Michael Schaap, Commercial Director Marine, Titan LNG.

The flexibility of the LNG bunker pontoon is indicative of a market becoming more adaptable. In the past, the terms and conditions of an LNG bunker delivery by truck were more rigid, requiring complicated take-or-pay structures and the obligation to take a full truckload of fuel. However, the expansion of the company’s truck fleet, which has strengthened supply guarantee, has enabled it to adopt a more flexible

‘It’s very difficult to predict but if I were to gamble, I would say hydrogen fuel cells and electricity – if you combine them – could be a very positive case for society for the private owner’

approach which is beneficial to both parties.

‘If a barge wants to top up and take only the content of half a trailer, that’s fine for us because we now have sufficient outlets to get rid of the other product in a cost-efficient way,’ says Schaap. ‘Of course, it’s a bit more expensive if you want to take half a truck rather than a full truck but the delta is not gigantic anymore.’

In the coming years this focus on flexibility may need to be extended to what the company is able to supply. With emissions regulations only expected to tighten, marine LNG suppliers find themselves at risk of becoming outmoded unless they can provide a more CO₂-efficient product. In April, a study commissioned by industry coalition SEALNG and the Society for Gas as a Marine Fuel (SGMF) found that BioLNG and synthetic LNG provide ‘significant additional benefit in terms of well-to-wake GHG intensity’. The study also noted that a blend of 20% BioLNG as a drop-in fuel can reduce GHG emissions by a further 13% compared with 100% fossil fuel LNG.

‘The developments of BioLNG are well underway and will find their way into the supply chain soon, reducing CO₂ emissions considerably,’ says Schaap. ‘It can be adopted when required, future proofing your barge towards the future basis proven technology available now, whilst running your barge economically on LNG versus low sulphur marine gasoil.’

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