HOUSE OF COMMONS

Transport Committee

Oral evidence: Fuelling the future: motive power and connectivity, HC 973

Wednesday 2 March 2022

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Watch the meeting

Members present: Huw Merriman (Chair); Mr Ben Bradshaw; Ruth Cadbury; Simon Jupp; Chris Loder; Karl McCartney; Grahame Morris; Gavin Newlands; Greg Smith.

Questions 109–140

Witnesses

I: Rhona Macdonald, Sustainability Adviser, British Ports Association; and Anna Ziou, Policy Director (Safety and Environment), UK Chamber of Shipping.

Written evidence from witnesses:

– UK Chamber of Shipping

Examination of witnesses

Witnesses: Rhona Macdonald and Anna Ziou.

Q109 **Chair:** This is the Transport Committee's second evidence session of our inquiry into fuelling the future, in which we are looking at alternative fuels and power for the transport sector.

We will look at four sections: first, maritime; secondly, aviation; thirdly, roads; and, finally, the future of rail. We will ask about future power on all those transport sectors, with the commitment to decarbonise by 2040 or 2050.

We will do things slightly differently. Each section will take 30 minutes and two Members will ask the leading questions. We might have more time for more Members to ask more. For optics' sake—we are very collegiate—one Conservative Member will buddy with one Opposition Member.

The first section is on maritime, and I am delighted to ask our two witnesses to introduce themselves.

Anna Ziou: Good morning, everyone. I am a policy director on safety and environmental issues at the UK Chamber of Shipping.

Rhona Macdonald: Good morning. I am the sustainability adviser for the British Ports Association. We are the national trade association for ports and harbours and we represent port operators, who handle 86% of UK port traffic, in Westminster and in the devolved nations.

Chair: Thank you to you and to all the other witnesses for getting here early. I know that it has been a bit of a struggle to get in because of the fallout from the strikes on TfL.

This section is going to be Grahame Morris and me. We will go with the brains of the operation first: Grahame Morris.

Q110 **Grahame Morris:** You caught me out there, Chair, I thought you were going to start.

Good morning, Anna and Rhona. May I start by looking at the quite ambitious target to be delivered by 2050 for the maritime sector? Is it achievable?

Anna Ziou: The industry is committed to delivering the 2050 target not only nationally but internationally for international shipping. We are supportive of the UK's net zero target. We welcomed the clean maritime plan that was published in 2019 and the transport decarbonisation plan published last year.

We believe that it is achievable, but it is the action that needs to be taken and the policies that should accompany it that are going to determine whether it is going to be delivered.

Q111 **Grahame Morris:** I want to come to the policies and so on, but does the

Ports Association have a view? The target of net zero emissions is not simply from shipping; it is also from activities in the ports. Is net zero achievable by 2050?

Rhona Macdonald: I agree with a lot of the points Anna made there. I think it is important to note that the ports sector in the UK is market-led— we are independent of Government—but when it comes to a lot of these technologies and we look at technology readiness we need that extra level of support to push them further up. At the moment, they are not commercially operational, but to push them to higher levels we need more support.

Q112 **Grahame Morris:** In recent times we have concentrated on other transport sectors—road, rail and aviation. What fuels are most promising for the maritime sector? Is it a similar mix? Is there a clear stand-out alternative for the maritime sector to achieve zero emissions by 2050?

Anna Ziou: The maritime sector is a difficult sector to decarbonise because of the fact that it is such a diverse sector. We have vessels from very small tugs to very big vessels that trade internationally, and different sizes and ship types. That makes it very complex and the dependence of the industry on international infrastructure is a challenge as well.

When we look at the future pathways of decarbonising shipping, it is not likely it is going to be a silver bullet or a single technology. It is likely to be a mix of technologies. However, at this point it is very difficult to say which are the promising technologies due to the fact that the technology readiness of the industry is very far behind that of other sectors.

Q113 **Grahame Morris:** How can we achieve net zero by 2050 unless Government drive that development? Is that what you are alluding to?

Anna Ziou: Yes, over the past decades the maritime industry has been the less-funded industry. There is a need for R&D funding and support from Government. That needs to be accompanied by appropriate incentive schemes and policies that are going to incentivise their uptake.

Q114 **Grahame Morris:** We touched on this in a previous section, but in terms of drivers and encouraging uptake and the development of alternatives, what is your view on the renewable transport fuel obligation? Should it be amended to drive the take-up of alternative fuels in the maritime sector?

Anna Ziou: We have seen the RTFO deliver fuel emission reductions in other sectors and we believe that the expansion of that to other fuel types will be very useful for the industry. Yes, definitely that will be a useful instrument, but it is not the only one the industry needs in order to achieve the targets. We need much more.

Q115 **Grahame Morris:** What other methods could be deployed?

Anna Ziou: In addition to funding for R&D, the industry needs economic incentives for the uptake of those fuels. We need also the appropriate infrastructure to allow ships to bunker green fuels. The availability of

green fuels in ports where vessels call is very important. If we do not have those fuels, ship owners are not going to invest in those technologies if they are not certain there are globally available green fuels that are going to run and are economically viable.

Rhona Macdonald: For ports, we have to consider not only operations but the role we have to play in the transition for shipping. A key thing for a lot of these fuels is that they are going to need a lot of electricity. As I said, we are a market-led sector and we do not usually take a lot of money from Government, but in order to produce those fuels we are going to need more electricity, and at the moment the network is just not capable for the quantity of electricity that we need. We need Government support to push that forward; that is essential.

Q116 **Grahame Morris:** You have both stressed that it is a market-led sector. Shipping is in the private sector, but is there a distinctive role for Government to drive change, through subsidy or through policy changes, and to drive the transition to zero emissions by 2050?

Rhona Macdonald: The ports need that clearer framework to know where to move forward. When they are investing in new infrastructure there needs to be a viable business case. They need a clearer pathway so they know what sector to invest in.

In saying that, we also do not want Government to home in on a single fuel. There is going to be a mixture of fuels used for maritime, and it comes back to that technology-agnostic approach: we do not want them homing in on one fuel, but we need a clearer pathway for investment.

Q117 **Grahame Morris:** There is clearly an important role for Government to drive the process. We have seen in the shipping sector in particular over a number of years ship owners taking cheaper commercial options, particularly in terms of overseas crews rather than UK-based ratings. What is the role of the private sector in this, and how can it take a lead in driving towards zero emissions? Is that more of a question for Anna?

Rhona Macdonald: For shipping, yes.

Anna Ziou: When it comes to what private initiatives can do, definitely when we consider decarbonisation and reaching those targets, it is not a single action from a single party. It is a collaboration and it requires everyone in society to take responsibility and to pay a premium on what is required to achieve those targets.

From the shipping perspective, we have recognised it and already ship owners are looking to pay a premium on sustainable future fuels. There is a growing interest from the charterers to look at those green alternatives. For that to be achievable on a global and larger scale, it needs more than people paying a premium. We need full decarbonisation, and that can be achieved only if there is proper support and action.

Q118 **Grahame Morris:** You mentioned that the Government should not have a preferred option; they should be technology-neutral or agnostic.

Clearly, there will be a lot of responsibility on the ports to provide these alternative fuels. Do you want to mention some of the practical issues that are involved and mention some of the alternative fuels that will be available to power this move to zero emissions?

Rhona Macdonald: At the moment, hydrogen/ammonia seems to be particularly fashionable, but there are concerns about energy density. They are a lot less dense than heavy fuel oil and marine gasoil. For instance, I have figures here that for compressed hydrogen it is 28 kg per cubic metre but for HFO it is 580 kg per cubic metre, so you can see that comparison.

Q119 **Grahame Morris:** Does that have implications for physical storage?

Rhona Macdonald: Absolutely. That is a major concern. Could you repeat the last section of your question?

Q120 **Grahame Morris:** I was interested in the alternatives. I appreciate it is the ports that have the fuel stations and there is a key role for you in providing those alternative fuels, just as there is a key role for Government in driving the transition. I follow that. That is fine, thanks.

Anna Ziou: May I add to that? When we look at the pathways, there are different pathways, from electrification in ports to full electrification of vessels. Those could be viable for short voyages—intra-European voyages—but other options depend pretty much on how the technology evolves. We have options whereby the current infrastructure on LNG can be extended by using bioenergy in the future. Other options include using biofuels, but synthetic fuels could be used by renewables or perhaps nuclear plants.

Obviously, ammonia/hydrogen has been having a lot of attention. Primarily, ammonia has played a lot due to the fact that it has characteristics which are closer to conventional fuels in that it needs 50% less than hydrogen. Hydrogen is a way more challenging fuel due to the size of the tanks that are needed to be carried, and it potentially has some challenges.

Rhona Macdonald: I want to add another point. You mentioned the ports' role in that. At the moment, it is important to stress that the UK is not a major bunkering hub for these fuels, but there is that potential in future. When you look at the storage capacity on vessels, vessels might have to bunker more if they are using these fuels. By taking a technology-agnostic approach, the UK is not a major player in that field, if you look at the likes of Rotterdam, which has major bunkering facilities. We do not have the position to decide on what fuel that is going to be. We are going to have to look at the international market and go from there.

Grahame Morris: I am going to hand back to the Chair, who is going to take up those issues relating to the international role.

Q121 **Chair:** Thank you, Grahame. Drilling into some of those points, it strikes me from the evidence you have given in response to Grahame's

questions that the challenge is that this is very much an international market. The UK can set an ambition of net zero by 2050, but if it is not internationally worked on it won't actually happen.

The second challenge appears to be that there is no obvious alternative right now, as perhaps there is for the other transport modes we are going to go on to.

May I drill down a bit more? First, dealing with the latter part and looking at the alternatives, is it okay to go through some and see the positives and negatives of them? It is up to you which one of you wants to take it.

Liquefied natural gas could lead to a reduction in CO_2 emissions. It seems to have its challenges, not least—and this is the same for others—whether it really does decarbonise. Do you have a view on the future for liquefied natural gas?

Anna Ziou: LNG is a fuel that has been given a lot of attention recently, mainly because of the recent regulation of the International Maritime Organisation to reduce sulphur and NOx emissions from ships. We see there is going to be an uptake. However, it is still fossil-fuel based, so it is considered a transition fuel due to the fact that, depending on the processes and how it is produced, it can produce up to 20% less CO_2 than the other alternative fossil fuels.

So, yes, long term it will definitely depend on how the technology around it evolves and the R&D. Currently in Japan, there are studies looking at LNG which can be produced in the future through renewables and through bio LNG, and that could maximise the utility of the current infrastructure and investments.

Q122 **Chair:** Liquefied natural gas could be used, but it does not deliver the decarbonisation that is needed.

Let us move on to biofuels. Where are they in the mix right now?

Anna Ziou: Biofuels are a very interesting point. Currently, there is a lot of interest, at least in the short term, from the industry in using biofuels. What we see from a UK Chamber perspective is a lot of our members are calling us and saying, "We would like to use biofuels now because they are readily available and we can use them on the current engines." Depending on whether they are included in the RTFO, they will pay a bit of a premium, but it is still commercially viable for them, and they are willing to pay the premium. However, there has been a Government decision to exclude biofuel of a non-biological origin for shipping, which makes it a bit challenging, at least in the short term, for shipping to have any alternative fuel until other zero-emissions fuels are developed, and that needs more technology.

Q123 **Chair:** Why have the Government taken that decision?

Anna Ziou: Because they consider that other transport sectors are more challenging to decarbonise, and a limited amount of biofuels are available, so the decision was made that shipping has other options and we should be prioritising biofuels for other sectors.

Q124 **Chair:** We have not finished our canter yet, but I sense that might be the conclusion we get to.

Anna Ziou: Exactly. Shipping is way behind the other sectors when it comes to technology. It is much more challenging due to its international nature. When we look internationally we can see that biofuels are available elsewhere. What our members do—they cannot get them in the UK because of the high cost; they are excluded from RTFO—is they go to countries like Norway and purchase the fuels. However, that becomes very challenging for domestic operators. They have no opportunity to go elsewhere to buy those fuels and deliver those emission reductions that can be delivered today.

Q125 **Chair:** Rhona, do you want to come in on biofuels with your view?

Rhona Macdonald: Homing in on that, obviously, there is the whole question of availability. Some of our members are trialling various fuels at the moment such as hydrogenated vegetable oil, and the big issue has been cost. More controversially, some ports which have been trialling these fuels are questioning the emission reduction potential of them. Again, it comes back to the market and cost-wise.

Q126 **Chair:** Is that almost an equivalent of sustainable aviation fuel that they have been trying to produce from oils?

Rhona Macdonald: I am sorry, I am not too sure.

Q127 **Chair:** We will put that to the SAFs, but that is one of the ways aviation is looking to decarbonise, through the creation of sustainable aviation fuel.

It appears that hydrogen is cheaper to produce but ammonia is easier to store or handle in terms of temperatures. Does ammonia have a future? Does it decarbonise? Is it possible?

Rhona Macdonald: The difference between hydrogen and ammonia is that with ammonia, despite the low energy content per tonne compared with hydrogen, the density of the fuel results in less volume required to store it. That is the difference between ammonia and hydrogen, but there are safety concerns about air quality and the emissions from that. It is certainly an option that ports and shipping are looking at.

Q128 **Chair:** Anna, according to my notes, burning ammonia can create polluting nitrous oxides and is toxic, thus requiring careful handling and storage, so it appears to have its drawbacks.

Anna Ziou: The interesting thing about ammonia is that ships have been carrying ammonia for decades now, so as a product we are not complete strangers to it. However, it is different carrying it and burning it. There are definitely some technological challenges on how to make ammonia safe to burn on board vessels due to the high toxicity. It is also highly corrosive.

There are technological challenges. Currently there is no regulation at the IMO on how you build and structure a vessel for ammonia. There is

ongoing discussion. It was only last September that the International Maritime Organisation agreed to start working on developing global standards on how to build a vessel run with ammonia. Yes, technology—

Chair: —is challenging again.

Anna Ziou: Yes.

Chair: Green hydrogen.

Rhona Macdonald: We have talked about storage capacity, but I think another issue for ports is the safety aspect. Ports are looking to provide hydrogen, but the COMAH regulations certainly come into that. For storing hydrogen at ports you need a certain exclusion zone, and that can impact on port operations as well. That is a big question that needs to be answered before ports can move forward and invest in it to store it at ports.

That is a big concern, but there is a big option as well in the northern part of Scotland. With renewable energy and with ports being traditionally at the end of the energy network, there is that option to become a more integrated part in the future, and to use the excess electricity they have to invest in hydrogen. There is a big opportunity there for it, certainly.

Q129 **Chair:** Anna, expensive, and currently just 0.1% of hydrogen is used in making it in terms of green hydrogen.

Anna Ziou: Yes, when you burn hydrogen on board a vessel it definitely will be the real zero-emission fuel that we are looking for—zero emission of everything, and that makes that fuel very attractive. However, it depends on how you produce it. Currently, the processes are using fossil fuel. If you use fossil fuels to produce hydrogen, obviously that is not going to deliver the targets, because you are just shifting the problem elsewhere.

You can produce ammonia through, for example, renewable wind farms and electricity. However, using that on board a vessel might be a bit more challenging due to the fact that you have to take a lot of your payload—the cargo-carrying capacity of the vessel—and replace that with tanks to carry that fuel. It could be challenging for a long voyage on ocean-going vessels. Typically in today's market, for example, a bulk carrier or tanker might have to bunker once a month, and they have very long voyages of 24 days. If you use hydrogen you have to stop more frequently to bunker, or you have to replace that capacity with what you are carrying.

Chair: The on-board part.

Anna Ziou: And that is expensive. It may be something that can be considered for short voyages, provided renewable energy is used to produce that, but for long voyages it might make it very challenging, in my opinion.

Q130 **Chair:** Due to time, Rhona, I will come back to you with this one: battery

power. I can see one obvious drawback for long journeys, but where is the future with regard to batteries and electricity?

Rhona Macdonald: There is concern among our members that there is going to be a mixture of fuels to decarbonise the sector, as I have mentioned, and batteries will have their role, but more so for short sea shipping and ferries. Ferries are looking at battery power at the moment, but, again, the sheer size of these batteries and the storage capacity on ships would reduce efficiency. It will have its role, certainly, but not for larger cargo vessels sailing longer journeys.

Q131 **Chair:** The final question from me before I give Karl the last question is on the international side. We have already talked about the fact that there is no obvious "right now" solution, but even if there were and the UK championed it, that does not work unless there is some international consensus around what that would be. What is being done internationally, and what more can the UK do internationally to try to deliver some form of global solution and get the globe to pick the most likely candidates, albeit, as you say, there does not seem to be an obvious one?

Rhona Macdonald: Our role in the IMO is a key way forward. We need to take a leadership role and help push things forward. We saw that especially with the argument over absolute zero and net zero, where we pushed that forward, and with green corridors. Having these frameworks developed on an international level, IMO will certainly help our sector pushing fuels forward.

Q132 **Chair:** Anna, any points on that before I come to Karl?

Anna Ziou: When it comes to the IMO, in 2018 the International Maritime Organisation agreed a strategy on reducing GG emissions. We believe that the targets set for 2050 are not adequate and need to be revised. Although a lot of good work has been going on over the last decade, especially in the last few years, on agreeing measures to improve the energy efficiency of the sector, there are currently no measures to address the long-term needs of the industry. In that respect, there is a need for the IMO to commit to a net zero carbon by 2050 target and to agree on market-based measures that are very much needed in order to incentivise the uptake of new fuels, and to make them more economically viable towards fossil fuels. A carbon price at the international level is very much needed as well as a revision of the IMO strategy to align it with the 1.5 °C Paris agreement target.

We would like the UK to support the IMO's role—it is critical that the IMO's role is not undermined by regional requirements—and to support it to agree those ambitious targets and to facilitate the agreements and compromises that are needed for carbon pricing at an international level.

There has been a proposal for an R&D fund at a global level. That is also important because, as Rhona mentioned, it is not about the action of a single country. Whatever technology the UK decides to proceed with, if the other countries globally are not going to provide the fuel, there is no point, and we are never going to achieve the target. There is a need for

an R&D fund at the IMO level to expedite that technology readiness that is needed and also clear the pathways that are needed. Yes, definitely there are opportunities for the UK to have a leading role there and we would welcome that.

Chair: I will hand over to Karl McCartney because time is limited.

Q133 **Karl McCartney:** These are to both of you and they are quick-fire questions. Negating the lead time of building a ship, for a container or a tanker, roughly what is the life cycle of a ship in time? How long does a ship remain on the water?

Rhona Macdonald: That is probably more a question for Anna.

Anna Ziou: Depending how you operate the vessel, obviously, the average is 20 to 30 years of life. This is one of the challenges.

Q134 **Karl McCartney:** Thirty years minimum and 40 years maximum, roughly.

Anna Ziou: Yes, but you can obviously always recycle a vessel.

Q135 **Karl McCartney:** I am conscious of the time so the next part of the question is: what would be the cost of converting any of those large ships to any of the options of lower emission or so-called sustainable fuel propulsion, roughly?

Anna Ziou: I do not have a specific figure. It depends on the ship type and ship size, etc.

Q136 **Karl McCartney:** Could your colleagues perhaps write to the Committee with those figures?

Anna Ziou: We can provide some comments on that.

Q137 **Chair:** I am really glad you asked that because it needed to be put on the record. It is not just the challenge of there not being an alternative right now or an international solution. Basically, you have to build these ships right now because they will still likely be in play by 2050.

Karl's question begs an obvious one. The Government have a commitment to decarbonise shipping and deliver net zero by 2050. Is that completely unrealistic in practice?

Rhona Macdonald: I do not think it is unrealistic. There is a possibility, but we need that support, as I have reiterated many times. There is the question of network capacity. We are going to need electricity to produce and store these fuels at ports. We need Government support. The capacity is just not there to be able not only to decarbonise our own operations at ports but to help provide fuels for shipping.

Q138 **Chair:** Anna, very briefly, because Grahame wants to come back.

Anna Ziou: I agree with Rhona. It is not something that cannot be achieved—it can be achieved, but it needs action urgently, because the later we leave it, the more difficult it will be. Vessels that are built today

with conventional fuels will probably be, as mentioned, operating in 2050, so there needs to be action and options not only for new vessels that are going to be built for zero emissions but the potential 25% of the fleet that will have conventional technologies, and what we do with them in 2050. Obviously, scrapping them will mean that a large number of vessels will be leaving the market, which could cause market distortion in the future.

Q139 **Grahame Morris:** You touched earlier on the use of biofuels, presumably biodiesel and bioethanol, and when you mentioned the practical difficulties, presumably, that was using them at 100%. Is it possible to use a blend for existing ships and engines? Would they take a blend of biofuels without the need for scrappage and rebuilding, and engines that would take the new synthetic fuels or ammonia or hydrogen?

Rhona Macdonald: I do not have the exact technical information about certain blends, but I know from a ports perspective that we support the transition, and we are going to need transition fuels to get there, so we support the idea of fuel blends to get us there, to get to a point eventually where we are using fully renewable fuels.

Q140 **Grahame Morris:** I know an internal combustion engine on a car will operate on a certain percentage of biofuel without any adaptation. Is that the same with maritime engines? I presume it is.

Anna Ziou: We would expect maritime engines to be more robust compared to a small car. Yes, not only theoretically but practically there are drop-in fuels that are currently used, but not at scale. It is more on an experimental trial basis. There are some challenges on how to manage the process, and safety concerns, and those need to be addressed. It is technologically feasible. It might require slight modifications on engines, but, yes, it is doable.

Chair: Anna and Rhona, thank you so much for all your evidence. We could have gone on for a lot longer. We are going to ask every single panel whether their own sector ambition can be delivered. We are not singling out maritime. You have given us a great opening. Thank you so much for your time. Please keep in touch with us.