Agenda Item B6

By:	KEIFCA Chief Fishery Officer
To:	Kent & Essex Inshore Fisheries and Conservation Authority – 28 January 2022
Subject:	Initial research into meeting net zero carbon emissions by 2050
Classification	Unrestricted

Summary:

This paper will provide Members with initial findings and actions on how KEIFCA can move to reach government targets of net zero carbon emissions by 2050 and the opportunities, challenges, and possible pathways of in achieving this goal in the inshore sector.

Recommendations:

Members are asked to **COMMENT** and **NOTE** the report.

Introduction

Building on the discussion at the November Authority meeting KEIFCA officers have been engaging with a wide range of different organisations in an effort to understand how best to reach government targets of net zero carbon emissions by 2050. Officer have held meetings with Port of London (a clear industry leader in this field) as well as the CEFAS team carrying out an assessment of the cardon footprint of the UK fishing industry as well as suggesting pathways and options to DEFRA for carbon reduction pathways (Appendix 1).

From initial discussions there are two main tasks for KEIFCA as an organisation:

1. To reduce the carbon footprint of KEIFCA to meet UK targets

2. To work collaboratively and help facilitate the local KEIFCA fishing fleet reduce its carbon footprint and meet UK targets.

In taking on these tasks, the far bigger national picture needs to be taken into account, especially with regards to facilitating the inshore fleet. The picture is

constantly evolving and shifting, as much more focus is brought to bear on practical solutions to addressing climate change.

1. Reducing the carbon footprint of KEIFCA to meet UK targets (net zero emissions by 2050)

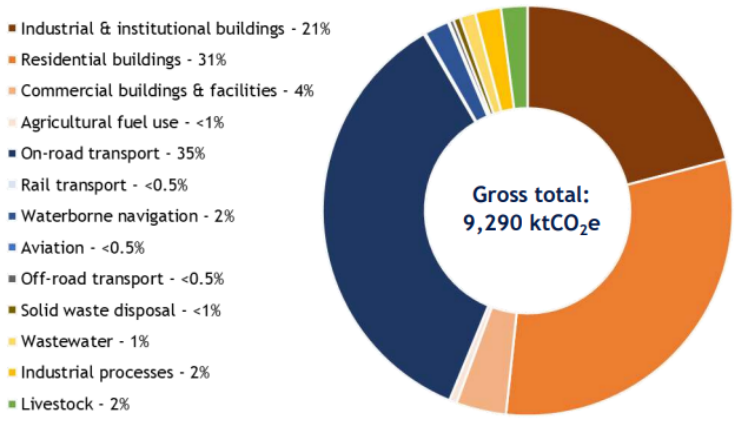


Figure 1 SCATTER emissions inventory for Kent & Medway 2017 (excluding land use)

Analysis from KCC -Kent & Medway Emissions Analysis and Pathways to Net Zero (Dec 2020) (Fig. 1) breaks down the CO2 emissions per emission type and helps contextualise the challenge across the county. As an organisation our major emissions are likely to come from transport (patrol vessels and trucks) and heating and running our offices.

One of the first steps to undertake will be to complete a CO_2 audit and produce a baseline from which to measure progress. Building on this analysis and other organisations action plans (Fig. 2), we can then develop a short, medium and long-term CO_2 reduction action plan (if obvious actions emerge from this process we will look to bring them to the Authority as quickly as possible and act on them rapidly). Our ambition would be to present at least a draft short-term action plan to the Authority by September, the whole plan by the end of 2022 and then integrate the reduction action plan into our future annual plans starting with the 2023/24 annual plan.

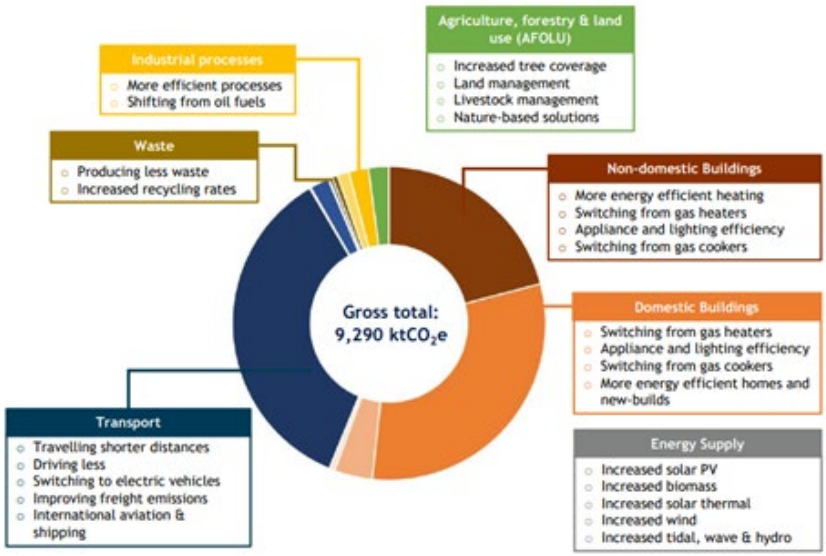


Figure 2 Summary of potential key actions per sector

2. Collaborative working and facilitation to explore new opportunities for the inshore fleet

An initial search of the internet shows there are a lot of different CO_2 reduction plans mirroring governmental and organisational structures (national and local/ regional plans and sectoral (fishing industry) and wider marine industry plans). Unfortunately, the one thing they all have in common is that the needs of the inshore fishing fleet are either too small to be included or seen as a lower priority with efforts initially focusing on larger vessels.

One of the challenges for the inshore fleet moving forward will be to make sure its needs and requirements are clearly considered in future planning and resourcing. As a nation we can capitalise on the inshore industry's ability to respond quickly to new opportunities, find practical low-cost solutions to problems and entrepreneurial culture.

When you look at what the inshore fishing industry could be in 2050 it is clear we are at a crossroads, with a predominately aging fishing fleet (most fishing boats are 15 years or older) and the vast majority of active fishers in the industry over 55. There is a massive opportunity post EU exit to re-imagine what the inshore fleet could look like in 30 years' time and use this change to highlight and improve the advantages the inshore fleet already possess. Inshore vessels already have a relatively low carbon footprint per kg fish (compared to other fishing fleets) and an ability to supply local markets reducing the carbon cost of transport (e.g. reduce examples like Greek farmed sea bass being sold in fish shops, in harbours, 4m away from where local sea bass are landed!). For those with long memories, it is important not to make the same mistakes as the past when the inshore fleet was excluded from the allocation of UK fishing quotas because it was seen as a minor player.

Specifically, within KEIFCA district there is a huge strategic potential to capitalise better on the significant populations in Kent, Essex and London, on the vast amount of renewable energy and national energy infrastructure in our district and the skills and ingenuity of our sector. Since the inception of Kent and Essex Sea Fishery Committee (KEIFCAs forerunner) in 1888 the fishing industry has transformed itself numerous times from oyster smacks to steam trawlers to ever more powerful diesel engines. The change to a carbon neutral industry is the next iteration in this journey, however this time there is the ability for inshore fishers to take the lead and describe their future.

3. The national picture

3.1 Marine carbon neutral plans

The Governments Clean Maritime Plan written in 2019 by the Department for Transport is the environment route map of Maritime 2050, outlining the UK's pathway to zero emissions shipping. Although the plan primarily addresses the needs of large ships, the infrastructure changes will likely frame the options and technology available to the inshore fleet. The text below pulls out some of the plan's key points, however the full document is work a quick read.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/815664/clean-maritime-plan.pdf

In Maritime 2050, the Government set out its vision for the future of zero emission shipping:

"In 2050, zero emission ships are commonplace globally. The UK has taken a proactive role in driving the transition to zero emission shipping in UK waters and is seen globally as a role model in this field, moving faster than other countries and faster than international standards. As a result, the UK has successfully captured a significant share of the economic, environmental and health benefits associated with this transition."

Ambitions

By 2025 we expect that:
i. All vessels operating in UK waters are maximising the use of energy efficiency options. All new vessels being ordered for use in UK waters are being designed with zero emission propulsion capability. Zero emission commercial vessels are in operation in UK waters.

ii. The UK is building clean maritime clusters focused on innovation and infrastructure associated with zero emission propulsion technologies, including bunkering of low or zero emission fuel.

By 2035 we expect that:
iii. The UK has built a number of clean maritime clusters. These combine infrastructure and innovation for the use of zero emission propulsion technologies. Low or zero emission marine fuel bunkering options are readily available across the UK.

iv. The UK Ship Register is known as a global leader in clean shipping and the UK is home to a world-leading zero emissions maritime sector, with:
a. a strong UK export industry
b. cutting-edge research and development activities
c. the global centre for investment, insurance and legal services related to clean maritime growth.

Commitments

1. Government will launch a call for evidence in 2020 on non-tax incentives to support the transition to zero emission shipping.

2. Government will consult in 2020 on how the Renewable Transport Fuel Obligation could be used to encourage the uptake of low carbon fuels in maritime.

3. Government will launch a 'Greening Finance/Financing Green' for Maritime Initiative at London International Shipping Week 2019.

4. In conjunction with a working group as part of the Clean Maritime Council, Government will undertake a study to identify and support potential UK zero emission shipping clusters.

5. Government will support clean maritime innovation in the UK, beginning with:

● Providing seed funding to contribute to the establishment of MarRI-UK;
● Funding a competition for innovation in clean maritime in 2019;
● Launching a round of Government grant support for early-stage research projects related to clean maritime; and
● Establishing a Clean Maritime Award to celebrate leaders in the field of emissions reductions.

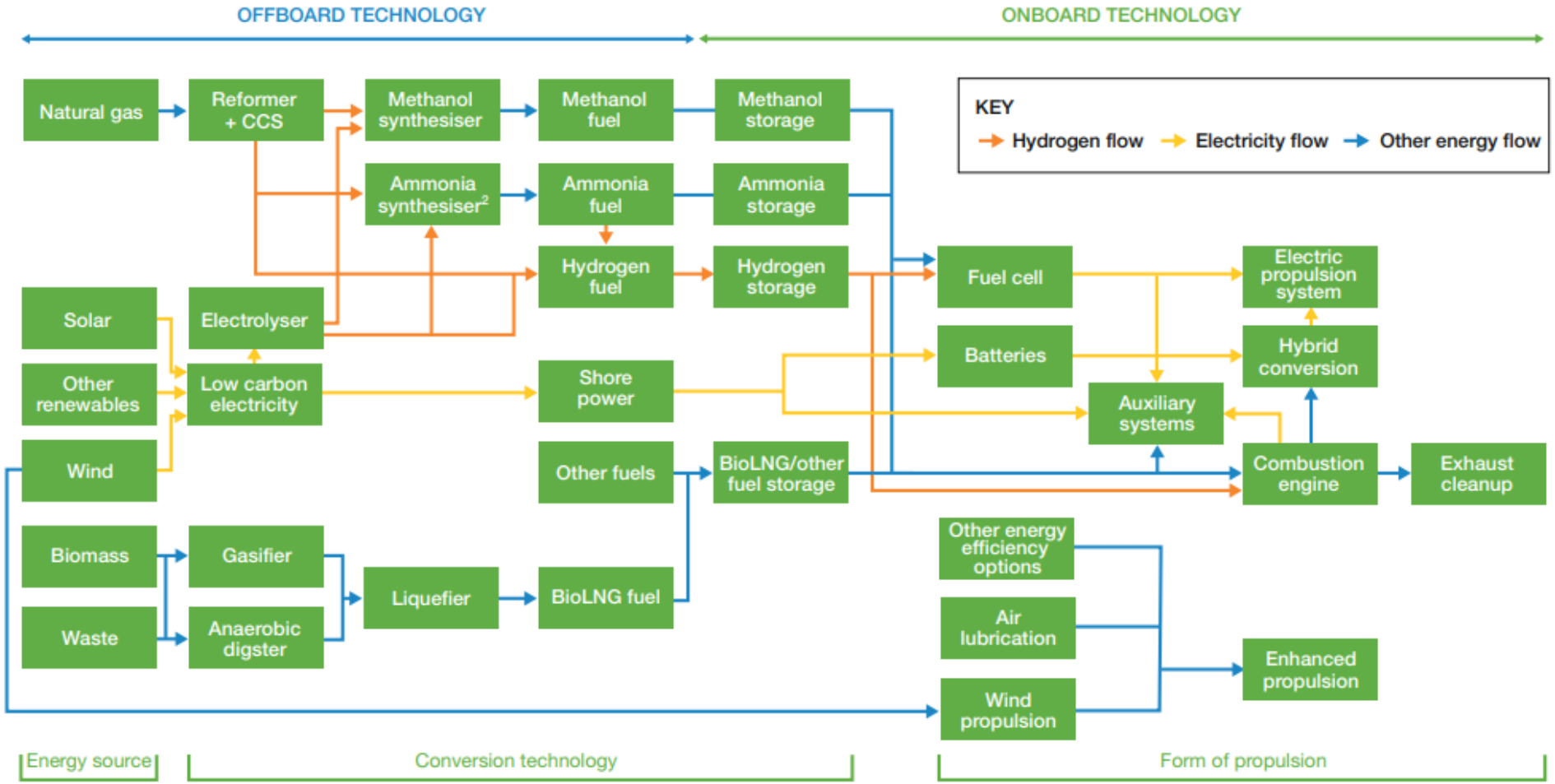
6. The Government will establish the Maritime Emissions Regulation Advisory Service (MERAS) by 2020. Supported by the Maritime and Coastguard Agency, MERAS will provide dedicated support to innovators using zero emission propulsion technologies, assisting them through the regulatory process.

In order to achieve the reductions greenhouse gas emissions required, it is estimated that energy efficiency improvements alone on vessels will not be sufficient and that the use of alternative fuels will be required. This leads to a whole range of big questions:

- What kind of fuel will be used?
- How will it be used?
- How will the fuel be stored?
- When will this happen?
- How much will it cost and how will we afford it?

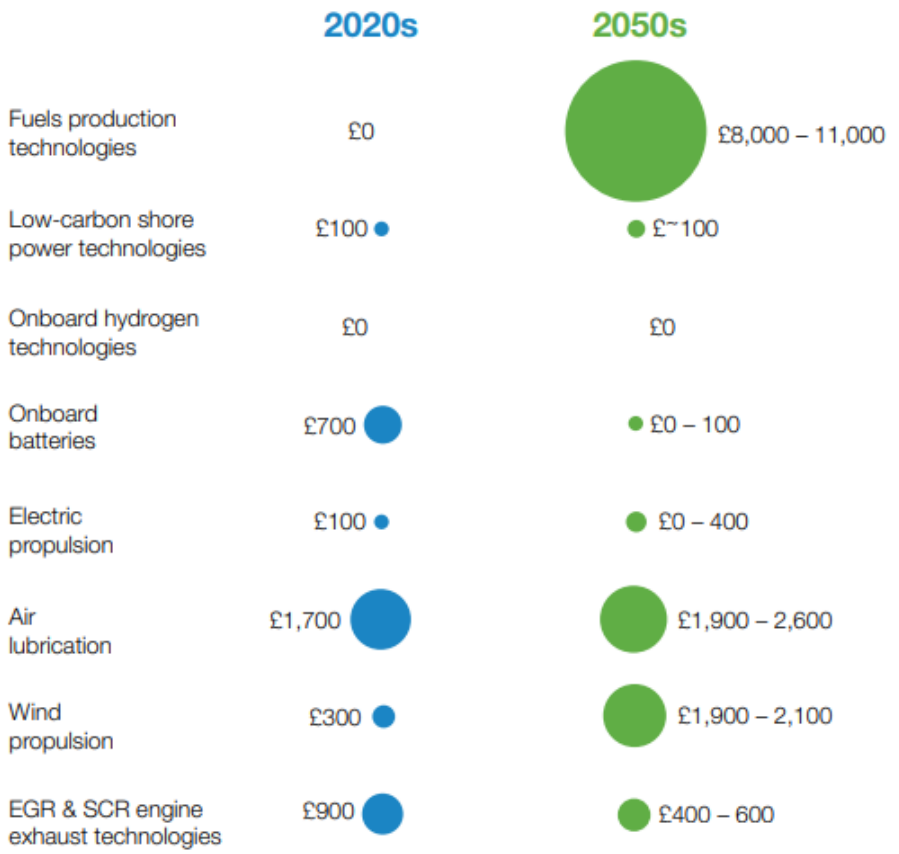
Figure 3 outlines the range of potential options and pathways that could be used to help reach net zero targets. Different solutions will better fit different sized vessels, however the shoreside infrastructure and end use cost will also be vital in planning and reaching a solution. The Clean Marine Plan did not focus on one specific energy pathway but highlighted the advantages and disadvantages of different potential options. Transition fuels like biofuels are likely to play a role until new technologies come to the market.

Figure 3 Technologies and fuels on a pathway to zero-emission shipping



1 Steam Methane Reformer (SMR) + Carbon Capture & Storage
2 Equipment used for the Haber Bosch process

Figure 4: Potential annual future global market for maritime emission reduction options[49]



Source: Frontier Economics for DfT

Figure 4 visualises the estimates of the potential annual global market size for the different maritime emission reduction options assessed in the research. More specifically, the research identified hydrogen and ammonia production technologies as offering the most significant potential economic benefits to the UK.

- *Hydrogen production technologies*

"The UK is well placed in relation to hydrogen production technologies. The UK's extensive experience in natural gas and reformer technologies would be a key advantage here. In addition, the UK is already a world leader in electrolysis activities, which are directly relevant to hydrogen production for zero emission shipping. It is estimated that the UK currently has around a 9% global export market share of reformer and CCS technologies, which are likely to be important elements of hydrogen production for zero emission shipping. Both China and the USA currently have market shares in excess of 10% in this area." There is currently no take-up of hydrogen fuel in the global fleet. If policies and incentives are in place to move towards zero emission shipping by the middle of the century, hydrogen fuel usage may increase or remain low depending on future cost effectiveness. However, hydrogen production technologies are an important input

to ammonia and in some cases methanol fuel which may have substantial expected take-up.

- *Ammonia production technologies*

The UK also has a strong competitive position in relation to ammonia production technologies. In particular, the UK has a strong domestic position for ammonia catalyst supply, and ammonia-based fertiliser is produced in volume in the UK. This is important because catalyst supply is a high-value part of the supply chain. The current take-up of onboard ammonia fuel technologies is relatively low so this is a nascent market at present."

3.2 Potential uptake of new technologies

Running in parallel the Government has also commissioned research to investigate the likely take-up of technologies and alternative fuels, and the associated costs, under a number of different future scenarios.

● Container vessel traffic is estimated to make the highest contribution to UK international shipping GHG emissions, while ro-ro vessel traffic is estimated to be the highest contributor to UK domestic shipping GHG emissions.

● Under the assumptions made in the research, ammonia is estimated to be more cost-effective than methanol or hydrogen for most ship types. However, there is substantial uncertainty around this result, so it is not possible to reach definitive conclusions on this at present.

In addition, under these assumptions, generation of hydrogen, methanol and ammonia is estimated to be more cost effective using fossil fuels (with carbon capture and storage) rather than via electrolysis.

● LNG is not estimated to be a substantial part of the fuel mix in the future (whether near future, around 2035, or longer-term, around 2050) under any scenarios that achieve the reductions in GHGs required by the IMO GHG Strategy.

● Electricity is estimated to play a much smaller role than that of alternative fuels, with electric propulsion take up limited to vessels that operate short voyages, such as short ferry crossings. Whilst its use is expected to be more significant for the UK domestic fleet than the UK international fleet, it is still estimated to remain relatively small under all scenarios. This conclusion is sensitive, however, to current cost assumptions, such as regarding the capital cost of batteries.

● Whether or not shipping has access to biofuels is not estimated to result in a significant difference in the costs to business of delivering the reduction in GHGs required by the IMO GHG Strategy. This last point is relevant given the need to ensure, across the economy, the optimal use of limited feedstocks of sustainable bioenergy supply. The most recent advice from Government's independent advisory body, the Committee on Climate Change, suggests that the use of biofuels should be directed towards those sectors which faces the hardest challenges to abate emissions. The extent to which biofuels may play a role in decarbonising the maritime sector will need to be considered carefully against the

needs of these other sectors (such as aviation and heavy goods vehicles) to ensure cost-effective decarbonisation for the whole economy.

● There are also important considerations regarding hydrogen, ammonia and methanol as alternative fuels. Since none of these fuels are currently widely used for marine propulsion, their uptake will require the development of both safety standards and bunkering infrastructure. It should be noted, however, that the maritime sector already has significant experience working with each of these products, which are already shipped as cargo on a significant global scale. As such, there already exists global infrastructure and established standards for their handling, storage and transport in bulk form.

3.3 Zero emission shipping clusters

To assist in the development of a systems approach to the development of alternative fuel bunkering in the UK, the Government in conjunction with the Clean Maritime Council will undertake a study on zero emission shipping clusters. This study will include a detailed assessment of the infrastructure required to enable the uptake of alternative fuelled vessels. This will include consideration of the refuelling requirements of vessels, as well as whether there are particular geographic locations suitable for the production, storage and distribution of alternative fuels for shipping including any dependencies or synergies with other economic sectors such as heating or other transport modes. The study will consider the issues of sustainability of alternative fuel production, noting where clusters have particular advantages in producing fuels with the greatest emission reduction potential (e.g. CCUS opportunities and renewable energy availability). It will also take into account opportunities as well as safety and cost challenges related to, integration with the wider energy system and work ongoing to decarbonise the wider freight system (e.g. with regards to HGV and rail).

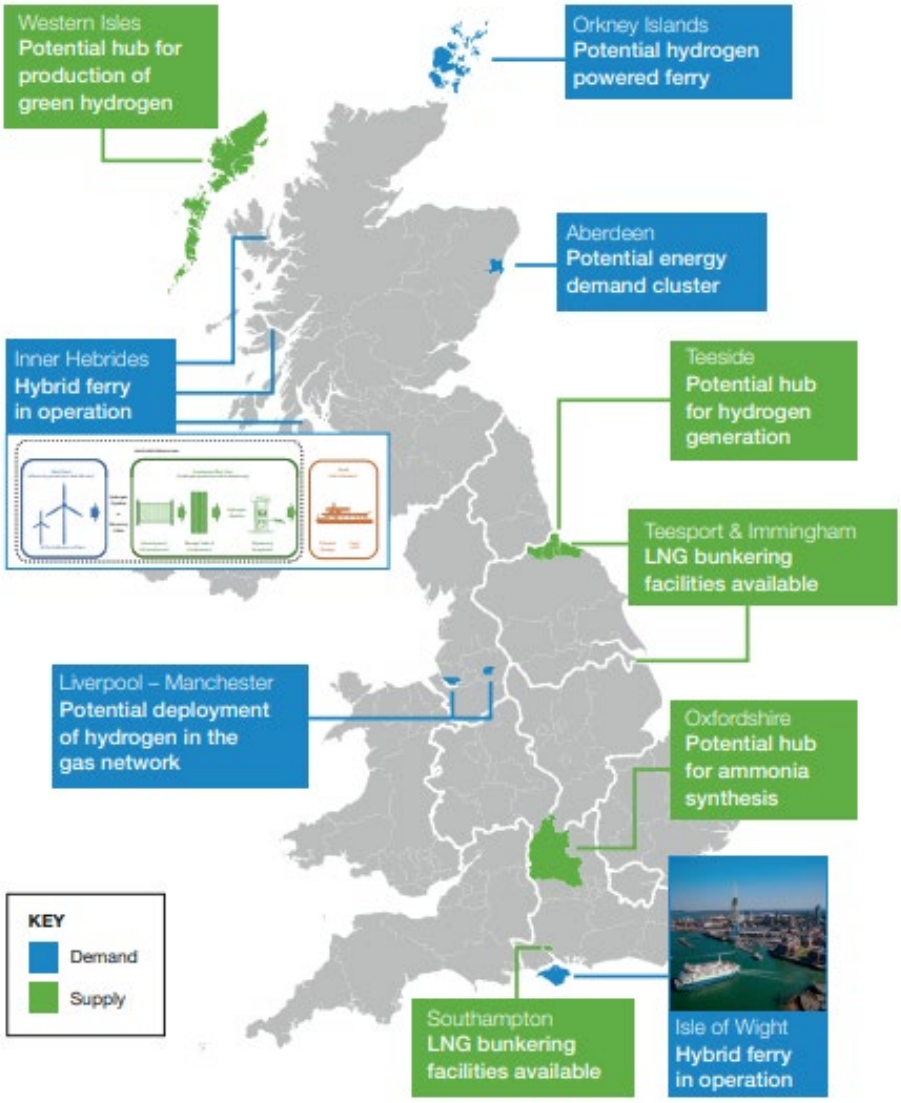


Figure 5 Areas of potential demand and supply for clean maritime technologies

3.4 Developing new technology and operational trials

The Clean Maritime Council will engage closely with research organisations, such as MarRI-UK, to ensure strong collaboration between Government, industry and academia. This will be aimed at encouraging innovation (and, where possible trials or demonstrations) across a spectrum of emissions abatement options (both on board and landside) to enable low cost movement along the pathway to zero emissions.

The Carbon Trust's Offshore Wind Accelerator (OWA) was launched in 2008, with the focus on commercialising key technologies in the supply chain for offshore wind farms. As the industry moves forward, the OWA is looking to support the development and implementation of low emissions vessels. Reducing the emissions and fuel consumption of offshore wind vessels will have a positive effect on the environmental impact of offshore wind energy and will continue to make offshore wind a more commercially viable energy source. As part of this ongoing

work, in January 2019, the Carbon Trust launched a Request for Information (RFI) to inform the scope of a competition which aims to accelerate the development and uptake of new technologies with the potential to reduce emissions and fuel consumption in offshore vessels. The competition will have an estimated funding of circa £400,000, initially focusing on Crew Transfer Vessels, but with consideration to future development of larger Service Operations Vessels.

4. The regional picture

At a regional level KEIFCA officers met with Port of London, Thanet Fisherman's Association and CEFAS to discuss current CO2 reduction plans and explore opportunities for future collaboration (Appendix 1).

Cefas have been working on a Defra project 'Moving Towards Net Zero Carbon Fisheries' linked to the climate change objective in the Fisheries Act 2020 and the Government's commitment to reach a reduction in carbon emissions of 78% by 2035 and net zero carbon emissions by 2050. The final report was due to be provided to Defra in March 2022.

TFA Fuel Ltd have been asked to supply biofuel (HVO) by the Windfarm vessels in Ramsgate which they were hoping to start doing in April 2022.

Port of London (PLA) have produced a plan with the aim of getting to zero carbon emissions by 2040. They intended to transition to HVO fuel by 2022, electric vehicles by 2025, electric pilot cars by 2030, zero emission vessels by 2035 and all remaining vessels by 2040. A summary report could be found on their website http://www.pla.co.uk/Environment/2040-Net-Zero-Target.

PLA had carried out a trial last year on the use of HVO fuel and published case studies on emissions and engine performance.

Next steps for KEIFCA

• Liaise at a regional level with PLA and TFA to look at the practicalities of local issues

• Look at a regional plan for the fishing industry on carbon reduction similar to that of the PLA

• Work with Cefas using the March meeting run by DEFRA as an entry point

• TFA Fuel to adopt use of biofuel and report back on update and any issues

Recommendation: Members are asked to **COMMENT** and **NOTE** the report.