

Written evidence submitted by Connected Places Catapult

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About Connected Places Catapult

Connected Places Catapult is the UK's innovation accelerator for transport, cities, and places. We work with Innovate UK and with stakeholders across the UK's maritime sectors. More broadly, we provide impartial 'innovation as a service' for mobility and built environment businesses, infrastructure providers and public institutions to catalyse step-change improvements in the way people live, work and travel.

We support UK commercialisation of cutting-edge research and connect businesses and public sector leaders to it. We help develop, implement and commercialise the latest technology and innovation for existing markets, as well as create demand and grow new markets in the UK and globally. In addition to the many projects that we work on with our partners, we run technology demonstrations and innovation accelerators for SMEs to help scale new solutions that drive business growth while contributing to economic growth and a better, greener future for all.

Executive Summary

1. This response focuses on maritime aspects relating to three of the Committee's questions:
 - Supporting the Development and Uptake of Net Zero Technologies, Fuels and Infrastructure in Shipping (Re Question 4)
 - UK Shipping and Carbon Reduction (Re Question 5)
 - Driving International Action on Carbon Emissions (Re Question 6)
2. Case studies and contexts led by, or involving, our local partners are cited from the following parts of the United Kingdom and their wider regions:

- Aberdeen
 - Brighton (Brighton University)
 - Cumbria
 - Liverpool & Merseyside
 - Portsmouth & The Solent
 - Teesside
 - Tyneside
 - Decarbon8 Network (of Northern Universities).
3. In addressing the above questions, the following perspectives are offered for the Committee's consideration:
- i. The maritime sector has long asset lifetimes and high capital costs. Consequently, businesses need to build confidence in the technical and economic value of an asset in order to invest. This creates challenges for the sector in terms of risk appetite.
 - ii. Initiatives that address the commercially risk sensitive nature of the sector should be considered - including regulation where appropriate and supporting trials that demonstrate the techno-economic value of net zero technologies.
 - iii. UK Green House Gas emissions should be considered holistically across transport modes in those contexts where shipping may have a lower CO2 emitted, per tonne, per mile, than road or rail transport alternatives. Exploring an increased utilisation of coastal and inland shipping as an alternative transport mode may offer scope for broader reductions in GHGs in some contexts.
 - iv. Initiatives that address UK GHG emissions should further consider the transport of people and freight across multiple transport modes as a whole system.
 - v. The growth of sustainable maritime technology demand and of the coastal and inland shipping sector, may present unique opportunities for levelling up regional economies through their supporting business ecosystems - particularly in coastal communities.
 - vi. The UK should actively support initiatives to establish a Green Shipping Corridor with other nations to drive international decarbonisation of the shipping sector and create export opportunities for UK solutions providers. Ports operate in a unique context as multi-modal transport hubs. Multi-modal decarbonisation infrastructure has the potential to transform ports to multi-modal energy hubs, developing and trialling new technologies to support the drive towards net zero and scaling solutions outwards.

Written Evidence

Supporting the Development and Uptake of Net Zero Technologies in Shipping

4. A common barrier to adoption in high capital, long asset lifetime, infrastructure-heavy sectors is the risk of stranded assets as uncertainty remains around emerging technology

options and the commercial benefits of those technologies. To invest in new technologies, shipping operators need confidence in the technology to perform as required - and that the supporting infrastructure (such as servicing and refuelling) will be available at the relevant ports of call. This has created a well-known 'chicken and egg' effect, whereby infrastructure won't be committed until future fuel decisions are made, where those future fuel decisions are to a large extent reliant on the future infrastructure being available.

5. This environment can sometimes create perverse incentive pressures to be second rather than first in investing in new technologies. The UK maritime sector has always been fortunate in having many farsighted innovation investors, commensurate with the UK's renowned high-tech innovators. However, there has also often been a risk averse approach to new maritime technologies, which is particularly felt during disruptive shifts that fundamentally alter the ways in which the sector operates - such as in the adoption of future fuels. Much of the context to this is that in the 20th century, the UK maritime sector enjoyed far less strategic state support than have other UK sectors such as aerospace and automotive, which has not been the case with our overseas competitors, who took a much more active interest in their maritime sectors.
6. The Connected Places Catapult is working with industry and the UK Government to address these strategic challenges, mindful of this historical context. Furthermore, it should also be noted that the UK Government has recently provided other support to the sector such as the 2021 Clean Maritime Demonstrator Competitions, funded by the Department for Transport and delivered by them in partnership with Innovate UK. In part enabled by calls such as this, we are working closely with partners across industry to increase awareness of new technologies and to stimulate and de-risk innovation. This current work includes our locally-led projects across the United Kingdom under the aforementioned **DfT Clean Maritime Demonstrator Competition (September 2021 - March 2022)**:
 - i. **'Green Port Blueprint'**¹ - working with **Aberdeen Harbour Board**. This project builds on Aberdeen's local expertise in energy and future infrastructure investment. It is: delivering transferable clarity for ports in future decarbonisation solutions; and producing detailed design specifications for shore power.
 - ii. **'Clean Tyne'**² - working with the **Port of Tyne, Siemens, Newcastle University and the North East Local Enterprise Partnership**. This project is delivering the trial of a digital energy platform at the Port of Tyne - and establishing a future business case for utilising the multiple renewable energy vectors available in the North East.
 - iii. **'Cloud Based Ports'**³ - working with **Teesside Port-owner, PD Ports, and with GE and Teesside University**. This project is helping to further build the exploitable IP assets of the North East's existing digital economy. It is delivering a feasibility study and future business models for a predictive ports energy management platform.
 - iv. **'SHAPE UK'**⁴ - working across the extensive Solent maritime innovation ecosystem, with **Portsmouth International Port, Portsmouth University, KnowNow, Lloyd's Register, Engas and Brighton University** to deliver: a live trial of a modular hydrogen

¹ [Aberdeen Harbour Green Port Blueprint](#)

² [Clean Tyne Project](#)

³ [Vertically Integrated Cloud Based Ports](#)

⁴ [SHAPE UK Project](#)

electrolyser; a vessel retrofit; and a predictive digital twin for multi-modal hydrogen supply through ports as transport hubs.

7. The above projects build and expand on our previous work with industry and the UK Government to identify high impact opportunities, such as:
 - i. **Ports of the Future Blueprint**⁵ working with the **Department for Transport** and **over 150 maritime stakeholders representing the whole maritime value-chain**. This project clarified challenges, established future initiatives, and provided recommendations to Government and industry.
 - ii. **Ports as Energy Hubs**⁶ in the **Connected Places Catapult Net Zero Places programme**. This built on the potential for ports to support the wider, systematic energy transition as future multi-modal fuel hubs. This work informed several of our Clean Maritime Demonstrator projects, including **SHAPE UK, Clean Tyne** and the **Aberdeen Green Port Blueprint**.
8. To further leverage the UK's innovation ecosystem, expanded public sector strategic support and continued engagement would better enable our leading innovators to identify and exploit commercialisation opportunities. Connected Places Catapult already works with innovators, investors and customers across the UK to support their identification of potential commercial exploitation routes and connect them with new opportunities. We have recently done this with the **EPSRC-funded DecarboN8 Network of Northern universities**,⁷ where we developed a maritime decarbonisation seed corn project on hydrogen fuel transition in **Cumbria**, to a full-scale demonstrator proposal with commercial partners in 2021.
9. To accelerate the development and uptake of net zero technologies in shipping, the UK should support:
 - i. Initiatives that build on the success of the UK Government's aforementioned Clean Maritime Demonstrator Competition that has enabled significant numbers of innovators and industry partners to develop and trial new technologies across the United Kingdom
 - ii. Establishing exploitation routes and support for maritime research that builds on our world-leading marine academic sector
 - iii. Trials of new technologies that demonstrate their techno-economic value
 - iv. Initiatives that consider investment of infrastructure in ports within the wider transport ecosystem to develop multi-modal future energy hubs
 - v. Scaling of UK maritime manufacturers in net zero solutions. This critical phase for businesses currently lacks significant Government support
 - vi. Deepening Government support for national initiatives that are helping the UK to scale up maritime innovation through connecting and driving collaboration across regional maritime clusters.

⁵ [Transition to Ports of the Future](#)

⁶ [Ports as Energy Hubs](#)

⁷ [DecarboN8](#)

UK Shipping and Carbon Reduction

10. Reducing our reliance on shipping would not necessarily lead to systemic emissions reductions in the UK where that would require heavier reliance on other transport modes. Shipping can provide scope for lower CO2 emissions per tonne of cargo per mile travelled, where road or rail alternatives exist. While it is true that many regional ports cannot support today's largest cargo vessels, it is important to remember however, that many are capable of servicing smaller feeder vessels transporting cargo from larger ports to smaller, regional ports using coastal and short sea shipping routes. These smaller feeder vessels, in many instances, may prove to be a lower carbon key to more widely dispersed economic regeneration.
11. In considering a decreased reliance on shipping, it should be remembered that this could often logically necessitate transport of goods by other means, presenting increased pressures for the strategic road and rail networks which are already highly utilised. Considering wider UK emissions reduction on a modally-specific basis, could sometimes increase the risk that our actions in one transport mode will create unintended side effects in other transport modes - having a negative impact on greenhouse gas emissions from a whole systems perspective.
12. A prosperous maritime sector also provides secondary benefits to regions, economies and communities in the supporting businesses, jobs and skills that exist to service it. Many UK regions requiring economic regeneration are coastal. The more active use of green coastal and short sea shipping may provide substantial opportunities for more sustainable regional growth and levelling up across the UK.
13. Connected Places Catapult is currently leading several projects which support regional maritime ecosystems, including:
 - i. We have launched the **Solent Maritime Innovation Gateway** at London International Shipping Week 2021, to further develop the Solent's extensive maritime economy, including a focus on how organisations and researchers in the region can enable a cleaner future for the maritime sector. Our partners are: the **Solent Maritime Enterprise Zone** (a **Royal Navy** initiative); **Maritime UK Solent**; and the **Solent Local Enterprise Partnership**.
 - ii. Launching in **Liverpool** from April 2022, Connected Places Catapult is working with North West region partners to stimulate opportunities for maritime innovators through establishing the industry-driven '**End-to-End Journeys**' project, to further utilise the vast sustainable economic potential of the River Mersey in providing more efficient and connected transport options utilising regional waterways.
14. To support wider decarbonisation targets across the transport system and unlock regional economic growth through the opportunities presented by a prosperous maritime sector, the UK should support initiatives that:
 - i. Work towards establishing green coastal shipping corridors between the UK's international and regional ports
 - ii. Build the socio-economic case for a regenerated coastal and short sea shipping sector in the UK, leveraging the potential of emerging green shipping technologies to realise greater greenhouse gas emissions reductions

- iii. Stimulate a modal shift to waterways for people and freight where this makes commercial, practical and environmental sense.

Driving International Action on Carbon Emissions

15. Both the UK's maritime heritage and position as a leading force in international shipping is reflected in London being home to many maritime headquarters including: the International Maritime Organisation; international regulators; and technology companies. Recent developments in home nations and internationally, put the UK in a strong position to drive international action on carbon emissions:
 - i. As host of Glasgow COP26, the UK took a leading position with the Clydesbank Declaration to establish international green shipping corridors
 - ii. The UK maritime sector is benefiting from revitalised support. As real-world examples, the aforementioned 2021/22 Clean Maritime Demonstrator Competition enabled the Connected Places Catapult and its partners to initiate four strategic projects in maritime decarbonisation in Aberdeen, Portsmouth, Teesside and Tyneside.
16. The above four projects all present potential to establish future coastal or short sea partnerships, providing end-to-end system demonstrators with international collaborators. Whilst the first 'Green Shipping Corridor' is to be established between Australia and China, the second has yet to be determined.
17. UK leadership in the decarbonisation of international shipping can be unlocked through seeking overseas partnerships. Several Clean Maritime Demonstrator Competition projects (ours included) involve work to ensure UK ports are 'infrastructure ready' for the green vessels of the near future. The solutions and exploitable IP being developed at UK ports are relevant to challenges faced at ports globally.
18. To drive forward international action on emissions, the UK should:
 - i. Develop inter-departmental Government initiatives that foster international collaboration on building end-to-end infrastructure for future green shipping corridors. Singapore or Northern Europe could present good options - based on our current international relations, regional objectives and trade routes
 - ii. With regards to point one above – and for fostering commercial green innovation opportunities for UK ports and maritime industry, high profile Royal Navy-supported UK trade missions could encompass further relevant strategic opportunities. Both the visibility of the UK's civilian maritime sectors, and the growing confidence of their communities, could be further enhanced this way.

Conclusion

19. Society often becomes most aware of the climate crisis when we think globally, such as during landmark international summits. We may be most likely to convert both our anxiety about that crisis and our capacity for innovation, into action and opportunity, when we think globally - but also have a means to act locally and nationally in response.
20. By having the confidence to prioritise the driving of international action on carbon emissions such as through high profile international trade promotion of emerging UK low carbon maritime successes to date - we will further build a tangible local-national-global

context that can help further drive competitiveness and the development and uptake of net zero maritime technologies in the UK. We will move further away from 'chicken-and-egg' - to 'virtuous circle' as our emerging zero carbon maritime economy's visibility commands greater priority and attracts more innovators and investors.

- 21.** 'Coastal and inland' (or a similar term) should become as common as public policy shorthand, as 'North and South' or 'Urban and Rural'. Fostering that visibility and the rising confidence of some of our often long-neglected British maritime coastal communities, could be a powerful further driver for the UK's growing contribution to realising a global net zero maritime future. That future will also be more widely and speedily realised, as public policy is increasingly informed by localised, granular and regional approaches where coastal communities experience intergenerational challenges - so that those communities are in the best position to connect with, and catch the tide of, the UK's emerging sustainable maritime economy. The 2019 House of Lords Select Committee Report on The Future of Seaside Towns (HL 320) offers insights into the opportunities and challenges in many coastal communities.

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