
Invest 2035: The UK's Modern Industrial Strategy

Department for Business & Trade Green Paper

UK National Clean Maritime Research Hub's response November 2024

The UK National Clean Maritime Research Hub is focusing on research at lower technology readiness levels to inform future research, development and deployment. Through collaboration with stakeholders from across the maritime sector, the Hub aims to drive forward innovation and transformation, establishing the UK's competitive advantage by setting a global benchmark for excellence.

Website: <https://www.clean-maritime-research-hub.org/>

Approach

How should the UK government identify the most important subsectors for delivering our objectives?

Some industries and related activities, such as maritime and shipping, are critical for many of the growth sectors identified in Invest 2035. A focus on the identified growth sectors without considering the contributions and challenges within certain industrial/economic sectors could reduce the feasibility of achieving growth aims overall.

Maritime and shipping is especially important to the UK economy not least from being an island nation. It is a key sector for delivering on three of the five government missions in particular:

Economic growth: There is great potential via our ports and harbours to achieve regional and place-based growth aims. 95% of UK's international trade is handled by seaports. Seaports in the UK play a vital role in the nation's economy and infrastructure and are an integral part of the supply chain for all UK industry.

Clean energy superpower: Ports can become important energy hubs not only in handling vessels, but also:

- playing an increasing role in contributing to distributed energy systems
- supporting the shipment and storage of low carbon fuels
- providing infrastructure for the delivery and maintenance of offshore renewable energy projects, and,
- serving wider communities with the transition away from fossil fuels.

Overcoming barriers to opportunity: There is great potential for creating opportunities for highly valued and well-paid jobs in the maritime sector including ports, shipping and related sectors.

Turning now to Invest 2035 and the 8 sectors identified that relate to the UK's maritime and shipping industry:

Advanced manufacturing: Adoption of automation and additive manufacturing in vessel build and repair. Design of new power and propulsion systems to improve efficiency and use of low carbon fuels, new vessel designs and integration of innovative technologies to reduce energy

demand, and the exploitation of digitalisation and AI. Ports are the first transport sector to adopt autonomous vessels for example.

Clean Energy Industries: 50% of world shipping currently transports fossil fuels and it will play a vital role in the supply chain logistics in future in the take up of alternative low carbon fuels. The maritime sector provides infrastructure and support necessary for offshore renewables, such as offshore wind farms, and supplies the materials and components necessary to decarbonise wider industry and transport sectors. There is an increasing interest in nuclear powered commercial shipping with the potential for wider application such as in small modular reactor technology that could stimulate more rapid development and deployment.

Defence: Naval shipbuilding and maintenance are important in stimulating advances in the industrial sector. The development of AUKUS Pillar II technologies will enable industry to take advantage of advances in quantum technologies, AI and cybersecurity. Seaports play a key role in customs enforcement, immigration control, and offer logistical support for defence related activities.

Digital and Technologies: There is scope for improvements in efficiency and service provision through digitalisation adoption in maritime and shipping particularly at ports and adopting technologies such as autonomous vehicles. Digital technologies and data analysis empower operation automation, leading to enhanced productivity, sustainability and safety.

Financial Services: UK is a global leader in maritime finance, leading on capital finance, and reinsurance.

Imports and exports are critical to the health of the UK economy and therefore the maritime and shipping sector is fundamentally important to the UK.

How should the UK government account for emerging sectors and technologies for which conventional data sources are less appropriate?

Identifying technologies that can deliver on challenges in multiple industrial/economic sectors is important. For example, in the UK National Clean Maritime Research Hub (<https://www.cleanmaritime-research-hub.org/>) our world leading research is developing disruptive technologies and solutions, with some of these applicable elsewhere in the industrial and transportation sectors.

UK National Clean Maritime Research Hub technological development examples:

- Self-venting explosion free hydrogen storage
- Fuel flexible combined heat and power
- Injection chamber design for hydrogen/ammonia combustion
- Fuel cell development with ammonia
- Engine developments with methanol and cryogenic fuel evaporation for power generation
- Transport scheduling optimisation models
- Powerplant integrated CO₂ capture and storage

For more information: <https://www.clean-maritime-research-hub.org/resources/>

Taking a cross industrial/economic sector approach can explore the potential for these in achieving delivery on the government missions, 3 of which outlined in the response to Q1. This

would need a focus on disruptive innovations, such as clean energy solutions, and efficiency improvement through AI and machine learning. Also needed is support for technological knowledge transfer and emerging business support to encourage commercialisation of innovative technologies.

How should the UK government incorporate foundational sectors and value chains into this analysis?

With UK being an island nation, the maritime and shipping sector is critically important to the UK economy. Over 95% of the nation's imports and exports involve transportation by ship and the sector is a key part of delivering contribution to the UK's clean energy transition. Examples include supporting offshore wind farms and the potential for ports to become energy hubs.

How to include in the analysis? We suggest the following:

- Mapping Maritime Sector's role in the economy and in the international trade value chain: its economic contribution, and where the key inputs and outputs are
- Assessing technological innovation and gaps and where these can address multiple industrial/economic sector challenges
- Analysing policy and regulatory drivers and barriers
- Identifying opportunities for investment and matching with types of investors (for example due to degrees of risk)

What are the most important subsectors and technologies that the UK government should focus on and why?

As answered for Q1 - maritime and shipping are a key part of the transport sector that can contribute to many of the objectives:

Economic growth: Over 95% of goods arrive in the UK by ship as well as importance for food (fishing) and leisure (ferries/cruises/other recreational) sectors.

Net zero:

- The UK is a global leader on climate change. Taking a global lead on decarbonising the maritime and shipping industry can make a significant contribution towards the UK's emission reduction targets.
- Offshore wind farm development and maintenance requires manufacturing, shore side facilities and shipping vessels to site construction, ongoing maintenance and repair.
- Ports can be hubs for clean energy for use regionally when surplus to port operations.

Regional growth:

Our major industrial clusters have grown from our major ports, and these are often located in the UK's most deprived and left behind towns and regions. Many regions of the UK have ports, and these can contribute to regional growth including exploiting the benefits of Freeport operation, stimulating inward investment and job creation.

Economic security and resilience:

- Investment in ports and leading on decarbonisation of fuels and shipping more generally contribute to economic security and resilience.

- Ports can act as an energy hub improve energy security and resilience. Creation of green shipping corridors stimulating sustainable trade routes.
- Operations analysis can lead to more efficient ports and facilitate improved efficiency and lower costs.
- Shifting towards sustainable coastal shipping from congested road and rail systems can be one way to easily and efficiently decarbonise freight transportation.

What are the UK's strengths and capabilities in these sub sectors?

As outlined in Q2 the UK National Clean Maritime Research Hub is conducting world leading research and has developed several technologies with great potential. Support for commercialisation of such developments would enable the UK to be a world leader and attract further inwards investment.

What are the key enablers and barriers to growth in these subsectors and how could the UK government address them?

Certainty around alternative fuels is needed. It is good there is a start looking into the feasibility methanol for the two green shipping corridors (Tyne-IJmeuiden and Holyhead-Dublin). However, while methanol could play an important role to 2035, it is considered by some as a transitional fuel for much of the shipping sector. This is because there are questions about the availability and sustainability of biomass and hydrogen to produce methanol, particularly in competition with energy demand from other sectors. The creation of a circular economy in CO₂ supported by carbon capture would reduce the biomass requirement.

A pathway for the longer term to 2050 and beyond for marine fuels and associated infrastructure is needed to signal more certainty and encourage net zero investment. This pathway needs to take a whole system approach to understand energy demand from other areas of the economy and likely net zero emissions pathways.

Power and propulsion system safety and efficiency, vessel design for efficiency, are all aspects we are conducting world leading researching on in the UK National Clean Maritime Research Hub. Government could support key technologies particularly where these are of benefit more widely. For example, our researchers have developed a self-venting explosion free tank design suitable for a variety of alternative fuels. This is relevant not just to shipping but other industrial and transport sectors as well.

UK electricity pricing and how much higher this is than other nearby countries is an issue lowering price electricity would benefit alternative fuel production, electric charging of vessels that are most suitable (such as ferries) and operations at ports such as cold ironing.

Business Environment

What are the most significant barriers to investment? Do they vary across the growth-driving sectors? What evidence can you share to illustrate this?

An update of the Clean Maritime Plan was initially planned for 2022 but has still not been materialised. This would signal areas of investment in UK maritime and shipping.

Business Environment – People and Skills

Where you identified barriers in response to Question 7 which relate to people and skills (including issues such as delivery of employment support, careers, and skills provision), what UK government policy solutions could best address these?

What is needed is an understanding of the skills needs of the future and planning for these developing strategically placed training centres around the UK. Also needed is the promotion of upcoming high quality and well-paid job areas and through schools, colleges and universities highlighting long-term permanent employment dependent on a pipeline of continued maritime activity. In promoting such careers, the potential for exciting career progression within the maritime sector should be highlighted.

What more could be done to achieve a step change in employer investment in training in the growth-driving sectors?

A roadmap of the UK's future to provide certainty of direction could encourage investment in training. The tax system could be used to incentivise skills development funding. Support could further be provided through colleges and universities to deliver a modern curriculum in alignment with the future direction.

Business Environment - Innovation

Where you identified barriers in response to Question 7 which relate to RDI and technology adoption and diffusion, what UK government policy solutions could best address these?

Need to recognise key technologies to address challenges across industrial/economic sectors. There is a need to significantly increase the availability of Seed Enterprise and Investment Schemes (SEIS) and Enterprise Investment Schemes (EIS) for investors.

The setting of a carbon price can incentivise adoption of new technology, practices and business models.

What are the barriers to R&D commercialisation that the UK government should be considering?

There are high costs for scaling up disruptive technologies, significantly increasing Seed Enterprise and Investment Schemes (SEIS) and Enterprise Investment Schemes (EIS) availability for investors could help with this. There is limited access to investment capital at TRL 3-5 stage and this needs to be improved.

A factor is the complex approval processes for new technologies, and especially for new chemical fuels very important to the shipping sector. Addressing the lack of standards from both industry, government and classification societies could help with this.

Maintaining international competitiveness in these areas is of course important for the UK economy.

Business Environment - Data

How can the UK government best use data to support the delivery of the Industrial Strategy?

There are many types of data, and it is important to bear in mind the suitability of the data to address particular questions.

What challenges or barriers to sharing or accessing data could the UK government remove to help improve business operations and decision making?

Proprietary data can be an issue as this creates a barrier to use for decision making. Understanding what certain data can be used for and its limitations is also critical.

Beware too of extrapolating data to the future, historic trends do not necessarily indicate the future particularly during the profound challenge that is the transition to a low carbon economy.

Business Environment - Infrastructure

Where you identified barriers in response to Question 7 which relate to planning, infrastructure, and transport, what UK government policy solutions could best address these in addition to existing reforms? How can this best support regional growth?

Local Growth Plans in coastal regions need to recognise the economic, environmental and societal contribution from maritime and shipping.

There needs to be recognition of the role ports can play in regional growth strategies as well as net zero and the clean energy transition. Furthermore, the recognition of the vital economic role shipping plays in the end-to-end freight transport system (ship-rail or road) and the government needs to lead on initiatives to improve efficiency and reduce emissions in that sector.

Measures to improve air quality at ports, such as cold ironing, considerations, contributes to improved health for residents in coastal communities and therefore a lower burden on local health services.

When considering land development associated with maritime and shipping and biodiversity considerations need to make sure balance up pros and cons and that the development is as environmentally benign as possible.

How can investment into infrastructure support the Industrial Strategy? What can the UK government do to better support this and facilitate co-investment? How does this differ across infrastructure classes?)

Appropriate infrastructure will underpin the feasibility of realising net zero emission targets, and the maritime and shipping sector can make a significant contribution to this. Examples include at ports, in end-to-end transport system efficiencies, adopting digitalisation AI and associated communications architectures to name but a few. An infrastructure strategy is needed

alongside the Investment Strategy as highlighted by Institute for Government¹ - alternative fuels and their production are a fundamental part of this.

Business Environment - Energy

What are the barriers to competitive industrial activity and increased electrification, beyond those set out in response to the UK government's recent Call for Evidence on industrial electrification?

High price of electricity in the UK versus elsewhere and insufficient grid infrastructure (aging and inadequate electrical grids) means that the uptake of cold ironing (maritime and shipping sector) is not competitive or immediately feasible in many ports.

There is limited access to affordable renewable energy: A need to scale up offshore energy production, and associated infrastructure bring this onshore. Investing in renewable energy microgrids will help alleviate demands on expansion of the national grid and energy storage systems also needed.

There is a lack of policy certainty for maritime and shipping and addressing the long overdue Clean Maritime Plan refresh would help with this.

Business Environment - Competition

How can regulatory and competition institutions best drive market dynamism to boost economic activity and growth?

The government could extend the UK ETS to shipping as the EU has done for the EU ETS². Further the FuelEU Maritime³ will enter into force from 1/1/25 limiting emissions and introducing zero emission requirements when ship berth at port and a similar approach is needed for the UK to avoid falling behind in global climate leadership.

Business Environment – Mobilising Capital

What are the main barriers faced by companies who are seeking finance to scale up in the UK or by investors who are seeking to deploy capital, and do those barriers vary for the growth-driving sectors? How can addressing these barriers enable more global players in the UK?

In addition to the reference in earlier questions to increase availability of Seed Enterprise and Investment Schemes (SEIS) and Enterprise Investment Schemes (EIS) for investors and other support mechanisms for nascent technologies and businesses.

¹ <https://www.instituteforgovernment.org.uk/publication/report/how-design-infrastructure-strategy-uk>

² https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en

³ https://transport.ec.europa.eu/transport-modes/maritime/decarbonising-maritime-transport-fueleu-maritime_en

Findings from shipping economics and finance research by the UK National Clean Maritime Research Hub give the following policy recommendations for investment in more efficient ships and alternative fuels:

- Clarity and certainty around market-based measures and alternative fuels regulations
- Green finance options to encourage investment in eco-ships
- Fossil fuel levies to discourage conventional ship use and encourage eco-ship investments

Please see the Policy Bulletin on this research here: <https://www.clean-maritime-research-hub.org/news/resource/policy-bulletin-001/>

Business Environment – Trade and International Partnerships

How can international partnerships (government-to-government or government-to-business) support the Industrial Strategy?

Maritime and shipping necessarily involves an international perspective due to its nature, therefore as much collaboration with other countries and ports as possible. This includes taking learnings from activities in other countries and ensuring UK is not left behind.

Place

Do you agree with this characterisation of clusters? Are there any additional characteristics of dimensions of cluster definition and strength we should consider, such as the difference between services clusters and manufacturing clusters?

While some clusters may have a strong concentration of employment there may be disruption on that front to that cluster due to digitalisation and AI. The need for workforce with particular skills now and in the future needs to be appraised. A plan to train and reskill in geographical areas where there is most employment risk, where suffering from restructuring happened in the past, and where there is potential to embrace future opportunities.

How should the Industrial Strategy accelerate growth in city regions and clusters of growth sectors across the UK through Local Growth Plans and other policy mechanisms?

Working with key stakeholders in the maritime and shipping sector such as at ports.

How should the Industrial Strategy align with Devolved Government economic strategies and support the sectoral strengths of Scotland, Wales, and Northern Ireland?

Maritime and shipping planning across all devolved nations and UK as a whole should be aligned.