

SHIP Discussion Papers

Project no:

2019-SE-MS-15

**Sustainable and
Holistic management
of Irish Ports (SHIP)**

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Introduction

Sustainable and Holistic management of Irish Ports (SHIP) is a 3-year project funded under the EPA Research Programme 2014-2020. Port sustainability requires a safe, socially acceptable, energy-efficient, and environmentally friendly port management approach that can simultaneously maximise available profits. SHIP explores how Irish ports can facilitate growth in maritime trade and transport, become catalysts for sustainable hinterland development and, at the same time, be compliant with climate change, environmental policy and the UN's Sustainable Development Goals. The overall aim of SHIP is to develop recommendations for Irish ports to sustainably achieve these objectives. SHIP's overall research approach is described in Appendix A.

Based on SHIP's research to date, draft recommendations have been developed in the following areas: **port governance; innovation; decarbonisation; connectivity; and efficiency and innovation.** In this document, a briefing paper is presented for each of these themes. The briefing papers consist of the key findings from stakeholder participation which are based on identified barriers, opportunities and draft recommendations for increasing port sustainability in Ireland. As a key stakeholder in this area, we are seeking your feedback on our draft recommendations. To facilitate future thinking a sustainable vision for Irish ports is briefly outlined before the discussion papers and questions.

A 2050 vision for Irish Ports

In 2050, Irish Ports are operating profitably following some turbulent times in the previous decade due to environmental, health and economic crises. These were the result of ongoing pandemics, geopolitical unrest, economic downturns, and climate change all attributed to an over-exploitation of natural resources and ongoing societal inequalities. As the global economy has been transformed to exist within the means of our living planet, society has transitioned to a more regenerative and distributive lifestyle. Consequently, the consumption of raw materials has significantly declined in favour of a more circular economy. Regional and local supply chains are preferred over global supply chains. This has resulted in a major shift in trade and shipping routes for Irish ports. International and long-distance shipping services have decreased while short-range services between British and European ports have significantly increased.

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In 2050, all of Ireland's ports are zero-emission. All the ships that visit Irish ports are zero-emission and are powered by clean, renewable sources such as batteries, green hydrogen, green ammonia, fuel cells and wind. So too are the trucks and trains that service Irish ports. Port equipment is connected to the national grid which is powered by renewables, and communities in and around the ports have clean and healthy air. Ports have embraced SMART technologies, engineering and sustainable design. Artificial intelligence, the Internet of Things, Big Data and other technological solutions have enabled Irish ports to become more intelligent in terms of flow, situation and customer management. Port innovation, however, is not limited to technological development; it also involves collaboration. Irish ports have created ecosystems, communities of interest and practices that make the whole system smarter. This has required large-scale change in systems design and operations as well as policy development, management approaches and collaboration.

Government cross-sectoral policy along with European and national financial support prompted a wave of infrastructural development around Ireland's coast during the period 2025-2040. These initiatives helped to accelerate the zero-emission transition at Irish ports and decarbonise the Irish shipping fleet. During this period, a transformation of the national electrical grid occurred with the majority of its power being generated from renewable sources including solar, wind, wave and tidal. Rail freight and passenger connections with Tier 1 and Tier 2 ports have been developed and enhanced. The role of Irish ports has evolved in recent decades. They not only cater for maritime and hinterland transport, Irish ports are now renewable energy hubs as well as innovative enterprise zones supporting highly-skilled, well-paid, diverse, safe and unionised workforces. Irish ports have transformed their operations through innovative management and practice with a zero-waste policy and a thriving circular economy enhanced by nature-based solutions. The aesthetic of ports has also changed with estate lands designed to be more permeable, connected, landscaped and integrated with the local environment and community through open spaces, green corridors, pedestrian and cycle routes and heritage zones. Irish ports are not just industrial and commercial spaces, they are tourism destinations with world renowned maritime and cultural attractions as well as biodiversity assets. Irish ports work collaboratively with local and regional communities to ensure their operations and development are sustainable, with minimal impacts on the surrounding environment and residential amenities. A just energy transition approach endorsed by the Irish Government has enabled coastal communities to benefit from cooperatives and community-owned businesses being integrated with the port supply chain. A well-managed and resourced MPA network has informed the location of port and maritime activities and ensure they have no adverse impacts on marine protected habitats or species.

Is this the vision we wish to see by 2050? If so, how might we achieve this?

Stakeholder questions:

The research findings (to date) are presented thematically in this report, and we request that you consider the following questions when reviewing them:

1. Do our findings reflect the prevalent sustainability issues for Irish Ports?
2. Have we overlooked any key issues or are there any gaps in our findings?
3. Do you have any final remarks to add on perceived barriers, opportunities and potential recommendations to port sustainability in an Irish context?
4. Which recommended actions should be prioritised?
5. Can you categorise the recommendations into short – (+2 years); medium – (+12yrs) and long-term (+27 yrs) actions? Please refer to Figure 1 for an indicative timeframe with key milestones included and consider when draft recommendations should be introduced.
6. What are the enabling conditions for these recommendations?

How to provide feedback

You can answer the questions online at this link:

SHIP Discussion Papers Feedback

<https://www.surveymonkey.co.uk/r/JL9H332>

We would appreciate your feedback by **14 September 2022**.

Next Steps

Your feedback will be collated and used to assist in developing a (transition) framework to advance port sustainability and inform its policy development and implementation in Ireland.

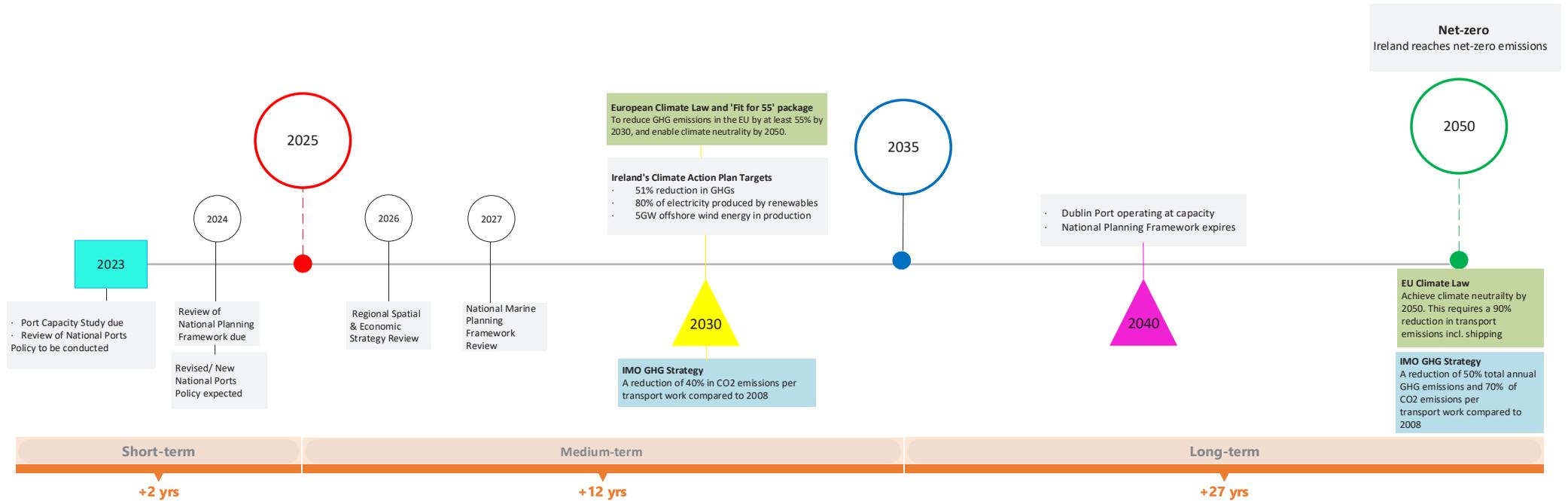


Figure 1 – Indicative timeframe of key milestones and future actions relevant to port sustainability

Port Governance

The degree to which governance processes facilitate change is key to the realisation of port sustainability. Ports, however, are complex systems with varying operations, functions, assets, and management mechanisms that are affected by the economy, culture, policies, local communities, geographical locations and conditions, and wider governance considerations. Addressing this complexity and moving towards more sustainable practices will require a collaborative, integrated and multi-sector approach, the development of a new national ports policy and a more spatially focused national marine planning framework.

Key findings

SHIP explored the perceived barriers and opportunities to sustainability in Irish ports. Findings indicate that:

- Participants contend that the relevant sectors, particularly transport, ports, energy, planning and environment are working in silos.
- Participants desire a more joined-up approach at a high/national level. Port personnel recommend the establishment of a multi-sector working group involving Irish ports (CEOs), Government departments i.e. transport, energy, climate, environment and planning (terrestrial & marine) and industry representatives. This model of integration should also be replicated at a regional/ local level – involving senior management of ports, the Department of Transport, local authorities/ regional assemblies, industry, NGOs, and local communities.
- National planning frameworks (terrestrial and marine) do not specifically address the future development of Irish ports i.e. in terms of long-term capacity and growth in trade, facilitation of offshore renewable energy (ORE) development and supplementary activities such as technology and innovation hubs.
- Regional marine planning has not commenced in Ireland but should be considered a potential framework for guiding large-scale port developments and associated marine/ coastal activities strategically and sustainably.
- There is concern from the environmental sector that port developments along with strategic marine developments will be considered on a project-by-project basis instead of in a strategic and integrated manner. This could potentially have adverse impacts on protected / designated sites with little regard for cumulative and in-combination effects.

- There is strong support for the sustainable development of Irish ports despite concerns of potential environmental effects from future expansion. Their development in support of the ORE sector is seen as a once-in-a-lifetime opportunity that can have significant positive national, regional and local impacts in terms of jobs and increased business as well as the regeneration of coastal communities.
- A revised National Ports Policy must reflect the emerging role of Irish ports in the energy and logistics sectors as well as a sustainable form of transport, and their contribution to advancing the UN's Sustainable Development Goals.
- The evolving international and European legislative landscape will drive change in Irish ports with regard to sustainability. For example, ports will be called upon to provide infrastructure for alternative shipping fuels and provide connections for onshore power supply.

Governance Barriers

Lack of adaptive governance and resilience thinking

SHIP participants were frustrated by a lack of strategic guidance, commitment, and clear policy direction concerning the offshore renewable energy (ORE) sector. This was exemplified in the non-designation of specific ports to service the offshore renewable energy sector and the non-financing of ports for associated large infrastructural developments. Given the current geopolitical challenges affecting energy supplies and ongoing climate change risks, participants were concerned at the government's lack of: urgency, response and resilience thinking. SHIP project participants view the transport, energy, planning and environment sectors as operating in silos, with no joined-up approach to delivering national

climate targets. Adaptive forms of governance must make use of various networks in the co-management of resources to develop mechanisms that can efficiently respond to unexpected realities. Project participants see the lack of this coordinated approach as having serious negative impacts. For example, in relation to achieving ORE targets, participants believe that the lack of a coordinated approach has contributed to the fact that there is not a single port in the Republic of Ireland presently capable of servicing all of the requirements of the ORE sector (i.e. construction/ deployment, operations and maintenance stages). This is despite the ports' critical role in achieving these targets being identified in an IMDO study on **Irish Ports' Offshore Renewable Energy Services**. Given that the Irish Government has a target of delivering 7GW of offshore wind by 2030 (recently announced as part of the **sectoral emissions ceilings** for Ireland) and 30GW by 2050, this is a significant barrier to achieving that goal and retaining services in Ireland. Several project participants criticised the Government for failing to take a lead and designate specific Irish ports for this servicing role, resulting in uncertainty and investment risks for the ports and ORE developers. While the Department of Transport has since published a statement outlining its support for a multi-port approach, this has garnered a mixed response with some SHIP participants stating that this was too late an intervention, while others have welcomed it. Notwithstanding this statement, Government and/or private sector investment will be required to assist two to three ports along the southeast, south and west coast to build out the required infrastructure. With the current National Ports Policy stipulating that ports will not receive exchequer funding for infrastructure development, this places an onus on the ports themselves and private investors to finance these large-scale infrastructural developments. One participant also highlighted the uncertainty associated with economic growth and port volume growth. They

purported that port volume growth could not continue at the current rate otherwise, Dublin Port will be larger than the Port of Rotterdam within the next 90 years which is unlikely to happen. A decoupling between economic growth and port volume growth will occur at some stage and this must be planned for in a sustainable way within Irish ports.

Lack of integrated governance

There are forthcoming policy and legislative developments at the EU level as part of the **European Green Deal** and **'Fit for 55'** package which will fundamentally change maritime transport policy in Ireland. At an EU level, there is a suite of proposals under consideration including a revised Alternative Fuels Infrastructure Regulation (AFIR), the use of alternative fuels by shipping (FuelEU Maritime) and the extension of the Emissions Trading System to shipping (EU ETS). Project participants felt that there needs to be greater engagement with them concerning these future requirements in Ireland. Port representatives highlighted their concerns regarding the future provision of onshore power supply. They were unaware of grid capacity, potential energy providers, power demand requirements, the investment needed and funds available for this major infrastructural development. Ports' representatives were largely unaware of any customer demand for alternative maritime fuels or how they could be sourced as part of future requirements.

Unchanged planning and consenting regime

Participants had envisaged that the introduction of the **National Marine Planning Framework (NMPF)** and the **Maritime Area Planning Act, 2021** would foster a more coherent, transparent, and efficient governance framework for the future development of marine activities including ports, coastal infrastructure, ORE development and marine protected areas. Despite these new legislative implementations, there is still no overarching spatial framework that specifically

Environmental stakeholders were concerned that development applications assessed on an individual basis would result in adverse impacts on protected/ designated sites if cumulative and in-combination effects are not appropriately assessed. This scenario is further exacerbated by the exclusion of a comprehensive network of marine protected areas within the National Marine Planning Framework. Some stakeholders felt that there would be no alternative but to apply the precautionary principle, potentially delaying or preventing development consents if the information is unavailable.

addresses the future and strategic development of Irish ports. A framework is required to guide the ports' approaches to long-term capacity and expansion, facilitation and servicing of offshore renewable energy development, and supplementary activities such as energy, technology and innovation hubs. Regional marine planning or **'designated marine area plans'** has not commenced in Ireland but should be considered as a potential framework for strategically and sustainably guiding the intensification of marine activities in key geographic areas. Regional marine planning could be applied to a specific area and should incorporate issues related to port development and associated coastal and marine activities. In the absence of such a strategic approach, participants are concerned that port developments along with significant marine developments will be considered on a project-by-project basis instead of in an integrated manner. There were some concerns regarding the creation of the new **Maritime Area Regulatory Authority (MARA)**. Participants are fearful that it will not be resourced and capable of delivering its aims efficiently.

Governance Opportunities

An innovative and adaptive National Ports Policy

There is strong project participant support for the *sustainable* development of Irish ports. Irish ports' potential in servicing the ORE sector is seen as a once-in-a-lifetime opportunity that can have significant positive national, regional and local impacts in terms of job creation, skills development, retention of workers and societal benefits to the local economy and coastal communities as well as mitigating climate impacts. This will require collaboration and cooperation between Irish ports, industry, local businesses, education and training authorities and local communities. Investment in research, development and innovation will be necessary to pilot novel initiatives, scaling-up of activities and maximising the potential for marine, environmental and technological spin-offs and business clusters around Irish ports. A planned review of the National Ports Policy is an opportunity to support ports capable of servicing the ORE sector and developing their potential. The long-term capacity needs (i.e. land and infrastructure resources) of Irish ports must also be addressed and is an opportunity to promote a 'whole ports' approach to balancing capacity constraints with capacity prospects. For example, the sharing of trade overflow from Dublin Port post-2040. Collaboration instead of competition between Irish ports should be encouraged. A sustainable approach to port planning which involves maximising capacity within brownfield sites before they are full is recommended. As noted previously, there is uncertainty over when decoupling between economic growth and port volume growth is likely to occur. It is important therefore, to plan now for future growth scenarios given the timeframe required for the design, consenting and construction of strategic infrastructure or 'mega' port projects.

Evaluating port performance based on metrics such as volumes of throughput may not reflect the overall contribution of Irish ports in achieving national objectives, particularly in relation to renewable energy targets. National Ports Policy should instead, introduce new/revised criterion for ports based on their handling capacity of renewable energies and contribution to sustainability.

Multi-sector collaboration

Future ports policy can also promote multi-sector collaboration between ports and other activities including sustainable mobility, fisheries, aquaculture and tourism, as well as assisting the development of innovation and digitalisation in Irish ports through knowledge exchange and funding support. Participants have suggested that a 'systems-thinking' and cross-policy approach is needed to drive change across the entire port supply chain. For example, a policy is needed to address emissions in the port, freight-haulage and shipping sectors. These could include targets and/ or incentives for engine efficiency, increasing road capacity, road pricing/ charges, alternative shipping fuels, onshore power supply, renewable energy at ports (PV installations), alternatives to marine diesel in port handling equipment and digitalisation. Engagement with sector stakeholders should be prioritised.

The Strategic Integrated Framework Plan for the Shannon Estuary (SIFP) was an early and novel approach to the holistic management of marine activities and could provide a template for future planning in areas of intense marine activity or sensitivity.

Integrated Planning and Development Regime

The NMPF and the Maritime Area Planning Act, 2021 are opportunities to strategically and spatially plan the future development of Irish ports as part of an integrated regional planning framework. Regional marine plans or 'designated marine area plans' provide a policy framework and baseline spatial data to guide the placement of marine developments in a holistic manner. This could help to streamline the development application process by enabling developers to identify suitable areas for development and potential constraints at the feasibility and pre-application stage. This should lead to a reduction of conflicts and provide greater certainty for long-term investment decisions by decreasing commercial risk and remaining regulatory burden. A regional approach can focus on the sustainable development of local assets and working with the Southern Regional Assembly on a Ports and Harbour Strategy can help to identify priority areas for action and funding opportunities. A well-resourced and supported MARA can help to deliver an effective and efficient marine licensing and enforcement process that is world-leading and exemplary in the development of marine activities and conservation of the marine environment.

Draft Recommendations

1. Decisive government action and enabling policy frameworks are needed to scale-up the use of zero-emission fuels to foster collaboration and deploy a transition strategy.
2. Establishment of National Ports Body/ High-level Ports Working Group to co-develop a future vision for Irish ports and identify short – and medium-term priority actions. This group can facilitate dialogue, inform policy, seek investment, and share knowledge and best practice.
3. National Ports Policy should seek to maximise the use of existing brownfield sites before considering the development of greenfield sites for port expansion or new port development.
4. National Ports Policy to incorporate revised criterium for ports based on their handling capacity of renewable energies and contribution to sustainability as well as/ instead of volumes of throughput/ tonnage.
5. If the revised National Ports Policy contributes to a framework for future port development (although not a plan or programme) it should be subject to environmental and habitats assessments.
6. A periodic review of the National Ports Policy including monitoring and evaluation objectives and targets should be considered as part of any future revisions.
7. Through the NMPF and Maritime Area Planning Act 2021, explore the adoption of a regional marine planning approach which encompasses strategic port development.

Innovation

Innovation is often associated with the use of technology and the digitalisation of port operations but also includes port management regimes which allow for the efficient operation of port services and sustainable practice. This can encompass novel port policies promoting ethical and sustainable procurement, gender equalities in the workforce as well as the provision of port infrastructure for alternative energy sources, facilitating a circular economy, the adoption of nature-based solutions and technology supporting 'smart' and 'greener' ports. To date, many of these initiatives have yet to be embraced in Irish ports however, there is an appetite to make operations more efficient through the adoption of innovative measures.

Key Findings

SHIP explored the perceived barriers and opportunities to sustainability in Irish ports. Findings indicate that:

- The larger Irish ports have more resources and tend to be more involved in research and development activities and collaborative innovation.
- The smaller Irish ports tend to be more specialised and handle smaller volumes of freight so there is less demand for digitalisation when serving minimal customers.
- Due to the size, type of business and scale, each port will require a tailored digitalisation approach.
- The skills and technologies are available in Ireland to provide the bespoke service each port will require.
- Potential funding may be available for innovative projects from European Regional Development Fund (ERDF) and through collaborative partnerships with the Regional Assemblies and other stakeholders.
- The review of the National Ports Policy is an opportunity to support innovation and digitalisation in Irish ports which will deliver increased efficiency and sustainability. This includes advances in procurement policy, contribution to a circular economy and the implementation of nature-based solutions.

Barriers to Innovation

Lack of technological guidance

The digital transformation of ports ranges from paperless to automated and smart procedures using the Internet of Things (IoT) and Artificial Intelligence (AI). In Irish ports, the challenge has been identifying which technologies are to be integrated or newly installed into daily operations. Also, which type of system is used: i) digitalisation of individual parties within a port; and (ii) integrated systems in a port community. Elsewhere additional and more advanced procedures include (iii) logistics chain integrated with hinterland users; and (iv) connected ports in the global logistics chain into digitalised port networks.

The larger Irish ports have more resources and tend to be more involved in research and development activities and collaborative innovation. The smaller ports tend to be more specialised i.e. managing break-bulk, and handling smaller volumes of freight so there is less demand for digitalisation when serving fewer customers. Due to the size, type of business and scale, each port will require a tailored digitalisation approach. In some ports, there is a perception that digitalisation requires significant effort which may be unjustified given the scale and nature of their business. Nonetheless, the ports recognise that digitalisation is a necessary investment and will eventually be funded. Advancements in port cyber security and compliance with General Data Protection Regulation (GDPR) were also recognised as inevitable challenges which must be addressed to ensure the safe management of sensitive information. It is acknowledged that investments must be underpinned by a robust and sustainable business case and demonstrable demand for the services and infrastructure.

Inadequate infrastructure

In Ireland, basic broadband provision is unavailable to some ports. It was highlighted by participants in

The SafeSeas Ireland (SSI) online portal was identified by participants as the first initiative to integrate ports and shipping data online. This is a portal that stores and shares information on ships arriving and departing Irish ports and is available to relevant stakeholders i.e. customs, immigration and ports. Participants did, however, identify some limitations with the infrastructure, particularly concerning access and reliability of service. As one participant noted 'they're the same, they struggle with connectivity as well and they're still ringing us up asking for this, or asking for that, you know....It's fairly time-consuming would be the main hindrance I'd have' (Response of Shipping Agent).

Shannon that broadband infrastructure is inadequate in terms of providing a reliable and fast internet connection. With an increasing demand for wireless data collection, a 5G network will be imperative to facilitate fast, efficient and reliable digitalisation but is not yet fully available in the majority of Irish ports.

Opportunities for Innovation

Availability of local resources and expertise

Digitalisation was the main innovative measure discussed by participants. It was agreed by participants that there is no one type of template that Irish ports can select in terms of appropriate IT architecture. However as noted by the larger ports, the skills and technologies to provide the bespoke service each port will require are available in Ireland. Several participants suggested the establishment of an all-Ireland ports team or network as useful to discuss best practices, learn lessons and avoid unnecessary pitfalls. This could be conducted as part of existing fora such as the Irish Harbour

Masters Committee etc. It was also noted by one port representative that money will always be made available for innovation so long as there is a robust business case. It will be imperative to ensure that ports have access to adequate fibre broadband and the latest (5G) mobile network infrastructure to transition to digitalisation when required. The production of green hydrogen through electrolysis powered by offshore renewable energy was also identified as a significant opportunity. Since the focus groups were conducted, the Irish Government has introduced a 2 GW green hydrogen target by 2030. Irish ports have the potential to become clean energy hubs of the future facilitating these new industries. This is discussed in more detail under the 'Decarbonisation' theme. It was highlighted that funding for innovation projects could potentially be sourced from European funds such as the European Regional Development Fund (ERDF) under the Regional Operational Program. The development of a Port Strategy as provided for in the Southern Regional Assembly's Regional and Social Economic Strategy (RSES) also presented an opportunity for regional cooperation concerning SMART urban areas, SMART infrastructure and potentially SMART Ports. The review of the National Ports Policy was also identified as an opportunity to support innovation and digitalisation in Irish ports.

Experimentation and demonstration initiatives

While **ethical and sustainable procurement policy** was not discussed in the focus groups, it was considered in Stage 1 as part of the stakeholder interviews with ports identifying this as an opportunity to build a more sustainable supply chain in the future by availing of more locally sourced and ethically considered products and services. In relation to the **circular economy**, this was also raised in Stage 1 with ports highlighting their contribution including reusing construction materials, waste recycling in

Port digitalisation Case Study – Port of Livorno, Italy

The Port of Livorno serves as an experimental area covered by a live 5G network. The network enables the port area to be cloned in a digital twin, a virtual replica of the port and cargo freights in real-time. This allows port operators to use smart virtual reality (VR) and augmented reality (AR) to perform their tasks in a safer, more productive, and sustainable way.

More information: *The 5g Port of the Future*

Circular Economy in the Port of Amsterdam

The Port of Amsterdam provides a hub for bringing together everything from waste, raw materials and port logistics to established demo plants and innovative circular companies. It offers modern port infrastructure, circular economy enterprises and space to grow. It continuously expands its infrastructure and facilities to support innovative new solutions and offers start-ups and scale-ups the opportunity to connect with other circular and biobased initiatives and other industries within the Port.

More information: <https://www.portofamsterdam.com/en/discover/sustainable-port/circular-economy>

ports, and facilitating the transportation of recycled raw materials such as steel. This, however, is an area with greater potential in terms of allowing ports to become more sustainable whilst creating value in the process by applying a more transformative

approach to production and consumption and achieving a systemically circular economy. **Nature-based solutions** (NbS) were recommended by participants at the interview and focus group stages as innovative interventions that ports should explore as part of their future development. NbS are actions that involve the protection, restoration or management of natural and semi-natural ecosystems. They have the potential to address major challenges such as climate change, water security, human health, disaster risk and social and economic development. Examples include protecting wetlands, sustainable urban drainage systems, landscaping and coastal habitat restoration. It is acknowledged that Dublin Port Company has committed to implementing a Natural Capital Policy as per its **2040 Masterplan**. NbS also represents circularity by protecting, sustainably managing or restoring natural or modified ecosystems and therefore connect to the circular economy as a potential axis of innovation across ports.

Draft Recommendations

1. Provide adequate fibre broadband and mobile network access to Irish ports.
2. Explore the potential for digital and enterprise hubs and zones around the ports supporting the use of IoT solutions, data analytics, wireless communication systems and marine robotics with applications across multiple sectors.
3. Promote the application of digital technology to help measure and monitor parameters in the marine and terrestrial port environment e.g. marine mammals, underwater noise, air and water quality.
4. Seek potential funding for innovation projects from European and national sources. For example, see **European Commission Innovation Fund** and **European Regional Development Fund**
5. Engage with the Southern Regional Assembly and stakeholders in the development of a Port Strategy for the Southern Region. Explore the potential to apply this approach to the Eastern and Midlands and Northern and Western Regions in the future.
6. The National Ports Policy Review is an opportunity to support innovation and digitalisation in Irish ports.
7. Irish ports should develop their own ethical and sustainable procurement policy.
8. Irish ports, with government support, should explore their contribution to a circular economy as part of a national effort to manage the production and consumption of raw materials.
9. Nature-based solutions should be intrinsic to future port development activities in addressing climate change as well as social and economic well-being.

Decarbonisation

Ports play a fundamental role in facilitating import and export movements between countries and are a key node in the global supply chain. The continuous and increasing growth in trade, however, has increased GHG emissions. Consequently, ports and their surrounding cities and urban areas, have become carbon-intensive. Decarbonisation, in accordance with the Government's **Climate Action Plan**, is necessary to ensure greater sustainability in Irish ports and the surrounding hinterland. This can be achieved using a 'systems' thinking or holistic approach integrating multiple sectors, relationships and perspectives. Strong policy and financial support will also be required to assist in decarbonising the sector.

Key findings

SHIP explored perceived barriers and opportunities to sustainability in Irish ports. Findings indicate that:

- Decarbonisation should be delivered across the entire supply chain i.e. ports, shipping and freight movements.
- A 'systems' thinking approach would ensure a multimodal, decarbonised transport sector.
- Port representatives confirmed that there has been little demand for low - or zero-carbon fuels.
- Ship and haulage representatives highlighted a lack of policy support and incentives for the industry to shift from fossil fuels to cleaner alternatives.
- Participants recognise the significant potential of Irish ports in servicing the expanding ORE sector and potentially a future indigenous green hydrogen industry.
- There was a fear, however, that without financial support from the Irish Government, European Union and other sources, Irish ports may not be able to invest in the infrastructure needed to provide for this sector.
- Strong policy support is needed to avoid stranded assets and future-proof investments in decarbonisation actions.
- Through collaboration and partnerships with government departments and agencies, industry, ports, environmental NGOs and local communities, renewable energy targets can be achieved and socio-economic and environmental benefits gained.
- Regional marine plans offer a more spatially integrated approach to the management of marine activities within a defined geographical area and, ideally, incorporate areas of high-use activities including ports and/or areas of environmental sensitivity.

Barriers to Decarbonisation

Fragmented approach

Participants agreed that decarbonisation should be delivered across the entire supply chain i.e. ports, shipping and freight movements. To date, however, there has not been an integrated approach to decarbonisation across these three sectors. For example, there are no specific policies on energy efficiency in port equipment and vehicles; the provision of alternative shipping fuels and/ or onshore power supply in Irish ports; road pricing/ charges for use of fossil fuels in HGVs; and increasing road capacity to minimise congestion until zero-emission fuel is available for road haulage. Furthermore, emissions from maritime navigation are not counted as part of Ireland's national total emissions¹ but are reported to the United Nations Framework Convention on Climate Change (UNFCCC) and EU for information purposes. As referred to in the Governance section, a 'systems' thinking approach is required to ensure a multimodal, decarbonised transport sector. In addition, international shipping targets set by the International Maritime Organisation (IMO) require a reduction of 50% of total annual GHG emissions from 2008 levels by 2050. This target is significantly less ambitious than Ireland's net-zero emissions target by 2050.

Perceived cost implications

Port representatives confirmed they have been implementing a range of energy-efficient measures within their port buildings and port operations with positive results to date. One of the remaining challenges is the cost of replacing port equipment with more sustainable models. For example, one port representative explained that a more energy-efficient straddle carrier costs approximately €130,000 more than the one they purchased in 2018. In terms of low or zero-carbon fuels, ship and haulage representatives highlighted a lack of policy support and incentives for the industry to shift from fossil fuels

to cleaner alternatives which cost significantly higher. There was a perception that if the industry switches to alternative fuels, the increased costs would be passed to the customer who would most likely choose a cheaper and ultimately, less sustainable, freight agent. Port representatives noted that there had been little demand for alternative fuels such as LNG, CNG and biofuels and were unaware of suppliers of these fuels however, they did not think this would be an impediment if demand did arise. Similarly, they noted that there was no demand yet for onshore power supply (OPS)/ cold ironing. This lack of demand could, nonetheless, represent a challenge when justifying the costs for installing the necessary infrastructure as required in the Alternative Fuels Infrastructure Directive which specifies the supply of LNG bunkering points and OPS in ports of the TEN-T core network by 2025. Given that the investments in quayside infrastructure for OPS, for example, can range from €125,000 to €4 million per berth² depending on port location, power demand, voltage, frequency and vessel type, the proportionality of costs to benefits including environmental should be considered.

Gap between policy and action

Participants recognise the significant potential of Irish ports in servicing the expanding ORE sector and potentially a future indigenous green hydrogen industry. There had been some concern initially over the lack of policy intervention with regards to the role of Irish ports in facilitating these sectors however, the recently published statement from the Department of Transport proposing a multi-port approach has been welcomed. While it was regarded by several participants that this policy intervention may be too late for Irish ports to service ORE developments along the East Coast of Ireland planned before 2030, there is still an opportunity for Irish ports to benefit from developments planned post-2030. There was a fear, however, that without financial support from the Irish Government, European Union and other sources,

1. EPA. 2022. Ireland's Provisional Greenhouse Gas Emissions 1990-2021. Available at: <https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/>

2. WPSP. 2022. Investments in OPS. Available at: <https://sustainableworldports.org/ops/costs/investments/>

Nigg Skills Academy, Scotland

The Nigg Skills Academy is a “not for profit” training provider based at Nigg Energy Park, Nigg, Scotland. NSA was set up over six years ago to address the energy skills gaps in the oil & gas and renewable energy industry. Originally focusing on the delivery of Modern Apprentices, NSA has added a range of short up-skilling courses in Advanced Fabrication and Welding training. NSA has established itself as a leading industry-led educational facility delivering “work ready” candidates, up-skilled candidates and Modern Apprentice trainees to their employers.

More info: <http://niggskillsacademy.com/about> and <http://nigg.com/about/port-of-nigg>

Port readiness for the ORE sector

Rosslare Europort: announced plans in April 2022 to establish the port, its hinterland and the south-east region as Ireland’s Offshore Renewable Energy (ORE) Hub. The Offshore Renewable Energy hub plan represents an investment estimated at €200 million and proposes to deliver:

- *ORE purpose-built quay and berth*
- *ORE quayside storage and pre-construction / up to 50 acres in area*
- *Navigable channel dredged down to a minimum of – 9m depth*
- *Management Control Centre & management offices and facilities*
- *Significant economic growth and up to 2,000 new jobs*

More info here: <https://www.rosslareeuroport.ie/en-IE/news/ore-hub>

Cork Dockyard: is privately owned by the Doyle Shipping Group (DSG), which is investing €120m in upgrading the existing yard, with 750m of reinforced quay wall and 49 acres of storage space. This will be a purpose-built site to handle floating offshore wind turbines.

More info here: <https://doyleshipping.ie/expertise/renewables/>

The GH2 Galway Hydrogen Hub

The GH2 consortium comprises the Port of Galway, SSE Renewables, NUI Galway, CIE Group and Bus Eireann, Aran Islands Ferries, Lasta Mara Teo and Aer Arann Islands and proposes to develop an initial flagship demonstrator project at Galway Harbour, for the indigenous production and supply of clean green hydrogen fuel for public and private vehicles. This will include buses and trucks and deliver a multi-modal, zero-emission, renewable hydrogen transport hub. Hydrogen can be produced when renewable electricity is used to split water into its component parts of hydrogen and oxygen through electrolysis. Over the long term, green hydrogen can become an alternative fuel supply for shipping vessels. Currently, the Port of Galway and its partners are learning from the experience of the Port of Aberdeen in the production and onshore use of green hydrogen.

More info here: <https://www.sserenewables.com/news-and-views/2022/04/new-hydrogen-multi-modal-transport-facility-to-be-developed-in-galway/>

Irish ports may not be able to fund the infrastructure needed for this sector. It was also acknowledged that the lack of a national hydrogen strategy and/ or hydrogen policy represented a barrier to investment in this sector. Other challenges identified are related to grid capacity and energy storage.

Opportunities for Decarbonisation **Maximising the potential of renewable energy developments**

The development of the offshore renewable energy sector is a significant opportunity for Ireland. With the potential to deliver 7GW of offshore wind energy by the end of this decade, a further 30GW+ after 2030, and the production of 2 GW of green hydrogen from excess electricity, Ireland's ports, coastal communities, economy, regional development and climate, will reap significant economic, societal and environmental benefits *if* this sector is progressed in a timely and sustainable manner. Through collaboration and partnerships with government departments and agencies, industry, ports, environmental NGOs and local communities, these renewable energy targets can be achieved. It will be important to coordinate education at secondary and third-level and apprenticeship schemes to address any skills shortage. The multi-port approach advocated by the Department of Transport should be implemented with adequate support and resources. It was also acknowledged by participants that discussions had commenced between the Department of Transport and Eirgrid concerning grid capacity. This will be critical for accommodating future energy requirements in Irish ports including the provision of onshore power supplies. The Maritime Area Planning Act, 2022, presents an opportunity to address several consenting issues related to delays, duplication of applications and the fragmented assessment and permitting processes for proposals within the foreshore, coastal and marine areas. The development of regional marine plans offers a more

spatially integrated approach to the management of marine activities within a defined geographical area and, ideally, incorporates areas of high-use activities including ports and/or areas of sensitivity. To achieve national emission targets it will also be necessary to decarbonise Ireland's shipping fleet by 2050. Support for zero-emission shipping projects through national action, with, for example, domestic shipping emissions targets, incentives and support for first-movers can help drive decarbonisation in the Irish fleet. Given the 20-year plus lifetimes of ships, those entering into service in 2030 will still be operational in 2050 so it is important to pledge for zero emissions by 2030. The Irish Government should lobby the IMO and EU for stricter regulations to reach zero-emissions shipping by 2050. New vessels are already being developed that use fuels produced without carbon emissions i.e. ammonia, methanol and fuel cells produced using green hydrogen.

Balanced regional development

Decarbonisation of the energy sector including the production of ORE and green hydrogen has the potential to contribute to balanced regional development. Planned developments off the East, South and West coasts of Ireland will attract significant investment to these areas, resulting in additional employment and demand for local services and facilities and reinvigoration of coastal communities. For example, maritime and logistics clusters, IT hubs and enterprise zones can be developed around ports to support the ORE industry and supply chains as well as indigenous SMEs. Education and skills shortages are already being addressed with the IMDO and National Maritime College of Ireland undertaking a review of maritime training needs. This can be extended to all third-level colleges and universities reflecting on the disciplines and skills requirements of the Irish ORE sector with the aim of exporting skills and capacity over the long term.

Draft Recommendations

1. National Ports Policy to require the Irish shipping fleet to be decarbonised by 2050 and consider a pledge for new vessels entering into service in 2030 to be zero-emission.
2. Government to assist zero-emission shipping projects through domestic shipping emissions targets, incentives and support for innovation.
3. Government to petition the IMO and EU for stricter regulations to reach zero-emission shipping by 2050.
4. Grid capacity and power network around Irish ports need to cater for the accommodation of renewable energy sources and the provision of onshore power supply for shipping vessels and other modes of transport in port.
5. Partnerships and collaboration will be necessary to ensure an integrated approach to the development of the ORE sector and the delivery of required infrastructure and services. Networks should be established between developers, ports, government departments, the public sector and education and training bodies to facilitate a regional supply chain to support and enhance productivity and competitiveness.
6. National Ports Policy to provide clear guidance on the implementation of pending European legislation particularly in relation to the Alternative Fuels Infrastructure Directive and FuelEU Maritime Regulation.
7. Government to assist Irish ports to deliver the infrastructure requirements to service the ORE sector.
8. Government to develop a national hydrogen strategy to provide strategic guidance on issues related to the sustainable use of natural resources, appropriate locations, spatial and infrastructural requirements, grid capacity, potential constraints and implementation and delivery mechanisms.

Connectivity: Sustainable Coastal Communities and Natural Environment

Ports are inherently linked to their surrounding urban area and hinterland. These areas are indeed interdependent and their activities affect each other. While contributing to regional economic growth, port activities can result in adverse societal and environmental impacts caused by port development, port operations, commercial activities from ships as well as the transportation of goods to and from the hinterland. It is important to ensure that coastal communities and the natural environment are protected from any negative impacts and that communities are meaningfully engaged in future planning decision-making processes associated with port development and operations.

Key findings

SHIP explored perceived barriers and opportunities to sustainability in Irish ports. Findings indicate that:

- Local community representatives were concerned about the impacts of increased port traffic on residential amenities.
- Irish ports are now investing more resources in community liaison and stakeholder engagement.
- Estuarine and marine water quality has improved around ports due to a ban on the use of toxic substances, stricter enforcement of regulations and improved port management.
- A multi-level and integrated approach between the IMO, European Union and national Governments is required to tackle emissions from global maritime transport.
- Participants were concerned that the lack of a network of Marine Protected Areas in Irish waters could potentially delay development consent within sensitive marine areas due to a lack of information and adherence to the precautionary principle.
- The redevelopment of port areas represents significant opportunities to transform existing industrial areas into mixed-use urban quarters and maritime cultural tourism attractions bringing additional investment, services, facilities and amenities to local businesses and communities.
- The review of the National Ports Policy is a chance to prioritise the potential impacts of climate change on Irish ports and their infrastructure.

Barriers to sustainable communities

Environmental impacts from port-related development

Participants were concerned about port-related developments, including an increase in vessel size and movements, negatively impacting the terrestrial and marine environments and local residential communities. These potential impacts include noise, air and water pollution, biodiversity damage and loss, alteration of coastal processes/ morphology and traffic congestion. Community representatives felt that their concerns around environmental effects and impacts on their residential amenities were often overlooked. For example, cruise ships berthing in ports were cited as sources of air and noise pollution and congestion. The provision of waste recycling for ships in Irish ports was considered inadequate by one shipping agent who attributed this to the out-sourcing of the contract to third parties instead of being managed in-house by the relevant port authority.

Project participants suggested that the emissions from ships in Irish ports should be investigated to determine potential impacts to air quality and human health. Shipping emissions are often considered unregulated in comparison to other sectors and other forms of transport. One regulator, however, noted that sulphur oxide (SO_x) emissions were being managed under IMO directives and the application of emission control areas. Nitrogen oxide (NO_x) emissions were less regulated (no equivalent IMO/EU directive) but could be managed with the implementation of nitrogen oxide emission controls areas (NECAs). This would be challenging in Ireland however, with the regulator observing that a case and evidence base would have to be made to the IMO which could be costly particularly, if it were to include CO₂ as well as NO_x and SO_x limits. It was implied that the main source of NO_x is from road transport so a NECA may not be so beneficial.

In terms of future developments associated with the ORE sector, participants emphasised that the larger ports are located within European designated sites and areas of environmental sensitivity. As a consequence, port-related developments and activities must have regard for these constraints. Participants highlighted the lack of a network of Marine Protected Areas (MPAs) in Irish waters could potentially delay development consent within sensitive marine areas due to a lack of information and adherence to the precautionary principle. It was reiterated that a forward-looking planning and integrated approach to the development of large-scale marine infrastructure projects in Irish waters is needed to avoid unnecessary delays, expense and environmental damage.

Inaction on Climate Change

It was recognised by participants that there is still work to be conducted in Irish ports about action on climate change. While measures to decarbonise including energy efficiency, energy sufficiency and use of renewable energy all contribute to climate mitigation, there has been minimum action to date on climate adaptation, except for Dublin Port Company. Dublin Port Company commissioned an independent study on the implications of sea-level rise on the Port and its infrastructure. Preliminary findings from this study indicate that the Great South Wall will have to be increased by 1.4m which will inevitably have significant environmental and heritage implications. Other port representatives reflected on the challenges of river and estuarine management works (i.e. dredging), particularly in marine sensitive areas, and the magnified the impacts of climate change due to seabed disturbance and increasing GHG emissions.

Dublin Port Company (DPC) and community benefit

DPC has its own Corporate Social Responsibility (CSR) programme which comprises three elements of support for the local community: education, community events and sports. DPC has several key personnel dedicated to enhancing community and social relationships with a communications manager, a community engagement manager and a heritage director. In addition to the Port's CSR programme, initiatives have been developed for community gain and include (i) as part of the ABR project, the transfer of ownership to Dublin City Council of 10.5ha of lands owned at North Bull Island; (ii) as part of the MP2 project, the allocation of €1million towards the enhancement and support of education provision at St Joseph's Co-Ed Primary School; and (iii) also as part of the MP2 project, allocating a sum of up to €1million towards the provision and operation of a City Farm on lands owned by Dublin City Council adjacent to the Port. In addition, DPC has developed a number of 'soft value' initiatives which aim to improve the relationship between the City and Dublin Port. These initiatives include supporting and promoting local port heritage, arts and culture. Some examples include organising musical, theatre, art and photographic events. Furthermore, DPC is in

the process of designing and delivering several important projects for the Port area including:

- *The Liffey-Tolka Project, which will create a new public realm along a 1.4 km dedicated cycle and pedestrian route linking the River Liffey with the Tolka Estuary through Dublin Port lands on the east side of East Wall Road and along Bond Road.*
- *The Tolka Estuary Greenway, which is a 3.2 km route along the northern perimeter of Dublin Port overlooking the Tolka Estuary.*
- *Distributed Museum which comprises a 6.3km trail starting at the Diving Bell along Sir John Rogerson's Quay over the Samuel Beckett Bridge, past the Scherzer Bridge and down the North Wall Quay campshire; incorporating the Liffey Tolka Project –with a 300-metre spur along Alexandra Road to The Pumphouse and another 200 metres to The Flour Mill; and the Tolka Estuary Greenway.*
- *The Flour Mill Masterplan, which involves the redevelopment of the former Odlums Flour Mill on Alexandra Road based on a masterplan completed by Grafton Architects to provide a mix of port operational uses, a National Maritime Archive, two 300-seat performance venues, working and studio spaces for artists and exhibition spaces.*

Opportunities for sustainable communities

Supporting coastal communities

The redevelopment of port areas such as Cork City Docklands and Galway Inner Harbour lands which are dependent on the re-location of port services are also

significant opportunities to transform these existing industrial areas into mixed-use urban living quarters bringing additional investment, services, facilities and amenities to local businesses and communities as well as financial leverage for the ports. They have the

potential to become important maritime cultural and tourism attractions also.

The sustainable development of dockland/ port areas should have regard for the local community. It is acknowledged that all of the Irish case study ports are involved in corporate social responsibility (CSR) activities of varying degrees. Any future large-scale development around Irish ports is an opportunity to engage with coastal communities and ensure the distribution of economic benefits.

Sustainable environmental management

The decarbonisation of Ireland's energy sector will require significant investment in the production of renewable energy including offshore wind as well as green hydrogen using electricity produced from wind energy. These developments will require the construction and assembly of large-scale infrastructure at sea and along the coast which will have environmental implications. Now is the time to start the surveying and monitoring of potential environmental impacts in advance of these strategic infrastructure developments and is an opportunity for stakeholders to come together and work in partnership, in an integrated manner to share the effort, data collection and cost of environmental assessments. The **Strategic Integrated Framework Plan for the Shannon Estuary (SIFP)** represents an opportune initiative to address potential environmental impacts of strategic infrastructure development within a European designated site using a forward-planning and partnership approach. Given the significance of the **European Green Deal** and its emphasis on renewable energy development, there may be an opportunity for an initiative like the SIFP to apply for funding from the European Commission to assist with the costs associated with surveying and monitoring environmental impacts in an internationally protected site. This could help to inform the consenting

process, reduce delays and ensure the sustainable development of sensitive marine environments.

Decarbonisation of port activities, operations and shipping vessels will reduce GHG emissions as well as SO_x, NO_x and particulate matter (PM) resulting in cleaner air and improved human health. Given the global nature of marine transportation, a multi-level and integrated approach must be undertaken between the IMO, European Union and national Governments in tackling emissions from these sectors. This will be necessary to ensure a level and just playing field for all of the maritime transport sectors including ferries, cargo and containerships, cruise vessels as well as smaller port vessels. Similarly, trains and trucks carrying port freight should also be decarbonised in line with maritime transport and zero emissions logistics. It was highlighted that a study called '**PortAir**' is currently being conducted in Dublin Port by UCC and NUIG which will determine the impact of shipping emissions and other port activities on air quality in Dublin. The findings from this project should help inform the National Ports Policy. It is acknowledged that in England, major ports³ are requested to produce a voluntary **Port Air Quality Strategy** in accordance with the **UK Clean Air Strategy**.

Innovative policies have been introduced locally within Irish ports that are different to national and international legislation. For example, Dublin Port Company introduced a policy which bans the use of open-loop scrubbers on board ships when in port. These systems use seawater to wash the sulphur out of the exhaust stream and return it to the marine environment. This prohibitive measure helps to maintain water quality within the Dublin Bay area.

Regulatory participants highlighted that negative environmental impacts associated with port development have been significantly reduced

3. Any port handling cargo volumes of at least 1 million tonnes annually. Source: Department for Transport: Port Air Quality Strategies: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/815665/port-air-quality-strategies.pdf

and mitigated in recent years due to stringent environmental legislation and regulations. Estuarine and marine water quality have improved due to a ban on the use of toxic substances and stricter enforcement of regulations. With advancements in environmental technology, assessments and monitoring adverse effects can be minimised. In terms of waste recycling, it was highlighted that a separation scheme is provided in port by Belfast Harbour for visiting vessels, including cruise ships.

Positive climate action

The review of the National Ports Policy is a chance to consider climate change projections and potential impacts on Irish ports and their infrastructure. Given that ports are located within vulnerable coastal areas, impacts associated with sea-level rise, increased storminess and storm surges will be challenging to manage and could result in disruptions to operations if not mitigated. It was acknowledged at one of the focus groups that the Transport Adaptation Stakeholder Group for sea-level rise involving ports were meeting for the first time in Q1 of 2022. This forum could potentially feed into the review process of the National Ports Policy with specific reference to climate change adaptation. Internationally, research has been conducted on climate change adaptation by PIANC⁴, the World Association for Waterborne Transport Infrastructure. It was also noted by one of the participants that the **Atlantic Smart Ports Blue Acceleration Network (AspBAN)** which identifies common challenges for ports, was also examining the use of natural capital resources and responses to sea-level rise. These international networks could prove useful in terms of sharing information and good practice. It is also recognised that plans for ORE development will significantly contribute to climate change mitigation, reducing the need for further adaptation actions. It is important to recognise that Irish ports themselves are not big energy users however, they have a very important role to play in

facilitating decarbonisation activities, particularly concerning becoming energy hubs servicing the ORE and green hydrogen sectors. They can do this through the provision of land, infrastructure, shipping services and maritime skills and experience.

Draft Recommendations

1. Early and meaningful engagement with coastal communities and NGOs throughout the design, consenting and construction processes of strategic infrastructure developments in and around Irish ports should be an essential consenting requirement.
2. Community liaison personnel should be designated within Irish ports to ensure continuous engagement and information sharing about port activities and potential impacts on the local environment and community.
3. Monitoring of emissions in major Irish ports should be conducted to help inform policy and mitigate environmental pollution and adverse impacts on human health.
4. The development of a network of Marine Protected Areas in Irish waters should be prioritised.
5. Policy should provide guidance on assessing potential climate change impacts and recommending appropriate adaptation measures to ensure the long-term sustainability of port infrastructure.
6. Encourage and support surveying and monitoring of potential environmental impacts in advance of strategic infrastructure developments and promote stakeholders working in partnership to share the effort, data and cost of environmental assessments.

4. EnviCom WG 178: Climate Change Adaptation Planning for Ports and Inland Waterways (2020). Available at: <https://www.pianc.org/publications/envicom/wg178>

Efficiency and Investment

Port efficiency refers to operational performance, particularly concerning the maximisation of outputs with limited possible resources. Operational performance includes maritime, terminal and hinterland operations such as access, turnaround time, cargo handling equipment, storage yard activities, dwell time, gate and security requirements and road/ rail capacity. Irish ports confirmed they invest significant resources in increasing efficiencies which in turn result in greater sustainability. This has been achieved through reductions in the use of land, sea, water and energy for electricity, heating and transport. New technologies and digitalisation have increased efficiencies in how ports are managed and operated, reducing turn-around times and delivery of services. Waste management and recycling initiatives have also increased efficiencies with a reduction in the use of raw materials. Efficiencies in port management and operations must be continued, improved upon, and adequately resourced to ensure greater sustainability. Opportunities exist based on collaboration, incentives, investment and marketing.

Key findings

SHIP explored challenges and potential solutions to the identified sustainable barriers in Irish ports, revealing that:

- Incentives are needed to drive change towards sustainability in ports and shipping.
- Health and Safety requirements are different for each port resulting in excessive bureaucracy and delays for the haulage sector.
- Government support is required for large infrastructural port developments which are in the national interest i.e. facilitating the ORE sector.
- The redevelopment of brownfield port sites is preferable to the development of new greenfield sites in the interests of sustainable development.
- Maritime transport tends to be overlooked as the most energy-efficient form of transport for freight and goods over longer distances.
- There needs to be a wider discussion on the global issues of consumption, consumerism, demand for cheaper products, next-day deliveries and cheap passenger flights which are driving up emissions.
- A collaborative approach is required to support the distribution of port services on the island of Ireland and to promote the role of Irish ports in the global supply chain and in facilitating a decarbonised society.

Barriers to efficiency and investment

Dearth of incentives

Participants advocated for the introduction of national incentives to drive change in the port, shipping and haulage sectors. While some participants were in favour of a 'carrot instead of a stick' approach, others believed that clear policy and fiscal charges would be necessary to influence change towards greater sustainability. It was acknowledged that change in the international maritime sector takes too long with participants stating that the IMO was slow and arduous when it came to introducing new legislation and targets and often, influenced by vested interests. One haulage representative highlighted the lack of funding or grant support for their sector to upgrade their fleet of trucks which incurs additional costs. This was a concern as the majority of Irish freight trucks comprise diesel engines which are below Euro VI emissions standards for greater efficiency.

Investment myopia

Port representatives highlighted the challenges of securing investment for strategic infrastructural developments. While the Government and public recognise the importance of Irish ports in facilitating the global supply chain during the Covid-19 pandemic and disruptions caused by Brexit, Irish ports have not received any financial support. As noted, the current National Ports Policy stipulates that commercial ports do not receive exchequer funding. With significant infrastructural requirements in ports needed to address efficiency and sustainability issues such as: indigenous renewable energy production, the provision of alternative maritime fuels, digitalisation of port operations and environmental protection, financial support will be necessary to address the gaps between TEN-T and debt capability. Some port representatives questioned how ports' debt finance is based on 'hope value' and implied that any gap in port finance would result in a missed opportunity,

particularly concerning servicing the ORE sector where time is of the essence.

Inefficient use of port land and operations

Participants raised concerns about the future development of a new port along the East Coast on a greenfield site. This was perceived as an inefficient use of existing port lands where the redevelopment of brownfield sites should be prioritised before the development of new lands in the interests of sustainable development. It was acknowledged, that due to environmental constraints and protected marine sites along the East Coast, any future development extending into the sea will be subject to environmental and habitats assessments. It was noted that this usually resulted in planning delays and challenges. The use of land at Dublin Port for customs was considered excessive by some project participants. It was suggested that this land would be better utilised for port-related activities. Participants also claimed that the cruise ship and haulage sectors required more space as ships are getting bigger and trucks require parking areas. Another issue highlighted by the project participants is that Irish ports have limited hours of operation which contribute to traffic congestion in and around the ports. It was noted that international ports operate on a 24/7 basis which helps to minimise congestion and reduces air pollution and emissions. It was implied that the Irish supply chain would have to adapt to any extension of hours of port operation.

A haulage representative stated that there was unnecessary bureaucracy in Irish ports which resulted in delays and duplication of time and effort. For example, port customs IT systems for the Department of Agriculture and Veterinary Department are different; and health and safety requirements in each of the Irish ports are different requiring a different safe pass despite similar hazards, risks and use of equipment.

Under-valuing the role of ports and maritime transport in furthering sustainability

Participants felt that shipping was often regarded as a 'dirty' industry due to its transportation of fossil fuels and its dependency on fossil fuels as an energy fuel source. Shipping, however, tends to be overlooked as the most energy-efficient form of transport for freight and goods over longer distances. The reduction in emissions achieved by moving freight from road to sea increases in line with the distance over which the freight is to be transported. It was highlighted that this fact is not publicised enough. Furthermore, the role of rail freight in transporting cargo to and from Irish ports was also considered an under-utilised and under-funded resource. There were contradictory views on the role of rail freight in Ireland with some participants purporting that Ireland is of insufficient scale to facilitate an expansion of rail freight. Other participants reflected on the wider and more global issues of consumption, consumerism, demand for cheaper products and next-day deliveries which were driving up emissions. One participant highlighted the cheap cost of flights which were prolonging unnecessary air passenger travel and further increasing GHG emissions.

Opportunities for efficiency and investment

Incentivising greater efficiency

Participants believed there should be more incentives for ports and port users to switch to more sustainable practices. They suggested the Government or relevant authorities, for example, could provide incentives to switch to cleaner energy supplies similar to Norway where one shipping agent noted that the Norwegian Government grant assistance to shipping carriers to invest in research and pilot certain technologies. Examples of useful incentives included SEAI tax rebates for energy-saving works.

Dublin Port Company Franchise Policy

In 2014 Dublin Port Company developed its own franchise policy to implement measures that aim to address the pressing issue of capacity and maximise the utilisation of existing Port lands. These measures included: the displacement of non-core activities to a new inland port site (14 km from Dublin Port off the M2); policies that encourage the relocation of empty container depots; and a review of the terms and conditions of operator licences—particularly concerning container storage times across the port. The franchise policy and its 13 measures were also designed to encourage greater efficiencies across the Dublin Port site which in turn could help the port operate more sustainably and address the issue of capacity in the context of its 2040 Masterplan.

More info here: <https://www.dublinport.ie/wp-content/uploads/2019/06/Dublin-Port-Franchise-Policy-Doc.pdf>

Participants questioned if there is potential for SEAI grants to bridge costs of moving from fossil fuels to cleaner alternatives in port handling equipment. Other examples included no Benefit-In-Kind levies on electric vehicles for port management staff. Participants called for funding to be made available for innovation and pilot schemes in sustainability practices and technologies.

Investment Support

Advancements in digitalisation, energy efficiency, renewable energy, environmental technology, sustainable building design and construction and alternative fuel usage will require significant

Investment Support

Port of Hull and the Humber Region

The Green Port Hull vision is to establish the city of Hull as a world-class centre for renewable energy, creating economic growth and employment for the region. Hull City and East Riding Councils and Associated British Ports (ABP) along with partner organisations from the private sector have been working together to ensure that this ambitious vision becomes a reality. Through the *Regional Growth Fund for the Humber Region*, significant investment has been secured for skills, employment, business support, and research and development to ensure that local people and businesses secure maximum benefit from the renewable energy sector. The University of Hull is also working to ensure that the knowledge element of the sector establishes itself in the City. These attributes have encouraged Siemens to choose Hull as the location to build its world-renowned offshore wind turbine blade manufacturing, assembly and servicing facilities that represent the centrepiece of Green Port Hull.

More info here: <https://greenporthull.co.uk/about>

UK Government innovation funding

Net Zero Innovation Portfolio

The UK Government awarded £9.3m from its '*Net Zero Innovation Portfolio*' to Vattenfall to build 8MW offshore hydrogen electrolyser at its test and demonstration wind farm in

Aberdeen Bay. The project – '*Hydrogen Turbine 1*' or '*HT1*' – aims to be the first project in the world to test the full integration of hydrogen production with an offshore wind turbine. The project will also map out development and consent processes for large-scale hydrogen projects co-located with offshore wind farms to speed up future development.

Information on the wider H2 Aberdeen initiative here: <https://investaberdeen.co.uk/flagship-projects/hydrogen-economy>

Clean Maritime Demonstration Competition

Round 1 of the Clean Maritime Demonstration Competition (CMDM) launched in March 2021 and ended in March 2022. It allocated up to £23,259,000 funding to UK innovators to support the design and development of zero-emission vessel technologies and greener ports. Supported by private consortia comprising 208 partners from around the UK, a total of 55 projects won the competition, representing a total investment of £33.5 million to be completed by March 2022.

Round 2 of the CMDM has allocated up to £12 million to support feasibility studies and pre-deployment trials in innovative clean maritime solutions. It launched on 24 May 2022 and is open for applications until 13 July 2022.

More info here: <https://www.gov.uk/government/publications/clean-maritime-demonstration-competition-cmdm>

infrastructural investment by Irish ports. Participants felt that the Irish Government should provide financial assistance given the evolving role of Irish ports in facilitating the decarbonisation of our society in line with national objectives. It was acknowledged that Irish ports proved resilient and agile during the Covid-19 pandemic and Brexit disruptions and are worth investing in over the long-term, particularly with regard to servicing the ORE sector. One participant estimated a potential return on inward investment of approximately €8 million per gigawatt of power. Other sources of funding cited by participants included the EU-**Connecting Europe Facility** (CEF) which contributes to the implementation of the TEN-T. It was noted that the Department of Transport had to lobby to keep ports within this category based on their periphery location, exacerbated by Brexit. EU Interreg funds were also suggested as a potential opportunity for a case study examining environmental impacts from strategic infrastructural developments within a European designated marine site. European Regional Development Funds were also identified as a possible source of funding for sustainable and innovative projects. This option was also supported by Regional Assembly representatives. Participants recommended establishing a dedicated national team/government sponsored network to develop bids around port sustainability or scaling-up future operations. This could be linked to developing ORE infrastructure, particularly cross-port bids which may be considered more competitive when seeking EU funds and investment. The team could also be responsible for administering any levered grants, monitoring impact and building further bids.

A collaborative and sustainable approach to delivering port services

Participants highlighted the capacity constraints at Dublin Port and felt that an All-Ireland approach to the delivery of port services is required. This would entail the distribution of services to other ports other

than Dublin Port. The expansion or redevelopment of existing ports along the East and South-East Coast was identified as a more sustainable and viable option for the development of a new port on a greenfield site given the cost, time and consenting constraints associated with the development of large or 'mega' infrastructural projects such as a new port. The growth in trade at Rosslare Europort (50% increase in trade since 2019) in response to Brexit is an indication of how agile working and adaptative management can result in an expansion of business. By providing new connections and routes, the market will follow as noted by one of the port's representatives. With the government supporting a multi-port approach to facilitating the ORE sector, Irish ports can share the distribution of services ensuring balanced regional development. It was acknowledged that a port capacity study had been commissioned by the Irish Maritime Development Organisation (IMDO) and Department of Transport in 2018. The findings of this report will be useful in determining the future development of Irish ports. Project participants were keen to maximise future development opportunities and recommended a coordinated approach to the delivery of education, training and skills in the maritime sectors. It was suggested that a review and amendment to the Merchant Shipping Act is required to accommodate a different classification of vessels and qualifications needed to service the offshore energy sector.

Promoting maritime transport as an energy-efficient form of travel and an essential service provider

Participants advocated increasing public awareness of the role of ports in the global supply chain, as a potential clean energy hub and as a sustainable form of travel in comparison to road and air usage. It was suggested that inland waterways could also be maximised to transport goods between future hubs

and clusters around Irish ports, similar to the Rhine in Germany.

While some participants were sceptic of the expansion and viability of rail freight in Ireland, others promoted it as an opportunity to balance regional development and reduce GHG emissions. One participant noted that large UK retailers such as Tesco and Waitrose are moving their freight by rail on journeys of less than 100km and are using electric trucks for last-mile delivery. This addresses the problem with HGV driver shortages. Participants claimed that the cost of maritime transport and rail freight would have to be competitive with other forms of transport. It was acknowledged that Irish Rail is investing €0.5 billion in rail freight infrastructure up to 2040 and actively investing in rail heads and carriages, the cost of which would previously have been on the developer/ customer as noted by a port representative. Irish Rail's 2040 **Rail Freight Strategy** includes initiatives to enhance connections with Irish seaports including connecting all Tier 1 Ports to the rail network. Participants recommended improvements to the road network were also needed as Ro-Ro freight and HGVs will still be using them whether electrified or hydrogen-powered in the future.

Draft Recommendations

1. Government support for large infrastructural port developments which are in the national interest i.e. facilitating the ORE sector.
2. Support to be provided to Irish ports to access EU Funds for 'Green', 'SMART' and 'Innovative' port developments. This could include establishing a dedicated team or a sub-working group of a National Ports body to develop bids for funding.
3. Tax rebates/ reliefs should be introduced for more sustainable transport actions
4. The findings from the forthcoming Port Capacity Study should be communicated to all port stakeholders and used as an evidence base in the review of the National Ports Policy.
5. A review of the National Ports Policy is an opportunity to promote an All-Ireland approach to the delivery of port services. There should be a focus on the development of regional ports and their contribution to sustainability.
6. Conduct a review of the Merchant Shipping Act and the need to cater for a different classification of vessels and qualifications to service the offshore renewable energy sector.
7. Need to enhance and reconnect Tier 1 and Tier 2 ports (where feasible) to rail infrastructure.
8. Consider the need for a National Ports body to support the distribution of port services and to promote the role of Irish ports in the global supply chain and in facilitating a decarbonised society. Co-ordinated approaches to customs, health and safety requirements, port operating hours and funding bids could also be explored as part of this group's remit.

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Appendix 1

Research approach

The SHIP research approach involves three key stages of data collection and stakeholder engagement. As part of **Stage 1**, we conducted online meetings and interviews with key port personnel in the following case study ports: **Dublin Port Company, Port of Cork, Shannon-Foynes Port Company, Rosslare Europort, Port of Waterford** and **Port of Galway**; collected baseline port sustainability data for these ports; and carried out online interviews with external stakeholders with an interest in our case study ports. **Stage 2** involved a more in-depth look at issues that emerged from Stage 1 including perceived barriers to port sustainability and opportunities for improved sustainability. To investigate these issues further, we conducted a series of online focus groups with key port personnel from each of the case study ports and relevant external stakeholders. This enabled us to collate and synthesise responses to challenges, opportunities and potential solutions to identified barriers. As part of this final phase, **Stage 3**, we are building on these findings from Stage 2 and are inviting stakeholders to reflect on our consolidated overview of the key themes, barriers, opportunities and draft recommendations to assist Irish ports in addressing future sustainability demands.