

Submission of Shannon Estuary Economic Taskforce to the R&I Strategy Consultation of the Department of the Environment, Climate and Communications.

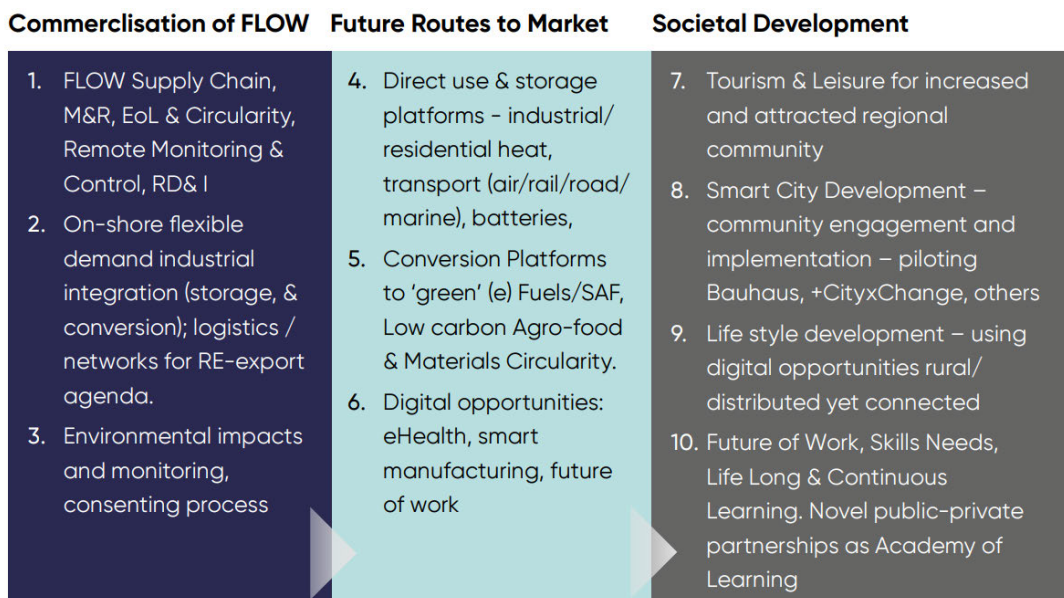
As Shannon Estuary Economic Taskforce (SEETF), we fully support the Irish (and European) ambition to transition towards being fully green and digital, and seeks to accelerate implementation. The level of acceleration will depend heavily on technological innovation and radical systems change, to complement streamlined planning, the development of enabling infrastructure and other strategic measures – in this sense we welcome the R&I Strategy Consultation of DECC fully. We thought it is useful to provide DECC with the RD&I elements of our integral SEETF vision, strategy and recommendations, that essentially cover your questions 1-3, 6-8, 10.

As outlined in our final Report¹, launched at 8th of July 2023 at Ireland’s landmark renewable hydropower plant in Ardnacrusha by An Taoiseach and Cabinet Ministers, among who Minister Eamonn Ryan of DECC, SEETF anticipates the scale of the Atlantic wind resource requiring the development of a wind energy supply chain at scale alongside the development of matching flexible industrial demand onshore and routes to market that target a balanced portfolio of value added and/or mandated products. The future industrial development should be balanced with societal needs and be complemented with an intelligent and profitable export agenda.

As further detailed in SEETF Report, we anticipate Research, Development and Innovation (RD&I) across three pillars, developed over time and which will require dedicated RD&I roadmaps and investments:

1. supporting commercialisation of Floating Offshore Wind (FLOW) in the short and medium term;
2. supporting the green and digital routes to market during the medium and long term;
3. societal and community developments in the medium and short term.

Note that while the economic development will be realised over a longer time scale, the corresponding RD&I investments need upfront investment to align and prepare for the future.



¹ Shannon Estuary Economic Taskforce Report / July 2023 – for download at <https://enterprise.gov.ie/en/publications/shannon-estuary-economic-taskforce-report-july-2023.html>

Three coherent pillars of RD&I investments as in SEETF Report.

1. Short- to Medium-Term Development (Towards 2035)

Development and innovation in energy technologies generally requires approximately a decade from concept to tested and commercial system, with significant learning effects on cost reduction and system efficiency and integration while installed capacity increases.

In line with the ambition presented in Shannon Foynes Port Company's Vision 2041 Review², consecutive phases of scaling for FLOW will be required to achieve a target 30 GW installed nominal capacity by 2050. Initially, the estuary will be capable of deploying 400 MW per annum, but from 2033 onwards it is hoped to be in a position to deploy up to 1 GW per annum by increasing port capacity, new facilities and improved efficiency. This roadmap expects approximately 80%+ of the required CAPEX spend to occur after 2033, giving Ireland just over a decade of development time, to learn from early commercial projects. These early projects will obviously deploy with state-of-the-art components that have been developed and tested in other jurisdictions, deployed at scale in the Atlantic environment and requiring assembly, testing/commissioning, transport and installation to their respective commercial sites, resulting in a renewable energy project at unprecedented scale.

While learnings from other jurisdictions will apply, this phase must be used to accelerate Irish industrial and academic learning, ideally in international codevelopment with leading industrial and academic partners from Denmark, Norway, the Netherlands, the UK, and others. We also believe that this learning must be done in partnerships that build a knowledge system that combines model-based description (digital twins), optimisation and prediction of all elements of (1) offshore wind energy supply chain, (2) onshore flexible industrial and societal demand while integrating (3) an analysis of key environmental and societal impacts. The latter will streamline and enable the social licence required for this transformational programme while facilitating monitoring and future consenting processes.

The Taskforce recommends building partnerships in international co-development programmes and collaborating in European (Horizon) and other national RD&I funded projects that can complement and focus our efforts to those areas that can make the biggest impact. Furthermore, we believe that an opportunity exists at present, in both industry and academia, for the US and the EU to collaborate on their respective Inflation Reduction Act and REPowerEU programmes. We propose that the Estuary region is an ideal location for that: six hours from Boston and two from Berlin and on the edge of one of the world's largest wind resources. By increasing the amount of IP, the Irish economy can reap a wider and deeper benefit from the green energy programme.

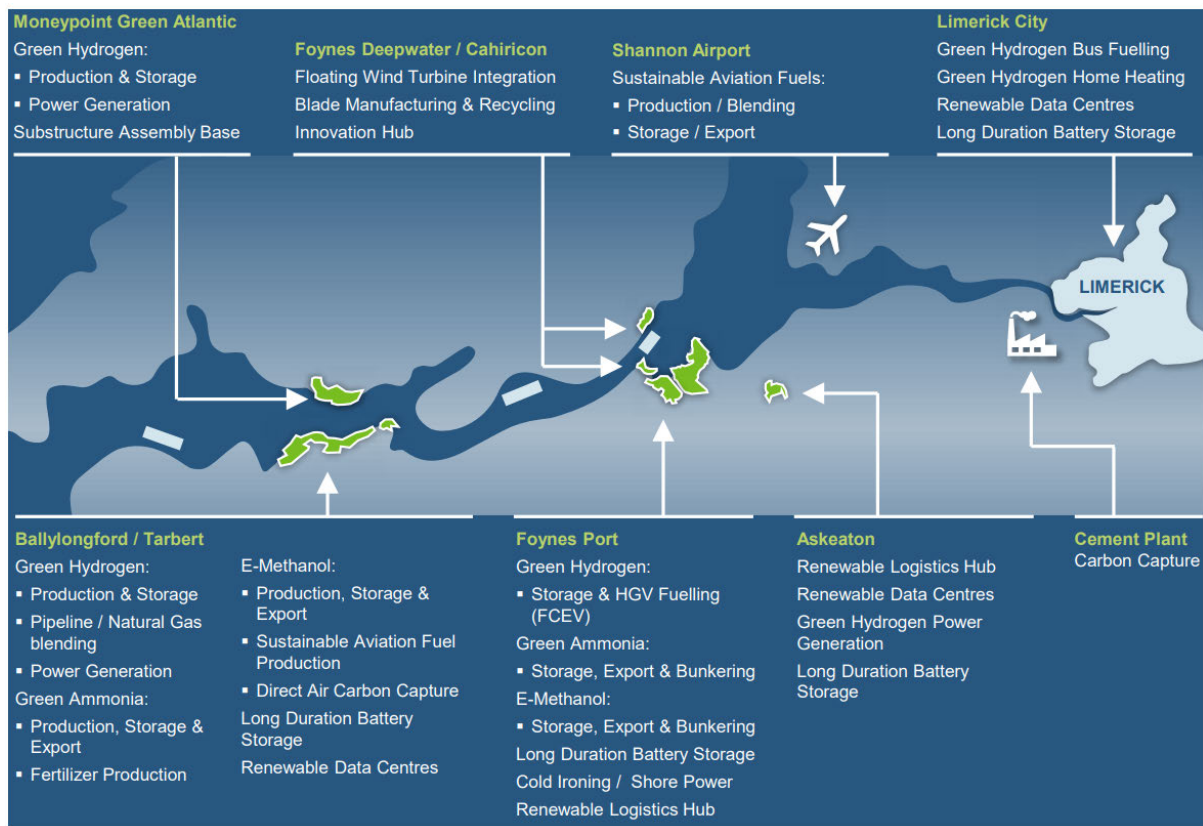
1.1 The Shannon Estuary Living Lab

Development of the Atlantic FLOW supply chain presents a transformational renewable energy system at unprecedented scale. To accelerate learning effects; optimise the system, minimise costs, footprint and environmental impacts; and optimise robustness and economic impacts, the first developmental phases must be embraced as a living ORE lab at realistic scale. Living labs are ecosystems of open innovation, which often operate in a specific context, integrating concurrent research and innovation processes within a public-private partnership. Here, living lab is effectively a route for RD&I to be trialled and tested on or alongside active projects. That requires RD&I investments beyond the direct commercial and technical investments.

² <https://www.sfpc.ie/vision-2041-strategic-review/>

SEETF recommends the establishment of a floating offshore wind farm living lab off the west coast. This would be used as an (inter)national proof of concept and learn how floating offshore wind platforms can be installed and operated in Atlantic conditions. This would also support the de-risking of O&M costs for the specific requirements of Atlantic FLOW and help to develop the supply chain in the Shannon Estuary region. Moreover, it will send a strong signal to industry of Ireland’s intentions in relation to offshore wind deployment and build investor confidence.

A similar living lab concept has recently been announced off the Grimsby coast to test robotics and autonomous solutions to support necessary inspections, maintenance and repair in the offshore wind industry³. The project will see the development of a 5G Testbed which will allow technology providers to test and demonstrate their equipment in real world conditions. The delivery of major offshore projects off Ireland’s west coast should be leveraged in a similar way through living labs to support continuous innovation, development and indigenous intellectual property.



Shannon Estuary Green Industrial Ecosystem (Source: Shannon Foynes Port Company⁴)

2 Medium- to Long-Term Development (2035-2050)

The availability of abundant renewable energy (i.e. post 2035) will open up new possibilities for Irish innovations, startups and new industrial developments to reduce cost and increase competitiveness. This scale will also help to develop more economically attractive and significant routes to market to

³ Offshore wind 'living lab' planned for English coast, renews.biz, 2023 - <https://renews.biz/84903/offshore-wind-living-lab-planned-for-english-coast/>

⁴ <https://www.sfpc.ie/vision-2041-strategic-review/>

capture larger macroeconomic benefits by developing a balanced, high added value portfolio of domestic uses alongside a carefully designed export agenda.

In the short- to medium-term most FLOW developments will, due to Ireland's limited offshore energy and onshore industrial tradition, be based on technology developed and manufactured elsewhere. This leads to a significant fraction of the required direct investments to be spent internationally, with only an estimated 35-38% of the direct CAPEX retained in the Irish economy. This results in a combined direct, indirect and induced economic (GVA) effect of about 75% of the direct investments, which while acceptable in early stages leaves a large amount of value uncaptured.

One strategy to counter this leakage of investment is to mandate minimum local content to stimulate supply chain investment such as the manufacturing of wind supply chain components within Ireland, which happens in other jurisdictions⁵, but this can impact project delivery while local supply chains are being developed.

Another strategy is to target RD&I investments in differentiating elements of the wind supply chain, and in the integration of onshore flexible demand. SEETF Report provides a rough breakdown of the capital investment in the FLOW supply chain. While the wind turbine itself represents a large fraction of project CAPEX, opportunities to develop new technology in the other elements of the FLOW supply chain may provide opportunities to substantially increase direct investment share in Ireland.

Based on a number of recent, current and planned RD&I projects within Ireland, it is expected that blade and turbine innovations can be foreseen in the coming decade. Increased competitiveness through RD&I across the FLOW supply chain will build bigger segments of the FLOW supply chain and knowledge base in Ireland. Investments in relevant RD&I are typically a small percentage (2-5%) of the expected commercial investments of €90-120 billion for the projected 30 GW scenario. RD&I investments totalling over €2 billion are therefore merited. We anticipate this RD&I Investment starting in 2023/24 using a balanced mix of public sector (via DFHERIS, DECC, DETE, etc.), private sector, and a variety of European sources.

2.1 RD&I supporting Future Routes to Market

Abundant offshore renewable energy is the key to decarbonising existing and emerging industries in Ireland. Agriculture (37.5% of Ireland's GHG emissions⁶), transport (17.7%), energy (16.7%), and manufacturing (7.5%) are key sectors from which Ireland's GDP and exports would benefit most from the green energy transition. The universities in the region (UL, TUS, MTU) already have strong research programmes across a variety of relevant areas such as advanced food and nutrition, bioeconomy, engineering, technology, software, material science and pharmaceuticals.

- Agriculture/food – Ireland has robust export markets for dairy (€5 billion) and meat (€2.5 billion) production; however, current conventional agri-food production systems are challenged by their

⁵ <https://www.offshorewind.biz/2022/10/13/vestas-setting-up-assembly-plant-for-flagship-offshore-wind-turbine-in-poland/>

⁶ Full references in SEETF Final Report

inherent GHG emissions. Innovations in this space can potentially extend and grow this sector's contribution to the Irish economy⁷ at a reduced GHG footprint.

- Transport – Ireland is an island nation with a strong export focus. Decarbonised transport systems are therefore crucial to support economic continuity and future growth. Aviation, marine and long-haul freight are difficult to decarbonise, and have EU-mandated (REFUEL, RED) targets with strict requirements on the biogenic origin of any carbon in their future fuels (biogas, agro-forestry residue or DAC).
- Circular and Biogenic Materials – the Shannon Estuary region has a significant number of high tech/high added value industries in the (bio)pharma, biomedical devices and micro-electronics domain, food, as well as commodity materials manufacturers (Aluminium and Cement), and plastics recyclers. Several industries have located global R&D centres in the region and will be focusing on the circularity of materials and the decarbonisation of supply chains. Circularity will also be a key innovation in the FLOW space with solutions needed for maintenance, repair and end-of-life usage of turbines (nacelles and blades). It is also important to note that the region is rich in biogenic carbon feedstocks as biogas, biomethane and forestry residual products which are critical for being compliant to EU REFUEL, RED II/III and anticipated EU regulations for transport fuels (aviation, marine), circular plastic and insulation materials and other (biogenic) carbon containing products.
- Digital – Currently over 50% of Irish service exports relate to ICT, finance and insurance, and other digital services⁵¹. The availability of abundant decarbonised power will help to grow and also create new digital industries. Ireland's future digital sector will include a broad range of areas such as data transport, storage and handling, supporting a wide range of service sectors such as ICT, finance and insurance, digital manufacturing, eHealth solutions, Internet-of-Things, smart city solutions, etc.

Further detail and context can be found in our Final Report, which is available for download : <https://enterprise.gov.ie/en/publications/shannon-estuary-economic-taskforce-report-july-2023.html> .

In response to your question 7, as Shannon Estuary Economic Taskforce, we are happy to discuss our integral vision including RD&I strategy, our more detailed recommendations and background information further with the Department of the Environment, Climate and Communications.

Kind regards, on behalf of Shannon Estuary Economic Taskforce

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⁷ <https://www.mckinsey.com/industries/life-sciences/our-insights/the-bio-revolution-innovations-transforming-economies-societies-and-our-lives> and <https://www.rethinkx.com/food-and-agriculture>