

Vision 2041 Strategic Review



Foreword

The Vision 2041 Strategic Review
Final Report is available at:
www.sfpc.ie

Vision 2041 was launched in 2013 with its plan period entailing a 30-year time horizon. Vision 2041 committed to a review every 7 to 10 years and accordingly we are delighted to present this ambitious and comprehensive Review. This Strategic Review does not replace Vision 2041 and should be read in conjunction with it. In summary, the Review focuses on the sea change of opportunities and obligations around climate action as well as the extensive changes in national supply chain logistics. Climate action is grounded in our net zero obligations by 2050, and plans to attain them must be devised and implemented in the immediate term. Likewise, with regard to the logistics sector, events such as Brexit and Covid-19 have fundamentally changed freight market dynamics. These changing dynamics, coupled with strong Irish economic and population growth, require additional sustainable supply chain capacity particularly with regard to port infrastructure.

The approach to the Review has been to identify and address relevant changes over the Vision 2041 period to date, and is structured over three main themes or drivers for future growth and expansion:

1. Delivering floating offshore wind (FLOW) at scale
2. Green industrial development and transition – facilitating alternative fuels (“e-fuels”) production
3. Expanded, diversified and more sustainable logistics services

This Review has taken a holistic approach focusing on the numerous advantages of the Shannon Estuary such as its 500km² of deep water, its 1,400 ha of zoned Strategic Development Locations (below), and its proximity to the Atlantic’s abundant offshore wind resources.

On a national scale, the Shannon Estuary’s natural attributes make it uniquely suited to develop the supply chain for FLOW and related green industries, this Review finds that, with regard to infrastructure, a new deep water port at Foynes Island and a strategy for the development

of the offshore grid (potentially along marine cable corridors identified in this Review) are critical and should be in place by 2028 in order to enable the sector to mobilise and meet net zero obligations by 2050.

Expansions at the Port of Foynes will add substantial freight capacity to the national supply chain. Importantly, this capacity will be situated at an uncongested point in the national transport network due to progress made on delivering both the Foynes to Limerick Road Scheme and the Limerick to Foynes rail connection.

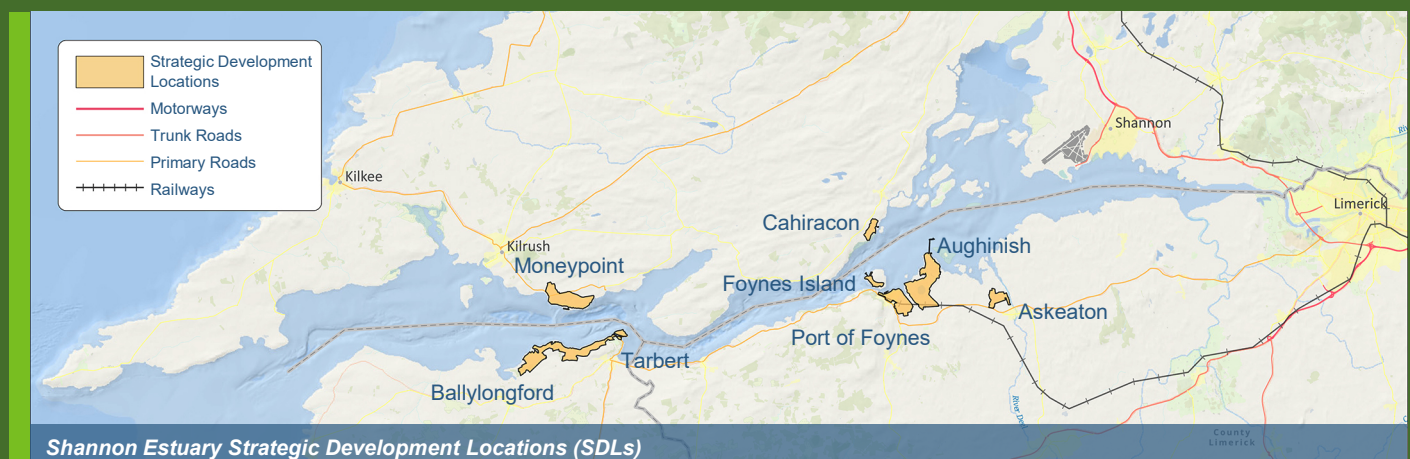
Successful delivery of the identified offshore wind, green industry and logistics opportunities will be transformational for the Shannon Estuary, the region and the country. Resulting economic impacts will be in the order of tens of thousands of jobs created and billions of euro invested in supply chain and route to market infrastructure and facilities around the Shannon Estuary.

To fully unlock these huge opportunities, significant national policies in a number of sectors require updating. Examples include more clarity around energy policy, enduring regime, alternative fuels and wider economic and social policies.

Finally, I would like to thank all those who contributed to this Review through consultation with a special thanks to Bechtel for their hard work and guidance during its compilation.



Patrick Keating
CEO
Shannon Foynes Port Company



The Scale of the Opportunity

The Resource Potential

Since the Vision 2041 Strategy was published in 2013, perhaps the most consequential market development has been the accelerated emergence of the offshore wind industry. Now that deeper waters have been unlocked via the advancement of floating wind technology, it is estimated that over 70 gigawatts (GW) of offshore wind potential can be delivered and serviced from the Shannon Estuary.

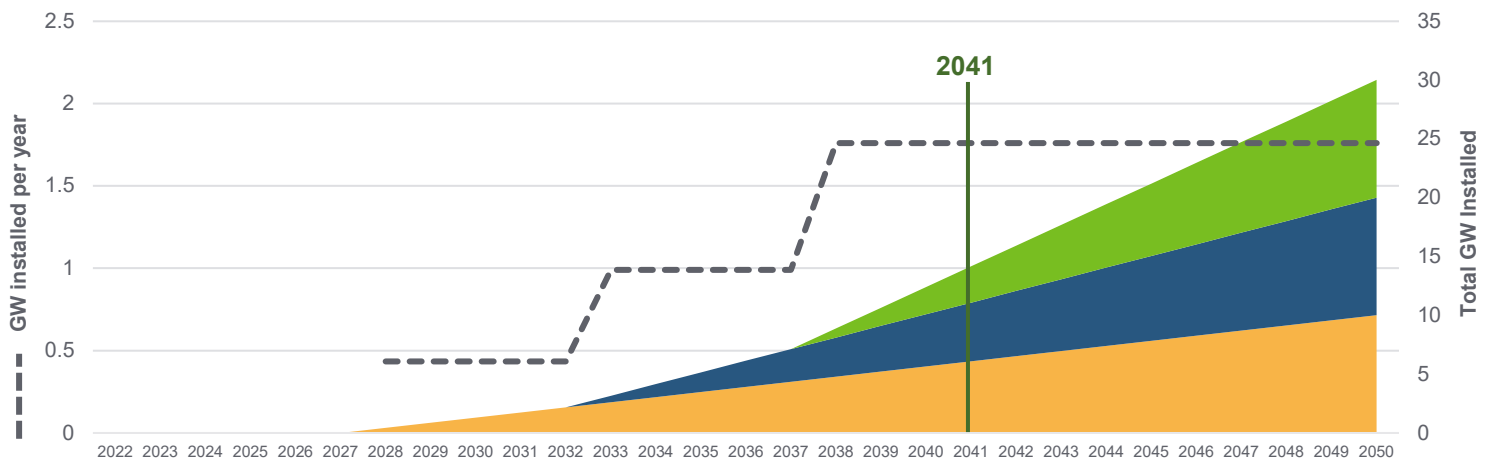
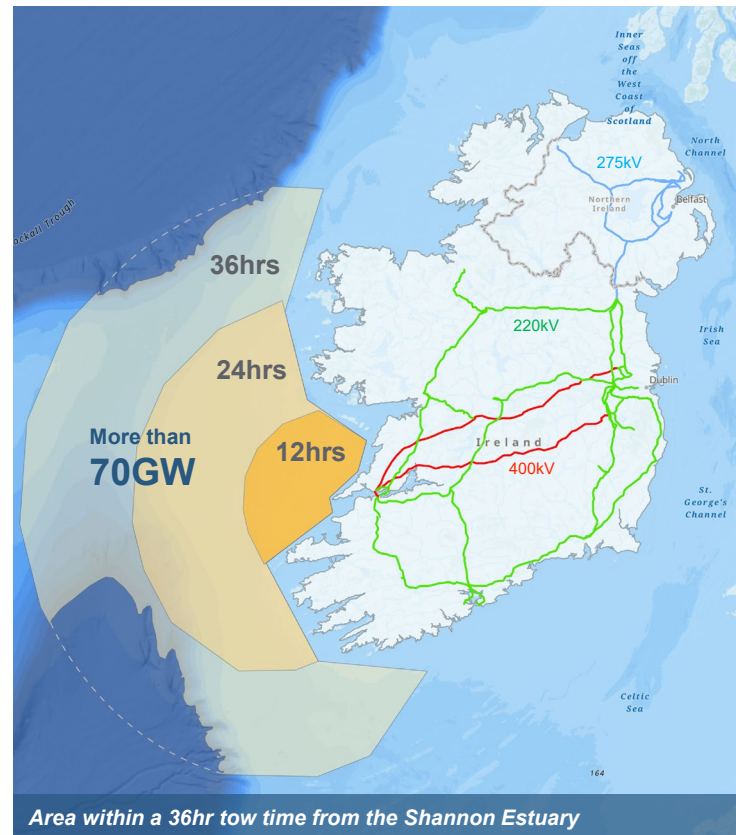
However, the vast wind energy potential within the Estuary's sights will remain just that – potential – unless this resource is connected to sources of demand.

Offshore Wind Generation Capacity to be Delivered from the Estuary

Having surveyed the wind energy potential alongside prospective sources of demand and their possible routes to market, a set of generation capacity scenarios was developed that serve as a planning basis for this Vision 2041 Review.

As shown below, the low, medium, and high scenarios reflect different generation capacities delivered from the Shannon Estuary by 2050: 10 GW, 20 GW, and 30 GW.

The three scenarios are shown as being achieved in a phased manner, which enables the formation of a long-term vision with a great degree of flexibility.



Low Scenario
10GW by 2050
CAPACITY DEMAND IN 2050
Domestic electricity & E-fuels: (5GW - 10GW)
Electricity export: (0 GW – 5 GW)
E-fuels export: (0 GW – 5 GW)
CAPACITY SUPPLY PROFILE
~400MW per year from 2028
~25-30 turbines per year

Medium Scenario
20GW by 2050
CAPACITY DEMAND IN 2050
Domestic electricity & E-fuels: (5GW - 10GW)
Electricity export: (5 GW – 10 GW)
E-fuels export: (5 GW – 10 GW)
CAPACITY SUPPLY PROFILE
Increase to ~1,000MW per year from 2033
~65 turbines per year

High Scenario
30GW by 2050
CAPACITY DEMAND IN 2050
Domestic electricity & E-fuels: (5GW - 10GW)
Electricity export: (10+ GW)
E-fuels export: (10+ GW)
CAPACITY SUPPLY PROFILE
Increase to ~1,800MW per year from 2038
~120 turbines per year

Delivering Floating Offshore Wind at Scale

Uniquely Suited to Deliver

The European Commission recognises that offshore wind has the greatest scale-up potential and has stated that Europe will need up to 450 GW of offshore wind by 2050. This poses both an immense challenge to existing ports as well as generational opportunity for the establishment of purpose-built port infrastructure that will support the emerging delivery chain.

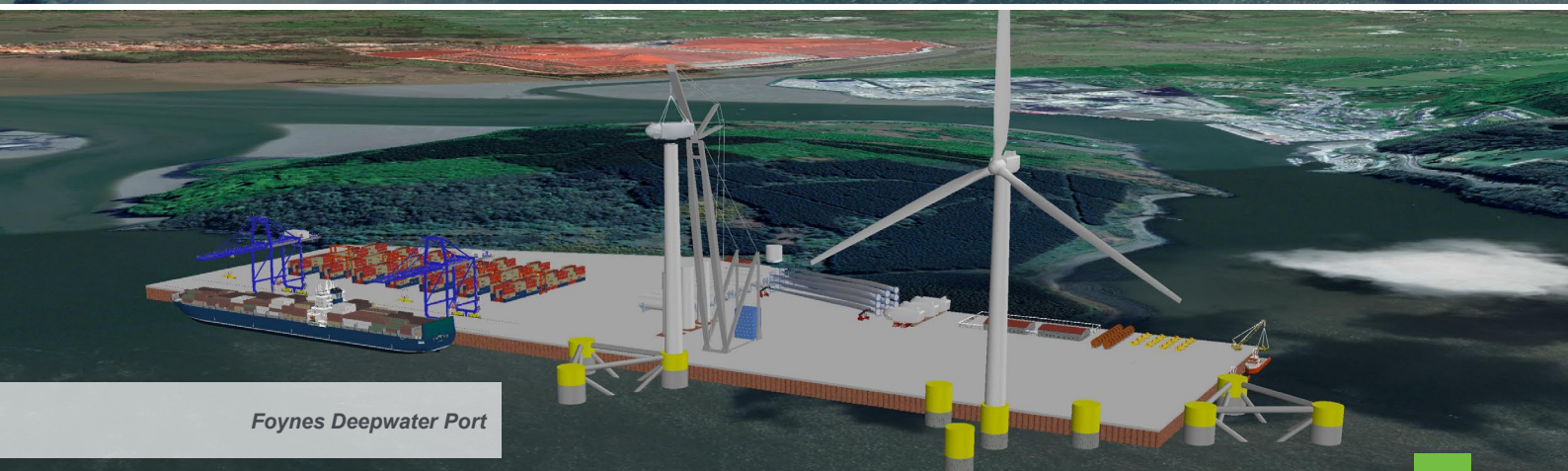
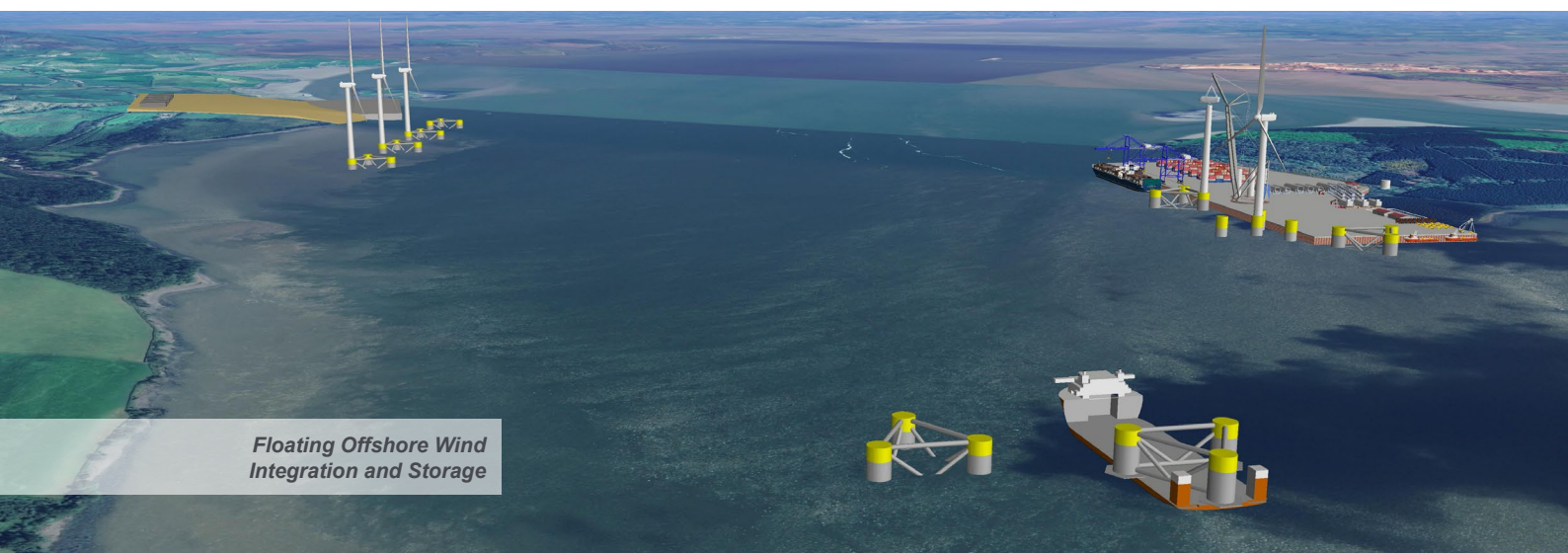
For the west coast of Ireland to play its part and host such purpose-built infrastructure, there are four elements that are crucial to enabling the delivery of floating offshore wind at scale, and as demonstrated below the Shannon Estuary is uniquely positioned to host key delivery chain activities on its shores.

Proximity to the resource. The design and installation methods for floating offshore wind turbines require that certain assembly activities take place relatively close to the wind farm. Given its central location along the west coast, the Shannon Estuary is best-positioned to serve as a key delivery and operations base for floating offshore wind.

Deep water facilities. Because a floating offshore wind turbine is completely assembled at port before wet-towing to the wind farm, the port facilities require very deep water alongside. As one of the deepest and most sheltered estuaries in the world, and unique to Ireland, the Shannon Estuary hosts multiple jetties (existing and planned) with over 15m water depth alongside.

Wet storage. The final activities in the floating wind offshore wind delivery chain require buffer storage in water (or “wet storage”). The Shannon Estuary’s unparalleled potential for deep water wet storage – totalling in the hundreds of hectares – offers a crucial risk mitigating solution towards realising the full potential of Atlantic offshore wind.

Strong grid connections. Situated at the end of Ireland’s main 400kV cross-country transmission lines and with major high-voltage substations on its shores, the Shannon Estuary is best-positioned to serve as a major receiving node for Atlantic offshore wind generated electricity.



Delivering from the Shannon Estuary

This assessment recommends the establishment of four core facilities on the Shannon Estuary to support the delivery of floating offshore wind at scale:

- 1 Turbine integration and pre-commissioning at Foynes Deepwater Port
- 2 Substructure assembly at Moneypoint
- 3 Wet storage at various locations within the Estuary
- 4 O&M base at the Port of Foynes.

The establishment of these four core facilities lays the groundwork for the potential development of additional delivery chain capabilities over the longer term, such as turbine blade manufacturing, blade recycling and miscellaneous steel fabrication.

Estuary Transmission Infrastructure: Given the existing well-connected substation facilities on its shores, the Shannon Estuary is poised to be a “go-to” destination for connecting Atlantic offshore wind into the national grid.

Multiple high voltage submarine cables will be required for 10+GW of Atlantic offshore wind power to reach the Estuary’s shores. Therefore, initial cable deployments must be planned with future expansion in mind.

Owing to its water depth and overall width, the Estuary is ideally suited to host a submarine “cable corridor” that reserves a route for multiple cables. In addition to streamlining and offering greater certainty to the windfarm development process, a designated “cable corridor” that connects to the grid through the existing transmission infrastructure offers significant opportunities for green industrial development along the Shannon Estuary.

	2022-2025	2026-2030	2031-2035	2036-2041
Route to Market		Submarine HV cable corridor Local / regional grid upgrades	Grid connections to HV interconnects Direct HVDC connection to Europe	SuperGrid connection
Estuary Facilities	Substations upgrades and expansions	Foynes Deepwater Port Phase 1 Substructure assembly base at Moneypoint Wet storage Windfarm O&M base at Foynes	Foynes Deepwater Port Phase 2 Misc. fabrication support at Foynes Port facilities at Cahiracon Blade manufacturing at Cahiracon	Foynes Deepwater Port Phase 3 Windfarm End of Life (EOL) / recycling facilities at Cahiracon

Windfarm Developments:

Each windfarm will require a submarine HV cable solution to connect to the national (onshore & offshore) HV transmission system.

HV cable corridor through the Estuary

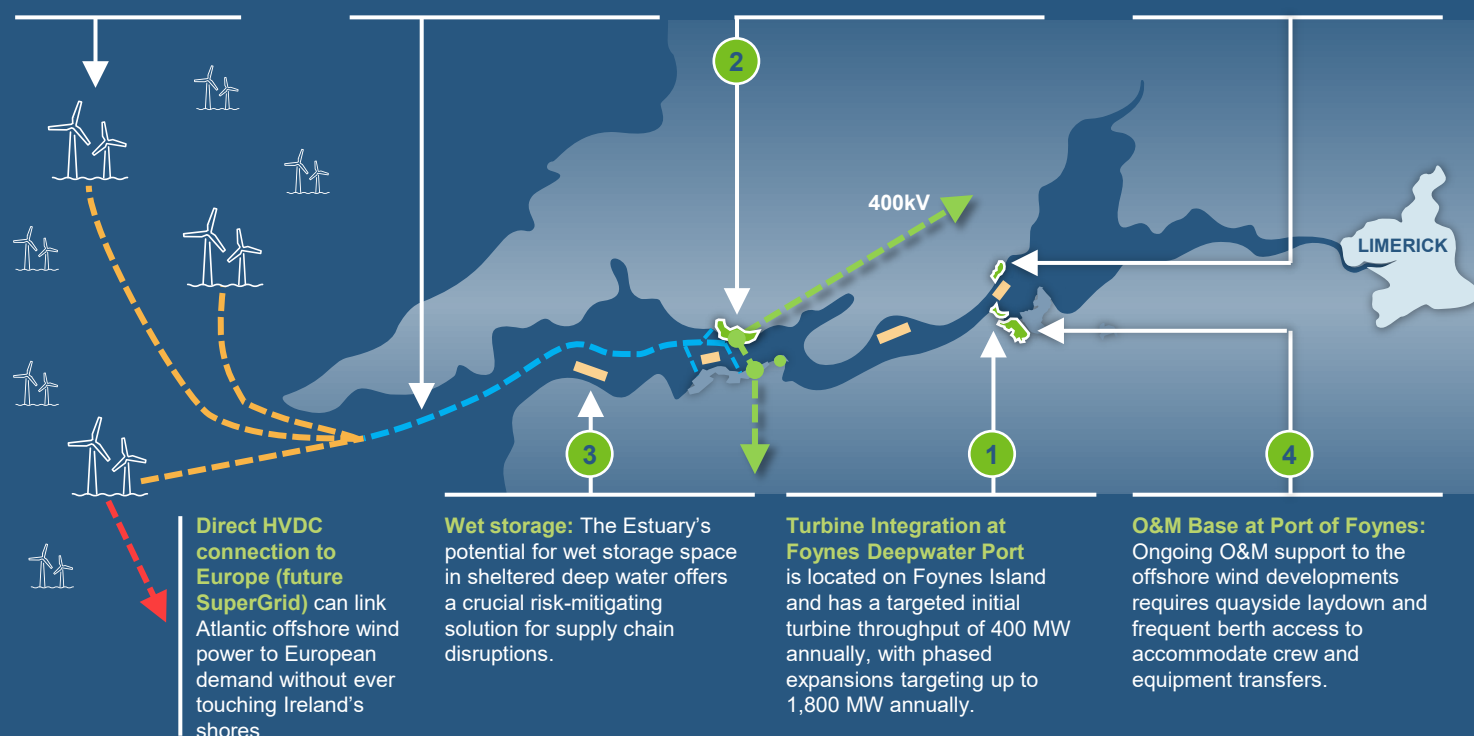
that can accommodate multiple windfarm developments can more readily leverage existing onshore grid infrastructure and minimise greenfield facilities shoreside.

Substructure Assembly Base at Moneypoint

will serve as one of the core delivery bases for floating offshore wind and would complement the turbine integration activities planned at Foynes Island.

Blade manufacturing and EOL facilities at Cahiracon:

Increases in the annual turbine delivery rate can attract additional supply chain activities, such as blade manufacturing and end-of-life recycling.



Primed to Lead Ireland's Energy Transition

The Shannon Estuary's proximity to an abundance of renewable energy from offshore wind provides the potential for significant production of net zero compatible fuels and feedstocks, such as green hydrogen and its various derivatives. In addition to transforming local industry and helping the country accelerate its transition to a net zero future, this will enhance Ireland's energy security as it reduces reliance on imported fossil fuels.

The Shannon Estuary is ideally placed to play a leading role in green industrial development as outlined below.

Proximity to vast amounts of renewable electricity.

The electricity generated by Atlantic offshore wind will likely initially travel through the existing substations and transmission infrastructure along the Shannon Estuary in order to access the national grid, offering significant opportunities for green industrial development.

Existing industries can lead Ireland's green transition.

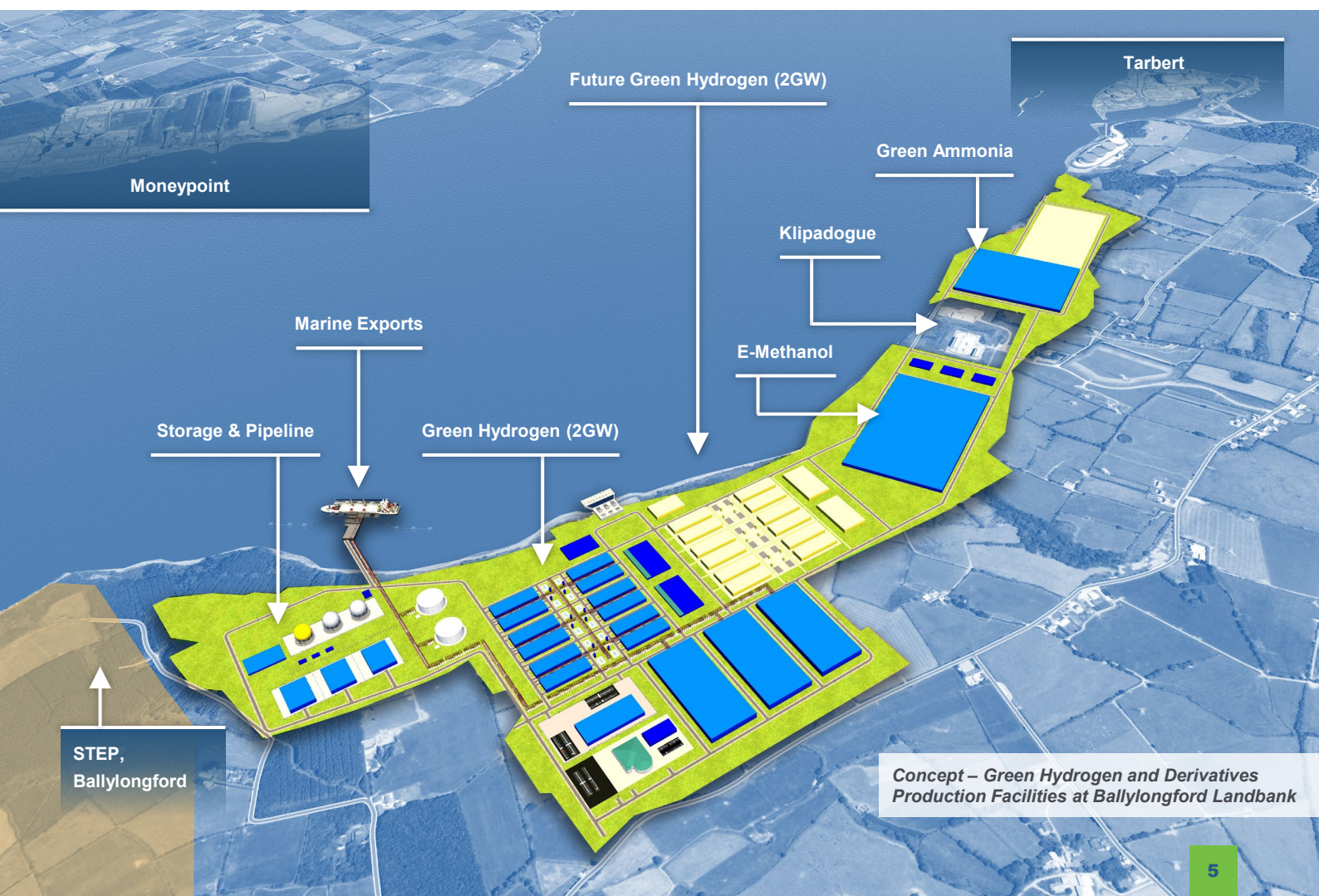
The region is already home to the largest electricity producers in the country along with some of the largest industrial energy and fuel consumers.

As important regional anchors of industry and employment, these facilities can play a vital role in supporting the achievement of Ireland's climate objectives.

Continuing its role as an energy storage hub.

The Shannon Estuary already serves as a leading energy storage hub for Ireland. Through the production and storage of green hydrogen and derivatives, along with additional grid services such as the deployment of long-duration large-scale battery storage, the Estuary will transition to a leading renewable energy storage hub. Accordingly, the Shannon Estuary will play a key role in Ireland's transition to net zero.

Access to all potential routes to market. The Shannon Estuary can readily access all potential routes to market for green hydrogen and its derivatives. Whether demand emerges from dispatchable power generation, transport fuels (for road, rail, air and sea), industrial heating or mass seaborne exports of e-fuels or green ammonia, the Shannon Estuary is uniquely poised to deliver.



Green Hydrogen Ecosystem

There is a significant potential for the development of a green hydrogen ecosystem in the Shannon Estuary. A new industrial future powered by wind energy and fuelled by green hydrogen should be an obvious goal for the region; this will require significant collaboration between industry and the Government to ensure policy is in place to achieve this goal as soon as possible and to further accelerate the country's transition to net zero.

Central to the establishment of a green hydrogen ecosystem on the Shannon Estuary is the development of a gigawatt-scale green hydrogen production facility powered by offshore wind. Among the various SDLs along the Estuary, the Ballylongford/Tarbert landbank emerges as an ideal location for such a facility considering the availability of land, its access to water, and its proximity to existing electrical grid and potential new gas grid.

Green hydrogen produced along the Estuary could be trucked or piped directly to industries and fuelling stations

as demand emerges around the region, and it could also be further processed into ammonia for domestic production of fertilizer or for seaborne export to European markets as a hydrogen carrier.

E-methanol, which is produced from green hydrogen and captured carbon, is a likely candidate for shipping fuel in the transition to net zero, and can also be further processed into synthetic kerosene to be used as a sustainable aviation fuel (SAF). The production of e-methanol requires a supply of carbon dioxide (CO₂), which could potentially be captured locally from the large CO₂ emitters in the region.

The availability of green hydrogen also supports the development of hyperscale datacentres along the Shannon Estuary. New renewables-powered datacentres with large scale battery storage and green hydrogen-fuelled back-up power generation can provide net zero data services without impacting the existing grid.



Moneypoint Green Atlantic

Green Hydrogen:

- Production & Storage
- Power Generation

Substructure Assembly Base

Foynes Deepwater / Cahiricon

Floating Wind Turbine Integration
Blade Manufacturing & Recycling
Innovation Hub

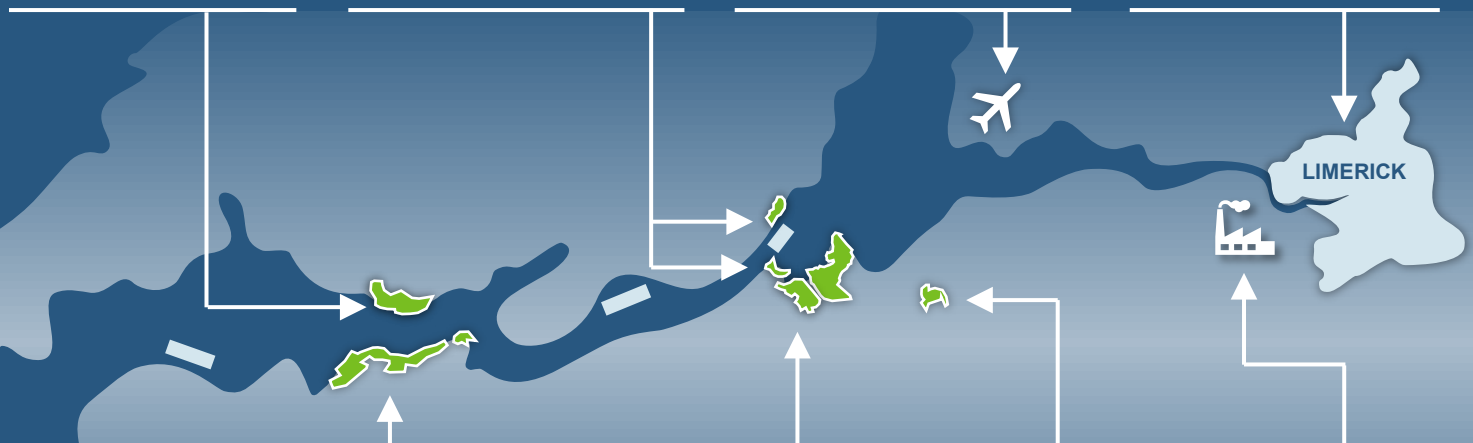
Shannon Airport

Sustainable Aviation Fuels:

- Production / Blending
- Storage / Export

Limerick City

Green Hydrogen Bus Fuelling
Green Hydrogen Home Heating
Renewable Data Centres
Long Duration Battery Storage



Ballylongford / Tarbert

Green Hydrogen:

- Production & Storage
- Pipeline / Natural Gas blending
- Power Generation

Green Ammonia:

- Production, Storage & Export
- Fertilizer Production

E-Methanol:

- Production, Storage & Export
- Sustainable Aviation Fuel Production
- Direct Air Carbon Capture

Long Duration Battery Storage
Renewable Data Centres

Port of Foynes

Green Hydrogen:

- Storage & HGV Fuelling (FCEV)

Green Ammonia:

- Storage, Export & Bunkering

E-Methanol:

- Storage, Export & Bunkering

Long Duration Battery Storage
Cold Ironing / Shore Power
Renewable Logistics Hub

Askeaton

Renewable Logistics Hub
Renewable Data Centres
Green Hydrogen Power Generation
Long Duration Battery Storage

Cement Plant

Carbon Capture

3 Expanded, Diversified, and More Sustainable Logistics

Decongesting and Decarbonising Ireland's Supply Chain

Adjacent to the world's busiest shipping routes, currently handling over 10 million tonnes annually and with water depths of up to 32m, the facilities on the Shannon Estuary are uniquely positioned to expand as an international cargo hub serving the domestic, European, and worldwide markets.

SFPC has statutory maritime jurisdiction over the entire Shannon Estuary and is identified as a Tier 1 Port at a national level and as a "core corridor port" on the EU's TEN-T network.

As the largest bulk port in the country, approximately 20% of Ireland's maritime cargo travels through the Estuary across six terminals (see below inset map). The Port of Foynes, Limerick Docks, and Shannon Airport facilities are owned and operated by SFPC. The other three facilities at Tarbert, Aghinish, and Moneypoint are managed privately but serviced by SFPC.

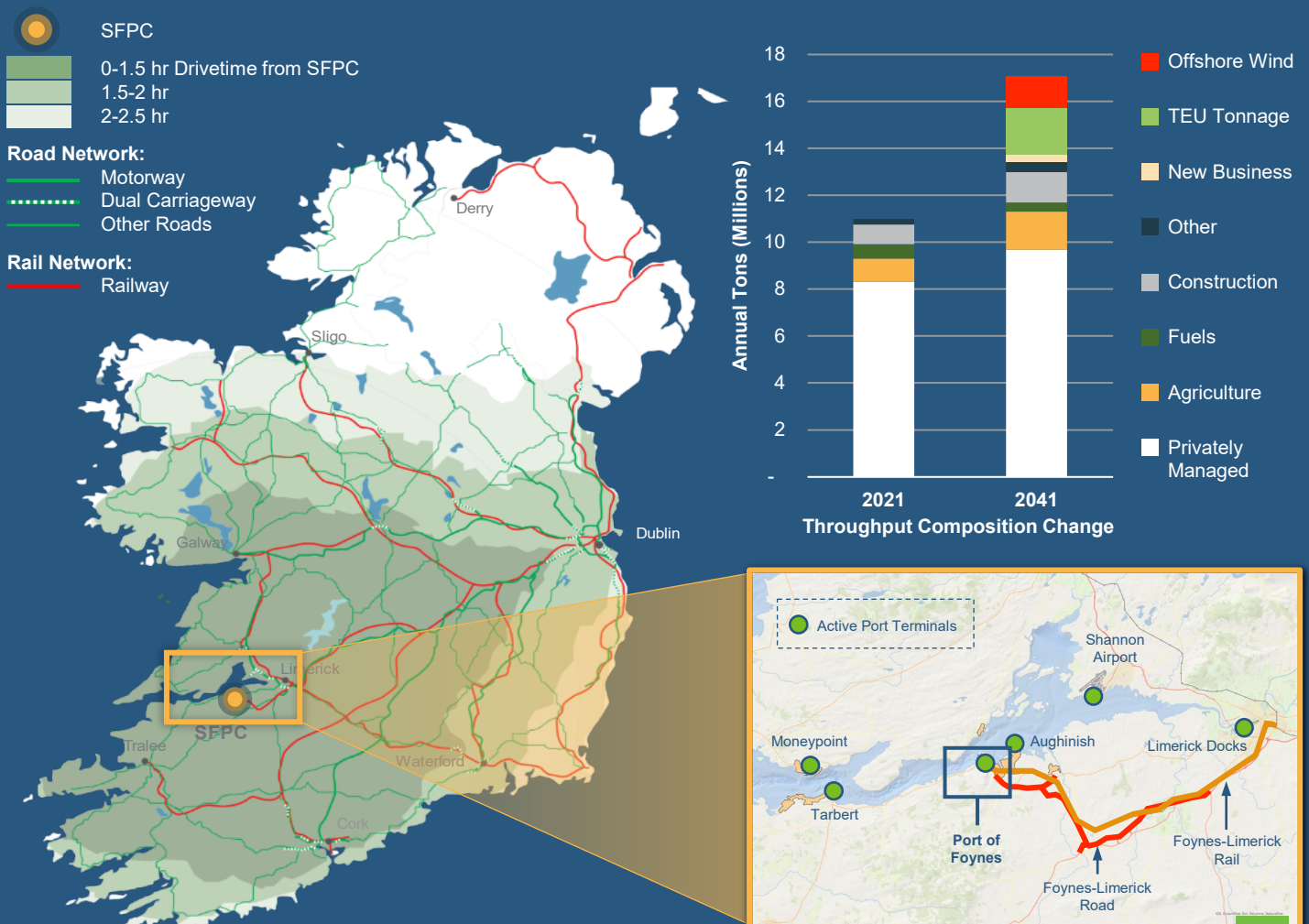
The Port of Foynes stands today within a 2.5-hour drive of 75% of Ireland's gross domestic product (GDP), a catchment that is enhanced by the delivery of the planned road schemes for the region.

Growing and Diversifying Throughput

Driven by base business growth as well as national climate objectives related to decarbonising both the energy and transport sectors, Estuary logistics is projected to see a shifting mix in operations and growth that will necessitate port expansions and ground transport upgrades.

A review of the Estuary throughput projections highlights how the Shannon Estuary can leverage its central position in the Irish supply chain and the infrastructure needs to address forecasted growth – including diversification into container services, planned offshore wind and emerging renewable industries.

The result is a projected throughput of over 17M tonnes in 2041 – a 10% increase from the Vision 2041 projections – with a greater proportion of forecasted Estuary traffic to be directly managed by SFPC.



Foynes Logistics Hub

Expansions at the Port of Foynes including the new deep water port at Foynes Island will add substantial freight capacity on the national supply chain. Importantly, this capacity at Foynes will be situated at an uncongested point in the national road and rail network due to progress made on Vision 2041 transport objectives.

Both the Limerick to Foynes rail connection and the Foynes to Limerick Road Scheme are key requirements of Vision 2041. These crucial hinterland connections together with the planned port infrastructure will transform Foynes into a major national freight and logistics hub. Its unparalleled maritime and land transport access, with its 180-hectare port estate, ensures Foynes can provide substantial capacity and resilience for the national freight sector.

Uncongested access to the national road network.

An Bord Pleanála has approved plans for the Foynes to Limerick Road, which includes the Adare bypass and a 17 km extension to the existing motorway at Patrickswell. The road scheme is required to support future throughput projections and will cement the Port of Foynes central position in the national supply chain.

Rail freight to decarbonise the national supply chain.

Irish Rail have commenced procurement for the reinstatement of the Limerick-to- Foynes rail line.

Reinstating this link will offer the opportunity to decarbonise and decongest the national supply chain through providing a rail freight option.

Additional and diversified freight capacity. In addition to becoming an integration port for floating offshore wind, the deep water port at Foynes Island will feature 400m of dedicated quay for berthing container vessels. With a targeted throughput capacity of 190,000 TEUs (equivalent to ~10% of Ireland's projected 2040 volumes), the Foynes Deepwater Port will be Ireland's only neo-Panamax-capable container terminal with rail connectivity.

Economical logistics base with further expansion potential. SFPC is developing portions of the available land at the Port of Foynes to immediately address warehouse and laydown demands, and has over 100 hectares of additional space available for businesses to establish facilities that can optimise their respective operations and supply chains. Over the coming decades, as the port diversifies to also accommodate container traffic, offshore wind operations, and new renewables-led industries, the availability of development lands within a Tier 1 Port further strengthens the offering from the Shannon Foynes Port Company.



Policy and Environmental

Supporting Policy

This Vision 2041 Review has set out to account for shifting political, environmental, and market dynamics since Vision 2041 was originally published. By far the most significant shifts relate to global climate change and the policy responses to combat its effects at a national and European level.

The European Commission's European Climate Law and Ireland's Climate Action and Low Carbon Development Act were formally enacted in 2021 and set a legally binding target of net zero carbon emissions by 2050. As outlined in Ireland's Climate Action Plan 2021, the implications of these pieces of legislation are immense and far reaching, not least with regards to the Shannon Estuary, whose naturally occurring and expansive deep waters can play a pivotal role in delivering on the objectives therein.

First, achieving "Net Zero" will require a dramatic increase in renewable electricity generation capacity, and the European Commission recognises that – among the various renewable energy sources – offshore wind has the greatest scale-up potential. Sitting on the doorstep of the vast offshore wind potential of the Atlantic Ocean, opportunity knocks for the Shannon Estuary.

Second, delivering upon national and European climate objectives will necessitate the transitioning of existing industries as well as the formation of new, renewables-based ("green") industries. This includes the production of alternative, zero carbon, and carbon-neutral combustion fuels (i.e., "e-fuels") for use by those energy consumption areas that cannot be directly electrified. Already a major energy production and storage hub and with ready access to the major routes to market for e-fuels, the Shannon Estuary is well-positioned to lead a green industrial revolution for Ireland.

Lastly, the decarbonisation of supply chains will be central to realising "Net Zero" by 2050. Here the Shannon Estuary can again play a pivotal role as host to Ireland's only Tier-1 Neo-Panamax-capable container terminal (at the planned Foynes Deepwater Port). Considering the dedicated rail connection, available green hydrogen for HGV refuelling, and availability of renewable onshore power and e-fuels for marine operations introduces a more efficient and lower carbon supply chain alternative.

Environmental Considerations

As the statutory port authority and a significant landowner, SFPC has environmental duties laid out in statute. European and national policy also requires port authorities to strike an appropriate balance between long-term protection of the environment and sustainable economic growth. The evolving opportunities identified in this Review are heavily influenced by the need for carbon emissions reduction and preparation for climate change. In positioning the Shannon Estuary for the future, SFPC will support compliance with recently enacted environmental policies and legislation but must also mitigate against and manage the environmental impacts which these opportunities may generate.

In the development of the original Vision 2041 Strategy, a Strategic Environmental Assessment (SEA) and natura impact Appropriate Assessment (AA) were performed to identify the potential environmental consequences of the Vision strategy. Such studies were also undertaken to incorporate specific strategic environmental objectives into the Vision strategy and consequently, to influence any future site-specific project developments.

Whilst this review of Vision 2041 is not a statutory plan or program for which mandatory environmental or ecological assessment is required, strategic environmental and natura impact assessments will be performed as part of a formal update to Vision 2041 to assess the potential environmental consequences of the recommendations within this Vision 2041 Review. This process will be undertaken cognisant of the findings of the environmental and ecological assessments (SEA & AA) carried out for the purpose of the Strategic Integrated Framework Plan (SIFP), its objectives for the Shannon Estuary and its wider environment.

The Irish Government has stated that "it is crucially important for Ireland to develop its offshore wind capability to meet our targets as set out in the Climate Action Plan". Floating offshore wind, associated green industry/e-fuel development and logistics infrastructure developments in the Shannon Estuary provide a significant opportunity to help achieve both Ireland's and Europe's climate objectives.

Delivering these developments within the Shannon Estuary are critical in Ireland's transition to net zero.

Successful delivery of the identified offshore wind, green industry and logistics opportunities will be transformational for the Shannon Estuary, the region and the country.

Patrick Keating, SFPC CEO

Vision 2041 Strategic Review: Shannon Estuary

Major Infrastructure Developments

1

Port of Foynes Expansions



2

Foynes Deepwater Port



3

Estuary Cable Corridor



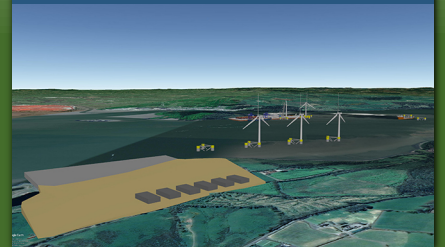
4

Green Hydrogen at Ballylongford



5

Cahiracon Port Facilities



6

Green Atlantic at Moneypoint



7

Foynes-Limerick Road



8

Foynes-Limerick Rail



LIMERICK



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