

NAVIGATING MARITIME INNOVATION

IN THE LIVERPOOL CITY REGION

LIVERPOOL CITY REGION THE UK'S LEADING MARITIME INNOVATION POWERHOUSE

Executive Summary Report
Mersey Maritime





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FOREWORD

FROM RUTH WOOD, CEO AT MERSEY MARITIME

Mersey Maritime has led an industry driven programme examining critical innovation across the maritime sector within the Liverpool City Region (LCR). Supported by the Department for Transport's 'Maritime Cluster Development Fund', the Navigating Maritime Innovation (NMI) project assesses the region's existing strengths, technological capabilities, and emerging opportunities across both the LCR and the wider North West.

Our findings identify a globally significant maritime innovation ecosystem, characterised by deep research expertise, advanced industrial capacity, a highly skilled workforce, and a strong culture of collaboration. Partners from industry, academia, and the technology sector have contributed evidence-based insights and forward-looking proposals that collectively position the LCR as one of the most innovation dense maritime regions in the United Kingdom.

The project illustrates the breadth of this regional capability, highlights key innovation assets, and promotes opportunities for collaboration and investment to both national and international audiences.

This work has been delivered in partnership with leading industry and academic organisations, including Bibby Marine, APCL Cammell Laird, Liverpool John Moores University (LJMU), Peel Ports Group, Haskoning, the Manufacturing Technology Centre (MTC), and the University of Liverpool.



This document serves as an abbreviated version or executive summary of our complete findings and report which can be accessed via this QR code.



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PROJECT OVERVIEW & FINDINGS

The Liverpool City Region (LCR) has emerged as one of the UK's most advanced, innovation dense and commercially ready maritime ecosystems. Evidence gathered through Mersey Maritime's NMI programme identifies **188 innovation projects** with a combined **estimated value of £1.9bn**, revealing a region not preparing for transformation, **but already delivering it at scale.**

The NMI programme captured critical insights from across the LCR and wider North West maritime sector. Its objective was to assess current capabilities, future ambitions, appetite for innovation, and the opportunities achievable through stronger collaboration and support. The project was structured around four core themes: **decarbonisation, advanced technology, future energy** and **strategic positioning**. Key findings of the NMI:

£1.9bn

INNOVATION PIPELINE

£1.9 billion with 57% of projects currently in delivery or during the next 12 months. 28% over the course of 12-24 months, 15% 2-5 years.

ADVANCED TECHNOLOGY MOST PREVALENT

68% of responses with AI, digitalisation, 5G, cloud integration, automation and autonomy as capability.



DECARBONISATION AND FUTURE ENERGY

21% of responses identify carbon capture and clean infrastructure directly. Hydrogen, hybrid, nuclear and e-methanol were also key areas of innovation focus. 91% of organisations open to collaborative partnerships (SMEs, primes, ports, universities, RTO).



SECTOR VERY RECEPTIVE TO COLLABORATION

91% of organisations open to collaborative partnerships (SMEs, primes, ports, universities, RTO).



MARITIME SUBSECTOR FOCUS

42% of projects target port systems; very closely followed by 41% vessel innovation (manned & unmanned).



REGIONAL PRODUCTIVITY

95% of projects linked to hiring/upskilling, tackling LCR's productivity challenge. With opportunities in port and shore side the majority.



INVESTMENT SPECTRUM

From early-stage study projects 50k-£1m (37%). Mid-range projects: £1m-£10m accounting for 21% and potentially transformational ventures identified from £10m upward of £300m, representing 17%.



FUNDING AWARENESS

A quarter of projects were unsure of funding options, identifying greater need for grant and funding initiative awareness. If known, our NMI estimate would be comfortably above £2bn.



A GLOBALLY SIGNIFICANT MARITIME ECOSYSTEM

The NMI evidence base highlights a region where:



Major corporates, SMEs, universities, regional research assets and technology providers operate in a tightly interconnected innovation environment.



Deep strengths exist in shipbuilding, offshore energy, digital technologies and AI, autonomy and automation, manufacturing, ocean science, climate modelling, clean fuels and logistics systems.



Key assets and businesses such as Peel Ports at the Port of Liverpool, APCL Cammell Laird shipyard, Stanlow Terminals and Bibby Marine sit alongside world class academic research institutions including Liverpool John Moores University, the University of Liverpool, the National Oceanography Centre (NOC) and SciTech Daresbury.

The LCR is not simply maintaining its maritime heritage, it is pioneering technologies that will shape the future of global maritime operations.



**£1.9BN MARITIME
INNOVATION &
INVESTMENT
PIPELINE**





LCR STRATEGIC POSITIONING

MARITIME ECONOMIC IMPACT

In 2025, Liverpool John Moores University commissioned a refresh of a maritime industry focused economic impact study through the Centre for Economics and Business Research (Cebr). In reference to this analysis, the NMI project findings sit at the heart of a rapidly expanding LCR maritime sector.

Key findings:

North West Maritime Economy

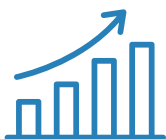


Worth
£9.03 billion
through business turnover



47,773
jobs supported

Liverpool City Region Maritime Economy



18.6% growth
in direct employment 2023-2025



£3.40 billion
direct turnover



GVA productivity of workers
67.4% & 45.2%
higher than wider LCR higher than UK average



11.3% import growth
at the Port of Liverpool year on year, above the UK average

Economic Drivers



3.38 jobs
for every job created by the sector



£1 = £1.65
turnover wider economic activity



WORLD CLASS ACADEMIC, SCIENTIFIC AND INDUSTRY CAPABILITY

The region hosts some of the UK's most advanced maritime research centres with leading expertise:

- Two world class universities (LJMU & UoL) providing leading maritime engineering, digital systems, simulation, and logistics expertise.
- Specialist maritime research projects including the Liverpool Logistics Offshore and Marine Research Institute (LOOM), the Maritime & Last Mile Place Based Impact Accelerator Account project (MaLaMi PBIAA), and the Centre for Doctoral Training in Net Zero Maritime Energy Solutions (NOMES CDT) initiative.
- National ocean science leadership through the National Oceanography Centre, with globally significant ocean data, autonomous systems, and environmental modelling.
- Advanced satellite, 5G and digital connectivity from SciTech Daresbury enabling autonomy, smart ports, vessel tracking, and real time maritime communications.
- High value advanced manufacturing capability via the Manufacturing Technology Centre.
- Global maritime expertise as the LCR is home to global leaders in maritime consultancy, professional services and shipping.

Policy Alignment

- The NMI project demonstrates that the Liverpool City Region has a highly advanced, investment ready maritime innovation ecosystem, strongly aligned with regional priorities including the LCR Freeport, the LCR Growth Plan, and national strategies such as Maritime 2050 and the Clean Maritime Plan.
- The 188-project pipeline shows strengths in decarbonisation, digital systems, clean energy and port optimisation, positioning the region as a leading testbed for UK SHORE (i.e. CMDC and ZEVI) funding opportunities.
- The findings highlight accelerating demand for advanced technical and digital skills, significant potential productivity gains, and a commercially driven pipeline capable of delivering substantial GVA uplift – which align and reinforce the LCR's trajectory as a national leader in clean, smart and globally competitive maritime innovation.

Geographic Advantage

The LCR sits at the centre of a growing Irish Sea maritime supercluster, with strategic links to Dublin, Belfast, the Isle of Man and the wider Celtic Sea. Its strengths in clean shipping, digital port systems, vessel retrofit, advanced manufacturing and offshore testing, position it as a hub for green shipping corridors, alternative fuels, autonomy, and integrated future energy deployment. Together these connected regions form a coherent, investable corridor for large scale decarbonisation, maritime innovation and cross border economic growth.



KEY THEMES



Advanced technology is the largest thematic category, representing 68% of NMI projects and £886m in innovation value.

Core Capabilities

- | | | |
|---|--|---|
|  Automation & robotics |  Predictive maintenance |  Additive manufacturing |
|  Digital twins |  5G & satellite hybrid connectivity |  Smart energy and data interoperable systems |
|  AI & machine learning |  Autonomous vessels | |

Examples of Impact

- **Armada Technologies:** Hull design and advanced technology venturi drive systems for passive air lubrication systems that reduce vessel hull resistance
- **Associated British Ports:** Port Digitalisation & Infrastructure Innovation' as a key strategic priority. The initiative centres on transitioning toward paperless operational systems
- **Maritime Transport:** Exploring smart visual connectivity and remote-release systems and driver health monitoring, embedding biometric sensing technology
- **Marlan Maritime Technologies:** Environmental intelligence, resilience to flooding and erosion, real-time sensing and port analytics, strengthening operational efficiency

STRATEGIC POSITIONING

The region is developing into the UK's leading centre for connected, autonomous and data driven maritime systems, and one of the most complete digital maritime ecosystems anywhere in the UK.

KEY THEMES



DECARBONISATION

A CAPITAL INTENSIVE, DELIVERY READY ECOSYSTEM



Decarbonisation represents 36% of total project value and nearly £700m of activity, the second largest theme in the dataset.

Key Insights:

-  21% of projects fall into this category
-  92% of project value comes from major corporates
-  SMEs contribute a strong £19m pipeline of enabling innovations
-  Nearly half of projects are looking to target future Innovate UK funding

Examples of Decarbonisation Impact

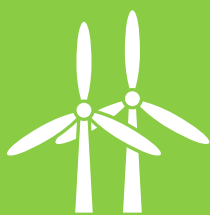
- **Stanlow Terminals:** New Energies Hub enabling national scale CO₂ carbon capture and storage, methanol, ammonia and hydrogen fuel production and logistics
- **GT Wings:** Advanced wind assisted propulsion systems delivering immediate emissions reductions for vessels
- **Carbon Happy World:** Maritime Carbon Data Hub providing unified, high-integrity emissions intelligence across vessels, terminals and logistics. An AI driven net zero platform for operational efficiency decision making across the maritime ecosystem
- **Projects focused** on shore power, vessel electrification, emissions optimisation and hybrid operations across LCR industry

STRATEGIC POSITIONING

LCR now stands as the UK's strongest candidate for designation as a national clean maritime cluster, capable of hosting the UK's flagship decarbonisation pilots and alternative fuel transition programmes.



KEY THEMES



FUTURE ENERGY

A £342M PLATFORM FOR CLEAN, SECURE, SCALABLE MARITIME ENERGY SYSTEMS



Future Energy is the third major innovation category, representing £342m across 20 key projects.

Key Insights:

-  96% of funding value from corporates
-  35% of projects currently unfunded, representing significant future opportunities
-  Strong higher education institution alignment
-  A structured pipeline of £500k-£5m deployment ready concepts

Examples of Impact

- **Grafmarine:** Distributed clean energy generation, photovoltaic maritime surfaces, supporting hybridised reduced auxiliary power use
- **Maersk:** Deployment of dual-fuel vessels like 'Laura Maersk', capable of running on green methanol. New generation fleet of methanol-enabled ships, positioning alternative fuels as a core pathway to net-zero maritime operations
- **Stena Line:** Introduction of 'New Max' RoRo vessels with hybrid systems operating on battery, biofuels, and methanol. Scalable integration of multi-fuel capability

The region is developing into the UK's leading centre for connected, autonomous and data driven maritime systems, and one of the most complete digital maritime ecosystems anywhere in the UK.

STRATEGIC POSITIONING

LCR is emerging as the UK's most promising maritime energy transition corridor with integrated assets and capability, linking clean fuel production, vessel conversion, electrified port estates and offshore renewable ecosystems across the Irish Sea and Celtic basins.



CASE STUDY APCL CAMMELL LAIRD

Innovation in Shipbuilding & Maritime Manufacturing

APCL Cammell Laird is a sovereign UK leader in shipbuilding, ship repair, and complex maritime engineering and a cornerstone of the Liverpool City Region's maritime economy. With almost two centuries of heritage, the organisation combines deepwater Mersey access, heavy-lift capacity, and one of the UK's largest enclosed construction halls, enabling the delivery of sophisticated, high-value vessels across defence, commercial, and research markets.

As a major industrial anchor, APCL Cammell Laird deploys around 50% of its economic impact locally, with £1.5bn of projected value expected to flow into the region over the coming years. The organisation continues to demonstrate how modern manufacturing, sovereign capability, and place-based innovation can drive high-quality employment and national resilience.

INNOVATION PILLARS

1. Advanced Technology

- Automated steel fabrication & digital production systems
- Methanol-capable and low-carbon vessel designs
- New autonomous and optionally crewed vessels (harbour craft, civil maritime platforms and defence-adjacent autonomous systems)

2. Decarbonisation

- Shipyard electrification programmes underway
- CMDC4 shore-power installation enabling clean-energy vessel operations at berth

3. Future Energy

- Exploration of large-scale rooftop photovoltaic systems deployment across yard infrastructure
- Strengthening energy independence and enhancing long term operational sustainability

4. Strategic Impact

- Represents 22–25% of the entire NMI innovation pipeline
- Strengthening sovereign shipbuilding capability
- Expansion opportunities in modular automated hull assembly, intelligent port integration, and autonomous marine systems

APCL Cammell Laird is setting a new benchmark for resilient, low-carbon, and digitally enabled shipbuilding, strengthening the Liverpool City Region's position as a nationally significant centre for advanced maritime manufacturing and next generation technologies.





CASE STUDY BIBBY MARINE

Pioneering Clean Vessel Innovation & Digital Maritime Transformation

Bibby Marine, part of one of the LCR's most historic maritime companies, is delivering a globally significant clean-energy vessel programme alongside a full organisational digital transformation. The development of the fully electric-Commissioning Service Operation Vessel (eCSOV) places the company at the forefront of next-generation offshore wind operations and clean vessel systems.

INNOVATION PILLARS

1. Advanced Technology

- Digital twin development for operations and asset performance
- Unified Name Space (UNS) digital backbone for interoperable data
- Real-time executive dashboards and operational automation
- Connected vessel systems enabling future-ready autonomy

2. Decarbonisation

- World-leading eCSOV vessel with 20MWh battery and methanol-ready engines
- Strategic exploration of carbon-transport vessels for CCUS systems
- Paperless systems and digital spare-parts management (330,000+ components)

3. Future Energy

- Waste-heat recovery and circular-energy concepts
- Exploration of next-generation vessel power systems
- Integration of battery, hybrid and alternative-fuel readiness

4. Strategic Impact

- Represents 18–21% of the NMI innovation pipeline
- Setting international benchmarks for clean offshore wind vessels
- Delivering a scalable digital architecture for future fleets
- Strengthening LCR's global reputation in advanced vessel systems

Bibby Marine is advancing the next generation of clean maritime operations by integrating high fidelity digital systems, cutting edge vessel engineering, and regionally focused operational expertise to accelerate the UK's transition toward low carbon maritime architectures.

CASE STUDY

PEEL PORTS GROUP

Transforming the Port of Liverpool into a Smart, Low-Carbon, Digitally Enabled Port Estate

Peel Ports is delivering one of the UK's most ambitious port-modernisation programmes, embedding digital systems, automation, and clean energy infrastructure across the estate. From private 5G networks to advanced safety systems and one of the largest port-based solar rollouts in the country, Peel Ports is positioning the Liverpool City Region as a national testbed for next-generation port innovation.

INNOVATION PILLARS

1. Advanced Technology

- HALO digital safety system and automated gate operations
- Private 5G networks and interconnected SCADA systems
- Digital twin capability for real-time monitoring and predictive maintenance
- Exploration of autonomous harbour craft, barges, and intelligent mooring systems

2. Decarbonisation

- Large-scale solar deployment (up to 31MW)
- Hydrotreated Vegetable Oil (HVO) fuel transition across port plant
- Estate-wide digital optimisation reducing vessel holding times and emissions
- Shore-side electrification and clean marine interfaces

3. Future Energy

- Renewable energy generation across the estate
- Fleet electrification, electric ship charging and future fuel bunkering
- Green shipping corridor development
- Integration of wind, PV and future hybrid energy systems

4. Strategic Impact

- Represents 9% of the entire NMI innovation pipeline
- Establishing Liverpool as a leading UK smart-port demonstrator
- Strengthening resilience through digital-enabled operations
- Enabling port-wide clean energy transition and future-fuel readiness

Peel Ports is setting a new benchmark for modern port operations by delivering safe, efficient, low carbon, and digitally enabled services, reinforcing the Liverpool City Region's role as a national leader in advanced port infrastructure.



CASE STUDY

STANLOW TERMINALS



Building the UK's Leading Clean-Fuel Logistics & CO₂ Transport Hub

Stanlow Terminals is delivering one of the UK's most strategically important clean-energy infrastructures through the development of the New Energies Hub. This includes large-scale CO₂ transport capability, low-carbon fuel import systems, ammonia and methanol handling, and hydrogen-distribution infrastructure.

INNOVATION PILLARS

1. Advanced Technology

- Digital terminal systems integrating logistics, fuel routing and CO₂ handling
- High-integrity monitoring of storage, berthing, and multi-fuel transport networks
- Technology-enabled optimisation of bulk-liquid operations

2. Decarbonisation

- CO₂ import capacity of 1-6 million tonnes per year
- Infrastructure supporting renewable methanol, SAF, and green-ammonia logistics
- Repurposing legacy fossil infrastructure for low-carbon fuels
- Enabling industrial decarbonisation across the North West

3. Future Energy

- Hydrogen distribution networks and future ammonia-to-hydrogen conversion
- Multi-fuel routing integrated with deep-water jetties and national pipeline assets
- Collaboration with DESNZ, DfT, EET Fuels, CCUS partners and industry

4. Strategic Impact

- Represents 26-29% of the total NMI innovation pipeline
- One of the LCR's most economically significant future-energy infrastructures
- National-scale enabler of clean-fuel logistics and industrial decarbonisation
- Strengthening UK energy security and supply-chain resilience

Stanlow Terminals is transforming the Liverpool City Region into the UK's leading clean energy gateway by providing the critical infrastructure required to support low carbon fuels, CO₂ transport, and next generation resilient energy systems. In doing so, the company is underpinning significant regional economic growth, strengthening industrial competitiveness, attracting new investment, and creating high value employment across the evolving clean energy supply chain.

CONCLUSION

Our findings through the NMI dataset represents:

- ✓ A £1.9bn maritime innovation pipeline which is driving national priorities
- ✓ 188 projects across automation and autonomy, AI, digital twins, clean propulsion, port electrification, vessel efficiency and next generation systems
- ✓ £886m pipeline in advanced technology
- ✓ £696m pipeline in decarbonisation programmes
- ✓ £342m pipeline in future energy systems

This pipeline aligns directly with a number of key national and local policy priorities, including:

- ✓ The Department for Transport's Maritime 2050 strategy and Clean Maritime Plan, demonstrating alignment with UK Government decarbonisation priorities
- ✓ The work of UK SHORE, including the CMDC7 and ZEVI2 competitions announced in spring 2026
- ✓ The LCR Freeport, Investment Zone, the LCR Growth Plan and the Local Skills Improvement Plan

WHY LIVERPOOL CITY REGION?

The Liverpool City Region combines strong maritime innovation, clean energy capability, advanced manufacturing and world-class research.

With nationally significant port and logistics assets, a growing innovation pipeline, and alignment to national priorities, it is well placed to drive progress across the sector.

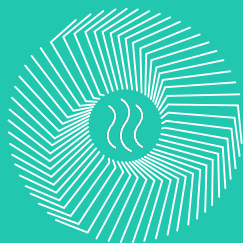
Even partial delivery of the £1.9bn NMI portfolio would accelerate innovation-led growth with UK-wide impact.

Liverpool is not simply a maritime region, it is a collaborative national launchpad for clean, digital and autonomous maritime systems.



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