marinerg-i

Marine Renewable Energy Distributed Research Infrastructure - Preparatory Phase

POLICY BRIEF

Advancing Offshore Renewable Energy Testing Infrastructure in Europe

Summary

Achieving Europe's 2050 offshore renewable energy (ORE) targets requires immediate investment in world-class testing infrastructure. Yet today, major gaps remain – hindering innovation, slowing deployment, and risking Europe's global competitiveness.

The MARINERG-i Preparatory Phase (MARINERG-i_PP) project, funded by Horizon Europe, is finalising necessary steps to establish MARINERG-i as a European Research Infrastructure Consortium (ERIC) – an integrated legal entity to advance the ORE innovation across Europe.

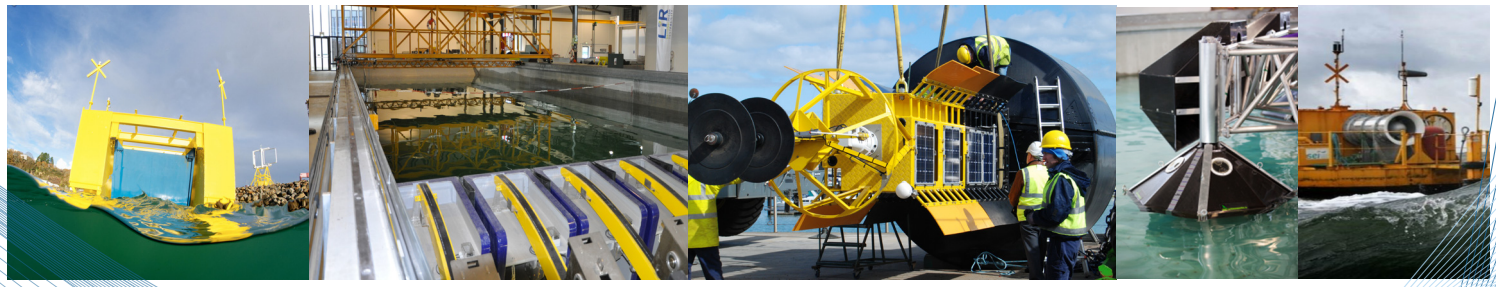
MARINERG-i builds on the success of previous initiatives such as the MaRINET and the MaRINET2 projects[1] – which delivered a high-impact, collaborative network of 45 testing infrastructures across 36 institutions, seeking to provide a permanent, fully integrated approach. Unlike these projects' temporary nature limiting long-term impact, MARINERG-i aims to create a long lasting, integrated framework that will institutionalise collaboration, improve infrastructure access, and support standardisation efforts across Europe.

As part of the preparatory work, the project has undertaken gap analysis and stakeholder engagement activities to meet industry needs. Drawing on the preliminary results, this briefing outlines three key policy recommendations to help advance ORE testing and test infrastructures in Europe:

1. Launch a dedicated funding call under FP10[2] for ORE test-infrastructure access to address the lack of funding for prospective users
2. Launch a dedicated funding call under FP10 for improving testing methodologies to establish best practices and implement standardisation across facilities
3. Support the creation of additional large-scale test infrastructures to meet the evolving needs of the ORE sector

These actions are essential to unlock the full potential of ORE and achieve a sustainable energy future in Europe. This briefing is intended for EU and national policymakers involved in research, innovation, and industrial strategy for offshore renewable energy.

1 *Funded through Framework Programme 7 and Horizon 2020 programme respectively*
2 *FP10: EU Framework Programme for Research and Innovation, scheduled for 2028-2035*



Introduction

The world is shifting to more sustainable energy sources, and offshore renewable energy (ORE) has the potential to play a major role. Recognising this, the EU has set ambitious 2050 targets: 300 GW of offshore wind and 40 GW of ocean energy. Achieving these targets requires rapid development and deployment of innovative technologies such as floating wind, wave, and tidal energy. They are also recognised as strategic net-zero technologies under the EU's Net-Zero Industry Act (NZIA), which targets at least 40% of the EU's annual deployment needs for key net-zero technologies through domestic manufacturing by 2030.

To achieve this, we must accelerate the development and commercialisation of innovative OREs in Europe. A key enabler is the availability of advanced testing capabilities, which are crucial for validating innovative technologies and reducing deployment risks. These facilities provide onshore and real-sea environments for rigorous testing, enabling the standardisation and certification processes necessary for commercial readiness.

MARINERG-i is designed to meet this need. As a long-term, sustainable partnership between top testing facilities, it provides coordinated services to support end-user needs, ensuring efficient use of European testing resources. By promoting collaboration and interoperability, MARINERG-i aligns with EU innovation goals, as reflected in its inclusion in the 2021 ESFRI Roadmap and recognition as a Distributed Research Infrastructure (DRI). The project has now entered the ESFRI roadmap preparation phase, directly supporting EU leadership in ORE.

Project Progress

Initiated in December 2023 and funded by Horizon Europe, the MARINERG-i Preparatory Phase (MARINERG-i_PP) project is undertaking the steps necessary to establish an independent legal entity dedicated to providing coordinated services for ORE testing.

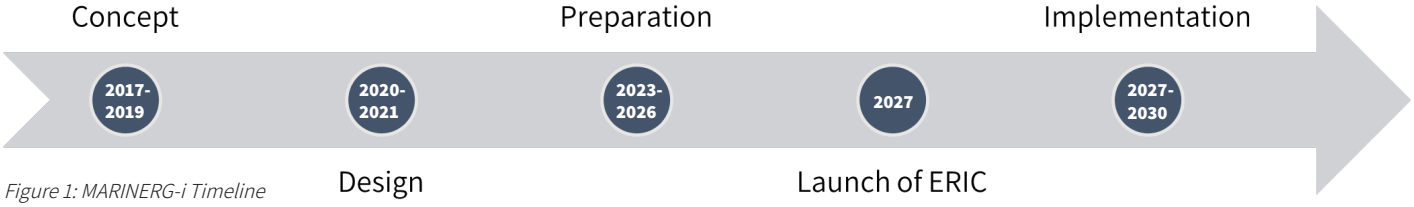


Figure 1: MARINERG-i Timeline

38 prospective participating testing facilities and 44 potential users were profiled to assess their technical capabilities and sectoral needs respectively. This analysis ensures that the proposed MARINERG-i DRI will be appropriately equipped to address user requirements.

Results indicate a strong alignment between the identified testing capacities (technology category and facility scale) of 160 MARINERG-i participating infrastructures and the demand evidenced by the percentage of applications in previous MaRINET and MaRINET2 Transnational Access Programme calls (Figures 2 and 3).

For example, the majority of MARINERG-i research infrastructures (RIs) are located in large labs (41%) and the largest number of applications (60%) in MaRINET was for large labs. In addition, 31% of MARINERG-i RIs have the capacity to test wave energy, with 41% of MaRINET applications to test wave technologies. In response to stakeholder feedback, the scope of the infrastructure has expanded to include a floating solar category, reflecting emerging trends in ORE development.

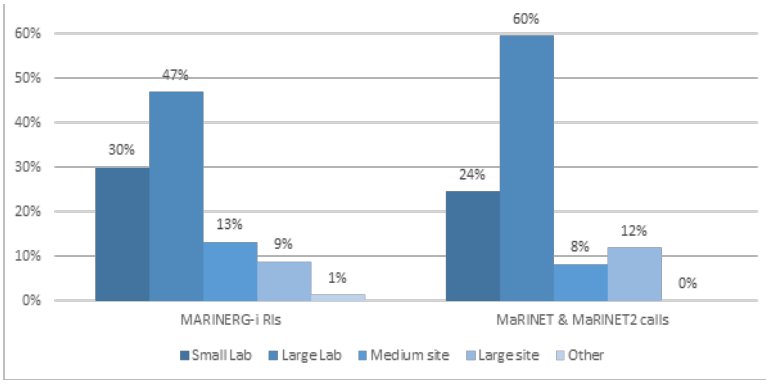


Figure 2: Comparison of MARINERG-i RI's scale with the % of applications for each scale in MaRINET calls.

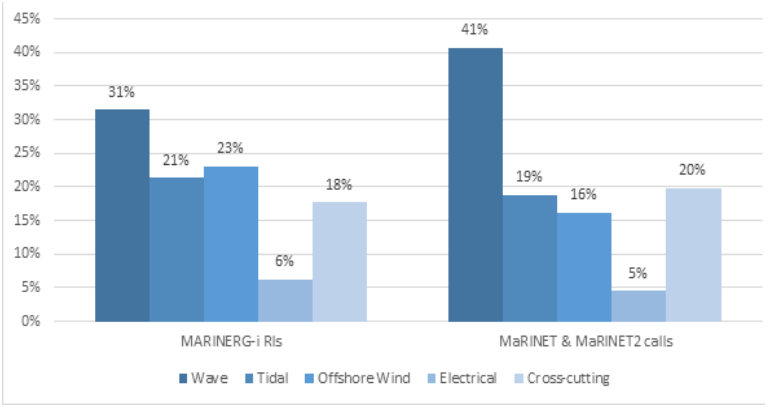


Figure 3: Comparison between % of MARINERG-i RIs with capacity per category and the % of applications for each category in MaRINET calls.

Key Findings from Stakeholder Engagement

1. Insufficient Funding for Access to Testing Facilities Across TRLs

The lack of sustained funding is a major gap restricting the use of testing facilities. Two-thirds of surveyed potential testing facility users named **the availability of funding as the main factor driving their decision to use a particular testing facility**. Moreover, 94% planned to rely at least partially on public funding for their future testing. Test facilities similarly reported that, on average, 87% of their usage was publicly funded.

With the conclusion of significant programmes such as MaRINET2 (€10.5 million), BLUEGIFT (€2.5 million), and Ocean DEMO (€13 million), along with only a handful of nationally funded access programmes, support for ORE technologies faces critical challenges. Currently, RISEnergy[3] (€15 million) is the only substantial European-funded programme supporting users' access to ORE test infrastructures. Within RISEnergy, ORE technologies must compete for resources with other renewable sectors, notably onshore wind and solar.

Despite advancements in ORE technology, many promising projects remain in early development stages due to insufficient funding for comprehensive testing and demonstration. This funding shortfall not only hinders the growth of the ORE sector but also delays the deployment of clean energy solutions, which are vital for achieving global climate goals.

2. Lack of Standardisation and Interoperability Between Test Infrastructures

The most critical gap identified during the profiling of prospective MARINERG-i participant facilities is the **lack of standardisation and best practices across test infrastructures**. This leads to the non-optimal use of resources and can result in prolonged, costly testing campaigns. Moreover, it can prevent the smooth evolution of technologies from proof of concept in the lab to full-scale testing, thus weakening investors' confidence, especially at the intermediate scale.

Developers from effectively communicating their progress or investor confidence in the validation results. Addressing this issue requires dedicated funding for collaborative projects to develop standardised testing protocols and best practices that allow interoperability between facilities; improve the quality of outcomes; drive innovation; reduce costs; and provide a clear evaluation framework.

3. Limited Availability of Full-Scale Test Sites

Unmet demand for full-scale test sites of larger devices is a major hurdle for innovative OREs and scaling up. The MARINERG-i stakeholder survey found that 40% of users will require full-scale test sites over the next 5-10 years.

As innovative ORE technologies move quickly towards commercialisation (e.g. floating offshore wind, tidal energy), there is a pressing need for more full-scale testing infrastructures within the EU. Existing facilities are often limited by their current permitting regulations, such as grid connection and height restrictions, and they have limited infrastructure to accommodate larger devices or demonstration farms. Facilities that do allow for large-scale testing are often booked for long periods in advance.

Establishing additional full-scale testing sites or mandating that future ORE farms allocate space for prototype technologies are needed to equip the sector with the essential resources to experiment with scaled-up devices. Such initiatives could pave the way for breakthroughs that improve efficiency and overall performance in ORE technologies.

3 *The Research Infrastructure Services for Renewable Energy project, funded by Horizon Europe, aims to integrate services provided through a network of energy-related research infrastructures (RIs) in both the EU and Associated Countries. Learn more: https://risenergy-project.eu*

Key Policy Recommendations

Drawing on the preliminary project results and the identified gaps, MARINERG-i has three policy recommendations. These recommendations are in line with the ocean energy sector's Strategic Research and Innovation Agenda developed by ETIP Ocean.

1. A funding call for ORE test-infrastructure access should be created under FP10 to address the lack of funding for prospective users.

MARINERG-i conducted a comprehensive market analysis, which included a user survey on testing needs for the next 5-10 years; profiling of participating facilities; and data gathered from >40 EU research institutes (RIs) over the past 10 years. Based on the results, MARINERG-i recommends creating a funding call covering 360 facility access/testing weeks over a five-year time period, with an estimated total cost of €7.6 million. Ideally, this would follow the conclusion of RISEnergy and the establishment of MARINERG-i ERIC in 2028.

2. A funding call for a research project to improve testing methodologies should be created under FP10 to establish best practices and implement standardisation across facilities.

Building on the successes of MaRINET and MaRINET2, MARINERG-i proposes a €5.3 million project to implement MARINERG-i's common scientific agenda (potentially as part of the above access programme). Research would focus on standardised testing practices and benchmarking conditions across infrastructures to promote interoperability. This would include collaboration with standard-setting bodies (IEA, IEC, ISO). Such a project should also expand services in line with industry needs, e.g. the MARINERG-i Virtual Research Environment (VRE); provision of open access data; and implementation of training courses and personnel exchange programmes to enhance collaboration and develop a world-class scientific community.

3. The creation of additional large-scale test infrastructure should be supported.

This can be achieved by providing funds for developing new or upgrading existing large-scale test sites. Regulatory reforms and harmonisation of permitting procedures in Member States should be encouraged to streamline the process of building or upgrading test sites (e.g., strengthening grid connection for higher capacity). An additional tool could be mandating that future ORE farms allocate space for test devices of different ORE technologies.

Conclusion

In its initial phase, the MARINERG-i_PP project has identified key gaps and corresponding policy recommendations. These include improving access to funding for test facilities, research on testing methodologies and standardisation, and supporting the development of larger-scale test infrastructures. The project consortium is convinced that implementing these recommendations will significantly accelerate the commercialisation of innovative OREs in Europe. This will not only strengthen the global competitiveness of European industry and reinforce its technological leadership in offshore renewables, but also speed up progress toward the EU's 2050 net-zero targets and its green transition.

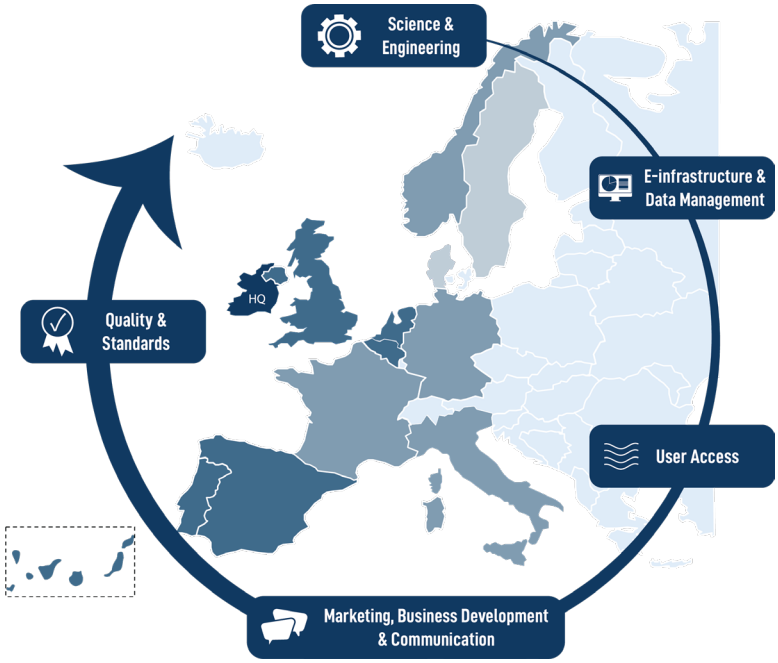
About MARINERG-i

Offshore Renewable Energy (ORE) is crucial for sustainable energy. MARINERG-i, a new Distributed Research Infrastructure (DRI) of testing facilities, aims to accelerate development of the ORE sector.

Building on past projects like MaRINET and MaRINET2, MARINERG-i will provide long-term, integrated support to deliver joint research for improving the quality of testing outcomes, a functional network, and a high demand access programme. Recognised by the EU and funded by Horizon Europe, the MARINERG-i Preparatory Phase (MARINERG-i_PP) project (2023-2026) will complete the preparation phase work necessary to formally establish a European Research Infrastructure Consortium (ERIC) to offer services.

The mission:

- Technical de-risking and increasing investor confidence through the development and implementation of best practices; quality metrics; standards.
- Leverage existing local knowledge and capabilities to accelerate the development of the Offshore Renewable Energy industry.
- Inform national and EU policy and investment strategies to capitalise on leadership in the Offshore Renewable Energy sector.



Keep in touch!

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Funded by the European Union

The MARINERG-i_PP project has received funding from the Horizon Europe INFRADEV Programme under grant agreement No. 101128668