FACT SHEET

Demand-driven research for the energy transition

The Living Lab 70 GW Offshore Wind

Together with the wider TEN.efzn programme, the Living Lab 70 GW Offshore Wind research platform creates a unique research and innovation ecosystem. For the first time, a field with considerable scientific potential is being explored through a demand-driven, holistic approach to the expansion of wind energy in the German North Sea planned by 2045. Across five innovation areas, more than 20 subprojects are developing scientifically sound, practical solutions to technical, environmental and societal challenges. The work provides an evidence-based, practical foundation for sustainable decisions on large-scale offshore wind deployment, supporting long-term public acceptance and technological innovation.

- **Strategies for the sustainable expansion of offshore wind energy.**
- **Transdisciplinary collaboration with diverse stakeholder groups to address complex challenges.**

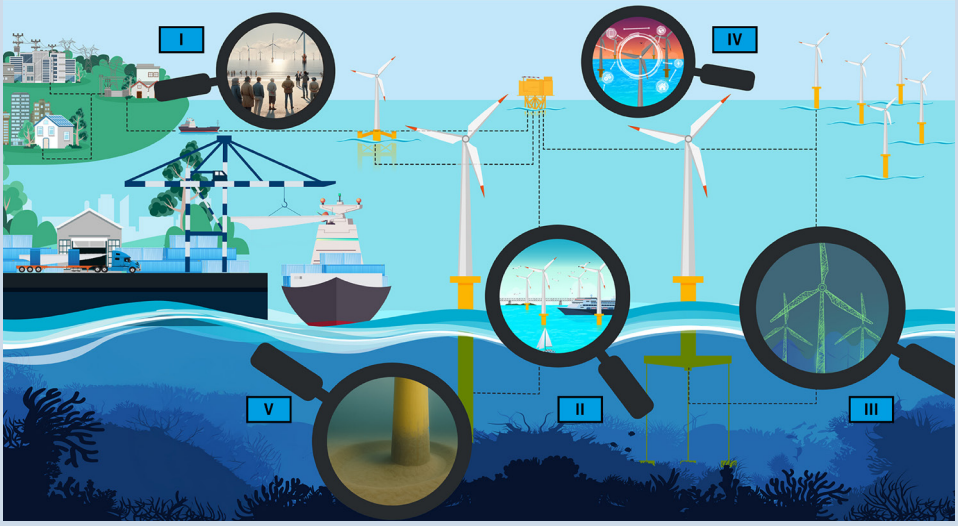
- **Seven research partners from different fields.**
- **Joint approaches to technical, economic, environmental and social questions.**

▸ Why is offshore wind expansion in the German Bight necessary? Reaching the target of 70 GW of offshore wind capacity by 2045 requires innovative solutions across the entire value chain. The Living Lab investigates how existing and future wind farms can be planned and operated more efficiently, and how marine space can be used and protected effectively and sustainably, taking account of competing interests such as fishing, shipping and nature conservation.

▸ What is a living lab? A living lab is a space for research and experimentation in which real societal challenges are addressed through interdisciplinary and transdisciplinary processes. Scientific methods are combined with the joint development of practical solutions involving stakeholders from public administration, industry and civil society. Projects are planned through co-design, implemented through co-production, and their results assessed through co-evaluation.

The five innovation areas (IA) in the Living Lab

IA I analyses societal conflicts, opportunities and success factors associated with offshore wind expansion.
IA II uses models to develop sustainable expansion strategies and maritime spatial planning in the German Bight.
IA III and **IA IV** conduct measurement campaigns and simulations to analyse turbine ageing, extend service life and improve control of new turbines.
IA V uses research vessels and other methods to investigate the effects of offshore wind energy on the marine environment.



- **Germany plans to expand offshore wind capacity to 70 GW by 2045.**
- **The density of turbines requires new concepts and models across a wide range of fields.**

► Offshore wind expansion is a key component of the energy transition. However, existing plans face spatial, technical and societal constraints. Integrated solutions are needed that give equal consideration to environmental, economic and social aspects.

► Wakes, dynamic loads, maintenance, subsequent use, and the cascading effects of marine processes and dynamics are just some of the factors that require new models and simulations. At the same time, innovative and transdisciplinary approaches are needed to reconcile diverse interests in the use of marine space and achieve the highest possible level of public acceptance.

► It remains an open question how large-scale offshore wind expansion will affect marine ecosystems in the long term and what socioeconomic effects can be expected in coastal regions. Standards for sustainable planning and operation also need to be developed.

- **Research questions must be revisited and approaches agreed through co-design with stakeholders from public administration, industry and civil society.**

► The challenges and knowledge gaps associated with accelerated wind energy expansion also reflect shortcomings in existing approaches to interdisciplinary and transdisciplinary collaboration. In particular, involving civil society and fostering its sense of ownership of wind energy infrastructure development and the associated shared uses requires approaches and solutions that address both technical and social issues. The following partners work together in the Living Lab 70 GW Offshore Wind: the University of Oldenburg, Leibniz University Hannover, the Fraunhofer Institute for Wind Energy Systems, the Sociological Research Institute Göttingen, the Helmholtz-Zentrum Hereon and Technische Universität Braunschweig and RWE as an industry partner.

► Relevant stakeholders are involved from an early stage. Regular stakeholder workshops and other formats for communication and exchange ensure that co-design, co-production and co-evaluation remain central to the work, as essential elements of a living lab. Knowledge transfer, education and communication activities will support the Living Lab's work.

- **The project's outputs and impact are supported by systematic knowledge transfer to diverse stakeholder groups.**

► Research findings are communicated through fact sheets, policy briefs, concept papers, databases, tools and scientific publications. Through its members' extensive involvement in international bodies, the Living Lab has strong networks and helps shape research agendas and international collaborations. Through the TEN.efzn consortium, the Living Lab is closely connected to efzn Transfer and actively contributes to its work in communication, innovation and continuing education (efzn Academy).

Web page Living Lab 70 GW Offshore Wind

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