Offshore Wind R&I: The now and the future

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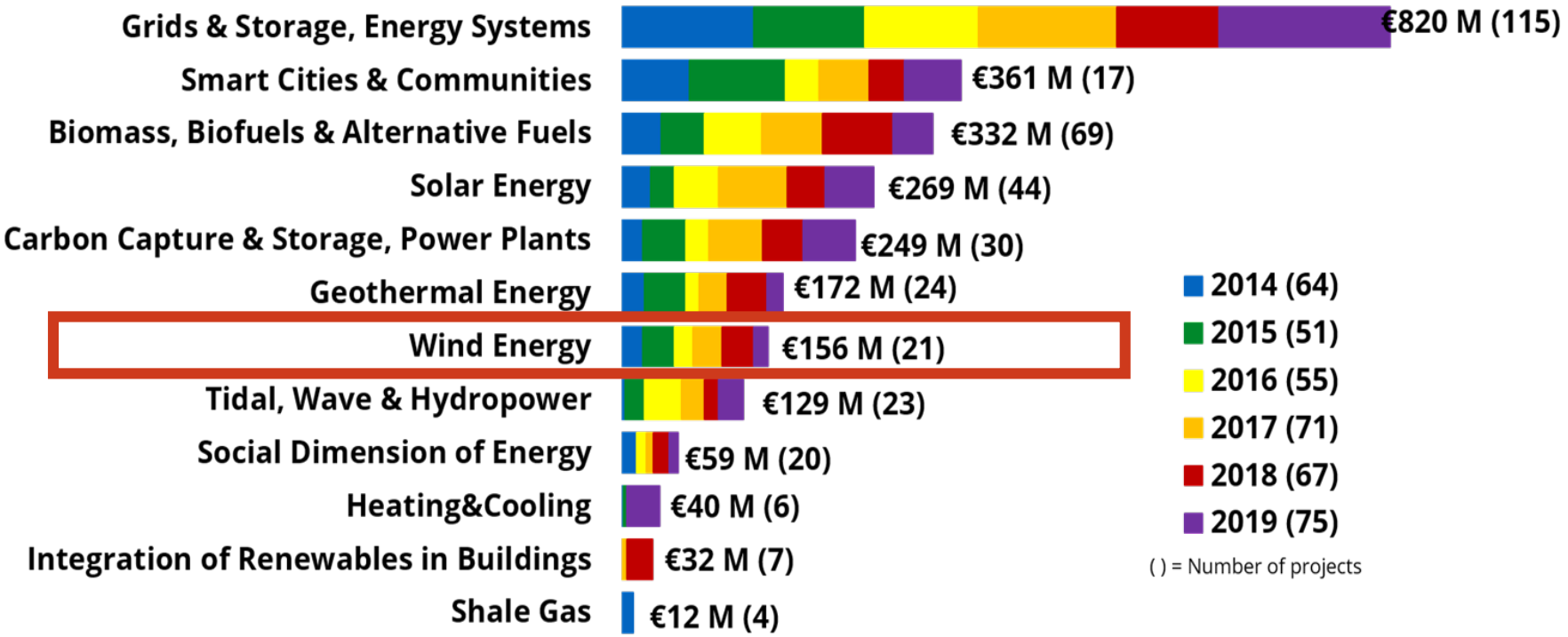
Current state-of-affairs

Numbers and figures in wind energy

European Commission

H2020 Energy Projects*

In total over **380 projects (€2.6B)**



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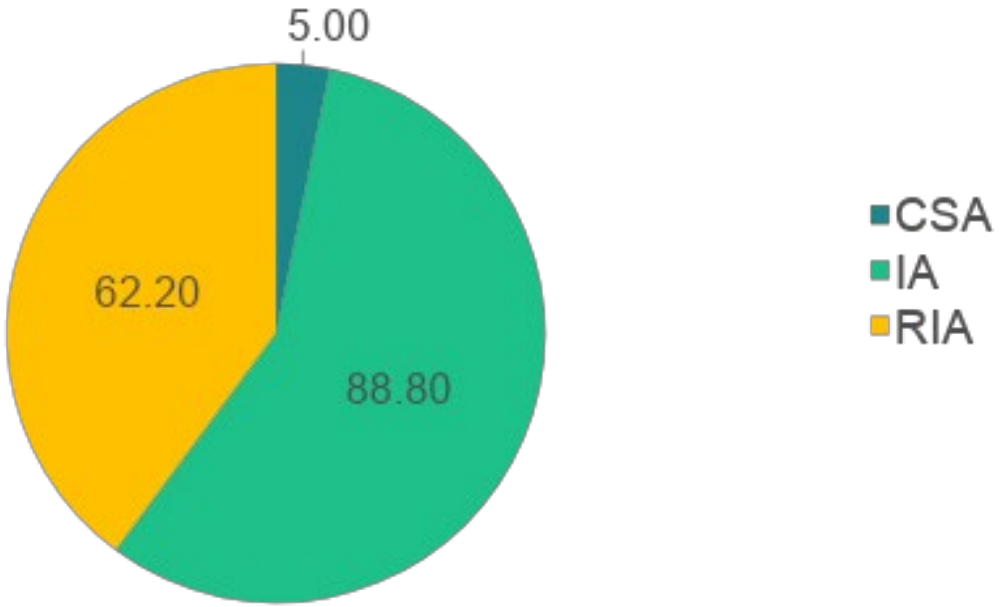
*numbers from INEA

H2020 Wind Energy Projects*

21 projects: 12 RIA - 6 IA - 3 CSA
EU funding: €156M



EU funds of the 21 projects, per type of action (Mio Euro)

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*numbers from INEA

Closing Horizons 2020

Last calls of this Work Programme

European Commission

Closing calls

- Secure, clean and efficient energy programme
  - LC-SC3-RES-31-2020 Offshore wind basic science and balance of plant
  - LC-SC3-RES-19-2020 Demonstration of innovative technologies for floating wind farms
- NMBP Programme
  - DT-FOF-10-2020 Pilot lines for large-part high-precision manufacturing
  - LC-NMBP-31-2020 Materials for offshore energy
- General topics
  - LC-SC3-RES-1-2019-2020 Developing the next generation of renewable energy technologies
  - H2020-EIC-SMEInst-2018-2020 EIC Accelerator pilot

LC-SC3-RES-31-2020: Offshore wind basic science and balance of plant

RIA

Final TRL: 4-5

Budget: 8 M€

EU-funding: 2-4 M€/project

Expected impacts:

- Decrease Levelised Cost of Energy
- Increase Market Value of Wind Power

Deadline: 21-04-2020

- **Specific challenge:** Cost reductions are required to achieve an increase of offshore wind power to the energy mix by 2030. Need for better knowledge of basic wind energy science and related areas.
- **Scope:**
  1. Atmospheric multi-scale flow modelling
  2. Understanding and modelling key uncertainties and physical phenomena of offshore wind energy design and operation
  3. High performance computing and digitalisation
  4. Development and validation of models of structural damage and degradation for offshore wind turbines and/or for their components as functions of loads and environment;
  5. Numerical and test methods for accurate assessment of system and component reliability when introducing new materials and technologies;
  6. Other offshore balance of plant aspects related to the manufacturing, construction, installation and/or decommissioning of large-scale wind turbines.

LC-SC3-RES-19-2020: Demonstration of innovative technologies for floating wind farms

IA

Final TRL: 6-8

Budget: 25 M€

EU-funding: up to 25 M€/project

Expected impacts:

- Drive down the costs of floating wind farms and to fully commercialise and industrialise the technology
- Decrease LCOE and environmental impact while increasing market value of floating wind farms

Deadline: 11-12-2019

- **Specific challenge:** The first commercial-scale floating wind farm has recently come into operation and other floating wind farms initiatives are ongoing. Floating wind farms have significant potential but further efforts are needed to drive the costs down and to fully commercialise and industrialise the technology.

- **Scope:**
  1. Proposals will demonstrate floating offshore wind innovations (blades, floaters, moorings, electrical subsystems and cabling, monitoring systems, and/or integrated systems, including whole wind turbines conceived for floating offshore), in view of scaling-up power rating to >10 MW.
  2. Different sea and weather conditions shall be considered.
  3. Proposals shall improve industrial design and manufacturing processes, installation methods and operation & maintenance.

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DT-FOF-10-2020: Pilot lines for large-part high-precision manufacturing

IA

Final TRL: 7

Budget: 100 M€

EU-funding: up to 12-15 M€/project

50% funding!

Expected impacts:

- Reduction of production cost by at least 15%
- Reduction of production time by at least 20%
- Higher or similar precision level
- Reduction of the scrap generated by at least 20%
- Reduction of environmental impact and safety hazards

Deadline: 05-02-2020

- **Specific challenge:** Recent research in the large-scale parts production has delivered high quality demonstrators, although generally quite specific and with a too limited impact. Full-scale, reconfigurable, modular and flexible pilot lines including different processing facilities, thermal treatment, control and characterisation could demonstrate comprehensive highly visible prototypes.

- **Scope:**
  1. The proposals should deliver reliable high-precision processes to manufacture and repair innovative large-scale parts, such as wind turbine blades, …..
  2. Proposals should cover demonstration activities in industrial settings building on the outcomes of the Factories of the Future programme.

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LC-NMBP-31-2020: Materials for offshore energy

IA

Final TRL: 6

Budget: 20 M€

EU-funding: up to 5-7 M€/project

70% funding!

Expected impacts:

- Reduction of life cycle costs
- Optimised materials cost or improved durability
- LCOE offshore wind <10 ct€/kWh Higher or similar precision level
- Reduction of environmental impact by 35% (LCA and eco-design)

Deadline: 2-stage

12-12-2019/14-05-2020

- **Specific challenge:** The challenge is to improve the operational performance of the next generation of offshore wind energy generators (larger than 8MW) and tidal stream power generators through better performance of their functional (e.g. wind energy generator rotor blades) and/or structural components (e.g. floating or bottom fixed base structure).

- **Scope:**
  1. Develop new and/or improved material solutions or improvements by a combination of materials, technologies and design of structural and functional components. This should result in one or more of the following properties:
     - Increased durability and reliability and reduced maintenance requirements
     - Smart material functionality and/or the possibility to use embedded sensors for online monitoring of performance and/or structural health monitoring
     - Lightweight (mainly applicable to wind energy);
     - Increased recyclability with respect to current state-of-the-art;
     - Materials should be easy to repair.

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LC-SC3-RES-1-2019-2020: Developing the next generation of renewable energy technologies

RIA

Final TRL: 3-4

Budget: 45 M€

EU-funding: 2-4 M€/project

Expected impacts:

- acceleration of technologies
- cost reductions
- advance knowledge

Deadline: 21-04-2020

- **Specific challenge:** Bringing new energy conversions, new renewable energy concepts and innovative renewable energy uses faster to commercialisation is challenging.

- **Scope:**
  1. Support will be given to activities which focus on converting renewable energy sources into an energy vector, or the direct application of renewable energy sources.
  2. This topic calls for bottom-up proposals addressing any renewable technology currently in the early phases of research.
  3. Activities also might include energy materials, catalysts, enzymes, microorganisms, models, tools and equipment, as long as those are strictly connected to the energy conversion process.

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H2020-EIC-SMEInst-2018-2020: EIC Accelerator pilot

Final TRL: 8 (-9)

Budget: 634 M€

EU-funding:

- **Grant max 2.5 M€/project**
- **Equity max 15 M€/project**

Expected impacts:

- acceleration of technologies
- cost reductions
- advance knowledge

Deadline: 8/1, 18/3, 19/5 and 7/10 2020

- **Scope:**
  1. supports high-risk, high-potential small and medium-sized enterprises to develop and bring to market new products, services and business models that could drive economic growth.
  2. for innovators with ground-breaking concepts that could shape new markets or disrupt existing ones in Europe and worldwide.
  3. Only for individual for-profit SMEs!
  4. Phase 2 offers a grant only support to SMEs in need of one last push before the scaling-up phase; and it will offer blended finance (combining grant and equity) to SMEs looking to further develop their idea.
  5. https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-eic_en.pdf

Exploring Other Possibilities

There is more beyond RIA, IA, CSA…

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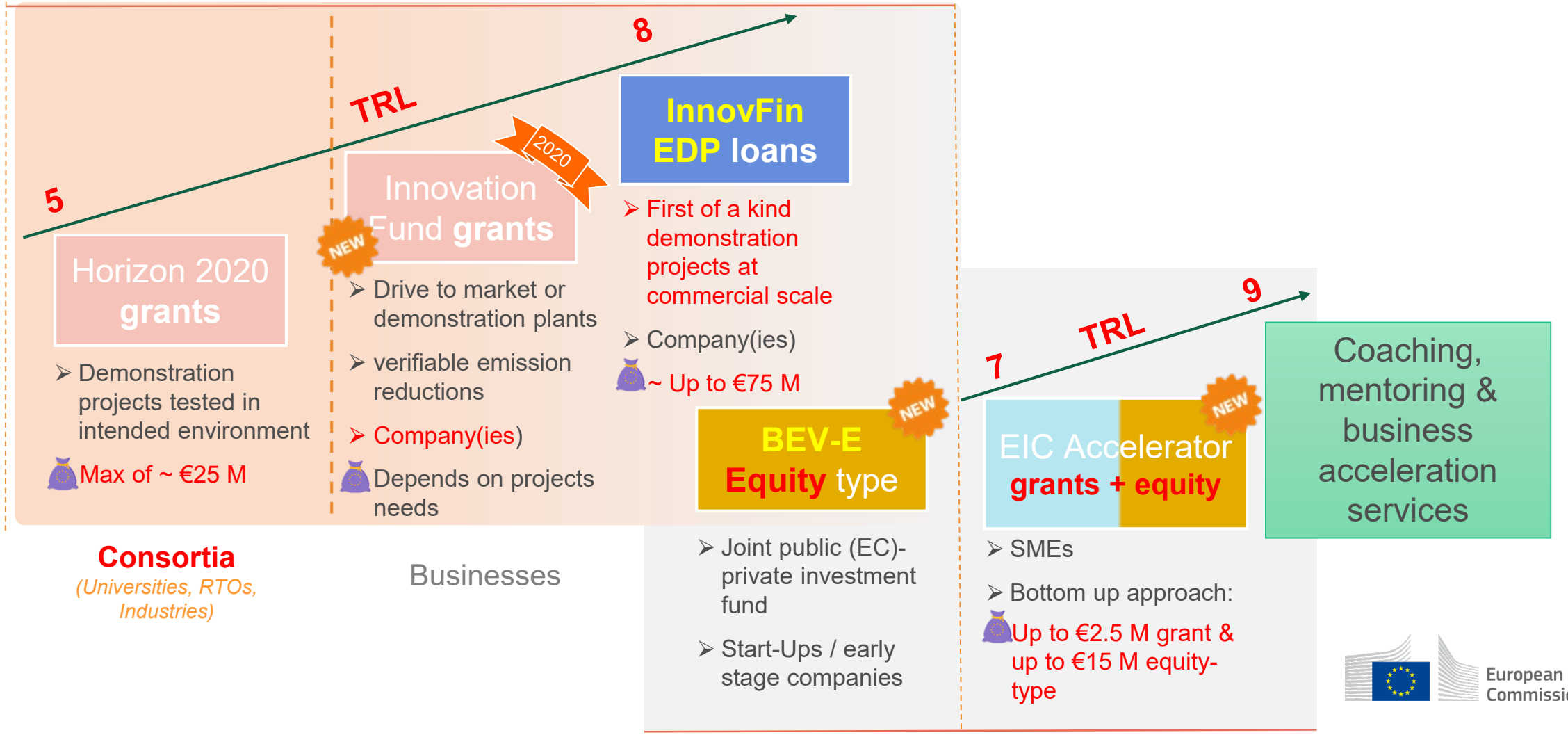
Other EU funding options for clean energy innovation



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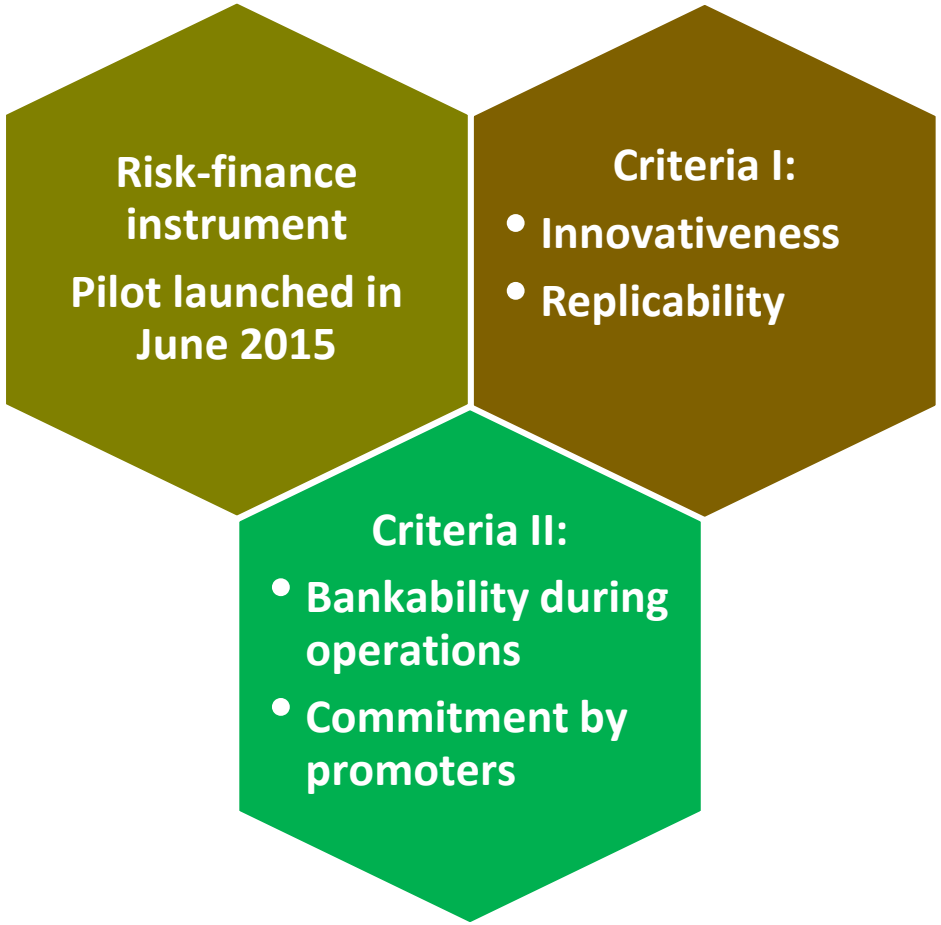
InnoVFin
Energy Demo Projects



Targets first-of-a-kind demonstrations of innovative technologies at commercial scale

Support via **loans and quasi-equity**

Budget: over € 700M

- Energy Challenge: **€** 125M
- Access to Risk Finance: **€** 165M
- Undisbursed NER300: over **€** 436M

Current Portfolio: 7 projects

- **€ 186M of EU support (Jan 2020)**
- € 393M project costs

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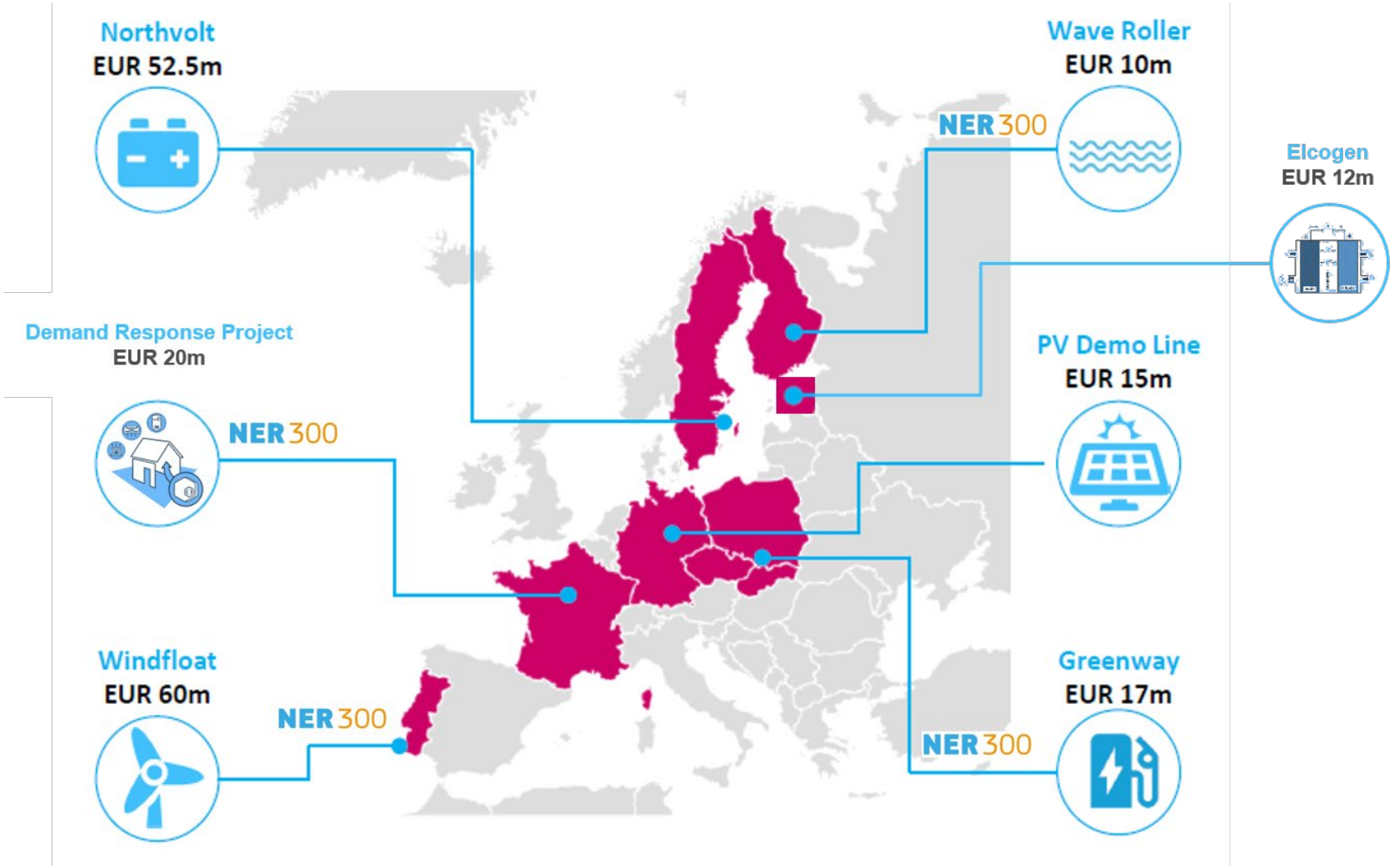
Portfolio



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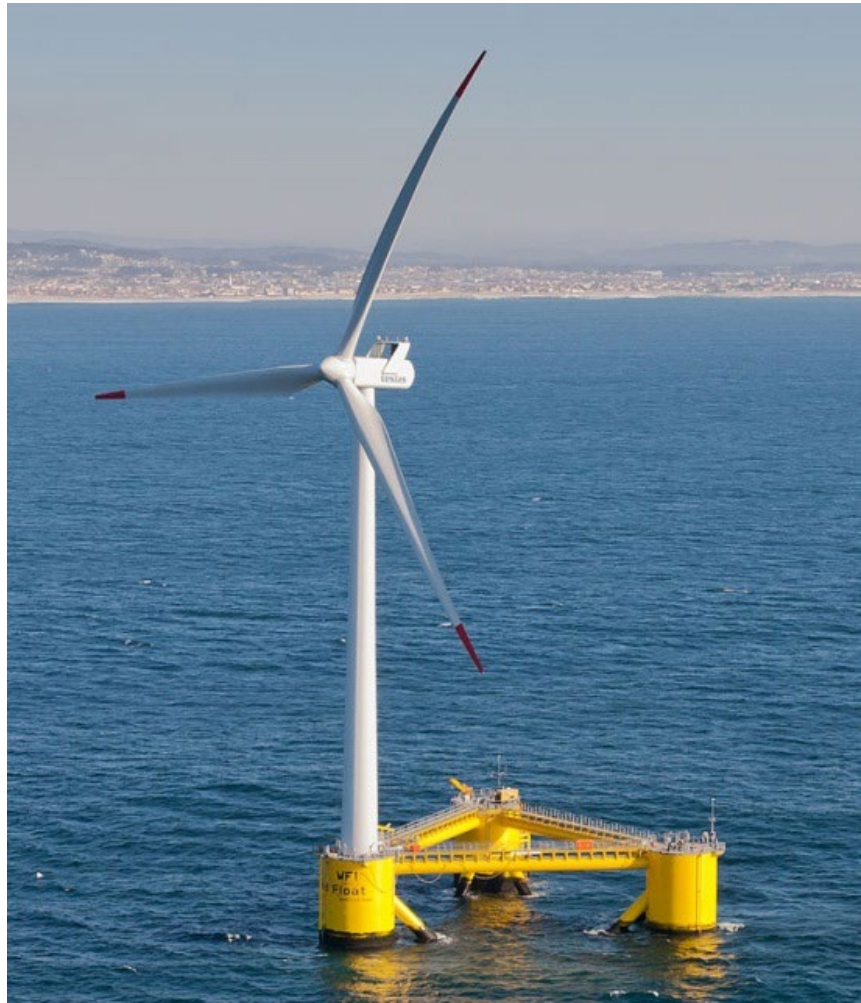
WindFloat

- **Project characteristics**
  - Floating offshore wind farm in Portugal
  - Semi-submersible floating structure
  - 3 x 8,3 MW
  - 20 km from shore, water depth 85-100 m
- **Risks and opportunities**
  - Risks: new turbine, upscaling, structural integrity, wind resources
  - Opportunities: deep seas, assembly in port, transport by tugboats
- **Technological development**
  - 2011-2014 – FP7 "DEMOWFLOAT" project: pilot installation of 2 MW
- **Finance**
  - Support: €60M InnovFin EDP loan + €30M NER300 grant
  - Total project cost: €131M



The road ahead

What will Horizons Europe bring us?

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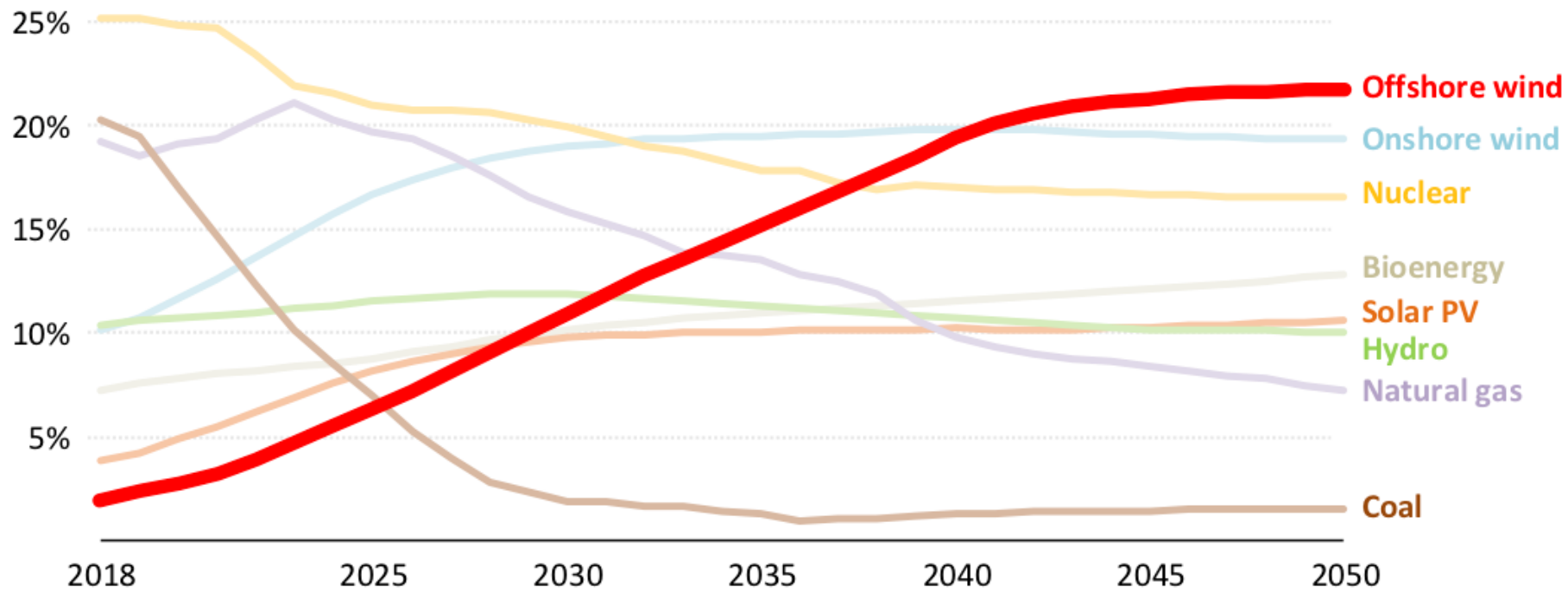
Circular Economy · Sustainability · Carbon Neutrality by 2050 · Global Competitiveness with Global Consequences

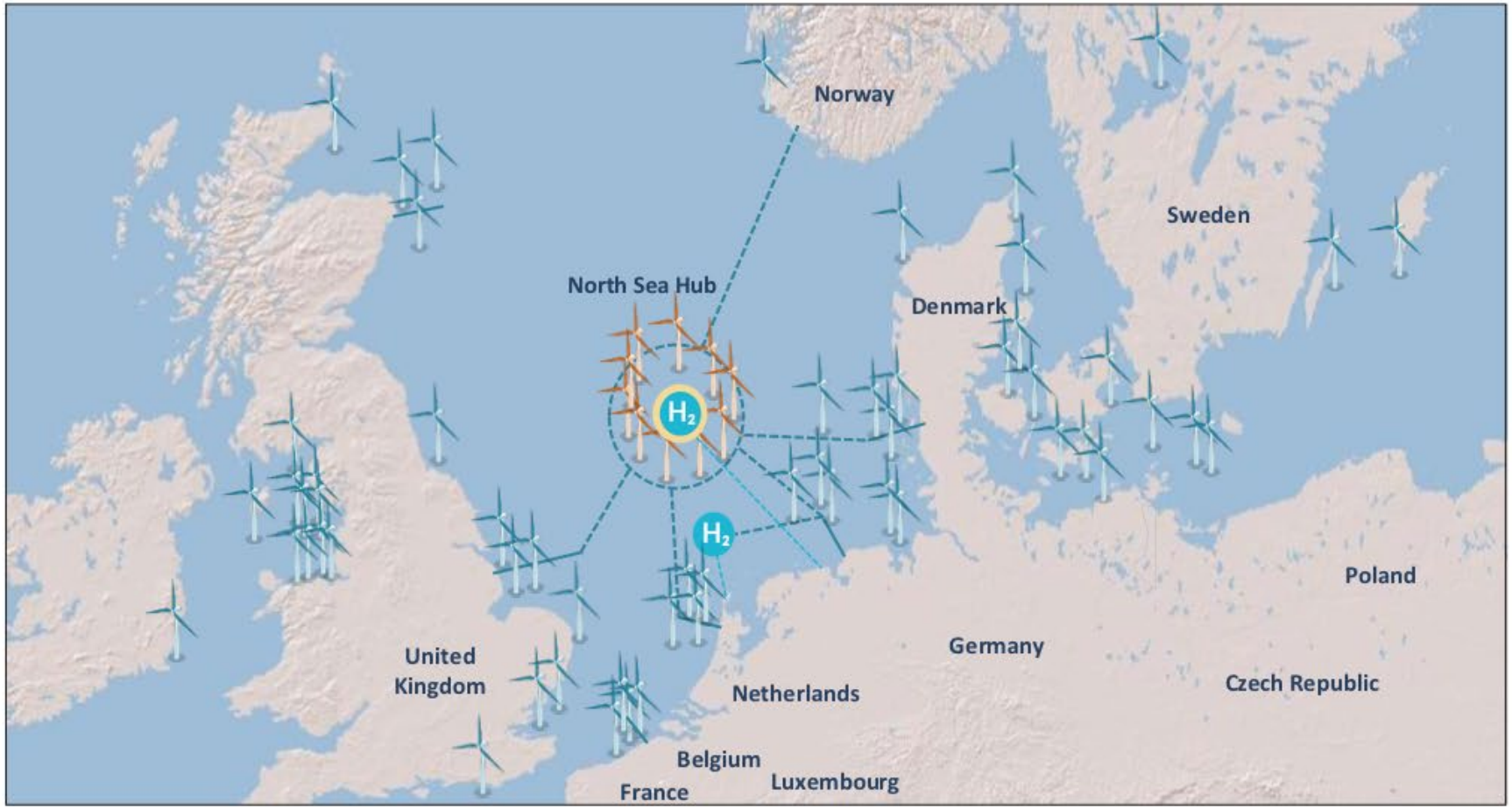
A carbon neutral Europe puts offshore wind in front

Shares of electricity generation by technology in the European Union, Sustainable Development Scenario



Offshore wind is set to become the largest source of electricity in the European Union by 2040, complementing other renewables towards a fully decarbonised power system

Offshore wind is well suited for hydrogen production



Decarbonisation of heat and transport could further increase demand for hydrogen, opening new market opportunities for offshore wind

Horizons Europe and the Green Deal

- Horizons Europe will support the Green Deal.
  - Expected budget: €100B
  - Missions & Partnerships
  - Co-creation with other financial instruments
- Beyond Horizons Europe
  - Private Public Initiatives focused on climate and environment
  - Just Transition Mechanism
    - Leveling the playfield
    - Expected budget: at least €100B
  - Sustainable Europe Investment Plan
    - European Investment Bank = European Green Bank
    - InvestEU (consolidated InnovFin)
    - Expected budget: at least €1T

Clean energy
Sustainable industry
Building and renovating
Sustainable mobility
Biodiversity
From Farm to Fork
Eliminating pollution

European Commission

Thanks. Danke. Merci. Obrigado.

More info at:

https://ec.europa.eu/research/
https://ec.europa.eu/energy/

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