ETIPWind public workshop

Help us define long-term R&I priorities and implement them in the most-efficient way!

ETIP Wind
EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON WIND ENERGY

Funded by the European Union

17 October 2024

Welcome and Introduction

Stephan Barth
Managing Director, ForWind
ETIPWind Vice-Chair

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What is ETIPWind?

- **Defines R&I priorities** to accelerate deployment of wind energy in Europe.

- Provides targeted **R&I funding recommendations** to EU and national policymakers.

- Works closely with research & academia to develop **common R&I agendas**.
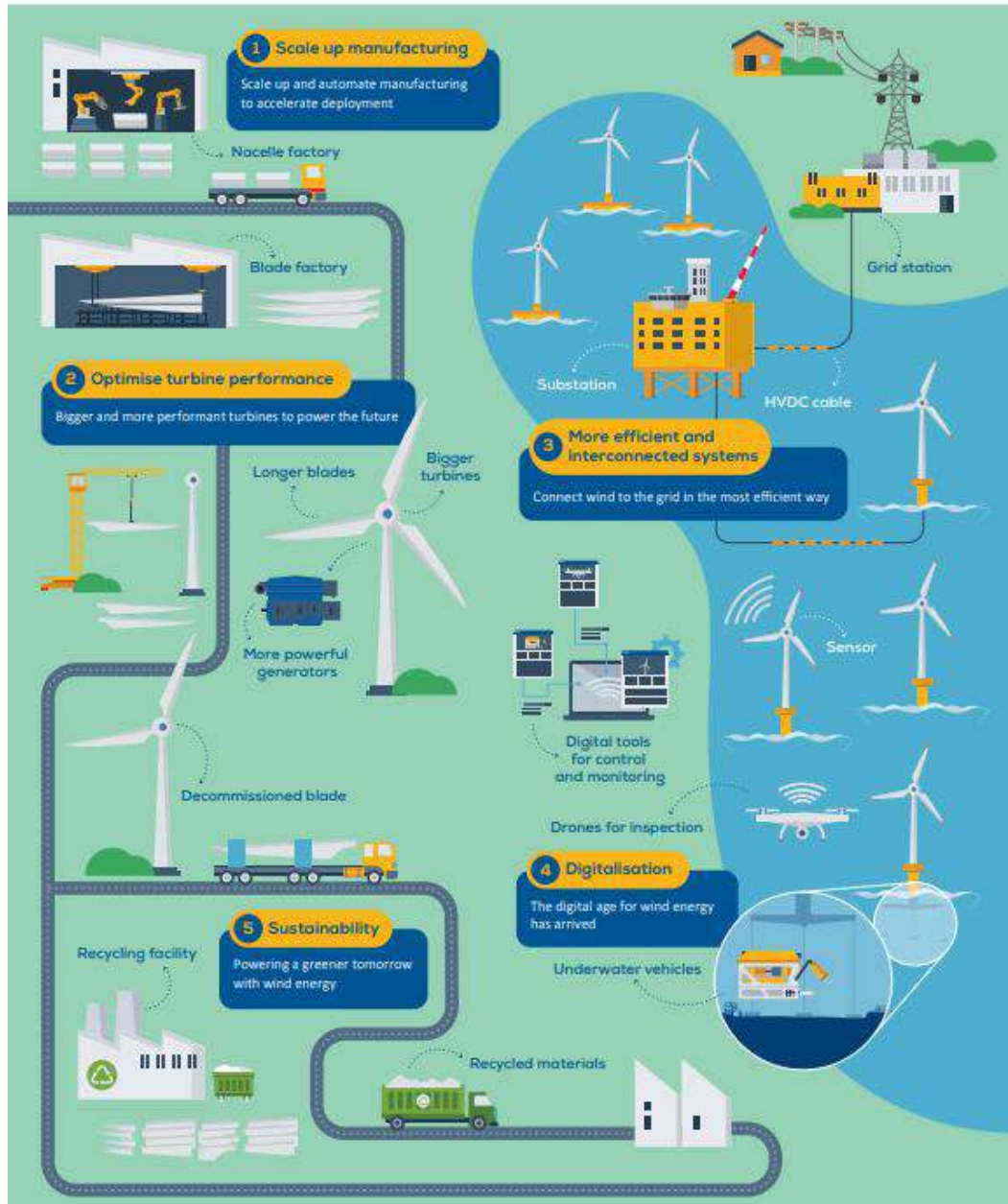
Outcomes from previous ETIPWind workshop

- **Common perceptions** that policymakers might have about wind energy technology;
- **Policy actions** that policymakers should undertake to support wind R&I; and
- **New ideas** for ETIPWind to better engage with policymakers.
- Definition of 5 key wind energy **technology megatrends**.

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Five Megatrends in Wind Energy Technology

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1 Scale up manufacturing

Scale up and automate manufacturing to accelerate deployment

- Nacelle factory
- Blade factory

2 Optimise turbine performance

Bigger and more performant turbines to power the future

- Longer blades
- Bigger turbines
- More powerful generators
- Decommissioned blade

3 More efficient and interconnected systems

Connect wind to the grid in the most efficient way

- Grid station
- Substation
- HVDC cable
- Sensor
- Digital tools for control and monitoring
- Drones for inspection

4 Digitalisation

The digital age for wind energy has arrived

- Underwater vehicles

5 Sustainability

Powering a greener tomorrow with wind energy

- Recycling facility
- Recycled materials

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1 Scale up manufacturing

The wind industry holds a unique position in Europe's industrial landscape. It is a high-tech, sustainable, and heavy manufacturing industry. To deliver Europe's energy ambitions wind manufacturing capacity needs to scale up and automate to produce and install on average 30 GW of new installations a year by 2030.

- **Innovative turbine designs** suited to large-volume manufacturing with (semi-)automated production processes.
- **New and upgraded facilities** to deploy the increasingly higher, wider, and heavier turbines.
- **New installation and transport methods** to transport and install the bigger turbines faster and easier.

2 Optimise turbine performance

The demand to optimise turbine performance keeps increasing. To maximise energy production we'll need innovative solutions to increase the turbine size, make them more powerful, and increase their availability.

- **Higher towers** to reach stronger and more stable winds.
- **Longer blades** to capture more kinetic energy from the wind.
- More **powerful generators** to turn the energy captured into electricity.

3 More efficient and interconnected systems

Wind energy could account for half of the EU's electricity demand by 2050. Europe will need more, and more performant grids to integrate these large amounts of wind. In addition, energy storage solutions and power-to-x will help balance the system and ensure no wind energy is lost or curtailed.

- **Advanced grid management technologies** enable better coordination between wind farms and other energy sources.
- **Innovation in real-time data exchange** and **adaptive control mechanisms** will help maximise the share of clean electricity in the grid.
- **High Voltage Direct Current** (HVDC technology) allows the collection and transmission of very large volumes of electricity across great distances.

4 Digitalisation

Digitalisation is reshaping the wind energy industry by integrating advanced technologies that enhance operational efficiency and facilitate decision-making. The rapid development of digital technologies pushes the industry to keep innovating, including to safeguard the cybersecurity of its infrastructures.

- **Artificial Intelligence (AI) and digital tools** will help to facilitate monitoring the condition of the assets and send signals when repairs are needed.
- **Advanced data analytics and AI-driven tools** help further refine wind forecasting and measurements to optimise electricity production and consumption.
- **Long-term innovation in autonomous tools**, robots, and vehicles could enable wind farms to operate and maintain themselves almost independently.

5 Sustainability

Wind energy is a sustainable technology which cuts down CO_2 emissions and is already 90% recyclable. The industry is committed to become 100% sustainable and achieve the highest levels of circularity. Sustainability is in our DNA.

- **Innovations to recycle key components** such as blades and permanent magnets.
- **Developing new materials and component** that are sustainable by design.
- **New sustainable practices** to ensure that wind farms remain nature inclusive and are developed in harmony with ecosystems and local communities.


Objective of today's workshop

➤ Validate impactful **long-term R&I priorities** for the wind energy sector;

➤ Identify the right **strategies to implement these priorities** at the EU and national levels; and

➤ Discuss with the European Commission how to **optimise EU funding programmes** to support wind R&I.
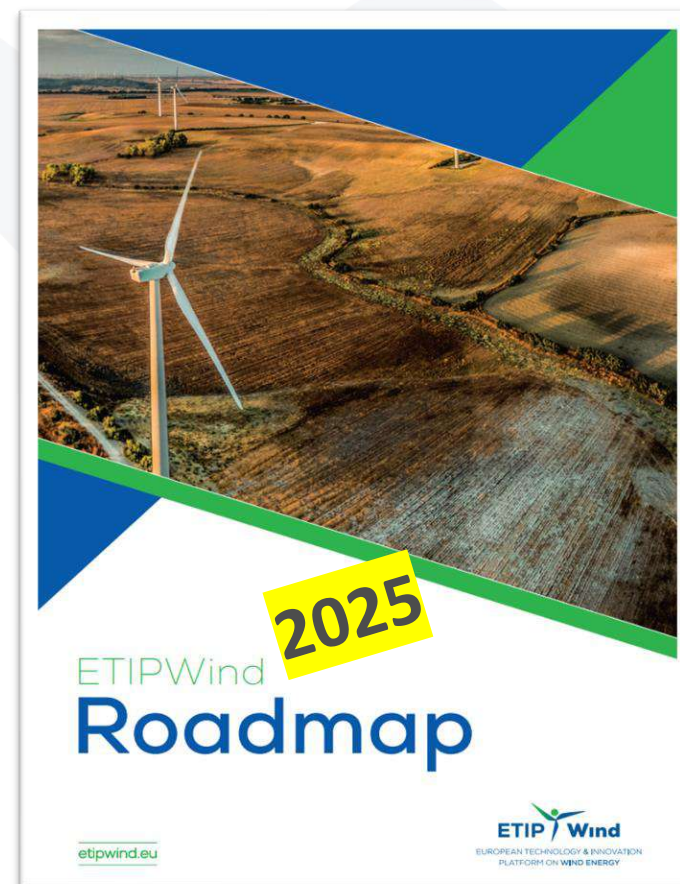
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Objective of today's workshop

Short-term R&I priorities 2025-2027
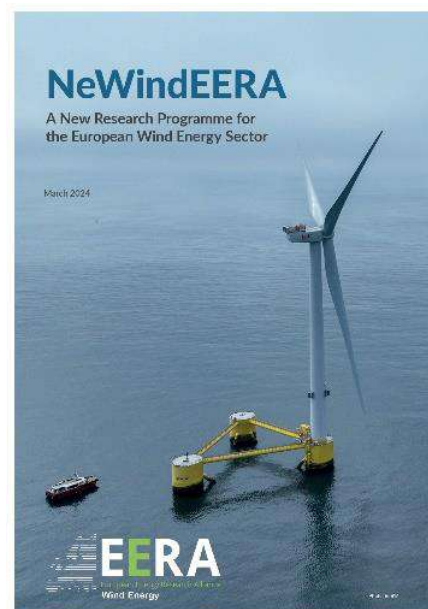
Long-term research actions by 2050

- **Focus on the implementation**

- **Provides a long-term strategy to correctly address the R&I priorities at EU and national level**

- **Supported politically by both the European Commission and the Member States**

- **Basis for establishing a long-term R&I partnership**

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Competitiveness: a key priority of the new European Commission

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"To lead on innovation, we need to create the conditions for researchers to thrive. This means providing the infrastructure and innovative laboratories they need to test and develop ideas through new public-private partnerships, such as joint undertakings."

© European Commission

Mario Draghi delivers his report on the future of European Competitiveness to Ursula von der Leyen.

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Agenda

Time	Session	Speaker/Moderator
9:30-10:00	**Registrations and welcome coffee**	
10:00-10:15	**Introduction and scope of the workshop**	**Stephan Barth**, ETIPWind Vice-Chair
10:15-10:30	**Keynote speech from the European Commission**	**Jacek Truszczynski**, Deputy Head of Unit, DG GROW, European Commission
10:30-11:00	**EERA's long-term research programme and ETIPWind Strategic R&I Agenda**	ETIPWind and EERA JP wind Secretariats
11:00-11:45	**Definition of the long-term R&I priorities for the wind energy sector** *Inc. interactive session on Slido*	Moderated by ETIPWind Secretariat and Stephan Barth, ETIPWind Vice-Chair
11:45-12:00	*Coffee break*	
12:00-13:30	**Strategies for effective implementation of R&I priorities** *3 rounds of discussion on:* • *Stakeholders involved and their role* • *Tools and actions needed* • *Challenges faced for collaboration* *Inc. interactive session on Slido*	Moderated by ETIPWind Secretariat and Stephan Barth, ETIPWind Vice-Chair

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Agenda

Time	Session	Speaker
13:30-14:30	*Networking lunch*	
14:30-15:20	**How to optimise EU support for wind R&I** *3 presentations from the European Commission focusing on:* ● *the Horizon Europe programme* ● *the Innovation Fund* ● *the Net Zero Industry Act* *Inc. Interactive session on Slido*	**Davide Amato**, Deputy Head of Unit DG RTD, European Commission **Joao Serrano Gomes,** Policy Officer, DG CLIMA, European Commission **Andrea Hercsuth**, Policy Officer, DG ENER, European Commission
15:20-15:30	**Outcomes of the workshop and next steps**	ETIPWind Secretariat
15:30	**Closing remarks**	Stephan Barth, ETIPWind Vice-Chair

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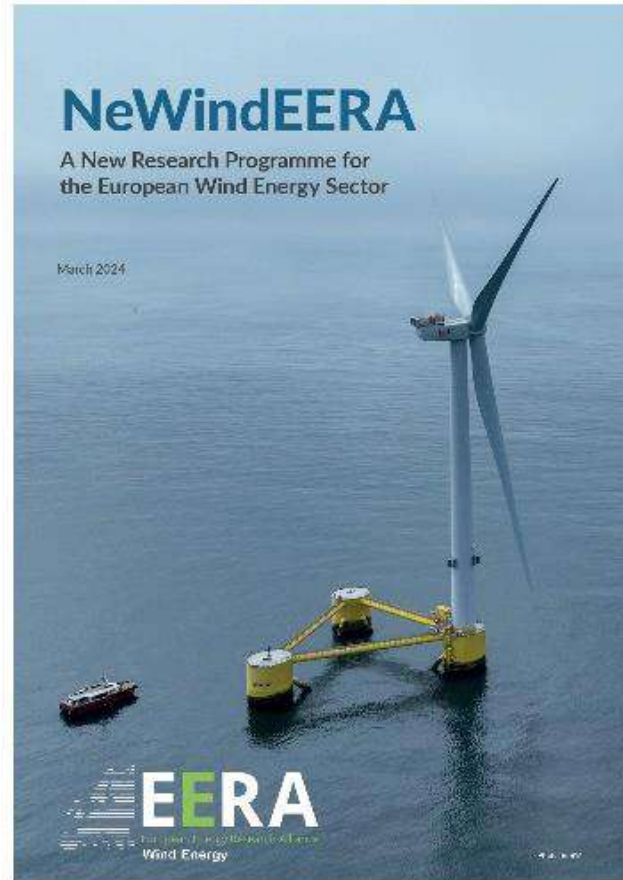PLATFORM ON WIND ENERGY

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Keynote speech from the European Commission

Jacek Truszczynski,
Deputy Head of Unit, DG GROW,
European Commission

EERA's long-term research programme and ETIPWind Strategic R&I Agenda

EERA JP Wind and ETIPWind Secretariats

Strategic R&I documents fully aligned

1. Industrialisation, scale-up and competitiveness

2. Optimisation and further digitalisation of Operations & Maintenance

3. Wind energy system integration

4. Sustainability and Circularity

5. Skills, acceptability and coexistence

6. Cross-cutting themes

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Industrialisation, scale-up and competitiveness

€447m

Mass Production
€165 million

Deploy innovative manufacturing processes, production lines methodologies or automated solutions to accelerate mass-production of wind energy components.

Design for large volume deployment
€90 million

Demonstrate innovative designs to ease deployment of larger volumes, including modular designs and solutions for local assembly or in situ repairs.

Design for reliable products
€51 million

Develop new component designs and solutions such as reliability prediction tools or innovative health monitoring systems to improve reliability of wind turbine components.

Improve construction and installation methods
### €135 million

Deploy innovative transportation and installation methods with reduced environmental impacts and optimised logistics including at ports level.

Innovative economics to scale-up wind
€6 million

Create innovative legal, financial, regulatory and economic instruments to scale-up and derisk wind energy technologies.

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Industrialisation, Scale-up, Competitiveness
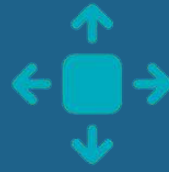
This R&I priority theme is guided by the IEA's Grand Challenges in Wind Energy Science and the R&I priorities from ETIPWind's Strategic Research and Innovation Agenda. Research topics take note of the current State of the Art and future challenges and also recognise the need to continuously improve the underlying design and modelling tools.

PRIORITY SUB-THEMES

Mass Production supported by automation and reliable supply chain

Design for large volume manufacturing and deployment

Design for reliable and lasting products

Improve construction and installation methods

Adequate economic and financial conditions

RESEARCH TOPICS

Manufacturing for mass production

Environmental impact of mass production

Social impacts of mass production

Next generation wind turbine technology and economic optimisation

Combination with other generation technologies

Industrialisation of floating offshore wind

Holistic and accelerated turbine design

Probabilistic design

Virtual, scaled and full-scale testing

Small and Off-Grid Wind

Scaling up installation

Assembly and heavy maintenance solutions

Adequate support policies

Market design

Impact assessment for value creation

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Optimisation and further digitalisation of Operations & Maintenance

€335m

Digitalisation and optimisation for operational efficiency
€60 million

Develop advanced AI tools, forecasting methods and predictive maintenance solutions to assist O&M technicians and optimise wind farm efficiency.

Autonomous operations & maintenance
€110 million

Develop robots, advanced inspection and repair methods, and autonomous vehicles to allow wind turbines to install and maintain themselves autonomously.

Digital ecosystems
€50 million

Optimise the system and O&M processes with advanced digital ecosystems based on industrial Internet Of Things, sensor technologies, and cloud analytics.

Replacement & transport of large components
€135 million

Demonstrate new solutions to improve replacement and transport of large components onshore and offshore. Including quick connect/disconnect systems for floating wind turbines.

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Digitalisation and Optimisation of Operation & Maintenance

R&I Priority Theme 2 creates four sub-themes focusing on improving operational efficiency through digitalisation; the need to automate a significant amount of O&M; the opportunity to embrace a digital ecosystem; and the need to cater for the replacement and transport of major components as the size of offshore wind turbines continues to grow.

PRIORITY SUB-THEMES

Digitalisation of maintenance and optimisation tools for operational efficiency

Autonomous Operations and Maintenance

Digital Ecosystems

Replacement and transport of major components

RESEARCH TOPICS

Innovative training for technicians using AR, VR and/or AI

AI-driven predictive maintenance for key components & report analysis

AI-driven resource assessment and forcasting tools

Enhanced robotics for blade servicing & semi-automated inspection

Advanced offshore repair methodologies and autonomous vehicles for marine operation

Autonomous wind installation, O&M and decommissioning

Data exchange across sub-systems

Sensor technologies

Industrial IoT, cloud analytics, cybersecurity

Optimisation & Decision-making

Holistic understanding of natural systems

Component replacement solutions onshore & offshore

Quick connect/disconnect systems for mooring lines & inter-array cables

Autonomy & digitalisation for port operations with novel fuel alternatives

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Wind energy system integration

€400m

Modeling system needs
€20 million

Develop digital tools and models to design and adjust wind farm controls to ease grid integration, including software tools for system stability analyses at all system levels.

Advanced Grid Capabilities
€130 million

Demonstrate grid-forming, black start capability and other ancillary services from wind farms. Including cross-sector research on synthetic grid inertia needs.

Grid equipment interoperability
€60 Million

Roll-out new solutions to ensure interoperability of (offshore) high-voltage grid infrastructure including modelling of digital twins of wind power plants. Including solutions that ensure cyber resilience and cybersecurity.

Solutions to manage curtailment
€60 million

Deploy and demonstrate technologies to limit wind farm curtailment at large scale. Including congestion management services and large-scale virtual power plants.

Integration of hybrid and co-located projects
€70 million

Design and develop hardware and software solutions to demonstrate grid support services from co-located, offshore hybrid and other projects, such as wind-to-x.

Direct Current Grids Solutions
€60million

Validate and demonstrate the viability of DC grids where long-distance electricity transmissions are needed, including far-from-shore offshore wind farms installed.

Wind Energy System Integration

The integration of large scale wind energy remains one of the biggest challenges facing the sector. This priority theme identifies six sub-themes including plant level control and grid forming hybrid plants that were highlighted in the IEA's Grand Challenges in Wind Energy Science.

PRIORITY SUB-THEMES

- **Definition and modelling of future system needs**
- **Advanced grid capabilities**
- **Interoperability**
- **Solutions to effectively manage curtailment**
- **Power to X and hybrid plants**
- **DC grid solutions**

RESEARCH TOPICS

Definition and modelling of future system needs
- Transmission and generation flexibility
- Optimisation of transmission infrastructure
- Grid digitalisation

Advanced grid capabilities
- Ancillary service provision
- Develoment of new converter capabilities and systems
- Short term balancing

Interoperability
- Digital twin technologies
- Plant level control

Solutions to effectively manage curtailment
- Long duration energy storage
- Offshore wind and hydrogen production

Power to X and hybrid plants
- Power to X technologies
- Hydrogen market integration
- Hybrid plants

DC grid solutions
- Offshore grid infrastructure

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Sustainability and Circularity

€550m

Material substitution
€105 million

Develop and demonstrate new materials to further reduce wind energy's environmental impact and lower dependency on critical raw materials.

Recycling methods for wind turbine materials
€110 million

Develop and demonstrate recycling and re-use solutions for all wind turbine materials. R&I should assess pathways to closed-loop circularity.

Lifetime extension
€80 million

Develop new tools to better assess the condition and performance of wind turbine components and materials to facilitate validation for lifetime extension, re-use or re-purposing.

New decommissioning tools
€120 million

Develop new tools and methods to decommission retired assets with lower environmental impacts and more opportunity to reuse and recycle components and materials.

Biodiversity solutions
€135 million

Fundamental research to assess (cumulative) environmental impacts from wind energy installation and operation procedures. Demonstration of nature-positive strategies and technologies including new mitigation technologies for wildlife.

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Sustainability and Circularity

Inspired by IEA Wind and ETIPWind activity, this R&I priority theme focuses on several topics including environmental co-design, social aspects of wind energy development, sustainable materials, and reuse and recycling. It also identifies the need to research end-of-life management, life cycle assessment, and new business models for reusing materials.

PRIORITY SUB-THEMES

Material substitution for decarbonisation	Recycling methods	Lifetime extension via re-using, refurbishing and re-purposing	New decommissioning tools and methods	Biodiversity solutions

RESEARCH TOPICS

Material substitution for decarbonisation	Recycling methods	Lifetime extension via re-using, refurbishing and re-purposing	New decommissioning tools and methods	Biodiversity solutions
Sustainable materials in design and recyclability by design	Blade recycling, sustainability assessment and technologies to lower CO2 footprint	Solutions for lifetime extension,	Decommissioning methods and tools for offshore wind	Environmental co-design
New components and materials	Reliability of secondary materials	End-of-life management	Technologies for environmentally friendly decommissioning	Impact on ecosystems and biodiversity
Material durability and protection	New recycling process	Assessment of the damage state of turbine properties	Processes and components to ease reuse and recycling	Noise reduction
Alternative design solutions	Holistic life cycle assessment		Economic model for full decommissioning project cycle	
	New business models			

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Skills and Coexistence

€121m

World-class education for wind energy
€20 million

Develop and expand wind energy education with interdisciplinary programmes, new education tools and development of centres of competence or multi-level educational campaigns.

Skilling, re-skilling and upskilling
€81 million

Deploy actions to future-proof Europe's work force by rolling out programmes to skill, re-skill, and up-skill them with easy to access lifelong learning activities or R&I supporting them to enter into the workforce faster.

Public engagement and coexistence
€20 million

Develop new ways and practices for community & stakeholder involvement, models and data sets to better understand interaction between stakeholders.

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Skills, Acceptability & Coexistence
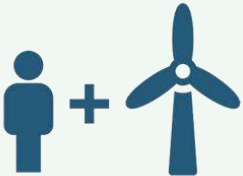
The large-scale expansion of wind energy demands a skilled workforce, cultivating both inter- and transdisciplinary collaboration, and nurturing a holistic understanding and acceptance. Coexistence with individuals, diverse industries and the environment is crucial

PRIORITY SUB-THEMES

Education

Skilling, re-skilling and upskilling activities

Increase public engagement of citizens

Fair transition, inclusiveness and stakeholder interests

Interdisciplinary and transdisciplinary relations with coexistence

RESEARCH TOPICS

Education and strategic workforce expansion for the wind energy sector

Innovative pedagogy for wind energy excellence

Cultivating diversity and sustained interest in wind energy

Strategic workforce development across the wind energy value chain

Optimising cross-sector talent integration for wind energy sustainability

Community involvement modelling/tool development

Wind energy societal benefits and impact analysis

The good process

Tools to map stakeholder concerns

Technology-people-relations and public perception

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Cross-cutting Research Themes

Although partially addressed in the earlier R&I priority themes, the NeWindEERA programme proposes a number of critical cross-cutting topics. They will address additional challenges and explicit convey important research needs in the areas of climate, atmosphere, ocean and geophysics, disruptive technologies, policy and regulation, social aspects and finance.

PRIORITY SUB-THEMES

Climate, Atmosphere, Ocean and Geophysics

Disruptive technologies

Policy and regulation

Social Aspects

Finance

RESEARCH TOPICS

Climate, Atmosphere, Ocean and Geophysics
- Geophysical characteristic measuring and modelling advancement
- Wake effect model development
- Climate change physical conditions impact analysis

Disruptive technologies
- New concept assessment and development
- Turbine component performance and efficiency

Policy and regulation
- Spatial planning
- Evolution of environmental impact assessments
- Wind farm life cycle public/community engagement
- Best practice transfer to the Global South

Social Aspects
- Communivation streamlining and host community benefit creation
- Development of practical approach to lifecycle public participation
- Socialising wind rights
- Relationship between people, technology and places for all relevant social issues

Finance
- Upgrade to finance and cost models to incorporate environmental/external costs
- Risk factors impacting financing costs

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Validation of the long-term R&I priorities for the wind energy sector

Discussion time

What are the most important wind energy R&I priorities in the long-term?

- Industrialisation (inc. modular and scalable designs), more manufacturing capacity, speed-up deployment
- Digitalisation and optimisation of O&M (AI, robotics)
- System integration, grid stability, large interconnectors
- Cost-reduction
- Public acceptance of windfarms
- Circularity of materials, reduction of critical materials use
- Recycling, repurposing
- Decommissioning and repowering methods
- Floating offshore wind (testing and upscaling, consolidation of floater design, HV dynamic cable standards, in-situ maintenance, digital twin)
- Storage and offshore wind to hydrogen
- Nature inclusive designs (bird detection and collision avoidance) and large-scale environmental effects
- Wind resource measurement, addressing challenges of harsh environments, forecasting methods
- Decarbonisation of the wind supply chain (e.g. wooden towers, clean steel)
- Turbine quick stop
- Cyber and physical security
- Skilled workers
- Acceptance and citizen participation
- Hybridisation (PV and wind + batteries) and co-location
- Reliability of supply chain and components

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- Industrialisation (inc. modular and scalable designs), more manufacturing capacity, speed-up deployment
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- System integration, grid stability, large interconnectors
- Cost-reduction *(Covered by R&I area on O&M optimisation)*
- Public acceptance of windfarms
- Circularity of materials, reduction of critical materials use
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- Nature inclusive designs (bird detection and collision avoidance) and large-scale environmental effects
- Wind resource measurement, addressing challenges of harsh environments, forecasting methods
- Decarbonisation of the wind supply chain (e.g. wooden towers, clean steel) *(Covered by R&I area on Sustainability and Circularity)*
- Turbine quick stop
- Cyber and physical security
- Skilled workers
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- Hybridisation (PV and wind + batteries) and co-location
- Reliability of supply chain and components

Wind energy long-term targets by 2050

1. The European wind industry is healthy and competitive at the global scale.

2. The European industry harnessed the potential of digitalisation, automation with high cybersecurity standards.

3. Wind is the backbone of a climate-neutral energy system centered around electrification.

4. Wind farms are fully recyclable and have a positive environmental impact

5. Society actively supports and recognises wind energy as indispensable for European prosperity and climate-neutrality.

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Coffee break
11:45-12:00

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Strategies for effective implementation of long-term R&I priorities

European partnerships on R&I

➤ Existing **European partnerships** under Horizon Europe covering many energy technologies.

➤ What we propose: establish a **long-term public-private partnership** between the EU and the wind energy sector.

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EU funding for wind R&I

Current status

🔋	Funding is limited (€50m p/a)
✉️	Wind sector provides only recommendations
⏱️	Bi-annual funding cycle
🧱	Funding is spread
🖼️	Broad 'calls for proposals'
📄	Cumbersome administrative processes

Desired status

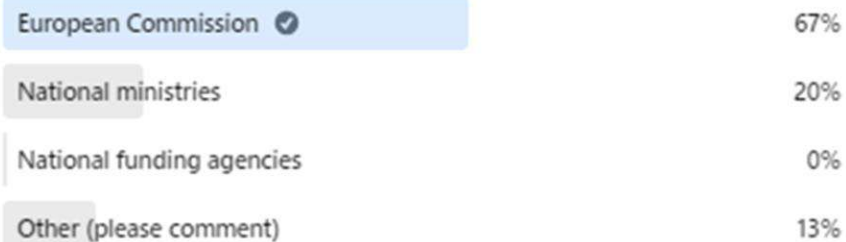|	
🪙	More EU funding for wind projects
⚖️	Wind sector is an equal partner
🔍	Long-term visibility and better allocation of EU funding
🏪	One stop shop
🎯	Targeted funding and more impactful projects
🖨️	Simpler reporting

Wind EUROPE

Strategies for effective implementation of long-term R&I priorities

Discussion time

Pre-workshop survey results

What are the key stakeholders that need to be involved in implementing long-term R&I priorities?

Multiple Choice Poll · 23 votes · 23 participants

➡ European Commission - 19 votes
83%

National ministries - 16 votes
70%

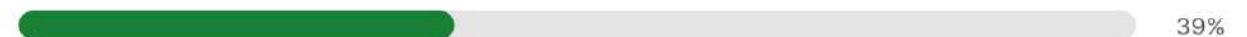➡ National funding agencies - 18 votes
78%

Research institutes - 17 votes
74%

➡ Universities - 18 votes
78%

➡ R&D experts from industry - 20 votes
87%

Investors - 16 votes
70%

SMEs/start-ups - 9 votes
39%

Other - 1 vote
4%

Which public authority do you think has the most important role to implement long term R&I strategies for wind energy?

You can see how people vote. Learn more

European Commission ✓	67%
National ministries	20%
National funding agencies	0%
Other (please comment)	13%

15 votes · Poll closed · Remove vote

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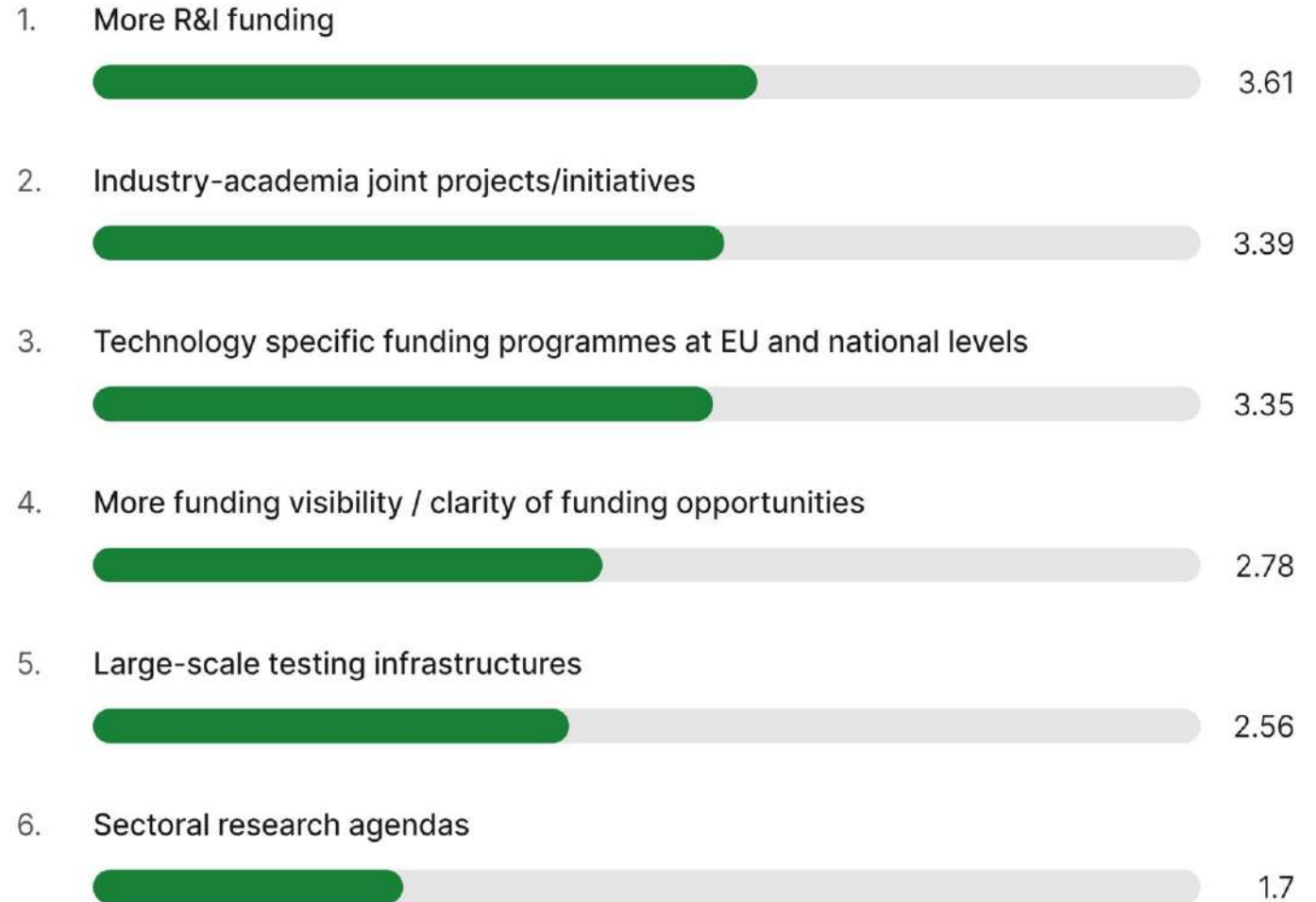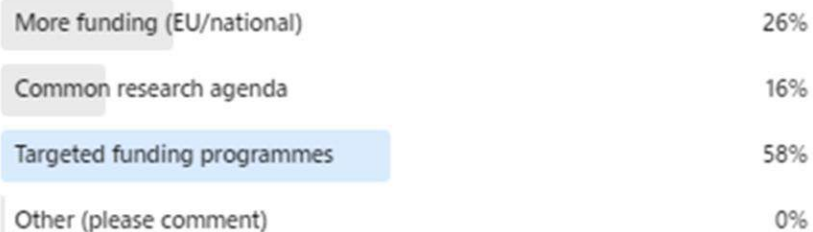PLATFORM ON WIND ENERGY

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Pre-workshop survey results

In your opinion, what is the most needed to implement long-term R&I priorities?

Ranking Poll · 23 votes · 23 participants

1. More R&I funding

3.61

2. Industry-academia joint projects/initiatives

3.39

3. Technology specific funding programmes at EU and national levels

3.35

4. More funding visibility / clarity of funding opportunities

2.78

5. Large-scale testing infrastructures

2.56

6. Sectoral research agendas

1.7

What is the most needed to implement long-term R&I priorities for wind energy?

You can see how people vote. Learn more

More funding (EU/national)	26%
Common research agenda	16%
Targeted funding programmes	58%
Other (please comment)	0%

19 votes · Poll closed

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Pre-workshop survey results

💬 **What are the most significant challenges slowing down R&I collaboration between different stakeholders in the wind energy sector? (Please answer with key words)**

- Intellectual Property processes and management
- Complexity of Consortium, too big
- Issues with data-sharing
- Shortage of demonstration site, testing infrastructures
- Skills gap
- Fragmentation / Complexity of EU funding programmes, lack of clarity of funding opportunities
- EU funding processes are too slow
- Long administrative procedures, reporting complexity
- R&I agendas are publicly available (also for foreign competitors) but implementation is too slow in Europe
- Lack of clarity for developer (market)
- Bureaucracy
- No fast-track for pilot projects
- Also need to collaborate with smaller companies or new institutes
- Need more funding for commercialisation of R&I output to ensure they're used
- Lack of involvement of all actors in the process
- Lack of transparency
- Lack of a framework for competitors to partner and create critical mass / standardisation in specific areas

Pre-workshop survey results

What would be needed to overcome those challenges and reach an effective European collaboration for wind R&I?
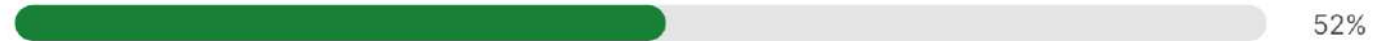
Multiple Choice Poll | 23 votes | 23 participants

Stronger commitment from the stakeholders involved (European Commission, industry, research, etc) - 15 votes

65%

Clearer collaboration framework at European level - 12 votes

52%

Common multi-annual research agenda spelling out R&I actions needed from basic research to commercialisation - 14 votes

61%

More involvement from the Member States - 8 votes

35%

Other - 3 votes

13%

What would be needed to reach an effective European collaboration for wind R&I?

You can see how people vote. Learn more

Strong stakeholder commitment	44%
Joint long-term R&I agenda	44%
More support from EU countries	11%
Other (please comment)	0%

9 votes • Poll closed

slido

Networking lunch
13:30-14:30

ETIP Wind

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How to optimise EU support for wind Research & Innovation

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EU R&I policy for wind energy

Davide Amato
Deputy Head of Unit DG RTD, European Commission

EU R&I policy for wind energy – update

ETIP Wind workshop on wind energy long-term R&I priorities

Brussels, 17 October 2024

Davide Amato

DG Research & Innovation

Clean Planet Directorate

Unit Clean Energy Transitions

Recent EU policy and legislative developments

SET Plan Revision

- IWG on offshore wind expands its scope to also cover onshore

SET Plan IWG on offshore wind expands its scope to also cover onshore

- Definition of the SET Plan Terms of Reference
- Definition of the SET Plan Steering Group Rules of Procedure
- Five cross-cutting task forces to support the work of the SET Plan Implementation Working Groups and ETIPs
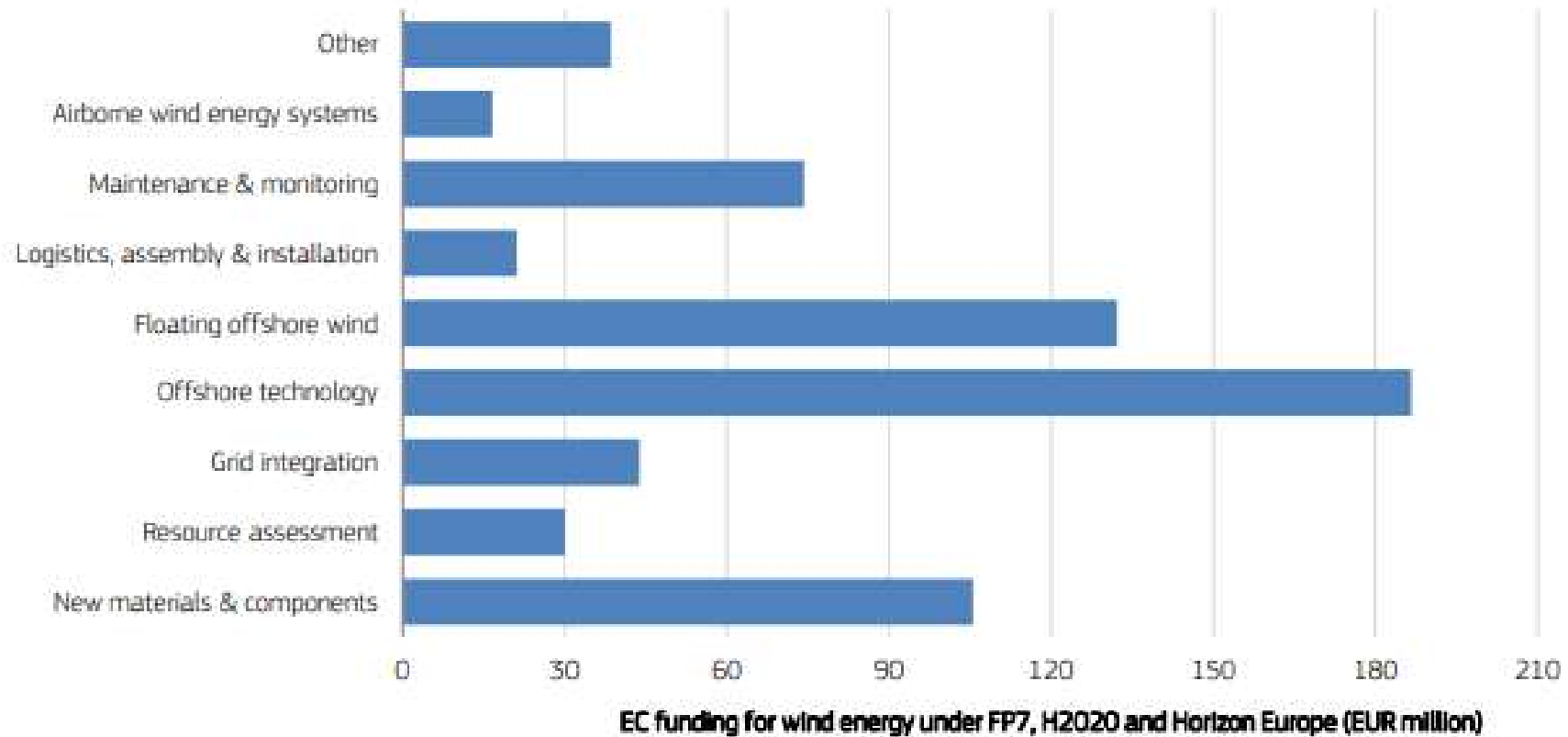
NZIA SG officially established as expert group

- Expert group preparation ongoing
- Finalisation of SET Plan governance description

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EU R&I funding – wind sector – 2009-2022

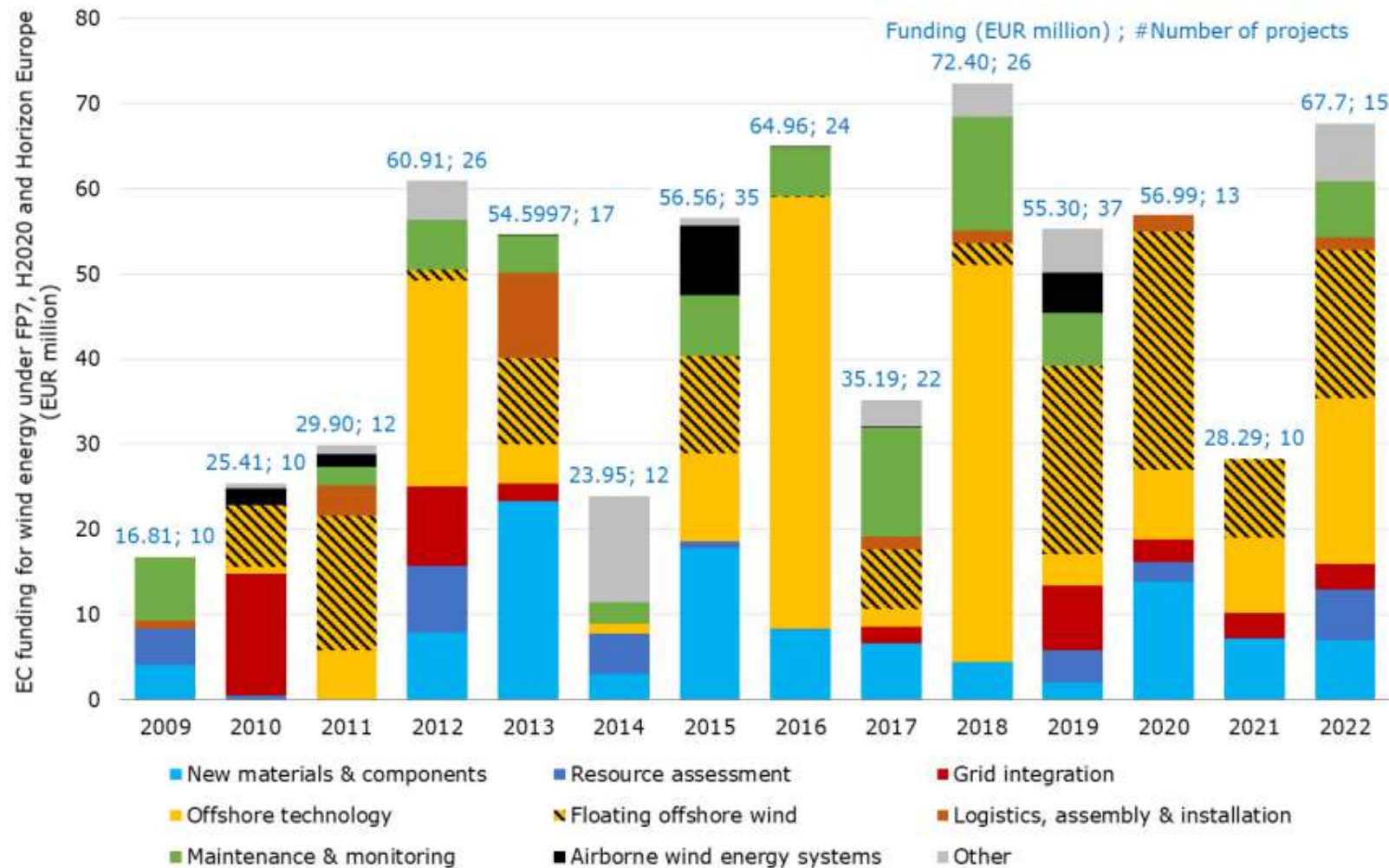**Figure 29.** EC funding on wind energy R&I priorities in the period 2009-2022 under FP7, H2020 and Horizon Europe.

Source: JRC based on Cordis, 2023.

Total since 2009: 648.96 M€

- 187 M€ offshore wind technologies
- 132 M€ floating offshore wind
- 105 M€ for new materials and components

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EU R&I funding – wind sector – 2009-2022

Annual average: 46.3 M€

Source: JRC based on Cordis, 2023.

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Horizon Europe – main topics addressed (WP 2021-2024)

- Floating offshore

- Circularity, innovative materials, life-time extension, decommissioning and recycling technologies

- Environmental and socio-economic impacts

- Digitalisation, digital twins and wind farms control

- Resource assessment

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# Horizon Europe – cluster 5 work programme 2023-2024 Wind – related topics

- HORIZON-CL5-2024-D3-02-08: Minimisation of environmental, and optimisation of socio-economic impacts in the deployment, operation and decommissioning of offshore wind farms (10M€ - 5M€/project – call opening: 17.9.24; call closing 21.01.25 04.02.2025)

- HORIZON-CL5-2024-D3-02-09: Demonstrations of innovative floating wind concepts (30M€ - 15M€/project – 17.9.24; call closing 21.01.25 04.02.2025)

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Horizon Europe – next work programmes (WP)

- Horizon Europe Work programme 2025:
    - Co-creation process and consultations with programme committees throughout 2024
    - April 2024: Stakeholder feedback
    - By end 2024: Entry into office of new College of Commissioners (Commissioners-designate hearings in front of European Parliament to start on 4 November)
    - WP 2025 adoption: early 2025

- Horizon Europe Work programme 2026-2027:
    - Drafting and consultations in 2025
    - Target publication: early 2026
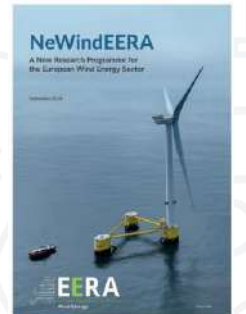
Important input to the WPs

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Upcoming events, reports, …

- SET Plan Conference 2024: 14-15 November 2024, Budapest

- Autumn 2024:
  - JRC Clean Energy Transition Report (CETO) – November 2024
  - Annual Competitiveness Progress Report
  - SET Plan progress report
  - Results of Innovation Fund call 2023 (including on clean tech manufacturing)

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Thank you

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The Innovation Fund

Joao Serrano Gomes
Policy Officer, DG CLIMA, European Commission

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INNOVATION FUND

ETIPWind public workshop – 17 October 2024

Funded by the EU Emissions Trading System

INNOVATION FUND

Deploying innovative net-zero technologies for climate neutrality

€40 billion* available between 2020-2030 → grants awarded through regular calls and auctions → avoid GHG emissions, boost competitiveness
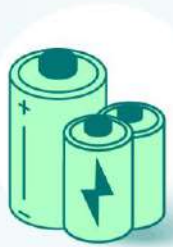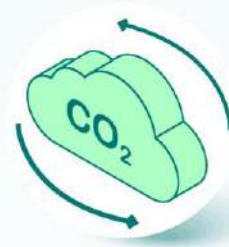
supporting innovation in:

Energy-intensive industries

Renewable energy

Energy storage

Carbon capture, use and storage
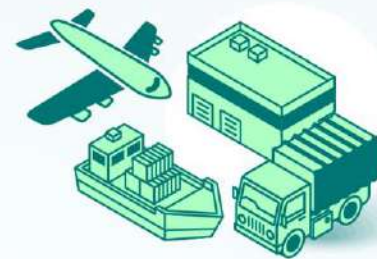
Net-zero mobility and buildings

based on a carbon price of €75/tonne

The Innovation Fund can support urgent policy priorities, but holds a long-term line of bottom-up support across sectors

- **RePowerEU** objective of 10Mt of renewable H2 domestic production.

- **Net-Zero Industry Act**: clean tech manufacturing topic (€700 million in 2022, €1.4 billion in 2023).

- **European Hydrogen Bank:** first pilot auction under the Innovation Fund.

- **Wind package:** clean tech manufacturing topic and project development assistance.

- **Strategic Technologies for Europe Platform (STEP):** 'as a service' feature for the Innovation Fund

Innovation Fund – targeted project portfolio

Technology Readiness Level

1 2 3 4 5 6 7 8 9

Horizon Europe (TRL: 1)
- Research and Innovation (CRL: 1)

European Innovation Council
- Early adoption, start-ups|

LIFE program
- Pilot projects for mitigation and adaptation

Innovation Fund (TRL: 7-9)
- **GRANTS**: upscaling to commercial level (CRL: 2-4)
- **Auctions**: roll-out of more mature technologies (CRL: 2-6)

Modernization Fund
- RE, EE, energy storage, energy networks for 10 lower-income countries

Connecting Europe Facility
- Transport facilities for energy and mobility

InvestEU – EIB
- Debt financing

1

2 3 4 5 6

Commercial readiness level

National funding (including RRPs)

TRL & CRL are indicative

European Commission

The Innovation Fund in a nutshell

123 ongoing projects

€ 7.23 Billion EU granted

~479 Mt CO2 eq to be avoided**

24 Countries

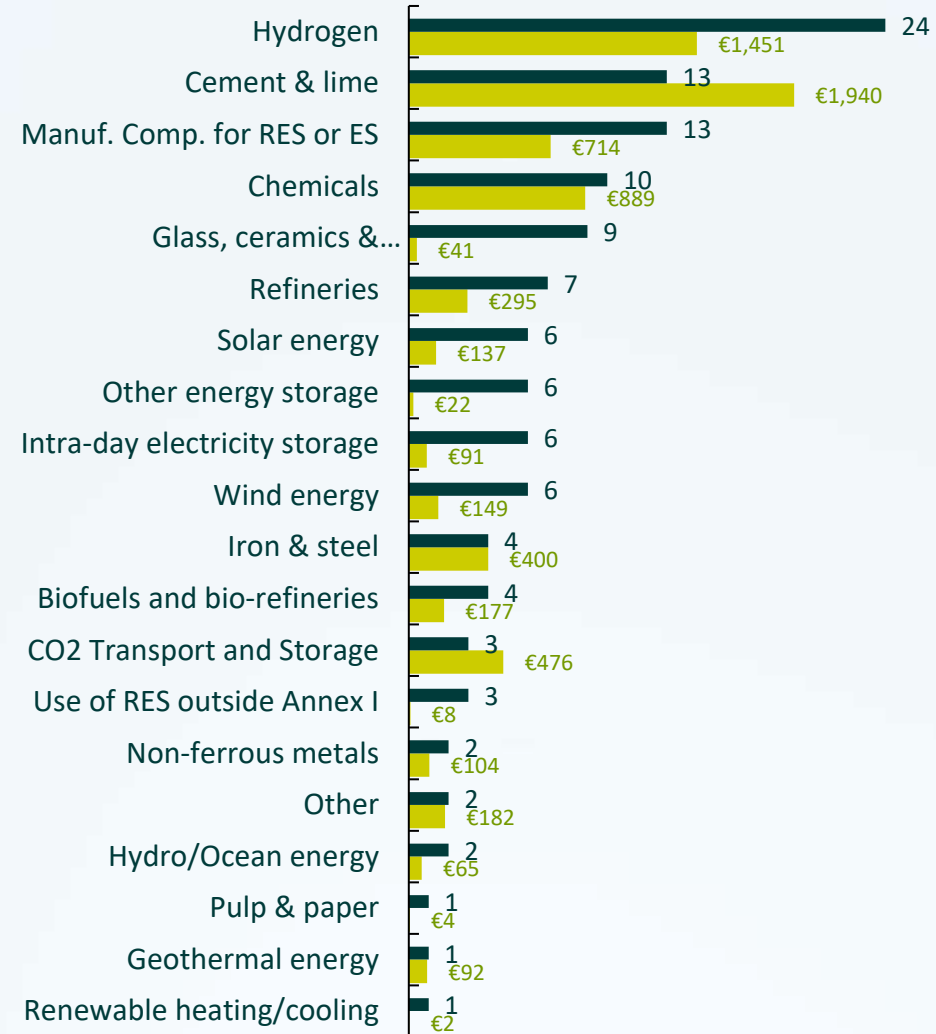Number of Projects per country

25

0
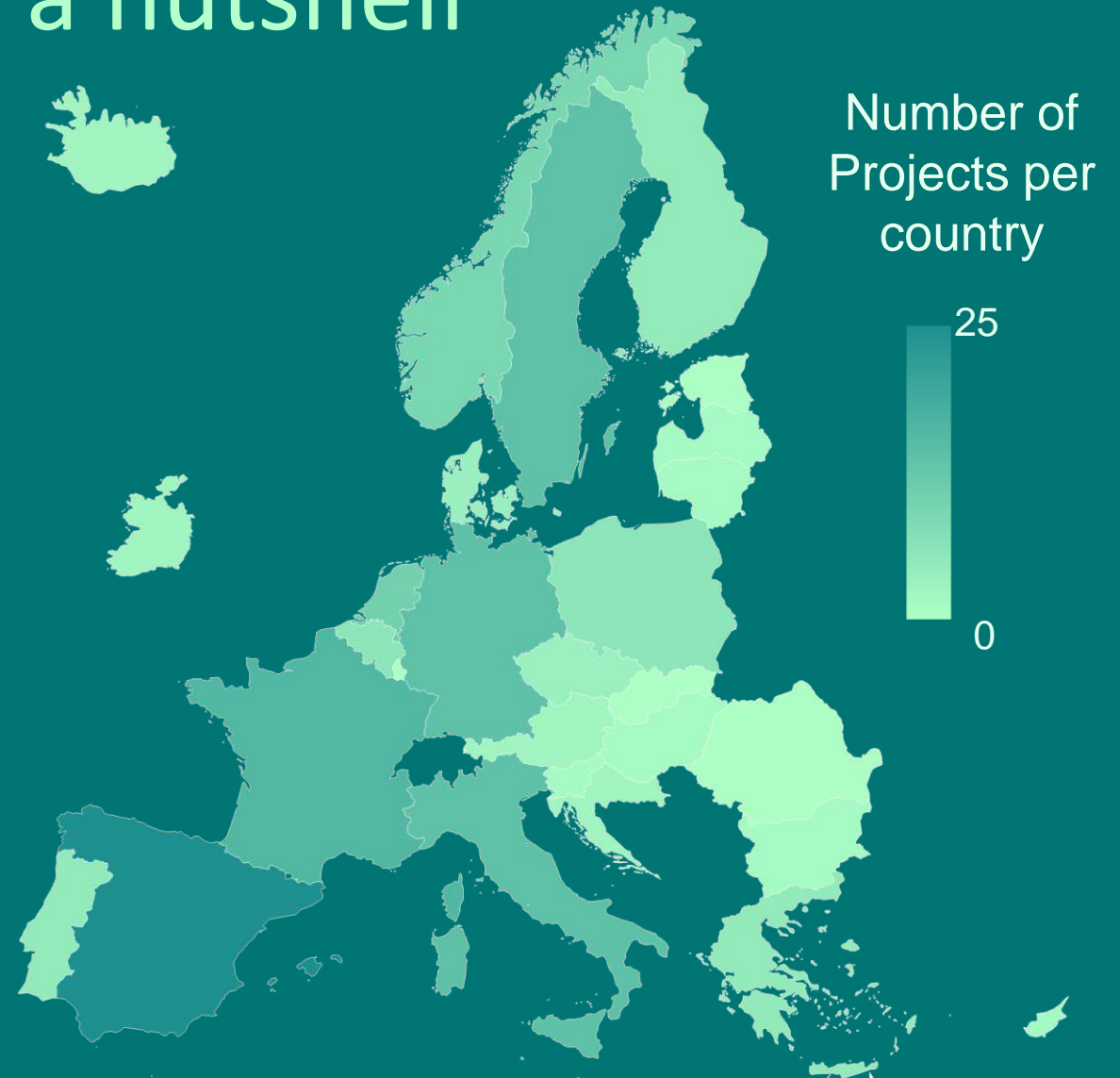
*GAP: Grant Agreement Preparation
** estimated based on 10 years operations

European Commission

IF Portfolio: ongoing projects

Projects' share by category

- Carbon Capture and storage 9%
- Renewable Energy 20%
- Energy Storage 13%
- Energy Intensive Industries 58%

Data includes 123 ongoing projects
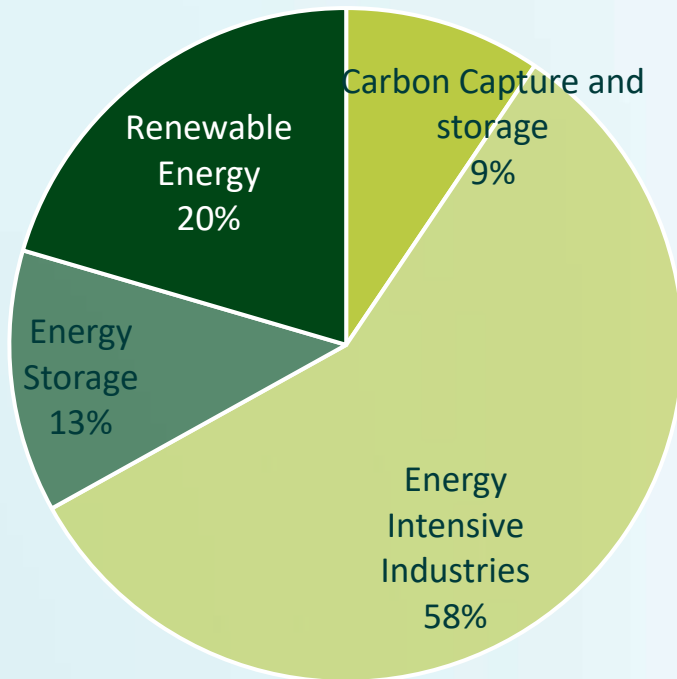
Projects and allocated budget by sector

Sector	# projects	Allocated EU budget
Hydrogen	24	€1,451
Cement & lime	13	€1,940
Manuf. Comp. for RES or ES	13	€714
Chemicals	10	€889
Glass, ceramics &...	9	€41
Refineries	7	€295
Solar energy	6	€137
Other energy storage	6	€22
Intra-day electricity storage	6	€91
Wind energy	6	€149
Iron & steel	4	€400
Biofuels and bio-refineries	4	€177
CO2 Transport and Storage	3	€476
Use of RES outside Annex I	3	€8
Non-ferrous metals	2	€104
Other	2	€182
Hydro/Ocean energy	2	€65
Pulp & paper	1	€4
Geothermal energy	1	€92
Renewable heating/cooling	1	€2

Millions

■ Allocated EU budget ■ # projects

European Commission

IF Portfolio: ongoing + selected projects*

Distribution of projects and allocated EU budget per sector

Sector	Number of projects	Allocated IF budget
Hydrogen	25	€ 1,475
Cement & lime	13	€ 1,940
Manuf. Comp. for RES or…	13	€ 714
Chemicals	10	€ 889
Glass, ceramics &…	10	€ 45
Refineries	8	€ 375
Solar energy	6	€ 137
Other energy storage	6	€ 22
Intra-day electricity…	6	€ 91
Wind energy	6	€ 149
Iron & steel	4	€ 400
Biofuels and bio-refineries	4	€ 177
CO2 Transport and Storage	3	€ 476
Use of RES outside Annex I	3	€ 8
Pulp & paper	2	€ 9
Non-ferrous metals	2	€ 104
Other	2	€ 182
Hydro/Ocean energy	2	€ 65
Geothermal energy	1	€ 92
Renewable…	1	€ 2

Millions

■ Allocated IF budget   ■ Number of projects

24 Countries*

~457 Mt CO$_2$ eq to be avoided*

€ 7.35 Billion EU granted + under GAP*

Projects: 100 ongoing + 27* under GAP

Data includes ongoing projects + selected proposals currently under grant agreement preparation (GAP) : 17 from SSC-2022 + 3 from LSC-2022 and 7 from IF23-AUC-RFNBO-H2

European Commission

Last update: 7 - May -2024

Innovation Fund "Wind" portfolio:

- **Aquilon** Airborne wind hybrid renewable microgrid with RedOX Flow battery to provide flat renewable energy to an industrial site

- **HIPPOW** Offshore Wind turbine generator

- **N2OWF** offshore wind farm, with a capacity of 450 megawatt (MW) combined with on-site production, storage, and offtake of green hydrogen

- **NAWEP** Airborne Wind Energy - build and operate an onshore array of at least 12 off the 100kW KM2 devices generating a combined 1.2MW

- **NEXTFLOAT PLUS** Integrated Floating Wind Optimized for Deep Waters

- **SustainSea** Maritime transport wind propulsion integrated into five large cargo vessels operating, mainly, in EU waters.

- **RoboticRepair** deploy and operate 30 first-of-a-kind robotic systems for Wind Turbine Generator (WTG) rotor blade repair

- **SEAWORTHY** Sustainable dispatchable Energy enabled by wAve-Wind OffshoRe plaTforms with onboard Hydrogen

INNOVATION FUND
Funded by the EU Emissions Trading System

Applications to the 2023 Net-Zero Technologies call

IF23 CALL

Applications per category

Mobility **34**

Energy storage **35**

Renewable energy sources **64**

Total **337**

204 Energy-intensive industries

Project location

0   5   10   15   20   25   30   35   40   45   50   55

Total funding requested: EUR 24.6 billion, 6x higher than the available budget (EUR 4 billion)
Overall, potential to reduce 1.4 billion tonnes CO_2 equivalent

European Commission

Thank you

European Commission

IF dashboard
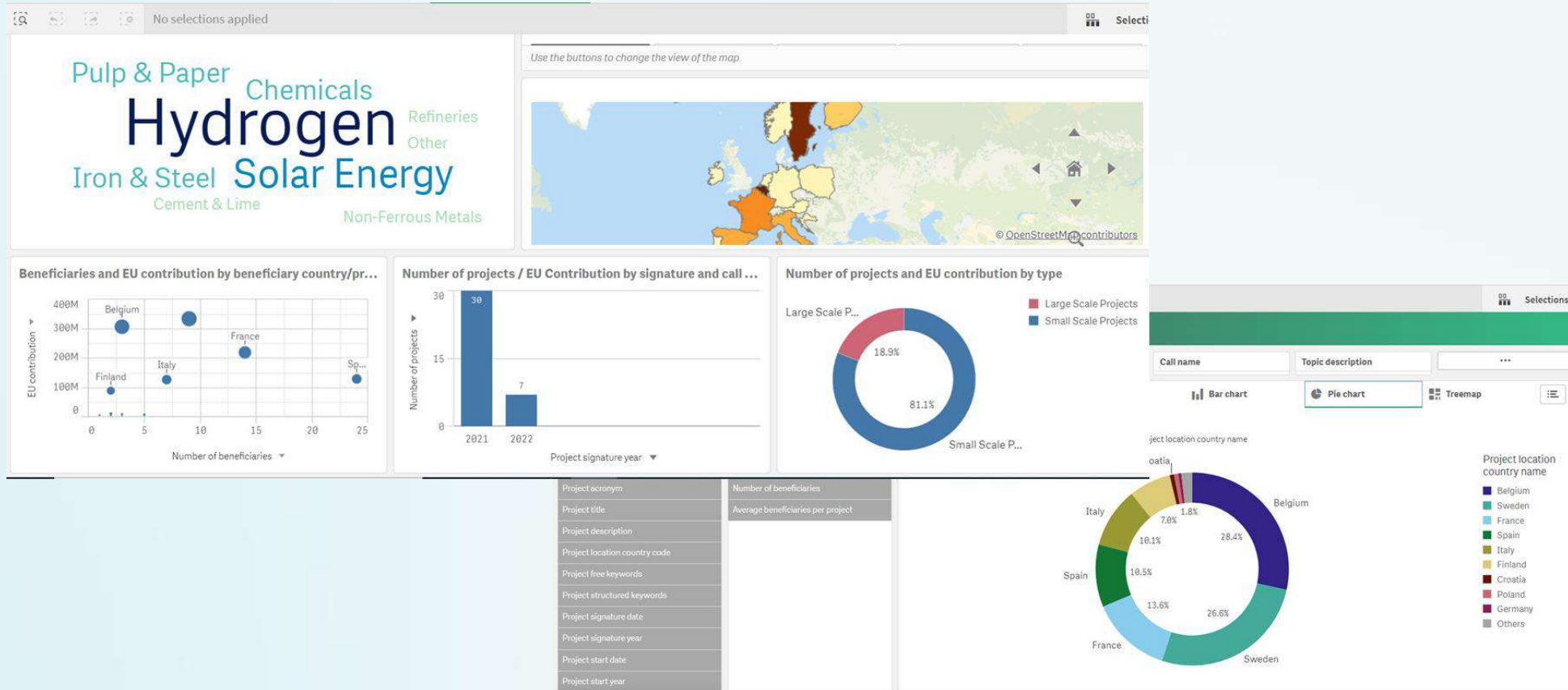
Available on CINEA's website

More information

All (past) call documents available on the Funding and Tenders Portal including:

✓ Guidance and calculation tools on GHG emissions   and

   relevant costs

✓ Frequently asked questions

 https://europa.eu/!QB67by

Further info, planning of new calls, recorded webinars and videos available on the IF Website:

https://europa.eu/!rx34Dt

And more videos available on YouTube:

https://bit.ly/2WxK8w7

European
Commission

Let's keep in touch

🌐 climate.ec.europa.eu

cinea.ec.europa.eu/programmes/innovation-fund_en

@ clima-innovation-fund@ec.europa.eu

f @EUClimateAction

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European Commission

Net Zero Industry Act

Andrea Hercsuth
Policy Officer, DG ENER, European Commission
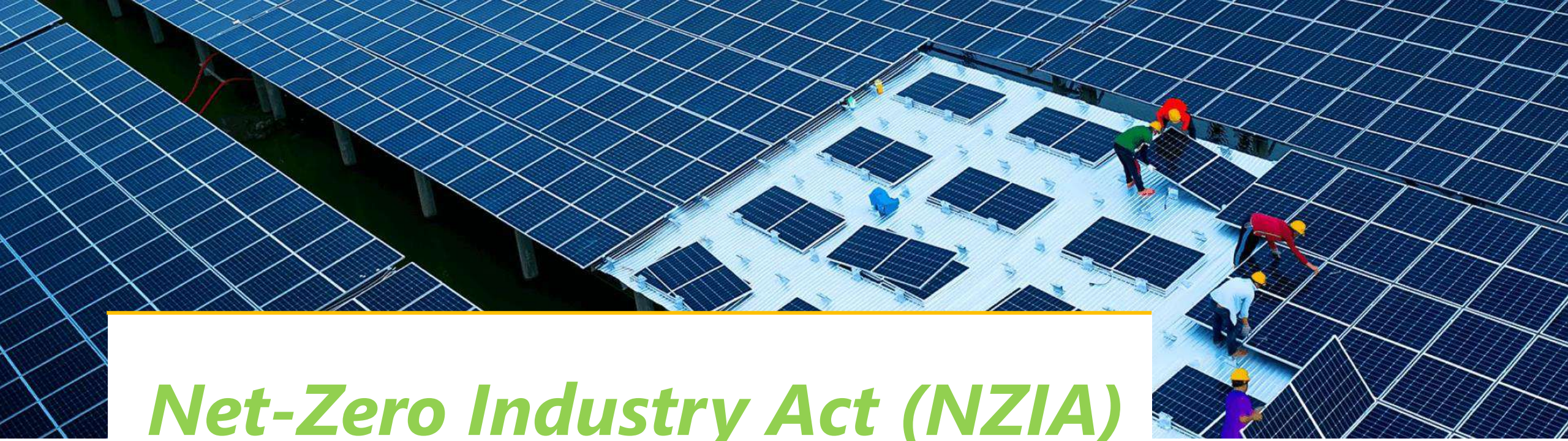
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Net-Zero Industry Act (NZIA)

At ETIPWind public workshop
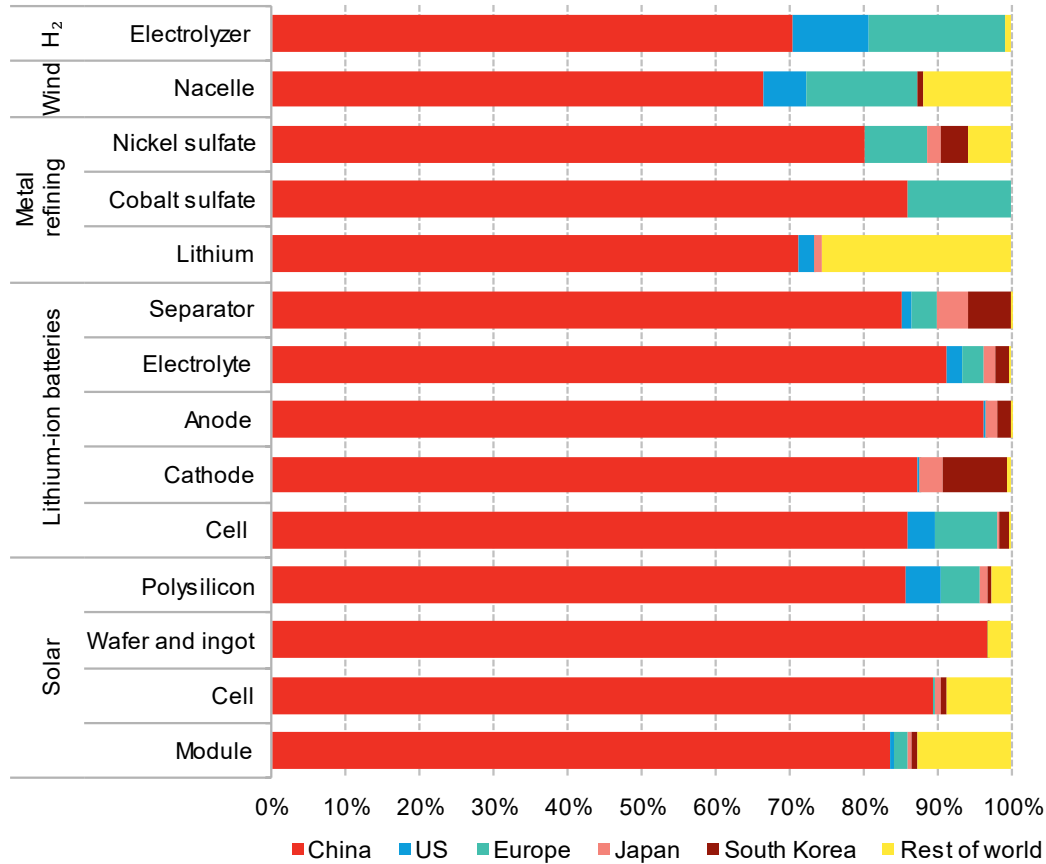
Andrea Hercsuth

ENER.B4
Digitalisation, Competitiveness, Research and Innovation

17 October 2024

General objective of NZIA
Ensuring reduction of strategic dependencies

Clean technology production in 2023
Source: BNEF data

- Establishing a regulatory framework to ensure the Union's access to a secure and sustainable supply of net-zero technologies including by scaling up the manufacturing capacity of net-zero technologies and their supply chains.

Two political benchmarks – reaching manufacturing capacities

at least **40%** of **EU annual deployment needs** for the corresponding technologies necessary to achieve the Union's **2030** climate and energy targets.

an increased Union's share for the corresponding technologies in view to reach **15%** of **world production by 2040**, based on the monitoring in the Act.

Scope & type of projects covered

Focus: manufacturing facilities of net-zero technologies across the <u>full</u> supply chain (except for raw materials)

Coverage: 19 net-zero technology categories

- **Final products and specific components** considered **"primarily used"**
  - *Delegated act: annex of components "primarily used"*
  - *If not listed in the annex: MS selection process based on project promoter evidence that a final product, component or machinery is "primarily used" for a net-zero technology.*

Additionally in scope:

- Energy intensive industry decarbonisation projects and CCS storage sites

European Commission

NZIA - Overview

Enabling conditions for net-zero manufacturing

Streamlining permitting processes (single point of contact, legally binding time-limits)	Strategic projects (priority status, shorter permitting time-limits)	Acceleration valleys (areas to foster net-zero industry clusters)

Access to markets

Public procurement: Environmental sustainability, resilience contribution	Auctions: apply non-price pre-qualification and award criteria	Other forms of public intervention

CO_2 injection capacity

Skills
Net-Zero Academies

Governance and monitoring

Innovation
Regulatory sandboxes

European Commission

Access to Markets

Public procurement

- Mandatory minimum requirements on **environmental sustainability** (implementing act)

- At least one additional criterion: **social and employment-related considerations, cybersecurity, obligation to deliver on time**

- **Resilience criterion**

  - When?
    - *More than 50% dependency from a single source of supply.*
    - *Dependency increase of more than 10 percentage points on average over two years, leading to a dependency over 40%.*
  - How?
    - No more than 50% of the value may come from that triggering single source of supply
    - Non-compliance charge of at least 10% of the value of the specific product

Auctions

- Pre-qualification criteria related to **responsible business conduct, cyber security and data security and ability to deliver the project fully on time.**

- **Sustainability and resilience contribution** shall be included either as pre-qualification or award criteria.

  - *Contribution to resilience*

  - *At least one of the following: **environmental sustainability, innovation, energy system integration**.*

- *The article would apply to at least 30% of the yearly volume of auctions per Member State, or alternatively to at least 6 GW per year per Member State, depending on each Member State's decision.*

European Commission

Bridging innovation & manufacturing (1/2)

Regulatory sandboxes

- If a project/solution is facing regulatory barriers to be implemented, it can require authorities to create a **NZ regulatory sandbox** to get time-limited exemption from the rule in question.

- Aim is to foster start-ups and innovative technologies, to allow for trials and to see if the regulatory framework can be adjusted.

- Important tool to support communication and collaboration between innovators and competent authorities (e.g. energy regulators or other responsible entities).

Need for regulatory experimentation in the energy sector (SWD(2023) 277/2 final)

➢ **System transformation**

- **Profound transformation in the context of the digital and green transition** (EU Green Deal, Fit for 55 Package; REPowerEU, Digital Strategy)

- Climate – security of supply – competitiveness -> accelerated deployment of **EE, RES, smart energy systems**

- **Innovation** - key to enabling the complex transformation of the sector to reach our objectives

➢ **Barriers**

- Innovative energy projects might face different types of **barriers**
  - Technical challenges (e.g. interoperability); Limited resources to fund innovation due to high financial risks; Resistance to change among stakeholders
  - **Regulatory barriers** – delays in transposition, lack of sufficiently streamlined regulation, lack of regulation, split incentives

- **Limitations** built in the regulatory framework – might serve **well justified societal purposes** –> **not in the scope** of regulatory experimentation

- Focus on **unintended regulatory barriers** (flexibility markets for electricity, waste-heat recovery, integration of demand-side assets, prosumer-use cases, community energy storage, offshore wind farm permitting, recycling of blades, agri-PV, floating PV, integrated PV in building codes…)

European Commission

Regulatory sandboxes are*...

* Based on MS examples in the energy sector.

- Schemes used when the **competent authority** (be it energy regulator of the ministry) provides a **wider scheme** theoretically **open to all market actors**.

- **Typical characteristics**:

  - a **transparent** framework

  - potentially **open to all** market actors,

  - an **application and selection procedure,**

  - providing **time-limited derogations**,

  - on a **case-by case basis**,

  - a requirement for an **innovative element** from the project,

  - a requirement to serve the (EU and national) **energy policy objectives** providing directly societal/ consumer benefits,

  - **safeguards** for general regulatory objectives (safety, consumer protection, internal market competition),

  - **reporting** obligations for the participants,

- **monitoring and evaluation** responsibilities for the competent authority,

- **publication of results** to the wider public,

- **regulatory learning** element

- **legal base** in national sectoral (energy) or wider legislation (in order to provide powers for derogations)

There is a **degree of variability** as to:

- **who manages** the programme (ministry, energy regulator, other governmental body),

- the **target group** (any market participants, or a predefined group)

- the **scope of derogations** possible (only certain pre-defined aspects, or any provision of the specific law, or even going beyond the sectoral legislation),

- **how regulatory learning** is ensured.
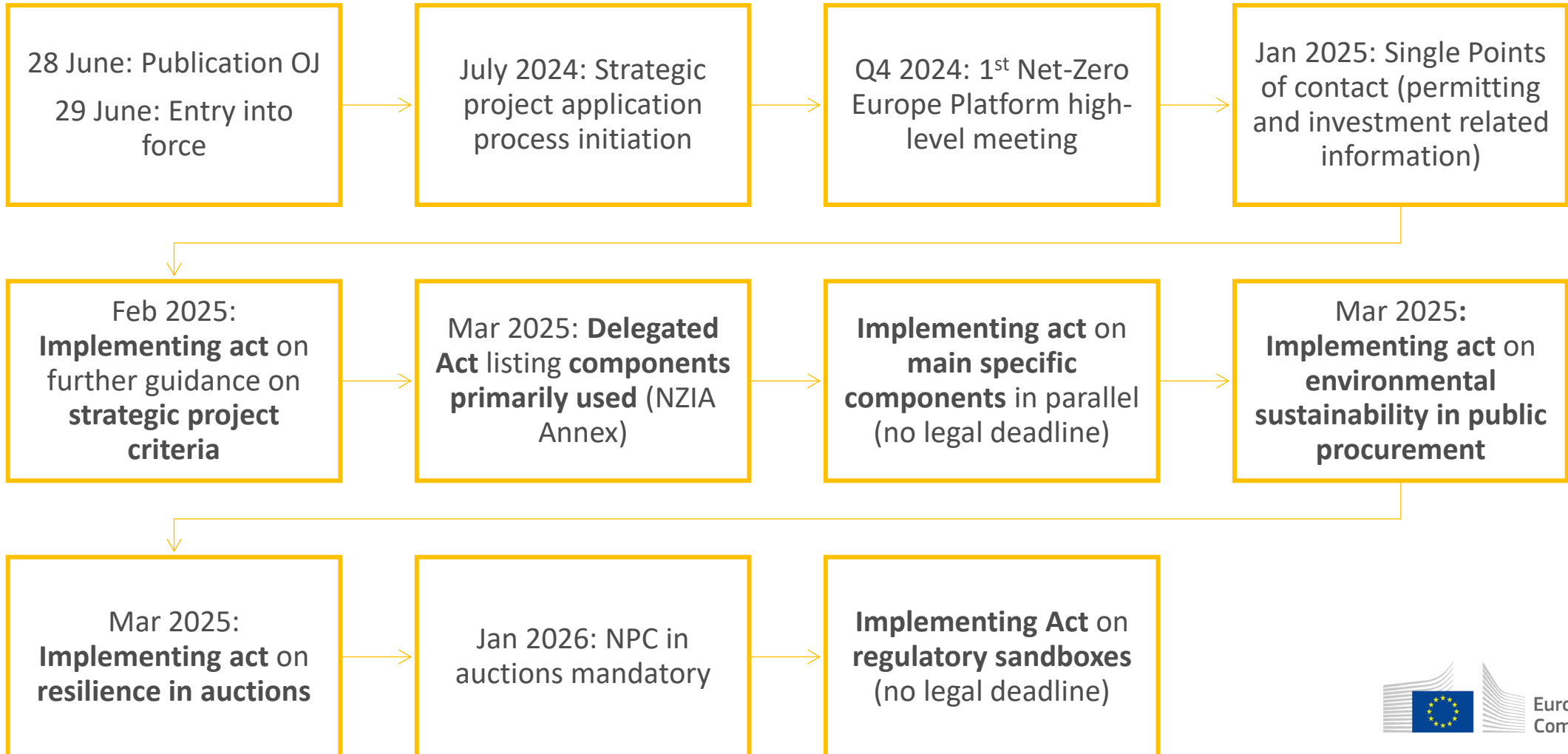
(SWD(2023) 277/2 final)

76

Bridging innovation & manufacturing (2/2)

Strategic Energy Technology (SET) Plan

- Principal policy tool for net-zero energy research and innovation

- Link with & in NZIA: Insurance that energy research and innovation policies and priorities are linked with manufacturing

- NZIA **enshrines the SET Plan Steering Group** in its text and sets it up as "**other entity**"

NZIA Implementation Timeline (*Process on strategic projects and secondary legislation*)

28 June: Publication OJ 29 June: Entry into force	July 2024: Strategic project application process initiation	Q4 2024: 1st Net-Zero Europe Platform high-level meeting	Jan 2025: Single Points of contact (permitting and investment related information)
Feb 2025: **Implementing act** on further guidance on **strategic project criteria**	Mar 2025: **Delegated Act** listing **components primarily used** (NZIA Annex)	**Implementing act** on **main specific components** in parallel (no legal deadline)	Mar 2025**: Implementing act** on **environmental sustainability in public procurement**
Mar 2025: **Implementing act** on **resilience in auctions**	Jan 2026: NPC in auctions mandatory	**Implementing Act** on **regulatory sandboxes** (no legal deadline)	

Thank you

[Net Zero Industry Act - Website](#)

Time for Questions & Answers!

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Workshop outcomes and next steps
ETIPWind Secretariat

etipwind.eu

Use of workshop outcomes

Short-term R&I priorities 2025-2027
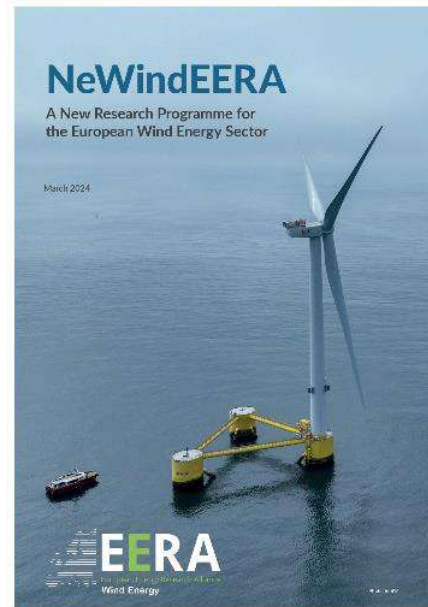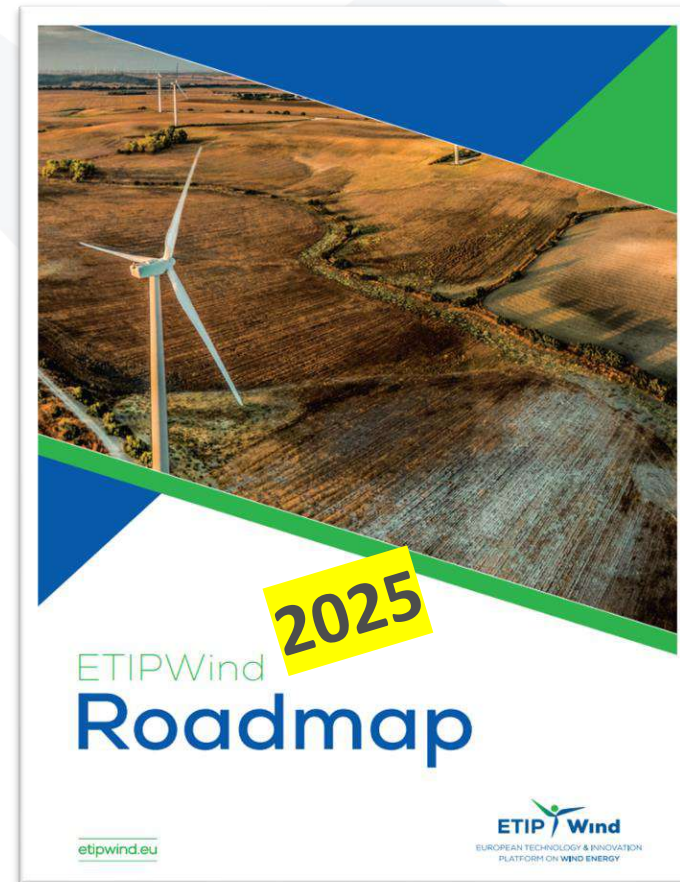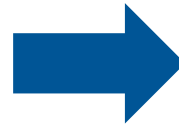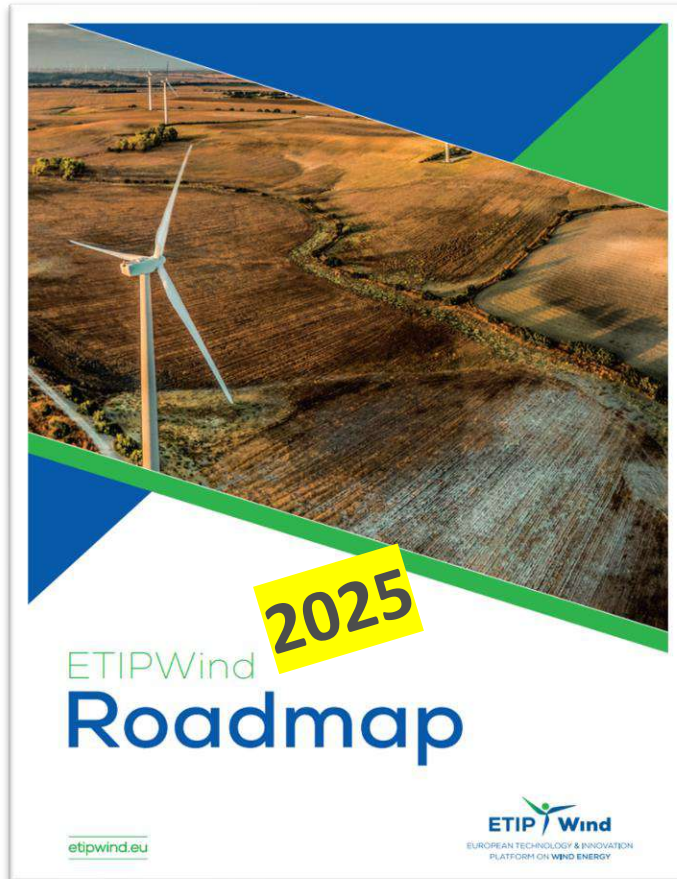
Long-term research actions by 2050

2025

ETIPWind **Roadmap**

- **Focus on the implementation**

- **Provides a long-term strategy to correctly address the R&I priorities at EU and national level**

- **Supported politically by both the European Commission and the Member States**

- **Basis for establishing a long-term R&I partnership**

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Use of workshop outcomes

ETIPWind **Roadmap** 2025

- **Focus on the implementation**

- **Provides a long-term strategy to correctly address the R&I priorities at EU and national level**

- **Supported politically by both the European Commission and the Member States**

- **Basis for establishing a long-term R&I partnership**

Content:

→ Analysis of the current EU funding support for wind &I

→ Long-term R&I priorities (based on EERA and ETIPWind strategic agendas)

→ Implementation strategy (partnership, optimisation of EU and national funding)

→ Key recommendations

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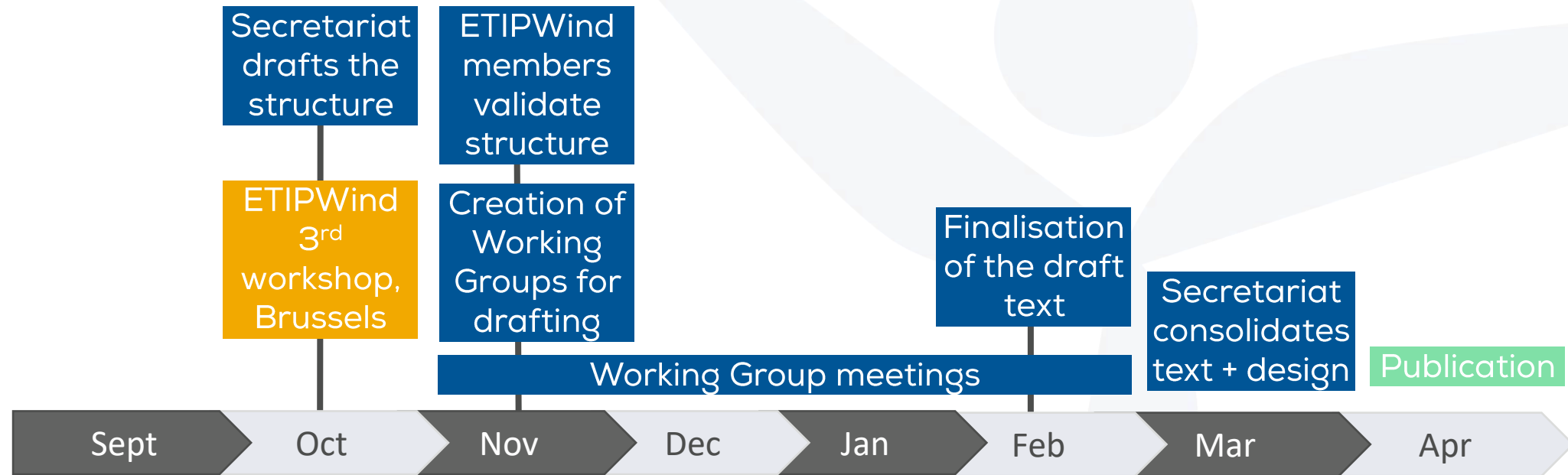
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Download and use our new factsheet!

- 5 wind energy technology megatrends

- Now available on the ETIPWind website:

https://etipwind.eu/publications/
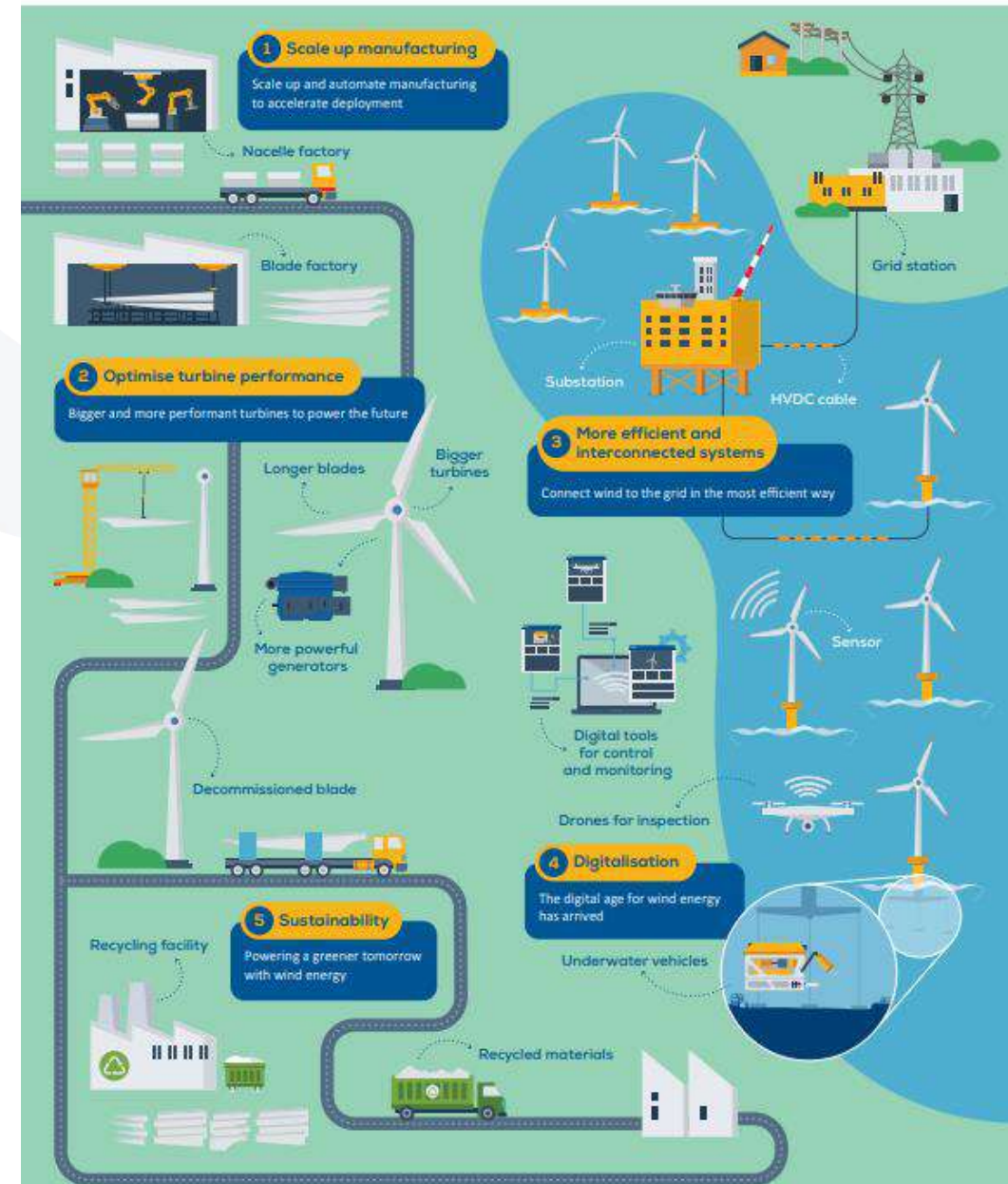
THANK YOU

Contact: secretariat@etipwind.eu

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