From Innovation to Industrial Competitiveness

How wind R&I funding will deliver European Technology Sovereignty

April 2025

ETIP Wind
EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON WIND ENERGY

EERA
European Energy Research Alliance
Wind Energy

Wind Implementation Working Group

About ETIPWind

ETIPWind, the European Technology and Innovation Platform on Wind energy, connects Europe's wind energy community. Key stakeholders involved in the platform include the wind energy industry, political stakeholders and research institutions.

The ETIPWind was established in 2016 to inform Research & Innovation policy at European and national level. ETIPWind provides a public platform to wind energy stakeholders to identify common Research & Innovation priorities and to foster breakthrough innovations in the sector.

Its recommendations highlight the pivotal role of wind energy in the clean energy transition. They inform policymakers on how to maintain Europe's global leadership in wind energy technology so that wind delivers on the EU's climate and energy objectives. As such, the platform is key in supporting the implementation of the SET Plan (Strategic Energy and Technology Plan).

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Executive Summary

Wind is a clean, free, and readily available renewable energy source. Wind energy does not need to be mined or shipped. And the more we use it, the closer Europe gets to real energy independence. Wind energy is therefore a strategic sector for Europe and central to Europe's energy security strategy.

The wind industry is **Europe's flagship clean tech industry**. Wind energy companies and research institutes employ more than 370,000 people and contribute more than €52bn to the EU's GDP. Wind energy provides for 20% of Europe's electricity demand. And the European Commission sees wind being half of Europe's electricity by 2050, with wind energy installed capacity in the EU rising from 231 GW today to up to 1,300 GW by mid-century.

EU and national funding for Research & Innovation (R&I) has been **instrumental in turning wind energy from a promising technology to an established industry**. R&I support has allowed the wind industry to grow sustainably, made wind competitive in the energy markets, and has brought socio-economic benefits to all Europeans.

But past successes must not lead to complacency. **European policies and instruments for R&I funding are falling short**, leading to the gradual decline of Europe's industrial competitiveness.

In today's (geo-)political world clean energy technologies are of increasing strategic importance. Achieving **energy independence and technology sovereignty is essential to Europe's economic resilience**. Europe needs to urgently electrify its energy demand to reduce its dependence on expensive and unreliable fossil fuel imports and achieve true decarbonisation. And it must support its wind energy industry to ensure the electricity consumed in Europe is produced with European equipment and technology.

The wind energy industry faces key innovation challenges as it looks to scale up. To boost the competitiveness of the European wind sector, the Strategic Energy & Technology Plan (SET Plan) community on wind energy[1] agrees on a **common European strategy for wind research and competitiveness by 2050**. This report spells out the main elements of the strategy: scale up manufacturing capacity and industrial productivity, improve the resilience and cybersecurity of the energy system, and achieve a 100% circular European wind energy supply chain composed of skilled workers and supported by all Europeans.

The good news is that Europe has **academic excellence in fundamental wind research**. And there is still a strong European industry that can take up that research. The bad news is that the **EU lacks the right R&I policies and tools** to translate that excellence and innovation potential into industrial competitiveness.

Optimising and streamlining public R&I funding for wind is essential to put the wind energy industry back on track to deliver the EU's climate and energy goals and boost the competitiveness of Europe's flagship clean tech industry.

The SET Plan community on wind energy therefore calls on EU and national policymakers to:

- **Prioritise wind energy** in EU and national industrial competitiveness policies.
- **Increase EU and national wind energy R&I funding** to at least €600m a year.
- **Align all wind energy R&I funding** with the common strategy spelled out in this report.
- **Set up a European Fund for Wind Research & Competitiveness** to centralise funding access.
- **Simplify the administrative requirements** associated with public R&I funding.
- **Streamline the SET Plan ecosystem**.

This report provides the blueprint of a common European strategy to turn Europe's excellence in wind energy R&I into industrial competitiveness and to deliver technology sovereignty. A **European Fund for Wind Research & Competitiveness** must be set up to implement this strategy, ensuring that the European wind industry can provide Europe with the clean electricity it will need for a climate-neutral and competitive economy by 2050.

1 In this report, the "SET Plan community on wind energy" refers to the European Technology & Innovation Platform on wind energy (ETIP-Wind - gathering industry and research experts), the EERA Joint Programme on wind energy (EERA JP Wind - gathering research experts), the SET Plan implementation working group on wind energy (IWG Wind - gathering representatives from 10 EU Member States).

1

Wind energy at heart of Europe's Green and Clean Industrial Deal

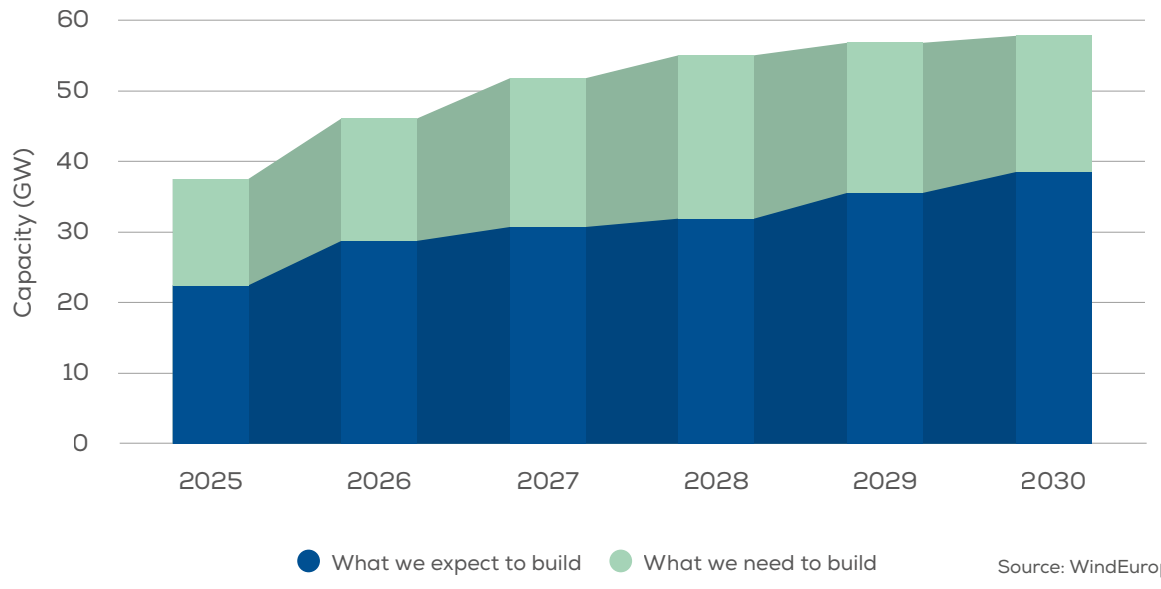
The European Union's supporting framework for wind energy is rooted in its commitment to become climate neutral by 2050 and to strengthen its energy security. To this end the EU has launched a European Green Deal, a regulatory framework enshrining the EU's energy and climate ambitions into law.

Under the Green Deal, the EU must cut greenhouse gas emissions by at least 55% and increase the share of renewables to at least 42.5% by 2030. More wind energy is instrumental in meeting these targets. By 2030 the EU will need 425 GW of wind energy, covering 34% of electricity demand. To deliver climate neutrality by 2050 wind is expected to provide more than half of this increasingly larger electricity demand.

The EU relies on wind energy because of its unique value proposition. Wind can provide the bulk volumes of clean renewable electricity needed to decarbonise industry, transport and homes. Wind energy is still made in Europe, providing 370,000 jobs and contributing more than €52bn to the EU's GDP. Wind is a local energy source that secures energy independence. And avoids the need for expensive, unreliable fossil fuel imports.

Despite political ambitions, the much-needed growth of the European wind industry has stalled. Slow policy implementation, rising costs of raw materials, and the changing (geo-)political environment have taken their toll. To reach its 2030 targets, the EU should be installing 35 GW of new wind farms a year on average. But installations are falling significantly short, with just 13 GW connected in 2024 (see Figure 1).

Figure 1
Expected and needed annual wind energy installations in the EU 2025-2030



Source: WindEurope

> With rising ambitions and global competition intensifying, Europe must prioritise R&I funding for wind to maintain a resilient, competitive, and sustainable wind industry.

In response, the European Commission launched the Wind Power Action Plan to strengthen the European wind energy sector's resilience and boost its global competitiveness. The package lays out 15 clear actions to accelerate permitting, improve auction design, and create a level-playing field for industry to compete. But it had one major shortcoming. It does not do enough to increase or improve R&I funding for wind.

With rising ambitions and global competition intensifying, Europe must prioritise R&I funding for wind to maintain a resilient, competitive, and sustainable wind industry. Europe holds all the cards. It can boast academic excellence in fundamental and applied research, plus an innovative European industry that can readily take up that research and bring it to market.

But the EU lacks the right policies and tools to translate that excellence and innovation into industrial competitiveness. The biggest difference can be achieved through better coordination of the fragmented wind R&I funding landscape. The current European energy R&I coordination framework – the SET Plan – is not up to the task.

In 2024 Mario Draghi and Manuel Heitor each issued a report highlighting significant challenges in the European "innovation lifecycle".[i; ii] Overcoming them will require rapid implementation of new fit-for-purpose R&I initiatives that address five main weaknesses in the current EU R&I funding approach:

1. The EU is simply not spending enough on R&I.
2. EU R&I spending is fragmented.
3. EU R&I spending lacks focus and direction.
4. R&I funding instruments are bureaucracy heavy
5. The EU lacks a wider supportive financing system to bring innovation to market.

The Draghi and Heitor reports provide the EU with the blueprint for a new Clean Industrial Deal tailored to deliver the Green Deal and sustain industrial competitiveness. Clean energy technologies like wind should be a strategic area where the EU should increasingly prioritise its R&I funding.

That funding should be disbursed through fewer programmes with easier rules and criteria, and in closer partnership with national and private R&I funding. Representatives from industry and academia should also be involved in the decision-making process to ensure funding flows to the most impactful projects.

The European Commission's communication on the Clean Industrial Deal published in February 2025 contains positive first steps toward strengthening EU funding for clean technologies, including a €600m Horizon Europe pilot call for a clean tech deployment project. But these measures will not be enough. They must be coupled with an improved framework for wind energy R&I in the next EU budget (2028-2034).

With that in mind, the European wind energy sector calls on the EU to set up a European Fund for Wind Research & Competitiveness. It must address the five R&I funding weaknesses highlighted above and direct funding to common R&I priorities that will put the wind industry back on track to deliver the EU's climate and energy goals and boost the competitiveness of Europe's flagship clean tech industry.

This report provides policymakers at EU institutions and National Governments with all the pieces of the puzzle.

Chapter 2 outlines the core elements of the common R&I priorities. These represent the shared view of the SET Plan Community on Wind Energy and build on the R&I agendas of the wind industry (ETIPWind), the research community (EERA and EAWE) and Member States (IWG Wind).

Chapter 3 provides a critical assessment of the European funding landscape for wind R&I today and makes recommendations for improvements.

Chapter 4 looks at how a European Fund for Wind Research & Competitiveness will address R&I funding challenges for the wind sector. And it spells outs the sector's preliminary ideas on how this could be implemented in the next EU budget (2028-2034).

2

Common European strategy for wind R&I funding

The European strategy for wind R&I was jointly developed by the SET Plan community on wind energy. It builds on and harmonises the existing R&I strategies from the European wind industry (ETIPWind's Strategic R&I Agenda 2025-2027), wind research and academia (EERA JP Wind's NeWindEERA research programme) and national priorities from the SET Plan Implementation Working Group on Wind Energy (IWG Wind).

This long-term strategy makes it clear that the whole wind energy sector is fully aligned by a common and coordinated R&I programme for wind energy to maintain a strong, competitive, and sustainable European wind industry, capable of securing Europe's energy sovereignty and meeting EU climate and energy targets.

The strategy is based on five long-term targets to guide public and private R&I investments from now until 2050.

1. The European wind industry must be healthy and competitive at the global scale.
2. The European industry should have harnessed the potential of digitalisation, automation with high cybersecurity standards.
3. Wind should be the backbone of a climate-neutral energy system centred around electrification.
4. Wind farms are fully circular and have a positive environmental impact.
5. Society should actively support and recognise wind energy as indispensable to European prosperity and climate-neutrality.

Implementing a common European strategy for wind R&I will require both alignment and better coordination of EU and national funding for wind R&I. The alignment is there, but the coordination is missing.

The alignment can be found by looking at the wind R&I priorities identified at the EU level as defined in ETIPWind's Strategic R&I Agenda, the NeWindEERA programme and the R&I priorities addressed in national R&I funding programmes.

A survey conducted within the IWG Wind in 2024 showed full alignment of national priorities with the 28 R&I priorities defined in the ETIPWind and EERA JP Wind documents. This survey also showed that most IWG Wind members are willing to invest in 24 out of 28 R&I priorities. [iii]

Without proper coordination in public funding for wind R&I, there is a significant risk of duplication and gaps in topics addressed, diffusing the impact of R&I investments. The fact that most national funding programmes relevant for wind energy are "technology-neutral" and don't have specific funding budgets for wind energy R&I makes the coordination even harder and prevents a strategic and impactful implementation. The net result is that funding commitments become difficult at best and unreliable at worst.

The IWG Wind survey shows that Member States want stronger collaboration between the EU, industry, academia and National Governments to implement this strategy through a European-wide initiative or fund.

The next sections will provide a visual summary of the common European strategy for wind R&I focusing on each long-term target. The milestones and market enablers (or other needs) are represented using a timeline. It consolidates the sector's previous R&I agendas and identifies several R&I milestones between now and 2050 to mark major technology advancements for the European wind sector. In addition, the strategy includes Key Performance Indicators (KPIs) to help the sector in tracking progress towards the long-term targets.

Still, R&I investments alone will not be enough to implement the common European strategy for wind R&I. Policies, infrastructure investments, and other developments will have to supplement R&I funding so the milestones can materialise. These R&I enablers are defined as "other needs" in the graphics.

2.1
The European wind industry must be healthy and competitive at the global scale

Wind energy in Europe is "made in Europe". 99.9% of the turbines installed in Europe are made by European manufacturers. But to meet its 2030 energy targets the EU needs to double its annual wind energy installations. More R&I is needed to scale up production and fill the gaps in the manufacturing and material supply chains.

Innovative solutions such as (semi-)automated manufacturing processes or modular designs will lead to cost-efficient production and accelerate wind energy deployment in Europe. A key milestone would be to develop the first fully automated production line for customised components (e.g. substructures).

In recent years both onshore and offshore wind turbines have grown significantly in power and size. They will likely continue to grow in the future. But that growth must become more gradual so the entire supply chain can scale up in a sustainable way. The accelerated growth in turbine sizes creates new R&I challenges in terms of transport and installation methods, testing, and reliability. Strengthening the reliability of turbine components through new design tools will mean better use of materials and would save valuable resources.

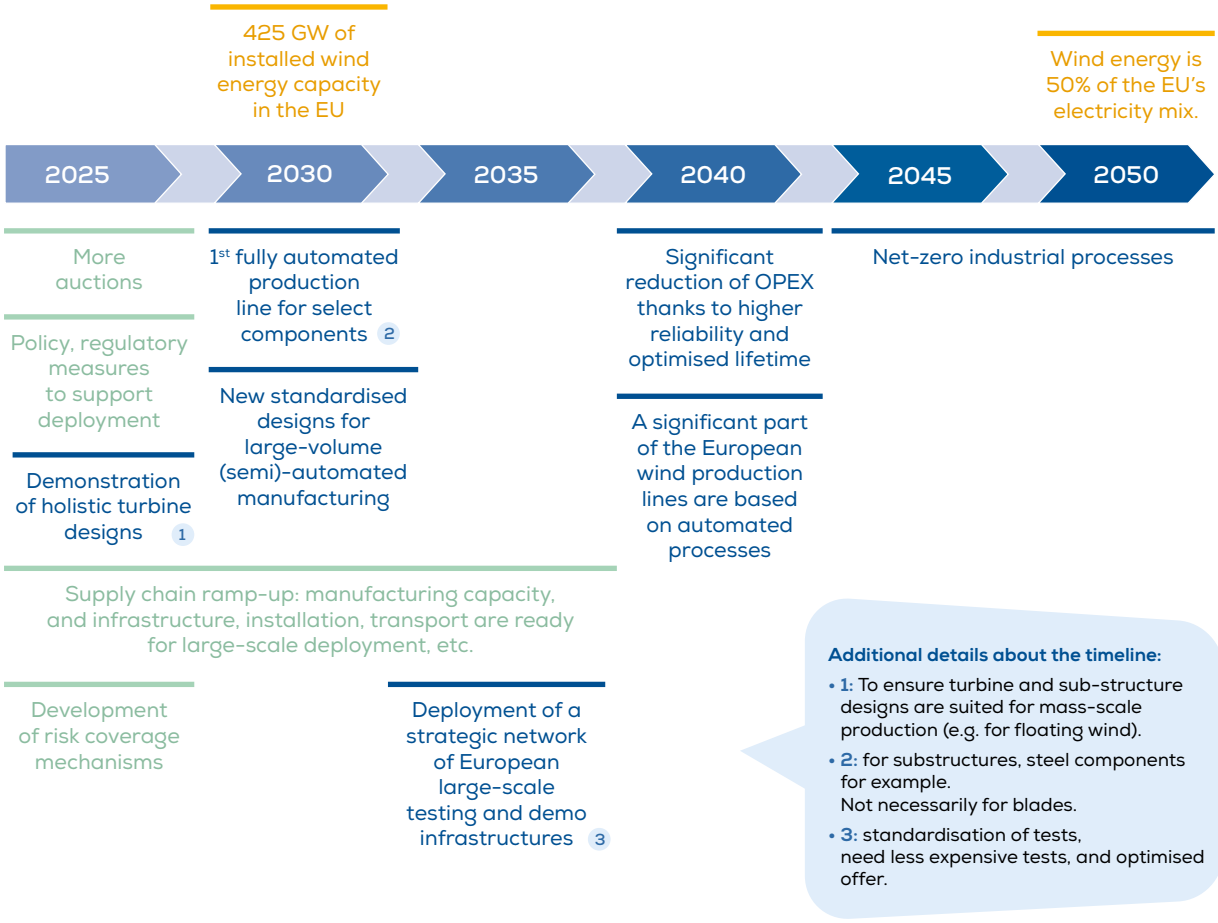
R&I must be coupled with auction designs at national level and policy measures at EU level which support European supply-chain deployment. Infrastructure investments in ports and transport will also be needed to ensure the equipment can be delivered to the projects safely, on time, and at reasonable prices.

For more details on R&I topics and projects that will drive progress on the milestones mentioned above, please see:

- The ETIPWind Strategic R&I Agenda section 4.1
- The EERA JP Wind research programme section 3.1

Figure 2
R&I strategy timeline for long-term competitiveness

Key Performance Indicator:
- Turbine manufacturing capacity (MW per year).



2.2
The European wind industry harnesses the full potential of AI, digitalisation, and automation with high cybersecurity standards

In the past few years, the European wind industry has invested heavily in R&I for digital solutions to optimise operations and maintenance (O&M) and to boost wind farm productivity and turbine availability. Those solutions cut the O&M cost of wind farms and directly boosted the sector's cost-competitiveness.

But we still need further R&I to harness the full potential of digitalisation, robotisation and Artificial Intelligence (AI). Rapid development in these fields means that we cannot allow for complacency. Continued R&I support must be available so that the wind sector can adapt to new technological developments and key challenges. In recent years cybersecurity of wind energy and the energy system as a whole has become a top priority for the EU.

The accelerated growth of wind turbine component sizes (see chapter 2.1) also creates new challenges for O&M. R&I investments must develop new transport and replacement methods for major components and new reliable designs to ease O&M of onshore and offshore turbines. Digital innovations will also help to develop smart materials and tailor-made O&M strategies to extend the lifetime of turbine components.

Robots and automation have the potential to optimise a wide range of O&M activities as well. They limit the need for onsite operations and therefore increase workers' safety. Some autonomous tools or resident robots have been developed but are not yet widely available. By 2050, R&I should therefore focus on embedding these technologies in the standard toolkit of wind farm operations. This means future wind turbines can be self-maintaining, self-repairing or even self-assembling.

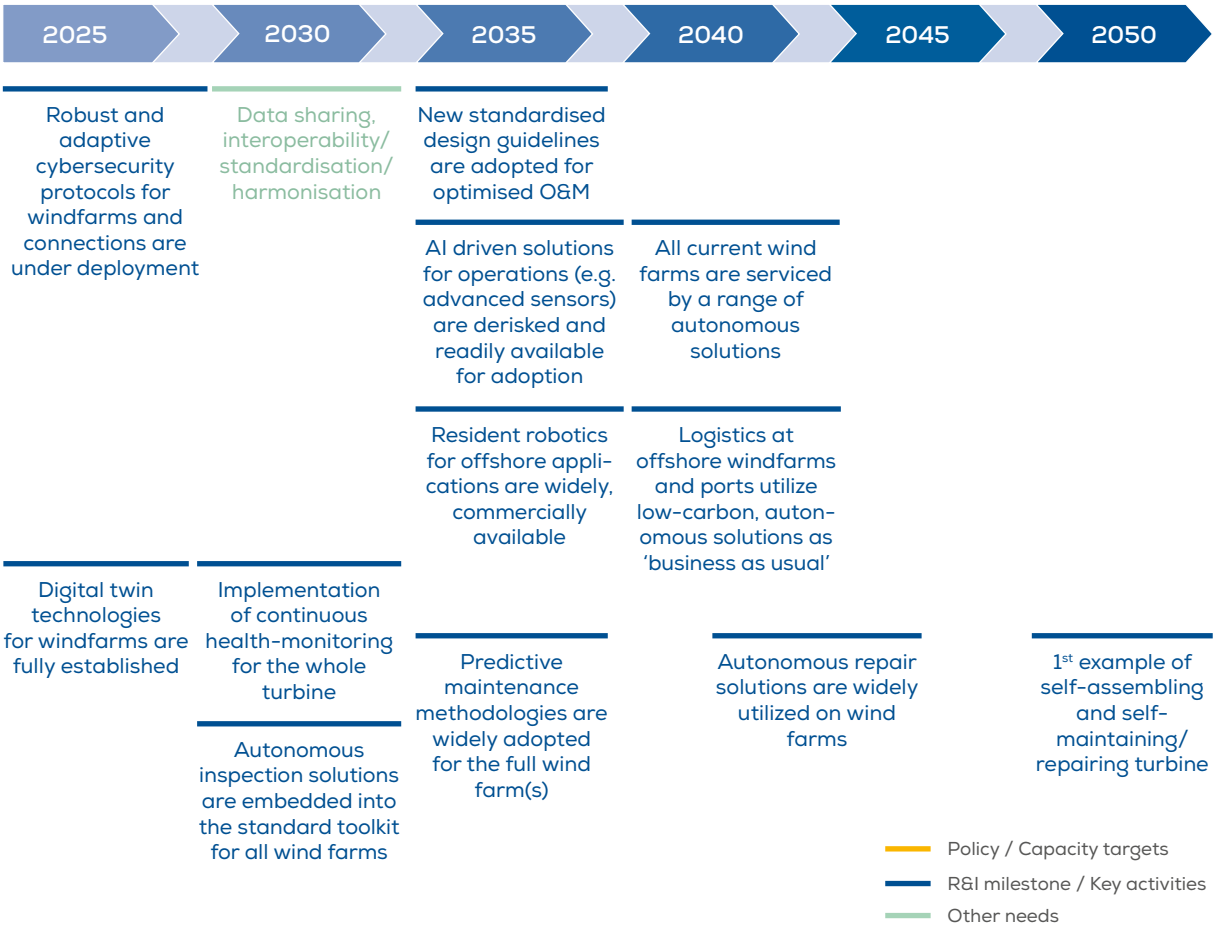
For more details on R&I topics and projects that will drive progress on the R&I milestones mentioned above, please see:

- The ETIPWind Strategic R&I Agenda section 4.2
- The EERA JP Wind research programme section 3.2

Key Performance Indicator:

- Generation loss (in MWh or percentage) during the year based on wind turbine component downtime.
- Cost-reduction of O&M activities (€/kW or percentage).

Figure 3
R&I strategy timeline for harnessing the full potential of digitalisation



2.3
Wind energy will be the backbone of a climate-neutral energy system centred on electrification

Wind energy is already a key component of Europe's energy system. In 2024 wind provided 20% of Europe's electricity. By 2030 it should provide for 30% and by 2050 this should be 50% of an increasingly electrified energy system. Achieving these ambitions is possible. But it will require a combination of policy changes and new technological solutions, plus major upgrades to and expansion of our grids.

In the short to medium-term, we need to boost R&I efforts to demonstrate key technologies enabling the integration of onshore and offshore wind energy. This includes large-scale demonstrations of hardware (e.g. a multi-vendor, multi-terminal High Voltage Direct Current (HVDC) system), but also large-scale demonstration of softer innovations (e.g. wind farms' grid forming capabilities and the provision of other ancillary services). Offshore grid development deserves particular attention with R&I challenges to both AC and DC (floating) substations, dynamic power cables, and large-distance subsea HVDC transmission cables.

This should go together with solutions to optimise the flow of energy at wind farm (e.g. hybrid plants) and grid level (e.g. storage, advanced grid management technology). Technologies to upgrade existing grid infrastructure and accelerate grid expansion should also be developed. The result will help to guarantee grid stability and flexibility and prevent wind energy from being curtailed from the grid.

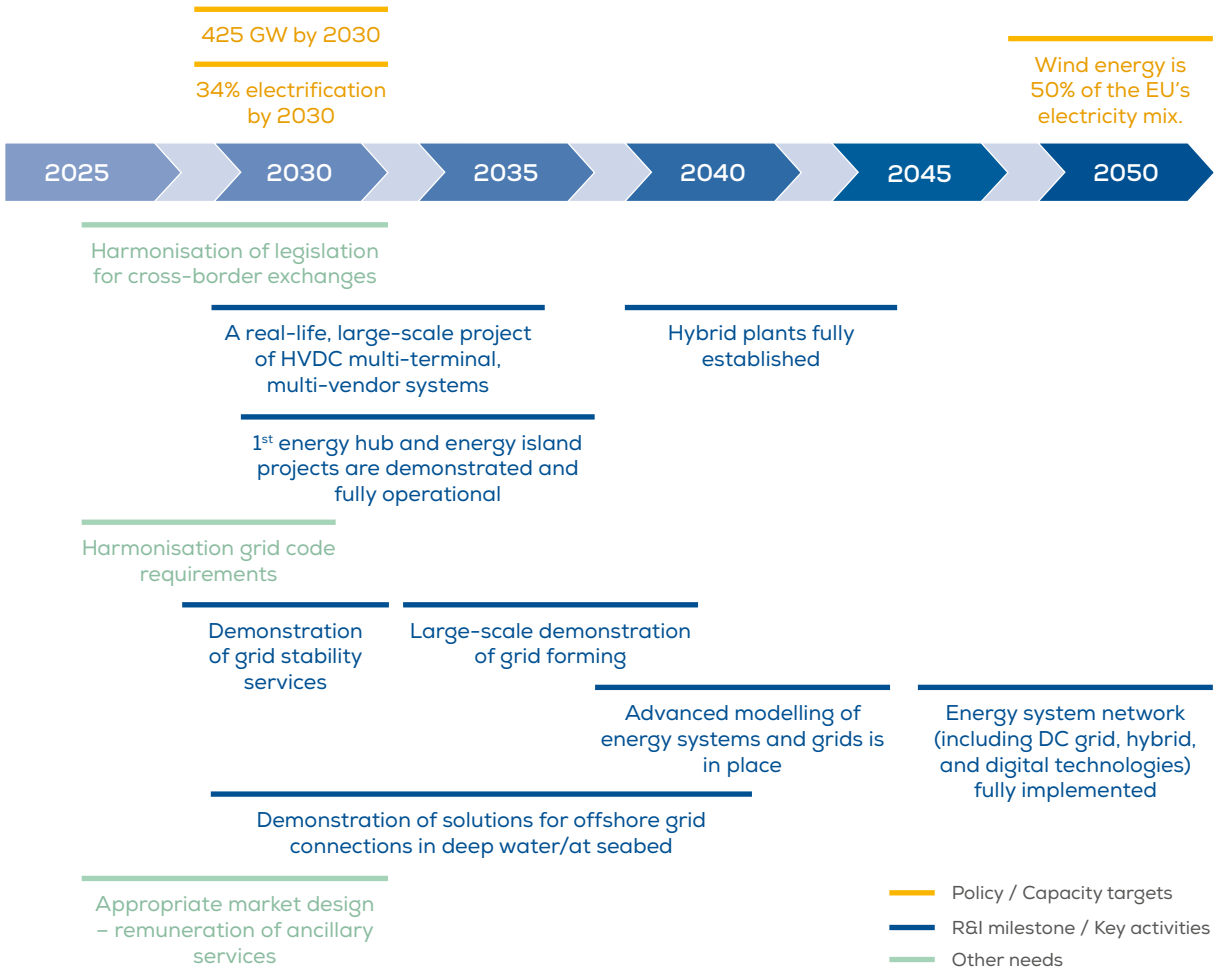
The integration of wind power capacity and other renewables to the grid must come with crucial policy measures including the harmonisation of European legislation for cross-border exchanges, the establishment of a functional and appropriate market design that remunerates ancillary services and the harmonisation of EU grid code requirements.

For more details on the R&I topics and projects that will drive progress on the milestones mentioned above, please see:

- The ETIPWind Strategic R&I Agenda section 4.3
- The EERA JP Wind research programme section 3.3

Key Performance Indicator:
- Increased share of wind energy integrated in EU's electricity mix.

Figure 4
R&I strategy timeline for system integration



2.4
Wind farms will be fully circular and have a positive environmental impact

Sustainability is part of the wind energy sector's DNA. Wind is a sustainable technology with a low carbon footprint and a recyclability rate of 90%. But the industry is still committed to achieving the highest levels of circularity. This means reducing waste, limiting the use of scarce resources, and improving the long-term resilience of the wind energy sector. However, there is still a lot of R&I needed to transform wind farms into circular installations that can deliver net-positive environmental impacts by 2050.

Regarding circularity, the first priority will be to industrialise recycling technologies for all wind turbine components and materials, from manufacturing to end of life. This means scaling-up recycling technologies for blades and generators containing permanent magnets. A key milestone will be piloting the combination of new component manufacturing technologies that use new materials that are lighter, more durable, and more recyclable. This is the first step to a zero-waste, recyclable-by-design (or circular) wind turbine. Improved sustainability metrics will be an increasingly driving factor for future wind turbines.

In addition, the wind industry needs to further explore innovations to ensure wind farms have a positive impact on nature and ecosystems. Nature positive solutions exist and are already deployed by wind farm operators. But these need more research and piloting to be deployed at scale.

Cumulative impacts of wind farms on ecosystems also need to be better understood and measured with harmonised impact assessment tools. Investing in these technologies will set high sustainability standards and raise a competitive advantage on non-EU actors that do not prioritise sustainable practices.

To ensure that circularity and sustainability become a source of profitability, clear market incentives should reward European industries for using recycled materials and creating more circular products.

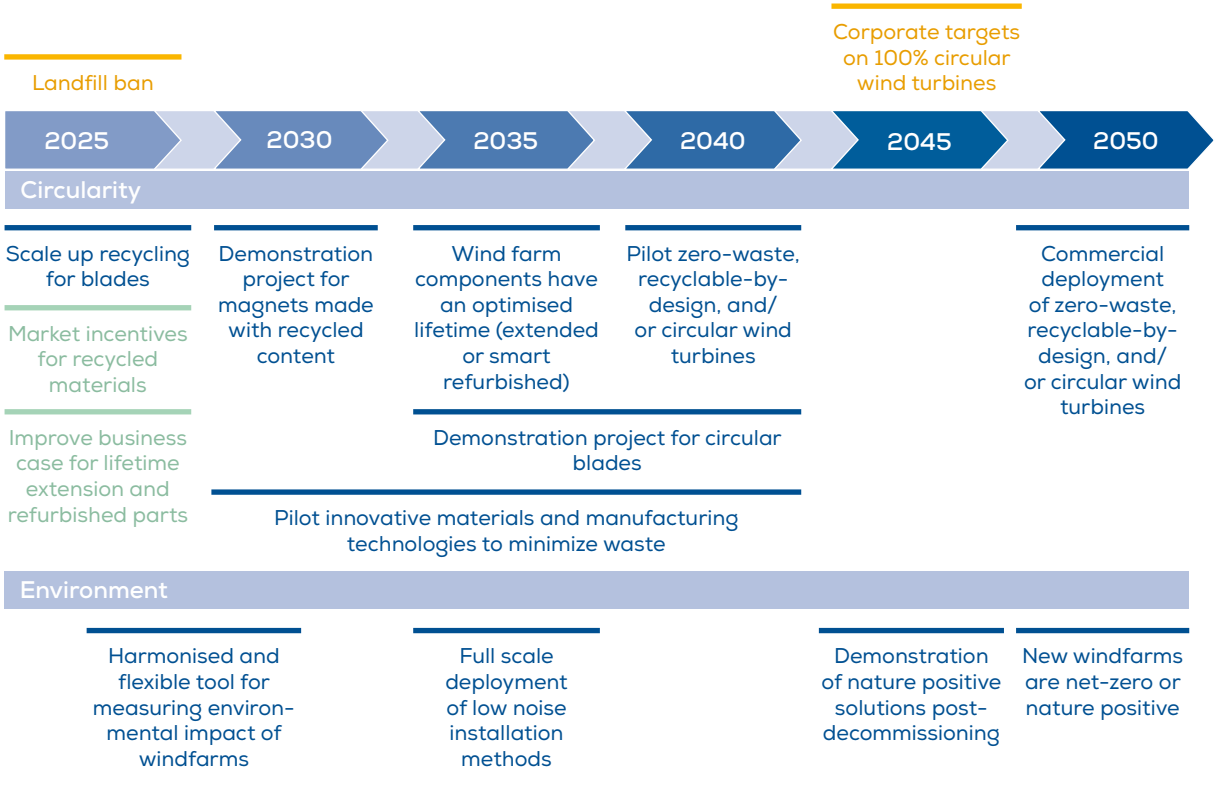
For more details on R&I topics and projects that will drive progress on the milestones mentioned above, please see:

- The ETIPWind Strategic R&I Agenda section 4.4
- The EERA JP Wind research programme section 3.4

Key Performance Indicator:

- Increase of circularity indicators for new wind turbines.
- Life-cycle assessment tools show a further reduction of carbon footprint of wind farms.

Figure 5
R&I strategy timeline for long-term sustainability and circularity



2.5
Society actively supports and recognises wind energy as indispensable for European prosperity and climate-neutrality

The European wind industry employs 370,000 people today and could need up to 600,000 by 2030. This means the industry will need to find 200,000 new workers with increasingly diverse profiles covering physics, biology, and engineering. Reskilling workers from other industries will help, but attracting new talent to the sector is key.

Higher education for wind energy is still fragmented in Europe. Solving the skills bottlenecks will require a harmonisation of educational programmes and curricula. And interdisciplinary skilling programmes addressing a broad range of digital and science, technology, engineering and mathematics (STEM) related skills.

Together with national authorities the wind industry must develop lifelong learning opportunities and European-wide training centres to ensure the European workforce stays ahead of the curve. Universities and industry should build strategic partnerships to capitalise on academic excellence and exploit it fully.

The social impact of wind is still a research priority. To boost the acceptability of wind energy, we need to see close collaboration between public and private actors to fight disinformation, address societal concerns, and strengthen co-existence with other sectors (e.g. the military, fishing, ocean energy, etc).

This will optimise space and costs while also ensuring that, by 2050, European society at large will actively support and recognise wind energy as indispensable to European prosperity and climate-neutrality.

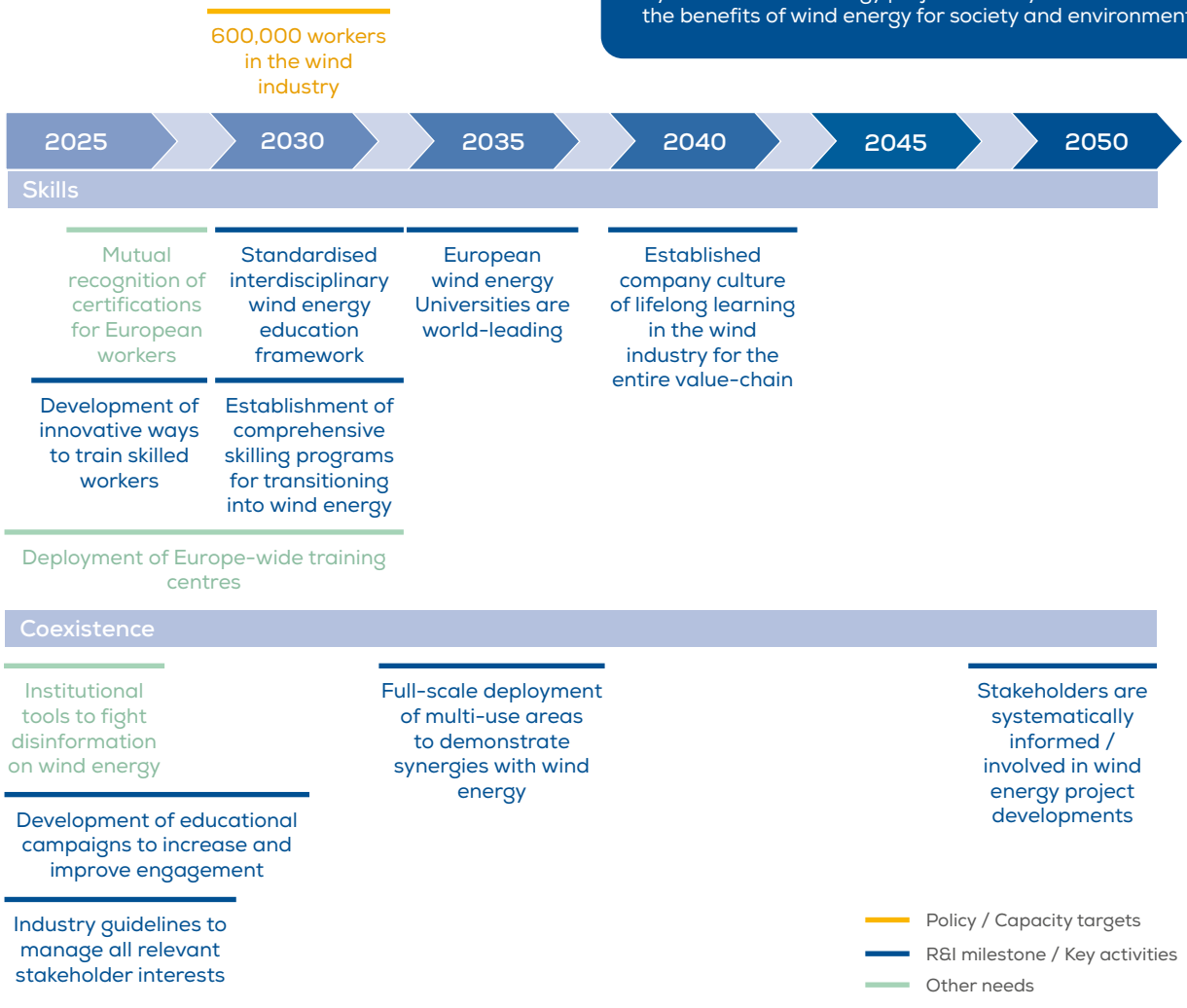
For more details on the R&I topics and projects that will drive progress on the milestones mentioned above, please see:

- The ETIPWind Strategic R&I Agenda section 4.5
- The EERA JP Wind research programme section 3.5

Key Performance Indicator:

- 75% of workers received trainings by 2030. This should increase to 90% by 2040.
- At least 4 European Universities are in the top-10 of the global wind energy education ranking.
- By 2050 all wind energy projects clearly communicate the benefits of wind energy for society and environment.

Figure 6
R&I strategy timeline for skilled workforce and long-term societal support



3

The current state of wind R&I funding

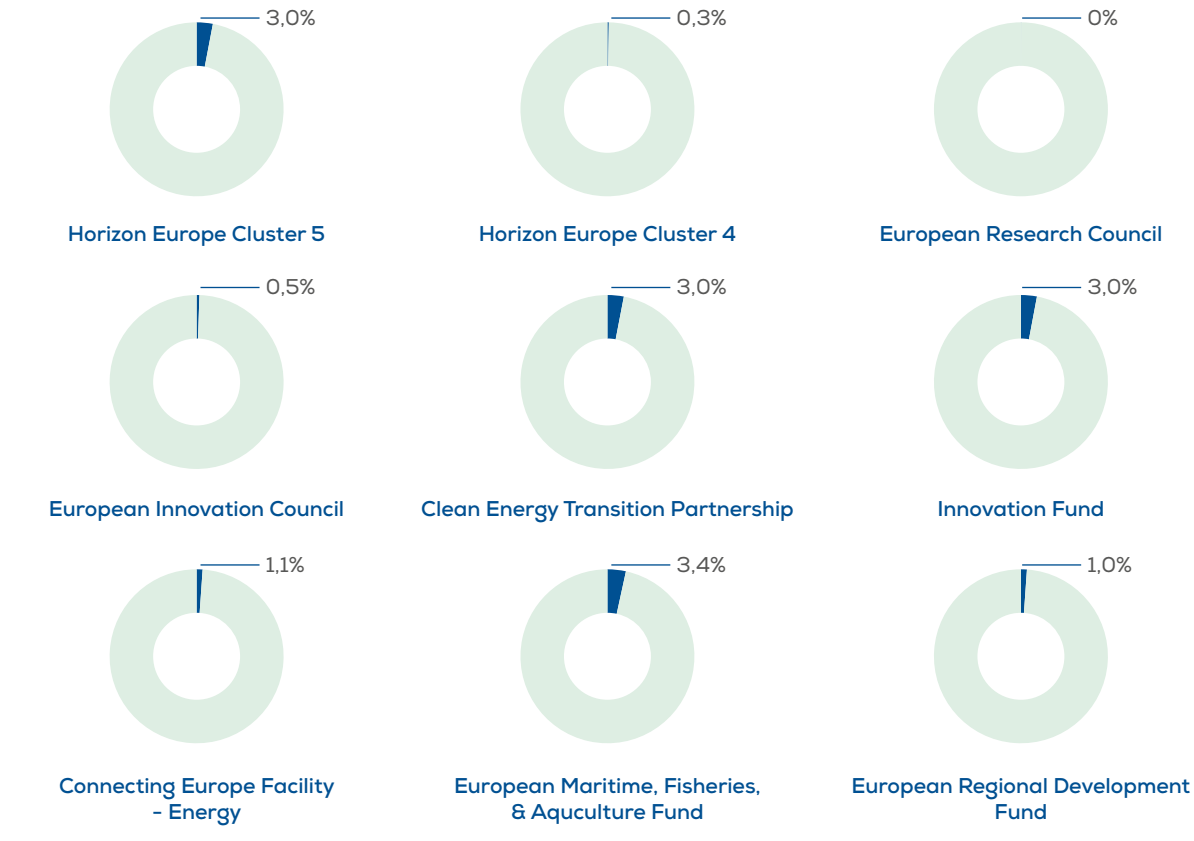
In this chapter we will critically assess funding for wind R&I projects from 2021 to 2024. Looking at the most relevant funding programmes, we will see how they supported the sector, identifying short-term improvements; and providing recommendations for the next EU budget (2028-2034). The guiding questions for this assessment will be the five main weaknesses of EU R&I policy from Chapter 1.

The analysis focuses on EU funding for R&I projects with an exclusive focus on wind energy. Support for projects enabling wind energy deployment such as grids, skills, port infrastructure and sustainability are not considered in this assessment, unless stated otherwise.

In terms of methodology, the assessment is based on public databases and sources provided by the European Commission and the European Investment Bank (EIB). The funding programmes assessed offered grants and a variety of financial instruments for wind energy projects. For more information see Annex 1.

In total more than €18.6bn was invested in the wind industry. Most was not for R&I but supporting commercial deployment projects. The Recovery and Resilience Facility (RRF) through grants and loans, and the EIB through various financial instruments, provided 96% of the funding. Grants only programmes – focused on R&I funding – only accounted for 4% of the EU's total support for wind energy.

Figure 7
EU funding for wind energy R&I (2021-2024)



Main conclusions from EU funding programmes' in-depth analysis

3.1 The EU is not spending enough on wind energy R&I

From 2021-2024, combined private and public R&I investment in wind energy was about €6.9bn[iv]. Almost 75% or €5.2bn of that came from the private sector. That's €1.3bn a year. And whilst still sizeable, R&I investments in the wind industry are on average 20% lower than in the period before.

The reported public funding for wind energy R&I was on average €423m a year but will in reality be closer to €500m due to delays in Government reporting[v]. Member States and EU institutions will need to increase R&I funding by at least 20% to meet the wind industry's short-term funding target identified in the ETIPWind SRIA 2025-2027. And that is still a fraction of the more than hundred billion it spends on R&I annually.[vi]

3.2 EU and national funding is fragmented

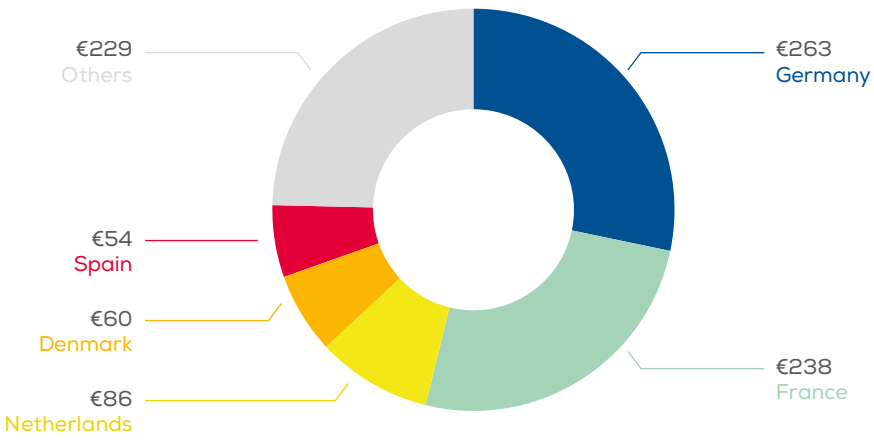
More than half of EU public funding for wind energy R&I came from Member States. The rest came from the EU institutions. In the period 2021-2023, EU Member States provided €930m in grant funding for wind energy R&I as a whole. That is on average €310m a year.

As shown by Figure 8 below, 75% of the funding came from just five Member States: Germany (€263m), France (€238m), The Netherlands (€86m), Denmark (€60m), and Spain (€58m).

So the funding is fragmented, but there is also potential for coordination as R&I funding is concentrated in just a few countries. Close collaboration between the EU and just five Member states could significantly improve most of the public offering for wind energy R&I.

Sadly the SET Plan, which sets out the current framework for collaboration on energy R&I in Europe, falls short of delivering impact (see box below). Two of the main wind energy R&I donor countries (Denmark and the Netherlands) are not even part of the SET Plan IWG Wind. And three out of ten IWG Wind members have not reported any R&I investments in wind energy (see Figure 9).

Figure 8
Reported national funding for wind energy R&I (2021-2023) in € millions



Source: IEA

The SET-Plan and R&I funding fragmentation: cause or solution?

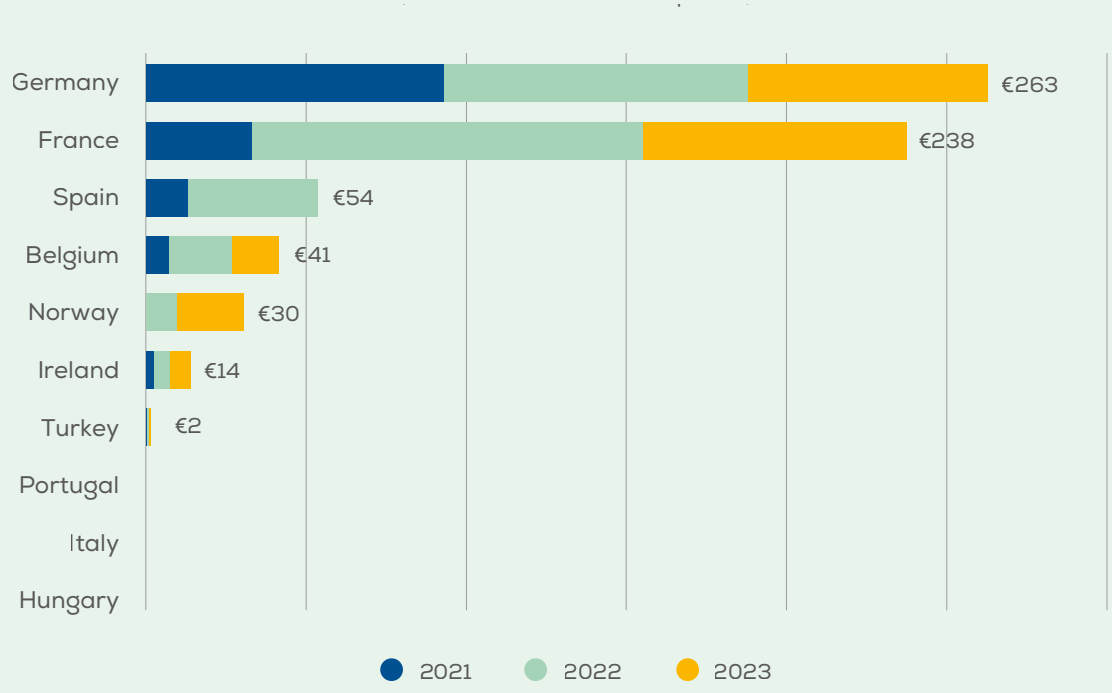
The Strategic Energy Technology Plan or SET Plan is the EU's energy R&I framework. It aims to coordinate European and national R&I agendas for strategic technologies to ensure investments and initiatives align with the EU's goals. Wind energy is represented in the SET Plan by the European Technology & Innovation Platform on Wind Energy (**ETIPWind**) and the Implementation Working Group for Wind Energy (**IWG Wind**). The former brings the industry and research communities together, the latter the willing EU Member States.

Ever since its creation in 2007 the SET Plan has failed in this ambition to effectively coordinate and align EU R&I investments on wind energy. The SET Plan has undergone several 'refinements', the last of which was in 2023. But coordination remains poor and few to no actions are jointly implemented under the SET Plan. The latest revision, on cross-cutting actions, could add further fragmentation and confusion.

To optimise the SET Plan and make it fit-for-purpose the EU must take three immediate actions:

- **Level-up Member State representatives in Implementation Working Groups:** Representatives in IWGs must be individuals from a relevant Ministry or national funding agency that are empowered to commit national funding budgets to implement the IWG's agreed priorities through energy R&I funding programmes at national level. The Commission should incentivise National Governments to delegate the right people under the SET Plan by consulting IWGs in defining Horizon Europe work programmes.
- **Empower the SET Plan Steering Group:** Recommendations from the SET Plan Steering Group should feed directly into the EU's energy R&I policy and fund framework. The group should be recognised as an official "working party" on energy R&I within the Council of the EU.
- **Simplify the SET Plan governance:** The SET Plan should be made leaner so that it becomes easier to implement and more impactful. Too many groups are working on too many topics, diffusing already limited R&I funding resources. The Plan should also have fewer, more concrete overarching objectives in line with the EU's climate and energy goals.

Figure 9
Reported Funding for wind energy R&I by IWG members (2021-2023) in € millions



Source: IEA

3.3
EU funding lacks focus

In 2021-2024 the EU supported 72 wind energy R&I projects with €761m in grants. The funding came from several programmes supporting R&I, technology development, scale-up, and deployment in Europe through grants alone.

The funding was disbursed across eight different programmes[vii], each with various subprogrammes, work programmes, or funding windows. This means EU funding for wind energy sits within a seriously fragmented funding system that can be difficult to navigate; all the main EU funding programmes have some budget for wind energy, but the money dedicated to wind R&I projects is never more than 3% of the available budget (see Figure 11).

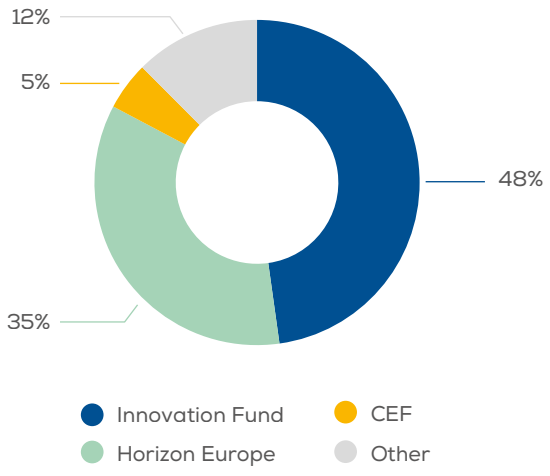
As shown in the Figure 10 below, the Innovation Fund provided €363m or 48% of total funding for wind energy projects. The various funding windows under Horizon Europe supported wind energy R&I with €266m.

The remaining funding (€131m) came from the European Maritime, Fisheries and Aquaculture Fund (EMFAF), the European Regional Development Fund (ERDF) and the Connecting Europe Facility (CEF).

Out of the €761m in grant funding for wind energy R&I, almost a third went to deployment and commercialisation (€231m), pilot and demonstrations (€212m) respectively. Scale-up projects received €177m and technology development projects €119m. Early research only got €23m split across 6 projects. See Figure 11.

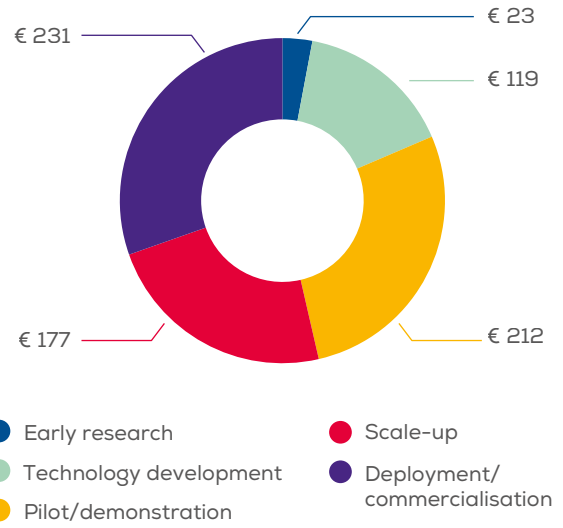
In addition, EU funding programmes also provided grant funding to other projects enabling wind energy deployment. 23 such projects received €140m in funding from the Connecting Europe Facility (CEF), Horizon Europe and Erasmus+. The largest projects were related to energy and port infrastructure, financed by the CEF Energy and CEF Transport programmes.

Figure 10
EU grants for wind energy R&I by programme 2021-2024



Source: ETIPWind

Figure 11
EU grants for wind energy R&I by innovation cycle 2021-2024 in € millions



Source: ETIPWind

3.4
EU funding is overly bureaucratic

EU funding is increasingly less attractive to the industry and research community. Applying for and getting hold of EU funding comes with lots of red tape. In addition, the various programmes follow different rules which further complicate reporting requirements for the companies and institutions involved. Simplification must be a top priority.

The grant timeframe also seems to be increasing. For Horizon Europe the time between the end of a call for proposals and the signing of grant agreements is now 273 days – 8% longer than for Horizon 2020. Almost 60% of the grants are not signed within the expected period of eight months.[viii] And for the Innovation Fund the expected time to grant is even longer - almost 11 months.[ix]

In addition to the long and cumbersome processes, EU funding is also overly bureaucratic in its decision-making structure. The EU provides funding to sectoral platforms (like ETIPWind and the IWG Wind) but fails to implement their R&I recommendations through the available funding instruments.

This is mainly because the stakeholders developing the R&I agendas are not invited to take part in the decision-making process. The EU should make better use of thematic experts, for instance by elevating the SET Plan IWGs to formal expert groups drafting Horizon Europe work programmes, inviting industry and research to participate in the Horizon Europe programme committees, and setting up more joint private and public funding initiatives and partnerships.

3.5
EU funding lacks a supportive ecosystem

The Draghi report highlighted the EU's lack of a supportive financing ecosystem to commercialise innovations. But for wind energy that ecosystem is already there, shown by the different programmes supporting the various stages of the innovation lifecycle. For example, the European Research Council funds early-stage research, the Horizon Europe clusters primarily fund technology development; and the Innovation Fund pilots and scale-up projects.

It is not a question of building a supportive ecosystem. Rather it is about streamlining the ecosystem to ensure money flows faster, more easily and in a more coordinated fashion. To this end the EU should set up a one-stop-shop for R&I funding for each strategic sector. The EU must make tough decisions to increase available funding for the strategic sectors, streamline access, and simplify the rules and procedures.

EU funding programmes and other financial instruments must be more flexible so they can adapt more easily to evolving needs. This will ensure funds are channelled to where they are most needed and will have the most impact. The table below highlights the gaps in the main programmes that support wind energy projects and key recommendations on how to maximise resources and how to optimise EU funding.

Funding programme	Wind funding 2021-2024	Recommendations
Innovation Fund	€364m	• Earmark funding for wind energy under clean tech manufacturing. • Add more weight to supply chain resilience criteria. • Enlarge the scope to include grid equipment manufacturing and installation vessel construction. • Earmark funding for direct electrification of industry. • Simplify carbon emission calculations methodology.
Horizon Europe Cluster 4	€19m	• Earmark at least €300m for wind energy R&I in 2025-2027. • Introduce a large cascade funding call for wind energy R&I. • Remove geographical consortium requirements for wind energy R&I calls. • Reduce proposal and technical reporting requirements. • Involve industry and research sector in the decision-making process. • Empower IWG Wind as a programme committee.
Horizon Europe Cluster 5	€209m	
Horizon Europe European Research Council (ERC)	€4m	• Earmark funding for fundamental research in support of the energy transition. • Allow ERC grants for programmes, not just individuals.

Horizon Europe European Innovation Council (EIC)	€24m	• Include private sector experts in the EIC governance. • Allow the EIB to invest equity in the EIC fund. • Set more calls with a 'rolling basis'.
Horizon Europe Clean Energy Transition Partnership	€11m	• Streamline Member States' eligibility requirements and criteria for co-financing projects. • Reduce time to grant to under 12 months. • Reduce proposal and technical reporting requirements. • Involve industry and research sector in the decision-making process. • Remove minimum consortium composition requirements.
Connecting Europe Facility	€36m	• Provide financing for national grid projects. • Set up an exclusive funding window for electricity grids. • Set up a 'ports for energy transition' window. • Set application and funding disbursement to project level, not Member States' level. • Allow applications from privately financed projects. • Introduce a 28th regulatory regime providing projects with simplified procedures and easier permitting.
Recovery & Resilience Facility	€7bn	• Streamline all national plans (cohesion plans, national climate and energy plans) into one single overarching plan. • Adopt the Temporary Crisis and Transition Framework approach to those single national plans. • Set strict deadlines for Cohesion funding disbursement at the end of the EU legislature. • Introduce a gap filler mechanism for the EU to use up unspent funding.
European Regional Development Fund	€93m	
European Investment Bank	€10bn	• Increase the budget of the existing counter-guarantee scheme for wind energy manufacturers beyond the initially set €5bn. • Extend the scope of coverage of counter-guarantees for wind energy manufacturers to also cover warranty bonds for the construction and operation of wind farms. • Earmark financial support for grid infrastructure projects. • Set up a dedicated financing instrument offering competitive rates of at least €4.5bn for the build-out and expansion of ports to support the deployment of renewables.
European Maritime, Fisheries and Aquaculture Fund	€1.8m	• Earmark funding for coexistence projects on multi-use and aquaculture. • Increase funding for blue skills careers.

4

European Fund for Wind Research & Competitiveness

On 25 January the President of the European Commission Ursula von der Leyen outlined the Commission's approach to the next EU budget, also known as the Multiannual Financial Framework (MFF) for 2028-2034. The top priority is to restore European industrial competitiveness. But delivering the Green Deal remains a key common ambition for the EU.

Achieving the EU's decarbonisation goals would bring opportunities to "*lower energy prices, increase its energy security and take the lead in clean technologies. Reaching this goal will require streamlining EU financing for clean technologies, concentrating on the technologies where the EU has an advantage and strong potential for growth*."[x]

To deliver this ambition, the EU needs to invest more in R&I, science, and technology. And to simplify and streamline how EU funding programmes operates. More funding must flow to wind energy and other strategic sectors. And it must flow faster. To this end the Commission is committed to four key actions:

- Focus the EU budget to address only common challenges.
- Reduce the number of funding programmes.
- Simplify and streamline the rules and criteria related to EU funding.
- Set up a European Competitiveness Fund supporting strategic sectors and technologies.

Wind energy must therefore be visible as strategic sector in the next EU budget. It is one of the few clean energy technologies where the EU still has an advantage and where there is significant potential for growth. But that potential must be actualised to become reality. Global competition is growing rapidly and must be countered.

This chapter lays out a new framework to bring the EU, industry, academia, Governments and civil society actors together to explore how EU programmes under the next EU budget (2028-2034) could better support the implementation of these pathways.

> **The wind energy sector calls on the EU to create a European Fund for Wind Research & Competitiveness.**
> **A one-stop shop for wind R&I funding that will better pool EU, national and private R&I funding.**

This requires a more focused and centralised investment strategy for wind energy R&I. And a new framework that brings the EU, industry, academia, and National Governments together to implement that strategy. Public authorities must take lessons from Horizon Europe and the Innovation Fund and earmark upfront funding budgets for wind energy R&I. Without this earmarking, political commitments on wind energy R&I are pointless.

The EU must streamline and centralise its funding offer for wind energy research, technology development, and scale-up, including manufacturing. EU funding for wind R&I must also come with fewer, simpler rules and criteria, so that EU funding becomes easier, faster, and more attractive.

With all that in mind, the wind energy sector calls on the EU to create a European Fund for Wind Research & Competitiveness. A one-stop shop for wind R&I funding that will better pool EU, national and private R&I funding and direct scarce funding more quickly and easily to the projects that need it. The Fund will allow the EU to address five weaknesses of in EU's innovation policy and funding landscape and mitigate their impacts on the wind energy sector. The benefits of the Fund are described in the table below.

Towards a European Fund for Wind Research & Competitiveness		
EU R&I Challenge	State of play on wind R&I funding	Desired outcome
1. EU is not spending enough on R&I for wind energy	EU R&I funding in 2021-2024 was on average up to €500m a year. At least 20% below what the industry's needs. In the long term, the wind sector will need at least €5bn in support across the Innovation lifecycle.	Increase resources for wind energy R&I by pooling existing funding sources and earmarking funding from the European Competitiveness Fund and next EU budget.
2. EU funding is fragmented	The funding for wind energy R&I is split between Member States and EU level. EU funding alone for wind energy was delivered through 12 different EU programmes each with numerous subprogramme.	A technology-specific funding vehicle centralising all R&I funding sources from the EU, and when relevant, national authorities.
3. EU funding is not focused	EU programmes remain too agnostic causing diffusion of scarce funding resources.	Bring together thematic experts from industry, academia and national and EU authorities empowered to implement a common strategy through private and public funding.
4. EU funding is overly bureaucratic	EU and national funding are too dispersed across programmes often with different rules for eligibility, reporting and application processes. Experts from the private sector are excluded from the decision-making process and are only consulted ad hoc.	Simplify and streamline rules and criteria to access EU funding through a single set of rules. Bring industry and academia to the table to ensure funding will support impactful projects with commercial viability.
5. The financial ecosystem is underdeveloped	Today the EU funding landscape is too fragmented to be effective. Industry needs long-term visibility on what and how much can be funded each year to better match their R&I pipeline with available instruments.	Provide a one-stop-shop for the entire wind energy innovation lifecycle including deployment and manufacturing.

4.1 European Fund for Wind Research & Competitiveness and the SET Plan

The call for a European Fund for Wind Energy Research & Competitiveness is not new. It builds on a long-standing request by the SET Plan community on wind energy to develop a new framework to better direct public and private funding to implement common R&I priorities as described in Chapter 2. And it will help implement the research community's call for a European Centre of Excellence for wind energy research.

The SET Plan community have identified five key elements that any framework to pool EU, national and private resources for wind energy R&I and to boost long-term competitiveness of Europe's flagship industry must have.

1. A technology-specific public budget for wind energy R&I.
2. Upfront and long-term visibility on that public budget.
3. Co-decision from the industry and research sector on what projects will get funded.
4. Leaner and simpler administrative procedures.
5. A one-stop shop for public funding for the entire innovation lifecycle, including for manufacturing.

In 2024, the SET Plan community concluded that an institutionalised partnership or Joint Undertaking would be the best framework to meet the evolving needs of the wind energy sector. At the time, Joint Undertakings seemed best

suited to mobilise long-term and technology-specific R&I budgets from the EU and Member States at the scale and magnitude the wind energy sector needs.

However, this discussion preceded communication on the next EU budget and the European Competitiveness Fund. The European Fund for Wind Energy Research & Competitiveness does not need to be a Joint undertaking. A leaner mechanism bringing the EU, Member States, and private sector together would be preferred. But only as long as the five key elements highlighted above are accounted for.

4.2 European Fund for Wind Research & Competitiveness governance and operations

The European Fund for Wind Research & Competitiveness can easily become operational. And in the wind energy sector there is a common R&I strategy to implement (see Chapter 2). The right stakeholders are already identified and active in representative bodies. They just need to be empowered to take part in the decision-making process.

A new board comprising industry, academics, and European Commission representatives should be the main decision-making body. To govern effectively the board should be limited to 12 or 15 seats. The latter depending on how many Member States have opted in to co-finance in the Fund.

In general Member States' representatives must have significant decision-making power at the national ministries. Their role would be aligning national funding with the Fund and where relevant opt in for co-financing. National alignment could come through development of Important Projects of Common European Interest. Member States' participation can build on the existing SET Plan IWG Wind.

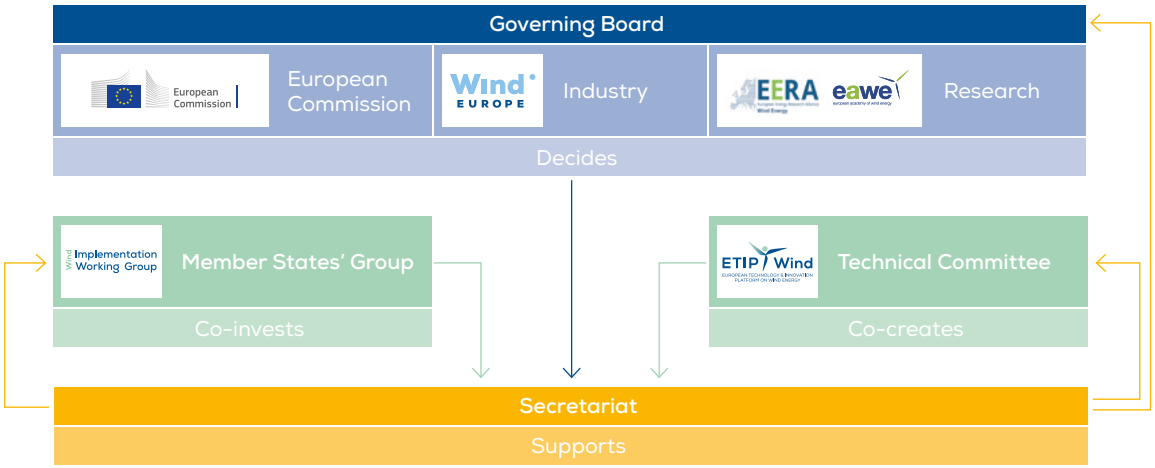
Private sector representatives must have significant experience in implementing R&I actions in the private sector including academia. Their role would be to oversee the implementation of actions addressing the common R&I areas described in Chapter 2. The private sector's participation can build on existing R&I funding expertise from the ETIPWind Steering Committee members.

A Secretariat will be needed to organise the activities, disseminate results and support the implementation of the common R&I strategy. There is a secretariat supporting the SET Plan community for wind energy, operating with an EU grant. But in the future an independent secretariat should be financed through a solidarity grant from projects that have been awarded grants from the Fund.

For those decision-making processes, the EU can build on its experiences of the Research Fund for Coal and Steel and the Joint Undertakings under Horizon Europe. And take lessons from less successful initiatives such as the European Innovation Partnerships. The European toolbox for public private partnerships may change in the next EU budget. The sector invites all stakeholders to an open dialogue to prepare the best suited instrument.

All members of the Fund should contribute to its budget. The public funding contribution from the Commission and National Governments must be in grant funding. The private sector's contribution can be a mix of grants and in-kind contributions. The total private contribution must at least match the Commission's contribution.

Figure 12
Proposed governance for the European Fund for Wind Research & Competitiveness



5
Conclusions

To correctly implement the common European strategy for wind energy research and competitiveness, the SET Plan community on wind energy calls on the EU to take the following actions:

1

Prioritise wind energy in EU and national industrial competitiveness policies:

Wind energy is a homegrown renewable energy technology. It is key for Europe's competitiveness and energy sovereignty. Accelerating renewables-based electrification and strengthening the European wind supply chain must take centre-stage in the Clean Industrial Deal and the next EU budget.

2

Increase EU and national investments in wind energy R&I:

EU support for wind has historically been on average up to €500m a year, a fraction of the hundreds of billions it invests annually in R&I. To meet the wind industry's needs Member States and EU institutions must boost R&I funding by at least 20%. The EU and National Governments must also guarantee an earmarked budget for wind energy R&I to provide long-term visibility to the wind energy sector.

3

Align all R&I investments in wind energy with the common strategy on wind Research & Competitiveness:

The EU and National Governments must allocate wind R&I funding so that funded projects implement the common strategy (as described in Chapter 2). This will ensure all wind energy projects have a tangible and direct impact on the competitiveness of the European wind industry.

4

Set up a European Fund for Wind Research & Competitiveness to centralise funding access:

The EU must radically simplify its funding offer. It needs to reduce the number of funding programmes to avoid fragmentation and lack of focus, and make the funding landscape easier to navigate for applicants. As part of the European Competitiveness Fund, the EU needs to set up a technology-specific one-stop-shop to centralise EU funding for wind energy R&I. The Fund must be the framework to implement the common wind energy R&I strategy through private and public funding.

5

Simplify the administrative requirements associated with public R&I funding:

EU funding should come with fewer rules, streamlined reporting requirements, a lighter application process, and less prescriptive but more targeted R&I priority aligned calls. The European Fund for Wind Research & Competitiveness should apply leaner rules and criteria to accelerate the disbursement of wind energy R&I funding in Europe. These rules and criteria must be the same across the entire wind energy innovation lifecycle including deployment and manufacturing.

6

Streamline the SET Plan ecosystem:

The SET Plan ecosystem is too diverse and fragmented. This prevents any focused strategy, or any coordinated action being taken. The SET Plan Steering Group should become a ministerial group and implement a simplified governance. The EU should ask Member States to level up representatives in the IWGs and empower them by giving them a role in existing decision-making bodies, such as the Horizon Europe programme committee, and pending ones such as the European Fund for Wind Research & Competitiveness.

ANNEX 1

EU funding assessment methodology

Programmes assessed

The following funding schemes were taken into account for the EU funding assessment: Horizon Europe (Cluster 4 and Cluster 5, European Innovation Council (EIC), European Research Centre (ERC), and Clean Energy Transition Partnership (CETP), Innovation Fund, Connecting Europe Facility (CEF Energy and CEF Transport), LIFE, Erasmus+, European Maritime, Fisheries and Aquaculture Fund (EMFAF), Modernisation Fund, Recovery and Resilience Fund, European Regional Development Fund (ERDF), Cohesion Fund, Just Transition Fund. As well as financial instruments offered by the European Investment Bank (EIB).

Scope

This assessment focused only on wind energy R&I projects and R&I projects enabling wind deployment. Projects with a certain wind-specific share were taken into consideration. The share was based on JRC data.

Excluded from the scope were:

- R&I projects covering renewable energy sources in general – too generic for meaningful analysis.
- Airborne wind and Horizontal axis projects – inconsistent terminology across programmes.
- Wind-assisted propulsion for shipping projects - inconsistent terminology across programmes.

Notes

For the ERDF, we assessed projects receiving funding in the period 2021-2024 and reported under the priority 'renewable energy: wind'.

For the RRF, we analysed measures under the code "028 - Renewable energy: wind" in Annex I Climate tracking and digital tagging of the most updated version of the Recovery and Resilience Plan documents. We also included measures with the following codes when the measures were clearly related to wind energy:

- "027-Support to enterprises that provide services contributing to the low carbon economy and to resilience to climate change including awareness-raising measures".
- "050-Nature and biodiversity protection, natural heritage and resources, green and blue infrastructure".
- "031- Renewable energy: marine".
- "033-smart Energy Systems (including smart grids and ICT systems) and related storage".
- "049- Protection, restoration and sustainable use of Natura 2000 sites".

Data sources

- CINEA Dashboard for Horizon Europe Cluster 4 and 5, the Innovation Fund, CEF Transport, CEF Energy, EMFAF, and LIFE programmes. Data was extracted in December 2024.
- Cohesion open data platform for all cohesion funds including Just Transition Fund.
- The Recovery and Resilience Facility country pages for the RRF.
- The EIB provided data on EIB wind projects (January 2025).
- EMFAF is under both direct and shared managed. For this assessment, we used data only for the direct management of the fund, available at the CINEA dashboard.
- The approved EU budgets for 2021-2024 (commitment appropriations) for the total budget for most programmes. For CETP, EMFAF, and Innovation Fund data was extracted from work programmes, the CINEA Dashboard and the European Commission website.

Endnotes

i The Draghi report on EU competitiveness, September 2024: https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en

ii Align, act, accelerate - Research, technology and innovation to boost European competitiveness, November 2024: https://op.europa.eu/en/publication-detail/-/publication/2f9fc221-86bb-11ef-a67d-01aa75ed71a1/language-en

iii IWG wind survey, see SETIPWind webpage: https://setipwind.eu/iwg-wind/news/

iv €5.2bn from the private sector, €761m from EU funding (grants) and €930m from Member States. RRF and EIB support are not included.

v Based on IEA data from IEA (2024), Energy Technology RD&D Budgets, https://www.iea.org/data-and-statistics, All rights reserved; as modified by WindEurope

vi EUROSTAT, GBARD by socioeconomic objectives (NABS 2007)

vii Horizon Europe Cluster 4 & 5, European Innovation Council, European Research Council, Clean Energy Transition Partnership (CETP), Innovation Fund, Connecting Europe Facility (CEF), European Maritime, Fisheries and Aquaculture Fund (EMFAF), European Regional Development Fund (ERDF).

viii https://sciencebusiness.net/horizon-europe/processing-horizon-europe-grants-taking-23-days-longer-horizon-2020

ix https://www.pnoconsultants.com/news/start-your-innovation-fund-application-in-time/

x Communication on the road to the next multiannual financial framework, 2024

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