EUROPEAN CLIMATE, INFRASTRUCTURE AND ENVIRONMENT EXECUTIVE AGENCY (CINEA)

CINEA.C - Green research and innovation
C.4 - Innovation Fund

Innovation Fund Knowledge Sharing Closed-door workshop Renewable Energy Value Chain

Key takeaways to strengthen the renewable energy value chain in Europe

21 March 2024, Brussels

1. BACKGROUND

The European Climate, Infrastructure and Environment Executive Agency (CINEA) and DG Climate Action (DG CLIMA) held a closed-door workshop on the renewable energy value chain for the Innovation Fund on 21 March 2024. Seventeen renewable energy-related Innovation Fund (IF) projects and one LIFE project participated in the event.

At the time of the event, the Innovation Fund's portfolio included 102 ongoing projects plus 20 projects undergoing grant agreement preparations. The projects are located in 24 countries and aim to avoid the release of 446.7 million tonnes of carbon dioxide (CO_2) equivalent over a 10-year operational period. The total grant amount committed to these projects adds up to €6.64 billion.

Among the ongoing projects, 21 projects are related to the renewable energy value chain (Figure 1), receiving a total EU contribution of €726 million and with potential to avoid 52.3 million tonnes of CO_2 in their first 10 years of operation. Out of these projects, six

had reached financial close[1] and one had entered into operation[2] at the time of the workshop.

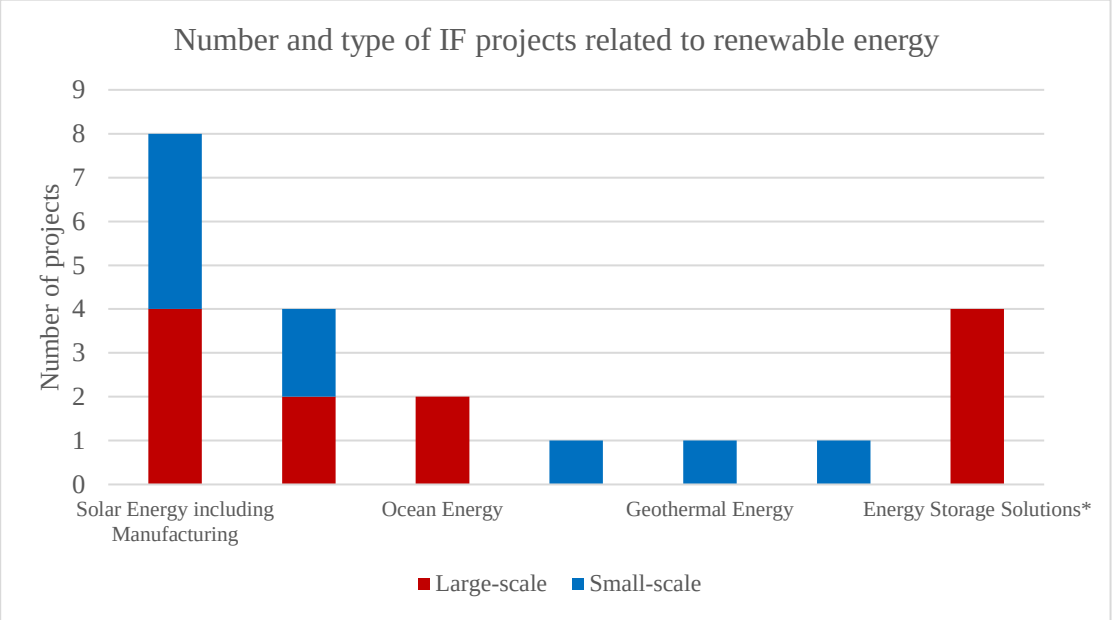

Figure 1 Number and type of Innovation Fund projects related to renewable energy that were invited to the event.

* Energy Storage Solutions integrating renewable energy.

The workshop brought together solar, geothermal, wind and ocean energy projects and those integrating renewables into the grid. It covered discussions on manufacturing, permitting, and financing, and it helped participants to share knowledge and lessons learned on project implementation. The following section summarises the main conclusions from these discussions, highlighting key learnings and opportunities for improvement within the renewable energy industry. A summary of the policy brief prepared by the European Commission for the participants can be found in Annex 1 at the end of the document.

2. CHALLENGES AND SOLUTIONS

The participants highlighted that the Innovation Fund support can help them implement innovative technologies and solutions in various parts of the European renewable energy value chains. For many of them, the Innovation Fund grant has been an important stimulus for attracting other funding sources and establishing cooperation with different actors in the value chain.

[1] In the Innovation Fund, "financial close" is defined as the moment in the project development cycle where all the project and financing agreements have been signed and all the required conditions contained in them have been met.

[2] In the Innovation Fund, "entry into operation" means the moment in the project development cycle where all elements and systems required for operation of the project have been tested and activities resulting in effective avoidance of greenhouse gas emissions have commenced.

Projects face varied challenges at the different project implementation stages that could delay their progress and success. Some of these challenges are due to their innovative nature and need bespoke approaches and solutions.

Participants emphasised that closed-door events and discussions in small groups can help them learn from each other, improve the implementation of their projects, brainstorm about possible solutions to common problems, and increase collaboration and communication among themselves. At the event, active participation of European Commission representatives from the Directorate-General for Climate Action (DG CLIMA), the Directorate-General for Energy (DG ENER) and the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) was highly valued. This participation provided attendees with the latest EU policy objectives and priorities and facilitated direct communication between the attendees and the European Commission representatives.

Several projects indicated that they struggled to secure the different permits on time, while others pointed to supply chain disruptions being the main bottleneck, which has led to increased costs and has had a negative impact on their business models and investment decisions.

The participants underlined how important it is for innovative projects to have solid and transparent planning, clear timelines for financing and permitting, strong business models, solid pre-contractual agreements with suppliers and off-takers, preventive contingency measures against fluctuations in prices and to maintain realistic expectations. The prudent project design allows projects to better showcase their value and impact to investors, communities, and permitting authorities, which increases their chances of securing additional financial support and achieving their goals.

2.1. Challenges with permitting

The participants pointed out significant issues with the different permitting procedures, such as construction, environmental, and safety permits. They discussed how lengthy permitting times, complex procedures, and a lack of harmonisation of rules and regulations among EU Member States affect project implementation and increase costs. The participants underlined the importance of a direct, open dialogue with relevant local, regional and/or national authorities. In particular, they referred to the importance of physical meetings with responsible authorities rather than engaging through a remote one-stop shop. They also highlighted the importance of going digital rather than following paper procedures.

> Airborne wind energy (AWE) and offshore hydrogen production are examples of technology pathways where relevant regulations do not yet exist and need to be addressed.

Delays often occur when the existing regulations do not align with the project's specific requirements, resulting in prolonged approval processes. Some projects stressed that due to the lack of specific permitting procedures for their innovative technologies, they had to follow regulations that have been designed for other established technologies. For example, two projects in airbone wind energy (AWE) developing similar technologies, but being implemented in different countries, were advised to follow different permitting procedures (one had to follow the legislation for drones whereas the other had to follow the one for wind turbines and add another layer of authorisation related to flying zones from the

aviation and military authorities). While one project found it relatively straightforward to meet the requirements, the other faced significant obstacles.

The projects discussed how inconsistencies in the permitting procedures across the EU lead to delays in project implementation that negatively affects negotiations with suppliers and off-takers and creates uncertainty for investors. In the case of pilot installations such as wave energy converters, a project suggested that a possible solution to this problem could be the use of regulatory sandboxes[3]. Project representatives also emphasised the need for clear, uniform guidelines for regional authorities, and a national or EU-level redress mechanisms to promptly resolve permitting decision inconsistencies. Another solution mentioned was the training of both the relevant authorities and the applicants on permitting procedures.

Projects highlighted the importance of environmental impact assessments for innovative technologies. Despite being time-consuming, these assessments can help not only to educate permitting authorities and project promoters, but also to reduce resistance from local communities. To speed up the environmental impact assessments, it is crucial to engage early with all key stakeholders, including academia, local communities and consultants who can provide valuable assistance in conducting the necessary studies.

Although grid capacity is not a significant concern for participating projects, national-level grid balancing and surplus energy management pose challenges. Project participants emphasised how transparency concerning grid capacity information and pricing by Distribution System Operators (DSOs) is crucial for ensuring efficient operation, fair competition, and trust in the energy market. They also emphasised the need to group similar projects (such as numerous houses using the same innovative technology) and jointly apply for a permit to connect to the grid instead of requesting individual permits for each installation.

2.2. Engaging with local communities and academia

Regarding public engagement, it was stressed that efforts should focus on community education and engagement, particularly on transparent dialogue with citizens clearly explaining benefits and risks based on facts and data.

For example, a project shared how they have constructed small-scale models of a wave energy converter to explain to the public what they do, and they have also carried out activities in schools to engage the younger population. In ocean energy projects, project promoters have engaged with local interest groups, such as the fishing and surfing community to explain the implications of the project on their daily activities. Another project shared that after a technology test failure, they invited the community and the authorities to explain the test, why it failed, and how they would implement what they had learned from it. This approach allowed them to increase the trust of the stakeholders in the project.

Moreover, the projects indicated that showcasing successful small-case pilots is crucial for fostering acceptance and trust in innovative solutions from different value chain actors. They pointed out that small-scale projects should engage with other similar projects to

[3] A regulatory sandbox is a structured framework allowing real-world experimentation of innovative technologies, products, or services, within a limited time and sector and under regulatory supervision.

increase their visibility among authorities, investors, and the academic community. They also highlighted the significance of targeted media and communication activities in achieving this goal.

Most of the projects pointed to the difficulties of finding highly skilled workers for their technologies. They underlined the importance of engaging with academic institutions to strengthen the industry-academia knowledge exchange, discuss possible ways to train the future skilled workforce and foster the successful deployment of innovations.

Project participants reflected on how an increasing number of individuals are recently becoming energy prosumers[4], boosting the EU renewable energy production and contributing to the decarbonisation of the EU economy. They pointed out that a successfully deploying and utilising renewable energy requires education and transparent, fact-based communication among energy suppliers, prosumers and consumers.

2.3. Financing

Projects have greatly benefited from the financial support of the EU ETS Innovation Fund, with many acknowledging that their implementation would not have been possible without this funding. In some cases, the Innovation Fund grant has also helped projects to secure additional financial support from other sources, further highlighting the program's value.

While an Innovation Fund grant has been crucial for obtaining critical part of the financing for renewable energy projects, investors still require security and guarantees, which can be challenging to provide. The projects discussed that although having solid financial analysis and projections and strong business plans is key to securing financing, external financial advisors could help carry out informed negotiations with banks. This could lead to fewer conditions from the banks and help secure financing for large-scale projects.

Some projects expressed that securing financing had been complex due to institutional and commercial lenders' lack of understanding of the project. It is challenging to explain to financiers an innovative technology, particularly in the case of Innovation Fund projects, how GHG reductions will be met and what will be the financial consequences of not achieving them.

> Project representatives should pay attention to explain the technical and financial fundamentals of the project, the planned GHG reductions and the risk mitigation measures

Furthermore, it is challenging for new project developers who may not have strong financial backing or history to build trust with the credit departments of banks. As a solution, the participants suggested to look for complementary funding sources that are more used to deal with innovative projects, such as EIC accelerator or National Promotional Banks (such as BPI France equity). Furthermore, projects may be interested in looking for bridge loans and credit lines from lenders to cover cash shortfalls. The attendees highlighted the importance of being open to exploring all options, even if at first, they seem unreachable, e.g. conventional loans.

[4] An individual or entity that self-produces and consumes energy, often through renewable sources.

As advice for future projects, participants highlighted the importance of sufficient time and preparation for securing financing since it can take longer than expected, e.g. over a year for non/limited-recourse project financing. Solid financial planning and budgeting are crucial. For some technologies, as price fluctuations can happen during the project's duration (e.g. CAPEX or OPEX increase), it is recommended to include sufficient contingencies and consider periodical business model adjustments.

2.4. Challenges specific to manufacturing of components for renewable energy

Some project representatives stated that they have suffered from supply chain disruptions, high energy and material costs, inflation and securing funding sources when trying to reach financial close. Particularly, the photovoltaic (PV) manufacturing projects indicated that they face challenges in securing a market for end products due to the strong manufacturing capacity in non-EU countries, maintaining an advantage in cost efficiency due to economy of scale, and access to subsidies and issues with patent infringements.

These factors have led to high uncertainty in the EU PV market, which threatens the survival of small EU PV manufacturers. Further, banks that finance deployment projects often require developers to procure PV modules from stable companies, making it harder for smaller manufacturers to secure offtake contracts.

Another challenge in the PV manufacturing industry is the more expensive procurement and longer lead times for acquiring and upgrading equipment and tools for PV cell manufacturing from European sources compared to non-EU suppliers. The Russian aggression against Ukraine and surging inflation have further aggravated these difficulties. Nonetheless, one project successfully concluded contracts with EU suppliers without negative impacts on overall project progress, considering it possible to avoid them in the future after evaluating trade-offs and weighing different supply chain options.

To tackle these challenges, the projects suggested that a combination of policy measures may be necessary, including the enforcement of legally applicable measures against cheap imports from non-EU countries, ensuring supply security within the EU (for components and critical raw materials), and promoting sustainable and ethical practices within the industry. Participants indicated that to improve the ability to ensure offtake contracts for manufacturers of renewable energy components, non-price criteria for procurement should become more important than price criteria. Establishing legal certification requirements in which a digital passport is required per product and can ensure traceability and recyclability and could help usher consumers towards the choice of quality and sustainability over price criteria.

The projects on solar technologies added that the current taxes on assembled cells and their components, are inconsistent and complex. For instance, when components are imported separately, the amount of duty paid may be very different from the duty paid on assembled cells. To address this issue, participants suggested to review the import taxes on different components and final products to streamline the taxation process and create a more level playing field for solar PV production, ultimately fostering a more robust and competitive renewable energy sector.

The participants also highlighted the self-sustaining nature of the domestic manufacturing ecosystem, where a solid manufacturing base supports subsequent players. They concluded

that for new project developers, it is easier to build on the existing manufacturing industry foundations rather than start all over from scratch.

3. CONCLUSIONS

This knowledge sharing event allowed different actors of the renewable energy value chain to interact and reflect on the importance of strengthening of the European renewable energy industry. By discussing in small groups, projects were able to share their concerns, problems, and possible solutions to common problems that they are facing during implementation.

The policy recommendations include accelerating the different permitting process, harmonising rules and regulations among EU Member States and creating opportunities for project promoters to have a direct and open dialogue with the relevant local, regional and/or national authorities. Furthermore, in manufacturing of components for renewable energy, it is recommended to implement measures for domestic manufacturers against cheap imports from non-EU countries and ensure the security of supply for critical raw materials within the EU.

It was stressed that public engagement in innovative projects should prioritise community education and transparent dialogue, emphasising benefits and risks based on facts and data. Engagement with academic institutions is recommended since it can help foster acceptance and trust in innovative solutions, facilitate knowledge exchange between the academic community and project implementers to create more availability of skilled workers to companies.

CINEA and DG Climate Action will continue hosting knowledge-sharing events so that the different projects can continue exchanging insights and lessons learned at different project phases and accelerating the deployment of these technologies.

ANNEX 1

4. POLICY UPDATE

4.1. The revision of the Renewable Energy Directive

The Renewable Energy Directive (RED) is a critical EU legislation promoting the development and deployment of renewable energy technologies. While RED (2009) set a 20% renewable energy target by 2020, RED II (2018) raised the target to 32% by 2030, with specific goals for transport and heating and cooling sectors. The EU's revised RED III (2023)[5] aims to establish a 42.5% renewable energy target, introducing measures like a financing mechanism, a research and innovation programme, a skills and training initiative, an energy efficiency obligation scheme, and a carbon emissions trading system (ETS) reform. The revised RED also features strengthened horizontal measures, such as streamlining permitting and planning processes, strengthened energy system integration, power purchase agreements and cross-border cooperation, and enhanced sustainability criteria for bioenergy, along with guarantees of origin.

4.2. Net-Zero Industry Act

The "Net-Zero industry Act" sets a target for Europe to produce 40% of its annual deployment needs in net-zero technologies by 2030 and to capture 15% of the global market value for these technologies[6]. This will be achieved through measures to stimulate investment, innovation, and scaling up of low-carbon technologies across various industries. The Act streamlines administrative requirements, ensures access to information, and supports innovation through regulatory sandboxes. It establishes Net-Zero Academies to train workforce per industry technology within three years and a Net-Zero Europe Platform for discussion, exchange of information and input from stakeholders in the sector. Furthermore, the creation of Net-Zero Acceleration Valleys aims to create clusters of companies involved in net-zero technologies and to further streamline the administrative procedures. The Act also introduces the notion of "Net-Zero Strategic Projects," which are essential for improving the resilience and autonomy of the EU's net-zero industry. These projects will receive priority status and benefit from rapid administrative treatment, as well as financing advice and, if necessary, urgent treatment in judicial and disputed resolution processes.

4.3. Solar photovoltaics

The EU Solar Energy Strategy[7], adopted in May 2022, aims to identify barriers and challenges in the solar energy sector and accelerate the deployment of solar technologies. The strategy targets 320 GW of solar photovoltaic by 2025 and 600 GW by 2030. It includes three initiatives: the European Solar Rooftops Initiative, the EU large-scale skills partnership, and the EU Solar PV Industry Alliance. The latter aims to create conditions for investment, diversify supply chains, and promote competitive and sustainable solar PV products. The main goals include reaching 30 GW of annual manufacturing capacity by 2030, generating €60 billion of new GDP per year, and creating 400,000 new jobs in

[5] Directive - EU - 2023/2413 - EN - Renewable Energy Directive - EUR-Lex (europa.eu)

[6] Net Zero Industry Act - European Commission (europa.eu)

[7] EUR-Lex - 52022DC0221 - EN - EUR-Lex (europa.eu)

Europe. However, due to various challenges, including prolonged permitting procedures and labour scarcity, these targets may need adjustments. Addressing these issues is crucial for growth and competitiveness.

4.4. Wind Power Action Plan

The wind industry has faced difficulties such as operating losses in 2022 due to insufficient demand for wind turbines, slow and complex permitting, inflation and commodity prices, design of national tenders for renewables, growing pressure from international competitors, and unavailability of skilled workers. The Wind Power Action Plan[8] aims to boost the European wind energy sector's growth and competitiveness by addressing challenges, promoting innovation, and creating jobs. It sets a target of 450 GW of onshore wind power and 300 GW of offshore wind power capacity in Europe by 2050, it also streamlines permitting processes, removes regulatory barriers, and encourages international cooperation to make wind power a central pillar of Europe's sustainable energy transition.

4.5. Offshore Communication (Delivering on the EU offshore renewable energy ambitions)

The European Commission published a strategy in November 2020, titled "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future,"[9] to maximise the potential of offshore renewable energy. The strategy aims to support the sustainable development of the offshore energy sector, increase offshore wind capacity to 60 GW by 2030 and 300 GW by 2050, and achieve at least 1 GW of ocean energy by 2030 and 40 GW by 2050. The strategy proposes actions to strengthen cross-border grids, regional cooperation, permitting, maritime spatial planning, infrastructure resilience, maritime security, research and innovation efforts, EU supply chains, and skills.

4.6. EU action to speed up permit-granting for renewable energy projects

The “RES Simplify” project report[10] focuses on streamlining permitting and administrative procedures for renewable energy installations, providing best practices and policy recommendations. The study found a mismatch between the actual RES deployment and the ambitious targets of the last 10 years, with process-related issues accounting for about 50% of identified barriers, followed by conflicting public goods (except for rooftop PV), third party issues and grid connection issues. Other prevalent obstacles include bureaucratic and environmental issues (i.e. Environmental Impact Assessment processes), conflicting interests with aviation and military, and public resistance.

To address these challenges, the report recommends speeding up permit-granting procedures and improving the identification and planning of locations for projects. Furthermore, the recommendations also include clear guidelines for all process steps, ensuring access to justice, enabling a framework for energy communities and self-consumers, defining responsibilities and procedures at national, regional, and municipal

[8] EUR-Lex - 52023DC0669 - EN - EUR-Lex (europa.eu)

[9] EUR-Lex - 52023DC0668 - EN - EUR-Lex (europa.eu)

[10] Technical support for RES policy development and implementation - Publications Office of the EU (europa.eu)

levels, up- and reskilling permit-granting bodies, mapping suitable areas, long-term planning, and optimising grid capacity to allow an easy grid connection.

As part of the "REPowerEU" Plan, the European Commission has established a temporary emergency framework for faster RES permitting. This measure aims to speed the deployment of renewable energy projects throughout the EU and streamline the permitting process. Under this framework, EU Member States must create one-stop shops for permits, simplify and expedite permitting processes, carry out strategic environmental assessments and spatial planning, engage with local populations, and report progress to the European Commission. The framework is in effect until June 30, 2025.