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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the implementation of the Innovation Fund in 2022

CONTENTS

1 INTRODUCTION

1.1 Context and objectives of the Innovation Fund

The Innovation Fund is one of the world's largest funding programmes for the demonstration of innovative low-carbon technologies. It is funded by the European Union's Emissions Trading System and supports the European Union's objective to reach climate neutrality by 2050.

The European Union (EU) is committed to reducing greenhouse gas (GHG) emissions and mitigating the effects of climate change. In 2021, the European Climate Law[1] was approved as one of the core initiatives for the delivery of the European Green Deal, setting ambitious targets for 2030 in areas such as reductions in GHG emissions, the deployment of renewable energy technologies, and energy efficiency. The Regulation aims to achieve climate neutrality by 2050 in the EU. This aim will require considerable efforts, including regulatory and public sector support, to promote innovation and hasten the path to market of zero-carbon and low-carbon solutions.

The European Union Emissions Trading System (EU ETS) is a cornerstone of the EU's policy to combat climate change and is a key tool for reducing GHG emissions in a cost-effective manner. Established in 2005[2], it is the world's first – and now the world's largest – carbon market, covering around 40% of the EU's GHG emissions. In 2018, the revised ETS Directive created the Innovation Fund (IF) using revenues from auctioning 450 million emission allowances to support innovation in low-carbon technologies and processes in the sectors covered by the EU ETS. In 2019, with the adoption of its Delegated Regulation[3], the IF officially started its activities to provide grants and contributions to blending operations to support the relevant costs of eligible projects.

The IF is now one of the world's largest funding programmes for the commercial demonstration of innovative zero-carbon and low-carbon technologies aimed at bringing to market industrial solutions to decarbonise Europe and support its transition to climate neutrality. The IF provides funding in five key areas: (i) energy intensive industries (EII), (ii) renewable-energy technologies, (iii) carbon capture and geological storage (CCS), (iv) energy storage, and (v) net-zero mobility and buildings.

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[1] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.

[2] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003L0087.

[3] Commission Delegated Regulation (EU) 2019/856 of 26 February 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council with regard to the operation of the Innovation Fund, available at: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32019R0856.

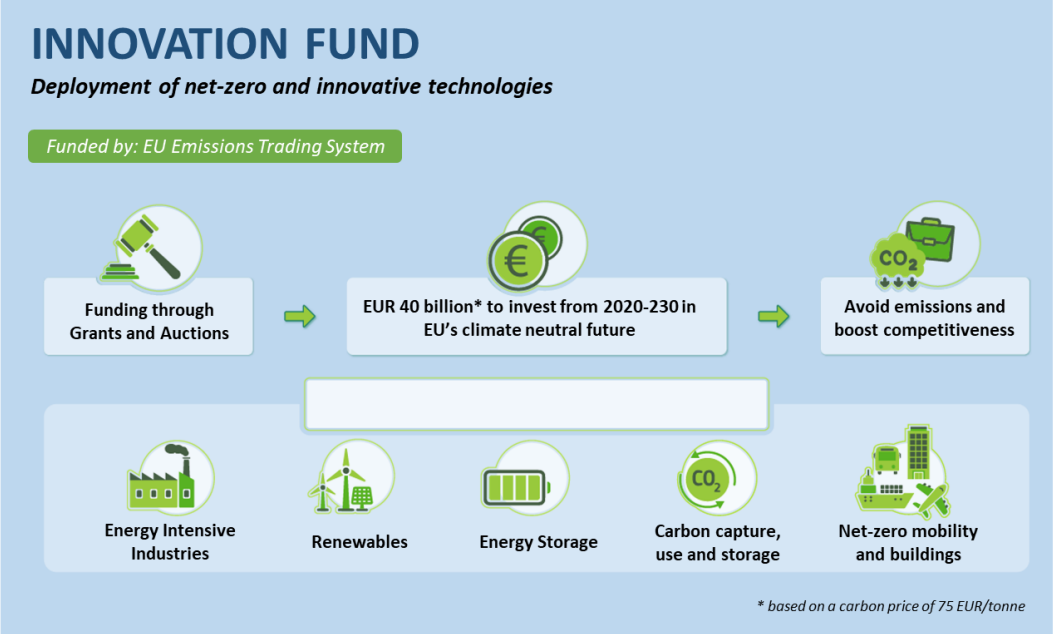
In July 2021, the European Commission adopted a revision of the EU ETS Directive[4] as part of the 'Fit-for-55' package of legislative measures to implement the EU's increased climate ambition for 2030. The package of measures included an amendment to the provisions governing the IF and it had three main aspects set out in the bullet points below.

i) More ETS allowances allocated to the IF: an increase from 450 million to about 530 million. This means that the IF will make available an estimated EUR 40 billion for investment between 2020 and 2030[5].

ii) An expanded scope for funding both in terms of sectors (which now also include maritime, aviation, buildings, and road transport) and in terms of the level of innovation, with technologies at greater levels of maturity now eligible.

iii) A new support mechanism, through which projects are selected on the basis of a competitive bidding procedure (i.e. auction). This makes it possible to implement supporting schemes such as fixed premium contracts, contracts for difference or carbon contracts for difference, covering up to 100% of their relevant costs.

Figure 1: Key aspects of the Innovation Fund after the EU ETS revision



The Commission is working on amending the IF's legal framework[6] to ensure that it: (i) is fully aligned with the most recent amendments of the ETS Directive; and (ii) draws on the lessons learnt from the first years of implementation. A final version of the Delegated Regulation is planned for adoption by the end of 2023.

[4] COM(2021) 551.

[5] Calculated based on an estimated carbon price of EUR 75 per tonne, subject to fluctuations in the market.

[6] Commission Delegated Regulation (EU) 2019/856.

According to the EU ETS Directive[7], by 31 December 2023 and every year thereafter, the Commission shall report on the implementation of the IF to the Climate Change Committee.

1.2 Overview of the operation of the IF

The IF seeks to support innovative technologies, techniques, and processes that: (i) have the potential to substantially reduce GHG emissions in the sectors covered by the EU ETS; (ii) have wide market replication potential; and (iii) are cost-efficient. The IF supports the funding gap through: (i) grants awarded through calls for proposals or auctions; (ii) other financial structuring, such as contributions to blending operations; and (iii) technical and financial advisory support through the project development assistance programme.

The IF is designed to provide financial support to projects demonstrating highly innovative technologies, processes, or products that have significant potential to reduce GHG emissions. This support is provided mainly in the form of grants, although it can also take other forms, such as contributions to blended operations under other EU investment support instruments or advisory support through the project development assistance (PDA) programme, instruments defined in the Delegated Act of the Innovation Fund. The grants provided by the IF can cover a maximum of 60% of the relevant costs[8] of a project if awarded through a regular call for proposals, or up to 100% if awarded through a competitive bidding mechanism. This design ensures both cost-efficient allocation of the support and the mobilisation of private investment.

By the end of the reporting period for this report, which covers the year 2022, the main awarding mechanism used by the IF was through open calls for proposals. These calls for proposals were launched separately for two categories of projects: one with estimated capital expenditures below EUR 7.5 million (small-scale projects) and another with estimated capital expenditures greater than EUR 7.5 million (large-scale projects). Regardless of whether the projects are large-scale or small-scale, funding is awarded without any discrimination as to the type of technology being proposed in the project, provided that the project is in one of the sectors eligible for the IF.

The proposals are evaluated against five criteria: (i) GHG emissions avoidance, (ii) degree of innovation; (iii) maturity at technical, financial, and operational level; (iv) scalability potential; and (v) cost efficiency in the avoidance of GHG emissions. The IF supports highly innovative projects that facilitate the comprehensive transition to climate neutrality of industrial ecosystems. To be considered for funding, projects must offer more than an incremental degree of innovation in comparison to the state-of-the-art in the EU. Typically, the selected projects are evaluated as constituting either very strong innovation or breakthrough innovation. These

[7] Article 10a (8) of the Directive 2003/87/EC as amended in 2023.

[8] Relevant costs: the difference between the best estimate of the CAPEX, the net present value of operating expenditure and operational benefits arising in the 10 years after the entry into operation of the project compared to the result of the same calculation for a conventional production with the same capacity in terms of effective production of the respective final product.

projects also show high technological maturity and substantial potential for scalability, i.e. they will both: (i) enable further GHG reductions by transferring the technology or its application to other locations and sectors; and (ii) entail the cooperation of different actors in the regional and European economy. The IF thus supports highly innovative projects that will help European industrial ecosystems make a comprehensive transition to climate neutrality.

The IF also provides, through its PDA programme, tailor-made support to promising projects that could not be selected in a call due to insufficient maturity, in the form of grants and technical assistance. The objective of the PDA is to help these unsuccessful projects to increase their maturity levels and increase their chances of success at subsequent IF calls.

The IF is operated through the coordinated work of four main actors. The contribution of each of these actors is discussed in the bullet points below.

- The European Commission's Directorate-General for Climate Action (DG CLIMA) has overall responsibility for implementing the IF, including the decisions on the amount of financial assistance, policy priorities, and essential elements of every call for proposals. DG CLIMA also has overall responsibility for adopting the award decisions.
- The European Climate Infrastructure and Environment Executive Agency (CINEA) is responsible for: (i) launching the calls for proposals; (ii) evaluating the calls; (iii) preparing and formalising the grant agreements; and (iv) carrying out the monitoring, supervision, and payments during the implementation of the projects.
- The European Investment Bank (EIB) is responsible for providing PDA to selected projects.
- EU Member States play an essential role in contacting potential applicants on their territory and supporting them in both applying for projects (e.g. through support schemes at Member-State level) and implementing them (e.g. through facilitating permitting). Member States are consulted by the European Commission on both: (i) the financing decisions that determine the periodic calls for proposals of the IF; and (ii) the list of projects selected for award.

1.3 Contribution of the IF to EU policy objectives

The IF, through its objective of supporting the deployment of European net-zero and innovative technologies, contributes to several specific policy objectives under the European Green Deal. The bullet points below set out the seven main objectives to which the IF contributes.

- It contributes to the targets of the EU Climate Law[9] to achieve a 55% reduction in GHG emissions by 2030.

[9] Reg 2021/1110.

- It contributes to the objective of developing the use of renewable hydrogen in Europe, as set out in several initiatives, such as: (i) the REPowerEU[10] initiative to make 10 million tonnes of renewable hydrogen available in Europe from domestic production and another 10 million tonnes from international imports by 2030; (ii) the objective of the European hydrogen strategy[11] to ensure that 40 GW of electrolysers producing 40 million tonnes of hydrogen are installed in Europe by 2050; and (iii) the objective in the Renewable Energy Directive[12] to ensure that 42% of hydrogen used in industry is renewable by 2030, reaching 60% by 2035.

- It contributes to the EU's objectives for developing alternative fuels, such as those set down in REfuelEU Aviation[13] to make 2% of the fuel made available at EU airports sustainable aviation fuel by 2025 (and 6% in 2030, 20% in 2035 and 70% in 2050). It also contributes to the biomethane action plan's objective of reaching domestic production (i.e. production within the EU) of 35 bcms of biomethane by 2030.

- It contributes to the objectives in the Renewable Energy Directive[14] and REPowerEU of rolling out renewable energy generation and reaching a share of 45% renewables in the energy mix by 2030 (through goals such as doubling the generation of solar power by 2025, installing 600GW of solar power by 2030, doubling the rate of deployment of heat-pumps, and promoting the integration of district heating systems with geothermal and solar energy sources). It also contributes to the objectives of the offshore energy strategy[15] which aims to have installed 300 GW of offshore wind generation and 40 GW of ocean-based generation by 2050.

- It contributes to the objectives of the Batteries Regulation[16] to strengthen the functioning of the EU's internal battery market (including in products themselves, production and disposal processes, waste batteries, and recycled materials), to promote a circular economy. It also contributes to the Batteries Regulation's objective to reduce environmental and social impacts throughout all stages of the battery life cycle.

- It contributes to the overall objectives of the Net Zero Industry Act (NZIA) [17], aiming at innovating and scaling up manufacturing capacity for net-zero technologies so that EU companies are able to provide at least 40% of EU deployment needs for these technologies by 2030. It also contributes to the objective of reaching 50 Mt/y of CO_2 storage capacity by 2030.

[10] Reg 2023/435.

[11] COM 2020/301.

[12] COM 2021/148.

[13] COM (2021)561.

[14] 2018/2001/EU.

[15] COM 2020/741.

[16] COM 2020/798.

[17] COM(2023) 161.

- From 2023, the IF will also actively contribute to the European Strategic Technologies for Europe Platform (STEP)[18], which has the objective of enforcing and making the most of existing EU funding instruments to quickly deploy financial support to the benefit of business investments in strategic technologies. The Commission proposes[19] to reinforce the IF with EUR 5 billion from the STEP programme, earmarked to benefit projects located in Member States with GDP per capita below the EU average. The platform also adds a 'Sovereignty Seal' to projects during their selection process, which is a new label intended to help project promoters attract public and private investments by certifying a project's contribution to the STEP objectives, regardless of whether the project has been able to receive EU funding.

The awarded projects will also bring social and economic benefits, such as the creation of quality jobs in the green transition, support for local economies, and cooperation between different industries to foster innovation and sustainability. Support for domestic manufacturing capabilities in new technologies, such as electrolysers and batteries, will strengthen Europe's industrial base and create economies of scale that will make these technologies more competitive at international level. Furthermore, the IF can also help address the social and labour-market aspects of the fair green transition by supporting the reconversion of industrial activities into low carbon options and incorporating existing expertise in the new green economy.

1.4 Synergies with other EU funding instruments

The IF aims to ensure synergies and complementarities with other investment-support instruments, such as: (i) InvestEU; (ii) the lending programmes of the EIB; and (iii) other EU funding programmes, such as Horizon Europe or the Connecting Europe Facility. Further details on the synergies and complementarities that have been achieved so far with these instruments can be found in Section 5.5.1 of this report.

1.5 Knowledge sharing on clean-tech solutions

Knowledge sharing is an essential part of the IF because it supports the replication and faster market penetration of technologies or solutions supported by the IF.

The Delegated Regulation on the IF requires all proposals applying for IF support to include a knowledge-sharing plan to ensure that they: (i) actively disseminate the acquired knowledge; (ii) help encourage scaling up to commercial readiness; and (iii) accelerate the deployment and commercialisation of the proposed technologies. Projects receiving support from the IF should make information about the design and implementation of the projects available to the public on their websites, also acknowledging the EU funds the project has received. It is also of particular importance that the projects gather lessons learnt in the projects on challenges encountered in reaching financial close[20] and entry into operation. This information is expected

[18] COM(2023) 335.

[19] COM(2023) 335 final.

[20] 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.

to help the market penetration of the demonstrated technologies and reduce the risks in the transition to the large-scale production and use of low-carbon products.

The information collated from the projects is used by the Commission as to inform subsequent policymaking. This information is also used to support other IF projects, industrial stakeholders, and future applicants. CINEA and the knowledge-sharing framework ensures that commercially sensitive information will remain confidential. The activities within the knowledge-sharing framework include: (i) closed-door events between IF projects; (ii) open door events to share knowledge, strengthen synergies with other EU funded projects and Member States, and help disseminate the generated knowledge; and (iii) information on the IF project portfolio. Further details on the work carried out so far in knowledge sharing can be found in Section 5.1.2 of this report.

1.6 Purpose of this report

This report gives an account of the status of implementation of the IF at 31 December 2022, presenting: (i) the results from the calls for proposals and PDA implemented during 2022; (ii) the cumulated results of the IF; and (iii) conclusions and expected next steps.

According to the EU ETS Directive[21], by 31 December 2023 and every year thereafter, the Commission has to report on the implementation of the IF to the Climate Change Committee. This report should provide an analysis of projects that have been awarded funding, by sector and by Member State, and the expected contribution of those projects to the objective of climate neutrality by 2050 in the EU.

The purpose of this specific report is to fulfil this requirement and report on the implementation of the IF up until **31 December 2022**. It includes the following information:

(i) a general overview of the most relevant milestones achieved in the implementation of the IF during 2022;

(ii) implementation and results of the IF calls for proposals carried out during 2022;

(iii) cumulated results of the IF from its beginning until the end of 2022;

(iv) the status of implementation of the PDA up until the end of 2022;

(v) on overview of key next steps planned for 2023.

2 INNOVATION FUND KEY MILESTONES IN 2022

The six key milestones achieved by the IF in 2022 are set out in the paragraphs below.

[21] Article 10a (8) of the Directive 2003/87/EC as amended in 2023.

1. **Award of grants in the second call for large-scale projects (LSC-2021).** The call had a total budget of EUR 1.5 billion for projects with an estimated capital expenditure above EUR 7.5 million per project. The call was launched on 26 October 2021, and the grants were awarded on 11 July 2022.
2. **Launch and award of second call for small-scale projects (SCC-2021)**. The call had a budget of EUR 100 million for projects with an estimated capital expenditure below EUR 7.5 million per project. It was launched on 31 March 2022 and the grants were awarded on 12 December 2022.
3. **Launch of the third call for large-scale projects (LSC-2022).** The call had a budget of EUR 3 billion for projects with an estimated capital expenditure above EUR 7.5 million per project. It was launched on 3 November 2022. The results of the call were published on 13 July 2023[22]. As a result, 41 projects were selected for grant-agreement preparation.
4. **Implementation of communication and engagement activities around each call for proposals.** For each call, the Commission and CINEA organised dedicated webinars[23] and information days during which: (i) the call texts were explained in detail to potential applicants; (ii) the questions of potential applicants were answered; and (iii) further application guidance material was shared with potential applicants. In parallel, a dedicated helpdesk telephone line was activated, which during 2022 answered more than 1 100 questions (778 for the large-scale call and 334 for the small-scale call).
5. **Implementation of the first PDA and selection of additional potential beneficiaries.** By the end of 2022, a total of 40 projects from the large-scale calls were offered support under the PDA programme. By that date, the EIB had completed the implementation of the PDA for 19 projects, while 3 projects were still receiving the PDA, and 15 projects were in negotiations to receive it. Three projects had declined the PDA.
6. **Start of the development of competitive bidding mechanisms under the IF.** 2022 also marked the start of preparations for the new competitive bidding procedure (i.e. auctions) under the IF. Studies were conducted on the possible economic design and pricing mechanisms of the competitive bidding procedure. The first pilot auction will be launched in 2023, and corresponding information will be included in the IF's annual report for 2023. The competitive bidding procedure will also include an 'auction-as-a-service' mechanism, which will enable countries in the EEA to use their national budget resources to award support to projects located on their territory while relying on an EU-wide auction mechanism to identify the most competitive projects.

[22] See: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3787

[23] Large-scale projects (europa.eu) and Small-scale projects (europa.eu) under Webinars

3 SECOND CALL FOR LARGE-SCALE PROJECTS (LSC-2021)

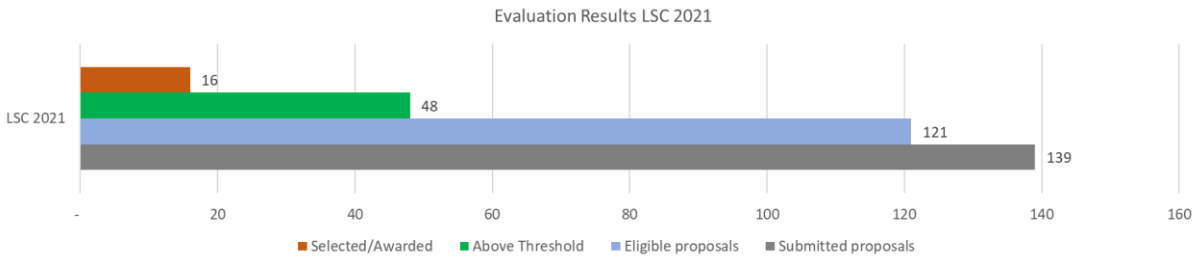
The LSC-2021 targeted projects with capital expenditures of more than EUR 7.5 million per project. It selected 16 projects requesting a total of EUR 1.78 billion (an average grant of EUR 111 million per project). The call attracted many excellent projects, and LSC-2021 was only able to provide 36% of the total grants requested by projects that met or exceeded the evaluation's threshold requirements for ranking. The most supported sector in LSC-2021 is 'cement & lime', with four projects receiving EUR 653 million in total to implement CCS solutions. Altogether, the selected projects are expected to support the avoidance of 132 million tonnes of CO_2e over 10 years.

3.1 Project participation in the call

The LSC-2021 proposals had an original budget of EUR 1.5 billion and aimed to support projects with an estimated capital expenditure greater than EUR 7.5 million per project in any sector eligible under the IF. The financing decision preceding the call also set a maximum 20% flexibility provision on the total budget if the budget was insufficient for the received proposals above the minimum thresholds). The call was launched on 26 October 2021, with a deadline to receive proposals by 3 March 2022. The results of the evaluation were announced on 11 July 2022.

The call received 139 proposals, out of which 121 (87%) were considered admissible and eligible for evaluation (see Figure 2). The quality of the proposals was high, leading to 48 proposals meeting or exceeding the minimum evaluation threshold for award consideration. Once ranked according to their assessment score under the applicable award criteria, and considering the limited available budget, 16 projects were selected and invited for grant preparation while 5 projects were allocated to the reserve list.

Figure 2: Evaluation Results for LSC-2021



Two proposals[24] that were selected for grant-agreement preparation did not finalise the process. As a result, the first proposal from the reserve list[25] was invited to grant negotiation. By the end of 2022, 15 projects had signed a grant agreement with CINEA to benefit from the support

[24] Projects: (i) *RISE (at the applicant's request) and (ii) IONFibre (at CINEA's request since the applicant proposed changes that would put in question the result of the evaluation).*

[25] EAVORLOOP project.

of the IF, while the unfinalised project from the reserve list was still in the process of preparing a grant agreement.

Out of all the proposals received in LSC-2021, 59 (45% of all proposals received) were resubmissions from the previous LSC-2020 call, including 3 that had received PDA under LSC-2020. Out of the 16 finally selected proposals in LSC-2021, 9 were among these 59 resubmissions. This experience showed the extent to which projects can benefit from experience in applying and subsequently improve their competitiveness, especially by tackling the shortcomings in the technical, financial and operational maturity of their projects. Also, this experience illustrates the importance of having the PDA programme in place to help projects to become more mature. After LSC-2021, out of the 32 projects that were not selected due to the limited available budget, 18 projects were invited to receive the PDA provided by the EIB.

3.2 Call budget and financial support requested

The total grant support requested by all projects that applied for the second LSC (LSC-2021) amounted to EUR 11.2 billion. Projects that were assessed as meeting or exceeding the minimum threshold requirements accounted for a total grant request of EUR 4.97 billion. This figure considerably exceeded the available budget of EUR 1.5 billion. For that reason, the Commission used the 20% flexibility rule to maximise the impact of this call for proposals. The flexibility rule, as defined in each of the IF financing decisions, allows changes in the available budget in several situations. One of the situations is when the results of the call for proposals are such that many projects are evaluated as meeting or exceeding the minimum threshold requirements, but cannot all be invited to prepare a grant agreement due to the budget constraint of the call. As a result, and despite the application of the flexibility rule, the proposals invited to prepare grant agreements corresponded to only 36% (EUR 1.78 billion) of the total amount requested by proposals that met or exceeded the evaluation threshold requirements.

The total capital expenditure of projects finally selected under LSC-2021 amounted to EUR 8.47 billion, while the maximum IF grant support to those projects was EUR 1.78 billion. That means that the IF was leveraging other investment worth almost 4 times the IF's own contribution. The average capital expenditure (CAPEX) per project has been EUR 530 million and the average grant amount requested was approximately EUR 111 million per project.

LSC-2021 has revealed an increased interest in the IF by developers with projects seeking more than EUR 7.5 million per project. Therefore, the available budget for this type of calls has proven insufficient. After LSC-2021, out of the total EUR 4.97 billion requested by projects that met or exceeded the minimum threshold requirements for selection, projects worth EUR 3.2 billion could not be selected due to insufficient budget. At the same time, LSC-2021 has shown that the competitive nature of the calls for proposals provides an efficient approach to mobilising private funding, with IF grants representing an average of 23% of the projects' capital expenditure.

3.3 Characteristics of the awarded projects

3.3.1 Sectors

The 16 projects finally selected for grant-agreement preparation were distributed along 8 sectors of activity (see Figure 3). The largest number of projects (4 projects or 25% of all the projects selected) were in the "cement and lime" sector. These 4 projects benefited from 37%

of the total grant support (see Figure 4). The selected projects showed the relevance of the IF for supporting large initiatives to decarbonise industrial activities, such as cement production, chemical and petrochemical processes, and the use of hydrogen as an alternative clean fuel. The cement industry has been particularly competitive, putting forward credible and cost-effective solutions to abate GHG emissions through CCS technologies.

Figure 3: Number of projects by sector in LSC 2021

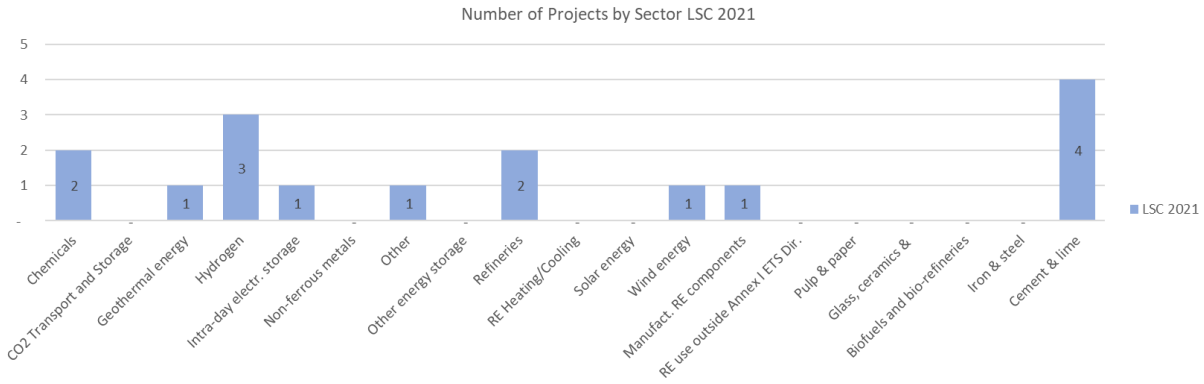
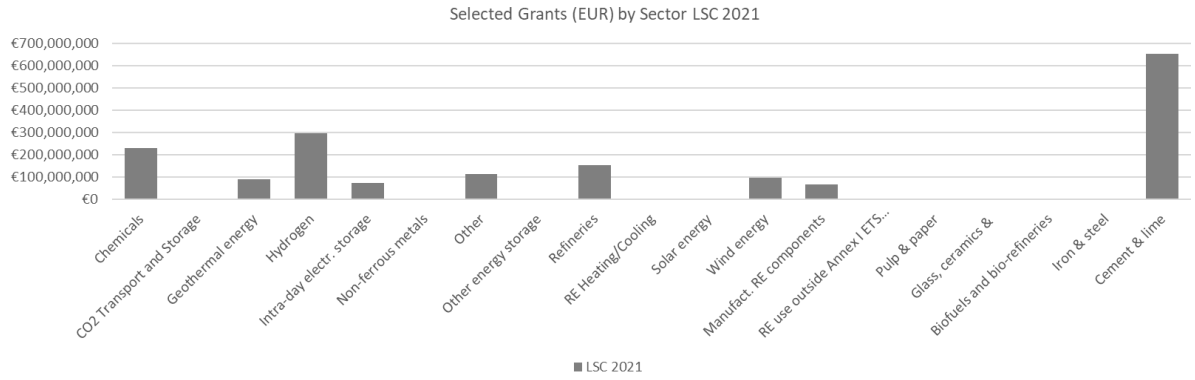


Figure 4: Amount of grants (EUR) for selected projects in LSC 2021



3.3.2 Geographical distribution

The selected and awarded projects were distributed across nine Member States, as well as Norway and Iceland. The Member States with the most selected and awarded projects were the Netherlands and Germany (3 projects each). The most budget was awarded to projects located in the Netherlands, Germany, and Poland, with each country representing around 17% of the total budget awarded, or approximately EUR 302 million (see Figures 5 and 6). Projects based in western and northern Europe still performed better during evaluation in this large-scale call, , with lower eligibility rates in Central and Eastern Europe.

Figure 5: Number of projects eligible, above threshold, and selected, by country – LSC 2021

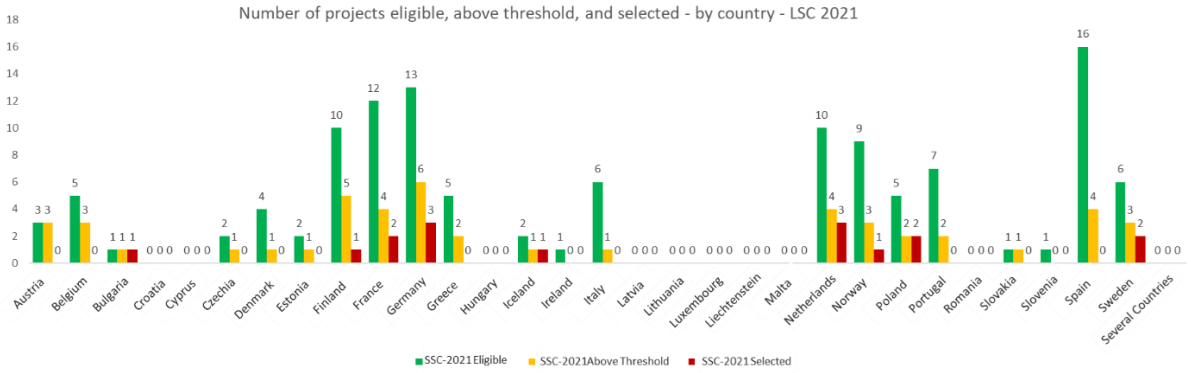
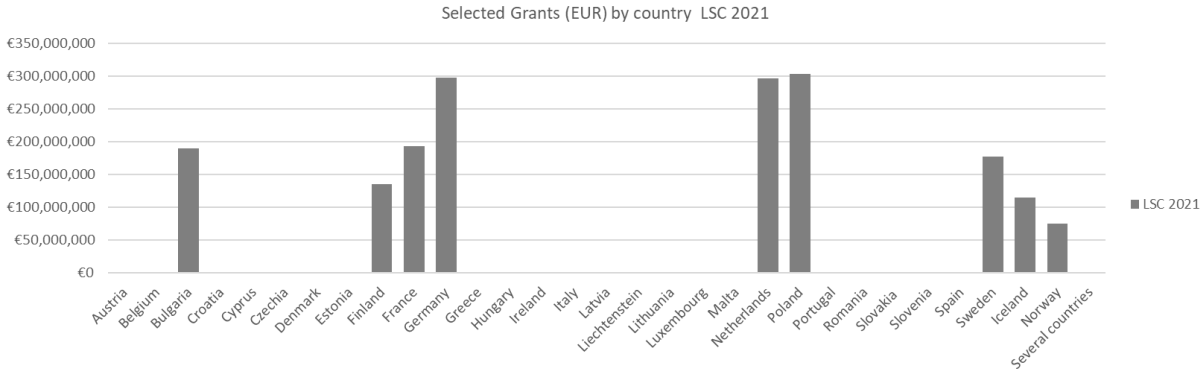


Figure 6: Amount of selected grants (EUR) by country in LSC-2021



3.3.3 GHG-reduction potential

The estimated total absolute avoided GHG emissions from projects selected and awarded in LSC-2021 is 132 million tonnes of CO_2e over a period of 10 years, with an average contribution per project of 8.2 million tonnes of avoided CO_2e. The greatest contributions to this figure come from projects in the cement-and-lime sector (28%), intra-day electricity storage (26%), and the chemicals sector (11%). The greatest cost efficiency in the relation between the grant amount and the absolute GHG emissions avoided was achieved by projects in intra-day electricity storage, with an average of 458 kg of CO_2e avoided per EUR 1 of grant, showing the significant impact of these technologies when helping to integrate renewable energies into the grid.

3.3.4 Level of maturity

All projects selected in LSC-2021 planned to have achieved financial close by the second quarter of 2025 and have entered into operation by the second quarter of 2028, as seen in Figures 7 and 8. On average, the time to achieve financial close is 22 months, and the time to achieve entry into operation is 58 months. Considering that the technical maturity of the projects participating in the IF is in general low, requiring on average of almost 5 years to start operations fits with the innovative nature of the supported technologies. One project, NorthStorPlus, already reached financial closure at the end of 2022.

Figure 7: Expected financial close date in LSC 2021

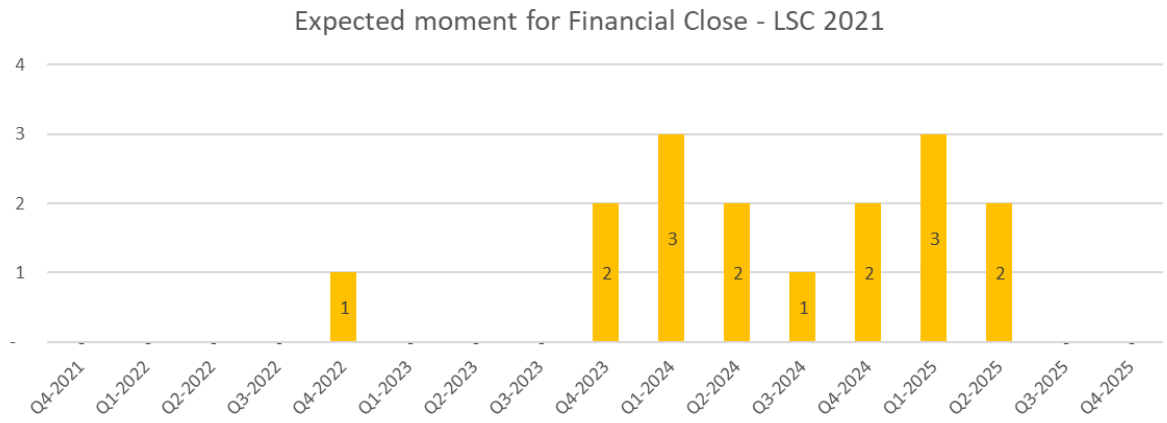
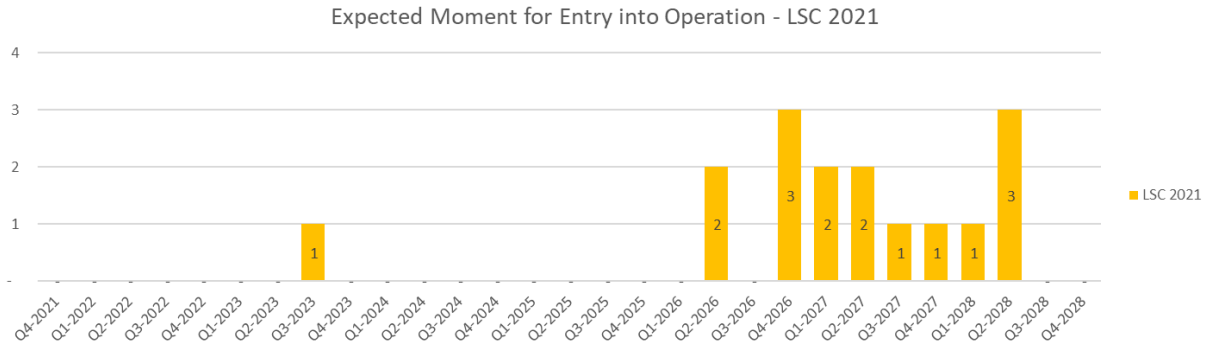


Figure 8: Expected date of entry into operation in LSC 2021



3.3.5 Level of innovation and potential for scalability

The degree of innovation in the selected proposals has been very good, with almost all of the proposals achieving a score of 4 (out of a total possible of 5) or higher in this criterion during their evaluation, with good scores in both the 'state-of-the-art' and 'EU policy contribution' sub-criteria.

The IF aims to select projects with technical and market potential for: (i) widespread application or replication; or (ii) future cost reduction. Therefore, the evaluation assesses: (i) whether the proposals are scalable at the level of the project and the regional economy; (ii) whether the proposals are scalable at the level of the sector and economy-wide; and (iii) the quality and extent of the knowledge-sharing plan. On this scalability potential, all selected proposals from the LSC-2021 achieved scores of between 3.5 out of 5 and 5 out of 5, with almost all scoring 4 or above.

Projects selected for support under LSC-2021 cover many technological innovations that may be crucial for decarbonising the European economy in the coming years. Examples of key technologies include: (i) the expansion of offshore wind-power coupled with electrolysers producing hydrogen; (ii) the manufacturing, deployment, and recycling of innovative materials (such as high-nickel-content Li-Ion batteries) for electrochemical energy storage in the power grids; (iii) the development of new chemical processes for the large-scale recycling of plastic

waste streams; or (iv) the incorporation of CCS techniques into cement-producing industrial processes.

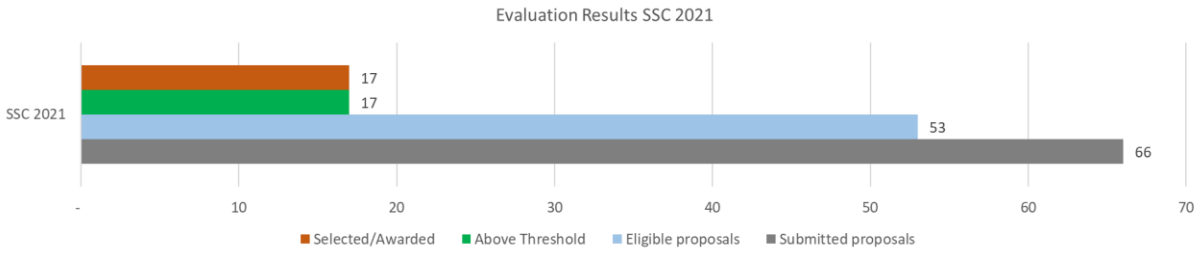
4 SECOND CALL FOR SMALL-SCALE PROJECTS (SSC-2021)

SSC-2021 was targeted at projects with capital expenditure of less than EUR 7.5 million per project. It selected 17 projects that received a total of EUR 61.8 million (an average of EUR 3.6 million in grants per project). Although 66 proposals were submitted, only 17 proposals were assessed as meeting or exceeding the evaluation thresholds. The budget of the call was therefore not fully used and the call was therefore undersubscribed by 38%. The most supported sector under the call was the 'glass, ceramics and construction materials' sector, with five projects receiving approximately EUR 19 million in total to implement decarbonisation solutions in their industrial processes, such as electrification of furnaces or recirculation of waste-heat. Taken together, the selected projects are expected to help avoid 1.3 million tonnes of CO_2e over a period of 10 years.

The SSC-2021, which was the second call for small-scale proposals under the IF, had a budget of EUR 100 million and was directed at projects with an estimated capital expenditure below EUR 7.5 million per project in any sector covered by the EU ETS. It was launched on 31 March 2022, with a deadline to receive proposals of 31 August 2022. The results of the evaluation were announced on 12 December 2022.

66 proposals were submitted, out of which 53 (80%) were considered admissible and eligible for evaluation. Out of those 53, 17 proposals met or exceeded the minimum evaluation threshold requirements to be considered for a grant award. Since the available budget exceeded the combined requested support of the proposals, all 17 of these proposals were selected for grant-agreement preparation (see Figure 9).

Figure 9: Number of projects participating in SSC-2021



4.1 Call budget and financial support requested

The projects applying for SSC-2021 requested a total of EUR 302.8 million. The projects that were assessed as meeting or exceeding the minimum threshold requirements – all of which were selected for grant-agreement preparation – represented a total request of EUR 61.8 million in grant support, an average of EUR 3.64 million per project. The capital expenditure of

projects finally awarded under SSC-2021 amounted to EUR 115 million, with an average of EUR 6.7 million per project.

4.2 Characteristics of the awarded projects

4.2.1 Sectors

The 17 projects finally selected for grant-agreement preparation were distributed across 12 sectors of activity. Out of the 17 projects, 29% (or 5 projects) were related to 'glass, ceramics and construction material', and these projects received 31% of the allocated grant budget, as seen in Figures 10 and 11. During this call, the IF proved itself to be a key instrument in supporting industrial decarbonisation activities at small scale, by promoting remarkably competitive projects to improve furnaces in the glass industry with solutions such as electrification or recirculation of waste-heat.

Figure 10: Number of projects by sector in SSC-2021

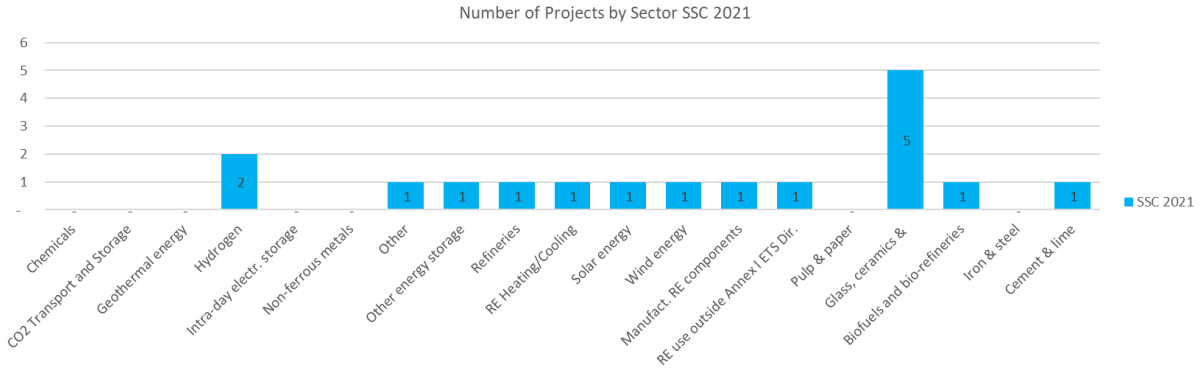
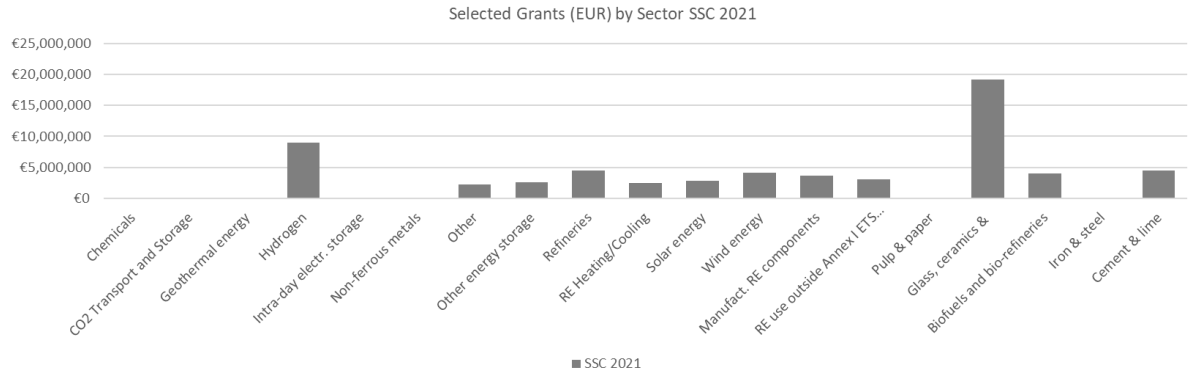


Figure 11: Amount of grants by sector in SSC 2021



4.2.2 Geographical distribution

The selected projects were distributed across 12 Member States. The Member State with the most selected projects was Spain (3 projects), which also received the most budget allocated at 17% of the total (or EUR 10.7 million). There was one project located in three different countries (Czechia, France, and Spain) targeting manufacturing of renewable-energy components. In this small-scale call, almost 53% of the proposals selected were located in the south, centre and east of Europe, with only 1 proposal in the north of Europe (Finland). This is a different picture to that seen in the large-scale call (where most of the projects were from northern and western Europe) thus contributing to a balance in the geographical distribution of funding.

Figure 12: Number of projects by country in SSC-2021

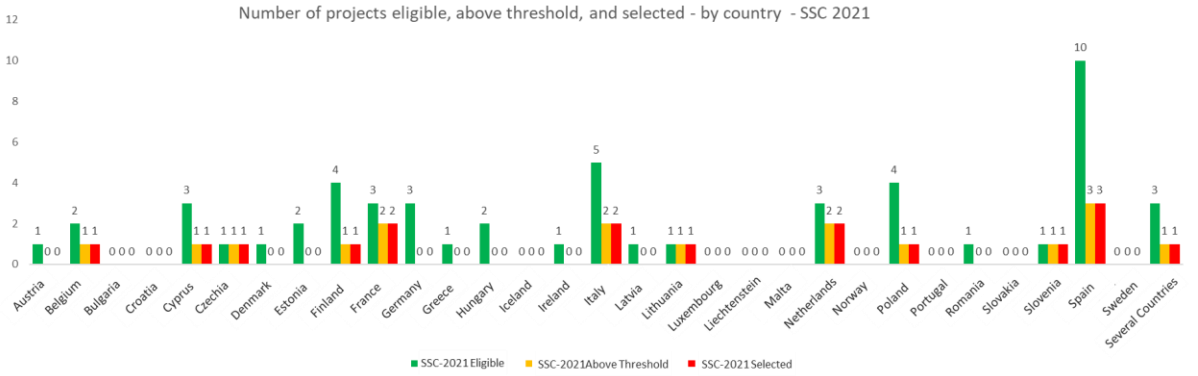
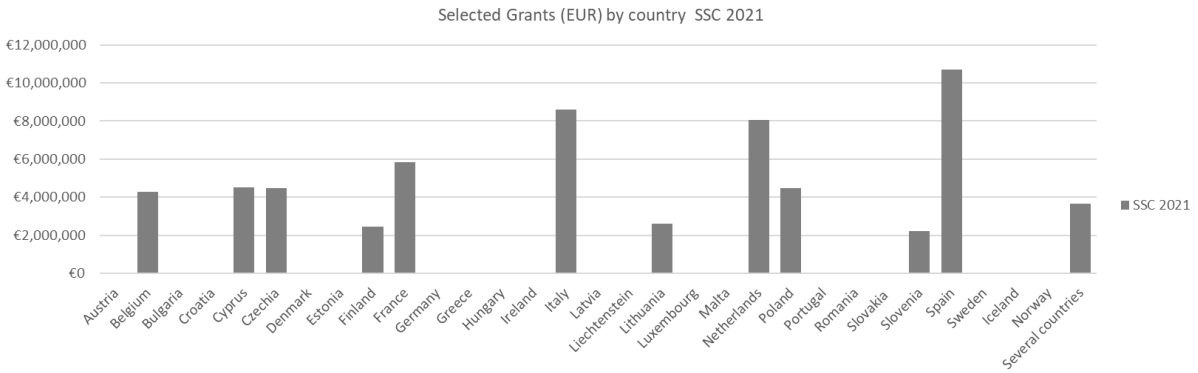


Figure 13: Amount of grants (EUR) by country in SSC-2021



4.2.3 GHG-reduction potential

The estimated total potential for mitigation of GHG emissions from the projects selected and awarded in SSC-2021 is 1.3 million tonnes of CO_2e over a period of 10 years, with an average contribution per project of 79 121 tonnes of CO_2e. The greatest contribution to this figure comes from projects in the glass, ceramics and construction material sector (34%) and from the cement and lime sector (30%). The greatest cost efficiency in the relation between the grant

amount and the absolute reduction in GHG emissions was achieved by projects in the cement and lime sector, with an average of 92 kg of CO_2e reduced per EUR 1 of grant. These efficiencies were especially seen in the substitution of fossil fuels in cement kilns.

4.2.4 Level of maturity

All projects selected under SSC-2021 have plans to achieve financial close by the third quarter of 2025 and enter into operation by early 2028. Moreover, 88% will reach financial close by the end of 2024 and 76% will start operations by the end of 2025, which is faster than the pace of large-scale projects, as smaller projects are easier to implement.

Figure 14: Planned date for financial close in projects selected under SSC-2021

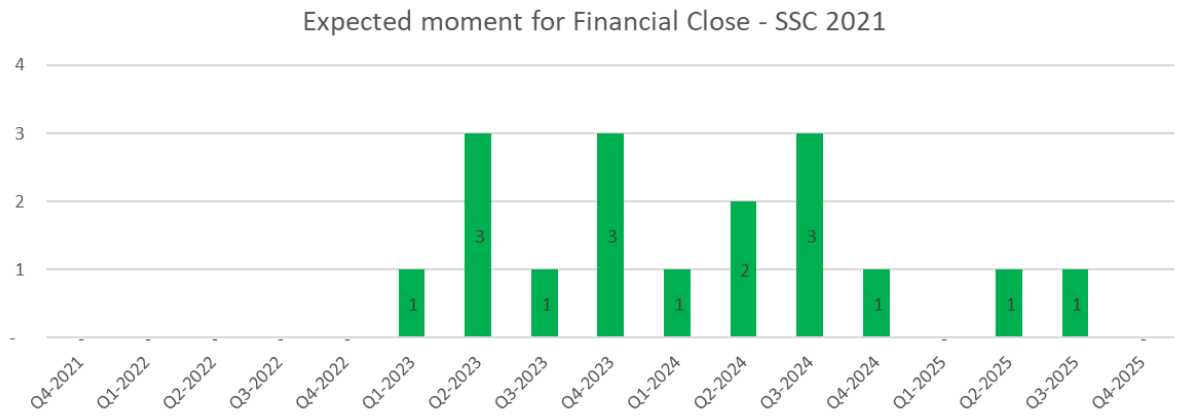
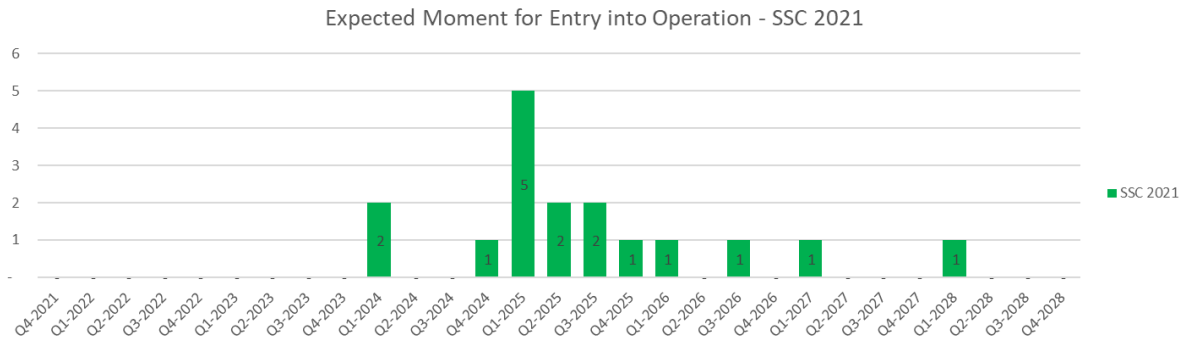


Figure 15: Expected date of entry into operation in projects selected under SSC-2021



4.2.5 Level of innovation and potential for scalability

The degree of innovation in the selected proposals for SSC-2021 has been very good, with more than 50% of the proposals achieving a score of 12 (out of a possible 15) or higher in this criterion.

On this scalability potential, more than 70% of the selected proposals from SSC-2021 achieved high scores of more than 12 points (out of 15). This call resulted in a variety of projects supporting areas such as the decarbonisation of intensive industries, the improvement of energy-storage solutions, or the expansion of uses for renewable energy. For example, the IF

will be supporting projects to: (i) combine solar-energy generation with agricultural activities; (ii) promote shipping mobility solutions based on hydrogen fuel or wind; and (iii) develop district heating installations using geothermal energy. For the industrial sector, the projects under this call will develop solutions such as: (i) electric furnaces in the glass manufacturing industry; (ii) carbon removal pre-cast construction materials; or (iii) the incorporation of alternative fuels (e.g. renewable hydrogen or biofuels) and heat pumps into various industrial processes. On energy-storage solutions, the projects under SSC-2021 will develop solutions such as improved energy-as-service schemes, or new electric-vehicle battery-cooler technologies that reduce the weight of energy-storage systems.

5 CUMULATIVE RESULTS OF THE INNOVATION FUND BY THE END OF 2022

By the end of 2022, the IF had launched and awarded four calls for proposals: two for small-scale projects and two for large-scale projects. In total, 70 projects have been selected to receive support in the form of grants totalling EUR 3.1 billion. The interest of project developers has remained high, particularly in the calls for large-scale projects. The most support so far has been directed to projects seeking to decarbonise energy-intensive industries, with a particular focus on the cement and lime sector. From a geographical point of view, there is still an under-representation of participating projects located in eastern Europe. The currently selected projects plan to avoid 215 million tonnes of CO_2e *emissions over a period of 10 years, making the IF a key contributor to the European Green Deal and the EU's aim to reach climate neutrality by 2050.*

The IF launched its first call for proposals on 3 July 2020 (first large-scale call) and the second one on 1 December 2020 (first small-scale call). By the end of 2022, three additional calls had been launched: the second small-scale call (31 March 2022), the second large-scale call (26 October 2022), and the third large-scale call (3 November 2022).

5.1 Project participation in the call

Between its launch and the end of 2022, the IF had received a total of 748 proposals for projects, at both large scale and small scale, out of which 70 projects were preselected for grant agreement. As can be seen in Figure 16, participation in the small-scale calls has differed from participation in the large-scale calls. The small-scale calls initially attracted a lot of interest, but participation then fell by 70% between the first and the second call. One of the reasons for this loss of interest in small-scale calls may have been due to the small size of the maximum CAPEX requirement at only EUR 7.5 million. Projects of this size often have access to national funding with less competition and easier application procedures. There was a similar pattern in the large-scale call, which also initially attracted strong interest. However, there was only a 55%[26] decline in the number of proposals between the first large-scale call and the second

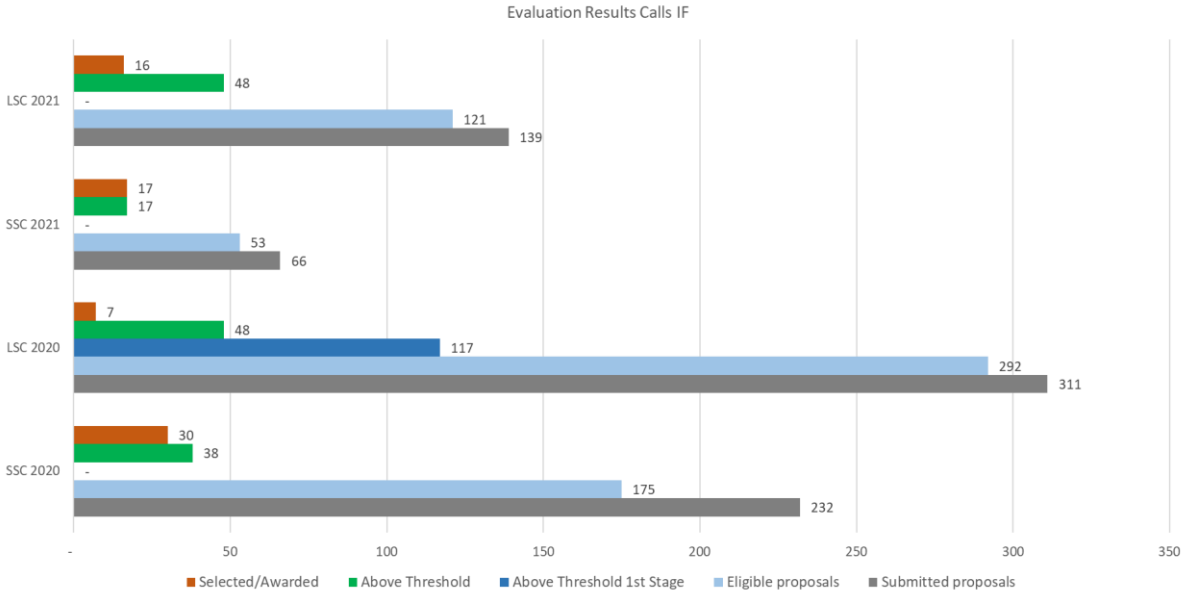
[26] LSC-2020 was organised in two steps. In step 1 expressions of interest were received and 70 of the highest ranking proposals were invited to participate in step 2. In Step 2, a full application and evaluation process was

large-scale call. In this case, the reasons for the decline in proposals may be due to the very high oversubscription/very low success rate in the first large-scale call in 2020 (LSC-2020), which might have discouraged applicants from applying the following year. It should also be noted that, during the first large-scale call in 2020, a two-step selection process was implemented; first there was an 'expressions of interest' stage followed by a full 'call for proposals' stage. After the first stage, 117 proposals were found to meet or exceed the threshold criteria and 70 of these proposals were invited to the second stage, in line with the provisions of the call, resulting in 48 proposals exceeding the threshold criteria in this second stage, 7 of which were finally invited for grant agreement preparation. This scheme aligned with Article 12 of the Delegated Act of the IF. However, this two-step approach caused significant administrative burden while unnecessarily prolonging the period of evaluation and it may also have discouraged applicants from applying the following year. The one-step procedure of LSC-2021 proved more streamlined.

In small-scale calls, the proposals finally invited to prepare grant agreements represented only 25% of the proposals assessed as being eligible for evaluation, but represented 89% of those proposals that were assessed as exceeding the minimum threshold requirements to be considered for evaluation.

In large-scale calls, the number of proposals invited to finally prepare a grant agreement represented an average of 15% of those assessed as being eligible for evaluation and 46% of those assessed as being above the minimum threshold requirements to be considered for a grant award.

Figure 16: Number of projects in calls for proposals of the Innovation Fund (December 2022)



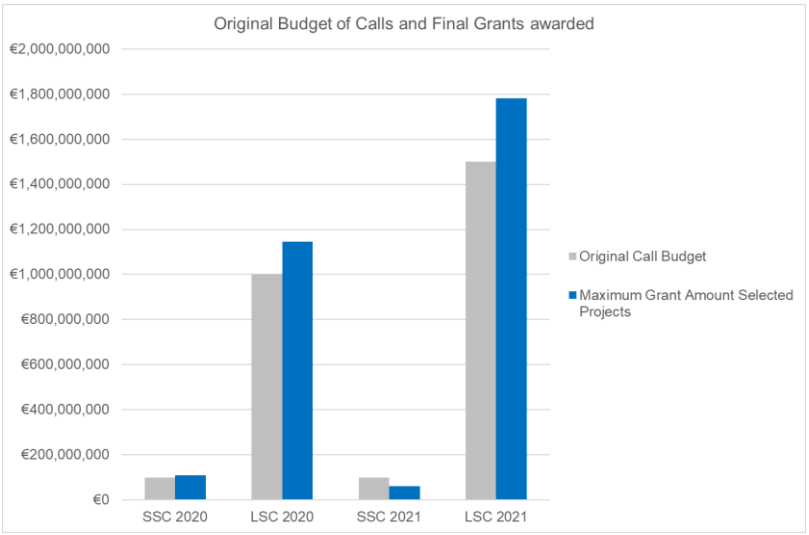
carried out. In LSC-2020, out of the 311 proposals received for Step 1, a total of 117 were found eligible for the second step. Following the call text provisions, 70 proposals were invited for the Step 2 application. In Step 2, 66 proposals were received and evaluated.

5.2 Call budget and financial support requested

The selected projects in the four calls for proposals under the IF amounted to a total combined expected CAPEX of EUR 13.5 billion. The total maximum support from the IF for these selected projects was EUR 3.1 billion in grants, representing an average of 23% grant support for the capital expenditure of all the projects[27]. This also meant that the IF is currently helping to mobilise EUR 10.4 billion from other sources of investments, a figure that has been growing with each call, as can be seen in Figure 18.

The total available budget of the four calls closed by the end of December 2022 accounted for EUR 2.7 billion. Due to oversubscription, particularly in the large-scale calls, the application of the flexibility rule laid down in the financial decisions[28] was applied to three of the calls (SSC-2020, LSC-2020 and LSC-2021). This application of the flexibility rule resulted in an average increase of 16% in the original budget to make a total increased budget of EUR 3.14 billion, as can be seen in Figure 17. Despite this increased budget for three calls, there was one call – SSC-2021 – where the selected projects represented a budget that was 37% below the total budget of the call.

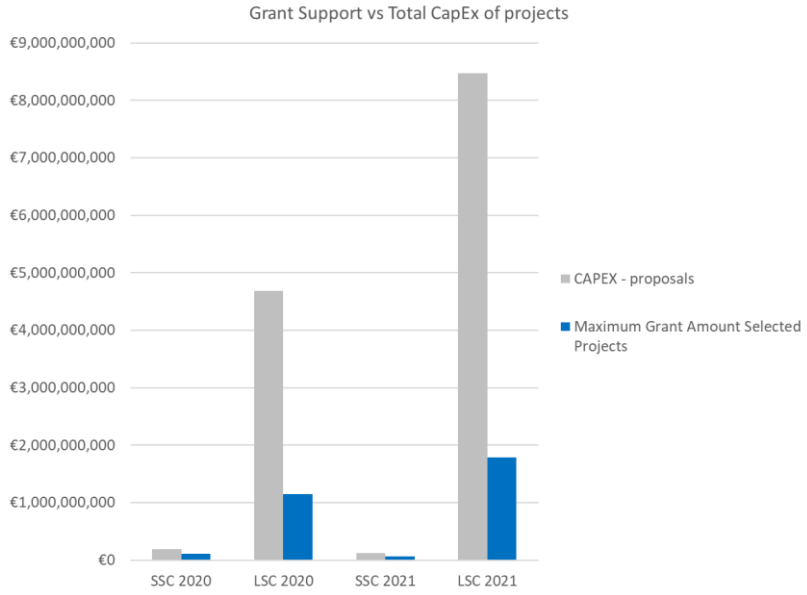
Figure 17: Comparison of available budget and requested grants in projects selected under the Innovation Fund



[27] IF grant covers both capital and operational expenditure, so these figures are given by way of indication.

[28] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/innovfund/wp-call/wp_innovfund-2020_en.pdf.

Figure 18: Comparison of CAPEX and maximum grant amount requested by selected projects under the Innovation Fund



5.3 CHARACTERISTICS OF THE AWARDED PROJECTS

5.3.1 Categories and sectors

The IF organised each of its first four calls in a 'technology neutral' manner (i.e. the IF did not favour any particular technology) for categories eligible for IF support: (i) renewable energy; (ii) energy storage; (iii) energy-intensive industries; and (iv) carbon-capture and geological storage and/or use.

Across all four calls, the two categories in which the most proposals were selected were energy-intensive industries (38 proposals) and renewable energy (14 proposals). However, although the former is also the category with the largest share of the total grant amount selected (48% or EUR 1.5 billion, as can be seen in Figure 20), the CCS category is the most budget intensive by proposal, using 35% of the budget with only 6 proposals.

Figure 19: Number of selected projects by sector in the IF's calls for proposals

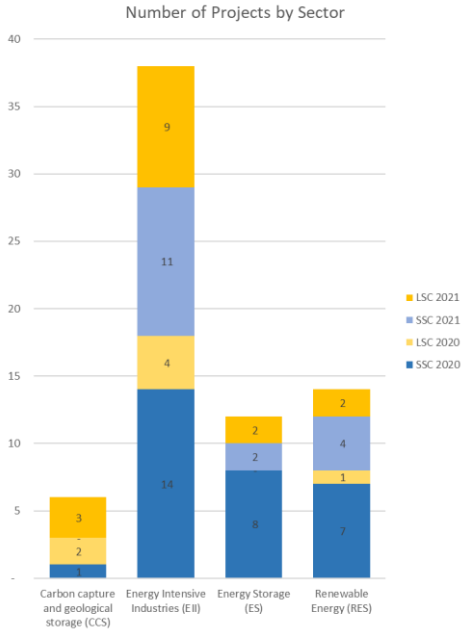
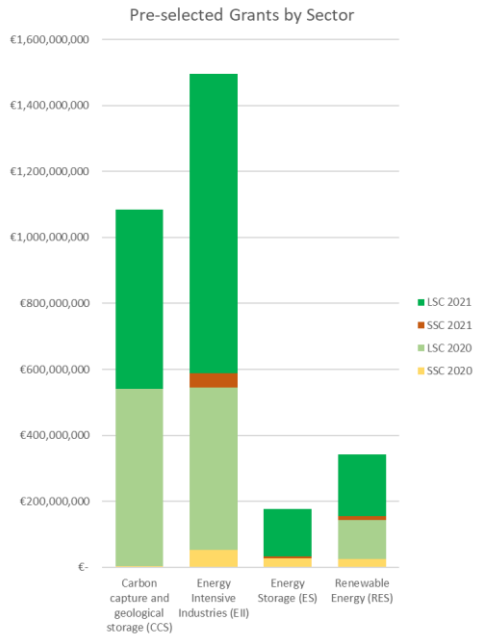


Figure 20: Number of selected projects by country in the IF's calls for proposals



Looking into the sectors, as reflected in Figure 21, the two sectors with the most selected projects have been "hydrogen" (10 projects) and the "glass, ceramics and other construction materials" sector (7 projects). However, when considering the cumulated allocated funding grant support by the end of December 2022 (see Figure 22), the leading sector is "cement and lime" (EUR 810.7 million), followed by hydrogen (EUR 411.1 million). This is mostly because most of the emissions from the cement and lime industry originate in the chemical reaction inside the kiln and the most common technological pathway for the abatement of these

emissions is through an investment-intensive CCS solution, which still requires considerable investment.

Figure 21: Number of selected projects by sector in the IF's calls for proposals

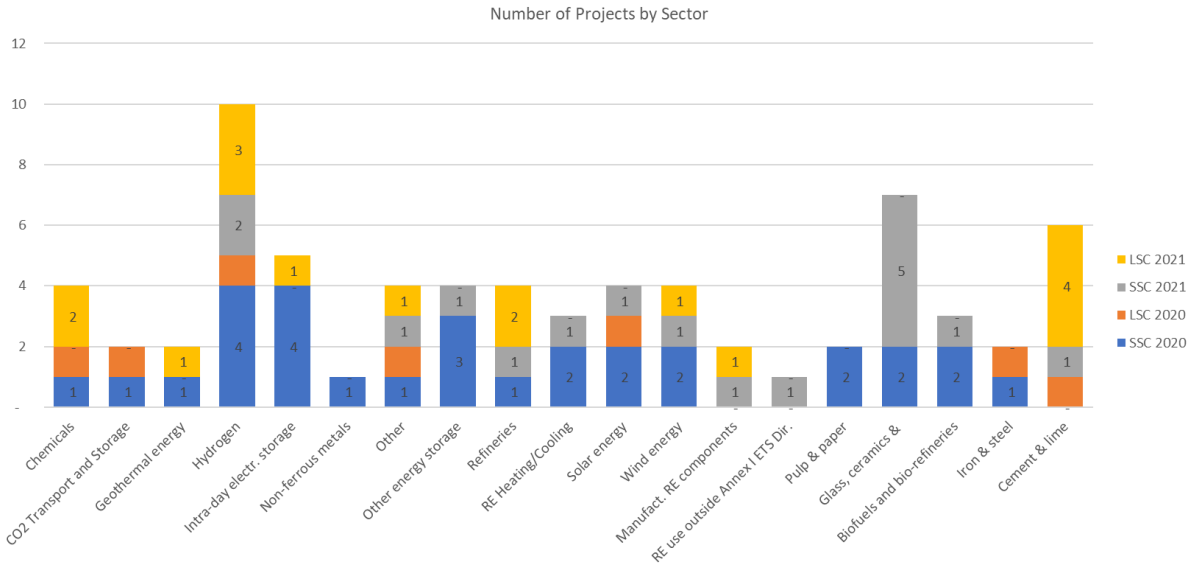
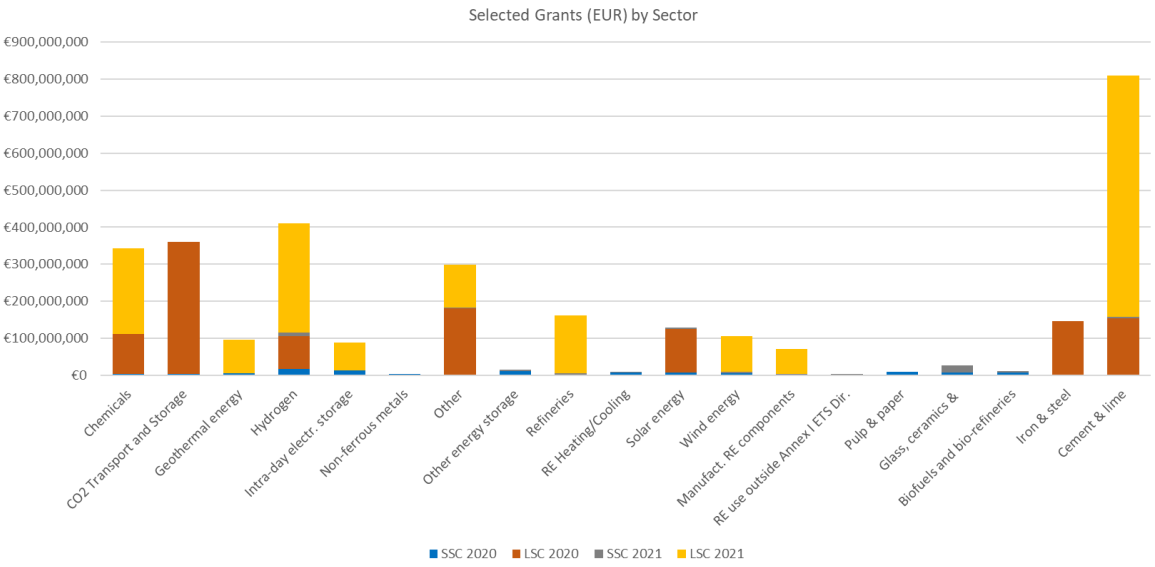


Figure 22: Number of selected projects by country in the IF's calls for proposals



5.3.2 Geographical distribution

The IF aims at achieving geographical and sectoral balance. When this report was being drafted, selected projects were located in 20 of the 30 eligible countries (EU Member States and EEA countries)[29]. However, there is proportionately lower participation by projects from eastern and central Europe.

[29] Two projects are located in several countries: NorthFlex in Poland-Sweden, and Listlawelbattcool in Czechia-France-Spain.

The country with the most projects selected by the IF by the end of 2022 was Spain (11 projects), followed by France (10 projects) and Sweden (7 projects). When looking into cumulated allocated funding from the IF grant budget since the creation of the IF, the picture changes, with Sweden (EUR 511 million) leading the list followed by France (EUR 368.8 million) and Belgium (EUR 361.3 million).

Figure 23: Number of selected projects by country in the IF calls for proposals

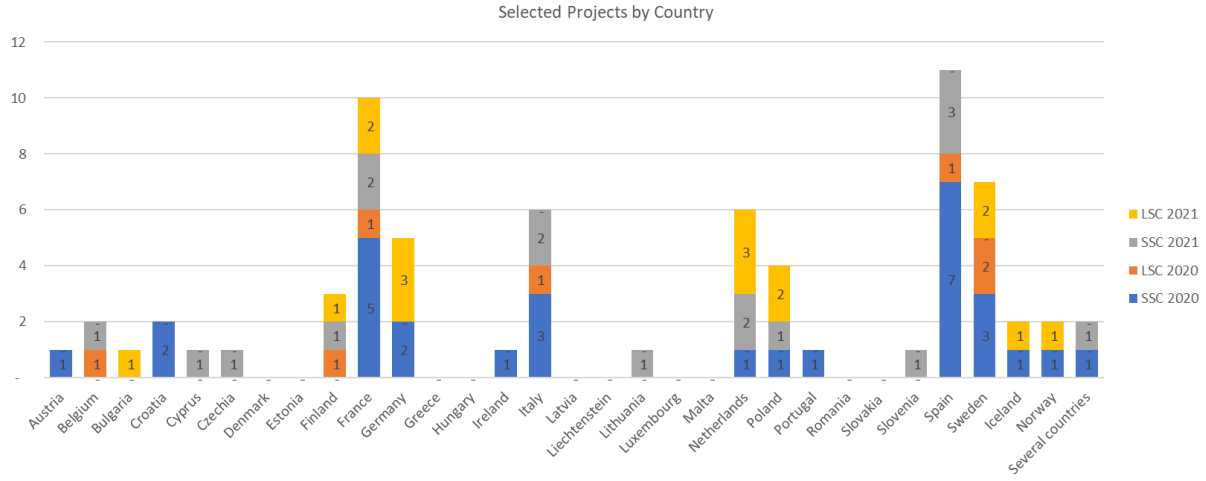
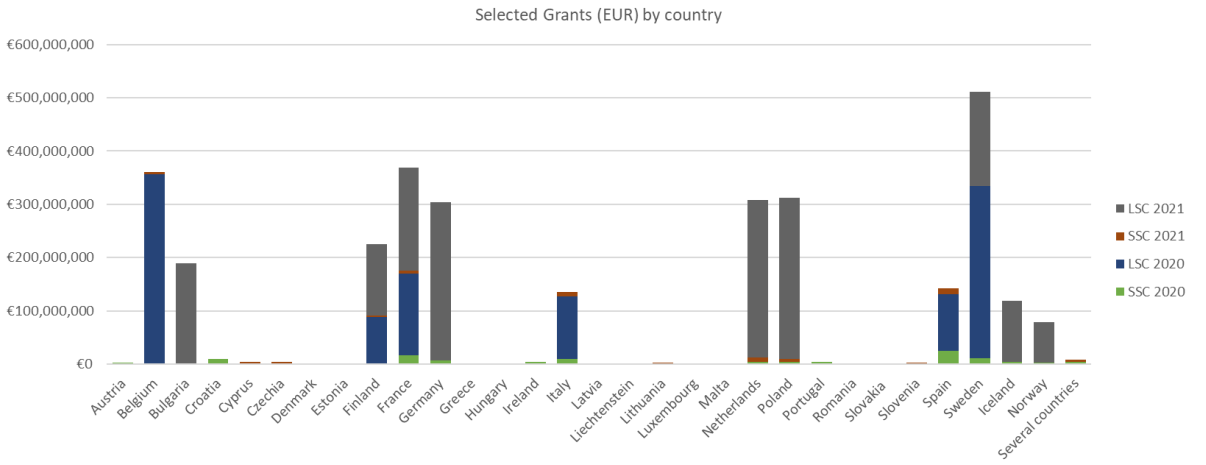
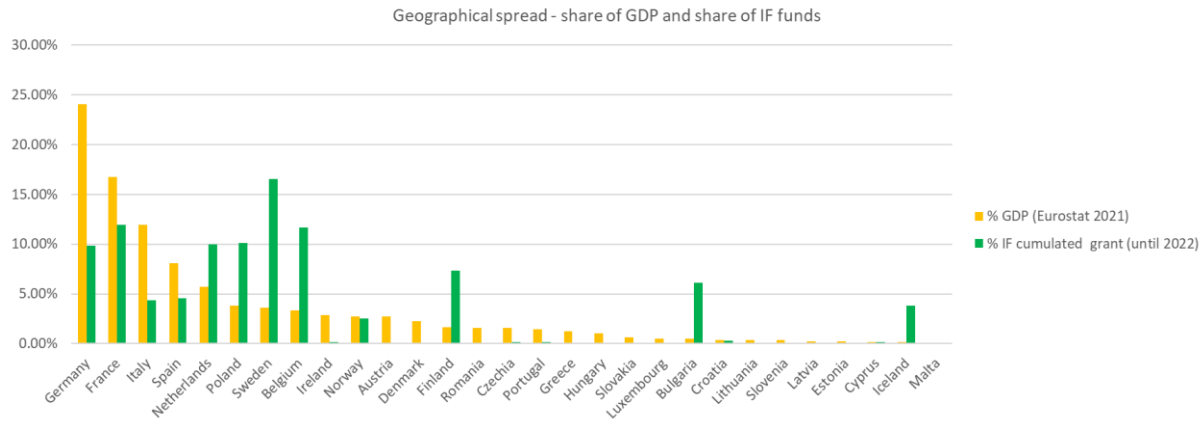


Figure 24: Amount of grants (EUR) in selected projects under the IF's calls for proposals



Geographical balance in the allocation of IF funds to selected projects can also be assessed by looking at each country's share of GDP in the EEA. By that measure, it can be seen in Figure 25 that, by the end of 2022, there was still a relevant under-representation of countries like Germany, France, Italy, or Spain despite the absolute amount of grants allocated in those countries. On the other hand, Sweden, Belgium, Bulgaria, the Netherlands and Finland all show an over representation when their GDPs are compared with the amount of money they have received in IF grants.

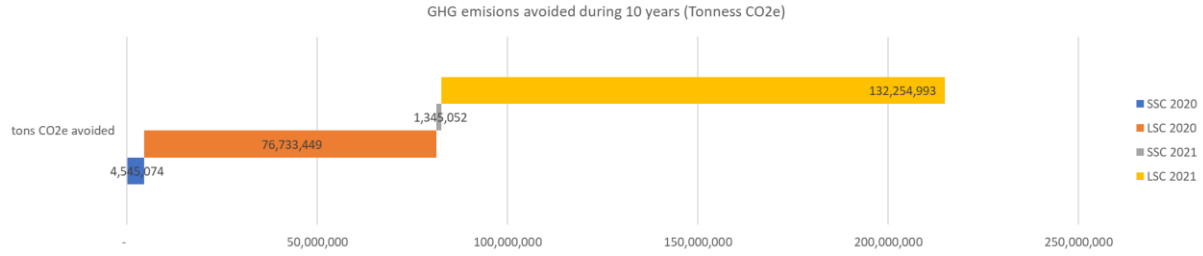
Figure 25: Geographical spread - share of GDP (EEA) compared with share of IF funds (data 2021)



5.3.3 Potential for reducing GHG emissions

The IF supports projects with significant potential to reduce GHG emissions and contribute to EU climate neutrality. The total planned reductions in GHG emissions from all 70 selected projects by the end of December 2022 is approximately 215 million tonnes of CO_2e over a period of 10 years. For reference, that is approximately 7% of total GHG emissions emitted in the European Union in 2022. The average planned reduction in emissions per project is 9.6 million tonnes of CO_2e for large-scale projects and 115 312 tonnes of CO_2e in small-scale projects. This can be translated into monetary terms as follows: for every 1 EUR of support provided by the IF, an average of 70 kg of CO_2e will be avoided on average over a period of 10 years. The first actual avoided emissions will be reported during 2023 by the first projects that entered into operation at the end of 2022 from SSC-2020.

Figure 26: Cumulated GHG emissions set to be avoided by selected projects over a ten-year implementation period



Overall, the most cost-efficient projects for reducing GHG emissions are those in the "intra-day energy-storage" sector, averaging respectively 100 kg of CO_2e/EUR of CAPEX and 147 kg of CO_2e/EUR of IF grant received. These levels of efficiency are reached through technological solutions such as that used in the NorthStorePlus project, which will manufacture (by building two dedicated factories, one in Sweden and one in Poland) a 6 GW of lithium-ion batteries for providing services to the power grid. The project will develop a high-nickel-based cell battery originally designed for the automotive sector albeit with greater energy density.

5.3.4 Level of maturity

The IF calls support clean-tech projects with high financial and business maturity, credibly proving that these projects can be deployed in the short-term. Projects are evaluated against their likelihood of achieving two key milestones: (i) financial close within a maximum of 4 years since grant signature; and (ii) entry into operation.

By 2022, the average time to reach financial close since the start of the selected projects has been 23 months for large-scale projects and 16 for small-scale projects, while the time necessary to achieve entry into operation is 53 months for large-scale projects and 31 for small-scale projects, as can be seen in Figures 26 and 27. These longer time-scales needed for larger projects are due to the greater complexity of larger projects.

At the time when this report was being drafted: (i) 77% of projects were set to achieve financial close by the second quarter of 2024; (ii) 84% were scheduled to have entered into operation by early 2027; and (iii) all projects were expected to have entered into operation before the end of 2028. This will not only ensure emission reductions before the end of the decade, but also demonstrate that a number of decarbonisation technologies can support the transition of the energy and industrial sectors of the European economy.

Figure 27: Planned date for financial close in selected projects

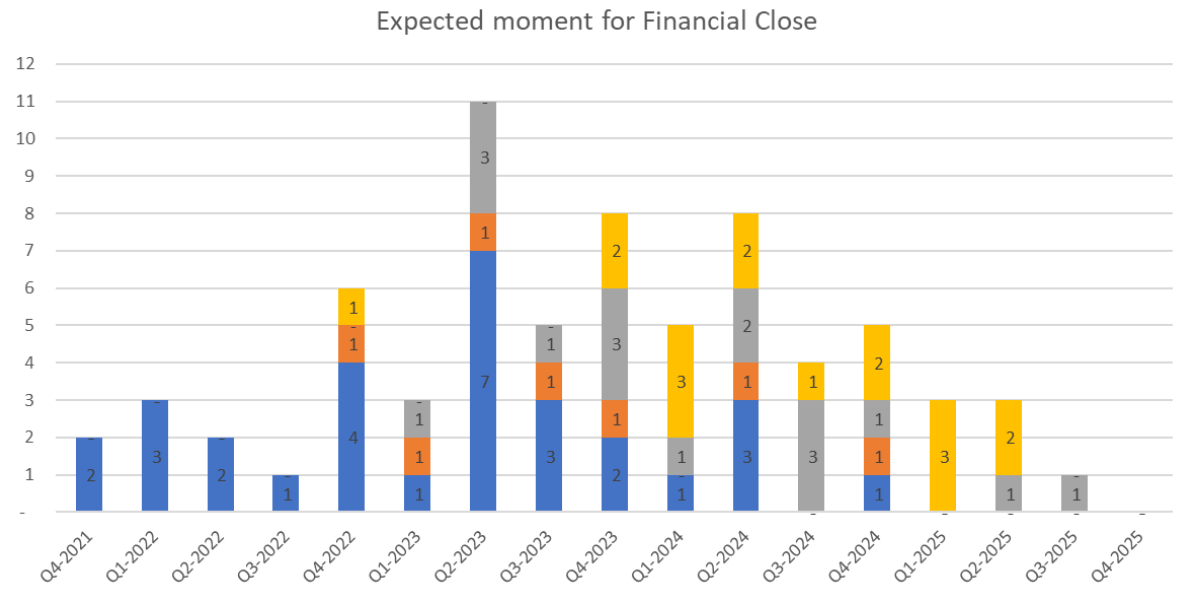
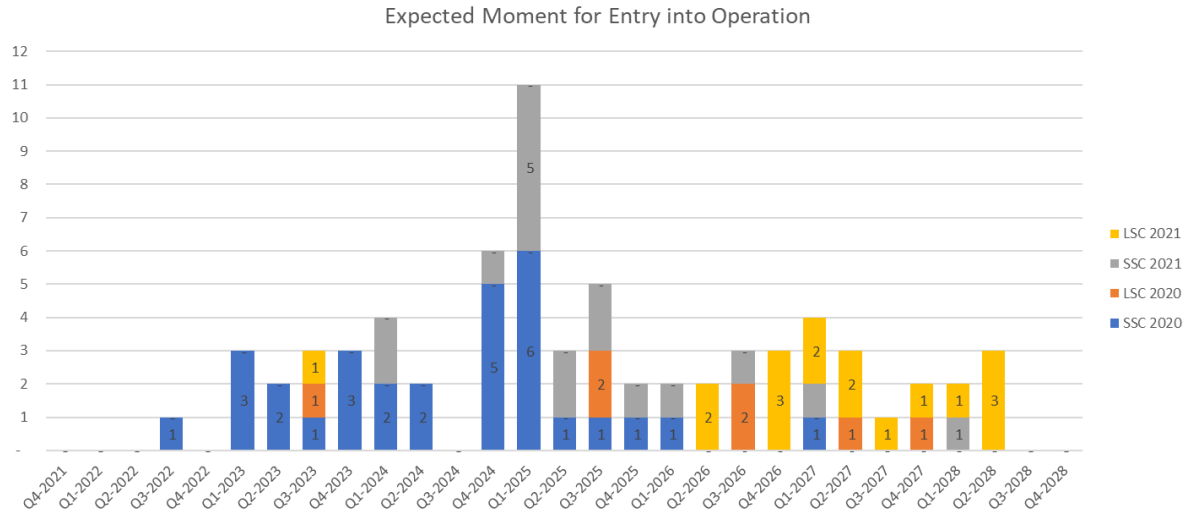


Figure 28: Planned date for entry into operation in selected projects



IF support alone may in certain cases be sufficient to enable the projects' timely realisation. This is notably the case where projects are expected to: (i) create sufficient revenues (including beyond the period considered for the relevant cost calculation); (ii) create synergies with other activities of project coordinators; or (iii) attract external private financing. In some cases, projects may need to secure other public funding, such as State aid or support from other EU funding programmes that does not constitute State aid (altogether, considered as 'public support'). Since the IF's regular calls for proposals allow cumulation with State aid, a total of 13 projects out of those selected in LSC-2020 and LSC-2021 decided to benefit from this additional source of financing.

5.4 Innovative technologies supported

Projects selected to receive support from the IF cover a wide range of technological innovations that will be crucial for the decarbonisation of the European economy in the coming years. As explained above, the supported projects are classified in four categories and 19 sectors. Some of the relevant technologies being supported are set out in the bullet points below.

- *On renewable energy*: the IF is actively supporting projects in the solar, wind, and geothermal-energy sectors. Although solar PV power generation can already be considered a mature technology, there is still a need to make its manufacturing processes more efficient and competitive in Europe. For example, the TANGO project will develop one of the largest solar-panel manufacturing plants in Europe to produce 3 GW of bifacial panels every year. These panels will be made using heterojunction, a technology that increases efficiency and durability compared with more traditional technologies. Another project, HELEXIO, will develop manufacturing processes for lighter solar-panel designs featuring longer modules, to make it easier to install the panels on a wider range of building roofs. On wind energy, one of the projects supported by the IF is the development of next-generation offshore wind turbines in the N2OWF project. This project has the potential to reduce the number of necessary

windmills by 40% compared with conventional technologies. Geothermal energy is another area being funded by the IF. It is a relatively untapped resource that can be used for the combined production of heat and electricity. The potential of geothermal energy can be increased by exploiting the possibilities of compressed gases dissolved in geothermal fluids (such as in the IF-funded project CCGeo) or by developing deep closed loops that will overcome much of the geographical limitations of this technology (such as in the IF-funded project EavorLoop). The IF also supports the development of heating and cooling systems, such as in the DMC project, which will build a solar thermal heating plant, heat pumps, and a storage facility to provide renewable heat to an energy-intensive malt-production process.

- *On energy-intensive industries,* projects are developing decarbonisation strategies that are mostly based on: (i) substituting fossil fuels with renewable fuels or with electrification; and (ii) integrating CCS technologies in production processes. For example, the CLYNGAS project will incorporate waste-to-fuel synthetic fuel into the cement production industry, while the C2B project will demonstrate the possibilities of capturing emissions from cement production to be used as a raw material in other production activities. The IF is also supporting the development of new sustainable materials and recycling processes, such as in the TLP project, which will demonstrate biodegradable biomaterial produced from lignin that can be used in bio-composites for producing packaging films and that can therefore replace traditional fossil fuel-based plastics. Another project being supported by the IF in this area is PULSE, which will implement improved technologies for recycling plastic chemicals.
- *On energy storage,* the storage of energy, particularly through electrochemical technologies, will help integrate renewable generation technologies into power grids while providing flexibility to the system. The IF is supporting the manufacturing and deployment of enhanced materials in energy-storage installations, such as the high-nickel-content Li-Ion batteries that the NorthStorePlus project will be developing. The IF will also be supporting a circular economy for batteries through, for example, the CarBatteryReFactory project, which will address solutions to facilitate the second life of electric-vehicle batteries.
- *On CCS,* the IF is supporting large-scale projects to store carbon dioxide. For example, the KAIROS-AT-C project will be the first European project to integrate cryogenic carbon capture from various industrial sources, with liquefaction, shipping and the permanent sub-sea storage of CO_2. Other projects, like GO4ECOPANET and CALCC, will also demonstrate the large-scale capture and offshore geological storage of CO_2 emissions from industries like cement and lime production.

5.5 Contribution to other EU policy objectives

The IF has already contributed to specific policy objectives in the European Green Deal by supporting a variety of projects, some of which are set out in the bullet points below.

- IF projects already selected by the end of 2022 are expected to avoid 215 million tonnes of CO_2e emissions during their first 10 years of operation, contributing to the targets for reducing GHG emissions set out in the Climate Law[30].

- The IF has provided EUR 411 million to fund 10 projects related to the production and use of hydrogen. This contributes to the EU's objectives of deploying renewable hydrogen, as set down in initiatives such as REPowerEU, the European hydrogen strategy, and the Renewable Energy Directive.

- The IF has provided EUR 10.8 million in grant funding to three projects related to biofuels and bio-refineries, contributing to the objectives to develop alternative fuels set out in ReFuelEU and the biomethane action plan.

- The IF has provided a total of EUR 330 million to 10 projects directly related to solar, wind and geothermal energy. Through this support, the IF is directly contributing to the objectives in the Renewable Energy Directive and REPowerEU of both rolling out renewable energy generation and developing the EU's strategy for offshore energy[31].

- The IF has provided EUR 89 million in grant funding to five projects related to intra-day electricity storage, thus contributing to the objectives in the Batteries Regulation to promote a domestic circular economy for batteries.

- The IF has provided EUR 71 million to fund two projects related to manufacturing components for producing renewable energy or storing energy. It also provided EUR 1.08 billion for 6 projects related to CCS, and invested EUR 1.45 billion in 38 projects related to energy-intensive industries. In so doing, the IF is already contributing to the overall objectives of the Net Zero Industry Act (NZIA) and its Communication[32].

5.5.1 Synergies with other funding instruments

As mentioned at the beginning of this report, the IF aims to ensure synergies and complementarities with other investment-support instruments. By the end of 2022, the IF had carried out specific activities to foster synergies with Horizon Europe and the European Investment Bank.

The EU framework programmes for research and innovation (i.e. Horizon 2020 and Horizon Europe) and the IF have potential synergies. To help achieve these synergies, several actions have been taken. For example, some relevant topics in Horizon Europe's work programme for 2023-2024 (particularly in Clusters 4 & 5) included a standard sentence that encouraged applicants to include in their proposals a business-case strategy and feasibility study that could later pave the way for possible future applications to the IF. Also, that same work programme included in its Cluster 5 a dedicated "coordination and support action" with the objective of

[30] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.

[31] COM(2020) 741.

[32] COM (2023) 62.

promoting the exchange of best practices among four consortia composed of beneficiaries of the Horizon 2020 programme and helping these consortia to produce high-quality IF applications. Furthermore, the IF organised in 2022 a dedicated virtual workshop to: (i) inform participants in mature Horizon 2020 projects about the thematic areas covered by the IF and funding opportunities offered by the IF; and (ii) enable projects to share lessons learnt on the IF application process with potential future applicants, and share any hurdles they may have encountered in deploying their technological solutions.

The IF and Horizon Europe programmes also work with the European Investment Bank through blended financial instruments in the EU-Catalyst Partnership. This partnership brings together the European Commission, the European Investment Bank, and the Breakthrough Energy Catalyst (BEC). The EU-Catalyst Partnership was launched in 2021, in the context of the COP26 in Glasgow, with the objective of mobilising EUR 820 million in investment for critical climate technologies between 2022 and 2026 in Europe. The partnership will focus its efforts on the fields of clean hydrogen, sustainable aviation fuels, direct air capture of carbon, long-duration energy storage, and the decarbonisation of industry. In total, the IF will contribute to the partnership with up to EUR 220 million, and Horizon Europe will contribute up to EUR 200 million. At the beginning of 2022, the BEC launched a first call for proposals as part of its collaboration with the European Union. This first call was not successful in attracting enough interest from project developers, and the platform was relaunched at the beginning of 2023, providing more flexible financing schemes for advanced technological stages (demonstration and first of a kind) and expanding the scope of sectors in the partnership.

5.5.2 Knowledge sharing on clean-tech solutions

Knowledge sharing is an essential part of the IF because it supports the replication and the faster market penetration of the technologies or solutions supported by the IF.

In 2022, the first knowledge-sharing reports were submitted by the supported projects. Meanwhile, the European Commission, together with CINEA, has made significant efforts to communicate and disseminate knowledge gathered by the projects during 2022. During 2022, the IF held one closed-door event: 'Main Challenges in Reaching Financial Close (FC) and Ways to Tackle Them' (September 2022). This event discussed issues such as challenges in securing financing, the impact of regulatory frameworks and permitting processes, and market uncertainty.

The Commission also organised regular meetings of the IF Expert Group throughout 2022 to discuss with Member States and industry representatives the implementation and future orientations of the IF. In addition, DG CLIMA and/or CINEA participated in more than 50 events organised by third parties to increase knowledge and awareness of the IF. According to a survey carried out during the event with IF projects, the major factors that determine whether projects reach financial close include, in descending order of importance: (i) challenges encountered while contracting with suppliers and off-takers; (ii) unexpected increases in CAPEX; (iii) delays in the delivery of equipment, raw material or feedstock; and (iv) procedures for permitting and government approvals.

6 PROJECT DEVELOPMENT ASSISTANCE FOR LESS MATURE PROJECTS

The PDA programme has so far provided support to 22 projects. Of these 22 projects, 19 had already completed their support programme by the end of 2022, while a further 3 are continuing to receive support. The European Investment Bank is also in negotiations to provide PDA support to a further 15 projects. This support has been critical in helping projects to improve their maturity and therefore improving their applications in IF calls for proposals. The programme has proven successful in helping some projects to re-apply to calls, having been unsuccessful in the previous year. Of the re-applications submitted in LSC-2021 and SSC-2021, 40% were selected for grant-agreement preparation.

The project development assistance (PDA)[33] programme is a part of the IF is dedicated to improving the maturity of some selected projects through high-quality technical and financial advice provided by the European Investment Bank (EIB)[34]. The support is tailored to the needs of each project to make them more competitive on maturity aspects for future calls for proposals from the IF. The PDA can also help to fulfil the IF's commitment to better geographical balance in the distribution of IF support.

The PDA is available to both large-scale and small-scale projects with a target of inviting 20 unsuccessful proposals per call to receive such support. After the first call, LSC-2020, 22 projects were offered assistance under the PDA programme, with 19 projects finally receiving PDA. And after LSC-2021, 18 additional projects were offered the assistance. By the end of 2022, the PDA programme, implemented by the EIB, had provided a total of EUR 2.5 million in consultancy services to a total of 22 projects: the PDA was fully completed for 19 projects, and is still ongoing for 3 projects. At the time this report was being drafted, the EIB was still negotiating the PDA agreement with 15 additional projects (see Figures 29 and 30). Out of the 19 projects that had completed the full course of PDA by the end of 2022, 18 have already re-applied to one of the IF calls for proposals launched in 2022, with 2 of them already invited to sign a grant agreement during 2022. Since most of the projects receiving PDA support decided to re-apply for LSC-2022, the assessment of the results will be made in the IF report for 2023.

[33] https://ec.europa.eu/clima/eu-action/funding-climate-action/innovation-fund/project-development-assistance_en.

[34] A Contribution Agreement about the provision of PDA was signed between the European Commission and the European Investment Bank in April 2021.

Figure 29: Number of projects engaged in PDA by sector by December 2022

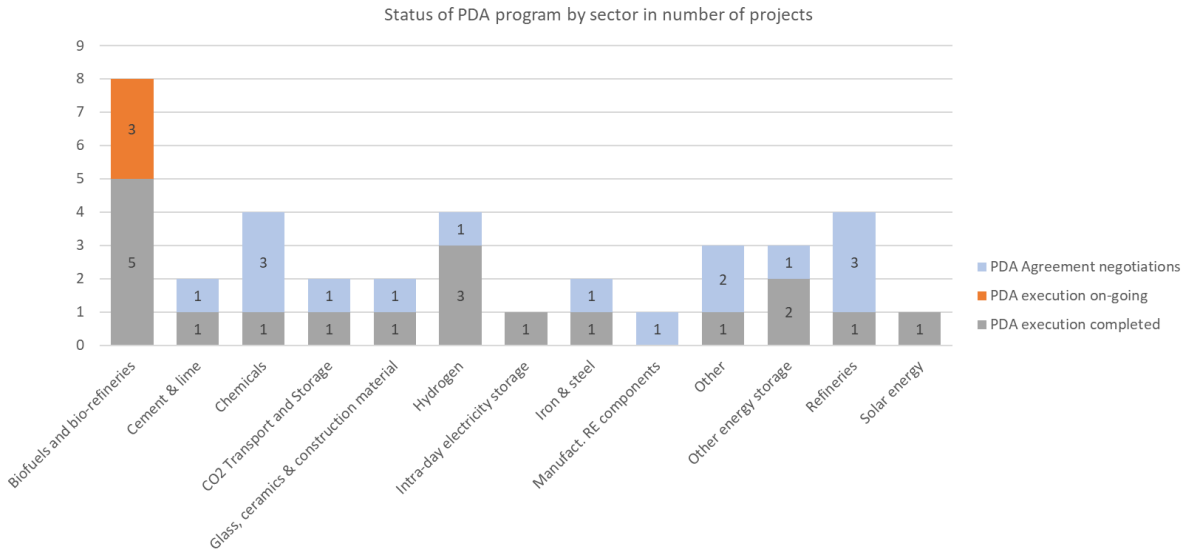
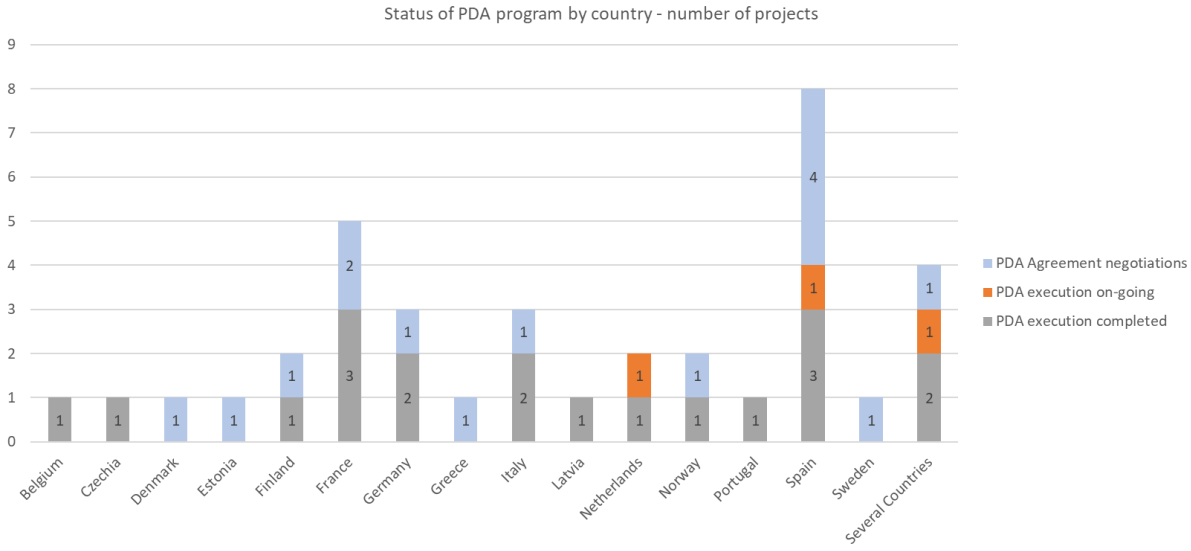


Figure 30: Number of projects engaged in PDA by country by December 2022



7 CONCLUSIONS AND NEXT STEPS

The IF has become a key instrument for achieving climate neutrality by 2050 in the European Union, supporting the net-zero ambition and innovative technologies. By the end of 2022, the 70 projects selected to receive support from the IF covered 19 sectors in the categories of energy-intensive industries, energy storage, renewable energy, and CCS. These projects are set to avoid a total of 215 million tonnes of CO_2e emissions during their 10 years of operation. For

reference, this is approximately 7% of the total GHG emissions emitted by the European Union in 2022.

The oversubscription to LSC-2021 was remarkable, as budget was only available to cover 36% of the total grant amount requested by proposals that met the minimum threshold. However, the interest in the small-scale call seems to have considerably reduced: there were 66 proposals in response to SSC-2021, compared with the 232 received in SSC-2020. This meant that all eligible proposals that met or exceeded the ranking threshold requirements in SSC-2021 (17) were invited for grant-agreement preparation, and that 38% of the available budget in the call was not allocated. One of the reasons for this reduction in interest in the small-scale window may be the excessively low limit on CAPEX for project participation, set at EUR 7.5 million. This proved to be insufficiently attractive given the numerous national funding programmes available for such levels of support.

The PDA programme began operations in 2021, with 19 projects having completed a full programme of PDA support from the EIB by the end of 2022. Out of these projects supported, 18 projects (all of which had been rejected in previous calls) re-applied to calls launched in 2022, and 2 of these 18 have already been invited to sign a grant agreement under SSC-2021 (most of the rest re-applied to LSC-2022, the results of which will be assessed in next year's report).

At the moment of publication of this report, the IF had already taken some next steps that will be further reported in the IF Annual Report 2023:

- The third large-scale call (LSC-2022) was launched on 3 November 2022 and closed in March 2023. The call received 239 proposals, of which 41 have been invited for grant-agreement preparation. The total grants available under this call amount to more than EUR 3.6 billion and will support projects aiming to bring innovative technologies to the market in energy-intensive industries, hydrogen, renewable energy, and manufacturing components for energy storage and renewables. A third small-scale call is scheduled for award decision by the end of 2023. Further details on these calls will be reported as part of the IF annual report for 2023. In addition, by the beginning of 2023, three additional projects participating in SSC-2021 were invited to receive PDA.

- In 2023, a new mechanism will be implemented for project selection based on a competitive bidding procedure. The first pilot auction under the IF will be organised in the context of the European Hydrogen Bank, directed to the domestic production of renewable hydrogen. The competitive bidding procedure will also include an 'auction-as-a-service' mechanism, which will enable EEA countries to use their national budgets to award support to projects located on their territory while simultaneously relying on an EU-wide auction mechanism to identify the most competitive projects.

- Before the end of 2023, a call for proposals will be launched, combining windows for small, medium, and large projects, and specific windows for manufacturing and pilots. The call will be awarded during 2024.

- A revised delegated act on the IF has been adopted to align the operation of the IF with the revised ETS Directive, which expanded the sectors supported by the IF (now also including maritime, aviation, CCS, and land transport).