



2nd call for large-scale projects: process, results and next steps

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2021 Large-scale projects call - results

139 applications received (€12.16 bn)

121 proposals evaluated (€11.2bn)

10 proposals inadmissible
6 proposals ineligible
2 proposals withdrew

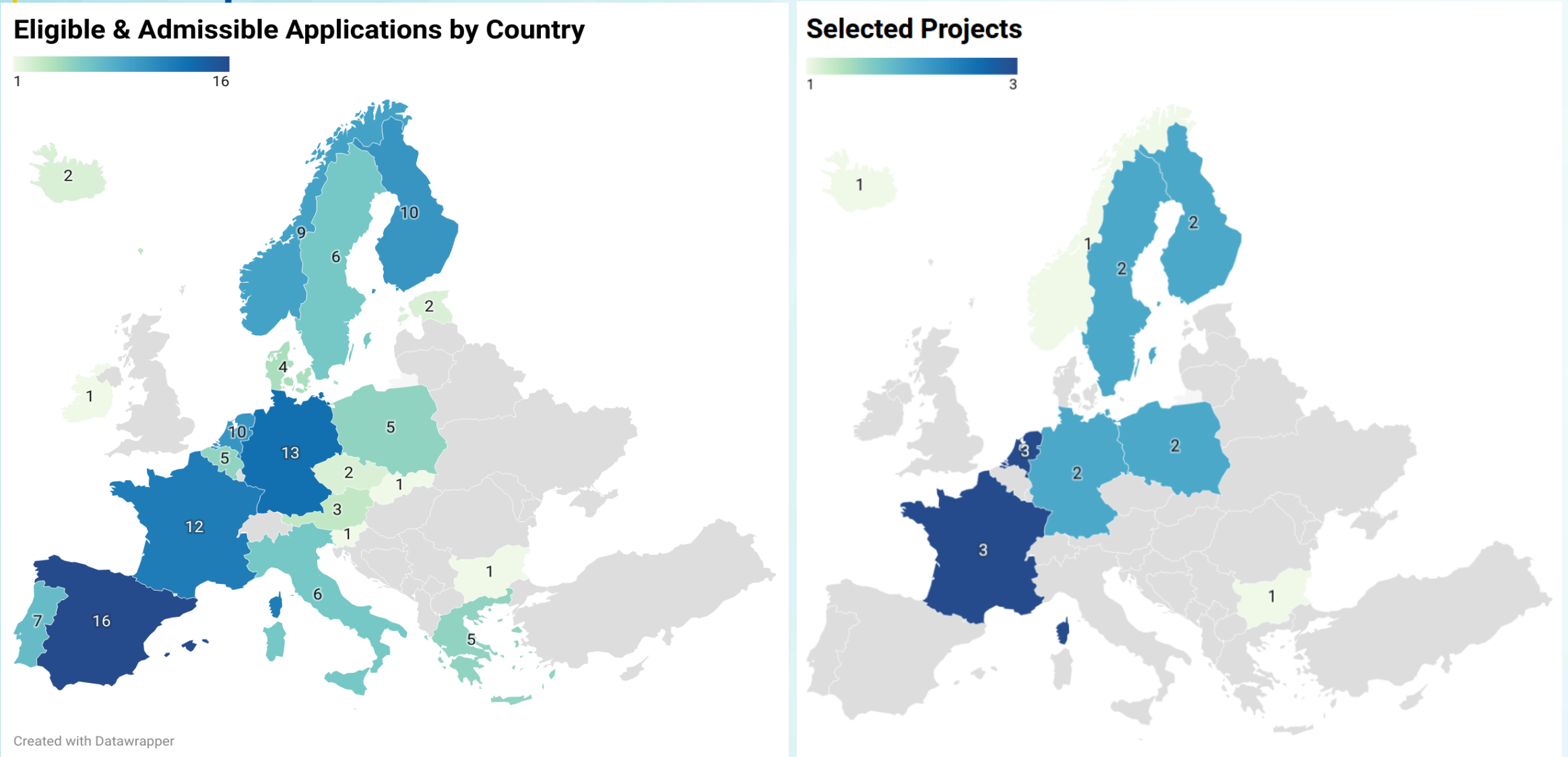
17 proposals pre-selected*
(€1.8 bn)

31 further proposals above threshold
(€3.2 bn)

73 proposals failed
(€6.2bn)

*subject to successful conclusion of GAP process

17 out of 121¹ eligible and admissible projects were pre-selected











1) Out of 123 eligible and admissible projects 2 withdrew on their own request

Innovation Fund

Second call for large-scale projects

Projects pre-selected for grant agreement preparation (17 projects)

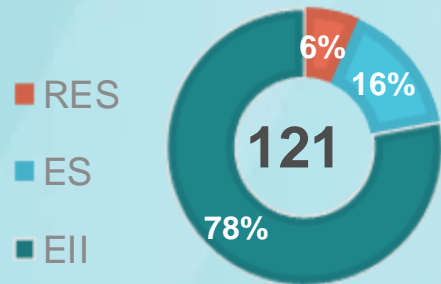
-  Chemicals
-  Hydrogen
-  Refineries
-  CO₂ transport and storage
-  Manufacturing of components for solar energy
-  Wind energy
-  Cement and lime
-  Manufacturing of components for energy storage



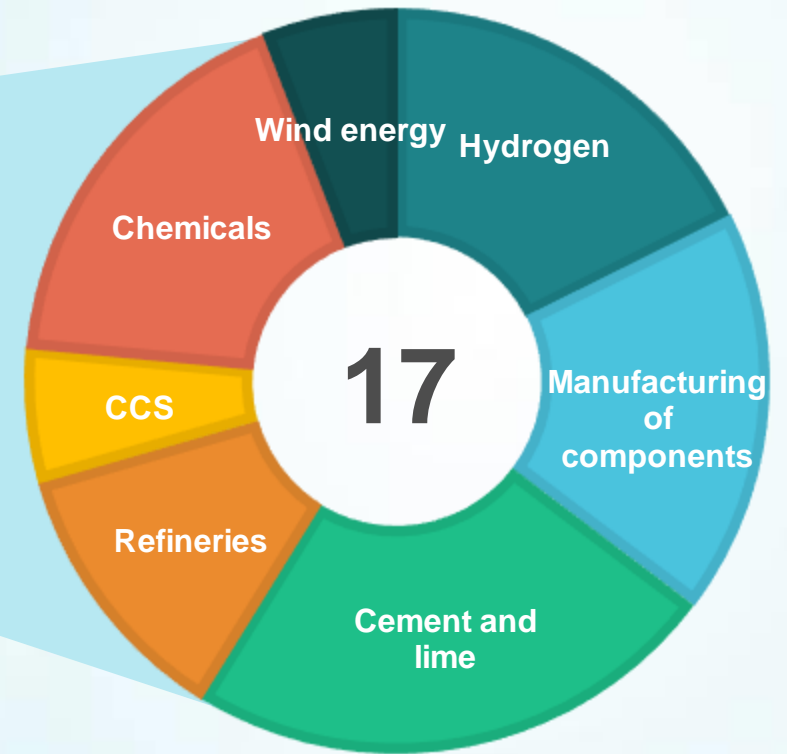
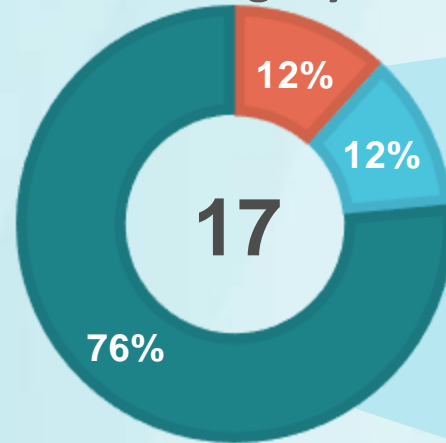
LSC 2021 results

Breakdown by sectors

Eligible projects by category



Selected projects by category



The abatement potential of pre-selected projects: around **136 million tons of CO₂eq** over 10 years of operation

Pre-selected projects cover a range of mitigation technologies

Sector	# projects	Technology pathways
Hydrogen production	3	Hydrogen electrolyzers (renewables based, + distribution / use)
		Waste to hydrogen
Cement	4	Oxy-fuel + CCS
		Oxy-fuel + CC / H2 for methanol production
Refineries	2	Second-generation biofuels (drop-in) & biochar from forestry waste
		Synthetic aviation fuels from RES H2 and CC
Chemicals	3	Chemical recycling of plastics – feedstock for refinery
		Methanol production from RES H2 and CC
		Textile fibre from pulp to replace polyester
Manufacturing of components	3	Li-ion Battery systems
		Li-ion Battery recycling
		Solar PV manufacturing
Renewables	1	Offshore wind, turbines + electrolyser
CCS infrastructure (other)	1	Carbon mineral storage terminal (basalt)

LSC 2021 Pre-selected projects



Holland Hydrogen



The project aims to avoid **5,1 MtCO₂e** over 10 years of operation.

The objective is to produce, distribute and use green hydrogen. A 400 MW electrolyser will be supplied with offshore wind generated electricity (200MW trial by 2025, 400MW by 2027).

The hydrogen will be supplied to the Pernis refinery via a new high capacity “open-access” 40 km pipeline to replace fossil derived hydrogen used in the production of road fuels.

Hydrogen will also be used to refuel heavy duty trucks across Belgium and the Netherlands.

Partners

1. Rotterdam Hydrogen Company
2. Shell Hydrogen Operations & Production
3. Shell Energy Europe
4. Shell Nederland Raffinaderij
5. Shell New Energies NL



Furec



The project aims to avoid **3,6 MtCO₂e** over 10 years of operation.

The objective is to process non-recyclable solid waste streams and transform them primarily into hydrogen.

The process will first be deployed at Chemelot, Geleen, The Netherlands, a major chemicals cluster with excellent logistical connections for waste collection and potential for future carbon dioxide utilisation and storage.

The production capacity of the FUREC project is 54 kt/year of hydrogen.

Partners

1. RWE Generation NL B.V.

LSC 2021 Pre-selected projects



ELYgator



The project aims to avoid **3,3 MtCO₂e** over 10 years of operation.

The objective is to deploy a 200 MW electrolyser in Terneuzen (Netherlands) that will produce 15,500 tons of renewable hydrogen per year.

Flexible electrolyser dispatch will follow wind and solar power production. Thus, the plant uses more electricity when more is produced. This prevents grid congestion and contributes to grid stability, paving the way for more renewable power in electrical grids.

The renewable hydrogen produced will supply hard to abate sectors in both industry and mobility.

Partners

1. Airliquide Industrie

LSC 2021 Pre-selected projects



ANRAV

The project aims to avoid **7,8 MtCO₂e** over 10 years of operation.

The objective is to build the first CCUS full-chain in Eastern Europe, linking CO₂ capture facilities at the Devnya cement plant in Bulgaria, through an onshore and offshore pipeline system with offshore permanent storage in a depleted gas field in the Black Sea. The project will realize an economically feasible CCUS-cluster for Bulgaria and its adjacent regions in Romania and Greece, leveraging on the identified potential of CO₂ sequestration in the Galata depleted offshore gas field.

Partners

1. Devnya Cement JSC
2. Petroceltic Bulgar



Carbon2Business

The project aims to avoid **13,1 MtCO₂e** over 10 years of operation.

The objective is to deploy a 2nd generation oxyfuel carbon capture process at Holcim's Lägerdorf cement plant in Germany, capturing over 1 million tons of CO₂ annually and provide it as a raw material for further processing into synthetic methanol.

The capture technology will substitute combustion air with pure oxygen resulting in a CO₂-rich flue gas, which is dried, pressurized and purified in a subsequent Carbon Processing Unit and can fully eliminate the need for gas recirculation.

Partners

1. Holcim Deutschland GmbH

LSC 2021 Pre-selected projects



CalCC



The project aims to avoid **5,8 MtCO₂e** over 10 years of operation.

The objective is to capture the CO₂ emissions coming from exhaust gases, produced during the lime production (calcination) process with Air Liquide's Cryocap technology and storing them permanently offshore in geological formations.

The proposed CCS project will cover the full CO₂ value chain from capture to geological storage passing through steps of shared pipeline CO₂ transport in dense phase, liquefaction and shipping.

Annually, around 610 ktCO₂ will be permanently stored.

Partners

1. Chaux et Dolomies du Boulonnais
2. Air Liquide France



GO4ECOPLANET



The project aims to avoid **10,2 MtCO₂e** over 10 years of operation.

The objective is to create an end-to-end CCS chain starting from CO₂ capture and liquefaction at the Kujawy cement plant, transporting LCO₂ by train to the Gdansk terminal and shipping the LCO₂ to the offshore storage sites.

Air Liquide will act as technological provider bringing Cryocap technology adapted to direct capture of flue gas.

The projects will be the first CO₂ negative cement plant, once operational.

Partners

1. Lafarge Cement

LSC 2021 Pre-selected projects



BIOZIN

The project aims to avoid **2,6 MtCO₂e** over 10 years of operation.

The objective is to build and operate the world's first commercial-scale drop-in biofuel production facility in Åmli, Norway.

The project will convert forestry waste and offcuts from the sawmill industry alongside other waste into advanced second-generation biofuels (drop-in) and biochar (by-product).

The BIOZIN plant will enable recovering up to 80% of the carbon present in the solid waste (26% conversion yield on mass basis) in light-hydrocarbon liquids that can be used as drop-in fuels.

Partners

1. Biozin Holdings AS
2. Bergene Holm AS
3. Norske Shell AS

Partners

1. Shell New energies NL B.V.
2. Vattenfall A.B.
3. Lanzatech



HySkies

The project aims to avoid **2,7 MtCO₂e** over 10 years of operation.

The objective is to build a large-scale Synthetic Aviation Fuel production facility in Sweden.

The project will realise and commission an electrolyzer plant integrated in an operational environment.

A CO₂ capture facility at a Waste-to-Energy plant will be installed and operated.

The project will demonstrate the technical and economic viability of the integrated system of electrolysis, carbon capture, Gas Fermentation and Alcohol-to-Jet processes.

LSC 2021 Pre-selected projects



AIR

The project aims to avoid **4,1 MtCO₂e** over 10 years of operation.

The objective is to create a methanol plant in Sweden, using a CCU process for converting CO₂, residue streams, renewable hydrogen and biogas to methanol.

Perstorp will be the first chemical producer to use this integrated production concept and the first chemical producer to replace all fossil methanol for its European production plants (200 000 tons annually) with sustainable methanol.

Partners

1. Perstorp Oxo AB
2. Fortum Sverige AB
3. Sydkraft AB



IONFibre

The project aims to avoid **2,3 MtCO₂e** over 10 years of operation.

The objective is to produce a new fibre to substitute existing textile fibres both in apparel and technical textile applications.

In comparison to the reference product, polyester fibre, the Kuura textile fibre saves 93% of GHG emissions.

The Kuura textile fibre production is integrated to a Metsä Group bioproduct mill, enabling the use of never-dried pulp made wood sourced from sustainably managed Finnish forests, and resulting in savings in electricity, heat and costs as well as improvements in the dissolution process.

Partners

1. Metsa Spring Oy

LSC 2021 Pre-selected projects



Pulse

The project aims to avoid **10,3 MtCO₂e** over 10 years of operation.

The objective is to process waste, residues and innovative raw materials into high-quality renewable fuels and sustainable raw materials for the polymers and chemicals industry.

The project chemically recycles plastics to combat the plastic waste challenge and to scale up the circular economy of plastics. The project target is to process over 1 Mt of waste plastics per year from 2030 onwards.

The process will be integrated into Neste's Porvoo refinery in Finland.

Partners

1. NESTE OYJ

LSC 2021 Pre-selected projects



N2OWF (Nordsee 2)



The project aims to avoid **3,2 MtCO₂e** over 10 years of operation.

The objective is the construction and operation of 450 MW offshore windfarm.

The project will implement 15MW turbines, innovation in foundations (single piece monopiles, secondary steel concept, vibratory piling and green steel usage) and in hydrogen solutions (integration of a 4MW electrolyser on the offshore substation) in the German North Sea.

The integrated electrolyser will produce 337.5 t/year of green hydrogen used for vessel fueling and emergency power.

Partners

1. Nordsee Two GmbH

LSC 2021 Pre-selected projects



ReLieVe



The project aims to avoid **4,2 MtCO₂e** over 10 years of operation.

The objective is to construct a Li-Ion recycling plant at the Dunkirk battery cluster for producing and refining black mass, providing access to a secondary source of battery raw material, located in Europe, with limited associated country or logistics risks.

The facility is a first-of-the-kind black mass recycling unit and will have a total treatment capacity of 50 000t of modules or scrap per year.

Partners

1. Eramet SA



NorthSTOR+



The project aims to avoid **27,6 MtCO₂e** over 10 years of operation.

The objective is to construct a Manufacturing Plant for Innovative Technology Components providing short-term electricity storage by means of an electrochemical battery system.

The “Voltainer” features a larger form-factor and more energy dense High Nickel NMC cells than incumbent technologies. It is superior to state-of-the-art in terms of performance, safety, costs, modularity & flexibility, connectivity, traceability and life-cycle environmental impact.

The estimated net benefit for the end-customer is a cost reduction of 16,9-18,8% per kWh.

Partners

1. Northvolt Poland SP
2. Northvolt Battery Systems AB

LSC 2021 Pre-selected projects



RISE



The project aims to avoid **9,2 MtCO₂e** over 10 years of operation.

The objective is to build a 2 GW/year PV module manufacturing plant in the north of France, producing innovative heterojunction (HJT) based technology (REC Revo).

The module efficiency will be >22.5%, up to 26% by 2030, 90% bifaciality, G12 wafer size, new generation equipment with high capability & throughput with 95% automation throughout the whole manufacturing line, compatibility with next generation tandem-cells technologies (e.g. HJT-Perovskite).

Partners

1. REC Solar Pte.Ltd.
2. CEA France
3. REC Solar France

LSC 2021 Pre-selected projects



Coda Terminal



The project aims to avoid **21,1 MtCO₂e** over 10 years of operation.

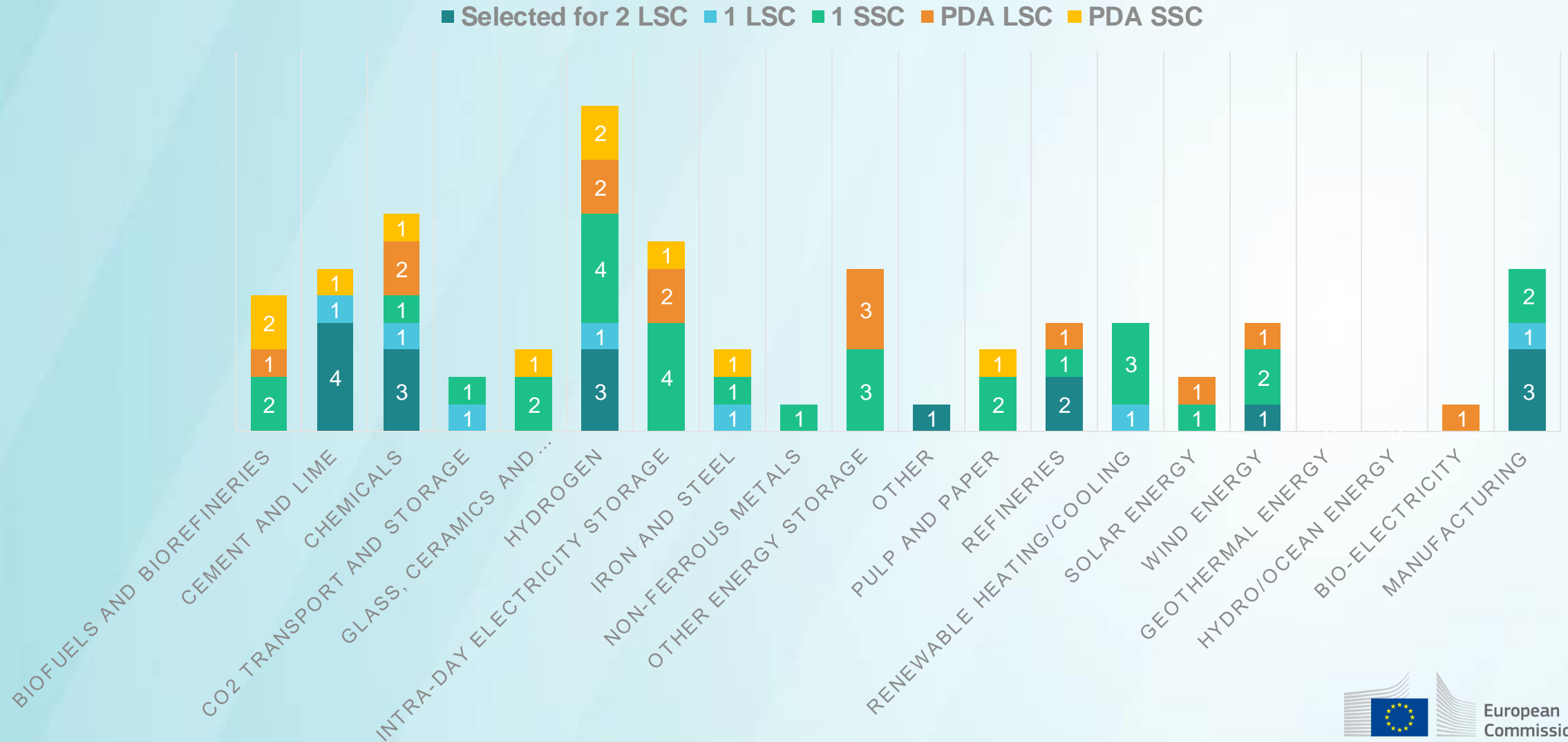
The objective is to build a highly scalable onshore carbon mineral storage terminal in Iceland with an estimated storage capacity of 880 million tonnes of CO₂.

With an estimated storage cost of 13 €/tCO₂, the Coda Terminal will drastically reduce the cost and risks of CO₂ storage while also unlocking the >100,000 Gt global storage capacity of basalts. The Coda Terminal concept builds on the Carbfix technology, where captured CO₂ is dissolved in water and injected into basalt formations.

Partners

1. Carbfix OHF
2. Dan-Unity CO₂ A/S

Sectoral balance improves with 2nd LSC results



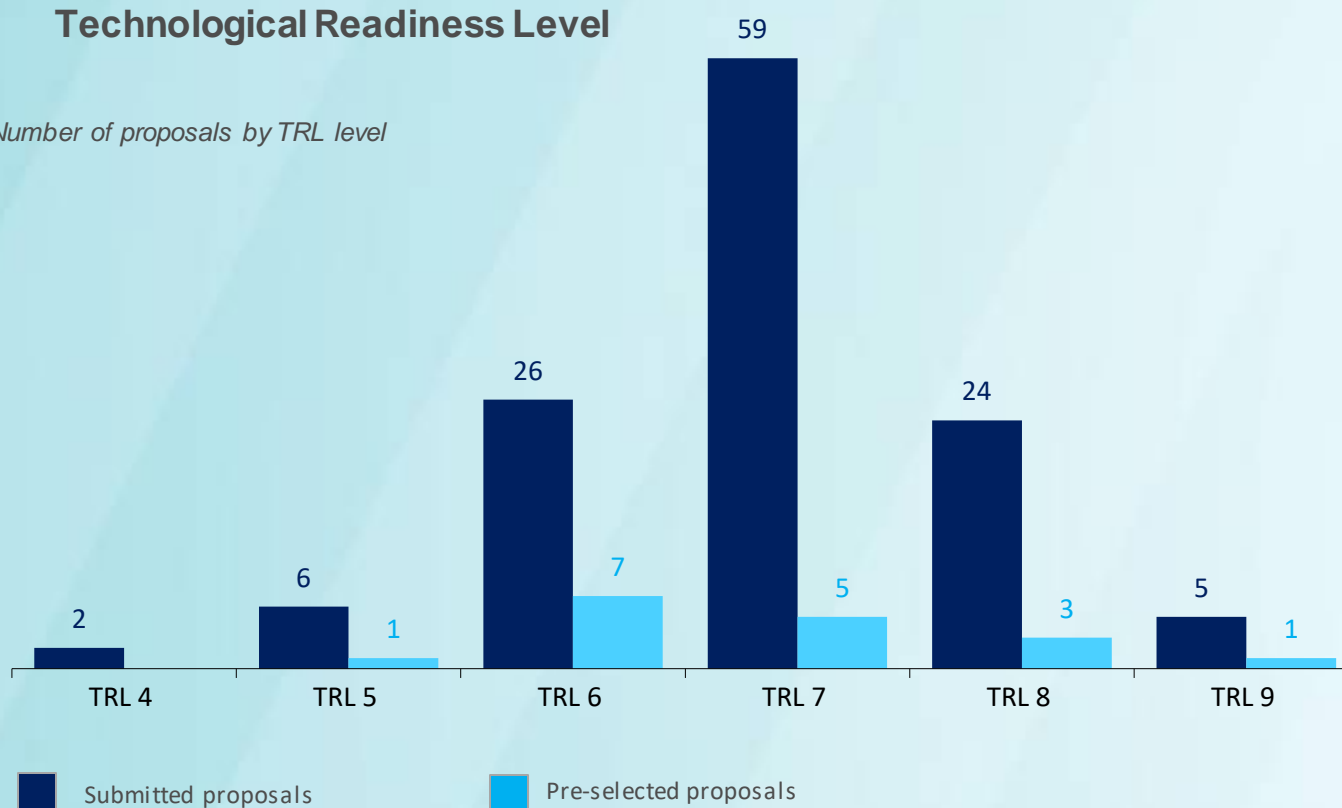
Main general findings from the 2021 LSC

- Compared to the first large-scale projects call, proposals in general demonstrate **improvement in technical and operational maturity** sub-criteria
- High number of promising projects, with **financial maturity being the decisive factor**
- **66 resubmissions**, demonstrating improvements on all evaluation criteria (especially 2nd stage resubmissions), while financial maturity and scalability remain rather stable
- Many proposals count with **Member State co-financing** in various stages of confirmation – point of attention in relation to financial maturity
- Some proposals are building on previous financing e.g. from Horizon 2020
- Applicants (based on the survey performed) mostly ask for **simplification of call documentation**, removal of duplicities or clearer guidance – work in progress

Most proposals have technological readiness level between 6 and 8

Technological Readiness Level

Number of proposals by TRL level



- About half of proposals are planning to develop projects which have already demonstrated a prototype system in an operational environment (TRL 7)

TRL definitions:

TRL 4 - technology validated in lab;

TRL 5 - technology validated in relevant environment;

TRL 6 - technology demonstrated in relevant environment;

TRL 7 - system prototype demonstration in operational environment;

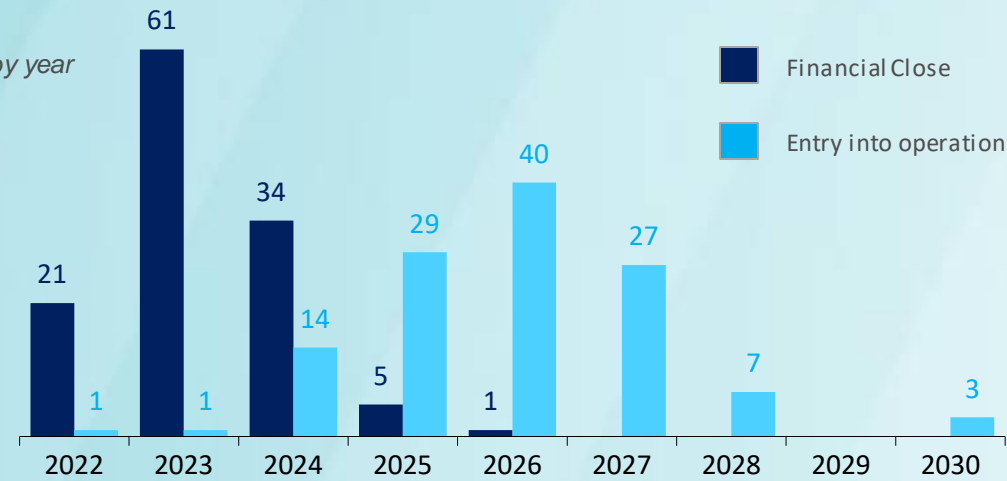
TRL 8 - system complete and qualified;

TRL 9 - actual system proven in operational environment

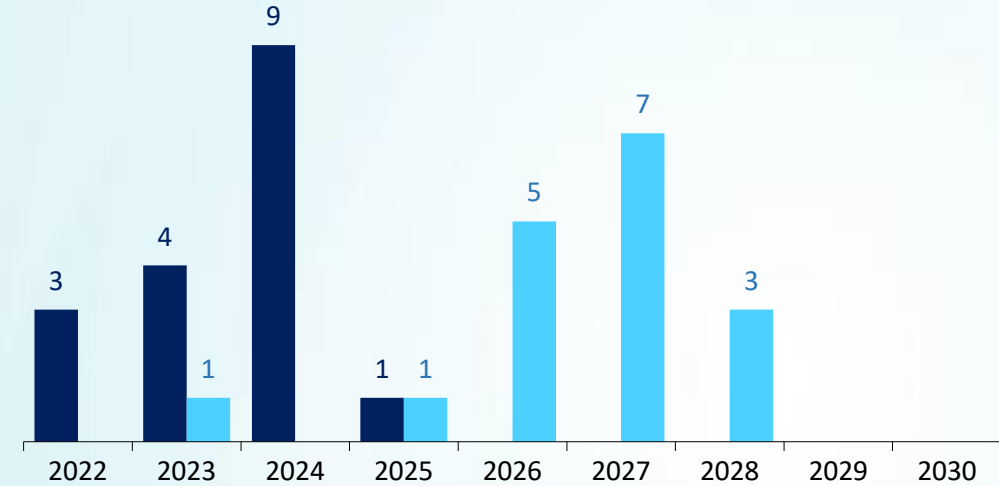
Most proposals plan 2 years to reach Financial Close and 3 years of construction

Submitted proposals

Number of proposals by year



Pre-selected proposals



- Assuming that pre-selected projects sign their grants by December 2022, 94% of them are anticipating to reach financial close within 2 years from grant signature
- When taking all projects submitted into account, 95% are planning to reach financial close within 2 years
- Business plans anticipate construction to take about 3 years on average, but for some projects completion is expected to take more than 5 years

Nearly half of proposals plan to finance with equity only(*)

- About 40% of proposals submitted were planning to finance their projects entirely with equity(*), reflecting the challenge to find debt investors for innovative projects entailing high risks
- For projects planning to raise debt, the gearing ratio (debt as a share of debt plus equity) was around 51% on average
- The majority of pre-selected projects were planning to raise equity only. For those with debt in the financing mix, the average gearing ratio was 38%, reflecting a more conservative stance
- Capital structures tend to differ across sectors, suggesting that risks are not uniform across industries

Key elements of success – Financial Maturity

Business plan and financial model

- Main revenues and cost assumptions described and substantiated
- Transparency on CAPEX and OPEX assumptions

Expected project profitability and viability

- WACC assumptions adequately reflect project risks
- Debt/equity mix coherent with financing plan

Business risks and mitigation measures

- Main business risks identified and tackled by effective mitigation measures
- Risks of inter-dependencies with other projects described and addressed
- Sensitivity analysis on main financial parameters
- Indicative terms of contracts with suppliers/clients give comfort that projected prices will be achieved and protection against price fluctuations

Key elements of success – Financial Maturity

Soundness of the financing plan

- Evidence of support from project owners (e.g. indicative terms of contract), details of timing and conditions for taking final investment decision
- Assumed debt terms supported by feedback from banks/debt investors
- If other public funding sources, letters of intent from authorities and description of award process and timing. Contingency measures in place if level of support is lower than anticipated

Strategy to secure key contractual framework

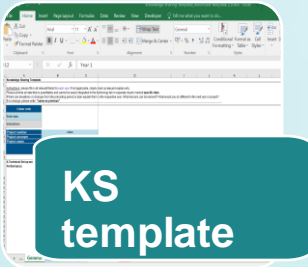
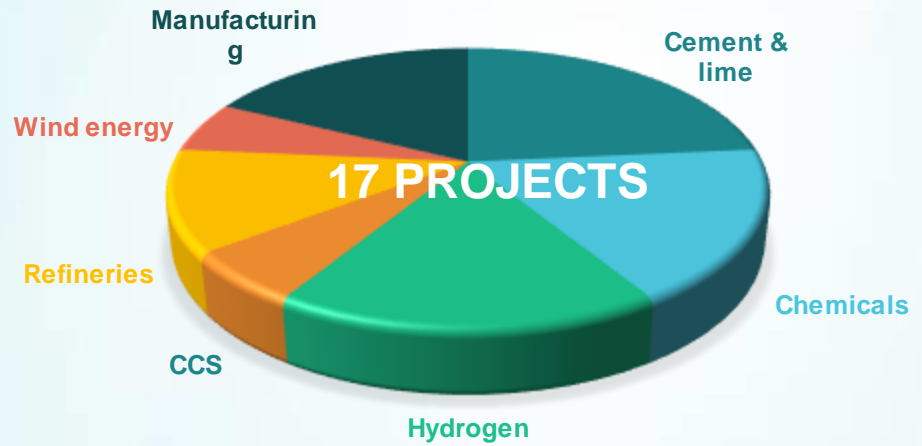
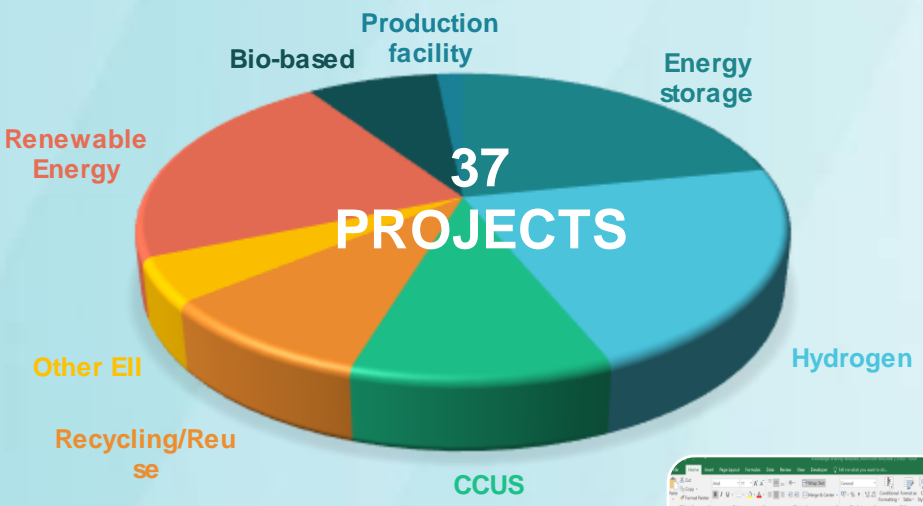
- Stability and visibility of cash flows underpinned by credible progress to secure contracts with key customers, feedstock suppliers and construction partners

Summary IF Projects

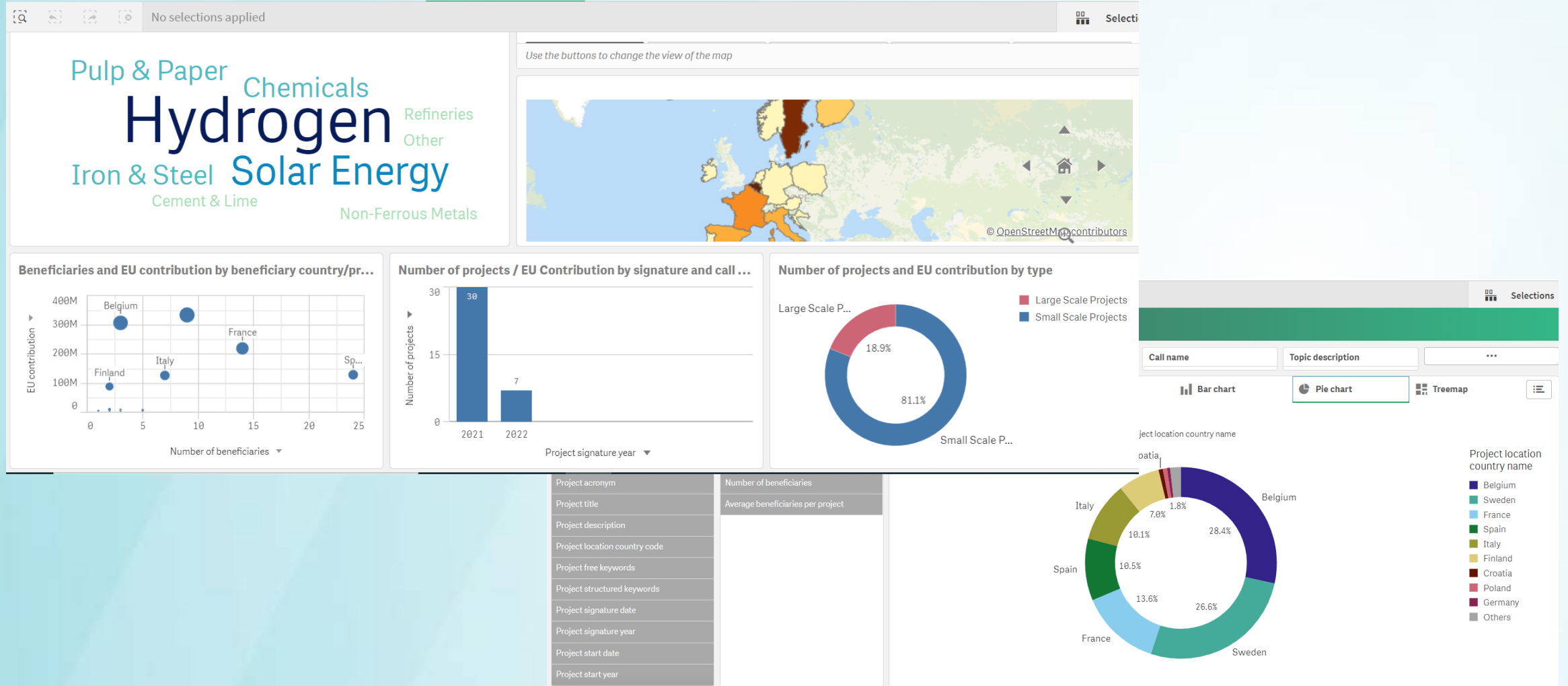
GA signed



2021 LSC pre-selected



IF Project Dashboard



[Link: Innovation Fund dashboard](#)

IF country fact-sheets

European Commission | English | Search

European Climate Infrastructure and Environment Executive Agency

Home | About us | Programmes | Funding opportunities | Our Projects | News & Events | Publications

European Commission > ... > Programmes > Innovation Fund > Innovation Fund projects per country

Innovation Fund projects per country

Overview of the Innovation Fund awarded projects per eligible country where the projects are implemented.

Austria Overview of supported projects	Belgium Overview of supported projects	Croatia Overview of supported projects	Finland Overview of supported projects
France Overview of supported projects	Germany Overview of supported projects	Iceland Overview of supported projects	Ireland Overview of supported projects
Italy Overview of supported projects	Netherlands Overview of supported projects	Norway Overview of supported projects	Poland Overview of supported projects
Portugal Overview of supported projects	Spain Overview of supported projects	Sweden Overview of supported projects	

European Commission

Innovation Fund Programme

Overview of awarded projects in Spain

Funded by the revenue of the EU Emissions Trading System, the Innovation Fund's goal is to help businesses investing in innovative low-carbon technologies with significant GHG emissions reduction potential. The Innovation Fund currently supports **8 projects** located in Spain, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **3.8 Mt CO₂ equivalent in the first 10 years of operation**. The total **Innovation Fund grant in Spain is of EUR 131.3 million**, out of the **total relevant costs of EUR 230.2 million**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund¹.

Projects per category

Number of projects and percentage of the total

Category	Percentage	Number of projects
Energy Intensive Industries (EEI)	75%	6
Renewable Energy (RES)	12%	1
Energy Storage (ES)	12%	1

Projects per sector

Number of Small and Large-Scale projects

Sector	Small Scale	Large Scale
Solar energy	1	0
Refineries	1	0
Other energy storage	1	0
Hydrogen	2	0
Glass, ceramics & construction material	1	0
Chemicals	1	0
Biofuels and bio-refineries	1	0

Projects per phase²

Number of projects

Phase	Number of projects
Preparation	7
Operation	1

Top 5 technology pathways³

Number of projects

Technology Pathway	Number of projects
Recycling/reuse: municipal solid waste	3
Energy intensive industries: New process/New product	2
Renewable energy: fuels	2
Renewable energy: electricity	1
Hydrogen production: renewable H2 - other technologies	1

¹ OJ L 140, 28.5.2019, p. 8
² Preparation means the period before financial close is reached, construction means the period between financial close and entry into operation; operation means that the construction is finished and the project has already started production.
³ Projects may employ several technological pathways, only the top 5 per country are kept in the graph.
 State of play: 06/07/2022

[Link: Innovation Fund Fact Sheets](#)

Innovation Fund Calls 2021-2022

2021 LSC

Launch: 26 Oct 2021
Deadline: 03 Mar 2022
Results: Q3 2022
Budget: **EUR 1,5 bn**

Closed

Next steps:

- **GAP until end October**
- **Award Decision – November**
- **GA signature - December**

2021 SSC

Launch: 31 Mar 2022
Deadline: 31 Aug 2022
Results: Q1 2023
Budget: **EUR 100 million**

Open

2022 LSC

Launch: November 2022
Deadline: March 2023
Results: Q3 2023
Budget: **expected EUR 3 bn**

Under construction

2022 SSC

Launch: Q2 2023
Deadline: Q3 2023
Results: Q4 2023
Budget: **expected EUR 100 million**

Under planning

2021 Small-scale projects call – still time to apply!



Launch 31 March 2022
Deadline 31 August 2022
Results Q1 2023



€ 100 000 000 for grants
+
Project Development Assistance



**Same scope as previous calls:
innovative projects close to
market**

- [Small-scale project 2021 call on the F&T portal](#)
- [Self-check questionnaire](#)
- [Innovation Fund small-scale projects \(fiches\)](#)

AWARD CRITERIA

Degree of innovation
GHG emission avoidance*
Project maturity
Scalability
Cost efficiency

*incl. quality of calculations, net carbon removals and other GHG emission savings

GRANT DISTRIBUTION

LUMP-SUM contribution
grant up to 60% of capital expenditure

- up to 40% of grant at financial close
- remaining amount of at least 60% after financial close
- generally, at least 10% after Entry into operation.

Forthcoming events

15 September 2022



Knowledge Sharing

29 September 2022



[EUSEW](#)

29 November 2022



Lessons Learned
from the 2021
LSC

30 November 2022



LSC 2022 – Info Day

Call for top-notch experts supporting evaluations – join us!



Technical experts



**GHG emission
calculations
experts**



Financial experts



**Rapporteurs +
quality checkers**

Check [CINEA website](#) for the
application process!

[Sign up as an Expert \(europa.eu\)](https://europa.eu)

- **Individual evaluation**
 - To be organised fully remotely from your office or home at your best convenience
- **Consensus group**
 - Discussion with other fellow evaluators
 - Either in Brussels or virtually
- **Helps us deliver thorough and impartial assessment of applications and select the best projects**
- **Gain insights into the latest technology and business trends**
- **Confidentiality and no conflict of interest rules apply**

Q&A



Closure



Next steps for IFEG

1. Written feed-back from IFEG on 3LSC design (ideally 31 July 2022)
2. Consultation of Member States on Financing Decision (Sept 2022)
3. Consultation of Member States on the list of pre-selected projects (by 5 Sept 2022)
 - forthcoming national, regional or local regulatory or support measures changes that could significantly affect the business case for the project;
 - any possible hurdles to the granting of a permit because of nature conservation concerns or any other potential use for the project site leading to site unavailability for the project;
 - significant public opposition to a project expected that could considerably delay its realisation.
4. Support to all selected projects and projects in preparation

Where to find more information?



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

- ✓ Guidance and calculation tools on GHG emissions and relevant costs
- ✓ Frequently asked questions

<https://europa.eu/!QB67by>



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

<https://europa.eu/!rx34Dt>



Innovation Fund - YouTube

<https://bit.ly/2WxK8w7>

