



Welcome

The event will start at 10:00 CET

*Disclaimer: this meeting is being recorded.
Please indicate your Member State or organisation followed by your name/surname on Webex.*



Innovation Fund Expert Group meeting

6 October 2023

Webex and in-person

Agenda

- 10:00 Introduction
- 10:05 Third large-scale call results
- 10:45 Renewable hydrogen IF23 Auction T&Cs
- 11:15 Stakeholder consultations and IF23 Call
- 11:50 GHG methodology for maritime and aviation (discussion)

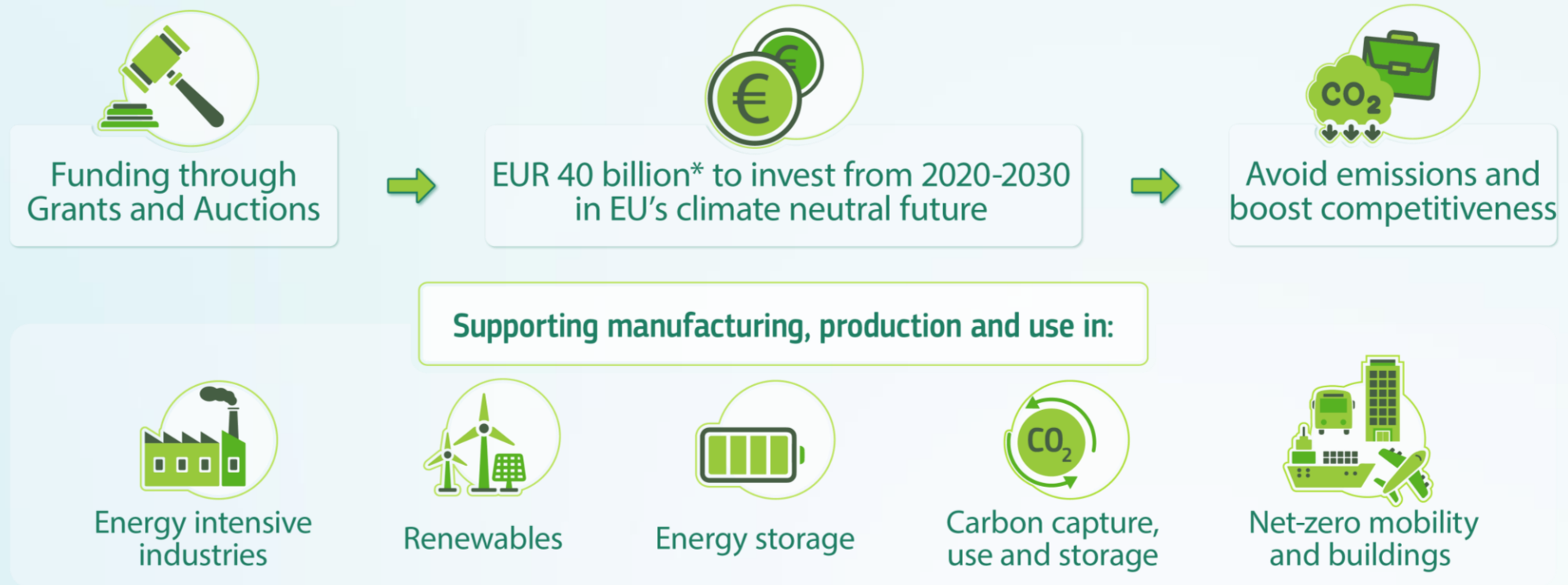
Introduction

Alexandre Paquot, Director
DG CLIMA



INNOVATION FUND

Deployment of net-zero and innovative technologies



*based on a carbon price of 75 EUR/tonne

2023 Achievements



STEP regulation and communication

- *“Let's make sure that the future of our industry is made in Europe.”*
European Commission President Ursula von der Leyen, State of the Union Address, 14 September 2022
- The EU answer to the need to boost investments in critical technologies:
 - reinforce, leverage and steer [EU funds](#) to investments in deep, digital, clean and bio-technologies;
 - introducing the [Sovereignty seal](#), a European quality label for projects;
 - gathering all information about existing funding opportunities for STEP investments and relevant contact details of national authorities in the [Sovereignty portal](#).



Target investment areas



Contributing EU programmes



Sovereignty seal

STEP and the Innovation Fund – part 1/2

- Innovation Fund to be **increased by €5 billion** (financed from MFF from 1 January 2024 to 31 December 2027):
 - the **biggest increase** in STEP (in total €10 billion financed from MFF)
 - for **supporting investments contributing to STEP objectives** (among others: supporting the **development or manufacturing of clean technologies**)
 - will enable to open calls for proposals to entities from MS whose **average GDP per capita is below the EU average** of the EU-27 calculated for the period 2015-2017
 - will result in overall investments of around €20 billion
- a **Sovereignty Seal** will be awarded to proposals contributing to the STEP objectives provided the proposals has been assessed and complies with the minimum quality requirements and regardless of whether the proposal has received funds.

STEP and the Innovation Fund – part 2/2

- A number of proposals aim to cumulate IF grant and State aid (because of 60% of relevant costs rule)
- We are working to maximise synergies between IF and the State aid rules to ensure a more streamlined process:
 - further align IF award and State aid clearance criteria (work is already ongoing on minimum requirements on GHG and cost efficiency, incentive effect, indirect emissions, changes to IF relevant costs methodology);
 - streamline processes to ensure that the decision on State aid is taken at the same time as the IF funding decision, provided a complete notification by the MS occurs in due time;
 - such synergies are also being assessed for other selected EU instruments, including the European Innovation Council Fund.

Third large-scale call results



Results overview

239 proposals received



195 admissible & eligible

65 resubmissions



41 pre-selected

	Number of eligible proposals	Number of selected projects	Budget oversubscription
General	80	8	9x
Ind-Elec-H2	59	13	7x
Manufacturing	34	11	3x
Pilots	22	9	3x













Innovation Fund projects pre-selected for grant

Topic LSC-01- GENERAL (8)*

Topic LSC-02- INDUSTRYELEC&H2 (13)

Topic LSC-03- MANUFACTURING (11)*

Topic LSC-04-PILOTS (9)

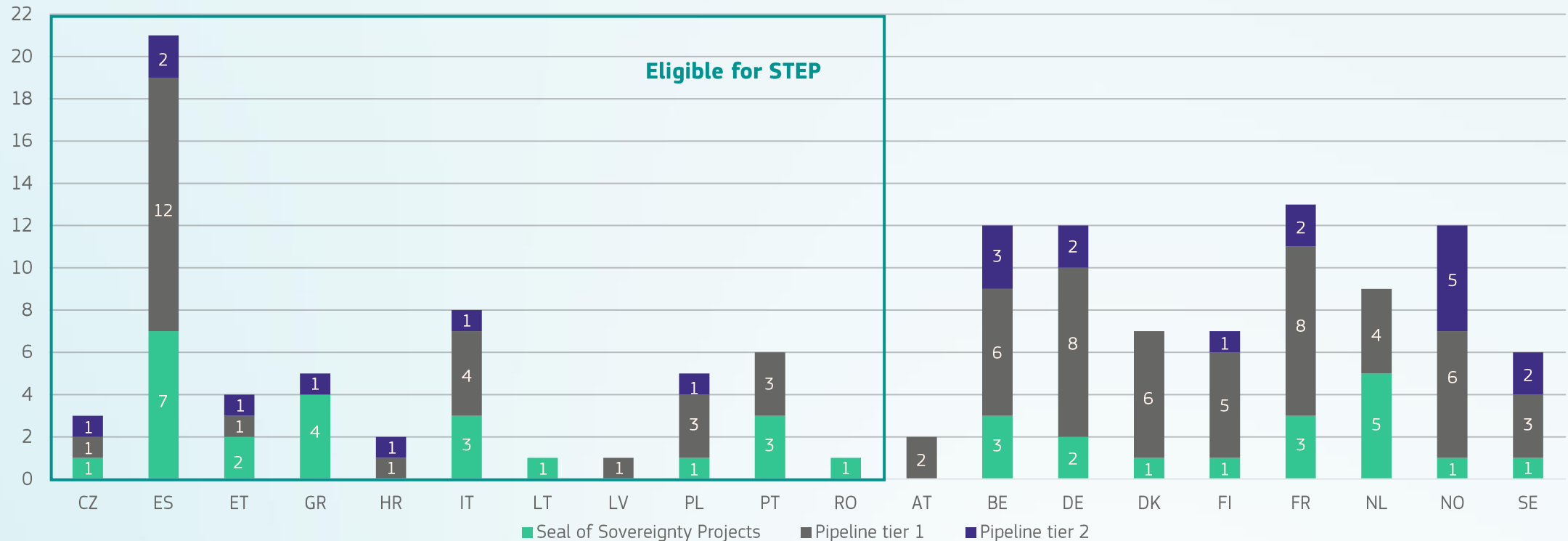
- | | |
|---|---|
|  Cement and lime |  Manufacturing of components for energy intensive industries |
|  Chemicals |  Manufacturing of components for energy storage |
|  Glass, ceramics and construction material |  Manufacturing of components for renewable energy |
|  Hydro/Ocean energy |  Non-ferrous metals |
|  Hydrogen |  Refineries |
|  Iron and steel |  Wind energy |



*The number of symbols is higher than the number of projects, as some projects are implemented in multiple locations

Geographical distribution of proposals not selected but passing all or most evaluation thresholds

Project pipeline: Main country of project implementation***



* Tier 1: Projects that achieved at least 50% of project maturity scores and moved on to evaluation of Scalability

** Tier 2: Projects that failed Tier 1 but passed Degree of Innovation

***Some projects will be implemented in multiple countries. This is reflected on the map, but omitted in this and the following analysis for simplicity / readability

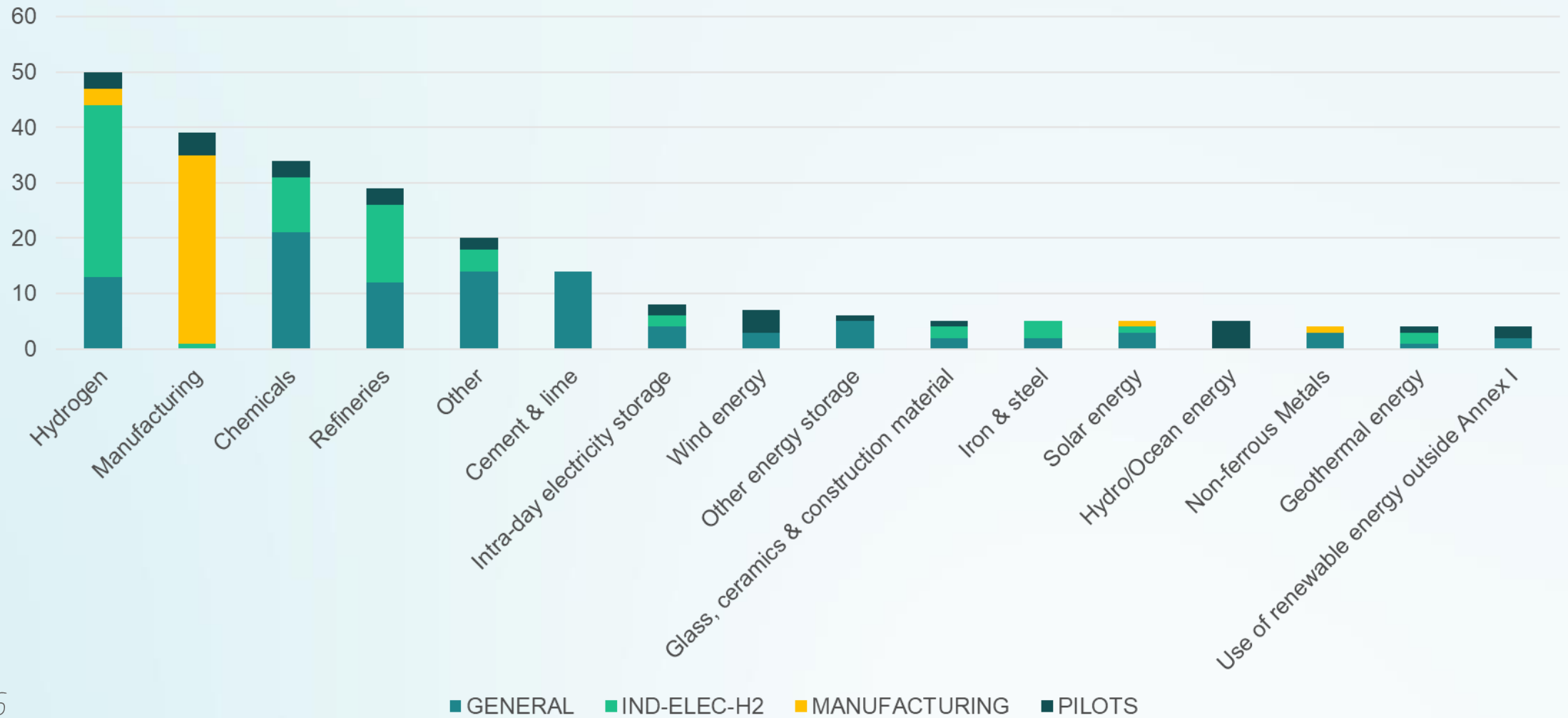
Despite using the full budget, €4.4 bn of Sovereignty seal proposals cannot be funded

	General	Ind-Elec-H2	Manufacturing	Pilots	Total
Proposals above all thresholds	31	28	13	9	81
Budget proposals above all thresholds	€4 076 983 088	€2 811 470 095	€912.971.250	€254.863.000	€8 056 287 433
Selected proposals (+ flexibility)	8	13	11	9	41
Committed budget	€1 398 266 039	€1.182.299.139	€781.696.895	€254.863.000	€3 617 125 073
Budget needs for the Sovereignty seal pipeline	€2 678 717 049	€1 629 170 956	€131.274.355	n/a	€4 439 162 360

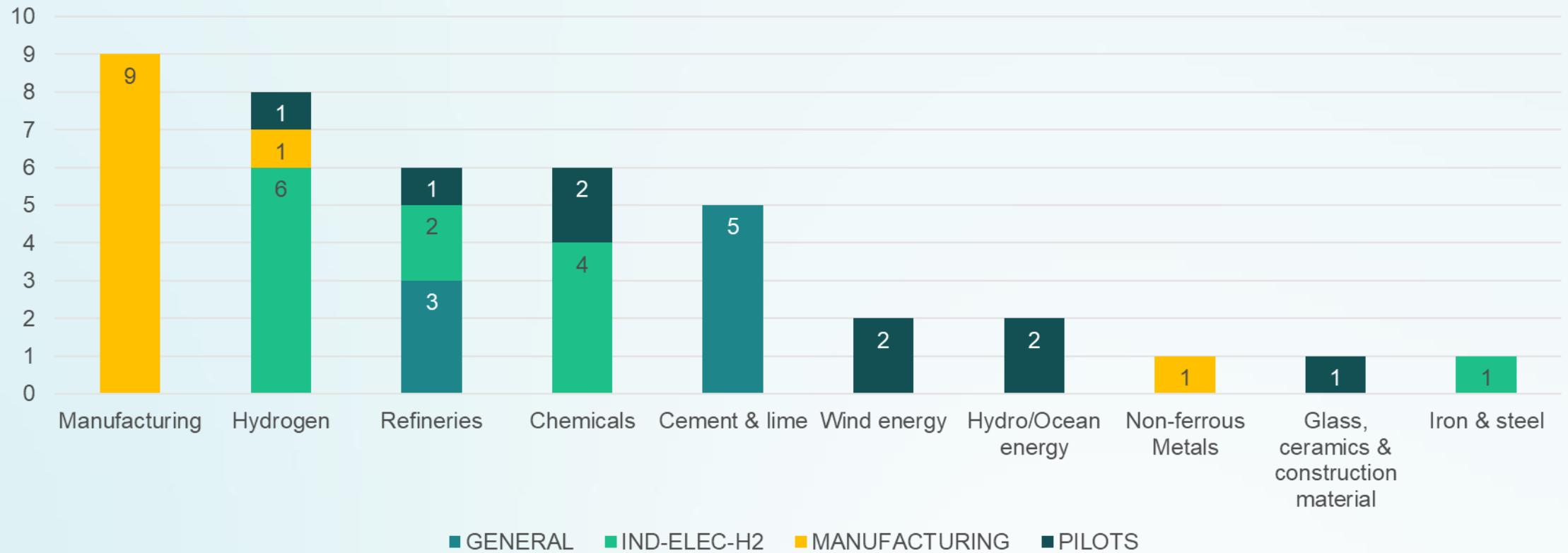
Third large-scale call results

Deep dive

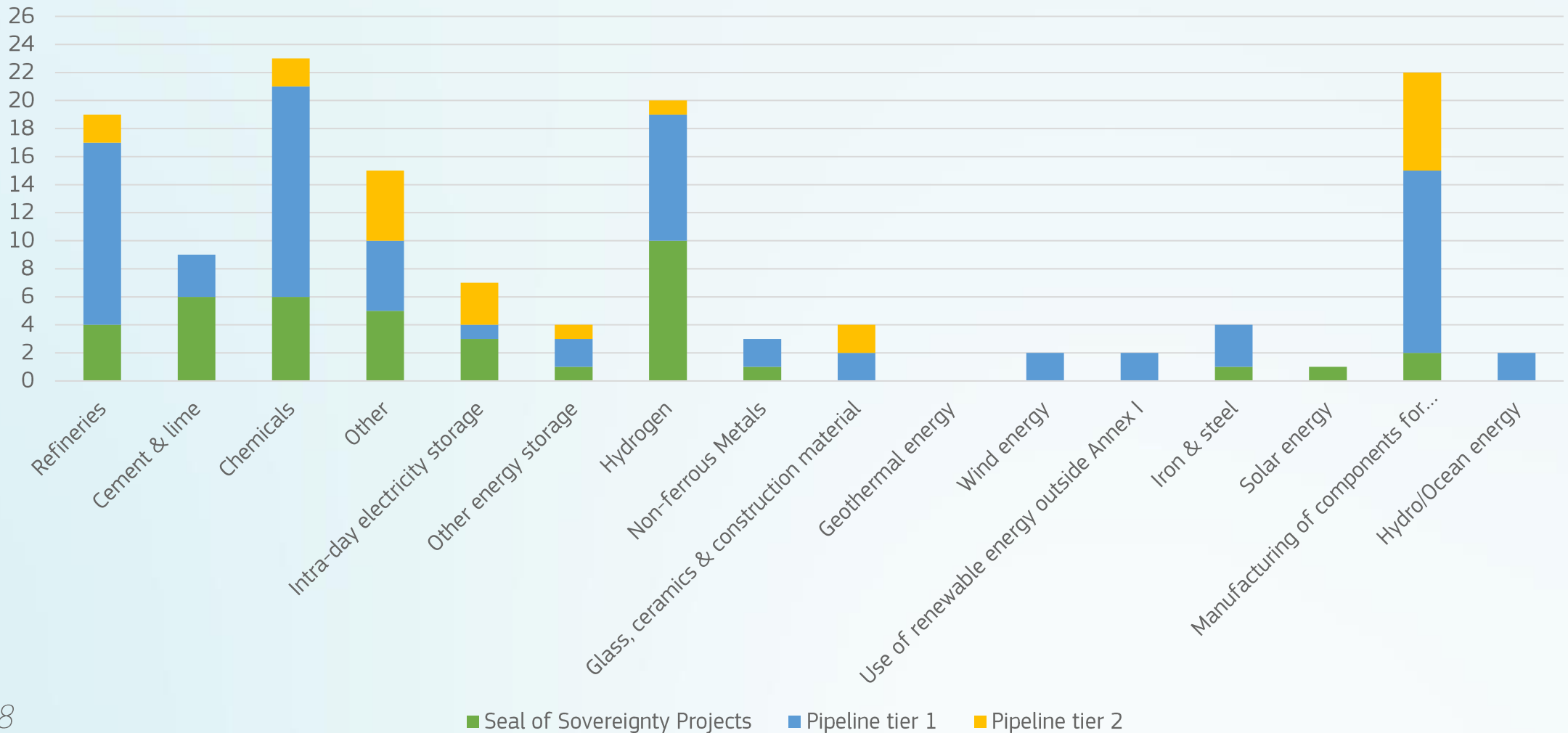
Sectoral distribution – all proposals



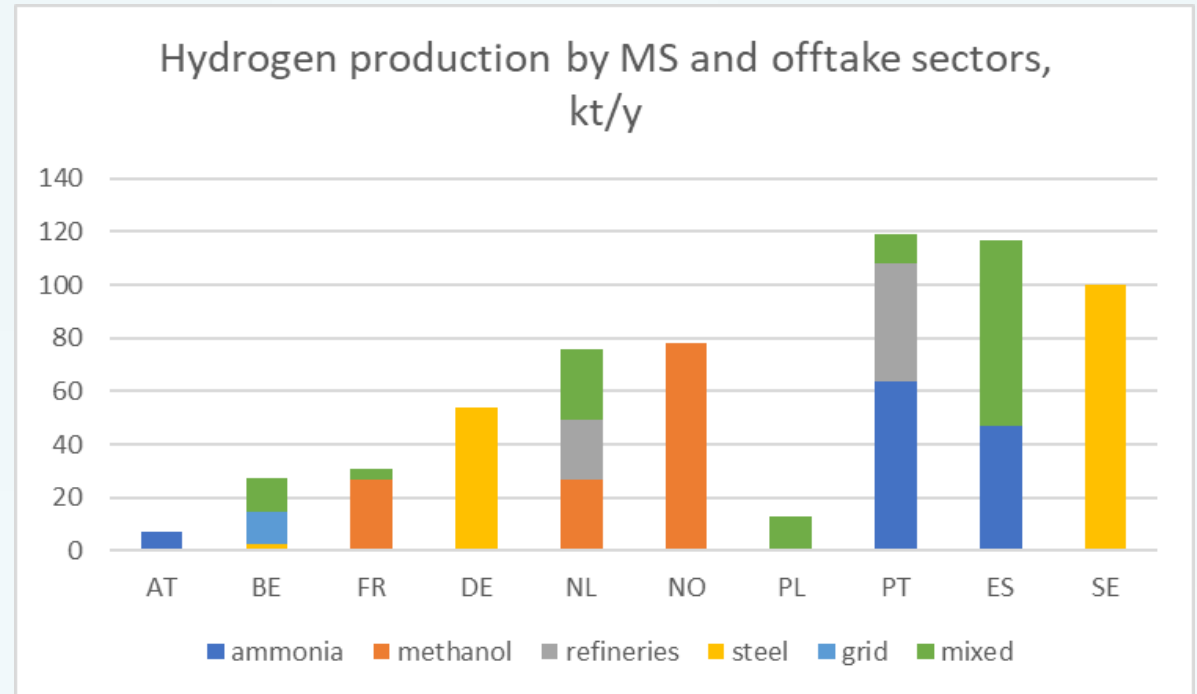
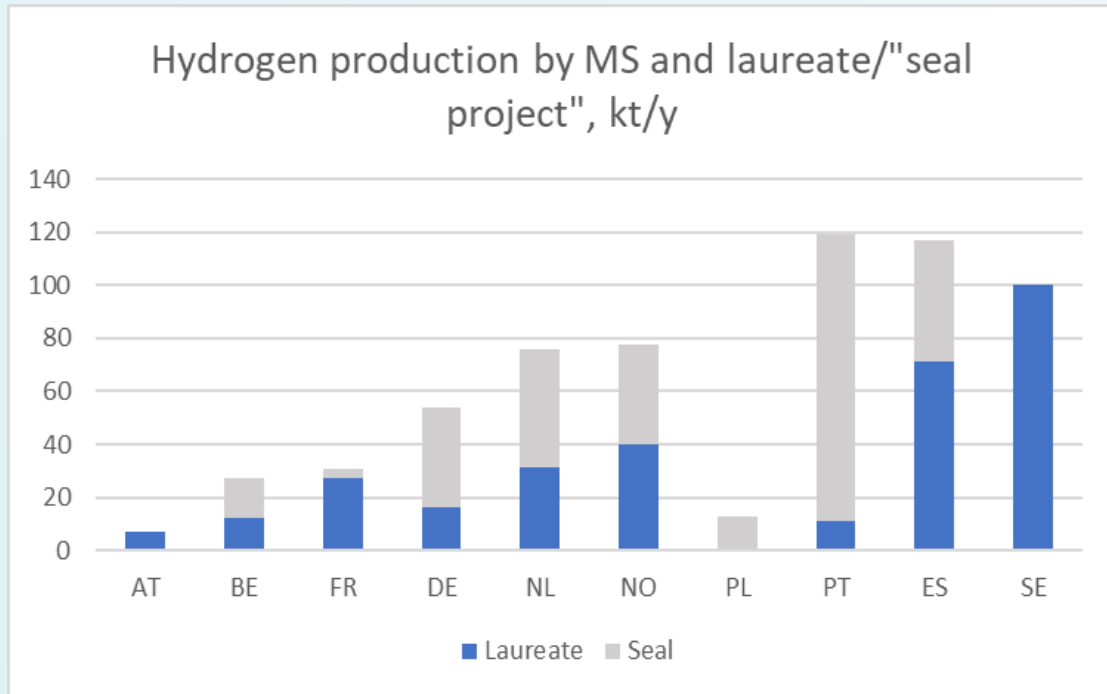
Sectoral distribution – projects



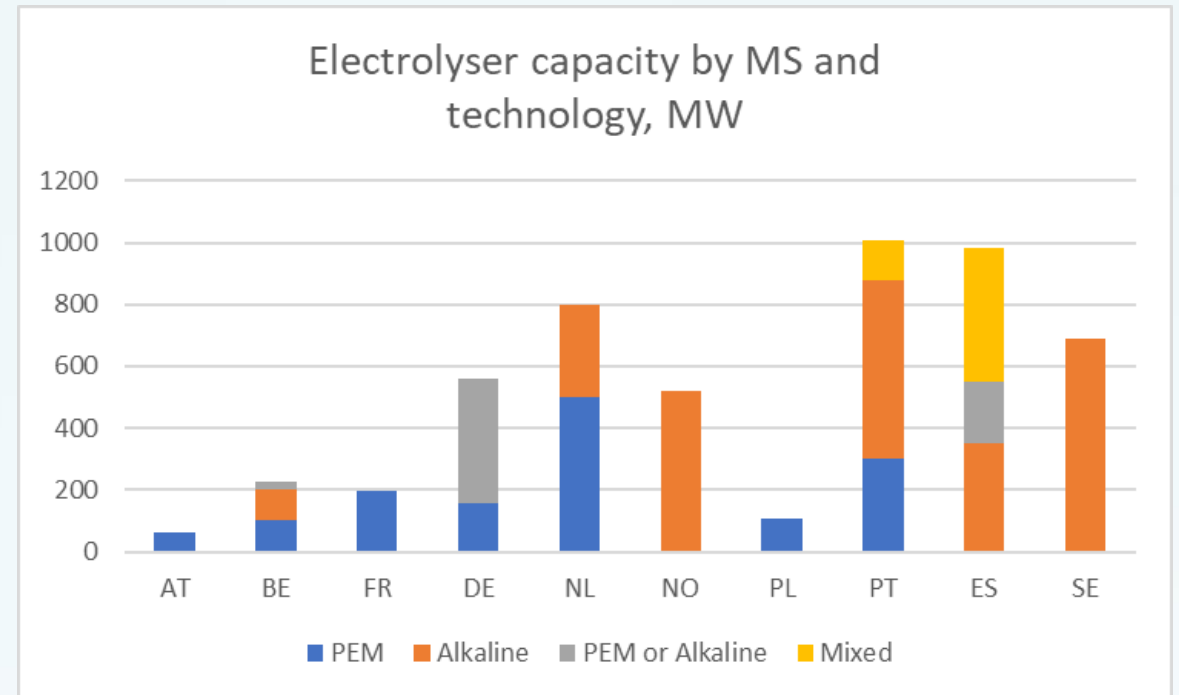
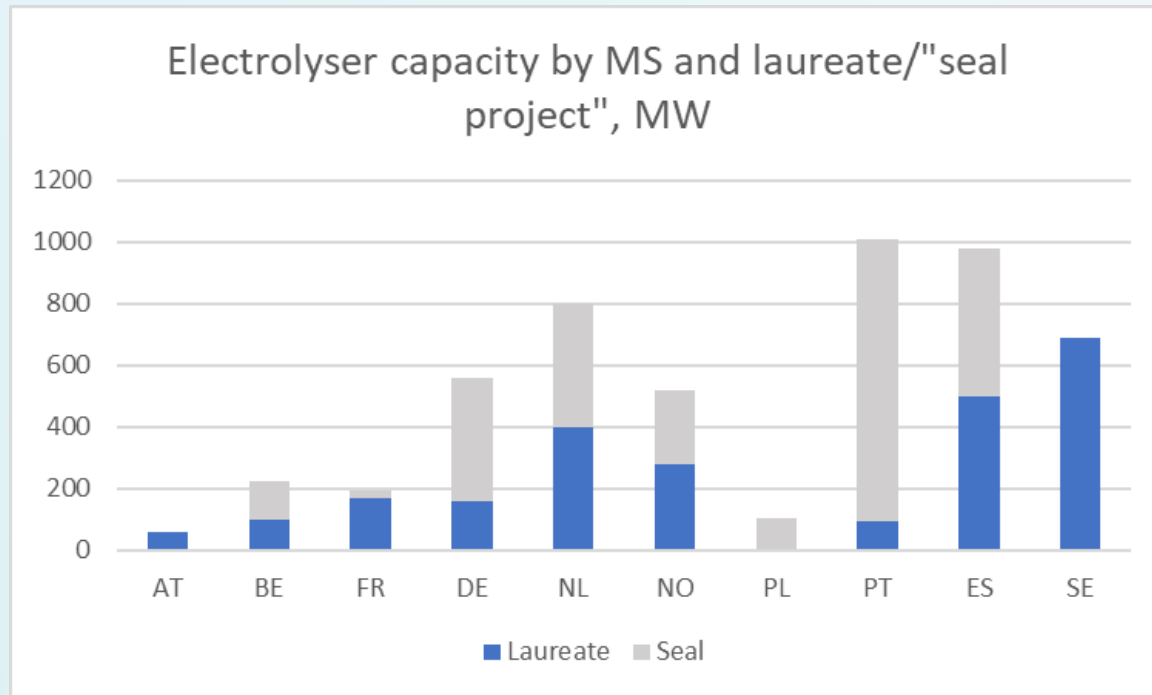
Sectoral distribution – promising proposals



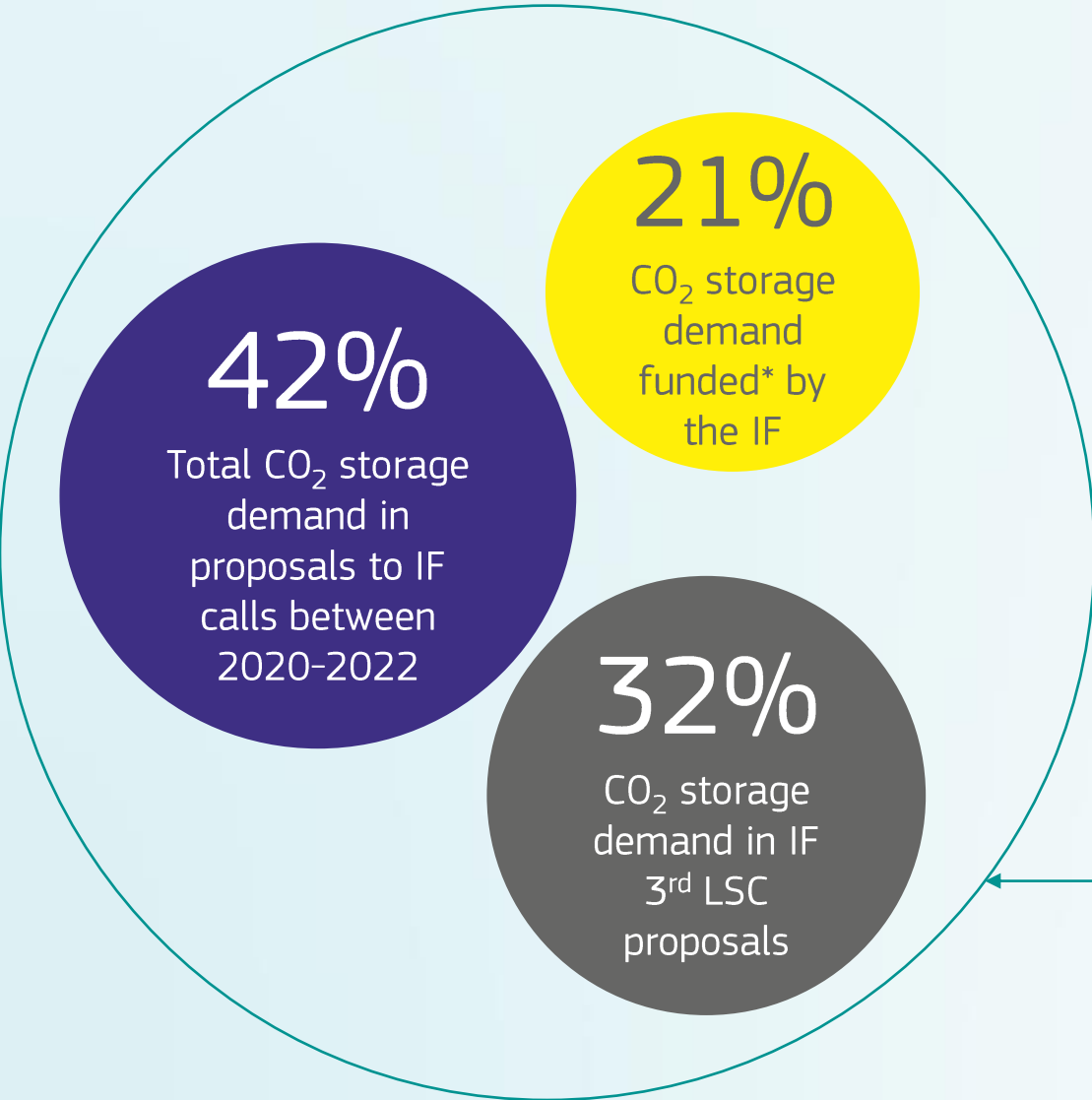
Hydrogen production projects



Hydrogen capacity



CCUS – IF contribution to NZIA target in 2023

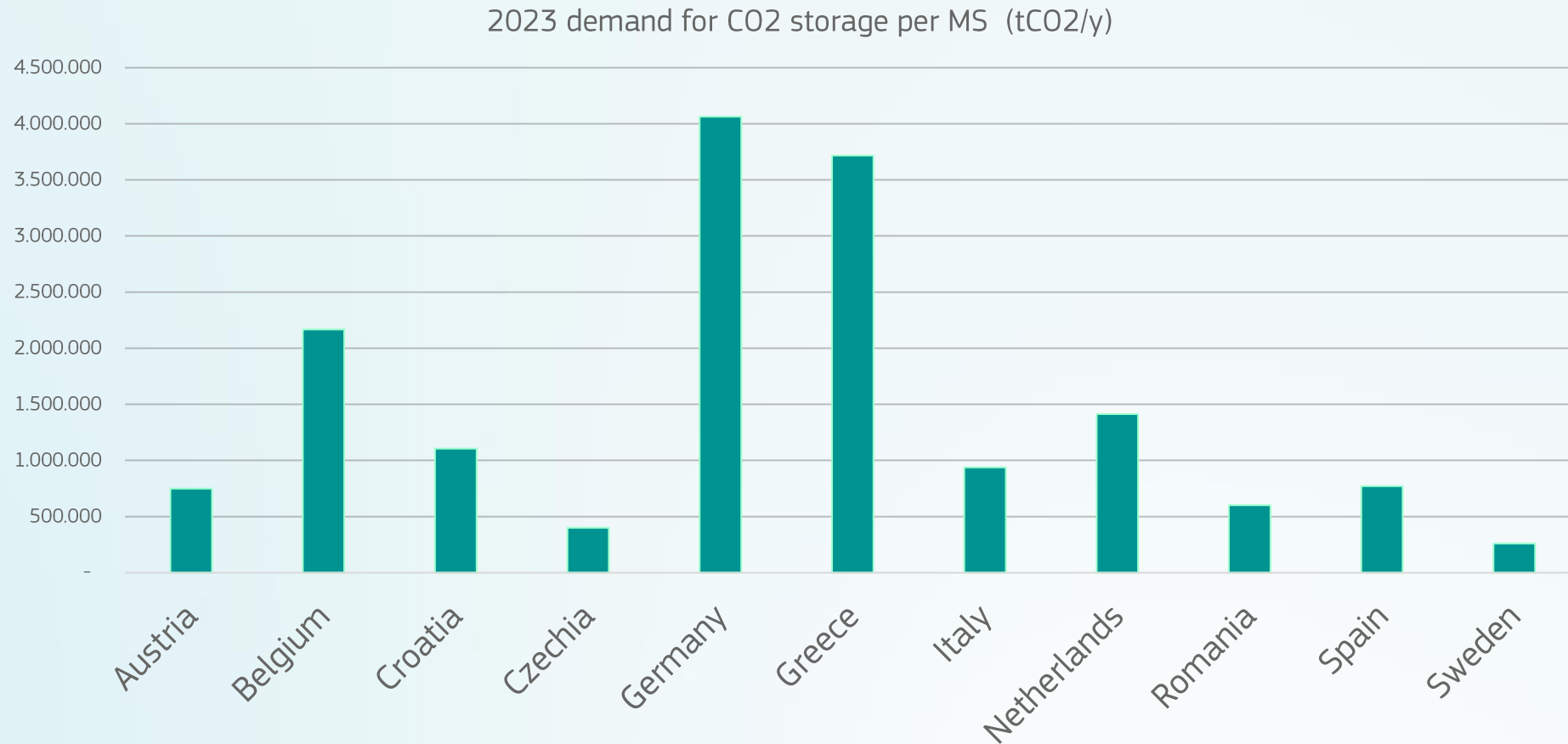


NZIA CO ₂ target	50 Mt/y CO ₂	Innovation Fund @ NZIA
Total CO ₂ storage demanded by IF proposals since 2020	20.8	42%
CO ₂ storage demanded by IF proposals in 2022 alone	16.2	32%
Total CO ₂ storage demand funded* by the IF 2020-2022	10.4	21%

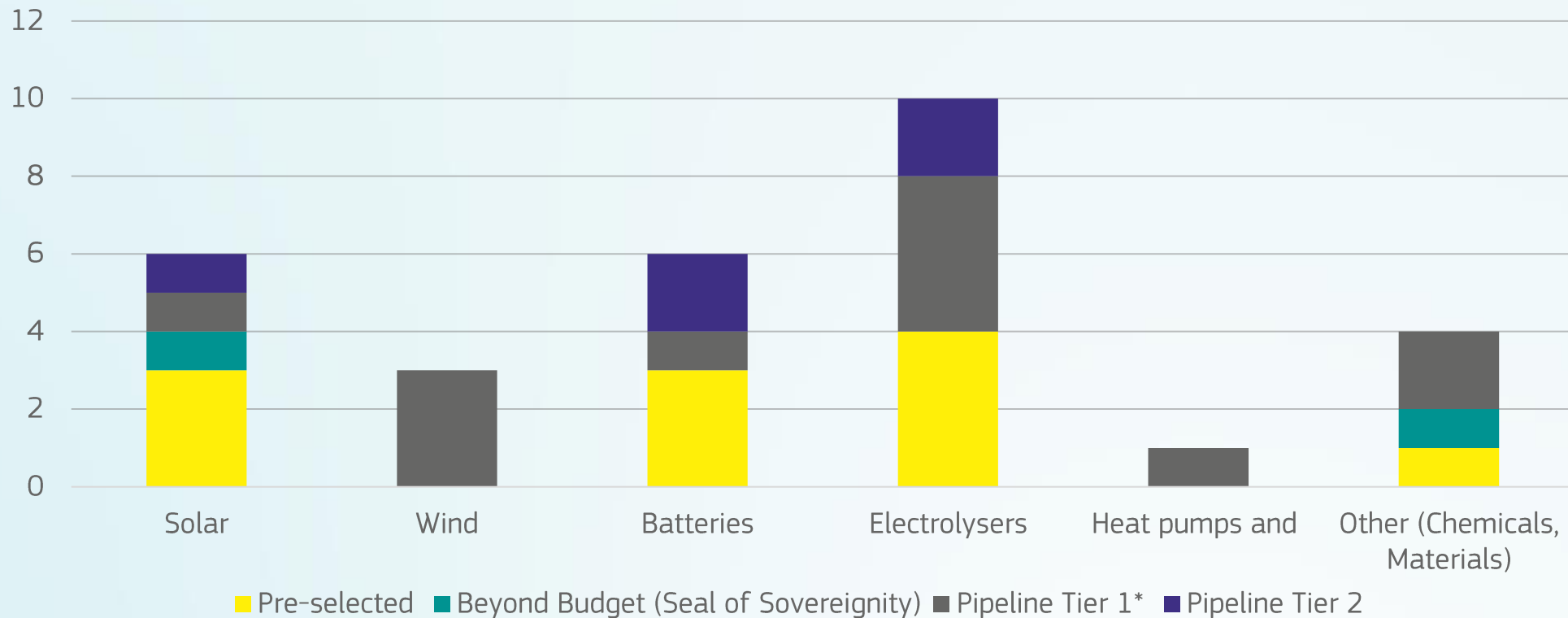
NZIA target: **50 Mt/y** of operational CO₂ injection capacity in 2030

* Pending grant agreement

CCUS - Demand for CO₂ storage























Manufacturing – 11 projects



Selected projects - 14% contribution to NZIA 2030 production capacity targets

- Together with the existing portfolio, IF would contribute up to 17% to NZIA targets.
- Additional 4% to 31% projects can work on their maturity and be submitted in the next call.

	Contribution to NZIA 2030 objectives (%)					All 11 3LSC Selected Manufacturing Projects	Total IF contribution (selected 3LSC + previously awarded projects)
	39 Manufacturing Proposals 3LSC	Failing due to low budget (Sovereignty Seal)	Failing due to low score in other areas (mostly FM)				
Solar	 38%	 -2%	 -22%	 14%	 17%		
Wind	 5%	 -	 -5%	 -	 -		
Batteries	 9%	 -	 -3%	 6%	 7%		
Electrolysers	 42%	 -	 -31%	 11%	 11%		

Takeaways

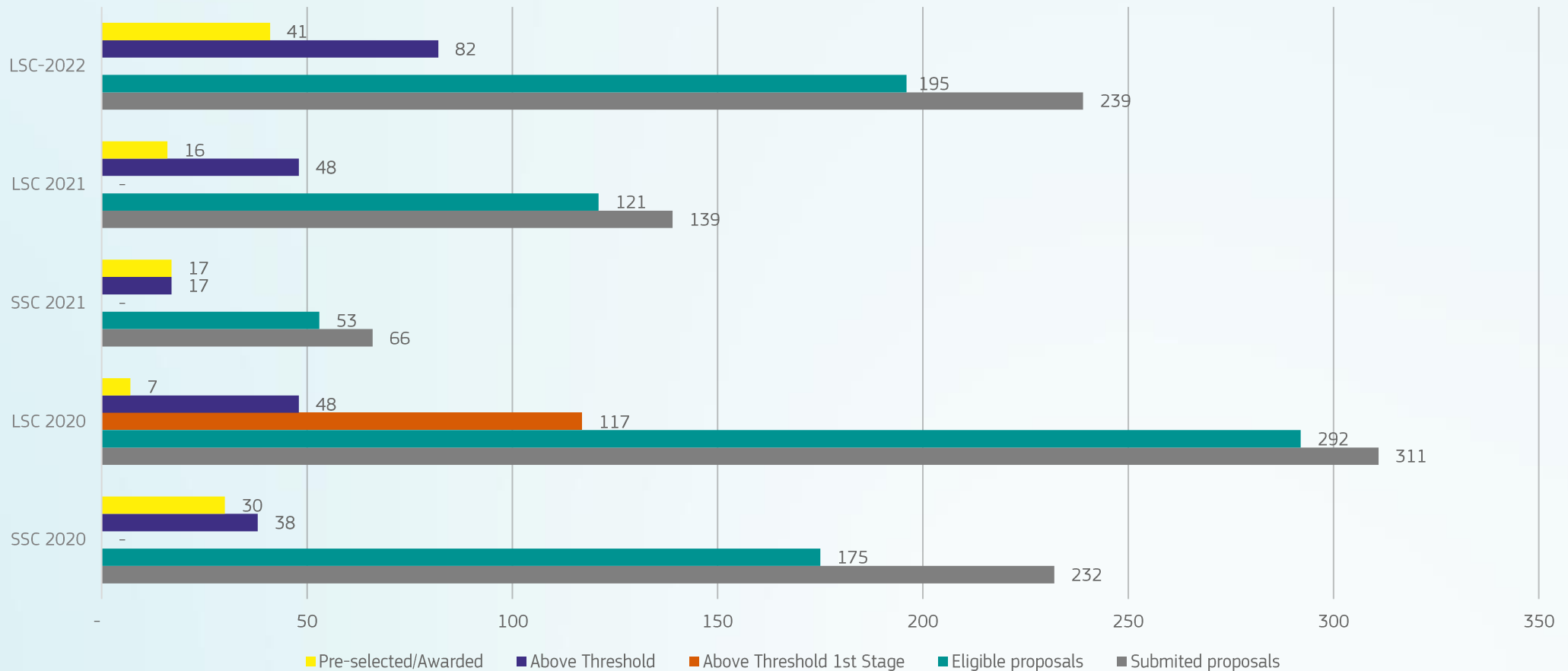
- Oversubscription in the topics GENERAL and IND-ELEC-H2.
- A solid pipeline of promising proposals across all sectors.
- A higher budget would bring us closer to NZIA, H₂ Strategy and CO₂ targets.
- Geographical enlargement of the IF portfolio: 7 new countries get projects.
- Introduction of dedicated topics on MANUFACTURING and PILOTS resulted in higher visibility, more proposals and projects in these sectors.

Innovation Fund state of play

Since 2020

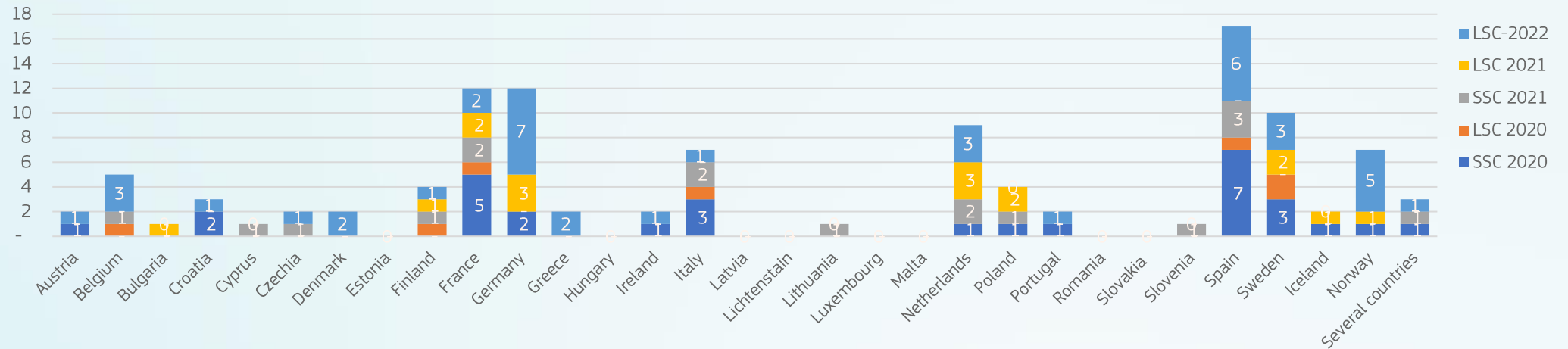
Total number of projects

The IF supports **111 projects**, providing a total max. grant of **€6,7 billion**:

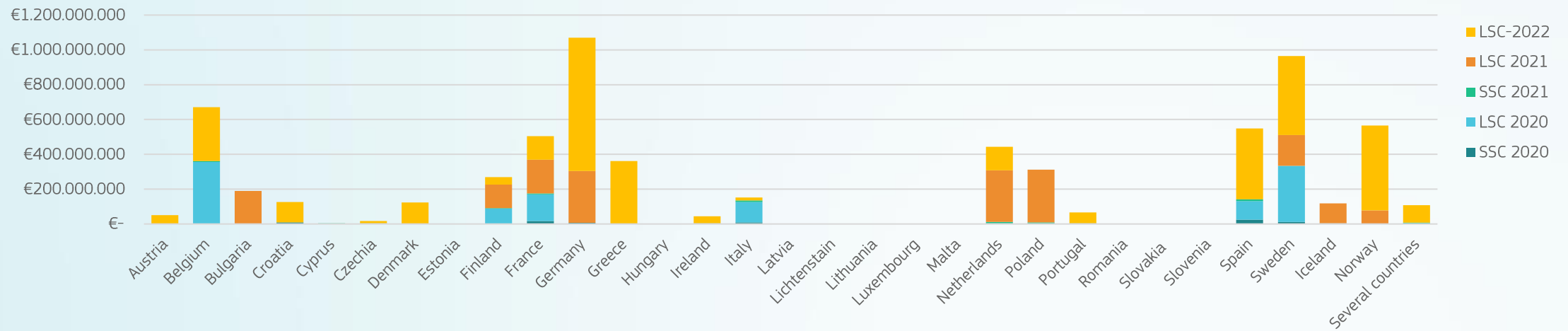


Projects geographical distribution

Number of Projects by Country

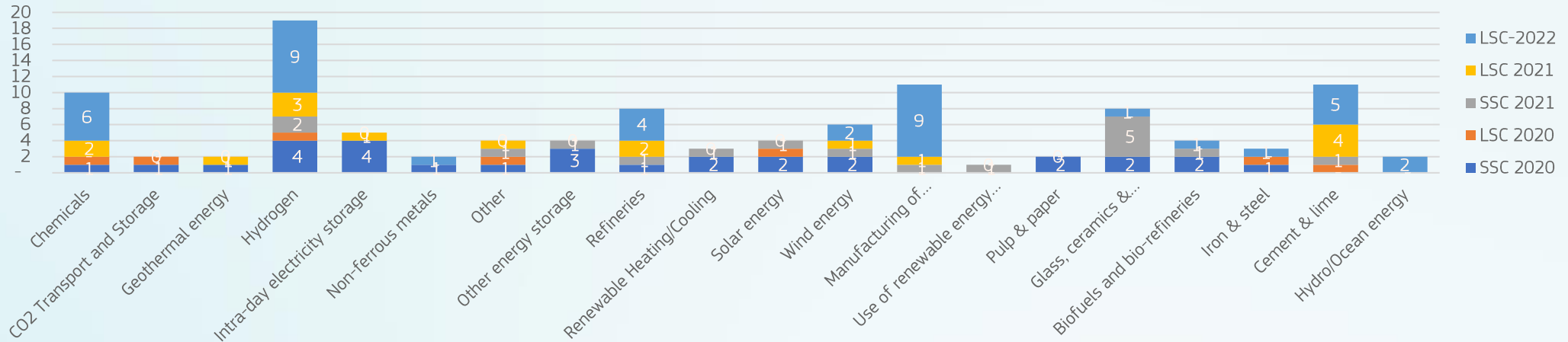


Maximum EU Grants (EUR) of selected projects by country

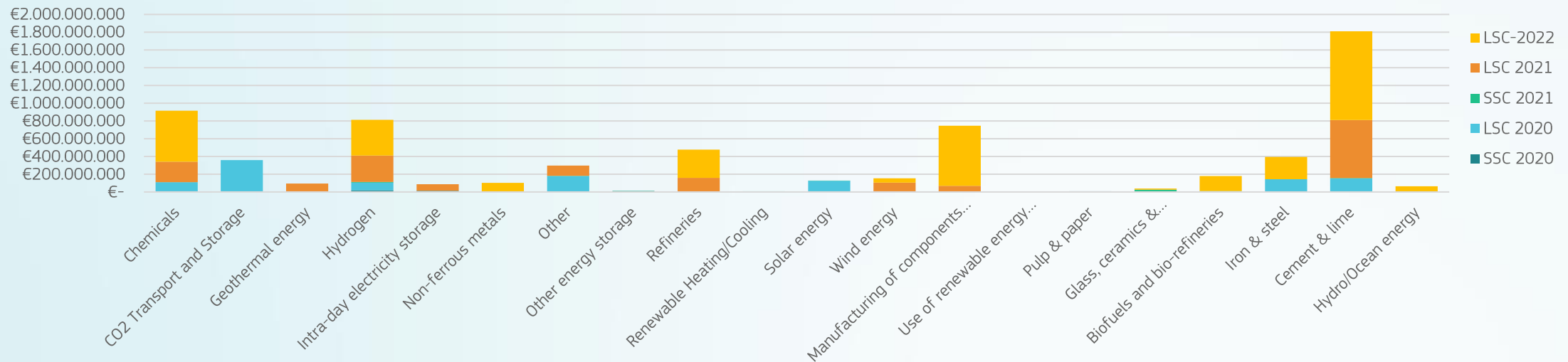


Projects sectorial distribution

Number of Projects by Sector

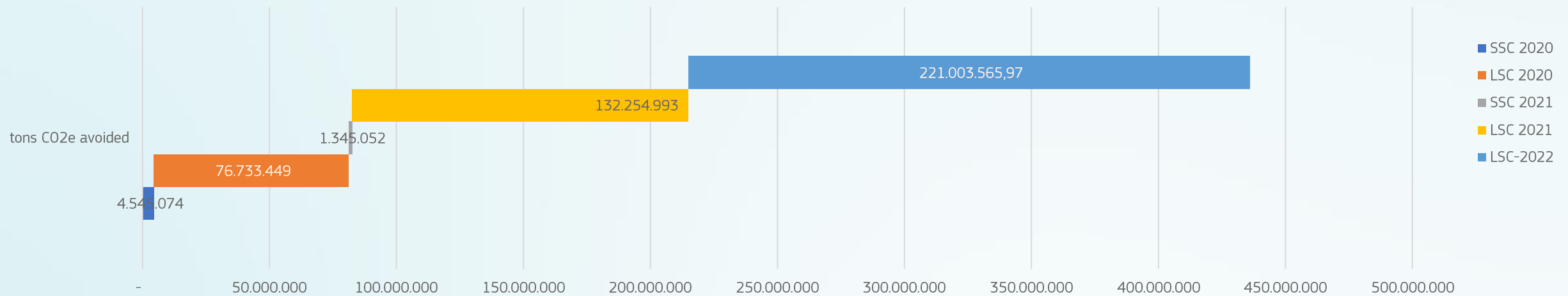


Selected Grants (EUR) by Sector - detailed



Planned absolute GHG emissions avoidance

GHG emissions avoided during first 10 years of operation (Tons CO2e)



Project Development Assistance

43 projects awarded PDA in total since 2020

Two SSC21 projects awarded (out of 8 resubmitted following PDA)

Four LSC22 projects selected + **Five** above all thresholds (out of 17 resubmitted following PDA)

Third large-scale call results

Discussion

Questions & Answers



Renewable hydrogen IF23 Auction T&Cs

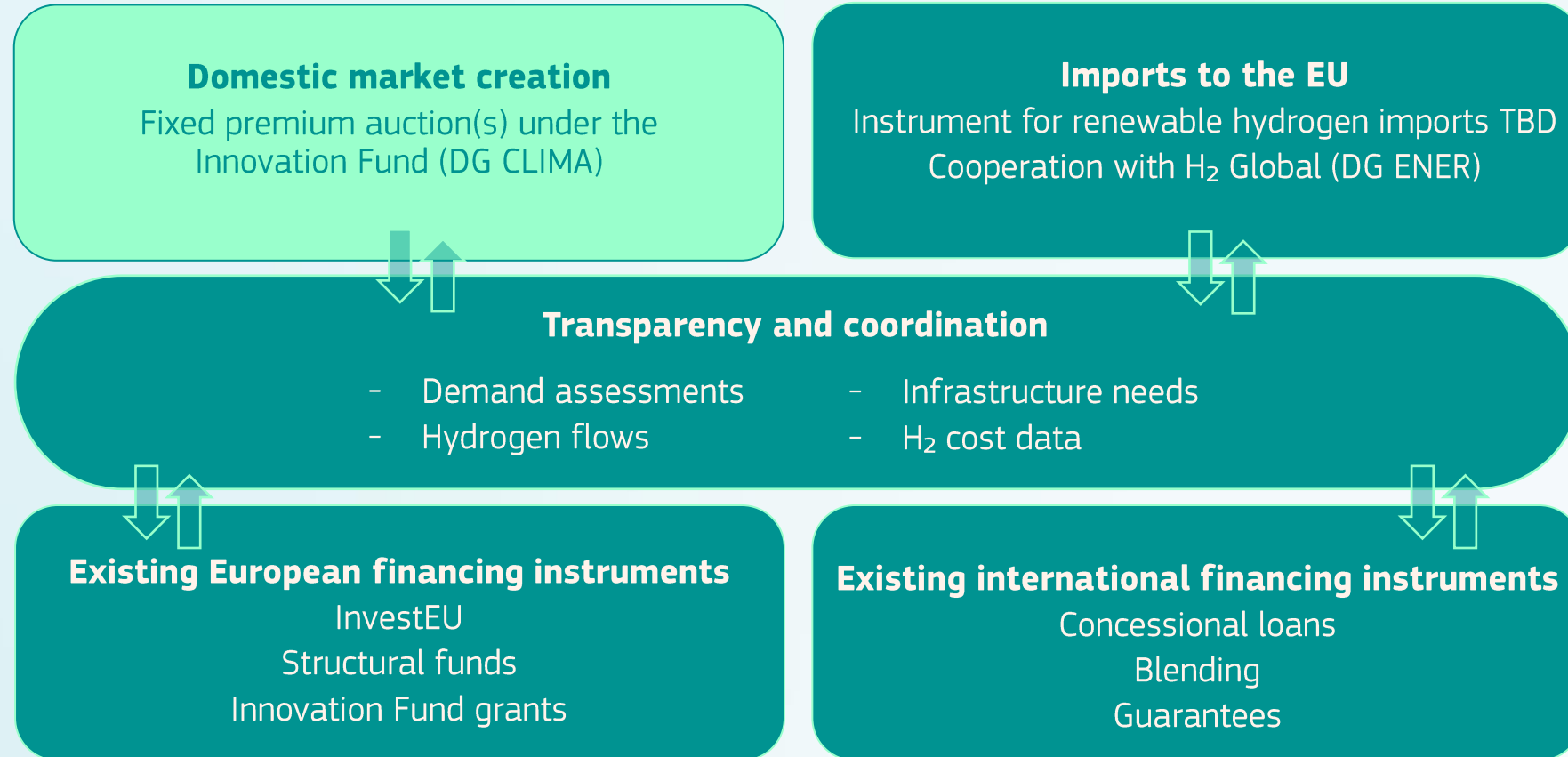


The European Hydrogen Bank (EHB)

- Announced in the State of the Energy Union 2022 – linked to **REPowerEU** objectives
- Communication adopted on 16 March 2023
- Import auctions by DG ENER vs. **EU production incentives** by DG CLIMA
- **Pilot auction** scheduled to open 23 Nov 2023
- Terms & Conditions published on [DG CLIMA's website](#)



EHB proposed activities



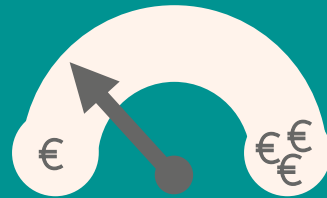
EU domestic RFNBO auction objectives

1



Cost-efficient,
market based instrument
for financial support

2



De-risking projects and
maximising leverage of
private capital

3



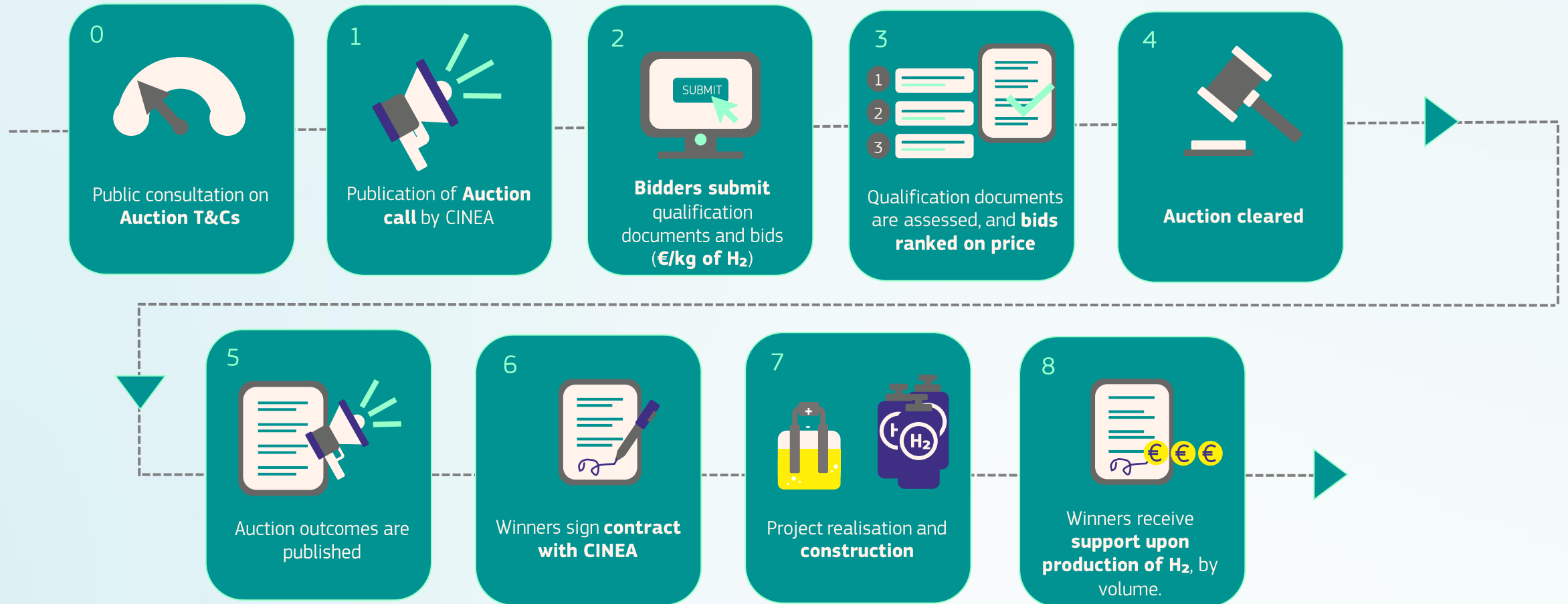
Price discovery and
market formation

4



Reduced administrative
burden

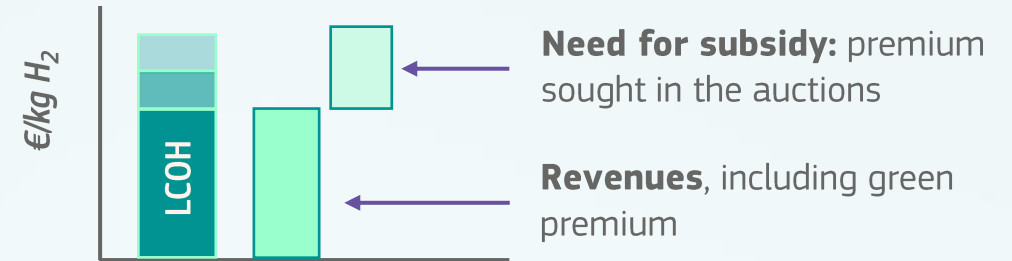
A market-based instrument with a lean procedure



IF23 Auction in a nutshell

- Budget: **€800mn**
- Auctioned good: **RFNBO hydrogen**
- Support in form of a **fixed premium** in €/kg of renewable hydrogen **produced** over **10 years**
- Bids **ranked on price** – budget allocated to projects with the lowest specific support requirements
- **Pay-as-bid** (no indexation to inflation)
- **Output based support**, upon verified and certified production of RFNBO volumes (no payments before entry into operation)
- **Semi-annual** payments

Fixed-premium auction



Bids ranked on price only



Termination rules, deposits and ceilings

- Auction **ceiling price**: €4.5/kg hydrogen.
- **Deposit (“Completion bond”)** required at signature: 4% of total grant value.
- **Maximum realisation period** (expected time until Entry into operation): 5 years. Termination if exceeded.
- Other termination reasons: severe under-production over 3 consecutive years.
- General rule of **no cumulation with other aid** (with few specified exceptions).

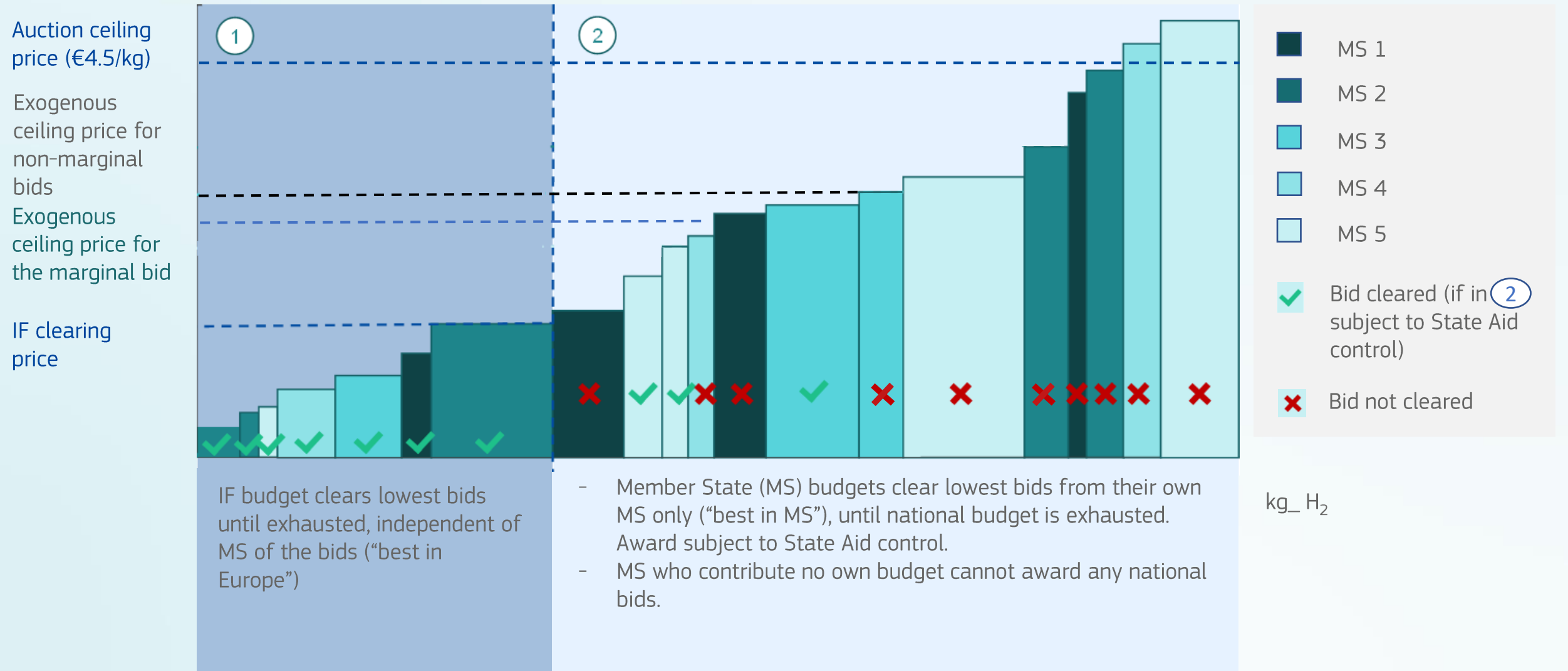
Other design elements

- Minimum capacity of 5MWe per bid. No virtual capacity pooling.
- Maximum grant per project (=price*volume) at 1/3 of total auction budget to avoid “winner takes all”.
- Key qualification requirements (checked pass/fail before bid ranking):
 - Renewably electricity sourcing & hydrogen off-take strategies
 - Electrolyser procurement & permitting strategies
 - Completion bond letter of intent from a bank or financial institution (minimum rating BBB-/Baa3)

Auctions As A Service

€/kg_ H₂

illustrative



Renewable hydrogen IF23 Auction T&Cs

Discussion
Questions & Answers



Key documents and next steps

- [Terms & Conditions](#) published on 30 August.
- [Frequently Asked Questions](#) published on 4 October.
- Auction will open on **23 November** and close on **8 February** on the [Funding & Tender Portal](#)
- Preparation of the bids can begin before, based on T&Cs.

Any questions? Ask us at CLIMA-AUCTIONS@ec.europa.eu

Coffee break

Stakeholder consultations



Aviation session

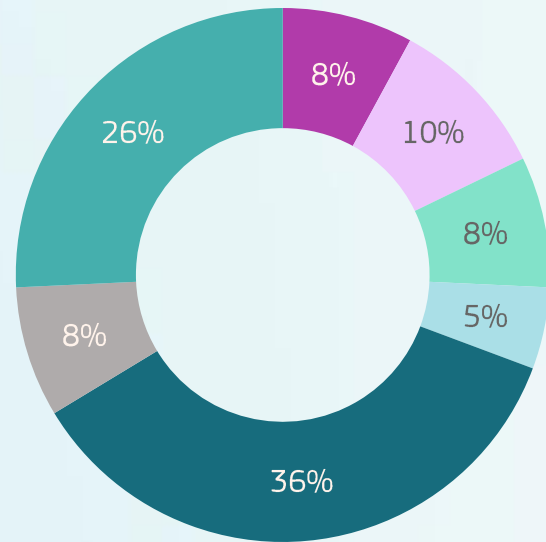
- Intro from DG CLIMA and DG RTD
- Sectoral views from Airlines for Europe (A4E) and Aerospace, Security and Defence Industries Association (ASD)

Key takeaways:

- The largest opportunities are in the use of Sustainable Aviation Fuels (SAF) in flights.
- Agreement that auctions are most suitable for a certain type of projects, such as fuel production.
- The use of other financing instruments such as Feed-in Tariffs (FiTs) and Contracts for Difference (CFD) would be beneficial for the sector.

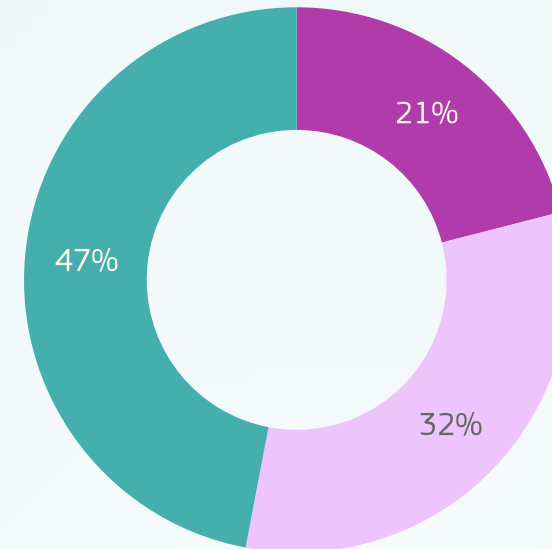
Aviation session

What kind of projects are you planning?



- Design changes
- Production of electric/hydrogen-based aircrafts
- Use of electric/hydrogen-based aircrafts
- Engine efficiency
- Use of SAFs
- Operational measures
- Other

Which areas would benefit from auctions?
Other funding measures required?



- Auctions are useful for the whole sector
- Auctions are useful for certain sectoral techs
- Public funding other than grants and auctions is required

Industry decarbonisation (incl. substitute products) session

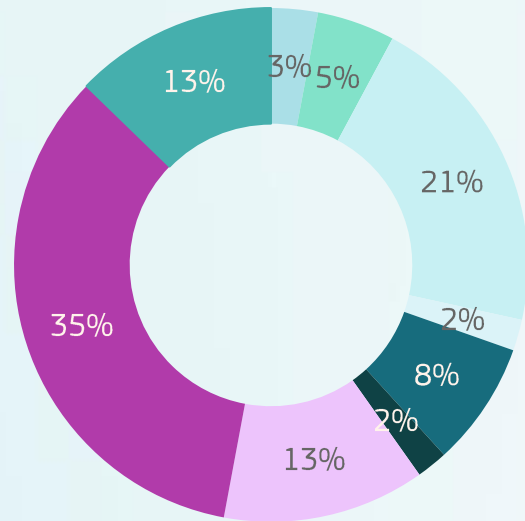
- Intro from DG RTD
- Sectoral views from Processes4Planet Research Association (ASPIRE)

Key takeaways:

- Project portfolio shows there is a clear role for each of the instruments along the R&I pipeline.
- A small share of IF projects have received a Horizon grant which is an indication for a gap in the funding landscape between TRL 6-7 and TRL 9.
- There is a request for more clarity about the compatibility of EU and Member State funding streams.

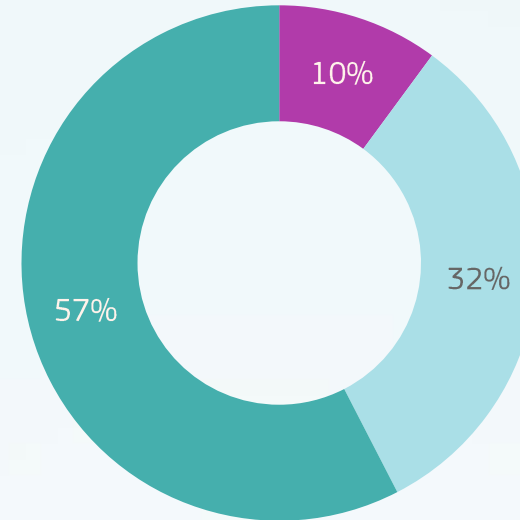
Industry decarbonisation (incl. substitute products) session

What kind of projects are you planning?



- Substitute products
- Direct electrification
- Hydrogen technologies
- Use of renewable fuels
- Energy efficiency
- CCU
- CCS
- Digitalisation
- Combination of the above
- Other

Which areas would benefit from auctions?
Other funding measures required?



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Maritime session

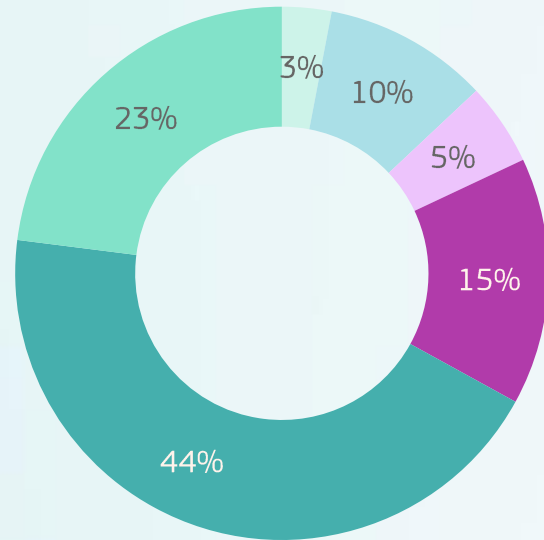
- Intro from DG CLIMA and DG RTD
- Sectoral views from Cruise Lines International Association (CLIA) and the European Community Shipowners' Associations (ECSA)

Key takeaways:

- Approx. €9.9 billion raised for sustainable fuels, ships and infrastructure/logistics, as a requirement to make significant progress towards the sector's decarbonisation.
- Importance of clean fuels and shore power supply for maritime applications - scalability and price of alternative fuels are key.
- Diverse needs within the sector - risk that only fuels production is funded (instead of fleets); auctions and grants are relevant for different technology pathways.

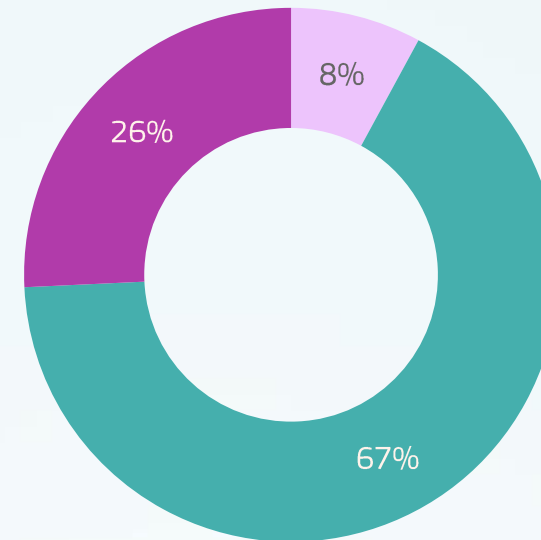
Maritime session

What kind of projects are you planning?



- Wind energy and re-routing
- Deep sea and cruise zero-emission retrofit/replacement
- Ferry and tugs zero-emission retrofit/replacement
- Shore power
- RFNBO fuel supply and associated bunkering
- Other

Which areas would benefit from auctions?
Other funding measures required?



- Auction are useful for the whole sector
- Auctions are useful for certain sectoral techs
- Public funding other than grants and auctions is required

Cleantech manufacturing session

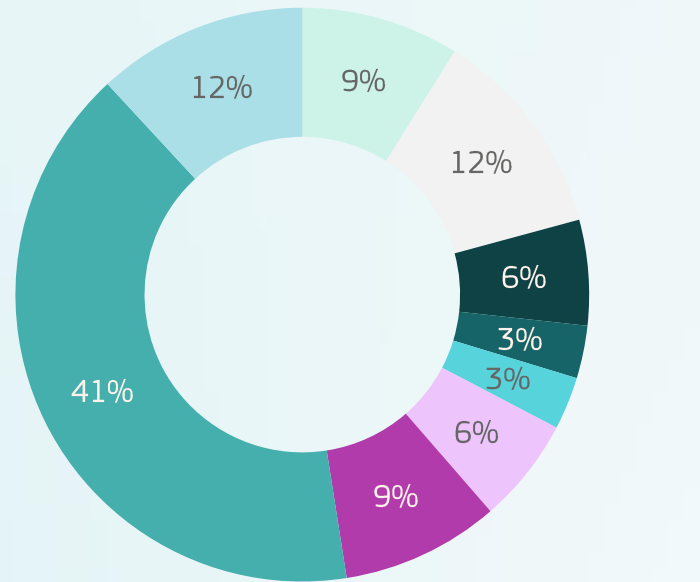
- Intro from DG CLIMA
- Sectoral views from European Association for Storage of Energy (EASE), Wind Europe and Solar Power Europe

Key takeaways:

- Concern that Europe is not taking full advantage of its potential to produce wind energy.
- Despite the observed growth in the solar supply chain, Europe remains far behind the scale that is required to be competitive.
- Auctions suitable to cleantech manufacturing and energy storage facilities.

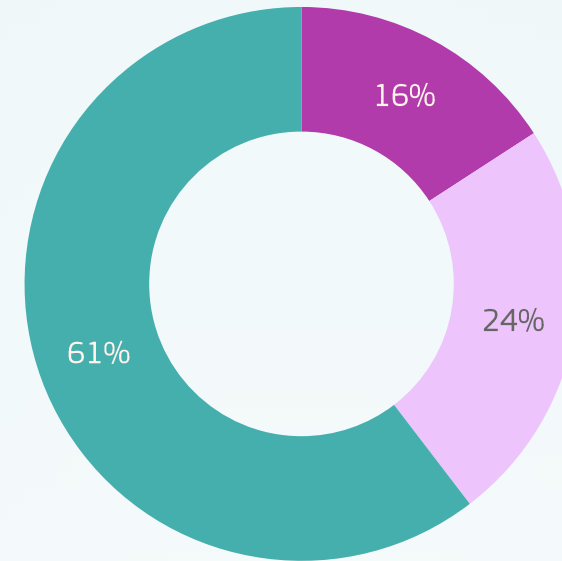
Cleantech manufacturing session

What kind of projects are you planning?



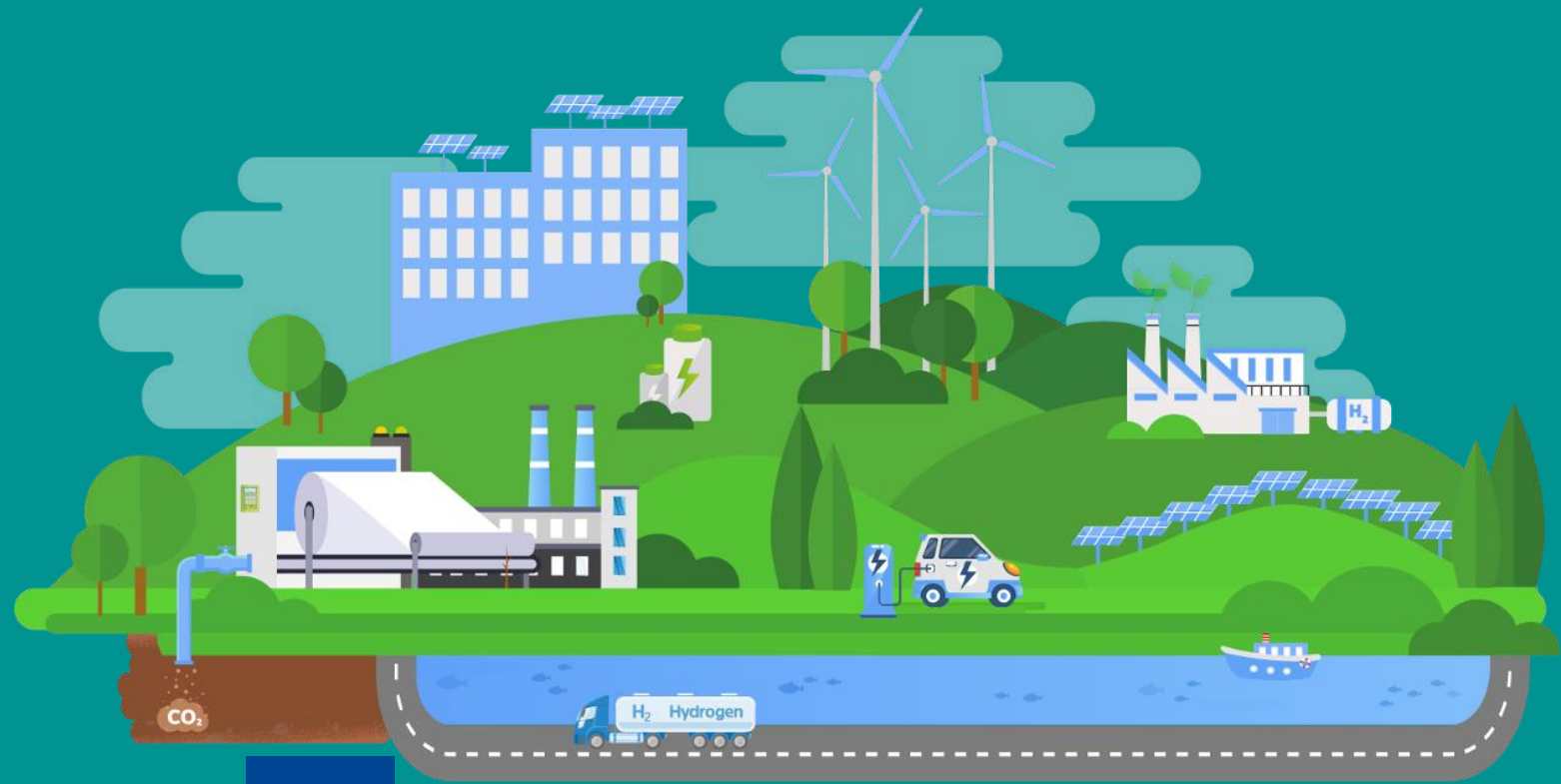
- Innovative RES generation
- Energy storage
- Manufacturing of components for RES generation
- Manufacturing of components for heat pumps
- Manufacturing of components for electrolysers or fuel cells
- Other clean-tech manufacturing
- Fuel use for road transport
- Energy use in buildings
- Combinations of the above
- Other

Which areas would benefit from auctions?
Other funding measures required?



- Auctions are useful for the whole sector
- Auctions are useful for certain sectoral techs
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IF23 Call



ETS Directive revision – what's new?

1



IF overall size increased from 450 million ETS allowances to ca. 530 million.

2



Scope: new sectors, medium-scale projects, DNSH from 2025, stronger reference to multiple environmental impacts.

3



New financial instruments (competitive bidding): Fixed premium, Contracts for Difference (CfDs) or Carbon Contracts for Difference (CCfDs), covering up to 100% of the funding gap.

4



Stronger attention to geographical balance.

The Innovation Fund 2023 Call - 'IF23 Call'

- An increased size - **€4 billion**.
- **Budget reserved by topics** - but budget reserved and not spent on a given topic, can be used for other topics.
- A **single annual** Innovation Fund Call = one publication cycle for all projects.
- **Sector eligibility revised** - particularly relevant for maritime sector.

IF23 Call topics

Bottom-up approach covering all areas eligible in the general decarbonisation window(s) under **three topics by project size**:

	Small-scale projects	Medium-scale projects	Large-scale projects
Project size	Up to €20 million	Above €20 million and up to €100 million	Above €100 million

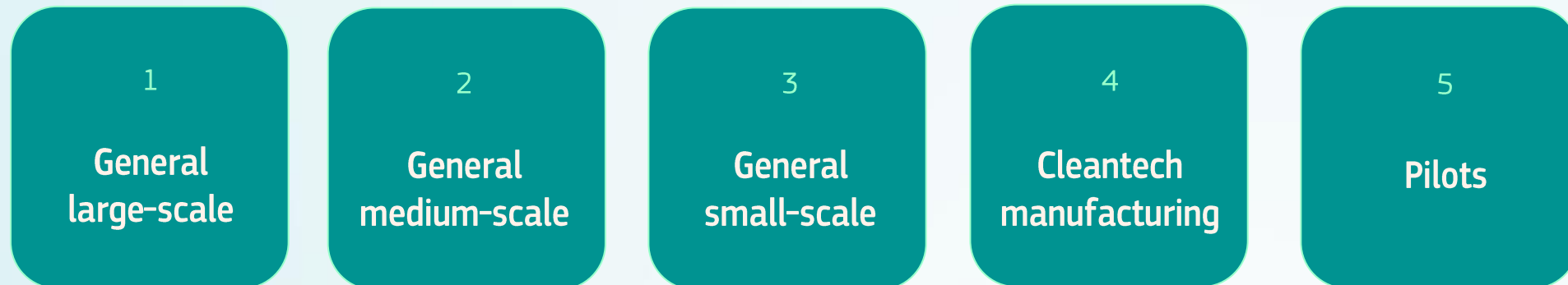
EU Green Deal Industrial Plan and Net Zero Industry Act's key priorities reflected by the continuation of two focused topics:

- manufacturing topic on innovative clean tech manufacturing;
- pilot proposals that focus on validating, testing and optimising highly innovative solutions.

IF23 Call structure

- Budget available: **€4 bn** + 20% flexibility reserve
- Call launch: **23 November** 2023 (planned)
- Call closure: **9 April 2024** (indicative)

Topics:



IF23 Call structure

The topics allow to cater for specific **policy priorities**.

The topics definitions aim to continue to benefit numerous/all sectors eligible and **avoid 'parcelling'**.

The topics will reserve a **dedicated budget envelope**.

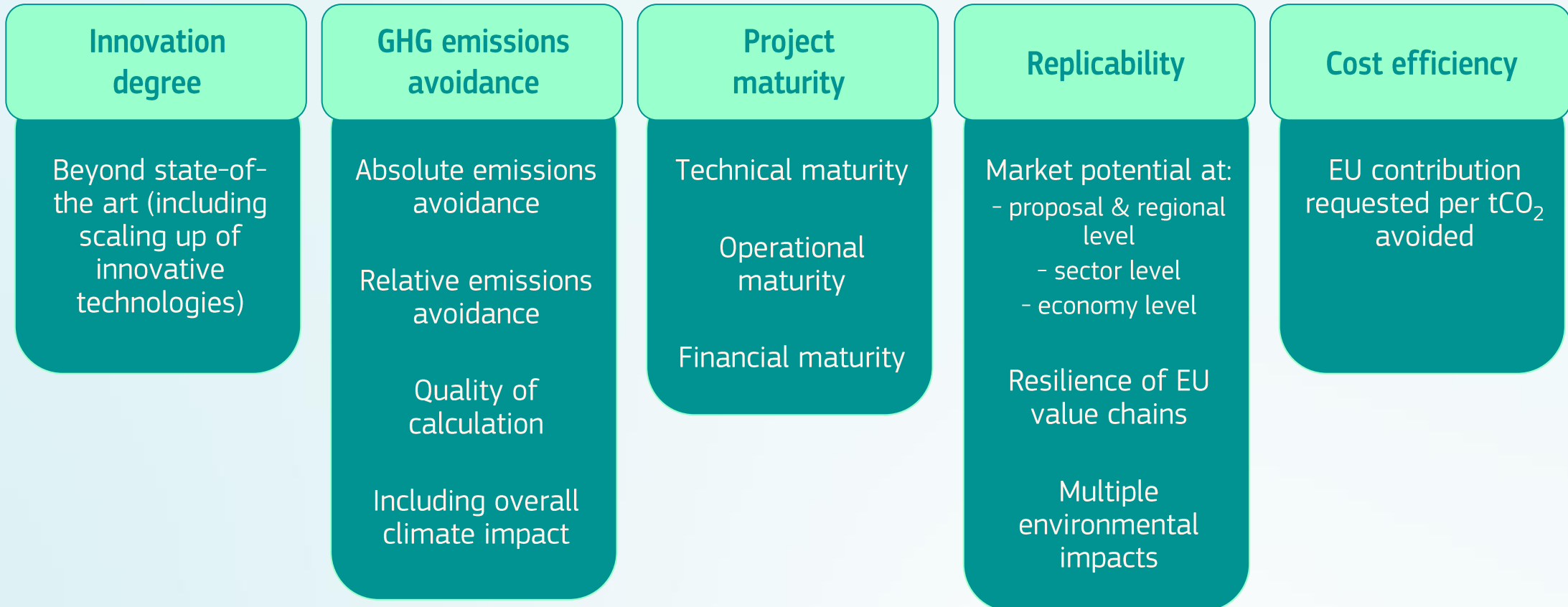
The topics make competition among proposals more **focused**.

Manufacturing and Pilots topics apply weighting of award criteria to reflect policy priorities (fast project maturity, higher degree of innovation) and **amplify scores of proposals that perform best** in this respect.

Maritime sector is eligible with sector specific provisions on full climate impact, including black carbon – *no dedicated topic for IF 23 Call*.

Topics designed not to overlap – **one proposal application can only be made to one topic**.

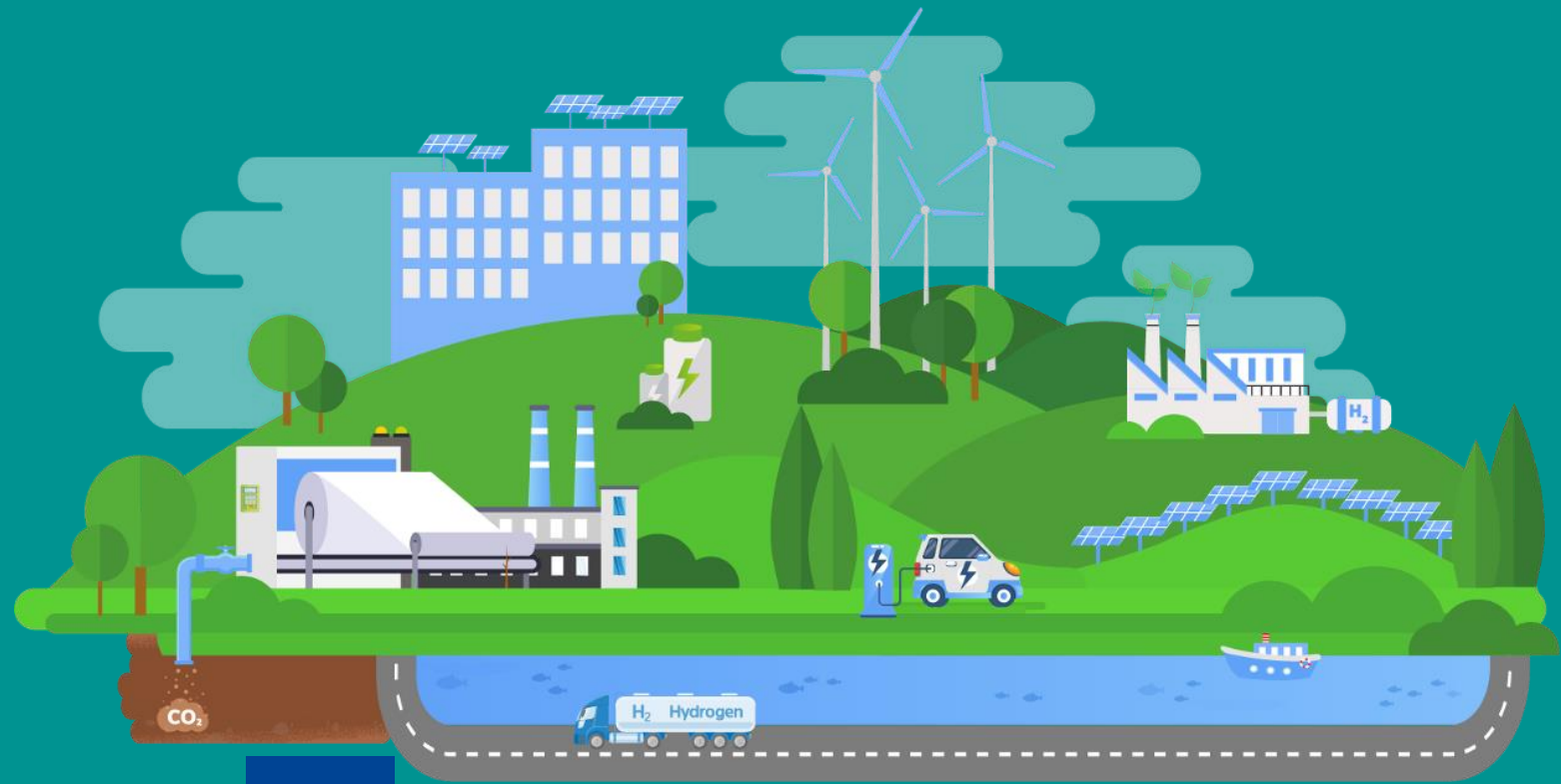
IF23 Call award criteria



Bonus points: net carbon removals, other GHG emissions, additional RES, maritime.

Stakeholder consultations and IF23 Call

Discussion
Questions & Answers



Projects fiches

Update April 2022

European Commission

INNOVATION FUND
Driving clean innovative technologies towards the market

Beccs Stockholm: Bio Energy Carbon Capture and Storage by Stockholm Exergi

The Innovation Fund is 100% Funded by the EU Emissions Trading System



COORDINATOR
Stockholm Exergi

LOCATION
Stockholm, Sweden

SECTOR
Bio-electricity

AMOUNT OF INNOVATION FUND GRANT
EUR 180 000 000

RELEVANT COSTS
EUR 608 863 394

CAPEX
EUR 453 661 141

TOTAL PROJECT COSTS
EUR 2 707 453 271

RRG EMISSION AVOIDANCE
7,8 Mt. CO₂eq

STARTING DATE
01 July 2021

PLANNED DATE OF ENTRY INTO OPERATION
Q3 2026

Project summary

The Beccs Stockholm project will create a world-class, full-scale Bio-Energy Carbon Capture and Storage (BECCS) facility at its existing heat and power biomass plant in Stockholm. The project will combine CO₂ capture with heat recovery, making the process much more energy-efficient than the process in a conventional Carbon Capture Storage (CCS) plant. It will capture and permanently store large quantities of biogenic CO₂, leading to carbon removals from the atmosphere, also called negative emissions. The Beccs Stockholm project has a potential to remove around 7.0 Mt CO₂eq over the first ten years of operation. Net carbon removals are seen as an increasingly important technology-based solution to climate mitigation, indispensable to reach climate neutrality in 2050. The project will also be a catalyst for paving the way for a new market of net carbon removals. Besides the actual negative emissions achieved, Beccs Stockholm will also have a positive impact on the balance for renewable heat and electricity, resulting in additional reduction of around 0,8 Mt CO₂eq over the same period.

Climate Action



A world-class, full-scale Bio-Energy Carbon Capture and Storage (BECCS) plant

Beccs Stockholm will make use of a novel combination of existing technologies (Hot Potassium Carbonate for CCS and bio-fueled CHP) on a new scale, to develop the first, large commercial BECCS plant in Europe. The HPC technology is well proven with multiple installations over the years. Its application with flue-gases from a bio-fueled CHP-plant is, however, not tested in full scale. Therefore, Stockholm Exergi has designed, constructed and now operates a smaller-scale R&D facility at the plant site with support from the Swedish Energy Agency with the objective to gain practical experience and results before designing the full scale plant. The Beccs Stockholm implementation will represent the first-of-a-kind global integration of CO₂ capture in an existing combined heat and power (CHP) plant that uses biomass-based fuels. By using the excess heat of the CO₂ capture facility to supply Stockholm's district heating network, the extra energy required for the CCS process (i.e. the energy penalty) will be greatly reduced. This energy penalty is normally in the range of 15-20% of the energy produced, while Beccs Stockholm will reduce it to a mere 2%. Importantly, 90% of the CO₂ in the flue gas will be captured by use of the HPC technology. Stockholm Exergi selected this CO₂ absorption technology based on several advantages, such as its non-toxicity, the high selectivity for CO₂ and as a result high purity of captured CO₂, its low regeneration heat, and, the compact lay out of the technology in comparison to other CO₂ absorption solutions. After liquefaction and buffering, the CO₂ will be transported by ship to an underground storage site in the North Sea (although being part of relevant cost-calculation, this part of the technology chain is not part of the project).

Beccs Stockholm actively supports the climate neutrality goal and multiple European strategies

The scaling up of carbon removal solutions that capture CO₂ from the atmosphere and store it for the long term is vital to achieve the EU objective of economy-wide Climate Neutrality by 2050. Beccs Stockholm will support the achievement of this climate goal by capturing and storing almost 800 000 tonnes of biogenic CO₂ per year, with the aim to further improve the technology in the future. CCS, as well as bioenergy – the building blocks of the project – are among the ten main priority actions of the European Strategic Energy Technology Plan (SET Plan) to accelerate the energy system's transformation. In particular, the SET Plan highlights

that CCS needs to become a cost-competitive technology and gain public acceptance, to be eventually commercially deployed. Beccs Stockholm will remove/avoid the emissions of 7.8 Mt CO₂eq of absolute GHG emissions during its first ten years of operation. This is the equivalent to more than the 2018 GHG emissions from public electricity and heat production in Sweden¹. From the overall emissions removed/avoided, 50% will come from CO₂ capture and storage (removal), and 10% will be associated with renewable electricity and heat generation from a renewable source.

At site-level, the project will implement solutions in line with the Circular Economy Action Plan, using locally-sourced biomass waste, as a feedstock in the electricity and heat generating plant, reusing process water to eliminate or diminish the use of fresh water, and with the opportunity to supply sustainably managed forests with fly ash coming from the co-incineration of the current biomass waste with phosphorus-rich sludge, with the potential to increase Swedish forest sequestration of carbon by 0.45 Mt CO₂eq per year. In line with the EU recovery ambition, the project will also create direct jobs locally and outside Sweden, acting as a springboard for many more highly-skilled engineering, construction and operation-related jobs throughout the CCS value chain.

Measures taken during the preparation phase increased the support of the project among citizens, living as close as 140 metres from the facility. For Stockholm Exergi, nurturing a strong and transparent relation with citizens, is and has always been a priority. One example of this, was the launch of a public acceptance survey at an early stage in the project's planning. This is an essential prerequisite for successful implementation within the boundaries of a populated city. Stockholm Exergi, which is already active in the field, will continue its efforts to establish a market for net CO₂ removals as a novel product. This will make the net carbon removals at Beccs Stockholm profitable for a CHP plant, paving the way for other actors to join.

Strategic location to support scalability and technology transfer

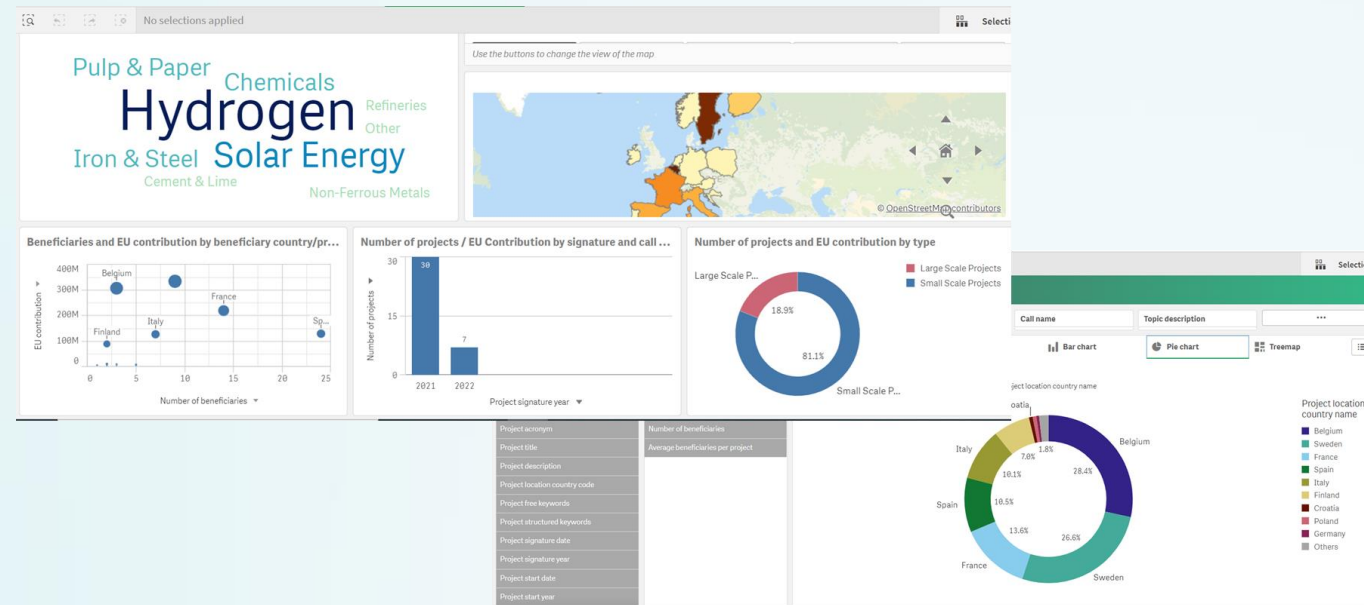
The Beccs Stockholm technology can be replicated in other sites. For example, two locations have already been identified in the region where the solution could be implemented by 2030. These two sites have the potential to avoid 1.1 Mt CO₂eq per year, of which 0.8 Mt from biogenic sources, thereby contributing to the necessary net carbon removals foreseen by relevant scenarios reaching climate neutrality.

The solution also has the potential to be scaled up across the economy, by replicating the technology in other industries, such as the pulp and paper industry, waste incinerators and heat plants. The project overall will help to establish a new European market for net carbon removals. By contributing to the establishment of all necessary links in the CCS value chain in Northern Europe, including transport by ship of the CO₂ for storage in saline aquifers or depleted gas/oil-fields in the North Sea basin, Beccs Stockholm is one of the important early adopters that will lead many other CCS projects to follow suit, both in the region and further afield.

Information from the Innovation Fund for Climate Action and the Swedish Energy Agency. ¹ The public electricity and heat production sector in Sweden produced 708 Mt CO₂eq in 2018.

Available on [DG CLIMA's website](#)

IF dashboard



Available on [CINEA's website](#)

Join as project evaluator

INNOVATION FUND

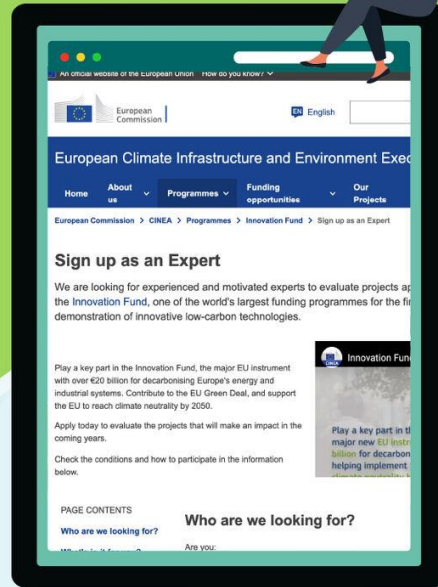
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Discussion: GHG methodology for maritime and aviation

Objectives of the presentation

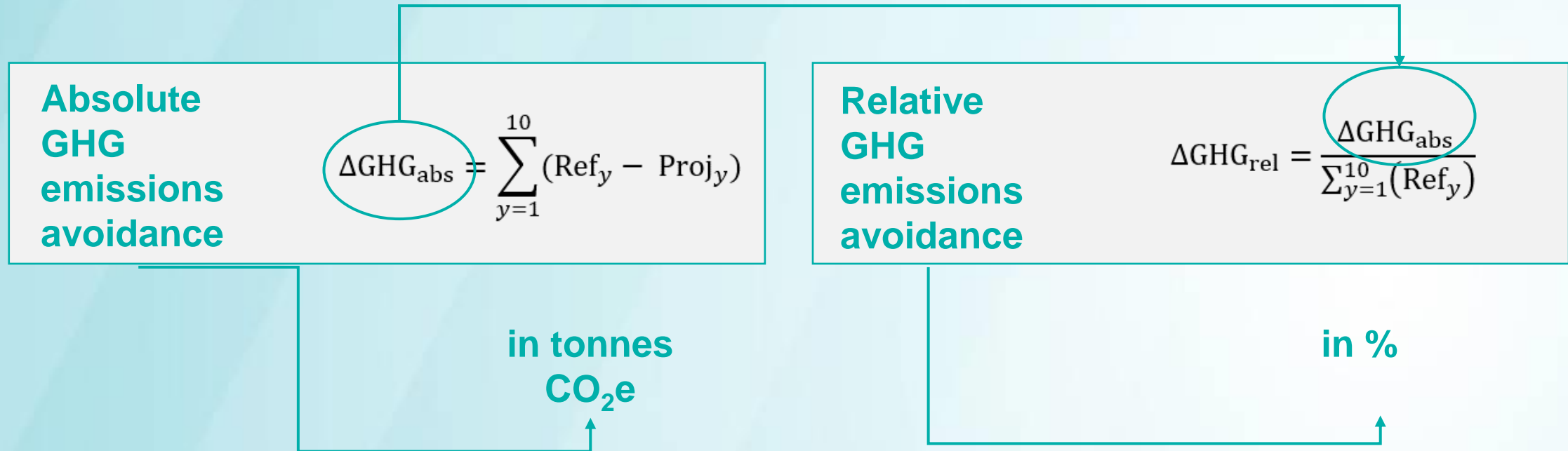
The **GHG methodology** forms the basis of the scoring for the “GHG emission avoidance effectiveness” criterion and informs applicants on how to estimate GHG emissions avoidance over the first 10 years of operation for their type of project.

Currently, the GHG methodology comprises Energy-Intensive Industries, including CCS and CCU, Renewable Energies and Energy Storage, including Clean Tech Manufacturing.

With the inclusion of maritime activities (MAR) in the EU ETS and specific mentions of supporting breakthrough innovation in maritime and aviation and addressing their full climate impacts, the IF will now have specific methodologies for MAR and aviation (AVI).

Today's purpose is to recap the basis of the GHG methodologies and cross-cutting assumptions, and to introduce the proposed approach for these new chapters for feedback.

GHG emission avoidance criteria



Where:

- Ref: emissions that would occur in the absence of the project
- Proj: emissions from the project activity

Recap of cross-cutting assumptions

- Pre-defined reference scenarios
- Simplifications of boundaries, i.e., fewer emissions sources to be calculated
- Adoption of default parameters, i.e., fewer parameters to be monitored
- GHG emissions avoidance to be calculated over the first 10 years of operation, so that applications can have a fair comparison.
- Use of ETS benchmarks, fossil fuel comparators and EU grid mix as the conventional technologies/scenarios that will be replaced by the project, instead of regional or site-specific assumptions

Classification

When submitting the application, the applicant needs to choose the sector under which the project falls. This choice may influence the outcome of the evaluation, as they will be ranked under the sector of the project. The sector is determined based on the function of the principal product or service that is the main aim of the project.

Category	Sector	Products/services
Mobility	Maritime	<ul style="list-style-type: none">• Transportation of goods/passengers• Manufacturing of vessels or their components• Other, please specify
	Aviation	<ul style="list-style-type: none">• Transportation of goods/passengers• Manufacturing of aircrafts or their components• Other, please specify

Note: Projects aiming exclusively to produce SAFs shall apply under the EII category. However, projects that envisage both the production and use of SAFs shall apply as a hybrid EII and AVI project. Similarly, projects that aim to combine renewable energy facilities to feed electric vessels shall apply as a hybrid RES + MAR project, where the GHG emissions avoided are calculated separately, and added up, whilst removing any double-counted emissions or reductions.

Scope

This methodology applies for the calculation of the GHG emission avoidance occurring in flights (AVI) or voyage of ships (MAR) that fall within the eligibility set in the call.

Possible types of projects. Any innovative projects that can demonstrate GHG emission avoidance and/or that contribute to the reduction of effects of non-CO₂ gases within the defined scope, could be accounted. Examples of such projects could include:

Projects that reduce energy use per functional unit e.g., MJ per journey-	Design changes (e.g., AVI: new airframes, optimised weight / MAR: new hull designs, energy saving propulsors, power train hull appendage and other hull technologies such as air bubbles to reduce hull resistance or energy use on board)
	Operational measures, (e.g., AVI: speed limitation approaches, climate-optimized flight trajectories to avoid climate forcing arising from aircraft contrails / MAR: speed reduction approaches, system condition monitoring which improves system performance, reductions in waiting time to enter/leave port);
	Engine efficiency (e.g., replacement of fleet with more efficient motors)
	Wind propulsion technologies and power take-in from propulsors (e.g. Flettner rotors, sail rigs)
Projects that reduce GHG emissions per energy use, e.g., tCO₂e / MJ	Manufacturing of electric or hydrogen-fuelled aircraft/vessels or their components
	Fuel switch (e.g., use of electricity, sustainable biofuels, recycled carbon fuels or renewable fuels of non-biological origin, instead of the conventional fossil fuel);
Projects that envisage a modal shift (e.g., new mode of transportation, or a combination of various modes)	
Other projects that contribute to the reduction non-CO₂ effects, e.g., contrails from aviation and black carbon from maritime	

Boundaries: Aviation

Scenario	Emission source	Large and medium scale projects	Small scale projects
Reference	GHG emissions due to the combustion of conventional aviation fuel that in the absence of the project activity would be consumed for the operation of the flights covered by the project	Yes	Yes
	Other climate impacts due to the non-CO2 effects that would occur in the absence of the project activity	Yes	Yes
Project	GHG emissions due to the combustion of the fuels of fossil origin, including any residual quantities of jet A-1 kerosene and the fossil fuel share of SAFs, that will be consumed in air, water or land modes proposed in the project activity	Yes	Yes
	GHG emissions due to the (1) combustion of the <u>biomass-based</u> fuel, including the share of biogenic fuels in SAFs, (2) generation of <u>renewable</u> energy or (3) generation of <u>electricity</u> that will be either imported from the grid or produced on-site that will be consumed in air, water or land modes proposed in the project activity	Yes	No
	GHG emissions due to the use of H2, including derived synthetic fuels, and any share used in the composition of SAFs that will be consumed in air, water or land modes proposed in the project activity	Yes	Yes
	Cumulated climate impacts due to the non-CO2 effects that will occur in the project activity	Yes	Yes

Absolute GHG emissions avoidance

Aviation, transportation of goods and passengers

$$\Delta\text{GHG}_{\text{abs}} = \sum_{y=1}^{10} (\text{Ref}_y - \text{Proj}_y) = \sum_{y=1}^{10} \left(\text{Ref}_{\text{jetA1}} + \text{Ref}_{\text{nonCO2}} - (\text{Proj}_{\text{FF}} + \text{Proj}_{\text{bio}} + \text{Proj}_{\text{elec}} + \text{Proj}_{\text{res}} + \text{Proj}_{\text{H2}}) \right)$$

The diagram illustrates the components of absolute GHG emissions avoidance for aviation. The left side shows the reference scenario: a factory producing jet fuel (Ref_{jetA1}) and a jet airplane (Ref_{nonCO2}). The right side shows the projected scenario: a jet airplane powered by various sources (Proj_{FF}, Proj_{bio}, Proj_{elec}, Proj_{res}, Proj_{H2}) and a helicopter (Proj_{H2}).

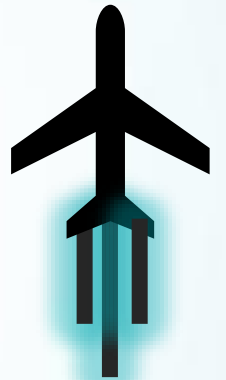
Absolute GHG emissions avoidance

Aviation, non-CO₂ effects

The non-CO₂ impacts derive mostly from the contrails as a result of water vapour and emissions from nitrogen oxides (NO_x), soot particles and oxidised sulphur species. Their net impact is a warming effect on the climate, although there are a number of individual warming and cooling effects from the respective aviation non-CO₂ emissions, with trade-offs and uncertainties of different degrees, and with sensitivity to atmospheric conditions at the point of emission.

As projects have a rather unique nature, to be able to claim reductions of such impacts under the InnovFund, applicants will have to explain their own approach for calculating or modelling non-CO₂ effects in both reference and project scenarios, using the corresponding CO₂ equivalency metric, demonstrated either by scientific literature or by modelling global near surface temperature change.

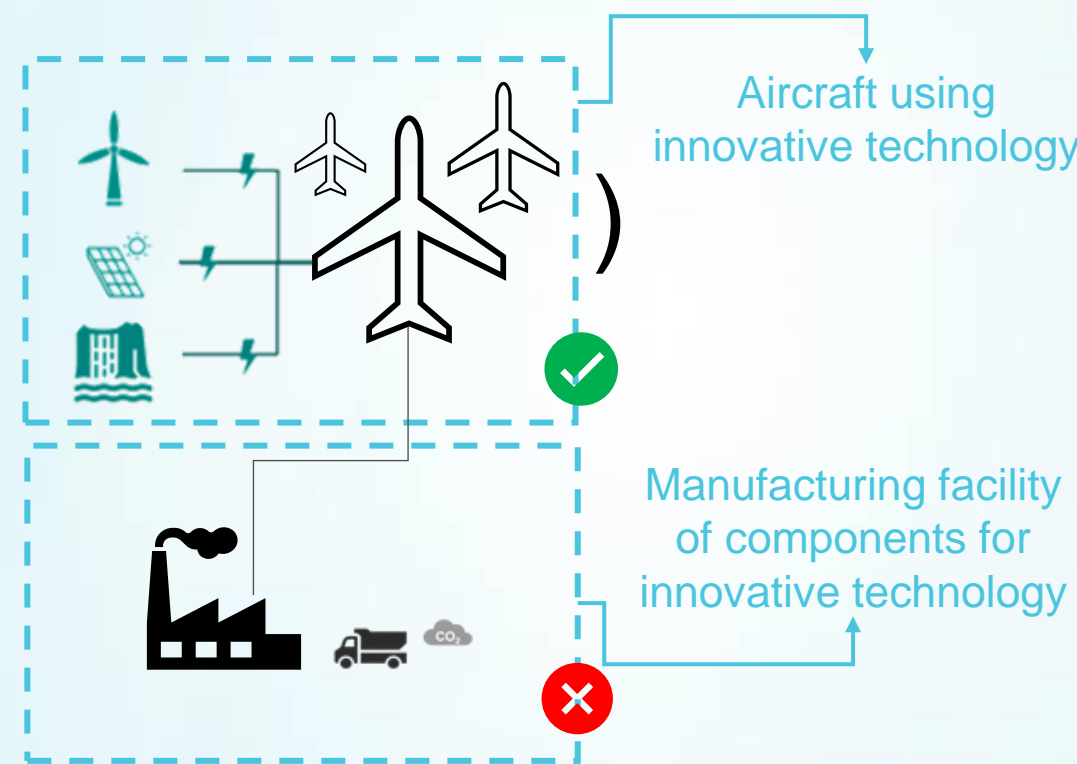
The equivalence factor should be aligned with the range of overall radiative forcing from aviation identified by the IPCC in its special report on aviation (1999) **ranging from 2 to 4 times the radiative forcing from CO₂ alone.**



Absolute GHG emissions avoidance

Manufacturing of innovative aircraft or their components

$$\Delta\text{GHG}_{\text{abs}} = \sum_{y=1}^{10} (\text{Ref}_y - \text{Proj}_y) = \sum_{y=1}^{10} (\text{Factory} + \text{Fuel} + \text{Aircraft} - \text{Aircraft})$$

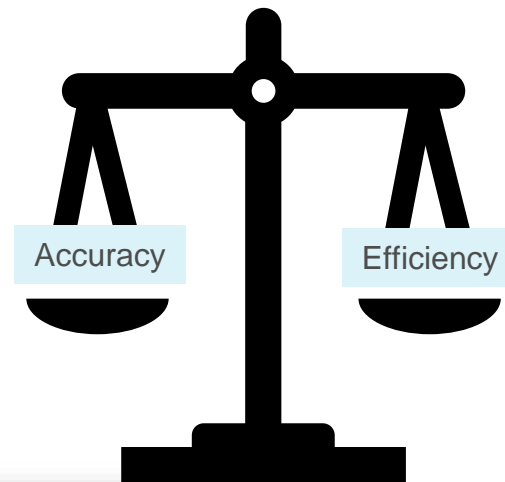


Emissions due to the manufacturing of the innovative aircraft/vessel are out of the scope of GHG avoidance calculations.

GHG avoidance will be equal to the emissions saved by the innovative technology when operating

Your insights needed

Aviation



01

What are your views on the suggested approach for the inclusion of non-CO₂ effects from aviation in the GHG methodology?

02

Is the selected reference scenario of flight running on fossil jet A1 kerosene adequate? Does it represent the common practice in the market?

03

Any other comments on the aviation methodology?



European
Commission

Boundaries: Maritime

Scenario	Emission source	Large and medium scale projects	Small scale projects
Reference	Energy-related GHG emissions present in the reference scenario for the delivery of the same transport services as provided by the innovative project, e.g., direct GHG emissions from use of fossil fuels, indirect emissions from use of methanol, ammonia and hydrogen, both by vessels, vehicles and at port facilities. This also includes other energy-related climate impacts , in particular due to black carbon .	Yes	Yes
	Other climate impacts present in the reference case for the delivery of the same transport services as provided by the innovative project, e.g., fugitive and slipped emissions of all GHGs	Yes	Yes, except for a manufacturing plants
Project	Energy-related GHG emissions that will occur due to the provision of the reference transport services by the project put in place, e.g., direct GHG emissions from the use of fossil fuels, indirect emissions from the use of methanol, ammonia and hydrogen, both by vessels, vehicles and at port facilities. This also includes other energy-related climate impacts , in particular due to black carbon .	Yes	Yes
	Other climate impact that will occur due to the provision of the reference transport services by the project put in place, e.g., fugitive and slipped emissions of all GHGs	Yes	Yes, except for a manufacturing plants

Absolute GHG emissions avoidance

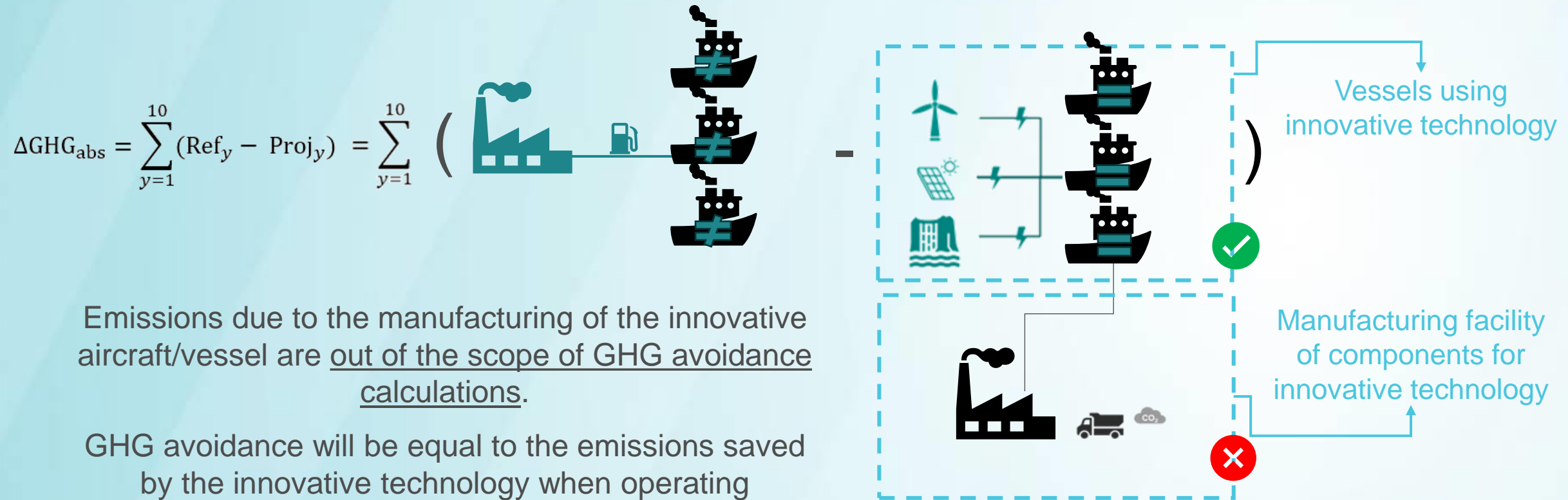
Maritime, transportation of goods and passengers

$$\begin{aligned}
 \Delta\text{GHG}_{\text{abs}} &= \sum_{y=1}^{10} (\text{Ref}_y - \text{Proj}_y) = \sum_{y=1}^{10} \left(\text{Ref}_{\text{energy}} + \text{Ref}_{\text{other}} - (\text{Proj}_{\text{energy}} + \text{Proj}_{\text{other}}) \right) \\
 &= \sum_{y=1}^{10} \left(\text{Ref}_{\text{energy}} - \text{Proj}_{\text{energy}} + \text{Ref}_{\text{other}} - \text{Proj}_{\text{other}} \right)
 \end{aligned}$$

The diagram illustrates the components of absolute GHG emissions avoidance. The left side shows a reference scenario (Ref) with a factory, a fuel pump, and a ship. The right side shows a projected scenario (Proj) with various energy sources (factory, wind, solar, building, plant) and transport modes (airplane, ship, train, sailboat).

Absolute GHG emissions avoidance

Manufacturing of innovative vessels or their components



Absolute GHG emissions avoidance

Maritime, black carbon and other non-Kyoto climate effects

The recent revision of the EU ETS Directive highlights the role of reducing the full climate impact, including black carbon emissions in the maritime sector. Accordingly, these emissions are accounted for in this GHG methodology.

The direct and non-direct climate impacts of black carbon and its importance in the maritime sector are well established, but there is no established GWP for black carbon in existing EU regulations --> The methodology makes use of the average GWP applied by IMO and ICCT:

GWP_BC = 900 tCO₂e/t.

Potential **climate impacts of other emissions not covered by Kyoto (e.g. sulfur) are less clear** for the maritime sector. The GHG methodology includes the option to include these, and applicants are asked to provide clear explanation and sufficient evidence for their relevance and the relevant data.

Your insights needed

Maritime



01

What are your views on the suggested approach for the inclusion of black carbon and other non-Kyoto climate impacts in the maritime methodology?

02

Is the selected reference scenario of ships running on average fossil fuels in the EU maritime sector adequate?

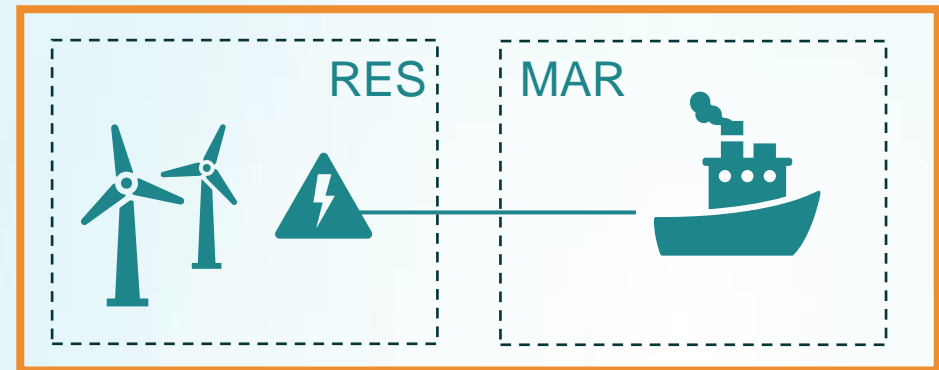
03

Any other comments on the maritime methodology?

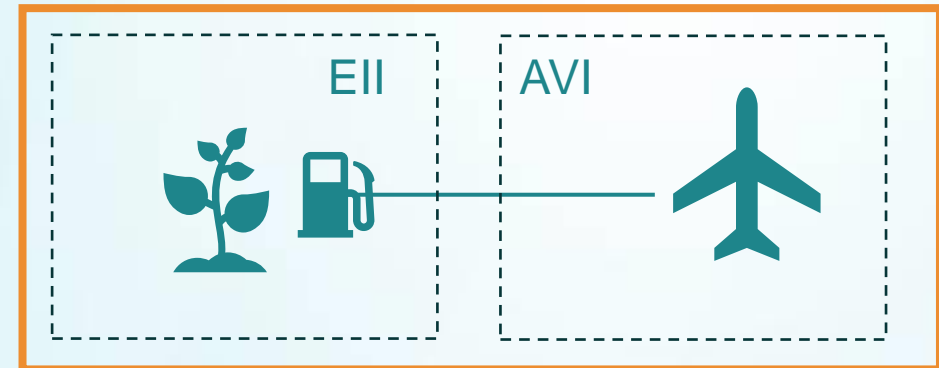
Hybrid projects

- **Absolute GHG emission avoidance:** calculate separately using respective methodologies and add them up. Remove double counting of avoidance and/or emissions, if any.
- **Relative GHG emission avoidance:** calculate based on the cumulated emission avoidance and the cumulated project emissions

Example of Hybrid Project 1



Example of Hybrid Project 2



Parameters to be monitored

The methodology includes default parameters that will be deemed as constant throughout the duration of the project, unless otherwise stated. This to secure alignment and reduce the volume of data to be defined and monitored by the applicant.

For the project-specific data used in GHG avoidance calculation, a monitoring plan consisting of a detailed, complete and transparent documentation of the information and data sources shall be submitted at the application. For each parameter, applicants shall document:

- Source of data
- Measurement methods and procedures
- Monitoring frequency
- QA/QC procedures
- Responsibility for collection and archiving

Example of parameters to be monitored for an aviation project (transportation of goods/passengers)

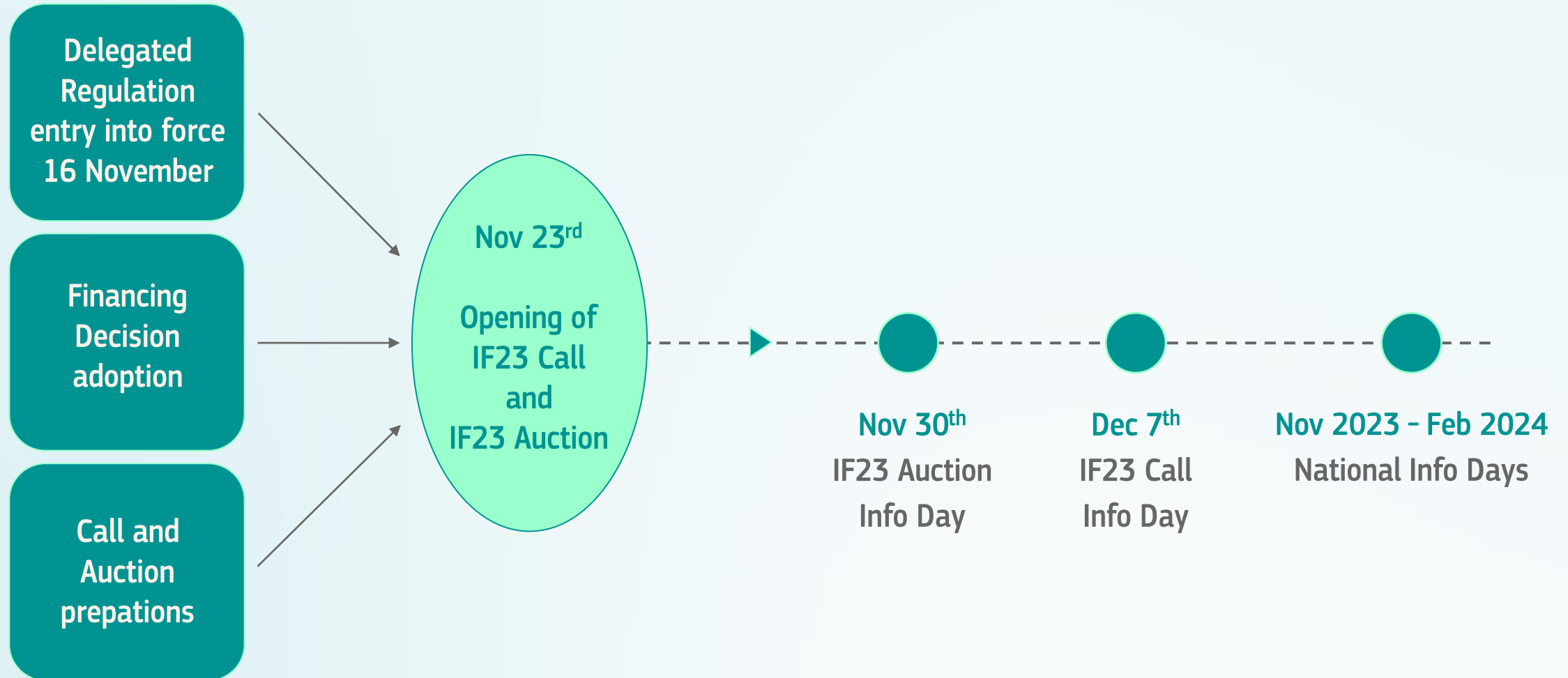
Data / Parameter	Description
Q_{jetA1}	Quantity of conventional aviation fuel (e.g., jet A1 kerosene, aviation gasoline) consumed for the operation of flights that will be reduced and/or replaced with other energy sources in the project activity
$Q_{\text{FF},t}$	Quantity of fossil fuel type “FF” consumed in the project activity in modal type “t”
$Q_{\text{bio},t}$	Quantity of bio-based fuel type “bio”, including SAF and other alternative climate-neutral fuels from biogenic origin consumed in the project activity in modal type “t”
$Q_{\text{res},t}$	Quantity of energy generated by renewable energy sources type “res” and used directly for motion in the project activity in modal type t
$Q_{\text{elect},c}$	Quantity of electricity that will be either imported from the grid or produced on-site in country “c” where the modal type “t” will be charged in the project
$Q_{\text{H2},t}$	Quantity of hydrogen consumed in the project activity in modal type “t”



Discussion: GHG methodology for maritime and aviation

Questions & Answers

Next milestones and closure



Thank you