ACCESSING EU INSTRUMENTS TO FINANCE H2 AND P2X PROJECTS

4th European Conference
Hydrogen and P2X
14-15 June 2023 Copenhagen

CHRISTIAN JUSSEN

Implement Consulting Group Partner

Expert on innovation projects, access to EU finance and energy transition.

Please feel free to contact me at: **chju@implement.se**

DAVID MORA

Implement Consulting Group Partner

Expert on project finance, project development and access to EU finance.

Please feel free to contact me at: **damo@implement.dk**

LOCAL ROOTS GLOBAL PERSPECTIVE

Born in Denmark with offices in Copenhagen, Aarhus, Stockholm, Malmo, Gothenburg, Oslo, Zurich, Munich, Hamburg and Raleigh, NC. With 1300 consultants, multinational clients and worldwide projects, we offer expertise with a global perspective.

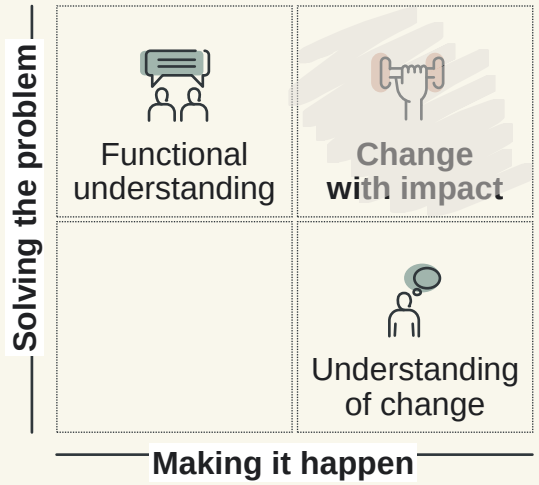
We believe that great organisational impact leads to great impact for humanity. Implement was created to help make true expertise turn into real change.

Founded in **1996**

Average CAGR of **20%**

Employee- owned

Working **globally**



THE DRIVERS FOR H2 AND P2X PROJECTS

With the REPowerEU, the EU is setting the direction for a future EU renewable hydrogen economy

RATIONALE

Accelerate the uptake of renewable hydrogen, ammonia and other derivatives to reduce the dependency on natural gas by 27 bcm, oil by 3.9Mtoe and coking coal imports by 156 Kt from Russia

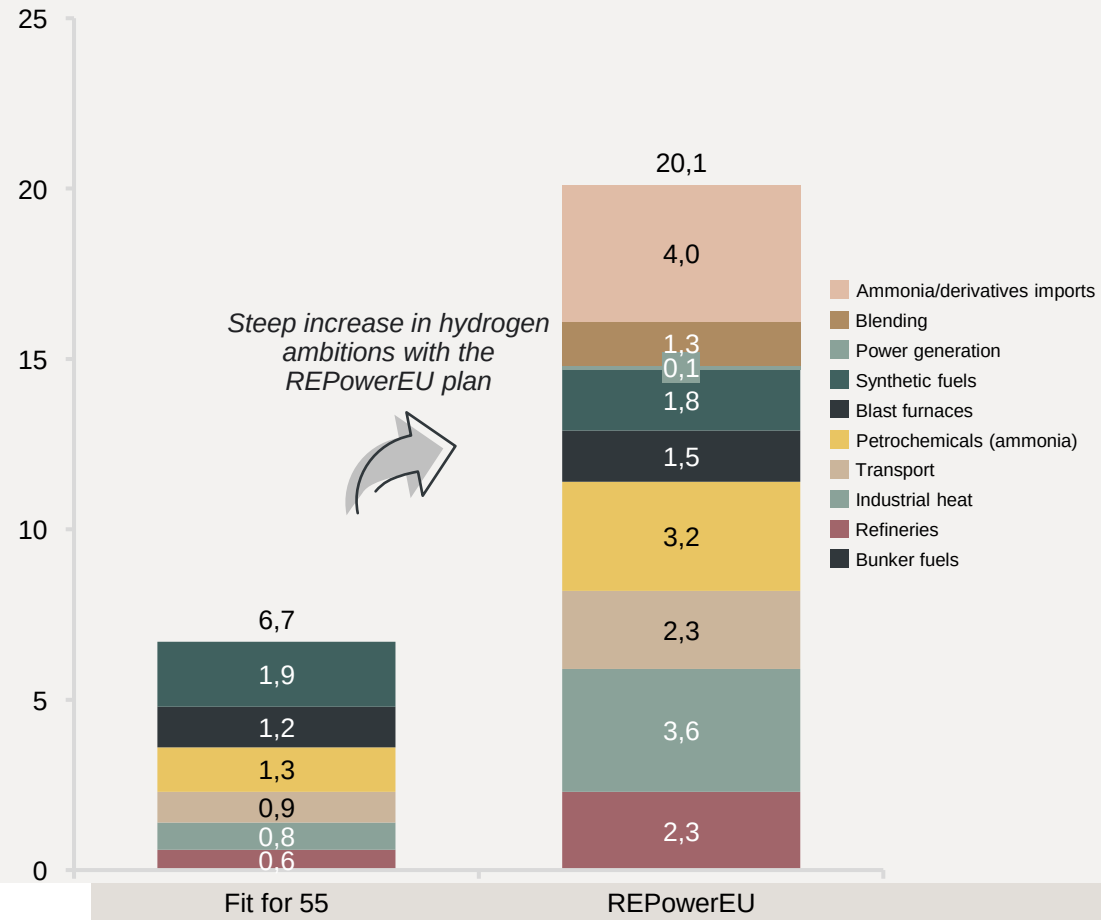
DRIVERS

- Expected higher shares of renewable hydrogen and renewable fuels of non-biological origins in the industry sector (from 50% to >75%)
- Increase in hydrogen and derived fuels in transport (>5%) and in hard-to-abate transport sectors (heavy duty trucks, SAFs, waterborne transport)
- Potential adoption of blending hydrogen in the natural gas grid (but high adaptation costs)
- Additional investments of 335-471b€ towards additional RE production, with a target of 500 TWh additional power generation in 2030
- Investments of 2b€ to scale up EU electrolyser manufacturing capacity for a combined annual electrolyser capacity of 17.5 GW in 2025* to be further increased by 2030 (40GW)

POLICY SUPPORT

- Faster permitting procedures for RE generation, green H2 production and infrastructure development
- State aid mechanisms and funding (EU Innovation Fund, Clean Hydrogen Partnership)
- Standard setting for quality on hydrogen

REPowerEU forecasts for hydrogen use by sector in 2030 in Europe (modelling using PRIMES)



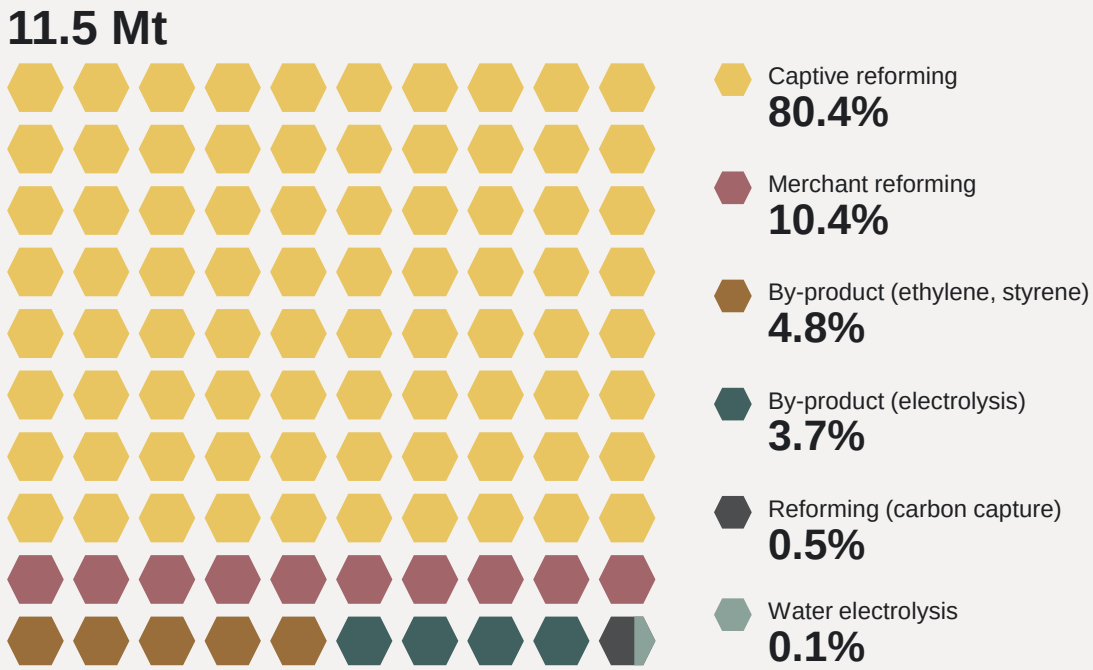
*objective set by European electrolysers manufacturers
REPowerEU

The ambitions from REPowerEU are extremely ambitious to accelerate the development of renewable hydrogen production and consumption…

TODAY

11.5Mt hydrogen was produced in Europe in 2020 with power-to-hydrogen representing only 0.1% of the total hydrogen generation capacity

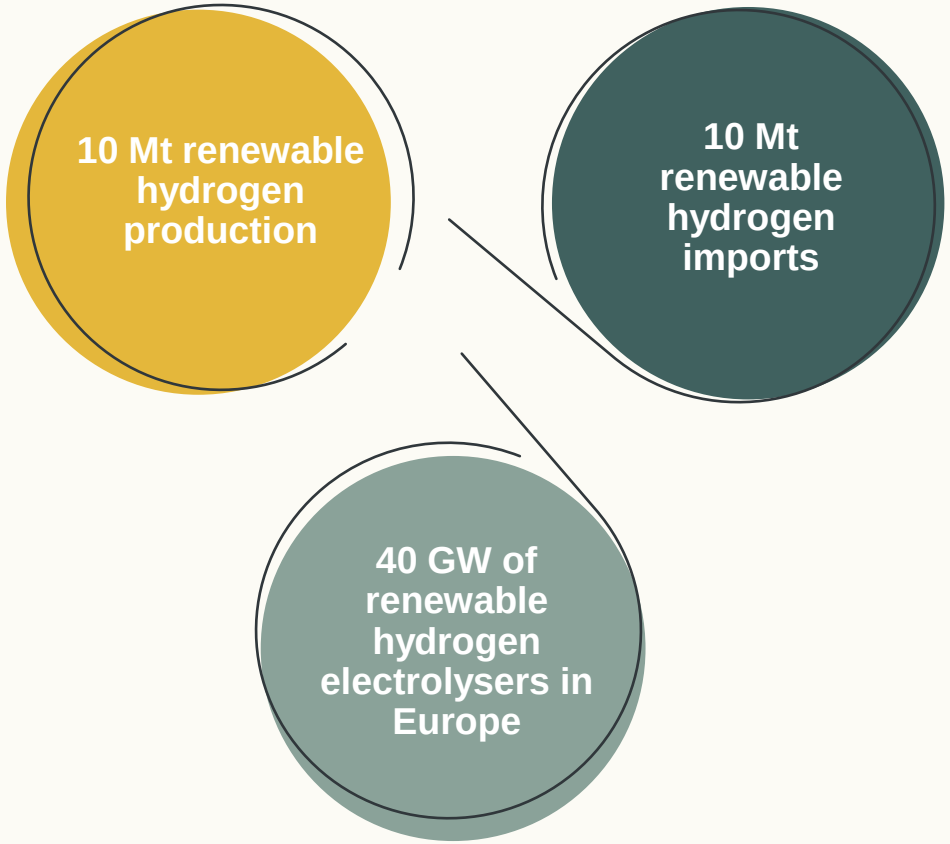
Hydrogen generation capacity by the production process in 2020



Source: Hydrogen Europe based on work for Fuel Cells and Hydrogen Observatory

BY 2030

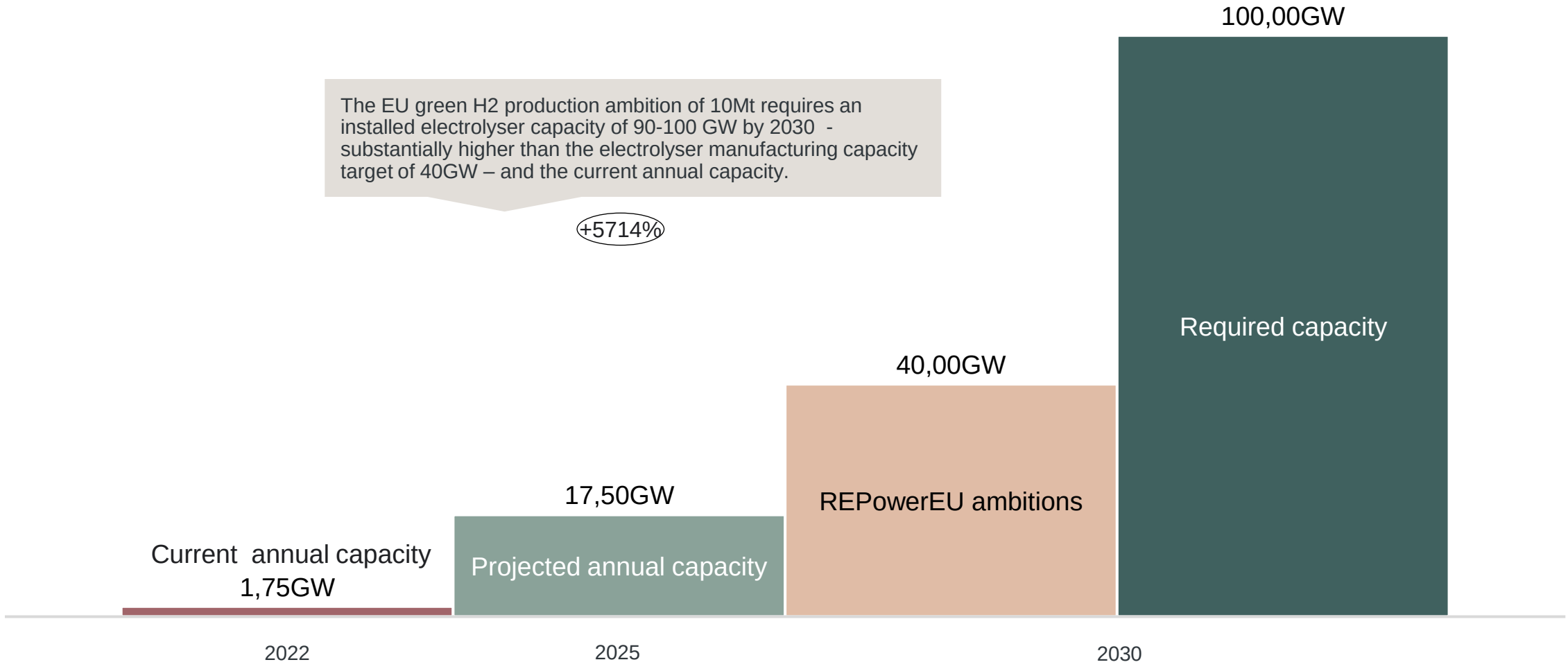
The ambition to reach 20Mt of renewable hydrogen in Europe will require 600 GW of new wind and solar power and 200 GW of electrolysers



… and will require a significant upscaling of EU electrolyser manufacturing capacities

Manufacturers of electrolysers and their components in the EU are among the global technology leaders in the field but this technology leadership is also a commercial and industrial challenge

The EU green H2 production ambition of 10Mt requires an installed electrolyser capacity of 90-100 GW by 2030 - substantially higher than the electrolyser manufacturing capacity target of 40GW – and the current annual capacity.

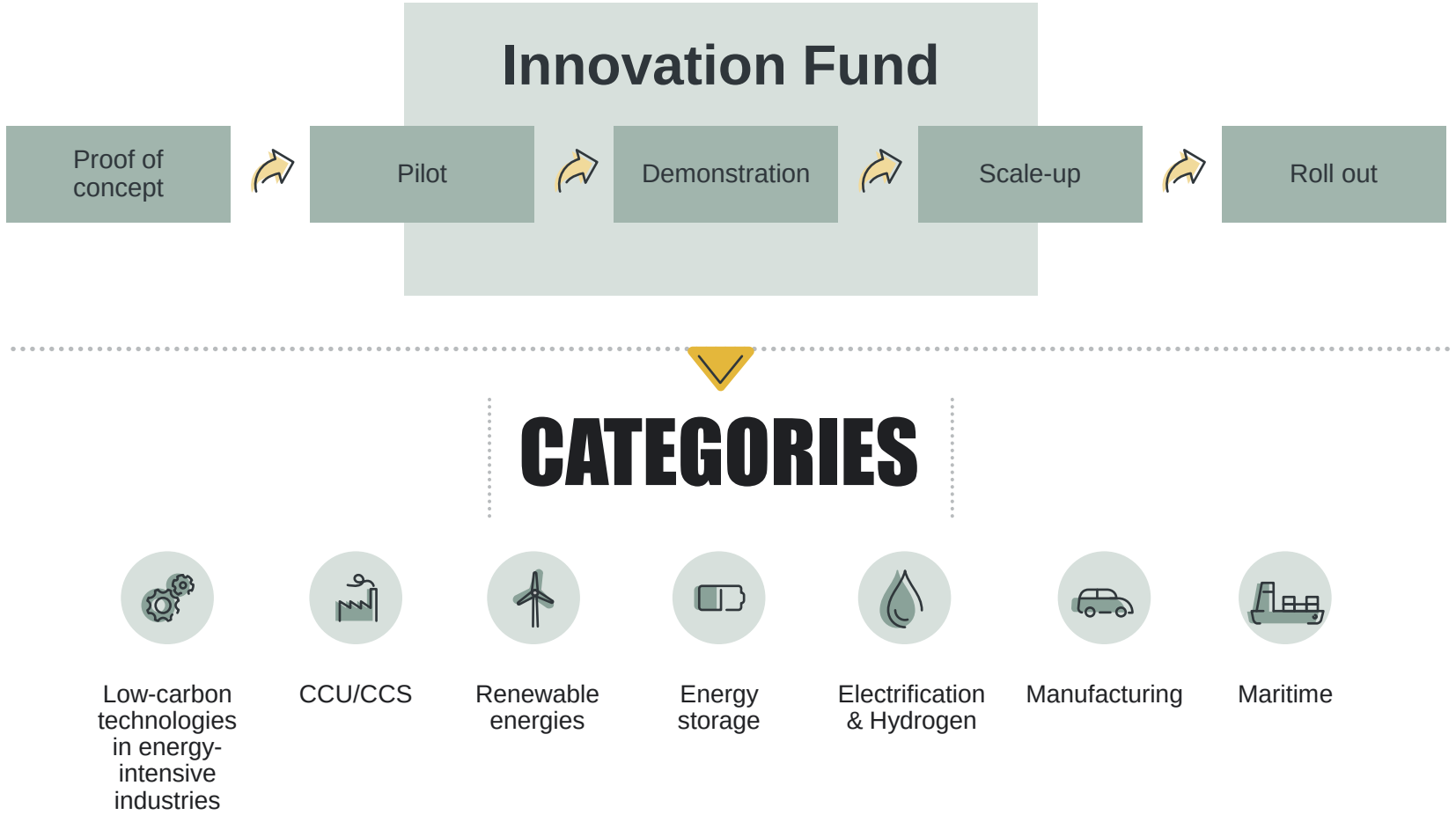


*GW in terms of hydrogen output
REPowerEU; European Clean Hydrogen Alliance Join Declaration (May 2022)

FUNDING FOR H2 AND P2X PROJECTS

The EU Innovation Fund assist H2 and P2X with CapEx and OpEx support

- The EU Innovation Fund supports highly innovative technologies and industrial solutions to the market for **decarbonizing Europe**
- The focus is on funding the **first industrial implementation of innovative low-carbon technologies** that are not yet commercially available
- The scheme targets legal entities in Member States, associated countries (incl. Norway and Iceland) and third countries – as long as the project is implemented on **European territory**
- The maximum budget for this year is of **3 billion euros** for the LS call, with a 20% flexibility clause



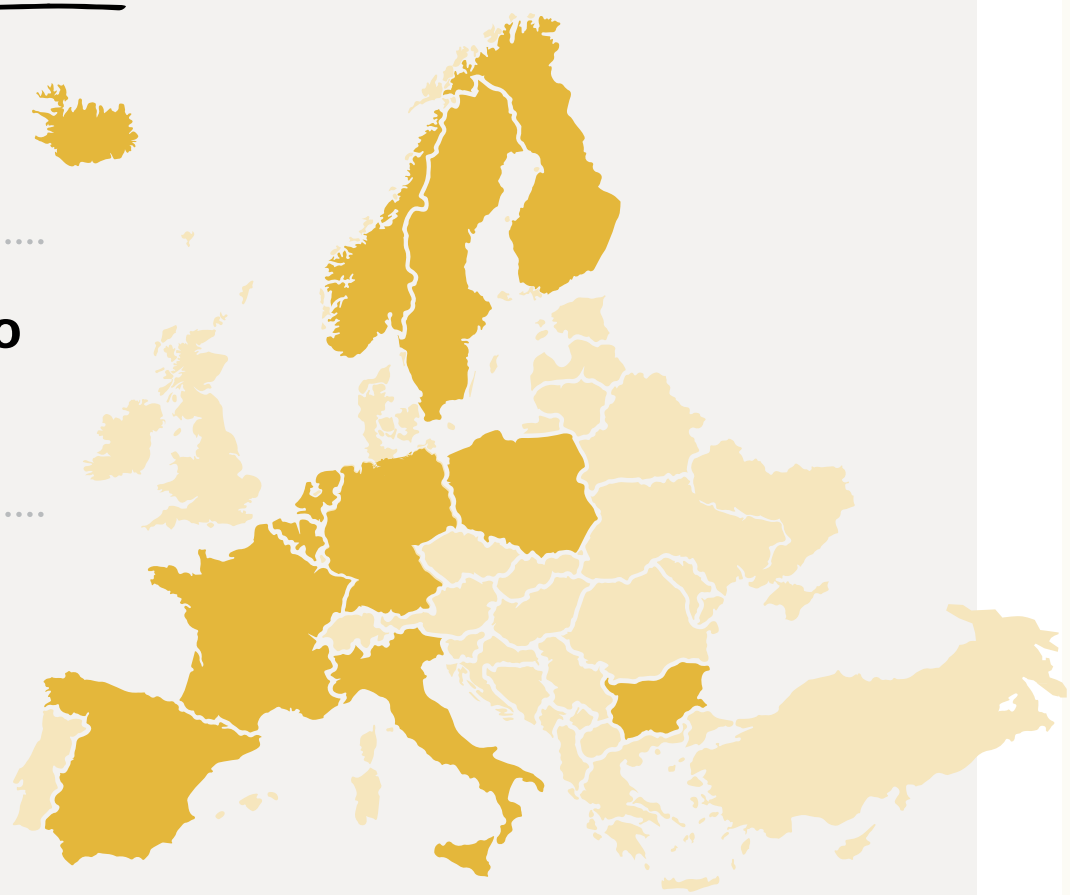
A look at the projects funded in the first three rounds

2020 and 2021 Edition

24
projects

From 2.3Mt to 27,6 Mt CO_2
avoidance potential

€ 3bn
Total distributed



Key characteristics

- Heterogeneity in terms of geographical coverage, sector and technology
- Strong representation of EIIs and CCS
- Several products output – multi-sided business models

	LSC1 (2021)	LSC2 (2022)	LSC3 (2023)
Average grant request	€ 157m	€ 106m	€ 75m
Average CO_2 avoidance (first ten years of operation)	10,4 $MtCO_{2e}$	8 $MtCO_{2e}$	10, $MtCO_{2e}$
Cost efficiency	€ 15,1/tCO_{2e}	€ 13,2/tCO_{2e}	€ 7,5/tCO_{2e}

It is sourced from ETS revenues and increased consistently over the years

The EUIF started at a CO_2 price around **EUR 20/ton**

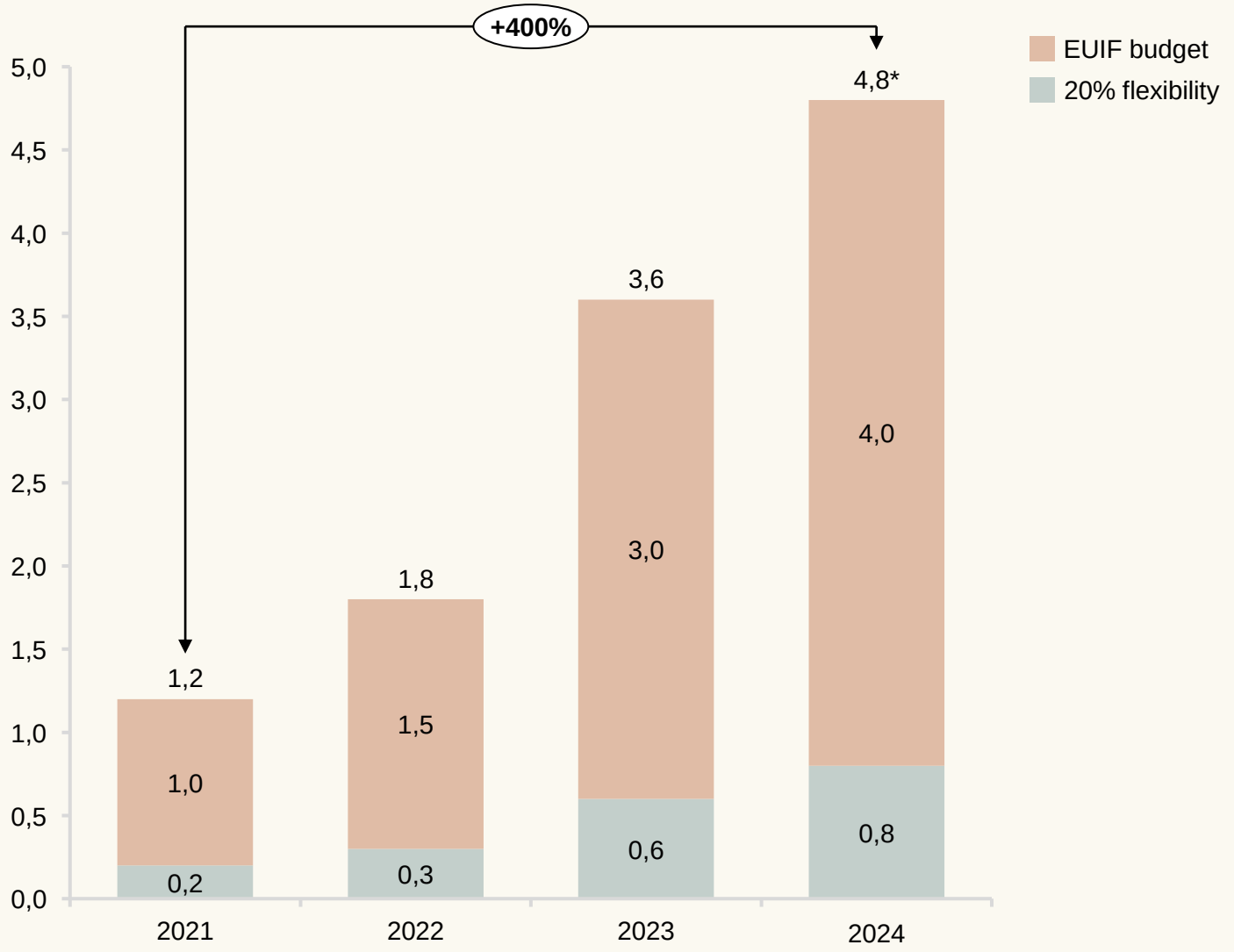
Right now the EUIF has a total committed budget of **EUR 40** with high likelihood to increase further to EUR 50bn

Key hypotheses:

- The budget will keep expanding
- There will be room for bigger projects

*estimate

EUIF budget evolutions (2020-2023) (b€)



5 large scale out of 24 projects granted under the EUIF focused on hydrogen production

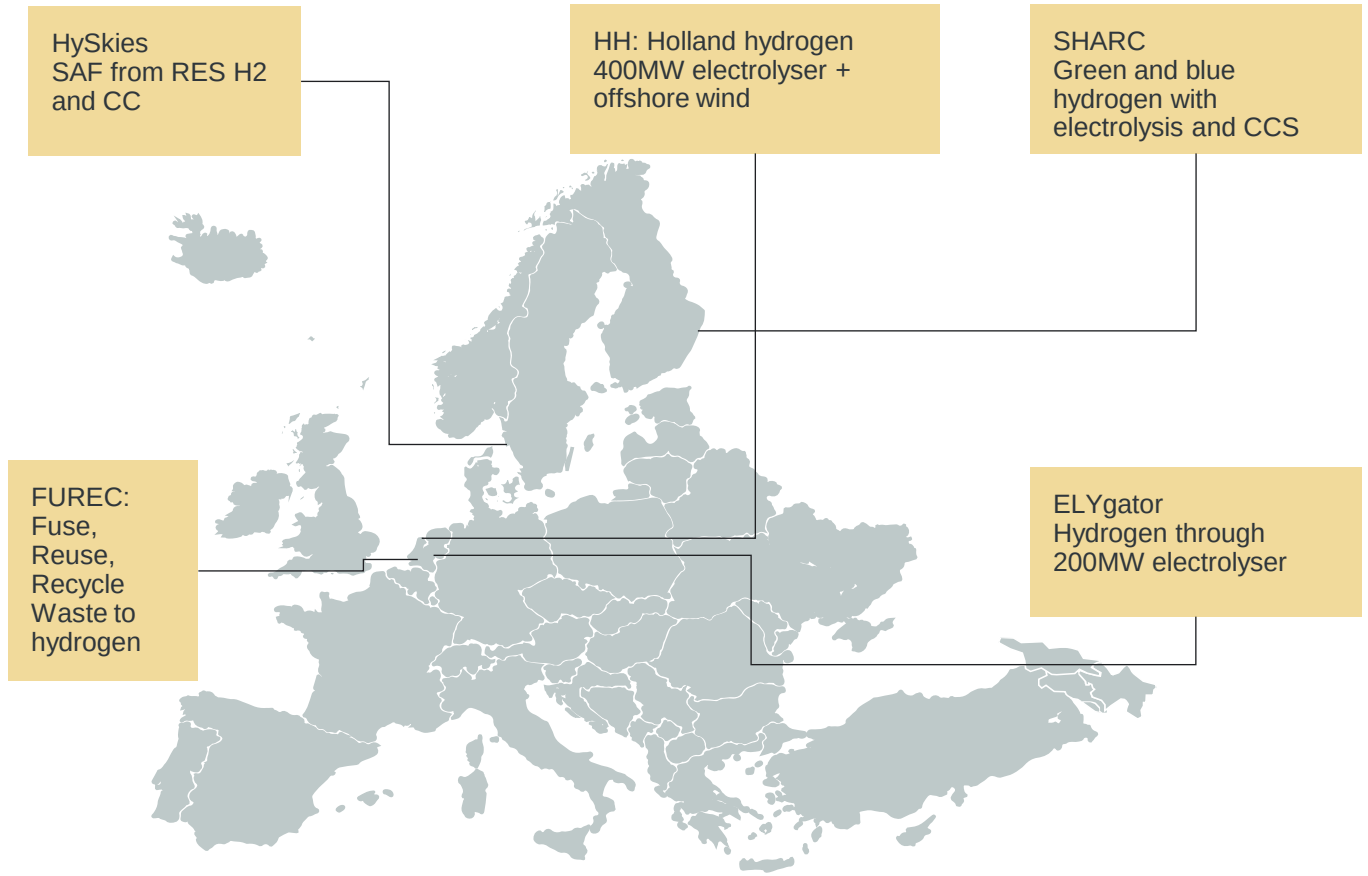
Technologies covered under the EUIF

Examples of hydrogen-production technologies

Electricity from renewable energy (green hydrogen)

Natural gas with carbon capture technologies (blue hydrogen)

Pipeline of upcoming H2 and P2X large scale projects granted under the EUIF



HOW TO ACCESS THE EU INNOVATION FUND

The EU Innovation Fund is focusing on mature technology

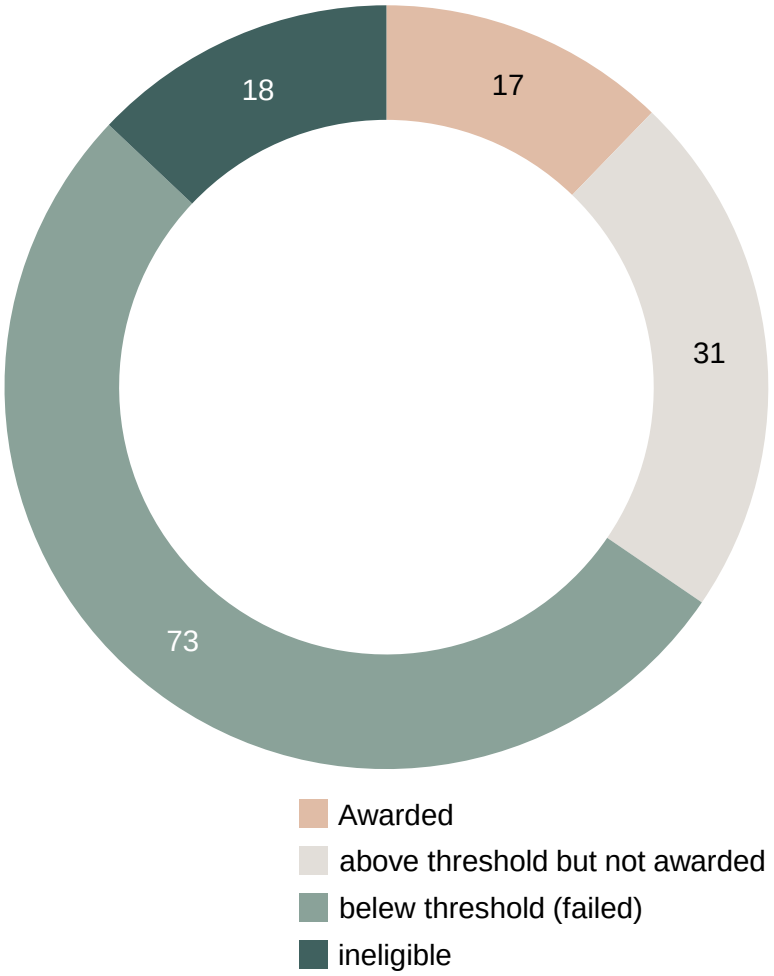
NEW:
- New sector: e.g., Maritime
- H2 Pilot Auction

It will depend on…

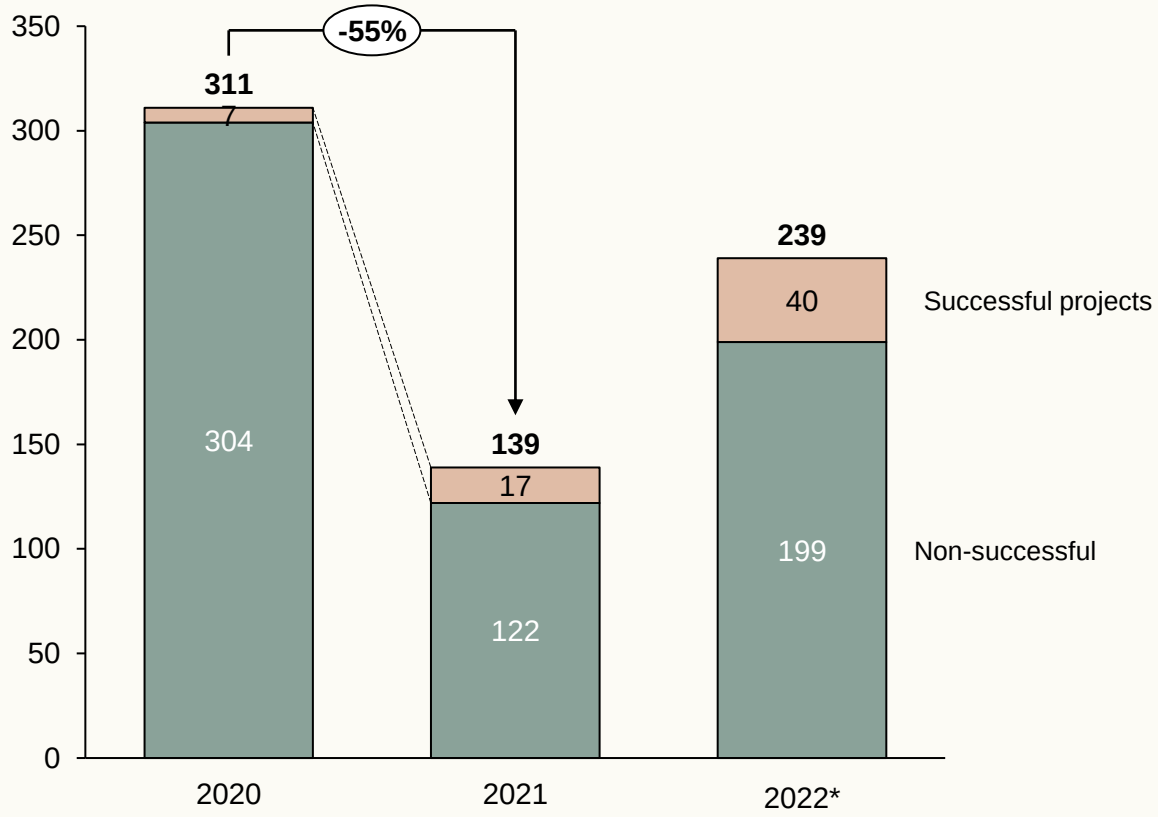
	General decarbonisation	Electrification & Hydrogen	Manufacturing	Pilots
Activity	• Low-carbon technologies in ETS sectors • CCU • CCS • Construction and operation of innovation RE and ES technologies Low-carbon technologies in energy-intensive industries; CCU/CCS; Energy storage; Renewable energies	• Innovative direct electrification of industry • Innovative hydrogen production combined with application or storage	• Production of components for RE installations • Production of components for electrolysers and fuel cells • Production of components for energy storage solutions • Heat pumps	• Construction and operation of pilot projects to validate disruptive or breakthrough technologies • Across all EUIF sectors
Grant size	Average 100-150M€			Max. 40 M€
TRL	Up to TRL 9			Up to TRL 7 - 8
Evaluation impact	• Equal evaluation across criteria • Up to 75 points	• Weighting applied on maturity • Up to 90 points	• Weighting applied on Degree of Innovation AND maturity • Up to 105 points	• Weighting applied to Degree of Innovation • Up to 90 points
Example	Carbon Capture and sequestration	Production of green hydrogen and hydrogen storage	Electrolyser manufacturing	Novel electrolysis process technologies (e.g. super critical water gasification)

The programme is highly competitive – in terms of quality and volume of applications

Breakdown of second-stage applications of the second call of the EUIF (2021)



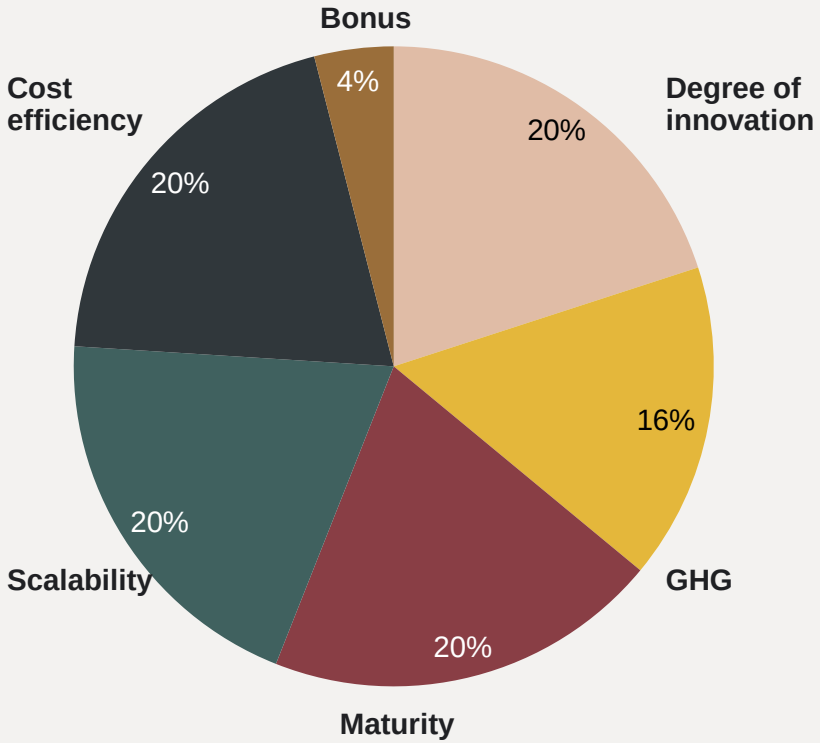
Applications received and granted in the first two calls of the EUIF 2020-2022 (estimate for 2022 call)



*estimate

The scoring depends on the window of application chosen

Overview of the scoring weighting for the general window



To be in a striking range, you need to aim to get 90% points, i.e. a score of 67,5 points out of 75

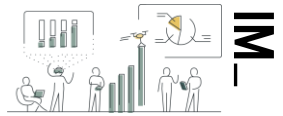
GENERAL WINDOW

Degree of innovation *[15 pts]*	Innovation in relation to the state-of-the-art **[9/15]**		
GHG emissions avoidance *[12 pts]*	Absolute GHG **[2]**	Relative GHG **[5]**	Quality of calculations, min. requirements **[3/5]**
Maturity *[15 pts]*	Technical **[3/5]**	Operational **[3/5]**	Financial **[3/5]**
Scalability ***[9/15 pts]***	Efficiency gains	Further technology or solutions deployment	Quality of KSP
Funding efficiency *[15 pts]*	Cost efficiency ratio [12]	Quality and credibility of cost calculation [3]	
Bonus points *[3 pts]*	Net carbon removals [1]	Other GHG savings [1]	Additional RE [1]

New criteria:
- Better geographical balance
- Multiple environmental impacts

Max of 75 points

The evaluation criteria require different deliverables



DELIVERABLES	EVALUATION CRITERIA						
	GHG emissions avoidance potential	Degree of innovation	Maturity			Scalability	Funding efficiency
			Technical	Financial	Operational		
Part B (80 pages)	☑	☑	☑	☑	☑	☑	☑
Knowledge Sharing Plan (60 pages)						☑	
Business Plan (60 pages)				☑			
Detailed budget table / relevant cost calculator + detailed financial model sheets							☑
Participant information (incl. CVs and previous projects)					☑		
Feasibility Study (60 pages)	☑	☑	☑				
GHG emissions calculator	☑	☑				☑	☑
Timetable / GANTT chart					☑		
Existing due diligence reports, permits, licenses, authorisations, agreements and LOIs/LOSs	☑	☑	☑	☑	☑		

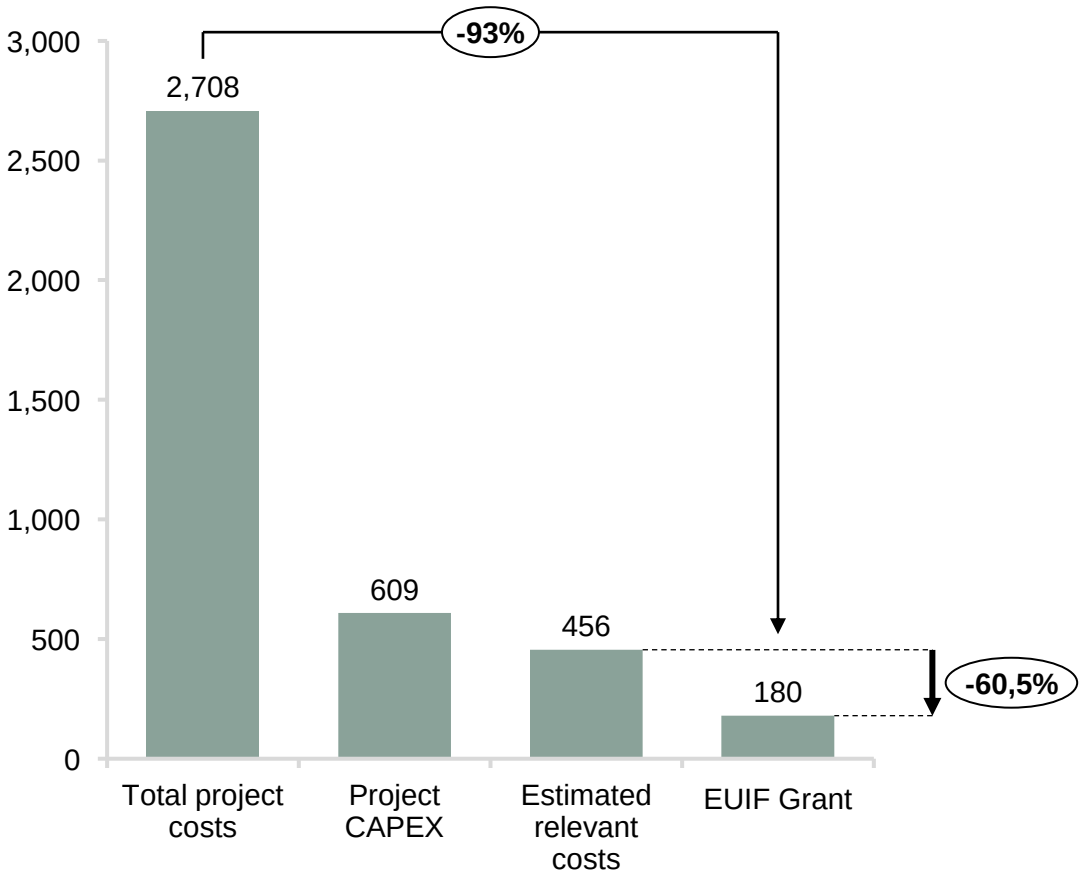
- The total required documentation is **well above 300 pages**
- Maturity only represents **20% of the score** but is split across three demanding sub-criteria, each of which require extensive documentation
- The audits requirements are gone (at application stage!)

The grant covers the additional costs associated with the highly innovative and risky nature of the project investments

NEW:
Relevant cost will be simplified

The grant covers only a fraction of the total project costs…

Breakdown of the funding structure for project BECCS
Million €



…and is defined based on the relevant cost basis

"The relevant costs shall be the additional costs that are borne by the applicant as a result of the application of the innovative technology related to GHG emissions avoidance.

They shall be calculated as the difference between the best estimate of the total CAPEX, the NPV of OPEX and benefits arising during 10 years after the entry of 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."

Grant paid in **lump sum**	Payments depend on achievement of the results and completion of WPs
The Innovation Fund supports **up to 60% of the relevant costs** of projects.	Your need other financial instruments, equity or debt
The EU Innovation Fund can be combined with **additional public financing**	Depending on the instrument and applicable state aid rules

H2 AUCTIONS

A shift from award criteria to competitive bidding mechanisms for the IF

A new proposal suggests a shift towards competitive bidding mechanisms

The ETS Directive puts forward a proposal that foresees the introduction of competitive bidding mechanisms to award funding. The objectives of the competitive bidding mechanism are four-folded.

1

Cost efficient way of distributing financial support. Auctions have been a major success story in the power sector in many Member States, bringing down the funding needs for renewable power by magnitudes.

2

Price discovery and market formation.

If there is sufficient competition, auctions reveal the “real” price of the private sector for a given good

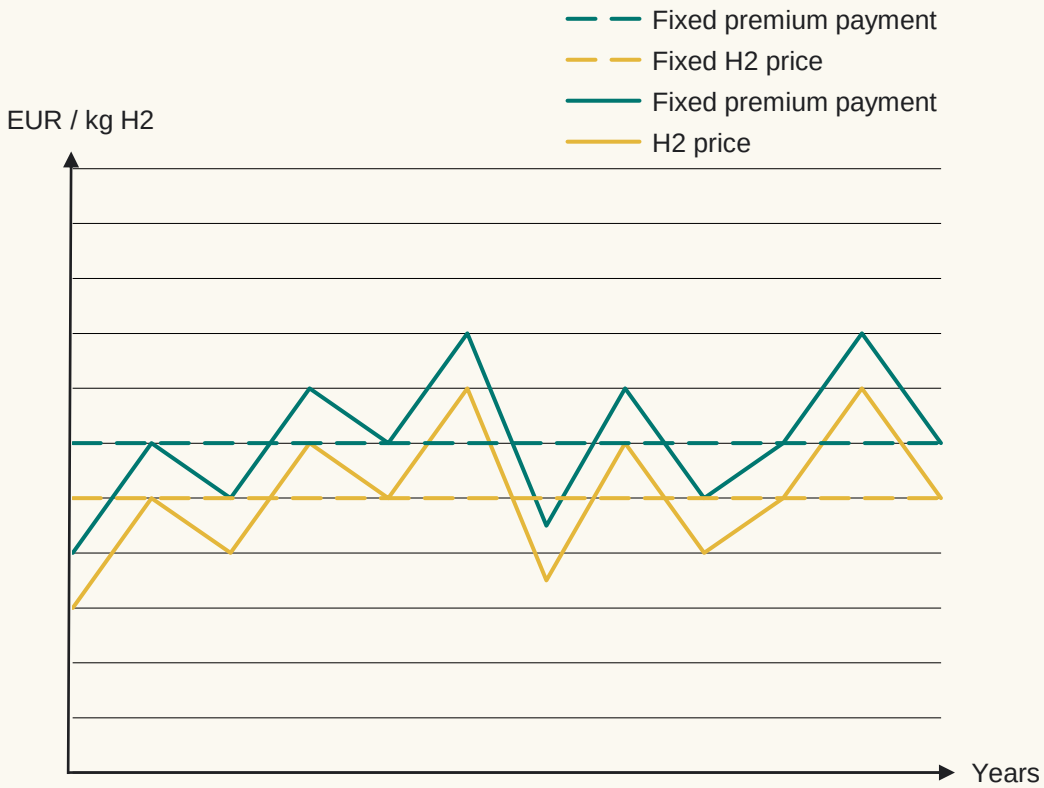
3

De-risking projects and leveraging private capital into them.

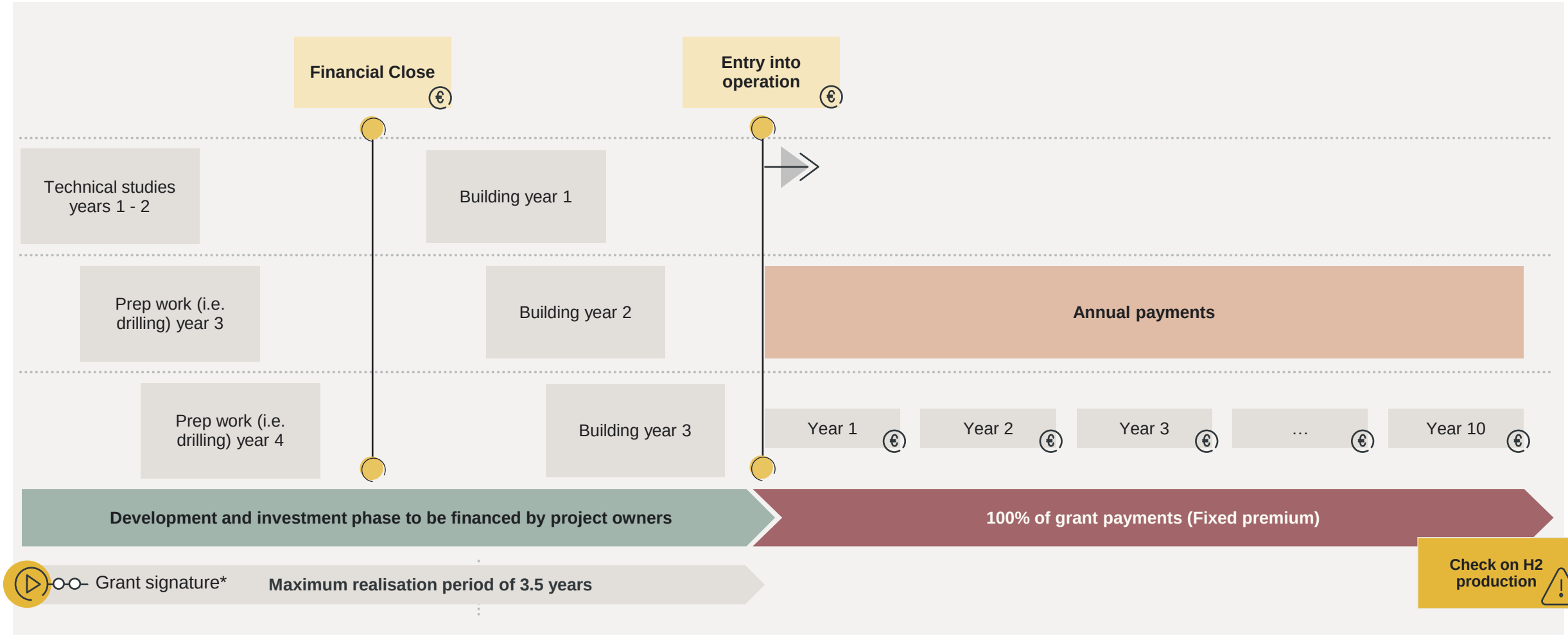
4

Reducing administrative burden.

EUIF Auction selected remuneration type: Fixed premium payment



The grant is disbursed after entry into operation yearly for [10] years in line with specific rules pre-conditions



*The project starting date can be prior to grant signature but not earlier **than proposal submission date**

IF Pilot hydrogen Terms & Conditions (Draft) for autumn 2023

Design parameter	Description	IF Pilot auction
General auction design elements	Auctioned good	Green hydrogen
	Constraining value for auction clearing	EUIF budget allocated to the respective auction: 800 million EUR
	Remuneration form	Fixed premium
	Remuneration type	Output-based support (payment per unit of verified and certified production)
	Bid ranking/ award criteria	Price-only ranking: EUR/kg H2
	Support duration	Limitation to a maximum of 10 years duration for disbursement of support after Entry into Operation of projects
	Termination reasons and penalties	Yearly production can be increased by 30% compared to plan. Production above 130% compared to plan is possible but not supported. Support is restricted to 100% over the overall project volume.
Auction procedure	Pricing rules	Pay as bid
	Ceiling price	Disclosed ceiling price: 4.00 €/kg of hydrogen produced as a maximum bid for the fixed premium
Rights and obligations	Maximum realisation period	3.5 years
Qualification requirements	Cumulation with State Aid	Cumulation with State aid (e.g., IPCEI) or EU funding programs is excluded

Danish auction H2

Design parameter	Description	IF Pilot auction
General auction design elements	Auctioned good	Green Hydrogen
	Budget	DKK 1.25 billion (Approximately 170 million EUR) / annual ceiling fixed at DKK 125 million • One tender round, if budget fully for bids < 70 DKK/GJ (1.12 EUR/kg) IF NOT • Two rounds: 750 million DKK and 500 million DKK
	Remuneration form	Fixed price supplement
	Remuneration type	Output-based support for the green H2 produced
	Bid ranking/ award criteria	Lowest bid price supplement DKK/GJ H2
	Support duration	Limitation to a maximum of 10 years aid period after start of production
	Termination reasons and penalties	Retention penalty for not starting operation within the limits backed up by a guarantee
Auction procedure	Pricing rules	Pay as bid
	Ceiling price	120 DKK/GJ (1.93 EUR/kg) bid price + max 5500 full load hours
Rights and obligations	Maximum realisation period	4 years from contract signing and full capacity
Qualification requirements	Cumulation with State Aid	Bidders cannot receive any other state aid to cover the costs covered by the price supplement

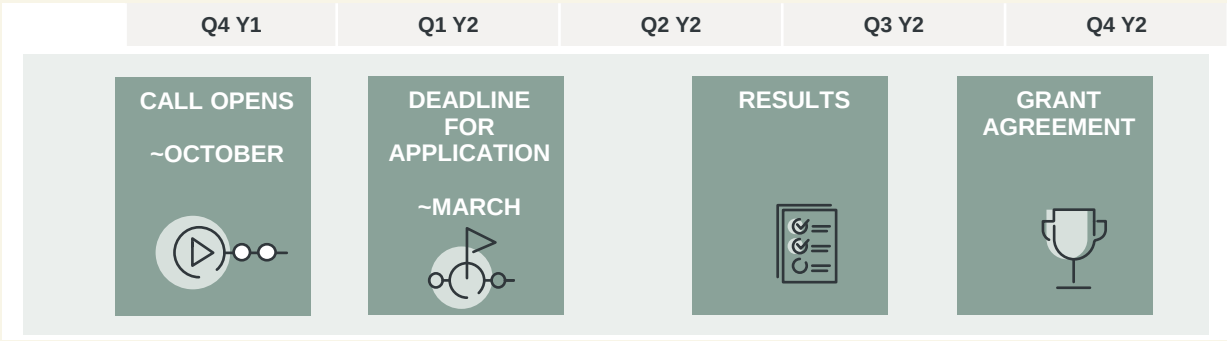
WHAT DOES YOUR PROJECT NEED TO MAXIMISE CHANCES OF SUCCESS IN THE EUIF?

Before you engage with the EU Innovation Fund, be aware that…:

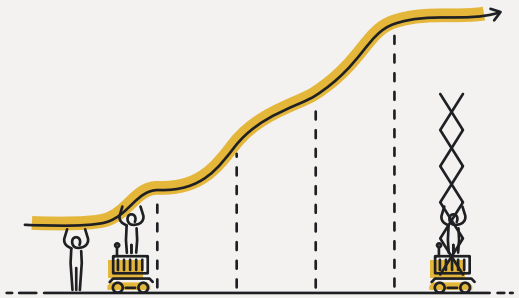
remember

- The total required documentation ranges between **300 – 500 pages**
- Technical and financial **maturity** of the project are key to success
- **Allocate resources and budget** to the project and start early
- Identify **critical deal breakers** in the project
- Compare with benchmarks, specifically on funding efficiency
- Ensure financial security of the project and income streams
- Find the **“sweet spot”** between innovation and maturity
- Get **board/CEO approval** early on

Timeline

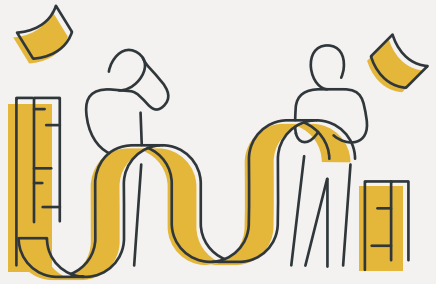


Some tips to build a competitive edge



Be strategic and position your project well in your relevant sector – you should be able to stand the comparison – also to other CCUS projects

Be very clear on the proposed legal and organizational structure of the project (e.g. the possibility to include or create an SPV) and how your project makes **“business sense”**



Be realistic in your assumptions and calculations and ensure consistency of claims and numbers across your documentation (Peer reviews of material is a must)

Make sure **that parties** upon which the project implementation depends are fully in line with the proposal and **provide explicit support** (e.g. permits, buy-back rights, licences, additional funding etc.)