Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Public Conference

20 May 2025, Brussels, Thon Hotel, Rue de la Loi 75

REALIZE

H2!F

2DPLOY

LEADS

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Public Conference
20 May 2025, 9.00 - 17.00
Brussels

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Opening

Jose Jimenez Mingo
European Commission
(DG CLIMA)

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“Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment”

Opening: Jose Jimenez Mingo, European Commission (DG CLIMA)

European Commission

European Commission

Event structure

- The required elements for successful exploitation of R&I results towards deployment
- R&I real-life stories
- Thematic breakout sessions (renewables, hydrogen and energy storage, carbon capture, use and storage, energy intensive industry)
- Complementary Funding Opportunities

The 4 CSA’s and their areas

- LEADS: CCUS
- 2DPLOY: EII decarbonization
- H2IF: energy storage (hydrogen & batteries)
- REALIZE: Renewables (Concentrated Solar Power, wind, solar thermal and solar photovoltaics, ocean energy and biofuels)

Key objectives of the CSA's

- Development and operationalisation of a continuous innovation pipeline from Horizon 2020 innovations to deployment
- Organise joint open events within their specific area with key industrial stakeholders to share lessons learnt and to promote synergies between Horizon Europe and the IF
- Organise joint activities to promote the mobilisation of the financial and technical expertise needed for the elaboration of sound IF proposals.
- The scope of this topic is not limited to the Innovation Fund, and the promotion of projects to deployment include other relevant funding means either at EU or national/regional levels (such as Regional & Cohesion funds, Recovery and Resilience Facility, Important Projects of Common European Interest)

Fill in copyright information.

Thank you

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Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Keynote Speech

Maria Velkova
European Commission
(DG CLIMA)

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“Unlocking Low-Carbon Deployment Innovation: From Horizon Projects to Market Deployment”

Keynote Presentation

Maria VELKOVA, Deputy Head of Unit
DG CLIMA C.2 (Research and low carbon technology deployment)

Policy Context

- Rapidly **increasing energy prices & growing geopolitical tensions** are threatening the security of supply of Europe's energy and challenge our competitiveness. There is a **need to mobilise investments** to strengthen the competitiveness of the clean-tech sector and decarbonise energy-intensive industries.
- **Draghi Report**: identifies three transformational imperatives to boost Europe's competitiveness: 1) Closing the innovation gap; 2) A joint roadmap for decarbonisation and competitiveness; and 3) Reducing excessive dependencies and increasing security.
- **New Political Guidelines 2024-2029**: "research and innovation is at the heart of Europe's economy".
- **Competitiveness Compass:** sets a path for Europe to become the place where future technologies, services, and clean products are invented, manufactured, and put on the market, whilst being the first continent to become climate neutral.

Clean Industrial Deal (CID) Communication

- A response to strengthen **European industry's competitiveness.**
- A clear commitment to the **2050 objective** of the EU becoming the first climate neutral continent, including through the **intermediate 2040 target of 90%** net greenhouse gas emissions reduction.
- Also reinforcing Europe's **resilience**
- A set of **incentives** to encourage industrial decarbonisation in **energy-intensive industries** and **clean tech** manufacturing, as well as circular business models:
  1. Access to affordable energy
  2. Lead markets: boosting clean supply and demand
  3. Public and private investments
  4. Circularity and Access to Resources
  5. Global Markets and International Partnerships
  6. Skills

CID: EU funding

- The next MFF will play a key role with the planned **Competitiveness Fund**
- **Industrial Decarbonisation Bank** aiming to mobilise **EUR 100 bn funding for industrial decarbonisation**.
- Based on a **competitive selection** (e.g. EU-wide Carbon Contracts for Difference), while also considering a **fair distribution of support across Member States**.
- It will be financed by using the **existing Innovation Fund** resources, **reserve ETS allowances** (revision of the ETS Directive) as well as leveraged finance from **InvestEU**, mobilizing also voluntary Member State resources (e.g. **auctioning as a service**).
- Plan to commit **EUR 6 billion from the IF in 2025**, including clean tech, battery manufacturing, H2 bank and industrial decarbonisation. Invitation for MS to make use of auction and grant-as-a-service.
- The 2025 Innovation Fund call will already include a **pilot** for the bank of **EUR 1 billion to decarbonise key industrial processes across various sectors**.
- The Communication states that "*R&I is a key enabler for promoting the next generation of clean tech, clean energy and decarbonised manufacturing in the EU. The **flagship Horizon Europe call of ca. EUR 600 million under the 2026-2027 work programme supports fit-for-deployment projects**.*"

The Innovation Fund in a Nutshell

May 2025

European Commission

INNOVATION FUND

Funded by the EU Emissions Trading System

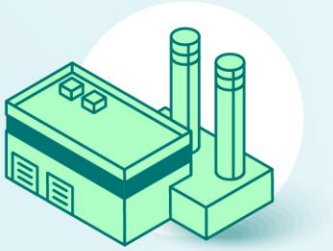
Deploying innovative net-zero technologies for climate neutrality

€40 billion* available between 2020-2030

grants awarded through regular calls and auctions

avoid GHG emissions, boost competitiveness

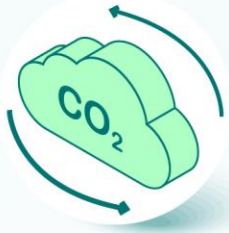
supporting innovation in:



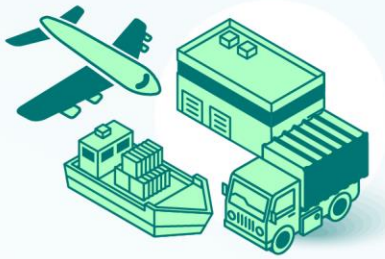
Energy-intensive industries

Renewable energy

Energy storage



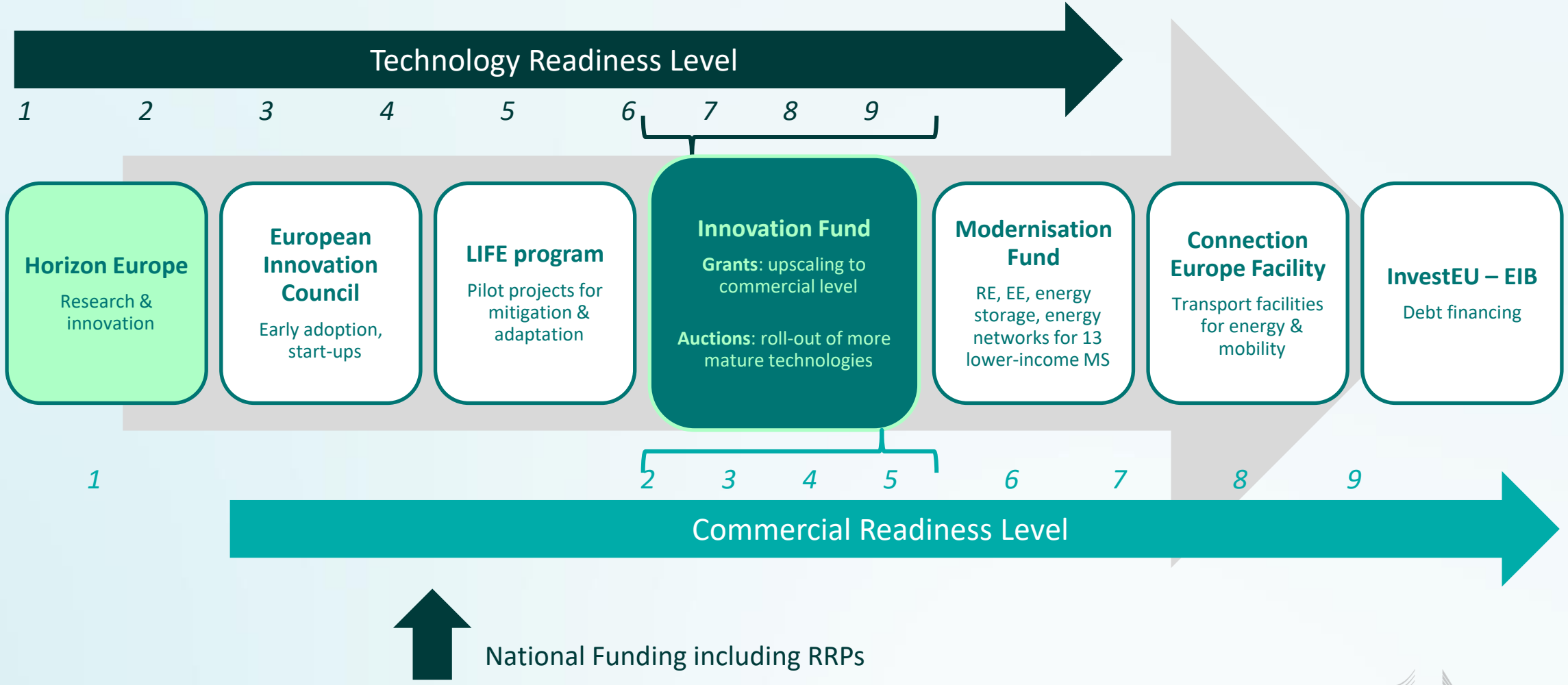
Carbon capture, use and storage



Net-zero mobility and buildings

*based on a carbon price of €75/tonne

A targeted projects portfolio



TRL & CRL are indicative

European Commission

Innovation Fund in a nutshell

Projects granted + under GAP*

~ 200 projects

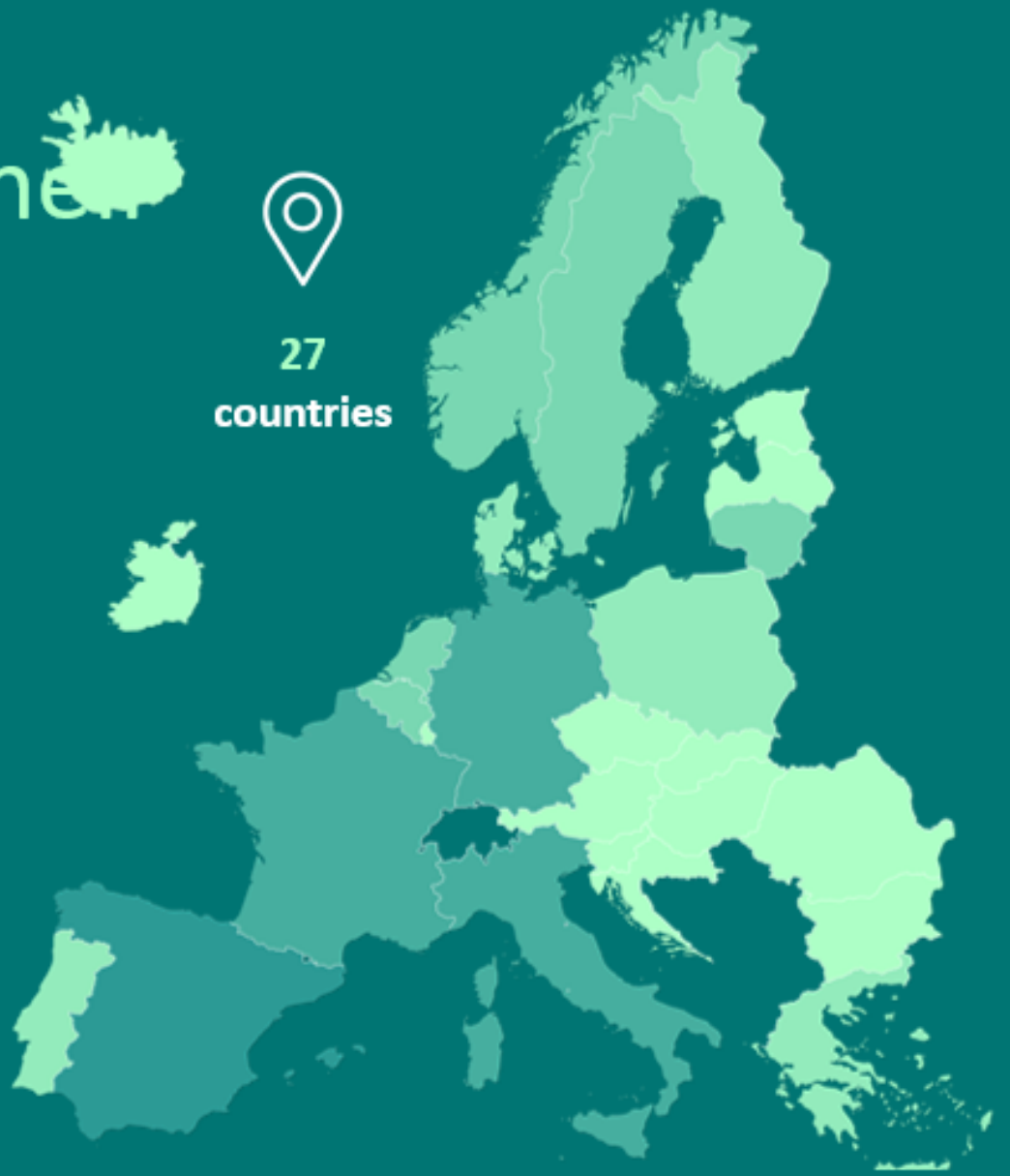
~ €12 billion

~865 Mt CO_2e
to be avoided**

Over 1 500 proposals received

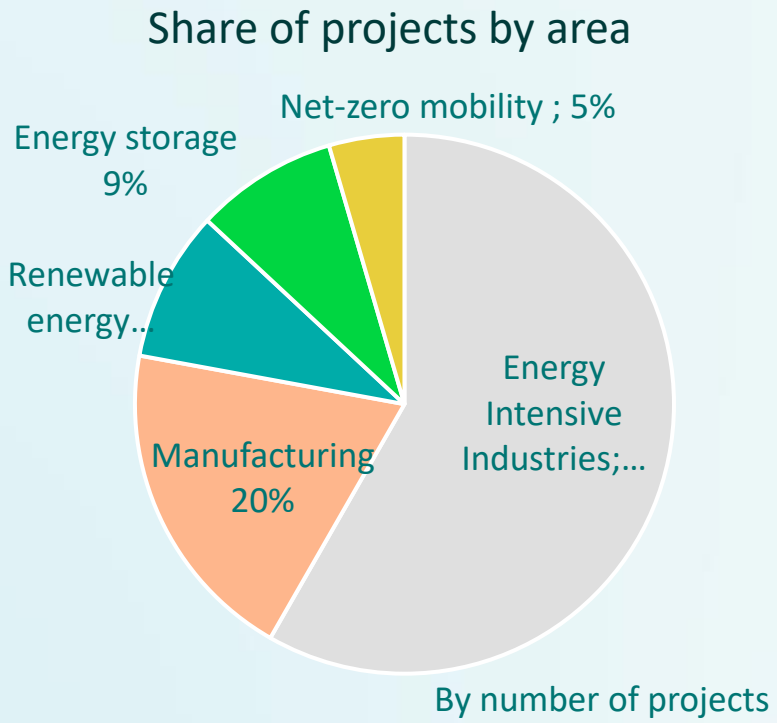
**Grant Agreement Preparation*
***estimated based on 10 years of operations*

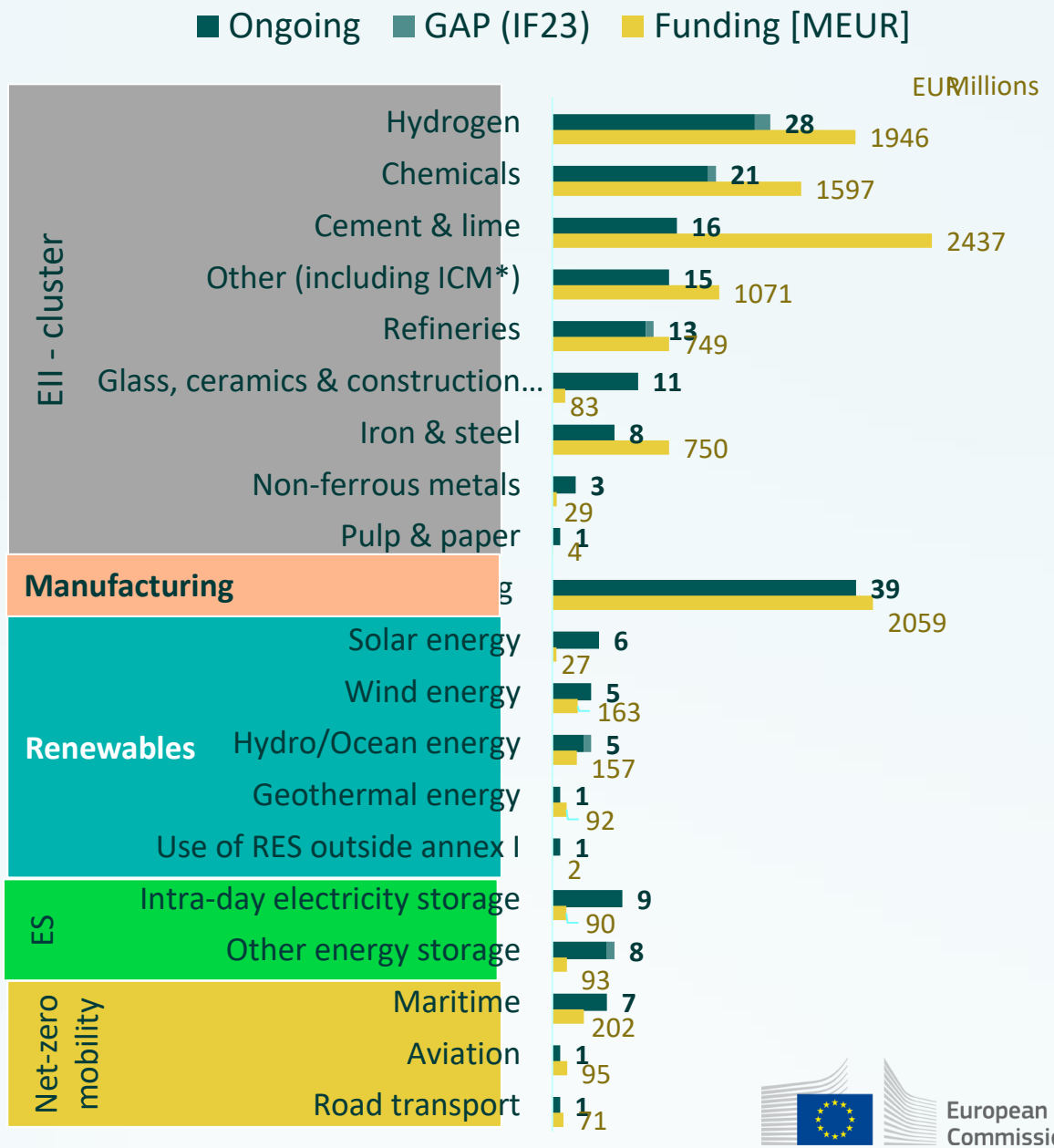
27
countries



Data as of 30/03/2025

Projects portfolio*





*ICM Industrial Carbon Management

European Commission

Last update 30/03/2025

Types of calls

GRANTS

- Up to **60% of the relevant costs**
- **Payments based on milestones** (payments possible before project's entry into operation)
- **Non-Price award criteria**
- **Wide variety of innovations**
- **Large scale demos, first-of-a-kind projects, large pilots**

AUCTIONS

- **Up to 100% of relevant cost**
- **No payments before entry into operation**
- **Price-based award criterion,** possibility for non-price criteria
- Focus on one **uniform auctioned good**
- **Higher TRL/CRL**

2024 funding opportunities

CALLS CLOSED / Under evaluation

IF24 Auction

RFNBO Hydrogen

3 Dec 2024 – 20 Feb 2025

Budget: €1.2 billion

Further information: CINEA website

Apply under the F&T portal

IF24 Call

General, Clean-tech, Pilots

3 Dec 2024 – 24 April 2025

Budget: €2.4 billion

Further information: CINEA website

For further guidelines: click here

Apply under F&T portal

IF24 Batteries

Manufacturing of electric vehicle battery cell

3 Dec 2024 – 24 April 2025

Budget: €1 billion

Further information: CINEA website

Apply under F&T portal

European Commission

Synergies between Horizon and Innovation Fund

R&I/Horizon – Deployment/Innovation Fund

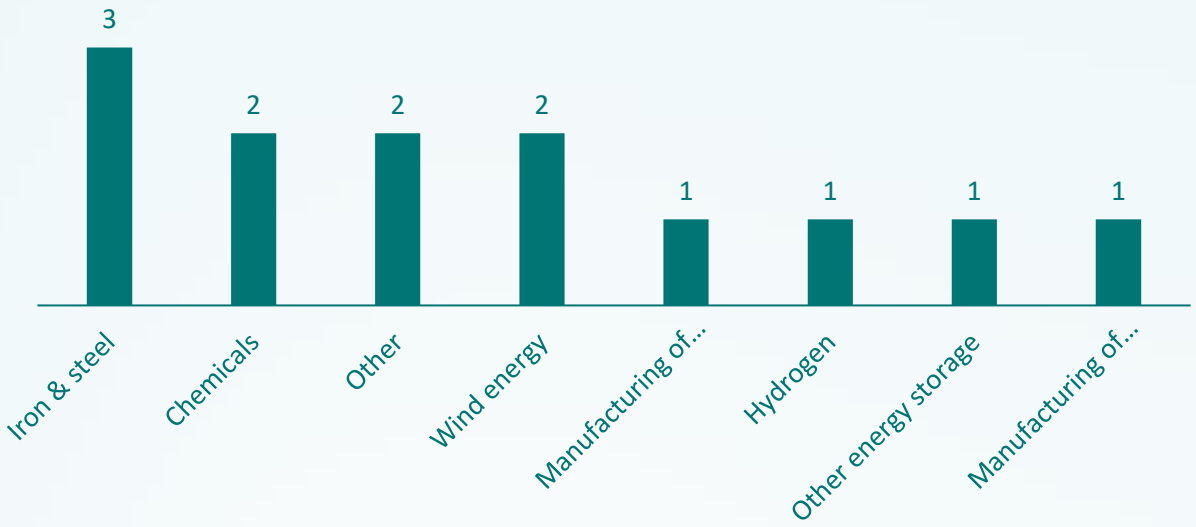
- In line with the new political guidelines on incentivising investments in decarbonisation & clean tech, **the Innovation Fund has a key role on focusing on the later stages of the innovation cycle** (deployment/market uptake).
- The **synergies and complementarities with Horizon Europe** are highly relevant as Horizon Europe is essential for the development of a strong pipeline of advanced/innovative R&I results ready for market uptake that can benefit from deployment/investment programmes such as the Innovation Fund.
- The aim is to support such synergies in order to **accelerate the commercialisation and deployment of R&I results**

Moving from R&I to deployment stage

Projects from FP7, Horizon Europe and Horizon 2020 later funded by the Innovation Fund

- There are **13 ongoing** Innovation Fund projects previously funded by either FP7, Horizon Europe or Horizon 2020
- The **success rate*** of previously funded Horizon/FP7 projects is **32,5%** within the Innovation Fund, compared to the overall IF portfolio's success rate of 12%**

Ongoing Innovation Fund projects previously funded by Horizon Europe, Horizon 2020 or FP7



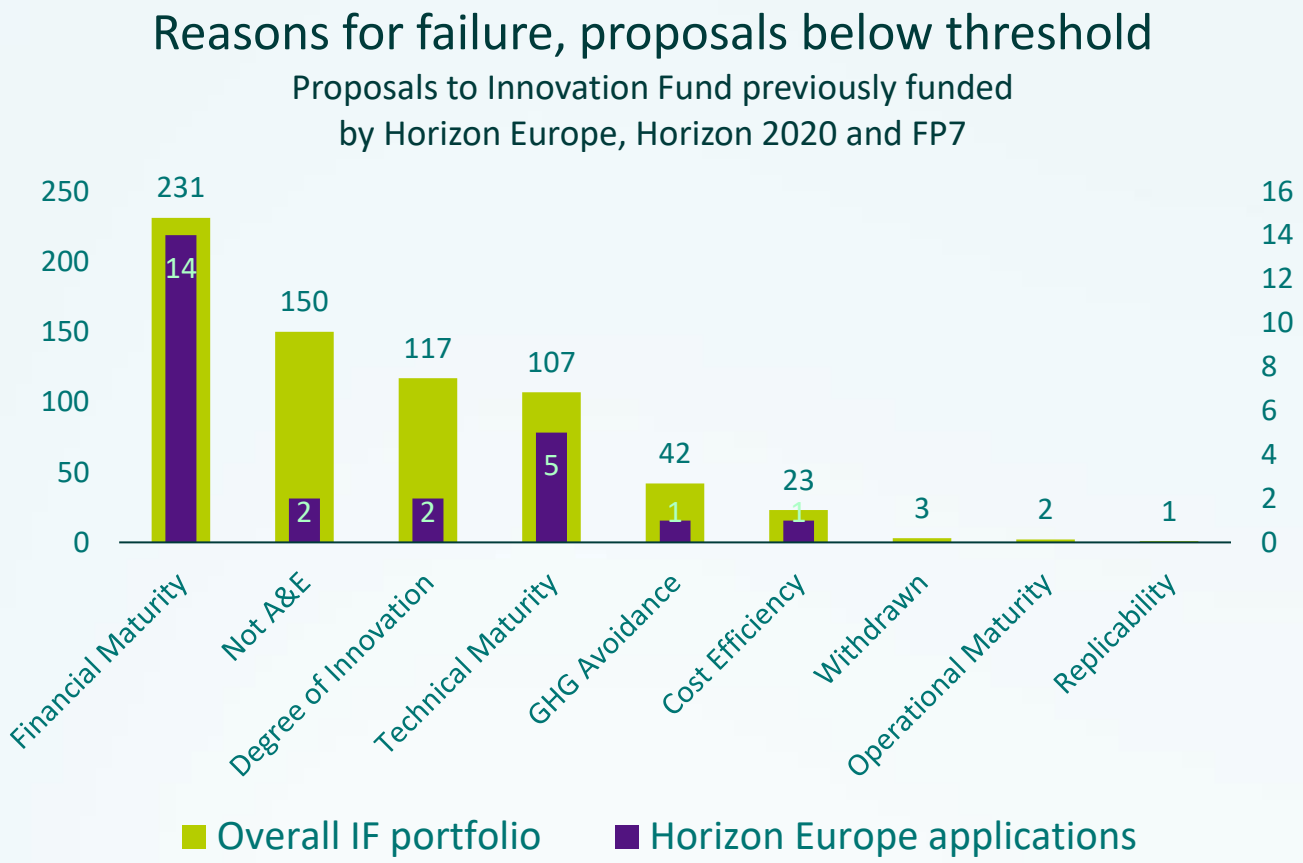
*Success rate defined as nbr of ongoing projects divided by all proposals submitted
**Data from IF2021 – IF2023, regular Grant calls and auctions

European Commission

Reasons for failure

Projects from FP7, Horizon Europe and Horizon 2020 applying for the Innovation Fund

- The large majority of previous Horizon/FP7 proposals fail on **'Financial maturity',** followed by 'Technical Maturity'
- 'Financial maturity' is also the most common reason for failure for Innovation Fund proposals overall, followed by 'Not A&E' and 'Degree of Innovation'
- 'Degree of Innovation' and 'GHG Avoidance' are criteria where former Horizon/FP7 project do better than the overall IF portfolio



Proposals are evaluated according to the following cascade: (1) 'Degree of innovation', (2) 'GHG emission avoidance potential' and 'Project maturity', (3) 'Cost efficiency', (4) 'Replicability' and Bonus points. If a proposal scores less than the minimum threshold under each step, the evaluation is stopped (the remaining criteria are neither evaluated nor scored)

Let’s keep in touch

climate.ec.europa.eu
Portfolio of IF projects

clima-innovation-fund@ec.europa.eu

@EUClimateAction

Subscribe to the Innovation Fund mailing list

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EU Environment and Climate

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Brussels

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Session 1: The required elements for successful exploitation of R&I results towards deployment

Andrea Rausa
Ciaotech
(LEADS)

Maria Velkova
European
Commission
(DG CLIMA)

David García Arrate
Euro-Funding
(REALIZE)

Federico Spadaro
CLERENS
(H2IF)

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Innovation Fund - Assessing the technical and operational maturity

David García Arrate, Senior Project Manager - European Funds, Euro-Funding (REALIZE)

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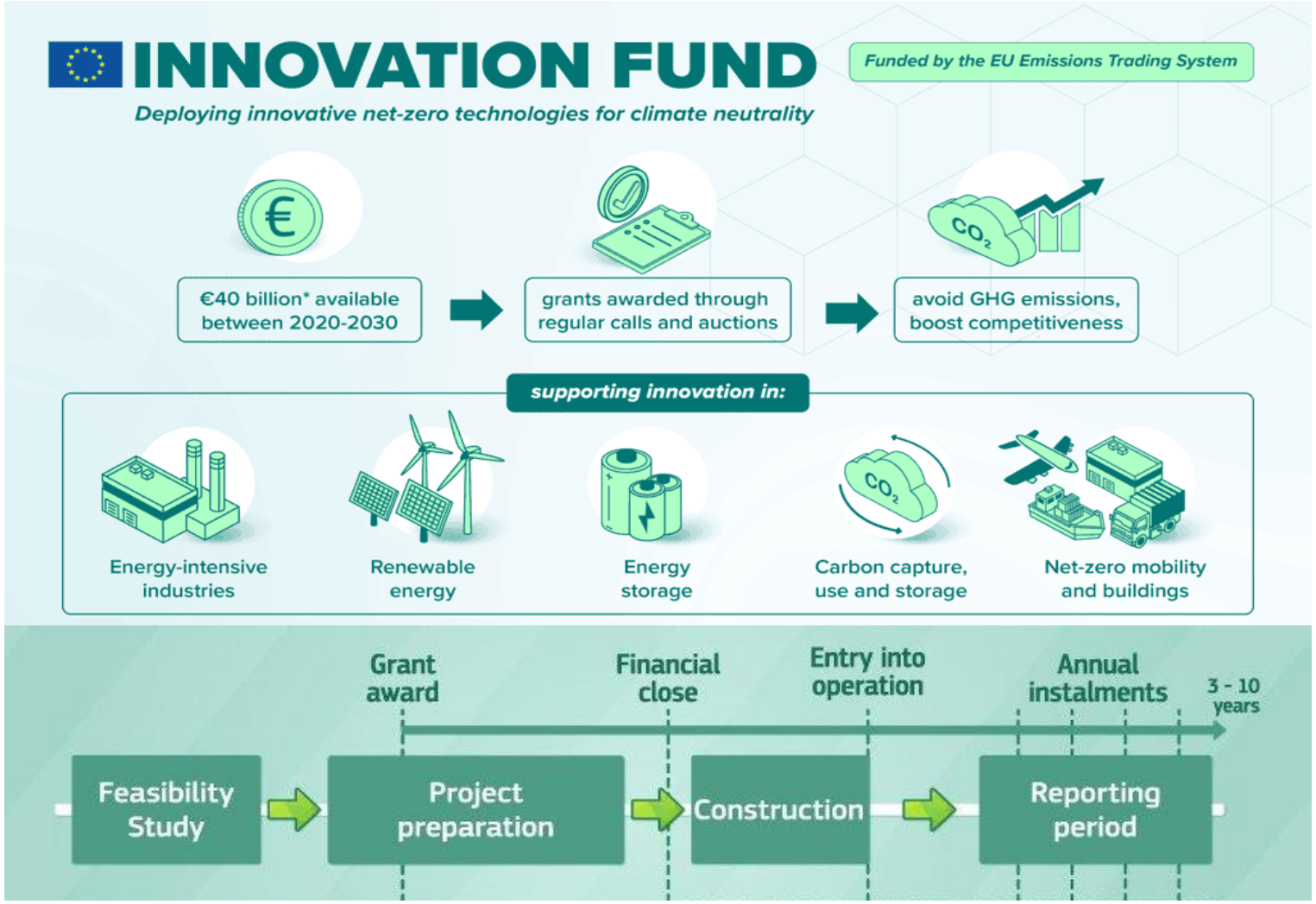
INNOVATION FUND CONTEXT

Key priorities

- Deployment gap
- Risk reduction for investment
- Proven capacity
- Completeness of Business Model
- Maturity of the solution
- Interest in the outcomes



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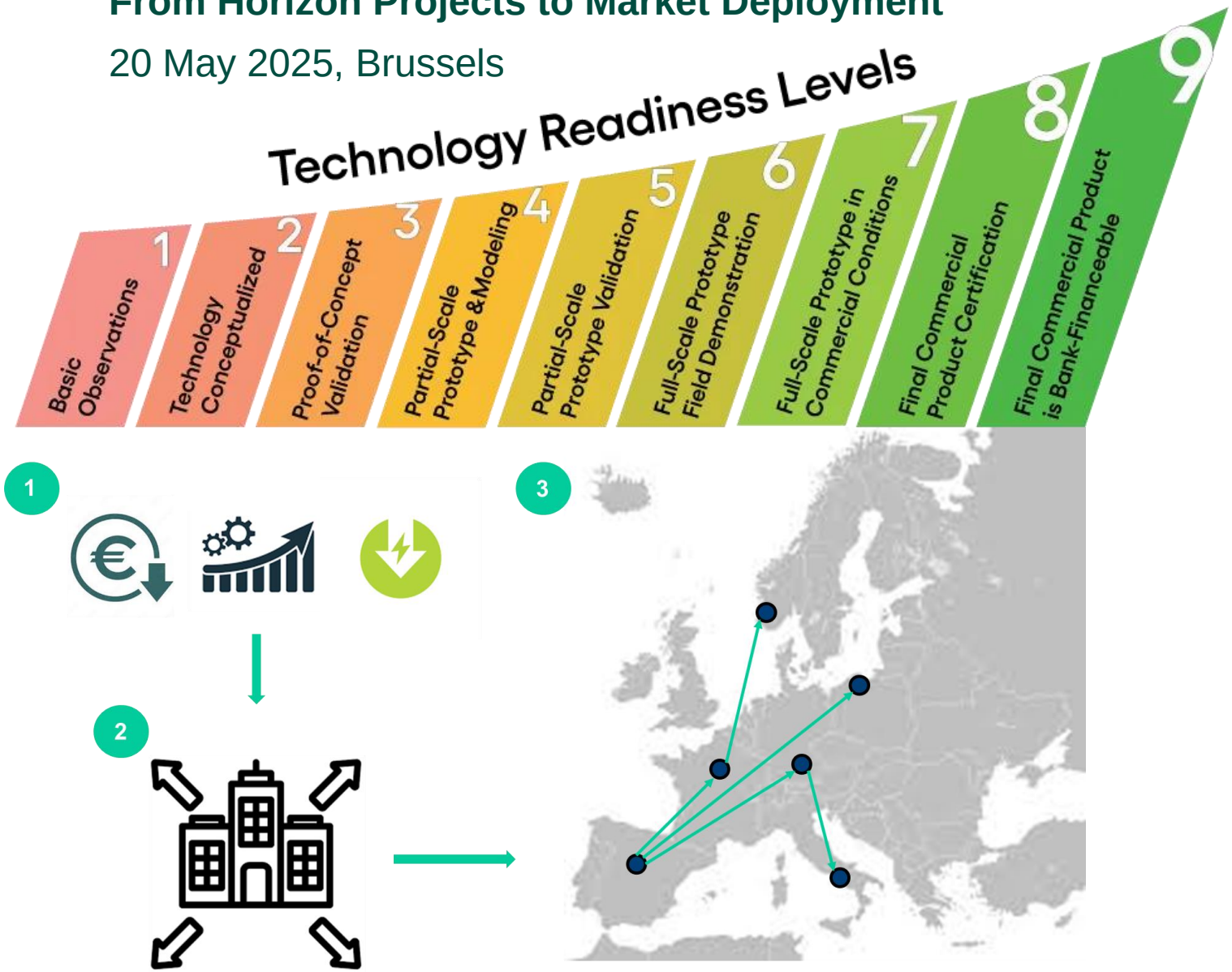
TECHNICAL MATURITY

Key priorities and evaluation criteria

- Technology readiness level
- Proven performance
- Degree of innovation
- Environmental aspects
- Safety standards
- Operation and maintenance
- Technical risks and mitigation measures
- Scalability of the solution



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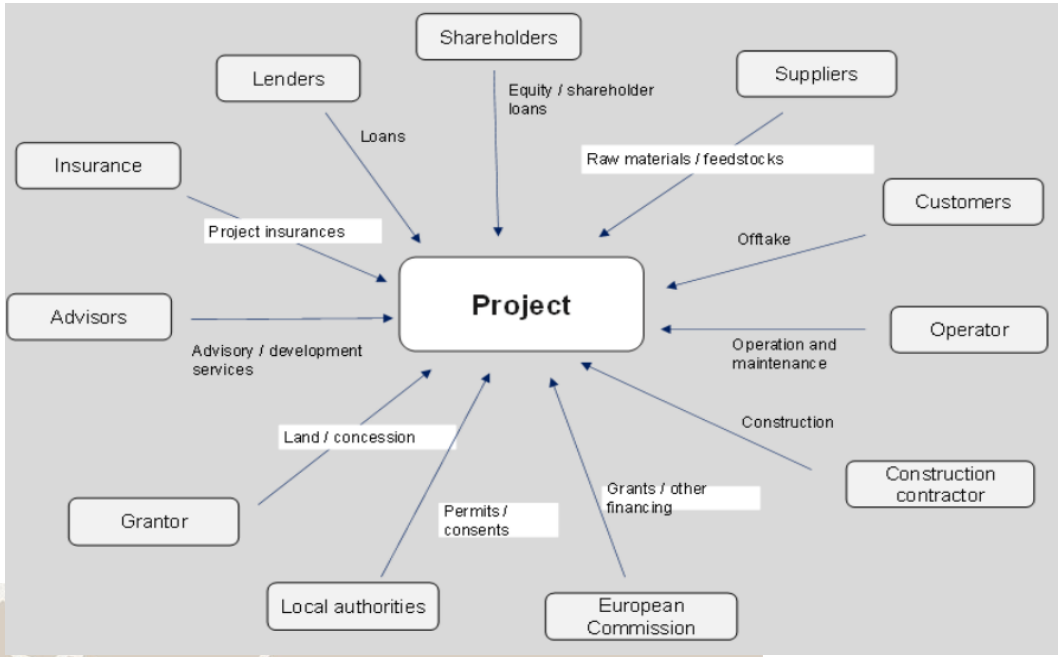
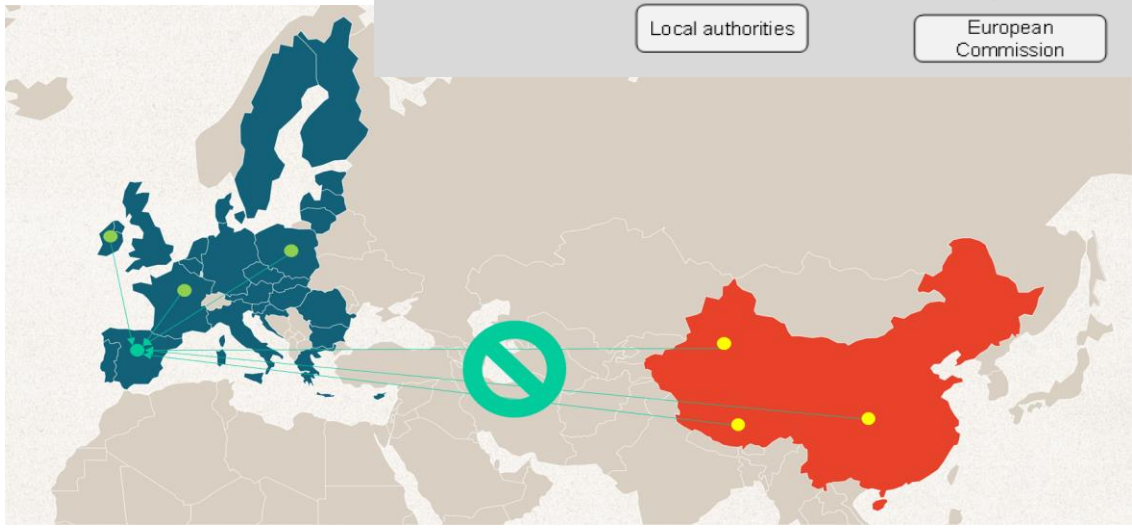
OPERATIONAL MATURITY

Key priorities and evaluation criteria

- Project management
- Execution plan and timeline
- Project team
- Regulatory and permitting
- Stakeholder engagement
- Contracting status
- Public acceptance
- Implementation risks and mitigation measures





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Thank you!

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Financial maturity and required expertise

Federico Spadaro, EU Project Manager, CLERENS (H2IF)

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Financial Maturity

- Essential condition **to allow R&I results to scale up and be deployed** on an industrial scale
- It refers to the stage at which **all project's financial aspects** (funding, cost/revenue management, financial risks) are fully developed and effectively managed
- **The Innovation Fund adopts a specific definition** and criteria to measure it

> ***Financial maturity*** *measures a project's ability to reach* ***Financial Close (FC)**** *no later than 4 years after grant agreement signature*

Financial Close
Moment when all the agreements have been signed and everything is ready for the projects to start construction phase

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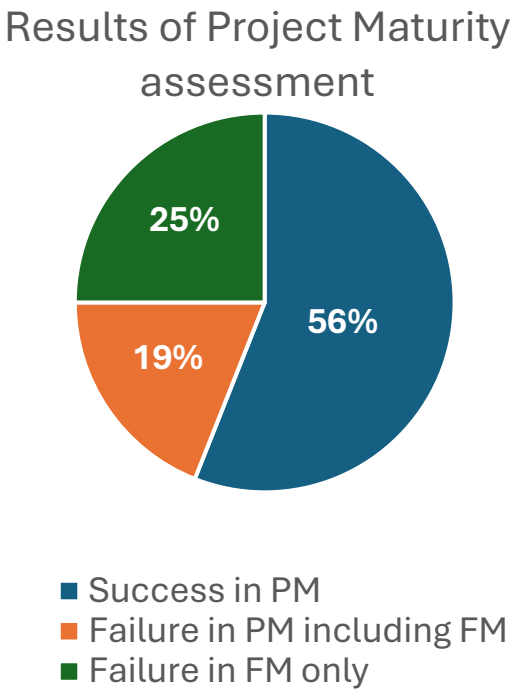
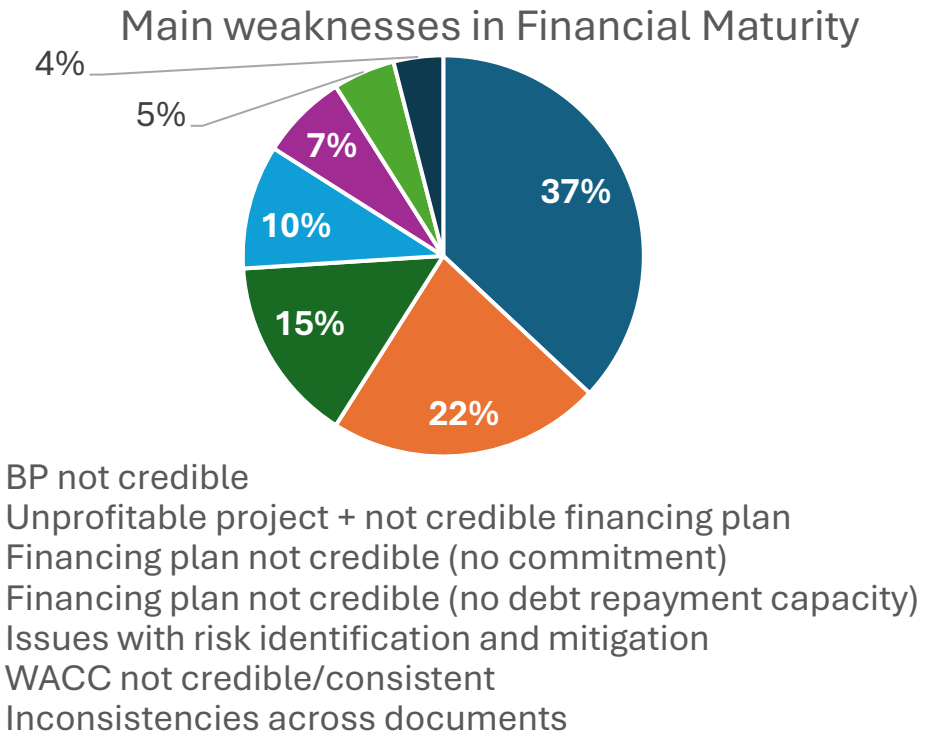
Financial Maturity

Financial maturity is one of the **hardest criteria to fulfill in IF applications**.





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Financial Maturity

The key to a financially mature IF proposal is **credibility and soundness** of:

- The **business model and business plan**
- The strategy to **secure key contracts**
- The **cash flow projections** and expected **project profitability**
- The **financing plan**, expected **sources of financing** and **commitment of project funders**
- The **project's business and financial risks**, and proposed mitigation measures

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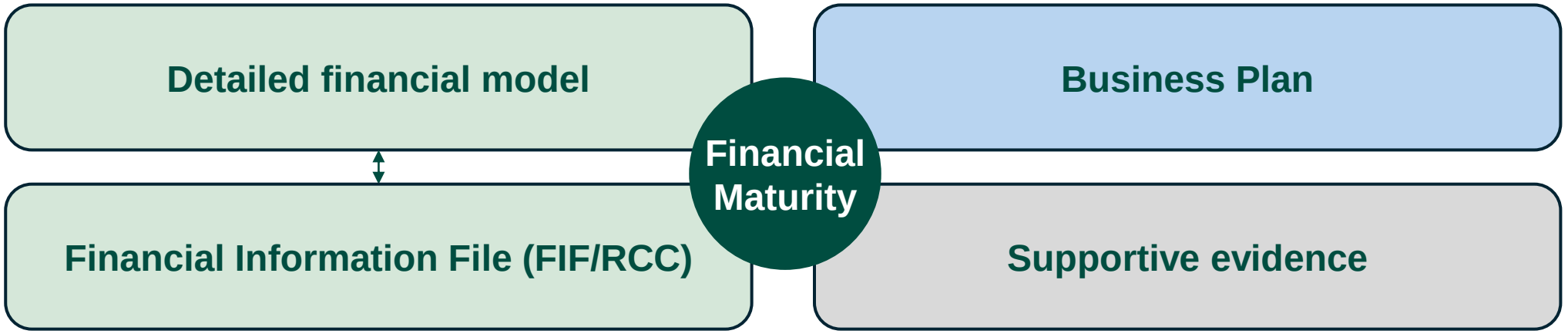
Relevant documentation (IF)

In order to **demonstrate financial maturity**, applicants must provide the following **documents**:



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Relevant documentation (IF)

Qualitative documents

A **Business Plan*** including:

- **Business model**
- Target **market** overview
- **Main model assumptions**
- **Financing plan**
- Business/financial **risks**

Quantitative documents

A **financial model** including:

- All project **cash flows**
- All **financial assumptions**

A **Financial Information File***

- **Matches** with financial model
- Includes **project cash flows**
- Calculates the **max grant**

Supportive evidence

Documents supporting the credibility of the project and the assumptions made, in terms of e.g., revenues/ costs, CAPEX, funding, etc. (market analyses, contract terms, letters of support, quotations, etc.)

***Produced** by the applicant*

***Collected** by the applicant*

**template from the EC available*

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Expertise needed

	Financial model	FIF/RCC	Business Plan	Supportive evidence
Business strategy			✓	✓
Commercial/sales	✓		✓	✓
Technical			✓	
Finance/funding	✓	✓	✓	✓
Accounting	✓	✓		

- Involvement of **company decision-makers** (e.g., C-suite)
- **IF-specific expertise** (e.g., Relevant Costs, project WACC, cost eligibility, FIF)

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IF-specific expertise

Some examples of **IF-specific concepts** are the following ones:

Relevant Costs & RCC

- **RC:** net extra costs, used to calculate the **maximum grant: <=60% RC**
- Calculated by the **RCC/FIF,** that should **match the financial model**

Project-specific WACC

- **Project-specific** and calculated according to the **EC guidelines**
- **Detailed justifications** are needed in case of misalignments

Financial Close

- **All agreements in place** and the projects can start **construction**
- To be achieved **within 4 years from Grant Agreement signature**

Grant allocation

- Grant needs to be **proportional to the value of the Work Packages**
- Grant needs to respect the **foreseen minimum/thresholds**

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The required elements for successful exploitation of R&I results towards deployment

Lessons learned from previous IF calls

European Commission

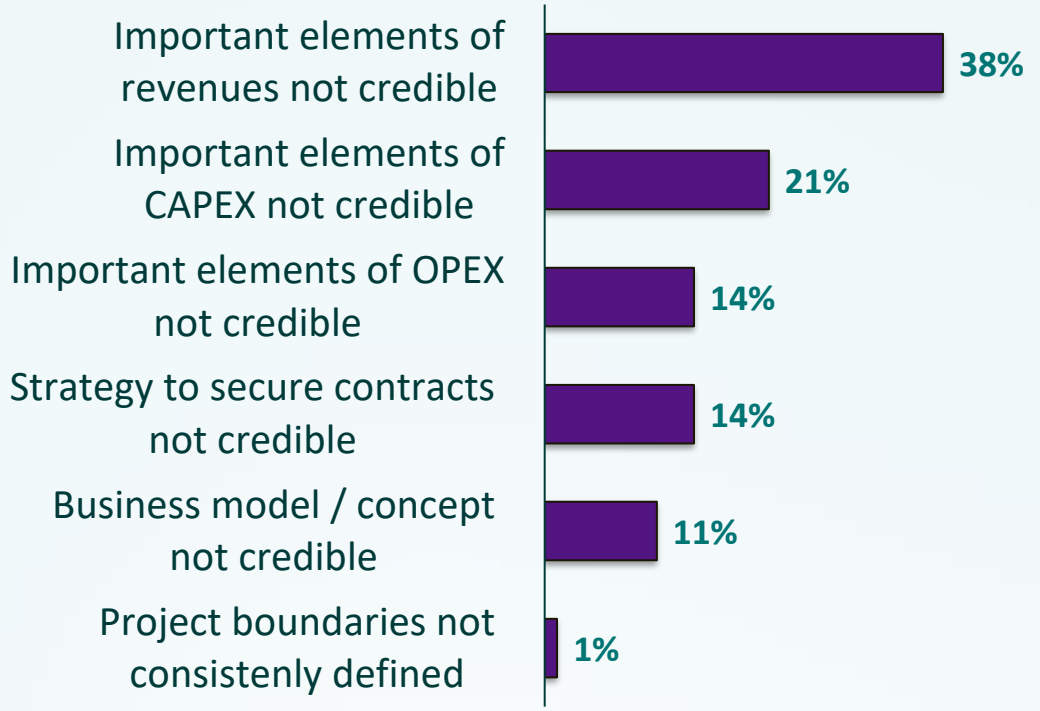
Main issues with the Business Plan

Lessons Learned IF23 Call

Most issues related to **business plan** refer to:

- **Revenues:** credibility and justification of prices, volumes
- **CAPEX:**
  - Justification missing,
  - No detailed breakdown,
  - Lack of evidence (including quotes from engineering and construction contractors)

Out of 84 proposals, the main issues with the business plan are:



- Fully **describe, substantiate and evidence the main revenues, CAPEX and OPEX assumptions** and include a **detailed breakdown** and description of prices and volumes

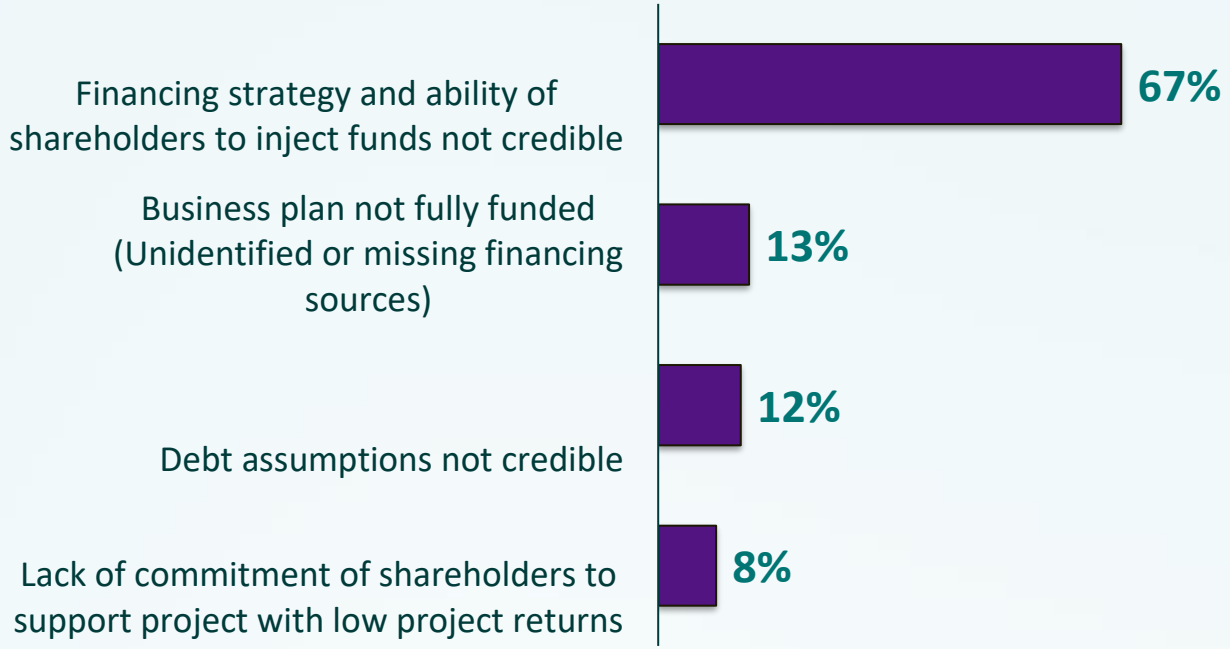
Main issues with the Financing Plan:

Lessons Learned IF23 Call

Main issues with **financing strategy**

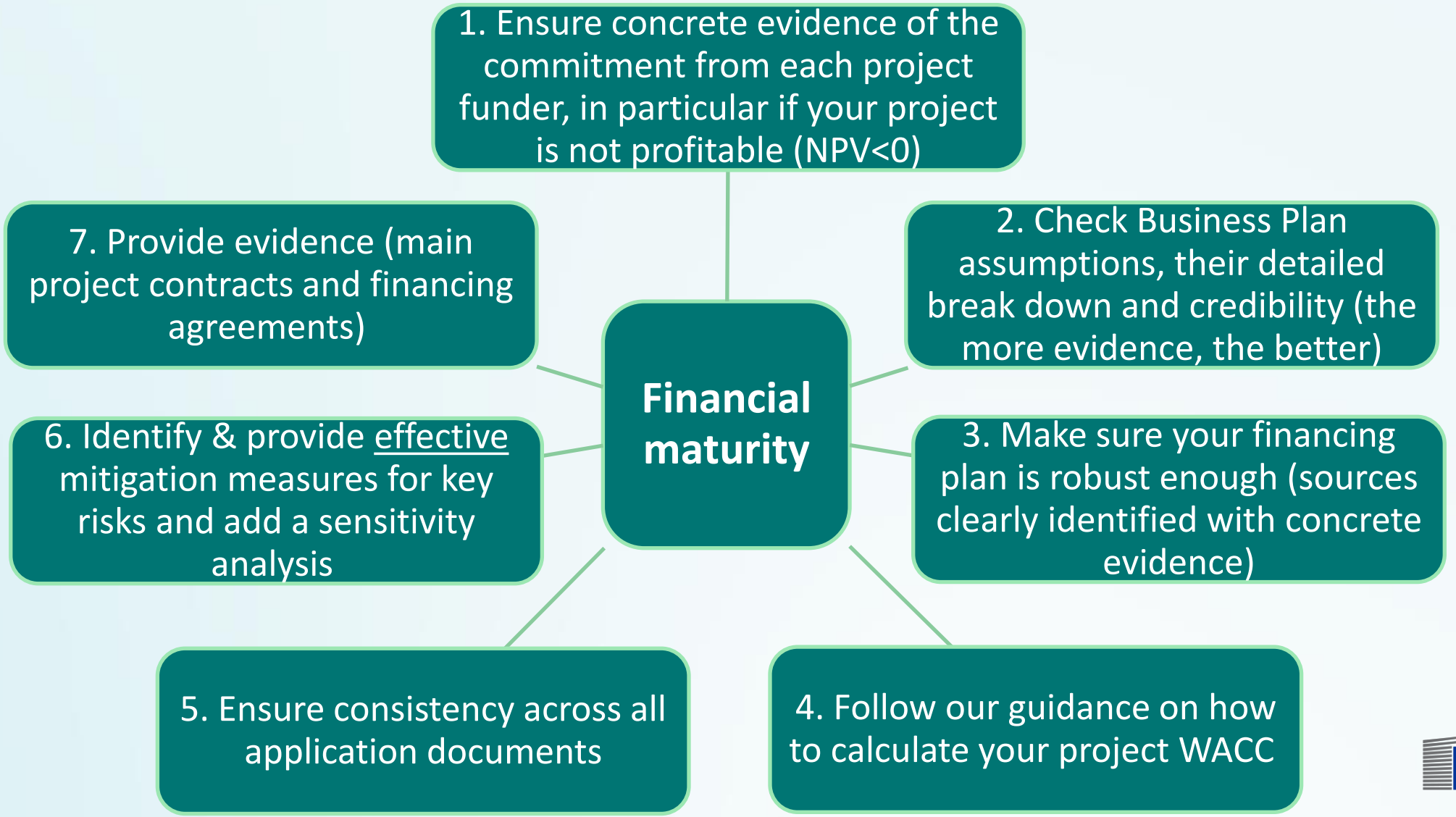
- Ability to secure the required funding
- Commitment of shareholders
- Expected timing
- Steps to reach final investment decision
- Other issues related to **debt assumptions** (for instance debt repayment capacity)
- **Unidentified or missing funding sources**

Out of 84 proposals, the main issues with the financing plan are:



- Clearly **identify all funding sources** with their terms and conditions and the progress made in defining and/or negotiating them with funding counterparts.
- Provide financial statements of the shareholder entities

7 Golden Rules of Financial Maturity



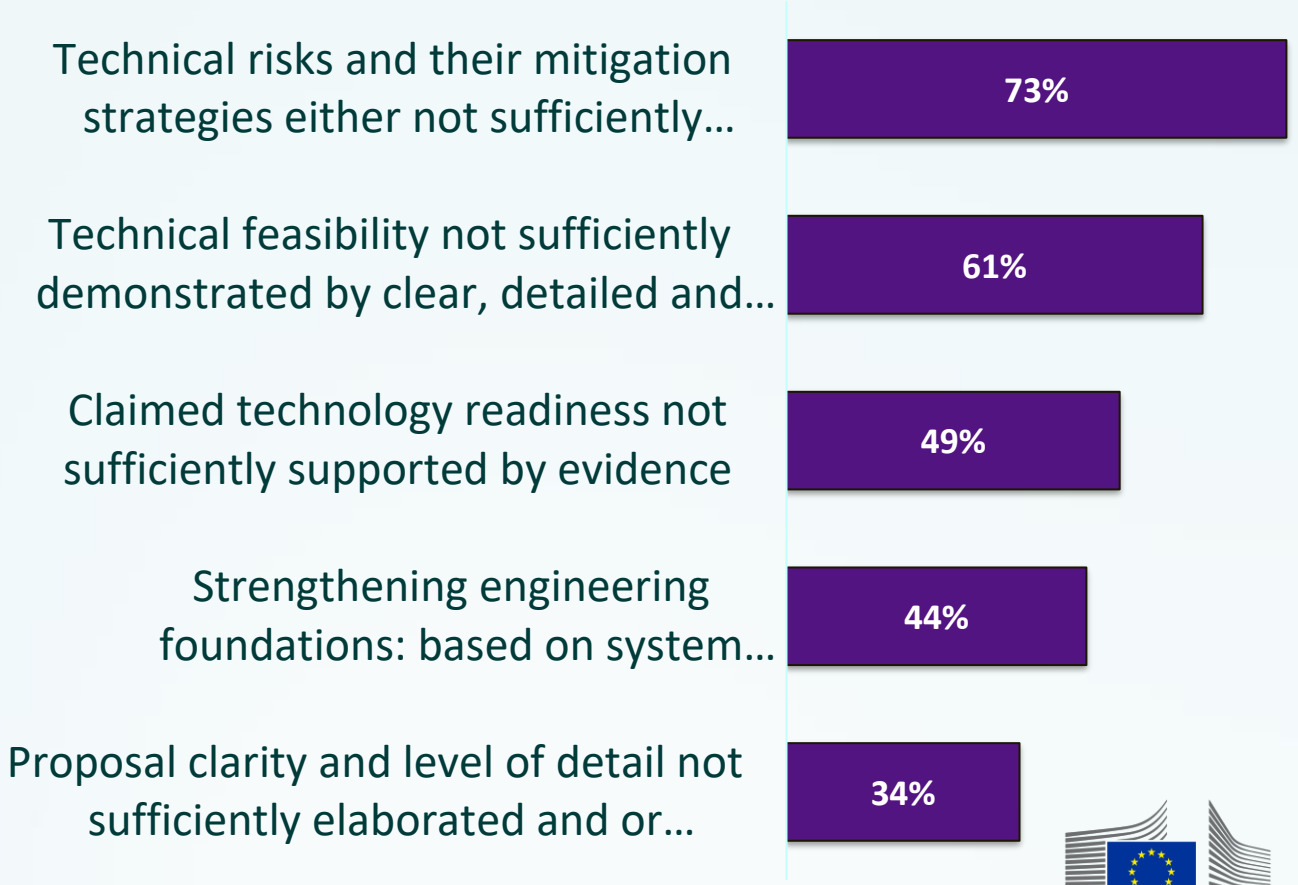
Technical Maturity: Lessons Learned IF23 Call

Key reasons for failure:

Technical feasibility claims not sufficiently supported by:

- Proper identification of risks and mitigation measures
- Credible data and evidence
- Detailed strategies to achieve targets

Out of 29 proposals failing technical maturity, the main reasons are:

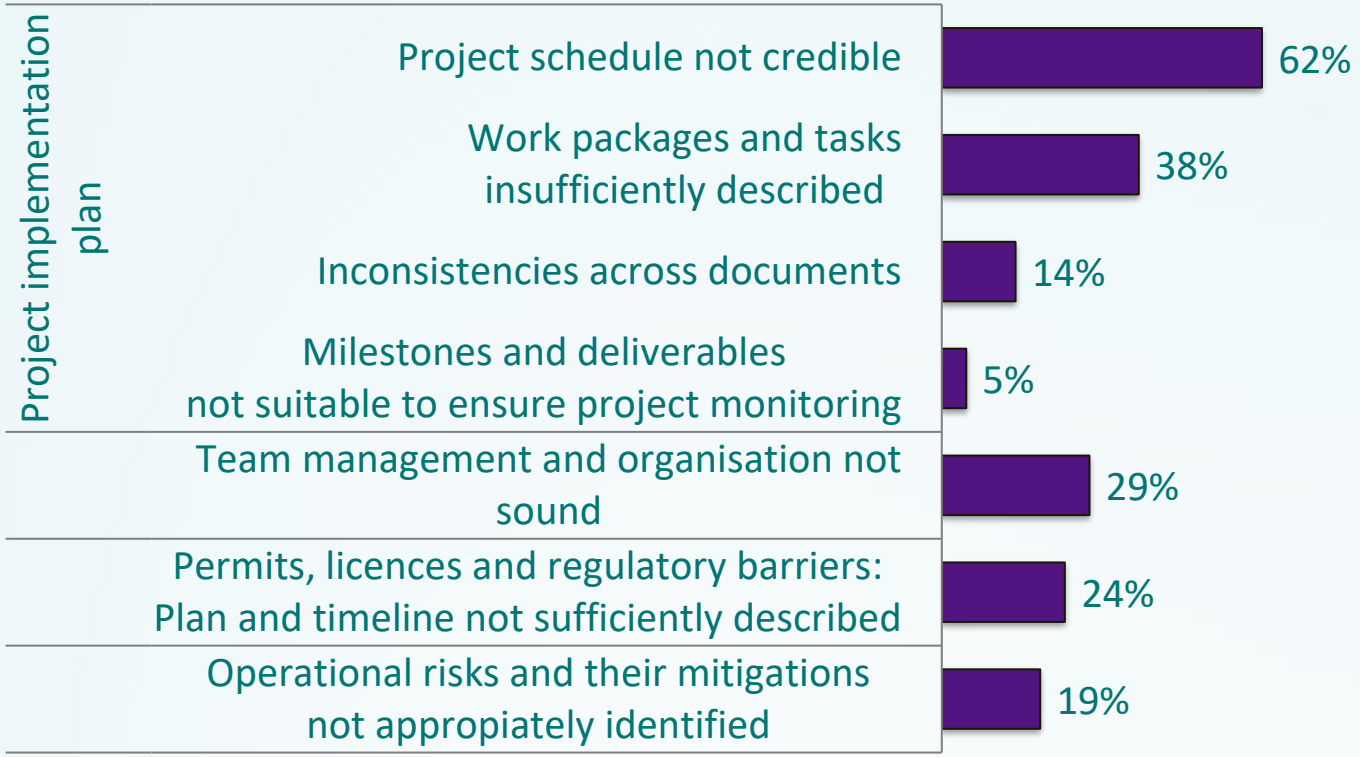


Operational Maturity: Lessons Learned IF23 Call

Key reasons for failure:

- Project implementation plan not credible
- Team management and organisation not sound
- Permitting and licences plan and timeline not sufficiently elaborated
- Operational risks and their mitigation strategies not adequate

Out of 21 proposals failing operational maturity, the main reasons are:



Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

20 May 2025, Brussels

Session 1 : The required elements for successful exploitation of R&I results towards deployment

Main take aways from the CSAs so far

Andrea Rausa, Coordinator, LEADS

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

1. Main bottlenecks from R&I to full deployment (including through IF)

- While H2020/HEU projects have strong potential for scaling up innovative technologies* only a reduced number are well-aligned with IF criteria and/or proceed to full deployment. Some of the main bottlenecks:
  - **External factors** (changes in policies/regulations, market dynamics, geopolitical tensions.)
  - **Scope, activities and business model** of your IF project and your full deployment could be (and will most probably be) very different from your R&I project
  - **Long development time** due to project **complexity** and/or **scale** (especially for large industrial projects), leading to, e.g. obsolence of technology/IP and/or competition; increase in costs; etc.
  - Lack of clear **ownership of IP and financing**
  - **High risk profile** ('first of a kind')→ low attractiveness for investors/financiers
- H2020/HEU projects produce multiple Key Exploitable Results **KERs**, while the IF and/or the full scale project focuses on one significant KER/IP that meets specific criteria.

** "Scaling up innovative technologies for climate neutrality" report by DG RTD (May 2023) mapping the EU demonstration projects in energy intensive industries (link)*

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2. Recommendation for project owners

- Deployment of innovative technologies from R&I into a full-scale plant/process requires several steps with several risks associated, including defining:
  - Main IPs to be brought forward,
  - Ownership of IP (licence agreements if needed),
  - Budget of full project (including preparation steps, studies, etc.)
  - Main financiers of the full project (including public funding, private investors, banks)
  - Techno-economic analysis, technical feasibility/engineering + cost assessment
  - Life Cycle assessment or similar environmental impact assessment
  - Market analysis
- Many of the above-mentioned steps involve additional internal (finance, permitting, HSE, board) and external stakeholders (consultants, engineering companies, EPC, suppliers, clients), adding complexity to project development → consider them in your planning

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2. Recommendation for project owners

- Critical elements to assess towards full deployment: **maturity of the technology** (and the time to bring it to full-scale); **maturity** of the whole **value chain**; **GHG emissions abatement**; **financial maturity**; **timeline** of the project.
- Clarify the **ownership** of results of your H2020/HEU project, and the steps needed to bring those result to full commercial scale.
- Define the whole **value chain** of the commercial scale set-up, map the **stakeholders** and identify the ones that are crucial for the realisation of the full-scale plant (including potential applicants of the IF grant).

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2. Recommendation for project owners

- Have **agreements** in place **with crucial stakeholders** well before the start of the application, with clear distribution of roles, including on project financing and governance (SPV or JV if needed). All the **other stakeholders** of the value chain will have to provide concrete support (LoS, MoUs) as part of the IF application. Start engaging early with them.

- **Allocate adequate and competent resources** to each project stream (technical, financial, business, permitting etc.) and ensure everyone is in line with the proposal requirements and concept. Assign a **Project Manager** that supervises the process, ensures consistency of information and main claims across all documents and clear cross-reference to the annexes

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thank you!

Andrea Rausa
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Public Conference
20 May 2025, 9.00 - 17.00
Brussels

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Session 2: R&I real-life stories

Philip Hawkins
European Commission (DG CLIMA)

Heidi Fuglum
Tidetec

Athanase Vafeas
Dowel Innovation

Fredericq Peigneux
Heidelberg Materials

Kristian Aas
SINTEF (2DPLOY)

REALIZE H2.F 2DPLOY LEADS

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Innovation Pipeline approach – maturing R&I projects for IF

Speaker: Kristian Aas, Coordinator, 2DPLOY

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The CSA projects aim to develop a better set of tools maturing R&D projects for IF

within:

- Low Carbon Technologies in the Energy Intensive Industries (EII) - 2DPLOY
- Hydrogen and Energy Storage - H2IF
- Renewable Energy - REALIZE
- Carbon Capture Utilization and Storage (CCUS) - LEADS

Similar approaches

- Developing “Innovation pipelines/funnels” to help bridging the gap between Research and Industrialization
- Screening of the pool of projects (Horizon 2020 and Horizon Europe)
- Procedures for selection and giving advise
- Assisting the selected projects
- Feed back for improving the methodology

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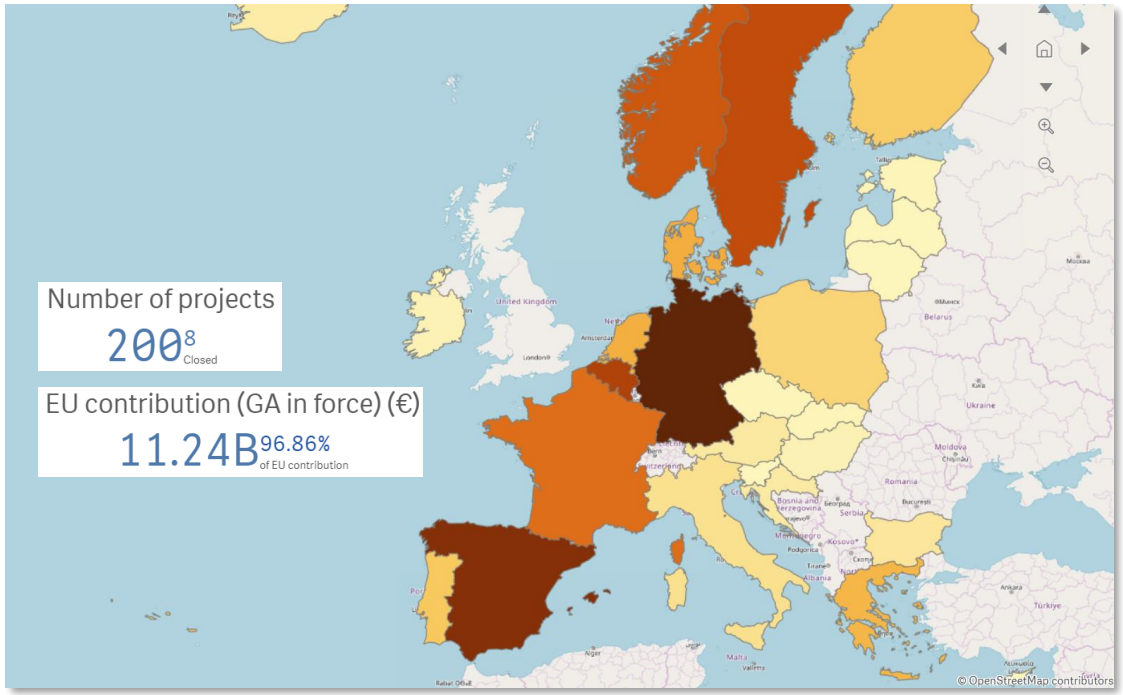
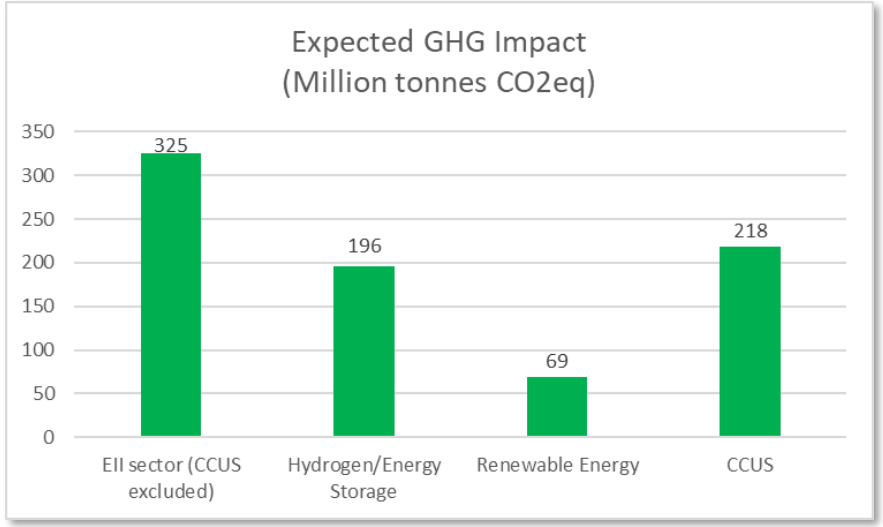
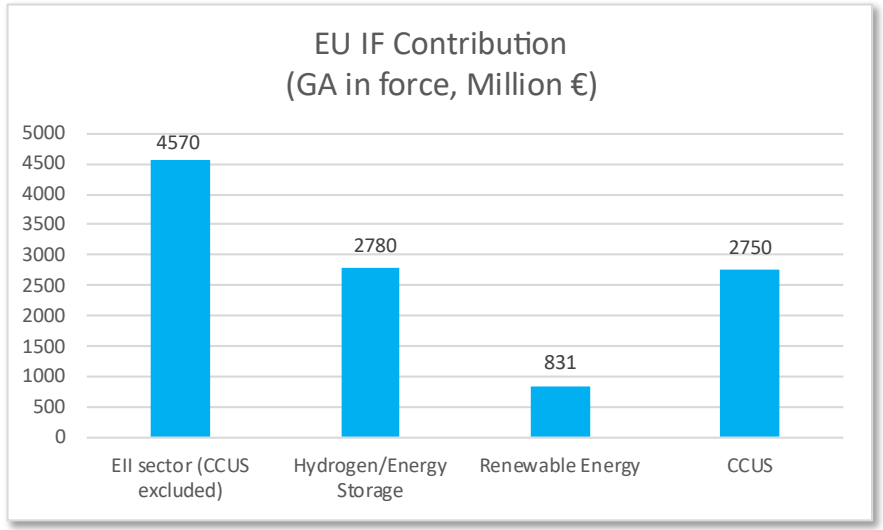
Brief overview of ongoing IF projects in the sectors



Reference: https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/6e4815c8-1f4c-4664-b9ca-8454f77d758d/sheet/bac47ac8-b5c7-4cd1-87ad-9f8d6d238eae/state/analysis





The CSAs help selected projects in their effort to get there in the next calls

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Low-Carbon Technologies in Energy-Intensive Industries (EII) – What is in the pipeline?

4 Pre-selected projects (TRL6-7)
Process innovations towards chemicals, steel, cement and ceramic.
(Belgium, Germany, Spain)

Additional portfolio (H2020 & HE)
Large pool of approx. 150 potential projects covering a wide spectra of industries and technologies

EII
includes

- **Steel**
- **Cement,**
- **Chemicals**
- Refineries
- Glass and ceramics
- Paper and Pulp
- Non-ferrous metals

Technologies

- Energy efficiency improvements
- Electrification
- Fuel switching (H_2, Bio)
- **Process innovation** (e.g., low-carbon cement or steel),
- Recycling and waste heat recovery.

Pre-qualification (Large pool)
- Self–check online questionnaire
- Automated feedback

Expert interview (Reduced pool)
- Follow up to the pre-qualification
- QA of self-check and additional items

Evaluation Commission - (Small pool)
- Review of key criteria with experts (technical , financial ...)
- NDA can be necessary

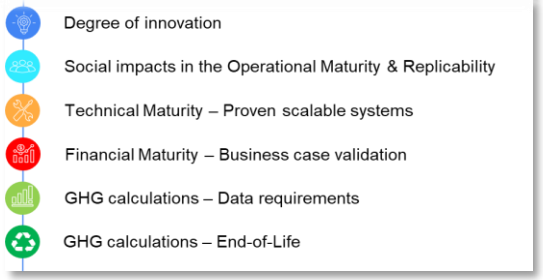
Support in IF application work (3 projects)
- Individual support with guidelines
- Good practise examples and master class

"Main outcome is the methodology"

Give advice to «non-mature» projects

Further assist «mature» projects

Develop lectures



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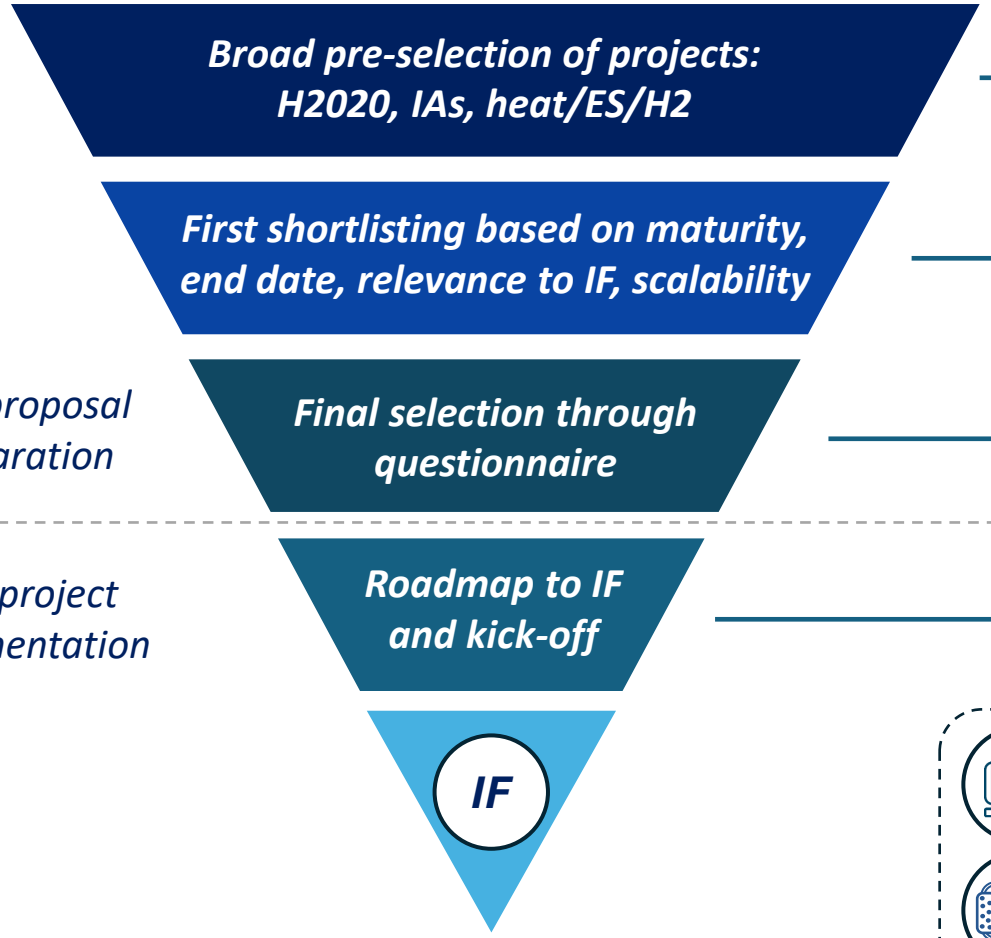
Hydrogen and energy storage - What is in the pipeline?



H2IF proposal preparation

H2IF project implementation

Broad pre-selection of projects: H2020, IAs, heat/ES/H2	***288 projects***	***Preliminary pool*** *for the selection of relevant technologies/innovations*
First shortlisting based on maturity, end date, relevance to IF, scalability	***26 projects***	*Major shortlist to only consider* ***potentially feasible projects for IF***
Final selection through questionnaire	***3 projects (+4 reserve list)***	*Identification of the* ***best candidates****, and backup options for the H2IF project*
Roadmap to IF and kick-off	***3 projects***	***Tailored roadmap*** *for each, collection of* ***relevant documents, IF internal workshop and guidelines to IF proposal***

- ***Hydrogen storage*** *technology*
- ***Hydrogen-Bromine*** *Flow Battery**
- *High-power and fast-charging* ***LFP battery cell*****

**technology was then reviewed and currently is Hydrogen-iron sulphate*

***withdrew from the project – negotiations ongoing to involve similar battery innovation*

REALIZE Process

600+ projects identified

100+ projects filtered

30+ Projects pre-selected

10 projects selected (PPs)

Horizon projects analysis for engagement of potential Project Promoters in RES

SWOT analysis

Training

Financial, technical and operational feedback

Due Diligence methodology

Up to 7 high-quality proposals - Innovation Fund 2025-26

Proposal setting up and IF application

Proposal phase

Project phase

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Carbon Capture Utilisation and Storage - What is in the pipeline?

Mapping EU CCUS Funded Projects

95

Mapped H2020 CCUS projects based on inputs from **advisory board members** (e.g. CBE JU, ZEP, CO2 Value Europe) and **A.SPIRE portfolio**.

Shortlist based on LEADS criteria alongside IF Criteria

30

LEADS criteria check: alignment with **Innovation Fund topics and categories**, **business model** and project scope, and **internal HR capacity** to manage a complex IF call

Potentially suitable projects

4+3

The best candidates have been selected. 4 projects from beneficiaries and 3 additional from pipeline. LEADS partner are still **seeking other projects to include into the Pipeline** for next year

Viability checks and coaching

3

LEADS experts support by gap analysis and planning of the IF application process

Evaluators-eye' reviews of the IF proposal: LEADS

IF

To date, LEADS supported 1 Project for submission in IF Call 2024

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Collaboration between the CSAs to:

- **Understand the gap between H2020/HE -projects and how they are “fit for deployment”**
- **Exchange experiences for better development of the tools and selection of projects**
- **Increase the number of projects that reach industrialization**

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thank you!

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A journey towards IF application: the perspective of a world-leader in natural gas storage and low carbon energy solutions

Athanase Vafeas, Director Associate Partner, Dowel Innovation (H2IF)

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Our experience over the first 18 months as H2IF's industrial partner

Content:

- STORENGY
- The rationale and motivation
- Our applicant Journey: key challenges faced in the route from R&I to deployment
- Lessons learned so far

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STORENGY, a word leader in natural gas storage committed to the zero-carbon transition

1st underground storage operator in Europe

- +1000 employees
- 70 years of expertise in Natural Gas storage and development of LC energy solutions…
- 21 sites in the United Kingdom, France, Germany
- Guarantee the security of energy supply with a very high level of industrial safety

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Ambition to become the leading company in Europe for renewable gases

To provide the flexibility, security and reliability essential to tomorrow's energy system

Today focus: underground storage projects

- Stublach
- GeoH2 project
- HyPSTER project
- StorgrHYn project
- SaltHy project

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H2IF consortium

Industry association

EASE – European Association for Storage of Energy

EU Funds consultancies

CLERENS

zabala INNOVATION

Dowel innovation

H2020 projects/technology owners

HEROES

BEYONDER

hypster Hydrogen Storage

storengy

MELODY

elestor

Innovation proposed

*High-power and fast-charging **LFP battery cell***

***Hydrogen** storage technology*

*Hydrogen-Bromine **Flow Battery***

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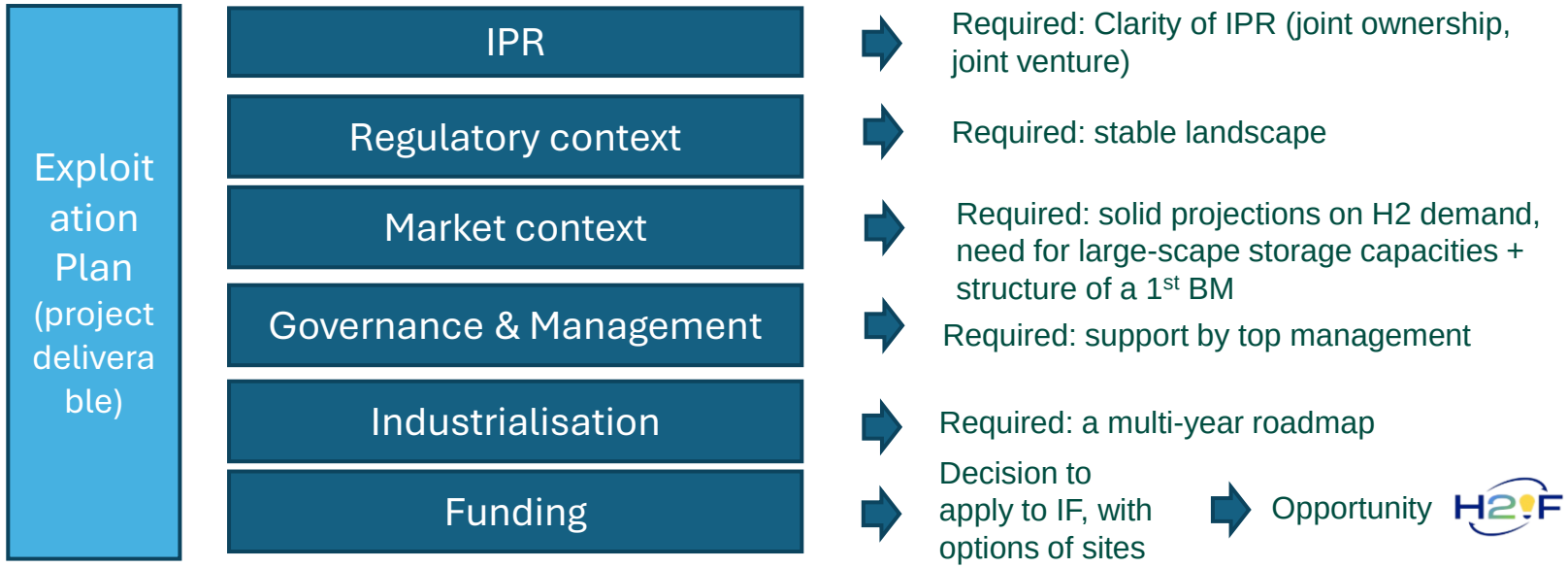
Our applicant journey, from R&I to Market deployment

step 1/3: a public-private funding demonstrator for the feasibility of storing and cycling hydrogen in a salt cavity

❶ At the start of H2IF project:

the H2020 projects identified by STORENGY was Hypster[1], demonstrator for green hydrogen underground storage demonstration project located in Etrez (France)
>> launching the first commercial operations of underground hydrogen storage in France by 2026.



[1]Hydrogen Pilot Storage for large Ecosystem Replication (2020-23, Clean Hydrogen Partnership in 2020): demonstration of H2 storage and cycling in salt cavity

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Our applicant journey, from R&I to Market deployment

step 2/3: STORENGY partner of H2IF (CSA project), selecting best option for a future IF application

❷ During the first year of H2IF:

- Two main sites shortlisted by STORENGY for the IF application.
- After 6 months, the site of Harselfeld, near **Hamburg** was selected for the IF application => ***SaltHy***
- Period m7-m12: preparation started to document the Business Model and the various maturities required by IF

IPR	This criterion used for the selection: STORENGY was owner of 100% of the asset
Regulatory context	The political landscape in Germany was complex in 2024 which delayed the H2 storage regulation
Market context	No issue: promising calculations on the potential
Governance & Management	No issue
Industrialisation	Managed internally by STORENGY Germany
Funding	IF guidance supported by H2IF consultants

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Our applicant journey, from R&I to Market deployment

step 3/3: STORENGY partner of H2IF, decision to postpone the application to 2026 to maximise chances of success

❸ After 12 months,
it was commonly agreed to postpone the submission to 2026 to increase the chance to build a winning IF proposition:

Regulatory context	**Political landscape** was clarified in 2025, after the building of a political coalition in Germany, regulatory/financing scheme for Underground Hydrogen Storage still to be defined
Governance & Management	Clarification of the **respective roles** between the headquarter of STORENGY and the subsidiary in charge of the application

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Take aways from our experience: factors of success

IPR	clarity of IPR (joint ownership, joint venture)
Regulatory context	clear long-term principles
Market context	documented sources to enable to structure of a 1st Business Model
Governance & Management	support by top management
Industrialisation	a multi-year roadmap with milestones
Funding	guidance from skilled third parties

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20 May 2025, Brussels

Thank you!

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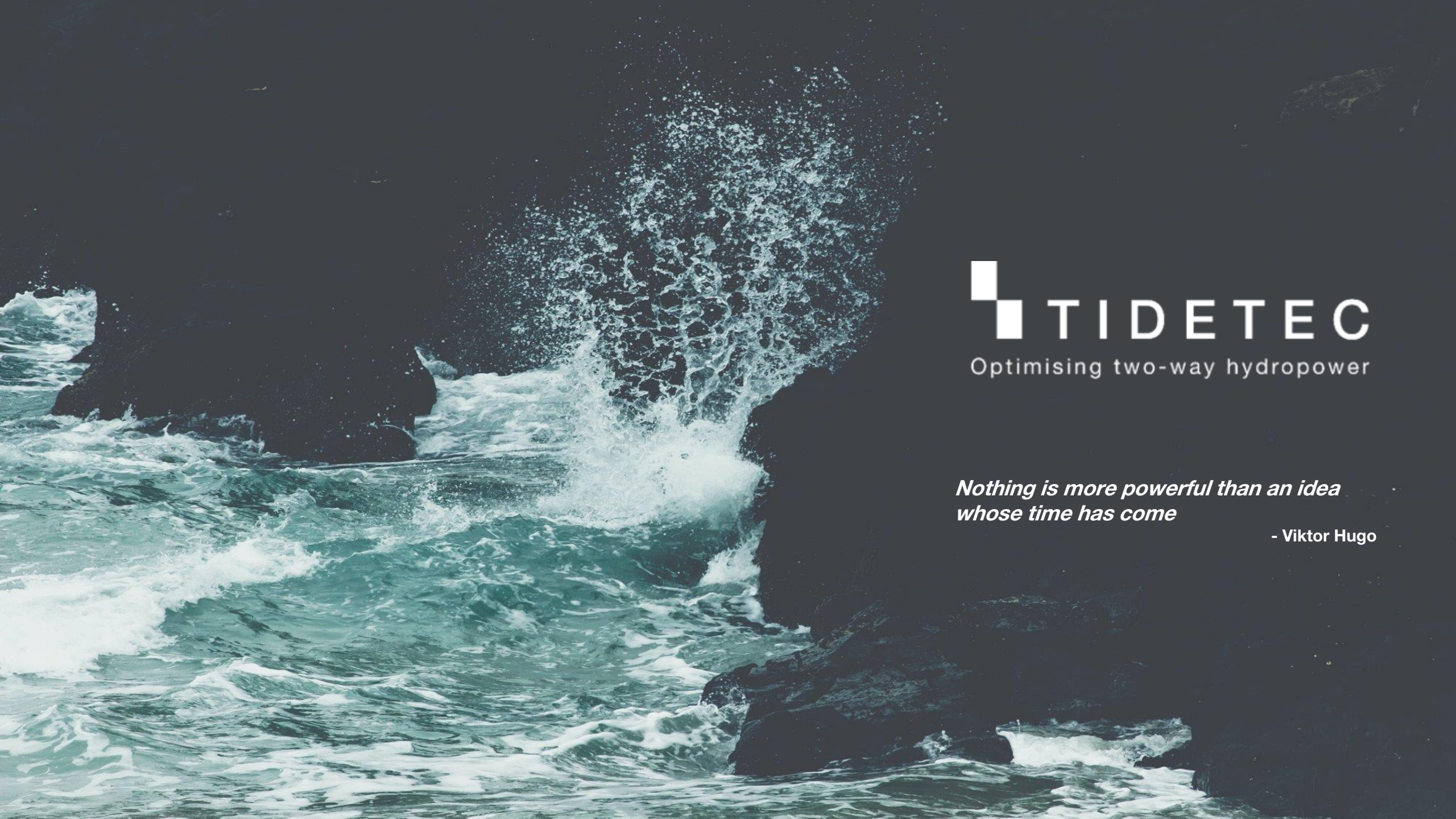

TIDETEC
Optimising two-way hydropower
Nothing is more powerful than an idea whose time has come
- Viktor Hugo

TIDETEC
Optimising two-way hydropower

A world in transition

Renewable energy challenge:

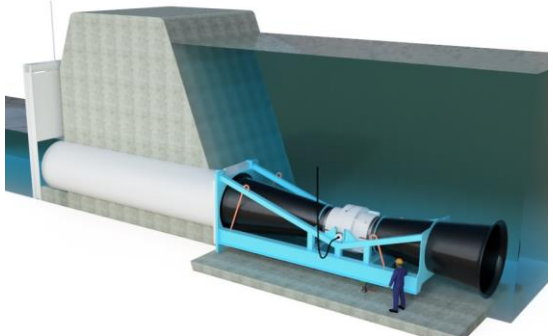
1. **What do you do when the wind is not blowing, and the sun is not shining?**
2. **What do you do when there is too much intermittent energy, and you cannot get paid for what you are producing?**

Tidetec harnesses the power of tidal range to provide predictable and clean energy:

- **Low cost of energy**
- **Provides energy storage**
- **Stabilizes intermittent energy sources**
- **Low noise and visibility**
- **Can provide flood protection**

Tidetec has a patented rotating turbine solution, allowing for optimal use of tidal range turbines to generate energy from the head difference of the tides

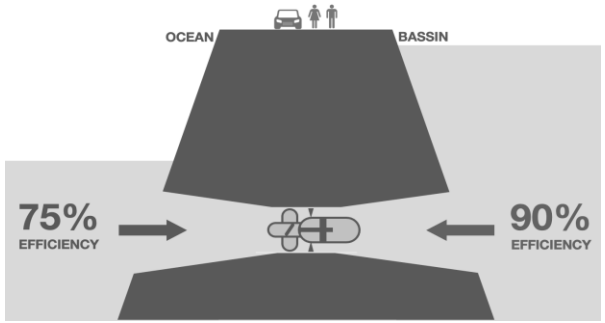
- **Providing both energy generation and energy storage**

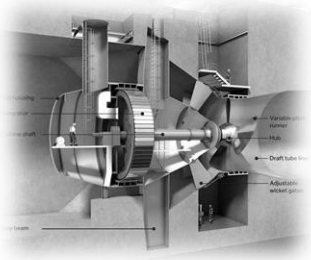


TIDETEC
Optimising two-way hydropower

Why Tidetec?

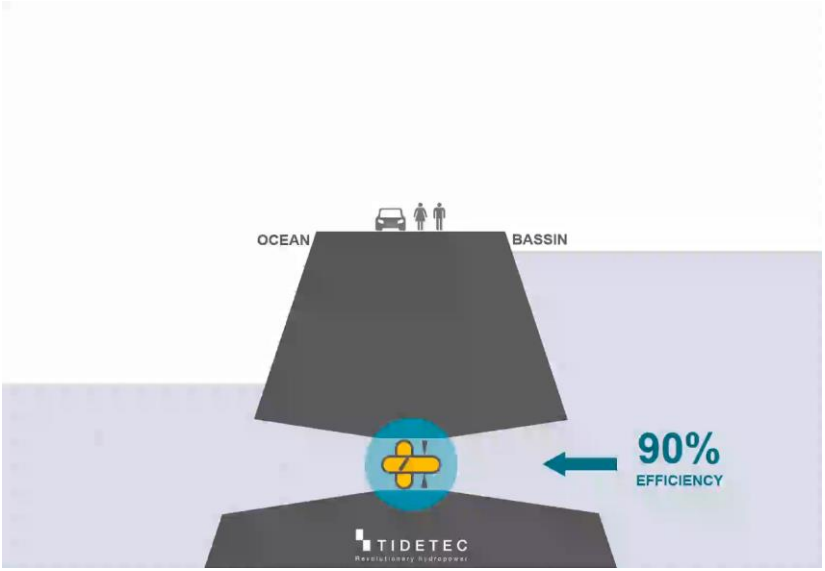
CONVENTIONAL TURBINES

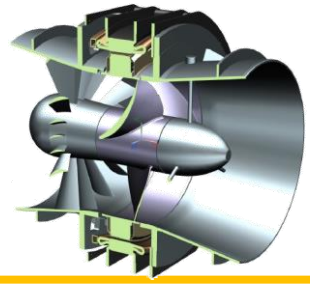




TIDETEC

- Optimal generation and pumping in both directions
  - (up to 30% increase in energy generation)
- Lower CAPEX (- 20% investment)
- Lower OPEX (- 40% cost)
  - Lighter and simpler turbine





TIDETEC
Optimising two-way hydropower

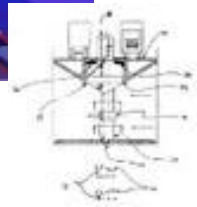
Our History

2003
Tidetec founded
by Per Kollandsrud

2013
Arne
Kollandsrud
hired as MD

2013
Eurostars project – not approved
"Wrong partner"

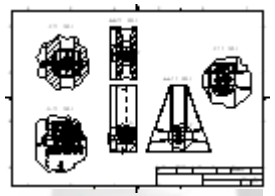
2014-2017
MEUR 1.9 Eurostars project
3 employees



3 patents

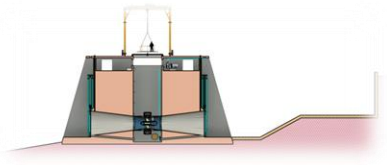
2015
Nomination at
Tidal Energy Summit 2015

2016
New patent Rolling turret filed



2016
Functional scale model turning
mechanism tested in sea water

2017
Tidetec featured as promising
technology in Hendry review
All-Energy prize
Model turbine tested

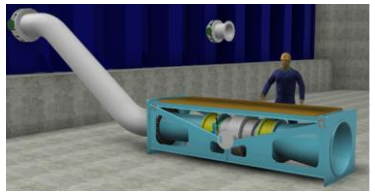


2018: National funding: Innovation Norway supported pre-project activities for a pilot project

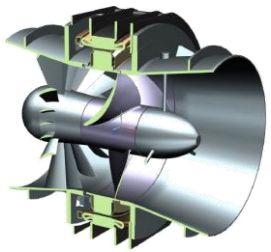
2017/18
MoU Atlantis
Wyre
Patent granted

2019
Collaboration Mersey Tidal
Project ++
Europe patent granted
2021 Conceptual design
and Pilot/Demonstrator

2021
Increasing to 6 employees
Pilot project design basis and
upscaling of model turbine + EU
project Fibregy
Fundraising and soft funding
secure runway until 2023



2022
Finished detail
engineering of small
scale pilot
Building consortium for
demonstrator full-scale
project
Pre-feed for new
markets within
hydropower.



TIDETEC
Optimising two-way hydropower

Challenges - applications

- 2013 Eurostar approved in EU, but not with the Spanish partner
  - Spain has spent their quota on projects

✓ 2014-2018 Eurostar granted with a new German partner

✓ 2019-2024: Tidetec was invited in H2020 project Fibregy + IN funding
  - An important step for Tidetec , Project not on Tidetec terms,
  - Not completely ready for marine demonstration, it did not take us all the way due to the program-focus (we were only invited in)
  - Comprehensive final reporting (Audit certificate etc.)

- 2023: EIC accelerator: Time consuming but not approved

- 2024: EIC Accelerator – reached final stage, received no grants, but Seal of Excellence.
  - Spent a lot of time and money on application for grants instead of spending money to develop the product

✓ 2025: Demo project with softfunding (IN + REALIZE+ eksfin + industrial partner)

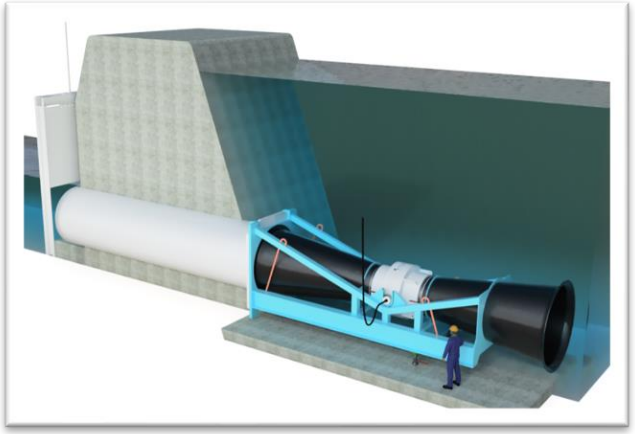
TIDETEC
Optimising two-way hydropower

Challenges – outside funding

- Tidetec require large infrastructure - is not so easy to get a small pilot

- Market has still not kicked off, but there are many early-stage projects
  - Lots of interest but limited realization and cash
  - 2022-2025: Tidalinabox activities + demo project prep and industrial partner search

- Get in touch and work with large companies/governments
  - Are time-consuming and time to decision is long



«Tidal-in-a-box» solutions: Integrated in existing infrastructure dry-docks, port basins

TIDETEC
Optimising two-way hydropower

Lesson learnt

- In the beginning - Be patient and use all the opportunities that come your way
- After some time, you will have to select on the opportunities,
  - there may be too many programs which are not targeting your technology, but you will get invitations.
- Try to get a pilot and pilot customer, proof of your technology is “everything”
- When applying for application
  - Note the success/selection criteria.
  - It is easy to be too much in the “project world” and forget what information will give you grant.

Heidelberg Materials

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment I Heidelberg Materials I Fredericq Peigneux I Brussels

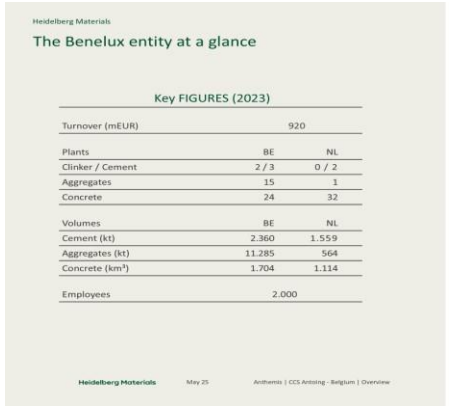
May 25

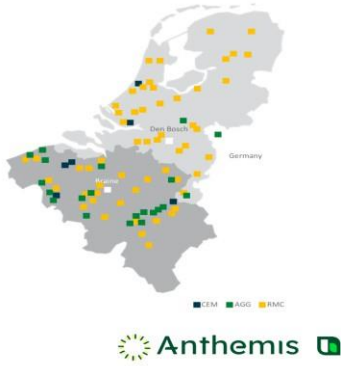
Heidelberg Materials

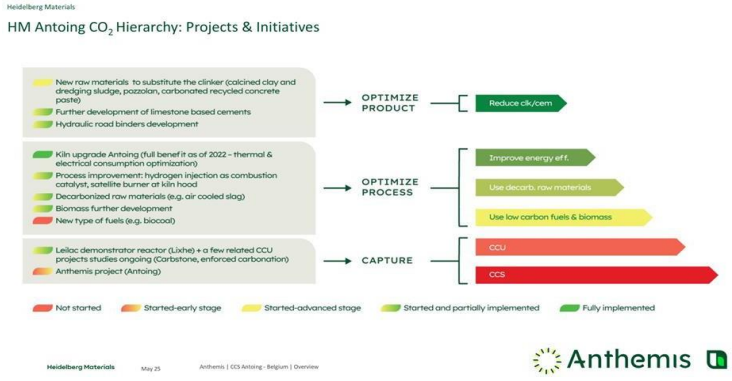
Anthemis

Heidelberg Materials is one of the world's largest building materials companies

Heidelberg Materials is set ambitious 2030 targets on the way towards Net Zero 2050







Heidelberg Materials 14.05.2024

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment | Heidelberg Materials | Frederica Peigneux | Brussels

Anthemis

Heidelberg Materials is one of the world's largest building materials companies

2024: Agreements with main stakeholders & prepare the permit application

2025: Anthemis CCS submitted IF proposal (EUIF 24 call)

INNOVATION FUND
Driving clean innovative technologies towards the market

Rationale and Motivation:
Industry leader on the road to carbon neutrality by 2050.

HM Benelux : Equip its Antoing facility with an innovative second-generation system based on Oxyfuel pre-combustion CC technology (*).

Thanks to Anthemis project :

- Put a new standard in Emissions and Efficiency of CCS (reference for the cement industry) – Role Model
- Have the first full scale continental European clinker plant fully connected by pipeline to offshore storage (around 900ktpa)
- Enabling larger cost-effective "Source-to-Sink" value chain for HM and other emitters in NWE
- > 15 Mt net zero Cement to the market (over 10 years)

* Combustion process that consists of burning fuel using pure oxygen
  - Oxyfuel 1.0: 1st generation, suitable for retrofitting existing plants
  - Oxyfuel 2.0: 2nd generation, suitable for new cement plants

Anthemis

CEMCAP: CO2 capture from cement production

Horizon 2020 - EU 3.3.2.3 Develop competitive and environmentally safe technologies for CO2 capture, transport, storage and re-use (GA n° 641185)

Duration: May 2015 – October 2018 **EU contribution: 8,7M €**

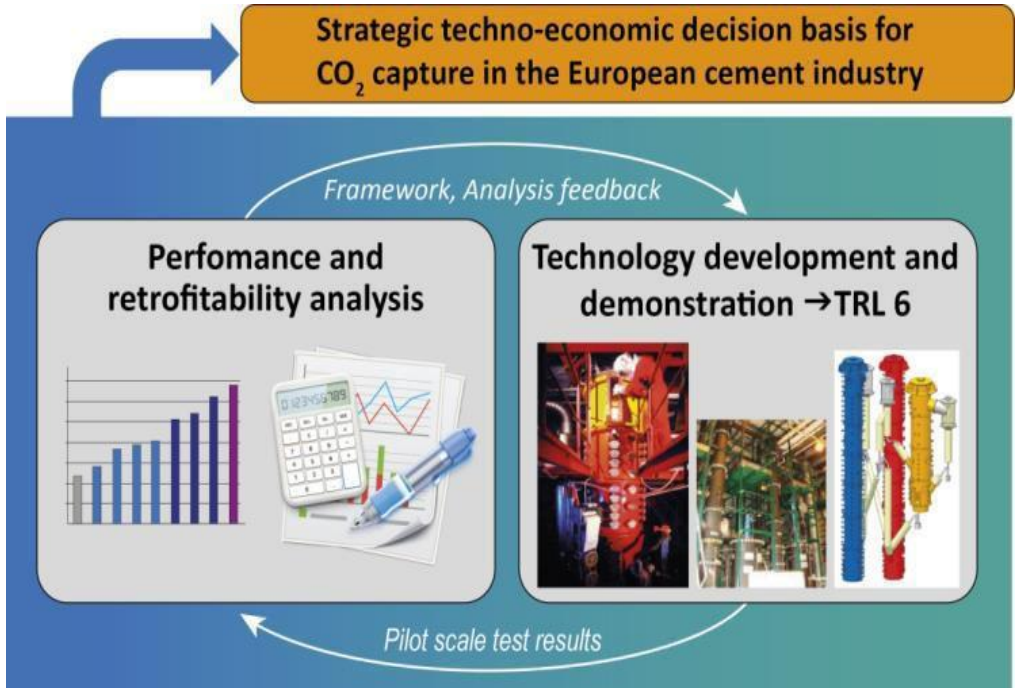
Main objective: to **prepare the ground for large-scale implementation of CO2 capture** in the European cement industry.

Specific Objectives:

- Identify high potential CC technologies to **retrofit existing cement plants in a cost- and resource-effective** manner, maintaining product quality and environmental compatibility.
- Leverage to TRL6 for cement plants Oxyfuel and 3 different post-combustion combustion CC technologies, all with a targeted capture rate of 90%.
- **Formulate Techno-economic basis and retro-fitability potential** for CC implementation in the cement industry, where the current uncertainty regarding CO2 capture cost is reduced by at least 50%.

Main role of HM in CEMCAP:

- **Support pilot on Oxyfuel**
- **Lead clinker cooler design and on-site testing (**in plant (DE))



Coordinator

SINTEF

Participants

ecra european cement research academy

thyssenkrupp

Heidelberg Materials

CSIC

POLITECNICO MILANO 1863

Universität Stuttgart

IKN

vdz

GE Energy

NORCEM HEIDELBERGCEMENT Group

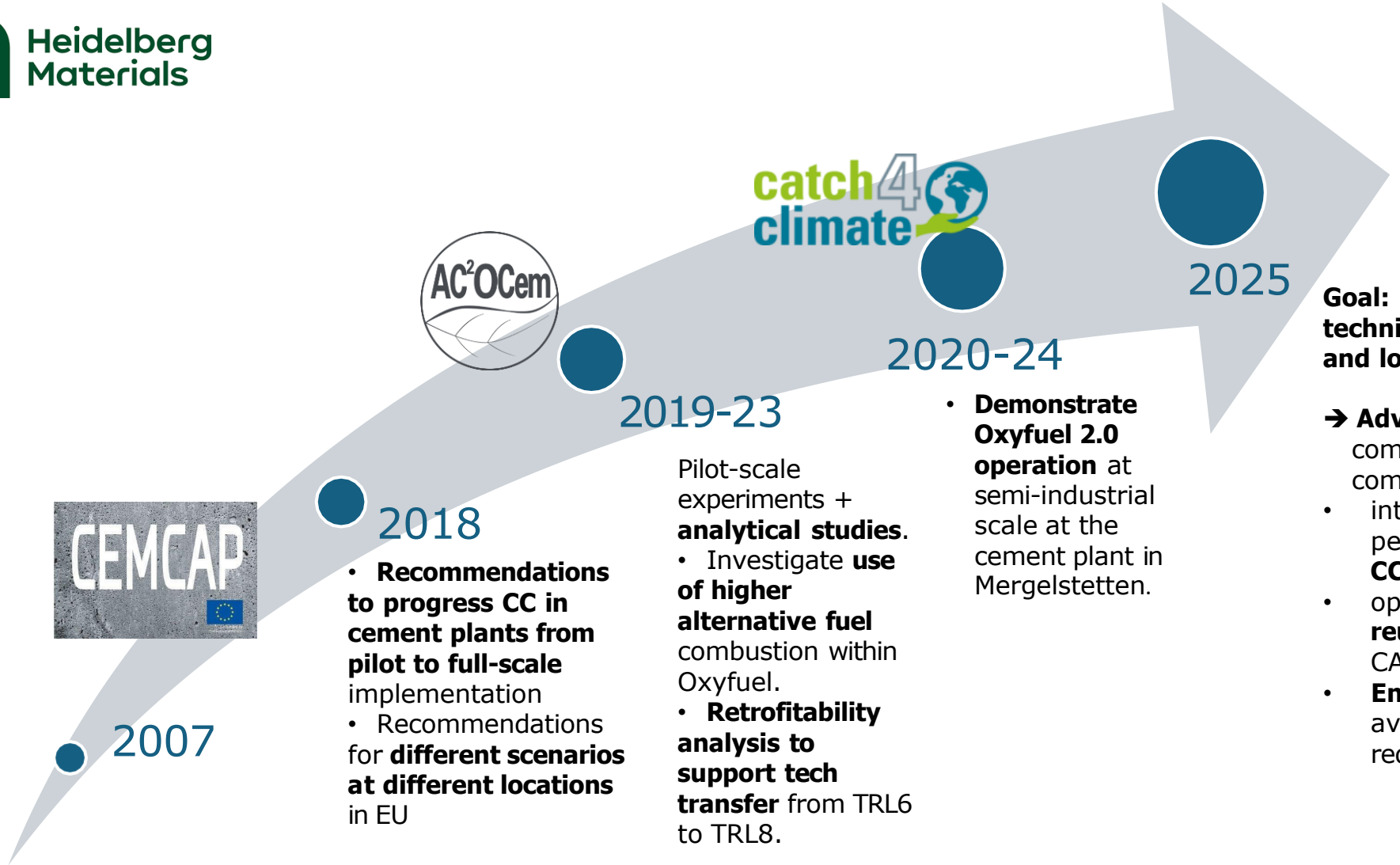
TNO innovation for life

HM journey from CEMCAP to Anthemis

Heidelberg Materials

HORIZON 2020

INNOVATION FUND
Driving clean innovative technologies towards the market



ECRA starts **development of Oxyfuel** for cement kilns

Goal: strike a better balance between technical feasibility, economic viability, and long-term process reliability.

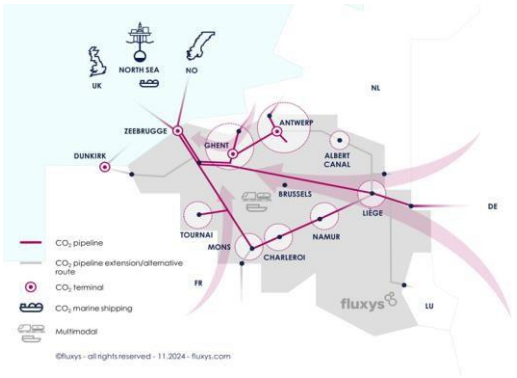
➔ **Advanced Oxyfuel concept,** a pre-combustion Oxyfuel + cryogenic post-combustion CO_2 CPU.

- integrated approach with high-performance and more **streamlined CC process.**
- optimal **energy performance and reuse of existing assets** ➔ minimise CAPEX investment.
- **Enhances production capacity** and avoids extended downtime typically required for kiln replacement.

** AC²OCem is funded through the ACT program (Accelerating CCS Technologies, Horizon2020 Project No 299663).*

Anthemis

Lessons learnt : Technicalities….and much more



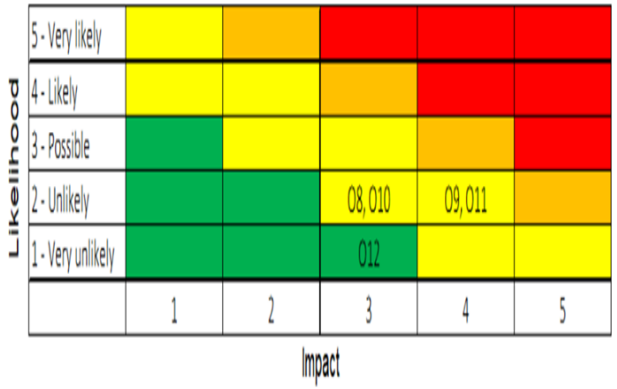


Figure 24: Roundtable panel

Anthemis

Disclaimer

Unless otherwise indicated, the financial information provided herein has been prepared under International Financial Reporting Standards (IFRS).

This presentation contains forward-looking statements and information. Forward-looking statements and information are statements that are not historical facts, related to future, not past, events. They include statements about our believes and expectations and the assumptions underlying them. These statements and information are based on plans, estimates, projections as they are currently available to the management of Heidelberg Materials. Forward-looking statements and information therefore speak only as of the date they are made, and we undertake no obligation to update publicly any of them in light of new information or future events.

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"Operating EBITDA" definition included in this presentation represents "Result from current operations before depreciation and amortization (RCOBD)" and "Operating Income" represents "Result from current operations (RCO)" lines in the annual and interim reports.

Public Conference
20 May 2025, 9.00 - 17.00
Brussels

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Session 3: Thematic breakout sessions

Jan-Erik Hanssen
1-Tech
Renewables

Andrea Rausa
Ciaotech
CCUS

Kristian Aas
SINTEF
EEI

Federico Spadaro
CLERENS
Hydrogen &
Energy storage

Maria Mazuera
CLERENS
Hydrogen &
Energy storage

REALIZE H2IF 2DPLOY LEADS

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Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thematic Breakout Session:

Innovative Renewable Energy Technologies (i-RETs)

Dr. Jan Erik Hanssen (1-Tech BV, Brussels), REALIZE

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels: 14h00 to 15h30

Thematic Break-out session on i-RETs

- Welcome and Brief introduction. Scope and Objectives of session.

- **REALIZE Project Promoter presentation:**
  Experience with creating an IF Pilot project on offshore wind following previous Horizon and National projects; Pedro Mayorga, CEO Enerocean (Málaga, Spain) via videolink + Short Q&A.

- **Other topical issues for IF projects on i-RET's**
  - New advanced Biofuels
  - Role of Grid improvements
  - Other subjects of interest to breakout participants

- **Summary Discussion – Aligning IF & Horizon for i-RETs**
  - Value of Go-/No-Go criteria in Horizon IA's
  - Other possible improvements: IF and Horizon

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thank you!

Jan Erik Hanssen, +32 474.980.616
hanssen@1-tech.net

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REALIZE

"Experience with creating an IF Pilot project on offshore wind following previous Horizon and National projects;".

The W2Power Solution and the Primavera-PP Project.

Pedro Mayorga, CEO , Enerocean

enerOCEAN

W2POWER

COMPANY AND TECHNOLOGY

EnerOcean & Primavera Offshore Wind

EnerOcean, a highly innovative and dynamic Spanish company specializing in Marine Energy Engineering.

Founded in Malaga 2007.
Developer of W2Power floating wind technology.
Owner of all related IP, including patents, in all relevant floating windpower markets.

Management team combine over 100 years of experience in relevant industries

Member of the Eni group, with Plenitude as largest industrial shareholder since 2022.

Founder of Primavera Offshore Wind S.L., the SPV set up in Tenerife to build the full-size Demonstrator of W2Power.

W2Power

First twin-turbine solution in the world and First floating wind prototype in Spain to successfully complete open-sea testing.

Twin turbine semi-submersible floating wind platform with highest power per tonne of steel on the market.

Design Certification by Bureau Veritas for 15 MW version.
20+ MW commercial product in advanced development.

Self-orienting mooring system enables accurate, responsive platform alignment.
No turbine yaw – No active ballasting: Low Opex.

Full-size demonstrator *Primavera* incorporates a pair of 5.5 MW commercially available, bankable wind turbines.

PRIMAVERA PP :FLOATING WIND PROJECT

Annual Energy Generation Capacity: >55 GWh

Location: Port of Granadilla, Tenerife, Spain

Wind Turbines: Two Commercially available 5.5 MW Units

Business Model:
20+ MW demand identified in port & industrial area and interest confirmed. Project is a test bed for private commercial offtake.

Permitting:
Application for required area in port waters accepted and environmental impact studies completed.
Electrical Connection Access application granted.

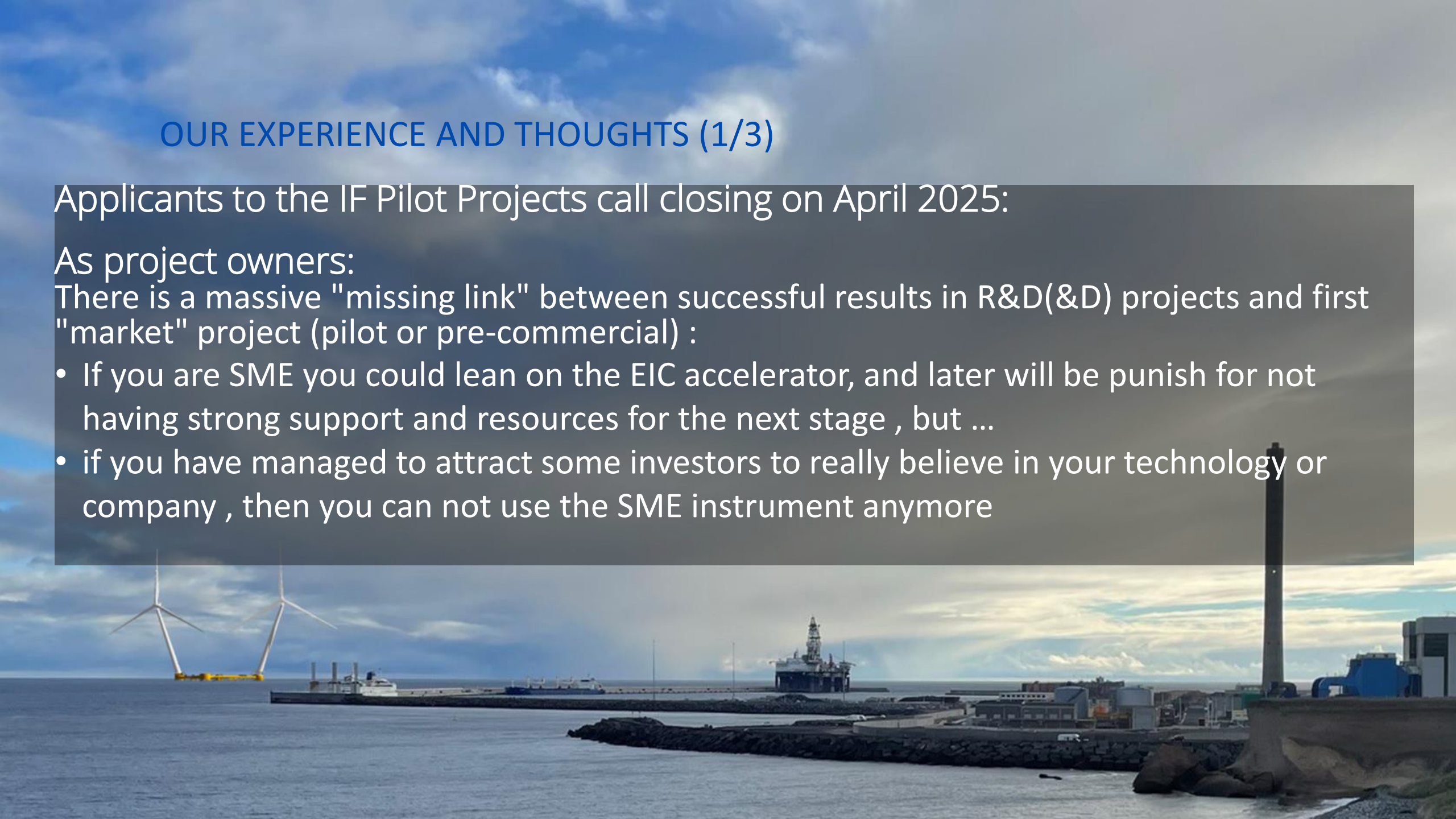
OUR EXPERIENCE AND THOUGHTS (1/3)

Applicants to the IF Pilot Projects call closing on April 2025:

As project owners:

There is a massive "missing link" between successful results in R&D(&D) projects and first "market" project (pilot or pre-commercial) :

- If you are SME you could lean on the EIC accelerator, and later will be punish for not having strong support and resources for the next stage , but …
- if you have managed to attract some investors to really believe in your technology or company , then you can not use the SME instrument anymore



OUR EXPERIENCE AND THOUGHTS (2/3)

Applicants to the IF Pilot Projects call closing on April 2025:

As Horizon successful beneficiaries:

The initial support to achieve exploitation of results can be included into the support (not necessarily funding) received in the Horizon project . This support should be linked to results actually obtained, not to beautifully draft plans at the proposal stage :

- **More support to excellent project "executers"**
- **Not “more prize” to "good proposal writters"**

We consider ourselves in a difficult conundrum as if you try to be realistic and prepare projects that can be done, we are penalized in comparison to "poets" that later abandon the projects

•The limited funding for Demo (IA) projects, the needed cooperation in Horizon Europe projects, that divides the resources and the increasing capital requirements makes the gap to be filled even bigger

•Maybe EC services could provide a linking support between Horizon (RIA) and Demonstration (IA) or even Pilot to expand the results into next stages based on performance/ not in proposal writting

OUR EXPERIENCE AND THOUGHTS (3/3)

Applicants to the IF Pilot Projects call closing on April 2025:

As IF applicants:

Very hard balance into defining the project in technical terms and advancing in financing commitments, public and private, for a project that needs to be innovative to make an impact. PRIMAVERA PP is a enabler of a longer to be able to pass this hurdle

Project maturity is very highly rewarding external "feasibility reports" instead of recognizing the value of: - Actual effort already dedicated, - Permitting really advanced (grid connection, area securing, environmental study ready) or technology certification

Thank you for your attention

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Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

20 May 2025, Brussels

Break-out Session: CCUS

Andrea Rausa, Coordinator, LEADS

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Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

20 May 2025, Brussels

- Intro - Andrea Rausa, LEADS Coordinator (5 min)
- Status of CCUS in Europe - Aymeric Amand, Policy Manager ZEP (10’)
- The LEADS project: goals, activities and results – Andrea Rausa (10’)
- LEADS Project owners presentations: (30’)
    - TNO – Soraya Sluijter, Specialist Researcher TNO
    - NOVIS – Thomas Helle, General Director NOVIS GmhB
    - Avantium - Annelie Jongerius, Programme Manager Avantium
- Panel discussion with Q&A from the audience (30’)
- Closing remarks – Andrea Rausa (5’)

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LEADS

BRIDGING THE INNOVATION GAP

Creating and managing a pipeLine of H2020 projEcts for the InnovAtion FunD on CCUS

Andrea Rausa - Project Coordinator

Creating and managing a pipeline of h2020 projects for the Innovation Fund on CCUS (Grant Agreement No. 101137584). Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Project Summary

Call: HORIZON-CL5-2023-D2-01

Topic: HORIZON-CL5-2023-D2-01-07 - Synergies with the ETS Innovation Fund

Type of Action: Coordination and Support Action (CSA)

Start date and duration: 1 January 2024 - 31 December 2026 (36 months)

Total Grant Amount: €933.139,93

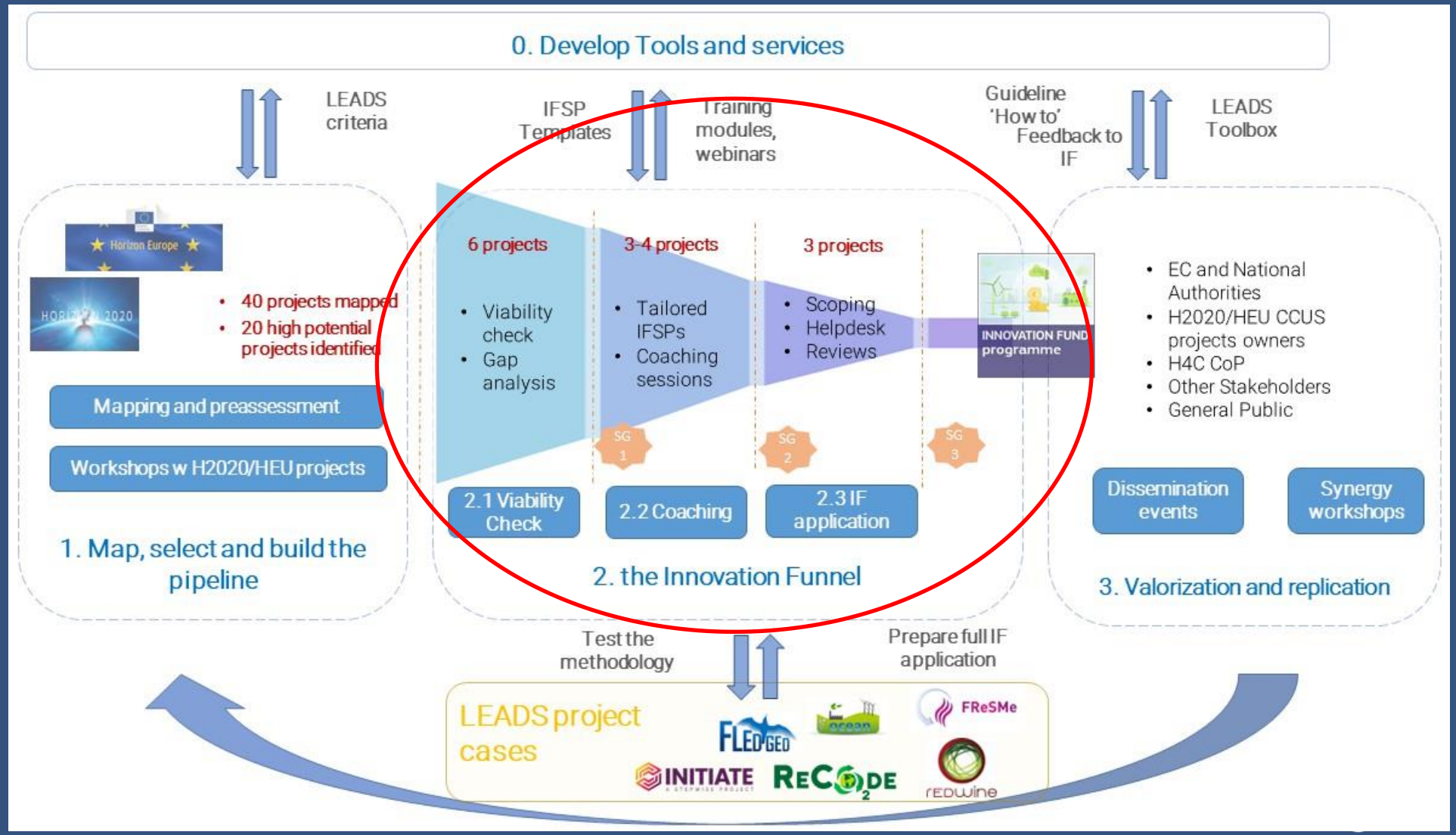
Partners

Work packages

WP	WP Title	Lead Participant
WP1	Mapping, assessment and selection	ADM
WP2	Coaching and capacity building	PNO
WP3	Building the innovation pipeline and promotion of synergies	A.SPIRE
WP4	Tools and services	PNO
WP5	Dissemination, Communication & Exploitation	A.SPIRE
WP6	Management and Coordination	PNO

The project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101137584

LEADS concept and methodology



The project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101137584

LEADS methodology – 1st round 2024

- 3 teams formed by
  - 1 PNO consultant (lead);
  - 1 ADM expert (GHG emissions);
  - project owner representatives

TNO

avantium

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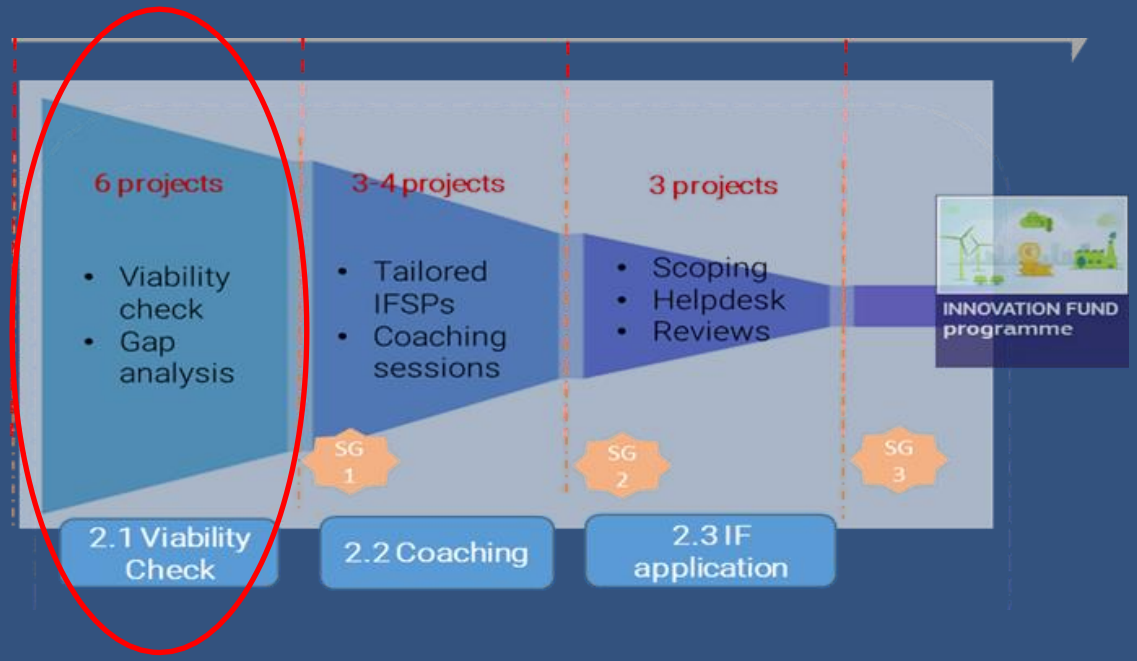
- Chinese walls to preserve confidentiality
- Work in parallel along the whole process
- Mix of in-person and online meetings
- Non confidential information will be reported in project Deliverables + lessons learnt for external dissemination



➔ None of the projects moved to Stage 2.2

- 2nd round of VC started in March 25

LEADS

The project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101137584

LEADS methodology – 1st round 2024

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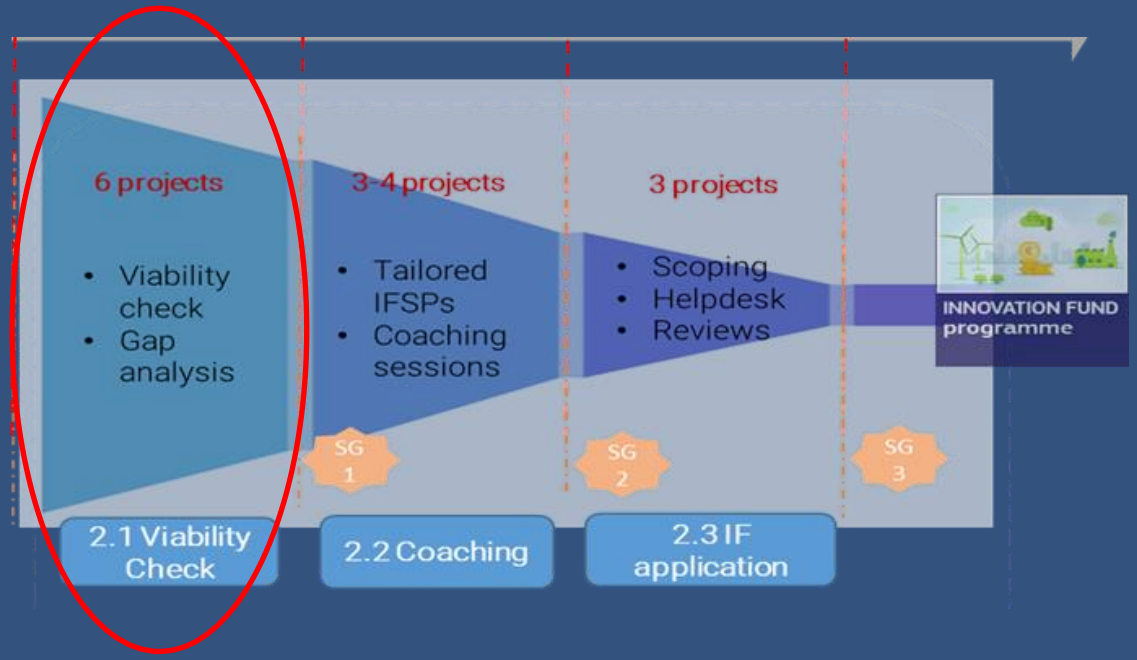

- LEADS experts got in touch with other 3 external projects
- 1 project ANTHEMIS (HM B) supported in DoI and technical maturity
- Applied to IF Call April 24

LEADS

The project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101137584

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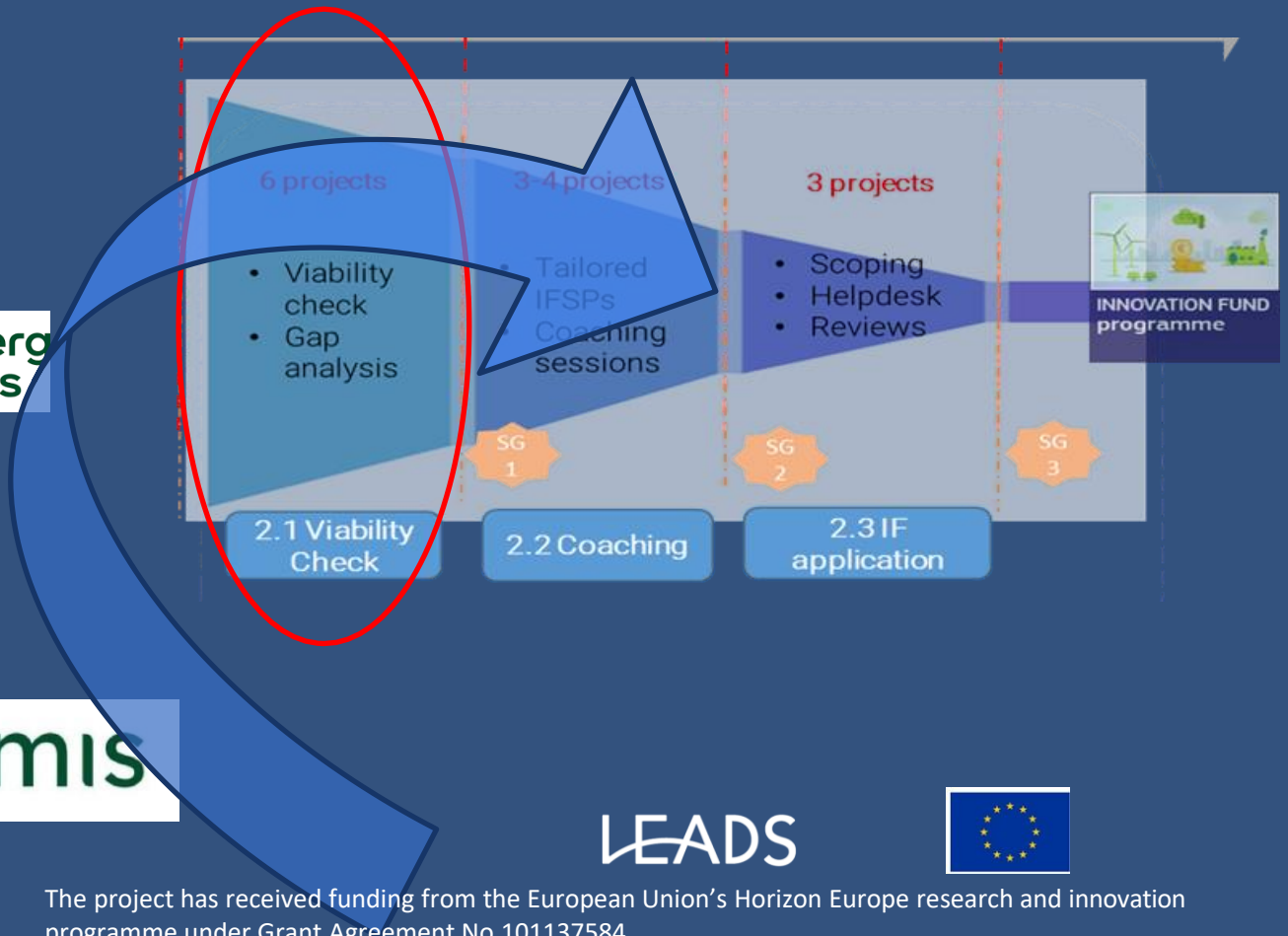


LEADS

The project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101137584

LEADS

BRIDGING THE INNOVATION GAP

Scaling-up Sorption Enhanced CCUS technologies

Soraya Sluijter, TNO

Creating and managing a pipeline of H2020 projects for the Innovation Fund on CCUS (Grant Agreement No. 101137584). Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

TNO – INNOVATION FOR LIFE

TNO connects people and knowledge to create innovations that boost companies' competitiveness and sustainably increase well-being across society. TNO stands apart through its unique knowledge base.

- Founded by law in 1932
- Not for profit

CCUS @ TNO

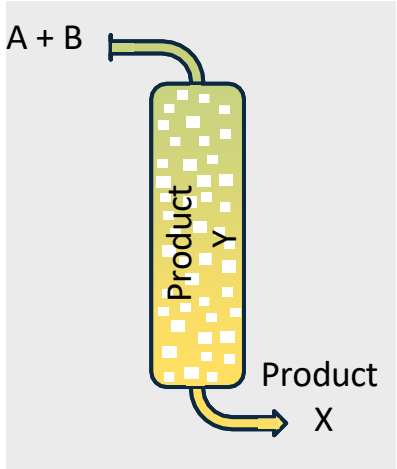
- **Capture:**
- Pre and post- combustion , hard to abate industries
- BECCS, Direct Air capture
- **Utilisation:**
- Efficiently converting CO_2 into chemical building blocks, sustainable fuels and plastics
- **Transport and Storage**

LEADS

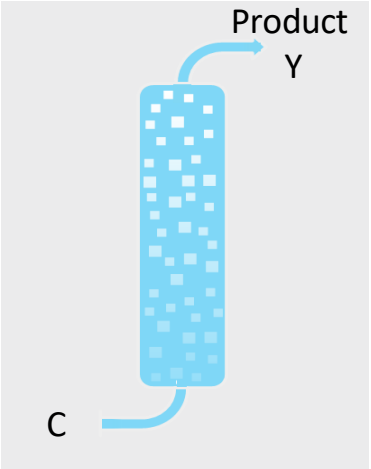
TNO innovation for life

SORPTION ENHANCED CCUS

SEWGS, SEDMES and COMAX all are technologies that **combine reaction and separation in one system** for Carbon Capture and Utilization, resulting in more efficient and cost-effective technologies than their state-of-the-art alternatives.

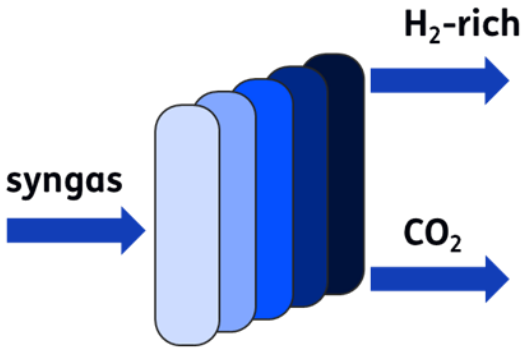


ADSORPTION & REACTION



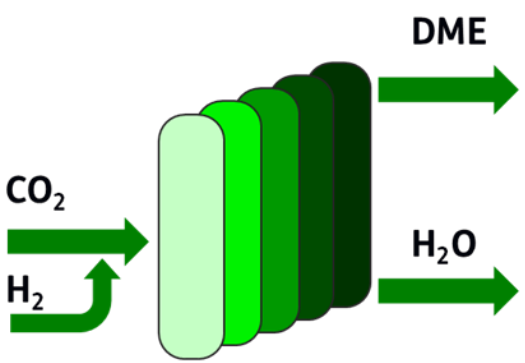
REGENERATION

SEWGS



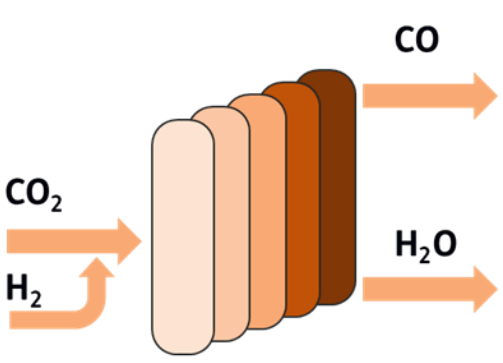
$CO + H_2O \rightarrow CO_2\downarrow + H_2$

SEDMES

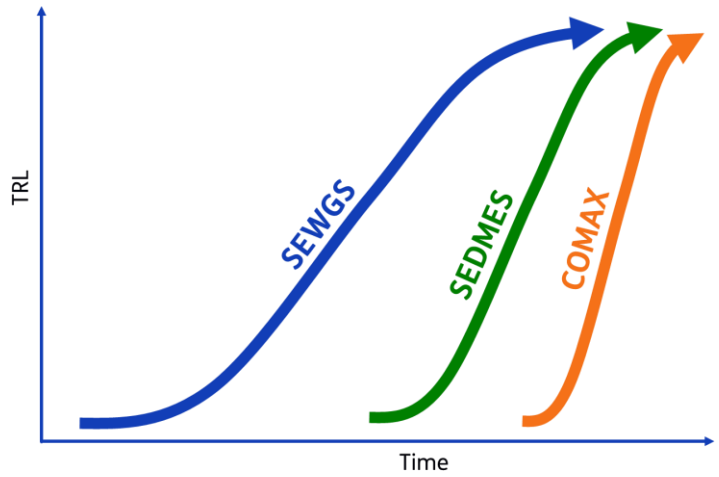


$2\ CO_2 + 6\ H_2 \rightarrow 3\ H_2O\downarrow + CH_3OCH_3$

COMAX



$CO_2 + H_2 \rightarrow H_2O\downarrow + CO$



LEADS

TNO innovation for life

SEWGS-TIMELINE

2004 — Proof of Concept at lab scale

2008 — CACHET
Bench scale validatio, single column.

2011 — CAESAR
Process and material development, low steam use

2015 — STEPWISE
TRL6 Single Column Demo at Steel plant (Lulea, Sweden)

2016 — FRESME
TRL6 Single Column Demo for Methanol

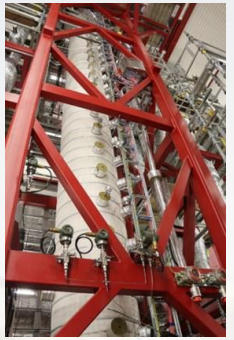
2019 — INITIATE
TRL6 Multi Column Demo for Ammmonia

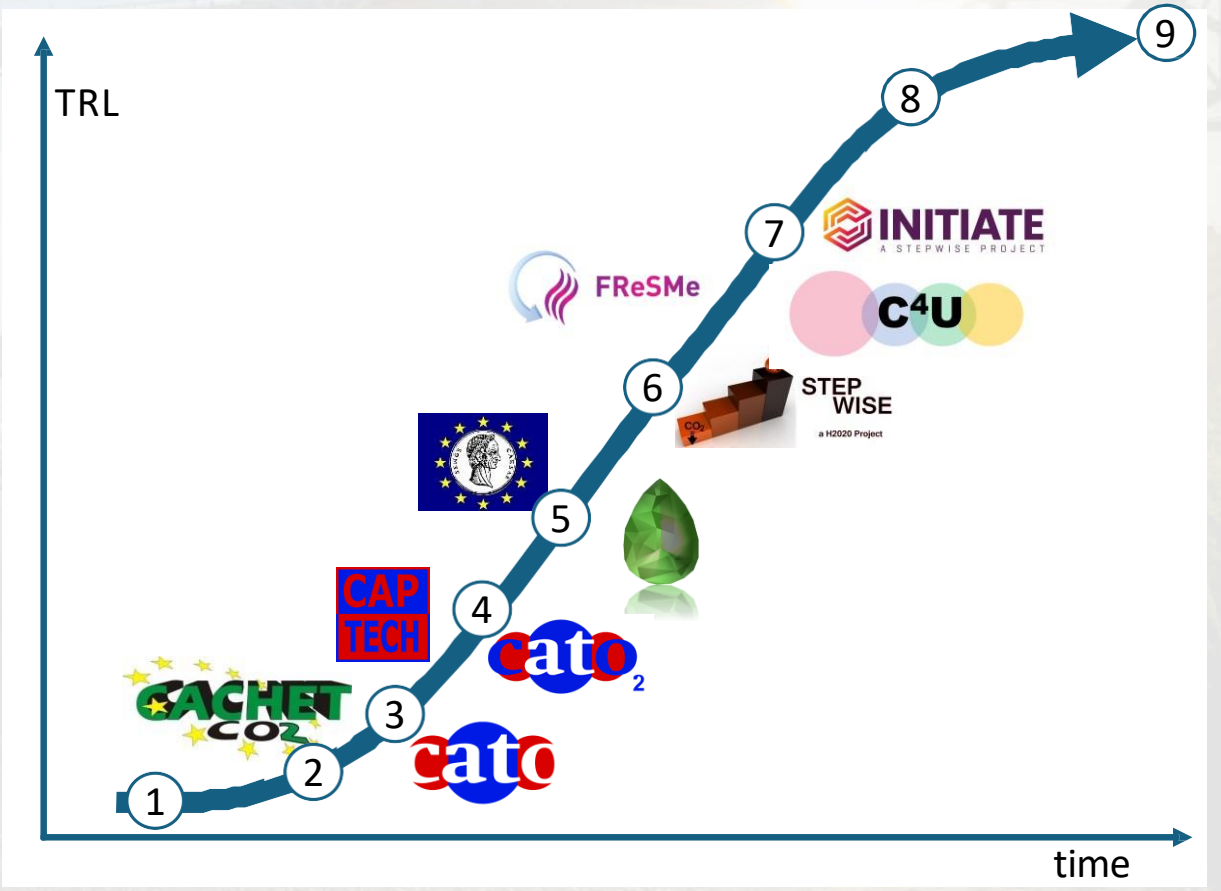
2024 — LICENSE AGREEMENT
License agreement signed with Paul Würth Italy in Iron & Steel

2026 — INNOVATION FUND (IF) PROPOSAL

2029 — IF: TRL8 STEEL INDUSTRY OPERATIONAL
First of a kind TRL8 plant in Steel industry



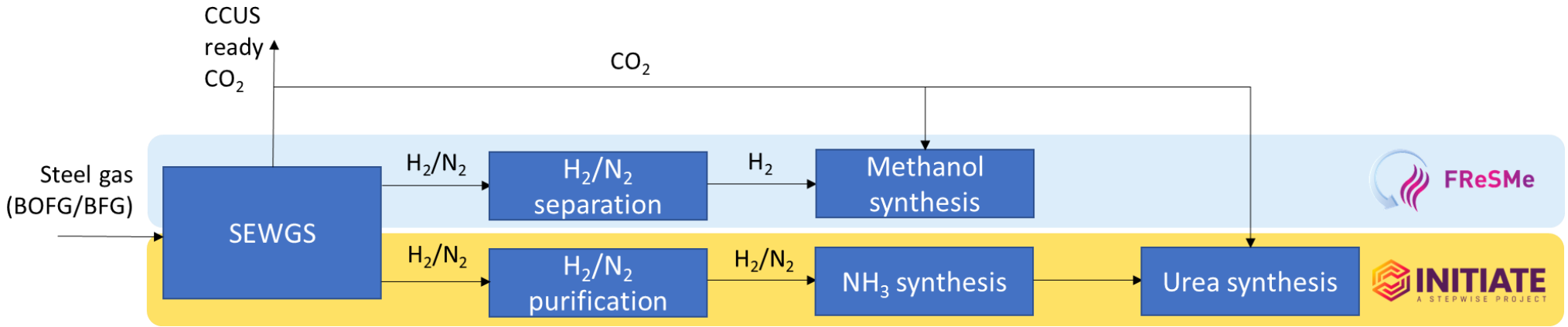
LEARNINGS & CHALLENGES

LEADS

1 IF: Determining product is key and depends on end-user

2 TNO will not be the party to apply for innovation fund, building consortium remains key!

3 Keep involving relevant partners and study TEA & LCA as early as possible



TNO innovation for life

LEADS

TNO innovation for life

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LEADS

BRIDGING THE INNOVATION GAP

Introduction to Volta Technology

Creating and managing a pipeline of h2020 projects for the Innovation Fund on CCUS (Grant Agreement No. 101137584). Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

avantium

EURONEXT

Ticker: **AVTX**
Amsterdam & **Brussels**

Headquartered in **Amsterdam**

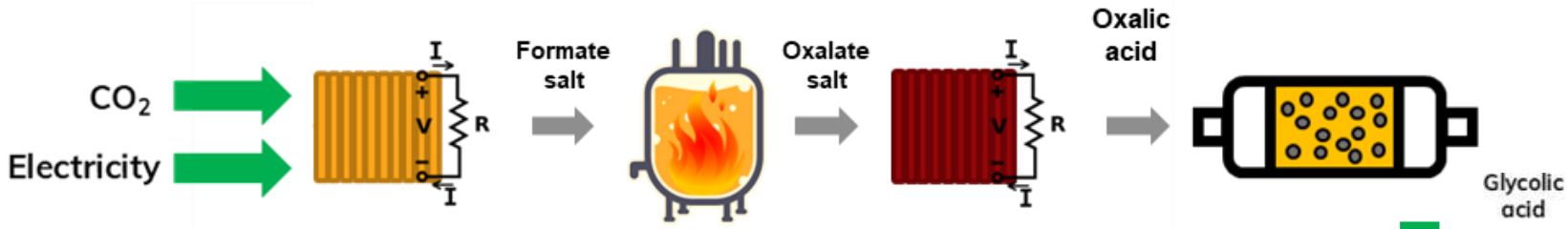
150+
patent families

280
>75% scientists
20+ nationalities
1/3 female

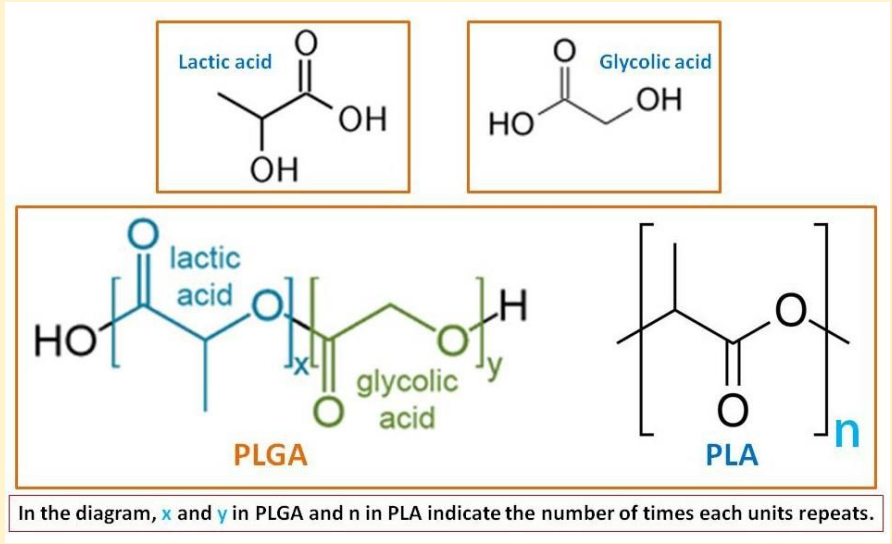
Transforming Emissions into Essential Materials

Volta Technology is a unique electrochemical process that converts CO_2 in a clean way to sustainable plastics and chemicals, creating value and optimizing efficiency.

This optimized polymer is referred to as PLGA or poly-lactic co-glycolic acid.



Lactic Acid



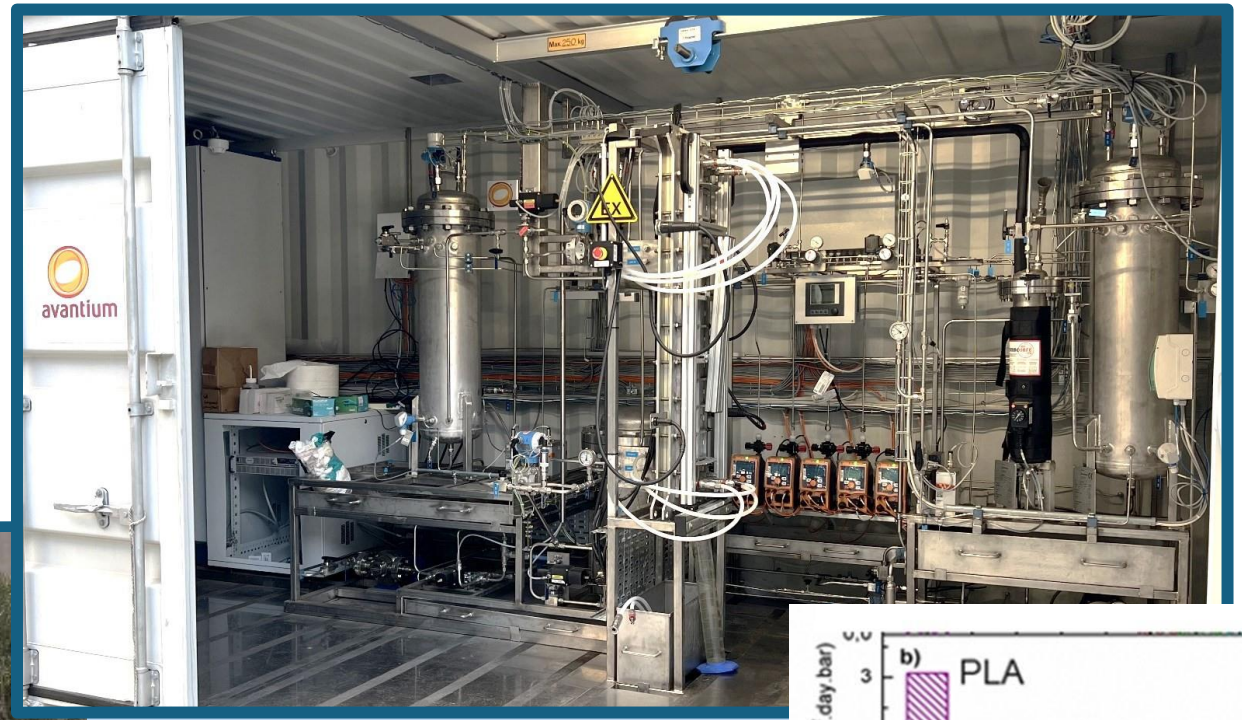
avantium

These projects have received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 767798 and No 768583

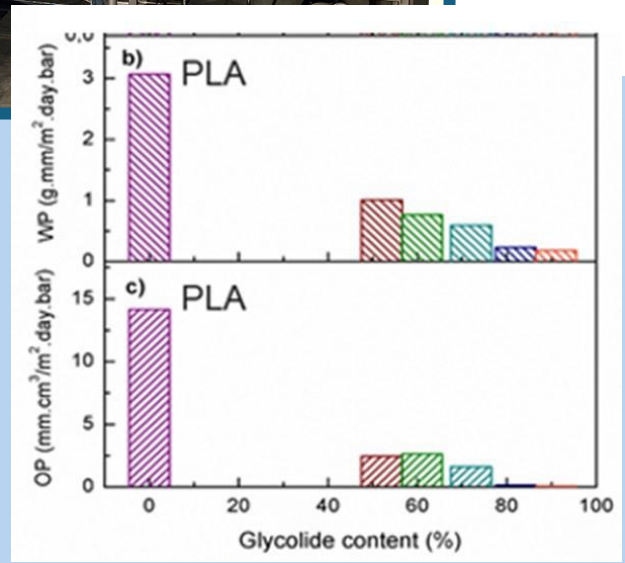
OCEAN and RECODE Demonstration at TRL5/6

CO_2 → Formate

- 20 ft containers
- 0.25 – 0.5 kg/h
- Cell size 0.2 m^2



- Formate to Oxalate
- Oxalic acid hydrogentation
- PLGA properties



Outlook CO_2 to formate and PLGA value chain

2022	2025	Future
Single cell (0.2 m^2)	Stacked cells (6x0.2m^2)	Full stack 10x1m2
250 g/h formate	5 kg/h formate	100-ton formate/year
1000+ hours stability	Salt recovery & product separation (end users)	Fully integrated upstream & downstream

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Funded by the European Union

This project is supported by the Circular Bio-based Europe Joint Undertaking and its members.

Co-funded by the European Union

Challenges from R&I to implementation

1

Innovation takes time

- First of its kind technology
- Novel market applications

2

Public funding for CO_2 emissions reduction

- Often compared to CCS
- Most GHG savings are in Scope 3

3

Learnings from PEF

- Shorten product development timeline
- Scaling up using commercial monomers/materials

The end

I F Application Novis
CO2Pro 2025

Project Brief

Decarbonisation of Industry is …

Carbon Capture: Elektrodialysis

Highly innovative Approach of Capturing CO2 from Industrial Point Sources – patent secured

Carbon Use: Algae Photobioreactors

Patented (pend.) Novis Proprietary Technology for Algae Production and Subsequent Use

Added Value: 100% Decorbonisation – 100% Circular

Algae are used for direct sales, Cosmetics, Tensides, Paraffines and Alkohols, adding Value to the Textile Industry

first of a Kind …

BYSOA

First Pilots running, CO_2 purification from 10 to 100% ➔ Liquefaction Pilot 3rd year

Algae Photobioreactors

Space demand: < 5 % of standard plate, pipe or open pond systems

100% Decorbonisation – 100% Circular

RedWine and CAPTUS: Algae offtakers are secured; CHT is offtaker for tensides, lipids and alcohols (➔ prod. for textile industries)

Profitabel for Novis and Textile Industry!

Novis and Partners

Engineering Team Dr. Thomas Helle	**Max Jackisch** CTO	**Christopher Oechsner** Senior Engineer	**Lars Loitz** Biotech Assist.
BioTech Team Dr. Benitez de la Fuente	**Dr. Hennrich** Senior Researcher	**Ms. Ma** Senior Researcher	**Nico Winter** Reactor Development

Partner for the first pilot installation at KZW and five others in the company consortium

Research Partner and Communication to textile sector w/o application to IF

Research Partner and offtaker / redistributor to textile sector
w/o application to IF

Project Approach

Algae are sold directly

Novis is processing and selling centralized

Lipids, Algohols, … are sold to the offtakers(s)

Offtaker

Novis is buying dry Algae from Production Plant

Prod. Plant grows Algae with CO_2

100% of Flue Gases from Chimney

Target:
1.000.000 tons used and processed until 2038

Fine chemicals (detergents, Paraffines) are sold to Prod. Plant

Prod. Plant 1

Algae from Prod. Plant 1 is generating added value of 3.6 Million €, shared between plant and Novis 30% /70%

Decentralized CCU fits perfect for Medium Sized Companies and does not requiere very large installations

Remarks on I F

Challenges

To produce at least 300 Pages paper, instead on focussing on fast developping markets and technologies.

Restricted investment money, to go for a fast upscaling into the market and to develop all fields at the same time.

Thank you for listening!

novis

BioBased Technology

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

20 May 2025, Brussels

Break-out Session: CCUS

Summary of Panel Discussion

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- **General learning from LEADS project owners** after 16 months:
  - Realized we had limited knowledge of Innovation Fund at the beginning
  - The work with LEADS expert helped to realize the IF requirements and expectations
  - We realized that our R&I project is different from the IF project
- **CCS vs. CCU**: the two routes are often mixed, where there are several differences in terms of technologies (and technology paths), scale, products, markets, regulations/policies ➔ there is a need to open a transparent debate in Europe about these two routes before mixing them under a single topic

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

- **Main challenges in bringing CCUS projects to full deployment:**
  - Having good technologies but also
  - Business case: for this, applicants need to look at
    - ETS (revision under way, important especially for CCU projects)
    - Funding
    - Creating a demand (➔upcoming Industrial Decarbonization Act)
- **Collaboration is not only a nice to have, but a necessity in the case of CCUS**
  - Cluster-based approach
  - Collaboration among sectors and across the value chain
  - Regulators: need to distribute the price of high-risk pioneer projects, guide definition of CO2 specs

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- **Policy and Regulation**
  - Upcoming CO2 Transport legislation
  - Regulations are still moving at a slow pace ➔ need to decarbonize much faster if we want to reach 2050 climate goals
- **Public Support at National level** for operations of infrastructure, and funding

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thank you!

Andrea Rausa
a.Rausa@ciaotech.com

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Break out session – 2DPLOY - Energy Intensive Industries (EII)

2DPLOY TEAM

Kristian Aas, Coordinator (SINTEF)

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Agenda

- Welcome & Introduction
- 2DPLOY: The project
- (Field Insights: Direct Experience from the ground) TBD
- Open Discussion: “Market Deployment for Energy Intensive Industries”
  - Identifying the Gap
  - Filling the Gap
- Q&A and Interactive Discussion

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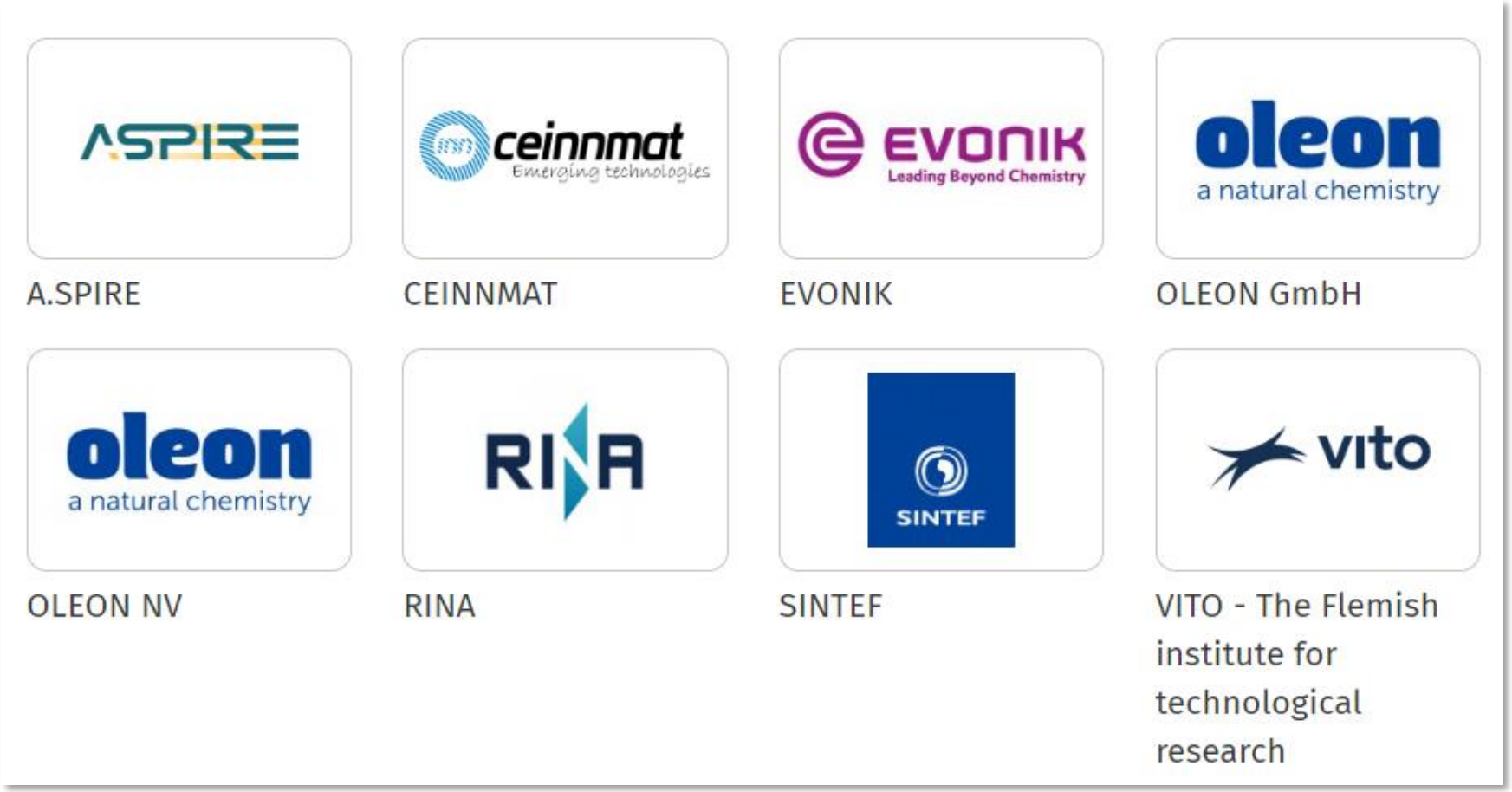
The 2DPLOY project

2DPLOY has set four main objectives

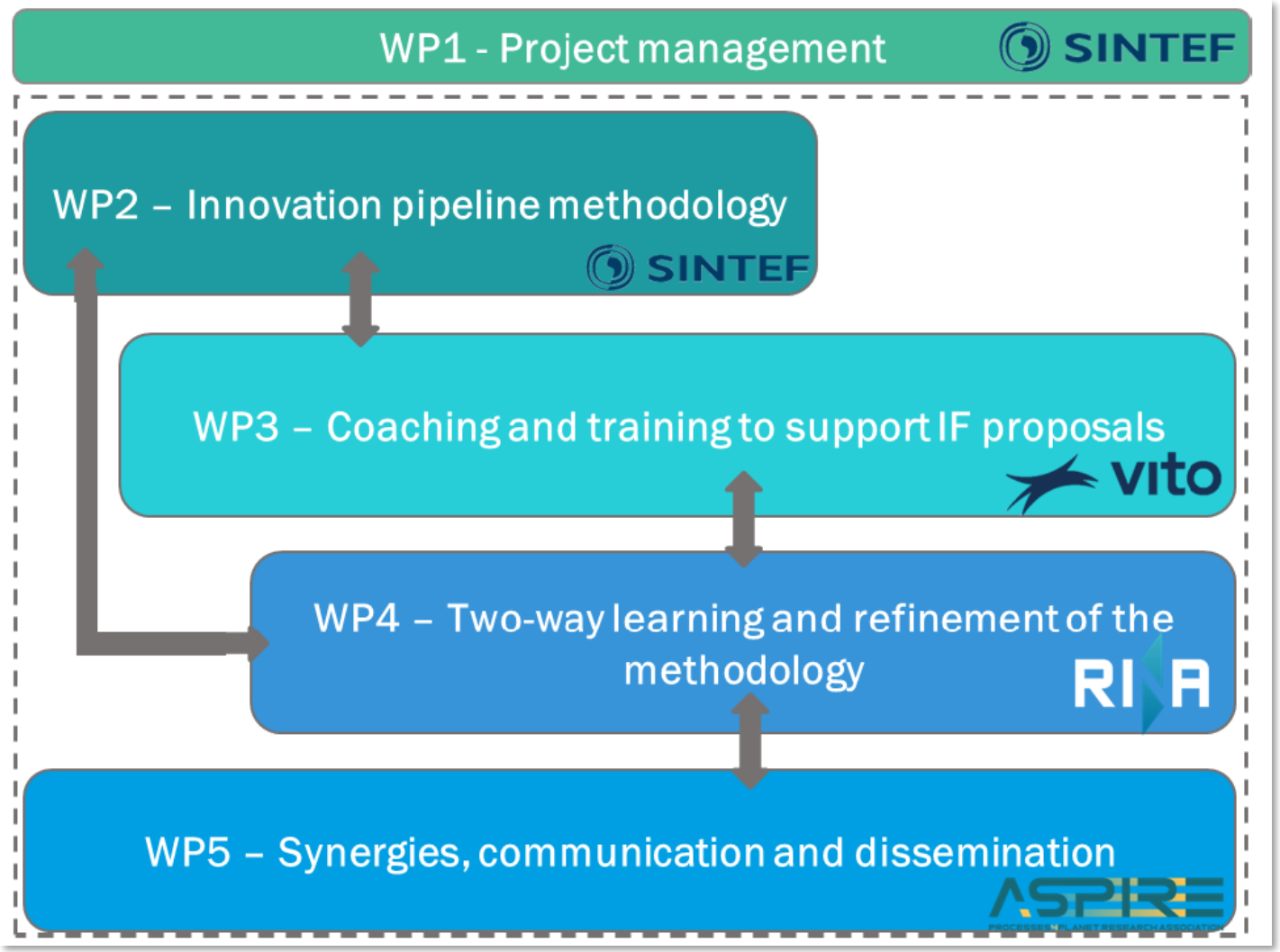
- Objective 1: **Establish a continuous innovation pipeline** for low-carbon technologies within EIIs
- Objective 2: **Develop best practices and support pilot IF proposals**
- Objective 3: **Feed 2DPLOY innovation pipeline & share learnings** with priority stakeholders
- Objective 4: **Fostering open collaboration and creating synergies**

Partners in 2DPLOY



2DPLOY

WP structure to achieve the project goals



Innovation Pipeline and selection of projects

4 Pre-selected projects (TRL6-7)
Process innovations towards chemicals, steel, cement and ceramic.
(Belgium, Germany, Spain)

Additional portfolio (H2020 & HE)
Large pool of approx. 150 potential projects covering a wide spectra of industries and technologies

EII
includes

- **Steel**
- **Cement,**
- **Chemicals**
- Refineries
- Glass and ceramics
- Paper and Pulp
- Non-ferrous metals

Technologies

- Energy efficiency improvements
- Electrification
- Fuel switching (H_2, Bio)
- **Process innovation** (e.g., low-carbon cement or steel),
- Recycling and waste heat recovery.

Pre-qualification (Large pool)
- Self–check online questionnaire
- Automated feedback

Expert interview (Reduced pool)
- Follow up to the pre-qualification
- QA of self-check and additional items

Evaluation Commission - (Small pool)
- Review of key criteria with experts (technical , financial ...)
- NDA can be necessary

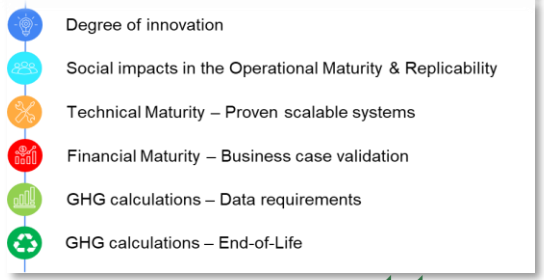
Support in IF application work (3 projects)
- Individual support with guidelines
- Good practise examples and master class

"Main outcome is the methodology"

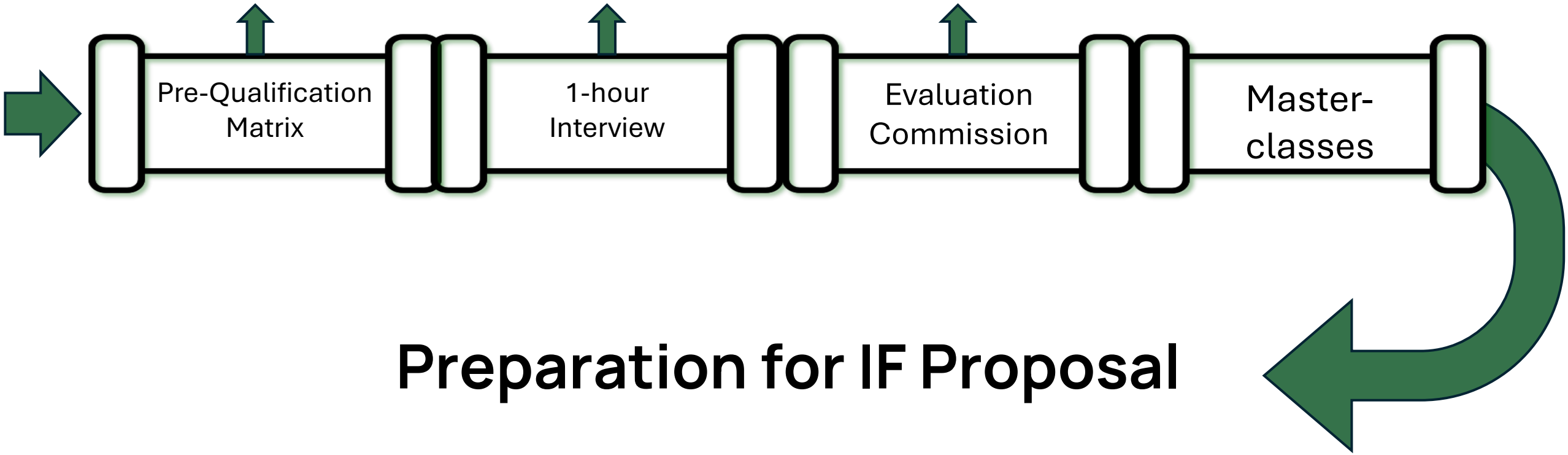
Give advice to «non-mature» projects

Further assist «mature» projects

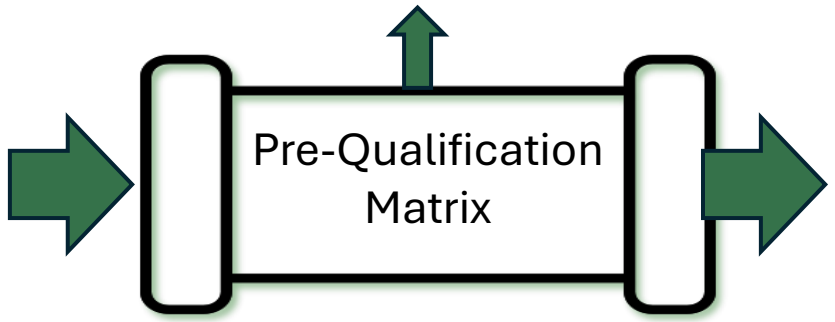
Develop lectures



Innovation Pipeline



Preparation for IF Proposal



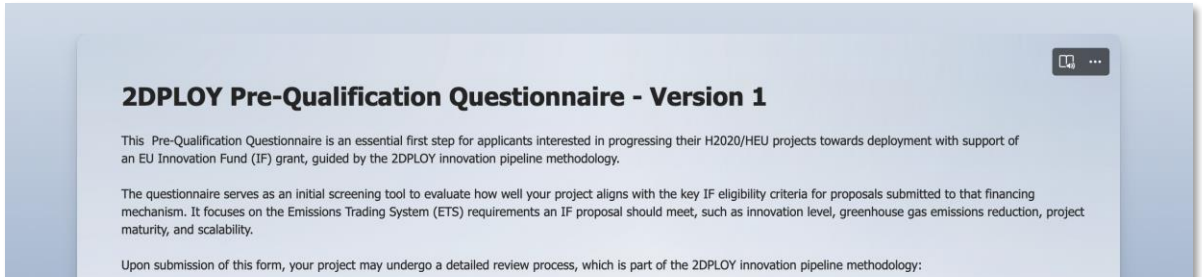
Purpose

Screen projects so that only the highest-potential, climate-impactful innovations move forward.

Give applicants concise, constructive feedback—while primarily acting as a go/no-go gatekeeper for the pipeline.

NOTE : The tool is an early-stage prototype and has not yet reached production readiness.

TEST it `https://forms.office.com/e/DwB9y3YLsa`



Evaluate projects and assess maturity for IF based on key criteria:

- Degree of Innovation
- GHG Emission Avoidance Potential
- Project Maturity
- Replicability

Non-disclosure agreements in place as needed

The Evaluation Commission is composed of experts from 2DPLOY research partner organizations (SINTEF, VITO, and RINA-CSM).

Feedback on maturity and recommendations for how to proceed

2DPLOY Innovation Pipeline Evaluation Commission (IPEC)
News Published on 28 August 2024
https://www.aspire2050.eu/2dploy#

Master class – Methodology

- Evaluated the material that is already available from CINEA
- Analyzed the lessons learned from previous calls shared by CINEA and the European Commission
- Interview stakeholders to create content tailored to their needs based on previous experience

Master class – Goal

- Help to improve the quality of EU IF applications by providing tips and tricks
- Targeted audience: IF applicants with mature projects

Master class – Content and Schedule

	Planned date
Degree of innovation	30th Sept.
Social impacts in the Operational Maturity & Replicability	2nd Oct.
Technical Maturity – Proven scalable systems	7th Oct.
Financial Maturity – Business case validation	9th Oct.
GHG calculations – Data requirements	14th Oct.
GHG calculations – End-of-Life	16th Oct.

Online lectures, complemented with e.g. checklists, guidance documents, glossary,…

2DPLOY

Two-way Learning & Refinement of the Methodology (WP4)

Lessons learned and sharing experience of 2DPLOY

Lessons learned on the **innovation pipeline methodology** (i.e. possible **improvements** and **identified gaps**) will be identified from validated and non validated projects.

These activities will be **input to WP2** to improve and consolidate the methodology of the 2DPLOY project.

Following this approach 2DPLOY methodology will be a living, constantly improving methodology.

Exploring Alternative Funding Schemes

To improve the flexibility and range of the 2DPLOY methodology, complementary funding opportunities at European, National and Regional level will be identified both as input and output of the methodology.

- Other *input* funding schemes in addition to H2020 will be identified
- Other *output* funding schemes in alternative to Innovation Fund will be also identified

2DPLOY

Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Open Discussion: “Market Deployment for Energy Intensive Industries”

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Open Discussion: “Market Deployment for Energy Intensive Industries”
Identifying the Gap

1. What are the most common barriers preventing low-carbon technologies from reaching the market in energy-intensive industries?

2. To what extent do current funding mechanisms address the specific needs of EEI deployment, and where do they fall short?

3. How do organizational or cultural factors within industries influence the adoption (or resistance) to low-carbon solutions?

4. What regulatory or policy challenges are the most critical obstacles to wider deployment of energy efficiency technologies?

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Open Discussion: “Market Deployment for Energy Intensive Industries”
Filling the Gap

1. What types of support structures — beyond funding — could help accelerate the market readiness of low-carbon technologies?

2. How can innovation pipelines be better aligned with deployment needs to ensure technologies are not only developed but implemented at scale?

3. Are there successful examples (national or EU-wide) where a gap has been effectively bridged — and what lessons can we draw from them?

4. Where are the biggest opportunities for cross-industry collaboration to remove barriers and encourage large-scale adoption?

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Thank you!

The 2DPLOY Team

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Energy Storage and Hydrogen – breakout session

Federico Spadaro, EU Project Manager, CLERENS (H2IF)

Maria Mazuera, EU Funding Senior Consultant, CLERENS (H2IF)

Athanase Vafeas, Director Associate Partner, Dowel Innovation (H2IF)

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

Agenda

- H2IF presentation (10 min)
- ES/H2 peculiarities for IF applications (20 min)
- Comment from project owner (10 min)
- Interactive session (40 min)
- Wrap up and summary (10 min)

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The H2IF project

H2IF aims to define a methodology to accompany R&I results in **Energy Storage** and **Hydrogen** sectors to industrial readiness and demonstrate how to **scale up Horizon-funded results to IF projects → *3 H2020 projects to the Innovation Fund instrument***

- **Develop a roadmap** for mature R&I results implementation on ES and H2 and identify synergies with IF
- **Implement the roadmap** for upscaling projects and prepare proposals for the IF
- Commit to the deployment of energy storage and hydrogen projects and EU climate targets by **facilitating the innovation pipeline through policy recommendations**
- **Promote, disseminate and communicate** the objectives and achievements of the project and strengthen collaboration with other European R&I energy storage initiatives

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Unlocking Low-Carbon Innovation:
From Horizon Projects to Market Deployment

20 May 2025, Brussels

H2IF consortium

Industry association

EASE – European Association for Storage of Energy

EU Funds consultancies

CLERENS

zabala INNOVATION

Dowel innovation

H2020 projects/technology owners

HEROES

BEYONDER

hypster Hydrogen Storage

storengy

MELODY

elestor

Innovation proposed

*High-power and fast-charging **LFP battery cell***

***Hydrogen** storage technology*

*Hydrogen-Bromine **Flow Battery***

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H2IF activities

- ***2023*** — **Selection** of relevant **projects and project owners**
- ***Jan 2024*** — Project **kicks off**
- ***Apr 2024*** — Definition of **roadmap to IF readiness**
- ***2024 – 2025*** — Kick-off of **proposal writing activities** (collection of documents, IF workshop…)
- ***Apr 2026*** — Submission of **3 proposals**
- ***End of 2026*** — **Collection of lessons learnt** (policy recommendations and innovation pipeline)

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IF Energy-Storage-specific aspects

- **Energy storage in the** IF23
- The **results** on IF23
- Broader results
- Energy storage in the **IF24 – Main differences with IF23**
- **Insights on the IF24 application**

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IF23 Net-Zero technologies

4 B€ available

Topic	Focus	Total available budget	CAPEX
General decarbonisation	Large-scale	1.7 B€	> 100 M€
General decarbonisation	Medium-scale	500 M€	> 20 M€, < 100 M€
General decarbonisation	Small-scale	200 M€	> 2.5 M€, < 20 M€
Cleantech manufacturing	Renewable energy, energy storage, Heat pumps, H_2 production	1.4 B€	> 2.5 M€,
Pilot	Deep decarbonisation	200 M€	> 2.5 M€

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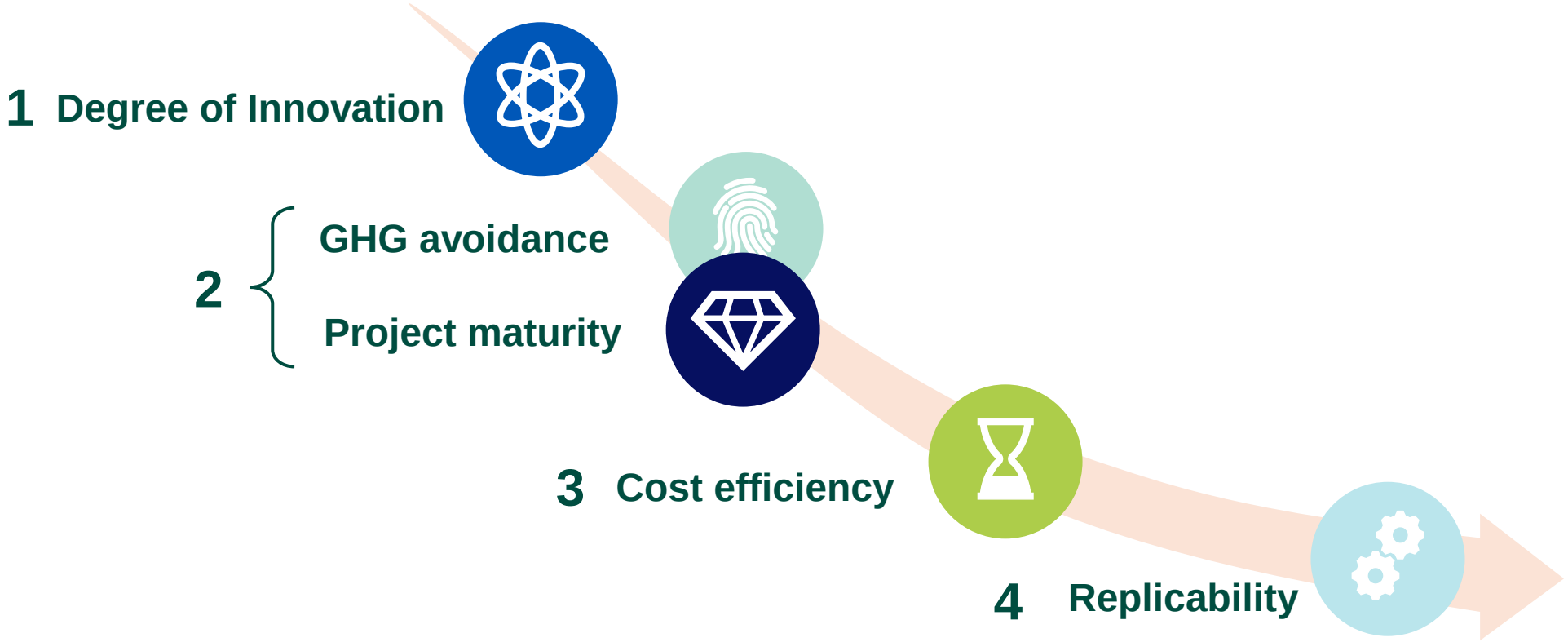
IF23 Net-Zero – evaluation criteria

IF proposals are evaluated through a cascade approach (if the proposal doesn't reach the minimum threshold in an earlier criterion, the evaluation process stops)



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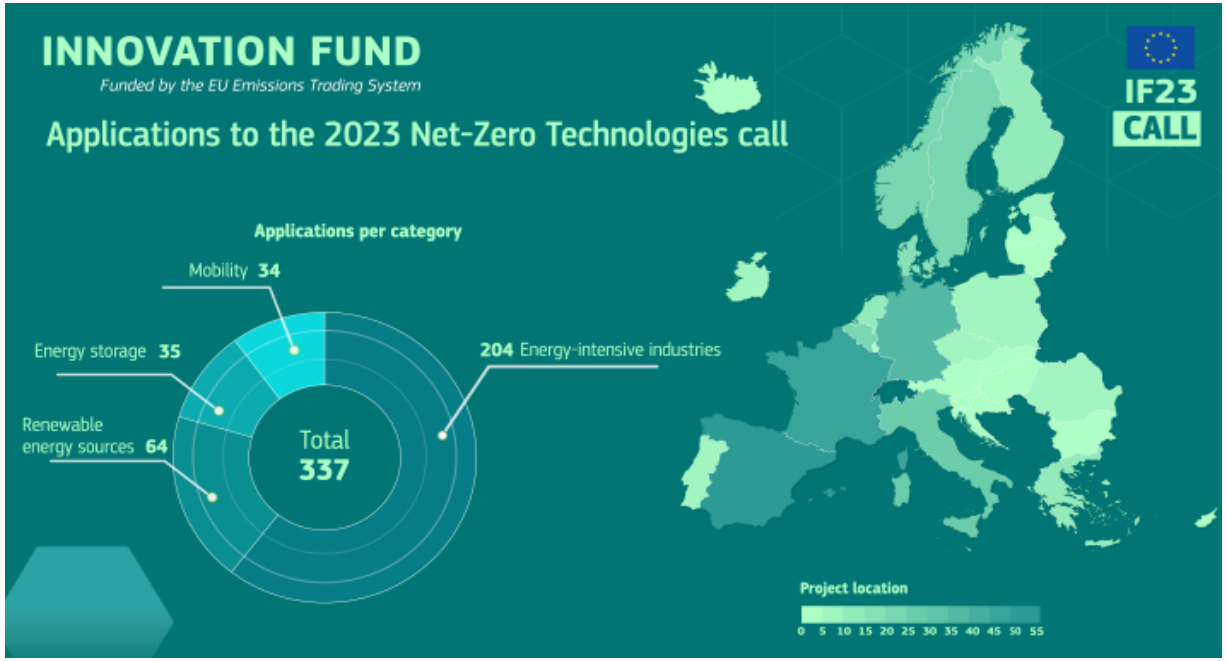
From Horizon Projects to Market Deployment

20 May 2025, Brussels

IF23 Results

- 337 applications
- 77 Projects signed GA
- 9 Projects on Manufacturing of components for ES, intra-day electricity storage & other ES

Project	Description	GHG avoidance	Grant
TalnodeONE	Natural graphite anode production for Li-ion batteries	2.1 $MtCO_2$	70 M€
BigBATT	Deployment of a large-scale BESS	492 $ktCO_2$	31.6 M€
SOVALIS	Large-scale PV + vanadium lithium storage	253 $ktCO_2$	21 M€
GALLICAM	pCAM production to manufacture NMC cathodes for EV batteries	7 $MtCO_2$	144.4 M€
neFO	Wind generation + battery storage equipment	1.8 $MtCO_2$	27.6 M€
ScaleUp	Large-scale underground termal energy storage	81 $ktCO_2$	17.4 M€



Information taken from available data in the Innovation Fund dashboard

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IF – Energy storage Results

33 Projects on Manufacturing of components for production of renewables and energy storage & intra-day electricity storage

Thermal

- Underground thermal energy storage
- Heat storage + Renewable Electricity + waste Heat
- Thermal storage from waste heat recovery

Batteries + RES

- BESS + Hydropower
- BESS + Wind
- BESS + Solar PV

Hydropower

- Pumped storage hydropower installation

Hydrogen

- Hydrogen storage system for heavy duty vehicles
- Hydrogen membrane production plant
- Efficient PEM stack production.

Information taken from available data in the Innovation Fund dashboard

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IF24 Net-Zero Technologies

2.4 B€ available

Topic	Focus	Total available budget	CAPEX
General decarbonisation	Large-scale	1.2 B€	> 100 M€
General decarbonisation	Medium-scale	200 M€	> 20 M€, < 100 M€
General decarbonisation	Small-scale	100 M€	> 2.5 M€, < 20 M€
Cleantech manufacturing	Renewable energy, energy storage, Heat pumps, H_2 production	700 M€	> 2.5 M€,
Pilot	Deep decarbonisation	200 M€	> 2.5 M€

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From Horizon Projects to Market Deployment

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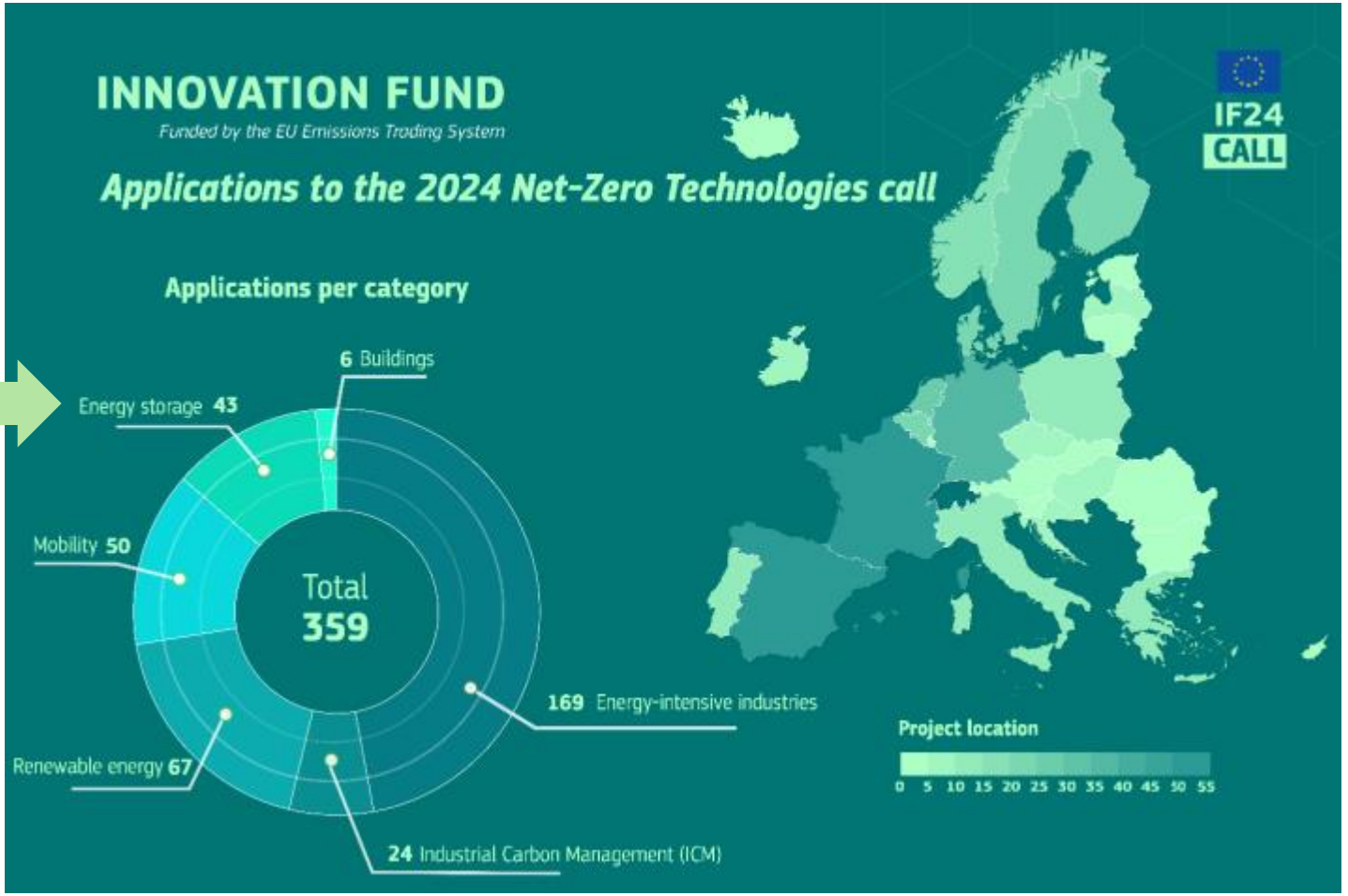
IF24 Net-Zero Technologies

359 applications

12%

Topic	Share
Large-scale	39%
Medium-scale	15%
Small-scale	13%
Cleantech Manufacturing	14%
Pilots	19%



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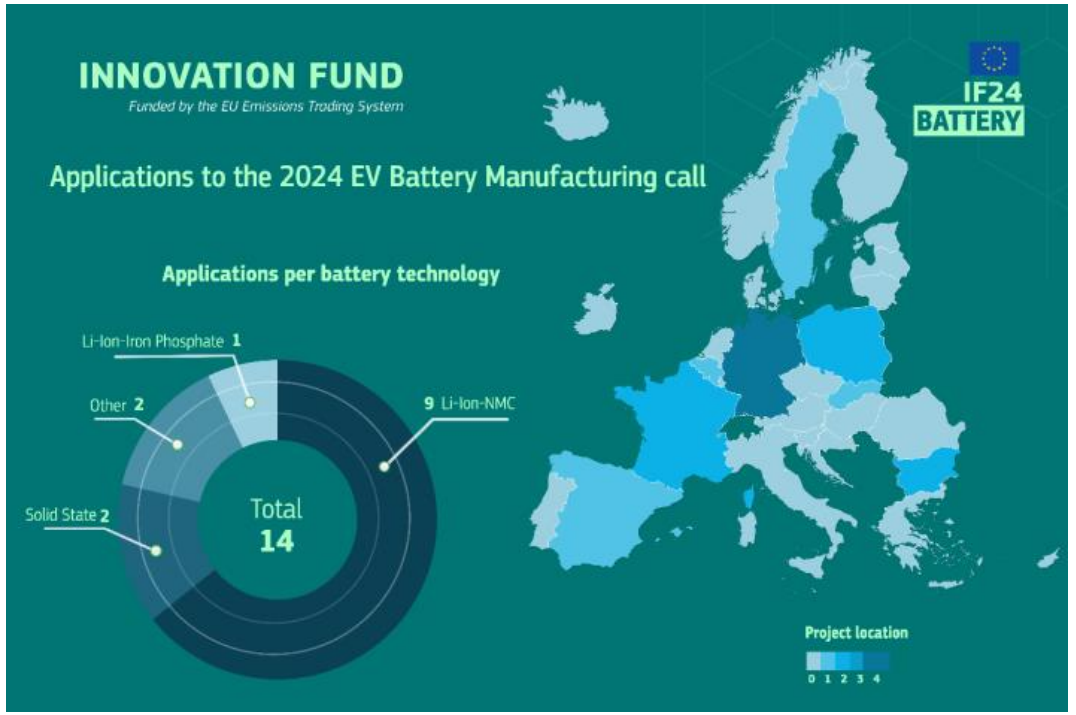
IF24 EV Battery manufacturing call

- 14 applications
- 1 B€ available for IF24
- **Focus:** Innovative EV battery cells, manufacturing techniques, processes and technologies

Industrial-scale battery cells production	Manufacturing, assembly, formation & ageing	Technically mature & strong financial plan	GHG avoidance from: use phase + Manufacturing

Batteries

- Large-scale V2G system
- 2nd life EV batteries applications
- Anode and pCAM materials for EV batteries
- Batteries recycling for EVs



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IF Hydrogen-specific aspects: the H2 auction

- **Rationale of the Call** IF23 Auction
- The **results**
- Some **insights from statistics**
- Preparing **IF24 Auction**

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Rationale of the first EU-wide renewable hydrogen auction

- The IF23 Auction is the **Innovation Fund pilot hydrogen auction**
- Action being one of the pillar of the **European Hydrogen Bank (EHB)** launched in 2023
- The 2nd call published on **27 Sept 2024** (increased budget)

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The call and project selection

- **The call received 132 bids from 17 EU countries covering 15 times the available 800 MEUR**. 119 eligible proposals assessed and ranked by CINEA according to the bid price
- 720 million were awarded by EHB: on 30th April 2024 **seven EU projects selected for funding**, located in ES (2 projects), PT (2 projects), FI, N (one withdraw during the GAP). Sectors: maritime, heavy-duty transport, agriculture, e-methane and e-methanol production
- These projects will be supported with a **fixed premium payment per kg of renewable H2 produced** (certified and verified). Payment will occur once projects have started production (the production shall start in less than 5 years from the GA signature)

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The ‘Auction as a service’ mechanism

- IF23/In 2024 **€350 million** in national funding has been made available by Germany for the highest ranked projects in Germany which did not qualify for EU-level support, but which do meet the eligibility criteria.
- The “Auctions-as-a-service” scheme is open to all Member States, enabling them to **benefit from the EU-level auction platform** and award national funding to additional projects.
- IF24/ Spain, Lithuania, and Austria participated in the IF24 Auctions-as-a-Service and will deploy **over €700 million** in national funds to support renewable hydrogen production projects located in their countries.

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Insights on bid price and GHG abatement (IF23 Auction)

- Overall, the projects have the **potential to produce up to 1.5 Mt of renewable hydrogen** during the first 10 years of their operations, avoiding 10+ Mt of CO2 emissions, for about **700 M€ of requested funding**
- Bid prices of renewable projects range from **0.37-0.48 (€/kg)**
- Bid capacities range from **35-500 MWe**
- The avoided GhG tCO2 range from **54 to 70 €/tCO2** (average at 67 corresponding to a mark of about 8/12)

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Preparing Innovation Fund 2024 Auction

- A total of **€1.2 billion**
- Opened **3 Dec 2024 until 20 Feb 2025**
- Read the **FAQ with 121 questions** (dec 2024)

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Takeaways from our experience: factors of success

IPR	clarity of IPR (joint ownership, joint venture)
Regulatory context	clear long-term principles
Market context	documented sources to enable to structure of a 1st Business Model
Governance & Management	support by top management
Industrialisation	a multi-year roadmap with milestones
Funding	guidance from skilled third parties

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Interactive session

- Questions and comments from the audience

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Wrap up

- Main points discussed
- Major concerns from industry representatives

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Thank you!

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Public Conference
20 May 2025, 9.00 - 17.00
Brussels

Unlocking Low-Carbon Innovation: From Horizon Projects to Market Deployment

Session 4: Complementary Funding Opportunities

Marie Latour
Euro-Funding

Radu Surdeanu
Siemens Energy

Simon Bennett
IEA

Ruben Davis
Cleantech for Europe

REALIZE H2.F 2DPLOY LEADS

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Mapping report on funding instruments for energy innovation (update)

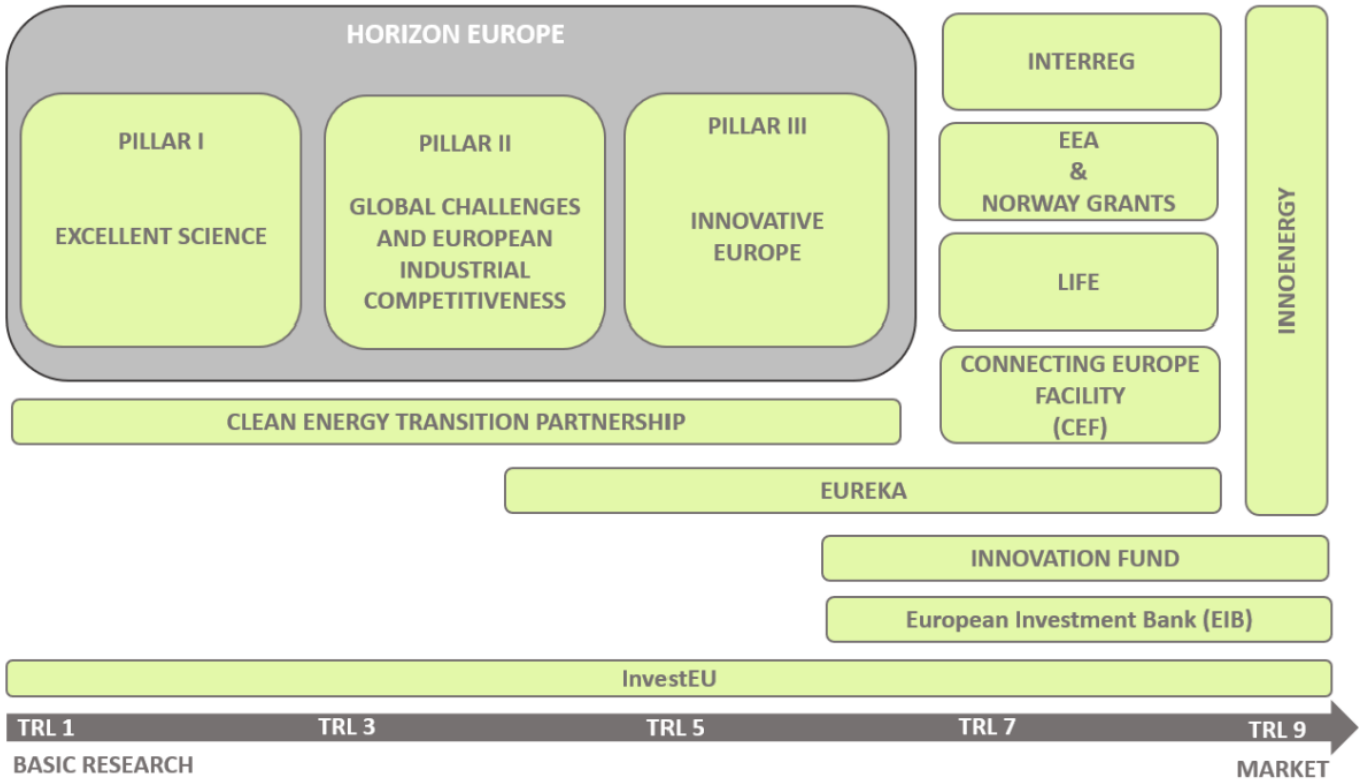

Figure 6: Mapping of European Transnational Programmes for Energy Innovation
Source: own elaboration

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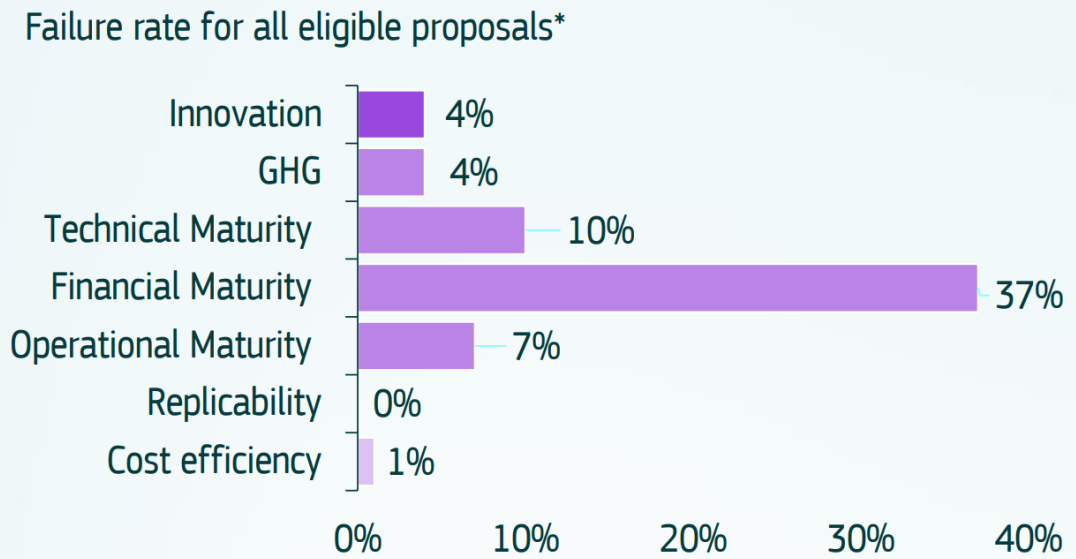
Results per evaluation criterion: IF23 Call

Out of 281 evaluated proposals, 85 were pre-selected for funding, 64 additional projects cannot be funded due to lack of budget

- Demonstrating financial maturity is the most challenging step of the evaluation process
- All proposals that reached the replicability assessment passed it



* Some proposals failed various criteria simultaneously

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