Public funding for permanent carbon removal in the EU

28 January 2025 | 10:00 – 16:00
Brussels

Public funding for permanent carbon removal in the EU

Opening remarks

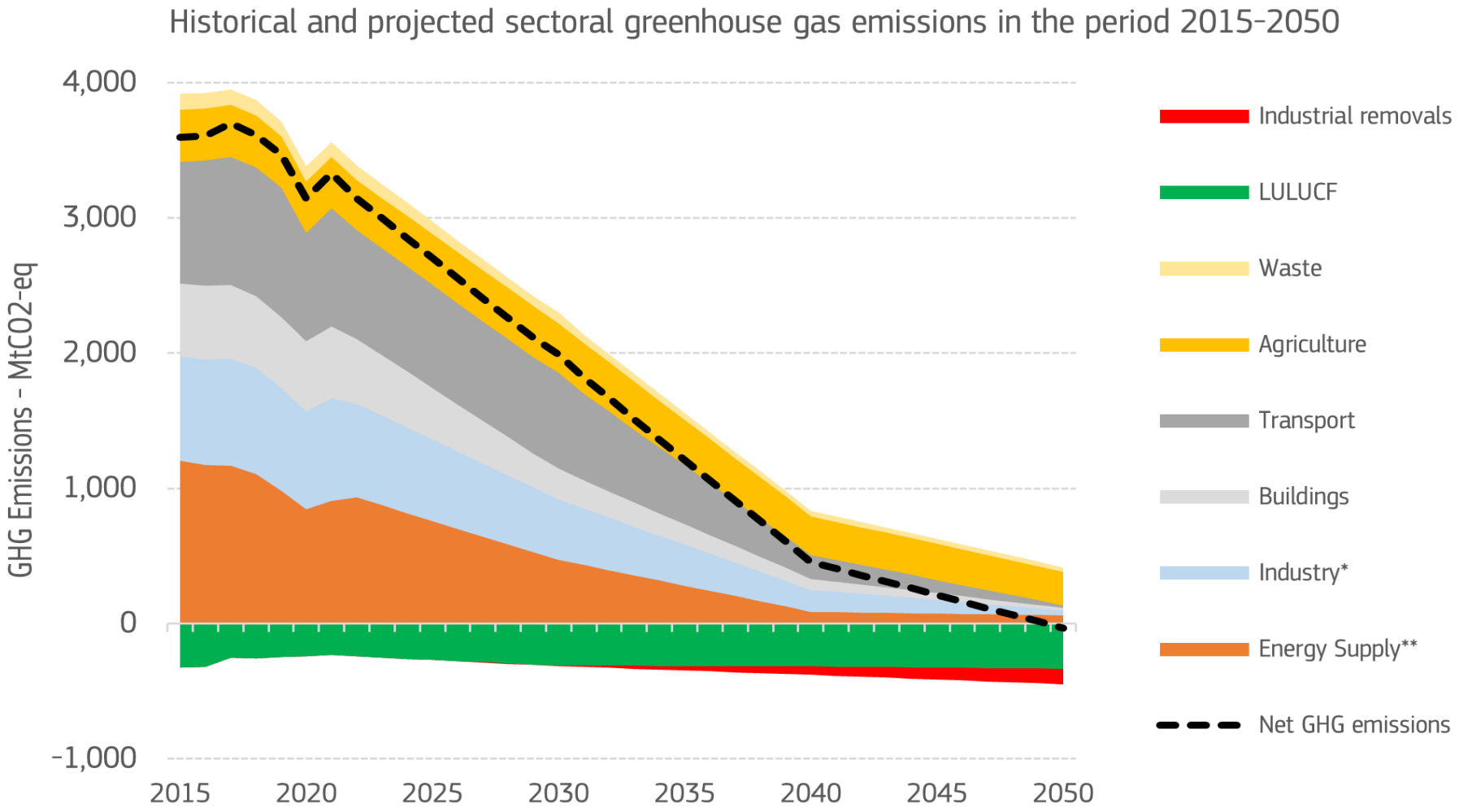
Christian Holzleitner
Head of Unit, DG CLIMA, European Commission

28 January 2025 | Brussels

Financing Permanent Removals

28 January 2025

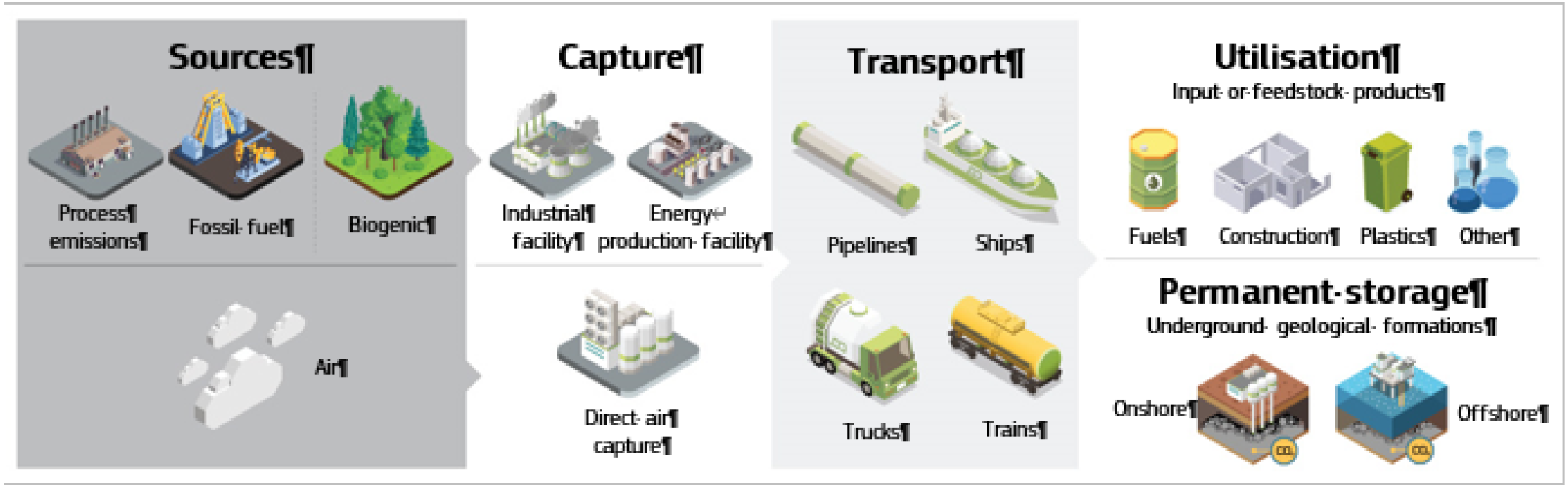
Pathway to climate neutrality

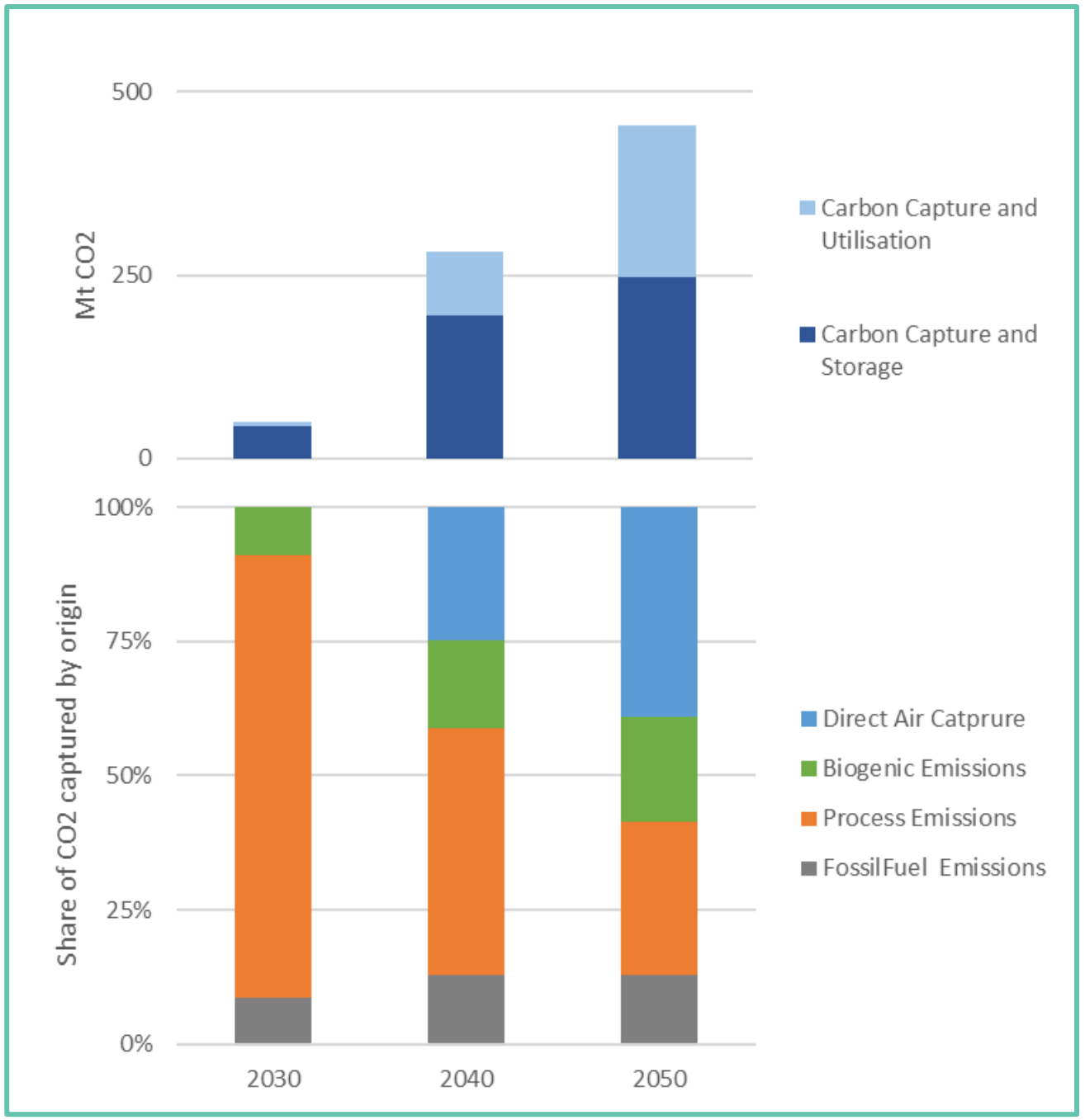


*Excluding non-BECCS industrial removals
**Including bioenergy with carbon capture and storage (BECCS)

European Commission

A circular carbon economy



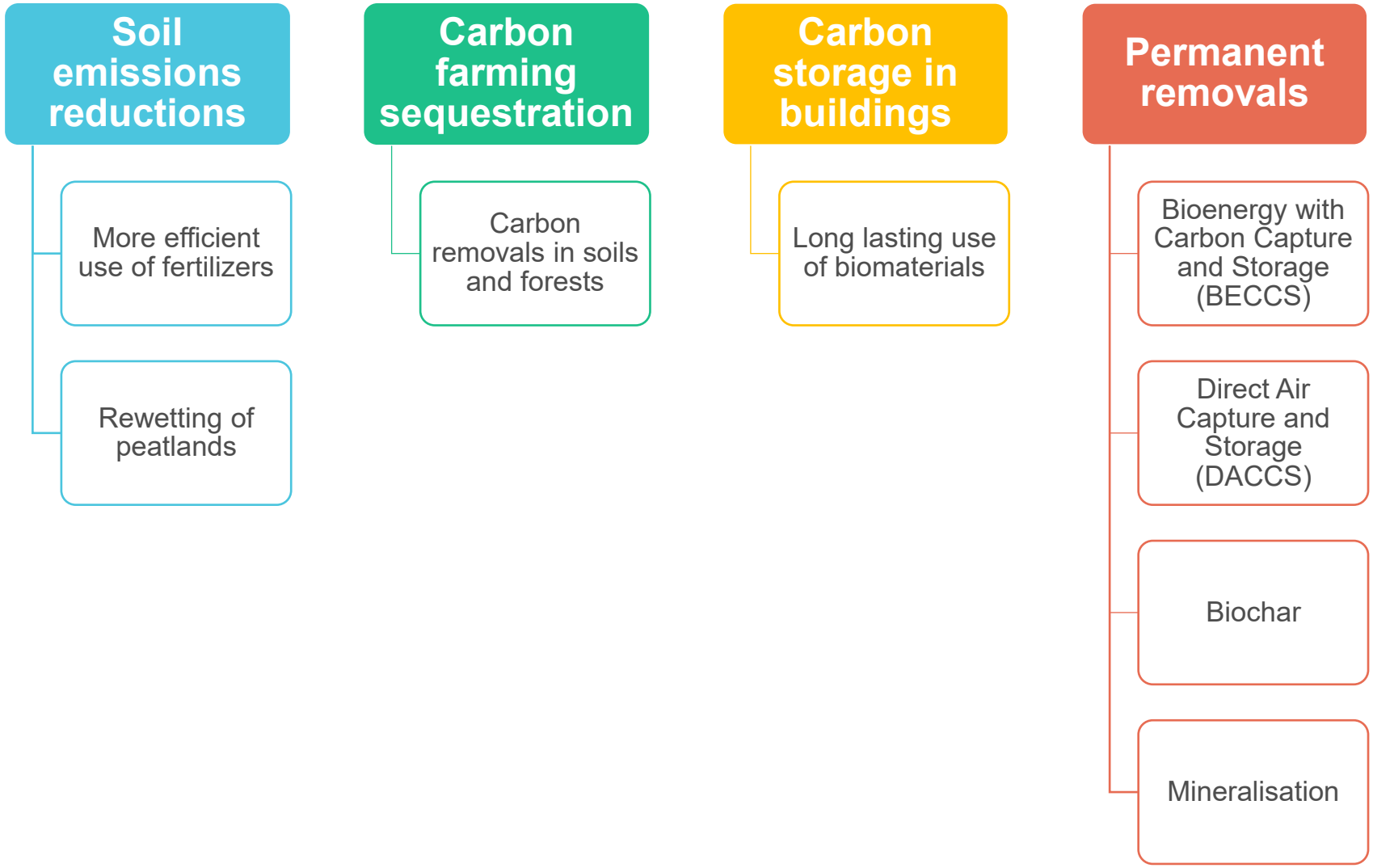


Estimated CO2 volumes for CCUS market

European Commission

Certification of carbon farming and removals

CRCF Regulation – first set of methodologies



Next steps towards certification

December 2024	Entry into force of CRCF Regulation	Regulation - EU - 2024/3012 - EN - EUR-Lex
2025	Proposal of delegated acts on first set of certification methodologies	Permanent removals Carbon farming Carbon storage in long-lasting buildings
	Proposal of implementing act on verification and registries	
2026	Start of certification	EC recognition of certification schemes First issuance of certified units
	Development of further certification methodologies	Enhanced rock weathering Blue carbon, …
2028	Start of EU registry	

European Commission

Regulatory framework for voluntary and compliance carbon markets

Corporate Sustainability Reporting Directive

- Sustainable Reporting Standards on Climate for non-financial reporting

Green Claims

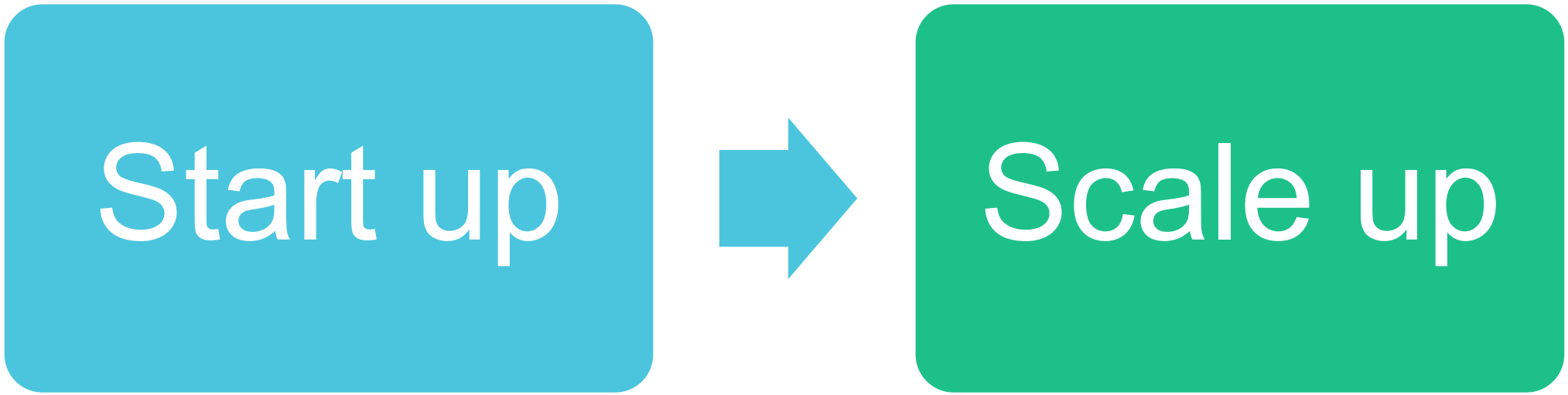
- Commission proposal from March 2023 on environmental claims
- Currently in co-decision

ETS Review in 2026

NZIA obligation to provide storage of 50 Mt by 2030

European Commission

Public-private financing of permanent removals



Purchasing program for CRCF credits

Two events in Brussels and online planned for Q2 2025

- Carbon farming
- Permanent removals

Designing a purchasing program

- How could an EU purchasing program be designed?
- Testing the interest with public or private buyers to build up a portfolio of carbon removal credits, including
  - Public and private financial institutions
  - Corporates

More information:

- DG CLIMA website on Carbon Removals and Carbon Farming
- CRCF Regulation: Regulation - EU - 2024/3012 - EN - EUR-Lex
- FAQ: a8abe1c4-a3c6-4c94-be0e-4b76f7fd0308_en (europa.eu)
- EU carbon removals newsletter

Public funding for permanent carbon removal in the EU

Insights on the ‘Financing permanent carbon removal’ project

Xavier le Den, Ramboll

Agenda:

28 January 2025 | Brussels

Project insights: Developing a strategy for financing of permanent carbon removals

Ramboll in brief

Independent architecture, engineering, and consultancy company

Top 10 leading energy consultancy in Europe

“All in” on sustainability and decarbonisation

Owned by an independent foundation: The Ramboll Foundation

Mission:

To create sustainable societies where people and nature flourish

>35

Countries covered by global office network

>18,000

Experts

2.2 Bn

Global revenue, in 2023 across all markets

Ecologic Institute

- Independent, academic think tank for applied environmental research and policy analysis
- Berlin-based, with over 100 team members from over 20 countries
- Socio-ecological research to support sustainability transformations
- Evaluations of political processes on the local, national, European and international levels
- Since its founding in 1995, Ecologic Institute has been dedicated to improving environmental policy, sustainable development and policy practice

We have been at the forefront of supporting the deployment of carbon removal technologies

2021-2025, Ørsted Bioenergy and Thermal Power
Ramboll

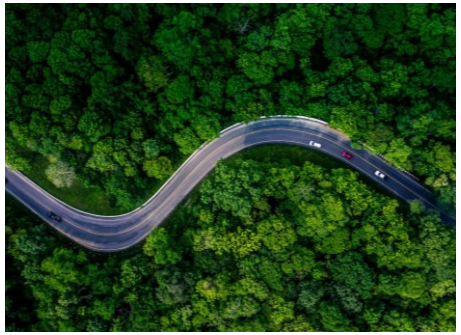
Development of a BECCS plant capturing 37.5 t/hour

Development of the overall concept, contract management, detailed design and integration of existing facilities.

2024-2032, Climeworks
Ramboll

Independent Engineering review of Orca Direct Air Capture plant

Annual review of CDR production, operational records and maintenance of the Orca Direct Air Capture plant (4,000 tons of CO2/year)



2017-2019, DG CLIMA
Ramboll

Identification and analysis of promising CCU technologies, including their regulatory aspects

Analysis of CCU technologies with potential to scale up in the next decade and development of policy options to maximize the market potential for most promising CCU technologies.

2020-2022, DG CLIMA
Ramboll & Ecologic Institute

Support on Devising a Carbon Removal Certification Framework

Developing and evaluating different options for an EU-wide carbon removal certification. mechanisms

2023-2024, EEA
Ramboll & Ecologic Institute

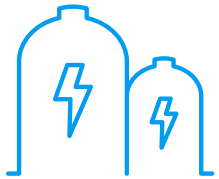
Technical assistance to the European Scientific Advisory Board on Climate Change on carbon removals

Overview and long-term vision for the EU's governance of carbon removals, including analysis of the policy architecture, financial analysis and policy evaluation.

We support the European Commission in developing a strategy for financing permanent carbon removals

Strategic objectives

Leverage support for early-stage carbon removal activities



Ensure the scale-up of carbon removals to commercialisation

Mobilise private and public financing in combination with regulatory policy options

Focusing on permanent carbon removals

"Permanent carbon removal refers to human activities removing CO2 from the atmosphere and storing it securely and durably for several centuries."

Direct Air Capture and Carbon Storage (DACCS) is an approach that extracts CO_2 from the atmosphere. The captured CO_2 is then compressed and transported for storage.

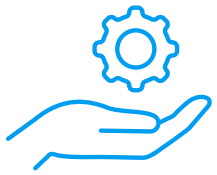
Biochar is a carbon-rich material produced by pyrolysis of organic biomass under low oxygen conditions. It sequesters carbon by stabilising biomass derived carbon into a solid form.

Ocean-based carbon removals aim at enhancing the ocean's natural ability to absorb and store CO_2. These approaches include ocean alkalinity enhancement, nutrient fertilisation, and direct CO_2 injection.

BioCCS uses biological processes to sequester CO_2 and subsequently store them permanently underground. BECCS is the primary method where biomass is used to generate energy, and the resulting CO_2 is captured and stored.

Mineralisation involves storing CO_2 by accelerating its reaction with naturally occurring minerals, such as magnesium or calcium silicates. Enhanced rock weathering (ERW) is a method which involves spreading finely ground rocks onto soils, where CO_2 is chemically bound.

Looking at both the supply and demand of permanent carbon removals



Supply

Review of the state of the sector and early-stage funding opportunities

- Map current state of play for permanent carbon removal technologies
- Assess carbon removal in existing EU funding programmes

Demand

Policy options for incentivising permanent carbon removal

- Identify and evaluate options for a public or public-private purchasing programme to scale up permanent CDR
- Develop a strategy aimed at stimulating long-term demand for CDR

Today’s event is about the supply side

Questions we aim to address:

- What is the potential supply of removals from ongoing and planned projects in Europe in 2030 and 2035, and their expected prices?
- What are the financing needs and the private and public funding available to support the development of carbon removals in the EU?
- What are the key barriers for industry scale up for each carbon removal technology?
- What can existing EU funding programs do more to support the scale-up of carbon removal technologies?

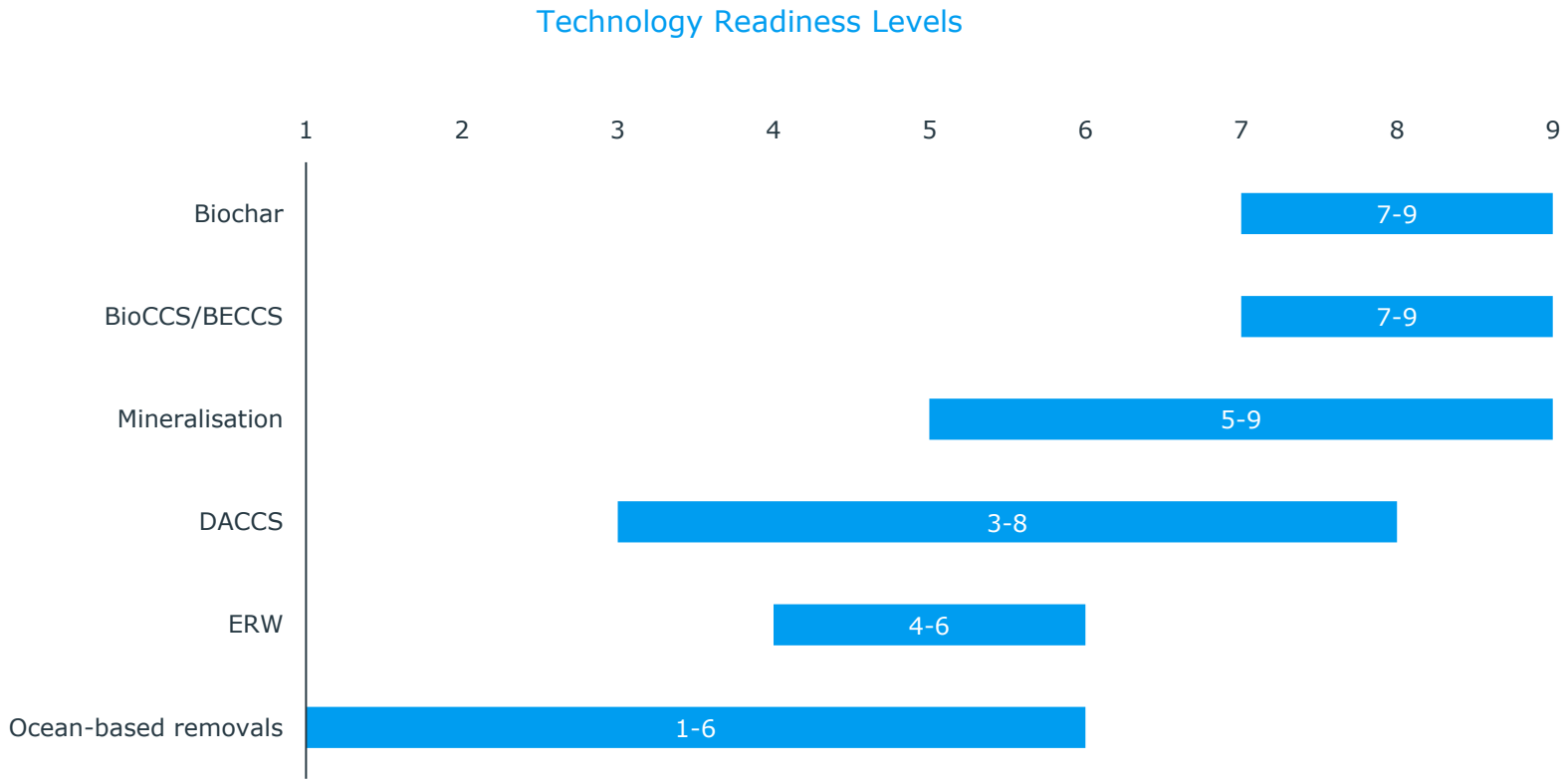
How we prepared:

- Literature review
- Mapping of projects
- Survey to CDR companies
- Interviews

Project insights:

Review of the state of the sector and early-stage funding opportunities

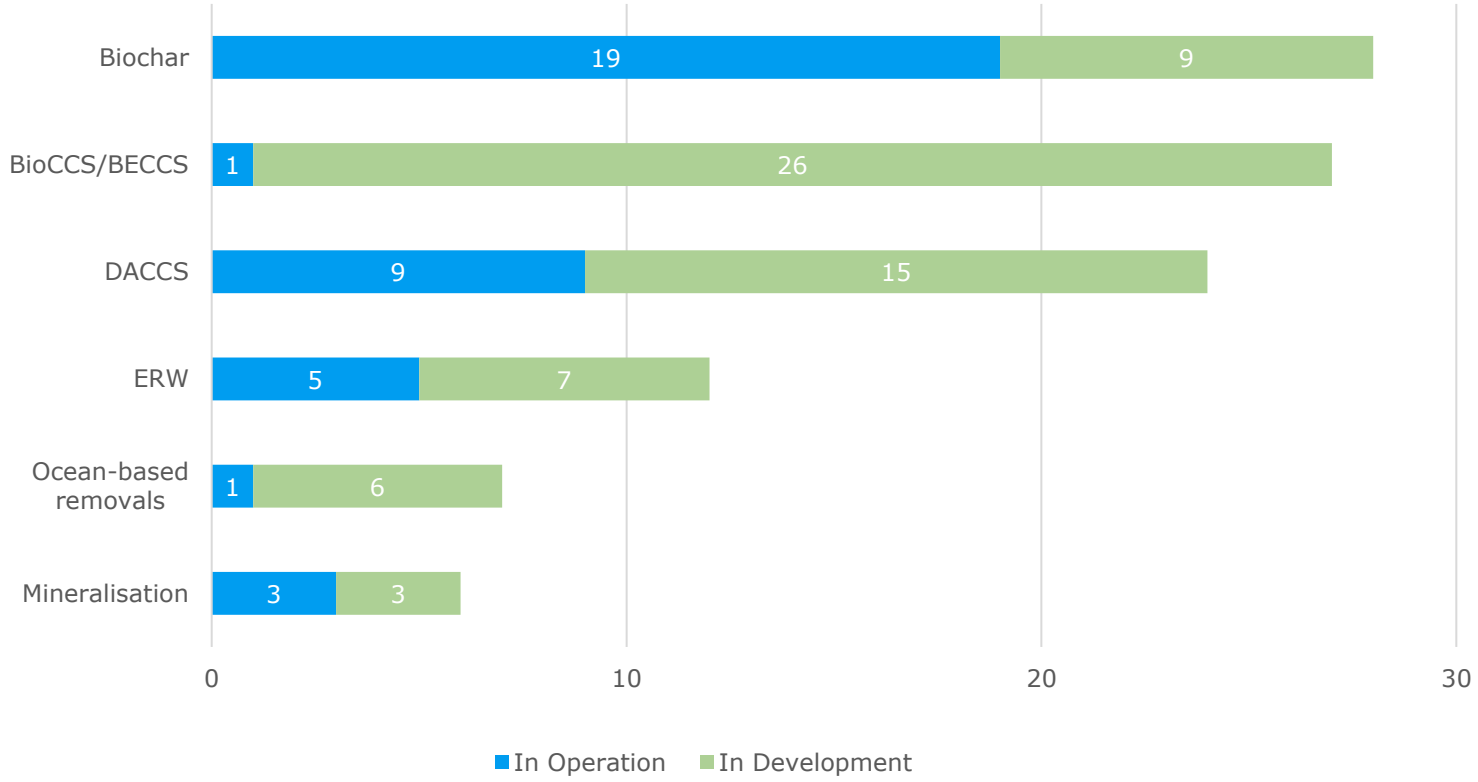
Technological maturity is increasing rapidly, but varies



Source: Ramboll analysis based on desk research and survey response of CDR companies

- Large scale removal installations exist for biochar, BECCS and DACCS
- Mineralisation technologies are also advanced, but show high variation

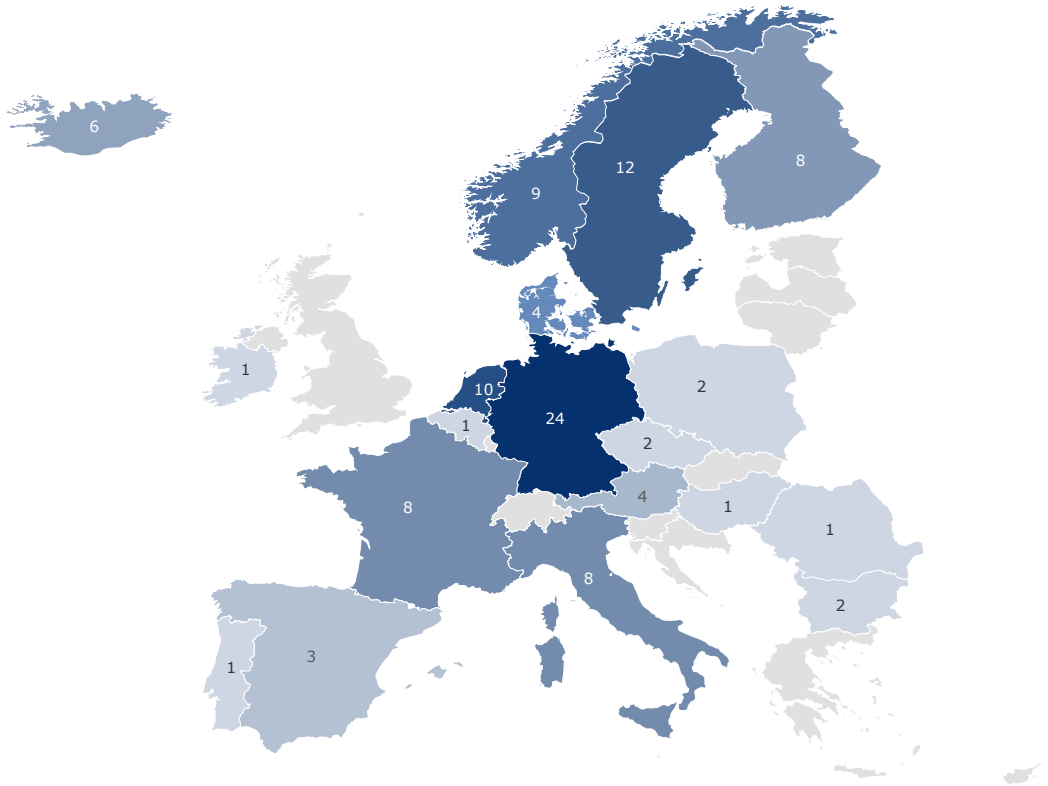
The CDR sector in Europe is continuously growing and diversifying



Source: Ramboll analysis. CDR projects/companies were identified through comprehensive desktop research. The initial list was compared against and expanded with data from a stakeholder survey (n = 107)

- 107 projects/companies identified in Europe
- CDR projects/companies correlates with high TRL levels, except for mineralisation
- 2/3 of projects are currently in development, usually ones with higher removal capacity

Northern and Western Europe is leading the CDR development



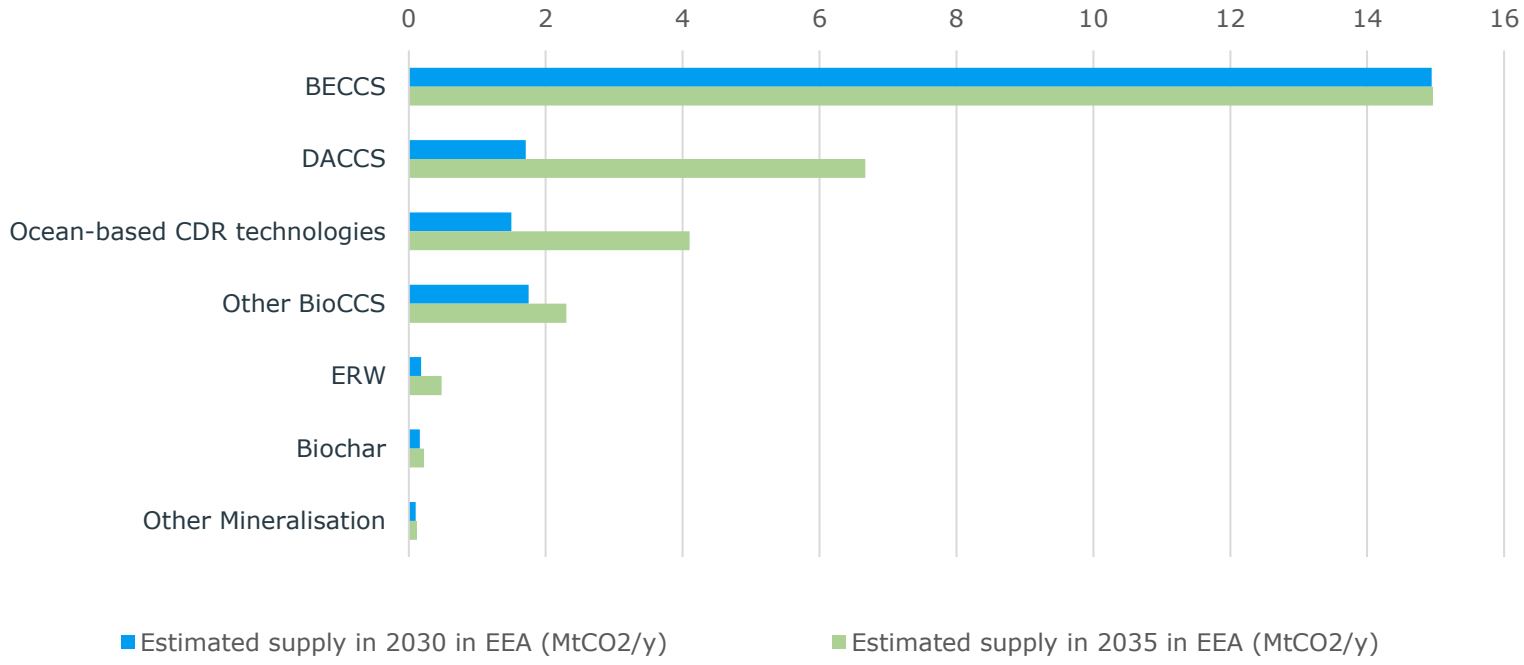
Note: Project locations are used for BioCCS/BECCS and DACCS, for less site-specific technologies (ERW, mineralisation, ocean-based removal) company headquarters are used.

Source: Ramboll analysis. Desk research and survey of CDR companies

- Concentration of activities in Northern and Western Europe
- Technological hubs:
  - BECCS: Norway, Sweden
  - Biochar: Italy
  - DACCS: Germany, Iceland
  - ERW/Mineralisation: Germany
  - Ocean-based: Netherlands

Expected CDR supply in Europe is centred around a few technologies

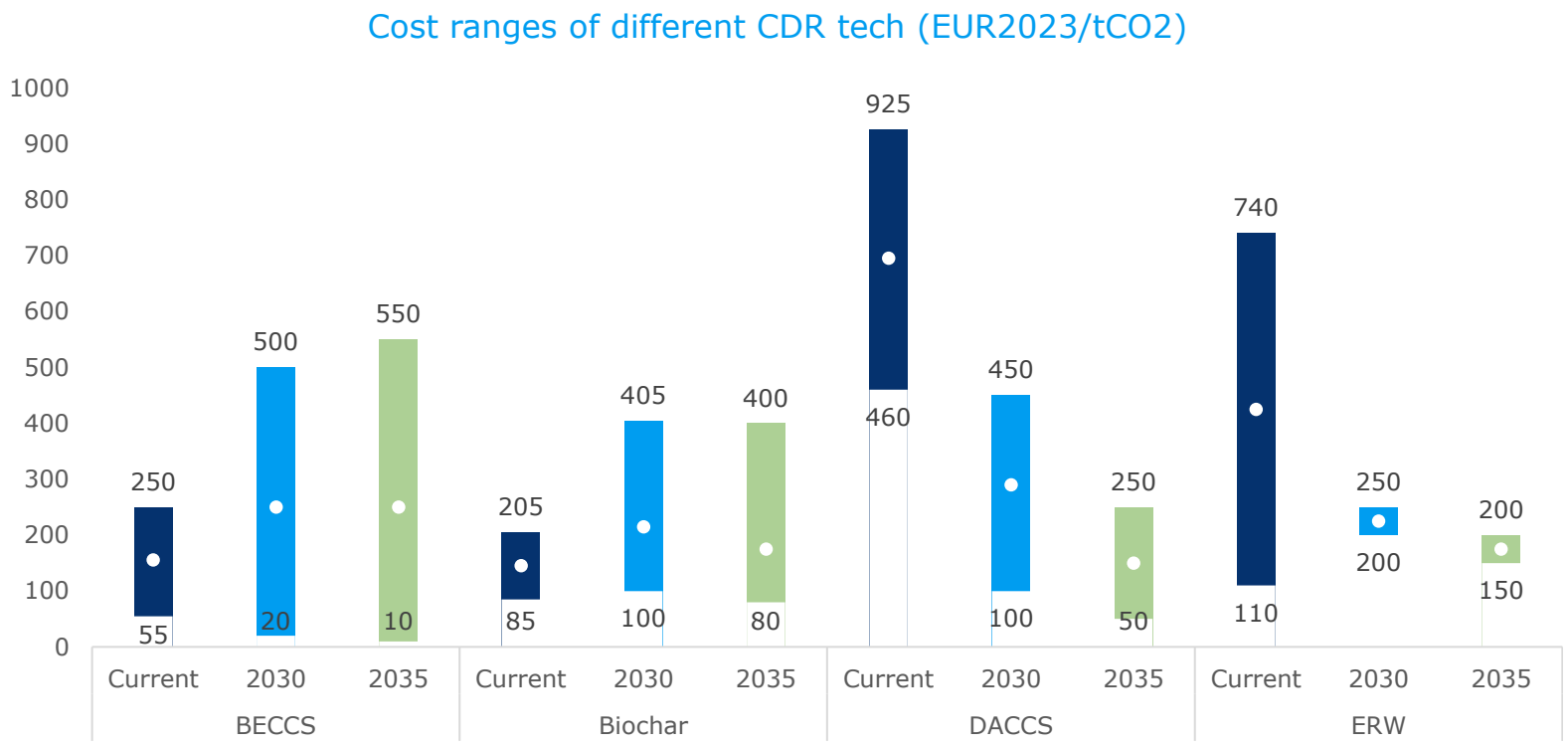
Estimated supply 2030/2035 in EEA (MtCO2/y)



Source: Ramboll analysis based on survey responses by CDR companies (n = 58)

- European CDR supply has the potential to reach 20 $MtCO_2$/y in 2030 30 $MtCO_2$/y in 2035.
- Significant increase compared to current levels, estimated at around 1.3 $MtCO_2$ globally
- BECCS accounts for the majority of future CDR capacity
- By 2035, DACCS and ocean-based technologies are expected to grow in volume

CDR costs are projected to decrease or remain stable over the next decade



Note: Mineralisation and ocean-based technologies excluded due to limited data entries. Low number of data points for ERW leads to narrowing cost ranges.

Source: Ramboll analysis based on McKinsey (2023). 'Carbon removals: How to scale a new gigaton industry' (current costs) and stakeholder survey data (N=43) (2023 and 2035 costs)

- Current costs variations between technologies are expected to decrease by 2035
- DACCS and ERW demonstrate larger cost reductions
- BECCS and biochar are expected to remain more or less stable

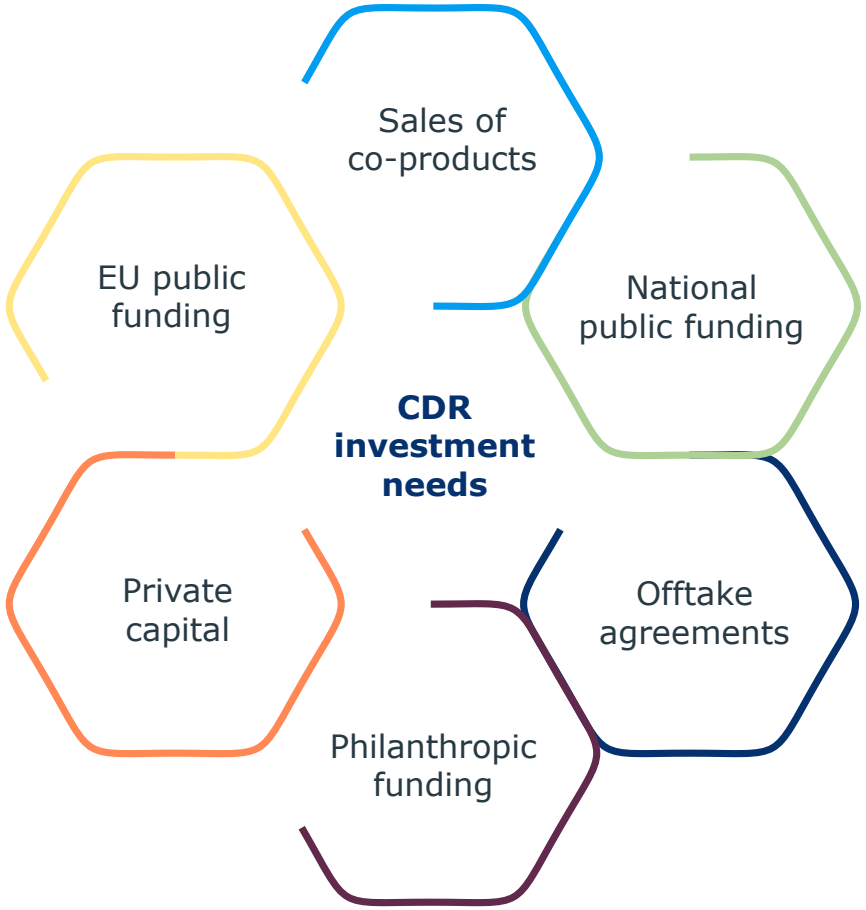
CDR financing is challenged by technology risks and a variety of other barriers

CDR Technology	Financing needs	Other barriers and risks
BioCCS/BECCS	High CAPEX needs	• Competition for biomass • Diverging regulatory objectives
DACCS	High CAPEX needs	• Dependence on price and availability of renewable energy
Biochar	High OPEX needs	• Competition for biomass • Diverging regulatory objectives
ERW	High OPEX needs	• MRV uncertainties
Ocean-based CDR	High OPEX needs	• MRV uncertainties • Technological uncertainties

General challenges:

- Mainly still first-of-a-kind installations with high technical risk profile
- Need for supportive infrastructure
- Securing demand for the offtake of credits
- International alignment on MRV standards

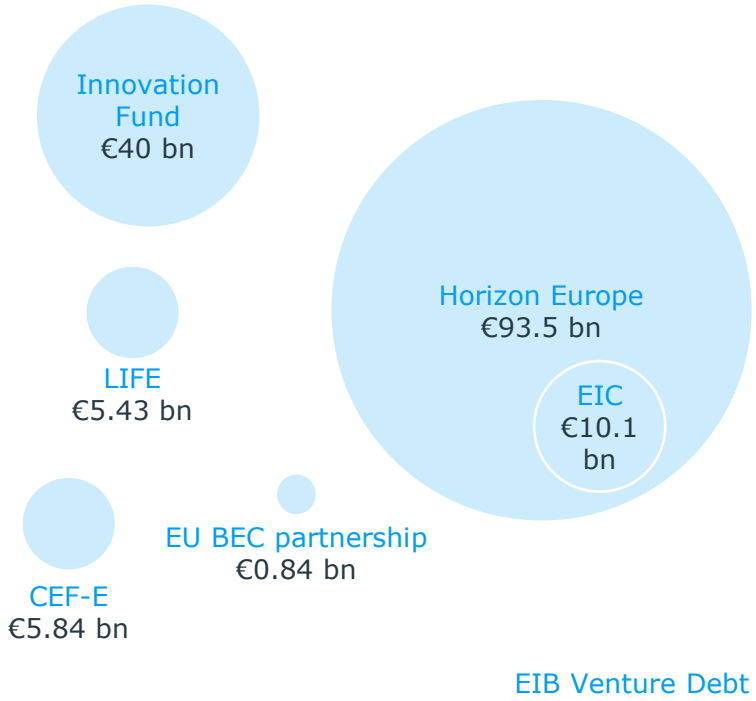
Financing needs are high and only a combination of financing sources can cover the mid-term investment needs



- Expected investment needs of 4.0 – 5.8 billion EUR until 2030 to reach 5 Mt CO2 removal per year (EC target in Sustainable Carbon Cycles Communication)
- Higher removal volumes seem possible but would require more than proportionally higher investment

EU funding is accessible through several programmes

Direct Funding Programmes



Indirect Funding via Member States

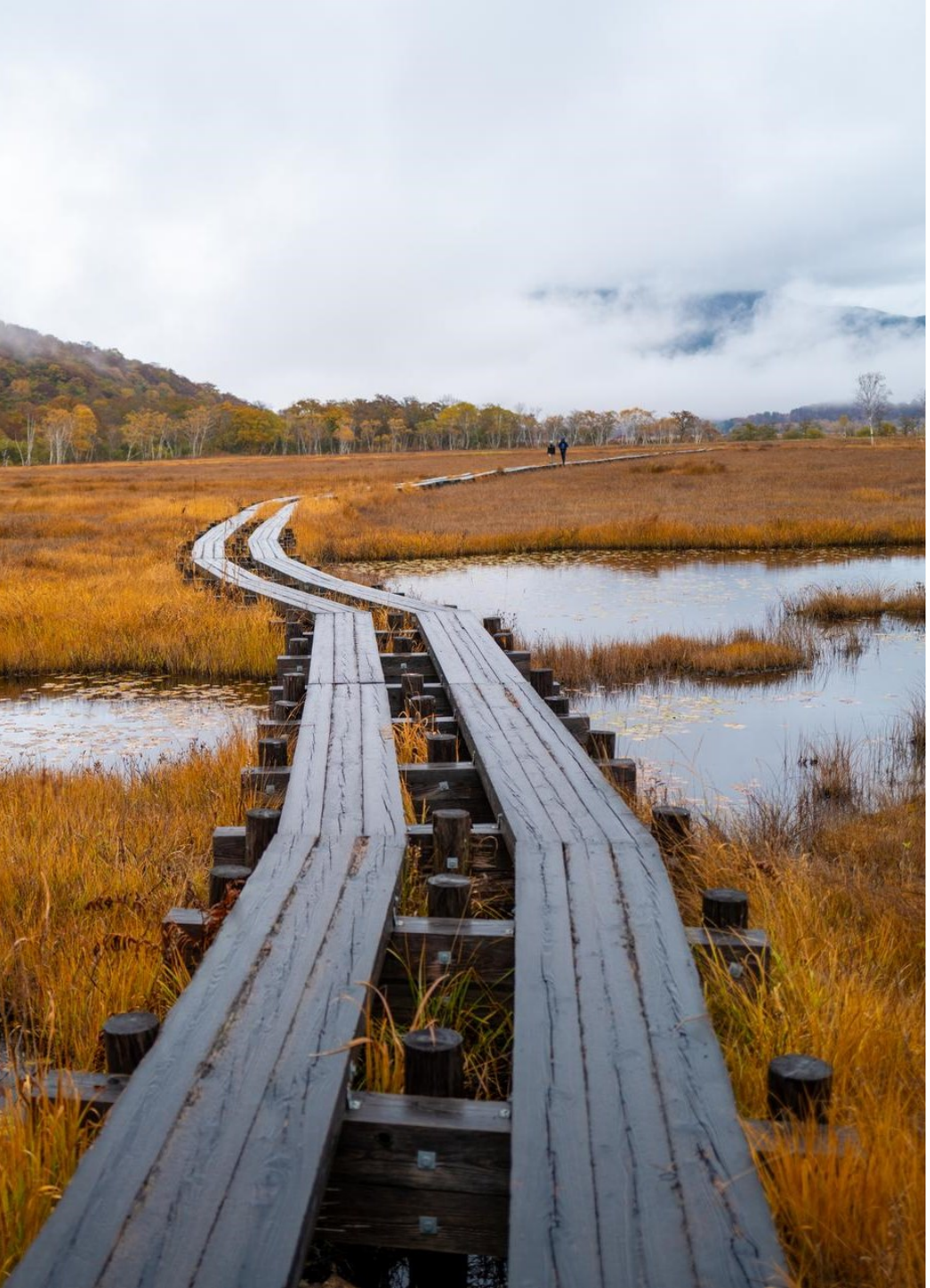
- InvestEU
- Just Transition Fund
- European Regional Development Fund
- Cohesion Fund
- Recovery and Resilience Facility
- State Aid (as per the Guidelines on State aid for climate, environmental protection and energy 2022).

Note: Funding volumes are overall funding for the 2021-2027 period, except for the Innovation Fund (2020-2030) and the EU BEC partnership (2023-2026).

EU has been funding CDR and enabling infrastructure since 2020

Total 1.3 billion EUR

- Innovation Fund : 656 million EUR
- CEF-E: 614 million EUR
- LIFE:30 million EUR
- Horizon: 15 million EUR
- EIC: 7 million EUR



Let’s dive deeper into the EU’s financing landscape

Morning

Get to know EU funding programmes for early-stage CDR projects

Afternoon

Ways of scaling up projects to commercial level and boosting public funding

Get in touch

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Bright
ideas.
Sustainable
change.

RAMBØLL

Public funding for permanent carbon removal in the EU

Information session: EU funding for early-stage projects & project showcase

Jose Jimenez Mingo, DG Clima, European Commission
Carina Faber, EISMEA
Hanna Ojanen, Carbon Culture
Antonio Di Lullo, DG BUDG, European Commission

28 January 2025 | Brussels

Horizon Europe

Pillar II ("Global Challenges & European Industrial Competitiveness)

Public Funding for Permanent Carbon Removals in EU

Jose JIMENEZ MINGO – DG CLIMA

28/01/2025

European Commission

The Horizon Europe Framework Programme

European Commission

HORIZON EUROPE

SPECIFIC PROGRAMME: EUROPEAN DEFENCE FUND

Exclusive focus on defence research & development

- Research actions
- Development actions

SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT*

Exclusive focus on civil applications

Pillar I
EXCELLENT SCIENCE

- European Research Council
- Marie Sklodowska-Curie
- Research Infrastructures

Pillar II
GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Mobility
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre

Pillar III
INNOVATIVE EUROPE

- European Innovation Council
- European Innovation Ecosystems
- European Institute of Innovation & Technology*

WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA

- Widening participation & spreading excellence
- Reforming & Enhancing the European R&I system

EURATOM

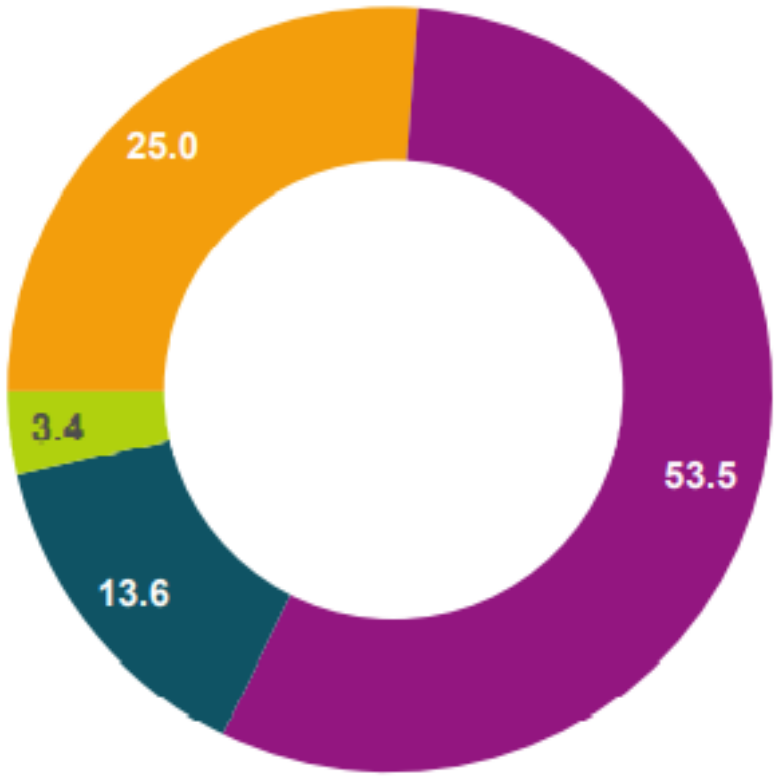
- Fusion
- Fission
- Joint Research Center

* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

European Commission

Horizon Europe Budget: €95.5 billion (2021-2027)

(including €5.4 billion from NGEU – Next Generation Europe – programme of EU for Recovery from COVID-19 crisis)



Political agreement December 2020

€ billion in current prices

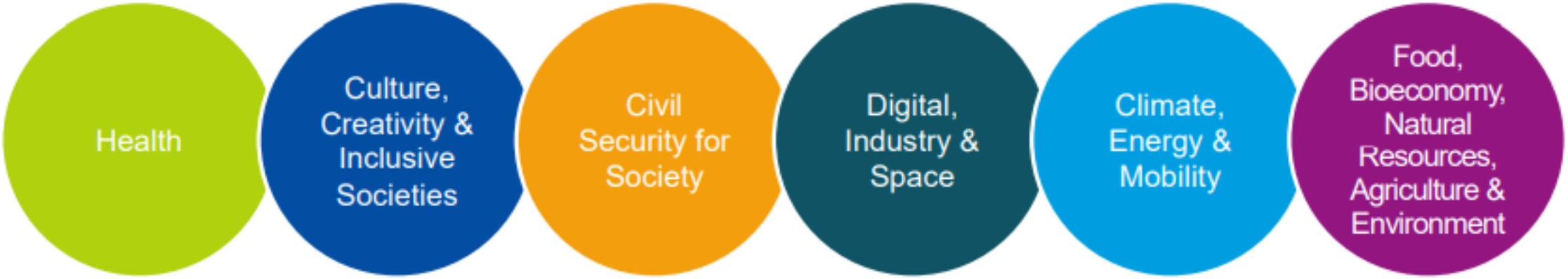
- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA

European Commission

Pillar II - Clusters

GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS:

boosting **key technologies** and solutions underpinning **EU policies & Sustainable Development Goals** (6 clusters and JRC – non-nuclear direct actions)



€53.5 billion

Horizon Europe supports R&I especially through Work Programmes, which set out funding opportunities for R&I activities.

European Commission

Carbon Removal R&I in Horizon Europe Pillar II

Carbon Removals R&I
Cluster 4 (Digital, Industry & Space)

Focus on **Industry**, in the context of the **Processes4Planet** co-programmed Partnership:

- Flexible CO2 capture and purification technologies,
- CO2 utilisation in concrete production,
- CO2 mineralisation to produce building materials,
- Catalytic conversion of CO2 into chemicals/fuels etc.

Example **topics** in Work Programmes 2021-2022 & 2023-2024:

- HORIZON-CL4-2024-TWIN-TRANSITION-01-35: Turning CO2 emissions from the process industry to feedstock (EUR 30 million, Innovation Action)

Example **projects**:

- **ICO2NIC** (IA, EUR 15 million): Innovative electrochemical CO2 Conversion into Versatile Feedstock
- **EMPHATICA**L (IA, EUR 17 million): Efficient Methanol from Pumped Heat and Calcium Looping

Carbon Removals R&I
Cluster 5 (Climate, Energy & Mobility)

Focus on **CCUS**, in the context of:

- Improving CO2 capture efficiency,
- Understanding CO2 storage potential,
- In electricity generation etc.

Example **topics** in Work Programmes 2021-2022 & 2023-2024:

- HORIZON-CL5-2021-D3-02-13: Cost reduction of CO2 capture (RIA, EUR 30mn)
- HORIZON-CL5-2023-D3-01-17: Development of CO2 transport & storage demo projects (IA, EUR 40mn)
- HORIZON-CL5-2024-D3-02-11: CCU for the production of fuels (IA, EUR 15mn)
- HORIZON-CL5-2024-D3-02-12: DACCS & BECCS for CO2 removal/negative emissions (IA, EUR 15mn)

Example **projects**:

- **COREU** (IA, EUR 30 million): CO2 Routes Across Europe
- **HiRECORD** (RIA, EUR 6.3 million): Scaling-up Of A Highly Modular Rotating Packed Bed Plant With An Efficient Solvent For Capture Cost Reduction

Carbon Removals R&I
Cluster 6 (Climate, Energy & Mobility)

Focus on **Carbon Removals**, in the context of **Land, Forestry, Oceans & Agriculture**:

- Carbon removal potential of bio-based economies,
- Demonstrating carbon farming practices & developing carbon removal certifications,
- Blue carbon sequestration etc.

Example **topics** in Work Programmes 2021-2022 & 2023-2024:

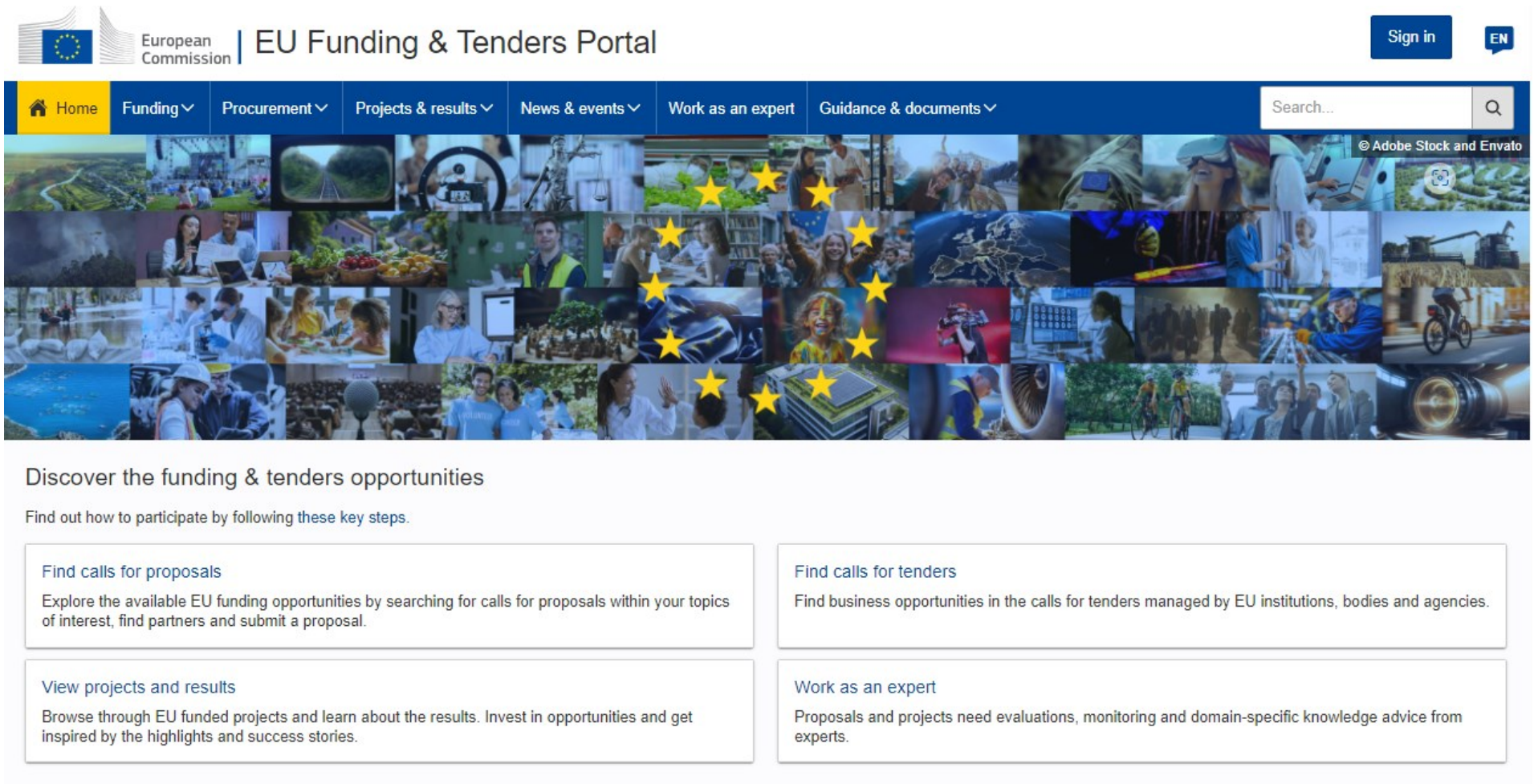
- HORIZON-CL6-2023-CLIMATE-01-4: Demonstration network on climate-smart farming – linking research station
- HORIZON-CL6-2023-CLIMATE-01-5 - Pilot network of climate-positive organic farms
- HORIZON-CL6-2024-CLIMATE-01-5: Climate-smart use of wood in the construction sector to support the New European Bauhaus

Example **projects**:

- **OrganicClimateNET** (CSA, EUR 5 million): A pilot network of organic farming actors contributing to the uptake of climate farming and its co-benefits for a carbon neutral and climate resilient Europe
- **SEA-Quester** (RIA, EUR 5 million): Blue Carbon production, export and sequestration in emerging polar ecosystems

Funding & Tenders (F&T) Portal

- Open calls for proposals can be found on the EU Funding & Tenders Portal (EU Funding & Tenders Portal | EU Funding & Tenders Portal)



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EIC’s hands-on public funding strategy

From Scientific Curiosity to Technological Innovation

PhD Carina Faber, Programme Manager for Renewable Energy Conversion and Alternative Resource Exploitation

European Innovation Council

28/01/2025

The EIC – Deep Tech funding along the whole innovation chain

European Commission

European Innovation Council

Europe's most ambitious innovation initiative

Budget

€ 10 billion

Unique

combines research & accelerator for SMEs, startups, scaleups

Largest deep-tech innovestor in Europe

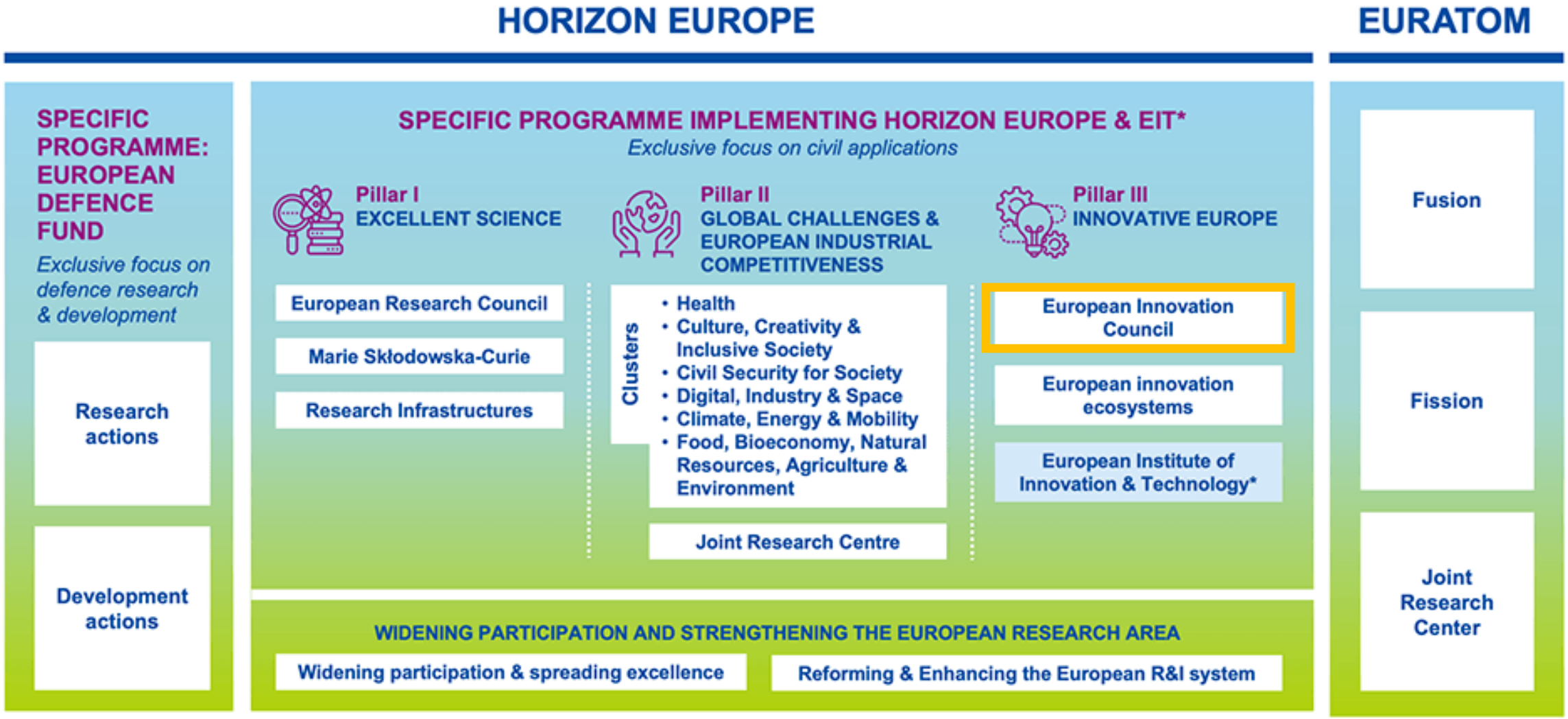
Over €3 billion

Enhances the European Innovation Ecosystems

Partnerships with ERC, EIT, regions…

The EIC: a novel instrument within Horizon Europe

European Innovation Council



* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

The EIC:
Deep tech funding along the whole innovation chain

European Innovation Council

Pathfinder

Advanced research on game-changing technologies

TRL 1-4

Fundamental research

Collaborative projects

Transition

From research results to innovation opportunities

TRL 4-6

Follow up of EIC, ERC, Horizon Pillar 2 projects

Collaborative research with restricted number of partners

Accelerator

Scale-up with high risk and high impact

TRL 6+

Individual SMEs

Grant Funding

Equity Funding

2.5 Mio. – 10 Mio. Euros

Funding schemes

European Innovation Council

EIC Open Calls	to support projects in any field of science, technology or application without predefined thematic priorities
EIC Challenge Calls	to support coherent portfolios of projects within predefined thematic areas with the aim to achieve specific objectives for each Challenge

EIC PROGRAMME MANAGERS

Orsolya Symmons
Health and Biotechnology

Hedi Karray
Artificial Intelligence

Federica Zanca
Medical imaging and AI in healthcare

Isabel Obieta
Sustainable Semiconductors

Stella Tkatchova
Space systems & technologies

Samira Nik
Quantum tech & electronics

Franc Mouwen
Architecture engineering construction technologies

Ivan Stefanic
Food chain technologies, novel & sustainable food

Paolo Bondavalli
Advanced materials for energy

Carina Faber
Renewable energy conversion & alternative resource exploitation

European Innovation Council

EIC Programme Manager Priorities

European Innovation Council

Identify candidate challenges and select portfolios of projects

- Science and innovation intelligence activity
- Outreach and community building
- Guiding panel members to select portfolios for Pathfinder, and active observers for Transition and Accelerator

Pro-active management of selected portfolios and projects

- Technology
- Regulation
- Transition to innovation
- Communication and dissemination

The EIC work programme 2025 – 1.4 bio. Euros significant budget to drive forward innovation

European Innovation Council

EIC PATHFINDER €262 m

Funding for early-stage technology research and development

Grants per project MAX **€4 m**

EIC Pathfinder Open [€142 million]
APPLY BY 21 MAY 2025

EIC Pathfinder Challenges [€120 million]
APPLY BY 29 OCTOBER 2025

EIC TRANSITION €98 m

Funding for technology validation and commercialisation

Grants per project MAX **€2.5 m**

EIC Transition Open [€98 million]
APPLY BY 17 SEPTEMBER 2025

EIC ACCELERATOR €634 m

Funding for commercialisation and scale-up

Grants per company MAX **€2.5 m**

Equity investments per company MAX **€10 m**

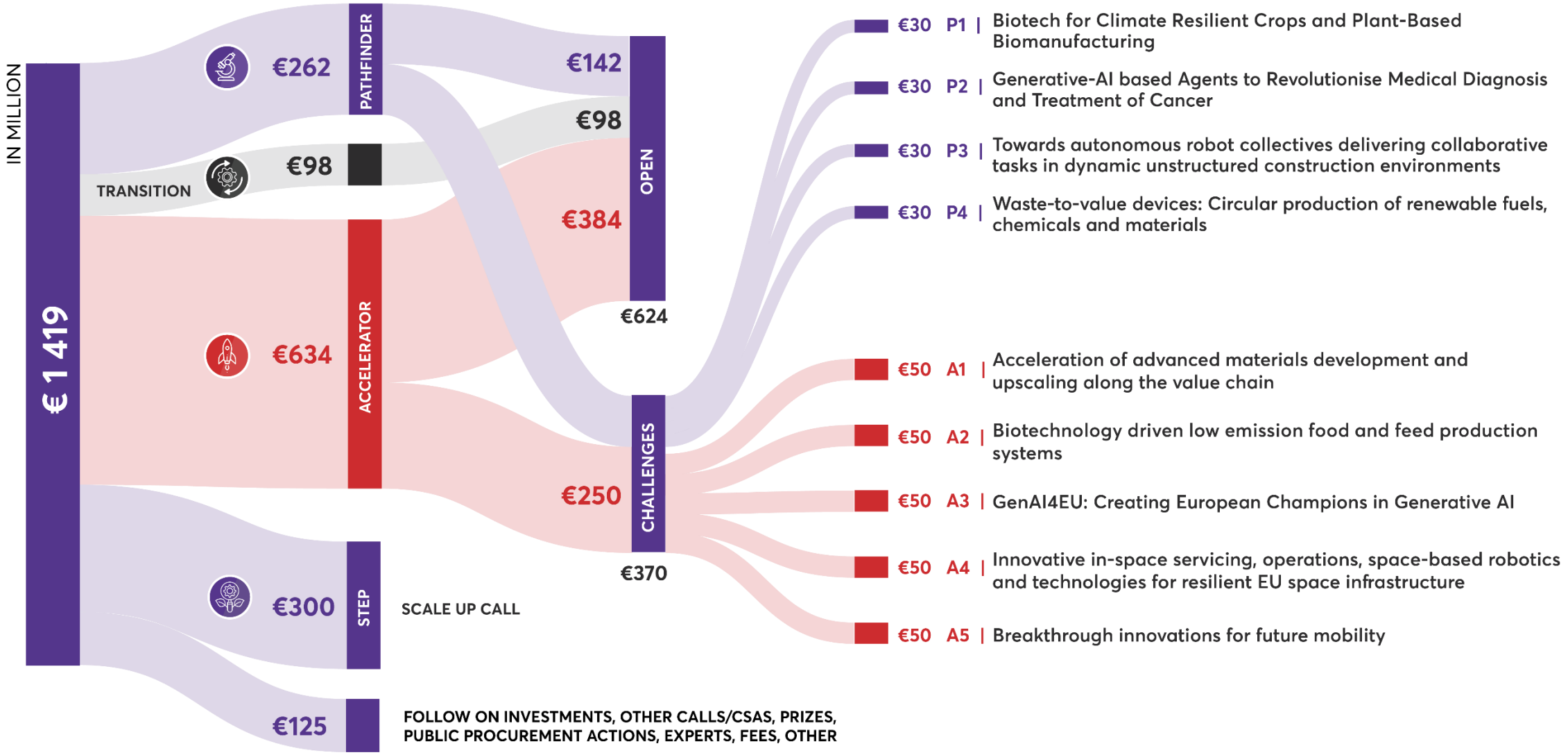
EIC Accelerator Open [€384 million] and Challenges [€250 million]
APPLY ANYTIME

Full application by:
12 MARCH 2025
1 OCTOBER 2025

+ STEP

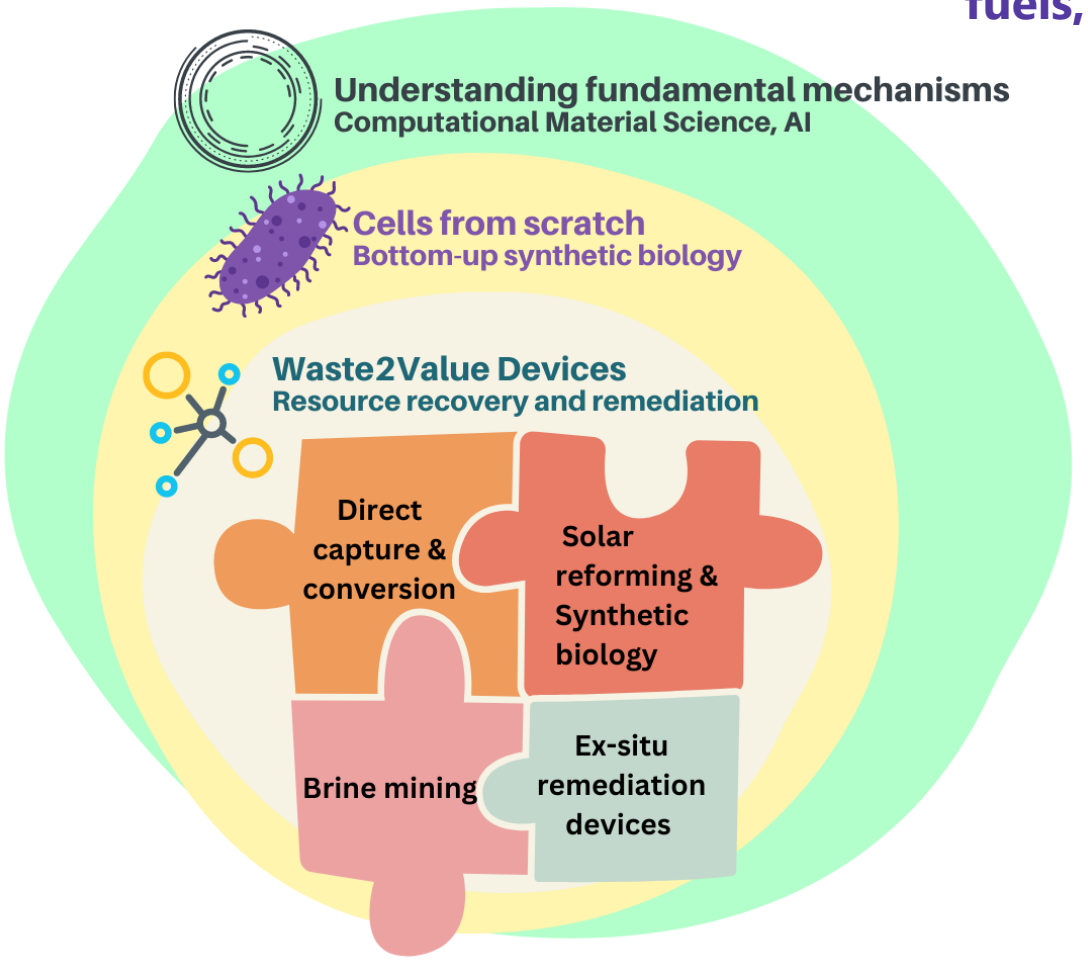
Work Programme 2025

European Innovation Council



The EIC work programme 2025: Challenges

European Innovation Council



II.2.4 Waste-to-value devices: Circular production of renewable fuels, chemicals and materials

Developing of next generation technologies that turn today's problematic waste streams into essential building blocks of a future circular economy.

The Challenge focuses on currently **non- or hard-to-recycle types of synthetic polymer** materials (including among other mixtures of different types of plastics, polymeric composite materials, micro-/nanoplastics, untreated plastic waste, diapers, rubber, etc.), **flue gases, wastewater and seawater desalination brines**. Proposals must **target real-life industrial and household waste.**

EIC Challenges:
→ to define a clear scope
→ to prioritize and match to societal needs

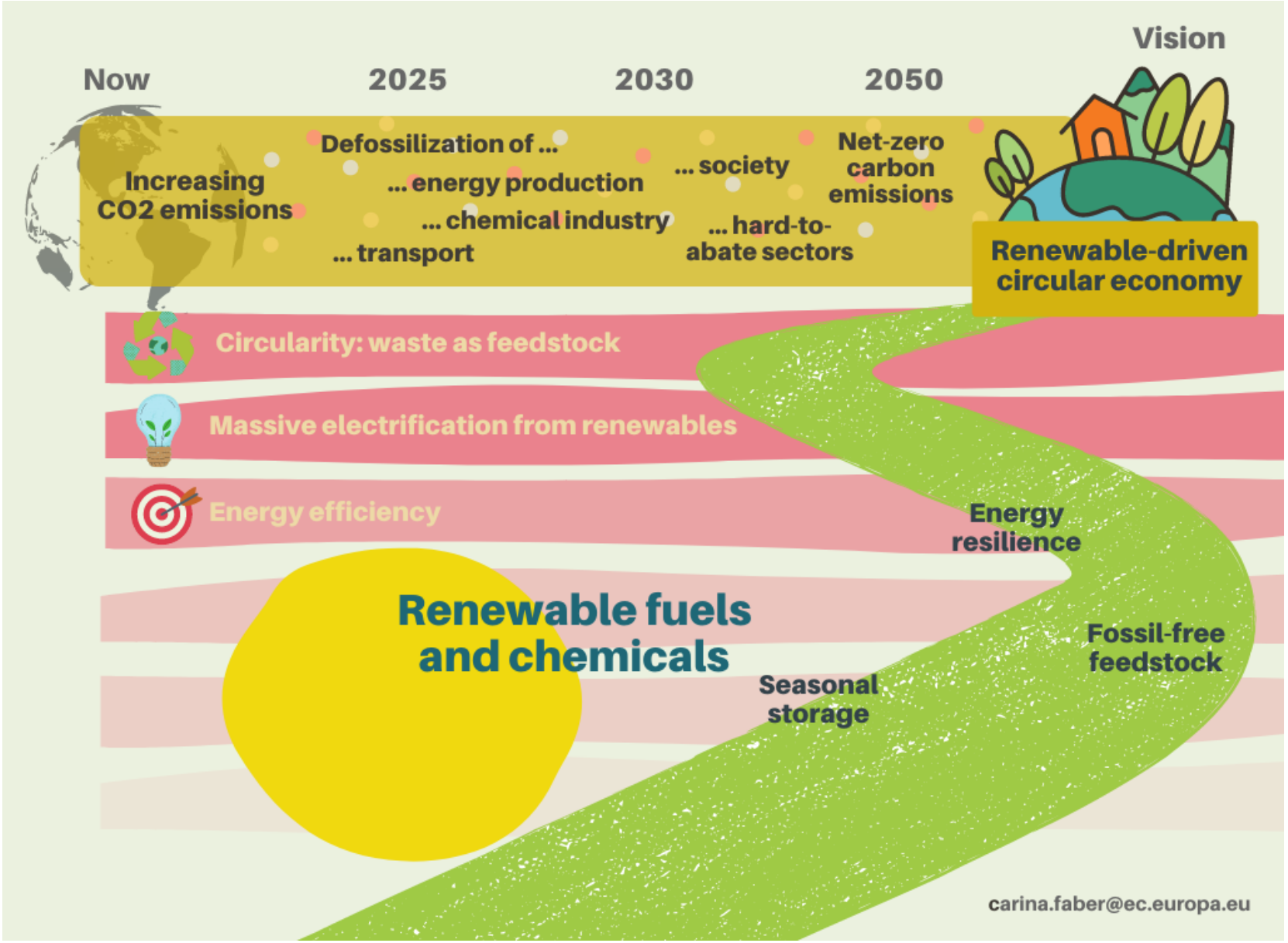
When is it ready?
When is it needed?
What is needed?

EIC Proactive Management

From a societal need to a technological solution

European Commission

It all stars from a vision…

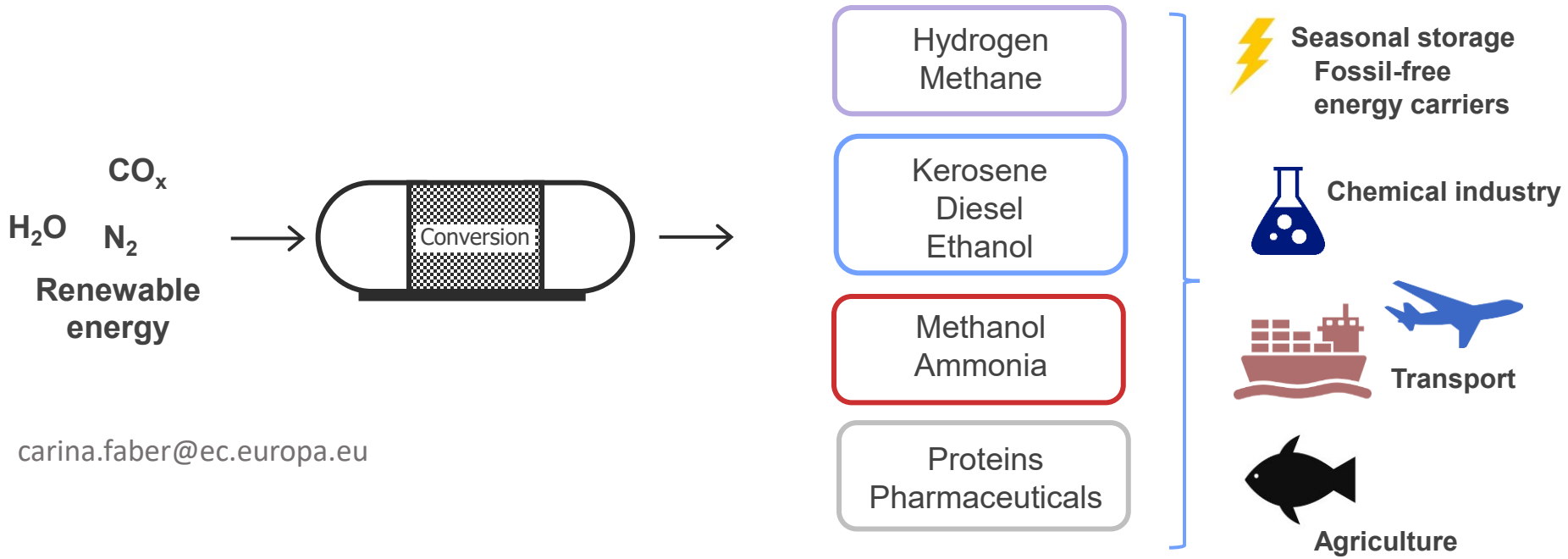


Renewable fuels and chemicals from green energy, carbon oxides and water: products

European Innovation Council

Renewable fuels of non-biological origin (RFNBO) are synthetic fuels and chemicals produced from renewable energy, water and simple molecules (not biomass-based feedstock).

The products are manifold, ranging from hydrogen, sustainable aviation fuels to proteins for food and feed applications. No designated winner, **quest for viable business models.**



carina.faber@ec.europa.eu

EIC funding opportunities: synergies

European Innovation Council

R&D → Innovation

EIC Pathfinder & Transition

- Novel conversion processes, diverse RES, alternative resources
- Construction of industrial prototypes reaching TRL-6

EIC Accelerator

- Technology Upscaling
- Pilots for de-risking
  - Operations procedure
  - Validated performances in industrial environment

EIC funding opportunities

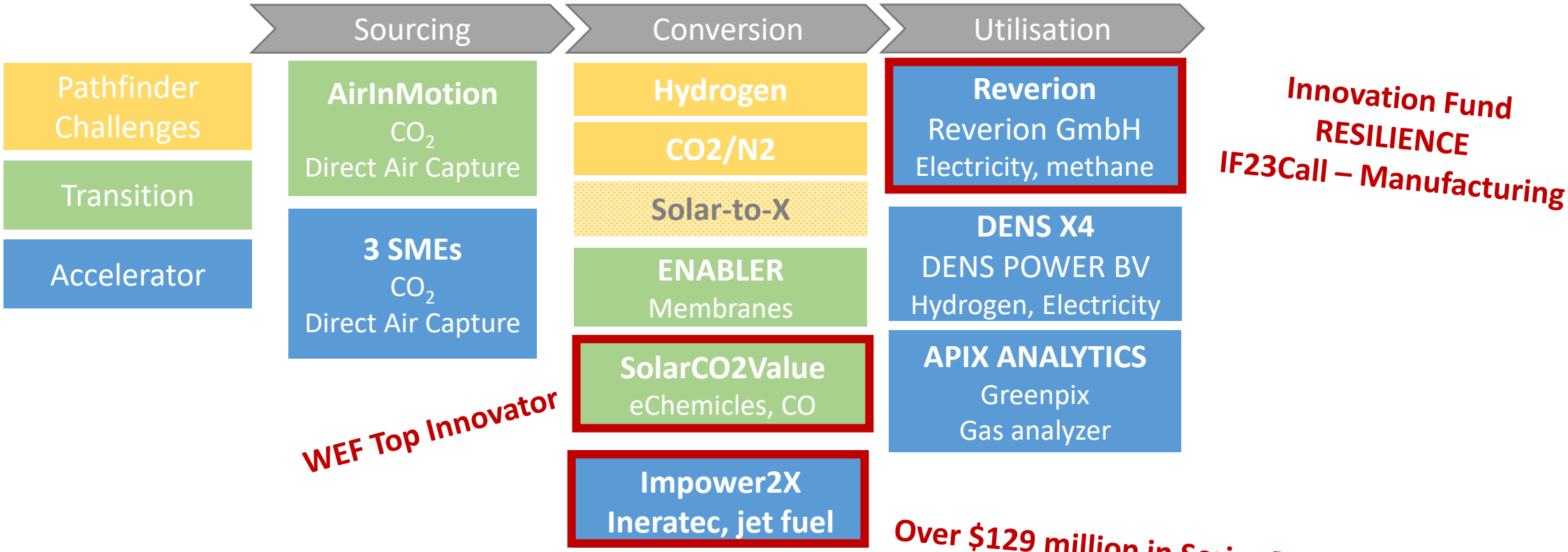
Large-scale demonstration projects

- Innovative technologies tested
- Techno-economic validation industrial efficiency
- Practical aspects of integration with renewable energy and feedstock assets (batteries, PV, hydrogen production, CO_2 capture, heat, etc.)

EIC Thematic Portfolio: Renewable hydrogen, fuels and chemicals

European Innovation Council

→ **A range of diverse products and business models is explored, at all maturity levels**



Solar-to-X workshop: community building

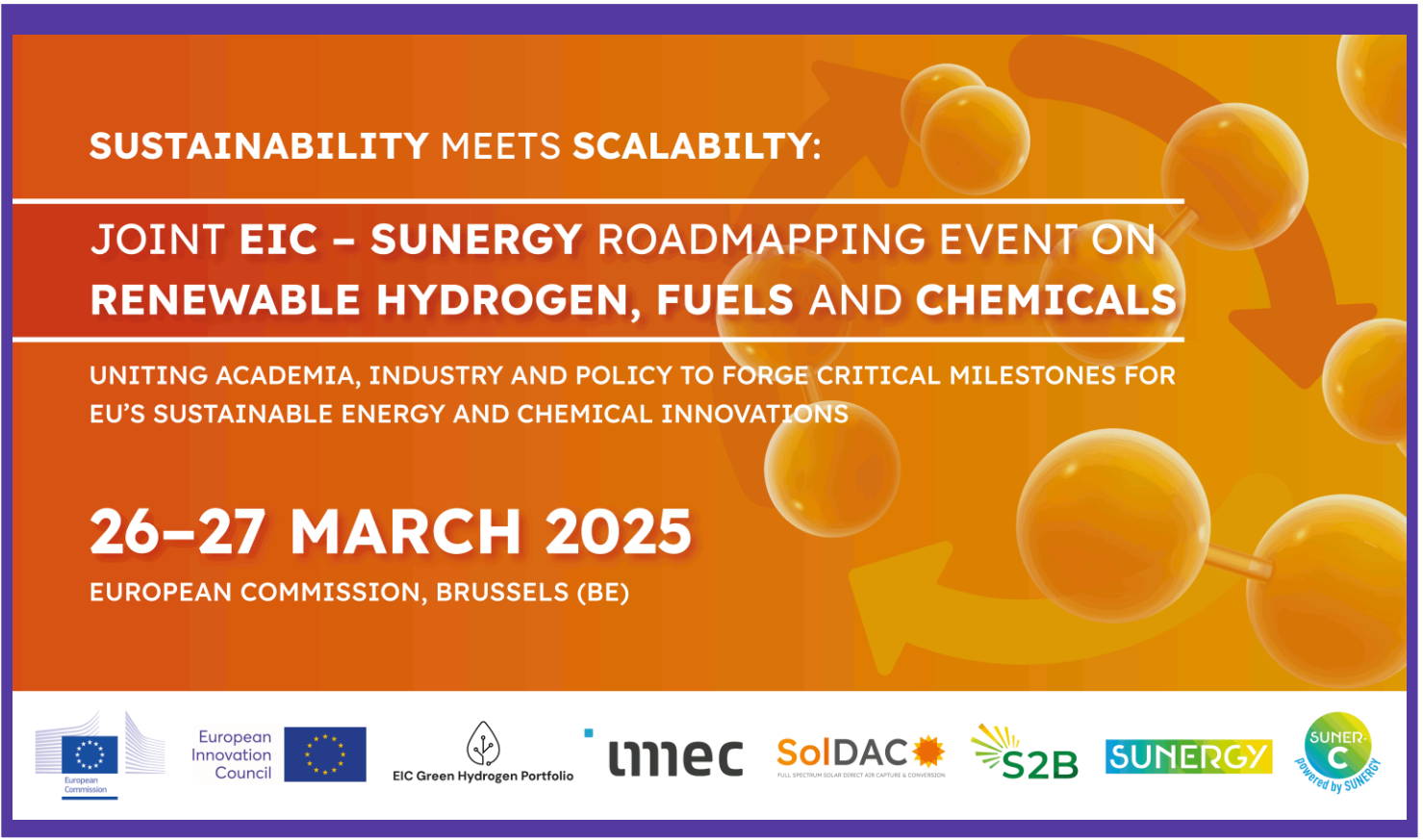
EIC event, attended by over 130 people:

- Comprehensive overview of the state-of-the-art in Solar-to-X, Power-to-X, and CCU.
- Uniting representatives from academia, industry, policy and finance

- Goal: clear view and alignment

[The future of Solar-to-X - Publications Office of the EU]

Upcoming event:Join us!



What we want to achieve:

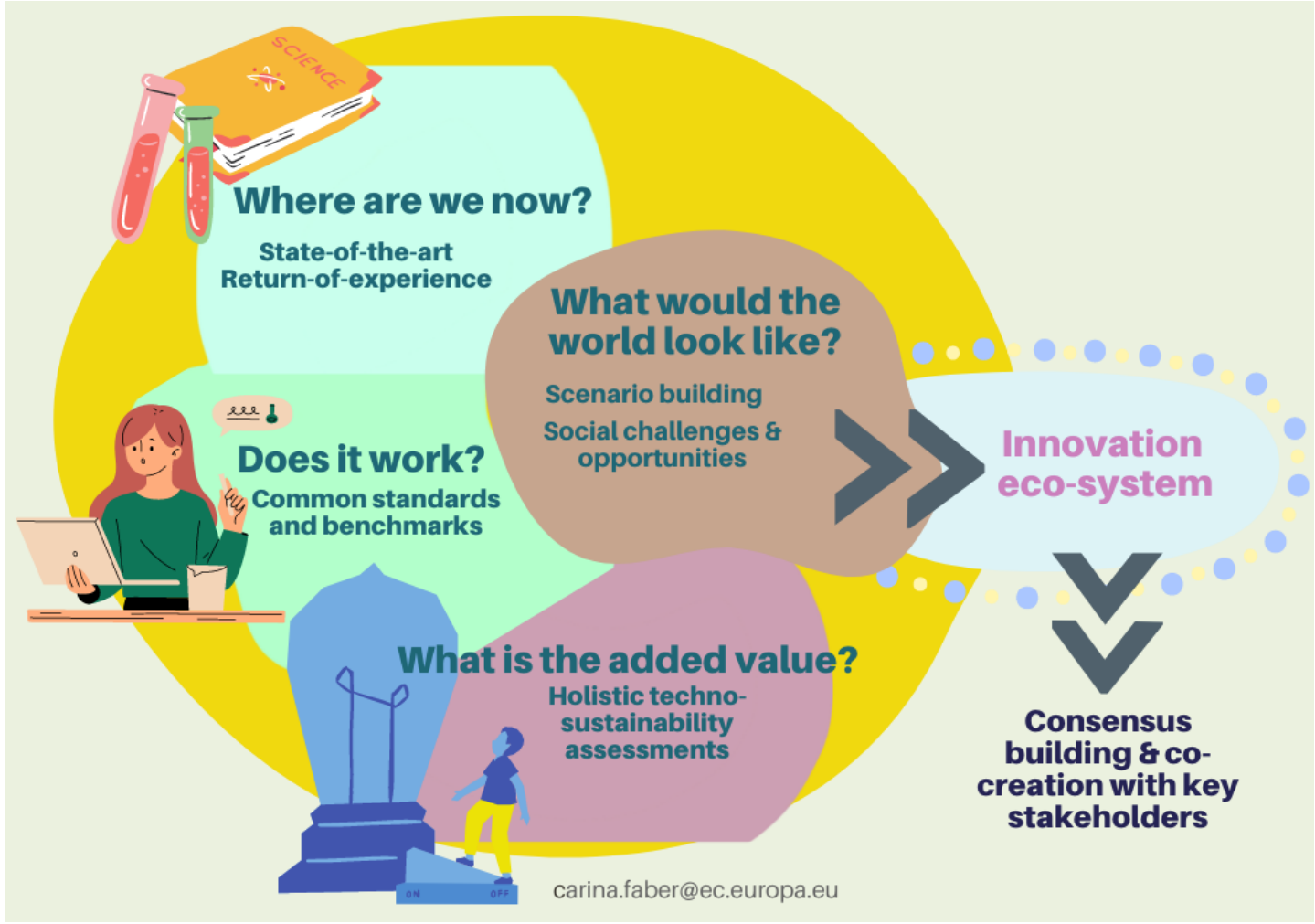
- Reality check: Match R&I realities with industrial needs and policy ambitions
- Gain a clear understanding of the next technological milestones
- Guide innovation at an early stage towards the most sustainable configurations that meet societal needs
- Bring together the entire innovation eco-system on renewable hydrogen, fuels and chemicals

[Sustainability meets Scalability: Joint EIC – SUNERGY Roadmapping Event on Renewable Hydrogen, Fuels and Chemicals - European Commission]

Solar fuels: Tools we deploy

European Innovation Council

What? Where is the added value of solar-to-X technologies in the future energy system?



Techno-sustainability assessment for emerging solar-to-X technologies

European Innovation Council

Goals

- Systematic, reproducible and comparable assessment methodology
- Clear understanding of the potential sustainability impact of solar fuel innovation
- Insight into the applications that need to be targeted within this domain to guide decision makers and identify the possible societal impact
- Guide researchers towards the most sustainable configurations at early stage

How?

- Development of a **holistic, standardized methodology** for **various solar-to-X architectures**
- Offering **flexibility,** but also **standardization** to guide **interpretation** and **inter-comparability**
- Evaluation of selected environmental, economic and social indicators – combined with technical parameters
- Development together with the community

Sustainability assessment Solar fuels

vito

European Innovation Council

Disclaimer: *This dashboard displays an overview of important data, each time referring to the different input worksheets. Data should not be entered in this worksheet by the registrants.*

Miet Van Dael (VITO)
Sustainability analysis for emerging technologies

And finally – useful links

European Innovation Council

EIC Work Programme 2025

Support for applicants
(FAQs, guidelines, contacts)

Funding & tenders opportunities Portal
(legal & supporting documents)

+ EIC Info Days on Pathfinder Challenges: 4th April 2025

Thank you!

https://eic.ec.europa.eu

@EUeic

#EUeic

Public funding for permanent carbon removal in the EU

Information session: EU funding for early-stage projects & project showcase

Jose Jimenez Mingo, DG Clima, European Commission
Carina Faber, EISMEA
Hanna Ojanen, Carbon Culture
Antonio Di Lullo, DG BUDG, European Commission

Agenda:

28 January 2025 | Brussels

Hanna Ojanen, Head of Carbon Markets, Carbo Culture
28.1.25, Brussels
hanna@carboculture.com

carboculture

carboculture

Selection of the industry-leading partners, advisors and clients we are proud to work with

NextGen

zendesk

Supercritical

GenZero

Rothschild & Co

carboculture

Tesi

true Ventures

European Investment Bank

BUSINESS FINLAND

puro·earth

SPRIN-D
BUNDESAGENTUR FÜR SPRUNGINNOVATIONEN

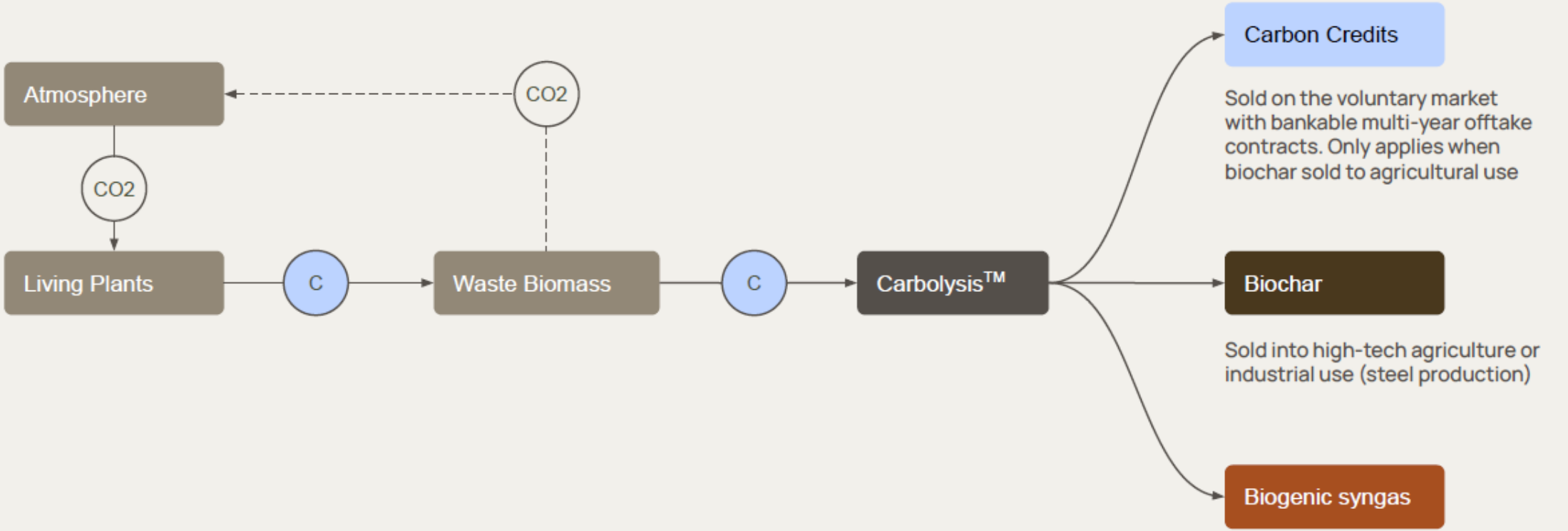
European Innovation Council

We are a biochar project developer with proprietary technology

- → Searching bankable offtake contracts and strong JV partners
- → Established 2016 with HQ in Finland
- → 35 Full Time Employees
- → 26M€ equity + 5M€ grants raised to date
- → Institutional Investors: Temasek Genzero, True Ventures, Tesi with over 9B$ of combined AUM for decarbonisation
- → We are initially developing a portfolio of projects across the Nordics and Benelux

carboculture

Converting waste plant matter into 3 revenue streams



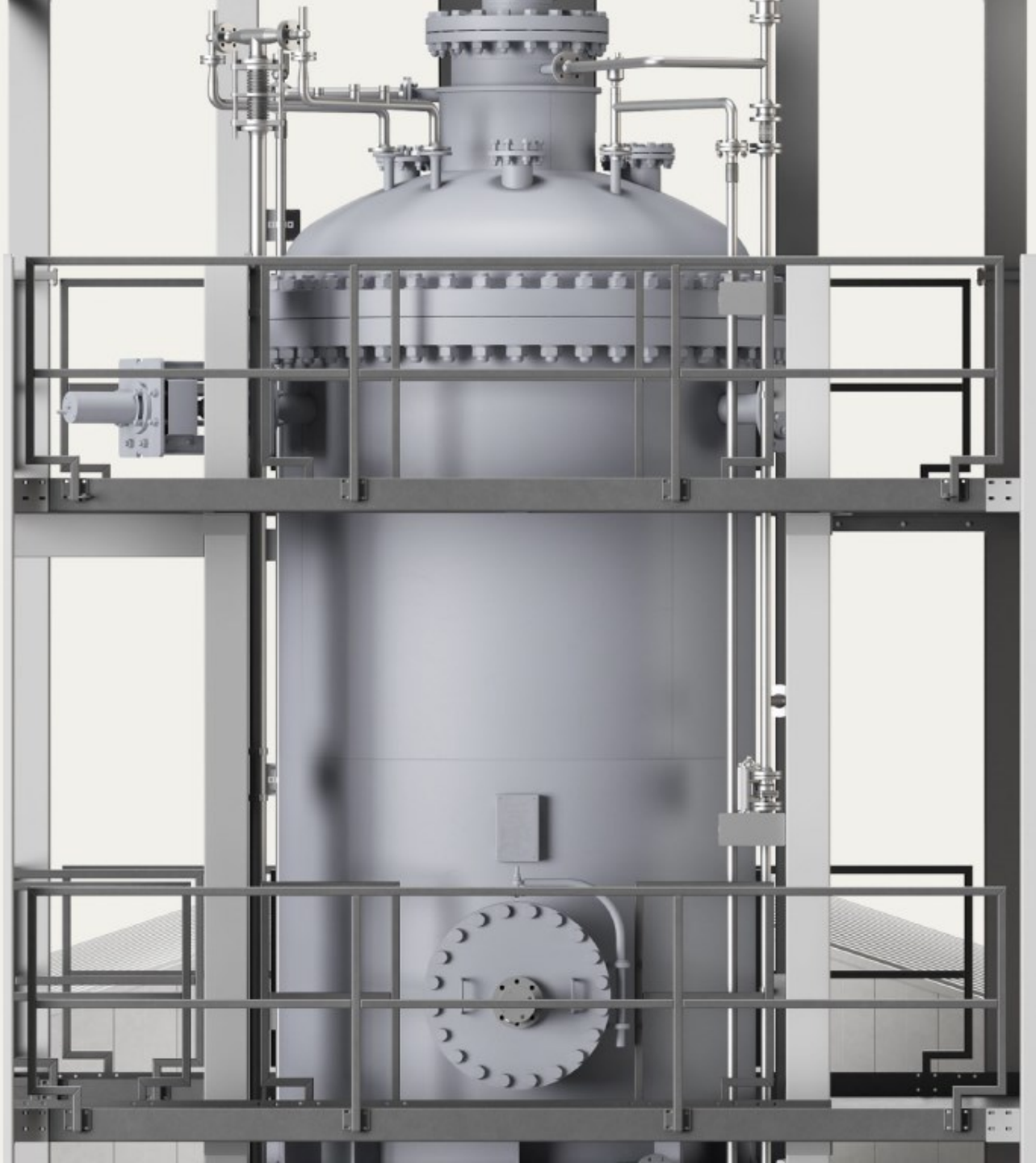
Carbon Cycle

Carbo Culture

Technological advantages

Carbolysis™ is our patented technology for industrial Biochar Carbon Removal.

Higher energy and carbon output	No tar or oils, no loss; 70% more usable energy output than best-in-industry competitor
Ultra efficient	1 ton of biochar generates 3.2 tCO_2 of net carbon removal and 10 MWh of energy
Scalable	No external energy need
Proprietary technology	Full control over design, fulfillment, cost and schedule with industry leading innovations
High uptime & reliability	Less maintenance costs thanks to clean outputs



European Innovation Council

The European Innovation Council represents an important avenue for R&D funding in the EU

Carbo Culture won the competition in 2022, and the grant led us to move our R&D from the US to Finland and to build our final pilot reactor, R3 in Helsinki 2022-2023.

The funding from the EIC has been catalytic. Carbo Culture has grown from 10 to 40, mostly in the EU since the grant and has helped fundraising efforts.

R3: Automated, industrial sized pilot reactor

Location: Kerava, Finland

Commissioned: 2023

Objectives:

- Commercial sized reactor proven before moving to modular plant design
- Proven variety of feedstocks and pre-processing requirements identified
- R&D for biochar applications for growing media and substrate clients

Output: 1kt biochar, 3kt of CO_2e or carbon credits per annum

We have proven our technology and product quality at increasing scales

CALIFORNIA

R1 **In operation**
R&D

R2 **In operation**
Volume scale up 4x

EUROPE

R3 **In operation**
Volume scale up 1.5x
Automated system
Industrial standards

C1 **2025-2026**
Full module pilot
(In development)

Thank you!

Get in touch with our experts!

hello@carboculture.com
carboculture.com

Follow us on LinkedIn

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Public funding for permanent carbon removal in the EU

Information session: EU funding for early-stage projects & project showcase

Jose Jimenez Mingo, DG Clima, European Commission
Carina Faber, EISMEA
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28 January 2025 | Brussels

Strategic Technologies for Europe Platform (STEP)

Public funding for permanent carbon removal in the EU

Antonino DI LULLO - STEP Task Force – DG BUDG – European Commission

https://strategic-technologies.europa.eu

STEP

In a nutshell

- **Context:** competitiveness a top priority of the new Commission
- **Investment focus but not a new fund:** pooling funding from 11 EU existing programmes, with a top-up of €1.5bn. No focus on regulatory frameworks.
- **A service-oriented team in the Commission** to support STEP sectors
- **User-centric portal**
- **A pilot for a new Competitiveness Fund** as announced by Commission President in July 2024
- **Regulation entered into force on 1 March 2024 –** adopted by the Council (27 Member States) and the European Parliament

STEP
A laser-focused scope* to support where needed

STEP OBJECTIVES

Supporting the **development or manufacturing** of critical technologies or safeguarding and strengthening their respective **value chains**

Addressing shortages of **labour and skills**

STEP CONDITIONS

Bring an **innovative**, cutting-edge element with significant economic potential to the Single Market

OR

Contribute to **reduce or prevent strategic dependencies** of the Union

STEP SECTORS

(indicative & non-exhaustive) EXAMPLES

Digital and deep tech innovation → Artificial intelligence, quantum technologies, advanced connectivity

NZIA

Clean and resource efficient tech → Carbon capture and storage technologies, heat pumps

Bio tech → Molecular biotechnology, pharmaceuticals, crop biotechnology

CRMA

NZIA: Net-Zero industry Act
CRMA: Critical Raw Materials Act

*STEP Guidance note published on 13 May 2024

STEP

Steering resources across the EU budget

Programmes concerned

- Innovation Fund
- Horizon Europe
- Digital Europe Programme
- EU4Health
- European Defence Fund

Conditions for award

Project complying with the minimum quality requirements of the call for proposals

+

Contributing to STEP objectives

=

Publication on STEP Portal

Award of STEP Seal

Valid throughout duration of project

Unless:

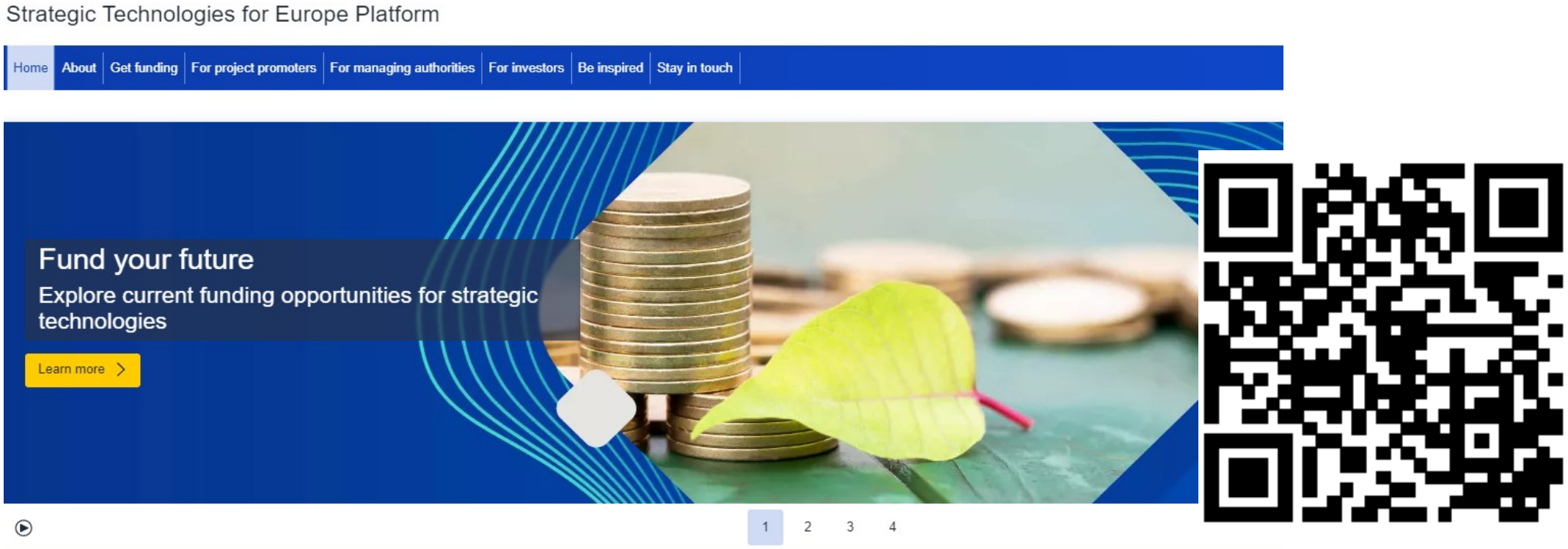
- Project has not started within 5 years of award
- Project relocated outside EU

149 STEP Seals in clean-tech so far

Benefits per programme

Cohesion policy funds (ERDF, ESF+)	Managing Authorities can directly award support to projects, provided they align to the scope of ERDF or ESF+ and contribute to the programmers' objectives
National Recovery and Resilience Facility (RRF)	Project to be considered as a priority for funding when revising RRPs – possibility to provide alternative or cumulative funding
Modernisation Fund	Project may be considered as a priority for funding
InvestEU	To be taken into account by EIB and Implementing Partners during the policy check process
Other Union funds or programmes	Project could be granted (combined) support

STEP
Portal : Central access point for users



European Commission

STEP
De-carbonization as a priority in Member States

Denmark

1 regional ERDF + JTF programme

Netherlands

1 regional ERDF programme

Germany

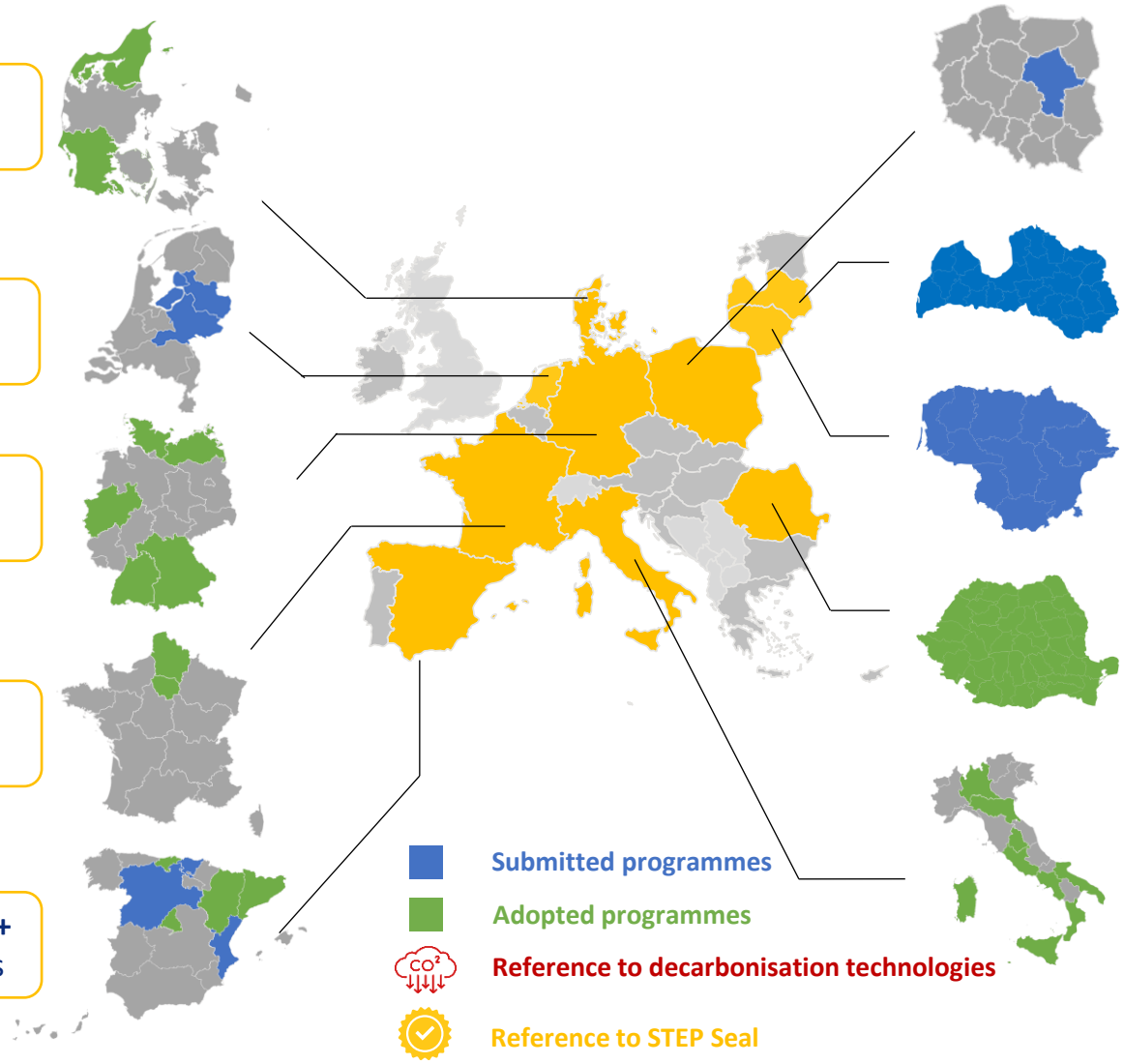
5 regional ERDF, 1 JTF and **1 ESF+** programmes

France

2 regional ERDF and **ESF+** programmes

Spain

7 regional ERDF, **2 regional ESF+** and **1 national JTF** programmes



Poland

1 regional ERDF programme

Latvia

1 national ERDF programme

Lithuania

1 national ERDF programme

Romania

2 national ESF+, 2 national ERDF and 1 national JTF programmes

Italy

9 regional and 1 national ERDF programme

STEP in Member States

National Contact Points are there to support

- The **STEP National Contact Points** are officials designated by EU Member States to **oversee and support the implementation of STEP at national level**

Contact details of **National Contact Points** available on the **STEP Portal**

European Commission

Thank you

Contact us at EC-STEP-INFO@ec.europa.eu

More info on STEP: strategic-technologies.europa.eu

European Commission

Public funding for permanent carbon removal in the EU

Stacking multiple sources of funding to reach a final investment decision

Johan Börje, Stockholm Exergi

28 January 2025 | Brussels

Getting Permanent Carbon Removals off the ground, or Funding a new world-leading European industry

How I use the terms:

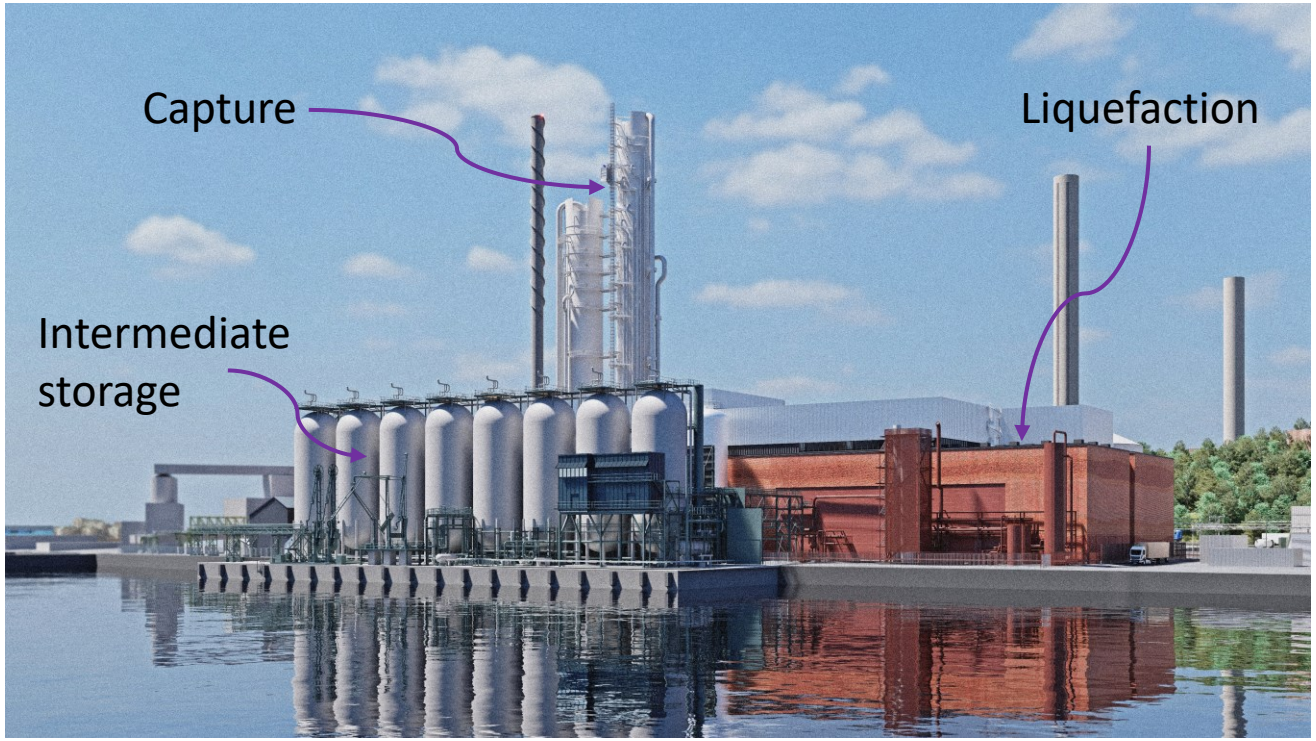
- **Funding:** cash-flows that don't expect repayment, but typically require some deliverable: revenues, grants or government aid
- **Financing:** cash-flows that expect repayment, with interest: equity or loans

This project is co-funded by the European Union's Innovation Fund under grant agreement no 101051202

Beccs Stockholm

Beccs Stockholm – Leveraging sustainable energy transition for efficient climate mitigation

- Heating and Electricity as well as Green Carbon for Permanent Storage or Usage
- Thanks to improved opportunities for heat recovery, no Energy penalty (!)
- At the same time, provides:
  - Net output of fresh water
  - Energy storage (biomass)
  - Security of Supply
  - Dispatchable energy, facilitating introduction of intermittent renewable power sources



Retrofit. Capture, Liquefaction and Intermediate storage by Stockholm Exergi. 250 000 hours engineering design. 800 ktonnes capture/y. Transport and Storage acquired as a service. Post combustion, Hot Potassium Carbonate. Funding received from EU Innovation Fund and Swedish State Aid. Significant funding from VCM. FID Q1-2025

This project is co-funded by the European Union's Innovation Fund under grant agreement no 101051202

Beccs Stockholm

The Challenge is…..industrial

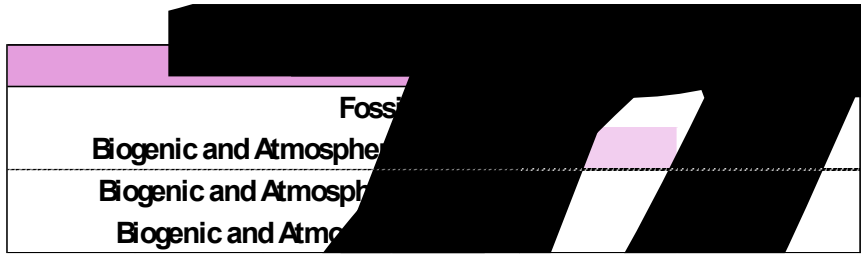
- **Grasp the scope:** To reach the EU 2040 SWD run-rate **capture** target of 117 Mt CO_2/year, we need almost one FID per month of the size of Beccs Stockholm, starting now
- **Implication:** Build, …., build!

The problem is not financing, but to project future incoming cash-flow streams

(you rarely need to worry about the outgoing cash-flow streams…)

If you have credible future incoming cash-flow streams, you will find the necessary financing for your project

EU 2040 climate target Communication Staff Working Document (2024) 63, and own calculations



This project is co-funded by the European Union's Innovation Fund under grant agreement no 101051202

Beccs Stockholm

Policy considerations for generating incoming cash-flow

- Permanent removals are a necessary offering in search of demand – Market or Taxpayer? **Market as far as possible, taxpayer when necessary** (to cover funding gap)
- A Voluntary market or Compliance market? **Voluntary to kick-start the industry, Compliance as soon as feasible to accelerate and scale**
- Policy implications:
  - Promote **co-funding/stacking** of public and private funds –> **co-claiming**
  - Ensure regulation incentivizes voluntary purchase of permanent carbon removals – including **compensation claims** for intermediate targets
  - **Accelerate** application of permanent removals for **compliance purposes**
- What about Mitigation deterrence, Sustainability and Consumer protection?

Source: Wallace and Gromit

This project is co-funded by the European Union's Innovation Fund under grant agreement no 101051202

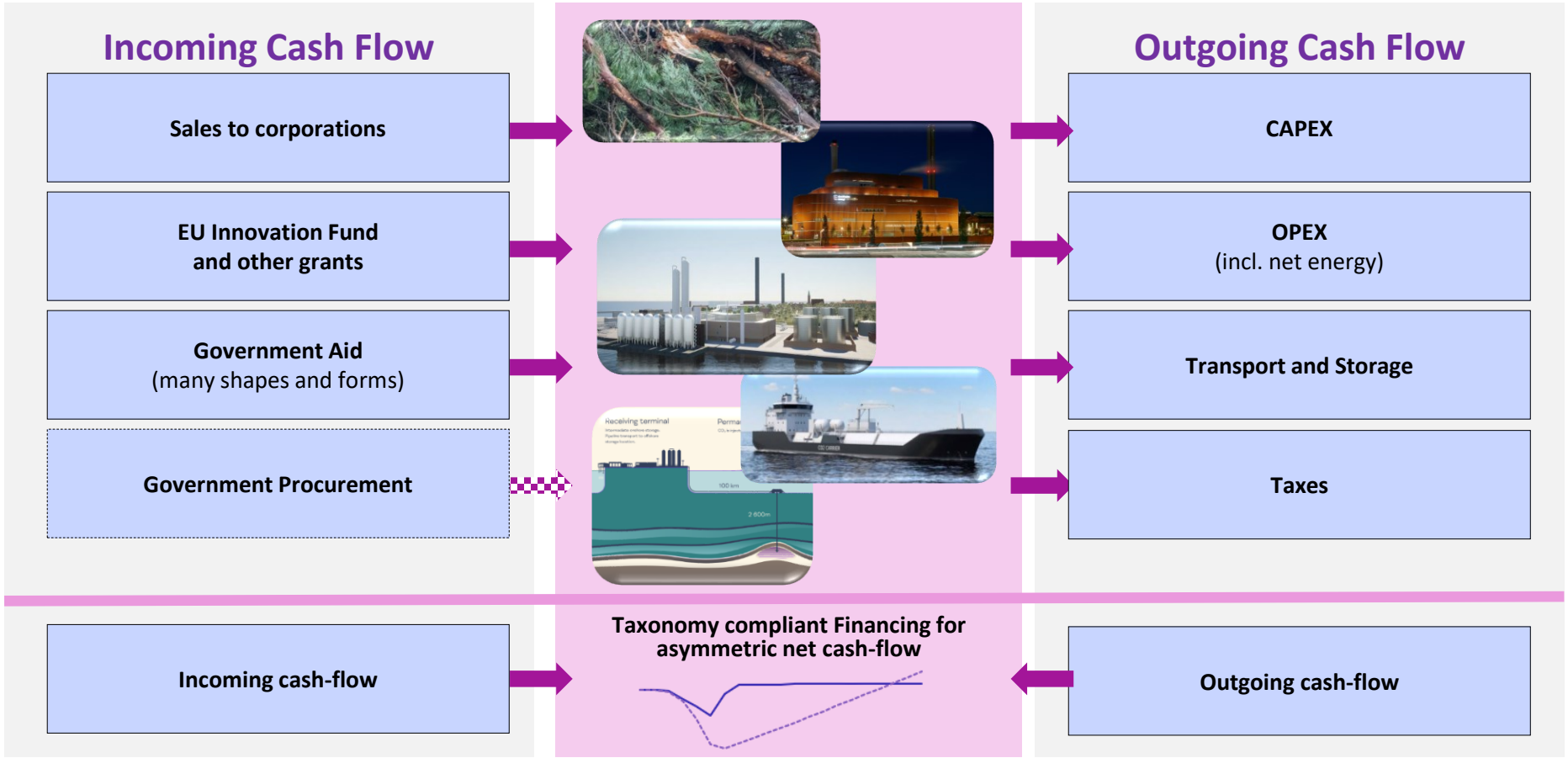
Beccs Stockholm

Funding, Financing and Risk Perspectives

- Demand drivers
  - Claiming & Compliance
  - 2040 Targets and L-f-L
  - Methodology & Accounting
  - SBTi/ISO
- Reduce effort – explore pay-as-stored (45Q-ish)
- AaaS is a great idea

- Efficiency vs. Execution
- TTM: Copy mechanisms already approved by DG Competition

- Would be a purchase
- Makes sense if market fails or purchase by non-host nation
- Makes sense for net-negative



- FID Catch-22
- Clearer policy, larger FIDs
- Weak policy begs CAPEX support

- Inflation mismatch
- High net-energy, higher risk

- Fossil CO_2 ?
- Risk distribution in value chain: Delivery Shortfall Remedies

- May impact your design

This project is co-funded by the European Union's Innovation Fund under grant agreement no 101051202

Beccs Stockholm

Public funding for permanent carbon removal in the EU

Thank you!

28 January 2025 | 10:00 – 16:00
Brussels