

Innovation Fund Stakeholder Consultation event

13 June 2023 - In person and online

Break time 11:10 – 11:30 CEST

Next session – workshops:

- Industry decarbonisation, including substitute products → Room 0D (ground floor)
- Aviation → Room 4B (fourth floor)

Please note the event is livestreamed and recorded.





Task Force for demonstrating climate neutral industries by 2030

Presentation of outcomes

*Innovation Fund Stakeholder consultation event
13 June 2023*

Scaling up innovative technologies for climate neutrality

Mapping of EU demonstration projects in energy-intensive industries



Scaling up innovative technologies for climate neutrality

Mapping of EU demonstration projects in energy-intensive industries



Research and Innovation

The report

- To be published on **20 June 2023**
- An analysis based on an inventory of **184 demonstrators**
- Funded under **Horizon** framework programmes, the **Innovation Fund**, **IPCEIs** and other EU instruments
- Collaborative work led by **RTD**, **GROW** and **CLIMA**, involving colleagues in **JRC**, **ENER**, **HADEA**, **ENV**, **ECFIN**, **REGIO**, **RECOVER**

Outline

1. Introduction

1.1. Policy context

1.2. Scope of the overview

2. Overview

2.1. Demonstrators for climate neutrality in the EU innovation pipeline

2.2. Investment volumes and funding estimates

2.3. Technologies for climate neutrality and industrial sectors represented

2.3.1. Technologies demonstrated

2.3.2. Industrial sectors engaged

2.3.3. Focus by technology group

2.4. Location of demonstrators in EU Member States and other ERA countries

2.5. Gap analysis

3. Country specificities in Member States and other ERA countries with relevant demonstrators

Key findings

- There is a clear role for each of the instruments in the R&I pipeline: the **Horizon** framework programmes mostly fund projects aiming for **TRL 6-7**, the **Innovation Fund** and **IPCEIs** those aiming for **TRL 9**.
- The EU funding involved in the demonstration projects in this overview amounts to **EUR 3.14 billion**, with an overall **leverage of 10+** of EU funding to be expected (*higher leverage factor for high TRL projects, namely under the Innovation Fund*).
- **Energy efficiency** and **CCUS** technologies are represented in all industries.
- The **cement** industry is strongly focusing on CCUS and on energy efficiency technologies. On the contrary, no electrification technologies are among the EU demonstration projects analysed.
- **Circularity** technologies are strongly represented in the **chemicals** sector.
- Despite the role of energy-intensive industries in their economy, **Slovakia** and **Hungary** do not seem to have any EU project on their territories to demonstrate climate-neutral technologies in energy-intensive industries.

Key findings

Sector representation by technology group based on the Task Force mapping

| | use of green hydrogen | circularity | CCUS | energy efficiency | digitalisation | electrification |
|---------------------------|-----------------------|-------------|------|-------------------|----------------|-----------------|
| Steel | 12 | 11 | 6 | 9 | 10 | 4 |
| Chemicals | 11 | 20 | 7 | 3 | 3 | 6 |
| Cement | 2 | 3 | 14 | 8 | 2 | |
| Non-ferrous metals | 1 | 7 | | 7 | 5 | 1 |
| Oil refineries | 9 | 1 | 5 | 3 | | |
| Multiple | 3 | 2 | 6 | | | |
| Pulp, paper and cardboard | 3 | | 2 | 5 | | |
| Glass | 1 | | 1 | 2 | 1 | 3 |
| Ceramics | 1 | | 1 | 5 | | 2 |
| Minerals | | | 1 | 1 | | |

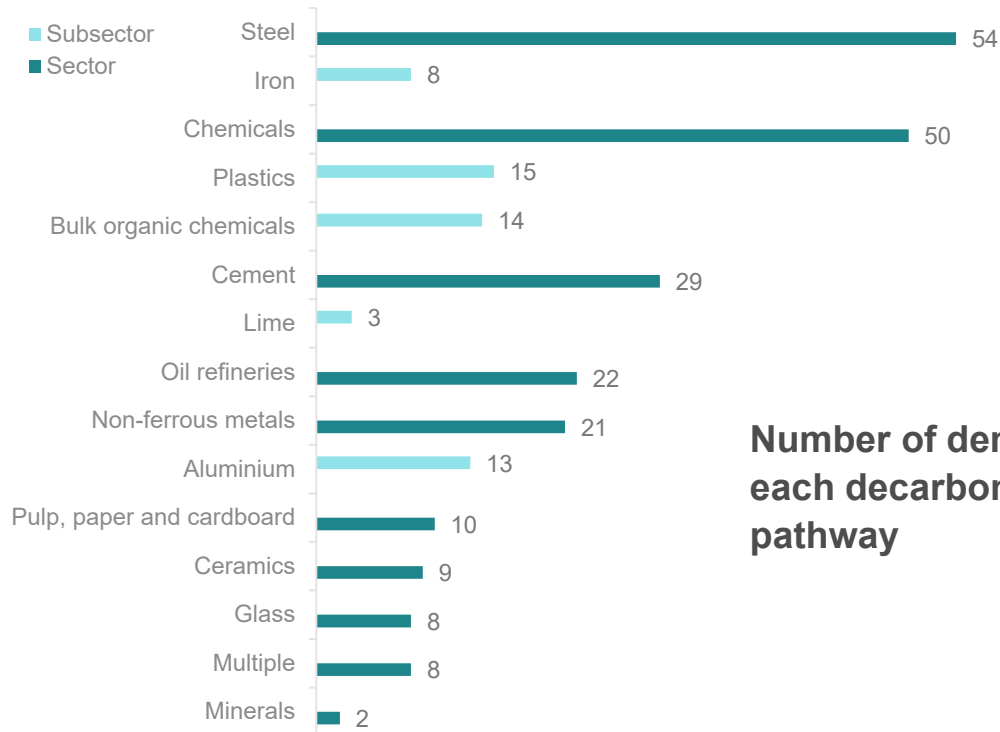
Funding programmes in the innovation pipeline Technology maturity expected at completion of the project

| | TRL 6 | TRL 7 | TRL 8 | TRL 9 | Unknown | Total |
|-----------------|-------|-------|-------|-------|---------|-------|
| H2020 | 16 | 66 | 6 | 1 | 3 | 92 |
| Horizon Europe | | 19 | 8 | | | 27 |
| Innovation Fund | | | 4 | 28 | 2 | 34 |
| IPCEI | 1 | 1 | 1 | 21 | | 25 |
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| InnovFin | | 1 | | | 1 | 2 |
| InvestEU | | | | | 1 | |
| Total | 17 | 87 | 19 | 52 | 9 | 184 |

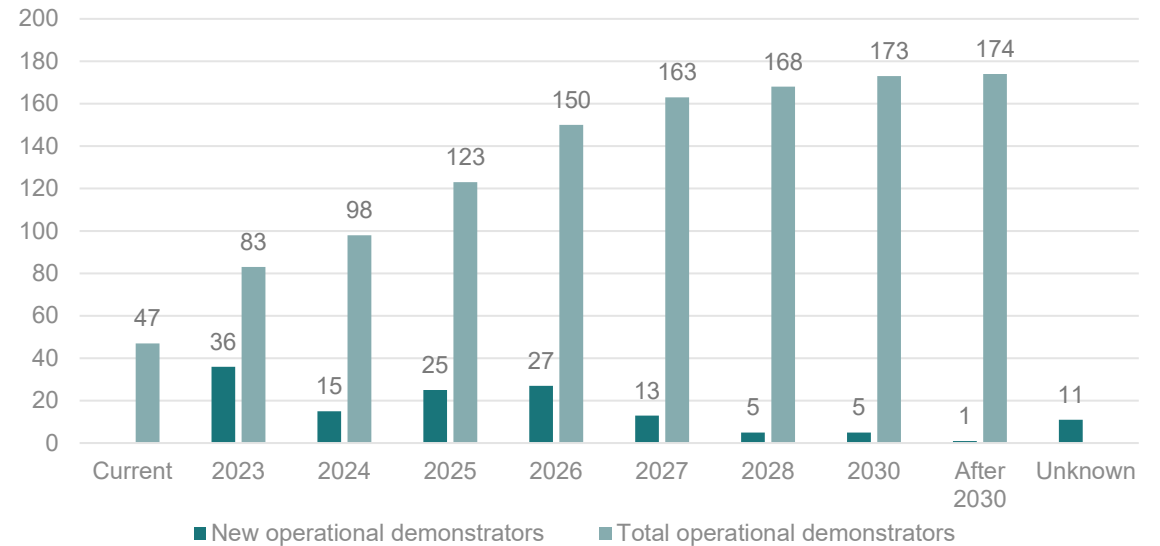
4 of these 34 Innovation Fund demonstrators had received funding under Horizon previously

Key findings

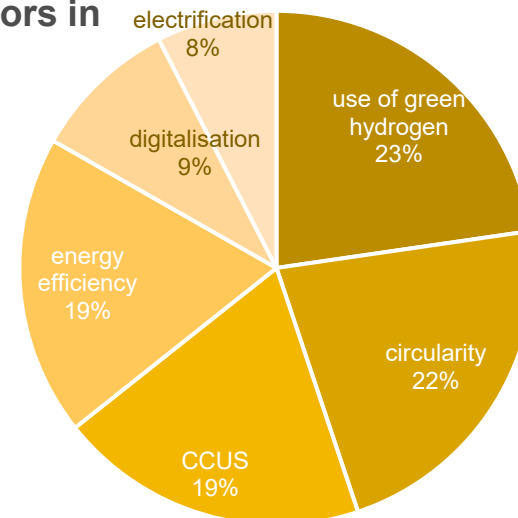
Number of demonstrators in the overview represented in each industrial sector and subsector



Estimated date of entry into operation and total of operational demonstrators over time

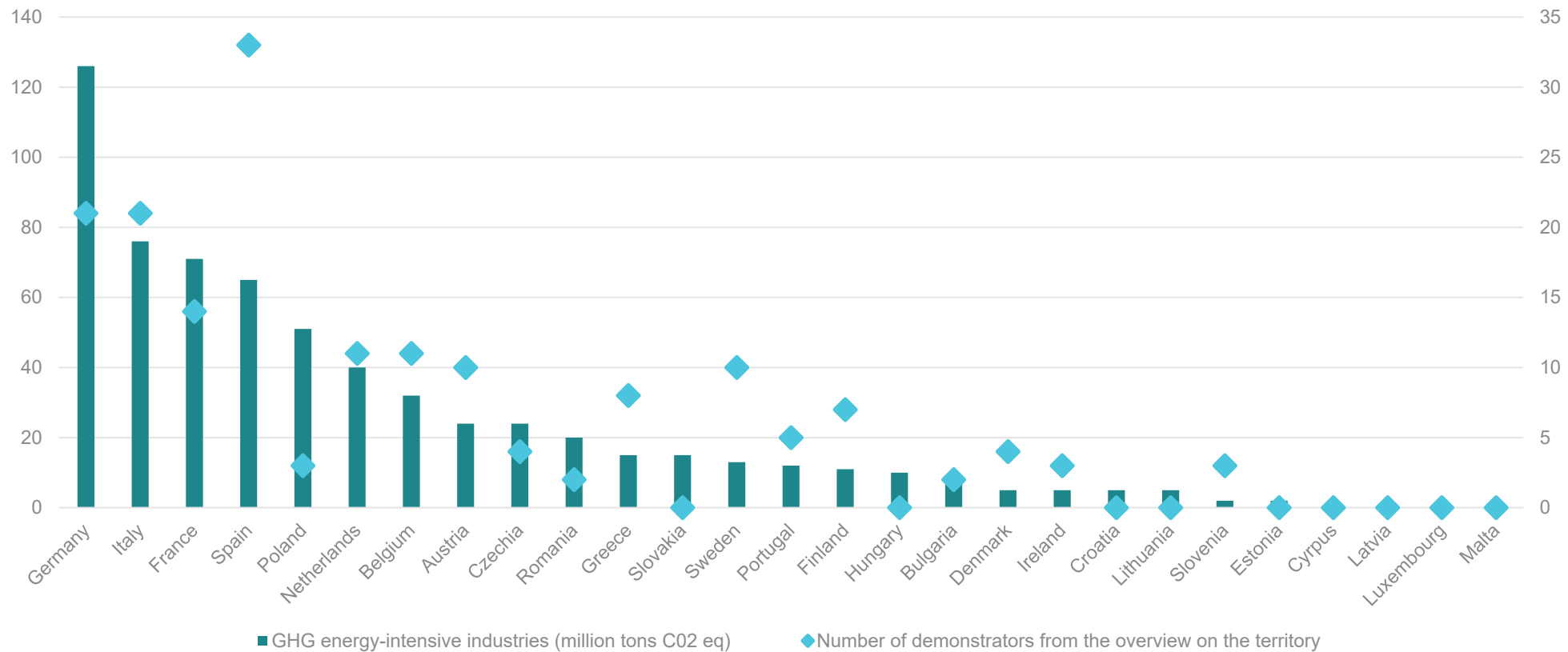


Number of demonstrators in each decarbonisation pathway



Key findings

Greenhouse gas emissions attributed to energy-intensive industries in Member States and number of demonstrators from the overview mapped on their territories



Thank you

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Innovation Fund - *Stakeholder insights*

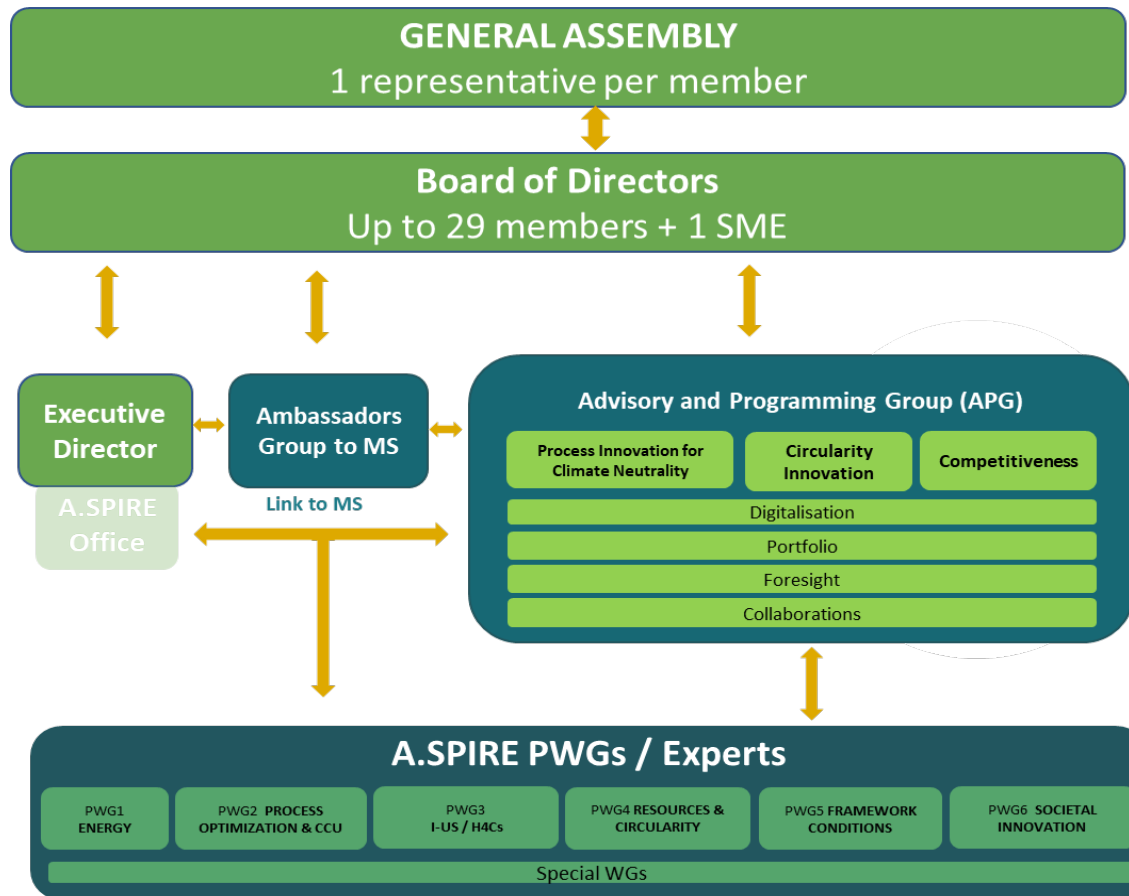
A.SPIRE & Processes4Planet

10 EU Process Industry Sectors

13 June 2023



Overview of A.SPIRE and the sectors

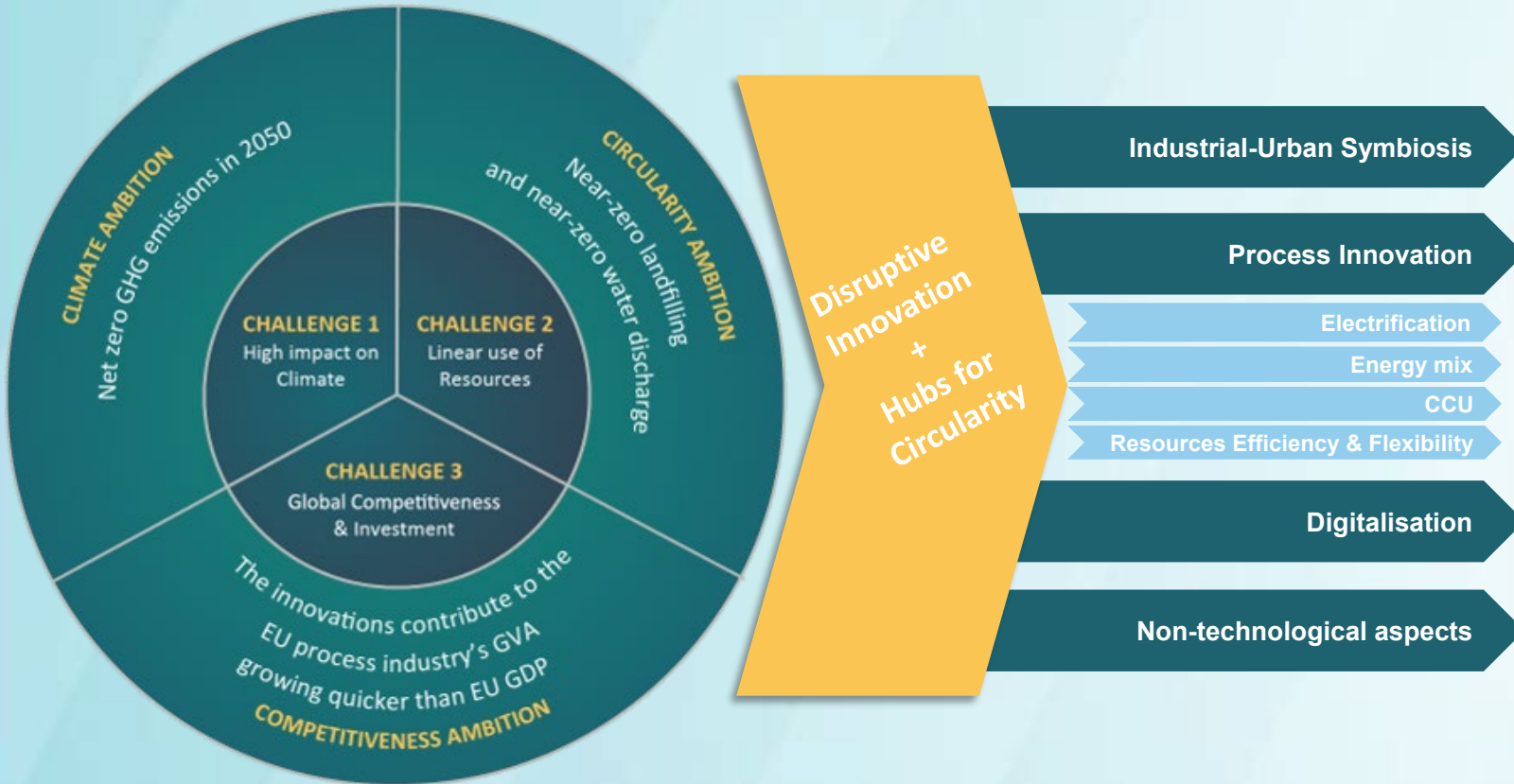


A.SPIRE is the partner from the private side in the Processes4Planet (P4P) partnership.



- 6.3 million direct jobs
- 19 million indirect jobs
- 450,000 enterprises
- €1,8 trillion/y turnover
- 4.7% of EU28 GDP

Overview of the Process Industry R&I Agenda



| Innovation area | Progress up until milestone year ¹ | | | |
|---|---|------|------|------|
| | 2024 | 2030 | 2040 | 2050 |
| Renewable energy integration | 🟢 | 🟢 | 🟢 | 🟢 |
| Heat reuse | 🟢 | 🟢 | 🟢 | 🟢 |
| Electrification of thermal processes | 🟢 | 🟢 | 🟢 | 🟢 |
| Electrically-driven processes | 🟢 | 🟢 | 🟢 | 🟢 |
| Hydrogen integration | 🟢 | 🟢 | 🟢 | 🟢 |
| CO ₂ capture for utilisation | 🟢 | 🟢 | 🟢 | 🟢 |
| CO ₂ utilisation in minerals | 🟢 | 🟢 | 🟢 | 🟢 |
| CO ₂ & CO utilisation in chemicals and fuels | 🟢 | 🟢 | 🟢 | 🟢 |
| Energy and resource efficiency | 🟢 | 🟢 | 🟢 | 🟢 |
| Circularity of materials | 🟢 | 🟢 | 🟢 | 🟢 |
| Industrial-Urban symbiosis | 🟢 | 🟢 | 🟢 | 🟢 |
| Circular regions | 🟢 | 🟢 | 🟢 | 🟢 |
| Digitalisation | 🟢 | 🟢 | 🟢 | 🟢 |
| Non-technological aspects | 🟢 | 🟢 | 🟢 | 🟢 |

¹ Progress is depicted here as % of total TRL9 projects programmed in each area, and for circular regions, digitalisation, and non-technological aspects % of total investment needs until 2050

- 100% of total CO₂e emission reduction potential,
- 80% of waste and secondary raw materials reduction potential,
- 90% of wastewater reused/recycled potential

Participation of EIs in Innovation Fund

- Requests by EIs

| | estimated request by EIs | available budget |
|----------|-----------------------------|---------------------|
| Oct 2020 | ±13 B€ | 1 B€ |
| Mar 2022 | 7-8 B€ | 1.5 B€ |
| Mar 2023 | 11-13 B€ | 3 B€ |

- Participation of EIs (2020-2022)

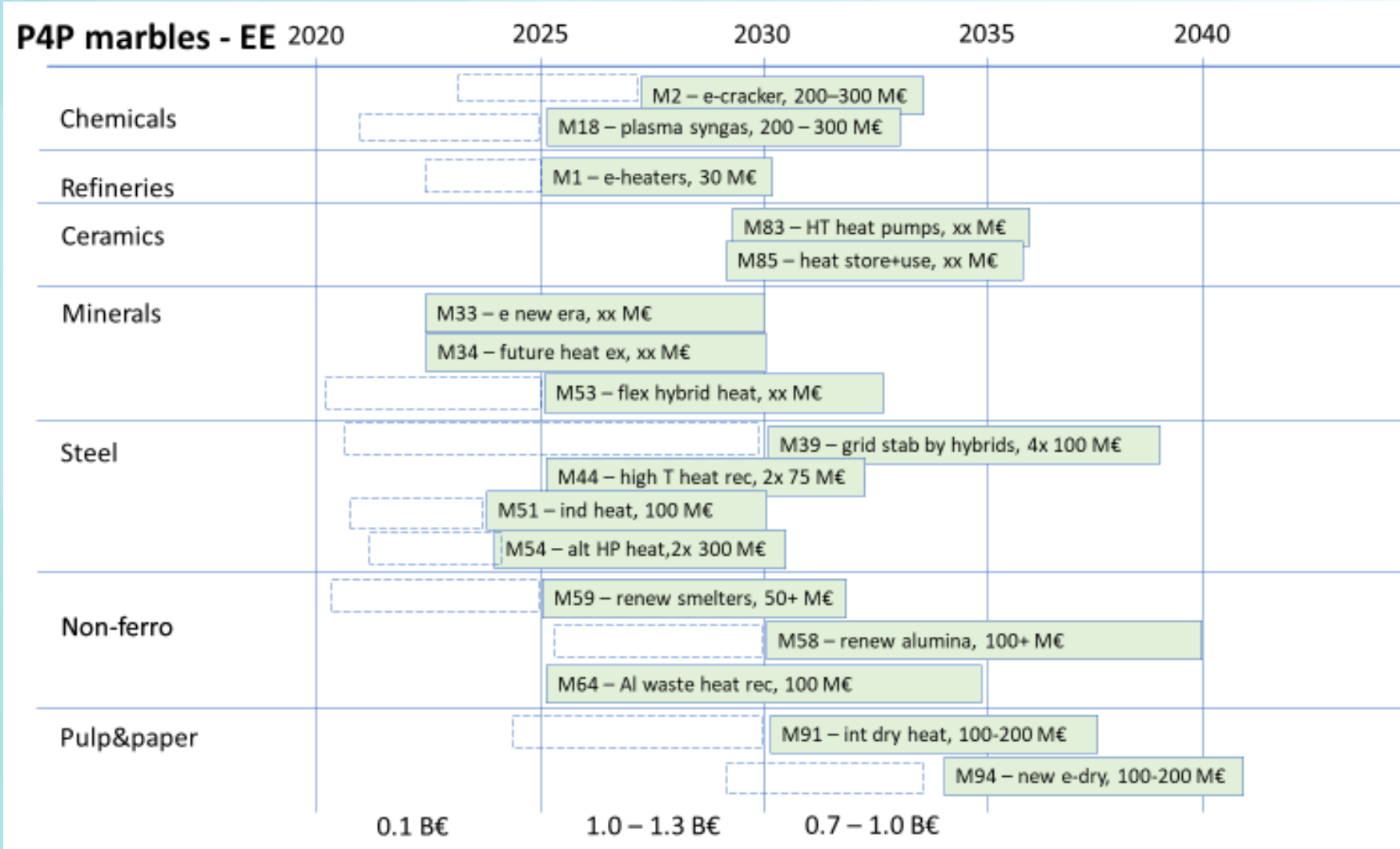
| sector | large scale projects | overall IF support, M€ | CCS, M€ | CCU, M€ | H2, M€ | other, M€ |
|----------------------------|-------------------------|---------------------------|------------|------------|-----------|--------------|
| refineries (incl bio-fuel) | 4 (3+1) x | 343 | | 80 | 177 | 75 |
| chemicals | 4x | 700 | 357 | 97 | | 241 |
| cement & lime | 5x | 810 | 700 | 110 | | |
| iron & steel | 1x | 145 | | | 145 | |
| non-ferro | 0x | 9 | | | | |
| pulp&paper | 0x | 4 | | | | |
| glass&ceramics | 0x | 37 | | | | |
| | | 2048 | 1057 | 287 | 322 | 316 |

A.SPIRE's view on FOAK ('marbles')

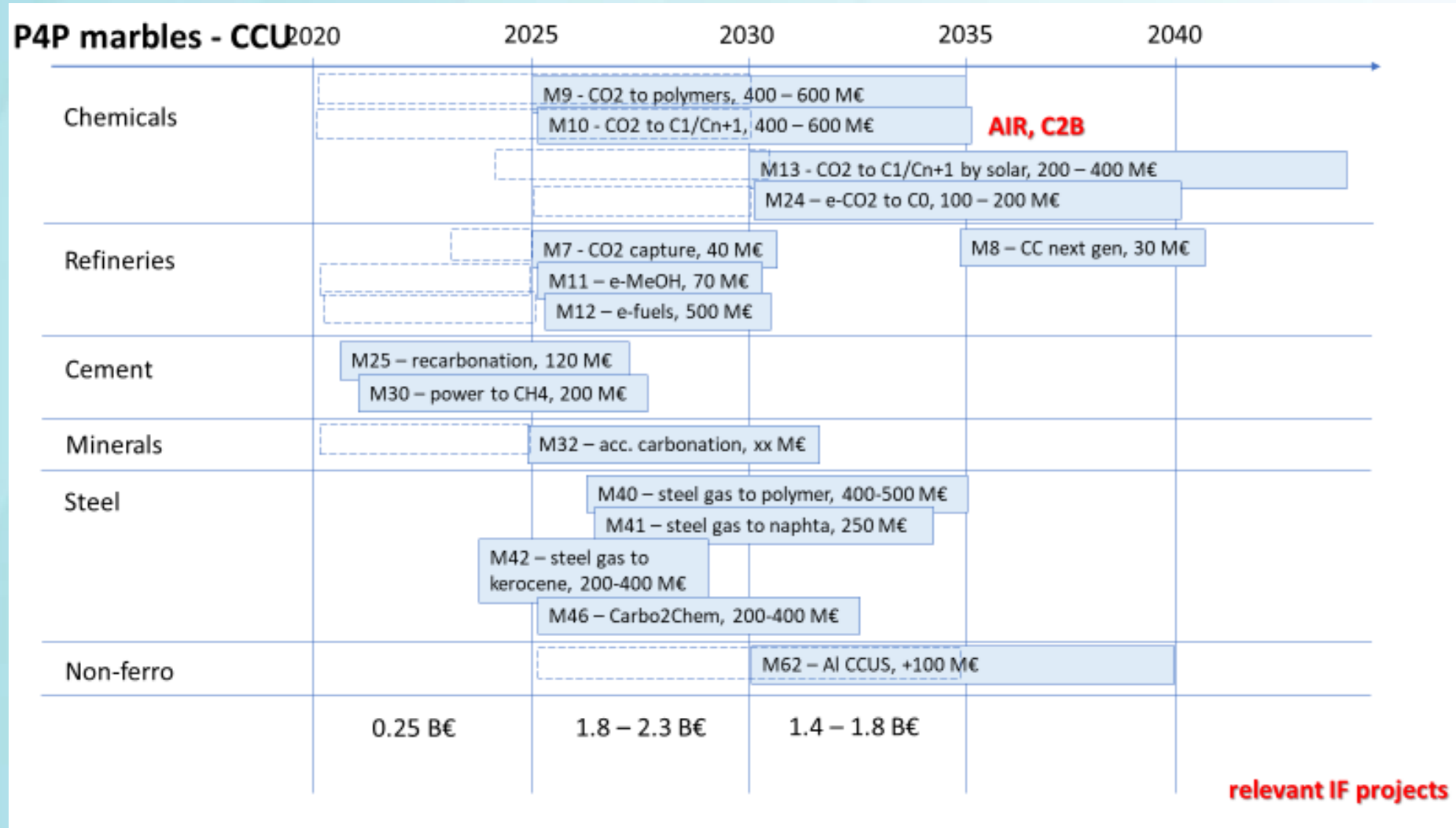


- Within the P4P strategic research and innovation agenda (Oct 2021) a list of so-called 'marbles' was published.
- 2020 estimated need of demonstrators (type, number, budget)
- The so-called 'marbles' list also serves as guidance for timely design of research/innovation actions in P4P.

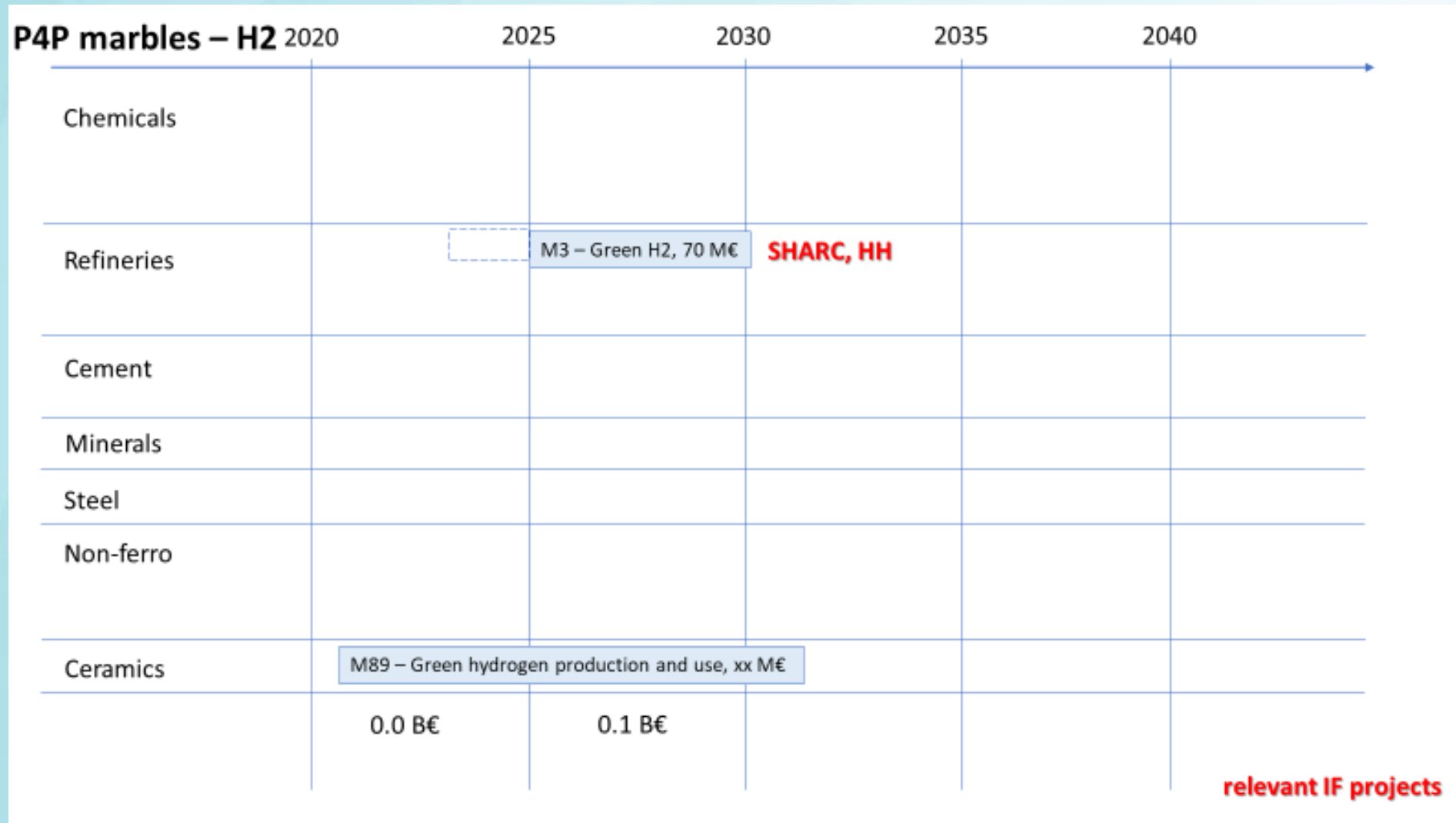
P4P 'marbles' on energy efficiency



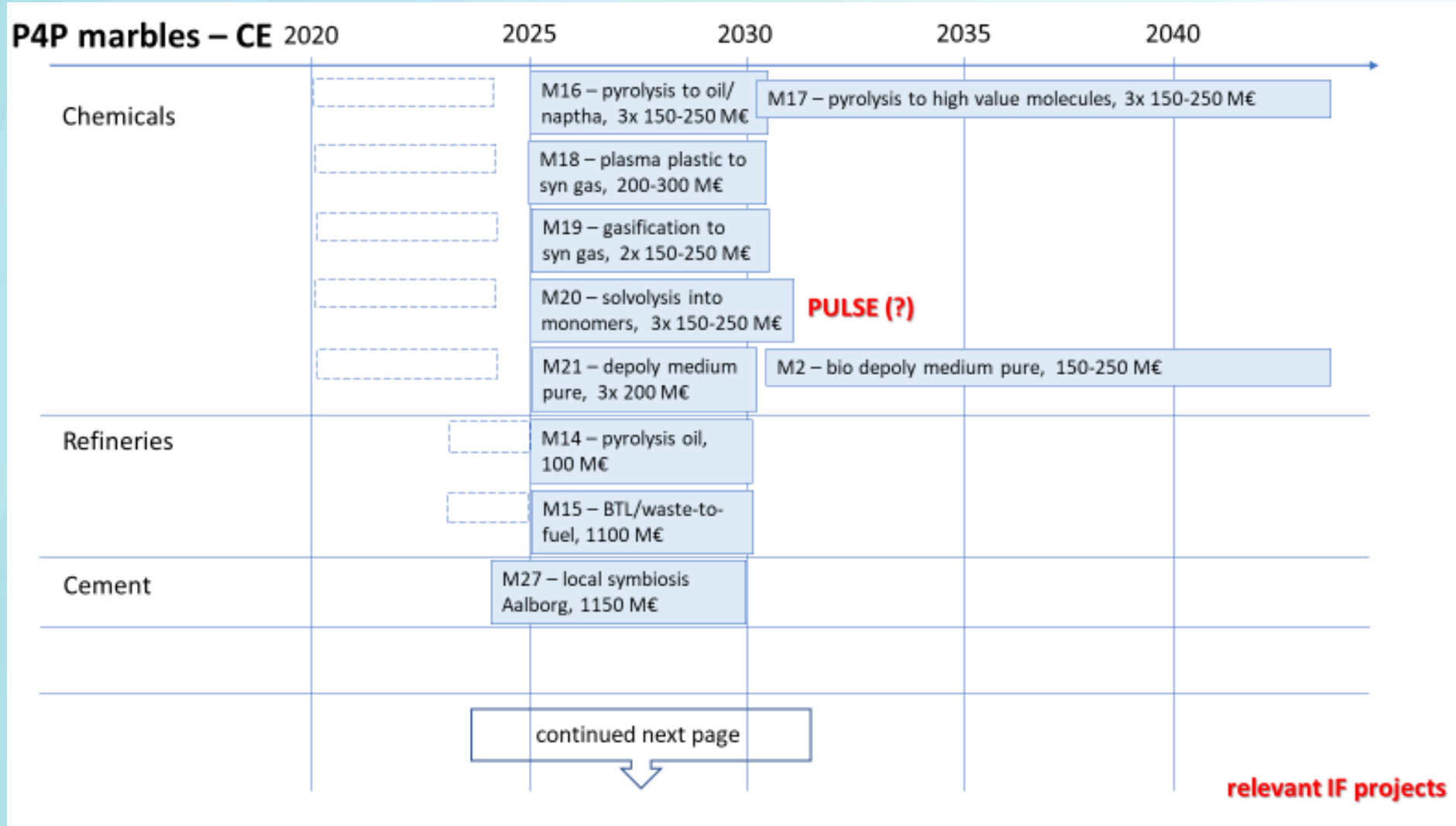
P4P 'marbles' on CCU



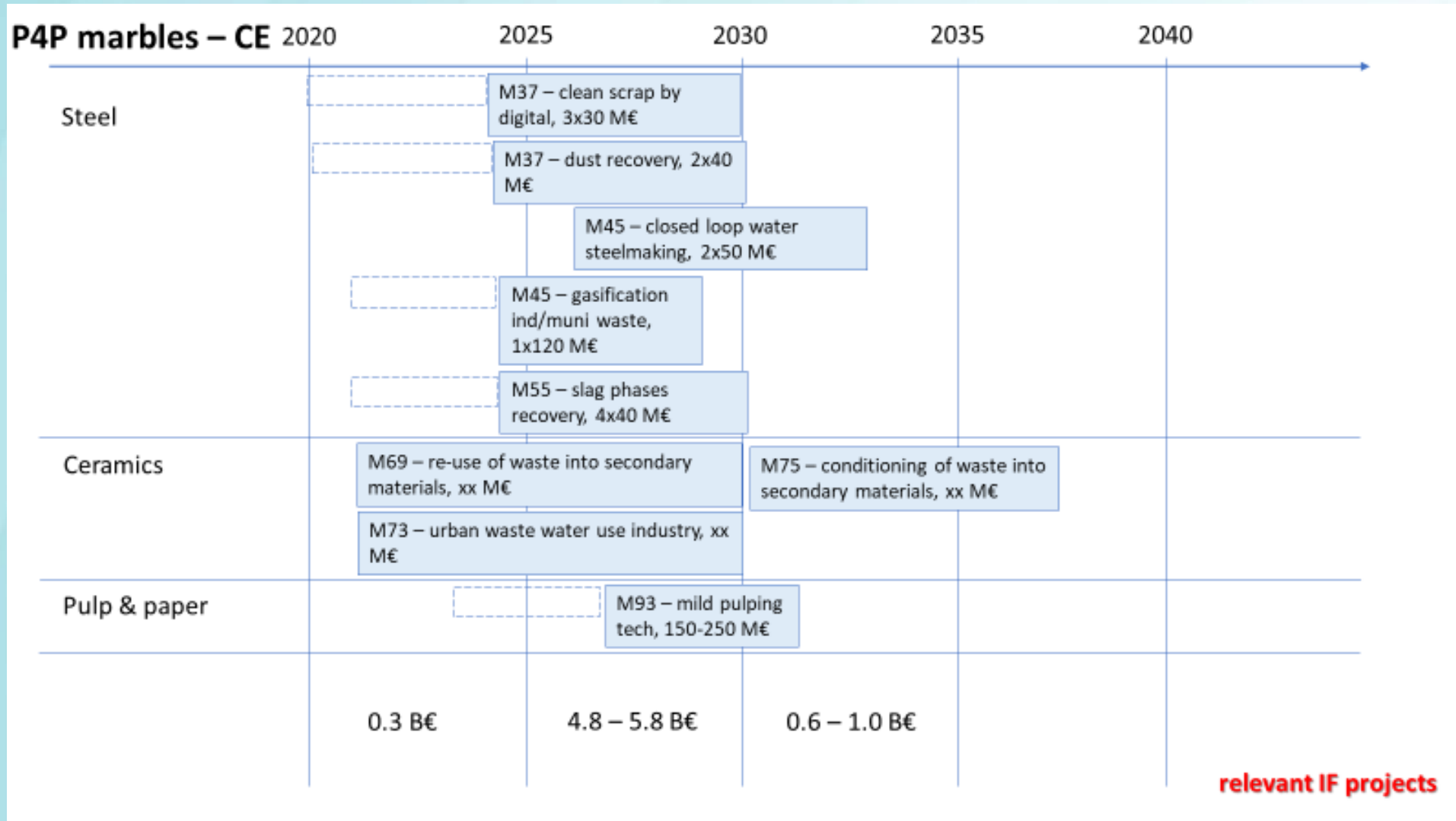
P4P 'marbles' on hydrogen use



P4P marbles on circular economy(1/2)



P4P 'marbles' on circular economy (2/2)



P4P 'marbles' - summary

Estimated FOAK investments as in P4P SRIA (dated from 2021):

- 2020 – 2024 period: 0.65 B€
- 2025 – 2030 period: 7.7 - 9.5 B€
- 2030 – 2035 period: 2.7 - 3.8 B€

Scope: energy efficiency, circular economy, CCU and hydrogen use.

SPIRE/P4P PROJECTS PIPELINE

INFORMATION FROM:

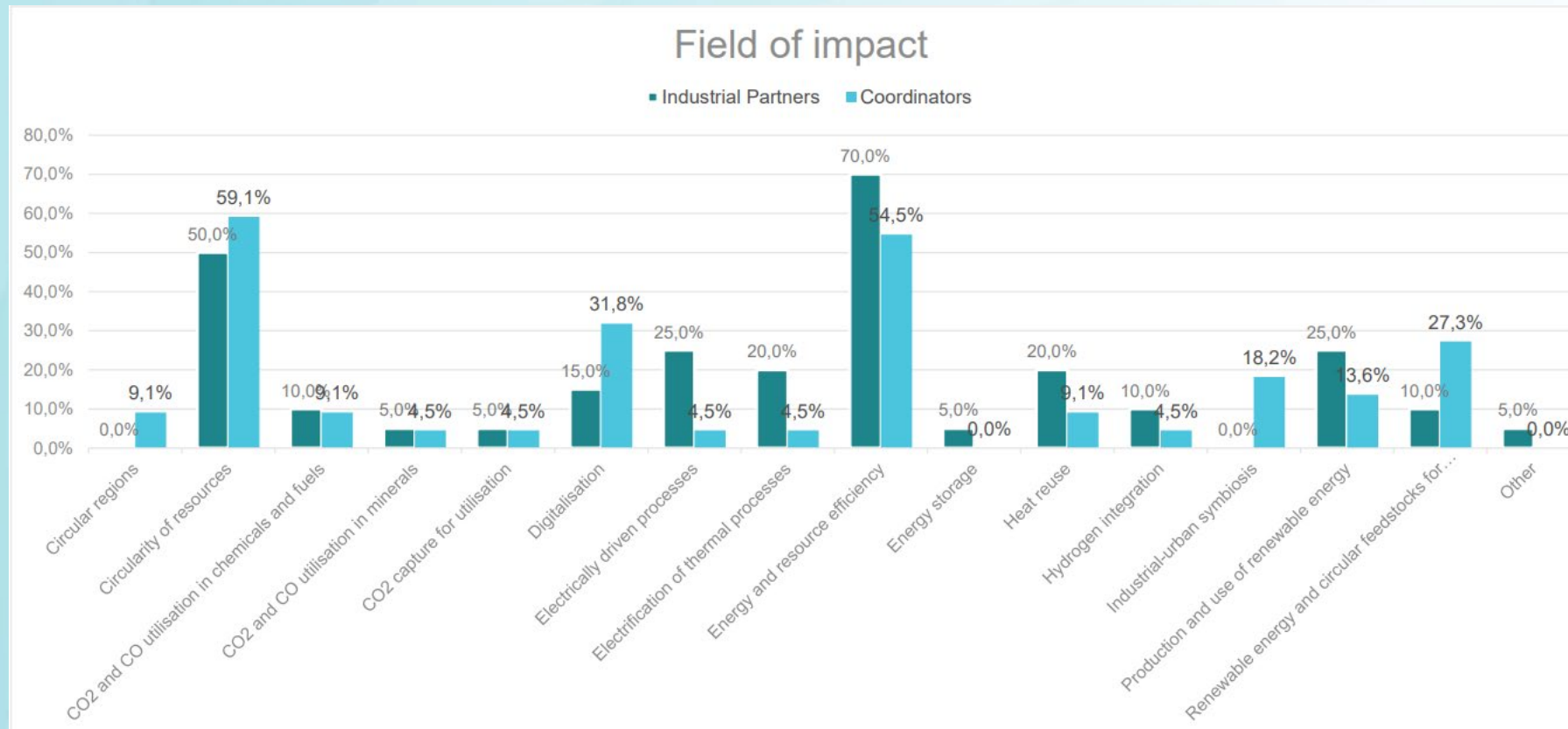
- 2022: HADEA Survey to SPIRE projects. Elaborated for P4Planet's Impact Panel
- **2022-23**: Analysis by A.SPIRE Portfolio Team (on-going, still partial information)
- **2023**: DG RTD – List of demonstrators

NEXT STEPS:

- **July-Nov 2023**: 1st P4Planet's Full Report on all the KPIs (projects) and further activities
- **June23- Feb24**: further portfolio analysis based on the report results

SPIRE/P4P PROJECTS PIPELINE - survey

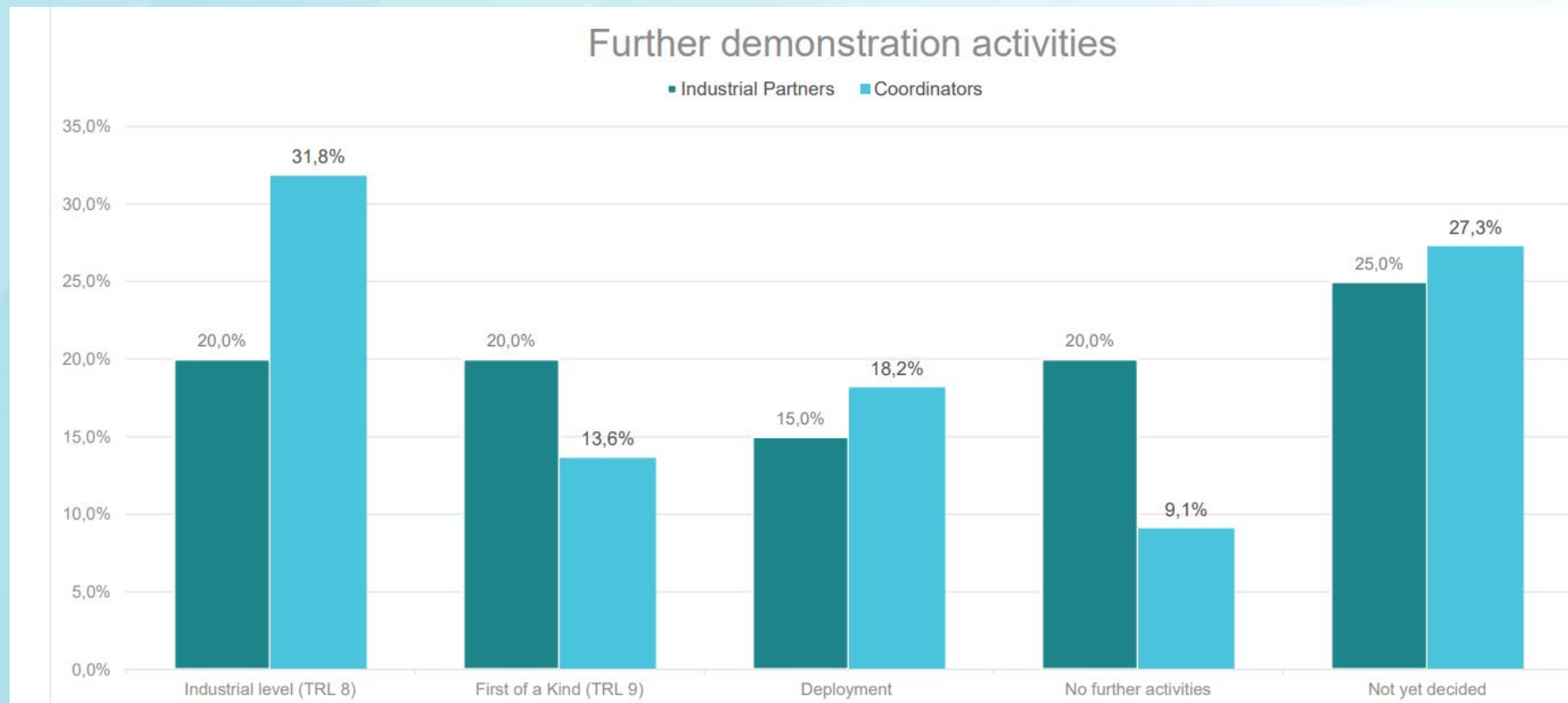
SPIRE (under H2020) and P4P (under HEU) have supported innovative projects within the process industry (RIA, IA, CSA) in the range of 120 to 170 M€ per year. These projects are expected to have impact in the following innovation areas:



**DATA from
HADEA
SURVEY TO
SPIRE projects
in 2022 (co-
developed with
A.SPIRE)**

SPIRE/P4P PROJECTS PIPELINE- survey

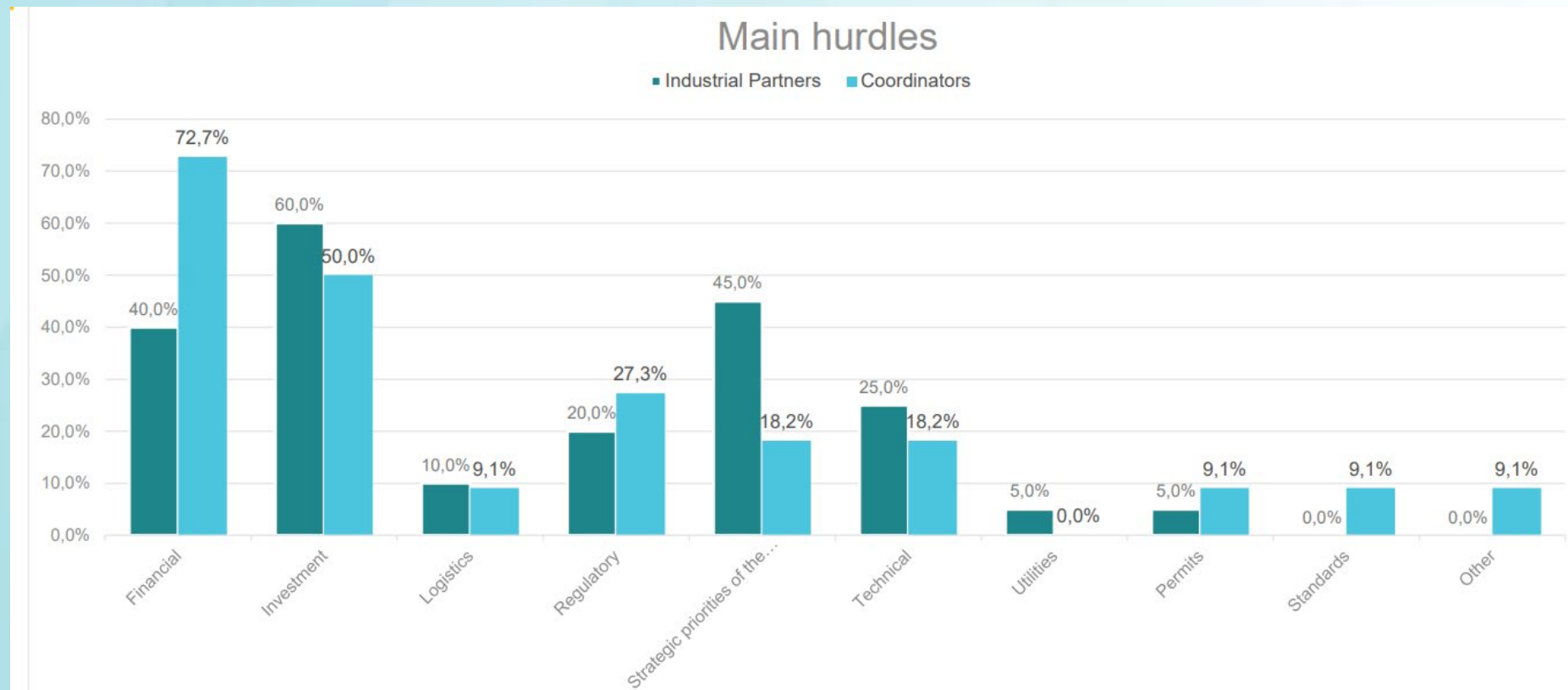
SPIRE/P4P innovative projects continue in the following manner:



**DATA from
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SURVEY TO
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SPIRE/P4P PROJECTS PIPELINE- survey

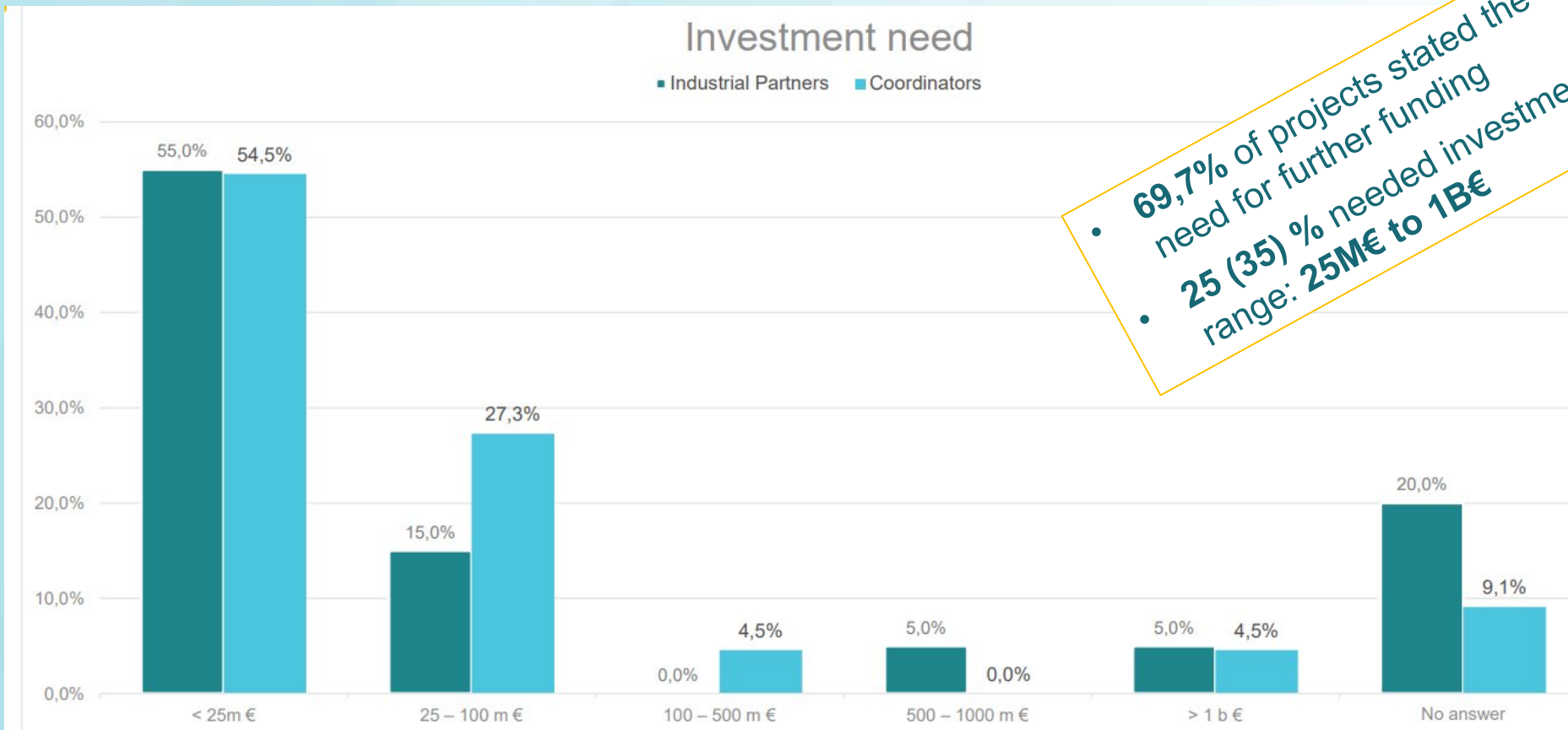
The deployment of SPIRE/P4P innovative projects is hindered by the following main hurdles:



**DATA from
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SPIRE/P4P PROJECTS PIPELINE- survey

The investment need for the deployment of SPIRE/P4P innovative projects ranges from <25 M€ to >1 B€.

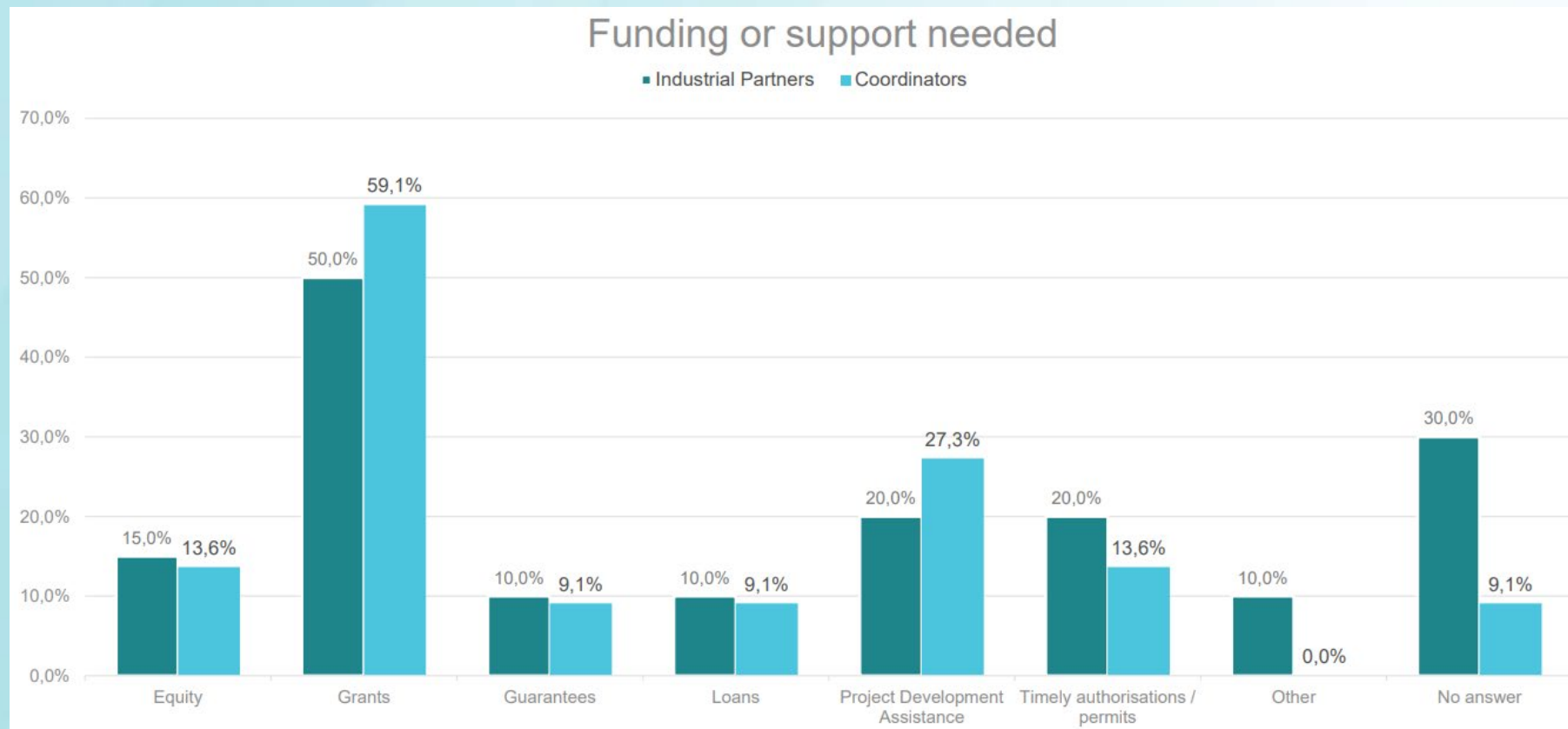


- 69,7% of projects stated the need for further funding
- 25 (35) % needed investments range: 25M€ to 1B€

DATA from
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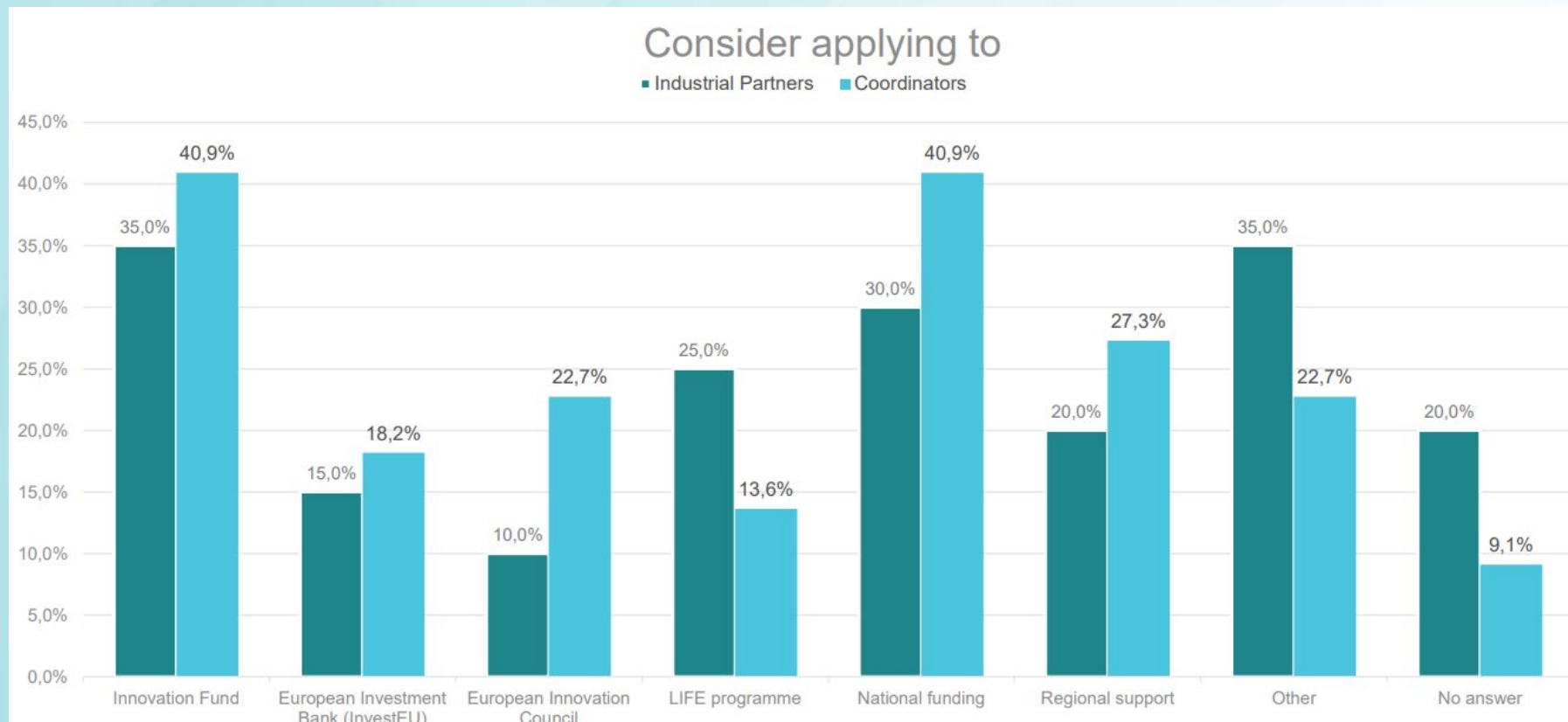
Support needed for the deployment of SPIRE/P4P innovative projects can have different forms:



DATA from
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SPIRE/P4P PROJECTS PIPELINE- survey

For the deployment of SPIRE/P4P innovative projects parties consider the following:



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SPIRE/P4P PROJECTS PIPELINE- demos

EC services have made a mapping of 184 EU demonstration projects in energy-intensive industries (with 3 B€ EU contribution) to support the scaling up of innovative technology for climate neutrality (see SET plan IWG6).

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Collaborative work led by RTD, GROW and CLIMA, involving colleagues in JRC, ENER, HADEA, ENV, ECFIN, REGIO, RECOVER

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Sector representation by technology group based on the Task Force mapping

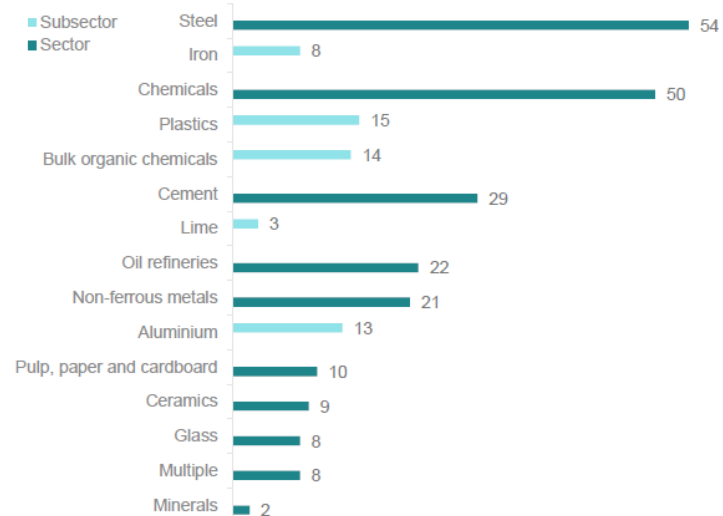
| | use of green hydrogen | circularity | CCUS | energy efficiency | digitalisation | electrification |
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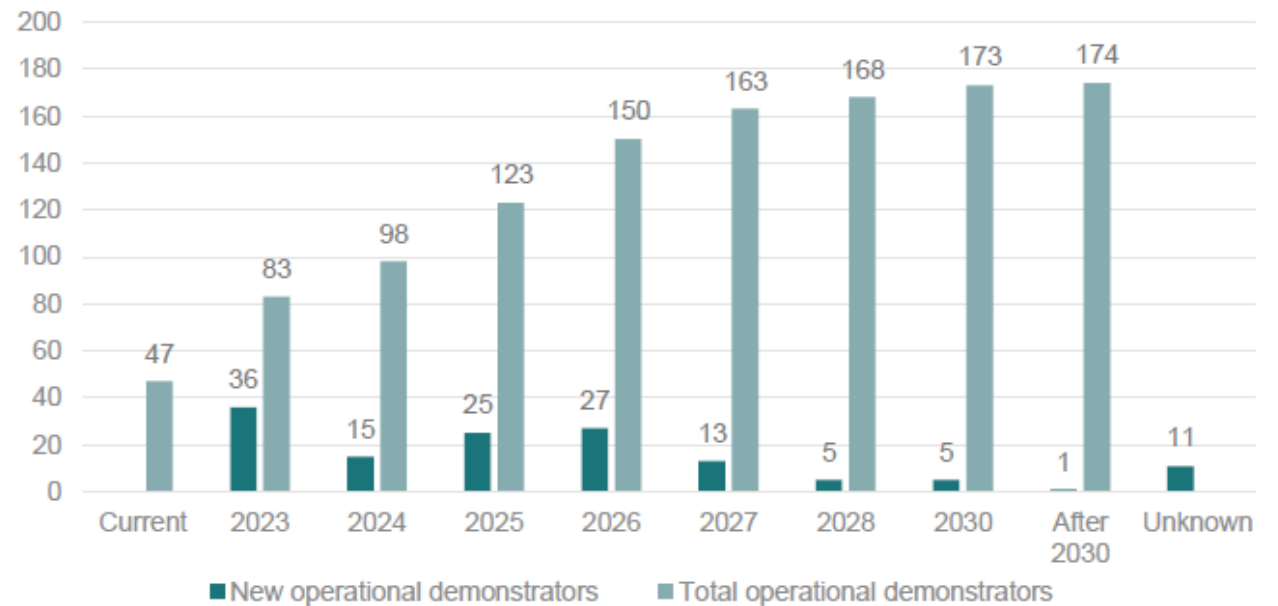
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Conclusions and recommendations

- within the A.SPIRE strategic research and innovation agenda a list of potential FOAK demonstrators ('marbles') is available, various of them could fit into Innovation Fund projects
- an EC/A.SPIRE gap analysis is ongoing to identify process industry demonstration domains that need more push to remain aligned with climate, circularity and competitiveness ambitions



Innovation Fund

Session Moderation

13 June 2023



Session Moderation

Industry decarbonisation

Jakob Wachsmuth

We want to hear your views and your experience

1

What are the most promising technologies and strategies for reducing emissions in this sector?

2

What are the main lessons learned from recent projects implemented in Europe, and how to avoid repeating mistakes in new projects?

3

Which areas would benefit from auctions in addition or as an alternative to grants? What additional funding measures are required?

What are the most promising technologies and strategies for reducing emissions in this category?

1

With regard to

Substitute Products

1

Energy Efficiency

5

Direct Electrification

2

Carbon Capture and Utilisation (CCU)

6

Hydrogen Technologies

3

Carbon Capture and Storage (CCS)

7

Use of Renewable Fuels (including Biomass)

4

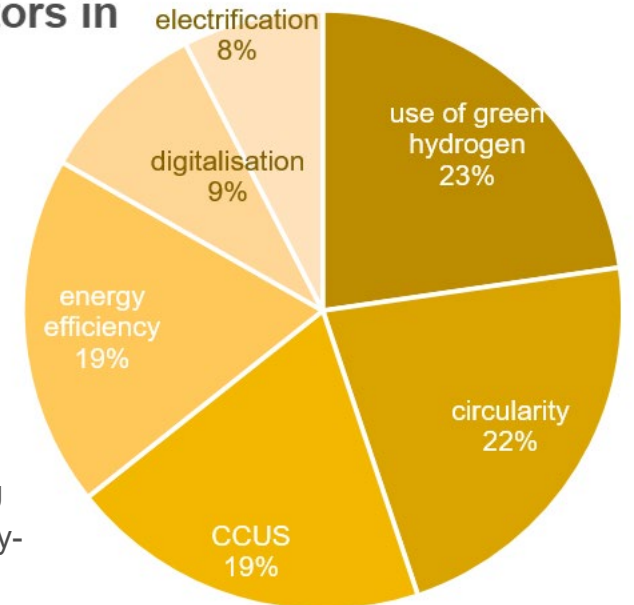
Digitalisation

8

Combinations of

1 – 8

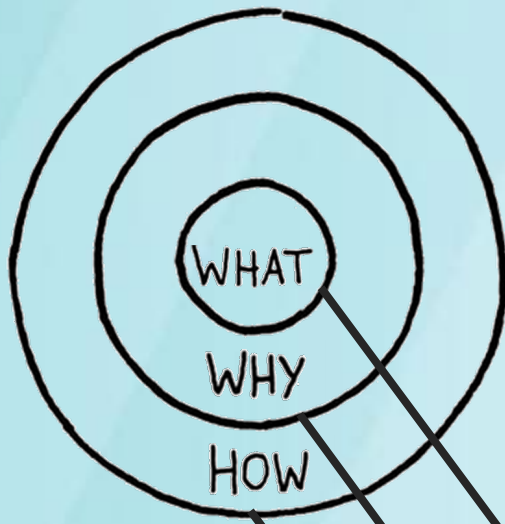
Number of demonstrators in each decarbonisation pathway



Source: Input on Mapping of EU demonstration projects in energy-intensive industries

What are the main lessons learned from recent projects implemented in Europe, and how to avoid repeating mistakes in new projects?

2



What went well, or what did not go so well?

Why has this happened this way?

How could this experience be replicated (if positive) or avoided (if negative)?

Examples of factors that help avoiding negative experiences and enabling reliable paths for implementation

1. Adequate allocation of funds and contingency
2. Realistic schedule
3. Proper forecasting of barriers
4. Timely management of risks
5. Diligent design and implementation/construction planning
6. Diligent progress monitoring
7. Experienced, well-trained and committed project team
8. Good networking with suppliers, project partners, regulatory agencies, local politicians and communities
9. Well developed and comprehensive contract documents
10. Adequate investigation during project commissioning

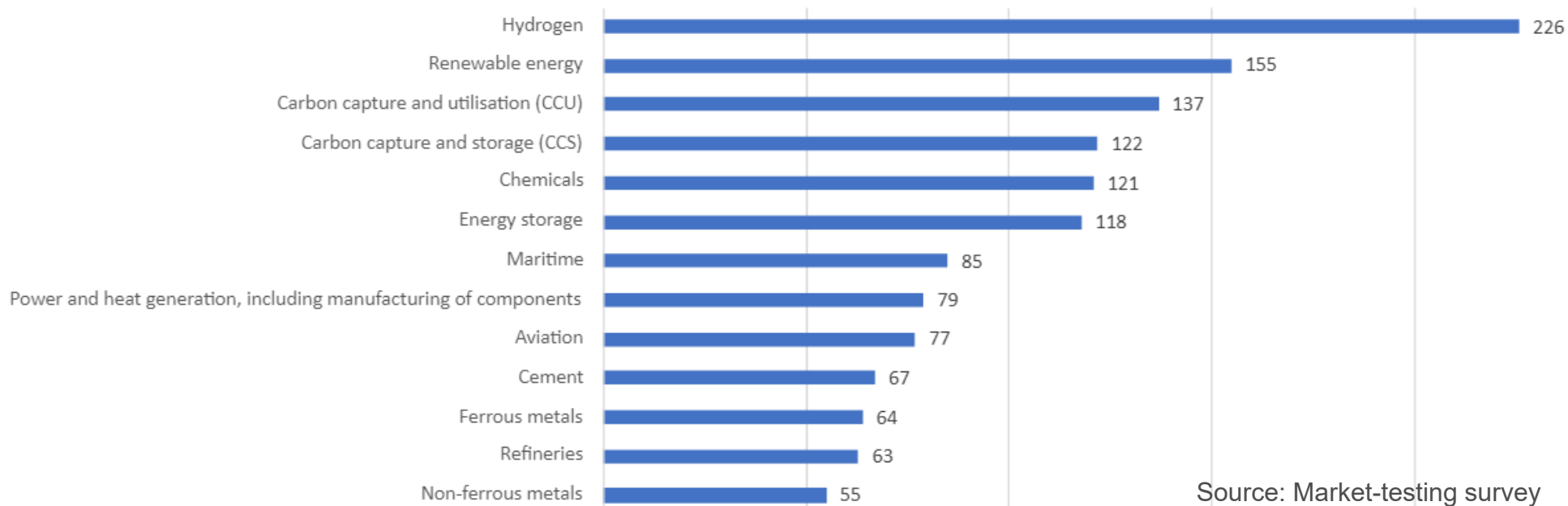
Which areas would benefit from auctions in addition or as an alternative to grants? What additional funding measures are required?

3

Grants (current IF funding) award up to 60 % of a project's relevant cost (i.e., funding gap over 10 years)

Auctions (i.e., competitive bidding) award a fixed premium or (carbon) contracts for difference type of support

Sectors that should be prioritised for auctions that can award fixed premiums or contracts for difference



Source: Market-testing survey

Wrapping up: SLIDO polls [multiple choice]

1

What subsector are you from?

- cement and lime
- chemicals
- ferrous metals
- glass and ceramics
- non-ferrous metals
- pulp and paper
- refineries
- other

2

What kind of projects are you planning?

- substitute products
- direct electrification
- hydrogen technologies
- use of renewable fuels
- energy efficiency
- CCU
- CCS
- digitalisation
- combinations of the above
- other

3

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

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

Q&A on slido

Join at
slido.com
#WGBD



Thank you



https://cinea.ec.europa.eu/programmes/innovation-fund_en



[@cinea_eu](https://twitter.com/cinea_eu)



[European Climate, Infrastructure and Environment Executive Agency](#)



[CINEATube](#)

Innovation Fund Stakeholder Consultation event

13 June 2023 - In person and online

Lunch time 13:00 – 14:00 CEST

Next session – workshops:

- Clean tech manufacturing including RES and storage → Room 0D (ground floor)
- Maritime → Room 4B (fourth floor)

Please note the event is livestreamed and recorded.

