



PROCESSES4PLANET

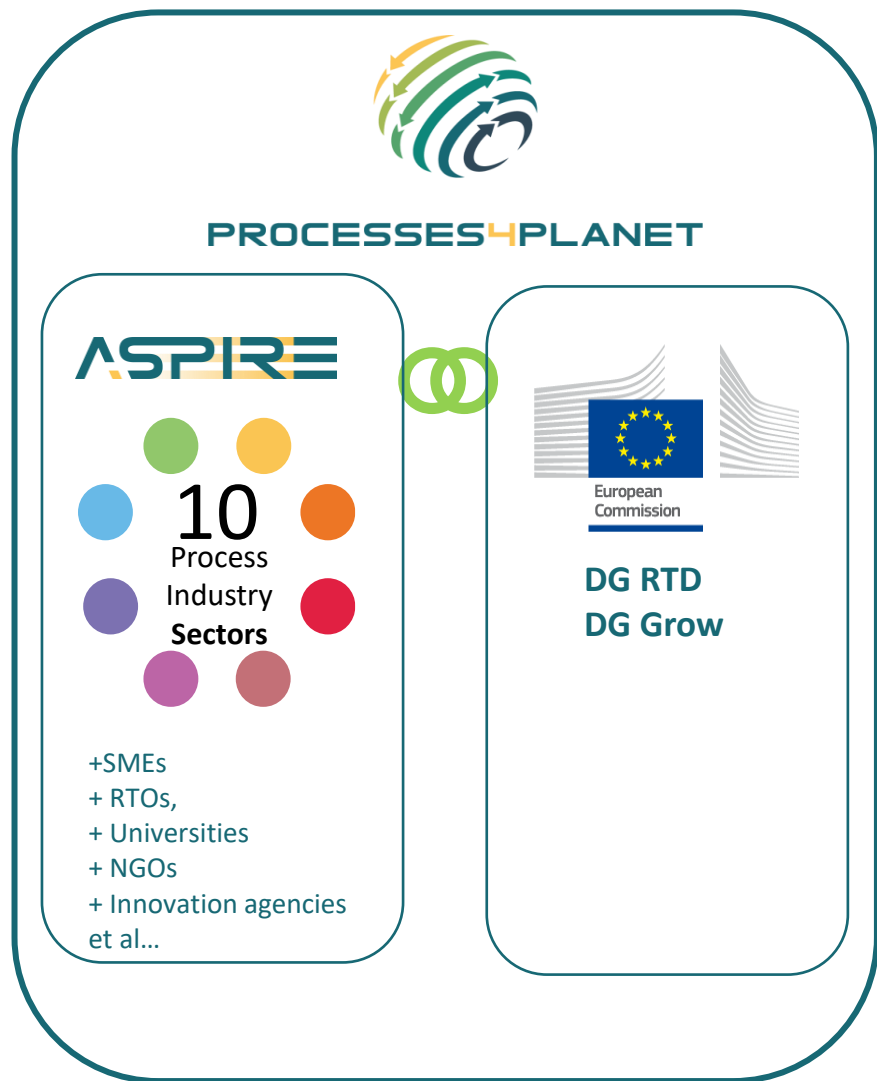
# Processes4Planet

Transforming the European Process Industry

CDTI – Webinar EU Partnerships  
Online, 10 July 2023

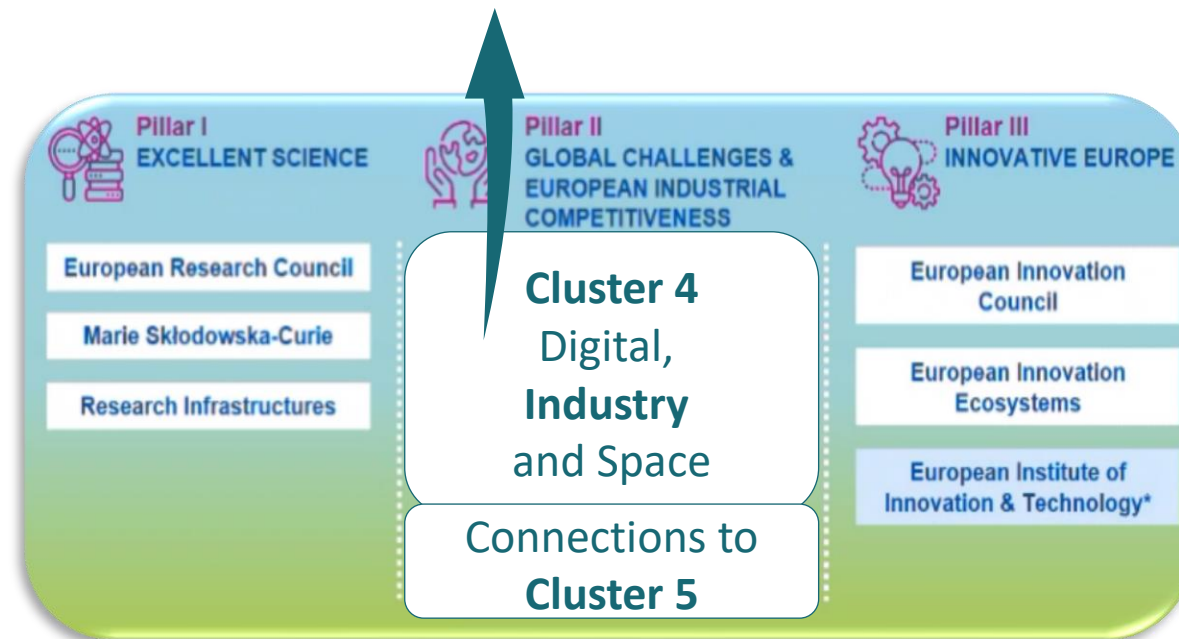
Àngels Orduña Cao  
Executive Director  
A.SPIRE

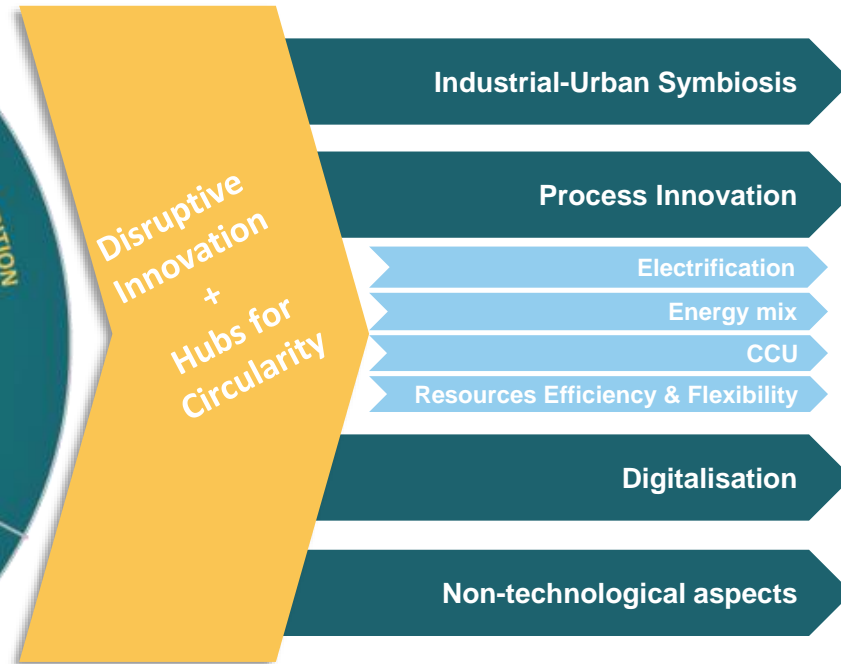
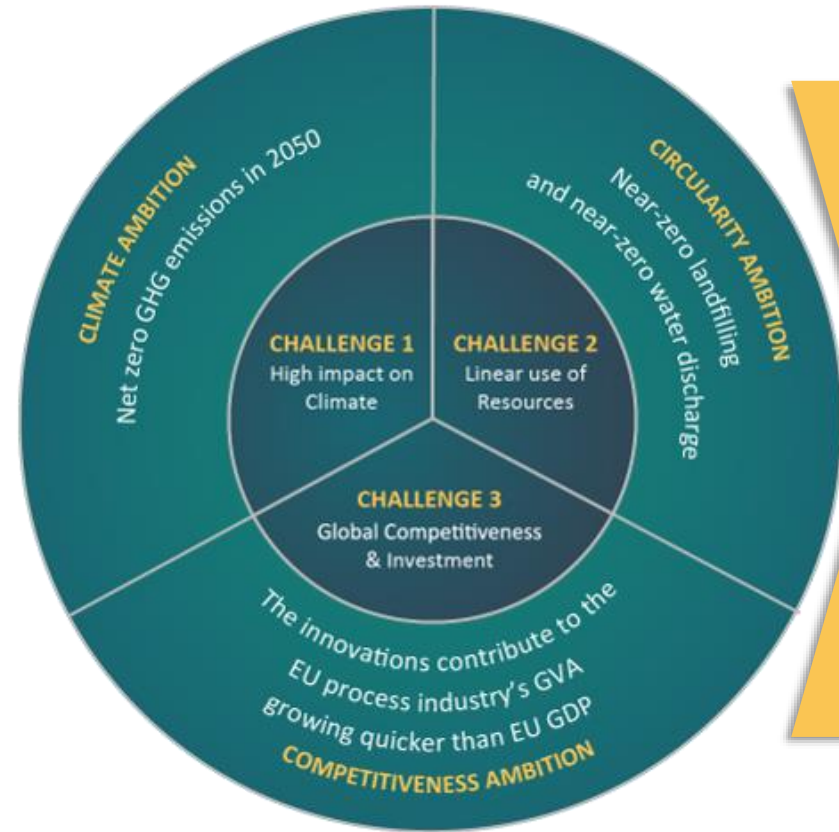




**Co-programmed Partnership**

**MoU signed:**  
**€1,3 bn** exclusively for projects  
*27% more than in H2020*

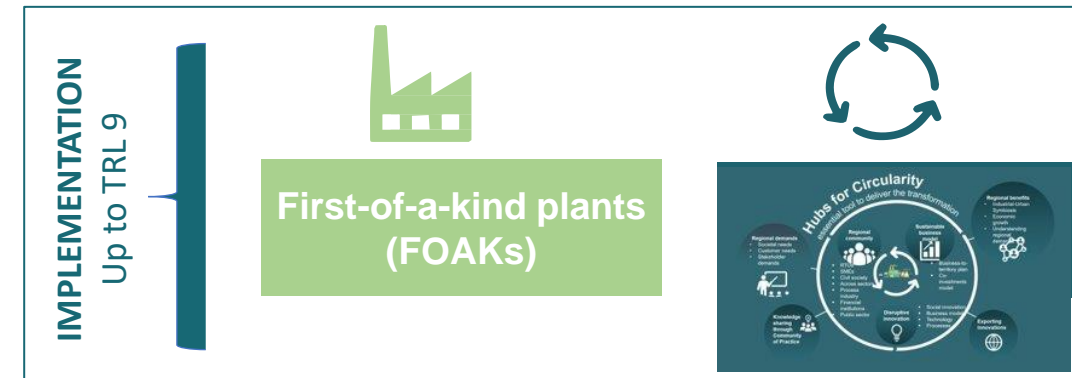




Innovation area	Progress up until milestone year <sup>1</sup>			
	2024	2030	2040	2050
Renewable energy integration	🟢	🟢	🟢	🟢
Heat reuse	🟢	🟢	🟢	🟢
Electrification of thermal processes	🟢	🟢	🟢	🟢
Electrically-driven processes	🟢	🟢	🟢	🟢
Hydrogen integration	🟢	🟢	🟢	🟢
CO <sub>2</sub> capture for utilisation	🟢	🟢	🟢	🟢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

<sup>1</sup> 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

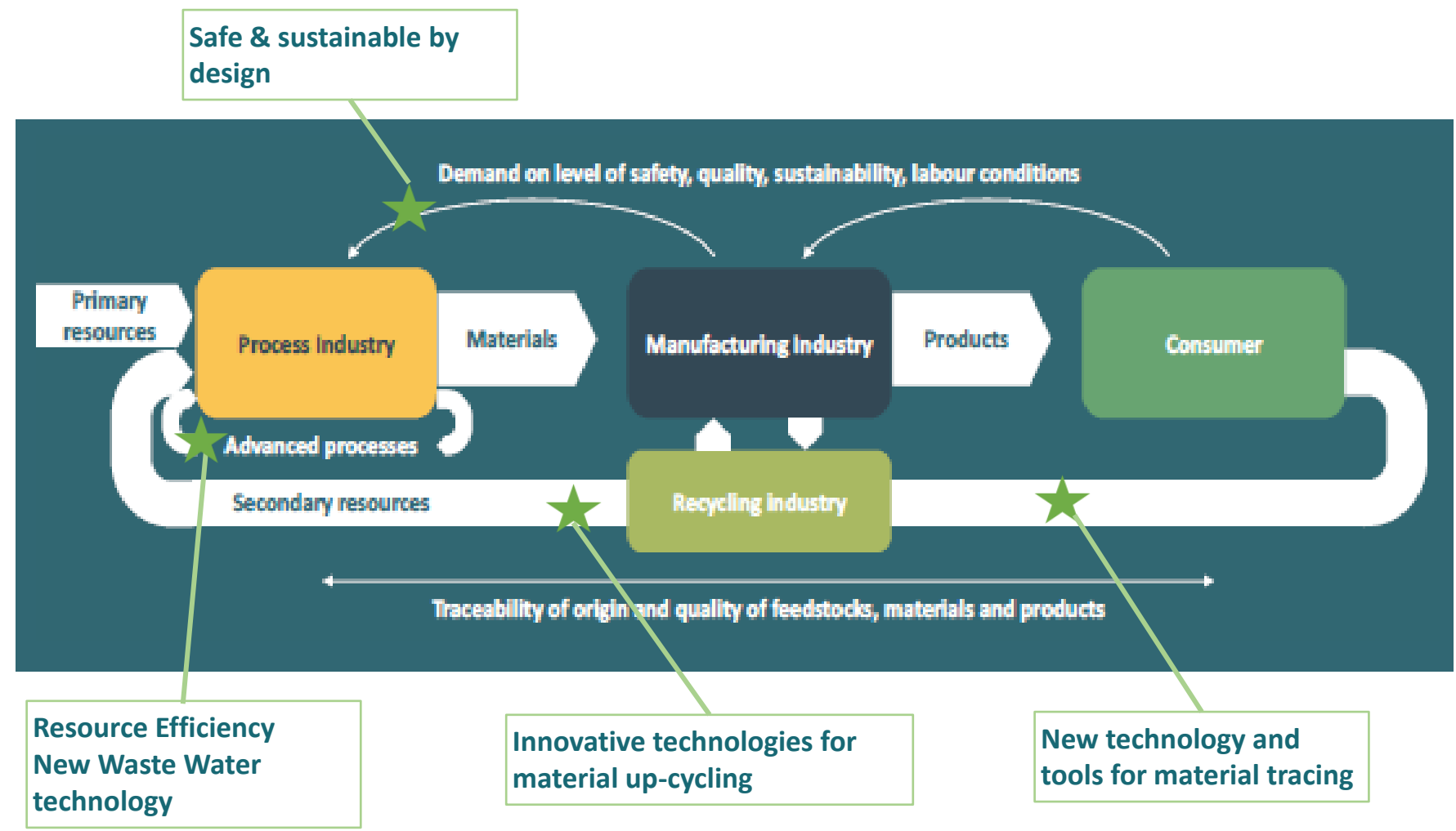
- 100% of total CO<sub>2</sub>eq emission reduction potential,
- 80% of waste and secondary raw materials reduction potential,
- 90% of wastewater reused/recycled potential



UPCYCLING & ECO-DESIGN:  
Near zero-landfilling & Near  
zero-water discharge



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**Disruptive new processes:  
Towards net-zero CO<sub>2</sub>  
emissions**

- Renewable Electricity integration
- Alternative Fuels integration: H<sub>2</sub>
- Biomass / Waste
- Electrification of furnaces
- Electrification of Processes
- Energy Efficiency



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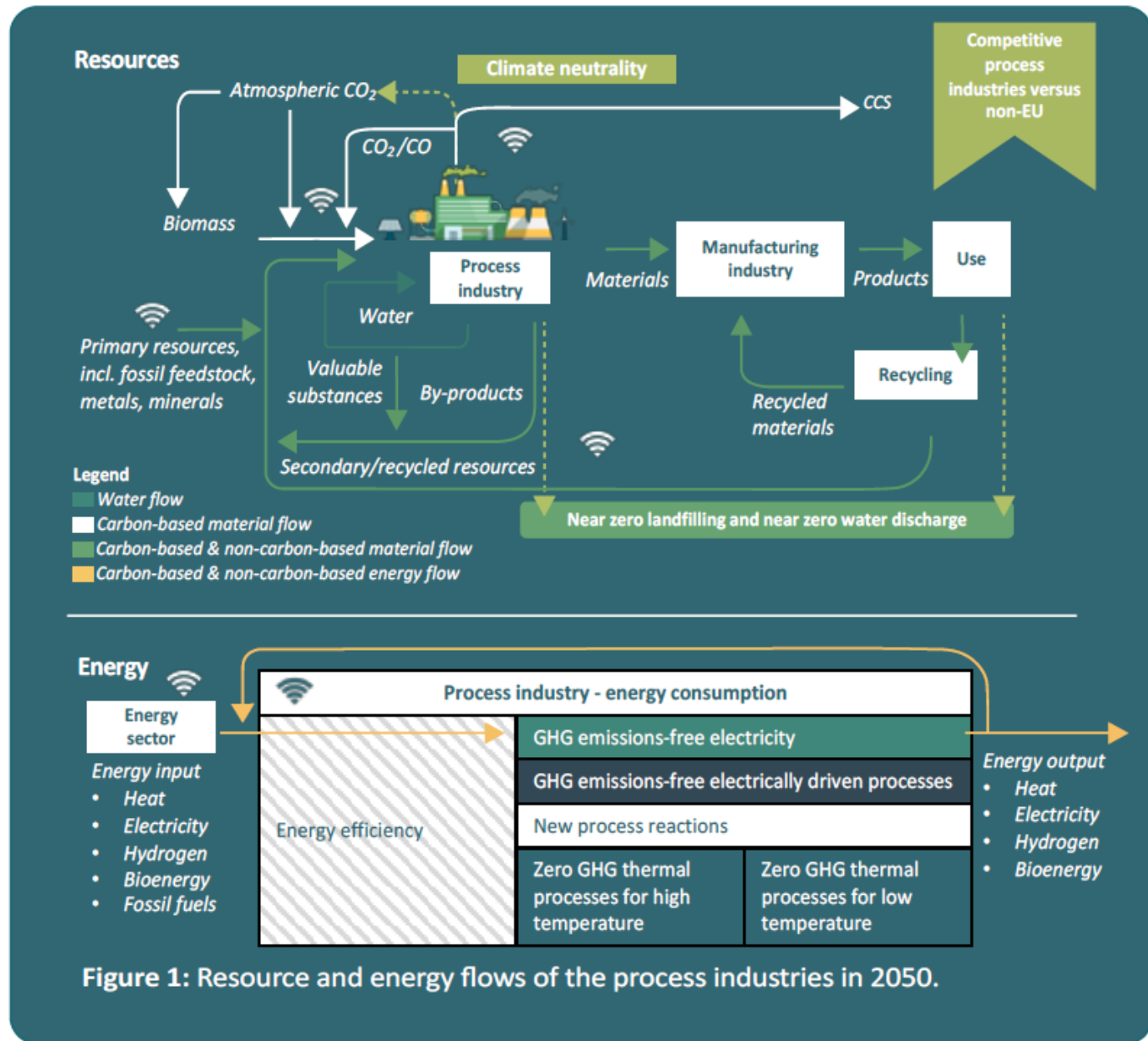


Figure 1: Resource and energy flows of the process industries in 2050.

## First-of-a-kind Large scale plants in operation

### FOAK Units within existing plants

- Combine one or several P4Planet Innovations towards the 2030/2050 ambitions to reach Climate neutrality and circularity
- Several marbles will likely connect to reach together the targets of the partnership's KPIs
- **90+ "Marbles"** identified. Aiming to **launch 15 in the period 2021 – 2030**, responding to the Green Deal plan, and enabled by the P4Planet innovation portfolio



### PRIVATE INVESTMENTS

- Industry leader commitment
- when technical and economic feasibility is proved through Horizon Europe programs.
- Public support needed to de-risk and accelerate



# Hubs for Circularity

essential tool to deliver the transformation

Connecting the system  
to deliver the transition

Regional needs

What we need



Regional  
community



Sustainable  
business  
model



Regional benefits

Where we want to go  
together



Building knowledge  
& solutions  
for climate, circularity  
& competitiveness

Knowledge  
sharing  
through  
Community  
of Practice



Disruptive  
innovation



Exporting  
innovations



Connected H4Cs  
EU transition



# H4Cs WITHIN THE CIRCULAR ECONOMY



**Focus on UPCYCLING: the use of end-of-life products and materials as feedstock for industry.**

**H4Cs**

**Process Industry as hubs for circularity:**  
capable to reintroduce bulk amounts of waste (secondary resources) into the industrial system.

**Innovations to develop & deploy:**

- ∞ Full Scale I-U Symbiosis
- 📷 Closing energy, resources and data loops

**Industrial Symbiosis:**  
use of materials streams or energy carriers underutilized by one company/sector, by another company.

**Industrial-Urban Symbiosis:**  
Coupling of industrial production sites with their regional or urban environment (electricity, waste water, district heating, infrastructures...)

**I-US**

**Circular Economy**

**The value of products, materials and resources is maintained in the economy for as long as possible, and the generation and deposition or incineration of waste is minimised. Many facets: repair, reuse, refurbishing...**





### Deadline 20/04/2023

- **HORIZON-CL4-2023-TWIN-TRANSITION-01-31:** Energy efficiency breakthroughs in the process industries (Processes4Planet partnership) (RIA). €8 to 10 M/project
- **HORIZON-CL4-2023-TWIN-TRANSITION-01-33:** Electrification of high temperature heating systems (IA). *€12 to 15M/project.*
- **HORIZON-CL4-2023-TWIN-TRANSITION-01-36:** Modelling industry transition to climate neutrality, sustainability and circularity (RIA). *€6 to 7 M /project. Lumpsum*
- **HORIZON-CL4-2023-TWIN-TRANSITION-01-37:** Hubs for circularity for near zero emissions regions applying industrial symbiosis and cooperative approach to heavy industrialized clusters and surrounding (IA). *€15 to 20 M/project.*
- **HORIZON-CL4-2023-TWIN-TRANSITION-01-40:** Sustainable and efficient industrial **water consumption**: through energy and solute recovery (RIA). €10 to 12 M /project.
- **HORIZON-CL4-2023-TWIN-TRANSITION-01-42:** Circular economy in process industries: Upcycling large volumes of secondary resources (RIA). €10 to 12 M/project. Lump sum.

### Deadline 07/02/2024

- **HORIZON-CL4-2024-TWIN-TRANSITION-01-32:** **Optimisation of thermal energy flows** in the process industry (IA). €10 to 15 M per project.
- **HORIZON-CL4-2024-TWIN-TRANSITION-01-34:** Renewable hydrogen used as feedstock in innovative production routes (Processes4Planet Partnership) (RIA). €8 to 10 M per project
- **HORIZON-CL4-2024-TWIN-TRANSITION-01-35:** Turning CO2 emissions from the process industry to feedstock (Processes4Planet partnership) (IA). €10 to 15 M per project.
- **HORIZON-CL4-2024-TWIN-TRANSITION-01-38:** **Hubs for circularity** for industrialised urban peripheral areas (Processes4Planet partnership) (IA). €15 to 20 M per project
- **HORIZON-CL4-2024-TWIN-TRANSITION-01-41:** **Breakthroughs to improve process industry resource efficiency** (Processes4Planet partnership) (RIA). €10 to 12M per project. Lump sum

January - February 2023

- Start with a **critical reading** of the existing SRIA: what is missing or is outdated?
- Input from the **Portfolio, Foresight and Digital** Transversal Teams
- Points of attention from **Societal Innovation**
- 22 Feb 2023 – PWGs and **Community Day** in Brussels

June - September

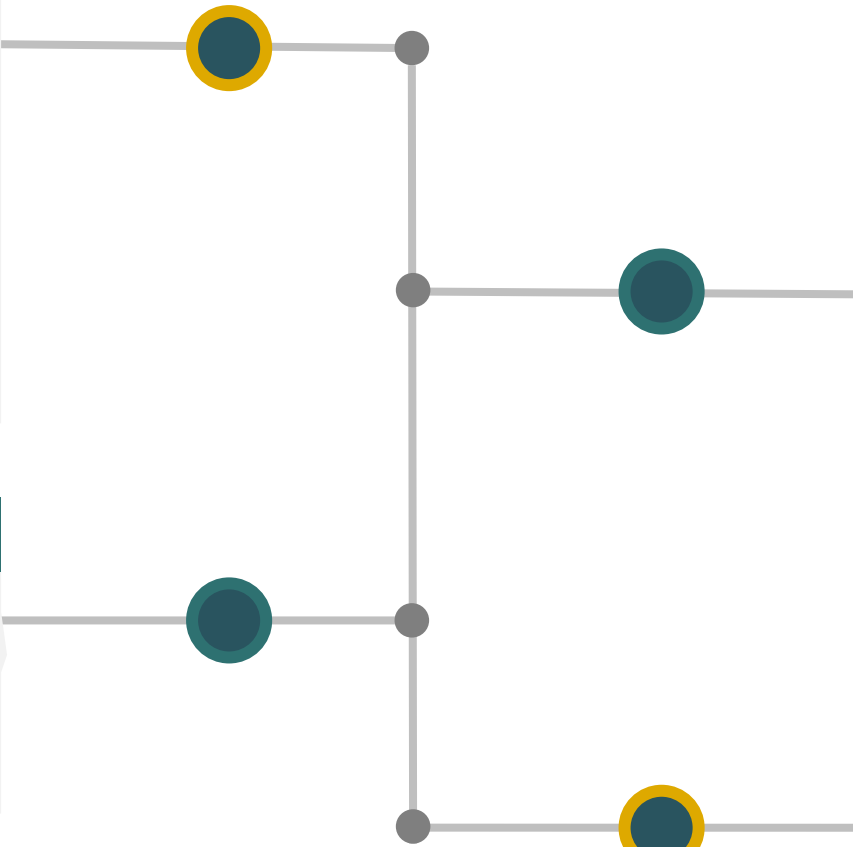
- Input from **Collaborations**
- Discussion of specific points with other **stakeholders and partnerships.**
- Consolidation of the final text.
- A.SPIRE members consultation.

March - May

- PWG Leaders consolidate the first input from all PWGs and Transversal Teams
- Integration of **all input** into a template.
- **Synthesis** meeting with the PWG Leaders
- Defining ten **priority themes.**

October - November

- **Finalizing** the document (appendix to the current SRIA).
- Approval by the A.SPIRE Board of Directors.



1. Electrification: flexible and efficient use of different loads of energy mix
2. Alternative Carriers of energy and their integration
3. Further continuous improvement of energy and material efficiency
4. CCU / CCS
5. Circular economy: technologies to upcycle impactful waste streams
6. Hubs for Circularity as placed-base innovation sites
7. Technologies for Resilience
8. Digitalisation to accelerate the innovations for the transition of the Process Industry
9. Process Industry 5.0
10. Making it happen: Accelerate The Progress To Large-Scale Deployment And Breakthrough Innovation

THE ASSOCIATION



General Assembly

Board of Directors  
Up to 29 members + 1 SME

Executive Director  
A.SPIRE Office

Advisory and Programming Group (APG)

Process Innovation for  
Climate Neutrality

Circularity  
Innovation

Competitiveness

Digitalisation

Portfolio

Foresight

Collaborations

A.SPIRE PWGs / Experts

PWG1  
ENERGY

PWG2 PROCESS  
OPTIMIZATION & CCU

PWG3  
I-US / H4Cs

PWG4 RESOURCES &  
CIRCULARITY

PWG5 FRAMEWORK  
CONDITIONS

PWG6 SOCIETAL  
INNOVATION

Special WGs

THE PARTNERSHIP

PRIVATE PARTNER  
ASPIRE

Board of Directors  
5 representatives

Executive Director  
1 representative

APG  
15 representatives  
(Incl. Ambassadors Group Leader)

Co-chair of PB

PARTNERSHIP BOARD



PROCESSES4PLANET

- Signatories
- Commitment
- Decision making

Co-chair of PB

PUBLIC PARTNER

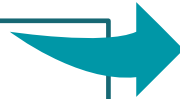


€1,3 bn funding for projects from HEU – C4

*Teaming up to address the challenges of Climate Change, Circular Economy and Competitiveness together*

## LARGER INDUSTRIES:

- Continuous dialogue on R&I across SPIRE sectors and beyond
- Channel to raise your voice on R&I for HEU & other programmes
- Access to a pool of knowledge & talent (in Universities, research centres....)
- Direct access to SME providers
- Collaboration with the innovation ecosystem and value chain
- Access to developments by other projects, SMEs, universities...
- Protection of intellectual property
- Dialogue with the EC, MS, regions, MePs & other stakeholders



## SMEs:

- Direct Access to growth opportunities
- Direct Access to new markets
- Direct Access to large industry customers

## RTOs, Universities, NGOs, Innovation agencies, Regions et al.:

- Direct Access to applied innovation
- Link to deliver impact to society and regions
- Collaboration for disruptive innovations

**BECOME A MEMBER. Send us an online application**

<https://www.spire2030.eu/spire/join-us/application-and-fees>

# 2<sup>nd</sup> half 2023

## Key Activities, Meetings & Events

Key Activities	Governance Meetings & Partnership related events	Key events for A.SPIRE Members
<p><b>Sept- Oct. 2023:</b> Finalising P4Planet’s SRIA update</p> <p><b>End November 2023:</b> P4Planet’s first Full Report (progress of projects, investments leverage, progress of the Partnership).</p>	<p><b>11 September (tbc):</b> Member States WS</p> <p><b>5-6 October:</b> EU Industry Days (Málaga, Spain)</p> <p><b>23 October:</b> BoD meeting</p> <p><b>25-26 Oct:</b> R&amp;I Days (Brussels + Bulgaria)</p> <p><b>13-14 November:</b> SET PLAN Conference (Barcelona, Spain)</p>	<p><b>20 September:</b> P4Planet brokerage &amp; Projects - H4Cs Forum (Brussels)</p> <p><b>26 October (tbc):</b> P4Planet’s Stakeholders event: Declaration and Launch of SRIA update. (Brussels/online)</p> <p><b>30 November:</b> H4Cs workshop + H4Cs Members’ meeting + Impact Panel (Chemelot, The Netherlands)</p>




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