



Reconmatic

VIRTUAL EVENT | 28 February 2024

Clustering Event: Promoting Circularity in Construction



Funded by
the European Union



UK Research
and Innovation



LEARN MORE ABOUT THE EVENT



Welcome

Moderator



Jan Valentin
Czech Technical University,
RECONMATIC Project Coordinator

Participating projects



Reconmatic

Automated Solutions For Sustainable
And Circular Construction
And Demolition Waste Management



Beeyonders

Pioneering worker-friendly
technologies for Europe's
construction sector



CircularB Action

Implementation of Circular
Economy in the Built
Environment



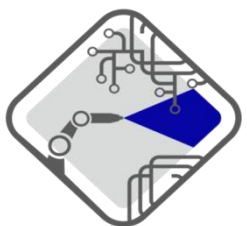
Redol

Demonstration
of Local industrial-
urban symbiosis initiative



Reincarnate

Innovative solutions for a
greener construction
industry



RoBétArmé

Human-robot collaborative
construction system for shotcrete
digitization and automation
through advanced perception,
cognition, mobility and additive
manufacturing skills



Valrec

Promotion of the valuation and
use of CDW under Circular
Economy criteria in the region
of Madrid (Spain)

Twin Transition Projects: Synergies between participating projects



Anna Palaiologk
Future Needs Management Consulting,
RECONMATIC Impact Leader, Economist,
Expert in EU Research Funding

The Circular Construction Cluster | Open invitation to initiatives for Circularity in Construction to join



CIRCULAR
CONSTRUCTION
CLUSTER

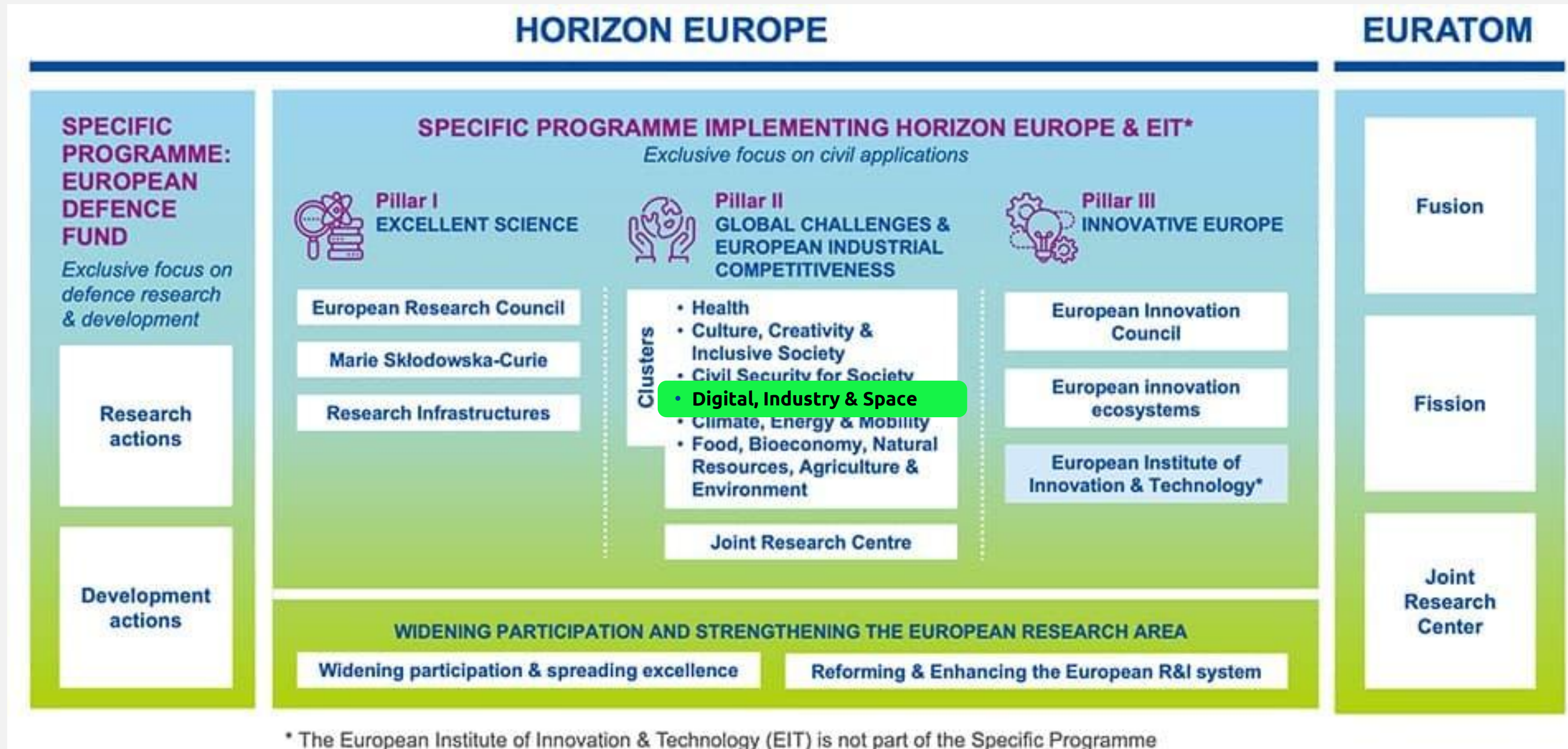
Research Collaboration

- Sharing knowledge and research results
- Joint research activities

Joint Communication and Dissemination Activities

- Social media campaigns
- Exchange of articles
- Mutual promotion of dissemination activities
- Co-organisation of dissemination activities

How did it all start? | Horizon Europe TWIN TRANSITION in Construction



How did it all start? | Horizon Europe TWIN TRANSITION in Construction



- **Destination 1: Climate neutral, circular, and digitised production**
- Destination 2: Increased Autonomy in Key Strategic Value Chains for Resilient Industry
- Destination 3: World leading data and computing technologies
- Destination 4: Digital and emerging technologies for competitiveness and fit for the green deal
- Destination 5: Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data
- Destination 6: A human-centred and ethical development and industrial technologies

How did it all start? | Horizon Europe TWIN TRANSITION in Construction

Call: Twin (Green & Digital) Transition 2021

Destination 1 17 topics in 2021

- **HORIZON-CL4-2021-TWIN-TRANSITION-01-01:** AI enhanced robotics systems for smart manufacturing (AI, Data and Robotics - Made in Europe Partnerships) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-02:** Zero-defect manufacturing towards zero-waste (Made in Europe Partnership) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-03:** Laser-based technologies for green manufacturing (Photonics - Made in Europe Partnerships) (RIA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-05:** Manufacturing technologies for bio-based materials (Made in Europe Partnership) (RIA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-07:** Artificial Intelligence for sustainable, agile manufacturing (AI, Data and Robotics - Made in Europe Partnerships) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-08:** Data-driven Distributed Industrial Environments (Made in Europe Partnership) (IA)

A new way to build, accelerating disruptive change in construction

- **CL4-2021-TWIN-TRANSITION-01-10:** Digital permits and compliance checks for buildings and infrastructure (IA)
- **CL4-2021-TWIN-TRANSITION-01-11:** Automated tools for the valorisation of construction waste (RIA)
- **CL4-2021-TWIN-TRANSITION-01-12:** Breakthrough technologies supporting technological sovereignty in construction (RIA)

Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry

- **CL4-2021-TWIN-TRANSITION-01-14:** Deploying industrial-urban symbiosis solutions for the utilization of energy, water, industrial waste and by-products at regional scale (Processes4Planet Partnership) (RIA)
- **CL4-2021-TWIN-TRANSITION-01-16:** Hubs for Circularity European Community of Practice (ECoP) platform (Processes4Planet Partnership) (CSA)

- **HORIZON-CL4-2021-TWIN-TRANSITION-01-17:** Plastic waste as a circular carbon feedstock for industry (Processes4Planet Partnership) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-18:** Carbon Direct Avoidance in steel: Electricity and hydrogen-based metallurgy (Clean Steel Partnership) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-19:** Improvement of the yield of the iron and steel making (Clean Steel Partnership) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-20:** Reducing environmental footprint, improving circularity in extractive and processing value chains (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-21:** Design and optimisation of energy flexible industrial processes (Processes4Planet Partnership) (IA)
- **HORIZON-CL4-2021-TWIN-TRANSITION-01-22:** Adjustment of Steel process production to prepare for the transition towards climate neutrality (Clean Steel Partnership) (IA)

How did it all start? | Horizon Europe TWIN TRANSITION in Construction

Call: Twin (Green & Digital) Transition 2022

Destination 1 13 topics in 2022

- **HORIZON-CL4-2022-TWIN-TRANSITION-01-01** Rapid reconfigurable production process chains (Made in Europe Partnership) (IA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-02** Products with complex functional surfaces (Made in Europe Partnership) (RIA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-03** Excellence in distributed control and modular manufacturing (Made in Europe Partnership) (RIA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-04** Intelligent work piece handling in a full production line (Made in Europe Partnership) (RIA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-06** ICT Innovation for Manufacturing Sustainability in SMEs (I4MS2) (Made in Europe Partnership) (IA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-07** Digital tools to support the engineering of a Circular Economy (Made in Europe Partnership) (RIA)

A new way to build, accelerating disruptive change in construction




- **HORIZON-CL4-2022-TWIN-TRANSITION-01-09** Demonstrate the use of Digital Logbook for buildings (IA)

Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry

- **HORIZON-CL4-2022-TWIN-TRANSITION-01-10** Circular flows for solid waste in urban environment (IA)

- **HORIZON-CL4-2022-TWIN-TRANSITION-01-11** Valorisation of CO/CO2 streams into added-value products of market interest (Processes4Planet Partnership) (IA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-13** Raw material preparation for clean steel production (Clean Steel Partnership) (IA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-15** New electrochemical conversion routes for the production of chemicals and materials in process industries (Processes4Planet Partnership) (RIA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-16** Modular and hybrid heating technologies in steel production (Clean Steel Partnership) (IA)
- **HORIZON-CL4-2022-TWIN-TRANSITION-01-17** Integration of hydrogen for replacing fossil fuels in industrial applications (Processes4Planet Partnership) (IA)

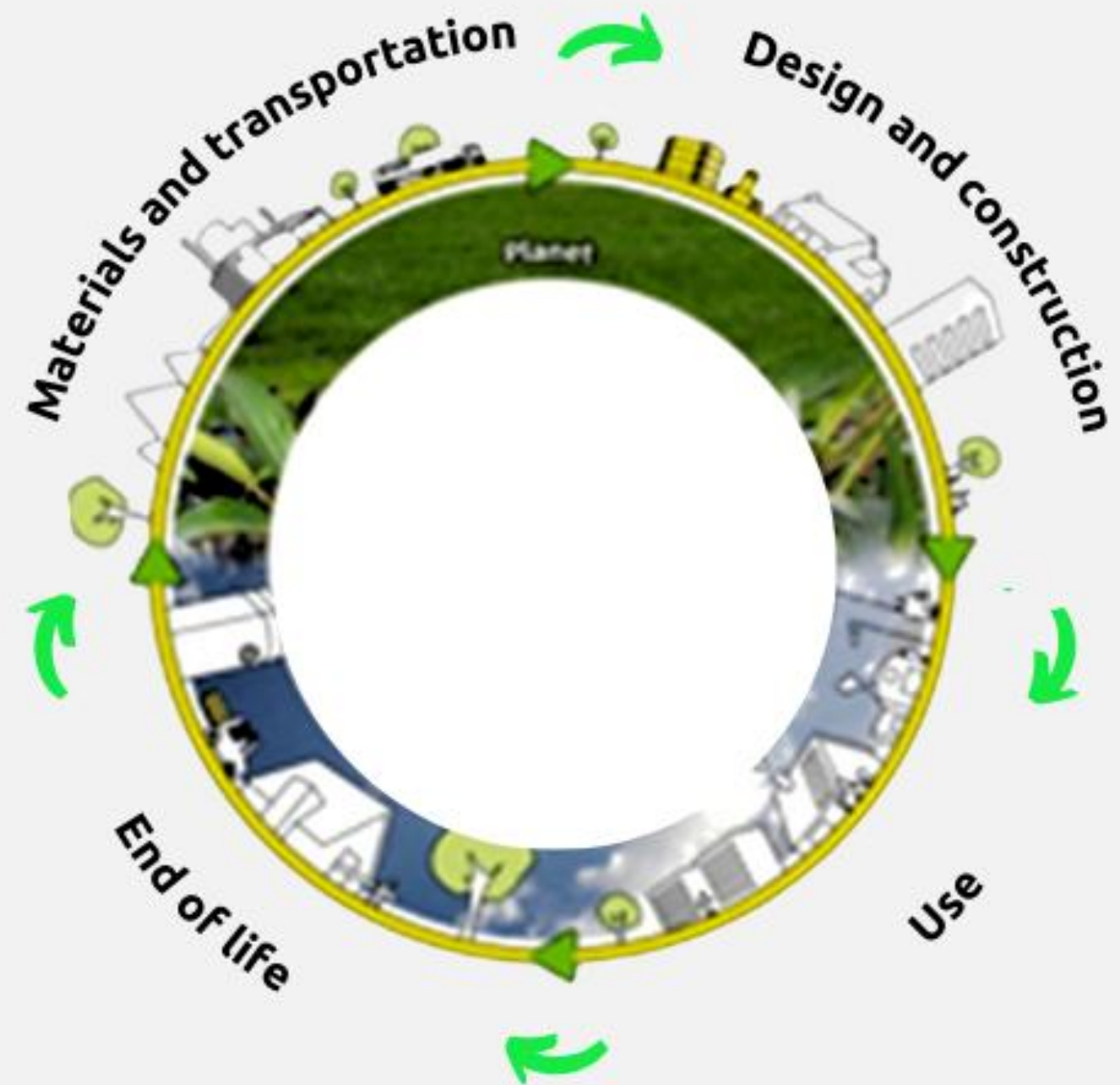
How did it all start? | Horizon Europe TWIN TRANSITION in Construction

CALL: TWIN GREEN AND DIGITAL TRANSITION 2021 A new way to build, accelerating disruptive change in construction		
	Circularity aspects in Expected Impacts of the call topic	Projects
<p>CL4-2021-TWIN-TRANSITION-01-11: Automated tools for the valorisation of construction waste TRL: 4 → 6 Call type: RIA</p>	<ul style="list-style-type: none"> ● Increase Construction & Demolition Waste utilisation (at least 80% weight) ● New value chain and business models for construction waste reduction ● Tracing of material and /or component ● Increase by 50% the reusability of construction products post demolition ● Overcome barriers (e.g. end of waste criteria, lack of trust in secondary products, awareness of circular potential) ● More circular and climate neutral construction materials and activities 	
<p>CL4-2021-TWIN-TRANSITION-01-12: Breakthrough technologies supporting technological sovereignty in construction TRL: 4 → 6 Call type: RIA</p>	<ul style="list-style-type: none"> ● Increase efficiency of resources (raw materials, water etc.) ● Increase reduction of waste and embodied CO2 emissions 	
CALL: TWIN GREEN AND DIGITAL TRANSITION 2022 Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry		
	Circularity aspects in Expected Impacts of the call topic	Projects
<p>CL4-2022-TWIN-TRANSITION-01-10: Circular flows for solid waste in urban environment TRL: 5 → 7 Call type: IA</p>	<ul style="list-style-type: none"> ● Reduce 80 % (in weight or volume) solid waste ● Re-use, valorise and transform waste ● Circularity potential awareness ● Network amongst waste associations ● Involve local community actors ● Removing the usual barriers of exploitation for end-of-life materials 	

How did it all start? | Horizon Europe TWIN TRANSITION in Construction

Background

- The construction ecosystem (driven mainly by SMEs) offers **22 million jobs** and contributes **10.5%** of EU-27 global value added.
- The digital intensity of the construction sector is below 10%, meaning that the sector has a **very slow absorption rate of digital technologies**, according to the Digital Transformation Scoreboard 2018.



How did it all start? | Horizon Europe TWIN TRANSITION in Construction

Summary of common goals

- ✓ **Reduce CO2 emissions** during entire construction life-cycle.
- ✓ **Reduce waste** via durability, reparability and **re-cycling** of products/components.
- ✓ Ensure better and more efficient **use of construction-generated data** to sustain competitiveness and greening of the sector.
- ✓ **Overcome non-technical barriers** - awareness raising and acceptance of circularity concept/products by consumers.
- ✓ **New business models** for construction waste and circular activities.
- ✓ Point the way to opportunities for **upskilling** construction workforce (green skills).
- ✓ **Create communities** of circularity practice.



Panel Discussion | How do you address circularity in construction in your project?



Moderator,
Jan Valentin
Czech Technical University,
RECONMATIC Coordinator



Antonio Alonso Cepeda
Acciona
BEEYONDERS Coordinator



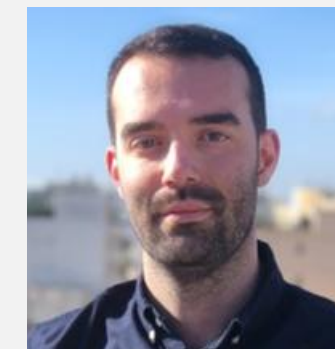
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Jaime Moreno Juez
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PANEL DISCUSSION

How do you address **circularity** in construction in your project?

Moderator



Jan
Valentin
RECONMATIC

Panellists



Antonio Alonso
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Dimitrios
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ROBETARME



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VALREC

Panel Discussion | Similarities between the participating EU research & Innovation Projects

1. Digitalisation in construction processes and waste management

- ✓ Collection of relevant information for waste management/valorisation
- ✓ Contribution to digitalization of the construction industry
- ✓ Use of AI, automation, and digitalisation
- ✓ Advanced Digital tools
- ✓ Development & implementation of digital tools to improve selective demolition, traceability and management of CDW
- ✓ Digital platform SITRANS, incl. optimization of waste transportation
- ✓ Blockchain solutions

Beeyonders, CircularB Action, Redol, Reincarnate, RoBétArmé, Valrec, Reconmatic

2. Digital twins and their use in the building life-cycle

- ✓ Develop cognitive Digital Twin and simulation environments for construction monitoring, diagnostics, and orchestration activities
- ✓ Reduction of waste and emitted and embedded CO2, (through digital twin monitoring)

Beeyonders, Redol, Reincarnate, RoBétArmé, Valrec, Reconmatic

3. Automation in waste management systems for CDW

- ✓ AI for the improvement of CDW management
- ✓ Use of AI, automation, and digitalisation
- ✓ Blockchain Solutions
- ✓ Automation in construction

Beeyonders, Redol, Reincarnate, RoBétArmé, , Valrec, Reconmatic

Panel Discussion | Similarities between the participating EU research & Innovation Projects

4. Integration of life cycle waste management into BIM solutions and tools

- ✓ Tool for pre-demolition audits making use of BIM called BIM4DW

Reincarnate, Valrec, Reconmatic

5. Sustainability and circularity in construction life-cycle

- ✓ Defining a classification or ontology of circularity and sustainability
- ✓ Sustainable construction practices

CircularB Action, Reincarnate, Valrec, Reconmatic

6. Robotics in construction and CDW processing

- ✓ Human-robot collaboration
- ✓ Ground/air autonomous and tele-operated robots in construction

Beeyonders, Redol, RoBétArmé, Reconmatic

7. CDW valorisation and resource optimization

- ✓ High added value valorisation of CDW
- ✓ New ways to get added value solutions from CDW
- ✓ New sustainable construction products from recycled materials derived from CDW (incl. Research)
- ✓ Supporting decision-making regarding the management of CDW, and other materials and products already in use

CircularB Action, Reincarnate, Valrec, Reconmatic

Panel Discussion | Similarities between the participating EU research & Innovation Projects

8. Where do we have demonstration cases with economic impact on the European construction industry?

- ✓ Innovation and collaboration as integrating principle between R&D activities for sustainable Construction industry in Europe

9. Educational material and training of stakeholders on circularity

CircularB Action, Reincarnate, Reconmatic

Synergies identified



1. Digitalisation in construction processes and waste management



2. Digital twins and their use in the building life-cycle



3. Automation in waste management systems for CDW



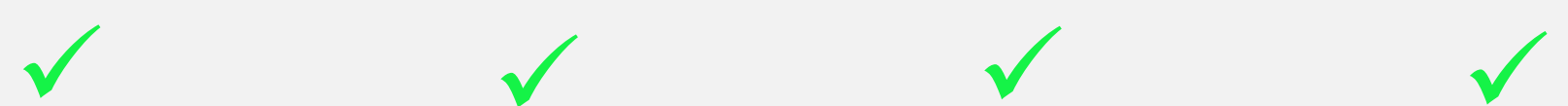
4. Integration of life cycle waste management into BIM solutions



5. Sustainability and circularity in construction life-cycle



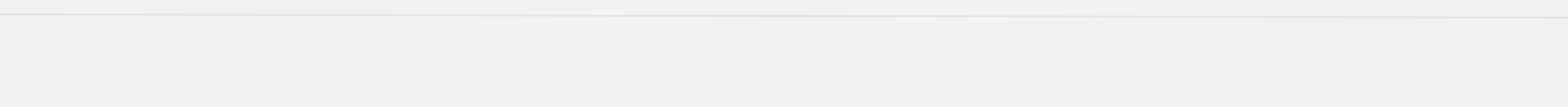
6. Robotics in construction and CDW processing



7. CDW valorisation and resource optimization



8. Demonstration cases with economic impact on the European construction industry



9. Educational material and training of stakeholders on circularity



Q & A

Future Research Dissemination & Conference Opportunities | Joint Activities



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Events



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The **RECONMATIC project** has been funded by the European Union under Grant Agreement No. 101058580 and by the UK Research and Innovation as part of the UK Guarantee programme for UK Horizon Europe participation.

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Thank you



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