4Recycling ecosystem RDI roadmap

Plastics and composites in construction industry

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SYSTEMIC CHALLENGE

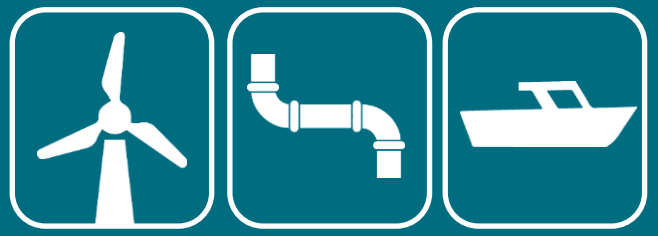
that stems from diversified waste material streams

FUNCTIONAL BIO-BASED AND CIRCULAR SOLUTIONS FOR RETAIL PACKAGING

RECYCLING TECHNOLOGIES FOR RETAIL PACKAGING

PLASTICS AND COMPOSITES IN CONSTRUCTION INDUSTRY

RECYCLING OF BULKY FIBRE-REINFORCED PLASTIC PRODUCTS AND INDUSTRIAL SIDE-STREAMS



PLASTICS AND COMPOSITES IN CONSTRUCTION INDUSTRY

GOALS → 2025 → 2030 → 2035

2025: Collection methods for plastic waste streams from construction sites developed

2030: Biobased or recycled material solutions in construction use demonstrated successfully

2035: Recycling Infrastructure ready and running for selected applications.

Recycling technologies of multimaterial construction plastics

- Identification methods enabling biocomposite separation from other waste streams
- Conversion of biocomposites using pyrolysis and the possible use of pyrolysis products in novel products
- The separation systems for multimaterial construction plastics
- Demonstrations of the use of recycled materials in construction
- Efficiency of thermochemicals conversions.
- Cost efficient processes to be developed for recycling

Recycling of biocomposites or product including a biobased component

- Research on recognizing the recyclable fractions of construction waste and identification of recycling options for them
- Research on recognizing the recyclable fractions of construction waste and identification of recycling options for them
- Demonstration of technologies for large scale recycling of biocomposites and biobased material
- Continuous Development of technologies

Recycling system and infrastucture for construction plastics

- Collection methods for plastic waste streams from construction sites
- PPP (Public-private partnership) system for recycled plastic products / market demand
- Development of the use of different virgin or recycled bio-based fibres in biocomposites
- Environmental sustainability and economic feasibility of biocomposite products compared to a product manufactured using competing traditional materials
- Eliminating plastic waste from new construction as well as demolition sites.

Biobased components for construction industry

- Efficient methods and equipment for producing bio-based plastics in large quantities for the demands of construction industry
- Research on development of recycled fibres in biocomposites
- Development of the bio-based additivies and fire-retardants.
- LCA of the whole product lifecycles.

The use of recycled materials in construction sector

- Research on recognizing the material recycling and clear flows for recycling
- Understanding on the possibility to group different plastic and/or composite waste streams together
- Understanding on the most feasible end-of-life treatments and recovery options for biocomposites proven through LCA
- New products for recycled fibres in biocomposites and biobased compo-nents with proper recycling options

Development of the recycling system and infrastructure for construction plastics

Return

NOW

- ✓ State- of-the-art of the recycling system and infrastructure for construction plastics
- ✓ Definition what kind of plastics could be replaced in construction.
- ✓ Recycling rate for current materials understood.

Recycling technologies of multimaterial construction plastics, biocomposites or product including a biobased component

Return

2025

- ✓ Development of the separation systems for multimaterial construction plastics
- ✓ Development of the identification methods enabling biocomposite separation from other waste streams
- ✓ Development of conversion of biocomposites using pyrolysis and the possible use of pyrolysis products in novel products
- ✓ Screening of main enzymatic technologies and their industrial feasibility which could be applied to the recycling of biocomposites
- ✓ Development of the recycling for materials including hazardous components
- ✓ Development of the recycling methods for insulation materials from demolition.

Recycling technologies of multimaterial construction plastics, biocomposites or product including a biobased component

Return

2025

- ✓ Research on recognizing the recyclable fractions of construction waste and identification of recycling options for them
- ✓ Understanding on the effect of biocomposite when entering the homogenous recycled polymer stream
  Effect of biodegradable biocomposite within recycled biocomposite stream
- ✓ Understanding on the location and quantity of existing biocomposite wastes in EU
- ✓ Understanding on the possibility to group different plastic and/or composite waste streams together
- ✓ Understanding on the most feasible end-of-life treatments and recovery options for biocomposites proven through LCA

Recycling technologies of multimaterial construction plastics, biocomposites or product including a biobased component

Return

2030

- ✓ Demonstrations of the use of recycled materials in construction
- ✓ Development of thermochemical processes for recycling of multimaterials and end-uses for conversion products.
- ✓ Development of the efficiency of thermochemicals conversions.
- ✓ Demonstration of technologies for large scale recycling of biocomposites and biobased material

Recycling technologies of multimaterial construction plastics, biocomposites or product including a biobased component

Return

2035

- ✓ Cost efficient processes to be developed for recycling
- ✓ Infrastructure to support processes constructed in this time frame
- ✓ Continuous development of technologies.

Development of the recycling system and infrastructure for construction plastics

Return

2025

- ✓ Collection methods for plastic waste streams from construction sites
- ✓ PPP (Public-private partnership) system for recycled plastic products / market demand
- ✓ Development of the recycling system and infrastructure so that all material from construction is recycled
- ✓ Increasing understanding how thoroughly materials with different raw material base need to be separated for efficient recycling to enable the utilization of material in novel products
- ✓ Development of the methods to have better picture what kind of plastics are used in construction stages, processes or packaging.
- ✓ Development of the reuse options for plastic tubes and insulation materials from demolition.
- ✓ The trace and tracking practice needs to be developed for the materials.

Development of the recycling system and infrastructure for construction plastics

Return

2030

- ✓ Eliminating plastic waste from new construction as well as demolition sites.
- ✓ Meaning that all plastics will eventually find their way to recycling and new uses, and new buildings are designed so that this disassembly and recycling at end-of-use will be easy.

Development of the biobased components for construction industry

Return

2025

- ✓ Efficient methods and equipment for producing bio-based plastics in large quantities for the demands of construction industry
- ✓ Research and development of biobased components and readiness to use existing manufacturing facilities
- ✓ Maintaining or improving fibre properties in thermoplastics processing (extrusion, injection moulding) to produce biocomposites
- ✓ Development of the use of different virgin or recycled bio-based fibres in biocomposites
- ✓ Development of the products out of recycled heterogeneous material streams
- ✓ Development of the interoperability of biocomposites with the traditional thermoplastics processing equipment
- ✓ Environmental sustainability and economic feasibility of biocomposite products compared to a product manufactured using competing traditional materials

Development of the use of recycled materials in construction sector

Return

2025

- ✓ Research on development of recycled fibres in biocomposites

2030

- ✓ Development of the end-uses for recycled materials in construction sector.
- ✓ Development of new products for recycled fibres in biocomposites and biobased components with proper recycling options

Development of the biobased components for construction industry

Return

2030

- ✓ Biobased raw material available for manufacturing, recycling system ready
- ✓ Development of the bio-based additives and fire-retardants.
- ✓ LCA of the whole product lifecycles.
- ✓ Design of innovative business models to support the system change