De & Remanufacturing for Circular Economy Investments in the Composite Industry

Recycling vof Composite Possibilities and Barriers

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- Kompetenzzentrum Holz GmbH

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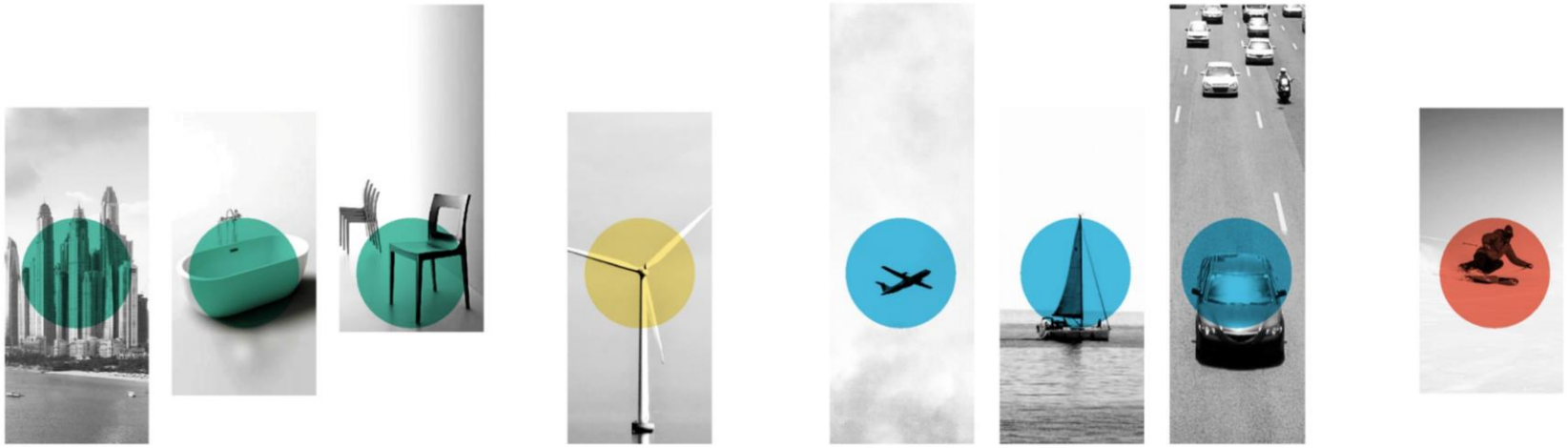
Composite materials: WHAT?



HOUSING CONSTRUCTION, FU RNITURE, CREATIVE

ENERGY

TRANSPORT AEROSPACE, NAUTICAL, AUTO

SPORTS

Fiber-Reinforced Plastics (FRPs) are widely adopted in several massively used products in the electronics, sport equipment, medical equipment, automotive, construction, wind energy, aeronautics and marine industries, due to their better lightweight and corrosion resistance compared to metals.

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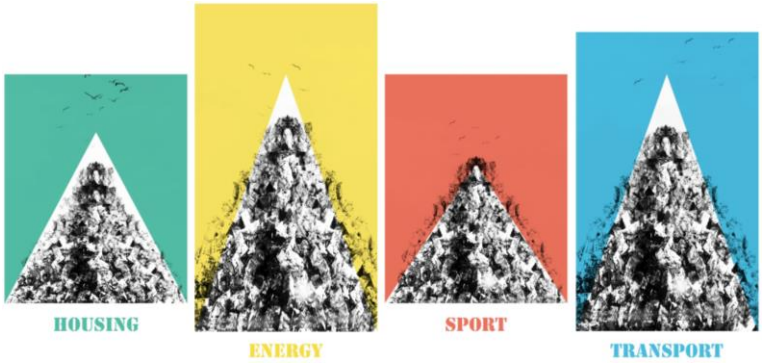
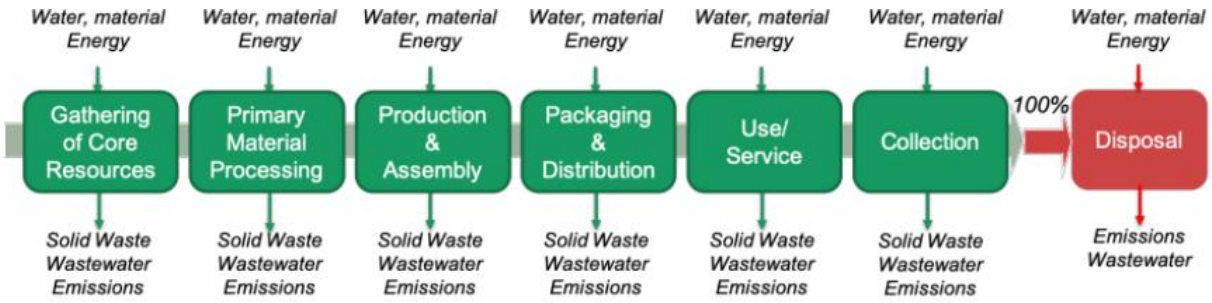
Composite materials: WHY? (Barriers)

The lack of a European sustainable circular value-chain for the recovery and re-use of plastics materials into high value-added applications would lead to both untapped business opportunities and economic losses and to a serious environmental burden.



The existing **main barriers** for a sustainable circular economy solution are:

- Lack of a systematic value-chain integration approach for re-use of composites.
- Poor customer acceptance for remanufactured products.
- Lack of circular business models for boosting profitability.
- Unstable and unpredictable EoL products flows.



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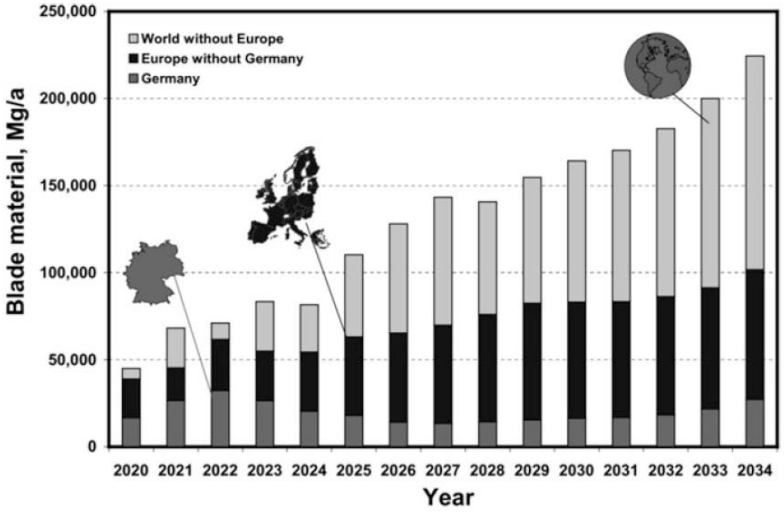
Composite materials: WHY?

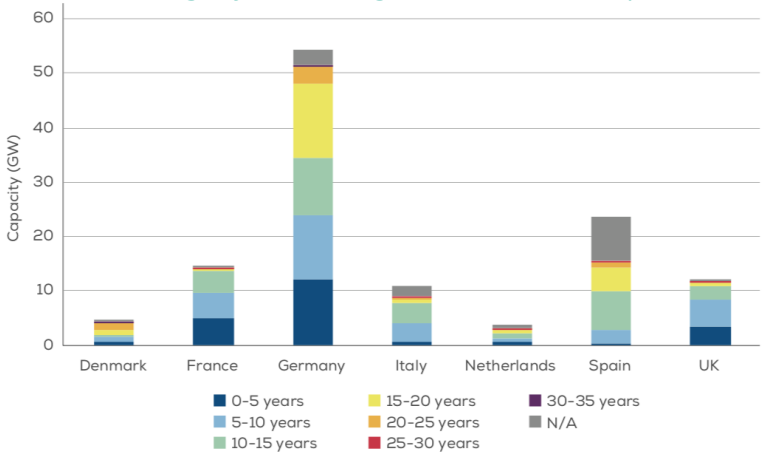
Expected amount of EoL blades in Germany, in Europe and worldwide from 2020 to 2034.



WindEurope estimates around 14,000 blades could be decommissioned by 2023, equivalent to between 40,000 and 60,000 tons. Recycling these old blades is a top priority for the **wind industry**.

The **DeremCo project** aims at the development of innovative systemic solutions for unlocking the great potential of EoL composite materials as new manufacturing sources, with a set of actions inspired by two major general guidelines: **Sustainable Manufacturing and Digitalization**.

Age of the existing installations in Europe



Source: WindEurope

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Possibilities for recycling

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DeremCo Background: FiberEUse project

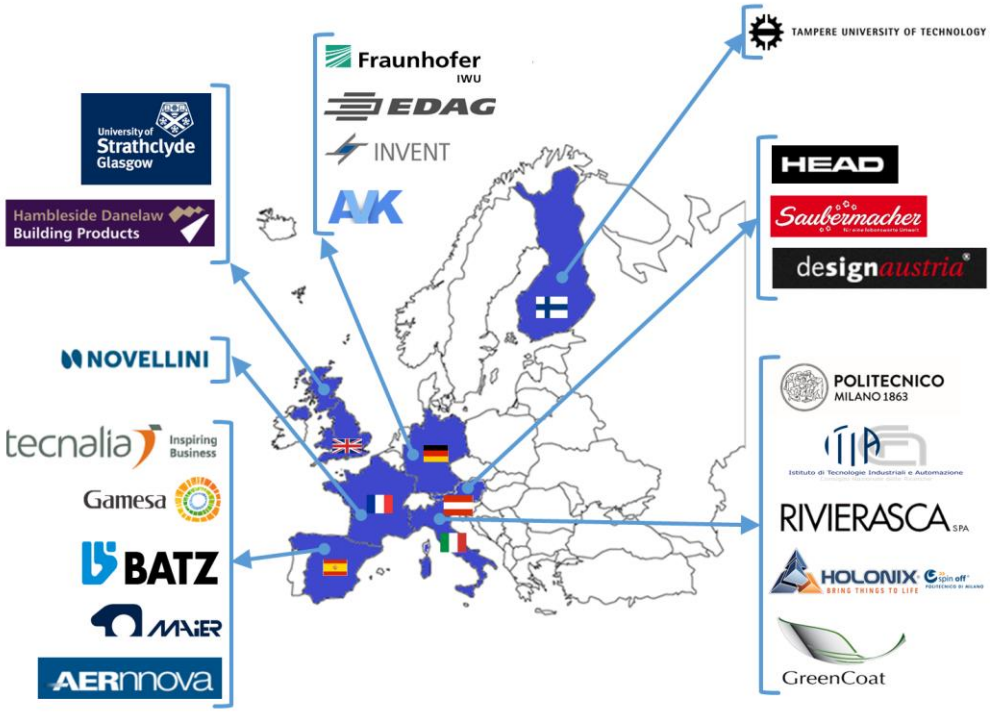
FiberEUse - Large scale demonstration of new circular economy value-chains based on the reuse of end-of-life fiber reinforced composites.

Topic: Systemic, eco-innovative approaches for the circular economy: large-scale demonstration projects (CIRC-1-2016)

The FiberEUse project aims at integrating in a holistic approach different innovation actions aimed at enhancing the profitability of composite recycling and reuse in value-added products.

Project results are collected in this BOOK.

- **DURATION**: 48 months, 2017-2021
- **CONSORTIUM**: 21 partners, from 7 EU countries.
- **COORDINATOR PARTNER**: Politecnico di Milano
- **EC FUNDING**: ca. 10 mln €.



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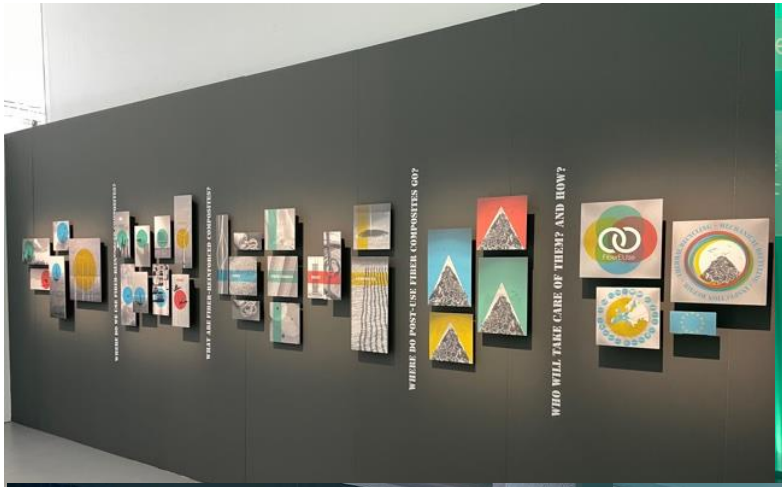
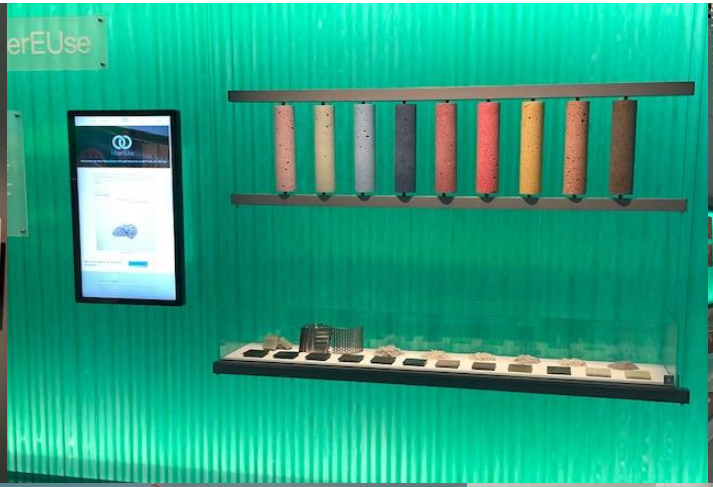
FiberEUse - Milan Design Week 2021





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DeremCo Project

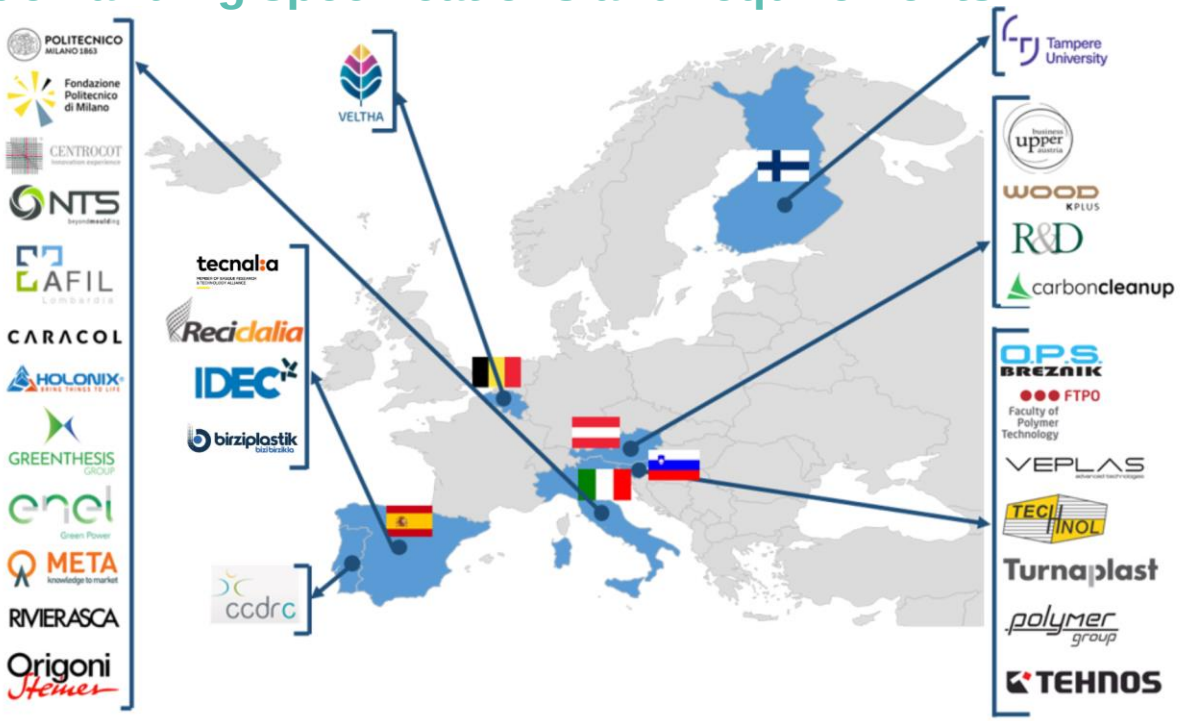
De and Remanufacturing for Circular Economy Investments in the Composite Industry

DURATION: 36 months, 2022-2025
CONSORTIUM: 30 partners, from 7 EU countries and Regions.
COORDINATOR: Politecnico di Milano
EC FUNDING: ca. 9 mln €.

DeremCo combines:

- Geographical areas with the highest utilization of composites;
- Complementarity in smart specialization on technical enablers;
- Part of the Vanguard De-and Remanufacturing network;
- Wind and automotive are distributed value-chains with relevant footprint in these Regions.

The project will integrate in a systemic approach **different innovation actions** aimed at enhancing the profitability of reinforced plastics recycling and reuse in value-added products. By properly transforming their properties, such plastics can be **re-used in new value-added applications in sectors characterized by less demanding specifications and requirements**.



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DeremCo systemic cross-sectorial approach

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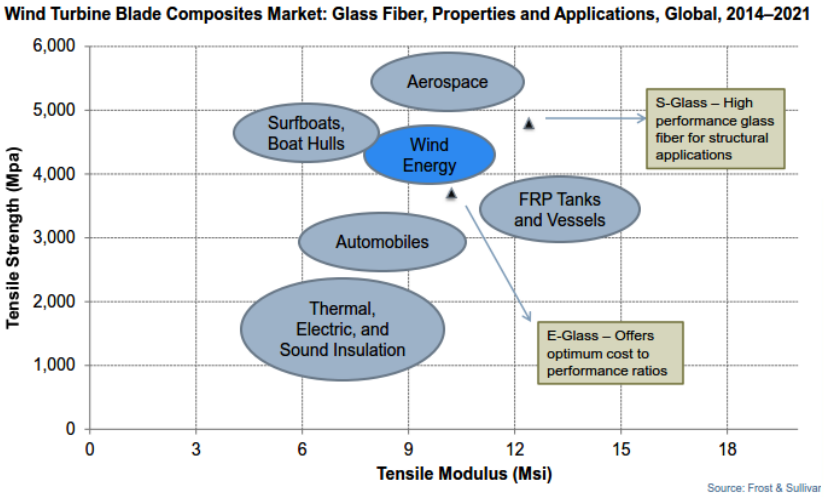

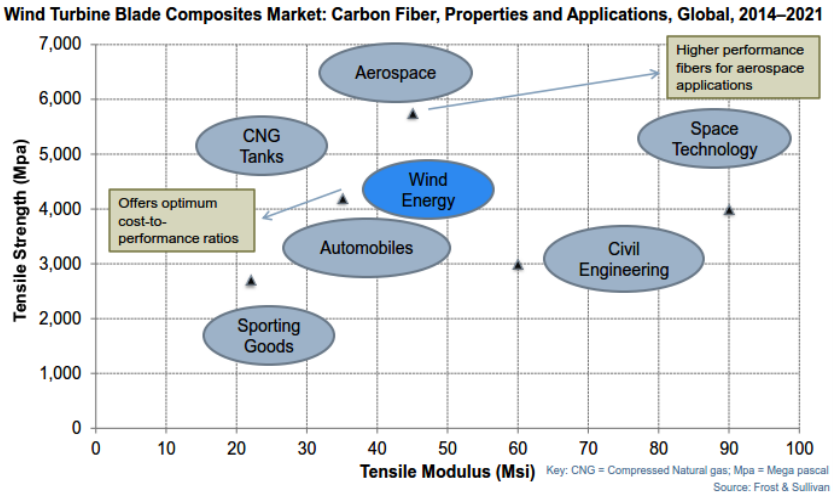

Leveraging on a cross-sectorial approach can open new potentials for composite made parts recycling, remanufacturing and re-use under a systemic circular economy perspective.

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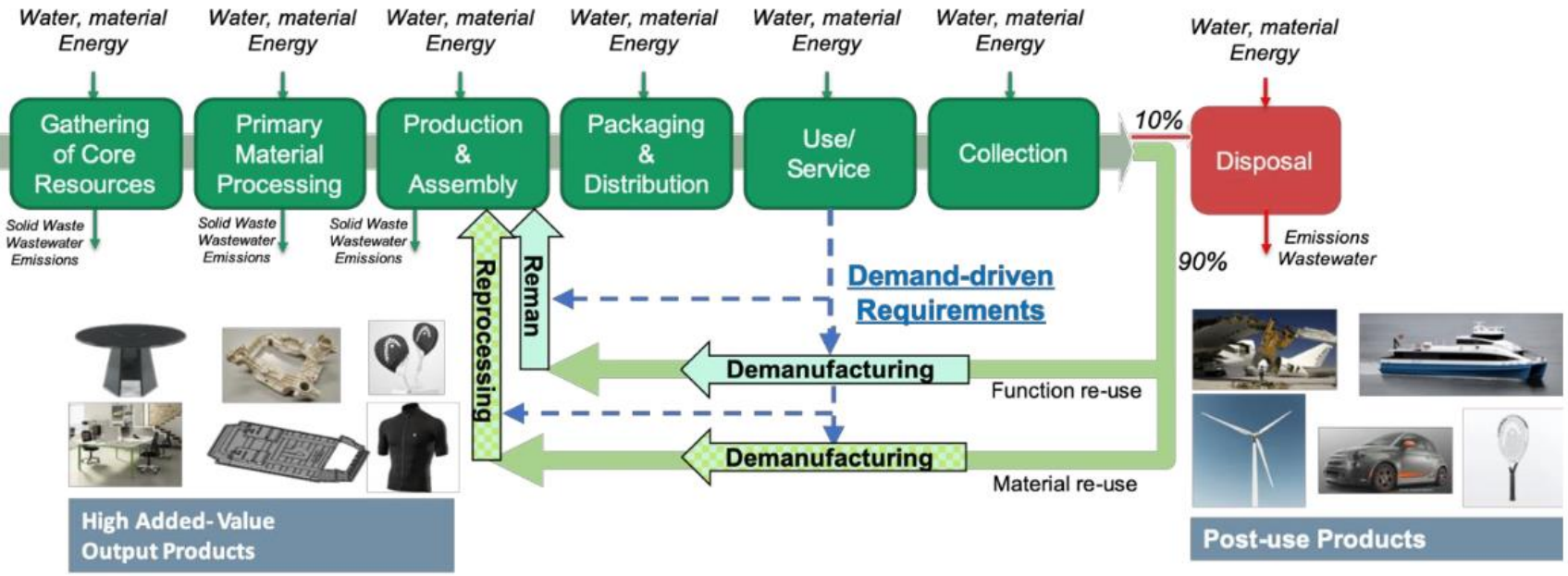
DeremCo Demand-Driven Circular solution

Exploit the **interregional Partnership** to achieve a large-scale demonstration of circular economy solutions for **demand-driven Fiber-Reinforced Plastics reprocessing and re-use into added value products**, de-risking future industrial uptake through private investments thus supporting future producer-driven replication at industrial scale.



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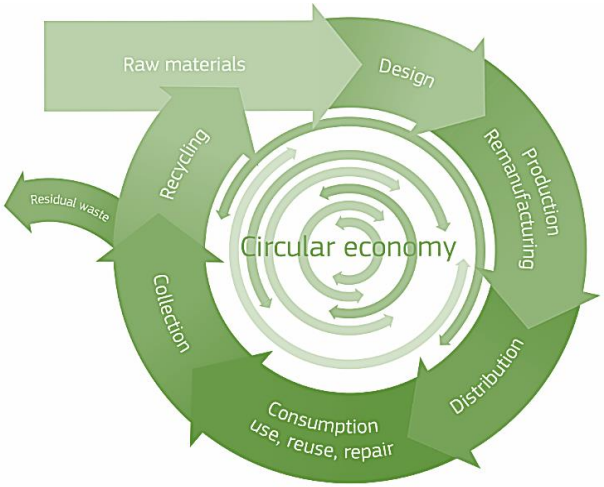
DeremCo Innovation and Technical Enablers

TECHNICAL ENABLERS:

- Innovative highly controlled demanufacturing (thermo-chemical, mechanical) processes
- Demand-driven reprocessing and certification solutions for unlocking industrial re-use business cases
- Product co-design solutions for enhancing user and citizens involvement
- A digital platform incorporating tools for material traceability and information exchange among stakeholders



NON-TECHNICAL ENABLERS:

- Achieve large scale replication and multiplication by exploiting the capabilities of the Vanguard Initiative “De-and Remanufacturing for Circular Economy” network
- Boosting the industrial uptake within the local eco-system, implementing actions designed by public administrations and institutions, clusters and sector associations, financial intermediaries, citizens representatives
- Increasing awareness for a more conscious consumer behavior

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What is the KPI for stiffness?

- Process As-is:
  - Thermoforming
  - Spray lay-up
  - Rolling
  - Curing
  - Cut-Drill
  - Assembly
  - Testing

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What is the value of recycled composites?

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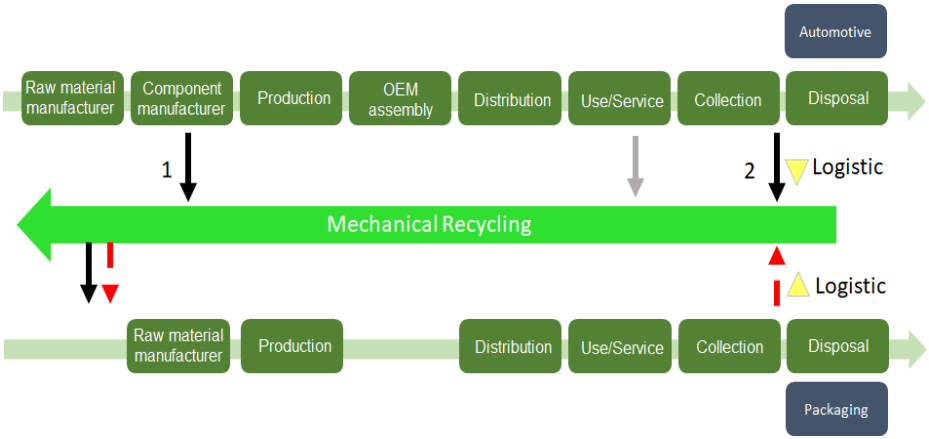
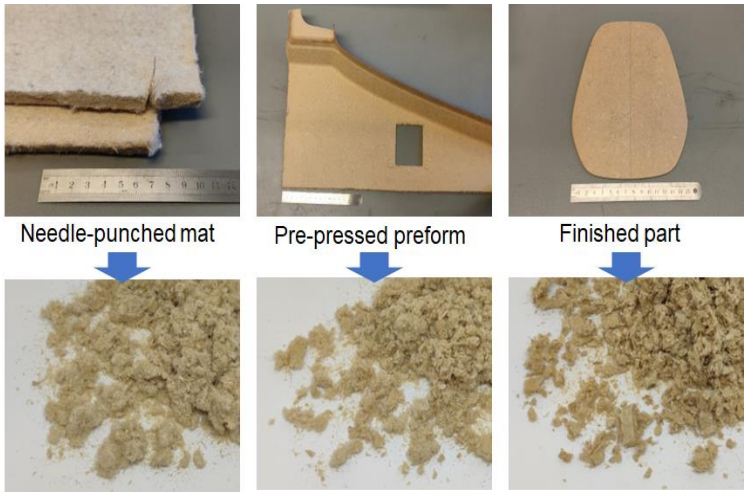
Cross Value Chain for NFC



Recycling of wood fiber mat from automotive scrap and reusing it as an alternative cellulose in packaging (fiber casting)

WK+ developes a concept by introducing natural fibers and recycled fibers for packaging industry (molded fiber parts).



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Cross Value Chain for NFC

Copilot Artwork
of reusing high quality structural natural fiber composites in pulp molded packaging

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Presenter contact

THANKS

DOES ANYONE HAVE ANY QUESTIONS?

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