



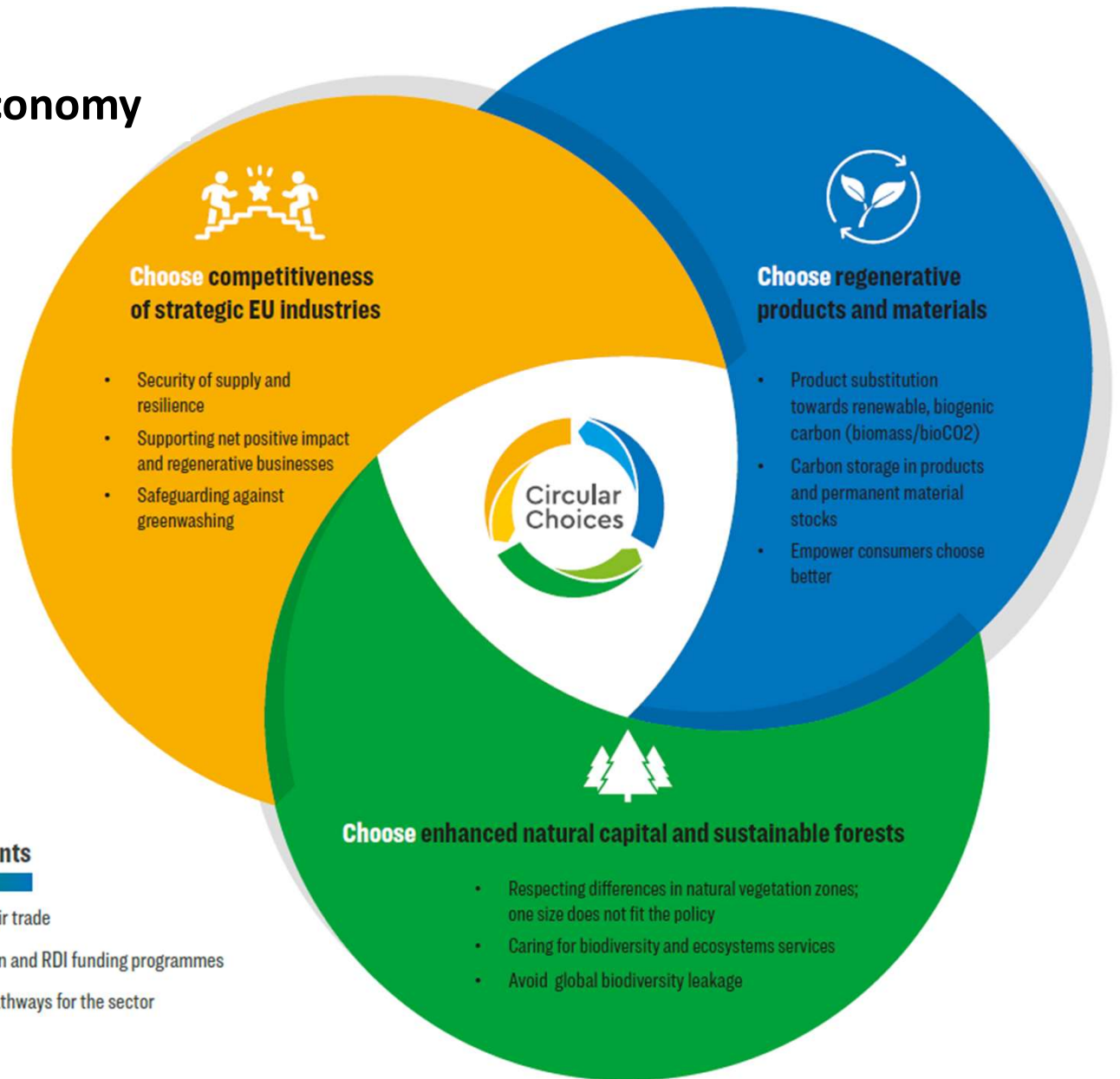
Circular Choices for a Competitive EU Bioeconomy

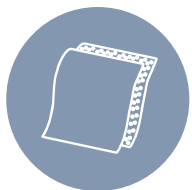
**20 European
sector
associations**

**Direct
employment
>4 million
Europeans**

**Annual turnover
>520 billion
euro**

**1 in every 5
manufacturing
companies in EU**





Use cases

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Fiber based packaging materials and solutions are always recyclable (70-90%) whereas today >90% of plastic material is not recycled to original application

FIBER BASED PACKAGING



State-of-the-art

- Fiber-based packaging materials are based on either recycled fiber or virgin fiber
- Fiber-based packaging solutions include 1) rigid containers, 2) flexible films and 3) cushion materials
- Recycling of fiber products is a very well established and feasible system in Europe.

Need:

- Wood based packaging is a viable and competitive alternative for fossil-based plastics
 - Recyclability brings sustainability over many other raw material alternative especially in single-use products
 - Combatting against the microplastic challenge in global perspective
 - Enables sustainable growth for the forest sector

New fiber-based solutions are related to e.g.:

- Light weight packaging
- Flexible and transparent packaging
- Cushion materials
- Cellulose-based films as barrier materials
- Wood-based recyclable plastics

Policy Suggestions:

- **SUP Directive**
current regulation equalizes fossil-based plastic and wood-based materials -> regulation should support all the efforts to maximize renewable content
- **PPWD**
proposed regulation will increase utilization of fossil-based plastics and logistical emissions -> regulation should emphasize recycled content with minimum emissions



Wood based textile fibers are recyclable and compliments the Sustainable textiles EU strategy



CELLULOSE BASED TEXTILES

Drivers:

- Cotton and fossil based polyester fibers do not fulfil the requirements of EU's sustainable textile strategy
- Consumers demand high quality products from renewable raw material sources produced in a sustainable way

Current situation:

- Several companies are either on pilot scale or demo scale demonstrating their fiber spinning technologies
→ larger investments expected during 2023 – 2030



TEXTILE RECYCLING

Driver:

- Without textile recycling the utilization of fossil based textile fibers will increase drastically
- Textile recycling as a key enabler for EU's Sustainable textile strategy

Gap:

- Missing waste management and recycling systems for discarded clothes
- Incineration will generate CO2 emissions

Current situation:

- Several companies demonstrating their technologies for mechanical and chemical recycling
→ larger investments started already since 2021

Wood based construction materials are carbon storages and enables convertible buildings



LIGNIN-BASED CHEMICALS

- Lignin-based chemicals generate added value and lignin side-streams can be upgraded for many applications. It should not be regarded only as an energy source.
 - Phenolic resins for wood products
 - Dispersant and surface active agent for paints and coatings
 - Thermoplastic material for composites
 - Antioxidant and antimicrobial compounds
 - UV-shielding compounds
 - Energy storages



WOOD BASED INSULATION

- Manufacturing of glass wool and rock wool requires ample of energy
- Although glass wool and rock wool are made by using recyclable raw material those are not made by using renewable raw materials and recycling of them is challenging
- Recyclable wood based fibers are well suited to produce fiber based insulation materials at a much lower CO2 footprint (lower energy demand)
- Wood based additives used to improve hydrophobicity and antibacterial properties for recyclable wood / cellulose fibers

Policy Suggestions:

- EU wide requirement to utilize wood as a construction material e.g. in public buildings
 - > current situation is limiting possibilities to re-purpose buildings
 - > wood building enables energy efficient housing

GREEN ACCELERATOR USE CASES

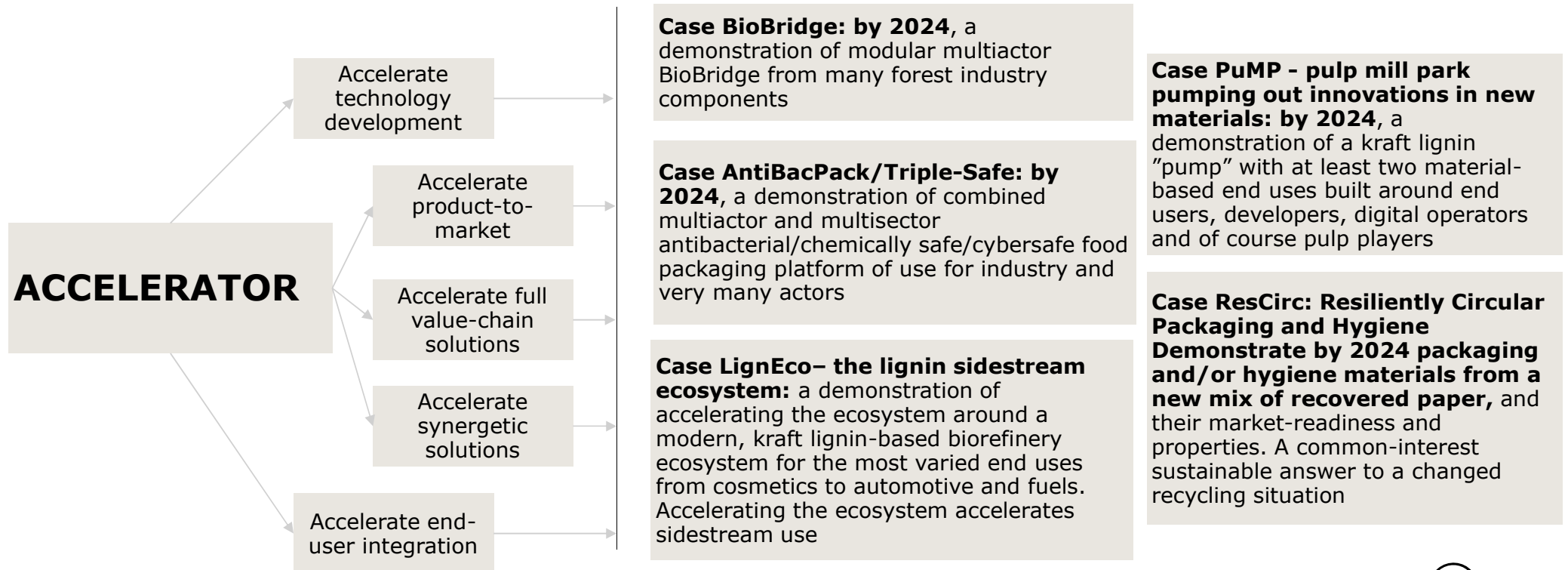
A BALANCED 2024 VIEW

MARCH 2023
DR. PETRI VASARA, VP, AFRY



Synergy as part of a set of use cases

The accelerator roles in different cases overlap, for efficiency, and likewise there are some mutual multiactor/industry benefits built into synergies between the cases



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