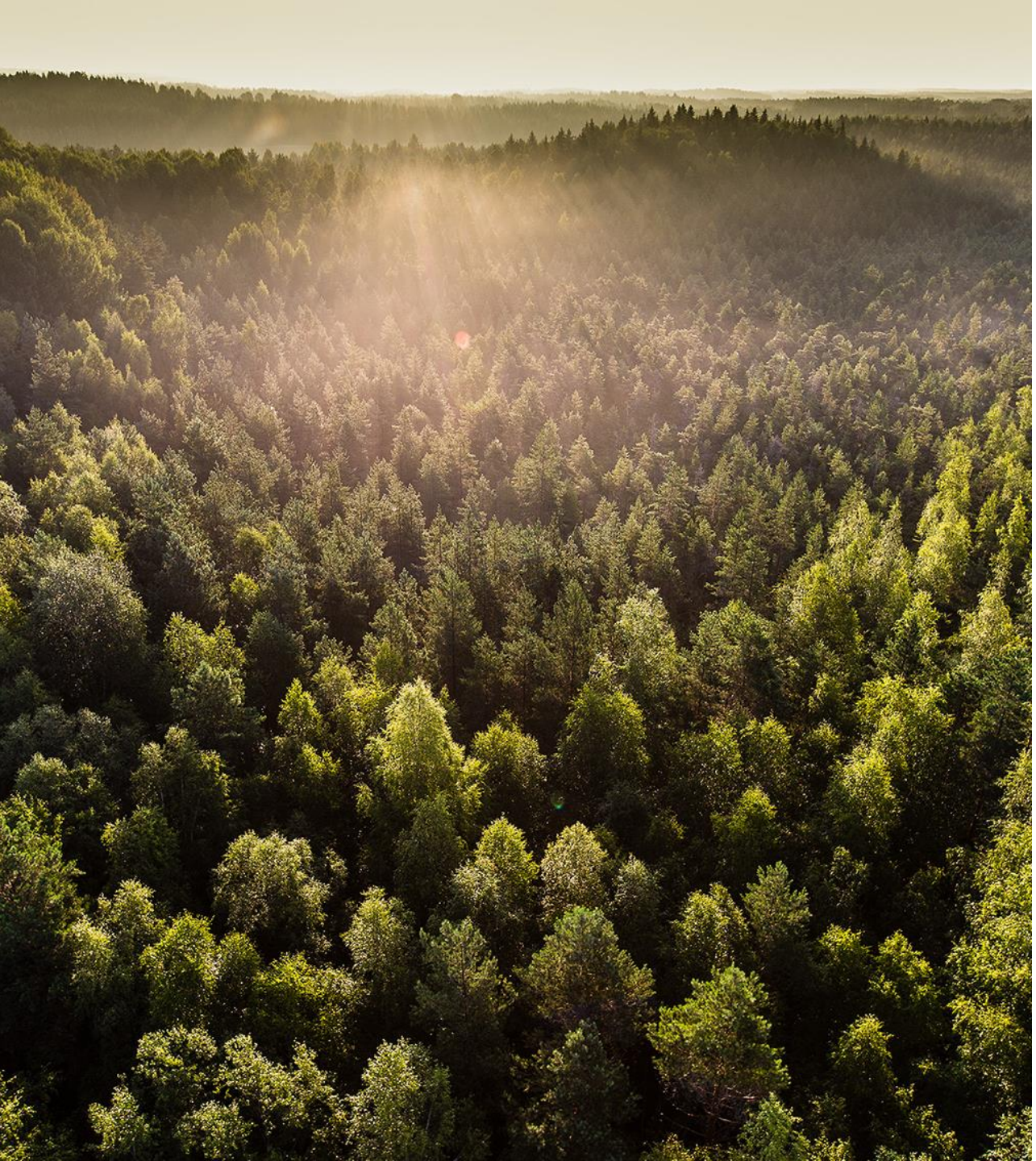

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Stora Enso CEBIPRO seminaari 01.04.2025

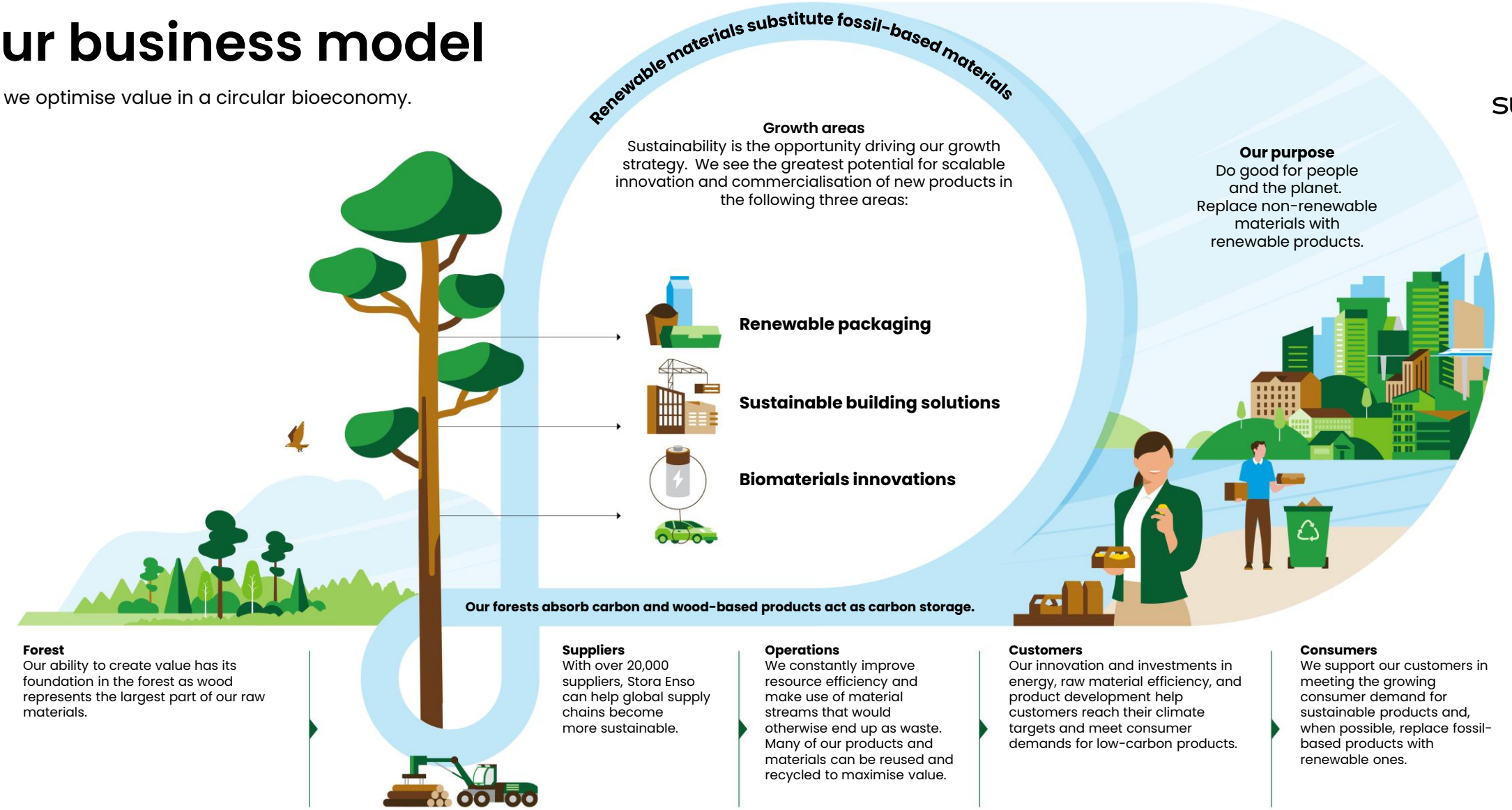
Metsäteollisuuden näkemykset ja tulevaisuuden kehityssuunnat uusissa sellulaaduissa

Mikko Suhonen
Specialist
Packaging Materials IRD
Stora Enso Oyj

The renewable materials company

Our business model

How we optimise value in a circular bioeconomy.



Forest
Our ability to create value has its foundation in the forest as wood represents the largest part of our raw materials.

Suppliers
With over 20,000 suppliers, Stora Enso can help global supply chains become more sustainable.

Operations
We constantly improve resource efficiency and make use of material streams that would otherwise end up as waste. Many of our products and materials can be reused and recycled to maximise value.

Customers
Our innovation and investments in energy, raw material efficiency, and product development help customers reach their climate targets and meet consumer demands for low-carbon products.

Consumers
We support our customers in meeting the growing consumer demand for sustainable products and, when possible, replace fossil-based products with renewable ones.

Stora Enso's products in everyday life

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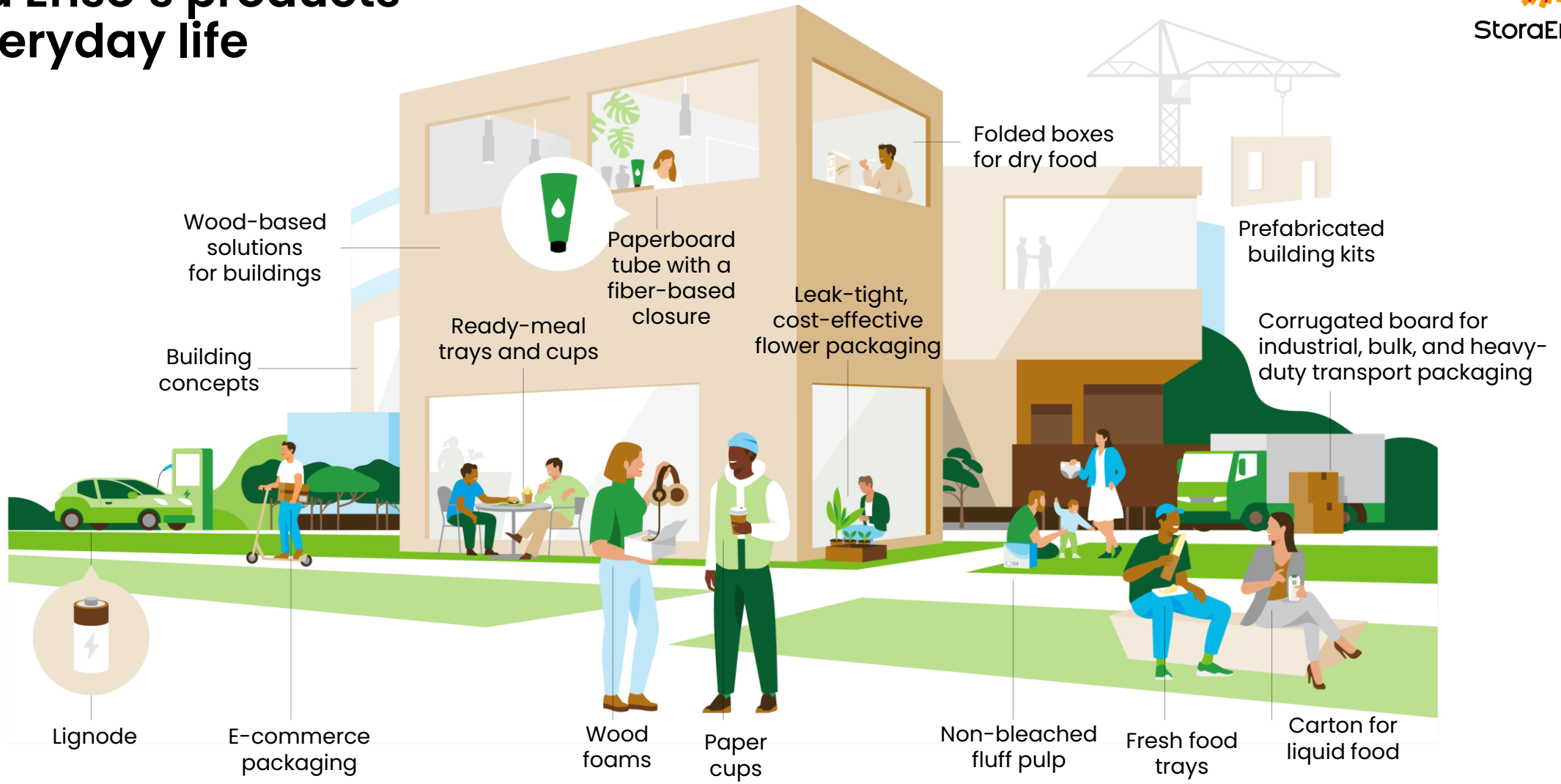

Packaging materials

Leading through innovation and sustainability

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Key innovation drivers

Circularity | Replacing plastics | Reduce CO_2 footprint

Key research areas

Design for Circularity | Barriers | Reduce materials needed

Packaging Materials sustainability ambitions

By 2030

-50%
reduction in absolute emissions (Scope 1,2,3)

100%
Technically recyclable products

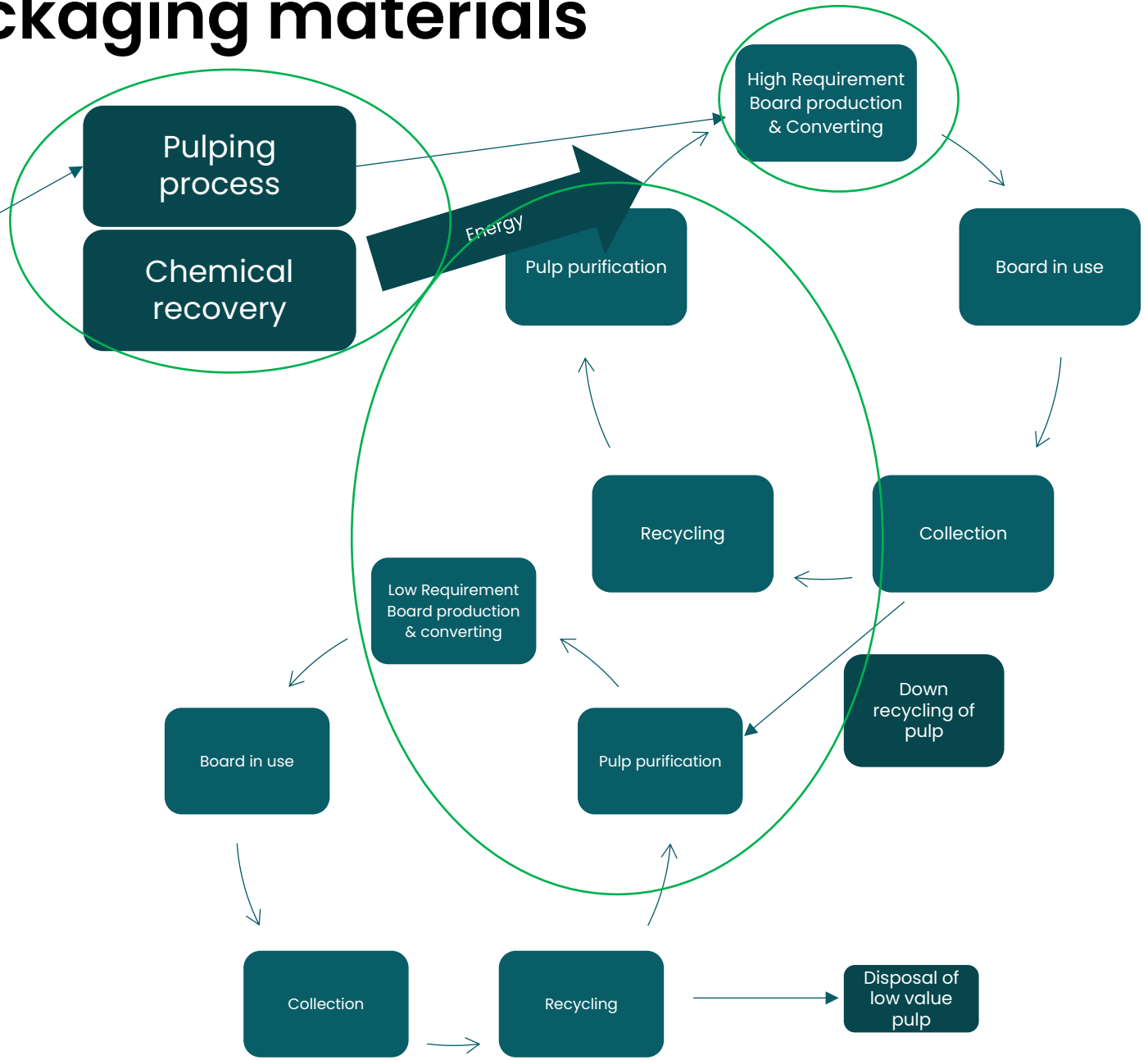
By 2050

Net positive
impact on biodiversity, climate and circularity

100%
regenerative products and solutions

Flowsheet of packaging materials Ideal case

- Material efficiency:
  - Pulping process
  - Board production
    - With MFC increase in material efficiency.
- Recycling
  - High and Low requirement board production



Pulping process
Ways to increase in material efficiency in pulp mill

- Pulping process yield
- By-products to sell vs. energy
- Chemi-Mechanical pulping
- Previous vs. Carbon capture?

Kraft pulping

- Superior:
  - Fibre properties
  - Recovery of chemicals
- Low potential in yield improvement
- Lignin production
  - Better material efficiency?

Mechanical pulp

- High yield
- High bulk
- Strength properties limits the application areas

New pulping processes

- Yield?
- Pulp properties?
  - Application area?
- Chemicals?

New pulping processes
Questions to be answered with iterative method

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Pulping	Chemical recovery	Energy	Target application	System analysis	Product safety and Environment
• Raw material • Chemicals • Yield • Fibre and Pulp properties • Energy need • Water need	• Recovery method and process units • Make-up chemical need and costs	• Energy production method • Energy efficiency • Emissions	• Fibre and Pulp properties	• Mill balance • The benefits of the pulp in the target applications • Comparison to Kraft + mechanical pulp	• Chemical residues and toxicity of the pulp • Recyclability • Emissions

Final words

- Learnings:
  - Do your own math!
    - Excel is a good basic tool for this.
- R&D Project portfolio:
  - Variety of ideas and balancing between them is needed.
  - All ideas do not fly.
- Better material and energy efficiency and recycling leads to:
  - Regenerative board products by 2050!