

redysign

Resource-efficient processes for the production and
circularization of innovative Recyclable-by-Design
fresh meat smart packaging from wood

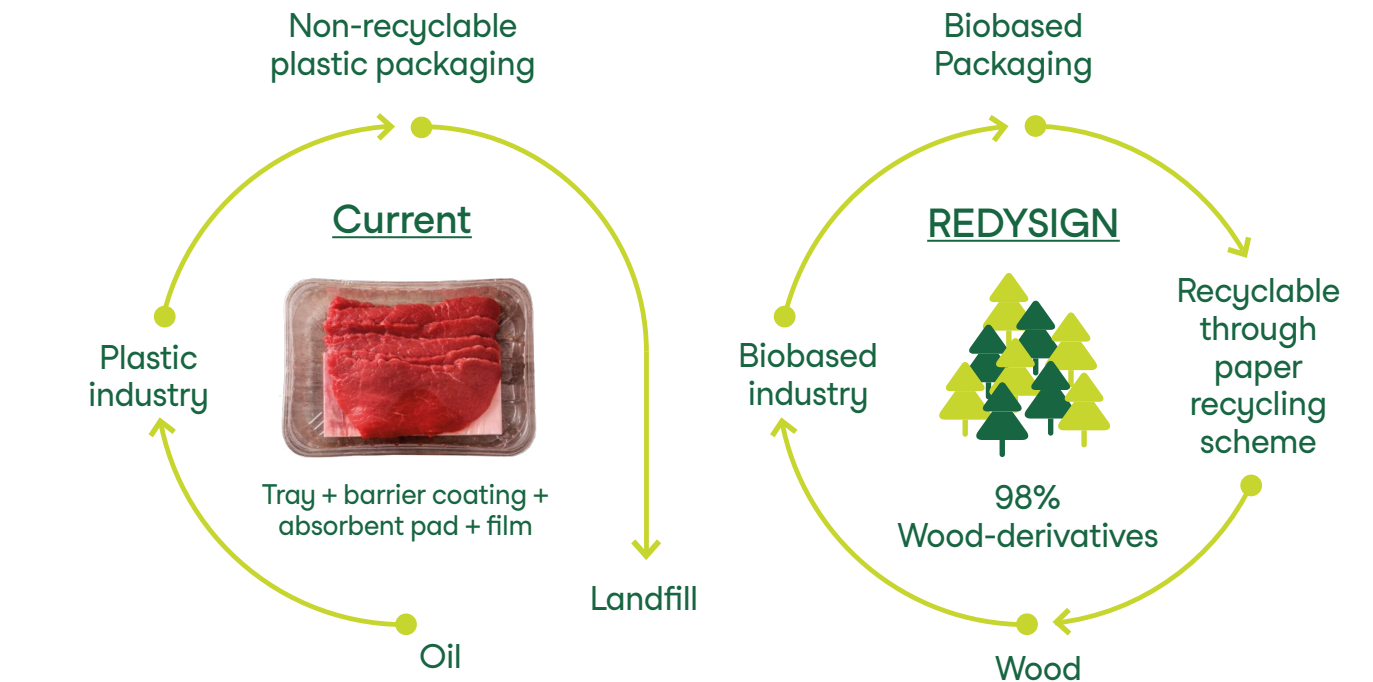
Towards a recyclable, biobased and smart alternative for fresh meat packaging.

REDYSIGN is a major European Research and Innovation action which focuses on the development of several resource-efficient processes dedicated to the production and circularization of a biobased, recyclable, and smart fibre-based packaging (FBP) alternative for fresh meat distribution as a substitute for current non-circular multi-plastic solutions.

REDYSIGN Concept

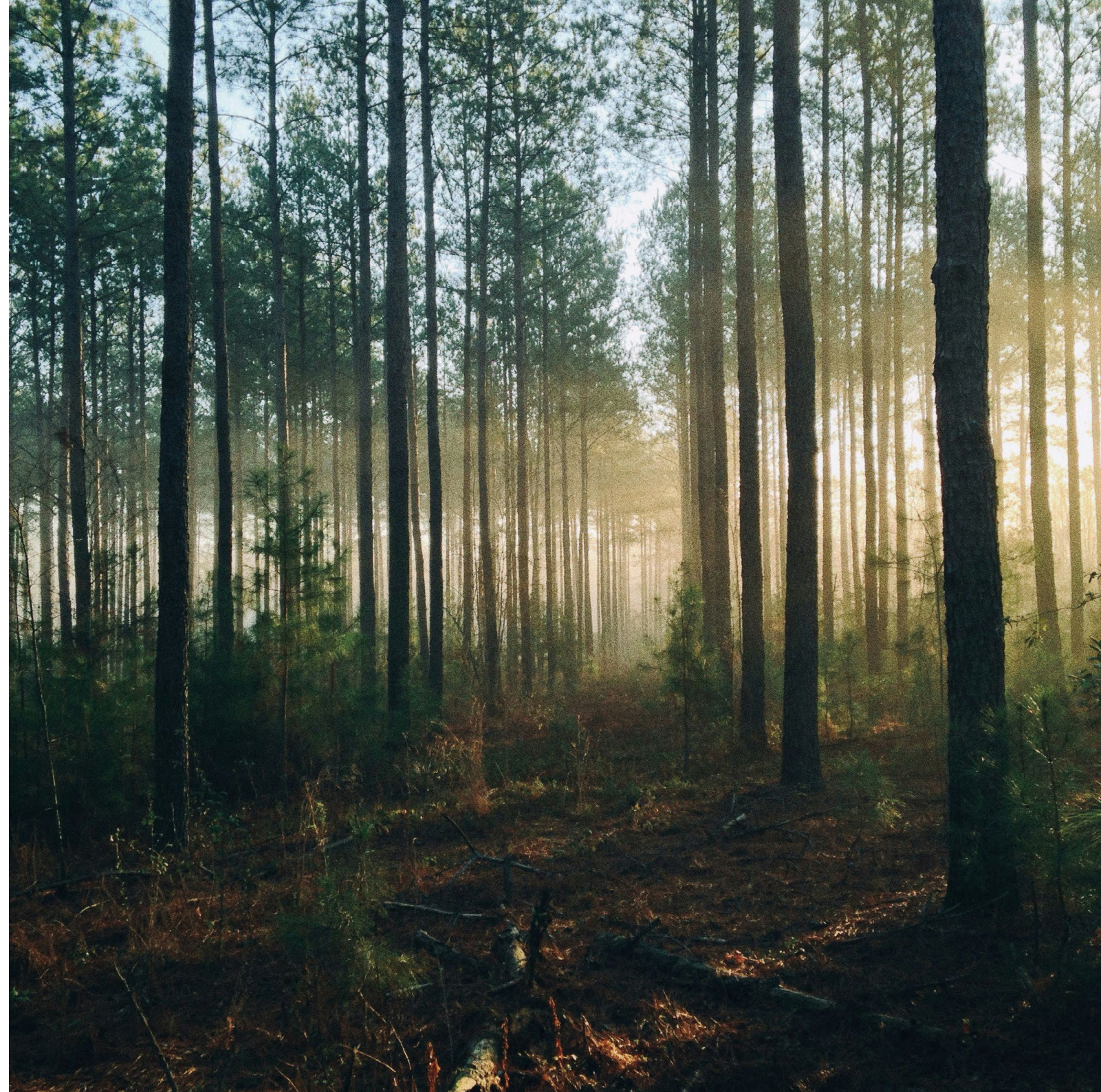
REDYSIGN aims to develop new sustainable bio-based materials to replace the non-circular plastic food packaging products. The project focuses on creating a completely bio-based, smart and recyclable fresh meat packaging solution for which every intermediate product —tray, barrier coating, absorbent pad, and transparent

film— will be almost exclusively wood-based (macro-micro-nanofibres, lignin and sugars). The new packaging solution will incorporate two sensors to prevent food spoilage (one to detect early rotting, one to detect breaks in the cold chain) and an identification marker to improve sorting and thereby increase recycling efficiency.



Objectives

1. Create a circular, recyclable-by-design fresh meat fibre-based packaging (FBP) able to replace non-circular, plastic-made products.
2. Develop innovative resource-efficient processes to produce high-performing lignocellulosic materials (functional fibres and wood constituents) and, out of them, the bio-based intermediate products.
3. Design smart fresh meat FBP that helps reducing food spoilage, improves sorting operations prior to recycling and allows traceability and data management.
4. Formulate an efficient recycling process for FBP contaminated with organic waste and demonstrate the circularity of the new product through the production of new FBP with recycled fibres.
5. Commercialize the solutions, unveiling maximum exploitation potential in other applications and issue guidelines for maximizing recycling of FBP.



Main project innovations

01

Efficient processes for transforming wood into Fibre-based Packaging (FBP)

- Enzymatic pretreatments on softwood chips to reduce the energy consumed in the production of TMP.
- New processes to obtain wood-derived compounds that can be integrated into different parts of fresh meat packaging.
- Technologies for fiber processing with low water consumption (high-consistency functionalization, dry thermoforming).

02

Wood-derived products for fresh meat packaging

- Develop new plastic-free, fully recyclable trays and absorbing pads.
- Create new bio-based barrier coatings able to fulfil barrier requirements.
- Design flexible (lid) films based on lignocellulosic micronanofibers (LCMNF) for FBP.

03

Smart packaging

- Develop two anti-food spoilage sensors and integrate them into the FBP product.
- Design a novel multi-spectral quality assessment system for in-line, real-time characterization of FBP waste.
- Use advanced AI techniques to analyze large data sets from the in-line quality system.

04



More efficient recycling and upcycling technologies for contaminated FBP

- Produce new identification markers and integrate them in the package components, enabling efficient sorting of contaminated FBP.
- Develop new advanced oxidative and enzyme-assisted treatments to increase energy efficiency of recycling process, improve the properties of recycled fibres and valorize the recalcitrant fractions.



Impacts



Environmental

Increase in the circularity rate, significant GHG emissions reduction, and energy and material consumption savings.



Societal

Create new green high qualified jobs and expand the market share for fibre-based packaging.



Economic

Pave the way for the marketability of highly demanded new sustainable packaging products.



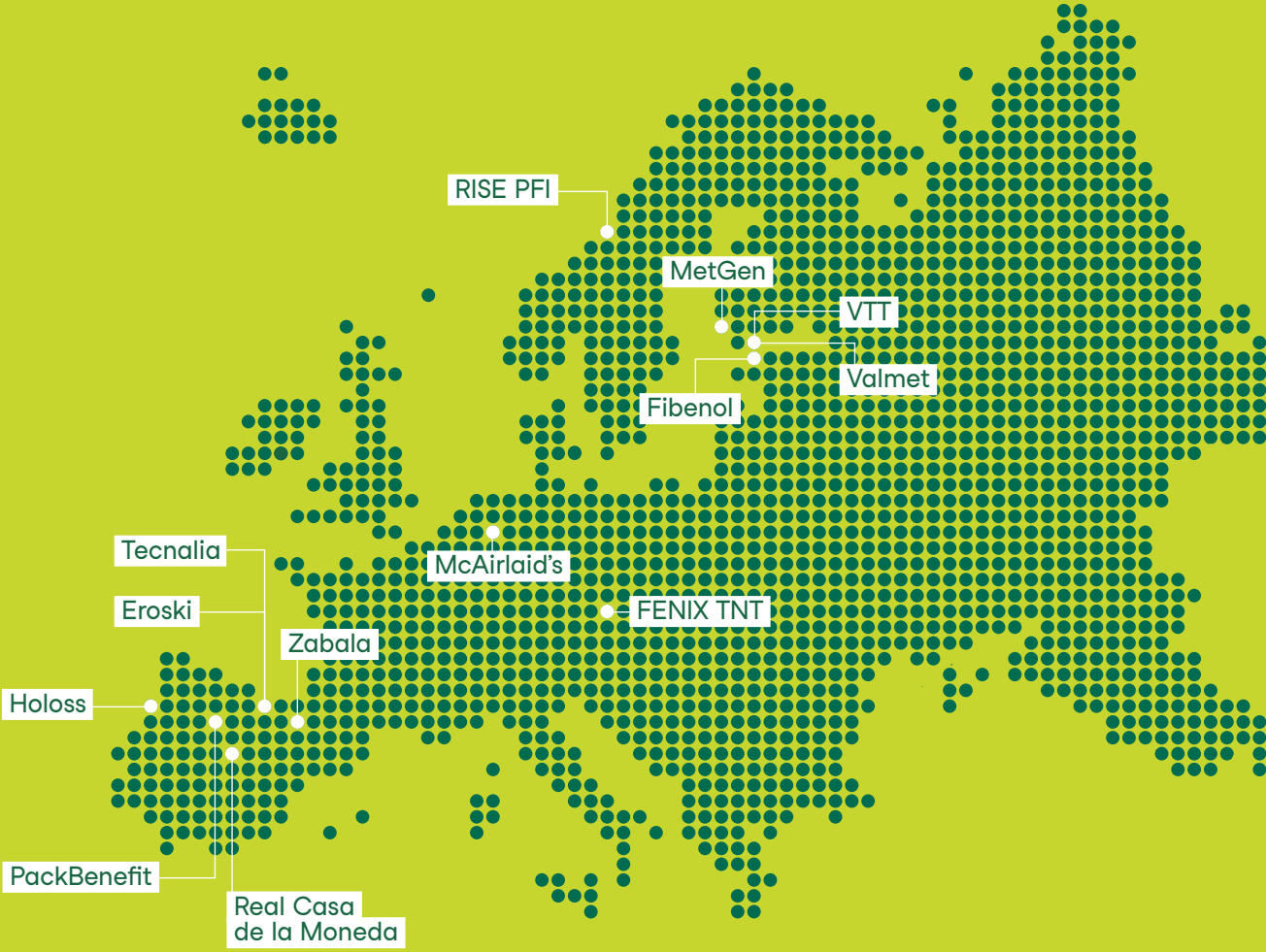
Scientific

Availability of research documentation to the scientific community of the most relevant findings.

Consortium

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About REDYSIGN



13	7	5	4
PARTNERS	COUNTRIES	MILLION EUROS BUDGET	YEARS



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Video
REDYSIGN: Towards a circular-
by-design, biobased alternative
for fresh meat packaging



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Bio-based Industries
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Co-funded by
the European Union

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CBE JU. Neither the European Union nor the CBE JU can be held responsible for them.