R3PACK

REDUCE, REUSE, RETHINK PACKAGING

WP7.2 R3PACK Business Plan

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Deliverable: 7.2 - R3PACK business plan

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INTRODUCTION

R3PACK's Business Plan is a key deliverable for results exploitation. It will be regularly updated; M18 (November 2023), M24 (May 2024) and M36 (May 2025) allowing to finetune the strategy as the results become more concrete. The R3PACK Business Plan will detail the expected results from the project and showcase their benefit for targeted stakeholders (scientific community, food manufacturers, retailers, innovators, etc.), to ensure their exploitation by external actors to the consortium. The defined strategy shall attract new investors, encouraging the uptake of the developed solutions to guarantee their scale up in the European Union (EU).

The current document is the first version, drafting the structure of the future Business Plan once the results will be tangible and quantifiable. The deliverable will describe among other things:

a) The status of R3PACK's collaborations with other European and local projects,to develop appropriate standards for the interoperability of the results obtained

b) The project's overall business model, detailing the costs and benefits for the targeted prospects

c) An analysis of the results' positive enviromental impacts on the market, such as the plastic reduction potential

d) The key actions and success factors to replicate the real-life demonstration phase that will be carried out in a near future in three European countries and about 30 shops

The first version of this deliverable will only provide the framework of the business plan and the anticipated KPIs to measure the impact of the results' exploitation. These will most likely evolve in time. No qualitative nor quantitative information can be given at this stage. However, it will help visualize and comprehend R3PACK's exploitation strategy. The plan will progressibely be completed throughout the project.

EXPECTED RESULTS

R3PACK's objective is to reduce single use plastic packaging for the food industry. Two ways have been identified and are being addressed within the project: substitution and reuse. Depending on the food categories (e.g. light weight products, need for modified atmosphere, …) one option will be favored compared to another. For instance bagged salads will only be addressed by substitution with alternative fibre-based packaging and not reuse, because reusable containers do not allow the necessary breathability of the product and due to the product weight/ratio it is not advisable environmentally speaking. The eligibility of products to one or the other solution are detailed in the deliverable 2.1.

The 3-year project will result in the development of alternative fibre-based packaging for the relevant food categories selected in 2.1 (salad, cheese, cut fruits and vegetables, etc) and optimized reuse schemes for boosting the uptake of reusable offers in retail. These results will be transcribed in following deliverables:

- *D3.4 Decision-support model for reuse logistic network design (M16)*
- *D4.2 Decision-matrix based on materials, barrier combination and application performance evaluation (M16)*
- *D4.5 Process methodology for producing high performance fibre-based, high barrier packaging that can be upscaled for commercialization (M30)*
- *D5.3 Decision tool model / guidelines adapted to the feedback (M36)*
- *D6.4 Guidelines for efficient environmental reuse scenarios (M18/36)*

These are supported by complementary deliverables providing a more systemic perspective on the implementation process of the substitution and reuse solutions.

- *D2.2 Guidelines for promoting behaviour change and social innovation (M24/33)*
- *D3.2 Food safety protocol (M12)*
- *D3.3 Auditing protocol for washing centers (M12)*
- *D4.3 Final assessment report on shelf life, including a shelf life modelling tool with project specific datasets (M22)*
- *D4.4 Evaluation of recycling and compostability analysis (M34)*
- *D6.3 Comparative analysis: LCA of SUBSTITUTION packagings and REUSE loops (M36)*

The deliverables are public, providing to anyone the keys to a successful exploitation of the results. These solutions can disrupt the packaging sector in the food industry, switching consumption behaviors, changing the industrial processes, adapting the in-shop experience and ultimately, allowing to drastically reduce single-use plastic packaging.

I / INTEROPERABILITY OF OBTAINED RESULTS

Funded by the European Union

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HORIZON RESULTS BOOSTER INTEGRATION

The Horizon Results Booster (HRB) is a service by the European Commission that supports Horizon projects in the dissemination of their results. Since end of April 2023, R3PACK is part of the Circular Plastics Cluster composed of 6 other Horizon 2020 and Horizon Europe projects:

Together we form the Circular Plastics cluster, which aims to boost the collection, sorting, cleaning, recycling, manufacturing, reuse and substitution of plastic products, including complex and multilayer materials. Ultimately, this alliance will allow for each member to reach a larger audience, capitalizing on each others network, and obtain a greater resonance of each project's results.

To do so, we will benefit from mutualized communication material, such as a common logo, a video introducing all projects' purposes and complementarity, as well as a factsheet with the same purpose.

At least one joint action such as participating in an event, lauching a social media campaigns or communicating with policy makers and decision makers will be carried out in the framework of this collaboration. It is yet to be determined which option is most relevant for all members.

Finally a Portfolio Dissemination Planning, including the cluster's key outputs & key exploitable results, prioritised stakeholders and dissemination & exploitation actions, will be provided for coherent and cohesive communication campaigns.It will complement R3PACK's current Action Plan for Dissemination and Communication.

COLLABORATION WITH BUDDIE PACK ON REUSE

Buddie Pack https://www.buddie-pack.com/ is a Horizon Europe project, part of the same call for project batch CL6 - 2021 as R3PACK. It's core objective is to develop and demonstrate sustainable strategies for reusable plastic packaging (RPP) in the food and cosmetic/personal care sectors. R3APCK is driven by a similar objective, developping reuse schemes for the food sector, balancing the economic and environmental aspects, to foster reuse uptake accross Europe.

The respective work packages overlap on several subjects:

- Understanding consumers' expectations with regards to RPP, what they find acceptable, and assessing drivers and barriers to behaviour change
- Developing sustainable business-driven strategies offering profitable economic models to RPP
- Ensuring safety, risk management
- Carrying out large scale TRL8 demo trials to validate RPP along the value chains from a technical, economical and social point of view

There are clear synergies, both parties wish to capitalize on for the purpose of boosting reuse. The respective coordinators agreed to regular updates, to allow the projects to build up on each others results.

The respective work on food safety, pillar of a reuse system, has been the collaboration's priority so far. Buddie Pack will assess the functional properties and safety (presence of contaminants, chemical migration, microorganisms…) of reusable packaging after multiple cycles of reuse/cleaning. Based on the results, the cleaning technologies will be optimized to demonstrate the capacity of packaging to remain functional after a certain number of cycles.

Similarly SGS, R3PACK's partner, a world leader in testing, inspection and certification is developping an auditing grid for washing facilities controlling the performance of the process and encouraging the harmonization of best practices among washers to secure a homogeneous level of food safety accros the EU. SGS will also draft a food safety protocol, tested on plastic containers, which assesses the performance and migration of reusable packaging. Both are public deliverables, that will be shared at the end of month 12 – May 2023 with Buddie Pack for them to review and build on R3PACK's first base.

II / BUSINESS MODEL & EXPLOITATION STRATEGY

Funded by the European Union

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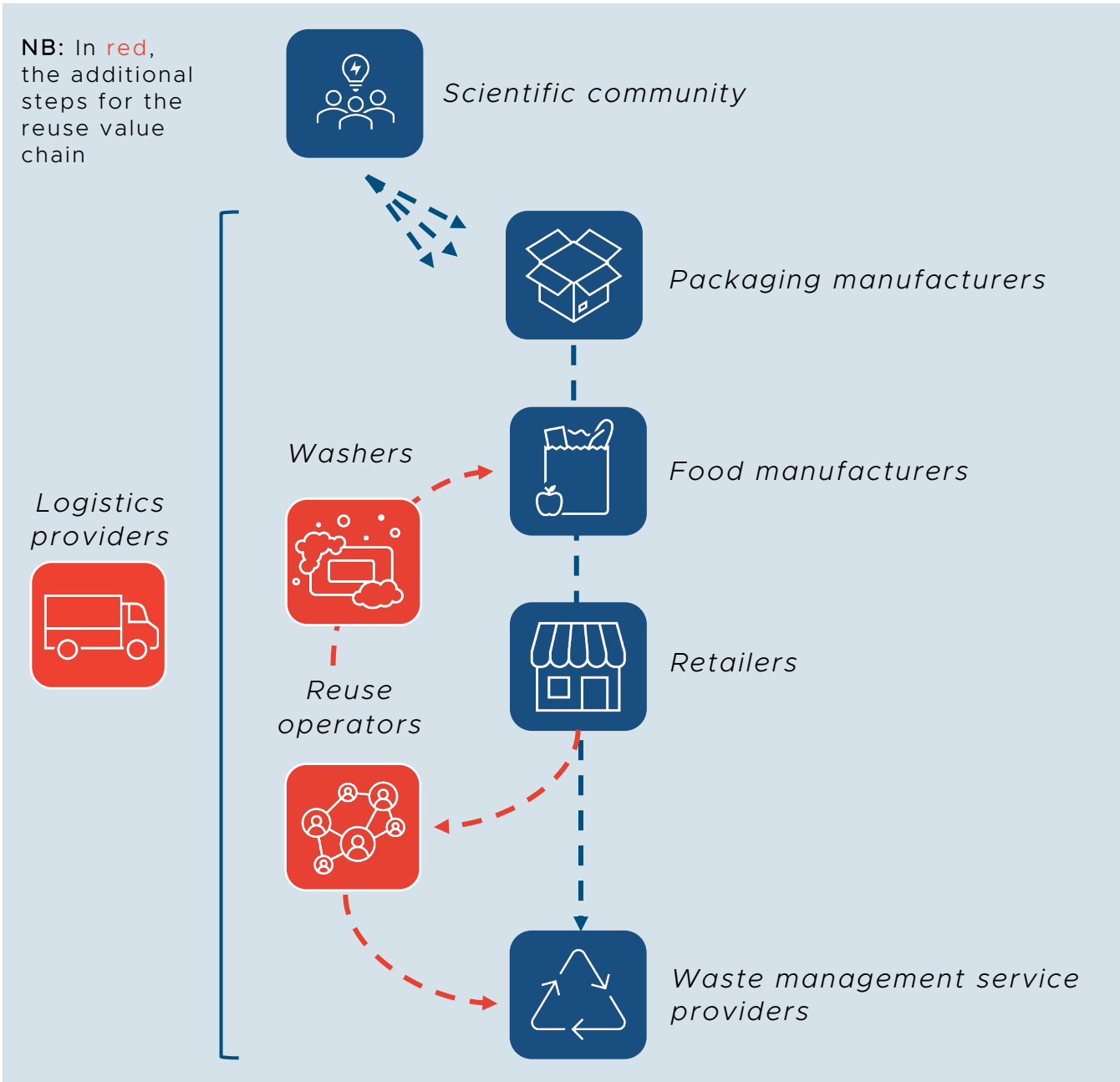
#1

TARGETED STAKEHOLDERS

TARGETED STAKEHOLDERS

The exploitable results, fibre-based packaging alternatives and tried-and-tested reuse models for a large range of food products cover a whole value chain of stakeholders, which can find potential in R3PACK's work. From the scientific community contributing to developing new packaging, to the packaging manufacturer which can expand its product range, to the food manufacturers and retailer able to reduce their plastic footprint and attract new customers. Service providers can also benefit from R3PACK's results, like waste management operators taping into new waste streams as well as reuse and logistics operators growing their client portfolio.



#2

COSTS & BENEFITS PER STAKEHOLDER

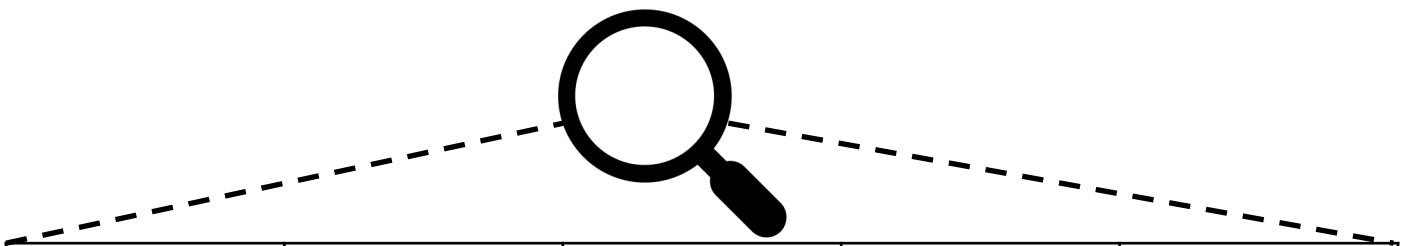
METHODOLOGY

R3PACK has identified 8 main stakeholders along the food sector value chain that are impacted by the goal of reducing single use plastic packaging and thus, could have an interest in the project's outcomes. To showcase the result's intrinsec advantages, but also associated investments for each prospect, a personalized template is summarizing their costs and benefits for:

SUBSTITUTION = fibre-based packaging alternatives

REUSE = reuse scheme models

The investments comprise the capital expenditure (CAPEX: …) and operational expenditure (OPEX: …) specific to each profile. To quickly assess the level of investment required for both solutions, the scale below provides an overview of the expected expenses level based on the capability to implement the solution with currenlty owned resources (equipment, workforce, …). The more additional resources are needed, the higher the expected investment level.



… CITERIA	●●●	●●●	●●●	●●●
NECESSARY INVESTMENTS	Works with existing ressources	Requires adapting some elements of current ressources	Requires the purchase of additionnal ressources	Purchase of a complete line

SCIENTIFIC COMMUNITY

The scientific community comprises research and development institutes, laboratories, universities and any other private or public entity that carries out scientific research in the field of packaging. As an example in R3PACK's consortium: RISE, UNIBO, FRAUNHOFER are considered being part of the scientific community.

NO INVESTMENT

BENEFITS OF SUBSTITUTION

SCIENTIFIC IMPROVEMENTS

The results will contribute to the ongoing research on fibre based packaging alternatives, providing the scientific community with new evidence, results and bibliography to work on. It can be a breakthrough for the research field optimizing the time of scientists or at least giving a new starting point allowing to pinpoint the remaining gaps to fill. Tried-and-tested methodologies by R3PACK can accelerate the process of R&D for other parties.

In the case of substitution, the findings about succesfull and failed combinations of substrates, with several materials and formulations using different types of application methods helps to better grasp the challenges of plastic-free packaging for the food sector.

The results add to the scientific literature:
- Results of processing and behavior of chitosan, PHA, cellulosic materials, MFCs/LMFCs, and more
- LCAs evaluating fibre-based packaging environmental performance
- Consumer behavior and levers with regards to purchasing fibre-based packaging

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NO INVESTMENT

BENEFITS OF REUSE

SCIENTIFIC IMPROVEMENTS

The results will contribute to the ongoing research on fibre based packaging alternatives, providing the scientific community with new evidence, results and bibliography to work on. It can be a breakthrough for the research field optimizing the time of scientists or at least give a new starting point allowing to pinpoint the gaps to fill. Tried-and-tested methodologies by R3PACK can accelerate the process of R&D for other parties.

In the case of reuse, the findings improve the understanding of reuse models success factors and challenges to find an equilibrium between economic and environmental criteria.

The results add to the scientific literature:
- Algorithm calculating the ideal reuse schemes balancing economic and environmental performance
- LCAs evaluating reusable packaging environmental performance
- Consumer behavior and levers with regards to purchasing and returning reusable packaging
- Food safety protocol for reusable containers

PACKAGING MANUFACTURERS

Packaging manufacturers are producing and/or processing (e.g. printing) and selling the packaging to industrials. They provide the finished packaging, such as Gascogne or Guillin within R3PACK's consortium.

INVESTMENT LEVEL

BENEFITS OF SUBSTITUTION

ECONOMIC

- Brand image: number of visits on website or NPS
- New or expansion of income stream: by x% in sales or in revenue or x% more in market share
- New or expansion of client base: x new prospects

ENVIRONMENTAL

- Carbon footprint: reduction rate (tbc by LCA)
- Fossil ressource use: reduction rate

COSTS OF SUBSTITUTION

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the manufacturing line/machine : yes/no, what?
  - ❑ Purchase of new equipment : yes/no, what?
  - ❑ Implementation of a new factory yes/no, what?
- Space: number of additional m2

OPERATIONAL EXPENDITURE

- Raw material costs: x€/T of cellulosic material (vs plastic)
- Labour costs: number of additional personnel
- R&D costs: what expertise + x€/year
- Certification costs (e.g. food contact): x€/new packaging type

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BENEFITS OF REUSE

ECONOMIC

- Brand image: number of visits on website or NPS
- New or expansion of income stream: by x% in sales or in revenue or x% more in market share
- New or expansion of client base: x new prospects

ENVIRONMENTAL

N/A

COSTS OF REUSE

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the manufacturing line/machine : yes/no, what? Price?
  - ❑ Purchase of new equipment : yes/no, what? Price?
  - ❑ Implementation of a new factory yes/no, what? Price?
- Space: number of additional m2

OPERATIONAL EXPENDITURE

- Raw material costs: x€/T of reusable packaging
- Labour costs: number of additional personnel
- R&D costs: what expertise + x€/year
- Certification costs (e.g. food contact): x€/new packaging type

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FOOD MANUFACTURERS

The food manufacturers sell fast consumer goods in the food sector and are the ones that package the food items before sending into retail. These are represented by Agrial, Sodiaal (Candia) and Altho for instance within R3PACK's consortium.

INVESTMENT LEVEL

BENEFITS OF SUBSTITUTION +

ECONOMIC

- Brand image: number of visits on website or NPS
- Sales: increase by x% in sales or in revenue or x% more in market share

ENVIRONMENTAL

- Carbon footprint: reduction rate (tbc by LCA)
- Plastic reduction: x% saved plastic

COSTS OF SUBSTITUTION −

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the conditioning line/machine : yes/no, what? Price?
  - ❑ Purchase of a new conditioning line/machine : yes/no, what? Price?
- Pace: number of pack/minute
- Sealability system: x€ for a x new system
- Space: number of additional m2
- Secondary packaging: x€ for a x new packaging

OPERATIONAL EXPENDITURE

- Packaging costs: x€/m or x€/reel
- Labour costs: number of additional personnel
- Subcontracting costs: x€/x type of service provider
- Marketing costs: x€ budget

R3PACK

FOOD MANUFACTURERS

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INVESTMENT LEVEL

BENEFITS OF REUSE

ECONOMIC

- Brand image: number of visits on website or NPS
- New income stream: increase by x% in sales or in revenue or x% more in market share
- Customer loyalty: returning customers
- Saved packaging purchase: € saved per packaging not purchased

ENVIRONMENTAL

- Carbon footprint: reduction rate (tbc by LCA)
- Rotation rate: number of rotations per packaging
- Plastic reduction: x% saved plastic

COSTS OF REUSE

CAPITAL EXPENDITURE

- Packaging pool: €/reusable packaging
- Type of industrial change:
  - ❑ Adaptation of the conditioning line/machine : yes/no, what? Price?
  - ❑ Purchase of a new conditioning line/machine : yes/no, what? Price?
- Pace: number of pack/minute
- Sealability system: x€ for a x new system
- Space: number of additional m2
- Secondary packaging: x€ for a x new packaging

OPERATIONAL EXPENDITURE

- Additional packaging costs: x€/ additional reusable packaging if the return rate is too low
- Labour costs: number of additional personnel
- Subcontracting costs: x€/x type of service provider (transport, logistics, washing, ...)
- Marketing costs: x€ budget

R3PACK

RETAILERS

Retailers distribute the consumer goods to the end consumers. Within R3PACK the Beneficiaries Carrefour and Système U represent that stakeholder.

INVESTMENT LEVEL

BENEFITS OF SUBSTITUTION

ECONOMIC

- Brand image: number of visits on website or NPS
- Sales: increase by x% in sales or in revenue or x% more in market share

ENVIRONMENTAL

- Carbon footprint: reduction rate (tbc by LCA)
- Plastic reduction: x% saved plastic

COSTS OF SUBSTITUTION

CAPITAL EXPENDITURE

- Type of merchandising change:
  - ❑ Adaptation of shelving yes/no, what? Price?
  - ❑ Re-arrangement/Purchase of shelving: yes/no, what? Price
- Space: number of additional m2

OPERATIONAL EXPENDITURE

- Labour costs: number of additional personnel
- Marketing costs: x€ budget
- Merchandising costs: x€ budget
- Higher turnover costs (shorter shelf-life products)
- Alternative packaging cost: €/packaging

RETAILERS

Retailers distribute the consumer goods to the end consumers in shops. Within R3PACK the Beneficiaries Carrefour and Système U represent that stakeholder.

INVESTMENT LEVEL

BENEFITS OF REUSE

ECONOMIC

- Brand image: number of visits on website, shops, or NPS
- Sales: increase by x% in sales or in revenue or x% more in market share
- Customer loyalty: returning customers

ENVIRONMENTAL

- Carbon footprint: reduction rate (tbc by LCA)
- Plastic reduction: x% saved plastic

COSTS OF REUSE

CAPITAL EXPENDITURE

- Type of merchandising change:
  - ❑ Adaptation of shelving yes/no, what? Price?
  - ❑ Re-arrangement/Purchase of shelving: yes/no, what? Price?
  - ❑ Purchase of collection equipement (RVM, …) yes/no, what? Price?
- Space (e.g. shelving, collection place, storage space): number of additional m2
- Secondary packaging: x€ for a x new packaging

OPERATIONAL EXPENDITURE

- Labour costs: number of additional personnel
- Training costs: x€/employee
- Subcontracting cost: x€/x service provider (transport, logistics, washing, …)
- Marketing costs: x€ budget
- Merchandising costs: x€ budget

REUSE OPERATORS

Reuse operators are versatile, they can provide reverse vending machines, take care of the packaging traceability and overall logistics of the reuse loop. This type of stakeholder is only relevant for reuse and is not part of R3PACK, but will be contracted with for the sake of the demonstration phase.

INVESTMENT LEVEL

BENEFITS OF REUSE

ECONOMIC

- Brand image: number of visits on website or NPS
- Expansion of income stream: by x% in sales or in revenue or x% more in market share
- Expansion of client base: x new prospects

ENVIRONMENTAL

- N/A

COSTS OF REUSE

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the return systems/equipment yes/no, what? Price?
  - ❑ Purchase of new return systems/equipment: yes/no, what? Price?
- Traçability system investment: €/system
- Packaging pool purchase: €/packaging

OPERATIONAL EXPENDITURE

- Labour cost: number of additional personnel
- Subcontracting cost: x€/x service provider
- R&D costs: what expertise + x€/year
- Additional packaging costs: x€/ additional reusable packaging if the return rate is too low

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WASHERS

Washers are industrial plants that can procress the washing of several types of packaging. They have an obligation of result regarding the food safety of the packaging coming out their washing machines. This type of stakeholder is only relevant for reuse and is not part of R3PACK, but will be contracted with for the sake of the demonstration phase.

INVESTMENT LEVEL

BENEFITS OF REUSE

ECONOMIC

- Brand image: number of visits on website or NPS
- Expansion of income stream: by x% in sales or in revenue or x% more in market share
- Expansion of client base: x new prospects

ENVIRONMENTAL

- Water use : L of water used/packaging (tbc by LCA)
- Carbon footprint: reduction rate (tbc by LCA)

COSTS OF REUSE

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the washing line/machine to new packaging types: yes/no, what? Price?
  - ❑ Purchase of a new washing line/machine: yes/no, what? Price?
  - ❑ Implementation of new plant: yes/no, what? Price?
- Space: number of additional m2
- Pallet forming system: x€

OPERATIONAL EXPENDITURE

- Energy costs: x€/Wh
- Water costs: x€/L
- Labour cost: number of additional personnel
- Subcontracting cost: x€/x service provider

WASTE MANAGEMENT SERVICE PROVIDERS

Waste management service providers collect, sort out and recycle specific waste streams. Their activities will vary from country to country depending on the existing sorting and recycling infrastructures. They are not Beneficiaries of R3PACK.

INVESTMENT LEVEL

BENEFITS OF SUBSTITUTION

ECONOMIC

- New income (new waste streams): x€/T of material

ENVIRONMENTAL

- Regenerated material yield: % of recovered cellulose

COSTS OF SUBSTITUTION

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Adaptation of the sorting/recycling line: yes/no, what? Price?
  - ❑ Purchase of a new equipment: yes/no, what? Price?
  - ❑ Implementation of sorting/recycling plant: yes/no, what? Price?

OPERATIONAL EXPENDITURE

LOGISTICS OPERATORS

Logistics operators provide transport services at any point in the value chain. This stakeholder is not part of R3PACK's consortium.

INVESTMENT LEVEL

BENEFITS OF SUBSTITUTION

ECONOMIC

N/A

ENVIRONMENTAL

N/A

COSTS OF SUBSTITUTION

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Modernization of fleet:
  - ❑ yes/no, what? Price?
  - ❑ Purchase of new fleet: yes/no, what? Price?
- Space: number of additional m2

OPERATIONAL EXPENDITURE

- Energy costs: x€/m or x€/reel
- Labour costs: number of additional personnel

LOGISTICS OPERATORS

Logistics operator provide transport services at any point in the value chain. This stakeholder is not part of R3PACK's consortium.

INVESTMENT LEVEL

BENEFITS OF REUSE

ECONOMIC

- Expansion of income stream: by x% in sales or in revenue or x% more in market share
- Expansion of client base: x new prospects

ENVIRONMENTAL

N/A

COSTS OF REUSE

CAPITAL EXPENDITURE

- Type of industrial change:
  - ❑ Modernization of fleet:
  - ❑ yes/no, what? Price?
  - ❑ Purchase of new fleet: yes/no, what? Price?
- Space: number of additional m2
- Secondary packaging: x€ for a x new packaging

OPERATIONAL EXPENDITURE

- Energy costs: x€/m or x€/reel
- Labour costs: number of additional personnel

III / POTENTIAL MARKET REACH & IMPACT

Funded by the European Union

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MARKET SIZE & IMPACT FORECAST

HYPOTHESES PENETRATION RATE:

- Chips & savoury biscuits:
- Bagged salads:
- Butter:
- Cheese:
- In-shop products:
- Juices:
- Milk:
- Prepared salads:
- Savory biscuits:
- Soups:
- Unprocessed fruits & vegetables:
- Yoghurt:
- Sweet biscuits:
- Cholocate & baking inredients:
- Fruits puree:
- Pastry dough:
- Cider, beer & soda:
- Processed meat:

A TEMPLATE TO SHOWCASE THE MARKET REACH POTENTIAL:

Food category

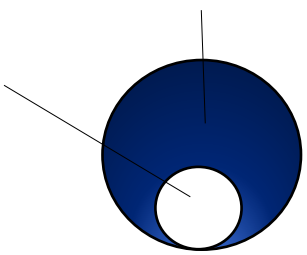
Industrials part of R3PACK

ALTHO

europe snacks

EU's market share for a specific food category

R3PACK Industrial's market share for a specific food category



	2025	2030	2040	
PENETRATION RATE	X%	X%	X%	← Substitution
PENETRATION RATE	X%	X%	X%	← Reuse

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MARKET SIZE & IMPACT FORECAST

HYPOTHESES PLASTIC REDUCTION:

According to the defined penetration rate and the estimated plastic consumption of the industrials for a specific food category, we calculate the potential plastic reduction rate in 2025 when the demonstration will have ended and the upscale begins. Then we forecast the progress made by 2030 and 2040.

Based on the assumptions made for the industrials that are part of the consortium, we extrapolate the potential plastic reduction rate to the whole market of the concerned food category.

A TEMPLATE TO SHOWCASE THE PLASTIC REDUCTION POTENTIAL:

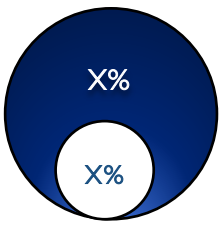
X tons of packaging purchased/year by R3PACK's industrials T

		2025	2030	2040
Potential plastic reduction rate achievable with substitution for R3PACK's industrials on a specific food category →	**PLASTIC REDUCTION RATE**	X%	X%	X%
Potential plastic reduction rate achievable for the whole European Market on the specific food category →	**PLASTIC REDUCTION** EU market	X%	X%	X%
Potential plastic reduction rate achievable with reuse for R3PACK's industrials on a specific food category →	**PLASTIC REDUCTION RATE**	X%	X%	X%
Potential plastic reduction rate achievable for the whole European Market on the specific food category →	**PLASTIC REDUCTION** EU market	X%	X%	X%

R3PACK

COVERED MARKETS & IMPACT FORECAST

MARKET SIZE
(in % of consumer units sold)

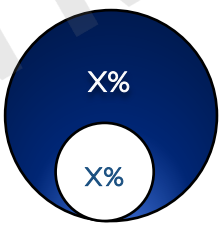


ALTHO
europe snacks

X tons of packaging purchased/year by R3PACK's industrials

	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

MARKET SIZE
(in % of consumer units sold)



Florédale
LAITERIE DE SAINT DENIS DE L'HOTEL

X tons of packaging purchased/year by R3PACK's industrials

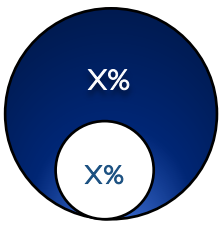
	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

COVERED MARKETS & IMPACT FORECAST

candia

MARKET SIZE
(in % of consumer units sold)



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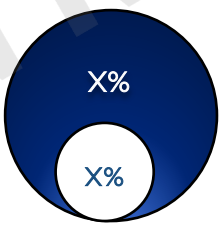
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

candia

EntreMont

MARKET SIZE
(in % of consumer units sold)



X

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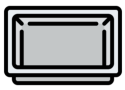
R3PACK

COVERED MARKETS & IMPACT FORECAST



Carrefour

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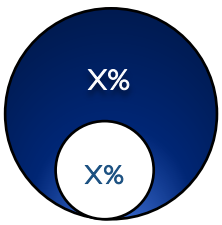
MARKET SIZE
(in % of consumer units sold)



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PLASTIC REDUCTION EU market	X%	X%	X%

Florédale

LAITERIE de SAINT DENIS de L'HOTEL

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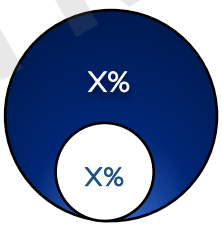

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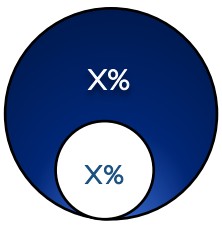
R3PACK

COVERED MARKETS & IMPACT FORECAST

candia

LAITERIE de SAINT-DENIS de L'HÔTEL

MARKET SIZE
(in % of consumer units sold)



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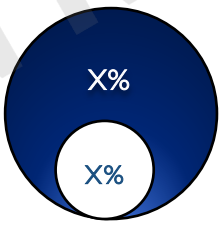
PLASTIC REDUCTION EU market	X%	X%	X%

Florédale
UNE ENTREPRISE DU GROUPE AGRIAL

LAITERIE de SAINT-DENIS de L'HÔTEL

MARKET SIZE
(in % of consumer units sold)



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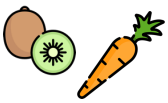
R3PACK

COVERED MARKETS & IMPACT FORECAST



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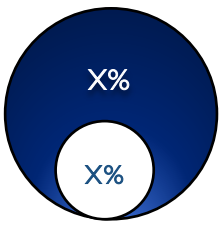

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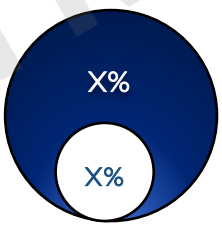

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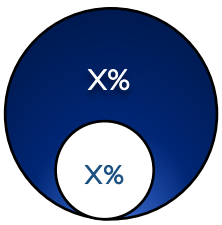
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

COVERED MARKETS & IMPACT FORECAST

MARKET SIZE
(in % of consumer units sold)



Schreiber

yoplait

X tons of packaging purchased/year by R3PACK's industrials

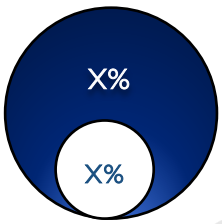
	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

ADDITIONAL MARKETS REACHED

R3PACK has already started expanding the food manufacturers' base to reach other markets. It will pursue these efforts trhouhout the lifetime of the project.

MARKET SIZE
(in % of consumer units sold)

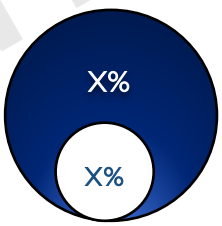


GROUPE SAVENCIA Saveurs & Spécialités

X tons of packaging purchased/year by R3PACK's industrials

	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

MARKET SIZE
(in % of consumer units sold)



GROUPE SAVENCIA Saveurs & Spécialités

X tons of packaging purchased/year by R3PACK's industrials

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PENETRATION RATE	X%	X%	X%
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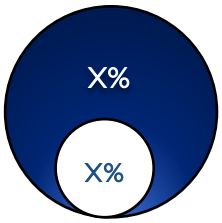
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

ADDITIONAL MARKETS REACHED

MARKET SIZE
(in % of consumer units sold)



Cérélia

X

tons of packaging purchased/year by R3PACK's industrials

	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

MARKET SIZE
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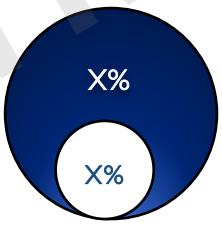


BOUVARD

X

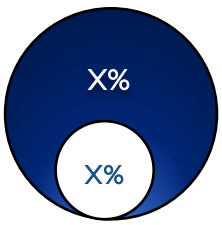
tons of packaging purchased/year by R3PACK's industrials

	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

ADDITIONAL MARKETS REACHED

MARKET SIZE
(in % of consumer units sold)

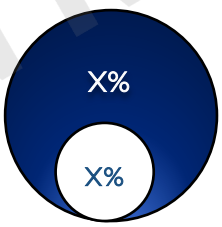


AGRIAL
Cultiver nos racines, ouvrir au monde

X tons of packaging purchased/year by R3PACK's industrials

	2025	2030	2040
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%
PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

MARKET SIZE
(in % of consumer units sold)



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PENETRATION RATE	X%	X%	X%
PLASTIC REDUCTION R3PACK	X%	X%	X%
PLASTIC REDUCTION EU market	X%	X%	X%

R3PACK

OTHER MARKET OPPORTUNITIES

The targeted food categories are representative of the Beneficiaries' products. However, their potential to expand the market reach within these food categories. Moreover, the developped solutions are also suited for other type of foods. The barrier properties and shelf-life might vary, but R3PACK has focused on some of the most challenging foods, requiring high protection from water vapour and oxygen, but also resistance to heat or humid environments and holding up to three years on a shelf. Therefore, one should first **capitalize on expanding these solutions in the retail food market** for: other fruits and vegetables, dry foods (cereal and legume products), fish, etc

X%

of sector's weight out of total plastic waste in EU

Major actors of interest:

Unilever, Coca-Cola, DANONE, Heineken, Mondelēz International

To upscale the reuse models and fibre-based packaging alternatives other means should also be considered. By transfer of technology, the developped solutions could be applied for products from other sectors than the food industry. For instance, fast consumer goods such as **cosmetics, skincare or home care** face the same challenges in terms of reduction of single-use plastic packaging. They share similar type of packaging and barrier requirements (grease, oil, water, oxygen), which makes them good candidates for adopting some of the developped fibre-based alternatives, but also the reuse models since they follow alike distribution channels. However, these products are usually known for having a long shelf life (up to 3-years) and are sold worldwide. The solutions might need improvement in view of these new constraints.

X%

of sector's weight out of total plastic waste in EU

Major actors of interest

L'ORÉAL OPERATIONS, Johnson&Johnson, LVMH, Mustela, P&G, Groupe L'OCCITANE

R3PACK

IV / REPLICATION MODEL FOR DEMONSTRATION

Funded by the European Union

This project has received funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No 101060806.

TARGETED VALUE CHAIN MODEL FOR THE REUSE DEMONSTRATION

The value chain for the reuse real-life demonstration is disrupting the the usual industrial process. Packaging manufacturers need to produce suitable packaging to resist several loops and guaranteeing food safety. Then food manufacturers need to adapt or buy new conditioning lines to be able to run the reusable packaging (e.g. different dimensions, quantities, materials, rigid vs flexible packaging,….) and refill them at every rotation. As the format and weight of the new packaging references are different from the standards, new secondary packaging might have to be developped. The transportation means also might not be able to carry an equivalent amount of products, thus the logistics have to be reviewed. Once the end product is prepared, retailers need to adapt their communication, shelving and most importantly in this case the collection point. How will the customer return their packaging? What will be the incentive to boost the return rate? If there is a monetary incentive, how to deal with the financial flows? How to implement a traceability system that is sufficient to obtain relevant data and guarantee the consumers safety. Mutliple questions need to be answered by the reuse scheme. After the return of the reusable packaging, a reverse logistic or dedicated logistic need to be put in place to transport the dirty containers to a washing center. These need to be food contact coming out of the cleaning process, meaning suitable for consumption. Finally, the food manufacturers will received the washed packaging and refill them to launch a new loop.

R3PACK

CHECKLIST FOR INDUSTRIALS TO PREPARE FOR THE REUSE DEMONSTRATION

R3PACK is working on the first phase of demonstration for reusable packaging. According to the targeted reuse model, a specific checklist for industrials has been prepared, including 'industrialization ', 'logistics' and 'on pack-communication' key tasks. As this preparation phase is still ongoing, as well as the definition of the model, the checklist is not exhaustive and only highlights the main elements identified so far. These are some of the key actions to be carried out by industrials when launching a real-life demonstration in retail shop for food items. The list wil be completed throughout the lifetime of the demonstration.

Typology	Tasks to anticipate internally to your organization
Industrialization	Select potential packaging per product categories (all materials) to do conditioning test
Industrialization	Contact packaging providers to get samples
Industrialization	Communication of a list of product references EAN
Industrialization	Launch conditioning test with packagings identified and the process you want to implement for demonstrator
Industrialization	Determine production volume capacity / estimate volume constraints
Industrialization	Launch ageing tests
Industrialization	Order packaging for phase 1
Industrialization	Validate/invalidate the packaging use per reference/product category
Industrialization	Get results from conditioning tests
Industrialization	Get result ageing tests
Industrialization	Contact shops to validate delivery specifications, frequency and secondary packaging
Industrialization	Order packaging for phase 2
Logistics	Determine modalities of delivery with retailers (with or without distribution center)
Logistics	Establish secondary packaging with retailers
Logistics	Determine modalities of return flow with operator
On-pack communication	Contact marketing team to make sure they are aware of the pilot phase and new reference implementation
On-pack communication	Establish internally whether or not you change the "classic" label
On-pack communication	Identify washable label provider
On-pack communication	Validate common specific label
On-pack communication	Create new "classic" label - need to be washable
On-pack communication	Order common specific label
On-pack communication	Create with marketing label for reusable reference (EAN included)
On-pack communication	Order "classic" label for reusable reference
Service provider contractualization	Service provider choices
Service provider contractualization	Contact legal services
Service provider contractualization	Establish contract
Service provider contractualization	Contract review
Service provider contractualization	Contract signature

CHECKLIST FOR RETAILERS TO PREPARE FOR THE REUSE DEMONSTRATION

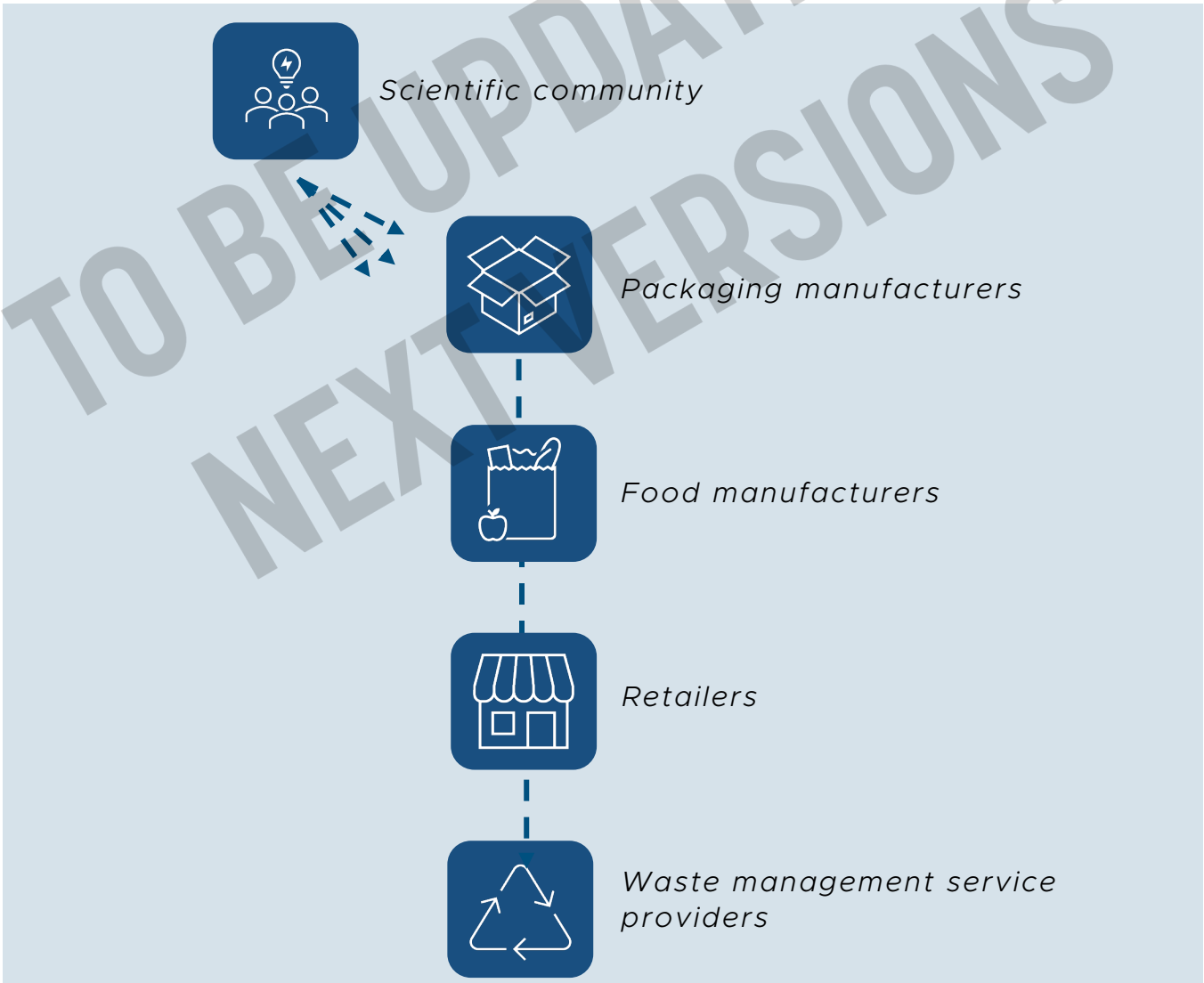
R3PACK is working on the first phase of demonstration for reusable packaging. According to the targeted reuse model, a specific checklist for retailers has also been prepared, including 'logistics', 'product referencement', 'service provider contractualization', 'shop mobilization' and 'shop organization'on key tasks. As this preparation phase is still ongoing, as well as the definition of the model, the checklist is not exhaustive and only highlights the main elements identified so far. These are some of the key actions to be carried out by retailers when launching a real-life demonstration in retail shop for food items. The list wil be completed throughout the lifetime of the demonstration.

Typology	Tasks to anticipate internally to your organization
Logistics	Estimate with DC the min volumes required to be referenced at a DC
Logistics	Determine modalities of delivery with shops and industrials (with or without distribution center)
Logistics	Validate secondary packaging with retailers
Logistics	Determine collect specifications with operator
Product referencement	Product reference prioritization
Product referencement	Communicate volumes per reference
Product referencement	Creation of references at shop level (EAN with product price and packaging price)
Service provider contractualization	Service provider choice
Service provider contractualization	Contact juridic services
Service provider contractualization	Establish contract
Service provider contractualization	Contract review
Service provider contractualization	Contract signature
Shop mobilisation	Validate the mobilization of 3 shops for phases 1 & 2
Shop mobilisation	Validate the mobilization of 15 shops (in total) for phase 3
Shop organization	Contact merchandising team for phases 1 & 2
Shop organization	Determine monetary deposit specifications with operator
Shop organization	In-shop communication material
Shop organization	Determine merchandising plan
Shop organization	RVM location choice
Shop organization	RVM installation

R3PACK

TARGETED VALUE CHAIN MODEL FOR THE SUBSTITUTION DEMONSTRATION

The value chain for the substitution real-life demonstration is seamingly the same as the usual industrial process. In this case the scientific community develops the new fibre-based packaging, which once tested and validated according the food manufacturers specifications, are then produced at large scale by the packaging manufacturer. The packaging alternatives are delivered to the food manufacturers, which they run on their conditioning lines to package the food. Finally, these are distributed at retail shops and are ready to be bought by the end-consumer. Once used, the packaging can be thrown away in the recyclable bin to be recycled in the paper stream.



EXPERIMENTATION PROTOCOL FOR INDUSTRIALS TO PREPARE FOR DEMONSTRATION

For a food manufacturer the substitution's neuralgic aspect is validating the machinability.
Once the necessary barrier properties (grease, water-vapour, oxygen, …) to preserve the food in a reasonable timeframe are validated, the substrates need to be tested on machine lines. The challenge is to reach similar industrial conditions as with plastic packaging (e.g. same cadency, no ripping, good sealability, etc). However, paper and cardboard are not always suited to the machines used by food manufacturers. In the contrary these have been optimized for plastic and run at high speed, whereas the fibre-based substrates are known for being more sensitive to mechanical tensions; they behave differently as they are more rigid. Therefore, a key aspect of the demonstration will consist in testing the solutions on machines lines to determine the optimal parameters to successfully package the food, but also guarantee the economic feasability (e.g. not reducing too drastically the production pace).

For that purpose R3PACK has developped a common experiment protocol for the project's food manufacturers. It lays down a thorough methodology that aims to optimize the timing of machine tests by detailing the common key steps to take and identifying the potential for mutualization among the industrials.

Experiment protocol for machinability testing of fibre-based solutions in Appendix.

Beyond machinability, other aspects such as the shelf-life have to be considered. Alternative solutions might not provide the same longevity, therefore performing shelf life test to compare are essential. To do so, the exact expected barrier properties for a product have to be known, which is not always the case. Industrial's refer to the intrinsec properties of plastic which are not reflecting the needs of the product. Therefore R3PACK's partner Fraunhofer is conducting shelf life simulations to determine the barrier requirements of the products. It is also the opportunity to challenge and compromise on the minimal shelf-life expected by consumers and by extension retailers.

The above recommendations are specific to not yet commercially available fibre-based packaging.

CONCLUSION

R3PACK will issue two main exploitable results for academia, as well as business actors. Those are the developed reuse schemes and fibre-based packaging alternatives.

This document provides a first overview of what R3PACK's Business Plan will look like at the end of the project, in May 2025. The ultimate goal is to communicate the underlying opportunities of each key result to ensure their upscale at the European level.

So far, R3PACK has started collaborating with alike European projects to create synergies and expand the reachable audience.

Identify the main cost items and model the potential reduction impact

The business model and exploitation strategy draft the anticipated KPIs to measure the costs and benefits for each identified stakeholder impacted by the expected results.

Based on interviews and additional market research, R3PACK will then be able to measure the expected environmental impact per targeted food category, namely the potential plastic reduction according the expected market reach.

The next version of this deliverable is due in November 2023.

APPENDIX

Funded by the European Union

This project has received funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No 101060806.

EXPERIMENT PROTOCOL FOR MACHINABILITY TESTING OF FIBRE-BASED SOLUTIONS