



Bridging investment opportunities to achieve the resilient European food packaging value chain

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**A Collaborative Approach to "Reduce" -
Challenges and Opportunities**

REDUCE: report on key challenges identified

As part of the project's WP4 "Valorization and Sustainability Activities", partners completed and administered to their stakeholders a questionnaire aimed at identifying the main challenge and needs concerning the 4Rs in food packaging (Refuse, Reduce, Reuse, Recycle). The survey respondents come from all over Europe: Italy, Spain, Slovenia, Poland, Finland, Latvia, Belgium, France, Lithuania, and Sweden.

This document summarizes the key challenges identified by questionnaire's respondents across Europe regarding the reduction of food packaging. The challenges reported have been grouped into 6 different thematic areas. Respondents addressed challenges concerning both the reduction in the amount of packaging material used and the reduction in packaging waste. Additionally, "reduce" explores also the utilization of innovative packaging materials, such as bio-based materials, edible coatings, etc. aimed at reducing, for example, the utilization of plastics.

The responses have been grouped into the following thematic areas:

1. Material Reduction & Optimization:

- **Minimizing Material Use:** need to reduce the amount of packaging material used, focusing on optimizing design and minimizing excess. This includes exploring thinner films, lighter-weight containers, and minimizing fiber usage.
- **Balancing Protection and Reduction:** finding the balance between reducing packaging weight and maintaining the necessary protection for the product. Concerns were raised about compromising product integrity and shelf life with overly thin or weak packaging.
- **Material Limitations:** reaching the limits of current material reduction possibilities, particularly with films used for frozen food, where further thinning risks damage.

2. Technological & Production Constraints:

- **Adapting Production Processes:** Changes in packaging materials or designs may require adapting existing machinery and production processes, which can be costly and time-consuming.
- **Technological Limitations:** Current technology may not offer suitable solutions for all packaging needs, particularly in terms of performance, cost, and environmental impact.

3. Material Sourcing & Alternatives:

- **Sustainable Material Availability & Cost:** Access to affordable and readily available sustainable materials is a major concern. This includes bio-based, recycled, and compostable options. The high cost of these alternatives compared to traditional materials presents a barrier.
- **Finding Suitable Alternatives:** finding suitable replacements for existing materials, such as degradable films for producing packaging or oxygen and moisture-impermeable compostable materials for specific applications like pesticide packaging.
- **Reducing Material Variety:** The proliferation of different plastic types poses a challenge for recycling. Respondents suggested focusing on reducing the variety of plastics used to simplify the recycling process.

4. Food Waste vs. Packaging Waste Dilemma:

- **Balancing Priorities:** The inherent tension between minimizing food waste and reducing packaging waste was highlighted. Finding the optimal balance between these competing priorities is crucial. Packaging plays a vital role in protecting food and extending shelf life, thus preventing food waste

5. Consumer & Market Dynamics:

- **Consumer Acceptance:** Finding alternatives to familiar packaging, like glass bottles in the wine industry, requires consumer acceptance and education.
- **Retailer Pressure:** Retailer demands for lower prices can hinder innovation in sustainable packaging, creating a barrier to implementing more expensive but environmentally friendly solutions to reduce the amount of packaging material used.
- **Marketing Challenges:** Communicating the benefits of reduced packaging to consumers can be difficult, especially when packaging represents a small portion of the overall product footprint. Balancing product information requirements with limited packaging space is also a challenge.

6. Regulatory & Policy Landscape:

- **Inconsistent Regulations:** Varying regulations across different regions and countries can create complexity for businesses seeking to implement sustainable packaging.

Collaborative Solutions Needed - Addressing Food Packaging Challenges

To enable productive dialogue during the open discussion section of working group meetings, the 6 key challenges arising from the questionnaire analysis were organized into three core thematic areas.

CHALLENGE #1: Minimizing packaging material while ensuring product safety and affordability

How can we minimize food packaging material without compromising product safety and shelf life? Let's brainstorm innovative solutions to achieve effective material reduction while maintaining essential product protection.

CHALLENGE #2: Utilizing sustainable packaging materials that enable to reduce overall packaging use

What innovative material solutions, sourcing strategies, or collaborative partnerships can help us find and utilize sustainable alternatives that empower us to reduce packaging effectively?

CHALLENGE #3: Driving the "reduce" agenda in packaging by navigating consumer preferences, retailer dynamics, and effective communication

What innovative strategies can we develop to encourage consumer acceptance of reduced packaging, incentivize retailer buy-in, and effectively market the value of "less"?

We believe that collaborative innovation is essential to overcome these complex challenges. We invite all partners and stakeholders – material producers, packaging manufacturers, food producers, retailers, consumers, policymakers, and researchers – to contribute their expertise and ideas. Your input will form the foundation for an open discussion at the first Value4Pack Working Group Talk, "REDUCE to Innovate Sustainable Food Packaging," taking place on **Friday, February 28th, from 1:00-2:00 PM CET**.

This engaging session, the first in our series on the 4R's (Refuse, Reduce, Reuse, Recycle), will focus on practical "Reduce" strategies for sustainable packaging innovation. We will explore industry challenges and dive into an interactive brainstorming session where

we'll work together to develop innovative solutions for reducing packaging waste. Please share your proposed solutions, innovative technologies, best practices, and collaborative strategies for addressing these critical areas *before* the meeting. Your input will be invaluable in shaping the discussion and helping us create a more sustainable future for food packaging.

Innovative Solutions Identified During the Value4Pack Workshop

During the recent Value4Pack Working Group Talk held on 28th February 2025, European stakeholders from various countries collaboratively proposed innovative solutions

addressing the three macro-challenges identified in the survey. These solutions, gathered through interactive discussions and brainstorming sessions, are summarized below.

Challenge #1: Minimizing Packaging Material While Ensuring Product Safety and Affordability

Early-stage Packaging Minimization (CLIC, Finland)

One significant opportunity to reduce packaging is to actively integrate packaging reduction into the early phases of product development. By starting product development with a clear goal of minimizing or removing packaging, it becomes possible to significantly reduce packaging needs, sizes, and specifications compared to traditional approaches.

Innovation in Aseptic Bottling: Lightweight PET Preforms (GEA Procomac, Italy)

GEA Procomac offers innovative aseptic bottling machinery that sterilizes and blows PET preforms. This technology allows using lightweight preforms (as low as 12 grams for a 0.5L bottle) without shrinkage during sterilization, significantly reducing PET usage while maintaining shelf life and safety. This approach also reduces greenhouse gas emissions by approximately 22 grams per bottle compared to standard bottles.

Hybrid Barrier Materials (Nice Filler, Italy)

NiceFiller has developed an innovative filler composed of organic molecules linked to edible inorganic lamellar structures. When dispersed in polymer matrices, these hybrid systems act as effective oxygen and thermal barriers. When combined with ultra-thin barrier materials, smart packaging technologies (active components and sensors), and modular reusable designs, this approach significantly reduces packaging material usage while maintaining food safety and shelf life.

Redesign and Smart Design Strategies (Polymeris, France)

- Rémy Martin Cognac: Eliminating secondary packaging ("canister") and reducing glass bottle weight by 30%, saving approximately 1,500 tonnes of CO₂ equivalent.
- Mondelēz International: Transitioning to recyclable paper-based packaging reduces virgin plastic use by 63% per pack, saving around 177 tonnes of virgin plastic annually across France, Belgium, and the UK.

- High-barrier laminated polypropylene bags: Using recyclable materials with solvent-free adhesives and innovative printing methods (UV flexo combined with digital inkjet) for single-layer recyclable bags.

Mono-material Barrier Solutions (Pack4Food & Flanders' FOOD, Belgium)

Development of monolayer films as alternatives to multilayer systems without compromising shelf life. This approach simplifies recycling processes while maintaining essential barrier properties.

Machinery Transition for Mono-material Production (TTOM & PDO, Poland)

- TTOM: Machinery enabling production of high-quality mono-direction oriented polyethylene (MDO/PE) films with redesigned sealing systems.
- PDO: Barrier mono-polypropylene packaging reducing plastic usage by 35%, recyclable within PP streams with high moisture and UV barriers. This solution achieves significant CO₂ emission reductions.

Vidre+™ Technology for Extended Shelf-life (Fresh Inset, Poland)

Vidre+™ is a sustainable packaging solution delivering plant growth regulators directly within packaging to slow ripening processes. This patented technology extends produce shelf-life considerably, reducing both food waste and associated packaging waste.

Ecodesign Packaging for Logistics Optimization (Clusaga, Spain)

Development of eco-friendly packaging solutions specifically designed for traditional cheese logistics optimization. By redesigning packaging dimensions for Tetilla cheese transportation, this approach reduces cardboard usage, transportation frequency, fossil fuel consumption, and overall carbon footprint.

Packaging Optimization for Distribution Efficiency (Packbridge, Sweden)

Optimizing package dimensions to eliminate unnecessary empty space ("stop sending air") can save up to 30% distribution space per container load. This method significantly reduces energy consumption and associated costs.

Reduced-width Flexible Packaging Materials (DBH, Hungary)

Introducing innovative mono-material foils with barrier properties comparable to previously used multi-material foils enables significant reductions in flexible packaging material width without compromising performance.

Challenge #2: Utilizing Sustainable Packaging Materials That Enable Overall Packaging Reduction

Collaborative Sustainable Material Development (CLIC, Finland)

Encouraging close collaboration between research institutions and industry from early stages ensures market-aligned sustainable material solutions. Clear communication aligned with the EU Green Claims Directive is essential for successful adoption.

Barrier-enhanced Paints and Varnishes (DBH, Hungary)

Replacing multilayer films with thinner BOPP foils enhanced by specialized barrier paints or varnishes maintains protective properties while substantially reducing material usage.

Digitalization via QR Codes for Reduced Packaging (Polymeris, France)

Utilizing QR codes and digital interfaces on products can significantly reduce physical packaging requirements by digitally providing necessary consumer information.

Insect-derived Chitosan Bioplastics (BUGSLAB, Italy)

Chitosan derived from insects offers a sustainable alternative source for biodegradable bioplastics suitable for food preservation applications.

Biobased & Biodegradable Materials (ENEA Italy; PDO & Natureef Poland)

Promoting biobased materials from renewable biomass sources combined with biodegradable properties facilitates compostable packaging solutions suitable even for challenging applications such as frozen foods or herbs.

Optimized Packaging for Hot Products Logistics (Clusaga Spain)

Developing recyclable and biodegradable carton packs specifically designed to improve cooling efficiency during palletization/storage stages of hot food products reduces energy consumption and logistics costs while protecting consumer health.

Coastal Plastic Waste Transformation into Sustainable Packaging (Clusaga Spain)

Recycling approximately 10 tonnes of coastal plastic waste collected from beaches into new sustainable packaging solutions fosters circular economy practices while raising societal awareness about marine pollution issues.

Challenge #3: Driving the "Reduce" Agenda by Navigating Consumer Preferences, Retailer Dynamics & Effective Communication

Sustainability Communication Tools - TACTIC Project (Flanders' FOOD & Pack4Food Belgium)

Developing simplified labeling systems ("one label or claim") alongside best practice guides helps clearly communicate sustainability benefits of reduced packaging to consumers. Co-creation sessions with consumers bridge intention-action gaps regarding sustainability behaviors.

Reusable Packaging Coalition - RePaCo Initiative (Pack4Food & Flanders' FOOD Belgium)

Establishing coalitions involving diverse stakeholders – packaging producers, retailers, logistics providers – to introduce standardized reusable packaging systems at scale for fresh produce distribution.

Green Claims Compliance & Digital Outreach Campaigns (CLIC Finland)

Leveraging digital platforms like TikTok for innovative communication campaigns aligned with the EU Green Claims Directive effectively promotes reduced-packaging benefits among younger demographics.

Consumer Education Campaigns & Practical Design Adjustments (Packbridge Sweden; Polymeris France)

Conducting targeted information campaigns involving retailers and consumer organizations emphasizes practical benefits of reduced packaging. Implementing practical store-level changes – such as removing unnecessary branding from packages not visible on shelves – further supports reduction goals.

These innovative solutions presented during the workshop demonstrate the collective commitment of European partners towards addressing critical challenges in sustainable food packaging. The collaborative nature of these proposals highlights promising pathways towards achieving meaningful reductions in food packaging materials across Europe.



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