



oceanBag

Reusable Big Bags

Executive Summary

Author: Rosemarie Wuite
November 2025

The Challenge

Across Europe, Big Bags are essential to industrial logistics—yet almost all are used once.

350 million bags a year consume **875,000 tonnes** of virgin PP, with most burned, buried, or exported after a single trip. This creates avoidable waste, CO₂, and rising costs.

Companies also face increasing price volatility and waste fees. Switching to a pay-per-use reuse model can cut packaging costs by ~37.5% per bag, removing the repeated expense of disposables.

With PPWR approaching, change is now unavoidable.

40% by 2030
70% by 2040
100% for intra-company movements

“Business as usual is no longer an option”

The oceanBag project is investigating how to develop a practical, low-impact, cost-saving reusable Big Bag system. Supported by the **Versnellingshuis Moonshot Programme** and a strong consortium, it combines technical testing, behavioural insights, digital tracking, and pilot data to define a scalable circular solution. — ready to scale across the Netherlands and Europe.

Why Reusable Big Bags Matter Now

The environmental and economic case for reuse is strong — but the *timing* makes it unavoidable.

Environmental Impact

Big Bags represent one of the most material-intensive forms of industrial packaging. Using them only once dramatically increases plastic waste and CO₂ emissions.

Studies and pilot results show reusable Big Bags can reduce emissions and virgin plastic usage by **>60%** over multiple cycles.

Operational resilience

Multiple industries are already facing:

- unpredictable PP prices
- container shipping disruptions
- rising waste handling costs
- pressure to stabilise packaging supply

Reusable systems provide a stable domestic loop — and cut packaging costs by **~37.5%** per bag.

Regulatory Pressure

The PPWR will require all reusable packaging to be:

- digitally tracked
- used repeatedly within validated systems
- meet reuse targets

- **40% by 2030**
- **70% by 2040**
- **100% for intra-company**

Reusable Big Bags are *specifically included* in these mandates.

The Consortium

The oceanBag initiative is financially supported by the Versnellingshuis Nederland Circulair, within the framework of its strategic Moonshot Programme for high-impact circular economy transitions.

The consortium started with the following members and has been welcoming new members since:

- **Royal LC Packaging** — Bag manufacturing & design.
- **WorldBag / TTG** — Cleaning & reconditioning.
- **Re3v** — Pooling & logistics.
- **Bexter** — Digital tracking & data.
- **Bas van den Ende** — Recycling at end-of-life.
- **Major end users (e.g. P&G, WeylChem)** — Real-world testing & feedback.
- **Searious Business** — Coordination, modelling, LCA & behaviour insights.



Together, these partners cover the full circular loop: manufacturing → use → return → cleaning → digital tracking → recycling

The Question

Can reusable Big Bags work at scale? — in real industry conditions — and can they deliver clear cost, environmental, and operational benefits over single-use bags?

The goal was not only to test bags in a pilot setting — but to model a system, with end-to-end considerations including behavioural engagement, branding, labelling, pooling structure, and future investment needs.

Demonstrate technical feasibility

Evaluating cleaning, contamination control, reconditioning, and bag durability.

Test logistical feasibility in practice

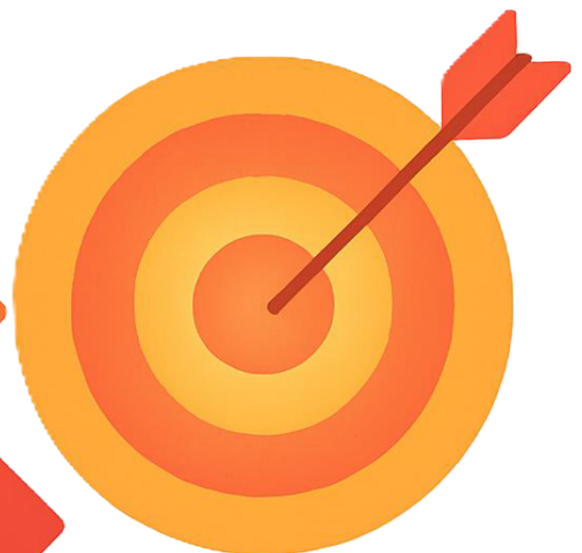
Running a pilot to evaluate return logistics, handling, turnaround time, and operational integration.

Assess digital solutions for traceability

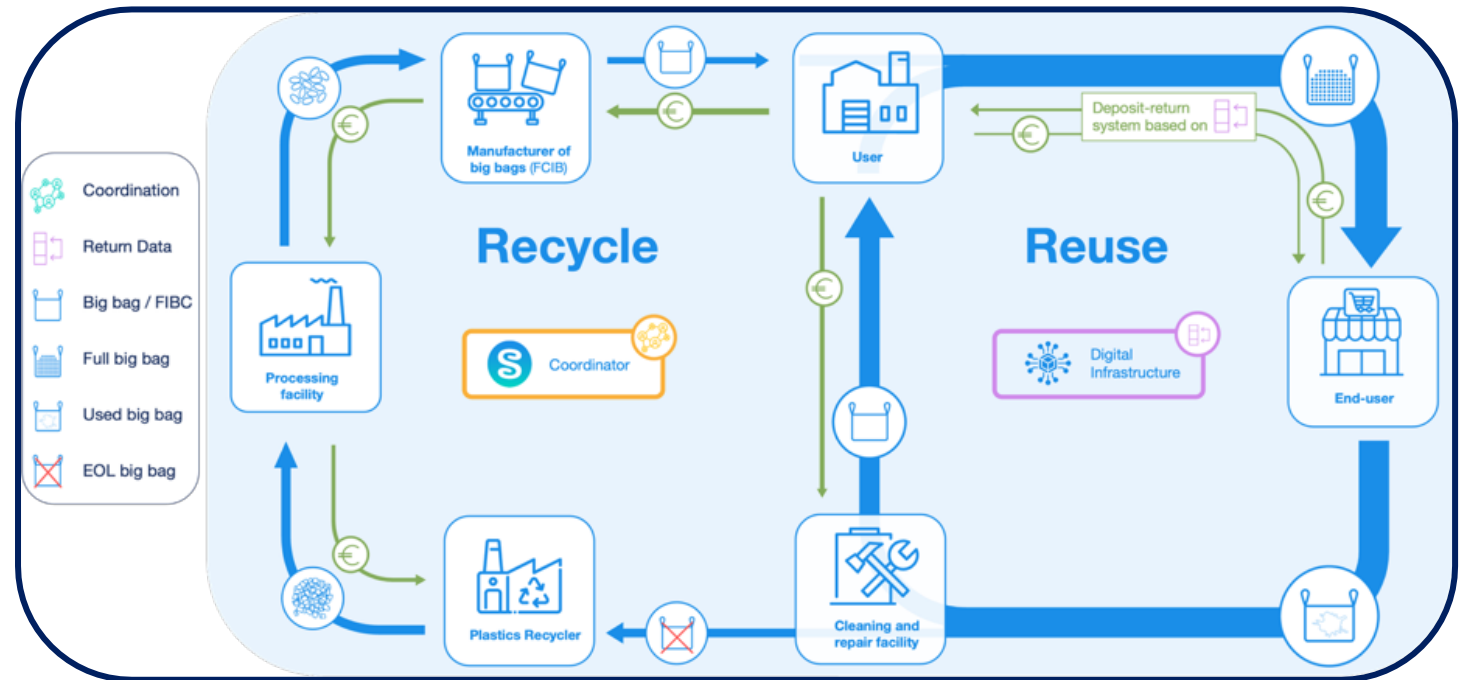
Implementing QR-based tracking to monitor usage, manage deposits, and enable future PPWR-compliant reporting.

Generate evidence and insights to support scale-up

Providing data, business cases, user behaviour insights, and system design recommendations.



The Pilot: Testing Reuse in the Real World



Bag Design

- Recognisable blue colour (like CHEP pallets).
- Single PP tie-on label integrating:
 - unique QR code for tracking
 - QR code linking to instructions and user info
 - regulatory and safety information
- Polypropylene-only components for recyclability (This replaces typical PVC/nylon label components that contaminate recycling streams).

Cleaning & Safety Validation

WorldBag and TTG performed:

- allergen testing
- microbial testing
- dry vs. wet cleaning trials

Wet cleaning achieved complete decontamination, meeting thresholds for food and **even hospital textile standards**.

This confirmed that reusable bags can achieve required safety levels reliably.

Digital Tracking

Using Bexter's system, bags were scanned at each touchpoint. Digital tracking supports:

- audit trails
- deposit management
- PPWR compliance
- performance metrics (cycles, losses, condition)

The Results

Operational

Technical Feasibility

- Wet-cleaning meets **hospital-grade** hygiene.
- No allergens or contaminants detected.
- Wear-and-tear was minimal suggesting high future life-cycle potential

Operational Feasibility

- Works smoothly in existing workflows.
- Bag inspection, scanning, and return processes easy for operators.
- Turnaround times achievable at scale.
- Reverse logistics works but needs incentives for high return rates.

Digital Tracking Feasibility

QR system is a critical enabler to manage deposits and meet PPWR requirements.

- full bag traceability
- complete audit trail
- automated compliance reporting
- insights into losses & bottlenecks

Environmental

CO₂ Reduction

- 55–60% lower CO₂ per reuse cycle.
- Higher reduction when transport optimized.

Material Savings

- Up to 6,600 tonnes virgin PP saved/yr (NL).

Waste Reduction

- Multi-cycle reuse dramatically cuts waste.
- Bags recycled into new PP at end-of-life.

Water Trade-Off

- Washing uses water, but carbon savings vastly outweigh impact

Economic

Cost Modelling

- Cost-effective after 3–5 cycles.
- Lower pay-per-use fee compared to the price of single use bags (€4.50 per cycle, vs €7.20 for a single use Big Bag. Savings from:
 - fewer bag purchases
 - reduced PP price exposure
 - more stable supply
 - pooling efficiencies

Business Case at Scale

- 2–3-year payback at national scale
- Strong cash flow after break-even.

Behavioural

Hearts, minds, wallets and time

- Workers need simple instructions (QR helps).
- Clear bag design improves correct handling.
- Easy scanning reduces non-compliance.
- Engagement rises when sustainability is shared.
- Deposit (€5–€10) essential for 90–95% return rates.

Return incentives are essential — financially or contractually.

#ReuseAddsUp

The Barriers and Fixes



Reverse Logistics Complexity

Fix: A scaled system would involve:

- decentralised hubs
- using existing logistics flows
- strong return incentives
- digital tracking
- clear responsibility contracts



Weak Market Signals

Fix: A coordinated multi-company pilot at scale would give clarity on:

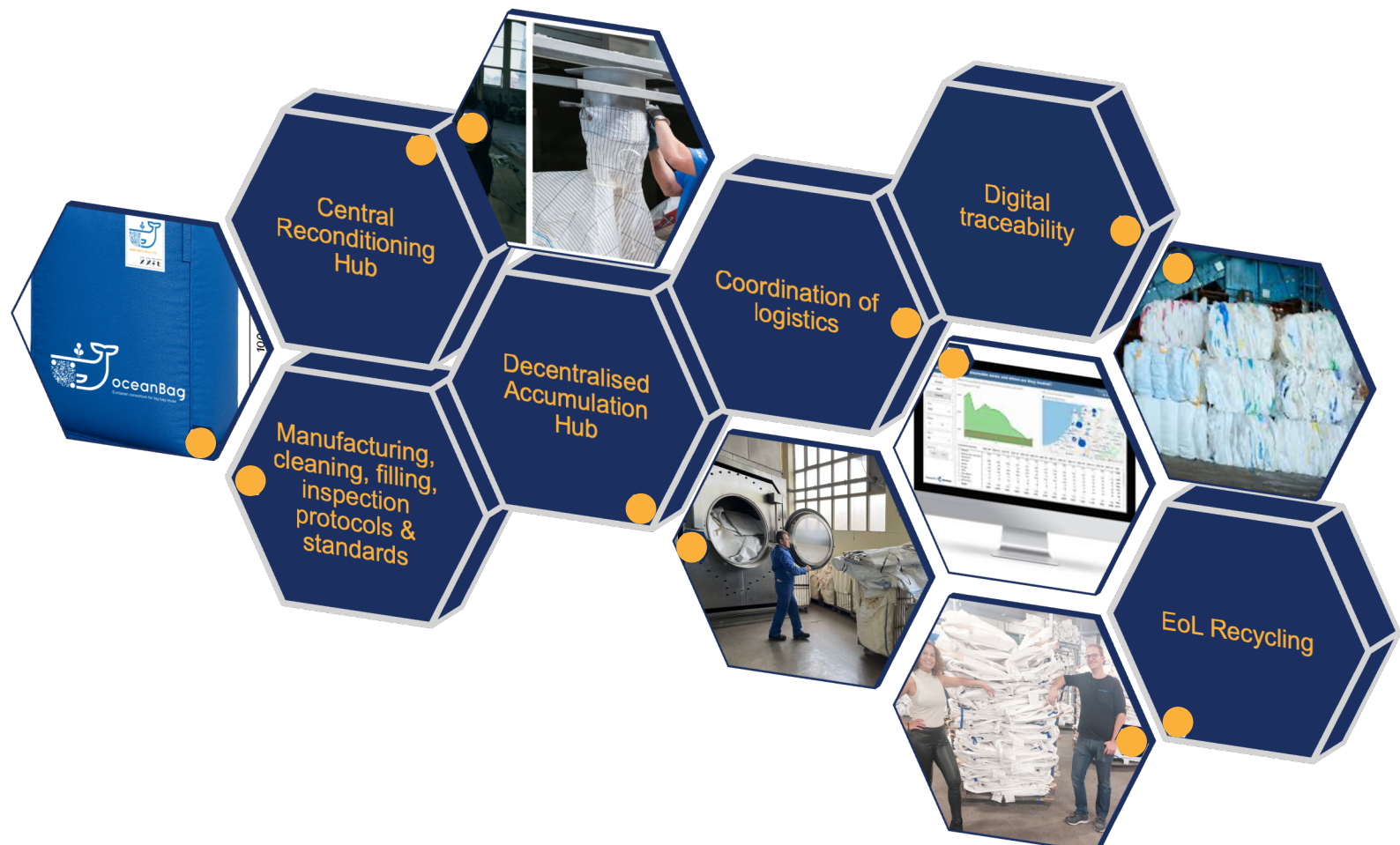
- costs
- standards
- responsibility distribution
- service providers
- quality guarantees
- deposit systems
- legal and regulatory implications



PPWR Uncertainty

Fix: Reusable big bags align with the future of all packaging legislation, CO2 reporting and data requirements. Those who have a system ready will have a competitive advantage.

The System to Scale



The Market Potential and Sector Opportunities

The oceanBag system has strong applicability across multiple industrial sectors that depend heavily on Big Bags. Interviews with stakeholders confirmed broad interest — but also sector-by-sector differences in motivations and readiness.

Chemicals

- High Big Bag usage volumes and standardisation levels.
- High specification bags = high financial savings potential
- Strong awareness of regulatory pressure (PPWR).

→ **Chemical industry is one of the most promising early adopters.**

Food & Feed

- Strict hygiene requirements met through testing.
- High material consumption and waste management costs.
- Validated cleaning mitigates contamination.

→ **Excellent long-term potential esp. domestic supply**

Construction & Building

- Very high-volume flow but often rough handling.
- Durability requirements high but reusable models can be reinforced.

→ **Suitable for a robust, reinforced reusable bag variant.**

Minerals & Mining

- Stable routes and repetitive flows.
- Operate integrated logistics — managing their own transport and handling = direct control over packaging flows.
- Lower hygiene concerns.

→ **Ideal for early scaling due to predictable logistics.**

Recycling Sector

- Many recyclers are already part of circular systems.
- Using reusable bags reinforces their brand positioning.

→ **Strong alignment with sustainability strategies.**

Fertilisers & Agriculture

- Highly seasonal flows; return logistics must account for timing.

→ **Good potential with organised hubs.**

Plastics Production

- Heavy users of Big Bags for polymer shipments.
- Positioned to lead by example in circular packaging.

→ **Strong opportunity for cross-European adoption.**

Six key conditions:

1. Clear, competitive cost structure
2. Defined responsibilities
3. Guaranteed hygiene and performance
4. Operational simplicity to minimize workflow changes
5. Digital traceability for PPWR reporting
6. Return incentives/obligations

Investment Pathway & Scale-Up Strategy

The report presents a practical pathway to scale reusable Big Bags from pilot to national and European implementation. Each phase incorporates the core recommendations needed to make reuse succeed.

Phase 1

Extended Pilot

(1–2 years)

Build Confidence and optimize the system

Core activities:

- 5,000–20,000 bags across 2–3 major companies in multiple sectors.
- Refinement of cleaning, QC, and contamination management.
- Full-cycle digital traceability from day one.
- Validation of a €5–€10 deposit model to secure 90–95% return rates.
- Testing of sector-specific workflows (chemicals, mining, agri-food).
- Early alignment with Dutch and EU regulators.

Recommendations:

- ✓ Launch a large-scale, multi-company pilot.
- ✓ Use digital tracking from the start.
- ✓ Introduce and test the deposit system.
- ✓ Tailor rollouts by sector.

Phase 2

National Launch

(3–5 years)

Create national standards and achieve economies of scale

Core activities:

- Up to 1 million reusable bags in circulation.
- Standardised “Blue Bag” design and handling protocols adopted nationally.
- Network of decentralised accumulation hubs operational.
- Full-service logistics via pooling partner(s).
- Digital dashboards providing compliance and performance data.
- Alignment with Dutch EPR implementation.

Recommendations:

- ✓ Standardise the Blue Bag.
- ✓ Build decentralised hub infrastructure.
- ✓ Integrate digital systems for compliance and optimisation.
- ✓ Align with national regulators.

Phase 3

Cross European Expansion

(3–5 years)

Build a European Network for reusable industrial packaging

Core activities:

- Integration with German, Belgian, and cross-border reconditioning hubs.
- Standardised bag specifications recognised EU-wide.
- Harmonised deposit and traceability systems.
- Collaboration with PPWR implementation bodies.
- Expansion into high-volume industrial sectors.

Recommendations:

- ✓ Tailor sector-specific rollout pathways across Europe.
- ✓ Align with EU regulators and PPWR guidance.
- ✓ Build interoperable systems for cross-border pooling.

Conclusion

The oceanBag project demonstrates that reusable Big Bags are technically feasible, hygienically safe, operationally workable, and economically attractive.

- Technical performance is proven.
- Cleaning meets high hygiene standards.
- Digital tracking enables full transparency.
- Environmental benefits are substantial.
- Cost savings appear over multiple cycles.

To succeed at scale, reusable Big Bags require coordinated logistics, digital traceability, standardised designs, and strong return incentives.

With PPWR reuse targets approaching, reusable systems are no longer optional—they are a strategic, future-proof solution for industries reliant on bulk packaging.

Project Report oceanBag

The full oceanBag report provides the detailed foundation behind this executive summary. It includes complete technical results, contamination and cleaning data, digital tracking insights, cost-benefit modelling, behavioural research, system design architecture, and sector-specific opportunities. For organisations exploring reusable Big Bags, the full report offers a comprehensive, evidence-based roadmap for informed decision-making. Access the report [here](#).

