

Welcome to Circular Economy by
means of

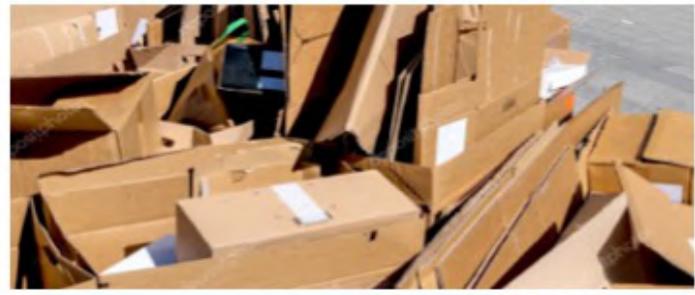
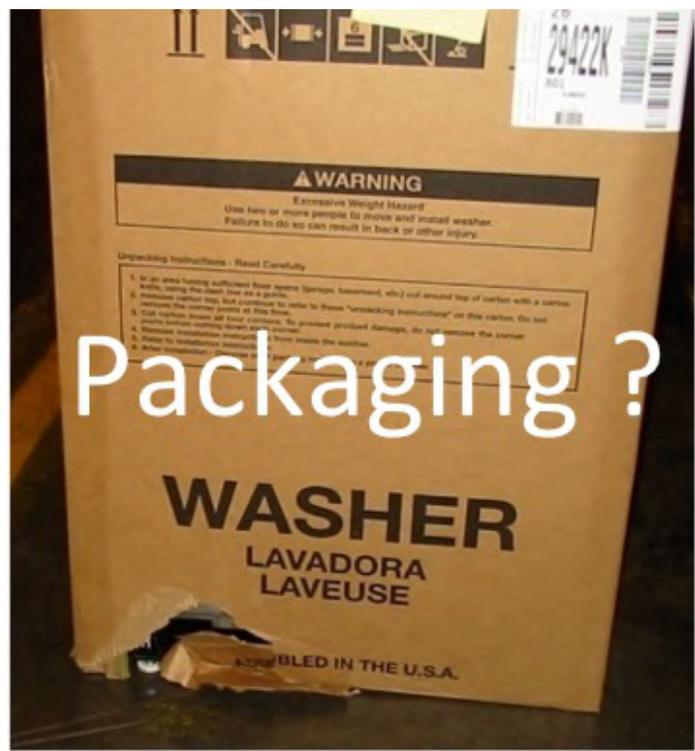


Returnable Protective Packaging
and Circular Reverse Logistics for
Large Household Appliances

Free Pack Net Holding Sagl
Switzerland



Our strategic vision for Plastic
in a Circular Economy leads to
Returnable Protective Packaging (RPP),
Circular Reverse Logistics and, using Rfid,
Digitalization of the value chain.



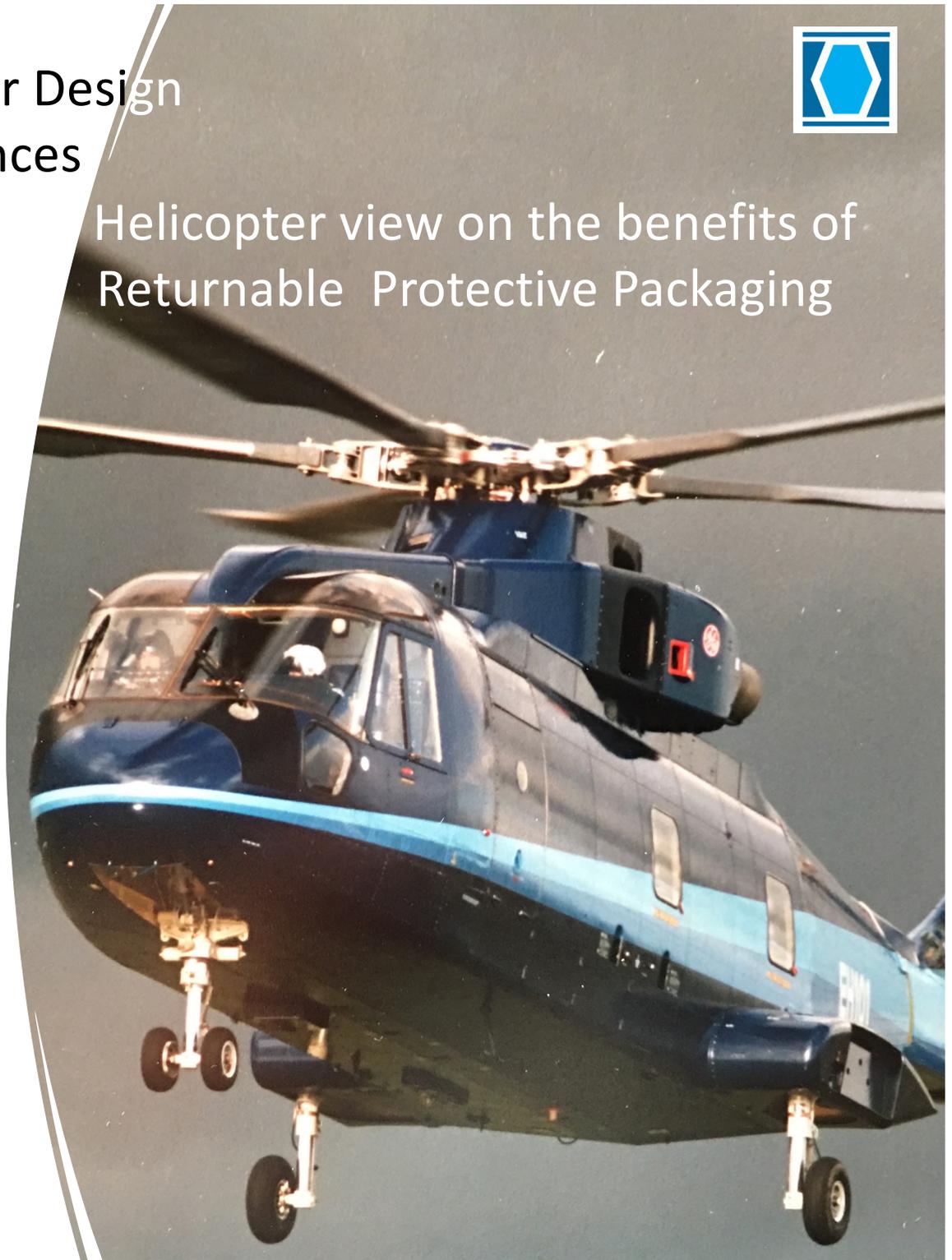
Circular economy and Circular Design into Large Household Appliances



Helicopter view on the benefits of Returnable Protective Packaging

KPI

- In accordance with PPWR
- RPP tracking platform allow the full digitalization of the supply chain
- Eliminate product damages
- Reduce TCO
- Reduce CO₂ emissions
- Eliminate packaging waste
- Stacking up to 1200 kg
- Clamping up to 1200 kg
side to side and front to rear
- Product to be developed only to function
and not to withstand vertical and lateral forces



The problems we solve.



Product damages

from 5 to 8%
30 M pcs yr

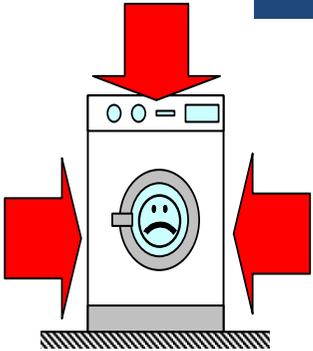


Packaging Waste

Global - average of
 $2,4 \text{ Kg} \times \text{unit} \times 500 \text{ Mpcs} \times \text{yr} =$
1.200.000 ton yr (300.000 trucks)



Structures oversized



Product's structure is designed
to resist to vertical & lateral
pressures up to 1200 Kg.

Microplastics
or
Macroplastics

A cartoon illustration of a person standing with their hand on their chin, looking thoughtful. A blue thought bubble above them contains the text 'Microplastics or Macroplastics'. The person is holding a small blue ball.

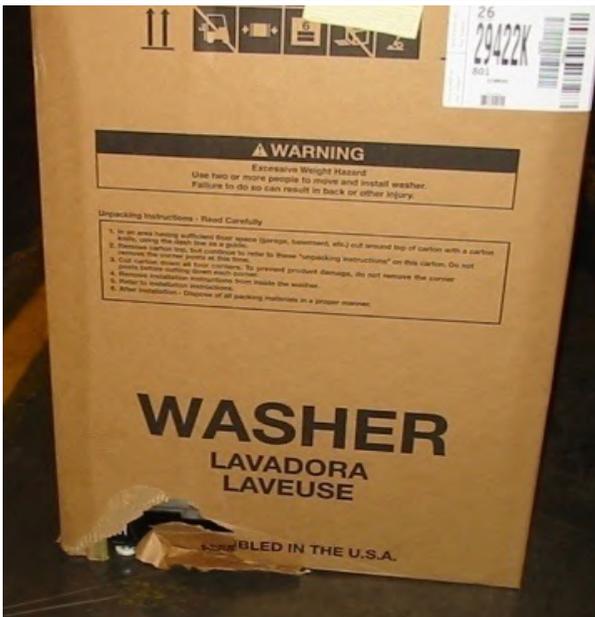
Disposable packaging materials
and the problem of clamping forces (from 600 to 1200 Kg)
on the products.

In accordance to ISO definition,
packaging have to be able to protect
the product inside.

Disposable packaging materials are
not able to resist alone to clamping
and stacking forces.
As a consequence, the damages are
increasing with huge economical
losses.



CLAMPING



Is cardboard protective ?



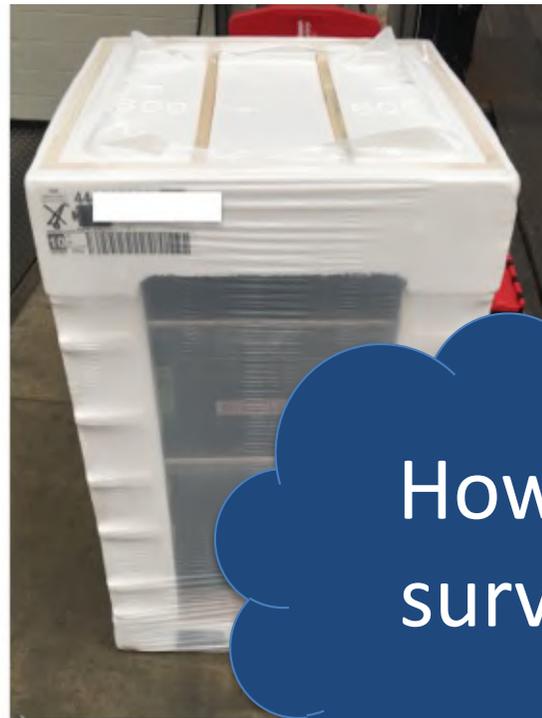


Is EPS protective?



Problematic
packaging
materials





How to survive



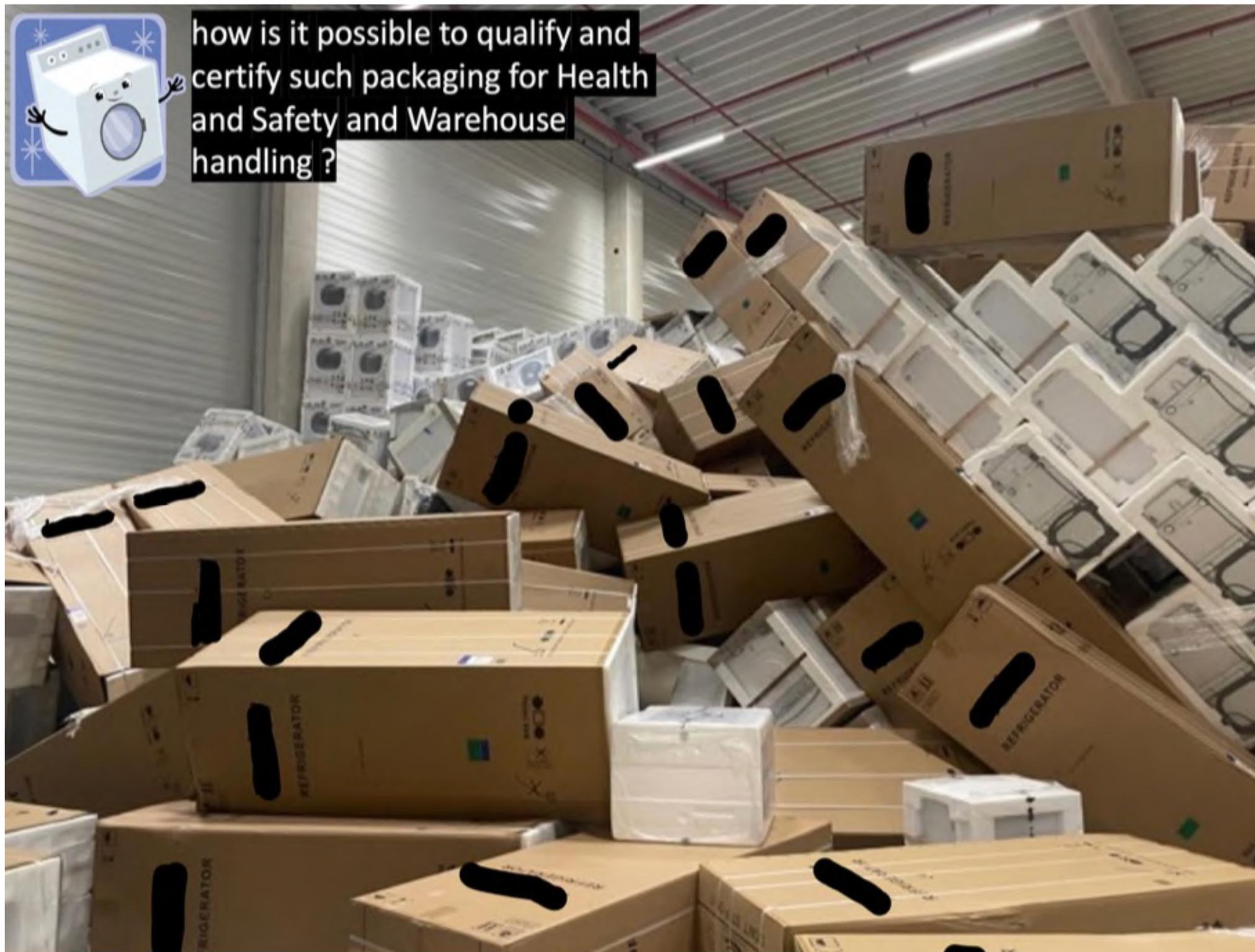


Is this column falling





how is it possible to qualify and certify such packaging for Health and Safety and Warehouse handling ?





Retailer
Products damaged ready to be
returned to manufacturer

With the increase of Internet sales the amount of commercial returns is dramatically growing and, as a consequence, the percentage of damages on the appliances.

The drama of Damages in the Circular Economy

**Global damages
30 M pcs /Yr**

Eco-design? Ecolabel?
Waste Prevention?
Extended Producer Responsibility?
Life Cycle Assessment?



Damaged products along the whole supply chain 5-8%
on which: EU 5,5 Mpcs; NAR 4,5; LAR 3; PRC 14; MEA 3; AusNZ 1,5.



Linear economy
the 5 pillars of disposable
packaging materials in the
LHA market sector.

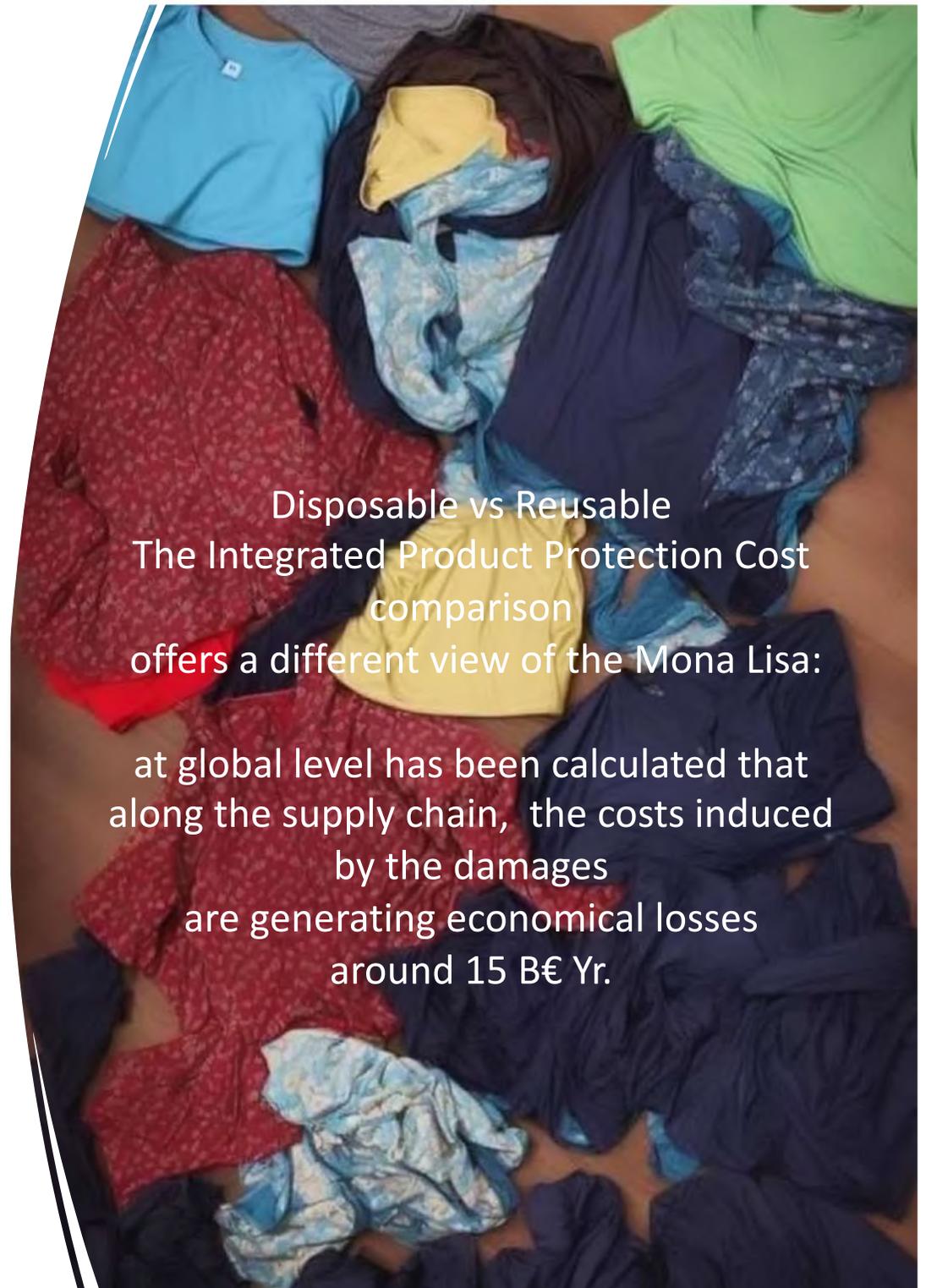


1. Reduce profits.
2. Destroys the company image.
3. Destroys the environment.
4. Prevents the technological development of products.
5. Frustrates efforts in Eco-design.

Disposable packaging materials.

Impact on TCO

- damaged products disposed of
- damaged products sold with discount
- retrieving products damaged
- repair and rework
- repackaging
- stacking limit & cost per sqm
- banding and un-banding column
- compliance scheme
- disposal costs
- extra time for damages management



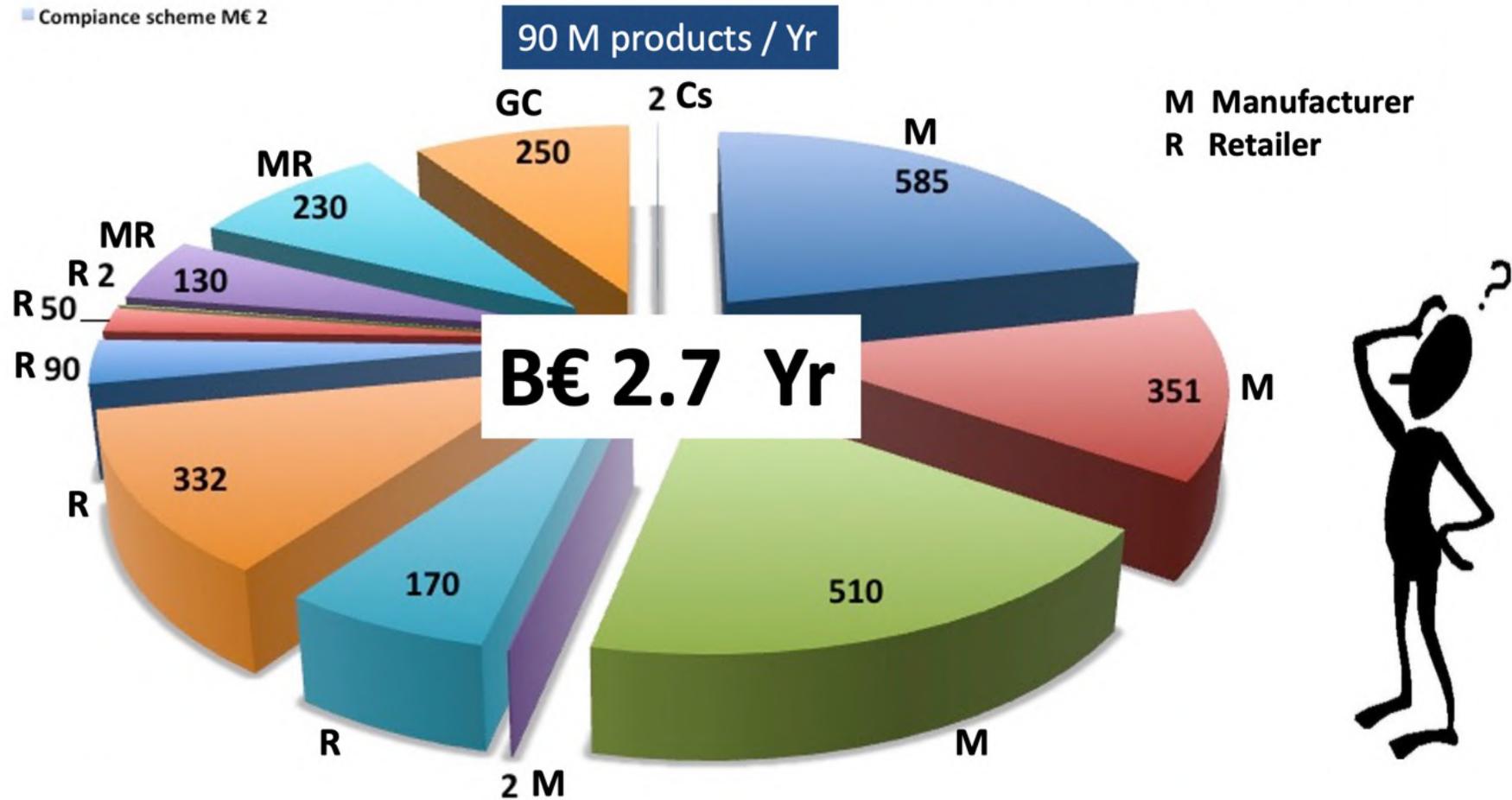
Disposable vs Reusable
The Integrated Product Protection Cost comparison offers a different view of the Mona Lisa: at global level has been calculated that along the supply chain, the costs induced by the damages are generating economical losses around 15 B€ Yr.

Which is the Cost of product damages in Europe?

In other words: which is the TCO determined by disposable packaging materials?

Linear Economy – disposable packaging, damages and induced costs

- M - M€ 585 Disposable packaging
- M - M€ 510 Rework on Products returned
- R - M€ 170 30% of damages disposed of
- R - M€ 90 Retrieving of products damaged
- R - M€ 2 Management of damages
- MR - M€ 230 Warehouses handling - banding unbanding
- Compliance scheme M€ 2
- M - M€ 351 Damages
- M - M€ 2 Management of damages
- R - M€ 332 Discount on products damaged
- R - M€ 50 Repackaging
- MR - M€ 130 Warehouses unsaturation - stacking level 5
- Gen. Costs - M€ 250 Disposable Packaging Collection, Sorting, Recycling



About Free Pack Net



Free Pack Net is a **System Operator** that specialized in Returnable Protective Packaging (RPP) for Large Household Appliances.

We focus on improving supply chain efficiencies through manufacturing, logistics, reusable rental markets, robust data analytics and services.

Basically we invest in **Products' Durability** and we control Reverse Logistics through procedures and planning.

By leveraging our expertise in **Design for Reuse**, intellectual property and materials, we are able to provide sustainable competitive advantages and deliver total supply chain transformation.

Our organization consists of three main areas:

- a) Circular design, Project development and Manufacturing,
- b) Circular Reverse Logistics and Assets Tracking
- c) Commercial and Analytics.



2024 - Tokyo, October 24th

After a long selection over 300 solutions presented worldwide by as many companies (3M, Henkel, Südpack, Amcor, Nestlé) and evaluated by 18 international experts, the solution proposed by Free Pack Net has seen the coveted recognition.



The Packaging Innovation Awards

brought to you by 



20250114 131916

2024 WINNERS

Reusable Transport Packaging for Large Household Appliances

This is a reusable PaaS (packaging as a service) solution that is incredibly robust, capable of withstanding up to 1200/1500kg vertical and lateral pressures while also absorbing kinetic energy from drops or improper handling.

Made from mono-material polypropylene (PP) and expanded polypropylene (EPP), the packaging solution incorporates radio-frequency identification (RFID) digitalization, offers cost savings, and uses circular design methodologies to renew itself (i.e., after a minimum of 20 rent cycles, reusables are ground up and the recycled material is reused to produce new recycled polypropylene or RPP).

The packaging is suitable for global applications, especially large household appliances, with a significantly positive environmental impact as recognized by the European Commission and the International Organization for Standardization (ISO).



confidential



**GOLD
WINNER**

Company
Free Pack Net
Holding SAGL



Circular business model

PaaS - Product as a Service

- 1 Offering a full service, FPN replaces proprietary disposable one way packaging with Reusable Transport Packaging, which are basically Rented per cycle to Manufacturers or Retailers to protect the appliances and the environment from the factories to the end users.
- 2 With the support of its **Circular Reverse Logistics** organization and the integration with Retailers and 3PL, FPN collects the RPP and delivers it back to the factories.
- 3 After 20 cycles the Reusable Packaging is grinded and the Recycled material is Reused to produce new ones.



«Take a small idea and develop it as no one else is able to do».



The offers

PaaS - Packaging as a Service

- ❑ **PaaS 1 : RPP rented per cycle to Manufacturers or Retailers** to protect the appliances and the environment from the factories to end users. The offer includes RPP Circular Reverse Logistics.
- ❑ **PaaS 2 : Long Term Rent to Manufacturers or Retailers** – RPP rented for 24 / 36 months. The responsibility for RPP reverse logistics lies with the manufacturer/retailer.



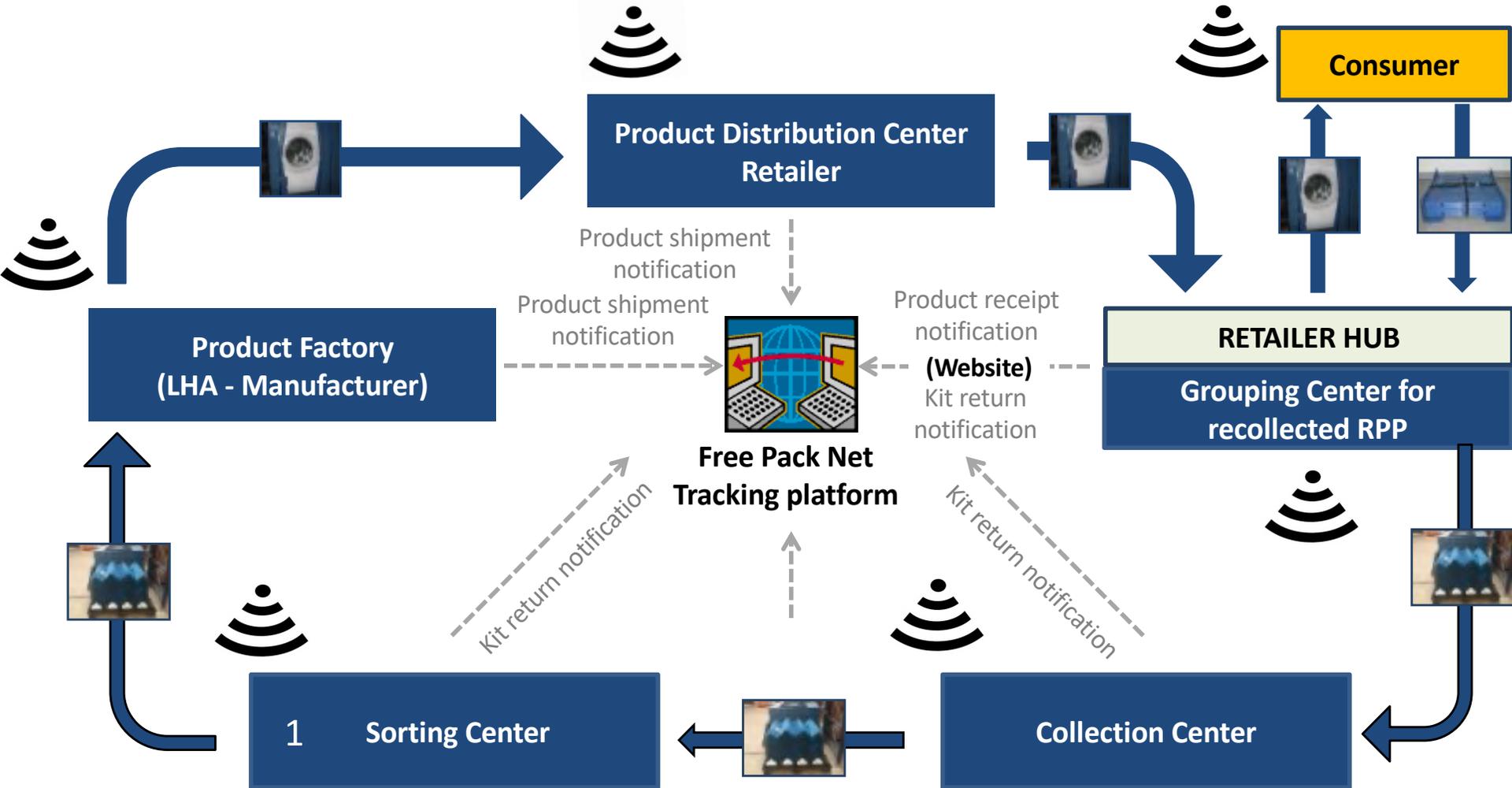
PaaS 1 - how it works at a glance



Service Agreement with Manufacturer
Volumes forecast, Factories, Call off, Product models.

or, alternatively also with

Service Agreement with Retailer
Circular Reverse Logistics procedures.



RPP tracking platform

calculates
CO₂ emissions throughout
the supply chain



Through **RFID positioned on the RPP**, we identify:

- what** → the single Serial Number;
- when** → the time/date;
- where** → the geographical location;
- who** → the user doing the identification.

The screenshot displays the RPP tracking platform interface. It features a top navigation bar with 'Product Master Data', 'Care Instructions', and 'Configuration'. Below this is a search bar labeled 'Enter Master Data Search Input' and a list of product items. Each item includes an icon, article name, color, size, article number, SKU, and GTIN. To the right, there is a detailed view of a washing machine with its specifications: Article Number 1342542, Color -, Size 600x620x850 mm, SKU 00810055933976, and GTIN 00810055933976. Below the product list, there is a section for '9 Events' showing a timeline of activities: Receiving (Retailer DC) on 5/23/22 (0.063 kgCO₂), Shipping (Factory DC) on 5/23/22 (0 kgCO₂), Receiving (Factory DC) on 5/22/22 (0 kgCO₂), Shipping (Factory) on 5/21/22 (0 kgCO₂), and Assembling (Factory) on 5/13/22 (0 kgCO₂). A map on the right shows the geographical locations of these events, with markers for Frankfurt, Munich, and Milan.

Article Name	Color	Size	Article Number	SKU	GTIN
Washing machine	-	600x620x850 mm	1342542	00810055933976	00810055933976
Packed washing machine	-	640x670x890 mm	1842542	00810055933983	00810055933983
Base panel	-	640x670x60 mm	2364522	00810055933709	00810055933709

Event	Date	CO ₂ Emissions (kg)
Receiving (Retailer DC)	5/23/22	0.063
Shipping (Factory DC)	5/23/22	0
Receiving (Factory DC)	5/22/22	0
Shipping (Factory)	5/21/22	0
Assembling (Factory)	5/13/22	0



Stacking differences.

Disposable packaging



1200 Kg on the product

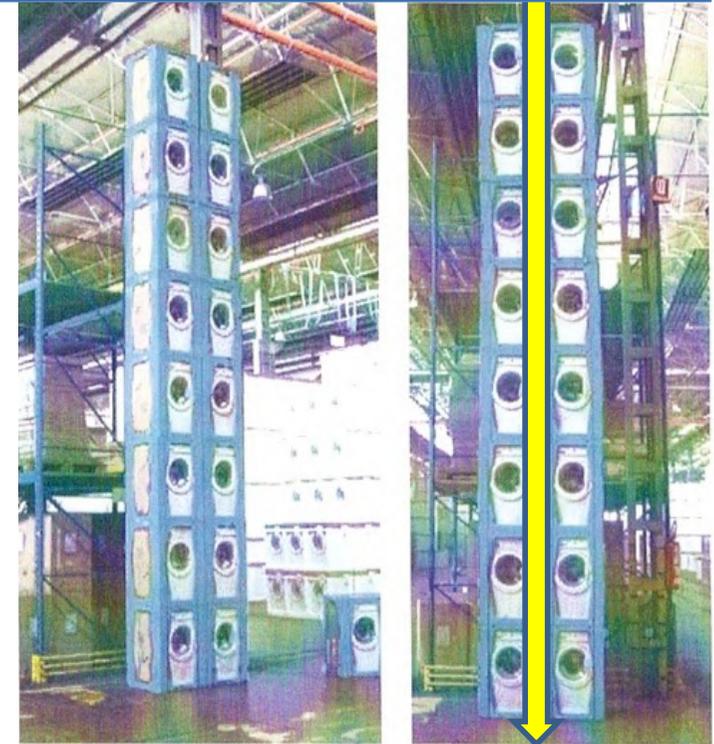


50% of the warehouse is empty

Returnable Protective Packaging

The stacking limit is the height of the warehouse

1200 Kg on the shell

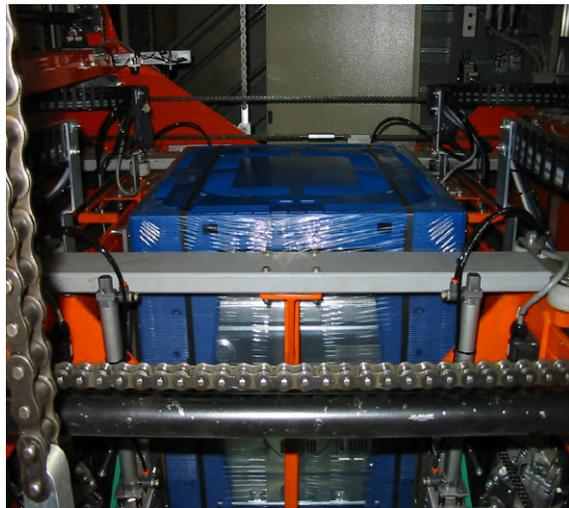


The product can be redesigned with important savings in material !

Circular Economy and Design for Reuse lead to different approaches and results.



The RPP shell is autonomously able to resist vertical and lateral forces.



Assesment from Manufacturer

Objective

Is it feasible to use RPP on the production line at the ~~rate~~ factory to package Tumble Dryers?

- Technically Yes
- Logistically Yes
- Economically Yes
- IME objectives Yes



Retailer – RPP is approved for health and safety and warehouse handling.

Internal Trials

- Internal trials have been completed within Acton Gate to review the handling and feasibility of the new packaging solution.
- Checks have been made to ensure stability of packaging in storage, handling by DC staff and delivery drivers and movement by clamp truck around the DC



Internal trial conclusions

- Acton Gate have approved the new packaging for health and safety and warehouse handling.
-



In the Stores,



managers really enjoy the RPP because finally they don't need to have any more discussions with clients concerning damages.



Polystyrene is so messy. It's like a snowstorm !

Extract from a Survey with Customers.

In-store Customer Intercept Review – Current Packaging

Customers identify issues with current MDA packaging, especially from Customers who have had negative experiences in the past with carryout packaging, especially with larger items (including MDA products)

"It's really annoying when the packaging is so much bigger than the product and you can't get it in your car."



Issues arise once product is at home

A major gripe remains the polystyrene packaging, which is both messy and clunky to dispose of properly and takes time to do

The size of bins is also a consideration, with a recognition that they are getting smaller, meaning there is less disposal space

"Polystyrene is so messy; it's like a snowstorm sometimes."

"The rubbish collectors are so fussy now about what they will take. I have to break it up into small pieces so that it fits in the bin."



Home delivery is the preferred option (if customers have time to wait)

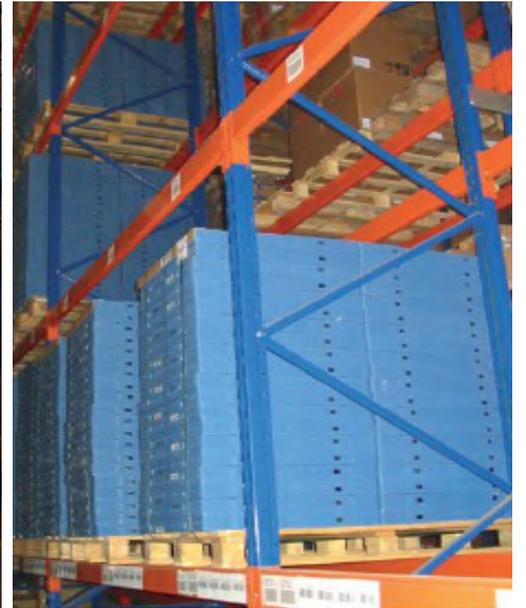
The role of home delivery offers clear benefits – the driver will take the used packaging away, saving the customer the hassle of disposal

"I hate being left with all that polystyrene and cardboard after getting a new machine home. That's why I prefer getting things delivered."

There is an openness to change given customer frustrations around packaging, and recognition that current solutions are not the most environmental ones



Easy handling



RPP Reverse logistics in accordance with procedures



In the Retailer's warehouse, the preparation of RPP for reverse logistics is simple

Sorting Center

After washing and control, RPPs are prepared for new delivery to the factory.



Assesment from global logistic player

KUEHNE+NAGEL



Kuehne+Nagel's /Freepacknet End Trial

- KN to assess value and durability of the product as a returnable unit. Damages reduced to zero.
- Within the UK market, KN to assess feasibility of collecting and sorting the RTP in accordance with the Freepacknet reverse logistics procedures. Procedures OK.

POS Collections



Collection Center



Assesment from a leading retailer

Performance of packaging (clamping, stacking and container air bags)



Clamping

The re-usable packaging can be safely clamped in all six directions without affecting the integrity of the product up to 1500kg of pressure

Stack height

Units can be safely stacked to 10 high or a safe stacking weight of 1000kg



Container air bags

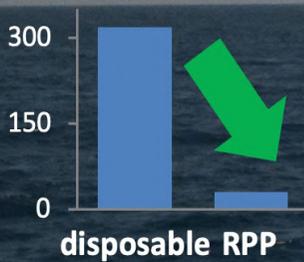
The re-usable packaging has a specially designed lid and base which gives maximum friction when stacking and transporting which negates the need for air bags to be used.



Results of the Life Cycle Analysis

comparing disposable packages with the Returnable Protective Packaging

kg Waste Production



-90 %

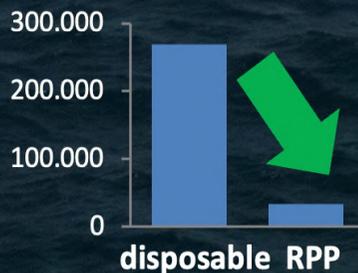
1.150.000 tons Yr

g Health Damages (Harmful Substances)



-83 %

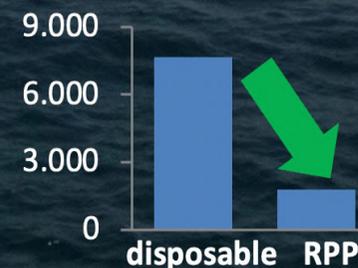
MJ Energy Consumption



-88 %

12 M oil barrels Yr

kg CO₂ Emissions



-77 %

3.300.000 tons Yr



Total Cost of Ownership reduced



Packaging waste elimination.



CO₂ emissions reduced



Increase of Brand perception.



...and, do not forget that the RPP is fully in accordance with the PPWR.

Contacts

Circular Economy
doesn't happen by accident
but through
Circular Design,
attitudes and plans.

Free Pack Net Holding Sagl
Piazza Indipendenza 3
6900 Lugano - CH

Email: info@freepacknet.com

