LIFE COLRECEPS

COLLECTION AND RECYCLING OF EXPANDED POLYSTYRENE (EPS) IN THE URBAN ZONE OF VALLADOLID

Alicia Aguado Pesquera
Technology Centre CARTIF
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LIFE12 ENV/ES/000754

BUT… WHAT IS EPS?

- ✓ *Expanded polystyrene* o *EPS* is also known as *porexpan*, *styrofoam* or *white cork*.
- ✓ It's a plastic material obtained from petroleum with a closed cellular structure and filled with air.
- ✓ It's used in practically any activity due to its excellent properties like its high capacity of protection and its high thermal and acoustic insulation, as well as its lightness and ease of conforming. The most common are in the **packaging and construction sector**.





HOW COMES UP?

- ✓ Today's lifestyle has increased the consumption of plastics, especially those with a short life span such as the EPS.
- ✓ In Spain, 40.000 t/year of waste is generated, 80% goes to landill → 32.000 t/year in landfill.
- ✓ Only in Europe, around 2 million tonnes of EPS were demanded in 2015.
- ✓ EPS waste is **100% recyclable** → disposing in landfill is not a sustainable option, since it misses the full potential of this plastic and reinforces the misperception that they are materials with little added value once it has ended its useful life.

HOW COMES UP?

- ✓ EPS is an inert waste and does not generate any type of derived environmental problem, but it is a non-biodegradable material and can take more than 500 years to be decomposed. In addition, this waste has very low density occupying a high volume and generating space problems in landfills, likewise it disintegrates very easily so it releases little balls that are dragged by the wind generating contamination outside landfills.
- ✓ Therefore, **LIFE COLRECEPS project was proposed, in order to solve this environmental problem and give an added value to a very valuable plastic waste.**

Plastics should never be waste in landfill

HOW TO RECYCLE IT?

- ✓ <u>Current recycling methods</u>: Pressing for briquettes manufacturing or by grinding to reuse it as part of new EPS products → Added value of these alternatives is very low.
- ✓ The incineration is also very common, although only a minimal part of the energy used for its manufacturing is recovered.
- ✓ On the contrary, LIFE COLRECEPS **recycling process gives a great added value to this waste, being able to manufacture high quality new beads of EPS used in new valuable products in the industrial sector as packaging.**

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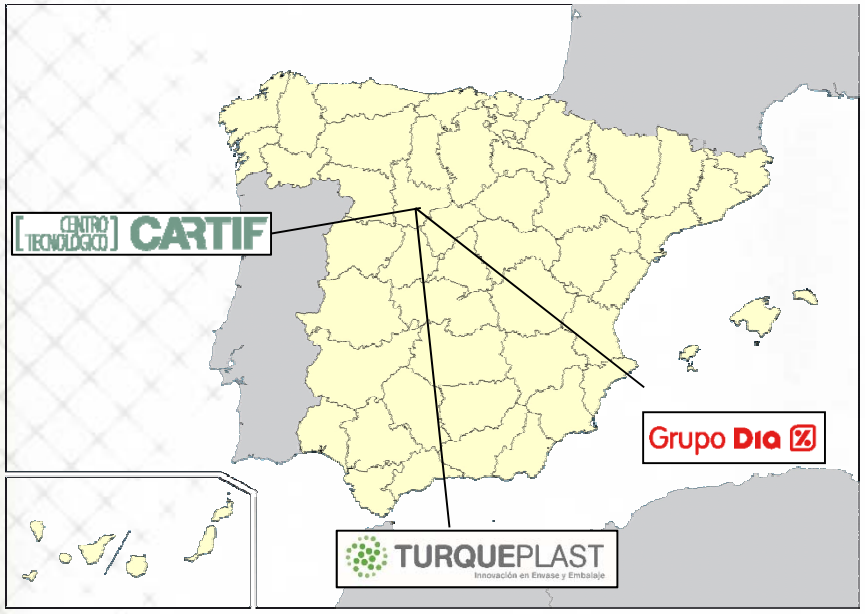


DATES

Start: 01/10/2013

End: 30/06/2017

Duration: 45 months

NUMBERS

Budget: 1.201.933 €

European Contribution: 50%

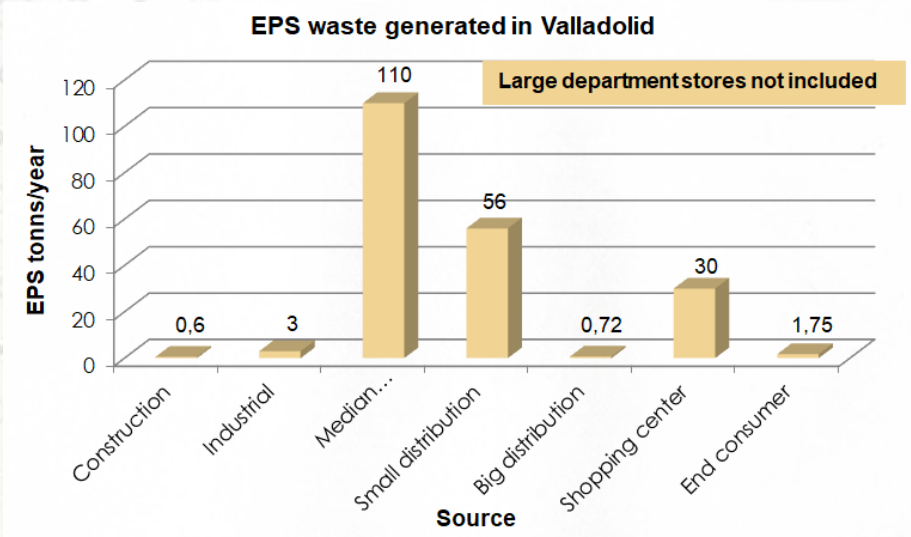
OBJECTIVES

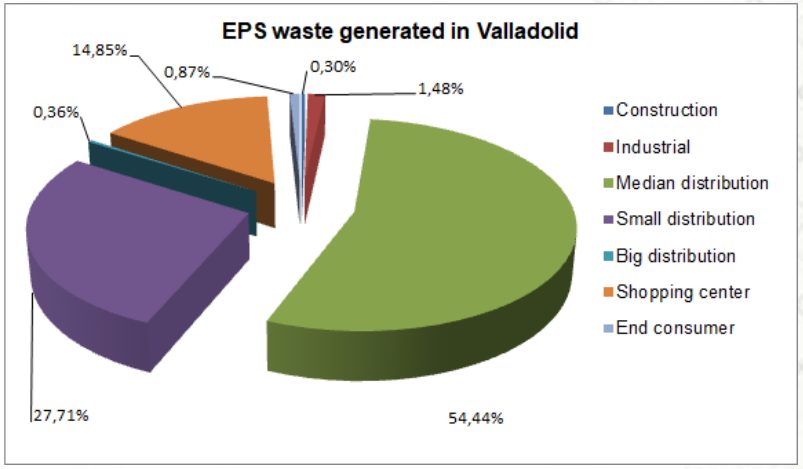
- ✓ The main objective is the implementation of a demonstration pilot plant for the recycling of expanded polystyrene waste to obtain new beads of EPS.
- ✓ These pearls have been used to manufacture new products based on recycled EPS.
- ✓ The application of these new products is in the in the packaging sector.

Close the life cycle of EPS waste, giving them an added value by manufacturing new products

DATABASE

- Detailed information on EPS waste production in Valladolid, by sector of origin, state of waste, etc.
- High ignorance of waste production.





202 t EPS waste / year in Valladolid

LOGISTIC STUDY

Study of the best method of management and collection of waste to the recycling plant.

- Alternative1: Daily collection by waste production centres.
- Alternative2: The waste production centres that have reverse logistics process, will go to the regulatory centre for the waste. Those who do not have reverse logistics will have daily collection.
- Alternative3: Work in collaboration with waste managers.

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RECYCLING PROCESS

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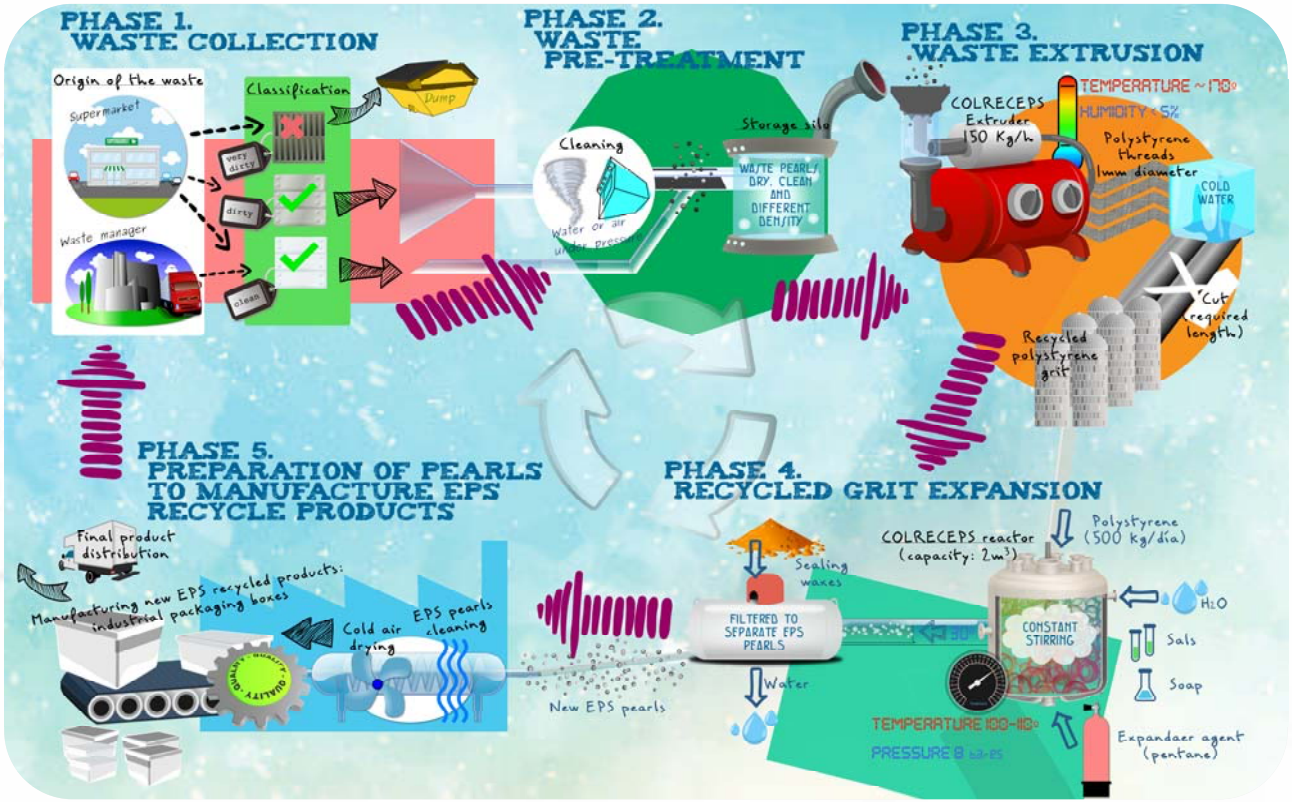

Phase 1 – Waste collection

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RECYCLING PROCESS

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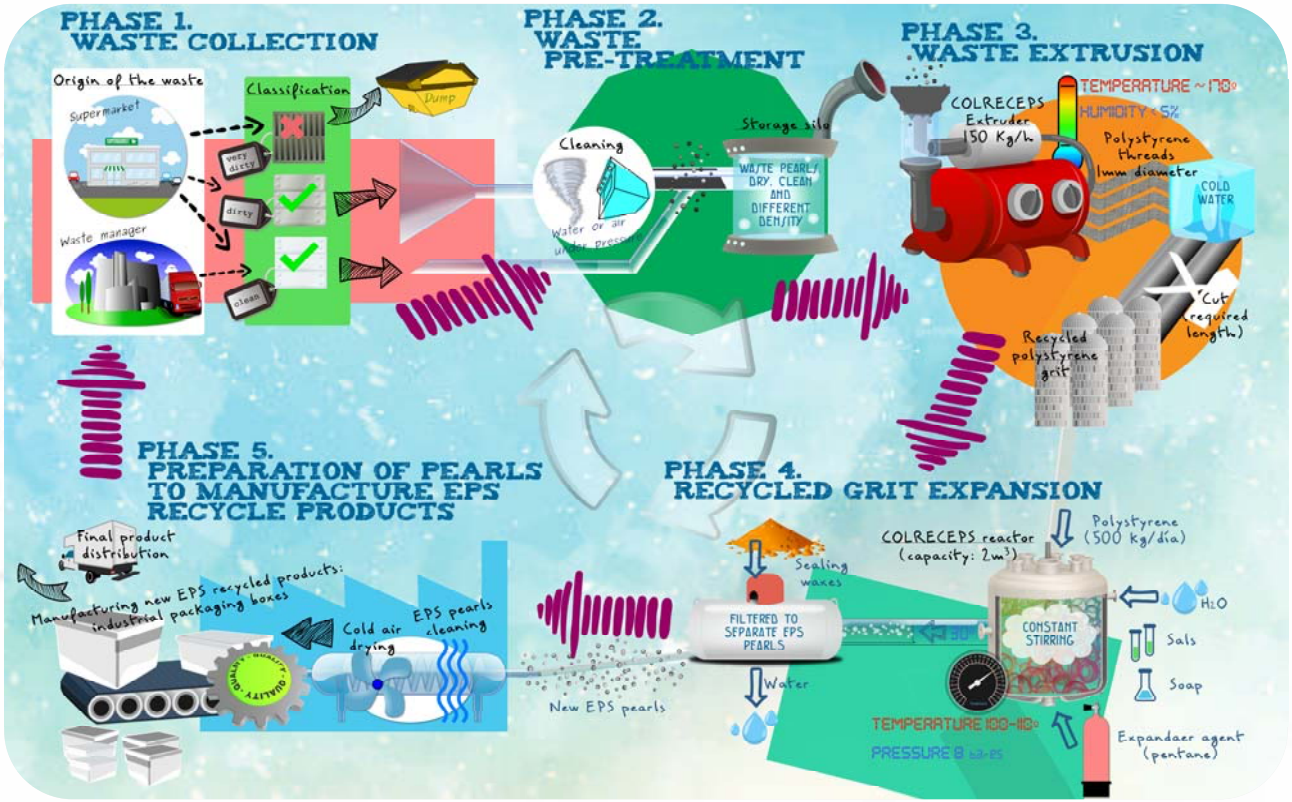

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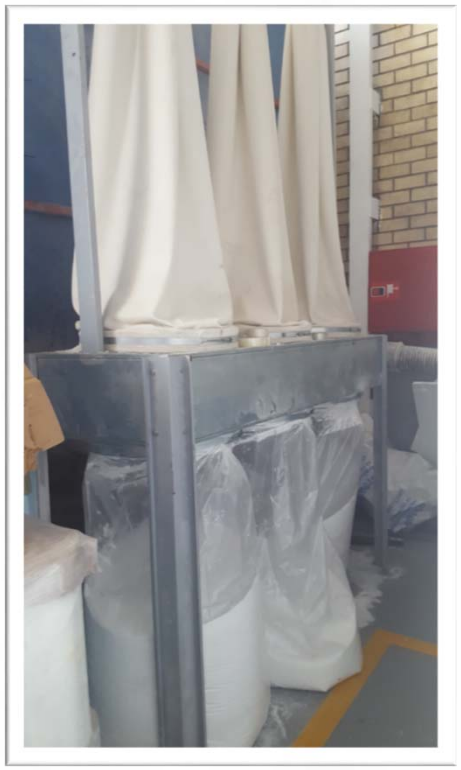
Phase 2 – Waste pre-treatment



1. Grinding mill
2. Storage silos

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RECYCLING PROCESS

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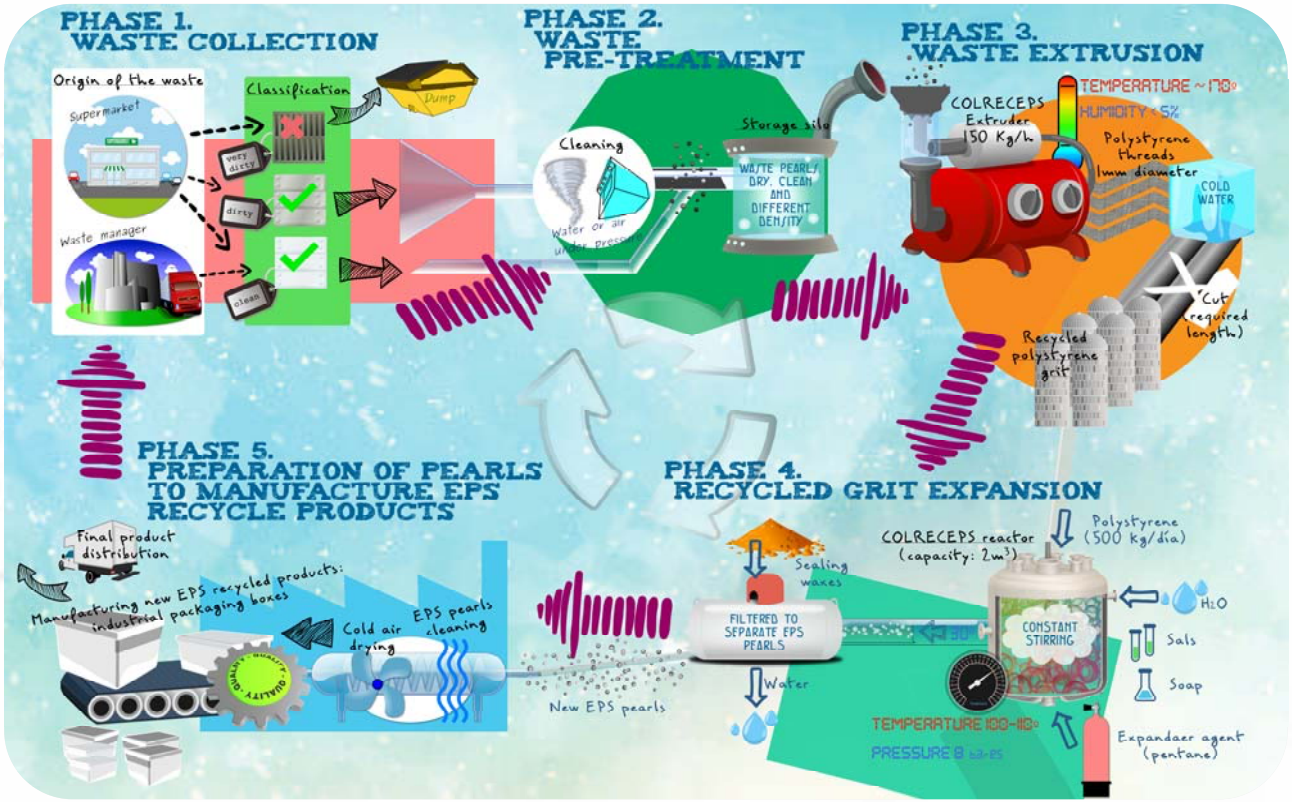

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Phase 3 – Waste extrusion

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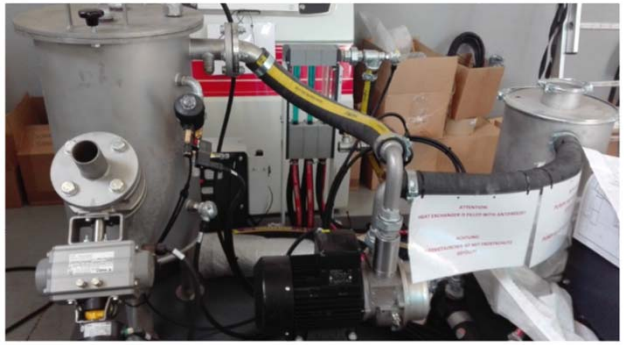
Phase 3 – Waste extrusion

1. Introduction of waste in the extruder

3. Degassing module



2. Extrusion

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Phase 3 – Waste extrusion

4. Micro-cut module

5. Cooling pools

Phase 3 – Waste extrusion

6. Cyclone

5. Cooling module

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Phase 3 – Waste extrusion

Extruder in operation

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RECYCLING PROCESS

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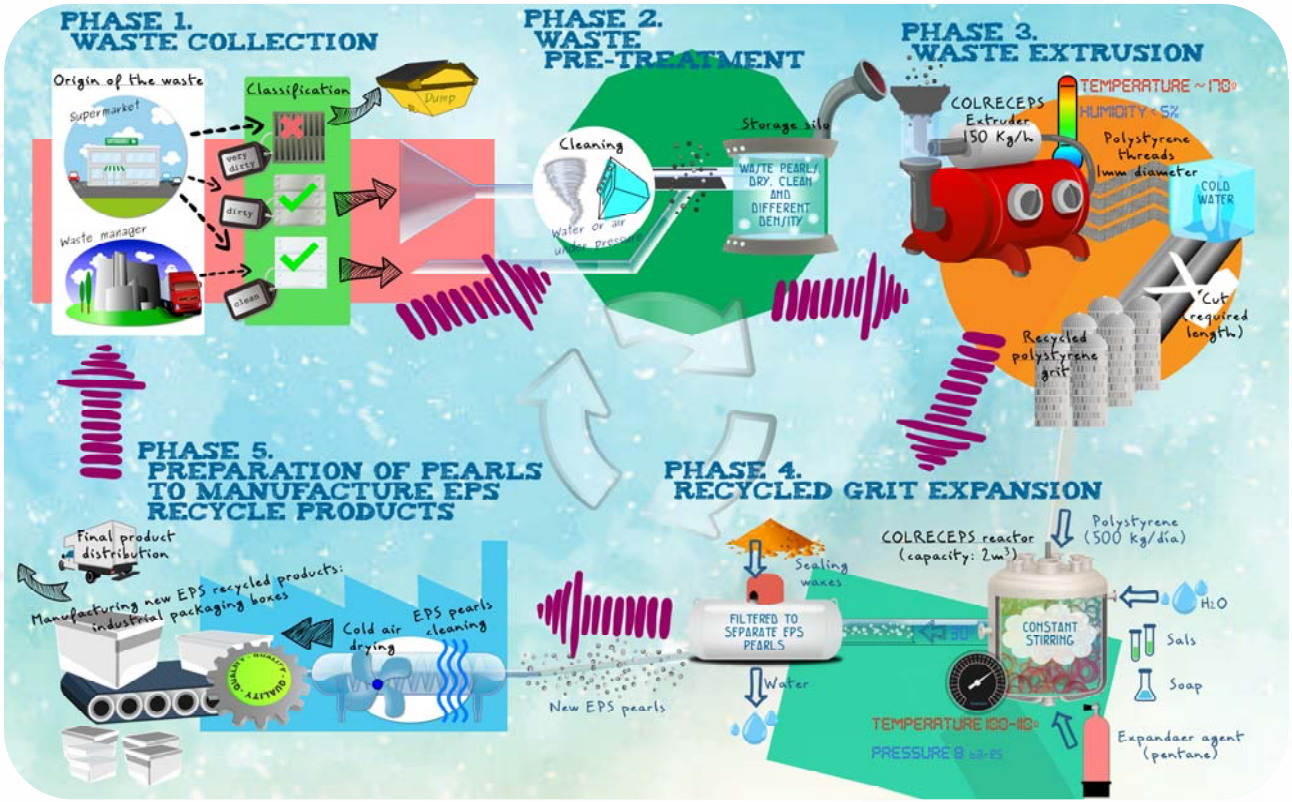

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Phase 4 –Grit expansion

2. Recycled EPS beads

1. Reactor

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RECYCLING PROCESS

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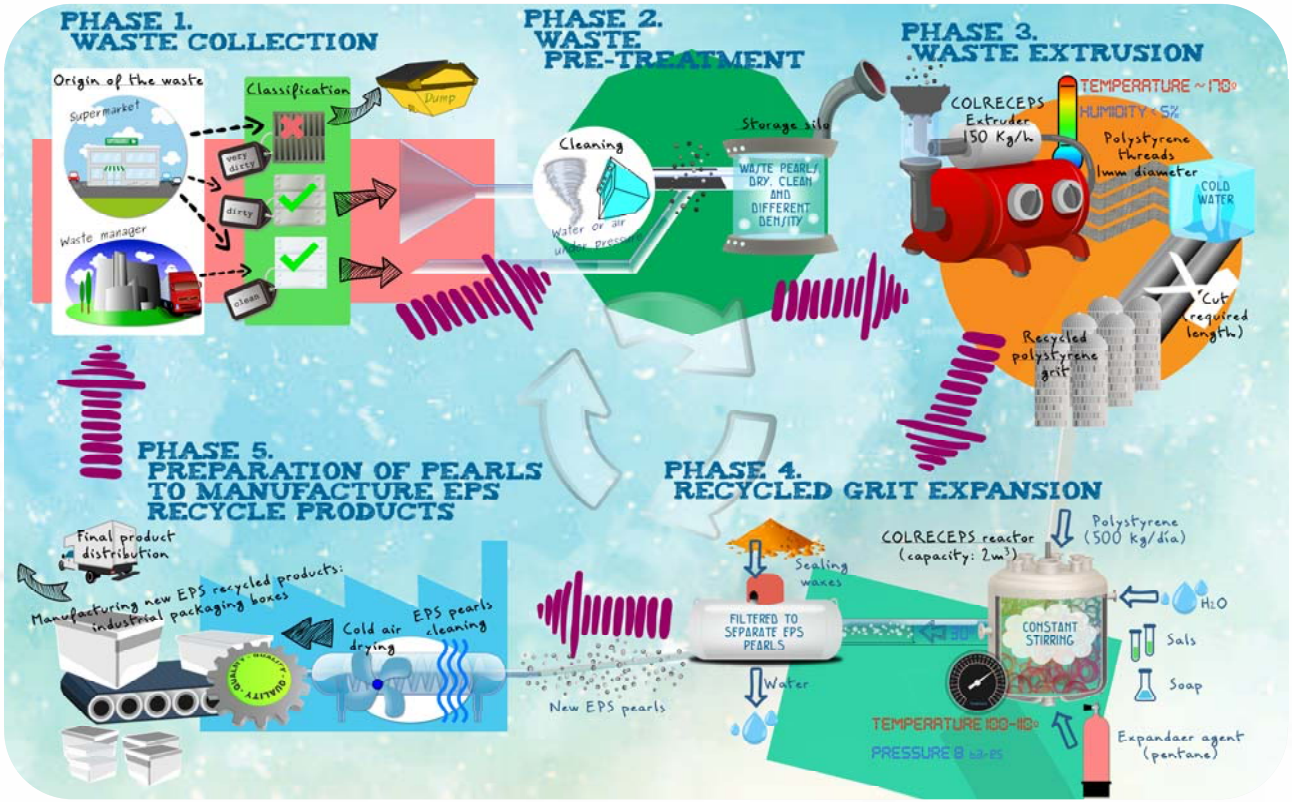
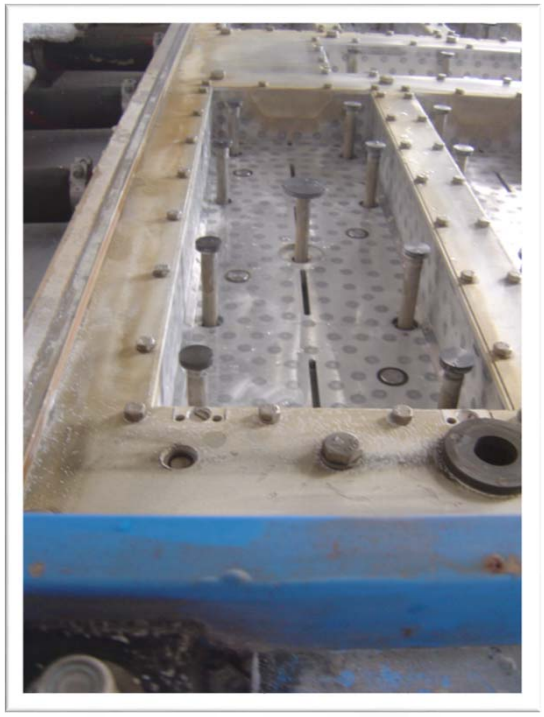


Phase 5 – Manufacturing recycled EPS products

Mould

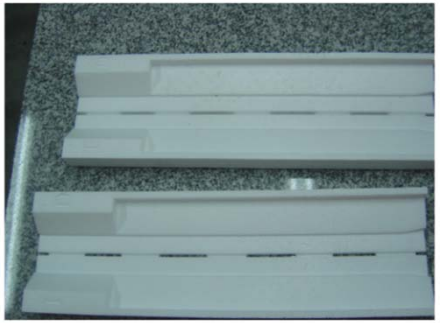


Phase 5 – Manufacturing recycled EPS products

EPS transformation line

Phase 5 – Manufacturing recycled EPS products

New recycled products obtained– Packaging for the industrial sector



RESULTS

- ✓ Develop a **real database of EPS waste** generation in Valladolid (Spain), divided by sectors of origin, as well as their status, characterization, etc. → **202 t/year.**
- ✓ Study the best option for the collection and logistic of EPS waste → working in collaboration with waste managers.
- ✓ Construction of a recycling EPS waste pilot plant, unique in Europe.
- ✓ Recycling of 500 kg/day EPS waste to obtain EPS grit with a high quality, avoiding this amount is sent to landfill.
- ✓ Valorisation of 100% of the waste that enters in the recycling plant.

RESULTS

- ✓ Obtain 0,8 kg of optimum EPS beads for each recycled kg of EPS waste.
- ✓ Manufacture of new products made of 50% of recycled EPS and 50% of virgin EPS → obtain 2.000 packaging boxes used in the industrial sector → fulfil with all the technical requirements.
- ✓ 1 kg EPS recycles cost is similar or even below 1 kg of virgin EPS cost.

EPS waste is a valuable resource because it can be used to manufacture new high added value products

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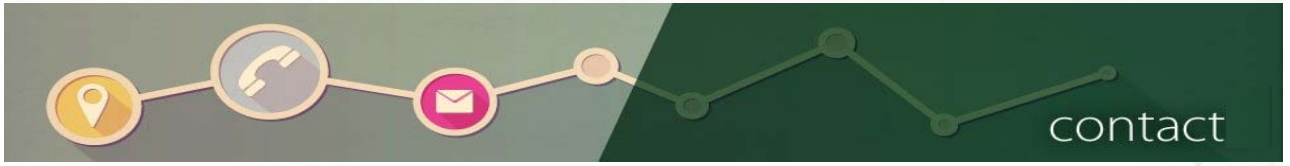

Alicia Aguado Pesquera

LIFE COLRECEPs Project coordinator

aliagu@cartif.es

www.lifecolreceps.eu

@colreceps

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