

# Made of EPS

A NEWSLETTER FROM



**OCEAN  
WISE**

Reducing  
EPS marine litter  
in the North East  
Atlantic

**DGRM**

DIRECÇÃO GERAL DE RECURSOS NATURAIS,  
SEGURANÇA E SERVIÇOS MARÍTIMOS



**Interreg  
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European Regional Development Fund



EUROPEAN UNION



- **LET'S TALK ABOUT**

Seventeen findings on EPS

- **IN THE FIELD**

The EPS cages

- **FOUR QUESTIONS TO**

Julio Maroto, is an expert from CETMAR, a public foundation that aims to improve the quality of life of the marine and maritime sectors through training.

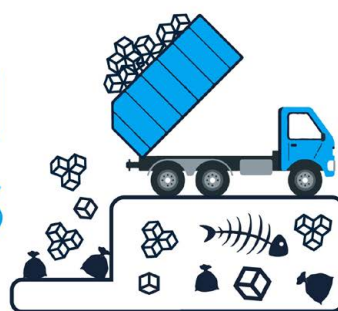
**IN  
THIS  
ISSUE:**

Let's talk about...

## Seventeen findings on EPS

**D**id you know there are millions of EPS fragments lost to the environment that never get captured? Imagine the impact of this reality in the marine environment: where did these go?

**3 million  
cube metres of EPS  
are landfilled each year**



Actually, only 3 million cube metres of EPS are landfilled each year, according to a French recycling company. The statistics continue and the numbers are scary.

Also the European Association of Plastics Recyclers (EPRO) estimated the consumption of EPS in Europe to be 335,000 tonnes in 2015. Of these, 290,000 tonnes were produced in Europe and 45,000 tonnes imported from outside the EU. On this total, EPRO estimates also that only 27% was recycled, 40% recovered and 33% sent to landfill.

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These conclusions are explained on the most recent OCEANWISE Report on research findings following completion of the “State of the art working catalogue/database on the current solutions to recycle, reuse and repurpose”. The ambition of this report is to catalogue data to help the development of solutions to recycle, reuse and repurpose EPS and XPS.

Here, it is important to remember: these materials are 100% recyclable, which facilitates this battle. Therefore, the report says, the focus should be on eliminating its use “where there is a viable alternative” and on “improving the existing collection and recycling infrastructure”. And the essay brings good news: despite the large volumes of EPS placed on the market, “it is not a major waste stream



compared to other materials such as glass, paper and other plastics”. How did we get here? On the Household Waste Characterisation Campaign Report for the Environmental Protection Agency in Ireland, RPS Group estimated the number of EPS and XPS placed incorrectly in the Mixed Residual Waste bin and there was approximately 2.3% of this material, which is less than 1% of the overall waste.

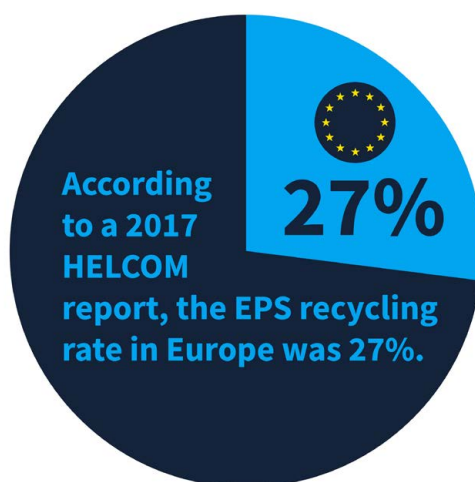
So, how should this material be recycled? This essay reports two ways to do it:

**It can be reground and added back into a manufacturing process to produce EPS, or;**

**It can be compacted and then subjected to a chemical process making the resulting material suitable for production into Polystyrene items.**

And in this process we can actually avoid chemical processes, too. EPS and XPS can be subjected to mechanical recycle action: there are already many companies focused on selling compacting and recycling machines for post-industrial EPS waste.

The report tells us that knowing the recycling rates for this material is still a challenge for international organisations, due to the lack of verifiable data on production and waste - as we mentioned in the previous newsletter. But there are estimated numbers: According to a 2017 HELCOM report, the EPS recycling rate in Europe was 27%. However, the OCEANWISE report tells us that “this figure is unlikely to include all in-house recycling activities carried out by manufacturers, both of their own production waste (reuse) and their customers’ EPS waste (recycling)”.



It is against the lack of definitive information that the OCEANWISE reports fight. **Therefore, we share 17 findings about recycling and alternatives for this material, explained through this essay.**

**1**

## **Difference between Compacting and Recycling**

As EPS is 98% air EPS, that cannot be recycled on-site by a business, needs to be compacted to remove most of that air, prior to being transported. It can then be recycled into new products.

**2**

## **EPS Recyclers Database**

A comprehensive database has been completed of EPS recycling operations in the focus countries (See Table 3 below). 154 recycling companies in total were found. Details of individual recycling operations are included in each of the country factsheets of the report.

**3**

## **EPS Recycling Rates**

Up-to-date data for the recycling rate for EPS was not available at the time of publication. An average EPS recycling rate of 28% was noted from this data; however this includes significant variations (e.g. the Netherlands at 60% Vs. Iceland 0%). More recent data for some countries can be found on pages 15 and 16 of the report, however various measurement methods are in use.

**4**

## **XPS Recycling Rates**

No figures were found for the recycling rate for XPS, as there is no mechanism to capture the reuse activities of XPS manufacturers. This finding also reflects the lack of specific XPS recycling systems or projects found.

**5**

## **In-house reuse and recycling activities**

Much EPS and XPS reuse and recycling is carried out by EPS and XPS manufacturers in their factories, of production waste and from customer waste returned through take-back schemes.

**6**

## **Demand for recycled material**

Demand for any recycled plastic material remains low with only 6% of recycled material currently replacing virgin demand. Most recycled EPS/XPS goes back into construction and/or insulation or low-value items such as hangers and garden furniture.

**7**

## **HBCDD**

HBCDD fire-retardant was banned in 2016; however it is still found in waste EPS/XPS coming from demolition sites and must be treated prior to recycling.

**8**

## **EPS & XPS and Waste-to-Energy / Incineration**

While some WtE operators e.g. in Denmark are happy to receive large volumes of EPS and XPS, this is not the case for many WtE / incineration plants in the focus countries.

**9**

## **EPS & XPS Research and Recycling Projects**

There are a number of EPS/XPS research and recycling projects currently ongoing and completed within the EU. Details of these projects can be found in the report.

**10**

## **EPS Recycling Commitments**

The major EPS manufacturers, through their representative organisation, EUMEPS, have committed to work to increase the recycling rates for EPS. EUMEPS has pledged to achieve a 46% EPS recycling rate by 2025.

**11**

## **Operation Clean Sweep®**

This is an industry-led programme which works on minimising pellet-loss during the production and transport of EPS and XPS, to which most EPS and XPS manufacturers subscribe.

**12**

## **Approaches to post-industrial and post-consumer EPS & XPS waste**

Different approaches have been adopted to post-industrial and post-consumer waste. As there is less infrastructure in place to capture the latter, it is at higher risk of becoming marine litter.

**13**

### **Different approaches taken by industries and countries**

Various approaches to post-industrial and post-consumer waste have been adopted by industries and by individual countries. It's difficult to determine if there is a correlation between the approaches taken and the recycling rates for EPS and/or XPS.

**14**

### **Conflicting data-sets**

Diverse approaches to the collection of data and reference points lead to varying figures available for both production and recycling rates. A consistent approach is required to provide accurate data on EPS and XPS recycling rates.

**15**

### **EPS Recycling Case Studies**

There are a number of successful EPS recycling systems and operations currently in operation in a number of countries.

**16**

### **Lack of Awareness and Understanding**

Despite industry attempts to educate both business and consumers, there is a perception that both EPS and XPS are difficult or impossible to recycle.

**17**

### **Lack of Reuse / Repurpose options**

While both EPS and XPS can be recycled, there is a dearth of options to repurpose or reuse them once used.

## The EPS cages

**F**reedom implies also responsibility. That's why a cage was set near the docks in the city of Setúbal, in Portugal. Yes, a cage. In it, there are no birds, but EPS and XPS. For years, restaurants in this popular area have asked for a solution for the white coat of waste from fragmented EPS boxes that spreads on the seafront on windy days, because there's no place to deposit the fish boxes that bring fresh fish and seafood to restaurants only to get discarded by lunchtime.



This case-study was developed by the municipality of Setúbal and the cage was installed on March 19 this year. It has a maximum capacity of about 100 boxes and the daily volume deposited there is about  $\frac{3}{4}$  of the total

volume of fish boxes that would otherwise be left in open air waiting for the waste management trucks to pick them up. We talked to councilor Carla Guerreiro, currently responsible for the municipality's urban hygiene department, and she told us how they came about with this idea: "the entry of the recycling bin is too small for the size of the EPS boxes, which always leads to the boxes being deposited on the ground next to the recycling bin".

It's good to remember the damage that fish boxes made of EPS or XPS do to the environment and remember the information we talked about in the first newsletter.

This material is a common problem for marine wildlife and humans.

Not a lot of EPS gets recycled, due to the low cost-effectiveness rate of transporting and recycling expanded material – it weighs too little in relation to its volume. The lightness of this material makes it easy to be blown away, getting scattered on the ground and being a common marine litter item in the European Union

and worldwide. OSPAR beach monitoring reports say small pieces of expanded polystyrene are amongst the most common types of marine litter items found. Moreover, because it flakes so easily and gets fragmented into small particles, it can randomly travel long distances. This problem is exactly the motto for the work developed by the OCEANWISE project.



Back in Setúbal, there is now an added challenge facing this polystyrene cage: the collection of this waste. Carla Guerreiro says that a waste collection entity was asked to integrate the cage site into its route, “but as this collection is not daily and the boxes have some contamination with fish remains”, this collection is not happening as it should.

We know from one of the active OceanWise Portuguese stakeholders, representing the BEWiSynbra factory, that collecting EPS and XPS and treating the material through a non-chemical process, and then transforming it into granules can be a profitable business. As we told you in the first newsletter, BEWi is delivering vertical compacters in some fishing ports in the country, capable of crushing the fish boxes and allowing the company to transport more material in one trip.



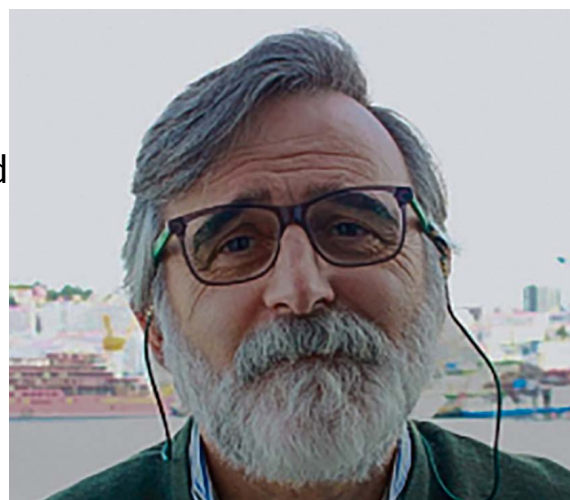
As for the EPS cage in Setúbal, the results of the initial trial is proving the effectiveness of this strategy to capture discarded fish-boxes from a commercial area. The municipality now wants to expand the experience to “other restaurant areas with a large production of EPS boxes”.

In addition to this cage, an ash-deposit box was installed, allowing for the ashes from restaurant roasters to be deposited safely – a very thoughtful idea from Setúbal, the land of grilled on fire fish. Up until now Carla Guerreiro says that “the ashes were dumped into the river, on the ground next to the containers or into the containers themselves, often still on fire, which led to several fires”.

# Four questions to

## JULIO MAROTO

**J**ulio Maroto is an expert from CETMAR, a public foundation that aims to improve the quality of life of the marine and maritime sectors through training. He was recently involved in a critical essay about the use of EPS and XPS and their life cycle. It's called "Essay on the commercialization chain for refrigerated fishery products packed in EPS/XPS, as well as their management cycle, processing and recovery of their waste within the European countries in the Atlantic Area. Assessment on usage of bioplastics as alternative to EPS / XPS materials". Based on his experience, we challenged him to be a part of this section of the newsletter and explain to us how far we've come on this battle.



### **Is the number of EPS/XPS alternatives growing as much as it should? Why?**

The best possible alternative would be that of a material with which boxes and other elements with characteristics similar to EPS / XPS and which are biodegradable in the marine environment can be manufactured. According to the findings of the OCEANWISE consortium, these alternatives are very scarce on the market and very expensive. Therefore, for the moment, the possible alternatives have not experienced growth.

The reasons can be of very different types: probably, and in this regard I do not have a well-founded opinion, scientifically and technologically it should not be easy to develop a material with these characteristics and, at the same time, be competitive in price with the materials already known.

## **Which country has performed better on alternatives, in your opinion?**

I do not have an opinion on this question. In reality, it is the large companies that carry out their activity in the sector of the manufacture of raw materials for plastics who invest in developing alternatives. Once they have achieved them, all countries market them and adopt them because they are obviously an advantage. Therefore, I do not believe that some countries have performed better than others on this issue; all of them are waiting for solutions from the industry to arrive.

## **And what is the best alternative invented so far? Why?**

When it comes to alternative packaging, the options I am aware of are very few and perhaps incomplete. It is therefore difficult to pronounce on this point. At the moment, I think that the best alternative is to promote the awareness of citizens and companies that use these products so that they increase their social awareness and contribute to a more intense recycling and, in the same way, it is extremely important to introduce improvements in management flows, segregation and recycling of this type of materials (and any type of waste) to avoid “leaks” that can reach the sea becoming marine litter. The preventive approach is as important as the use of other more sustainable materials.



## **What is CETMAR's next step in this area?**

For years CETMAR has been working on the issue of marine pollution in general and, logically, on marine litter. Our participation in OCEANWISE, a project focused on the EPS / XPS problem, is not an isolated event. The extensive knowledge acquired in this project will help us to participate and promote future actions under a broader knowledge.

## The OceanWise project is co-financed by the European Regional Development Fund through the Interreg Atlantic Area Programme

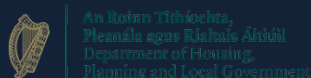


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