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# Made of EPS

A NEWSLETTER FROM



**DGRM** DIREÇÃO-GERAL DE RECURSOS NATURAIS,  
SEGURANÇA E SERVIÇOS MARÍTIMOS



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Kevin O'Donoghue, Department of Communications  
Climate Action and Environment of Ireland

**IN  
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ISSUE:**

# WELCOME (AND THE PERKS OF CHANGING THE WORLD)

Night falls, the sun is waiting, it's time to dock the boat. In the small fishing town of Peniche, in Portugal, the fishermen return from the high seas with the fish and now roll up their sleeves to sell it at the dock. Auction-style or to order. The dirty and wet galoshes, which are not afraid to step on the already dirty floor and sales starts, hurried from side to side. "We have to sell, we have to sell". They scream for the fish and exposed it on a white platter, common to all types and shapes of fish.

Here, they call it "box", no more than that. Science has called this material EPS (Expanded Polystyrene products) and the data show that it is one of the biggest predators in the plot that is ocean pollution. The fish goes, the white platters end up where they came from: in the sea.

**EPS or XPS is a common problem for the marine wildlife and for humans, especially around the European Union's Atlantic coasts and sea.**

Generally used to produce packaging or in the construction sector, although it is recyclable material this process is a rare phenomenon. This is largely due to the low cost-effectiveness rate of transporting and recycling of expanded material – it weighs little in relation to its volume. The lightness of this material makes it easy to be blown away from landfills, getting scattered on the ground or, as often occurs, at sea, contaminating the food chain. OSPAR beach monitoring reports say small pieces of 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 the motto for the work developed by the OCEANWISE project, which already promises to make the world a better place. But did you know there is a company that already shows evidence of really changing the world in this field? BEWiSynbra has only existed for a year, but it is already the only company in Europe that makes total recycling of EPS. A process based on the concept of circular economy. And speaking of circular economy: in Spain, there is a team dedicated to creating a tool that aims to help European companies to apply circular economy in their businesses. In Ireland, the Principal Officer of the Waste Policy and Resource Efficiency Division at the Department of Communications, Climate Action and Environment told us how his country is currently positioned on EPS recycling compared to other. And what does the famous Green Deal say about recycling EPS? We explore all of these topics in this newsletter.



# Let's talk about...

## HOW GREEN DEALERS ARE WE?

Published in December 2019, the European document Green Deal, as it came to be known, opens the door to a deeper discussion on environmental sense and citizenship in Europe. The common agreement is a set of policies and strategies articulated by the European Commission in order to contain the threat of global warming. They are spread over ten main areas of action – amongst which the promotion of recycling and circular economy. Regarding the announcement of this document, Commission President, Ursula von der Leyen, said at the time that the main objective of this document "is to reconcile the economy with our Planet". Within a year, the agreement must be revised, just at the same time when the OCEANWISE project will publish its final report, with recommendations and concrete proposals for improving the management of EPS and XPS end-of-life products. Opportunity alert: after all, where do these materials come into the European agreement? **The matching deadlines give OCEANWISE the chance to enter through the green door and help to raise awareness of the economy and communities about the need to invest in EPS / XPS recycling.**



Not only on dates are they coincidental. It can even be said that the OCEANWISE project, which started to be approved in 2016, and the Green Deal are close relatives. **We quickly found more than a dozen parameters where both goals and ambitions match.** With the help of Maeve Thornberry & Associates, that provides research and report writing to organizations, we defined which battlegrounds we have in common with Green Deal.



In the Green Deal we find the direct link to the biggest motto of OCEANWISE: “[protect, conserve and enhance the EU’s natural capital](#)”. The OCEANWISE project is committed to this end, developing long-term measures to reduce the impact of EPS and XPS in the North-East Atlantic Ocean. It seeks to do so by finding ways to better manage these materials at end-of life, making it possible to reduce the amounts that are found as marine and beach litter. In addition, this objective links directly to the plan for Member States to restore the areas covered by the Natura 2000 network – many of which on the edge of the North-East Atlantic.



[Increasing the use of recycled materials so that the need for virgin resources is reduced is one of the ambitions of the Green Deal, and OCEANWISE has already shown work in this direction.](#) Mainly, through initiatives in which the EPS and XPS used are captured by industrial users and recycled, to become new products, replacing the use of new resources. If the recycling rate increases, naturally the demand for virgin resources will be reduced. This culminates in less non-renewable resources in use and, likely less marine pollution.



The Green Deal raises a warning: to think about recycling per se will not be sufficient; the discussion must go further and think about economically viable alternatives. [The agreement aims to make it a requirement that all packaging on the EU market be reusable or recyclable in an economically viable manner by 2030.](#) EPS and XPS meet this ambition and the OCEANWISE project has already proven, with several initiatives, the recyclable and economical potential from the use of these materials, 100% recyclable. The EPS Life Sure project has certainly tested that EPS can be recycled into new polystyrene containers. The ongoing PolyStyrene Loop initiative is also proving that even EPS waste containing flame retardants can be recycled into new construction products.





Construction is one of the sectors which makes more use of EPS and XPS, for insulation and soundproof systems. The same in engineering applications, such as building bridges and foundations. Being aware that construction is a very polluting sector, the Green Deal intends to [make it mandatory that construction materials have a minimum amount of recycled content](#). This of course meets the objectives of OCEANWISE, which promotes an increase in the amount of EPS and XPS recycled, so that it can also increase the incorporation of these materials in the manufacturing processes of companies.



"Take, make, use and dispose of" was taken, until recently, as an European motto. But even before the publication of the Green Deal, the EU recognized that it was not a sustainable strategy. This awareness led, moreover, to the creation of the Circular Economy Plan, in the year 2015. And the Green Deal followed this new way of thinking, stating that [markets for neutral climate and circular products must be developed under a new policy structure](#). EPS and XPS recycling fit this.



For all purposes there is a way to get there. And to achieve the goals of recycling EPS and XPS, it is important to study how the market works today: how many companies can we find which transform these materials? Are they sustainable? In the answers to these questions lies one of the biggest goals to increase the recycling of these materials. OCEANWISE was able to ascertain that the large EPS and XPS transformers' Industry support a large number of micro-enterprises and SMEs. The majority are small companies, but the recycling process requires a lot of work on their part, as they must have the necessary systems to compact and recycle. The burden on these companies is a risk, and puts the entire recycling ecosystem for these materials at risk, too. The solution will be to promote the development of more recycling infrastructures for EPS and XPS waste products, generating additional jobs. Which meets the Green Deal's goal of [stimulate sustainable markets and jobs](#).



OCEANWISE data also shows that the implementation of policies to manage EPS and XPS recycling continues to happen only at a local and regional level, generating an international imbalance in recycling rates. Just look at the example of these two almost neighbouring European countries: Denmark and Norway. In the first case, the EPS recycling rate is 17%. A number that is subdued by Norway's 70%. Increasing the recycling of these materials, whilst trying to make it economically viable requires a cohesive approach among all member states of the European Union. One of the Green Deal's goals is [to develop a common methodology for sustainable products](#).



Energy poverty currently reaches an average of 7% among EU countries and even in countries with milder climates, such as Portugal, the percentage comes close to 20%. Better-insulated houses require less energy for both heating and cooling. That's one of the reasons why the Green Deal intends to [double the rate of efficiency and renovation initiatives, to comply with existing legislation on the energy performance of buildings and to create more sustainable school buildings](#) in order to promote increased demand for insulation products. OCEANWISE has demonstrated the potential for recycling opportunities for these materials, which are abundant at the end of life. All together, it will help to combat what is also one of the problems pointed out in the Green Deal: energy poverty.



One of the advantages of recycling EPS and XPS comes from the properties of this material and which justify its use for different purposes. For example, in the food sector these materials help to transport fresh food such as fish, meat, fruit and vegetables. As well as hot food. These materials easily control the temperature of the stored product, are lightweight and protect even the most delicate products on long journeys. Therefore, they are a reliable alternative to ensure that food remains fresh, reducing food waste. One of the ambitions of the European agreement is precisely the [Farm to Fork strategy, "for a fair, healthy and environmentally-friendly food system"](#).





Even at an organizational level, OCEANWISE and the Green Deal have something in common. [The European agreement promotes, among other strategies, that collaborations between associations dedicated to research, between higher education providers and between companies are fundamental](#), so that the policies recommended or implemented are better informed. The OCEANWISE project currently works with a network of 13 international partners, including public sector organisations.






# in the field

## BEWI FACTORY "WHAT GOES AROUND COMES AROUND"

It feels like when we launch a boomerang: if you do it right, it doesn't matter how far it gets, because it will come back towards us. This is the ambition of the BEWiSynbra company: to make all the EPS and XPS produced arrive back at its factories, to be recycled and transformed, sold and then return yet again later. "It is the real circular economy in action", says the Portuguese managing director Pedro Luís. With recycling factories in five countries (Portugal, Sweden, Norway, Finland and Denmark) and just one year of existence of this strand of action – it was already one of the largest producers of EPS –, the company wants to promote the often-overlooked idea that these materials are 100% recyclable and should not end up in landfills or in the oceans, as they usually do.



BEWiSynbra collects EPS and XPS, treats the material through a non-chemical process, transforms it into granules and sells it to companies that will give it other forms

We are in Almargem do Bispo, one of the most rural villages in the municipality of Sintra, Portugal. Amidst old and renovated houses, a set of large white pavilions stands out. As soon as we get there, we are overwhelmed by the factory noise that echoes from this place: blades in motion, objects in crushers, things to be dragged and – by the steam that is noticeable in the air –, and also things to be heated to high temperatures. We are at the Portuguese BEWi factory, where a thousand tons of EPS and XPS are being prepared to be transformed: clean of impurities and gases, recycled and ready to be used again for countless applications: in the construction sector (for the insulation of houses), for fish boxes, for cold or hot food packaging, in the pharmaceutical industry for the transport of drugs, among others.



It seems impossible that the idea is new in Europe: to build a factory capable of recycling 100% of all the EPS and XPS that arrives. So far, as explain by Pedro Luís, "there were companies that did it, but the recycled material could only be used in construction". "EPS plates were placed in the houses, for their insulation, and stayed there. To produce more, we would always have to resort to virgin raw materials and not recycle the existing one. There was no solution to what, in my opinion, was the biggest problem, that is the fish boxes." With the new tools that BEWi currently has, capable of removing all impurities and gases from the material through a non-chemical process (using only water and high temperatures), the opportunities that come from recycling are endless.

After the process, the treated material is no longer EPS or XPS and becomes only PS (polystyrene), because it is no longer an expanded material. "It returns to being a final product". In the end, it looks like small pearls of sand. Almost translucent (because all the dirt that came with it was removed from the material), smooth and light.





In Portugal, the company is already able to recycle 98% of all EPS and XPS produced. “What goes around comes around”. One of the biggest reasons for this successful statistic is because the company was able to implement a system for collecting these materials from the docks, from north to south of the country. Pedro Luís recalls that the challenge was precisely where to place the fish boxes after being used by the fishermen and then transporting them. “The fishermen ended up leaving them on the ground or trying to break them so that they could fit in a common waste container – and there were always pieces that fell to the ground and went with the wind or to the sea.” Therefore they decided to implement large EPS ecopoints on the docks – an ample space limited by railings, where BEWi will later collect the discarded boxes.

Transport itself can be an “ungrateful” process, says Pedro Luís. It is a very light material, but it is really bulky, so it does not make travel profitable. To face this challenge, BEWi is delivering vertical compactors in some fishing ports in the country, capable of crushing the fish boxes and allowing the company to transport more material in one trip. Both ideas emerged from multiple meetings with the OCEANWISE project, with whom Pedro Luís has been in contact for at least three years – even when he worked in another EPS treatment company.

The next step for the company is to enter the food industry directly. In Sweden and Norway, where they are based, they are already developing partnerships at laboratory level with some other companies. The point here is to ensure not direct contact, but the manufacture of that packaging with an outer layer. The path involves a series of tests and certifications, to ensure that the final product is safe in an industry as sensitive as food industry. But the managing director already estimates the certification “will arrive next year, guaranteed”.





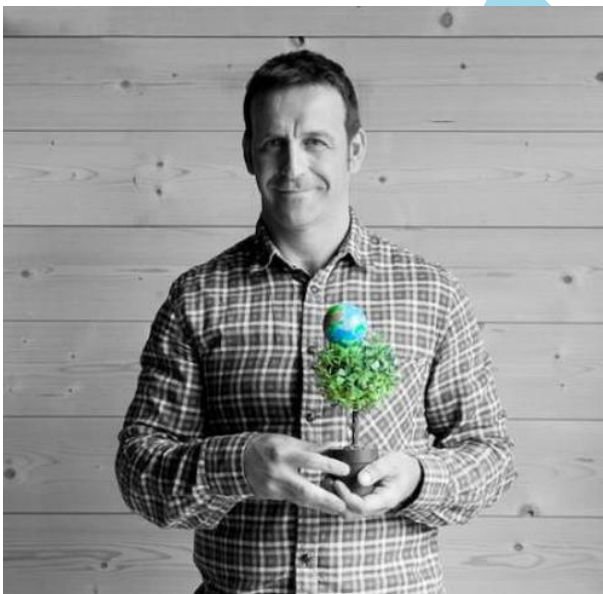
# CIRCULAR ECONOMY FOR ALL

*"Here's where redesign begins in earnest, where we stop trying to be less bad and we start figuring out how to be good"*

This quote is very familiar to Carlos León. It sounds like a new beginning and reminds him of the change he decided to make in his life in 2013, after reading this sentence in the book *Cradle to Cradle: Redoing the way we do things*, published at the beginning of the millennium by the German chemist Michael Braungart and the architect American William McDonough. "I started to think if I could dedicate myself to an activity that adds value to society, taking advantage of my experience in designing and developing systems and products, so as not to generate waste in the product design phase".

At this time, he was also beginning to understand the concept of the circular economy, while the European Union was taking its first steps in the development of an action plan for the circular economy - published in 2015. "From there I decided to start the adventure to create a consultancy and finally..." Sustainn was born in late 2014. **Carlos Leon is the co-founder of this company that helps "companies and administrations to implement the principles of circular economy in their activities based on strategy, business model and development of products and services"**.

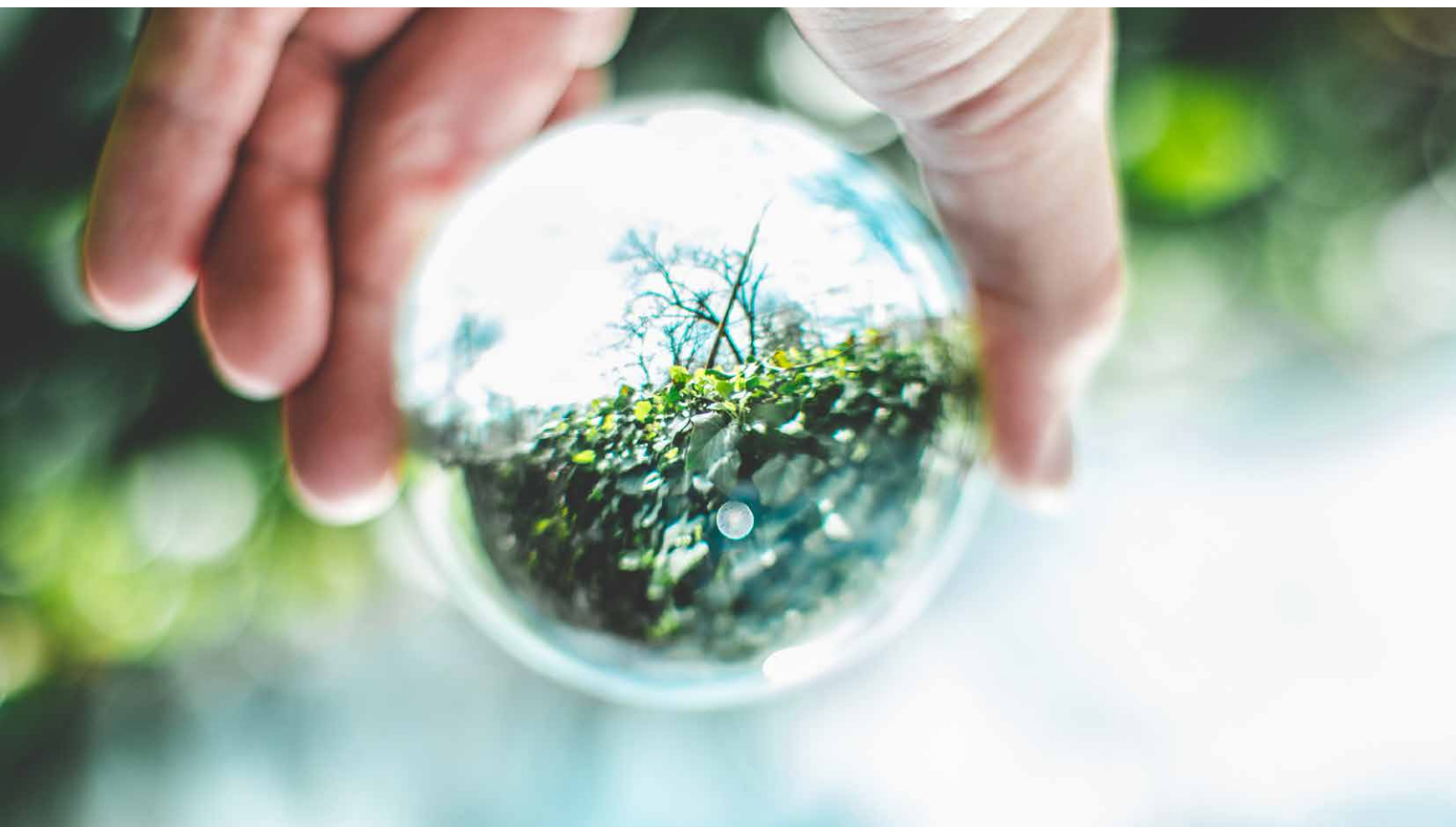
This company, located in Pamplona and Barcelona (Spain), not only provide consulting services to accompany organizations "in their transition to circular economy in a sustainable way", but also develop methodologies and tools to help other companies implement it. "Always thinking about the triple dimension: economic, environmental and social", says Carlos León.



**Carlos León, co-founder of Sustainn**

One of those projects is being developed within OCEANWISE. Sustainn **leads the work package called WP6 (Circularity Indicators and Tools) that aims to create a methodology to evaluate the circularity and sustainability of current Expanded Polystyrene (EPS) and Extruded Polystyrene (XPS) solutions**, “as well as alternative solutions that may arise as a result of the development of the project”. This work can also help make alternative products and applications for EPS / XPS more circular and sustainable.

**How exactly will this work out?** “First of all, it helps to map of the value stream of the product or application and to identify all possible variants. Subsequently to identify the economic, environmental and social impacts throughout the life cycle of a product or application and to measure its circularity and sustainability. It helps also to identify critical parameters related to sustainability and circularity and to, finally, identify opportunities to improve circularity and sustainability throughout the life cycle of a specific EPS / XPS product or application.” The co-founder of Sustainn also tells us that there is the ambition this tool can help “other agents in the value chain to assess the economic, environmental and social impact of their activities and potential improvements to their processes and technologies throughout the life cycle of EPS / XPS products and applications”.





## Location matters

In any case, being aware of our ecological footprint of our products is the principle of everything. The result depends not only on the product produced – and the materials that compose it. Neither only from energy consumption and the generation of waste and emissions in all operations throughout the life cycle of this product, as well as transport activities. **According to Carlos León, it is important to realize that “the degree of socio-economic development and the technologies available in each location have an important influence on the environmental impacts that are produced”.**

Since we speak of location as a factor, which countries are better on applying the circular economy? The co-founder of Sustainn does not hesitate to point out the countries of northern Europe (**France, Holland, Denmark, Norway and Sweden**) as the following examples. And justifies: in general, they “have more integrated care for the environment in society and have an advantage in the development of policies and strategies at a country level. Therefore, it is easier to implement all these concepts in different areas, from education, entrepreneurship to companies with the development of new business models, products and services”.

In Spain, his native land, “environmental awareness has been increasing little by little in recent years” but the concept of circular economy “has not just reached citizens or small and medium-sized companies”. In his view, the development of practical tools and methodologies like those you are creating can be the key to success. While recognizing that it is necessary to go further and start by taking these tools to schools and universities, “so that new generations already have this concept integrated and can use it in their daily consumption decisions and for the development of their professional careers”.



# Four questions to

## KEVIN O'DONOGHUE

**Principal Officer of the Waste Policy and Resource Efficiency Division at the Department of Communications, Climate Action and Environment of IRELAND**

**How is Ireland currently positioned in EPS recycling compared to other countries?**

**What is done and what is expected to be done?**

Ireland has made some major progress in recent years in terms of material recycling but Expanded Polystyrene Foam is not commonly recycled and is placed in the general waste bin.

**Where does Ireland detect the greatest presence of EPS?**

We have a website called [mywaste.ie](https://mywaste.ie) that has information for householders and commercial operators on waste issues. The EPA completed a waste characterisation study in 2019 showing the make up of household and commercial bins. All sectors need to examine how they will assist in our transition from a linear to a circular economy and the removal of difficult to recycle products is one way to help achieve the changes required.

**What is the next step in Ireland on EPS recycling?**

Ireland recently published a new 5 year Waste Action Plan for a Circular Economy and the steps we are going to take across all waste streams are clearly laid out in this plan. Manufacturers and product designers have a critical role to play in phasing out the use of materials that are not commonly recycled.

**What are the biggest challenges in the world regarding the recycling of this material?**

Recycling facilities are constantly evolving and will look for any value materials that can be easily recycled. Our initial focus must remain on waste prevention and designing out the use of materials that are not easy to recycle. The introduction of eco-modulated fees will assist in the transition to the use of easy to recycle products.

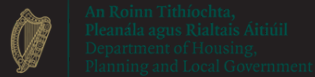
## The OceanWise project is co-financed by the European Regional Development Fund through the Interreg Atlantic Area Programme



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