

# REPORT

OCEANWISE DELPHI OUTREACH- ACTIVELY  
ENGAGING STAKEHOLDERS

Results analysis

WP4



# OCEAN WISE

Reducing  
EPS marine litter  
in the North East  
Atlantic

 **Interreg**  
**Atlantic Area**  
European Regional Development Fund



EUROPEAN UNION

**Technical report**

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**Team**

FCT NOVA

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# 1. CONTEXT

## 1.1 OceanWise Project

OceanWise aims to jointly develop and implement a set of long-term measures to reduce the impact of Expanded and Extruded Polystyrene (EPS/XPS) products as marine litter in the North-East Atlantic Ocean. 13 partners including national governmental agencies responsible for marine environment, waste management and recycling are taking up this challenge within circular economy principles.

Tangible solutions will be set by addressing the entire life-cycle of EPS and XPS products to achieve transnational sound management of EPS/XPS marine litter in the Atlantic. Based on resource-efficiency, participatory methods and Circular Economy principles, this project will generate new and best practices within sectors using, manufacturing or recycling EPS and XPS.

With this aim, the consortium is intended to explore new ways to:

- i. Identify EPS/XPS products and their source that are more likely to reach the marine environment and impact on its ecosystems;
- ii. Propose and test plausible options (reduce, reuse, recycle, recover) to achieve better environmental outcomes within different sectors;
- iii. Engage producer and designer communities on the sustainability of specific applications and to explore more circular models;
- iv. Develop CE-oriented methodologies to assess new opportunities, barriers and policy options.

## 1.2 Work Package Nr. 4 'Interactive Stakeholders' Platform' summary

This WP targets stakeholder active involvement, mobilization and engagement in an emancipatory participatory process promoting technical capacity building aiming the development of a platform. This aims to enhance interaction and collaboration between different stakeholders and sectors targeting the building up of innovative ideas and solutions. The following actions are key to support this:

1. Stakeholders mapping in the Atlantic area: Identification and characterization of the stakeholders;
2. Dialogue Living Labs: Carry out active participatory sessions - spaces for genuine dialogue – aiming the emerging of collective knowledge, supported by specific interactive methodologies for the creation of a community of practice;
3. Stakeholder's engagement tool: Creation of an interactive platform integrated in the project website, able to receive individual contributions and comments;
4. Building together Eco-Innovation (Eco-I): Promotion and diffusion of Eco-I by launching a contest in association with the Ponto Verde Open Innovation platform that will be adapted to encourage the appearance of projects that develop alternative ideas to the EPS and XPS use, creating an incentive for the emergence of projects for this theme.

FCT NOVA leads actions nº1, 2 ,DGRM leads action nº 3 and SPV leads action nº4. Due to the characteristics of this WP, all the remaining partners are actively contributing and organizing some of the actions defined, always with the support and guidance from the WP lead partner.

### **1.3 Objectives of the deliverable**

This deliverable is realized within the action 4.2 – “Dialogue Living Labs” and reports on the process of applying the Delphi Method to the EPS and XPS stakeholders in the North East Atlantic area identified by the OceanWise partner countries. The objective was to propose a set of Achievements concerning the use and management of EPS/XPS and other expanded foam plastics over the next 10 years.

## 2. OCEANWISE DELPHI OUTREACH- ACTIVELY ENGAGING STAKEHOLDERS

The OceanWise, an Interreg project that deals with marine litter in the perspective of the Circular Economy, focus specifically in products composed of Expanded and Extruded Polystyrene (EPS/XPS), and it has the purpose to develop recommendations for public policies and good practices for Industry.

The Delphi method is a popular mean of forecasting future scenarios. This method is used to determine the range of opinions on specific matters, to test questions of policy or others, and to explore (or achieve) consensus on disputed topics. The Delphi method has its own distinct characteristics, and it uses a group of participants (known as ‘panellists’) specially selected for their specific expertise on a topic.

In this Delphi approach, the panellists evaluated a set of 33 hypothetical achievements, answering the following 3 issues:

- Time period for the achievement;
- If the country already met the requirements or gather the know-how required for accomplishment;
- Identification of main constraints for accomplishment / achievement.

### 2.1. Methodology phases

Previous DELPHI studies typically used 2 or 3 rounds [1]. Some studies also suggested that round one be a brainstorming phase [2].

#### ***Brainstorming phase - Set up the Delphi Achievements***

Thus, the OceanWise project team started the process of developing the Delphi method in a workshop context. The option to start the Delphi method application within the national workshops had to do with the opportunity of developing joint brainstorming activities involving experts / stakeholders in the area under study in each country.

The 33 hypothetical achievements, provided by the FCT team to the Delphi survey participants, resulted from the work developed by the Portuguese partners of OceanWise project: FCT NOVA, DGRM and SPV based on the results of the Delphi activities carry out during the initial countries stakeholders workshops, one for each country project.

In this sense, the participants of the workshop were asked: *“As an expert in your area, please carefully read each of the hypothetical 10 scenarios presented, and give us your opinion for each of them”*, answering the following issues:

- Time period for the achievement;
- If the country already met the requirements or gather the know-how required for accomplishment;
- Identification of main constraints for accomplishment / achievement.

After that the participants were invited to develop in group new Scenarios that answered the question: *“Taking into account the current panorama, your intervention area and the example*

of the scenarios previously analysed, create / develop your own scenarios for EPS / XPS and other expanded foamed plastics in the short-medium-long term”.

To this end, 5 categories were pre-defined for the definition of scenarios, having the group's freedom to choose which categories to address or even to create other categories:

- A) Raw Material Producers
- B) Fishing Industry
- C) Food Industry
- D) Applications and consumption goods
- E) Other

Through the analysis of the results of these activities carried out in the five stakeholders workshops, the final scenarios that integrated the Delphi method were developed.

### ***Application Phase - Rounds involving the specialist of the five-country***

#### *1. The Delphi Survey – First round applied to the Atlantic North-East Stakeholders*

The first round of Delphi approach was applied to the Atlantic North-East Stakeholders. In this exercise, a diversity of stakeholders experts were asked to carefully analyse each of the 33 hypothetical achievements, and to give their opinion, focusing in 3 mentioned issues. This 1<sup>st</sup> Delphi round took place between July and October 2020 and encompass the participation of 45 panellists.

The analyses of the results of the first round allowed us to close the range of options and the participants were asked again to help us find consensus within the options presented in each question to better define the achievement.

Additionally, as the objective is to collect specialists answers in the different issues presented, the option "I don't know" was introduced for participant not an expert in the area under analysis. This way we have only the answers of the experts in each achievement.

In this context, we ask to the same participants of the first round to re-evaluate the 33 hypothetical achievements but this time with a smaller range of answers on each of the questions for each of the achievements.

#### *2. The Delphi Survey – Second round applied to the Atlantic North-East Stakeholders*

The 2<sup>nd</sup> round - OceanWise Delphi Outreach- actively engaging stakeholders was carry out between 12 February 2022 and 6 April 2022, encompassing 26 experts related to the EPS/XPS life cycle.

The analysis of the results aimed to seek consensus on a set of 33 achievements regarding EPS / XPS and other expanded foamed plastics. As the literature is not unanimous on consensus measures [1,3–5], several assessment metrics were considered to allow for a more robust identification of consensus (when reached). Main statistics for the ranking phase include the mean item ranking, share (%) of experts placing an item in the top half of their list, and Kendall's W [6]

For this purpose, in the analysis of the results we carried out:

Phase 1 - Conversion of the results into a "ranking" scale of "1" or "0" (agree or disagree), using a 2 point scale. This scale is the simplest Likert scale assuming just two options, such as agree and disagree as two poles of the scale. It is typically used to measure Agreement.

Phase 2 - The various metrics used for consensus assessment have been calculated:

- Kendall's W coefficient
  - The Kendall's W is a non-parametric statistic test to measure agreement in ratings, ranging from 0 - no agreement - to 1 - complete agreement. Consensus was considered reached when  $W > 0.5$  [6,7].
- Highest group mean (%) through the "Percentage to responding to a category"
  - Percentage to responding to a category => 51% [5].
- Mean (used to calculate CV) and median
  - Measures of central tendency (mean and median) were used to quantify the amount of variation or dispersion [1], (should be  $\geq 0.5$ , both numerical and percentage)
- Coefficient of variation (CV)
  - Coefficient of variation  $\leq 0.5$  [5].

It is considered that there is consensus in the category with "Highest group mean" if it meets the assumptions made. When there is no tendency towards consensus, this value is assessed by grouping categories. Also, it was considered that consensus may contain two or more categories, especially in questions b) and c) where there is no single choice. For example, when an expert agree that there is more than one option that is "correct", e.g. political AND economic are both the main constraints for to attain a certain achievement [2].

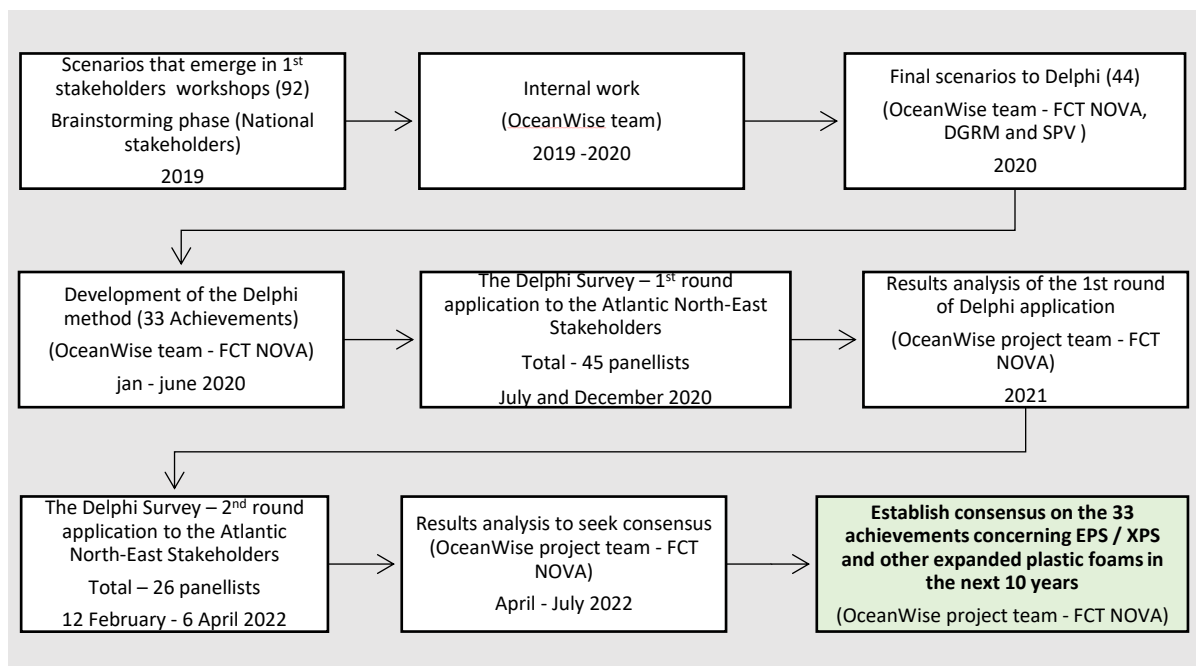


Figure 1 - Different stages in the development and application of the Delphi method to the Atlantic North-East Stakeholders



Following the results analysis, whose are presented below, it was possible to establish consensus on the 33 achievements concerning EPS / XPS and other expanded plastic foams in terms of the time for their accomplishment, where the necessary requirements or know-how already exist or will exist and finally which are the main constraints associated to their accomplishment.

## 2.2. Main Results

### Characterisation of the participants involved in the Delphi method

The panellist were stakeholders related to EPS and XPS in the North-East Atlantic area, mapped by the project partners, considered to be experts representative in their country (ES; FR; IE; PT; UK) in the following categories:

- Raw Material Supplier (manufactures in Europe);
- EPS/XPS product packaging industry (packaging association, cluster or platform);
- Retail Supplier Industry (producer market (central); supermarkets);
- Final Consumer (fishing/aquaculture industry).

The project partners played a crucial role in supporting the dissemination of the Delphi survey among their key stakeholders.

In the figures below, the stakeholders who participated as panellists in this application of the Delphi method are characterized.

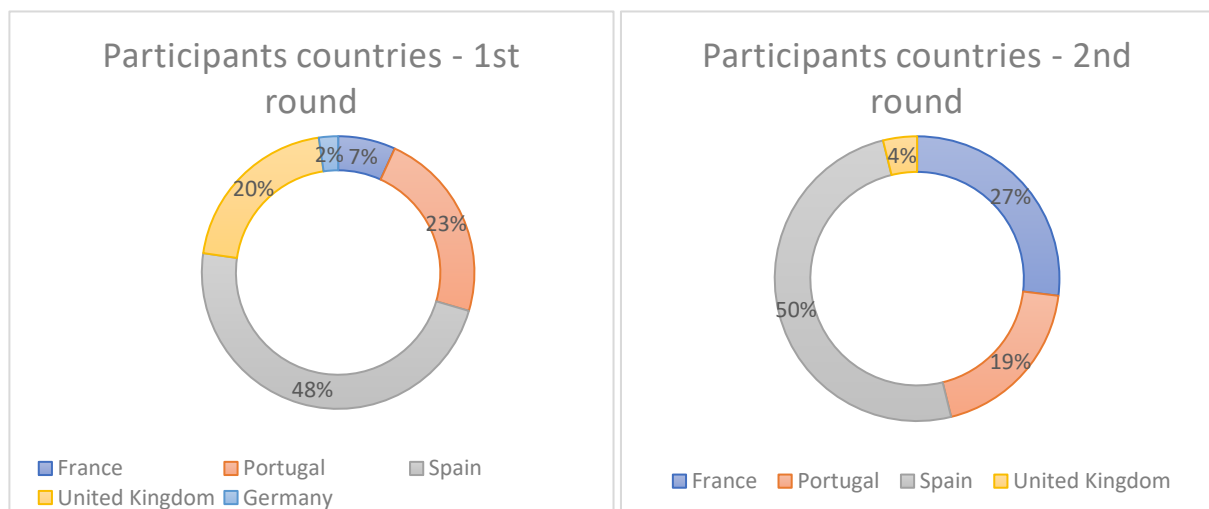


Figure 2 - Countries of the panellists who participated in the two rounds of the Delphi survey

Figure 2, highlights the high mobilisation of participants from Spain in the two application rounds of the Delphi survey. It is worth noting that the answers to the question “Countries which already met the requirements or gather the know-how required for accomplishment”, in the first round all participants considered Spain to be the most prominent country. In the second round, due to the introduction of the category "All EU Countries" this prominence was attenuated.

### Area of expertise of Delphi panellists

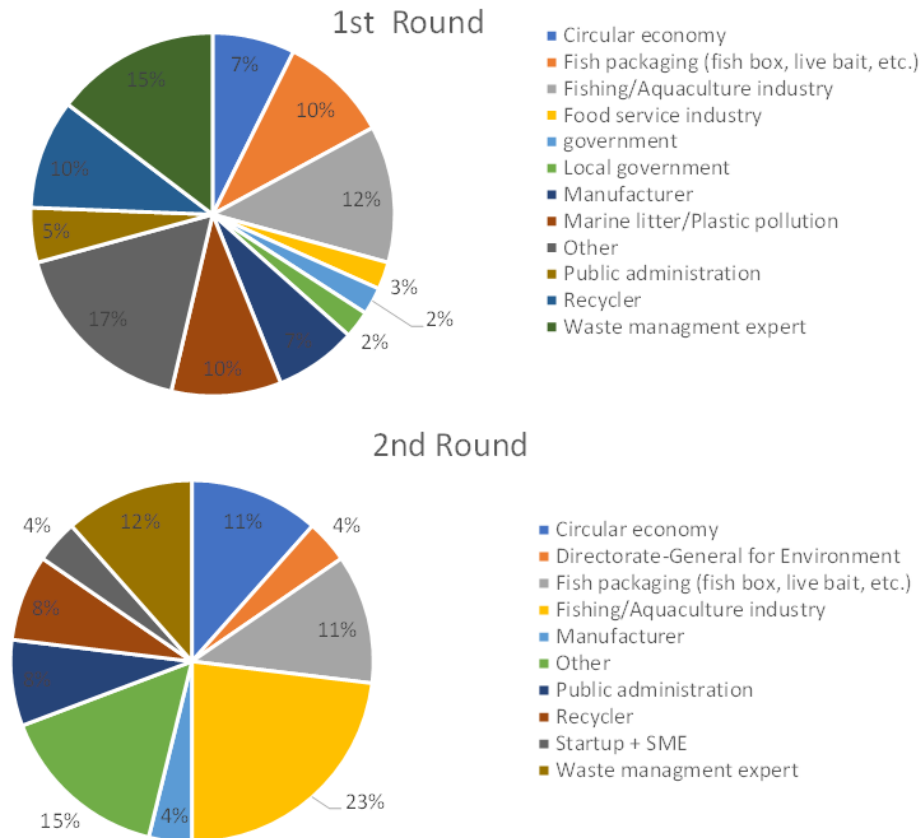


Figure 3 – Areas of expertise panellists who participated in the two rounds of the Delphi survey

Delphi participants cover the various areas of knowledge and activity associated with the life cycle of EPS/XPS products and their management, from industry to government entities. However, it is important to highlight the participation of stakeholders associated with Fish packaging, fishing/ aquaculture industry and waste management experts. It is important to specify that the panellists invited to participate in the second round of the Delphi survey, were those who responded in the first round. The concern for involving only those who had already participated in the first round was due the need to give continuity to the work developed and to combine the consensus of the same sample of specialists in the different areas present in the 33 achievements.

## **Results of the 33 Achievements regarding EPS/XPS and other expanded foamed plastics in the next 10 years, develop under the Delphi method application:**

1. In the next 5 years Synergies between EPS/XPS producers and processors are set up to promote reuse, selective collection and recycling considering that EU countries will have the required know-how for accomplishment and that the main constraints will be at the economic level.
2. During the next 5 years, synergies are created between EPS/XPS producers and processors to promote chemical recycling and mechanical recycling; considering that EU countries, and in particular France, will have the necessary know-how to achieve this, and the main constraints will be economic and technological.
3. Over the next 3 years, EPS/XPS producers, commercial users of waste management operators and the end consumer are informed and encouraged towards all recycling techniques and opportunities (e.g. % recycled material in product, disposal instructions; traceability processes for EPS/XPS products); considering that EU countries will have the necessary know-how to achieve this and that the main constraints will be economic, technological and social.
4. Over the next 5 years, ES-specific waste collection schemes, including proper routing (e.g. awareness campaigns to raise awareness at fishing ports, regular inspection/supervision to ensure that all fishing gear and devices are returned to shore), considering that EU countries will have the know-how to achieve this and that the main constraints will be economic, but will be impacted by technological and social constraints.
5. In the next 5 years, EPS/XPS is included in public environmental education to raise awareness to more proactive and responsible attitude, whereas EU countries will have the know-how to attain this and the main constraint is a social one, but it will also impact at the political level.
6. During the next 5 years, new business models by recycling companies are encouraged to achieve efficient management of waste in the sea/ocean, with Spain and Portugal having the necessary know-how to implement it, and the main constraints to compliance are economic.
7. During the next 5 years, will set the Legislative goal of reducing EPS and XPS in coastal and riverine sites by 20%, with EU countries having the necessary know-how to implement it, being considered that the main constraints to its achievement are of economic and political level.
8. In the 10-year period, the whole fish boxes chain is contemplated in their overall cost calculation (e.g. the cost of EPS pollution in the ocean), with EU countries having the necessary know-how to implement it. The main constraints to its implementation are economic and political.
9. In the period of 5 years, the use of returnable and washable EPS fish boxes (new coating) will be accomplished, having the EU countries the necessary know-how to implement it. The main constraints to its implementation are economic and technological.
10. In the 5-year period, the use of sustainable alternatives for EPS/XPS food packaging and heat sensitive products, with France and Spain identified as countries with know-how for its implementation. The main constraints to its implementation are economic and technological.

11. In the 5-year period, a minimum percentage (e.g. 30%) for incorporation of recycled EPS/XPS materials in new products as secondary raw materials is adopted through Regulation, having been identified that the EU countries have know-how for its implementation. The main constraints to its implementation are economic and political.
12. It is considered that a significant diversity of construction products incorporating recycled EPS/XPS materials already exists but will improve over the next 5 years. EU countries were identified with know-how with the main constraints to its implementation considered as economic and political.
13. It is considered that alternatives for EPS/XPS for non-heat sensitive products (e.g., protective packaging and filling) already exist, but will improve over the next 5 years. EU countries were identified with know-how with the main constraints to its implementation considered as economic and political.
14. It is considered that efficient alternatives for industrial EPS collection logistics are already in place but will be improved in the next 5 years. EU countries have been identified with know-how for its implementation, and the main constraints to its improvement are economic.
15. It is considered that efficient alternatives for urban EPS collection logistics are already implemented (especially for large volume packages), but that there will be an improvement in the next 5 years. EU countries were identified with know-how for its implementation, and the main constraints to its improvement are economic but with the impact on political constraints.
16. In the next 5 years, more efficient recycling technologies are achieved through R&D&I to increase EPS/XPS alternatives. EU countries were identified with know-how for implementation, being the main constraints economic and technological.
17. Specific circuits for regular EPS/XPS collection (e.g., recycling bins near places with regular high volume of EPS/XPS disposal) will be created by 3 years from now. It has been identified that EU countries, in particular Spain, will have the necessary know-how, being the main constraints economic.
18. By 5 years from now, synergies will be created between stakeholders (institutions, industry, and retailers) to obtain efficient EPS products recycling channels. It has been identified that EU countries, in particular Spain, will have the necessary know-how, being the main constraints economic and political.
19. The achievement of installing collection points for fish boxes is considered to have been achieved and EU countries are in position to do so. However, the degree of implementation is mainly conditioned by economic constraints but is also conditioned by social constraints.
20. Optimisation of short distance collection loops (e.g., to reduce carbon impact transport) will be realised within 5 years. It has been identified that EU countries and the USA, will have the know-how to achieve this, bearing in mind that the main constraints will be economic.
21. During the next 5 years, the Extended Producer Responsibility (EPR) for all EPS/XPS packages is applied in accordance with Directive 94/62/EC (Packaging and Packaging Waste), amended by Directive 2018/852/EC, with EU countries having the necessary know-how to implement it. In relation to the associated constraints, although there is a weak consensus, they will be mainly economic and political.

22. It is considered that there is technology and market to recycle over 25% of EPS/XPS are already underway but that there will be an improvement in the next 3 years. EU countries and USA were identified with know-how required for accomplishment, and the main constraints as economic.
23. In a period of 5 years, it will enforce legislation applied to small producers/generators of polymers waste at local level, considering that EU countries, highlighting Spain, meet the requirements or gather the know-how required for it. However, it is pointed out that the main constraint to achieve this achievement is considering political, albeit through weak consensus, thus having to also be considered constraints of an economic and social nature.
24. In the period of 5 years, it is expected that there are no bureaucratic obstacles to the process of waste declassification when they comply with the criteria set by the Legislation, detaining the possible existence of political constraints.
25. In the period of 5 years, the existing grants are sufficient for implementing EPS compacting and collection systems, noting the possible existence of constraints to its fulfilment at a political and economic level.
26. It is expected that sometime in the next 10 years, in fishing ports, 80% of the EPS collection for recycling is achieved. It has been identified that EU countries, in particular Spain, will have the necessary know-how, being the main constraints economic and social, but also can be impacted by political constraints.
27. In the next 10 years, incentives are expected to be created for the return of packaging and other consumer EPS/XPS applications (e.g., deposit return scheme for fish boxes), being the main constraints economic and political, but also impacted by social constraints.
28. Consumers are considered to be using durable (i.e. not single-use) products that are made from alternatives to EPS/XPS through incentives, but will increase their use over the next 3 years. It was considered that EU countries meet the requirements or gather the necessary know-how for the same, being the main constraints economic and social.
29. Although it was considered that there is already the collection of agricultural EPS (seeds), but it will increase in the next 3 years. Having identified which economic constraints may impact its implementation.
30. In the next 5 years there will be recognition in Legislation that EPS/XPS is a major pathway in the introduction of exotic species (e.g., organisms on floating EPS/XPS objects). There is no consensus on what kind of constraints may impact this, but there is a tendency that constraints at an economic level will have an important weight.
31. It is considered that there is already social and political pressure to reduce the EPS consumption (e.g., as occurred with plastic bags). And that EU countries already meet the requirements for accomplishment it, considering that the main constraints may be at the political and social level.
32. In the next 5 years the Overpackaging and excessive use of EPS/XPS is strongly reduced by adopting Legislation. EU countries will gather the know-how required for accomplishment it, considering that the main constraints may be at the political and social level.
33. Over the next 3 years, the instruments are in place ensuring that the eco-tax is really invested in improving recycling, considering that the main constraints to its implementation will be at a political level.

### 3. FINAL CONSIDERATIONS

The work carried out for the application of the Delphi method allowed us to realise that despite the unpredictability associated with the future, a long road has already been travelled in order to develop tools and policies to minimise the impact of EPS /XPS on the environment. The results show that the major changes associated with the uses and management of products with EPS / XPS and other expanded foamed plastics will be achieved significantly in the next 5 years. Some of these changes will only fully materialise within the next 10 years. It is important to consider that most of the associated constraints are at the economic, social and political level. Showing a tendency towards a consensus that at the technological level the necessary tools are already in place or are close to being available to reach the achievements analysed.

Considering that the presented results are a basis to go further in developing scenarios for a long-term management of EPS/XPS products, it is suggested to analyse them in focus groups with experts. In this way, scenarios can be developed that can influence the establishment of targets and public policies related to the uses of EPS/XPS and other expanded foamed plastics in the next 10 years.

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