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Abstract

The interactive one day workshop was held in order to identify entry points for prevention and reduction of marine litter in the Baltic Sea on a design level. It was intended to support the implementation of the HELCOM Regional Action Plan on Marine Litter and, as such, does not represent the official views of the agencies or organisations involved. Almost 30 participants from design, industry, research, authorities and civil society took part in this event. This report summarises background, workshop proceedings, major results and provides supporting materials. The workshop concept may further inspire to hold similar workshops also in other regions and to continue this process.



If it can't be reduced Reused, repaired Rebuilt, refurbished, refinished, resold, recycled or composted Then it should be Restricted, redesigned Or removed From production

Pete Seeger (1919 - 2014) American environmental / anti-war / civil rights activist, singer, guitarist, songwriter









Background of the Workshop

www.helcom.fi

Marine litter has close ties with how we produce and consume products. In the Baltic Sea Area, the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM) has set out a Plan of Action to prevent marine litter. In 2015, the **HELCOM Regional Action Plan on Marine Litter** (HELCOM RAP ML) was adopted with the aim to significantly reduce marine litter by 2025, compared to 2015, and to prevent harm to the coastal and marine environment. One of the actions is to understand the role that design can play in reducing or preferably prevent marine litter.

HELCOM Regional Action Plan http://www.helcom.fi/action-areas/marine-litter-andnoise/marine-litter/marine-litter-action-plan Action RL 5 of the HELCOM RAP ML outlines to "establish a dialogue and negotiate on solutions with business and industry to (i) develop design improvements that reduce the negative impacts of products entering the marine environment, and (ii) reduce over-packaging and promote wise packaging".

As a regional action, this action aims to engage the private sector and designers from around the Baltic Sea in understanding how improved design of products (and the systems they are embedded in) can influence the reduction or prevention of (marine) litter.

Study on major marine litter items http://mcc.jrc.ec.europa.eu/documents/Marine Litter/MarineLitt erTOPitems_final_24.1.2017.pdf

> European Commission Press Release: "Single-use plastics: New EU rules to reduce marine litter" http://europa.eu/rapid/press-release_IP-18-3927_en.htm

Based on a compiled beach data set from 2016, **most abundant items on EU beaches** have been identified. The main groups of items found on beaches in the Baltic Sea are discarded short-life or single-use goods, mostly consisting of sanitary and household waste, such as cotton bud sticks, bottles, food and snack packaging and cigarette butts. Fishing nets and micro-particles (fibers and remnants of car tires) are assumed to be important groups of marine litter. The European Commission has issued a proposal for a Directive on the reduction of the impact of certain plastic products on the environment in May 2018, which envisages to address the top ten litter items found on European beaches.













In order to create synergies with other on-going projects in the Baltic Sea region, HELCOM and the INTERREG Project "EcoDesign Circle" jointly organised a workshop on how ecodesign methods and tools can be applied to reduce marine litter in the Baltic Sea region.

HELCOM was established in 1974 to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation. The organisation plays a role as an environmental policy makers that develops objectives, actions and recommendations; it provides information about the state of and trends in the marine environment, supervises the implementation of standards and acts as coordinating body.

The **Interreg Baltic Sea Region Programme 2014-2020** supports integrated territorial development and cooperation for a more innovative and sustainable Baltic Sea region. Partners from countries around the Baltic Sea work together in transnational projects on common key challenges and opportunities. The **INTERREG project "EcoDesign Circle"** aims (i) to enhance the capability of small and medium-sized enterprises to make use of ecodesign, (ii) to increase the capacity of designers in the environmental dimension of design, (iii) to improve the Baltic Sea Region-wide cooperation between design centers and (iv) to facilitate the development of new, sustainable products / services and create jobs for tomorrow's markets.

In the context of the project, partners understand the **term 'ecodesign'** as a broad and holistic approach.











https://sustainabilityguide.eu/

Understanding of 'ecodesign' by the partners of the INTERREG project "EcoDesign Circle":

"A key aim of ecodesign is to reduce to a minimum the overall environmental impact of a product or service. It refers to innovative design solutions in both products and services that take into consideration the entire lifecycle – from the extraction of raw materials to production, distribution and use – all the way to recycling, "reparability", and disposal. Minimisation of pollutants during the production period is just as important as it is during the product's lifetime. However, ecodesign is an elastic and evolving concept that is better considered as an approach to design than as a label for eco-friendly products. It is a holistic approach, keeping in view environmental, social and economic benefits as well as aesthetically appealing and durable design. Ecodesign by its nature fosters innovation and promotes behavioural change in producers and consumers towards product-service systems and self-sufficiency. It envisions "ecologically-minded" thinking not as an add-on but as part of the fundamental design process right from the start. Once it has made the leap from theory to practice, ecodesign can help achieve the move towards a circular economy. In short, Ecodesign is good design that benefits people and the environment alike."

More information on ecodesign can be found at the **"Sustainability Guide" (see link to the left.)**











2. Purpose of the workshop[#]

[#]The workshop was intended to support the implementation of the HELCOM Regional Action Plan on Marine Litter and, as such, does not represent the official views of the agencies or organisations involved. The various sessions of the workshop were intended as illustrative exercises for the workshop participants. The information used in the workshop was based entirely on the information available and the knowledge of the workshop participants. The aim of the workshop was to engage in a dialogue and enhanced cooperation with designers, representatives of industry, research institutions, civil society organisations, national authorities and other stakeholders. It discussed how ecodesign principles, methods, tools, approaches and circular systems can be specified and applied to contribute to the reduction of marine litter in the Baltic Sea Area and which measures and framework conditions can support it. The workshop aimed to identify design solutions optimizing the use of products at the end of their life. After the workshop, it is aimed to submit conclusions and recommendations of the workshop as an outcome document to the HELCOM Contracting Parties for further considerations.

Key questions for this workshop were:

- How can product design contribute to prevent marine litter?
- How can products be designed in a way that, should they end up in the oceans, they cause as little damage as possible?
- What do designers, product, service developers and engineers need to know in order to contribute in an adequate way to marine litter prevention?
- What are opportunities and limitations of sustainable design for marine litter?
- What are supportive systems? Which further framework conditions are needed so that ecodesigned services and products reach their objectives?
- What is the role of product design in the bigger sustainability and circular economy context?











3. Workshop approach and structure

www.ethica.fi

"The HELCOM Pressure group provides the necessary technical basis to the work on inputs of nutrients and hazardous substances from both diffuse and point sources on land, including follow-up of the implementation of the HELCOM nutrient reduction scheme. The group focuses on developing solutions to the policy-relevant questions and needs. The group will also have marine litter and underwater noise in its portfolio. The workshop, facilitated by Ms. Anne Raudaskoski (Ethica Finland), was organised in plenary and breakout groups and included presentations with question-and-answer sessions as well as interactive group exercises. These exercises were intended as interdisciplinary teamwork (i) to deduce generalisable results from illustrative, product-related case studies, (ii) to identify points of common agreements or disagreements and (iii) to exchange experiences. The workshop participants were either nominated by HELCOM Contracting Parties as invited by HELCOM Working Group PRESSURE 8[#] or by the INTERREG-project "EcoDesign Circle". Their professional backgrounds spanned industry, industry associations, designers, consultancy, non-governmental and research organisations as well as public authorities or organisations.

The workshop agenda and the list of participants are provided in <u>Annex IV</u> and <u>Annex V</u>, respectively.













4. Workshop proceedings

The workshop was opened by Mr. Conrad Dorer on behalf of the INTERREG-project EcoDesign Circle and Ms. Marta Ruiz of the HELCOM Secretariat. Ms. Ruiz introduced the Helsinki Convention, its instruments for implementation and provided an overview of the HELCOM Regional Action Plan on Marine Litter, which forms the basis for taking actions on marine litter and ecodesign. RL 5 of the HELCOM Regional Action Plan on Marine Litter outlines to "establish a dialogue and negotiate on solutions with business and industry to (i) develop design improvements that reduce the negative impacts of products entering the marine environment, and (ii) reduce over-packaging and promote wise packaging".

Presentation on marine litter



Ms. Raudaskoski outlined the workshop goals and introduced Ms. Stefanie Werner of the German Environment Agency to give an introductory presentation on marine litter. Ms. Werner outlined that marine litter is any solid material which has been deliberately discarded, or unintentionally lost on beaches and on shores or at sea, including materials transported into the marine environment from land by rivers, draining or sewage systems or winds. Ms. Werner presented the different sources of marine litter and highlighted the diverse impacts marine litter can have on the marine ecosystem, its inhabitants and also on humans. She also outlined the **top marine items** which are nets and ropes, plastic caps and lids, cigarette butts, crisp packets and sweet wrappers, lolly sticks, strings and cords with a diameter < 1cm, cotton bud sticks, plastic drink bottles, plastic food containers, balloons, plastic cutlery and plastic bags.









Presentation on ecodesign / circular systems

In a subsequent presentation, Ms. Raudaskoski set the basic understanding of what is meant by ecodesign and circular systems. She commenced by presenting a quote from Peter Seeger who outlined "If it can't be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned or removed from production". Subsequently, the concept of the circular economy and its principles were introduced and opportunities for ecodesign were presented. Within the circular economy, materials cycle within the biological and technical cycle and the design life cycle forms the basis of solutions and systemic thinking. Within this context, the relevance of the Sustainable Development Goals (SDGs) was outlined. The life cycle served as the basis for subsequent discussions.

Group work: Creating a vision

In order to create a common vision for all participants, the participants were asked to gather in groups and to discuss and conclude on a vision for the Baltic Sea and Litter Prevention which is to be achieved by 2030. To guide the discussions, they were asked to also address the following issues: "the value the vision is underpinning", "everyday life looks like this", "policy and regulation guides in this way" and "business operate in this way". As orientation, relevant sustainable development goals (SDGs) were distributed among the participants.

- SDG 6 "Ensure availability and sustainable management of water and sanitation for all"
- **SDG11** "Make cities and human settlements inclusive, safe, resilient and sustainable"
- **SDG 12** "Ensure sustainable **consumption and production** patterns"

SDG 14 – "Conserve and sustainably use the oceans, seas and marine resources for sustainable development"

14.1 "By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution



CLEAN WATER



https://sustainabledevelopment.un.org/













All discussion groups presented the outcomes of their discussions and by way of voting, the workshop group's vision and underlying assumptions were agreed on. The group aimed to achieve a vision by 2030 in which nothing is designed to be thrown away: the Baltic Sea is litter-free and healthy, with happy marine and human life, and humans act sustainably in balance with nature. Everyday life is a society of services in which no fossil fuels are used and renewable energy is the main source of power. The underpinning value is that people should reconnect with nature. With regard to policy and regulations, strict guidelines for production, wastemanagement (e.g. ban single-use) and nano-particles are kept in mind, and "no littering" obligations are enforced.











Practical example to reduce/reuse packaging

http://füll-einfach-mehrfach.de/ (in German)

Group work: Going through the lifecycle of the top 10 litter items



In order to inspire the participants, two designers, **Ms. Kerstin Jana Kater and Ms. Karen Rose from Füll, Berlin**, Germany demonstrated their product that aims to reduce packaging waste through reusable food packaging

In a subsequent group work, the participants were asked to select a product of the top litter items found in the Baltic Sea area based on HELCOM marine litter monitoring assessments and to apply the life cycle thinking approach. The workshop only considered single-use items. The aim of the exercise was to understand what the life cycle of the specific product looks like and how the life cycle thinking can play a role in preventing marine litter. The life cycle approach developed by Ethica, Finland comprises the following phases and aspects: Design, materials, manufacturing, product and packaging, logistics, business model communication & marketing, use, after use, and the overarching element "ecosystem and enabling environment". Designers, manufacturers and others should keep in mind the different elements when designing or redesigning a product with marine litter prevention in mind. As support for the group work, for each phase guiding questions were developed (see <u>Annex IIIb</u>).

The generalised outcome of the exercise is visualised in <u>Annex IIIa</u> to this document. The group developed the **following central approaches on how to incorporate marine litter considerations into the designing within the life cycle**. These elements are those that have been identified by all groups throughout their work and discussions whilst addressing different single use items that end up in the oceans:

• Achieve more standardisation

• Collaboration with researchers and other relevant actors in order to find alternative materials / involvement of an interdisciplinary group of actors along the product life cycle in the design process

Design for reuse





Presentation on Round Table on Ecodesign

Presentation on Ecodesign Policy

https://www.swerea.se/en/services/operational-

https://ecodesign-packaging.org/en

development/ecodesign





- Raise awareness of the biodegradability in the marine environment ٠
- Focus on function that a design needs to address instead of the product •
- Labelling and process accountability •
- Reduce unnecessary packaging •
- Provide packaging with a value
- Address issues relating to hygienic concerns along the supply chain/business model ٠
- develop and explore alternative business models supporting circular systems and minimizing detrimental environmental impact
- Designers, manufacturers and others should keep in mind the different life cycle phases and systemic aspects when (re)designing a product with marine litter prevention
- Develop deposit /take-back systems

Ms. Isabell Schmidt of the German Association for Plastic Packaging introduced the Round Table EcoDesign of Plastic Packaging. She outlined that the Round Table serves as a network and cooperation platform of its members which come from the industry, research organisations as well as consumer protection associations. Ms. Schmidt presented the guideline on ecodesign for plastic packaging which is currently being prepared by the Round Table and highlighted the toolbox, factsheets as well as practical examples that are developed and presented in order to support its implementation.

Ms. Anna Karin Jönbrink, from the Swedish research group Swerea, presented the challenges of creating policies for ecodesign by introducing EU instruments that deal with ecodesign and outlining their limitations with regard to ecodesign. A focus of her presentation was placed on the EU Ecodesign Directive as a successful instrument to eliminate worst products. Furthermore, she mentioned that circularity plays a big role in recent development, such as "Closing the Loop - an EU Action Plan for the Circular Economy". However, she demonstrated insufficiencies and that different regulations stop each other. Consequently, a holistic perspective in policymaking is necessary.



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Group work: Prioritising actions and creating a path towards the desired future[#]

*This exercise was based on the method developed by Eppler and Pfitzer: Eppler, M.J., Pfister, R. (2012) Paths to Success: A sketchbased creativity method for teams and individuals. Proceedings of the 16th International Conference on Information Visualization. Montpellier: IEEE Press.



As a follow-up exercise, the participants were asked to prioritise actions to address the singleuse items that they analyzed in the life-cycle exercise. In order to systematise the discussions, a format outlining the path towards the desired future was distributed. It outlined the steps that the participants should include in their discussions. First, the product should be mentioned, then the (2) current situation for the selected single-use item was described and the (3) goal of what should be achieved outlined. Subsequently, the participants were asked to (4) describe the wrong direction of what would be an undesired outcome. In order to prioritise actions, the participants were asked to formulate the (5) action and then to think of possible (6) barriers and how to overcome these. In order to account for systemic issues that arose during the discussions, participants were also asked to (7) note systemic issues and actors that should be addressed and to determine who to involve in order to solve these issues. Whereas the groups developed a diverse set of specific information related to the products selected, there are several aspects that serve as common denominators among the groups. <u>Annex II</u> to this document outlines the general findings of this exercise.

Common Problems identified

The **current situation** for most single use items is that some of them are (1) easily available at low cost, such as coffee-to-go cups and (2) sold in high numbers (3) convenient. The current linear economic model leads to unsustainable consumption and consumers often are either not aware of the impacts of their actions or do not feel responsible. The **goal** would be to achieve sustainable consumption and to avoid these items from being littered. Also, one objective was that no single-use item is placed on the market and that all designers apply a circular design thinking and to have deposit and return schemes in place. An **undesired future** would be one in which ecosystem functions are severely impacted by litter and that the present "business as usual" is continuously applied. Furthermore, new single use items are being introduced and missing awareness and responsibility and low recycling rates will lead to increased accumulation of marine litter.











Actions to achieve the goals would be to raise awareness, withdraw unsustainable choices completely from the market, find appropriate instruments for prevention and reduction of litter, and to develop regulations that create new market conditions which favour sustainable consumption. Furthermore it was suggested to include the cost of externalities like environmental impact in the cost of single use items. **Barriers** that might hinder these actions include, among others, the unwillingness of people to change habits and long established consumption patterns and also incomplete awareness of the impacts of their actions. Also, technological limits for deposit systems, recycling (of biodegradable waste) are currently prevailing.

Systemic issues that should be addressed include, creating value for different consumption patterns that are environmentally sound and overcoming market competition that is based on the prevailing consumption patterns.

Ecodesign Matrix for Marine Litter Prevention



In this exercise, the participants were asked to group their findings into a matrix that depicts the challenges of addressing marine litter prevention. Each participant was asked to address the following elements along the product life cycle stages and aspects: 1. Design, 2. Materials, 3. Manufacturing, 4. Product, 5. Logistics, 6. Use, 7. After use, 8. Business Models, communication and marketing and 9. Supportive systems and framework conditions. Each of these elements was to be commented with regard to "what has to be done", who needs to be involved, needs to act, the timeframe, the impact with regard to marine litter prevention, the costs and benefits of such an action as well as overall challenges and comments.

After sketching the comments on little notes and grouping them into the corresponding category, the participants were asked to discuss the findings and notes among each other, regrouping, rewording and suggesting additional comments. The final outcome of this exercise can be found in <u>Annex I</u>.











Conclusion

In concluding the meeting, Ms. Raudaskoski thanked the presenters and participants for their input and all of their work. Ms. Ruiz of the HELCOM Secretariat shared possible options under the HELCOM framework on how to utilise the workshop result in further implementing the HELCOM Action Plan on Marine Litter. Germany as lead country for the relevant action outlined that it will produce a workshop report that will serve as the basis for subsequent actions taken within HELCOM.

Overall, it was noted that the workshop materials used for this workshop can be used for follow-up or implementing activities in different settings, be it for a national or other form of workshop.

Evaluation / Feedback

"I am very happy about the outcome ... showing that individuals, companies, authorities, researchers, NGOs etc. all have to work together and that everybody has a responsibility to do better. I really like the expression 'Human Rights must be connected to Human Responsibilities'."

"For me was very nice to have all the information about the topic analysed from very different angles and have a total overview, concentrated information."

"Invite more people from business, who could really implement some good ideas in their production processes and change marine litter situation, people who are possibly not really aware of the recent situation and damage their goods are doing to the environment." The workshop participants acknowledged networking opportunities, discussions and group work in international and interdisciplinary mixed teams. Several participants emphasised that they received additional knowledge both on marine litter and on design / circularity issues. The provided information and the detailed exercises helped to better grasp the complexity of the issue. Nevertheless, more time for exchange was wished. With respect to repeat this workshop or to organise a follow-up event, participants recommended to:

- include more target groups
- include more people with a business background
- organise a workshop with specialists on material, design and marketing to find ways on how to implement what has been discussed
- Invite stakeholders that can make decisions











5. Summarised outcome



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In considering the workshop result, the following aspects are important when applying ecodesign concepts and approaches in preventing marine litter.

The prevention of waste is a fundamental prerequisite when addressing the issue of marine litter. This can be implemented by way of using resources more efficiently, leading to a more sufficient lifestyle or applying the circular economy model. The core of the circular economy approach is designing so as to stop producing waste. The underlying mindset aims to design only products from materials that can circulate in biological and technical cycles and as such, can be considered as nutrients. The concept of waste should not be treated as something that is inevitable, rather it is an outcome of the design (product design, design of waste management and other systems). For a successful and comprehensive transformation of our economy in the mid-to-long run, the shift in the mindset and what is acceptable in terms of design and waste needs to start now. In summary, sustainable, circular design has to refer to designing better systems and operations, not just better products.

Thus, when designing with marine litter in mind, both the various phases and aspects of a product's life cycle and a systemic view and framing conditions should be considered. Each of the below regarded life cycle phases and aspects need to be addressed for a functioning circular economy leading to a reduced pressure on nature.

However, the issue of marine litter is closely linked to prevailing production and consumption patterns. Design as an instrument alone, cannot prevent that marine litter enters the ocean. It can, however, (i) reduce the possibility that products enter the ocean, (ii) minimise their impact, (iii) nudge consumer behaviour and (iv) serve as an instrument to raise awareness and to start a discussion along the life cycle of products to reconsider fundamental patterns that are detrimental for the environment. The marine litter problem must always be set against the overall framework of the way resources are used and value that is given to these.











Design

Recent studies and report (e.g. <u>Potting et al., 2017</u> and <u>Reike et al., 2018</u>) identified even up to 11 circularity strategies from refuse to remining.

Recommendations

- D.1 Design with the practicability of the product in mind
- D.2 Minimise the number of components
- D.3 Minimise material diversity
- D.4 Use inseparable joints for components made of the same or a compatible material in order to prevent littering
- D.5 Practice collaboration, sharing and partnering, and the involvement of stakeholders in the problem definition and the solution design process, design is not an isolated process. Reach out to other sectors and countries to learn about their best practice examples.
- D.6 Seek to work with other disciplines, practice systemic thinking
- D.7 Avoid using parts that require frequent replacement/repair
- D.8 Minimise losses within the life cycle of a product
- D.9 Design products and services for a circular economy and rule out as far as possible waste
- D.10 Plan for continual improvement
- D.11 Design the business system; consider product-service systems
- D.12 Consider packaging in the design phase

The guiding principle is to be the **prevention of marine litter.** If this cannot be achieved, steps should be taken to facilitate the reuse or the product or its parts and the recycling of its materials.

Designing for marine litter prevention in a circular economy should apply, as much as possible, the following aspects:

Products should be designed to be harmless to marine flora and fauna should they enter the (marine) environment while retaining their function.

The designer should consider that any parts that can easily be separated from a product, are prone to being discarded or lost. On the other hand, modular design can help make products last longer by enabling easy repair. Unrecyclable parts should also be easily removed.

The standardisation and interchangeability of individual product parts such as chargers and caps should be promoted to prevent waste.

Innovative approaches to reducing marine litter include the design of multi-purpose products as well as products inspired by solutions from before the "plastic age" and "To-Go-culture".

Actors along the complete life cycle in a strong dialogue with industry representatives (as one major actor) are encouraged to establish concrete design guidelines for individual products and supportive services in order to target specific problem areas and offer specialised solutions. In general, the collaboration of all relevant life cycle actors and stakeholders of the system the life cycle is embedded in (e.g. communities) is important. Systemic thinking is essential. Designing can be regarded as a permanent learning process and should include good practice examples from other sectors and countries.

"Collaboration between different actors needs to be strengthened. It is the best and most effective way to move forward." Anne Raudaskoski











Materials

Recommendations						
D.13	Use materials with low environmental impact in the					
er	itire life cycle of a product					
D.14	Use recyclable non-toxic materials					
D.15	Use recycled materials					
D.16	Minimise Composites					
D.17	Identify / Label Materials					
S.1 Fu m	rther R&D in developing sustainable "alternative aterials"					

https://plasticsrecyclers.eu/downloads

In light of the many risks, plastics pose to the marine environment due to their low biodegradability and often toxic properties of additives. In line with the precautionary principle, the use of plastics for products that are prone to ending up as marine litter should be avoided whenever adequate alternatives with a lower environmental impact are available.

Seeing the unique qualities of plastics and their low carbon footprint compared to other materials however, plastics currently remain a viable option in terms of environment-friendliness as long as their recycling and/or reuse in products can be guaranteed. (In the circular economy future fossil-fuel dependence is not an option anymore.)

In line with this, plastics recyclable in several cycles and with no or very low toxicity of additives should be considered for the product or its packaging whenever the use of plastics seems appropriate. As recycled plastics may at times possess inferior qualities to those possessed by virgin plastics, collaboration between designers, producers, recyclers and researchers to improve the quality of recycled plastics is advised.

Another way to improve the quality of recycled plastic is to design products and packaging in such a way that they are easier to recycle. For this purpose, the Plastic Recyclers of Europe have published "Design for Recycling" guidelines that demonstrate which design features are desirable from the point of view of recyclability, and which ones are not.

For some single-use products, edible materials may also be an appropriate way to reduce waste while also generating consumer attention.

Recognizing that while so-called "biodegradable" plastics are currently in many cases not a sustainable option since they only break down under very specific conditions, developments in this field and for other options of "alternative materials" should be followed closely. Further research is needed to check the suitability of "alternative materials" for circular application, for use at larger scale and their environmental impacts.

In general, often substitution of materials is considered as one of the central factors in addressing the marine litter issue. However, it is just one life cycle aspect against many other options.











Manufacturing

Waste may be generated during the manufacturing process of the product. It is advisable, especially from an economic point of view, to recover any excess material produced during the manufacturing process, and to recycle it. Companies with exceptional waste management should be labelled as such in order to ensure process accountability.

An important point is to work together with reliable and certified suppliers from an environmental point, in order to ensure quality and keep environmental risks as low as possible.

Product and packaging

Recommendations

- D.18 Provide information on packaging about the materials used in the products and its packaging
- D.19 Reduce packaging to what is necessary for the product (consider, amongst others, transport before and after use as well as the use phase)
- D.20 Avoid pre-portioned single use packaging (designers, industry, conscious decision of customers)
- D.21 Enable reuse of packaging
- D.22 Integrate marine litter aspects into packaging design
- D.23 Favour products intended for immediate (and local) consumption, which require less durable packaging

Packaging should be reduced to an absolute minimum while still considering hygienic and functional concerns. For this purpose, small, pre-portioned single use packaging should be avoided. Instead, products can be packaged more resource-efficiently in bulk.

Packaging should also be tailored to the needs of the product and take into consideration the transport conditions (also after use). For example, products intended for immediate (and local) consumption may require less durable packaging.









Logistics

Recommendations

D.24 Product design should consider the logistics of transporting and the transport distances of materials etc. of the product.

Business models, marketing and information

Recommendations

- D.25 Communicate environmental excellence of the product (customer group specific)
- S.2 Introduce a label that indicates designs which use resources as efficiently as possible and which integrate environmental impacts, such as marine litter, into the life cycle of the product

See also recommendation D.11

Product design should consider the logistics of transporting and the transport distances of materials etc. of the product.

By designing products in such a way that they are easier to stack, waste may be reduced since they can be held in place more easily, and the carbon footprint may also be reduced. Improper transport can result in products getting lost during the transport, with especially smaller items often ending up as marine litter. To prevent this, bulk packaging appears necessary, but should be reusable if possible. For larger items, plastic bulk packaging may also be replaced with reusable straps.

Especially on an industrial scale, designers may want to charge buyers different amounts for different types of packaging, in accordance with their environmental impact. Packaging should be tailored to the specific situation, for example the duration of transport and humidity levels experienced.

Marketing and consumer communication can be a powerful tool for reducing marine litter. To enable consumers to make informed decisions about their purchases, transparency about the materials used in the product and its packaging should be provided. Through the packaging and other channels of information, consumers should be informed on how to recycle the product and its packaging appropriately and about possible consequences of littering (e.g. similar as warnings on cigarette boxes). Furthermore, re-designed products should communicate their improvement or nudge their users to a "behaviour" that prevents littering.

Newly established business model play a major role in economic transformation. With respect to reduce or prevent marine litter, the following two models can be of high importance: (i) services to satisfy user needs that minimise physical goods (e.g. "refilling of own bottles") and (ii) exploitation of otherwise "wasted" materials or resources (e.g. "fishernets as basis for carpets").









Use

Recommendations							
D.26	Foster emotional connection to product						
D.27	Create timeless aesthetic						
D.28	Design upgradeable products						
D.29	Design products that can be customised						
D.30	Design for maintenance and easy repair						
D.31	Design for reuse						
S.3 Er	ncourage low-consumption user behaviour b	Ŋ					
de	eveloping and supporting awareness-raising campaign	S					

After Use

Reco	mmendations				
D.32	Design smart waste systems				
D.33	Design the recycling business model				
D.34	Locate unrecyclable parts in areas easy to remove				
D.35	Design for safe disposal [if no further cycles of the				
product, its parts and its materials is possible]					

Marine litter occurs particularly during the use of products, such as intentional or unintentional littering of mainly single use items.

Among others, the use of microplastics or the use of plastic as material for products that are subject to friction in such a way that microplastics would be created, should be particularly considered. Therefore it is advisable to reconsider the use of certain materials and to evaluate whether the design might lead to marine litter during the use of the product.

The design should always ensure that the product can be used for its purpose as long as possible. Designers should keep practicability in mind.

It should be checked how far hygienic regulations can be adapted to allow waste prevention or at least reducing reuse models while still guaranteeing (public) health.

Customisable or emotional design may help to establish stronger relationship to the user and thus to foster a long-term use of the product.

In general, even if design measures contribute to long-lasting, re-usable products, the dependency on economic growth triggers overconsumption and leads to ongoing growing demand in resources and subsequent (environmental) impacts. Often low-impact and high-impact products co-exist.

A way to avoid products and especially their packaging from being discarded carelessly into the (marine) environment is to provide packaging with value. Packaging can be given value through implementation of a deposit system, which incentivises people to collect packaging and return it in exchange for money.

A further option is also designing the product or the packaging for reuse, and/or providing information on how the item can be reused, through instructions on the packaging itself or through other means of consumer communication.

In order to enhance waste collection, (charitable) collection schemes for single-use items can be introduced, as well as innovative collection tools such as "singing trashcans". The availability of return options is especially important at beaches.











Enabling environment and systemic issues

Recommendations

- S.4 Raise awareness on own influence on the marine litter issue among designers and all other life cycle actors
- S.5 Support and inform broader public (including all life cycle actors) on best practice examples in (i) re(design) / circular design, (ii) sustainable production and business models for a circular economy and (iii) good consumer behaviour to reduce /prevent waste.
- S.6 Include environmental costs in the price of products to incentivise the purchase of products that produce less environmental costs.
- S.7 Create a regulatory framework that enables ecodesign policies, sustainable production and consumption. Also consider the ban of high impact products.

The environment in which designers are operating may limit the effectiveness of the outlined measures; however, it can also enable them to have a broader impact.

A supportive environment is characterised by strong consumer awareness of the issue of marine litter and the negative implications of a linear economy. This calls for effective communication between the consumer and the various stakeholders. Furthermore, best practice examples, e.g. in production and consumer behaviour should receive widespread attention.

Policy makers can work together with producing companies to create a supportive and perhaps even protective regulatory framework to enable sustainable products and services. This should happen with a holistic view of the environment, realising that while some measures may be environmentally sound in regards to a single issue, they may be problematic in other areas. Keeping the economic costs of marine litter in mind, public funding should be made available for research on solutions, such as improved recycling processes, R&D for "alternative materials", cross-sector collaboration (e.g. where recycled plastics could be used for high-value products) and advanced remanufacturing technologies.

Meanwhile, the environmental costs should be included in the price of products to incentivise to purchase of products that produce less environmental costs.

Nevertheless, a sole focus on "technological solution and research" will not completely solve the problem. Our unsustainable lifestyle remains a core issue to be addressed.











Annexes



Annex I: Ecodesign Matrix for marine litter prevention

Annex II: Paths to the desired future (summarised results)

Annex Illa: Life cycle aspects (summarised results)

Annex IIIb: Life cycle aspects (guiding questions)

Annex IV: Workshop Agenda

Annex V: Workshop Participants









Annex I: Ecodesign Matrix for marine litter prevention

What	Who	Impact	€€€	Comments
 Harmless to marine flora and fauna but functional Reusable packaging Items that can be easily disassembled, improve their recyclability Long living items that are not thrown away design to reduce waste Focus on function instead of product 	Working together with people from different directions	•		 Think products form the end: what impact will it have on a (marine) ecosystem? Take inspirations from easy solutions e.g. from nature
fixed easily. This will – depe	nding on the products purpo	se - support the long-term-us	se of products. Single-use pro	ducts need to be recyclable.
Inspiration for sustainable po be started with "thinking the	roducts could be found in "ea e product from the end", to ma	sy" solutions, e.g. inspired by ake the possible impact visible	nature. Also the process of d and to keep it in mind while o	esigning new products could developing a product.
	 What Harmless to marine flora and fauna but functional Reusable packaging Items that can be easily disassembled, improve their recyclability Long living items that are not thrown away design to reduce waste Focus on function instead of product The design of a product must fixed easily. This will – dependent of the started with "thinking the started wit	WhatWho• Harmless to marine flora and fauna but functional• Working together with people from different directions• Reusable packaging• Working together with people from different directions• Items that can be easily disassembled, improve their recyclability• Long living items that are not thrown away• Long living items that are not thrown away• Source• Focus on function instead of product• The design of a product must ensure no harm to the envir fixed easily. This will – depending on the products purpor Inspiration for sustainable products could be found in "ea be started with "thinking the product from the end", to make	What Who Impact • Harmless to marine flora and fauna but functional • Working together with people from different directions • • Reusable packaging • Items that can be easily disassembled, improve their recyclability • • • Long living items that are not thrown away • • • • design to reduce waste • • • Focus on function instead of product • • The design of a product must ensure no harm to the environment. Packaging could be r fixed easily. This will – depending on the products purpose - support the long-term-us Inspiration for sustainable products could be found in "easy" solutions, e.g. inspired by be started with "thinking the product from the end", to make the possible impact visible	What Who Impact €€€ • Harmless to marine flora and fauna but functional • Working together with people from different directions • • • Reusable packaging • Working together with people from different directions • • • Items that can be easily disassembled, improve their recyclability • • • • Long living items that are not thrown away • • • • design to reduce waste • • • • Focus on function instead of product • • • The design of a product must ensure no harm to the environment. Packaging could be reusable and products easy to fixed easily. This will – depending on the products purpose - support the long-term-use of products. Single-use pro • Inspiration for sustainable products could be found in "easy" solutions, e.g. inspired by nature. Also the process of dibe be started with "thinking the product from the end", to make the possible impact visible and to keep it in mind while of









Life cycle stage / aspect	What	Who	Impact	€€€	Comments
Materials	 Material substitution Reusable, bio-based and degradable materials Develop new materials (bio-based, biodegradable also in sea, compostable) Monomaterials alternative materials Recyclate 	 Material "development" supported by all stakeholders (producer of material, designer, "user", recycler, end of life) -> interdisciplinarity 	 New materials should be considered for products that have high risks of becoming litter 	 New materials expensive at the beginning but cheap once implemented in the production cycle Take environmental costs of materials into account and add to the pricing 	 Research and development of alternatives to plastics have to be supported Increasing the consumers awareness of the different materials (e.g. bio- based vs. biodegradable) Caution about merge of biodegradability and marine environment Think about the use of local materials
	Alternative materials for plas into the market as a recyclate using the term "biodegradal more research for new susta these materials may be high	tics made of fossil materials h e with good quality. Alternativ ble" due to the fact that mater inable and not harmful mater at the beginning but will decre	ave to find their way into the r res could be bio-based, biodeg erials that are biodegradable rials should take place. This pr ease after the materials are in	market or the existing material radable and compostable. It is could cause serious harm to t rocess has to be supported by pplemented in the production	Is have to find their way back very important to be careful he environment. This is why all stakeholders. The cost of cycle.
u- ing	 Zero waste production with minimal waste tails 				Labelling and process accountability
Man factur	During the production of pro must be established.	oducts, as few waste as possi	ble should be generated. The	manufacturers need to be re	sponsible and clear labelling











Life cycle stage / aspect	What	Who	Impact	€€€	Comments
^o roducts & Packaging	 Packaging/ "single use plastics" need more value (so it is not thrown away) Higher quality of products (bottles -> not only single use) Caps attached to bottle (or deposit scheme for caps) Labeling the products that contain "hidden plastics" reduce unnecessary packaging without losing function 	 Producers e.g. beverage companies State/ authorities → directive, regulation 	 Reducing caps in environment Give value to packaging Y of the products should be h 	"Zero" cost	Competition with current companies
4	avoid single-use items. Also p also be seen as a product.	borities who have an impact of	belling about contained subst	ances, this is also important fo	or the package, which should
gistics	 Provide local products with less transport footprint Working together on an international basis 				 Local production to minimise costs and CO₂
Γο	Products and their productio emissions.	ns have to be local in order to	cause as few harm to the env	ironment as possible. This will	minimise their cost and CO ₂ -









Life cycle stag	e What	Who	Impact	€€€	Comments
/ aspect					
usiness model, mmunication,	 Sharing and collaborating information, ideas, solutions and make them easily assessable Changing mindset of retailers and consumers extended producer responsibility 				How can we organise better cooperation?
Bu Co	The knowledge of different s	stakeholders has to be shared	in order to harmonise differe	nt systems and make them we retailers has to be changed	ork. It is therefore important
- •	One open question is how th	e cooperation between different	ent stakeholders can be enhar	nced.	
Use	 Much more use of incentives and (financed or other) reward systems to change consumer behaviour Think about sufficiency and simplicity (Do we really need that?) Awareness raising and informing 	 General public (consumers) -> responsible consumption 			 Systemic changes, sustainable production and consumption Change consumer behaviour and acceptance we need a "letter of human responsibility"
	of alternatives for products rewarded and incentives for whether it is necessary or no	consumer behaviour and to ra that harm the environment e. the consumers should be given of to even have the product.	ise awareness for (marine) litt g. single use products. Existir n. The sufficiency and simplicit	er and now to avoid it. It is to a ng systems aiming for a chang ty of products should also be a	achieve a general acceptance e of consumption should be ddressed in order to find out











Life cycle stage / aspect	What	Who	Impact	€€€	Comments
After Use	 Effective and proper collection of private and municipal waste operators Harmonise/ standardise waste collection and recycling -> economics of scale Develop better deposit system (e.g. more money if bottle is returned with lid) Deposit systems/ funds make collection easy, visible and even attractive ("music is playing if you put the container to a 'collection station' ") regard plastic as a valuable material and use it over and over again 	 Sorters, recyclers, certifiers EU CEN Producer and consumer (take responsibility for after use) 		 Costs for: installing collection points, sorting plants, recycling and recovery facilities etc. 	 Waste management systems being easy to understand Return back (reused, recycled, recovered) Behaviour of the people Bringing stakeholders together

After the use of a product, the collection of the resulting waste must be managed properly and effective. The waste collection and recycling has to be standardised. Therefore, the deposit system has to be improved. It must be easy to understand that no gaps of collection occur. Costs for installing collection systems, sorting plants, recycling and recovery facilities also need to be covered.

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Life cycle stage / aspect	What	Who	Impact	€€€	Comments
osystem and enabling environment	 Awareness/ education measures (starting by the youngsters) Improved consume communication Supportive (protective?) regulatory framework WITH companies Connecting human rights with responsibilities change our "cultural behaviour": from "a to- go-culture" to "a to- stay-culture" 			 Cost internalisation Public funding for research 	 Listen to the good companies rather than the "bad ones" (who often influence the industry associations) Policy making holistic view (e.g. circulation is not always better for the environmental point of view, due to hazardous chemicals or energy) improve communication between different ministries so that you don't have conflicting measures
SCC	Supportivo systems have diff	forant duties. On ana hand the	w should start aducational mo	occurac in order to inform cust	omors about their

Supportive systems have different duties. On one hand they should start educational measures in order to inform customers about their possibilities of living a sustainable life. On the other hand they should work with producers and create supportive regulatory framework. This framework must be created without losing the holistic view. Also human rights could be connected with human responsibilities. The funding of these measures could take place through public funding.





































Annex IIIb: Life cycle aspects (guiding questions)











Annex IV: Workshop Agenda

- Venue: Stratum lounge, Berlin, Germany
 - 9:00 Introductions
 - 9:20 Workshop goals: Marta Ruitz, HELCOM & Conrad Dorer, German Environment Agency
 - 9:30 Marine litter facts, challenges & current situation, followed by Q&A: Stefanie Werner, German Environment Agency
 - 9:50 What do we mean by ecodesign? Followed by Q&A: Anne Raudaskoski, Ethica
- 10:05 Group work: Creating a common vision for the Baltic Sea and marine litter prevention
- 10:40 Coffee
- 10.50 Practical example to reduce/reuse packaging: Kerstin Jana Kater & Karen Rose, Füll
- 11:00 Groupwork: Going through the lifecycle of top 10 marine litter items: what should change?
- 12:00 Lunch
- 13:00 Short presentations on Round Table on Ecodesign and Packaging: 1) Isabell Schmidt, German Association for Plastics Packagings and Films 2) Ecodesign Policy, Anna Karin Jönbrink, Swerea
- 13:20 Group work: Prioritising actions & creating a path towards the vision
- 14:00 Group work: Creating an ecodesign matrix for marine litter prevention
- 14:30 Coffee
- 14:45 Group work: finalising the ecodesign matrix
- 15:30 Round table discussion: take-away from the day & next steps
- 16:00 Thank you & goodbye!









Annex V: Workshop participants





