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COP
Circular Ocean-bound Plastic

Business Opportunities

Report

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Report on Business Opportunities

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Summary

This report is one of several deliverables in the EU Interreg South Baltic Project, Circular Ocean-bound plastic (COP). The name of deliverable is "2.6.1 Report on Business Opportunities" and the report explores the vast potential for Small and Medium-sized Enterprises (SMEs) in the South Baltic Sea Region to engage in sustainable practices by addressing ocean-bound plastic (OBP) waste.

The report emphasizes the importance of preventing plastic waste from entering water streams and highlights innovative methods for recycling and reusing waste materials. It outlines four key levels of waste management: prevention and collection on land, collection in water bodies, waste management and recycling processes, and designing new products from recycled plastics. Each level presents unique business opportunities, from developing public awareness campaigns and interactive waste bins to creating advanced recycling technologies and eco-friendly products.

The report also discusses future possibilities, such as integrating waste collection with tourist activities and using apps to incentivize recycling. By grasping these opportunities, SMEs can contribute to environmental protection while tapping into the growing market for sustainable solutions. The appendix provides a comprehensive list of organisations involved in regular and Ocean-bound plastic waste management, showcasing the diverse efforts in the region and globally. This report serves as a valuable resource for SMEs looking to innovate and lead in the sustainability market.

Acknowledgement

We would like to extend our gratitude to all the partners whose insightful comments and contributions have been important and helped us to finish this report.
Special thanks to the communication and design team of the Circular Ocean-bound plastic (COP) project for making this report both beautiful and more comprehensive.

Additionally, we are also grateful of City of Malmö for their fruitful discussions and contributions. Thank you to all for the support.

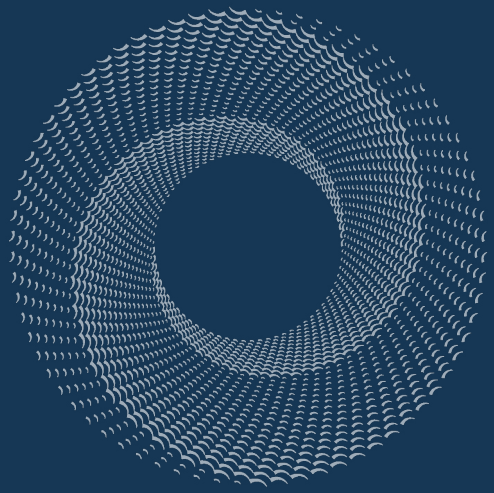
- Partners from Sustainable Business Hub, Sweden

“The greatest threat to our planet is the belief that someone else will save it”

- Robert Swan, Polar explorer

Content

1.
Aim of the report



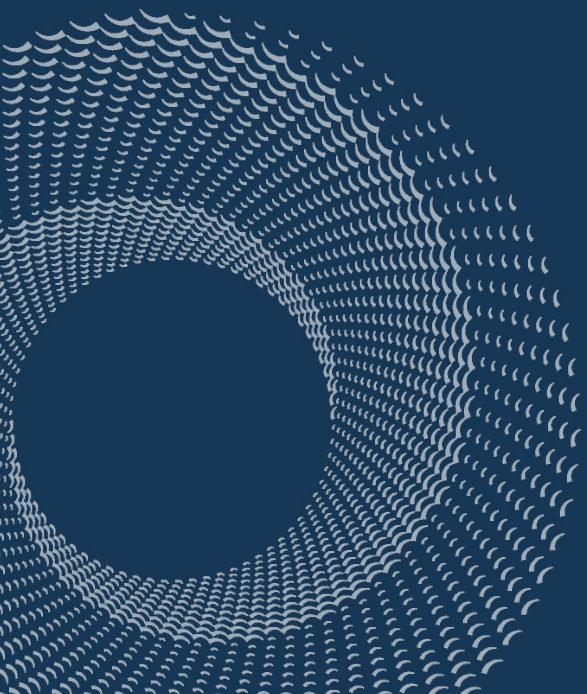
1. Aim of the report

The aim of this report is to collect necessary information on different business opportunities available in the market for Ocean-bound plastic (OBP) waste in the South Baltic Sea Region, including possibilities about how to prevent the waste reaching to the water streams in urban areas. Additionally, also to study how the waste can be recycled and reused for new product production without extracting the new raw material from the ecosystem. This report is part of the EU Interreg South Baltic project Circular Ocean-bound plastic (COP), which addresses ocean plastic problems in the South Baltic Sea. Hopefully, this report will inspire Small and medium-sized enterprises (SMEs) and other organisations to understand the potential available in the market for ocean-bound plastic waste.

Ocean-bound plastic waste presents a significant business opportunity for SMEs to tap into the growing demand for sustainable solutions. By focusing on recycling, upcycling, and creating eco-friendly products from reclaimed plastics, SMEs can address environmental concerns while appealing to eco-conscious consumers and corporations. Opportunities range from developing sustainable packaging and fashion accessories to offering consultancy services for waste management, enabling SMEs to establish themselves as leaders in the sustainability market.

At the end the report includes an appendix, with a list of SMEs, Non-Profit Organisations (NGOs), and large companies involved in the collection, handling, recycling, and production of new products from recycled plastic, including ocean-bound plastic. The organisations operate in countries around the South Baltic region, as well as various other countries globally, showcasing a diverse array of business opportunities addressing plastic waste and sustainable practices.

2.
Reimagining waste
- The journey from packaging to product innovation



2. Reimagining waste

Imagine a sunny afternoon in the city. While strolling through a busy street, a couple buys a cold bottle of water, a bag of chips, and a chocolate bar. As they walk, they enjoy their snacks, eventually finishing the bottle and crumpling the chip bag. The wrapper from the chocolate bar, now empty, is tucked into their pocket. But when the time comes to discard these items, they face a dilemma: the nearest bin is too far away, or maybe it's overflowing. In a moment of convenience, the person tosses the empty bottle into a nearby bin, but the chip bag and chocolate wrapper are casually discarded on the street, while the cigarette butt is flicked to the ground.

At first glance, this waste seems harmless, just a small piece of litter on the pavement. But as the day goes on, a gust of wind picks up the chip bag and chocolate wrapper, carrying them down the street, where they join other bits of trash blown around by the breeze. Eventually, the wrappers find their way into a storm drain, which leads directly to the nearby river. Meanwhile, the cigarette butt is washed into a gutter by a sudden rain shower, also ending up in the waterway.

Figure 1: Journey of packing material from consumption to new products

Once in the water, these items don't just disappear. They become part of a growing mass of debris that pollutes the river, harming the aquatic life and the ecosystem around it. The plastic bottle, although in the bin, may not be properly collected or recycled, and it too could eventually find its way to the water, carried by birds, wind, or simply through the mismanagement of waste.

Today, the story of waste doesn't have to end in pollution. Increasingly, discarded items like wrappers, bottles, and cigarette butts are being collected through various initiatives and recycled into new products. This shift represents a significant business opportunity for SMEs, who can capitalize on the growing demand for sustainable solutions. By transforming waste into valuable resources through recycling, SMEs can not only contribute to environmental protection but also tap into a market focused on sustainability and responsible consumption.

3.
Unlocking Business Potential
- Opportunities for SMEs in Plastic Waste Management

3. Unlocking Business Potential

Several opportunities exist to manage waste generated after consumer use. In today's world, where the focus is increasingly on building a sustainable society, various business opportunities emerge at different levels of waste management. In the following sections, there will be four levels where SMEs can explore innovative techniques to transform waste into viable business models. We have chosen different levels to indicate that there is some form of hierarchy when one considers reducing littering at its source is more effective compared to relying on collecting waste as an end-of-pipe solution. Hence, the lower the level the closer to the source of the waste and the better chance of having pure fractions i.e. material with higher value.

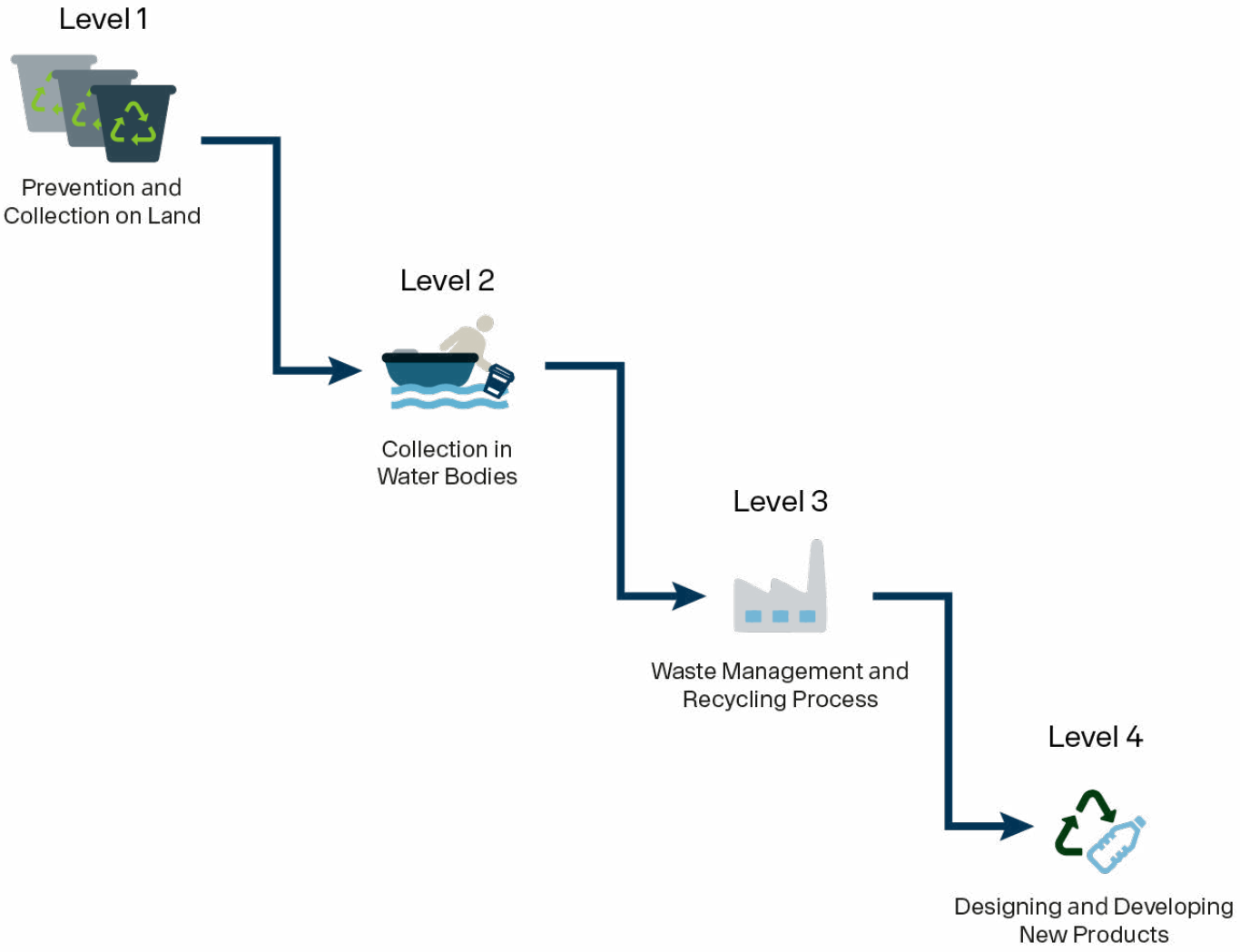


Figure 2: Different levels of where there are business opportunities within ocean-bound plastic area

Level 1 - Waste prevention and collection on land

This level will explore various initiatives aimed at preventing plastic waste from becoming ocean-bound plastic. It will cover the key players involved in producing specialised equipment, such as public bins for parks and baskets under stormwater drains, designed to capture waste before it reaches the ocean. Furthermore, it will show public awareness efforts, including information campaigns and community-driven activities, like the “Ballot Bins” for voting or other interactive collection bins, which encourage collective action to keep our environment clean.

Figure 3: Fimpomat, Sweden

Figure 4: Baltic Sea Ashtray, Germany

In fig. 3 this an examples of interactive collection device so called ”ballot bins”. In Sweden it’s called “**fimpomat**” where you can vote with your cigarette butt. It has been proved to reduce the number of butts on the ground drastically (Håll Sverige Rent, 2024). And another similar example is fig. 4 **Baltic Sea Ashtray** from Germany.

There are several opportunities to stop plastic waste before it becomes ocean-bound plastic. After using items like coffee cups, ice cream wrappers, or candy packaging, consumers have a few options: dispose of the waste in the nearest bin, drop it on the ground, or carry it home to throw it away later. For most people, convenience and proximity to a bin are key factors.

Take the city of Malmö, for instance in fig. 5, they've designed their public waste bins with a thoughtful, multifunctional approach. These bins feature dedicated spaces for cigarette butts on top and side compartments for bottles and cans with deposits, making it easier for people to dispose of different types of waste responsibly.

Figure 5: Multipurpose bin from Malmö

Figure 6: Talking Bin

One way to encourage consumers to properly dispose of waste is by using interactive "talking bins" that thank or compliment people for doing the right thing. This playful approach can make the experience more enjoyable and memorable, reinforcing positive behaviour, see fig. 6.

It is of highest importance to motivate people to depose their waste properly. In Sweden, starting January 1st, 2026, municipalities will be required to collect general packaging waste separately, like in fig. 7, in public spaces like squares and parks that exceed 2,000 square meters and where significant amounts of waste are generated (Regeringskansliet, 2022).

Additionally, municipalities must also collect plastic packaging separately in other outdoor locations, such as pedestrian streets, where large amounts of plastic waste tend to accumulate. These initiatives aim to make waste management more efficient and prevent littering in high-traffic areas (Regeringskansliet, 2022). Regulations like this indicate that the demand for sorting recycling bins will increase.

Figure 7: Example of Waste sorting container. The picture shows a recycling container placed in an open square in the close vicinity to train and bus station in Sweden. Fractions from the right white=uncoloured glass, green =coloured glass, orange = plastic waste, blue= paper and red = "other waste"

There are also examples of national parks in Sweden like Kullaberg, where the organisation "Keep Sweden Clean" (Håll Sverige Rent) has placed stands with bags at parking areas, along with encouraging messages. Visitors are urged to take a bag, collect their own waste (and any litter they come across), and dispose it in bins or containers upon returning. On 30th April 2024, a workshop was organised within the COP project. During the workshop, there was discussion about taking this initiative a step further by connecting the bags to a fun activity, especially for kids.

The idea was to turn waste collection into a game—if a child fills a bag with litter, like ice cream or candy wrappers, the company selling those products could reward them with a free candy or ice cream or a discount. There could also be variants where the brand of the litter could be analysed, and the biggest polluters made public as a discouraging example.

A similar initiative is led by the organisation Clean Up Sweden (Städa Sverige). In collaboration with the ICA Foundation and ICA, one of Sweden's largest retail companies, they aim to create a litter-free environment across the country. The mission is simple but powerful: to eliminate litter from nature. Through this partnership, ICA-sponsored sports clubs are given an important task; —cleaning up their local surroundings. As a reward for their efforts, participating clubs receive financial support for their team funds, which helps cover travel expenses and competition fees etc. (Städa Sveriga, 2024).

This initiative is a win-win situation. Kids from the sports clubs help clean up areas near ICA stores, which often face littering from their own customers. In turn, they gain valuable funds for their teams while contributing to a cleaner, healthier community.

The same NGO organisation Clean Up Sweden has been involved in development of a regional “clean up map”. There is also an app where you can announce “clen up activities” or give attention to areas that needs to be cleaned up from waste (Skånsk Städkarta, 2024).

Within the city there are the municipal workers that are cleaning the waste. For them to have a better working condition and work environment and not need to bend their back, using equipment for picking up waste and cigarette butts is important. There are several examples of hand-hold pick-up devices.

An interesting example in fig. 8, that highlights the broader business opportunities in waste management is the wooden waste-picking device designed and produced by individuals in Malmö as part of a work-training program for those returning after sick leave. The device is now widely used throughout the city and is even available as part of the waste-picking equipment that residents can borrow. This project showcases how environmental solutions can be intertwined with social benefits, offering a win-win for both communities and the environment (Malmö Stad, n.d.).

Figure 8: Wooden waste-picking device

This example shows when focusing on preventing waste from reaching our waters while also considering the social aspects of waste collection, activities can create several business opportunities for companies, organisations, and municipalities. By integrating these efforts, it’s possible to create environmentally and socially impactful solutions.

Moreover, waste-picking activities can be used as a powerful tool to raise awareness and increase knowledge about environmental preservation. Some cities offer initiatives where citizens can engage in waste-picking efforts to contribute to a cleaner city (Malmö Stad, 2024).

Another solution in fig.9 is to prevent cigarette butts from reaching the canals has been implemented in some areas in the City of Malmö: basket devices are placed under the lids of stormwater wells, capturing the butts before they enter the waterways (Reniva, 2022).

To further streamline the process of cleaning cigarette butts from pavements and quays, some areas have introduced an efficient working scheme for municipal service personnel. Instead of manually picking up butts, they use water to wash the streets, allowing the waste to flow into the stormwater wells.

Figure 9: Basket devices from the company **Reniva** are placed under the lids of stormwater wells to collect cigarette butts

Afterward, they simply empty the baskets under the well lids, effectively collecting cigarette butts and other debris in a quicker and more efficient manner. This approach reduces litter and enhances the workers' efficiency in keeping the city clean. In this way there might be more chemicals from the butts due to the water but on the other hand, the butts are removed from the well quickly after so the time for leaking chemicals is reduced. One way to further improve the equipment could be to add some filter that absorbs the toxins in the butts maybe a certified biochar might work.

A similar system has been developed to address the issue of plastic waste originating from artificial grass and football fields, where single-use rubber granules are used to create optimal playing conditions. When these granules escape the fields, they can become microplastics in the environment. To combat this, baskets have been placed under the stormwater wells surrounding these fields, effectively capturing the rubber granules and preventing their migration into nature. By using the baskets also saves money as the rubber granules can be recycled (Reniva, 2022).

In the city of Helsingborg, innovative "art installations" serve as public ashtrays, providing attractive and functional solutions for cigarette disposal. Reflecting on experiences from the 1990s in Marseille, France, where tourists could receive metal tins for cigarette butts as souvenirs, there's potential for a similar business opportunity in creating branded tourist ashtrays.

Additionally, pocket-sized ashtrays designed for convenience and small, handcrafted trash containers are also available for consumers, promoting responsible waste disposal while adding a personal touch to litter prevention efforts.

Figure 10: Pocket-sized and bring along ashtrays from the NGO organisation **Håll Sverige rent** and the small handcraft business **Tash**

To raise awareness art made of waste fished up from city waters or cleaned up in parks or city centers in combination with information about waste and their damage to the environment also makes business opportunities for artists and exhibition designers.

Figure 11: Public Ashtray in Helsingborg

Figure 12: Trash art exhibition in Malmö (picture shown with permission of City of Malmö)

Additionally, organisations focused on educating and inspiring individuals and companies to contribute to cleaner environments and oceans create further potential for business collaborations. In Sweden, **Plogga** promotes the activity of “plogging” - a combination of jogging and litter-picking (from the Swedish word plocka meaning “to pick up”). This initiative has opened business opportunities for designers, as well as companies that wish to partner in support of the cause.

Figure 13: Waste Bin for nicotine pouches and the cases (Morgan, 2022)

Picture fig. 13 showing example of collection and sorting bin from Swedish Match and the shipping company Viking Line where the consumer is supposed to dispose their snuff pouches bags and plastic containers instead of throwing them into the sea (Morgan, 2022). Waste from the new white snuff has increased lately and is now the second most common waste in Sweden. But since snuff is not commonly used in all European countries the snuff pouches are not included in the EU single use Directive and the Snuff producers are not bound to pay cleaning up fees (Håll Sverige Rent, 2024).

Business opportunities for prevention of waste (examples)
Multipurpose and interactive public recycling and sorting bins
NGO, kids sport club and retailer clean up collaboration
Art Installations and exhibitions
Ergonomic grabbers for waste collections
Basket devices under stormwater wells
Public and pocket ashtrays
Incentive Game and Campaigns
Sport and tourist activities
Clean up Apps

In conclusion, these examples highlight some of the innovative solutions currently being implemented by companies, organisations, and municipalities to reduce waste and prevent it from reaching our oceans. From specialized collection equipment like stormwater well baskets to public ashtrays integrated into art installations, these efforts demonstrate a growing commitment to sustainability. Whether through practical tools that capture microplastics from artificial turf or creative initiatives that incentivize responsible waste disposal, these strategies not only help protect our environment but also open new business opportunities. By continuing to develop and refine such approaches, it can make significant progress in reducing plastic pollution and safeguarding our waterways for future generations.

Level 2 - Waste collection in water bodies

Once waste like cigarette butts, popsicle wrappers, and other litter reaches the water, it becomes significantly more difficult to collect and causes greater environmental harm. Weather conditions, saltwater, and UV radiation contribute to the degradation of plastic, breaking it down into smaller particles known as microplastics. These microscopic fragments can even enter the human food chain. Therefore, it is crucial to remove plastic litter from the water as soon as possible. In water, plastic waste often mixes with other debris, such as aquatic plants and paper waste. While most plastic waste floats, certain items, like water-filled plastic bottles, may sink to the bottom.

One method for removing waste is by actively picking it from riverbanks or quays using picking equipment and fishing nets. However, this approach poses risks for workers, as they might accidentally fall into the water. Telescopic fishing nets or litter grabbers in fig.14 can help reduce these risks, but the process is time-consuming and therefore costly.

In Malmö, the municipal service personnel are doing this cleaning, while in cities like Rostock, Germany, a private company is employed to clean the water surface at the city harbour. This involves a straightforward process of collecting waste from the pier using landing nets. Additionally, divers from Rostock's fire brigade complement these efforts by incorporating litter collection into their routine when training dives, focusing on cleaning the harbour floor (COP, Circular Ocean-bound Plastic, 2024).

Figure 14: Examples of picking up devices for litter manually from the water surface and riverbanks. Telescopic Fish net and trash grabber from Denios (Denios, n.d.)

When litter is floating in the water, it can be collected using passive floating booms, water-suction collectors, or skimmers.

Passive collectors placed at canal corners, where litter naturally accumulates, offer a cost-effective solution. A more active approach is using skimmer boats, like in fig. 15 the **Versi Cat trash** skimmer, which requires personnel to operate the vessel.

Figure 15: Example of a skimmer boat, the Versi Cat trash skimmer

To retrieve litter and plastics from riverbeds, methods such as employing divers, magnetic fishing, or using equipment that generates bubbles to lift plastic debris to the surface are necessary.

Many methods and equipment for collecting plastic litter from water streams are labour-intensive, requiring personnel not only for the collection itself but also for emptying collection devices and sorting the waste downstream. This sorting is crucial to separate different materials and plastic types, allowing for further processing into new products.

There is equipment that are less labour intense for example in fig.16, the autonomous **Aquadrone** Unmanned Surface Vehicle and the Aquapod which is cloud-connected system capable of collecting both larger debris and microplastics, an effective tool to improve the marine environment while reducing labour intensity for cleanup operations (Clean Sea Solution, n.d.).

The Aquadrone, an Unmanned Surface Vehicle (USV), can work in tandem with the Aquapod to sweep larger areas for floating debris, returning to dock automatically for self-emptying and charging. In a similar way as a robotic vacuum cleaner. The system also collects real-time data and do sustainability reporting meeting the EU's Corporate Sustainability Reporting Directive (CSRD). As the equipment needs electricity the company Clean sea solution is now working on a sunpower driven Aquapod in an EU Eurostar project.

Figure 16: Example of an unmanned drone with self-emptying and reporting system from Clean sea solution

With advancements in IT technology and AI, there are promising business opportunities for devices that utilize AI to separate or sort waste at the collection point. For underwater collection, using underwater cameras in combination with AI could also present significant potential. Additionally, scuba diving clubs and companies are already offering diving and cleaning services, which could be enhanced by incorporating AI-driven solutions for more efficient waste retrieval.

One of the examples of plastic waste capturing from water is the **Great Bubble Barrier** in fig. 17. This innovative technology uses a bubble curtain to capture plastic pollution in rivers. It operates by pumping air through a perforated tube laid on the riverbed, generating a continuous stream of bubbles that pushes plastic waste to the surface. The bubble curtain is strategically positioned diagonally across the river, allowing the natural flow of the water, combined with the bubbles, to direct plastic waste into a catchment system for collection and subsequent processing or reuse. A key advantage of this system is its ability to run 24/7 without disrupting ship traffic or harming aquatic life. Additionally, the bubbles increase the water's dissolved oxygen levels, which benefits the overall health of the aquatic ecosystem.

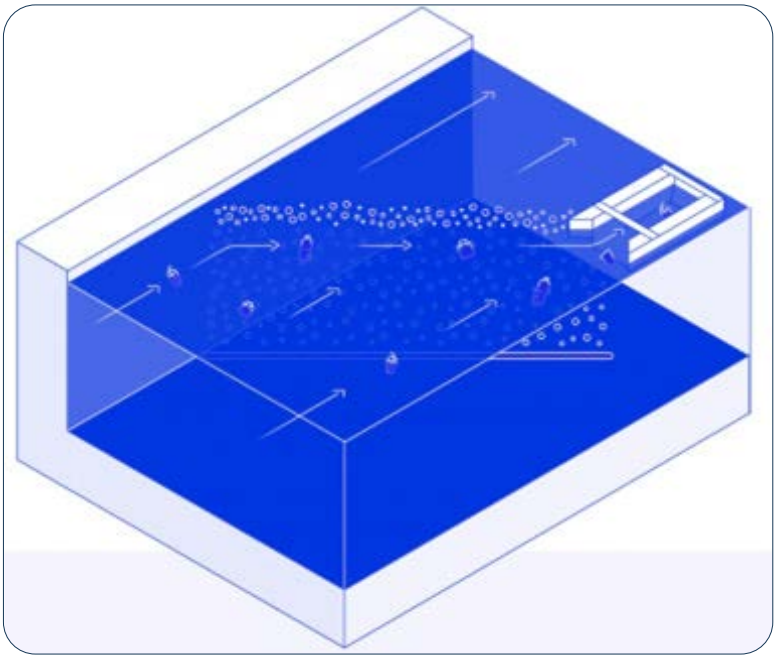


Figure 17: The Great Bubble Barrier
(The Great Bubble Barrier, 2024)

There are potential business opportunities in developing improved grabber tools and equipment for cleaning workers, making their tasks more efficient and ergonomic.

One approach to reduce municipal cleaning costs while creating business opportunities for tourism companies is to allow sustainable-profile tourist boat rental businesses to operate in city waters. A notable example is **Green Kayak** (Green Kayak, 2024), an NGO that allows people to rent kayaks for free, provided they collect trash while paddling. In fig. 18, in 2023 Green kayak were for instance operating in Denmark, Germany, Norway, Sweden and Finland. This model encourages both eco-friendly tourism and environmental cleanup, offering a win-win situation for cities and businesses alike.

Figure 18: In Gdansk, one of the demo sites in the COP project, kayaks are rented out for free if the tourist pick waste while paddling. An example of a tourist business opportunity

Once litter ends up on riverbanks, tourist groups or companies can participate in clean-up activities as part of team-building exercises. For instance, the city of Malmö has developed litter picking stations where people can borrow grabbing sticks, gloves, and trash buckets or paper bags to collect waste. The design of these stations in fig. 19, along with other initiatives aimed at raising awareness about the impact of litter on oceans, presents business opportunities (Malmö Stad, n.d.).

There are numerous examples of equipment currently on the market, being used by various countries, that are effectively helping to clean marine litter from the oceans. These tools range from floating barriers and skimmer boats to underwater robots and AI-powered waste collection systems. To explore such equipment and technologies in detail, kindly refer to the ocean-bound plastic collection methodology report, which offers comprehensive insights into the innovative solutions being implemented globally to tackle marine pollution (COP, Circular Ocean-bound Plastic, 2024).

Figure 19: Picture of beach cleanup stations (Malmö Stad, n.d.)

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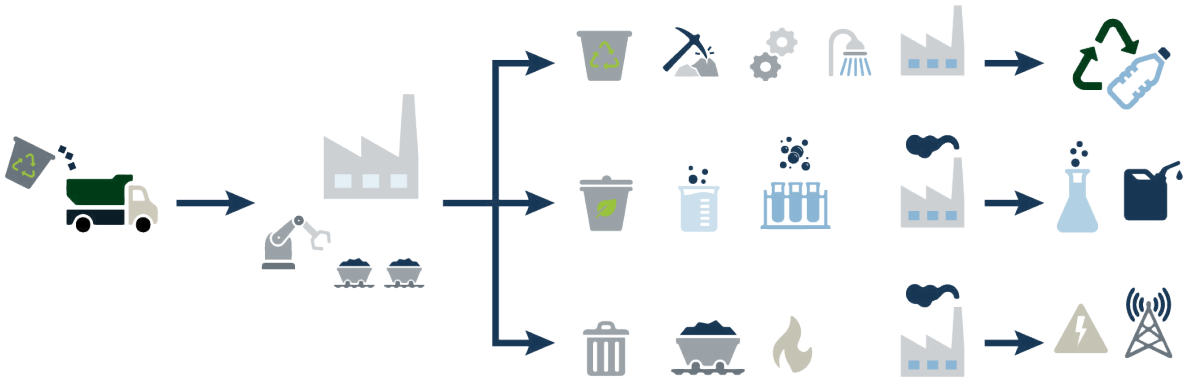
Business opportunities for picking up waste in water (examples)
Floating booms
Telescopic fish net and trash grabber devices
Water-suction collectors like port bins
Skimmer and water drones
Great Bubble Barrier
Beach CleanUp Activities
Tourist and sport activities (e.g. kayaking)

Level 3 - Waste Management and recycling processes



1. Waste management

Waste management includes **collection**, gathering waste from various sources; **handling**, involving safe transfer and storage; and **sorting**, where materials are separated for recycling. **Washing** is often necessary to remove contaminants, especially for recyclable materials like plastics, ensuring higher quality and usability in recycling processes. These steps together enhance recycling efficiency and reduce landfill waste. **Collection, handling, and sorting** usually are managed by municipal authorities, private waste companies, or recycling facilities. Often it is the municipalities who handle household waste, often outsourcing to private firms, while recycling facilities focus on advanced sorting and processing.

- **Trebo** focuses on advanced sorting technologies, using fluid-mechanical methods to separate complex plastic waste into high-purity fractions for both closed-loop and open-loop recycling.

- **ReSource Denmark** offers advanced plastic sorting services aimed at improving recycling efficiency. Their state-of-the-art facility in Esbjerg processes up to 160,000 tons of plastic waste annually, using flexible and proven technology to separate plastics into various types, such as HDPE, PET, and PVC. This process helps optimize both chemical and mechanical recycling while removing contaminants like food packaging and metals.

- **Svensk Plaståtervinning** operates an advanced recycling facility, utilizing AI and infrared technology to sort, clean, and process up to 12 types of plastic, aiming to create a closed-loop system for maximum material recovery.

These are few examples of companies who are driving innovation and efficiency in plastic waste, contributing to a more circular economy.

2. Recycling processes

Plastic waste recycling can be done through mechanical or chemical processes. Mechanical recycling involves sorting, cleaning, shredding, and remoulding plastics into new products, though it faces limitations with contamination and material degradation. In contrast, chemical recycling breaks plastics down into basic chemical components using methods like pyrolysis or depolymerization, the cleaning and sorting requirements depends on the method used for recycling. There are many companies globally that are in this business structure, either for mechanical recycling or chemical recycling.

a. Mechanical Recycling

Mechanical recycling is one of the most widely used methods globally for recycling plastic, paper, and glass waste. In this process, waste residues are transformed into new raw materials without extracting natural resources or altering their chemical structure. The mechanical recycling of plastic typically involves grinding, washing, separating, drying, re-granulating, and compounding. A significant portion of plastic recycling worldwide is conducted through mechanical recycling. When possible, this method allows the material to be reused in the same application, commonly referred to as a “closed loop”. During mechanical recycling the properties of the plastics are affected and in best case some types of plastics could be recycled eight cycles (Ikem, n.d.).

Several companies specialize in waste collection and the production of new materials using this method. Examples include *Nomi4S*, *Strandet*, and *RC Plast* from Denmark, as well as *Reko* from Poland, *Wildplastic and Terracycle* from Germany, *Sustainable Plastics* from Sweden, and *Remondis, Ragnsell, and Stena*, are a few famous companies from Europe and global market.

Mechanical recycling plays a crucial role in reducing environmental impact by minimizing the need for virgin resources and supporting a more sustainable circular economy.

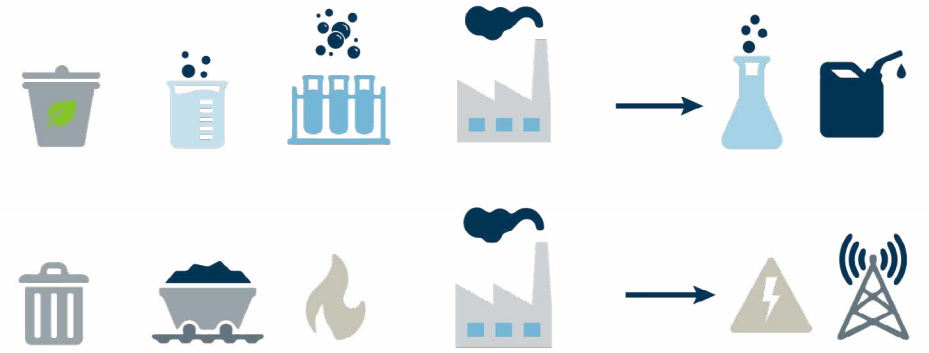
- **Nomi4S** is a Danish municipal resource company focusing on advanced waste management solutions, including plastic recycling. In partnership with Plastix, Nomi4S sorts plastic waste from domestic household trash and provides a clean, sorted fraction of hard plastics for further processing. This collaboration helps ensure that the plastic waste is recycled into raw materials, contributing to a circular economy model.

- **Strandet** takes a hands-on approach by collecting marine plastic waste, processing it into new products, and raising awareness about sustainability through educational initiatives.

- **Reko** provides comprehensive waste management services, collecting and recycling a variety of industrial wastes, while ensuring materials are managed in compliance with environmental regulations.

- Finally, **Wildplastic** primarily uses mechanical recycling for their process. They collect and clean plastic waste, then sort and transform it into new products without breaking it down chemically. This mechanical recycling method supports their goal of upcycling "wild" plastic into durable, reusable materials.

b. Chemical recycling



Chemical recycling is an emerging technology that offers the potential to return materials from various stages of the recycling process back to high-quality raw materials, like their original form. This term encompasses several processes that differ in how they break down polymers—the large molecules that constitute plastic materials.

One such process is pyrolysis, where polymers are heated in the absence of oxygen, causing them to break down into smaller components that behave like oil. Under optimal conditions, the resulting synthetic oil closely resembles petrochemical naphtha, which can be used as feedstock for producing chemicals, synthetic rubber, and various plastics.

Another method is gasification, which involves heating polymers in the presence of oxygen and water, resulting in a mixture of gases known as syngas, which serves as chemical feedstock in the chemical industry. A third process, depolymerisation, is specific to certain types of plastic and breaks polymers down into monomers, the starting material for producing new plastics.

Companies who are experts in chemical recycling of plastics are like Quantafuel Skive ApS, Clariter, BASF, are some of the known companies, who are making significant steps in chemical recycling to transform plastic waste into valuable resources.

- **Quantafuel Skive ApS** employs proprietary thermal and catalytic technologies to convert mixed plastic waste into basic chemical components, which are then refined to create new plastics or chemical products. This method reduces landfill waste and supports a circular economy.

- **Clariter** utilizes a chemical recycling process to convert waste plastics into high-value petrochemical products. Their technology transforms various types of plastic waste into sustainable materials that can replace traditional fossil-based chemicals, helping to close the loop in plastic recycling. This process contributes to a circular economy by upcycling plastics into useful raw materials for industrial applications.

- **BASF ChemCycling** process involves chemically recycling plastic waste that is difficult to recycle mechanically. This is done by converting the waste into pyrolysis oil or syngas, which are then used as feedstocks in BASF's production network. This approach enables the creation of high-quality, recycled plastic products that are indistinguishable from those made with virgin materials, supporting a circular economy.

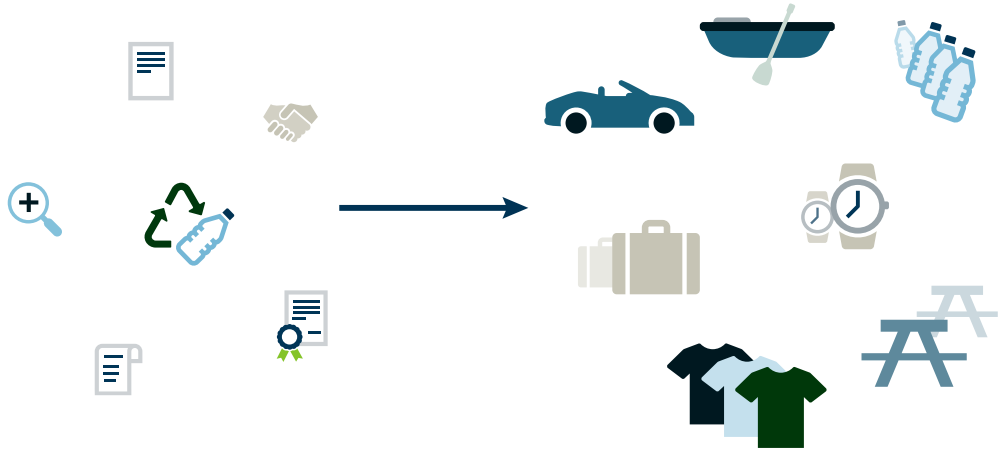
- Similarly, **Sustainable Plastic** focus on breaking down plastic waste into monomers through chemical recycling, followed by purification and repolymerisation to create high-quality new plastics.

These few companies are examples of driving innovation by converting non-recyclable plastics into reusable materials, enhancing recycling efficiency, and promoting circularity in the plastic industry.

Chemical recycling involves breaking down plastic polymers into their original components, such as crude oil or monomers, for reuse. While this method holds promise, it faces challenges like high energy consumption, CO_2 emissions, and difficulties processing mixed or contaminated plastic waste, limiting its efficiency and scalability. In contrast, mechanical recycling retains the plastic's structure but is hindered by contamination and colour issues. Despite these challenges, chemical recycling continues to attract significant investment, highlighting its potential for technological and business innovation (ChemViews Magazine, 2020).

Both mechanical and chemical recycling methods play vital roles in plastic waste management, each addressing different types of waste. Mechanical recycling is widely used but limited by contamination and degradation, while some chemical recycling methods offer a potential solution for mixed or contaminated plastics, though it still struggles with energy efficiency and scalability. Chemical recycling could serve as an alternative solution to incineration for plastic that cannot be recycled through mechanical process anymore. Despite challenges, both methods are crucial to advancing the circular economy, offering opportunities for innovation and business growth.

Level 4 - Designing and developing new products from recucled plastic materials



Recycling ocean-bound plastic waste transforms marine litter into valuable new products through efficient processes. Plastics collected from beaches and waterways are sorted, cleaned, and recycled using mechanical or chemical methods. Recycled PET (Polyethylene Terephthalate) from ocean plastics is used to create sustainable packaging materials, such as bottles and containers, and stylish, eco-friendly fashion textiles, including clothing and accessories. In the construction sector, these plastics are repurposed into durable materials like composite decking and insulation panels. Additionally, they find applications in outdoor furniture, household items, and automotive parts, highlighting their versatility. This innovative approach not only addresses marine pollution but also promotes sustainability by conserving resources and reducing environmental impact.

Several innovative companies are leading the way in transforming ocean-bound plastic into high-quality, sustainable products, each contributing to environmental conservation and circular economy principles. **Luxaflex** uses ocean plastic waste to create eco-friendly window coverings, such as roller blinds and curtains, with 50% of their fabric made from recycled materials. **The Ocean Cleanup** produces sunglasses with frames composed of 95% recycled high-density polyethylene (HDPE) from the Great Pacific Garbage Patch, incorporating other recycled components and raising funds for further ocean cleanup efforts. **BlockBlocks** produces bags, pocket ashtray, bracelet and many other products, all aimed at raising awareness about plastic pollution. These products are designed to promote sustainability while contributing to cleanup efforts.

Additionally, **OM-HU** offers a variety of functional products, including key chains, jewellery, t-shirts, cups, surf pins and few other items all crafted from recycled ocean plastic, promoting both sustainability and environmental awareness. **Strandet** creates stylish rulers, pearls, buttons, bracelets from collected plastic waste, highlighting their commitment to reducing marine pollution through fashionable, eco-friendly accessories.

TRIWA's "Time for Oceans" collection features watches made from ocean-bound plastic, merging modern design with sustainability to provide high-quality, elegant timepieces. **Reparell** offers a range of apparel and accessories, including t-shirts and hoodies, all made from recycled ocean plastic, emphasizing durability and environmental responsibility.

Furthermore, **Helly Hansen** incorporates ocean plastic into their outdoor gear and apparel, including outerwear and accessories, supporting both high performance and environmental conservation. Finally, **Ogoori** provides fashionable lifestyle products, such as t-shirts and bags, made from ocean-bound plastic, demonstrating their commitment to reducing marine pollution through stylish and practical items.

Each company exemplifies a dedication to transforming ocean plastic waste into valuable products, contributing significantly to a more sustainable future. Many such companies provide several products manufactured from ocean-bound plastic.

For designing and developing new products from recycled plastic materials there are huge business opportunities for packaging and product designers. Design for recycling. Using plastics that could more easily be recycled. There are work in progress for agreeing on standards and certifications on EU level (RecyClass, n.d.). This will generate business opportunities as mentioned for third party certification suppliers.

For plastics being recycled more than once new products made from recycled plastics also need to be recyclable and recycled. Hence the new recycled products in the future should not contain mixture of different plastics. There are also business opportunities for companies with smart digital tracing and labelling applications, in order to encourage closed loop business models.

Business opportunities for designing and develop new products from recycled plastic materials (examples)
Accessories
Clothes
House appliances
Furniture
Building material
Product designers
Recycling of plastics by biological means
Industrial composing and biodedradation of plastics

4.
Other opportunities
- and different approaches

4. Other opportunities

Moving to the final section of the report, describes several unique and niche solutions for plastic recycling, as well as future possibilities for introducing new solutions.

Within the lifecycle of plastic packaging used by consumers—ranging from collection by the consumer, retrieval from land or water, through the recycling process, and ultimately creating new products—there are several direct and indirect business opportunities, as outlined in this report. In this section, the report will elaborate on some innovative business opportunities that lie ahead, including those that may have more indirect implications.

In prevention of waste, packaging can either become litter on land or end up in recycling or waste bins in the city. Indirect business opportunities include artists and designers creating waste bins and public ashtrays that attract users. These could be interactive bins, such as talking bins or facilities that allow users to vote on various topics. From tourist and sport businesses, activities like golfing, mini-golf, mountain bike, bicycle rental in combination with picking up waste could be rewarded with lower rent or other rewards. For instance, one could collaborate with local cafes and restaurants. A free coffee or beverage often results in the purchase of something to eat.

Packaging designers could also collaborate with app developers to create innovative solutions. For instance, apps could reward users for recycling, similar to the **Bower** app. With this app one can scan items with barcodes or take a photo to identify the material. And then when recycle the packaging in a registered recycling location you get rewarded with discount coupons and the environmental impact by monitoring saved CO2 emissions is tracked. Bower has collaboration with 3.000 brand owners which gets trend reports, industry statistics and consumer insights of their products.

During the workshop organized in COP project, one innovative idea emerged to encourage people to carry their own waste while walking in national parks. The concept involved designing a garbage storage compartment that could easily attach to a backpack, providing a convenient and eco-friendly solution for hikers to collect and store their waste until they find a proper disposal point. This approach promotes personal responsibility and helps keep natural spaces clean, reducing the risk of plastic waste reaching the ocean.

During the same workshop, another suggestion was to implement kiosks in parks that offer children free ice cream for returning plastic and other waste from the ground in parks or playgrounds. In combination with some gamification and apps one could have a feedback system so the products or brands with the most packaging on the ground pay some fee or in some way contribute to NGOs or others. In that way it might be business opportunity to app developers and game developers.

When litter is found in rivers or channels, there are potential technical solutions as well as numerous tourist business opportunities. For instance, in addition to kayaks, when renting sailing boats, pedalo and other water sport equipment, operators could offer a discount to customers who pick up litter and return waste after their boat trip.

For larger tourist boats, implementing a net or skimmer at the back of the vessel could help collect waste. Additionally, hotels and restaurants located by the water could install various types of bins, such as Aquapods, to demonstrate their commitment to environmental care. **Clean Sea Solutions Partners** provides examples of such initiatives.

There are research and development going on for robots designed for collecting litter on the sea floor like the drone **SeaClear** (COP Circular Ocean-bound Plastic, 2024; SeaClear2.0, 2023). And this is expected to be available in the near future. If one could ensure high hygiene and disinfection of the drones a Drone service with SeaClear and other water cleaning equipment might be a future business opportunity. Instead of each city is buying the equipment an entrepreneur could provide the service.

In Norway there are examples of new business models where equipment producing company collaborates with non-profit organisations that via sponsors and public grant can buy the equipment and then by voluntary work do clean ups more efficiently (Elvestuen, 2024).

In the recycling process of ocean-bound plastic, several challenges arise in collecting, sorting, cleaning, and ultimately recycling the different polymers. These challenges also present business opportunities, similar to those found in other plastic recycling efforts.

Once the polymers are recycled, there are significant business opportunities to meet the demand for recycled plastics sourced from the ocean. This plastic has a lower carbon footprint since no virgin fossil materials are used. Additionally, using recycled ocean plastics can enhance branding, as it demonstrates a commitment to helping the environment.

Consequently, there are business opportunities for services that connect material suppliers, buyers, and plastic brokers to provide companies with the appropriate types of recycled plastic materials. One example of such a broker service is the company **Atomler**. This is an online one stop shop for recyclable plastic materials and products. One could sell or buy and put out a request for a specific polymer and quality.

Understanding the quality and properties of recycled plastics and new biodegradable polymers is crucial, and as these activities are expected to grow, companies providing analysis services and third-party certifications are likely to expand as well. Additionally, the demand for advanced analytical instruments capable of efficiently measuring various plastic properties will rise, both in the recycling and sorting processes as well as in biodegradability assessments. For instance, **BPC Instruments**, which offers state-of-the-art tools for biodegradability and composability analysis of new polymers under various environmental conditions, will be instrumental in evaluating the environmental impact and lifecycle of materials. These instruments are critical for identifying polymer biodegradation, ensuring sustainable practices aligned with circular economy goals. Furthermore, companies producing portable analytical tools based on near infrared spectroscopy such as NIR and MIR techniques will be indispensable in differentiating various types of polymers during recycling.

The properties of plastics are determined by the type of polymer and the additives used. As the demand for recycled plastics grows, business opportunities for additive suppliers, for example Nexam Chemicals will likely increase, as certain additives can improve the properties and quality of recycled materials (Bernagozzi et al., 2024).

New recycling methods and zero waste approaches

In the previous chapter, there was distinguished between mechanical and chemical recycling methods. Most of these methods require sorting by polymer type and cleaning, which can be resource- and energy-consuming.

There are examples in nature of plastic degradation through biological means, as some fungi and bacteria are known to digest plastics and thereby convert polymers into organic material. Recently, scientists incorporated bacterial spores from plastic-eating bacteria into polyurethane, a plastic used in everything from phone cases to trainers, but one that is difficult to recycle. By incorporating spores of plastic-eating bacteria they've developed a plastic that can self-destruct. The spores remain dormant during the useful life of the plastic but spring back to life and begin to digest the product when exposed to nutrients in a controlled industrial compost (Briggs, 2024).

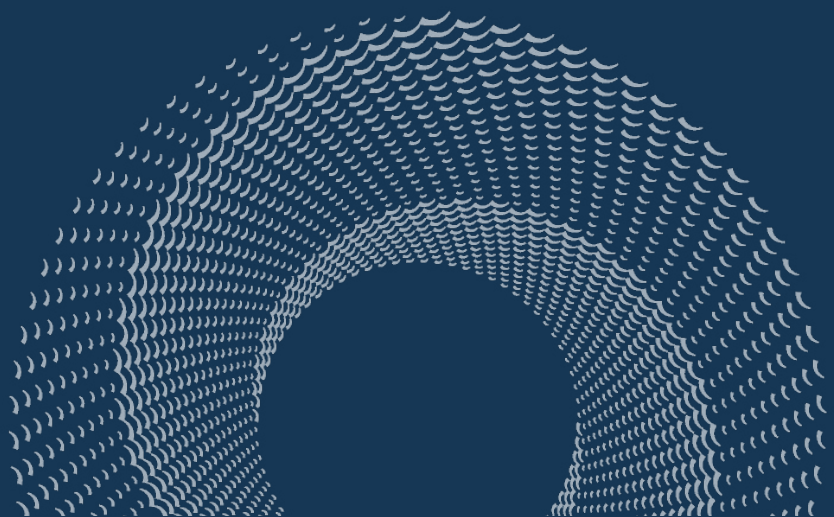
Other biotechnology research approaches where specific enzymes are used to recycle different polymers are ongoing research today and may contribute to business opportunities for SME companies in the future.

Today, there are start-up companies, such as **Norbite**, that use the larvae of the wax moth (Galleria mellonella). These larvae can transform more than 90% of commonly used polymeric materials, including recalcitrant synthetic fibbers, etc. into proteins and lipids for use in other applications. According to the company, the input can be a mixture of polymers, and no intensive cleaning of the waste is required. This could represent an alternative business opportunity for managing some ocean-bound plastic.

Another approach to biological recycling involves using special equipment for biological recycling methods, such as composting food and food trays, where the material becomes nutrient-rich soil, as exemplified by **Solserv**. If restaurants etc sold food in compostable trays and high temperature compost equipment were commonly available at public places or at restaurants serving food in single use compostable trays a local circularity of nutrients could occur, which would make it possible for more restaurants to grow their own lettuce leaves and vegetables as long as one could check and guarantee the safety of the soil from the composting machines. Hence, also in this scenario there will be business opportunities for analytical companies.

Business opportunities for other opportunities and differnt approaches (examples)
Tourist campaign/activities
Broker Services
Biotechnology solutions
Third party certification
App developer
Game developer
Tourist outdoor equipment

5.
Conclusion



5. Conclusion

In conclusion, the landscape of recycling offers abundant business opportunities for SMEs to develop innovative solutions for ocean-bound plastic waste. In this report we have extended the view and business opportunities to also include knowledge and information for preventing waste, like artists but also packaging designers, app developers etc.

he tourist sector in collaboration with NGOs, equipment producers and municipalities. For the recycled plastics business opportunities for analytical companies and certification and valuation organisations. By leveraging emerging technologies and biological processes, SMEs can effectively transform waste into valuable resources, creating products that meet the growing demand for sustainability.

This shift not only addresses pressing environmental challenges but also opens new markets for recycled materials. As consumers and businesses alike increasingly prioritize sustainable practices, SMEs that seize these opportunities will play a pivotal role in shaping a circular business model. By contributing to the reduction of plastic waste and the development of new, eco-friendly products, these enterprises can drive meaningful change while fostering economic growth and resilience in their communities.

Examples of business opportunities

- Artist
- Ballot bins
- Recycling bins
- Ergonomic grabbers
- Recycling information
- Park cleaning activities

Prevention and
Collection on Land

- Port bins
- Skimmers
- Information
- Telescopic grabbers
- Beach cleaning activities
- Kayaks, sailboat for tourists

Collection in
Water Bodies

- Collecting
- Handling
- Mechanical Recycling
- Chemical Recycling
- Biological Recycling
- Additive producers
- Digital trackability

Waste Management and
Recycling Process

- Product designers
- 3rd part Certification
- Analytical companies
- Material brokers
- Clothes & Furniture
- Automotive details
- Building materials

Designing and Developing
New Products

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Appendix

Appendix

In this appendix, it includes a comprehensive list of SMEs, NGOs, and large companies involved in the collection, handling, recycling, and production of new products from recycled plastic, including ocean-bound plastic. This curated selection features organisations from countries around the South Baltic Region, as well as from various other countries globally, showcasing a diverse array of efforts aimed at addressing plastic waste and promoting sustainable practices.

Denmark

Company name	Type of company	Category	Website link
All in On Green	SME	Collecting waste	www.allinonegreen.dk
Don't Waste It ApS	SME	Collecting waste	www.dont-waste-it.dk
EcoChange	SME	Collecting waste	www.ecochange.dk
Econet	SME	Collecting waste	www.econet.dk
Maacks	SME	Collecting waste	www.maack-it.dk
Strandet	SME	Collecting waste	www.strandet.io
Dansk Naturfredningsforening	NGO	Collecting waste	www.affaldsindsamlingen.dk
Havmiljø vogter	NPO	Collecting waste	www.havmiljovogter.dk
Mr. Trash Wheel	-	Collecting waste	www.mrtrashwheel.com
Geminor	Public	Collecting waste	www.geminor.no
Amager Resource Center	Public	Handling Waste	www.a-r-c.dk
Aris Robotics	SME	Handling Waste	www.aris-robotics.com
Marcus Pedersen	SME	Handling Waste	www.marcuspedersen.dk
Reccura	SME	Handling Waste	www.reccura.com
SemperCycle	SME	Handling Waste	www.sempercycle.com
Solum	SME	Handling Waste	www.solum.com
RC plast	SME	Handling Waste	www.rcplast.dk
Trebo	SME	Handling Waste (recycling)	www.trebo.dk

Denmark (continued)			
Excellent Ramp A/S	SME	Product making	www.excellent-ramp.com
Plazzo	SME	Product making	www.plazzo.dk
The Upcycl	SME	Product making	www.theupcycle.com
Venge	SME	Product making	www.venge.dk
WildStudioCPH	SME	Product making	www.wildstudiocph.com
Wohn Homes	SME	Product making	www.wohnhomes.com
Luxaflex	SME	Product making	www.luxaflex.dk
Arturel	SME	Product making	www.arturel.dk
Letbek	SME	Product making	www.letbek.com
Os om Havet	NGO	Collecting waste Beach Cleaning	www.osomhavet.dk
Race for Oceans	NGO	Collecting waste Beach Cleaning	www.raceforoceans.org
Plastic Change	NGO	Collecting waste Beach Cleaning	www.plasticchange.dk
Stena Recycling	Large company	Collecting waste Handling waste (recycling) Product making	www.stenarecycling.com
Salling Autogenbrug ApS	SME	Collecting waste Handling waste (recycling)	www.sallingautogenbrug.dk
Nordværk I/S	Owned by 6 municipalities	Collecting waste Handling waste (recycling)	www.nordvaerk.dk
Nomi4s I/S	Owned by 4 municipalities	Collecting waste Handling waste (recycling)	www.nomi4s.dk
ARGO	Owned by 9 municipalities	Collecting waste Handling waste (recycling)	www.argo.dk
ARC	Owned by 5 municipalities	Collecting waste Handling waste (recycling)	www.a-r-c.dk

Denmark (continued)			
WUPPI A/S	Danish system for collecting PVC	Collecting waste	www.wuppi.dk
The Ocean Cleanup	Non-profit	Collecting waste	www.theoceancleanup.com
OM-HU.dk ApS	SME	Collecting waste Handling waste (recycling) Product making	www.om-hu.dk
Aage Vestergaard Larsen A/S	Large company	Handling waste (recycling)	www.avl.dk
A. V. Pehrsson A/S	SME	Handling waste (recycling)	www.avpehrsson.dk
Dansk Affaldsminimering ApS	SME	Handling waste (recycling)	www.dkaffald.dk
Compsoil A/S	SME	Handling waste (recycling)	www.compsoil.dk
Ragn-Sells	SME	Handling waste (recycling)	www.ragnsells.dk
Remondis	Large company	Handling waste (recycling)	www.remondis.dk
PolyLoop	SME	Handling waste (recycling)	www.polyloop.dk
Dansk Retursystem	Non-profit	Handling waste (recycling)	www.danskretursystem.dk
Quantafuel Skive ApS	Large company	Handling waste (recycling)	www.quantafuel.com
A-skrot ApS	SME	Handling waste (recycling)	www.a-skrot.dk
Posibi A/S	SME	Handling waste (recycling)	www.posibi.dk
Damifo Vojens A/S	SME	Handling waste (recycling)	www.danskaffald.dk
ReSource Denmark ApS	Large company	Handling waste (recycling)	www.reourcedk.com
Shark Solutions A/S	Large company	Handling waste (recycling)	www.shark-solutions.com
JB Recycling	SME	Handling waste (recycling)	www.jb-recycling.dk
Textile Change ApS	SME	Handling waste (recycling)	www.textilechange.com
Circular Economy - beyond waste	NGO	Knowledge company	www.cebeyondwaste.eu
Coloplast A/S	Large company	Product manufacture	www.coloplast.dk
COOP Danmark A/S	Large company	Product manufacture	www.coop.dk
Dakofa	NGO	Knowledge company	www.dakofa.dk
Danfoss A/S	Large company	Product manufacture	www.danfoss.com
FH group A/S	Large company	Product manufacture	www.fh-group.dk

Denmark (continued)			
Geminor ApS	SME	Handling waste (recycling)	www.geminor.no
Letbæk Plast	SME	Product making	www.letbek.com
Makeen Power A/S	SME	Handling waste (recycling)	www.makeenenergy.com
Marius Pedersen A/S	Large company	Handling waste (recycling)	www.mariuspedersen.dk
Plastix	SME	Handling waste (recycling)	www.plastixglobal.com
Re-Match	SME	Handling waste (recycling)	www.re-match.com
ReSea Project	NGO	Collecting waste	www.reseaproject.com
TechCircle	SME	Knowledge company	www.techcircle.dk

Germany			
Company name	**Type of company**	**Category**	**Website link**
Bracenet	SME	Upcycling of fishing net - the nets are collected by others	www.bracenet.net
GOT BAG	SME	Upcycling	www.got-bag.com
Oceanmate	SME	Upcycling	www.oceanmate.com
Wildplastic	SME	Recycling	www.wildplastic.com
Plastic Fisher GmbH	SME	Colleting waste in rivers	www.plasticfischer.com
Everwave	SME	Colleting litter before it enters the oceans	www.everwave.de
Terracycle	SME	Recycling	www.terracycle.com
Upcycling-deluxe	SME	Upcycling	www.upcycling-deluxe.com
Plasticpreneur	SME	Development of machines for up-/downcycling litter in products	www.plasticpreneur.com
Tide Ocean Material	SME	Recycling	www.tide.earth
Plastic Fisherman	SME	Collection of waste Awareness raising	www.plasticfischerman.com
BlockBlocks Cleanup	SME	Recycling	www.blockblocks.de

Poland

Company name	Type of company	Category	Website link
MB Recycling	SME	Handling waste (recycling)	www.mbrecycling.pl
EkoHybres	SME	Handling waste (recycling)	www.ekohybres.com.pl
Elektryczne Śmieci	SME	Handling waste (recycling)	www.elektrycznesmieci.pl
VGT Polska	SME	Handling waste (recycling)	www.vgt.com.pl
REKO Gospodarka Odpadami	SME	Collecting waste Handling waste (recycling)	www.reko-odpady.pl
REMONDIS	SME	Collecting waste	www.remondis-medison.pl
Thornmann Recycling	SME	Handling waste (recycling)	www.thornmann.com.pl
Elim International	SME	Collecting waste Handling waste (recycling)	www.eliminternational.pl
ARGUS Maszyny	SME	Product manufacture	www.argusmaszyny.pl
Fundacja Odzyskaj Środowisko	NGO	Knowledge company	www.odzyskajsrodowisko.pl
SRS Group	SME	Knowledge company	www.srsgroup.pl
Gecon	SME	Product manufacture	www.gecon.net.pl
R3 Polska	SME	Product manufacture	www.r3polska.pl
Ekolinia	SME	Product manufacture	www.ekolinia.net
ORWAK	SME	Product manufacture	www.orwakpolska.pl
Clartier	Large company	Recycling	www.clariter.com
Stowaezyszenie Polski Recykling	NGO	Knowledge company	www.polskirecykling.org

Sweden

Company name	Type of company	Category	Website link
Sustainable Plastics	SME	Handling waste (recycling)	www.sustainableplastics.se
Quantafuel	Large company	Handling waste (recycling)	www.quantafuel.com
Triwa	SME	Product manufacture	www.triwa.com
Reparell	SME	Product manufacture	www.reparell.se
Stena Recycling	Large company	Handling waste (recycling)	www.stenarecycling.com
Borealis AB	Large company	Handling waste (recycling)	www.borealisgroup.com
Remondis	Large company	Handling waste (recycling)	www.remondisrecycling.se
Kuusakoski	Large company	Handling waste (recycling)	www.kuusakoski.com
Sysav	Large company	Handling waste (recycling)	www.sysav.se
Swedish Plastic Recycling	Large company	Handling waste (recycling)	www.svenskplastatervinning.se
Isbjörn	SME	Product manufacture	www.isbjornofsweden.com
Helly Hansen	Large company	Product manufacture	www.hellyhansen.com
Städa Sverige	NGO	Collecting waste Beach cleaning	www.stadasverige.se
Håll Sverige Rent	NGO	Collecting waste Beach cleaning	www.hsr.se
Avfall Sverige	Industry association	Handling waste (recycling)	www.avfallsverige.se
ReturPack	Large company	Handling waste (recycling)	www.pantamera.nu
RagnSells	Large company	Collecting waste and handling waste (recycling)	www.ragnsells.se
Atomler	SME	Consultant	www.atomler.com
Clean Sea	SME	Collecting waste and handling waste (recycling)	www.cleansea.co
Plogga	SME	Collecting waste and handling waste	www.plogga.se

Sweden (continued)			
Skargardsidyllen	SME	Collecting waste and handling waste	www.skargardsidyllen.se
Swerec AB	SME	Collecting waste and handling waste (recycling)	www.swerec.se
Denios	SME	Collecting waste Product manufacture	www.denios.se
Reniva	SME	Collecting waste Product manufacture	www.reniva.se

Europe and other countries

Company name	Type of company	Category	Website link
Unimetal Recycling	SME	Handling waste (recycling)	www.unimetalrecycling.pl
4ocean	-	Collecting waste Handling waste (recycling)	www.4ocean.com
Plastic Bank	NGO	Collecting waste	www.plasticbank.com
Bureo	NGO	Colleting waste Handling waste (recycling) Product making	www.bureo.co
Oceanworks	NGO	Collecting waste Handling waste (recycling)	www.oceanworks.co
Plastic Whale	NGO	Colleting waste Handling waste (recycling) Product making	www.plasticwhale.com
5 Gyres Institute	NGO	Knowledge company	www.5gyres.org
ALGALITA	NGO	Knowledge company	www.algalita.org
Amphibious Vehicle	SME	Micro waste collection	www.newseu.cgnt.com
Azure	NGO	Macro waste collection	www.ichthion.com
B. O. B. Litter Trap	SME/NGO	Macro waste collection	www.en.mareaverdepanama.org

Europe and other countries (continued)			
Bandalong Boom	SME	Macro waste collection	www.bandalong.com.au
Barber Sand Man	SME	Macro waste collection	www.hbarber.com
Barber Surf Rake	SME	Macro waste collection	www.hbarber.com
BeachBot	SME	Macro waste collection	www.designboom.com
BeachComber	SME	Micro waste collection	www.lift.erau.edu
BluePhin	SME	Macro waste collection	www.bluephin.io
Blutopia	NGO	Knowledge company	www.blutopia.org
BOW	NGO	Knowledge company	www.blueocean.watch
Break Free from Plastic	NGO	Knowledge company	www.breakfreefromplastic.org
Brute Boom	NGO	Macro waste collection	www.weforum.org
Chemolez	NGO	Macro waste collection	www.nowaste.whatdesigncando.com
Circleaner	SME	Macro waste collection	www.inspire-europe.org
CircThread	NGO	Knowledge company	www.circthread.com
Citarum River concentrator	NGO	Macro waste collection	www.cleancurrentcoalition.org
Clean My Calanques	NGO	Collecting waste	www.cleanmycalanques.fr
Clean Trash	SME	Macro waste collection	www.oilspillresponse.gr
Cleaner Seas Group	SME	Waste prevention	www.cleaner-seas.com
Clear River Litter Trap	SME	Macro waste collection	www.clearrivers.eu
ClearBot	NGO	Macro waste collection	www.clearbot.org
CLEVER-volume	SME	Waste prevention	www.portugalventures.pt
Cobalt	SME	Macro and micro waste collection	www.securities.io
Cora Ball	SME	Waste prevention	www.coraball.com
Donä Rueda	SME	Macro waste collection	www.nicholasinstitute.duke.edu
Ellen Macarthur Foundation	NGO	Knowledge company	www.ellenmacarthurfoundation.org
EPS-Recycle	NGO	Handling waste (recycling)	www.epscycle.org
Ervis	SME	Macro waste collection	www.ervisfoundation.org

Europe and other countries (continued)			
Expedition 7 Continent	NGO	Tourist activities	www.septiemecntinent.com
eXXpedition	NGO	Tourist activities	www.exxpedition.com
Fourth Element Ocean debris bag	SME	Macro waste collection	www.fourthelement.com
FRED	SME	Macro waste collection	www.clearbluesea.org/fred
GENplast	SME	Handling waste (recycling)	www.genplast.dk
GLS Argos GPS Beacons	Large company	Macro waste collection	www.argos-system.org
GoJelly Project	NGO	Waste prevention	www.cordis.europa.eu
GPS device on Ghost net	NGO	Macro waste collection	www.parkaustralie.gov.au
Greata Bubble Barrier	SME/NGO	Macro and micro waste collection	www.thegreatbubblebarrier.com
GreenPeace	NGO	Knowledge company	www.greenpeace.org
Guyppefriend washing bag	SME	Waste prevention	www.guppyfriend.us
Hector the Collector	SME	Macro waste collection	www.rozaliaproject.org
Holy Turtle	NGO	Macro waste collection	www.prnewswire.com
Hoola one	SME	Macro and micro waste collection	www.hoolaone.com
Inner Harbor Water Wheel	NGO	Macro waste collection	www.mrtrashwheel.com
LADI	SME	Micro waste collection	www.latitude38.com
Litter Gitter	SME	Macro waste collection	www.stormwater.brentwoodindustries.com
Clear River Litter Trap	SME	Macro waste collection	www.clearrivers.eu
Litterboom Project	NGO	Macro waste collection	www.thelitterboomproject.com
Lonely Whale	NGO	Knowledge company	www.lonelywhale.org
Malolo 1	SME	Macro waste collection	www.sanctuaries.noaa.gov
Manta	NGO	Macro waste collection	www.theseacleaners.org
MAPP Detection Robots	SME	Macro waste collection	www.projects.bb
Marina Trash Skimmer	SME	Macro and micro waste collection	www.ecori.org
Marine Debris Sled	NGO	Macro waste collection	www.nicholasinstitute.duke.edu
Marine Microplastic removal tool	SME	Micro waste collection	www.opb.org

Europe and other countries (continued)			
Mission Blue	NGO	Knowledge company	www.mission-blue.org
NetTag	NGO	Macro waste collection	www.cinea.ec.europa.eu
Ocean Conservancy	NGO	Macro waste collection	www.weforum.org
Ocean Innovation Tour	NGO	Tourist activities	www.ocean-innovation.org
Ocean Sole	NGO	Handling waste (recycling)	www.oceansoleafrica.com
Ocean Voyages Institute	NGO	Collecting waste	www.oceanvoyagesinstitute.org
OCEANPLASTIC	NGO	Knowledge company	www.oceanplastic.org
One Earth-one Ocean	NGO	Macro waste collection	www.oneearth-oneocean.com
Optimised Dutch weave	SME	Waste prevention	www.engineerlive.com
ORCA-SMURF	NGO	Macro waste collection	www.medium.com
Palana Environment	NGO	Collecting waste	www.planan-environment.org
PlanetCare Filter	SME	Waste prevention	www.planetcare.org
Plastic Fischer	NGO	Macro waste collection	www.plasticfischer.com
Plastic Oceans	NGO	Knowledge compant	www.plasticoceans.org
Plastic Odyssey	NGO	Collecting waster	www.plasticodyssey.org
Plastic Soup Foundation	NGO	Product manufacture	www.plasticsoupfoundation.org
PolyGone Plastic Hunter	SME	Micro waste collection	www.polygonesystems.org
Project Rescue Ocean	NGO	City Campaign	www.projectrescureocean.org
PumpGuard	SME	Waste prevention	www.stormtrap.com
Race for Water Odyssey	NGO	Tourist activities	www.raceforwater.org
RC Plast	SME	Handling waste (recycling)	www.rcplast.dk
Rethink Plastic	NGO	Knowledge company	www.rethinkplasticalliance.eu
RiverTrap	SME	Macro waste collection	www.promar.org
RPRS	Large company	Macro waste collection	www.bwlpg.com
SCG Litter Trap	Large company	Macro waste collection	www.plasticsoupfoundation.org
Sea Shepherd	NGO	City Campaign	www.seashepherd.org

Europe and other countries (continued)			
SeaCleaners	NGO	-	ww.theseacleaners.org
SeaClear	NGO	Macro waste collection	www.seaclear-project.eu
Seas at risk	NGO	Knowledge company	www.seas-at-risk.org
SeaVax	SME	Macro waste collection	www.bluebird-electric.net
SEED	NGO	Micro waste collection	www.seed.world
Showerloop	SME	Waste prevention	www.showerloop.org
Skroow Trash	SME	Micro waste collection	www.nicholasinstitute.duke.edu
Stop Plastic Pollution	Campaign	City campaign	www.stop-plastic-pollution.org
Stormtrap TrashTrap	SME	Waste prevention	www.stormtrap.com
StormX Netting Trash Trap	NGO	Waste prevention	www.environmental-expert.com
Stow it, Don't throw it	NGO	Waste prevention	www.stowitdonttrhowitproject.weebly.com
Sungai Simple Trahs Barriers	SME/NGO	Macro waste collection	www.sungai.watch
Surfrider Foundation	NGO	Beach Cleaning	www.surfrider.org
Take 3	NGO	Beach Cleaning	www.take3.org
Tara Expeditions	NGO	Knowledge company	www.ocean.taraexpeditions.org
The 8th continent	NGO	Macro waste collection	www.theindexproject.org
The Interceptor	NGO	Macro waste collection	www.theoceancleanup.com
The Tyre Collective	SME	Waste prevention	www.thetyrecollective.com
TrashCat	SME	Macro waste collection	www.bluebird-electric.net
TrashMaster Netting	SME	Waste prevention	www.scribd.com
Trioplast	SME	Handling waste (recycling)	www.trioplast.ofir.com
Ultra-Drain Guard	SME	Waste prevention	www.spillcontainment.com
Ultramarine	NGO	Macro waste collection	www.nicholasinstitute.duke.edu
WasteShark	SME	Macro waste collection	www.ranmarine.io
Wings of the ocean	NGO	-	www.wingsoftheocean.com
Xfilter	SME	Waste prevention	www.xerostech.com
YUNA	NGO	Micro waste collection	www.springwise.com

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