NATUR VÅRDS VERKET

SWEDISH ENVIRONMENTAL PROTECTION AGENCY

The Swedish EPA's roadmap for the sustainable use of plastics

Inspiring action

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ISBN 978-91-620-6998-8
ISSN 0282-7298

Cover: Platform/Johnér bildbyrå
Photos: page 4: Maskot/Johnér bildbyrå, page 6: Lena Granefelt/Johnér bildbyrå;
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Foreword

Several problems need to be solved to achieve Sweden's long-term climate goals by 2045, to create a circular economy and to reduce the amount of plastic in our seas and in nature. Fossil fuel plastics need to be replaced by materials with a lower climate impact and we need to identify the value inherent in plastics to increase material recycling and reduce plastic leakage.

We need shared targets, priorities and understanding of the necessary changes if we are to act together to achieve the sustainable use of plastics. Our hope for this roadmap is for it to become the tool of choice and for it to serve as both a guide and an inspiration for all stakeholders.

The roadmap was developed as part of the government assignment to the Swedish Environmental Protection Agency to provide National Plastics Coordination. The purpose of the National Plastics Coordination is to demonstrate the importance of society's efforts and opportunities for combining efforts to jointly achieve a societal transition in the use of plastics.

The roadmap is based on existing legislation, strategies, goals and action plans at national, EU and international levels. It presents the targets, the necessary changes for achieving these targets and the development areas that enable these changes.

Creative and innovative solutions are important tools for achieving long-term positive effects for the environment. We all need to contribute to transitioning to the sustainable use of plastics, and I encourage every stakeholder to use this roadmap for refocusing your organisation and for taking action.

In the course of our work, we have received valuable input from the National Plastics Coordination reference group and its public authority group, and I would like to thank them for their contributions.

Stockholm, 6 May 2021

Björn Risinger
Director General

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The roadmap in short

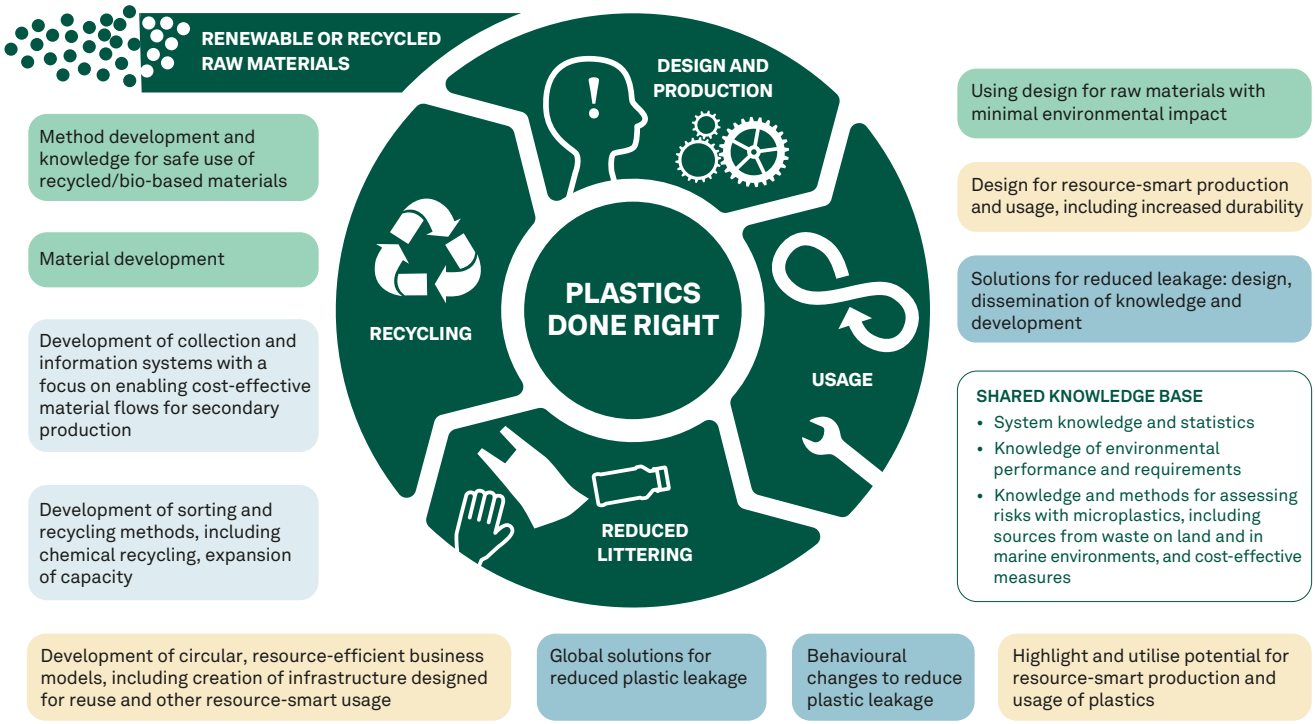
The Swedish Environmental Protection Agency's roadmap provides an overall picture and a guide for where we are going and what we mean by sustainable use of plastics. It is intended to create a unified understanding of what changes are needed and which areas for development are particularly important to work with. The roadmap should also inspire others to take action.

The roadmap is based on existing legislation, strategies and goals nationally, in the EU and globally. Decision-makers in both the private and public sectors should be able to use the roadmap to support deciding what path to take, as a basis for strategic work and, even more practically, how to contribute. The roadmap also provides options for combining forces and collaborating on issues that individual organisations cannot solve alone.

Sustainable plastic use means using plastics in the right place and in resource-efficient, climate-efficient, non-toxic and circular flows with negligible leakage. To achieve this, efforts are needed in four impact areas: raw materials and production with minimal environmental impact; resource-smart use; reduced leakage of plastics to nature; and greatly expanded and high-quality material recycling. Each area describes which changes are needed to achieve the objectives and which indicators will be used for follow-up.

For these changes to occur, many areas need development. The illustration shows prioritised development areas. The three development areas in the middle constitute an overlapping knowledge base. Development areas in yellow link to the "Resource-smart use" impact area, blue to "Reduce leakage", green to "Raw material and production with minimal environmental impact" and light blue to "Sharply increased and high-quality material recycling".

Plastics are on the agenda with a lot happening in the field. The roadmap is expected to serve as a guide until 2025, after which it will need to be reassessed.



Why have a roadmap?

Plastics offer many benefits to society. How we design, produce, consume and otherwise handle plastics and plastic products cause the environmental problems associated with them. Properly used, plastics are important and valuable materials. This makes it important that we address the environmental challenges with today's handling of plastics so that we can continue using them sustainably.

Through the National Plastic Coordination, the Swedish EPA is responsible for leading Sweden towards the sustainable use of plastics. Discussions with stakeholders have revealed that a joint roadmap is needed to achieve this. The roadmap provides:

- An overall picture and a shared direction for where we are going and what we mean by sustainable plastic use.
- A mutually agreed understanding of what changes are needed and the most important areas for development.
- Common priorities for what should be done.

The roadmap thus serves as a catalyst for a change in the right direction. It is based on existing legislation, strategies and goals nationally, in the EU and globally. The roadmap should be useful for decision-makers in both the private and public sectors and at the national level. This includes as support in deciding what path to take, as a basis for strategic work and, even more practically, as inspiration for the ways companies, the public sector and research and development can contribute. The roadmap offers the opportunity to join forces and collaborate on issues that individual organisations cannot solve alone.

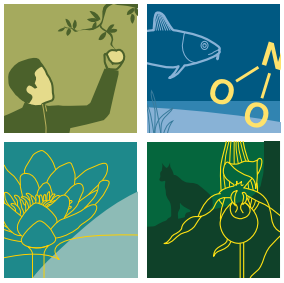
As resources permit, the Swedish EPA, through its National Plastic Coordination, will continuously monitor developments and identify needs and opportunities for additional initiatives (knowledge-enhancing initiatives, guidance, supervision, need for instruments etc.) in various plastic streams and development areas. The field is developing fast, and the roadmap should be able to serve as a guide until 2025, after which a reassessment will be needed. Ongoing and planned activities are published regularly on the Swedish EPA's website.

In developing the roadmap, we have listened to the needs of many stakeholders. Several have highlighted the need for more data, definitions, and good examples. This type of information can be found on the Swedish EPA's website.

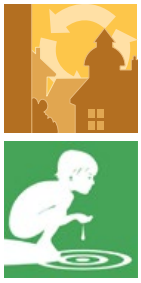
What environmental problems should we solve?

The overall goal of environmental policy, the generational goal, is to pass on to the next generation a society that has solved the major environmental problems. Working for sustainable plastic use will contribute to Sweden's environmental quality objectives and Agenda 2030, with a focus on:

Reduced climate impact. Sweden will have no net emissions of greenhouse gases into the atmosphere by 2045, and from that point will have negative emissions.



Leakage of plastics and microplastics into nature and exposure to hazardous substances. The environmental quality objective "Non-toxic environment" means, among other things, that the total exposure to chemical substances through all sources of exposure must not be harmful to humans or biological diversity.



To increase benefits and reduce the negative impact of consumption of materials and products through resource-efficient use and synergies with other societal goals. Good conservation of natural resources is an important focus for achieving the generational goal.

The work also considers significant consequences of measures and other efforts to achieve the environmental quality objectives as a whole. For example, in addition to climate change, declining biodiversity is another area where the Swedish EPA believes that timely and forceful efforts are needed to reverse the negative trend. There are several pressing reasons to prioritise both areas in environmental policy in the coming years. In its strategy for a circular economy, the Government notes that this work should focus on replacing fossil raw materials with renewable and bio-based raw materials without adversely affecting biodiversity and other eco-system services. This makes it essential to sustainably produce bio-based raw materials that replace fossil raw materials in the production of plastics.

The roadmap helps in identifying how Sweden can achieve sustainable plastic use. There are many different types of plastics, and these can consist of a variety of polymers and additives. Regardless of the type of plastic, they need to be manufactured, used and managed sustainably. Tyres are included in the roadmap because, despite being made of rubber, they are a significant source of microplastics.* On the other hand, textiles are not included other than as a source of microplastics, as extensive efforts to create a sustainable textile value chain are already underway elsewhere.

Additional information on environmental impacts and current data regarding plastics is found on the Swedish EPA's website.

The following global sustainability goals are discussed:

* There is currently no established definition for microplastics. In this roadmap, microplastics refers to solid particles of plastic and rubber regardless of shape (such as grains, flakes and fibres) that are between 1 nm and 5 mm and which are insoluble in water. For additional details, see the Swedish EPA's website.

Targets for the sustainable use of plastics

Sustainable plastic use means using plastics in the right place and in resource-efficient, climate-efficient, non-toxic and circular flows with negligible leakage. This allows us to more efficiently use resources and reduce negative environmental impacts, including to the climate.

To achieve a sustainable use of plastics, the Swedish EPA sees four impact areas that need addressing: raw materials and production with minimal environmental impact; resource-smart use; reduced leakage of plastics in nature; and greatly expanded and high-quality material recycling.

The impact areas describe the overall need for improving how plastics are produced, used and circulated, and these are closely linked to each other. Measures taken in one area can also have an impact in other areas.

Resource-smart usage

Resource-smart usage means that plastic is used in a way that provides the greatest possible benefit per amount of plastic during its life cycle. An important part of this is starting from the required function and benefit and examining options for making it as resource efficient as possible.

Work in this impact area will contribute to:

- Avoiding unnecessary use, i.e., over-consumption of products and materials that are not needed to fulfil the function.
- Increased reuse. Efficient recycling processes and infrastructure are key for this.
- Optimal product life for plastic products, including reduced unwanted wear and thus reduced leakage of microplastics.
- Using less material to achieve the same function/need/benefit, e.g., reducing material use to achieve a certain function or more people sharing a product so that it can be used more during its lifetime.

Follow-up indicators

Follow-up indicators are:

- Use of certain single-use products.
- Sales in different industries in relation to plastic use.
- Plastic usage in Sweden, divided by plastic stream.
- Plastic waste in Sweden, divided by plastic stream.

The follow-up of the roadmap will also use the results of the follow-up of adopted goals for resource-smart usage.

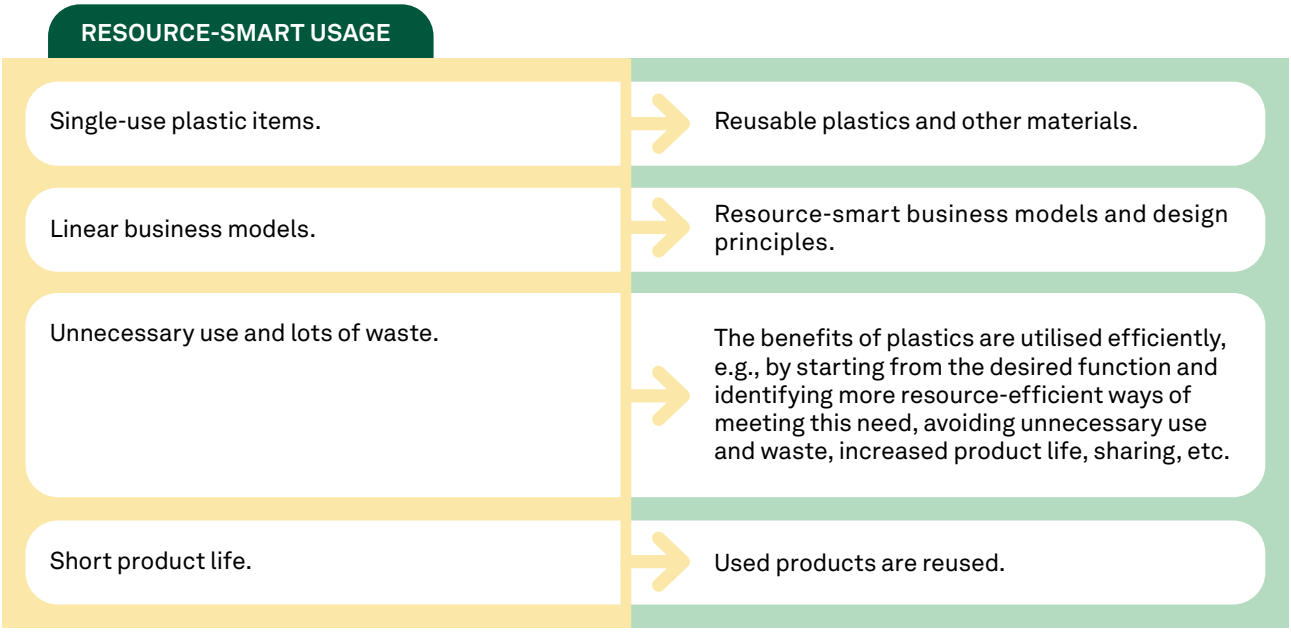
Adopted goals of existing legislation and the environmental objective system mean that:

- Of the packaging offered on the market in Sweden for the first time, the proportion that is reusable must increase by at least 20 per cent from 2022 to 2026 and by at least 30 per cent from 2022 to 2030.[1]
- By 2025, preparations for reuse and material recycling of municipal waste are to have increased to at least 55 per cent by weight, in 2030 to at least 60 per cent by weight and in 2035 to at least 65 per cent by weight.[2]
- By 31 December 2025, plastic bag use per person is not to exceed 40 bags annually.[3]

Additional follow-up indicators may be added.

Need for change

Pushing for designing products for long life and making it easy and profitable for businesses and individuals to share, repair and reuse products are both important focuses of this work and are in line with the Government's strategy for a circular economy. Striving to increase the usefulness of the materials and products we use is an important aspect, as are reducing unnecessary use and the generation of waste.



Raw materials and production with minimal environmental impact

To achieve established climate goals and other environmental goals, the focus should be on minimal environmental impact from raw materials and production and be based on a life cycle perspective. This means that products are designed based on the environmental impact of production, use and waste management. The risk of plastic leakage, recyclability, possible impact on food waste, fuel consumption and so on also need to be considered.

Efforts in this impact area will contribute to:

- Minimising climate impact in producing plastic raw materials and plastic products, including reducing the amount of primary fossil plastic used. Developing resource-efficient processes is an important piece of the puzzle.
- Reducing the environmental impact of plastic used as seen from a life cycle perspective, including an increased share of recycled, bio-based plastic raw materials and designing for material recycling and reuse. This includes more consideration of the impact of the raw material composition on material recyclability (mixed materials, additives etc.) and reduced climate impact from the incineration of plastics.
- Substituting materials/techniques with lower environmental impact, including reusable/recyclable and/or more durable plastic/rubber in product groups that account for significant leakage of plastics and/or microplastics to nature.
- Substituting particularly hazardous substances* in plastics and designing goods to create non-toxic and resource-efficient cycles.

Follow-up indicators

Follow-up indicators are:

- Share of recycled and bio-based raw materials in products on the market in Sweden in different product groups.
- Territorial greenhouse gas emissions from waste incineration, including plastics in the electricity and district heating sector.
- Estimated leakage of microplastics in Sweden (weight/year, broken down by source and dispersal pathway).

Additional follow-up indicators may be added.

Need for change

One of the focuses of continued work announced in the Government's strategy for a circular economy is the development of long-term financial instruments using the "polluter pays" principle. The European Commission announced in the EU action plan for a circular economy that it will consider appropriate regulations to reduce environmental impact and reward products based on their sustainability performance.

The Government's strategy for a circular economy notes that strict demands are needed on non-toxicity of both recycled and new raw materials and that bio-based raw materials must be sustainably produced.

* Particularly hazardous substances can have properties that cause long-term damage to human health or the environment so severely that their use should cease as far as possible in accordance with the environmental quality objective Non-toxic Environment. These substance properties most closely coincide with criteria in EU legislation (Article 57 of the REACH Regulation). The difference is that the environmental quality objective generally identifies endocrine disruptors and highly allergenic substances.

RAW MATERIALS AND PRODUCTION WITH MINIMAL ENVIRONMENTAL IMPACT

Almost all plastics are made from fossil raw materials	Products primarily contain recycled and/or bio-based materials. Strict demands on non-toxicity for recycled and new raw materials. Moving towards replacing fossil raw materials with bio-based raw materials without adversely affecting biodiversity and other ecosystem services.
Primary plastics and product design do not fully bear the costs of negative externalities from a life-cycle perspective.	The cost of materials and products also includes the cost of their environmental and climate impact.
Lack of knowledge about content and environmental performance	Clear and easily accessible information about product content, origin, environmental impact and how they can be disposed of or recycled.
Lack of design for circularity and minimal environmental impact, including the presence of particularly hazardous substances	Standard product design accounts for minimal environmental impact from a life cycle perspective, including phasing out particularly hazardous substances.
Lack of awareness of the meaning of terms such as “degradable” and “bio-based”.	Good knowledge of which plastic is suitable where, to identify opportunities for minimising environmental impact from a life cycle perspective.

Significantly increased and high-quality material recycling

Sharply increased and high-quality material recycling is an important part of reducing climate impact from the production and incineration of plastic raw materials. It is also important for achieving resource-efficient use of both fossil and bio-based materials to reduce negative impacts on biodiversity and other environmental goals. Closed systems require initiatives in several parts of the value chain, from product design and collection to increased sorting and increased demand for recycled raw materials. This applies to mechanical recycling and to various types of chemical recycling.

Work in this impact area will contribute to:

- Increased share of plastics collected for material recycling.
- Increased share of products designed to be recyclable. This includes avoiding substances that make material recycling more difficult.
- Increased share of plastics that is recycled in efficient and profitable processes. Increased capacity for recycling will be needed. To ensure that products made from recycled materials comply with product and chemical legislation, knowledge and control of hazardous substances are required throughout the value chain.
- Reduced illegal management of waste.
- Follow-up indicators
- Follow-up indicators are:
- Share of sorted plastic waste for recycling or reuse, divided by plastic stream.
- Material recycling rate by plastic stream.
- Territorial greenhouse gas emissions from waste incineration, including plastics in the electricity and district heating sector.

Results from follow-ups of adopted national goals relevant for greatly increased and high-quality material recycling will also be used for follow-up.

Adopted goals in existing legislation and the environmental objective system:

- For plastic packaging, the material recycling rate must be at least 50 per cent by 2025 and thereafter at least 55 per cent.[4]
- At least 90 per cent of returnable bottles must be recycled.[5]
- At least 65 per cent of the electronics offered on the market must be collected annually. The recycling targets for electronics are different depending on the category of the equipment.[6]
- For end-of-life cars, the goal is that at least 95 per cent of the car's weight will be reused or recycled (including energy recovery), of which 85 per cent of the car's weight will be reused or material recycled.[7]
- By 2025, material recycling of municipal waste must increase to at least 55 per cent by weight, by 2030 to at least 60 per cent by weight and by 2035 to at least 65 per cent by weight.[8]

Unless otherwise stated, the targets apply to the total waste stream, i.e., not specifically for plastics.

Additional follow-up indicators may be added.

Need for change

The Government's strategy for a circular economy strives for a society where resources are used efficiently in non-toxic, circular flows and replace new materials. According to the strategy, incineration with energy utilisation may only occur with waste not suitable for use in any other way. The strategy is also clear that strict and equivalent requirements must be placed on recycled and newly produced materials.

Both the Government's and the EU's work toward a circular economy focuses on improved product information and better traceability of product content, among other things.

SIGNIFICANTLY INCREASED AND HIGH-QUALITY MATERIAL RECYCLING

Plastic is the main cause of greenhouse gas emissions from waste incineration. Less than 10 per cent of the plastic used in Sweden is recycled.	Recycling of plastics significantly contributes to achieving the climate goal.
Instruments and systems have previously focused on collection volumes and mixed streams.	Focus on enabling material flows for producing recycled raw material of required quality. As part of this, create plastic streams with well-defined composition suitable for material recycling, including control of hazardous substances throughout the value chain
Lack of logistics solutions	Well-developed logistics, including smart loops.

Reduce plastic leakage in nature

Leakage of plastic includes plastic debris and microplastics that end up in nature through littering or more unintentional leakage from wear and so on. This includes illegal waste management.

To rectify the problem, the sources of leaks need to be addressed, dispersal pathways need to be limited and waste that leaks into nature needs to be cleaned up.

Work in this impact area will contribute to:

- Products that risk becoming rubbish in nature or contributing to leakage of microplastics are designed to reduce this leakage.
- Reduced littering. By reducing direct litter and collecting existing litter.
- Reduced leakage of microplastics. In the short term, significant improvements can be achieved by focusing on measures with low implementation costs. By working for synergies with other goals, additional improved cost-effectiveness of measures can be achieved.
- Reduced illegal management of waste.

Follow-up indicators

Follow-up indicators are:

- Littering of objects containing plastic (weight/year, divided by product category).
- Estimated leakage of microplastics in Sweden (weight/year, divided by source and dispersal pathway).

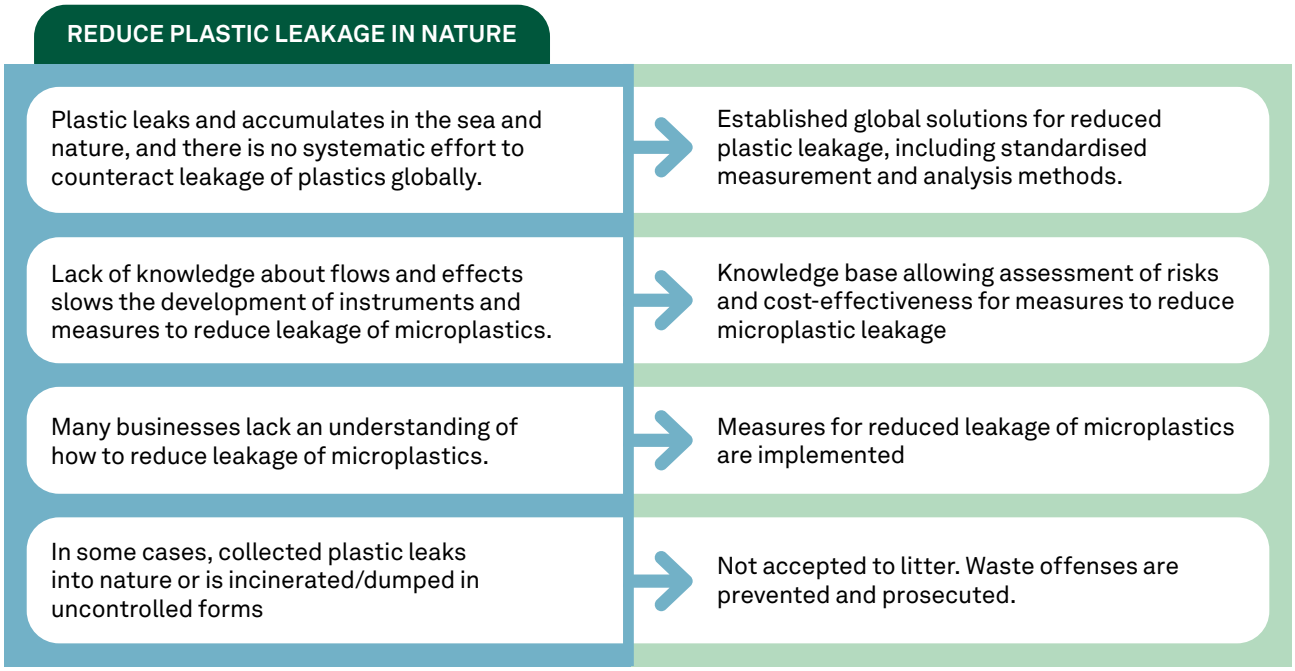
Additional follow-up indicators may be added.

Need for change

Sweden is working to achieve a global agreement on plastics that will reduce and prevent marine plastic waste and microplastics in the oceans.

Outdoor littering in places with public access or which the public can view is prohibited under the Environmental Code. In line with the EU Single-Use Plastics Directive, producers of certain products are responsible for covering the cost of removing products that litter in outdoor areas.

A REACH process is underway for intentionally formed microplastics, where a bill is being discussed, and additional planning is underway for a process for unintentionally formed microplastics.

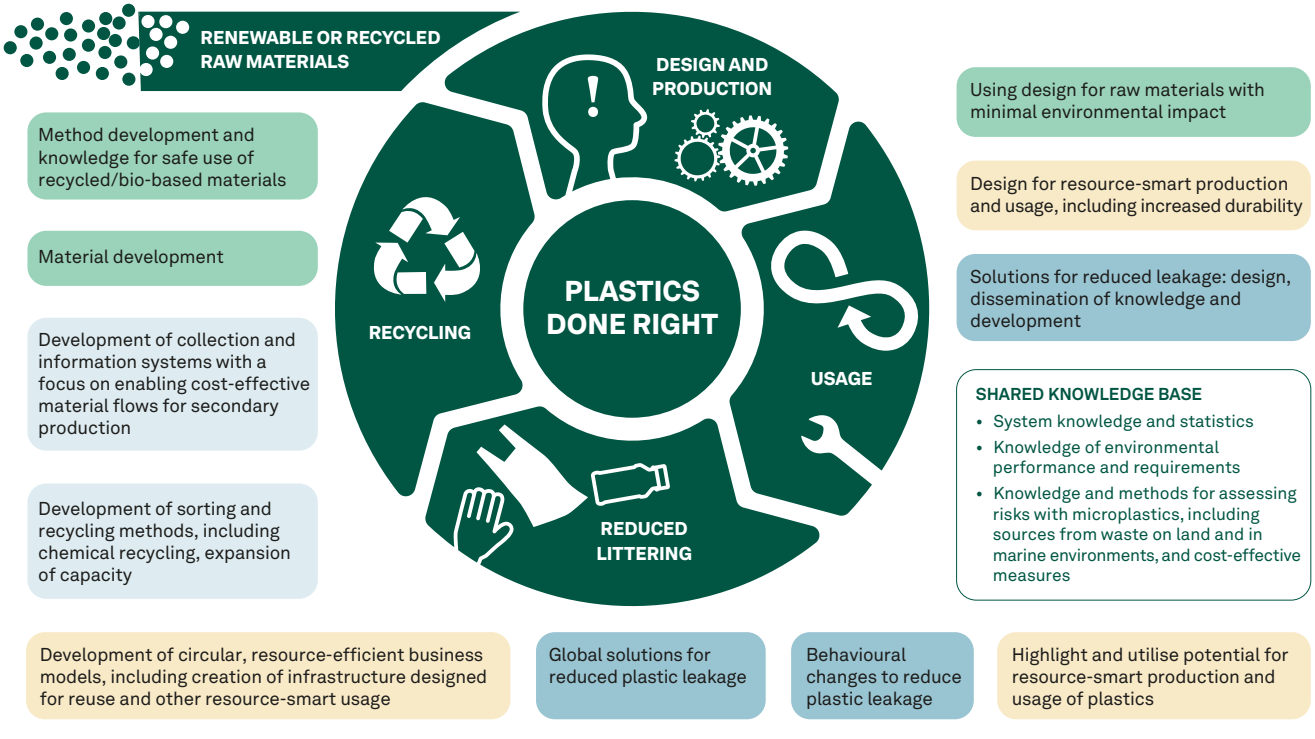


Need for developing and opportunities for contributing to sustainable plastic use

Significant changes are necessary to achieve the development needed in the field of plastics:

- New collaborations need to be created and old ones intensified. No single stakeholder can succeed on their own. Increased collaboration is needed to develop the necessary system solutions for the sustainable use of plastics, including collaboration in the value chain and on developing and utilising new knowledge and new solutions.
- Major changes are required. We need to increase recycling from today's approximately 8 per cent to recycling more than half of all used plastic be recycled into new raw materials, which means even greater increases for the streams that are easier to recycle. We also need to completely rethink the design phase of many products and change existing business models.
- Development can be made more cost-effective by combining several types of solutions and instruments and within several different impact areas to achieve sustainable plastic use. For example, both resource-smart use and increased collection for material recycling are important for reducing plastic leakage.

The figure below provides an overview of priority development areas for continued efforts to achieve sustainable plastic use. The three development areas in the box constitute an overlapping knowledge base. Development areas in yellow link to the "Resource-smart use" impact area, in blue to "Reduce leakage", in green to "Raw material and production with minimal environmental impact" and in light blue to "Sharply increased and high-quality material recycling".



These areas are based on important identified bottlenecks for development. For a more detailed description of obstacles that the Swedish EPA considers important, see the Agency's website.

Achieving sustainable plastic use requires development at the system level, where several parts of the value chain interact with each other. There are also many opportunities for contributing to sustainable plastic use in one's own organisation. Important aspects include increased knowledge and competence; developing and testing/demonstrating new solutions; instrument development; investments; product specifications; responsible procurement; smarter use, including changes in behaviour; and developed routines to avoid unnecessary use.

Some of the changes described in the section on targets above can easily be achieved within certain areas of use. Measures to achieve these changes should be implemented soon. Other changes are more challenging and require long-term work. Several of the changes are not specific to plastics. Developing sustainable material use and a circular economy in general offers an opportunity for significant synergies.

The need for continued development in the value chains and R&D is described and exemplified below. This can inspire efforts to identify activities that contribute to development within each development area.

Shared knowledge base

System knowledge and statistics

In general, a better understanding of material streams is needed, including information on the content of hazardous substances and how different choices affect each other. This will help in making decisions for infrastructure development, investments and instrument development.

To help in this, the Swedish EPA will continue to map plastic streams, develop statistics, follow up indicators and knowledge needs and track other obstacles to identify additional necessary initiatives beyond existing instruments.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• System knowledge and statistics.	• EU Waste Statistics (WstatR) and reporting to the Packaging, WEEE and ELV directives. • Upcoming reports linked to the Single-Use Plastics Directive.	• Contribute to collecting statistical data. • Share knowledge from your own surveys. • Clarify and communicate information needs. • Develop platforms and tools to provide requested information. • Develop environmental information linked to products and materials. • Develop indicators for measuring the development towards sustainable plastic use. • Develop scenarios and assessment of the potential of measures.

Requirements for and knowledge of environmental performance

It should be as simple as possible to make informed, sustainable choices based on a life cycle perspective. This makes improving knowledge of environmental performance and requirements important for sustainable plastic use. How material choices affect product life cycles needs to be better understood and disseminated.

In the work ahead, the Swedish EPA will gradually develop and provide data and information on tools that facilitate well-founded, sustainable choices. Collaboration with other authorities and research funders is an important part of this work, as is contributing to relevant EU efforts. The Swedish EPA also contributes to EU efforts with product passports and the Product Environmental Footprint. It will also work with the Swedish Consumer Agency to disseminate knowledge about such concepts as bio-based and biodegradable.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• It is difficult to know what is actually more sustainable, since knowledge about climate and environmental product performance is lacking. This also means that it is unclear how to define requirements and create effective measures (best practices) among product users. • Lack of knowledge about the content of hazardous substances and possible substitutions. • Difficulty communicating and understanding concepts such as “bio-based” and “degradable”.	• The EU develops life cycle-based organisation environmental footprints (OEF) and product environmental footprints (PEF). • The Union intends to establish sustainability principles and other appropriate regulations to reduce carbon and environmental footprints, reward products based on their sustainability performance and increase the content of recycled materials in products. • Requirements for climate declarations for buildings are under development ahead of their implementation in 2022. • The EU will develop a policy framework for use of biodegradable or compostable plastics.	• Make requirements for/provide information on environmental performance (within certain product groups, standards such as EPD can be used). • Take a life cycle perspective, even when assessing such aspects as reducing plastic leakage, which is generally not considered in life cycle analyses. For example, be clear with/request information on the conditions under which “biodegradable plastic” degrades and investigate whether it is an advantage in the specific case. • Use tools and aids that are currently available. • Develop tools and aids that simplify well-grounded choices of products with minimal environmental impact. • Develop traceability and other systems for providing product information. • Expand knowledge on how to promote behavioural changes (generally applies to all areas).

Knowledge and methods for assessing risks with microplastics, including sources from land and marine waste, and cost-effective measures

Significant bottlenecks exist in efforts to reduce the negative effects of microplastic leakage, include difficulties in assessing risks and the cost-effectiveness for measures because of a lack of knowledge, including a lack of harmonised measurement and analysis methods.

In 2021, the Swedish EPA is developing a research agenda for microplastics, which will provide an in-depth description of knowledge needs in the area. Collaborating with other research funding bodies is important for addressing prioritised knowledge gaps. Harmonised method development is central for the field, and international collaboration is important in this context. The Swedish EPA also collaborates with the Swedish Agency for Marine and Water Management and VTI on microplastics and leakage.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Difficulties in assessing risks and the cost-effectiveness for measures because of a lack of knowledge, including a lack of harmonised measurement and analysis methods.	• The European Commission has announced work to further develop and harmonise methods for measuring unintentional emissions of microplastics, especially from tyres and textiles. • Ongoing REACH processes on microplastics.	• Developing common definitions, standardising and harmonising data types, etc. • Better data quality and estimation of microplastic concentrations. • Improved understanding of the concentration levels at which negative effects occur. • Further research on the prevalence, concentration levels and toxicity associated with nano- and microplastics. Knowledge about sources for marine-based rubbish, the occurrence of rubbish and the consequences of cleaning, how littered areas should be classified, the basis for deciding where to focus efforts, who is responsible for taking action etc. • Development of data and methodology for different stakeholders' risk assessments and forecasts of the risks to humans and ecosystems. R&D on limiting techniques and best practices that can be implemented at different stages of a product's life cycle, from manufacturing through urban water flows to recipient. Improved evaluation of the relative cost-effectiveness of measures to reduce leakage of microplastics from different sources in different parts of the life cycle.

Resource-smart usage

Highlighting and utilising the potential for resource-smart production and use of plastics

Resource-smart plastic use should be as obvious as efficient energy use. An important part of this is to highlight potential and possible benefits with resource-smart use. For this to happen, statistics and data collection need to be developed at both company and national levels. Good examples need highlighting.

The Swedish EPA works with relevant authorities and other stakeholders to produce, collect and disseminate knowledge and examples that facilitate this. Another important part of this work is implementing the Single-Use Plastics Directive and various efforts to enable increased reuse of products. The Swedish EPA also works with statistical development.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of measurements, goals and data that highlight potential and possible benefits of working for resource-smart use. • Primary fossil raw materials are relatively cheap.	• EU Single-Use Plastics Directive: Prohibition of certain single-use plastic products, reduction targets for others. • Milestone for reusable packaging: increase by at least 20 per cent from 2022 to 2026 and by at least 30 per cent from 2022 to 2030. • By 2025, preparations will be instituted to allow for reuse and material recycling of at least 55 per cent by weight of municipal waste, of at least 60 per cent by weight by 2030 and of at least 65 per cent by weight by 2035. • Developed roles and responsibilities for municipalities to inform about waste prevention measures, such as reuse.	• Survey the current situation. • Identify opportunities for improvement. Many small steps can make a big difference – avoid unnecessary use, phase out unnecessary single-use products, improved maintenance etc. • Identify opportunities for new approaches for increasing benefits from plastics. For example, based on the changes needed to achieve resource-smart use. In each procurement, consider the need and whether it could be met in a more resource-smart way – the product is needed everywhere it is used, the product must be newly manufactured, its function can be defined, etc. • Identify opportunities for new approaches for increasing benefits from plastics for your customers and others who define specifications. • Identify/inventory opportunities for reusing/repurposing packaging and furniture, install drinking water taps with free tap water for public use etc. • Formulate a target/policy for resource-smart use. • Adopt and implement measures that contribute to significant environmental benefits. In this work, consider any added value in relation to other values/goals in the business. • Follow up and improve. • Learn more about optimal product life, function and performance.

Designing for resource-smart production and usage, including increased durability

Design has a major influence on the product's environmental impact throughout its life cycle. In its action plan for a circular economy, the EU has pointed out that up to 80 per cent of the environmental impact of products can be determined during the design phase – this makes improvements to the design process very important. Design for resource-smart use can, in some cases, allow synergies with reduced littering (for example by designing for reusable use) and leakage of microplastic (by designing for increased durability).

The Swedish EPA, together the Swedish Energy Agency, the Swedish Consumer Agency, the Swedish Agency for Public Procurements, the Swedish Chemicals Agency and others, is involved in the EU's development of product policy. The Swedish EPA also works to produce and disseminate knowledge to facilitate the design process. Together with the Agency for Public Procurements, the Swedish EPA also works to facilitate good specifications. Additionally, the Swedish EPA also provides supervisory guidance.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of incentives for designing for resource-smart use, including increased durability/reduced wear and thus reduced microplastic leakage.	• The Ecodesign Directive. • The EU's upcoming work with product policy, including resource efficiency requirements linked to the Ecodesign Directive, which is being expanded to cover as wide a range of products as possible. • The Packaging Directive – revision announced, stricter requirements to reduce (excessive) packaging and packaging waste, encouraging design for reuse and more.	• Investigate opportunities. What solutions are available on the market? Consider optimal product life, function and performance. • Define requirements for purchasing, design etc. Utilise support from the National Agency for Public Procurements and others. • Strive to exceed established environmental and ecodesign requirements, and communicate opportunities for stricter requirements to those who define requirements. • Think outside the box. Design resource smart. Can the desired function be met in a more resource-smart way? Are there opportunities to contribute to improving the "benefits of plastic", can plastic provide more value during its lifetime, is it possible to design products/buildings for reduced waste? • Think holistically, design for a sustainable life cycle. Are there opportunities for value-creating collaborations with customers/suppliers/others, which enable the product to be used longer and by additional users, and perhaps be returned to the company for re-manufacturing, reuse or recycling into new products after initial use? • Participate in collaboration forums such as the European Plastic Pact. • Conduct inspections to ensure the waste hierarchy is implemented – increase reuse/preparation for reuse/material recycling. • Develop design criteria, disseminate knowledge.

Developing circular, resource-efficient business models, including building infrastructure designed for reuse and other resource-smart usage

Both infrastructure for reuse and resource-smart concepts/business models need to be developed to achieve resource-smart usage.

The Swedish EPA works to promote reuse and collaboration on infrastructure development and resource-efficient logistics. Important aspects include collecting and disseminating knowledge, facilitating for municipalities and others in meeting their responsibility for providing information about waste prevention efforts, implementing the EU Single-Use Plastics Directive and contributing to other EU efforts, such as developing systems for product information.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of infrastructure for distribution/collection/ inventory/management for reuse.	• Of the packaging offered on the market in Sweden for the first time, the reusable share is to increase by at least 20 per cent from 2022 to 2026 and by at least 30 per cent from 2022 to 2030.[9] • By 2025, preparation for reuse and material recycling of municipal waste must have increased to at least 55% by weight, to at least 60% by weight in 2030 and by 2035 to have increased to at least 65% by weight.[10] • Planning and Building Act: Requirements that the inspection plan lists which construction products can be reused and their disposal, what waste the measures can produce, how this waste is to be disposed of, and, in particular, what plans are in place to enable high-quality material recycling. • Municipalities are responsible for providing information about waste prevention measures. • The EU has announced that it will consider establishing sustainability principles and other appropriate ways of mobilising the potential inherent in digitisation of product information, including solutions like digital passports, tagging and watermarks.	• Collaborate on the development of resource-efficient logistics, including infrastructure for reuse, like the development of return systems for more types of packaging. • Develop resource-smart business models that enable products to create more value during their service life, reuse, sharing etc. • Develop systems for necessary information exchange between stakeholders in the chain that facilitate safe and convenient reuse.

Raw materials and production with minimal environmental impact

Using and designing for raw materials with minimal environmental impact

Design has a major influence on the product's environmental impact throughout its life cycle. In its action plan for a circular economy, the EU has begun a major effort to develop product policy. The purpose is to adapt products to a climate-neutral, resource-efficient and circular economy, reduce waste and ensure that the performance of the most sustainable products gradually becomes the minimum standard. By staying ahead of the curve in improving environmental performance of their products, Swedish companies can be well-prepared to meet future sustainability requirements and compete in the market. From a life cycle perspective, using raw materials with minimal environmental impact includes, in addition to selecting raw materials, design choices that enable raw material recycling.

The Swedish EPA is working to develop long-term financial instruments using the "polluter pays" principle. Collaboration with the National Agency for Public Procurements and others on procurement requirements and with SIS on the development of standards is an important part of this work. The Swedish EPA is also working to develop and compile data to enable better selection of raw materials. Collaboration with research funding bodies is important for knowledge development.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Primary fossil raw materials are relatively cheap. • Lack of incentives to design for raw materials with minimal environmental impact and for material reusability.	• The EU's development of product policy. The purpose is to adapt products to a climate-neutral, resource-efficient and circular economy, reduce waste and ensure that the performance of the most sustainable products gradually becomes the minimum standard. • The EU will be proposing mandatory requirements on the content of recycled materials for important product groups. • The revision of the Packaging Directive will examine whether to push designing for material recycling by considering such aspects as the potential of reducing the complexity of packaging materials, including the number of materials and polymers used.	• Investigate opportunities. What solutions are available on the market? • Define requirements. Requirements for the content of recycled raw material are one way of achieving higher usage while requirements for material recyclability for products is another. This can include work with design and requirements to enable material streams for secondary production. Utilise support from the National Agency for Public Procurements and others. • Develop the necessary tools and aids for defining requirements and facilitating making well-grounded choices when defining requirements. • Knowledge development about material content, manufacturing processes and usage to enable the best design. • Develop design to reduce littering and wear. • Standards work for terminology, such as recyclability. • Explore opportunities for substituting hazardous substances. Seek out assistance from the Swedish Centre for Chemical Substitution and others.

Method development for and data on safe use of recycled/bio-based materials

Anyone choosing to use a product produced with recycled raw materials must be confident that it is as safe for health and the environment in its intended use as a product made from new raw materials. Bio-based raw materials must be produced sustainably. This requires developing methods for achieving this and increased knowledge is also needed.

An important aspect of the Swedish EPA's work in this area is participating in EU efforts to increase the content of recycled materials in products while guaranteeing their performance and safety and in EU efforts on a policy framework for bio-based plastics. Government collaboration with the Swedish Chemicals Agency on non-toxic and resource-efficient cycles is another important aspect. A third important aspect is contributing to terminology development through standardisation, development of mass balance concepts, sustainability criteria for bio-based raw materials and so on.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of reliable supply and quality of recycled/bio-based raw materials. • There are no established methods for guaranteeing "sustainable" extraction of bio-based raw materials for bio-based plastics.	• The Government's strategy for a circular economy: Strict demands on non-toxicity for recycled and new raw materials. Drive replacement of fossil raw materials with renewable and bio-based raw materials without adversely affecting biodiversity and other ecosystem services. • EU: Consider establishing sustainability principles to increase the content of recycled materials in products while guaranteeing their performance and safety. • EU: Develop a policy framework for procurement, labelling and use of bio-based plastics based on an assessment of where using bio-based raw materials leads to real environmental benefits and goes beyond simply reducing the use of fossil resources.	• Develop verification methods for the percentage of recycled and/or bio-based raw materials, including working with terminology standards. • Develop quality assurance of recycled raw materials, including methods for increased knowledge about the content of plastic streams (e.g., product declarations, traceability adapted to needs in the current application, smart loops and screening methods.). • Develop tools to facilitate secure access to recycled raw materials of the right quality. This may include the development of marketplaces, market participants that encourage the buying and selling of collected and recycled plastics. • Method development for sustainability requirements for bio-based raw materials used in producing bio-based plastics. • Providing information on the percentage of recycled/bio-based raw materials in products. • Develop the mass balance concept. • Verification methods and labelling for content. • Test beds and knowledge support that enable moving towards more recycled or bio-based raw materials. • Develop new screening methods for evaluation of new materials.

Material development

Certain applications lack materials with satisfactory properties and a significantly lower environmental impact than primary fossil plastic.

Important aspects of the Swedish EPA's work in this development area are collaboration with research funding organisations, providing data and information that facilitate well-grounded choices, EU efforts on product policy, including ecodesign, and development of procurement requirements.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Certain applications lack materials with satisfactory properties and a significantly lower environmental impact than primary fossil plastic. • Lack of reliable supply and quality of recycled/bio-based raw materials.	• EU: Develop product policy aimed at adapting products to a climate-neutral, resource-efficient and circular economy, reducing waste and ensuring that the performance of the most sustainable products gradually becomes the minimum standard.	• Develop processes for producing recycled raw materials of required quality. • Develop bio-based and material-recyclable material solutions that can meet requirements for barrier properties in various applications, quality requirements for and when using recycled raw materials, including certification for use with foods. • Develop material solutions that contribute to reduced use of hazardous substances. • Develop resource-efficient manufacturing processes for bio-based plastics and plastics made with carbon dioxide. • Develop material solutions that reduce leakage of microplastics. • Develop additives with improved environmental performance, additives that contribute to improved quality for mechanically recycled materials, etc. • Test material solutions with lower environmental impact in various applications.

Significantly increased and high-quality material recycling

Developing collection and information systems focused on enabling cost- and climate-effective material streams for secondary production

Achieving significantly increased and high-quality material reuse requires more focus on enabling material streams for producing recycled raw materials that have the desired quality, and, as part of this, creating plastic streams with well-defined compositions suitable for material recycling. Logistics solutions also need to be developed, including “smart loops”.

In 2021, the Swedish EPA is working on a government assignment to increase material recycling of plastics and will implement proposed initiatives. Waste legislation, including producer responsibility, is an important instrument in this area, where the Swedish EPA is responsible for supervision and supervisory guidance for various streams and is contributing to the revision of the Packaging, WEEE and ELV directives. Collaboration on developing initiatives for increased collection, including logistics solutions and material recycling, is central, as is the development of knowledge.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Difficult to achieve profitability for increased sorting and sorting that preserves value. Even among fractions where producer responsibility applies, sorting rate is often low.	• The EU has introduced a new method for calculating Member State membership fees that includes a national financial contribution based on the amount of non-recycled plastic waste. • The EU has announced that it will consider establishing sustainability principles and mobilising the potential inherent in digitisation of product information, including digital passports, tagging and watermarks. • Waste Ordinance requirements for sorting out plastic waste from construction and demolition separately, in at least one fraction. • For plastic packaging, the goal is for the material recycling rate to be at least 50 per cent by 2025 and thereafter at least 55 per cent.[11] • At least 90 per cent of returnable bottles are to be recycled.[12] • At least 65 per cent of the electronics offered on the market must be collected annually. Recycling goals for electrical equipment vary depending on the category of the equipment. The goals, however, are not only linked to plastics but to the product as a whole.[13] • The goal for end-of-life cars is for at least 95 per cent of the car's weight shall be reused or recycled, of which at least 85 per cent of the car's weight shall be reused or its material recycled.[14] The goals, however, are not only linked to plastic but to the product as a whole. • By 2025, material recycling of municipal waste must increase to at least 55 per cent by weight, by 2030 to at least 60 per cent by weight and by 2035 to at least 65 per cent by weight.[15] The goals, however, are not only linked to plastic.	• Design: Design for material recyclability • Sorting: Review opportunities for separate collection of certain plastic waste fractions. Investigate opportunities for waste contractors to accept different plastic waste streams for material recycling. Do what you can to allow as a high degree of material recycling and as climate-efficient material recycling for your plastic waste as possible. Ask for feedback on the material recycling rate for current plastic waste streams. • Waste contractors/recyclers: Collaborate with customers on appropriate sorting to enable climate- and cost-effective material recycling. Review pricing for receiving different waste fractions. Invest in re-sorting and recycling capacity. • Participate in collaboration forums, such as the European Plastics Pact and the Circular Plastics Alliance. • Develop system solutions, including the expansion of infrastructure and working methods for climate- and cost-effective material recycling. • Develop information infrastructure/traceability for information transfer of content on and supply of plastic waste streams of different compositions. • Develop systems and methods for advanced post-sorting. • Collaborate to develop infrastructure solutions and logistics. • Develop smart loops to create more well-defined, homogenous plastic waste streams and in this way allow value-creating recycling.

Developing sorting and recycling methods, including chemical recycling and expansion of capacity

Climate- and cost-effective material recycling requires appropriate sorting and processing, including both mechanical and chemical recycling. Increased recycling requires technological development for both types of recycling. In addition to the above noted work, an expansion of capacity is needed for various parts of the recycling. New collaborations are also needed to enable higher volume streams to be recycled. At present, our knowledge is limited on how different parts of the value chain can contribute to appropriate conditions for material recycling, not least for chemical material recycling. More information is required, and conditions for both different types of mechanical and chemical recycling should be considered when developing system solutions for greatly increased and high-quality material recycling.

In 2021, the Swedish EPA is working on a government assignment to increase material recycling of plastics and will implement proposed initiatives. Collaboration on the development of initiatives for increased material recycling of various plastic streams is central. The Swedish EPA supports climate investments through its local and regional climate investments programme *Klimatklivet* and monitors these efforts through the *Industriklivet* initiative. The Swedish EPA also contributes to EU efforts with product information and other initiatives for greatly increased and high-quality material recycling, participates in standardisation efforts linked to recycling and collaborates widely with research funding organisations.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• There are no established methods for quality assuring recycled raw materials. • We have too few incentives for design that minimises the environmental impact of raw materials and for material reusability. Primary fossil raw materials are cheap.	• The EU has introduced a new method for calculating Member State membership fees that includes a national financial contribution based on the amount of non-recycled plastic waste. • According to the Government's strategy for a circular economy, incineration that includes producing energy is only to be used for such waste that is inappropriate for any other use.	• Purchasing/procurement: Ask for products made from recycled raw materials. Review opportunities to contribute to material recycling by setting requirements for material recyclability. In addition to requirements for material recyclability for individual products, in some cases, it may be relevant to take a holistic perspective on the company's plastic streams and review opportunities to reduce the number of materials and polymers used as a way of enabling material recycling of the organisation's plastic waste streams. • Develop technology, including process engineering knowledge, for various sub-steps in recycling processes, both mechanical and chemical recycling, which in a climate- and cost-effective way can place quality demands on recycled raw material. • Invest in capacity for material recycling with good climate performance, both mechanical and chemical. • Collaborate on opportunities for sending higher volume streams to recycling. • Participate in initiatives like the European Plastics Pact and the Circular Plastics Alliance. • Develop sorting techniques based on newly developed materials and methods for washing, production of flakes and drying to enable the use of new and more durable materials beyond those already processed. • Develop information to support developing system solutions for greatly increased and high-quality material recycling, including opportunities for and consequences of chemical recycling.

Reduce plastic leakage in nature

Solutions for reduced leakage: Design, knowledge dissemination and development

The EU Single-Use Plastics Directive will increase producer responsibility for certain product groups in 2023, which means that producers must bear the cost of awareness-raising measures, collection in public systems and cleaning initiatives.

Important aspects of the Swedish EPA's work in this area include implementing the EU's Single-Use Plastics Directive, contributing to the EU's product policy work, including developing ecodesign requirements, guidance for supervision and testing, public agency collaboration on gathering and disseminating information about opportunities to contribute to reduce leakage of microplastics with a focus on measures with low implementation costs and/or synergies with other environmental goals, and collaborating on innovation-promoting initiatives. Collaboration with the Swedish Agency for Marine and Water Management is a central part of this work.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of incentives for reducing plastic leakage in nature through design and production, including system solutions. • Lack of awareness about existing knowledge on leakage of microplastics and opportunities to reduce it. • Lack of solutions for reducing leakage of microplastics from specific streams.	• The EU Single-Use Plastics Directive will increase producer responsibility for certain product groups in 2023, meaning producers will bear the cost of awareness-raising measures, collection in public systems and cleaning initiatives for litter caused by products. In addition, a requirement is introduced that bottle tops/lids must remain on beverage containers. • The Swedish Agency for Marine and Water Management has proposed a producer responsibility regulation for plastic fishing gear. • Emissions of microplastics are covered by the Industrial Emissions Directive. • Proposals for a ban on intentionally added microplastics in products are being considered as part of REACH. • The European Commission will develop labelling, standardisation, certification and legislative measures for accidental releases of microplastics, including measures to increase the separation of microplastics in all relevant phases of the product life cycle. • The Local Authorities International Environmental Organisation (KIMO) has produced an action plan describing municipal sources of microplastics, available municipal resources and what measures or changes municipalities can take to prevent microplastics from arising and spreading. • Two milestones for stormwater management within the environmental objective system: Municipalities at risk of significant impact from stormwater on land, water and the physical environment in existing developed areas are required to survey the situation, develop action plans for sustainable stormwater management and begin implementing these plans by 2025. By 2023, all municipalities must integrate sustainable stormwater management in the planning of new buildings or in the event of significant changes to existing buildings.	• Identify sources. Do operations contribute to leakage of plastic and/or microplastic? If so how? • Investigate opportunities. What solutions are available on the market? • Make demands and take advantage of the support from the National Agency for Public Procurements. • Develop designs for reduced littering and increased durability/reduced leakage of microplastics. • Strive to exceed environmental requirements, including ecodesign requirements, and communicate opportunities for stricter requirements to those who define requirements. • Collaborate on the development of system solutions for the collection of used products as a way to reducing littering. • Develop action plans for reducing leakage of microplastics. • Take measures for reducing leakage of microplastics. In the short term, significant improvements can be achieved by focusing on measures with low implementation costs. • Evaluate how new solutions affect leakage of plastics and microplastics. • Develop new solutions for reducing leakage of microplastics. • Participate in collaboration forums such as Operation Clean Sweep and the Keep Sweden Tidy Foundation. • Increased knowledge of leakage causes from various sources, such as fishing gear.

Change behaviour to reduce plastic leakage

Single-use plastic articles and plastic fishing gear are significant causes of plastic leakage into the environment. Social norms play an important role in this context – efforts are needed to create and maintain a culture of not littering.

Important aspects of the Swedish EPA's work on this issue include the implementation of the EU's Single-Use Plastics Directive, efforts to increase the reuse of packaging, collecting and disseminate information about how to contribute to behavioural changes that reduce litter, supervisory guidance, and collaboration with other public authorities and stakeholders.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of incentives for collection and good management of waste, not least from a global perspective.	• The EU's Single-Use Plastics Directive includes reduction targets for food containers and cups and requirements for awareness-raising measures for a range of sources of land-based litter and for fishing gear. • The EU Marine Strategy Framework Directive includes targets for marine litter and thresholds for beach litter adopted at EU level. • Municipal waste plans are to include goals and measures for preventing and limiting littering.	• Identify litter points and direct actions there. • Work throughout the value chain to drive behaviour changes, known as nudging, both linked to design and consumer behaviours. Offer reusable alternatives. • Offer a deposit. • Removing litter campaigns, ploughing and more. • Events to establish trends - reduced one-time use. • Communicate that balloon debris, confetti and other material from events are litter. • Training and campaigns on better handling of plastic for reduced leakage, e.g., for fishing gear, artificial grass. • Develop and define requirements, e.g., on managing plastic and cleaning during construction, in ports and in marine environments.

International and EU collaboration for reduced plastic leakage

Plastic littering occurs in every part of the world, and plastic pollutants travel across international borders by air and water. As such, the problems with plastics cannot be solved only through national efforts. Cross-border cooperation is essential. There is currently no global tool or forum dealing with the problems of marine plastic waste and pollution from microplastics in a coordinated way. The Swedish government is working to achieve a global agreement on plastics that will prevent emissions of plastic waste and microplastics into the oceans and that includes the entire life cycle of plastics. This work is intended to contribute to the global goal of eliminating all marine plastics in the long term (decision by the UN Environment Assembly, UNEA 3). The business community can also contribute to reducing global plastics leakage through its design and formulation of business models and other means.

The Swedish EPA is working with the regional marine environment conventions Helcom, OSPAR and others for a global agreement and with several international initiatives, including the Basel Convention and other environmental conventions within the framework of the UN Environment Programme (UNEP). Part of the EU-related work is supervision according to the Waste Shipment Regulation, but also to gather and disseminate information about opportunities for contributing to reduced litter globally.

Current obstacles	Examples of relevant requirements, goals etc.	Inspiration for potential actions
• Lack of incentives for collection and good management of waste, not least from a global perspective. • Lack of incentives to reduce plastic leakage in nature through choices in design and production, including system solutions.	• Regional action plans to reduce marine litter: HELCOM, OSPAR and others. • Basel Convention. • EU Single-Use Plastics Directive: Requirement that bottle tops/lids remain on beverage containers. • IMO: Including action plan to reduce marine litter from ships.	• Join the call for a global plastics agreement https://www.plasticpollutiontreaty.org/. • Contribute to reduced litter globally by developing product design and distribution. This can be done by designing to reduce littering, but also business models that include reuse and design for material recyclability that incentivises product collection. • Design products and business models to add value to plastics and create incentives for collection – design for material recycling, reuse, etc. • Participate in collaboration forums such as Operation Clean Sweep and the Keep Sweden Tidy Foundation.

Continue efforts for the sustainable use of plastics

Through the National Plastics Coordination, the Swedish EPA will monitor developments toward sustainable plastics use in various plastic streams and development areas and identify needs and opportunities for initiatives to achieve sustainable plastic use. The Swedish EPA encourages all relevant organisations, value chains and industries to evaluate opportunities for contributing to these targets and to develop concrete action plans/action points for their own efforts. We will be reporting the activities carried out and commitments by various stakeholders on the Swedish EPA's website.

Collaboration on developing the sustainable use of plastic

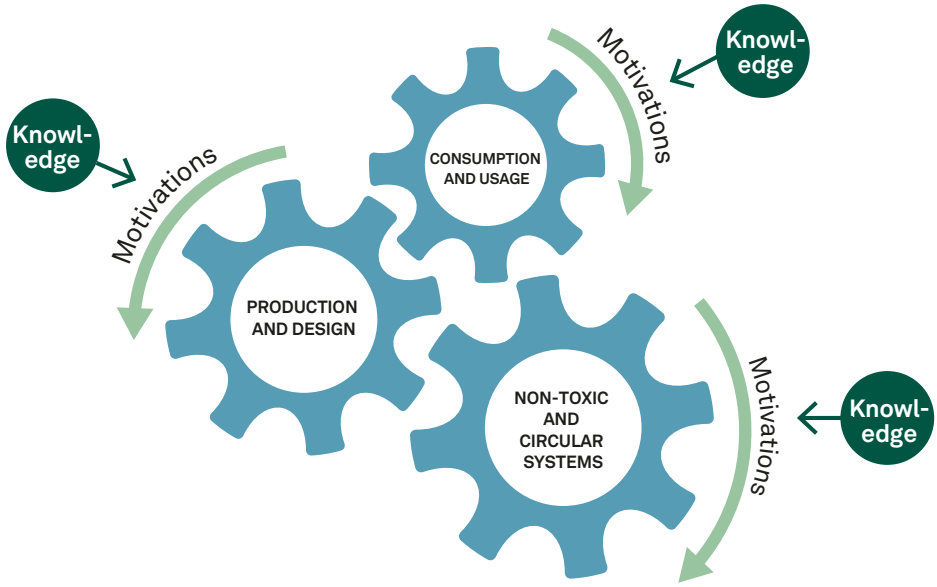
The entire value chain can and needs to contribute to the sustainable use of plastics. Collaboration is very important for identifying needs and opportunities for additional initiatives using a holistic approach. This is because solutions for sustainable plastic use are often system solutions involving several steps in the value chain and life cycles or requiring coordination for efficient implementation.

The National Plastics Coordination serves as an arena for knowledge acquisition and discussion about development needs and possible solutions, and thus will show the way towards the sustainable use of plastics. The roadmap is one of the fundaments for this. Collaboration with other public authorities and coordinating stakeholders is an important part of this work, as is contributing to relevant EU efforts. It is also important to be inspired and to learn from what has already been done by various stakeholders and to build on ongoing efforts.

Continually planning initiatives that enhance the impact of efforts for sustainable plastic use

Activities will be designed continually to increase the impact of these efforts based on the follow-up of sustainable plastic use efforts and discussions with relevant stakeholders. This can include knowledge-raising initiatives, guidance, supervision, the need for developing instruments and more. Ongoing and planned activities will be regularly compiled in an activity plan published on the Swedish EPA's website.

Developing sustainable use of plastics requires collaboration. The entire value chain can and must contribute.



Annex 1. Comments on the roadmap have been received from

Participating organisations in the reference group

Organisation	Name	Organisation	Name
AR-packaging	Amanda Persson	Swedish Society for Nature Conservation	Cecilia Hedfors
Avfall Sverige	Jon Djerf	Novoplast	Martin Stråât
Avfall Sverige	Åsa Hagelin	Orkla	Elna Hallgard
Axfood	Karin Grönskog	Perstorp	Linda Zellner
Axfood	Nadja Dahlgren	Prezero	Mårten Carlsson
Axfoundation	Maria Smith	Ragnsells	Patrik Isaksson
Billerud korsnäs	Malin Ljung Eiborn	Renova	Lia Detterfelt
Borealis	Marie-Louise Johansson	RISE	Annika Boss
Båtunionen	Carl Rönnow	RISE	Nazdaneh Yarahmadi
Chalmers	Henrik Thunman	Sandmaster	Mats Svensson
Chalmers	Henrikke Baumann	Scania	Lars Jerpdal
Duni	Erik Lindroth	SDAB	Fredrik Ardefors
Electrolux	Karl Edsjö	Stena Metall	David Karis
Energy companies	Raziyeh Khodayari	Stockholm Exergi	Ulf Wikström
FTI	Anette Löhnn	Stockholm Vatten och Avfall	Peter Ullenius
City of Gothenburg	Filip Eklund	City of Stockholm	Maria Azzopardi
University of Gothenburg	Martin Hassellöv	Region Stockholm	Katharina Högdin
Keep Sweden Tidy Foundation	Johanna Ragnartz	Swedish Trade Federation	Ann Christiansson
Hållbar Kemi 2030	Elin Hermansson	Swedish Plastic Recycling	Mattias Philipsson
Hållbar Kemi 2030	Lars Josefsson	Tarkett	Dag Duberg
IVL Swedish Environmental Research Institute	Anna Fråne	Tekniska verken i Linköping	Klas Gustafsson
JM	Jörgen Ågren	Trioplast	Kristin Geidenmark Olofsson
Karlstad Municipality	Jennie Rönnbäck	Uppsala Municipality	Mia Carlevi
KEMI	Henrik Oxfall	Visita	Anna Sandborgh
Lidköping Municipality	Gudrun Magnusson	VTI	Mikael Johannesson
The Swedish Food Federation	Marie Rydén	Västkuststiftelsen	Florina Lachmann
Luleå University of Technology	Helene Österlund	Region Västra Götaland	Per Rosander
Lund University	Fredric Bauer	Återvinningsindustrierna	Ellen Einebrant
Mälarplast	Peter Wall		

Authorities that have been involved in discussions regarding the roadmap

Swedish Energy Agency

Swedish Agency for Marine and Water Management

Swedish Chemicals Agency

Swedish Consumer Agency

Swedish Meteorological and Hydrological Institute (SMHI)

Swedish Transport Administration

National Agency for Public Procurements

References to adopted targets in existing legislation and the environmental objective system

1 Milestones within the environmental objective system

2 Milestones within the environmental objective system

3 Ordinance (2016:1041) on plastic bags Swedish Code of Statutes 2016:2016:1041 through 2018:1613 – Riksdagen.

4 Ordinance (2018:1462) on producer responsibility for packaging Swedish Code of Statutes 2018:2018:1462 through 2020:1299 – Riksdagen.

5 Ordinance (2018:1462) on producer responsibility for packaging Swedish Code of Statutes 2018:2018:1462 through 2020:1299 – Riksdagen.

6 Ordinance (2014:1075) on producer responsibility for electrical equipment Swedish Code of Statutes 2014:2014:1075 through 2020:703 – Riksdagen

7 Ordinance (2007:185) on producer responsibility for cars Swedish Code of Statutes 2007:2007:185 through 2020:700 – Riksdagen

8 Milestones within the environmental objective system

9 Milestones within the environmental objective system

10 Milestones within the environmental objective system

11 Ordinance (2018:1462) on producer responsibility for packaging Swedish Code of Statutes 2018:2018:1462 through 2020:1299 – Riksdagen.

12 Ordinance (2018:1462) on producer responsibility for packaging Swedish Code of Statutes 2018:2018:1462 through 2020:1299 – Riksdagen.

13 The goals are found in sections 25–28 of the Ordinance (2014:1075) on producer responsibility for electrical equipment. Electrical equipment – Swedish EPA (naturvardsverket.se).

14 Ordinance (2007:185) on producer responsibility for cars Swedish Code of Statutes 2007:2007:185 through 2020:700 – Riksdagen

15 Milestones within the environmental objective system.

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