REDUCE AND REFUSE, RECYCLE AND REPLACE

A PLASTICS ROADMAP FOR FINLAND

PROPOSALS FOR MEASURES

Foreword

Plastics have many good and important qualities, which is why they are used so much and why they have a key role in our economy. However, plastics also cause problems to which there are no easy solutions. Among the topics widely discussed in the media, in the EU and in international forums is marine litter.

The challenges related to plastics and the interest and lively discussion they give rise to urge us to act.

This Plastics Roadmap sets out a number of actions by which we can reduce the harm caused by plastics, avoid unnecessary consumption, improve the recycling of plastics, and find alternative solutions to replace plastics. The aim was to discover concrete practical measures to get started as quickly as possible.

The roadmap points out the first steps towards a new, sustainable plastics economy. While the implementation of most of the proposals can be launched immediately, some of the measures require additional resources and a longer term to be implemented. What we need is awareness raising, changes to consumer habits, research, product planning, technologies, markets, development work, and legislation and policies.

The roadmap was prepared by a broad-based working group appointed by the Ministry of the Environment. This work was supported by an expert secretariat, which was also responsible for writing the report. A large group of stakeholders and members of the public participated in the preparatory work. Online idea generation was used to compile hundreds of ideas and comments to serve as the basis for the preparation. So far, it has not been possible to make use of all the ideas. As the work progressed, two large workshops were organised to elaborate the themes selected to the road-map, and the proposals for measures were prioritised. Members of different parliamentary groups were also involved in the process, and the ministerial group for the Government key project concerning the bioeconomy and clean solutions followed the progress of the preparation.

Preparing this roadmap has been a rewarding process. It has brought together a growing number of enthusiastic and competent agents willing to commit themselves and do what it takes to solve the plastics challenge. We wish that in the years to come this roadmap will inspire even more people and stakeholders to take part in our joint effort.

For Finland, the plastics challenge is also an opportunity.

Hanna Kosonen Tuula Varis

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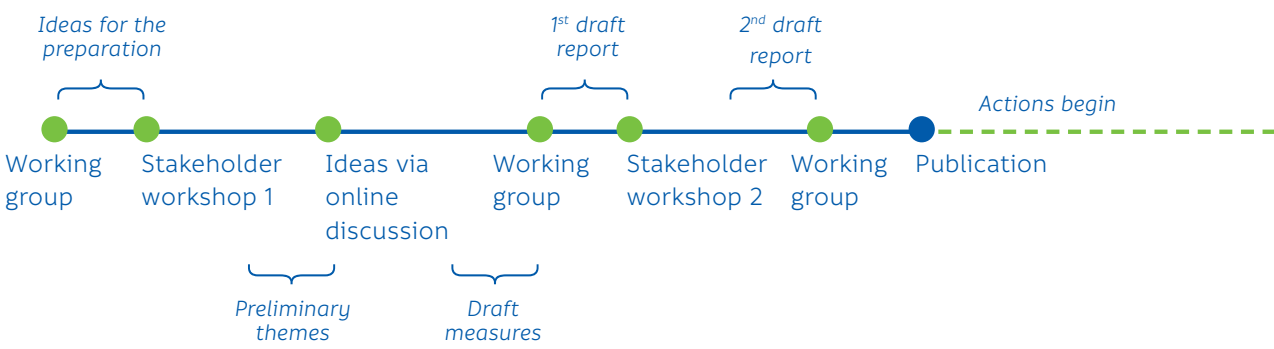
PREPARATION PROCESS OF THE PLASTICS ROADMAP



Roadmap prepared by the secretariat

Introduction

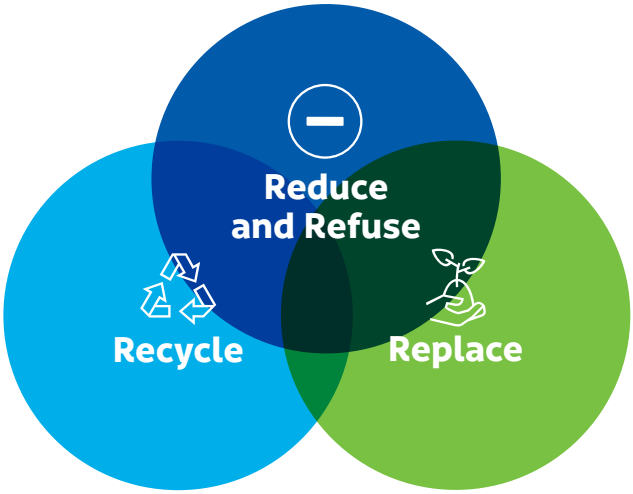
The Ministry of the Environment appointed in March 2018 a broad-based working group for the period 1 April to 14 September 2018, tasked with preparing a roadmap for plastics. The idea was to examine the challenges related to plastics and potential solutions to these and to define and prioritise short- and long- term measures to respond to the challenges.

Despite the various good qualities of plastics thanks to their performance and lightness, there are also serious challenges involved in their use, disposal and recycling. Now the aim is to reduce littering and unnecessary consumption of plastics, improve the recycling of plastics, and replace plastics made from fossil raw materials with sustainable and renewable alternatives. Responding to societal challenges, including those relating to plastics, and turning them into opportunities requires a broad spectrum of players, strategic choices, solution-oriented policies, and resources for the sectors that are the most promising in terms of achieving sustainable development. Our response to the challenge is part of the efforts to promote a circular economy.

This Plastics Roadmap is the first proposal in Finland aimed to find diverse solutions to the plastics challenge. Plastics are an extremely broad and complex issue, and we do not even know all the factors that may be involved. The Plastics Roadmap does not attempt to cover all aspects of the plastics challenge, but the aim was to gather ideas and suggestions from different players and choose the most promising and significant ones to be included in the roadmap. At the moment we do not yet know enough about plastics and their use. As our knowledge on the topic grows, new measures will also be needed.

The Plastics Roadmap identifies measures to reduce the harm caused by plastic waste and litter, help consumers take plastics to waste management, improve the efficiency of plastics recovery, recycling and product design, create conditions for investments and innovations in the circular economy, and make us less dependent on fossil raw materials by increasing bio-based and biodegradable solutions.

Addressing the plastics challenge requires a wide range of measures, some of them new ones. Voluntary actions are needed as well. One good example of the new ways to enforce the law and promote its objectives is the Plastic Carrier Bag Agreement concluded between the Ministry of the Environment and the Federation of Finnish Commerce. Replacing plastics and new solutions require more research, development work in the sector, and influencing people's attitudes. While some of the proposed measures could be launched and implemented quite quickly, actions spanning several government terms are also needed, and these should be started as soon as possible. Decisions in respect of State financing are made as part of General Government Fiscal Plan and the Budget.



PLASTICS ARE NECESSARY BUT THEIR USE MUST BE SUSTAINABLE

Plastics have many good and important qualities: they are affordable, light, durable, protective and adaptable. In the past 50 years, the global use of plastics has grown 20-fold, and it has been estimated to at least double in the following 20 years. Despite the fact that an increasing share of plastics are made from bio-based materials, the World Economic Forum has estimated that in 2050 the plastics industry will use one fifth of the world's oil production.

The environmental impacts of the plastics production chain are well known. In many applications, the environmental impacts of plastics are relatively small. Because they are light, plastics bring considerable environmental benefits in logistics and vehicles. Protective food packages improve storage life and prevent food loss and waste, which means that they are beneficial for the environment.

It was only after the trash vortices circulating in the oceans were discovered that people truly woke up to the harm caused by plastics. The problems caused by marine litter are getting worse and worse in all seas and oceans, including in the Baltic Sea. On one hand, chemicals are used to improve the characteristics of plastics and, on the other, harmful substances or micro-organisms may be bound to plastics and spread into the natural environment. Environmental problems are caused by plastics that end up in places where they do not belong. Microplastics represent a new phenomenon in this context, and we do not yet know very much about their impacts on people and the environment. All this means that new research is needed on the various aspects of plastics.

Many countries have already reacted to the harm caused by plastics. China, which used to be the recipient of plastic waste from Europe, has imposed a total ban on the imports of plastic waste, and the stream of this waste has now moved to other, less developed Southeast Asian countries. International

negotiations are under way on the possibility to introduce stricter transfer procedures for plastic waste so that this would be subject to authorisation. Many countries have imposed prohibitions and restrictions on the use of plastics. At the same time, a comprehensive European Strategy for Plastics has been prepared with the aim to take joint action to steer the use of plastics towards a sustainable circular economy. The Commission has proposed a new financial contribution by the Member States to the EU Budget, which would be directly proportional to the amount of unrecycled plastic packaging waste in each Member State. When discussing the legislative initiatives and proposals, clear and unambiguous definitions for the core concepts related to plastics, such as a disposable plastic product, should be provided.

FOR FINLAND THE SOLUTIONS TO THE PLASTICS PROBLEM ARE AN OPPORTUNITY

On the global scale, plastics are a massive challenge for which urgent solutions are needed. Billions of people lack appropriate waste management and enormous amounts of plastic litter and microplastics end up in water bodies and elsewhere in nature. Within the EU most of the plastic waste comes from packaging materials. Disposable plastics are a burden to waste management systems, and they also end up in nature. The use of unnecessary packaging materials should be avoided, but this alone will not solve the plastics problem. Solutions could be sought by developing recycling technologies and safe, new materials to replace traditional plastic. In terms of the economies, any solutions found to the plastics problem mean new business opportunities. Finnish companies can be among the leaders in this.

Finland has strong competence in biomaterials and raw materials that offer promising opportunities to replace plastics. The production of bio-based plastics on the industrial scale is not very common as bio-plastics tend to be much more expensive than their fossil alternatives, which means the feasible, scalable solutions that also work in mass production should be found. Meeting the wishes related to materials and solutions to replace plastics requires close cooperation and additional inputs to make sure that promising ideas end up in the market.

On the short term, the greatest expectations are targeted to more efficient recycling of plastics. Growing demand for better recycling solutions is also being created by the EU. In view of the need to implement even stricter requirements, the Member States should also be proactive and boost the recovery and recycling of plastics other than those in packaging materials. More efficient collection of plastic waste requires significant improvements in the recovery of plastic waste and recycled plastics, as well as increasing the demand for recycled plastic and its use. The plastics value chain should be an integral part of the circular economy.

Proposals for measures

Reduce littering and avoid unnecessary consumption

Study the possibility to introduce a tax on plastics

Increase significantly the recovery of plastic waste

Improve the identification of plastics in buildings and sorting of plastic waste at construction sites

Promote the recycling and replacement of plastics in agriculture and horticulture

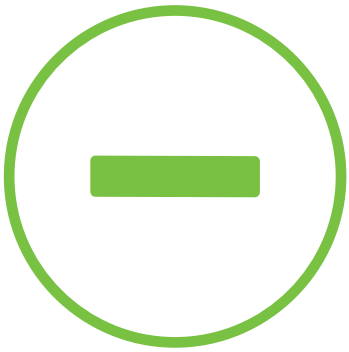
Introduce diverse recycling solutions for recovered plastics

Invest in a big way in alternative solutions and set up a New Plastics knowledge network

Raise the plastics challenge high on the international agenda of Finland

Export expertise and solutions

Enhance research knowledge on negative health and environmental impacts of plastics and solutions to these



Reduce littering and avoid unnecessary consumption

"**Plastics** do not belong in nature. The amount of plastic litter and waste can be reduced by influencing people's attitudes and changing the ways we act. Sustainable consumer habits, recycling and anti-littering can be cool."

Campaigns and events aimed at the general public are an important part of solving the plastics challenge. They increase awareness, opportunities for participation, and commitment. They provide answers to our efforts to make a difference and find solutions. Good examples of successful campaigns include the Litter Movement, plogging (pick up litter while jogging), the Marine Litter Challenge of the Finnish Environment Institute, and the World Village Festival, where littering is not tolerated. All of these have also become social media phenomena.

Companies and public players have a key role in reducing unsustainable consumption, including disposable and excessive packaging. Among the solutions are voluntary commitments such as the Green Deal agreements, enabling to set ambitious and observable targets and suggest measures to achieve these. For example, the Plastic Carrier Bag Agreement has in a short time successfully reduced the use of plastic bags. Companies and other stakeholders can also commit to tackling the plastics challenge with material efficiency commitments and the Society's Commitments to Sustainable Development.

Besides the voluntary measures, bans and other regulations can also be imposed if considered necessary. The prohibition on littering in the Waste Act allows to impose a fixed fine of e.g. EUR 100 for violating it. The quite recent legislative initiative by the European Commission (of May 2018) proposes a significant reduction in the consumption of certain single-use food packages as well as direct bans on certain disposable plastic items such as cutlery.

MEASURES:

- A set of campaigns is launched that gives wide and constant visibility to the plastics challenge, highlights solutions and players, and raises awareness among consumers and the general public on the consequences of one's actions and how each and every one can make a difference. The general public is challenged to choose sustainable alternatives to single-use items and reduce littering.
- Green Deal agreements are implemented to reduce the use of single-use packaging and overpackaging as well as littering. An operating model is designed for businesses using disposable packaging such as cafés, fast food restaurants and other companies offering takeaway services, which may include a separate fee for single-use containers as an incentive. The use of Finnish tap water instead of bottled water is promoted e.g. by encouraging cities, hotels and restaurants to visibly offer tap water.
- Cities and municipalities, event organisers and other agents are challenged to introduce solutions that reduce littering and unnecessary consumption, including by improving waste collection and the instructions on this, ensuring anti-littering and good recycling practices in public events, or restricting smoking on public beaches.

Implementers and partners: Ministry of the Environment, Sitra, cities and municipalities, Martha Organization, Finnish Plastics Industries Federation, others participating in preparing the Plastics Roadmap and operators in the sector

Quotas from online ideas and comments

Collection points into good shape and a broad TV and radio campaign on the benefits of recycling and how to do this in practice.

It should be possible to buy food without buying the (plastic) package.

Study the possibility to introduce a tax on plastics

Financial instruments can also be used as target-oriented means to influence the use of plastics, thus reducing the harm they cause, including littering. In the broad sense financial steering instruments may be understood to include producer responsibility systems, mixing obligations relating to recycled materials, and the pricing of products using different kinds of deposits, fees or taxes.

For example, the efficient recycling of plastic bottles in Finland is based on a deposit-refund system. By joining the system, the companies that

Quotas from online ideas and comments

Nuisance tax on plastics that cannot be recycled or reused.

There should be a waste charge on the packaging materials of these foreign products.

place beverage packages on the market avoid the packaging tax on beverage containers and fulfil their producer responsibility obligation. The recycling of car tyres works efficiently based on producer responsibility.

A tax imposed on single-use plastic products could reduce the use of these items, while at the same time increasing the demand for more sustainable solutions to replace these. The UK Government is about to introduce a tax on several disposable plastic products such as bottles and takeaway packages, with the aim to boost the transition from traditional fossil plastics to recycled and replacing materials. A tax targeted to certain plastic products could serve as an alternative to expanding the producer responsibility system, as proposed by the European Commission.

Financial incentives can also be used to improve the conditions for the recycling of plastic and use of recycled plastic by adjusting the relative prices of plastic raw materials and recycled plastic.

When considering the use of taxes and other financial steering instruments, careful and thorough consideration is needed as to the what the objectives are, what are the most feasible and cost-effective means to reach them, and what kind of impacts they will have. Overlapping measures and regulation should be avoided.

MEASURES:

- Alternative ways to implement a tax on plastics are studied.
- The impacts of a tax imposed on certain single-use plastic products on reducing their consumption are assessed.
- An evaluation is conducted of the relationship between taxation and the producer responsibility system and its expansion and the needs and opportunities to expand the deposit-refund system.

Implementers: Ministry of Finance, Ministry of the Environment, Ministry of Economic Affairs and Employment

Tax benefits for products made of recycled plastic.

10 cent deposit on all plastic containers and they will disappear soon enough.

Increase significantly the recovery of plastic waste

Recovery of plastics after their use should be far more effective than it is today. Most of the waste plastics are packages of which 25% are recycled in Finland (2016). The amendments to the EU Waste Directive tighten the objectives set for the recycling of plastic containers (2025: 50%, 2030: 55%) and expand the requirement for separate collection of other plastics. Reaching the objectives requires a number of additional measures, such as significantly increasing the number of bring sites for plastic waste. The final date for the national implementation of the amendments is 5 July 2020.

In addition to collection systems, boosting the recycling of packages and other plastic items requires communication and inspiring consumers and business life to reduce the use of plastics, sort and recycle plastic waste, and use products made of recycled plastic. The Ämpäristöteko ('Bucket Action') campaign organised by the Finnish Plastics Industries Federation in June 2018 proved that people have the interest and enthusiasm to collect plastic.

Among the aims of the European Strategy for Plastics is to ensure that all plastic packages entering the EU market will be reusable or easy to recycle by 2030. In terms of recycling, the most problematic are the composite plastics and their growing use. New solutions are required for the ecodesign and recycling of these materials. In future, the collection

systems may be influenced by the growing use of biodegradable plastics and the composition of products containing plastics and packages ordered online from outside the EU.

MEASURES:

- The requirements for separate waste collection are amended and the recovery of packaging plastic is significantly increased by expanding the property-specific and regional collection systems and organising neighbourhood collection points for areas with detached or terraced houses. There is better collaboration between package manufacturers, municipalities, waste management companies and other actors in the collection of plastic packaging waste. Sorting of waste is promoted by pricing.
- Experiments are launched to investigate the alternative ways to implement the separate collection of different types of plastic waste. To improve the quality of recycled plastic, cleaning, recycling and refining technologies for plastic waste are developed and tested, including the possibility to collect plastic packaging waste and other plastic waste in the same container. Collection systems are designed to be user-friendly and efficient. Awareness is raised among consumers and companies and advice on recycling plastics is disseminated.
- Means are found to ensure recyclability in designing plastic products and composites. Product groups are identified where a certain share of recycled plastic could be required.

Implementers and partners: Ministry of the Environment, municipalities, waste management companies, producer responsibility organisations, Finnish Plastics Industries Federation, VTT Technical Research Centre of Finland, Martha Organization, WWF Finland, other organisations and operators in the sector

Quotas from online ideas and comments

Property-specific recycling should be increased to provide easy access to collection points for all (e.g. no driving needed).

Numerous actors in the collection process where the key customer is the plastics producer, instead of the consumer.

Improve the identification of plastics in buildings and sorting of plastic waste at construction sites

Construction uses a lot of plastics and even more accumulates in buildings in connection with use-phase maintenance, additional installations and repairs. The construction sector is in fact one of the most significant users of plastics, but not very much plastic is recovered when buildings are being demolished. To enhance the recovery of plastics we need better identification of plastics used in construction and more efficient demolition practices, separate collection and recycling systems and, eventually, utilisation of plastic waste.

Of the plastic used in construction, different kinds of packaging and single-use plastics are the easiest to recover and recycle, and it is also possible to introduce solutions that replace plastics and reduce their total amount in structures.

Overall, the reuse and recycling of plastics could be facilitated by better access to information on plastic products used in a building.

MEASURES:

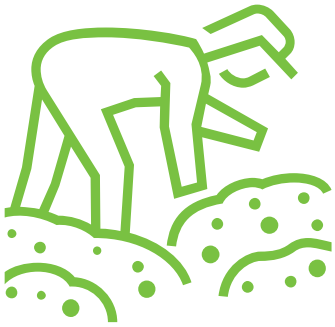
- An inventory is taken of the amount and recycling potential of plastics in the built environment.
- Guidelines are prepared for the sector on reducing packaging plastics in construction. A Green Deal agreement on the reduction of packaging plastics in the real estate and construction sector will be concluded in 2019.
- Opportunities are sought to improve the material efficiency of plastics in structures and building services engineering systems, reduce the total amount of plastics, and increase the utilisation rate of recycled plastics with alternative solutions in cooperation with the real estate and construction sector.
- A product fiche model is designed for buildings which can be attached to the information model used in designing buildings or construction permit information. The fiche facilitates the identification of plastics and improves their utilisation potential in connection with repair and demolition work.
- Together with ARA and Senate Properties, a plan is prepared on reducing of plastics and increasing the recycling rate of plastic waste as well as on the use of recycled plastics in construction in 2019. Experiments are carried out with public procurement project where these measures are applied in the design, construction, repair or demolition of buildings.

Implementers and partners: Ministry of the Environment, SYKE, ARA, Senate Properties, Confederation of Finnish Construction Industries, Finnish Plastics Industries Federation, Association of Finnish Local and Regional Authorities, KEINO Competence Centre for sustainable and innovative public procurement, VTT, Sitra

Quotas from online ideas and comments

Ageing surface treatment materials like paint and varnish create microplastics/ indecomposable fractions. Solutions are needed for this – paint is being removed without protection and waste collection.

Labelling of plastic-free products can be used as an attribute in competitive tendering. Preferred option in public procurement as well.



Promote the recycling and replacement of plastics in agriculture and horticulture

In agriculture and horticulture relatively large amounts of plastics are used e.g. in greenhouses, mulch and the handling of silage. Plastic sacks and canisters are used for fertilisers and pesticides. A cooperation network and a company offering pickup services already exist for the recovery of plastics from farms. As a rule, however, the recycling of agricultural plastics is not yet efficient nationwide and lots of used plastics are left on the farms.

The main problem in recycling agricultural and horticultural plastics and provision of recycling services is the separation of different types of plastics and the impurities accumulated in e.g. plastic used for silage. In terms of the environment, a particular problem is the degradation of plastics used in multi-annual mulch in the Finnish climate and the resulting microplastic litter.

Plastic packages used in agriculture are subject to producer responsibility. There are reception terminals established by producers where plastic packaging waste can be delivered free of charge. However, the producer responsibility for packaging only applies to the packaging of products professionally placed on the market, while plastics used for packing feed used on farms are excluded. More collaboration between different stakeholders is needed to improve the efficiency of recycling.

Fruit and vegetable farms already use some biodegradable mulch and, especially for annual plants, different kinds of biodegradable films are

replacing the use of plastic for covering the soil. Some of the solutions that are called biodegradable are not 100% biodegradable, but bio-based alternatives for these exist and new ones are being developed. Investments in this development work are needed and functional and fully biodegradable alternatives should be made an attractive choice.

The latest solutions include liquid mulch which can be used to replace plastic and pesticides (e.g. glyphosate) and which also has properties that improve the growth potential of the soil. For example, international patent protection has been applied for liquid mulch material developed in Finland that is made from domestic wood- and plant-based natural raw materials.

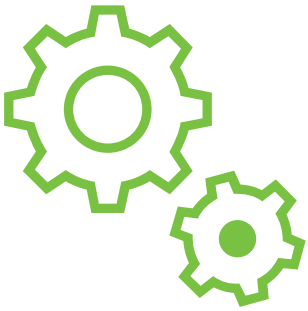
MEASURES:

- Cost-effective solutions and appropriate steering instruments are sought for more efficient recycling of agricultural plastics, and regional cooperation is increased also with actors outside the scope of producer responsibility. More advice on recycling is provided to farms. Alternative materials to agricultural plastics are developed.
- Investments are made in the development and introduction of new, bio-based and fully biodegradable mulch materials, including the verification of their biodegradability and testing different solutions in different application areas. Replacing fossil-based plastics with bio-based alternatives e.g. in the mulch for perennial plants is also encouraged by further expanding the scope and developing the environment payment scheme of the Rural Development Programme.
- Awareness is raised of the impacts of plastics on the soil and more information and training materials on the issue is provided. The main sources of microplastics in agriculture and horticulture are identified and measures are sought to reduce these by over 50 per cent.

Implementers and partners: Ministry of Agriculture and Forestry, Natural Resources Institute Finland, SYKE, companies, Evira

Quotas from online ideas and comments

> *Plastic waste from hay bales is clean but nobody seems to want it...could they?*



Introduce diverse recycling solutions for recovered plastic

Recycling of plastics is a multi-stage process which includes the recovery, transport, sorting and processing of waste plastic and manufacturing new products from the secondary raw material. The selection of the recycling process depends on the place where the plastic waste was created, its type and volume, and the requirements for the new products to be manufactured. It should also be noted that not all waste plastics are suitable for recycling but their controlled use for energy is a better option.

There are many solutions to processing plastic waste, from mechanical to chemical ones. Besides solutions suited to large volumes, small-scale solutions are needed as well. In all recycling and recovery solutions it is important to pay attention to the management of harmful substances and to the safety of secondary raw materials and products. Mechanical recycling is the best suited to uncontaminated plastic waste that is in good condition, while a large share of poor-quality plastic not suitable for mechanical recycling can be recycled and processed chemically. Chemical methods can be used to manufacture source materials for new chemicals and plastic raw materials from waste plastic, or fuel, and they also enable to eliminate all or part of the harmful substances. New biotechnological methods can further expand the opportunities for recycling plastics. The future solutions are likely to be increasingly based on the combination of different technologies.

The introduction of new recycling solutions depends a great deal on whether there is enough waste plastic available and what kind of market there is for recycled plastic and other products refined from plastic waste. Similarly, a well-functioning recycling market requires extensive cooperation between operators in order that traditional one-way value chains can be effectively incorporated into a circular economy model. In the initial phase, the public sector may have a significant role in facilitating new cooperation models and business operations.

The majority of plastics recycling in Europe is mechanical recycling, while the share of chemical processes is still less than 2 per cent. The chemical treatment of plastic waste is, however, emerging as a feasible method in the development of plastics recycling solutions and value networks. Pilot plants are already in use in Finland and a full-scale plant is also being planned. It should be noted that the use of plastic waste as energy is not considered recycling.

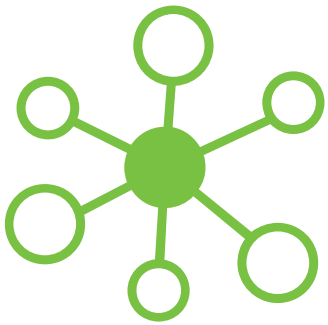
MEASURES:

- Recycling solutions suitable for different value chains are promoted. Projects are launched to strengthen cooperation between operators and the sorting and processing competence in companies and research institutes required for well-functioning recycling.
- Assessment is made of the feasibility and effects of chemical recycling in Finland. The potential of chemical recycling and the framework conditions involved are examined.
- Based on these, one or two full-scale plastic processing plants and a chemical recycling unit or units are set up as separate projects or as part of the existing chemical industry.

Implementers and partners: Ministry of Economic Affairs and Employment, VTT, BF, Sitra, Finnish Plastics Industries Federation, companies and other operators in the sector

Quotas from online ideas and comments

Recycling percentages registered too easily by shipping mixed goods that are difficult to recycle to Asia, where rejects from manual sorting end up in practically non-existent waste management.



Invest in a big way in alternative solutions and set up a New Plastics knowledge network

Bio-based materials replacing traditional plastics offer important opportunities to Finnish research, product development and production. There is a global need for safe, bio-based, recyclable and, in certain uses, also fully biodegradable packaging. Bio-based materials can also provide an alternative that replaces plastics in construction. Finland has strong competence in biomaterials and raw materials that offer promising opportunities to replace plastics. Nevertheless, fulfilling the wishes concerning the materials and solutions to replace plastics requires even closer cooperation, as well as additional investments in research and innovation and scaling the production to ensure that promising ideas end up in the market.

The aim is to introduce several novel replacement solutions to the international market within the next five years and to boost and expand the operations of the existing companies, particularly start-ups and SMEs. At the same time, there is a need to assess the sufficiency and usability of replacement materials and their raw materials and the relationships between these, as well as their properties and effects from the perspective of the environment, health and safety, recyclability and waste management. In the future, different kinds of composites combining plastic and bio-based materials may increasingly replace plastics, which means that their impacts must also be assessed with care. An internationally approved basis for the assessment and concepts must be created and standardisation developed to support the assessment.

The additional investments must be supported by an unbiased coordinating body that follows and makes efficient use of international research and innovation in the field and strengthens cooperation and

networking between research, companies and administration necessary for the development and implementation of replacement materials. Another important task is to promote the efforts to obtain more funding from the EU for building a sustainable plastics economy.

MEASURES:

- A national programme is launched and funding is allocated to the development of new value networks for the solutions, materials and technologies to replace plastics, as well as to business models developed jointly by various stakeholders. The needs and goals of the programme are prepared in extensive cooperation from the perspective of both material and product manufacturers and users, and various consortiums can apply for funding from the programme. In addition to national benefits, the programme aims to find solutions to global challenges and strengthen the international competitiveness of Finnish companies. The development of solutions to replace plastics ensures the comprehensive safety and environmental sustainability of the products (besides the production chains, the recyclability or biodegradability of products over their entire lifecycle).
- Cooperation between those operating in the value chains e.g. in developing food packaging is strengthened.
- The New Plastics Finland knowledge network will be established as part of the programme. The aim is to enhance the material competence of companies, strengthen the value chains of plastic recycling and research, disseminate knowledge on solutions to replace traditional plastic, and develop standardisation and unite the network with key international forums in the field. The knowledge network supports political decision-making and creates pressure to bring forth innovative solutions to replace plastics and recycling. The activities of the network can be supported e.g. by an artificial intelligence solution developed for database management.
- Development projects are launched to boost both wood-based products and products based on agriculture and side-streams to sustainably replace plastic. Research institutes and companies are invited to participate in the cooperation network for the projects. The aim is to create new business in Finland.

  Implementers and partners: Ministry of Economic Affairs and Employment, Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Industry Investment TESI, VTT, Luke, SYKE, Sitra, Finnish Plastics Industries Federation, Finnish Forest Industries Federation and other industrial associations, Academy of Finland

Raise the plastics challenge high on the international agenda of Finland

The European Strategy for Plastics adopted in January 2018 leads the way for the measures used by the EU and its Member States in rising up to the plastics challenge. Finland's Plastics Roadmap contributes to the implementation of the European Strategy for Plastics. It also draws attention to the best examples and strengthens Finland's visibility in nationally important questions.

In December 2017 the UN Environment Assembly (UNEA-3) established an intergovernmental working group to discuss global solutions to the plastic litter problem. The themes of the joint Nordic Programme on plastics include microplastics in coastal waters and plastic debris in the Arctic marine areas. The focus and forms of future cooperation are currently under preparation. The Baltic Marine Environment Protection Commission (HELCOM) has decided on cooperation in the Baltic Sea area to reduce marine litter. The Baltic Sea Action Plan will be revised during the Finnish HELCOM Presidency in 2018–2020.

Other important cooperation forums include the Arctic Council and several international conventions.

MEASURES:

- Implementation of the measures of the European Strategy for Plastics is front-loaded and information is provided about Finnish solutions and operating models that are important for Finland. The plastics challenge is high on the agenda in the preparation and events of Finland's Presidency of the Council of the EU (1 July–31 December 2019).
- Further measures are promoted at the EU level to strengthen the recyclability and ecodesign of products containing plastic, and growing amounts of recycled plastics are used in products.
- Further international measures are promoted to mitigate marine litter, and the plastics question is highlighted in the Nordic and Arctic co-operation and HELCOM cooperation for the protection of the Baltic Sea.

Implementers and partners: Ministry of the Environment, Ministry of Economic Affairs and Employment, other ministries, operators in the sector

Quotas from online ideas and comments

We have the Kyoto climate agreement – why not also have a Helsinki no-litter agreement where countries commit to preventing waste ending up in natural environment, by using the carrot or the stick.

One of the themes of Finland's EU Presidency could be how the EU could act to solve global plastic problems.

Export expertise and solutions

Plastic litter is a common problem in Asia and Africa. Especially in Southeast Asian countries such as Vietnam, Thailand and Malesia rivers carry massive amounts of plastic litter to seas and oceans. Resolving this problem requires changes in the operating models locally and regionally, better waste management, reducing the use of plastics and finding substitutes for them, and perhaps also recovering plastic from waterways and oceans. To get the changes started, a high level of expertise and strong cooperation between operators is needed. Finland has a lot of expertise and companies which can contribute to making this change happen. Examples of these include collection, sorting, processing and cleansing technologies, genuinely biodegradable materials, and solutions to recovering plastic from the ocean.

Business Finland (BF) boosts the development and export of Finnish solutions. The Ministry for Foreign Affairs has several financial instruments which support the business of Finnish companies in developing countries. For instance, the joint BEAM programme of the Ministry for Foreign Affairs and BF supports Finnish companies and other operators to solve global development challenges through innovation, and under the programme targeted campaigns can be organised particularly in developing countries. The United Nations Technology Innovation Lab (UNTIL) to be established

in Finland may also offer new channels to develop and scale solutions, especially in developing markets. The investment aid from PIF (Public Sector Investment Facility) of the Ministry for Foreign Affairs can be used to boost public investments in developing countries.

Impact investing provides a possible means to channel private equity to operators and projects that aim to achieve positive, measurable societal or environmental benefits. Impact investing can increase productive cooperation between the private, public and third sector and implement carefully planned, long-term and front-loaded investments to respond to the plastics challenge.

MEASURES

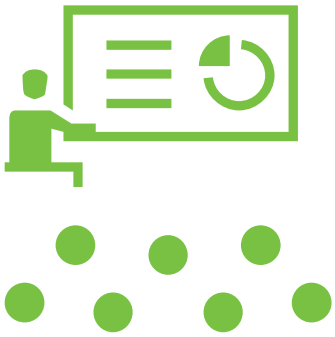
- The ability of Finnish companies to develop solutions to the plastics challenge is strengthened and their exports are promoted.
- Targeted cooperation is launched in areas with the most serious marine littering e.g. by establishing designated sites for Finland to mentor, which serve as a showcase and stepping stone to new solutions for responding to the plastics challenge, thus also supporting the export of solutions.
- Tests are carried out with impact investing and one of the means to implement this, a performance-based financing agreement (SIB model), in solving the plastics problem in developing economies and countries.

Implementers and partners: BF, Ministry for Foreign Affairs, Ministry of Economic Affairs and Employment, Ministry of the Environment, Sitra, WWF Finland, Finnfund

Quotas from online ideas and comments

> *Allocation of development cooperation funds could allow us to launch new kinds of multilateral projects that would bring together Finnish and local know-how and resources, companies and the third sector.*

> *Efforts should be made to promote the export of Finnish expertise (e.g. waste management), including through export campaigns and support and development support to countries where inputs in waste management expertise are needed.*



Enhance research knowledge on negative health and environmental impacts of plastics and solutions to these

A certain amount of knowledge on the environmental impacts of plastic litter, microplastics and the harmful substances contained in plastics exists, but it is fragmented and there are gaps even in the quite basic knowledge. There is also not enough information on the harmful substances recycled plastics may contain and their impacts. It was only recently that the first research findings on the health impacts of microplastics were published.

More information and identification of risks is needed to support decision-making. Studies should be made based on the needs that have already been identified, including harmful substances in plastics, microplastics in slurry and marine litter, the topics also raised in the National Programme on Dangerous Chemicals (KELO) and the Baltic Sea monitoring programme.

The European Chemicals Agency is currently exploring the options for restricting the use of microplastics added to products, and the Commission is seeking means to restrict microplastic emissions caused by the wear of products containing plastics, such as textiles, paints and car tyres.

These studies will take several years and require international cooperation. To succeed in international research cooperation and in

obtaining research funding, Finland also needs to conduct research on its own. The EU has already decided on additional investments in research on plastics as part of the current funding for the Framework Programme for Research and Innovation (Horizon 2020) and by preparing a long-term research strategy on plastics to steer the financing.

MEASURES:

- The needs for knowledge are specified to recognise the extent of the problem. A set of research projects is launched and international research cooperation on the harmful impacts of plastic, in particular microplastics, is strengthened. In targeting research, the focus is on the sources of microplastics, exposure to microplastics, permanence and degradability of microplastics in nature, added and accumulated harmful substances, environmental and health impacts and, if necessary, socio-economic perspectives.
- Solutions are developed for recovering microplastics in stormwater and wastewater as well as for utilising slurry that contains microplastics.
- Technologies and techniques are developed that can be applied to the identification of different components in plastic waste, identification and analytics of harmful substances contained in plastics, and eliminating harmful substances in plastic recycling.
- Monitoring and regular assessment of the status of marine littering are organised as part of the marine strategy, and research data is acquired on the impacts of plastics on marine biota.

  Implementers and partners: Academy of Finland, Strategic Research Council (SRC), ministries and the Prime Minister's Office, universities, National Institute for Health and Welfare (THL), SYKE, VTT, Luke, BF, Finnish Safety and Chemicals Agency (Tukes), cooperation with key international agents, such as the European Chemicals Agency.

Quotas from online ideas and comments

Research suffers from non-standardised observation and analysis methods for microplastics. Difficult to draft invitations to tender concerning e.g. levels of microplastics in wastewater as even provisional guidelines on what to observe and analyse are lacking.

Implementation and monitoring

The implementation of the Plastics Roadmap is started immediately. The roadmap presents the key implementers and partners for each set of measures. New stakeholders are also welcome to join in.

The Government and Parliament play a key role in implementing the roadmap, along with the designated implementers and partners. Measures spanning several government terms are needed, and these should also get started as soon as possible.

The next checkpoint for the implementation of the roadmap is in the spring of 2019. A joint monitoring event will be organised for the cooperation group and the bodies involved in implementing the roadmap at this point to evaluate the launch of the measures and progress made. By that time a more detailed proposal on how the implementation of the Plastics Roadmap is to be monitored and the measures strengthened in the long term will also be prepared.

The ideas compiled during the preparation of the roadmap and the collaborative efforts achieved in this context may serve as inspiration for launching brand new measures. The outcome of the online idea generation has been saved and the ideas are available on the website of the Ministry of the Environment at ym.fi/muovit.

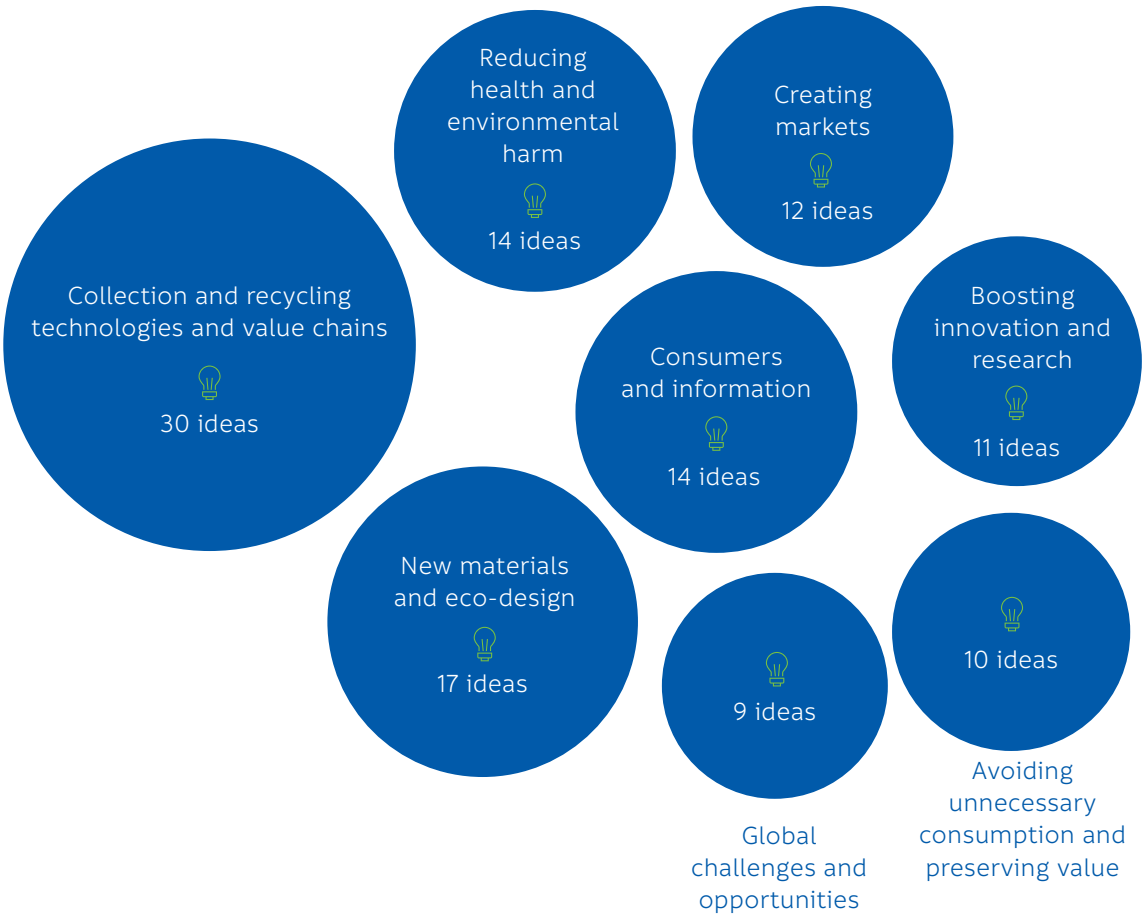
We encourage everyone to get involved in implementing this roadmap and further developing the ideas together with new partners in the plastics challenge.

Plastics Roadmap – compilation of the ideas generated online

117
ideas

276
comments

536
likes



Ideas

COLLECTING AND RECYCLING TECHNOLOGIES AND VALUE CHAINS

- Reorganisation of plastic collection and separating it from producer responsibility
- Obligation for companies to recycle plastics
- Renewable materials without a recycling fee
- Bringing competence in waste management to developing countries and curbing littering with agreements
- A recycling reward for construction companies
- A company delivering plastic abroad carries responsibility for it
- Favouring plastic-free building products
- Recyclability of packaging depends on the content
- Utilising smart robotics in collecting plastics
- Establishing a Plastics Academy
- Health impacts of plastic, such as phthalates
- Charging 50–70 cents for a plastic carried bag in shops
- Continuing the Ämpäristöteko ('Bucket Action') campaign
- Copying the available good ideas
- Producer responsibility for plastic items
- Property-specific plastic collection
- Plastic collection to waste collection centres
- Using kraft paper solutions as mulch instead of plastic
- Joint plastic collection for small businesses
- A campaign that offers solutions: replacing plastic containers at homes with sustainable alternatives
- Introducing a deposit-refund system to the recycling of plastics
- Increasing the amount of waste containers and burning litter
- Reusable plastic products
- More uses for recycled plastics
- Making use of artificial intelligence
- Recycling plastic used for hay bales
- Chemical recycling
- Expanding the deposit-refund system
- Plastic reception facilities in (EU) ports
- Indicators for monitoring the EU's circular economy

NEW MATERIALS AND ECODESIGN

- Highlighting plastic-free innovations
- Incentive for companies
- Respecting research and development
- Benchmarking pioneering countries
- Eliminating black plastic from packaging
- Solutions to the (micro)plastics emissions from traffic
- Making sale of products loose the norm
- Biodegradable diapers
- More refillable packaging

- influencing the packaging industry
- Renewable raw materials
- Multi-material packaging
- Replacement materials
- Cutting the use of materials
- Environmental tax
- Product-driven material design as the key
- New definition for plastics

CONSUMERS AND INFORMATION

- Increasing the sale of products loose in grocery shops
- Reducing unnecessary consumption
- Renaming mixed household waste
- Launching a national information campaign
- Stop talking about waste
- Awareness raising
- Including packaging information in online trade
- Theory of planned behaviour to get citizens actively involved into source-separation of plastic (among other waste)
- Plastic litter collection campaigns
- Packaging labels
- Clear information that is easy to find
- More plastic collection points!
- Plate model on plastics
- Ecologically sustainable economy

REDUCING HEALTH AND ENVIRONMENTAL HARM

- Discussion on carbon dioxide back in focus
- Chemicals in plastic
- Curbing microplastics
- Fine for littering, e.g. EUR 1,000
- Firm EHS regulations for online trade
- Steering with legislation
- Ban on mixing plastic with soil
- Cleaning the environment from plastics
- Putting an end to littering
- More reliable information
- Supporting companies and products that invest in the circular economy
- Purifying wastewater from microplastic litter
- Harmonising EU legislation

CREATING MARKETS

- Utilising recycled plastics in public procurement
- Updating waste management pricing
- Tax advantages for products made of recycled plastic
- Standardising recycled plastics at the EU level
- Global obligation for the first implementer of slow-cycle carbon to return the same amount of carbon to the sink
- Raising demand

- Aiming at scalability
- Introducing material banks
- Facilitating unexpected collaboration
- Strengthening market-driven RDI activities for recycled plastic products
- Industrial symbioses in Finland, utilisation of FISS activities
- Promoting the market access of plastic-free and biodegradable single-use packaging

BOOSTING INNOVATION AND RESEARCH

- HALAIN innovation
- Innovative materials
- A programme/fund for the development of plastics recycling ecosystems
- Standardising the observation and analysis methods for microplastics
- No burning but composite products!
- Focus on harms instead of plastics
- Investing in cooperation
- Specifying key areas for innovations
- Creating a more detailed picture on the effects
- Preparing a map of plastic and energy streams for Finland
- Investing in solutions

AVOIDING UNNECESSARY CONSUMPTION AND PRESERVING VALUE

- Charging for takeaway containers
- Ban on the sale of plastic carrier bags
- Eliminating empty space in packaging
- Special charge for mail-order products from abroad
- Guiding by information
- Expanding the deposit-refund system
- Green deals
- Reducing overpackaging
- Encouraging the involvement of public actors!
- Tax on plastics

GLOBAL CHALLENGES AND OPPORTUNITIES

- Export subsidy for environmental technology
- Restrictions to export of plastic waste
- Nordic countries as a driver
- Foreign countries pollute!
- Let's not make an unnecessary fuss
- Making plastic litter uncool
- Making use of international agreements
- Creating value for waste
- Importing to HotSpot countries

The descriptions of the ideas and related discussions are available in the online publication: **ym.fi/Muovit**

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