

Nordic improvements in collection and recycling of plastic waste



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Nordic co-operation

Nordic co-operation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, and the Faroe Islands, Greenland, and Åland.

Nordic co-operation has firm traditions in politics, the economy, and culture. It plays an important role in European and international collaboration, and aims at creating a strong Nordic community in a strong Europe.

Nordic co-operation seeks to safeguard Nordic and regional interests and principles in the global community. Common Nordic values help the region solidify its position as one of the world's most innovative and competitive.

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Policy brief

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Introduction

Recycling of plastic waste is generally more environmentally beneficial than incineration. Key to environmental benefits is to collect material of high quality in order to limit the amount of rejects in the following sorting and processes, and that the recycled plastics to the highest degree possible replace virgin plastics.

Plastic is a versatile material found in our daily lives in a wide range of applications, characterised as relatively inexpensive, lightweight and durable. The largest consumer of plastic is the packaging industry, producing short-lived products that are mostly discarded within a year. The production of plastics continues to increase, as does the amount of plastic waste it generates.

Collection and recycling of plastic waste is an important strategy in order to make the use of plastics more sustainable and resource-efficient.

This policy brief contains key findings and recommendations from *Improvements in existing collection and recycling systems for plastic waste from households and other municipal waste sources*, a project within the Nordic Prime Ministers' initiative, *The Nordic Region – leading in green growth*. It is one of six Nordic projects focusing on *Resource efficient recycling of plastic and textile waste*.

The aim of the project is to pave the way for a more efficient collection and recycling of plastic waste from

households and other municipal solid waste (MSW) sources in the Nordic countries, and thus striving towards higher recycling rates. Three main types of plastic waste are considered in the project: plastic packaging waste, plastic bulky waste, and small plastic waste other than packaging.

The project includes descriptions of the existing collection and recycling systems of plastic waste in place in the Nordic countries, highlighting the differences in terms of practical, organisational, and financial means. Secondly, it has developed Nordic guidelines on increased collection of plastic packaging waste from households and put forward possible future solutions for how, within the scope of the project, recycling of





plastic waste can increase.

More information about the project and the Nordic Prime Ministers' green growth initiative can be found at www.norden.org/greengrowth and in the Nordic Council of Ministers' web magazine, Green Growth the Nordic Way at www.nordicway.org.

Three light blue hexagons are arranged in a triangular pattern, with one hexagon at the top and two below it. The hexagons are semi-transparent and have a white border. The URL www.nordicway.org is centered in green text across the middle hexagon.

www.nordicway.org

Recommendations

Not a “one fits all” solution – different collection systems are suitable on local levels

A condition to increased recycling of plastic is to collect more of the generated plastic waste in the dedicated collection and recycling systems, and thus avoid plastic waste in waste fractions going to incineration.

An important key to increasing the collected amounts is the availability of collection systems for the consumers. Higher availability could be provided by kerbside collection, a denser net of public drop-off points, and smaller drop-off points in public areas. Providing other municipal sources, such as smaller companies, with better access to practical solutions like public drop-off points could additionally improve collection. Solutions focusing on

increased availability are required, including both source-separation of plastic waste¹ as well as sorting of plastic waste from a composition of mixed waste².

Less focus on packaging and more focus on plastic seems logical to consumers, but must be more deeply evaluated to avoid undesired effects

The generated amount of non-packaging small plastic items is small compared to discarded plastic packaging waste. Combined collection of packaging and non-packaging plastic items could be advantageous from many angles.

Non-packaging plastic waste is already found among plastic packaging waste fractions and it is clear that many consumers are not aware of this distinction.

Accepting non-packaging small plastic waste items among packaging is likely to influence consumer behaviour and their attitude and trust towards waste management in general. However, such a system is challenged by the fact that non-packaging plastic waste is a more heterogeneous stream than plastic packaging, both in relation to number of polymers and content of undesired potentially hazardous substances. The impact of implementing such solutions needs to be further analysed.

Communication in the value chain could be catalysed by Nordic cooperation

A Nordic networking platform involving stakeholders in the entire value chain could create conditions for communication and future cooperation. Possible tasks for

¹ Either into a single stream, i.e. into a fraction for plastic packaging waste only, or into a fraction for other recyclable materials and/or plastic waste other than packaging.

² Plastic waste (packaging and non-packaging) is discarded in a relatively dry mixed waste fraction subject to central sorting. Food waste, paper and cardboard, glass and metal are source-separated.



such a forum could be to develop common information to households about the benefits of plastics recycling, aim for a common Nordic approach to calculate national recycling rates, and thus facilitate benchmarking. Another task could be to initiate dialogue between sorting facilities, producers and producer responsibility organisations, with the purpose to share knowledge about products that are not possible to recycle in the existing collection and recycling systems. Practical cooperation between the Nordic countries could lead to economy of scale, allowing for sorting and recycling more within the local markets.

Transparency is important for trustworthiness

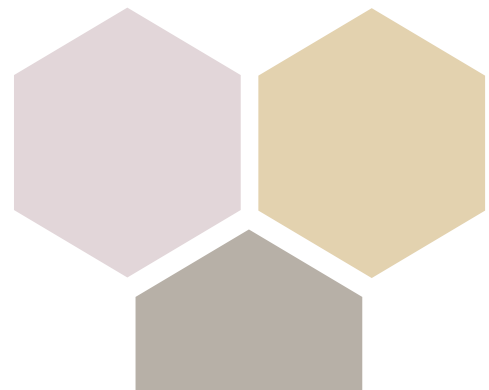
Transparency in the value chain is important for the general

trustworthiness of the collection and recycling systems, as well as for motivating and engaging consumers. Information about the fate of the plastic waste, and what type of products that are produced from the recycled plastics, could be the focus for more strategic communication efforts. The EU is the world's biggest exporter of plastic waste intended for recycling, most of which is transported to Asia. More detailed knowledge about the fate of the plastic waste, both in Asia and within the EU, could kill myths and answer questions consumers might have.

Evaluate possible policy instruments to increase the use of recycled plastics on the local market

A well-functioning market where the collected and sorted plastic waste is absorbed and recycled into new

products is a key requirement for higher levels of plastic recycling. The market and the demand for recycled plastics is a strong driver, creating a pull that will affect the activities upstream the value chain. It is important for the overall environmental impact of plastic collection and recycling that the secondary plastic material substitutes virgin plastics to a high extent, i.e. recycling into products of high quality. This requires that the collection and recycling systems can provide high-quality recycled plastics to the market. Policy instruments with focus on increased use of recycled plastics should be further evaluated.



Key findings

Key finding 1. **Increased collection is a key condition to increased recycling**

Nordic studies have shown that more plastic packaging waste is collected per capita and year with kerbside collection systems, compared to the existing bring systems. This indicates that the consumers' availability to discard plastic waste for recycling is important for the collection results.

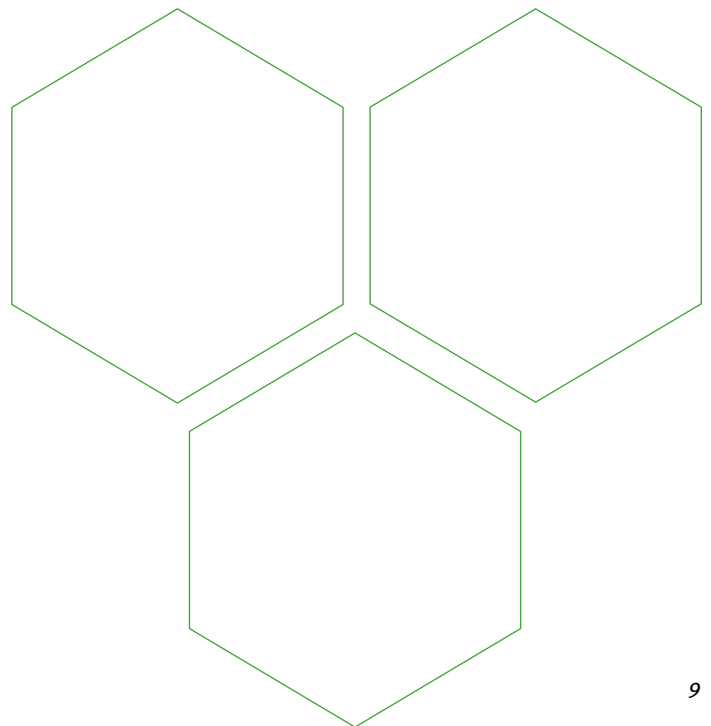


**Key finding 2.
Synchronization and communication in the value chain is highly important**

Plastic recycling is characterised by a series of activities – plastic products are put on the market, then collected, sorted and processed, and eventually recycled into new plastic products. These activities must collaborate and communicate in order to reach efficiency in the value chain.

Sorting and processing of plastic waste needs to be in line with the incoming material composition and produce secondary plastic raw material that substitutes virgin plastics to the highest extent possible. Continuous cooperation with material research and development and changeable process units are key features of a flexible recycling system. Possible consequences of having a more flexible recycling system are increased costs – both investment, maintenance, and administrative

costs. The responsibility and financing for securing sorting processes in line with upstream and downstream demand should be shared between actors in the value chain, meaning for example that sorting and recycling companies could influence product design.



Key finding 3.
Major differences between the Nordic collection and recycling systems for plastic waste

Producer responsibility obligations on plastic packaging waste are implemented in Finland, Iceland, Norway, Sweden and Åland, although they differ in structure. Sweden, Finland, Åland and Iceland have a legal form of producer responsibility, whilst Norway has chosen a different approach in the form of a voluntary producer responsibility. In Denmark the

packaging directive has been implemented without use of a producer responsibility scheme.

Municipalities are responsible for collecting plastic packaging waste in the entire Nordic region except in Sweden, where producers are responsible for collection and recycling of plastic packaging waste. The responsibility for recycling rests on the producers in the countries with producer responsibility.

In Finland the majority of the plastic waste from households is collected with an energy waste fraction of high

calorific value or as mixed household waste. Some municipalities arrange for separate collection, but either way the plastic waste is subject to incineration. This will however change in 2015 when the Finnish producer responsibility will be expanded to also include industrial packaging waste and household packaging. In the rest of the Nordic countries the separately collected plastic waste from MSW sources is collected for recycling.





Key finding 4. Different collection strategies in the Nordic countries

Two main strategies of plastic waste collection from households and other MSW sources are applied in the Nordic region. One strategy is focused on improved source-sorting where the source-separation plastic waste¹ is further sorted by polymer type at central sorting facilities. The other strategy is to collect a composition of mixed waste, including plastic waste, followed by central sorting where the plastic waste is sorted out from the rest, and into different polymers. The latter strategy requires source-separation of certain waste fractions (currently food waste, hazardous waste,

textile waste and metal, paper, and glass packaging waste), and results in a mixed waste fraction with a composition of both non-packaging and packaging waste plastics.

Bring systems are the most common way to separately collect plastic waste from MSW sources in Denmark, Iceland, Sweden and Åland, while kerbside collection is dominating in Norway. Kerbside collection includes a broad range of practical solutions such as multi-compartment bins, sorting into separate containers or in transparent plastic bags, and source-separation in differently coloured bags prior to optical sorting.

The amounts of collected plastic waste will not correspond to the amount actually recycled. The reasons for this are multifold and are explained by the fact that the collected amounts contain contaminants attached to the plastic waste such as food waste, moisture and paper labels, contain incorrectly source-separated material, or contain polymer types that cannot be separated for recycling by the technique used at the sorting facilities. Nordic experience indicates that kerbside collection of plastic waste generates less contamination than the existing bring systems.

¹ Either into a single stream, i.e. into a fraction for plastic packaging waste only, or into a fraction for other recyclable materials and/or plastic waste other than packaging.



**Key finding 5.
Plastic bulky waste, non-packaging small plastic waste and PET bottles are handled in a similar way**

Plastic bulky waste, i.e. waste that due to its size needs different handling, is not subject to any dedicated, nationwide collection and recycling system in the Nordics. Small-scale initiatives exist between municipalities and waste management companies,

and the trend is on the increase. Non-packaging small plastic waste is generally taken care of in a similar manner in the Nordic region, i.e. collected together with other types of waste and sent to energy recovery or landfill. The Nordic municipalities are responsible for plastic bulky waste from MSW sources, as well as for non-packaging small plastic waste. PET bottles are in most cases collected and recycled through separate deposit return systems.



**Key finding 6.
Unsorted plastic packaging
waste in residual waste
fractions represents an
important potential for
increased recycling**

The potential for increased recycling lies within the entire value chain, from collection of plastic waste to possible technical improvements in the sorting and recycling processes, and the market opportunities for recycled plastics.

Unsorted plastic packaging waste in the residual waste fraction is not subject to recycling and represents the main potential for increased recycling of plastic waste from MSW sources. The theoretical potential, here defined as the amount of plastic waste in residual waste fractions not subject to recycling, could be estimated to be somewhere around 700,000 tonnes per year in the Nordic countries. Identified potentials of a more general kind are related to the fact that plastic waste

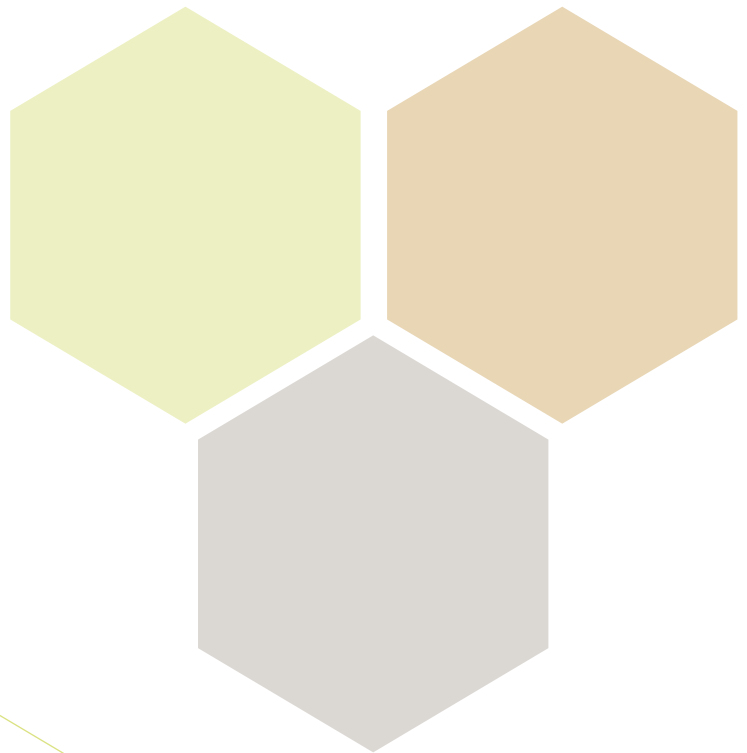
is landfilled, that source-separated plastic packaging waste in some parts of the region is not subject to recycling but to energy recovery, and that non-packaging small plastic items and plastic bulky waste are not collected for recycling through dedicated, nationwide collection and recycling systems.





**Key finding 7.
To compare recycling rates
and find best practice in
the Nordic countries is
challenging**

Comparing plastic recycling rates for different Nordic countries is challenging as the calculation methods vary, both for follow-up on EU-targets and on national targets. Differences in methods are for example the inclusion or exclusion of PET bottles in statistics on plastic packaging, and if one should consider or not consider moisture and contaminants in the plastic packaging waste flows.



Conclusion

Existing Nordic collection and recycling systems for plastic waste from households and other MSW sources are differently organised, structured and financed. The systems have in common that there is potential to increase the collection and recycling of plastic waste. To exploit this potential, collaboration and communication in the entire value chain is needed – from increased collection of plastic waste in the dedicated systems, reducing the amount of plastic waste to incineration or landfill, to a well-functioning market absorbing the reprocessed secondary raw material. In between, preparation for recycling in the form of efficient sorting and processing is needed.

Key to increased collection seems to be availability of collection systems for the consumers together with communication and transparency. Practical options are plentiful, and local circumstances require different solutions. Less focus on packaging and more focus on plastic would be beneficial for the overall collection and recycling of plastic waste.

Risks of introducing undesired potentially hazardous substances in the secondary plastic raw material as well as the effect on the quality of the secondary plastic raw material would need further evaluation if more material-based collection systems were to be implemented.

Sorting and processing of plastic waste needs to be in line with the incoming material composition and produce recycled plastics that substitute virgin plastics to the highest extent possible. Recycling into products of high-quality require collection and recycling systems that provide high-quality recycled plastics to the market.

Nordic plastic recycling could benefit from more extensive Nordic cooperation at two levels: on a practical level and based on knowledge exchange and benchmarking. Practical cooperation between the Nordic countries could lead to economy of scale, allowing for sorting and recycling more within the local markets.





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This policy brief on Nordic improvements in collection and recycling of plastic waste is part of the Nordic Prime Minister's overall green growth initiative, *The Nordic Region – leading in green growth*. Read more in the web magazine *Green Growth the Nordic Way* at www.nordicway.org or at www.norden.org/greengrowth

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