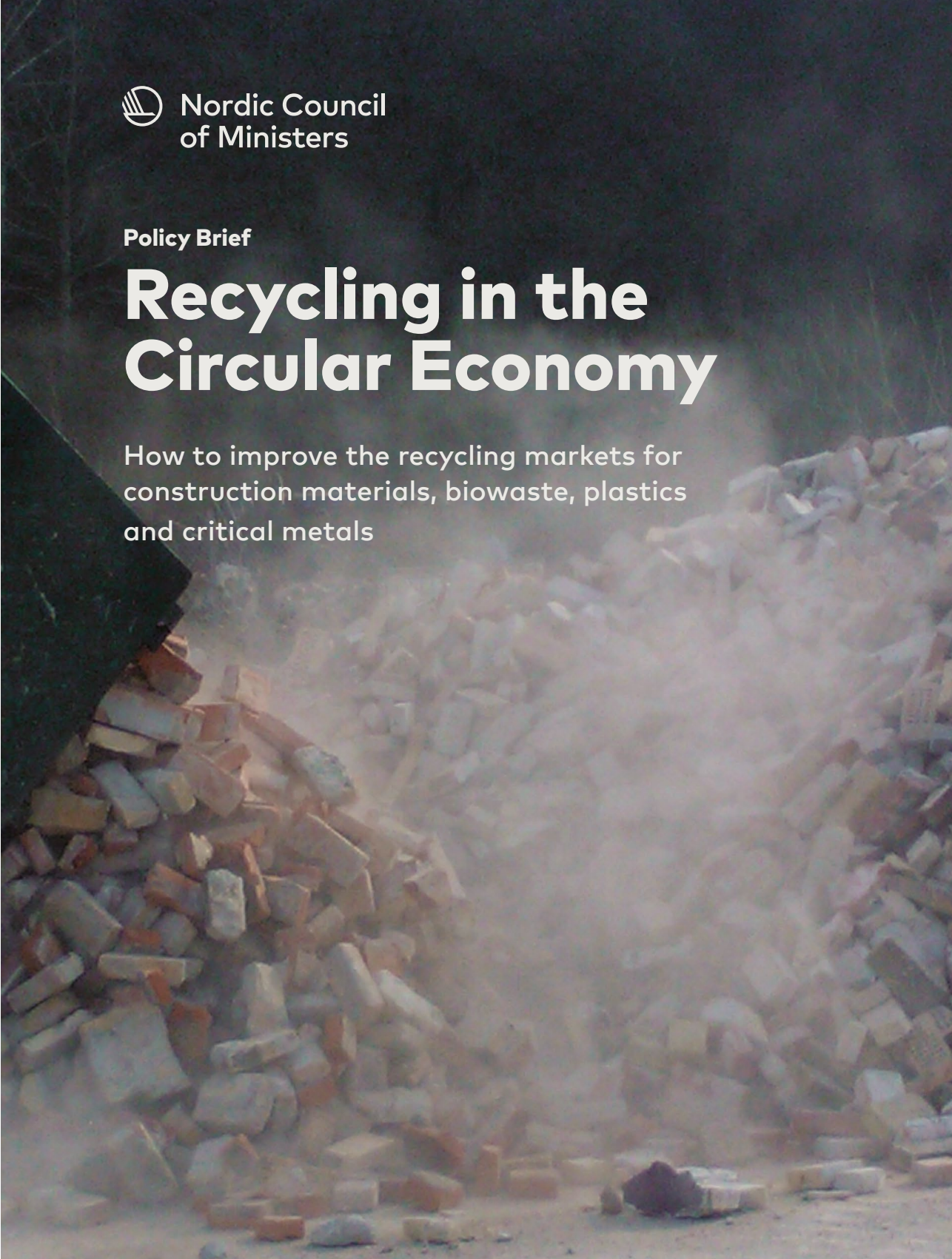
Nordic Council of Ministers

Policy Brief

Recycling in the Circular Economy

How to improve the recycling markets for construction materials, biowaste, plastics and critical metals



Policy Brief: Recycling in the Circular Economy
How to improve the recycling markets for construction materials, biowaste, plastics and critical metals
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CONTENTS


RHOTO: LENA HOLM CHRISTENSEN

PREFACE

In recent years, the Nordic Council of Ministers has focused on how environmental protection can go hand in hand with economic growth. The programme 'The Nordic Region - leading in green growth' is the Nordic Prime Ministers shared initiative under the auspices of the Nordic Council of Ministers.

This has led to a number of reports from the working groups 'Environment and Economy' and 'Nordic Waste' under the Nordic Council of Ministers identifying barriers and opportunities for recycling in the biomass, metals, construction, plastics and textiles sectors. The purpose of this policy brief is to provide a comprehensive overview of the conditions affecting the markets for secondary raw materials, in general and in the Nordic countries.

This Policy brief proposes a number of measures that could be introduced to accelerate the transition to a more circular economy. It is our hope that this can help to spread knowledge of the initiatives and tools that exist in the Nordic region and in Europe for the benefit of the environment.

November 2018

Signe Krarup,
Chairman, the Working Group on Environment and Economy under the Nordic Council of Ministers

ABOUT THIS POLICY BRIEF

This Policy Brief is based on seven reports from the Nordic Council of Ministers, focusing on different aspects of recycling in the Circular Economy (CE). The reports cover the following: construction and demolition material, biowaste, plastic and critical metals. The reports are noted in the literature list along with other sources used. This section briefly summarizes the content of the Policy Brief.

Turning waste into quality secondary raw materials has been on the policy agenda in the Nordic countries since the 80s. Today, the Nordic Region is regarded as a frontrunner, having achieved significant recycling levels for a number of waste streams, such as construction and demolition waste, paper, glass and packaging.

In the European Commission's Action Plan from 2018, the Circular Economy is about maintaining the value of products, materials and resources in the economy for as long as possible. This can be done through better product design, prioritizing renewable resources, using waste as a resource, preserving and extending existing stock, collaboration across the value chain and industrial symbiosis.

Therefore, increased recycling is one of the central pillars of the Circular Economy Package adopted by the EU Commission.

The transition to a circular economy requires well-functioning markets for secondary raw materials. The factors influencing the markets vary. The result, however, is often the same, namely uncompetitive prices. In this case businesses choose virgin material when procuring their raw materials.

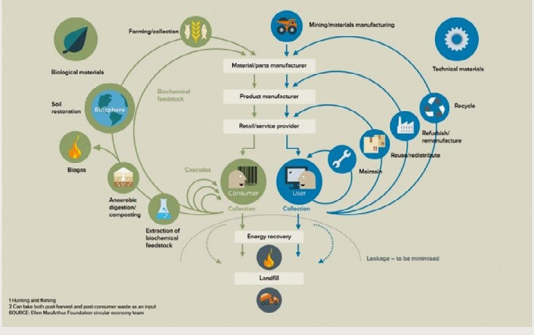
MATERIALS

Each material is described in the section named 'Materials Overview'. It provides selected key information about the material in order to give an overview of some of the differences and similarities between them.

A detailed description of each material, how and where it becomes waste, how it is collected, processed and used, can be found in the fact sheets on the individual materials together with key problems related to recycling of the material and which policy instruments that might be relevant to introduce. Furthermore,

WHAT IS CIRCULAR ECONOMY

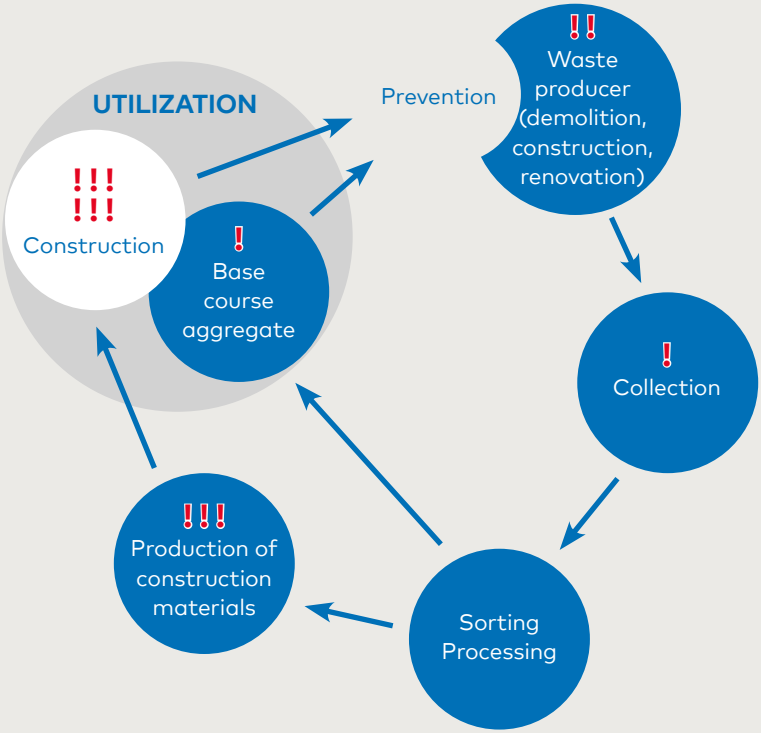
The concept of Circular Economy has been developed by researchers over the last decade. In essence, it represents an alternative to the linear take-make-consume-dispose economic model that prevails in Europe, the US and industrialized countries in Asia. The Ellen MacArthur Foundation (EMF) defines a circular economy as one that is restorative, and one which aims to maintain the utility of products, components and materials and retain their value.



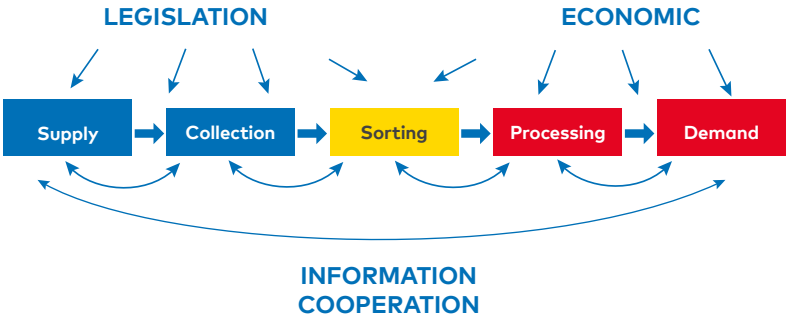
Visualization of the circular economy developed by EMF showing the 'circularity' in the biosphere and the technosphere.

https://www.ellenmacarthurfoundation.org/circular-economy/infographic

MATERIAL FLOW OF CONSTRUCTION MATERIALS



! Barriers reducing or preventing reuse or recycling



each fact sheet has a figure showing the material flow for recycling or reuse. Barriers occur in different parts of the material flow. Each key problem is marked with a red exclamation mark Overleaf, an example is given illustrating the material flow for construction materials.

POLICY INSTRUMENTS

Several of the background reports have identified policy instruments, which could help alleviate the identified key problems. Six of them have been selected for presentation in this Policy Brief:

1. Revision of legislation
2. Task Force for coordination of legislation and help desk
3. Green Public Procurement
4. Economic instruments
5. Funding for Innovation
6. Value chain information & certification

For each policy instrument there is a description of the nature of the mechanism (what is it, and how does it work?), which key problems it addresses and the expected impacts.
The policy options fall into three main categories: legislation, economics and information & cooperation.

The supply (generation of waste) and collection of recyclable materials are 'in place' for most recycling markets due to the mandatory recycling targets and well-functioning collection schemes in the Nordic countries, with the exception of WEEE (critical metals).

Hence, focus is on the barriers related to sorting, processing and the lack of demand.

PROSPECTS FOR THE RECYCLING MARKET

The Circular Economy Package, which is under implementation in the EU countries is helpful in that it sends long-term signals to public authorities, businesses and investors. The Circular

Economy package includes a range of other measures, such as financial support for developing new technologies.

This Policy Brief proposes a number of measures that could be introduced. It is suggested to set up a Task Force that can coordinate and spread the voice of the Nordic countries in clear messages. This Task Force should also gather knowledge about insufficiently integrated or contradictory legislation, in order to illustrate the practical and technical problems that several authorities and businesses are struggling with.

A very strong driver for increased demand for recycling material is through public procurement. A newly published report by the Nordic Council of Ministers presents recent examples on how governments can support recycling and proposes new criteria to be used in order to ensure circular procurement.

Finally, it is suggested that the Nordic countries explore the possibilities for joint development of new technologies for separation of electronic and electrical equipment that contain critical raw materials. It is also proposed to examine the feasibility of joint investment in recycling infrastructure targeting this difficult waste stream.

PHOTO: LENA HOLM CHRISTENSEN

INTRODUCTION

Turning waste into quality secondary raw materials has been on the policy agenda in the Nordic countries since the 80s. Today, the Nordic Region is regarded as a frontrunner, having achieved significant recycling levels for a number of waste streams, such as construction and demolition waste, paper, glass and packaging.

Other European countries also report increasing recycling rates for a number of waste streams, such as household and packaging waste, prompted by legally binding recycling targets and lack of sufficient treatment capacity.

Data reported by EU countries, however, often includes rejects from sorting and processing. Hence, the figures reflect the amount of waste collected rather than the actual level of recycling.

In addition, the data includes all forms of material recovery, and does not provide information on the quality of the recycling. In practice, only a limited number of materials (e.g. metals and glass) can currently be recycled without a loss of quality. A major obstacle in this respect is material mixes and additives that cannot be separated, together with contamination by hazardous chemical properties.

The challenges lying ahead are thus how to increase recycling of valuable resources in the waste stream while at the same time ensuring the delivery of high quality secondary raw materials to the European industry.

CIRCULAR ECONOMY IN EUROPE

The present linear 'take-make-consume-dispose' approach exerts great pressure on the environment while also reducing opportunities for increasing the competitiveness of several sectors of European industry.

In the European Commission's Action Plan, the Circular Economy is about maintaining the value of products, materials and resources in the economy for as long as possible. This can be done through better product design, prioritizing renewable resources, using waste as a resource, preserving and extending what's already made, collaboration across the value chain and industrial symbiosis.

Therefore, increased recycling is one of the central pillars of the Circular Economy Package adopted by the EU Commission. The package intends to stimulate Europe's transition towards a Circular Economy by providing the right framework conditions for the transition and encouraging investment in this direction. The 54 concrete actions address the full life cycle of products, including turning waste into quality secondary materials. The following materials are in focus: plastics, food waste, critical raw materials, construction and demolition waste, biomass and bio-based products.

GLOBAL ASPECTS

Circular Economy has a clear global dimension: materials, products, services and environmental impacts are transboundary and cooperation on a global level is needed in order to address these issues.

Its practical applications to modern economic systems are being developed and implemented around the world by forward-looking governments, business associations, think tanks and international organizations such as World Economic Forum and UN Environment Programme.

WHAT ARE THE BENEFITS?

It is broadly acknowledged that a circular economy approach could provide significant cost savings for various industries. Only a few analyses quantifying the actual economic benefit have been carried out. For example, a study[1] on the expected impact on the Danish economy estimates the annual net benefit.

European manufacturing industry is very reliant on a stable supply of resources. Decreased dependency on imports of strategic resources including critical raw materials was the main objective of the Raw Materials Initiative adopted in 2008.

THE ROLE OF RECYCLING IN A CIRCULAR ECONOMY

One of the central pillars of the circular economy is feeding materials back into the economy, thereby capturing the value of the materials. This is done through organized collection of waste material

[1] Potential for Denmark as a circular economy. A case study from: Delivering the circular economy – a toolkit for policy makers, Ellen MacArthur Foundation

generated by industry and households, and processed into secondary raw materials. Today, most EU countries have a well-functioning waste management system run by local governments and private businesses. Recycling rates are rising mainly due to legally binding targets. Through this context, the EU's waste policies already contribute to the development of the circular economy.

In December 2017, a new Waste Framework Directive setting ambitious targets for the collection and recycling of household waste, was approved by the EU Council and the Parliament. All EU countries have to comply with the requirements in the revised directive, including a common EU target for recycling 65% of municipal waste and 75% of packaging waste by 2030.

WEAK MARKETS FOR SECONDARY RAW MATERIALS

Even at current recycling levels about 25% of the secondary raw materials generated in Europe are being exported at the present time, primarily to China. Thus, Europe is dependent on the export market to allocate the secondary raw materials it produces. This shows the weakness of the markets for secondary raw materials, which has been emphasized by Chinas ban in 2017 on importing plastic waste. Despite all the effort put into the waste and resource sector, by local governments and private businesses, to improve the quantity and quality of recycling, there is still a long way to go.

The transition to a circular economy requires well-functioning markets for secondary raw materials. The factors influencing the markets vary. The result, however, is often the same, namely uncompetitive prices. In this case, businesses choose virgin material when procuring raw materials. And because the business cycles of virgin and secondary raw materials are so different, there are no easy solutions.

Therefore, more information on the specifics of each market is necessary in order to design policies that could help create better market conditions for recycling. In doing so, the focus should be on the institutional barriers and measures available to decision-makers at the policy level with a view to supporting the development of strong markets that are viable in the longer term.

PHOTO: LENA HOLM CHRISTENSEN

MATERIALS

The purpose of this section is to provide information about the materials in question.

Key characteristics of the materials are presented in schematic form in the "Materials overview". The characteristics "amount", "value" and "CO_2 reduction" are relevant in relation to the potential economic gains and environmental benefits of increased reuse or recycling of the material. There will only be a large CO_2 reduction when the material in question causes a large CO_2 emission for production of the virgin material. Therefore a large CO_2 reduction is shown as chimneys which are avoided: Many chimneys means large CO_2 reduction per tonne of material. The characteristics "toxic" and "issues with bacterial growth" are important obstacles for reuse and recycling of some materials. The key characteristics are illustrated in the table below.

Subject	Low			High
Amount				
Value				
CO_2 reduction				
Toxic				
Issues with bacterial growth				

FACT SHEETS

A more detailed description of each material (construction materials, bio waste, plastic waste and critical metals), how and where it is produced, collected, processed and used, and which key problems are connected to the material, can be found in the fact sheets on the individual materials.

Each fact sheet has a figure showing the material flow for recycling or reusing the material in question.

Barriers occur in different parts of the material flow. They are marked with a red exclamation mark **!** When possible, it is indicated in the end of the description of each barrier which of the following policy Instruments could be considered in order to alleviate the barrier.

1. Revision of legislation
2. Task Force for coordination of legislation and help desk
3. Procurement
4. Economic instruments
5. Funding for innovation
6. Value chain information & certification

Detailed descriptions can be found in "Policy Instruments" page 38.

COLLECTION CONCEPTS

The fact sheets refer to different collection concepts which are explained below:

Deposit and refund
A premium is paid when the product is purchased and paid back when the product (or packaging) is delivered back. This is very common for beverage bottles, but is also used for larger commercial packaging like pallets, big bags and different types of containers. Deposit and refund schemes usually achieve very high recovery and recycling rates. They are, however, only suited to items of large quantity and uniformity because administration cost will otherwise be too high.

Extended producer responsibility (EPR)
The producers or importers of groups of products pay a fee for the merchandise they put on the market. This fee is intended to finance the collection and processing of that group of products. There are EPR schemes for electronic waste in all the Nordic countries, and for packaging in Sweden, Norway and Finland. Collection itself can both take place at the source and be centralized.

Collection at the source
The waste is collected at the address where it is produced. Both for households and for businesses the tendency goes towards collecting more waste fractions at the source, because it increases the collection rates.

Centralized collection
Through centralized collection, the waste producer brings the waste to a collection point – typically a recycling station.

MATERIALS OVERVIEW

Some key characteristics are presented in tables for each material below – in order to provide a quick overview.

CONSTRUCTION MATERIALS

	20-30m tons collected 65-85% of estimated total amount
	Crushed concrete: 5-10 €/ton Iron: 100-150 €/ton
	0,2-2,4 ton CO2e/ton waste – Concrete: 0,8 CO2e/ton
	1. Large amounts – no unwanted substances 2. Smaller amounts – very problematic substances e.g. PCB
	No hygiene issues

BIOWASTE

	4-5m tons collected 25%-50% of estimated total amount
	Lost value: 1600 €/ton Bio-pulp value:10-15 €/ton
	0,5 ton CO2e avoided per ton biowaste – if recycling and recovery is maximized
	1. Without packaging – mostly no issue 2. With packaging – plastic particles can be an issue
	Severe hygiene issues Must be collected often, or kept in airtight containers or cooled

PLASTIC WASTE

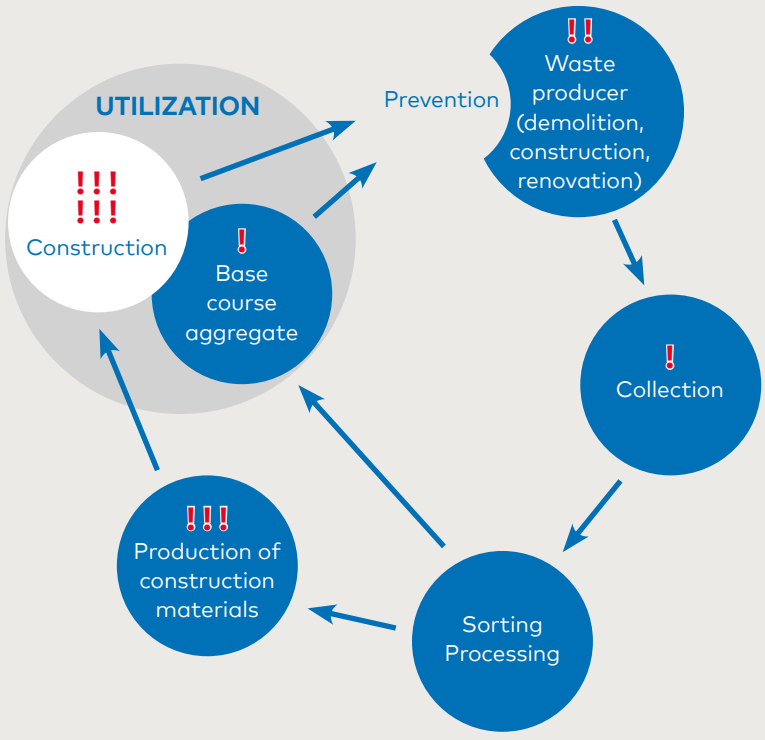
	900.000 tons collected 10-20% of estimated total amount
	Recycled plastic: large variation
	No single value. Depending very much on transport, amounts of rejects
	1. Large amounts e.g. PET[2] no issue 2. Additives can make recycling difficult 3. It is forbidden to recycle plastic containing brominated flame retardants
	Large amounts – no hygiene issue Used packaging for food – severe issue

CRITICAL METALS

	Gold in WEEE 40 tons ELV 5.000 tons (Manganese, Magnesium, Molybdenum) Lamps: 30 tons (Yttrium and Lanthanum) 15–25% of WEEE collected – amount of critical metals unknown
	Gold: 35.000.000 €/ton
	Gold: 12.500 ton CO2e/ton
	1. Large amounts – no issue 2. Lamps – issues with mercury and gallium arsenide
	No hygiene issue

[2] Polyetylentereftalat

MATERIAL FLOW FOR CONSTRUCTION WASTE



! Barriers reducing or preventing reuse or recycling

CONSTRUCTIONS MATERIALS

Materials from buildings and other constructions (e.g. roads, bridges, harbours). This group of materials is very diverse and covers concrete, metals, bricks and tiles, wood and plastics. Some materials are hazardous like lead, asbestos and PCB.

WASTE PREVENTION

Increasing lifespan of buildings (refurbishment instead of demolition)[3], supply chain management comprising improved handling and storage at the construction site[4].

WASTE PRODUCERS

Demolition: Materials have been in use – often for a long time – sometimes centuries. Risk of hazardous substances – content of materials often not known. Investigation of hazardous substances should be carried out before demolition. Deconstruction (disassembly) and sorting at the site is necessary in order to use the materials as resources.

Construction: Surplus materials, cut-offs and damaged materials. Content of materials are mostly well-known.

Renovation/refurbishment: Involves both demolition and construction

! Content of hazardous substances

[Policy Instrument: 1 Legislation: Requirement for waste and demolition plans. Requirements for registration of materials used in new buildings]

! Separation of some materials is time consuming and therefore costly

[Policy instrument 1 Legislation – demand for design for disassembly]

COLLECTION

At the source: From large projects, where there will often be several containers of each fraction, the waste is collected directly from the building/demolition site.

Central: Small renovation projects and building waste from households are collected at recycling stations.

[3] Potential for Denmark as a circular economy. A case study from; Delivering the circular economy – a toolkit for policy makers, Ellen McArthur Foundation
[4] Affaldsforebyggelse i byggeriet, Miljø- og Fødevareministeriet Miljøstyrelsen 2017

! **Large transportation and storage costs**
[Policy Instruments: 4 Economic Instruments; 6 Value chain cooperation – minimizing transport and storage]

SORTING AND PROCESSING
Many materials will be subject to further sorting by the recycler. In some cases the recycler will also carry out some processing, for instance crushing of concrete. In smaller projects, the waste can be collected un-sorted and then sorted by the recycler[5].

PRODUCTION OF CONSTRUCTION MATERIALS
The processes to produce new building materials will differ for the different materials. In general the market for reuse is still immature, but there are some examples of utilization of recycled materials: glass used for insulation material, stone wool and other materials for new stone wool, wood for chipboard. There is a mature and well-functioning market for metals[5].

! **Lack of market pull**
[Policy Instruments: 1 Legislation: quota on use of recycled materials in new buildings; 4 Economic instruments; 6 Certification – no hazardous substances, technical performance, durability, documentation for content of recycled material, environmental performance]

! **Lack of quality assurance**
[Policy Instruments: 6 Value chain cooperation and certification]

! **Price competition from new materials from low income countries**
[Policy Instruments: 4 Economic instruments]

UTILIZATION
Base course aggregates (Gravel)

This is probably the largest single use of construction waste. There is a well-functioning market, which can take delivery of very large amounts of material.

! **Substitution of gravel is considered down-cycling because material value is lost**
[Policy Instruments: 1 Legislation – more focus on material value and environmental effect and not only weight]

Construction
In the construction phase it is both possible to utilize recycled and reused materials, as well as influence the possibility to reuse and recycle materials and maintain material value in the future, by selecting products which are designed for dismantling and are without hazardous substances. Some materials comprising recycled resources are used just as any other

[5] Affaldsforebyggelse i byggeriet, Miljø og Fødevareministeriet Miljøstyrelsen 2017, Miljøprojekt nr. 1919.

material, for example glass and stone wool. For other materials for instance reused bricks, sourcing models and workflows need to be adapted.

! **There is not sufficient documentation of quality and content of recycled materials available**
[Policy Instruments: 1 Legislation; 3 Procurement; 6 Certification]

! **Insufficient traceability**
[Policy Instruments: 1 Legislation; 6 Value chain and certification]

! **Adaptation of sourcing models and workflows**
[Policy Instruments: 5 funding for Innovation]

! **Lack of market pull for design for disassembly, documentation of materials, avoidance of hazardous substances etc.**
[Policy Instruments: 1 Legislation; 3 Procurement; 6 Certification]

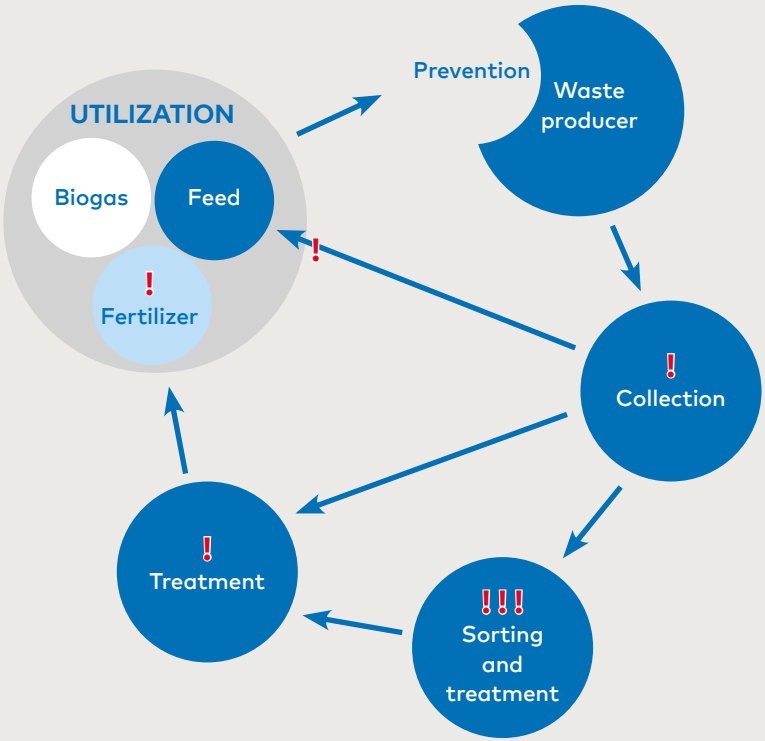
! **Lack of design for recycling**
[Policy Instruments: 3 Procurement; 6 Certification]

! **Public procurement often only focuses on price and not sustainability**
[Policy Instruments: 1 Legislation; 3 Procurement; 4 Economic instruments; 6 Certification]

WHOLE VALUE CHAIN

! **Focus on weight and not on maintaining material value or environmental effects**
[Policy Instruments: 1 Legislation]

MATERIAL FLOW FOR BIO WASTE



! Barriers reducing or preventing reuse or recycling

BIO WASTE

also referred to as organic waste

Food waste and other easily biodegradable products from primary production, food production, restaurants, retail, businesses and households. Different types of industrial biowaste e.g. from pharma and enzyme production.

WASTE PREVENTION
Value chain optimization (e.g. using knowledge of consumer behavior to avoid procuring of large or excess amounts), reducing consumer prices before sell-by date, donation, increased focus on reducing food waste and new routines in professional kitchens.

WASTE PRODUCERS
Primary food production and food industries – large uniform amounts – no packaging.

Restaurants and other professional kitchens: mostly no packaging.

Retail: often with packaging.

Households and non-food businesses: Often in plastic bags and risk of sorting mishaps.

COLLECTION
Collection system must either prevent deterioration or collection must be frequent.

Industries, large restaurants and retail with large amounts: Markets are starting to function well. Incentives seem to be sufficient.

Collection from households is increasing. It has been a municipal decision, but Norway has decided to make separate collection of biowaste mandatory, and it may be part of a coming EU directive.

! **Higher collection cost when amounts are small (households, small restaurants and retail), especially in thinly populated areas**
[PI 4 Economic instruments]

SORTING AND TREATMENT
Packaging and plastic bags are mechanically separated from the biowaste which is pulped simultaneously. Subsequently, the waste is converted to biogas, separately or with manure. Biowaste without packaging or plastic bags (see Waste Producers) goes directly to treatment.

! **Unclear legislation for environmental permit for treatment plants, causing delays and insecurity about the investment**
[Policy Instruments: 1 Legislation; Policy Instruments: Task Force]

! **Uncertainty of sufficient supply makes return of investments in treatment plants uncertain**
[Policy Instruments: 6 Value chain cooperation – e.g. new models for tender of waste]

! **Institutional barriers, unclear and diverse enforcement by transportation across borders**
[Policy Instruments: 2 Task Force]

UTILIZATION

FEED: Primarily waste of plant origin can be used as feed. Feed is generally considered a more valuable utilization than biogas and fertilizer.

! **Complex legislation makes biogas an easier option than feed. Especially a problem for smaller companies for whom the amounts are too small to justify the cost for experts to clarify the regulation**
[Policy Instruments: 2 Task Force]

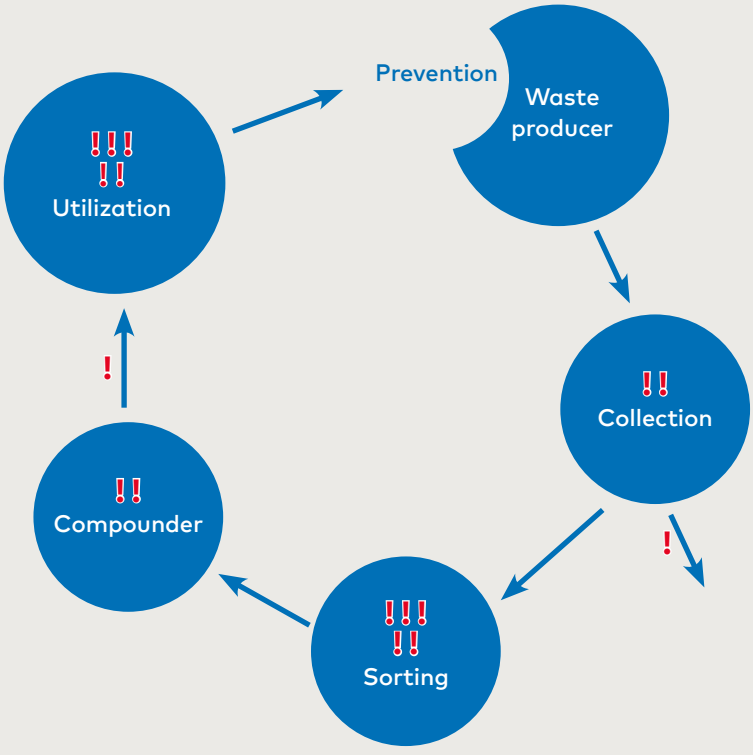
FERTILIZER: Mostly the residue from biogas process, which contains the plant nutrients from the biowaste, but some products are used directly as fertilizer.

! **Complicated legislation and differentiated enforcement for fertilizers which are not "pre-approved" (e.g. on a positive list in the legislation about using waste as fertilizer), which must be separately approved. It is complex and difficult if not impossible to have new biowaste materials pre-approved**
[Policy Instruments: 2 Task Force]

BIOGAS: Most types of biowaste can be converted to biogas. Mostly used for production of electricity and heat, but it can also be upgraded to the specifications of natural gas (methane).

PHOTO: UNSPLASH.COM

MATERIAL FLOW FOR PLASTIC WASTE



! Barrier reducing or preventing recycling or reuse

PLASTICS

Plastic waste derives from several very diverse waste producers (e.g. municipal, industry, agriculture etc.), and 'plastic' is the umbrella term for many chemical polymers (e.g. PP, PE, PET etc.) Most types are thermoplastic, and can be melted and reused, however there are also thermosetting plastics, which cannot be reused in this way. PET is currently the only plastic type which can be recycled almost endlessly without decreasing quality.

WASTE PREVENTION
Increasing lifespan of products comprising plastic (e.g WEEE, home appliances), Reusing packaging (e.g. Arla boxes, big bags)

WASTE PRODUCERS
Plastic producers: in-house recycling.

Commercial: large amounts of relatively uniform packaging materials, tubes and pipes from construction and demolition.

Commercial and households: WEEE, End of Life Vehicles (ELV), and a wide variety of consumer products: Plastic mixed with other materials. Some plastics contain brominated flame retardants which are toxic.

Households: Packaging – often not clean and consumer products e.g. garden furniture, toys etc.

COLLECTION
At the source: Large amounts of uniform plastic from commercial waste producers and increasing collection at the source from households sometimes with other materials e.g. metal.

Centralized: Plastic collection at recycling stations – sometimes in several polymers.

Deposit and refund: Uniform items in large numbers e.g. beverage bottles. Provides recycling rates at 85-95%.

Producer responsibility schemes: Plastic packaging (except DK) and WEEE.

! **Higher collection cost when amounts are small. Hard plastic is very voluminous before shredding – high transportation cost per ton**
[Policy Instruments: 4 Economic; Policy Instruments: ; 6 Value chain – shredding earlier]

! **Low collection rates for WEEE**

! **Export without documentation for recycling rate**
[Policy Instruments: 1 Legislation; Policy Instruments: 2 Task Force]

SORTING

Sorting of mixed plastic in different polymers and discarding composites (when several plastic types cannot be separated). Mostly a combination of automatic and manual sorting.

! **Sorting in Europe is usually at a higher cost than incineration**
[Policy Instruments: 4 Economic instruments]

! **Lack of capacity – lack of certainty of supply of sufficient amounts to invest**
[Policy Instruments: 6 Value chain cooperation]

! **Insecurity about demand for plastic fractions, especially from households, no market for multilayer plastics and mixed polymers**
[Policy Instruments: 6 Value chain cooperation]

! **Technological difficulties sorting black plastic [PI 5 Funding for innovation (finding methods for sorting black plastic)**
[Policy Instruments: 6 Value chain cooperation – avoiding black plastic]

! **Some products (WEEE and end of life vehicles ELV) are usually shredded, producing a mix that is difficult to sort, and where some of the plastic contains hazardous substances**
[Policy Instruments: 4 Economic instruments – increase possibilities for manual dismantling; 5 Funding for Innovation]

COMPOUNDER

The compounder transforms the recycled plastic into granulates, which are then readily workable for the plastic producer.

! **Need for new investments and technologies to use plastics from municipal solid waste (MSW)**
[Policy Instruments: 5 Funding for innovation; 6 Value chain cooperation – collection, sorting, compounder]

! **Competition with low prices on virgin plastic due to low oil prices**
[Policy Instruments: 4 Economic instruments]

! **Disconnect between supply and demand sides – supply experience insufficient demand and demand experience insufficient supply**
[Policy Instruments: 6 Value chain cooperation]

UTILIZATION

Utilization covers both production of plastic items, and the companies that purchase plastic items, either as packaging for their products or as part of their products.

! **Need for security of supply of very specific polymer types**
[Policy Instruments: 6 Value chain cooperation and Certification]

! **Large cost for development of new recipes for recycled plastic**
[Policy Instruments: 4 Economic instruments; 5 Funding for innovation]

! **Easier to define virgin plastic quality**
[Policy Instruments: 5 Funding for innovation; Policy Instruments: 6 Certification]

! **Lack of design for recycling**
[Policy Instruments: 3 Procurement; 6 Certification]

! **Public procurement often only focuses on price, not sustainability**
[Policy Instruments: 1 Legislation; 3 Procurement; 4 Economic instruments; 6 Certification]

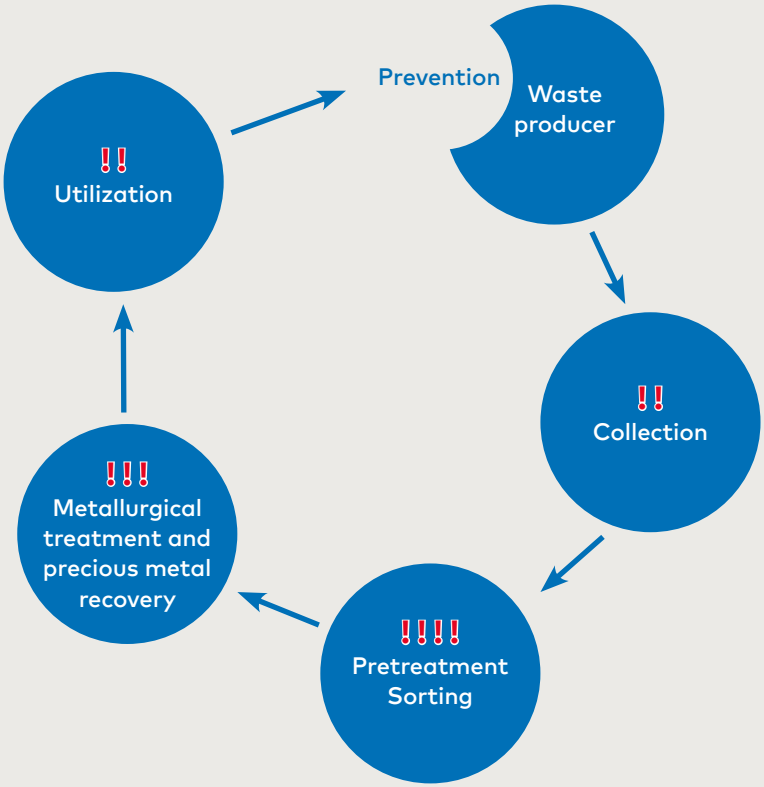
WHOLE VALUE CHAIN

! **Large demand for traceability, but it is difficult to establish**
[Policy Instruments: 5 Funding for innovation; 6 Value chain cooperation]

! **Plastic from MSW is particularly difficult to recycle. Costs for recycling are higher than incineration**
[Policy Instruments: 4 Economic instruments; 5 Funding for innovation; 6 Value chain cooperation]

! **Design for disassembly is not necessary enough to ensure that disassembly takes place. Development of waste management systems needed**
[Policy Instruments: 4 Economic instruments; 6 Value chain cooperation]

MATERIAL FLOW FOR CRITICAL METALS



! Barrier reducing or preventing recycling or reuse

CRITICAL METALS

Critical metals are also referred to as Critical Raw Materials CRM. Metals are characterized as critical when their supply rates are low compared with increasing demand. Other aspects of this "criticality" include the metals' low dispersity around the world, low recycling rates and substitution potential as well as their importance for specific applications such as military equipment and hi-tech products. Gold, lithium and platinum are some of the more well-known of over 20 critical metals. Critical metals are embedded in a wide range of products covering electronic devices, vehicles, wind mills, solar cells etc. Generally they occur in very low concentrations in the products they are applied to – and the products are very complex.

WASTE PREVENTION
Increasing lifespan of products – e.g. there are companies which specialize in refurbishing used computers, and new business models for cell-phones, generating business out of keeping phones in use instead of encouraging consumers to buy new products as often as possible.

WASTE PRODUCERS
Both households and companies.

COLLECTION
The collection is primarily central at recycling stations, however many municipalities maintain collection of batteries and small household appliances at the source. Electronics are covered by expanded producer responsibility (EPR) schemes.

! Low collection rates for WEEE and lamps

! Small appliances and batteries end up in residual waste

PRE-TREATMENT AND SORTING
CRM-containing products are mostly subject to a series of pre-treatment steps including manual sorting, shredding, air sorting, magnetic sorting, eddy current sorting and optical sorting. This results in a number of fractions – principally glass, plastics, ferrous metals and aluminum.

! Difficult to know the most valuable recycling. This makes low cost options attractive, which leads to less valuable utilization than might be possible
[Policy Instrument: 5 Funding for innovation – providing systems which can help analyze the most profitable recycling route]

! **Manual dismantling, which is a prerequisite for optimal recycling, is costly**
[Policy Instrument: 4 Economic instruments]

! **Machinery cannot detect CRM and loss of CRM to other fractions**
[Policy Instrument: 5 Funding for innovation]

! **Toxic substances in light sources pose a potential occupational hazard**
[Policy Instrument: 5 Funding for innovation – finding ways to handle hazardous substances without risk]

METALLURGICAL TREATMENT

Several steps of metallurgical treatment (Kaldo plant, converter aisle, anode refining) serve to remove lead, copper and nickel. The remaining metallic mix is then fed to the "precious metals refinery".

! **The processes cannot target a wide range of metals**
[Policy Instrument: 5 Funding for Innovation]

! **Loss of CRMs to other metals**
[Policy Instrument: 5 Funding for Innovation]

! **Few plants in Europe, however economy of scale is necessary – a plant will need scrap from several countries**

UTILIZATION

At least some metals can replace virgin materials in new products.

! **Lack of design for recycling**
[Policy Instrument: 3 Procurement; 5 Funding for Innovation; 6 Value chain cooperation and Certification]

! **The products are very complex with rapidly changing composition and design. Therefore efficient communication along the value chain, about CRM content in components is needed, but there are no well tested systems available**
[Policy Instrument: 3 Procurement; 5 Funding for Innovation; 6 Value chain cooperation and Certification – that products contain necessary information for the recycler]

WHOLE VALUE CHAIN

! **EU targets lead to focus on large amounts instead of e.g. environmental effect and potential economic value**
[Policy Instrument: 1 Legislation]

! **Low cost of incineration and landfill makes it difficult to achieve good business cases**
[Policy Instrument: 4 Economic instruments]

PHOTO: COLOURBOX.COM

POLICY INSTRUMENTS

Six policy instruments and tools have been selected for presentation in this Policy Brief.

The background reports contain detailed descriptions of the instruments and tools that could reduce or remove the barriers to increased recycling.

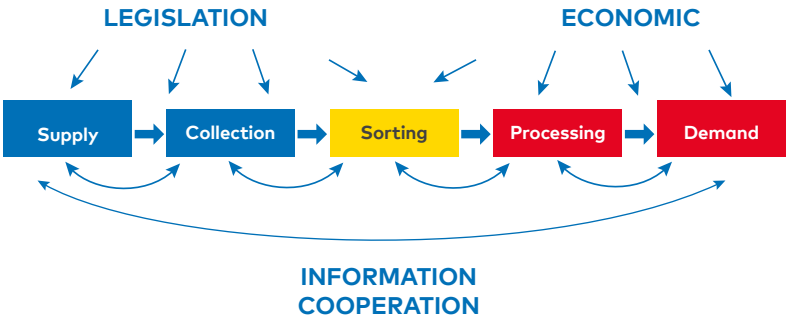
Each of these policies were assessed for their potential effects in addressing the hotspots identified in the analyses. It should be stressed, however, that they are not detailed policy descriptions.

To prepare a robust basis for policy recommendations, consultations were carried out with actors in the value chains to better identify and understand the barriers.

A lack of demand for recycled material was found to be one of the most significant problems. This can be further divided into lack of demand from producers and manufacturers of products because of quality concern, uncompetitive price of recycled compared to virgin material and uncertainty regarding timely supply. Most of the materials examined in this project (metals, bio-waste, construction materials and metals) are destined for the business-to-business markets.

The main research questions guiding the analysis were thus addressing the 'demand side' of the recycling chain:

- How could the recycling industry ensure a safe and standardized quality of recycled material that meets the demand of the manufacturer?



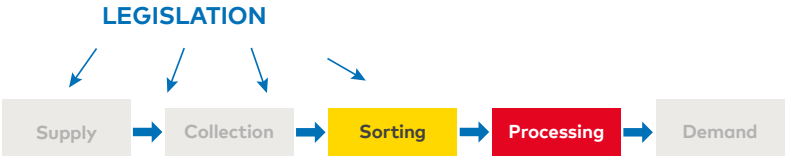
- What policy instruments could strengthen demand for recycled material?

Since the supply side (generation of waste) and collection of recyclable materials are 'in place' for most recycling markets, focus has been on how to enhance the demand.

The selection of policy instruments and tools was guided by the need for new policy initiatives to support the demand side.

It must be underlined that there are additional technical problems that relate to the quality of the material for recycling, the quality of the material after recycling and the quantities of material entering and exiting the recycling system. Much of this is dependent on the development of the technologies for more effective sorting and recycling, but also on the provisions of necessary logistics to collect the material from source. These problems are chicken/egg in nature: the market needs the technology innovation but the technology innovation needs the market.

REVISION OF LEGISLATION



Legislation is a description of the basic rules for a society including what to do and not to do. The goal of an environmental regulation is, for example, to protect both citizens and nature by setting binding standards for water and air quality, limits for industrial emissions and so forth.

In 2017 the European Commission approved a package for circular economy which includes revisions of a number of directives to support the wanted transition towards circular economy.

KEY PROBLEMS

- Existing binding recycling targets refer to quantitative goals which is detached from the environmental performance and economic impacts. The WEEE legislation currently addresses it as a uniform waste stream leaving no incentive for separate extraction of critical and rare earth metals.
- Regulation lacks instruments that reward higher quality waste treatment inclusive of promotion of Design for Recycling e.g. in the existing Extended Producer Responsibility (EPR) Scheme.
- Regulation lacks, in general, resource efficiency criteria and qualitative aspects of recycling (differentiating between high or low environmental and economic benefits).
- Regulatory requirements pose recycling obstacles through administrative complications or bans.

EXPECTED IMPACT

Introducing qualitative goals and resource efficiency criteria could provide an incentive for increased separate extraction/collection of recycled materials with high environmental and economic benefit as well as the development of new and more efficient technologies.

Structuring EPR schemes so that they promote and/or reward Design for Recycling can help the whole value chain to convert towards increased resource efficiency and closing of material loops.

Removal of unintended regulatory obstacles can facilitate utilization of secondary raw materials.

TRENDS
Increased focus on:

- Waste prevention (need to decouple environmental impacts from waste generation)
- Resource efficiency (resource efficiency targets for the performance of waste treatment facilities)
- Re-use, re-manufacturing and repair
- Circular business models (leasing, take-back/deposit schemes, sharing models etc.)
- EU recycling infrastructure

EXAMPLES FROM THE REPORTS

Report: Nordic plastic value chains
Regulators should implement a higher-cost, higher-quality treatment regime for WEEE and plastics rewarding higher-quality waste treatment more than punish low quality practice.

Extended Producer Responsibility (EPR) Schemes should be structured so as to promote Design for Recycling.

Report: Circular economy in the Nordic construction sector
Support the principles of circular economy e.g. minimum requirements or quotas for reuse/recycling of building materials from renovation/demolition in building regulation, use of products without hazardous substances, focus on design for disassembly, repair and maintenance.

New public regulatory policy instrument to improve the responsibility of contractors to sort recyclable resources and reusable building products. Could be

EXAMPLE OF LEGISLATION WITH RECYCLING TARGET

EU Battery Directive
Recycling processes shall achieve minimum recycling efficiency targets (Annex III, part B)

PHOTO: UNSPLASH.COM

entered into the Environmental Code or the Waste Ordinance.

New green criteria with focus on increased quality of recycling, increased use of building products with recycled resources and increased reuse of building products in building regulation.

Resource efficiency criteria for renovation and construction, minimum level for criteria could be national, obligatory and set quite low.

Requirements for the technical performance and quality of reused and recycled products (a declaration of technical performance incorporated into building regulations).

Screening (and mapping) of the building materials incorporated into the national building and waste legislation.

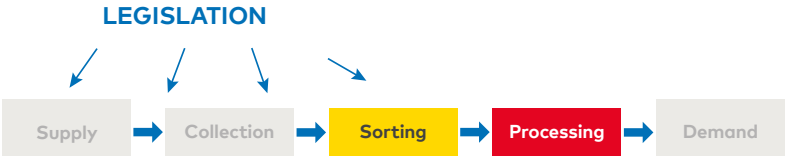
Report: Critical metals in discarded electronics
Provide incentives for critical metals-rich product groups collection.

New policy measures that address the qualitative aspects of recycling (differentiating between materials with high or low environmental and economic benefits).

Report: Plastic waste markets
Ban on incineration of plastic waste – would force collectors to collect plastic separately from other wastes and divert into alternative treatment facilities.

PHOTO: UNSPLASH.COM

TASK FORCE



Sometimes regulatory barriers derive not only from the specific content of legislation, but also from the complexity and administrative burdens of multiple legislations. Only a few of these barriers can be directly addressed by single national agencies acting alone, and even in those cases, cooperation with other agencies is expected to provide better results.

The Nordic countries are known to have a tradition for cross-sectoral collaboration. Environmental authorities at national and local levels often work together with other bodies, for instance within the health sector on a day-to-day basis. In other cases, a more formalized setting is required. This could take the form of a Task Force.

WHAT IS A TASK FORCE?
A temporary group of people who are brought together to do a particular job, or to solve a problem that requires a multi-disciplinary approach. Often members come from established organizations, such as ministries.

KEY PROBLEM
To utilize waste, actors have to comply with existing legislation, and this presents two immediate barriers to utilization:

- Actors need to be aware of, comply with and administer several overlapping policy domains
- These policy domains are insufficiently flexible to facilitate the better use of waste

The formal barriers identified comprise regulation (from EU to national level), demands from authorities, business standards and certification schemes.

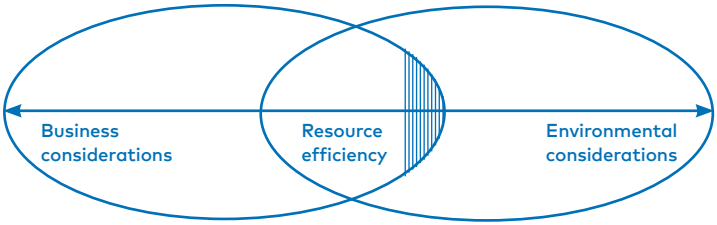


Illustration from the study. The project defined ressource efficiency as the overlap between business considerations and environmental considerations. If the economic incentives are small (marked area), even small obstacles can prevent implementation of possibilites to increase ressource efficiency.

A study from 2015 shows that relatively small obstacles can prevent initiatives for increased resource efficiency (including recycling), if the economic incentive is small, meaning that e.g. insecurity about interpretation of legislation or administrative burdens can hinder recycling.

PROPOSAL

One way to organize this effort could be to set up a TASK FORCE with representatives from relevant agencies, industry organizations and local governments. Such a Task Force could function as the focal point for identifying the most relevant topics for further work and for disseminating information and clarification on policy implementation.

In the longer term, the Task Force could also gather knowledge about insufficiently integrated or contradictory EU regulation, and use this knowledge to influence future EU policy making. The Task Force could also provide valuable knowledge with the goal of influencing EU regulation in the waste area. Finally, such a Task Force could act as the 'entry point' to all actors, alleviating some of the problems with unclear and complex legislation.

EXAMPLE FROM DENMARK

Task Force for increased resource efficiency: Waste definitions, waste hierarchy: End- of-Waste criteria, import and export of waste, The Danish Energy Protection Agency, The Danish Business Authority

Biogas Task Force, The Danish Energy Agency

EXAMPLES FROM THE REPORTS

Report: Barriers for utilization of Biowaste

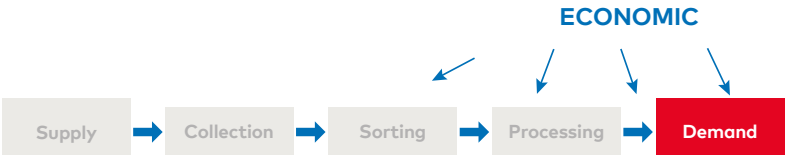
Unclear and complex legislation
"In order to run even the smallest facilities we must handle 15 regulations – on a daily basis. Many [of the regulatory] things are not fit for biowaste and recycling. The Waste Regulation is the point of departure, but that regulation is based on landfilling and incineration and the Sludge Act is based on sludge. We are a `side track´ that does not fit anywhere (...) Are we a waste treatment facility or a biogas plant?" (From interview with the plant manager of a biogas plant).

Some companies experience difficulties in getting adequate help and guidance from the authorities in relation to understanding and interpreting the regulation and case processing procedures correctly (Interview with food processing company).

Multiple reporting and documentation systems
The reporting and monitoring requirements during operation are not seen as an excessive burden. However, the different monitoring programmes contain largely the same information and recently a third reporting programme has been introduced. This creates an unnecessary work load (biogas plant). Likewise companies handling by-products experience the multiple requirements for documentation as unnecessary administrative burdens (retail/supermarket), as do companies exporting biowaste to nearby, but cross-border treatment facilities (waste industry association).

PHOTO: UNSPLASH.COM

GREEN PUBLIC PROCUREMENT



Public Procurement is widely recognized to be a key driver in the transition towards a circular economy. The impact could be significant as it is worth around 1,3 trillion euro in the EU, around 16% of GDP[6].

WHAT IS PUBLIC PROCUREMENT?
According to the EU Commission "Public procurement refers to the process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies".

EU law sets out minimum harmonized public procurement rules, which the Member States are obliged to transpose into national law. These rules organize the way public authorities and certain public utility operators purchase goods, works and services.

GREEN PUBLIC PROCUREMENT (GPP)
Member States can implement more strict requirements. The Nordic countries have a long tradition for using environmental criteria for selected product groups and services.

Circular public procurement is an approach to greening procurement which recognizes the role that public authorities can play in supporting the transition towards a circular economy.

Circular procurement can be defined as the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimizing, and in the best case avoiding, negative environmental impacts and waste creation across their whole life-cycle.

[6] http://ec.europa.eu/trade/policy/accessing-markets/public-procurement/

By setting specific requirements e.g. on the content of secondary raw materials in a product or a building, national and local governments can help develop the market for recycled materials.

This is typically implemented through product category reference documents, which lay out procurement criteria for GPP within a given product category.

Some countries are in the process of developing additional criteria e.g. longer lifespan of products which would help to ensure that a product or service meets the requirements of a circular economy.

In 2017 the Nordic Council of Ministers published a report: Circular Public Procurement in the Nordic Countries. This report defines a framework for circular procurement and presents good practice from the Nordic countries.

KEY PROBLEM

Lack of demand for recycled material from producers and manufacturers of products because of quality concerns and uncompetitive price of secondary raw material compared to virgin material.

EXPECTED IMPACT

GPP can be used to strengthen potential markets for environmentally or socially beneficial products. GPP could also help increasing the market for products comprising recycled materials such as post-consumer plastic waste and used building materials.

EXAMPLES FROM THE REPORTS

Report: Construction and demolition waste

Increase the recycling rate demand from buildings and construction waste

An increase in the recycling rate can be obtained by stricter recycling goals in waste regulation. It should also be reflected in building regulation through requirements for the use of building products containing secondary materials.

Require a certain content (%) of recycled resources in new products in national building regulation

The policy instrument will enable a pull from the market when the architects can prescribe the use of recycled resources in new building products through revised building regulation.

EXAMPLE FROM FINLAND

Tarpaper Recycling Ltd., Finland, has developed a patented method for recycling of tarpaper waste. The method was first tested on a road project for Lathi Municipality in Finland in 2012. The sorted roofing felt waste from demolition or refurbishing is processed at Tarpaper Recycling factory and the material can be used for the asphalt production for road construction[7].

[7] Circular Public Procurement in the Nordic Countries, TemaNord 2017:512, Nordic Council of Ministers 2017

Text from the report **Plastic Waste Markets**

The market for recycled plastic comprises several sub-markets along the value chain. Plastic products and the requirements of the raw materials are also very diverse. There are a number of different polymers with different properties, which are sometimes mixed, and supplied with additives to achieve certain properties. This means that quality specifications are not only a question of high or low quality, but also a question of using the right type of plastic for the right type of product.

There are many challenges connected to recycling mixed plastic waste from households and recycling centres, but this waste stream also carries a large potential for increased recycling.

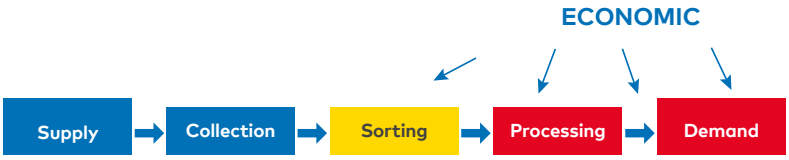
Currently significant amounts of this waste are exported to Germany and China, although the recently opened SWEREC plant in Sweden has absorbed a large fraction of the plastics collected in the region.

However, some parts of the market for recycled plastic work quite well. A very substantial part of production/manufacturing waste is reported to be recycled, and there are also functioning markets for other types of industrial waste, where large quantities of relatively pure and uniform plastics are available.

The diverse nature of the market means that the measures for increasing recycling of plastic must also be diverse.

Using public procurement to drive a market for products made from recycled plastics seems a useful place to begin.

ECONOMIC POLICY INSTRUMENTS



Economic Instruments cover a variety of policy tools, from pollution taxes and marketable permits to deposit-refund systems and performance bonds.

The common element of all economic instruments is that they are designed to change behavior through e.g. higher prices or lower cost.

The Nordic countries adopted economic instruments, mostly taxes, early on, also in the waste sector.

One prominent example is the charge on waste destined for incineration, in order to promote other treatment options, including recycling.

DEPOSIT AND REFUND SYSTEMS

Deposit-refund systems are commonly used for beverage containers, batteries, motor oil, tires, various hazardous materials and electronics. Several studies conclude that a deposit and refund system creates incentives for the optimal allocation between reducing

EXAMPLE FROM THE REPORT **PLASTIC WASTE MARKETS**

Tax on incineration

Imposing a tax on the incineration of recyclable plastic to make alternative disposal/treatment routes (e.g. recycling) more attractive. This could be levied at the point of delivery to the incineration plant per tonne of delivered plastic. Where the waste is mixed, it could be based on ongoing composition tests from waste collectors.

consumption and increasing recycling. A major disadvantage is the larger administrative cost for administrating a charge, as well as a refund. This means that the system is only suitable for uniform products which occur in very large numbers.

KEY PROBLEMS

In the report on Plastic Waste Markets, the low price of virgin plastic is often mentioned as a key barrier preventing increased use of recycled plastic.

In the report "Barriers for Utilization of Biowaste", short tender periods are mentioned as a barrier for companies to invest in sorting and processing capacity, and in the report on construction waste, some stakeholders expect increased cost for companies in the initial phase of increased recycling. In a Danish study on mitigation of waste from the construction sector[8], stakeholders would often mention lack of economic incentives as an important barrier to increased sorting and recycling.

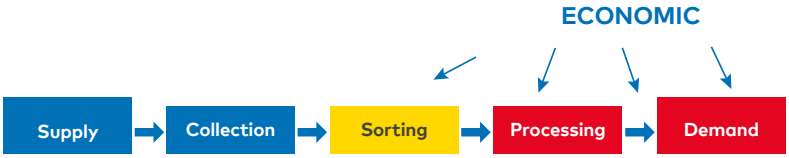
EXPECTED IMPACTS

Economic instruments can help improve the recycling markets, where the economic barrier is the main obstacle. In "Economic Policy Instruments for Plastic Waste", Swedish stakeholders consider EU certification schemes more important than subsidies to production, and economic instruments may not be effective, if the main obstacle is e.g. quality concerns.

The impacts of economic instruments will differ greatly depending on the design of the instrument, which will be a trade-off between achieving the optimal environmental effect and limiting the administrative burdens of the instrument.

[8] Affaldsforebyggelse i byggeriet, Miljø- og Fødevareministeriet Miljøstyrelsen 2017, Miljøprojekt nr. 1919

FUNDING INNOVATION



Access to external finance for new technologies is often challenging as they require documentation of performance. Especially in the early stages of start-ups (e.g. technologies, services, etc.) there is much uncertainty about what the innovation will result in.

Also later development stages where the innovation develops into prototypes and more commercial technologies are often in need of external funding.

Therefore, policy plays an especially important role in funding early technology development stages.

KEY PROBLEMS

Lack of external funding and attraction of potential investors for development of new technologies for waste collection, treatment and recycling especially within WEEE, plastics and building and demolition.

All the Nordic countries and EU have different funding programmes within the waste area supporting development of new technologies, R&D, test and demonstration projects etc. to support strategic and legislative policies. Examples are:

- EU: Horizon 2020, ESIF
- Denmark: MUDP, EUDP, GUDP, Innovation Fund Denmark
- Sweden: VINNOVA
- Norway: Innovation Norway
- Finland: Sitra

- Lack of stable waste supply and market conditions

- Lack of stable legal framework within the waste area

EXPECTED IMPACTS

Public funding for innovative actions, development of technology, R&D programmes and demonstration projects supporting the transition to circular economy and closing waste and material loops are expected to be of fundamental importance to bringing innovative ideas to life.

Innovations may for instance be:

- Decrease the cost and/or improve efficiency of collection, sorting and processing
- Facilitate tracking of materials, providing knowledge about valuable and/or hazardous substances along the value chain
- Facilitate utilization of secondary raw materials in production or provide entirely new products using secondary raw materials

EXAMPLES FROM THE REPORTS

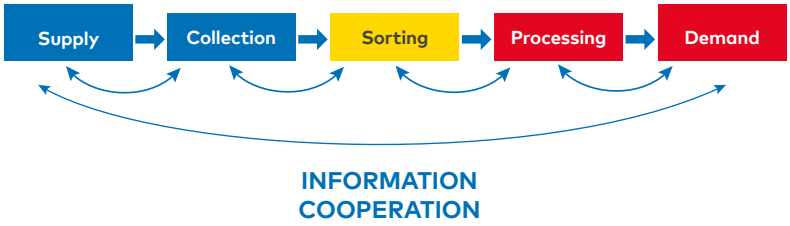
Report: Plastic waste markets

Funding for innovation – specifically for the development of technologies for better exploitation of the plastic waste stream. Part of existing innovation fund or specific fund (for plastic).

Report: Critical Metal in end-of-life products

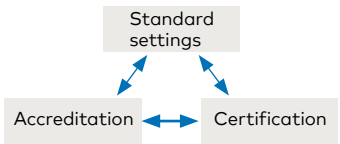
Support to demonstration facilities and selected R&D actions.

VALUE CHAIN COOPERATION AND CERTIFICATION



A value chain describes how industries process raw materials, adding value to the materials by producing end products which they sell to customers.

In the circular economy the value chain is ideally circular using waste materials as (secondary) raw materials. In a circular value chain, new dependencies between actors arise and the chain will often interact with more value chains since materials will be transferred from one sector to another.



CERTIFICATION SYSTEMS

Certification systems are a way to ensure that established requirements or standards for materials and products are fulfilled. Especially for secondary materials certification systems can provide a level of certainty about the quality of recycled materials.

Examples on Value Chain Cooperation: Plastic waste: Plastic recycling project including sorting by the collector and public sorting facility under instructions from the compounder, who is in dialogue with the plastic producer so that quality tests can be made. The plastic producer produces sorting equipment for households made from recycled plastic waste.

INFORMATION AND COMMUNICATION SYSTEMS

Information and communication systems can distribute information about e.g. origin of a material, content of valuable or hazardous substances, forecasts for amounts of a certain material etc. This could be e.g. digital tagging of components by the producer to enable automated sorting by the recycler and establish traceability to help develop cooperation, knowledge and information.

KEY PROBLEMS

- Traceability (knowing where a material comes from) and quality is essential

- Knowledge and information about the conditions in other parts of the value chain is lacking

- Communication and partnership across and along the value chain is often insufficient

- Value will often need to be redistributed along the value chain to create incentives for other actors along the chain to make changes benefitting other actors in the chain (shared value)

- Uncertainty of sufficient supply of secondary materials makes return of investments in treatment plants uncertain

EXPECTED IMPACT

Targeted value chain cooperation, networks and partnerships between actors across and along the chain will increase the level of information and knowledge needed for developing circular economy, shared value and closing of material loops. Furthermore, knowing more about the conditions in other parts of the chain will make it possible to change operations in ways that are valuable to the whole chain e.g. design for disassembly and to help eliminate uncertainties concerning supply and quality.

Certification systems and standards for recycled materials have been requested as a market driver and to ensure the credibility of recycled materials (fulfillment of specified requirements has been demonstrated).

PROPOSAL

Support and funding for networks and value chain cooperation are increasingly a part of programmes to drive circular economy development e.g. Horizon 2020. More focus on innovation and demonstration for communication along the value chain in existing relevant innovation programmes (see Funding for Innovation).

Establishment of certification systems and/or standards for recycled materials to develop the markets for recycled materials and ensure quality.

EXAMPLES ON CERTIFICATION

CE **Old Bricks:** A Danish company "Gamle Mursten" collects and cleans old bricks for reuse. Gamle Mursten has achieved a CE-labelling for their reused bricks.

The Nordic Swan Ecolabel: Nordic Council of Ministers has established a voluntary ecolabelling scheme for the Nordic countries.

60 different products groups counting more than 200 different product types can obtain a certification within the Nordic Swan Ecolabel.

EXAMPLES ON VALUE CHAIN COOPERATION:

Plastic waste: Plastic recycling project[9] including sorting by the collector and public sorting facility under instructions from the compounder, who is in dialogue with the plastic producer so that quality tests can be made. The plastic producer produces sorting equipment for households made from recycled plastic waste.

EXAMPLES FROM THE REPORTS

Value chain cooperation

Report: Critical metals in end-of life products
Improvement of knowledge and availability of up-to-date on CRM availabilities in different EOL products to reduce uncertainties which currently complicate assessment of the feasibility of different technical and system-level solutions.

Report: Nordic plastic value chains
Communication and partnership across and along the value chain is essential via improved traceability of wastes through the value chain, more assiduous record-keeping, measurement or analyses and smart labelling.

Report: Critical metals in discarded electronics
Policy measures providing guidance on critical metals recycling processes, recommending best practice and highlighting the technical aspects of recycling (standardize and target critical metals recycling).

Report: Barriers for utilization of Biowaste
Guidance and information e.g. alternative information systems for smaller companies and waste handlers.

Report: Plastic waste markets
Value chain coordination – a network facility to bring the disparate parts of the plastic value chain together.

CERTIFICATION SYSTEMS AND STANDARDS

Report: Plastic waste markets
Certification of recycled plastic materials to provide a level of certainty about the quality of recycled plastics.

Report: Circular economy in the Nordic construction sector
Special focus on use of secondary materials through voluntary systems (e.g. certification schemes, stricter documentation requirements, traceability, demolition guidelines incl. audits ahead of demolition, procurement of demolition contractor etc.).

[9] www.fors.dk/plastforsoget

PROSPECTS FOR THE RECYCLING MARKET

This Policy Brief summarizes the findings of seven comprehensive analyses of the barriers to increase recycling, carried out for the Nordic Council of Ministers over the last 2-3 years. They cover the generation, collection, sorting and treatment of the following waste materials: construction and demolition material, biowaste, plastic and critical metals.

The studies show that the markets for the above-mentioned waste materials are subject to important failures, such as externalities and information asymmetries. Furthermore, a number of barriers are hindering well-functioning markets.

RECYCLING IN THE CIRCULAR ECONOMY

Recycling plays a central role in the circular economy. As an industrial practice, it has been around for centuries driven by solid business cases and environmental legislation. Today, the markets for recycling of paper and cardboard, glass and some metals are functioning well.

The future market development for the materials examined in this report is highly uncertain due to the complexity of markets and the volatility of raw materials prices, as well as the rapid changes in the technologies and products. Therefore, investing in large-scale recycling is perceived as very risky.

A key factor in creating a dynamic market for secondary raw materials is sufficient demand, driven by the use of recycled materials in products and infrastructure. For certain materials (e.g. paper and metals) demand is already high; for others it is still developing.

One of the barriers faced by operators who want secondary raw materials is uncertainty as to their quality. This is one of the main reasons why virgin materials are preferred over close substitutes. This in turn leads to uncertainty in the market, and this is considered one of the main reasons why private business (and local governments) are reluctant to invest in recycling infrastructure (e.g. sorting and processing).

WHAT CAN GOVERNMENTS DO TO OVERCOME THE BARRIERS TO THE RECYCLING MARKETS

The Circular Economy Package, which is under implementation in the EU countries

is helpful in that it sends long-term signals to public authorities, businesses and investors. The newly adopted Waste Framework directive sets the medium to long term quantitative targets for the collection of waste for recycling. Also, this new legislation will ensure that the collected waste will receive the necessary treatment in order to convert it into useful materials.

The Circular Economy package also includes a range of other measures, such as financial support for developing new technologies for dismantling and separation of products, development of quality standards for secondary raw materials and options on the interface between chemicals, products and waste legislation.

The authors of the selected reports on the various waste streams strongly suggest that the governments in the Nordic countries make use of existing programmes and financing schemes. This could be done by playing an active role in the implementation of the action plan on the Circular Economy. This way, they could also influence the specific requirements with regard to quality standards and criteria, to the benefit of Nordic businesses.

Additionally, it is proposed to set up a Task Force that can coordinate and spread the voice of the Nordic countries in clear messages, with a view to impact European development within the environment and circular economy. This Task Force should also gather knowledge about insufficiently integrated or contradictory legislation in order to illustrate the practical and technical problems that several authorities and businesses are struggling with.

A very strong driver for increased demand for recycling material is through public procurement. Local and national governments already have this tool at hand in that they are entitled to establish own requirements e.g. beyond the minimum criteria in the EU legislation. A newly published report by the Nordic Council of Ministers presents the most recent examples on how governments can support recycling. Also, it proposes new criteria to be used in order to ensure circular procurement, in order to stimulate circular economy.

Finally, it is suggested that the Nordic countries explore the possibilities for joint development of new technologies for separation of electronic and electrical equipment that contain critical materials that are not recovered today. It is also proposed to examine the feasibility of joint investment in recycling infrastructure targeting this difficult waste stream.

The above demonstrates the need for enhanced collaboration between the Nordic countries. The Nordic region is very well known as the frontrunner when it comes to tackling environmental problems. Better quality recycling is one of today's major challenges. A joint effort would help improving the environment while supporting Nordic businesses at the same time and thereby show that the Nordic region is leading in green growth.

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The objective of this report is to contribute to the development towards a Circular Economy and is based upon a number of TemaNord reports on recycling of various materials commissioned by the Nordic Council of Ministers. This report contains synthesized knowledge on metals, biomass, building materials and plastics, from projects completed for the Environment and Economy Group (MEG) and the Nordic Waste Group (NAG). The findings in the TemaNord reports are presented to demonstrate the potentials, barriers and policy instruments in relation to increased recycling and improvement of the markets for recycled resources. The target group of the report is decision makers and other stakeholders searching for circular economy inspiration and knowledge.

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