

Plastic sorting at recycling centres

Guideline



THE NORDIC REGION
– leading in green growth





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1. Aim and background

The aim of this guide is to be a decision support tool for the management of the recycling centres with the purpose of collecting plastic of better qualities and in greater quantities. The collection at recycling centres will often be part of a larger system for collection of waste plastic, e.g. often supplementing kerbside collection of plastic materials. The overall ambition is that most of the recyclable plastics are sorted out for recycling. The guide addresses both larger, advanced recycling centres and smaller recycling centres.

The guide is financed by the Nordic Waste Group under the Nordic Council of Ministers, acknowledging that the present situation in the Nordic countries is quite different with respect to how the collection of plastic waste is organised. It is based on the collection of information and practical experience through interviews with a number of operators within the value chain related to collection, sorting and recycling of plastic from recycling centres in the Nordic countries supplemented with sorting trials.

The guide was compiled as part of the Nordic Council of Ministers green growth initiative, The Nordic Region – leading in green growth. It defines eight priorities, aimed at greening the Nordic economies, one of which is to develop innovative technologies and methods for waste treatment. More information about the initiative can be found at www.norden.org/greengrowth and in the Nordic Council of Ministers web magazine, Green Growth the Nordic Way, www.nordicway.org



2. Introduction

Collection of waste at the recycling centres has become more complex, as the recycling centres collect more and more waste fractions separately. This complexity is also true for plastic waste that is increasingly being collected in more separate fractions based on the technical recycling possibilities, the higher selling prices for better sorted plastics, and the prevention of recycling of hazardous substances into future recyclables. Recyclable PVC (hard PVC) has been collected separately for many years, and now often soft and hard plastic is also collected separately at the recycling centres. The operators of recycling centres all share the same challenges with respect to the collection of a fair quality of the different types of plastics and how to decide which fractions to focus on and how to increase the overall quantity collected

Due to the different organisation of plastic collection in the different Nordic countries and in the types of plastic received by vendors in a reasonable distance from a specific recycling centre, a solution with respect to which plastic fractions to collect and how that is valid for all cases cannot be presented. On the other hand, the choices to be made are similar. The guide therefor focuses on the issues that should be evaluated in the course of the decision making process regarding the collection of plastic waste at a recycling centre.

In Norway and Sweden, collection and sorting of plastic waste has been closely linked to their implementation of the packaging directive. Specific organisations have been formed to ensure the collection of packaging waste, including plastic, and specific collection schemes for these materials have been established. Thus collection of plastic at the municipal centres has been limited. In Denmark, collection and sorting of plastic waste, including packaging waste, is – apart from the direct collection of primarily bottles, etc. – mainly carried out at the municipal recycling centres, where also other plastic waste items, e.g. garden furniture, often are collected. In the other Nordic countries, collection of plastic waste is – again apart from the direct collection by vendors – in general just being initiated. Further detail on the present situation in the different Nordic countries is given in Appendix B.

The structure in the guide is as follows:

- First the potential plastic categories are listed and described, also with respect to potential content of hazardous substances. Information on plastic codes is given in Appendix A.
- Then the issues to take into account when choosing how to organise the collection of plastic at the recycling centre is described. This is supplemented with an example of a to do list for how a decision process for the sorting of plastic at a recycling centre can be carried out, see Appendix C.
- A separate chapter looks at how the public could be informed and assisted with the sorting of plastics at the recycling centres
- Training of personnel is addressed in the final chapter.





Summary

This is a guideline for plastic sorting at recycling centres. The aim is to give assistance to the choices made by the management of recycling centres in order to collect plastic of better quality and in greater quantities. In the guideline, the potential plastic categories are listed and described, also with respect to potential content of hazardous substances. Issues to take into account when choosing how to organise the collection of plastic at the recycling centre are described. A separate chapter looks at how the public could be assisted with the sorting of plastics at the recycling centres. Training of personnel is addressed in the final chapter.

The guideline is part of the Nordic Prime Ministers' 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



3. Plastic waste types that could be collected separately

The first question to ask when analysing possibilities for plastic collection at a recycling centre is obviously, which fractions should be collected, whether this is done separately or in a comingled fraction. In Table 1, relevant plastic waste fractions are listed together with information on, which type of plastic material they are typically made of, the code normally used by the plastic industry to mark the material type (in brackets, see codes in Appendix A),¹ examples of products, and specific issues that could be relevant for the plastic waste fraction in question.

Table 1. Plastic waste fractions and types, product examples and issues related to the plastic fraction

Plastic fraction	Product examples	Special issues
Packaging:		
Soft plastic (packaging)	Foils Plastic bags Bubble wrap	Can be collected separately in clear and coloured foils/bags, which can increase the price paid by the recycler.
Low Density PolyEthylene (4), Linear Low Density PolyEthylene (4), High Density PolyEthylene (2)		Users should be made aware that the foil should not contain metal thread, staples, textile, paper, cardboard, rubber or string
Hard plastic (packaging)	Water bottles Plastic containers for food, detergents etc.	Can be collected separately in clear and coloured packaging, which can increase the price paid by the recycler.
High Density PolyEthylene (2), PolyEster Terephthalate (1), PolyPropylene (5), PolyStyrene (6)	Trays used for vegetables/fruit Boxes for CDs and DVDs	Users should be made aware that containers used for hazardous contents (stamped with the appropriate stamps) should in general not be collected with the other types of containers. Some recyclers accept containers used for some types of hazardous materials; this should be checked with the recycler.

¹ It is not a legal requirement to mark the material type, and there are examples of injection moulded plastic products in various types of plastic, produced in the same form, but where the mould for injection moulding is characterized with the same material mark, whereby actual plastic type and plastics marking do not match.

Plastic fraction	Product examples	Special issues
EPS (Expanded PolyStyrene, e.g.. Flamingo®)	Packaging for food, electronics, etc.	Only clean EPS should be collected separately. Some disagreement among purchasers as to whether the EPS can be compacted or not, depending on the further treatment.
Non-Packaging:		
Hard plastic items	Baskets, buckets Toys (without electronics)	Car bumpers are collected separately by some municipalities resulting in lower costs for further sorting.
High Density PolyEthylene (2),	CD-covers Plastic car bumpers	Some municipalities combine this fraction with garden furniture.
Plastic Furniture	Garden chairs, garden tables	Should be collected separately due to a high content of chalk.
PolyPropylene (5)		Some sorting technologies will reject plastic furniture from other plastic types if not sorted separately due to different densities.
Hard PVC (3)	Pipes, Window frames	Should be collected separately for recycling. Since it is often difficult for the public to distinguish between PVC and other types of hard plastic, some municipalities collect everything together and send it for sorting
Soft PVC (3)	Vinyl flooring and wall cladding Toys Rain suits and boots	Should be collected for landfilling or incineration dependent on the national legislation ² . Often this type of PVC is mixed with other soft plastics as users have difficulty with distinguishing soft PVC as PVC. However, some recyclers may be able to recycle soft PVC, why separate collection may become feasible.
Mixed items	Toys Pens	Composite products consisting of plastic and other elements (e.g. metal, electronic and wood) should either be dismantled (if possible) or discarded as residual waste ^{3 4} .

3.1 Hazardous substances potentially present in plastic waste received at recycling centres

A number of compounds, now registered as hazardous, have been used in the production of plastic products, typically either as plasticisers, colourants or biocides. In the last years, many of these compounds have been

² Due to general high content of hazardous substances

³ It is in principle a possibility to collect composite products, shred them and then sort into the different fractions by flake sorting.

⁴ If the composite products include electronic components, they should be discarded as WEEE

either phased out or restricted in use (primarily in plastics in contacts with food and in toys or other articles for children).

Recycling of plastic materials containing hazardous substances should be avoided in order to restrict hazardous substances in future plastic products. This is, however, quite difficult in practice.

In Chapter 4 suggestions are given as to how the issue of presence of plastic products containing hazardous substances could be handled at a recycling centre.

Below is given an overview of the compounds that are most likely to be found in the types of plastic products collected at recycling centres.⁵

Especially soft PVC may contain phthalate based plasticisers, e.g. BBP, DEHP, DBP, DiBP and DMEP.⁶ PVC used in products susceptible to microbial attack, e.g. shower curtains, may contain arsenic compounds. PVC may also contain Bisphenol A; the use in PVC manufacture is being phased out in the EU.

PVC from before 2001 and ABS products may contain cadmium (as a pigment or stabiliser). The same is true for lead chromates, which have been banned in some of the Nordic countries, but in EU only for plastics in contact with food.

PET bottles may contain cobalt di-acetate as a colouring agent. This is now being phased out and this issue will therefore be less relevant in the future.

Red and yellow plastic (especially old plastic or plastic produced outside the EU) may contain mercury or lead as part of the colour pigment.

Plastic from WEEE and end of life vehicles (ELV) often contain flame retardants and other additives. Furthermore, if WEEE is disposed of with the electronics inside, this will contain metals (including heavy metals), batteries etc.

Flip-flops and other plastic footwear may contain polyaromatic hydrocarbons. This can also be the case for plastic materials coloured black, due to impurities in oil and coal based plasticisers.

A number of household products, e.g. toilet seats and food storage containers may contain triclosane as a biocide.

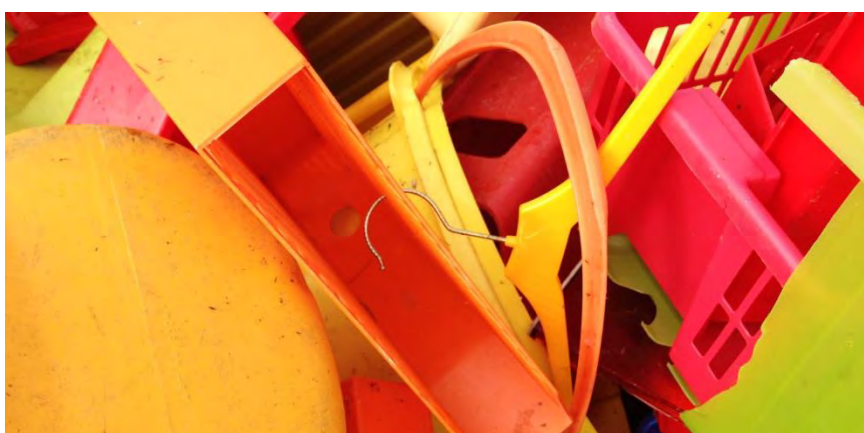
Table 2 summarises the potential hazardous components in different plastics (not an exhaustive list).

⁵ For further information on hazardous substances in plastic products, see Klif (2013): Hazardous substances in plastic materials.

⁶ DMEP: in toys, especially balls.

Table 2. Potential hazardous components in different plastics

Plastic type/characteristics	Product example	Problematic substance
Soft PVC	Shower curtains	Phthalates
Soft PVC		Arsenic compounds
PVC (rigid)		Bisphenol A
PVC		Cadmium
ABS	Drinking bottles	Cadmium
PET		Cobalt di-acetate
Red and yellow plastic		Mercury and/or lead
WEEE and ELV	Flip-flops	Flame retardants & other additives
Plastic footwear		PAH
Black plastic	Toilet seats	PAH
Different household products		Triclosane





4. Setting up or expanding a system for sorting of plastic waste at a recycling centre

There is a range of issues that should be addressed when defining the system for collection of plastics at a recycling station. The aim is at the same time to increase the amount of plastic for recycling and still have a simple and userfriendly system. Also, costs (for operation, treatment and transport) should be kept at a minimum and income (where possible) from sales should be optimised. However, these aspects most often conflict with each other.

In this chapter, the issues related to the decision making are first described, followed by a short overview of issues related to choice of equipment. An overview of the key decisions for the process is presented in Appendix C

One of the very important issues related to successfully increasing quantity and quality of the collected plastic is to have a good overview of the possible receivers. This includes the potential sorting facilities, of the different plastic fractions available in general and in a reasonable vicinity of the recycling centre in question. These issues and the need for communication between the stakeholders in general is addressed in the last two parts of the chapter.

4.1 Necessary decisions to ensure overall good solutions

Introducing or expanding separately collected plastic types at a recycling centre involves some challenges. The general issues to evaluate are:

- Many versus few fractions.
- Quantity versus quality.
- Transport.
- Products containing hazardous substances.

The pros and cons of these issues are detailed below.

4.1.1 Many versus few fractions

Many fractions

The source sorting into more fractions often lead to a higher selling price,⁷ and thereby a lowering of the total cost, compared to the delivery of a mixed plastic waste fraction.

Few fractions

Often the users of the recycling centres have difficulty in distinguishing between the different plastic fractions, e.g. what is specifically acceptable as hard and soft plastic. PVC can also in some cases be difficult to distinguish from other plastic types. This can be solved by collecting all plastic waste in one fraction and have it sorted automatically at a central sorting plant.⁸

If space is an issue at a given recycling centre, and no easy solutions to this available, this will limit the number of fractions to be collected.

4.1.2 Quantity versus quality

One of the main dilemmas, when choosing between quantities and qualities, lies between an easily understood and simple collection system, and on the other hand, a multi stream system with different plastic types to be collected separately, which ensures higher quality and better income (or lower costs) for subsequent treatment. This is exemplified below.

Quantity

According to some of the interviewed recycling centres, the easier it is for the user to drop off the plastic, the more plastic is collected. This, however, may lead to a reduced overall quality of the plastic collected. It should be noted that the data collected in this study does not support that fewer fractions lead to larger quantities.

⁷ Or lower cost to be paid to the receiver.

⁸ A sorting plant can with NIR (Near InfraRed), screens/drums, ballistic separators etc. sort a mix of hard and soft plastic into single polymer streams (PP, PS, LDPE, HDPE and PET) with minimum 98% purity (example from the producer responsibility scheme in Austria).

Quality

At some recycling centres plastic waste is thrown through smaller holes to avoid unwanted elements; for example holes that accept bottles in size, but not furniture. This leads to a cleaner fraction of the collected plastic waste.

4.1.3 Transport

Transportation costs can be an important cost parameter, which makes compaction of the plastic relevant. However, if hard plastic is compacted, there is a risk of breaking the plastic into too small pieces, which can be difficult to sort at a sorting plant.⁹ Soft plastic under cold weather conditions can also become crumbled if compacted and therefore impossible to sort.

It may be a good idea to reconsider the way to transport hard plastic in larger scale. In the developing countries, the hard plastic is transported in a flexible mesh on the load of a truck or lorry. This kind of transportation will be able to carry large quantities with a small risk of breaking the plastic – and it will reduce the overall costs for transport.

4.1.4 Products containing hazardous substances

The issue of handling of plastic products potentially containing hazardous substances should also be addressed.

As the market for recyclable plastic and the chemicals used in the plastic is constantly changing, it is important to discuss with the purchaser, which types of plastics that can be problematic further downstream in the recycling process or with the ultimate users of the recycled product. Products made from recycled materials of course need to comply with the legislation for the actual type of product (e.g. food packaging, toys, etc.). The information about hazardous substances potentially present in plastic in section 3.1 can be part of this dialogue.

Examples of how the problematic plastic can be handled at the recycling centre are given below. The examples are partly based on the results of the sorting trials in Oslo and Stockholm (September 2014).

⁹ It will also in general depend on the sorting technology utilized. If the plant is constructed to sort plastic flakes, it is not a problem. This can be done with NIR (Near InfraRed) scanners, which are able to scan and sort smaller pieces down to 10 mm pieces, depending on the sorting technology.

PVC

As can be seen from section 3.2, many of the hazardous substances are related to hard PVC products from before 2001 and soft PVC.

Information at the containers accepting hard PVC plastic products could tell users not to throw in hard PVC products, but to throw them in the container for combustibles or landfill¹⁰.

The issue with soft PVC (in general containing a large number of different hazardous substances) could be handled by not accepting soft PVC for recycling, at least not at present. In future years, alternative plasticisers will be introduced, thus making soft PVC a less potential container of hazardous substances.

WEEE

To avoid WEEE in the recyclable plastic, the information at the recycling centre could emphasise that e.g. toys and shoes with batteries are not accepted in this fraction.

Black plastic

There could be a problem with black plastic containing oil and coal based plasticiser and thus polyaromatic hydrocarbons. The level of PAH in black plastic should be investigated in the future.

Besides the hazardous potential, it is not possible to use NIR sorting technologies, since they have difficulties with recognising black plastic as plastic.¹¹

Quite recently a new type of black plastic has been introduced, CPET, crystalline polyethylene, which can be detected by infrared light, which is the common technology used for sorting of plastics. So in the future the above described problem for black plastic may decrease.

Red and yellow plastic

In older red and yellow plastic items (and potentially in imported plastic of the same colours) the pigment may contain cadmium, which is no longer allowed to different degrees in different countries. Thus recycling of these items may contaminate the plastic headed for recycling. The actual potential content of contaminants in this fraction is not known at

¹⁰ Dependent on national regulation related to treatment of PVC.

¹¹ NIR inferred technologies are one of the main sorting technologies at the moment. With this technology it is possible to sort plastic into specific polymers. The problem with the plastic coloured with carbon black is that carbon black absorbs the infrared light, and thus the black plastic cannot be recognized by the infrared sensor.

present; preliminary investigations show that the fraction of red and yellow makes up app. 10% of the total plastic fraction collected.

It would be comparably easy to instruct users not to put the red and yellow plastic items in the plastic container, if further investigations show that the heavy metal content is too high.



4.2 Equipment

The equipment for collection of different types of plastic waste at least encompasses bins and containers, but potentially also compaction equipment. Larger recycling centres may also introduce different types of equipment for local sorting and quality check of the plastic collected, if they have sufficient space. The latter is not further described in this guide, since the choices taken in this context will be very individual.

Soft plastics (foils etc.) are often either collected in large plastic bags (on stands or in bins) or directly in e.g. 600 litre bins. The collection in bags can make it easier for the personnel, if for instance the soft plastic is to be compacted at the recycling centre, but of course introduces an extra cost. The collection in bins is mainly used where an outside company takes care of the transport to a recycler.

Hard plastic is typically collected in containers. If the plastic is to be sorted at the recycling centre, e.g. to remove impurities etc., smaller tip-containers can be used for easier handling. Separate items such as garden furniture, can be collected in separate containers.

The question of compaction at the recycling centres or not is dependent on:

- Space.
- Transport distance.
- Costs.
- And what has been agreed with the recycler receiving the fraction.

Compaction of hard plastic and of plastic in very cold conditions should be done with respect to the subsequent sorting of plastic. It is important to agree with the purchaser of the plastic on the degree of compaction acceptable, in order to ensure that crumbled and splintered plastic is not lost for recycling.

4.3 Dialogue with purchasers

It is important to secure that there are matching expectations between the recycling centre and the purchaser.

The purchaser will have some requirements with respect to quality and amounts of the different plastic fractions. For the recycling centre, it is important to know these requirements exactly, and the agreement made

should be specific about the tolerance related to these requirements and the consequences, if the requirements are not met (e.g. higher costs).

It is also important to know, if the technology to be used for sorting is compatible with the way the plastic waste is treated at the recycling centre.

In order for the recycling centre to meet the requirements and make adjustments in their collection, some recycling centres have an agreement with the purchaser about systematic feed-back on the purity of the delivered plastic. The feedback can e.g. include pictures of the impurities in order to make the recycling centre aware of problematic impurities. In Table 3, some examples are given of agreements with respect to impurities.

Table 3. Examples of agreements on impurities allowed for different fractions of plastic.

Fraction	Allowed impurity [% weight foreign plastic allowed]
Buckets. etc. (mix – clean and without hazardous symbols)	90% hard plastic and of this, a minimum 60% PE or PP
Buckets etc. (only PE)	No soil
Crates for milk and bread	There are no impurities
Foil – clear	2%
Foil – coloured	0%
Foil – mixed both clear and coloured.	Has to be clean, if there is soil in it, it will all be discarded.
Garden furniture (plastic)	3%, no soil
Hard plastic (buckets, boxes, toys) w/o PVC	2 –3%
Plastic packaging (producer responsibility materials)	5% impurity (from tree or paper). 5 –10%, improvements required. 10-> (they stop the delivery or send a bill).
PVC (Hard)	The purchaser has no problem with impurity. The problem is at the recycling centre, because people put other plastic types than PVC in the container. This gives a larger amount of PVC and thereby a high cost, since the price for disposal of PVC is high.

The recycling centre will likewise have some requirements that it needs the purchaser to meet: For the recycling centre, it is important to know how much plastic is actually recycled. Therefore the recycling centre can have a requirement on traceability of the plastic with respect to the amounts rejected in the sorting process and the amounts being recycled.



The recycling centres can also benefit from mutual dialog, e.g. on experiences with purchasers, collection methods etc. The recycling centres can also enter in to agreements about selling the plastic together in order to achieve larger amounts, thus making the recycling centres more attractive for a purchaser and/or making the transport more efficient.

Below the issues to cover to ensure efficient collection and good collaboration between purchasers and recycling centres are summarized in short:

- More dialogue with purchasers on quality of received plastic, the technology used for further treatment and the restriction this may impose, and comments on initiatives for improvement.
- Agreements including requirements for documentation of plastic waste flow and final recovery, making the waste flow more transparent and traceable for the recycling centre. This is often a requirement sought for by the political decision makers.
- Joint agreements for more operators of recycling centres and possibly common agreements across national borders with a purchaser, sorting facility and/or remanufacturing facility.



5. Information aimed at the public

A range of aspects should be included in preparing the best collection of plastic waste at the recycling centres. Information at the recycling centre and on the internet as well as personal sorting guidance for the public visiting the recycling centres is of key importance. In addition, the placing of the collection equipment at the centre is of importance.

5.1 Personnel as communicators

It is clear from experience that the personnel play a major role in securing the quantity and quality of the plastic fractions. It is important that the personnel is knowledgeable with respect to:

- Which types of plastic goes where and why, that is how are the different fractions handled further downstream.
- What the potential products that can come out of it are.
- What can go wrong with this process, if erroneous sorting occurs.

It is also important that this information is presented in a friendly and helpful manner.

Especially, when new fractions are introduced, it is of high importance that staff is available also at the containers for combustible waste in order to encourage the users to take their plastic waste to the appropriate container instead.

5.2 Information at the recycling centre

The information at the recycling centre should be easily understandable and containers should be marked clearly with lists of typical products and e.g. pictures of these.

It is also important to inform users on which types of plastics that are not desired in the containers for plastic and the acceptable degree of contamination purity e.g. food leftovers or detergents in the plastic packaging. This can also be included in the above-mentioned lists.

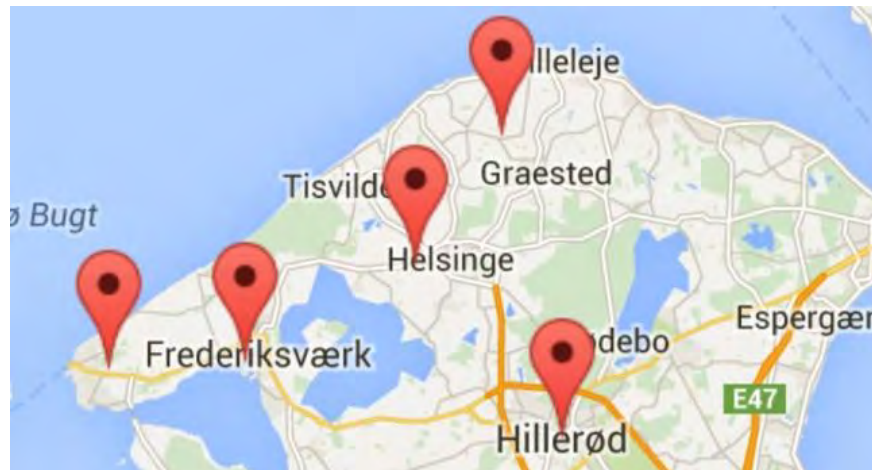


A folder can be produced detailing the above information and explaining the positive outcome of the recycling of the products and the undesirable consequences of erroneous sorting. This folder could be handed out by the personnel if further information is asked for by the users at the recycling centre.

Information at the recycling centre could also encompass the following:

- Information boards describing the subsequent sorting and recycling.
- Signs showing the plastic triangles indicating type of plastic material.
- Information on the economic and/or environmental effect of sorting (e.g. set up as small case studies with examples of CO₂ or fuel to be saved).
- Display of examples of products that are made from recycled plastic.
- Information on which products that should not be placed in the containers for plastic waste due to their potential content of hazardous compounds but be placed with e.g. combustibles instead.
- QR (Quick Response) barcodes for smart phone scanning giving web-based information such as videos or animations of the further management of the plastic waste.

Another measure to improve the sorting of plastic waste at the centre is to conduct a waste analysis to identify subjects that have been sorted incorrectly and through this improve the information given. A waste analysis can give valuable information on how the existing information is understood by the users and thus give information on which deficiencies the information given may have.



5.3 Online information

Online information about the separate waste collection is becoming more and more important – both for waste collected at the household and for waste delivered to the recycling centre. Information on the homepage could include:

- Location of recycling centres.
- Sorting guide for different plastic types/products. The sorting guide can be made as a search function (e.g. <http://sortere.no/kategori/104/kommune/Oslo> or <http://www.vestfor.dk/web/affald-og-genbrug/sorteringsguide>). Additionally, words that are not recognised in the search can be collected and later included in the database, improving the user-friendliness.
- Location of each (plastic) container at the recycling centre.
- Easy understandable recommendations on how the users can sort their waste at their homes (e.g. see www.skralderiet.dk – Facebook) before delivery to the recycling centre.
- Interaction with the users, through a FAQ or an actual possibility to ask questions e.g. through a Facebook page.

It should be considered to translate the online information to the most common languages in the specific area, to ensure that all inhabitants have a chance to sort the waste in the right way.



5.4 Organising of containers

If more plastic types are collected separately, it will be convenient for the user, if all plastic waste containers are placed close to each other, making differences between the types more visible and the sorting process simpler.

If a process of prevention of plastic products with hazardous compounds is set up, the containers for plastic waste should be placed near the containers for combustible waste.

To collect the plastic bags, the users have emptied when dropping off other waste types, some recycling centres have had good experience with placing bins for plastic foil close to containers where users often bring their waste in plastic bags.



6. Training of personnel

It is of high importance that the personnel at the recycling centres are both willing to help and motivated for recycling. Therefore it is important that the personnel is trained and educated in correct sorting and in waste recycling processes (in general and especially with respect to the processes relevant for the recycling centre in question) so that the staff can encourage the users of the benefit of recycling both with respect to costs, use of resources and environmental impacts.



The training of the staff could include short introductions on:

- What plastic waste fractions and products that can be collected at the site, and which plastic material types they are typically made of.
- How are the waste fractions typically treated further downstream, especially from the recycling centre in question.
- Which types of products that can be produced from recycled plastic.
- What are the consequences of erroneous sorting.
- Visits to sorting, recycling and treatment facilities in order to understand the further handling of the waste. This gives the personnel a story to tell the users, and makes correct sorting more relevant.



7. Sammanfattning







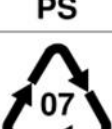
Det här är en guide för sortering av plastavfall på återvinningscentraler. Målet är att ge vägledning för att samla in större mängder plastavfall av bättre kvalitet. I guiden listas och beskrivs olika typer av plastavfall. Även risker med innehåll av farliga ämnen tas upp. Andra områden som tas upp är hur insamlingen kan organiseras. Ett separat kapitel beskriver hur avfallslämnarna kan få stöd när de ska lämna sitt avfall för återvinning. Ett annat kapitel tar upp utbildning av personalen.

Guiden är en del i de nordiska statsministrarnas initiativ för grön tillväxt.



8. Appendix A: Plastic codes

Figure 1. List of the resin identification codes, and some examples of their applications

Plastic Identification Code	Type of plastic polymer	Properties	Common Packaging Applications
 01 PET	Polyethylene Terephthalate (PET, PETE)	Clarity, strength, toughness, barrier to gas and moisture.	Soft drink, water and salad dressing bottles; peanut butter and jam jars
 02 PE-HD	High Density Polyethylene (HDPE)	Stiffness, strength, toughness, resistance to moisture, permeability to gas	Milk, juice and water bottles; trash and retail bags.
 03 PVC	Polyvinyl Chloride (V)	Versatility, clarity, ease of blending, strength, toughness	Juice bottles; cling films; PVC piping
 04 PE-LD	Low Density Polyethylene (LDPE)	Ease of processing, strength, toughness, flexibility, ease of sealing, barrier to moisture.	Frozen food bags; squeezable bottles, e.g. honey, mustard; cling films; flexible container lids.
 05 PP	Polypropylene (PP)	Strength, toughness, resistance to heat, chemicals, grease and oil, versatile, barrier to moisture	Reusable microwaveable ware; kitchenware; yogurt containers; margarine tubs; microwaveable disposable take-away containers; disposable cups and plates.
 06 PS	Polystyrene (PS)	Versatility, clarity, easily formed	Egg cartons; packing peanuts; "Styrofoam"; disposable cups, plates, trays and cutlery; disposable take-away containers;
 07 O	Other (often polycarbonate or ABS)	Dependent on polymers or combination of polymers	Beverage bottles; baby milk bottles; electronic casing.

(from: http://oregonstate.edu/sustainability/blog/wp-content/uploads/2014/01/About-Plastic-Recycling_plastic_identification_codes.jpg)



9. Appendix B:

Present situation for plastic collection in the Nordic countries

The following appendix presents some overall numbers of plastic potentials from the report Resource efficient recycling of plastic and textile waste, 2012, supplemented with some averaged amounts of plastic delivered to the recycling centres per inhabitant (collected in the present study). Hereafter the findings from the interviews are presented for each country, giving an overview of the organisation, the fractions collected presently and the purchasers used.

Overall figures for the Nordic countries

To give an idea about the amounts a recycling centre can expect, an overview of the potential plastic amounts is presented in the two tables below. The total potential amounts of plastic are the same in the two figures. First, they are given per application (Table 4) and secondly as post-consumer waste in the different waste streams (Table 5).

Table 4. Plastic waste per application, Nordic countries (1000 t, %)¹²

	DK	N	S	SF	Total	% Nordic	% Europe
Packaging	207	149	217	116	689	62	62
Building-/ construction	17	12	15	12	56	5	6
Automotive	11	11	18	10	50	4	5
WEEE	17	18	31	15	81	7	5
Housewares, leisure, sports	10	10	15	11	46	4	3
Agriculture	16	12	17	10	55	5	5
Other (Furniture etc.)	16	12	17	10	55	5	5
Total	310	240	363	208	1,121	100	100
Kg/capita	56	48	39	39	45		

The plastic applications that most likely will end in the plastic fractions at the recycling centres are Housewares, Leisure, Sports, the part of the furniture, which is made mostly of plastic such as plastic garden furniture. Some application types will not end up at the recycling centres, e.g. plastic packaging in Norway and Sweden, which will be collected through the specific system set up collection of packaging. Plastic materials in WEEE will in principle be collected as WEEE and first later through the recycling processes be sorted in to a specific plastic fraction. Likewise, automotive plastic will primarily be handled as required in the End of Life Vehicles Directive, though some Danish recycling centres collect car bumpers. One should be aware that also plastic application for commercial use is included in the figures given, and this stream will most likely not end at the recycling centres.

How the plastic materials are distributed into the different waste stream is presented in Table 5.

¹² Resource efficient recycling of plastic and textile waste, 2012, referring to: PlasticsEurope, EuPC, EuPR, EPRO and Consultic, Plastics-the Facts 2011- An analysis of European plastics production, demand and recovery for 2010.

Table 5. Plastics post-consumer waste per waste stream, Nordic countries (1000 t, %)¹³

	DK	DK %	N	N %	S	S %	SF	SF%	Total	%
Residual household waste	158	51	69	29	124	34	89	43	440	39
Bulky household waste	16	5	11	5	23	6	15	7	65	6
Separate collection from household by municipalities (non-packaging)	1	0	0	0	0	0	0	0	1	-
Sales packaging waste collected	13	4	22	9	61	17	15	7	111	10
WEEE waste collection	15	5	17	7	29	8	11	5	72	6
Municipal waste generated by commercial activities	31	10	40	17	40	11	36	17	147	13
Commercial & Industrial waste	13	4	21	9	13	4	15	7	62	6
Commercial packaging waste collected.	41	13	32	13	40	11	14	7	127	11
ELV, incl. auto-shredded residue	10	3	9	4	15	4	8	4	42	4
Other recycling systems	11	4	19	8	17	5	5	2	52	5
Total	309	100	240	100	363	100	208	100	1,121	100

¹³ Numbers are from Resource efficient recycling of plastic and textile waste, 2012, p.7, who refers to: PlasticsEurope, EuPC, EuPR, EPRO and Consultic, Plastics-the Facts 2011- An analysis of European plastics production, demand and recovery for 2010. The figures are thus not quite recent; especially in Denmark, a number of recycling centres have increased their collection of plastics the last few years.

Table 5 shows a marked difference between the amount of plastic in residual household waste for Denmark and Finland versus Sweden and Norway: Denmark and Finland have the highest percentage of plastics in the residual household waste compared to Sweden and Norway, and the lowest percentage of plastic collected through the packaging waste streams.

This is most likely due to the very different implementation of the packaging directive in the three countries,¹⁴ where Norway and Sweden have established specific take back organisations with a specific collection scheme, which is not the case in Denmark and Finland.

In a more overall perspective, the numbers indicate that there is a potential of 440,000 tons/year of plastic that could go to recycling instead of ending up in the residual household waste stream. The proportion that should go to the recycling centres and the proportion for special collection schemes cannot be defined based on these numbers, but the numbers show that there is a potential. For the bulky household waste, there are no other collection schemes, so for bulky household waste it seems that there is a potential of 65,000 tons/year in the four countries together.

Experiences from recycling centres collecting hard plastic shows that the collected amount of plastic typically lies in the range of 0.5 to 15 kg plastic/inhabitant in the area served by the recycling centre)/year. The largest quantities are collected where large plastic items are accepted (garden furniture and other large items). The amounts may be overly large, since these items have only recently been introduced, and stored items thus may have been gotten rid of, when the opportunity arose. Apart from that, there is no consistent relation between the number of plastic fractions collected at the recycling centre and the amount collected per inhabitant.

¹⁴ Finland is just starting to implement this directive.

Table 6. Collected yearly amounts of hard bulky waste plastic from different recycling centres in the Nordic countries

Location	t/yr	Population	kg/inh./yr	Source
ØRAS (NO), 2013	155	69,909	2.2	Torneby, 2014
Stockholm (SE), 2011	321	900,000	0.4	Nystrøm, 2014
Stockholm (SE), 2012	659	900,000	0.7	Nystrøm, 2014
Stockholm (SE), 2013	872	900,000	1.0	Nystrøm, 2014
SYSAV (SE), 2012	126 ¹	157,500 ²	0.8	Eklund, 2014
SYSAV (SE), 2013	97	157,500 ²	0.6	Eklund, 2014
SYSAV (SE), 2014	100 ¹	157,500 ²	0.6	Eklund, 2014
Göteborg (SE), 2013	772	70,000	11	Mårtensson, 2014
Ballerup (DK), 2012	61	48,514	1.26	Vestforbrænding, 2014
Sønderborg (DK), 2013	54	3,500 ³	15	Nielsen, 2014
Ringsted (DK), 2012	205	30,000	6.8	Dalgaard, 2014

1) Results for less than one year scaled up to 12 months.

2) Assuming that the recycling centre covers half the population of Malmø Municipality (in total 2 recycling centres in Malmø).

3) Assuming that the recycling centre covers 1/8 of the population of Sønderborg Municipality (in total 8 recycling centres).

Analysis of plastic collected at recycling centres in Sweden showed that typically 60–70% of this plastic is suitable for recycling (see Background report for details).

Denmark

Overall organisation

The collection of plastic from households in Denmark is based primarily on two collection systems: Collections at households or collection at recycling centres. Furthermore, plastic bottles will be collected at stores, partly for direct reuse.

The plastic from the recycling centres often goes to a sorting plant, either through a trader or directly. A few municipalities/collaborations between municipalities have established their own sorting plant; these are often run as a separate facility where the waste department is a customer at the sorting plant on equal terms with also private companies.

Actual fractions collected at the recycling centres

The different fractions collected at the interviewed recycling centres at present are listed in Table 7.

Table 7. Fractions collected at Danish recycling centres. The list encompasses all the possible fractions mentioned in the interviews, and thus not only fractions at a specific centre. Some plastic materials will be included in more than one of the mentioned fractions

Fractions
Milk or bread crates from specific companies
Bottles (PET) clear
Bottles (PET) coloured
Car bumper
Pails, buckets, etc. (mix – clean and without hazardous symbols)
Pails, buckets, etc. (only PE)
Pails, buckets, etc. (only PET)
DVDs and CDs
EPS products
Foil – clear
Foil – coloured
Foil – mixed both clear and coloured.
Garden furniture (plastic)
Hard plastic (buckets, boxes, toys) incl. PVC
Hard plastic (buckets, boxes, toys) w/o PVC
PVC (Hard)
VHS, cassette tape, floppy disc

Purchasers

The purchasers identified through the interviews with the recycling centres and a number of purchasers are presented in Table 8.

Table 8. List of purchasers

Purchasers
Danbørs
DK Raastoffer A/S
Expladan
Marius Pedersen
Ragn-Sells
RC plast
Returplast A/S
RGS90
Stena
WUPPI (specialized in PVC)
Aage Vestergård Larsen APS

Faroe Islands

Overall organisation

There are two municipal waste companies: KOB (Kommunala Orku- og Brennistøðin) that covers Torshavn, and IRF (Interkommunali Renovationsfelagsskapurin) that covers the rest of the Faroe Islands. The baling and selling of recyclables is managed by IRF with recyclables from KOB being transported to IRF.

Recycling of plastics from households only happens through the collection of plastic bottles included in the deposit scheme for returnable packaging. For businesses there is a voluntary collection system of source separated plastics in the fractions: clear foil, coloured foil, other plastic, nets (pound nets, nets, trawls) and white nylon big bags. There is no sorting plant at present, so the plastic collected has been sufficiently clean so that it can be baled and sold without additional sorting.

There are approximately 40 recycling centres of which most are unmanned; at present the plastic materials go in the combustible fraction.

Actual fractions collected from businesses

There is only source separated collection of clean fractions from businesses; the fractions collected are listed in Table 9.

Table 9. Overview of fractions collected through voluntarily source separated plastic from businesses

Fractions – from businesses
Foil coloured
Foil clear
Nets (pound nets, nets, trawls)
Big bags (white nylon)

Purchasers

The purchasers used by IRF, when the interviews were conducted, are listed in Table 10.

Table 10. Purchasers used by IRF when the interview were conducted

Purchasers
ESØ
Stena

Finland

Overall organisation

The plastic collection in Finland is in a transition phase, going from no collection of plastics to introducing producer responsibility schemes for packaging materials. Therefore any ongoing collection of packaging plastic is at the moment at a pilot scale, besides the existing deposit system for PET bottles organized by PALPA.

For other plastic types, there are manned recycling centres at an experimental stage, starting in 2013 and there are ongoing experiments with collection of plastics at unmanned drop off sites. But at present, the plastic in general goes to incineration, and PVC goes to the landfill.

Actual fractions collected at the recycling centres and unmanned drop off sites

There are two kinds of drop off sites at the moment. The unmanned with smaller containers, and the manned with larger containers that also take plastic garden furniture. The fractions are listed in Table 11.

Table 11. Fractions collected at two different setups of unmanned collection sites. Collection in larger containers is in an experimental stage

Fractions – unmanned drop off sites (small containers, approx. 1.5 m³)
Hard plastic from packaging Plastic bags
Fractions – recycling centres, manned (larger lift containers for trucks)
Hard plastic from packaging Bulky waste plastic Garden furniture

Purchasers

Collection of post-consumer plastics is in its beginning in Finland, and the market for selling recyclable post-consumer plastic is likewise just being established. The mentioned purchaser is presented in Table 12.

Table 12. The mentioned purchaser in Finland. There may be more, but the collection of plastic waste is just starting up

Purchaser
Muovix oy

Greenland

In Greenland, the large distances between the communities and from the communities to a purchaser are major impediments to the establishment of collection schemes. Due to this, KANUKOKA has assessed that collection of plastic is neither possible nor beneficial economically or environmentally.

Iceland

There is an extra tax on plastic packaging imported to Iceland, which goes into a recycling fund. The recycling fund then pays part of the costs related to the treatment and recycling of plastic, which is carried out by SORPA and other companies.

The collection of plastics is carried out through collection at recycling centres, kerb side collection, and in addition there are some private companies that are licensed to collect dry recyclables from homes in e.g. Reykjavik, Isafjordur, Stykkisholmur, Akureyri and Egilsstadir.

Actual fractions collected at the recycling centres

The collection done by SORPA at the recycling centre is done in the following fractions: plastic packaging, and a mixed fraction consisting of soft and hard plastic, mainly from food waste. These are the plastic fractions covered by the recycling fund. Furthermore, larger pieces of hard plastic mainly from industries are also collected. This fraction is kept separate due to the higher price it obtains. Some recycling stations have seasonal collection of plastic garden furniture and plastic from horticulture. The fractions are listed below in Table 13.

Table 13. Plastic fractions collected at recycling centres

Fractions
Plastic packaging, mainly from food waste (covered by the recycling fund)
Large pieces of hard plastic from industries
Plastic garden furniture (seasonal)
Plastic from horticulture (seasonal)

Purchasers

The plastic is sent to IL recycling in Sweden see Table 14.

Table 14. Purchaser used by SORPA

Purchasers
IL Recycling

Norway

Overall organisation

The plastic collection in Norway mainly encompasses plastic covered by the producer responsibility scheme on packaging. The plastic packaging is primarily source separated in the households. The source separation is not carried out in exactly the same way in all municipalities; but they all result in a mixed plastic packaging fraction. The collection, baling and transport is all undertaken by the municipalities or the municipal waste companies, and then the plastic is sold to Grønt Punkt Norge at a set rate. Grønt Punkt Norge sells the plastic to a sorting plant.

The plastic not included in the producer responsibility scheme is in some places only collected from industries and not from households. In other municipalities, the plastic not included in the producer responsibility is collected at the recycling centres in a separate stream. This waste can in general not be sent to Grønt Punkt for further handling. This is a challenge for the municipalities since they then have to have different schemes for what can be the same plastic waste fraction.

Amounts

The report "Økt utnyttelse av ressursene i plastavfall" (2013) gives more specific numbers for the plastic waste in Norway. In Table 15, the total estimated amounts of plastic are presented for the different types of plastic waste, compared to the actual amounts recovered. Additionally, the report estimates the realistic potentials for increased amounts based on the actual plastic amounts, the difficulties with collecting of plastics, and the collection possibilities. In the report, the recycling centres are mentioned as having a role to play in the collection of a larger share of the packaging, plastics from building/construction, and furniture.

Table 15. Estimated amounts of different plastic waste types in Norway, the actual recovered amounts, the net potential for increased material recovery and a realistic potential for material recovery¹⁵

Fraction	Total amount of waste in 2010	Material recovered in 2010	Net potential for increased material recovery	Realistic potential for total material recovery in 2020	Material recycling in 2020% of the amount of waste
Packaging	146,569	53,400	39,000	92,400	63%
Residual household waste	21,000	1,000	5,000	6,000	28%
Building / Construction	34,000	2,500	5,000	7,500	22%
Furniture	25,000	0	3,000	3,000	12%
WEEE	43,000	3,000	9,000	12,000	27%
ELV	16,500	400	4,800	5,200	31%
Agriculture	20,000	10,200	3,000	13,200	66%
Fishing materials	15,500	3,500	5,000	8,500	54%
Leisure Boats / Composites	1,500	0	0	0	0%
Unknown	7,000	7,000	0	7,000	100%
Total	330,069	81,000	73,800	154,800	47%

Actual fractions collected at the recycling centres

Grønt Punkt Norge receives the plastic packaging from households, which is covered by the producer responsibility scheme for packaging. They also receive EPS and are making a test with respect to receiving plastic garden furniture and other types of plastic waste. The system for the garden furniture however, has to be self-financing, since it is not included in the producer responsibility scheme. The different fractions collected at present are listed in Table 16.

¹⁵ Translated from Økt utnyttelse av ressursene i plastavfall, 2013, p. 89.

Table 16. Plastic fractions collected at recycling centres. The list is a mix of fractions at different recycling centres, and will thus not represent a specific recycling centre

Fractions
Containers
EPS
Packaging plastic
Plastic garden furniture
Plastic hard – incl. PVC

Purchasers

The recycling centres sell the plastic that is covered by the producer responsibility scheme to Grønt Punkt Norge who then sells it on to sorting plants in Norway, Germany or Sweden. The plastic not included in the producer responsibility scheme is sold by the municipalities to sorting plants directly or to Grønt Punkt (for some of the fractions, see above). The list of purchasers mentioned during the interviews is given in Table 17.

Table 17. List of purchasers identified through interviews with recycling centres and purchasers

Purchasers
Grønt punkt Norge
Alba
Dela
Norsk gjenvinning
Swerec

Sweden

Overall organisation

The municipalities in Sweden are responsible for collection of household waste. However, packaging waste, including plastic packaging, is covered by the producer responsibility. FTI (Förpacknings- och tidningsinsamlingen) and to a lesser degree TMR AB (Tailor Made responsibility), are collecting plastic packaging under the producer responsibility scheme via recycling stations. These recycling stations can either be placed at recycling centres or elsewhere at central locations in the municipality.

Some Swedish recycling centres are collection non-packaging plastic. This fraction may contain both rigid plastic and foil. At Swedish recycling centres, the plastic collection may therefore cover plastic packaging (FTI recycling stations), “other plastic” or both.

Some municipalities have chosen not to collect plastic at recycling centres, e.g. due to low priority because of kerbside collection of plastic packaging in the municipality. Collection of plastic at recycling centres in Sweden is increasing at the moment, also for non-packaging plastic.

The plastic packaging included in the producer responsibility scheme is collected and transported (partly by private contractors) to FTIs contracted sorting facilities.

The non-packaging plastic fractions are handled by the municipalities themselves. These fractions are sent to a sorting plant.

PET bottles are handled (collected, processed and recycled) as a separate fraction in a deposit return system by Cleanaway Svenska AB.

Actual fractions collected at the recycling centres

The recycling centres are typically collecting plastic materials in two fractions: plastic materials included in the producer responsibility scheme and non-packaging plastic materials (not included in the scheme).

The non-packaging plastic fraction is a very mixed fraction, which affects the value of the plastic materials considerably. To improve the value of the fraction, some recycling centres are investigating the possibility of separating the plastic into more fractions. This, however, requires space for more containers at the recycling centres.

Another incentive is the possibility of minimising the transport distance for cleaner plastic fractions, since purchasers may be available closer to the recycling centre. The two fractions mentioned during the interviews are listed in Table 18.

Table 18. Fractions found to be collected at Swedish recycling centres. Not all recycling centres are collecting the fraction covered by the producer responsibility scheme

Fractions
Mixed plastic fraction, all plastic incl. PVC – not in the producer responsibility scheme
Packaging plastic (producer responsibility materials)

Purchasers

The market for recyclable plastic in Sweden is mainly dominated by the sorting plant Swerec, but some of the plastic is currently sold to Germany. More sorting facilities are emerging in the Swedish market, and the interviewed recycling centres were investigating the possibilities for local purchase of their plastic fractions.

The list of purchasers mentioned is listed in Table 19.

Table 19. List of purchasers identified through interviews with recycling centres and purchasers

Purchasers
Swerec
Dela



10. Appendix C: Key Decisions

APPENDIX C KEY DECISION

The key decisions below try to compile the steps to be taken when deciding how to enhance the overall quantity and quality of the plastic collected and sorted at a recycling centre. As part of the key decisions, references are made to the different parts of guideline, where relevant information can be found on the different issues. Both the relevant plastic types, the availability of purchasers, the prices and the sorting technologies will change over time (and is rapidly doing so at present), so the key decisions point for the necessity to gathering of current information from colleagues in other municipalities and from purchasers. Using the list of key decisions will typically be an iterative process, where the overall expected results of the previous decisions may lead to necessary reiterations before a satisfactory solution is found.

References to the guideline

1 WHAT PLASTIC TYPES AND PRODUCTS SHOULD BE COLLECTED?

- 1.1 Are some plastic products and types of plastic already collected either through the producer responsibility system regarding packaging or through household collection? Will it be an advantage to collect the same types of plastic also at the recycling centre? Or should the recycling centre focus on other products and types?
- 1.2 Are there any types of plastics containing hazardous substances, which should not be recycled?
- 1.3 What experiences do other municipalities or waste companies have with the choice of plastic products, types and fractions?
- 1.4 Do other municipalities or waste companies have data on amounts of the different plastic types or different fractions?

App. B

Chap. 3.1

Chap. 3

App. B

2 ANALYSE THE CURRENT MARKET FOR POTENTIAL PURCHASERS (AND DEFINE WHICH TYPE OF PLASTIC SHOULD GO INTO WHICH FRACTION).

- 2.1 What price / cost can the different purchasers offer per delivered amount of the different plastic fractions based on different purities
 - a) How can your types of plastic match the plastic fractions the different purchasers take?
 - b) Is the focus of the collection on quantity or quality? Focus on quality can lead to lower quantity and vice versa.
 - c) Will the user-friendliness be impacted if more fractions are chosen?
- 2.2 What is the distance to the different purchasers and the cost of related transportation?
 - a) Is it possible to compact the plastic (this will depend on the type of plastic and the purchaser)?
 - b) What is the cost of compaction and is there enough space at the recycling centre.
- 2.3 Do the purchasers have a minimum amount of plastic they will take? And for how long would an agreement last for?
- 2.4 Can the purchaser meet your requirements regarding traceability of the delivered plastic e.g. with respect to actual recovery percentages or the actual use for the recycled plastic?
- 2.5 Can the purchaser meet your requirements regarding feedback with respect to impurities and sorting errors so that the sorting at the recycling centre can be improved and what impacts will impurities etc. have on the agreed process?
- 2.6 Would it improve agreements with purchasers if you could co-operate with other municipalities etc. in to order get a better price or other advantages (e.g. similar reporting on recycling percentages and so on)?
- 2.7 Will it be more beneficial to establish your own sorting facility e.g. in collaboration with other municipalities/waste companies? What type of sorting could be relevant?

Chap. 3, 4

Chap. 4

Chap. 4

Chap. 4.3

Based on the above the most fitting set of purchasers can be determined and choices regarding which plastic fractions the plastic should be sorted into taken.

3 OTHER COSTS

- 3.1 What material is needed for the collection of the new fractions?
 - a) What is the price for containers?
 - b) What would compaction cost?
 - c) What is the price of other equipment needed?
- 3.2 How many resources (man hours) are needed for handling, logistics and sales of the plastic.
 - a) The more fractions the more man hours needed. Does the benefit of having more fractions match the costs of more man hours?

Chap. 4

4 SPACE LIMITATIONS AT THE RECYCLING CENTRE.

- 4.1 What type and size of containers is needed for the different plastic fractions (based on expected amounts)?
- 4.2 Is there sufficient room for the extra containers needed for sorting into more fractions?
- 4.3 How much will it cost to redesign the recycling centre when introducing the new fractions?

Chap. 4.2

After the questions in 3 and 4 have been addressed, are the fractions and the purchasers still feasible? If not go back to 1 and 2.

Once the general setup is decided, the following should be evaluated:

5 ORGANISATION OF THE NEW FRACTIONS AT THE RECYCLING CENTRE

- 5.1 How can the new containers be set up in order to make the sorting of the new fractions easy and intuitive for the users?

Chap. 5.4

6 TRAINING OF PERSONNEL.

- 6.1 What training is needed for the personnel to guide the users?

Chap. 6

7 INFORMATION TO THE USERS / THE PUBLIC.

- 7.1 How can the public be addressed both at the recycling centre and elsewhere?

Chap. 5

Do the costs related to points 5 – 7 influence the decisions taken regarding the general setup? If so go back to 1 or 5 dependent on the reason.



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Plastic sorting at recycling centres

This is a guideline for plastic sorting at recycling centres. The aim is to give assistance to the choices made by the management of recycling centres in order to collect plastic of better quality and in greater quantities. In the guideline, the potential plastic categories are listed and described, also with respect to potential content of hazardous substances. Issues to take into account when choosing how to organise the collection of plastic at the recycling centre are described. A separate chapter looks at how the public could be assisted with the sorting of plastics at the recycling centres.

The guideline is part of the Nordic Prime Ministers' 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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