Assessment of textiles collection potential in Recycling Stations

Contents

Notes

** This report consequently uses the abbreviation RCS for Recycling Station*

*** The first priority of this survey is general conclusions and recommendations that can be drawn from it. A second priority is how these general conclusions and recommendations apply to the specific RCS in the survey. For this reason all investigated RCS are presented in an anonymous form in this report.*

Author: Kaj Pihl
Environment & Recycling Advisor
Humana People to People
+45 20803143 / kaj.pihl@humana.org

Contributors to the survey
UFF-Humana, Denmark
Foreningen UFF-Butikkene i Norge
Miljö- och biståndsföreningen HUMANA Sverige

Executive Summary

30 recycling stations (RCS) in Denmark, Norway, Sweden, and Germany were investigated to find out how the structure of the RCS and the information provided about handling of the materials affect the quality of textiles which people dispose of at the RCS.

The purpose of the survey is to recommend best practices for textiles collection to the waste management companies / municipalities which run the RCS.

A set of aims were defined for structure, information, and handling respectively as the basis for assessment. In the end the overall quality level of the textiles collected from the RCS is used as a measure for its rating.

At some RCS the site staff and some of the RCS users were interviewed to add detail and reasoning to the survey. The interviews were conducted where possible and are not counted.

The following main conclusions are drawn from questionnaires, interviews, and quality tests.

- Most of the RCS in the survey are run by inter-municipal companies. Normally the textiles collectors provide their own collection containers. In general the RCS structure is practical and promote efficient use to the satisfaction of users / citizens and service providers alike.
- The opposite is the case with regard to information; it varies very much from one waste management company to another how thoroughly they inform the public about how to prepare the materials for disposal at the RCS and what happens to the materials afterwards. In general information scored poorly in the assessment.
- There is a huge variation in the quality of collected textiles that differed from containing 1,3% waste (textile waste as well as non-textile waste) at one RCS to 46,5% at another.
- It was found that there is a connection between the level of information given by the waste management companies and the quality of the textiles delivered to the RCS by the citizens. The citizens are very good at following the information/instruction they get. When the waste management companies promote waste, they get waste. When they promote reuse, they get something better. Better information result in a better quality.

1. Background for the survey

In May 2018, the EU approved the revised Waste Framework Directive (EU) 2018/851[1], obligating all EU membership countries to a.o. implement mandatory separate collection of textiles by the beginning of 2025. Several membership countries / municipalities in membership countries have reacted to this directive and are developing new systems for collection and handling of second-hand clothes.

In the Nordic region, the main collectors of reusable clothes have for many years been charitable organisations[2], selling the best part of the clothes to raise funds for their charitable work and providing good and affordable clothes for people in developing countries. The new textile collection and handling systems aim both at collecting a bigger share of what is available and to retrieve reusable / recyclable textiles that are discarded together with residual waste. The consequence is that low quality textiles comprise an increasing share of the collected material[3].

According to the report "Exports of Nordic Used Textiles: Fate, benefits and impacts" (Nordic Council of Ministers, 2016)[2] around 3/4 of the textiles that are collected in the Nordic countries are sold on global markets. The 10% of the clothes which are of the highest quality represent more than half of the earning potential (figure 1 and 2).

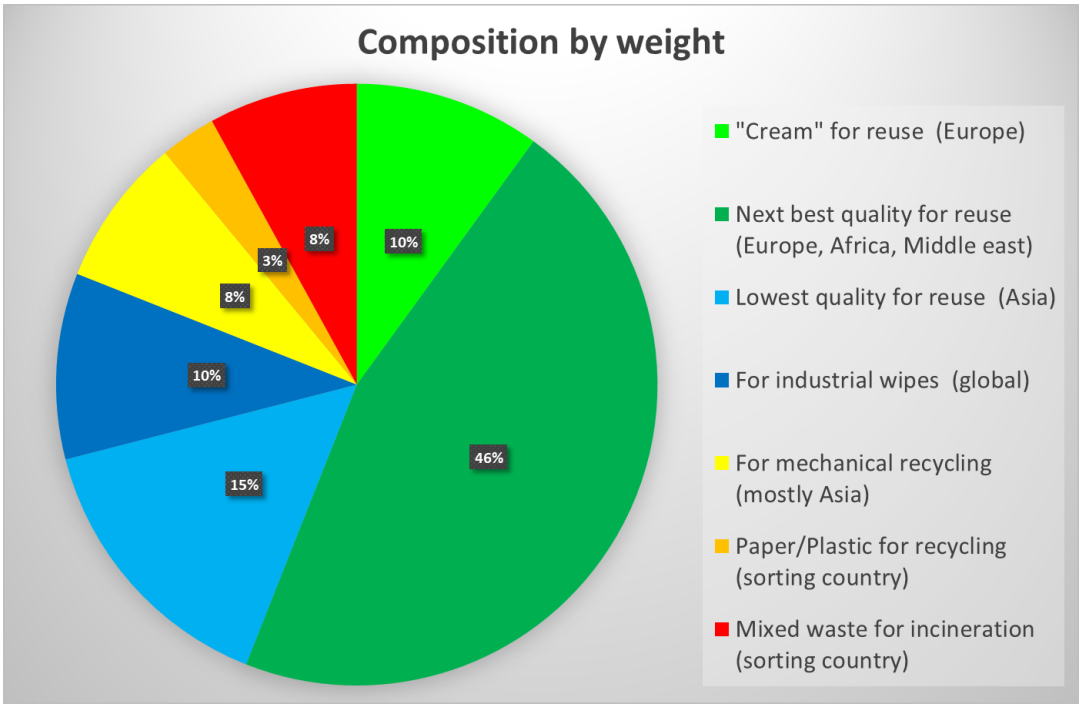


Figure 1 The diagram is a modified version of the diagram shown in the Policy Brief "Exports of Nordic Used Textiles: Fate, benefits and impacts", page 12. Figure 1 and 2 illustrate two different perspectives on "Original Clothes", or un-sorted clothes, clothes as they are received by the collectors.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018L0851
[2] http://norden.diva-portal.org/smash/get/diva2:1057017/FULLTEXT03.pdf
[3] https://www.sciencedirect.com/science/article/abs/pii/S0921344919300102

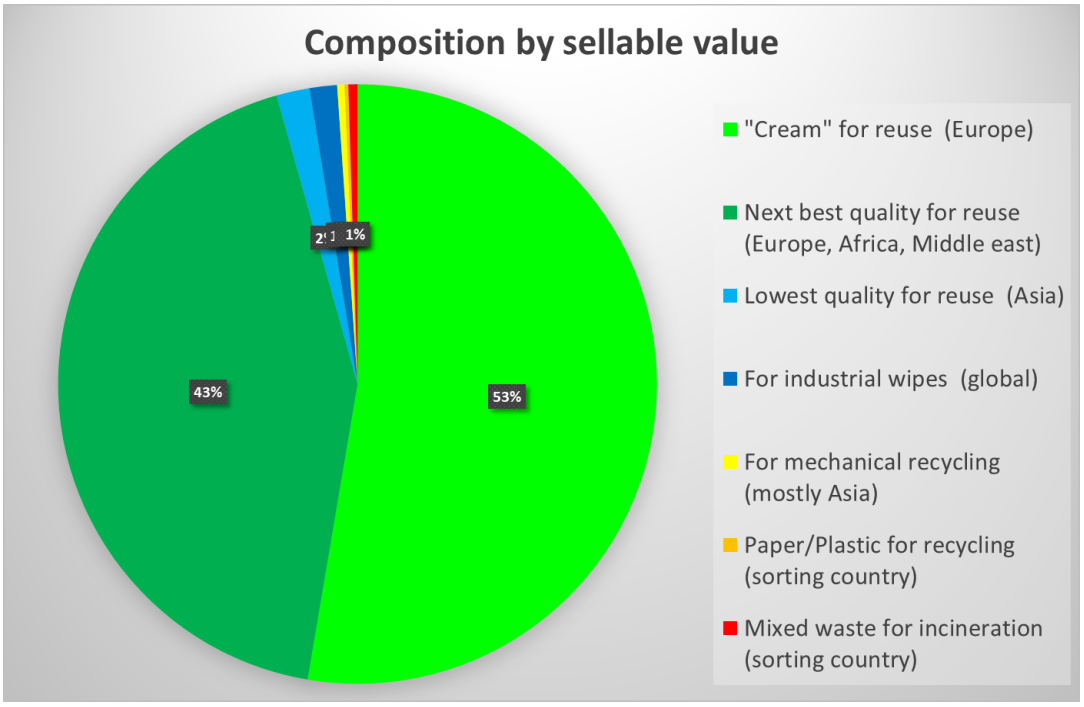


Figure 2 The diagram is a modified version of the diagram shown in the Policy Brief "Exports of Nordic Used Textiles: Fate, benefits and impacts", page 12. Figure 1 and 2 illustrate two different perspectives on "Original Clothes", or un-sorted clothes, clothes as they are received by the collectors.

The current decrease of quality in the collected textiles makes a huge challenge for the collectors. It threatens to destroy what used to be a profitable and well functioning activity well in line with the Waste Hierarchy, focusing on the highest level. This condition is supported by Nørup et al. in the study "Evaluation of a European textile sorting centre: Material flow analysis and life cycle inventory"[3].

[3] https://www.sciencedirect.com/science/article/abs/pii/S0921344919300102

2. Problem Description

Initiative to improve collection and handling of used textiles is taken by several waste management companies by supplementing their services in recycling stations (RCS) with collection of used textiles. This initiative has some obvious logistic advantages as well as it holds a potential for environmental advantages, provided that best practices are used. Unfortunately, this is not always the case.

There is no general definition or understanding of what the material category "textiles" comprises. The different waste management companies issue their own sorting guidelines for the RCS users, some very specific, others rather loose. The absence of a general and clear definition makes it hard for the RCS users to know what they should do and for the relevant authorities to measure the degree of compliance with standards. The study "Development and testing of a sorting and quality assessment method for textile waste"[5] has investigated and documented some of the consequences of unclear definition of what the fraction contains.

The citizens are increasingly encouraged to deliver their unwanted used clothes to reuse and recycling rather than discarding it as waste, in realization of the environmental benefits and thus in support of the intentions of the Waste Hierarchy. Alongside the traditional second-hand clothes shops, new and innovative solutions for reuse of clothes are implemented.

In the other end of the quality scale, some of Europe's most efficient and clean waste incineration systems take care of the textile waste. But in between the many reuse solutions and the good waste handling solutions there is a lack of appropriate and industrial-scale solutions for textile recycling. Sweden offers some promising textile recycling solutions and is, on the European scene, considered among the leading in this line of industry. However, the functioning solutions cannot absorb the entire textile quantity, nor are there solutions for all the different textile qualities, i.e. the myriad of mixed fiber textiles.

One unfortunate consequence of this is distortion of the other main textile categories; clothes collected for reuse are polluted with textile waste, and reusable clothes are thrown out with residual waste for incineration.

A Danish study, "The amount and quality of Clothing and Household textiles in the Danish Household waste" (Nørup et al., 2018)[4] investigated residual waste and combustible waste in 17 municipalities across the country and found that clothing and household textiles make approximately 3% of residual waste and 12% of combustible waste. Of these textiles around 65% were found to be reusable.
The above mentioned report "Exports of Nordic Used Textiles: Fate, benefits and impacts"[2] estimates the total amount of separately collected textiles in Denmark, Finland, Norway, and Sweden to be 118.000 tons and the total amount of textiles ending up in mixed municipal waste to be 191.000 tons, a best estimate as knowledge about the quality of textiles in household waste is lacking.
The figures from the 2 studies indicate a potential for material saving and environmental benefit, a potential which is at risk of being lost if used textiles are not assessed and handled properly. Conversely, the same figures serve as a warning of what may happen if textile waste is allowed to pollute the separately collected textiles, making it economically unfeasible to collect and handle them according to the Waste Hierarchy.

[2] http://norden.diva-portal.org/smash/get/diva2:1057017/FULLTEXT03.pdf
[4] https://orbit.dtu.dk/en/publications/quantity-and-quality-of-clothing-and-household-textiles-in-the-da
[5] https://www.sciencedirect.com/science/article/abs/pii/S0956053X18304306

3. Purpose of the survey

The purpose of the survey is to recommend a set of best practices to waste management companies concerning used textiles collected in Recycling Stations (RCS).
The recommendations must provide documented basis for making decisions favouring a higher level of environmental and economical sustainability as well as a higher level of compliance with the Waste Hierarchy.

4. Aims

The survey has investigated the textile collection practices of 30 RCS in Denmark (16), Sweden (6), Norway (7) and Germany (1).
The survey has 3 parts, each with its own set of aims.

<u>1. Structure</u>

a) The RCS size and structure corresponds well with the user base / the size and type of the population who use the RCS.
b) The physical set-up / organization of the RCS is convenient for the users and promotes correct and expedient delivery of the different types of materials.
c) The clothes collector and other service providers have convenient access to the RCS and can perform their work without bothering the users.

<u>2. Information</u>

a) It is easy to get information about the (use of) RCS from a variety of sources.
b) The information is in general adequate.
c) The information about second-hand clothes/textiles in particular supports an appropriate and realistic description of the category and what happens to it.
d) The information provides clear and sensible instruction to the users of the RCS about what to do with second-hand clothes/textiles they deliver to the RCS.
e) The assistance provided by the on-site staff is useful in this respect.

<u>3. Handling</u>

Based on quality assessment of standard samples from the RCS it must be concluded that

a) There is a simple and well functioning system to comply with the Waste Hierarchy, separating reusable textiles from textile waste.
b) The proportion of reusable textiles is large enough to ensure profitable collection and handling of the textiles. This condition is not fixed, but varies over time, influenced by fashion trends and movements in the market. In this survey we have chosen that the share of reuse A quality textiles must be at least 50%.
c) The proportion of waste is small enough to maintain profitable collection and handling of the textiles. As with the share of reusable textiles, this condition is not fixed. In this survey we have chosen that the share of waste must not exceed 5%.

5. Method

The first part of the survey, Structure, studies the following conditions:

1. An overview of all the RCS with whom the investigating clothes collector cooperates. The overview includes information about ownership and other RCS operated by the same owner, regardless of cooperation with the investigating clothes collector.
2. Exact location of each RCS and what type of area it is (f.ex. urban or rural). Information about opening hours and how users can get to the RCS (f.ex. private/public transportation).
3. The prospect user base / the size of the population in the RCS vicinity.
4. The physical set-up / organization of the RCS, eventually presented with an overview map, showing the infrastructure and the location of containers for the different types of materials.
5. Information about how the clothes collector and other service providers have access to the RCS, e.g. whether it is possible to empty the containers outside of the general opening hours and if there is easy access with big vehicles.
6. Assessment of the general functionality of the RCS according to its purpose; how easy it is to use the RCS.

The methods used for the above 6 conditions:

- studies of the RCS / waste management company website; # 1-3
- on-site observation of site organization / location of containers and people- and vehicle traffic, eventually combined with interviews with RCS users and site staff; # 2 and 4-6.

A questionnaire was made as a work-paper for part 1 of the survey concerning the RCS site and its structure (see attachment in the end of the report).
From the outset it was intended to make a response registration system which is very easy to use in all phases, during the fact-finding phase as well as in the phase of converting data that may even be handwritten into a digital format, and finally in the phase of comparing and analysing the data. Consequently, it was decided to use a “binary” format, formulating all questions so that they can be answered yes or no which onwards can easily be “translated” with 1 or 0 in a spreadsheet. During the implementation of the survey it was found that this method requires a very thorough preparation of each question in order to avoid any occurring misunderstanding or misinterpretation of the question. This will be discussed in section 8. on page 17.

The 2nd part of the survey, Information, studies the following conditions:

1. An overview of where the users of the RCS / the citizens in the area can get information about the RCS and how it works, most notably which kind of materials they can deliver to the RCS, e.g. website, printed information materials, info-signs a.s.o.
2. Details of this information, concerning how second-hand clothes & textiles and the handling of it is presented to the users.
3. Instruction & education of the on-site staff concerning how they assist the RCS users to serve them and to get the materials in the right places.

4. Assessment of the information provided to the RCS users, including these specifics:
    a. Is it easy to get information about what you can deliver to the RCS, where to put it and what happens to it?
    b. Is the information about the waste categories and their handling in general sufficient?
    c. Does the information about second-hand clothes and textiles in particular support an appropriate and realistic description and handling of it in order to get the most out of the textiles?
    d. Is the assistance provided by the on-site staff useful in this respect?
5. Assessment of the overall quality and effect/expediency of the information.

The methods used for the above 5 conditions:

- studies of the RCS / waste management company website; # 1, 2, 4, and 5
- studies of the municipality website, regarding local waste handling; # 1, 2, 4, and 5
- studies of on-location info-boards, signs, available free info-leaflets; # 1, 2, 4, and 5
- interviews with RCS users and site staff; # 1-5.

Also for part 2 of the survey, concerning how well the RCS users are informed about how to dispose of used textiles and what happens to them, was made a questionnaire / work-paper (see attachment in the end of the report).

The 3rd part of the survey, Handling, has tested samples of specific material categories in order to establish if the RCS in the way it is organized and presented achieves the best possible division, collection and utilization of the materials which are collected.

Clear definition of the material categories that will be tested in this survey is essential, as is the used test method. This part of the survey is based on the method described in "Development and testing of a sorting and quality assessment method for textile waste" by Nynne Nørup, Kaj Pihl, Charlotte Scheutz and Anders Damgaard, Waste Management July 2018[5].

This method operates with 4 levels:

1. At Level 1, the textile fraction is manually sorted from the waste.
2. At Level 2, the textile fraction is divided into 2 main sub-fractions 1) clothing and 2) household textiles, based on how the textile category is frequently understood, plus a 3rd sub-fraction, other textiles, which enables inclusion of a wide range of products which are commonly associated with textiles (a.o. shoes, belts, handbags. See Figure 3).
3. At levels 3 and 4 the quality assessment is made on clothing and household textiles. Level 3 examines production method, fiber composition and general condition of each item. Level 4 assesses whether the clothing and household textiles can be reused, recycled or are waste. Reusable quality is divided further into 3 sub-qualities, namely A, B and C:
    - Reuse A only contains products without defects and which can definitely be reused.
    - Reuse B contains products that are still functional but have minor defects. The definitions of textiles with minor defects that are still reusable are based on the international market for low quality clothing and household textiles and consist of products with small stains, minor holes and broken zippers. Professional textile sorting centres (TSC) work according to this market which means that the quality assessment

[5] https://www.sciencedirect.com/science/article/abs/pii/S0956053X18304306

will depend on which TSC performs it, just as it will depend on the current market conditions at any given time. In order to release the test from a largely economic assessment, which has sorting by professionals as a precondition, the method focuses on the functionality of the products, dividing them between Reuse A and Reuse B along a no defects / minor defects only line. This furthermore allows people without professional sorting experiences to perform the assessment.

- Reuse C only contains rags for reuse.

To determine the general condition of clothing and household textiles at level 3, the method defines a series of defects (f.ex. wear and tear, holes, stains, fading/discoloring) as well as some avoidable conditions (f.ex. that an item was dirty when it was thrown out).

The quality tests made in connection with the current survey have followed the method described above. However, a few important modifications are made to adapt the tests to the specific purpose of the survey:

- We have not considered production method or fiber composition of the products, resulting in a lower level of detail in the registration than in the original method. In the present survey the products are only registered (weighed and counted) in each of the 3 product sub-fractions according to quality: reuse, recycling, or waste. Assessment of a product as recyclable in the present survey is simplified to dry items with major damages, but still of a size big enough to enable recycling productions such as re-make or wipers or, for knitted products, shredding. Items that are extremely dirty / polluted, f.ex. with oil, chemicals, paint, cement, urine a.s.o., are assessed as waste for incineration. So are tiny pieces of fabric and yarn. Whether there exist viable recycling methods for products of all production methods and fiber compositions is not considered in this survey.
- We have also adapted the quality assessment to be used to assess the quality of items in the sub-fraction 3) other textiles (which includes a.o. shoes, belts, handbags).

In a regular collection of textiles / emptying of clothes collection containers, obvious waste and items belonging to other waste fractions are removed at the place of collection and not included in the collection. The tested textiles samples, however, include everything; nothing has been omitted from the sample. This is in order to get a full picture of what is disposed of in the textiles collection and thus be able to assess how well the different RCSs manage to collect pure waste categories.
The quality assessment method used as a model for this survey naturally does not include non-textile waste / items belonging to other waste fractions nor a classification hereof. In the current survey we have not intended to make an assessment of these items, but bluntly classified them as waste, even when they are fully reusable items such as toys or flea market items.

Division of the textiles fraction into 3 sub-fractions

Table 1 from the initial method[5]. Overview of the definition of textile fractions in residual waste, divided into 3 sub-fractions: Clothing, Household textiles and Other textiles. The two sub-fractions 'Clothing' and 'Household textiles' are fixed (25 and 13 product types respectively), whereas the 'Other textiles' fraction contains all textile products that are not included in the other two. It serves to demonstrate the range of what is understood as textiles and is thus an "open" fraction.

	Clothing	Household textiles	Other textiles
1	T-shirts	Linnen	Duvets
2	Tops	Decoration pillowcases	Pillows
3	Blouses	Bedcovers	Footwear (also when made of leather)
4	Shirts	Curtains	Belts (also when made of leather)
5	Trousers	Towels	Handbags (also when made of leather)
6	Shorts	Dishtowels	Soft toys
7	Winter clothing (w./wo. insulation)	Facecloths	Knitted hats
8	Dresses	Potholders	Caps
9	Skirts	Rags	Flags
10	Vests	Tablecloths	Textile pieces
11	Jackets	Place mats	Couch cushions, -covers
12	Infants' clothes, incl. socks & gloves	Plaids	
13	Workwear	Pieces of household textiles	
14	Apron		
15	Swimwear		
16	Underwear		
17	Nightwear		
18	Bathrobes		
19	Socks		
20	Gloves		
21	Scarfs & ties		
22	Handkerchiefs		
23	Costumes		
24	Parts of clothing		
25	Pieces of clothing		

Table 1 from the initial method[5].

Some products, which are partly made of textiles or which have textile-similar features, do not belong to normal textiles collection and are considered waste in this survey, regardless of their condition. Such products are f.ex. carpets, rugs, upholstery, parts of furniture, mattresses / top mattresses, tents, tarpaulins, covers for animals, any kind of obvious production waste, any kind of disposable personal hygiene products, disposable diapers as well as disposable napkins / table cloths / gloves.

[5] https://www.sciencedirect.com/science/article/abs/pii/S0956053X18304306

6. Survey results

Part 1: Structure

Quest. no.	Survey field & questions	Confirmative responses
	Ownership of RCS / RCS company type	
1	The municipality itself	6
2	Municipally owned company	24
3	Private company	1
	Container type used for textiles collection	
6	Regular 2 m^3 collection container	30
7	Mini container (400 – 1.100 liters)	1
8	Midi container (6 – 12 m^3)	1
	RCS opening hours	
13+14	Only afternoon	9
12-14	Normal business hours	19
11-15	24 hours	4
	How can you get to / access to the RCS	
16	By public transport	15
17	Small cars	28
18	Vans	27
19	Trucks	22
20	Collector has access outside of opening hours	8

Most of the RCS are Inter-Municipal Companies (IMC) / owned by local municipalities.

Almost all RCSs rely on the textile collectors to use their own clothes collection containers. One important exception is a Danish IMC which bought the containers from the collector.

Few RCSs allow the textile collector to enter the RCSs outside of regular opening hours.

Most RCS have access for all kinds of vehicles. A few which are local small RCS connected with residential areas in tight urban settings do not allow any cars at all to enter.

Quest. no.	Survey field & questions	Confirmative responses
	RCS location type	
22	Urban	16
23	Rural	5
24	Mixed	10
	RCS prospect users / Vicinity population size	
25-27	Less than 10.000	7
28	Between 10.000 and 25.000	11
29	More than 25.000	12
	Functionality assessment	
30	Easy to get to the RCS (for users)	24
31	Convenient opening hours (for users)	27
32	Practical, easy to use (for users)	29
33	Easy access (for collector)	23
34	Convenient access hours (for collector)	20
35	Good system for disposal of non-textile items and textile waste	15

The RCS in the survey represent a good mix of sites in the cities and in the countryside.

Similarly, they make a good mix of sites with rather small prospect user populations and sites with quite big prospect user populations.

The respondents in Norway have not answered all the questions in the survey for all the RCS. It was, however, possible to get many of the factual answers in this first part of the survey from the websites of the municipalities and waste management companies that operate the RCS.

Clarification of questions no. 33 and 34, Easy access and Convenient access hours for collector: Some RCS, in particular those situated in urban areas, have tight space conditions which makes it troublesome for the users if the different service providers enter the RCS to empty their containers during regular opening hours, eventually using big trucks. Similarly, it is inconvenient for the service providers if they cannot get easy and immediate access to the containers. In some

RCS this is organized smoothly by limiting the service providers' access time to the not-so-busy hours of the day or eventually by making it possible for them to enter the RCS outside of the general opening hours.

Question no. 35, Good system for disposal of non-textile items and textile waste:
In all RCS a share of waste is disposed of, intentionally or not, in the clothes collection containers. This waste can be anything from residual waste over moldy clothes to items that have nothing to do with textile collection (flea market items, mattresses, tents, tarpaulins a.s.o.). In some RCS there exist a system for how the textile collector can dispose correctly of such waste, ranging from simply leaving it behind for the RCS on-site staff to handle, to moving it to some of the other containers at the RCS. Some RCS demand that the collector takes everything with him.

Part 2: Information

Quest. no.	Survey field & questions	Confirmative responses
	Where can you get info about RCS	
36	RCS own website	3
37	Municipal website	15
38	Company website	24
39	Printed info material	7
40	You can call and ask	25
41	Info-signs at RCS	8
	Assistance from on-site staff	
42	Insufficient staff to assist users	9
43	There's staff but they don't assist	5
44	Staff wants to assist, but isn't instructed	1
45	Sufficient staff, well instructed, very helpful	15
	Information quality assessment	
46	Adequate info about RCS structure	12
47	Adequate info on materials in general	14
48	Info supports Waste Hierarchy in general	8
49	Info about textiles promote reuse	9
50	Info about textiles reject waste	1
51	Textiles value chain is explained	6
52	Used textiles described as waste	2
53	Textile waste described as useful material	6

Big variation in the level of concern for education of the RCS users

Very few RCS offered printed information material to the users. Some survey respondents have chosen to count waste sorting instructions which are down-loadable from the website as printed info-material.

Only 8 out of the 30 RCS had info-signs with more information than just the name and main characteristics of the textiles category at the RCS.

It varies very much how the RCS staff assist the RCS users. Half of the RCS do not provide this service whereas the other half clearly has it as a priority to have well-instructed staff help the users dispose correctly of the waste AND achieving a smooth site traffic.

Quest. no.	Survey field & questions	Confirmative responses
	Textile system assessment	
54	Textiles are discarded with waste	2
55	Textiles are divided into more categories	3
56	Textile category includes textile waste	19
57	Textile category doesn't include textile waste	8
58	The information is adequate and the system works	6

These questions relate entirely to INFORMATION and are thus unconnected with the quality test. Question no. 56, Textile category includes textile waste, only concerns the situation where the information (website, info-signs, RCS staff) instruct the RCS users to dispose of textile waste in the textiles collection. That textile waste was found among textiles in all RCS is another issue.

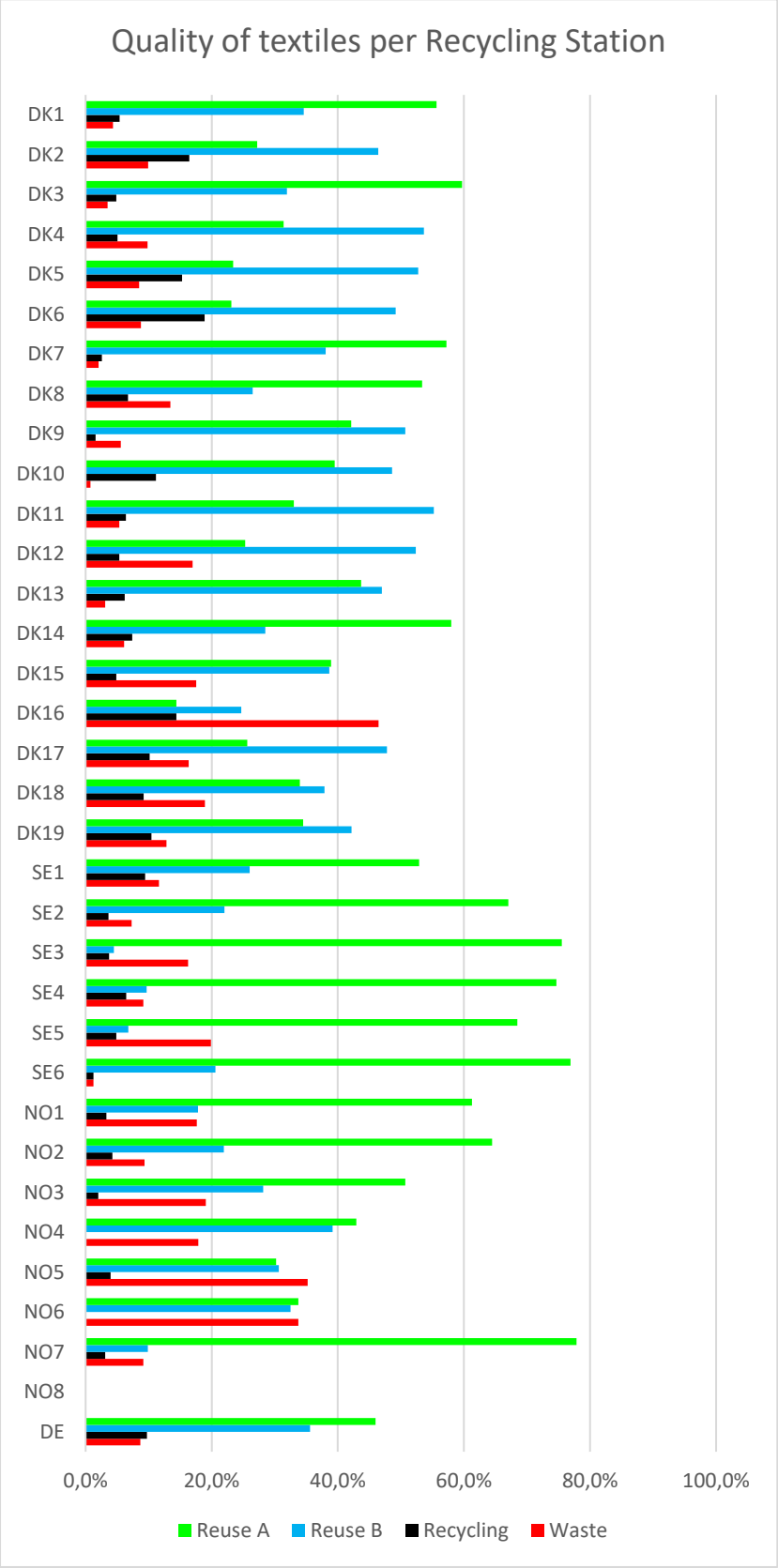
Clarification of question no. 55, Textiles are divided into more categories:
Some RCS attempt to separate reusable textiles from recyclable textiles / textile waste and engage the citizens in the separation by providing 2 places to dispose of textiles. None of the RCS in this survey had implemented this experiment. One RCS had, however, implemented division along completely different criteria, namely textiles in packing / loose textiles (= without packing). The reasoning behind this division is not clear. Another RCS had contracted one charitable collector to handle the textile collection, using containers in the general RCS design, but shortly after allowed a local charitable collector to collect textiles for reuse only, using their own promotional container design.

Question no. 56, Textile category includes textile waste:
The reality behind the responses to this question ranges from RCS which do not have a clear policy for separation of reusable / recyclable textiles and thus collect everything mixed, to RCS which clearly encourage the RCS users to deliver their damaged clothes and textile waste in particular, expecting the textiles collector to make use of the material.

Question no. 57, Textile category doesn't include textile waste:
This question caused some uncertainty among the respondents who were not sure how to translate instructions ranging between an imaginary but clear instruction like "waste wanted" and a real but less clear instruction like "you can also deliver damaged clothes and single shoes. Everything is used."

Question no. 58, The information is adequate and the system works:
Only the Swedish respondents and the one in Germany were quite clear about their assessment here, and responded confirmatively in all cases. None of the Danish and Norwegian respondents answered at all to this question.

Part 3: Handling



The quality levels

The quality test results shown in Figure 4 are the test results based on weight. It shows the scores for the 4 quality categories across the product types for each RCS.

- Reuse A
  Items without any defects
- Reuse B
  Items with minor defects
- **Recycling**
  Items not good enough for reuse, but with a potential for recycling
- Waste
  Items that are in such bad condition that it is assumed that the cost of recycling outweighs the benefit plus non-textile waste (= items that should not have been found in the textile collection at all).

There are obviously considerable variations from one RCS to the other.
In general the RCS in Sweden show a particularly big share og the reuse A quality, and the RCS in Norway, as a group, have higher shares of waste.

Two of the RCS, DK16 and NO7, stick out from the general impression. Possible reasons for this are discussed in section 8 on page 18.

Figure 4

Figure 5 shows the exact shares of the textiles according to quality for each of the RCS in survey part 3, Handling (the textiles quality test).

	Reuse A	Reuse B	Recycling	Waste
DK1	**55,7%**	34,6%	5,4%	**4,3%**
DK2	**27,2%**	46,4%	16,5%	**9,9%**
DK3	**59,7%**	31,9%	4,9%	**3,5%**
DK4	**31,4%**	53,7%	5,1%	**9,8%**
DK5	**23,4%**	52,8%	15,3%	**8,5%**
DK6	**23,1%**	49,2%	18,9%	**8,8%**
DK7	**57,3%**	38,1%	2,6%	**2,1%**
DK8	**53,4%**	26,5%	6,7%	**13,4%**
DK9	**42,1%**	50,7%	1,6%	**5,6%**
DK10	**39,5%**	48,6%	11,1%	**0,8%**
DK11	**33,0%**	55,2%	6,4%	**5,3%**
DK12	**25,3%**	52,4%	5,4%	**17,0%**
DK13	**43,7%**	47,0%	6,2%	**3,1%**
DK14	**58,0%**	28,5%	7,4%	**6,1%**
DK15	**38,9%**	38,6%	4,9%	**17,6%**
DK16	**14,4%**	24,7%	14,4%	**46,5%**
DK17	**25,7%**	47,8%	10,2%	**16,4%**
DK18	**34,0%**	37,9%	9,2%	**18,9%**
DK19	**34,5%**	42,2%	10,5%	**12,8%**
SE1	**52,9%**	26,0%	9,5%	**11,6%**
SE2	**67,1%**	22,0%	3,6%	**7,3%**
SE3	**75,5%**	4,5%	3,7%	**16,3%**
SE4	**74,7%**	9,7%	6,5%	**9,2%**
SE5	**68,5%**	6,8%	4,8%	**19,9%**
SE6	**76,9%**	20,6%	1,3%	**1,3%**
NO1	**61,3%**	17,8%	3,3%	**17,6%**
NO2	**64,5%**	21,9%	4,3%	**9,3%**
NO3	**50,7%**	28,2%	2,0%	**19,1%**
NO4	**42,9%**	39,2%	0,0%	**17,9%**
NO5	**30,2%**	30,6%	4,0%	**35,2%**
NO6	**33,8%**	32,5%	0,0%	**33,8%**
NO7	**77,9%**	9,9%	3,1%	**9,1%**
NO8				
DE	**46,0%**	35,6%	9,7%	**8,7%**

Sorting scores and the colour codes

Reuse A is green when > 50%
yellow when between 25% and 50%
and red when < 25%

Reuse B is green when > 45%
yellow when between 20% and 45%
and red when < 20%

Recycling is green when < 10%
yellow when between 10% and 25%
and red when > 25%

Waste is green when < 5%
yellow when between 5% and 10%
and red when > 10%

The colours indicate evaluation:

- **Green is good**
- **Yellow is questionable**
- **Red is bad**

The scores for Reuse A and Waste are high-lighted because they are included in the aims by definition (see section 4. Aims on page 6).

It is important to keep in mind that the tested textiles samples include everything; nothing has been omitted from the sample. Normally when the textile collection containers are emptied, obvious waste and items belonging to other waste fractions are removed and not included in the collection. In order to get a full picture of what is disposed of in the textiles collection, such items are included in this test / survey.

Figure 5

7. Analysis

		Structure			Information						Handling	
		32	33	34	46	47	48	51	58	45	Reuse A	Waste
		29	23	20	12	14	8	5	6	15		
1	Denmark 1	1	0	0	0	0	0	0	0	0	55,7%	4,3%
2	Denmark 2	1	0	0	0	0	0	0	0	0	27,2%	9,9%
3	Denmark 3	1	0	1	0	0	0	0	0	0	59,7%	3,5%
4	Denmark 4	1	0	0	0	0	0	0	0	0	31,4%	9,8%
5	Denmark 5	1	0	0	0	1	0	0	0	0	23,4%	8,5%
6	Denmark 6	1	0	0	0	1	0	0	0	0	23,1%	8,8%
7	Denmark 7	1	1	1	0	0	0	1	0	0	57,3%	2,1%
8	Denmark 8	1	1	1	0	0	0	1	0	1	53,4%	13,4%
9	Denmark 9	1	1	1	0	1	0	1	0	1	42,1%	5,6%
10	Denmark 10	1	1	1	0	0	0	0	0	1	39,5%	0,8%
11	Denmark 11	1	0	1	0	1	0	1	0	1	33,0%	5,3%
12	Denmark 12	1	1	1	1	1	0	0	0	0	25,3%	17,0%
13	Denmark 13	1	1	1	1	0	0	0	0	0	43,7%	3,1%
14	Denmark 14	1	1	1	1	0	1	0	0	1	58,0%	6,1%
15	Denmark 15	1	1	1	1	0	1	0	0	1	38,9%	17,6%
16	Denmark 16	1	1	1	0	0	0	0	0	0	14,4%	46,5%
17	Denmark 17	1	1	1	0	0	0	0	0	0	25,7%	16,4%
18	Denmark 18	1	1	1	0	0	0	0	0	0	34,0%	18,9%
19	Denmark 19	1	1	1	0	0	0	0	0	1	34,5%	12,8%
20	Sweden 1	0	1	1	1	1	1	0	0	1	52,9%	11,6%
21	Sweden 2	1	1	1	1	1	1	0	1	1	67,1%	7,3%
22	Sweden 3	1	1	1	1	1	1	0	1	1	75,5%	16,3%
23	Sweden 4	1	1	1	1	1	1	0	1	1	74,7%	9,2%
24	Sweden 5	1	1	1	1	1	1	0	1	1	68,5%	19,9%
25	Sweden 6	1	1	1	1	1	1	0	1	1	76,9%	1,3%
26	Norway 1	0	0	0	1	0	0	0	0	0	61,3%	17,6%
27	Norway 2	1	1	0	1	0	0	0	0	1	64,5%	9,3%
28	Norway 3	1	1	0	0	0	0	0	0	1	50,7%	19,1%
29	Norway 4	1	1	0	0	0	0	0	0	0	42,9%	17,9%
30	Norway 5	1	1	1	0	0	0	0	0	1	30,2%	35,2%
31	Norway 6	1	1	1	0	0	0	0	0	0	33,8%	33,8%
32	Norway 7	1	1	0	0	1	0	0	0	0	77,9%	9,1%
33	Norway 8	1	1	0	1	1	0	0	0	0		
34	Germany	1	0	0	0	1	1	1	1	0	46,0%	8,7%

Figure 6 Figure 6 shows the total scores for all RCSs in the survey. The scores are organized in the 3 parts of the survey: structure, information, and handling. The blue shades indicate full or very high scores in a survey field.

- The 3 goals set for **Part 1, Structure**, are considered met with confirmative answers for the questions no. 32, 33, and 34.
- The 5 goals set for **Part 2, Information**, are considered met with confirmative answers for the questions no. 46 and 47, no. 48 and 51, no. 58, and no. 45.
- The 3 goals set for **Part 3, Handling**, are considered met with a score of maximum 5% for waste AND at least 50% for Reuse A.

Concerning part 2, Information

Assessment of the quality of the information not surprisingly turned out to be complicated; it is much simpler to state with a yes or a no if the RCS has an info-sign (question 41) than to decide whether the given information is adequate or not (questions 46 and 47). The question opens for different expectations / reference frameworks on the part of the individual respondents. It does f.ex. make a difference whether the respondent is himself a clothes collector or is unfamiliar with how the textiles flows work. The questions 48-53 are much easier to answer in this respect. However, the given answers clearly indicate that there is plenty of room for improvement when it comes to information to the public about handling and disposal of textiles:

- Only half of the RCS are assessed as giving adequate information about the materials in general
- It strikes one as very unfortunate that only 8 of the RCS in the survey inform the public how the RCS strive to comply with the Waste Hierarchy
- Likewise, it is very unfortunate that only 6 RCS explain the textile value chain. 4 of them belong to the same IMC.

8. Discussion

The methods

In section 5. Method on page 7 it is indicated that the use of a “binary” format (formulating all questions so that they can be answered by a yes or by no answer, the latter indicating a no) was found to carry a risk of misunderstanding/misinterpretation of some questions, unless formulated very precisely. Failing to do so could eventually result in incomprehensible, useless, or even missing answers.
As an example, take question no. 51 which asks if (in the information given by the RCS operator) the textiles value chain is explained. “Yes” seems to be a clear answer, but it reveals no information about the quality of the explanation; is it an adequate explanation? Is it even a fully correct explanation? No answer leaves doubt. Does it mean “no, the textiles value chain is NOT explained”, or does it simply indicate that the question is un-answered?
Again, concerning the quality of the explanation, could the respondent have used this suggested “no” to signal that there is an explanation, but that it is misleading? Or that there is an explanation, but almost hidden in the RCS website from where it takes determination to dig it out?

Counting the “scores” in this survey must be done carefully. The wording of the questions are not made so that the answer “yes” is always a positive answer, and consequently you cannot “count scores” simply by summing up the confirmative responses. For example, question no. 42 “*Not enough staff to assist*” in the *Assistance from on-site RCS staff* is correctly answered with a “yes” if at this RCS there is too few on-site staff, not allowing time for the staff to assist the RCS users. But this is not a positive point. In another survey such formulations must be reconsidered.

In the section 7. Analysis on page 17 it is questioned whether the intention to design the survey so it can be implemented by more or less everyone is at all realistic. It is fair to expect that answers to some questions asking for assessment will to a high degree depend on the respondent’s experience with handling of textiles.
Regarding Figure 4 on page 14 it was noticed that the results from RCS called Norway 7 stick out: the share of Reuse A is extremely high, leaving the other categories, even Reuse B, almost insignificant. The person who performed this particular quality test was the only person in this survey working as a researcher, without having a professional foundation in the field of second-hand textiles. The assessments made by the researcher could be based on f.ex. the technological possibilities of reusing/recycling certain items and materials without assigning any economical reality to the assessment, whereas the second-hand textiles professionals could be more likely to combine their assessment of the items with the probability of sale as they know it. The survey instruction in its current form does not offer any advice as to which understanding is more correct.

Conditions invisible in the survey

Some conditions in certain RCS were not foreseen when the survey was planned or were not expected to influence the result of the survey. Such conditions are consequently not included among the questions. It can f.ex. be the location of the textiles collection containers outside the fence surrounding the RCS instead of inside, or the convenience of the location of the textiles collection container compared to other categories, f.ex. making it easier to dump textiles together with combustible waste.
In Figure 4 on page 14 it was noticed that also the results from RCS called Denmark 16 stick out: it shows an extremely high share of waste (46,5%). The main reason for this result, breach of contract, is not visible in the survey. In this particular RCS a local collector was allowed to locate his containers next to the general textiles collection containers, despite an exclusive agreement with the general collector. The local collector was even allowed to disregard the general neutral look of containers in the RCS and could thus promote collection of reusable clothes only.

9. Conclusions

Brief conclusion on how the RCSs meet the goals:

A. None of the RCS meet all goals.
B. 17 RCS out of 30 (= 56,6%) meet the goals in survey Part 1, Structure.
C. No RCS meet the goals in survey Part 2, Information, but 5 RCS (= 16,6%) meet 5 of 6 goals
D. 4 RCS (= 13,3%) meet the goals in survey Part 3, Handling
E. There are generally confirmative scores / positive assessments of the RCS structure.
F. There are generally poor scores on the assessment of information.
G. The differences in quality of the textiles between the RCSs are huge, ranging from 14,4% reuse A in one RCS to 77,9% in another, and from 1,3% to 46,5% waste.

Connection between the level of information and quality of the textiles

We wished to see if there is a relation between the level of information given about handling of textiles and the quality of the textiles which the RCS users deliver.

In Figure 7, the 30 RCS in this survey are organized according to their ranking in survey Part 2, Information, with the highest scoring RCS first and the lowest scoring RCS last. For each RCS is shown the the sum of shares reuse A + reuse B.
It appears that there is no automatic proportionality between information and quality of the textiles. But there is a trend. The 10 RCS ranking best on information also have the highest average share (84,7%) of reusable textiles, the 10 RCS ranking second best on information have the second highest average share (83,4%) of reusable textiles a.s.o.

The relation between information and textile quality depends on other conditions as well, f.ex.

1. Other possibilities for collection/reuse/recycling of textiles are there in the RCS vicinity and how these possibilities are advertised
2. Presence of different textiles categories in the same RCS
3. Other textile collectors in the same area as the RCS (or even within the RCS premises), but having special privileges, f.ex. along these lines:
   a) Collector in RCS: obligation to collect textile waste and to pay for the amount collected
   b) Other collector: privilege to collect reusable textiles exclusively, for free
4. Information material written and designed by people with poor knowledge about the second-hand textiles reality
5. A built-in conflict of interest between the desire to meet EU demands on textile waste actually recycled and another EU demand to comply with the Waste Hierarchy where reuse is the primary objective.

In Figure 8, the 30 RCS in this survey are organized according to their share of non-textile waste, items that should not have been found in the textile collection at all, with the lowest scoring RCS (= lowest share of waste) first and the highest scoring RCS last.

Again there is a trend. The RCS with a share of non-textile waste below 1% (14 RCS) have an average information score of 3,6 while the RCS with a share of non-textile waste over 1% (16 RCS) have an average information score of 1,6.

		Info	Reuse A+B	
34	Germany	7	81,6%	
21	Sweden 2	6	89,1%	
22	Sweden 3	6	80,0%	
23	Sweden 4	6	84,4%	
24	Sweden 5	6	75,3%	**84,7%**
25	Sweden 6	6	97,5%	
20	Sweden 1	5	78,9%	
8	Denmark 8	3	79,8%	
9	Denmark 9	3	92,8%	
10	Denmark 10	3	88,1%	
11	Denmark 11	3	88,3%	
14	Denmark 14	3	86,5%	
15	Denmark 15	3	77,6%	
12	Denmark 12	2	77,7%	
19	Denmark 19	2	76,7%	
26	Norway 1	2	79,1%	
27	Norway 2	2	86,4%	**83,4%**
32	Norway 7	2	87,7%	
33	Norway 8	2		
1	Denmark 1	1	90,3%	
2	Denmark 2	1	73,6%	
3	Denmark 3	1	91,7%	
4	Denmark 4	1	85,1%	
5	Denmark 5	1	76,2%	
6	Denmark 6	1	72,3%	
7	Denmark 7	1	95,3%	
13	Denmark 13	1	90,7%	
17	Denmark 17	1	73,5%	
18	Denmark 18	1	71,9%	**73,4%**
28	Norway 3	1	78,9%	
30	Norway 5	1	60,8%	
16	Denmark 16	0	39,1%	
29	Norway 4	0	82,1%	
31	Norway 6	0	66,3%	

Figure 7

	NT waste	Info score	
Denmark 3	0,0%	1	
Denmark 7	0,0%	1	
Denmark 9	0,0%	3	
Denmark 10	0,0%	3	
Denmark 11	0,0%	3	
Sweden 6	0,0%	6	
Sweden 4	0,2%	6	
Sweden 5	0,3%	6	**3,6**
Denmark 13	0,4%	1	
Denmark 5	0,4%	1	
Denmark 4	0,6%	1	
Germany	0,8%	7	
Sweden 2	0,9%	6	
Sweden 3	0,9%	6	
Norway 4	1,1%	0	
Norway 3	1,3%	1	
Denmark 6	1,3%	1	
Sweden 1	1,3%	5	
Norway 6	1,4%	0	
Norway 5	1,9%	1	
Norway 2	1,9%	2	
Denmark 2	2,1%	1	
Denmark 1	2,7%	1	
Denmark 18	3,0%	1	**1,6**
Denmark 19	3,3%	2	
Norway 7	3,5%	2	
Denmark 14	4,4%	3	
Denmark 17	5,8%	1	
Denmark 15	5,8%	3	
Denmark 12	7,1%	2	
Norway 1	7,7%	2	
Denmark 8	10,0%	3	
Denmark 16	17,9%	0	
Norway 8		2	

Figure 8

Interview statements

In section 5. Method is mentioned that interviews with RCS users and site staff are among the methods in the second part of the survey, Information. Such interviews were conducted at several of the RCSs in Denmark, but not at all in any of the other countries. The interviews that were conducted contributed to more levels and shades of answers than simply yes or no which is otherwise the format of the survey forms.

Here are some statements from the interviews, neither assessed, categorized, nor in order.

RCS staff

- Wet and moldy textiles are thrown away with combustible waste – the textile collection functions well.
- We keep an eye on what people put into the textile collection containers.
- We don't see what people put into the textile collection containers.
- It would be useful with more information directly on the collection containers.
- The best clothes go to local charitable collectors (*in a RCS with multiple collectors*).
- The best clothes are delivered to the flea-market corner (*in a RCS with a special reuse/exchange place*).
- We are instructed to tell people that damaged and dirty textiles go to the textile collection container.
- Many of the RCS users ask what happens to the clothes.
- Many of the RCS users ask what they may put to the textile collection.
- Much of the good clothes go to incineration due to people's laziness and ignorance.

RCS users

- I can't make up my mind where to put my good reusable clothes (*in a RCS with multiple collectors*).
- The information about the textile collection is very bad.
- I have used the container to get rid of pillows, duvets and curtains which would otherwise go to incineration.
- We would like to know what happens to the clothes.
- I put damaged clothes in the container because this is what the info-poster shows.
- I have never read what should be put into the container. I assume it is for reuse.
- The information is confusing if the primary objective is reuse.
- The container near us is used a lot because of the good location (*about a local RCS in a residential area*).
- At first I assumed that the containers were intended for clothing only; I didn't know that you can put household textiles, too.
- There should be more containers like this (*about a local RCS in a residential area*).
- I do read the information displayed on the container.
- I was unaware that the clothes must be delivered packed in bags.

10. Examples of high ranking and low ranking RCS

To highlight the differences between RCS with different scores in the survey, 3 RCS with high scores are compared with 3 RCS with low scores and with the average score for all RCS (figure 9).

	Structure (3 qualif. quest.)	**Information** (6 qualif. quest.)	**Handling (Quality)**			
			Reuse A	Reuse B	Recycling	Waste
Sweden 6	3	5	76,9%	20,6%	1,3%	1,3%
Denmark 7	3	1	57,3%	38,1%	2,6%	2,1%
Denmark 14	3	3	58,0%	28,5%	7,4%	6,1%
Denmark 16	3	0	14,4%	24,7%	14,4%	46,5%
Denmark 6	1	1	23,1%	49,2%	18,9%	8,8%
Norway 5	3	1	30,2%	30,6%	4,0%	35,2%
Average	2,4	2,0	46,8%	33,7%	6,6%	12,9%

Figure 9

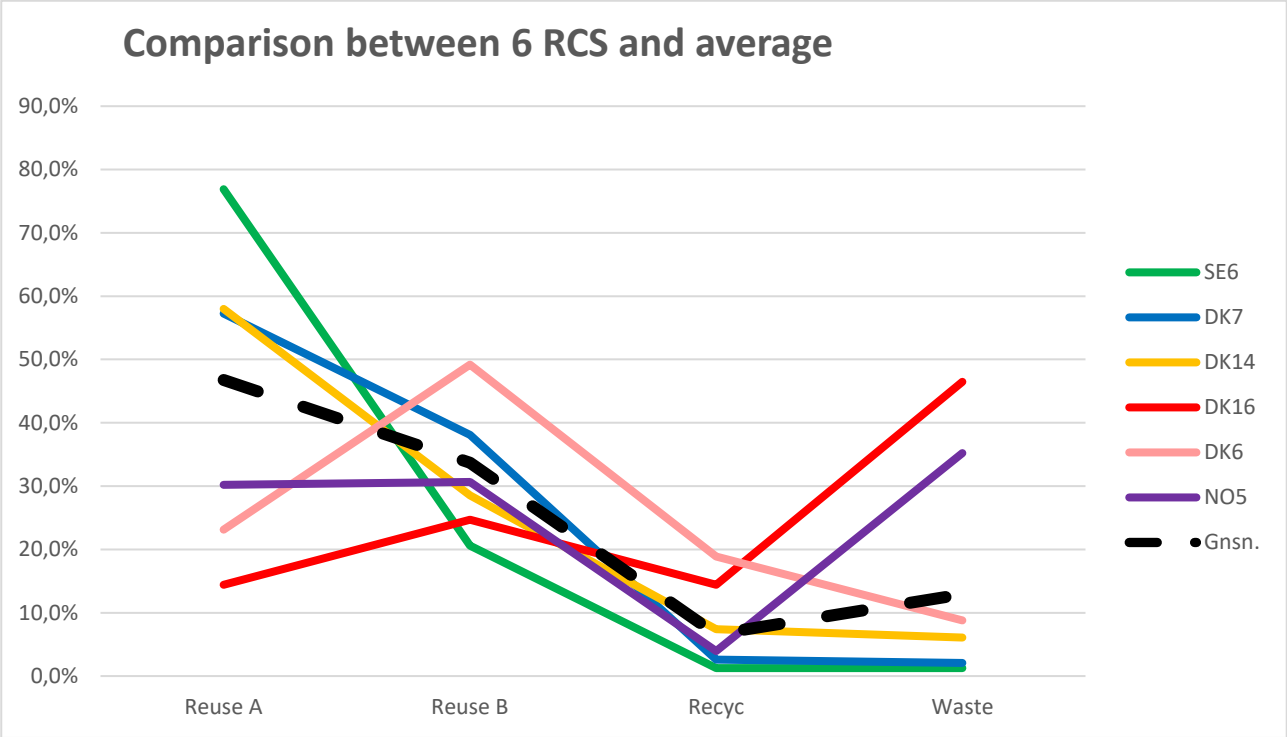


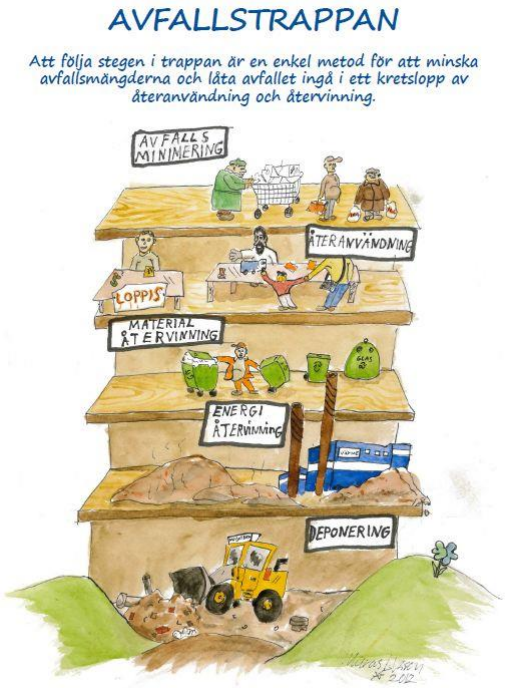
Figure 10 Figure 10 shows nothing new, but illustrates the different quality test results very clearly.

In the following pages each of the selected 3 + 3 RCS are described in more details.
It becomes evident that even the RCS with high scores and are thus assumed to have the best practices have space for improvements in some fields. Conversely, the low scoring RCS can present several good practices.

High ranking RCS - Sweden 6

Details (responses from questionnaire)

- The clothes collection containers are located just inside the entrance and are extremely easy to find.
- The structure of the site allows for easy in – easy out.
- The website offers comprehensive information about the types of waste you can deliver at the RCS, advice how to sort the waste, and what happens to it.



Assessment

The RCS is located in rural area. Its structure is very simple and users are informed well about the different waste categories by big info-boards with images of the waste types.

There is sufficient on-site staff to assist the citizens.

The RCS website emphasizes sorting the waste which is discarded at the RCS and has a very good downloadable folder informing about the main waste categories at the RCS. The Waste Hierarchy has its own page in this folder.

The website also provides a very detailed “Sorting key”, but almost no information on clothes, shoes, and textiles. It does, however, refer clothing to the clothes collection containers for reuse, or to combustible waste. This makes the containers the main source of information regarding textiles. They have stickers explaining both what can be put in the containers and what happens to it.

The test showed a very big share of reusable clothes and almost no waste, but “the crème” was missing.

The recommendation to the RCS management is to add more information about the textiles value chain on the website and back it up with the same type of info-boards at the containers as for other waste types. It should be investigated to which extend reusable textiles end up in combustible waste.

High ranking RCS - Denmark 7

Details (responses from questionnaire)

- There are a few staff on the site, but they don't appear much. However, they do help you when you ask for assistance.
- On the clothes collection containers are mounted holders with info-folders about the textiles collection; the information given corresponds with the company website.
- The RCS has an "Exchange Market" where you can put and take reusable items. Apart from this, the only object encouraging reuse is an info-sign telling that "Transparent bags give more reuse".

Assessment

The RCS is located near a major city. Its structure is simple and users are informed well about where to dispose of the different waste categories by info-boards with standardized symbols for the waste types.

The company website offers comprehensive information about the types of waste you can deliver, how to sort the waste, and what happens to it. There's even links to short informative videos on the importance of sorting the waste correctly and what happens to certain major waste types. The info about textiles is contradictory; it encourages you to deliver textile waste, but also informs that reuse is best.

The RCS is free of this contradiction. The clear symbols on the info-boards and containers (= no mixed messaging) leaves it to a high degree to the citizens' common sense to do the right thing. Judging from the quality test, which shows a close-to-perfect result, the citizens manage this very well.

The recommendation to the RCS management is to align its information with the Waste Hierarchy.

High ranking RCS - Denmark 14

Details (responses from questionnaire)

- At the entrance to the RCS there is a very good info-board with a map showing where to find what.
- There are 3-4 staff to help the citizens “navigate” in the RCS.
- The clothes collection containers are found right inside the entrance, making textiles the first category.
- Signs inform you that clean clothes and shoes can be left in a special place at the RCS, the “reuse house”, to support local charities.
- The waste category ”Small combustible” is excluded at this RCS, making it difficult to find out what to do with decaying textiles.

Assessment

The RCS is located near a major city. It is a very big site, but its structure is simple and users are informed well about where to dispose of the different types of waste in several ways:

- A great overview map at the entrance
- With standardized symbols for the different waste types, on all containers
- With big info-signs showing illustrations of the types of waste, at each waste category.

At the entrance you also find a big info-board telling about the Waste Hierarchy. In the office you can even pick up a variety of printed information folders. Finally, the on-site staff is very alert and helpful. In all ways the RCS presents itself as a place where you can have your questions about waste answered.

The municipal website about the RCS offers comprehensive information about the types of waste you can deliver, how to sort the waste, and what happens to it. Concerning textiles, it refers reusable clothes to the local charities / the special reuse place at the RCS, and textile waste to the textiles collection containers.

The quality test gave a very good result, surprisingly, considering all the information to deter the good clothes. Part of the explanation is that the local charities could not absorb the amounts of good clothes, so some eventually was put in the clothes collection containers. Another quality test made on textiles from the same site 2 months later (Denmark 15) shows a much different result.

Low ranking RCS - Denmark 16

Details (responses from questionnaire)

- 6 containers belonging to a local charity are located opposite the textiles collection containers.
- The sign in front of the containers encourage people to leave the good clothes to local charities in the “reuse room” next to the containers.
- A citizen is confused, cannot make up her mind where to put her bag with used clothes.
- The on-site staff are hard to find.

Assessment

The RCS is located near a city. It is a new and extraordinarily nice site, its structure is simple and users are informed well about where to dispose of the different types of waste in several ways:

- A great overview map at the entrance
- With standardized symbols for the different waste types, on all containers
- With big info-signs showing illustrations of the types of waste, at each waste category.

The operator is the same as for the RCS “Denmark 14”. It means that the information available on the website goes for this RCS as well: it refers reusable clothes to the local charities / the special reuse place at the RCS, and textile waste to the textiles collection containers.

By allowing a local charity to locate their containers just opposite to the textiles collection containers, even without having to follow the RCS standards concerning colours, marking, and information, the RCS operator/management definitely pulled the carpet away under any sensible outcome of the textiles collection.

Low ranking RCS - Denmark 6

Details (responses from questionnaire)

- Parking possibilities at the RCS are very scarce.
- The textiles collection containers are located in the most remote end of the RCS.
- Before you come to the textiles containers you pass by the “exchange corner” where you can deliver reusable items.
- Information is poor. A faded sticker showing what can be put in the textiles container is taped onto it.

Assessment

The RCS is located in a major city. It is a local RCS, serving the inhabitants in a certain residential area. There is not much space.

The section about the RCS in the municipal website offers sparse information about textiles and none about its value chain.

In this particular RCS it would probably help to make a much better sticker for the container and offer a simple printed info-folder to the local citizens.

Low ranking RCS - Norway 5

Details (responses from questionnaire)

- Written information is missing at the RCS location. No instruction at the RCS how to handle textiles.
- There should be instruction to separate reusable textiles from textile waste.
- Information about the textiles value chain should be included on the website.

Assessment

The RCS is located in an industrial area near a minor town. It serves a small community and has plenty of space; access is very easy, convenience is good.

On-site information at the RCS is minimal.

The waste management company website offers some information for the citizens about sorting of waste and which RCS receive which types of waste. What happens to certain major waste categories is explained.

Information about textiles is not much, but actually quite good:
Textiles, clothing and shoes
Textiles and clothing must be intact, clean, dry and odorless when you hand them in. Shoes should not be damaged or worn and do not need to be washed. You can also hand in single shoes.

Despite this straightforward instruction the quality test of textiles from this RCS resulted in a very big share of waste. The likely reason is the lack of information at the RCS, most notably an instruction to separate good textiles from textile waste, which obviously was put in the textiles collection containers.

It may also help to provide information about what happens to the textiles / what comes out of reusing textiles.

11. Recommendations

1. Production and use of textiles is a complicated matter, recycling and handling of textile waste just so. Doing it in an environmentally sustainable manner requires knowledge and ways. Therefore, build on knowledge. Assumptions and wishful thinking (“Everything can be used”) lead to wrong, or even damaging, decisions.

2. Most people want to do the right thing. Therefore, inform thoroughly and correctly. People want to know. Knowing about the Waste Hierarchy or the textiles material streams may not be a precondition for putting your used clothes into this container or that, but it is a great motivator to do your best, to do the right thing.

3. Generally, when you want to excel you go for the best. Textiles handling is no exception. When you want to comply with the Waste Hierarchy, go for the top, not the bottom. If you go for waste, you’ll get waste. If you go for reuse, you’ll get something better.

4. Apply ONE system. If you have 2 textile categories at the RCS you also have to define the difference and then to safeguard the difference in implementation. If you have 2 collectors you also have to justify why the one has more privileges than the other. In addition, it’s confusing for the RCS users, and rightly so.

5. Prioritize to have a well-educated on-site staff. They can make so many things at the RCS go so much better.

6. Handling second-hand clothes for the highest environmental benefit, and for any economical benefit, takes hard professional work. Hard professional work comes, reasonably, at a price. Therefore, do not ask payment to have second-hand textiles collected and handled professionally. It costs.

7. With the environmental benefits of reuse and the practical and economical requirements of separation of waste/non-waste in mind, do not accept a system where good textiles are thrown away with waste.

8. With the environmental benefits of reuse and the practical and economical requirements of separation of waste/non-waste in mind, do not accept a system where good textiles are polluted with waste.

12. Conclusion and recommendations for a waste management company

An example

Assessment of textiles collection potential in Recycling Stations Conclusion and recommendations	
Site ID	**RCS name**
Company name	
Street address	**Area code**
City	**Region**

General conclusion

The general ambition to reduce the amount and share of textile waste (waste prevention) is put into practice by moving waste to material streams intended for recycling and reuse. The way this is practiced is contrary to advice that existing recycling/reuse systems cannot make use of textile waste in an environmentally and economically sustainable way.

Specifically on RCS structure

- There is easy access to the RCS, both for small vehicles and trucks (service providers).
- A general, detailed, and easily visible site-map is set up at the entrance. The containers for collection of textiles are located just inside the entrance and are very easy to find.
- There is a special place for manual sorting of waste, advertised with “Did you sort your waste well?”, with specific instruction on particularly difficult items.
- The internal logistics of the RCS site is exemplarily simple and allows for easy in – easy out.

Specifically on information

- The municipal website offers comprehensive information about some of the types of waste you can deliver at the RCS, good advice how to sort/prepare the waste, and what happens to the waste. You can download information leaflets on a few specific waste types. However, there is no leaflet specifically on textiles.
- The information in the website concerning used clothes and which items are included in the category is inadequate. The reuse / recycle potential of the clothes, shoes, and textiles are not described at all.
- At the RCS a colorful and informative sign explaining the Waste Hierarchy is displayed. Strangely, the image is turned on its head, showing landfilling as the highest level.
- Other signs at the RCS instruct the RCS users to dispose of worn-out and damaged clothes in the containers for textiles. Yet other signs encourage the RCS users to support local charitable organizations by giving the reusable clothes to a separate collection, which is also located at the RCS.
- An adequate number of on-site staff is available to assist users / the citizens. The staff support the general RCS instruction, guiding the RCS users to dispose of the textile waste and the damaged textiles towards the textiles collection and the reusable clothes and shoes towards the separate collection conducted by local charities.

Specifically on the quality of textiles

- Extremely low quality: reuse A+B combined make 66% of the weight, recycling 4%, and waste 30%.
- 9% of the tested sample was waste that didn't belong to the category in the first place.
- Although there was after all 24,3% of the reuse A quality, the best quality, this part contained almost no "cream" items. These items generally constitute 10% of Original Clothing and are decisive for the commercial value of the product and consequently also for the incitement to further handling of the material as such.
- A material of this composition has no immediate commercial value in the current market for used textiles. After proper omission of the 30% waste, professional sorting of the remaining 70% will still give a negative economic result.

Recommendations		
1	**Recommendation:** Specific information on the textiles category, maybe even in a specific info-folder	**Argumentation:** At the moment adequate information about what belongs to the textiles category is lacking, as is information about what happens to the material.
2	Move the focus from waste to reuse	A new perspective can incite a different practice. There is a difference between collecting reusable items as a part of a waste collection and collecting waste items as a part of a collection for reuse.
3	Remove the signs with "Du kan også aflevere rent tøj og sko i vores genbrugsrum. Så støtter du lokale foreninger"	
4	One textile collection instead of two	The exclusive collection by local charities erodes the economic sustainability of the general textiles collection.

Final comments

From the survey material, data concerning individual RCS can be extracted for the production of customized RCS- or IMC-specific reports (see pages 30-31).

Much information was collected for the making of this report. More conditions than presented here can be studied on this basis. As an indication, the database contains the number of items matching all weights (Kgs) used in this report and a breakdown of reuse/recycling/waste into the 3 main categories Clothing, Household Textiles, and Other Textiles.

The report was finalized before the Danish government announced its Climate Plan, part one, in June 2020. It will be very exciting to see how the implementation of this plan will affect collection and handling of textiles.

The questionnaire below is used as a work-paper for survey parts 1 and 2. Most of the questions are meant to be marked with an X, indicating “yes” / confirmation, or not at all, indicating “no” / rejection. This is to ease simple transfer of the responses to a calculable format (Excel).

Part 1 - The RCS site and its structure	Part 2 - Information about how to use the RCS
RCS company type / Ownership of RCS 1. Municipality 2. Municipally owned company 3. Company 4. Cooperative 5. Other **Type of containers used for textiles collection** 6. Regular 2 m3 7. Mini 8. Midi 9. Maxi 10. Ship-container **RCS opening hours** 11. 6 – 8 12. 8 – 12 13. 12 – 16 14. 16 – 20 15. 20 - 6 **How can you get to / access to the RCS** 16. Public transport 17. Cars 18. Vans 19. Trucks 20. Access when site is closed **RCS location type** 21. Name of location 22. Urban 23. Rural 24. Urban & rural **RCS prospect users / RCS vicinity population size** 25. < 2.000 26. 2.000 – 5.000 27. 5.000 – 10.000 28. 10.000 – 25.000 29. 25.000 < **Functionality assessment, Citizens’ assessment** 30. Easy to get to the RCS 31. Convenient opening hours 32. Practical structure, easy to use the RCS **Functionality assessment, Collectors’ assessment** 33. Easy access 34. Convenient access hours 35. Good system for wrongly placed items	**Where to get information about the RCS** 36. RCS website 37. Mun. website 38. Company website 39. Printed info-material 40. You can call and ask 41. Info-signs / info-boards at the RCS **Assistance from on-site RCS staff** 42. Not enough staff to assist 43. There's staff but they don't assist 44. The staff wants to assist, but isn't instructed in what to do 45. There are sufficient staff and they are very helpful **Information quality assessment** 46. Adequate information about the structure of the RCS 47. Adequate information about sorting of the waste materials in general 48. Information supports the Waste Hierarchy in general 49. Information on textiles promote reuse 50. Instruction to separate waste / textiles 51. Textiles value chain is explained 52. Used textiles are labelled waste 53. Textile waste is labelled as useful **Textile system assessment** 54. Textiles are discarded with waste 55. Textiles are divided into more categories 56. The textiles category includes textile waste 57. The textiles category does not include textile waste 58. Information is adequate, the system works