Benchmark WEEE systems in Europe

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January, 2013

INTRODUCTION

Eco-systèmes, Recupel and NVMP asked Möbius to perform a broad study looking into the various collection models implemented to comply with the WEEE directive. This report contains a summary of this study.

As part of this study, Möbius analysed the setup in European countries and/or reference countries such as **Belgium, The Netherlands, France, the United Kingdom and Germany**. This report contains a high level summary of different aspects of the various collection models, such as principles, physical flow, treatment, quality, etc. In many countries a separation is made between household and professional WEEE, **the focus on this report lies on household WEEE**. Due to differences in legal structure, responsibilities, cost allocation and confidentiality, only an in-depth knowledge of the different models allows a fair comparison.
Each country is discussed separately, containing a summary one pager together with additional information. At the end of the document, a number of aspects are compared between the different countries.

Goal of the ENR initiative is to exchange information that could improve the self-efficiency of the individual members. The members will exchange information of a general nature (knowledge, best practices, performances, KPIs, …) with each other to allow their individual organisation to improve its service and performance. This exchange process will be co-ordinated and facilitated by Möbius.
Information shared on these meetings will not be disclosed to others, unless the information is already in the public domain

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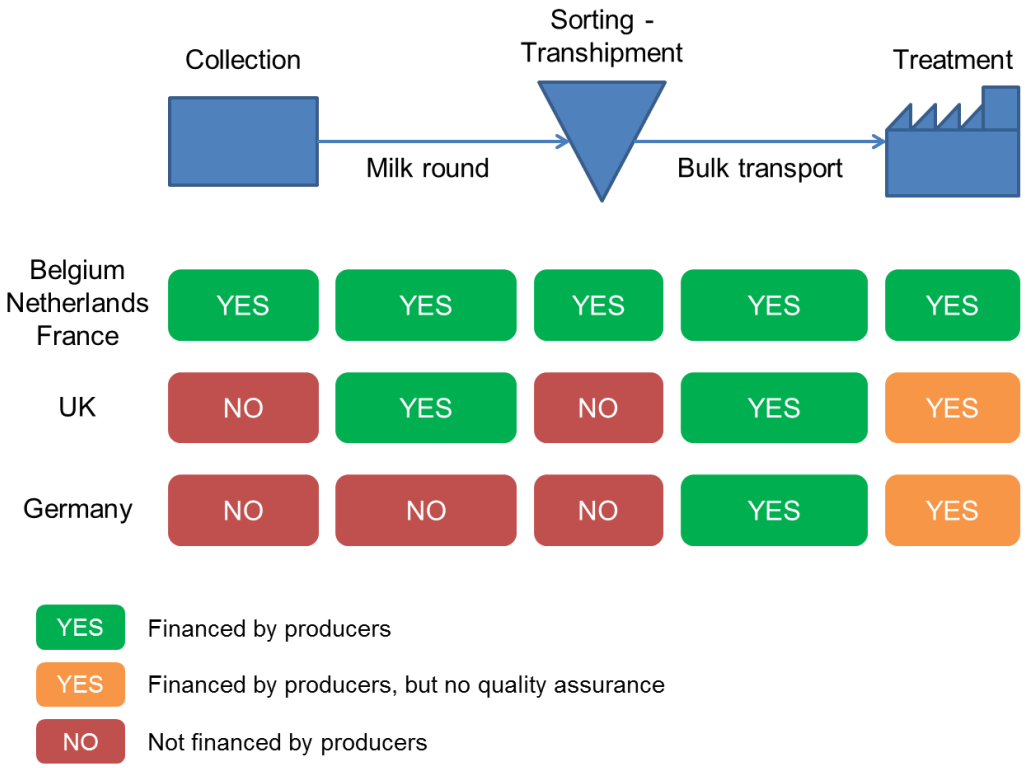
EXECUTIVE SUMMARY

This report contains a high level summary of different aspects of the various collection models adopted in Belgium, France, The Netherlands, the UK and Germany.
Due to differences in legal structure, responsibilities, cost allocation and confidentiality, only an in-depth knowledge of the different models allows a fair comparison.

Overview of the activities financed by producers and importers

In the figure below, an overview is given of the activities that are financed by producers and importers as part of their local legal obligation for the different countries that were investigated.



Belgium, Netherlands and France

In Belgium, The Netherlands and France, producers finance the entire chain of activities. A dense collection network is in place (collection from municipalities, retailers,...) and the total chain from collection to treatment is managed, controlled and financed by the collective collection schemes (= producers and importers).

United Kingdom

The system in the UK operates differently. The vast majority of the WEEE is collected via municipalities (obligation to collect in shops is redeemed via funding the DTS so retailers can refer their customers to the municipalities), so the **network is less dense** than in BeNeFra.

Due to the specific mechanism of the relative collection target of each collection scheme (see further in the UK chapter for more details), all information on costs is not disclosed to the public. Especially, the costs to be paid to get evidence notes are not disclosed at all.

However, interviews with representatives of treatment organisations and collective collection schemes, off the record, allowed us to compare the costs for some activities. **The costs for treatment, like for like, are similar to the treatment costs levels in BeNeFra**. Also the costs for transporting in bulk from a collection point to the treatment plant are comparable to the BeNeFra situation.

The most relevant difference between the UK and BeNeFra however is related to the guaranteed quality for treatment. The 'evidence note' concept results in a situation whereby every collective system has to buy evidence notes and has no control over the physical flow of the volumes. **In this way, a lot of the volume is (probably) treated at quality standards and costs well below BeNeFra standards**. The system with evidence notes is set up such that the evidence note is created before the actual treatment is done, which offers the possibility for the treatment party that issues the evidence note to trade with untreated WEEE. This can result in a cascade system of treatment whereby it is not possible anymore to determine where the actual physical treatment has taken place and at which quality level.

This system, in combination with a less strict audit concept (see further) results in a situation whereby the overall cost for the WEEE collection and treatment in the UK is (probably) lower than the cost in Belgium, The Netherlands and France, but with absolutely no guarantee towards quality or place of actual physical treatment (e.g. high risk of 'leakage').

Furthermore, **no incentive for improvement** is embedded in the system as collective schemes are only focused at meeting minimal collection targets and being able to present the associated evidence notes – the roll-out of collective quality plans such as WEEELABEX is frustrated by this system. For the collection schemes that are unable to physically collect sufficient WEEE to generate the associated ENs, the system results in a stale-mate where even if producers/importers would want to raise the level of assurance and quality of treatment of their share of WEEE, they are unable to do so.

Germany

In Germany, the collection network is **much less dense**, as there is no obligation to collect at retail shops.

Another important difference with BeNeFra is that all activities prior in the supply chain (collection, sorting and transhipment) are financed by the municipalities **due to German legal obligations.** Therefore, **only two activities remain within the financial responsibility of the producers and importers**: **bulk transport and treatment.** Cost levels for bulk transport are comparable with BeNeFra. For treatment, interviews with treatment partners revealed that in case of 'like for like' quality of treatment, the actual treatment costs are comparable with BeNeFra (some volumes of BeNeFra are even treated in Germany). **However, for the treatment of German volumes, treatment facilities and methods are chosen with best price as the main criterion which results in a significant lower treatment quality compared to BeNeFra as well as no assurance of downstream treatment and trade.**

The German system is **highly competitive**. **Municipalities can and are actively trading collected volumes with other parties**. They can register these volumes at the EAR but this is often neglected. Mostly the flows with positive market value, such as LHA and ICT, are traded with no guarantee that these volumes are treated with proper quality standards or even treated in Germany; there are indications that large quantities are exported.

In 2010 an article [1] pointed out the **(illegal) export of WEEE from Germany to countries outside the EU.** The estimated volume ranges **from 93.000 ton to 216.000 ton** for the reference year 2008. It is assumed that a large share of this volume had been in a very bad state and was not registered in the ElektroG system. Also the level of treatment conditions in these destination countries is considered to be problematic.

As a result, the German system is considerably cheaper due to the fact that an important part of the activities is paid for by the municipalities and that the supposed audit system in place (EAR) is less strict and/or demanding (local enforcement is left to the municipalities which

[1] Source: *Transboundary shipment of waste electrical / electronic equipment / electronic scrap*, Ökopol (2010)

results in a conflict of interest). The overall result is a system which, although cheaper, has a significant lower quality level with an extremely high risk of leakage.

Quantitative summary

The 'like for like' treatment costs are at the same level among the different investigated countries. In the UK and Germany cheaper options are available which result in a lower treatment quality without assurance on the downstream treatment.

The costs for bulk transport of the WEEE from collection points to treatment facilities do not show major differences when adjusted for local price indexes.

The costs of other activities such as compensation of collection points, dense WEEE collection, sorting and transhipment cannot be compared due to differences in the applicable standards, responsibilities and underlying cost/compensation structures.

QUALITATIVE COMPARISON

In the next figure, an overview is given of several qualitative aspects of WEEE collection and treatment that are applicable in the investigated countries.

	WEEELABEX required	ISO required	WF_Reptool	Third party auditing	Audited collection targets
Belgium	■	■	■	■	■
The Netherlands	■	■	■	■	■
France	■	▣	■	■	■
United Kingdom	□	▣	□	▣	□
Germany	□	▣	□	▣	□

WEEELABEX and ISO standards

In Belgium, The Netherlands and France, the operational partners are required by the compliance schemes to adopt the mentioned international standards. In the United Kingdom and Germany, no requirements are made on this topic. For the future, there are no indications that WEEELABEX or ISO standards will be made compulsory for the handling and treatment of WEEE in the UK or Germany.

WF_Reptool or equivalent

By using WF_Reptool or another equivalent tool, an objective documented track of the whole recycling path of WEEE is available. This increases the control of the compliance schemes on the flow of their collected WEEE.

Auditing by government or third parties

The quality level of the operations can be controlled through the use of external auditing. All investigated countries have adopted auditing of the WEEE operations. However, due to a lack of waste audit expertise, and the low level of control on these audits, questions are raised on the reliability of these audits in the UK and Germany.

Audited collection volume

The justification of the collected WEEE volume differs among the investigated countries.
The BeNeFra countries have adopted very extensive sampling activities to obtain proof of the actual physical volumes and better insight in the volume composition and the quality of the provided WEEE.

As a result of these frequent sampling exercises, the volume figures reported by BeNeFra are accurate and reliable and third party audited.

In the UK, collected volume figures originate from the issued evidence notes by the treatment facilities. These evidence notes are traded and questions are raised on the reliability of the collected volume figures. Sampling activities were performed once to establish the standard composition figures of the different treatment streams.

Due to the very competitive nature and the large black market of WEEE trade in Germany, reliability of the collected volume is questioned. Sampling activities are not carried out.

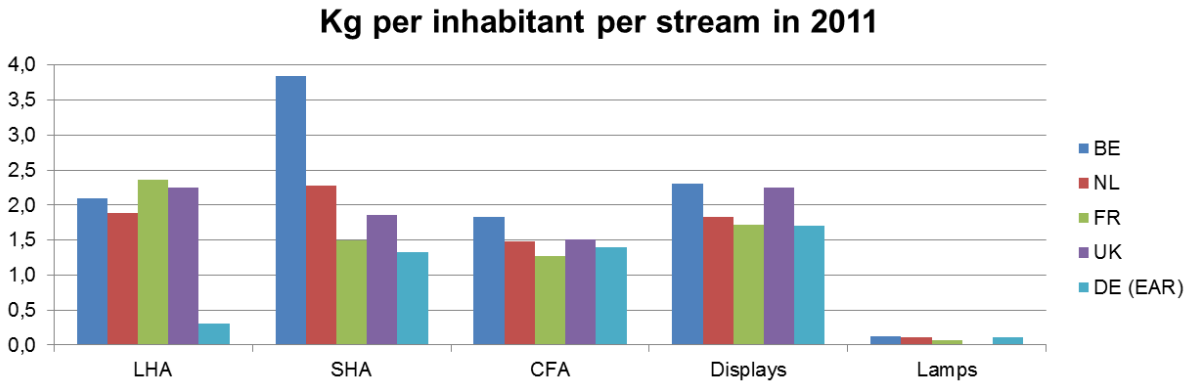
COLLECTED VOLUME

In this paragraph the collected volume per country is shown. This involves the volume that is officially collected under the control of producers and importers. In the United Kingdom this is labelled as obligated WEEE, in Germany we report the volume registered through EAR.
Belgium is ahead of the group with 10,2 kg per inhabitant and Germany has the lowest collection rate.

Country	Collected volume 2011	Collection rate 2011
Belgium	110 kiloton	10,2 kg/inhabitant
The Netherlands	128 kiloton	7,6 kg/inhabitant
France	450 kiloton	6,9 kg/inhabitant
United Kingdom	499 kiloton	7,9 kg/inhabitant
Germany	396 kiloton*	4,8 kg/inhabitant*

* Excluding Direct Trading

Below the collection rate per country is given per treatment stream. These figures must be analysed with caution as the definition of the treatment streams can vary over the different countries.



- **The high collection volume of Belgium can be attributed to the significant higher SHA stream** which in turn may be explained by the weight related charge (diftar) for regular household waste in combination with a dense network of municipalities.
- **Germany lacks a significant amount of LHA** which can be explained by the fact that this stream generates a net profit (the material yields are higher than the treatment costs). This means that the LHA is traded directly by the municipalities without interference of the producers.

It is noted that figures regarding the collected volumes are of a theoretical nature in the United Kingdom and Germany whereas in BeNeFra, these figures represent physical WEEE, justified by extensive sampling exercises.

RECYCLING RESULTS

A comparison can be made between the material recycling (excluding and including energy recovery) figures of the different countries for every treatment stream. Figures for the United Kingdom and Germany are not available.
The figures below are the audited recycling results of 2011 as reported by the compliance schemes.
It is noted that these results are dependent on the number of treatment steps taken into and the used treatment techniques. Differences in the depth of the batches may result in differences in the recycling results. Also, the definition of 'material recovery' and 'energy recovery' may deviate between the investigated countries.

Material Recycling in 2011 (%)

Stream	BE	NL	FR	UK	DE
LHA	86%	78%	75%	Not available	
SHA	74%	77%	75%		
CFA	85%	94%	81%		
Displays	89%	88%	85%		
Lamps	95%	93%	96%		
Overall	**82%**	**84%**	**79%**		

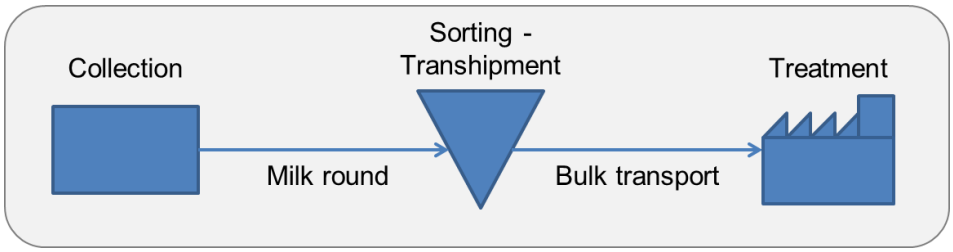
Material Recycling + Energy Recovery in 2011 (%)

Stream	BE	NL	FR	UK	DE
LHA	90%	94%	81%	Not available	
SHA	81%	96%	82%		
CFA	98%	96%	90%		
Displays	93%	96%	89%		
Lamps	95%	94%	97%		
Overall	**89%**	**96%**	**85%**		

Notes: these results depend on the number of treatment steps taken into account in the calculation of the recycling results – these may differ per country. The relative high Material Recycling + Energy Recovery value for SHA in The Netherlands is also due to the use of approved R1 energy recovery incinerators for final disposal.

WEEE COLLECTION AND TREATMENT

PROCESS STEPS



- The process starts with the **collection** of WEEE at different locations where citizens or businesses can dispose their appliances such as municipalities and retailers. In some cases a compensation is paid to these collection facilities.

- The WEEE that is collected in the collection facilities will be transported to sorting and transhipment centres through **milk rounds**.

- Because different types of WEEE require different methods of treatment, the collected volume is **sorted** into a number of 'treatment streams'. Sometimes WEEE is **transhipped** in intermediate storage locations in order to become efficient full truckloads.

- After sorting and transhipment, efficient **bulk transport** can be organised from the sorting and transhipment centres to the treatment facilities.

- The last step is the **treatment** of the appliances in order to recycle the materials of the WEEE.

COMPLIANCE SCHEMES

The WEEE directive determines that producers and importers are responsible for End-of-Life Electrical and Electronic Equipment. Although in most countries they are allowed to organise the necessary activities themselves, a lot of producers and importers throughout the different countries in Europe are grouped into compliance schemes which organise and coordinate the collection and treatment of WEEE on behalf of them. According to the legislation, different forms and number of compliance schemes are present in Europe. An overview is given below:

Country	Number of schemes	Description
Belgium	1	Recupel is the only compliance scheme.
The Netherlands	1	Wecycle is the only compliance scheme. (*)
France	3+1	Eco-systèmes (the biggest with 75% market share), Ecologic, ERP and Recylum (lamps only).
United Kingdom	± 39	Many schemes with various number of members.
Germany	0	No real compliance schemes, clearing house system.

(*) RTA only collects very small quantities of professional equipment

BELGIUM

Belgium

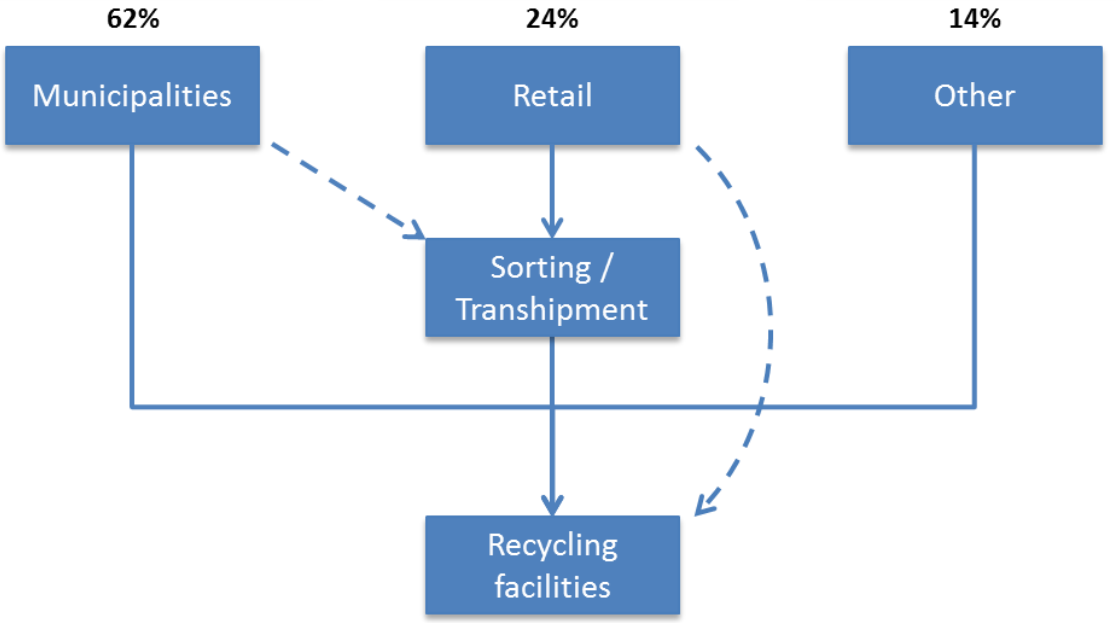
Key Figures 2011

- 110 kton
- 10,2 kg/inhabitant
- 82% MR
- 89% MR + ER

- Compensation fee
- Collected in 6 streams (LHA, CFA, SHA, TV, Lamps, Smoke detectors)

- Compensation fee
- 1 old, 1 new
- Expensive milkrounds
- Collected in 5 streams (LHA, CFA, SHA, TV, Lamps)

- Compensation fee
- Collected in 5 streams (LHA, CFA, SHA, TV, Lamps)



Compliance scheme

Recupel

- Only compliance scheme in Belgium
- Non-profit
- Directs all logistic and treatment activities
- EFQM

- Detailed downstream reporting (WF_Reptool)
- Independent third party auditing
- Sampling
- Quality standards:
  ISO 9001, ISO 140001, WEEELABEX

BELGIUM

KEY FIGURES

Number of compliance schemes	1
Volume 2011	110 kiloton
Collection rate 2011	10,2 kg/inhabitant
Material Recycling	82%
Material Recycling + Energy Recovery	89%

PRINCIPLES OF THE SYSTEM

Producers and importers have founded the **non-profit compliance scheme Recupel to direct all logistic and processing activities related to the take-back of WEEE**. Self-compliance is possible, but as of today, only a limited set of producers organise the take-back of WEEE by themselves – these are mostly related to professional equipment.

PHYSICAL FLOW OF THE WEEE

Typically WEEE arises at three types of locations: municipalities, retailers/distributors and other locations (reuse centres and charter facilities). The municipalities account for 62% of the volume, retailers are responsible for 24% of the volume and the other locations represent 14% of the volume.

Municipalities

All municipalities have to reserve space for resources (e.g. pallet boxes) to accept WEEE in **six streams** (large appliances, cooling & freezing appliances, small appliances, televisions, lamps and smoke detectors). In return they receive a **fee** which is paid by Recupel.

Generally, the WEEE from municipalities is grouped by so called 'inter-community' organisations. Recupel collects the WEEE from these organisations and transports it directly to the treatment facility.

Retailers/Distributors

Retailers are obliged to accept WEEE according to the **'1 old for 1 new'** principle. Recupel organises milk rounds to collect the WEEE from the retailers and transport it to the sorting/transhipment centres. From there on efficient full truckload transports are carried out to the recyclers. In some cases the retailer provides full truckloads itself, so the transport can go directly to the recycler.

The retailers obtain a **fee** from Recupel for providing the WEEE.

Other

Reuse centres and charter facilities also provide WEEE to Recupel. These locations present the WEEE in **five sorted streams** and receive a **compensation fee**.

Recupel transports the WEEE directly to the treatment facilities.

To obtain better insight in the volume composition and the quality of the provided WEEE, Recupel performs **sampling** activities on the collected volume.

TREATMENT

Facilities

Treatment facilities that wish to process WEEE have to be in the possession of the relevant **environmental permits** and are regularly being inspected by local and governmental authorities.

Quality of treatment and standards

Recupel aims to improve the quality of treatment by applying the following methods:

- Implementation of **quality standards** like ISO 9001, ISO 14001, WEEELABEX.
- Obligation to use **WF_Reptool** which involves detailed downstream reporting.
- Independent **auditing** by third parties.

By using WF_Reptool, reliable figures in terms of recycling results can be calculated. Below an overview is given of the material recycling rate (excluding and including energy recovery) of the different streams.

Recycling results in 2011

Stream	Material Recycling (%)	Material Recycling + Energy Recovery (%)
LHA	86%	90%
SHA	74%	81%
CFA	85%	98%
TV	89%	93%
Lamps	95%	95%
Overall	**82%**	**89%**

Note: these results are dependent on the number of treatment steps taken into account in the calculation of the recycling results.

GOVERNMENT

Recupel is the sole country-wide collection scheme and is controlled by the three regional governments. These have representatives in the board and provide advice on all major decisions.

FIGURES

The total collected household volume in 2011 was 110 kiloton which equals circa **10,2 kilograms per inhabitant**.

CONCLUSIONS

Recupel is the only compliance scheme for household WEEE in Belgium.
Insight in the volume composition and the quality of the collected WEEE by performing **sampling activities**.
High quality of operations are ensured by: • International standards such as ISO 9001, ISO 14001, WEEELABEX, EFQM, … • Independent third party audits • Detailed reporting through the use of WF_Reptool

THE NETHERLANDS

The Netherlands

Key Figures 2011

- 128 kton
- 7,6 kg/inhabitant
- 84% MR
- 96% MR + ER

- Compensation fee
- Collected in mix

- Compensation fee
- 1 old, 1 new
- Expensive milkrounds

- Compensation fee
- Sorted streams

68% Municipalities

18% Retail

14% Distribution Centres

Sorting / Transhipment

Recycling facilities

Compliance scheme

wecycle

- Only compliance scheme in the Netherlands
- Non-profit
- Directs all logistic and treatment activities

- Detailed downstream reporting (WF_Reptool)
- Independent third party auditing
- Sampling
- Quality standards:
  ISO 9001, ISO 14001, WEEELABEX

THE NETHERLANDS

KEY FIGURES

Number of compliance schemes	1
Volume 2011 (*)	128 kiloton
Collection rate 2011 (*)	7,6 kg/inhabitant
Material Recycling	84%
Material Recycling + Energy Recovery	96%

(*) *Including ICT equipment. The collection and treatment of ICT equipment was the responsibility of the compliance scheme 'ICT Milieu' until 2011. From the beginning of 2012 ICT Milieu is getting operationally and administratively integrated with Wecycle. This means that Wecycle now covers all categories of WEEE.*

PRINCIPLES OF THE SYSTEM

Producers and importers have founded the **non-profit compliance scheme Wecycle to direct all logistic and processing activities related to the take-back of WEEE**. Self-compliance is possible, but as of today, only limited set of producers organise the take-back of WEEE by themselves – these are mostly related to vending machine producers.

Wecycle is the only compliance scheme in The Netherlands for consumer flows. The RTA compliance scheme is focussed on professional material, however its volume is small in comparison with Wecycle.

PHYSICAL FLOW OF THE WEEE

Typically WEEE arises at three types of locations: municipalities, retailers/distributors and distribution centres.

Municipalities

All municipalities have agreed to reserve space and resources (e.g. containers) to accept WEEE in a **mix stream** (lamps are collected separately). In return they receive a **fee** which is paid by Wecycle. WEEE is collected by Wecycle and transported to sorting centres where the mix is sorted out into five treatment streams.

Retailers and Distributors

Retailers are obliged to accept WEEE according to the **'1 old for 1 new'** principle. Wecycle organises milk rounds to collect the WEEE from the retailers and transport it to the sorting centres. In return the retailers obtain a **fee** from Wecycle.
Distributors can receive a fee for the collection of sorted appliances in containers. Wecycle organises the direct bulk transport to the recycling facilities.

Distribution Centres

Distribution centres can collect WEEE in sorted treatment streams. Wecycle pays a **fee** for this WEEE and collects it by organising bulk transports to the sorting centres.

To obtain better insight in the volume composition and the quality of the provided WEEE, Wecycle performs **sampling** activities throughout the whole logistic chain.

TREATMENT

Facilities

Treatment facilities that wish to process WEEE have to be in the possession of the relevant **environmental permits** and are regularly being inspected by local and governmental authorities.

Quality of treatment and standards

Wecycle aims to improve the quality of treatment by applying the following methods:

- Implementation of **quality standards** like ISO 9001, ISO 14001, WEEELABEX.
- Obligation to use **WF_Reptool** which involves detailed downstream reporting.
- Independent **auditing** by third parties.

By using WF_Reptool, reliable figures in terms of recycling results can be calculated. Below an overview is given of the material recycling rate (excluding and including energy recovery) of the different streams.

Recycling results in 2011

Stream	Material Recycling (%)	Material Recycling + Energy Recovery (%)
LHA	78%	94%
SHA	77%	96%
CFA	94%	96%
TV	88%	96%
Lamps	93%	94%
Overall	**84%**	**96%**

Note: these results are dependent on the number of treatment steps taken into account in the calculation of the recycling results.

GOVERNMENT

Wecycle reports on a yearly basis to the Dutch government department 'Infrastructure and Environment' the PoM figures, the collected volume and the achieved recovery rates.

FIGURES

The total collected household volume in 2011 was 128 kiloton which equals circa **7,6 kilograms per inhabitant.**

CONCLUSIONS

Wecycle is the only compliance scheme for household WEEE in The Netherlands. (*)
Insight in the volume composition and the quality of the collected WEEE by performing **sampling** activities.
High quality of operations are ensured by: • International standards such as ISO 9001, ISO 14001, WEEELABEX, … • Independent third party audits • Detailed reporting through the use of WF_Reptool

(*) RTA only collects very small quantities of professional equipment

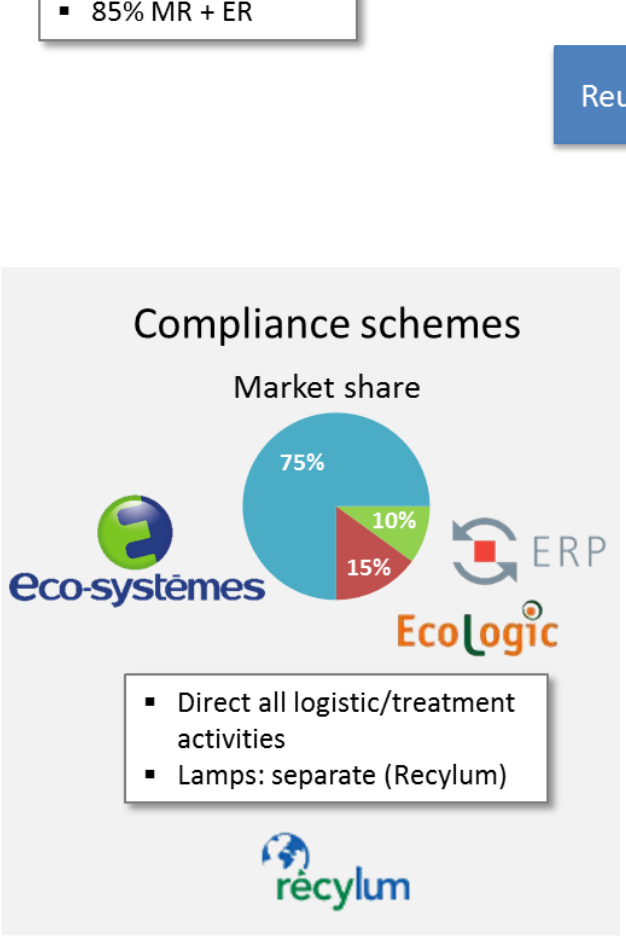
FRANCE

France

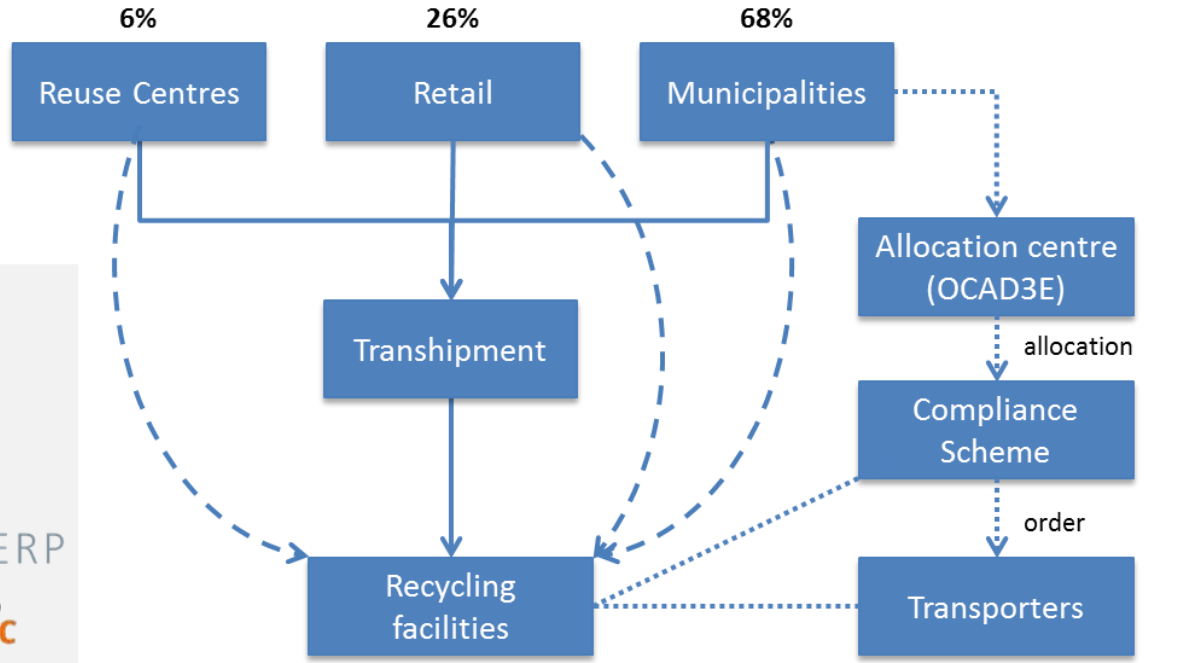
Key Figures 2011

- 450 kton
- 6,9 kg/inhabitant
- 79% MR
- 85% MR + ER

- Compensation fee
- Collected in 5 streams (LHA, CFA, SHA, Displays, Lamps)



- Direct all logistic/treatment activities
- Lamps: separate (Recylum)



- Detailed downstream reporting (WF_Reptool)
- Independent third party auditing
- Sampling
- Quality standards: WEEELABEX

Main physical flow
Secondary physical flow
Information flow

FRANCE

KEY FIGURES

Number of compliance schemes	3 + 1 (only lamps)
Volume 2011	450 kiloton
Collection rate 2011	6,9 kg/inhabitant
Material Recycling	79%
Material Recycling + Energy Recovery	85%

PRINCIPLES OF THE SYSTEM

The approved compliance schemes organise the collection and treatment of WEEE according to the PoM percentage share of their members. Self-compliance is possible, but as of today, no producer/importer organises the take-back of WEEE by themselves.

To coordinate the activities of the compliance schemes, a structure has been set up: the **OCAD3E** organism. It manages the contracts with the municipalities including the compensation fee and it **allocates the municipal collection points to the compliance schemes according to the level of collection requested to fulfil the obligation related to their PoM share.**

PHYSICAL FLOW OF THE WEEE

The physical flow of the WEEE from retailers is the same as from municipalities. WEEE is collected in **five treatment streams**: large household appliances, cooling and freezing appliances, small household appliances, displays and lamps. The WEEE is transported from the collection location where it is sorted in five different streams, to consolidation centres and then to the corresponding treatment facilities. From some collection points, where the volume is significant, the WEEE is directly transported to the treatment plants.

Municipalities

All municipalities have agreed to reserve space to accept WEEE in four sorted streams (lamps are generally collected separately). In return they receive a **fee** which is paid by the OCAD3E organism. WEEE is collected by the compliance schemes and transported to consolidating centres, where it is loaded by stream and sent to the relevant treatment facilities. Municipalities can receive a higher fee for the collection of sorted appliances in containers. The compliance schemes organise direct bulk transport to the recycling facilities.

Retailers

Retailers are obliged to accept WEEE according to the **'1 old for 1 new'** principle. The French compliance schemes organise milk rounds to collect the WEEE from the retailers and transport it to the consolidation centres. In return the retailers obtain a **fee** from the compliance schemes.
Retailers can receive a higher fee for the collection of sorted appliances in containers. The compliance schemes organise the direct bulk transport to the recycling facilities.

Reuse Centres

Reuse centres also provide WEEE (donations from consumers) to Eco-systèmes. These locations deliver the WEEE in four sorted streams (no lamps) and receive a compensation fee.
Eco-systèmes transports the WEEE then either to the consolidation centres or to the treatment facilities
(bulk transport).

The compliance schemes organise all logistic and treatment activities by subcontracting transporters and recycling facilities. The take-back of end-of-life lamps is organised through the separate compliance scheme Recylum.

To obtain better insight in the volume composition and the quality of the provided WEEE, Eco-systèmes performs sampling activities on the collected volume.

TREATMENT

Facilities

Treatment facilities that wish to process WEEE have to be in the possession of an **environmental permit.**

Quality of treatment and standards

Eco-systèmes aims to improve the quality of treatment by applying the following methods:

- Implementation of **quality** standards like WEEELABEX.
- Obligation to use **WF_Reptool** which involves detailed downstream reporting.
- **Independent auditing** by third parties.

By using WF_Reptool, reliable figures in terms of recycling results can be calculated. Below an overview is given of the material recycling rate (excluding and including energy recovery) of the different streams.

Recycling results in 2011

Stream	Material Recycling (%)	Material Recycling + Energy Recovery (%)
LHA	75%	81%
SHA	75%	82%
CFA	81%	90%
TV	85%	89%
Lamps	96%	97%
Total	**79%**	**85%**

Note: these results are dependent on the number of treatment steps taken into account in the calculation of the recycling results.

FIGURES

The total collected household volume in 2011 was 450 kiloton which equals circa **6,9 kilograms per inhabitant.**

CONCLUSIONS

The OCAD3E organism allocates the municipal collection points to the compliance schemes according to the level of collection requested to fulfil the obligation related to their PoM share.
Insight in the volume composition and the quality of the collected WEEE by performing **sampling activities.**
High quality of operations are ensured by: • International standards such as WEEELABEX. • Independent third party audits • Detailed reporting through the use of WF_Reptool

THE UNITED KINGDOM

United Kingdom

Key Figures 2011

- 499 kton
- 7,9 kg/inhabitant

- Directly sorted into 5 streams
- Funded by retailers (buy off 1 old-1 new obligation)

- 1 old – 1 new
- OR pay fee to municipalities

90%

Municipalities

10%

Retail

Waste Mgt Co.
Producer Compliance Schemes

Recycling facilities

- No WF_Reptool/WEEELABEX
- Shortage on waste audit expertise
- Treatment results (percentage material recycling) poorly monitored

Compliance schemes

Non-profit

Repic

ERP

Commercial

VEOLIA

valpak

DHL

Transform

...

Evidence Notes

- Proof of meeting relative target
- Issued at receipt: absence of trail
- Trading to match surplus-shortage
  => Profiteering

Physical flow

Information flow

THE UNITED KINGDOM

KEY FIGURES

Volume 2011	499 kiloton
Collection rate 2011	7,9 kg/inhabitant
Number of PCSs	39

PRINCIPLES OF THE SYSTEM

Producer Compliance Scheme and relative target

Producers and importers are obliged to join a **Producer Compliance Scheme (PCS)**. Each compliance scheme is responsible for financing the collection and treatment of WEEE according to the PoM percentage share of its members. Its **collection target is a relative figure calculated from the total WEEE collected in the UK.** As a consequence of this principle, each PCS only knows the exact absolute target figure at the end of the year. An example is given in the table below:

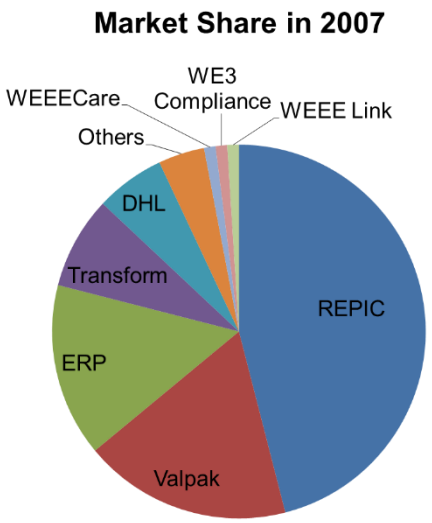
	Total PoM % of members in year x	Volume target year x (ton)
PCS 1	50%	50.000
PCS 2	30%	30.000
PCS 3	20%	20.000
Total	**100%**	**100.000**

In this example, it was clear at the end of year x that the members of PCS 1 had a relative PoM share of 50% and that the total collected volume in the UK was 100.000 ton. This means that the collection target of PCS 1 is equal to 50.000 ton.

Because the sum of the collection targets equals the total collected volume of the past year, **whenever a PCS collects too much WEEE, another PCS has a shortage of WEEE**.

There are 39 PCSs active in the UK, but only 10 of them are of a considerable size. PCSs can be divided into **non-profit** and **commercial** organizations. The first work on a cost plus basis for their members, the latter optimise their profits through member fees or evidence charges.

Because of the relative target mechanism, figures regarding PCS market share are very confidential. Only at the start of the UK WEEE legislation in 2007 market figures were published (see the chart below). Since then, no information that could impact the PCS's negotiation position on the acquisition of evidence notes was published anymore. It can be assumed that there **have not been big shifts in market share** since then although exact information on this topic is strictly confidential.



Evidence notes

Each Producer Compliance Scheme has to prove that it reached its collection target by presenting **evidence notes** to the authorities. These are issued by Approved Authorised Treatment Facilities (AATF) or Approved Exporters (AE) at receipt of the WEEE.

At the end of the compliance year, **trading of the evidence notes must be carried out in order to match the PCSs that have a surplus with the ones that have a shortage**. This principle was developed in an attempt to create a free market mechanism into the WEEE collection system. However, because of the relative target principle, **the evidence notes market is a closed system where every evidence note that is issued, is necessary for a PCS's collection target.** In the past this has led to profiteering by a number of PCSs that had little obligation to collect WEEE, but had access to a lot of evidence notes through their access to physical WEEE.

Although in the past it happened that 'ransom' prices were charged for evidence notes, until now the PCSs have always reached their target. A PCS that is not meeting its target at the end of the compliance year is considered to be committing a criminal offence and could be charged in court and lose its license.

Obligated and Non-obligated WEEE

A distinction is made between obligated and non-obligated WEEE. All WEEE that arrives for the first time at an AATF from or on behalf of a PCS is obligated WEEE. This can originate at various locations such as DCFs, distributors, households, etc.
Non-obligated WEEE involves mostly B2B appliances and WEEE collected by scrap dealers. WEEE that is sent from an AATF to other parties is also called non-obligated WEEE.

Non-obligated WEEE does not fall under the responsibility of the producers. Hence, evidence notes can only be issued for obligated WEEE.

PHYSICAL FLOW OF THE WEEE

Typically WEEE arises at two types of locations: municipalities and retailers/distributors.

Municipalities

Municipalities that accept WEEE are called Designated Collection Facilities (DCF). These are funded by the retailers through an intermediate scheme (Distributed Take-back Scheme). WEEE is collected in **five different streams**. PCSs should arrange contracts with DCFs to dispose its collected WEEE through AATFs or AEs.

Retailers and Distributors

Retailers are obliged to accept WEEE according to the **'1 old for 1 new'** principle. However, **retailers can avoid this obligation by joining the Distributor Take-back Scheme (DTS) and paying a fee**. This fee is used to fund the DCFs for the collection of WEEE.
Retailers and distributors that collect WEEE themselves should arrange the disposal of the WEEE with a PCS.

Access to physical WEEE

As described in the paragraph on evidence notes, **the access to physical WEEE guarantees the access to evidence notes which provides commercial power**. In the UK so called **Waste Management Companies (WMC) play an important role in this topic**. These are vertically integrated commercial companies that organise logistic and/or treatment activities. Approximately two thirds of the DCFs are managed by WMCs which means there is only one third left for the PCSs to manage the WEEE collection needed for their target by themselves. PCSs with a shortage of evidence notes have to negotiate with these WMCs to acquire the evidence notes from the municipal WEEE.

As a result the flow of WEEE from DCF to AATF involves a **complex system of interactions** between many parties like PCSs, WMCs, local authorities, treatment facilities, traders etc.

TREATMENT

Facilities

Treatment facilities that wish to process WEEE have to be in the possession of an **environmental permit or waste exemption.** These facilities are Authorised Treatment Facilities (ATF).
An ATF can apply to the appropriate environment authority to become an Approved Authorised Treatment Facility (AATF) which can accept WEEE on behalf of PCSs and issue evidence notes.

Quality of treatment and standards

Quality of treatment is controlled by Defra (Department for Environment, Food and Rural Affairs) which prescribes that the treatment of WEEE should be performed through the Best Available Treatment Recovery and Recycling Techniques (BATRRT). **However the control on the quality of treatment appears to be rather limited due to the absence of a central responsible party and full reliance on the local authorities to enforce legislation and carry out inspections**. The UK approach towards WEEE legislation is to transpose the EU directives, but to not exceed these minimum requirements. International standards like WEEELABEX or WF_Reptool are considered to be voluntary and PCSs have no incentive to encourage the use of these standards.

As previously mentioned, the PCSs that have a shortage of evidence notes at the end of the compliance period have to acquire evidence notes from other PCSs. The trading market for evidence notes is however completely decoupled from the physical WEEE which implicates that the **PCS that acquires evidence notes has no information or control at all on how and where the corresponding WEEE was processed**. Evidence notes are issued at receipt of the WEEE which makes it even more difficult to determine how and where the WEEE was treated. Some PCSs need to acquire evidence notes for more than 50% of their collection target which means that for more than 50% of the WEEE volume the PCS cannot provide their members with any insight in the recycling path.

Treatment results such as the percentage of material recycling are poorly monitored. Information on the final destination of WEEE and the recycling and recovery rate is opaque, especially when WEEE is transferred between treatment facilities.

Recycling results in 2011

Stream	Material Recycling (%)
LHA	Not available due to lack of public data
SHA	
CFA	
TV	
Lamps	

Composition of the WEEE

Treatment facilities need to report the amount of received WEEE. For the breakdown in lower level product categories, treatment facilities can use national protocols, issued by the authorities, which describe the composition of the treatment streams. These are derived from sampling investigations. The current protocols are based on a sampling exercise performed in 2010.

GOVERNMENT

Two government departments are qualified for the take-back of WEEE in the UK.
The department for Business, Innovation and Skills (BIS) carry the overall responsibility of the WEEE legislation in the UK. It represents the interests of businesses in the development of government policy and regulation. The BIS convert the WEEE directive into UK legislation.
The department for Environment, Food and Rural Affairs (DEFRA) focuses on environmental and waste related affairs. It is responsible for the quality of treatment and recycling. Three regional executive agencies operate under DEFRA. These are responsible for enforcement and have a more operational role (e.g. gathering data, setting targets …).

FIGURES

Volume

The total collected volume in 2011 was 499 kiloton which equals circa **7,9 kilograms per inhabitant**. Retailers and distributors accounted in 2011 for approximately 10% of the total registered volume.

These figures were reported by the regional executive environment agencies of the United Kingdom. However, **questions are raised on the validation of these collection figures**. Because of the high prices that are charged for evidence notes, it would be commercially interesting to get evidence notes issued more than once for the same WEEE or to import WEEE from other countries although this is strictly forbidden by law.

Cost

Insight in the costs of the system are difficult to obtain because of the **very sensitive nature of pricing information on evidence notes**. However, it is possible to make some general observations[2]:

- There is a disconnection between the market for evidence notes and the actual cost of collection, treatment and recycling.
- Despite increased collection and treatment efficiencies and rising commodity values, the price of evidence notes has remained relatively consistent.
- The benefit of reduced cost by WMCs has not been passed back to PCSs and producers.
- The AATF sector has significant over-capacity and is therefore tightly squeezed.
- The WMC sector is the sector that appears to be benefitting the most from WEEE revenues.

Informal interviews indicated that **for a similar treatment quality, the treatment costs for different WEEE categories are comparable to those of Belgium, France and The Netherlands**.
However, there are also treatment options which show a lower cost. In this case the quality will not be at the same level of the Belgian, French and Dutch recycling standards.

Retailers have to provide a '1 old for 1 new' service. However this obligation can be 'bought off' by joining the Distributor Takeback Scheme (DTS) which funds the municipalities (DCFs). The vast majority of retailers have joined the DTS and in the first phase from 2007-2009 the DTS raised a total of £ 10 million. In the second phase (2010-2012) the fees were significantly lower.
Fees for DCFs are approximately **£ 3000 per year in the first phase** and **£ 1000 per year in the second phase**.

Extrapolation of publicly available information reveal that the total cost of a compliance scheme in the UK is estimated at 110 – 160 euro per ton WEEE. Although this is lower than the cost in Belgium, The Netherlands and France, these costs do not include any compensation towards the collection locations, nor do they guarantee control on the location (e.g. illegal exports) and quality of the treatment of the WEEE.

[2] Source: *Cost impact of WEEE evidence trading*, 360 Environmental on behalf of Hewlett Packard

FUTURE

For the moment discussions are taking place to reform the current WEEE concept in the UK. This could lead to relevant changes of the current concept, especially regarding the relative market share concept.

CONCLUSIONS

The collected volume in 2011 was 499 kiloton which equals circa **7,9 kg per inhabitant.** However **questions can be raised about the reliability of the collection volume figure**s. Because of the struggle for WEEE to get the evidence nodes to meet the targets, can it be avoided that WEEE is double counted or imported from other countries?
The volume target for the PCSs is a relative percentage of the total collected volume. The attempt to introduce a free market mechanism has resulted in a closed market situation where every surplus evidence note must be bought. **Access to extra WEEE to cover for the extra market share of possible new PCS members is very expensive which means that there is very little movement of members between PCSs.**
When a PCS fails to meet its collection target by its own collection network, it needs to acquire evidence notes from other PCSs**. For these acquired evidence notes, the PCS has no control whatsoever on the location and quality of the treatment of the related WEEE**. Some PCSs need to acquire evidence notes for more than 50% of their collection target which means that its members have no information on the recycling path of more than 50% of their WEEE volume. Obtaining evidence notes in order to meet the target involves thus a complex and opaque 'system' of interactions between different actors like PCSs, WMCs, municipalities, etc.
Parties that have access to physical WEEE (such as Waste Management Companies) can count on a guaranteed income and therefore have **no incentive to improve the quality of their operations** (e.g. depollution).
The level of treatment quality is 'questionable'. Possible reasons for this are the absence of trail after issuing evidence notes, the shortage on waste audit expertise, the little control PCSs have on the level of treatment, …

GERMANY

Germany

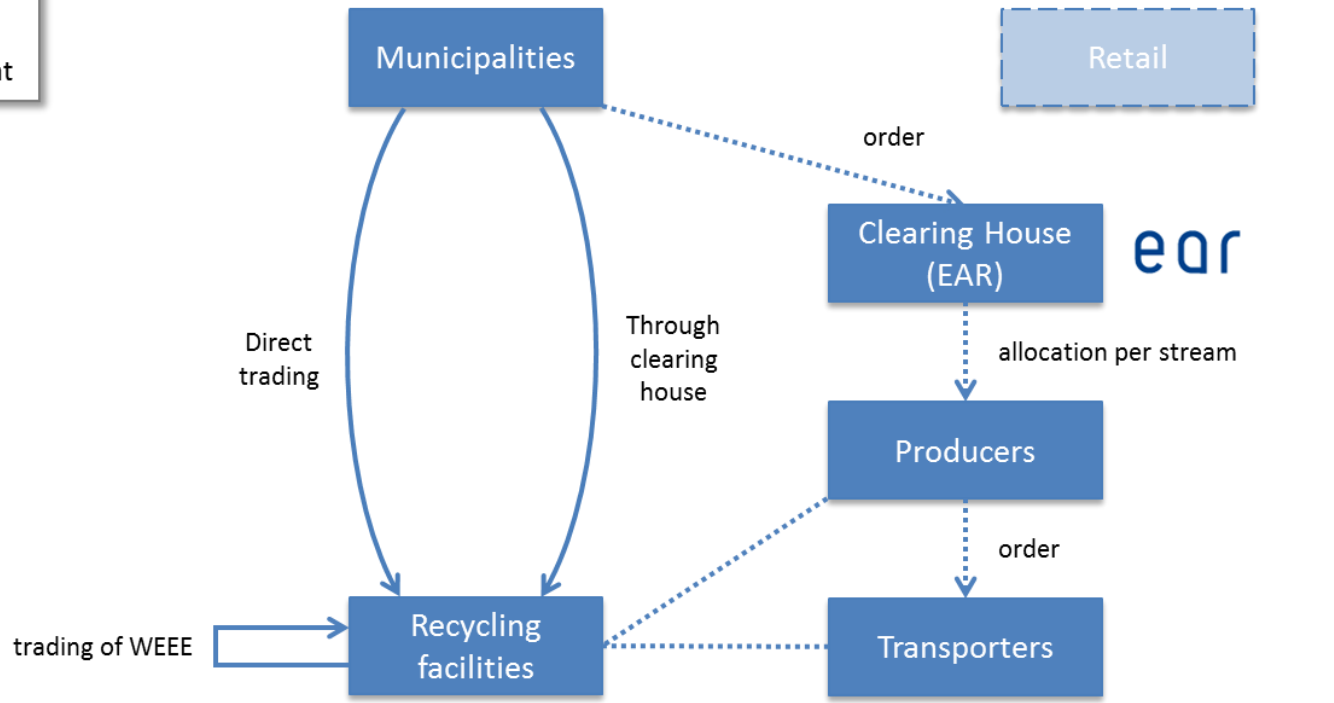
Key Figures 2011

Through EAR
- 396 ktonnes
- 4,8 kg/inhabitant

Direct
- 213 ktonnes
- 2,6 kg/inhabitant

- No fee for space and resources
- Directly sorted into 5 streams

- No compensation fee
- Voluntary
- No expensive milkrounds



- No WF_Reptool/WEEELABEX
- Limited auditing
- Easy to acquire certificate
- Yearly reporting on high level
- Price is most important aspect

GERMANY

KEY FIGURES

Volume 2011	396 kiloton (through EAR) 213 kiloton (direct trading) 609 kiloton (ElektroG - Total)
Collection rate 2011	4,8 kg/inhabitant (Through EAR) 2,6 kg/inhabitant (Direct trading) 7,4 kg/inhabitant (ElektroG - Total)
Number of compliance schemes	0

PRINCIPLES OF THE SYSTEM

The system is based on the translation of the European Directive in the national law: "Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment" (ElektroG).

Legal obligations

1. *Municipalities' legal obligation*
   Municipalities are by law responsible for historical waste (before August 2005), while producers are responsible for future waste (after August 2005). As this principle could not work in practice, a framework agreement was set up between the municipalities and the producers: **each municipality offers space for at least five containers free of charge**, while the producers provide containers and organise transport and treatment.

2. *Retail's legal obligation*
   Retailers are NOT obliged to take back old appliance but only do this on a voluntary basis. They can offer the volume free of charge at the municipality collection point but they have to arrange the transport for themselves. As such, retail collection points are rather rare.

3. *Recycler's legal obligation*
   To be able to recycle, a company only needs a 'certificate' (Entsorgungsfachbetrieb) which is very easy to acquire. The yearly reporting is on very high level and only limited auditing is performed by external auditing firms. WEEELABEX is not a standard in Germany and WF_Reptool is not used.
   All these factors together ensures that there is **no stimulus to use a state-of-the-art high quality** (and probably more expensive) recycling process.

Clearing house

In Germany, there are no compliance schemes but the collection system works through a **clearing house system, namely the Elektro-Altgeräte Register (EAR)**. This clearing house is set up by a board consisting of representatives of the producers, distributors, public waste management authorities, the federal and Länder governments, the waste management industry, and environmental and consumer protection associations. They assist the Competent Authority in preparing its decisions and must provide the Competent Authority with information on the data reported by producers.

EAR also calculates the quantities of WEEE (per stream) for each registered producer to collect from public waste management authorities and calculates the time and place from where each registered producer has to collect the WEEE and reports the figures. However, **no optimisation for allocation to distance is implemented**. A consequence is that recycling facilities have transport subcontractors all over Germany to reduce transport costs. An additional risk is that they never know what material they will receive, which puts pressure on the recycling tariffs.

ERP Deutschland and Ecologynet are two organizations similar to a producer compliance scheme, but are actually more a buyer platform. They gather several producers to enlarge the volume and decrease the price for transport and treatment.

PHYSICAL FLOW OF THE WEEE

The network structure has historically grown. Typically WEEE arises at two types of locations: municipalities and distributors. Retailers do not have an obligation to accept old for new, but only do this on a voluntary basis.

Municipalities

- **No fee** for using space at the collection points (1500).
- Direct sorting by consumer **into five bulk streams**: LHA, CFA, SHA, ICT, Lamps.
- Direct bulk transport from the collection point to the recycling facility

Distributors

- More than 2000 B2B distribution centre collection points.
- **Paid by user.**

The consequence of this structure is that there are **no sorting centres** in Germany, as the consumer sorts the WEEE directly at the municipalities of B2B collection points.

Trading

There is **a lot of competition** present in the German system. Municipalities can trade collected volumes with other parties. They can register these volumes at the EAR but this is often neglected. Mostly the positive flows such as LHA and ICT are sold after which there is no guarantee that these volumes are treated properly or not exported.

In 2010 an article [3] pointed out the **(illegal) export of WEEE from Germany to countries outside the EU.** The estimated volume ranges **from 93.000 ton to 216.000 ton** for the reference year 2008. It is assumed that a large share of this volume had been in a very bad state and was not registered in the ElektroG system. Also the level of treatment conditions in these destination countries is considered to be problematic.

TREATMENT

Facilities

Producers pay treatment partners an all-in price for collection & treatment. The treatment partners have to take care of the transport themselves. As the EAR can assign volumes all over Germany, they have to have subcontracting transport companies to cover the complete area of Germany.

Price is the key driver for producers to select their treatment partners. A lot of traders with low prices are present in the market, but most of them do not even have treatment plants in-house, nor do they have to under German law to be qualified as a recycling organisation.

[3] Source: *Transboundary shipment of waste electrical / electronic equipment / electronic scrap*, Ökopol (2010)

Quality of treatment and standards

Legislation in Germany is not that strict: the **European Directive is translated into local legislation, but is reduced to a minimum**. The enforcement is almost non-existing and no organization is involved in the WEEE-forum/WEEELABEX initiative.

The low level of control has as a consequence that **recycling facilities offer different treatment possibilities at different prices**. As price is the key driver for the producers, the "one star (cheaper) option" is often chosen above the qualitative option!

Also reporting is done on a less detailed level compared to Belgium, The Netherlands and France. As no actors are member of the WEEE-forum, WF_Reptool is also not used for this. Sampling, batches and audits are lacking. The little control leaves an open door for export, trading and incorrect treatment.

Recycling results in 2011

Stream	Material Recycling (%)
LHA	Not available
SHA	
CFA	
TV	
Lamps	

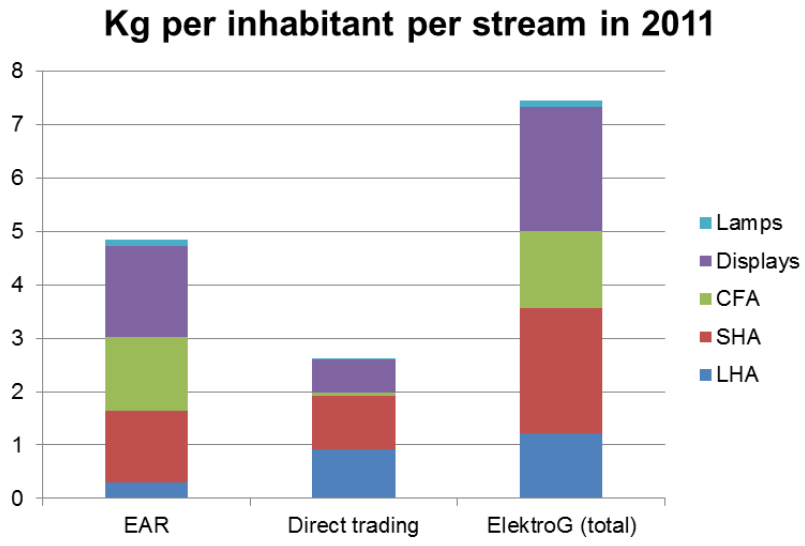
FIGURES

Volume

The EAR decides how much a producer needs to recycle, in alignment with the volume PoM (reported monthly by the producers).

The total collected volume in 2011 was 396 kiloton which equals circa **4,83 kilograms per inhabitant**. Of this volume, 87% went through the municipalities and 13% came in via the producers directly. This is however only the volume in control of the EAR and producers. There is an additional 213 kiloton collected at the municipalities which are traded. This sums up to a total of 609 kiloton or 7,43 kilograms per inhabitant.

In the figure below, the collected volume is given per channel. It is clear that **direct trading by municipalities is focused on the valuable streams SHA and LHA**. Almost no cooling and freezing appliances are collected outside the EAR system.



The previously mentioned article, on the (illegal) export of WEEE from Germany to countries outside the EU, estimated the exported volume at 155.000 ton or 2 kg per inhabitant. In comparison, the Dutch WEEE Flows research [4] estimated the illegal WEEE export in The Netherlands to be 0,4-0,8 kg per inhabitant.

Cost

The producer has a high level agreement/framework with the municipalities. EAR decides for each full container which producer needs to finance and organise the transport & treatment. Each producer has contracted treatment partners with an all-in price for collection, rent of recipients and treatment

CONCLUSIONS

The legal obligations for municipalities and producers enables a different logistic network and **no compensation fee**. Space and resources for WEEE collection are provided by the municipalities.
Logistical costs are significantly lower because of the **Retail's voluntary take-back service** which **prevents expensive milk round collecting costs for producers**.
There is **no compensation fee for retailers** that collect WEEE.
Less strict and less controlled recycler's obligation leads to **lower quality treatment with high risk of uncontrolled export.**
The German WEEEE market is very competitive which results in a large black market. **WEEE which has a negative treatment cost (e.g. LHA) is not collected through the Clearing House system, but is directly marketed by the municipalities.** The producers have no control whatsoever on the location and quality of the treatment of this WEEE.

[4] Source: *The Dutch WEEE Flows,* United Nations University, ISP – SCYCLE (2012)

DEFINITIONS

AATF:	Approved Authorised Treatment Facility
AE:	Approved Exporter
ATF:	Authorised Treatment Facility
BeNeFra:	Belgium, The Netherlands and France
CFA	Cooling and Freezing Appliances
DCF:	Designated Collection Facility
DTS:	Distributor Takeback Scheme
EAR:	Elektro-Altgeräte Register: Clearing house Germany
ER:	Energy Recovery: Recuperation of the released energy when incinerating the materials.
LHA	Large Household Appliances
MR:	Material Recycling: Recuperation by reuse of the materials.
NVMP:	The organisation NVMP acts as the implementing body for product organisations in The Netherlands in order to deal with the removal of end-of-life Electrical and Electronic Equipment.
PoM:	Put-on-Market: The number of appliances that a producer has sold, mostly determined per year.
Treatment stream:	A group of similar WEEE products which are recycled according to the same method. Typical treatment streams are LHA, SHA, CFA, Displays and Lamps.
SHA	Small Household Appliances
WEEEFORUM:	An association of European WEEE compliance schemes which provides a platform for co-operation and exchange of best practices.
WF_Reptool:	A WEEEFORUM software program that maps the entire chain of recycled WEEE starting from the delivery of the equipment at the recycling facility until the final destination of every output material.
WMC:	Waste Management Company