solving the e-waste problem

Reuse Potential

Evaluation of Reuse Opportunities within WEEE Compliance Schemes

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Reuse Potential – Evaluation of Reuse Opportunities within WEEE Compliance Schemes

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Table of Content

1 Background and rationale

Based on the findings of the "Re-Evaluate" and "Best Practices" projects[1], it was established that greater engagement with stakeholders in e-waste management systems was required to provide generic recommendations on changes to the e-waste management systems that would promote greater reuse. From the Step White Paper "One Global Understanding of ReUse Common Definitions", the definition of reuse is as follows:

Re-use of electrical and electronic equipment (EEE) or its components is to continue the use of it (for the same purpose for which it was conceived) beyond the point at which its specifications fail to meet the requirements of the current owner and the owner has ceased use of the product (Step - Solving the E-Waste Problem, 2009).

Reuse of EEE is seen as desirable as

- it conserves embodied energy and water;
- it conserves critical metals which do not emerge from recycling;
- it can make recycling more profitable;
- it creates employment opportunities (often in social economy enterprises); and
- it makes EEE affordable to low-income households and institutions.

2 Goals and objectives

The goals of this study are to

- compare and contrast the e-waste management systems in countries/ states where reuse is operating successfully (these countries/states include the United Kingdom of Great Britain and Northern Ireland and Belgium);
- conduct an analysis of the sources of e-waste within these systems;
- facilitate the identification of specific success factors and barriers for reuse within these e-waste management systems from a multi-stakeholder perspective; and
- provide generic recommendations on changes to the e-waste management systems that would promote reuse in any jurisdiction.

3 Methodology for data collection and analysis

The results of this work were derived using the following four-step process (see Figure 1). The steps are described in the following pages.

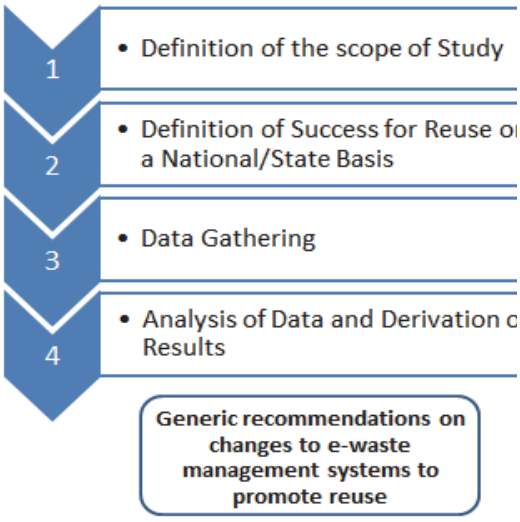

Figure 1: Methodology for data collection and analysis

[1] For more information see www.step-initiative.org or contact the Step Secretariat

3.1 Determining what products should be in scope

It is important to refer to the reuse value chain (Luger 2010, Kissling et al. 2012) shown in Figure 2 when defining the scope of the present study. The ideal value chain scenario encompasses six stages including production, distribution, use, collection, preparation for reuse and sorting, and finally, recycling and disposal. Also shown in Figure 2 are the actors involved in each of the separate stages (for a more comprehensive description of the reuse value chain as well as the actors involved, see the Step Best Practices in Re-Use Report). As illustrated in Figure 2, the scope of this study will be confined to the "collection & sorting" and the "preparation for reuse & sorting stages".

The stakeholders at the collection and sorting stage are:

- retailers,
- reuse organizations,
- recyclers,
- municipalities/government departments and
- producers/manufacturers, compliance schemes.

The stakeholders at the preparation for reuse and sorting stage are:

- reuse organizations and
- producers/manufacturers, compliance schemes.

The following steps were taken to limit the scope of the project to provide more focus on reuse activities in specific reuse operating models:

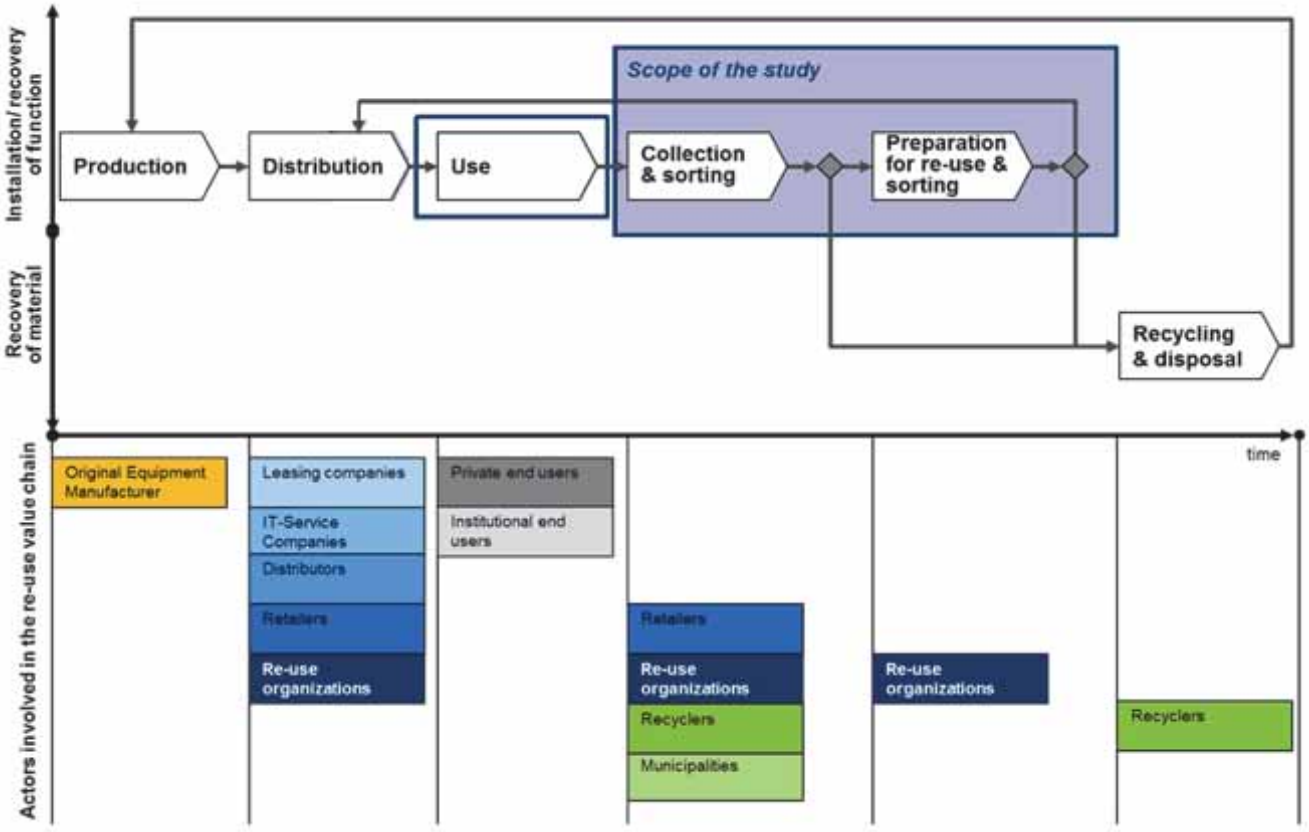

Figure 2: Generic EEE value chain and potential actors (adapted from Kissling et al. 2011)

- It was agreed upon to focus on information technology (IT) Asset Management and Social Enterprise operating models. This allowed both business-to-business (B2B) and business-to-consumer (B2C) market segments to be represented in the study.
- It was decided to talk to producer/retailer representatives for aggregated opinions, as
- It is probable that the opinion of retailers is largely reflected in producers/manufacturers for both of the chosen operating models.
- It was decided to eliminate institutional end users of the equipment from the scope, as desk research could be used to acquire this data.

3.2 Definition of success for re-use on a national/state basis

Countries were chosen based on their "relative success" in reuse business. For this reason, it was necessary to define success for reuse on a national/state basis. The members of the Step Reuse Task Force agreed the following definition:

Definition of relative success in reuse
A place where there is both a considerable supply of goods available for refurbishment and demand for reuse goods that is being serviced by reuse organisations. It does not imply that re-use is happening in a completely optimal fashion but instead may be contrasted with jurisdictions where negligible formal reuse is being undertaken.

Based on the knowledge gained from the Best Practices Report, Belgium and the United Kingdom were the chosen countries/states for this study. Choosing Belgium and the United Kingdom allowed a comparison of monopolistic and open competitive systems in Europe. Due to the existence of three compliance schemes in Belgium, the Flanders region was chosen in the case of this study.

The finalised matrix of stakeholders is shown below. The names of the stakeholders interviewed in each jurisdiction are also shown.

Country	UK	Belgium
Operating Model	***IT Asset Management***	
Re-use organisation	Dataserv	Flection
Regulators	BIS	OVAM
Compliance Schemes	ERP	Recupel
Operating Model	***Social Enterprise***	
Re-use organisation	Bryson	Komosie
Regulators	BIS	OVAM
Compliance Schemes	ERP	Recupel
Producer Association	Retra	FEE

Table 1: Overview of stakeholders interviewed for the study

3.3 Data gathering and questionnaire design

When designing a questionnaire for data collection, it had to be taken into account, with the exception of reuse organizations, that the opinions of the stakeholders targeted by this study were not well documented in the literature. A quantitative approach, such as a survey-based questionnaire, would have been preferable. However, collecting responses in a consistent format for quantitative comparison would have required specific bounded questions, and therefore, data was gathered hrough semi-structured interviews to develop an overview of reuse practices, focusing on impressions of reuse.

While a formalised set of questions was used in this method to ensure the goals and objectives of the study were met, the questions were open-ended to add richness and flexibility providing scope to record potentially hidden motivations of the participating stakeholders.

A standardised interview-guide (see Appendix A), involving questions structured in an open-ended fashion served as a basis for all interviews. This enabled a systematic analysis of the results. Internet research complemented the information gathered through the interviews. All interviews were conducted via Skype.

With all methodologies, there are limitations, and it is no different when it comes to this study. The limitations of the approach taken in this methodology include:

- There was only one reuse organization interviewed in each country chosen. The views of this reuse organization may not necessarily represent the views of other reuse organizations operating in the region. In addition, all reuse organizations were relatively large in size. In the United Kingdom, there are several smaller reuse operators that may not hot hold the views reflected by the larger reuse organizations.
- There was only one compliance scheme interviewed in the United Kingdom. With the existence of multiple compliance schemes in this region, again, the views of this compliance scheme may not necessarily be reflective of the views of all compliance schemes.
- There was only one legislative region in Belgium considered. Again, the views of this regulatory body may not be the same as the other two regulatory bodies.
- The views of the producer representatives chosen may not necessarily be the views of all the producers in each of the respective countries.

3.4 Analysis of data and derivation of results

The data collected through the semi-structured interviews was qualitative. The notes taken during each of the semi-structured interviews were transcribed and then collated into a single document. The transcription from each interview was colour-coded and then combined, grouped by themes derived from the results. These groupings were further refined to deliver a narrative of the information collected during the semi-structured interviews, with the strongest themes as topic headers. This narrative is described in the results section. This is followed with generic policy recommendations to promote reuse in Section 7.

4 Results

The results section is structured as follows. First an overview of the e-waste management system in the country of interest is provided. This includes quantitative data on reuse rates in each of the jurisdictions of interest. The success factors for reuse within these e-waste management systems are described in Section 4.2. This is followed by at a look at the barriers to reuse identified by all stakeholders in Section 4.3. Finally, a number of generic recommendations on changes to e-waste management policy that can promote reuse are proposed in Section 7.

Compliance Scheme	% Market Share of Obligation
REPIC	50%
Valpak	13%
ERP	13%
DHL	7%
Transform	7%
Electrolink	1%
Veolia	1%
WEEECare	2%
Others	6%
TOTAL	100%

Table 2: Market share of compliance schemes operating in the United Kindom

4.1 Overview of e-waste management systems

The responsibility for EEE at end-of-life (EoL) lies with producers in the EU, and the legislative framework is governed by the WEEE Directive. Currently, producers are financially responsible for WEEE collected in each Member State based on the previous year's market share (European Parliamentary Council, 2003).

4.1.1 E-waste management within the United Kingdom

In the United Kingdom, anyone can become a compliance scheme once they register with the WEEE Register Society and have an incoming supply of WEEE. All compliance schemes compete for market share and have quotas to reach each year. There are presently 37 approved compliance schemes; 24 of these schemes are dedicated to B2C and B2B categories, while 13 are dedicated to B2B only. A breakdown of the market share percentage estimated for each scheme is provided in Table 2.

The IT Asset management model is concerned with EoL computer equipment from businesses. IT equipment constitutes the greatest fraction (by weight) of B2B WEEE sold in the United Kingdom with 113,000 tonnes (t) of 300,000 t sold in 2009 (Butler 2010).

Figure 3 is taken from an IT asset management study and illustrates the general flow when it comes to EoL IT equipment from businesses in the United Kingdom (Hickey et al 2011). EoL units are transferred to a recycler mainly via a third party, and some units are diverted to

remanu-facture, or in some instances, charities.

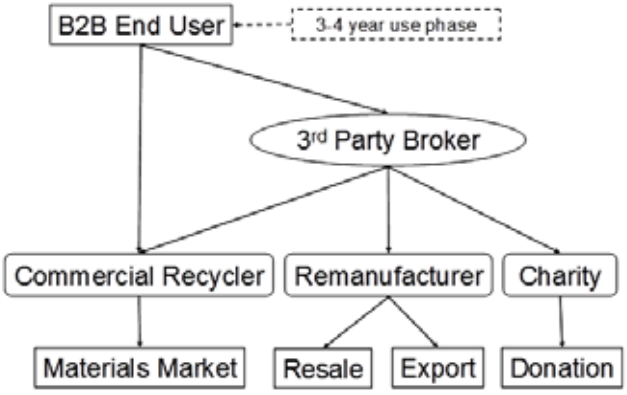

Figure 3: EoL processes for B2B Electronics in the United Kingdom (Hickey et al, 2011)

In terms of equipment deemed feasible for remanufacturing or refurbishment, it is the norm for third-party brokers to act as an intermediary between B2B end users and the reuse organizations. If an appliance is deemed unsuitable for reuse, it enters the scrap metal industry.

Unlike EoL IT equipment from businesses, white goods fall under the umbrella of B2C WEEE with 15,000 t of large household appliances sold in the United Kingdom in 2009 (Butler 2010). Under B2C WEEE compliance, a consumer has numerous options regarding product disposal. These include, civic amenity sites, retailers, Kerbside collections and open days. WEEE re-processors must register as "authorised treatment facilities"

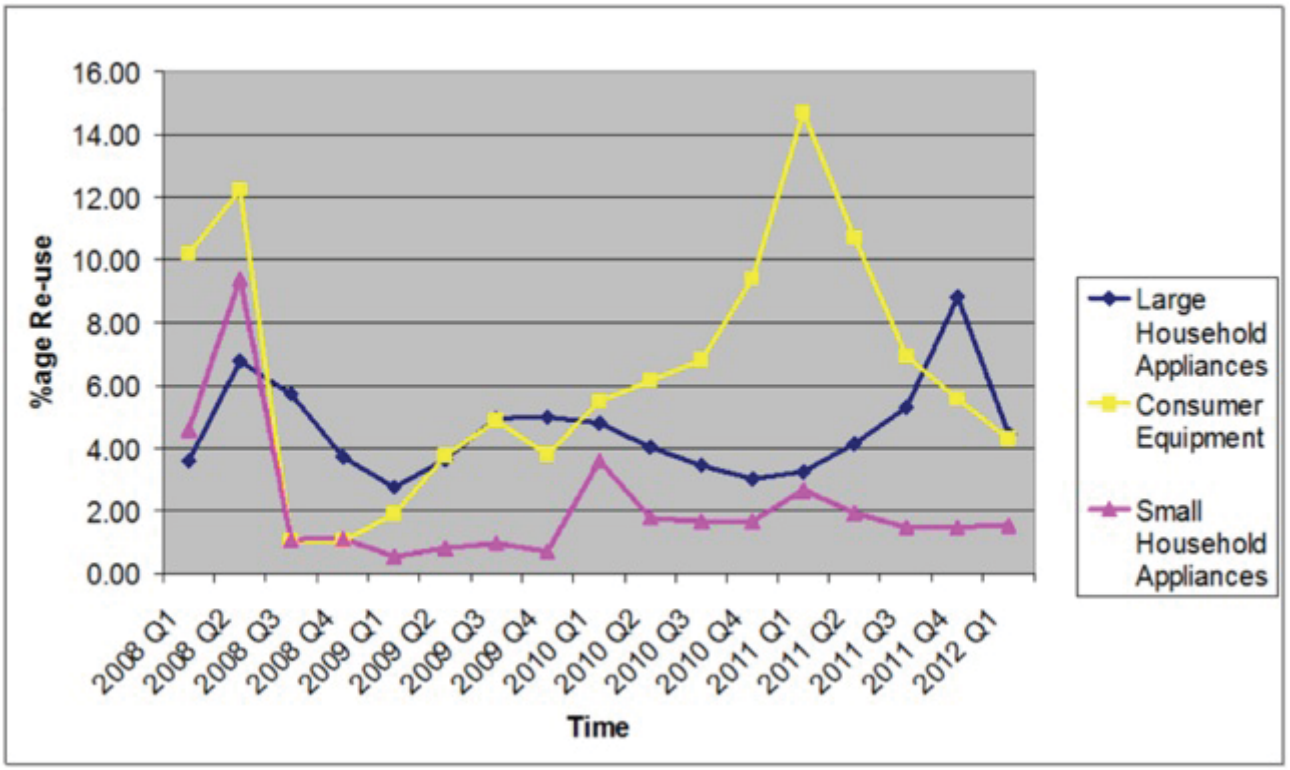

Figure 4: United Kingdom WEEE Reuse Rates 2008-2012 for CE, LHA and SHA (Source: United Kingdom Government Agency)

(AATFs) to issue WEEE evidence. Reuse of whole appliances counts as evidence and towards the United Kingdom WEEE recycling targets. Therefore, all reuse operators must register as AATFs.

Figure 4 above illustrates Eurostat WEEE re-use rates for large household appliances (LHA), small household appliances (SHA) and consumer electronics (CE) in the United Kingdom from 2008 to 2012.

CE equipment ranked first in terms of reuse rates achieved from 2010 Q2 to 2011 Q3. LHA ranked second in the three categories in terms of the reuse rates achieved from 2009 Q2 to 2011 Q3. While reuse rates for LHA fluctuated between 2 per cent and 6 per cent between 2008 Q4 and 2011 Q3, a record high of 7 per cent for this product category was achieved in 2011 Q4.

4.1.2 E-waste management within Belgium

Unlike the United Kingdom, Belgium employs a single compliance system when it comes to e-waste management. There are three legislative jurisdictions within Belgium including the Flemish Region (Flanders), the Walloon Region (Wallonia) and the Brussels-Capital Region (Brussels), with slight differences between the transpositions of WEEE legislation in each of these regions. This report will focus on the Flemish region, which is governed by by Public Waste Agency of

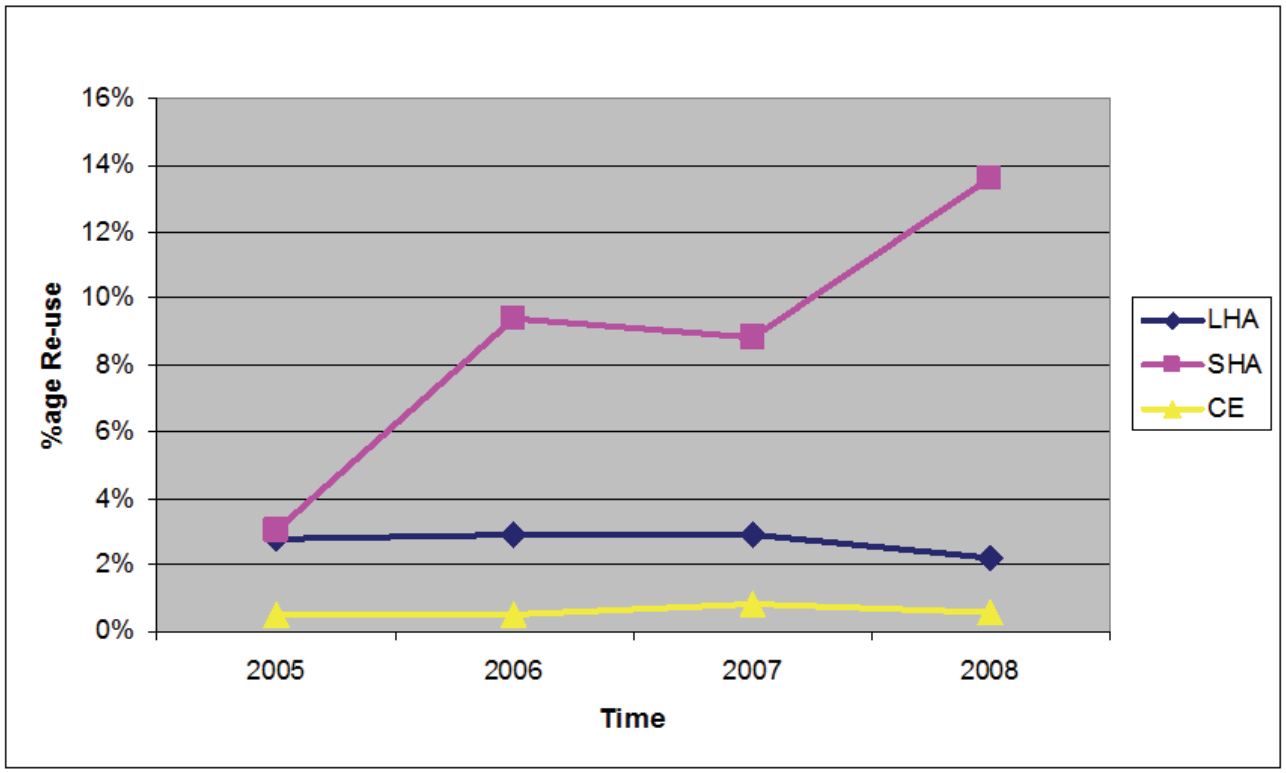

Figure 5: Belgium WEEE Reuse Rates 2005-2008 for CE, LHA and SHA
(Source: http://epp.eurostat.ec.europa.eu)

Flanders (Openbare Afvalstoffenmaatschappij voor het Vlaams Gewest [OVAM]), which is officially responsible for waste management and soil remediation.

The network surrounding waste management in Flanders includes 31 OVAM-accredited social economy enterprises and was responsible for the collection of 60,000 t of waste in 2011. This includes all kinds of waste, from furniture to household goods to textiles to used EEE, etc. Recycling is subcontracted out to waste recycling companies, as the professional network concentrates entirely on reuse activities. OVAM is an important partner for the 31 accredited reuse centres, which are united in a professional network in order to enable synergies between one another. The reuse rates achieved for all WEEE in Flanders in 2009, 2010 and 2011 were 12.2 per cent, 18.4 per cent and 17.9 per cent, respectively. This diverted approximately 9 t of goods/materials destined for recycling towards reuse in the last three consecutive years. Figure 5 illustrates Eurostat WEEE reuse rates for LHA, SHA and CE for the whole of Belgium from 2005 to 2008. Reuse data from 2008 to 2012 was not available at the time of writing this report. SHA equipment ranked first place in the three categories of equipment in terms of reuse rates achieved from 2005 to 2008, with a rate of approximately 14 per cent being achieved for this WEEE category in 2008.
LHA ranked second with reuse rates between 2 and 4 per cent being achieved during the same time period. The CE reuse rate between 2005 and 2008 remained under 1 per cent.

4.2 Success factors for reuse within these e-waste management systems

The following paragraphs provide more insight into the specific factors that contribute to successful reuse activities in the United Kingdom and Belgium. Opinions are provided from the perspective of reuse organizations, regulators, compliance schemes and producer representatives. In the case of reuse organizations, the success factors for IT equipment and for white goods are also given.

4.2.1 Reuse organizations

United Kingdom (B2C)
In the white goods domain, the reuse organization interviewed in the United Kingdom stated that “excellent access to civic amenity sites” allows them to “cherry-pick products which they determine feasible for reuse”. In the last year, there has been considerable progress in gaining accessibility to collection points and good quality used appliances. Moreover, the manner in which the refurbished second-hand appliances are presented has dramatically influenced consumer demand. Whereas previously, the gateway to the market had looked like a “charity shop”, now consumers are led into a showroom where they can view all the second-hand products “looking almost as good as new” on display. This has even allowed the reuse organization to change the focus of its marketing campaign. Two years ago, the organization had been targeting people on benefits but now they are finding first time buyers and mainstream consumers are coming off the street into their showroom expressing interest in all products and especially fridge’s and cookers for which “there is so much savings”

compared to purchasing equivalent new appliances. The recession in the country has also contributed to this shift in market demand. More focus on public engagement has been achieved through the local community papers, local radio and the "Gumtree" online platform. One reuse organisation, Bryson even have their own Facebook page that allows customers to provide testimonials that increase consumer confidence in the value of used products on offer.

United Kingdom (B2B)

In the case of the IT asset management, the ability to "handle customers' data correctly at EoL" was deemed the most important success factor. According to the firm interviewed, the information security standard "ISO/IEC 27002, plays an important role in correct data handling". With this standard, every organization, as part of the accreditation process, is expected to undertake a structured information security risk assessment process before best practice recommendations on information security management are provided. The organization noted that "once you can prove you are dealing with the data successfully, including wiping and providing a certificate, you can indemnify the customer".

Excellent "environmental tracking and tracing in audit trails" was identified as another important factor in the success of reuse business activities. Moreover, environmental services like carbon offsetting were reported to strengthen demand for the firm's core market offerings.

Understanding the market was also emphasized. The BRICS markets, particularly the Americas', were mentioned as big growth areas with LCDs and integrated desktops identified as important upcoming product groups. When asked to distinguish between customer demands within the European market, certain countries were branded as being "all about the money" (i.e., customers were more concerned about what the reuse organization was willing to pay them for their EoL equipment as opposed to the service being offered that demonstrates environmental commitment).

Belgium-Flanders (B2C)

The major success factor identified that contributes specifically to the success of white goods reuse is the branding system employed by the reuse shops in the country. This branding system ensures a unifying presentation, organization and logo for all the reuse shops and has widely gained acceptance by the general public. The reuse shops often combine their budgets to ensure promotion of their brand. External communication to the consumer market is conducted through an external office by means of a communication plan that targets specific market segments, for example students, households, etc. In Flanders and in the case of white goods, the target market is those consumers who cannot afford to buy the equivalent new appliances. A quality label called "Revisie" has been developed for electronic appliances that further instils consumer confidence in the value of used equipment. Moreover, all the reuse centres are legally obliged to give issue a one-year warranty with all second-hand white goods sold.

Belgium-Flanders (B2B)

For IT asset management in Belgium, providing a quality service that does not compromise customer data security is also viewed as an important success factor. When asked about securing the product, the response given was that "it is now necessary to

provide a range of services including certificates reporting, so we can get large NGOs and other leading companies to work with us". The quality of the service is usually the differentiating factor between companies competing to secure "quality kit" from customers. In certain instances, customers may perceive that destroying the equipment may be an easier option. However, "appropriate logistical steps" can be taken to ensure quality in the inbound channel. This, in conjunction with the correct refurbishment procedure, is vital to increase the chances of successful market exploitation of the equipment on the outbound channel where there is "generally more demand than supply".

Transparency and the provision a holistic service were also deemed important success factors. Catering for B2B and B2C consumers can be advantageous when the technical specification of inbound equipment tends to be diverse. In terms of outbound equipment, "sales are only half the job done". Even with B2C equipment, comprehensive signals for example three-year warrantees are vital to gain consumer confidence with second-hand market offerings.

4.2.2 Regulators

United Kingdom

The Department for Business Innovation and Skills (BIS) is responsible for the development of the legal framework for reuse in the United Kingdom. From the introduction section, reuse counts towards WEEE recycling targets in the country. Similar to Belgium, where there is a code of good practice for reuse, every compliance scheme must specify in their "business plan" procedures for conducting reuse activities.

The primary success factor for successful reuse according to BIS is the market. There is a "social stigma" related to second-hand products that must be addressed. Education is one means of changing consumer attitudes towards used equipment; many consumers are simply unaware of the option or the whereabouts to buy quality used equipment. Education on the environmental and social benefits of reuse could potentially commence in schools.

BIS also stress the importance of "quality control" for the success of reuse activities. First, reuse must be shown environmentally beneficial. Second, it is imperative the product is "safe, fully functional and fit for purpose". Third, the liability for final waste management must be strictly defined when the equipment comes to the end of its useful life. In the context of IT equipment, they also stress the importance of data protection for the original owners of the equipment. BIS acknowledge there is more of a thriving market when it comes to used IT equipment as opposed to white goods in the United Kingdom.

A significant development that has been encouraging reuse activities in the country is the development of PAS 141. Developed by the British Standards Institution (BSI), this standard sets out the requirements to successfully manage the process of preparing used EEE for reuse. The standard helps organizations put the right quality assurance systems in place, and looks at the handling, tracking, segregation, storage, and protection of electronic equipment and components. It also explains in detail how to prepare for reuse and covers visual inspection, electrical safety and the classification systems of prepared equipment.

Belgium (Flanders)
OVAM, the regulatory body in Belgium, grants one compliance scheme authority over the reuse organizations in each of the legislative regions. One of the key success factors identified by OVAM is the legislative and operational framework that drives to combine social economy and reuse. This framework allows social economy enterprises to focus on the collection of waste when it operates according to specific guidelines.

OVAM identifies three main success factors when it comes to reuse activities: (1) the code of good practice legislation considers the reuse of products, (2) education for people involved in reuse and refurbishment and (3) the open dialogue that exists between the collection schemes, the reuse organizations and the government, including traceability and transparency in the supply chain.

The first success factor pertains to codes of good practice. Belgian WEEE legislation currently promotes a code of good practice for reuse that includes two chapters. The first chapter provides best practice reuse guidelines that outline specific reuse criteria for each product category. For example, a product with high energy consumption when compared to a new appliance with low energy consumption cannot be considered for reuse. This means it can neither be sold as a second-hand good nor exported for resale in other countries. The second chapter provides a summation of all the steps that must be undertaken during the process of preparation of reuse. For example, the first step specifies there must be a visual inspection; this is followed by a repair/functionality test, and so on before the equipment can be considered for reuse. At the moment, the aforementioned chapters are simply a code of good practice. However, implementation in legislation is presently being discussed for the future term.

The second success factor identified was the importance of educational programmes for people working in reuse organizations. The current success of white goods reuse in the country could be partially attributed to the comprehensive training programmes provided for the people working in reuse centres. Education must be linked, of course, with a code of good practice that allows everyone to follow a standard procedure.

The open dialogue that exists between the collection schemes, the reuse organizations and the government is also deemed a very important factor when it comes to reuse. It is acknowledged that success in reuse business “did not happen overnight”; it has been a long process since the commencement of the collective system in the country. In the beginning, there was only a small percentage of equipment with potential for reuse being delivered to the reuse organizations. However, the good communication between the collection schemes and Komosis allows the reuse organizations to get access to WEEE with good potential for reuse. From the viewpoint of the collective system, it does not matter whether the equipment is reused or recycled; the most important aspect is that EoL equipment gets reported to the government.

4.2.3 Compliance schemes

United Kingdom (B2C)
ERP Ltd is the United Kingdom operation for the European Recycling Platform (ERP), and it is responsible for approximately 15 per cent of the EEE collected in the United Kingdom. From a waste environmental perspective, ERP has a strong awareness and

respect for the solid waste hierarchy where reuse is considered a high priority. However, they acknowledge that social and economic considerations must also be taken into account when making decisions concerning these activities. They also recognise that within certain WEEE categories, reusing the product can more environmentally and economically beneficial than recycling.

In order to legally operate as a compliance scheme in the United Kingdom, ERP must submit a “permit application", and as part of this application, they have to demonstrate how they are promoting reuse. From the beginning, the regulatory body made reuse as relevant as recycling with reuse counting towards recycling targets. This has given reuse a “status” that “respects and promotes the activity”.

One of the primary success factors identified concerning reuse was the “quality of the refurbishment and restoration process” and ensuring the “quality of the products coming back” through the formal WEEE channels. ERP has a very strict policy on reuse to ensure the practice adheres to the highest quality standards, and they welcome PAS and other standards in the pipeline that will serve to promote successful reuse practices.

The importance of capturing products as far away as possible from the civic amenity (CA) site was highlighted, as the quality of products ending up at the sites tend to be “pretty broken”. The weather in the country coupled with storage at CA sites was highlighted as problematic in this regard. Source segregation of products, particularly when they come in, so they can be diverted to covered sections is imperative. Better products tend to come from the retailers, and in the case of retailers picking up products directly from homes, there is no weather damage. It is “straight out of the vehicle to a truck then to a consolidation centre”. It was also noted that in terms of B2C products, white goods tend have the most potential when it comes to reuse.

Compulsory best practice guidelines outlining procedures and operating conditions at CA sites could be the solution to this above issue. However, the United Kingdom has an extremely commercialised waste industry, meaning there are numerous contractors at different points, which results in all sizes and all types of recycling centres.

Belgium-Flanders (B2C)

Founded in 2001, Recupel is the sole compliance scheme in Belgium. It manages the collection and recycling for seven participating industries through various innovative waste management strategies. Recupel acknowledges that reuse activities are politically driven with social enterprise serving as one of “the fundamental parts of the puzzle”. Social enterprise initiatives not only promote reuse of products, but they also provide the vehicle by which people who have been unemployed for a significant duration can seamlessly re-integrate into the labour market.

The importance of government involvement in marketing activities is also highlighted and has been highly successful, particularly within the Flemish region of Belgium. Reuse initiatives are typically local initiatives, and if a compliance scheme operates on a country-wide basis it simply does not have the resources to be involved in every single local reuse initiative across the country. Therefore, another important element of success is that the government must properly coordinate all the different reuse activities throughout the

country. This contributes “to a strong brand, which for the consumer is very important”. Komosis even has a marketing strategy and “a communication plan” that is revised on an annual basis like a typical company. An element of creativity is sometimes required when resources are limited but getting press attention is possible and usually at limited expense.

When asked about getting reuse initiatives off the ground in the first instance, the combination of the “knowledge base at the Federation” and the “financial aid provided by the government” was acknowledged as the most important aspects. When someone wants to set up a reuse shop, it is not necessary to “re-invent the wheel”. They can get in touch with the federation, which can offer this group assistance and guidance on initial steps to take. There are also laws that make it easier for reuse shops to operate. Funding in particular is viewed as extremely important to their survival.
Sometimes, an element of creativity is needed to gain access to EoL product flows. In Belgium, there are intermediary consolidation points between WEEE collection and the recycling centres where goods/materials are selected for reuse by the reuse centres. The reuse centres are also the stakeholders mainly responsible for organizing transportation of WEEE to the recycling companies, which is “definitely an element of success”. From a previous paragraph, the criteria of selection are determined by first by laws and second by agreement contracts between the reuse centres and the recycling companies. If there is high demand for reused products, the reuse centres are “a little less critical”. If demand is low due to an abundance of quality used goods in their own network, then they can be very critical and selective in which products they want to have for reuse.
The importance of handling during the collection process was also mentioned. White goods are collected piece-by-piece without being placed in containers before the first consolidation point. This only occurs after appliances are selected for reuse; the remaining appliances are put in a container and shipped towards toward a recycler. This arrangement helps to “preserve the quality of the appliance”.
Although white goods reuse has been the main part of reuse business in the region, a change is currently taking place with all WEEE fractions soon to be available for reuse. One of the challenges foreseen when it comes to reuse of other WEEE fractions, particularly IT equipment, is the expertise required to repair such equipment. The people required to repair a computer are often people of a higher skill level than those employed in the system by Belgium’s system of social enterprise. Another challenge when it comes to IT equipment is the short innovation cycles experienced by the sector. It might be difficult to find a market for such equipment given the rapid turnover of new products in the marketplace.

4.2.4 Producer representatives

Belgium (Flanders)
FEE represents the producers of white goods in Belgium, and although the ultimate objective of any manufacturer is to sell as many new appliances as possible, FEE recognises that producers have a social obligation to support reuse on the condition that environmental and social conditions are satisfied.

In order for reuse to be successful in the primary instance, the producer association acknowledges that the environmental benefit of reusing the appliance must be substantiated. Taking the evolution of water and

energy consumption over time, FEE fully agrees that appliances three to five years old should be reused. On the other hand, for appliances 10 to 20 years old, reuse may not be environmentally beneficial, and recycling may be the more environmentally-preferable option. The social dimension regarding this aspect is equally important. Most consumers in Belgium who buy used appliances from the reuse centres generally do not have sufficient funds to operate equipment that costs more money to operate then an equivalent new appliance. While the upfront cost for the appliance may be lower, the total lifecycle cost may turn out to be substantially higher. This can have the effect of exploiting economically disadvantaged groups.

FEE also fully supports the principle of reuse criteria enforced by laws as a contributor to successful reuse business. However, they do mention there should be limits on the category of appliances that are chosen for reuse. Moreover, where reparation of equipment is necessary, it should first be carried out by qualified people and second using manufacturer guaranteed original parts. Certain manufacturers have initiatives in place addressing the aforementioned aspects. Some producers are collaborating with the reuse sector to organize education and training for reuse center employees, and original parts are also made available to the reuse centres through an online platform. This industry-developed platform allows retailers/clients to purchase spare parts for appliances, and this resource has also been made available to the reuse centres allowing them to order new parts free of charge.

Another success factor for reuse identified by FEE is the forecasting made at the beginning of each year for the potential markets for reuse. This allows producers to supply the difference between the demand and the actual number of appliances recovered through take-back schemes. This is largely based on the estimation that one out of three appliances can be reused.

Moreover, they recognize it is important that all the appliances with high potential for reuse are made available to the reuse centres. It must also be factored in the equation that reuse is not only done by the non-profit sector; retailers also resell products that have been taken back.

Although the general opinion of producers is that consumers would prefer to buy brand new products, they are in favour of the reuse quality label, so that if something goes wrong with the appliance, their reputation is not tarnished.

4.3 Barriers for reuse within these e-waste management systems

The difficulty of accessing sufficient volumes of quality used equipment and the lack of legislation that supports, incentivizes and enforces this access were identified as the most impactful barriers by reuse organizations in the Best Practices Report. The following paragraphs provide more detail on the aforementioned barriers from not only the view of the reuse organizations but also the perspectives of the compliance schemes, regulators and producer associations.

4.3.1 Reuse organizations

United Kingdom (B2C)

In the case of white goods, it is conceivable that the quality of used products coming from retailers is superior to used products

coming from compliance schemes. One organization observed that a lot of their products had been previously coming from retailers but now some retailers have switched to alternative recycling schemes. This is because certain retailers do not want to see their products back in the marketplace. However, the same reuse organization stated that it has good access to the civic amenity site to "cherry pick", and this activity was "certainly supplying sufficient volumes of equipment to meet demand". When asked about legislation which supports reuse, their response was that "legislation was a bit grey". They note that evidence is not being gathered in certain aspects of compliance, for example retailers can bring their "take back" appliances straight to the scrap dealer. Despite informal dialogue between the environmental agency and these retailers on the correct manner to deal with take back appliances (i.e. through the compliance scheme), retailers argue that the scrap value is an added income to them.

United Kingdom (B2B)

Barriers that impede the operations of IT asset management were also mentioned by the reuse organization interviewed. The European Union was setup to allow easier trade between member states. The reuse organization noted that it is harder to trade, particularly in materials, within Europe compared to outside Europe, partly because there is so much difference in interpretation of the WEEE Directive by each country. They were of the opinion that "there is protectionism going on within Europe within certain countries, either through the trade organizations or through the ways that the local environmental agencies treat expectations of the materials". They deemed business a relatively straightforward task when moving material classified as waste or products destined directly for reuse. However, for products that require testing, the stakeholder says, "significant barriers presently exist". For example, to process a trans-boundary shipment within the EU that is classified as hazardous waste "because it contains some CRTs", can take anywhere from three weeks to two years before the final permission comes through to move the material. According to the reuse organization, the delay is largely because the environmental agencies do not complete the paperwork in a timely manner. Manufacturers have no problem with this delay and are "happy to wait". However, corporate business clients generally try to deal with their EoL stock in a different way, for example, by classifying everything as reuse of product to circumvent regulation.

Within the internal United Kingdom market, the biggest barrier identified was the large number of small companies operating in the marketplace. According to the interviewee from the IT asset management firm, there are 20 to 30 "good companies" in the United Kingdom that adhere completely to regulatory requirements, and there are about 500 companies that are not following the legislation. More often the not, these "one-to-two man bands" offer their services free of charge and make their money by reselling products "without properly inspecting them", creating a potential security risk for their customers.

Belgium-Flanders (B2C)

There are not many barriers impeding white goods reuse in Belgium, as the system incorporating social enterprise is working very well. However, there are certain things that need to be addressed in the immediate term.

The legal framework does not currently distinguish between professional and household

equipment. This discrepancy is not B2B verses B2C in the conventional sense, because some products, such as EoL computers from businesses, can also be used "in their second lives" in a household setting. It is somewhat easier to make the distinction in the context of white goods. Whereas professional equipment pertains to appliances such as fridge freezers found in stores, household appliances are generally smaller in size and also energy consumption requirements and are purchased by mainstream consumers. With the recast of the WEEE Directive permitting the transport of professional equipment across international borders for repair, but prohibiting the transport of household equipment for the same purpose, a change in the way logistics is organized will be necessary. The manner in which this change will take effect is currently being debated.

Belgium-Flanders (B2B)

One of the main obstacles inhibiting the growth of IT equipment reuse in Belgium in the consumer domain is the general lack of awareness regarding the market for used products. Domestic purchasers of refurbished computers are viewed as a very specific market segment with a particular socio-economic profile. There are many home user segments that simply do not know about the availability of second-hand equipment, and they do not know where they can go to purchase these products. The second issue is the impression many consumers have about used equipment. The provision of a one-year warranty does increase consumer confidence for many people. As such, "a quality label for second-hand PCs" is required address this issue. It was interesting to note that a three-year warranty offered for second-hand equipment helped "break open the market" back in 2000.

Another barrier noted was the lack of professionalism from certain refurbishers in the marketplace. Belgium contains a small number of large refurbishers that carry out reuse and refurbishment activities to certain standards. However, a large number of smaller operators do not adhere to such standards. This tarnishes the market for second-hand goods.

4.3.2 Compliance schemes

United Kingdom

The quality of product coming back through the formal WEEE channels was identified as a success factor and was again highlighted as major barrier to reuse in the country.

The social desire for used products was deemed another major barrier. It was acknowledged that for certain products, for example white goods, the market demand in the country is high. Unfortunately, this is not the case for appliances like toasters or kettles. Cheap products on the market "do not help the situation" in this regard. The importance of taking into account used products' efficiency was also mentioned. There have been big improvements in energy efficiency and also water consumption in modern white goods, and it is imperative that these factors be included when considering products for reuse.

In terms of legal barriers, the free market nature of the compliance system was identified as more problematic than beneficial. There are more compliance schemes in the United Kingdom than the aggregate of all the other compliance schemes in Europe. The idea of this system was to get "market dynamics in play". However, "in reality, this has not become true". A large number of compliance schemes means "you have a lot of schemes

fighting with each other about specific issues" in the WEEE system. Countries with fewer compliance schemes have much more stability in terms of where they source their collecting from, which allows operators to plan specific investments. In the United Kingdom, all local authorities can choose from any of the schemes that are operating so there is a lot of "chopping and changing", which translates to instability in the market. A more stable environment would promote reuse, because it would allow the government to intervene with the appropriate policy approaches. However, it was stressed that reuse targets may not be the best policy instruments in this instance. Leakage of products from formal WEEE channels is another area in which more research is needed.

Belgium (Flanders)
Recupel identifies two main barriers when it comes to reuse. The first barrier is the financial resources necessary for reuse centres to set themselves up and commence operation. This is addressed in the country by policy and the funds made available to start up reuse centres. Another barrier linked to this is competition from private companies. If reuse centres do not receive funds from the government, it is impossible for these organizations to compete. However, it is acknowledged that a balance must be maintained, because it is not healthy to have a market that is fully-owned by the reuse centres. Maintaining this balance is a job for the government, and there is constant debate between the private companies and the reuse centres over whether or not they are occupying each other's territory. The government plays an important role as "referee" in this regard.

When asked whether barriers to reuse in Belgium were due to cultural reasons, the response was that reuse markets are viewed as a separate target market to the mainstream consumer. People in financial difficulty or who have limited financial resources to survive look for creative opportunities. If the opportunity of a used appliance with a reputable quality label and guarantee at an affordable price exists, there will always be a market to take advantage of that.

4.3.3 Regulators

United Kingdom
The main barrier identified by BIS when it comes to reuse is consumer demand. People generally perceive used products to be inferior quality when compared to new ones. This is in part attributable to the large number of "sham operators" in the marketplace. There are many refurbishers who adhere to the correct operating procedures when it comes to reuse, but there are also many two-to-three man operators that conduct business from the "back of a van", which obviously does not adhere to these processes. To address this issue, BIS, in conjunction with industry, is currently developing a label that will accredit reuse organizations who adhere to set procedures and processes when it comes to reuse activities. This initiative hopes to serve a dual purpose: increase consumer confidence in the value of used equipment and also drive shame operators out of the market.

Environmental regulation specifying whether equipment is defined as waste or not can also sometimes be problematic, particularly in the context of quality used equipment that is suitable for export. This was also one of the major impediments identified by the reuse organization interviewed in the same region.

Belgium (Flanders)
The main barrier identified by OVAM when it comes to stimulating reuse is the absence of an "obligation to reuse" in national legislation. The national legislation in Belgium has this obligation, but it is recognised that other member states in the EU do not pay the same attention to reuse as they do. However it must be taken into account that Belgium's operational framework is comprised of a unique system of reuse organizations and social economy that greatly contributes to its success.

Another barrier identified is the absence of best practice procedures when it comes to reuse. From the previous section, it was seen that a code of conduct currently exists in the country. However, OVAM is of the opinion that it is necessary to go even further and implement specific reuse criteria into national legislation.

When asked about IT equipment entering the formal WEEE channels, the complexity of the refurbishment process for this product category was viewed as a significant barrier. White goods refurbishment appears to be a "better fit" with social projects. However, reuse organizations are planning to focus more on IT equipment including providing the necessary training required for people engaging with this type of WEEE.
Another important point mentioned was that reuse organizations that get access to the collective system guarantee that all the reuse equipment is being sold in Belgium. For the moment, it is important that used equipment is not transported to Africa, because reuse criteria are not specified in legislation. When reuse criteria become part of legislation, the legislation will stipulate when equipment fulfils reuse criteria, and therefore export will not be a problem.

4.3.4 Producer representatives

Belgium (Flanders)
The main barrier to reuse identified by producers in Belgium is on the demand side. In general, consumers prefer the newest appliances. For example, even when it comes to developing markets such as Africa, "nobody is interested in the CRT televisions anymore… consumers want flat screens instead". The same problem exists with white goods; people would prefer to buy a cheap new appliance rather than a reused appliance because "you never know what the previous owner did with their old appliance".

When asked whether barriers to reuse were due to cultural reasons, the response was that "there is growing acceptance in Belgium towards used appliances" when compared to other countries. This is largely a result of the growing popularity of the reuse shops and the quality label offered by these stores on used appliances.

5 Conclusions and recommendations on changes to e-waste management policy

The importance of control and securing the product and process quality is deemed important when it comes to successful reuse practices for both IT asset management and social enterprise reuse operating models. This again reflects the main finding of the Best Practices report.

For B2B IT equipment, data handling and provision of a holistic service are important success factors, while for B2C equipment, development of a brand that mitigates the

social stigma towards used products is a key issue. However, particularly in the latter case, the environmental benefit of reusing the appliance must be substantiated in order to prevent the exploitation of disadvantaged groups.

For B2B equipment, the trans-boundary movement of equipment was identified as a key obstacle

The producer representatives interviewed in the study were very much in favour of reuse, as they did not see used products competing in the same consumer segments as new products. However, they stressed that where reparation of equipment is necessary, it should first be carried out by qualified people using manufacturer-guaranteed original parts. However, dis-incentives for directing quality used products towards reuse centres may exist. For example, retailers can sometimes receive more money for directing EoL products towards recycling when scrap value of constituent materials is high.

Segregation of equipment should occur at the earliest possible time after product use. This will prevent potential damage to these appliances during aggregation with other appliances at the CA site. Reuse should also have at least an equal status as recycling towards WEEE targets.

Many of the stakeholders interviewed demonstrated no support for reuse targets. However, they agreed that policy is important to facilitate the promotion of conditions that promote the success of reuse activities. Moreover, the liability for final waste management must be strictly defined when the equipment comes to the end of its useful life.

The regulated system in Flanders appears to have its advantages over the free market system in the United Kingdom, as it enables investment. Large numbers of small operators can also detract from the market.

Developing a standard for refurbishment and a quality brand for reuse is crucial. Customers require strong signals to improve their opinion of second-hand products. Education can also play a role in improving people's perceptions of used equipment.

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7 Annex: Questionnaire

COMPLIANCE SCHEMES

1.0 Personnel

1.1 What is the total number of employees expressed in FTE (full time equivalent)?
1.2 What is the regional population covered by compliance scheme?
1.3 How many members are on the board of directors?
1.4 How many of members are producers?
1.5 Do you know the collection rates achieved in kg/person?

2.0 Operational and financial framework for treatment of EOL Equipment

2.1 What are the facilities serviced (e.g., civic amenity sites, etc.) by the compliance scheme?
2.2 Are end of life (EOL) business-to-business (B2B) and EOL business-to-consumer (B2C) categories treated separately or together at these facilities?
2.3 What is the status of discussion concerning individual producer responsibility (IPR) in your region?

3.0 Reuse Activities in the Compliance Region

3.1 What are your impressions about reuse?
3.2 What are the main drivers for reuse, historically?
3.3 What are the success factors?
3.4 Are there success factors that are specific to the type of equipment (IT equipment, consumer electronics, large household appliances, other (please specify))?
3.5 What are the barriers?
3.6 Are there barriers that are specific to the type of equipment (IT equipment, consumer electronics, large household appliances, other (please specify))?
3.7 Are barriers to reuse due to cultural factors?
3.8 What are the impacts of laws on reuse?
3.9 What is your opinion on reuse targets enforced by regulation?
- o EU/Federal Level or National/State Level

PRODUCER REPRESENTATIVES

1.0 Personnel

1.1 Name the producers you represent:
1.2 State the category of appliances manufactured by each producer (IT equipment, consumer electronics, large household appliances, other (please specify):

2.0 Formal Reuse Activities

2.1 What are your impressions about reuse?
2.2 What are the main drivers for reuse, historically?
2.3 What are the success factors?

2.4 Are there success factors that are specific to the type of equipment (IT equipment, consumer electronics, large household appliances, other (please specify))?
2.5 What are the barriers?
2.6 Are there barriers that are specific to the type of equipment (IT equipment, consumer electronics, large household appliances, other (please specify))?
2.7 Are barriers to reuse due to cultural factors?
2.8 What are the impacts of laws on reuse?
2.9 What is your opinion on reuse targets enforced by regulation?
- o EU/Federal Level or National/State Level

REGULATORS

1.0 Legal Framework/Formal Reuse Activities

1.1 Is reuse imposed as part of the legal framework?
1.2 What are your impressions about reuse?
1.3 What are the success factors?
1.4 What are the barriers?
1.5 Are barriers to reuse due to cultural factors?
1.6 What are the impacts of laws on reuse?
1.7 What is your opinion on reuse targets enforced by regulation?
- o EU/Federal Level or National/State Level

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(Jan 2016)

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- MicroPro Computers
- Microsoft
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- Philips Consumer Lifestyle Sustainability Center
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- Secretariat of the Pacific Regional Environment Program (SPREP)
- Sims Recycling Solutions
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Number	Area	Title	Date
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White Paper #4	“Recycle”	Recommendations for Standards Development for Collection, Storage, Transport and Treatment of E-waste	02 June 2014
White Paper #3	“Policy”	On the Revision of EU’s WEEE Directive - COM(2008)810 final	1 October 2009, revised 22 March 2010
White Paper #2	“Reuse”	One Global Understanding of Re-use – Common Definitions	5 March 2009
White Paper #1	“Policy”	E-waste Take-back System Design and Policy Approaches	28 January 2009

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About the Step Initiative:

"Step envisions tobe agents and stewards of change, uniquely leading global thinking, knowledge, awareness and innovation in the management and development of environmentally, economically and ethically-sound e-waste resource recovery, re-use and prevention."

Step is an international initiative comprised of manufacturers, recyclers, academics, governments and other organizations committed to solving the world's waste electrical and electronic-e-waste-problem. By providing a forum for discussion among stakeholders, Step is actively sharing information, seeking answers and implementing solutions.

Our prime objectives are:

- Research and Piloting
  - By conducting and sharing scientific research, Step is helping to shape effective policy-making
- Strategy and goad setting
  - A key strategic goal is to empower proactivity in the marketplace through expanded membership and to secure a robust funding base to support activity
- Training and Development
  - Step's global overview of e-waste issues makes it the obvious provider of training on e-waste issues
- Communication and branding
  - One of Step's priorities is to ensure that members, prospective members and legislators are all made aware of the nature and scale of the problem, its developmentop-portunities and how Step is contributing to solving the e-waste problem.

The Step initiative came about when several UN organizations, whowere increasingly aware of the growing global e-waste problem, saw the need for a neutral, international body to seek real, practical answers that would be supported by manufacturers, recyclers and legislators alike.

Step's core principles:

1. Step views the e-waste issue holistically, focusing on its social, environmental and economic impact – locally, regionally, globally.
2. Step follows the lifecycle of equipment and its component materials from sourcing natural resources, through distribution and usage, to disposal.
3. Step's research and pilot projects are "steps to e-waste solutions".
4. Step vigorously condemns the illegal activities that exacerbate e-waste issues, such as the illegal shipments, recycling practices and disposal methods that are hazardous to people and the environment.
5. Step encourages and supports best-practice reuse and recycling worldwide.

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