



**SIXTH FRAMEWORK PROGRAMME  
PRIORITY [policy-oriented research priority SSP 5A]**

**SPECIFIC TARGETED RESEARCH OR INNOVATION PROJECT  
FORWAST**

Overall mapping of physical flows and stocks of resources to forecast waste quantities in Europe and identify life-cycle environmental stakes of waste prevention and recycling

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**D4-1 Report chapter on needs for development of national statistics related to resources and wastes**

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## 1. Introduction

The FORWAST project provides comprehensive and validated data on the material flows, stocks and environmental pressures coming from the different sectors of the life cycle of resources to waste. In the wider context of sustainable development and environment protection, the connections between the use of natural resources, their accumulation in economy and waste generation and management need to be more clearly understood.

Therefore the objectives of the FORWAST project are:

- to provide an inventory of the historically cumulated physical stock of materials in EU-27, and to forecast the expected amounts of waste generated, per resource category, in the next 25 years.
- to provide an assessment of the life-cycle wide environmental impacts from different scenarios of waste prevention, recycling and waste treatment in the EU-27.

The aims of present Deliverable 4-3 are to summarize lessons learned from data mining related to resources and wastes and modeling of waste treatment scenarios for EU-27 and to identify needs for development of national statistics related to resources and wastes.

## 2. Data needs related to resources

Physical Supply and Use Tables developed within FORWAST project required collection of basic data on the mass of resources related to supply, use, import and export as well as their material composition for establishing of Matrix Resources (R).

The FORWAST project considers and analyses the following resources:

- *Biomass (food and fibre):*
  - grass,
  - grain crops,
  - crops,
  - wood-forest products,
  - fishes,
- *Fossil fuels:*
  - coal, lignite and peat,
  - crude petroleum and natural gas,
- *Metal ores:*
  - iron ores,
  - bauxite,
  - copper ores,
  - metals n.e.c.,
- *Minerals from other mining:*
  - sand, gravel and stone,
  - clay and soil from quarry,
  - minerals n.e.c.

Resource statistics comprising a number of sources on national level as well as on international level (FAOSTAT, EUROSTAT, UN, USGS, BSG, Euromines, etc.) provide physical data for the most of these resources. The general review of data sources and recommendations for the level of FORWAST model details have been presented in Deliverable 1-1 (D1-1 2007). The data availability on international as well as on national

statistics in the EU-27 has been described in Deliverables: D3-1 and D4-1 (D3-1 2010, D4-1 2010).

For domestic supply of resources the necessary statistical data in the EU-23 countries were collected within WP4. The Table 1 illustrates what resources are extracted by country. Natural resources such as: grass, grain crops and crops n.e.c. concern all EU-23 countries and they are not included in Table 1.

**Table 1 Domestic supply of resources in the EU-23**

No.	CODE	Country name	Fish and other fishing products	Forestry products (wood)	Coal, lignite, peat	Crude petroleum and natural gas	Metal ores	Other mining and quarrying minerals
1.	BE	Belgium	X	X	0	0	0	X
2.	BU	Bulgaria	X	X	X	X	X	X
3.	CY	Cyprus	X	0	0	X	0	X
4.	CZ	Czech Republic	X	X	X	X	X	X
5.	EE	Estonia	X	X	X	X	X	X
6.	FI	Finland	X	X	X	0	X	X
7.	GR	Greece	X	X	X	X	X	X
8.	HU	Hungary	X	X	X	X	0	X
9.	IE	Ireland	X	X	X	X	X	X
10.	IT	Italy	X	X	X	X	X	X
11.	LV	Latvia	X	X	X	X	X	X
12.	LT	Lithuania	X	X	X	X	X	X
13.	LU	Luxembourg	0	X	0	0	0	X
14.	MT	Malta	X	0	0	X	0	X
15.	NL	Netherlands	X	X	0	X	0	X
16.	PL	Poland	X	X	X	X	X	X
17.	PT	Portugal	X	X	0	0	X	X
18.	RO	Romania	X	X	X	X	X	X
19.	SK	Slovakia	X	X	X	X	X	X
20.	SI	Slovenia	X	X	X	0	0	X
21.	ES	Spain	X	X	X	X	X	X
22.	SE	Sweden	X	X	X	0	X	X
23.	UK	United Kingdom	X	X	X	X	0	X

0 – no domestic supply

The assessment of availability of data on resources production and their usefulness for creation of FORWAST Supply and Use Tables MASTER (SUTs) are shown in Table 2.

**Table 2 Availability of data on resources production**

Name	Grass	Grain crops and crops n.e.c.	Fish and other fishing products	Forestry products (wood)	Coal, lignite, peat	Crude petroleum and natural gas	Metal ores	Other mining and quarrying minerals
EU-23	N	Y	Y	YC	Y	YC	Y	PC

N – no, data are not available, P - partly, data are partly available, Y – yes, data are available, C – data in different units from mass and conversion factor is needed



Problems for use and transformation of statistical data related to natural resources production for construction of FORFAST SUTs MASTER, shown in Table 2, are discussed below:

- *Biomass, food and fibre*

Data concerning grass as a feed input for cattle and other animals (sheep, horse, goats, etc) are not recorded and this feed input was estimated usually from livestock numbers and the feed requirements.

Data on grain crops and crops are comprehensive both on national and international statistics. Data on forest products (wood) are not given in weight but in wet volume and transformation to dry mass requires the use of conversion factors (density of wood). The estimated weight is often not precise because density of wood is depended both on location and wood species.

Similarly, fish catches are reported as nominal catches, which refers to live weight equivalents (wet mass).

- *Fossil fuels*

Generally, data on the primary production of resources such as coal, lignite, peat, crude petroleum and natural gas are the comprehensive. Problematic are data on peat, because they are recorded under coal or separately, but should be distinguished for combustion and for other purpose.

- *Metal ores*

Data on metal ores are recorded by general minerals statistics as well as by international industry associations. Data are available usually on both ore and metal content.

- *Minerals from other mining*

Data on this category of minerals such as: sand, gravel and stone, clays and soil are especially problematic because they significantly vary between sources. One of reasons of this difference is definition of individual minerals. Furthermore data are recorded not in weight but in volume, what requires the use of conversion factors. In the case of clay it can be useful to estimate resource input from the data on output of final products (bricks) and raw material coefficient. There can be also a way to check quality of data.

For establishing distribution of resources at least to 57 economy activities (or 117) in matrix Use, data on use (consumption) of resources, were needed. For biomass (grain crops and crops) data on consumption provided by agriculture sector statistics are usually limited to balances which include consumption of these resources by a few industries.

To gather lessons learned from data mining on use of other resources, the questionnaire has been prepared and filled by data miners - partners responsible for given countries. Questionnaire is included in ANNEX 1 to this report.

The responses are presented in Table 3, which gives a good insight what is level of data availability by country (see also questionnaire, chapter I). According to Table 3, data on the consumption of resources such as coal, lignite, peat, crude petroleum and natural gas by activities are provided by national sector statistics of most of the EU-23 countries. In about 20% of EU-23 data are not available.

However, the level of aggregation is often not sufficient for determination of use of resources by 57 activities (or 117). In many cases data derived via emissions from sectors specified in UNFCCC national inventory were helpful.

Generally consumption data on forestry products and non-energy resources such as metal ores and other mining and quarrying minerals are very poor for all countries. In these cases data on use are highly based on calculation from balance  $Use = Supply + Import - Export$ , and then distributed using monetary information and balancing for physical data consistency. This was combined with consumption per unit of supply from various life cycle assessment studies.

Table 3 Use of resources in the EU-23

No.	CODE	Name	Forestry products (wood)	Coal, lignite, peat	Crude petroleum and natural gas	Metal ores	Other mining and quarrying minerals
1.	BE	Belgium	N	P	P	N	N
2.	BU	Bulgaria	N	P	P	Y*	N
3.	CY	Cyprus	N	0	P	0	P
4.	CZ	Czech Republic	N	P	P	N	N
5.	EE	Estonia	N	P	P	N	N
6.	FI	Finland	P	P	P	N	N
7.	GR	Greece	P	P	P	P	P
8.	HU	Hungary	N	P	P	N	N
9.	IE	Ireland	P	N	N	N	P
10.	IT	Italy	N	N	N	N	N
11.	LV	Latvia	N	P	P	N	N
12.	LT	Lithuania	N	P	P	N	N
13.	LU	Luxembourg	N	0	N	0	P
14.	MT	Malta	0	0	P	0	P
15.	NL	Netherlands	N	P	P	Y*	N
16.	PL	Poland	N	Y	P	P	N
17.	PT	Portugal	P	N	N	P	P
18.	RO	Romania	N	P	P	Y*	N
19.	SK	Slovakia	N	P	P	N	N
20.	SI	Slovenia	N	N	N	N	N
21.	ES	Spain	P	Y	P	P	P
22.	SE	Sweden	N	Y	Y	N	N
23.	UK	United Kingdom	P	P	P	N	P
		<i>N (in EU-23)</i>	<i>73%</i>	<i>20%</i>	<i>22%</i>	<i>65%</i>	<i>65%</i>
		<i>P (in EU-23)</i>	<i>27%</i>	<i>65%</i>	<i>74%</i>	<i>20%</i>	<i>35%</i>
		<i>Y (in EU-23)</i>	<i>0%</i>	<i>15%</i>	<i>4%</i>	<i>15%</i>	<i>0%</i>

Y- yes, data are available, P- partly; some of data are available, N- no, data are not available, 0 – no use,  
\* use by only one activity

### 3. Data needs related to wastes

Generally, data related to waste generation and waste management are not available in a good quality. Therefore waste is primary an output parameter of the FORWAST model. However, data on generation of wastes available from waste statistics can be useful for balancing, calibration or validation. The input to the model is the breakdown of the waste flows into different waste treatment activities. The detailed description of material flows and waste flows, considered and analyzed in the FORWAST project, is presented in Deliverable D6-3 (D6-3 2010).

In FORWAST project, all generated waste per activity are categorized into waste fractions. The waste fractions are directed to different waste treatment activities. For each of waste fraction the Residuals Distribution Matrix (J), one of the matrices includes in Supply and Use Tables MASTER, specifies the waste treatment (e.g. 20% to recycling, 20% to incineration, 40% to landfill and 20% exported). For creation of Matrix J, full set of data describing waste management were needed, the quantity of waste fractions directed to waste treatment.

Within WP4, for determination of breakdown of waste flows into waste treatment activities and establishing the Matrix J for each country of EU-23, data mining has been conducted.

The collection of data and information covered the following waste fractions and their distribution into waste treatment activities:

- Food waste – originating from the uses of agriculture products, food and beverages as well as residuals from digestion of food by humans and animals (human excretion and urine, manure),
- Wood waste – originating from the use of the forestry products, tobacco products and wood products, from wood products manufacturing, pulp manufacturing and manufacturing of furniture, waste fraction from other products (e.g. machinery, equipments, furniture),
- Textile waste – originating from the use of the textiles, wearing apparel and furs, leather, footwear,
- Paper waste – originating from the use of pulp, paper and paper products, printed matter and recorded media,
- Plastic waste – originating from the use of plastics basic, rubber and plastic products,
- Glass waste – originating mainly from the use of glass, mineral and ceramic goods,
- Ash and slag waste – originating from the use of coal, lignite and peat and from the waste incineration activities,
- Demolition and construction waste – originating from the use of the categories of products such as sand, gravel and stone from quarry, minerals from mine n.e.c., cement virgin, concrete, asphalt and other mineral products and bricks,
- Metal waste – originating from the use of metals such as iron, aluminium, copper and metals n.e.c. as well as other categories of products containing these metals (e.g. fabricated metal products, except, machinery and equipment n.e.c., office machinery and computers, electrical machinery n.e.c, radio, television and communication equipment, instruments etc.),
- Special waste fractions – hazardous waste (waste of fertilizers and chemicals), oil waste, residues of recycling of different materials (e.g. wood, paper, plastics, waste oil, slag and ash, inert materials etc.).

The considered waste treatment activities were:

- Recycling,



- Incineration of waste,
- Manure treatment,
- Biogasification of food waste,
- Composting of food waste,
- Waste water treatment,
- Landfill,
- Land application of waste,
- Others (special waste treatment).

Data collection for Matrix J and the year 2003 was based on national and international waste statistics (EUROSTAT and UN). Generally, the national waste statistics provide information about total quantity of generated waste flows from the main economy sectors. Waste statistics used to collect and publish data on waste via Joint Questionnaire (OECD/EUROSTAT). These data are rather hardly comparable across country due to variety of the definition of waste and the surveying methods. In addition these waste statistics are incomplete in the range of coverage of waste categories, origins and treatment type.

The assessment of availability of data on waste flows into waste treatment activities by country according to responses of data miners are illustrated in Table 4 (see also Annex 1, questionnaire, chapter II).

As it was shown in Table 4 assessment of the data availability and their feasibility to transform for Matrix J is rather critical.

For many of waste fractions, national statistics are incomplete or data needed for creation of Matrix J are non-recorded. For example, for food waste and wood waste, data are incomplete. The responses indicated that these data are only partly available in 70% of EU-23 countries and available on sufficient level in 9% of EU-23 only for wood waste. One of the reasons seems to be the fact that unauthorised disposal of these waste (home composting of food waste or incineration of wood waste) is not recorded.

The similar situation is noticed for WEEE and ELV, where data are available only partly for most of the countries (65% and 57% respectively), but full data are available only for ELV in 4% EU-23 countries

The questionnaire responses revealed that national statistics do not complete data especially for textiles, ash/slag/dust and construction waste. Data on these wastes are not available respectively in 74%, 70% and 61% of EU-23.

The availability of data varies between countries and it seems to be better in the case of Sweden, Finland, and Netherlands than in other EU-23 countries. Often national waste classification is not harmonized with NACE codes. Quality of data as well as high level of disaggregation cause that these data are often not useful for purposes of FORWAST project. In addition most of the waste fractions constitute a share of municipal and industrial waste what can have an impact on the reported amounts. Information related to waste management covers some general data on limited treatment types usually incineration and landfilling. Only in some cases data on recovery and rarely on recycling are available.

Establishing of breakdown of waste into waste treatment activities required data mining and compiling data from different sources e.g. from waste management programs and making own estimations. Often matrix J was delivered from known volume of recycling activities and some general data on landfilling and incineration.

Since 2004 it is noticed some progress in collection of data on the generation and treatment of waste by EUROSTAT. The information on waste treatment covers the five types of treatment, namely recovery, incineration with energy recovery, other incineration, disposal on land and land treatment. The division on waste categories is still not sufficient.




**Table 4. Data availability for establishing distribution of waste flows into waste treatment activities**

No.	CODE	Country name	Organic waste /animal-by-products/ food waste	Wood	Glass	Paper	Textiles	Plastics	Ash/slag/dust	Demolition & construction waste	WEEE	ELV
1.	BE	Belgium	P	P	P	Y	N	P	N	N	N	N
2.	BU	Bulgaria	N	N	P	P	N	P	N	N	P	P
3.	CY	Cyprus	P	P	P	P	N	P	P	P	P	P
4.	CZ	Czech Republic	P	P	P	P	N	P	N	N	N	N
5.	EE	Estonia	P	P	P	P	N	P	N	N	N	N
6.	FI	Finland	P	Y	Y	Y	N	Y	P	N	P	P
7.	GR	Greece	N	P	P	P	N	P	Y	P	P	P
8.	HU	Hungary	P	P	P	P	N	P	N	N	P	N
9.	IE	Ireland	P	P	P	P	P	P	P	P	P	P
10.	IT	Italy	P	P	P	Y	P	P	N	P	P	P
11.	LV	Latvia	P	P	P	P	N	P	N	P	N	N
12.	LT	Lithuania	P	P	P	P	N	P	N	N	N	N
13.	LU	Luxembourg	N	P	P	P	P	P	N	N	P	P
14.	MT	Malta	P	P	P	P	P	P	N	P	P	P
15.	NL	Netherlands	N	P	Y	Y	N	P	N	N	P	Y
16.	PL	Poland	P	N	P	Y	N	N	N	N	N	N
17.	PT	Portugal	P	P	P	P	P	P	N	P	P	P
18.	RO	Romania	N	N	P	P	N	P	N	N	P	P
19.	SK	Slovakia	P	P	P	P	N	Y	N	N	N	N
20.	SI	Slovenia	N	N	N	N	N	N	N	N	N	N
21.	ES	Spain	N	N	N	Y	N	Y	Y	N	P	P
22.	SE	Sweden	P	Y	Y	Y	N	Y	Y	Y	P	P
23.	UK	United Kingdom	P	P	P	P	P	P	P	P	P	P
		<i>N (in EU-23)</i>	<i>30%</i>	<i>22%</i>	<i>9%</i>	<i>4%</i>	<i>74%</i>	<i>9%</i>	<i>70%</i>	<i>61%</i>	<i>35%</i>	<i>39%</i>
		<i>P (in EU-23)</i>	<i>70%</i>	<i>70%</i>	<i>78%</i>	<i>65%</i>	<i>26%</i>	<i>74%</i>	<i>17%</i>	<i>35%</i>	<i>65%</i>	<i>57%</i>
		<i>Y (in EU-23)</i>	<i>0%</i>	<i>9%</i>	<i>13%</i>	<i>30%</i>	<i>0%</i>	<i>17%</i>	<i>91%</i>	<i>4%</i>	<i>0%</i>	<i>4%</i>

Y- yes, data are available, P- partly; some of data are available, N- no, data are not available



In the project FORWAST, collection of data focused also on waste materials which have been recycled and used as secondary materials. The flows of these materials have been included in Supply Matrix and considered as the following categories:

- Recycled wood,
- Recycled oil,
- Recycled paper,
- Recycled glass,
- Recycled slag/ash,
- Recycled mineral products: asphalt, bricks, others
- Recycled plastics,
- Metals: iron, aluminum, copper and metals n.e.c.

The collection of reliable data on recycled materials mentioned above was very difficult and data were compiled from different sources. In some countries separate collection does not comprise all the mentioned materials but is limited to materials such as: paper, glass, metals and plastics.

Due to the fact that statistics usually do not record data on materials used as feedstock for production process, figures on materials collected for recycling were used for construction of Supply Matrix. Table 5 illustrates the availability data on collected materials for recycling by country on the base of responses of data miners on carried out questionnaire (see ANNEX 1, questionnaire, chapter III).

The availability of data on waste paper is better than for other categories of materials. The figures on waste paper on consumption and collection for recycling were taken from annual statistics of the Confederation of European Paper Industries (CEPI), which has been compiled data on paper production, consumption and recycling in the CEPI Member States (including 15 countries from EU-23) for many years.

As shows Table 5, some gaps are identified for glass and plastics. For estimation of recycling of these materials, data available from ETC packaging waste statistics were helpful.

The necessary data on metals: iron, aluminum and cooper are available on sufficient level for 22% of EU-23 countries.

The significant poor data availability is noticed for materials such as: wood, metals n.e.c., construction/mineral waste and slag/ash. The data on these materials are not available respectively for 48%, 52%, 78% and 87% of EU-23.



Table 5. Data availability for recycled materials

No.	CODE	Country name	Wood	Paper	Glass	Plastics	Slag/ash	Construction mineral materials	Iron	Aluminum	Copper	Metals n.e.c.
1.	BE	Belgium	P	Y	P	P	N	N	N	N	N	N
2.	BU	Bulgaria	N	P	P	N	N	N	P	P	P	P
3.	CY	Cyprus	N	P	P	P	N	P	P	P	P	P
4.	CZ	Czech Republic	P	Y	P	P	N	N	P	P	P	N
5.	EE	Estonia	P	Y	P	P	N	N	P	P	P	N
6.	FI	Finland	Y	Y	Y	Y	N	N	Y	Y	Y	P
7.	GR	Greece	N	P	P	P	P	P	P	P	P	P
8.	HU	Hungary	P	P	P	P	N	N	P	P	P	N
9.	IE	Ireland	N	Y	Y	Y	N	N	Y	Y	Y	Y
10.	IT	Italy	P	Y	P	P	N	N	P	P	P	N
11.	LV	Latvia	P	N	P	N	N	P	N	P	P	N
12.	LT	Lithuania	N	N	N	N	N	N	P	P	P	N
13.	LU	Luxembourg	P	P	P	P	N	N	P	P	P	N
14.	MT	Malta	N	P	P	P	N	N	N	P	N	N
15.	NL	Netherlands	P	Y	Y	P	N	N	Y	Y	Y	P
16.	PL	Poland	N	Y	P	N	N	N	P	P	P	P
17.	PT	Portugal	P	P	P	P	N	P	N	N	N	N
18.	RO	Romania	N	P	P	N	N	N	P	P	P	P
19.	SK	Slovakia	P	Y	P	P	N	N	P	P	P	N
20.	SI	Slovenia	N	N	N	N	N	N	N	N	N	N
21.	ES	Spain	N	Y	N	Y	Y	N	Y	Y	Y	Y
22.	SE	Sweden	Y	Y	P	P	Y	Y	P	P	P	P
23.	UK	United Kingdom	N	Y	Y	Y	N	N	Y	Y	Y	Y
		<i>N (in EU-23)</i>	<i>48%</i>	<i>13%</i>	<i>13%</i>	<i>26%</i>	<i>87%</i>	<i>78%</i>	<i>22%</i>	<i>13%</i>	<i>17%</i>	<i>52%</i>
		<i>P (in EU-23)</i>	<i>43%</i>	<i>35%</i>	<i>70%</i>	<i>57%</i>	<i>4%</i>	<i>17%</i>	<i>57%</i>	<i>65%</i>	<i>61%</i>	<i>35%</i>
		<i>Y (in EU-23)</i>	<i>9%</i>	<i>52%</i>	<i>17%</i>	<i>17%</i>	<i>9%</i>	<i>4%</i>	<i>22%</i>	<i>22%</i>	<i>22%</i>	<i>13%</i>

Y- yes, data are available, P- partly; some of data are available, N- no, data are not available



## 4. Overall conclusions and recommendations

The overview of data availability conducted within project FORWAST in the EU-23 countries identifies the following areas of improvement as well as development of statistics related to resources and wastes:

- Generally, national statistics provide data on supply for most of the resources. However, often the use of these data and transformation into dry mass units requires knowledge of conversion factors. For supply of biomass: grain crops and crops as well as fossil fuels: coal, crude petroleum and natural gas, the availability of data is good, both in term of content and quality. In the case of domestic extraction of minerals such as: sand, gravel and stones, clays and other minerals n.e.c. statistics should be improved with the respect to the terminology and data quality.
- The statistics on resources do not provide full information related to resource management. The availability of data on consumption of resources is usually limited to a few economy sectors. The extend scope of generation and provision of data on consumption of resources, by national statistical authorities should be considered. It would be useful for the assessment a policy on the sustainable use and management of natural resources.
- There is a need to develop statistics related to reuse, recycling and recovery of waste. National statistics should record total quantity of waste per waste fraction specified by FORWAST project related to: waste collected for recycling, waste recycled domestically, waste imported and waste exported for recycling.
- The availability of comparable and representative data on the production and recycling of waste is essential if implementation of waste management policy is to be monitored effectively. For recycling activity, supply of the recycled product should be measured and specified. Therefore it is recommended to widen the scope of statistical data on physical supply of basic materials such as: paper, plastics, glass, sand, cement, asphalt, concrete, bricks, iron, aluminum, cooper and other metals to include virgin (primary materials) and recycled (secondary materials) supply. It allows to explore the efficiency and effectiveness of material recycling and environmental impact of material use.
- The progress made towards more complete and harmonised European waste statistics is obvious. Currently, collected and published waste data are often incomplete and hardly comparable across countries. The definition of waste and the surveying methods used vary from country to country. In addition, these waste statistics are incomplete as far as coverage of waste categories, origins and treatment types.
- In general, statistical data on wastes are still not sufficient to provide transparent and full picture of waste management. In the current state, the availability of data for establishing of breakdown of waste fractions flows into waste treatment activities specified by FORWAST is quite restricted due to the data quality and the disaggregation problems. The data mining conducted within FORWAST project



demonstrated the necessity to improve waste statistics related to breakdown by waste categories, national breakdown of data on waste treatment facilities and breakdown by waste treatment types. National statistics have to be focused on each type of waste treatment activities such as: recycling, incineration, manure treatment, biogasification, composting, waste water treatment, landfill, land application of waste and to record physical input and output of waste material fractions. In the case of waste incineration, quantities of incinerated waste for a number of waste fractions should be recorded.

- National statistics should replace existing system of surveys as principal data source to routine returns from waste treatment facilities. The data on which statistics are collected by surveys, statistical estimation procedures or referral to administrative or other sources. Small businesses (with fewer than 10 employees) are excluded from survey, unless they contribute significantly to the generation of waste. To improve the quality data for recycling, it seems be more relevant to gather data from the recycling sector than from the organizations in charge of waste collection and recycling.
- The FORWAST results of calculations of waste quantity showed significant differences from waste generation available in statistics. In most cases the obtained quantities of waste are higher than waste generations reported by statistics. The main causes of these differences seem to be non-recorded waste by the statistics and differences in waste definitions.
- In the case when information regarding material flows is lacking, the indirect data can be used for statistical analyses. Methodology of establishing of material and waste flows developed within the FORWAST project as well as elaborated model is a useful tool for creation of accounting system to support national statistics in the areas of estimation, comparison and validation of data on material and waste flows.



## 5. References

D1-1 2007: Hornblow B., Weidema B., Schmidt J., Review of available data and recommendation for the appropriate level of model detail, FORWAST Deliverable no. 6-1, 2007

D3-1 2010: Hafner G. and others, Report describing data processing and validation, FORWAST Deliverable no. 3-1, 2010

D4-1 2010: Rejman-Burzyńska A. and others, Report describing data processing and validation, FORWAST Deliverable no. 4-1, 2010

D6-3 2010: Schmidt J., Documentation of contribution analysis and uncertainty assessment. Results interpretation identifying priority material flows and wastes for waste prevention, recycling and choice of waste treatment options. Policy recommendations., FORWAST Deliverable no. 6-3, 2010



## ANNEX 1

### *D4-3 Report chapter for needs development national statistics related to resources and wastes*

#### Questionnaire

Current state of statistics and recommendations for development of national statistics related to material resources and waste – lessons learned from data collection and creation SUTs MASTER within FORWAST

Name of country/country group:

Name of author:

#### I. USE (CONSUMPTION) OF RESOURCES

1. Are data on consumption (use) of material resources by categories of activities, available from national statistics, sufficient for establishing matrix Use?			
Category	Yes	Partly	No
Forestry products (wood)			
Coal, lignite, peat			
Crude petroleum and natural gas			
Metal ores			
Other mining and quarrying minerals			
If no or partly, please identify needs on national level:			

#### II. GENERATION OF WASTE AND WASTE TREATMENT

2. Are data on waste generation and distribution of waste flows to waste treatment activities and trade, available from national statistics, sufficient for establishing matrix Residuals distribution (J)?			
Category	Yes	Partly	No
Organic waste/ animal-by products/ food waste			
Wood			
Glass			
Paper			
Textiles			
Plastics			



Ash/slag/dust			
Demolition & construction waste			
WEEE			
ELV			
If no or partly, please identify needs on national level:			

### III WASTE AS AN ECONOMIC RESOURCE

3. Are data on recycling materials flows available from national statistics sufficient for establishing matrix Supply?			
Category	Yes	Partly	No
Wood			
Paper			
Glass			
Plastics			
Slag/ash			
Demolition & construction waste			
Iron			
Aluminum			
Copper			
Metals n.e.c.			
If no or partly, please identify needs on national level:			

### IV RECOMMENDATIONS

4. Your suggestions/ ideas related to improving national statistics
A. Consumption of resources
B. Waste generation and waste flows to treatment activities
C. Recycling of waste