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Implementation of Environmental Data Centres AMI/07/2006/E3

Final Report

- draft -

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Content

1 Introduction 1

1.1 Background and objectives 1

1.2 Project activities 2

1.3 Acknowledgement 3

2 Data Centre Concept 4

2.1.1 Mandate according to Technical Arrangement 4

2.1.2 Mandate according to other documents 5

2.1.2.1 Thematic Strategy on the sustainable use of natural resources 5

2.1.2.2 Thematic Strategy on the prevention and recycling of waste 6

2.1.2.3 IPP communication 7

2.1.2.4 SCP Action Plan 7

2.1.2.5 Pre-study Terms of Reference 7

2.1.3 Institutional Mandate Eurostat 8

2.1.4 Views of Go4 9

2.1.4.1 Eurostat 9

2.1.4.2 EEA / ETC-RWM 9

2.1.4.3 DG ENV 10

2.1.5 Recommendations and way forward 11

2.2 Scope ESTAT DCs 12

2.2.1 Scope DC natural resources 13

2.2.1.1 Definition of “natural resources” 14

2.2.1.2 Differentiation to “products” 16

2.2.1.3 Differentiation to “waste” 17

2.2.1.4 Links to other DCs 17

2.2.2 Scope DC products 19

2.2.2.1 Pragmatic approach 19

2.2.3 Scope DC waste 20

3 Go4 institutions 24

3.1 Eurostat 24

3.1.1 Wishes to DCs / Data needs 25

3.1.1.1 Scope and mandate 26

3.1.1.2 Data needs 27
3.1.2 Current activities 28
3.1.2.1 DC implementation 28
3.1.2.2 "Waste" proposed as a pilot project 28
3.1.2.3 Other / Cross-cutting activities 29
3.1.2.4 IT infrastructure 30
3.2 DG ENV 32
3.2.1 Wishes to DCs / Data needs 33
3.2.1.1 General 33
3.2.1.2 Resources 34
3.2.1.3 Products 35
3.2.2 Current activities 35
3.2.2.1 Waste 35
3.2.2.2 Products 38
3.2.2.3 Natural Resources 40
3.2.2.4 Other / Cross-cutting 41
3.2.2.5 IT infrastructure 42
3.3 EEA 42
3.3.1 Wishes to DCs / Data needs 44
3.3.1.1 General 45
3.3.1.2 Waste 46
3.3.1.3 Resources 46
3.3.1.4 Products 46
3.3.2 Current activities 47
3.3.2.1 Other / Cross-cutting 47
3.3.2.2 IT infrastructure 50
3.3.3 ETC-RWM 50
3.3.3.1 Wishes to DCs / Data needs 51
3.3.3.2 Current activities 56
3.4 JRC 61
3.4.1 IES 63
3.4.1.1 European Platform on LCA / ENSURE action 63
3.4.1.2 Land Management and Natural Hazards Unit (FOREST & SOIL) 69
3.4.2 IPTS 75

3.4.2.1 Wishes to DCs / Data needs 76
3.4.2.2 Current activities 80

4 Stepwise implementation concept DCs 83
4.1 Client needs 83
4.1.1 DG ENV's needs 83
4.1.2 Other Go4 institutions' needs 86
4.1.3 Other actors' needs 87
4.2 General organisational tasks 88
4.3 General operational tasks 90
4.4 General technical tasks 92
4.5 DC Natural Resources 94
4.5.1 Organisational structure 94
4.5.2 Data, indicators and information 95
4.5.2.1 Statistical and related data 95
4.5.2.2 Other data from projects 96
4.5.2.3 Outlook 96
4.5.3 Methodological approaches for data development 97
4.5.3.1 Top-down and bottom-up approaches 97
4.5.3.2 Priority areas for natural resources 98
4.5.3.3 Hidden flows 98
4.5.4 Short-term steps 99
4.5.4.1 Organisational structure 99
4.5.4.2 Contents 99
4.5.5 Medium-term and long-term steps 100
4.6 DC Products 101
4.6.1 Background 101
4.6.1.1 Ongoing IPP activities 101
4.6.1.2 Relevant data for product DC 103
4.6.1.3 Data validation and data quality 110
4.6.1.4 LCA and EEIO approaches 110
4.6.1.5 Indicators for Decoupling and Sustainable Development 111
4.6.2 Specific product data needs 112
4.6.3 Short-term steps 115
4.6.4 Medium-and long-term steps 117

4.6.5 Interfaces 118
4.6.5.1 Interface to DC on natural resources and DC on waste 118
4.6.5.2 Interfaces to all DCs 119
4.6.5.3 Interfaces to further EU institutions 120
4.7 DC Waste 120
4.7.1 Short- and medium-term steps 121
4.7.1.1 Operational 121
4.7.1.2 Organisational 126
4.7.1.3 Technical 127
4.7.2 Long-term steps 128
4.8 Resources needed 129

5 Outlook 130
Scope of DC 131
Definitions 131
Budget and Staff Resources 132

6 References (to be completed and streamlined) 142

1 Introduction

This report contains the results of the pre-study on the "Implementation of Environmental Data Centres" carried out on behalf of Eurostat between December 2006 and August 2007.

After describing background and objectives of this study in section 1.1, the information collection and other project activities are shown in section 1.2 followed by acknowledgement to the many persons that participated in the elaboration of this report (see section 1.3).

Before introducing the stepwise implementation concept that has been developed in the context of this pre-study (see section 4), the Data Centre concept as such is introduced, including details on the mandate they have and the scope they need to cover (see section 2).

Since one of the targets of the project was to exchange information, views and ideas on Data Centre implementation at Eurostat with the involved Go4 institutions, section 3 summarises the results of the visits to those institutions including their needs and wishes towards Eurostat's Data Centre implementation.

The report concludes with an outlook chapter highlighting the most relevant aspects and challenges touched in this project which are likely to play a role on the way forward during the implementation process (see section 5).

1.1 Background and objectives

"Success in the conception, development, implementation, monitoring and further improvement of environmental policies depends crucially on the availability of robust data on the state of the environment, pressures (such as emissions) impacts and responses" [original quote from TA 2005].

Against this background, a "Technical Arrangement on the establishment of environmental data centres" (TA) was set up by the so-called Group of Four (Go4) [TA 2005]. Therein the implementation of 10 Environmental Data Centres (DCs) has been fixed as a joint system for the provision of data in some of the most important environmental fields, and principles for the sharing of responsibilities have been agreed upon: Each of the Go4 members is to facilitate gathering and assessment of environmental data with a view to supporting overall environmental policy goals.

The Go4 consists of four different European Institutions: the European Commission's DG Environment (DG ENV), Eurostat – being the European Statistical Office (DG ESTAT) –, the European Commission's DG Joint Research Centre[1] (JRC IPTS and IES) and the European Environmental Agency[2] (EEA). All of them have committed themselves to actively contribute to the development and the implementation of the DCs. Thus, they need to consolidate their efforts and to assign to this project the adequate importance. It is therefore crucial for these institutions to strengthen their coordination and cooperation in that matter. It should be high-

[1] Both the Sevilla-based Institute for prospective technological studies (IPTS) and the Ispra-based Institute for Environment and Sustainability (IES)

[2] Including its European Topic Centre on Resource and Waste Management (ETC-RWM)

lighted that they will not only be contributing to the establishment of the DCs but that these four institutions will also be major users of the data and information made available.

Out of the 10 Environmental Data Centres, Eurostat has been assigned leading organisation for the three DCs on natural resources, products and waste. The policy goals these DC will have to support are laid down in the Thematic Strategy on the Sustainable Use of Natural Resources, the Thematic Strategy on the Prevention and Recycling of Waste as well as in the Communication on Integrated Product Policy and forthcoming Action Plan on Sustainable Consumption and Production.

The goal of this pre-study is to assist Eurostat in the implementation of the three DCs on natural resources, products and waste. In order to achieve this goal, four main tasks have been set in the Terms of Reference (ToR):

A) Specification of work programme;
B) Clarification of similarities and potential synergies; identification of differences;
C) Clarification of possible contributions from other three members of Go4 and assessment of human resources needed for establishment of DCs;
D) Development of a concept for stepwise implementation of three DCs.

Eurostat now needs to implement these 3 DCs with regard to the mandate and scope described in section 2 further below. A stepwise implementation concept has been developed in the context of this pre-study and is presented in section 4.

1.2 Project activities

During the kick-off meeting of this pre-study on 31 January 2007, it was agreed that the focus of project activities should lie not so much on the collection of information with regard to available data and derived data gaps, but rather to start a communication process among Go4 institutions on the needs and wishes they have towards the implementation of Eurostat's DCs.

Against this background, each Go4 institution was visited at least once in the course of the project for an intense exchange of views and ideas. An overview on these visits is given in the table below. Additional telephone conferences were held where necessary.

Table 1: Overview on visits to Go4 institutions

Institution	**Visit dates**
JEC IES SOIL & FOREST	17.04.2007
JRC IES ENSURE / EPLCA	17.04.2007 13.07.2007
ETC-RWM	19.04.2007
EEA	19.04.2007
DG ENV	29.05.2007
IPTS	19.07.2007
ESTAT	11.06.2007 29.05.2007 20.06.2007

In the context of the visits to the institutions, following issues were discussed:

- Current activities with regard to Eurostat's three thematic DCs
  - Potential overlaps, synergies, links
  - Existing data and information exchange
- Data needs with regard to the thematic areas of resources, products and waste
  - Depending on institutional mandate
- Perceptions of the DC concept
  - Mandate and scope of Eurostat's three DCs
  - Future implementation of data and information flows
  - Role of institutions
  - Definition of clients to be served
- Potential problems for DC implementation.

The results of each visit were documented via internal minutes that were agreed upon by participants. A synthesis of the visits is given in section 1.2.

Further to these institutional visits, from the beginning a Steering Committee was set up comprising representatives of the Go4. Two Steering Committee meetings were held on 29 March 2007 and 3 July 2007 in order to discuss issues needing clarification which had been identified in the course of the pre-study as well as reports issued. Additional project meetings with Eurostat were held on 28 March 2007 and 29 May 2007.

Interim results of the project were presented to the DIMESA[3] meeting on 6 June 2007 and – as a side event – discussed in an informal ad-hoc Go4 meeting.

Besides the first interim report of April 2007, Eurostat was supported in drafting its internal documents ("ex-ante evaluations") for the allocation of necessary budget and additional staff in view of DC implementation.

Besides these activities, investigations of ongoing activities in the area of related environmental policy making, data collection, studies and projects were carried out.

1.3 Acknowledgement

Since a major part of this report could only be written on the ground of information made available by many different persons, the Öko-Institut would herewith like to thank all contributors at the Go4 institutions for their time and valuable input. Also, their willingness to (sometimes controversially but always constructively) discuss issues around DC shaping made it possible to propose a pragmatic approach to implementation of DCs at Eurostat.

[3] Directors' Meeting on Environment Statistics and Accounts.

2 Data Centre Concept

This section is intended to summarise the general considerations existing on scope and mandate of the three Data Centres (DCs) lead by Eurostat, i.e. the DC on natural resources, products and waste.

First of all the general mandate of all DCs as laid down in the Technical Arrangement will be described. Furthermore, the DC concept as referred to in other documents such as the Thematic Strategies and the Term of Reference for this pre-study will be described. These written statements will be compared with Eurostat's institutional mandate and with views of different Go4 members as brought forward in the numerous meetings.

Finally, Öko-Institut will give pragmatic recommendations on how to best proceed with the realisation and implementation of the DCs.

2.1.1 Mandate according to Technical Arrangement

The origin of DCs is laid down in the Technical Arrangement of November 2005. According to this document, the Go4 (DG ENV, DG ESTAT, DG JRC, and EEA) has "discussed the establishment of "Environmental Data Centres" as a **joint system for the provision of data** in some of the most important environmental fields, and agreed on principles for the sharing of responsibilities."

The need for such a system was mainly claimed by DG ENV in order "to **ensure the provision of high-quality data** on the state of the environment, pressures (such as emissions), impacts and responses, which is a prerequisite for developing effective environmental policy and integrating the environmental dimension into other policies."

With regard to the role and mandate of such DC, the Technical Arrangement states: "The party playing the role of data centre will act as the **primary data contact point for DG ENV** in order to fulfil DG ENV's information needs.[4] It will have the task of ensuring that the collected data fit DG ENV's requirements, that **data collection** is organised in an efficient way, that the necessary **quality assurance** is performed and that all relevant existing data are **accessible to the other parties**. It will thus have the primary **responsibility for organising the availability and quality of the data required for policy**. Data collection and quality control activities in relation to such data need to be fully co-ordinated with the data centre, which should also take steps to ensure that **user needs** are taken fully into account."

It is important to note that the Technical Arrangement also points out that it "applies to data on compliance to the extent that they overlap with data on state of the environment, pressures, impacts and responses. […] Neither data on the underlying driving forces, although

[4] DG ENV's political needs for development of advanced environmental impact indicators include: Indicators for monitoring legislation / strategies; 'decoupling' indicators for Thematic Strategy on Resources; indicator on environmental impact from products use; possible indicator on waste management and climate change; waste prevention indicator; Material flow account data (MFA) as collected and reported by EU-27. This shall be further developed into an environmentally weighted indicator.

also required for environmental policy, **nor policy-oriented interpretation and analysis are covered** by this arrangement."

With regard to the integration of DCs into the ongoing process of SEIS, the Technical Arrangement highlights that "the role of data centre will need to evolve over time as a result of the gradual development of a more co-ordinated (and decentralised) shared information system. There is a need to distinguish between the longer-term vision of a decentralised shared information system and the shorter-term need to streamline reporting and information gathering mechanisms." Nevertheless, the additional responsibility of a DC in a proactive support to the SEIS development within its thematic area and in ensuring interoperability with the data from the other centres is already recognised.

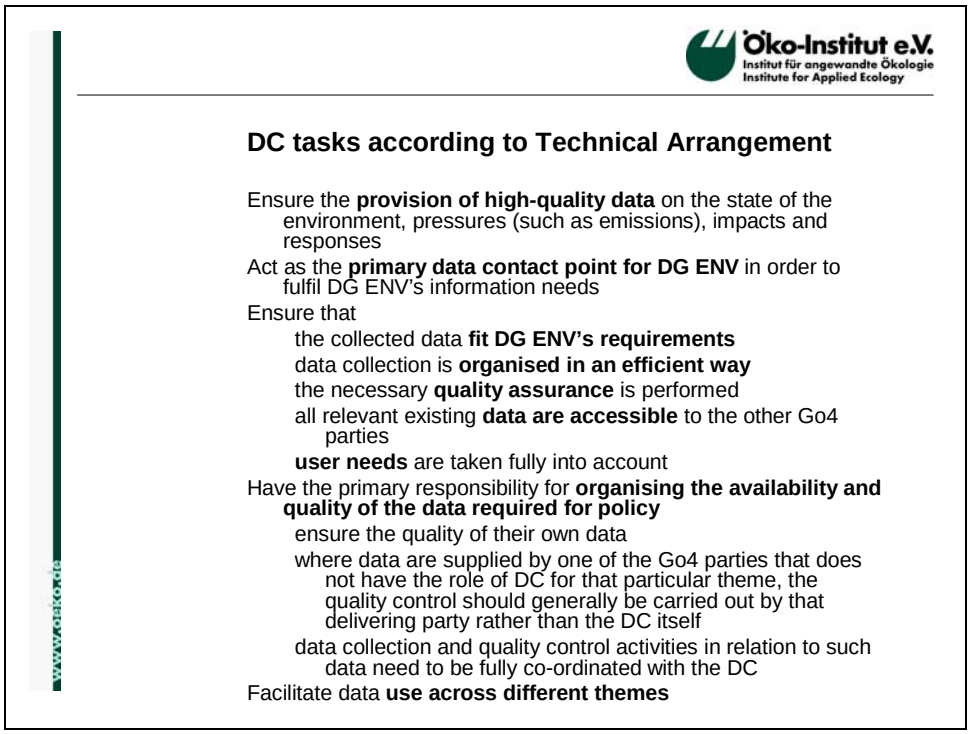

Figure 1: Overview on DC tasks according to TA

2.1.2 Mandate according to other documents

2.1.2.1 Thematic Strategy on the sustainable use of natural resources

Going beyond these principles laid down in the Technical Arrangement, Eurostat's DC on natural resources has been assigned a mandate that goes beyond the one described above and is thus wider than the one given to the other 9 DCs. The Thematic Strategy on the sustainable use of natural resources[5] has an own chapter on a DC for natural resources (5.1, page 8). Therein, it is described that the DC shall act as "Information Hub". In addition to DCs as "primary contact point for DG Environment" the widened mandate includes serving the general public, the scientific community and other actors.

[5] COM (2005) 670 final from 21.12.2005.

The role and mandate of the DC is described as follows:[6]

"The gaps and overlaps point to the need for a **Data Centre** for natural resources, a lead or central service to act as an "information hub" **bringing together all available, relevant information**, to **monitor and analyse it** and to **provide policy relevant information to decision makers**. […] The information providers will also have a role in other components of the strategy: **developing and consolidating suitable indicators for measuring the strategy's progress**, **assisting Member States in the development of the concrete actions plans** needed for delivering on the strategy's objectives, **supporting the International Panel** in its tasks, and **every five years**, **starting in 2010**, **drafting a status report on the implementation of the strategy** to be fed into the Commission's review process."

2.1.2.2 Thematic Strategy on the prevention and recycling of waste

The Thematic Strategy on the prevention and recycling of waste[7] does not explicitly mention Data Centres. Reference is made to the introduction of life cycle thinking into waste policy as well as "better knowledge and information which will underpin the continued development of waste prevention policy" (page 7).

Looking at it in more detail, on page 12 it is stated that:

"*The strategy will be monitored on an ongoing basis. This will require a continuous effort to improve statistics on landfill and recycling and to build a stronger knowledge base relative to environment impact and impact indicators. Assessment of national waste policies, analysis of Member States' implementation reports and continued consultation of stakeholders will contribute to this.*"

However, there is no mentioning as to who will be responsible for this task.

Furthermore, the Annex (page 16) of the Strategy lists one action as "improving the knowledge base" and says:

"*Life-cycle thinking requires an improved knowledge base on the impact of resource use, waste generation and management and more systematic forecasting and modelling. This will be provided mainly through the mechanism described in the Thematic Strategy on resources and through initiatives taken in the context of Integrated Product Policy. Beyond this, the European Environment Agency, Eurostat and the Joint Research Centre will all continue to play a role in building a robust scientific and economic information base for waste policy.*"

This could be – with the cross-reference to the Thematic Strategy on resources – interpreted as assigning Eurostat's DC on waste a similar (widened) mandate as to the one on natural resources. However, this is not explicitly mentioned.

The extended impact assessment for the Thematic Strategy[8] on its page 17 also mentions the need for better waste statistics, data and information in general. Clearly, improving the

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6 See also extended impact assessment for the Thematic Strategy on the sustainable use of natural resources, pages 18-20 and page 33 (financial impact), Brussels, 21.12.2005 COM (2005) 670 final, http://ec.europa.eu/environment/natres/pdf/ia_com_en.pdf for a more detailed description.

7 COM (2005) 666 final from 21.12.2005.

8 See Commission staff working paper on the extended impact assessment for the Thematic Strategy for the prevention and recycling of waste, http://ec.europa.eu/environment/waste/pdf/ia_waste.pdf.

knowledge base for waste policy is claimed as an important goal. But again no explicit reference is made to the Data Centres.

2.1.2.3 IPP communication

The Commission's communication to the Council and the European Parliament on Integrated Product Policy[9] does not mention the Data Centres. Life cycle thinking and the need for effective collection of corresponding data is mentioned (page 10). Also, the need to make data and information on products available is stressed. Reference is made to ongoing policies such as e.g. Green Public Procurement or to research as e.g. the LIFE program or the FPs.

2.1.2.4 SCP Action Plan

The Commission is currently developing an Action Plan on Sustainable Consumption and Production (SCP) by 2007.[10] A consultation has been launched in order to receive feedback on a background document [SCP 2007] (see also section 3.2). The approach described there intends to "create a framework for better knowledge and information on products, so as to identify policy priorities and suitable actions" (page 7).

The same document states on page 9 that "It is envisaged to integrate and expand the existing European Platform for Life-Cycle Assessment into a Data Centre for the environmental performance of products, technologies and services. This Data Centre would pool the relevant knowledge on the best performance products on the market and the environmental impacts of products in general."

2.1.2.5 Pre-study Terms of Reference

Within the Terms of Reference (elaborated jointly by DG ENV and Eurostat) on which this project is based, the widened mandate as described in section 2.1.2.1 has been adopted for all three DCs lead by Eurostat:

"The DCs on natural resources, products and waste have a common feature that makes them different from other EDCs in that **their missions often go beyond data management and include assessment of data to derive policy relevant information**. The Data Centres would act as an "information hub" and:

- Be the reference point for answering specific policy questions related to quantitative and qualitative information on resources, products and waste and the associated environmental impacts;

[9] COM (2003) 302 final from 18.06.2003.

[10] SCP is an area of growing policy focus, and this trend is expected to continue until at least 2010-11 when the UN Commission on Sustainable Development (UN CSD) will review global progress on sustainable consumption and production. Consumption and production are also major themes in the revision of the sustainable development strategy. At the global level, as a result of the Johannesburg 2002 agreement to "develop a framework of programmes on SCP", the Marrakech process has led to the establishment of seven task forces (led by countries) to make progress in specific areas.

- Manage data, perform data quality assurance, coordinate data management by other bodies and coordinate quality control of data as outlined in the Technical Agreement of the Group of Four;
- Develop the necessary methodologies to produce statistical data, information and indicators on the environmental impacts of resources, products and waste taking a life cycle perspective."

Would this definition be followed, Eurostat's three DCs would have all been assigned a wider mandate than the other 7 DCs which would not be consistent with the Technical Arrangement.

2.1.3 Institutional Mandate Eurostat

Each DC hosting institution (EEA, JRC and Eurostat) has its own institutional mandate which needs to be taken into account when shaping the implementation of the DCs. Eurostat's mandate is described in brief:

Eurostat collects data (from Member States), validates it and processes it to a certain degree – thus ending up somewhere around the intermediate level of the data pyramid (see Figure 2). The outcome is then further used by other institutions to further process data towards indicator-based policy assessments being at the very top of the pyramid (for a detailed analysis of all Go4 members' institutional mandates see section 3.1).

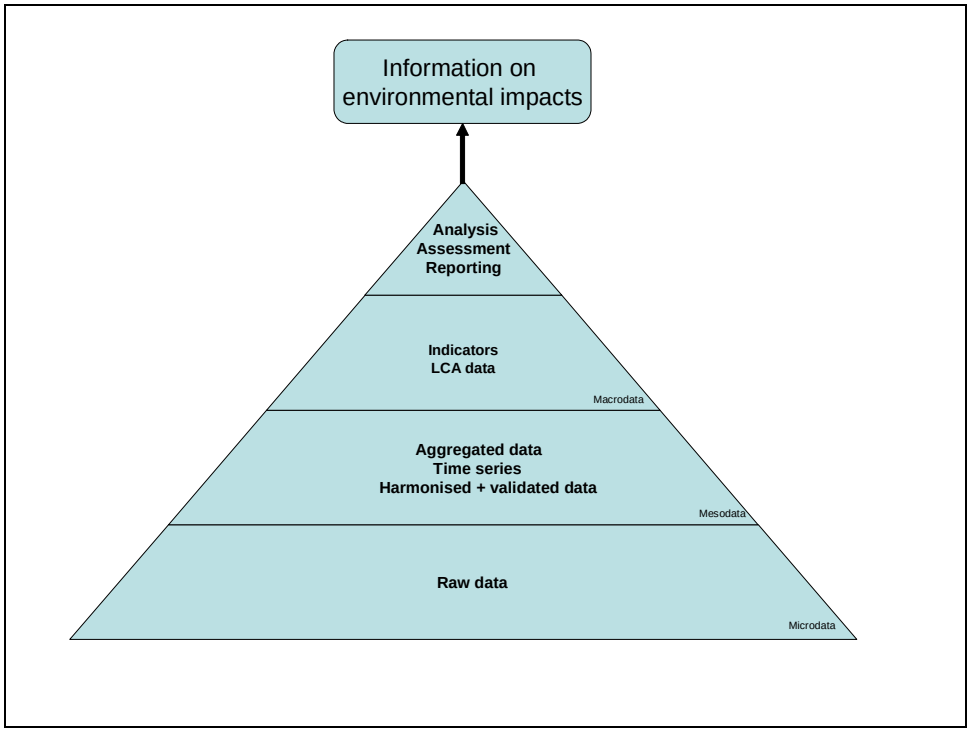

Figure 2: The data pyramid

2.1.4 Views of Go4

Before giving recommendations from an external perspective on a pragmatic way forward, a glance shall be taken at the different views of Go4 members with regard to the diverging ideas on DC mandate as described above.

Until now, in practise, each DC leading institution has developed its own way of handling the practical implementation of the DCs for which it has the leading role: basically, in shaping their DCs the hosting institutions quite understandably try to use as many existing structures and expertise as possible .

2.1.4.1 Eurostat

From Eurostat's perspective, the question which mandate its DCs should have is complex: following strictly Eurostat's institutional mandate, the DCs would have to focus on the collection and handling of statistical data as well as aggregation to a certain extent. Any assessment based on assumptions would then be outside the scope of Eurostat's DCs.

Furthermore, Eurostat considers that the institution responsible for a certain DC should not take over tasks carried out by other institutions so far, but should rather coordinate and integrate the already available expertise and knowledge of all institutions: the underlying idea of the data centre concept should be the improvement of data / information availability through better coordination between the involved parties (Go4).

On the other hand, Eurostat jointly with DG ENV have drafted the Terms of Reference for this pre-study, where it is stated that all three DCs shall act as "Information Hub" (including the tasks described above) and that – in addition to DCs as "primary contact point for DG Environment" – the widened mandate includes serving the general public, the scientific community and other actors.

This internal ambiguity has not been resolved yet by Eurostat until today.

Considering the specific case of the DC on natural resources, Eurostat stated that it had agreed to the Thematic Strategy and that the objective for the implementation of Eurostat's DC on natural resources is thus to provide "fit for purpose" and high quality data as well as to assure better, more (cost-)efficient reporting. Eurostat considers that the DC on natural resources should address all issues (and expectations when possible). This may imply going beyond the definition of DCs in the Technical Arrangement itself.

2.1.4.2 EEA / ETC-RWM

From the beginning of this pre-study, EEA has questioned the validity for all DCs lead by Eurostat of i) the 'information hub' function and ii) the feature of a DC to go beyond data management to include assessment of data to derive policy relevant information.

EEA agrees that the Thematic Strategy on the sustainable use of natural resources identifies the function of "information hub" for the DC on natural resources. However, the agency does not agree to such a function for the other two DCs lead by Eurostat since there is no men-

tioning in the corresponding documents.[11] Upon detailed request, it appeared that the expression "information hub" is used for products and wastes in internal Commission Documents only. EEA has repeatedly stressed the point that the suggestion that the three Eurostat's DC have a 'wider mandate than the DCs managed by other partners' does not correspond with the mandate agreed for the ten data centres by the Group of Four. The Nov. 2005 Technical Arrangement specifies that DCs should "act as the primary data contact point".[12] Furthermore, the EEA does not consider the Terms of Reference of this study to be a binding basis for DC implementation since it has not been agreed upon at Go4 level.

With respect to the future functioning of the DCs it was stated by ETC-RWM that coordinating is without question a necessary task of the DCs. However, the question what exactly coordination would mean in this context remained unanswered so far. One possible interpretation of "coordination" is that it does not mean to assign tasks or work packages as a leading institution; rather it should be regarded as a managing or organising task.

In this respect, EEA underlined the importance of proposing an effective mechanism to ensure the technical coordination and planning of work of the DCs. At present, the Go4 directors are meeting every year to discuss strategic issues. However, planning and coordination of specific tasks for the three DCs would probably require more frequent contacts, and on a more technical level.

2.1.4.3 DG ENV

From the beginning of this pre study DG ENV has rather adopted the opposite position to EEA and stated that

- The mandate of the DC on natural resources had been enlarged to tasks assigned in the Thematic Strategy, that Eurostat has agreed to it (agreed Commission position) and is thus willing to accept this task.
- The Thematic Strategy on prevention and recycling of waste and its Annex indirectly refer to the concept of "information hub" (see section 2.1.2.2).
- DG ENV and ESTAT agreed on the mandate of ESTAT's three DCs in the Terms of Reference and that these are thus binding for i) the contractor carrying out the pre study and ii) for ESTAT when implementing the DCs.

During consultations held with DG ENV in the context of this pre-study, the following views were added: The concept of "information hub" or "one-stop-shop" consists of ESTAT being the institution to which DG ENV can address policy-relevant questions.[13] Questions that have until now been answered by EEA, ETCs or JRC will continue to be answered by these insti-

[11] i.e. Thematic Strategy on prevention and recycling of waste and IPP Communication.

[12] The EEA has brought forward its concerns with regard to the Terms of Reference for this pre-study in a letter to DG ENV and Eurostat on 12 September 2006.

[13] It is in principle expected that the DC can answer directly the question (data, information or a straightforward assessment) which are addressed to the DC. If not, the next step would be to find an answer within the other Go4 members. If still no answer can be provided the DC would address a kind of inventory which should give information about an institution (university etc.) that might be able to answer the question. Finally the answer "no data available" would also have to be accepted as the outcome of an inquiry.

tutions; the DC should be able to deliver answers to questions beyond those.[14] Concerning the question whether or not policy analysis and assessment should be part of a DC's task, DG ENV pointed out that this would not necessarily have to be carried out by ESTAT as the DC hosting institution itself; ESTAT should rather be able to give access to the relevant analysis and assessment (via e.g. external consultants, virtual networks etc.). In summary, DCs are considered as an interface for data and information.

DG ENV confirmed that it is not intended to change the existing tasks of the Go4 members or to widen their mandate. Reference was made to the statements on this subject in the annex of the strategy on natural resources.

DG ENV expects that the relevant output of the DCs embraces data and information. While data are obligatory, information shall be made available on demand. A distinction is to be made between policy relevant information and studies. According to DG ENV, the latter are not part of DC tasks.

In relation to the functioning of the DCs it was stated that coordinating is without question a necessary task of the DCs. However, the question is what exactly does coordination mean in this context? An adapted interpretation of coordination is that it does not mean to assign tasks or work packages as a leading institution. But it should be regarded more as a managing or organising task. Instead of coordinating another description would be "creating an interface".[15]

The issue of how to deal with requests by the general public might be postponed to a later stage. One step will be to make data and information available to the general public, a more far-reaching task would be to answer inquiries. The latter is judged to be too much work and not manageable with an acceptable budget.

DG ENV explained that quality assurance will also be an important task of the DCs. If data come from e.g. ETCs, universities or other institutions the DC must offer information on the quality of the transmitted data.

A formulation chosen by DG ENV, taking all the above given descriptions and functions into account, is to possibly consider the DCs as an "in-house consultant" to DG ENV.

2.1.5 Recommendations and way forward

To conclude on the observations above, the status quo can be summarised as follows:

- There is a common agreement between Go4 members on the function of a DC on natural resources as "information hub" according to the Thematic Strategy.
- There is dissent on the role of the DC on natural resources with regard to tasks including policy analysis and assessment work as described in the Thematic Strategy.

[14] Apart from this the DC is considered to be the general contact for all requests. In this sense DG ENV will address the DC to obtain the required data or information, at least when it is not obvious where else to get the information from.

[15] Therefore it is necessary to have a formal contact person not only at the DC itself but also at the Go4 members for the cooperation with the DCs. These contact persons are needed in order to know to whom to address any kind of questions, information and organisational issues.

- There is dissent on whether the two DCs on products and waste also have a widened mandate as described in the Terms of Reference for this pre-study.

To the contractor's understanding, there is no legal basis for a widened mandate of the DCs on products and waste (Commission staff working documents and Terms of Reference for a pre-study cannot be regarded as legal basis for the DCs).

Furthermore, the Technical Arrangement clearly states that it "is not intended to be read as a comprehensive document governing the work that each service does or the relations between them." Hence, it could be interpreted that Eurostat's mandate with regard to DCs should be developed in the context of its own institutional mandate. However, it has to be taken into account that for the three DCs lead by Eurostat not only the Technical Arrangement builds the basis for its work but also the mandate laid down in other documents.

In order to bridge the gap between Eurostat's institutional mandate and the interests of different Go4 members, Eurostat will have to develop an approach of setting up an "information hub" for many different users in the framework of its own competences, strengths and its mandate.[16]

For the first implementing steps, the contractor proposes that the DCs hosted by Eurostat shall begin to become operational with tasks that will still have mainly the character of a statistical organisation. Especially in the initial period the focus of the Data Centres should thus lie on improving the presently unsatisfactory data situation. This refers to organizing data, compiling, and validating data and making it available to the Go4 partners more rapidly than in the past. The processed data will then be located at the lower end of the data pyramid (Fig. 2), since Eurostat is not expected to change its mandate and core expertise.[17] Nevertheless, a DC lead by Eurostat may well act as data facilitator to other levels of the pyramid. Additionally, once certain aggregated indicators have been developed by other institutions, Eurostat can apply them in conjunction with its own data, or at least make them available upon request.

2.2 Scope ESTAT DCs

This section gives a brief overview on the scope that shall be covered by ESTAT's three DCs. Even if the three corresponding thematic areas are clearly named (i.e. natural resources, products and waste), a detailed scope for each DC still needs to be elaborated.

The scope for each DC should be set in a way to fit to the DC mandate and to give the necessary framework for the development of the single tasks to be carried out by the DCs. Sometimes the same kind of data will be used for different DCs, depending on whether data has been collected and processed with a clear thematic link to one of the three DCs or whether data has been gathered and managed with a rather general environmental policy goal (e.g. using a certain methodology or project framework).

For example statistical data can clearly be allocated to one of the three areas; but there is also horizontal data that integrates data across all three areas: LCA data integrates all as-

[16] Clarification of details will be subject of the implementation study that is to be launched end of 2007.

[17] All work associated with assumptions and hypotheses cannot be carried out by Eurostat.

pects into one data set along the life cycle. This methodology can hence be applied to questions related to all three DC topics.

The most important need for clarification with regard to the scope concerns a clear definition of the three terms “natural resources”, “products” and “waste”. They are currently being used by many different actors in many different ways. Furthermore, the three thematic areas cannot be clearly separated one from another since overlapping areas are manifold (e.g. when does a natural resource become a product and when does a product then become waste and back again?). Discussions on a clear cut between natural resources / products / waste have already been initiated between ESTAT and DG ENV (also in the framework of the TF on environmental impacts). However, no final decision has been taken yet as regards the use of clear-cut criteria in the process of DC implementation.

In any case, the scope of the DCs should depend on the needs of their clients as they have *inter alia* been described in the Technical Arrangement, the Thematic Strategies and the IPP Communication / SCP Action Plan. DG ENV as the main client should commit itself to regularly review its needs towards the DCs and to clearly formulate them in order to make a sound definition of each DC’s scope possible.

The definition of the DCs’ scope will thus need to evolve over time and especially be reviewed in the light of a later possible merge of some DCs. The following sections therefore set up a first attempt to specify the scope of each of the three DCs while at the same time overlapping issues to other DCs are addressed.

2.2.1 Scope DC natural resources

The main objective of a DC on natural resources is to improve knowledge about the relationship between resource use, economic growth and environmental impacts. The ToR for this pre-study list the following tasks that should be covered by the scope of a DC on natural resources:

- A review of all appropriate methods to further elaborate the definition of 'environmental impacts' associated with resource use;
- Development of methodological approaches to produce data, indicators and information on environmental impacts associated with resource use, including material flow accounting and other relevant methodologies to cover the broad scope of 'Natural Resources', as defined in the Thematic Strategy. This will include, for example, the formulation of research needs for methodology development, data generation and modelling;
- Use of these methodologies to produce robust data sets, indicators and information to measure the progress towards a decoupling of environmental impacts associated with use of resources;
- Management and publication of statistics on material flow accounts (MFA), in particular those generated through the recently developed questionnaire on MFA. They form the basis for EU 25 estimations, based on commonly agreed estimation methods;
- Assessment of the possibility of developing 'emission factors' for materials uses, to be able to quickly show the most important effects on the environment.

These tasks cannot be carried out immediately by a DC on natural resources. This is why section 4.5 of this report suggests short-, medium- and long-term objectives for the stepwise implementation of the DC.

2.2.1.1 Definition of "natural resources"

A specific definition of the term "natural resources" for the use within DC implementation does not yet exist and could not be agreed upon by all Go4 partners within this pre-study. The definition should address the question which different kinds of resources should be included in the tasks of the DC on natural resources. In principle, fossil fuels, minerals and metals but also biogenic resources or for example environmental or flow resources like air, water or wind need to be considered. However a closer look at the individual resources is necessary in order to avoid double work and use synergies with other DCs.

Thematic Strategy

The Thematic Strategy on Natural Resources deals with the drivers of environmental pressures, beginning with e.g. mining, harvesting etc. and tracking the resources through the economy from there, identifying the most serious environmental threats related to their use, and develop solutions. In the Thematic Strategy, the European Commission has defined natural resources as follows: "Raw materials (e.g. minerals, fossil energy carriers, biomass), environmental media (e.g. air, water, soil), flow resources (wind, geothermal, tidal and solar energy), and space (land use for human settlements, infrastructure, industry, mineral extraction, agriculture and forestry)."

ETC-RWM

The European Topic Centre of Resource and Natural resources Management (ETC-RWM) distinguishes between renewable resources and non-renewable resources. These can be further split into four categories:

- Renewable resources that are non-extinguishable such as wind and sunlight
- Renewable resources that are extinguishable i.e. all biological resources and vulnerable reservoirs such as soil and fresh water
- Non-renewable resources that are non-extinguishable such as metals and minerals. These resources cannot be destroyed but they can be dispersed due to natural causes or human activity. Recovery is possible but will require input of energy depending on the level of dispersal
- Non-renewable resources that are extinguishable i.e. fossil fuels. Either their use will be stopped through policy as a response to environmental impacts or by the market as increased scarcity leading eventually to non-competitive prices.

EEA

The EEA has in its report on "sustainable use and management of natural resources" from September 2005 narrowed down the area of natural resources they covered: "Given the broad coverage of the term "natural resources", a decision was made at the outset to focus

the analysis on a selection of natural resources: fisheries, forestry, water, fossil fuels, metals and construction materials, and land use." The ETC-RWM focuses on what they call "mineral resources".

Pre-study discussions

The definition of resources as "materials that enter into the economy" was proposed. However, this expression is already used in LCAs as the "input to any unit process".

According to DG ENV, the scope of DC on natural resources should cover not only abiotic resources but also biotic resources that are covered by other DCs. However, DG ENV agreed that for biotic resources the natural resources DC should integrate data from other DCs. One example discussed was the issue of biofuels: from DG ENV's perspective, it cannot be stated clearly whether biofuels are a subject related to biodiversity, land use or climate change, but they certainly belong to the area of natural resources.[18]

It was widely agreed by the Steering Committee that flows (e.g. wind or tidal) and media (e.g. water or air) should for the moment not be covered in the DC on natural resources, provided that they are addressed in the other relevant DCs and easily accessible by the DC on natural resources. If the DC on forest for example would care about the material flows of wood and their environmental impacts than a link to this DC would be sufficient.

Pragmatic proposal

With regard to the implementation of a DC on natural resources it appears sensible to follow the approach already chosen by EEA and ETC-RWM. Since DCs on air, land use, biodiversity, climate change and water are lead by EEA, these areas should be kept out of a DC on natural resources in a first step. Similarly, soil and forestry are covered by the two DCs lead by JRC IES. Fisheries could be considered part of biodiversity.

Summarising the above declination, the following areas of natural resources remain as the first tasks for the implementation of the DC on natural resources:

- Natural Resources proposed to be covered by DC on natural resources: fossil fuels, minerals and metals, and construction materials;[19]
- Interfaces and overlapping issues with other DCs would have to be defined and taken into account;[20]
- Possibly, when assigning the responsibilities around data on natural resources to Go4 members as described above, some areas may possibly not be sufficiently covered.[21] These will have to be identified and addressed at Go4 level in order to find a solution.

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[18] At this stage it appears worth mentioning that such cross-cutting issues are complicated, and that a DC will not always be able to solve the complexity of such issues. Making data (and information) accessible for cross-cutting issues is a task that is currently carried out in the context of complex studies which a DC will not be able to replace in many cases.

[19] The resources wind, geothermal, tidal, solar energy etc. are regarded as "infinite" resources and thus not to be covered by a DC on Natural Resources in the short and medium term.

[20] In the long-term it could thought of a DC hierarchy, where the DC on natural resources will integrate data from other DCs. At present – due to the defined mandate of hosting institutions – such a hierarchy does not seem appropriate.

Fossil fuels, minerals and metals and construction materials and also to a certain degree the biogenic resources would mainly be covered by Eurostat's statistics and MFA activities. Environmental resources like e.g. water or soil could possibly follow in medium term as a potential input from other DCs. Finally the flow resources would be object of a long term perspective.

This scope should be adapted and updated according to policy changes. Further on data access should also be given to other DCs relevant for natural resources such as water, land use, biodiversity, soil and forests. Special attention will need to be paid to potential overlapping issues.

The scope of the DC on natural resources – as defined by its mandate described above as well as by requirements and needs of DC clients – is thus extremely broad. The description of the DC scope relies on proposals by the contractor (Öko-Institut) carrying out the prestudy on DC implementation. These proposals inter alia rely on the requirements specified in the Thematic Strategy on Natural Resources as well as on a step-by-step approach, starting with a focus on material resources used in the technosphere.

2.2.1.2 Differentiation to "products"

A clear-cut differentiation between "natural resources" and "products" appears particularly difficult. The fundamental question is how long a natural resource is a resource, and at which stage it becomes a product. Differentiation between DCs for natural resources and products means taking a different perspective on the same (data) system. Sugar for example can be considered a resource for the food industry, a product as output of a sugar producer or a consumable product.

The process chain of the production of a car (iron ore → steel → car) is chosen as an example for the differentiation between resource and product. Extraction of iron ore can clearly be assigned to the DC on natural resources, while the manufacturing of the car would unambiguously fall under the scope of the DC on products. Still, the crucial question is where the resource ends and where the product begins.

One of the fundamental tasks of the DC on natural resources is to make information on environmental impacts associated with resource use available.

Relevant impacts from the extraction of the iron ore which rarely takes place in Europe any more are considered to be e.g. mining wastes or overburden. For many other important impacts (e.g. emissions into the air, energy demand, greenhouse gases or production waste) the further processing of the ore resulting in the production of steel is expected to be much more relevant than the extraction of the ore itself. In order not to overload the Data Centre on Products, and also to balance the relevant process steps and workload between the Data Centres, it could be a rather pragmatic approach to include also the steel production into the DC on natural recourses. Other mass products such as construction materials could then similarly be included in the DC on natural recourses, while "semi-finished" or "finished"

[21] The resources biomass (including wood as a product) and agriculture are probably not covered by the other DCs. The question on a definition of biomass, wood and agriculture needs to be discussed.

products that often consist of a multitude of different components and materials (like e.g. cars) would be allocated to the DC on products.

Even with such a pragmatic approach, many cases will remain where complex decisions about the correct allocation of a resource or product need to be taken. After all, it may turn out that maintaining an – often artificial – border between resources and products brings about little advantage if any at all, which would speak in favour of merging the two Data Centres into one DC on resources and products. With both Data Centres hosted by ESTAT, this could well be the easiest solution.

2.2.1.3 Differentiation to “waste”

In principle the same kind of questions as discussed for resources and products applies to waste also. When does a waste become a resource or when does a product become a waste? However, the case of the DC on waste is different to natural resources and products, since wastes are legally more clearly defined, making it clearer which data shall be covered in the DC on waste (see section 2.2.3).

Nevertheless some difficulties in differentiating between natural resources and waste can be expected. Such questions on how to differentiate between “natural resources” and “waste” are answered either by legal decision, or with the help of case studies which are carried out e.g. by the JRC IPTS (End of Waste Project – see section 3.4.2.2, Waste).

2.2.1.4 Links to other DCs

Other DCs are run by the EEA and JRC’s IES. Since natural resources issues also play a role in other areas covered by those, this section will shortly describe related links and possible need for interaction.

DCs on soils and forests refer mostly to spatial information while a DC on natural resources rather refers to point data since natural resources are mobile and can thus not be geo-linked (except land). The activities of the European platform on LCA have relations to natural resources issues (e.g. development of natural resources guidelines) that will have to be taken into account (see section 3.4.1.1, Natrual Resources).

The following table gives a short tentative overview on possible links between the DC on natural resources and other thematic areas dealt with at the other Data Centres.

Table 2: Links between natural resources and other DCs

Link	Forests	Soil	Land Use	Air	Climate Change	Water	Products	Waste	Biodiversity
Natural resources	Wood as a natural resources 1) wood as a raw material for production of products 2) (waste) wood as a energy carrier	Amount of soil used and transported or moved; e.g. applications in the construction sector (house building)	Land as a natural resources, e.g. land sealing during road construction	Air as a natural resources; emissions into the air during extraction and use of natural resources	impact on Climate Change during extraction and use of natural resources	Water as a Natural resources; 1) use of water (water statistics) 2) emissions into the water during extraction and use of natural resources	Natural re-sources are part of the life-cycle and the environ-mental impacts of products	1) Wastes result from extraction and use of natural resources 2) Definition of waste (wastes as secondary raw materials can be considered as resources)	Biomass as a natural resources (biogenic resources); applications in agriculture e.g. feed from cattle pastures

2.2.2 Scope DC products

The main objective of a DC on products is to improve knowledge on the relationship between environmental aspects and impacts, design & production of goods, the provision of services, and consumption. The ToR building the basis for this pre-study list the following tasks that should be covered by the scope of a DC on products:

- Developing codes, nomenclatures and definitions for the purpose of improving knowledge of products and services and trade;
- Establishing, maintaining and publication of data, statistics and indicators for products and services that have the greatest environmental impacts as well as improvement potential taking a lifecycle perspective;
- Development of methodological approaches to produce data and information on environmental aspects and impacts associated with products and services, taking a life cycle perspective. This will include, for example, the formulation of research needs for methodology development, data generation and modelling, and take into account ongoing work;
- Providing, developing and managing product-related environmental data covering the life cycle of products and services useful for input to policy assessment and stakeholder use;
- Use of these methodologies to produce robust data and information on environmental impacts associated with products and services.

These tasks cannot be carried out immediately by a DC on products. This is why section 4.6 attempts to derive short-, medium- and long-term objectives for the stepwise implementation of the DC.

2.2.2.1 Pragmatic approach

Generally and taking into account the EU key documents on product policy (IPP Communication, SCP background document) this DC will set the focus on products following a life-cycle approach, thus regarding the entire life cycle from raw material extraction to production (intermediate and final products), consumption, end-of-life management including final disposal. The life-cycle perspective implies a strong interface to the DC on natural resources and to the DC on waste.

The DC on products will be getting a specific and outstanding role as the action plans on SCP and SIP (Sustainable Industrial Policy) are unambiguously setting the focus on a product-based approach.

In order to set the scope more precisely the following aspects should be considered:

- As given in the IPP communication, in ISO 14040 as well as in ESTAT classifications[22] (e.g. PRODCOM, CPA), products should encompass both goods and services. The focus of the DC may even go further beyond. Both goods and services are used to fulfil human needs. Different ways how to fulfil such a defined need can be compared by applying

[22] The statistical Classification of Products by Activity (CPA) and the statistical Classification of Economic Activities (NACE) in the European Community are part of an integrated system of statistical classifications.

LCA-based analyses and / or material flow analyses. For example, the need for mobility may be satisfied by using the train, the car or the plane. Main areas of needs include housing, food, clothing, health, education, leisure, mobility and communication.

- In order to structure different levels of detail it appears useful to define a hierarchy of different levels as follows:
  - Needs
  - Functional areas to fulfilment of needs
  - Subdivision of functional areas to product type groups
  - Typical average products
  - Individual products, specific goods and services
- The analysis of possibly relevant data showed that the DC on products will have to manage a part of the data in a completely different way than the other DCs, as the field "products and environment" has so many aspects which are handled from all stake-holders from different points of view and different approaches. Therefore, no uniform systematic is given.
- In accordance with the life cycle principle, the consumption of natural resources as well as the final disposal of wastes will have to be adequately considered too, although the main focus of this DC is laid on products. Insofar close relations with the other DCs are unavoidable. As discussed in sections 2.2.1.2 and 2.2.1.3. it will not be possible to draw a clear cut-off line between the three DCs on natural resources, products and waste. In order to deal with cross-cutting issues properly it will be necessary to define a common basis on data as well as on consistent methodological approaches.
- Although the SCP background document sets its focus on the key challenges of climate change, energy and resource efficiency or carbon profile of products we recommend broadening the "impact scope" according to the European Life Cycle Data System ELCD, section "Life Cycle impact assessment methods and indicators". Furthermore at least in a medium term perspective new methodological supplements as decoupling indicators, life cycle costing and social LCA should also be taken into consideration.
- Besides product-related quantitative data from Life Cycle Analyses and Material Flow Analyses, the DC on products will have to handle many qualitative data and general information on products (e.g. criteria for eco-labelled products).

A detailed overview on links to other DCs is given in sections 4.6.5.1 and 4.6.5.2.

An annual amount of 300.000 € from Eurostat budget 2008 - 2010 allocated for external expertise in order to support the implementation of the DC and to finance accompanying studies has been requested (see section 4.8).

2.2.3 Scope DC waste

The scope of the DC on waste is defined by its mandate described above as well as by requirements and needs of DC clients. The tasks described in the scope have to be seen in addition to the already existing task carried out by ESTAT since the DC should integrate on-going activities.

The scope of the waste DC may be the one that is easiest to define and specify. This is due to the fact that waste policies have been in place for over 30 years[23] thus generating a good data basis. For example, waste legislation on e.g. WEEE and ELV includes reporting obligations on well-defined parameters for waste data (reported to DG ENV). Furthermore, the WStatR has set a legislative framework requiring MS to deliver sound waste statistics (reported to ESTAT).

As regards the definition of the term "waste", there is already extensive documentation available:

- List of wastes (1994)
- List of hazardous wastes (1994)
- European Waste Catalogue (2000).[24]

Nevertheless, discussions on the definition of a clear cut-off point for the transition from "product" to waste and vice versa (or from "waste" to "resources") have also been ongoing for the last years but no final definition / setting exists yet.

Looking at the needs of a future waste DC's clients, the following points need to be covered by the scope of the DC:

- Improve knowledge of the relationship between environmental impacts and waste generation, prevention and management, to derive policy relevant information from a life-cycle perspective
  - Using existing structures, know-how and expertise of Go4
- Monitor waste policies
- Provide data and information for the assessment of policy effectiveness
- Generate good, reliable and timely available waste statistics
  - Develop and coordinate, in cooperation with the Go4 partners, the necessary methodologies to produce statistical data, information and indicators on the environmental impacts of waste taking on a life cycle perspective
  - Manage data, perform quality assurance, and coordinate data and information managed by other bodies (e.g. Go4, other EU institutions, international organisation such as OECD and UN etc.)
- Integrate knowledge available within other institutions.

[23] The Waste Framework Directive (WFD) has initially been issued in 1975 and has last been published in a codified version in 2006. It has numerous daughter Directives.

[24] Decision 2000/532/EC.

The scope of the DC on waste is in better agreement with Eurostat's common tasks (data collection, reporting etc.). It includes a visibly higher share of routine work. During this pre-study it was commonly agreed that the DC on waste should be and can be kept separately.

The DC tasks, in particular the establishment of a "knowledge base on waste", should thus include:

- Streamlining of reporting
- Transfer of technical responsibilities for various reporting obligations under Community waste law (such as WFD, ELV, WEEE Directive)
- Data validation
- Contract follow-up
- Reporting to DG Environment
- Databank management
- Production of meta data sheets
- Drafting reports and publications
- Updating the manuals and guidance
- Development of indicators
- Identify data gaps in the area of waste.

As already mentioned before, there are a certain number of overlapping issues and possible synergies between the DC on waste and other DCs. The following table gives a tentative overview on possible links between the DC on waste and the thematic areas dealt with at the other DCs.

Table 3: Links between waste and other DCs

Link	Forests	Soil	Land Use	Air	Climate Change	Water	Natural Resources	Products	Biodiversity
Waste **- as a product** **- as an energy source**	Collection & treatment of waste wood	1) Collection& treatment of waste con-taminated soils 2) Use of sewage sludge on soils	Land use for landfill sites	Air emissions from waste treatment operations	Greenhouse gas emissions from waste treatment operations	1) Emissions into water from waste treatment operations 2) sewage sludge from waste water treatment	Use of waste as secondary raw material	1) Wastes result from extraction and use of natural resources 2) Definition of waste (wastes as secondary raw materials can be con-sidered as resources)	-

An annual amount of 300.000 € from Eurostat budget 2008 - 2010 allocated in order to support the implementation of the DC and to finance accompanying studies in the field of waste management has been requested (see section 4.8).

3 Go4 institutions

This section represents a synthesis of results from visits to all Go4 institutions as well as from documents made available by all involved parties and online information. For each of the institutions a brief description is given of the institution (tasks, mandate etc.), followed by data needs and wishes towards future DCs formulated by participants to the meetings. Afterwards a short overview is given on ongoing activities with relation to resources, products and waste before briefly describing the IT infrastructure used by the institutions.

3.1 Eurostat

The Statistical Office of the European Communities in Luxembourg ("Eurostat") is a Directorate-General of the European Commission ("Commission"). Its mission is to provide the European Union with a high quality statistical information service. Eurostat and the national statistical offices form the European Statistical System (ESS). Eurostat implements standards, methods and classifications for the production of comparable, reliable and relevant statistics. Users of Eurostat's output include the Commission services and other institutions of the European Union, national governments of the Member States, international organisations, industry, universities and a wide range of other users. Eurostat also supports non-member countries, including the candidate countries, in adapting their statistical systems.

Eurostat's institutional mandate includes its expertise on data collection, data processing but explicitly not any work which is based on assumptions or value judgements, such as policy analysis. Its strengths lie in the collection and aggregation of (statistical) data from Member States in order to make it comparable at European level and with a view to publishing it (harmonisation, compliance with legislation).

Conceptual knowledge in the area of environmental impact is not yet a strength of Eurostat, but is under development (the relation between the technical level and the level of conceptual knowledge at Eurostat is about 80:20). However, it is not anticipated to reach the level of knowledge in developing environmental impact assessments and the provision of policy assessments, as e.g. done by the EEA.

The limitation in conceptual knowledge is partially compensated by national experts who bring in valuable additional knowledge in thematic areas, or by external consultants working on concrete projects for a limited period. It is not necessary to built up extra capacity for primary data analysis.

The following table gives an overview on Eurostat's institutional mandate:

Table 4: Eurostat's institutional mandate

Mission statement	Provide the European Union and the wider global community with a high-quality official statistical information service for inter alia environmental statistics and accounts, in order to support the definition, implementation and monitoring of EU environmental policies.
Core competence	Statistics, aggregated indicators to some extent
Main objective	Collect, validate and provide data; develop (environmental) accounting methods
Key ambition	Good reliability of published data; publish only after thorough validation
Legal basis	Annual Community Statistical Work Programme Various statistical Regulations. For Environment: Waste Statistics Regulation, Pesticides Statistics Regulation, still to be adopted.
Financial Basis	Annual Community budget, Financing decision

3.1.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCs as well as specific data needs that have been formulated by Eurostat staff during this pre-study.

The following diagram gives an overview on possible contribution and use of DC data by Eurostat.

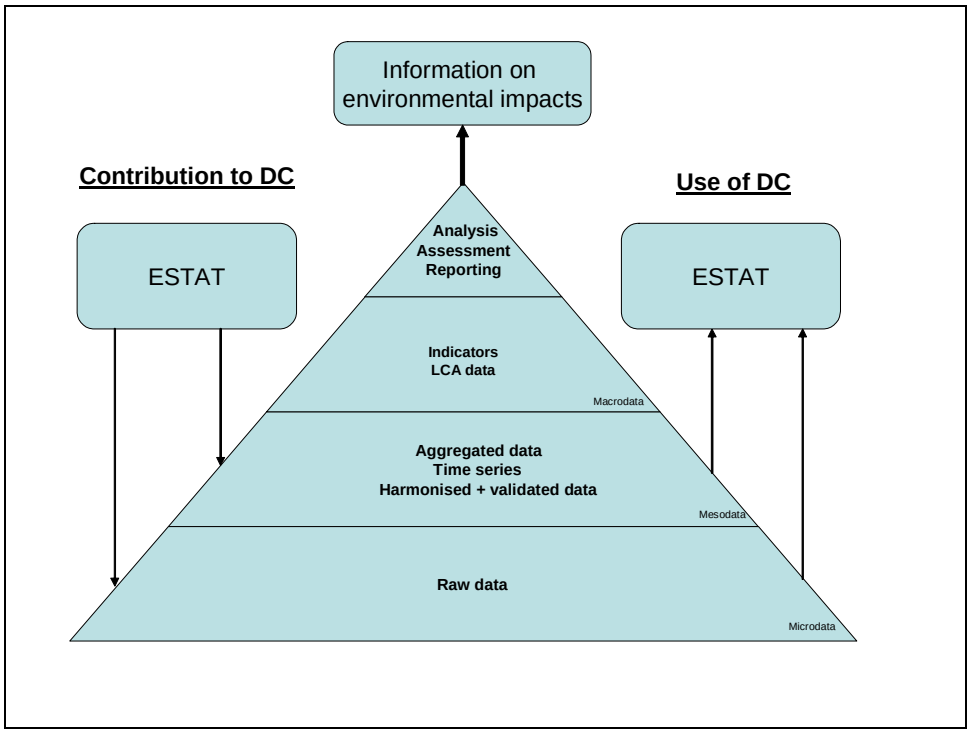

Figure 3: Data and information flow between ESTAT and its DCs

3.1.1.1 Scope and mandate

- According to Eurostat, the basic role of a DC is to serve as the main point for all data requirements of users (like DG Environment as a main policy user) in that specific domain. Each DC shall also ensure data quality and coordinate and facilitate data exchanges between decentralised data banks within future Shared Environmental Information Systems (SEIS). The conception of the DCs should permit the data centres to be developed into real information hubs, which function as real knowledge base in the specific domain, assuring also an efficient exchange and transfer to and from other existing knowledge bases (Europe, world wide), irrespective of where the data lie.
  - DCs should also be portals for science, and the general public[25];
  - The three DCs to be hosted by Eurostat have a clear link to environmental accounting.
- Thus, the scope and mandate of the DCs shall go beyond Eurostat's standard responsibilities, requiring information on the environmental impacts associated with the use of natural resources, with production and use of products and with their waste management, taking a life-cycle perspective, and coordinating data and information managed by other bodies.

  Eurostat thus considers a stepwise approach for the implementation of the DCs, to which the financial and staff resources will need to be adjusted in the short, medium and long term.
- In the area of waste data collection from other reporting obligations than statistics, some responsibilities should be shifted gradually from EEA to Eurostat, without shifting it completely.
  - EEA, assisted by its topic centres, will remain the specialist for the development of integrated environmental assessments and policy assessments in the area of sustainable resource use, consumption and production, and waste management issues.
- Eurostat DCs should have a common structure that will be ready to fit into SEIS.
- EU product related policies like Green Public Procurement (GPP), eco-labelling, Energy using Products (EuP) etc. should be included into the scope of the Product DC at a later stage and not within first implementation steps.
- The implementation of the DCs will have an impact on the IT environment. The Go4 have decided to have a common distributed architecture for the ten DCs. Eurostat's DCs will need to be integrated with the other ones that do not follow Eurostat's CVD[26] architecture and will or already have a different dissemination environment. Moreover, it has been decided to have a unique Web portal for the DCs and whenever possible a common 'look and feel'.

[25] The latter have been added lately.

[26] CVD = Cycle de vie des données.

- The scope of the Data Centre on Products is regarded the most difficult one to shape because the concept of "product" is broad and includes both goods and services. The DC on products has close relations with the other DCs managed by Eurostat, while the delimitations between them are not very clear (see section 2.2 for details).
- For the DC on natural resources, there is still a need to become more precise in defining the term "natural resource", and to decide which parts shall initially be covered. This DC will also require careful border setting in order to avoid double work and to ensure synergies with the other Go4 DCs.

3.1.1.2 Data needs

- The Sixth Environment Action Programme and its implementing 'Thematic Strategies', the Sustainable Development Strategy (SDS) as well as the Lisbon Strategy need reliable and timely statistical data.
- Data gaps / poor quality data should be identified first in close consultation with the (potential) users.
- There is a difference between data collected from implementing policies (not only data but also text information) and data collected for the purpose of statistics: the latter is the data that should be used by DCs / Eurostat in a first step, but information on implementation of legislation should also be evaluated and considered in order to build up the "knowledge bases".
- Access to metadata (on methods used and on data quality) should be given high priority and should be available and accessible online.
- Eurostat expects that data will be more rapidly published when data reporting becomes more routine work in the next years.
- Eurostat Directorates D, E and G are relevant for DCs
    - D: Regional statistics, Sustainable Development Indicators (SDI), land use, INSPIRE
    - E: Environment statistics
    - G: Production statistics, import/export statistics, material flows, energy and transport statistics
- The requirements (‘cahier de charge’) from DG Environment towards the DCs are not sufficiently detailed, putting Eurostat in the position to make own proposals according to realistic possibilities and pragmatic implementation.
    - It is important to identify what policy-relevant questions will be addressed to the DC because this will help to see what data is really needed.
- When implementing actions as described above the statistical data should meet user needs and correspond to Eurostat's quality standards (as defined, for example, in the European Statistics Code of Practice).
- “Low hanging fruits” (i.e. data which is quick and easy to generate with regard to existing data at Eurostat) should be picked first.

3.1.2 Current activities

Eurostat's work on environment statistics and accounts shall move from a conceptual phase (on methods' development as well as organisation and institutional arrangements) towards far more output oriented (concrete data and indicators) activities.

3.1.2.1 DC implementation

One key element of this work is of course the implementation of the three DCs Eurostat is responsible for (Natural resources, products and waste) in close co-operation with the Go4 partners. Furthermore, supporting the other seven DCs[27] for which the EEA and the JRC IES are responsible will also play an important role.[28]

This commitment has been integrated into the annual work programmes of 2006, 2007 and 2008 (draft) and is the main challenge for the Unit "Environment Statistics and Accounts" in the five-year programme 2008-2012. However, the current staff and financial resources attributed to environment statistics and accounts will be insufficient to carry out these new tasks.

This is why Eurostat has drafted ex-ante evaluations for the three thematic areas as well as one for the horizontal IT architecture in order to be accorded the necessary resources (required as a prerequisite for allocation of requested 1.2 million € in 2007 for DC). These documents will be presented to Eurostat's Directors' meeting for approval on 11 September 2007.

The outline for the DC for Waste was developed in parallel with the implementation of the Waste Statistics Regulation (WStatR[29]) and is therefore relatively advanced.

The two DCs on Natural resources and Products have close links to Environmental accounts and are also of importance for SDIs. Data collection activities are under way or starting for the DC on natural resources, whereas on the products DC still a lot of development work has to be done (e.g. on life-cycle analysis).

After finalisation of this pre-study, service contracts to assist Eurostat in the practical implementation and operation will be tendered by end 2007.

3.1.2.2 "Waste" proposed as a pilot project

Due to the relatively advanced status of the DC on waste it was decided to select it for the pilot implementation project.

Many activities are currently taking place at Eurostat in the area of waste, inter alia:

- Integrated reporting covering data collection under the WStatR, and reporting obligations *inter alia* according to Directives on End of live vehicles (ELV) and electrical and electronic waste (WEEE).

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27 EEA: Air, climate change, water, biodiversity, land use, JRC: soil, forestry.

28 In the fields of water (resource, use, wastewater), land use, biodiversity and forestry, but also for air and climate change (with its links to NAMEA environment accounts), this is quite obvious.

29 Regulation 2150/2002/EC on waste statistics.

- Collect and process data collected under the reporting obligations from various waste Directives.
- Study to develop a system to pre-fill the OECD-Eurostat Joint Questionnaire (Waste section) for EU Member States.
- Publish waste statistics in the Eurostat Dissemination Database.
- Calculation and dissemination of the Structural Indicators on municipal waste.

The policy objective for 2008-2012 and beyond will be the collection, validation and dissemination of reliable and comparable statistics on waste generation and treatment in the most efficient way. Appropriate indicators shall allow the monitoring of the effectiveness of the new Community waste policy, e.g.

- recycling rates;
- generation of waste from households;
- generation of hazardous waste by industry branch (where data quality and coverage would allow).

The main future tasks for the area of waste statistics include:

- WStatR data will be published in online databases within two years after the reference period (2006 data will be available by the end of 2008). The database will contain all non-confidential data at the national level, derived European aggregates and derived indicators.
- Ensure that all European reporting on waste will be done via the DC on waste as the single data entry point, using modern Eurostat transmission standards (EDAMIS, Web-Forms).[30]
- Implement regular pre-filling of the Joint Questionnaire: The Joint Questionnaire on waste is still in use at UN and OECD level. To continue the time series without multiple data reporting OECD and Eurostat have agreed on a derivation of the Joint Questionnaire information from the deliverables of the WStatR.
- Update the Waste Statistics Manual on a regular basis.
- Ensure that all statistics and meta information as mentioned above are easily accessible for the user community.

3.1.2.3 Other / Cross-cutting activities

A few cross-cutting activities of Eurostat with relation to its three DCs are briefly listed below:

- Coordination of activities with other Go4 institutions take place via joint work programmes, between Eurostat and the EEA, as well as between EEA and the JRC. Drafting a joint work programme between EEA, JRC and Eurostat is foreseen for 2008.[31] This shall clarify the working relationship in the areas of common interest and help identify the staff members to work together. Go4 Senior management meetings at least

[30] Statistical information on waste will be processed and evaluated by Eurostat, reporting of a non-statistical nature will be forwarded to the responsible European body (EEA, DG Environment). A close link to the future SEIS and to REPORTNET hosted by the EEA will be assured via the Common Architecture Drafting Team.

[31] Agreed at DIMESA 2007, Directors Meeting for Environment Statistics and Accounts, June 2007.

once per year are foreseen to review the progress of work and to adapt the agreements to evolving circumstances, including emerging data themes.

- Analysing and quantifying better the link between environment and economy, managed by the environmental accounts team
  - NAMEA framework;[32]
  - Contribute to Sustainable Development Indicators (SDI) - related concept "beyond GDP";
  - Taking part of UN Committee of Experts on environmental-economic accounting (incl. the 'London' Group);
  - European Strategy for Environmental Accounting (ESEA) under Eurostat responsibility.
- Task Force on environmental impacts
  - Wide consensus on translation of emissions to environmental impacts (using characterisation factors as used in LCA);
  - No broad consensus has been reached yet on which underlying method(s) shall be used to derive sound emission values (Discussed: MFA, LCA, NAMEA and/or combinations);
  - Discussions on clear cut between natural resources / product / waste.
- Eurostat is currently focussing on Input/Output data (top down) since it fits to its core competence and the work done within Environmental Accounting; however, close cooperation with colleagues from IES and IPTS to link work to Life Cycle Assessment (LCA, bottom up) exists.
- Ongoing process of creating “Centres of excellence” (not to be completed in time before end of 2007).
- Close partnership with UN and OECD on methods and data collection.

3.1.2.4 IT infrastructure

- Currently Eurostat runs its own IT environment with regard to processing, validation, publication and dissemination of all types of statistics, including environment statistics, as well as a homepage located on the Europa web portal.
- Eurostat wants to ensure that its concerns on data quality, accessibility, confidentiality, IT architecture and data bank interoperability are fed into the DC development process.

- Therefore, two main steps are currently proposed:
  1. Define a Common Architecture Framework for the ten DCs and propose a roadmap for its implementation;
  2. Draft technical specifications for the development of a pilot platform for the DC on waste.

[32] National Accounting Matrix including Environmental Accounts, opening environmental phenomena to the possibility of an economic analysis, compatible with national accounts.

- From an IT perspective, a DC is an institutionally supported facility providing convenient access to, manipulation of, and/or distribution of data sets pertaining to a specific thematic area (including supporting information and expertise) for a community of users. It is operational which means it has a long-term lifetime not tied to a specific project and provides information in a supervised and proofed quality. It is storing, maintaining, and making available data for users and is adapted for expected use in ongoing and/or future activities according to user requests.
- Currently, under DG Environment steer, the Common Architecture Drafting Team (CADT) is examining the technical consequences of the TA. This Drafting Team produced a working document with considerations for a 'Go4 Environmental Data Centre architecture framework and Guidelines'. This document was discussed with DG DIGIT, DG TREN in order to explore how existing initiatives can contribute to the implementation of the DCs. There are three interoperability frameworks available or under development at EU level (CEAF[33], IDA[34] and INSPIRE[35]).
- In 2006, the CADT made the following recommendations:
  - To build the Data Centre Enterprise Architecture Framework (DCEAF) on the basis of the Commission Enterprise IT Architecture Framework. This DC Architecture needs to be designed and technically implemented step by step.
  - Individual Data Centres have the flexibility to develop their own implementation plans but a set of guidelines (to be drafted), based on CEAF, IDA and INSPIRE will have to be respected in order to ensure interoperability.
  - A common Web Portal will be applied for accessing the DCs. The core functionality of the portal will be discovery, view and download services, with potential addition of horizontal/support services managing access rights and licenses. This future portal should be compatible with INSPIRE.
  - CADT will be responsible for the development of the technical architecture and guidelines.
  - The necessary resources should be allocated in order to guarantee the continuity of the work of the CADT. This includes internal but also appropriate external technical expertise when necessary.
- The integration of Eurostat's three DCs into the CVD context and its dissemination environment[36] will be also looked at.
- It has been decided that a feasibility study shall be carried out on a common DC architecture as well as on a pilot portal for the DC on waste. The specifications are to be finalised and approved by the CADT by 30 October 2007 in order to start in November.[37]

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33 CEAF: The Commission Enterprise IT Architecture Framework - version 1 http://www.cc.cec/home/dgserv/digit/ict_strategy/governance/enter_arch/com_arch/doc/ceaf%20guide%20v1.1.pdf

34 IDA: Interoperable Delivery of European eGovernment Services to public Administrations.

35 INSPIRE: Infrastructure for Spatial Information in the European Community (Directive 2007/2/EC).

36 CVD: Cycle de Vie des Données (CVD Master plan version 11.06.2007).

- With a view to coordinate efforts between Go4 institutions with regard to this feasibility study, a two days technical meeting (18-19 September 2007) will be organised in Ispra (JRC) with EEA and Eurostat representatives.
- The deliverables of the feasibility study include:
  - Document "Common Architecture for the Data Centres (Environmental Data Centres Architecture Framework – EDCEAF)"
  - Global Implementation plan
  - Detailed specifications for the pilot project on the Waste DC
  - Final report.

3.2 DG ENV

DG ENV is a service of the European Commission and its task is to develop and support environmental policy making in cooperation with other EU institutions. As such it is part of the Go4 and is one of the main drivers behind the need for better environmental data. Its goal is to reach a more sound and knowledge-based environmental policy in the future.

Furthermore DG ENV has many activities in relation to Eurostat's three DCs, namely tasks related to waste legislation (including corresponding reporting obligations), natural resources and products (involvement into drafting SCP action plan).

[37] On the basis of a specific convention to be signed under LOT 3A of the ESP-DESIS framework contract of DG-DIGIT (Quality, Security, requirements, analysis and specific studies). This LOT does not allow software developments. The specifications produced by this project will be the input to a development project using ESP-DESIS LOT 2 (Off-site development projects).

Table 5: DG ENV's institutional mandate

Mission statement	Protecting, preserving and improving the environment for present and future generations, and promoting sustainable development
Core competence	Initiate and define new environmental legislation and ensure that agreed measures are put into practice in the EU Member States
Main objective	Develop knowledge-based environmental policies to be integrated into SDS
Key ambition	Rapid availability of all existing data upon request via a single entry point
Mode of operation	Rely on data from other EU institutions via mutual support, contracting out studies and technical support
Financial Basis	EU Commission budget

3.2.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCs as well as specific data needs that have been formulated by DG ENV staff in the context of visits to institutions during this pre-study.

3.2.1.1 General

- DG ENV and ESTAT agreed on the mandate of ESTAT's three DCs in the form of the "Technical Information (2.1- General)" in the Terms of Reference (ToR), which is the basis for this pre-study. This is considered to be the most up-to-date document and explains thus the requirements of DG ENV.
  - According to DG ENV the concept of "information hub" or "one-stop-shop" consists of ESTAT being the institution to which DG ENV can address policy-relevant questions. Questions that have until now been answered by EEA, ETCs or JRC will continue to be answered by these institutions, but ESTAT should as a DC be able to deliver answers to questions beyond those.
  - Normally, EG ENV expects that the DC can answer directly the questions (data, information or a straightforward assessment) which are addressed to it. If not, the DC shall try to find an answer within the other Go4 members. If still no answer can be provided the DC would address a kind of inventory which should give information on an institution (university etc.) that might be able to answer the question. In rare cases, the answer "no data available" would also have to be accepted as the outcome of an inquiry.
  - The DC is expected to be the institution which provides an answer to the request of the clients. Only if it is helpful to the client beyond that, a direct contact with the institution which holds the required information might be established.
  - Policy analysis and assessment should be part of a DC's task. DG ENV pointed out that this would not necessarily be carried out by ESTAT as the DC hosting institution itself but that ESTAT should be able to give access to the relevant analysis and assessment (via e.g. external consultants, virtual networks etc.). In summary, DCs are considered as a coordinating institution / an interface for data

and information. DG ENV explained that probably an additional budget for "extra" questions would have to be made available.

- DG ENV pointed out that it was very important to design DC implementation in the vision of the future SEIS (i.e. distributed environmental data system, common portal for all 10 DCs for centralised data access, not only allow access to environmental data but also to environmental information, …). It was underlined that SEIS implementation was needed in order to give answers with regard to environmental pressures and impacts.
- DG ENV could agree with ESTAT on changing its rules of procedure concerning data accessibility (except of course for data with confidentiality issues). DG ENV proposed to check whether attaching metadata (giving the actual status of validation) could be a way forward for the DCs data validation policy.
- In principle both data and information are expected to be relevant output of the DCs. While data are obligatory, information shall be made available on demand. A distinction has to be made between policy relevant information and studies. According to DG ENV, the latter are not part of DCs tasks, except for studies on data gaps, statistics and related issues like indicator development.[38]
- According to DG ENV, there is a client hierarchy: the first client to be served by the DCs is DG ENV.[39] In DG ENV'S view, the next clients are other Commission DGs. EEA and JRCs have there own specific status in relation to the DCs. In principle they are of course also clients; however, they are seen to be on the same working level and therefore exchange of data and information is expected to be part of their normal business. The full hierarchy of possible clients should be worked out further.
- Concerning questions from the general public, DG ENV recommends being cautious at the present time. At a later stage it is intended to make data and information available to the general public. Going beyond that, to answer inquiries from "outside" is judged to be too much work and will not be manageable with an acceptable budget.
- Quality assurance. DG ENV stated that this would be also an important task of the DCs. If data come from e.g. ETC, universities or other institutions the DC must give information on the quality of the transmitted data.

3.2.1.2 Resources

DG ENV would particularly welcome support from DCs within the five-year-reporting cycle as foreseen by the Thematic Strategy on Natural Resources.

According to DG ENV, the scope of DC on natural resources should cover not only abiotic resources but also biotic resources that are covered by other DCs. However, DG ENV agreed that for biotic resources the natural resources DC should integrate data from other DCs.

[38] "Indicators should be a main task for the DC".

[39] DG ENV used the wording "in-house consultant", which however was rejected by other Go4 representatives as not being covered by the Technical Arrangement.

3.2.1.3 Products

For the area of products, DG ENV stated that there is no formal definition for "product" currently in use within SCP Action Plan. However, priority product groups would form the basis of a DC. These priority groups are based on current legislation activities such as e.g. EuP, ecolabelling, etc. Furthermore, the product groups looked at within the EIPRO and IMPRO studies should be taken as an orientation on such priority groups (i.e. food & drink, housing and cars – rather defined through their use and not the product itself). The EPLCA established by JRC IES would form the methodological basis for a DC on products.

3.2.2 Current activities

As already mentioned DG ENV is carrying out numerous activities in the areas of natural resources, products and waste. These include drafting legislation, contracting out studies, developing action plans and following up on implementation procedures.

3.2.2.1 Waste

DG ENV's activities in the area of waste are briefly described in this section.

Thematic Strategy on the prevention and recycling of waste

The European Commission proposed on 21 December 2005 a new strategy on the prevention and recycling of waste (Communication COM (2005) 666 final). This strategy is one of the seven thematic strategies programmed by the 6th Environmental Action Plan.

This long-term strategy aims to help Europe become a recycling society that seeks to avoid waste and uses waste as a resource. It will draw on the knowledge that the thematic strategy on resources, also adopted on 21 December 2005, will generate.

As a first step, the Commission proposes revising the 1975 Waste Framework Directive to set recycling standards and to include an obligation for EU Member States to develop national waste prevention programmes.[40] This revision will also merge, streamline and clarify legislation, contributing to better regulation. The European Parliament gave its first reading opinion on the revision of the Waste Framework Directive on 12 February 2007.

By-products Communication

The proposal for revision of the Waste Framework Directive set out a mechanism to tackle one of the issues around the waste definition, relating to setting criteria from when some waste streams cease to be waste (For example, when composted biological waste becomes compost). Instead of also proposing to define by-products in the legal text, the Commission committed itself to coming forward with clear guidance on the issue of waste and by-

[40] Proposal for a Directive of the European Parliament and the Council on Waste COM (2005) 667 final. This proposed substantive revision is not affected by the recent codification of the Waste Framework Directive (Directive 2006/12/EC). Codification is a process by which legal texts that have been revised several times are codified into one new text that replaces all the previous versions. No legal or political changes are made to the text during the codification process.

products, a commitment that is now met with this present Communication (Communication on waste and by-products (COM/2007/59)).

The Communication explains the business and environmental context around by-products. These materials can come from a wide range of business sectors, and can have very different environmental impacts. A number of examples of some materials that can be classified as waste or by-products are given in the Communication.

End of waste project

The JRC IPTS is working on a project to look at the scientific methodology that could be used to determine end of waste criteria (see section 3.4.2).

Impacts of classifying municipal incinerators as recovery using an energy efficiency threshold

Two documents relating to this activity are posted on DG ENV'S website:

- Letter from Commissioner Stavros Dimas to the European Parliament on additional information concerning the impacts of the proposed classification of municipal waste incinerators as recovery installations using an energy efficiency threshold.
- Non-paper submitted to the Council Working Group, explaining the origin and purpose of the proposed energy efficiency threshold for classification of municipal incinerators.

Preparation of guidance on biowaste management

As foreseen in Thematic Strategy on the prevention and recycling of waste, the Commission is preparing guidelines addressed to policy makers on the application of life cycle thinking to biowaste management policies. The JRC IES is assisting DG Environment with this task and has entrusted to a consultant the preparation of a first draft of the guidance (see section 3.4.1.1, Waste).

The project includes two major steps:

- Analysis and brief report on existing studies and related expertise
- Development of guidelines with a supporting tool, documentation and data

The final document will be the first guidance document developed at European level on applying life cycle thinking to waste management policies. It will be followed by further guidance addressing comprehensively the application of life cycle thinking in waste management.

Studies

Table 6: Overview on waste related studies carried out by DG ENV

Topic	Title
Batteries	Substitution of Rechargeable NiCd Batteries
Biodegradable Waste	Economic analysis of options for managing biodegradable municipal waste
Construction and Demolition Waste	Construction and Demolition Waste Management Practices and their Economic Impacts
End of Life Vehicles	Heavy metals in Vehicles Rules on compliance with Article 7.2 of Directive 2000/53/EC
Household Waste	Study on hazardous household waste with a main emphasis on hazardous chemicals
Landfill	Economic Valuation of Environment Externalities from Landfill Disposal and Incineration of Waste
Mining	Management of mining, quarrying and ore-processing waste in the European Union A study on the costs of improving the management of mining waste
Oils	Critical Review of Existing Studies and Life Cycle Analysis on the Regeneration and Incineration of Waste Oils
Packaging and Packaging Waste	Study on the implementation of the Packaging Directive and options to strengthen prevention and re-use Evaluation of Costs and Benefits for the Achievement of Reuse and the Recycling Targets for the Different Packaging Materials in the Frame of the Packaging and Packaging Waste Directive 94/62/EC
POPs - Persistent Organic Pollutants	Corrigendum of 29 September 2005 Final report on the study to Facilitate the Implementation of Certain Waste Related Provisions of the Regulation on Persistent Organic Pollutants (POPs)
PVC	Life cycle assessment of PVC and of principal competing materials Economic evaluation of PVC waste management Chemical recycling of Plastics Waste (PVC and other resins Mechanical recycling of PVC wastes The behaviour of PVC in landfills The influence of PVC on the quantity and hazardousness of flue gas cleaning residues from incineration Studies done by the European Commission on the additives used in PVC (phthalates, cadmium and lead) within the framework of the market restrictions policy of the Commission
Sludge	Heavy metals (trace elements) and organic matter content of European soils - Feasibility study Trace element and organic matter contents of European soils - Progress report Organic contaminants in sewage sludge for agriculture use Disposal and recycling routes for sewage sludge Pollutants in urban waste water and sewage sludge Evaluation of sludge treatments for pathogen reduction
Other Waste Studies	Support in the drafting of an ExIA on the Thematic Strategy on the Prevention and Recycling of Waste (TSPRW) Refuse Derived Fuel, Current Practice and Perspectives Heavy Metals in Waste Costs for Municipal Waste Management in the EU Financing and Incentive Schemes for Municipal Waste Management Waste Prevention and Minimisation Waste Management Options and Climate Change Survey of wastes spread on land Study on the definition of recovery and disposal operation Further studies on waste

3.2.2.2 Products

DG ENV's activities in the area of products are briefly described in this section.

IPP

The Commission has published a Communication on Integrated Product Policy (IPP),[41] adopted on 18th June 2003. It aims to "reduce the environmental impacts from products throughout their life-cycle, harnessing, where possible, a market driven approach, within which competitiveness concerns are integrated". Some of the activities derived from this Communication are:

- Pilot product exercise: this exercise aims to demonstrate how IPP can work in practice by establishing two voluntary pilot projects: on mobile phones and on a tropical wooden garden chair. The Commission selected these based on 22 suggestions from stakeholders. The importance of the environmental impact of these products did not play a role in the selection process. The successful proposals came from Nokia and from Carrefour. These projects began in mid-June 2004.

  The projects are carried out in the following stages:

  - Analysis of the environmental impacts of the products throughout their life cycle based on available information;
  - Identification of options to improve the environmental impact of the products;
  - Analysis of the potential social and economic effects of the improvement options identified;
  - Selection of the viable options for improvement and different participants making commitments to implement some of the solutions identified;
  - Implementation of the commitments made by stakeholders and monitoring of commitments in a year's time.
- Identifying products with the greatest environmental impact and potential for environmental improvement (see section 3.4.2)

  The Environmental Impact of PROducts (EIPRO) study demonstrated that products from the three need areas of food and drink, private transportation, and housing together are responsible for 70-80% of environmental impacts of private consumption, also accounting for 60% of consumption expenditure altogether. All other areas of consumption together account for 20–30 percent of most environmental impacts.
- Subsequent research is under way to identify possible ways in which the life-cycle environmental impacts can be reduced for some of the products with the greatest environmental impacts (IMPRO).
- European Platform on Life Cycle Assessment (LCA) (see section 3.4.1)
- IPP Toolbox – policy instruments under IPP

  Integrated Product Policy applies to all products. There is no single policy tool that can be used to encourage the greening of all products at all stages of the life cycle, but a

[41] COM (2003) 302 final: http://eur-lex.europa.eu/LexUriServ/site/en/com/2003/com2003_0302en01.pdf

combination of a number of policy instruments. These policy tools construct the IPP toolbox. They should be used in coherence with each other, in a way that they reinforce each others' effect.

Some of the policy tools from the IPP toolbox are:

- State Aid (guidelines on state aid for environmental protection);
- Voluntary Agreements ([COM(2002) 412] final[42]);
- Example for voluntary agreement: agreements committing the automobile manufacturers to reduce carbon dioxide (CO_2) emissions from passenger cars mainly by means of improved vehicle technology;
- Integration of environmental aspects into standardisation;
- Environmental Management System (EMAS);
- Eco-design.

- Eco-design of Energy-using Products (EuP) – methodology, preparatory studies and Consultation Forum
  - Workshops on eco-design for SMEs;
  - DG Joint Research Centre study on eco-design of television devices;
  - Projects to develop environmental performance indicators for PCs and other ICT products;
  - Labelling and Product Declarations.
- Eco-label
- Energy labelling
  - Greening Public Procurement (European GPP Database);
  - Green Technology.
- Environmental Technology Action Plan (ETAP)
- Performance targets for products, services and processes
  - Legislation (waste, chemicals, Sustainable Consumption and Production)

Studies carried out under the IPP topic inter alia include:

- A study looking at the level of awareness regarding life cycle thinking in small European firms, retailers and consumer organisations, and their needs for further information and support was finalised.
- A study on development of Indicators for Integrated Product Policy (IPP) - concluded in December 2005.
- A study evaluating Environmental Product Declaration Schemes.
- A study on the External Environmental Effects related to the Life-Cycle of Products and Services was completed in June 2003.

[42] Commission Communication on Environmental Agreements at Community Level Within the Framework of the Action Plan on the Simplification and Improvement of the Regulatory Environment.

Sustainable Consumption and Production

The renewed European Sustainable Development Strategy (EU SDS) identifies Sustainable Consumption and Production (SCP) as one of the key challenges to be addressed in the context of the EU's long-standing commitment to meet the challenges of sustainable development.

SCP aims to "promote sustainable consumption and production by addressing social and economic development within the carrying capacity of ecosystems and decoupling economic growth from environmental degradation". In this context, the Commission will propose a European action plan early 2008. It will build upon ongoing initiatives and instruments both at EU and international level (e.g. UN Marrakech process).

Building blocks for a European SCP policy are amongst others:

- Thematic Strategy on Sustainable Use of Natural Resources
- Thematic Strategy on Waste Prevention and Recycling
- Integrated Product Policy (IPP)
- Eco-Management and Audit Scheme (EMAS)
- Eco-label Scheme
- Environmental technology Action Plan (ETAP)
- Green Public Procurement (GPP)
- Eco-design of Energy Using Products Directive (EuP)
- European Compliance Assistance Programme - Environment & SMEs

The aims of the forthcoming action plan are improving the way products are produced, designed and consumed. A background document describes the options which could be considered at EU level to achieve these aims.[43] The Commission has launched a public consultation closing end September 2007.[44]

3.2.2.3 Natural Resources

The main activity of DG ENV in the area of resources has been the development of the Thematic Strategy on the Sustainable Use of Natural Resources [EC 2005a]. The objective of the strategy is to reduce the environmental impacts associated with resource use and to do so in a growing economy.[45] It is stated that focusing on the environmental impacts of resource use will be a decisive factor in helping the EU achieve sustainable development.

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[43] http://ec.europa.eu/enterprise/environment/sip.pdf.

[44] The joint consultation on developing Action Plans on Sustainable Consumption and Production (SCP) and on Sustainable Industrial Policy (SIP) was launched on 23 July 2007. Better products - Creating a dynamic internal market for better performing products - is one of the five key challenges the consultation's background document addresses. The Commission aims to launch in early 2008, Action Plans on SCP and on SIP.

[45] "Ensuring that the consumption of resources and their associated impacts do not exceed the carrying capacity of the environment and breaking the linkages between economic growth and resource use".

DG ENV is currently implementing the Resource Strategy, in particular the proposed strategic actions:

- Data Centre for knowledge-based policy;
- Impact Indicator(s) for measuring progress;
- Sector Initiatives for industry participation;
- High Level Forum for internal coordination & member states involvement;
- International Panel for the global dimension.

Further, under the Resource Strategy, two studies are currently undertaken - one on the ecological footprint and one on environmental impacts and prioritisation of resources flows:

- Strengthening the Knowledge Base for the implementation of the Thematic Strategy on the Sustainable Use of Natural Resources
- Potential of the Ecological Footprint for monitoring environmental impact from natural resource use: Analyse the potential of the Ecological Footprint and related assessment tools for use in the EU's Thematic Strategy on the Sustainable Use of Natural Resources

3.2.2.4 Other / Cross-cutting

Two exemplary cross-cutting activities of DG ENV are shortly presented here.

Indicators

DG ENV is issuing leaflets on environment related indicators.[46] They present ten environment-related indicators that highlight trends relevant to the Sixth Environment Action Programme's priority areas: Climate Change, Nature and Biodiversity, Environment and Health and Quality of Life, and Natural Resources and Waste. Some indicators show where improvements have been made, others where further action may be needed.

Geographic information in support of Environmental Policy

Two new initiatives in the area of geographic information have been prepared by the Commission: INSPIRE (INfrastructure for SPatial InfoRmation in Europe) and GMES (Global Monitoring for Environment and Security). Their goals are:

- Ensure the implementation of existing environmental legislation;
- Integrate environmental concerns into all relevant policy areas;
- Ensure better and more accessible information on the environment for citizens;
- Develop a more environmentally conscious attitude towards land use.

Both initiatives are broader than environment only, but for both, support to environmental policy is one of the key objectives.

[46] See e.g. http://ec.europa.eu/environment/indicators/pdf/leaflet_env_indic_2007.pdf.

INSPIRE[47]

- Makes relevant, harmonized and quality geographic information for the purpose of formulation, implementation, monitoring and evaluation of Community environmental policy-making available
- Provide access to compatible information across sectors such as environment, transport and agriculture (by establishing cross-sectoral co-ordination mechanisms)
- MS make accessible their existing public sector geographical information over the internet
- MS ensure that the information is shared between public bodies and that they take steps to make geographical information more coherent
- An EU Geo-portal in addition provides citizens with a unique access point to this information (http://www.ec-gis.org/inspire/)

GMES

The Commission has set the ambitious goal to achieve a European capacity for GMES by 2008 (Communication to the Gothenburg Council in June 2001). GMES is a joint initiative of the Commission and the European Space Agency (ESA). It aims to strengthen the Communities capabilities to acquire and integrate high-quality data derived from spaceborne, terrestrial and marine observations with geographical and socio-economic information supporting knowledge-based policy making from local to global level.

The GMES initiative is/will be supported by several calls for proposals in the context of the Fifth and Sixth Research Framework Programme. GMES will as such also contribute to the aims of the INSPIRE initiative.

3.2.2.5 IT infrastructure

Under http://ec.europa.eu/environment/policy_en.htm DG ENV introduces an overview on its activities by policy areas. Each area has its own online presentation including links to project-specific homepages as well as to relevant publications.

3.3 EEA

The European Environmental Agency (EEA) is the EU body dedicated to providing sound, independent information on the environment. It is an important information source for those involved in developing, adopting, implementing and evaluating environmental policy, as well as for the general public.

Its overall budget (33.715 mio. Euro in 2007) is composed of 86% EU subsidy and 14% other member country contributions. EEA's annual management plan for 2007 includes e.g. following main objectives with relevance for DCs:

- to support and strengthen the EEA and Eionet activities, through development of skills, capacities, environmental information products and services;

[47] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing INSPIRE was published in the official Journal on the 25th April 2007. It entered into force on 15 May 2007.

- to establish the Shared Environmental Information System[48] and the five data centres for which the EEA has responsibility i.e. in the thematic areas of climate change, air, water, biodiversity and land use, in partnership with DG ENV, JRC, ESTAT and member countries;
- to establish agreement on arrangements for data transfer and co-operation in the areas of waste, material flows and resource accounting with ESTAT and on chemicals, environment and health, soil and forestry with the JRC;
- to provide information, analyses and assessments in support of the thematic strategies and key policies, inter alia:
  - Inspire and global monitoring for environment and security (GMES), including development of indicators, data flows, fast-track services and spatial analyses relating to land, soil, water, air and ecosystems;
  - EU targets on biodiversity and actions under the 2006 Communication including the Millennium Assessment for Europe;
  - thematic strategies on sustainable use and management of natural resources and prevention and recycling of waste;
  - thematic strategy for soil protection;
  - and the Environmental Technology Action Plan.
- to work further with countries, the EU institutions, international organisations, secretariats of international conventions to ensure that respective activities on environmental information and reporting are properly streamlined, coordinated and the effectiveness of joint activities enhanced;
- to further develop co-operation with the research community aimed at better utilisation of results from relevant scientific projects across Europe;
- to communicate key findings and assessments to a broad spectrum of environmental organisations, business, governments and the general public and provide public access to environmental information in accordance with the Århus convention.

EEA is part of the Eionet which is a co-operative activity between the Agency and the member countries and was set up in order to help the Agency to retrieve information, identify special issues and produce efficient and timely information on Europe's environment.

The Eionet consists of three main elements: the Topic Centres, the National Reference Centres and the National Focal Points. DG Environment, Eurostat and Joint Research Centre are also parts of Eionet.

[48] The European Commission has outlined a vision for a Shared Environmental Information system (SEIS) in which the information resulting from more coherent environmental monitoring would continue to be managed by the competent authorities in the Member States, but become more readily accessible and shared between all the levels of governance, from local to international.

The following table gives an overview on EEA's institutional mandate:

Table 7: EEA's institutional mandate

Mission statement	EU body dedicated to providing sound, independent information on the environment to decision-makers and the public.
Core competence	Policy Assessment
Main objective	Provide environmental data and information to policy makers and the general public; assess policy effectiveness
Key ambition	Rapid availability of all existing data for trend observation and analysis of policy effectiveness
Mode of operation	Mixture: Compliance Data, State of Environment, Public Information, Research (CPSR)
Financial Basis	Mixed funding structure (EU/member countries)

3.3.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCs as well as specific data needs that have been formulated by EEA staff in the context of visits to institutions during this pre-study.

The following diagram gives an overview on possible contribution and use of DC data by the EEA.

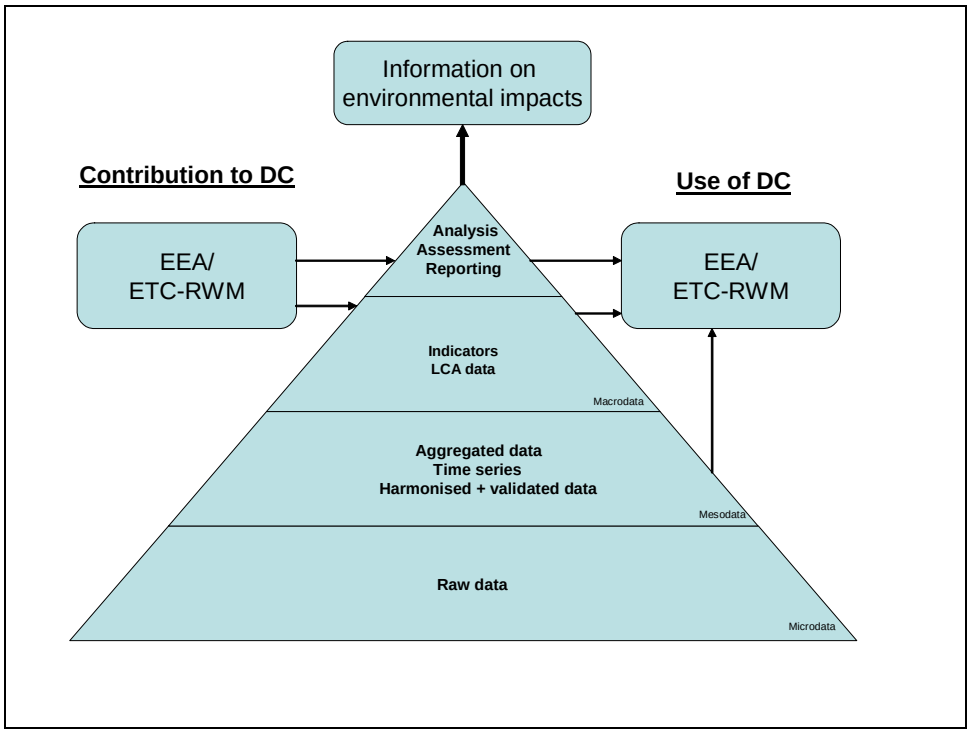


Figure 4: Data and information flow between EEA and Eurostat's DCs

3.3.1.1 General

As stated in EEA's annual management plan for 2007, a DC is defined as an institutionally supported facility for managing and providing access to data relevant at the European level. The Agency itself has the leading role for 5 DCs. Further, it is stated that the establishment of DCs is considered as being the European level within SEIS.

Additionally, EEA refers to the definition of DCs according to the Technical Arrangement, namely organise data availability and quality assurance of data while taking role / mandate of the hosting institution into account. Thus, assessments and evaluations in the areas of waste, resources and products will still be done by EEA following its mandate. A DC should rather be one entry point for data collection and "clean up":

- The original idea of the TA was to share the burden of DC implementation amongst Go4 members
- The original idea of DCs was DG ENV's need to underpin policy with "good data"
- DCs need to ensure quality of data
- Not all data activities should be transferred to the leading institution (some institutions will do concrete assessment of data flows, others not): e.g. with regard to DC on water, some activities have remained with ESTAT
  - What is done where should be decided on a case-by-case basis
  - Institutions will continue to do their core expertise: contact points will be data centres AND institutions
- DCs are meant to be a service provider and not a database: enable access to relevant data
  - EEA expressed the opinion that while DG Environment is the priority client for DCs, other Go4 institutions also need to have full access to the information and services provided by the DCs. For example, EEA for its assessments relies heavily on data collected and provided by Eurostat. EEA therefore expects that Go4 partners will have the same opportunity to draw on the DC for their analysis.
- The only exception is the DC on resources since its mandate has been defined in the thematic strategy on the sustainable use of natural resources: broader mandate as "information hub" or "knowledge base" with more analytical work (description of DC scope in TS differs from DC definition in TA)
- Difference has to be made between requirements for DCs as agreed upon in the TA and wishes of DG ENV with regard to knowledge-based environmental policy:
  - If DG ENV sees itself as primary customer, funds will have to be allocated in correspondence with needs attached to DG ENV's expectations;
  - Alternatively, DCs could be seen as a "helpdesk" and re-direct DG ENV's request, although it is difficult to see how this could work effectively in practise.
- It is hoped that DCs would be capable of giving a certain prioritisation as well as streamlining and a better planning possibility of data collection and management.

As regards a longer term perspective it is still too early to present data needs in a more precise wording. The EEA has initiated a process towards development of the multi-annual strategy covering 2009 – 2013 where more precise data needs might be included.

The EEA has never been data provider in the past, but uses data in order to perform the above mentioned tasks. This is expected to be continued in the future. However, ad hoc support for DG ENV on data processing has been given on a number of occasions in the past: from raw data, data validation to definition of electronic reporting format. EEA's possibility to offer such services depends on availability of staff and budget. In accordance with the Go4 agreement, any future requests for non-planned work should come through Director's level. Such support has not been given in 2007, and the EEA expects that future ad hoc data support requests will be directed to the DCs. If specific requests would come to the EEA-ETC/RWM in an interim period they will be considered.

3.3.1.2 Waste

EEA staff has made some specific data needs / wishes to the waste DC tasks available which are described in brief below:

- Waste data processing has clearly been task of ESTAT and this should continue;
- In line with SEIS: open access for all institutions of Go4 to data as soon as it is reported to ESTAT (*vs.* delay due to validation efforts) – in the short term this could be solved via access to data with explicit classification as "not yet validated by ESTAT";
- Enhancement of data quality;
- Narrow down role of DCs at the beginning to possibly widen it up at a later stage;
- Incorporate WStatR into DC on waste;
- Respond to requests on country data coming from reporting obligations.

3.3.1.3 Resources

EEA staff has made some specific data needs / wishes to the natural resources DC tasks available which are described in brief below:

- Definition of resources: no pragmatic solution yet;
- Coverage and scope of DC yet to be decided;
- Provide more material-related information; especially on non-renewable materials (EEA definition)
    - EEA uses the definition of "material resources" to avoid the interpretation that this also covers renewable natural resources.

3.3.1.4 Products

EEA staff has made some specific data needs / wishes to the product DC tasks available which are described in brief below:

- In November 2007 the Management Board of the EEA will decide on the frame and contents of the 'next' Topic Centre. It is already being referred to as the Topic Centre on SCP, indicating that it will have more focus on this new policy field.

- Coverage and scope of DC still to be decided;
  - Scoping of what is meant by “products” needed;
- EEA expects new data collection activities;
- Take parallel processes of DC implementation and SCP Action Plan into account;
- Current activities done in the field of NAMEA together by EEA and ESTAT could be of use for DC on products;
  - ESTAT does not use available data on air (IPCC);
  - Input-output data for NAMEA are provided infrequently.

3.3.2 Current activities

This section briefly lists a selection of ongoing activities with relation to Eurostat’s DCs.

3.3.2.1 Other / Cross-cutting

The EEA is carrying out numerous activities in the field of natural resources, products and waste. These activities are of importance for the implementation of Eurostat’s DCs. Furthermore EEA’s own implementation of 5 DCs is also of relevance, since interactions between the individual DCs play a key role in the development of implementation concepts.

Information System

In the following, first the EEA activities to providing an information system are introduced briefly as they have been fixed in the annual management plan for 2007:

- Development of EEA/Eionet information system with a view to integrate and consolidate services within SEIS (anticipated to run into next 5 year EEA strategy), inter alia including
  - support to ensure consistency and harmonisation of data across themes and support for QA/QC processes, use of software tools and promotion of best practice;
  - further development of the network’s software to meet user’s requirements and for supporting improved QA/QC processes
- Focus will continue to be on improving quality assurance of data, with emphasis on 5 EEA DCs (i.e. air, biodiversity, climate change, land and water).[49] This includes both the tabular data used for the current indicator based reporting and assessments and data needed for the EEA spatial data infrastructure
  - develop the DC structures within SEIS in partnership with DG ENV, JRC, ESTAT and others;
  - upgrade the EEA web services for data, maps, graphs and indicators, as well as online dynamic mapping services;
  - Core Set of Indicators (CSI) kept up-to-date via the indicator management;
  - Use of specific data sources such as EPER, EUNIS and selected international and Framework Programme RTD projects, and those deriving from Eurostat and the JRC.

[49] EEA has not yet set up implementation plans for its 5 DCs

- Quality assurance and control procedures will be developed and agreed upon within Eionet and DG ENV, JRC and ESTAT and supported by the relevant European Topic Centres where appropriate.
- Analytical tools and services will continue to be enhanced to enable EEA and its clients to access and use information more readily, including the spatial data required for spatial analysis and modelling.

The activities of EEA in the context of SEIS implementation (EEA is responsible for taking the lead within SEIS implementation) have been described by EEA staff as follows:

- The Communication of the Commission on SEIS is planned to be finalised by beginning of 2008 (DG ENV has political responsibility);
- Infrastructure should enable streamlined use of data from MS to Commission: important to relieve MS from their reporting burden;
- Decentralised approach favoured: MS should make information in their national language available for a greater target group;
- Currently benefit analysis is being done; impact assessment has been requested by MS
    - Since both ESTAT and JRC have no large networks in the MS, EEA is doing the benefit analysis through EIONET network; benefit analysis was to be finalised by 04/07 and foreseen to be discussed in the Environmental Policy Review Group.
    - MS would like to see a greater benefit from their investment into reporting: benefit should be shared not only with persons involved in reporting on MS level but also with e.g. the scientific community;
- 1st phase of implementation through EIONET includes:
    - Political level;
    - Operational level;
    - Quick wins;
- 2 SEIS modules to be ready by end 2008 in the area of Climate Change and Air;
- 2nd phase with other DCs responsible for land use, water, biodiversity;
    - Includes country visits: information on how to implement package; enable bench-marking and comparability between countries;
- EEA considers the DCs to be the EU level of SEIS, while SEIS has more dimensions; inter alia at MS level (“more than data”).

SCP, material resources and waste

In the following, the EEA thematic activities within SCP, resources and waste are introduced briefly as they have been fixed in the annual management plan for 2007:

- Provide framing, analyses, information and knowledge to support the development, implementation and evaluations of national, EU and global policies.
- Support policy making in the area of SCP, in particular focusing on the action plan on SCP, the thematic strategies on sustainable use of resources and on waste prevention

and recycling, waste directives, the 2007 Belgrade conference, and the UN CSD review of SCP in 2010-2011

- Communication is expected in 2008 (green paper for consultation expected in 2007);
- Inputs made at Slovenia conference on “Time for Action – Towards SCP in Europe” in September 2007.

- Analyse policy effectiveness
  - Continuation of preparation of guidelines for practitioners on ex-post policy effectiveness evaluation based on the outcome of the November 2006 expert workshop at the EEA.
  - Two studies evaluating the effectiveness of policies in selected countries
    - one study evaluating existing waste policies to achieve waste prevention and recycling (in the context of the landfill directive);
    - the other study, an effectiveness analysis of economic instruments in resource policy (aggregates taxes);
  - Developing methodology and applying in practice environmental input-output analyses to support policies in the field of SCP and resource use;
  - Further develop and maintain resource and waste indicators, including those in the core set as well as other indicators such as for example NAMEA-based indicators, and building up a process to develop indicators for SCP;
    - co-operate closely with ESTAT on waste and resource indicators;
    - regularly update the publicly available indicators on waste and resources (including those in the core set of indicators);
    - start process to develop indicators to measure resource efficiency and SCP in co-operation with ESTAT, UNEP and possibly OECD (SCP indicators currently developed by EEA and UNEP in cooperation).
- Analyse environmental impacts of consumption and production, including waste and material resources
    - Continue and expand the NAMEA project of integrated environmental and economic accounting, with regard to the data and methodologies and its possible policy implications (EEA has possibility to cooperate with countries in order to e.g. find out about CO_2 emissions by economic sector - has been done exemplarily for 8 countries; has already been ongoing for two years, publications scheduled for autumn summer 2008 [brochure] and autumn 2008 [EEA report]; draft report on ETC/RWM website);
    - Finalise the UNEP/EEA report on SCP in EECCA and SEE countries and inputs to the EEA Belgrade report;
    - Continue study on environmental and economic impacts of transboundary movements of waste for treatment;

- Undertake studies on the emissions to climate change from waste management; on projections for electronic and electrical waste (WEE); and on management of construction and demolition waste, to make contributions to the policy processes;
- Assess progress towards SCP in the pan-European region.

- Continue and further develop co-operation with member countries, the Commission, Parliament, UN CSD, UNEP, OECD and other organisations.
  - UNEP and the Commission to set up an International Panel on Natural Resources: first meeting to take place in September/October 2007;
  - OECD has set up a Council recommendation on resources and material flows.

3.3.2.2 IT infrastructure

The EEA has an own homepage located at http://www.eea.europa.eu/. From there access is given to different databases, publications (e.g. on indicators) and themes dealt with at the Agency. Eionet can also directly be accessed via http://eionet.europa.eu/.

3.3.3 ETC-RWM

The European Topic Centre on Resource and Waste Management (ETC/RWM), established in 1997, is one of five Topic Centres under the European Environment Agency (EEA). Its mission is to provide reliable and comparable data and information on resources and waste in Europe to decision-makers and the public. The Topic Centre is a consortium of seven specialist partner organisations from environmental authorities and research communities in Europe.

The Topic Centre contributes to EEA publications and prepares a number of stand-alone technical and topic reports with special focus on waste and material flows. It is also part of the European Information and Observation Network (Eionet).

Within the first years DG ENV asked the Topic Centre to assist in various data-related fields, in the beginning the services were paid for separately. The tasks were thus carried out outside the contract with the EEA, the Topic Centre merely acting as an external consultant for DG Environment. Later on these tasks were included in the Annual Work Programme according to a formal agreement between the EEA and DG ENV.

However, the Topic Centre was initially never meant to be a ‘data-collection’ body. In order not to add to the reporting burden it was agreed from the outset that the Topic Centre would use, as far as possible, quantitative data already reported to the various EU institutions or available at the national level. Nevertheless, the Topic Centre has, and will also in the future to a limited degree collect information on for instance implementation of legislation, policies and strategies and other qualitative information needed for carrying out assessments and analyses.

From the very start the Topic Centre established a very good working relationship with staff in the waste unit of DG ENV as well with staff in Eurostat working with waste data. This working relationship is crucial for the Topic Centre’s work. Collaboration with Eurostat has evolved over the years and resulted in a Memorandum of Understanding (MoU) signed by

the Executive Director of the EEA and his colleague at Eurostat. Annexed to this MoU a short list of tasks to be carried out by the Topic Centre was given.

The following table gives an overview on ETC-RWM's institutional mandate:

Table 8: ETC-RWM's institutional mandate

Mission statement	Provide reliable and comparable data and information on resource and waste in Europe to decision-makers and the public.
Core competence	Policy Assessment
Main objective	Provide environmental data and information to policy makers; assess policy effectiveness
Key ambition	Rapid availability of all existing data for trend observation and analysis of policy effectiveness
Mode of operation	Mixture: Compliance Data, State of Environment, Public Information, Research (CPSR)
Financial Basis	Mixed funding structure

3.3.3.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCs as well as specific data needs that have been formulated by ETC-RWM staff in the context of visits to institutions during this pre-study.

The following picture gives an overview on possible contribution and use of DC data by the ETC-RWM.

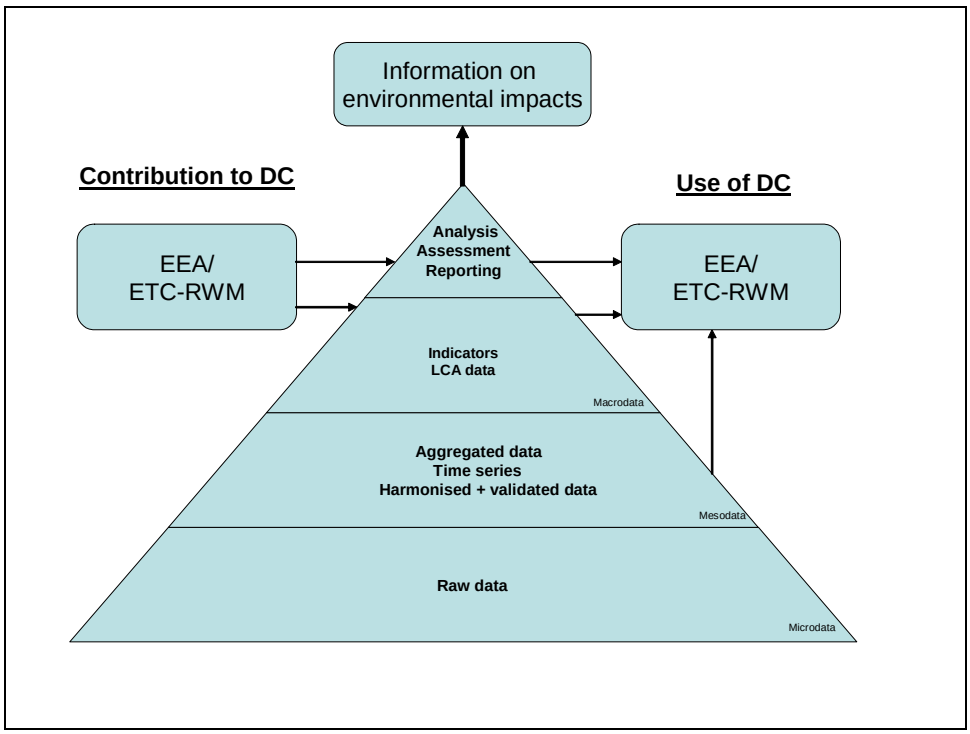


Figure 5: Data and information flow between ETC-RWM and Eurostat's DCs

General

The Topic Centre depends heavily on good quality data at European level. Establishment of the DCs, as part of a joint system for the provision of data in the field of waste, resources and products, is expected to contribute significantly to an improved and also to a more efficient use of both EEA's and the Topic Centre's resources. However, Eurostat is not seen as the institution which will be able to perform policy analysis of data. This expertise has been located at ETC-RWM / EEA since long.

Improving data quality is seen as a huge task in its own. It is important to consider that the main problems with data quality lie outside EU institutions, meaning that the DCs have to work closely with MS institutions.

It is hoped that the future DCs will help facilitate that data reported by the MS will be validated not only in its own context as such (for instance through assessment of time series), but also taking into consideration other reporting (for instance to DG ENV).

ReportNet[50] (run by EIONET) could be an example for a reporting system to which MS can contribute their data, while EU institutions can extract and further evaluate data without much delay.[51] Also for MS, it would be best if they had one central reporting tool / portal in which data would be fed once.

ETC-RWM expects that at operational level experts will still be needed to scrutinise the data and present it to the users, be it scientists, civil servants or other experts engaged in analysing and reporting on these issues at the European level.

[50] Structure developed by EEA integrating all environmental reporting requirements.

[51] At present, EEA and ETC are often facing a situation where other world regions are much faster in providing actual data.

Another crucial issue is that of accessibility of data. The Topic Centre has experienced that publication of reported data is delayed partly due to late submission of data from MS, but also due to lack of resources in the various receiving institutions. As a result, many of the reports made for the EEA are not presenting the most recent data. The EEA and the Topic Centre are often blamed for this. It is imperative that the Topic Centre will continue to have easy and quick access to these data (and other relevant information) when needed.

Not only the Topic Centre but also other actors are currently making efforts to obtain good quality data. Therefore, it is wished that DCs should provide validated and quality-assured data for the various purposes. This is considered as really helpful and cost-effective. Furthermore, these data should be accessible to the Topic Centre, also in advance of their publication.

For example, recently, in order to be able to produce the Belgrade report on SCP, the Topic Centre made use of many different sources of data and information, which again has illustrated the need for a body who can deliver quality-assured, updated information at the European level.

Waste

In the waste field for instance the Waste Statistics Regulation (WStatR) is hoped to produce good quality (consistent) data in the longer term. Actions to eliminate some of the basic errors (inconsistency, non-comparability etc.) should be taken at the MS level (through better coordination of reporting to the various institutions) and at the European level to examine the reported data and make sure the data from the countries are correct.

Furthermore, data reported within the WStatR is sometimes not consistent with data reported in the framework of reporting obligations through specific legislation (cooperation between statistical institutes and DG ENV would be sensible).

It is considered very helpful for ETC-RWM's work if it could get access to all the *non-confidential* data reported through the WStatR to Eurostat as soon as the data has been reported. In the past it got access only after 6-12 months after the data had been sent by the MS to Eurostat. The Topic Centre believes that being 'part of the family' and in the spirit of the new joint system, all Go4 institutions should have access to the data once they are submitted to the receiving institution.

Today, the Topic Centre has access to all data reported by the Member States to DG ENV according to the corresponding waste legislation as soon as this data has been submitted through ReportNet. All actors have access to this information as soon as it has been reported through ReportNet for the same waste stream. It is key to ETC-RWM's work that this will also be the case after the DC on Waste has been established.

The overall objective of the DC on Waste is therefore seen as providing European wide information on waste generation, treatment, recycling and disposal. Tables and graphs should reflect robust and quality assured data, as reported by the MS.

Resources

At present data and information on resource use are collected based on a voluntary agreement between Eurostat and the MS. The Topic Centre considers that more and better quality data is needed in the short term in order to be able to provide information on 'what's happening'. But also in the long run, when resources policy is to be established, better data and information to monitor and evaluate the effect of this and other related policies will be needed at MS and European level. Also, in this field the Topic Centre has established a very good working relationship with Eurostat.

ETC-RWM finds it difficult to define and delimit the term "natural resources" properly. In its work it has chosen to delimit it as 'material resources' (rough definition given in introduction to EEA report on Management of Natural Resources; see also Section ##). This could be a possible working definition for the DC on natural resources.

The Topic Centre has formulated the following concrete wishes towards the DC on natural resources:

- Continuation and further extension of data provision in the area of what is now called Eurostat's Environmental Accounts, namely:
  - Economy-wide material flow accounts (EW-MFA) including indicators such as DMI, DMC, TMR, TMC. This type of data is used by the Topic Centre to quantify the overall resource use in the EU and its MS and to regularly monitor progress in resource productivity. The task for the future DC *should* include:
    - Continuation of data collection of current standard tables (which enable derivation of DMI and DMC).
    - Possibly, an extension of data generation activities towards TMR and TMC. This will require the set up of a database on coefficients for indirect flows associated with imports. These coefficients can be derived from process-chain analyses and/or input-output analyses. The derivation of coefficients could evolve stepwise: (1) raw materials and important semi-manufactures (basic materials) (2) final products.

  - NAMEA (National Accounting Matrices including Environmental Accounts): So far, Eurostat has been collecting NAMEA-type data for air emissions and energy. In addition, the Topic Centre has transformed EW-MFA data into the NAMEA-type format. NAMEA data have been used to conduct environmentally extended Input-Output analyses *inter alia* to find out the relation between resource use and environmental impacts (global warming, acidification, tropospheric ozone formation).
    - Improvement and harmonisation of the data quality of NAMEA-air data; e.g. through assistance to national statistical offices (NSI) or by generation of NAMEA-air by Eurostat itself on the basis of energy statistics and international air emission inventories.
    - Extension of the coverage of NAMEA: e.g. waste, MFA indicators, land-use, and water.

- Developing concepts and methods for the prioritisation of and, later on, compilation of data on the life-cycle-wide environmental impacts of selected base materials (e.g. copper, aluminium) and taking into consideration the available information of process and product data bases, as well as of policy settings at the EU and MS level (with regard to relative importance of the different impact categories).
- European Minerals Yearbook

In the past, the European Commission used to publish the "European Minerals Yearbook" (EMY). Publication was interrupted by the end of the 1990ies. This geological data compendium contained basic figures on the production, import, export and use of some 50-60 minerals for the Member States of the European Union. It could be considered to revive the preparation and publication of EMY in the context of the DC. Further, its topics could be extended by information on global resource situations (e.g. available reserves of mineral resources; important global trends on which countries are producing and consuming major resources).

Products

Concerning the DC on products, it is still not quite clear to ETC-RWM which data the DC should offer to a broader audience. No doubt the EEA and the Topic Centre will need access to data on 'production and products' since their work on SCP-related issues most probably will increase dramatically. However, it is still too early to be more specific on this.

For the evaluation of SCP policies, it will be necessary to get a more differentiated picture on the life-cycle-wide impacts of selected types of priority products (from the need areas of construction/housing, nutrition, mobility). Here the DC on products could possibly serve as a clearinghouse and information hub for the existing product LCA data bases (e.g. EcoInvent, GEMIS, UMBERTO, GaBi). The DC could provide data on the life-cycle-wide resource requirements and environmental impacts of specific types of resource and impact intensive products (e.g. different types of cars, houses, diets).

The Topic Centre does not expect the DC to provide product LCAs. It will continue to make analyses of European consumption and production patterns. Within this latter context, broader groups of products will be analysed with regard to their life-cycle wide environmental impacts and resource requirements. Towards this the Topic Centre would require, in addition to NAMEA data (see above), economic Input-Output tables, which are provided by Eurostat's National Accounts unit.

As a concrete wish towards the DC on products, the Topic Centre would welcome – in a consistent and harmonised manner – the development of concepts and methods for the prioritisation of and, later on, compilation of data on the life-cycle-wide environmental impacts of selected final products (e.g. cars) by the data centre on products, taking into consideration the available information of process and product data bases, as well as of policy settings at the EU and MS level (with regard to relative importance of the different impact categories).

3.3.3.2 Current activities

This section briefly lists a selection of ongoing activities with relation to Eurostat's DCs.

Waste

- Initially, in 1997, the Topic Centre was asked to analyse apparent discrepancies reported by MS on some waste streams, and to propose how these could be harmonised and thereby present a true picture of waste generation in the EU. The Topic Centre produced a series of reports on these topics.
- WasteBase
  - WasteBase is an Access database maintained by the Topic Centre and hosted by the EEA. It contains information on waste quantities in the European countries (access under http://waste.eionet.europa.eu/wastebase).
  - Besides quantitative data on waste, WasteBase includes databases on waste management plans, competent authorities, waste prevention success stories and links to national and international databases on waste quantities.
- Within MoU with ESTAT:
  - Elaboration of Waste Statistics Regulation (WStatR)
  - Analysis of overlapping reporting obligations: report as required by MS
- Workshop jointly organised by the Topic Centre / EEA and the Department of Environmental Statistics (Eurostat) to discuss the WStatR and to bring together the two networks (Eionet of the EEA) and, representatives from the Statistical Offices in the MS forming Eurostat´s network
- Environmental impacts from waste
  - The Topic Centre has carried out several studies and projects with a view to develop a more global understanding of environmental issues related to waste generation *per se* and waste management in general. The objective of the work is to analyse possible methodological approaches to prioritisation of materials, waste streams and waste management operations, using their impact on the environment as a criterion.
  - Further, the Topic Centre has over the last 4 years developed a very good knowledge and understanding of how LCA and input-output analysis may be used in the waste management field. For example, 72 LCA studies on handling of waste paper (recycling, incineration or landfilling) were analysed. On this background LCA-based recommendations on the best way to manage waste paper were elaborated.[52]
- Environmental Outlooks

[52] Both JRC IES and ETC-RWM work on waste-related LCAs (e.g. paper recycling); ETC-RWM more in the field of applications and JRC more for the research part; additionally ETC-RWM is supporting JRC's work on LCA of organic waste. There is a well established dialogue between both institutions on this issue and no duplicate work seen as being done.

- The Topic Centre has developed 'outlooks' for the generation of municipal waste and the environmental impacts of waste diverted away from landfills and the handling of municipal waste. The environmental impact in focus has up to date been Greenhouse gases. It is planned to extend work to include other impacts. Work on projections of development of construction and demolition waste has been started.
- Future activities: information about future trends in waste generation and the impact hereof will still be needed. This work is based on data and long time series.

- Policy assessments
  - The Topic Centre has evaluated the implementation of several policies, e.g. the implementation of the EU Packaging Directive and Waste Management Plans, and is at present carrying out a study on the impact of the EU Landfill Directive. Further, a project has been started in order to contribute to defining an EU Recycling Society; reference is made to the Thematic Strategy on Waste Prevention and Recycling.
- Data collection and processing
  - As already mentioned, the Topic Centre has provided assistance to DG ENV for many years. Under the Standardised Reporting Directive and several waste directives, Member States are obliged to report to the Commission on compliance with these directives. ETC-RWM's task mainly comprised compiling the data and information sent to DG ENV either in paper format or through electronic reporting through software developed by the Topic Centre. In close collaboration with DG ENV staff ETC-RWM staff has validated the data and communicated with the MS on these issues.
  - Further, in order to facilitate reporting from MS the Topic Centre has developed a reporting format (for the EEA) which is now part of ReportNet.
  - DG ENV has also been supported on data processing for the Waste Shipment Regulation. Based on the country reports sent to the Commission the Topic Centre has uploaded the data into a database, analysed the data and presented them in graphs which were used in DG ENV's report to the Council.
- Fact sheets on waste
  - ETC/RWM, 2006: Country Fact Sheets on waste management in EU countries (http://waste.eionet.europa.eu/publications/factsheet/).
  - Recently this information has been updated and expanded for the purpose of an ongoing study, which aims at evaluating the 'impacts' of the implementation of the Landfill Directive.
- Future activities:
  - Assessments of policy effectiveness of existing waste policies and regulations are expected to be a future main area for the Topic Centre, with the aim to achieve i) waste prevention, ii) increase recycling and iii) decrease landfilling. All of these

issues are very high on the policy agenda at EU level as well as at national level. The Topic Centres are working very closely with EEA staff on these studies.

Products

- The Topic Centre has until now not worked with specific product assessments (e.g. applying product-LCA). The Input-Output work provides environmental impact information for the final use of aggregated product groups (on the 2-digit level of CPA.[53] This allows identification of priority consumption areas bearing high environmental implications such as food, housing and transport.
- Environmental impacts of consumption and production: based on the experience gained from the study on impacts of resource use, in July 2005 the Topic Centre has applied NAMEA-based Input-Output analyses for several European economies in order to investigate more broadly the environmental implications of European consumption and production patterns.

Natural Resources

- Data collection and processing / MFA
  - The Topic Centre does not collect primary data on use of resources. It has used economy-wide MFA data collected through *inter alia* a voluntary agreement between Eurostat and the MS, the MOSUS-project, and the Wuppertal Institute's MFA database. Further, resource relevant data provided by international institutions such as e.g. International Energy Agency (IEA), US Geological Survey (USGS), and Food and Agriculture Organisation of the United Nations (FAO) was used.
  - In 2003, the Topic Centre prepared a study for DG ENV (the so-called Zero-Study) providing an overview on Europe's resource use utilising economy-wide MFA data. The study was done to assist DG ENV in its development of the Thematic Strategy on Resources.
  - Finally, the Topic Centre made use of economy-wide MFA indicators in the EEA report 'Sustainable Use of Natural Resources'.
- Indicators
  - The Topic Centre has made use of indicators derived from economy-wide MFA (mainly DMI and DMC) in its reporting. They have been used to portray Europe's resource use in respective chapters in several EEA-reports:
    - Signals reports
    - Kiev Report
    - Belgrade Report (forthcoming)
  - The resource-related indicators DMI and DMC were proposed to be included into EEA's CSI. However, this decision is still pending.
- Environmental impacts of resource use

[53] Statistical classification of products by activity in the European Economic Community.

- Methodologies to operationalise environmental impacts are still under scientific development. In order to gather the state of the art, the Topic Centre organised an expert workshop in 2005.
- In 2003, a pilot study – based on German data – was conducted on environmental implications of resource use. The objective was to test and explore whether the methodology of environmentally extended Input-Output Analysis (based on NAMEA-type data) could be useful with regard to estimating environmental impacts of resource use.[54]
- The Topic Centre has also conducted a materials system analysis for iron & steel in order to identify environmental implications of the use of one particular resource.[55]

- Environmental Outlooks
  - The Topic Centre has generated outlooks for EU's resource use (in terms of economy-wide MFA indicators)[56].
- Policy assessments
  - The Topic Centre has conducted a policy assessment study on the use of economic instruments in the area of resource management.[57]

Other / Cross-cutting

- Reporting Obligations Database (ROD)
  - ROD contains records describing environmental reporting obligations that countries have towards international organisations. The following table provides an overview of the number of reporting obligations countries have towards Eurostat, EEA and DG Environment. The table also includes indirect reporting obligations. Therefore double counting of records may occur.

[54] Moll, S., Acosta, J., Villanueva, A. (2004): Environmental implications of resource use – insights from input-output analyses. Copenhagen (unpublished final report); see also Moll, S., Acosta, J. (2006): Environmental Implications of Resource Use – NAMEA based Environmental Input-Output Analyses for Germany. Journal of Industrial Ecology, Vol. 10, No. 3: 9-24.

[55] Moll, S., Acosta, J., Schütz, H. (2005): Iron and steel - a materials system analysis: Pilot study examining the material flows related to the production and consumption of steel in the European Union. ETC/RWM Working Paper 2005/3, European Topic Centre on Resource and Waste Management: Copenhagen http://waste.eionet.europa.eu/publications/wp3_2005.

[56] Skovgaard, M., Moll, S., Møller Andersen, F., Larsen, H. (2005): Outlook for waste and material flows - Baseline and alternative scenarios. ETC/RWM working paper 2005/1, European Topic Centre on Resource and Waste Management: Copenhagen http://waste.eionet.europa.eu/publications/wp1_2005; see also Møller Andersen, Frits, Larsen, Helge, Skovgaard, Mette, Moll, Stephan, Isoard, Stéphane (2007): A European model for waste and material flows. Resources, Conservation and Recycling, Volume 49, Issue 4 (February 2007), 421-435.

[57] Legg, D., Zoboli, R., Bleischwitz, R., Skovgaard, M., Herczeg, M., Leveson-Gower, H. (2006): Economic instruments to promote material resource efficiency Main report from phase 1. European Topic Centre on Resource and Waste Management, Copenhagen http://waste.eionet.europa.eu/publications/wp1_2006

Table 9: Reporting obligations towards Eurostat, EEA and DG ENV[58]

Issue	Report to	# Reporting Obligations
Waste	Eurostat	5
Waste	EEA	4
Waste	DG ENV	27
Natural resources	Eurostat	4
Natural resources	EEA	4
Natural resources	DG ENV	2

- Indicators:
  - The Topic Centre developed a technical report in 2002: Development of an Indicator Framework on Waste and Material Flows. Further in 2005 a revised set of 11 indicators on waste and resources were developed. In 2006 the Topic Centre supported Eurostat in developing a list of waste indicators.
  - Between 2001 and 2003 the Topic Centre developed a 'core set of indicators for waste and material flows' including resource-relevant aggregate indicators based on economy-wide MFA (e.g. DMI, DMC, TMR). This activity was halted around 2003 when the EEA started to develop and establish its own 'core set of indicators' (CSI).[59]
  - Based on data and indicators, the Topic Centre envisages performing integrated assessments in relation to the objectives formulated in the Thematic Strategy on Resources and with regard to the issue of SCP. This includes e.g. progress in resource efficiency and de-coupling of environmental impacts from economic growth. Of particular interest for the Topic Centre's work is the assessment of in how far certain policies have been successful in pursuing these goals.
- Fact sheets on waste policies and resource use
  - These fact sheets are a newly developed 'product' which includes legislation, administration and quantitative data collected by the Topic Centre. Each fact sheet presents this info at country level. Since the early years of the Topic Centre, information on 'waste management plans', 'competent authorities' and strategies in the waste and resource area were collected with a view to use this information in it integrated assessments.
  - Continuation of ongoing activity: Fact sheets describing in an integrated way waste and resource use, impacts hereof, measures, in the form of policies, legislation and economic instruments to deal with environmental aspects of waste and resource use. The Topic Centre has produced a version 1.0 and DG ENV has expressed a wish for an extension.
- SCP-related activities/studies

[58] Additional reporting requirements (e.g. towards Basel Secretariat) not yet included!

[59] http://themes.eea.europa.eu/IMS/CSI

- Increased focus: this year the Topic Centre has produced a draft chapter on Sustainable Consumption and Production (including resource and waste aspects) for the Belgrade Report.
- In order to evaluate progress towards SCP, the Topic Centre will draw on the results of the EW-MFA at the macro level and the NAMEA data at the meso level. As soon as product LCA type data for the micro level are available for selected product types used in the EU, these will also be used to complement the overview information with more detailed data.

- Life cycle based information
  - Future activities: Life-cycle based information related to waste management and resource use is also expected to be in demand ('implementation' of the Strategies).

IT infrastructure

Located on the waste site of Eionet (http://waste.eionet.europa.eu/etcwmf), the Topic Centre has its own website. It includes thematic areas such as LCA and resources but also has a direct link to WasteBase (http://waste.eionet.europa.eu/wastebase).

Definitions of terms used within its work for i) basic waste definitions, ii) waste prevention and management and iii) material flows can also be found on the website (http://waste.eionet.europa.eu/definitions).

3.4 JRC

The Joint Research Centre (JRC) of the European Commission has the general mandate to conduct scientific and technical support for the conception, development, implementation and monitoring of European Community policies. Unlike EEA, the JRC has no dissemination obligations and rather focuses on scientific work giving 'added value' to data. The JRC is composed of seven institutes, two of which are part of the Go4 (IES and IPTS).

As a Commission service, DG JRC has always internally cooperated with the other DGs. This is important when looking at the relations between DG JRC's institutes and other Commission services of the Go4, i.e. EEA, DG ENV and Eurostat.

In this context, work carried out within the IES' Land Management and Natural Hazards Unit, the ENSURE and the European Platform on LCA (EPLCA) project as well as the IPTS is communicated well with the above mentioned Commission services and exchange of data and information takes place where necessary or upon request. This means that e.g. data collected and processed will be made available to the DCs with the prerequisite that their requirements are formulated.

The following table gives an overview on JRC' institutional mandate:

Table 10: JRC's institutional mandate

Mission statement	The Mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national. IES: Provide scientific- technical support to the European Union's Policies for the Protection and sustainable development of the European and global environment. IPTS: Provide customer-driven support to the EU policy-making process by researching science-based responses to policy challenges that have both a socio-economic and a scientific or technological dimension; also support the monitoring and implementation phases of the policy cycle
Core competence	IES: Scientific and technical Research in the classical field of environmental studies and earth observation technologies. IPTS: Research policy and techno-economic foresight, sustainable development, industrial and clean technologies, energy, transport, agriculture and rural development, life sciences and the information society.
Main objective	IES: Provide policy-related research-based information on selected European and global environmental areas, such as climate change, natural hazards, Life Cycle Thinking, water, soils *etc.* IPTS: Promote and enable a better understanding of the links between technology, economy and society
Key ambition	Follow integrated scientific approach: manage process from data collection to scientific conclusion
Mode of operation	No routine operations Planning in the framework of the MAWP
Financial Basis	Annual institutional budget with additions from specific requests supported by e.g. other DGs (Framework Programme) and competitive research project involvement

In some cases, Administrative Arrangements (AA) can be set up between individual services / institutions in order to lay down specific arrangements allocated to a certain budget and corresponding tasks. E.g. the ongoing 'European Platform on Life Cycle Analysis' project is established via an AA between DG ENV and JRC-IES. Another AA is especially foreseen for the support of Eurostat by JRC-IES in the context of DC implementation. It would cover the following issues:

- Development of decoupling indicators (on behalf of ESTAT and designated to DG ENV);
- Overall EU-wide decoupling indicator; link to GDP;
- Incorporation of trade data;
- Integrate data from NAMEA / EEIO (hybrid methodology) as far as possible towards most appropriate approach / indicators;
- Provide indicators for 80% of most environmentally relevant products on macro level;

- Provide some first waste indicators on macro level as well;
- Coordination with work of external ESTAT support contracts on complementary deliverables for the three DCs.

3.4.1 IES

DG JRC's Institute for Environment and Sustainability (IES) located in Ispra (Italy) is part of the Go4. Three of its actions play a role with regard to Eurostat's DC implementation: ENSURE, SOIL and FOREST. They are described in further details in the sections below.

3.4.1.1 European Platform on LCA / ENSURE action

Activities of the European Platform on LCA (EPLCA) take place in the broader context of the action ENSURE (Environmental Assessment of European Wastes and the Sustainable Management of Resources): other aspects dealt with in this action are sustainability, mining waste, environmental fate modelling, and waste management guidelines. ENSURE activities are thus linked to the thematic areas of waste, natural resources and to products (within LCA activities). Since these activities are of particular importance as input for the implementation of Eurostat's DCs, they are described in this section separately from other JRC-IES activities.

The following figure gives an overview on possible contribution and use of DC data by JRC IES' EPLCA / ENSURE action.

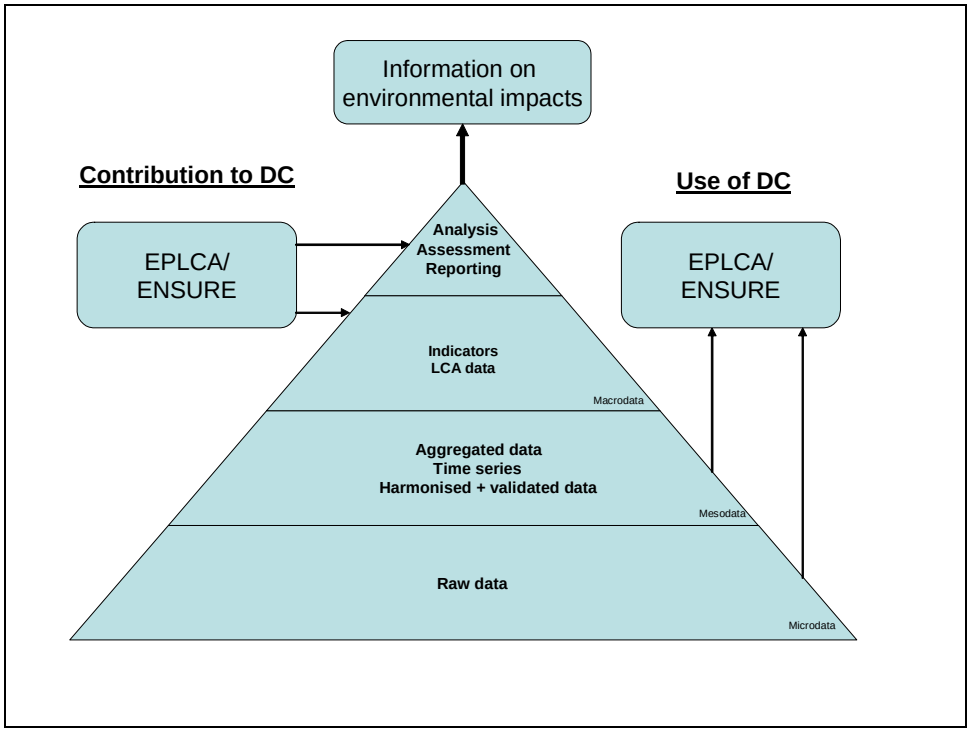


Figure 6: Data and information flow between JRC IES' EPLCA / ENSURE action and Eurostat's DCs

Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCs as well as specific data needs that have been formulated by ENSURE and EPLCA staff in the context of visits to institutions during this pre-study:

- It is very important to make sure that data used is consistent across all three DCs as well as across micro and macro levels; otherwise wrong or inconsistent policy measures may be taken;
- Products should encompass goods and services (with hierarchy: needs - needs fulfilment (function) - product group/type - product (service/goods)); description of term “product” as covering goods and services given in ISO 14040ff; same in ESTAT classifications (e.g. PRODCOM, CPA) and GDP / economic data;
- Although EPLCA is considered to be mainly data deliverer for DCs, data input e.g. on mix of energy carriers (import and export statistics) and certain material and energy flow data would be welcome;
- Linked with the life-cycle sustainability indicators for natural resources, consistent product-based indicators should be developed;
- For the foreseen Eurostat pilot portal for a waste DC appropriate means are needed to make JRC’s LCA data and/or derived indicators, waste guidelines and information available (link and description of what JRC is doing vs. direct access to data);
- SCP activities should be anticipated in DCs;
- The ELCD already contains extensive data sets related to many of the listed natural resources in the context of life-cycle data. These data are already online in a preliminary, non-reference form as provided to the JRC by Industry Associations and other sources. This should be referred to within the corresponding DC;
- Coherence of data sets between the different thematic DCs should be safeguarded. For example the same data sets on sugar should be used for both natural resources and products – depending on whether sugar is considered a product or a natural resource, depending on the context;
- As part of its coordination role, ESTAT could develop CVs / short description of which person does what in which institution. These could be used as a tool in order to better re-direct requests from outside (well structured expert directory; could be coordinated with the LCA Resource Directory of EPLCA project and the Directory provided by the ongoing DG ENV service contract in support of the International Resource Panel).

Current activities

This section briefly lists a selection of ongoing activities with relation to Eurostat's DCs.

Waste

Within the ENSURE action several waste-related activities have taken and will take place:

- Waste guidelines on biodegradable waste
  - Ongoing since January 2007;
  - Are developed in a way that they can be directly used and also implemented in third party software;
  - To be followed by guidelines on other unregulated wastes with AA and support contract expected to start autumn/end of 2007;
  - Expected to start autumn/end of 2007: development of guidelines on how to develop waste guidelines (and on how to implement LCT in waste policies).
- Pilot studies on availability of waste statistics
  - Completed pilot studies with Malta and Cyprus;
  - Assessment of waste management strategies: tests the direct use of waste statistics in such contexts to ensure that data being collected can also be used for assessments.
- Activities related to Mining Waste Directive
  - Risk-based inventories; remote sensing - link to risks and sites;
- Activities related to the Waste Framework Directive (WFD);
- Activities related to the Thematic Strategy on the prevention and recycling of waste.

Products

Within the EPLCA project a number of product-specific activities have taken place:

- European Reference Life Cycle Data System (ELCD)
  - Life Cycle Inventory data of key products (materials, energy carriers, waste and transport services, data sets for about 300 to 400 goods and services foreseen in final version by end 2008);
  - Particularly relevant in the context of IPP, as it responds to commitments made there;
  - Also of use for upcoming Sustainable Consumption and Production (SCP) policies;
  - Life cycle data and methods were not developed on time for EuP preparatory studies but should help to improve it in the future.

Natural Resources

Natural resources are a core competence of the JRC-IES. This is supported also by the EPLCA project:

- JRC-IES has an in-house strategy on the use of natural resources (besides Commission's strategy);
- ELCD contains extensive life cycle data sets related to several of the listed natural resources.

Cross-cutting issues

Beyond activities that can be clearly allocated to one of the three thematic areas, there are also horizontal or cross-cutting activities that are briefly listed in this section.

EPLCA

The "European Platform on Life Cycle Assessment" has two main goals:

- Support life cycle thinking (LCT) in the development of goods and services;
- Support life cycle thinking in a broad range of policies

With the deliverables of reference data (data for EPLCA mainly comes from industry associations and from activities within FP7) and recommended methods, this project addresses the needs of:

- Private business and
- Public policy makers

in the European Commission and Member States for more reliable and cost-effective LCA studies towards improved environmental performance and increased competitiveness.

The Platform project has an initial 3.5 years perspective until early 2009.

The following activities and deliverables are part of the EPLCA project and are realised through a series of focused technical studies, expert workshops, and stakeholder consultations:

- European Reference Life Cycle Data System (ELCD);
- Handbook of technical guidance documents for LCA;
- LCA information hub.

The initial commitment for a platform on LCA data is stated by the Commission in its IPP Communication. The mandate includes in between the two Thematic Strategies on Resources and Waste of 2005 the upcoming "Sustainable Consumption and Production Action Plan" (SCP). The need for continuation of EPLCA has consequently been expressed by DG ENV and JRC, among other stakeholders.

Resources for the EPLCA come from a combination of JRC budget, DG ENV budget (via AA), resulting in about 50/50 financing by DG ENV/JRC. In future, DC budget should also contribute to the EPLCA budget (via AA). The staff allocated to EPLCA tasks is 3-4 persons in the core team. Activities are a combination of in-house developments, close coordination /

technical steering of support contracts, and technical / scientific finalisation of supporting contract deliverables to independent European reports / deliverables for policy support.

Some of the not yet named EPLCA activities with specific interest for Eurostat's DCs are described in brief below:

- ELCD, Section "Life cycle inventory data sets"
  - European Business Advisory Group with industry associations (based on MoU): so far 9 associations; committed in written to provide their data sets;
  - Covers basic materials, energy carriers, transport and waste treatment services;
  - Review of data quality will be stronger than ISO (e.g. higher requirements on reviewer qualification; probably review of approval organisation). Will become part of Handbook of technical guidance documents for LCA;
  - Draft quality requirements for data already existing at JRC (used for newly starting support contracts, until advanced review requirements will be developed; to ensure that data does reflect industry reality and is of sufficient quality);
  - Enhancement and further harmonisation step of data ongoing in support contract;
  - Finalisation by end 2008;
  - Methodology questions (e.g. allocation, recycling quotes etc.) addressed with recommendations.
- ELCD, Section "Life Cycle impact assessment methods and indicators"
  - Supported by contractor, ongoing;
  - Building upon existing studies;
  - Global default value and EU value where regional differentiation is necessary;
  - Kick-off / contract start in 07/07;
  - Documentation in standard format
  - 1:1 usable also to derive "Environmental impact" for decoupling indicators; can be applied to emission etc. data independent from method used to derive these (LCA, NAMEA etc.).
- Handbook of technical guidance documents for LCA
  - Has to be ready by mid 2008;
  - Includes data collection, modelling, interpretation, documentation, third party review;
  - Support contract ongoing;
  - Covers range of questions from product declarations to product comparisons to future scenarios, also on background databases for use e.g. for decoupling indicators etc.;
  - Data coherence; quality control of LCA data.
- JRC-IES is also developing a multilanguage terminology (classified, hierarchical glossary with definitions of terms, synonyms etc.) in the field of life cycle thinking; initial glossary

already available online[60]; terminology will become part of the handbook of technical guidance documents for LCA;

- LCA resources directory (structured, detailed "yellow pages", independently evaluated: who does what; which data and tools are available where. Covers presently 100 service providers, 40 software tools, 26 life cycle data bases.);
- Foreseen to start autumn 2007: Methodological comparison between sector-based impact assessments and process-based life cycle impact assessment: what are advantages / disadvantages of the two methodologies for different applications? What data exists? How can they be brought together (hybrid methodology)?

Other

Apart from EPLCA, also a few other cross-cutting activities are currently carried out by ENSURE. Two examples relevant to Eurostat's DCs are briefly listed below.

- Work on indicators: Cyprus workshop with EEA / ESTAT / DG ENV
  - Sustainable Development Indicators (SDI);
  - Life cycle based indicators;
  - Position paper elaborated;
  - How are indicators to be used in policy context? Interpretation of time series, use for monitoring purposes?
  - Bring in life cycle perspective and environmental impact;
  - Development will be done within the next two years.
- Participation to Eurostat TF on "Environmental Impacts".

IT infrastructure

Located on the general IES site, ENSURE has a specific online site[61] giving an overview on the different activities carried out. Links to project-specific websites are also listed here.

A more specific website is in place for EPLCA and ELCD: access to both is given via the portal http://lca.jrc.ec.europa.eu/. Underneath lie two different sub-sites: the LCA info hub[62] and the EPLCA project homepage.[63]

The LCA info hub on life cycle thinking based data, tools and services supports users in integrating Life Cycle Thinking into product development and into policy making with structured, cost free and independent information.

It comprises two main areas:

- The ELCD Data System, with the Life Cycle Inventory data sets and (in future) also recommended impact factors;

60 http://lca.jrc.ec.europa.eu/lcainfohub/glossary.vm

61 http://ies.jrc.ec.europa.eu/525.html

62 http://lca.jrc.ec.europa.eu/lcainfohub/index.vm

63 http://lca.jrc.ec.europa.eu/EPLCA/

- The LCA Resources Directory of life cycle oriented service providers, tools and third party databases

The EPLCA homepage includes sections on:

- Platform project overview;
- Motivation and objective;
- Activities and deliverables;
- Coordination and cooperation;
- News and meetings;
- Participation in other projects.

3.4.1.2 Land Management and Natural Hazards Unit (FOREST & SOIL)

Activities taking place within the Land Management and Natural Hazards Unit that are relevant to Eurostat's DCs are located in two actions:

- Monitoring the forests in Europe (FOREST) and
- Soil Data and Information Systems (SOIL).

These two actions also each host one DC on forests (EFDAC: Environmental Forest Data Centre) and soils (ESDAC: Environmental Soil Data Centre) respectively, corresponding to their main thematic areas of work. As such cooperation with Eurostat will on the one hand take place on the level of possible data and information exchange with a view of integrating knowledge into the respective DCs and on the other hand take place on the more systematic develop of the DC concept within the Go4.

In the following section the focus is thus set on the description of activities within EFDAC and ESDAC implementation.

3.4.1.2.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCS as well as specific data needs that have been formulated by FOREST and SOIL staff in the context of visits to institutions during this pre-study:

- Concerning repartition of tasks, nothing is seen as area that should be shifted either from ESTAT to JRC IES and vice versa
  - Question that needs to be answered: shall all tasks be shifted to EEA while DCs remain manager of data without operational tasks or shall each institution keep its current tasks?
  - The wish is that existing infrastructure should be used (methodologies and models as well as databases).
- EFDAC and ESDAC have data needs at two different levels (due to different reporting systems):
  - Statistical data collected at Eurostat through regulatory framework;
  - Reporting of MS via EIONET to EEA;

- The view was expressed that DCs should also give European added value to data, i.e. go beyond pure data and also generate information and reports around it. Thus the tasks of a DC would cover the whole range of activities from raw data – derived data – information – assessment – reporting (within e.g. FP7 project).
- Concerning possible areas of overlapping between EFDAC, ESDAC and Eurostat's DCs, issues around natural resources (definition, scope DC) were addressed as follows:
    - Definition and discussion of the term "natural resources" with regard to tasks of DCs is also seen as an important issue to be clarified; requirements should be formulated by DG ENV (requirements for soil & forests were set up by DG ENV's relevant thematic unit);
    - DCs should not be stand-alone institutions but should be integrated one with the other; meaning that a DC on natural resources should build on existing data in DCs on water, air, soil, forests, climate change;
    - Missing data centre on meteorological and climate data: Meteorological Data Centre exists, however outside Go4 regime;
    - Focus for EDCs should be on improving data quality management and reporting (as fixed in SEIS); monitoring of impacts not part of the first SEIS implementation step;
    - Existing geo-data (i.e. INSPIRE) has link to spatial information: Eurostat's DCs do not have such geo-reference, they rather cover point information (waste, products and natural resources are mobile, thus geo-reference does not make sense).
- The Soil Strategy is about to be adopted: national and regional data centres are to be set up; should be taken into account for DCs;
- DG ENV should regularly update / review its requirements towards the DCs. This should include a clear separation of the individual themes assigned to the EEA, JRC and ESTAT (e.g.: soil requirements are also covered under the theme "land use"). The updating should follow a clear template following the categories of data, analysis, assessment and information.

The following picture gives an overview on possible contribution and use of DC data by JRC-IES' SOIL and FOREST actions.

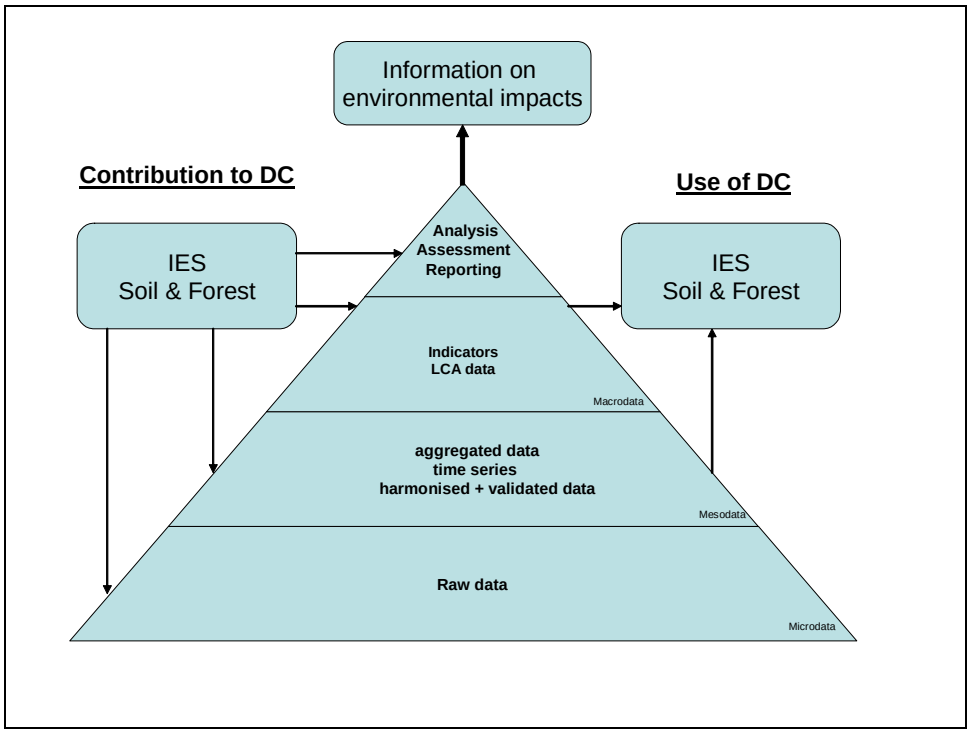


Figure 7: Data and information flow between JRC IES' SOIL / FOREST actions and Eurostat's DCs

Current activities

This section briefly lists a selection of ongoing activities with relation to Eurostat's DCs.

Being responsible for the implementation of DCs on forests and soils, JRC IES set up the following road map towards implementation of EFDAC and ESDAC:

- Analysis of data / information needs of DG ENV
- Inventory of available data
- Identification of data providers
- Implementation plan
- Agreement with data providers (network, IPR, protocols, …)
- Prototyping and population of DCs
- Formulation of links to projects within GMES, RTD
- Formulation of links with other DGs.

Activities started with the preparation of "Steps towards Implementation" in November 2006, including requirements set by DG ENV and presented it to the Director's meeting. JRC-IES has thus taken the front runner position with regard to implementation of DCs at Go4 level.

The draft implementation plans for DCs on soil & forests have been circulated to other Go4 members for comments. They were based on detailed requirements from DG ENV on the grounds of 2006 environmental policies and existing information. They should be adapted

and updated according to policy changes. They include an overview on existing data at EU level; however this is not yet complete and will still evolve towards a complete inventory.

The goal is to have EFDAC and ESDAC visibly running by end of 2007 (preliminary version); precursors are already available now.[64]

EFDAC

The following points highlight a few aspects of importance with regard to EFDAC implementation:

- Main goal of DC is to harmonise and integrate existing data to allow proper aggregation (e.g. point data vs. national average; time of data collection; spatial resolution);
- Close cooperation with ESDAC implementation process;
- Use of existing collaboration structures (e.g. with EFICP, EFI, EEA, ESTAT, FAO, UNECE, MCPFE, and Member States; European Forest Fire Information System [EFFIS]).
    - In 2006: EFCIP alpha version was made ready; final version expected by early 2008. Should be integrated into DC implementation.
- Data dissemination depends on type of data: some data can be made available to broad public without constraints, other data first has to be aggregated;
- Data collected from countries: they define what data can be disseminated;
- Interface to be elaborated for countries to submit data (it is important to mention that EFDAC is not intended only as a data repository but as a system that will link to data within distributed databases. The countries need to develop the necessary metadata to be accessible by EFDAC.);
- Guidelines on metadata form part of DC tasks; cooperation with SOIL action;
- Identification of potential data providers;
- Nested system from local to global data;
- Data is collected once and stored in different places (but not necessarily consistent);
- Integrate existing reporting obligations: EFFIS and National Focal Points - data provided by MS;
- Major clients of EFDAC: DG ENV, DG AGRI, DG REGIO and ESTAT;
- Examples for overlapping issues between EFDAC and DCs on natural resources and products:
    - Existing cooperation with ESTAT works well (reporting questionnaire);
    - Inventory of wood as a forest “resource”;
    - EFDAC covers forest as an eco-system: monitor status, amount of biomass, spatial distribution;
    - Exploitation of wood as a product out of scope EFDAC;

[64] European Soil Portal Homepage: http://eusoils.jrc.it/index.html; Forest Data and Information System: http://forest.jrc.it/; INSPIRE: http://eu-geoportal.jrc.it/

- Forest biodiversity data is made available by JRC to EEA;
- Data on forest fires is made available to EEA / ESTAT.

ESDAC

The following points highlight a few aspects of importance with regard to ESDAC implementation:

- System on soil data has been running for 15 years through functioning EU Soil Bureau Network;
- Gives access to soil data; ownership of data remains with data provider;
- IES gives an EU added value in harmonising data;
- Goal is to reach free access to all data via a portal (however no point data – negotiations ongoing);
- Participation in FP7 to expand EU soil data to global level;
- Current set up however not sufficient to meet requirements of DG ENV with regard to ESDAC;
- Goal is to enlarge data provider basis and to consolidate existing network
  - Other sources of data can be: EEA, EIONET, ESTAT and projects commissioned by DG ENV and RTD programmes;
  - Data providers at national and regional level;
  - Cooperation agreement has been signed with FAO and ISRIC.
- User base should be kept: free access system;
- INSPIRE and geo-portal are already there and functioning: that part of DCs is operational;
- Current work on Multiscale European Soil Information System (MEUSIS): scale transfer from vector data to raster / pixel data (upscale) in order to integrate different scales;
- Need to integrate with other data sets (e.g. water precipitation data in order to produce meaningful analysis of water erosion of soils);
- Examples for overlapping issues between ESDAC and DCs on natural resources and waste:
  - Data on peat would be needed by ESDAC;
  - Sewage sludge;
  - Biowaste: link to soil strategy;
  - Contaminated sites.
    - Ongoing activities related to contaminated sites (HERAKLES project: risk assessment via pilot studies)
    - Further activities to be shifted from EEA to JRC IES in 2007; common meeting foreseen during 2007 to discuss the overall procedure
  - Landfills: inventory of sites;
  - Mining waste: soil contamination.

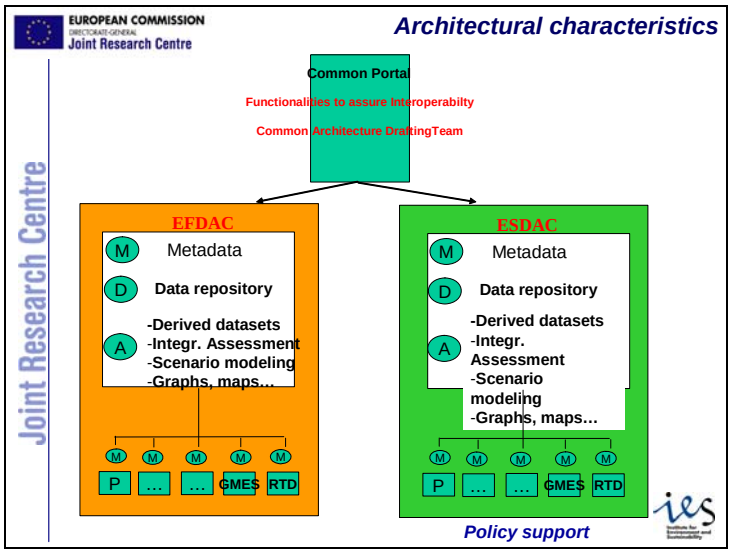
IT infrastructure

Located on the general IES site the Land Management and Natural Hazards Unit has specific online sites for the actions FOREST and SOIL.[65]

Besides that the Common Architecture Drafting Team (Go4 team lead by JRC IES) is currently working on a common platform for all DCs (functionality and interoperability are a key target). A preliminary version is to be operational by end 2007. Soil data will probably be available in a distributed way while forest data may only be available in centralised way (only for certain datasets).

The overall goal is to create an architecture that can be integrated into the SEIS concept through the establishment of common requirements. DCs may need to be re-designed in the mid-term in order to fit into SEIS. It has not been decided yet whether there will be one common portal for all DCs.

For EFDAC and ESDAC the architectural characteristics for a common web portal are shown in the figure below:



The “steps towards implementation” include the following architectural characteristics to be covered by EFDAC and ESDAC:

- Mission statements are elaborated
- Data and processing distribution needs are clarified and described in detail
- Access restrictions are addressed and designed accordingly
- The context (e.g. interface with other systems) is specified
- (IT) Standards are mentioned
- The functionality is described
- The link to INSPIRE is specified

[65] Land Management and Natural Hazards Unit: http://ies.jrc.ec.europa.eu/533.html (Forest) and http://ies.jrc.ec.europa.eu/530.html (Soil)

- The IT infrastructure is (i.e. operating system) set
- Necessary staff resources and needs for hardware and software are listed
- Need for framework contracts is specified

Furthermore, JRC IES mentioned that a minimum of services / utilities that should be included are:

- Integrated Catalog of Metadata
  - Harvested metadata collected and maintained by various DCs;
  - Direct hosting of metadata (if a DC is not managing its own catalog).
- Discovery services (search data using keywords, themes, geographical extent, geo-location);
- View services (view data stored in different DCs and partners).

The envisaged implementation between the DCs should encompass the following points:

- Common access point for users searching and viewing information distributed in different DCs;
- Interoperability of services in order to develop specific cross-cutting thematic applications;
- Analysis of data/information needs;
- Inventory of available data;
- Identification of data providers;
- Agreement with data providers (Network, IPR, protocols…);
- Establishment of links to projects within GMES, RTD projects;
- Involvement of expert knowledge.

3.4.2 IPTS

The Institute for Prospective Technological Studies (IPTS) is one of the seven institutes of the JRC and located in Seville (Spain). Activities at the IPTS related to environmental issues are mainly located in the Competitiveness and Sustainability Unit. Within this Unit three different areas can be distinguished:

- IPPC Bureau (waste and natural resources): BAT, BREF;
- Energy, climate change, transport;
- SUSPROC Action (sustainable production and consumption).

Although the IPPC Bureau may have relations to the topics of waste and natural resources which are relevant for the corresponding DCs lead by Eurostat, its activities were not studied in the context of this pre-study.[66]

The SUSPROC Action – which is looked at in more detail in the context of this pre-study – works in close cooperation with DG ENV's unit G.4. It carries out techno-economic analysis

[66] This might rather be a task for the forthcoming studies on DC implementation at Eurostat.

and assessment on the basis of current environmental policy questions (in-house, external, network of experts). In this context data is needed to feed research and analytical work.

3.4.2.1 Wishes to DCs / Data needs

This section describes wishes towards mandate and scope of DCS as well as specific data needs that have been formulated by SUSPROC staff in the context of visits to institutions during this pre-study.

The following picture gives an overview on possible contribution and use of DC data by the JRC IPTS.

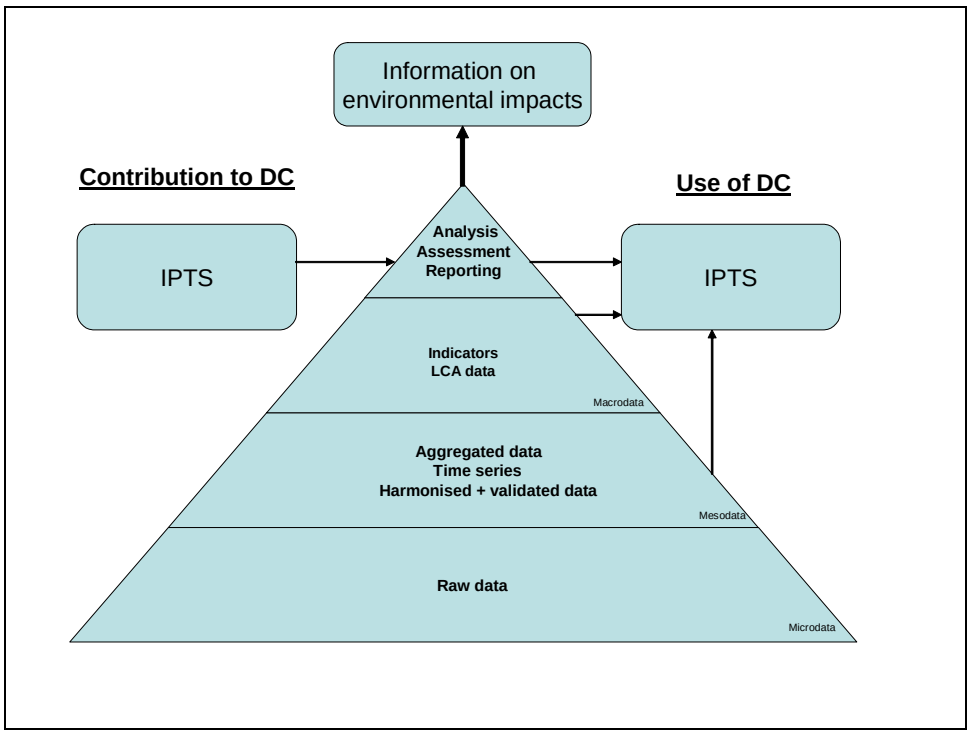


Figure 8: Data and information flow between JRC IPTS and Eurostat's DCs

General

Due to its data need with regard to feeding research and analytical work, SUSPROC rather considers itself as DC client than as DC contributor. Following general data needs have been formulated:

- Statistical data with better quality is needed for techno-economic analysis done by IPTS
  - It has been difficult to access waste statistics data in the past. Principally it is known what kind of data will be needed, but it is not available yet. The DCs should make that data available to IPTS for its techo-economic analytical work.
- Data gaps are currently filled with ad-hoc data collection; this should in the future be replaced by data collected and made available through the DCs;
- Differentiation needs to be made between (i) project-specific data that a DC cannot foresee to be needed and will thus not deliver, and (ii) data that is needed on a general

basis from IPTS and others. The DC should focus data collection and provision on the second type of data;

- Need for time series for certain data in order to update tools / databases of project-related data (update of EEIO data every three years would be helpful);
- Compatibility with economic accounts needed (sectoral data); aggregated flows are not enough for many applications (e.g. the IO-based ones);
- DCs should focus on pure data collection and management (as is currently being done by ESTAT);
- Activities like EXIOPOL relate to all three ESTAT DCs and cannot unambiguously be allocated to one of the three;
- Data needed comes from different levels of the data pyramid: it can be raw data or aggregated data like indicators;
- Data should easily be made available ("easy access to high quality data");
- Due to historic development of ESTAT as a statistical body, users have certain expectations as concerns data that can be delivered.
    - IPTS does thus not expect ESTAT to deliver complex policy analysis in the future;
    - IPTS is not the institution carrying out analysis of statistical data on a routine basis but can of course carry out such analysis on an ad-hoc basis;
    - IPTS rather sees a potential task of a DC to be able to deliver information on what kind of work IPTS is doing in order to redirect a data requester.

A few points have though been considered concerning possible contributions to ESTAT's DCs:

- Data collected on an ad-hoc basis in case data gaps are identified that need to be closed could be made available to DCs;
- Outcome of IPTS' work are reports, studies etc. that will not be of much use to a DC since they do not contain data; data that is used for these studies cannot be used without the knowledge on the context of the project (e.g. assumptions, goal of project, data quality etc.);
- IPTS would not be the institution to develop indicators; could give input as to what kind of indicators are needed for its technical analysis and assessment using such indicators;
- Work that IPTS is doing is well known by DG ENV; it would not have to pass via a DC to have access to IPTS work outcome; outcome that is accessible to the public already published on IPTS website; other outcomes not publicly accessible;
- Support to ESTAT will be continued on the same basis as before (intra Commission mutual support); support will be given upon request.

Waste

SUSPROC staff has made available some specific waste data needs / wishes to the waste DC tasks. These are described in brief below for two exemplary projects.

As one example data needs for the ongoing IPTS case study on aggregates' end-of-waste criteria (see current activities) are listed below. Some of this data could be accessible via a future waste DC. However, it has not yet been discussed which of this data is suitable for a DCs scope and tasks. This shall be part of the forthcoming implementation study for ESTAT DCs.

- Comprehensive data collection characterising all relevant material flows potentially suitable to be used as substitute aggregates in the EU-27. Focus on current and potential uses of secondary aggregates, relevant national legislation in place, standards, and end-users' specifications. Market for substitute aggregates and its evolution.
- Data should be gathered to provide information for the period since 2000 to date for all Member States EU-27, i.e.
- Materials
    - Construction and demolition waste;
    - Slags from the ferrous and non ferrous metal production;
    - Ashes from combustion/incinerators processes;
    - Others (e.g. quarry and mining wastes, spent foundry sand, spent railway ballast, waste glass, fired clay broken products);
    - Special emphasis should be given to C&D waste, slags from iron and steel production, and ashes from combustion processes.
- Material streams
    - Characterisation of the material flow;
    - Identification and brief description of how the material is generated;
    - Information about its typical composition;
    - Quantitative description (per country, tonnes per year, and per material subclass since 2000 to date);
    - Arisings/generation;
    - The extent of any separated collection of material;
    - Amount used as aggregate and per type of application.
- Uses
    - Identify the potential uses for the materials identified as aggregates (e.g. asphalt, concrete or unbound use);
    - The suitability of the material;
    - Technical limitations if any;
    - Environmental risks associated with the use of the material as aggregates;
    - Any life cycle issues associated with futures uses of recycled material or the ultimate faith;
- Processes applied
    - For the relevant materials identified above, briefly describe the processes / treatments involved in the production of recycled/secondary aggregates;

- Brief technical description of applied processes and techniques;
- Emission levels and consumption of utilities;
- Waste streams from the processes.

- Market assessment
  - Current situation of the natural aggregates market, imports/exports, and price; The contractor shall estimate the future trends of the natural aggregates market;
- Future trend for the potential materials to be used as aggregates:
  - The generation potential (kg per year);
  - The market potential for the materials to be used as aggregates substitute (kg per year);
  - Imports/exports potential for the above;
  - Transport potential of the recycled and secondary aggregates.

Another example is the study of waste streams and secondary materials in the EU. The data collection part of the study lists which data are needed:

- A life cycle analysis of waste streams and secondary materials includes the stages of waste generation, waste collection, waste treatment, including energy recovery, as well as the stages after treatment, for instance, recycling as secondary material or landfill, as shown in the diagram below.
- The objective is to provide all the relevant information and data that enables a comprehensive overview of the waste streams, especially those that are relevant for recovery, and the flows of secondary materials along the entire life cycle.

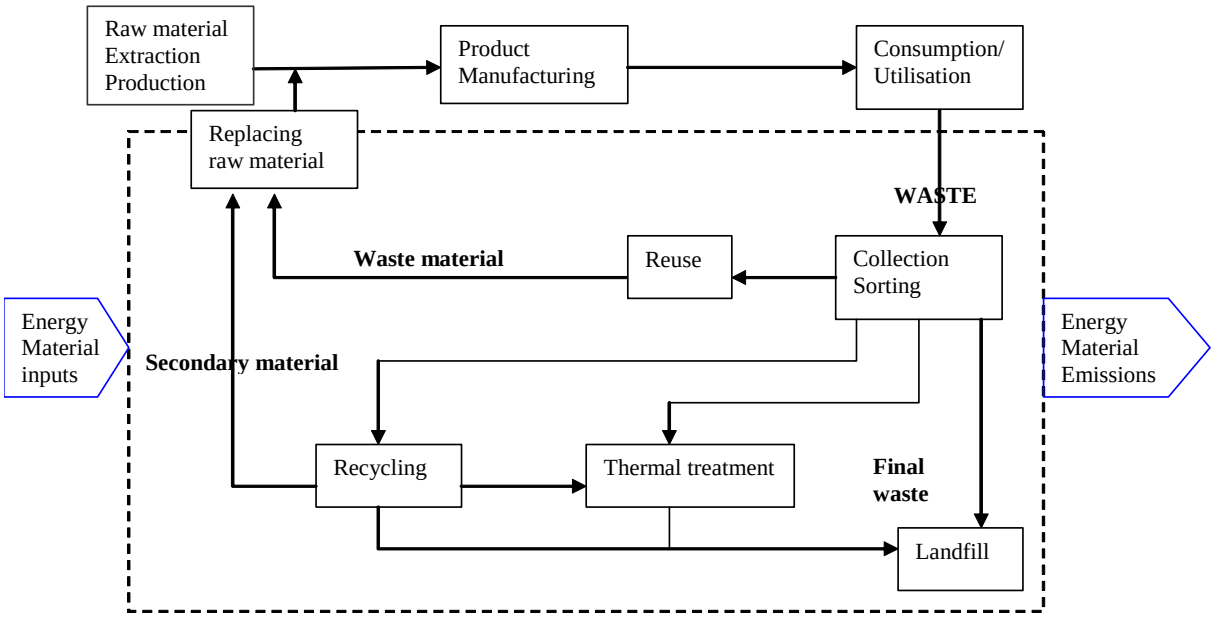


Figure 9: LCA of waste streams and secondary materials

These two examples show that data needs for IPTS's analytical work are very complex and cover a broad range of waste-related issues. An important task for the DC on waste should be to define its scope and tasks in accordance with the needs formulated above (completed

with similar data needs from other activities). Due to the so far existing focus of ESTAT on statistics, IPTS does not expect such an exercise to take place in the short term.

Cross-cutting

Using the example of the DEIA project that has taken place at IPTS, its data needs with regard to cross-cutting activities are briefly described as follows:

- The project is situated in the wider context of EU resources use, products and waste policies.
- Goal of the project was the development of a database of environmental interventions intended for environmentally extended input-output analysis (hereinafter e-IOA), with the geographical scope of all EU-25 countries for the years 1995-2002 and consistent with the NACE lev.2 classification system (each of the 60 activities separately).
- It was assumed that the database cannot be fully based on primary statistical sources.
- Environmental variables that needed to be looked at were:
    - Emissions to Air: CO_2, N_2O, CH_4, HFC, PFC, SF_6, NO_X, SO_X, NH_3, NMVOC, CO, PM, CFC, HCFC, heavy metals;[67]
    - Waste generation & Hazardous waste generation;
    - Water consumption & Waste water generation;
    - Environmental protection expenditures;
    - Resource extraction;
    - Land occupation;
    - Emissions to water and soil, including heavy metals, nutrients, pesticides, POPs.
- As concerns data sources ESTAT's Environmental Accounts were the core source for the following data: Waste, Water, Environmental protection expenditures, Air emissions;
- It is expected that needs towards a DC will in future be similar to those described here.

3.4.2.2 Current activities

This section briefly lists a selection of ongoing activities with relation to Eurostat's DCs.

Waste

Following activities with relation to the area of waste take place within SUSPROC:

- In the framework of WFD revision: "end-of-waste criteria" project; comparative analysis of waste streams and analysis of specific waste streams (processing technologies for e.g. polymers and WEEE)
    - Support in the development of end of waste criteria by developing a science based methodology that could be used to determine end of waste criteria.

[67] These air emissions are covered by the raw-data inventory supplied by IPTS. However, the completeness in terms of countries, years and sectors differs by large extents for different pollutants.

- Case studies on certain defined waste streams: compost, aggregates (addresses the use of various materials as a substitute for primary aggregates), metal waste: define where waste ceases to be waste in treatment / recycling activities.
- In this context ESTAT has been asked to deliver preliminary MS data (not validated nor published) and it has worked well. IPTS is aware that data is only preliminary and not complete; however no later correction of IPTS had to take place until now. It was more difficult to access data from DG ENV on waste shipment.
- Industry data available for metal scrap since market there for these materials – validated data by industry fills data gaps in statistical data.

Products

Following activities / points with relation to the area of products within SUSPROC have been identified:

- No IPTS in-house terminology defined with regard to “products”;
- Techno-economic analysis in the area of products (IPP / SCP);
  - EIPRO / IMPRO studies[68]: have been done using a methodological mix of EEIO and LCA; are used to support environmental policy making (inter alia SCP Action Plan); have identified three main areas of products with regard to environmental impacts (food products [dairy and meat], motor vehicles [cars] and buildings / housing); these areas are now being analysed in more detail; sometimes product focus, sometimes focus on needs (e.g. mobility);
  - For three product groups activities now make use of data to compare input / output data with LCA data (done by external consultants for food products and by IPTS for cars);
  - Support to eco-labelling, EuP (e.g. study on TV sets): upon requirements punctual support to policies.

Natural Resources

Following activities / points with relation to the area of resources within SUSPROC have been identified:

- No IPTS in-house terminology defined with regard to “natural resources”;
- Techno-economic analysis in the area of natural resources;
  - Project EIRES and analysis of certain resource flows (link between resource and direct use; use in different sectors).

Other / Cross-cutting

Following other or cross-cutting activities / points within SUSPROC have been identified:

- DEIA project (see above);

[68] See also http://ec.europa.eu/environment/ipp/identifying.htm

  - Emissions per total sectoral activity, NACE A59 classification;
  - Time series established for 1995 – 2002;
  - NAMEA-Air data was extended to fill existing gaps; EPER data (emissions to water) and agricultural inputs data (nutrients, pesticides) was integrated.

- EXIOPOL project
  - 4-year research project on combination of input/output data from national accounts (available for 60 sectors) with LCA data; ESTAT participates in the Advisory Board; difficulty to disaggregate data from macro / meso level to data on concrete products; this area of activity is being expanded at IPTS; the second important aspect of Exiopol is to further improve methods and data for monetisation of external costs;
  - In part is a follow-up of EIPRO; results of EXIOPOL will be checked with regard to consistency with EIPRO results. However, the scope is much broader: not only for LCA-type of analysis but also for Economic-Environmental analysis and integration with mainstream models (CGE,[69] LP-IO,[70] Econometric models);
  - Integrates National Accounts data on a sector base with NAMEA / LCA data to get the environmental dimension associated with IO on a sector base;
  - Intends to integrate existing data on waste, resources and products; however sectoral information is missing for this type of data; data formats are not compatible; extra-EU trade data in many cases not available;
  - Output will be a multiregional environmentally extended IO table that could be made available to the general public if the data that is used as input is public data;
  - EEIO table can then be used for analysis (case studies) of e.g. radical change in diet, shift in energy production, effects of future tariffs on agricultural products, water policy and use of natural resources;
  - Environmental interventions[71] looked at: air emissions, emissions to water, resources, waste and land use (harmonised to the NAMEA-type of accounting framework, i.e. compatible with economic accounts);
  - Establishment of time series not a project goal; however, EEIO table should be easily updatable.
- There are no further environmental data-related projects. There is however an internal project putting together a harmonised set of economic accounts (DEIA-compatible) and analytical software tools.
- Methodologies / tools;

[69] Computable General Equilibrium model: are a class of economic model that use actual economic data to estimate how an economy might react to changes in policy, technology or other external factors.

[70] Combination of Linear Programming (LP) and Input-Output (IO) methods.

[71] "Environmental intervention" is used by SUSPROC as a generalisation of environmental impact that includes every interaction between the technosphere and the environment (and that may or may not imply an impact). Roughly speaking, digging gravel is an environmental intervention but – per se – not necessarily an environmental impact.

- IPTS uses both EEIO- and LCA-based approaches for its projects according to what is best suited for a certain analytical work;
- Tools are developed that are the basis of the then following analysis; tools are not intended to be used as such by third parties.

IT infrastructure

Located on the IPTS website, SUSPROC has an own homepage (http://susproc.jrc.es/) where its activities are listed. Under the heading "IPP", activities connected to the EIPRO and IMPRO studies can be found as well as activities around EEIO and eco-design (http://susproc.jrc.es/pages/r4.htm). Publications can best be accessed via the direct link on top of the page.

4 Stepwise implementation concept DCs

In order to allow for a pragmatic approach towards DC implementation at Eurostat, this pre-study has – in close collaboration with Eurostat and other Go4 institutions – elaborated a stepwise implementation concept. This work programme depends very much on the client needs elaborated in section 3. Therefore, client needs are first of all summarised in the section below.

Building upon these client needs, general tasks of the DC implementation work programme are described followed by three individual sections for natural resources, products and waste. These tasks integrate currently already ongoing processes within Eurostat.

4.1 Client needs

Client needs described in section 3 are briefly summarised in the following starting with needs of DG ENV, followed by needs of other Go4 institutions and other actors.

It is not yet fully clear whether there will be a client hierarchy serving DG ENV first, then other Go4 institutions followed by other EU institutions and the other clients at last. For the purpose of this pre-study it is assumed that DG ENV's needs, complemented by needs of other Go4 institutions are the main driver behind first implementation steps of Eurostat's DCs.[72]

4.1.1 DG ENV's needs

According to the Technical Arrangement, DG ENV has set up detailed requirements of its needs towards the DCs that will be updated periodically. For Eurostat's DCs these needs have been formulated in the Terms of Reference of this pre-study (see sections 2 and 3.2).
In order to understand what other needs are associated with those, it is important to look at the background of general environmental policy needs: current political measures are based

[72] According to DG ENV "The first client to be served by the DCs is DG ENV. Following thereafter next clients are other DGs. EEA and JRCs have there own specific status in relation to the DCs. In principle they are of course also clients; however, they are seen to be on the same working level and therefore exchange of data and information is expected to be part of their normal business."

on the actual sixth environment action programme[73] (6th EAP) and its implementing seven 'Thematic Strategies',[74] the Sustainable Development Strategy (SDS) and the renewed Lisbon Strategy. These documents emphasize the need to ensure better and more easily accessible information on the environment for policy makers, enterprises and the citizen. This includes complete, reliable and timely statistical data and information.

Against this background, the following concrete needs with regard to DCs have *inter alia* been formulated:

- Be the first contact point for requests on data and information relevant for environmental policies on natural resources, products and waste;
- Provision of high-quality data on the state of the environment, pressures (such as emissions), impacts and responses, which is a prerequisite for developing effective environmental policy and integrating the environmental dimension into other policies;
    - Give access and / or develop advanced environmental impact indicators (such as e.g. indicator on waste management and climate change as well as a waste prevention indicator).
- Assessment of policy effectiveness via indicators for monitoring legislation/strategies
    - Have Directives been implemented with success (have the goals / quantitative targets been reached)?
    - Have the impacts / pressures on the environment been reduced? By how much?
    - What indicators can be used to monitor success / environmental impacts?
    - If legislation needs to be revised: what are the areas that have to be addressed with priority?
- Identification of priority areas for action
    - Which parts of the life cycle of resources, products and waste have the greatest environmental impacts? How can this be measured (development of methodologies, indicators, data collection, …)?
    - Which of these areas can be addressed most efficiently and with the greatest effect on environmental impact reduction?
    - What types of resources, products and waste have the greatest environmental impact – do the specific pieces of legislation target the most important objects?
- Different from the present situation, for the implementation of DCs, continuous data flows and data management need to be ensured beyond the duration of policy cycles and research programs.

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[73] The 6th EAP identifies four main policy areas:
- Climate change
- Nature and biodiversity
- Environment and health and quality of life
- Natural resources and waste

[74] The Commission has adopted seven 'Thematic Strategies' on: – Air pollution – Protection and conservation of the marine environment – Soil – Urban environment – Prevention and recycling of waste – Sustainable use of natural resources – Sustainable use of pesticides. Implementation of the last three is directly depending on support by Eurostat's Environment statistics Unit.

- Identification of potential overlaps with other areas of environmental legislation (hence also other DCs)
    - What is the impact of resources, products and waste policies on climate change, biodiversity, land use, water,…?
    - What measures from other environmental policy areas tackle resources, products and waste issues?

These questions and potentially other requests shall in the future be addressed by DG ENV to Eurostat's Data Centres. According to DG ENV, Eurostat shall state whether or not it is capable of treating the request. If not, the Data Centre shall bring together the relevant institutions to discuss the best way forward with regard to finding a solution.

This could e.g. mean that the development of a composite indicator which is needed for environmental policy-making and does not yet exist has first to be developed by another institution (e.g. EEA or ETC-RWM). Once it has been developed and a methodology has been created that is agreed upon, ESTAT can use this indicator for its work on generation of quality-labelled data (corresponding to its core strengths & competences).

The following figures show the difference between the current situation and the situation with DC implementation in relation to data and information requests from DG ENV.

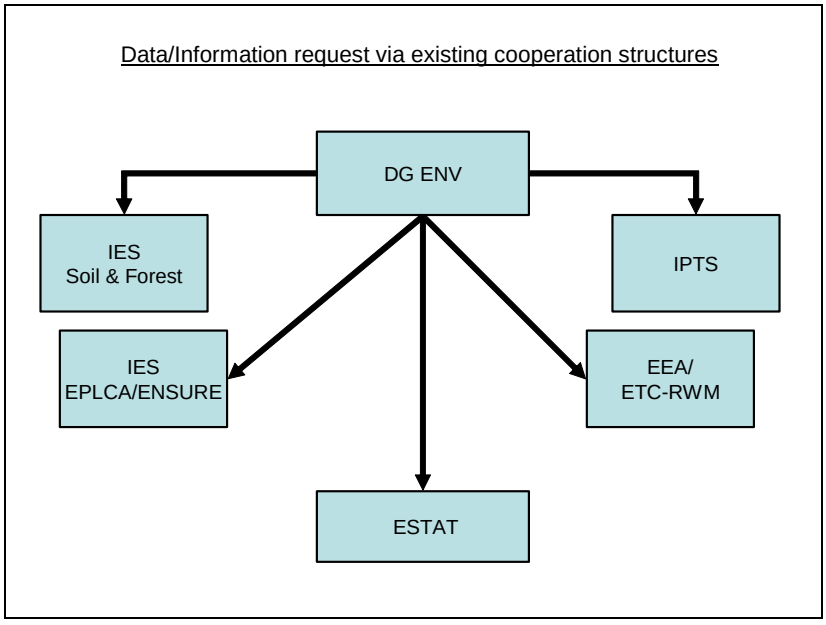

Figure 10: Existing cooperation structures for requests from DG ENV

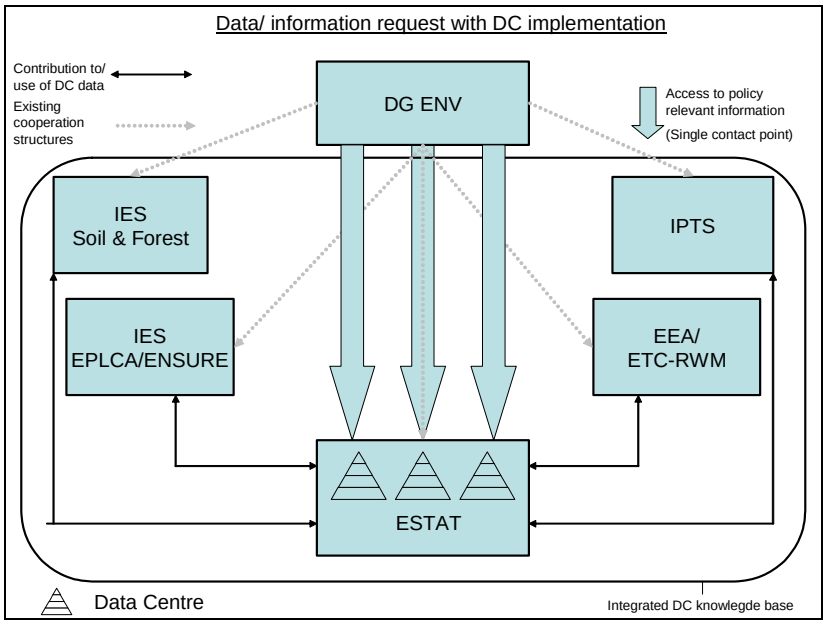

Figure 11: Future DG ENV data and information requests with DC implementation

4.1.2 Other Go4 institutions' needs

Needs of other Go4 institutions are sometimes overlapping with DG ENV's needs: depending on their respective institutional mandate they also need data in order to carry out analysis and assessment of environmental policies, or they need data for their research purposes. These needs are described in detail in section 3.

Some points however, have explicitly been mentioned by the other Go4 institutions and are summarised briefly as follows:

- Faster availability of data
  - MS data collected under the DCs tasks shall be made accessible more rapidly to the other Go4 members;
  - Possibly attach metadata to ensure easier use of data;
  - It needs to be clarified how this can be realised without interfering with Eurostat's procedural rules.
- Other institutions are contributors and users of DC data
  - Interfaces (IT and organisational) need to be created;
  - Data accessibility and provision need to be organised.
- Existing collaboration structures between Eurostat other Go4 institutions can be built on and intensified in order to have a well-working interface between the statistical and the analytical work;
- Shifting of responsibilities for data collection and management to Eurostat.

The following figure summarises the interactions between the Go4 institutions with the DC on waste with regard to contribution and use of DC data at different levels of the data pyramid – the overall goal being to deliver information on environmental impacts to DG ENV.

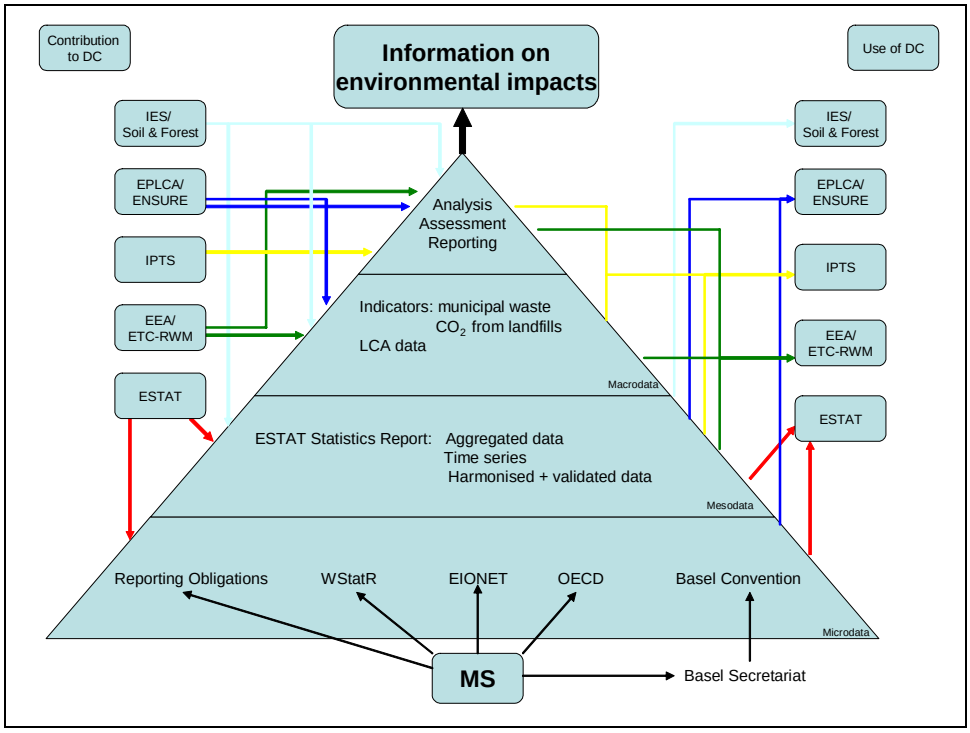

Figure 12: Contributions and use of waste DC data by Go4

4.1.3 Other actors' needs

At present it is not fully clear whether additional actors beyond Go4 should be considered possible clients of all Eurostat's DCs. Such other clients could be other (non-Go4) EU institutions, research institutes, administrations and the general public. This group of clients will at the latest become relevant when DCs are integrated into the development of SEIS. However, it is still too early to give detailed statements on those other clients' needs.

Therefore, other clients and their possible needs are only briefly listed in this section:

Other DG's: Other DG's (e.g. TREN, ENTR, RTD, INFSO) might also have an interest as data users and could also provide data. Cooperation agreements will need to be established in order to set up clients' needs and possible DC contributions.

Other EU institutions: European Parliament and Council will certainly be interested in the political dimension of DCs in order to monitor environmental policies.

International organisations: Main international stakeholders are OECD and Basel Convention Secretariat. Also other international organisations like e.g. UNEP will be involved.

General Public: there is a general increase in the awareness and interest of the general public on issues concerning environment. A centralised online portal on environmental data would enable the general public easy access to such data on EU level.

Furthermore, it needs to be stressed that according to the Arhus convention, access to environmental information needs to be given to the general public.

Business, consultants, scientific community: there is a need for availability of good quality European environmental data in the scientific community. At the moment data are scattered around several institutions and they are difficult to access. A centralised online portal on

environmental data would enable access to such data. Furthermore, the exchange with the scientific community is needed to improve the interpretation of the data.

Member States: currently Member States struggle with heavy reporting burdens towards several EU bodies. The DC will allow them to report data only once to only one institution (single entry point). Furthermore, data available at a DC will be of use for MS bodies for national environmental accounts as well as national environmental policy (benchmarking).

4.2 General organisational tasks

In this section organisational tasks that are common to all three DCs are described briefly:

- Organise procedures of DC set up within Eurostat
  - Staff allocation to personnel needs and tasks (e.g. name waste DC responsible desk officer / project manager);
  - Organise information flows and structures;
  - Detail working plan (calculation and project planning) with milestones over timeline.
  - Which Calls for Tender will need to be launched?
  - What can ESTAT do itself?
  - What resources are needed for both?
  - Agreement with Go4 on working plan
- Set up cooperation structure within Go4
  - Describe division of tasks between Go4 members
  - pilot joint work programme between Eurostat and the EEA has been drafted (EEA e.g. to support ESTAT in assessment of policy effectiveness)
  - Administrative Arrangement with JRC to be set up
    - Introduce meeting/communication schedule for thematic experts within Go4;
    - Find an agreement with the Go4 members on which data should be presented and made available to the DC;
    - Install “first contact point”.
  - Priority should be given to requests for data and information made by DG ENV and other Go4 parties;
  - Requests should be handled by DC staff, if possible;
  - Response to the requests by asking the other Go4 parties to give input;
  - Response to the requests by searching through other relevant sources including web-sites;
  - Each response should be accompanied by a statement on the method used to retrieve the data and information as well as by an assessment of its quality;
  - Requests for data and information that require further studies will not be done by the DC, but redirected to Go4 or be given a “negative response” (non-availability of requested data);

    - Other Go4 members should appoint their DC contact person;
    - The other Go4 parties will support this activity given availability of financial resources
        - Analyse and describe the organisational links to other DCs (information flow, responsibilities);
- Set up cooperation structure with other actors;
    - With MS (national EPAs / environment ministries and national or regional statistical offices);
    - With international organisations (e.g. Basel Secretariat, OECD, UN);
    - With other Commission services (who also have relevant data but are not involved in Go4);
- Organise (faster) data access and availability
    - How (in an organisational way) is the access to data to be provided (link to technical tasks);
    - Provide interested Go4 partners with access to data before the formal validation process has been finalised, with the condition that Eurostat would not be named as source (MS would be the source) and data would only be used for internal purposes of institutions; any publication would only take place after “green” light by ESTAT;[75]
    - Such structure differs from existing ESTAT rule to forward data only after a thorough and time-consuming validation exercise – need to clarify which data policy will be implied on DCs.

The following picture shows what the DC set up could look like. It shows that a differentiation has to be made between the preparation of data exchange as well as corresponding scientific and technical support on the one hand and the operation of data access via an online platform on the other hand. Latter is rather the task of a technical coordinator while the first task should be carried out by a scientific coordinator.

[75] Conflict with ESTAT rules can be avoided by clearly characterising which data are already ESTAT validated, and which are data provided e.g. by MS but not yet validated by ESTAT.

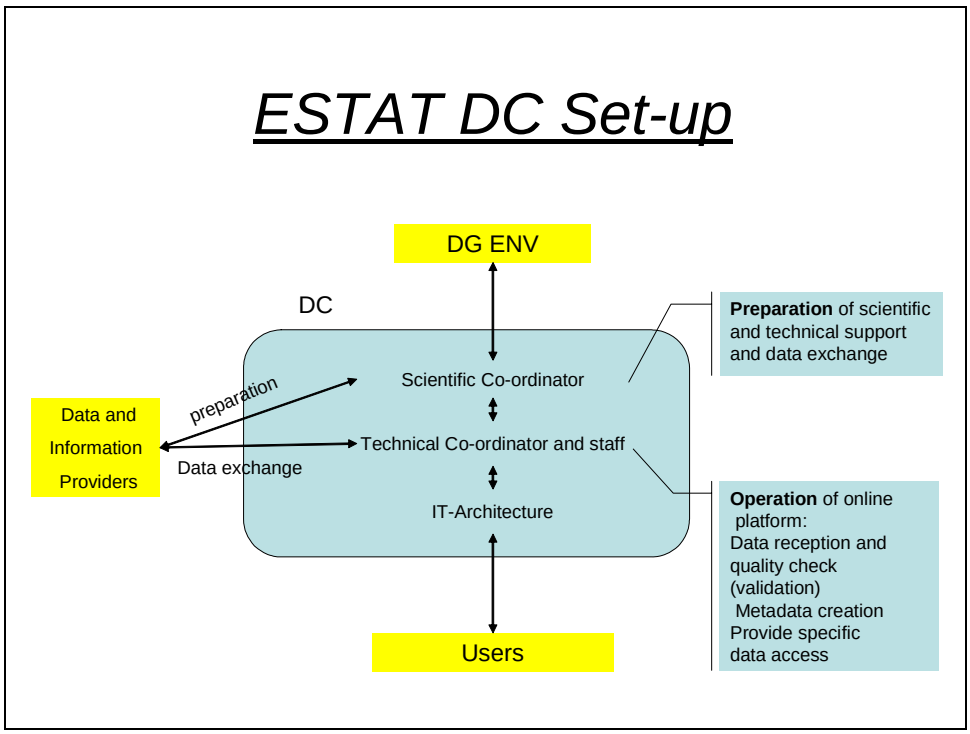

Figure 13: Eurostat DC set up structure (source: JRC IES)

4.3 General operational tasks

Natural resources, products and waste are all part of a complete life cycle. Therefore, a coordinated approach across the three new Eurostat DCs is of utmost importance for the life-cycle related data and information to be provided for consistent policy support as well as to avoid overlap.

Operational tasks (data and information management) that are common to all three DCs are described briefly in this section:

- Develop a detailed implementation plan
  - Agree with Go4 on work planning and prioritisation;
  - Launch large implementation studies for implementation of three Eurostat DCs;
  - Implement the three DCs together with a contractor.
- Improve data quality
  - Continue process of streamlining and harmonising data;[76]
  - Use data from industry associations as cross-check for data inconsistencies made available to EU institutions;[77]
  - As long as the data is provided by Member States on a voluntary basis, the grant agreement policy should be pursued at a significant level to help Member States to develop pilot studies on environmental accounts.

[76] Huge gaps are observed among Member States and different areas of environmental accounts in terms of data availability.

[77] However, these data are not always very reliable due to the use of different methodologies.

- Environmental data would be better covered if the main information had to be provided by Member States on a compulsory basis. Adoption of legal basis in the future could be helpful;
- Identify the gaps in areas of environmental accounts and MS where data is missing and assist MS in their efforts to fill these gaps.

- Gather and possibly generate data and information on environmental impacts
  - Continue the work in the Task Force on environmental impacts with JRC + DG ENV and incorporate the results into the DC structure;
  - It is too early to integrate a description of environmental impact into DC mandate; possible in the longer term.
- However, DCs should collect or give access to necessary data for future assessment on environmental impact.
- In the long run, further data needs could be formulated when new policy questions arise that need to be answered.
  - ESTAT may have a role to develop quantitative indicators.
- Some other Go4 institutions are better suited for development of more qualitative indicators (however based on statistics).
- Develop high quality indicators illustrating whether actions to reduce the environmental impact of resources, products and waste were successful and promote their use.
  - Use of estimation methods aiming at “nowcasting” and “forecasting” of data would be appropriate in well-defined cases. Scientific support by modelling and other advanced methods (like remote sensing) can supplement traditional tools.
- Collect new / additional data
  - Develop methods to estimate up to date EU-27 aggregates, in particular for Material Flow Accounts (MFA) and NAMEA Air emissions.
  - The UNCEEA and the London Group lead the revision of SEEA-2003 in order to promote it to a UN international statistical standard by 2012. Promotion of environmental accounts as a tool for policy making and monitoring is one of the main objectives of UNCEEA and London Group. Eurostat together with several EU countries are actively participating in this revision.
  - Include new emerging data themes identified by the Go4 (and by other actors) into account. Other areas that are to be covered are e.g. upcoming Thematic Strategies (e.g. urban strategy) as well as topics related to other political areas such as health, social and economic aspects.
  - Adapt according to long-term data needs formulated by DC client at a later stage of implementation.
- Disseminate data
  - Develop contents for an online portal and other user-friendly publications, and update free disseminated data (NewCronos).

- Input needed on what remote portals / websites need to be accessed by DC in order to better draft the IT architecture.
- Identify exactly where the documents are that need to be uploaded or interlinked by DC portal; clarify source questions and dissemination rights.
  - In a joint system like the DCs within Go4, equal data access should be given to all parties.

4.4 General technical tasks

Eurostat has already started a series of activities in the area of IT architecture. These are decribed in section 3.1. Technical tasks (IT architecture) that are common to all three DCs are summarised briefly in this section:

- Re-launch of common architecture drafting team (CADT)
  - Issues on governance, language and confidentiality issues;
  - How (in a technical way) is the access to data to be provided?
- Launch of contracts for building up hardware and software linked to DC IT architecture

In the context of the ex-ante document elaborated for Eurostat's internal budget planning with regard to necessary IT resources for DC implementation, following two steps have been identified as necessary:

1. Define a common architecture for the ten DCs by carrying out the following steps:

- Study the four identified existing architecture frameworks (including CVD[78]);
  - Future DC portal could be located on different portals (EEA, Europa);
  - If hosted on ESTAT portal (strict) ESTAT rules would have to be followed;
  - Question arises whether data will be kept in NewCronos and additionally hosted e. on another site whether there is a need for cross-linkage;
  - Define service level of a DC portal: view documents and access them (in analogy to INSPIRE)?
  - Code of Practice: data availability is possible if documented accordingly;
  - Data should be left with MS or hosting institution.
- Analyse the progress made in the implementation of the DCs managed by JRC and EEA in order to identify possible use or adaptation of existing building blocks;
- On the basis of the information collected in the previous steps, examine three scenarios, namely:
  - Minimal interoperability, limited to the adoption of common standards to facilitate data discovery and data exchange;
  - Service level interoperability between Data Centres;

[78] At ESTAT CVD is a master document on format of data

- Full interoperability, expressed to a common portal providing a single point of entry to all the Data Centres.

- The following deliverables shall be produced:
  - A Common Architecture for the Data Centres (Environmental Data Centres Architecture Framework – EDCEAF);
  - A Global Implementation Plan or "Road Map" to put this Common Architecture in place taking into account the necessity of a step by step approach towards the convergence of the ten DC architectures.

2. Draft technical specifications for a pilot platform for the Data Centre on Waste.

These specifications should be detailed enough to fully subcontract the realisation of this test environment using the framework contract of DG-DIGIT.

The following two figures give an overview on the structure of the IT architecture for Eurostat's DCs.

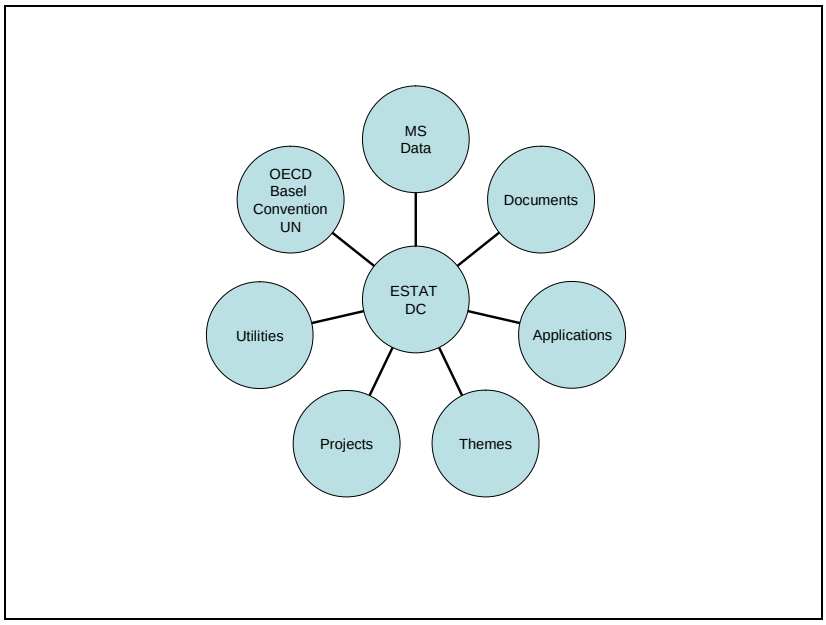

Figure 14: (IT) Structure of DCs at Eurostat (source: JRC IES)

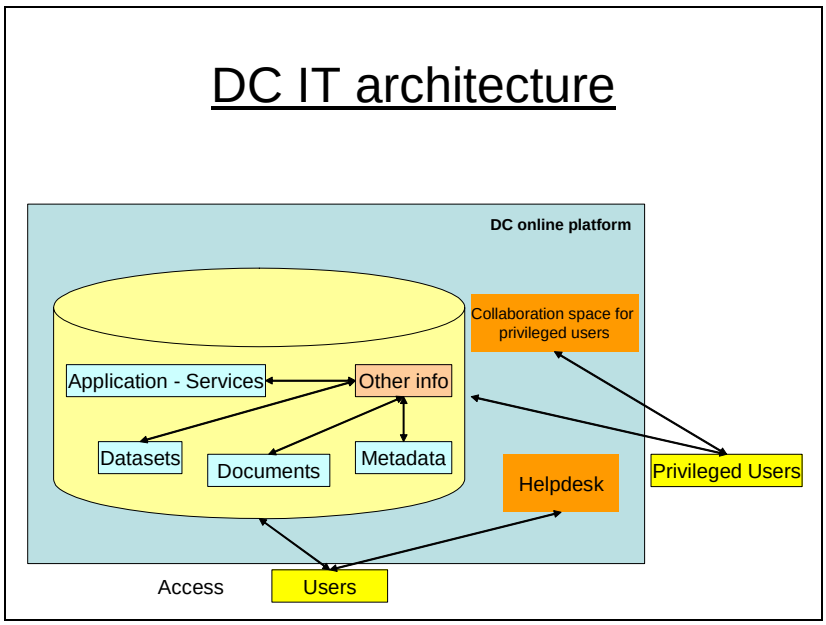

Figure 15: DC IT architecture (source: JRC IES)

4.5 DC Natural Resources

In the following the implementation concept for the DC on natural resource is introduced. Before describing individual steps, some general issues are addressed that are of importance to understand the special characteristics of this DC.

The concept of “information hub” which is foreseen for this DC has already been described in section 2.

4.5.1 Organisational structure

Taking into account all the expected tasks and objectives described in section 2.2.1 it becomes clear that Eurostat does not possess all the required expertise in-house to develop, establish and run the DC. Especially research for methodological approaches to develop for example indicators or environmental impacts associated with resource use are expected to be working fields to be outsourced to external experts.

In this context of external expertise a Task Force on MFA and Environment Impact has been established including all Go4 partners, experts from National Statistical Institutes and private experts. This will be complemented with life cycle environmental assessment expertise of e.g. JRC-IES, the EEA and DG ENV as well as possibly via the EPLCA’s established external advisory groups. Further on an Administrative Arrangement with JRC-IES on developing the decoupling indicators is planned and expected to be signed during the 4th Quarter of 2007. Further on contracts with external consultants shall be established who will assist Eurostat with the establishment of the DC.

Another important step will be to establish a steering committee to monitor the DC project. It should be composed of all Go4 partners and perhaps additionally some MS representatives. The DC together with the steering committee would present a regular update of the work done and the main results obtained. Main decisions should be taken by this committee.

In relation to this organisational structure of the DC a correspondent operational work schedule can be established:

- Give an overview on ongoing projects; this would include “outsourced” projects but also all other projects which potentially can produce relevant data and information related to the use of natural resources (e.g. work carried out in the context of the EPLCA and ELCD – see section 3.4.1.1).
- Information of the steering committee and joint decision on relevant data, information and projects; this would include for example priority setting of important natural resources in the short term or the decision on appropriate indicators.
- The extraction and processing of commonly agreed data and information would follow; this would include the identification of data providers, an agreement with data providers and the quality assurance and harmonisation of data.
- Finally the data and information would be made available to the clients.
- On a different level the publication of data and information by the DC would follow.

Apart from the organisational structure on the European level two other ongoing activities have to be considered and incorporated:

- UNEP and the Commission to set up an International Panel on Natural Resources; first meeting to take place in September/October 2007;
- OECD has set up a Council recommendation on resources and material flows.

Cooperation with and support to both activities is necessary. On the other hand it will be part of the DC work schedule to keep the Go4 or steering committee informed on these ongoing activities.

4.5.2 Data, indicators and information

Data and information relevant for the DC on natural resources can be generally grouped in two different categories. First of all there are statistics and other comparable data which are already available on a regularly bases. The second category includes all other quantitative or qualitative data and information which for example are extracted from specific projects or research studies.

4.5.2.1 Statistical and related data

The first data category is in correspondence with the core competence of Eurostat and at the same time presents the starting point for the DC. The main task will be to check which data are already available and are suitable in the context of natural resources. A comparison with the definition of natural resources in section 2.2.1.1 shows that the energy statistics and the production statistics (Prodcom) but in principle also the trade statistics (Comtext) are potentially relevant data sources. These contain figures on individual energy carriers or for example metals and ores. More data can be derived from the activities in the field of the economy-wide material flow accounts (MFA), in particular those generated through the recently developed questionnaire on MFA. NAMEA is an additional data source which is already in place at the European level (for more details compare the information on the Go4 activities in section 3).

The management and publication of these statistical data would follow the working scheme which was given as part of the organisational structure. These initial data present the 'low hanging fruits' and as such are part of the short term perspective. They offer first results for not only energy, metals and mineral resources but potentially also for some biogenic resources and will provide an overview mainly on Europe's material use.

A variety of data sets and even some first resource related indicators are available out of these sources either directly or after further processing. Typical data would be for example the domestic extraction of individual natural resources or the use of different energies. On a more aggregated level there are e.g. the direct material input (DMI) and other material related data. DMI or DMC (domestic material consumption) are examples for some preliminary work done at the ETC-RWM on the development of indicators from economy-wide MFA (see section 3.3). Another step forward leads to data which combine material with environmental or monetary dimensions. Examples are NAMEA-type data for air emissions and energies which Eurostat already collects on a regular basis from the member states.

Although a series of data can be derived from these short term activities it is obvious that this information will still be very restricted. It will definitely not fulfil the required information needs in relation to the measuring of the progress towards a decoupling of environmental impacts associated with the use of resources.

4.5.2.2 Other data from projects

The second category with ongoing and future projects and studies will certainly contribute with additional data and information. Therefore it has to be agreed on the cooperation with other Go4 partners in order to integrate their knowledge on natural resources data. The JRCs for instance have projects in the area of materials which include also environmental aspects. The ELCD of the JRC IES for example contains extensive data sets on the life-cycle-wide environmental impacts of a number of materials (see details in chapter 3.4.1.1). In principle also the Environment Extended Input-Output analyses (EEIO) which are performed mainly at JRC IPTS and EEA/ETC-RWM might add additional knowledge on life-cycle related environmental impacts. However EEIO projects like EIPRO or IMPRO focus on product groups and therefore seem to be better suited for the DC on products. The European wide EXIOPOL project would be another promising example for an EEIO.

4.5.2.3 Outlook

During the pre-study it became obvious that a lot of effort is needed to keep track of the different projects and even more their results. Therefore an important part of the short term activities will be to carry out a status-quo-analysis on currently available data. In accordance with the general working scheme the next step of the DC would be to identify which additional data are necessary, where they can be derived from or how they can be developed with an affordable effort. In this context the former European Minerals Yearbook was a potential data source which would be useful for the work on natural resources. It contained basic data on the production, import, export and use of different minerals in Europe and could possibly be extended by available reserves of resources.

The overview on data from above shows that there are already a significant number of statistics and projects either available or ongoing. The situation for indicators however is much different. Up to now not any life-cycle based sustainability indicators for natural resources have been developed. Much effort is needed to combine MFA data with qualitative/quantitative data from Life Cycle Analysis and transform them into aggregated environmental indicator for natural resources. Appropriate methodologies have to be developed for generating indicators to measure the progress towards decoupling of environmental impacts associated with the use of resources. More research is needed for development of an overall EU-wide decoupling indicator for the use of natural resources. The integration of the expert knowledge among the Go4 members and even more the cooperation and joint decision-making are crucial for a successful development of a decoupling indicator.

When it comes to a medium or long term perspective a wider scope of the definition of natural resources and thus different kind of resources has to be looked at and corresponding needs have to be formulated by the Go4 institutions. An agreement on areas for which data are missing and which additional data shall be collected is necessary.

4.5.3 Methodological approaches for data development

4.5.3.1 Top-down and bottom-up approaches

A major amount of potential data for the DC on natural resources is derived from top-down approaches like the MFA and NAMEA respectively. These ‘top-down’ approaches (based on EEIO-analysis) generate highly aggregated data on the macro level. They are useful for quantifying and monitoring the overall resource use in the EU and its Member States at a more general level. These methods can thus provide a good overview, and they bring about the advantage that they allow for generation of time series with replicable and comparable data. Once the method is established data can be produced with comparably smaller effort.

The second methodology relevant here is the LCA-based approach, a ‘bottom-up’ method. In the case of the natural resources the LCA-based method (different from a “classical” product-LCA according to ISO 14040) allows not only for analysis of a single product but has a much broader scope. E.g. the resource use in a whole branch or economic sector can be subject of the analysis.

When compared to the top-down approaches like e.g. MFA, the LCA method is better suited for detailed and practical oriented analysis of environmental impacts resulting from resource use. It allows for branch or material specific advice and in the end its results maybe more relevant in terms of specific policy making.

A practical example of a LCA-application in the area of natural resources is given with the life-cycle-wide analysis of PGMs (platinum group metals) (Buchert 2005). Starting with the extraction and production of these precious metals their total life-cycle including all their different applications in various sectors was investigated. Important results per application area are e.g. data like gross demand or net input, accumulated material losses, environmental impacts from primary and secondary PGM production, recycling ratios, and

last but not least specific recommendations for the improvement of the PGM resource efficiency for each application area.

The above mentioned two different methodological approaches should by no means be regarded as being competitive to one another, but rather as complementary. Concerning the methodological development, the DC Natural Resources should integrate both methods with the ultimate aim of "bridging the schools". It seems important to incorporate both the bottom-up approach of the LCA-method and the top-down approach of EEIO-based methods. Both methods can definitely benefit from each other and are essential for the environmental policy making in the field of natural resources.

In general the methodologies to operationalise resource use and resulting environmental impacts are still under scientific development. Further research is needed especially in the area of EEIO. Examples would be the further development of NAMEA and the combination of economic and environmental data (including e.g. indicator development) or the ongoing Exiopol project.

4.5.3.2 Priority areas for natural resources

In recent times a number of projects have been carried out at MS as well as European level. While taking a life-cycle perspective into account their objective was amongst other things to identify priority product areas for action from an environmental point of view. Within the Go4 the so called EIPRO study (see section 3.4.2) is the relevant project in this area. Passenger cars, meat products and housings were identified as relevant products and further investigated. In relation to the DC on natural resources a forthcoming task would be to summarise the ongoing activities on priority setting and to find a common agreement for priority areas in the field of natural resources.

The identification of priority areas for natural recourses would also be the starting point for the development of a case study. The case study could be an EU-wide life-cycle-based project on a previously identified natural resource. Its methodological focus would be on the Life Cycle approach comparable to the above mentioned PGM project. In order to improve the methodological approaches the case study would at the same time apply MFA methods to produce respective results for the identified natural resource. This would help to identify strengths and weaknesses of the bottom-up and tow-down approaches and thus in the long-term improve the uniting of the different methods. Another objective of this case study would also be to test the general functioning of the DC on natural resources.

4.5.3.3 Hidden flows

Another area where methodological approaches need to be further improved is the outsourcing of production processes in MFA. The usefulness of MFA is limited because more and more semi-finished and finished products are imported into the EU today with the consequence that less material-intensive production processes actually take place in the EU. This means that natural resources and resulting environmental impacts are "outsourced" to non-European countries. Improved strategies already account for "foreign" or "hidden" flows and thus incorporate all resource use regardless of its origin. However this applies especially

for member states projects and more importantly these projects consider only the material flows in tonnes but not related environmental impacts.

4.5.4 Short-term steps

The following work programme is based on the contents from above and describes in a short manner individual steps for the implementation of the DC on natural resources.

4.5.4.1 Organisational structure

- Establishment of the organisational structure of the DC and its functioning as an information hub including human resources and necessary infrastructure. Part of the infrastructure is setting up an online portal giving Go4 members access to already available data, projects and methodological approaches on natural resources.
- Coordinate with and learn from the development of the DCs already established by the JRC and EEA.
- Establishment of a steering committee to accompany and monitor the DC on natural resources.
- Identify formal contact persons not only at the DC itself but also at the Go4 members for the cooperation with the DC on natural resources.
- Establish the cooperation with the International Panel on Natural Resources and the OECD Council recommendation on resources and material flows.
- Placing of contracts with external experts to support the development and establishment of the DC on natural resources in different areas (e.g. research to produce data and indicators, projects for further development of methodological approaches or case studies).
- Agree on cooperation with other Go4 members in order to integrate their knowledge on natural resources.

4.5.4.2 Contents

- Agreement on the definition of natural resources and its differentiation from products and waste.
- Set up an inventory on existing projects and methods dealing with environmental impacts associated with resource use. This includes evaluation and an overview on the status-quo in this area (e.g. NAMEA, EXIOPOL, EIPRO etc.).
- Set up an inventory on available data, indicator and information in the context of resource use. This includes evaluation and an overview on the status-quo in this area.
- Identify priority areas for action on natural resources.
- Management and publication of statistical and other data in relation to resource use and resulting environmental impacts.
- Develop and agree on data sets and indicators for natural resources which are useful to measure the progress towards “decoupling” (resource efficiency, reduction of

environmental impacts, implementation of directives etc.). This includes the development of an overall indicator for the use of natural resources.

- Run LCA-based projects on natural resources (case study) to improve the data base and knowledge on resource use (e.g. emission factors etc.).
- Further develop methodological approaches like MFA, “bridging the schools” or “outsourcing” of resource related environmental impacts in order to produce data, indicators and information on natural resource use.
- Harmonisation of data and development of metadata.
- Analyse potential overlapping and links to other DCs. This includes the identification of possible contribution needs to other DCs, and in turn identification of areas which are covered by other DCs and should be integrated into the DC on natural resources.

4.5.5 Medium-term and long-term steps

Depending on the progress made within the short-term perspective the following tasks could be carried out in a second step. However, it has to be pointed out that these will need to be revised by the time of implementation.

- A further important task in the medium term is to continue the inventory of natural resources data and projects started in the short-term.
- Continue work on indicator development.
- Coordinate with other Data Centres, define and start research on methodological and data needs for 'environmental resources' (soil, water, air) and land. Develop a knowledge base and identify research needs on 'flow resources' (wind, geothermal, tidal, solar energy).
- The set up of the online portal giving centralised access to existing natural resources data should further be continued.
- In cooperation with DG ENV develop a case study for a request on natural resources in order to check functioning of DC on natural resources.

In addition to the DC as reference point for DG ENV and the other Go4 members its task should be widened and include serving also the general public, the scientific community and other actors in the longer run:

- Make data and information available to the general public and other actors.
- Another thing would be to answer inquiries. However this is even in the long-term judged to be too much work and presumably not manageable within an acceptable budget.

4.6 DC Products

4.6.1 Background

4.6.1.1 Ongoing IPP activities

The primary aim of the IPP is to reduce the environmental impacts from products throughout their life-cycle. There are already many IPP activities within the European Union. Some of these activities which might be of relevance for the data centre on products are shortly described below.

Green Public Procurement (GPP)

The EU Commissioner for Environment characterises the role of GPP as follows: *"Public authorities in Europe have a purchasing power equivalent to 16% of the EU's gross domestic product. By using their market leverage to opt for goods and services that also respect the environment, they can have a major influence on suppliers and stimulate the production of more sustainable goods and services"* [DIMAS 2006]. In its renewed EU Sustainable Development Strategy (SDS) from June 2006 the EU Member States decided to aim at achieving by 2010 an EU average level of GPP equal to that currently achieved by the best performing Member States [EU SDS 2006].

Eco-labels

There are different Eco-labels in the EU:

The most common is the label of type I (**"EU-flower"**). It is awarded by the European Union Eco-labelling board (EUEB).

Further EU labels are the **EU energy label** (is obligatory for mostly electrical household appliances ['white goods'] and lamps and differentiates between seven energy consumption classes), the **EU car labelling scheme** (a 1999 Directive requiring a label on fuel consumption and CO_2 emissions for new passenger cars), the **Environmental product declarations** (EPD; type III eco-labels according ISO 14020 and coming 14025. It is a report on the level of the parameters and not obligatory). The **EU Energy Star** was developed for labelling energy efficient office equipment. In July 2007 the European Parliament has backed a compromise deal with governments that will see EU and national authorities obliged to ensure all their office equipment purchases meet performance criteria in the revised Energy Star Eco-label.

EuP

The Directive on the eco-design of energy-using products (EuP) from 2005 delivers a framework to minimal requirements of environmental performance of energy using products. The elaboration of detailed standards is done in stakeholder workshops for specific products groups (e.g. boilers, fans). Responsible for the process are DG ENTR (DG enterprises and industry) und DG TREN (DG energy and transport).

Activities on Recycling and Waste Management

There are several EU directives in order to improve the recycling of certain products (e.g. WEEE directive, ELV Directive, Packaging Directive). As these activities will also be part of the data centre on waste they are not described in detail in this context.

Environment Extended Input-Output analysis (EEIO)

There are several completed studies as well as ongoing projects working with EEIO-analysis on European level (e.g. EIPRO [EIPRO 2006], IMPRO, a study by ETC-RWM [ETC-RWM 2006], DEIA, and Exiopol).[79] The analyses calculate material flows and environmental impacts and/or pressure related by economic activities or product groups at a macro level. Major competences lie with JRC IPTS and EEA/ETC-RWM. Possible tasks of the DC on products for assisting EEIO-analyses are discussed more deeply in chapter 4.6.1.4.

LCA-database and LCA methodology

The JRC IES started to implement an LCA platform comprising the European reference Life Cycle Data System (ELCD), the European guidance handbook on recommended practice, as well as a comprehensive and detailed Directory of LCA services, tools, databases, and providers. The data mainly comes from industry associations and from activities within FP7. The work of JRC IES comprises mainly methodological work. Recently, IES is involved in the project CALCAS which aims at deepening and broadening the LCA-methodology. The ETC-RWM is also involved in the field of LCA. Its main focus is the application of LCA on waste management. The IPTS applies LCA methodology in combination with the EEIO-analysis (see section 3).

Environment Technologies Action Plan (ETAP)

ETAP was adopted in 2004. Its objective is to support the development and use of environment technologies. It consists inter alia of a survey of promising technologies. For a database of products this link might be of interest in order to identify and promote products which were produced with an environmentally sound standard. Hereby, major competences lie with IPTS.

Life cycle thinking (LCT) in 7th Research Framework Programme (2007-2013)

The 7th Research Framework Programme promotes LCT and LCA and demands an attendant LCA or LCT in many of the research projects. Further, it initiates the development of a Sustainability Assessment of Technologies (SAT) method.

Indicators

DG ENV and further decision makers are highly interested in environmental impact indicators for the area of products, particularly indicators to monitor the effectiveness of IPP. Basic data

[79] For details on EIPRO, IMPRO, DEIA an Exiopol see Section 3.4.2 on IPTS.

are still missing. However, the development of indicators is ongoing. The issue will be discussed more deeply in chapter 4.6.1.5.

Green taxes

The background document to the consultation on the action plans on SCP and SIP [SCP 2007] points out the Commission's intention to examine the opportunity and efficiency of differentiating VAT rates according to the environmental performance of products.

4.6.1.2 Relevant data for product DC

Though it is no the genuine task of this project to finally select the data which should be considered within the DC on products, for the preparation of the implementation process it appears helpful to develop an idea of what kind of data might be in the central focus and later on in the widened focus. The analysis of possibly relevant data showed that the DC on products will have to manage some data in a completely different way than the other data centres. The main reason is that the field "products and environment" has so many aspects which are handled by all stakeholders from different points of view and using different approaches. Even for a concrete product there is no uniform systematic. This can be illustrated by the following example of a chair:

Example: Data on the product "chair"

In the ***EUROSTAT-statistic PRODCOM*** there are data on production and external trade for defined seats such as:

36111210	Seats convertible into beds (excluding garden seats or camping equipment)
36111230	Seats of cane; osier; bamboo or similar materials
36111250	Upholstered seats with wooden frames (including three piece suites) (excluding swivel seats)
36111290	Non-upholstered seats with wooden frames (excluding swivel seats)

Regarding ***eco-labels,*** the homepage on the EU Eco-label (the "Blue Angel") delivers an eco-labelling concept for furniture. There is no further differentiation in special furniture products. An example for a national label is the German "blue angle". There, furniture assortments which fit the basic criteria "Low-emission wood products and wood-based products RAL-UZ 30" are listed.

The product catalogue for a ***Green Public Procurement (GPP)*** from the European Commission gives for the product group "furniture and other manufactured goods" general recommendations on preferred materials and other environmental aspects (production, use and recycling) and gives advice for environmental requirements to be listed in tenders.

LCA-data for a chair can be generated when the material composition of the chair is known. Then a life cycle inventory can be generated and the environmental impacts for impact categories such as global warming potential, acidification potential etc. can be calculated. In most cases a set of scenarios and sensitivity analyses will be derived in order to model different assumptions and uncertainties on material composition, production processes, transport distances and more. Thus, the LCA result will comprise comprehensive data sets which can only be understood clearly when having sufficient knowledge on the background of the underlying LCA-study.

The following sub-sections will give an overview of the wide spectrum of data on products when looking at them from different points of views. In a first step, these points of view are split into the view on products on the micro-level, dealing with concrete products such as chairs, and the view on products on the macro-level with aggregated product groups such as vehicles or food.

Product data on micro-level

Data in PRODCOM and COMTEXT

The databases on production and external trade of Eurostat differentiate between 4.500 products at the lowest level (level 3). Monetary and physical data (tonnes, pieces) are included. Level 2 differentiates between 1.362 product groups. For the monitoring of IPP it should be checked if specific IPP measures result in new consumption/production patterns which are obvious within PRODOM and COMEXT.

Data on products with eco-label

There are several EU-labels such as: EU Eco-label type I (EU-Flower); label of type II (self declaration), label of type III - Environmental product declarations (EPD)[80], the EU energy label for White Goods and lamps and the EU car labelling scheme. There are further numerous national Eco-labels such as the “Blue Angel”. In this context, following data might be of interest:

- Is the considered product awarded with one of these labels?
- What are the main criteria of the label?
- What is the content of the EPD (if available)?
- What is the market share of eco-labelled products?
- What is the environmental performance of products which do not carry an eco-label?

Data on products concerning Green Public Procurement

Following data on green public procurement might be of interest:

- What is the market share of ‘green’ products in the public procurement?
- What is the market share of eco-labelled products in the public procurement?
- Are there recommendations for the selected product in the product catalogue of the European Commission for Green Public Procurement?
- What is the content of the product description?

LCA-data

Following LCA-data related to the considered product might be of interest:

- Are there LCA-studies on the considered product?
- Are there LCA-data-sets on the considered product or the production chain and in what database are they included?
- LCA-results: Results which are documented in LCA studies usually give values for a set of impact categories (GWP, acidification, eutrophication etc.) and different scenarios. Thus, the LCA result is not a single value but a set of many data. It can only be comprehensively understood when knowing the context of the study, particularly the driving parameters, the basic assumptions and the system boundaries. LCA data given in databanks are usually the results of one specific scenario. This must be well documented if the user shall assess and apply the results correctly. Further, there are data banks which give the user a minimum, mid and maximum value for each parameter in order to represent the margin of data uncertainties.

Products and hazardous chemicals

For the DC on products, the flowing information might be of interest:

- Does the product contain hazardous chemicals?

[80] EU Eco-label type III according ISO 14 020 and coming 14025.

- Are hazardous chemicals needed for the production of the product? Is this to be classified as a relevant “hot spot”?

Legal requirements regarding environmental aspects

For the DC on products, the following information might be of interest:

- Is the Eco-design Directive of relevance for the considered product?
- (If yes: what is actual status-quo of the stakeholder process for the considered product?)
- Are there other relevant guidelines of directives? (E.g. RoHS, WEEE or ELV)

Indicators for environmental performance

For the DC on products, the following information might be of interest:

- Are there indicators for the environmental performance of the product?
- What is the information of the indicator?

Product data on macro level

Data in PRODCOM and COMTEXT

The Prodcom/COMEXT level 1 (239 headings; corresponding to NACE Rev. 1.1 codes) and eventually level 2 (1.361 headings; corresponding to CPA 2002 codes) might be relevant for a view on macro level. For the monitoring of IPP it should be checked if specific IPP measures result in new consumption/production and trade patterns and which are obvious within level 1 or 2 of PRODOM and COMEXT.

Results of EEIO-Analysis (Environmentally Extended Input-Output Analysis) for product groups/economic sectors

Activities working with EEIO-analysis have two-fold relevance for the DC on products. Firstly, the DC might provide data which are necessary for performing an EEIO-analysis. IPTS which carries out EEIO-analyses pointed out that statistical data of better quality are needed, and that further data have to be collected. This might be one task of the DC on products. Secondly, the DC might provide its clients with results of EEIO-analyses (e.g. environmental impacts of different product groups on macro level, ranking of the relevance of product groups).

LCA for product groups

An LCA-based study can be carried out for a product group when data on the relevant material flows and emissions are available. The LCA result is not a single value but a set of many data. It can only be comprehensively understood when knowing the context of the LCA, particularly the driving parameters, the basic assumptions and the system boundaries.

Product groups which are “hot spots”

A major objective of looking at product groups on the macro-level is to identify hot spots where policy measures are demanded. Hot spots might be product groups with a relevant

share of environmental impacts / pressures, a relevant share of depletion of resources, problems due to the use of hazardous chemicals within the product or within the production chain or special requirements for a safe disposal or generation of hazardous wastes within the production chain. The role of the DC within this context has to be defined clearly as there is a strong interface to research and policy assessment.

Green taxes, legal framework and voluntary agreement

For the DC on products, the following information might be of interest:

- Is the Eco-design directive of relevance for the considered product group?
- Are there other relevant guidelines or directives?
- Are there relevant voluntary agreements or environmental agreements?
- Are there green taxes?

Summarising tables on possibly relevant data and the possible role of the DC on products

The next two tables summarise the possibly relevant data on the micro and the macro level, by whom they are currently managed and what the possible role of the DC might be. This table shall not show a final recommendation for the role of the DC. It rather points out the scope of possible tasks ranging from pure data management to identification of research needs to preparation of policy relevant information. It shall assist the political decision process of the Go4 when defining the working programme for the DC.

Table 11: Overview on different aspects of product data on micro level and a possible role of the DC on products

Data on micro level	**Managed by**	**Possible contribution of DC on products**
Data in PRODCOM / COMEXT	Eurostat	information hub Changes in production/consumption pattern by IPP?
Data on products with eco-label	DG ENV; European Eco-labelling board (EUEB); national labelling boards	information hub (Further assistance demanded by EUEB in future?)
Data on Green Public Procurement (GPP)	DN ENV	information hub (Further assistance demanded in future?)
Reduced taxes on green products	Member States	information hub
LCA-data - data-sets - LCA-studies	LCA-platform at JRC IES LCA-methodology: main competence at JRC IES LCA-application: JRC IES, JRC IPTS; ETC-RWM	information hub
Data on hazardous chemicals in products or production chain	European chemicals Agency (ECHA)	Identification of hot spots. Are there relevant final demand products? Which are relevant intermediate products?
Data on legal framework	Commission	information hub in the mid term: identification of requirements for new guidelines or voluntary agreements
Indicators for products and IPP	actually no indicators for products / evaluation of IPP available	development of indicators

Table 12: Overview on different aspects of data on product groups on macro level and a possible role of the DC on products

Data on macro level	**Managed by**	**Possible contribution of DC**
Data in PRODCOM / COMEXT (aggregated levels 1 and 2)	Eurostat	information hub Changes in production/consumption and trade pattern by IPP?
Input data for EEIO-Analysis	Eurostat, IPTS, ETC-RWM, EEA, Member states, scientific community	data collection and management assistance for one-time investigations and/or assistance for regular updates
Results of EEIO-Analysis for product groups / economic sectors	ipts; ETC-RWM; Eurostat	information hub identification of need for research *(Remark: interface with DC on nat res)*
LCA-results for product groups	LCA-platform at JRC IES LCA-methodology: main competence at JRC IES LCA-application: JRC IES, JRC IPTS; ETC-RWM	information hub identification of need for research *(Remark: interface with DC on nat res)*
Identification of product groups with “hot spots” and measurements for improvement	Studies by ipts, ETC-RWM and several scientific institutions; EXIOPOL-results, ECHA	information hub identification of need for research *(Remark: interface with DC on nat res)*
Sustainable Development Indicators Decoupling indicators	research activities managed by Commission / JRC-IES	Data collection Up-dating of indicators after their implementation *(Remark: interface with DC on nat res)*
Information on reduced taxes for green products, legal framework and voluntary agreements	Member states, EU commission, EU legislation	information hub

4.6.1.3 Data validation and data quality

Validation of data was frequently discussed on the meetings of the Go4-members and the contractor. Usually, Eurostat publishes exclusively validated data. Nevertheless, is has to be queried if this approach is feasible for the data provided by the DC on products.

Table 11 and Table 12 point out that the data which are relevant for the DC on products come from various sources such as Go4-members, scientific institutions, the European Eco-labelling board, the European Chemicals Agency, industry and divers LCA-databases. A data validation covering the whole spectrum is not feasible.

Concerning the LCA data it is to consider that the number of available data sets is quite high (e.g. GEMIS[81] includes more than 7.000 data sets, EcoInvent[82] more than 2.700). A validation process has to concentrate on a selection of key data sets and must be repeated regularly because many technologies change rapidly. For each dataset groups of experts in the particular fields would be needed. Further, these experts should be widely accepted in the scientific community if the results of their validation shall be accepted. Additionally, problems concerning the proprietary character of industrial data have to be solved. Therefore, this task would require significant manpower, the assistance of external experts and the cooperation of all relevant stakeholders (industry, energy supplier, provider of free and commercial LCA data bases).

A further point of discussion is the data quality. The efforts to assess the data quality are also very comprehensive, and it does not seem to be a feasible task for the majority of data. For the LCA platform, IES demands high quality requirements according to its standard in data processing [IES 2006].

4.6.1.4 LCA and EEIO approaches

Investigations on product groups on macro level and their environmental impact can be done by using both the bottom-up approach via product-based LCA and the top-down approach via EEIO-analysis (Environmentally extended Input Output analysis). A mix of both approaches seems to be the suitable.

Examples for the LCA-based bottom-up approach are the project “Materials flow of platinum group metals” [Buchert 2005] and the assessment on national environmental impacts of the building activities in Germany [Buchert et al. 1999].

Examples for the top-down approach are several completed studies as well as ongoing projects working with EEIO-analysis on European level (e.g. EIPRO [EIPRO 2006], IMPRO, a study by ETC-RWM [ETC-RWM 2006], NAMEA studies for several countries,[83] DEIA,[84]

[81] GEMIS (Global Emission Model for Integrated Systems) is an LCA software and database for energy, material and transport systems. It is maintained by Öko-Institut.

[82] The EcoInvent data base contains international industrial life cycle inventory data and is run by the Swiss Centre for Life Cycle Inventories.

[83] NAMEA for Belgium, see [Gilis Vandille 2006] and [Gilis et al. 2006]; NAMEA for Austria see [Tauber Baud 2004]; EU-25-study based on NAMEA see [ETC-RWM 2006].

EXIOPOL). The EEIO-analysis calculates material flows and environmental impacts and/or pressures related to product groups on macro level. The aggregation level depends on the methodology used. For example, the study by ETC-RWM (NAMEA-based IO-analysis) distinguished between 60 final demanded product groups (e.g. food products & beverages; textiles; motor vehicles, trailers & semi-trailers) whereas the study EIPRO worked with 283 product groups (e.g. roasted coffee, fluid milk, driving with motor vehicles). A conjunction with LCA-methodology is possible and is included in all of the above mentioned studies.[85]

The project EIPRO identified passenger cars, meat products and housings as key products in the EU25 having the highest life cycle environmental impacts. The study by ETC-RWM identified among others the following products causing the highest environmental pressures along the production cycle home and abroad: food products, beverages and tobacco; construction work; electrical energy, gas, steam and hot water; transport, storage and communication services; products of agriculture, hunting and forestry. The step-wise implementation of the DC on products will consider these results. It is intended to concentrate first on the products with a high impact and gradually widen the focus.

EEIO-tables can not only be used to analyse the status-quo, but can further be used for the analysis (case studies) of scenarios, e.g. radical change in diet, shift in energy production, and effects of future tariffs on agricultural products, water policy and use of natural resources. Thus, they can be useful to assess the impacts of possible IPP-measures. However, this issue is strongly related to the preparation of scientific case studies and policy assessment and will be mostly beyond the mandate of Eurostat.

EEA/ETC-RWM and IPTS belong to the main contributors in this area. IPTS is also involved in the ongoing project EXIOPOL. The aim of EXIOPOL is to set a detailed multi-regional economy-environment model for all EU-25 countries. 37 partners are involved in the project. Within the project EXIOPOL an establishment of time series is not a project goal. However, the EEIO-tables might be easily updateable. It is to discuss if the DC on products or the DC on resources could support such a work if regular updates will be established and financed.

IPTS pointed out that generally a better quality of data for techno-economic analyses is needed. The data collection and data management for techno-economic analyses including environmental issues might be one of the tasks of the DC.

4.6.1.5 Indicators for Decoupling and Sustainable Development

Measuring progress towards sustainable development and the decoupling of environmental pressure from economic growth is an integral part of the EU wide sustainable development strategy (SDS). With this in mind, the European commission adopted a set of sustainable development indicators (SDIs) in February 2005 [Hanauer 2007]. Presently, indicators to monitor the effectiveness of IPP are not available and basic data still are missing [Hanauer 2007]. This is underlined by a study contract recently launched by DG Environment / JRS IES on the development of decoupling indicators.

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84 Ongoing project launched by IPTS: “Environmentally Extended Input-Output Analysis: Database of Environmental Interventions for the EU25”.

85 Hereby, the material flows calculated by the EEIO-analysis serve as Life Cycle inventory for the LCA.

In 2005 the study "Development of Indicators for an Integrated Product Policy by IPU, CASA and IÖW" on behalf of the European Commission proposed 69 indicators for 25 product groups. However, these indicators are very specific to a certain product (e.g. product "window" – indicator: insulation factor) and can only be applied to specific products.

A study by ETC-RWM on Environmental Input-Output Analyses proposes 6 indicators which might be applied to aggregated product groups on macro level (Environmental pressure in relation to different reference parameters, e.g. per unit of output; per gross value added; per final demand of domestically produced products). These indicators appear to operate on a high aggregation level [ETC-RWM 2006].

Wolf and Bersani from the JRC IES [Wolf Bersani 2007] point out that *"society's needs and related products are the natural anchor-point for sustainable development. Sustainable needs fulfilment is also the pre-requisite to be able to tackle other society challenges. Production & consumption related indicators should hence be expressed in direct link to needs and products over their full life cycle, as far as feasible."*

The two approaches to derive product-related sustainability indicators are the bottom-up approach via process-based LCA on a product or a basket of products (product group) or the top-down approach via EEIO-analysis (e.g. NAMEA-based) as discussed in chapter 4.5.3.1. An overall comparison of these two approaches concerning the calculation of indicators is presented in [Wolf Bersani 2007]. Their preliminary conclusion is that NAMEA appears to be an unsuitable basis for decoupling indicators due to several severe and method-inherent problems. The process-based LCA appears to be a well suitable basis for decoupling indicators. A detailed evaluation of this matter is subject of an ongoing study launched by the Commission / JRC-IES.

4.6.2 Specific product data needs

Main user of the DC on products will be DG ENV as well as the other Go4 institutions. Furthermore other DGs should be considered as potential clients of the DC insofar as they are involved in product related analyses and measures.

According to the EU key documents for product policy (i.e. Commission's communication to the Council and the European Parliament on Integrated Product Policy [European Commission 2003] and the forthcoming Action Plan on Sustainable Consumption and Production) the main requirements are:

- Building up a data base with quantitative data and qualitative information for the main products and /or classes of products allowing calculation of estimates of their main known pressures on environment;
- Identification of those classes of products, product groups / product type groups which are (most) relevant in contributing to resource consumption and potential environment and human health impacts;
- Identification of those classes of products, product groups / product type groups where the improvement potential (relating to the above mentioned impacts) is greatest;

- Contribution to the monitoring of environmental policies in terms of their positive or negative pressures and to the design of new policies.

From a current point of view DG TREN with its activities concerning the preparatory studies in the frame of the Eco-design Directive for Energy using Products might be the most relevant EU body beyond the Go4 institutions acting as a client.

In a mid- to long-term perspective other actors like research institutes, administrations and the general public may become further clients of a DC on products. According to the Background document to the consultation on the action plan on SCP and SCI [SCP 2007] there are several actions which imply the need for life-cycle based product data:

- Generally dynamic incentives for producers will be set to improve the environmental performance of all types of products.
- The product-based approach mentioned above will create a framework for better knowledge and information on products in order to identify policy priorities and suitable actions.
- Indicators should be developed for setting benchmarks and establishing requirements for products.
- Consumers should easily be able to identify the products with the best environmental performance. Through enhancement of product labelling a shift of demand towards the most suitable products could be facilitated. Therefore it will be necessary to categorise the environmental performance and to establish labelling requirements for each product group.
- Through more standardised European Product Declarations multiple benefits could be generated: in addition to direct consumer effects, manufacturers are expected to be able to sell their products more easily to other producers on the EU market and the purchasers would not have to track back the environmental performance of a product on a case by base basis.
- In order to support a leaner production and to promote more efficient and environmentally sound production and cleaner and greener technologies, policy action should aim at improving the information about the environmental impacts of the components and materials used in production (and providing more incentives to promote more efficient production).
- The revision of the EU Eco-Label Regulation will extend the scheme to cover all important product groups. Beside others a key element of the revision will be a mechanism for selecting priority product groups.
- Within the activities to strengthen Green Public Procurement (GPP) in the EU the future policy could explore whether it would be more effective to focus on the most impacting products to lead markets (or whether it would be better to raise the proportion of green products overall in public purchases).

Summarising the aspects mentioned above it is clear that the scope of the DC on Products will cover data needs for a number of current legislation activities as well as for multiple actors.

Below a set of possible questions from policy makers and other clients are introduced. No pre-decision is made whether the DC shall solely be responsible for data management, or whether it shall have an extended mandate. The compilation of possible questions rather intends to transfer the objectives of IPP into a set of concrete and practical questions. Whether the answering of questions of this kind shall be included in the mandate of the DC or not, has to be decided within the first implementation step.

1. Questions on running EU (IPP-) measures:

- Progress in GPP in member states and EU-bodies (management, share of green products etc.);
- Statistics on implementation of EU-labels and other national labels (e.g. market share of products with different eco-labels);
- Environmental benefit of reduced taxes for green products in the Member States)?
- Environmental benefits of EU energy label for most white goods and lamps (estimated energy saving);
- Statistics on food with organic farming label (e.g. market share, estimation of environmental benefits)?
- Status-Quo of the EuP-Process (e.g. product-specific base-case, Base-case Environmental Impact Assessment, Base-case Life Cycle Costs, EU Total System Impact).

2. Questions on products and product groups

- Product ranking:
  - Which products cause the highest environmental impact/pressure?
  - Which products cause the highest external costs?
  - Information on specific products and product groups which are subject of discussions or in the focus of legislative initiatives:
    - available studies and their main results
    - Best practice examples (e.g. Eco-Top-Ten[86])
    - available products with an eco-label; data on these products
    - identification of need for research
    - Available indicators for the environmental performance of the product or the underlying needs? Development of indicators if necessary.
  - Results of case studies in order to identify environmental, economic and social effects of developments or measurements such as:
    - an increase or decline in the consumption of certain products,
    - economic instruments concerning products (eco-taxes, subsidies etc.),
    - other IPP-measures,
    - variations in the use of raw materials or secondary materials in the production,

[86] The EcoTopTen-initiative by Öko-Institut and ISOE analyses product groups, sets innovation objectives and delivers a ranking of the investigated specific products.

- changes in trade patterns and related shifts of environmental burdens.

- Monitoring sustainability and decoupling:
  - Can decoupling be observed between the production of certain products and the environmental pressure in the EU and in the supplying non-EU-countries?

4.6.3 Short-term steps

The following steps are seen as adequate for the short-term.

Setting up of a task force with key actors from Go4 and other EU-bodies

As an initial step we recommend to continue the identification of key actors among the Go4 partners as well as among other EU bodies (especially DG TREN) in order to build up a kind of task force with all relevant actors. This task force should agree upon data needs (in each direction, from the DC to the institutions as well as from the institutions to the DC), upon methodologies of choice as well as upon the time scale for implementation. This task force could be assisted by a network of experts to provide assistance in this work.

Methodological work

Currently there are at least four methodological approaches used to indicate the impacts to final consumption and products respectively:

- Process-based LCA, ISO-LCA,
- Simplified life-cycle orientated approaches like the so called VHK-Methodology developed and used in the context of the Eco-design Directive on Energy using Products,
- Material flow analysis,
- The sector based approaches, namely the National Accounting Matrix including Environmental Accounts (NAMEA, EEIO).

As each of these approaches has its strengths and weaknesses it will be necessary to clarify which approach (or rather which mix of the single approaches like hybrid models) will be most suitable for the scope of the DC on products. As the development of indicators is a key issue, the favoured methodologies should be able to deliver basic data for the calculation of appropriate sustainability and decoupling indicators. Further, it has to be determined in coherency with the other DC which environmental impacts will be in the focus besides the key challenges such as climate change, energy and resource efficiency. We recommend to gradually broaden the “impact scope” according to the European Life Cycle Data System ELCD, section “Life Cycle impact assessment methods and indicators”.

Selection of priority product groups

The existing projects on the identification of priority product groups with a high environmental impact and a high consumption of resources have to be evaluated (e.g. EIPRO, IMPRO, intermediate results of EXIOPOL, LCA-studies in member states). On this basis, a selection of priority product groups which shall be considered in the short term should be carried out.

Selection of data to be considered in the short and mid/long term

Before starting the implementation of the DC a decision has to be made which kind of data shall be considered in the short term, which kind of data shall be considered in the mid and long term, which data are beyond the scope of the DC and what the role of the DC is (data collection, data processing, data transfer). Hereby, the interfaces to other DCs must be harmonised (in chapter 4.6.1.2 an overview of the wide spectrum of data is given).

Selection of fields of questions from clients/policy which have the highest priority

Before starting the implementation of the DC it is highly recommended to agree on the basic questions which shall be answered by the DC in the different steps and the main needs of DG ENV and further Go4-members and policy makers. When determining the basic questions with the highest priority, it will become clear which data actually have the first priority, and further data needs might be identified. Again, the interfaces to other DCs must be harmonised, and the role of the DC has to be defined clearly (which question have to be treated by the DC, which questions have to be transferred to other actors?)

Investigation of the present data situation

Each of the Go4 institutions are conducting studies using statistical data on production, trade and consumption but each institution claims to regularly face data gaps which must be overcome on project based ad-hoc data collection. The situation is similar in the case of preparatory studies in the framework of the Eco-design Directive of EuP. Therefore the question arises whether these data gaps could be closed systematically in order to save time and effort. These short-term steps should ideally result in the identification of the main sources of data and information among the Go4 institutions and other relevant EU bodies.

Conceptual design of a data base and first implementation steps

The foregoing steps would allow conceptualising a data base. A further result of these short-term steps could be the establishment of a network of independently managed data sources, which are sourced by both EU institutions as well as third party contributions (like the contributions by industry in the European Reference Life Cycle Data System).

Agreement on handling of data validation

An agreement has to be made how to preliminary handle the data quality. Which data should be assessed or validated concerning their quality?

Adaptation to new requirements by the Action Plan on Sustainable Consumption and Production

Special attention should be given to the further development of the Action Plan on Sustainable Consumption and Production after the results and possible changes on the basis of the stakeholder consultation. Further data needs resulting from the possibly revised Action Plan should be agreed with DG ENV.

IT

Simultaneously to the other steps, the IT will be designed and implemented step by step. A continuous dialogue between the IT-designers and the task force is absolutely necessary during the whole process. Further, the IT has to be designed in a manner, that it allows the transfer of non-validated data.

4.6.4 Medium-and long-term steps

In the medium and long-term we recommend the following steps:

Start to act as "information hub"

After preparatory work in the short-term horizon the DC starts gradually to act as information hub for DG ENV and the other Go4-members.

Compilation of data

The DC starts to compile existing data from Go4-members, third parties and NSI and to collect further data according to the identified data gaps.

Continuous adaptation of the concept for data validation

A first agreement on how to validate data or to assess the data quality was made in the short-term steps. This agreement will constantly have to be adapted to the practical experience.

Finishing implementation of the data base and running the data base

In the mid term the data base has to be put in operation and filled with data.

Adaptation of the data base to actual requirements

The structure of the data bas has to be adapted periodically according to the experiences and actual requirements.

Widening of the product focus

The number of considered products will gradually be widened.

Identification of research needs

The DC will identify research needs according to the requirements of its Go4-clients.

Assistance to the compilation of EEIO-analyses

The DC may assist EEIO-analysis and regular updates by data provision. Beforehand it needs to be clarified, which EEIO-tool will be supported and further developed in the long term and which bodies will hold the major competence

Delivery of sustainability and decoupling indicators

When appropriate indicators for product groups are developed, the DC will provide regular updates of these indicators.

Continuation of methodological work

The DC has to be continuously involved in the methodological progress in relevant aspects concerning products, data, indicators and Life Cycle Thinking, particularly of the project CALCAS. New methodological supplements such as decoupling indicators, life cycle costing and social LCA should be taken into the focus too.

Continuous coordination with the work of other actors and the needs of the clients

The DC will have to closely collaborate with other actors in this field continuously, particularly with IES, IPTS, ETC-RWM and the other DCs. Additionally, it will permanently adapt its work to the actual requirements of its clients.

In the long term: Widen the focus to external clients

In the long term a decision has to be made in what extent the DC will offer services to external clients. The possible range is quite large (from offering information via internet to answering specific question from externals).

4.6.5 Interfaces

4.6.5.1 Interface to DC on natural resources and DC on waste

The DCs on natural resources, products and waste cover three different phases of the life cycle. Therefore, they have strong relations among each other. Particularly, the delimitations are not precisely defined and sometimes not clear. Consequently, these three DCs must harmonise their data bases and methodologies in order to guarantee a sufficient data coherency and to avoid double work.

The interface between the DC on products and the DC on natural resources is determined by the definition of ‘products’ and ‘resources’. If natural resources were considered natural resources as long as they are “in nature”, and if a natural resource were considered to become a product when it enters the technosphere, then the DC on products would have the widest scope. If, however, an industrial input such as steel also is still seen as a resource, then the DC on resources will have a wider scope. As long as the definition of products and resources is not fixed, it is not possible to define exactly the interface between these two DCs (see also discussion in section 4.5).

Overlapping issues, which might be addressed by both DCs depending on their mandate, include:

- Data collection for LCA- or EEIO-analyses (material flows, emissions etc.) in the context of single research activities or regular updates.
- Management of Output data / results of LCA- and EEIO-analyses (information hub; identification of needs of research).
- Evaluations for product groups with the focus on industrial inputs (identification of hot spots, management of results of LCAs and MFAs).
- Sustainable Development Indicators operating on a highly aggregated level.

The interface to the DC on waste is closely related to the question when a product becomes waste (is the decisive factor the legal definition of waste? what about secondary products and waste with a positive economic value?). However, in the short and medium term the DC on waste is supposed to focus its work on a well defined set of statistical data with no relevant interface to the DC on products.

4.6.5.2 Interfaces to all DCs

The next table gives an overview of existing interfaces between the DC on products and the other nine DCs. As described above, the strongest interfaces are seen with the DC on natural resources and the DC on waste.

Table 13: Links to other DCs

Data centres	field of interface
DC on natural resources	When does a resource become a product? - Data collection for LCA- and EEIO-analyses activities related to indicators and EEIO - Management of output data of LCA- and EEIO-analyses - Evaluations for industrial inputs - Sustainable Development Indicators
DC on waste	Life cycle data on the disposal of products - Integrated strategies covering all life stages of products - Definition of waste: when does waste ceases to be waste and is considered as product (e.g. blast furnace slag which is used as building material)? - Pilot project for DC on products?
DC on air	Data on air emissions and their link to the causing production or service units Monitoring of IPP strategies to reduce air emissions
DC on forests	- Existing structures as guide for DC on products?
DC on soil	- Existing structures as guide for DC on products?
DC on land use	- Interfaces in LCA-methodology for the impact indicator ‘land use’
DC on climate change	Monitoring of IPP strategies to reduce climate change
DC on water	Data on water emissions and their link to the causing production or service units Monitoring of IPP strategies to reduce water emissions
DC on biodiversity	- Interfaces in LCA-methodology for the impact ‘biodiversity’

4.6.5.3 Interfaces to further EU institutions

The following table gives a brief tentative overview on possible links to further EU institutions.

Table 14: Possible links to various DGs other and EU institutions

EU institution	field of interface
DG ENV	Green public procurement eco-labelling all issues related to IPP DG ENV is major client of DC
Eurostat	statistics on products environmental accounting Eurostat is implementing the DC
EAA / ETC-RWM	recycling, waste, LCA, MFA, EEIO, air emissions EEA is also a client of the DC in future more focus on SCP?
JRC IES	LCA, MFA, development of methodologies IES is also a client of the DC
JRC IPTS	EEIO-analysis ETAP (environmental technologies action plan) IPTS is also a client of the DC
DG Enterprise and Industry	products &policy (industrial policy, competitiveness, innovations, standardisation)
DG for Energy and Transport	eco-design of energy-using products energy labelling of domestic appliances end-use efficiency & energy services energy efficiency in buildings clean transport
DG Health and Consumer Protection	food processing
DG Research	research on transport, industrial technologies and food 7th Research Framework Programme with focus on Life Cycle Thinking (LCT) further research programmes
DG Agriculture and Rural Development	food production; organic farming
EC Energy Star Board	EU Energy star (label for energy efficient office equipment)
European Eco-labelling board	- Eco-labelling of products
European Chemicals Agency	- data on chemicals

4.7 DC Waste

The implementation concept described in this section integrates tasks of ongoing activities in the area of waste statistics and new tasks to be implemented in the context of the waste DC.

An overview is given in the figure below.

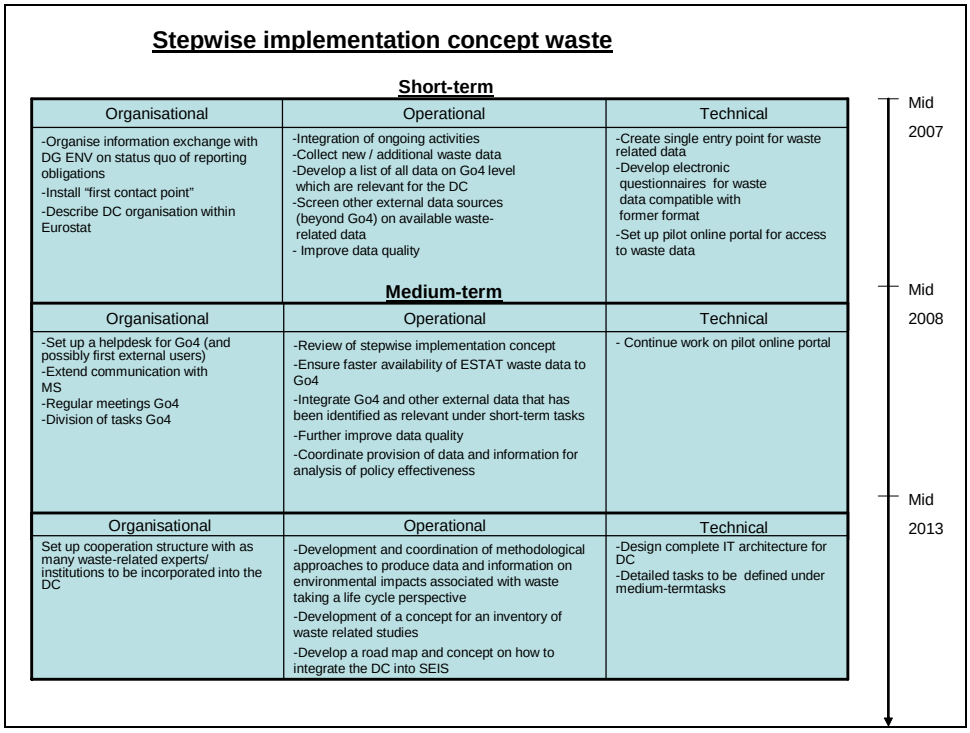

Figure 16: Overview on implementation steps for waste DC

4.7.1 Short- and medium-term steps

The steps described in this section are divided into the three categories "operational" (referring to data and information content-related activities), "organisational" (referring to rather pure managerial tasks) and "technical" (referring to IT infrastructure-related activities).

4.7.1.1 Operational

Integration of ongoing activities

The European waste policy has at its service a series of programs, information systems and tools. Ongoing activities in the area of waste are described in section 3. In a first step ongoing activities at ESTAT will need to be integrated. The corresponding tasks are described as follows:

- Maintain data production system for
  - Waste Statistics Regulation (WStatR) (Biennial)
    - Eurostat is currently implementing the Regulation 2150/2002/EC on waste statistics, implementation measures have been agreed upon, the technical infrastructure for processing the data is in place and the first data delivered mid 2006 are published.
  - Quantitative reporting obligations contained in EU waste legislation (e.g. packaging, ELV and WEEE directives)
    - By mid 2008: processing of data supplied in the MS reports on waste directives
  - Structural Indicators (Annual): structural indicators on municipal waste.

- Other implementation issues
- Reporting to EP and Council (Triennial)
- Manual for WStatR implementation (Triennial)
- Working group/ task force meetings (Annual)

- E.g. continue work in the TF on environmental impacts with JRC + DG ENV; incorporate the results into the DC structure
  - Drafting Commission Regulation for statistics on import-export of waste (Annual)
  - Monitoring of contracts / grants in relation to support of the implementation of the DC (Continuously)
- Dissemination
  - Publication (text + tables, paper and electronic format) - Biennial
  - Data dissemination (New Cronos) - Continuously
  - Response to information requests (Continuously)

Collection of new / additional waste data

Several Go4 institutions have mentioned the need for better quality waste data. Also, the Thematic Strategy on the prevention and recycling of waste already states that waste policies are currently based on poor knowledge and available statistics on waste are considered to be of poor quality, partly because of lack of consistency and comparability regarding statistics from different Member States, regions or cities. Furthermore, the environmental benefits of waste policies are difficult to quantify and to compare due to the complexity of their occurrence.

The implementation of the Regulation 2150/2002/EC on waste statistics is already improving the situation on data availability; however, not only statistical data on waste is needed for policy making. Additionally, overall information on the life-cycle environmental impact of waste generation, management and treatment is needed.[87] In order to be able to quantify the environmental impact of waste, new and additional data will need to be collected in the context of DC implementation. This should include:

By mid 2007: prepare questionnaires for the reporting on the implementation of waste legislation – on behalf of DG ENV – (Triennial)

Activate questionnaires beginning of July

By October – Dec 2007: forward results from electronic questionnaires to DG ENV and EEA

By August 2007: prepare for data collection on waste legislation (Packaging Directive) – annual frequency

Set up waste data production system by mid 2008 for

Import-export of waste (Biennial)

Packaging Directive (Annual)

[87] Currently such data does not exist and where information is available concerning specific waste flows it suffers from lack of consensus on methodology and data.

ELV Directive (Biennial)

WEEE Directive (Biennial)

Waste Shipment Regulation (Annual)

Batteries Directive (Biennial)

Collect additional data in agreement with the corresponding needs formulated by other Go4 institutions.

Up to now, only few data on the politically important categories ELV and WEEE are (publicly) available / accessible. A more comprehensive data basis for ELV can be expected with the implementation of the related Directive in future. However, a much more complex situation in the case of data availability of WEEE makes an acceptable data coverage much more difficult. Furthermore, data on radioactive waste are generally not included in waste databases.

Further improve data quality

It is important to have data and information of acceptable quality covering the life cycle of the waste materials in order to assess both the needs for policy action and the achievements of policies.[88]

The tasks that should be carried out with this regard in the context of DC implementation should be:

Consolidation of existing waste statistics

Identification of gaps in data and information and development of strategies to overcome data gaps (Continuously)

Give EU data an added value through harmonisation

Find solutions for problems of incoherent data (e.g. data from different sources):

Identification of incoherent data and description of the differences. A later task in long-term perspective would be to make the identified data coherent.

Streamlining of reporting

Incoherent data may occur for example if two different DCs report data from related areas. In the case of waste an overlapping with the DC on climate change can be expected. The calculation of greenhouse gases from e.g. landfills is based on the amount of waste being landfilled as a driving force. Comparable data are also part of the waste statistics. As there is a different methodological background for data generation in the different areas these data might be inconsistent.

Further develop metadata tool SDDS[89] (metadata is in general intended for statistical data and other regularly delivered data; SDDS tool should be used for this kind of data):

[88] Go4 members have stated to have massive problems with data (inconsistency) and problems of data comparability. It has been stated by Go4 institutions that “actions to eliminate some of the basic errors should be taken at the MS level (through better coordination of reporting to the various institutions) and at the European level to examine the reported data and make sure the data from the countries are correct.”

e.g. no metadata exists with regard to data collected by DG ENV in the context of reporting obligations.

Data reported by the MS should be validated not only in its own context as such (for instance through assessment of time series), but also taking into consideration other reporting (for instance to DG ENV). At the operational level experts might be needed to scrutinize the data and present it to the users, be it scientists, civil servants or other experts engaged in analysing and reporting on these issues at the European level.

Integration of waste data available at Go4 level

Identification of potential data and information located in Go4 institutions (including availability, cost and time coverage):

Develop a list of all data on Go4 level which are relevant for the DC

Find an agreement with the Go4 members on which of these data should be presented and made available at the DC (this might be a case to case decision)

By Autumn 2007: set up inventory of waste related activities

Waste related data at the other DCs are of special interest. Taking potential overlapping into account following tasks are foreseen:

Analyse and describe the links to other DCs

Identify possible contribution needs to other DCs

Identify areas covered by other DCs that should be integrated into waste DC.

The most common data given in waste databases are “amounts of waste” and as such can be easily assigned to the responsibility of the DC on waste. However, the emissions from waste treatment facilities are of great political importance with regard to the environmental pressures which result of the treatment of waste. On the other hand, waste treatment also has to be considered as an economic activity and additionally waste has to be considered as an input for energy production. Consequently, respective reporting obligations exist and air emissions from waste treatment and energy production are also subject of the two DCs on Air and Climate Change.

Take validation / data quality / confidentiality issues into account

Integration of other available waste data (clarification if external data and information sources beyond Go4 are of use for the DC):

Other Commission services also have relevant data but are not involved in Go4

International organisations (OECD, Basel Secretariat) and industrial associations could be other potential data sources

[89] Special Data Dissemination Standard; exists for environmental data and other statistical data. It gives information on data coverage, periodicity and timeliness as well as information on access by the public, integrity, quality and dissemination formats. Categories of environmental data covered are: Land use, Air pollution/climate change, Waste, Water, Transport and environment, Environmental expenditure and environmental taxes, Agriculture (pesticides, fertilisers, nitrogen balance, organic farming), Regional environment statistics, Biodiversity, Indicators on water.

To what extent can data sources from e.g. industry associations be used? External data (e.g. on ELV from industry associations) might be used for internal quality assurance but are not expected to be presented on the official DC website.[90]

Identify the main key players in this area both at EU level and worldwide, and build up a team and a network of experts to provide assistance in this work

Coordination of data and information managed by other bodies (e.g. other EU institutions, international organisation such as OECD and UN etc.)

Set up inventory of waste related studies

A comprehensive data and information system with a good coverage on waste related issues is in place at the European level. But on the other hand an interested client might face difficulties to work through the huge amount of information and thus to identify which data are available and where it can be found.

Development of a concept for an inventory of waste related studies (in form of a library or search tool for research projects in the field of waste, with an emphasis on quality and compliance with e.g. European guidelines where available)

Decide on a dissemination strategy in close co-operation with the other Go4 partners

An important task of the DC is to allow access to data in the field of waste. While the publication of waste statistics is routine work at Eurostat (compare “Integration of ongoing activities”) additional data will have to be made available at the DC on waste. Therefore an agreement in coordination with the other Go4 members is needed on which data, information and indicators shall be disseminated and on who should have access to these data in short-term (Go4, member states, experts etc.). The dissemination strategy should also include in which way data should be made available. Three possible scenarios for practical options on how data could be presented at the DC are given:

Direct link to the origin of data; no figures are given on the DC online portal itself (e.g. waste statistics at Eurostat)

A fact sheet on meta data (SDDS) is given and a link to the origin of data (e.g. dataset on greenhouse gases from landfills as part of the Greenhouse gas inventory)

Data are directly presented at DC; the DC would be the origin of the data (e.g. future data in the area of the ELV directive).

Improving knowledge of the relationship between environmental impacts and waste generation, management and treatment

Development and coordination of methodological approaches to produce data and information on environmental impacts associated with waste (prevention, generation, management, treatment) taking a life cycle perspective into account

Use of these methodologies to produce robust data and information on environmental impacts associated with waste generation, management and treatment

[90] Similarly, life cycle data from business associations are also a key input in relation to the European Platform on LCA’s objectives.

Take other activities into account, coordinate and identify priority areas for action

Formulation of research needs; possibly supporting the EEA, JRC or others in their methodological development, data generation and modelling of indicators; complementing other existing or planned arrangements/work e.g. in the context of indicators and life cycle data.

Coordinate provision of data and information for analysis of policy effectiveness

Provide data and information for Analysis of Policy effectiveness via appropriate development of monitoring indicators

Examples are environmental impacts from landfills, quantities of recycled material or, from monitoring e.g. the implementation of ELV Directive, the collection efficiency and achievement of recovery targets

Selection and development of indicators in agreement with DG ENV and other Go4 institutions

Include existing and ongoing work in this field from Go4 and others, exchange data and information.

4.7.1.2 Organisational

Install "first contact point" for DG ENV

The concept of the "first contact point" is to be understood as the DC on waste being the institution to which DG ENV and other clients can address their requests. The DC will either be able to answer the question by itself or coordinate with others to find an answer.

Describe organisation and procedures of waste DC within Eurostat

A written description for the organisation and the procedures of the DC on waste is helpful for a better coordination between Eurostat and the DC but also the other Go4 members (see further down).

Information exchange with DG ENV on status of reporting obligations

DG ENV to send out reminder for the reporting on the implementation of waste legislation

Coordination with DG ENV and Go4 (Continuously)

In order to continuously improve the DC on waste through regular exchange with Go4 needs and requirements an appropriate organisation is needed.

In particular the exchange with DG ENV on its specific requirements for developing future environmental policy making has to be organised.

Regular working level meetings of DC staff to exchange on current data activities need to be installed and a data network in EU and MS (building on existing ESS / EIONET structures) has to be established.

Coordination with DG ENV, EEA, JRC, including providing support for DG ENV in all waste related reporting obligations, participate in DG ENV working groups

Establish working links with European Platform on LCA to ensure data are of high quality and appropriate for supporting life cycle based indicators

Set up cooperation structure with as many waste-related experts / institutions whose data are to be incorporated into the DC

Describe the division of tasks between the Go4 members and introduce a meeting/communication schedule for the relevant experts within the Go4 members:

Identify contact persons in each Go4 institution

Set up a procedure including monitoring mechanism for handling information requests in cooperation with Go4 partners

Prepare inventories of activities relevant to the DC on waste together with Go4 partners and updating routines

By Autumn 2007: establish pilot joint work programme with JRC

Mid 2008: A coordinated work programme of Go4 partner institutions has been developed and regular meetings with Go4 partners take place (planning and evaluation process agreed).

End 2009: Progress review, user satisfaction survey, evaluation of achievements and if necessary adaptation of scope, to be updated every second year

Ensure that all reporting data is directed to ESTAT

The necessary organisational structure is already set up or the process is ongoing and has to be finalised.

4.7.1.3 Technical

Create single entry point for waste data reported to ESTAT

Set up and maintain mailbox function

Develop electronic questionnaire

Electronic questionnaires for the reporting on the implementation of waste legislation are presently prepared to be launched in July 200791 (Triennial)

Design complete IT architecture for DC and set up online pilot portal waste

Providing DG ENV and other Go4 members with waste data and information

Give a general overview on waste related data, information systems and tools on EU/Go4 level (graphical layout including links and short descriptions)

Check and agree on which other subjects should be linked with the DC website (e. g. waste legislation, waste related publications from Go4)

Development of a library or search tool for research projects in the field of waste (compare operational tasks “Set up inventory of waste related studies”)

[91] Electronic questionnaires for waste directives had been developed in the past by the EEA using EIONET. ESTAT is now proposing to use another tool (IPM) – I don't mind, provided numerical data can still be compared to those from previous periods.

Clarification of technical issues (e.g. languages to be covered, user profiles)

Create interoperability of data sets and integrate knowledge on waste data (Waste Base (EEA), LCA data (JRC))

By mid 2008: Online portal giving access to short-term scope data in place

Mid 2009: Web portal fully completed

End 2009: Common architecture with JRC and EEA in place (e.g. via common portal for all DCs)

4.7.2 Long-term steps

Review of stepwise implementation concept

After the short-term phase an analysis of the status-quo of the DC implementation is needed. It has to be evaluated which tasks and objectives are so far fulfilled and where weaknesses or failures have occurred.

Reformulate short-term tasks which might have been subject of change or could not have been completed

Specify long-term tasks in more detail (review of stepwise implementation concept)

Extend the number of stakeholders and clients and related communication structures

Once the DC on waste is generally established and operating, more effort can be spend to make the functioning of the DC more efficient and "user-friendly" (helpdesk).

In a long-term perspective the focus of the DC should no longer be limited to the Go4 as the main stakeholders. Member States are regarded to be prominent actors and in a next step also other external users have to be taken into consideration. A wider scope of the DC with more clients and stakeholder makes an improvement of the communication structure necessary.

Set up a helpdesk for stakeholders and clients (Go4 and possibly first external users)

Extend contact and communication with Member States; set up cooperation structures with EEA's EIONET

Continue work on pilot online portal

With respect to an extended access to the online portal which goes in hand with additional stakeholders (e.g. member states) a possible update or restructuring of the online portal will have to be examined. Further more the dissemination structure has to be adapted to a greater amount of data, information and indicators which are expected to accumulate over the time.

Update of the structure and design of the online portal

Extend the data and information exchange and dissemination with Go4 and others

Gradual evolvement towards a vision of a more coordinated and decentralised shared environmental information system (SEIS) over time

In the long run the tasks of a data centre on waste should fit into the structure of SEIS. In order to do so the online portal needs to be made accessible to everybody (with possible restrictions for some data subject to confidentiality or pending validation). The aim is to reach a distributed data system enabling centralised access to this data located at different institutions across the EU.

Develop a road map and concept on how to integrate the DC into SEIS.

4.8 Resources needed

Eurostat will need to implement its three DCs within the next years. In order to provide the totality of requested services, Eurostat needs to build up additional staff capacities and will need to contract out some work.

In order to specify the budget required over the next three years to start off the implementation process, ex-ante evaluation documents for each of the three DCs as well as for the corresponding IT infrastructure have been elaborated in the context of this pre-study. These documents include an estimation of the resources needed which are summarised in this section.

In total 1.2 mio. € are requested for the three DCs over a period of three years, plus additionally 200.000 € designated to the IT infrastructure. This budget is to be seen in addition to Eurostat's staff requirements in relation to DC implementation. It is required for contracting out supporting contracts for the implementation process itself and possibly for tendering first accompanying studies in the three thematic areas.

Since the upcoming work load for the DCs is not yet defined in detail, Eurostat will start the implementation along the proposed implementation concept elaborated in the context of this pre-study.

The exact definition of tasks, the connected amount of requests and the consequent budget needs will need to be elaborated step by step while implementation is progressing.

The budget and additional staff is required as follows:

Table 15: Overview on requested budget and additional staff

DC	Budget requested	Additional staff required
Waste	300.000 €	1 person/year (permanent person responsible for DC waste (coordination activities, in particular coordination with DG ENV on reporting related to waste directives (14 questionnaires), contact person for requests) 1 person/year (responsible for setting up and running a statistical production line for 5 waste directives)
Resources	600.000 €	1 person/year (permanent person responsible for DC natural resources (coordination activities, keep overview, contact person for requests)) 2 person/year (persons who are responsible for data collection, validation, dissemination, development of indicators)
Products	300.000 €	1 person/year (persons who are responsible for data collection, validation, dissemination, development of indicators) 1 person/year (agent to assist the coordinator and manage data collection, validation and analysis, and development of indicators. They should be prepared to discuss at technical level with contractors and actively participate in the organisation of the work. This requires solid knowledge and previous experience in at least LCA, as well as preferably product statistics. Additional knowledge in environmental accounts is welcome, but not essential as existing at Eurostat)
IT	200.000 €	0,1 person/year (Follow-up of contract) 0,4 person/year (Follow-up of technical work)

5 Outlook

In the course of this project, it became more and more evident that the full establishment of the three Environmental Data Centres on Natural Resources, Products and Waste at Eurostat will be a complex and ambitious duty which cannot be accomplished within one single step.

Time and again we encountered a situation where the representatives of the various involved institutions formulated distinctly diverging views about the exact scope and mandate of these Environmental Data Centres, and about the future roles and interactions between Eurostat as the hosting institution and other Go4 Members. Such different views are quite natural, given the fact that each of the contributing institutions has its specific mandate and role, and thus in the first place maybe tempted to envisage a new Environmental Data Centre in such a way that it may best fit with the respective institution's needs. However, the development of the Environmental Data Centres is a joint undertaking of the Go4 Members, suitable ways will have to be found in order to overcome structural discrepancies between the institutions, so that the Data Centres will equally serve the needs of each participating institution.

As the Data Centres will evolve over time along the lines depicted in the stepwise implementation concept (Section 4 of this report), it is to be expected that the following issues will come up again:

Scope of DC

Different views were brought forward concerning the question whether the Data Centres hosted by Estat should focus on data and statistics, or whether they should expand their activities into interpretation of data, value judgements, policy recommendations. Also, one could get the impression that people still have a different understanding of some general expressions like for example “data”, “information” or “policy assessment”.

The missing clarity lies in the differentiation between data and information on the one side and analysis and assessment on the other side. In the case of the DC on waste, no major problems are expected. However, this is different for the DC on natural resources: its mandate could be interpreted in such a way that political advice shall also be included – this however would not be in line with Eurostat’s institutional mandate. The Öko-Institut suggests that in order to bring this ongoing discussion to an end a written statement by Go4 on the mandate in relation to all ten DCs would be helpful.

Client hierarchy and client interactions

Formal agreements will be needed with both data providers and data users: which data are to be provided proactively, which data shall be made available upon request, and who is entitled to formulate a request? These questions should first be solved among Go4 Members, before in a second step the range of clients is expanded to further institutions or other stakeholders.

Since the majority data will originally come from Member States, this means that the DCs have to work closely with MS institutions. It is said that at present, the main problems concerning data quality lie outside EU institutions, but rather have their origin in different understanding at Member State or even regional level. Only by intense interaction between Data Centers and Member States will it be possible to develop solutions for problems of incoherent data.

Especially for resources and products, at present it cannot be foreseen whether provision of data on a voluntary basis will result in sufficiently comprehensive and detailed knowledge to serve the policy needs. In that case, one may have to consider new reporting obligations, being well aware that currently there is a strong preference to reduce the reporting burden on Member States.

Since it is intended to make data accessible not only to Go4 Member Institutions, but in the mid-term also to the wider public, this will have implications with respect to access rights to data, and licenses to use them, and dissemination rights. This issue is expected to become particularly relevant for the Data Centre on Products, where the majority of data are held not by public authorities but rather by private enterprises.

Definitions

While the “term” waste is legally defined which gives sufficient clarity for the DC on Waste to be started, some clear working definitions of the two terms “natural resources” and “products”, clarifying both the *scope* and the *delimitation* between the two areas are urgently

needed, because otherwise these two Data Centres cannot be set up. A sufficient number of proposals for such working definition are lying on the table, including the proposal to merge the two DCs into one.

Concerning the *scope* a written specification of DG ENV's needs would be helpful. With respect to *delimitation* between the two fields a decision is required, which will presumably be taken by the Go4. If such a decision should still appear to be too difficult to take, one or several case studies in specific application fields may help to better highlight the advantages and disadvantages of the various options.

If it is preferred to maintain two separate Data Centres on resources and products, it is to be expected that the working definitions referred to above will evolve over time, whenever there is a need for a clear-cut delimitation of terms in a specific production chain. Even then, a merger of the two DCs may appear reasonable at a later time.

Budget and Staff Resources

An anticipated budget of 1.2 million Euros per year will by far not be sufficient to fulfil all the conceivable tasks of Eurostat's Data Centres. Either, the expectations on the Data Centres will have to be adjusted to the available budget, or this budget and the human resources of one to three persons foreseen for the starting phase will have to be gradually expanded in line with the Data Centres' duties.

Final Remark

One very positive aspect is the fact that the existing collaboration structures among Go4 Members as well as between Go4 and Member States form an ideal starting basis for the huge task of establishing the Data Centres. Presumably, these interactions will need to be intensified if the establishment of Data Centres is to be successful. This specifically implies more frequent contacts between Go4 Member Institutions on a more technical level, in order to ensure the technical coordination and planning of work of the Data Centres. In the (unavoidable!) cases of diverging views between institutions due to their different mandates, a clearer decision structure will help to avoid stagnation.

Glossary (to be completed and streamlined)

EPLCA

European Platform on LCA

ELCD

European Life Cycle Data Reference System

TA

Technical Arrangement

AA

Administrative Arrangement

DC

Data Centre

TS

Thematic Strategy

MFA

Material Flow Analysis

Material Flow Accounting

IES

Institute for Environment and Sustainability

IPTS

Institute for Prospective and Technological Studies

DG ENV

Directorate-General Environment

JRC

Joint Research Centre

ESTAT / Eurostat

Statistical Office of the European Communities (DG ESTAT)

EEA

European Environment Agency

ETC-RWM

European Topic Centre – Resources and Waste Management

Go4

Group of Four (i.e. DG ENV, DG ESTAT, DG JRC, EEA)

EXIOPOL

DEIA

IPP

Integrated Product Policy

SCP

Sustainable Consumption and Production

(EE)IO

(Extended Environmental) Input-Output Analysis

LCA

Life cycle analysis

LCT

Life cycle thinking

EP

European Parliament

Commission

European Commission of the European Communities

ToR

Terms of Reference

WStatR

Waste Statistics Regulation

Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental agreement on hazardous and other wastes. The Convention has 169 Parties and aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes. The Basel Convention came into force in 1992.

CDR

The Central Data Repository is part of the Reportnet architechture. The Central Data Repository is like a bookshelf, with data reports on the environment as submitted to international clients. Each country either has a collection for its deliveries or a referral to a different preferred repository. The data reports within each country collection are arranged under the relevant reporting obligations or agreements

CIRCA

COMMUNICATION & INFORMATION RESOURCE CENTRE ADMINISTRATOR (CIRCA). CIRCA is the widely used group collaboration software, which gives access to various groups being part of Eionet.

CLC

The objective of the pan-European project CORINE Land Cover (CLC) is the provision of a unique and comparable data set of land cover for Europe. It is part of the European Union programme CORINE (Coordination of Information on the Environment). The mapping of the

land cover and land use was performed on the basis of satellite remote sensing images on a scale of 1:100,000. The first CLC data base CLC1990, which was finalised in the 1990s, consistently provided land use information comprising 44 classes. With CLC2000 a reliable, objective and comparable data base for the description of the current situation and the analysis of changes during the decade between 1990 and 2000 is now available.

Corinair

Corinair is a programme to establish an inventory of emissions of air pollutants in Europe. It was initiated by the European Environment Agency Task Force and was part of the Corine (Coordination of information on the environment) work programme set up by the European Council of Ministers in 1985. In 1995 the Agency's European Topic Centre on Air Emissions (ETC/AEM) was contracted to continue the Corinair programme.

CSI

Core Set of Indicators (CSI). The EEA management board approved the core set of indicators in March 2004. The set has been established for three main purposes: to provide a manageable and stable basis for indicator-based reporting by the EEA; to prioritise improvements in the quality and geographical coverage of data flows, especially Eionet priority data flows; and, to streamline EEA/Eionet's contributions to other European and global indicator initiatives, for example, EU structural indicators, EU sustainable development indicators and OECD environment indicators.

Eionet

Eionet - European Environment Information and Observation Network - is established by the EEA founding regulation as a of national organisations and experts network dealing with environmental informational services. Eionet is a partnership network of the EEA and its member and participating countries. It consists of the EEA itself, a number of European Topic Centres (ETC) and a network of around 900 experts from 37 countries in over 300 national environment agencies and other bodies dealing with environmental information. These are the national focal points (NFPs) and the national reference centres (NRCs). The Eionet partnership is crucial to the EEA in supporting the collection and organisation of data and the development and dissemination of information. Information technology infrastructure (sometimes referred to as e-Eionet) supports organisations and individuals in the network. The Eionet consists of three main elements: the Topic Centres, the National Reference Centres and the National Focal Points. DG Environment, Eurostat and Joint Research Centre are also parts of Eionet.

EPEA

The Environmental Protection Expenditure Account (EPEA) was one of the first areas of the System of Environmental Economic Accounting to be developed. In 1994, Eurostat published the European System for the Collection of Economic Information on the Environment, known

as the SERIEE, following the recommendations of Chapter XXI of the 1993 System of National Accounts. The primary purpose of the 1994 SETIEE manual was to set up the conceptual framework for a monetary description of the environmental-protection activities. This included drawing up the EPEA, which is based on, and closely linked to, the national accounts. The SERIEE manual also included the first version of the Classification of the Environmental Protection Activities and Expenditures (CEPA).

EPER

In 2000, the European Commission adopted a Decision on the implementation of an European pollutant emission register (EPER) according to Article 15 of Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC). The general purpose of the IPPC Directive is to reduce pollution by industry and to control emissions from larger facilities. National governments of all EC Member States are required to maintain inventories of emission data from specified industrial sources and to report emissions from individual facilities to the European Commission. The reported data will be made accessible in a public register (EPER), which is intended to provide environmental information on major industrial activities. EPER covers the emissions of 50 pollutants to be included if the threshold values indicated in Annex A1 of the EPER Decision are exceeded.

EPIS

The Environmental Pressure Information System (EPIS) started as a part of the Commission´s initiatives related to the Commission´s Communication to the Parliament on Environmental Indicators and Green National Accounting (COM(94) 670) in 1994. The earlier experiences in the German Statistische Bundesamt provided a promising start to the European project. The objective of EPIS is to provide a tool for the compilation and modelling of timely data on environmental pressures arising from different economics activities. EPIS shall provide an essential dataset for the follow-up of the 5th Environmental Action Plan and environmental performance evaluations of economic sectors. Accordingly, EPIS shall contribute to the production of branch-wise pressure statistics, Environmental Pressure Indices, Indicators of Sustainable Developments and Eco-Efficiency, NAMEA Environmental Accounting and Material Flow Statistics.

ETC

European Topic Centres (ETCs) are centres of thematic expertise contracted by the European Environment Agency (EEA) to carry out specific tasks identified in the EEA strategy (five-year work programme) and the annual management plans. They are designated by the EEA management board following a Europe-wide competitive selection process and work as an extension of the EEA in specific topic areas. Each ETC consist of a lead organisation and specialist partner organisations from the environmental research and information community, which combine their resources in their particular area of expertise. The ETCs, working together with member and participating countries, facilitate the provision of data and information from the countries and deliver reports and other services to the EEA

and Eionet. There are currently five ETCs and The European Topic Centre on Resource and Waste Management (ETC/RWM) is one of the five (ETC water, ETC Land Use and Spatial Information (LUSI, former "terrestrial environment"), ETC air and climate change, ETC biological diversity (former Nature Protection and Biodiversity and former Nature Conservation)).

European PRTR

The European Pollutant Release and Transfer Register (European PRTR) has been adopted on 18 January 2006 and laid down in Regulation (EC) No 166/2006. The PRTR's first edition is expected to be published in the autumn of 2009 and will include data for the first reporting year 2007. The European PRTR implements the UNECE PRTR Protocol, which was signed in May 2003 in Kiev; it further replaces the existing European Pollutant Emission Register (EPER).

GMES

Global Monitoring for Environment and Security (GMES) is a European initiative for the implementation of information services dealing with environment and security. GMES will be based on observation data received from Earth Observation satellites and ground based information. These data will be coordinated, analysed and prepared for end-users. Through GMES the state of our environment and its short, medium and long-term evolution will be monitored to support policy decisions or investments. GMES is a set of services for European citizens helping to improve their quality of life regarding environment and security. GMES will be built up gradually: it starts with a pilot phase which targets the availability of a first set of operational GMES services by 2008 followed by the development of an extended range of services which meet user requirements.

INSPIRE

Infrastructure for Spatial Information in Europe (INSPIRE). The initiative intends to trigger the creation of a European spatial information infrastructure that delivers to the users integrated spatial information services. These services should allow the users to identify and access spatial or geographical information from a wide range of sources, from the local level to the global level, in an inter-operable way for a variety of uses. The target users of INSPIRE include policy-makers, planners and managers at European, national and local level and the citizens and their organisations. Possible services are the visualisation of information layers, overlay of information from different sources, spatial and temporal analysis, etc.

IPPC

Integrated pollution prevention and control (IPPC). The general purpose of the IPPC Directive is to reduce pollution by industry and to control emissions from larger facilities.

Joint Questionnaire

The OECD (Organization for Economic Cooperation and Development)/Eurostat Joint Questionnaire is a statistical questionnaire with the general feature that it relies directly on observation data, and observable flow, such as current payments. Its aim is to collect data on expenditure for environmental protection, defined as “all purposeful activities that directly aim at the prevention, reduction and elimination of pollution or any other degradation oft the environment resulting from the production process or from the use of goods and services”.

LEAC

Land and Ecosystem Accounting (LEAC) allows the spatial analysis of Land Cover Change through all the European territory. The core data of the LEAC project have been structured in a Relational Database Model in order to allow quick and easy analyses. These databases as for example CLC have been made publicly accessible through the Internet.

NAMEA

NAMEA (national accounting matrix including environmental accounts) is an environmental accounting framework developed by Statistics Netherlands at the end of the 1980s. It consists of a conventional national accounting matrix extended with environmental accounts in physical units.

NACE

NACE (in French: Nomenclature générale des activités économiques): Statistical Classification of Economic Activities in the European Community, Rev. 2 (2007)

NEC

National Emission Ceilings (NEC) Inventory: Data on emissions of air pollutants (NH3, NMVOC, NOX, SO2) reported annually by Member States to the European Commission with copies to EEA under Directive 2001/81/EC of the European Parliament and of the Council on National Emission Ceilings for certain pollutants. This Directive also sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution.

NFP

National Focal Points (NFP): Environmental organisations and experts appointed by the EEA Member Countries at the national level as primary links/contacts between the EEA and the national Eionet partners in order to support the implementation of the EEA work programme and coordinate the environmental information exchange. NFP is one of the three main components of Eionet.

NRC

National Reference Centres (NRC): national organisations and experts nominated by the EEA Member Countries to work with EEA and while relevant with the European Topic Centres in specific environmental topics/thematic areas related to the EEA work programme.

RAMON

RAMON is Eurostats´s metadata server. It offers links to databases of definitions, glossaries, and classifications on national, European and international level. The website includes search tools for the databases.

Reportnet

Reportnet is Eionet's data reporting system. It is Eionet's infrastructure for supporting and improving data and information flows. Reportnet is based on a set of inter-related tools which all build on the active use of the World Wide Web. The system integrates different web services and allows for distributed responsibilities. Reportnet has initially been mainly used for reporting environmental data to EEA, but is now also hosting some of DG Environment's reporting tasks. The open and transparent system allows for making deliveries to other national and international organisations.

ROD

ROD is the EEA's **R**eporting **O**bligations **D**atabase. It contains records describing environmental reporting obligations that countries have towards international organisations. ROD is part of Reportnet. Reportnet is group of web applications and processes developed by the EEA to support international environmental reporting. Reporting obligations are requirements to provide information agreed between countries and international bodies such as the EEA or international conventions. Reporting obligations provide the basis for most environmental information flows. ROD includes all environmental reporting obligations that EEA member countries have towards DG environment, European marine conventions, Eurostat, OECD, UN, UNECE, as well as the EEA itself.

SEIS

SEIS (Shared environmental information system) is a vision for building an integrated and shared European infrastructure for efficient management, use, dissemination and reporting o better environmental data and information with access and sharing between national public authorities and the EU institutions in the first instance, the public and the private sector to be progressively integrated and provision of efficient information services to support public decision makers at all levels and in every day work and inform the citizens.

TERRIS

TERRIS (Terrestrial Environment Information System) is the Geographical Information System (GIS) that supports the spatial data related activities held by the European Topic Centre on Terrestrial Environment. The ETCTE Spatial Analysis Group's main tasks are the following: Environmental spatial data creation and correction, Spatial data management: data collection, harmonisation, and distribution, Map production for specific projects, Spatial analysis for specific projects, Development of environmental indicators used in policy-making process.

Wastebase

WasteBase is an electronic database with information on waste and waste management in Europe. This includes waste quantities, policies, plans, strategies, and instruments. WasteBase is prepared by the European Topic Centre on Resource and Waste Management, and the data and information represent the outcome of the work of EEA / ETC/RWM on providing information for decision makers and the general public for the development and implementation of sound environmental policies in the field of waste and material flows. WasteBase is divided into the following databases: Waste Quantities By Countries (11,116), Waste Management Plans (93), Competent Waste Authorities (44), International Databases, Success Stories on Waste Prevention (96), National Databases

(The quantitative data presented in WasteBase are used for our topic centres production of reports, indicators, fact sheets, etc. Most of the data is collected by EUROSTAT, which is the statistical unit of the EU. Biennially, EUROSTAT in co-operation with OECD sends out a joint questionnaire to all EU Member States and Candidate Countries in which they ask for information on waste generation and waste management. When data is needed in a field not covered by EUROSTAT other sources are used, such as the DG Environment, the Basel Secretariat, trade organisations, etc. In few cases the topic centre carries out own surveys for specific waste streams with insufficient statistics. It is the intention that the datasets in WasteBase always present the latest official statistics.)

WISE

WISE (Water Information System for Europe) — a new interactive Internet tool that informs Europe’s citizens about water quality and EU water policy — was jointly released by the European Commission and the European Environment Agency (EEA) today (22 March 2007) at the European Water Conference 2007 in Brussels. This new tool offers citizens the opportunity to monitor water quality in their neighborhood. By entering their region and river basin district, the user can check drinking water quality, bathing water quality and wastewater treatment. Experts can also find further data and in-depth analysis of all European river basins. The themes and data section of WISE also provides insight into Europe's rivers, lakes, reservoirs and groundwater as well as up-to-date scientific information on water pollution and water monitoring. Other features include monthly articles on European water issues, such as nitrate pollution in Europe's rivers. The system offers the public access to water data and information reported by Member States to the EEA and the European

Commission under the Water Framework Directive. WISE is the result of a joint project by the European Commission — DG Environment, Eurostat, the Joint Research Centre and the European Environment Agency.

6 References (to be completed and streamlined)

TA 2005
Technical Arrangement between DG ENV, ESTAT, JRC and EEA (Go4) on Environmental Data Centres of 14 November 2005

EEA

European Environment Agency 2006
Annual Account for the European Environment Agency

European Environment Agency 2006
Annual report 2005

European Environment Agency 2007
European Environment Agency 2007 Annual Management Plan

European Environment Agency
Policy effectiveness evaluation - The effectiveness of urban wastewater treatment and packaging waste management systems

European Environment Agency 2005 - 2006
Eionet priority data flows

European Environment Agency
Eionet connects

European Environment Agency 1999
EEA Multiannual Work Programme 1999-2003

European Environment Agency
The Reporting Obligations Database - What it is and how it can be used

European Environment Agency 2004
EEA strategy 2004–2008

ESTAT

G. Schäfer in cooperation with Heads of Unit Dir B 2007
CVD Masterplan - Cycle de Vie des Données

Office for Official Publications of the European Communities 2006
Energy, transport and environment indicators

Office for Official Publications of the European Communities 2006
Ecological Footprint and Biocapacity - The world's ability to regenerate resources and absorb waste in a limited time period

Office for Official Publications of the European Communities 2003
EU Member State experiences with sustainable development indicator

ETC-RWM

European Topic Centre on Resource and Waste Management 2006
ETC/RWM Implementation Plan 2007

INSPIRE

INSPIRE Infrastructure for Spatial Information in Europe 2007
DT Metadata – Draft Implementing Rules for Metadata

Institute for Environment and Sustainability 2006
INSPIRE Metadata Survey Results

JRS-IES

DG JRC IES 2007
Life Cycle Thinking and Sustainability Indicators

JRC-IPTS

Federal Planning Bureau Economic analyses and forecasts 2005
Environmental TAX ACCOUNTS for Belgium (1997-2002)

Federal Planning Bureau Economic analyses and forecasts 2005
Environmental Protection Expenditure Accounts for Belgium: 1997- 2002

EPLCA

European Platform on Life Cycle Assessment 2007
Documentation and draft quality requirements of the European Platform on Life Cycle Assessment for LCI data sets of the ELCD core database, v. 1.0.1

IES 2007
Tender Specifications: Enhancement of the ELCD core database

IES 2007
Tender Specifications: Definition of recommended Life Cycle Impact Assessment (LCIA) framework, methods and factors

IES 2007
Tender Specifications: Development of a technical guidance handbook on Life Cycle Assessment

Products

JRC IPTS 2006
Environmental Impact of Products (EIPRO) - Analysis of the life cycle environmental impacts related to the final consumption of the EU-25

JRC IPTS 2006
Terms of reference - Environmental Improvement Potentials of Residential Buildings (IMPRO-building)

JRC IPTS
Environmental Improvement of Products Passenger cars project (IMPRO-car project) - Project description

European Commission 2003
Communication from the Commission to the Council and the European Parliament - Integrated Product Policy Building on Environmental Life-Cycle Thinking

European Commission 2001
Green Paper on Integrated Product Policy

Institut für ökologische Wirtschaftsforschung gGmbH (IÖW) 2007
Integrierte Produktpolitik - Ein Policy Paper (Integrated Product Policy - A Policy Paper)

JRC IPTS 2007
Summary Memorandum: Extended InputOutput Analysis Research at IPTS/SIET

European Topic Centre on Resource and Waste Management 2006
Environmental Input-Output Analyses based on NAMEA data - A comparative European study on environmental pressures arising from consumption and production patterns

TNO, Delft, Netherlands, 2006
An Environmentally Extended Input-Output database for the EU25

Centre for European Economic Research (ZEW), Department of Environmental and Resource Economics
Discussion Paper No. 04-71; Integrated Product Policy and Environmental Product Innovations: An Empirical Analysis

DIMAS 2006
Green Public Procurement – an introduction

EU SDS 2006
Council of the European Union: Review of the EU Sustainable Development Strategy

SCP 2007
Background Document to The consultation on the Action Plans on Sustainable Consumption and Production and Sustainable Industrial Policy;
http://ec.europa.eu/environment/eussd/escp_en.htm

Poll et al. 2005
Development of Indicators for an Integrated Product Policy, final report, study by IPU, CASA and IÖW on behalf of the European Commission

Hanauer 2007
Use of LCA for SD Indicators at Eurostat; presentation at the 3rd International Life Cycle Thinking Workshop, Cyprus

Wolf Bersani 2007
Life Cycle Thinking and Sustainability Indicators; presentation at the 3rd International Life Cycle Thinking Workshop, Cyprus

Resources

Buchert 2005
Materials flow of platinum group metals – System analysis and measures for sustainable optimization of the materials flow of platinum group metals, Umicore, Öko-Institut and GFMS

EC 2005b
Commission Staff Working Document; Annexes to the Communication on a Thematic Strategy on the sustainable use of natural resources

GUA - Gesellschaft für umfassende Analysen GmbH, Wien 2000
Analysis of the fundamental Conceps of Resource Management

Institute of Environmental Sciences (CML), Leiden University; Wuppertal Institute for Climate, Environment and Energy¸ CE Solutions for Environment, Economy and Technology 2005
Policy Review on Decoupling: Development of indicators to assess decoupling of economic development and environmental pressure in the EU-25 and AC-3 countries

EC 2005c
Commission Staff Working Document; Annex to the Communication on a Thematic Strategy on the sustainable use of natural resources; Impact Assessment

University of St. Gallen, Institute for Economy and the Environment 2000
The Economics of Resource Management

EC 2005a
Communication on a Thematic Strategy on the sustainable use of natural resources (COM (2005) 670 final) of 21.12.2005

EEA Report No 9/2005 2005
Sustainable use and management of natural resources

Technical Report Series IPTS 2005
Environmental Impact of the Use of Natural Resources

European Topic Centre on Waste and Material Flows 2002
Towards a core set of indicators on waste and material flows

Draft paper presenting the core set of indicators prepared by the European Topic Centre on Waste and Material Flows (ETC/WMF)

Statistik Austria, Direktion Raumwirtschaft 2004
Interated NAMEA 1999-2001

Sachverständigenrat für Umweltfragen (SRU) 2007
Klimaschutz durch Biomasse - Sondergutachten (Kurzfassung)

ETC-RWM 2006
Environmental Input-Output Analyses based on NAMEA data; prepared by ETC-RWM

Institut für Zukunftsstudien und Technologiebewertung IZT Berlin gGmbH; Adelphi Research gGmbH, Berlin; Wuppertal Institut für Klima, Umwelt, Energie 2007
Seltene Metalle Maßnahmen und Konzepte zur Lösung des Problems konfliktverschärfender Rohstoffausbeutung am Beispiel Coltan

European Topic Centre on Waste and Material Flows 2004
Waste and material flows 2004; Current situation for Europe, Caucasus and Central Asia

Project WP3c Cooperation with DG Environment 2003
Zero Study: Resource Use in European Countries An estimate of materials and waste streams in the Community, including imports and exports using the instrument of material flow analysis

Office for Official Publications of the European Communities 2002
Material use in the European Union 1980-2000: Indicators and analysis

SEIS

European Commission
Implementing the Shared Environmental Information System (SEIS): Discussion Paper

EEA 2006
EEA Management Board seminar on Shared Environmental Information System (SEIS); Strategic note to frame discussions

EEA 2006
Conclusions from the EEA Management Board seminar on Shared Environmental Information System

EEA 2007
Subject: SEIS implementation in 2007-8 at Eionet level: priority setting process

EEA 2007
Source: Information and Data Services (IDS) Subject: Operational timetable EEA/Eionet activities 2007-2008 related to SEIS

WASTE

European Commission 2005
Communication on a Thematic Strategy on the prevention and recycling of waste

IPTS 2006
End of Waste Project

European Commission 2004
Commission Staff Working Document; Impact Assessment on the Thematic Strategy on the prevention and recycling of waste and the immediate implementing measures; Non-Official Document

European Commission 2005
Annex to the Communication on taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste; Technical Annexes to the Thematic Strategy on the Prevention and Recycling of Waste

Official Journal of the European Union 2006
Directive 2006/12/EC of 5 April 2006 on waste

ARGUS GmbH in co–operation with Ge–Systems sàrl 2005
Integrated reporting of waste data Task 3: Proposal of a detailed data format.

Official Journal of the European Union 2007
Commission Decision of 6 March 2007 amending Decisions 94/741/EC and 97/622/EC as regards the questionnaires for the report on the implementation of Directive 2006/12/EC of the European Parliament and of the Council on waste and on the implementation of Council Directive 91/689/EEC on hazardous waste

Eurostat 2005
Waste generated and treated in Europe Data 1995-2003

Department for Environment, Food and Rural Affairs (DEFRA) UK 2006
Quality Report on Waste; Statistics Regulation 2150/2002/EC on waste statistics

Eurostat 2004
Guidance on classification of waste according to EWC-Stat categories; Statistics on generation of waste; Annex to the Manual on Waste Statistics

European Topic Centre on Waste and Material Flows 2005
DRAFT Overlapping reporting obligations on waste