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REFLECTION GROUP ON ENERGY ACCOUNTS

Paper prepared by Eurostat

(for information)



EUROPEAN COMMISSION
EUROSTAT

Directorate E: Sectoral and regional statistics
Unit E-3: Environmental statistics and accounts



Luxembourg, 12 June 2009

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Reflection Group on Energy Accounts

**Paper for consultation:
Important conceptual and methodological questions related to Energy Accounts**

INTRODUCTION

According to the revised European Strategy for Environmental Accounting (ESEA) Eurostat is supposed to develop Energy Accounts (also sometimes referred to as NAMEA Energy) in the medium term (2-3 years).

Eurostat's Working Group "Environmental Accounts"¹ decided to set up a Reflection Group on Energy Accounts. The overall objective of the Reflection Group is to identify and prepare conceptual and methodological issues related to Energy Account which shall be tackled at the coming meetings of Eurostat's Task Force on NAMEA.

In chapter 2 of this document a number of conceptual and methodological questions are presented. **The Reflection Group is invited to comment on those questions by 15 August 2009.** The questions presented in chapter 2 have been compiled by Eurostat

¹ At its meeting on 23-24 March 2009; agenda item 4.

based on suggestions made by a number of European national statistical institutes (NSIs); see Annex 2.

Background:

Energy Accounts present physical and monetary information on the flows (supply and use) and assets of energy in a way compatible to the System of National Accounts. In order to avoid confusion with so-called energy statistics and balances, energy accounts may be defined in the following manner²:

Energy Accounts comprise *energy asset accounts* and *energy flow accounts*, both, in physical as well as monetary terms.

Energy Asset Accounts are asset accounts for energy resources such as coal, oil, and natural gas. In particular, they describe the opening and closing stocks of energy resources and the changes therein. They can be compiled in physical and/or monetary terms.

Energy Flow Accounts describe the supply of energy products (e.g. production, imports) and their use by economic categories (intermediate and final consumption, exports, and gross capital formation) in the economic territory of a country. They can be compiled in physical and/or monetary terms.

Please note that, as satellite accounts of the System of National Accounts (SNA), energy accounts follow the concepts (such as residence), definitions and classifications (such as ISIC) and the accounting rules of the SNA.

The compilation of Energy Accounts is the domains of national statistical institutes (NSIs) as opposed to the collection of basic energy statistics and compilation of energy balances for which also other agencies play a significant role. So far, Energy Accounts are prepared by a selected whilst increasing number of European NSIs.

One of the main obstacles for a more widespread application of Energy Accounts is the lack of an internationally agreed and "fixed" methodology. Up to now, Energy Accounts produced by several European NSIs are not standardised and hence not fully comparable. In order to improve this situation, Eurostat together with the European NSIs aims at supporting the methodological harmonisation and standardisation. Evidently, these activities will be fully synchronised and embedded into international efforts such as the development of the SEEA-Energy and the revised International Recommendations for Energy Statistics (IRES). Annex 1 provides an overview on where to find further information related to those international activities.

² See e.g. report on the Global Assessment of Energy Accounts prepared by the United Nations Statistics Division and presented to the Statistical Commission, Fortieth session, February 2009
<http://unstats.un.org/unsd/statcom/doc09/BG-EnergyAccounts.pdf>

Eurostat pursues a pragmatic and stepwise approach:

Pragmatic in the sense that comparable European data should be made available as soon as possible in a most effective way. Therefore, the aim is to develop and establish standardised reporting tables for the several parts of the more encompassing Energy Accounts.

Stepwise in the sense that the several parts/modules of the more encompassing Energy Accounts are not developed at the same time but one after the other. Eurostat recommends starting with the part/module of *Energy Flow Accounts in physical terms* for the following reason: Energy Flow Accounts in physical terms are closely linked to Eurostat's Air Emissions Accounts which are already established almost European-wide. The use (combustion) of energy carriers is the most important source for emissions to air. Integrated analyses of energy use and emissions by industries (e.g. decomposition analyses) provide most relevant information for policy making. Furthermore, Energy Flow Accounts in physical terms will form an important building block in the Environmentally Extended Supply-Use-Table data framework which will stand at the core of Eurostat's Environmental Data Centres on Natural Resources and Products.

Roadmap:

What	Who	When
Objective: Identifying main methodological issues which need to be clarified and gathering of NSIs experiences Output: discussion document for NAMEA Task Force meeting 2010	Eurostat Reflection Group on Energy Accounts	summer-autumn 2009
Objective: Clarification and decision on main methodological issues and establishing standardised tables Output: standardised reporting tables along with methodological guidelines	Eurostat Task Force on NAMEA with support from contractor	2010-2011: one meeting at the beginning of each year and written consultation rounds

QUESTIONS

In the following, eight questions are presented corresponding to eight clusters of methodological and conceptual issues which have been identified so far in conjunction with Energy Accounts.

The Reflection Group is invited to comment on those questions by 15 August 2009.

The questions presented in this chapter 2 have been compiled by Eurostat based on suggestions made by a number of European national statistical institutes (NSIs); see Annex 2.

What is the policy use of Energy Accounts?

Which are typical policy questions that can be answered with the help of Energy Accounts?

This question should recall and re-strengthen the main benefits of Energy Accounts (including added value to energy statistics/balances) and justify efforts and resources to compile Energy Accounts. This question should also sharpen the needs, i.e. helping to prioritise methodological developments.

The analytical potentials of Energy Accounts comprise *inter alia*:

Analysing the flow of energy commodities through the economy as delineated in economic statistics (ESA95);

Analysing the energy intensity of industries (relating energy use to production output/value added in national currency);

Analysing the emission intensity of energy use by industries (relating Energy Accounts to Air Emissions Accounts);

Analysing the cumulated energy use 'embodied' in products for final use ("energy footprint" of products);

Analysing the links with emissions and economic gross value added and/or output (decomposition analyses: effects of economic growth, energy-mix, energy efficiency of industries, economic structural change, change in consumption mix, change in mix of energy supply etc);

Energy-import-dependency of EU production and consumption.

<p><i>In your view and based on your experience, what are the most relevant policy uses of Energy Accounts?</i></p>

How to define important terms such as e.g. energy, energy flows, energy stocks, energy commodities, energy source/carriers etc.?

As a prerequisite, main terms need to be defined properly in Energy Accounts. This concerns e.g. the definition of energy as a physical phenomenon, the distinction between energy flows and energy stocks, range of energy carriers/sources (e.g. any form of biomass constitutes an energy carriers but is not recorded necessarily) etc. There are already a number of international technical and/or statistical documents which one may refer to. However, often those documents employ different terms for the same phenomena.

Possible points of departure:

Identify, which terms/concepts need to be defined for Energy Accounts, i.e. prepare a list of items, including further relevant items such as e.g. energy resources, energy residuals (losses?) etc.;

e.g. starting from thermodynamic laws and system theories to define energy as a physical phenomenon;

check definitions as employed in international technical documents (e.g. IEA/Eurostat Manual; International Recommendations for Energy Statistics, IRES; International Organisation for Standardisation, ISO; etc.);

How would you define (or how did you already define) important items in conjunction with Energy Accounts, e.g. such as energy, energy flows, energy stocks, energy commodities, energy source/carriers etc.?

Are there any further relevant definition items coming to your mind?

For which kinds/types of energy flows should Eurostat develop standard tables with which priority?

The draft SEEA-Energy encompasses a wide range of accounts. It recommends accounts for energy flows and stocks in both, physical and monetary terms.

Eurostat strongly suggests to start the methodological discussion with physical flow accounts, i.e. the recording of physical flows of energy supply and use in form of commodity-by-industry tables (other accounts may be tackled at a later stage). Yet the

physical energy flow accounts reveal already a number of methodological and conceptual questions, such as e.g.:

For which kinds/types of energy flows shall physical commodity-by-industry Supply and Use tables be compiled? (E.g. primary energy use, net energy use, emission-relevant energy use, non-energy use etc.);

How could the different types/kinds of energy flows be classified and defined?

What do different types/kinds of energy flows express actually? (E.g. net energy use of the electricity generating industry is something different than the emission-relevant energy use)?

Do you agree to tackle first Energy Flow Accounts in physical terms?

Which kinds/types of energy flows would you distinguish? (e.g. net energy use, gross energy use, emission-relevant use, non-energy use etc.)

Which kinds/types of energy flows should be tackled with priority? (e.g. emission-relevant energy uses are important in conjunction with Air Emissions Accounts)

Which kinds/types of energy flows are recorded in Energy Accounts of your country? (only valid, if your country has established Energy Accounts)

Which classification should be used to classify energy commodities in Energy Accounts?

Both, Energy Asset Accounts and Energy Flow Accounts require a specification of energy commodities. More particularly, Energy Flow Accounts are commodity-by-industry³ tables, where the commodity dimension (flow dimension, respectively) needs to be specified more precisely with the help of a classification.

Note that in the context of energy statistics, often the term "energy source" is used too, which is somewhat confusing as it mixes the commodity and industry dimension.

There are several possibilities or aspects to consider:

International energy statistics (by Eurostat and IEA) employ a list of approximately 60 energy commodities; this list is fairly established and plenty data are available;

³ In a strict sense, 'industry' means all kind of economic activities (i.e. including private household activities). One could also term it flow-by-activity tables.

The energy commodity list as used by IEA/Eurostat energy statistics comprises "products" in the sense of the SEEA; i.e. they omit "resources or raw materials" and "residuals" in a SEEA sense – hence, one may consider the latter to be added;

A usual distinction is made between primary energy commodities versus secondary energy commodities – how to consider this?

If perceived as necessary, how to take into consideration the international statistical classifications for products (CPC, CPA)?

Based on your view and experiences – how would you classify energy commodities?

Which classification should be used to classify economic activities (i.e. activities by industries and private households) in Energy Accounts?

Energy Accounts are supposed to be compatible with National Accounts data. Economic activities in Energy Accounts (and in all other Environmental Accounts) should be classified as far as possible in the same way as they are classified in National Accounts. Here, the main reference point are the ESA95 Input-Output Accounts (Supply- and Use tables) as provided by Eurostat; therein, economic activities are distinguished into industries (classified in a breakdown by 60 NACE 2-digit divisions) and categories of final use (including private household consumption).

The most pragmatic approach could be to classify economic activities in the very same way as in Eurostat's Air Emissions Accounts. Therein, the economic activity dimension is distinguished into three parts: (1) industries, (2) households, and (3) bridging items. The question arises on how to design the bridging items in the case of energy? Here, the main purpose is to make explicit the differences in numbers between residence versus territory principle (i.e. the differences in totals of Energy Accounts in comparison to energy statistics/balances).

Based on your view and experiences – how would you classify economic activities?

How to define and take into consideration the system boundary between economy and environment?

Energy flows take part (1) within the environment (natural energy flows), (2) within the economy (product flows), and (3) between the environment and the economy (resource flows and residual flows). A choice is needed which of these different types of energy flows should be considered. The SEEA2003 gives already a clear guidance on how to

draw the system boundary between environment and economy. However, there might appear some "border cases" where we need to set accounting conventions.

Based on your view and experiences – how would you define and take into consideration the system boundary issue?

Which measurement units and conversion factors should be used?

Energy flows can be recorded in physical units related to the characteristics of the respective energy commodity (e.g. tonnes, cubic metres). They can also be recorded in a common energetic measurement units (e.g. Joule) expressing the energetic value/content. The latter can be derived from the former by employing conversion factors (e.g. one tonne of hard coal contains a certain amount of energy in Joules). The IEA/Eurostat Energy Statistics Manual provides guidance.

Based on your view and experiences – which measurement units and conversion factors would you recommend?

What are the major adjustment requirements with respect to the residence principle?

Energy Accounts are supposed to follow the residence principle which is used for National Accounts. In comparison to national totals as reported in energy statistics/balances (which apply by and large the territory principle) this may require significant adjustments. The energy use/supply of residents' activities outside the territory need to be added to Energy Accounts, and the energy use/supply by non-residents on the territory need to be subtracted. In this context, the main adjustment requirements may need to be discussed. Also the treatment of marine bunkers and international air transport needs to be discussed.

Based on your view and experiences – which major adjustments to the residence principle are concerned and which particular data problems may be expected?

ANNEX 1: IMPORTANT DOCUMENTS AND LINKS

Report on the Global Assessment of Energy Accounts prepared by the United Nations Statistics Division (<http://unstats.un.org/unsd/statcom/doc09/BG-EnergyAccounts.pdf>)

Towards the revised International Recommendations for Energy Statistics (IRES):
<http://unstats.un.org/unsd/energy/ires/default.htm>

Towards SEEA – Energy: <http://unstats.un.org/unsd/envaccounting/seeae/>

Towards the revised SEEA: <http://unstats.un.org/unsd/envaccounting/seearev/>

14th London Group Meeting: SEEA classifications of energy resources (Ole Gravgård, Statistics Denmark):
http://unstats.un.org/unsd/envaccounting/londongroup/meeting14/LG14_8a.pdf

14th London Group Meeting: Renewable energy resources in the SEEA (Maarten van Rossum, Mark de Haan and Sjoerd Schenau, Statistics Netherlands):
http://unstats.un.org/unsd/envaccounting/londongroup/meeting14/LG14_7a.pdf

IEA/Eurostat: Energy Statistics Manual:
http://www.iea.org/Textbase/nppdf/free/2004/statistics_manual.pdf

CITY GROUPS INVOLVED IN ENERGY STATISTICS / ACCOUNTS

London Group on Environmental Accounting:
<http://unstats.un.org/unsd/envaccounting/londongroup/>

Oslo Group on Energy Statistics: <http://og.ssb.no/>

Annex 2: Contributions by countries

Spain

From: Luis Martín Salvador [<mailto:luis.martin.salvador@ine.es>]

Sent: Friday, April 17, 2009 1:12 PM

In reference to our participation in the Reflection Group on Energy Accounts we have started to revise the "List of issues for the SEEA-E" published by the United Nations. Do you think that this can be a good starting point?



Acrobat Document

Sweden

From: Palm Viveka RM/MN-S [<mailto:viveka.palm@scb.se>]

Sent: Thursday, April 16, 2009 5:32 PM

The main topic for us to discuss is the aggregation of fuels into categories that are possible to compare.

Netherlands

From: Schenau, S. [<mailto:s.schenau@cbs.nl>]

Sent: Friday, April 03, 2009 3:53 PM

Topics:

- How should the energy accounts look like?
- What kind of energy (gross, net, emission related, energetic only or non energetic also)?
- How to deal with renewable energy?
- How to deal with energy use of residents abroad and energy use of non-residents.

Austria

From: MAYER Barbara [<mailto:Barbara.Mayer@statistik.gv.at>]

Sent: Friday, April 03, 2009 12:20 PM

To: MOLL Stephan (ESTAT)

Cc: MILOTA Eva; BAUD Sacha; BITTERMANN Wolfgang; WEGSCHEIDER-PICHLER Alexandra

Subject: AW: Reflection Group Energy Accounts

Dear Stephan Moll!

Firstly may I introduce myself. My name is Barbara Mayer and I work at Statistics Austria in the field of energy statistics. In the context of an EU-Grant I developed Energy Accounts for Austria in 2008 for the

years 1999-2006. After talking to my colleagues Alexandra Wegscheider-Pichler and Sacha Baud we decided that I will participate in the Reflection Group on Energy Accounts. The basic idea of developing Energy Accounts was providing the Energy Balances data in the format needed for compiling the integrated NAMEA. This means that among other things the sector breakdown of the Energy Balances was adjusted to the NACE 2-digit level according to the SNA for the intermediate use of energy.

To avoid misunderstandings from my point of view a clear differentiation to the definitions of other systems as the Energy Balances as well as the SNA is needed. For instance Austria's Energy Balances follow the territory principle whereas Austria's Energy Accounts follow the residence principle.

In view of clear definitions for Energy Accounts, what they need to include, from my point of view following issues have to be discussed:

- What are the needs of the Energy Accounts users? As already mentioned Statistics Austria developed Energy Accounts to provide energy use data in the format needed for compiling the integrated NAMEA.
- Which balance items need to be included in the balance equation? The break down needs to be defined. In Austria's Energy Accounts the supply is subdivided in production and imports and the use in exports, intermediate use, consumption of households, non energy use, losses, stock changes.
- Austria's Energy Accounts comprise all energy commodities included in the Energy balances (in physical and energy units). The (product) classification needs to be defined.
- According to the user needs which units should Energy Accounts be available at? (physical, energetic, monetary units)

For further questions, please do not hesitate contacting me.

Kind regards

Barbara

Barbara Mayer
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Germany

>-----Original Message-----
>From: Helmut Mayer [<mailto:helmut.mayer@destatis.de>]
>Sent: Thursday, April 02, 2009 12:17 PM
>To: MOLL Stephan (ESTAT)
>Cc: Kuhn Michael.; Dr. Joachim Thomas
>Subject: Teilnahme an Reflection Group
>
>Sehr geehrter Herr Moll,
>
>Vielen Dank für Ihre Anfrage.
>

>Ich beteilige mich gerne an einer Reflection Group.
>
>M.E. könnten wir über folgende Punkte reflektieren (d.h. nachdenken,
>Probleme austauschen und über Lösungen diskutieren):
>
>a) Probleme bei der Erfassung und Zuordnung des Energieverbrauchs:
>1. Erfassung und Zuordnung der Stromproduktion nach
>Wirtschaftstätigkeiten und Zuordnung des entsprechenden
>Brennstoffverbrauchs
>2. Praxis der Aufteilung des Brennstoffverbrauchs bei kombinierter
>Strom- und Wärmeerzeugung (KWK-Anlagen) - Verbuchung in NAMEA -
>3. Erfassung des Energieverbrauchs von Sekundär- (Ersatz-)
>brennstoffen
>(wie z.B. Altreifen, Holzabfälle, Klärschlamm, Lösungen ...)
>4. Verbuchung von Biogasanlagen (Ermittlung des
>Primärenergieeinsatzes,
>Aufteilung Wärme/Strom; bei welchen Wirtschaftszweigen?)
>5. Ermittlung des emissionsrelevanten Energieverbrauchs
>(Behandlung von erneuerbaren Energieträgern, Behandlung des
>nicht-energetischen Energieeinsatzes, Konsistenz zwischen
>Treibhausinventaren und Energiebilanz-orientierten Ansätzen
>
>b) Analyse (Wozu werden die Daten verwendet?)
>6. Berechnung von Intensitäten/Produktivitäten (Bezugsgröße BWS oder
>Produktion oder physischer Energieoutput?(bei Energiebereichen))
>7. I/O-Analyse (Ansätze, Modelle, Anforderungen)
>
>Ich hoffe, die Vorschläge sind hilfreich!
>
>Mit freundlichen Grüßen
>und den besten Wünschen für ein schönes Ostern
>Helmut Mayer
>
>
>--
>*****
> Statistisches Bundesamt
>
> Helmut Mayer
>
> Umweltökonomische Gesamtrechnungen
> (Gruppe IIIIE)
>
>
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>
> Fax: +49-611-75-3971
>
> mailto: helmut.mayer@destatis.de

Denmark

From: Thomas Olsen [mailto:TOL@dst.dk]
Sent: Wednesday, April 01, 2009 11:58 AM
To: MOLL Stephan (ESTAT)
Cc: Ole Gravgård Pedersen
Subject: RE: Reflection Group Energy Accounts
Dear Stephan,

Ole Gravgård (ogp@dst.dk) and I (tol@dst.dk) would like to participate in the reflection group on energy accounts.

As you might already know, the chapter on the energy flows in the SEEA-E is soon to be sent out. We think this chapter could be used as the basis for our first discussions.

We look forward to the work in the group.

Best regards,

Thomas

Yours sincerely

Thomas Olsen
Senior Adviser
National Accounts, Environmental Accounts
Tel. +45 3917 3828
tol@dst.dk

Statistics Denmark
Sejrøgade 11
DK-2100 Copenhagen Ø
www.dst.dk/uk

France

>-----Original Message-----
>From: jean-louis pasquier
>[<mailto:jean-louis.pasquier@developpement-durable.gouv.fr>]
>Sent: Tuesday, March 31, 2009 11:00 AM
>To: MOLL Stephan (ESTAT)
>Cc: patrice gregoire
>Subject: Rép. : Reflection Group Energy Accounts
>
>Dear Stephan,
>
>1) Yes, I will participate in the Reflection Group on Energy
>Accounts and I agree with the proposed procedure.
>

>2) At this preliminary stage, I see 3 types of topics to be
>discussed (objective(s), coverage and level of detail) plus a
>few possible specific issues.
>- Objective(s) : environmental cost/benefits or
>advantage/disadvantage of the different energy sources, energy
>scarcity, changes in air emissions...
>- Coverage : physical data only or physical and monetary data
>; about fossil energy, energy use only or supply and use of
>energy, energy used as fuel only or energy used as raw
>material as well.
>- Level of detail : industry breakdown, energy breakdown.
>- Specific issues : the treatment of energy production
>(primary/secondary/auxiliary) and electricity
>(fossil/renewable/nuclear).
>
>Regards,
>Jean-Louis

Luxembourg

>-----Original Message-----
>From: Olivier Thunus [<mailto:Olivier.Thunus@statec.etat.lu>]
>Sent: Monday, March 30, 2009 3:31 PM
>To: MOLL Stephan (ESTAT)
>Subject: Re: Reflection Group Energy Accounts
>
>Dear M. Moll
>
>The Luxembourg will be very interested to participate in this
>Reflection
>Group on Energy Accounts.
>
>I suppose that I will be the contact-person for this Group.
>
>We have many questions on this subject, to begin:
>- how establish the link between energy balance and energy accounts ?
>- how switch from a table based on the territory principle to a table
>based on the resident principle ?
>- which level in the NACE is significant for the energy accounts ?
>- how combine in a same table some data in physical units and
>some data
>in value units ?
>- Is the CPA nomenclature adapted to establish a energy account ?
>- Is it necessary to integrate some specific subject like
>autoproduction
>in the energy accounts ?
>
>
>Kind regards
>Olivier Thunus

Belgium

>-----Original Message-----
>From: Guy Vandille [<mailto:gv@plan.be>]

>Sent: Monday, March 30, 2009 2:01 PM
>To: MOLL Stephan (ESTAT)
>Subject: Re: Reflection Group Energy Accounts
>
>
>
>Dear Stephan,
>
>Since as part of our new Eurostat Grant financed environmental
>accounts
>project we will update the Belgian NAMEA Energy (or Energy
>Accounts), I
>would like to participate in the Reflection Group on Energy Accounts.
>
>The following topics seem worthwhile to discuss (based on my own
>experience):
>
>1) Are the energy accounts to be presented only in physical terms
>(PetaJoules for instance), or also in monetary terms ? As far
>as Belgium
>is concerned, I created the current version of the Energy Accounts on
>the basis of the 3 regional energy balances. The monetary data
>in these
>balances are far less detailed than the physical data.
>
>2) What is the best procedure to allocate energy use for transport
>(road, water and air) ?
>
>3) Do we need a non-energy use table ? Or should we just include
>emission-relevant energy use from the outset ? In the old NAMEA Air
>energy use table non-energy use was to be left out.
>
>Best wishes,
>
>Guy Vandille
>Federal Planning Bureau
>Kunstlaan 47-49
>1000 Brussel
>tel: +32-2-507.73.65
>gv@plan.be