

Scope of energy accounts in the revised SEEA and SEEA-E and suggested issue list on energy accounts

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A. Introduction

1. As stated in the UNSD report *International Recommendations for Energy Statistics (IRES): the revision process, guiding principles, scope and contents* UNSD is focusing now on the preparation two documents, namely *International Recommendations for Energy Statistics (IRES)* and *System of Environmental-Economic Accounting for Energy (SEEA-E)*. IRES will focus on a list of data items, concepts, definitions and classifications for energy statistics covering flows and stocks (over- and under-ground) in physical and monetary terms as well as on data sources and compilation strategies, data quality, metadata and dissemination of energy statistics including the core tables. The SEEA-E will provide the international statistical standard for energy accounts consisting of agreed concepts, definitions, classifications and inter-related tables and accounts. IRES and SEEA-E are seen by UNSD as two complementary documents and their preparation will be fully coordinated. While IRES will comply to the extent possible with the SEEA-E conceptual structure and data needs, SEEA-E will develop its accounting standards on the basis of the IRES (e.g., using IRES definitions of data items and classifications of energy products and flows).

2. Energy accounts are an integral part of environmental-economic accounting. In the SEEA-2003 (UN et al. 2003²), the energy accounts are presented in several chapters describing the various modules of environmental-economic accounts, namely asset accounts in physical and monetary units, physical flow accounts, hybrid flow accounts as well as accounts for economic activities and products related to the environment including taxes, subsidies, licenses etc.

3. The elevation of the SEEA to the level of an international statistical standard presents a challenge and an opportunity to elevate the energy accounts to the level of a statistical standard. The UNCEEA at its last two meetings considered that the energy accounts are a mature subject matter to be elevated to the level of a statistical standard and recommended that they feature prominently in the revised SEEA. This recommendation calls for the international community to work expediently on developing definition, classification, tables and accounts that are internationally agreed.

¹ This paper is a revised version of the paper *Scope of energy accounts in the revised SEEA* (I. Di Matteo and A. Alfieri). It reflects the discussion held at the special session on energy accounts, organized by UNSD, which took place as a side meeting at the time of the 12th London Group Meeting (Rome, Italy 17-19 December 2007).

² United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank (2003): *Handbook of National Accounting: Integrated Environmental and Economic Accounting 2003*. Final draft circulated for information prior to official editing.

4. To meet this request, UNSD will work in consultation and close cooperation with the Oslo Group on Energy Statistics and London Group on Environmental Accounting, to avoid duplication of work and ensure consistency between energy statistics and accounts, on the standard for energy accounts, the System of Environmental-Economic Accounting for Energy (SEEA-E). This work will serve as an input in the revised SEEA.

5. The paper presents the scope of energy accounts in the SEEA and SEEA-E and presents selected issues of energy accounts organized according to the different modules of the SEEA, namely asset accounts and supply and use tables. It also discusses issues linking basic energy statistics, balances and accounts.

6. The paper has been revised after discussion at the special session on energy accounts, organized by UNSD at the time of the 12th Session of the London Group on Environmental Accounting (Rome, Italy, 17-19 December 2007). In the same meeting, a drafting group³ was created to assist UNSD in developing the energy accounts standard tables and in the drafting of the SEEA-E. Oslo Group members are invited to provide comments on the list of issues below and to actively contribute to the activities of the drafting group.

B. Energy accounts in the revised SEEA

7. In the context of environmental-economic accounting, the term “energy accounts” is used as a short cut for “integrated environmental-economic accounts for energy resources”. “Energy accounts” cover the whole suite of environmental-economic accounts, that is:

- Asset accounts in physical and monetary units,
- Supply and use tables in physical and monetary units and hybrid accounts;
- Accounts for economic activities and products related to the environment and other environmentally-related transactions (such as specific taxes, subsidies, permits licenses and property rights).

8. The same terminology convention is used for other natural resources accounts. “Water accounts”, for example, denote the whole sets of environmental-economic accounts for water, namely: asset accounts, physical supply and use tables, hybrid accounts, monetary accounts, emission accounts etc. Similarly in the case of fisheries and forest accounts, stock and flow accounts in physical and monetary units as well as other relevant accounts are discussed in the publications (e.g. environmental protection expenditure accounts) (see the publication “System of environmental-economic accounting for Water; Integrated Environmental and Economic Accounting for Fisheries, Economic and Environmental Accounting for Forestry: Status and Current Efforts).

9. To ensure consistency between stocks and flows, standard accounts for energy have to be developed for all the modules of accounts. In particular, classifications, definitions and the recording of transactions have to be consistent between the accounts for stocks and flows.

10. The revised SEEA will include agreed classifications of industries, products, transactions and assets, which will form the basis for the standard tables and accounts. The level of detail of these classifications presented in the tables will depend on considerations of relevance and data availability and will be discussed at a later stage.

³ The Group consists of Australia, Austria, Canada, China, Denmark, Germany, Italy, Netherlands, Norway, Eurostat, EEA, IMF, UNESCWA and UNSD.

11. Selected issues that may help to define the scope of the energy accounts in the revised SEEA are presented below. This is not intended to be a comprehensive list but a starting point for discussion.

1. Terminology

12. The terminology used in energy statistics may not be fully consistent with the terminology used in national accounts. It is important to develop a common language among the various communities. It is therefore advisable that common energy terms (e.g. energy carriers, etc.) be also defined in the SEEA-E and linked to the standard accounts terminology.

C. Suggested list of issues on energy accounts in the revised SEEA and SEEA-E

1. Asset Accounts - selected issues

13. Asset accounts record the opening and closing stocks and the changes therein. Assets accounts are compiled for both produced and non-produced assets. Some issues defining the scope of the energy asset accounts are presented separately below for non-produced and produced assets.

Energy resources (underground) – Issue 1

14. The asset classification for Mineral and energy resources (category EA.11) in the SEEA-2003 expands the 1993 SNA classification by including not only those resources that have a market value but also those resources in physical units that may not have a market value. The definition and classification of mineral and energy resources is still under discussion and it will take into account the development of the United Nations Framework Classification for Fossil Energy and Mineral Resources.

15. Another issue is whether there exists a stock of renewable energy resources. With the increase interest in renewable energy resources, some have argued that for renewable energy resources there may be a stock which would be the expected generation of renewable energy depending on the technology. Not including the stock of renewable resources in the stock may provide an unbalanced view of total stock of energy available in the country.

Inventories of energy products (Stocks) – Issue 2

16. Asset accounts for produced asset related to energy are part of the conventional System of National Accounts. Produced assets for energy include inventories of mineral and energy products that have entered the economy. They have either been only extracted or transformed/converted before being stored prior to their being further processed, sold, delivered to other units or used in other ways and stocks of products acquired from other units that are intended to be used for intermediate consumption or for resale without further processing (these are also referred to as inventories). A portion of the inventories of selected products is referred to as strategic stock.

Produced assets – energy-related infrastructure – Issue 3

17. Infrastructure for the exploration, exploitation, transportation and distribution of energy products is part of the conventional SNA produced asset accounts. In the SEEA it may be useful to separately identify these assets for analytical purposes.

2. Supply and use tables – selected issues

18. Supply and use tables record flows of goods and services. They are based on the principle that the total supply of each product is equal to its total uses. They are used to derive

value added and final demand in constant and current prices in a very detailed, integrated and consistent manner. They are also used, among other things, to derive input-output tables for the purpose of economic impact analysis and forecast.

19. The supply table presents by row the different kind of products produced by domestic industries (consisting of residents in the economic territory of a country) and supplied by the rest of the world (imports). The use table presents the use of the same products (shown by row) for intermediate consumption by the different industries, for final consumption, gross capital formation and for use by the rest of the world (exports).

20. For ease of reference, Tables 1 and 2 present the SNA structure of the supply and use tables. They are the starting point for the development of standard tables for energy flow accounts. Note that the disaggregation of the industries reflects that of the standard tables of the SEEAW.

Table 1: Supply table

Disaggregation of ISIC for energy-related industries

	Output of industries (by ISIC categories)							Imports	Taxes less Subsidies on products	Trade and transport margins	Total supply at purchaser's price
	1-3	5-33, 41-43	35	36	37	38,39, 45-99	Total output, at basic prices				
1. Total output <i>of which:</i> 1.a CPC ... 1.b CPC											

Classification and definition of energy (related) products

Table 2: Use table

	Intermediate consumption of industries (by ISIC categories)							Final consumption	Capital formation	Exports	Total uses at purchaser's price
	1-3	5-33, 41-43	35	36	37	38,39, 45-99	Total industry				
2. Total use <i>of which:</i> 1.a CPC... 1.b CPC... ...											
3. Total value added											

System boundary – Issue 4

21. International statistical standards such as the System of National Accounts (SNA), the Balance of Payments, International Merchandise Trade Statistics and the forthcoming standard on the System of Environmental-Economic Accounting (SEEA) use the economic territory as the system boundary. Energy balances and emission inventories use instead the national territory.

Classification/disaggregation of economic activities – Issue 5

22. In the SUT for energy, the relevant breakdown of industries for the standard and supplementary tables has to be identified and mapped to the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev. 4). The breakdown has to include the relevant economic activities on the supply side, such as, for example, economic activities for the extraction of energy resources, transformation/conversion of primary energy products and supply of energy products and the relevant activities on the use side.

23. The starting points should be the detailed industry breakdown used in energy statistics which distinguishes three groups of industries (which are called in energy statistics terminology “sectors”) and within each group a detailed list of industries is identified. The main groups are: the ‘transformations sector’ (broadly corresponding to activities dealing with the conversion of energy to other forms), “energy sector” (corresponding to energy producing activities - e.g. for heating, lighting and operation of all equipment used in the extraction process, for traction and for distribution). in the supply of energy) and “end-user sector” (industry, transport, residential, commercial/public services, agriculture/forestry, fishing and non specified).

“Transport sector” – Issue 6

24. Energy statistics refers to the fuel consumed in the transport sector irrespective of the economic activity in which the transportation activity occurs. In national and environmental-economic accounts, we need to allocate the use of fuel to the industries that use it for intermediate consumption. In addition in national and environmental-economic accounts, only the use of fuel by resident units is recorded as intermediate or final consumption. The use of fuel by non-resident units is recorded as export.

Classification/disaggregation and definition of energy products – Issue 7

25. In Tables 1 and 2 the list of energy products for which it is important and relevant to record the supply and use has to be identified and mapped into international classifications of products such as the Central Product Classification (CPC ver. 2) and the Harmonized System Codes (HS).

26. There is the need to develop a classification of energy products by purpose, for example, to distinguish energy and non-energy use of energy products, and main non-energy products used for energy purposes (see para. 29). It would also be useful to distinguish policy relevant energy-uses such as heating, lighting and transport, etc. Supplementary tables could be compiled to address specific policy needs.

27. There is also the need to develop additional classifications for energy in the case, for example, of renewable energy since these are not well developed in the existing classifications of products.

28. The distinction between primary and secondary energy products is often made in energy statistics to distinguish energy products that are “either extracted or captured directly from natural resources such as crude oil, hard coal, natural gas – primary; or are produced from primary sources – secondary” (OECD/IEA/Eurostat 2005⁴). Some countries distinguish between primary and secondary products in their energy accounts. It is relevant to have this distinction in the standard tables for energy accounts.

29. In energy statistics and balances a distinction is generally made in the use of energy products between “non-energy use”, “final energy use” and “transformation input”. Non-energy use (of energy products) refers to the use of energy products as raw materials in the chemical, petrochemical and other industries, not for the purpose to produce energy (e.g. bitumen used for asphalt). Final energy use refers to the use of energy products for energy purposes. It excludes the use of energy product for transformation into other forms of energy. Transformation input refers to the conversion of primary forms of energy to secondary and further transformation (e.g. coking coal to coke, crude oil to petroleum products, and heavy fuel oil to electricity).

30. The London Group agreed that the energy flow accounts should cover and distinguish the three different types of uses of energy products. Including (and explicitly identifying) all three

⁴ 2005, OECD/IEA/Eurostat *Energy Statistics Manual*.

types of uses in the SUT has the advantage of providing a complete picture of the demand of energy products by the economy as well as providing necessary information for the calculation of energy-related air emission. In this regard it further recommended disaggregating the use of energy products by combustion processes to provide a clear link to the emission accounts.

Definitions of transactions – Issue 8

31. The hybrid supply and use tables for energy juxtapose physical and monetary information to allow for integrated analysis. The definitions of transactions such as production, changes in inventories, imports, exports, use etc. in the monetary tables follow the 1993 SNA definitions. To juxtapose the physical flows to monetary flows the definitions of transactions have to be consistent. An analysis of the existing differences in definitions of transactions used in energy statistics and a comparison with the national accounts definitions has to be developed together with suggestions on how to move this forward.

Energy losses (e.g. in distribution, storage, etc.) – Issue 9

32. Losses of energy (in the storage, distribution system, transformation) are an important indicator of the efficiency of the distribution/storage/transformation system and allow for a mass balance of the energy flow. Different types of losses, including flaring should be analyzed in order to develop a proper recording for these flows in the supply and use tables.

Harmonized physical measurement units, Gross and net calorific values and Standard conversion factors – Issue 10

33. The London Group on Environmental Accounting considered very important to reach an agreement on the units in which the standard tables of the energy accounts should be compiled. In this regards, the work of the Oslo Group will be an important input to the work on the SEEA – Energy and the SEEA.

Links with energy statistics and balances – Issue 11

34. Energy statistics (and resource extraction statistics) is the main source of data and forms the main building blocks for energy accounts. Energy accounts - intended as the whole suite of environmental-economic accounts for energy - and energy statistics have to be as much as possible aligned so that countries compiling energy statistics can more easily organize the information according to the environmental-economic accounting framework.

35. Energy balances are a form of accounting for energy supply and use. They differ from the environmental-economic accounting with respect to the geographical coverage (territory principle vs. residence principle) and with respect to the link to the economic information of the SNA. It is important that they are not viewed as competing systems of accounting. Developing bridge tables that clearly show how to go from one to another and which additional information is needed for this transition is crucial in understanding the differences.

Links between emission inventories and emission accounts – Issue 12

36. Using the same argument for developing bridge tables linking energy balances with energy accounts, bridge tables between emission inventories and emission accounts should also be developed.