

System of Environmental Economic Accounting



System of
Environmental
Economic
Accounting

Compilation of the energy PSUTs: from basic energy data / energy balances to energy accounts



United Nations

Content

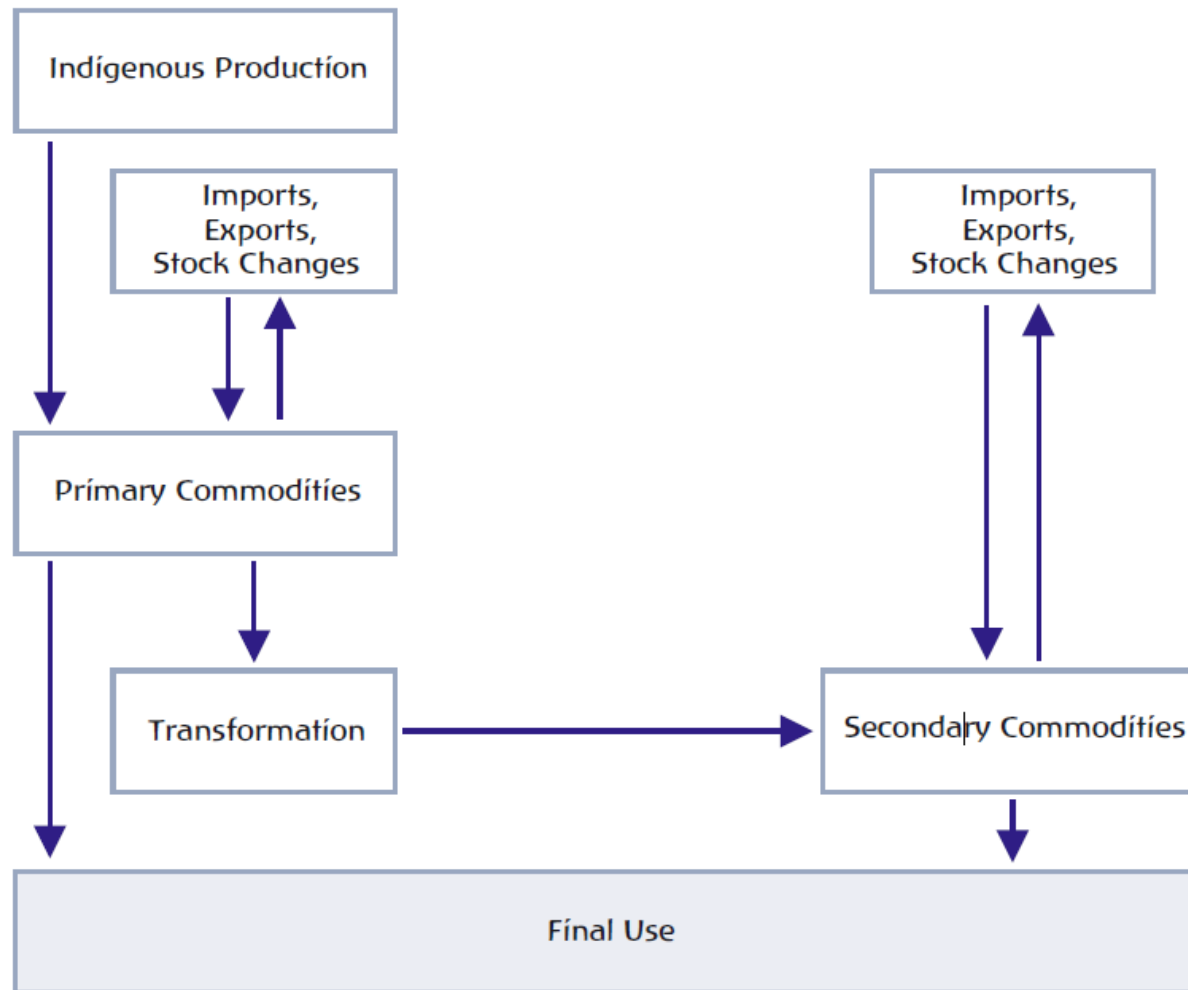
- Basic energy statistics
- International reporting of basic energy statistics
- Energy balances
- The link with energy accounts
- Compilation issues for the PSUTs
- The Eurostat PEFA builder

Scope of Basic Energy Statistics



- The basic energy statistics refer to **statistics on energy stocks and flows, energy infrastructure, performance of the energy industries**, and the availability of energy resources within the national territory of a given country during a reference period
- The **purpose** of the basic energy statistics is to provide information on stocks and flows of individual energy products in a non standardized format
- In brief, energy flows describe various activities of energy industries and energy consumers undertaken on national territory of a compiling country such as production of energy products, their import, export, and use
- In addition to providing information on energy stocks and flows, the basic energy statistics also serve as **input in the compilation of energy balances**

Main Energy Flows in Energy Statistics

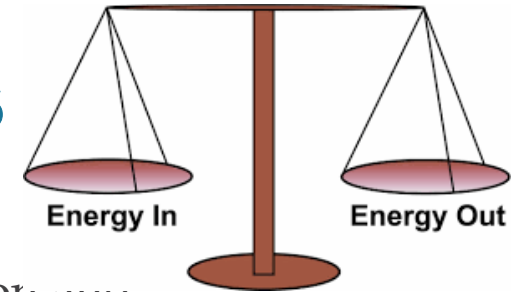


International Reporting of Basic Energy Statistics



- Each year, the International Energy Agency, Eurostat and the United Nations collect annual energy statistics using a set of **five joint questionnaires**
- Basic energy statistics are collected on:
 1. Oil
 2. Coal
 3. Gas
 4. Electricity and heat
 5. Renewables
- The questionnaires are designed to describe all flows related to the specific type of energy
- The flows covered by the basic energy statistics also **provide the basis for compiling energy balances**

Scope of Basic Energy Balances



- The **energy balances** provide a framework for compilation and reconciliation of data on all energy products entering, exiting and used within that territory
- The **purpose of the energy balance** is to;
 - > **Enhance the relevance of the basic energy statistics** by providing comprehensive and reconciled data on the energy situation on a national territory basis
 - > Provide **comprehensive information on the energy supply and demand on the national territory** in order to understand the energy security situation, the effective functioning of energy markets and other relevant policy goals as well as to formulate energy policies
 - > Serve as a **quality tool** to ensure completeness, consistency and comparability of basic statistics
- The energy balance shows the relationship between energy products and flows
- For each energy product, the supply equals the final consumption

The Energy Balance – Overview of Structure

Item code	Flows	Energy products					<i>of which: Renewables</i>
		E1	E2	E3	...	Total	
1.1	Primary production						
1.2	Imports						
1.3	Exports						
1.4	International Bunkers						
1.5	Stock change (closing-opening)						
1	Total energy supply						
2	<i>Statistical difference</i>						
3	<i>Transfers</i>						
4	Transformation processes						
5	Energy Industries own use						
6	Losses						
7	Final consumption						
7.1	Final energy consumption						
7.1.1	Manufacturing, const. and non-fuel mining industries, Total						
	Iron and steel						
	Chemical and petrochemical						
	Other Industries						
7.1.2	Transport, total						
	Road						
	Rail						
	Domestic aviation						
	Domestic navigation						
	Other Transport						
7.1.3	Other, total						
	<i>Of which: Agriculture, forestry and fishing</i>						
	Households						
7.2	Non energy use						

The Link with Energy Accounts

- Basic energy statistics and energy balances provides the **starting point** in the compilation of physical flow energy accounts
- Most of the flows described in the basic energy statistics and the energy balances can be **shown directly in the energy accounts**
- It is important to be aware that even though that there are many similarities between energy balances and energy accounts, some **crucial differences** also exists
 - > Differences in terminology and concepts
 - > Conceptual differences territory principle / residence principle
 - > Treatment of transport

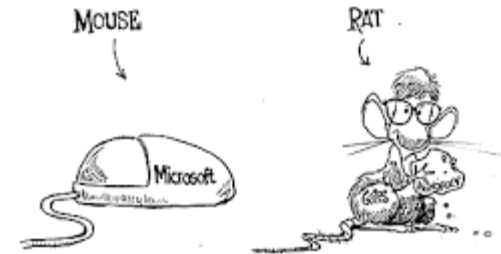
Differences in terminology

- In the energy balance, the supply is defined as:

Total energy supply =

- + Primary energy production
 - + Import of primary and secondary energy
 - Export of primary and secondary energy
 - International (aviation and marine) bunkers
 - Stock changes
- In the energy accounts the supply is defined as output+imports
 - In the energy accounts *intermediate consumption, households final consumption, exports, international bunkers and stock changes* are considered the uses
 - In the energy balance, *final consumption* refers to the use of fuels, electricity and heat delivered to final consumers being it industries or households. In the energy accounts, *final consumption* refers to the households use of energy only
 - Stocks and changes in stocks defined in the energy balances equals inventories and changes in inventories defined in the energy accounts

Terminology



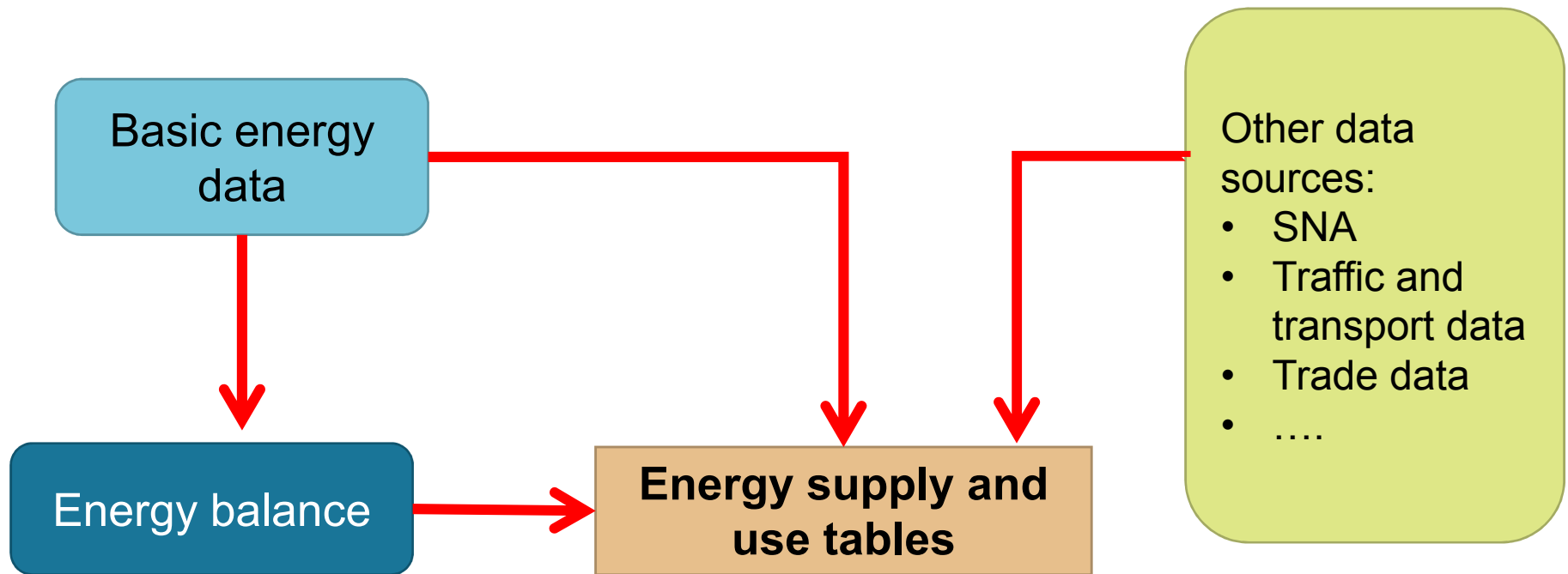
Compilation of energy PSUTs

5 basic steps:

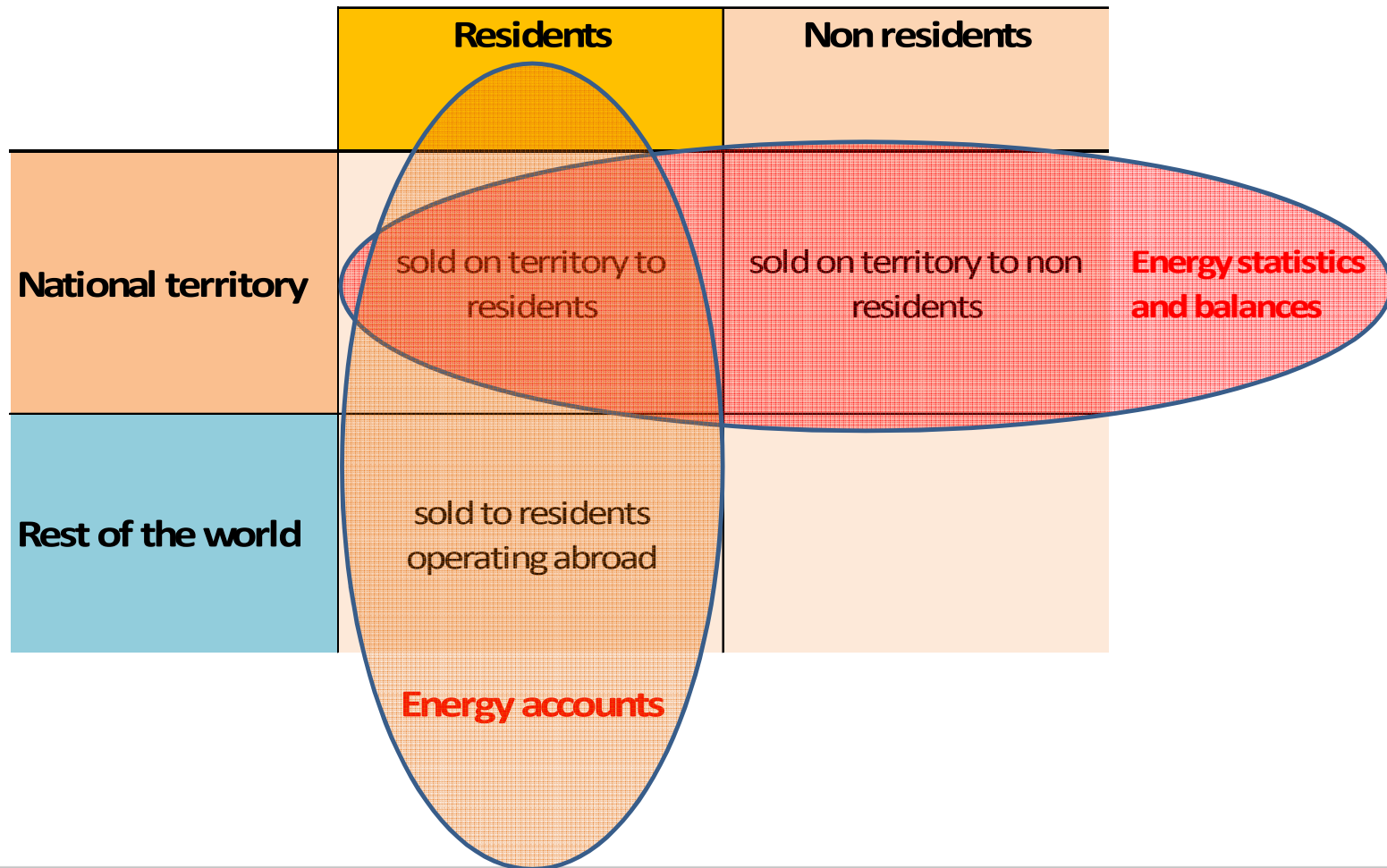
- 1) Find the right source data
 - Basic energy data
 - Energy balances
 - Additional data
- 2) Put the data in the accounting format
- 3) Make corrections for the resident principle (SEEA/SNA concepts)
- 4) Allocate supply and use to ISIC
- 5) Make sure supply = use and input = output (accounting identities)



Source data



Conceptual difference: territory vs residence principle



From energy balances to energy accounts: Adjustments to the resident principle

- Energy use by residents abroad needs to be added to the imports in the supply table and added to the use of energy in the relevant industry in the use table
- Energy use by non-residents on the territory needs to be registered as an exports in the use table



Bridge table

Domestic energy use - residence principle

PJ

Total activities by national residents abroad (+)

National fishing vessels operating abroad

Land transport operated by national residents abroad

Water transport operated by national residents abroad

Air transport operated by national residents abroad

Total activities by non-residents on the territory (-)

Land transport operated by non-residents on the territory

Water transport operated by non-residents on the territory

Air transport operated by non-residents on the territory

Other adjustments and statistical discrepancies (+/-)

Gross inland energy consumption - territory principle

From energy balances to energy accounts

Breakdown by ISIC industries

- The **primary production of energy** needs to be broken down by ISIC industries in the energy accounts supply table
- The **use of energy in the sectors** needs to be broken down by ISIC industries in the energy accounts use table
- The latter also goes for the use of energy accounted for in the **transport sector part** of the energy balances. Whereas in the energy balance, the transport is grouped into a single sector, in the energy accounts, the use of energy for transport purposes is broken down by the ISIC industries and the households



From the Five Joint Questionnaires to Physical Energy Flow Accounts (PEFA)



- Based on the five joint questionnaires used for the data collection by the International Energy Agency, Eurostat and the United Nations, Eurostat has developed a tool that can be used to compile PEFA. It's commonly referred to as **the PEFA builder**
- The PEFA builder converts the information in the five questionnaires into the reporting format suggested for the European Union regulation on Physical Energy Flow accounts.
- In order to adjust to the residence principle, it's necessary to load the country specific additional data items into the PEFA builder
- The PEFA builder has built in default breakdowns that can be used for the breakdown of the use of energy by NACE industries (A64)
- If specific country break downs are available, those can be loaded into the PEFA builder

More information on the PEFA builder

- The PEFA builder as well as a tutorial and information on the methodology can be downloaded and found at

<http://ec.europa.eu/eurostat/web/environment/methodology>

The Eurostat logo consists of a solid teal horizontal bar above the word "eurostat" in a lowercase, teal, sans-serif font.

**Physical Energy Flow
Accounts (PEFA)**

More information

- UN: International Recommendations for Energy Statistics
 - > <http://unstats.un.org/unsd/energy/ires/>
- UN: Energy Statistics Compilers Manual
 - > <http://unstats.un.org/unsd/energy/ESCM.htm>
- Eurostat: Physical Energy Flow Accounts
 - > <http://ec.europa.eu/eurostat/web/environment/methodology>

Exercise international transport

Based on the underlying information a) fill in the bridge table and b) add this information to the PEFA tables.

- The annual report of the main domestic airline contains the following information: total use of jetfuel equals 160 PJ. 50 % is bunkered at the national airport
- The main domestic airline has a domestic market share of 80 percent. In addition two other domestic airlines are active, but these provide only domestic flights.
- International trade statistics provide the following information: direct import of jetfuel is equal to 240 PJ.
- The total use of diesel by the road transport sector is 100 PJ and 40 PJ by households.
- Traffic statistics provide the following information: Total annual kilometres driven by road transport sector is 200 mln kilometres, of which 25 % occurs abroad. Total annual kilometres driven by road transport sector is 100 mln kilometres, of which 10 % occurs abroad.
- Non residents use 10 PJ diesel
- Jetfuel and diesel are not produced domestically

Bridge table

Domestic energy use - residence principle

PJ

Total activities by national residents abroad (+)

National fishing vessels operating abroad

Land transport operated by national residents abroad

Water transport operated by national residents abroad

Air transport operated by national residents abroad

Total activities by non-residents on the territory (-)

Land transport operated by non-residents on the territory

Water transport operated by non-residents on the territory

Air transport operated by non-residents on the territory

Other adjustments and statistical discrepancies (+/-)

Gross inland energy consumption - territory principle

Summary

- Basic energy statistics serves product/flow specific purposes
- The energy balance offers a framework for analysis of energy flows
- Basic energy statistics and energy balances provide the basis for compiling energy accounts
- Basic energy statistics and energy balances need to be supplemented with additional information in order to meet the requirements of the energy accounts
- Energy accounts are fully compatible with national accounts, whereas energy balances follow another structure and have another boundary. Energy accounts are designed in order to analyze the relationship between the flows of energy and the macro economic development
- The PEFA builder provide a tool that can be used to compile physical energy flow accounts based on the five joint questionnaires reported to the International Energy Agency, Eurostat and the UN

