



**Standard documentation  
Meta information**  
(definitions, explanations, methods, quality)

on

**Energy Accounts**

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STATISTICS AUSTRIA  
A-1110 Vienna, Guglgasse 13  
Tel.: +43-1-71128-0  
[www.statistik.at](http://www.statistik.at)

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## 1. Summary and important hints

Energy Accounts (EA) are a system of total accounts and are compiled by using a multitude of data sources. They provide information about the supply and use of energy commodities in physical and energetic units. The supply consists of production and imports of energy commodities. The use shows the intermediate use of energy commodities, their non energy use, losses, stock changes, exports and the consumption of households. There is no international standard that defines how to compile EA. The basic idea of developing EA is to allocate Energy balances (EB) data according to the format needed for generating the integrated NAMEA (National Accounting Matrix including Environmental Accounts). NAMEA stands for National Accounting Matrix including Environmental Accounts. Generally NAMEA accounts combine two or more data systems for an improved comparability of different data types and thus form the basis for more fundamental analyses. The integrated NAMEA follows the economic definitions of the System of National Accounts (SNA).

EA consist of a supply and a use side. They serve as bridge tables and enable the linking of the energy information provided in the EB with the sector breakdowns of the System of the integrated NAMEA (National Accounting Matrix including Environmental Accounts) that corresponds with the format of SNA but focuses on the use side only. EB and EA thereby use in a large part the same data sources.

EB and the SNA have been developed as independent statistical systems which are subject to their own definitions and classifications. With developing EA the differences between the two frameworks were identified. They were analysed and a method was found how to link these two systems. EA are made up for each energy commodity given in the EB, but are based on the same definitions and classifications as the SNA. As a result it is possible using EA to render a direct comparison between energy and economic information.

The background of this action was the fact that the NAMEA and EB were not comparable with each other directly as they follow different definitions and classifications.

The sectoral breakdown of Austrias EB follows the international formate used by Eurostat und the International Energy Agency (IEA). This format was used for publishing nationally and internationally harmonised EB and thereby avoiding confusion. EB provide information about the supply and consumption of energy. It follows the territorial definition of a country, i.e. that the boundary of EB follows the national territory. In Austria this energy information is provided by Statistics Austria and the Ministry for Economy, Family and Youth<sup>1</sup> in the five joint questionnaires (JQ) for IEA, UNECE and Eurostat. All energy produced and consumed at the national level is viewed in both physical and energy units.

In opposition to this in the SNA the supply and use of energy is recorded in monetary units following the residence principle.

One further difference is that in the EB transport is defined functionally. All energy consumed related to transport activities is assigned to separate items corresponding to rail, road traffic, pipeline transport, inland waterways and aviation. In contrast to this in the SNA the overall use of transport fuels is allocated to the corresponding NACE 2-digit sector that is actually using the fuel. This difference partly causes essential misunderstandings.

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<sup>1</sup> formerly Ministry for Economy and Labour

Based on the data used for compiling EB adjustments have been made to provide the EB data in a NAMEA accounts compatible format.

**The main differences between the Energy balances and the Energy Accounts:**

| Energy Balances                       | Energy Accounts              |
|---------------------------------------|------------------------------|
| IEA/UNECE/Eurostat sectoral breakdown | NACE 2-digit breakdown       |
| Territory principle                   | Residence principle          |
| Supply = Consumption                  | Supply = Use                 |
| Transport defined functionally        | Sectors defined economically |

After splitting up the functional defined transport sector and adopting the residence principle especially the decrease of energy use in the economically defined traffic sectors in comparison to the functionally defined transport sector as well as the increase in the other sectors (residential – and services sector) is conspicuous. Analysing the two different frameworks shows especially for the transport fuels the differences that occur using the territory principle versus the residence principle.

After consideration all available information about the fuel use of resident units, 63-82% of the EB supply of gasoline and 65-84% of the EB supply of diesel are explained.

As supply data is appraised as completely and under the assumption that the surveys cover the fuel use of resident units also completely, the difference between the supply and the use must be purchases by non-resident units from resident units (exports) and purchases by resident units from non-resident units (imports). So there is more diesel and gasoline exported than imported.

This is especially relevant because the prices of gasoline and diesel in Austria are lower than in most of the neighbouring countries. This might be a reason why non-residents refuel their vehicles in Austria. Austria is a small and open economy and an considerable transit country. Transit traffic has to cover only short distances for going through Austria, so e.g. lorries that refuel in can save money. Because of its geographic location it possesses a high proportion of tourism. As far as the neighbour countries use the same currency this allows a better comparability between the prices.

This assumption can be verified by an study on the effects of tank tourism on the fuel consumption and the development of CO<sub>2</sub>-Emissions in Austria<sup>2</sup>. This study deals with fuels purchased on the national territory that are not used within the austrian territory. The study focuses on reasons for this entity that is called tank tourism and supports our assumptions.

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<sup>2</sup> Cf. BMLFUW – Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (2005b): Abschätzung der Auswirkungen des Tanktourismus auf den Treibstoffverbrauch und die Entwicklung der CO<sub>2</sub>-Emissionen in Österreich. Wien (available in German only).

## 2. General information

### Type of statistics

Total account

### Subject area

Department of Energy Statistics

### Responsible organisational unit and contact details

Directorate Spatial Statistics, Department Environment and Energy;

Barbara Mayer

phone: +43 (1) 71128- 7624, e-mail: Barbara.Mayer@statistik.gv.at

Dr. Wolfgang Bittermann

phone: +43 (1) 71128- 7315, e-mail: Wolfgang.Bittermann@statistik.gv.at

### Objective and purpose, history

EA serve as link between the framework of the SNA and that of the EB. Before accomplishing Energy Accounts a direct comparison of these two statistics was partly possible only due to the fact that EB and the SNA follow different classifications and definitions. This matter of fact was problematic especially for the integrated NAMEA that focuses on the comparison of economic data with environmental data. One of its main data inputs are the EB items final energy consumption, consumption of energy industries and transformation input. Its intention is among others to provide information that could be used to identify the economic development of economies with respect to their energy consumption, for instance is there are decoupling of economic growth from the use of energy.

By developing EA the energy consumption data is available not only according to the IEA/UNECE/Eurostat classification, but also following the classification of the SNA. So it allows the comparison of the information provided by EB with economic data.

### Periodicity

EA were compiled in 2008 as times series from 1999 to 2007 and are expected to be published annually as from now on.

### Contracting entity

Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

### Main users

- Statistics Austria,
- Directorate Spatial Statistics,
- Science
- Eurostat

## Legal basis

Federal Statistics Act 2000 in the current version; private law contract

## 3. Statistical concepts and methodology

### Subject of the statistics

Energy Accounts (EA) are a system of total accounts and are compiled by using a multitude of data sources. They provide information about the supply and use of energy commodities in physical and energetic units. The supply consists of production and imports of energy commodities. The use shows the intermediate use of energy commodities, their non energy use, losses, stock changes, exports and the consumption of households. There is no international standard that defines how to compile EA. The basic idea of developing EA is to allocate EB data according to the format needed for generating the integrated NAMEA (National Accounting Matrix including Environmental Accounts). Therefore the intermediate use of the EA is broken down according to economic sectors (NACE classification). This allows the comparison of economic data with energy use data.

In order to link the EB with the SNA following steps were required:

1. Bridging the sector breakdowns of the IEA/UNECE/Eurostat JQ with the NACE 2-digit level
2. Splitting up the functionally defined transport sector of the IEA/UNECE/Eurostat JQ into the economically based NACE sectors
3. Transforming the balance equation as used in the EB framework into the balance equation as used in the SNA framework
4. Adjusting the territory principle as used in the EB to the residence principle as used in the SNA
5. Elimination of items not included in the SNA, such as electricity generated for the own use

### Linking the classifications

EB and National Accounts use different statistical classifications. To avoid misunderstandings it is important that statistical systems that are going to be compared use the same definitions. For linking EB data with the SNA the aggregation of the classification must be consistent. Therefore in the first step the EB data that serve as input data for compiling the integrated NAMEA have to be adjusted to the NACE 2-digit level as used in the SNA and in the NAMEA respectively. This concerns the EB items final energy consumption, consumption of energy industries and transformation input.

EB follow the IEA/Eurostat/UNECE classification which is based on NACE as the SNA classification, but sectors are aggregated in another way.

The following tables show the differences between the two classification levels.

#### Energy industry sectors:

| EB sectors | NACE | Energy Industry sectors SNA  |
|------------|------|--|
| E1         | 11   | Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying |

| EB sectors | NACE | Energy Industry sectors SNA                    |
|------------|------|--|
| E2         | 10   | Mining of coal and lignite; extraction of peat |
| E2         | 12   | Mining of uranium and thorium ores             |
| E3         | 232  | Manufacture of refined petroleum products      |
| E4         | 231  | Manufacture of coke                            |
| E4         | 233  | Manufacture of nuclear fuels                   |
| E5         | 401  | Electricity supply                             |
| E6         | 402  | Gas supply                                     |
| E7         | 403  | District heat supply                           |

The NACE 2-digit sectors 23 and 40 are more disaggregated following the EB framework than that of the SNA. These can be adopted by summing them up respectively. E1 can be attributed to NACE 11 directly whereas E2 following the EB framework is disaggregated into the two NACE 2-digit sectors 10 and 12 following the SNA.

**Industry sectors:**

| EB sectors | NACE                      | Industry sectors SNA  |
|------------|---------------------------|---|
| I7         | 13                        | Mining of metal ores  |
| I7         | 14                        | Other mining and quarrying  |
| I8         | 15                        | Manufacture of food products and beverages  |
| I8         | 16                        | Manufacture of tobacco products   |
| I12        | 17                        | Manufacture of textiles   |
| I12        | 18                        | Manufacture of wearing apparel; dressing and dyeing of fur  |
| I12        | 19                        | Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear                               |
| I10        | 20                        | Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials |
| I9         | 21                        | Manufacture of pulp, paper and paper products   |
| I9         | 22                        | Publishing, printing and reproduction of recorded media   |
| I13        | 25                        | Manufacture of rubber and plastic products  |
| I4         | 26                        | Manufacture of other non-metallic mineral products  |
| I1         | 271, 272, 273, 2751, 2752 | Manufacture of basic metals: Iron and Steel   |
| I3         | 274, 2753, 2754           | Manufacture of basic metals: Non-ferrous Metals   |
| I6         | 28                        | Manufacture of fabricated metal products, except machinery and equipment  |
| I6         | 29                        | Manufacture of machinery and equipment n.e.c.   |
| I6         | 30                        | Manufacture of office machinery and computers   |
| I6         | 31                        | Manufacture of electrical machinery and apparatus n.e.c.  |
| I6         | 32                        | Manufacture of radio, television and communication equipment and apparatus  |
| I13        | 33                        | Manufacture of medical, precision and optical instruments, watches and clocks   |
| I5         | 34                        | Manufacture of motor vehicles, trailers and semi-trailers   |
| I5         | 35                        | Manufacture of other transport equipment  |
| I13        | 36                        | Manufacture of furniture; manufacturing n.e.c.  |

| EB sectors | NACE | Industry sectors SNA |
|------------|------|----------------------|
| I13        | 37   | Recycling            |
| I11        | 45   | Construction         |

Most of the EB sectors are aggregated on a higher level than the sectors following the SNA NACE 2-digit level. For an unambiguous attribution of IEA/UNECE/Eurostat sector information to the NACE 2-digit level and vice versa the IEA/UNECE/Eurostat sectors I1 and I3 have to be split up on the NACE 4-digit level as the sectors E4, E3, E5, E6, E7 have to be on the NACE 3-digit level respectively. In the EA these data used for compiling EB are analysed on the NACE 2-digit level and respectively on the NACE 3-digit level and NACE 4-digit level as far as required.

EB are compiled by using a multitude of data sources. Surveys in the specific fields vary and as a result the data availability on the NACE 2-digit level does.

**Energy Industries/ Industries:** For the industry sectors the main data sources for calculating the final energy consumption are the material input statistics as well as the survey on the energy consumption by small to medium-sized industries. Both survey the total fuel input and are conducted by Statistics Austria. The material input statistics covers the overall fuel consumption of about 2.500 establishments with the largest turnover annually whereas the second survey covers small to medium sized establishments additionally every second year.

As a result of the surveys that are conducted by Statistics Austria it is possible to allocate the surveyed information to NACE 2-digit, NACE 3-digit and NACE 4-digit respectively.

All establishments that were queried in the context of surveys conducted by Statistics Austria can be classified on the NACE 6-digit level following the NACE-classification corresponding to their main economic activity. This is done by using Statistics Austrias business register (BR) which comprises all economically active establishments and allocates every single establishment corresponding to its economic main activity following the classifications concepts of Eurostat.

As far as external data is used such as for calculating the item transformation input also Statistics Austrias BR is used for classifying the energy use data of establishments according to their economic main activity.

Data for calculating the transformation input are delivered by E-Control GmbH<sup>3</sup>. E-Control GmbH is entrusted with monitoring, supporting and, where necessary, regulating the implementation of the liberalisation of the Austrian electricity and natural gas markets and surveys apart others data about transformation input and –output. By using the BR on the classification of establishments the transformation input is allocated to NACE. This availability of data in the (energy) industry sectors according to the needs allows the appraisal of the final energy consumption as well as the consumption of energy industries and the transformation input of the (energy) industry sectors following the SNA NACE classification directly.

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<sup>3</sup> Cf. [http://www.e-control.at/portal/page/portal/ECONTROL\\_HOME](http://www.e-control.at/portal/page/portal/ECONTROL_HOME)



**Service sectors:**

| Service sector EB | NACE-2 | Service sector SNA  |
|-------------------|--------|---|
| O1                | 41     | Collection, purification and distribution of water  |
| O1                | 50     | Sale, maintenance and repair of motor vehicles and motorcycles; retail sale services of automotive fuel |
| O1                | 51     | Wholesale trade and commission trade, except of motor vehicles and motorcycles                          |
| O1                | 52     | Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods          |
| O1                | 55     | Hotels and restaurants  |
| O1                | 60     | Land transport; transport via pipelines   |
| O1                | 61     | Water transport   |
| O1                | 62     | Air transport   |
| O1                | 63     | Supporting and auxiliary transport activities; activities of travel agencies                            |
| O1                | 64     | Post and telecommunications   |
| O1                | 65     | Financial intermediation  |
| O1                | 66     | Insurance and pension funding   |
| O1                | 67     | Activities auxiliary to financial intermediation  |
| O1                | 70     | Real estate activities  |
| O1                | 71     | Renting of machinery and equipment without operator and of personal and household goods                 |
| O1                | 72     | Computer and related activities   |
| O1                | 73     | Research and development  |
| O1                | 74     | Other business activities   |
| O1                | 75     | Public administration and defence; compulsory social security   |
| O1                | 80     | Education   |
| O1                | 85     | Health and social work  |
| O1                | 90     | Sewage and refuse disposal, sanitation and similar activities   |
| O1                | 91     | Activities of membership organisation n.e.c.  |
| O1                | 92     | Recreational, cultural and sporting activities  |
| O1                | 93     | Other service activities  |
| O1                | 95     | Private households with employed persons  |
| O1                | 99     | Extra-territorial organisations and bodies  |

The highest aggregated sector in the EB is the service sector. This is because there is only one sector defined for services in comparison to the SNA that includes 27 service sectors.

As EB do not focus on providing the fuel consumption in the service sector on such a detailed level, data availability on NACE 2-digit level is inferior to that in the industry sector. Up to now there has been only one in-depth survey on the service sector. This survey was carried out with the reference year 2003. The next in-depth survey on the service sector is planned for the reference year 2008 with follow-ups every five years. As far as available, the surveyed data is used for breaking down the fuel consumption on the NACE 2-digit level.

This survey regarding the year 2003 covers the sectors 41, 50, 51, 52, 55, 60, 63 to 67, 70 to 74, 92 and 93. The sectors 61, 62 and 75 to 91 were not included in the survey.

For the years 1999 to 2002 and 2004 to 2006 the consumption of the surveyed NACE 2-digit sectors is extrapolated proportionately according to the overall development of EB total final energy consumption in the service sector.

For the sectors 75, 80, 85 there has been an other survey concerning the energy consumption of public administration in the years 1999 to 2001. These results in the corresponding years are taken into account. Under the assumption that the rate of change of the final energy consumption of the special NACE 2-digit sectors is equal, over time, to that of the total final energy consumption in the service sector for the years 2002 to 2006 again the final energy consumption is extrapolated proportionately according to the development of the total final energy consumption in the service sector.

In the event of no or partly no information available about the final fuel consumption on the NACE 2-digit level it is estimated by using following models:

1. The total final consumption less the surveyed respectively surveyed and extrapolated consumption is disaggregated according to the rate of expenditures on CPA goods of the particular NACE 2-digit sector. CPA is the statistical Classification of Products by Activity in the European Economic Community. This information is available in the Supply and Use Tables. The SUT include information about the use in monetary values, for products of economic sectors on NACE 2-digit level. In the SUT as part of the SNA products are aggregated on a higher level than fuels included in EB as they are classified according to CPA. For example CPA 10 in the SUT includes all coal products as hard coal, lignite, peat etc. So the expenditures of NACE 2-digit sectors are not comparable with the used fuels directly, but the quota is a good indication for it. The percentage of expenditures is adopted for disaggregating the fuels and sectors when there is no data available.

2. The survey on the final energy consumption in the service sector 2003 did not survey all energy fuels either. This was due to the fact that the survey concentrated on the main energy fuels only such as gasoline, diesel, LPG, natural gas, fuel oil, biomass, wood, electricity and district heating. When no information is available for the consumption of fuels from this survey at all also expenditure information from the SUT is used assuming that the use of the EB fuels included in products following CPA are allocated relative equal within a CPA product.

Therefore the expenditures on energy classified by CPA-goods is used and a proportion of expenditures is calculated on the NACE 2-digit level for disaggregating the total final energy consumption of the NACE 2-digit sectors.

As already mentioned in the field of the service sector data availability on NACE-2-digit is inferior to that in the industry sector. Statistics Austria is working on upgrading data base in this field and in the future the results of coming surveys will be included and are expected to be considered by generating moving averages.

**Other sectors:**

| Service sector EB | NACE-2 | Service sector SNA |
|-------------------|--------|--------------------|
| O3                | 01     | Agriculture        |
| O2                |        | Private households |

For the household sector as well as for the agricultural sector that are both consistent with NACE-2-digit there is no disaggregation needed.

As the transport sector is more disaggregated in the energy balances than in the SNA there is no adjustment needed concerning the sector breakdowns, as these sectors can be summed up.

Nevertheless special regard has to be paid to the transport sector as there are used different approaches in the EB in comparison to the SNA. This circumstance is dealt with in the following section.

### ***Splitting up the functional defined transport sector***

In the EB the item final energy consumption in the Transport sector covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing. So the transport sector is defined functionally and all energy consumed related to transport activities is assigned to separate items corresponding to rail, road traffic, pipeline transport, inland waterways and aviation.

Transport fuels used off-road for for example digging should not be included as road transport.

In contrast to this following the SNA the use of fuels by transport activities is attributed to the corresponding economic sector that is actually using it. With the EB as starting point for linking the two systems the energy fuels used for transport purposes in the EB have to be split up and allocated to the corresponding economically based NACE 2-digit sector.

For splitting up the total consumption and allocating the off-road use to the sector that is actually using it and the road use to the transport sectors the results of the useful energy survey are used. It focuses on the final energy consumption according to useful energy categories such as transport, space heating and air condition, vapor production, industrial furnaces, stationary engines, lightning and computing as well as electrochemical purposes. Consequently it offers the quota of fuels used for transport purposes.

In the EB the supply must equal the consumption. All transport fuels not allocated to the corresponding economic sector for off-road use after using the useful energy analyses are allocated to the transport sector without considering which economic unit is actually using it so that the supply equals the consumption.

For generating EA the total consumption can be allocated as a whole to the corresponding NACE 2-digit sector.

For **(energy-) industry sectors** the material input statistics and the random sample survey on the energy consumption by small to medium-sized establishments in industry both provide data about the overall consumption of energy fuels independently from which purpose they are used for. For compiling EB this data is split into energy used for transport purposes and non-transport purposes by the useful energy analyses. As already mentioned for compiling the use of fuels following the SNA the total input data accordant to these two surveys in the (energy-) industry sectors is allocated directly to the corresponding sectors.

In the **household sector** the survey on the domestic energy consumption survey analyses data about the annual kilometres households cover in the context of road traffic, the amount of fuels used and the average fuel consumption per 100 kilometres. This survey presently is conducted every second year. The accordingly information is available for the years 2000, 2004 and 2006. This allows the calculation of energy fuels used by households for transport purposes by multiplying the three variables. The calculated amount is allocated to the households consumption. For appraising the consumed motor fuels in between these years (moving) averages are used.

In the **agricultural sector** data from the EB are taken over one-to-one, as off-road fuel consumption is not allocated to the transport sectors. It is assumed that transport fuel consumption includes off-road use solely.

The survey on the consumption of energy fuels in the **service sector** surveyed the total use of fuels independently from which purpose they are used for. For disaggregating the fuel con-

sumption following the framework of the EB this total consumption is disaggregated into use for transport purposes and off-road use by using the results of the useful energy survey. For calculating the consumption following the SNA framework the data as described under point “Linking the classifications” is used before adopting the useful energy analyses.

As the SNA includes all energy related to the activities of resident units no matter if the activities take place inside or outside the territory one further adjustment is needed. This concerns **international aviation**, as following the framework of the SNA fuels consumed by Austrian Airlines are to be accounted for in the EA. Therefore the fuels used by Austrian airlines are comprised.

### Linking the balance equations

EB and the SNA furthermore vary in their balance equation and in their wording. The differences are related to the respective purpose of each system. In the EB the supply must equal the consumption and in the SNA the supply must equal the use, but the term supply is defined differently in the EB in comparison to the SNA. This corresponds to the different principles – the territory principle vs. the residence principle that the systems use respectively. In the EB the supply concept accounts for fuels available at the national territory. In contrast to this in the SNA the supply is made up as the total of the two items production and imports. Consequently it includes all fuels that are available for use. The definition of use of energy fuels in the EA implies that the use caused by Austrian residents in Austria and abroad is included. In contrast to this EB account for the consumption of energy within the Austrian territory and can be classified by both residents as well as non-residents.

#### Energy Balances:

| Supply                        | Consumption                                     |
|-------------------------------|---|
| Indigenous Production         | Transformation Input                            |
| + Stock Changes <sub>EB</sub> | - Transformation Output                         |
| + Imports <sub>EB</sub>       | + Non energy use                                |
| - Exports <sub>EB</sub>       | + Losses <sub>EB</sub>                          |
|                               | + Consumption of energy industries              |
|                               | + Final energy consumption (without households) |
|                               | + Final energy consumption (households)         |

#### Energy Accounts:

| Supply                  | Use                           |
|-------------------------|-------------------------------|
| Production              | Intermediate Use              |
| + Imports <sub>EA</sub> | + Non energy use              |
|                         | + Consumption of households   |
|                         | + Exports <sub>EA</sub>       |
|                         | + Stock Changes <sub>EA</sub> |
|                         | + Losses <sub>EA</sub>        |

EB differentiate between indigenous production (= primary production) and transformation output (= secondary production) whereas the EA account for production as a whole.

On the use side the intermediate use as in the SNA is disaggregated into the EB items final energy consumption, consumption of energy industries and transformation input. The consumption

of households in the EA corresponds to the item final energy consumption of households in the EB.

In their wording imports and exports correspond in the EB and in the SNA, but they mean something different. Imports corresponding to the EB are all fuels crossing the borders, whereas imports in the definition of the SNA are all fuels purchased by resident units from non resident units .

The balance equation used in the EB framework is adjusted to the balance equation as it is used in the SUT of the SNA framework. The supply consists of production and imports. The use in the EA is the sum of the intermediate use, non energy use, the consumption of households, stock changes, losses and exports.

The supply and use tables developed consist of one worksheet for every fuel included in the EB with separate rows for industries and columns for every year.

### ***Adjusting the territory principle to the residence principle***

As already mentioned the EB follow the territory principle whereas the EA follow as the SNA the residence principle. All consumption of energy by residents are included in the EA irrespective of where it takes place. Therefore adjustments have to be made for fuels purchased by non-resident units from resident units (exports) and the quantities purchased by residents from non-resident units (imports).

Adjustments concern especially the household sector and international aviation and there in the first instance fuels used for transport purposes.

As already described the survey on the domestic energy consumption provides the information about the annual kilometres **households** cover in the context of road traffic, the fuel used and the average fuel consumption per 100 kilometres. This allows calculating the fuel consumption for transport purposes of the domestic households independently from if the fuels are purchased in Austria or abroad.

EA include the consumption of energy fuels purchased by Austrian airlines in Austria and foreign airports. For **international aviation** the use of Austria's airlines is taken into account. Therefore the use of kerosene was surveyed.

The survey on energy consumption of the **service sector** regarding the year 2003 also covered the total fuel consumption independent of the fuels were purchased locally or abroad. This was extrapolated and the fuel consumptions was calculated before applying the useful energy survey. For this reason all fuels applied by resident establishments of the service sector are captured in the EA independent of where the fuels were purchased.

### ***Further adjustments***

In the SNA goods and services produced as well as used by the same establishment in one reporting period are not reported separately, as production on the one hand and the use on the other hand cancel each other out. They are not included in calculating the production value in monetary units. Therefore electricity generated by autoproducers for their own use, that is included in the EB, is identified and the overall electricity generation is reduced by it in the EA.

As in the EB only traded heat is defined as district heating following the EB definitions there is no own production of district heating. Therefore in the EA no district heating generated by establishments for their own use has to be subtracted.

## Observed unit

Not relevant

## Data source

For compiling EA a multitude of data sources are used, including primary statistics conducted by Statistics Austria and other statistical bodies like E-Control GmbH und BMWFJ (former BMWA) as well as administrative data.

In the following the main data sources are displayed. In case of surveys conducted by Statistics Austria additional information is available on the Statistics Austria webpage.

- [Sample Survey on energy consumption of small to medium-sized establishments in manufacturing industries in 2002, 2004 and 2006](#) (Statistics Austria)

This survey was conducted the first time in January and February 2004 for the reporting period 2002 and was repeated for the reporting years 2004 and 2006. The results were integrated into the Energy Balances and the years between two surveys were extrapolated with heating degree days and moving averages.

Additionally to the detailed description of the survey and the questionnaire the methodological report includes the summary tables broken down by sectors and regions. The results are released in the framework of Energy Balances and Energy Accounts only but not independently because of the specific characteristic of the survey.

- [Sample Survey on Energy Consumption in the Service Sector 2003](#) (Statistics Austria)

Additionally to the detailed description of the survey and the questionnaire the methodological report includes the summary tables broken down by sectors and regions. The results are released in the framework of Energy Balances and Energy Accounts only but not independently because of the specific characteristic of the survey.

- [Sample Survey on Energy Consumption of Households](#) (Statistics Austria)

This sample survey is conducted every second year and covers some 0.6% of Austrian households. The results were integrated into the Energy Balances and the years between two surveys were extrapolated with heating degree days and moving averages. The survey is the main data source for fuel wood consumption in Austria. Although the sample size is relatively high the statistical errors are high, too, in case of rarely used fuels.

For the time being the survey is the only source for the sectoral breakdown of ambient heat and solar heat. Therefore the large statistical error leads to a high sectoral uncertainty. For the overall consumption it is not relevant because the data are collected with another survey (Annually survey on installed heat pumps, solar- and PV - panels).

Since 2004 the data is collected biannually with CATI (Computer Assisted Telephone Interview). The last survey was conducted in the 3<sup>rd</sup> quarter of 2008.

- [Short Term Statistics](#) (KJE, Statistics Austria, Metadata report available in German only)

Short term statistics is the main data source for lignite mining and oil and gas exploration. Since 2002 the "Characteristics of district heat industries" are not published any more by the Austrian Natural Gas and District Heat Association. Therefore Short Term Statistics is the only data source for district heat production for the time being with the disadvantage that only transformation output but no corresponding transformation input is surveyed.

- [Material Input Statistics](#) (Statistics Austria, Metadata report available in German only)

Material input statistics is the main data source for the sectoral breakdown of the consumption of all fuels used in industries. Its disadvantage is that it displays the overall consumption. Therefore Material Input Statistics has to be adapted to the balance struc-

ture with other surveys e. g. CHP-statistics to separate transformation input and final energy consumption.

- [Foreign Trade Statistics](#) (Statistics Austria, Metadata report available in German only)  
Foreign Trade Statistics is a main data source for solid fuels (coal, wood and biofuels) and natural gas imports.
- [Form III \(BMWFJ\)](#)  
Basing on the “Oil stockholding and reporting (amendment) act“ this survey conducted by BMWFJ includes foreign trade, transformation, stock keeping and putting into circulation at the first trade level. Therefore Form III provides a comprehensive and consistent data set for crude oil and oil products. Furthermore the fuel definition in Form III is identically with the balances needs and the survey is the exclusive data source for compiling refinery balances. Petrol coke which is of increasing importance in manufacturing of other non-metallic mineral products is excluded and has to be amended from Foreign Trade Statistics.
- [Coal Statistics](#) (BMWFJ)  
This survey is an important complement to Foreign Trade Statistics and gives additionally information on supply of solid fossil fuels on a sectoral base. Although the data are rough and not always comprehensive it is an important source for estimating stock changes.
- [Survey based on Electricity Statistics Directive](#) (E-Control GmbH)  
This survey is the bases for implementing electricity and the fuel electricity is generating from into the Energy Balances. Since 2002 power plants with capacities lower than 1MWe are excluded from the survey. Some difficulties occur in linking the plant based data with data from Material Input Statistics which is collected on establishment level.
- [CHP-Statistics](#) (E-Control GmbH)  
Since 2001 this survey conducted by E-Control is a main data source for district heat production that includes corresponding transformation input figures, too. E-Control does not apply the 75% criterion for transformation efficiency. All electricity production is displayed as CHP production. Therefore the electricity generation data provided has to be split into CHP and electricity generation only figures by applying the 75% efficiency criterion. Some difficulties occur in linking the plant based data with data from the Material Input Statistics which is collected on establishment level.
- [Green Electricity Statistics](#) (E-Control GmbH)  
This data set was released by E-Control 2003 firstly and includes most power plants < 1MWe that are excluded by the [Electricity Act \(ELWOG\)](#) from the two surveys mentioned above. For the reporting period 2006 the data are available on a regional base, too.
- [Survey based on Gas Statistics Directive](#) (E-Control GmbH)  
Since the reporting period 2003 this survey is the main data source for extraction, stock changes and overall consumption of natural gas as well as for calculation of export figures. Until 2002 BMWFJ was responsible for this survey.
- [Survey on number and installed capacities of district heat plants](#) (Chamber of Agriculture)  
Basing on this survey and together with production characteristics - surveyed in 1996 by the Austrian Biomass Association and 2005 by Statistics Austria- and heating degree days annually production of district heat is estimated.  
  
The results of this annual survey are the core element of the model for extrapolating the district heat production as well as the corresponding transformation inputs.

- [Survey on Fuel Input and Heat Production of Biomass Lighted District Heat Plants](#) (Statistics Austria, Metadata report available in German only)  
This survey was conducted the first time in 2005. All plant operators were asked to report the annual heat production and the corresponding transformation input broken down by fuel types. The next survey is planned for the year 2010.
- [Characteristics of District Heat Industries](#) (Austrian Natural Gas and District Heat Association)  
Up to and including the year 2001 this annually release was the main data source for district heat production and corresponding transformation inputs. Since 2002 the detailed data is not available any more
- [Characteristics of gas industries](#) (Austrian Natural Gas and District Heat Association)  
Up to and including the year 2001 this annually release was the main data source for regional natural gas supply. Since 2002 the detailed data is not available any more
- [Statistics on windmill based electricity generation](#) (IG Windkraft)  
This dataset is the basis for the regionalisation of overall annual wind power figures provided by E-Control GmbH.
- [Survey on Annually Installed Numbers and Capacities of Heat Pumps, Solar- and PV-Panels](#) (IFF Klagenfurt, since 2008 TU-Wien)  
Basing on this survey the annually production of ambient and solar heat as well as not grid connected PV based electricity generation is estimated. The disadvantage of the survey is that it contains no hint whether an installation is a new one or a replacement. Details one can find using the following link
- <http://www.solarwaerme.at/docs/370.pdf> (available in German only)

### Reporting unit and respondents

Not relevant as EA include no survey

For several surveys one can find detailed information in the following standard documentations:

- [Sample Survey on Energy Consumption of Small to Medium-Sized Establishments in Manufacturing Industries in 2002, 2004 and 2006](#) (Statistics Austria)
- [Sample survey on energy consumption of the public and private services 2003](#) (Statistics Austria)
- [Sample survey on energy consumption of households](#) (Statistics Austria)
- [Survey on fuel input and heat production of biomass lighted district heat plants](#) (Statistics Austria, Metadata report available in German only)
- [Shot term statistics](#) (Metadata report available in German only)
- [Material input statistics](#) (Metadata report available in German only)
- [Foreign trade statistics](#) (Metadata report available in German only)

### Survey format

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).

### Sample characteristics

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).



## **Survey techniques/data transmission**

### Survey techniques

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).

### Data transmission

Not relevant (not a survey in the conventional sense)

## **Survey questionnaire (including explanatory notes)**

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).

## **Survey participation (mandatory or voluntary)**

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).

## **Variables surveyed and derived indicators (incl. definitions)**

### Variables surveyed

Not a survey in the conventional sense (for detailed information see chapter *Reporting unit and respondents*).

### Variables derived

Displayed is each of the balance fuels for each balance aggregate. The fuels are presented in fuel specific physical units (t, m<sup>3</sup>, MWh) and for comparability reasons in TJ. The conversions are based on the average fuel specific heating values.

## **Classifications**

The breakdown by economic sectors follows the NACE classification.

## **Regional breakdown of the results**

NUTS 0 level.

# **4. Production of statistics, processing, quality assurance measures**

## **Data capture**

Not relevant (not a survey in the conventional sense)

## **Coding**

Not relevant (not a survey in the conventional sense)

## **Editing and verification of data sources used**

In preparing statistics for the EA, care has constantly been taken to ensure the best possible utilisation of existing/available data sources. However, the data sources used have some unavoidable inconsistencies.

In other areas, gaps in the data, which would require enormous time and effort to fill (if at all possible), necessitate qualified estimates. The resolution of such contradictions and/or the selection of the most suitable source necessitate the use of internal or external expertise that cor-

responds to the "state of the art". Changing requirements and new sources – even where the definitions remain the same – inevitably lead to the need for revisions that must be made to the entire time series in order to avoid discontinuities as far as possible. The EA represent a living system that requires on-going revision.

In addition, the sources and calculations used for the Accounts will continuously be coordinated with each other and checked for inconsistencies.

The data from all sources is checked for consistency with supply and consumption information and, if relevant, complemented with non-recorded stock movements, particularly in the household and service sectors. In order to avoid systematic errors, a careful check by means of a time series analysis is made to ensure that these stock additions are not continuously in one direction.

### **Imputation (where responses are missing or data incomplete)**

Not relevant (not a survey in the conventional sense)

### **Grossing up procedures**

Not relevant

### **Compilation of the final data set, (other) models and statistical estimation techniques used**

During preparation of the Energy Accounts, each energy sub-source is assigned to the relevant balance item. The intermediate use is subdivided into sectors as classified NACE. A wide range of data sources is used, and these sources have very varied origins with different survey aims. If the survey does not allow the data to be clearly assigned to a sector it is sectorised on the basis of the Business Register (BR).

## **5. Publication (Accessibility)**

The main results are published on the homepage of Statistics Austria

## **6. Quality**

### **6.1. Relevance**

The criterion of relevance captures if statistics answer to the users needs whereas users needs naturally differ. EA are especially relevant for compiling the integrated NAMEA (National Accounting Matrix including Environmental Accounts) that compares economic and environment-related data directly. The integrated NAMEA also follows the definitions and classifications of the SNA. As a significant input the integrated NAMEA uses the EB items final energy use, the use of energy industries and the transformation input. Before accomplishing the action these items were available on the IEA/UNECE/Eurostat sector breakdowns only. Because of the differences in the classifications a direct linking with the NACE 2-digit level was possible partly only.

Compiling EA is also relevant in terms of checking and improving data quality as the linkage between the SNA and the EB brings out inconsistencies between those two systems that partially use the same data sources.

## **6.2. Accuracy**

### **6.2.1 Sampling effects, representativeness**

Not relevant

### **6.2.2. Non-sampling effects**

#### **Quality of data sources used**

The quality of data sources used basically can be appraised as well except of fuel wood, small-scale hydropower and not traded biomass.

#### **Coverage (misclassifications, undercoverage / overcoverage)**

Undercoverage by trend in case of fuels surveyed on supply side only

#### **Missing responses (unit non-response, item non-response)**

Not relevant

#### **Measurement errors (entry errors)**

Not relevant

#### **Processing errors**

None known

#### **Model assumption effects**

None known

## **6.3. Timeliness and punctuality**

Firstly a time series from 1999 to 2007 was compiled. The results of a reporting year intended to be prepared at the end of the subsequent year respectively.

## **6.4. Comparability**

For compiling EA the concepts and classifications used in the SNA were adopted. These are given by ESVG 95. Basically the comparability between several years is given.

The comparability to EB is given concerning the included fuels, comparability to the SUT is given concerning the balance equation and the residence principle. Comparability to NAMEA is given concerning the sectoral break down of the intermediate use.

Concerning the international comparability due to the use of international standardized concepts it should be kept in mind that to a large extend consistency should be given. Certainly variations can arise in the case of the fact that often national statistical systems of several countries are designed in another way.

## **6.5. Coherence**

The Coherence of a statistic gears to how far results and concepts are comparable to other statistical products. Energy Accounts follow in many points the definitions of the SNA. It is very important to point out the differences to other statistical systems to avoid confusion. Therefore efforts of harmonizing different systems do exist.

## **LIST OF ABBREVIATIONS**

|               |   |
|---------------|---|
| <b>BR:</b>    | Business register   |
| <b>CPA:</b>   | Statistical Classification of Products by Activity in the EEC                   |
| <b>EA:</b>    | Energy Accounts   |
| <b>EB:</b>    | Energy Balances   |
| <b>IEA:</b>   | International Energy Agency   |
| <b>JQ:</b>    | Joint Questionnaires  |
| <b>NACE:</b>  | The Statistical Classification of Economic Activities in the European Community |
| <b>NAMEA:</b> | National Accounting Matrix including Environmental Accounts                     |
| <b>NEA:</b>   | The useful energy analyses  |
| <b>SNA:</b>   | System of National Accounts   |
| <b>SUT:</b>   | Supply and Use Tables   |
| <b>IOT:</b>   | Input-Output Tables   |
| <b>UNECE</b>  | United Nations Economic Commission for Europe                                   |