

**Documentation of statistics for  
Energy Accounts for Denmark 2023**

## 1 Introduction

The energy accounts link data on energy with the national accounts. The energy accounts are based on the same definitions and classifications as the national accounts. This implies that the use of energy as described in the energy accounts is fully consistent with the description of the economic activity as described in the national accounts. In 1974, the first energy accounts for Denmark were made as a reaction to the first oil crisis. At the same time the accounts were made for the years back to 1966.

## 2 Statistical presentation

The energy accounts account for 46 different energy commodities. The energy accounts are made up in specific physical quantities (tonnes, m<sup>3</sup>, GWh), energy units (joule) and gross energy consumption. The energy account is published in newsletters (Nyt) and in the statistical database.

### 2.1 Data description

The energy accounts are for each energy commodity made up in physical quantities. The system is based on the identity that the supply must equal the use. The supply is made up as the total of Danish production etc. and imports. The use is the total exports, waste and cable losses, changes in inventories, input in 117 industries as well as private consumption broken down by five groups of private consumption.

Furthermore, the energy accounts form the basis for the calculation of a set of indicators on energy consumption and production by different municipality groups (LABY33).

### 2.2 Classification system

The Energy Accounts use the same industry classification as the national accounts with 117 industries. The national accounts industry classification is based on the Danish industry classification from 2007 (DB07). DB07 is a Danish version of the EU classification NACE rev. 2 and the UN classification ISIC. The national accounts industrial classifications is consistent with the 127 grouping of DB07 with few exemptions.

The following 46 energy products are included in the Energy Accounts. Energy products are grouped according to 8 energy types.

#### Oil Products

1. Crude oil (tonnes)
2. Refinery feedstocks (tonnes)
3. Refinery gas (tonnes)
4. LPG (tonnes)
5. LPG for transport (tonnes)
6. LVN (tonnes)
7. Motor gasoline, colored (tonnes) (discontinued from 2016)
8. Motor gasoline, unleaded (tonnes) (includes colored gasoline from 2016)
9. Motor gasoline, leaded (tonnes)
10. JP4 (tonnes)
11. Kerosene (tonnes)
12. Aviation gasoline (tonnes) (discontinued from 2016)
13. Jet petroleum (tonnes) (includes aviation gasoline from 2016)
14. Jet petroleum bunkered by Danish operated planes abroad (tonnes)

15. Gasoil (tonnes)
16. Diesel bunkered by Danish operated vehicles abroad (tonnes)
17. Diesel oil (tonnes)
18. Fuel oil (tonnes)
19. Fuel oil bunkered by Danish operated ships abroad (tonnes)
20. Waste oil (tonnes)
21. Petroleum coke (tonnes)
22. Orimulsion (tonnes)

#### Natural Gas

1. Natural gas 1, North Sea and imports (1000 Nm<sup>3</sup>)
2. Natural gas 2, large-scale consumers and exports (1000 Nm<sup>3</sup>) (discontinued from 2016)
3. Natural gas 3 to industries and households (1000 Nm<sup>3</sup>) (includes large-scale consumers and exports from 2016)

#### Coal and Coke

1. Coal (tonnes)
2. Coke (tonnes)
3. Brown coal briquettes (tonnes)

#### Waste

1. Waste, non-renewable (tonnes)

#### Renewable energy

1. Waste, renewable (tonnes)
2. Wind power (GWh)
3. Hydro power (GWh)
4. Solar power (GWh)
5. Solar heat (TJ)
6. Geothermal (TJ)
7. Straw (tonnes)
8. Firewood (1000 m<sup>3</sup>)
9. Wood chips (tonnes)
10. Wood pellets (tonnes)
11. Wood waste (tonnes)
12. Biogas (1000 Nm<sup>3</sup>)
13. Bio diesel, bio ethanol and bio oil (tonnes)
14. Heat pumps (TJ)

#### Converted types of energy

1. Electricity (GWh)
2. District heat (TJ)
3. Gas works gas (1000 Nm<sup>3</sup>)

In the energy accounts production of electricity and district heat are only placed within industrial classification 350010, 350030 and 383900. The relatively small amount of electricity and district heat produced by enterprises in other industries, are functionally placed in the mentioned industries.

Import and export of bio mass (wood chips and wood pellets) should be seen together as there can be classification issues.

Finally, a number of key figures for energy consumption and production (LABY33) are allocated to different [types of municipalities](#).

### **2.3 Sector coverage**

All sectors in the economy are covered by the statistics.

### **2.4 Statistical concepts and definitions**

**Basic Price:** Basic prices are for domestic production defined as the price ex factory, excl. of product taxes, net. For imports, they are the c.i.f. prices, i.e. the prices of the products at their arrival in Denmark, incl. transport and insurance expenses.

**Net Energy Consumption:** The production of electricity, district heat and town gas is based on inputs of other types of energy and are named converted types of energy. A direct aggregation of each energy commodity calculated into joule would therefore result in a double counting, because the content of energy in the converted types of energy already is represented in the power plants use of first and foremost coal, oil and natural gas.

In practice, the calculation of the net energy consumption is carried out by dividing the use of primary energy (e.g. coal, crude oil and natural gas) used in the production process at the electricity plants and district heat plants proportionately on the users of the individual converted energy commodities. Simultaneously, the use of primary energy in the conversion industries is reset to zero.

The conversion process involves a considerably loss of energy (the conversion loss). Therefore, the total energy content used in the production process is allocated to the final users of energy in the calculation of the net energy consumption

Furthermore, the electricity power plants consumption of energy is adjusted for the net imports of electricity, implying that this is also converted into primary energy.

**Energy Taxes:** The energy taxes include taxes on petrol, electricity, certain oil products, coal and natural gas. In addition to this, the CO<sub>2</sub>-tax, the SO<sub>2</sub>-tax and the NO<sub>x</sub>-tax is also accounted for. The SO<sub>2</sub>-tax is also paid for the use of straw and waste used as fuel at larger power plants.

**Purchasers' Prices:** The purchasers' prices are the price actually paid by the purchaser for a product, i.e. the market price. Consequently, this price may, in addition to the factory price of the product, include costs for transportation, trade margins, commodity tax and VAT.

### **2.5 Statistical unit**

The statistical unit is the local kind-of-activity unit, enterprise.

### **2.6 Statistical population**

All the units engaged in Danish economic activity.

### **2.7 Reference area**

Denmark.

## **2.8 Time coverage**

1966-2023

## **2.9 Base period**

Not relevant for these statistics.

## **2.10 Unit of measure**

Energy accounts in quantities are measured in tons, m<sup>3</sup>, GWh. In common units the measurement is done in gigajoule (GJ).

## **2.11 Reference period**

The reference period of the figures in the energy accounts is the calendar year.

## **2.12 Frequency of dissemination**

Annually.

## **2.13 Legal acts and other agreements**

Necessary according to Council Regulation 538/2014.

## **2.14 Cost and burden**

There is no direct response burden as the data are collected by others (see sources).

## **2.15 Comment**

[Webpage for energy and emission accounts.](#)

## **3 Statistical processing**

Energy accounts are compiled using a method of product balancing. Supply and use of each energy product are compiled in a way to ensure their equality and are balanced by utilizing all the relevant information from the available sources.

### **3.1 Source data**

The energy accounts are compiled on the basis of a number of sources.

Statistics Denmark's external trade statistics are used to decide the imports and exports of energy commodities. Statistics Denmark's production statistics are used to decide the production of certain energy commodities, e.g. petrol, gas oil and fuel oil.

Statistics Denmark's census of the manufacturing industries consumption of energy is used as the source for the manufacturing industries consumption of energy.

Information about the industrial companies' reimbursement of energy taxes is used as a source in the calculation of the consumption of electricity, natural gas, gas oil and fuel oil within parts of the commercial and service sector. These data are collected from the Danish Tax Agency.

Meter data from Energinet is used to calculate electricity consumption. This data has been included from the publication in 2021.

Data from the Danish Energy Authority is used to decide the different inputs of energy in the energy sectors, i.e. production of electricity and heat. The statistics include input at the large-scale and small-scale power units and district heating plants. Furthermore, information from the Energy Authority on the consumption of energy in agriculture, horticulture, fisheries, and construction as well as private consumption (the households) is used as a source to the physical use of energy. In addition to this, a series of other sources is used to determine the specific values.

Information about the production of crude oil and natural gas in volumes as well as monetary values is also obtained from the Danish Energy Authority.

### **3.2 Frequency of data collection**

Annually.

### **3.3 Data collection**

Data is obtained from the different primary sources.

### **3.4 Data validation**

During the compilation of the energy accounts a variety of sources are involved. Verification of the external consistency of data between the data sources is part of the quality control in the process of compilation of the energy accounts. This is an important part of the quality assurance in the development of energy accounts. More specifically, the data sources on supply of an energy product with data sources on use of the energy product. If there is an observed inconsistency in the data sources there will be an evaluation of the data sources in order to decide which should be given more weight. Normally, inconsistencies is a result of missing reporting and hence source data need to be revised. Furthermore, there is a check of production of energy products and the input used for production.

### **3.5 Data compilation**

Initially a comprehensive data validation is made in the primary statistics.

The calculation of the consumption of fuel oil bunkered by Danish operated ships abroad, jet petroleum bunkered by Danish planes and diesel for Danish operated vehicles abroad is based on information obtained from the balance of payments on the companies' expenses for fuel oil and jet petroleum. The physical quantities are calculated by using information on the relevant unit price.

### **3.6 Adjustment**

No corrections, apart from the already mentioned under the validity and data processing, is undertaken.

## **4 Relevance**

The energy accounts are used by ministries, governmental agencies and organizations as a part of the surveillance of measures in the field of energy policy. Within Statistics Denmark, the energy accounts are used as basis for the supply use tables of the national accounts and as basis for the compilation of the air emissions accounts. The energy accounts are furthermore used as basis for input-output model based analyses.

### **4.1 User Needs**

The energy accounts are used by ministries, governmental agencies and organizations as a part of the surveillance of measures in the field of energy policy. Within Statistics Denmark, the energy accounts are used as basis for a part of the supply use tables of the national accounts and as basis for the compilation of the air emissions accounts (e.g. CO<sub>2</sub>), which are published as a part of Statistics Denmark's environmental accounts. Finally, the energy accounts are used as basis for input-output model based analyses. The energy accounts is part of the data used for the environmental and climate economic model GreenREFORM which has been developed by DREAM.

### **4.2 User Satisfaction**

The energy accounts is reviewed by expert users in expert committee for Environmental-Economic Accounts and Statistics and is reviewed by central stakeholders in the advisory board for statistics and data on green transition.

### **4.3 Data completeness rate**

Data is complete.

## **5 Accuracy and reliability**

Precision and reliability are estimated to be great for the overall energy consumption thanks to energy statistics from the Danish Energy Agency as well as statistics on production and foreign trade with energy products. The precision of the distribution of energy use by industry is estimated to be less accurate.

### **5.1 Overall accuracy**

The overall accuracy can be regarded as good as far as the information on overall supply and use of energy products is concerned. Generally the uncertainty is bigger when it comes to information on the energy use of specific energy products by the individual industries. For some industries observations of the the energy use are available, while for others the information on energy use is based on estimations. In the latter case the accuracy is generally lower.

When compiling the energy accounts it is simultaneously ensured that all parts of the final accounts are completed, so the description is comprehensive for the entire energy balance. It is ensured simultaneously that the different data appears consistent and without conflicts - both across energy products and over time. In order to achieve this, it is necessary to make a number of assumptions. In practice this means that you base a portion of data on calculations, distributions and in some cases on estimates. This implies that some of the information is subject to considerable uncertainty, and that in some cases is best considered as model calculations that indicate the structure, rather than precise figures for that area.

Stock changes includes also some inconsistencies between different sources.

There are no calculations regarding uncertainty.

### **5.2 Sampling error**

Not relevant for these statistics.

### **5.3 Non-sampling error**

Generally the uncertainty is bigger when it comes to information on the energy use of specific energy products by the individual industries. For some industries observations of the energy use are available, while for others the information on energy use is based on estimations. In the latter case the accuracy is generally lower. This is the case for service industries, where the distribution of energy consumption by industries is based on a combination of information on energy tax reimbursement and employment statistics.

### **5.4 Quality management**

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

### **5.5 Quality assurance**

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.



## 5.6 Quality assessment

The primary sources used for the compilation of energy accounts have undergone quality control in the respective institutions, where they have been produced. Compilation of energy accounts includes various consistency checks of data. Energy accounts follow the same definitions and classifications as national accounts and are compiled in accordance with international standards. All this ensures the high quality of the resulting energy accounts.

## 5.7 Data revision - policy

Statistics Denmark revises published figures in accordance with the [Revision Policy for Statistics Denmark](#). The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.

## 5.8 Data revision practice

After the first publication of figures, they are revised the following two years and are then considered final. The first publication of the Energy Accounts is for some parts based on the same distributions of energy consumption as the previous year. For the first revision on the following year most sources for distribution of energy consumption is available which is the cause of revisions. The second revision of the Energy Accounts is consistent with the final National Accounts. When there are main revisions of the national accounts every 5 years, there can also be revisions of the Energy Accounts for longer time series. The latest main revision is in 2024, which includes revision of the time series back to 2005. There has been made an analysis of revisions for the publications in 2019-2021. The revisions calculated as the weighted mean absolute percentage error (WMAPE) is in the range 0,42-9,32.

## 6 Timeliness and punctuality

The statistics is published annually approx. 6 months after the reference period. However, on the most detailed level the energy accounts are published approx. 18 months after the reference period. The first publication 6 months after the reference period includes only data aggregated on 36 industry groups. The statistics is normally published without delays on the announced date.

### 6.1 Timeliness and time lag - final results

The statistics are published annually approx. 6 months after the reference period. The first publication includes more aggregated industry groupings( 10a3, 19a2, 36a2). The more detailed energy accounts are published approx. 18 months after the reference period. Approx. 30 months after the reference year the final figures are published.

### 6.2 Punctuality

The statistics are usually published according to the schedule.

## **7 Comparability**

The energy accounts are available in a comparable form back to 1966, which allows for consistent time series analysis. The energy accounts were revised for all year with the publication on 20 November 2013. The main focus of the revision was to ensure comparability and consistency over time. The statistics follow international standards and are thus largely comparable with similar statistics from other countries.

### **7.1 Comparability - geographical**

The statistics follows international standards and has a high degree of comparability with other international statistics that follow the same acknowledge international principles.

### **7.2 Comparability over time**

The energy accounts are available in a comparable form back to 1966, which allows for consistent time series analysis. The energy accounts from 2008 and onwards are based on data sources based on the Danish Industry Classification of All Economic Activities 2007 (DB07), whereas the accounts for the years from 1966-2007 are based on calculations on an older set of accounts. In the calculations it has been attempted to make the necessary adjustments in order to comply with new industry classifications.

From the reference year 2007 the product 'diesel' only includes diesel used for road transport while stocks, imports and exports are included in 'gasoil'.

The energy accounts has been published in <http://www.statbank.dk> with monetary values until the reference year 2016. These figures were to a large extent based on models without primary sources. Hence it has been decided to discontinue this publication.

### **7.3 Coherence - cross domain**

The energy accounts are based on the same definitions and classifications as the national accounts.

With the revision of the energy accounts a new allocation of the production of electricity and district heat has been introduced. Electricity is now produced by 350010 Production and distribution of electricity and by 383900 Sewerage; waste collection, treatment and disposal activities etc. District heat is produced by 350010 Production and distribution of electricity, 350030 Steam and hot water supply, and by 383900 Waste management and materials recovery.

Other energy statistics, for instance the Danish Energy Authorities energy statistics accounts for the consumption of energy, which can be classified by both Danish residents as well as by non-residents within the Danish territory. The Danish Energy Authorities energy statistics is based on the guidelines from the International Energy Agency (IEA).

Compared to other energy statistics this implies that the energy accounts based on the national accounts principles also include the consumption of energy caused by international transport activities carried out by Danish residents. That is, the consumption of fuels for Danish operated vehicles, planes and ships abroad are included in these energy accounts. Diesel, jet petroleum and fuel oil purchased abroad are indicated a separate products.

#### **7.4 Coherence - internal**

Internal data consistency is good. Before each new data release of the energy accounts, the data is validated to be consistent with the final national accounts.

### **8 Accessibility and clarity**

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. Theme publications etc. may be published at other times of the day. Each publishing of data is followed by a news release. Energy accounts is included in the statistical ten-year review published annually. The data is simultaneously published on the [webpage](#), where it is available as matrices in Excel, SAS, GAUSS and GAMS formats.

#### **8.1 Release calendar**

The publication date appears in the release calendar. The date is confirmed in the weeks before.

#### **8.3 User access**

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published.

#### **8.2 Release calendar access**

The Release Calendar can be accessed on our English website: [Release Calendar](#).

#### **8.4 News release**

[Subject page](#)

#### **8.5 Publications**

- [Subject page for Energy and emission accounts](#)

The following publication available only in Danish: - [Statistisk Tiårsoversigt](#)

## 8.6 On-line database

The statistics are published in the StatBank under the subject [Energy and air emissions](#) in the following tables:

- [ENE2HA](#): Energy Account in common units (detailed table) by use, type of energy and time
- [ENE3H](#): Gross energy consumption in common units by industry, type of energy and time
- [ENE1HO](#): Energy Account in specific units (summary table) by supply and use, type of energy and time
- [ENE1HT](#): Energy Account in specific units (detailed table) by supply, type of energy and time
- [ENE1HA](#): Energy Account in specific units (detailed table) by use, type of energy and time
- [ENE2HO](#): Energy Account in common units (summary table) by supply and use, type of energy and time
- [ENE2HT](#): Energy Account in common units (detailed table) by supply, type of energy and time
- [LABY33](#): Key figures for energy consumption and production by municipality group, indicator and unit
- [SDGo7021](#): Renewable energy' share of total gross energy consumption

## 8.7 Micro-data access

Data is published at the most detailed level available.

## 8.8 Other

The energy accounts deliver data for the emission accounts and the national accounts. In the internal delivery to national accounts the energy accounts includes monetary values.

## 8.9 Confidentiality - policy

Follows Statistics Denmark's discretion policy.

## 8.10 Confidentiality - data treatment

Not relevant for these statistics.

## 8.11 Documentation on methodology

A general description of environmental accounts and national accounts is available in the "System of Environmental-Economic Accounting Central Framework". (White cover publication). United Nations et. al. 2012".

A note on methodology for the LABY33 table (Key figures for energy consumption and production by municipality group, indicator and unit) can be accessed [here \(in Danish\)](#).

## 8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

## **9 Contact**

The administrative placement of these statistics are in the division of National Accounts. The person responsible is Thomas Eisler, tel. +45 39 17 30 68, e-mail: tme@dst.dk

### **9.1 Contact organisation**

Statistics Denmark

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