



STATISTICS
DENMARK

Introduction of DB07 in the Danish Energy Accounts

Methods and data sources

by

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September 2011

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Preface

On 15 September 2011, the energy accounts are published by the new national accounts industry classification based on the *Danish Industrial Classification of All Economic Activities 2007* (DB07) for the first time.

This note describes the overall process for the implementation of the new industry classification as well as the methods and the data sources.

The Danish energy accounts are available free of charge on the Internet. There are two different ways of downloading the energy accounts data from Statistics Denmark's homepage.

Firstly, data are available in Statistics Denmark's online databank at www.statbank.dk/ene1n (and [/ene2n](http://www.statbank.dk/ene2n), [/ene3n](http://www.statbank.dk/ene3n), [/ene4n](http://www.statbank.dk/ene4n)), which offers the possibility of extracting either complete tables or sections of the energy accounts.

Secondly, www.dst.dk/inputoutput provides users with the possibility of downloading entire sets of energy accounts in Excel-, GAMS-, Gauss- or SAS-formats.

This note is based on a report, which benefited from funding by the European Commission, Eurostat, through grant agreement no. 50304.2009.001-2009.248. The grant agreement included two reports. One entitled "Introduction of NACE, rev.2 in the Danish Energy Accounts" together with the study entitled "Renewables in the Danish Energy Accounts". This note is based on the first of the two reports.

Further details on the report can be obtained by contacting the author.

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1. Introduction of DB07 in the energy accounts

With the introduction of the *NACE, rev. 2*, which is EU's classification of economic activities, the *Danish Industrial Classification of All Economic Activities 2007* (DB07) was introduced. For data with reference year 2007 and onwards, every primary statistics published by Statistics Denmark have been based on this classification.

As a consequence of the DB07, a new national accounts industry classification has been developed. At the most detailed level, this classification contains 117 industries. The national accounts and the energy accounts are published by this classification for the first time 15 September 2011.

One main difference between the old national accounts industry classification and the new classification is that the new industry classification offers more detail on the tertiary industries and less detail on the primary and secondary industries.

This section outlines the steps in the process with the implementation of the new industry classification based on the DB07 in the energy accounts.

1.1. Relations between energy accounts and SUT

The energy accounts Statistics Denmark compiles energy accounts annually in both physical and monetary units.

The energy accounts include information on supply and use of energy at various mass and volume units (tonnes, cubic metres, etc. and joule), and monetary information at various price levels (basic prices, trade margins, taxes and subsidies, value added tax and market prices) for the years 1966 to 2009.

Close relationship with the national accounts The energy accounts are compiled in close connection with the compilation of the supply and use tables of the national accounts and the energy accounts are organised in such a way that they are directly compatible with the supply and use tables at the most detailed level.

Implementation of D07 in national accounts and energy accounts The monetary energy accounts are used directly as input into the system of supply and use tables of the Danish national accounts. The implementation of the DB07 in the energy accounts is thus very much linked to the introduction of the DB07 industry classification in the national accounts.

Danish system of supply and use tables The supply and use tables (SUT) of the Danish national accounts contain approximately 2350 products among which 25 energy products. The 25 energy products in the SUT is an aggregation of the 40 energy products accounted for in the energy accounts.

This very detailed level of information in the Danish national accounts is only compiled as part of the final version of the national accounts, which is published with a time lag of a little less than three years.

The implementation of the DB07 has been carried out at the most detailed level in the supply and use tables.

1.2. The implementation process

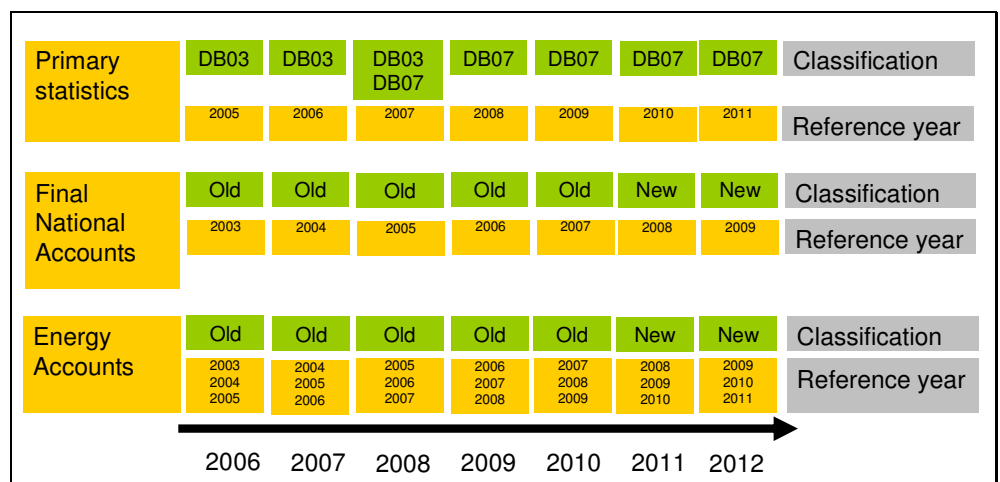
Energy accounts converted as one of the first systems

Apart from being an independent statistics, the energy accounts are, as already mentioned, also used as input into the supply and use table of the national accounts. In this regard, the energy accounts are seen as a pre-compilation system. In relation to the implementation of the DB07, this meant that the energy accounts had to be converted as one of the first parts of the national accounts and before the rest of the supply use tables were converted.

Double-coded businesses register

It is important to be aware that what made it possible to establish the double-coded file, as described below, is the fact that Statistics Denmark's businesses register, which contains thoroughly information on all the Danish companies in terms of kind-of-activity, economic data, employment etc., for 2007 was coded with information on both the old industry classification (DB03) and the new industry classification (DB07). That is, it was possible to have the primary statistics for 2007 by both the DB03 and the DB07 industry classifications.

Relationship between the primary statistics and the national accounts



Please notice that the whole time series from 1966 and onwards for the national accounts as well as the energy accounts will be published by the new industry classification by 15 September 2011.

The national accounts and the energy accounts will be fully based on primary statistics based on DB07 for data with reference year 2008 and onwards.

Energy accounts for 2008 and 2009, which were published in November 2010 was converted from the new national accounts industry classification to the old one using the numerical key developed for 2007 cf. section 1.2.4.

1.2.1. Features of the double-coded file

The double-coded file provides the cornerstone

The cornerstone in the introduction of the DB07 in the national accounts and thus the energy accounts is the development of the so called double-coded file. An example is given in the figure below.

The double-coded file is constructed in such a way that it is possible to group the information (in this case, the use of energy in either physical units or monetary values) by either the old national accounts industry classification or the new national accounts industry classification and by that, it is possible to present the information by either the new or the old industry classification.

Makes it possible to derive a numerical key

When the data is organised in this way, it becomes possible to calculate a numerical key, which can be used to convert information for other years by the old industry classification to the new industry classification.

Example: Part of a double coded file for a single energy product

2007

Double - coded file

Old national accounts industry	New national accounts industry	Old code	New code	Physical Energy Accounts		Monetary Energy Accounts				
				Physical quantities	Heating values	Basic prices	Trade margins	Taxes (Energy, CO ₂ , SO ₂)	VAT	Market prices
Agriculture	Agriculture, forestry, fishing	011009	010000							
Horticulture, orchards etc.	Agriculture, forestry, fishing	011209	010000							
Agricultural services; landscape gardeners etc.	Agriculture, forestry, fishing	014001	010000							
Agricultural services; landscape gardeners etc.	Services to buildings, cleaning	014001	810000							
Stadsgartnere, ikke-markedsm.	Services to buildings, cleaning	014002	810000							
Forestry	Forestry	020000	020000							
Fishing	Fishing	050000	030000							
Extr. of crude petroleum, natural gas etc.	Extraction of oil and gas	110000	060000							
Extr. of crude petroleum, natural gas etc.	Mining support service	110000	090000							
Extr. of gravel, clay, stone and salt etc.	Extraction of gravel and stone	140009	080090							
Production etc. of meat and meat products	Production of meat	151000	100010							
Processing etc. of fish and fish products	Processing of fish	152000	100020							
Processing etc. of fish and fish products	Other manufacture of food	152000	100050							
Processing etc. of fruit and vegetables	Other manufacture of food	153000	100050							
Mfr. of vegetable and animal oils and fats	Other manufacture of food	154000	100050							
Mfr. of dairy products	Manufacture of dairy products	155000	100030							
...							
...							

Double coded file on physical quantities based on primary statistics.

Double coded information based on numerical key derived from double coded file.

Double-coded file based on physical quantities

Before taking a closer look at the process with the establishing of the double-coded file, it is important to emphasize that the double-coded file is based on primary statistics and that the double-coded file has been established for the energy accounts in physical quantities only.

Numerical key derived from the double-coded file

Another thing that it is also very important to emphasize, is that the numerical key, which can be derived from the double-coded file, provides the basis for the conversion of the energy accounts in heating values as well as the various price levels, cf. the figure above.

1.2.2. The process in order to establish the double coded file for 2007*Implementation process*

In brief, the implementation process of the DB07 for the energy accounts can be summarised into:

First, double coded supply and use tables for 2007 containing information on both the old and the new national accounts industry classification was established. The data sources used in order to establish the double coded energy account is described below.

Secondly, it was analysed how this new break down of the use of energy measured in the monetary energy accounts fitted into the overall description of the economy in the supply and use tables, e.g. how it affected total value added. This led to the final version of the double coded file, i.e. the numerical key, which was used in order to convert data for previous years from the old national accounts industry classification to the new, i.e. the classifications based on DB03 and DB07 respectively.

Next, the numerical key derived from the double coded file for the year 2007, was used in order to convert energy accounts for the years 1966 to 2006.

Direct link between energy supply industries Finally, before looking deeper into the methods, it is important to emphasize that the implementation of the new industry classification only affects the use of energy i.e. intermediate consumption. There is a direct relationship between the industries supplying energy products in the new and the former industry classification.

Steps The overall process and all the steps gone through with relation to implementing the DB07 in the energy accounts and establishing the double coded file from which the conversion key can be derived follows below.

1. All theoretical relationships between DB03 and DB07 were identified. In the work with the national accounts and the energy accounts this was done by looking at information on payments of VAT.
2. All direct relationships between the former and new industry classification was identified.
3. Very small theoretical relationships and relationships unlikely to be of any relevance were ignored.
4. Reallocation of energy use between industries, between which no output was moved as a consequence of the new industry classification, was not allowed either. That is, if no output was moved, no input should be moved either.
5. The double coded file was established. This was done at the most detailed level possible and in most cases by using information from statistical sources coded with both the DB03 and the DB07 codes.
6. Alternatively, the distribution in the statistical sources based on DB07 was taken into account.
7. This was done for all energy products.
8. The effects of the new break down on the national accounts aggregates especially gross value added was analysed.

In principle, a specific annual double coded file for each product based on primary statistics for each reference year should have been established.

Numerical keys based on 2007 However, due to the amount of resources allocated to the implementation of the DB07, it was decided to establish a double coded file, i.e. a conversion key only for the year 2007 and use this key to convert all years.

Important to see the use of energy in the light of the whole economy This is very important to be aware of, especially for the conversion of the monetary energy accounts, which in the Danish situation, is used as input into the supply and use tables of the national accounts. If the same key is used for every year, it might lead to a situation, where the input allocated to one industry is too big when compared to the output. In this situation, the gross value added will be distorted compared to the description of the economy based on the old industry classification.

1.2.3. The data sources used for the double coded file for 2007

Where there is no direct relationship between the industries, the double coded file was established by using the following information. Examples on the distribution keys that can be derived from the double coded file are given in the table below.

Example: Input of electricity - Bridge between old and new classifications

Old National Accounts industry classification	From Old to New	New National Accounts industry classification
	Per cent	
310000 Mfr. of other electrical machinery and app.	7	260010 Manufact. of computers, etc.
310000 Mfr. of other electrical machinery and app.	14	270010 Mfr. of motors, etc.
310000 Mfr. of other electrical machinery and app.	21	270020 Mfr. of wires, cables
310000 Mfr. of other electrical machinery and app.	12	270030 Manuf. of household appl. etc.
310000 Mfr. of other electrical machinery and app.	45	280010 Mfr. of engines etc.
310000 Mfr. of other electrical machinery and app.	1	330000 Repair, inst. of machinery etc

Data by the old classification is converted to the new classification by multiplying with the percentage in the shaded column.

The data sources For the industries, where there is no direct link between the former and the new industry classification, the following data sources was used in order to establish the double coded file for 2007.

Data source: Manufacturing industries The part of the double coded file regarding the manufacturing industries was based on a census of the use of energy in the manufacturing industries in 2009.

Data source: Industries not paying VAT The part of the double coded file regarding other industries not paying VAT was established using information on the reimbursement of energy taxes coded with information on both the old and the new industry classification.

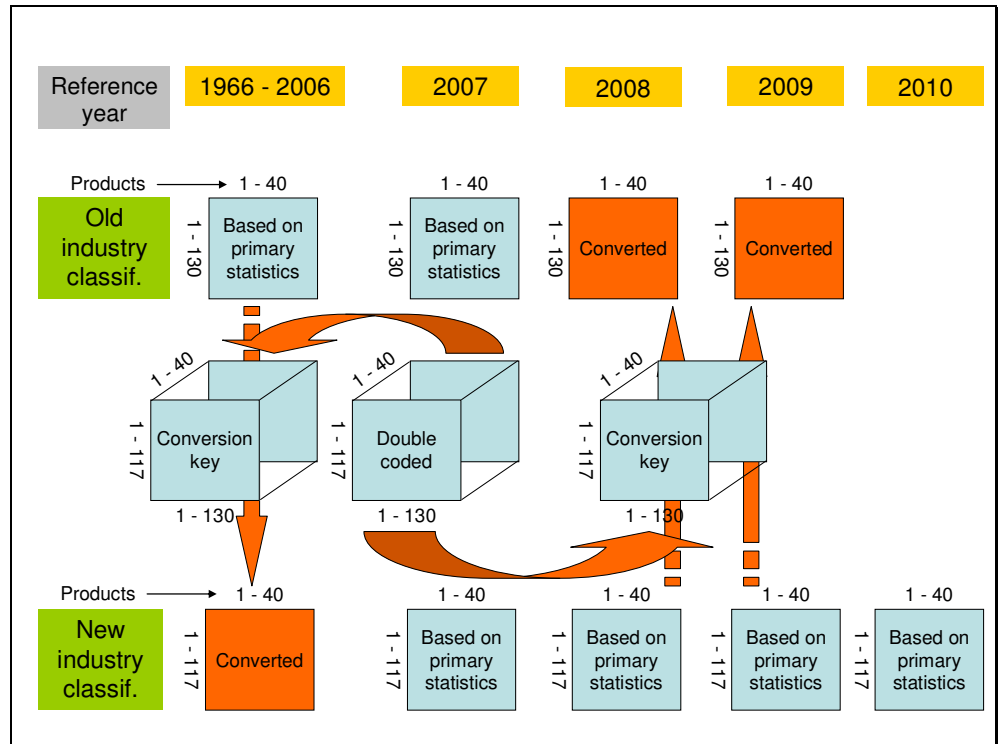
Data source: Other industries The part of the double coded file regarding all other industries, primarily the private and public services, was calculated using a weighted key based on information on employment containing information on both the old and the new industry classification.

1.2.4. Conversion of the energy accounts 1966 to 2006

Method Based on the conversion key derived from the double coded file for 2007, the energy accounts for every year between 1966 and 2006 was converted by multiplying the information on each energy product in the energy accounts with the specific product conversion key.

As emphasized in section 1.2.1, the energy accounts in physical units as well as the monetary energy accounts measured at the various price levels was all converted by using the same conversion key.

Illustration of the method applied to the conversion of specific reference years



Please notice that the energy accounts by the old national accounts industry classification was published for the last time in November 2010 whereas energy accounts by the new classification will be published on 15 September 2011.

1.3. Possible inadequacies caused by the applied method

Conversion affect quality

It is important to be aware that going from the old industry classification to the new industry classifications might affect the quality of the time series for the use of energy in the industries, which goes back to 1966.

However, since the conversion key for each product is based on the relationship between the old and the new industry classification measured in actual physical units, it follows that the use of energy measured in quantities and in basic prices is correct according to the key. There might be other possible shortcomings though.

Shortcomings

One possible shortcoming with the method outlined above, is that when using the same conversion key for the conversion of all years, the relative sizes between the industries might not be reflected correctly in a given historical year, e.g. *Software consultancy and supply* cannot be said to have the same size relative to other industries in 1985 as in 2007.

However, it is important to emphasize that this shortcoming is only relevant for industries where there is no direct link between the former and the new industry classification. It is of course important to be aware that this uncertainty gets bigger the further back one goes compared to the year 2007.

Taxes and VAT could have been distributed different

Another thing is that the conversion keys do not take into account that the degree to which, the industries are exempted of paying VAT and thus energy taxes, might have changed as a consequence of how the activity in the new industries, at the aggregation level of the national accounts, are weighed together.

In relation to the energy taxes and VAT this, however, only affects the distribution of the energy taxes since the total yields are given by the Government Finance Statistics. As a consequence, it is only the distribution of the use of energy valued at market prices that are affected.