ssions

nomy

STATISTICS
DENMARK

TemaPubl
2009:3

Greenhouse Gas Emissions from the Danish Economy

Ole Gravgård
Thomas Olsen
Peter Rørmose

STATISTICS DENMARK

Greenhouse Gas Emissions from the Danish Economy

TemaPubl 2009:3
Statistics Denmark
November 2009

Pdf-version:
Are free available on
www.dst.dk/publ/GreenhouseGas
ISBN 978-87-501-1809-1

Address:
Statistics Denmark
Sejrøgade 11
DK- 2100 København Ø

Phone: +45 39 17 39 17
e-mail: dst@dst.dk
www.dst.dk

Authors:
Ole Gravgård
Born 1956
Chief Adviser
With the National Accounts Division since 1993
M.Sc. in Economics from the University of Copenhagen 1987

Thomas Olsen
Born 1976
Senior Adviser
With the National Accounts Division since 2002
M.Sc. in Economics from the University of Copenhagen 2003

Peter Rørmose Jensen
Born 1963
Senior Adviser
With the National Accounts Division since 2005
M.Sc. in Economics from the University of Copenhagen 1992

Preface

The purpose of this publication *Greenhouse* Gas *Emissions from the Danish Economy,* which is based on Statistics Denmark's *Environmental Accounts for Denmark*, is to describe the emissions of greenhouse gases caused by Danish economic activities. The publication describes the extent of emissions from the industries and the households. Furthermore, the publication contains analytical results on the relationship between the structural characteristics of the Danish economy and the emissions of greenhouse gases.

In addition to information on the greenhouse gas emissions, the *Environmental Accounts for Denmark* include information on other types of air emissions, the use of energy and water, material flows, the Danish reserves of oil and natural gas in the North Sea and environmental taxes and subsidies. All information in the accounts is linked consistently with the Danish national accounts and the so-called input-output tables through common classifications and definitions. The link facilitates, as shown in this publication, analyses of the interaction between the economic activities and the environment.

The *Environmental Accounts for Denmark* are available free of charge on the Internet. Firstly, www.statbank.dk offers the possibility of extracting either complete tables or sections of the tables in the same way as other data are extracted from StatBank Denmark. Secondly, www.dst.dk/inputoutput provides users with the possibility of downloading entire sets of energy and emissions accounts as well as input-output tables.

This publication has been prepared in the National Accounts Division of Statistics Denmark by Chief Adviser Ole Gravgård, Senior Adviser Thomas Olsen and Senior Adviser Peter Rørmose. Poul Erik Olesen, Head of Section, has assisted with the translation of the text into English.

Statistics Denmark, November 2009

Jan Plovsing / Ole Berner

Contents

Explanation of symbols

0 0,0	Less than 0.5 of the unit applied
.	Category not applicable
. .	Data too uncertain
. . .	Data not available
-	Nil
*	Provisional or estimated figures

Summary

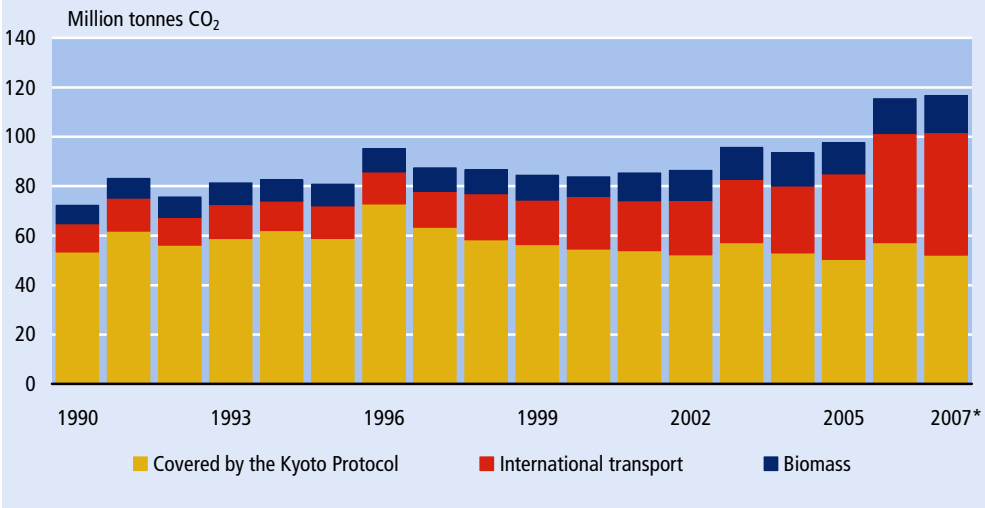
130 million tonnes of greenhouse gasses and 117 million tonnes of CO_2

The emissions of greenhouse gases from the Danish economy were 130 million tonnes in 2007, when the emissions of nitrous oxides and methane are converted into CO_2 equivalents and added to the emissions of CO_2. CO_2 is the predominant greenhouse gas, and the CO_2 emissions alone were 117 million tonnes, corresponding to 21 tonnes per Dane.

Only half of the emissions from the Danish economy are relevant for the Kyoto Protocol

These estimates include emissions from international sea and air transport as well as emissions from biomass used as fuel. If the latter categories are excluded, by using the principles for reporting to the Kyoto Protocol, the Danish emissions of all greenhouse gas emissions were 66 million tonnes CO_2 equivalents with CO_2 alone contributing 52 million tonnes. The latter figure corresponds to 10 tonnes per Dane. Thus, the reporting to the Kyoto protocol only accounts for less than half of the total emissions from the Danish economy.

Emissions of CO_2 from Danish economic activities



CO_2 emissions increased by 62 percent from 1990 to 2007

From 1990 to 2007, total emissions of CO_2 from Danish economic activities increased by 62 percent from 72 million tonnes to 117 million tonnes. This increase results, to a great degree, from an increase in Danish shipping activities. In 2007, the emissions caused by Danish sea transport in international waters accounted for more than 40 percent of the total CO_2 emissions.

90 percent of emissions came from the industries

Almost 90 percent of the overall greenhouse gas emissions from 1990 to 2007 came from Danish industries and the remaining 10 percent from Danish households. Three industry groups stand out. *Transport, post and telecommunications* is the greatest contributor (43 percent), not the least due to the large shipping activities. *Electricity, gas and water supply* accounts for approximately one fourth of all emissions (23 percent) due to the production of electricity and district heating, while *Agriculture, fishing and quarrying* contributes around 12 percent. Agriculture is the only industry group for which nitrous oxide and methane are of significant magnitude.

Predominantly emissions from use of oil products

For the industry groups and for the Danish economy as a whole, emissions from the use of oil products, is most dominant. Oil products account for 62 percent of the total CO_2 emissions. *Electricity, gas and water supply* is the only industry for which oil products do not dominate, and instead emissions from the use of coal make up the main part of the emissions. Emissions from combustion of natural gas are, generally relatively small, 10 percent of all CO_2 emissions.

Increase in biomass use

The use of biomass fuels by households and the energy supplying industries has increased since 1990, and the CO_2 emissions from the use of biomass have consequently gone up, implying that they contributed with 10 per cent of all CO_2

emissions in 2007. Frequently, these emissions from combustion of biomass are seen as neutral in relation to the greenhouse effect.

Decoupling of economic growth and emissions

From 1990 to 2007, Denmark experienced a period of considerable economic growth with GDP at constant prices rising by 40 percent. While the total CO_2 emissions, including the emissions from international transport activities rose even more, economic growth and CO_2 emissions are no longer linked together for most of the Danish industries. If emissions from international transport are excluded from the totals, the increase in CO_2 emissions was only 8 percent from 1990 to 2007, i.e. much lower than the economic growth. And if also emissions from biomass are excluded on the grounds that they are neutral to the greenhouse effect, emissions show a 4 percent decrease over the period.

Increased energy efficiency, cleaner energy and structural changes save CO_2 emissions

The reason that some decoupling have taken place is that most Danish industries have become more effective when they use energy, and they choose energy products with lower carbon content per unit of energy used. In addition, a relative larger share of service activities contributes to cutting the link between economic growth and CO_2 emissions. Model calculations show that if these CO_2 reducing developments had not taken place, the energy related CO_2 emissions from Danish industries would have been 23 million tonnes larger in 2007 than they really were. However, 8 million tonnes CO_2 alone were saved due to the use of energy products with less or no CO_2 emissions associated. This includes an increased use of biomass. 4 million tonnes of CO_2 were saved due to a more effective use of the energy, and changes in the structure of the economy (e.g. more service activities) saved another 11 million tonnes of CO_2.

Exports and consumption by households are behind the emissions

Exports and private consumption by households are the two main drivers behind the economic activity in Denmark and therefore also behind the CO_2 emissions. The importance of export in relation to Danish CO_2 emissions has been increasing. In 1990, exports were responsible for 37 percent of total emissions, rising to 56 percent in 2006. The growing importance of exports is, in part, connected with the increase in exports of transport services by Danish shipping companies.

Consumption prompts emissions in the phase of production

Consumption of electricity and district heating by households does not directly generate CO_2 emissions, but when coal, oil, or natural gas are used by power stations, etc. to produce electricity and district heating CO_2 is indirectly emitted as a result of the household consumption. The same is the case when households consume other products, which are purchased from the industries. Typically, they are associated with emissions from the production processes.

14 million tonnes directly from households, and 25 million tones indirectly in Denmark

In 2006, combustion of energy products for heating, cooking, and driving cars, etc. in households caused the release of 14 million tonnes of CO_2 emissions. However, it can, based on model calculations, be estimated that households prompted an additional 25 million tonnes of CO_2 emissions in the Danish industries as a result of the production of electricity, district heating, private and public transport services, food products, restaurant visits, refuse disposal and sewage treatment services, and a great many other products and services used by the households.

11 million tonnes abroad from households' consumption

Private consumption did not only prompt an estimated 25 million tonnes of CO_2 in the Danish industries, but also an estimated 11 million tonnes of CO_2 in industries in other countries through imports from these countries to Denmark.

40 million tonnes abroad in total

However, it is not only the consumption by households, which gives rise to emissions in other countries. For all imports to Denmark, we estimate 40 million tonnes of emissions generated abroad. Adding this number to all Danish emissions, we obtain a total of 154 million tonnes of CO_2 generated globally as a result of the Danish economic activity in 2006.

Consumption based estimate of emissions ...

Since part of these emissions are, in actual fact, prompted because Danish industries produce goods and services for exports, a so-called consumption based estimate of

the Danish emissions may be derived by subtracting that part of the globally induced emissions that are related to the Danish exports. It is called consumption based because it corresponds to all emissions in Demark and abroad caused by the domestic Danish final consumption, i.e. the consumption by Danish households, government consumption and the investments, etc. taking place in Denmark. The consumption based estimate can be compared with the traditional production based, i.e. the total emissions from Danish industries and households.

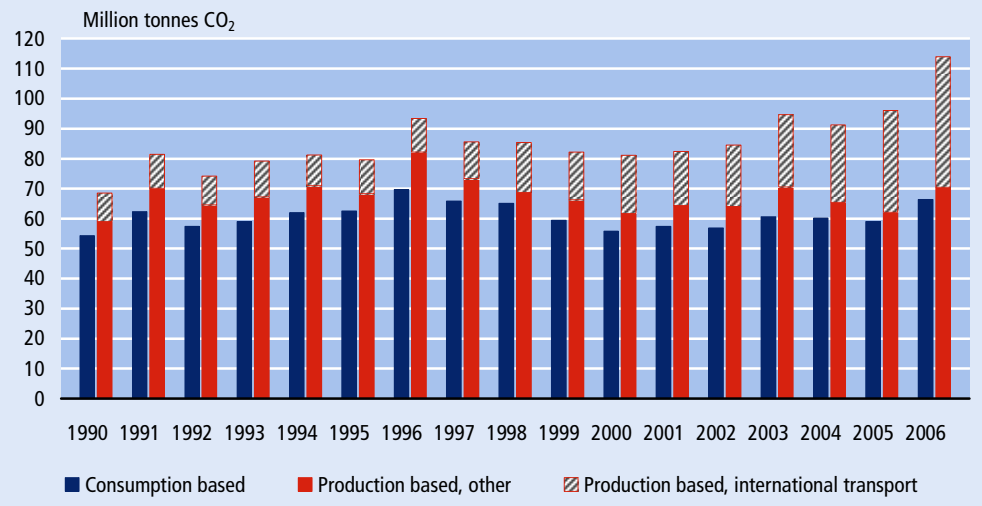
... are smaller than the production based estimates

For the period 1990 to 2006 the consumption based CO_2 emissions have been estimated to be smaller than the production based CO_2 emissions. Another way to express this is to say that Denmark has been emitting more CO_2 on behalf of other countries (due to exports from Denmark) than other countries have been emitting on behalf of Denmark (due to imports).

The gap diminishes when international transport is excluded

The magnitude of the gap between the production and the consumption based estimate depends heavily on whether international transport is included in the production based estimate or not, since inclusion of the emissions from international sea transport gives, as already demonstrated, rise to a great increases in the emissions. If the emissions from international transport are excluded, the gap between the two measures has been diminishing over time, and it is almost insignificant in 2006.

Production and consumption based measures of Danish CO_2 emissions



Environmental Accounting principles

The data and analytical results presented in the main part of this publication is based on the Environmental Accounting principles, which are internationally agreed principles for describing the link between the economy and the environment, but which at the same time, in some respects, deviate from the principles used for estimating emissions in relation to the Kyoto Protocol.

The Kyoto Protocol

In order to put the emissions into the perspective of the Kyoto Protocol, the publication is rounded off by presenting the Protocol's reduction targets for individual countries as well as the development of their emissions from 1990 to 2007. CO_2 permits and other schemes under the Kyoto Protocol are also mentioned.

Annexes and tables

The publication includes an annex presenting further information on the environmental accounting principles, energy accounts and emissions accounts. Detailed tables for greenhouse gas emissions by industries and by households are also included.

1. Climate change and greenhouse gases

Climate change

With great probability, human activity has had an effect on climate change. Over the last 100 years, the mean global temperature has risen by 0.7 degrees[1] - quite a sizeable increase in climate terms. Other signs of climate change are record heat waves, melting glaciers and Arctic ice, rising sea levels and changes in precipitation patterns.

Man-made greenhouse effect

The composition of the atmosphere is affected by emissions of various gases. Changes in the composition contribute to the so-called 'greenhouse effect' in which an increasing amount of the sun's heat does not escape from earth again. According to the UN-based Intergovernmental Panel on Climate Change, the IPCC , it is most likely that emissions of man-made greenhouse gases are affecting the atmosphere and are responsible for most of the increase in mean global temperature, which has been taking place since the middle of the 20th Century.

Great increase in emissions of greenhouse gases

Since 1970 global emissions of man-made greenhouse gases such as CO_2, methane, nitrous oxide and halocarbons have increased considerably. Taking into consideration that each of them has a different effect on the atmosphere, i.e. a different global warming potential, the increase has been 70 percent. Over a 100-year period, the global warming potential from methane is 21 times higher than that of CO_2 whilst that of nitrous oxide is 310 times higher.

Greenhouse gases and the greenhouse effect

Greenhouse gases are gas types which are able to absorb part of the long-wave infra-red radiation from the earth and send it back in the form of heat. Greenhouse gases occur both naturally and as a result of human activity.

The way in which individual gases contributes to the greenhouse effect depends on their concentration and ability to absorb heat radiation. Global warming potential (GWP) is used to evaluate the relative effect of the various emitted gases. Global warming potential is the effect one kilo of a given gas has compared with a kilo of CO_2. The length of time the effect is measured over is also important - usually 100 years is the time span used. When the effect of the greenhouse gas is taken into account the measuring unit is CO_2 equivalents or GWP.

CO_2 from fossil fuels ...

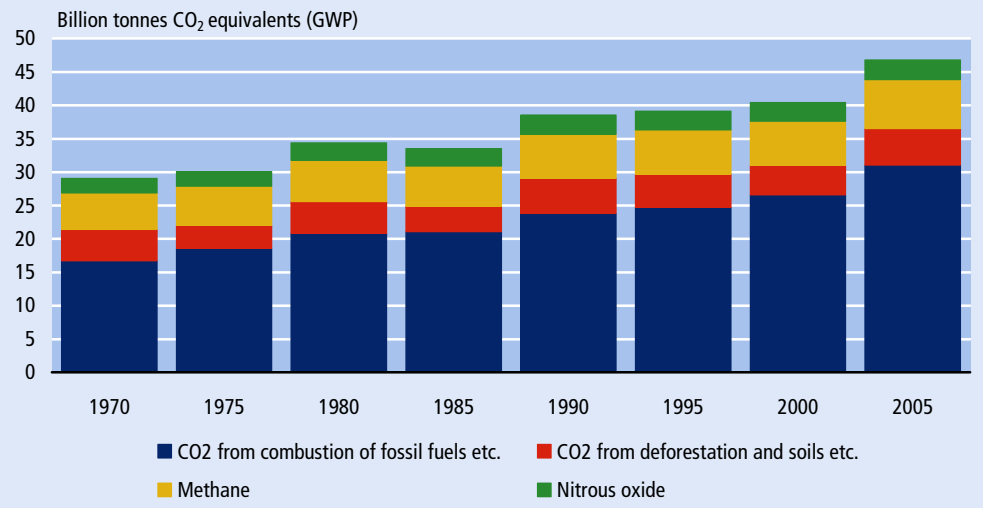
On a global scale over two thirds of the global warming potential from greenhouse gas emissions in 2005 came from CO_2 emissions as a result of burning of fossil fuels, e.g. coal, oil products and natural gas.

... forestry and land use

CO_2 is also released when biomass is burned or broken down as a result of activities such as forestry and forest clearing. When this is taken into account, global CO_2 emissions count for more than 75 percent of the global warming potential from man-made emissions of greenhouse gases.

[1] IPCC/DMI, 2007/08 (cf. the References) gives a rise of 0.74 degrees Celsius with a 90 percentpercent uncertainty interval of between 0.56 and 0.92 degrees Celsius.

Figure 1 **Global man-made emissions of greenhouse gases**



Source: European Commission (EC), Joint Research Centre (JRC)/Netherlands Environmental Assessment Agency (PBL).EC-JRC/PBL. EDGAR version 4.0. (http://edgar.jrc.ec.europa.eu/, 2009). See also IPCC/DMI, 2007/08

Methane and Nitrous oxide from agriculture, etc

Almost 25 percent of the global warming potential comes from methane, nitrous oxide and halocarbons. Emissions of methane originate from production and use of energy as well as from rice cultivation and livestock. Nitrous oxide comes from a number of sources, including nitrogen rich agricultural fertilizer, burning of biomass and various industrial activities.

Halocarbons used in industrial processes etc

Emissions of halocarbons make up only around 1 percent of the total contribution to the global warming potential. Halocarbons denote a collective term for artificially produced gases, e.g., for industrial use. These are powerful greenhouse gases although they are only released in relatively small amounts.

Important greenhouse gases

Carbon dioxide (CO_2) is formed by burning fossil fuels and biomass as well as the breaking down of organic material. A large part of CO_2 emissions is absorbed by the oceans, woods and other eco-systems, while the rest stays in the atmosphere. From 1750 to the present day, the concentration of CO_2 in the atmosphere has risen by up to 33 percent and is now at its highest for 420 000 years.

Methane (CH_4) is primarily of organic origin. Natural emissions come from wet areas, ruminants and insects. Man-made emissions come from coal deposits, the extraction and transport of natural gas and landfill sites, the burning of biomass, rice cultivation and livestock. The GWP of methane is calculated as being 21 times greater than CO_2 over a period of 100 years.

Nitrous oxide (N_2O) comes naturally from the oceans and from the breaking down of organic material. Man-made emissions come from nitrogen rich fertilisers in agriculture, the burning of biomass and industrial activities. The GWP of nitrous oxide is calculated as being 310 times greater than CO_2 over a 100 year period.

Halocarbons (CFC-gases, HCFCs, HFCs, PFCs' and SF_6) are artificially manufactured carbon compounds which contain fluor, chlorine, bromine or iodine. The use of CFC (Freon) in, for example, refrigerators has been considerably limited by international agreements because, as well as being a greenhouse gas, it also breaks down the ozone layer. CFC's have been replaced by other halocarbons such as HFC's. HFCs PFC's and SF_6 are powerful greenhouse gases. For example, the GWP of SF_6 is 22 800 greater than CO_2 over a 100 year period.

Source: The Danish Meteorological Institute and the Danish Energy Agency

2. Greenhouse gas emissions from the Danish economy

IPCC definition and the Kyoto assessment …

When calculating a country's emission of greenhouse gases, it is necessary to define precisely which emissions are to be included. In most cases, the accepted definition of total emissions is the one decided upon by the IPCC (the UN climate panel) for the assessment of whether the Kyoto Protocol is adhered to (see Chapter 6). However, this definition does not include all emissions. International sea and air transport is, for example, not included. Neither is the burning of biomass.

… calculates Danish emissions at 66 million tonnes

Following the IPCC definition, the Danish National Environmental Research Institute (NERI) has assessed the Danish greenhouse gases emissions as 66 million tonnes converted to CO_2 (GWP). In 2007, this was an estimated 12 tonnes per Dane. CO_2 alone represents 52 million tonnes of the total emissions, or around 10 tonnes per Dane.

The Environmental Accounts calculate Danish emissions at 130 million tonnes

A more comprehensive idea of the total emissions caused by a country's economic activities can be gained by using the principles of the so-called Environmental Accounts, cf. annex 1. Statistics Denmark's *Environmental Accounts for Denmark* takes into account *all* the economic activities underlying the GDP (Gross Domestic Product) as described by the Danish National Accounts. The *Environmental Accounts for Denmark* also include the emissions from the burning of biomass and the fuel used in connection with international air transport and shipping carried out by Danish companies. Further, these calculations include and show separately emissions from burning of biomass. Using these principles, total Danish emissions of greenhouse gases were 130 million tonnes converted to CO_2 in 2007. This is equivalent to 24 tonnes per Dane.

Environmental accounts

Environmental accounts (Integrated environmental-economic accounts) are so-called satellite accounts to the System of National Accounts (SNA), which is the international standard framework for organising economic information and for calculating for instance GDP (the gross domestic product). Therefore, the environmental accounts share common definitions and classifications with the national accounts. It provides an integrated set of aggregate environmental and economic information from which indicators of economic-environmental performance can be derived. These can be at the sectoral and macroeconomic level, as well as at more detailed levels.

The basic principles on environmental accounting are embodied in the handbook *Integrated Environmental and Economic Accounting 2003* (United Nations *et al.*, 2003), commonly referred to as SEEA 2003.

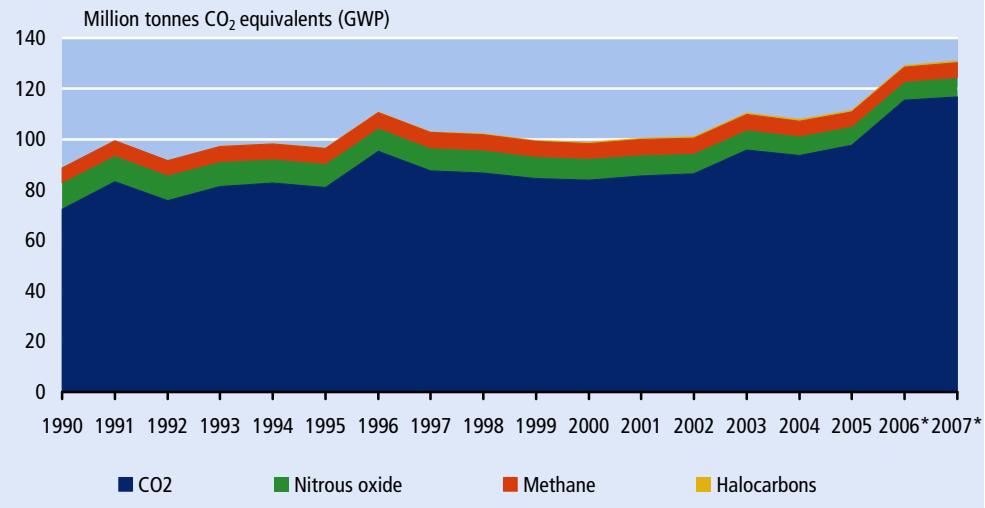
The integration of information on the economy and the environment adds substantial analytical value, because the different data sets can be linked and compared directly. It allows decisions and policies to be designed, analysed and reviewed for effectiveness. In the case of energy and air emissions, the accounts provide, for instance, an information basis for informing policy makers on which economic activities are behind the air emissions and what the likely economic consequences of implementing air emissions reduction policies are.

See Annex 1 for more information on environmental accounts.

CO_2 also principal Danish greenhouse gas

89 percent of the global warming potential from Danish greenhouse gases comes from CO_2. Nitrous oxide contributes 6 percent, methane accounts for 4 percent, while emissions from halocarbons constitute 1 percent of the total Danish global warming potential.

Figure 2 **Emissions of greenhouse gases from Danish economic activities**



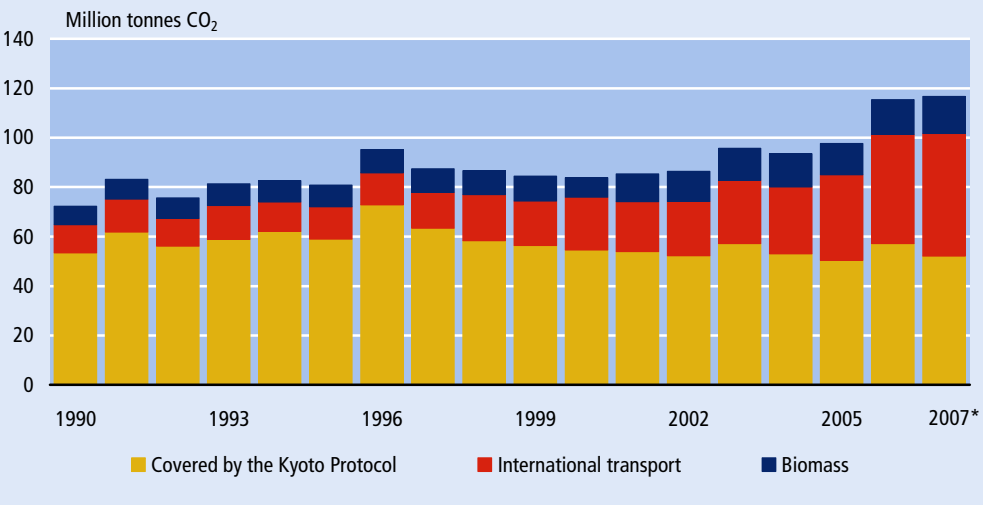
117 million tonnes of CO_2 in 2007

From 1990 to 2007, figures for CO_2 alone show that emissions from Danish economic activities constitute an increase of 62 percent, from 72 million tonnes to 117 million tonnes, or from 14 to 21 tonnes per Dane.

International transport has great influence on the whole picture of emissions

In 2007, total CO_2 emissions from Danish economic activities were more than twice as large as the emissions accounted for in the principles laid down by the IPCC and the Kyoto Protocol. This is partly due to the fact that, as mentioned previously, the Kyoto Protocol does not include emissions from international transport carried out by Danish companies, including shipping between international ports. In 2007, CO_2 emissions alone from Danish-operated ships in international waters were 47 million tonnes, which is more than 40 percent of all Danish CO_2 emissions.

Figure 3 **Emissions of CO_2 from Danish economic activities**



Due to an increase in international shipping by Danish companies in recent years, emissions from Danish shipping have also increased. In 1990, emissions from Danish-operated ships in international waters were 9 million tonnes, increasing to 47 million tonnes in 2007. The gap between the IPCC-defined emissions and the results of the Danish Environmental accounts has thus also widened.

Biomass

Biomass is another area in which IPCC and Environmental Accounting methods differ. In contrast to the accounts, the IPCC does not include emissions from the burning of biomass in their final result. Although these emissions actually take place,

they are considered as being neutral in that a comparable amount of CO_2 is also absorbed during the growth of the biomass. The IPCC also subtract the amount of CO_2 associated with an increase in the total biomass, for example in the growth of new forests.

Increase in CO_2 emissions from biomass

There has been a large increase in the use of biomass as fuel, resulting in an increase in the related CO_2 emissions. From 1999 to 2007, these emissions rose from 5 million to 12 million tonnes CO_2. So while this type of emission from the use of biomass represented 6 percent of the total CO_2 emission of 72 million tonnes in 1990, in 2007 it represented 10 percent of the total of 117 million tonnes.

Binding of CO_2 by planting new forest, etc

The further annual binding (sequestration) of CO_2 by plants and trees which occurs with the growth of biomass through the planting of new areas of forest has, in Denmark's case, been more or less constant at 3 million tonnes CO_2 since 1990.

From the total CO_2-emissions to the Kyoto-protocol

Statistics Denmark's *Environmental Accounts for Denmark* are based on a description of all economic activities, including those carried out abroad by Danish companies in relation to transport. The UN Climate Panel, the IPCC and the Kyoto Protocol (see Chapter 6) on the other hand, see it in terms of Denmark as a geographical area.

The following adjustments are used to get from the total figures from the Environmental Accounts to the figures for total Danish emissions according to IPCC and the Kyoto Protocol.

- CO_2 emissions from Danish operated ships and aeroplanes are subtracted as the emissions occurred outside of Denmark.
- CO_2 emissions from the burning of biomass are also subtracted as these emissions are seen as counterbalanced by a comparable binding of CO_2 during the biomass growth. Binding of CO_2, which occurs, for example, due to planting of new forests, is also subtracted since the binding of CO_2 means less CO_2 in the atmosphere.
- A further deduction is made because the IPCC and the Kyoto Protocol defines certain other transport emissions, e.g. those related to cross border trade of petrol, in a different way compared to the Environmental Accounts.

Bridge table

	1990	2007*
	Million tonnes	
Total CO_2 emissions from the Danish economy (Environmental Accounts)	**72.2**	**116.8**
- CO_2 related to biomass	7.5	15.1
Of which biomass used as fuels	4.6	12.1
Further binding of CO_2 (new forest, etc.)	2.8	3.0
- CO_2 emissions from international transport (bunkering abroad)	9.4	49.6
Of which ships	9.2	47.2
Planes	0.3	1.8
- Other differences related to transport and cross border trade	2.0	0.5
Total emissions accounted for in the Kyoto Protocol (IPCC)	**53.3**	**52.1**

3. Greenhouse gas emissions from industries and households

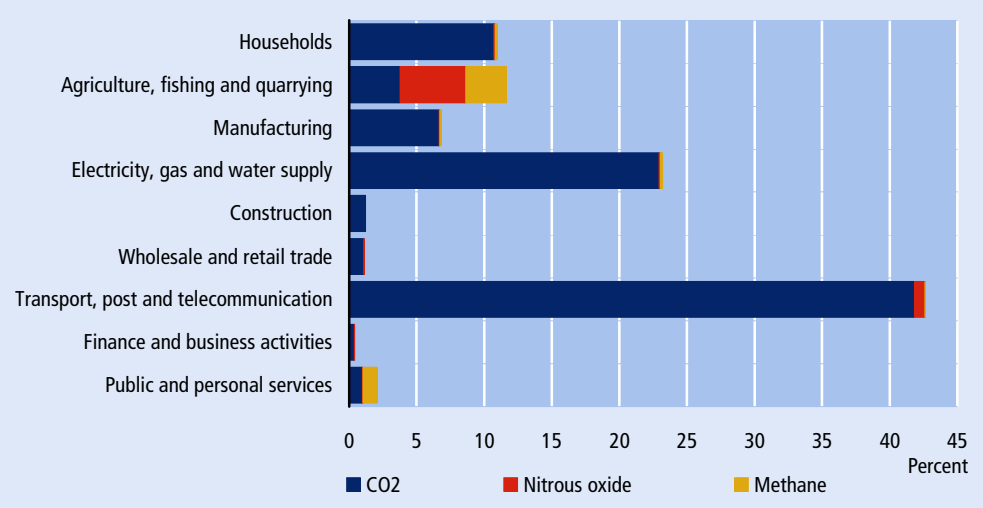
Almost 90 percent of all emissions come from industries

Most of the man-made greenhouse gases are produced in connection with the industries' production of goods and services. When CO_2, methane and nitrous oxide emissions are taken as one and assessed in relation to their global warming potential, between 1990 and 2007, the industries have contributed 90 percent of all Danish man-made emissions, with households making up the remaining 10 percent.

Three industries contribute 78 percent

Three industry groups contribute especially to the greenhouse gas emissions (Figure 4). In 2007, *Agriculture, fishing and quarrying* contributed 12 percent, *Electricity, gas and water supply 23 percent and Transport, post and telecommunications* 43 percent of the total global warming potential.

Figure 4 **Greenhouse gas emissions from industries and households. 2007***



Methane and nitrous oxide emissions are given as CO_2–equivalents (GWP)

Agriculture

The global warming potential of emissions from *Agriculture, fishing and quarrying* is largely due to emissions of methane and nitrous oxide and to a lesser extent to CO_2. As a result of changes in fertilizing practice, emissions of nitrous oxide from agriculture and thus their contribution to the global warming potential have fallen since 1990.

Transport

The global warming potential of emissions from *Transport, post and telecommunication* is mainly caused by the CO_2 emission. 46 percent of all CO_2 emissions come from this industry (Figure 5 and Table 1). The industry includes all businesses that carry out transport as a service to other businesses and households. On the other hand, it does not include transport activities carried out by businesses and households for themselves.

International shipping

As previously mentioned, emissions from international shipping have increased substantially, which is reflected in the fact that emissions from *Transport post and telecommunication* were more than three and a half times larger in 2007 than in 1990.

Energy supply

In 2007, *Electricity, gas and water supply* contributed almost 23 percent of the global warming potential from greenhouse gases. The sector showed actual emissions of 30 million tonnes from CO_2 alone, corresponding to 25 percent of all Danish CO_2 emissions. This includes all Danish production of electricity and district heating. All emissions in connection with electricity and district heating production come from this area, while the use of electricity and district heating in the industries and households cause no direct emissions.

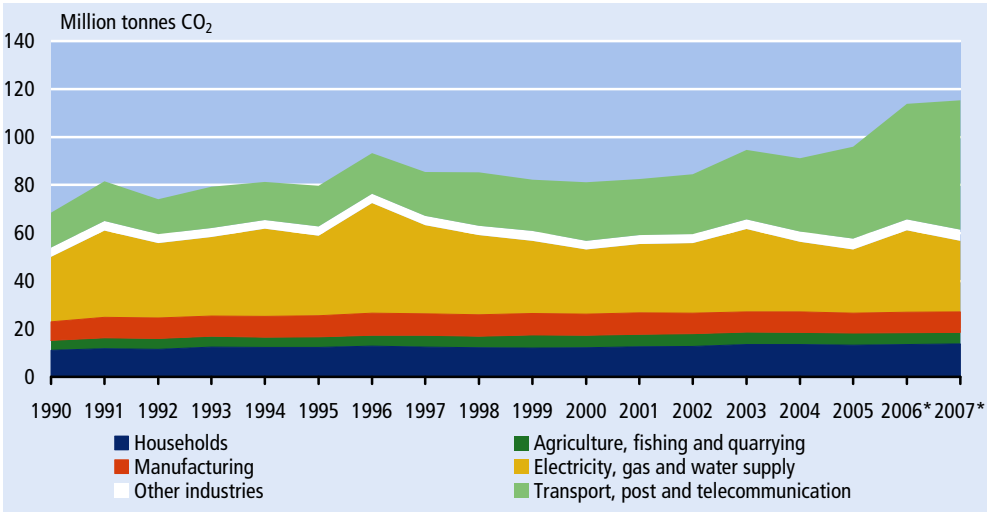
Attributing emissions from energy producers to energy users

However, it may be argued that it is the use of the electricity and district heating which, in actual fact, causes the emissions. Therefore, it is, based on the *Environmental Accounts*, useful to supplement the accounts for actual emissions by adjusted accounts in which the allocation of emissions caused by generation of electricity and district heating is reallocated in a simple way to the users of the energy. Such adjusted emissions are presented in the box below. Further analytical results, including more sophisticated model based re-allocations of the emissions are presented in Chapter 5.

Major variations in emissions from energy supply

Emissions of CO_2 from the Danish energy supply change considerably from year to year as the production of electricity and district heating varies. The reason for this is that temperatures change year by year and there are significant variations in import and export of electricity. Emissions were consequently high in 1996 and 2003 when a lot of electricity was produced for export.

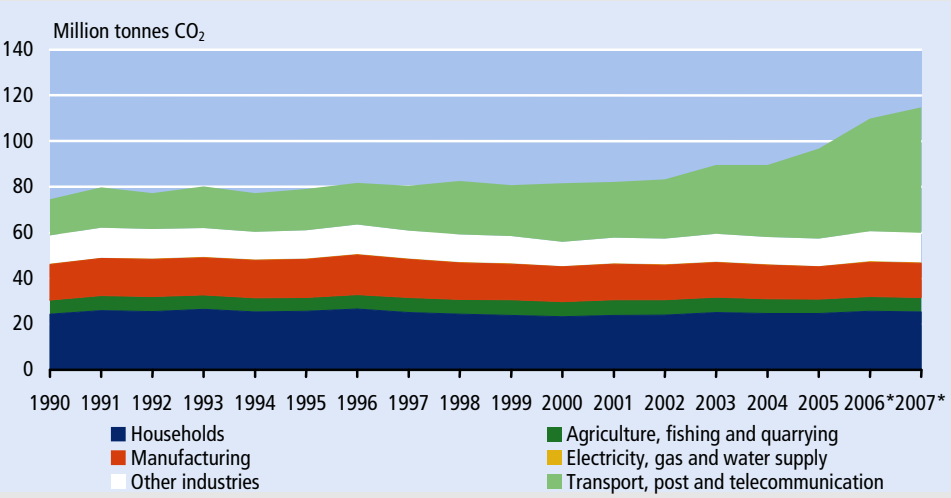
Figure 5 **CO_2 emissions from industries and households**



Adjusted CO_2 emissions

Adjusted CO_2 emissions are a simple analytical result based on the air emission accounts. The adjustment entails that emissions caused by the *Electricity, gas and water supply* industry in relation to their production of electricity, district heat and town gas are attributed to end users, i.e. the industries and the households using those products. At the same time, the emissions caused by external trade with those products are adjusted for by assuming that the net imports entail the same emissions as the Danish production.

Adjusted CO_2 emissions from industries and from households



It proves that especially the households and the *Manufacturing* and *Other industries* inclusive of retail trade and the private and public services now account for a much bigger proportion of the CO_2 emissions. The *Electricity, gas and water supply* industry accounts for less than one percent. Furthermore, the peaks caused by extraordinarily big exports of electricity no longer appear in the figure.

It is important to emphasise that the figures, due to the adjustment for the external trade, do not correspond to actual emissions. Furthermore, the adjustment only involves the energy supply industries. Therefore, the adjusted CO_2 emissions shown here should not be confused with the so-called direct and indirect emissions presented in Chapter 5.

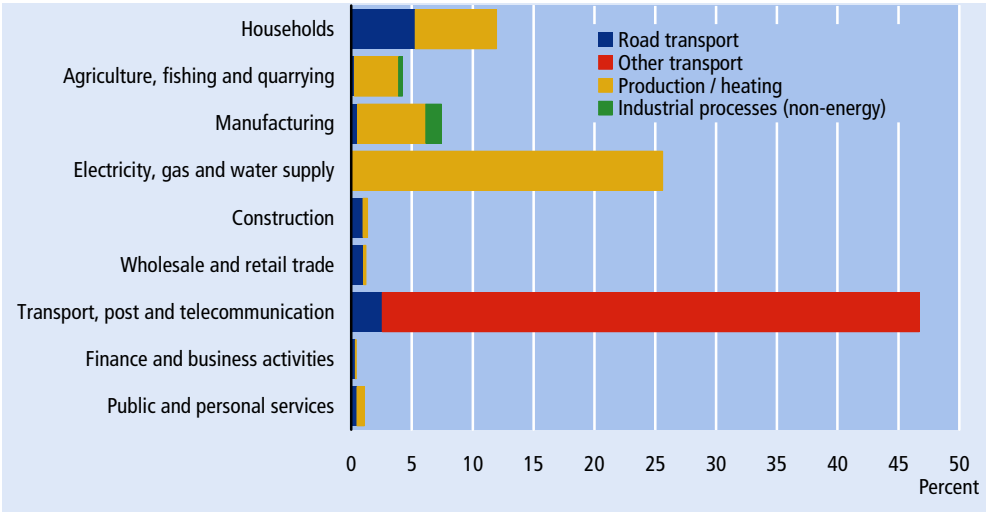
Table 1 **Danish CO_2 emission 1990 and 2007***

		1990		2007*		Increase 1990 to 2007
		Emissions	Share of the total emissions	Emissions	Share of the total emissions	
		mill. tonnes	percent	mill. tonnes	percent	
1	Agriculture, fishing and quarrying	4.2	6	4.8	4	14
2	Manufacturing	7.7	11	8.6	7	11
3	Electricity, gas and water supply	27.1	37	29.5	25	9
4	Construction	0.8	1	1.5	1	91
5	Wholesale and retail trade	1.4	2	1.4	1	- 0
6	Transport, post and telecommunication	14.5	20	53.9	46	271
7	Finance and business activities	0.4	1	0.5	0	33
8	Public and personal services	1.2	2	1.2	1	7
	Total industries	**57.3**	**79**	**101.5**	**87**	**77**
	Households	11.1	15	13.8	12	24
	Other	3.8	5	1.5	1	- 62
	Total emissions	**72.2**	**100**	**116.8**	**100**	**62**
	Of which ships bunkering abroad	9.2	13	47.2	40	415
	planes bunkering abroad	0.3	0	1.8	2	575
	emissions from biomass	4.6	6	12.1	10	161
	Total industries excl. of bunkering abroad	47.8	66	52.5	45	10
	CO_2 binding	-2.8	-4	-3.0	-3	5

CO_2 emissions by purpose

Figure 6 presents the CO_2 emissions by purpose. Emissions from road transport made up a substantial part of the emissions from households, although the emissions related to heating and cooking, etc. were dominant. Emissions from road transport are relatively important for *Construction* and *Wholesale and retail trade,* while it is other types of transport, especially sea transport, which is entirely predominant for *Transport, post and telecommunication*. Emissions from road transport constituted 11 percent of all Danish CO_2 emissions in 2007, while emissions related to other types of transport accounted for 44 percent. Non-energy related emissions from industrial processes in *Manufacturing* and *Agriculture, fishing and quarrying* accounted for 2 percent of total CO_2 emissions.

Figure 6 **CO_2 emissions from industries and households by purpose. 2007***



CO_2 emissions by type of energy

Figure 7 presents CO_2 emissions broken down by economic activity and type of energy used.

Oil products predominant

It shows that CO_2 emissions caused by combustion of oil products are predominant for most industry groups, *Electricity, gas and water supply* being the most obvious exception. For the Danish economy as a whole, emissions related to the combustion

of oil products account for 62 percent of the total emissions. This large proportion is partly explained by the fact that international transport is included. If we do not include emissions caused by Danish operated ships and planes abroad, then oil products accounted for 34 percent of the total CO_2 emissions.

Coal emissions from the energy supply industry

The *Electricity, gas and water supply* relies to a large extent on the use of coal, which is reflected in large emissions from this type of energy product. In total coal represents 16 per cent of all Danish emissions.

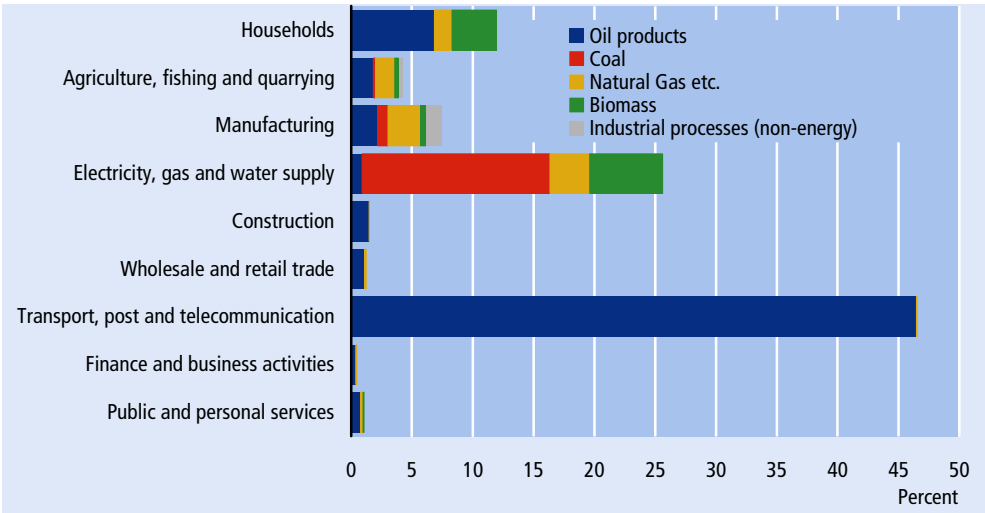
Relatively small emissions from natural gas

Emissions from combustion of natural gas are generally relatively small, 10 percent of total emissions.

Biomass

As mentioned, the combustion of biomass fuels has increased in recent years. Especially *Households* and the *Electricity, gas and water supply* are using the biomass. The CO_2 emissions caused by the combustion of biomass accounted for 11 percent of total emissions in 2007.

Figure 7 **CO_2 emissions from industries and households by type of energy. 2007***



4. Economic growth and CO_2 emissions

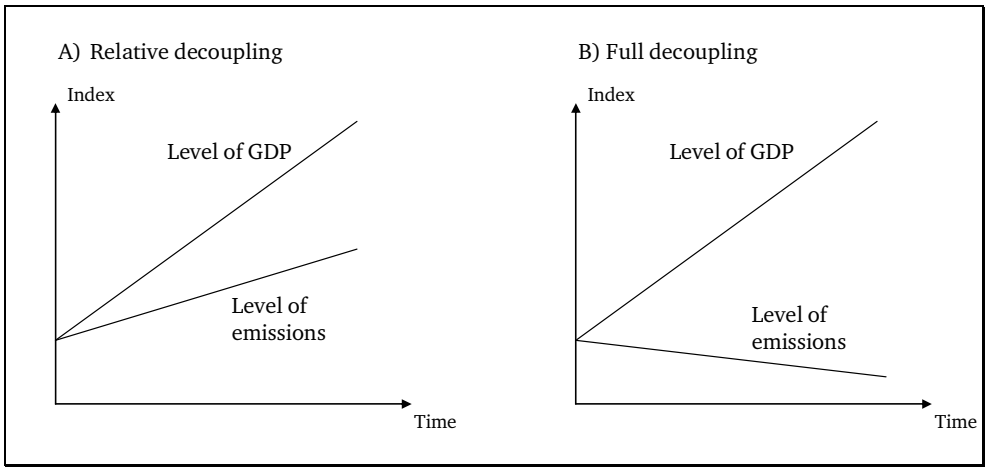
Economic growth and emissions of CO_2

Economic development and high environmental quality is often regarded as conflicting goals. The apparent conflict is linked to the conception that the so-called scale effect implies that economic growth in itself increases pollution, while prevention or abatement of environmental degradation is too costly to implement and will eventually lead to decreasing production and growth. However, other effects than scale effects are involved, some of which actually reduces environmental pressures without hampering economic growth.

Decoupling

Many economies in the world have actually experienced emissions of CO_2 that did not grow at the same pace as the economy. In some countries there has even been a decline in emissions side by side with an incline in economic growth measured by GDP (gross national product). The term 'decoupling' is used for this type of phenomenon. Decoupling is *relative* if both GDP and emissions are increasing with the latter at a smaller pace than the former. Decoupling is *full* if emissions decline, while GDP grows. Thus, decoupling does not necessarily require decreasing emissions. Only in the case of full decoupling emissions actually fall.

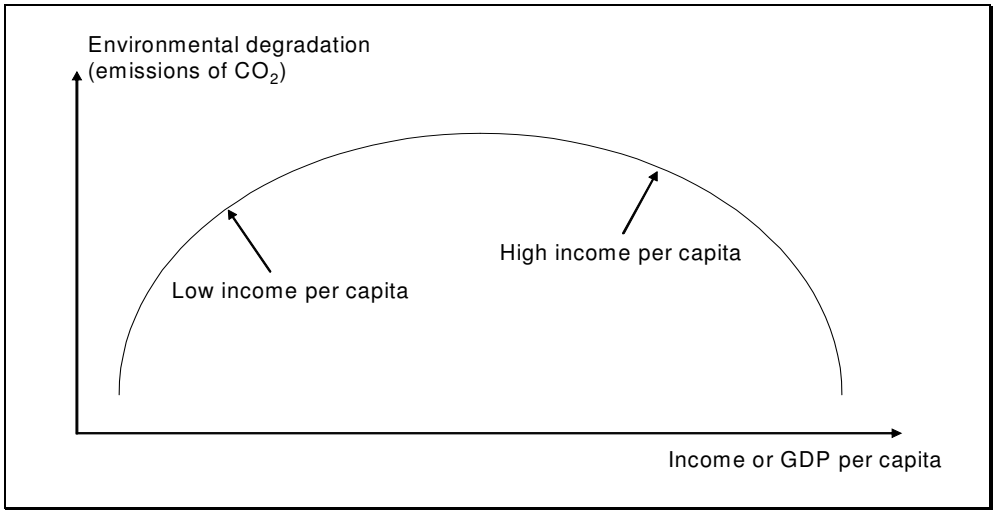
Figure 8 **The principles of relative and full decoupling**



Environmental Kuznets Curve (EKC)

Empirical studies have concluded that decoupling of growth and CO_2 emissions is observed mostly in richer developed economies and this phenomenon has more generally been seen as a representation of the so-called "Environmental Kuznets Curve".

Figure 9 **The theoretical Environmental Kuznets Curve**



Decoupling mostly in richer countries

The shape of the Environmental Kuznets Curve is like an inverted U with income or GDP per capita on the first axis and environmental degradation on the second. Emissions of CO_2 can be seen as a proxy for environmental degradation under the assumption that the higher the level of emissions the more severe environmental degradation is. The curve indicates that environmental degradation worsens as the GDP per capita increases until a turning point is reached. Increasing income per capita above this point will tend to benefit the quality of the environment. Thus, in less developed economies, economic growth tends to worsen a number of environmental problems, while in some economies, e.g. the Danish economy, growth will improve at least some aspects of the environment.

EKC explained

The rationale behind this theory is that in developing economies, less weight is given to environmental concerns. In contrast, when a certain standard of living in terms of income per capita has been obtained the focus is changed and more emphasis is given to environmental concerns and cleaner production methods.

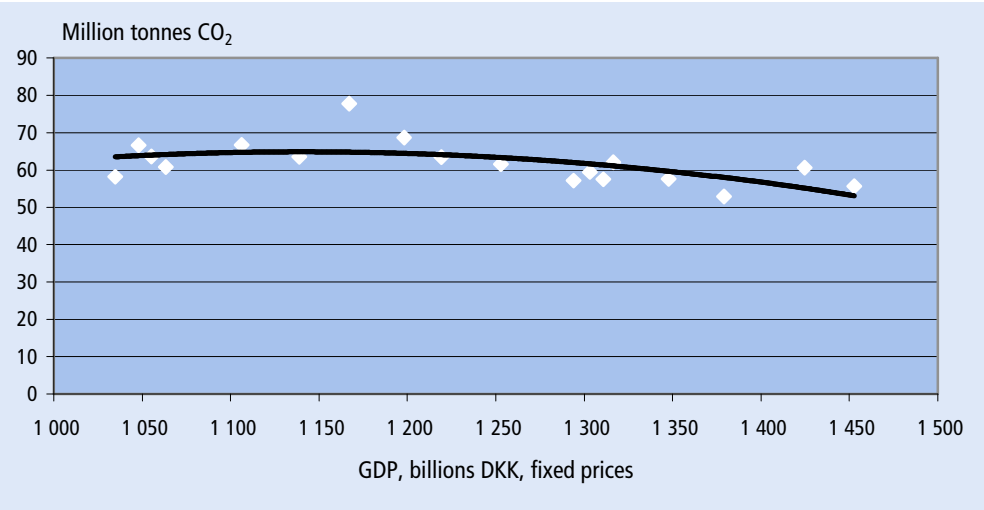
Growth in emissions and offsetting effects

In the period from 1990 to 2007 Denmark experienced an economic growth of 40 percent and the scale effect suggests that the emissions should have grown at the same pace. Fortunately, there were other effects present in the economy that decreased the level of emissions per unit of production. Consequently, emissions in most industries did not increase as much as the scale effect suggested. These offsetting effects will be discussed below based on actual data and model calculations for the Danish economy.

Empirical evidence for a Danish Environmental Kuznets Curve?

Figure 10 below shows for the period 1990 to 2007 a scatter diagram of the size of GDP and the size of the Danish CO_2 emissions, where the size of GDP is a proxy for income per capita.

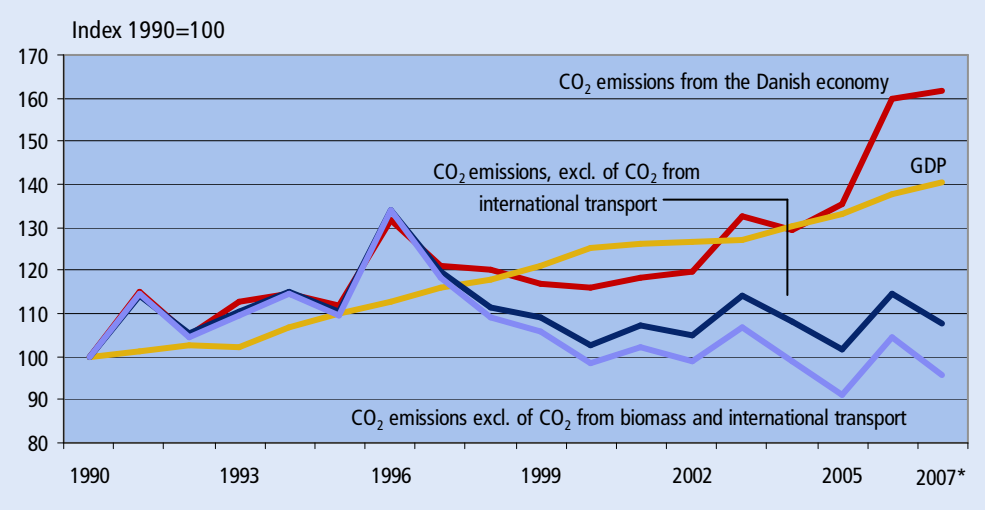
Figure 10 **Relationship between the level of economic growth and CO_2 emissions in Denmark**



Emissions from biomass and international transport are not included in the emission figures.
The curve is a second order polynomial fitted to the observations.

The data show a tendency to decreasing emissions concurrently with increasing GDP. This may be seen as an indication that Danish emissions are on the downward slope of the Environmental Kuznets Curve

Figure 11 **Development in the Danish CO_2 emissions and in the Danish economic growth**



Decoupling

It is also evident from Figure 11 that there has been a decoupling between economic growth and CO_2-emissions. From 1990 to 2007, Denmark experienced a period of considerable economic growth with GDP at constant prices rising by 40 percent. While the total CO_2 emissions, including the emissions from international transport activities rose even more, economic growth and CO_2 emissions are no longer linked together for most of the Danish industries. If emissions from international transport are excluded from the totals, the increase in CO_2 emissions was only 8 percent from 1990 to 2007, i.e. much lower than the economic growth. And if also emissions from biomass are excluded on the grounds that they are neutral to the greenhouse effect, emissions show a 4 percent decrease over the period. Thus, there is a clear and increasing gap between economic growth and the CO_2 emissions when international transport is excluded.

No evidence of EKC or decoupling when international transport is included

However, the international transport is an increasingly important part of the Danish economy in terms of contribution to the gross national product. In the economic accounts, gross value added and exports, etc. prompted by international transport are considered in line with value added and exports, etc. from any other industries. A consistent inclusion of the associated emissions leads to an increase in total Danish emissions of CO_2 by more than 60 percent since 1990. It means that when all economic activities are considered there is, in actual fact, no apparent decoupling and no evidence that the Danish economy was on the downward slope of the Environmental Kuznets Curve in the period 1990 to 2007.

Decoupling is found in most single industries

But decoupling can be observed in most Danish industries at a more disaggregated level, and the increasing gap between GDP and emissions, once international transport is excluded, indicates that decoupling is certainly present in many single industries.

Increased energy efficiency, cleaner energy and structural changes save CO_2 emissions

Different factors lay behind the decoupling for many industries: Danish industries have become more effective when energy is used, and energy products with lower emissions per unit of energy used are chosen by the industries. In addition, a relative larger share of service activities contributes to cutting the link between economic growth and CO_2 emissions once international transport is excluded. Service industries are normally less polluting per unit of production than manufacturing industries. However, it should be observed that shipping is one of the largest service industries in Denmark, and although transport by sea is an effective form of transportation it still has high emissions per unit of output.

Factors underlying the decoupling

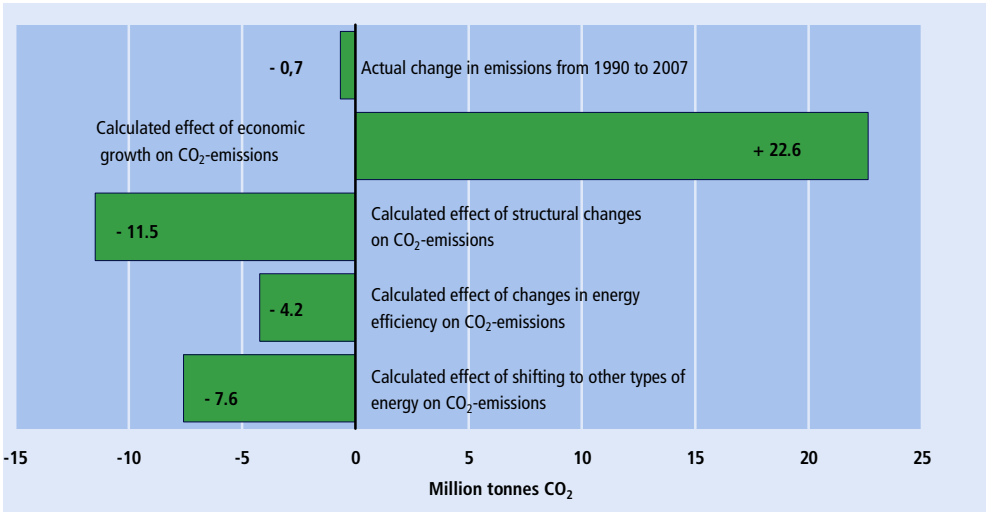
In the following, it is quantified how much these factors have contributed to keeping overall emissions of CO_2 lower than indicated by the scale factor during the period from 1990 – 2007. Model calculations make it possible to assess how great an effect the better energy effectiveness and transfer to other forms of energy has had on emissions. At the same time, the effect of the structural changes in the economy, e.g. the relative growth in the service industries is quantified.

Fall in CO_2 emissions divided into underlying factors

The actual emissions from industries fell by 0.7 million tonnes between 1990 and 2007 when emissions from international transport and biomass are excluded. The upper bar in Figure 12 represents this development, while the other bars quantify the factors responsible for this development.

Figure 12

Changes in energy - related CO_2 emissions from Danish industries from 1990 to 2007



Emissions are calculated omitting emissions from international transport and burning of biomass.

Economic growth increases emissions

The scale effect is presented by the second bar from the top. It shows that if CO_2 emissions had simply followed the development in production and consumption from 1990 to 2007, Danish emissions would have been 22.6 million higher in 2007.

Structural changes in the economy

Due to structural changes between 1990 and 2007, both production and consumption have gradually been reorganised in a less CO_2 intensive way. The service industry share is now relatively larger, and this tends to pull in the opposite direction of the scale effect when international transport is excluded. At the same time, imports have increased when compared with domestic production, and this also offsets part of the scale effect. The result of the structural changes is a decrease of CO_2 emissions of 11.5 million tonnes.

One possible explanation of the decrease in emissions due to structural changes and, more generally, the downward slope of the Environmental Kuznets Curve is that the polluting industries are moving to developing countries, while traditional industrial production is substituted for service and knowledge based production in the developed countries. Thus, by letting other countries take over the dirtiest part of production and importing the goods afterwards the total emissions will not decline. It will just be shifted from the developed countries to the less developed countries (cf. Stern (2003). The extent to which Denmark is shifting emissions to other countries is analysed in Chapter 5.

Improved energy effectiveness

The industries also used energy more efficiently in 2007 than was the case in 1990. The same production could therefore be achieved with less energy consumption than previously. It has been calculated that this effectively reduced emissions by 4.2 million tonnes in 2007. It is important to note that energy effectiveness here is measured in relation to the economic result of the industries. This can differ from

technical energy effectiveness, e.g. energy consumption for each item produced, or each kilometre driven.

Changes to new forms of energy

During the period from 1990 to 2007, the industries have gradually changed their energy consumption towards cleaner forms of energy. Firstly there has been a shift away from oil and coal towards natural gas and wind energy, as well as the use of bio-fuels such as wooden pellets and hay. According to the model calculations, changes in the composition of energy consumption between 1990 and 2007 altogether saved the atmosphere from an emission of 7.6 million tonnes CO_2. Included in these calculations is the assumption that bio-fuels are neutral in relation to the greenhouse effect, implying that an increased use of bio-fuels has contributed to lower emission.

5. Production or consumption approach to measuring CO_2 emissions

Production and consumption in national accounts

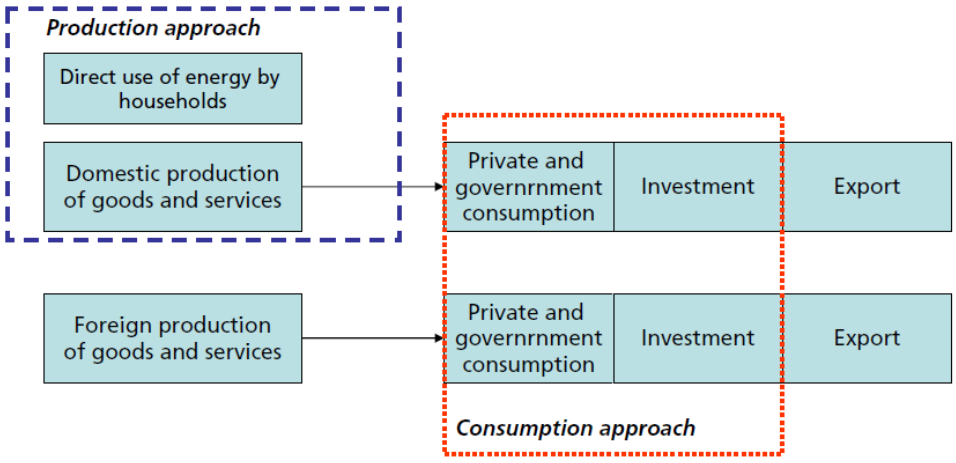
An important distinction in national accounts is the one between production on the one side and final demand, e.g. consumption by households and government, exports, investments (capital formation), etc., on the other side. Thus, the total amount of goods and services produced domestically by the economy in question (output) can be looked at from two angles: It has been produced by a variety of industries, and it is being used by different final users either as consumption (private or government), for capital formation or export.

Emissions are generated primarily in the production processes by burning fossil fuels. Consequently, in an accounting framework it is obvious to ascribe the emissions to the production processes that created it. However, if there were no consumers demanding the goods and services produced, they would never be produced, and there would be no emissions. Therefore, it is almost just as obvious in an accounting framework to ascribe all emissions to categories of final demand that are responsible for them in the end.

Analytical possibilities

Figure 13 presents the differences and the connections between the two approaches for accounting for the emissions.

Figure 13 **Production and consumption approaches to emission accounting**



Production approach

The most common approach to measuring emissions is the production approach. This is the approach, on which the presentation in the previous parts of this publication relies. Emissions are measured by the industries and households that actually generate them. This is a pure statistical measurement that involves observation of energy consumption by industries and the use of emission coefficients to calculate the corresponding emissions. For households it is also a statistical measurement of the direct emissions related to the direct energy consumption among these heating from burning of fossil fuels and gasoline and diesel for private cars.

The production approach records emissions according to where they actually take place irrespective of whether the intended use of the products is destined for intermediate consumption in other industries or for any kind of final demand. The scope of emissions according to the production approach is indicated by the blue dotted line in Figure 13.

Consumption approach

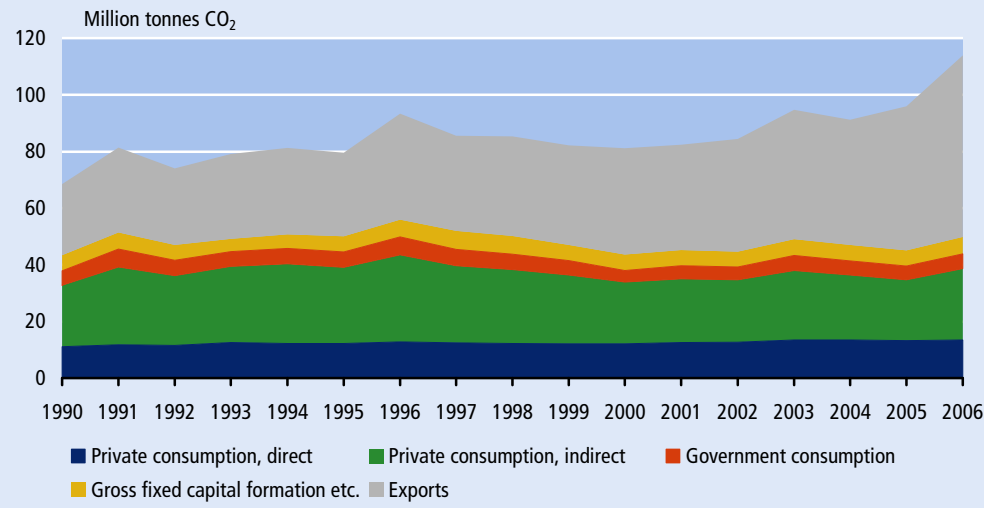
The emissions generated on the production side can be completely mirrored on the final demand side by applying the so-called consumption approach. This, however, requires the use of an input-output model to ascribe all the emissions from the production approach to exactly the categories of final demand that are “responsible”

for them. One example is emissions from electrical power and district heating used by industries and households. According to the production approach, these are recorded as emissions from the power plants. At the same time, there are no emissions recorded from the use of electricity and district heating by final demand categories (i.e. households). However, an input-output model is capable of reallocating the emissions from electricity measured on the production side to every single item of final demand that is ultimately responsible for them. The main focus of the consumption approach is emissions generated by the demand of products and services within the red dotted line in Figure 13. From this demand, the production activities by industries and corresponding emissions are traced. A complete tracing of all emissions related to the final demand includes also an estimation of emissions taking place abroad as a result of imports.

Input-output model

The model used for reallocating the emissions from the production approach to the consumption approach is a so-called input-output model. It is a mathematical extension of the detailed input-output tables that are compiled and published on an annual basis by Statistics Denmark. These tables give a very detailed picture of inter-industry deliveries of goods and services as well as deliveries to final demand.

Figure 14 **CO_2 emissions by Danish industries indirectly caused by various types of final demand**



Private consumption and export carry the greatest burden

Model calculations carried out on the basis of data for the period 1990 to 2006 shows that the Danish CO_2 emissions are primarily created by the private consumption and exports. Together, these two forms of demand make up 90 percent of total CO_2 emissions.

On the other hand, demand by government consumption and investments (fixed capital formation) in buildings, machinery and transport equipment etc. only contributes 10 percent of total CO_2 emissions, more or less equally spread between these two groups.

Export has increasing importance

The importance of exports has been increasing. In 1990, exports were responsible for 37 percent of total emissions, rising to 56 percent in 2006. The growing importance of exports during this period is, in part, connected with the increase in Danish shipping, which is demanded by companies abroad and therefore linked to exports.

Private consumption

In 2006, private consumption was responsible for almost 39 million tonnes of Danish CO_2-emissions. Of this, a little more than one third - 14 million tonnes – as shown in Chapter 3, was related to the households' use of fuel for heating, etc., as well as petrol and diesel for cars. About two thirds - 25 million tonnes - was indirect emissions in Danish industries as a consequence of the production necessary in order to meet the demands of the consumers.

Private consumption, indirect CO_2 emissions

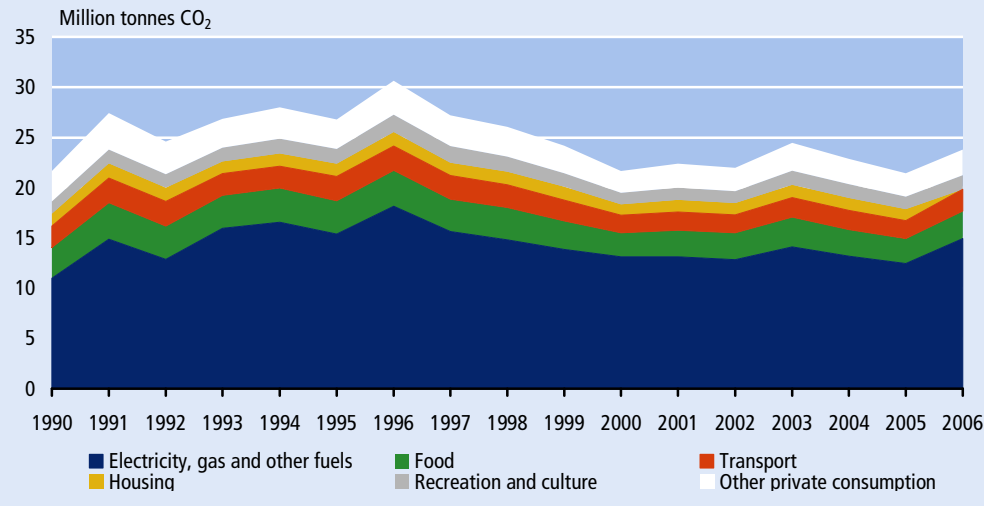
The emissions created by private consumption by industries in Denmark are very closely related to households' energy consumption. Consumption of electricity and district heating does not involve direct CO_2 emissions, but when coal, oil, or natural gas is used by power stations, CO_2 is indirectly emitted.

Besides the use of electricity and district heating, households' consumption of food, restaurant visits, private and public transport and housing prompts CO_2 emissions in Danish industries. Housing includes maintenance of buildings, administration, refuse disposal, water supply and sewage treatment.

The relative significance of the individual consumer categories for emissions has been more or less stable since 1990 although emissions from electricity generation have been heavier in certain years. This is due to a great deal of electricity export in those years, which made it necessary to bring in older and less CO_2 effective power stations.

Figure 15

CO_2 emissions by Danish industries indirectly caused by various types of private consumption



What is the responsibility of domestic final demand?

In an economy like the Danish, a lot of imported products are used in production and imports are used directly by households and other final demand categories as well. At the same time Denmark has a very large export sector. Some of the goods and services imported have been produced in countries similar to Denmark in terms of energy efficiency and energy supply, but some come from economies that are very different with various patterns of emissions. Normally, these foreign emissions are registered by the countries where the products are produced, despite the fact that Danish final consumption is actually responsible for this. The duality of this is that all Danish emissions, which are generated when Danish exports are produced, are accounted for in the Danish emissions accounts and not in the accounts of the countries demanding the Danish export goods.

Model calculations can give an indication

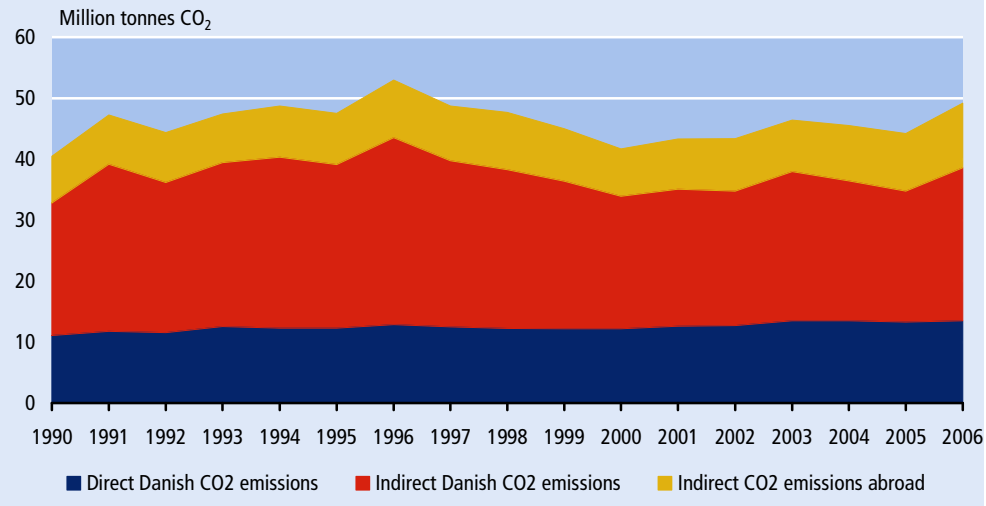
It is difficult to know precisely how great an emission Danish final demand causes in other countries, although model calculations with an input-output model can give an indication. The model is the same as in the previous calculation, except that the imported part of intermediate consumption and final demand is now added to the domestically produced part. Emissions calculated with this model are "global" in the sense that they cover effects of Danish final demand in all countries. The calculations show how great direct and indirect emissions from Danish industries would be if all goods and services used by the Danish Economy were produced in Denmark, i.e. if also all the imported goods and services were to be produced in Denmark, instead of being imported. Thus, in this calculation it is assumed that Danish and foreign companies produce in more or less the same way and with the same CO_2 emission per produced unit. In certain instances, the calculations will overestimate the foreign

emissions, for instance, in the case of the import of hydro-power based electricity. In other instances, calculations will underestimate the emissions, for example the import of consumer goods from countries where energy effectiveness is generally lower than in Denmark, or where fuel causing greater emissions is used.

Almost 11 million tonnes CO_2 abroad as a consequence of private consumption

If we start with the private consumption part of the consumption approach calculations alone, results show that Danish private consumption through import resulted in a foreign CO_2 emission of 9 million tonnes in 2006 (Figure 16) In other words, emissions that were caused in other countries as a consequence of Danish private consumption, correspond to around 28 percent of the direct and indirect emissions from domestic consumption.

Figure 16 **Total direct and indirect CO_2 emissions from private consumption**



How to get from production based to consumption based?

However, it is not only Danish private consumption that results in emissions in other countries. Emissions are also prompted abroad as a result of imports to Denmark due to public consumption, exports and investments, etc. (capital formation, etc.) In order to shed light on these emissions and to the overall emissions according to the consumption approach a consistent adjustment for emissions embedded in imports and exports are presented in Table 2.

Column (1) The first column shows the direct CO_2 emissions by Danish industries and households. This is the pure production approach where emissions generated by Danish production and households are recorded according to where they occur.

Column (2) This column is a listing of the emissions from international transport, i.e. the bunkering of Danish operated ships and planes outside Denmark. The numbers are needed for adjustments in other rows.

Column (3) The third column displays direct CO_2 emissions by Danish industries and households excluding international transport (bunkering abroad by Danish ships and planes).

Column (4) This column shows the total direct and indirect global emissions of CO_2 caused by Danish final demand. Thus, these numbers include emissions in other countries that are generated producing the import goods required by Danish final demand. It also includes emissions in Denmark tied to export on behalf of economies in other countries. Emissions abroad are measured under the assumption that the import goods have been produced with the exact same technology as if they had been produced in Denmark.

Column (5) This column shows the total direct and indirect global emissions of CO_2 caused by Danish exports. Thus, these numbers include emissions in other countries that are generated producing the import goods required for the production of Danish export

goods. It also includes emissions in Denmark tied to this production. Emissions abroad are measured under the assumption that the import goods have been produced with the exact same technology as if they had been produced in Denmark.

Table 2. Danish CO_2 emissions under the production and consumption approach

	Production based method			Consumption based method				
	Direct CO_2-emissions by Danish industries and households	Emissions from bunkering abroad by Danish ships and planes	Direct CO_2-emissions by Danish industries and households excl. emissions from bunkering	Direct and indirect global CO_2- emissions caused by Danish final demand	Direct and indirect global CO_2- emissions caused by Danish export	Direct and indirect global CO_2- emissions caused by Danish domestic final demand	Excess emissions in production approach over consumption approach	Excess emissions in production approach excl. bunkering over consumption approach
	(1)	(2)	(3)=(1)-(2)	(4)	(5)	(6)=(4)-(5)	(7)=(1)-(6)	(8)=(3)-(6)
	1 000 tonnes							
1990	68 419	9 448	58 970	91 110	36 860	54 251	14 168	4 720
1991	81 462	11 446	70 016	106 732	44 477	62 255	19 207	7 762
1992	74 059	9 544	64 515	97 872	40 441	57 431	16 628	7 084
1993	79 199	12 050	67 149	101 876	42 889	58 987	20 211	8 161
1994	81 292	10 348	70 945	106 012	44 075	61 938	19 355	9 007
1995	79 603	11 373	68 230	105 424	42 921	62 503	17 100	5 727
1996	93 368	11 145	82 223	122 195	52 577	69 618	23 750	12 605
1997	85 555	12 349	73 206	113 306	47 474	65 832	19 723	7 374
1998	85 369	16 700	68 669	114 902	49 855	65 046	20 323	3 623
1999	82 171	15 963	66 208	109 232	49 850	59 382	22 789	6 826
2000	81 159	19 466	61 693	108 220	52 433	55 787	25 372	5 906
2001	82 460	18 119	64 341	110 577	53 138	57 439	25 021	6 902
2002	84 529	20 501	64 028	113 962	57 084	56 878	27 651	7 150
2003	94 696	24 178	70 518	122 947	62 358	60 589	34 107	9 928
2004	91 198	25 811	65 387	121 159	60 989	60 169	31 029	5 218
2005	96 007	33 920	62 087	127 768	68 777	58 991	37 015	3 096
2006	113 892	43 509	70 383	154 281	87 954	66 327	47 565	4 056

Column (6) This column shows the total direct and indirect global emissions of CO_2 caused by domestic Danish final demand i.e. private and government consumption as well as investment. All global emissions related to Danish export are excluded. This is the consumption based measure of Danish emissions. In this case "consumption" is a broad concept meaning private and government consumption as well as investment i.e. final demand minus export. The numbers are calculated by subtracting column (3) from column (2). What is left then is all emissions in Denmark and abroad related to Danish consumption in the broad sense.

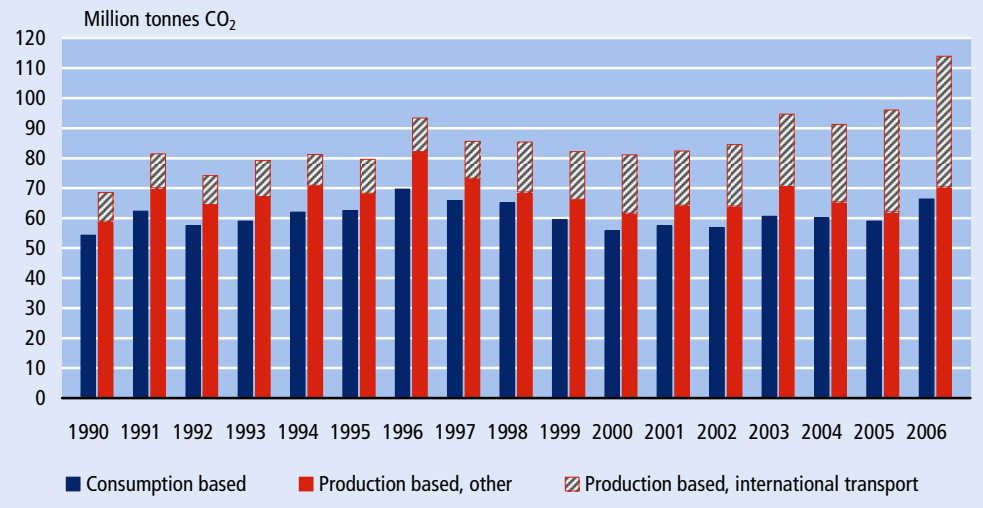
Column (7) This column shows the emissions accounted for under the production approach including emissions related to bunkering abroad by Danish operated ships and planes minus the emissions accounted for under the consumption approach.

Column (8) The last column shows the emissions accounted for under the production approach excluding emissions related to bunkering abroad by Danish operated ships and planes minus the emissions accounted for under the consumption approach.

Denmark emits more on behalf of other countries than they emit of behalf of Denmark

Figure 17 summarises the data from Table 2, and shows the difference between emissions according to the production approach and the consumption approach. Danish CO_2-emissions from 1990 to 2006 according to the consumption approach are lower than emissions according to the production approach, no matter if emissions from bunkering are included or not. In other words, Denmark emits more CO_2 on behalf of other countries than other countries emit on behalf of Denmark.

Figure 17 **Production and consumption based measures of Danish CO_2 emissions**



Consequences of increasing world trade

At the same time it shows that over the last years there is a tendency that the gap between emissions measured by the consumption approach and emissions measured by the production approach is gradually closing when international transport is excluded. It is an evidence of the still increasing world trade. Thus, the share of imported input in Danish industries compared to domestically produced input is increasing.

Consequences of increasing activity in the Danish shipping industry

At the same time the gap between emissions based on the consumption approach and emissions based on the production approach is increasing over time when international transport is included. It is an evidence of the still increasing share that the shipping industry constitutes of the total production and emissions by Danish industries.

6. The UN Climate Convention and the Kyoto Protocol

The UN Climate Convention and the Kyoto Protocol

Since 1992, in the attempt to reduce global warming and alleviate the effects of the increase in global temperature, 192 countries have joined the UN Climate Convention (United Nations Framework Convention on Climate Change, UNFCCC). Furthermore, since 1997, 18 countries have joined the Kyoto Protocol. One of the requirements of the Protocol is that 41 industrialised countries (Annex 1 countries) altogether must in the period from 2008 to 2012 bring down their annual emissions by 5.2 percent measured in relation to base emissions, which for most countries and types of greenhouse gases can be taken to be the emissions in 1990.

Not all emissions are included in the Kyoto Protocol

In measuring the extent of individual countries emissions and how far they are from the target, the UNFCCC and the Kyoto Protocol uses the principles laid down by the IPCC (UN Climate Panel). As mentioned previously, the figures do not include all emissions, such as those from international transport.

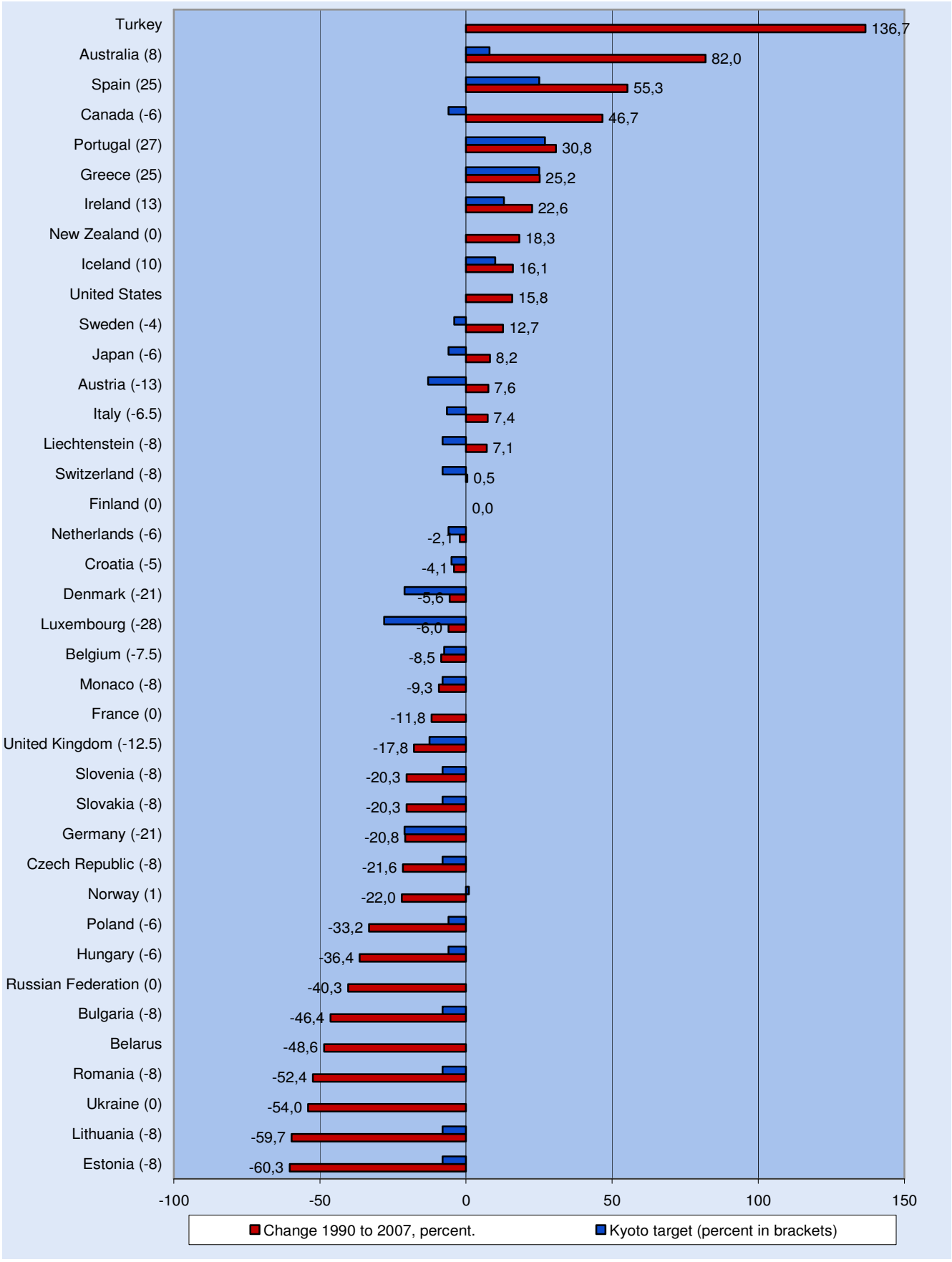
Reduction targets

There is a significant difference in each country's commitments to the protocol. The 15 countries that were members of the EU in 1990 (including Denmark) must altogether cut 8 percent of their emissions, although this covers up the fact that within the EU, various reduction agreements for individual countries exist. Denmark is committed to reducing emissions by 21 percent in relation to 1990 and is thus among those countries, which must carry out the largest reductions in their emissions. Countries such as Canada and Japan must reduce their emissions by 6 percent, while Australia is allowed to increase its emissions by 8 percent and Iceland by 10 percent

Changes in Kyoto targets through altered land use and Kyoto Mechanisms

Whether countries maintain their limitations for emissions as laid down by the Kyoto Protocol for the period from 2008 to 2012 will not only be assessed on the basis of emissions from energy production and consumption, industry and transport etc. The net emissions of greenhouse gases from land use changes will also be taken into account. A country can, for example, by planting new forests to fulfil part of their Kyoto target. Conversely, the felling of a forest will increase requirements for further reduction.

Figure 18. Kyoto targets and development in emissions of greenhouse gases, 1990 - 2007



Note: The numbers for the changes from 1990 to 2007 includes net-emissions from land use changes, etc. (LULUCF)

Please notice that Latvia has been left out of the figure due to an extreme value. Latvia's Kyoto target is -8 percent the change however, is -478.3 percent.

Source: UNFCCC, 2008 and http://unfccc.int/resource/docs/2009/sbi/eng/12.pdf.

Development 1990-2007

Figure 18 shows the development in the emission of greenhouse gases calculated and evaluated in accordance with the Kyoto Protocol. Account is taken for the net emissions, i.e. emissions less binding (removals by sinks) of CO_2, related to land use changes, including changes in the forest areas. The figure also shows the reduction targets for the individual countries. There are no reduction targets for countries that do not have binding targets, for example, because they have not ratified the Kyoto Protocol.

Big variations among countries

On the evidence of the development in emissions between 1990 and 2007, many countries are still some way off achieving their reduction targets and in particular the western industrialised countries, including Denmark. On the other hand, diminishing economic activity in countries such as the former Soviet Union has meant that many of these countries have been able to reduce their emissions much further than they were committed to under the Kyoto Protocol.

5.2 percent decrease in emissions from industrialised countries under the Kyoto Protocol

Overall, the 41 industrialised countries (Annex 1 countries) reduced their emissions by 3.9 percent before the net effect of emissions from land use changes, etc. is taken into account. However, the inclusion of the net effect from land use changes, etc. gives a more positive evaluation of development. The reduction of the industrialised countries' emissions from 1990 to 2007 will increase to 5.2 percent, when land use changes, etc. is taken into consideration.

Denmark

Overall, Denmark's emissions of greenhouse gases were somewhat lower in 2007, compared to 1990. In 2007, the Danish Kyoto-related emissions of greenhouse gases were 3.3 and 5.6 percent below the base year emissions before and after, respectively account is taken for the emissions and bindings due to land use changes.

Kyoto Mechanisms

As well as the fact that by reducing emissions of greenhouse gases by planting new forests and other types of land changes, a country can fulfil its reduction targets for the 2008 – 2012 period by using one of the three so-called Kyoto Mechanisms; Emissions trading ("emissions permits"), JI (Joint Implementation) and CDM (Clean Development Mechanism).

Trading of emissions permits

Annex 1 countries that have emissions below their Kyoto target are able to sell their emissions permits to other Annex 1 countries. The permit system does not affect the total permitted emissions altogether, but makes it possible for a changed allocation of reduction targets between countries.

Denmark part of the EU trading system

In addition to the permit-trading system under the Kyoto Protocol, the EU has in addition introduced an emission trading scheme (ETS) in order to undertake the overall EU settlement of emission. The EU ETS includes almost 12,000 energy-intensive businesses. As far as Denmark is concerned this means that during the 2008 – 2012 period, approximately 380 businesses are included in the system. They are only allowed an annual emission of 24 million tonnes of CO_2 in total. If emissions from a permit-regulated business exceed the quantity allowed by the number of permits it has been assigned for free or has bought from other companies, then it must in following year earn the missing permits and pay a fine of 100 Euro per tonne of emitted CO_2.

Half of the industrial CO_2 emissions are included in the permit system

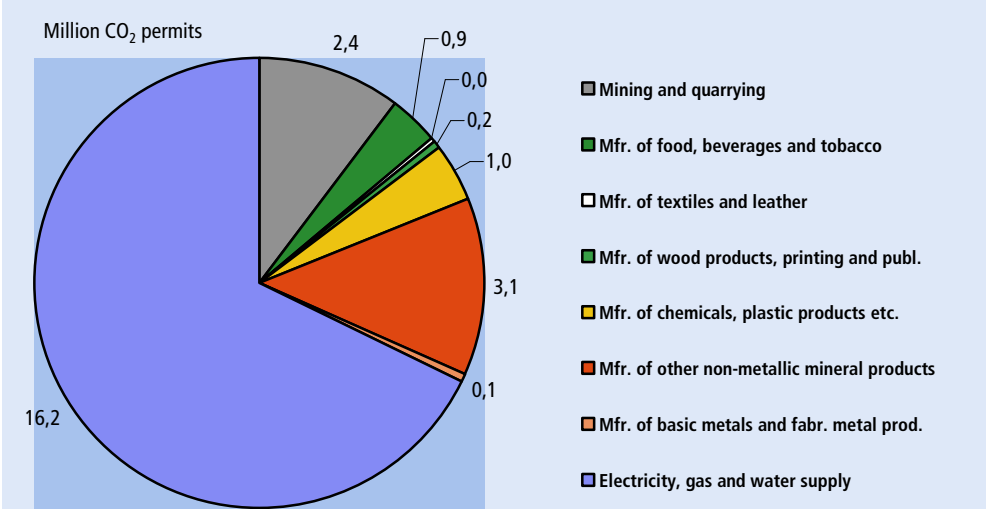
The maximum yearly emissions of 24 million tonnes CO_2 accounts for approximately 55 percent of CO_2 emissions from industries in 2007 when emissions from international transport and biomass are excluded. In addition to energy supply, permits are primarily given to companies extracting oil and cement manufacturers, etc. See Figure 19.

JI

The Joint Implementation Mechanism (JI) is based on projects aimed at reducing or removing emissions of greenhouse gases in Annex 1 countries. An Annex 1 country investing in an approved project that reduce or remove emissions from another country, earns a reduction credit which contributes to fulfilment of the investing country's target. The host country receiving the foreign investment is not credited the

emission reduction, and the Annex 1 countries total reduction commitment is thus not affected.

Figure 19 **Share of CO_2 permits among Danish businesses 2008**



Rep. One CO_2 permit gives permission to emit one ton of CO_2

CDM With the CDM (Clean Development Mechanism), Annex 1 countries can through projects in developing countries earn emission reduction credits if the projects result in emission reductions or binding of greenhouse gases. Each credit, which corresponds to one tonne of CO_2, can be traded. By earning emission reduction credits, industrialised countries can supplement their efforts to reduce emissions and thereby meet a part of their reduction commitment. In contrast to the EU ETS and the JI Mechanism, the CDM extends the total quantity of allowed emissions for Annex 1 countries. From its inception in 2006, more than 1650 projects have been registered and the UN Climate Secretariat expects that it will produce credits worth 2.9 billion tonnes CO_2 during the period 2008 - 2012[2]. This can be compared with the fact that the total global emission of greenhouse gases in 2005 was approximately 48 billion tonnes (see figure 1).

[2] Source: http://unfccc.int/kyoto_protocol/mechanismsclean_development_mechanism/items/2718.php.

References

European Commission, Joint Research Centre (JRC)/Netherlands Environmental Assessment Agency (PBL). Emission Database for Global Atmospheric Research (EDGAR), release version 4.0. http://edgar.jrc.ec.europe.eu, 2009.

European Commission (2009). Manual for Air Emissions Accounts. Eurostat Methodologies and Working papers.

IPCC/DMI, 2007/08: Climate changes 2007: Synthesis report, summary for decision makers. The Intergovernmental Panel on Climate, Fourth Assessment Report. Intergovernmental Panel on Climate. The report can be found in an electronic version on www.dmi.dk and www.ipcc.ch

Nielsen, O.-K., Lyck, E., Mikkelsen, M.H., Hoffmann, L., Gyldenkærne, S., Winther, M., Nielsen, M., Fauser, P., Thomsen, M., Plejdrup, M.S., Albrektsen, R., Hjelgaard, K., Vesterdal, L., Møller, I.S. & Baunbæk, L. 2009: Denmark's National Inventory Report 2009. Emission Inventories 1990-2007 - Submitted under the United Nations Framework Convention on Climate Change. National Environmental Research Institute, Aarhus University. 826 pp. – NERI Technical Report. No 724. http://www.dmu.dk/Pub/FR724.pdf

Statistics Denmark (2008). Energy Accounts for Denmark 2007. Statistical Information, Environment and Energy. 2008:5. Statistics Denmark, 24. November 2008. Publication in the Danish language.

Statistics Denmark (2009). Environmental Account for Denmark 2007. Statistical Information, Environment and Energy. 2009:1. Statistics Denmark, 28. April 2009. Publication in the Danish language.

Statistics Denmark (2009). Danish Input-Output Tables and Analyses 2007-Employment, Imports and Environment.

Statistics Denmark (2009). National Accounts 2003-2008, November version. Statistical Information, National Accounts and Balance of Payments. 2009:15. Statistics Denmark, 9. November 2009. Publication in the Danish language.

Stern, Sir Nick: Stern Review: The Economics of Climate Change. United Kingdom's Economics and Finance Ministry (2006).

The Danish Ministry of Economic and Business Affairs (2008): Vækst, Klima og Konkurrenceevne. Publication in the Danish language.

UNFCCC 2008: National greenhouse gas inventory data for the period 1990-2006. UNFCCC Subsidiary Body for Implementation, Twenty-ninth session. Poznan 1-10 December 2008 (FCCC/SBI/2008/12, 17 November 2008)

United Nations et al. (2003): Integrated Environmental and Economic Accounting 2003.

World Commission on Environment and Development (1987): *Our Common Future* (also known as the Brundtland report).

Annex 1 Methodology

A.1 Environmental Accounting Principles

SEEA 2003

The basic principles on environmental accounting are embodied in the handbook *Integrated Environmental and Economic Accounting 2003* (United Nations *et al.*, 2003), commonly referred to as SEEA 2003.

System of National Accounts

The SEEA 2003 is a satellite system of the System of National Accounts (SNA), which is the standard system for organizing economic information. It is from the SNA that economic indicators, similar to the gross domestic product (GDP), are derived. As a satellite system the SEEA 2003 has a similar structure to the SNA and shares common definitions and classifications.

Interaction between economy and environment

The SEEA 2003 describes the interaction between the economy and the environment and covers the whole spectrum of natural resources and the environment. It provides a set of definitions, classifications, statistical accounts and tables to analyse the interactions between the economy and the environment. It also enables to analyze links between different environmental domains (e.g. energy, pollution, land, water, etc).

The structure of SEEA 2003

The SEEA 2003 comprises four types of accounts. The first category of account comprises physical flow and hybrid flow accounts. Physical flow accounts describe the flows of natural resources from the environment to the economy, within the economy and back to the environment. Energy accounts and air emissions accounts are part of this category. Hybrid flow accounts link the physical flow accounts with the standard SNA accounts in monetary terms. They are called "hybrid" because they entail accounts expressed in different units – i.e. monetary and physical quantity (SEEA 2003, Chapters 3 and 4).

The second category of accounts comprises accounts for economic activities and products related to the environment and environmental transactions. Accounts in this category explicitly identify those economic transactions related to the environment such as environmental protection activities (SEEA 2003, Chapter 5), accounts for environmental taxes and subsidies and other economic instruments e.g. permits and licences (SEEA 2003, Chapter 6). In the case of energy, the latter category of accounts is particularly relevant and includes, for example, the cost of extraction, production and distribution of energy products, fees paid by the users for the energy products and permits paid by companies to extract mineral and energy resources.

The third category comprises asset accounts in physical and monetary terms (SEEA 2003, Chapter 7). Chapter 8 shows how the considerations in chapter 7 can be applied for specific resources, e.g. mineral and energy resources. These accounts describe, in physical and monetary terms, stocks at the beginning and end of the accounting period and changes therein due to natural causes and human intervention (e.g. extraction, discoveries, changes in prices, etc.).

The fourth category covers the valuation techniques for measuring environmental depletion of natural resources, as well as degradation of natural assets (SEEA 2003, Chapter 9). Further, it addresses ways to adjust standard national accounts aggregates (GDP, savings), for depletion and degradation (SEEA 2003, Chapter 10).

The last chapter of the SEEA 2003 illustrates examples of policy applications of environmental-economic accounts through country case studies (SEEA 2003, Chapter 11).

Source: http://unstats.un.org/unsd/envaccounting/seea.asp

Residence principle

Since environmental accounts follow the principles of the System of National Accounts, the concepts of resident units and centre of economic interest are used to define the boundaries and to decide which activities should be included or excluded in the accounts. Using these concepts to define the boundary is different from the practice normally used in energy and environmental statistics, for instance in the regular energy statistics and energy balances reported to the International Energy Agency (IEA) and the emission inventory reported to UNFCCC.

Resident units

Resident units of a country are defined as institutional units with residence in the economic territory of the country, i.e. those institutional units, which has the strongest connection (its centre of predominant economic interest) to the economic territory of the country. The economic territory includes land area, airspace, territorial waters, and territorial enclaves in the rest of the world (e.g. embassies, consulates, military bases, and scientific stations).

Accounts ensures consistency

The use of the resident principle guarantees that the total air emissions can be juxtaposed consistently with macroeconomic and sectoral aggregates such as gross domestic product and value added. This is also essential for the correct calculation of, for instance, emissions intensities defined as air emissions by industry over value added.

Classifications

Another difference between the emissions accounts and the inventories concerns how activities are classified. The UNFCCC emissions inventories are, for instance, based on a reporting format presenting the air emissions by sectors at different levels (Agriculture, Forestry, Energy industries, Manufacturing industries, Chemical Industry, Metal Production, etc.). While the titles of some of these sectors and sub-sectors, may have similarities with the titles used in the classification used in the environmental accounts, it is important to note that the contents are not exactly the same.

Transport

Especially, when it comes to the transport, it should be noted that this category in the UNFCCC emissions inventories include all air emissions activated by transport activities. In contrast, the air emissions accounts allocate air emissions from transport to all the industries and households to the extent that they carry out transport activities on own-account. It implies that the air emissions of the transportation industries do include only air emissions from part of the total transport activities. Thus, it is necessary to add all air emissions related to own-account transport from the other industries and the households in order to obtain the total transport related air emissions as defined by the air emissions accounts.

Further information

See
http://unstats.un.org/unsd/envaccounting/default.asp
for further information on environmental accounts.

A.2 Energy Accounts

Fossil fuels the major contributor to global warming

On a global scale, more than two thirds of the global warming potential caused by human activity was in 2005 caused by the combustion of fossil fuels like coal, oil products and natural gas. Combustion of fossil fuels is also predominant in the Danish context even though energy sources like biomass and wind power in recent years have come to play a more important role.

Detailed information in the energy accounts

In order to be able to estimate the greenhouse gas emissions related to the use of fossil fuels in the industries and the households, it is important to have information on the consumption of energy broken down by energy types, industries and households. This is done in the energy accounts.

130 industries and 40 types of energy

At the most detailed level, the Danish energy accounts include information on the supply and use of energy by the 130 industry classification used for the Danish national accounts. Further, the detailed accounts include a breakdown by 40 different types of energy.

Flows of energy

Table A.2 in Annex 2 contains aggregated information on every flow of energy related to Danish economic activities from the extraction of crude oil and natural gas to the conversion of primary energy into electricity and district heat as well as the use of wind power and other renewable types of energy.

Physical and monetary information at various measuring units

The table shows the energy flows at physical units, tera joules (TJ). In addition, the Danish energy accounts include information on energy flows at various mass and volume units (tonnes, cubic metres, etc.), and monetary information at various price levels (basic prices, trade margins, taxes and subsidies, VAT, and purchasers prices). The accounts also show so-called adjusted energy use figures as presented in the box in Chapter 3.

Danish energy accounts methodology

The supply side of the energy accounts (production and imports) is based on Statistics Denmark's commodity statistics and the external trade statistics, both of which are made up in physical as well as monetary values.

The use side of the energy accounts relies on information on the energy sector from the Danish Energy Agency, Statistics Denmark's censuses of the energy consumption in the manufacturing industries and data on reimbursement of energy taxes as well as data on employment.

The expenditures related to the bunkering abroad are included in the balance of payments together with other Danish expenditures abroad. The amount of fuel oil and jet petroleum bunkered by Danish operated ships and planes have been estimated from the expenses and corresponding fuel oil and jet petroleum prices obtained from the external trade statistics.

Use of energy relevant for air emissions

When looking at the total flow of energy and the use of energy, it is important to be aware that it is the combustion of the primary energy like coal, natural gas and oil products that causes the greenhouse gas emissions. Combustion of biomass also causes emissions even though these emissions are often considered neutral in relation to the greenhouse effect. The use of electricity and district heat does not cause any direct emissions. In Table A.1 below, non-emission relevant energy flows have been shaded.

Essential differences between energy accounts and energy balances

Energy accounts are a satellite of the system of national accounts (SNA), and they follow the principles of the SNA, and therefore the residence principle is adopted. This implies that all economic activities of a resident unit are within the boundaries of the energy accounts. Energy balances, as presented by, for instance the International Energy Agency (IEA) and Eurostat, on the other hand, follow the territory principle according to which all activities taking place in the national territory are considered within the boundary. This difference in approach has implications mainly on the treatment of energy consumption, especially for transportation.

In energy accounts, production is defined according to the SNA and economic activities are classified according to the International Standard Classification of All Economic Activities (ISIC) of the primary product of the establishment. In energy balances, activities are mainly classified by sector.

The energy products in the energy accounts are those as classified by the Harmonized System (HS), for trade data, and the Central Product Classification (CPC), for production and consumption data. However, it is important to be aware that energy accounts not only accounts for energy products, which are traded and thus have an economic value attached to it. Within its boundary, energy accounts account for all energy flows also accounted for in the energy balances.

In energy balances, all energy consumption for transportation is reported as a total. In energy accounts, it is broken down according to intermediate consumption of industries (transport industries and other industries) and final consumption of households. Further, consumption of energy products bunkered abroad for international sea transport and for international air transport is not included in energy balances, but it is in the energy accounts.

Actual use of energy

Table A.1 and Figure A.1 show the Danish industries' total actual use of energy. The use of energy in the industries *Electricity, gas and water supply* as well as in the refineries are for most parts converted into electricity, district heat as well as refined into oil products. The industries' use of these converted (refined) energy products are also included in the figure, which in that way includes, to some extent, the same amount of energy twice. The calculation of the net energy consumption, as shown below in Figure A.2, adjusts for this double counting.

Figure A.1 Composition of the Danish industries' actual use of energy

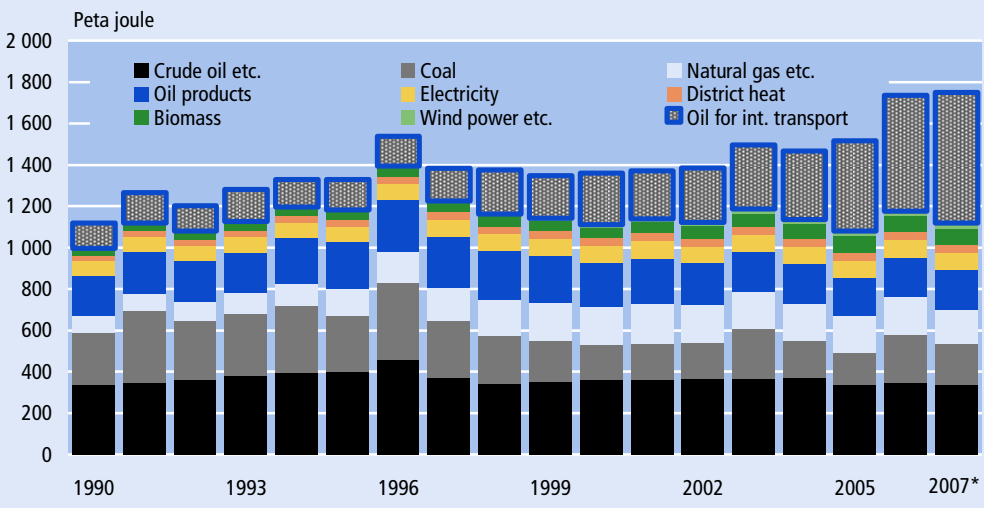


Table A.1 **Use of energy caused by Danish economic activities. 2007***

		Crude oil and semi-manufactured oil	Coal, coke, etc.	Oil products	Natural gas	Other gas	Renewable energy resources	Electricity	District heating
		TJ							
	Total industries and households	**338 638**	**197 510**	**923 338**	**171 576**	**19 756**	**146 098**	**121 000**	**97 659**
	Total industries	**338 638**	**197 501**	**822 773**	**145 314**	**18 728**	**105 956**	**83 715**	**37 115**
	Households	-	9	100 565	26 262	1 028	40 142	37 285	60 544
1	**Agriculture, fishing, quarrying**	**-**	**2 323**	**34 566**	**31 536**	**178**	**3 530**	**7 664**	**1 994**
0109	Agriculture, horticulture, and forestry	-	2 230	26 277	1 897	122	3 286	7 174	1 985
0500	Fishing	-	-	7 009	-	18	-	215	-
1009	Mining and quarrying	-	93	1 279	29 639	38	244	275	9
2	**Manufacturing**	**338 638**	**9 525**	**30 329**	**36 089**	**17 249**	**5 069**	**33 868**	**6 039**
1509	Mfr. of food, beverages and tobacco	-	2 196	7 582	14 504	342	495	8 198	945
1709	Mfr. of textile and leather	-	-	389	402	10	1	581	156
2009	Mfr. of wood products, printing and publishing	-	-	1 445	3 339	125	2 085	3 886	1 093
2309	Mfr. of chemicals and plastic products	338 638	-	2 681	5 026	15 939	113	7 662	1 510
2600	Mfr. of other non-metallic mineral products	-	7 325	11 926	5 828	335	784	3 308	116
2709	Mfr. of basic metals and fabr. metal product	-	4	5 512	6 524	465	289	8 793	2 047
3600	Mfr. of furniture and manufacturing n.e.c.	-	-	793	466	34	1 302	1 440	171
3	**Electricity, gas and water supply**	**-**	**185 654**	**13 082**	**65 042**	**1**	**96 463**	**2 428**	**14**
4	**Construction**	**-**	**-**	**19 227**	**364**	**222**	**-**	**1 133**	**-**
5	**Wholesale and retail trade, hotels, restau.**	**-**	**-**	**16 074**	**4 251**	**110**	**-**	**14 935**	**10 059**
5000	Sale and repair of motor vehic., sale of auto fuel	-	-	3 912	445	12	-	1 372	1 052
5100	Wholesale, except of motor vehicles	-	-	8 578	1 682	73	-	4 864	3 980
5200	Retail trade and repair work, exc. of m. vehicles	-	-	2 794	1 138	3	-	6 354	2 692
5500	Hotels and restaurants	-	-	790	987	22	-	2 345	2 336
6	**Transport, storage and communication**	**-**	**-**	**692 984**	**454**	**482**	**-**	**5 884**	**1 074**
6009	Transport	-	-	691 978	216	482	-	4 326	512
6400	Post and telecommunications	-	-	1 006	238	0	-	1 558	563
7	**Finance and business activities**	**-**	**-**	**5 480**	**2 183**	**53**	**-**	**5 741**	**5 166**
6509	Finance and insurance	-	-	293	354	-	-	798	837
7009	Letting and sale of real estate	-	-	1 166	303	2	-	551	717
7209	Business activities	-	-	4 021	1 526	52	-	4 392	3 611
8	**Public and personal services**	**-**	**-**	**11 031**	**5 396**	**433**	**893**	**12 061**	**12 768**
7500	Public administration	-	-	4 642	647	64	116	1 393	1 532
8000	Education	-	-	1 351	1 221	144	286	2 752	2 889
8519	Human health activities	-	-	527	770	64	179	1 736	1 823
8539	Social institutions etc.	-	-	1 545	1 210	-	313	2 728	2 864
9009	Associations, culture and refuse disposal	-	-	2 967	1 547	160	-	3 453	3 661
610000	Of which Danish ships bunkering abroad	-	-	605 556	-	-	-	-	-
620000	Of which Danish planes bunkering abroad	-	-	25 492	-	-	-	-	-

The Danish operated ships' and planes' bunkering of oil products abroad (fuel oil and JP1 respectively) is part of the input in the industry *Transport*.

*Preliminary figures.

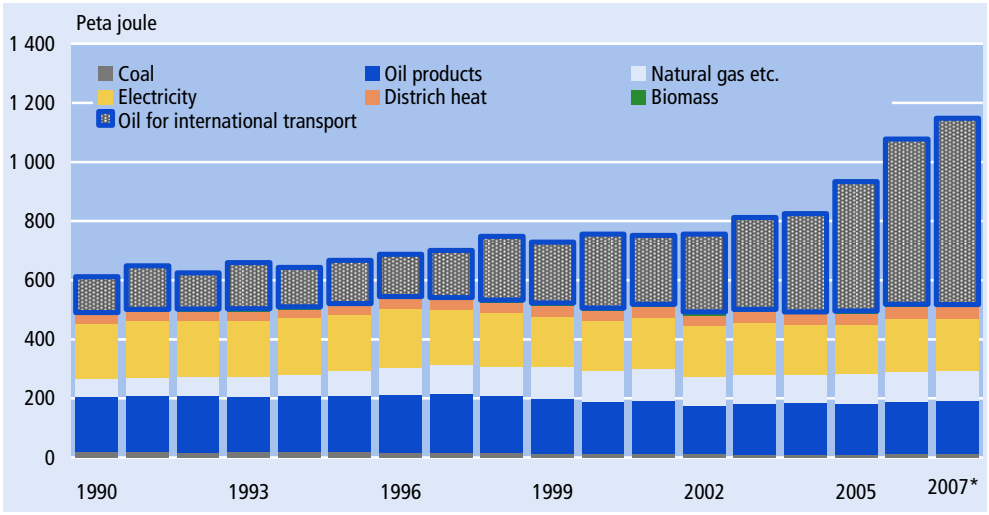
For further information visit www.statbank.dk/ene1.

Non-emission relevant uses of energy have been shaded.

Calculation of the adjusted energy consumption

The calculation of the adjusted energy consumption or the net energy consumption, which it sometimes is also referred to as, is carried out by breaking down 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. However, at first the consumption of energy at the electricity production plants is adjusted for the net imports of electricity so that the net import of electricity is also converted into primary energy. In addition to this, the waste and cable losses of the individual types of energy are broken down by the users of the respective energy products. This implies that increased efficiency in the conversion industries results in a lower consumption of energy at the final users, even though their consumption of electricity and district heat is constant.

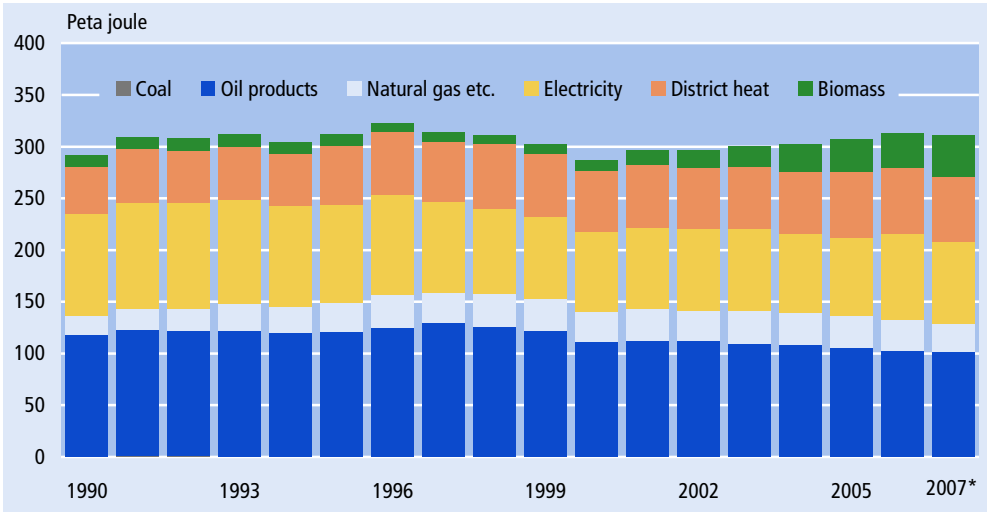
Figure A.2 Composition of the Danish industries' net energy consumption



Constant net consumption of energy in the industries ...

It appears from the figure that whereas oil products bunkered by Danish operated ships and planes abroad have increased dramatically since 1990, the net consumption of energy in the other industries is more or less at the same level. It is important to emphasise that the figures are adjusted for the external trade with electricity. Therefore, the figures cannot be observed and do not correspond to the actual consumption of energy.

Figure A.3 Composition of the Danish households' net energy consumption



... and in the households

The households' net energy consumption has been more or less at the same level since 1990. The composition has changed though. The use of oil products has decreased, whereas biomass has become more important.

Further information

See
http://www.dst.dk/declarations/052916
for further information on the Danish energy accounts.

Data available free of charge

The Danish energy accounts are available on the Internet.

Firstly,
www.statbank.dk/ene1
offers the possibility of extracting either complete tables or sections of the tables in the same way as other data are extracted from StatBank Denmark.

Secondly,
www.dst.dk/inputoutput
provides users with the possibility of downloading entire sets of energy accounts.

A.3 Air Emission Accounts

Eight types of air emissions

The Danish air emission accounts comprise not only greenhouse gases, but also other substances. Overall, eight substances, CO_2, SO_2, NO_x, CH_4, N_2O, NMVOC, NH_3, and CO, are distinguished in the accounts.

Energy related air emissions

For energy related emissions, the Danish air emission accounts include a breakdown of the emissions by the same 40 types of energy, which are included in the Danish energy accounts, cf. Annex A.2. Furthermore, all information on emissions is broken down by 130 industries and households.

The primary sources used to compile the Danish air emissions accounts are the Danish energy accounts and emission factors and emission inventories obtained from the Danish National Environmental Research Institute (NERI).

Generally, the air emissions are estimated at a detailed level (i.e. for each type of energy and each industry and households) by multiplying the energy use by a technical emissions factor. The general procedure is described in the box.

Danish air emission accounts methodology

Calculations of air emissions from energy use and emissions factors can mathematically be described in the following way:

Let E_{ii} be the total amount (in GJ) of energy type *i* used in industry *j* or households and let e_{hii} be kilograms of emissions of pollutant *h* per GJ of energy type *i* used in sector *j*. The total emission of pollutant *h* connected to the use of energy type *i* in sector *j* is then EM_{hii} given by:

$$EM_{hii} = E_{ii}e_{hii}$$

h = CO_2, SO_2, NO_x, CO, NH_3, N_2O, CH_4, and NMVOC
i = 1,..,40 (types of energy)
j = 1,..,130 industries + households

E_{ii} is taken directly from the Danish energy accounts, while e_{hii} generally corresponds to the emission factors obtained from the Danish National Environmental Research Institute (NERI).

The number of different e_{hii} is limited as the emissions of a single type, *h*, caused by use of energy type, *i*, in most cases (but not all), are the same for different industries/households, *j*. The emission, for example, of CO_2 per unit of gasoline is the same whatever industry the gasoline is used.

This calculation gives a breakdown of the emissions on the industries and households and types of energy products. This breakdown of the emissions is afterwards supplemented with additional information in order to meet some of the emission totals in the emission inventories submitted by NERI to the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Economic Commission for Europe (UNECE) and the European Union.

The reason for supplementing with this additional information to meet the level in NERI's emission inventories is to make the air emissions accounts fully consistent with NERI's reports to the UNFCCC, UNECE and the EU in areas where the definitions and boundaries of the accounts and emission inventories are the same. An important argument for the balancing is to ensure that account is taken for different abatement technologies in use. This is the case for SO_2 and NO_x from power plants, where emissions to a large extent are measured by monitoring equipment at the power plants (by Government regulation and control).

Thus, for main areas, the data for air emissions in the air emissions accounts correspond to the emissions, which are also reported to the international conventions. However, as explained elsewhere, in some areas, e.g. for international transport, different definitions entail different estimates of emissions.

Road transport

For the use of LPG, motor gasoline and diesel oil the calculation of emissions is carried out at an even more detailed level than described in the box. The calculation for these three types of energy is based on a breakdown of energy consumption in industries and households into specific use/purpose categories.

For the consumption of LPG, motor gasoline and diesel oil for cars a breakdown by 189 different types of cars is included in the calculations. For each industry/households and type of car the emissions are estimated, using specific emission factors for the relevant type of car. Calculation of emissions on a detailed level like this one gives more reliable estimates for some emission types in cases where emission factors vary from one type of car to another type of car. Finally, the emissions from road are adjusted in order to ensure consistency with NERI's estimates of emissions from road transport.

Cross border trade

Emissions related to cross border trade with motor gasoline and diesel oil are calculated in the same way as emissions from bunkering. The emission factor used to the calculations is approximated to the emission factor for a passenger car.

Ships and aeroplanes

Emissions from fuel oil and jet petroleum bunkered by Danish operated ships and planes in foreign countries are also calculated by multiplying the fuel use obtained from the energy accounts by corresponding emission factors for international sea or air transport.

Non-energy related emissions

In addition to the energy related emissions, the accounts also include non-energy related emissions from, for instance, the use of various types of solvents by industries and households. The data source used for the accounts for the non-energy related emissions is NERI's emission inventories.

Production based approach …

It is important to be aware that in relation to air emission accounts, the principle is to attribute the emissions to the industry or the households actually combusting the fossil fuels causing the emissions. This means that in the air emissions accounts emissions are attributed to, e.g., the electricity supply industry and not the industries or households using the electricity.

… but consumption based approach is possible

However, this does not mean, as shown elsewhere in this publication, that the environmental accounting approach does not allow to analyse and to focus on the greenhouse gas emissions caused by, e.g., the Danish consumption activities.

Detailed tables in annex 2

Detailed tables showing Danish emissions of greenhouse gases with a breakdown by 130 industries are presented in Annex 2.

Manual for air emission accounts

Further, general information on the compilation of air emission accounts can be obtained from Eurostat's manual on air emissions accounts (European Commission, 2009).

Further information

See
http://www.dst.dk/declarations/918
for further information on the air emission accounts.

Data available free of charge

The Danish air emission accounts are available on the Internet.

Firstly,
www.statbank.dk/mreg5
offers the possibility of extracting either complete tables or sections of the tables in the same way as other data are extracted from StatBank Denmark.

Secondly,
www.dst.dk/inputoutput
provides users with the possibility of downloading entire sets of emission accounts.

Annex 2 Detailed tables

Table A.2 Energy account, heating values 2007*

		Crude oil and semi-manufactured oil	Coal, coke, etc.	Oil products	Natural gas
		Tera joule (TJ)			
	Production	663 955	-	310 662	352 243
	Imports	98 147	200 995	864 079	-
	Total supply (= total use)	**762 102**	**200 995**	**1 174 741**	**352 243**
	Changes in inventories	-2 385	- 681	-46 903	11 008
	Waste and cable losses	3 396	2 133	2 474	119
	Exports	422 453	2 033	295 831	169 540
	Total industries and households	**338 638**	**197 510**	**923 339**	**171 576**
	Total industries	338 638	197 501	822 773	145 314
	Households	**-**	**9**	**100 565**	**26 262**
011009	Agriculture	-	201	19 370	814
011209	Horticulture, orchards etc.	-	2 029	1 289	1 040
014000	Agricultural services; landscape gardeners etc.	-	-	4 938	43
020000	Forestry	-	-	680	-
050000	Fishing	-	-	7 009	-
110000	Extr. of oil and natural gas	-	-	10	27 832
140009	Extr. of gravel and clay etc.	-	93	1 269	1 807
151000	Production etc. of meat and meat products	-	-	538	1 492
152000	Processing and preserving of fish and fish products	-	257	463	1 579
153000	Processing and preserving of fruit and vegetables	-	-	198	695
154000	Mfr. of vegetable and animal oils and fats	-	-	1 054	389
155000	Mfr. of dairy products	-	-	635	4 255
156009	Mfr. of starch, chocolate and sugar products	-	932	1 151	3 364
158109	Mfr. of bread, cakes and biscuits	-	-	432	579
158120	Bakers shops	-	-	243	-
158300	Manufacture of sugar	-	1 007	1 610	-
159000	Manufacture of beverages	-	-	1 244	2 029
160000	Manufacture of tobacco products	-	-	13	121
170000	Mfr. of textiles	-	-	237	315
180000	Mfr. of wearing apparel	-	-	126	69
190000	Mfr. of leather and footwear	-	-	26	18
200000	Mfr. of wood and wood products	-	-	560	416
210000	Mfr. of pulp, paper and paper products	-	-	330	2 267
221200	Publishing of newspapers	-	-	88	84
221309	Publishing activities, excluding newspapers	-	-	183	225
222009	Printing activities	-	-	283	347
230000	Mfr. of refined petroleum products etc.	338 638	-	851	-
241109	Mfr. of industrial gases and inorganic basic chemicals	-	-	73	35
241209	Mfr. of dyes, pigments and organic basic chemicals	-	-	453	469
241500	Manufacture of fertilizers	-	-	0	14
241617	Mfr. of plastics and synthetic rubber	-	-	13	16
242000	Manufacture of pesticides and other agro-chemical products	-	-	18	1 481
243000	Mfr. of paints, varnishes and similar coatings, printing ink and mastics	-	-	51	93
244000	Mfr. of pharmaceuticals etc.	-	-	247	882
245070	Mfr. of detergents and other chemical products	-	-	253	898
251122	Mfr. of rubber products and plastic packing goods etc.	-	-	487	891
252300	Mfr. of builders ware of plastic	-	-	86	26
252400	Manufacture of other plastic products n.e.c.	-	-	150	222
261126	Mfr. of glass and ceramic goods etc.	-	-	78	1 275
263053	Mfr. of cement, bricks, tiles, flags etc.	-	4 789	10 324	1 955
266080	Mfr. of concrete, cement, asphalt and rockwool products	-	2 536	1 523	2 597
271000	Mfr. of basic iron and steel and of ferro alloys	-	-	16	1 607
272030	First processing of iron and steel	-	-	78	33
274000	Mfr. of basic non-ferrous metals	-	-	96	131
275000	Casting of metal products	-	-	46	85
281009	Mfr. of building materials of metal	-	4	1 696	1 152
286009	Mfr. of various metal products	-	-	460	795
291000	Mfr. of marine engines and compressors	-	-	255	293
292000	Mfr. of ovens and cold-storage plants	-	-	723	353
293000	Mfr. of agricultural machinery	-	-	414	216
294009	Mfr. of machinery for industries	-	-	542	301
297000	Mfr. of domestic appliances	-	-	49	67
300000	Mfr. of office machinery and computers	-	-	21	23

Energy account, heating values 2007* — Table A.2

Other gas	Renewable energy resources	Electricity	District heating	
Tera joule (TJ)				
24 156	129 866	132 826	122 111	Production
222	18 699	37 534	-	Imports
24 378	**148 565**	**170 359**	**122 111**	**Total supply (= total use)**
69	52	-	-	Changes in inventories
214	733	8 402	24 452	Waste and cable losses
4 339	1 681	40 957	-	Exports
19 756	**146 098**	**121 000**	**97 659**	**Total industries and households**
18 728	105 956	83 715	37 115	Total industries
1 028	**40 142**	**37 285**	**60 544**	**Households**
111	3 236	6 028	-	Agriculture
11	50	947	1 985	Horticulture, orchards etc.
-	-	160	-	Agricultural services; landscape gardeners etc.
-	-	39	-	Forestry
18	-	215	-	Fishing
-	-	11	-	Extr. of oil and natural gas
38	244	264	9	Extr. of gravel and clay etc.
26	0	1 873	47	Production etc. of meat and meat products
47	16	772	133	Processing and preserving of fish and fish products
2	-	281	27	Processing and preserving of fruit and vegetables
-	6	237	5	Mfr. of vegetable and animal oils and fats
1	22	883	2	Mfr. of dairy products
186	440	2 447	131	Mfr. of starch, chocolate and sugar products
47	9	435	184	Mfr. of bread, cakes and biscuits
2	-	344	-	Bakers shops
2	-	77	15	Manufacture of sugar
26	-	731	360	Manufacture of beverages
1	1	119	43	Manufacture of tobacco products
9	1	508	86	Mfr. of textiles
1	-	62	70	Mfr. of wearing apparel
-	-	11	-	Mfr. of leather and footwear
20	2 052	1 090	423	Mfr. of wood and wood products
101	32	1 020	9	Mfr. of pulp, paper and paper products
0	-	350	335	Publishing of newspapers
1	-	355	215	Publishing activities, excluding newspapers
3	1	1 072	111	Printing activities
15 916	-	1 102	405	Mfr. of refined petroleum products etc.
0	-	484	5	Mfr. of industrial gases and inorganic basic chemicals
0	-	1 227	50	Mfr. of dyes, pigments and organic basic chemicals
-	-	4	-	Manufacture of fertilizers
4	-	133	10	Mfr. of plastics and synthetic rubber
0	-	279	-	Manufacture of pesticides and other agro-chemical products
3	4	100	30	Mfr. of paints, varnishes and similar coatings, printing ink and mastics
0	4	1 304	872	Mfr. of pharmaceuticals etc.
3	90	649	20	Mfr. of detergents and other chemical products
6	0	1 482	34	Mfr. of rubber products and plastic packing goods etc.
1	12	89	12	Mfr. of builders ware of plastic
5	4	809	71	Manufacture of other plastic products n.e.c.
5	0	722	52	Mfr. of glass and ceramic goods etc.
0	400	1 559	-	Mfr. of cement, bricks, tiles, flags etc.
330	383	1 028	64	Mfr. of concrete, cement, asphalt and rockwool products
2	-	198	2	Mfr. of basic iron and steel and of ferro alloys
17	-	249	152	First processing of iron and steel
1	-	291	11	Mfr. of basic non-ferrous metals
21	-	418	4	Casting of metal products
224	183	1 255	497	Mfr. of building materials of metal
55	17	1 033	86	Mfr. of various metal products
28	3	1 218	257	Mfr. of marine engines and compressors
34	22	537	130	Mfr. of ovens and cold-storage plants
17	0	196	31	Mfr. of agricultural machinery
15	10	546	176	Mfr. of machinery for industries
1	2	136	20	Mfr. of domestic appliances
0	-	23	4	Mfr. of office machinery and computers

Table A.2. (cont.) **Energy account, heating values 2007***

		Crude oil and semi-manu-factured oil	Coal, coke, etc.	Oil products	Natural gas
		Tera joule (TJ)			
310000	Mfr. of other electrical machinery and apparatus	-	-	380	379
320000	Mfr. of radio and communication equipment	-	-	102	162
330000	Mfr. of medical and optical instruments	-	-	185	181
340000	Manufacture of motor vehicles etc.	-	-	162	391
351000	Building and repairing of ships and boats	-	-	222	307
352050	Mfr. of transport equipment excl. ships, motor vehicles etc.	-	-	65	49
361000	Mfr. of furniture	-	-	542	364
362060	Mfr. of toys, gold and silver articles etc.	-	-	197	101
370000	Recycling of waste and scrap	-	-	55	1
401000	Production and distribution of electricity	-	166 866	9 832	30 894
402000	Manufacture and distribution of gas	-	-	77	459
403000	Steam and hot water supply	-	18 788	3 148	33 684
410000	Collection and distribution of water	-	-	24	6
450001	Construction of new buildings	-	-	6 562	131
450002	Repair and maintenance of buildings	-	-	8 785	181
450003	Civil engineering	-	-	3 880	52
450004	Construction materials for own-account repair	-	-	-	-
501009	Sale of motor vehicles and motorcycles	-	-	2 411	147
502000	Maintenance and repair of motor vehicles	-	-	1 396	221
505000	Retail sale of automotive fuel	-	-	104	77
510000	Wholesale except of motor vehicles	-	-	8 578	1 682
521090	Retail trade of food	-	-	653	422
522990	Department stores	-	-	36	156
523000	Re. sale of phar. goods, cosmetic art.	-	-	83	51
524190	Re. sale of clothing and footwear	-	-	172	128
524490	Other retail sale, repair work	-	-	1 851	381
551009	Hotels	-	-	145	247
553009	Restaurants	-	-	645	740
601000	Transport via railways	-	-	3 109	7
602100	Other scheduled passenger land transport	-	-	3 837	13
602223	Taxi operation and coach services	-	-	2 834	5
602409	Freight transport by road and via pipelines	-	-	27 045	15
610000	Water transport	-	-	614 722	7
620000	Air transport	-	-	38 529	21
631130	Cargo handling, harbours etc., travel agencies	-	-	638	90
634000	Activities of other transport agencies	-	-	1 264	57
640000	Post and telecommunications	-	-	1 006	238
651000	Financial institutions	-	-	147	210
652000	Mortgage credit institutions	-	-	58	46
660102	Life insurance and pension funding	-	-	17	11
660300	Non-life insurance	-	-	38	69
670000	Activities auxiliary to finance	-	-	33	17
701109	Real estate agents etc.	-	-	152	54
702009	Dwellings	-	-	217	180
702040	Letting of non-residential buildings	-	-	587	30
710000	Renting of transport equipment and machinery	-	-	211	39
721009	Computer activities exc. software consultancy and supply	-	-	115	56
722000	Software consultancy and supply	-	-	356	144
730001	Research and development (market)	-	-	25	17
730002	Research and development (other non-market)	-	-	69	77
741100	Legal activities	-	-	76	70
741200	Accounting, book-keeping, auditing	-	-	168	120
742009	Consulting engineers, architects	-	-	721	366
744000	Advertising	-	-	303	117
747000	Building-cleaning activities	-	-	1 091	220
748009	Other business activities	-	-	1 095	341
751100	General (overall) public service activities	-	-	361	159
751209	Administration of public sectors exc. for business	-	-	307	109
751300	Regulation of and contribution to more efficient operation of business	-	-	951	29
752000	Defence, police and administration of justice	-	-	3 023	351

Energy account, heating values 2007* **Table A.2 (cont.)**

Other gas	Renewable energy resources	Electricity	District heating	
Tera joule (TJ)				
11	11	857	234	Mfr. of other electrical machinery and apparatus
18	26	367	42	Mfr. of radio and communication equipment
1	5	415	197	Mfr. of medical and optical instruments
9	7	696	86	Manufacture of motor vehicles etc.
9	2	287	25	Building and repairing of ships and boats
0	-	70	94	Mfr. of transport equipment excl. ships, motor vehicles etc.
33	1 294	1 171	113	Mfr. of furniture
1	8	143	55	Mfr. of toys, gold and silver articles etc.
-	-	126	3	Recycling of waste and scrap
-	51 660	704	-	Production and distribution of electricity
1	-	67	-	Manufacture and distribution of gas
-	44 803	1 078	-	Steam and hot water supply
-	-	579	14	Collection and distribution of water
77	-	407	-	Construction of new buildings
119	-	563	-	Repair and maintenance of buildings
27	-	163	-	Civil engineering
-	-	-	-	Construction materials for own-account repair
4	-	667	347	Sale of motor vehicles and motorcycles
7	-	390	523	Maintenance and repair of motor vehicles
1	-	315	182	Retail sale of automotive fuel
73	-	4 864	3 980	Wholesale except of motor vehicles
1	-	3 210	999	Retail trade of food
-	-	1 160	368	Department stores
0	-	98	120	Re. sale of phar. goods, cosmetic art.
0	-	553	303	Re. sale of clothing and footwear
1	-	1 333	901	Other retail sale, repair work
5	-	772	585	Hotels
17	-	1 572	1 750	Restaurants
-	-	849	17	Transport via railways
461	-	433	31	Other scheduled passenger land transport
10	-	12	13	Taxi operation and coach services
7	-	185	35	Freight transport by road and via pipelines
0	-	101	17	Water transport
-	-	79	51	Air transport
-	-	2 437	214	Cargo handling, harbours etc., travel agencies
4	-	230	135	Activities of other transport agencies
0	-	1 558	563	Post and telecommunications
-	-	474	498	Financial institutions
-	-	104	109	Mortgage credit institutions
-	-	26	27	Life insurance and pension funding
-	-	156	163	Non-life insurance
-	-	38	40	Activities auxiliary to finance
0	-	59	128	Real estate agents etc.
0	-	97	427	Dwellings
1	-	300	70	Letting of non-residential buildings
1	-	95	92	Renting of transport equipment and machinery
-	-	512	132	Computer activities exc. software consultancy and supply
0	-	359	340	Software consultancy and supply
-	-	38	40	Research and development (market)
-	-	173	182	Research and development (other non-market)
-	-	157	165	Legal activities
-	-	270	283	Accounting, book-keeping, auditing
52	-	1 356	865	Consulting engineers, architects
-	-	263	276	Advertising
-	-	496	521	Building-cleaning activities
-	-	768	806	Other business activities
12	-	357	375	General (overall) public service activities
1	-	245	258	Administration of public sectors exc. for business
3	-	66	69	Regulation of and contribution to more efficient operation of business
48	116	725	830	Defence, police and administration of justice

Table A.2 (cont.) **Energy account, heating values 2007***

		Crude oil and semi-manu-factured oil	Coal, coke, etc.	Oil products	Natural gas
		Tera joule (TJ)			
801000	Primary education	-	-	379	866
802000	Secondary education	-	-	391	97
803000	Higher education	-	-	138	253
804001	Adult and other education (market)	-	-	111	4
804002	Adult and other education (other non-market)	-	-	332	-
851100	Hospital activities	-	-	196	543
851209	Medical, dental and veterinary activities	-	-	330	227
853109	Social institutions etc. for children	-	-	453	268
853209	Social institutions etc. for adults	-	-	1 092	942
900010	Sewage removal and purifying plants	-	-	395	480
900020	Refuse collection and sanitation	-	-	1 057	3
900030	Refuse dumps and refuse disposal plants	-	-	78	9
910000	Activities of membership organizations	-	-	144	132
920001	Recreational, cultural, sporting activities (market)	-	-	606	534
920002	Recreational, cultural, sporting activities (other non-market)	-	-	231	299
930009	Other service activities	-	-	456	88
950000	Private households with employed persons	-	-	-	-
	Of which Danish operated ships bunkering abroad	-	-	605 556	-
	Of which Danish operated planes bunkering abroad	-	-	25 492	-

For further information visit www.statbank.dk/ene1

Energy account, heating values 2007* **Table A.2 (cont.)**

Other gas	Renewable energy resources	Electricity	District heating	
Tera joule (TJ)				
103	286	1 953	2 050	Primary education
12	-	220	231	Secondary education
30	-	571	600	Higher education
-	-	8	9	Adult and other education (market)
-	-	-	-	Adult and other education (other non-market)
64	179	1 224	1 285	Hospital activities
-	-	512	537	Medical, dental and veterinary activities
-	-	605	635	Social institutions etc. for children
-	313	2 123	2 229	Social institutions etc. for adults
1	-	465	1 136	Sewage removal and purifying plants
0	-	32	8	Refuse collection and sanitation
5	-	427	21	Refuse dumps and refuse disposal plants
16	-	299	314	Activities of membership organizations
64	-	1 204	1 265	Recreational, cultural, sporting activities (market)
36	-	675	708	Recreational, cultural, sporting activities (other non-market)
39	-	352	209	Other service activities
-	-	-	-	Private households with employed persons
-	-	-	-	Of which Danish operated ships bunkering abroad
-	-	-	-	Of which Danish operated planes bunkering abroad

Table A.3 **CO_2 emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		1 000 tonnes CO_2					
	Total emissions	**72 232**	**80 836**	**95 218**	**87 549**	**86 682**	**84 445**
	Households	11 127	12 326	12 910	12 543	12 253	12 187
	Other emissions	3 813	1 233	1 850	1 994	1 313	2 274
	Total industries	**57 291**	**67 277**	**80 458**	**73 012**	**73 117**	**69 984**
011009	Agriculture	1 521	1 501	1 439	1 432	1 426	1 351
011209	Horticulture, orchards etc.	580	628	635	592	587	502
014000	Agricultural services; landscape gardeners etc.	189	241	236	230	236	261
020000	Forestry	22	31	38	35	35	34
050000	Fishing	834	602	669	616	626	627
110000	Extr. of oil and natural gas	803	1 098	1 267	1 694	1 677	2 261
140009	Extr. of gravel and clay etc.	284	294	250	270	260	301
151000	Production etc. of meat and meat products	220	236	240	241	253	276
152000	Processing and preserving of fish and fish products	162	270	197	227	212	226
153000	Processing and preserving of fruit and vegetables	31	36	42	43	42	36
154000	Mfr. of vegetable and animal oils and fats	111	68	137	105	112	121
155000	Mfr. of dairy products	273	248	277	291	313	326
156009	Mfr. of starch, chocolate and sugar products	291	451	311	272	268	239
158109	Mfr. of bread, cakes and biscuits	59	53	58	58	58	62
158120	Bakers shops	22	42	23	24	25	24
158300	Manufacture of sugar	417	302	313	358	364	355
159000	Manufacture of beverages	273	218	218	219	231	214
160000	Manufacture of tobacco products	10	9	8	8	8	8
170000	Mfr. of textiles	123	93	98	90	91	97
180000	Mfr. of wearing apparel	19	16	17	15	13	15
190000	Mfr. of leather and footwear	10	9	7	5	5	5
200000	Mfr. of wood and wood products	487	478	472	483	486	557
210000	Mfr. of pulp, paper and paper products	350	181	208	210	235	212
221200	Publishing of newspapers	6	4	4	4	4	7
221309	Publishing activities, excluding newspapers	13	12	13	12	13	18
222009	Printing activities	46	48	43	33	33	38
230000	Mfr. of refined petroleum products etc.	898	1 372	1 397	1 094	952	981
241109	Mfr. of industrial gases and inorganic basic chemicals	8	8	8	6	5	7
241209	Mfr. of dyes, pigments and organic basic chemicals	105	118	121	96	66	58
241500	Manufacture of fertilizers	35	59	71	81	87	73
241617	Mfr. of plastics and synthetic rubber	7	2	10	9	8	7
242000	Manufacture of pesticides and other agro-chemical products	1	1	2	1	1	105
243000	Mfr. of paints, varnishes and similar coatings, printing ink and mastics	12	10	12	12	12	12
244000	Mfr. of pharmaceuticals etc.	107	98	108	117	145	109
245070	Mfr. of detergents and other chemical products	203	196	196	195	177	191
251122	Mfr. of rubber products and plastic packing goods etc.	85	79	88	92	103	107
252300	Mfr. of builders ware of plastic	7	7	9	10	12	11
252400	Manufacture of other plastic products n.e.c.	13	17	20	18	18	26
261126	Mfr. of glass and ceramic goods etc.	101	100	101	98	107	123
263053	Mfr. of cement, bricks, tiles, flags etc.	1 778	2 557	2 729	2 984	2 852	2 738
266080	Mfr. of concrete, cement, asphalt and rockwool products	455	494	529	474	484	547
271000	Mfr. of basic iron and steel and of ferro alloys	95	93	93	97	102	100
272030	First processing of iron and steel	19	13	12	11	13	14
274000	Mfr. of basic non-ferrous metals	20	20	18	20	20	15
275000	Casting of metal products	2	1	2	1	1	15
281009	Mfr. of building materials of metal	104	141	147	136	137	164
286009	Mfr. of various metal products	98	84	109	100	101	104
291000	Mfr. of marine engines and compressors	54	63	69	62	63	66
292000	Mfr. of ovens and cold-storage plants	59	61	66	77	79	78
293000	Mfr. of agricultural machinery	38	40	46	42	47	41
294009	Mfr. of machinery for industries	51	47	46	46	44	48
297000	Mfr. of domestic appliances	30	21	19	19	19	14
300000	Mfr. of office machinery and computers	4	4	3	3	2	4
310000	Mfr. of other electrical machinery and apparatus	54	39	40	41	39	44
320000	Mfr. of radio and communication equipment	20	20	28	27	29	28
330000	Mfr. of medical and optical instruments	19	16	21	32	32	21
340000	Manufacture of motor vehicles etc.	31	31	40	37	37	34
351000	Building and repairing of ships and boats	29	41	42	48	46	32
352050	Mfr. of transport equipment excl. ships, motor vehicles etc.	6	20	12	13	14	11
361000	Mfr. of furniture	211	197	215	200	203	189
362060	Mfr. of toys, gold and silver articles etc.	26	20	28	22	23	23
370000	Recycling of waste and scrap	10	6	4	4	4	3
401000	Production and distribution of electricity	20 644	25 983	38 123	29 297	25 174	22 309
402000	Manufacture and distribution of gas	98	70	72	60	57	55
403000	Steam and hot water supply	6 325	7 260	7 633	7 498	7 944	7 876
410000	Collection and distribution of water	1	2	2	2	2	2

CO_2 emissions broken down by industries and by households — Table A.3

2000	2001	2002	2003	2004	2005	2006*	2007*	
1 000 tonnes CO_2								
83 777	**85 466**	**86 429**	**95 757**	**93 570**	**97 711**	**115 486**	**116 778**	**Total emissions**
12 228	12 614	12 743	13 539	13 537	13 328	13 534	13 797	Households
2 619	3 007	1 900	1 061	2 371	1 704	1 595	1 460	Other emissions
68 931	**69 846**	**71 786**	**81 157**	**77 662**	**82 678**	**100 357**	**101 522**	**Total industries**
1 446	1 476	1 564	1 606	1 443	1 570	1 509	1 515	Agriculture
461	477	432	360	324	344	337	314	Horticulture, orchards etc.
274	285	268	258	254	266	260	279	Agricultural services; landscape gardeners etc.
40	43	36	40	40	44	42	46	Forestry
656	615	624	607	536	523	497	455	Fishing
2 042	2 050	2 055	2 069	2 174	2 043	2 057	1 985	Extr. of oil and natural gas
329	353	333	311	313	296	268	241	Extr. of gravel and clay etc.
248	232	220	221	220	188	175	132	Production etc. of meat and meat products
226	224	211	138	143	129	152	160	Processing and preserving of fish and fish products
39	40	41	48	47	44	49	56	Processing and preserving of fruit and vegetables
122	127	119	129	132	102	106	108	Mfr. of vegetable and animal oils and fats
310	303	286	282	280	329	325	303	Mfr. of dairy products
309	397	384	226	229	335	369	430	Mfr. of starch, chocolate and sugar products
60	63	58	58	58	70	72	72	Mfr. of bread, cakes and biscuits
21	21	20	20	22	18	18	19	Bakers shops
304	267	244	313	328	292	281	230	Manufacture of sugar
202	204	191	222	221	217	220	218	Manufacture of beverages
8	8	8	10	10	8	8	8	Manufacture of tobacco products
95	94	91	80	79	53	51	38	Mfr. of textiles
13	12	11	16	16	12	13	14	Mfr. of wearing apparel
5	5	5	7	7	2	3	3	Mfr. of leather and footwear
551	505	501	235	236	252	276	279	Mfr. of wood and wood products
205	206	198	211	209	214	214	169	Mfr. of pulp, paper and paper products
6	7	8	13	13	11	11	12	Publishing of newspapers
17	19	18	26	26	25	25	27	Publishing activities, excluding newspapers
38	40	39	47	48	42	43	43	Printing activities
989	1 010	972	1 014	990	929	968	972	Mfr. of refined petroleum products etc.
6	6	6	7	8	8	8	8	Mfr. of industrial gases and inorganic basic chemicals
61	66	63	62	62	66	63	64	Mfr. of dyes, pigments and organic basic chemicals
60	49	47	54	4	2	1	1	Manufacture of fertilizers
6	7	6	3	3	2	2	2	Mfr. of plastics and synthetic rubber
107	112	108	109	106	98	98	89	Manufacture of pesticides and other agro-chemical products
11	12	12	14	19	10	10	10	Mfr. of paints, varnishes and similar coatings, printing ink and mastics
112	119	114	94	93	86	83	72	Mfr. of pharmaceuticals etc.
189	201	215	205	202	185	164	147	Mfr. of detergents and other chemical products
105	106	103	106	105	82	81	91	Mfr. of rubber products and plastic packing goods etc.
9	8	7	10	11	11	10	9	Mfr. of builders ware of plastic
24	22	22	28	28	34	28	25	Manufacture of other plastic products n.e.c.
117	117	111	98	96	80	80	82	Mfr. of glass and ceramic goods etc.
2 703	2 763	2 757	2 666	2 898	2 789	2 894	2 992	Mfr. of cement, bricks, tiles, flags etc.
481	446	428	450	470	467	522	593	Mfr. of concrete, cement, asphalt and rockwool products
97	95	43	76	74	82	90	96	Mfr. of basic iron and steel and of ferro alloys
14	17	15	12	12	7	7	9	First processing of iron and steel
18	20	18	16	16	9	11	15	Mfr. of basic non-ferrous metals
19	20	19	21	21	12	11	10	Casting of metal products
160	165	163	177	181	161	197	234	Mfr. of building materials of metal
93	87	86	94	96	85	87	88	Mfr. of various metal products
65	65	64	68	68	92	87	39	Mfr. of marine engines and compressors
67	67	68	74	76	74	77	82	Mfr. of ovens and cold-storage plants
42	45	43	47	48	37	40	46	Mfr. of agricultural machinery
48	51	53	60	60	57	60	62	Mfr. of machinery for industries
10	8	8	12	12	8	9	8	Mfr. of domestic appliances
3	3	3	3	3	2	3	3	Mfr. of office machinery and computers
45	47	49	60	61	57	57	54	Mfr. of other electrical machinery and apparatus
28	29	29	31	31	19	20	21	Mfr. of radio and communication equipment
23	24	25	29	29	26	25	26	Mfr. of medical and optical instruments
28	27	27	37	37	34	35	37	Manufacture of motor vehicles etc.
30	33	31	29	29	31	32	36	Building and repairing of ships and boats
9	7	7	8	8	6	7	8	Mfr. of transport equipment excl. ships, motor vehicles etc.
194	200	196	218	219	163	172	197	Mfr. of furniture
21	22	21	28	28	23	21	22	Mfr. of toys, gold and silver articles etc.
3	3	4	4	4	4	4	4	Recycling of waste and scrap
19 259	20 796	21 376	26 663	21 262	18 095	25 768	21 181	Production and distribution of electricity
46	45	44	43	44	37	34	33	Manufacture and distribution of gas
7 549	7 797	7 693	7 785	7 889	8 486	8 397	8 332	Steam and hot water supply
3	3	2	2	2	2	2	2	Collection and distribution of water

Table A.3 (cont.) **CO_2 emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		1 000 tonnes CO_2					
450001	Construction of new buildings	262	294	320	336	359	409
450002	Repair and maintenance of buildings	367	397	468	493	527	601
450003	Civil engineering	179	229	185	197	206	235
450004	Construction materials for own-account repair	-	-	-	-	-	-
501009	Sale of motor vehicles and motorcycles	131	140	139	144	100	146
502000	Maintenance and repair of motor vehicles	87	100	100	94	97	100
505000	Retail sale of automotive fuel	22	17	19	16	13	16
510000	Wholesale except of motor vehicles	759	703	745	700	693	722
521090	Retail trade of food	85	77	79	77	70	67
522990	Department stores	7	9	12	9	9	9
523000	Re. sale of phar. goods, cosmetic art.	6	6	7	6	6	8
524190	Re. sale of clothing and footwear	23	21	22	20	19	20
524490	Other retail sale, repair work	152	145	148	143	142	140
551009	Hotels	30	39	37	28	21	22
553009	Restaurants	102	76	78	69	77	70
601000	Transport via railways	333	321	311	301	257	254
602100	Other scheduled passenger land transport	149	247	257	255	272	241
602223	Taxi operation and coach services	217	224	219	223	218	201
602409	Freight transport by road and via pipelines	1 404	1 476	1 582	1 555	1 691	1 666
610000	Water transport	9 976	12 039	11 791	12 765	16 808	16 064
620000	Air transport	2 255	2 369	2 613	3 067	2 938	2 699
631130	Cargo handling, harbours etc., travel agencies	32	47	29	31	31	33
634000	Activities of other transport agencies	52	78	76	78	78	81
640000	Post and telecommunications	98	93	108	105	98	122
651000	Financial institutions	33	21	26	26	20	21
652000	Mortgage credit institutions	9	6	6	6	5	5
660102	Life insurance and pension funding	2	1	2	2	2	2
660300	Non-life insurance	10	5	7	7	6	6
670000	Activities auxiliary to finance	3	3	3	3	3	3
701109	Real estate agents etc.	9	12	12	12	11	11
702009	Dwellings	53	37	36	32	30	23
702040	Letting of non-residential buildings	25	27	37	40	36	32
710000	Renting of transport equipment and machinery	18	11	12	11	11	11
721009	Computer activities exc. software consultancy and supply	5	13	6	7	8	11
722000	Software consultancy and supply	14	16	17	16	15	20
730001	Research and development (market)	4	2	3	3	3	3
730002	Research and development (other non-market)	10	5	6	6	5	6
741100	Legal activities	9	7	8	8	7	7
741200	Accounting, book-keeping, auditing	20	16	17	17	15	14
742009	Consulting engineers, architects	45	46	52	46	47	50
744000	Advertising	19	18	19	21	20	21
747000	Building-cleaning activities	44	48	54	58	57	66
748009	Other business activities	42	43	48	52	51	55
751100	General (overall) public service activities	30	24	29	30	26	30
751209	Administration of public sectors exc. for business	21	17	20	21	20	24
751300	Regulation of and contribution to more efficient operation of business	46	48	48	50	52	57
752000	Defence, police and administration of justice	349	567	438	409	456	405
801000	Primary education	111	64	83	84	62	66
802000	Secondary education	33	24	34	34	33	33
803000	Higher education	28	19	25	26	20	21
804001	Adult and other education (market)	4	4	4	5	5	6
804002	Adult and other education (other non-market)	13	15	16	18	18	22
851100	Hospital activities	84	35	46	47	37	37
851209	Medical, dental and veterinary activities	43	36	41	42	37	32
853109	Social institutions etc. for children	40	29	34	36	33	39
853209	Social institutions etc. for adults	101	78	92	94	91	103
900010	Sewage removal and purifying plants	48	67	79	40	42	47
900020	Refuse collection and sanitation	42	56	58	60	63	66
900030	Refuse dumps and refuse disposal plants	12	8	31	25	25	8
910000	Activities of membership organizations	19	16	17	18	14	15
920001	Recreational, cultural, sporting activities (market)	56	50	60	61	57	60
920002	Recreational, cultural, sporting activities (other non-market)	40	29	35	36	30	29
930009	Other service activities	43	26	47	43	44	37
950000	Private households with employed persons	-	-	-	-	-	-
	Of which Danish operated ships bunkering abroad	9 176	10 947	10 714	11 811	15 955	15 277
	Of which Danish operated planes bunkering abroad	272	426	431	538	746	686
	Of which emissions from biomass	4 641	5 869	6 296	6 542	6 492	6 857
	Total industries excl. of bunkering abroad	47 843	55 904	69 313	60 663	56 417	54 021
	CO_2 binding (sequestration)	- 2 831	- 2 993	- 3 069	- 3 162	- 3 320	- 3 320

CO_2 emissions broken down by industries and by households — Table A.3 (cont.)

2000	2001	2002	2003	2004	2005	2006*	2007*	
			1 000 tonnes CO_2					
353	372	407	423	444	449	474	512	Construction of new buildings
497	524	574	596	626	634	670	724	Repair and maintenance of buildings
226	242	258	263	275	271	282	303	Civil engineering
-	-	-	-	-	-	-	-	Construction materials for own-account repair
129	132	159	167	172	173	183	192	Sale of motor vehicles and motorcycles
88	91	95	101	101	102	109	113	Maintenance and repair of motor vehicles
13	14	11	12	11	11	11	11	Retail sale of automotive fuel
637	637	620	644	654	666	709	727	Wholesale except of motor vehicles
62	64	61	63	63	61	67	67	Retail trade of food
8	9	9	10	9	8	10	9	Department stores
8	6	6	11	6	6	7	8	Re. sale of phar. goods, cosmetic art.
17	18	17	19	18	17	19	18	Re. sale of clothing and footwear
131	135	128	137	137	139	150	158	Other retail sale, repair work
20	20	21	21	21	20	23	21	Hotels
65	70	72	76	74	73	81	77	Restaurants
244	228	212	220	218	234	229	230	Transport via railways
242	256	245	259	272	285	307	334	Other scheduled passenger land transport
219	238	158	169	180	189	205	225	Taxi operation and coach services
1 525	1 644	1 494	1 602	1 709	1 799	1 943	2 139	Freight transport by road and via pipelines
19 874	18 411	20 560	24 256	25 996	33 006	42 430	47 931	Water transport
2 112	2 376	2 086	2 331	1 947	2 664	2 841	2 776	Air transport
33	35	42	45	46	47	51	53	Cargo handling, harbours etc., travel agencies
76	80	76	82	86	89	95	102	Activities of other transport agencies
115	107	72	76	78	79	85	88	Post and telecommunications
21	18	20	22	21	19	21	18	Financial institutions
5	5	6	7	6	6	7	6	Mortgage credit institutions
2	2	2	2	2	2	2	2	Life insurance and pension funding
6	5	6	7	6	6	6	5	Non-life insurance
3	3	3	3	3	3	3	3	Activities auxiliary to finance
12	12	13	13	13	13	14	14	Real estate agents etc.
24	24	21	22	21	21	24	23	Dwellings
43	42	39	42	40	42	43	45	Letting of non-residential buildings
10	18	14	17	17	15	16	16	Renting of transport equipment and machinery
9	10	10	11	10	10	11	11	Computer activities exc. software consultancy and supply
23	27	30	31	31	31	32	33	Software consultancy and supply
3	3	2	2	2	2	2	2	Research and development (market)
6	5	8	8	8	8	9	8	Research and development (other non-market)
7	7	8	9	8	8	9	8	Legal activities
15	15	16	17	17	17	18	17	Accounting, book-keeping, auditing
48	54	62	67	65	67	72	72	Consulting engineers, architects
22	22	24	26	26	26	28	27	Advertising
65	67	75	80	82	84	90	92	Building-cleaning activities
57	61	82	89	89	90	96	96	Other business activities
28	24	31	34	33	33	35	34	General (overall) public service activities
21	27	24	26	26	26	28	27	Administration of public sectors exc. for business
49	51	56	60	63	66	70	76	Regulation of and contribution to more efficient operation of business
265	248	216	235	463	528	307	368	Defence, police and administration of justice
67	59	64	73	70	66	104	91	Primary education
29	35	33	33	30	30	32	31	Secondary education
21	19	21	23	23	21	24	20	Higher education
6	7	6	7	7	7	8	9	Adult and other education (market)
19	20	20	21	22	23	24	26	Adult and other education (other non-market)
38	34	36	42	40	38	62	54	Hospital activities
41	37	32	35	34	33	36	33	Medical, dental and veterinary activities
35	34	40	44	43	43	46	44	Social institutions etc. for children
97	93	108	122	118	115	156	147	Social institutions etc. for adults
41	51	43	44	44	44	49	48	Sewage removal and purifying plants
59	64	59	63	67	71	76	83	Refuse collection and sanitation
9	6	9	12	7	6	8	6	Refuse dumps and refuse disposal plants
15	14	15	17	17	16	18	16	Activities of membership organizations
62	62	62	69	69	68	74	67	Recreational, cultural, sporting activities (market)
29	26	28	32	31	30	34	29	Recreational, cultural, sporting activities (other non-market)
35	37	37	39	37	36	38	37	Other service activities
-	-	-	-	-	-	-	-	Private households with employed persons
18 951	17 489	19 846	23 514	25 351	32 309	41 709	47 233	Of which Danish operated ships bunkering abroad
514	630	655	664	460	1 610	1 799	1 835	Of which Danish operated planes bunkering abroad
7 169	7 902	8 430	9 453	10 142	10 893	11 335	12 110	Of which emissions from biomass
49 465	51 727	51 285	56 979	51 850	48 759	56 849	52 453	Total industries excl. of bunkering abroad
- 664	- 3 551	- 3 827	- 3 547	- 3 465	- 1 797	- 2 783	- 2 977	CO_2 binding (sequestration)

Table A.4 **N_2O emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		Tonnes N_2O					
	Total emissions	**34 568**	**30 922**	**29 741**	**29 521**	**29 502**	**28 462**
	Households	297	390	412	406	396	389
	Other emissions	- 31	- 27	- 24	- 21	- 22	- 10
	Total industries	**34 302**	**30 559**	**29 353**	**29 136**	**29 128**	**28 083**
011009	Agriculture	29 103	25 574	24 480	24 235	24 144	22 692
011209	Horticulture, orchards etc.	22	22	21	19	19	16
014000	Agricultural services; landscape gardeners etc.	9	12	12	11	11	13
020000	Forestry	1	1	1	1	1	1
050000	Fishing	28	20	22	20	20	20
110000	Extr. of oil and natural gas	26	34	40	53	55	68
140009	Extr. of gravel and clay etc.	9	9	8	8	8	8
151000	Production etc. of meat and meat products	6	6	6	6	7	7
152000	Processing and preserving of fish and fish products	4	7	5	6	6	6
153000	Processing and preserving of fruit and vegetables	1	1	1	1	1	1
154000	Mfr. of vegetable and animal oils and fats	3	2	4	3	3	3
155000	Mfr. of dairy products	8	6	7	7	8	8
156009	Mfr. of starch, chocolate and sugar products	8	12	8	7	7	6
158109	Mfr. of bread, cakes and biscuits	2	2	2	2	2	2
158120	Bakers shops	1	1	1	1	1	1
158300	Manufacture of sugar	13	9	9	11	11	10
159000	Manufacture of beverages	8	6	6	6	6	6
160000	Manufacture of tobacco products	0	0	0	0	0	0
170000	Mfr. of textiles	3	2	3	2	2	3
180000	Mfr. of wearing apparel	1	1	1	1	0	1
190000	Mfr. of leather and footwear	0	0	0	0	0	0
200000	Mfr. of wood and wood products	18	17	17	18	18	22
210000	Mfr. of pulp, paper and paper products	10	5	5	5	6	5
221200	Publishing of newspapers	0	0	0	0	0	0
221309	Publishing activities, excluding newspapers	0	0	0	0	0	1
222009	Printing activities	1	2	1	1	1	1
230000	Mfr. of refined petroleum products etc.	31	47	48	38	33	34
241109	Mfr. of industrial gases and inorganic basic chemicals	0	0	0	0	0	0
241209	Mfr. of dyes, pigments and organic basic chemicals	3	3	3	2	2	1
241500	Manufacture of fertilizers	3 365	2 917	2 693	2 738	2 604	3 067
241617	Mfr. of plastics and synthetic rubber	0	0	0	0	0	0
242000	Manufacture of pesticides and other agro-chemical products	0	0	0	0	0	2
243000	Mfr. of paints, varnishes and similar coatings, printing ink and mastics	0	0	0	0	0	0
244000	Mfr. of pharmaceuticals etc.	3	3	3	3	4	3
245070	Mfr. of detergents and other chemical products	2	3	3	3	3	3
251122	Mfr. of rubber products and plastic packing goods etc.	2	2	2	2	3	3
252300	Mfr. of builders ware of plastic	0	0	0	0	0	0
252400	Manufacture of other plastic products n.e.c.	0	1	1	1	1	1
261126	Mfr. of glass and ceramic goods etc.	3	2	3	2	3	3
263053	Mfr. of cement, bricks, tiles, flags etc.	28	41	46	48	46	43
266080	Mfr. of concrete, cement, asphalt and rockwool products	14	14	15	14	14	16
271000	Mfr. of basic iron and steel and of ferro alloys	2	2	2	2	2	2
272030	First processing of iron and steel	1	0	0	0	0	0
274000	Mfr. of basic non-ferrous metals	1	1	0	1	1	0
275000	Casting of metal products	0	0	0	0	0	0
281009	Mfr. of building materials of metal	4	5	5	5	5	6
286009	Mfr. of various metal products	3	2	3	3	3	3
291000	Mfr. of marine engines and compressors	2	2	2	2	2	2
292000	Mfr. of ovens and cold-storage plants	2	2	2	3	3	3
293000	Mfr. of agricultural machinery	1	1	1	1	2	1
294009	Mfr. of machinery for industries	2	2	2	2	1	2
297000	Mfr. of domestic appliances	1	1	1	1	1	0
300000	Mfr. of office machinery and computers	0	0	0	0	0	0
310000	Mfr. of other electrical machinery and apparatus	2	1	1	1	1	1
320000	Mfr. of radio and communication equipment	1	1	1	1	1	1
330000	Mfr. of medical and optical instruments	1	1	1	1	1	1
340000	Manufacture of motor vehicles etc.	1	1	1	1	1	1
351000	Building and repairing of ships and boats	1	1	1	1	1	1
352050	Mfr. of transport equipment excl. ships, motor vehicles etc.	0	1	0	0	0	0
361000	Mfr. of furniture	8	7	8	7	8	7
362060	Mfr. of toys, gold and silver articles etc.	1	1	1	1	1	1
370000	Recycling of waste and scrap	0	0	0	0	0	0
401000	Production and distribution of electricity	176	255	391	315	274	256
402000	Manufacture and distribution of gas	1	0	0	0	0	0
403000	Steam and hot water supply	157	167	183	174	179	174
410000	Collection and distribution of water	0	0	0	0	0	0

N_2O emissions broken down by industries and by households — Table A.4

2000	2001	2002	2003	2004	2005	2006*	2007*	
Tonnes N_2O								
28 007	**27 049**	**26 061**	**25 937**	**25 174**	**23 842**	**23 613**	**24 918**	**Total emissions**
394	390	391	393	390	386	379	392	Households
- 3	- 5	- 9	- 16	- 18	29	105	101	Other emissions
27 616	**26 664**	**25 679**	**25 561**	**24 802**	**23 428**	**23 130**	**24 425**	**Total industries**
21 888	21 396	20 651	19 894	20 242	20 164	19 174	20 189	Agriculture
15	16	14	11	11	12	12	11	Horticulture, orchards etc.
13	14	12	12	12	12	12	13	Agricultural services; landscape gardeners etc.
2	2	1	1	1	2	1	2	Forestry
21	20	19	18	17	16	16	14	Fishing
66	65	67	68	71	69	70	66	Extr. of oil and natural gas
9	10	9	9	9	9	8	7	Extr. of gravel and clay etc.
6	6	6	6	6	5	5	4	Production etc. of meat and meat products
6	6	6	4	4	4	4	4	Processing and preserving of fish and fish products
1	1	1	1	1	1	1	1	Processing and preserving of fruit and vegetables
3	3	3	4	4	3	3	3	Mfr. of vegetable and animal oils and fats
8	8	7	7	7	9	9	8	Mfr. of dairy products
9	11	11	6	6	9	10	12	Mfr. of starch, chocolate and sugar products
2	2	2	2	2	2	2	2	Mfr. of bread, cakes and biscuits
1	1	1	1	1	1	1	1	Bakers shops
9	8	7	10	10	9	9	7	Manufacture of sugar
5	5	5	6	6	6	6	6	Manufacture of beverages
0	0	0	0	0	0	0	0	Manufacture of tobacco products
2	2	2	2	2	2	1	1	Mfr. of textiles
0	0	0	1	1	0	0	0	Mfr. of wearing apparel
0	0	0	0	0	0	0	0	Mfr. of leather and footwear
22	20	21	9	10	10	11	11	Mfr. of wood and wood products
5	5	5	5	5	6	6	5	Mfr. of pulp, paper and paper products
0	0	0	0	0	0	0	0	Publishing of newspapers
1	1	1	1	1	1	1	1	Publishing activities, excluding newspapers
1	1	1	1	1	1	1	1	Printing activities
35	35	34	36	35	33	34	34	Mfr. of refined petroleum products etc.
0	0	0	0	0	0	0	0	Mfr. of industrial gases and inorganic basic chemicals
2	2	2	2	2	2	2	2	Mfr. of dyes, pigments and organic basic chemicals
3 239	2 857	2 498	2 887	1 712	0	0	0	Manufacture of fertilizers
0	0	0	0	0	0	0	0	Mfr. of plastics and synthetic rubber
3	3	3	3	3	3	2	2	Manufacture of pesticides and other agro-chemical products
0	0	0	0	1	0	0	0	Mfr. of paints, varnishes and similar coatings, printing ink and mastics
3	3	3	2	2	2	2	2	Mfr. of pharmaceuticals etc.
3	3	3	4	4	4	3	2	Mfr. of detergents and other chemical products
3	3	3	3	3	2	2	2	Mfr. of rubber products and plastic packing goods etc.
0	0	0	0	0	0	0	0	Mfr. of builders ware of plastic
1	1	1	1	1	1	1	1	Manufacture of other plastic products n.e.c.
3	3	3	2	2	2	2	2	Mfr. of glass and ceramic goods etc.
43	45	44	46	50	51	53	55	Mfr. of cement, bricks, tiles, flags etc.
14	13	12	13	14	14	16	19	Mfr. of concrete, cement, asphalt and rockwool products
2	2	1	2	2	2	2	2	Mfr. of basic iron and steel and of ferro alloys
0	1	0	0	0	0	0	0	First processing of iron and steel
0	1	0	0	0	0	0	0	Mfr. of basic non-ferrous metals
1	1	1	1	1	0	0	0	Casting of metal products
6	6	6	6	6	6	7	8	Mfr. of building materials of metal
3	3	3	3	3	3	3	3	Mfr. of various metal products
2	2	2	2	2	3	3	1	Mfr. of marine engines and compressors
2	2	3	3	3	3	3	3	Mfr. of ovens and cold-storage plants
1	1	1	2	2	1	1	2	Mfr. of agricultural machinery
2	2	2	2	2	2	2	2	Mfr. of machinery for industries
0	0	0	0	0	0	0	0	Mfr. of domestic appliances
0	0	0	0	0	0	0	0	Mfr. of office machinery and computers
2	2	2	2	2	2	2	2	Mfr. of other electrical machinery and apparatus
1	1	1	1	1	1	1	1	Mfr. of radio and communication equipment
1	1	1	1	1	1	1	1	Mfr. of medical and optical instruments
1	1	1	1	1	1	1	1	Manufacture of motor vehicles etc.
1	1	1	1	1	1	1	1	Building and repairing of ships and boats
0	0	0	0	0	0	0	0	Mfr. of transport equipment excl. ships, motor vehicles etc.
7	8	8	9	9	6	7	8	Mfr. of furniture
1	1	1	1	1	1	1	1	Mfr. of toys, gold and silver articles etc.
0	0	0	0	0	0	0	0	Recycling of waste and scrap
231	250	259	284	231	184	259	205	Production and distribution of electricity
0	0	0	0	0	0	0	0	Manufacture and distribution of gas
165	171	173	174	174	182	187	183	Steam and hot water supply
0	0	0	0	0	0	0	0	Collection and distribution of water

Table A.4 (cont.) **N_2O emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		Tonnes N_2O					
450001	Construction of new buildings	12	13	14	15	16	19
450002	Repair and maintenance of buildings	16	17	21	22	24	28
450003	Civil engineering	8	9	7	7	8	9
450004	Construction materials for own-account repair	-	-	-	-	-	-
501009	Sale of motor vehicles and motorcycles	5	6	6	6	4	7
502000	Maintenance and repair of motor vehicles	4	4	4	4	4	4
505000	Retail sale of automotive fuel	1	1	1	1	1	1
510000	Wholesale except of motor vehicles	27	26	27	27	26	29
521090	Retail trade of food	3	3	3	3	3	3
522990	Department stores	0	0	0	0	0	0
523000	Re. sale of phar. goods, cosmetic art.	0	0	0	0	0	0
524190	Re. sale of clothing and footwear	1	1	1	1	1	1
524490	Other retail sale, repair work	6	6	7	7	6	7
551009	Hotels	1	1	1	1	1	1
553009	Restaurants	3	3	3	2	3	3
601000	Transport via railways	9	9	9	8	7	7
602100	Other scheduled passenger land transport	5	7	7	7	7	6
602223	Taxi operation and coach services	10	9	8	8	7	6
602409	Freight transport by road and via pipelines	53	53	57	56	60	58
610000	Water transport	616	733	715	779	1 037	993
620000	Air transport	79	82	91	107	102	94
631130	Cargo handling, harbours etc., travel agencies	1	2	1	1	1	1
634000	Activities of other transport agencies	2	3	3	3	3	3
640000	Post and telecommunications	4	4	4	4	4	6
651000	Financial institutions	1	1	1	1	1	1
652000	Mortgage credit institutions	0	0	0	0	0	0
660102	Life insurance and pension funding	0	0	0	0	0	0
660300	Non-life insurance	0	0	0	0	0	0
670000	Activities auxiliary to finance	0	0	0	0	0	0
701109	Real estate agents etc.	0	0	0	0	0	0
702009	Dwellings	2	1	1	1	1	1
702040	Letting of non-residential buildings	1	1	2	2	2	1
710000	Renting of transport equipment and machinery	1	0	0	0	0	0
721009	Computer activities exc. software consultancy and supply	0	0	0	0	0	0
722000	Software consultancy and supply	0	1	1	1	1	1
730001	Research and development (market)	0	0	0	0	0	0
730002	Research and development (other non-market)	0	0	0	0	0	0
741100	Legal activities	0	0	0	0	0	0
741200	Accounting, book-keeping, auditing	1	1	1	1	1	1
742009	Consulting engineers, architects	2	2	2	2	2	2
744000	Advertising	1	1	1	1	1	1
747000	Building-cleaning activities	2	2	2	3	3	3
748009	Other business activities	2	2	2	2	2	2
751100	General (overall) public service activities	1	1	1	1	1	1
751209	Administration of public sectors exc. for business	1	1	1	1	1	1
751300	Regulation of and contribution to more efficient operation of business	2	2	2	2	2	2
752000	Defence, police and administration of justice	12	18	14	13	15	14
801000	Primary education	3	2	2	2	2	2
802000	Secondary education	1	1	1	1	1	1
803000	Higher education	1	1	1	1	1	1
804001	Adult and other education (market)	0	0	0	0	0	0
804002	Adult and other education (other non-market)	0	1	1	1	1	1
851100	Hospital activities	2	1	1	1	1	1
851209	Medical, dental and veterinary activities	1	1	1	1	1	1
853109	Social institutions etc. for children	1	1	1	1	1	1
853209	Social institutions etc. for adults	3	3	3	3	3	4
900010	Sewage removal and purifying plants	284	276	226	211	214	201
900020	Refuse collection and sanitation	2	2	2	2	2	2
900030	Refuse dumps and refuse disposal plants	0	0	1	1	1	0
910000	Activities of membership organizations	1	1	1	1	0	1
920001	Recreational, cultural, sporting activities (market)	2	2	2	2	2	2
920002	Recreational, cultural, sporting activities (other non-market)	1	1	1	1	1	1
930009	Other service activities	1	1	2	2	2	1
950000	Private households with employed persons	-	-	-	-	-	-
	Of which Danish operated ships bunkering abroad	576	688	673	742	1 002	960
	Of which Danish operated planes bunkering abroad	9	15	15	19	26	24
	Total industries excl. of bunkering abroad	33 716	29 856	28 665	28 375	28 099	27 100

N_2O emissions broken down by industries and by households — Table A.4 (cont.)

2000	2001	2002	2003	2004	2005	2006*	2007*	
Tonnes N_2O								
16	17	19	19	20	20	21	23	Construction of new buildings
23	24	27	28	29	29	30	32	Repair and maintenance of buildings
9	10	10	11	11	11	12	12	Civil engineering
-	-	-	-	-	-	-	-	Construction materials for own-account repair
6	6	7	7	7	7	7	8	Sale of motor vehicles and motorcycles
4	4	4	4	4	4	4	4	Maintenance and repair of motor vehicles
0	1	0	0	0	0	0	0	Retail sale of automotive fuel
24	24	24	25	24	24	25	25	Wholesale except of motor vehicles
3	3	2	3	2	2	3	3	Retail trade of food
0	0	0	0	0	0	0	0	Department stores
0	0	0	0	0	0	0	0	Re. sale of phar. goods, cosmetic art.
1	1	1	1	1	1	1	1	Re. sale of clothing and footwear
6	6	6	6	6	6	7	7	Other retail sale, repair work
1	1	1	1	1	1	1	1	Hotels
2	2	2	3	2	2	3	3	Restaurants
7	6	6	6	6	6	6	6	Transport via railways
6	6	6	6	6	6	6	6	Other scheduled passenger land transport
7	7	4	4	5	4	5	5	Taxi operation and coach services
52	53	47	49	51	52	55	59	Freight transport by road and via pipelines
1 233	1 142	1 277	1 508	1 620	2 058	2 652	2 999	Water transport
74	83	73	81	68	93	99	97	Air transport
1	1	1	2	2	2	2	2	Cargo handling, harbours etc., travel agencies
3	3	3	3	3	3	3	3	Activities of other transport agencies
5	5	3	4	4	4	4	4	Post and telecommunications
1	1	1	1	1	1	1	0	Financial institutions
0	0	0	0	0	0	0	0	Mortgage credit institutions
0	0	0	0	0	0	0	0	Life insurance and pension funding
0	0	0	0	0	0	0	0	Non-life insurance
0	0	0	0	0	0	0	0	Activities auxiliary to finance
0	0	0	1	0	0	1	1	Real estate agents etc.
1	1	1	1	1	1	1	1	Dwellings
2	2	2	2	2	2	2	2	Letting of non-residential buildings
0	1	1	1	1	1	1	1	Renting of transport equipment and machinery
0	0	0	0	0	0	0	0	Computer activities exc. software consultancy and supply
1	1	1	1	1	1	1	1	Software consultancy and supply
0	0	0	0	0	0	0	0	Research and development (market)
0	0	0	0	0	0	0	0	Research and development (other non-market)
0	0	0	0	0	0	0	0	Legal activities
1	1	1	1	1	1	1	1	Accounting, book-keeping, auditing
2	2	2	3	3	3	3	3	Consulting engineers, architects
1	1	1	1	1	1	1	1	Advertising
3	3	4	4	4	4	4	4	Building-cleaning activities
2	2	3	3	3	3	4	3	Other business activities
1	1	1	1	1	1	1	1	General (overall) public service activities
1	1	1	1	1	1	1	1	Administration of public sectors exc. for business
2	2	2	2	2	2	2	2	Regulation of and contribution to more efficient operation of business
9	8	7	8	15	18	10	12	Defence, police and administration of justice
2	2	2	2	2	2	3	2	Primary education
1	1	1	1	1	1	1	1	Secondary education
1	1	1	1	1	1	1	1	Higher education
0	0	0	0	0	0	0	0	Adult and other education (market)
1	1	1	1	1	1	1	1	Adult and other education (other non-market)
1	1	1	1	1	1	2	1	Hospital activities
1	1	1	1	1	1	1	1	Medical, dental and veterinary activities
1	1	1	2	1	1	2	1	Social institutions etc. for children
3	3	3	4	4	4	5	4	Social institutions etc. for adults
212	186	189	162	173	164	163	154	Sewage removal and purifying plants
2	2	2	2	2	2	2	2	Refuse collection and sanitation
0	0	0	0	0	0	0	0	Refuse dumps and refuse disposal plants
0	0	0	1	1	1	1	0	Activities of membership organizations
2	2	2	2	2	2	2	2	Recreational, cultural, sporting activities (market)
1	1	1	1	1	1	1	1	Recreational, cultural, sporting activities (other non-market)
1	1	1	1	1	1	1	1	Other service activities
-	-	-	-	-	-	-	-	Private households with employed persons
1 191	1 099	1 247	1 477	1 593	2 030	2 620	2 967	Of which Danish operated ships bunkering abroad
18	22	23	23	16	56	63	64	Of which Danish operated planes bunkering abroad
26 408	25 544	24 409	24 060	23 194	21 342	20 447	21 394	Total industries excl. of bunkering abroad

Table A.5 **CH_4 emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		Tonnes CH_4					
	Total emissions	**271 650**	**285 440**	**290 894**	**285 741**	**287 079**	**281 277**
	Households	5 119	5 999	6 219	6 076	5 728	5 653
	Other emissions	169	- 52	- 32	- 23	- 34	24
	Total industries	**266 363**	**279 493**	**284 707**	**279 688**	**281 385**	**275 599**
011009	Agriculture	191 795	191 230	191 408	186 850	188 542	182 004
011209	Horticulture, orchards etc.	100	594	932	1 264	1 580	1 482
014000	Agricultural services; landscape gardeners etc.	15	25	29	31	35	39
020000	Forestry	2	2	3	3	3	2
050000	Fishing	22	15	17	18	18	26
110000	Extr. of oil and natural gas	100	139	148	147	145	186
140009	Extr. of gravel and clay etc.	38	33	33	35	35	52
151000	Production etc. of meat and meat products	16	23	46	47	52	55
152000	Processing and preserving of fish and fish products	14	33	47	55	54	51
153000	Processing and preserving of fruit and vegetables	2	4	10	10	11	9
154000	Mfr. of vegetable and animal oils and fats	6	4	8	6	7	5
155000	Mfr. of dairy products	17	29	71	78	87	82
156009	Mfr. of starch, chocolate and sugar products	29	57	81	72	75	54
158109	Mfr. of bread, cakes and biscuits	5	6	12	12	12	12
158120	Bakers shops	2	3	1	1	1	1
158300	Manufacture of sugar	57	34	37	42	43	36
159000	Manufacture of beverages	21	19	35	45	51	53
160000	Manufacture of tobacco products	1	1	2	2	2	2
170000	Mfr. of textiles	9	12	24	22	24	26
180000	Mfr. of wearing apparel	3	2	3	3	3	3
190000	Mfr. of leather and footwear	1	1	1	1	1	1
200000	Mfr. of wood and wood products	141	124	132	130	139	159
210000	Mfr. of pulp, paper and paper products	39	21	60	62	72	61
221200	Publishing of newspapers	1	1	1	1	1	2
221309	Publishing activities, excluding newspapers	2	2	3	2	3	4
222009	Printing activities	9	8	11	8	8	9
230000	Mfr. of refined petroleum products etc.	1 569	2 307	2 489	2 762	2 837	3 199
241109	Mfr. of industrial gases and inorganic basic chemicals	1	1	1	1	1	1
241209	Mfr. of dyes, pigments and organic basic chemicals	5	8	17	15	11	12
241500	Manufacture of fertilizers	2	8	22	25	28	23
241617	Mfr. of plastics and synthetic rubber	0	0	1	1	1	1
242000	Manufacture of pesticides and other agro-chemical products	0	0	0	0	0	33
243000	Mfr. of paints, varnishes and similar coatings, printing ink and mastics	2	2	3	3	3	3
244000	Mfr. of pharmaceuticals etc.	6	7	14	14	19	18
245070	Mfr. of detergents and other chemical products	8	16	23	22	21	24
251122	Mfr. of rubber products and plastic packing goods etc.	8	11	24	25	29	27
252300	Mfr. of builders ware of plastic	1	1	2	2	2	2
252400	Manufacture of other plastic products n.e.c.	2	2	4	3	4	5
261126	Mfr. of glass and ceramic goods etc.	8	13	28	27	31	34
263053	Mfr. of cement, bricks, tiles, flags etc.	128	189	236	236	233	227
266080	Mfr. of concrete, cement, asphalt and rockwool products	51	66	88	86	92	95
271000	Mfr. of basic iron and steel and of ferro alloys	7	13	30	31	34	31
272030	First processing of iron and steel	2	1	2	2	2	2
274000	Mfr. of basic non-ferrous metals	1	2	3	3	4	3
275000	Casting of metal products	0	0	0	0	0	3
281009	Mfr. of building materials of metal	11	15	24	20	22	25
286009	Mfr. of various metal products	10	10	23	21	23	22
291000	Mfr. of marine engines and compressors	4	8	16	14	15	15
292000	Mfr. of ovens and cold-storage plants	7	7	10	10	10	11
293000	Mfr. of agricultural machinery	4	4	8	7	8	6
294009	Mfr. of machinery for industries	6	6	8	8	8	8
297000	Mfr. of domestic appliances	3	3	5	5	5	3
300000	Mfr. of office machinery and computers	1	1	1	1	1	1
310000	Mfr. of other electrical machinery and apparatus	7	5	8	8	8	8
320000	Mfr. of radio and communication equipment	3	4	8	7	8	7
330000	Mfr. of medical and optical instruments	3	3	5	7	8	4
340000	Manufacture of motor vehicles etc.	3	4	8	7	8	7
351000	Building and repairing of ships and boats	2	4	10	11	11	8
352050	Mfr. of transport equipment excl. ships, motor vehicles etc.	1	3	3	3	3	3
361000	Mfr. of furniture	54	47	58	53	57	49
362060	Mfr. of toys, gold and silver articles etc.	5	3	5	4	4	5
370000	Recycling of waste and scrap	0	0	0	0	0	0
401000	Production and distribution of electricity	207	4 780	6 930	7 281	8 240	8 585
402000	Manufacture and distribution of gas	24	41	48	48	50	44
403000	Steam and hot water supply	864	6 984	8 424	7 571	7 854	7 453
410000	Collection and distribution of water	0	0	0	0	0	0

CH_4 emissions broken down by industries and by households — Table A.5

2000	2001	2002	2003	2004	2005	2006*	2007*	
Tonnes CH_4								
281 024	**287 299**	**285 966**	**285 149**	**276 156**	**271 223**	**268 906**	**274 887**	**Total emissions**
6 032	6 479	6 537	7 087	7 275	7 970	8 455	9 569	Households
41	16	2	- 15	- 19	- 19	- 29	- 36	Other emissions
274 951	**280 804**	**279 427**	**278 078**	**268 900**	**263 272**	**260 480**	**265 354**	**Total industries**
182 686	186 975	184 662	182 840	179 542	177 340	175 464	183 507	Agriculture
1 348	1 252	1 087	1 095	1 067	694	480	258	Horticulture, orchards etc.
39	40	34	33	41	39	34	27	Agricultural services; landscape gardeners etc.
3	3	2	2	3	3	3	3	Forestry
26	18	17	14	15	14	14	12	Fishing
168	153	177	153	179	193	185	185	Extr. of oil and natural gas
67	80	73	70	69	58	44	31	Extr. of gravel and clay etc.
58	60	55	60	59	45	34	20	Production etc. of meat and meat products
59	64	59	33	34	26	31	25	Processing and preserving of fish and fish products
11	12	11	16	16	13	12	9	Processing and preserving of fruit and vegetables
6	7	6	8	8	8	9	8	Mfr. of vegetable and animal oils and fats
88	97	89	94	92	98	81	53	Mfr. of dairy products
76	96	88	62	63	90	79	62	Mfr. of starch, chocolate and sugar products
14	17	16	15	14	13	12	9	Mfr. of bread, cakes and biscuits
1	1	1	1	1	1	1	1	Bakers shops
35	26	23	29	31	26	24	21	Manufacture of sugar
58	66	60	74	73	63	50	29	Manufacture of beverages
3	3	2	3	3	3	2	2	Manufacture of tobacco products
30	33	30	26	26	15	12	5	Mfr. of textiles
3	2	2	3	3	2	2	2	Mfr. of wearing apparel
1	2	1	2	2	0	0	0	Mfr. of leather and footwear
181	151	149	65	67	62	68	77	Mfr. of wood and wood products
68	77	71	80	79	74	59	29	Mfr. of pulp, paper and paper products
2	3	3	4	4	3	2	2	Publishing of newspapers
4	5	4	7	6	6	5	4	Publishing activities, excluding newspapers
10	11	10	13	13	11	9	6	Printing activities
3 480	3 434	3 640	3 728	4 419	4 443	5 752	5 841	Mfr. of refined petroleum products etc.
1	1	1	1	1	2	1	1	Mfr. of industrial gases and inorganic basic chemicals
13	15	14	15	15	14	10	7	Mfr. of dyes, pigments and organic basic chemicals
22	21	19	23	2	1	0	0	Manufacture of fertilizers
1	1	1	0	0	0	0	0	Mfr. of plastics and synthetic rubber
39	47	43	46	45	36	29	18	Manufacture of pesticides and other agro-chemical products
3	4	4	4	4	3	2	1	Mfr. of paints, varnishes and similar coatings, printing ink and mastics
22	27	24	26	26	26	20	12	Mfr. of pharmaceuticals etc.
29	33	30	33	34	27	20	12	Mfr. of detergents and other chemical products
31	36	33	34	33	24	20	13	Mfr. of rubber products and plastic packing goods etc.
2	1	1	2	2	2	2	1	Mfr. of builders ware of plastic
6	6	6	8	8	6	5	4	Manufacture of other plastic products n.e.c.
39	45	41	39	39	28	23	16	Mfr. of glass and ceramic goods etc.
253	237	221	235	248	223	230	249	Mfr. of cement, bricks, tiles, flags etc.
99	94	85	94	96	84	83	82	Mfr. of concrete, cement, asphalt and rockwool products
34	39	16	32	31	30	27	19	Mfr. of basic iron and steel and of ferro alloys
3	3	3	2	2	1	1	1	First processing of iron and steel
4	5	4	4	4	3	2	2	Mfr. of basic non-ferrous metals
4	5	5	5	5	3	2	1	Casting of metal products
28	33	31	34	34	26	29	28	Mfr. of building materials of metal
22	23	21	25	24	19	17	13	Mfr. of various metal products
18	21	19	21	21	18	13	5	Mfr. of marine engines and compressors
11	12	11	12	12	11	10	9	Mfr. of ovens and cold-storage plants
8	9	8	9	9	6	6	5	Mfr. of agricultural machinery
10	12	11	11	11	10	9	7	Mfr. of machinery for industries
3	2	2	3	3	2	2	1	Mfr. of domestic appliances
1	1	1	1	1	0	0	0	Mfr. of office machinery and computers
10	12	11	15	15	12	10	7	Mfr. of other electrical machinery and apparatus
8	9	9	10	9	5	4	3	Mfr. of radio and communication equipment
6	7	6	7	7	6	6	4	Mfr. of medical and optical instruments
7	8	7	10	10	8	7	6	Manufacture of motor vehicles etc.
8	9	8	8	8	7	6	5	Building and repairing of ships and boats
2	2	2	2	2	1	1	1	Mfr. of transport equipment excl. ships, motor vehicles etc.
58	57	55	66	67	38	40	49	Mfr. of furniture
5	6	5	7	7	5	4	2	Mfr. of toys, gold and silver articles etc.
0	0	0	0	0	0	0	0	Recycling of waste and scrap
7 994	8 935	8 898	8 890	8 408	6 651	6 087	4 065	Production and distribution of electricity
49	56	39	39	142	62	97	88	Manufacture and distribution of gas
7 232	7 560	7 525	7 222	6 702	6 469	5 253	5 039	Steam and hot water supply
0	0	0	0	0	0	0	0	Collection and distribution of water

Table A.5 (cont.) **CH_4 emissions broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		Tonnes CH_4					
450001	Construction of new buildings	30	29	31	31	31	33
450002	Repair and maintenance of buildings	35	35	40	41	42	44
450003	Civil engineering	18	19	15	15	16	16
450004	Construction materials for own-account repair	-	-	-	-	-	-
501009	Sale of motor vehicles and motorcycles	24	29	30	33	25	32
502000	Maintenance and repair of motor vehicles	13	20	21	22	25	25
505000	Retail sale of automotive fuel	4	7	8	8	7	7
510000	Wholesale except of motor vehicles	115	167	178	183	192	199
521090	Retail trade of food	13	27	28	30	32	33
522990	Department stores	2	9	10	10	10	11
523000	Re. sale of phar. goods, cosmetic art.	2	3	4	4	4	4
524190	Re. sale of clothing and footwear	5	10	10	11	10	11
524490	Other retail sale, repair work	23	34	35	36	39	38
551009	Hotels	5	14	16	17	18	19
553009	Restaurants	17	39	43	45	50	51
601000	Transport via railways	17	15	14	13	11	13
602100	Other scheduled passenger land transport	18	25	25	25	26	22
602223	Taxi operation and coach services	28	22	20	18	18	15
602409	Freight transport by road and via pipelines	414	693	372	396	327	352
610000	Water transport	241	291	285	309	407	389
620000	Air transport	49	53	58	65	62	58
631130	Cargo handling, harbours etc., travel agencies	5	8	8	9	10	10
634000	Activities of other transport agencies	9	13	13	13	12	13
640000	Post and telecommunications	20	31	34	35	31	32
651000	Financial institutions	6	15	17	18	17	17
652000	Mortgage credit institutions	2	3	3	3	3	4
660102	Life insurance and pension funding	1	1	1	1	1	1
660300	Non-life insurance	2	4	5	5	5	5
670000	Activities auxiliary to finance	1	1	2	2	2	2
701109	Real estate agents etc.	2	4	4	5	4	4
702009	Dwellings	8	13	14	14	14	13
702040	Letting of non-residential buildings	3	4	5	5	5	5
710000	Renting of transport equipment and machinery	2	3	3	3	3	4
721009	Computer activities exc. software consultancy and supply	1	4	3	3	5	4
722000	Software consultancy and supply	4	7	8	8	7	9
730001	Research and development (market)	1	2	2	2	2	3
730002	Research and development (other non-market)	2	3	4	4	4	4
741100	Legal activities	2	4	4	4	4	4
741200	Accounting, book-keeping, auditing	4	7	8	8	8	8
742009	Consulting engineers, architects	11	20	21	22	23	25
744000	Advertising	4	7	7	7	7	8
747000	Building-cleaning activities	7	14	15	17	17	18
748009	Other business activities	9	16	18	19	20	22
751100	General (overall) public service activities	5	13	15	16	16	16
751209	Administration of public sectors exc. for business	4	8	9	10	10	11
751300	Regulation of and contribution to more efficient operation of business	6	8	8	8	8	8
752000	Defence, police and administration of justice	30	60	48	55	57	53
801000	Primary education	17	52	60	65	61	65
802000	Secondary education	3	7	8	9	9	9
803000	Higher education	5	16	18	19	19	20
804001	Adult and other education (market)	1	1	1	1	1	1
804002	Adult and other education (other non-market)	2	2	3	3	3	3
851100	Hospital activities	13	30	35	38	38	39
851209	Medical, dental and veterinary activities	8	19	21	23	22	22
853109	Social institutions etc. for children	6	16	18	20	21	22
853209	Social institutions etc. for adults	15	43	49	52	61	68
900010	Sewage removal and purifying plants	5 991	8 455	9 652	11 847	12 065	11 318
900020	Refuse collection and sanitation	5	6	6	6	7	7
900030	Refuse dumps and refuse disposal plants	63 580	61 964	61 501	58 627	56 645	57 845
910000	Activities of membership organizations	4	9	10	10	10	10
920001	Recreational, cultural, sporting activities (market)	9	28	31	34	38	41
920002	Recreational, cultural, sporting activities (other non-market)	6	19	21	23	22	23
930009	Other service activities	5	8	9	10	10	9
950000	Private households with employed persons	-	-	-	-	-	-
	Of which Danish operated ships bunkering abroad	222	265	260	286	387	370
	Of which Danish operated planes bunkering abroad	5	8	8	10	14	13
	Total industries excl. of bunkering abroad	266 135	279 219	284 439	279 391	280 984	275 216

CH_4 emissions broken down by industries and by households — Table A.5 (cont.)

2000	2001	2002	2003	2004	2005	2006*	2007*	
Tonnes CH_4								
31	29	29	30	30	29	29	30	Construction of new buildings
38	37	36	37	38	36	37	38	Repair and maintenance of buildings
17	17	16	17	17	16	16	17	Civil engineering
-	-	-	-	-	-	-	-	Construction materials for own-account repair
31	26	26	26	25	23	21	19	Sale of motor vehicles and motorcycles
25	24	24	24	23	22	19	17	Maintenance and repair of motor vehicles
8	7	7	6	6	6	5	4	Retail sale of automotive fuel
200	184	179	176	168	158	140	128	Wholesale except of motor vehicles
34	33	35	34	33	30	27	24	Retail trade of food
11	12	12	11	11	10	9	8	Department stores
4	4	4	4	4	4	3	3	Re. sale of phar. goods, cosmetic art.
11	11	11	11	10	9	8	7	Re. sale of clothing and footwear
39	37	37	37	36	33	30	27	Other retail sale, repair work
20	18	19	19	19	17	15	13	Hotels
54	55	58	57	57	53	45	40	Restaurants
12	11	9	9	8	9	9	9	Transport via railways
27	28	25	26	26	26	27	26	Other scheduled passenger land transport
15	15	10	10	11	11	11	11	Taxi operation and coach services
309	375	266	284	301	335	368	240	Freight transport by road and via pipelines
481	446	498	587	630	800	1 028	1 161	Water transport
47	51	46	50	43	55	57	56	Air transport
10	10	11	11	10	10	9	8	Cargo handling, harbours etc., travel agencies
12	12	11	11	11	11	10	10	Activities of other transport agencies
30	28	24	24	23	21	18	16	Post and telecommunications
18	17	18	18	17	15	13	11	Financial institutions
4	4	4	4	4	3	3	3	Mortgage credit institutions
1	1	1	1	1	1	1	1	Life insurance and pension funding
6	5	6	6	5	5	4	4	Non-life insurance
2	2	2	2	2	1	1	1	Activities auxiliary to finance
5	5	5	5	5	5	4	4	Real estate agents etc.
14	13	14	14	14	13	11	10	Dwellings
6	6	5	5	5	5	4	4	Letting of non-residential buildings
4	4	4	4	4	3	3	3	Renting of transport equipment and machinery
4	5	5	5	5	4	4	3	Computer activities exc. software consultancy and supply
10	15	14	13	13	12	11	10	Software consultancy and supply
3	3	1	1	1	1	1	1	Research and development (market)
5	4	6	6	6	5	5	4	Research and development (other non-market)
5	5	5	5	5	5	4	4	Legal activities
8	8	10	10	9	9	8	7	Accounting, book-keeping, auditing
26	25	30	30	29	28	24	22	Consulting engineers, architects
9	10	10	10	10	9	8	7	Advertising
18	20	21	21	20	19	17	16	Building-cleaning activities
24	29	31	30	30	29	25	23	Other business activities
17	12	15	15	14	13	11	9	General (overall) public service activities
12	19	11	10	10	9	8	7	Administration of public sectors exc. for business
7	6	7	7	7	7	7	6	Regulation of and contribution to more efficient operation of business
45	46	41	42	53	52	57	58	Defence, police and administration of justice
70	66	70	69	66	59	105	101	Primary education
9	9	9	9	9	8	7	6	Secondary education
21	20	21	20	20	18	15	13	Higher education
1	1	1	1	1	1	1	1	Adult and other education (market)
2	2	2	2	2	2	2	2	Adult and other education (other non-market)
42	39	42	41	39	36	66	63	Hospital activities
24	20	20	20	19	17	15	13	Medical, dental and veterinary activities
24	23	23	23	22	20	17	15	Social institutions etc. for children
72	69	80	79	75	69	118	113	Social institutions etc. for adults
10 384	11 074	14 815	14 342	13 122	12 490	11 854	12 206	Sewage removal and purifying plants
6	6	5	5	6	6	6	6	Refuse collection and sanitation
57 875	57 574	54 992	56 082	51 604	51 273	51 486	50 621	Refuse dumps and refuse disposal plants
11	10	11	11	11	10	8	7	Activities of membership organizations
44	45	45	45	44	40	34	29	Recreational, cultural, sporting activities (market)
24	22	25	24	24	22	18	16	Recreational, cultural, sporting activities (other non-market)
10	9	9	9	9	8	7	6	Other service activities
-	-	-	-	-	-	-	-	Private households with employed persons
459	424	481	570	614	783	1 011	1 145	Of which Danish operated ships bunkering abroad
10	12	12	13	9	31	34	35	Of which Danish operated planes bunkering abroad
274 482	280 369	278 933	277 495	268 277	262 458	259 435	264 174	Total industries excl. of bunkering abroad

Table A.6 **CO_2 equivalents (GWP) broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		1 000 tonnes CO_2 equivalents (GWP)					
	Total emissions	**81 181**	**87 555**	**101 182**	**92 997**	**92 044**	**88 998**
	CO_2 sequestration	- 2 831	- 2 993	- 3 069	- 3 162	- 3 320	- 3 320
	Households	9 854	10 918	11 377	10 939	10 838	10 712
	Other emissions	3 807	1 224	1 842	1 987	1 305	2 272
	Total industries	**70 350**	**78 406**	**91 032**	**83 232**	**83 221**	**79 334**
011009	Agriculture	14 225	13 190	12 806	12 627	12 636	11 974
011209	Horticulture, orchards etc.	583	643	655	617	578	521
014000	Agricultural services; landscape gardeners etc.	193	245	241	235	240	266
020000	Forestry	23	32	38	35	36	34
050000	Fishing	843	609	676	623	632	633
110000	Extr. of oil and natural gas	813	1 111	1 282	1 714	1 697	2 286
140009	Extr. of gravel and clay etc.	287	297	253	273	263	304
151000	Production etc. of meat and meat products	222	238	243	244	256	279
152000	Processing and preserving of fish and fish products	163	272	199	230	214	222
153000	Processing and preserving of fruit and vegetables	32	36	42	43	42	37
154000	Mfr. of vegetable and animal oils and fats	112	68	138	106	114	122
155000	Mfr. of dairy products	276	250	280	295	317	330
156009	Mfr. of starch, chocolate and sugar products	290	453	312	275	271	230
158109	Mfr. of bread, cakes and biscuits	60	54	59	59	58	62
158120	Bakers shops	22	42	23	24	26	24
158300	Manufacture of sugar	423	304	315	363	369	357
159000	Manufacture of beverages	276	220	221	222	234	217
160000	Manufacture of tobacco products	10	9	8	8	8	8
170000	Mfr. of textiles	124	94	99	91	92	98
180000	Mfr. of wearing apparel	20	16	17	15	13	15
190000	Mfr. of leather and footwear	10	9	7	5	5	5
200000	Mfr. of wood and wood products	76	93	93	102	103	97
210000	Mfr. of pulp, paper and paper products	349	182	210	212	237	212
221200	Publishing of newspapers	6	4	4	4	4	7
221309	Publishing activities, excluding newspapers	13	12	13	12	13	18
222009	Printing activities	42	43	38	30	30	38
230000	Mfr. of refined petroleum products etc.	941	1 435	1 464	1 164	1 022	1 058
241109	Mfr. of industrial gases and inorganic basic chemicals	8	8	8	6	6	7
241209	Mfr. of dyes, pigments and organic basic chemicals	105	117	121	96	66	59
241500	Manufacture of fertilizers	1 079	964	906	930	895	1 024
241617	Mfr. of plastics and synthetic rubber	7	2	10	9	8	7
242000	Manufacture of pesticides and other agro-chemical products	1	1	2	1	1	106
243000	Mfr. of paints, varnishes and similar coatings, printing ink and mastics	12	10	12	12	12	12
244000	Mfr. of pharmaceuticals etc.	108	99	109	118	146	111
245070	Mfr. of detergents and other chemical products	204	197	198	197	178	193
251122	Mfr. of rubber products and plastic packing goods etc.	85	80	89	94	104	109
252300	Mfr. of builders ware of plastic	6	7	9	11	11	10
252400	Manufacture of other plastic products n.e.c.	13	17	20	18	19	26
261126	Mfr. of glass and ceramic goods etc.	102	101	102	99	109	124
263053	Mfr. of cement, bricks, tiles, flags etc.	1 789	2 573	2 747	3 003	2 870	2 755
266080	Mfr. of concrete, cement, asphalt and rockwool products	460	499	535	480	490	552
271000	Mfr. of basic iron and steel and of ferro alloys	96	94	95	98	103	101
272030	First processing of iron and steel	19	13	13	12	13	14
274000	Mfr. of basic non-ferrous metals	20	20	18	20	21	15
275000	Casting of metal products	2	1	2	1	1	15
281009	Mfr. of building materials of metal	106	142	146	136	137	159
286009	Mfr. of various metal products	98	84	108	99	100	103
291000	Mfr. of marine engines and compressors	55	63	70	63	64	67
292000	Mfr. of ovens and cold-storage plants	60	62	66	78	80	79
293000	Mfr. of agricultural machinery	39	41	46	43	47	42
294009	Mfr. of machinery for industries	51	47	47	47	44	48
297000	Mfr. of domestic appliances	30	21	20	19	19	14
300000	Mfr. of office machinery and computers	4	4	3	3	2	4
310000	Mfr. of other electrical machinery and apparatus	55	39	40	41	40	45
320000	Mfr. of radio and communication equipment	17	15	22	22	23	24
330000	Mfr. of medical and optical instruments	19	16	22	32	32	22
340000	Manufacture of motor vehicles etc.	32	31	41	37	37	34
351000	Building and repairing of ships and boats	29	42	42	49	47	31
352050	Mfr. of transport equipment excl. ships, motor vehicles etc.	6	20	12	13	14	12
361000	Mfr. of furniture	71	71	82	74	75	77
362060	Mfr. of toys, gold and silver articles etc.	18	20	27	21	22	23
370000	Recycling of waste and scrap	10	6	4	4	4	3
401000	Production and distribution of electricity	20 662	25 606	37 789	28 943	24 443	21 490
402000	Manufacture and distribution of gas	99	71	73	61	58	56
403000	Steam and hot water supply	4 236	4 638	4 805	4 416	5 143	4 905

CO_2 equivalents (GWP) broken down by industries and by households — Table A.6

2000	2001	2002	2003	2004	2005	2006*	2007*	
1 000 tonnes CO_2 equivalents (GWP)								
90 527	**88 431**	**88 257**	**96 785**	**93 565**	**98 108**	**114 335**	**115 188**	**Total emissions**
- 664	- 3 551	- 3 827	- 3 547	- 3 465	- 1 797	- 2 783	- 2 977	CO_2 sequestration
10 406	10 388	10 563	10 713	10 627	10 413	10 146	9 885	Households
2 618	3 005	1 897	1 055	2 365	1 713	1 627	1 490	Other emissions
78 167	**78 590**	**79 624**	**88 564**	**84 039**	**87 779**	**105 346**	**106 790**	**Total industries**
11 856	11 838	11 462	11 237	11 279	11 235	10 855	11 304	Agriculture
480	496	447	378	342	356	346	318	Horticulture, orchards etc.
279	290	273	262	259	270	264	283	Agricultural services; landscape gardeners etc.
41	44	36	40	40	44	43	47	Forestry
663	621	630	613	542	528	502	460	Fishing
2 066	2 074	2 080	2 093	2 200	2 068	2 082	2 009	Extr. of oil and natural gas
333	358	337	309	308	292	262	220	Extr. of gravel and clay etc.
251	235	223	224	223	190	177	134	Production etc. of meat and meat products
222	222	209	136	139	129	153	160	Processing and preserving of fish and fish products
40	41	42	49	48	44	49	57	Processing and preserving of fruit and vegetables
123	128	120	130	132	102	107	109	Mfr. of vegetable and animal oils and fats
314	308	290	287	284	334	330	304	Mfr. of dairy products
302	393	380	229	232	336	360	398	Mfr. of starch, chocolate and sugar products
61	64	59	58	58	70	72	72	Mfr. of bread, cakes and biscuits
21	21	21	20	22	19	18	19	Bakers shops
306	268	246	311	327	294	283	232	Manufacture of sugar
205	207	194	226	224	220	223	220	Manufacture of beverages
9	9	8	10	10	8	8	8	Manufacture of tobacco products
96	95	92	81	80	54	51	38	Mfr. of textiles
13	12	11	13	13	11	12	14	Mfr. of wearing apparel
5	5	5	7	7	2	3	3	Mfr. of leather and footwear
96	78	74	78	79	77	82	75	Mfr. of wood and wood products
206	207	198	210	206	214	214	168	Mfr. of pulp, paper and paper products
7	7	8	13	13	11	11	12	Publishing of newspapers
18	19	18	27	27	25	26	28	Publishing activities, excluding newspapers
38	41	40	47	46	42	43	43	Printing activities
1 073	1 093	1 059	1 104	1 094	1 032	1 099	1 105	Mfr. of refined petroleum products etc.
6	6	6	8	8	8	8	8	Mfr. of industrial gases and inorganic basic chemicals
62	66	64	63	63	67	64	65	Mfr. of dyes, pigments and organic basic chemicals
1 064	935	822	950	535	2	1	1	Manufacture of fertilizers
6	6	6	3	3	2	2	2	Mfr. of plastics and synthetic rubber
108	114	110	110	108	100	99	90	Manufacture of pesticides and other agro-chemical products
12	12	13	12	16	10	10	10	Mfr. of paints, varnishes and similar coatings, printing ink and mastics
114	121	116	95	94	87	84	72	Mfr. of pharmaceuticals etc.
191	203	217	206	204	186	165	141	Mfr. of detergents and other chemical products
106	107	105	107	106	83	82	92	Mfr. of rubber products and plastic packing goods etc.
8	7	7	11	11	10	9	8	Mfr. of builders ware of plastic
25	22	22	28	28	35	28	25	Manufacture of other plastic products n.e.c.
119	118	112	100	98	81	81	83	Mfr. of glass and ceramic goods etc.
2 720	2 735	2 728	2 614	2 812	2 703	2 869	2 976	Mfr. of cement, bricks, tiles, flags etc.
486	452	433	450	466	463	517	564	Mfr. of concrete, cement, asphalt and rockwool products
98	96	44	77	75	83	91	97	Mfr. of basic iron and steel and of ferro alloys
15	17	16	12	13	7	7	9	First processing of iron and steel
18	20	18	16	16	9	11	15	Mfr. of basic non-ferrous metals
19	20	20	21	21	12	12	10	Casting of metal products
157	162	160	179	182	159	194	218	Mfr. of building materials of metal
93	87	85	92	92	85	87	87	Mfr. of various metal products
66	66	65	69	69	93	88	39	Mfr. of marine engines and compressors
68	67	69	75	77	74	77	81	Mfr. of ovens and cold-storage plants
42	45	43	48	48	38	40	47	Mfr. of agricultural machinery
49	52	53	60	61	57	60	62	Mfr. of machinery for industries
10	8	8	12	12	8	8	8	Mfr. of domestic appliances
3	3	3	3	3	2	3	3	Mfr. of office machinery and computers
45	47	49	60	60	55	55	53	Mfr. of other electrical machinery and apparatus
24	25	25	28	28	16	17	19	Mfr. of radio and communication equipment
23	25	25	29	29	26	25	25	Mfr. of medical and optical instruments
29	27	27	38	37	33	35	37	Manufacture of motor vehicles etc.
30	32	30	30	30	31	32	36	Building and repairing of ships and boats
9	7	7	8	8	7	7	8	Mfr. of transport equipment excl. ships, motor vehicles etc.
75	75	71	78	79	63	64	69	Mfr. of furniture
21	22	21	26	26	23	21	21	Mfr. of toys, gold and silver articles etc.
3	3	4	4	4	4	4	4	Recycling of waste and scrap
18 453	19 597	19 895	24 818	18 913	15 678	23 437	18 736	Production and distribution of electricity
47	47	45	44	47	38	37	35	Manufacture and distribution of gas
4 551	4 910	4 703	4 561	4 411	4 353	4 245	4 158	Steam and hot water supply

Table A.6 (cont.) **CO_2 equivalents (GWP) broken down by industries and by households**

		1990	1995	1996	1997	1998	1999
		1 000 tonnes CO_2 equivalents (GWP)					
410000	Collection and distribution of water	1	2	2	2	2	2
450001	Construction of new buildings	267	299	325	342	364	415
450002	Repair and maintenance of buildings	373	403	476	501	535	610
450003	Civil engineering	181	233	188	200	209	238
450004	Construction materials for own-account repair	-	-	-	-	-	-
501009	Sale of motor vehicles and motorcycles	133	142	141	147	102	149
502000	Maintenance and repair of motor vehicles	89	102	102	95	99	102
505000	Retail sale of automotive fuel	22	18	19	16	14	16
510000	Wholesale except of motor vehicles	770	715	757	712	705	735
521090	Retail trade of food	86	79	80	79	72	69
522990	Department stores	7	10	12	10	9	10
523000	Re. sale of phar. goods, cosmetic art.	7	7	7	6	6	8
524190	Re. sale of clothing and footwear	23	22	22	20	19	20
524490	Other retail sale, repair work	154	147	151	145	145	143
551009	Hotels	30	39	37	28	22	23
553009	Restaurants	104	78	80	71	79	72
601000	Transport via railways	336	324	314	304	259	256
602100	Other scheduled passenger land transport	150	249	259	258	274	243
602223	Taxi operation and coach services	221	228	222	225	221	203
602409	Freight transport by road and via pipelines	1 429	1 507	1 608	1 581	1 716	1 691
610000	Water transport	10 172	12 272	12 019	13 013	17 138	16 380
620000	Air transport	2 281	2 396	2 642	3 101	2 971	2 729
631130	Cargo handling, harbours etc., travel agencies	32	48	30	32	32	34
634000	Activities of other transport agencies	52	79	77	79	80	82
640000	Post and telecommunications	100	95	110	107	100	124
651000	Financial institutions	34	21	26	27	21	21
652000	Mortgage credit institutions	9	6	7	6	5	6
660102	Life insurance and pension funding	2	2	2	2	2	2
660300	Non-life insurance	11	5	7	7	6	6
670000	Activities auxiliary to finance	3	3	3	3	3	3
701109	Real estate agents etc.	9	12	12	12	11	12
702009	Dwellings	54	38	37	33	31	23
702040	Letting of non-residential buildings	26	27	38	41	36	33
710000	Renting of transport equipment and machinery	18	11	12	11	11	11
721009	Computer activities exc. software consultancy and supply	5	13	6	7	8	11
722000	Software consultancy and supply	14	17	18	17	15	21
730001	Research and development (market)	4	2	3	3	3	3
730002	Research and development (other non-market)	10	5	6	6	5	6
741100	Legal activities	9	7	8	8	7	7
741200	Accounting, book-keeping, auditing	20	16	17	18	16	14
742009	Consulting engineers, architects	46	47	53	47	48	52
744000	Advertising	19	18	19	21	20	22
747000	Building-cleaning activities	45	49	55	59	58	67
748009	Other business activities	43	44	49	53	52	56
751100	General (overall) public service activities	30	25	29	30	27	31
751209	Administration of public sectors exc. for business	21	17	20	21	20	24
751300	Regulation of and contribution to more efficient operation of business	47	48	48	51	53	57
752000	Defence, police and administration of justice	353	574	444	414	462	411
801000	Primary education	112	65	85	86	64	68
802000	Secondary education	34	25	34	35	34	34
803000	Higher education	29	20	25	26	20	22
804001	Adult and other education (market)	4	4	5	5	5	6
804002	Adult and other education (other non-market)	13	15	17	18	19	22
851100	Hospital activities	85	36	47	48	38	39
851209	Medical, dental and veterinary activities	43	37	42	43	38	33
853109	Social institutions etc. for children	41	29	35	36	34	40
853209	Social institutions etc. for adults	102	80	94	96	93	105
900010	Sewage removal and purifying plants	243	303	315	355	362	348
900020	Refuse collection and sanitation	42	57	59	61	64	67
900030	Refuse dumps and refuse disposal plants	1 344	1 304	1 315	1 257	1 215	1 223
910000	Activities of membership organizations	19	16	18	18	14	15
920001	Recreational, cultural, sporting activities (market)	57	51	61	62	59	61
920002	Recreational, cultural, sporting activities (other non-market)	41	29	36	37	30	30
930009	Other service activities	44	27	47	43	45	38
950000	Private households with employed persons	-	-	-	-	-	-
	Of which Danish operated ships bunkering abroad	9 360	11 166	10 928	12 047	16 273	15 582
	Of which Danish operated planes bunkering abroad	275	431	436	544	754	693
	Emissions from biomass	4 641	5 869	6 296	6 542	6 492	6 857
	Total industries excl. of bunkering abroad	60 716	66 809	79 668	70 641	66 193	63 058

CO_2 equivalents (GWP) broken down by industries and by households Table A.6 (cont.)

2000	2001	2002	2003	2004	2005	2006*	2007*	
1 000 tonnes CO_2 equivalents (GWP)								
3	3	2	2	2	2	2	2	Collection and distribution of water
359	378	414	429	451	456	482	520	Construction of new buildings
505	533	583	606	636	644	681	735	Repair and maintenance of buildings
230	245	261	267	278	275	286	307	Civil engineering
-	-	-	-	-	-	-	-	Construction materials for own-account repair
132	134	162	170	175	175	186	195	Sale of motor vehicles and motorcycles
90	93	97	103	103	104	110	115	Maintenance and repair of motor vehicles
13	15	11	12	11	11	11	11	Retail sale of automotive fuel
649	648	631	655	665	677	719	737	Wholesale except of motor vehicles
63	65	62	65	64	63	68	68	Retail trade of food
9	10	10	10	9	9	10	9	Department stores
9	6	6	11	6	6	7	8	Re. sale of phar. goods, cosmetic art.
18	19	18	19	18	18	19	19	Re. sale of clothing and footwear
134	138	131	140	140	142	153	161	Other retail sale, repair work
21	20	21	22	21	21	23	21	Hotels
67	71	74	78	76	75	82	79	Restaurants
247	231	214	222	220	237	231	232	Transport via railways
244	259	247	261	274	288	310	336	Other scheduled passenger land transport
222	240	159	171	182	191	206	227	Taxi operation and coach services
1 548	1 668	1 514	1 623	1 731	1 822	1 968	2 162	Freight transport by road and via pipelines
20 266	18 774	20 966	24 736	26 511	33 661	43 273	48 885	Water transport
2 136	2 402	2 109	2 357	1 969	2 694	2 873	2 807	Air transport
34	35	43	46	47	48	51	54	Cargo handling, harbours etc., travel agencies
77	81	77	83	87	90	96	103	Activities of other transport agencies
118	109	73	77	80	80	87	90	Post and telecommunications
21	19	20	23	21	20	22	18	Financial institutions
5	5	6	7	6	6	7	6	Mortgage credit institutions
2	2	2	2	2	2	2	2	Life insurance and pension funding
6	5	6	7	6	6	6	5	Non-life insurance
3	3	3	3	3	3	3	3	Activities auxiliary to finance
12	12	13	13	13	13	14	14	Real estate agents etc.
24	25	22	22	21	21	24	24	Dwellings
43	43	40	43	41	42	44	46	Letting of non-residential buildings
11	18	14	18	17	16	16	16	Renting of transport equipment and machinery
10	10	10	11	11	11	11	11	Computer activities exc. software consultancy and supply
24	28	31	32	32	31	33	33	Software consultancy and supply
3	3	2	2	2	2	2	2	Research and development (market)
6	5	8	9	8	8	9	8	Research and development (other non-market)
7	7	8	9	8	8	9	8	Legal activities
16	15	16	18	17	17	18	17	Accounting, book-keeping, auditing
49	55	63	68	66	69	73	73	Consulting engineers, architects
22	23	24	26	26	27	28	28	Advertising
67	69	76	82	84	86	91	94	Building-cleaning activities
58	62	84	90	91	92	98	98	Other business activities
29	24	31	34	34	33	35	34	General (overall) public service activities
22	27	25	27	27	27	28	28	Administration of public sectors exc. for business
50	51	57	61	64	66	71	77	Regulation of and contribution to more efficient operation of business
269	251	219	238	469	534	301	361	Defence, police and administration of justice
69	61	66	75	72	67	79	65	Primary education
30	36	34	34	30	30	33	31	Secondary education
22	20	21	24	23	22	25	21	Higher education
7	7	7	7	7	8	8	9	Adult and other education (market)
19	20	20	21	22	23	25	27	Adult and other education (other non-market)
40	35	38	43	41	39	47	37	Hospital activities
42	37	33	36	35	34	36	33	Medical, dental and veterinary activities
36	35	40	45	44	44	47	45	Social institutions etc. for children
100	95	111	125	120	118	130	119	Social institutions etc. for adults
325	341	413	396	374	357	348	352	Sewage removal and purifying plants
60	65	59	63	68	71	77	84	Refuse collection and sanitation
1 225	1 215	1 164	1 190	1 090	1 083	1 089	1 069	Refuse dumps and refuse disposal plants
15	14	16	17	17	17	18	16	Activities of membership organizations
64	64	64	71	70	69	76	68	Recreational, cultural, sporting activities (market)
29	27	29	33	32	31	35	30	Recreational, cultural, sporting activities (other non-market)
36	38	38	40	38	36	38	38	Other service activities
-	-	-	-	-	-	-	-	Private households with employed persons
19 330	17 839	20 243	23 984	25 858	32 955	42 543	48 177	Of which Danish operated ships bunkering abroad
520	637	662	672	465	1 628	1 820	1 856	Of which Danish operated planes bunkering abroad
7 169	7 902	8 430	9 453	10 142	10 893	11 335	12 110	Emissions from biomass
58 317	60 114	58 719	63 908	57 716	53 195	60 984	56 757	Total industries excl. of bunkering abroad

Thematic publications from Statistics Denmark

2009 Greenhouse Gas Emissions from the Danish Economi
70 sider, kun som net-publikation, TemaPubl 2009:3

Arbejdsløshed - ny analyse af ledighedsforløb
58 sider, 65,00 kr., TemaPubl 2009:2

Productivity and Quality of the Public Sector
67 sider, kun som net-publikation, TemaPubl 2009:1

2008 Turisme - Regionalt, nationalt og internationalt
154 sider, 155 kr., TemaPubl 2008:1

Børns familier
205 sider, 205 kr. TemaPubl 2008:2

2007 Sundhed og uddannelse. Ny metode i nationalregnskabet
54 sider, 55 kr., TemaPubl 2007:1

2006 Det nye demografiske danmarkskort
52 sider, 130 kr., TemaPubl 2006:4

Videre fra grundskolen - de unges uddannelse
42 sider, 130 kr., TemaPubl 2006:3

Forskning og udvikling - nationalregnskabsmæssigt sattellitregnskab, 1990-2003.
53 sider, 164 kr., TemaPubl 2006:2

Dansk erhvervsliv i internationalt perspektiv.
45 sider, 130 kr., TemaPubl 2006:1

2005 Dødelighed og erhverv 1996-2000, Udk. 2005. 65 sider. 126 kr.

Familie og arbejdsliv. Udk. 2005. 34 sider, 74 kr.

Vielser og skilsmisser - børn i skilsmisser. Udk. 2005. 59 sider, 126 kr.

Privatøkonomi og uddannelse. Udk. 2005. 54 sider. 126 kr.

Overgang til efterløn. Udk. 2005. 52 sider. 126 kr.

Videre i uddannelsessystemet - fra de gymnasiale uddannelser. Udk. 2005. 45 sider. 126 kr.

Produktivitetsudviklingen i Danmark 1966-2003. Udk. 2005.
129 sider. 240 kr.

2004 Befolkningens uddannelsesniveau. Udk. 2004. 47 sider. 122 kr.

De nyuddannede og arbejdsmarkedet. Udk. 2004. 55 sider. 122 kr.

De ældre og arbejdsmarkedet. Udk. 2004. 25 sider. 72 kr.

Indvandrerne og arbejdsmarkedet. Udk. 2004. 61 sider. 122 kr.

Køn og arbejdsliv. Udk. 2004. 45 sider. 122 kr.

Produktivitetsudviklingen i Danmark 1988-2000. Udk. 2004.
71 sider. 193 kr.

Vandmiljøet. Udk. 2004. 42 sider. 115 kr.

2003 Danske virksomheders samarbejde 2003. Udk. 2004. 43 sider. 122 kr.

Helbredsproblemer og arbejdsliv. Udk. 2003. 19 sider. 50 kr.

2002 Børns levevilkår. Udk. 2002. 177 sider. 196 kr.

Skove og plantager 2000. Udk. 2002. 171 sider. 196 kr.

Læs nærmere omtale og bestil publikationerne på
www.dst.dk/boghandel,
tlf. 39 17 30 20 eller publsalg@dst.dk