Physical Input-Output Tables for Denmark

Products and Materials 1990
Air Emissions 1990-92

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STATISTICS
DENMARK

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- Nil
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• Not applicable

Due to rounding, the figures given for individual items do not necessarily add up to the corresponding total shown.

Preface

This report on physical input-output tables and emission accounts is a result of the general work with integrated environmental and economic accounting (»green« national accounts) at Statistics Denmark. One aim has been to outline some of the possibilities and limitations in this emerging field of research.

The project has been carried out as an integrated part of Statistics Denmark's participation in the AMOR Centre (Centre for Analysis, Modelling and Accounting). AMOR is a scientific centre established in 1992 as part of The Danish Environmental Research Programme. The centre also embraces The National Environmental Research Institute (Department of Policy Analysis), The Royal Veterinary and Agricultural University (Department of Economics and Natural Resources), The Secretariat of the Danish Economic Council, Risø National Laboratory (Systems Analysis Department), University of Copenhagen (Institute of Economics), Roskilde University (Department of Social Sciences) and The Danish Institute of Agricultural and Fisheries Economics.

The report has been prepared by Senior Adviser Ole Gravgård Pedersen, who has been supported by the graduate students Kamilla Heurlén and Kristoffer Pavia Hvidsteen.

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Any opinions expressed here are those of the author and not necessarily those of Statistics Denmark.

Statistics Denmark, August 1999

Jan Plovsing /
Ole Berner

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1. Introduction

Flows of materials

Most problems pertaining to natural resources and the environment are related to economic activities through the physical flows of materials between the economy and the natural environment. Flows of resources from the natural environment to the economy are a prerequisite of production while flows of residuals from the economy to the environment are the consequence of production and consumption.

A comprehensive and integrated understanding of the natural resource and environmental problems with which we are faced assumes that we have both a conceptual framework and statistical data, which can monitor the flows of materials.

The physical input-output tables

The aim of this report is to show how physical input-output tables can be used to describe the magnitude and nature of materials and commodities used in the Danish economy. It shows how the natural resources enter, are processed and subsequently as commodities are moved around the economy, used and finally returned to the natural environment in the form of residuals.

The physical input-output tables presented here provide, as far as the author is aware, the first fairly exhaustive description of Danish flows of materials and commodities in the sense that the weight of almost all commodities and materials, which have entered, been produced and used in the Danish economy are quantified and monitored with regard to origin and use.

Emission accounts

In connection with the physical input-output tables, emission accounts have been drawn up to give a more detailed description of some of the residuals from economic activity.

Input-output calculations

To analyse further the relationship between economic activity and emissions, calculations have been made on the basis of the emission accounts and an input-output model. The model, *inter alia*, identify the total direct and indirect emissions stemming from private consumption as well as from other components of final demand thereby achieving a more complete picture of not only the sources but also the actual causes of emissions.

»Green« national accounts

The physical input-output tables, emission accounts and input-output model calculations presented in this report can all be regarded as components of »green« national accounts for Denmark. The fundamental principle behind the construction of the tables and calculations has been that all classifications, definitions and data, as far as possible, are consistent with the classifications, definitions and data used when drawing up the national accounts.

Due to the same classifications being used as in the national accounts, the information on materials, commodities and residuals can immediately be compared with the information on economic transactions and values in the national accounts. The physical input-output tables and emission accounts may therefore also be characterised as satellites linked to the national accounts and it is in this respect that these developments are components of »green« national accounts for Denmark.

This approach to »green« national accounts is in contrast to the environmentally adjusted national accounts and ecodomestic products, etc., where resource extraction and pollution are valued and entered in the traditional national accounts.[1]

[1] In *Gravgård Pedersen, 1995*, a more detailed description of the two different approaches to compiling »green« national accounts is given.

A comprehensive picture

The aim of physical input-output tables and emission accounts is to give a comprehensive picture of the flows of natural resources, commodities and residuals to which economic activity has given rise. In this context, comprehensive means that the description is exhaustive in the sense that all physical flows are, in principle, included and presented in a logical and consistent way throughout the accounts. However, comprehensive also means that with the aid of the physical input-output tables it is possible to analyse the relationship between the materials which are, on the one hand, extracted from Danish nature or imported into Denmark and the materials which, on the other, are accumulated in the economy, exported or returned to nature as residual products. Consequently, resource utilisation and environmental problems prove to be two aspects of the same issue.

The inclusion of all physical flows of resources, commodities and residuals has implied that some details have had to be excluded when drawing up the physical input-output tables. Industries, natural resources, commodities and residuals are thus aggregated into main groups; for example, there is only information on the total weight of imported chemicals, etc. for use in the food products, beverages and tobacco industry, but not on the use of different types of chemicals by the individual industries.[2] Correspondingly, residuals/waste are, by and large, only aggregated into two categories: energy related residuals and others. This rough division naturally means that it is only possible, to a limited extent, to identify the physical flows with information and assessments of any harmful effect on humans and the environment.

1990-92

The physical input-output tables are drawn up for the year 1990, while the emission accounts and the relevant input-output model calculations apply to the years 1990-1992. What is therefore involved is a description of the interaction of the economy and the environment as it appeared some years ago. Yet with regard to the figures in the tables below, which must thus be regarded as »old«, there is nevertheless no doubt that many of the aggregates, general connections and structural conditions disclosed in the tables continue to be valid.

Overview of the report

In chapter 2, a kind of general conceptual framework for the understanding of the exchange of material between nature and the economy and the identities, in accounting terms, in the physical input-output tables are outlined via a review of the environmental/economic circuit. The conceptual framework is extended further with a discussion of the material balance principle, which is essential as far as the physical input-output tables are concerned. Finally, in chapter 2, the information content of the physical input-output tables, emission accounts and model calculations are put into perspective using the DPSIR model which, *inter alia*, gives a general description of the cause-and-effect connection within the environment and the economy.

The physical input-output tables are constructed on the basis of exactly the same principles and assumptions as the monetary input-output tables for the Danish economy (in DKK) which are currently constructed and published by Statistics Denmark. In chapter 3 the monetary input-output table for 1990 is presented. Among other things, the table covers the value of the physical flow of commodities which are monitored in the physical input-output tables.[3]

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[2] However, in the commodity balance system forming the basis of the physical input-output tables, there is information at a more detailed level - cf. chapter 4.

[3] The input-output tables, national accounts data and classifications, etc. used in connection with the physical input-output tables and emission accounts are based on the national accounts as they appeared before readjustment in accordance with the new European national accounts system ENS95 and the source and method revisions, etc. introduced at the same time. Regarding the readjustment, cf. *Statistics Denmark, 1998*.

In chapter 4, the basis for the data in the physical input-output tables and the methodology used in the construction of the tables are described.

Chapter 5 contains the physical input-output tables for the year 1990. There is, on the one hand, an input-output table for all commodities and material together and, on the other, input-output tables for different groups of commodities, packaging and nitrogen flows. The grouping by industries in the physical input-output tables is the 27-industry grouping of the national accounts (the appendix contains an overview of the division by industry and the relationship between the national accounts' detailed 117-industry grouping and the 27-industry grouping). Each of the physical input-output tables is supplemented by comments highlighting the characteristic features in the table and clarify how to read and interpret the table.

Chapter 6 contains a comparison of certain orders of magnitude from the Danish physical input-output tables for 1990 with corresponding tables for West Germany 1990. For purposes of comparison, data from the physical input-output tables have been converted to a per capita basis.

Chapter 7 contains accounts for energy related emissions of SO_2, NO_x, CO_2, CO and NMVOC. The accounts for the years 1990-92 show the emissions broken down by source in the form of 117 national accounts industries plus households.

In chapters 8-10, emission accounts for 1992 broken down by causes are presented. The accounts focus on clarifying the connection between the emissions and demand from private consumption, public consumption, export, gross capital formation, etc. (final demand) which may be said to be the actual causes of the emissions.

In chapter 8 the emissions from industries are assigned to the final demand components, which have given rise to the production activities in the industries and thereby to the energy consumption and the subsequent emissions.

In chapter 9 the main focus is on demand according to the various final demand groups, including private consumption broken down by 64 consumption groups. For each of the categories the magnitude of the emissions caused by Danish final demand in Denmark and the rest of the world respectively, is shown.

In chapter 10 an account is drawn up for the emission content of the goods and services which are exchanged via imports and exports between Denmark and the rest of the world. The account shows the extent to which Denmark, by importing goods and services from abroad, has induced other countries to emit CO_2, SO_2, NO_x, CO and NMVOC. Correspondingly, the account shows the extent to which other countries have, by importing goods and services from Denmark, induced Denmark to emit gasses.

2. The conceptual framework

The economy and the environment

In this chapter, three different approaches to a description of the connection between economy and environment are formulated. Together the three approaches provide a conceptual framework to which physical input-output tables, emission accounts and model calculations - and satellite accounts on the whole - can be fitted. The three approaches are:

- The environmental/economic circuit
- The principle of material balance
- The DPSIR model

2.1 The environmental/economic circuit

Functions of the environment

Viewed from the economic/human perspective, the environment has three functions:

- The environment is the supplier of resources (energy and materials)
- The environment functions as a waste bucket (decomposes residuals), where we can dispose of materials for which there is no longer any use
- The environment provides recreational facilities

All three functions are naturally important but focus will here be on the resource supply and waste decomposing. They are the functions which are most closely related with production and consumption. Figure 2.1 illustrates the role of the two functions in the environmental/economic circuit.

Production and final demand

In the description of the Danish economy (top left box), the focus in figure 2.1 is on production and final demand. Production takes place in different industries and these industries are linked to each other via supplies of inputs. This is illustrated by the network (production) in the topmost box in the figure. The industries also supply goods and services for final demand, which embrace private and public consumption, exports, gross capital formation and changes in stocks.[4]

Resources and waste

As stated, the Danish economy is dependent on the environment acting as a supplier of resources and as a waste bucket, in other words there is flows of resources from the Danish environment (bottom left box) to the economy and flows of waste (residuals) from the economy to the Danish environment.

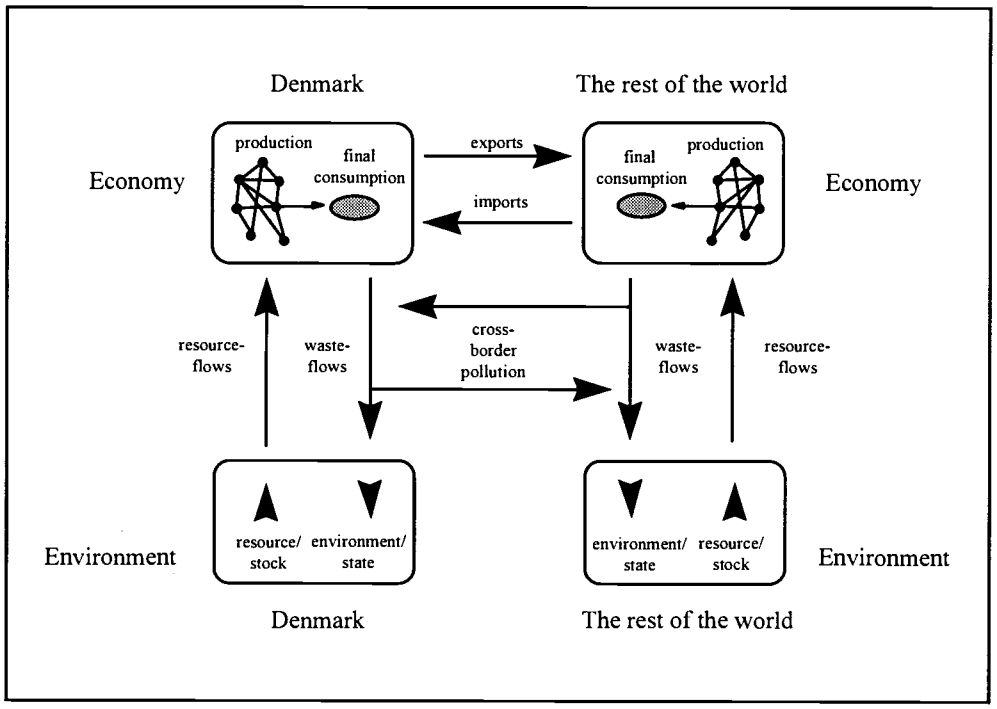
Rest of the world

The Danish economy is linked with the economies of the rest of the world (top right box) via, *inter alia*, imports and exports of goods and services. Via the production of goods and services abroad there is also a connection between Danish economic activity and the environments of the rest of the world (bottom right box). Hence, production of the Danish imports induces movements of resources and flows of residuals in other countries. Conversely, the goods and services exported from Denmark naturally cause movements of resources and flows of residuals in Denmark.

[4] The designation final demand in the national accounts is actually slightly misleading in relation to the environmental/economic circuit, since there is no question of goods/materials finding their final placing here. Some time or another the goods/materials are leaving the economy again via flows of waste. Demand is thus only final when the economy is considered narrowly.

Some of the residuals from Danish economic activity end up abroad similar to, for example, emissions of SO_2 which are transported across borders by air. Correspondingly, Denmark also receives cross-border pollution.[5]

Figure 2.1 **The environmental/economic circuit**



Traditional monetary input-output tables (chapter 3) contain information on money value associated with the flows of goods and services in the economy (contents of the top left box and import/export arrows).

Physical flows

The physical input-output tables (chapter 4-5) contain information on physical flows (weight of materials/commodities) in the economy (top left box), flows of resources and flows of residuals (arrows between top and bottom left boxes) and also the exchange of goods and services with the rest of the world (arrows between the top boxes).

A complete description of the physical connections between economic activities and the environment embraces, in principle, all substances and materials used in the economy, including, for example, the oxygen of the air which goes into combustion processes and also sea water used for cooling purposes. These free goods are, however, not included in the existing input-output tables for Denmark.[6]

The emission accounts in chapter 7 give a detailed picture for energy related air emissions of the flows of residuals from the Danish economy to the environment (connection from top left box to bottom left box). On the basis of a more detailed classification, focus is on the directly energy related emissions to the air of the industries and households.

The model calculations in chapters 8 and 9 present a slightly different picture of the energy related residual flows, since the focus here is on the connection be-

[5] We will only consider flows of residuals which are involuntary as cross-border residuals. Waste, which is deliberately (and for payment) sent abroad for treatment or depositing, is instead regarded as part of foreign trade in goods and services.

[6] In the German input-output tables for 1990 the description of the environmental/economic circuit is more comprehensive on this point, cf. chapter 6.

tween the emissions and the final demand (in the top left box) which has caused the production activities and accordingly the energy related emissions. Moreover, an estimation is given in chapter 9 (and 10) of the order of magnitude of the energy related emissions which take place abroad (arrow from top right box to bottom right box) as a result of the direct and indirect production abroad of the goods and services imported into Denmark.

Other accounting practices

A number of the flows in the environmental/economic circuit are thus described by the physical input-output tables, emission accounts and model calculations in the present report. The flows which are not described are: Flows in the environment (what happens to the residuals in the environment?), the connections between flows on the one hand and resource stocks and the state of the environment on the other (how are resources affected by extraction and the environment by pollutants?), the flows of resources to the rest of the world and cross-border flows of residuals. Some of these flows are, however, monitored by other satellite accounts in connection with the national accounts. For example, in *Vadmand Jensen and Gravgård Pedersen, 1998*, NAMEA's (National Accounting Matrices including Environmental Accounts) are set up for Denmark for the years 1980-1992. These NAMEA's are satellite accounts which, *inter alia*, contain information with respect to energy consumption, reserves of oil and natural gas, emissions and cross-border movements of emissions.

2.2 The material balance principle

In connection with the environmental/economic circuit, the material balance principle constitutes an essential condition for an understanding of the connection between the economy and the environment and accordingly also the physical input-output tables.

The first law of thermodynamics

The material balance principle is based on the first law of thermodynamics, which states that materials and energy does not disappear regardless of the physical processes in which they are a constituent part. Thus, if there is a physical flow into a system (production process, enterprise, industry, economy, geographical area, etc.), a counterpart must be found either in the form of an accumulation of materials/energy in the system or a flow out of the system.

The principle of material balance

The physical input-output tables presented in chapters 4 and 5 are based on the principle of material balance. It is a fundamental principle of accounting that, for the economy as a whole, there should be a balance of input (Danish resources, production and imports) and output (accumulation, exports and residuals). For the individual industries (and households) it must also be the case that the flow of materials into an industry (or households) must be precisely matched by a corresponding accumulation and/or flow from the industry (or households).

The use of the principle of the material balance within the framework drawn by the environmental/economic circuit makes it possible to follow the materials consistently throughout the entire system. Consequently, resource utilisation, consumption and environmental problems appear to be different aspects of the same issue. It becomes possible, for example, to analyse how the consumption of resources corresponds to the scale and composition of final demand, and how the discharge of pollutants is determined by, *inter alia*, the extent and composition of the materials used for intermediate consumption in the various industries.

2.3 The DPSIR

The third conceptual approach is the DPSIR model. The abbreviation indicates the various stages in the cause/effect connections within the environmental/economic circuit and the processes which take place in nature: *D*riving forces, *P*ressure, *S*tate, *I*mpact and *R*esponse. DPSIR is an extension of the more simple PSR model. As a result of the extension, DPSIR is better suited to describe the interrelationship between the economy and the environment, and therefore has greater relevance in connection with laying down environmental policy and solving resource and environmental problems. DPSIR is not a formalised model with firm definitions and interpretations. DPSIR is to be considered more as a conceptual framework which can be used in building up classifications and statistical systems and not least in analyses of cause/effect chains within social activity and environmental changes and states.[7]

The links of the DPSIR

The first link, Driving Forces, covers the description of the activities, for example production and consumption, which give rise to the second link in the model, Pressure (environmental effect[8]). Pressure is, for example, the discharge of pollutants and resource extraction. To the extent that the pressure has an effect on the environment, (for example, a change in the air quality), this is described as the third stage in the model through a change in State. Changes in the environmental State may also refer to changes in the stocks of resources. A change in the environmental state can bring with it consequences for welfare and economy, in other words Impact, which is the fourth stage in the model. There can, for example, be effects on health or changes in productivity. The last stage in the model, Response, covers a description of how economic and welfare changes have repercussions on the economy in the form of adjustments and changed behaviour in order to respond to the changes outlined in the Impact section of the DPSIR.

IO-tables and the DPSIR

In relation to the DPSIR model, physical input-output tables and emission accounts may be placed in relation to the first two stages of the model, D and P. Driving forces (activities) are described with the help of national accounts, the traditional monetary input-output tables plus the physical input-output tables. The description of activity embraces both consumption and production drawn up in value as well as the corresponding physical flow of commodities counted in kg. Via the physical input-output tables' information on resource consumption and residuals as well as the detailed information in the emission accounts on energy related emissions, pressure/environmental burden is linked up with driving forces. Since the classification used for the description of the activities (D) and the environmental pressure (P) is the same, viz. the national accounts classification, D and P can be compared and a picture of cause/effect connections emerges. Moreover, the focusing on the cause/effect relationship and the advantages of a consistent description of the two links in the DPSIR chain are especially evident when performing input-output calculations in relation to the emission accounts (chapters 8-10), since the main focus of these is on causes of the emissions.

Other accounting practices and DPSIR

The other parts in the DPSIR chain cannot be quantified using the physical input-output tables and the emission accounts as they are drawn up in this context. However, within the field of »green« national accounts and satellite accounts there are,

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[7] The definitions and interpretations of the various links in the DPSIR chain are thus not unambiguous. The interpretation used here is adjusted to the use of DPSIR in connection with the environmental/economic circuit and the conceptual framework of the national accounts.

[8] Pressure and environmental effect are in reality inappropriate designations, since they suggest that not only does a quantitative change take place but a qualitative one also. The designations do, however, also cover the cases where emissions of pollutants have no measurable/observable effect at all on the environment in qualitative terms.

other types of accounts which can be used. Thus (resource) assets accounts in the form of satellite accounts to the national accounts are an example of how the part of S (state) which is formed by the resource stocks can be quantified in such a way that there is consistency with the D and P parts of the satellite accounts. There are examples of this in *Vadmand Jensen and Gravgård Pedersen, 1998*, and *Statistisk Sentralbyrå, 1997*. However, it is, generally, extraordinarily difficult to describe in quantitative terms the connection between P and S in the environmental/pollution area, *inter alia* because changes in environmental status are most often the result of many effects, which may even be subjected to time lags. Consequently, for the time being no unequivocal and generally useful solution to these problems can be devised with respect to scientific analysis, environmental statistics in general or »green« national accounts.

The same difficulties apply with regard to the relationship between S and I. Within selected areas there are, however, interesting attempts to clarify cause/effect chains; for example, in a Norwegian study *(Alfsen and Rosendahl, 1996)* physical dose-response functions for the description of the connection between air pollution and damage to health and materials are drawn up. Dose-response functions are related to an economic model (general equilibrium model) and the direct and indirect effects on economic growth are estimated in accordance with it.

As far as the response part is concerned, satellite accounts which give information on economic activity in the eco-industries, on recycling and environmental protection expenditures can be drawn up (*Rørmose Jensen, 1998* and *Eurostat, 1994*).

3. The monetary input-output table

In section 3.1 the main features of the traditional monetary input-output table for 1990 are presented. Section 3.2 discusses the bookkeeping identities which characterise the input-output table. The commodity balances of the national accounts, which constitute the basis for both the monetary and the physical input-output tables, are described in section 3.3. A more exhaustive review of the construction and interpretation of the monetary input-output table also appear in *Statistics Denmark, 1996.*

3.1 The construction and interpretation of the table

Flows of goods and services valued in DKK

The input-output table (table 3.1) is a special representation of the three accounts of the national accounts for goods and services, production, and income formation respectively. The table gives a picture of the value of the goods and services produced and exchanged in the economy. The table thus gives a summary of the value of the inter-industry flows of goods and services as well as the value of the flows of goods and services from the industries to final demand, viz. to private consumption, public consumption, export, stock changes and gross capital formation, etc. The income generated by the transactions is also presented in the table.

The 27-industry and 117-industry classification

The input-output table, shown in table 3.1, applies a 27-industry classification. The 27-industry classification is an aggregate of the detailed 117-industry classification in the Danish national accounts and input-output tables, (cf. also footnote 3 in chapter 1). The relationship between the 27 and 117-industry classifications is shown in the appendix (page 181).

Rows

One row in the table shows the value in DKK of the row industry's output for use in the column industries and categories of final demand. In addition to the rows for output from the Danish industries, rows appear for imports and other primary factors (indirect taxes, net, wages and operating surplus).

Columns

Each column in the table shows the value of the goods and services, which the column's industry or component of final demand has received from the row industries and imports (input) and also the volume of the indirect taxes, wages and operating surplus, which the industry/category in the columns has paid.

Physical interpretation

The value of the supplies described in the input-output tables can, as a rule, be interpreted, as if there were a physical correspondence in the form of an actual flow of goods (or service carried out). The correspondence between values and volumes is secured through efforts to obtain a uniform price-volume relationship in the rows when drawing up the input-output table. Thus, a value unit can be assumed to correspond to the same physical amount regardless of the industry or final demand category to which the value unit is supplied. However, the aggregation from the most detailed level to the 27-industry level erodes the correspondence between values and volumes somewhat. It must also be noted that the monetary input-output table contains supplies of services and that the interpretation of values as quantity units, accordingly also include the »physical« production of services, (cf. *Statistics Denmark, 1996*, section 2.3).

Table 3.1 Input-output table 1990 with endogenous import - Current prices - Mill. DKK

			Input							
			11000	12000	13000	20000	31000	32000	33000	34000
1	11000	Agriculture, horticulture etc	5 465	1	-	-	35 396	78	9	55
2	12000	Forestry and logging	1	-	-	-	-	-	468	5
3	13000	Fishing	59	-	2	-	1 459	-	-	-
4	20000	Mining and quarrying	103	-	-	80	55	2	-	3
5	31000	Manuf. of food, beverages, tobacco	2 600	-	12	1	10 405	9	20	30
6	32000	Textile, clothing, leather industry	8	-	22	2	12	2 188	220	19
7	33000	Manuf. of wood products, incl. furnit	14	-	-	1	107	28	1 866	29
8	34000	Manuf. of paper, printing, publishing	153	6	12	28	2 217	169	299	7 369
9	35000	Chemical and petroleum industries	1 771	3	323	72	1 549	285	538	437
10	36000	Non-metallic mineral products	11	-	-	14	307	6	297	18
11	37000	Basic metal industries	2	-	-	-	13	4	19	14
12	38000	Manuf. of fabricated metal products	2 590	16	536	156	1 698	172	773	351
13	39000	Other manufacturing industries	5	-	1	2	18	18	16	16
14	40000	Electricity, gas and water	804	1	-	26	1 115	122	141	286
15	50000	Construction	1 163	18	21	164	364	91	128	196
16	60099	Wholesale and retail trade	3 688	4	107	44	2 405	919	1 473	1 696
17	63000	Restaurants and hotels	49	1	2	5	95	31	29	64
18	71000	Transport and storage	306	20	500	455	2 364	404	381	1 357
19	72000	Communication	250	6	11	26	484	156	146	327
20	80099	Financing and insurance	409	14	7	18	320	120	115	203
21	83110	Dwellings	-	-	-	-	-	-	-	-
22	83509	Business services	1 570	31	49	275	2 079	670	673	1 641
23	93009	Market services of education, health	440	-	-	-	4	1	1	2
24	94000	Recreational and cultural services	2	-	-	-	4	1	1	16
25	95009	Household services, incl. auto repair	395	12	21	21	557	91	107	246
26	95399	Other producers, excl. government	-	-	-	-	-	-	-	-
27	98099	Producers of government services	96	3	5	11	197	62	59	137
28	**Total (1-27)**		**21 954**	**138**	**1 635**	**1 404**	**63 226**	**5 626**	**7 780**	**14 516**
29	Imports at basic values		7 101	7	193	400	10 879	5 201	4 305	6 831
30	Purchases in Denmark by non-res. households		-	-	-	-	-	-	-	-
31	Commodity taxes, net		- 666	5	28	14	778	74	42	155
32	Value added tax		108	1	5	3	91	22	21	44
33	**Uses at market prices (28-32)**		**28 496**	**151**	**1 861**	**1 821**	**74 975**	**10 923**	**12 149**	**21 547**
34	Other taxes linked to production		- 547	- 116	- 69	254	- 443	- 95	- 113	- 197
35	Compensation of employees		4 535	559	962	583	15 952	4 432	5 489	11 322
36	Gross operating surplus		22 660	562	1 024	6 716	10 729	1 600	1 790	2 809
37	**Gross output at basic values (33-36)**		**55 144**	**1 156**	**3 777**	**9 374**	**101 213**	**16 860**	**19 315**	**35 480**

			Input (cont.)							
			83 110	83 509	93 009	94 000	95 009	95 399	98 099	Imputed bank service charges
1	11000	Agriculture, horticulture etc	-	7	-	1	2	-	411	-
2	12000	Forestry and logging	-	-	-	-	-	-	6	-
3	13000	Fishing	-	-	-	-	-	-	11	-
4	20000	Mining and quarrying	-	-	-	-	-	-	48	-
5	31000	Manuf. of food, beverages, tobacco	2	45	3	25	14	2	2 129	-
6	32000	Textile, clothing, leather industry	-	11	1	6	20	1	176	-
7	33000	Manuf. of wood products, incl. furnit	-	5	-	1	128	-	73	-
8	34000	Manuf. of paper, printing, publishing	50	6 392	63	62	412	206	2 770	-
9	35000	Chemical and petroleum industries	9	120	40	20	560	7	1 485	-
10	36000	Non-metallic mineral products	-	1	-	1	21	-	22	-
11	37000	Basic metal industries	-	-	-	-	12	-	52	-
12	38000	Manuf. of fabricated metal products	1	91	19	132	1 068	9	2 276	-
13	39000	Other manufacturing industries	1	24	2	2	34	1	104	-
14	40000	Electricity, gas and water	79	494	115	79	322	11	1 893	-
15	50000	Construction	12 349	811	96	286	346	15	4 945	-
16	60099	Wholesale and retail trade	13	289	90	118	3 290	14	2 144	-
17	63000	Restaurants and hotels	17	367	13	24	93	11	885	-
18	71000	Transport and storage	30	939	22	57	409	19	4 074	-
19	72000	Communication	88	1 865	64	121	473	57	3 622	-
20	80099	Financing and insurance	645	712	42	53	232	22	318	23 123
21	83110	Dwellings	-	-	-	-	-	-	1 146	-
22	83509	Business services	378	8 821	273	588	2 031	243	7 974	-
23	93009	Market services of education, health	1	13	310	1	3	-	5 821	-
24	94000	Recreational and cultural services	1	561	1	1 189	4	-	402	-
25	95009	Household services, incl. auto repair	1 995	1 008	139	66	750	35	2 656	-
26	95399	Other producers, excl. government	-	-	-	-	-	-	-	-
27	98099	Producers of government services	819	739	27	47	190	24	4 497	-
28	**Total (1-27)**		**16 480**	**23 315**	**1 320**	**2 879**	**10 414**	**678**	**49 941**	**23 123**
29	Imports at basic values		43	1 320	197	311	3 662	47	6 703	-
30	Purchases in Denmark by non-res. households		-	-	-	-	-	-	-	-
31	Commodity taxes, net		743	711	162	28	270	13	1 767	-
32	Value added tax		3 591	195	244	75	118	145	10 356	-
33	**Uses at market prices (28-32)**		**20 857**	**25 541**	**1 923**	**3 294**	**14 464**	**883**	**68 767**	**23 123**
34	Other taxes linked to production		798	- 143	- 191	- 890	- 339	135	816	-
35	Compensation of employees		2 302	22 945	2 676	4 210	10 587	4 703	146 755	-
36	Gross operating surplus		65 964	23 143	6 095	2 463	9 320	291	7 541	- 23 123
37	**Gross output at basic values (33-36)**		**89 922**	**71 485**	**10 503**	**9 077**	**34 032**	**6 012**	**223 879**	-

Table 3.1

35000	36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	
3	-	-	4	-	1	502	9	220	3	1	3	1
-	1	-	6	-	-	31	-	-	-	-	-	2
1	-	-	-	-	-	-	-	25	-	-	-	3
3 404	280	11	15	-	941	471	-	10	-	-	-	4
404	9	2	54	3	9	20	61	3 701	18	7	21	5
71	6	1	91	24	5	50	27	6	35	3	6	6
40	40	22	497	50	2	2 612	12	9	8	1	3	7
695	204	20	1 090	196	181	395	1 828	79	369	143	580	8
3 456	252	57	2 137	158	186	3 065	1 196	110	1 492	67	67	9
139	1 090	38	233	4	3	7 157	24	-	3	1	1	10
15	56	153	1 695	9	1	151	12	-	2	-	-	11
849	429	205	15 277	180	326	6 069	668	24	1 159	146	143	12
24	8	2	147	466	6	171	31	2	17	4	10	13
733	327	223	699	34	1 160	95	992	395	253	162	376	14
211	99	27	549	24	2 292	270	2 151	565	1 345	2 893	637	15
978	623	526	5 156	321	106	4 207	1 393	1 281	1 268	95	137	16
80	21	5	173	8	41	169	215	43	94	40	261	17
1 136	481	85	1 774	115	106	3 485	9 811	74	14 979	377	452	18
407	108	27	878	41	210	856	1 092	217	475	203	1 734	19
252	87	23	578	25	92	470	893	106	351	97	517	20
-	-	-	-	-	-	-	-	-	-	-	-	21
1 748	465	118	3 767	177	900	14 857	4 766	932	2 038	871	5 685	22
3	1	-	6	-	2	6	8	2	3	1	10	23
3	1	-	7	-	2	7	9	12	4	2	11	24
209	68	16	529	24	105	1 335	2 697	330	2 977	256	539	25
-	-	-	-	-	-	-	-	-	-	-	-	26
168	43	11	352	16	87	329	471	83	195	82	513	27
15 032	**4 701**	**1 574**	**35 715**	**1 876**	**6 766**	**46 779**	**28 366**	**8 226**	**27 088**	**5 453**	**11 708**	**28**
16 690	1 942	1 274	27 942	1 315	2 827	8 783	2 583	1 518	20 857	200	525	29
-	-	-	-	-	-	-	-	-	-	-	-	30
117	71	7	325	22	1 081	431	1 108	1 847	805	118	640	31
87	17	4	114	7	27	107	183	29	821	139	2 445	32
31 926	**6 731**	**2 858**	**64 095**	**3 220**	**10 701**	**56 101**	**32 240**	**11 620**	**49 571**	**5 910**	**15 319**	**33**
- 137	- 31	- 16	- 665	- 36	- 46	- 344	913	- 116	- 5 059	- 89	1 374	34
9 852	3 838	1 139	38 038	1 800	3 854	30 252	51 381	6 662	24 286	7 038	23 111	35
7 704	1 919	525	9 466	1 515	8 657	10 349	34 905	2 519	23 776	7 273	- 1 513	36
49 345	**12 457**	**4 507**	**110 935**	**6 501**	**23 166**	**96 359**	**119 439**	**20 685**	**92 575**	**20 132**	**38 290**	**37**

Total	Final demand						Increase in stocks	Exports of goods and services	Total	Total	
	Private consumption	Governm. consump-tion	Gross fixed capital formation								
			Machinery etc.	Transport equip-ment	Con-struction	Agricult. breeding stock					
42 172		-	-	-	-	231	339	9 492	12 971	55 144	1
519	109	-	21	-	-	-	44	464	638	1 156	2
1 558	72	-	-	-	-	-	53	2 094	2 219	3 777	3
5 424	73	-	1	-	-	-	- 70	3 946	3 950	9 374	4
19 608	29 658	-	38	-	-	-	1 194	50 715	81 605	101 213	5
3 013	5 269	-	585	1	-	-	- 119	8 110	13 847	16 860	6
5 550	1 675	-	1 905	4	-	-	- 17	10 199	13 766	19 315	7
25 991	4 691	-	330	-	-	-	- 83	4 551	9 489	35 480	8
19 460	4 686	-	700	-	-	-	- 287	24 786	29 885	49 345	9
9 392	280	-	132	-	-	-	- 600	3 252	3 065	12 457	10
2 213	22	-	74	-	-	-	45	2 154	2 294	4 507	11
35 362	2 625	-	14 639	5 756	-	-	- 684	53 237	75 573	110 935	12
1 133	1 265	-	329	-	-	-	64	3 709	5 368	6 501	13
10 938	11 495	-	-	-	-	-	-	733	12 227	23 166	14
32 059	-	-	-	-	64 299	-	-	-	64 299	96 359	15
32 386	52 282	-	7 232	1 401	-	-	65	26 073	87 053	119 439	16
2 839	17 845	-	-	-	-	-	-	-	17 845	20 685	17
44 214	13 136	-	-	-	-	-	-	35 225	48 361	92 575	18
13 946	6 186	-	-	-	-	-	-	-	6 186	20 132	19
29 844	8 374	-	-	-	-	-	-	72	8 446	38 290	20
1 146	88 776	-	-	-	-	-	-	-	88 776	89 922	21
63 618	3 322	-	1 080	-	2 194	-	-	1 272	7 867	71 485	22
6 640	3 863	-	-	-	-	-	-	-	3 863	10 503	23
2 241	6 664	-	-	-	-	-	- 6	178	6 836	9 077	24
17 186	16 846	-	-	-	-	-	-	-	16 846	34 032	25
-	6 012	-	-	-	-	-	-	-	6 012	6 012	26
9 262	11 931	202 504	-	-	-	-	-	182	214 617	223 879	27
437 715	**300 067**	**202 504**	**27 065**	**7 163**	**66 493**	**231**	**- 62**	**240 444**	**843 904**	**1 281 619**	**28**
133 657	55 271	-	21 064	5 350	-	4	- 294	27 239	108 634	242 291	29
-	- 22 676	-	-	-	-	-	-	22 676	-	-	30
10 698	30 717	-	16	1 073	920	-	- 560	- 6 785	25 381	36 079	31
18 999	51 653	-	1 796	331	7 852	-	-	-	61 632	80 630	32
601 068	**415 032**	**202 504**	**49 942**	**13 916**	**75 265**	**234**	**- 917**	**283 575**	**1 039 551**	**1 640 619**	**33**
- 5 391											
439 262											
246 680											
1 281 619											

3.2 The identities of the table in bookkeeping terms

Balance of values

For each industry it is the case that the value of the goods and services received by an industry calculated in terms of the basic price[9] plus the primary factors (import, indirect taxes, net, plus wages and gross operating surplus) is equal to the value of the goods and services supplied by the industry (column sums equal row sums). The monetary input-output table is, in other words, constructed in such a way that there is a value balance for each industry.

As stated above, supplies can be interpreted as having a counterpart in the form of a supplied or received »physical« commodity. But even though there is a value balance in the input-output table, it cannot be concluded that there will also be a material balance in the table. The transfer from monetary values to the corresponding physical volumes does not in itself secure a balance in the flows of volume. This is due, to among other things, that there is no specific account being taken of the waste quantities which leave the economy nor, to a certain extent, the quantities of natural resources, which flow into the economy. These problems are examined more carefully in chapter 4.

3.3 The commodity balances - basis of the input-output table

2,900 commodity balances

The Danish input-output tables are drawn up on the basis of commodity balances of the final national accounts, with respect to approximately 2,900 goods and services. A commodity balance describes the supply of, and the use of, the commodity or service in question. On the supply side the domestic output in one or more of the 117 industries of the national accounts and the imports are included. On the use side, the commodity or service appear as input in one or more of the 117 industries or as final demand.

Supply equals use

As the name suggests, there is balance, viz. for each of these 2,900 or so goods and services the value of the total supply i.e. domestic production and imports is equal to the value of the total use i.e. inputs in industries and final demand.

An example: rye

As an example, the balance for rye, drawn up at basic prices, is shown in table 3.2 for the year 1990. The supply of rye was DKK 478 million in total. Of this, 471 originated from the agricultural production and DKK 7 million from imports. On the use side, use was broken down into inputs in industries, changes in stocks and exports. The industry for the manufacturing of flour, grain, etc. received, for example, DKK 150 million worth of inputs. Furthermore, there was an increase in stocks of DKK 65 million and exports of DKK 148 million. Thus, the total use of DKK 478 million corresponds to the total supply.

A full description

The 2,900 commodity balances cover all goods and services in the Danish economy. In other words, when adding up the values of the domestic production in the commodity balances, the total value of output, as drawn up in the national accounts, is arrived at. When adding up the import components, the total value of the imports into Denmark is arrived at and so forth. Correspondingly, the total value of all the different components (intermediate consumption, private consumption, government consumption, exports, changes in stocks, gross fixed capital formation, etc.) of the commodity balances can be obtained through a summation.

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[9] In the case of domestic production, the basic price is defined as the amount receivable by the producer from the purchaser for a unit of a commodity produced as output net of product taxes excluding VAT and import and export taxes. In the case of imports, the basic price is defined as c.i.f. (cost, insurance and freight) price plus any duties.

The input-output table

The transition from the commodity balances to the input-output table is based on a number of assumptions regarding market shares and production methods applied in the industries. In *Statistics Denmark, 1986*, a more detailed description of the commodity flow system and the compilation of input-output tables from the commodity flow balances is given.

Table 3.2 **Example of a commodity balance in mill. DKK - Rye 1990**

Supply/Use	Industry	Basic price
		Mill. DKK
Domestic production	Agriculture	471
Imports		7
Total supply		**478**
Use in industry	Agriculture	49
	Manufacturing of flour, grain, etc.	150
	Bakeries	63
	Manufacturing of foodstuffs	3
Changes in stocks		65
Exports		148
Total use		**478**

4. The construction of the physical input-output tables

The principle in the construction of the physical input-output tables follows, by and large, the principle for the construction of the monetary input-output table. The construction is based on the following steps:

- Drawing up of commodity balances in kg
- Supplementary information (resources, recycling, water and emissions)
- Reconciliation of the individual industries' input and output
- Transfer from commodity balances to the input-output table
- Balance entries for residuals

4.1 Drawing up of commodity balances in kg

From DKK to kg

The first step is a conversion of the commodity balances of the national accounts (cf. section 3.3) from DKK to kg. For each of the commodity balances, both the supply side and the use side are thus drawn up in kg. The main sources for the quantitative information are the production statistics, agricultural statistics and the foreign trade statistics compiled by Statistics Denmark.

Production

The compilation of domestic production in kg broken down by industry is thus primarily based on Statistics Denmark's production statistics and agricultural statistics. With respect to the production not directly covered by these statistics (mostly small enterprises, and craftsmanship) a matching with the VAT statistics and special calculations is undertaken in such a way that an output value and product mix are obtained for the total economy. The matching calculations take place according to the same principle as the calculations, which take place for the corresponding values in the commodity balances.

Imports and exports

As far as imports and exports are concerned, information on imported and exported quantities from the foreign trade statistics are used. A scaling is necessary with respect to the threshold items, viz. minor imports and exports values which are not covered by the foreign trade statistics. Again the scaling is undertaken according to the same principles and under the same circumstances as in the national accounts. Hence, the correspondence between values and volumes is sustained.

Conversion from other volume measures to kg

In the case of a number of items in the commodity balances there is no information in the commodity statistics on weight and this is, therefore, estimated in another way. In those cases where alternative quantitative information has been given in, for example, cubic metres, a conversion is made from the density to kg. In other cases, the quantities are estimated on the basis of value and corresponding unit volume price. As there is price and quantitative information available for exports in almost all commodity balances in the foreign trade statistics, the unit volume prices are typically calculated on the basis of the proportionality between the basic price and the weight of the exported item.

The use side

On the use side, it is as a rule only on exported commodities that there is direct statistical quantitative information. However, in the agricultural statistics there is information on agriculture's use of certain commodities and on the consumption of food by private households. Correspondingly, there is information on energy use by industries and households in the energy balances which Statistics Denmark compiles (in quantities and calorific value, PJ) in connection with the input-output tables. In these cases, the direct statistical information is used. But for the bulk of the use items the quantities are determined by allocating the difference between

total supply and the directly-known use (for example, exports) on the basis of the value of the relevant use drawn up at basic prices. By these means, the overall use balances with the overall supply also as far as the quantities are concerned.

Uncertainty

When allocating use on the basis of (basic) values it is assumed that a kg of the relevant goods item has the same price irrespective of the category of use. This is, of course, not always the case, especially since most of the commodity balances cover heterogeneous groups of commodities where there is no such uniformity. Whereas the overall weight of use is thus known with reasonable certainty, there is greater uncertainty concerning the breakdown of use on the different categories.

An example: rye

Table 4.1 shows, for example, the result of the conversion of the commodity balance for rye (cf. section 3.3) from values to quantities. The weight in 1 000 ton of the various supply and use components is listed with the corresponding values. It may be seen that the total supply were 413,000 tonnes of rye, of which 412,000 tonnes were produced in Denmark. On the use side we find, *inter alia*, an export of 219,000 tonnes of rye and an increase in stocks of 35,000 tonnes. If the use of rye in industries is included, the total use becomes 413,000 tonnes and thus the same as the overall supply.

Table 4.1 **Example of a commodity balance in mill. DKK and 1 000 ton - Rye 1990**

Supply/Use	Industry	Basic price	Weight
		Mill. DKK	1 000 ton
Domestic production	Agriculture	471	412
Imports		7	2
Total supply		**478**	**413**
Use in industries	Agriculture	49	42
	Manufacturing of flour, grain, etc.	150	82
	Bakeries	63	34
	Manufacturing of foodstuffs	3	2
Changes in stock		65	35
Exports		148	219
Total use		**478**	**413**

4.2 Supplementary information (resources, recycling, water, waste and emissions)

Resources

The commodity balances of the national accounts provide information on commodities which enter the economic circuit and accordingly the supplies of commodities which take place between industries and between industries and final demand (private consumption, gross capital formation, export, etc.). A number of the commodities have their origin in nature, such as crude oil, natural gas, stone, sand and fish. The commodity balances thus cover a number of exhaustible and renewable resources, but the balances cover only the flows between industries and between industries and final demand. Thus, the commodity balances and national accounts describe the flows of resources *after* the natural resources have entered the economy. To draw up complete physical input-output tables, additional information is needed on the flows of both exhaustible and renewable resources *from the natural environment to the economy* (in relation to figure 2.1, this corresponds to the flows from the bottom left box to the top left box). The resources in question are: fossil energy (oil and natural gas from the North Sea), stone, gravel, clay, etc. and also nature's direct contribution to biomass growth in connection with animal

and vegetable agricultural products, horticultural products, fish and wood. The volume (expressed in kg) of these inputs is, as far as exhaustible resources are concerned (energy, stone, gravel, etc.) determined via the existing energy statistics and raw material statistics. The contribution from Danish nature to biomass growth is calculated as the weight of animal and vegetable products after the deduction of, *inter alia*, the foodstuffs supplied from Danish and foreign industries.

Recycling

The commodity balances do not provide an exhaustive description of the recycling of residuals (such as paper, glass, iron, fly ash and slag) in the industries.[10] The extent of recycling in the industries is instead estimated from reports of, *inter alia*, the Danish Environmental Protection Agency. Since it has not been possible in all cases to find information on recycling in 1990, this is in certain cases calculated on the basis of recycling in other years and inter- or extrapolated, typically with the rate of growth of production in the respective producing industries. As a rule, recycling is only included in the accounts to the extent that »inter-industry« recycling is involved, viz. production of recycling materials in one industry and the use in one or more industries different from the producer. For example, a large proportion of recycling in building and construction is not included, since it takes place internally in the industry. It is thus not the total recycling quantities, which are represented in the physical input-output tables.

Water

Water plays a special role in the physical input-output tables. In the commodity balances and in the monetary input-output table the industries total expenditure on the purchase of water from waterworks is shown. However, in connection with the drawing up of the physical input-output tables, the input of water is, limited to the quantities of water used in products from the manufacturing industry, and which therefore leaves the industry again contained in the commodities produced. Water supplied to production in agriculture, horticulture, forestry and fishery is implicitly included when calculating biomass weight. Additional water consumption, viz. the water which evaporates on the output side or which the industries discharge to the waste water system is not included due to lack of information. Information on water added to products included in the physical input-output tables is, as a rule, obtained from a study of the manufacturing industry's water consumption, (*Miljøstyrelsen, 1994b* and *1994c*).

Specific residuals

The sparse and sporadic information on waste quantities by industry which has been available is, as far as possible, included in drawing up the physical input-output tables. A condition for including waste quantities has, however, been that the waste is not recycled in the same industry, which produced the waste.

Residuals related to energy

Information on waste quantities by industry - or more generally on residuals by industry - has, as stated, been sporadic. In a significant area, it has, however, been possible to quantify residuals by industry, namely in the case of energy related emissions and residuals. Emissions of CO_2 and SO_2 by industry (cf. chapter 7) are converted to the weight of the carbon and sulphur supplied to the industries via energy products and which leave the industries again in connection with air emissions. The quantity of fly ash and slag from energy production is correspondingly recorded in the physical input-output tables.

[10] The list is deficient in the case of the flows which are not connected with economic transactions and do not have a value. However, a significant proportion of recycling is included in the commodity balances e.g. imports and exports of waste products.

By comparing the weight of each individual industries' energy input, on the one hand, with the weight of the carbon and the sulphur emitted to the air, plus, on the other, fly ash and slag weight, other energy related residuals can be calculated. These include, *inter alia*, hydrogen, which leaves industries as part of steam in connection with the combustion of energy. Inaccuracies in the calculation of carbon and sulphur emissions will by definition also be included in this residual calculation.

4.3 Reconciliation of the individual industries' input and output

Total input and output

After the introductory compilation of commodity balances in kg, the total input of commodities and the total output of commodities are calculated for each of the 117 industries in the national accounts.

If all scrapped capital goods are disregarded, it is a requirement for a reliable set of accounts that output from an industry should not be greater than input in the same industry (cf. the description of the principle of the material balance in section 2.2). At the same time, a marked surplus of input in relation to produced output is an indication of large quantities of waste.

Adjustment

For each of the 117 industries it has therefore been assessed whether there is a reasonable balance between input and output, and in most cases where this does not seem to be the case the initial distribution of input and output of commodities and materials is reviewed in order to achieve a more likely input-output proportion for the respective industry.

Subdivisions

The comparison of input and output in the individual industries has been conducted for all commodities as a whole. However, in a number of cases the comparison has also been made on the basis of subdivisions of inputs and outputs according to individual commodities in order to obtain a clearer picture of the material balance. An example of such a subdivision, is the input of energy products on the one hand and the output of energy products and energy related residuals on the other. The input and output have in this case been assessed in isolation from the industries' other inputs and outputs.

Technical information and common sense

Assessment and review at industry level were undertaken, *inter alia*, in the light of information on the technical production conditions in the industries obtained, on the one hand, from different technical reports and, on the other, directly from enterprises. In addition to this, it was necessary, in a large number of cases, to use estimates and common sense considerations.

27-industry division

The industries' input and output were assessed and reviewed for all 117 industries, but as a complete reconciliation at so detailed a level is a very time-consuming process, the final reconciliation was limited to ensure that there is, as a rule, a reasonable relationship between input and output for the individual (117-classification) industries and that there is in all cases a balance at 27-industries level when the balance entry for residuals (cf. section 4.5) is taken into account (the 117- and 27-industries classifications are shown in appendix).

4.4 The transformation from commodity balances to the input-output table

Industry x industry table

The Danish monetary input-output tables are constructed from the commodity balances as industry x industry tables with the aid of various assumptions on the industries' market shares and production methods (industry-technology assumption). The physical input-output tables are constructed in just the same way. Only when the same methods and the same assumptions are used is it possible to achieve the greatest possible comparability and consistency between the monetary and the physical input-output table.

In *Statistics Denmark, 1986*, a detailed description of the transformation from commodity balances to input-output tables is given.

4.5 Balance entry for residuals

Interpretation of »other residuals«

As stated above, information on residuals by industry are, as far as possible, obtained directly on the basis of published material and by calculating energy related emissions by industries. In addition, the difference between an industry's total input (natural resource extraction, commodities, recycling materials and water supplied to products) on the one hand and the industry's output (commodities and known industry allocated residuals) on the other, must be interpreted as other residuals which ultimately leave the industry. In other words, the industries' other residuals can be calculated as the balance entry between input and known output.

Sub-groups

In a number of cases, it is possible to form an impression of the nature of these other residuals by looking at the input and output of sub-groups of commodities. This applies, for example, in the case of commodities used for packaging, for which a special physical input-output table is drawn up. This has made it possible to separate the residuals stemming from packaging from other residuals.

The concept of residuals

Note must be made of the fact that calculation of industries' residuals in this way gives a very broad residual concept, since, for example, evaporation of water contained in products also will be included in the industries' residuals. The residuals contain the quantities of unwanted waste and other customary residuals, on which attention is normally focused, but the residuals are consequently not restricted to just these items.

4.6 Uncertainty

Production

The figures presented here are naturally associated with a good deal of uncertainty, but the margins of uncertainty vary. If we look at total production and the production by industry, then the figures to a great extent are based on the direct quantitative information of the production statistics, foreign trade statistics and agricultural statistics. The figures are thus close to the primary statistics and may thus be presumed to be of a reasonably high quality. If we look at total use, this is by definition equal to total supply and it follows that this figure is correspondingly reliable.

Use

The use by the different industries is to a great extent based on a conversion from values to quantities on the basis of unit prices (cf. section 4.1). Since it has only been possible, to a limited extent, to take account of varying unit prices, a certain source of uncertainty naturally lies herein. In this connection, however, it should be noted that, as a result of the principle of the material balance (cf. section 2.2), it has been possible to determine the overall input of the individual industries with a reasonable degree of certainty.

Residuals

The account and distribution of energy related residuals are also determined on the basis of the statistical information on the use of energy, and may therefore be presumed to be associated with a reasonably high degree of reliability. The account of other residuals is closely linked to the account of inputs in the industries and with corresponding levels of uncertainty.

5. The physical input-output tables

This chapter contains the physical input-output tables: on the one hand the general table for all flows of commodities and on the other tables for different groups of commodities. Each of the physical input-output tables is supplemented by some comments highlighting the characteristic features in the table and clarify how to »read« and interpret the tables.

5.1 Overview of the physical input-output tables

Commodities

Physical input-output tables have been constructed for the following groups of commodities:

Table 5.1.a	All commodities (all 2,940 commodities/national accounts numbers[11])
Table 5.2.a	Animal and vegetable products (332 selected commodities)
Table 5.3.a	Stone, gravel and building materials, etc. (101 selected commodities)
Table 5.4.a	Energy, weight (1 000 ton) (24 selected commodities)
Table 5.5.a	Energy, calorific value (PJ) (24 selected commodities). Corresponds to table 5.4.a but with the quantities converted to calorific value content.
Table 5.6.a	Metals, machinery, apparatus and transport equipment, etc. (861 selected commodities)
Table 5.7.a	Chemical products and fertilisers (290 selected commodities)
Table 5.8.a	Plastic and plastic manufactures (79 selected commodities)
Table 5.9.a	Wood, paper and commodities thereof (114 selected commodities)
Table 5.10.a	Other commodities (1,139 other commodities). Includes glass and textile commodities, amongst others.

Tables 5.2.a-5.4.a and 5.6.a-5.10.a may be regarded as a subdivision of table 5.1.a in related commodity groups. By a simple cell-wise addition of the sub-tables, table 5.1.a can be obtained.

[11] The 2,940 commodities in the national accounts also include services. In this context, services are perceived as commodities with no weight.

Transverse categories of goods and materials

As examples of how physical input-output tables can be constructed for transverse commodities categories and for materials instead of commodities, an input-output table showing supply and use of packaging and an input-output table for flows of nitrogen contained in products has been constructed.

Table 5.11.a Packaging
(30 types of packaging)

Table 5.12.a Nitrogen content of commodities
(nitrogen content of 812 commodities)

Tables for imports

In the said (a-) tables, flows of commodities from abroad collectively appear as total imports. In order to clarify the volume and composition of the imports, each (a-) table is followed by a (b-) table, which shows the imports by supplying foreign industry and receiving Danish industry or final demand. The foreign industries are classified in the same way as the Danish industries (27 industry main groups, cf. appendix). Everyone of the 12 (a-) tables is thus succeeded by a (b-) table showing imports distributed across industries.

5.2 General points concerning the interpretation of the tables

This section describes the physical input-output tables' general construction in relation to table 4.1.a. The other physical input-output tables are, by and large, constructed in a corresponding way, although there may be minor deviations in the construction of individual tables.

Rows

The first 27 rows show each of the 27 main industry groups' physical output (1000 ton), viz. how much was supplied by the industry in the form of commodities to other industries and final demand and how many residuals were created by the industry. *Row 28* contains the corresponding information for the 27 industries collectively. *Row 29* contains the weight of the commodities which were imported into Denmark. *Row 30* contains the weight of the resources which were extracted from Danish nature and brought into the Danish economy. It includes nature's contribution to biomass growth in agriculture, horticulture, forestry and fishery, extraction of gravel, stone and clay and crude oil and natural gas from the North Sea. *Row 31* gives the weight of (some of) the materials which were recycled (cf. section 4.2), while the weight of water supplied to products in manufacturing is in *row 32*. *Row 33* is a row which shows the weight of the residuals from the households. Finally, *row 34* contains the sum of the other rows. The figures in this row may be interpreted as the total weight of materials which go into the economy or nature viewed from the origin side, viz. resource extraction, output from industries, imported commodities, residuals from households and recycled materials and water supplied to products.

Columns

The columns are divided into three categories: intermediate consumption in the industries, final demand and residuals. The columns for *input into industry* show, for each of the 27 main industry groups, the weight of the commodities, natural resources, recycled materials and water for products which are received by the relevant industry. The columns for *final demand* show the corresponding weight of all commodities which go into the relevant category being either private consumption, gross capital formation (buildings and construction, machinery and transport equipment), changes in stocks or exports. Note that in the physical input-output table no allowance is made for government consumption (in contrast with the monetary input-output table, table 3.1). The reason for this being that all commodities which have been used for government consumption instead are shown as

input in industry 98099 Producers of government services, while government consumption (as output) is regarded as a service with no weight.

The columns for *residuals*[12] includes three columns for energy related residuals, one for construction waste, one for packaging, one for specific quantities of waste and finally one for other residuals. The three energy related types of residuals consist of carbon, sulphur and other energy related residuals, which are produced when energy is burned (cf. also section 4.2). Packaging residuals correspond to the (net) purchase of packaging (cf. section 5.3.11). Specific quantities of waste comprise concrete dust, furnace slag, iron scales, hardened rockwool, tile seconds and hard-core, which are not recycled (cf. section 5.3.3). Other residuals comprise all other materials and substances which in one way or another have been available in surplus quantity in production by the industry (and consumption by households). In the case of industries the quantity of these substances corresponds to the total input in industries shown in row 34 less all supplies from the industry to other industries (the column for input in industries in total), supplies for final demand (the column for final demand in total) and residuals counted for in the columns for energy related residuals, building waste, packaging and specific waste quantities. In the case of households/private consumption, the calculation is a corresponding one, cf. also section 4.5.

Uncertainty

When calculating other residuals in this way, attention naturally needs to be paid to the fact that the residual figures also are influenced by any uncertainties contained in the main figures from which they are calculated. To the extent, for example, that input in an industry is overestimated, other residuals will be as well, and if an industry's energy related residuals are underestimated, other residuals will be correspondingly overestimated.

Interpretation of residuals

The residuals in the tables for sub-groups of commodities and materials (tables 5.2.a-5.4.a and 5.6.a-5.10.a) have a special interpretation, since they do not necessarily reflect an actual material surplus but, by contrast, may include materials being used to manufacture commodities, which do not coincide with the relevant sub-group.

Residuals as inputs

As an example, there is a positive residual in the industry for timber processing and wooden furniture manufacture in the physical input-output table for wood and wood products (table 5.9.a), but this is due, *inter alia*, to wood being part of certain commodities which are not included in the table. Hence, wood waste is included in the energy table (table 5.4.a) whereas, for example, wooden handles are included in the table for metal and metal products (table 5.6.a). There are therefore a number of cases where the residuals are smaller when all the commodities are viewed collectively than when the residuals are looked at for sub-groups of commodities.

Negative residuals

Correspondingly, there are cases where the residuals in the tables for sub-groups of commodities are negative. This reflects the fact that a part of the intermediate consumption in the production of the commodities covered by the relevant table, is included in other tables.

Balance

For all industries and for private consumption/households *input is equal to output*, and column totals are equal to corresponding row totals.

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[12] In relation to the environmental/economic circuit described in section 2.1, residuals comprise of flows of waste but in a number of cases what is also involved is residual products which are deposited, processed or recycled. Thus the point in time when the residuals are channelled from economy to nature is postponed.

Services

Some of the rows consist exclusively of zeros. This is due to the fact that the industry only supplies services and not »physical« goods. The wholesale and retail industry are particularly worth noting. The input-output table is constructed in such a way that a goods item which is delivered from a factory to a wholesale undertaking and thence on to a retail undertaking, finally ending up with the ultimate recipient (industry or final demand), is entered as a supply from the producer to the final recipient. In the monetary input-output table (table 3.1), trade margins are entered in the row for wholesale and retail margins, but there is naturally no counterpart in volume terms to the margins. Nevertheless, when positive quantities still appear in the row for wholesale and retail trade margins, this ties in with the fact that trade in scrap iron appears, technically, in both the monetary and the physical input-output tables as a supply from the wholesale and retail industry (cf. section 5.3.6).

Even if the service industries do not, as a rule, have any physical output and accordingly have zeros in the rows, this is not the case for the corresponding columns, since service-providing industries consume, for example, petrol for cars, packaging, etc. We thus have industries which have physical input but no physical output apart from residuals.

Imports

In the physical input-output tables (a-tables), imports are shown as one row (row 29). To give a more succinct presentation of the imports more clearly, each of the physical input-output tables, as stated earlier, is supplemented by a (b-) table which shows the imports distributed by the supplying foreign industries. The foreign industries are categorised in the same way as the Danish industries. In the imports tables' text column the supplying foreign industries are shown while the receiving Danish industry or final demand category is given in the table heading. Columns for residuals are not given as in the (b-) tables, since imported commodities, in all cases, are entered as inputs in a Danish industry or in a final demand category.

The column sums in the (b-) tables correspond for each industry/final demand to the corresponding figures in row 29 in the input-output tables.

Addition of (a-) and (b-) tables

Moreover, by a suitable element-by-element addition of an import table and the corresponding physical input-output table, an input-output table can be compiled, which shows total input in the Danish industries and final demand distributed by supplying Danish and foreign industry.

5.3 The individual physical input-output tables

The following 12 sub-sections contain the 12 different physical input-output tables with the accompanying import tables.

Summary table

The individual sub-sections begin with a presentation of a summary table (c-table) which shows the total flow of materials into the economy and the total flow of materials, which are either accumulated in the economy or flow out of the economy. In contrast to the actual physical input-output tables, summary tables do not contain any information on the inter-industry flows of materials in the economy.

Total flow of commodities

As a result of the fact that the same materials can be incorporated in several different commodities if, for example, a commodity is used for the production of another commodity, the volume of the total flows of commodities in the physical input-output tables will be larger than the volume of the total flows of commodities in the summary (c-) tables.

In connection with the tables in the following sections, there are short introductory comments highlighting the heaviest flows of commodities, the book-keeping identities, and whatever special considerations there may be regarding the commodity groups and the tables.

5.3.1 All commodities

2,940 commodities

The tables in this section cover the flows of the 2,940 different commodities.[13] Accordingly, all commodities included in the national accounts are covered.

Consistency

The general input-output table in which all commodities are included ensures that the description of the flows of commodities is consistent in the sense that there is generally a material balance for the economy as a whole and for the individual industries. Only by considering all commodities collectively can this be ensured when reconciling physical input-output tables.

Supply

The general material balance for the Danish economy is shown in table 5.1.c. It is apparent from this that the total flow of material from the environment to the Danish economy amounted to 123.6 million tonnes. Of this just over 64%, or 79.6 million tonnes, came from Danish nature in the form of oil, natural gas, stone, gravel, clay, etc. plus biomass growth. 38.3 million tonnes of commodities were imported while 2.4 million tonnes and 3.3 million tonnes were recycled residuals and water supplied to products. Note that the statement of recycling and water only covers a part of total recycling and water consumption (cf. section 4.2). In the case of especially water, only a very small proportion of the total water consumption is covered.

Use

On the use side, the biggest item is accumulation via gross capital formation (mainly building and construction) amounting to 58.7 million tonnes. Exports represented 25.2 million tonnes while the economy's material surplus in the form of residuals was 42.8 million tonnes.

Imports and exports

If imports and exports are compared, it may be seen that the flows of commodities to Denmark weighed 13.1 million tonnes, viz. just over 50% more than the flows of commodities from Denmark.

Table 5.1.c **General material balance for the Danish economy - All commodities 1990**

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	38.3	Exports	25.2
Danish resources	79.6	Accumulation	58.7
Water added to products	2.4	Changes in stocks	-3.1
Recycling of residuals [1)]	3.3	Residuals	42.8
Total	**123.6**	**Total**	**123.6**

[1)] Includes only recycling not included elsewhere as a commodity flow within the economy, (cf. section 4.2).

Inter-industry flows

Table 5.1.a completes the picture of the flows of commodities since inter-industry flows are also included here. The table shows that 93.7 million tonnes of Danish-produced commodities were supplied for intermediate consumption between industries.

[13] Cf. footnote 11 on page 26.

Output from industries

From the mining and quarrying industry, 41.6 million tonnes of intermediate consumption materials were supplied. The industry thus accounted for over 40% by weight of total Danish supplies of materials for intermediate consumption.

The supply of 4.7 million tonnes of intermediate consumption materials from the industry for mining and quarrying to the industry for the chemical and petroleum products industry consisted primarily of crude oil and natural gas from the North Sea supplied to oil refineries.

The large supplies from mining and quarrying consisted, moreover, of gravel, stone and clay etc. for the non-metallic mineral products industry (9.8 million tonnes) and construction industry (21.5 million tonnes).

The counterpart to the large input for the non-metallic mineral products industry is that this industry supplied a substantial volume to, *inter alia*, the construction industry (10.6 million tonnes). All in all, the non-metallic mineral products industry supplied 13.1 million tonnes of materials for intermediate consumption.

The industry for chemical and petroleum products supplied a total of 7.4 million tonnes of intermediate consumption materials to the industries. Among the intermediate consumption materials produced were asphalt, refined oil products and chemicals.

Supplies of intermediate consumption materials from agriculture and horticulture, etc. and the food products, beverages and tobacco industry were also very significant measured by weight, since these flows of commodities represented respectively 15.3 million tonnes and 9.1 million tonnes. It is evident from table 5.1.a that the supplies from the food products, beverages and tobacco industry went mainly to agriculture and to the industry itself. The major internal supplies were due, *inter alia*, to the comparatively high degree of aggregation, which means that the industry comprises many different types of manufacturing industries which make use of each other's products.

Input into the industries

If the industries' total intermediate consumption is considered (»input total« column), it is apparent that the total input of 213.7 million tonnes breaks down into 93.7 million tonnes of commodities supplied from Danish industries, 34.7 million tonnes of imported commodities, 79.6 tonnes extracted from Danish nature, 2.4 tonnes of recycled residuals and 3.3 million tonnes of water added to products (note that water consumption only comprises water, which is added to finished products and thus excludes water used, for example, for cooling purposes or water used for irrigation).

The construction industry was the greatest consumer of intermediate consumption materials with a total of 58.7 million tonnes. Of this, 35.8 million were supplied from Danish industries, 2.5 million tonnes were imported, 20.5 million tonnes were extracted by the industry itself (stone, gravel and clay), while 0.5 million ton were in the form of recycled materials.

Other major consumers of intermediate consumption materials were agriculture and horticulture etc. (25.5 million tonnes), mining and quarrying (45.7 million tonnes), the food products, beverages and tobacco industry (23.6 million tonnes) and the industry for chemical and petroleum products (14.5 million tonnes).

Table 5.1.a Physical input-output table 1990 - All commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc.	2 713	0	0	0	12 071	6	37	0	0
2 12000 Forestry and logging	3	-	-	-	1	-	976	15	0
3 13000 Fishing	75	-	0	-	1 226	-	-	-	0
4 20000 Mining and quarrying	1 712	-	0	1 646	148	48	0	14	4 722
5 31000 Manuf. of food, beverages, tobacco	3 465	0	37	0	4 717	22	42	8	109
6 32000 Textile, clothing, leather industry	0	0	0	0	0	24	7	1	1
7 33000 Manuf. of wood products, incl. furnit.	4	0	0	0	43	2	467	7	9
8 34000 Manuf. of paper, printing, publishing	7	0	0	1	215	10	26	324	42
9 35000 Chemical and petroleum industries	952	1	176	70	381	33	53	64	819
10 36000 Non-metallic mineral products	203	0	0	85	163	3	27	8	250
11 37000 Basic metal industries	0	-	-	-	1	0	2	0	1
12 38000 Manuf. of fabricated metal products	0	0	0	0	51	1	23	1	13
13 39000 Other manufacturing industries	0	0	0	0	2	0	1	0	1
14 40000 Electricity, gas and water	50	0	-	0	170	23	1	54	67
15 50000 Construction	20	0	1	0	8	2	3	5	4
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	0	2
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**9 205**	**2**	**214**	**1 802**	**19 197**	**175**	**1 665**	**502**	**6 040**
29 Imports	3 897	1	102	220	1 902	187	1 036	1 070	8 003
30 Danish resource extraction etc.	12 426	1 519	1 449	43 674	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	409	249
32 Water added to products	-	-	-	-	2 476	61	6	16	214
33 Households									
34 Total	**25 528**	**1 521**	**1 766**	**45 696**	**23 576**	**423**	**2 707**	**1 997**	**14 506**

	Input						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc.	0	0	0	0	40	15 279	1 156	30
2 12000 Forestry and logging	-	-	-	-	1	1 060	143	19
3 13000 Fishing	-	-	-	-	4	1 314	12	-
4 20000 Mining and quarrying	-	-	-	-	288	41 611	699	-
5 31000 Manuf. of food, beverages, tobacco	1	7	2	0	249	9 158	2 954	0
6 32000 Textile, clothing, leather industry	0	0	1	0	2	44	155	9
7 33000 Manuf. of wood products, incl. furnit.	0	0	10	0	3	958	274	288
8 34000 Manuf. of paper, printing, publishing	1	1	15	1	63	985	258	4
9 35000 Chemical and petroleum industries	12	5	93	1	203	7 407	1 745	13
10 36000 Non-metallic mineral products	0	0	1	0	6	13 090	29	2
11 37000 Basic metal industries	-	-	0	-	1	268	1	2
12 38000 Manuf. of fabricated metal products	0	0	13	0	4	956	51	458
13 39000 Other manufacturing industries	0	0	2	0	1	20	15	9
14 40000 Electricity, gas and water	1	1	3	0	43	939	483	-
15 50000 Construction	2	7	8	0	55	580	-	57 652
16 60099 Wholesale and retail trade	-	-	-	-	-	42	-	- 266
17 63000 Restaurants and hotels	-	-	-	-	-	-	645	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	0	-	-	-	0	0	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	1	-	-	0	1	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	322	-
28 Total (1-27)	**18**	**23**	**147**	**3**	**964**	**93 712**	**8 942**	**58 220**
29 Imports	8	5	114	1	438	34 683	2 157	489
30 Danish resource extraction etc.	-	-	-	-	-	79 558	-	-
31 Materials recycled	-	-	-	-	-	2 368	-	-
32 Water added to products	-	-	-	-	-	3 329	-	-
33 Households								
34 Total	**26**	**28**	**261**	**4**	**1 402**	**213 650**	**11 099**	**58 709**

Table 5.1.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
0	0	0	0	324	0	0	85	0	0	0	0	0	1
3	0	11	1	-	50	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	9	-	-	-	-	-	3
9 797	105	71	-	1 517	21 543	-	1	-	-	-	-	-	4
2	0	11	2	2	2	10	454	3	1	4	0	8	5
0	0	2	0	0	2	1	0	1	0	0	0	0	6
10	2	120	5	0	269	2	0	1	0	1	0	1	7
17	1	78	13	4	11	87	1	6	2	7	1	50	8
219	31	225	11	258	2 477	306	24	911	32	19	4	28	9
1 660	41	30	0	0	10 607	6	0	0	0	0	0	0	10
11	23	209	1	-	18	0	-	0	-	-	-	0	11
14	6	589	4	0	225	11	0	1	0	0	0	1	12
0	0	4	4	0	3	0	0	0	0	0	0	0	13
110	37	38	1	306	3	11	6	2	2	4	1	5	14
2	1	13	1	7	7	54	14	17	3	16	311	20	15
-	39	1	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
11 845	**287**	**1 401**	**43**	**2 417**	**35 217**	**489**	**593**	**941**	**41**	**51**	**316**	**114**	**28**
1 912	305	2 051	74	9 367	2 509	244	132	1 018	19	18	3	47	29
-	-	-	-	-	20 490	-	-	-	-	-	-	-	30
622	547	-	-	-	541	-	-	-	-	-	-	-	31
514	-	-	-	42	-	-	-	-	-	-	-	-	32
													33
14 893	**1 139**	**3 451**	**117**	**11 826**	**58 757**	**733**	**724**	**1 959**	**60**	**69**	**319**	**161**	**34**

demand			Residuals etc.								Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Construc-tion, repairs	Packaging	Specific waste	Others	Total		
510	4 297	5 992	454	2	108	20	10	-	3 663	4 257	25 528	1
4	294	459	2	0	0	0	0	-	0	2	1 521	2
18	157	186	218	3	35	1	4	-	6	265	1 766	3
-1 868	5 126	3 957	93	1	25	0	1	-	8	128	45 696	4
204	3 864	7 023	615	4	127	8	397	-	6 244	7 395	23 576	5
- 2	110	272	39	0	11	2	13	-	43	107	423	6
-	830	1 392	162	0	161	3	21	-	10	357	2 707	7
- 8	548	802	124	1	42	5	8	-	30	210	1 997	8
77	4 311	6 145	215	1	399	4	69	-	266	954	14 506	9
- 886	1 596	741	532	5	185	2	20	175	143	1 062	14 893	10
10	486	499	37	0	14	1	2	127	190	372	1 139	11
- 208	1 315	1 617	141	0	34	13	107	35	547	878	3 451	12
0	50	75	4	0	1	1	7	-	10	23	117	13
14	-	496	6 671	62	3 639	7	0	-	12	10 391	11 826	14
-	-	57 652	234	1	40	7	3	-	241	525	58 757	15
- 9	233	- 42	356	1	61	54	118	-	144	733	733	16
-	-	645	26	0	7	14	1	-	32	79	724	17
-	-	-	1 591	8	271	17	1	-	72	1 959	1 959	18
-	-	-	40	0	7	3	0	-	9	60	60	19
-	-	-	24	0	5	16	1	-	23	69	69	20
-	-	-	5	0	1	311	0	-	2	319	319	21
-	4	4	33	0	7	20	1	-	95	157	161	22
-	-	-	15	0	3	2	0	-	6	26	26	23
-	0	0	7	0	1	7	0	-	11	27	28	24
-	-	-	83	0	14	8	12	-	144	261	261	25
-	-	-	1	0	0	0	0	-	3	4	4	26
-	-	322	235	1	50	55	21	-	717	1 080	1 402	27
-2 144	**23 220**	**88 238**	**11 956**	**90**	**5 248**	**580**	**817**	**337**	**12 671**	**31 699**	**213 650**	**28**
- 952	1 935	3 630									38 312	29
-	-	-									79 558	30
-	-	-									2 368	31
-	-	-									3 329	32
			2 728	2	979				7 390	11 099	11 099	33
-3 096	**25 156**	**91 868**	**14 684**	**93**	**6 227**	**580**	**817**	**337**	**20 061**	**42 799**	**348 317**	**34**

Table 5.1.b Imports by industries 1990 - All commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	48	0	0	0	165	6	0	0	2
2 12000 Forestry and logging	0	-	-	-	0	-	191	2	0
3 13000 Fishing	3	-	1	-	216	-	-	-	3
4 20000 Mining and quarrying	165	-	0	185	255	11	0	64	4 622
5 31000 Manuf. of food, beverages, tobacco	2 503	0	14	1	957	16	13	25	243
6 32000 Textile, clothing, leather industry	0	0	0	0	1	77	8	1	18
7 33000 Manuf. of wood products, incl. furnit	1	0	0	0	11	2	708	143	6
8 34000 Manuf. of paper, printing, publishing	1	0	0	0	46	6	29	772	21
9 35000 Chemical and petroleum industries	1 170	1	88	22	175	63	43	52	2 944
10 36000 Non-metallic mineral products	4	0	0	10	39	1	10	5	57
11 37000 Basic metal industries	0	-	-	0	5	0	10	1	5
12 38000 Manuf. of fabricated metal products	0	0	0	0	24	5	23	5	24
13 39000 Other manufacturing industries	0	0	0	0	0	1	0	1	55
14 40000 Electricity, gas and water	-	-	-	1	7	-	0	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	2
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**3 897**	**1**	**102**	**220**	**1 902**	**187**	**1 036**	**1 070**	**8 003**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	0	0	0	0	14	256	206	0
2 12000 Forestry and logging	-	-	-	-	0	202	11	17
3 13000 Fishing	-	-	-	-	2	231	10	-
4 20000 Mining and quarrying	-	-	-	-	136	16 913	45	-
5 31000 Manuf. of food, beverages, tobacco	0	1	1	0	34	4 023	544	0
6 32000 Textile, clothing, leather industry	0	0	0	0	4	130	77	9
7 33000 Manuf. of wood products, incl. furnit	0	0	3	0	2	1 429	41	48
8 34000 Manuf. of paper, printing, publishing	1	1	3	0	51	1 087	33	0
9 35000 Chemical and petroleum industries	7	3	59	1	159	7 050	983	10
10 36000 Non-metallic mineral products	0	0	3	0	13	842	33	8
11 37000 Basic metal industries	-	-	2	-	3	1 010	1	1
12 38000 Manuf. of fabricated metal products	0	1	43	0	18	1 350	150	394
13 39000 Other manufacturing industries	0	0	1	0	2	81	15	3
14 40000 Electricity, gas and water	-	-	-	-	-	42	7	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	37	-2	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	0	-	-	0	0	0	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	0	0	-	0	0	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**8**	**5**	**114**	**1**	**438**	**34 683**	**2 157**	**489**

Table 5.1.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
0	0	1	0	0	0	0	18	0	0	0	0	0	1
0	0	2	0	-	7	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	6	-	-	-	-	-	3
856	19	11	1	9 331	1 257	-	0	-	-	-	-	-	4
95	1	19	1	0	2	3	90	1	0	1	0	2	5
1	0	5	3	0	8	2	0	1	0	0	0	0	6
19	1	59	21	1	434	7	0	2	1	2	0	5	7
20	0	17	10	2	28	44	1	4	1	4	0	22	8
548	12	217	22	32	200	172	14	1 004	16	10	2	16	9
290	18	17	0	0	373	2	0	0	0	0	0	0	10
22	100	818	4	-	37	1	-	0	-	0	-	-	11
24	116	879	7	0	158	13	0	6	0	0	0	2	12
9	0	3	5	0	3	0	0	0	0	0	0	0	13
28	4	1	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	35	0	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
1 912	**305**	**2 051**	**74**	**9 367**	**2 509**	**244**	**132**	**1 018**	**19**	**18**	**3**	**47**	**28**

demand			Total	
Changes in stocks	Exports	Total		
- 19	42	230	485	1
- 1	2	29	231	2
15	58	83	313	3
- 379	173	- 160	16 753	4
- 48	284	780	4 803	5
- 4	27	110	240	6
- 43	70	116	1 545	7
5	42	81	1 167	8
- 348	779	1 423	8 474	9
- 64	73	49	891	10
1	98	101	1 111	11
- 49	276	771	2 120	12
- 9	4	13	94	13
- 6	1	2	43	14
-	-	-	-	15
- 1	5	3	39	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	1	1	1	22
-	-	-	-	23
-	0	0	0	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 952	**1 935**	**3 630**	**38 312**	**28**

In the case of the primary industries agriculture, horticulture, forestry and logging, fishing and mining and quarrying, the table shows that a very large part - or the bulk - of the input into the industries comes directly from nature. For example, 12.4 million tonnes out of a total input of 25.5 million tonnes came from nature for agriculture and horticulture, etc. and 43.7 million tonnes out of 45.7 million tonnes for mining and quarrying.

For final demand

Commodities supplied for final demand (viz. for private consumption, gross capital formation, changes in stocks and exports) weighed a total of 91.9 million tonnes. The bulk, 88.2 million tonnes came from Danish production, and of this 57.7 million tonnes were materials supplied from the construction industry to gross capital formation. If this large individual item is disregarded, the final demand of other Danish commodities can be put at 30.6 million tonnes. 23.2 million tonnes were exported, 8.9 million tonnes were supplied to private consumption and 2.1 million tonnes were drawn from stocks.

Exports

As far as exports were concerned, it was supplies from mining and quarrying (primarily oil and natural gas), the food products, beverages and tobacco industry and the chemical and petroleum products industry (primarily refined oil products), which were the most significant in terms of weight.

Private consumption

In the case of private consumption, commodities from agriculture and horticulture etc., the food products, beverages and tobacco industry and the chemical and petroleum products industry (primarily refined oil products) dominated the picture.

Imports

Imported commodities (row 29) for private consumption weighed 2.2 million tonnes in all. This corresponds to roughly 20% of total private consumption.

Gross capital formation

If supplies of building and construction materials are disregarded as far as gross capital formation are concerned, barely half the gross capital formation came from abroad in terms of weight.

Residuals

Residuals from the industries weighed a total of 31.7 million tonnes. Of these, more than half were energy related. Building waste amounted to 0.6 million ton, packaging 0.8 million ton and specific waste quantities (cf. section 4.2) to 0.3 million tonnes. Other residuals (section 4.5) were recorded at 12.7 million tonnes.

Looking at the distribution of residuals by industry it is evident that the largest contributors were the electricity, gas and water industry with 10.4 million tonnes or barely one-third of the total residuals. 6.7 million tonnes of this industry's residuals consisted of carbon, which was discharged into the air in connection with CO_2 emissions.

Among other industries with large residuals, mention may be made of agriculture and horticulture etc. and the food products, beverages and tobacco industry. As far as the industry for agriculture, horticulture etc. is concerned, the residuals originated primarily from the use of agricultural lime (cf. section 5.3.3) and chemicals and fertilisers (section 5.3.7). As far as the food products, beverages and tobacco industry is concerned, the residuals mainly came from the animal and vegetable raw materials used in the industry (cf. section 5.3.2).

The transport and storage industry had residuals in the region of 2.0 million tonnes, the bulk of which was represented by energy related residuals. As far as this industry is concerned - as in the case of all other service industries - the only physical output is precisely the residuals.

In the case of households (row 33), the residuals correspond by definition to the total commodity input for private consumption, viz. 11.1 million tonnes. Of this, one-third is made up of energy related residuals. If we look at the column for commodities supplied for private consumption, it may immediately be concluded that the bulk of the residuals from households comes from commodities supplied by agriculture, horticulture etc. and the food products, beverages and tobacco industry.

Detailed imports

Table 5.1.b shows the import of commodities broken down by supplying foreign industry (first column text) and the receiving Danish industry (table heading). Row 28 in this table is identical to row 29 in table 5.1.a.

Of the total imports into Denmark amounting to 38.3 million tonnes, 16.8 million tonnes, or just 44%, were supplied from foreign mining and quarrying industry (primarily energy products), 8.5 million tonnes or just over 20% from foreign industry for chemical and petroleum products (refined energy products and other chemical products). 4.8 million tonnes were supplied from the foreign food products, beverages and tobacco industry.

5.3.2 Animal and vegetable products

332 commodities

The tables cover 332 selected animal and vegetable products. The products are, *inter alia*, live animals, fresh meat, preserved meat, sausages, fresh and prepared fish, natural milk, milk products, fresh and preserved vegetables, fruits, nuts, flowers, coffee, tea, cocoa, confectionery, spice oils, pasta products, edible ice, beer, soda water, wine, spirits, sugar beet refuse, animal foodstuffs, tobacco and tobacco goods. Straw, firewood, wood, wood products, leather and leather ware are not covered by this table - cf. instead sections 5.3.4, 5.3.9 and 5.3.10.

General material balance

The general material balance for the exchange of vegetable and animal products between the economy and the environment is shown in table 5.2.c.

Table 5.2.c

General material balance - Animal and vegetable products 1990

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	5.3	Exports	8.5
Danish resources	12.9	Accumulation	0.0
Water added to products	2.5	Changes in stocks	0.8
		Residuals	11.4
Total	**20.7**	**Total**	**20.7**

Supply

The total flow of materials involving animal and vegetable products from the environment to the Danish economy consisted of 20.7 million tonnes. Of this, 5.3 million tonnes came from the rest of the world as imported commodities and 2.5 million tonnes of water were supplied to products, while there was a net input of 12.9 million tonnes from Danish nature in the form of biomass.

Use

8.5 million tonnes of animal and vegetable products were exported, 0.8 million ton were put into stocks while 11.4 million tonnes ended up as residuals.

Intermediate consumption

From table 5.2.a it may be seen that Danish animal and vegetable products used as intermediate consumption accounted for 25.3 million tonnes. When the weight of intermediate consumption materials exceeds the weight of the materials brought into the Danish economy (and which leave the economy again), according to table 5.2.c, this is associated with the processing of products, and the materials being recorded more than one time i.e. when they enter into the production of different commodities. For example, both live pigs as well as pig meat are counted in table 5.2.a.

Agriculture

Of the 25.3 million tonnes of intermediate consumption materials, agriculture, horticulture, etc. accounted for the production of 14.9 million tonnes and the food products, beverages and tobacco industry for 9 million tonnes. The largest

Food products

recipient of Danish animal and vegetable products as intermediate consumption materials was naturally the food products, beverages and tobacco industry (18 million tonnes).

Agriculture etc. used 6.3 million tonnes or just over 16% of Danish-produced animal and vegetable products. When assessing this figure attention should be paid to the fact that the agricultural products entered in the national accounts and accordingly the physical input-output tables are primarily vegetable and animal products which are sold on the market. This means, for example, that the bulk of the yield, which is used for fodder in agriculture, is not entered.

Private consumption

From table 5.2.a it is also seen that private consumption of vegetable and animal products accounted for a total of 5.3 million tonnes, of which 4.6 million tonnes were supplied from Danish industries while 0.8 million ton were imported. The 5.3 million tonnes are again found in row 33 as waste products from private consumption, since it is assumed that all products used in households end up as residuals.

Restaurants

Government services

Private consumption also receives supplies from restaurants and hotels and from producers of government services. For the physical input-output table, these supplies have been estimated on the basis of the inputs of vegetable and animal products in 63000 restaurants and hotels and 98099 producers of government services. However, an estimated 17 000 tonnes and 8 000 tonnes respectively of food waste have been deducted (estimated on the basis of *Miljøstyrelsen, 1997a*).

Biomass growth

In row 30, (Danish resource extraction etc.), the *net* input from nature is shown for agriculture and horticulture, etc. as well as for fishing. The net input from nature consist of the biomass growth which is not due to purchased vegetable and animal products. It is calculated as the difference between inputs and outputs of animal and vegetable products in the two industries.[14] As a result of this net statement of inputs, there are no residuals from these two industries in connection with the flows of vegetable and animal products. Residuals in the form of plant residues and unused manure are substantial, and note must therefore naturally be made of the fact that a gross listing would result in considerably higher figures (cf. section 6.1). Note also that biomass growth in connection with forestry is not recorded in this table, but instead in table 5.9.a for wood, paper and products thereof.

Water

The input of water as an addition to products in the food products, beverages and tobacco industry is given at 2.5 million tonnes, or just over 11% of the total input in the industry. Water used for the manufacture of *inter alia,* beer and soda water, is contained in the 2.5 million tonnes.

Residuals

The table shows that there were residuals of 5.8 million tonnes from the food products, beverages and tobacco industry. These residuals include, *inter alia*, solid waste, the dry substance content of sludge from slaughterhouses, etc. and, naturally, water content, which evaporates or is removed from products, as in the manufacture of skimmed milk powder, potato flour and sugar.

Detailed imports

From table 5.2.b, which shows imports of vegetable and animal products broken down by supplying foreign industry (first column text) and receiving Danish industry and groups of final demand (table heading), it is apparent that total imports amounted to 5.3 million tonnes and that the industries received the bulk of it. Imports of vegetable and animal products for use in agriculture amounted to 2.6 million tonnes. The bulk was supplied by foreign food products and the beverages and tobacco industry.

[14] The calculation of the net supply from nature taken as the difference between inputs and outputs of animal and vegetable products does not take any account of the fact that a certain part of biomass growth originates, for example, from purchased fertilisers. This, however, is of minor significance in terms of weight.

Table 5.2.a Physical input-output table 1990 - Animal and vegetable products - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	2 713	0	0	0	12 063	0	0	0	0
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	75	-	0	-	1 226	-	-	-	0
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	3 464	0	37	0	4 709	1	1	2	80
6 32000 Textile, clothing, leather industry	0	-	-	-	0	0	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	0	-	-	-	0
8 34000 Manuf. of paper, printing, publishing	0	-	-	-	0	-	-	-	-
9 35000 Chemical and petroleum industries	13	0	0	0	7	0	0	0	2
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	-	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**6 266**	**0**	**37**	**0**	**18 005**	**1**	**1**	**3**	**83**
29 Imports	2 556	0	14	0	1 320	1	2	1	107
30 Danish resource extraction etc	11 526	-	1 449	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	2 476	-	-	-	-
33 Households									
34 Total	**20 348**	**0**	**1 500**	**0**	**21 801**	**2**	**3**	**3**	**190**

	Input						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	0	0	0	0	40	14 903	639	30
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	4	1 314	12	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	1	7	2	0	244	9 037	2 927	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	0	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	0	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	0	-	-
9 35000 Chemical and petroleum industries	0	0	0	0	0	23	10	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	645	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	322	-
28 Total (1-27)	**1**	**7**	**2**	**0**	**288**	**25 279**	**4 555**	**30**
29 Imports	0	1	0	0	41	4 168	750	0
30 Danish resource extraction etc.	-	-	-	-	-	12 975		
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	2 476		
33 Households								
34 Total	**1**	**8**	**3**	**1**	**330**	**44 897**	**5 305**	**30**

Table 5.2.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
0	0	0	0	0	0	0	85	0	0	0	0	0	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	9	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	0	4	2	1	2	10	453	3	1	3	0	7	5
-	-	-	0	-	-	-	-	-	-	-	-	-	**6**
-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
0	0	0	0	0	0	0	0	0	0	0	0	0	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	**16**
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	**26**
-	-	-	-	-	-	-	-	-	-	-	-	-	27
1	**0**	**4**	**2**	**2**	**2**	**11**	**547**	**3**	**1**	**4**	**0**	**8**	**28**
0	0	1	1	0	0	2	116	1	0	1	0	2	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	-	-	-	-	-	-	-	-	-	32
													33
1	**0**	**6**	**2**	**2**	**2**	**13**	**663**	**4**	**1**	**4**	**0**	**9**	**34**

demand			Residuals etc.									Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Construc-tion, repairs	Packaging	Specific waste	Others	Total			
486	4 290	5 446							- 1	- 1		20 348	1
-	-	-							0	0		0	2
18	157	186							-	-		1 500	3
-	-	-							0	0		0	4
220	3 771	6 918							5 846	5 846		21 801	5
-	1	1							1	1		2	**6**
0	0	0							3	3		3	7
0	0	0							3	3		3	8
4	25	39							128	128		190	9
-	-	-							1	1		1	10
-	-	-							0	0		0	11
-	-	-							**6**	**6**		**6**	12
-	-	-							2	2		2	13
-	-	-							2	2		2	14
-	-	-							2	2		2	15
-	-	-							13	13		13	**16**
-	-	645							17	17		663	17
-	-	-							4	4		4	18
-	-	-							1	1		1	19
-	-	-							4	4		4	20
-	-	-							0	0		0	21
-	-	-							9	9		9	22
-	-	-							1	1		1	23
-	-	-							8	8		8	24
-	-	-							3	3		3	25
-	-	-							1	1		1	**26**
-	-	322							8	8		330	27
728	**8 244**	**13 557**							**6 062**	**6 062**		**44 897**	**28**
83	274	1 107										5 275	29
												12 975	30
												-	31
												2 476	32
									5 305	5 305		5 305	33
811	**8 518**	**14 664**							**11 367**	**11 367**		**70 929**	**34**

Table 5.2.b Imports by industries 1990 - Animal and vegetable products - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	48	0	0	0	165	0	0	0	1
2 12000 Forestry and logging	-	-	-	-	-	-	2	-	0
3 13000 Fishing	3	-	1	-	216	-	-	-	3
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	2 502	0	14	0	930	1	0	0	99
6 32000 Textile, clothing, leather industry	-	-	-	-	0	0	-	-	-
7 33000 Manuf. of wood products, incl. furnit..	-	-	-	-	0	-	-	-	0
8 34000 Manuf. of paper, printing, publishing..	0	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	2	0	0	0	9	0	0	0	3
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	-	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair...	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**2 556**	**0**	**14**	**0**	**1 320**	**1**	**2**	**1**	**107**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	0	0	0	0	14	249	206	0
2 12000 Forestry and logging	-	-	-	-	-	2	-	-
3 13000 Fishing	-	-	-	-	2	231	10	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	0	1	0	0	25	3 668	520	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	1	-	-
7 33000 Manuf. of wood products, incl. furnit..	-	-	-	-	-	0	-	-
8 34000 Manuf. of paper, printing, publishing..	-	-	-	-	-	0	-	-
9 35000 Chemical and petroleum industries	0	0	0	0	1	17	15	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair...	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**1**	**0**	**0**	**41**	**4 168**	**750**	**0**

Table 5.2.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
0	0	0	0	0	0	0	18	0	0	0	0	0	1
-	-	0	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	6	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	**4**
0	0	1	0	0	0	1	90	0	0	0	0	1	5
-	-	-	0	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
0	0	0	0	0	0	0	1	0	0	0	0	0	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	**14**
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	**24**
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
0	**0**	**1**	**1**	**0**	**0**	**2**	**116**	**1**	**0**	**1**	**0**	**2**	**28**

demand			Total	
Changes in stocks	Export	Total		
- 20	42	228	477	1
0	0	0	3	2
15	58	83	313	3
-	-	-	-	**4**
86	173	778	4 446	5
-	-	-	1	6
0	-	0	0	7
-	-	-	0	8
2	1	18	35	9
-	-	-	-	10
-	-	-	-	11
-	-	-	-	12
-	-	-	-	13
-	-	-	-	**14**
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	**24**
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
83	**274**	**1 107**	**5 275**	**28**

5.3.3 Stone, gravel and building materials, etc.

101 commodities

The tables cover 101 commodities and groups of commodities from the national accounts, including salt, sulphur, quartz, sand, clay, chalk, marble, gypsum, cement, mortar, concrete, cryolite, iron ore, copper ore, slag from iron and steel production, ash, peat, tar, asphalt, paving stones, bricks and ceramics.

General material balance

The general material balance for the transactions in these materials in the economy and between the economy and the environment is shown in table 5.3.c.

Table 5.3.c

General material balance - Stone, gravel and building materials, etc. 1990

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	4.1	Exports	3.5
Danish resources	55.8	Accumulation	57.7
Water added to products	0.5	Changes in stocks	-3.3
Recycling of residuals	1.4	Residuals	4.0
Total	**61.8**	**Total**	**61.8**

Supply

The total flow of materials from the environment to the Danish economy within this group of commodities amounted to 61.8 million tonnes. On the supply side, extraction from Danish nature of 55.8 million tonnes constituted an entirely dominant share, while imports from the rest of the world amounted to 4.1 million tonnes. Moreover, on the supply side, there are relatively modest material flows of water as an additive to products and a recycling of residuals.

Use

On the use side, an accumulation of 57.7 million tonnes of materials constituted the bulk of the 61.8 million tonnes. Exports were relatively modest. Residuals were also of less significance in terms of weight.

Mining and quarrying

It is shown in the physical input-output table 5.3.a that the extraction from Danish nature totalling 55.8 million tonnes breaks down into 35.3 million tonnes from the industry for mining and quarrying and 20.5 million tonnes from the construction industry. The total mining and quarrying of 55.8 million tonnes are recorded on the basis of statistics by the *Miljøministeriet, 1992* and *Skov- og Naturstyrelsen, 1992*. The 35.2 million tonnes is calculated on the basis of the turnover of the relevant materials, which according to production statistics and the national accounts at *Statistics Denmark* took place in the industry for mining and quarrying. The difference of 20.5 million tonnes is assumed to represent quantities not covered by the latter statistics, including unsold quantities of gravel and stone, which are extracted by enterprises from their own gravel pits, etc.

Intermediate consumption

The physical input-output table for stone, gravel and building materials, etc. shows that 53.2 million tonnes of the Danish-produced gravel, stone and building materials, etc. were used as intermediate consumption and that 4.3 million tonnes were correspondingly imported.

Gross capital formation

Furthermore, it is seen that the extraction of raw materials from nature and the flows of intermediate consumption materials totalling 57.7 million tonnes are finally delivered from the construction industry to gross fixed capital formation.

Output from construction

The 57.7 million tonnes are estimated on the basis of a calculation of output from construction. The estimation of this output is furthermore based on an assessment

of the quantity and type of the industry's raw material purchases[15] and the weight of the industries' own extraction of gravel, stone and clay, etc. From the total output 0.6 million ton, corresponding to materials for repair and maintenance of buildings, are deducted while the remaining 57.7 million tonnes are taken as gross capital formation.

Concrete

Apart from the input of intermediate consumption materials supplied from the industry for mining and quarrying and own resource extraction of gravel and stone, input in the construction industry consists primarily of intermediate consumption materials supplied from the industry for the non-metallic mineral products industry. This input covers especially factory-produced concrete and concrete products. In addition, there is an input of 2.2 million tonnes from the industry for the chemical and petroleum products industry consisting of, among other things, supplies from asphalt factories.

Repair and maintenance of buildings

The repair and maintenance of buildings (0.6 million ton) are regarded, on the one hand, as intermediate consumption supplied from the construction industry and, on the other, as connected to the removal of a corresponding quantity of waste. The latter is linked with the assumption that, when new materials are supplied in connection with the repair and maintenance of buildings, a removal of a corresponding quantity of materials takes place. The result of this accounting practice is that, in the residual part of the physical input-output table, industry-distributed residuals of building materials appear which correspond precisely to the industry-allocated inputs from the construction industry to the industries in row 15 of the table.

Accumulation of building materials

It is possible that the above-mentioned calculation of the production by building and construction enterprises on the basis of the input of materials overestimates the actual output. The calculation does not take account of the fact that not all materials are necessarily fully utilised, and that not all extracted raw materials are necessarily removed, ultimately, from nature. The calculated gross capital formation (57.7 million tonnes) must therefore be interpreted broadly as covering not only the accumulation of buildings and installations but also partly as accumulation of materials in nature.

Demolition of buildings

In the present physical input-output table no account has been taken of waste quantities which have arisen in connection with the demolition of old buildings or in connection with the demolition and/or repair of installations. Since a significant proportion of these demolition materials, however, are, recycled by the construction industry, the significance of this omission is that the flows of materials are reduced on the input as well as the output side and that the residual entry therefore is only affected, to a minor extent, by the omission.

Deposited waste from construction

By analysing the amount of waste from construction, which is not recycled, it may be mentioned that the recorded quantities of deposited construction waste amounted to 0.4 million ton in 1994 (*Miljøstyrelsen, 1996b*), and that the degree of recycling presumably rose from 1990 to 1994.

Specific waste quantities

Specific quantities of waste cover, 36000 Non-metallic mineral products industry, *inter alia*, concrete waste and cement dust which have not been recycled. In the case of 37000 Basic metal industry, what is involved is waste sand and furnace slag, whereas in the case of industry 38000 Manufacture of fabricated metal products, various blasting products constitutes the waste.

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[15] Purchased energy products are not included in the calculation of the volume of production whereas, for example, concrete, cement, bricks, timber and iron sections are.

Table 5.3.a Physical input-output table 1990 - Stone, gravel, building materials, etc. - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	1 712	-	0	1 646	148	48	0	14	1 489
5 31000 Manuf. of food, beverages, tobacco	-	-	-	0	0	-	0	-	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	-	-	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	2	-	-	11	0	1	1	0	458
10 36000 Non-metallic mineral products	203	0	0	85	73	3	5	8	240
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	0	-	0
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	20	0	1	0	8	2	3	5	4
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1 936**	**0**	**1**	**1 741**	**230**	**54**	**9**	**27**	**2 192**
29 Imports	52	-	0	152	57	11	4	9	972
30 Danish resource extraction etc	-	-	-	35 288	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	249
32 Water added to products	-	-	-	-	-	-	-	-	-
33 Households									
34 Total	**1 989**	**0**	**1**	**37 181**	**286**	**65**	**14**	**36**	**3 413**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	288	36 862	699	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	0	0	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	-	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	-	-	0	-	0	2 829	5	-
10 36000 Non-metallic mineral products	0	0	0	0	6	12 920	27	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	23	0	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	0	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	2	7	8	0	55	580	-	57 652
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**2**	**7**	**8**	**0**	**349**	**53 214**	**731**	57 652
29 Imports	0	0	0	0	148	4 286	61	1
30 Danish resource extraction etc.	-	-	-	-	-	55 778		
31 Materials recycled	-	-	-	-	-	1 412		
32 Water added to products	-	-	-	-	-	514		
33 Households								
34 Total	**2**	**7**	**8**	**0**	**497**	**115 204**	**792**	**57 653**

Table 5.3.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
9 797	105	71	-	-	21 543	-	1	-	-	-	-	-	4
0	-	0	0	-	0	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
121	1	5	0	0	2 228	0	-	0	0	0	-	0	9
1 655	41	20	0	0	10 579	0	0	0	0	0	0	0	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
1	0	0	-	-	22	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
2	1	13	1	7	7	54	14	17	3	16	311	20	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
11 576	**148**	**109**	**1**	**7**	**34 379**	**54**	**15**	**17**	**3**	**16**	**311**	**21**	**28**
1 162	37	32	2	0	1 649	0	0	0	0	0	0	0	29
-	-	-	-	-	20 490	-	-	-	-	-	-	-	30
622	-	-	-	-	541	-	-	-	-	-	-	-	31
514	-	-	-		-	-	-	-	-	-	-	-	32
													33
13 874	**185**	**140**	**2**	**7**	**57 059**	**54**	**15**	**17**	**3**	**16**	**311**	**21**	**34**

demand			Residuals etc.									Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Construction, repairs	Pack-aging	Specific waste	Others	Total			
-	-	-				20			1 969	1 989	1 989		1
-	-	-				0			0	0	0		2
-	-	-				1			0	1	1		3
-1 908	1 528	319				0			0	0	37 181		4
-	0	-				8			278	287	286		5
-	-	-				2			63	65	65		6
-	-	-				3			11	14	14		7
-	-	-				5			31	36	36		8
25	104	134				4			447	451	3 413		9
- 879	1 522	670				2		175	107	284	13 874		10
-	-	-				1		113	72	185	185		11
- 2	4	2				13		35	67	115	140		12
-	0	0				1			2	2	2		13
-	-	-				7			0	7	7		14
-	-	57 652				7			-1 180	-1 173	57 059		15
-	-	-				54			0	54	54		16
-	-	-				14			1	15	15		17
-	-	-				17			0	17	17		18
-	-	-				3			0	3	3		19
-	-	-				16			0	16	16		20
-	-	-				311			0	311	311		21
-	-	-				20			0	21	21		22
-	-	-				2			0	2	2		23
-	-	-				7			0	7	7		24
-	-	-				8			0	8	8		25
-	-	-				0			0	0	0		26
-	-	-				55			441	497	497		27
-2 765	**3 159**	**58 777**				**580**		**323**	**2 310**	**3 213**	**115 204**		**28**
- 563	353	- 147									4 139		29
											55 778		30
											1 412		31
											514		32
									792	792	792		33
-3 328	**3 512**	**58 630**				**580**		**323**	**3 102**	**4 005**	**177 839**		**34**

Table 5.3.b Imports by industries 1990 - Stone, gravel, building materials, etc. - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	48	-	0	141	36	11	0	2	283
5 31000 Manuf. of food, beverages, tobacco	-	-	-	0	0	-	0	-	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	-	-	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	0	-	-	0	5	0	2	2	591
10 36000 Non-metallic mineral products	4	-	-	10	15	0	2	4	52
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	-	-	0
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	46
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**52**	**-**	**0**	**152**	**57**	**11**	**4**	**9**	**972**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	136	2 453	40	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	90	0	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	-	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	-	-	-	-	0	989	0	-
10 36000 Non-metallic mineral products	0	0	0	0	12	696	21	1
11 37000 Basic metal industries	-	-	-	-	-	1	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	1	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	56	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**0**	**0**	**148**	**4 286**	**61**	**1**

Table 5.3.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
507	19	10	1	-	1 257	-	0	-	-	-	-	-	**4**
90	-	0	0	-	0	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
324	0	16	0	-	48	-	-	-	-	-	-	-	9
231	18	5	0	0	342	0	0	0	0	0	0	0	10
1	-	-	-	-	-	-	-	-	-	-	-	-	11
1	0	0	-	-	0	-	-	-	-	-	-	-	12
8	-	-	0	-	2	-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	**14**
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	**24**
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
1 162	**37**	**32**	**2**	**0**	**1 649**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	-	-	-	2
-	-	-	-	3
- 196	127	- 28	2 424	**4**
- 144	103	- 41	49	5
-	-	-	-	6
-	-	-	-	7
-	-	-	-	8
- 140	32	- 108	881	9
- 60	69	31	726	10
- 13	20	8	9	11
- 1	3	1	2	12
- 9	0	- 9	48	13
-	-	-	-	**14**
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	**24**
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 563	**353**	**- 147**	**4 139**	**28**

Agricultural lime

There is an input of 2 million tonnes of stone, gravel etc. for agriculture, horticulture etc. The bulk (1.7 million tonnes) is supplied by the industry for mining and quarrying. Agricultural lime is the predominant material. The input is balanced with a corresponding residual in the row for agriculture and horticulture, etc.

Negative residuals

The negative residual from the construction industry of approximately 1.2 million tonnes is due to the fact that, when calculating the industry's production, a number of materials have been included, which are not covered by the table. This is the case, for example, with metal ware used in the industry. Since these materials are excluded from the input side, but are included in the output side, we arrive at a negative residual. The counterpart to this is the comparatively large positive residuals in the physical input-output tables for wood, paper and commodities thereof (table 5.9.a) and also metals, machinery, apparatus, means of transport, etc. (table 5.6.a). The negative and positive residuals do, to a certain extent, cancel out each other when all commodities are viewed collectively, as is the case in table 5.1.a.

Recycling

With regard to the recycling side (row 31), we find a total input of recycled materials within this group of commodities of 1.4 million tonnes. The industries, which receive the recycled materials are 35000 chemical and petroleum industry (0.2 million ton), 36000 Non-metallic mineral products industry (0.6 million ton) and 50000 Construction (0.5 million ton). The recycled materials in question are mainly slag, fly ash and desulphurization products.

Water

The water added to products in the 36000 Non-metallic mineral products industry amounts to 0.5 ton and consists of water used for concrete production.

5.3.4 Energy, weight (1,000 ton)

24 products

The group covers 24 selected products. These include gasworks gas, natural gas, straw, coal, coke, crude oil, different kinds of petrol, diesel oil, fuel oil and firewood. District heating and electricity are included with zero entries, since there is no point listing these types of energy in units of weight - cf. instead section 5.3.5, where the flows of energy are listed in PJ.

Table 5.4.c

General material balance - Energy, weight 1990

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	18.0	Exports	7.1
Danish resources	9.6	Changes in stocks	-0.4
		Residuals	21.0
Total	**27.6**	**Total**	**27.6**

Supply

Of the total supply of energy of 27.6 million tonnes, barely two-thirds were imported from the rest of the world, while just over one-third came from the Danish resource extraction.

Use

On the use side, 7.1 million tonnes were exported while 21 million tonnes ended up as residuals. There was a decrease in stocks of 0.4 million ton.

Danish resource extraction

From the physical input-output table for energy products, table 5.4.a, it may be seen in row 30 how the total Danish energy related resource extraction of 9.6 million tonnes breaks down into the extracting industry. The bulk or (8.4 million tonnes) of resource extraction naturally takes place in the industry for mining and quarrying. This extraction consists of crude oil and natural gas from the North Sea. 0.9 million ton are extracted via agriculture and horticulture etc. as straw used for energy purposes. Finally, energy related resource extraction includes 0.3 million ton of firewood via forestry.

Water

No addition of water to products takes place apart from a modest quantity (42 000 tonnes) used as input in the electricity, gas and water industry. The water in question is used in the manufacture of town gas from natural gas.

Intermediate consumption

In terms of weight, the bulk of the energy was used for intermediate consumption in the industries. Of the total use of 36.3 million tonnes, 11.8 million tonnes went to the industry of electricity, gas and water, while 8.4 million tonnes of energy products were supplied to the chemical and petroleum industry (including oil refineries).

Private consumption

Private consumption of energy products amounted to 3.7 million tonnes, of which 1.6 million tonnes were supplied from the chemical and petroleum industry (oil refineries). Agriculture, horticulture etc. supplied households with 0.5 million ton of straw, while 0.9 million ton of energy products were imported for private consumption.

Exports

The export of energy products of 7.1 million tonnes was mainly supplied by the mining and quarrying industry (3.6 million tonnes) and the chemical and petroleum industry (3 million tonnes).

Table 5.4.a Physical input-output table 1990 - Energy - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	9	-	37	-	-
2 12000 Forestry and logging	3	-	-	-	1	-	217	2	0
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	3 232
5 31000 Manuf. of food, beverages, tobacco	0	-	-	-	0	-	40	0	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	1	-	-	-	0	-	63	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	-	0	-	-
9 35000 Chemical and petroleum industries	271	1	172	58	324	21	23	45	162
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	-	-	-	0	-	1	0	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	50	0	-	0	170	23	1	54	67
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**324**	**1**	**172**	**58**	**504**	**45**	**382**	**100**	**3 461**
29 Imports	240	1	83	61	302	5	34	70	4 972
30 Danish resource extraction etc	900	320	-	8 386	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	-	-	-	-
33 Households									
34 Total	**1 464**	**322**	**255**	**8 505**	**806**	**50**	**416**	**170**	**8 433**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	369	516	-
2 12000 Forestry and logging	-	-	-	-	-	226	130	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	4 748	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	42	24	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	66	38	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	1	2	-
9 35000 Chemical and petroleum industries	12	5	64	1	144	3 196	1 623	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	1	0	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	1	1	3	0	43	939	483	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**13**	**6**	**67**	**1**	**188**	**9 587**	**2 816**	**-**
29 Imports	5	2	31	0	98	17 075	893	-
30 Danish resource extraction etc.	-	-	-	-	-	9 606	-	-
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	42		
33 Households								
34 Total	**18**	**8**	**98**	**1**	**286**	**36 310**	**3 710**	**-**

Table 5.4.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	324	-	-	-	-	-	-	-	-	1
0	-	3	1	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	1 517	-	-	-	-	-	-	-	-	4
0	-	1	0	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
0	-	1	0	-	-	-	-	-	-	-	-	-	7
-	-	-	-	1	-	-	-	-	-	-	-	-	8
86	8	98	3	257	189	274	18	885	31	17	4	24	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
0	-	0	0	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
110	37	38	1	306	3	11	6	2	2	4	1	5	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
197	**45**	**140**	**4**	**2 404**	**192**	**285**	**24**	**887**	**33**	**21**	**4**	**29**	**28**
525	6	36	1	9 361	83	133	8	982	15	8	2	11	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	42	-	-	-	-	-	-	-	-	32
													33
722	**51**	**176**	**5**	**11 807**	**275**	**418**	**32**	**1 869**	**48**	**29**	**6**	**40**	**34**

demand			Residuals etc.					Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Slag and ashes, etc.	Others	Total		
9	5	531	454	2		108	564	1 464	1
- 48	12	94	2	0		0	2	322	2
-	-	-	218	3		35	255	255	3
40	3 598	3 638	93	1		25	118	8 505	4
- 9	2	18	615	4		127	746	806	5
-	-	-	39	0		11	50	50	6
- 14	4	27	162	0		161	323	416	7
0	0	2	124	1		42	167	170	8
- 3	3 002	4 622	215	1		399	615	8 433	9
-	-	-	532	5		185	722	722	10
-	-	-	37	0		14	51	51	11
-	0	0	141	0		34	176	176	12
-	-	-	4	0		1	5	5	13
14	-	496	6 671	62	1 198	2 441	10 372	11 807	14
-	-	-	234	1		40	275	275	15
-	-	-	356	1		61	418	418	16
-	-	-	26	0		7	32	32	17
-	-	-	1 591	8		271	1 869	1 869	18
-	-	-	40	0		7	48	48	19
-	-	-	24	0		5	29	29	20
-	-	-	5	0		1	6	6	21
-	-	-	33	0		7	40	40	22
-	-	-	15	0		3	18	18	23
-	-	-	7	0		1	8	8	24
-	-	-	83	0		14	98	98	25
-	-	-	1	0		0	1	1	26
-	-	-	235	1		50	286	286	27
- 10	**6 622**	**9 428**	**11 956**	**90**	**1 198**	**4 050**	**17 294**	**36 310**	**28**
- 396	466	964						18 038	29
-	-	-						9 606	30
								-	31
								42	32
			2 728	2		979	3 710	3 710	33
- 406	**7 088**	**10 392**	**14 684**	**93**	**1 198**	**5 029**	**21 004**	**67 706**	**34**

Table 5.4.b Imports by industries 1990 - Energy - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	0	-	-
2 12000 Forestry and logging	0	-	-	-	0	-	18	0	0
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	96	-	-	44	219	-	-	61	4 029
5 31000 Manuf. of food, beverages, tobacco	0	-	-	-	0	-	3	0	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit	0	-	-	-	0	-	5	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	144	1	83	15	76	5	7	8	943
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	-	-	-	-	-	0	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	1	7	-	0	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**240**	**1**	**83**	**61**	**302**	**5**	**34**	**70**	**4 972**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	0	0	-
2 12000 Forestry and logging	-	-	-	-	-	19	11	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	14 130	5	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	4	2	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit	-	-	-	-	-	6	3	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	5	2	31	0	98	2 875	864	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	0	0	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	-	-	-	-	-	42	7	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**5**	**2**	**31**	**0**	**98**	**17 075**	**893**	-

Table 5.4.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	0	-	-	-	-	-	-	-	-	1
0	-	0	0	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
349	-	1	-	9 331	-	-	-	-	-	-	-	-	4
0	-	0	0	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
0	-	0	0	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
148	2	34	1	30	83	133	8	982	15	8	2	11	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	0	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
28	4	1	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
525	**6**	**36**	**1**	**9 361**	**83**	**133**	**8**	**982**	**15**	**8**	**2**	**11**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	0	0	1
- 4	0	7	26	2
-	-	-	-	3
- 140	46	- 89	14 041	4
- 1	0	1	5	5
-	-	-	-	6
- 1	0	2	8	7
-	-	-	-	8
- 243	419	1 040	3 916	9
-	-	-	-	10
-	-	-	-	11
-	-	0	0	12
-	-	-	-	13
- 6	1	2	43	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 396	**466**	**964**	**18 038**	**28**

Residuals

Of the total residuals of 21 million tonnes from the use of energy products 14.7 million tonnes are specified as carbon, which is emitted in connection with CO_2 emissions and 93,000 tonnes are sulphur emitted in connection with SO_2.[16] 1.2 million tonnes are fly ash, slag and desulphurization products from power stations, while 5 million tonnes are other energy related emissions, including hydrogen. The residuals, as shown here, comes exclusively from the quantities of fuel burned. This means, *inter alia*, that oxygen from the air, which was involved in combustion processes and subsequently emitted in the form of CO_2 and SO_2, is not included in the residual account.

Of the total energy related residuals of 21 million tonnes, 3.7 million tonnes were residuals from private consumption. As for each industry, it is the case with private consumption that the residuals correspond to the quantities of energy burned.

Detailed imports

From table 5.4.b, which shows the imports of energy distributed by the supplying foreign industries, it is evident that the bulk of the imported energy products were supplied by foreign mining and quarrying industry for use in the chemical and petroleum industry (*inter alia*, oil for oil refineries) and in the electricity, gas and water industry (*inter alia* coal for power stations).

The bulk of imports for direct use in connection with private consumption comes from the foreign chemical and petroleum industry. The commodities in question are refined oil products.

[16] The quantities of coal and sulphur quoted and the breakdown by the emitting industry correspond to the energy-related emissions of CO_2 and SO_2 in chapter 7.

5.3.5 Energy, calorific value (PJ)

24 types of energy

As a supplement to tables 5.4.a-5.4.c for energy recorded in ton, tables 5.5.a-5.5.c show the corresponding flows of energy expressed in PJ (1 PJ = 10^{15} Joules). The tables cover the same 24 types of energy as the tables with the energy products. Note that the flows of energy in connection with district heating and electricity have an actual physical content (different from zero) when energy is expressed in PJ.

Table 5.5.c

General energy balance - Energy, calorific value 1990

Origin/supply		Destination/use	
	PJ		PJ
Imports	632	Exports	318
Danish resources	377	Changes in stocks	9
		Intermediate consumption	458
		Private consumption	225
Total	**1 009**	**Total**	**1 009**

General material balance

Table 5.5.c shows the origin of the energy content in the energy products and how this quantity of energy is finally used.

Supply

Of the total supply of 1,009 PJ, two-thirds were imported while one-third was extracted from Danish resources.

Use

On the use side, we find that 318 PJ were exported and 9 PJ went to build up stocks. The industries had a total consumption of 458 PJ while households used 225 PJ. By comparison with table 5.4.c for energy expressed in million tonnes, we see here that intermediate consumption and the private consumption appear instead of residuals.

The interpretations of the physical input-output table, table 5.5.a, and the relevant import table 5.5.b for flows of energy expressed in PJ follow the interpretations of the corresponding tables for energy expressed in 1,000 ton.

Electricity and district heating

The inclusion of the energy content of electricity and district heating means that the electricity, gas and water industry have acquired greater significance as a supplying industry, both with relevance to other industries and to private consumption.

Interpretation of residuals

It should be noted that the residual calculated as the difference between the industries' energy input and output in PJ is interpreted as the industries' own consumption of energy (including any conversion losses). This is due to the fact that the energy is received from the environment and other industries but not supplied onto other industries or to final demand. Since it may be assumed that these quantities of energy end up as unusable energy (heating losses into the environment, etc.), the energy consumption of industries and households may accordingly be interpreted as flows of energy from the economy to the environment.

Table 5.5.a Physical input-output table 1990 - Energy, calorific value - PJ

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	0	-	1	-	-
2 12000 Forestry and logging	0	-	-	-	0	-	3	0	0
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	136
5 31000 Manuf. of food, beverages, tobacco	0	-	-	-	0	-	1	0	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	0	-	-	-	0	-	1	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	0	-	-
9 35000 Chemical and petroleum industries	12	0	7	2	13	1	1	2	7
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	0	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	8	0	-	0	13	2	1	4	7
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**19**	**0**	7	**3**	**27**	**3**	**6**	**6**	**150**
29 Imports	10	0	4	2	12	1	1	3	212
30 Danish resource extraction etc	13	4	-	360	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	-	-	-	-
33 Households									
34 Total	**43**	**4**	**11**	**365**	**39**	**3**	**8**	**9**	**362**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	5	7	-
2 12000 Forestry and logging	-	-	-	-	-	3	2	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	204	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	1	0	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	1	0	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	0	0	-
9 35000 Chemical and petroleum industries	0	0	3	0	6	135	70	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	0	0	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	1	1	3	0	17	113	95	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**1**	**5**	**0**	**23**	**461**	**175**	-
29 Imports	1	0	2	0	8	574	49	-
30 Danish resource extraction etc.	-	-	-	-	-	377		
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	-		
33 Households								
34 Total	**2**	**1**	**7**	**0**	**32**	**1 412**	**225**	-

Table 5.5.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	5	-	-	-	-	-	-	-	-	1
0	-	0	0	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	68	-	-	-	-	-	-	-	-	4
0	-	0	0	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
0	-	0	0	-	-	-	-	-	-	-	-	-	7
-	-	-	-	0	-	-	-	-	-	-	-	-	8
4	0	4	0	10	12	8	3	36	1	1	0	1	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
6	3	6	0	15	1	9	3	2	1	3	1	4	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
10	**4**	**10**	**0**	**98**	**12**	**17**	**6**	**38**	**3**	**4**	**1**	**6**	**28**
16	1	4	0	236	6	7	2	42	1	2	0	2	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	-	-	-	-	-	-	-	-	-	32
													33
26	**5**	**14**	**1**	**334**	**18**	**24**	**8**	**80**	**4**	**6**	**1**	**8**	**34**

demand				Total	
Changes in stocks	Exports	Total	Own energy consumption by industries		
0	0	8	30	43	1
- 1	0	1	0	4	2
-	-	-	11	11	3
1	154	156	5	365	4
-	0	0	38	39	5
-	-	-	3	3	6
-	0	0	6	8	7
0	-	0	9	9	8
-	126	196	31	362	9
-	-	-	26	26	10
-	-	-	5	5	11
-	-	0	14	14	12
-	-	-	1	1	13
19	17	131	90	334	14
-	-	-	18	18	15
-	-	-	24	24	16
-	-	-	8	8	17
-	-	-	80	80	18
-	-	-	4	4	19
-	-	-	6	6	20
-	-	-	1	1	21
-	-	-	8	8	22
-	-	-	2	2	23
-	-	-	1	1	24
-	-	-	7	7	25
-	-	-	0	0	26
-	-	-	32	32	27
20	**298**	**493**	**458**	**1 412**	**28**
- 12	20	58	0	632	29
			-	377	30
			-	-	31
			-	-	32
			225	225	33
9	**318**	**551**	**682**	**2 646**	**34**

Table 5.5.b Imports by industries 1990 - Energy, calorific value - PJ

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	0	-	-	-	-	-	0	0	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	3	-	-	1	6	-	-	2	170
5 31000 Manuf. of food, beverages, tobacco	0	-	-	-	-	-	0	-	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit	0	-	-	-	-	-	0	-	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	6	0	4	1	3	0	0	0	40
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	-	0	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	2	0	-	0	3	0	0	1	2
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**10**	**0**	**4**	**2**	**12**	**1**	**1**	**3**	**212**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	0	0	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	424	0	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	0	0	-
6 32000 Textile, clothing, leather industry	-	-	-	-	-	-	-	-
7 33000 Manuf. of wood products, incl. furnit	-	-	-	-	-	0	0	-
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	-	-	-	-
9 35000 Chemical and petroleum industries	0	0	1	0	4	121	37	-
10 36000 Non-metallic mineral products	-	-	-	-	-	-	-	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	-	0	-	-
13 39000 Other manufacturing industries	-	-	-	-	-	-	-	-
14 40000 Electricity, gas and water	0	0	1	0	4	28	12	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**2**	**0**	**8**	**574**	**49**	**-**

Table 5.5.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	0	0	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
9	-	0	-	234	-	-	-	-	-	-	-	-	4
-	-	0	-	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	0	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	8
5	0	1	0	1	5	4	1	42	0	0	0	0	9
-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	13
2	1	2	0	1	0	3	1	1	1	1	0	2	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
16	**1**	**4**	**0**	**236**	**6**	7	**2**	**42**	**1**	**2**	**0**	**2**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	0	0	0	2
-	-	-	-	3
- 4	3	- 2	422	4
-	-	0	0	5
-	-	-	-	6
-	-	0	0	7
-	-	-	-	8
- 10	18	45	166	9
-	-	-	-	10
-	-	-	-	11
-	-	-	0	12
-	-	-	-	13
3	0	15	43	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 11	**20**	**58**	**632**	**28**

5.3.6 Metals, machinery, apparatus and means of transport, etc.

861 commodities

This group comprises 861 selected commodities and groups of commodities, consisting entirely or predominantly of iron, steel and other metals. As examples of this comprehensive and varied group, mention may be made of crude iron, plates, bars, profiles and wires, pipes, pipe fittings, iron and steel constructions, bridges and bridge constructions, tanks, vats, screws, knitting needles and safety pins, various household goods, cookers, refrigerators, radiators, various knives, tools, padlocks, central heating boilers, motors, turbines, staples, various machines and machine parts, various items of apparatus and measuring instruments, cables, locomotives, tractors, cars, cycles, ships, revolvers and swords. Iron and metal waste and scrap are also included.

Table 5.6.c

General material balance - Metals, machinery, apparatus and means of transport, etc. 1990

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	3.3	Exports	2.4
Recycling of residuals	0.5	Accumulation	0.5
		Changes in stocks	-0.2
		Residuals	1.1
Total	**3.8**	**Total**	**3.8**

Supply

The total supply from the environment to the Danish economy weighed according to table 5.6.c, 3.8 million tonnes, of which 3.3 million tonnes were imported.

Use

If the 3.8 million tonnes are considered from the use side, it is evident that 2.4 million tonnes, or just over 70%, of total use, were exports, 0.5 million ton were accumulated via gross capital formation, while 1.1 million tonnes were residuals. There was in addition a modest change in stocks.

The industries

Table 5.6.a shows that the total input into industries amounted to 4.2 million tonnes. Of these, 1.2 million tonnes were supplied from the Danish industries, 2.4 million tonnes were imported and 0.5 million ton were recycling of waste. 38000 Fabricated metal products industry used a good half of these intermediate consumption materials, while 37000 Basic metal industry used just over 20%. Furthermore, it is clear from row 31 of the table that the latter industry's input consisted for the most part of the recycling of waste and scrap (recycling of basic metal scrap at the Danish Steel Works Ltd.).

Exported scrap

In addition to the recycling of iron and scrap shown in row 31, the waste and scrap which is exported is recorded in the row for the wholesale and retail trade industry. The supply of these quantities arises as a negative gross capital formation which appears in the row for the wholesale and retail trade industry.

Private consumption

The private consumption of iron and metal etc. amounted to 186,000 tonnes. The bulk was imported commodities, including cars.

Residuals

The residuals belonging to this group of commodities amounted to 1.1 million tonnes. Of this, 0.4 million ton came from the construction industry. The residuals must not, as a whole, be interpreted as waste quantities or residuals, since what is involved to some extent, is intermediate consumption materials used for the production of goods not included among the 861 selected commodities comprised by this group. The counterpart to this is, *inter alia*, that we found, in the case of building and construction, a negative residual in the physical input-output table for gravel, stone and building materials etc. (cf. section 5.3.3). The negative residual

in that connection is a sign of the fact that the consumed intermediate input are not covered by the group in question.

Accumulation in the households

It should be noted that total private consumption of iron and metal commodities, etc. in row 33 of the table is entered as residuals. A proportion of iron and metal commodities etc. (such as cars) are durable commodities with a lifetime of over one year. To a certain extent the question may thus be whether some of the commodities recorded here as residuals in reality are accumulated in households. The counterpart to this is, however, that other durables, which are bought in years prior to the year in question, are scrapped. The residuals of households hence overestimate the waste quantity only to the extent that a net accumulation of durables actually takes place in households.

Table 5.6.a Physical input-output table 1990 - Metals, machinery, apparatus, means of transport etc.

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc.	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	0	0	-	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	0	0	-	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	1	-	0	1	0
9 35000 Chemical and petroleum industries	-	-	-	-	1	0	0	0	0
10 36000 Non-metallic mineral products	-	-	-	-	-	0	0	-	0
11 37000 Basic metal industries	0	-	-	-	1	0	2	0	1
12 38000 Manuf. of fabricated metal products	0	0	0	0	50	1	20	1	12
13 39000 Other manufacturing industries	-	-	-	-	0	0	0	-	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	0	2
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**0**	**0**	**53**	**1**	**22**	**2**	**15**
29 Imports	1	0	0	0	32	3	33	6	19
30 Danish resource extraction etc.	-	-	-	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	-	-	-	-
33 Households									
34 Total	**1**	**0**	**0**	**0**	**85**	**4**	**55**	**8**	**35**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc.	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	1	-	0
6 32000 Textile, clothing, leather industry	-	-	0	-	0	1	0	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	1	0	1
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	4	0	0
9 35000 Chemical and petroleum industries	-	-	0	-	0	4	0	0
10 36000 Non-metallic mineral products	-	-	0	-	0	1	0	1
11 37000 Basic metal industries	-	-	0	-	1	268	1	2
12 38000 Manuf. of fabricated metal products	0	0	12	0	4	915	38	417
13 39000 Other manufacturing industries	-	-	0	-	0	3	1	2
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	42	-	- 266
17 63000 Restaurants and hotels	-	-	-	-	-	-		-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	0	-	-	-	0	0	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-		-
28 Total (1-27)	**0**	**0**	**13**	**0**	**5**	**1 241**	**40**	**158**
29 Imports	0	1	48	0	14	2 401	146	387
30 Danish resource extraction etc.	-	-	-	-	-	-		
31 Materials recycled	-	-	-	-	-	547		
32 Water added to products	-	-	-	-	-	-		
33 Households								
34 Total	**0**	**1**	**61**	**0**	**19**	**4 189**	**186**	**544**

1 000 ton **Table 5.6.a**

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	0	1	0	-	0	-	-	-	-	-	-	-	5
0	-	0	0	-	0	-	-	0	-	-	-	-	6
0	0	1	0	-	0	-	-	0	-	-	-	-	7
0	0	1	0	-	0	1	-	-	-	-	-	0	8
1	-	1	0	-	1	0	-	0	-	-	-	-	9
0	-	1	-	-	1	-	-	0	-	-	-	-	10
11	23	209	1	-	18	0	-	0	-	-	-	0	11
13	6	586	4	0	195	10	0	0	0	0	0	0	12
0	0	1	0	-	1	0	-	0	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	39	1	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
26	**68**	**801**	**5**	**0**	**216**	**12**	**0**	**1**	**0**	**0**	**0**	**1**	**28**
44	251	1 721	11	0	199	8	0	7	0	0	0	2	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	547	-	-	-	-	-	-	-	-	-	-	-	31
		-	-	-	-	-	-	-	-	-	-	-	32
													33
69	**866**	**2 522**	**16**	**0**	**414**	**20**	**0**	**7**	**0**	**0**	**0**	**3**	**34**

demand			Residuals etc.							Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Packaging	Specific waste	Others	Total		
-	-	-						1	1	1	1
-	-	-						0	0	0	2
-	-	-						0	0	0	3
-	-	-						0	0	0	4
0	1	1						83	83	85	5
0	2	2						1	1	4	6
0	4	5						49	49	55	7
-	4	5						- 1	- 1	8	8
0	19	19						11	11	35	9
0	1	2						66	66	69	10
10	486	499					14	85	99	866	11
- 204	1 263	1 514						93	93	2 522	12
0	2	5						8	8	16	13
-	-	-						0	0	0	14
-	-	-						414	414	414	15
- 9	233	- 42						20	20	20	16
-	-	-						0	0	0	17
-	-	-						7	7	7	18
-	-	-						0	0	0	19
-	-	-						0	0	0	20
-	-	-						0	0	0	21
-	4	4						- 1	- 1	3	22
-	-	-						0	0	0	23
-	-	-						1	1	1	24
-	-	-						61	61	61	25
-	-	-						0	0	0	26
-	-	-						19	19	19	27
- 202	**2 018**	**2 014**					**14**	**920**	**934**	**4 189**	**28**
- 35	370	868								3 268	29
										-	30
										547	31
										-	32
								186	186	186	33
- 238	**2 388**	**2 881**					**14**	**1 106**	**1 120**	**8 191**	**34**

Table 5.6.b Imports by industries 1990 - Metals, machinery, apparatus, means of transport etc.

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	0	0	-	0
6 32000 Textile, clothing, leather industry	-	-	-	-	-	0	0	-	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	-	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	1	-	0	1	0
9 35000 Chemical and petroleum industries	-	-	-	-	1	0	0	1	2
10 36000 Non-metallic mineral products	-	-	-	-	-	0	0	0	0
11 37000 Basic metal industries	0	-	-	0	5	0	10	1	5
12 38000 Manuf. of fabricated metal products	0	0	0	0	24	2	22	3	11
13 39000 Other manufacturing industries	-	-	-	-	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	2
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**0**	**0**	**32**	**3**	**33**	**6**	**19**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	0	-	0
6 32000 Textile, clothing, leather industry	-	-	0	-	0	2	0	1
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	1	0	1
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	6	0	0
9 35000 Chemical and petroleum industries	-	-	4	-	1	44	0	2
10 36000 Non-metallic mineral products	-	-	0	-	0	1	0	1
11 37000 Basic metal industries	-	-	2	-	3	1 009	1	1
12 38000 Manuf. of fabricated metal products	0	0	42	0	10	1 299	142	380
13 39000 Other manufacturing industries	-	-	0	-	0	2	2	1
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	37	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	0	-	-	0	0	0	0
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**1**	**48**	**0**	**14**	**2 401**	**146**	**387**

1 000 ton **Table 5.6.b**

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	0	0	0	-	0	-	-	-	-	-	-	-	5
0	-	1	0	-	1	-	-	0	-	-	-	-	6
0	0	1	0	-	0	-	-	0	-	-	-	-	7
0	0	1	0	-	0	1	-	-	-	-	-	1	8
1	0	26	0	-	7	0	-	0	-	-	-	0	9
0	-	0	0	-	0	-	-	0	-	-	-	-	10
21	100	818	4	-	37	1	-	0	-	0	-	-	11
22	116	873	6	0	153	6	0	6	0	0	0	2	12
0	0	1	0	0	0	0	-	0	0	0	-	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	35	0	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
44	**251**	**1 721**	**11**	**0**	**199**	**8**	**0**	**7**	**0**	**0**	**0**	**2**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	-	-	-	2
-	-	-	-	3
-	-	-	-	4
-	0	0	0	5
-	0	1	3	6
-	1	2	3	7
-	0	0	6	8
-	18	19	63	9
-	0	1	3	10
13	78	93	1 102	11
- 47	269	744	2 043	12
0	0	3	5	13
-	-	-	-	14
-	-	-	-	15
- 1	3	2	39	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	1	1	1	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 36	**370**	**868**	**3 268**	**28**

5.3.7 Chemical products and fertilisers

290 commodities

This group comprises 290 selected commodities and groups of commodities relating to chemical products and fertilisers. These include lubricating oils, white spirit, sulphur, oxygen, sulphides, ammonia, oxides, chlorides, sulphates, carbides, methanol, heterocyclical compounds, vitamins, antibiotics, medicines, fertilisers, tanning agents, printing ink, smelling substances, soaps, cleaning materials, cosmetics, enzymes, explosives, photographic paper, insecticides, herbicides, timber impregnation and protection products, solvents and thinners, brake fluid, substrates and reagents. Plastic and plastic products are not covered by this group (cf. instead section 5.3.8).

Table 5.7.c **General material balance - Chemical products and fertilisers 1990**

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	3.4	Exports	1.2
Water added to products	0.2	Changes in stocks	0.1
		Residuals	2.3
Total	**3.6**	**Total**	**3.6**

Supply

The supply of materials to this group was, according to table 5.7.c, 3.6 million tonnes in total and consisted predominantly of imports. There was, however, also an addition of 0.2 million ton of water.

Use

On the use side, we find that 1.2 million tonnes were exported and that there were residuals amounting to 2.3 million tonnes. Changes in stocks were moderate.

Intermediate consumption

The total use of intermediate consumption materials in the industries in connection with this group of commodities is shown in table 5.7.a as 4.4 million tonnes, of which 1.2 million tonnes are intermediate consumption materials supplied by Danish industries.

Major recipients

The two dominant recipients of chemical products as intermediate consumption materials were 35000 Chemical and petroleum products industry and 11000 Agriculture, horticulture, etc. As far as the former is concerned, the products were primarily imported intermediate consumption materials intended for further processing. In the case of agriculture, horticulture etc. the 1.7 million tonnes is broken down into 0.7 million ton of Danish products and 1 million ton of imports. The bulk of agriculture's intermediate consumption within this group consisted of fertilisers.

Imports

80% of the imported intermediate consumption materials originated from the foreign chemical and petroleum products industry while most of the remaining 20% are broken down fairly evenly into foreign industries for mining and quarrying and the food products, beverages and tobacco industry (table 5.7.b).

Private consumption

The private consumption of chemical products amounts in total to 0.2 million ton. This includes fertilisers used by households.

Residuals

Of the total residuals of 2.3 million tonnes, the 1.7 million tonnes came from agriculture, horticulture etc. and accordingly from the large input of chemical products and fertilisers in that industry. There is a negative residual from 35000 chemical and petroleum products industry. This is due to the fact that, among the commodities which the input-output table covers, certain intermediate consumption materials used in the industry are not included. For example, bitumen, which is an im-

portant intermediate consumption materials in the chemical and petroleum products industry are included in input-output table 5.3.a covering stone, gravel and building materials, since bitumen is also used in the manufacture of asphalt.

Table 5.7.a Physical input-output table 1990 - Chemical products and fertilisers - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	0	-	-	-	0	-	-	-	1
5 31000 Manuf. of food, beverages, tobacco	0	0	0	0	8	1	0	5	29
6 32000 Textile, clothing, leather industry	-	-	-	-	0	0	-	0	0
7 33000 Manuf. of wood products, incl. furnit.	0	-	-	-	0	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	0	0	0	2	0
9 35000 Chemical and petroleum industries	665	0	2	1	21	5	8	13	134
10 36000 Non-metallic mineral products	0	-	-	-	0	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	0	0	0	0	0
13 39000 Other manufacturing industries	-	-	-	-	0	-	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**665**	**0**	**2**	**1**	**29**	**6**	**9**	**21**	**165**
29 Imports	1 044	0	3	6	91	34	27	57	1 436
30 Danish resource extraction etc	-	-	-	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	-	-	-	206
33 Households									
34 Total	**1 710**	**0**	**5**	**7**	**120**	**40**	**36**	**78**	**1 806**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	1	-	-
5 31000 Manuf. of food, beverages, tobacco	0	0	0	0	5	57	3	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	0	0	-
7 33000 Manuf. of wood products, incl. furnit.	0	0	0	-	0	1	1	-
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	0	3	0	-
9 35000 Chemical and petroleum industries	0	0	25	0	39	1 105	80	-
10 36000 Non-metallic mineral products	0	0	0	0	0	2	0	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	0	0	-
13 39000 Other manufacturing industries	-	-	0	-	0	1	0	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-		-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	1	-	-	0	1	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-		-
28 Total (1-27)	**0**	**1**	**25**	**0**	**44**	**1 170**	**84**	-
29 Imports	2	1	22	0	60	3 038	94	-
30 Danish resource extraction etc.	-	-	-	-	-	-		
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	206		
33 Households								
34 Total	**2**	**1**	**47**	**0**	**104**	**4 415**	**178**	-

Table 5.7.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
1	0	6	0	0	0	0	0	0	0	0	0	0	5
0	-	0	-	0	0	0	0	0	-	0	-	0	6
0	-	0	0	0	0	0	-	0	0	0	-	0	7
0	0	0	0	0	0	0	0	0	0	0	0	0	8
8	21	87	1	1	41	5	4	18	1	1	0	2	9
0	0	0	0	0	1	0	0	0	0	0	0	0	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
0	0	0	-	-	0	0	0	0	-	0	-	0	12
0	-	0	-	-	0	0	-	0	-	0	-	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
9	**22**	**94**	**1**	**1**	**42**	**6**	**4**	**18**	**1**	**1**	**0**	**3**	**28**
81	10	76	3	2	47	12	3	13	1	2	0	4	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	-	-	-	-	-	-	-	-	-	32
													33
90	**31**	**169**	**4**	**3**	**89**	**18**	**8**	**31**	**2**	**3**	**0**	**7**	**34**

demand			Residuals etc.							Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Packaging	Specific waste	Others	Total		
-	-	-						1 710	1 710	1 710	1
-	-	-						0	0	0	2
-	-	-						5	5	5	3
-	0	-						6	6	7	4
3	69	74						- 11	- 11	120	5
-	0	0						40	40	40	6
0	0	1						34	34	36	7
-	0	0						75	75	78	8
55	909	1 045						- 343	- 343	1 806	9
-	2	2						86	86	90	10
-	-	-						31	31	31	11
-	1	1						168	168	169	12
-	1	1						3	3	4	13
-	-	-						3	3	3	14
-	-	-						89	89	89	15
-	-	-						18	18	18	16
-	-	-						8	8	8	17
-	-	-						31	31	31	18
-	-	-						2	2	2	19
-	-	-						3	3	3	20
-	-	-						0	0	0	21
-	-	-						7	7	7	22
-	-	-						2	2	2	23
-	0	0						0	0	1	24
-	-	-						47	47	47	25
-	-	-						0	0	0	26
-	-	-						104	104	104	27
58	**983**	**1 124**						**2 120**	**2 120**	**4 415**	**28**
13	259	365								3 403	29
										-	30
										-	31
										206	32
								178	178	178	33
71	**1 241**	**1 490**						**2 298**	**2 298**	**8 202**	**34**

Table 5.7.b Imports by industries 1990 - Chemical products and fertilisers - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	21	-	-	-	0	0	-	0	310
5 31000 Manuf. of food, beverages, tobacco	1	0	0	1	26	13	10	24	143
6 32000 Textile, clothing, leather industry	-	-	-	-	0	0	-	0	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	0	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	0	-	-	-	0	0	0	0	3
9 35000 Chemical and petroleum industries	1 023	0	3	6	64	21	17	31	974
10 36000 Non-metallic mineral products	0	0	0	0	0	0	0	0	1
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	0	0	0	1	4
13 39000 Other manufacturing industries	-	-	-	-	-	-	0	-	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1 044**	**0**	**3**	**6**	**91**	**34**	**27**	**57**	**1 436**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	331	-	-
5 31000 Manuf. of food, beverages, tobacco	0	0	0	0	9	256	22	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	0	0	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	0	0	-
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	0	10	0	-
9 35000 Chemical and petroleum industries	2	0	21	0	48	2 423	71	-
10 36000 Non-metallic mineral products	0	0	0	0	0	6	0	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	0	0	-	3	12	0	-
13 39000 Other manufacturing industries	-	-	-	-	0	0	0	-
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	0	0	-	0	0	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**2**	**1**	**22**	**0**	**60**	**3 038**	**94**	**-**

Table 5.7.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
5	1	18	1	0	2	1	0	1	0	0	0	1	5
0	-	0	-	0	0	0	0	0	0	0	-	0	6
0	-	0	0	0	0	0	-	0	0	0	-	0	7
7	-	0	0	0	0	0	0	0	0	0	0	0	8
69	9	55	2	2	44	11	3	13	1	2	0	4	9
1	0	1	0	0	1	0	0	0	0	0	0	0	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
0	0	2	0	0	0	0	0	0	0	0	-	0	12
0	-	0	-	-	0	0	-	0	-	0	-	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
81	**10**	**76**	**3**	**2**	**47**	**12**	**3**	**13**	**1**	**2**	**0**	**4**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	-	-	-	2
-	-	-	-	3
- 43	0	- 43	288	4
13	6	41	297	5
-	0	0	0	6
0	0	0	1	7
-	0	0	11	8
44	252	366	2 789	9
-	0	0	6	10
-	-	-	-	11
0	0	0	12	12
-	0	0	1	13
-	-	-	-	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	0	0	0	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
13	**259**	**365**	**3 403**	**28**

5.3.8 Plastic and plastic products

79 commodities

In this group there are 79 commodities and groups of commodities consisting of plastic, and these include polyethylene, polymers, polyamides, polyurethane, silicones, plastic waste, monofilaments, casings, pipes, tubes, plates, sheets, films, tapes, bathtubs, boxes, bags, stoppers, transport and packaging articles, dinner sets, toiletries, doors, windows, office requisites, school items and garments.

Table 5.8.c **General material balance - Plastic and plastic products 1990**

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	0.738	Exports	0.258
Water added to products	0.008	Accumulation	0.016
		Changes in stocks	-0.015
		Residuals	0.486
Total	**0.746**	**Total**	**0.746**

Supply

The total supply of materials in connection with plastic and plastic products amounted, according to table 5.8.c, to 746,000 tonnes. The bulk was imported, but there was also an addition of water to products of 8,000 tonnes.

Use

On the use side, just about 258,000 tonnes were exported, and 16,000 tonnes were accumulated via gross capital formation. 486,000 tonnes appear in table 5.8.c as residuals. There was in addition a minor reduction in stocks.

Intermediate consumption

The physical input-output table, table 5.8.a, for plastic and plastic products, shows that 942,000 tonnes were used as intermediate consumption materials in the industries. Of these intermediate consumption materials, 693,000 tonnes were imported. The major recipients of plastic as an intermediate consumption material was the chemical and petroleum industries, which also cover enterprises manufacturing basic plastic and plastic products.

Packaging

With an intermediate consumption of plastic and plastic products of 108,000 tonnes, 38000 Manufacture of fabricated metal products was, moreover, the industry accounting for the greatest input of these products. The consumption of plastic and plastic products by industries - including particularly the food products, beverages and tobacco industry and the wholesale and retail trade industry - also covers packaging articles. This is more clearly illustrated in section 5.3.11 concerning commodities used for packaging.

Private consumption

The private consumption of plastic commodities amounted to 24,000 tonnes. Of this over 40% were imported commodities.

Residuals

Of the total residuals of 486,000 tonnes, 100,000 tonnes can be attributed to the 38000 Manufacture of fabricated metal products. As mentioned above in connection with the discussion of residuals concerning several of the physical input-output tables, residuals must not necessarily be interpreted as waste quantities, as it may be the case that some of the materials enter production processes which are not included in this sub-group of commodities presented. Thus, the weight of plastic which goes into, for example, electronic apparatus and measuring instruments will, on the output side, be included in the weight of the relevant apparatus and instrument and accordingly in the corresponding physical input-output table (cf. section 5.3.6).

The negative residual in the 34000 Paper, printing and publishing industry is thus correspondingly due to the fact that the industry uses some intermediate consumption materials which are not characterised as plastic and plastic products for the manufacture of, *inter alia*, office requisites and school items made of plastic.

Table 5.8.a Physical input-output table 1990 - Plastic and plastic products - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	-	0	0	0
6 32000 Textile, clothing, leather industry	0	-	-	0	0	0	0	0	0
7 33000 Manuf. of wood products, incl. furnit	0	-	-	-	0	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	1	0	0	0	1
9 35000 Chemical and petroleum industries	1	0	2	1	27	4	19	5	59
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	0	-	-
12 38000 Manuf. of fabricated metal products	0	-	0	0	0	0	0	0	0
13 39000 Other manufacturing industries	0	-	0	0	0	0	0	0	1
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**2**	**1**	**28**	**5**	**20**	**5**	**61**
29 Imports	1	0	1	0	20	24	18	11	448
30 Danish resource extraction etc	-	-	-	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	-	-	-	8
33 Households									
34 Total	**2**	**0**	**4**	**1**	**48**	**29**	**38**	**16**	**517**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	0	-	0	0	0	0
6 32000 Textile, clothing, leather industry	-	-	0	-	0	1	0	0
7 33000 Manuf. of wood products, incl. furnit	0	0	0	-	0	1	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	3	9	1	0
9 35000 Chemical and petroleum industries	0	0	3	0	19	224	12	10
10 36000 Non-metallic mineral products	-	-	0	-	0	0	0	0
11 37000 Basic metal industries	-	-	0	-	0	0	0	0
12 38000 Manuf. of fabricated metal products	0	0	0	0	0	3	1	0
13 39000 Other manufacturing industries	0	0	0	0	0	4	1	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-		-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-		-
28 Total (1-27)	0	0	**4**	0	**23**	**241**	**14**	**11**
29 Imports	0	0	2	0	9	693	10	5
30 Danish resource extraction etc.	-	-	-	-	-	-		
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	8		
33 Households								
34 Total	0	0	**5**	0	**32**	**942**	**24**	**16**

Table 5.8.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	0	0	-	0	0	-	-	-	-	-	-	5
0	-	0	0	-	0	0	-	0	-	0	-	0	6
0	-	0	0	0	0	0	0	0	0	0	-	0	7
0	0	0	0	0	0	1	0	0	0	0	0	1	8
3	0	29	7	0	16	22	1	3	0	1	0	1	9
0	-	0	0	-	0	0	-	0	-	0	-	0	10
-	-	0	-	-	0	-	-	0	-	-	-	-	11
0	-	1	0	0	1	0	0	0	0	0	0	0	12
0	-	1	0	0	1	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
3	**0**	**32**	**7**	**0**	**18**	**24**	**1**	**4**	**0**	**1**	**0**	**2**	**28**
8	0	77	19	0	18	30	1	3	0	1	0	1	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-		-	-	-	-	-	-	-	-	32
													33
11	**0**	**108**	**26**	**1**	**35**	**54**	**2**	**7**	**0**	**1**	**0**	**3**	**34**

demand			Residuals etc.							Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Packaging	Specific waste	Others	Total		
-	-	-						2	2	2	1
-	-	-						0	0	0	2
-	-	-						4	4	4	3
-	-	-						1	1	1	4
-	0	0						48	48	48	5
0	1	1						28	28	29	6
0	0	1						37	37	38	7
-	9	10						- 3	- 3	16	8
- 4	199	216						78	78	517	9
0	0	0						10	10	11	10
-	0	0						0	0	0	11
-	5	6						100	100	108	12
0	4	5						17	17	26	13
-	-	-						1	1	1	14
-	-	-						35	35	35	15
-	-	-						54	54	54	16
-	-	-						2	2	2	17
-	-	-						7	7	7	18
-	-	-						0	0	0	19
-	-	-						1	1	1	20
-	-	-						0	0	0	21
-	-	-						3	3	3	22
-	-	-						0	0	0	23
-	-	-						0	0	0	24
-	-	-						5	5	5	25
-	-	-						0	0	0	26
-	-	-						32	32	32	27
- 4	**218**	**239**						**462**	**462**	**942**	**28**
- 10	40	45								738	29
										-	30
										-	31
										8	32
								24	24	24	33
- 15	**258**	**283**						**486**	**486**	**1 711**	**34**

Table 5.8.b Imports by industries 1990 - Plastic and plastic products - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	0	0	0	1
6 32000 Textile, clothing, leather industry	0	-	-	0	0	0	3	0	15
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	0	-	0	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	1	0	0	0	1
9 35000 Chemical and petroleum industries	1	0	1	0	19	23	15	10	414
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	-	0	0	0	1	0	0	8
13 39000 Other manufacturing industries	0	-	0	0	0	0	0	0	9
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**1**	**0**	**20**	**24**	**18**	**11**	**448**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	2	0	0
6 32000 Textile, clothing, leather industry	-	-	0	-	0	22	0	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	0	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	1	5	0	0
9 35000 Chemical and petroleum industries	0	0	1	0	8	631	9	5
10 36000 Non-metallic mineral products	-	-	0	-	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	0	0	0
12 38000 Manuf. of fabricated metal products	0	0	0	0	0	19	0	0
13 39000 Other manufacturing industries	0	0	0	0	0	12	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**2**	**0**	**9**	**693**	**10**	**5**

Table 5.8.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	-	0	0	-	0	0	-	-	-	-	-	-	5
1	-	2	1	-	0	0	-	0	-	0	-	0	6
-	-	0	0	-	0	0	0	0	-	0	-	0	7
0	0	1	0	0	0	1	0	0	0	0	0	0	8
6	0	71	17	0	16	22	1	2	0	1	0	1	9
0	-	0	0	-	0	0	-	0	-	-	-	0	10
-	-	0	-	-	0	-	-	-	-	-	-	-	11
0	-	1	0	0	0	7	0	0	0	0	0	0	12
0	-	2	0	0	1	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
8	**0**	**77**	**19**	**0**	**18**	**30**	**1**	**3**	**0**	**1**	**0**	**1**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	-	-	-	2
-	-	-	-	3
-	-	-	-	4
0	0	0	2	5
-	1	0	23	6
-	0	0	0	7
-	1	1	6	8
- 10	36	40	671	9
0	0	0	0	10
-	-	0	0	11
-	2	2	22	12
-	1	1	13	13
-	-	-	-	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 10	**40**	**45**	**738**	**28**

5.3.9 Wood, paper and commodities thereof

114 commodities

The physical input-output table for wood, paper and commodities thereof consists of 114 selected commodities and groups of commodities, including Christmas trees, sawdust, barked timber, timber, railway sleepers, posts, veneers, wooden tools, frames, packing cases, pallets, window and door frames, natural cork, wood pulp, paper pulp, crude paper, other paper, cardboard, sacks, boxes, newspapers, books, stamps and printed matter. Fire wood and furniture are not included in this group (cf. instead section 5.3.4 and 5.3.10 respectively).

Table 5.9.c **General material balance - Wood, paper and commodities thereof 1990**

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	2.8	Exports	1.4
Danish resources	1.2	Accumulation	0.3
Water added to products	0.0	Changes in stocks	0.0
Recycling of residuals	0.4	Residuals	2.7
Total	**4.4**	**Total**	**4.4**

Supply

The total supply of materials within this group of commodities consisted of imports of 2.8 million tonnes, a supply from Danish nature of 1.2 million tonnes and a recycling of 0.4 million ton. The total supply was thus 4.4 million tonnes.

Use

Use consisted of 1.4 million tonnes of exports, an accumulation via gross capital formation of 0.3 million ton and residuals amounting to 2.7 million tonnes.

Intermediate consumption

Table 5.9.a shows that the intermediate consumption materials of this group (including water added to products and recycling) totalled 6.9 million tonnes. Imports and intermediate consumption materials supplied from Danish industry are broken down evenly with 2.7 million tonnes from each of these sources. For each individual industry, however, there is a great difference in the proportion between the input of imported and Danish-produced intermediate consumption materials. The import share was particularly large for the paper, printing and publishing industry as the imports here amounted to 0.9 million ton, while supplies from Danish industries only were 0.3 million ton.

Resource use

The resource use of forestry totalling 1.2 million tonnes of wood is on the output side (row 2 in the input-output table), *inter alia*, converted to supplies of 0.8 million ton for manufacturing of wood products incl. furniture and 0.3 million ton for exports. Exports of Christmas trees, among other things, belong to the latter group.

Manufacture of wood products

33000 Manufacturing of wood products incl. furniture (row 7) supplies, *inter alia*, wood products for the construction industry, gross capital formation and, not least, for exports.

Manufacture of paper etc.

34000 Paper, printing and publishing industry accounts for a total input of 1.7 million tonnes, which includes 0.4 million ton of recycled paper (row 31).

Private consumption

The private consumption of wood, paper and products thereof amounted to 0.3 million ton. From the table it may be seen that 0.2 million ton were supplied from the paper, printing and publishing industry, which also includes newspapers and publishing companies, etc. Paper in the form of newspapers, periodicals and books is thus included in this quantity.

Exports

The total exports of 1.4 million tonnes are broken down into the above-mentioned export of 0.3 million ton from forestry, 0.5 million ton from manufacture of wood products industry and 0.5 million ton from the paper, printing and publishing industry.

Detailed imports

From the table for industry-distributed imports, table 5.9.b, it appears that within this group of commodities it was the case that approximately half of the imports of 2.8 million tonnes were supplied from foreign manufacturing of wood products incl. furniture industry and slightly less than half from foreign paper, printing and publishing industry.

Table 5.9.a Physical input-output table 1990 - Wood, paper and commodities thereof - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	759	13	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	-	-	0	0
6 32000 Textile, clothing, leather industry	-	-	-	-	0	-	0	0	0
7 33000 Manuf. of wood products, incl. furnit.	3	0	0	0	43	1	381	7	9
8 34000 Manuf. of paper, printing, publishing	7	0	0	1	213	10	26	321	41
9 35000 Chemical and petroleum industries	0	-	-	0	0	0	0	0	0
10 36000 Non-metallic mineral products	-	-	-	-	0	-	-	0	-
11 37000 Basic metal industries	0	-	-	-	0	-	0	0	0
12 38000 Manuf. of fabricated metal products	0	-	-	0	0	0	0	0	0
13 39000 Other manufacturing industries	0	-	0	0	1	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**10**	**0**	**0**	**1**	**259**	**11**	**1 167**	**342**	**50**
29 Imports	2	0	0	0	55	7	893	916	22
30 Danish resource extraction etc	-	1 199	-	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	409	-
32 Water added to products	-	-	-	-	-	-	6	16	-
33 Households									
34 Total	**12**	**1 199**	**0**	**1**	**314**	**19**	**2 066**	**1 683**	**72**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	1	834	13	19
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	0	0	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	0	1	0
7 33000 Manuf. of wood products, incl. furnit.	0	0	5	0	2	850	19	236
8 34000 Manuf. of paper, printing, publishing	1	1	15	1	56	963	158	0
9 35000 Chemical and petroleum industries	0	0	0	0	0	2	1	0
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	-
11 37000 Basic metal industries	-	-	0	-	-	0	-	0
12 38000 Manuf. of fabricated metal products	0	-	0	-	0	2	0	1
13 39000 Other manufacturing industries	0	0	1	0	0	6	4	6
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-		-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-		-
28 Total (1-27)	**1**	**1**	**21**	**1**	**60**	**2 657**	**195**	**262**
29 Imports	1	1	5	1	52	2 656	58	42
30 Danish resource extraction etc.	-	-	-	-	-	1 199		
31 Materials recycled	-	-	-	-	-	409		
32 Water added to products	-	-	-	-	-	22		
33 Households								
34 Total	**2**	**2**	**26**	**2**	**112**	**6 943**	**253**	**304**

Table 5.9.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
2	0	8	-	-	50	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	0	-	-	-	-	-	-	5
-	-	0	-	-	-	0	0	-	-	-	-	0	6
10	2	115	5	0	261	2	0	1	0	1	0	1	7
17	1	77	13	3	11	84	1	5	2	7	1	48	8
0	0	0	0	0	0	0	0	0	0	0	0	0	9
-	-	0	-	-	-	0	-	-	-	-	-	-	10
0	0	0	-	-	-	0	-	-	-	-	-	-	11
0	0	0	0	0	1	0	0	0	0	0	-	0	12
0	0	1	0	0	0	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
29	**3**	**201**	**19**	**3**	**324**	**87**	**1**	**6**	**2**	**7**	**1**	**50**	**28**
32	1	73	31	3	467	50	3	5	2	6	1	26	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	-	-	-	-	-	-	-	-	-	32
													33
61	**4**	**274**	**50**	**6**	**791**	**137**	**4**	**11**	**4**	**14**	**1**	**76**	**34**

demand			Residuals etc.							Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Packaging	Specific waste	Others	Total		
-	-	-						12	12	12	1
51	282	365						0	0	1 199	2
-	-	-						0	0	0	3
-	-	-						1	1	1	4
-	0	0						314	314	314	5
-	0	1						18	18	19	6
20	504	778						438	438	2 066	7
- 8	533	684						36	36	1 683	8
-	1	2						68	68	72	9
0	0	0						61	61	61	10
-	0	0						4	4	4	11
0	1	2						270	270	274	12
0	10	19						25	25	50	13
-	-	-						6	6	6	14
-	-	-						791	791	791	15
-	-	-						137	137	137	16
-	-	-						4	4	4	17
-	-	-						11	11	11	18
-	-	-						4	4	4	19
-	-	-						14	14	14	20
-	-	-						1	1	1	21
-	-	-						76	76	76	22
-	-	-						2	2	2	23
-	-	-						2	2	2	24
-	-	-						26	26	26	25
-	-	-						2	2	2	26
-	-	-						112	112	112	27
64	**1 330**	**1 851**						**2 435**	**2 435**	**6 943**	**28**
- 32	112	181								2 837	29
										1 199	30
										409	31
										22	32
								253	253	253	33
32	**1 443**	**2 032**						**2 688**	**2 688**	**11 664**	**34**

Table 5.9.b Imports by industries 1990 - Wood, paper and commodities thereof - 1 000 ton

	Input								
	I1000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	170	2	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	0	-	-	-	0	0	0	0	0
6 32000 Textile, clothing, leather industry	-	-	-	-	0	-	-	0	0
7 33000 Manuf. of wood products, incl. furnit...	1	0	0	0	10	I	694	143	6
8 34000 Manuf. of paper, printing, publishing...	1	0	0	0	44	6	29	770	16
9 35000 Chemical and petroleum industries	0	-	-	0	0	0	0	0	0
10 36000 Non-metallic mineral products	-	-	-	-	0	-	0	0	-
11 37000 Basic metal industries	0	-	-	-	0	-	0	0	0
12 38000 Manuf. of fabricated metal products	0	-	-	-	0	0	0	0	0
13 39000 Other manufacturing industries	0	-	-	0	0	0	0	1	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health....	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair....	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**2**	**0**	**0**	**0**	**55**	**7**	**893**	**916**	**22**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	0	181	0	17
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	0	-	0	0	0	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	0	1	0
7 33000 Manuf. of wood products, incl. furnit...	0	0	2	0	2	1 405	18	24
8 34000 Manuf. of paper, printing, publishing...	1	0	3	0	50	1 065	32	0
9 35000 Chemical and petroleum industries	0	0	0	0	0	1	7	0
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	-
11 37000 Basic metal industries	-	-	-	-	-	0	-	0
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	1	0	0
13 39000 Other manufacturing industries	0	0	0	0	0	2	0	1
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health....	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair....	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**1**	**5**	**1**	**52**	**2 656**	**58**	**42**

Table 5.9.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
0	0	1	-	-	7	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	-	0	0	0	0	0	-	0	0	0	-	0	5
0	-	0	-	0	0	0	0	0	-	0	-	0	6
19	1	56	21	1	431	7	0	2	1	2	0	5	7
13	0	15	10	2	28	43	1	3	1	4	0	22	8
0	0	0	0	0	0	0	1	0	0	0	-	0	9
0	-	0	-	-	0	0	-	-	-	0	-	0	10
0	0	0	-	-	-	-	-	-	-	-	-	-	11
0	0	0	0	0	0	0	0	0	0	0	-	0	12
0	0	0	0	0	0	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
32	**1**	73	**31**	**3**	467	**50**	**3**	**5**	**2**	6	**1**	**26**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
3	2	22	202	2
-	-	-	-	3
-	-	-	-	4
-	0	0	0	5
-	0	1	1	6
- 40	66	68	1 473	7
5	41	78	1 143	8
-	3	10	11	9
-	0	0	1	10
-	0	0	0	11
-	0	0	1	12
0	1	2	4	13
-	-	-	-	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 32	**112**	**181**	**2 837**	**28**

5.3.10 Other commodities

1,139 commodities

The last actual group of commodities/physical input-output table comprises 1,139 commodities and services, which together with the other groups of commodities and physical input-output tables, constitute an exhaustive breakdown of all commodities and services covered by the commodity balances of the national accounts. A large proportion is represented by supplies of services, which by definition have a weight of zero (Cf. footnote 11 on page 26).

Among the actual commodities with a positive weight which are included in this group are car tyres, rubber goods, leather, leather ware, silk, yarn, textiles, carpets, garments, footwear, glass, broken glass, glassware, pearls, diamonds, precious metals, furniture, lighting articles, toys, sports equipment, pencils, stamp pads and antiques.

Table 5.10.c **General material balance - Other commodities 1990**

Origin/supply		Destination/use	
	Mill. ton		Mill. ton
Imports	0.614	Exports	0.706
Water added to products	0.061	Accumulation	0.161
		Changes in stocks	-0.022
		Residuals	-0.171
Total	**0.675**	**Total**	**0.675**

Supply

From the summary table 5.10.c it is apparent that the exchange between the economy and the environment in the case of this residual group was comparatively modest. The total supply was 675,000 tonnes, and the bulk was represented by imported commodities.

Use

On the use side exports of 706,000 tonnes and accumulation via gross capital formation of 161,000 tonnes can be seen. In addition there is a change in stocks of 22,000 tonnes and a negative residual of 171,000 tonnes. The negative residual is caused here too by intermediate consumption materials, which are included in other groups of commodities, being included for the production of goods in this group. The negative residual is thus counterbalanced by positive contributions to the residuals as far as other groups are concerned.

Intermediate consumption

From the physical input-output table 5.10.a and the detailed import table 5.10.b, it may be seen that the use of these commodities as intermediate consumption materials is concentrated around three areas

- The use by the food products, beverages and tobacco industry of products from the non-metallic mineral products industry
- The use by the textile, clothing and leather industry of products from the industry itself
- The use by the construction industry of products from the non-metallic mineral products industry.

In the first of the above cases what is involved is the food products, beverages and tobacco industry using glass products as packaging, among other things (cf. also section 5.3.11). In the second case, what is involved is comparatively major imports of commodities from the foreign textile, clothing and leather industry for further processing in the corresponding Danish industry. In the latter case, the ex-

planation is that glass, among other things, is used in the construction industry in connection with repair and maintenance as well as in construction of new buildings.

Private consumption

Total private consumption of this group of commodities amounts to 651,000 tonnes distributed among, *inter alia*, commodities from the textile, clothing and leather ware industry, the manufacture of wood products, and the paper, printing and publishing industry.

Exports

Just over half of exports (including re-exports) totalling 706,000 tonnes were supplied by the industry for manufacture of wood products.

Table 5.10.a Physical input-output table 1990 - Other commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	6	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	0	20	-	-	-
6 32000 Textile, clothing, leather industry	0	0	0	0	0	24	7	1	1
7 33000 Manuf. of wood products, incl. furnit.	-	-	-	-	0	1	23	0	0
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	0	0	0	0	0
9 35000 Chemical and petroleum industries	0	0	0	0	1	1	1	0	3
10 36000 Non-metallic mineral products	0	-	-	-	89	0	22	0	10
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	0	0	0	0	0	2	0	0
13 39000 Other manufacturing industries	0	0	0	0	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**0**	**0**	**90**	**53**	**55**	**2**	**14**
29 Imports	1	0	0	0	25	101	24	2	26
30 Danish resource extraction etc	-	-	-	-	-	-	-	-	-
31 Materials recycled	-	-	-	-	-	-	-	-	-
32 Water added to products	-	-	-	-	-	61	-	-	-
33 Households									
34 Total	**2**	**0**	**1**	**0**	**115**	**214**	**80**	**3**	**40**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	6	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	20	-	-
6 32000 Textile, clothing, leather industry	0	0	1	0	1	42	154	9
7 33000 Manuf. of wood products, incl. furnit.	-	-	5	-	1	40	217	51
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	3	6	98	3
9 35000 Chemical and petroleum industries	0	0	1	0	1	24	15	3
10 36000 Non-metallic mineral products	-	-	1	-	0	167	2	1
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	0	0	0	0	12	12	40
13 39000 Other manufacturing industries	0	0	0	0	1	7	10	1
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-		-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-		-
28 Total (1-27)	**0**	**0**	**8**	**0**	**7**	**323**	**507**	**107**
29 Imports	0	0	5	0	14	366	144	54
30 Danish resource extraction etc.	-	-	-	-	-	-		
31 Materials recycled	-	-	-	-	-	-		
32 Water added to products	-	-	-	-	-	61		
33 Households								
34 Total	**0**	**0**	**13**	**0**	**22**	**750**	**651**	**161**

Table 5.10.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	5
0	0	1	0	0	2	1	0	1	0	0	0	0	6
0	-	4	0	-	7	0	-	0	-	0	-	0	7
0	0	0	0	0	0	0	0	0	0	0	0	0	8
0	0	5	1	0	2	3	0	5	0	0	0	0	9
4	0	9	0	0	26	6	-	0	0	0	-	0	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
0	0	2	0	0	6	0	0	0	0	0	0	0	12
0	0	0	4	0	1	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
5	**0**	**21**	**5**	**0**	**44**	**11**	**0**	**6**	**0**	**0**	**0**	**1**	**28**
60	0	35	7	0	47	8	0	7	0	0	0	1	29
-	-	-	-	-	-	-	-	-	-	-	-	-	30
-	-	-	-	-	-	-	-	-	-	-	-	-	31
-	-	-	-	-	-	-	-	-	-	-	-	-	32
													33
65	**0**	**55**	**12**	**0**	**91**	**19**	**1**	**13**	**1**	**1**	**0**	**2**	**34**

demand			Residuals etc.							Total	
Changes in stocks	Exports	Total	Carbon, C	Sulphur, S	Energy, others	Packaging	Specific waste	Others	Total		
14	2	16						- 20	- 20	2	1
-	-	-						0	0	0	2
-	-	-						1	1	1	3
-	-	-						0	0	0	4
- 9	22	13						82	82	115	5
- 2	106	267						- 94	- 94	214	6
- 6	318	580						- 540	- 540	80	7
-	1	102						- 104	- 104	3	8
0	51	69						- 53	- 53	40	9
- 6	70	66						- 168	- 168	65	10
-	-	-						0	0	0	11
- 2	42	92						- 49	- 49	55	12
0	33	44						- 39	- 39	12	13
-	-	-						0	0	0	14
-	-	-						91	91	91	15
-	-	-						19	19	19	16
-	-	-						1	1	1	17
-	-	-						13	13	13	18
-	-	-						1	1	1	19
-	-	-						1	1	1	20
-	-	-						0	0	0	21
-	-	-						2	2	2	22
-	-	-						0	0	0	23
-	0	0						0	0	0	24
-	-	-						13	13	13	25
-	-	-						0	0	0	26
-	-	-						22	22	22	27
- 11	**646**	**1 249**						**- 822**	**- 822**	**750**	**28**
- 11	61	248								614	29
										-	30
										-	31
										61	32
								651	651	651	33
- 22	**706**	**1 497**						**- 171**	**- 171**	**2 075**	**34**

Table 5.10.b Imports by industries 1990 - Other commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	6	-	-	1
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	3	-	-	-
6 32000 Textile, clothing, leather industry	0	0	0	0	1	76	5	1	3
7 33000 Manuf. of wood products, incl. furnit.	0	-	-	0	0	1	9	0	0
8 34000 Manuf. of paper, printing, publishing	0	-	-	-	0	0	0	0	0
9 35000 Chemical and petroleum industries	1	0	0	0	1	13	2	0	18
10 36000 Non-metallic mineral products	0	-	-	0	23	0	8	0	4
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	0	-	0	0	0	1	1	0	1
13 39000 Other manufacturing industries	0	0	0	0	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**0**	**0**	**25**	**101**	**24**	**2**	**26**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	7	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	0	0	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	3	-	-
6 32000 Textile, clothing, leather industry	0	0	0	0	3	105	76	8
7 33000 Manuf. of wood products, incl. furnit.	0	0	1	0	1	16	20	22
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	0	0	1	-
9 35000 Chemical and petroleum industries	0	0	1	0	3	70	17	4
10 36000 Non-metallic mineral products	0	0	2	0	0	138	11	6
11 37000 Basic metal industries	-	-	-	-	-	0	0	-
12 38000 Manuf. of fabricated metal products	0	0	0	0	5	18	7	13
13 39000 Other manufacturing industries	0	0	0	0	2	8	13	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-2	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	0	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**5**	**0**	**14**	**366**	**144**	**54**

Table 5.10.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
0	0	0	0	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	0	0	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	5
0	0	3	1	0	7	1	0	1	0	0	0	0	6
0	-	2	0	0	3	0	0	0	0	0	0	0	7
0	-	0	0	0	0	0	0	0	0	0	0	0	8
0	0	16	1	0	2	5	0	6	0	0	0	0	9
58	0	11	0	0	29	2	0	0	0	0	0	0	10
-	-	0	0	-	-	-	-	-	-	-	-	-	11
2	0	2	0	0	5	0	0	0	0	0	0	0	12
0	0	0	5	0	0	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
60	**0**	**35**	**7**	**0**	**47**	**8**	**0**	**7**	**0**	**0**	**0**	**1**	**28**

demand			Total	
Changes in stocks	Exports	Total		
1	1	1	8	1
-	-	-	-	2
-	-	-	-	3
0	0	0	0	4
- 1	2	1	4	5
- 3	26	107	211	6
- 2	3	43	59	7
-	0	1	2	8
- 1	18	38	108	9
- 4	3	17	155	10
-	0	0	0	11
- 1	3	23	41	12
0	2	15	24	13
-	-	-	-	14
-	-	-	-	15
0	2	0	0	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	0	0	0	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 11	**61**	**248**	**614**	**28**

5.3.11 Packaging

30 types

The physical input-output table for packaging has been constructed on the basis of 30 commodity balances for different packaging goods of plastic, wood, paper, cardboard, glass or metal. The grouping comprises sheets, foils, bags, sacks, carboys, bottles, drums, pallets, boxes, tubes, barrels, stoppers and caps of the said materials. Account is taken of the industries' use of empty packaging but not the supply of full packaging in connection with imports. The recycling of packaging is not included.

Recycling is not included

Table 5.11.c **General material balance - Packaging 1990**

Origin/supply		Destination/use	
	1 000 tonnes		1 000 tonnes
Imports of empty packaging	191	Exports	251
Materials for the production of empty packaging	883	Accumulation	14
		Changes in stocks	-18
		Use/residuals	827
Total	**1 074**	**Total**	**1 074**

Supply

Summary table 5.11.c shows that the total supply of materials in connection with packaging was 1.074 million tonnes, of which 191,000 tonnes were imported packaging, while 883,000 tonnes of materials went into Danish packaging production. In the latter figure only the weight of the materials, which went into the packaging itself, is included and not the intermediate consumption materials such as energy, which ended up as residual products in connection with production. Expressed in another way, the weight of empty packaging, which was either imported or produced in Denmark, was 1.074 million tonnes in 1990.

Use

On the use side we find that 251,000 tonnes of empty packaging were exported and 14,000 tonnes were accumulated via gross capital formation (among other things, wooden pallets). There was a decrease in stocks of 18,000 tonnes while the residual entry item of 827,000 tonnes corresponds to the actual Danish use of packaging in industries and households.

Materials for the production of packaging

The interpretation of physical input-output table 5.11.a for packaging is slightly different from the interpretation of the other physical input-output tables, since the rows for resource use, addition of water and recycling of waste are replaced by a row for total material consumption for production. The material quantities appearing in this row are material quantities, which go into the production processes and end up in finished packaging.[17]

The industries' consumption of packaging

The residual columns are replaced by columns for the use of different types of packaging (paper and cardboard, glass, metal, wood and plastic). In these columns the industries' use of the relevant packaging types is shown. This is not packaging waste from the industries but, by contrast, the quantity of packaging, which the industries have used for the packaging of their products. If we disregard recycling, these packaging quantities will, however, ultimately come up again as waste, although it will be other industries/households, which dispose of the packaging. For each industry and each packaging type, the use of packaging is calculated as the difference between the input of the relevant packaging type and output in the form

[17] In some cases the input of packaging, which is further processed, is included in addition to these quantities of materials. These quantities are, in the physical input-output table for packaging, included in the deliveries between Danish packaging producing industries and in imports from foreign to Danish packaging producing industries.

of sales of packaging to other industries and final demand. The recycling of packaging is not included in the table.

It is apparent from the physical input-output table for packaging that the overall Danish industries accounted for an input of 691,000 tonnes of Danish produced packaging and 178,000 tonnes of imported packaging - a total of 869,000 tonnes. The industries' own total packaging use was 817,000 tonnes. The difference of 52,000 tonnes corresponds to the use by the packaging producing industry of packaging as an intermediate consumption material for further processing.

Types of packaging

The industries' own total use of packaging of 817,000 tonnes breaks down into 370,000 tonnes of *paper and cardboard packaging*, 131,000 tonnes of *glass packaging*, 99,000 tonnes of *metal packaging*, 101,000 tonnes of *wood packaging* and 115,000 tonnes of *plastic packaging*.

The industries accounting for the greatest use of packaging were the food products, beverages and tobacco industry with 397,000 tonnes, manufacturing of fabricated metal products with 107,000 tonnes, and the wholesale and retail trade industry with 118,000 tonnes. Together these industries accounted for three-quarters of total packaging use.

The food products, beverages and tobacco industry mainly used paper and cardboard (167,000 tonnes) and also glass (112,000 tonnes) as packaging. If we disregard wood packaging, the food products, beverages and tobacco industry was, moreover, the biggest user of all types of packaging.

In connection with the manufacture of fabricated metal products, most of the packaging used was of wood (56,000 tonnes) but a good deal of paper and cardboard (40,000 tonnes) was also used.

The use of packaging by the wholesale and retail trade industry consisted mainly of paper and cardboard (67,000 tonnes). In addition, 26,000 tonnes of plastic packaging were used, viz. barely a quarter of the industries' total use of plastic packaging.

Exports

Total Danish exports of packaging amounted to 251,000 tonnes and were, to a great extent, supplied from the paper, printing and publishing industry.

Table 5.11.a Physical input-output table 1990 - Packaging - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	-	-	-	-
6 32000 Textile, clothing, leather industry	0	-	-	0	0	0	0	0	0
7 33000 Manuf. of wood products, incl. furnit.	3	-	-	0	14	0	3	1	6
8 34000 Manuf. of paper, printing, publishing	6	0	0	0	143	8	16	24	27
9 35000 Chemical and petroleum industries	0	0	2	0	23	2	1	2	11
10 36000 Non-metallic mineral products	-	-	-	-	89	-	-	0	8
11 37000 Basic metal industries	0	-	-	-	0	-	0	0	0
12 38000 Manuf. of fabricated metal products	0	-	0	0	49	0	0	0	9
13 39000 Other manufacturing industries	0	-	-	0	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**9**	**0**	**2**	**1**	**319**	**10**	**20**	**28**	**61**
29 Imports	1	0	1	0	78	2	3	8	22
30 Materials for production of packaging							92	425	139
31 Total	**10**	**0**	**4**	**1**	**397**	**13**	**115**	**461**	**222**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	-	-	-
6 32000 Textile, clothing, leather industry	-	-	-	-	0	0	0	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	1	-	0	82	0	8
8 34000 Manuf. of paper, printing, publishing	0	0	10	0	2	350	1	0
9 35000 Chemical and petroleum industries	0	0	0	0	12	82	4	2
10 36000 Non-metallic mineral products	-	-	-	-	0	104	0	0
11 37000 Basic metal industries	-	-	0	-	0	1	0	0
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	71	0	0
13 39000 Other manufacturing industries	0	0	0	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**11**	**0**	**15**	**691**	**6**	**10**
29 Imports	0	0	0	0	6	178	4	4
30 Materials for production of packaging						883		
31 Total	**0**	**0**	**12**	**0**	**21**	**1 751**	**10**	**14**

Table 5.11.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	5
0	-	0	0	-	0	0	-	0	-	-	-	-	6
7	1	45	0	-	-	1	-	-	-	-	-	-	7
8	1	36	6	0	0	60	0	0	0	0	0	0	8
2	0	5	1	0	1	19	1	0	0	0	0	0	9
-	-	1	-	-	-	6	-	-	-	-	-	-	10
0	0	0	0	-	0	0	-	-	-	-	-	-	11
0	0	2	0	-	0	10	0	0	-	0	-	0	12
0	0	0	0	0	0	0	0	0	0	0	0	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
17	**2**	**89**	**7**	**0**	**1**	**95**	**1**	**0**	**0**	**0**	**0**	**1**	**28**
3	0	24	2	0	2	23	0	0	0	0	0	0	29
138	2												30
158	**4**	**200**	**9**	**0**	**3**	**118**	**1**	**1**	**0**	**1**	**0**	**1**	**31**

demand			Industries' consumption of packaging						Total	
Changes in stocks	Exports	Total	Paper and cardboard	Glass	Metals	Wood	Plastic	Total		
-	-	-	6	-	-	4	0	10	10	1
-	-	-	0	-	-	-	0	0	0	2
-	-	-	0	-	-	-	4	4	4	3
-	-	-	0	-	0	0	1	1	1	4
-	-	-	167	112	64	17	37	397	397	5
0	0	0	10	-	0	0	3	13	13	6
- 5	9	12	18	-	0	2	2	21	115	7
- 4	106	103	3	-	1	2	2	8	461	8
- 1	66	71	28	10	14	8	7	69	222	9
- 4	37	34	9	0	0	8	3	20	158	10
-	1	1	1	-	0	1	0	2	4	11
- 1	23	22	40	1	1	56	8	107	200	12
-	2	2	5	-	0	0	1	7	9	13
-	-	-	0	-	-	-	0	0	0	14
-	-	-	0	-	1	-	2	3	3	15
-	-	-	67	7	16	1	26	118	118	16
-	-	-	0	-	-	-	1	1	1	17
-	-	-	0	-	-	-	1	1	1	18
-	-	-	0	-	-	-	0	0	0	19
-	-	-	0	-	-	-	0	1	1	20
-	-	-	0	-	-	-	0	0	0	21
-	-	-	1	-	-	-	0	1	1	22
-	-	-	0	-	-	-	0	0	0	23
-	-	-	0	-	-	-	0	0	0	24
-	-	-	11	-	-	1	0	12	12	25
-	-	-	0	-	-	-	0	0	0	26
-	-	-	3	-	0	0	17	21	21	27
- 14	**242**	**244**	**370**	**131**	**99**	**101**	**115**	**817**	**1 751**	**28**
- 4	9	13							191	29
									883	30
- 18	**251**	**257**	**370**	**131**	**99**	**101**	**115**	**817**	**2 825**	**31**

Table 5.11.b Imports by industries 1990 - Packaging - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	-	-	-	-
6 32000 Textile, clothing, leather industry	0	-	-	0	0	0	0	0	0
7 33000 Manuf. of wood products, incl. furnit.	1	-	-	0	3	0	1	0	2
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	23	1	2	5	4
9 35000 Chemical and petroleum industries	0	0	1	0	13	1	1	2	10
10 36000 Non-metallic mineral products	-	-	-	-	23	-	-	0	2
11 37000 Basic metal industries	0	-	-	-	0	-	0	0	0
12 38000 Manuf. of fabricated metal products	0	-	0	0	14	0	0	1	4
13 39000 Other manufacturing industries	0	-	-	0	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**1**	**0**	**1**	**0**	**78**	**2**	**3**	**8**	**22**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	-	-	-	-
2 12000 Forestry and logging	-	-	-	-	-	-	-	-
3 13000 Fishing	-	-	-	-	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	-	-	-	-	-	-	-
6 32000 Textile, clothing, leather industry	-	-	-	-	0	0	0	-
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	20	0	2
8 34000 Manuf. of paper, printing, publishing	0	0	0	0	1	53	1	0
9 35000 Chemical and petroleum industries	0	0	0	0	5	46	2	1
10 36000 Non-metallic mineral products	-	-	-	-	0	27	0	0
11 37000 Basic metal industries	-	-	-	-	0	3	0	0
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	28	1	0
13 39000 Other manufacturing industries	0	-	0	-	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**0**	**0**	6	**178**	**4**	**4**

Table 5.11.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	5
0	-	0	0	-	0	0	-	0	-	-	-	-	6
2	0	11	0	-	-	0	-	-	-	-	-	-	7
1	0	5	1	0	0	9	0	0	0	0	0	0	8
1	0	4	1	0	1	7	0	0	0	0	0	0	9
-	-	0	-	-	-	1	-	-	-	-	-	-	10
0	0	1	0	-	0	1	-	-	-	-	-	-	11
0	0	3	0	-	0	5	0	0	-	0	-	0	12
0	-	0	0	0	0	0	0	0	0	0	-	0	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
3	**0**	**24**	**2**	**0**	**2**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	-	-	-	1
-	-	-	-	2
-	-	-	-	3
-	-	-	-	4
-	-	-	-	5
-	0	0	0	6
- 1	2	3	22	7
- 1	1	1	54	8
- 1	4	7	54	9
- 1	1	-	27	10
-	0	0	3	11
-	0	1	30	12
-	0	0	0	13
-	-	-	-	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 4	**9**	**13**	**191**	**28**

5.3.12 Nitrogen content of commodities

Nitrogen content of 812 commodities

The tables in this section relate to flows of nitrogen linked with 812 of the national accounts' commodity balances. Against the background of the nitrogen content in percentage terms of each of the commodities, the relevant commodity balances are calculated from the product weight to the weight of nitrogen contained in the commodities.

The commodities for which the nitrogen content is calculated are, *inter alia*, animal and vegetable products (including leather, hides, wood and wood products), chemical products and fertilisers, plastic and plastic products, yarn, textiles and garments.

References

The nitrogen percentages have been arrived at from, *inter alia*, *Statistics Denmark, 1995*, *Sibbesen, 1990*, *Kyllingsbæk, 1995* and *Møller & Saxholt, 1996*. In addition, nitrogen percentages have been used from a Norwegian nitrogen research project, cf. *Bleken and Bakken, 1997a* and *Bleken and Bakken, 1997b*.[18]

Table 5.12.c

General material balance[1] - Nitrogen 1990

Origin/supply		Destination/use	
	1 000 ton		1 000 ton
Imports	784	Exports	296
Danish resources	98	Accumulation	2
		Changes in stocks	47
		Losses etc./residual	536
Total	**882**	**Total**	**882**

[1] Excluding deposition of nitrogen from the air.

Supply

From the summary table 5.12.c it can be seen that nitrogen flows to the economy consisted of 784,000 tonnes of nitrogen in imported commodities plus 98,000 tonnes from Danish nature, a total supply of nitrogen of 882,000 tonnes.

Use

This quantity is broken down on the use side into 296,000 tonnes in exports, 47,000 tonnes in stock changes, 2,000 tonnes accumulated in connection with gross capital formation (*inter alia* agriculture's breeding stock) and a residual of 536,000 tonnes, which include losses to Danish nature.

Inter-industry flows

The physical input-output table 5.12.a for nitrogen flows shows, *inter alia*, that the flows of nitrogen in the economy were concentrated around three sectors: agriculture, horticulture etc., the food products, beverages and tobacco industry, and the chemical and petroleum industry.

Agriculture, horticulture etc.

In the case of agriculture, horticulture etc., there was an overall input of nitrogen of 704,000 tonnes. Of this, 134,000 tonnes came from Danish chemical and petroleum industries, 273,000 tonnes from the corresponding foreign industries (cf. table 5.12.b) and 48,000 tonnes from nature in the form of the biological fixing of nitrogen by plants.

In connection with agriculture's use of products from the food products, beverages and tobacco industry, 52,000 tonnes were contained in Danish products and 144,000 tonnes of nitrogen in imported products.

[18] Parts of the database from the Norwegian project have kindly been made available by Marina Azzaroli Bleken, Agricultural University of Norway, Department of Horticulture and Crop Sciences.

Surplus

On the output side, agriculture and horticulture, etc. supplied 115,000 tonnes of nitrogen to the food products, beverages and tobacco industry and 81,000 tonnes to the rest of the world embedded in exported agricultural goods. In the case of agriculture, horticulture, etc., there is a difference in the commodity related input and output of nitrogen of 443,000 tonnes. This excess of nitrogen can also be interpreted as loss from the industry to the environment. It constitutes the bulk of the overall loss of nitrogen on the part of the industries totalling 477,000 tonnes.

Input from nature

The total input of nitrogen from nature was 98,000 tonnes. In addition to the above-mentioned 48,000 tonnes to agriculture, 2,000 tonnes were directly supplied from nature to the economy via biomass growth in forestry and 48,000 tonnes via biomass growth in fishing.

The food products, beverages and tobacco industry

The food products, beverages and tobacco industry accounted for a total input of nitrogen of 245,000 tonnes. Of this, 115,000 tonnes were, as stated, supplied from agriculture and horticulture, etc., 38,000 tonnes from fishing and 53,000 tonnes from the industry itself.

Use of the industry's nitrogen is broken down into 52,000 tonnes to agriculture and horticulture, etc., inter-industry deliveries of 53,000 tonnes, 90,000 tonnes for exports and 28,000 tonnes to private consumption. For the food products, beverages and tobacco industry, we find a total residual of 9,000 tonnes. This surplus includes, *inter alia*, the nitrogen content of solid waste and sewage sludge.

Fertilisers

The total input to the chemical and petroleum products industry was 323,000 tonnes of nitrogen, of which a very large part (297,000 tonnes, cf. table 5.12.b) was attributed to imports from the foreign chemical industry. This large import of nitrogen is linked with the import of intermediate consumption materials for fertiliser production. The nitrogen in the products of the Danish chemical and petroleum industry was primarily sold to agriculture (134,000 tonnes) and to the rest of the world via exports (98,000 tonnes).

Private consumption

The nitrogen content supplied to private consumption totalled 59,000 tonnes. The bulk was supplied direct from the Danish and foreign food products, beverages and tobacco industry, but it may also be seen that there were nitrogen flows associated with flows of goods (food) from restaurants and hotels and producers of government services (hospital kitchens, etc.).

Residuals from households

The nitrogen content of private consumption is, as a whole, also recorded in the physical input-output table's residual part on the basis of an assumption that nitrogen is finally returned to the environment in conjunction with waste and sewage.

Surplus

Of the total commodity-related nitrogen surplus/loss of 536,000 tonnes, 443,000 tonnes (83%) can be attributed to agriculture, horticulture etc., 59,000 (11%) to households while the remaining 34,000 tonnes (6%) is distributed among the other industries.[19]

[19] Note that no account is taken in the statement of nitrogen surplus of the wet and dry deposition of nitrogen on agricultural areas or of the supply of nitrogen via the spreading of sludge. The nitrogen content of sludge is contained in the residuals of other industries and households.

Table 5.12.a Physical input-output table 1990 - Nitrogen content of commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	49	-	-	-	115	0	0	-	0
2 12000 Forestry and logging	0	-	-	-	0	-	1	0	-
3 13000 Fishing	2	-	0	-	38	-	-	-	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	52	-	1	-	53	2	0	-	1
6 32000 Textile, clothing, leather industry	0	-	-	-	0	1	1	0	0
7 33000 Manuf. of wood products, incl. furnit.	0	-	-	-	0	0	1	0	0
8 34000 Manuf. of paper, printing, publishing	0	-	-	-	0	0	0	0	0
9 35000 Chemical and petroleum industries	134	-	0	0	6	0	0	0	21
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	0	-	0	0	0
13 39000 Other manufacturing industries	-	-	-	-	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**238**	**-**	**1**	**0**	**212**	**4**	**3**	**1**	**23**
29 Imports	418	-	0	0	34	6	2	2	300
30 Biological fixation of nitrogen, etc	48	2	48						
31 Nitrogen from private consumption									
32 Total	**704**	**2**	**50**	**0**	**245**	**9**	**5**	**2**	**323**

	Input (cont.)						Final	
	93 009	94 000	95 009	95 399	98 099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	0	-	-	0	167	6	1
2 12000 Forestry and logging	-	-	-	-	0	1	0	0
3 13000 Fishing	-	-	-	-	0	41	0	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	0	-	-	2	115	28	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	2	1	0
7 33000 Manuf. of wood products, incl. furnit.	-	-	0	-	0	2	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	0	0	0
9 35000 Chemical and petroleum industries	-	0	0	-	4	168	2	0
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	0	0	0
13 39000 Other manufacturing industries	-	-	0	-	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	5	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	3	-
28 Total (1-27)	**-**	**0**	**0**	**-**	**7**	**496**	**46**	**1**
29 Imports	0	0	0	-	3	771	12	0
30 Biological fixation of nitrogen, etc						98		
31 Nitrogen from private consumption								
32 Total	**0**	**0**	**0**	**-**	**10**	**1 365**	**59**	**2**

Table 5.12.a

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	-	2	-	-	0	-	-	-	-	-	1
0	-	0	0	-	0	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	0	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	0	0	-	-	-	3	-	-	-	-	-	5
0	-	0	0	-	0	-	-	0	-	-	-	-	6
0	0	0	0	-	1	0	-	0	-	-	-	-	7
0	-	0	0	0	0	0	-	-	-	-	-	-	8
0	-	1	0	-	0	0	0	0	-	-	-	-	9
0	-	0	0	-	0	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	0	0	-	0	-	-	0	-	-	-	-	12
-	-	0	0	-	0	-	-	0	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
0	**0**	**1**	**0**	**2**	**1**	**0**	**4**	**0**	-	-	-	-	**28**
1	0	3	0	-	2	0	1	0	-	-	-	-	29
													30
													31
1	**0**	**4**	**1**	**2**	**3**	**1**	**5**	**0**	-	-	-	-	**32**

demand			Loss etc.	Total	
Changes in stocks	Exports	Total			
6	81	94	443	704	1
0	0	0	0	2	2
1	6	7	2	50	3
-	-	-	0	0	4
3	90	121	9	245	5
0	5	7	0	9	6
0	1	2	2	5	7
-	0	0	2	2	8
52	98	153	2	323	9
-	0	0	1	1	10
-	-	-	0	0	11
-	0	0	4	4	12
-	0	0	0	1	13
-	-	-	2	2	14
-	-	-	3	3	15
-	-	-	1	1	16
-	-	5	-	5	17
-	-	-	0	0	18
-	-	-	-	-	19
-	-	-	-	-	20
-	-	-	-	-	21
-	-	-	-	-	22
-	-	-	0	0	23
-	-	-	0	0	24
-	-	-	0	0	25
-	-	-	-	-	26
-	-	3	7	10	27
62	**282**	**391**	**477**	**1 365**	**28**
- 14	14	12	-	784	29
				98	30
			59	59	31
47	**296**	**404**	**536**	**2 305**	**32**

Table 5.12.b Imports by industries 1990 - Nitrogen content of commodities - 1 000 ton

	Input								
	11000	12000	13000	20000	31000	32000	33000	34000	35000
1 11000 Agriculture, horticulture etc	1	-	-	-	5	0	-	-	0
2 12000 Forestry and logging	-	-	-	-	-	-	0	0	-
3 13000 Fishing	0	-	0	-	8	-	-	-	0
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	144	-	0	-	16	0	0	1	1
6 32000 Textile, clothing, leather industry	0	-	-	-	0	4	0	0	0
7 33000 Manuf. of wood products, incl. furnit	0	-	-	-	0	0	1	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	0	0	0	0
9 35000 Chemical and petroleum industries	273	-	0	0	5	1	1	1	297
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	0	0
11 37000 Basic metal industries	-	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	-	-	0	0	0	0	1
13 39000 Other manufacturing industries	-	-	-	-	0	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-	-
28 Total (1-27)	**418**	**-**	**0**	**0**	**34**	**6**	**2**	**2**	**300**

	Input (cont.)						Final	
	93009	94000	95009	95399	98099	Total	Private consump.	Capital formation
1 11000 Agriculture, horticulture etc	-	-	-	-	0	7	1	0
2 12000 Forestry and logging	-	-	-	-	-	0	0	0
3 13000 Fishing	-	-	-	-	0	8	0	-
4 20000 Mining and quarrying	-	-	-	-	-	-	-	-
5 31000 Manuf. of food, beverages, tobacco	-	0	-	-	0	164	5	-
6 32000 Textile, clothing, leather industry	-	-	0	-	0	5	3	0
7 33000 Manuf. of wood products, incl. furnit	-	-	0	-	0	2	0	0
8 34000 Manuf. of paper, printing, publishing	-	-	-	-	0	0	0	0
9 35000 Chemical and petroleum industries	0	0	0	-	2	583	2	0
10 36000 Non-metallic mineral products	-	-	-	-	0	0	0	-
11 37000 Basic metal industries	-	-	-	-	-	-	-	-
12 38000 Manuf. of fabricated metal products	-	-	0	-	0	2	0	0
13 39000 Other manufacturing industries	-	-	0	-	0	0	0	0
14 40000 Electricity, gas and water	-	-	-	-	-	-	-	-
15 50000 Construction	-	-	-	-	-	-	-	-
16 60099 Wholesale and retail trade	-	-	-	-	-	-	-	-
17 63000 Restaurants and hotels	-	-	-	-	-	-	-	-
18 71000 Transport and storage	-	-	-	-	-	-	-	-
19 72000 Communication	-	-	-	-	-	-	-	-
20 80099 Financing and insurance	-	-	-	-	-	-	-	-
21 83110 Dwellings	-	-	-	-	-	-	-	-
22 83509 Business services	-	-	-	-	-	-	-	-
23 93009 Market services of education, health	-	-	-	-	-	-	-	-
24 94000 Recreational and cultural services	-	-	-	-	-	-	-	-
25 95009 Household services, incl. auto repair	-	-	-	-	-	-	-	-
26 95399 Other producers, excl. government	-	-	-	-	-	-	-	-
27 98099 Producers of government services	-	-	-	-	-	-	-	-
28 Total (1-27)	**0**	**0**	**0**	**-**	**3**	**771**	**12**	**0**

Table 5.12.b

36000	37000	38000	39000	40000	50000	60099	63000	71000	72000	80099	83110	83509	
-	-	-	0	-	-	-	0	-	-	-	-	-	1
-	-	0	-	-	0	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	0	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	4
0	-	0	0	-	0	0	1	-	-	-	-	-	5
0	-	0	0	-	0	0	0	0	-	-	-	-	6
0	-	0	0	-	1	-	-	0	-	-	-	-	7
0	-	0	0	-	0	0	-	-	-	-	-	-	8
0	0	2	0	-	1	0	0	0	-	-	-	-	9
0	-	0	0	-	0	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	11
0	0	0	0	-	0	0	-	0	-	-	-	-	12
-	-	0	0	-	0	-	0	0	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	20
-	-	-	-	-	-	-	-	-	-	-	-	-	21
-	-	-	-	-	-	-	-	-	-	-	-	-	22
-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	24
-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	27
1	**0**	**3**	**0**	-	**2**	**0**	**1**	**0**	-	-	-	-	**28**

demand			Total	
Changes in stocks	Exports	Total		
-	1	2	8	1
-	0	0	0	2
1	2	3	11	3
-	-	-	-	4
4	4	13	177	5
-	1	3	9	6
-	0	0	2	7
-	0	0	0	8
- 18	7	- 9	574	9
-	0	0	0	10
-	-	-	-	11
0	0	0	2	12
-	0	0	0	13
-	-	-	-	14
-	-	-	-	15
-	-	-	-	16
-	-	-	-	17
-	-	-	-	18
-	-	-	-	19
-	-	-	-	20
-	-	-	-	21
-	-	-	-	22
-	-	-	-	23
-	-	-	-	24
-	-	-	-	25
-	-	-	-	26
-	-	-	-	27
- 14	**14**	**12**	**784**	**28**

6. Comparison of Danish and German physical flows of goods and materials

In this chapter, main figures from the Danish physical input-output tables and corresponding figures from German physical input-output tables for 1990 are compared. As far as methods are concerned, the Danish and German physical input-output tables are constructed in accordance with broadly the same principles. The German tables relate to the former West Germany.

Why compare?

A comparison is interesting in many ways. On the one hand, it can give an impression of whether the quantitative information in the physical input-output tables is of the same order of magnitude in the case of areas expected to be comparable beforehand, and on the other a comparison can indicate areas where Germany and Denmark differ as far as the volume of the flows of materials are concerned. Finally, a comparison of the tables can give an idea of the nature and volume of the flows of materials, which are not included in the Danish physical input-output tables but which are in the German ones.

German vs. Danish tables

The German physical input-output tables are, in some areas, more detailed and comprehensive than the Danish ones. The German tables thus include all water used in the economy, such as cooling water used for energy production. The Danish tables include only water which is added to products (for example, in beverages).

In the German tables, the consumption and discharge of oxygen in connection with combustion processes, plus oxygen and CO_2 used in biological metabolism, are also included. In the Danish tables, oxygen is not included in either the input side or the output side (oxygen as a commodity is, however, included).

As a result of these differences, not all figures are comparable, although a number of main figures are - or can be made to be so with additional calculations.

Main areas

The following comparison covers three main areas:

- Flows from nature to the economy
- Flows within the economy
- Residuals (waste, emissions, etc.) from economy to nature.

6.1 Flows from nature to the economy

In both the Danish and the German input-output tables, the flows from nature to the economy cover the areas energy, gravel, stone and clay and also biomass growth in agriculture, horticulture, forestry and fishery.

As far as the growth of the biomass is concerned, different methods of calculation have been applied, but a comparison is nevertheless possible as far as agriculture and horticulture are concerned with the addition of supplementary calculations on the basis of the German physical input-output tables.

Energy

Table 6.1 compares the main figures. The flows of energy from nature to the economy cover, as far as Denmark is concerned, mainly crude oil and natural gas from the North Sea (firewood and straw are also included, however), whereas as far as Germany is concerned what is mainly involved is coal extracted by mining. Converted to per capita level, there was in Germany a flow of material of 3.1 tonnes

per inhabitant. In the case of Denmark, the figure was 1.9 tonnes per inhabitant. The difference reflects the countries' different natural resource situation and the fact that coal is comparatively heavier than crude oil and natural gas in proportion to the energy amounts, which can be used per kg of the different types of energy.

Gravel, stone and clay

The extraction of gravel, stone and clay amounted to 10.9 and 9.7 tonnes per inhabitant in Denmark and Germany respectively. There is thus a general agreement between the figures given per inhabitant.

Earth

Earth used for constructions, etc. in Germany weighed 2.7 tonnes per inhabitant. No account is taken in the Danish tables of earth for construction, since no economic sale in this area has been recorded in connection with the national accounts, but the German figures indicate that earth which, in this way, is connected to economic activities does have a significant volume in weight terms.

Biomass

The flows of materials from nature to agriculture and horticulture are made comparable for the two countries by recording the net input from nature in the case of Germany. From the total biomass growth is subtracted the quantity which ends up as plant remains (and accordingly remains in nature), so biomass growth in relation to actual agricultural products becomes apparent. From this the biomass growth, which can be attributed to agriculture and horticulture being supplied with animal and vegetable products, is then deducted. The remainder is the biomass growth which comes net from nature and which, in definition terms, corresponds to the input from nature to agriculture and horticulture in the Danish physical input-output tables (cf. also section 5.3.2).[20]

Per inhabitant

Table 6.1 shows that there was a net supply from nature to Danish agriculture and horticulture of 2.4 tonnes per inhabitant, while the corresponding figure for supply to German agriculture and horticulture was 0.9 ton per inhabitant. As far as Denmark was concerned, the supply was more than two and a half times as great as in Germany. This is at first surprising, but reflects the fact that the agricultural and food industry in Denmark is, in relative terms, considerably larger than in Germany.

Per km^2

If the net input from nature to agriculture and horticulture is recorded in relation to the size of the agricultural area, a high level of concordance is obtained between the Danish and German figures. From table 6.1 it may be seen that net input in relation to the size of the agricultural area was 430 kg/km^2 in Denmark and 491 kg/km^2 in Germany.

Water

In the Danish tables only water which is used in the manufacturing industry as an addition to products is included. The Danish tables thus give a very limited and incomplete picture of the extent to which water is used in the economy. By contrast, all water which is depended on by economic activities (including water used for cooling purposes) is included in the German tables. As may be seen from table 6.1, very substantial amounts are involved, viz. 735 tonnes per inhabitant.

Water as a product, i.e. water supplied via water works, represented 105 tonnes per inhabitant in Germany. By way of comparison the consumption of water supplied via common water installations etc. in Denmark in 1990 was 571.3 million m^3, or

[20] In this calculation, the relatively modest amount in weight terms of nutrients and pesticides etc., which contributes to product weight on the output side, is disregarded.

Table 6.1 **Flows from nature to the economy - Denmark and West Germany 1990**

	Denmark		Germany	
	Mill. ton	Ton/inhab.	Mill. ton	Ton/inhab.
Energy	10	1.9	193	3.1
Gravel, stone, clay, etc.	56	10.9	615	9.7
Earth excavated for construction	[1]		170	2.7
Biomass growth in agriculture and horticulture				
Total biomass growth	[1]		227	
- Plant residues, etc.	[1]		56	
= Actual agricultural products	[2]		172	
- Input of anim. and veg. products in agriculture	[2]		114	
= Net input from nature	12	2.4	58	0.9
		Ton/km^2		Ton/km^2
Net input from nature vis-à-vis agricultural area		430		491
Water				Ton/inhab.
Water used in the economy	[1]		46 428	734.6
Water as a product	[1]		6 661	105.4

[1] Not included
[2] Not comparable
Source: The physical input-output tables and *Stahmer et al., 1997.*

112 tonnes per inhabitant, cf. *Statistics Denmark, 1997*. Water is thus without exception the most substantial input in weight terms in the economy.

6.2 Flows within the economy

Table 6.2 shows the main figures for physical flows within the economy in Denmark and West Germany.

Intermediate consumption

It shows that there were flows of materials per inhabitant in connection with domestically produced intermediate consumption materials (except water) of 18.8 tonnes and 25.9 tonnes in Denmark and West Germany respectively. To this must be added imported intermediate consumption materials of 6.8 and 5.4 tonnes respectively.

The German economy is therefore characterised by larger flows between industries in quantity terms than the Danish economy. This is due to, among other things, German industry being relatively larger than the Danish and characterised by heavy flows of material in connection with, among other things, mining (coal etc.) and the iron and metal industry. Another part of the explanation is that different recording principles are used in the input-output tables as regards recycling. In the German input-output tables the flows of recycling are included, to a great extent, whereas in the Danish table, as a rule, only flows of recycling from one industry to another (but not inter-industry flows) are recorded. This tends towards larger flows of commodities on both the input and the output side in the German physical input-output tables.

Table 6.2 **Flows within the economy - Denmark and West Germany 1990**

	Denmark		Germany	
	Mill. ton	Ton/inhab.	Mill. ton	Ton/inhab.
Intermediate consumption materials				
Domestically-produced commodities[1]	96	18.8	1 639	25.9
Imported commodities	35	6.8	343	5.4
Total	131	26.6	1 982	31.4
Private consumption				
Domestically-produced commodities[1]	9	1.7	122	1.9
Imported commodities	2	0.4	34	0.5
Total	11	2.2	156	2.5
Capital formation - construction				
Net	[2]		521	8.2
Waste from construction	[3]		259	4.1
Gross	58	11.4	780	12.3
Capital formation - machinery etc.				
Net	[2]		2	0.04
Waste from machinery	[3]		8	0.13
Gross	1	0.15	11	0.17
Foreign trade				
Imports	38	7.5	393	6.2
Exports	25	4.9	206	3.3
Net imports	13	2.6	187	3.0

[1] Water excluded, recycling included
[2] Not included
[3] Not comparable
Source: The physical input-output tables and *Stahmer et al.,1997.*

Private consumption

In the case of private consumption there were supplies of domestically-produced commodities of 1.7 tonnes and 1.9 tonnes per inhabitant in Denmark and Germany respectively. The private consumption of imported commodities was 0.4 of a ton and 0.5 of a ton per inhabitant. All in all, the weight of average private consumption was 2.2 tonnes per inhabitant in Denmark and 2.5 tonnes in Germany.

The explanation for the lighter private consumption in Denmark is, among other things, that the consumption of oil products in households was less per inhabitant in Denmark than in Germany, presumably because of a relatively lower consumption of petrol and diesel for cars, but possibly also on account of the extensive use of district heating in Denmark.

Accumulation

Table 6.2 also shows figures for the accumulation of materials in the economy. In the Danish input-output tables the accumulation of building materials is recorded in gross terms, viz. without any deduction of waste from construction (except for waste from the repair of buildings, cf. section 5.3.3). If the German accumulation is recorded correspondingly (by adding construction waste, etc. to the net accumulation), it may be seen that the Danish gross accumulation was 11.4 tonnes per inhabitant, whereas the German was 12.3 tonnes per inhabitant - an order of magnitude, which was just about the same.

For the gross accumulation of machinery we find 0.15 and 0.17 of a ton per inhabitant in Denmark and Germany respectively.

Gross and net accumulation

The German figures provide, moreover, a picture of the relationship between gross and net accumulation. As far as constructions are concerned, 1/3 of the gross accumulation corresponds to residuals (breakdown products, etc.). In the case of machinery, 3/4 of the gross accumulation goes towards the replacement of old machinery.

Foreign trade

The exchange of commodities with the rest of the world is illustrated by means of figures for imports, exports and net imports. It may be seen that both the in- and outgoing flows of commodities as far as Denmark is concerned were larger per inhabitant than was the case for Germany. Since a relatively larger dependence on, and connection with, the rest of the world is expected for small countries, this result is not surprising.

As far as both Denmark and Germany are concerned, the case is that - by virtue of a large import of energy products - more was imported in weight terms than was exported. Denmark had a net import of 2.6 tonnes per inhabitant, while Germany had a net import of 3.0 tonnes per inhabitant. The average German's net dependence on other countries was thus slightly larger than the average Dane's.

6.3 Residuals (waste, air emissions, etc.) from the economy

As a result of different degrees of detail and a difference in the method of recording in the German and Danish physical input-output tables with regard to flows of waste, it is only possible to compare the flows from the economy to the environment at a general level.

Energy related

In the top half of table 6.3 may be seen the main figures with respect to the residuals, which appear in connection with the combustion of energy in the industries on the one hand and in households on the other. Residuals are calculated exclusive of oxygen, which is fixed, for example, in CO_2. As far as Denmark is concerned, it may be seen that the residuals from the industries amounted to 3.4 tonnes per inhabitant. In the case of households, the figure is 0.7 ton per inhabitant. This is somewhat lower than in Germany, where the corresponding figures were 4.3 tonnes and 1.0 ton per inhabitant.

As the weight of the residuals from the combustion of energy are recorded exclusive of the weight of the oxygen etc. from the air which is involved in combustion, the figures mentioned above correspond to the weight of the energy combusted in Denmark and West Germany respectively.

Carbon in energy

The largest single component of the waste products from combustion is, in both Denmark and Germany, the carbon content of CO_2 emissions, but the breakdown of energy related residuals by sub-groups (ash and slag, carbon and other residuals) is, moreover, affected by the chemical composition of the energy.

Not energy related

When comparing the Danish and German residuals, which are not energy related (re-cycled, processed and deposited waste and also residuals directly discharged into the environment), the residuals from agriculture, horticulture, etc. and the construction industries need to be disregarded, since different methods of recording (net/gross etc.) are used in that connection.

The industries

After correction, residuals from other industries are obtained of the order of magnitude of 2.0 tonnes and 3.8 tonnes per inhabitant. Recorded this way and per inhabitant, the German industries' residuals were accordingly almost double those of

Table 6.3 **Flows of residuals from the economy- Denmark and West Germany 1990**

	Denmark		Germany	
	Mill. ton	Ton/inhab.	Mill. ton	Ton/inhab
Energy related residuals from industries[1]				
Ash and slag	1	0.2	19	0.3
Carbon in CO_2	12	2.3	151	2.4
Other residuals (hydrogen etc.), excl. oxygen	4	0.8	101	1.6
Total	17	3.4	270	4.3
Energy related residuals from households				
Carbon in CO_2	3	0.5	47	0.7
Other residuals (hydrogen, etc.), excl. oxygen	1	0.2	14	0.2
Total	4	0.7	61	1.0
Residuals, not energy related, from industry				
Waste[2]			207	
+ Residuals discharged directly into nature			506	
= Total residuals	14	14.8	713	
- Residuals, agriculture[3]	4		253	
- Residuals, construction[3]	1		224	
= Total, adjusted	10	2.0	236	3.8
Residuals, not energy related, from households				
Waste			20	0.3
Residuals discharged directly into nature			19	0.3
Excrement			32	0.5
Total residual[4]	7	1.4	71	1.1

[1] The German residuals contain, by contrast with the Danish, also residuals from the incineration of waste. These residuals are, however, relatively modest
[2] Excluding residuals from agriculture, horticulture, etc. and construction
[3] Residuals from agriculture, horticulture, etc. and construction are omitted, since the numbers are not comparable.
[4] In the figure for Denmark by contrast to Germany water, which has been contained in food and beverages (excl. drinking water), is included.
Source: The physical input-output tables and *Stahmer et al., 1997.*

the Danish industries. When evaluating this result, it must be taken into consideration that the input and output of intermediate consumption materials in German industries were generally greater per inhabitant on account of a relatively larger and heavier industry, but presumably also on account of the difference there is between the German and Danish physical input-output tables with regard to the recording of recycling. If the residuals in the two countries are assessed relative to the input of intermediate consumption materials, the difference becomes somewhat less marked.

Households

The table also shows figures for residuals from households which are not energy related. The residuals cover household waste, residuals which are discharged directly to nature, and excrement. In the case of Germany, the individual items are specified, whereas in the case of Denmark only a total is entered. If the totals are compared, it may be seen that the figure was 1.4 tonnes per inhabitant for Denmark and 1.1 tonnes per inhabitant for Germany. The cause of the larger residual in the case of Denmark is presumably determined by the fact that the Danish - but not the German - figures, include water which has been contained in food and beverages. The figures concerning the residuals from households may, moreover, be compared to the purchases of commodities by households, which amounted to 2.2 and 2.5 tonnes per inhabitant respectively (cf. table 6.2). Note, however, that energy products are included in these last figures.

7. Energy related emissions to the air broken down by source

Energy related residuals represent a very large proportion of the total quantity of residuals which flow from the economy to the environment. The residuals, which originate from combusted energy represented, according to the physical input-output table (table 5.1.a), 21.0 million tonnes of carbon, sulphur etc. out of the total quantity of residuals of 42.8 million tonnes in 1990. Evaluated on these terms, just under half of the flows of residuals from the economy to the environment were related to energy.

In the physical input-output tables (and accordingly in the above figures) chemical substances, for example, oxygen and nitrogen, which originate from the air and hence form part of combustion processes, are excluded on the input as well as the output side. Accordingly, the energy related residuals in the physical input-output tables do not appear in the chemical composition in which they actually occur.

Oxygen etc.

In this chapter another itemisation of the energy related residuals, which have the greatest significance in weight terms, is presented. These are CO_2 (carbon dioxide), SO_2 (sulphur dioxide), NO_x (nitrous oxide), CO (carbon monoxide) and NMVOC (volatile organic compounds).

Inflation of the residuals

Compared to the itemisation of the residuals in the physical input-output tables, the present emission account is on the one hand more comprehensive, since chemical substances from combustion air is included. On the other, the itemisation is more limited, since not all materials from the combusted energy is to be found in the emissions of CO_2, SO_2, NO_x, CO and NMVOC. The net effect of these differences may be illustrated by the fact that the total emission in 1990 of CO_2, SO_2, NO_x and NMVOC - as will be apparent from the following sections - is recorded at upwards of 54 million tonnes.[21] The inclusion of oxygen etc. from combustion air accordingly gives - despite the exclusion of certain substances from the quantities of energy - residuals which are more than two and a half times larger than residuals calculated on the basis of the quantities of energy alone.

7.1 The principle underlying the itemisations

Energy consumption times technical coefficient

The itemisations of air emissions associated with the combustion of energy are, as a rule, based on calculations of the type *energy consumption times technical coefficient*, where energy consumption is expressed in, for example, GJ and the technical coefficient expresses the content of pollutant per unit of GJ energy consumption. The technical coefficients are approximated on the basis of, *inter alia*, the chemical composition (for example, sulphur or carbon content) the energy type and, in the case of certain emission types (for example NO_x), the combustion conditions. When the technical coefficients are determined, attention is paid to the measures taken, which may limit potential discharges (for example, catalytic converters for cars).

A mathematical formula

Mathematically, the general estimation of emissions can be described in the following way. Let E_{ij} designate the total quantity (measured in GJ) of energy type i used in use j and e_{hij} the emission in kg of pollutant h linked with the use of one GJ of energy of type i used in category j. Then the total emission of pollutant h, EM_{hij}, when using energy type i in use category j is obtained as:

[21] A simple addition of the emissions of CO_2, SO_2, NO_x, CO and NMVOC introduces an error in the form of double-counting, since the carbon content of CO and NMVOC is included twice. This is due to the emission of CO_2 being recorded as »final« emissions - cf. footnote 28 below. The error is, however, of minor significance.

$$EM_{hij} = E_{ij} e_{hij} \qquad (7.1)$$

h = CO_2, SO_2, NO_x, CO, NMVOC
i = 1,..,23 (types of energy)
j = 1,..,117 industries + households

Energy balances

Through the emission calculations, information concerning E_{ij} from *Statistics Denmark's* energy balances are used. The energy balances are recorded in connection with the compilation of the input-output tables.[22] The information concerning E_{ij} corresponds, furthermore, to the information, which is in evidence at a more aggregated level from the physical input-output table for energy drawn up in PJ (cf. section 5.3.5).[23] The use of energy is, in the energy balances and accordingly in the estimation of emissions, apportioned among the 23 types of energy, 117 industries and households.

Cars

The information from the energy balances is supplemented by more detailed information, among other things, some of the background data, which the energy balances in the first place are compiled from. As an example, reference may be made to the use of petrol, LPG and diesel for cars. The detailed data material covers a breakdown of the use of petrol, LPG and motor gas oil into different categories of cars (private cars, vans, lorries, buses, etc.) in each of the use categories.

Emission coefficients

The information on emission factors, e_{hij}, originates from the CORINAIR data base.[24] In certain cases, the emission coefficients are calculated with respect to the chemical composition of the fuel while in others they are based on measurements. The latter is valid, for example, for the emissions of SO_2 and NO_x from power plants.

Different accounts

The emissions, which are calculated in accordance with the above-mentioned method, does not accord completely with the emissions computed, by the Danish National Environmental Research Institute (NERI) in accordance with both ECE guidelines[25] and IPCC guidelines. This is due, on the one hand, to differences as regards the statistical sources for the energy consumption (*Statistics Denmark's* energy balances and the energy balances of the Danish Energy Agency respectively) and on the other to the fact that the boundaries for consumption of energy are by definition different in the estimations. The energy balances of *Statistics Denmark* are based on the definitions of the national accounts, so that energy consumption corresponds to the economic activity which is described in the national accounts. In contrast to this, the guidelines of the ECE and the IPCC are laid down partly on the basis of an assessment of the damage caused by the emissions and

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[22] In the energy balances from *Statistics Denmark* used here, renewable energy is only included to a moderate extent, since only traded quantities of firewood and wood waste for energy purposes are included. Straw, biogass and waste are thus not included. Cf. *Vadmand Jensen and Gravgård Pedersen, 1998*, concerning an estimation of emissions from the consumption of renewable energy. The energy balances are, moreover, described in *Statistics Denmark, 1996*, chapter 4.

[23] There is, however, a minor difference between the itemisations in the energy balances and the physical input-output table, since straw used for energy purposes is included in the physical input-output table, but not in the energy balances. Emissions from the combustion of straw are not included in the following tables.

[24] CORINAIR is a European air mission database established on the initiative of the EU's Council of Ministers. At European level, the European Environment Agency (EEA) is responsible for the continued development, while the current updating and maintenance of the Danish part of the database is undertaken by the Danish National Research Institute. The Danish CORINAIR database contains detailed information on energy consumption and emission factors. In *Vadmand Jensen and Gravgård Pedersen, 1998*, is a description of the connection between the CORINAIR estimation of total emissions and the estimation of emissions in connection with *Statistic Denmark's* energy balances.

[25] Within the ECE (Economic Commission for Europe) agreements have been reached concerning the limitation of the countries' discharges of SO_2 and NO_x. In this connection, principles have been drawn up for the itemisation of emissions.

partly on the basis of international negotiations on what the individual countries can be made responsible for.[26]

Cross-border trade

In the field of transport, the consumption of petrol and diesel by cars is drawn up on the basis of the quantity of fuel sold in Denmark. This implies that foreign tourists' purchases of petrol and diesel in Denmark, including for example the Germans' border trade in Denmark, is included.[27] It may be expected that part of this petrol and diesel actually is used abroad and thus that the corresponding emissions take place geographically outside Denmark. Conversely, there will be emissions in Denmark from fuel purchased abroad and subsequently imported across the border into Denmark. In the case of ships and aircraft, it is also Danish economic activity which is the starting point for the calculations of emissions. Thus, the emissions may not necessarily reflect the actual emissions within the Danish territory.

Further description

In *Vadmand Jensen and Gravgård Pedersen, 1998*, a more detailed description of the emission itemisation in connection with *Statistics Denmark's* energy balances is given.

117 and 27 industries

Tables 7.1-7.5 show the emissions from 1990-1992 broken down by industry and households. The industries' emissions are recorded at detailed national accounts level, viz. for 117 industries. The tables also show the emissions for the 27 main groups of industries which are used as a classification in the physical input-output tables. Thus, the emissions for 1990 may be compared with, for example, the energy information in the physical input-output tables (sections 5.3.4 and 5.3.5).

[26] Cf. *Gravgård Pedersen, 1998.*

[27] In chapter 9 an indication of the order of magnitude of the emissions linked to the petrol and oil bought by foreigners (including border trade in Denmark) is given.

7.2 CO_2

Total emissions

Energy related CO_2 emissions[28] are estimated at 56.2 million tonnes for the year 1992, of which 9.7 million tonnes of CO_2, or a total 17%, originated from households.

27-industries

The last section of table 7.1 (27 industry main groups) shows that there was an emission of 27.0 million tonnes from the supply of electricity, gas, heating and water industry. In other words, 58% of the industries' total emissions of 46.5 million tonnes can be attributed to this main group of industries.

Among the other groups of industries we find that agriculture and horticulture, etc. (1.9 million tonnes), the manufacture of food, beverages and tobacco (2.4 million tonnes), the non-metallic mineral products industry (1.6 million tonnes) and transport and storage activity (5.4 million tonnes) in particular accounted for significant emissions. Together, these four main groups accounted for nearly 25% of the industries' emissions and a total 20% of the total energy related emissions of CO_2.

117-industries

The emissions from industries can be further analysed by looking at the detailed breakdown of the emissions in table 7.1.

It is apparent, *inter alia*, that among the manufacture of food, beverages and tobacco especially the sugar factories and refineries, the manufacture of food products n.e.c (e.g. potato flour, etc.), the manufacture of prepared animal feeds as well as breweries especially gave rise to CO_2 emissions. For example, CO_2 emissions from the latter industry amounted to 0.3 million ton in 1992.

In the main group for the manufacturing of non-metallic mineral products, it was the emission of approximately 1 million ton from cement works in particular, which was of significance.

Among transport and storage activity, other land transport (the conveyance of tourists, taxi- and carriage services, etc.) accounted for CO_2 emission of 1.9 million tonnes, i.e. a total of 35% of the emissions from transport and storage. Emissions from air transport and airports were of the same order of magnitude, i.e. 1.8 million tonnes.

The development 1990-92

The development of the industries' CO_2 emissions over the period 1990-1992 was characterised by a steep rise from 43.7 to 53.0 million tonnes from 1990 to 1991 followed by a decline to 46.5 million tonnes in 1992. The emissions from households were at the same level, 9.2-9.7 million tonnes in the three years. Total emissions amounted to 53.1, 62.2 and 56.2 million tonnes respectively for each of the three years of the period.

The steep rise in the industries' total CO_2 emissions was due to a correspondingly steep rise in the emissions from the supply of electric light and power, since this rose from 19.8 million tonnes in 1991 to 28.0 million tonnes in 1992. The rise is connected with the fact that in 1991 there was a significant production of electricity induced by a substantial export of electricity.

Conversion to carbon contents

Converted to carbon content (C), the 1990 CO_2 emission of 53.1 million tonnes corresponds to 14.3 million tonnes of C. If 0.4 million ton, which is the carbon content of straw used for energy purposes (cf. footnotes 22 and 23 above), is added

[28] CO_2 emissions are here recorded as »final« CO_2 emissions, viz. account is also taken of the fact that the carbon content of emissions of CO, CH_4 and NMVOC oxidise to CO_2.

to this, 14.7 million tonnes are arrived at, and this figure corresponds to the total carbon residual recorded in the physical input-output tables (cf. tables 5.1.a and 5.4.a).

In general, carbon residuals are obtained in the physical input-output tables by multiplying the CO_2 emission of the main industry groups by 0.27. In the case of the manufacture of food products, beverages and tobacco, manufacturing of wood products, incl. furniture, the supply of electricity, gas, heating and water, and households, 0.004, 0.015, 0.130 and 0.207 million tonnes carbon, must be added when moving across from the CO_2 emission in table 7.1 to the carbon residuals in tables 5.1.a and 5.4.a.

CO_2-intensities

Table 7.1 also shows the industries' CO_2 emissions drawn up in relation to the value of the production output (CO_2 intensity). For the industries as a whole, there were CO_2 emissions of 34 tonnes per million DKK output in 1992. The CO_2 intensity varied a great deal from industry to industry. The supply of electricity and district heating supply has without comparison, at 1,821 and 542 tonnes of CO_2 per million DKK of output, the highest emission intensities. Among other industries with high emission intensities we find fishing (203 tonnes/million Kr), manufacture of structural clay products (220 tonnes/million DKK), manufacture of cement, lime and plaster (585 tonnes/million DKK), railway and bus transport (105 tonnes/million DKK) and air transport (162 tonnes/million DKK). Several of the industries within the manufacture of food products, beverages and tobacco have also quite high emission intensities.

Table 7.1 CO_2-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			1 000 ton			ton per mill. DKK output		
1	11101	Agriculture	1 147	1 207	1 304	25	27	29
2	11103	Horticulture	478	516	476	95	103	96
3	11109	Fur farming, etc.	11	11	24	8	9	22
4	11200	Agricultural services	46	48	63	25	25	34
5	12000	Forestry and logging	6	6	9	5	5	8
6	13000	Fishing	807	821	839	214	203	203
7	20099	Extraction of coal, oil, and gas	162	178	162	20	22	19
8	29000	Other mining	183	193	163	128	140	107
9	31113	Slaughtering etc. of pigs and cattle	167	170	139	5	5	4
10	31117	Poultry killing, dressing, packing	14	16	11	8	9	5
11	31121	Dairies	220	241	158	13	14	9
12	31123	Processed cheese, condensed milk	127	115	92	28	28	22
13	31124	Ice cream manufacturing	5	5	11	5	4	7
14	31130	Processing of fruits and vegetables	62	64	38	22	20	13
15	31140	Processing of fish	39	45	36	5	5	4
16	31151	Oil mills	97	89	55	40	42	30
17	31152	Margarine manufacturing	29	29	14	25	28	14
18	31153	Fish meal manufacturing	138	163	141	71	70	53
19	31160	Grain mill products	10	11	7	6	6	4
20	31171	Bread factories	52	53	26	35	35	17
21	31173	Cake factories	25	24	22	13	10	8
22	31174	Bakeries	42	43	30	13	14	10
23	31180	Sugar factories and refineries	437	479	366	154	164	129
24	31190	Chocolate and sugar confectionery	40	40	29	13	12	8
25	31210	Manufacture of food products n.e.c.	137	159	609	43	46	157
26	31229	Manufacture of prepared animal feeds	261	299	284	137	148	116
27	31310	Distilling and blending spirits	44	35	24	75	69	46
28	31338	Breweries	309	368	331	53	55	44
29	31400	Tobacco manufactures	10	11	8	5	5	4
30	32118	Spinning, weaving etc., textiles	99	108	77	23	27	20
31	32120	Manufacture of made-up textile goods	9	10	9	5	5	4
32	32130	Knitting mills	5	5	5	2	2	1
33	32158	Cordage, rope and twine industries	5	5	5	5	6	6
34	32200	Manufacture of wearing apparel	15	15	16	3	3	3
35	32300	Manufacture of leather products	7	9	8	14	20	15
36	32400	Manufacture of footwear	3	2	4	3	2	3
37	33100	Manufacture of wood products exc. furniture	418	379	340	49	44	37
38	33200	Manufacture of wooden furniture, etc.	127	140	145	12	12	12
39	34110	Manufacture of pulp, paper, paperboard	282	305	240	135	173	151
40	34128	Manufacture of paper containers, wallpaper	71	78	53	10	11	7
41	34210	Reproducing and composing services	2	2	3	1	1	1
42	34221	Bookprinting	48	49	55	10	11	12
43	34222	Offset printing	36	41	31	8	9	7
44	34223	Other printing	3	4	4	2	2	2
45	34230	Bookbinding	3	3	2	3	3	2
46	34240	Newspaper printing and publishing	7	7	4	1	1	1
47	34291	Book and art publishing	2	2	3	2	2	2
48	34292	Magazine publishing	2	2	1	1	1	1
49	34293	Other publishing	3	3	4	1	1	1
50	35110	Manufacture of basic industrial chemicals	208	227	200	33	38	30
51	35120	Manufacture of fertilisers and pesticides	42	41	25	29	32	23
52	35130	Manufacture of basic plastic materials	33	33	24	6	6	5
53	35210	Manufacture of paints and varnishes	11	12	10	5	5	4
54	35220	Manufacture of drugs and medicines	116	141	120	13	15	11
55	35230	Manufacture of soap and cosmetics	17	15	13	8	7	6
56	35290	Manufacture of chemical products n.e.c.	7	8	11	5	6	6
57	35300	Petroleum refineries	123	126	134	13	14	15
58	35400	Manufacture of asphalt and roofing material	141	141	155	68	64	71
59	35510	Tyre and tube industries	8	8	11	21	21	30
60	35590	Manufacture of rubber products n.e.c.	36	29	23	31	26	20

Table 7.1 cont. CO_2-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
				1 000 ton			ton per mill. DKK output	
61	35600	Manufacture of plastic products n.e.c.	53	54	70	6	6	8
62	36100	Manufacture of earthenware and pottery	12	12	11	19	20	18
63	36200	Manufacture of glass and glass products	74	70	41	52	45	26
64	36910	Manufacture of structural clay products	330	260	179	421	327	220
65	36920	Manufacture of cement, lime and plaster	1 120	1 118	1 000	724	683	585
66	36993	Concrete products and stone cutting	160	160	175	28	30	35
67	36998	Non-metallic mineral products n.e.c.	275	286	203	116	110	73
68	37101	Iron and steel works	99	92	42	42	42	22
69	37102	Iron and steel casting	23	25	17	22	24	20
70	37201	Non-ferrous metal works	7	8	7	12	17	13
71	37202	Non-ferrous metal casting	9	9	9	14	15	14
72	38121	Manufacture of metal furniture	21	23	28	7	8	10
73	38138	Manufacture of structural metal products	47	51	65	4	4	5
74	38191	Manufacture of metal cans and containers	24	26	15	10	9	5
75	38198	Manuf. of other fabricated metal products	67	67	73	7	6	7
76	38220	Manufacture of agricultural machinery	32	32	30	8	9	9
77	38238	Manufacture of industrial machinery	42	48	55	4	5	5
78	38280	Repair of machinery	31	32	42	6	7	8
79	38293	Manufacture of household machinery	20	20	19	6	5	5
80	38298	Manufacture of refrigerators, accessories	100	107	118	5	5	5
81	38320	Manufacture of telecommunication equipment	20	25	22	3	3	3
82	38330	Manufacture of electrical home appliances	5	5	6	7	8	7
83	38392	Manufacture of accumulators and batteries	2	2	1	8	9	4
84	38398	Manufacture of other electrical supplies	35	37	38	4	4	4
85	38410	Ship building and repairing	37	40	40	3	3	3
86	38438	Railroad and automobile equipment	19	23	25	5	5	5
87	38498	Manufacture of cycles, mopeds, etc.	5	4	15	4	4	14
88	38500	Professional and measuring equipment	12	13	17	2	2	2
89	39010	Manuf. of jewellery, etc.	1	1	1	2	2	2
90	39098	Manufacture of toys, sporting goods, etc.	13	13	19	2	2	3
91	41010	Electric light and power	19 872	27 996	22 555	1 679	2 118	1 821
92	41020	Gas manufacture and distribution	18	8	7	5	2	2
93	41030	Steam and hot water supply	4 336	4 637	4 508	653	594	542
94	42000	Water works and supply	3	1	2	2	1	1
95	50000	Construction	866	924	1 029	9	10	11
96	61000	Wholesale trade	962	981	745	12	12	9
97	62000	Retail trade	355	370	510	9	8	11
98	63000	Restaurants and hotels	96	104	134	5	5	6
99	71118	Railway and bus transport, etc.	1 181	1 189	896	148	145	105
100	71138	Other land transport	2 168	2 278	1 932	88	85	68
101	71210	Ocean and coastal water transport	602	696	559	22	22	19
102	71230	Supporting services to water transport	9	8	5	4	4	2
103	71300	Air transport	1 830	1 800	1 842	174	163	162
104	71509	Services allied to transport, etc.	101	105	203	5	5	9
105	72000	Communication	149	153	101	7	7	4
106	81000	Financial institutions	70	75	91	2	3	4
107	82000	Insurance	19	22	23	3	4	4
108	83110	Dwellings	18	20	36	-	-	-
109	83509	Business services	124	137	267	2	2	4
110	93109	Education, market services	26	25	10	27	25	10
111	93300	Health, market services	31	35	47	3	3	4
112	94000	Recreational and cultural services	25	27	43	3	3	4
113	95130	Rep. of motor vehicles	43	45	78	2	2	4
114	95299	Household services	264	271	178	18	18	11
115	95400	Domestic services	-	-	-	-	-	-
116	97099	Private non-profit institutions	3	3	13	1	1	2
117	98099	Producers of government services	872	1 040	1 088	4	4	4
		Industries total	43 733	53 000	46 490	34	40	34
		Households	9 339	9 201	9 704	•	•	•
		Industries and households total	53 072	62 201	56 194	•	•	•

Table 7.1 cont. CO_2-emissions by industries and households 1990-92

Main groups			1990	1991	1992	1990	1991	1992
			1 000 ton			ton per mill. DKK output		
1	11000	Agriculture, horticulture etc.	1 683	1 782	1 867	31	33	35
2	12000	Forestry and logging	6	6	9	5	5	8
3	13000	Fishing	807	821	839	214	203	203
4	20000	Mining and quarrying	345	372	325	37	39	32
5	31000	Manuf. of food, beverages, tobacco	2 265	2 458	2 433	22	23	22
6	32000	Textile, clothing, leather industry	143	154	125	8	9	7
7	33000	Manuf. of wood products, incl. furnit.	545	519	485	28	26	23
8	34000	Manuf. of paper, printing, publishing	460	496	402	13	14	11
9	35000	Chemical and petroleum industry	795	835	796	16	17	15
10	36000	Non-metallic mineral products	1 970	1 906	1 608	158	151	130
11	37000	Basic metal industry	137	133	75	30	31	19
12	38000	Manuf. of fabricated metal products	521	553	607	5	5	5
13	39000	Other manufacturing industries	14	14	20	2	2	3
14	40000	Electricity, gas and water	24 228	32 642	27 071	1 046	1 237	1 038
15	50000	Construction	866	924	1 029	9	10	11
16	60099	Wholesale and retail trade	1 317	1 351	1 255	11	11	10
17	63000	Restaurants and hotels	96	104	134	5	5	6
18	71000	Transport and storage	5 891	6 076	5 438	64	59	53
19	72000	Communication	149	153	101	7	7	4
20	80099	Financing and insurance	90	97	114	2	3	4
21	83110	Dwellings	18	20	36	-	-	-
22	83509	Business services	124	137	267	2	2	4
23	93009	Market services of education, health	57	60	57	5	5	5
24	94000	Recreational and cultural services	25	27	43	3	3	4
25	95009	Household services, incl. auto repair	307	317	256	9	9	7
26	95399	Other producers, exc. government	3	3	13	1	1	2
27	98099	Producers of government services	872	1 040	1 088	4	4	4
		Industries total	43 733	53 000	46 490	34	40	34
		Households	9 339	9 201	9 704	•	•	•
		Industries and households total	53 072	62 201	56 194	•	•	•

7.3 SO_2

Total emission

Table 7.2 shows energy related SO_2 emissions broken down by industries and households. Total SO_2 emission in 1992 amounted to 189,000 tonnes. Of this, the bulk of just under 184,000 tonnes originated from industries, while only 5,000 or so were attributable to energy consumption by households. The emission from households thus represented less than 3% of total SO_2 emission.

27-industry

Broken down by main industry groups it was - as in the case of CO_2 emissions - the electricity, gas and water industry which was the source of the bulk of the emission. A total of 134,000 tonnes of SO_2 were accounted for by this main industry group in 1992, which corresponds to nearly 73% of the industries' total emissions. The remaining 27% of the industries' SO_2 emissions are broken down into, *inter alia*, 2% in agriculture and horticulture, etc. (3,902 tonnes), 3% in fishing (5,380 tonnes), 5% in manufacture of food, beverages and tobacco (8,725 tonnes), 5% in the non-metallic mineral products industry (8,454 tonnes) and 6% in transport (11,093 tonnes).

117-industry

The detailed classification of SO_2 emissions shows, *inter alia*, that in the manufacture of food products, beverages and tobacco in particular there were substantial emissions from sugar factories and refineries (2,236 tonnes), the manufacture of prepared animal feeds (1,351 tonnes) and breweries (1,719 tonnes).

In the main group for the non-metallic mineral products industry, it was primarily the manufacture of cement, etc., which accounted for the SO_2 emissions (6,305 tonnes) but there were also significant emissions from the manufacture of other non-metallic mineral products (1,071 tonnes).

As far as transport and storage were concerned, we find 4,204 tonnes of SO_2 emissions from railway and bus transport, etc. and 5,234 tonnes from ocean and coastal water transport. The industry for railway and bus transport etc. includes Danish State Railways' ferries and a considerable proportion of the industries SO_2 emissions does in fact come from those ferries. It may thus be concluded that a very large proportion of total emission form transport and storage of 11,093 tonnes is related to shipping.

The development 1990-92

The development of the industries' SO_2 emissions over the period 1990-92 is, as in the case of CO_2 emissions, characterised by a steep rise from 1990 to 1991. Emissions rose from 180,000 tonnes to over 239,000 tonnes. The increase was succeeded by a drop in emissions to approximately 183,000 tonnes in 1992. The cause of the rise may be accounted for by the export of electricity and corresponding electricity supply activity.

As far as households are concerned, the SO_2 emission was relatively stable at around 5,000 tonnes in all three years.

In the case of the years 1990 and 1991, total energy related SO_2 emissions are recorded at 185,000 tonnes and just under 245,000 tonnes, respectively. Total SO_2 emission was, as mentioned above, approximately 189,000 tonnes in 1992.

Table 7.2 SO_2-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11101	Agriculture	1 713	1 818	1 701	37	40	37
2	11103	Horticulture	2 117	2 374	2 116	423	473	429
3	11109	Fur farming, etc.	13	11	18	9	9	16
4	11200	Agricultural services	53	55	68	28	29	37
5	12000	Forestry and logging	5	5	6	4	4	6
6	13000	Fishing	5 250	5 171	5 380	1 390	1 280	1 300
7	20099	Extraction of coal, oil, and gas	801	896	753	101	109	88
8	29000	Other mining	784	883	753	549	638	498
9	31113	Slaughtering etc. of pigs and cattle	580	586	556	18	17	15
10	31117	Poultry killing, dressing, packing	27	30	27	15	17	13
11	31121	Dairies	477	529	452	28	31	25
12	31123	Processed cheese, condensed milk	505	460	448	112	112	105
13	31124	Ice cream manufacturing	6	7	11	6	6	7
14	31130	Processing of fruits and vegetables	168	175	149	59	55	49
15	31140	Processing of fish	80	92	80	10	11	10
16	31151	Oil mills	485	443	306	198	211	167
17	31152	Margarine manufacturing	65	64	46	55	63	48
18	31153	Fish meal manufacturing	384	483	559	197	206	211
19	31160	Grain mill products	9	9	9	5	5	5
20	31171	Bread factories	49	50	23	33	33	15
21	31173	Cake factories	21	20	20	11	8	8
22	31174	Bakeries	34	32	30	11	10	10
23	31180	Sugar factories and refineries	2 673	2 931	2 236	943	1 004	787
24	31190	Chocolate and sugar confectionery	107	105	99	35	31	29
25	31210	Manufacture of food products n.e.c.	404	520	509	126	151	131
26	31229	Manufacture of prepared animal feeds	1 029	1 240	1 351	541	613	552
27	31310	Distilling and blending spirits	126	108	77	215	213	146
28	31338	Breweries	1 476	1 779	1 719	251	265	228
29	31400	Tobacco manufactures	21	22	20	10	10	9
30	32118	Spinning, weaving etc., textiles	254	275	267	58	68	69
31	32120	Manufacture of made-up textile goods	10	11	11	5	5	5
32	32130	Knitting mills	4	4	4	1	1	1
33	32158	Cordage, rope and twine industries	4	4	5	4	4	6
34	32200	Manufacture of wearing apparel	16	17	15	3	3	3
35	32300	Manufacture of leather products	21	29	29	44	65	51
36	32400	Manufacture of footwear	4	2	3	3	2	2
37	33100	Manufacture of wood products exc. furniture	336	284	261	39	33	28
38	33200	Manufacture of wooden furniture, etc.	71	75	70	7	7	6
39	34110	Manufacture of pulp, paper, paperboard	1 374	1 533	1 316	657	871	829
40	34128	Manufacture of paper containers, wallpaper	77	85	85	11	12	12
41	34210	Reproducing and composing services	1	1	1	1	1	1
42	34221	Bookprinting	284	290	298	61	62	64
43	34222	Offset printing	6	6	6	1	1	1
44	34223	Other printing	2	2	2	1	1	1
45	34230	Bookbinding	2	2	1	2	2	1
46	34240	Newspaper printing and publishing	6	6	3	1	1	-
47	34291	Book and art publishing	3	2	2	2	2	2
48	34292	Magazine publishing	2	2	1	1	1	1
49	34293	Other publishing	4	3	3	1	1	1
50	35110	Manufacture of basic industrial chemicals	858	943	935	137	157	138
51	35120	Manufacture of fertilisers and pesticides	53	52	53	37	40	48
52	35130	Manufacture of basic plastic materials	43	45	40	8	8	8
53	35210	Manufacture of paints and varnishes	15	15	13	6	6	6
54	35220	Manufacture of drugs and medicines	568	689	632	63	71	56
55	35230	Manufacture of soap and cosmetics	42	37	34	20	17	15
56	35290	Manufacture of chemical products n.e.c.	13	15	20	10	11	10
57	35300	Petroleum refineries	772	791	848	81	85	97
58	35400	Manufacture of asphalt and roofing material	393	383	391	190	173	178
59	35510	Tyre and tube industries	26	25	29	65	63	81
60	35590	Manufacture of rubber products n.e.c.	19	17	16	17	16	14

Table 7.2 cont. SO_2-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
61	35600	Manufacture of plastic products n.e.c.	98	101	95	12	12	11
62	36100	Manufacture of earthenware and pottery	28	26	24	44	45	41
63	36200	Manufacture of glass and glass products	10	11	10	7	7	7
64	36910	Manufacture of structural clay products	1 453	1 127	842	1 852	1 416	1 032
65	36920	Manufacture of cement, lime and plaster	6 992	6 982	6 305	4 520	4 262	3 692
66	36993	Concrete products and stone cutting	192	201	203	34	37	41
67	36998	Non-metallic mineral products n.e.c.	1 289	1 399	1 071	545	536	385
68	37101	Iron and steel works	8	8	6	3	4	3
69	37102	Iron and steel casting	70	83	58	70	82	66
70	37201	Non-ferrous metal works	18	23	22	34	47	42
71	37202	Non-ferrous metal casting	7	7	6	12	11	9
72	38121	Manufacture of metal furniture	26	27	29	9	9	10
73	38138	Manufacture of structural metal products	73	79	90	7	7	7
74	38191	Manufacture of metal cans and containers	5	5	4	2	2	1
75	38198	Manuf. of other fabricated metal products	78	82	75	8	8	7
76	38220	Manufacture of agricultural machinery	37	37	34	9	10	10
77	38238	Manufacture of industrial machinery	95	105	114	10	11	11
78	38280	Repair of machinery	23	23	32	5	5	6
79	38293	Manufacture of household machinery	93	90	86	26	25	22
80	38298	Manufacture of refrigerators, accessories	267	284	277	13	13	12
81	38320	Manufacture of telecommunication equipment	22	28	23	3	4	3
82	38330	Manufacture of electrical home appliances	4	4	4	6	6	5
83	38392	Manufacture of accumulators and batteries	2	2	1	7	7	4
84	38398	Manufacture of other electrical supplies	124	127	117	14	15	13
85	38410	Ship building and repairing	98	104	99	8	8	8
86	38438	Railroad and automobile equipment	24	29	32	6	6	6
87	38498	Manufacture of cycles, mopeds, etc.	6	5	7	5	5	7
88	38500	Professional and measuring equipment	14	14	14	2	2	2
89	39010	Manuf. of jewellery, etc.	1	1	1	1	2	2
90	39098	Manufacture of toys, sporting goods, etc.	20	19	23	3	3	4
91	41010	Electric light and power	105 659	159 664	114 867	8 926	12 080	9 276
92	41020	Gas manufacture and distribution	3	3	2	1	1	1
93	41030	Steam and hot water supply	17 866	20 278	18 733	2 689	2 599	2 252
94	42000	Water works and supply	3	1	1	3	1	1
95	50000	Construction	1 246	1 481	1 457	13	16	15
96	61000	Wholesale trade	1 034	1 018	488	13	12	6
97	62000	Retail trade	238	228	298	6	5	6
98	63000	Restaurants and hotels	130	125	129	6	6	6
99	71118	Railway and bus transport, etc.	5 736	5 323	4 204	720	648	493
100	71138	Other land transport	2 506	2 587	1 374	102	96	48
101	71210	Ocean and coastal water transport	7 650	8 855	5 234	286	280	176
102	71230	Supporting services to water transport	6	6	2	3	3	1
103	71300	Air transport	140	137	138	13	12	12
104	71509	Services allied to transport, etc.	85	84	140	4	4	6
105	72000	Communication	153	149	75	8	7	3
106	81000	Financial institutions	104	97	99	3	4	4
107	82000	Insurance	27	26	24	4	4	5
108	83110	Dwellings	28	26	34	-	-	-
109	83509	Business services	173	167	219	2	2	3
110	93109	Education, market services	7	7	7	8	7	7
111	93300	Health, market services	41	40	41	4	4	4
112	94000	Recreational and cultural services	32	30	37	3	3	3
113	95130	Rep. of motor vehicles	43	40	61	2	2	3
114	95299	Household services	287	283	123	19	19	8
115	95400	Domestic services	-	-	-	-	-	-
116	97099	Private non-profit institutions	4	4	9	1	1	2
117	98099	Producers of government services	1 111	1 282	1 454	5	5	6
		Industries total	180 236	239 516	183 869	141	181	135
		Households	4 904	4 982	5 172	•	•	•
		Industries and households total	185 140	244 498	189 041	•	•	•

Table 7.2 cont. SO_2-emissions by industries and households 1990-92

Main groups			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11000	Agriculture, horticulture etc.	3 896	4 257	3 902	71	80	73
2	12000	Forestry and logging	5	5	6	4	4	6
3	13000	Fishing	5 250	5 171	5 380	1 390	1 280	1 300
4	20000	Mining and quarrying	1 585	1 779	1 506	169	185	150
5	31000	Manuf. of food, beverages, tobacco	8 727	9 683	8 725	86	92	79
6	32000	Textile, clothing, leather industry	313	343	335	19	20	19
7	33000	Manuf. of wood products, incl. furnit.	407	359	332	21	18	16
8	34000	Manuf. of paper, printing, publishing	1 759	1 933	1 719	50	54	48
9	35000	Chemical and petroleum industry	2 900	3 113	3 105	59	62	59
10	36000	Non-metallic mineral products	9 965	9 745	8 454	800	775	682
11	37000	Basic metal industry	104	120	91	23	28	23
12	38000	Manuf. of fabricated metal products	993	1 046	1 038	9	9	9
13	39000	Other manufacturing industries	21	20	23	3	3	4
14	40000	Electricity, gas and water	123 531	179 945	133 604	5 332	6 817	5 121
15	50000	Construction	1 246	1 481	1 457	13	16	15
16	60099	Wholesale and retail trade	1 272	1 245	786	11	10	6
17	63000	Restaurants and hotels	130	125	129	6	6	6
18	71000	Transport and storage	16 122	16 992	11 093	174	166	107
19	72000	Communication	153	149	75	8	7	3
20	80099	Financing and insurance	131	124	123	3	4	4
21	83110	Dwellings	28	26	34	-	-	-
22	83509	Business services	173	167	219	2	2	3
23	93009	Market services of education, health	48	47	48	5	4	4
24	94000	Recreational and cultural services	32	30	37	3	3	3
25	95009	Household services, incl. auto repair	331	324	183	10	9	5
26	95399	Other producers, exc. government	4	4	9	1	1	1
27	98099	Producers of government services	1 111	1 282	1 454	5	5	6
		Industries total	180 236	239 516	183 869	141	181	135
		Households	4 904	4 982	5 172	•	•	•
		Industries and households total	185 140	244 498	189 041	•	•	•

SO_2-intensity

Emissions from the industries recorded in relation to the value of production (SO_2 intensity) show a wide variation between the industries. In the case of the industries collectively, the SO_2 intensity in 1992 was 135 kg per million DKK of output. Electricity, gas and water supply in particular had a high SO_2 intensity (5,121 kg per million DKK output). Fishing and the non-metallic mineral products industry also had high SO_2 intensities.

Conversion to sulphur contents

The SO_2 emission in 1990 of 185,140 tonnes had a sulphur (S) content of 92,570 tonnes. This corresponds to the sulphur residual shown in the physical input-output tables (tables 5.1.a and 5.4.a). For the 27 main industry groups the SO_2 emission in table 7.2 and the sulphur residuals in tables 5.1.a and 5.4.a correspond, since the sulphur (S) residual is arrived at from the SO_2 emission by dividing by 2.[29]

[29] The emission from straw used for energy purposes ought, however, also to be taken account of when moving from table 7.2 to table 5.1.a and 5.4.a. Since only 322 tonnes of SO_2 are involved this is not, however, of any significance.

7.4 NO_x

Total emission

Table 7.3 shows the energy related NO_x emissions broken down by industries and households. In 1992 the emission of NO_x was upwards of 274,000 tonnes, of which 50,900 tonnes originated from households and a total of 223,000 tonnes from industries. Households thus accounted for just about 20% of the emission while industries' share was upwards of 80%.

27-industry

The three main groups of industries with the highest NO_x emissions were the electricity, gas and water supply industry (84,044 tonnes), transport and storage (56,878 tonnes) and agriculture and horticulture, etc. (21,086 tonnes). Together, these main groups of industries accounted for over 70% of the total emission from industries and 59% of total NO_x emission.

117-industry

Of the total discharge of 84,000 tonnes of NO_x from electricity, gas and water supply, just under 85% originated from electricity supply (71,339 tonnes) and 15% from the supply of district heating (12,660 tonnes).

Among transport's discharge of 57,000 tonnes or so, the other land transport industry (conveyance of tourists, taxi services and carriage services, etc.) was responsible for 23,000 tonnes and railway and bus transport etc. for just under 14,000 tonnes. In connection with ocean and coastal water transport, and air transport, 10,000 tonnes and 7,600 tonnes of NO_x respectively were discharged.

Within the main group agriculture and horticulture etc., it was especially agriculture itself, with 18,700 tonnes, which accounted for the NO_x emissions. The emissions were due to, *inter alia*, the use of fuel for tractors. Emissions from horticulture of 1,300 tonnes of NO_x took place, *inter alia*, in connection with the heating of greenhouses.

Another primary industry with relatively large NO_x emissions is fishing (14,700 tonnes). In the case of this industry, the emissions were primarily due to the use of fuel for fishing vessels.

The development 1990-92

The period 1990-1992 was characterised by nearly constant NO_x emissions from households, with a yearly level around 50,000 tonnes.

The industries' emissions peaked in 1991 with just under 272,000 tonnes of NO_x, while the level in the two years on either side was 220-230,000 tonnes. The explanation for the large NO_x emissions in 1991 is - as in the case of CO_2 and SO_2 - the extensive electricity supply activity induced by the exports of electricity. It is seen from the table that NO_x emissions from the supply of electricity rose by more than 50% from 1990 to 1991. By comparison, the emissions from steam and hot water supply rose by barely 15%.

NO_x-intensities

The industries' NO_x emissions recorded in relation to the value of output (NO_x intensity) show a wide variation between industries. In the case of industries collectively, NO_x intensity in 1992 was 164 kg per million DKK of output, but this conceals the fact that fishing and fish farming and the supply of electricity had intensities of over 3,500 kg and 5,700 kg respectively per million DKK of output, while a large number of industries had NO_x intensities of less than 10 kg per million DKK worth of production.

Table 7.3 NO_x-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11101	Agriculture	17 057	17 610	18 722	365	390	412
2	11103	Horticulture	1 237	1 285	1 258	247	256	255
3	11109	Fur farming, etc.	79	56	149	53	48	134
4	11200	Agricultural services	818	825	957	438	432	513
5	12000	Forestry and logging	71	47	63	62	39	56
6	13000	Fishing	14 245	14 475	14 745	3 771	3 582	3 564
7	20099	Extraction of coal, oil, and gas	287	317	282	36	39	33
8	29000	Other mining	438	443	368	307	320	243
9	31113	Slaughtering etc. of pigs and cattle	529	502	392	16	15	11
10	31117	Poultry killing, dressing, packing	85	80	41	49	44	20
11	31121	Dairies	1 539	1 480	539	90	87	30
12	31123	Processed cheese, condensed milk	243	221	177	54	54	41
13	31124	Ice cream manufacturing	26	25	106	25	20	70
14	31130	Processing of fruits and vegetables	349	324	89	124	103	29
15	31140	Processing of fish	81	88	110	10	10	14
16	31151	Oil mills	190	174	104	78	83	57
17	31152	Margarine manufacturing	153	145	41	130	142	43
18	31153	Fish meal manufacturing	344	384	299	176	163	113
19	31160	Grain mill products	27	27	25	16	15	13
20	31171	Bread factories	420	389	121	287	258	78
21	31173	Cake factories	52	47	45	26	19	17
22	31174	Bakeries	272	267	98	88	85	32
23	31180	Sugar factories and refineries	926	1 014	783	327	347	276
24	31190	Chocolate and sugar confectionery	198	184	99	66	54	28
25	31210	Manufacture of food products n.e.c.	370	392	1 129	116	114	290
26	31229	Manufacture of prepared animal feeds	676	733	608	355	362	249
27	31310	Distilling and blending spirits	87	70	47	149	139	89
28	31338	Breweries	744	841	815	127	125	108
29	31400	Tobacco manufactures	30	29	19	15	13	9
30	32118	Spinning, weaving etc., textiles	192	204	158	43	51	41
31	32120	Manufacture of made-up textile goods	36	33	35	19	16	17
32	32130	Knitting mills	26	20	24	8	6	7
33	32158	Cordage, rope and twine industries	13	12	25	13	14	29
34	32200	Manufacture of wearing apparel	95	76	70	20	15	13
35	32300	Manufacture of leather products	28	28	19	60	62	33
36	32400	Manufacture of footwear	10	8	12	8	6	8
37	33100	Manufacture of wood products exc. furniture	653	574	576	76	67	63
38	33200	Manufacture of wooden furniture, etc.	327	303	352	31	27	29
39	34110	Manufacture of pulp, paper, paperboard	570	619	485	272	351	305
40	34128	Manufacture of paper containers, wallpaper	148	157	128	21	21	18
41	34210	Reproducing and composing services	10	7	21	5	3	11
42	34221	Bookprinting	95	97	143	20	21	31
43	34222	Offset printing	78	79	85	18	18	19
44	34223	Other printing	19	16	28	9	7	12
45	34230	Bookbinding	29	25	15	26	22	17
46	34240	Newspaper printing and publishing	73	55	32	12	9	5
47	34291	Book and art publishing	14	11	20	11	8	14
48	34292	Magazine publishing	14	10	4	8	6	2
49	34293	Other publishing	15	12	26	5	4	8
50	35110	Manufacture of basic industrial chemicals	385	421	408	61	70	60
51	35120	Manufacture of fertilisers and pesticides	83	80	52	58	62	47
52	35130	Manufacture of basic plastic materials	93	85	63	18	15	12
53	35210	Manufacture of paints and varnishes	55	49	36	23	19	16
54	35220	Manufacture of drugs and medicines	233	276	251	26	28	22
55	35230	Manufacture of soap and cosmetics	54	47	49	26	22	22
56	35290	Manufacture of chemical products n.e.c.	18	18	36	14	13	18
57	35300	Petroleum refineries	238	244	258	25	26	30
58	35400	Manufacture of asphalt and roofing material	260	255	284	126	115	130
59	35510	Tyre and tube industries	20	19	40	51	48	111
60	35590	Manufacture of rubber products n.e.c.	68	53	43	59	48	38

Table 7.3 cont. NO_x-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
61	35600	Manufacture of plastic products n.e.c.	229	194	199	27	22	22
62	36100	Manufacture of earthenware and pottery	30	27	30	47	47	52
63	36200	Manufacture of glass and glass products	141	131	96	99	85	61
64	36910	Manufacture of structural clay products	670	527	365	854	663	447
65	36920	Manufacture of cement, lime and plaster	2 274	2 277	2 072	1 470	1 390	1 213
66	36993	Concrete products and stone cutting	301	295	676	53	55	137
67	36998	Non-metallic mineral products n.e.c.	653	642	431	276	246	155
68	37101	Iron and steel works	180	166	81	77	76	42
69	37102	Iron and steel casting	52	53	36	51	52	41
70	37201	Non-ferrous metal works	22	22	13	40	45	25
71	37202	Non-ferrous metal casting	23	20	19	38	35	30
72	38121	Manufacture of metal furniture	42	44	73	15	15	26
73	38138	Manufacture of structural metal products	128	125	239	12	10	19
74	38191	Manufacture of metal cans and containers	60	58	32	25	21	12
75	38198	Manuf. of other fabricated metal products	167	158	245	16	15	22
76	38220	Manufacture of agricultural machinery	76	70	111	19	20	33
77	38238	Manufacture of industrial machinery	128	120	164	13	12	16
78	38280	Repair of machinery	282	235	248	59	50	50
79	38293	Manufacture of household machinery	46	42	46	13	12	12
80	38298	Manufacture of refrigerators, accessories	269	253	392	13	12	17
81	38320	Manufacture of telecommunication equipment	51	53	65	7	7	9
82	38330	Manufacture of electrical home appliances	10	9	13	14	15	17
83	38392	Manufacture of accumulators and batteries	15	11	3	64	50	13
84	38398	Manufacture of other electrical supplies	157	114	147	18	14	17
85	38410	Ship building and repairing	81	77	111	7	6	9
86	38438	Railroad and automobile equipment	38	42	110	9	9	22
87	38498	Manufacture of cycles, mopeds, etc.	9	8	34	8	8	33
88	38500	Professional and measuring equipment	42	39	71	6	6	10
89	39010	Manuf. of jewellery, etc.	6	6	7	13	12	12
90	39098	Manufacture of toys, sporting goods, etc.	41	40	96	7	6	16
91	41010	Electric light and power	72 819	111 960	71 339	6 152	8 471	5 761
92	41020	Gas manufacture and distribution	71	42	34	20	10	8
93	41030	Steam and hot water supply	12 807	14 727	12 660	1 927	1 888	1 522
94	42000	Water works and supply	7	4	11	6	3	9
95	50000	Construction	11 112	9 463	10 223	115	104	107
96	61000	Wholesale trade	11 048	9 151	6 751	142	112	82
97	62000	Retail trade	2 704	2 658	3 676	65	60	78
98	63000	Restaurants and hotels	199	184	433	10	9	19
99	71118	Railway and bus transport, etc.	17 621	17 240	13 982	2 211	2 099	1 640
100	71138	Other land transport	27 198	26 147	23 178	1 102	973	818
101	71210	Ocean and coastal water transport	10 817	12 486	10 063	404	394	339
102	71230	Supporting services to water transport	77	55	26	32	24	11
103	71300	Air transport	5 317	7 645	7 644	506	693	670
104	71509	Services allied to transport, etc.	988	930	1 985	49	41	86
105	72000	Communication	1 425	1 222	675	71	58	30
106	81000	Financial institutions	83	87	268	3	3	11
107	82000	Insurance	40	42	52	5	7	10
108	83110	Dwellings	15	15	171	-	-	2
109	83509	Business services	239	243	1 468	3	3	20
110	93109	Education, market services	308	283	112	319	281	108
111	93300	Health, market services	81	82	173	9	8	16
112	94000	Recreational and cultural services	113	97	257	12	10	23
113	95130	Rep. of motor vehicles	211	209	437	11	11	21
114	95299	Household services	2 892	2 198	1 346	192	146	87
115	95400	Domestic services	-	-	-	-	-	-
116	97099	Private non-profit institutions	8	9	120	2	2	21
117	98099	Producers of government services	1 751	2 514	4 031	8	11	16
		Industries total	231 695	271 916	223 351	181	206	164
		Households	51 929	49 734	50 900	•	•	•
		Industries and households total	283 625	321 650	274 251	•	•	•

Table 7.3 cont. NO_x-emissions by industries and households 1990-92

Main groups			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11000	Agriculture, horticulture etc.	19 190	19 776	21 086	348	371	395
2	12000	Forestry and logging	71	47	63	62	39	56
3	13000	Fishing	14 245	14 475	14 745	3 771	3 582	3 564
4	20000	Mining and quarrying	725	760	650	77	79	65
5	31000	Manuf. of food, beverages, tobacco	7 340	7 415	5 686	73	70	51
6	32000	Textile, clothing, leather industry	398	380	343	24	22	19
7	33000	Manuf. of wood products, incl. furnit.	980	877	928	51	44	44
8	34000	Manuf. of paper, printing, publishing	1 064	1 087	987	30	30	27
9	35000	Chemical and petroleum industry	1 737	1 740	1 720	35	35	33
10	36000	Non-metallic mineral products	4 068	3 899	3 670	327	310	296
11	37000	Basic metal industry	276	261	149	61	61	38
12	38000	Manuf. of fabricated metal products	1 599	1 458	2 104	14	13	18
13	39000	Other manufacturing industries	47	46	102	7	7	16
14	40000	Electricity, gas and water	85 704	126 734	84 044	3 700	4 801	3 221
15	50000	Construction	11 112	9 463	10 223	115	104	107
16	60099	Wholesale and retail trade	13 752	11 809	10 428	115	94	80
17	63000	Restaurants and hotels	199	184	433	10	9	19
18	71000	Transport and storage	62 019	64 503	56 878	670	629	550
19	72000	Communication	1 425	1 222	675	71	58	30
20	80099	Financing and insurance	124	129	319	3	4	11
21	83110	Dwellings	15	15	171	-	-	2
22	83509	Business services	239	243	1 468	3	3	20
23	93009	Market services of education, health	389	364	285	37	33	23
24	94000	Recreational and cultural services	113	97	257	12	10	23
25	95009	Household services, incl. auto repair	3 103	2 407	1 783	91	69	49
26	95399	Other producers, exc. government	8	9	120	1	1	18
27	98099	Producers of government services	1 751	2 514	4 031	8	11	16
		Industries total	231 695	271 916	223 351	181	206	164
		Households	51 929	49 734	50 900	•	•	•
		Industries and households total	283 625	321 650	274 251	•	•	•

7.5 CO

Total emissions

Table 7.4 shows the energy related CO emissions of industries and households.[30] For 1992, the emission of CO is recorded as upwards of 630,000 tonnes. Of this, emissions from households accounted for 63% (397,700 tonnes) and emissions from industries for 37% (232,800 tonnes). The proportion of energy related emissions from households is thus considerably greater in the case of this type of emission viewed in relation to the other emission types CO_2, SO_2 and NO_x.

Households

The large proportion of CO emission from households is linked to the fact that households, to a greater extent, use petrol driven cars and the fact that the combustion of petrol gives rise to larger CO emissions than, for example, the combustion of diesel.

Industries

Of the industries' total emission of 232,800 tonnes, over 43%, or just over 100,000 tonnes, were attributed to transport and storage. On the basis of the detailed classification in the table, it may be seen that within this main group it was air transport which accounted for the greatest amount of CO emission, namely 47,600 tonnes. The CO emission from the conveyance of tourists, taxi services and carriage services (other land transport) accounted for nearly 41,800 tonnes.

In connection with wholesale and retail trade activity, approximately 42,000 tonnes of CO, or 18% of industries' emissions, were discharged. As in the case of households, the relatively substantial CO emission was due to the use of petrol driven cars.

Building and construction (20,172 tonnes) and also agriculture and horticulture, etc. (17,610 tonnes) were, moreover, main groups which had a relatively large CO emission.

There were comparatively modest CO emissions from the supply of electricity, gas, heating and water (4,611 tonnes). This is in contrast to the situation as regards CO_2, SO_2 and NO_x, where the emission from this main group was of significant volume.

The development 1990-92

The development from 1990-1992 shows a slightly declining trend in the emission from households, since CO emission fell from just under 417,000 tonnes to 398,000 tonnes.

Total CO emission from industries did, by contrast, not fall. In 1991 in particular, emissions were high (just about 246,000 tonnes). By contrast to the emission of CO_2, SO_2 and NO_x, the high CO emission in 1991 was not due to an export induced increase in the electricity supply but rather to an increase in CO emission from transport and storage from 86,800 tonnes in 1990 to nearly 109,000 tonnes in 1991.

CO-intensity

CO intensity was, in the case of industries collectively, 171 kg per million DKK worth of output in 1992. The greatest CO intensity, 974 kg per million DKK, was in connection with transport, whereas many of the main groups of industries within both manufacturing and the service industry had a CO intensity of less than 100 kg per million DKK.

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[30] The emissions from the combustion of straw and waste are not included. As regards CO and NMVOC, the emissions from combustion of straw and waste are of a considerable volume. In *Vadmand Jensen and Gravgård Pedersen, 1998*, an estimation, which also includes, among other things, emissions of CO and NMVOC from the combustion of straw and waste, is given.

Table 7.4 CO-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11101	Agriculture	17 017	16 825	15 114	364	373	333
2	11103	Horticulture	1 779	1 774	1 281	355	353	259
3	11109	Fur farming, etc.	289	265	498	193	227	448
4	11200	Agricultural services	851	838	716	455	439	384
5	12000	Forestry and logging	242	218	177	209	180	158
6	13000	Fishing	2 391	2 394	2 278	633	593	551
7	20099	Extraction of coal, oil, and gas	36	39	40	5	5	5
8	29000	Other mining	432	423	264	303	305	174
9	31113	Slaughtering etc. of pigs and cattle	823	783	448	25	23	12
10	31117	Poultry killing, dressing, packing	211	205	66	122	114	31
11	31121	Dairies	1 987	1 958	439	116	116	24
12	31123	Processed cheese, condensed milk	91	88	29	20	21	7
13	31124	Ice cream manufacturing	74	72	155	72	57	102
14	31130	Processing of fruits and vegetables	676	649	79	239	206	26
15	31140	Processing of fish	98	97	153	12	11	19
16	31151	Oil mills	44	42	14	18	20	7
17	31152	Margarine manufacturing	333	325	63	283	317	66
18	31153	Fish meal manufacturing	292	299	104	149	127	39
19	31160	Grain mill products	73	72	49	43	39	26
20	31171	Bread factories	904	875	142	618	580	92
21	31173	Cake factories	41	38	77	21	16	29
22	31174	Bakeries	1 876	1 865	319	608	591	103
23	31180	Sugar factories and refineries	466	512	375	164	176	132
24	31190	Chocolate and sugar confectionery	403	390	149	133	114	43
25	31210	Manufacture of food products n.e.c.	448	445	354	140	129	91
26	31229	Manufacture of prepared animal feeds	638	653	270	336	323	110
27	31310	Distilling and blending spirits	60	52	30	102	103	57
28	31338	Breweries	396	411	444	67	61	59
29	31400	Tobacco manufactures	67	65	27	33	29	12
30	32118	Spinning, weaving etc., textiles	84	83	102	19	20	26
31	32120	Manufacture of made-up textile goods	149	143	134	79	69	64
32	32130	Knitting mills	106	99	106	34	32	31
33	32158	Cordage, rope and twine industries	21	21	44	22	23	50
34	32200	Manufacture of wearing apparel	419	395	261	88	76	48
35	32300	Manufacture of leather products	112	108	33	240	243	58
36	32400	Manufacture of footwear	42	41	44	34	32	31
37	33100	Manufacture of wood products exc. furniture	1 015	899	962	118	105	105
38	33200	Manufacture of wooden furniture, etc.	745	721	778	70	63	64
39	34110	Manufacture of pulp, paper, paperboard	216	242	179	103	137	112
40	34128	Manufacture of paper containers, wallpaper	164	161	209	24	22	29
41	34210	Reproducing and composing services	32	29	148	16	15	74
42	34221	Bookprinting	49	49	320	10	10	68
43	34222	Offset printing	82	77	253	18	18	57
44	34223	Other printing	80	77	135	38	34	57
45	34230	Bookbinding	136	130	71	121	115	79
46	34240	Newspaper printing and publishing	316	296	177	50	47	27
47	34291	Book and art publishing	53	50	110	42	37	79
48	34292	Magazine publishing	60	56	18	33	32	10
49	34293	Other publishing	53	51	117	19	17	37
50	35110	Manufacture of basic industrial chemicals	109	115	152	17	19	22
51	35120	Manufacture of fertilisers and pesticides	58	56	28	40	43	25
52	35130	Manufacture of basic plastic materials	168	158	154	32	29	30
53	35210	Manufacture of paints and varnishes	140	133	111	58	50	47
54	35220	Manufacture of drugs and medicines	130	131	216	14	14	19
55	35230	Manufacture of soap and cosmetics	157	151	164	76	69	74
56	35290	Manufacture of chemical products n.e.c.	44	42	97	34	32	49
57	35300	Petroleum refineries	49	49	28	5	5	3
58	35400	Manufacture of asphalt and roofing material	236	228	125	114	103	57
59	35510	Tyre and tube industries	30	28	54	75	72	151
60	35590	Manufacture of rubber products n.e.c.	51	44	63	44	39	55

Table 7.4 cont. CO-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
61	35600	Manufacture of plastic products n.e.c.	506	467	391	60	53	44
62	36100	Manufacture of earthenware and pottery	47	44	66	74	77	114
63	36200	Manufacture of glass and glass products	68	64	71	47	41	45
64	36910	Manufacture of structural clay products	354	295	184	452	370	226
65	36920	Manufacture of cement, lime and plaster	1 049	1 064	1 005	678	649	588
66	36993	Concrete products and stone cutting	364	328	878	64	61	178
67	36998	Non-metallic mineral products n.e.c.	622	596	314	263	229	113
68	37101	Iron and steel works	50	47	50	21	22	26
69	37102	Iron and steel casting	55	54	32	54	53	37
70	37201	Non-ferrous metal works	40	38	7	74	78	13
71	37202	Non-ferrous metal casting	43	40	32	70	69	51
72	38121	Manufacture of metal furniture	93	93	141	32	32	49
73	38138	Manufacture of structural metal products	350	338	484	32	28	39
74	38191	Manufacture of metal cans and containers	65	61	48	27	22	18
75	38198	Manuf. of other fabricated metal products	465	453	642	45	42	57
76	38220	Manufacture of agricultural machinery	148	141	215	37	39	64
77	38238	Manufacture of industrial machinery	395	378	499	41	38	49
78	38280	Repair of machinery	1 536	1 484	736	320	318	148
79	38293	Manufacture of household machinery	45	42	67	13	12	17
80	38298	Manufacture of refrigerators, accessories	616	585	1 061	29	28	47
81	38320	Manufacture of telecommunication equipment	108	104	201	14	14	27
82	38330	Manufacture of electrical home appliances	17	17	32	23	26	41
83	38392	Manufacture of accumulators and batteries	56	52	8	247	245	34
84	38398	Manufacture of other electrical supplies	369	323	567	41	38	65
85	38410	Ship building and repairing	130	118	285	11	9	22
86	38438	Railroad and automobile equipment	55	54	189	13	11	37
87	38498	Manufacture of cycles, mopeds, etc.	11	10	49	10	10	47
88	38500	Professional and measuring equipment	180	175	346	26	25	48
89	39010	Manuf. of jewellery, etc.	40	39	40	88	82	77
90	39098	Manufacture of toys, sporting goods, etc.	202	198	342	33	31	58
91	41010	Electric light and power	2 400	3 273	3 202	203	248	259
92	41020	Gas manufacture and distribution	213	195	101	61	47	25
93	41030	Steam and hot water supply	1 245	1 338	1 251	187	172	150
94	42000	Water works and supply	28	28	57	24	22	45
95	50000	Construction	21 946	20 109	20 172	228	222	212
96	61000	Wholesale trade	25 806	24 234	22 321	331	297	270
97	62000	Retail trade	19 327	19 238	19 826	467	436	419
98	63000	Restaurants and hotels	770	746	1 514	37	34	66
99	71118	Railway and bus transport, etc.	9 644	9 605	4 649	1 210	1 170	545
100	71138	Other land transport	44 353	44 795	41 769	1 798	1 667	1 474
101	71210	Ocean and coastal water transport	1 766	1 962	1 415	66	62	48
102	71230	Supporting services to water transport	210	189	80	87	82	35
103	71300	Air transport	26 483	48 161	47 632	2 521	4 364	4 176
104	71509	Services allied to transport, etc.	4 347	4 274	5 136	215	190	222
105	72000	Communication	4 381	4 179	2 717	218	198	121
106	81000	Financial institutions	240	244	503	8	9	21
107	82000	Insurance	208	208	277	28	34	54
108	83110	Dwellings	5	6	458	-	-	5
109	83509	Business services	1 147	1 142	5 837	16	15	78
110	93109	Education, market services	1 839	1 805	280	1 908	1 793	269
111	93300	Health, market services	471	470	911	49	47	82
112	94000	Recreational and cultural services	458	440	755	50	44	67
113	95130	Rep. of motor vehicles	1 475	1 468	1 735	78	74	83
114	95299	Household services	6 962	6 347	5 127	462	420	330
115	95400	Domestic services	-	-	-	-	-	-
116	97099	Private non-profit institutions	50	50	376	10	9	67
117	98099	Producers of government services	5 344	6 185	6 212	24	26	25
		Industries total	227 342	245 927	232 841	177	186	171
		Households	416 854	408 839	397 719	•	•	•
		Industries and households total	644 196	654 766	630 560	•	•	•

Table 7.4 cont. CO-emissions by industries and households 1990-92

Main groups			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11000	Agriculture, horticulture etc.	19 936	19 702	17 610	362	370	330
2	12000	Forestry and logging	242	218	177	209	180	158
3	13000	Fishing	2 391	2 394	2 278	633	593	551
4	20000	Mining and quarrying	468	462	304	50	48	30
5	31000	Manuf. of food, beverages, tobacco	10 001	9 897	3 783	99	94	34
6	32000	Textile, clothing, leather industry	934	889	724	55	52	41
7	33000	Manuf. of wood products, incl. furnit.	1 761	1 620	1 740	91	81	82
8	34000	Manuf. of paper, printing, publishing	1 242	1 218	1 735	35	34	48
9	35000	Chemical and petroleum industry	1 678	1 602	1 584	34	32	30
10	36000	Non-metallic mineral products	2 504	2 392	2 519	201	190	203
11	37000	Basic metal industry	188	178	121	42	42	31
12	38000	Manuf. of fabricated metal products	4 639	4 427	5 571	42	39	47
13	39000	Other manufacturing industries	242	238	382	37	35	60
14	40000	Electricity, gas and water	3 887	4 833	4 611	168	183	177
15	50000	Construction	21 946	20 109	20 172	228	222	212
16	60099	Wholesale and retail trade	45 133	43 473	42 147	378	345	324
17	63000	Restaurants and hotels	770	746	1 514	37	34	66
18	71000	Transport and storage	86 802	108 984	100 681	938	1 062	974
19	72000	Communication	4 381	4 179	2 717	218	198	121
20	80099	Financing and insurance	448	453	780	12	14	27
21	83110	Dwellings	5	6	458	-	-	5
22	83509	Business services	1 147	1 142	5 837	16	15	78
23	93009	Market services of education, health	2 310	2 275	1 191	220	205	98
24	94000	Recreational and cultural services	458	440	755	50	44	67
25	95009	Household services, incl. auto repair	8 437	7 814	6 862	248	223	188
26	95399	Other producers, exc. government	50	50	376	8	8	57
27	98099	Producers of government services	5 344	6 185	6 212	24	26	25
		Industries total	227 342	245 927	232 841	177	186	171
		Households	416 854	408 839	397 719	•	•	•
		Industries and households total	644 196	654 766	630 560	•	•	•

7.6 NMVOC

Total emission

Table 7.5 shows the energy related NMVOC emissions broken down by industries and households. In 1992, the share of the total NMVOC emissions of 121,000 tonnes accounted for by households was 55% and by industries 45%. As in the case of CO emission, the large proportion accounted for by households was due to the extensive use of petrol driven cars.

Industries

Of the industries' total NMVOC emissions of 54,000 tonnes, transport and storage contributed by over one half, or 28,200 tonnes, of the NMVOC emission. Within the transport industries, it was primarily air transport which had a substantial NMVOC emission, viz. 17,400 tonnes. The conveyance of tourists, taxi services and carriage services (other land transport) were responsible for 7,900 tonnes of the energy related NMVOC emission.

Among the main industry groups it was, as in the case of CO emission, the wholesale and retail trade, construction, and agriculture and horticulture, etc. which accounted for substantial emissions. The emissions were, in that order, 7,600, 4,000 and 4,200 tonnes of NMVOC.

As in the case of the emission of CO, the emission of NMVOC from the supply of electricity, gas, heating and water was only moderate in volume terms.

The development 1990-92

NMVOC emissions from households showed a fall from 71,000 tonnes in 1991 to 67,000 tonnes in 1992, corresponding to around 6%.

Total NMVOC emission from industries was fairly constant at around 54-56,000 tonnes in the three years in the period 1990-91.

NMVOC-intensity

NMVOC intensity in the case of the industries collectively was 40 kg per million DKK of output in 1992. Transportation and storage (as was also the case in respect of CO) had the highest intensity - 273 kg per million DKK. The intensity in the case of, for example, fishing was 162 kg per million DKK worth of output.

Table 7.5 NMVOC-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11101	Agriculture	3 909	3 875	3 710	84	86	82
2	11103	Horticulture	323	318	244	64	63	49
3	11109	Fur farming, etc.	52	48	95	35	41	85
4	11200	Agricultural services	193	192	180	104	101	97
5	12000	Forestry and logging	44	40	35	38	33	31
6	13000	Fishing	677	681	670	179	169	162
7	20099	Extraction of coal, oil, and gas	7	7	7	1	1	1
8	29000	Other mining	76	73	46	53	53	30
9	31113	Slaughtering etc. of pigs and cattle	152	143	83	5	4	2
10	31117	Poultry killing, dressing, packing	39	37	12	22	21	6
11	31121	Dairies	379	372	85	22	22	5
12	31123	Processed cheese, condensed milk	18	17	6	4	4	1
13	31124	Ice cream manufacturing	13	13	30	13	10	20
14	31130	Processing of fruits and vegetables	125	119	15	44	38	5
15	31140	Processing of fish	18	18	29	2	2	4
16	31151	Oil mills	9	8	3	4	4	2
17	31152	Margarine manufacturing	61	59	12	52	58	12
18	31153	Fish meal manufacturing	55	56	20	28	24	8
19	31160	Grain mill products	13	13	9	8	7	5
20	31171	Bread factories	167	161	27	114	107	18
21	31173	Cake factories	8	7	14	4	3	5
22	31174	Bakeries	336	328	60	109	104	19
23	31180	Sugar factories and refineries	76	83	61	27	28	22
24	31190	Chocolate and sugar confectionery	74	71	28	25	21	8
25	31210	Manufacture of food products n.e.c.	82	80	77	26	23	20
26	31229	Manufacture of prepared animal feeds	117	118	47	61	58	19
27	31310	Distilling and blending spirits	11	9	5	18	18	10
28	31338	Breweries	75	78	84	13	12	11
29	31400	Tobacco manufactures	12	12	5	6	5	2
30	32118	Spinning, weaving etc., textiles	17	17	19	4	4	5
31	32120	Manufacture of made-up textile goods	27	25	24	14	12	12
32	32130	Knitting mills	19	18	19	6	6	6
33	32158	Cordage, rope and twine industries	4	4	8	4	4	10
34	32200	Manufacture of wearing apparel	75	70	48	16	14	9
35	32300	Manufacture of leather products	20	19	6	43	43	11
36	32400	Manufacture of footwear	8	7	8	6	6	6
37	33100	Manufacture of wood products exc. furniture	251	224	230	29	26	25
38	33200	Manufacture of wooden furniture, etc.	152	149	161	14	13	13
39	34110	Manufacture of pulp, paper, paperboard	37	41	29	18	23	18
40	34128	Manufacture of paper containers, wallpaper	31	30	38	4	4	5
41	34210	Reproducing and composing services	6	5	26	3	3	13
42	34221	Bookprinting	9	9	58	2	2	12
43	34222	Offset printing	16	16	47	4	4	10
44	34223	Other printing	14	14	24	7	6	10
45	34230	Bookbinding	25	23	13	22	20	14
46	34240	Newspaper printing and publishing	57	53	32	9	8	5
47	34291	Book and art publishing	10	9	20	8	7	14
48	34292	Magazine publishing	11	10	3	6	6	2
49	34293	Other publishing	10	9	21	4	3	7
50	35110	Manufacture of basic industrial chemicals	21	22	29	3	4	4
51	35120	Manufacture of fertilisers and pesticides	11	11	6	8	8	5
52	35130	Manufacture of basic plastic materials	31	29	28	6	5	5
53	35210	Manufacture of paints and varnishes	26	24	20	11	9	9
54	35220	Manufacture of drugs and medicines	24	24	39	3	3	3
55	35230	Manufacture of soap and cosmetics	28	27	29	14	12	13
56	35290	Manufacture of chemical products n.e.c.	8	8	18	6	6	9
57	35300	Petroleum refineries	9	9	6	1	1	1
58	35400	Manufacture of asphalt and roofing material	43	40	24	21	18	11
59	35510	Tyre and tube industries	5	5	10	14	13	29
60	35590	Manufacture of rubber products n.e.c.	10	8	11	8	7	10

Table 7.5 cont. NMVOC-emissions by industries and households 1990-92

			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
61	35600	Manufacture of plastic products n.e.c.	93	86	72	11	10	8
62	36100	Manufacture of earthenware and pottery	9	8	12	14	14	21
63	36200	Manufacture of glass and glass products	14	13	14	10	9	9
64	36910	Manufacture of structural clay products	58	48	29	74	61	35
65	36920	Manufacture of cement, lime and plaster	113	117	99	73	71	58
66	36993	Concrete products and stone cutting	67	59	167	12	11	34
67	36998	Non-metallic mineral products n.e.c.	110	104	53	46	40	19
68	37101	Iron and steel works	12	11	10	5	5	5
69	37102	Iron and steel casting	10	9	6	10	9	6
70	37201	Non-ferrous metal works	7	7	1	14	14	3
71	37202	Non-ferrous metal casting	8	7	6	13	12	9
72	38121	Manufacture of metal furniture	17	17	26	6	6	9
73	38138	Manufacture of structural metal products	63	60	92	6	5	7
74	38191	Manufacture of metal cans and containers	12	12	9	5	4	3
75	38198	Manuf. of other fabricated metal products	84	80	118	8	7	11
76	38220	Manufacture of agricultural machinery	27	26	41	7	7	12
77	38238	Manufacture of industrial machinery	71	67	91	7	7	9
78	38280	Repair of machinery	276	264	143	58	56	29
79	38293	Manufacture of household machinery	8	8	13	2	2	3
80	38298	Manufacture of refrigerators, accessories	111	105	197	5	5	9
81	38320	Manufacture of telecommunication equipment	20	19	37	3	3	5
82	38330	Manufacture of electrical home appliances	3	3	6	4	5	7
83	38392	Manufacture of accumulators and batteries	10	9	2	45	44	6
84	38398	Manufacture of other electrical supplies	67	59	104	8	7	12
85	38410	Ship building and repairing	23	21	52	2	2	4
86	38438	Railroad and automobile equipment	10	10	36	2	2	7
87	38498	Manufacture of cycles, mopeds, etc.	2	2	9	2	2	9
88	38500	Professional and measuring equipment	32	31	62	5	4	9
89	39010	Manuf. of jewellery, etc.	7	7	7	16	14	14
90	39098	Manufacture of toys, sporting goods, etc.	36	35	63	6	6	11
91	41010	Electric light and power	372	504	513	31	38	41
92	41020	Gas manufacture and distribution	38	35	19	11	9	5
93	41030	Steam and hot water supply	227	245	224	34	31	27
94	42000	Water works and supply	5	5	10	4	4	8
95	50000	Construction	4 242	3 932	4 006	44	43	42
96	61000	Wholesale trade	4 780	4 487	4 090	61	55	50
97	62000	Retail trade	3 462	3 379	3 576	84	77	76
98	63000	Restaurants and hotels	138	132	278	7	6	12
99	71118	Railway and bus transport, etc.	2 449	2 472	1 574	307	301	185
100	71138	Other land transport	8 418	8 467	7 862	341	315	277
101	71210	Ocean and coastal water transport	506	570	430	19	18	15
102	71230	Supporting services to water transport	38	35	15	16	15	6
103	71300	Air transport	15 042	17 186	17 414	1 432	1 557	1 527
104	71509	Services allied to transport, etc.	786	761	951	39	34	41
105	72000	Communication	801	758	490	40	36	22
106	81000	Financial institutions	43	43	93	1	2	4
107	82000	Insurance	37	37	49	5	6	10
108	83110	Dwellings	1	1	86	-	-	1
109	83509	Business services	205	200	1 065	3	3	14
110	93109	Education, market services	332	319	52	345	317	50
111	93300	Health, market services	84	83	165	9	8	15
112	94000	Recreational and cultural services	83	79	140	9	8	12
113	95130	Rep. of motor vehicles	264	257	322	14	13	15
114	95299	Household services	1 287	1 180	938	85	78	60
115	95400	Domestic services	-	-	-	-	-	-
116	97099	Private non-profit institutions	9	9	69	2	2	12
117	98099	Producers of government services	1 578	2 050	1 545	7	9	6
		Industries total	54 741	56 524	54 310	43	43	40
		Households	71 046	68 273	66 992	•	•	•
		Industries and households total	125 788	124 797	121 302	•	•	•

Table 7.5 cont. NMVOC-emissions by industries and households 1990-92

Main groups			1990	1991	1992	1990	1991	1992
			ton			kg per mill. DKK output		
1	11000	Agriculture, horticulture etc.	4 477	4 433	4 229	81	83	79
2	12000	Forestry and logging	44	40	35	38	33	31
3	13000	Fishing	677	681	670	179	169	162
4	20000	Mining and quarrying	82	80	53	9	8	5
5	31000	Manuf. of food, beverages, tobacco	1 841	1 802	711	18	17	6
6	32000	Textile, clothing, leather industry	170	160	134	10	9	8
7	33000	Manuf. of wood products, incl. furnit.	403	373	391	21	19	18
8	34000	Manuf. of paper, printing, publishing	225	219	312	6	6	9
9	35000	Chemical and petroleum industry	309	293	292	6	6	6
10	36000	Non-metallic mineral products	370	350	374	30	28	30
11	37000	Basic metal industry	37	34	23	8	8	6
12	38000	Manuf. of fabricated metal products	838	791	1 038	8	7	9
13	39000	Other manufacturing industries	43	42	70	7	6	11
14	40000	Electricity, gas and water	642	788	767	28	30	29
15	50000	Construction	4 242	3 932	4 006	44	43	42
16	60099	Wholesale and retail trade	8 241	7 867	7 667	69	63	59
17	63000	Restaurants and hotels	138	132	278	7	6	12
18	71000	Transport and storage	27 238	29 491	28 247	294	288	273
19	72000	Communication	801	758	490	40	36	22
20	80099	Financing and insurance	80	79	142	2	2	5
21	83110	Dwellings	1	1	86	-	-	1
22	83509	Business services	205	200	1 065	3	3	14
23	93009	Market services of education, health	416	402	217	40	36	18
24	94000	Recreational and cultural services	83	79	140	9	8	12
25	95009	Household services, incl. auto repair	1 551	1 438	1 259	46	41	35
26	95399	Other producers, exc. government	9	9	69	1	1	10
27	98099	Producers of government services	1 578	2 050	1 545	7	9	6
		Industries total	54 741	56 524	54 310	43	43	40
		Households	71 046	68 273	66 992	•	•	•
		Industries and households total	125 788	124 797	121 302	•	•	•

8. Energy related emissions from industries broken down by cause

Emissions by cause

In chapter 7, energy related emissions were attributed to the households and industries where the energy consumption - and accordingly the emissions - took place. Such emission accounts may be characterised as source-oriented. In this chapter, the emissions are, instead, drawn up on a cause-oriented basis. This is done by assigning industries' emissions to the categories of final demand, which may be regarded as the cause of the production, energy consumption and, accordingly, the associated emissions from the industries.

Source vs. cause

As an example of the difference between the types of accounts, the source-oriented itemisation of CO_2 emissions states that the electricity supply activity in 1992 gave rise to an emission of 22.6 million tonnes (cf. table 7.1). From a cause- oriented viewpoint, it will, instead, however, be stated (as will be apparent from section 8.3) that of those 22.6 million tonnes of CO_2, 12.5 million tonnes were caused by private consumption, 2.4 million tonnes by government consumption, 6.3 million tonnes by exports, 1.1 million tonnes by gross capital formation and 0.3 million ton by other final demand categories (changes in stocks and in agriculture's breeding stock).

The linking of final demand and production

The cause-oriented itemisation of emissions by industry is based on a linking of industrial production and energy consumption with the various final demand categories, which have induced the production.

An example for electricity supply

In the example of electricity supply activity, part of the electricity produced is supplied directly to households, but part of the electricity supplied to industries is used for the manufacture of goods and services, which also are sold to the households. These parts of industries' electricity consumption - and the corresponding CO_2 emissions in electricity supply - may similarly be regarded as caused by private consumption. Further, part of the intermediate consumption materials, which industries produce and sell to other industries is manufactured, because the receiving industries have to meet the private consumption by households or because the receiving industries have to supply intermediate consumption materials to industries which will then supply products to households. Between private consumption and an industry's production of intermediate consumption materials, there may naturally be many steps in the form of supplies from one industry to another. However, this does not alter the fact that part of an industry's production - and accordingly its electricity consumption - will be determined by the fact that initially there was a demand from households.

If the part of industries' production and electricity, which, in this way, is caused by private consumption, is linked to the relevant CO_2 emissions at power stations - and the CO_2 emission from the electricity production, which is sold directly to households is then added - the quantity of the electricity supply's CO_2 emission, which is caused by private consumption, can ultimately be determined.

An exhaustive breakdown

Correspondingly, it can be determined for each industry, each category of final demand and each type of emission how great a proportion of the industry's emission is caused by the relevant final demand category. Since all production in industries is caused by private consumption, government consumption, gross capital formation, exports or other final demand categories, the breakdown of the emission by causing final demand will be exhaustive.

The environmental/ economic circuit

In relation to the environmental/economic circuit shown in figure 2.1 in section 2.1, the attention in the source-oriented itemisation of emissions is focused on the direct connection between Danish emissions (flows of waste between the top and

bottom left box) and Danish production (in the top left box), while in the cause-oriented itemisation of emissions the attention is focused on the connection between Danish final demand (in the top left box) and Danish emissions.

The input-output model

The cause-oriented itemisation of emissions is undertaken using an input-output model, which again has as its starting point a linking of the monetary input-output table (chapter 3) and the source-oriented breakdown of emissions (chapter 7). In section 8.1, a description of the model calculations and the underlying assumptions, is given. The section is of a slightly technical nature and assumes a certain knowledge of input-output models and matrix calculation. Readers, who are not interested in the modelling aspect, can skip the section and go directly to sections 8.2-8.7 and also chapters 9 and 10, which set out the results of the input-output calculations.

8.1 Drawing up of the model

117 industries

The starting point for the cause-oriented distribution of emissions is a traditional input-output model (with so-called endogenous import) created on the basis of the monetary input-output table (cf. chapter 3). For the specific calculations, which form the basis of the results presented subsequently, the input-output table for 1992 is used with a 117-industry classification of rows and columns.

Mathematical formulation

The input-output table is drawn up in the following way:

$$A_{dk} X_{dk} + Y_{dk} = X_{dk} \qquad (8.1)$$

X_{dk} is a (117 x 1) vector with the 117 Danish industries' production, A_{dk} is a (117 x 117) matrix with input-output coefficients. The characteristic element (j,k) describes the value of the supply from industry j to industry k per unit of output in industry k. Y_{dk} is a (117 x 1) vector which shows the supplies from the Danish industries to final demand.[31]

At first (8.1) is only a writing-up in accounting terms of the connections which characterise the input-output table, but (8.1) can also be viewed as an linear equations system consisting of 117 equations with 117 unknowns. If the final demand, Y_{dk}, is regarded as known and the output, X_{dk} as unknown, this gives the solution to the equation system with reference to X_{dk}:

$$X_{dk} = (I-A_{dk})^{-1} Y_{dk} \qquad (8.2)$$

where I is a (117 x 117) unit matrix (ones in the diagonal and zeroes otherwise). Equation (8.2) can, in other words, be used to calculate the total output of the 117 industries as a function of the supplies to final demand, with allowance being made for all supplies of intermediate consumption materials between the industries (direct and indirect production).

[31] Converted to 27 industry level, the following connection between the monetary input-output table, table 3.1, and the matrices set out in equations (8.2) and (8.3) are: X_{dk} corresponds to the last column (and also row 37 transposed) in table 3.1. A_{dk} corresponds to the matrix, which arises from table 3.1 by taking the first 27 rows and columns and carrying out a column-wise division with the corresponding values for ouput. Y_{dk} corresponds to the first 27 rows in the »Total« column under final consumption.

We now assume that for each of the industries the emissions are proportional to the output. In the case of industry j the discharge of emission type h, Z_{hj} can therefore be written up as:

$$Z_{hj} = ef_{hj} X_j \qquad (8.3)$$

$h = CO_2, SO_2, NO_x, CO, NMVOC$
$j = 1,..,117$ (industry)

where X_j is the output from industry j and ef_{hj} is the industry's emission of emission type h per unit of output. Industry j's emission factor, ef_{hj}, is estimated by:

$$ef_{hj} = \frac{\sum_{i=1}^{23} EM_{hij}}{X_j} \qquad (8.4)$$

$i = 1,...,23$ (energy types)

where EM_{hij} is the source-oriented emissions as recorded in chapter 7 (cf. equation (7.1) on page 111).

If the input-output model (8.2) is combined with the expression for the industries' emission given in (8.3), an expression for the emission caused by direct and indirect production and energy consumption necessary for the industries' fulfilment of supplies to final demand, is obtained:

$$Z_h = diag(ef_h)X_{dk} = diag(ef_h)(I - A_{dk})^{-1}Y_{dk} \qquad (8.5)$$

Z_h is a (117 x 1) column vector, where the j element states the discharge of emission type h caused by the production in industry j, which is ultimately necessary in order to be able to comply with the final demand, Y_{dk}.

Diag(ef_h) is a matrix obtained by arranging the ef_{hj}'s in the diagonal on a (117 x 117) matrix, which moreover consists of zeroes.

By inserting different combinations of final demand in the Y_{dk} vector, the matching combinations of emissions from the industries can be calculated. If, for example, the vector for private consumption broken down by the supplying 117 industries[32] is inserted as Y_{dk}, a calculation of the emissions in all industries, taking account of the industries also having to supply intermediate consumption materials to each other can be arrived at on the basis of (8.5). Correspondingly, vectors for government consumption, gross capital formation and exports etc. can be inserted as Y_{dk} and the volume of the emissions caused thereby can be calculated using (8.5).

A global perspective

As illustrated by the environmental/economic circuit (cf. section 2.1), Danish economic activity also gives rise to emissions abroad as a result of the production activities in foreign industries induced by exports to Denmark. As in the case of Danish industries, account also needs to be taken of the foreign industries' intermediate supplies if a complete picture of the emission which arises abroad as a result of exports to Denmark is wanted. This can be done by drawing up an input-output emission model with so-called exogenous imports. The model with exogenous imports corresponds to the model described in Equations (8.1)-(8.5) above, but supplies of imported commodities are added to the different matrices.

[32] At 27-industry level this corresponds to the first 27 rows in the column for private consumption in table 3.1.

By analogy with (8.2), the fundamental connection between total Danish and foreign production, X_{glob}, is obtained on the one hand and Danish final demand of Danish and foreign products, $Y_{dk} + Y_{imp}$, on the other:

$$X_{glob} = (I - A_{dk} - A_{imp})^{-1} (Y_{dk} + Y_{imp}) \qquad (8.6)$$

A_{imp} is a 117 x 117 coefficient matrix in which the characteristic element (j,k) shows exports from foreign industry j to Danish industry k per unit of output from Danish industry k.[33]

On the basis of Equation (8.6), the total Danish and foreign (global) emissions caused by the final demand can be quantified by the following:

$$G_h = \text{diag}(ef_h)X_{glob} = \text{diag}(ef_h)(I - A_{dk} - A_{imp})^{-1} (Y_{dk} + Y_{imp}) \qquad (8.7)$$

where the interpretation of G_h follows the interpretation of Z_h, apart from G_h including all energy related emissions from direct and indirect production in foreign industry induced by exports to Denmark. Exports to Denmark include both goods for final demand and foreign intermediate products which are directly and indirectly needed by Danish industries for the fulfilment of production for final demand.

By inserting different combinations of final demand of Danish and foreign products in $Y_{dk} + Y_{imp}$ (8.7), the corresponding Danish and foreign emissions can be calculated with account being taken of all necessary Danish and foreign production of intermediate products.

Assumptions

An input-output model with exogenous import as described in Equations (8.6) and (8.7) is, *inter alia*, based on an assumption that all imported products are produced using the same technology as is employed in Denmark. The extent to which this is a realistic assumption naturally depends on the calculations, which are undertaken. The assumption will be reasonable (however not correct) if the starting point adopted is a final demand, where the commodities are imported from countries, which have an industry structure similar to Denmark's.

It must, however, be emphasised that the assumptions concerning Danish and foreign production conditions do not only involve industry structure and production technology in the narrow sense. Energy intensity, the types of energy used and emission coefficients for the energy types are also assumed to be the same abroad as in Denmark. These assumptions do not consider whether the imported commodities, for example, are produced in Sweden in activities using hydroelectric power. Energy related emission in Sweden is, in this case, zero but the input-output calculation will lead to an emission corresponding to the emission, which would have arisen if the imported commodities had, instead, been produced in Denmark using electricity from Danish coal fired power stations.

The assumptions used must thus lead to the calculated foreign emissions being treated with some reservation, but there is not immediately any alternative to cal-

[33] A_{imp} corresponds at 27-industry level to the coefficient matrix, which arises by first allocating the first 27 figures in row 29 in table 3.1 by supplying foreign industries and then dividing the columns throughout by the matching values for output (row 37).

culations of this type if one wishes to gain an impression of the volume of the emissions which Danish economic activity causes abroad.[34]

8.2 General points concerning the tables

6 groups of final demand

Tables 8.1-8.5 in the following sections show the industries' energy related emissions in 1992 broken down by causing final demand category, viz. private consumption, government consumption, gross fixed capital formation in buildings and installations, gross fixed capital formation in machinery, equipment and means of transport, exports and other final demand.[35] The latter cover changes in stocks and changes in breeding stocks in agriculture. These 6 categories correspond to an aggregation of the 8 categories of final demand in table 3.1. The industries' emissions by causing final demand category are distributed using input-output calculations as described in section 8.1.

First column

For each of the 117 industries, the industry's total emission is shown in the first column of the tables. The first column in tables 8.1-8.5 is thus identical with the column for emissions for the year 1992 in tables 7.1-7.5 respectively.

Following columns

The next six columns show the emissions distributed by causes. They show how much of the industries' emission is caused by private consumption, how much is due to government consumption and correspondingly in the case of each other category of final demand.

Interpretation

As stated in the introduction to this chapter, the industries' emissions by causing final demand category are distributed taking account of all inter-industry deliveries of intermediate consumption materials. When, for example, it is seen from table 8.1 that 350,000 tonnes of agriculture's total emission of 1.3 million tonnes of CO_2 are caused by private consumption, this must not be interpreted as private consumption of agriculture's products having given rise to a CO_2 emission of 350,000 tonnes. Instead, it reflects the fact that total private consumption, viz. private consumption of products from agriculture, slaughterhouses, dairies, sugar factories, power plants, restaurants and all the other industries caused an emission of 350,000 tonnes in agriculture via the direct and indirect production activities induced in agriculture by raw and secondary material deliveries to other industries.

Percentage distribution of final demand

As a result of the assumptions inherent in the input-output model, the percentage breakdown of the emissions into the six categories of final use for each industry at 117-industry level, is the same for different types of emission. However, this does not apply when one looks at the 27 main groups of industries, as the distribution on a percentage basis in this case is influenced by the fact that the industries at the detailed level enter with a different weight (emission volume) by the aggregation into the 27-industry main groups.

Negative figures

In a number of cases, negative figures appear in the tables in the column for other final demand. These negative emission figures express that some of the goods and services used in the given year are produced in an earlier year. In other words, the negative contributions are the result of a transfer of emissions between years via changes in stocks. Production of goods and services for building up stocks increases the year's emission, while a withdrawal from stocks reduces the total emis-

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[34] Alternately, the results of the calculations can be interpreted as the emissions, which would have occurred if the imported commodities had been produced in Denmark.

[35] Tourists' expenditure in Denmark (and also border trade in Denmark) is categorised as exports and not as private consumption. Cf. also section 9.1.

sion in relation to what it would have been if all the commodities consumed had been produced in the current year.

The following sections

To clarify in concrete terms how the tables are to be interpreted, attention is drawn in the following sections 8.3-8.7 to some main features concerning the distribution of the industries' emissions by causing final demand category. The discussion is most complete in the case of CO_2. Since, however, there are many common features in the tables for the different types of emission, some of the remarks concerning the conditions regarding CO_2 will also be valid for the other types of emission.

8.3 CO_2

Table 8.1 shows CO_2 emissions broken down by causing final demand category in 1992.

Private consumption

Of the total emissions by industries of 46.5 million tonnes, 21.7 million tonnes, or almost half, were caused by private consumption. The total emission of 21.7 million tonnes from private consumption may, moreover, be compared with the direct CO_2 emission from private consumption (households) of 9.7 million tonnes (cf. section 7.2).

Exports and government consumption

The supplies of goods and services for exports accounted for 15.7 million tonnes of CO_2 emission, viz. around one-third of the industries' emission, while government consumption gave rise to a CO_2 emission in industries of 5 million tonnes or just over one-tenth of the industries' total emissions. Gross fixed capital formation and other final demand categories only gave rise to modest volumes of emission from the industries.

When the industries emissions are viewed collectively, it may thus be concluded that it was exports, and particularly private consumption, which gave rise to the bulk of the CO_2 emissions.

Primary industries

In the case of individual industries, however, there was a considerable difference in the extent to which the various categories of final demand caused emissions. In the case of an industry like fishing, exports gave rise to 728,000 tonnes, or more than 85% of the industry's emission. In the case also of, for example, agriculture and horticulture etc., the chemical and petroleum industry and the manufacture of fabricated metal products, Danish exports accounted for a large part (more than two-thirds) of the total industry emissions.

Energy supply

The very significant CO_2 emission from the electricity, gas and water industry was, to a great extent, caused by private consumption. Nearly two-thirds (16.1 million tonnes) of the industry's total emission of 27 million tonnes can be attributed to private consumption. Exports accounted for 6.5 million tonnes and government consumption for 2.9 million tonnes. This corresponds to 24% and 11% respectively.

The food products, beverages and tobacco industry

In the case of the food, beverages and tobacco industry collectively, 58% or 1.5 million tonnes out of 2.4 million tonnes of emission were related to exports. From the detailed industry breakdown, it is apparent that within this main group it was especially in industries like slaughtering, processed cheese and milk condensation factories, and fish meal manufacturing that the emissions were caused by exports. In the case of processing of fruits and vegetables, margarine manufacturing, bread

factories, bakeries and chocolate and sugar confectionery, the CO_2 emissions were somewhat more closely related to private consumption.

The transport and storage industry

Of the CO_2 emission from transport and storage of 5.4 million tonnes, 2.0 million tonnes and 2.6 million tonnes were caused by private consumption and exports respectively. This fairly even distribution between causative private consumption and exports for the main group of transport and storage was also characteristic of the sub-industry describing air transport. In the case of railway and bus transport, etc., government consumption and especially private consumption gave rise to CO_2 emissions. In the case of the conveyance of tourists, taxi- and carriage services (other land transport) and ocean and coastal water transport it was, by contrast, mainly Danish exports which caused the discharge of CO_2.

Construction

Even though gross fixed capital formation taken as a whole only caused a relatively moderate proportion of total emissions from the industries, the emissions caused were relatively large in certain industries. This is the case in the main groups of industries such as manufacture of wood products, incl. furniture, the non-metallic mineral products industry and construction. Thus, for example, gross capital formation in construction caused 670,000 tonnes out of the total CO_2 emission of 1 million ton by the construction industry. This corresponds to 67%.

Table 8.1 CO_2-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport, equip. etc.	Exports of goods and services	Other final consumption
			1 000 ton						
1	11101	Agriculture	1 304	350	37	1	1	904	11
2	11103	Horticulture	476	187	35	29	1	223	1
3	11109	Fur farming, etc.	24	3	-	-	-	24	-3
4	11200	Agricultural services	63	17	2	-	-	44	1
5	12000	Forestry and logging	9	2	-	1	-	6	-
6	13000	Fishing	839	57	9	-	-	728	43
7	20099	Extraction of coal, oil, and gas	162	30	4	2	1	125	1
8	29000	Other mining	163	37	12	53	2	60	-
9	31113	Slaughtering etc. of pigs and cattle	139	34	2	-	-	101	1
10	31117	Poultry killing, dressing, packing	11	4	-	-	-	7	-
11	31121	Dairies	158	50	10	-	-	91	7
12	31123	Processed cheese, condensed milk	92	17	1	-	-	77	-3
13	31124	Ice cream manufacturing	11	6	-	-	-	5	-
14	31130	Processing of fruits and vegetables	38	19	1	-	-	17	1
15	31140	Processing of fish	36	3	1	-	-	33	-
16	31151	Oil mills	55	10	1	-	-	45	-1
17	31152	Margarine manufacturing	14	7	-	-	-	6	-
18	31153	Fish meal manufacturing	141	18	1	-	-	110	12
19	31160	Grain mill products	7	3	-	-	-	3	-
20	31171	Bread factories	26	18	2	-	-	6	-
21	31173	Cake factories	22	7	1	-	-	14	-
22	31174	Bakeries	30	24	3	-	-	4	-
23	31180	Sugar factories and refineries	366	99	7	1	4	269	-13
24	31190	Chocolate and sugar confectionery	29	16	-	-	-	14	-
25	31210	Manufacture of food products n.e.c.	609	200	10	1	1	389	8
26	31229	Manufacture of prepared animal feeds	284	78	6	1	1	200	-1
27	31310	Distilling and blending spirits	24	9	1	-	-	14	-
28	31338	Breweries	331	195	6	1	1	127	1
29	31400	Tobacco manufactures	8	5	-	-	-	3	-
30	32118	Spinning, weaving etc., textiles	77	19	1	-	3	56	-1
31	32120	Manufacture of made-up textile goods	9	4	-	-	1	4	-
32	32130	Knitting mills	5	2	-	-	-	3	-
33	32158	Cordage, rope and twine industries	5	-	-	-	1	4	-
34	32200	Manufacture of wearing apparel	16	6	-	-	-	10	-
35	32300	Manufacture of leather products	8	3	-	-	-	5	-
36	32400	Manufacture of footwear	4	2	-	-	-	1	-
37	33100	Manufacture of wood products exc. furniture	340	43	10	68	29	200	-11
38	33200	Manufacture of wooden furniture, etc.	145	20	-	1	21	103	-
39	34110	Manufacture of pulp, paper, paperboard	240	47	20	10	6	165	-7
40	34128	Manufacture of paper containers, wallpaper	53	12	4	1	2	34	-
41	34210	Reproducing and composing services	3	1	-	-	-	1	-
42	34221	Bookprinting	55	17	10	3	2	21	1
43	34222	Offset printing	31	11	6	2	1	11	1
44	34223	Other printing	4	1	1	-	-	2	-
45	34230	Bookbinding	2	1	1	-	-	1	-
46	34240	Newspaper printing and publishing	4	2	1	-	-	1	-
47	34291	Book and art publishing	3	2	-	-	1	-	-
48	34292	Magazine publishing	1	1	-	-	-	-	-
49	34293	Other publishing	4	1	1	-	-	1	-
50	35110	Manufacture of basic industrial chemicals	200	9	3	2	3	182	1
51	35120	Manufacture of fertilisers and pesticides	25	4	1	-	-	19	1
52	35130	Manufacture of basic plastic materials	24	3	1	2	1	17	-
53	35210	Manufacture of paints and varnishes	10	1	-	1	-	6	-
54	35220	Manufacture of drugs and medicines	120	7	5	-	-	105	2
55	35230	Manufacture of soap and cosmetics	13	4	1	-	-	7	1
56	35290	Manufacture of chemical products n.e.c.	11	2	1	1	-	7	-
57	35300	Petroleum refineries	134	45	6	5	1	81	-4
58	35400	Manufacture of asphalt and roofing material	155	30	8	63	2	51	1
59	35510	Tyre and tube industries	11	4	1	1	-	5	-
60	35590	Manufacture of rubber products n.e.c.	23	2	1	-	2	18	-

Table 8.1 cont. CO_2-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			1 000 ton						
61	35600	Manufacture of plastic products n.e.c.	70	13	5	5	3	44	-
62	36100	Manufacture of earthenware and pottery	11	2	-	-	-	7	1
63	36200	Manufacture of glass and glass products	41	8	1	6	2	24	-
64	36910	Manufacture of structural clay products	179	23	7	62	1	96	- 10
65	36920	Manufacture of cement, lime and plaster	1 000	138	43	376	10	439	- 7
66	36993	Concrete products and stone cutting	175	33	10	95	2	38	- 3
67	36998	Non-metallic mineral products n.e.c.	203	20	7	52	6	118	-
68	37101	Iron and steel works	42	1	1	2	2	36	- 1
69	37102	Iron and steel casting	17	1	-	1	2	13	-
70	37201	Non-ferrous metal works	7	-	-	-	-	5	-
71	37202	Non-ferrous metal casting	9	1	-	1	1	6	-
72	38121	Manufacture of metal furniture	28	3	-	-	11	14	-
73	38138	Manufacture of structural metal products	65	6	2	10	11	35	-
74	38191	Manufacture of metal cans and containers	15	3	-	-	1	10	-
75	38198	Manuf. of other fabricated metal products	73	10	2	9	10	43	-
76	38220	Manufacture of agricultural machinery	29	1	-	-	8	21	- 2
77	38238	Manufacture of industrial machinery	55	1	1	1	13	39	-
78	38280	Repair of machinery	42	11	4	2	3	22	-
79	38293	Manufacture of household machinery	19	3	-	-	1	14	-
80	38298	Manufacture of refrigerators, accessories	118	7	3	5	22	82	- 1
81	38320	Manufacture of telecommunication equipment	22	2	1	1	2	17	-
82	38330	Manufacture of electrical home appliances	6	1	-	-	1	3	-
83	38392	Manufacture of accumulators and batteries	1	-	-	-	-	1	-
84	38398	Manufacture of other electrical supplies	38	4	2	3	7	23	-
85	38410	Ship building and repairing	40	1	2	-	10	27	-
86	38438	Railroad and automobile equipment	25	1	-	-	10	14	-
87	38498	Manufacture of cycles, mopeds, etc.	15	4	-	-	4	8	- 1
88	38500	Professional and measuring equipment	17	1	1	-	2	14	-
89	39010	Manuf. of jewellery, etc.	1	1	-	-	-	1	-
90	39098	Manufacture of toys, sporting goods, etc.	19	4	-	-	1	13	-
91	41010	Electric light and power	22 555	12 504	2 408	640	466	6 278	259
92	41020	Gas manufacture and distribution	7	5	1	-	-	1	-
93	41030	Steam and hot water supply	4 508	3 634	530	37	32	233	42
94	42000	Water works and supply	2	1	-	-	-	-	-
95	50000	Construction	1 029	227	71	670	5	49	6
96	61000	Wholesale trade	745	242	27	34	90	352	1
97	62000	Retail trade	510	418	16	9	25	42	-
98	63000	Restaurants and hotels	134	97	6	1	1	29	-
99	71118	Railway and bus transport, etc.	896	558	146	28	14	146	4
100	71138	Other land transport	1 932	564	190	134	69	965	10
101	71210	Ocean and coastal water transport	559	31	8	5	1	514	-
102	71230	Supporting services to water transport	5	1	-	-	-	3	-
103	71300	Air transport	1 842	732	128	73	30	871	10
104	71509	Services allied to transport, etc.	203	66	23	12	9	92	1
105	72000	Communication	101	50	22	5	2	15	7
106	81000	Financial institutions	91	22	2	2	-	6	60
107	82000	Insurance	23	22	-	-	-	1	-
108	83110	Dwellings	36	35	-	-	-	-	-
109	83509	Business services	267	87	40	47	11	70	12
110	93109	Education, market services	10	8	1	-	-	1	-
111	93300	Health, market services	47	17	27	-	-	2	-
112	94000	Recreational and cultural services	43	32	3	1	-	7	-
113	95130	Rep. of motor vehicles	78	55	4	4	1	14	-
114	95299	Household services	178	110	34	5	2	22	3
115	95400	Domestic services	-	-	-	-	-	-	-
116	97099	Private non-profit institutions	13	13	-	-	-	-	-
117	98099	Producers of government services	1 088	76	996	2	1	11	2
		Industries total	46 490	21 725	5 009	2 596	995	15 718	447

Table 8.1 cont. CO_2-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			1 000 ton						
Main groups									
1	11000	Agriculture, horticulture etc.	1 867	557	74	30	2	1 195	10
2	12000	Forestry and logging	9	2	-	1	-	6	-
3	13000	Fishing	839	57	9	-	-	728	43
4	20000	Mining and quarrying	325	67	16	55	2	185	-
5	31000	Manuf. of food, beverages, tobacco	2 433	822	53	4	8	1 535	11
6	32000	Textile, clothing, leather industry	125	34	1	1	5	84	- 1
7	33000	Manuf. of wood products, incl. furnit.	485	63	11	69	50	303	- 11
8	34000	Manuf. of paper, printing, publishing	402	97	43	18	12	236	- 4
9	35000	Chemical and petroleum industry	796	126	31	80	13	542	3
10	36000	Non-metallic mineral products	1 608	224	69	592	21	722	- 20
11	37000	Basic metal industry	75	4	1	4	6	60	- 1
12	38000	Manuf. of fabricated metal products	607	59	19	32	114	386	- 3
13	39000	Other manufacturing industries	20	4	-	-	1	14	-
14	40000	Electricity, gas and water	27 071	16 144	2 939	677	498	6 512	301
15	50000	Construction	1 029	227	71	670	5	49	6
16	60099	Wholesale and retail trade	1 255	660	43	43	115	394	2
17	63000	Restaurants and hotels	134	97	6	1	1	29	-
18	71000	Transport and storage	5 438	1 952	494	253	123	2 590	25
19	72000	Communication	101	50	22	5	2	15	7
20	80099	Financing and insurance	114	43	2	2	1	7	60
21	83110	Dwellings	36	35	-	-	-	-	-
22	83509	Business services	267	87	40	47	11	70	12
23	93009	Market services of education, health	57	25	28	-	-	3	-
24	94000	Recreational and cultural services	43	32	3	1	-	7	-
25	95009	Household services, incl. auto repair	256	165	38	10	3	36	4
26	95399	Other producers, exc. government	13	13	-	-	-	-	-
27	98099	Producers of government services	1 088	76	996	2	1	11	2
		Industries total	46 490	21 725	5 009	2 596	995	15 718	447

8.4 SO_2

Total emission by causes

SO_2 emissions broken down by the causing final demand categories are shown in table 8.2. Of the industries' total SO_2 emission of nearly 184,000 tonnes, private consumption caused 90,606 tonnes, or 49% of the emissions. The shares of exports and government consumption were 61,528 and 18,154 tonnes respectively, which correspond to 33% and 10% of the industries' total SO_2 emissions.

The indirect emission of 90,606 tonnes from private consumption may be compared to the direct SO_2 emission from private consumption (households) totalling 5,000 tonnes (cf. section 7.3).

The individual industries

The distribution of the individual industries' total SO_2 emission by category of causing final demand corresponds, moreover, to the distribution which applied in the case of CO_2. This relationship applies, as a rule, also when the main industry groups are considered. The remarks in relation to CO_2 in section 8.3 are therefore, to a certain extent, valid also for SO_2.

The transport and storage industry

Note, however, that for transport and storage it was the case that private consumption and exports were, to a fairly equal extent, the cause of CO_2 emission, while exports, to a greater extent, were the cause of SO_2 emissions. Of transport's total SO_2 emission of 11,000 tonnes, exports accounted for 6,310 tonnes and private consumption for 3,406 tonnes. Looking at the individual industries within the main group for transport and storage, it may be seen from table 8.2 that around half of its SO_2 emission comes from ocean and coastal water transport, where the emission, to a great extent, is determined by Danish exports.

Table 8.2 SO_2-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
1	11101	Agriculture	1 701	457	48	1	1	1 179	14
2	11103	Horticulture	2 116	830	158	128	2	993	6
3	11109	Fur farming, etc.	18	2	-	-	-	18	-2
4	11200	Agricultural services	68	18	2	-	-	47	1
5	12000	Forestry and logging	6	1	-	1	-	4	-
6	13000	Fishing	5 380	368	60	2	2	4 671	276
7	20099	Extraction of coal, oil, and gas	753	139	19	9	3	578	4
8	29000	Other mining	753	171	55	244	7	278	-2
9	31113	Slaughtering etc. of pigs and cattle	556	136	10	-	-	405	5
10	31117	Poultry killing, dressing, packing	27	9	-	-	-	18	-
11	31121	Dairies	452	143	28	1	-	261	19
12	31123	Processed cheese, condensed milk	448	83	4	1	2	372	-14
13	31124	Ice cream manufacturing	11	6	-	-	-	5	-
14	31130	Processing of fruits and vegetables	149	75	3	-	-	67	4
15	31140	Processing of fish	80	6	1	-	-	72	1
16	31151	Oil mills	306	56	4	1	1	248	-5
17	31152	Margarine manufacturing	46	25	1	-	-	20	-1
18	31153	Fish meal manufacturing	559	71	6	-	-	435	46
19	31160	Grain mill products	9	4	-	-	-	4	-
20	31171	Bread factories	23	16	1	-	-	5	-
21	31173	Cake factories	20	6	1	-	-	13	-
22	31174	Bakeries	30	23	2	-	-	4	-
23	31180	Sugar factories and refineries	2 236	603	44	5	24	1 642	-81
24	31190	Chocolate and sugar confectionery	99	53	1	-	-	46	-1
25	31210	Manufacture of food products n.e.c.	509	167	8	1	1	325	7
26	31229	Manufacture of prepared animal feeds	1 351	372	27	2	3	952	-5
27	31310	Distilling and blending spirits	77	29	2	-	1	45	-1
28	31338	Breweries	1 719	1 013	33	4	4	657	7
29	31400	Tobacco manufactures	20	13	-	-	-	8	-
30	32118	Spinning, weaving etc., textiles	267	64	2	1	10	193	-3
31	32120	Manufacture of made-up textile goods	11	4	-	-	1	5	-
32	32130	Knitting mills	4	1	-	-	-	3	-
33	32158	Cordage, rope and twine industries	5	-	-	-	1	4	-
34	32200	Manufacture of wearing apparel	15	5	-	-	-	10	-
35	32300	Manufacture of leather products	29	9	-	-	1	17	1
36	32400	Manufacture of footwear	3	2	-	-	-	1	-
37	33100	Manufacture of wood products exc. furniture	261	33	8	52	22	154	-8
38	33200	Manufacture of wooden furniture, etc.	70	10	-	-	10	50	-
39	34110	Manufacture of pulp, paper, paperboard	1 316	256	107	52	32	905	-37
40	34128	Manufacture of paper containers, wallpaper	85	19	6	2	3	55	-
41	34210	Reproducing and composing services	1	-	-	-	-	-	-
42	34221	Bookprinting	298	93	56	18	11	115	6
43	34222	Offset printing	6	2	1	-	-	2	-
44	34223	Other printing	2	1	-	-	-	1	-
45	34230	Bookbinding	1	-	-	-	-	-	-
46	34240	Newspaper printing and publishing	3	1	-	-	-	1	-
47	34291	Book and art publishing	2	1	-	-	1	-	-
48	34292	Magazine publishing	1	1	-	-	-	-	-
49	34293	Other publishing	3	1	1	-	-	1	-
50	35110	Manufacture of basic industrial chemicals	935	44	16	7	12	851	5
51	35120	Manufacture of fertilisers and pesticides	53	8	1	-	1	40	3
52	35130	Manufacture of basic plastic materials	40	5	2	4	1	28	-
53	35210	Manufacture of paints and varnishes	13	2	-	2	1	8	-
54	35220	Manufacture of drugs and medicines	632	36	27	-	1	554	13
55	35230	Manufacture of soap and cosmetics	34	11	2	-	-	19	1
56	35290	Manufacture of chemical products n.e.c.	20	4	1	2	1	12	-
57	35300	Petroleum refineries	848	286	36	30	9	511	-24
58	35400	Manufacture of asphalt and roofing material	391	75	20	159	5	130	3
59	35510	Tyre and tube industries	29	12	1	2	1	12	-
60	35590	Manufacture of rubber products n.e.c.	16	2	1	-	1	13	-

Table 8.2. cont. SO_2-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF, machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
61	35600	Manufacture of plastic products n.e.c.	95	18	6	7	4	60	-
62	36100	Manufacture of earthenware and pottery	24	5	-	-	-	17	1
63	36200	Manufacture of glass and glass products	10	2	-	2	-	6	-
64	36910	Manufacture of structural clay products	841	107	34	291	6	451	- 47
65	36920	Manufacture of cement, lime and plaster	6 305	870	274	2 373	65	2 770	- 46
66	36993	Concrete products and stone cutting	203	38	12	110	2	44	- 3
67	36998	Non-metallic mineral products n.e.c.	1 071	107	35	275	32	621	-
68	37101	Iron and steel works	6	-	-	-	-	5	-
69	37102	Iron and steel casting	58	3	1	2	7	45	-
70	37201	Non-ferrous metal works	22	1	-	1	1	17	1
71	37202	Non-ferrous metal casting	6	1	-	-	1	4	-
72	38121	Manufacture of metal furniture	29	3	-	-	11	15	-
73	38138	Manufacture of structural metal products	90	8	3	15	15	49	-
74	38191	Manufacture of metal cans and containers	4	1	-	-	-	3	-
75	38198	Manuf. of other fabricated metal products	75	10	2	9	10	44	-
76	38220	Manufacture of agricultural machinery	34	1	-	1	10	24	- 2
77	38238	Manufacture of industrial machinery	114	3	1	2	28	80	- 1
78	38280	Repair of machinery	32	8	3	1	2	17	-
79	38293	Manufacture of household machinery	86	14	-	-	7	62	2
80	38298	Manufacture of refrigerators, accessories	277	15	7	11	52	193	- 2
81	38320	Manufacture of telecommunication equipment	23	2	1	1	2	17	-
82	38330	Manufacture of electrical home appliances	4	1	-	-	-	2	-
83	38392	Manufacture of accumulators and batteries	1	-	-	-	-	1	-
84	38398	Manufacture of other electrical supplies	117	11	5	8	20	72	-
85	38410	Ship building and repairing	99	3	4	1	24	67	-
86	38438	Railroad and automobile equipment	32	2	1	-	12	17	-
87	38498	Manufacture of cycles, mopeds, etc.	7	2	-	-	2	4	-
88	38500	Professional and measuring equipment	14	1	1	-	1	11	-
89	39010	Manuf. of jewellery, etc.	1	-	-	-	-	-	-
90	39098	Manufacture of toys, sporting goods, etc.	23	4	-	-	1	16	-
91	41010	Electric light and power	114 867	63 680	12 261	3 259	2 375	31 975	1 318
92	41020	Gas manufacture and distribution	2	2	-	-	-	-	-
93	41030	Steam and hot water supply	18 733	15 103	2 202	153	132	966	176
94	42000	Water works and supply	1	1	-	-	-	-	-
95	50000	Construction	1 457	322	100	949	7	70	9
96	61000	Wholesale trade	488	158	17	22	59	231	1
97	62000	Retail trade	298	244	10	5	14	24	-
98	63000	Restaurants and hotels	129	94	6	1	1	28	-
99	71118	Railway and bus transport, etc.	4 204	2 617	684	132	65	685	21
100	71138	Other land transport	1 374	401	135	96	49	686	7
101	71210	Ocean and coastal water transport	5 234	286	72	50	13	4 809	3
102	71230	Supporting services to water transport	2	1	-	-	-	2	-
103	71300	Air transport	138	55	10	5	2	65	1
104	71509	Services allied to transport, etc.	140	46	16	8	7	63	1
105	72000	Communication	75	38	16	4	1	11	5
106	81000	Financial institutions	99	24	2	2	1	6	65
107	82000	Insurance	24	22	-	-	-	1	-
108	83110	Dwellings	34	33	-	-	-	-	-
109	83509	Business services	219	72	32	39	9	58	10
110	93109	Education, market services	7	5	1	-	-	-	-
111	93300	Health, market services	41	15	24	-	-	2	-
112	94000	Recreational and cultural services	37	28	3	1	-	6	-
113	95130	Rep. of motor vehicles	61	42	3	3	1	11	-
114	95299	Household services	123	76	24	4	1	15	2
115	95400	Domestic services	-	-	-	-	-	-	-
116	97099	Private non-profit institutions	9	9	-	-	-	-	-
117	98099	Producers of government services	1 454	102	1 331	3	1	15	2
		Industries total	183 869	90 606	18 154	8 584	3 235	61 528	1 762

Table 8.2 cont. **SO_2-emissions by industries and causing final demand category 1992**

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
Main groups									
1	11000	Agriculture, horticulture etc.	3 902	1 307	208	129	4	2 236	18
2	12000	Forestry and logging	6	1	-	1	-	4	-
3	13000	Fishing	5 380	368	60	2	2	4 671	276
4	20000	Mining and quarrying	1 506	309	74	254	10	857	2
5	31000	Manuf. of food, beverages, tobacco	8 725	2 909	179	16	37	5 604	- 20
6	32000	Textile, clothing, leather industry	335	86	3	2	13	233	- 2
7	33000	Manuf. of wood products, incl. furnit.	332	43	8	53	32	204	- 8
8	34000	Manuf. of paper, printing, publishing	1 719	378	172	74	47	1 079	- 30
9	35000	Chemical and petroleum industry	3 105	503	114	213	37	2 237	2
10	36000	Non-metallic mineral products	8 454	1 129	355	3 051	105	3 909	- 95
11	37000	Basic metal industry	91	5	2	4	10	70	-
12	38000	Manuf. of fabricated metal products	1 038	86	30	49	197	679	- 3
13	39000	Other manufacturing industries	23	5	-	-	1	17	-
14	40000	Electricity, gas and water	133 604	78 786	14 464	3 412	2 507	32 942	1 493
15	50000	Construction	1 457	322	100	949	7	70	9
16	60099	Wholesale and retail trade	786	402	27	27	73	255	1
17	63000	Restaurants and hotels	129	94	6	1	1	28	-
18	71000	Transport and storage	11 093	3 406	916	292	136	6 310	33
19	72000	Communication	75	38	16	4	1	11	5
20	80099	Financing and insurance	123	46	2	2	1	7	65
21	83110	Dwellings	34	33	-	-	-	-	-
22	83509	Business services	219	72	32	39	9	58	10
23	93009	Market services of education, health	48	21	25	-	-	3	-
24	94000	Recreational and cultural services	37	28	3	1	-	6	-
25	95009	Household services, incl. auto repair	183	119	27	7	2	26	3
26	95399	Other producers, exc. government	9	9	-	-	-	-	-
27	98099	Producers of government services	1 454	102	1 331	3	1	15	2
		Industries total	183 869	90 606	18 154	8 584	3 235	61 528	1 762

8.5 NO_x

Total emission by causes

Table 8.3 shows NO_x emissions in 1992 broken down by causing final demand category. The industries' total NO_x emissions of 223,000 tonnes are broken down into just under 90,800 tonnes by way of private consumption, barely 89,800 tonnes by way of exports and 21,500 tonnes by way of government consumption. This corresponds to 41% of the emission being attributable to private consumption, 40% to exports and 10% to government consumption. Gross fixed capital formation and other final demand categories caused the remaining 10% of the industries' emissions.

The indirect emission of about 90,800 tonnes from private consumption may be compared with the direct NO_x emission from households of 50,900 tonnes (cf. table 7.3).

Exports and the transport and storage industry

Compared to the CO_2 and SO_2, the NO_x emissions are slightly more affected by exports of goods and services and slightly less affected by private consumption. The shift from private consumption towards exports as a cause of emissions is due to, *inter alia*, the transport and storage industry share of the emissions being greater in the case of NO_x than in the case of CO_2 and SO_2, and exports being a considerable cause of activity in the transport and storage industry.

Table 8.3 NO_x-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
1	11101	Agriculture	18 722	5 030	533	12	15	12 976	156
2	11103	Horticulture	1 258	493	94	76	1	590	3
3	11109	Fur farming, etc.	149	18	-	-	-	148	- 18
4	11200	Agricultural services	957	259	28	1	1	660	8
5	12000	Forestry and logging	63	12	1	8	2	40	-
6	13000	Fishing	14 745	1 010	165	5	5	12 804	756
7	20099	Extraction of coal, oil, and gas	282	52	7	4	1	217	1
8	29000	Other mining	368	83	27	119	4	136	- 1
9	31113	Slaughtering etc. of pigs and cattle	392	96	7	-	-	285	3
10	31117	Poultry killing, dressing, packing	41	14	-	-	-	27	-
11	31121	Dairies	539	171	33	1	1	312	23
12	31123	Processed cheese, condensed milk	177	33	2	-	1	147	- 6
13	31124	Ice cream manufacturing	106	54	2	-	-	50	-
14	31130	Processing of fruits and vegetables	89	45	2	-	-	40	3
15	31140	Processing of fish	110	8	2	-	-	99	1
16	31151	Oil mills	104	19	1	-	-	85	- 2
17	31152	Margarine manufacturing	41	22	1	-	-	18	-
18	31153	Fish meal manufacturing	299	38	3	-	-	233	24
19	31160	Grain mill products	25	11	1	-	-	12	-
20	31171	Bread factories	121	85	8	-	-	28	- 1
21	31173	Cake factories	45	14	2	-	-	29	-
22	31174	Bakeries	98	78	8	-	-	12	-
23	31180	Sugar factories and refineries	783	211	15	2	8	575	- 28
24	31190	Chocolate and sugar confectionery	99	53	1	-	-	46	- 1
25	31210	Manufacture of food products n.e.c.	1 129	371	19	1	3	721	15
26	31229	Manufacture of prepared animal feeds	608	167	12	1	1	429	- 2
27	31310	Distilling and blending spirits	47	17	1	-	1	27	-
28	31338	Breweries	815	480	16	2	2	311	3
29	31400	Tobacco manufactures	19	12	-	-	-	7	-
30	32118	Spinning, weaving etc., textiles	158	38	1	1	6	114	- 2
31	32120	Manufacture of made-up textile goods	35	14	1	1	3	16	- 1
32	32130	Knitting mills	24	8	-	-	-	17	-
33	32158	Cordage, rope and twine industries	25	2	-	-	5	18	-
34	32200	Manufacture of wearing apparel	70	24	1	-	-	44	1
35	32300	Manufacture of leather products	19	6	-	-	1	11	1
36	32400	Manufacture of footwear	12	7	1	-	-	4	-
37	33100	Manufacture of wood products exc. furniture	576	74	17	116	49	339	- 18
38	33200	Manufacture of wooden furniture, etc.	352	49	1	1	51	251	-
39	34110	Manufacture of pulp, paper, paperboard	485	94	39	19	12	333	- 13
40	34128	Manufacture of paper containers, wallpaper	128	29	9	4	5	82	-
41	34210	Reproducing and composing services	21	8	3	1	1	8	1
42	34221	Bookprinting	143	45	27	8	5	55	3
43	34222	Offset printing	85	30	15	5	3	30	2
44	34223	Other printing	28	9	5	2	1	10	1
45	34230	Bookbinding	15	4	4	1	-	6	-
46	34240	Newspaper printing and publishing	32	16	4	3	1	7	1
47	34291	Book and art publishing	20	12	3	-	5	1	-
48	34292	Magazine publishing	4	3	-	-	-	-	-
49	34293	Other publishing	26	9	6	2	1	6	1
50	35110	Manufacture of basic industrial chemicals	408	19	7	3	5	371	2
51	35120	Manufacture of fertilisers and pesticides	52	8	1	-	1	39	3
52	35130	Manufacture of basic plastic materials	63	9	3	6	2	44	-
53	35210	Manufacture of paints and varnishes	36	5	1	5	2	23	-
54	35220	Manufacture of drugs and medicines	251	14	11	-	-	220	5
55	35230	Manufacture of soap and cosmetics	49	16	3	-	-	27	2
56	35290	Manufacture of chemical products n.e.c.	36	8	2	3	1	21	1
57	35300	Petroleum refineries	258	87	11	9	3	155	- 7
58	35400	Manufacture of asphalt and roofing material	284	54	15	115	4	94	2
59	35510	Tyre and tube industries	40	17	2	3	1	17	-
60	35590	Manufacture of rubber products n.e.c.	43	4	1	1	3	34	-

Table 8.3 cont. NO_x-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF, machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
61	35600	Manufacture of plastic products n.e.c.	199	37	13	15	9	125	-
62	36100	Manufacture of earthenware and pottery	30	7	-	-	-	21	2
63	36200	Manufacture of glass and glass products	96	20	3	14	4	56	- 1
64	36910	Manufacture of structural clay products	365	46	15	126	2	195	- 20
65	36920	Manufacture of cement, lime and plaster	2 072	286	90	780	21	910	- 15
66	36993	Concrete products and stone cutting	676	127	39	368	6	147	- 11
67	36998	Non-metallic mineral products n.e.c.	431	43	14	111	13	250	-
68	37101	Iron and steel works	81	3	1	4	4	69	- 1
69	37102	Iron and steel casting	36	2	1	1	4	27	-
70	37201	Non-ferrous metal works	13	1	-	1	1	10	-
71	37202	Non-ferrous metal casting	19	2	1	1	3	13	-
72	38121	Manufacture of metal furniture	73	8	1	1	28	37	- 1
73	38138	Manufacture of structural metal products	239	22	7	39	40	130	1
74	38191	Manufacture of metal cans and containers	32	6	1	1	1	23	1
75	38198	Manuf. of other fabricated metal products	245	33	7	29	32	144	1
76	38220	Manufacture of agricultural machinery	111	4	1	2	31	79	- 6
77	38238	Manufacture of industrial machinery	164	4	2	4	40	116	- 1
78	38280	Repair of machinery	248	65	23	9	17	131	2
79	38293	Manufacture of household machinery	46	8	-	-	4	33	1
80	38298	Manufacture of refrigerators, accessories	392	22	11	15	74	273	- 2
81	38320	Manufacture of telecommunication equipment	65	6	2	2	6	49	-
82	38330	Manufacture of electrical home appliances	13	3	-	-	1	8	-
83	38392	Manufacture of accumulators and batteries	3	1	-	-	-	2	-
84	38398	Manufacture of other electrical supplies	147	14	7	10	26	91	-
85	38410	Ship building and repairing	111	3	5	1	27	75	-
86	38438	Railroad and automobile equipment	110	6	2	1	43	60	- 2
87	38498	Manufacture of cycles, mopeds, etc.	34	9	1	-	9	18	- 2
88	38500	Professional and measuring equipment	71	3	3	1	7	59	- 2
89	39010	Manuf. of jewellery, etc.	7	3	-	-	-	3	-
90	39098	Manufacture of toys, sporting goods, etc.	96	19	2	2	5	69	- 1
91	41010	Electric light and power	71 339	39 549	7 615	2 024	1 475	19 858	818
92	41020	Gas manufacture and distribution	34	25	4	-	-	4	-
93	41030	Steam and hot water supply	12 660	10 207	1 488	103	89	653	119
94	42000	Water works and supply	11	7	2	-	-	2	-
95	50000	Construction	10 223	2 258	701	6 661	51	488	63
96	61000	Wholesale trade	6 751	2 192	240	306	814	3 189	11
97	62000	Retail trade	3 676	3 010	118	65	178	302	3
98	63000	Restaurants and hotels	433	313	19	4	3	93	1
99	71118	Railway and bus transport, etc.	13 982	8 703	2 275	440	217	2 277	70
100	71138	Other land transport	23 178	6 768	2 278	1 613	826	11 573	119
101	71210	Ocean and coastal water transport	10 063	550	138	96	25	9 247	6
102	71230	Supporting services to water transport	26	7	-	-	1	18	-
103	71300	Air transport	7 644	3 037	529	303	123	3 612	41
104	71509	Services allied to transport, etc.	1 985	645	227	119	92	894	8
105	72000	Communication	675	338	145	35	12	100	46
106	81000	Financial institutions	268	64	5	5	1	18	175
107	82000	Insurance	52	48	1	-	-	2	-
108	83110	Dwellings	171	166	2	-	-	2	-
109	83509	Business services	1 468	479	217	260	60	385	67
110	93109	Education, market services	112	88	14	1	1	8	-
111	93300	Health, market services	173	64	99	-	-	9	-
112	94000	Recreational and cultural services	257	194	18	4	1	39	1
113	95130	Rep. of motor vehicles	437	306	20	23	7	78	3
114	95299	Household services	1 346	836	261	41	15	167	26
115	95400	Domestic services	-	-	-	-	-	-	-
116	97099	Private non-profit institutions	120	120	-	-	-	-	-
117	98099	Producers of government services	4 031	283	3 689	8	3	41	7
		Industries total	223 351	90 747	21 544	14 197	4 672	89 744	2 447

Table 8.3 cont. NO_x-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
Main groups									
1	11000	Agriculture, horticulture etc.	21 086	5 800	655	90	17	14 374	150
2	12000	Forestry and logging	63	12	1	8	2	40	-
3	13000	Fishing	14 745	1 010	165	5	5	12 804	756
4	20000	Mining and quarrying	650	135	34	123	5	352	1
5	31000	Manuf. of food, beverages, tobacco	5 686	1 999	137	9	18	3 493	31
6	32000	Textile, clothing, leather industry	343	98	4	3	15	225	- 1
7	33000	Manuf. of wood products, incl. furnit.	928	122	19	117	99	590	- 19
8	34000	Manuf. of paper, printing, publishing	987	260	115	46	34	537	- 5
9	35000	Chemical and petroleum industry	1 720	278	70	160	31	1 173	8
10	36000	Non-metallic mineral products	3 670	528	161	1 399	47	1 580	- 45
11	37000	Basic metal industry	149	7	3	8	12	120	- 1
12	38000	Manuf. of fabricated metal products	2 104	216	73	114	385	1 327	- 10
13	39000	Other manufacturing industries	102	22	2	2	5	72	- 1
14	40000	Electricity, gas and water	84 044	49 788	9 109	2 128	1 564	20 517	937
15	50000	Construction	10 223	2 258	701	6 661	51	488	63
16	60099	Wholesale and retail trade	10 428	5 202	358	371	993	3 491	13
17	63000	Restaurants and hotels	433	313	19	4	3	93	1
18	71000	Transport and storage	56 878	19 711	5 448	2 572	1 284	27 620	245
19	72000	Communication	675	338	145	35	12	100	46
20	80099	Financing and insurance	319	113	6	5	2	20	175
21	83110	Dwellings	171	166	2	-	-	2	-
22	83509	Business services	1 468	479	217	260	60	385	67
23	93009	Market services of education, health	285	152	113	1	1	17	-
24	94000	Recreational and cultural services	257	194	18	4	1	39	1
25	95009	Household services, incl. auto repair	1 783	1 142	281	64	23	245	29
26	95399	Other producers, exc. government	120	120	-	-	-	-	-
27	98099	Producers of government services	4 031	283	3 689	8	3	41	7
		Industries total	223 351	90 747	21 544	14 197	4 672	89 744	2 447

8.6 CO

Total emission by causes

In table 8.4 the breakdown of industries' CO emissions in 1992 by causing final demand category is shown. Of the total CO emission of nearly 233,000 tonnes, 87,000 tonnes were due to private consumption (37%), 90,000 tonnes to exports (38%), 23,300 tonnes to gross fixed capital formation in building and construction (10%), 22,400 tonnes to government consumption (10%) and 8,200 tonnes to gross fixed capital formation in machinery, equipment and means of transport (4%).

Compared with CO_2, SO_2 and NO_x emissions, a somewhat smaller proportion of CO emission was due to private consumption, even though this category of final demand is still a considerable cause of emission.

Exports and the transport and storage industry

As in the case of NO_x, the combination of transport and exports account for a large proportion of the total emissions from industries. With an emission of 47,787 tonnes out of 232,841 tonnes, exports of goods and services via the transport and storage industry caused 21% of the industries' emissions.

Gross capital formation

Gross fixed capital formation has a considerably greater importance as far as CO is concerned. Gross fixed capital formation collectively gave rise to 14% of the CO emission. By comparison, gross fixed capital formation was the cause of 6-8% of the emission of CO_2, SO_2 and NO_x. The cause of the greater importance of gross fixed capital formation as a cause of CO emission is, *inter alia*, that building and construction's share of total CO emissions is greater than in the case of the other emission types, and that gross fixed capital formation is of decisive importance as far as activity in construction is concerned.

Table 8.4 CO-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
1	11101	Agriculture	15 114	4 060	430	10	12	10 475	126
2	11103	Horticulture	1 281	502	95	77	1	601	3
3	11109	Fur farming, etc.	498	61	2	-	-	494	- 59
4	11200	Agricultural services	716	194	21	1	1	494	6
5	12000	Forestry and logging	177	33	4	23	5	114	- 1
6	13000	Fishing	2 278	156	25	1	1	1 978	117
7	20099	Extraction of coal, oil, and gas	40	7	1	1	-	31	-
8	29000	Other mining	264	60	19	85	3	97	- 1
9	31113	Slaughtering etc. of pigs and cattle	448	110	8	-	-	326	4
10	31117	Poultry killing, dressing, packing	66	23	1	-	-	43	-
11	31121	Dairies	439	139	27	1	-	254	19
12	31123	Processed cheese, condensed milk	29	5	-	-	-	24	- 1
13	31124	Ice cream manufacturing	155	78	4	-	-	73	- 1
14	31130	Processing of fruits and vegetables	79	40	1	-	-	35	2
15	31140	Processing of fish	153	11	3	-	-	137	2
16	31151	Oil mills	14	3	-	-	-	11	-
17	31152	Margarine manufacturing	63	34	2	-	-	28	- 1
18	31153	Fish meal manufacturing	104	13	1	-	-	81	8
19	31160	Grain mill products	49	23	2	-	-	25	-
20	31171	Bread factories	142	99	9	-	-	33	- 1
21	31173	Cake factories	77	24	3	-	-	49	-
22	31174	Bakeries	319	253	27	1	-	39	- 1
23	31180	Sugar factories and refineries	375	101	7	1	4	275	- 14
24	31190	Chocolate and sugar confectionery	149	80	1	-	-	70	- 2
25	31210	Manufacture of food products n.e.c.	354	116	6	-	1	226	5
26	31229	Manufacture of prepared animal feeds	270	74	5	-	1	190	- 1
27	31310	Distilling and blending spirits	30	11	1	-	-	17	-
28	31338	Breweries	444	261	9	1	1	169	2
29	31400	Tobacco manufactures	27	17	-	-	-	10	- 1
30	32118	Spinning, weaving etc., textiles	102	25	1	-	4	74	- 1
31	32120	Manufacture of made-up textile goods	134	52	3	5	13	63	- 2
32	32130	Knitting mills	106	33	1	-	-	73	-
33	32158	Cordage, rope and twine industries	44	3	1	1	8	31	-
34	32200	Manufacture of wearing apparel	261	90	3	1	1	164	3
35	32300	Manufacture of leather products	33	10	-	-	1	20	1
36	32400	Manufacture of footwear	44	25	3	-	-	16	1
37	33100	Manufacture of wood products exc. furniture	962	123	29	193	81	566	- 30
38	33200	Manufacture of wooden furniture, etc.	778	108	3	3	112	554	- 1
39	34110	Manufacture of pulp, paper, paperboard	179	35	15	7	4	123	- 5
40	34128	Manufacture of paper containers, wallpaper	209	48	14	6	7	134	-
41	34210	Reproducing and composing services	148	56	18	10	8	52	4
42	34221	Bookprinting	320	100	60	19	12	123	7
43	34222	Offset printing	253	89	44	16	9	88	6
44	34223	Other printing	135	45	25	8	5	50	3
45	34230	Bookbinding	71	18	18	3	2	28	1
46	34240	Newspaper printing and publishing	177	90	24	17	5	36	5
47	34291	Book and art publishing	110	66	15	-	26	3	-
48	34292	Magazine publishing	18	14	2	-	-	2	-
49	34293	Other publishing	117	42	28	10	4	27	5
50	35110	Manufacture of basic industrial chemicals	152	7	3	1	2	138	1
51	35120	Manufacture of fertilisers and pesticides	28	4	1	-	-	21	1
52	35130	Manufacture of basic plastic materials	154	21	6	14	6	108	- 1
53	35210	Manufacture of paints and varnishes	111	14	3	17	5	71	1
54	35220	Manufacture of drugs and medicines	216	12	9	-	-	190	4
55	35230	Manufacture of soap and cosmetics	164	53	11	1	1	92	7
56	35290	Manufacture of chemical products n.e.c.	97	21	5	8	3	58	2
57	35300	Petroleum refineries	28	9	1	1	-	17	- 1
58	35400	Manufacture of asphalt and roofing material	125	24	6	51	2	41	1
59	35510	Tyre and tube industries	54	23	3	3	2	23	-
60	35590	Manufacture of rubber products n.e.c.	63	6	2	1	4	50	-

Table 8.4 cont. CO-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
61	35600	Manufacture of plastic products n.e.c.	391	73	26	29	17	246	-
62	36100	Manufacture of earthenware and pottery	66	14	-	1	1	47	4
63	36200	Manufacture of glass and glass products	71	14	2	11	3	41	- 1
64	36910	Manufacture of structural clay products	184	23	7	64	1	99	- 10
65	36920	Manufacture of cement, lime and plaster	1 005	139	44	378	10	441	- 7
66	36993	Concrete products and stone cutting	878	165	51	478	8	191	- 14
67	36998	Non-metallic mineral products n.e.c.	314	31	10	81	9	182	-
68	37101	Iron and steel works	50	2	1	3	3	43	- 1
69	37102	Iron and steel casting	32	2	1	1	4	25	-
70	37201	Non-ferrous metal works	7	-	-	-	-	5	-
71	37202	Non-ferrous metal casting	32	3	2	2	4	21	-
72	38121	Manufacture of metal furniture	141	15	1	1	53	72	- 2
73	38138	Manufacture of structural metal products	484	44	14	78	81	265	2
74	38191	Manufacture of metal cans and containers	48	9	1	1	2	33	1
75	38198	Manuf. of other fabricated metal products	642	86	19	76	83	377	2
76	38220	Manufacture of agricultural machinery	215	8	3	3	60	152	- 11
77	38238	Manufacture of industrial machinery	499	13	5	11	121	352	- 3
78	38280	Repair of machinery	736	193	70	27	51	390	6
79	38293	Manufacture of household machinery	67	11	-	-	5	49	2
80	38298	Manufacture of refrigerators, accessories	1 061	59	29	41	200	739	- 6
81	38320	Manufacture of telecommunication equipment	201	19	5	6	19	152	-
82	38330	Manufacture of electrical home appliances	32	7	1	1	3	20	-
83	38392	Manufacture of accumulators and batteries	8	1	-	-	-	6	-
84	38398	Manufacture of other electrical supplies	567	55	26	38	99	349	1
85	38410	Ship building and repairing	285	8	13	2	70	192	-
86	38438	Railroad and automobile equipment	189	11	3	2	73	103	- 3
87	38498	Manufacture of cycles, mopeds, etc.	49	13	1	-	12	25	- 3
88	38500	Professional and measuring equipment	346	16	16	4	32	285	- 8
89	39010	Manuf. of jewellery, etc.	40	20	-	-	-	18	1
90	39098	Manufacture of toys, sporting goods, etc.	342	68	6	7	18	246	- 4
91	41010	Electric light and power	3 202	1 775	342	91	66	891	37
92	41020	Gas manufacture and distribution	101	75	11	1	1	12	1
93	41030	Steam and hot water supply	1 251	1 009	147	10	9	65	12
94	42000	Water works and supply	57	37	8	1	1	10	-
95	50000	Construction	20 172	4 456	1 383	13 144	101	963	124
96	61000	Wholesale trade	22 321	7 245	794	1 012	2 692	10 543	35
97	62000	Retail trade	19 826	16 234	636	352	961	1 627	15
98	63000	Restaurants and hotels	1 514	1 095	66	13	11	324	4
99	71118	Railway and bus transport, etc.	4 649	2 894	756	146	72	757	23
100	71138	Other land transport	41 769	12 197	4 106	2 907	1 488	20 856	215
101	71210	Ocean and coastal water transport	1 415	77	19	14	4	1 300	1
102	71230	Supporting services to water transport	80	22	1	1	2	54	-
103	71300	Air transport	47 632	18 921	3 297	1 886	766	22 508	254
104	71509	Services allied to transport, etc.	5 136	1 670	587	307	238	2 312	22
105	72000	Communication	2 717	1 362	584	140	47	401	184
106	81000	Financial institutions	503	121	10	9	3	33	328
107	82000	Insurance	277	259	3	2	2	11	-
108	83110	Dwellings	458	446	6	-	-	6	-
109	83509	Business services	5 837	1 903	863	1 034	238	1 531	267
110	93109	Education, market services	280	220	34	2	3	20	-
111	93300	Health, market services	911	335	525	1	1	48	1
112	94000	Recreational and cultural services	755	569	52	13	4	116	3
113	95130	Rep. of motor vehicles	1 735	1 214	78	92	29	310	10
114	95299	Household services	5 127	3 184	995	156	58	634	100
115	95400	Domestic services	-	-	-	-	-	-	-
116	97099	Private non-profit institutions	376	376	-	-	-	-	-
117	98099	Producers of government services	6 212	436	5 685	13	5	63	10
		Industries total	232 841	87 110	22 417	23 296	8 208	89 995	1 815

Table 8.4 cont. CO-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
Main groups									
1	11000	Agriculture, horticulture etc.	17 610	4 817	548	89	14	12 064	77
2	12000	Forestry and logging	177	33	4	23	5	114	- 1
3	13000	Fishing	2 278	156	25	1	1	1 978	117
4	20000	Mining and quarrying	304	67	20	86	3	128	-
5	31000	Manuf. of food, beverages, tobacco	3 783	1 516	117	5	9	2 117	20
6	32000	Textile, clothing, leather industry	724	237	11	8	27	440	1
7	33000	Manuf. of wood products, incl. furnit.	1 740	231	32	196	193	1 120	- 31
8	34000	Manuf. of paper, printing, publishing	1 735	602	263	96	84	666	25
9	35000	Chemical and petroleum industry	1 584	268	76	127	43	1 054	16
10	36000	Non-metallic mineral products	2 519	387	115	1 012	32	1 001	- 29
11	37000	Basic metal industry	121	7	3	6	11	94	- 1
12	38000	Manuf. of fabricated metal products	5 571	568	208	293	966	3 559	- 23
13	39000	Other manufacturing industries	382	88	7	7	19	264	- 3
14	40000	Electricity, gas and water	4 611	2 896	508	104	77	977	50
15	50000	Construction	20 172	4 456	1 383	13 144	101	963	124
16	60099	Wholesale and retail trade	42 147	23 480	1 430	1 364	3 653	12 170	50
17	63000	Restaurants and hotels	1 514	1 095	66	13	11	324	4
18	71000	Transport and storage	100 681	35 781	8 767	5 261	2 570	47 787	516
19	72000	Communication	2 717	1 362	584	140	47	401	184
20	80099	Financing and insurance	780	380	13	10	5	44	329
21	83110	Dwellings	458	446	6	-	-	6	-
22	83509	Business services	5 837	1 903	863	1 034	238	1 531	267
23	93009	Market services of education, health	1 191	555	559	4	3	68	1
24	94000	Recreational and cultural services	755	569	52	13	4	116	3
25	95009	Household services, incl. auto repair	6 862	4 398	1 073	248	87	945	110
26	95399	Other producers, exc. government	376	376	-	-	-	-	-
27	98099	Producers of government services	6 212	436	5 685	13	5	63	10
		Industries total	232 841	87 110	22 417	23 296	8 208	89 995	1 815

8.7 NMVOC

Total emission by causes

The breakdown of NMVOC emissions in 1992 by causing final demand categories is shown in table 8.5. Of the industries' NMVOC emission totalling 54,300 tonnes, a total of 20,200 tonnes were attributable to private consumption (37%), 21,900 tonnes to exports (40%), 5,300 tonnes to government consumption (10%), 4,800 tonnes to gross fixed capital formation in building and construction (9%) and 1,670 tonnes to gross capital formation in machinery, equipment and means of transport (3%).

Almost the same as regards CO

The breakdown of industries' NMVOC emissions by causing final demand categories broadly corresponds to the distribution, which applies to CO, apart from exports gaining a little ground by comparison with gross fixed capital formation. The agreement between CO emissions and NMVOC emissions is due to the fact that both are related, to a great extent, to the combustion of petrol. The comments pertaining to the allocation of CO are thus as a rule valid for NMVOC as well.

Table 8.5 NMVOC-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
1	11101	Agriculture	3 710	997	106	2	3	2 571	31
2	11103	Horticulture	244	96	18	15	-	114	1
3	11109	Fur farming, etc.	95	12	-	-	-	94	- 11
4	11200	Agricultural services	180	49	5	-	-	124	1
5	12000	Forestry and logging	35	7	1	5	1	22	-
6	13000	Fishing	670	46	7	-	-	582	34
7	20099	Extraction of coal, oil, and gas	7	1	-	-	-	6	-
8	29000	Other mining	46	10	3	15	-	17	-
9	31113	Slaughtering etc. of pigs and cattle	83	20	1	-	-	61	1
10	31117	Poultry killing, dressing, packing	12	4	-	-	-	8	-
11	31121	Dairies	85	27	5	-	-	49	4
12	31123	Processed cheese, condensed milk	6	1	-	-	-	5	-
13	31124	Ice cream manufacturing	30	15	1	-	-	14	-
14	31130	Processing of fruits and vegetables	15	7	-	-	-	7	-
15	31140	Processing of fish	29	2	1	-	-	26	-
16	31151	Oil mills	3	1	-	-	-	2	-
17	31152	Margarine manufacturing	12	6	-	-	-	5	-
18	31153	Fish meal manufacturing	20	3	-	-	-	15	2
19	31160	Grain mill products	9	4	-	-	-	5	-
20	31171	Bread factories	27	19	2	-	-	6	-
21	31173	Cake factories	14	4	1	-	-	9	-
22	31174	Bakeries	60	48	5	-	-	7	-
23	31180	Sugar factories and refineries	61	17	1	-	1	45	- 2
24	31190	Chocolate and sugar confectionery	28	15	-	-	-	13	-
25	31210	Manufacture of food products n.e.c.	77	25	1	-	-	49	1
26	31229	Manufacture of prepared animal feeds	47	13	1	-	-	33	-
27	31310	Distilling and blending spirits	5	2	-	-	-	3	-
28	31338	Breweries	84	50	2	-	-	32	-
29	31400	Tobacco manufactures	5	3	-	-	-	2	-
30	32118	Spinning, weaving etc., textiles	19	5	-	-	1	14	-
31	32120	Manufacture of made-up textile goods	24	9	1	1	2	11	-
32	32130	Knitting mills	19	6	-	-	-	13	-
33	32158	Cordage, rope and twine industries	8	1	-	-	2	6	-
34	32200	Manufacture of wearing apparel	48	17	-	-	-	30	1
35	32300	Manufacture of leather products	6	2	-	-	-	4	-
36	32400	Manufacture of footwear	8	4	1	-	-	3	-
37	33100	Manufacture of wood products exc. furniture	230	29	7	46	19	135	- 7
38	33200	Manufacture of wooden furniture, etc.	161	22	1	1	23	115	-
39	34110	Manufacture of pulp, paper, paperboard	29	6	2	1	1	20	- 1
40	34128	Manufacture of paper containers, wallpaper	38	9	3	1	1	25	-
41	34210	Reproducing and composing services	26	10	3	2	1	9	1
42	34221	Bookprinting	58	18	11	3	2	22	1
43	34222	Offset printing	47	17	8	3	2	16	1
44	34223	Other printing	24	8	5	1	1	9	1
45	34230	Bookbinding	13	3	3	1	-	5	-
46	34240	Newspaper printing and publishing	32	16	4	3	1	6	1
47	34291	Book and art publishing	20	12	3	-	5	1	-
48	34292	Magazine publishing	3	2	-	-	-	-	-
49	34293	Other publishing	21	8	5	2	1	5	1
50	35110	Manufacture of basic industrial chemicals	29	1	-	-	-	26	-
51	35120	Manufacture of fertilisers and pesticides	6	1	-	-	-	4	-
52	35130	Manufacture of basic plastic materials	28	4	1	3	1	20	-
53	35210	Manufacture of paints and varnishes	20	3	1	3	1	13	-
54	35220	Manufacture of drugs and medicines	39	2	2	-	-	34	1
55	35230	Manufacture of soap and cosmetics	29	9	2	-	-	16	1
56	35290	Manufacture of chemical products n.e.c.	18	4	1	2	1	11	-
57	35300	Petroleum refineries	6	2	-	-	-	3	-
58	35400	Manufacture of asphalt and roofing material	24	5	1	10	-	8	-
59	35510	Tyre and tube industries	10	4	1	1	-	4	-
60	35590	Manufacture of rubber products n.e.c.	11	1	-	-	1	9	-

Table 8.5 cont. NMVOC-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
61	35600	Manufacture of plastic products n.e.c.	72	14	5	5	3	46	-
62	36100	Manufacture of earthenware and pottery	12	3	-	-	-	9	1
63	36200	Manufacture of glass and glass products	14	3	-	2	1	8	-
64	36910	Manufacture of structural clay products	29	4	1	10	-	15	-2
65	36920	Manufacture of cement, lime and plaster	99	14	4	37	1	43	-1
66	36993	Concrete products and stone cutting	167	31	10	91	1	36	-3
67	36998	Non-metallic mineral products n.e.c.	53	5	2	14	2	31	-
68	37101	Iron and steel works	10	-	-	1	1	9	-
69	37102	Iron and steel casting	6	-	-	-	1	4	-
70	37201	Non-ferrous metal works	1	-	-	-	-	1	-
71	37202	Non-ferrous metal casting	6	1	-	-	1	4	-
72	38121	Manufacture of metal furniture	26	3	-	-	10	13	-
73	38138	Manufacture of structural metal products	92	8	3	15	15	50	-
74	38191	Manufacture of metal cans and containers	9	2	-	-	-	6	-
75	38198	Manuf. of other fabricated metal products	118	16	3	14	15	69	-
76	38220	Manufacture of agricultural machinery	41	1	-	1	12	29	-2
77	38238	Manufacture of industrial machinery	91	2	1	2	22	64	-1
78	38280	Repair of machinery	143	37	14	5	10	76	1
79	38293	Manufacture of household machinery	13	2	-	-	1	9	-
80	38298	Manufacture of refrigerators, accessories	197	11	5	8	37	137	-1
81	38320	Manufacture of telecommunication equipment	37	4	1	1	4	28	-
82	38330	Manufacture of electrical home appliances	6	1	-	-	1	4	-
83	38392	Manufacture of accumulators and batteries	2	-	-	-	-	1	-
84	38398	Manufacture of other electrical supplies	104	10	5	7	18	64	-
85	38410	Ship building and repairing	52	1	2	-	13	35	-
86	38438	Railroad and automobile equipment	36	2	1	-	14	19	-1
87	38498	Manufacture of cycles, mopeds, etc.	9	2	-	-	2	5	-1
88	38500	Professional and measuring equipment	62	3	3	1	6	51	-1
89	39010	Manuf. of jewellery, etc.	7	4	-	-	-	3	-
90	39098	Manufacture of toys, sporting goods, etc.	63	12	1	1	3	45	-1
91	41010	Electric light and power	513	285	55	15	11	143	6
92	41020	Gas manufacture and distribution	19	14	2	-	-	2	-
93	41030	Steam and hot water supply	224	181	26	2	2	12	2
94	42000	Water works and supply	10	7	1	-	-	2	-
95	50000	Construction	4 006	885	275	2 611	20	191	25
96	61000	Wholesale trade	4 090	1 328	146	185	493	1 932	6
97	62000	Retail trade	3 576	2 928	115	64	173	294	3
98	63000	Restaurants and hotels	278	201	12	2	2	60	1
99	71118	Railway and bus transport, etc.	1 574	980	256	50	24	256	8
100	71138	Other land transport	7 862	2 296	773	547	280	3 926	41
101	71210	Ocean and coastal water transport	430	24	6	4	1	395	-
102	71230	Supporting services to water transport	15	4	-	-	-	10	-
103	71300	Air transport	17 414	6 918	1 205	689	280	8 229	93
104	71509	Services allied to transport, etc.	951	309	109	57	44	428	4
105	72000	Communication	490	246	105	25	8	72	33
106	81000	Financial institutions	93	22	2	2	-	6	61
107	82000	Insurance	49	46	1	-	-	2	-
108	83110	Dwellings	86	83	1	-	-	1	-
109	83509	Business services	1 065	347	158	189	44	279	49
110	93109	Education, market services	52	41	6	-	1	4	-
111	93300	Health, market services	165	61	95	-	-	9	-
112	94000	Recreational and cultural services	140	105	10	2	1	21	-
113	95130	Rep. of motor vehicles	322	225	15	17	5	58	2
114	95299	Household services	938	582	182	29	11	116	18
115	95400	Domestic services	-	-	-	-	-	-	-
116	97099	Private non-profit institutions	69	69	-	-	-	-	-
117	98099	Producers of government services	1 545	108	1 414	3	1	16	3
		Industries total	54 310	20 234	5 261	4 832	1 670	21 907	406

Table 8.5 cont. NMVOC-emissions by industries and causing final demand category 1992

			Total	Caused by					
				Private consumption	Government consumption	GFCF construction	GFCF, machinery, transport equip. etc.	Exports of goods and services	Other final consumption
			ton						
Main groups									
1	11000	Agriculture, horticulture etc.	4 229	1 153	129	17	3	2 904	22
2	12000	Forestry and logging	35	7	1	5	1	22	-
3	13000	Fishing	670	46	7	-	-	582	34
4	20000	Mining and quarrying	53	12	4	15	-	22	-
5	31000	Manuf. of food, beverages, tobacco	711	286	22	1	2	397	4
6	32000	Textile, clothing, leather industry	134	44	2	1	5	81	-
7	33000	Manuf. of wood products, incl. furnit.	391	52	7	47	43	250	- 7
8	34000	Manuf. of paper, printing, publishing	312	108	47	17	15	119	5
9	35000	Chemical and petroleum industry	292	50	14	23	8	194	3
10	36000	Non-metallic mineral products	374	59	17	154	5	143	- 4
11	37000	Basic metal industry	23	1	1	1	2	18	-
12	38000	Manuf. of fabricated metal products	1 038	107	39	55	180	662	- 4
13	39000	Other manufacturing industries	70	16	1	1	3	49	- 1
14	40000	Electricity, gas and water	767	486	85	17	12	158	8
15	50000	Construction	4 006	885	275	2 611	20	191	25
16	60099	Wholesale and retail trade	7 667	4 256	260	249	667	2 226	9
17	63000	Restaurants and hotels	278	201	12	2	2	60	1
18	71000	Transport and storage	28 247	10 530	2 349	1 347	630	13 245	146
19	72000	Communication	490	246	105	25	8	72	33
20	80099	Financing and insurance	142	68	2	2	1	8	61
21	83110	Dwellings	86	83	1	-	-	1	-
22	83509	Business services	1 065	347	158	189	44	279	49
23	93009	Market services of education, health	217	101	101	1	1	12	-
24	94000	Recreational and cultural services	140	105	10	2	1	21	-
25	95009	Household services, incl. auto repair	1 259	808	196	46	16	174	20
26	95399	Other producers, exc. government	69	69	-	-	-	-	-
27	98099	Producers of government services	1 545	108	1 414	3	1	16	3
		Industries total	54 310	20 234	5 261	4 832	1 670	21 907	406

9. Energy related emissions broken down by consumption groups and other final demand categories

A detailed breakdown of private consumption

In this chapter the emissions caused by each category of final demand in 1992 are shown. These cause-oriented accounts are - like the accounts in chapter 8 - based on calculations using an input-output model. The difference between the present accounts and the ones in chapter 8 is, first and foremost, that in chapter 8 the starting point taken was the emissions by industries, whereas presently the starting point is the final demand following amongst others a breakdown of private consumption into 66 consumption groups. Moreover, the emissions in the rest of the world induced by Danish final demand are added when compared to the figures presented in the previous chapter.

Emissions in the rest of the world

9.1 General points concerning the tables

Tables 9.1-9.5 show the emissions which were induced in 1992 by the final demand, viz. by private consumption, government consumption, gross fixed capital formation, exports and other final demand components (changes in stocks and changes in agriculture's breeding stocks). Furthermore, private consumption is divided into 66 different consumption groups.

Direct emissions

For each of the 66 categories of private consumption the first column shows the emission directly linked to the relevant consumption category, viz. the emission, which takes place as a result of the households' consumption of energy. It is apparent from the tables that the direct emission takes place in connection with the consumption of gas, liquid fuel and other expenditures on fuels and in connection with the consumption of petrol and oil for vehicles.

Tourists

Included in the emissions from the consumption of petroleum and oil for vehicles are the emissions, which originate from foreign tourists' consumption of petrol and oil when refuelling in Denmark (this also covers border trade in Denmark). Since these emissions do, however, also figure with a negative sign opposite the consumption group »purchases in Denmark by non-resident households«, the result is that the emissions, which are shown opposite »Total private consumption« in the tables cover emissions in connection with Danish households' private consumption in Denmark, but not emissions created via tourists' consumption of petrol and oil.[36]

The counterpart to the above-mentioned »tourist correction« of the direct emissions associated with private consumption is the fact that emissions from tourists' consumption of petrol and oil also are shown opposite exports of goods and services. Accordingly, the direct emissions from total final demand contain the total emissions from households, including tourists. This also means that the direct emissions from final demand in total correspond to the emissions, which, for the year 1992, are listed opposite the households in tables 7.1-7.5.

Refuelling by foreign tourists in Denmark and border trade in petrol and oil in Denmark constitute a quite large part of the total quantity of petrol and oil sold in Denmark in 1992.[37] Hence, the NO_x, CO, and NMVOC emissions in particular corresponding to that consumption are significant. The total emissions must thus be interpreted as emissions associated with the economic activity on Danish territory. The emissions may not, on the other hand, be interpreted at their face value as emissions from Danish territory.

[36] However, emissions created by Danish tourists' consumption abroad are not included.

[37] However, the itemisation is subjected to considerable uncertainty.

Direct and indirect emissions in Denmark

Column 2 in tables 9.1-9.5 shows the total direct and indirect emissions, which took place in 1992 as a result of the final demand that year. For a given final demand the direct and indirect emissions state the sum of the direct emission (first column) and the emission, which in aggregate took place from Danish industries as a result of all the production activities necessary for supply to meet demand. [38]

An example

By way of example, there were direct and indirect Danish CO_2 emissions of 803,000 tonnes as a result of the private consumption of meat (cf. table 9.1). This figure covers the energy related emission of CO_2, which took place at slaughterhouses during the production of meat, but also the emissions associated with all indirect production activities in other industries as a result of the necessary production for intermediate consumption materials.

The indirect production activities are created by slaughterhouses by, for example, having received live animals from agriculture. When agriculture is to produce for slaughterhouses, then foodstuffs, for example, are needed from foodstuffs factories and when foodstuffs are to be manufactured, supplies from other industries are necessary, such as energy from the energy producing industries and grain from agriculture. In this manner, one can continue further and further back in the economic system, and at each step CO_2 emissions take place as a result of energy consumption. In the example mentioned above, only a few effects of dissemination are hinted at, but when drawing up the direct and indirect production activities account must also be taken of many other dissemination effects.

Coherence with the tables in chapter 8

The difference between direct (Column 2) and indirect (Column 1) Danish emission corresponds to the emission created in the industries by final demand. There is thus agreement between the emissions, which can be calculated in this way for the industries' emissions, and the corresponding column sums in tables 8.1-8.5. For example, it is apparent from table 9.1 that the CO_2 emission from industries induced by the private consumption in total was 30.7 - 9.0 = 21.7 million tonnes. This figure for the industries' CO_2 emission caused by private consumption is also found in table 8.1.

Coherence with the tables in chapter 7

The direct and indirect emission induced by final demand in total corresponds to the total Danish emission, as is also apparent from tables 7.1-7.5.

Global direct and indirect emissions

If one wants an expression of how large the emissions are, which are created in aggregate in Denmark and abroad by Danish final demand, Danish direct and indirect emissions must be added to the emissions, which are created abroad via production of goods and services exported to Denmark. In this way, the global direct and indirect emissions in column 3 of the tables are obtained. The interpretation of the global direct and indirect emissions follows the interpretation of the Danish direct and indirect emissions. The difference is only that the global emissions include foreign energy related emissions created via both the primary production of goods and services supplied to the Danish market[39] as well as the production of all the intermediate consumption materials which make up the »inter-industry« supplies as a result of production of goods and services exported to Denmark.

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[38] Similar to the correction for tourism in the direct emissions, the indirect emissions are corrected by generally transferring tourists' consumption from private consumption to exports.

[39] This involves both imported goods and services which go directly to Danish final consumption as well as goods and services which are used for intermediate consumption in Danish industries.

Assumptions

The direct and indirect global emissions are calculated using input-output calculations as described in equation (8.7) in section 8.1. Note that when calculating foreign emissions, it has been necessary to use a number of assumptions concerning the production technology, etc. These assumptions are - as is set out in more detail in section 8.1 - not especially realistic in all cases. With the interpretation of the global direct and indirect emissions one must therefore be careful to observe that the figures provide orders of magnitude rather than precise itemisations of the emissions.

Foreign emissions

The difference between the global direct and indirect emissions (Column 3) and the Danish direct and indirect emissions (Column 2) are the foreign emissions induced by Danish imports. For example, the global direct and indirect CO_2 emission as a result of private consumption of meat amounted to 1.3 million tonnes (table 9.1). If the direct and indirect Danish emission of 0.8 million ton is subtracted from this, we obtain Danish private consumption of meat giving rise to foreign CO_2 emissions of 0.5 ton.

Negative emissions

In the case of the category »other final demand«, the global direct and indirect emissions are less than the Danish ones. This implies negative foreign emissions. These negative emissions are of an accounting nature and reflect the fact that there has been a decline in the stocks of imported commodities (cf. also the mention of negative emissions in section 8.2).

Relative emission intensity

For all final demand categories and the three types of emission levels (direct emissions, Danish direct and indirect emissions and global direct and indirect emissions), relative emissions, viz. emission per million DKK of final demand in the relevant category, are furthermore stated in the tables 9.1-9.5. For example, it is apparent from table 9.1 that the private consumption of meat gave rise to a direct and indirect Danish CO_2 emission of 42 tonnes per million DKK of private consumption of meat. The figure is arrived at on the basis of the CO_2 emission of 803,000 tonnes and a private consumption of meat worth 19,303 million DKK.

The following sections

In the following sections 9.2-9.6 some main features concerning the link between final demand and the emission are discussed for each emission type. The discussion is most detailed in the case of CO_2, but since there are many common features in the tables with respect to the different types of emission, some of the remarks concerning characteristic conditions in respect of CO_2 can be transferred to the other types of emission.

9.2 CO_2

Table 9.1 shows CO_2 emissions by final demand categories.

Direct emissions

It is apparent, *inter alia*, that direct emission is broken down fairly evenly into two main groups, gross rents, fuel and power, and transport and communication. Within the first group it was particularly liquid fuels, which caused the direct emissions.

In total, direct emissions amounted to 9.7 million tonnes. The 9.7 million tonnes of CO_2 included the emission, which is linked to foreign tourist' use of petrol and oil. From the row for purchases in Denmark by non-resident households it is apparent that these emissions amounted to 675,000 tonnes, so that Danish households' direct emissions in Denmark corresponded to 9.0 million tonnes.

Danish direct and indirect emissions

Private consumption by way of gross rent, fuel and power gave rise to Danish direct and indirect emissions of 18.1 million tonnes in total. This corresponds to just under one-third of total Danish CO_2 emission. At 8.5 million tonnes of CO_2, the consumption of electricity was the consumption group, which caused most direct and indirect emission in Denmark.

Purchases of transport services gave rise to direct and indirect CO_2 emissions of 1.6 million tonnes. These emissions, which are, *inter alia*, caused by households' use of public traffic, are thus comparatively modest when compared with, for example, the direct and indirect emissions from the private consumption of gasoline and oil for vehicles. The emission from this source was 4.7 million tonnes. Private consumption of transport and communication caused a total of CO_2 emissions of 7 million tonnes, or as much as 12% of the total Danish emission.

The main group food within private consumption gave rise to Danish emissions of 2.7 million tonnes, or just about 5% of the total emission. It is apparent, *inter alia*, that private consumption of meat brought about nearly two and a half times as much CO_2 emission as fruits and vegetables. In the case of meat, the direct and indirect emissions amounted to 803,000 tonnes, while in the case of fruits and vegetables the figure was 341,000 tonnes.

Expenditure in restaurants was a consumption group with comparatively large direct and indirect emissions, viz. 886,000 tonnes. This is due, *inter alia*, to the fact that emissions from the production of electricity used in connection with the running of restaurants are included in restaurants' direct and indirect emissions.

Global direct and indirect emissions

Moving across from Danish direct and indirect emissions to global direct and indirect emissions, it may be seen that total CO_2 emission is up from 56.2 million tonnes to 84.8 million tonnes. The difference of 28.6 million tonnes is represented by the emissions, which the production of Danish imports have directly and indirectly created abroad.

Danish ships

Particularly in the case of Danish exports, the inclusion of foreign emissions is of significance, since direct and indirect emissions went up from 16.4 to 33.9 million tonnes once foreign emissions are included. This very substantial increase is linked to the fact that emissions from Danish ships sailing abroad for foreign enterprises, are included in the exports' global emissions (but not in the Danish emissions). Danish ships have a very high energy consumption and accordingly also give rise to substantial emissions.

Among the consumption groups, the inclusion of foreign direct and indirect emissions is of relatively great significance for the groups clothing and footwear and household equipment and services, as emissions are more than doubled when focus is changed from Danish to global emission.

In the case of gross rent, fuel and power which, as stated, caused one-third of Danish CO_2 emissions, the induced foreign emissions amounted to a modest 0.9 million ton.

In the case of private consumption of food foreign emissions are of fairly great significance, since they push direct and indirect emissions up from 2.7 million tonnes to 4.7 million tonnes. In the case of individual food groups there is a varying degree of significance. For example, foreign emissions are of relatively modest significance for the private consumption of sugar and great in the case of the private consumption of fruits and vegetables.

Relative emission intensity

Viewed relative to the value of the final demand, private consumption and exports gave rise to much of the emissions. It is apparent from table 9.1 that each million DKK worth of private consumption in Denmark gave rise to emission of 69 tonnes of CO_2 in Denmark and 84 tonnes globally. The corresponding relative intensity of emission figures for exports were 58 and 119 tonnes per million DKK worth of exports. The very high relative intensity of global emission for exports was due to the fact that - as stated above - the emission from Danish ships providing their services internationally is included.

Among the groups of private consumption, energy related consumption groups in particular (electricity, gas, liquid fuel, other fuels and also gasoline and oil for vehicles) and by virtue had large relative emissions both on Danish soil and globally.

In the case of the different food groups, the difference between consumption groups is, as a rule, relatively modest when reviewing the relative intensity of Danish emissions, for example, 42 tonnes per million DKK of private consumption of meat and 38 tonnes per million DKK of private consumption of fruit and vegetables. Hence, when account is taken of the value of private consumption in this way, the divergence between the different consumption groups is narrowed.

As a result of the differences between the consumption groups' import quotas, the divergence between the relative intensity of global emissions is greater than the divergence between the relative intensity of Danish emissions.

Table 9.1 CO_2-emissions by final demand categories 1992

		Direct	Direct and indirect In Denmark	Direct and indirect Globally	Direct	Direct and indirect In Denmark	Direct and indirect Globally
			1 000 ton			ton per mill. DKK final demand	
100	**Food**	-	2 723	4 677	-	41	70
1	Bread and cereals	-	343	545	-	45	71
2	Meat	-	803	1 251	-	42	65
3	Fish	-	65	151	-	30	70
4	Eggs	-	48	71	-	40	60
5	Milk, cream, yoghurt, etc.	-	282	395	-	54	76
6	Cheese	-	158	229	-	43	63
7	Butter	-	54	98	-	44	79
8	Margarine and lard	-	44	87	-	46	90
9	Fruits and vegetables	-	341	828	-	38	92
10	Potatoes, etc.	-	84	131	-	42	66
11	Sugar	-	39	46	-	78	90
12	Coffee, tea, cocoa	-	63	120	-	24	45
13	Ice cream	-	53	85	-	36	57
14	Chocolate and sugar confectionery	-	152	308	-	25	50
15	Other foods	-	193	332	-	58	100
150	**Beverages and tobacco**	-	589	934	-	21	33
120	Non-alcoholic beverages	-	140	178	-	50	64
131	Beer	-	284	352	-	40	50
132	Wine and spirits	-	79	237	-	13	39
140	Tobacco	-	87	166	-	7	14
200	**Clothing aud footwear**	-	376	1 010	-	16	44
210	Clothing	-	320	845	-	16	44
220	Footwear	-	57	164	-	16	46
300	**Gross reut, fuel and power**	5 094	18 102	19 084	41	144	152
311	Gross rents	-	876	1 179	-	9	12
312	Water charges	-	122	132	-	157	170
321	Electricity	-	8 486	9 010	-	857	909
322	Gas	1 526	1 554	1 566	578	588	593
323	Liquid fuels	3 197	3 240	3 304	550	557	568
324	Other fuels	372	3 823	3 893	47	479	488
400	**Household equipment and operation**	-	623	1 299	-	23	47
410	Furniture, fixtures, carpets, etc.	-	237	418	-	27	48
420	Household textiles, furnishings, etc.	-	75	155	-	23	48
431	Major household appliances	-	62	176	-	15	42
432	Repairs to major househ. appliances	-	19	23	-	28	34
440	Glassware, tableware, househ. utensils	-	67	144	-	21	46
451	Non-durable household goods	-	108	316	-	24	71
452	Household services	-	49	59	-	30	36
460	Domestic services	-	6	8	-	5	6
500	**Medical care**	-	192	315	-	21	34
510	Medical and pharmaceutical products	-	47	131	-	17	48
520	Therapeutic appliances and equip.	-	50	72	-	23	34
530	Physicians, dentists, etc.	-	63	73	-	20	23
540	Hospital care and the like	-	20	24	-	23	28
550	Accident and health insurance	-	12	14	-	33	40
600	**Transport and communication**	4 609	7 012	8 244	68	103	122
610	Personal transport equipment	-	105	469	-	6	29
621	Maintenance of transport equipment	-	284	497	-	17	30
622	Gasoline and oils for trsp. equip.	4 609	4 726	4 841	455	466	477
623	Other expenditure on trsp. equip.	-	72	84	-	24	29
630	Purchased transport	-	1 647	2 132	-	126	163
640	Communication	-	178	222	-	21	26
700	**Recreation, entertainment, etc.**	-	1 095	1 831	-	24	40
711	Wireless and TV sets, gramophones	-	62	146	-	15	35
712	Photo and musical equipment, boats	-	48	96	-	18	37
713	Other recreational goods	-	376	709	-	34	65
714	Maintenance of recreational goods	-	20	32	-	22	37
720	Entertainment, cultural services, etc.	-	249	311	-	19	24
730	Books, newspapers and magazines	-	142	289	-	24	50
740	Education	-	89	111	-	22	28
750	Day-care institutions for children	-	109	137	-	23	29

Table 9.1 cont. CO_2-emissions by final demand categories 1992

		Direct	Direct and indirect		Direct	Direct and indirect	
			In Denmark	Globally		In Denmark	Globally
		1 000 ton			ton per mill. DKK final demand		
800	**Miscellaneous goods and services**	-	1 553	2 239	-	31	45
811	Barbers, beauty shops, etc.	-	83	102	-	28	34
812	Goods for personal care	-	76	192	-	17	44
821	Jewellery, watches, rings, etc.	-	36	66	-	20	37
822	Other personal goods	-	34	76	-	22	48
823	Writing and drawing equipment	-	17	32	-	25	47
831	Expenditure in restaurants	-	886	1 231	-	38	52
832	Expenditure for hotels and lodging	-	114	160	-	40	56
850	Financial services, n.e.c.	-	217	257	-	31	37
860	Services, n.e.c.	-	91	123	-	17	23
994	**Purchases in DK by non-res. househ.**	- 675	-1 559	-2 051	26	60	79
995	**Purchases abroad by res. households**	-	-	-	-	-	-
	Cons. by private non-profit inst.	-	47	66	-	8	12
	Total private consumption	9 029	30 754	37 648	20	69	84
	Government consumption	-	5 009	6 304	-	25	31
	GFCF, construction	-	2 596	3 729	-	34	50
	GFCF, machinery, transport equip. etc.	-	995	2 913	-	16	46
	Exports of goods and services	675	16 393	33 851	2	58	119
	Other final demand	-	447	363	-	20	16
	Total final demand	9 704	56 194	84 809	9	53	80

9.3 SO_2

Table 9.2 shows the SO_2 emissions by final demand categories.

Direct emissions

The direct emission amounted to 5,172 tonnes, as also mentioned in section 7.3, which accounts for less than 3% of the total Danish SO_2 emissions of 189,041 tonnes.

Direct SO_2 emissions were mainly linked to the private consumption of liquid fuel (4,060 tonnes). Furthermore, the direct emissions in connection with the main group transport and communication were of only modest significance.

Direct and indirect Danish emissions

With direct and indirect emissions amounting to 43,000 tonnes of SO_2, the private consumption of electricity was the group linked to the largest amount of SO_2 emission in Denmark.

Within the group transport and communication, the purchase of transport services in particular caused Danish direct and indirect emissions, the figure being 3,833 tonnes. In this figure is included, *inter alia*, SO_2 emission from Danish ferries. By comparison, the direct and indirect Danish emission from the private consumption of petrol and oil for vehicles was 1,023 tonnes. Private consumption of transport and communication services induced SO_2 emissions of 6,865 tonnes in aggregate, or just under 4% of the total Danish SO_2 emission.

The main group food within private consumption gave rise to Danish emissions of 9,453 tonnes or just around 5% of the total emission. As in the case of CO_2, the total is subject to wide variations over the different food groups. For example, the private consumption of meat gave rise to considerably larger emissions than the private consumption of fruits and vegetables.

Global direct and indirect emissions

Global direct and indirect SO_2 emissions amounted to a total of 361,925 tonnes. This is nearly double by comparison to the Danish emissions. It is particularly exports and gross fixed capital formation in machinery, equipment and means of transport that induce substantial amounts of foreign emissions. Direct and indirect emissions are up threefold for these groups when moving across from Danish to global emissions. In the case of private consumption and government consumption, emissions are up by about a third.

Greatly contributing to the substantial foreign emissions in connection with Danish exports are emissions linked to the Danish ships, which provide services internationally (cf. the mention of this point in section 9.2).

Relative emission intensity

In relation to the value of the final demand, it was private consumption and exports which in particular accounted for substantial emission intensities. It is apparent from table 9.2 that each million DKK worth of private consumption in Denmark gave rise to 214 kg of SO_2 emission in Denmark and 286 kg globally. The corresponding relative intensity of emission for exports were 217 and 644 kg per million DKK of exports, respectively.

Table 9.2 SO_2-emissions by final demand category 1992

		Direct	Direct and indirect In Denmark	Direct and indirect Globally	Direct	Direct and indirect In Denmark	Direct and indirect Globally
		ton			kg per mill. DKK final demand		
100	**Food**	-	9 453	17 414	-	142	262
1	Bread and cereals	-	1 250	2 035	-	163	265
2	Meat	-	2 792	4 819	-	145	250
3	Fish	-	269	732	-	125	340
4	Eggs	-	146	249	-	123	210
5	Milk, cream, yoghurt, etc.	-	998	1 502	-	192	288
6	Cheese	-	534	851	-	147	234
7	Butter	-	188	369	-	152	299
8	Margarine and lard	-	177	363	-	183	376
9	Fruits and vegetables	-	1 231	2 958	-	137	329
10	Potatoes, etc.	-	235	410	-	119	207
11	Sugar	-	199	231	-	392	455
12	Coffee, tea, cocoa	-	218	440	-	81	164
13	Ice cream	-	194	330	-	131	223
14	Chocolate and sugar confectionery	-	568	1 194	-	92	193
15	Other foods	-	453	930	-	137	281
150	**Beverages and tobacco**	-	2 451	3 906	-	87	139
120	Non-alcoholic beverages	-	601	772	-	217	279
131	Beer	-	1 286	1 584	-	182	225
132	Wine and spirits	-	257	910	-	42	149
140	Tobacco	-	307	639	-	25	53
200	**Clothing and footwear**	-	1 281	3 917	-	56	170
210	Clothing	-	1 091	3 311	-	56	170
220	Footwear	-	189	606	-	53	169
300	**Gross rent, fuel and power**	4 641	66 052	71 061	37	526	565
311	Gross rents	-	2 989	4 446	-	30	45
312	Water charges	-	605	656	-	781	846
321	Electricity	-	43 169	45 863	-	4 358	4 629
322	Gas	8	108	188	3	41	71
323	Liquid fuels	4 060	4 259	4 632	698	732	796
324	Other fuels	574	14 922	15 277	72	1 869	1 913
400	**Household equipment and operation**	-	2 097	5 032	-	77	184
410	Furniture, fixtures, carpets, etc.	-	765	1 502	-	88	172
420	Household textiles, furnishings, etc.	-	250	591	-	77	181
431	Major household appliances	-	217	693	-	51	164
432	Repairs to major househ. appliances	-	58	78	-	85	115
440	Glassware, tableware, househ. utensils	-	219	532	-	70	169
451	Non-durable household goods	-	397	1 387	-	89	312
452	Household services	-	171	223	-	104	136
460	Domestic services	-	19	26	-	15	21
500	**Medical care**	-	689	1 252	-	74	134
510	Medical and pharmaceutical products	-	166	548	-	60	198
520	Therapeutic appliances and equip.	-	160	260	-	75	121
530	Physicians, dentists, etc.	-	246	291	-	77	91
540	Hospital care and the like	-	71	95	-	82	110
550	Accident and health insurance	-	46	57	-	127	160
600	**Transport and communication**	531	6 865	14 298	8	101	211
610	Personal transport equipment	-	358	1 773	-	22	108
621	Maintenance of transport equipment	-	902	1 815	-	54	108
622	Gasoline and oils for trsp. equip.	531	1 023	1 678	52	101	166
623	Other expenditure on trsp. equip.	-	166	243	-	57	83
630	Purchased transport	-	3 833	7 992	-	294	613
640	Communication	-	582	797	-	68	93
700	**Recreation, entertainment, etc.**	-	4 005	7 398	-	87	160
711	Wireless and TV sets, gramophones	-	202	549	-	49	132
712	Photo and musical equipment, boats	-	163	365	-	62	139
713	Other recreational goods	-	1 515	3 014	-	139	277
714	Maintenance of recreational goods	-	62	118	-	70	134
720	Entertainment, cultural services, etc.	-	872	1 169	-	67	89
730	Books, newspapers and magazines	-	482	1 222	-	83	210
740	Education	-	312	425	-	79	108
750	Day-care institutions for children	-	396	536	-	83	112

Table 9.2 cont. SO_2-emissions by final demand category 1992

		Direct	Direct and indirect In Denmark	Direct and indirect Globally	Direct	Direct and indirect In Denmark	Direct and indirect Globally
		ton			kg per mill. DKK final demand		
800	**Miscellaneous goods and services**	-	5 816	8 892	-	116	178
811	Barbers, beauty shops, etc.	-	254	342	-	85	115
812	Goods for personal care	-	228	728	-	52	167
821	Jewellery, watches, rings, etc.	-	117	251	-	67	142
822	Other personal goods	-	116	298	-	74	190
823	Writing and drawing equipment	-	60	131	-	87	191
831	Expenditure in restaurants	-	3 446	4 983	-	146	211
832	Expenditure for hotels and lodging	-	446	647	-	156	227
850	Financial services, n.e.c.	-	838	1 037	-	120	149
860	Services, n.e.c.	-	311	476	-	59	90
994	**Purchases in DK by non-res. househ.**	- 78	-3 150	-5 454	3	122	211
995	**Purchases abroad by res. households**	-	-	-	-	-	-
	Cons. by private non-profit inst.	-	143	236	-	26	42
	Total private consumption	5 094	95 701	127 953	11	214	286
	Government consumption	-	18 154	24 566	-	90	121
	GFCF, construction	-	8 584	14 013	-	114	186
	GFCF, machinery, transport equip. etc.	-	3 235	11 065	-	51	173
	Exports of goods and services	78	61 606	182 688	-	217	644
	Other final demand	-	1 762	1 641	-	79	73
	Total final demand	5 172	189 041	361 925	5	178	341

9.4 NO_x

Table 9.3 shows the NO_x emissions by final demand categories.

Direct emissions

The direct emissions totalled 50,900 tonnes. This corresponds to just under 20% of the total Danish NO_x emission of 274,251 tonnes. The bulk of the direct NO_x emissions originated from the private consumption of gasoline and oil for vehicles.

Direct and indirect Danish emissions

The direct and indirect Danish NO_x emissions from private consumption amounted to 134,762 tonnes or just over half of the total NO_x emission. The emissions in connection with exports amounted to 96,629 tonnes, or one-third of the total Danish emission.

Within private consumption it was the transport and communication group in particular which caused emissions. Of the main group's direct and indirect NO_x emission of 65,806 tonnes the bulk was accounted for by gasoline and oil for vehicles.

The consumption of gross rent, fuel and power is, however, of modest significance compared to their significance regarding the CO_2 and SO_2 emissions. The direct and indirect Danish emission from private consumption of gross rent, fuel and power totalling 45,931 tonnes does nevertheless constitute almost one-third of the emissions created by private consumption.

In the case of CO_2 and SO_2, we found that the private consumption of meat caused emissions, which were just over double the emissions from the private consumption of fruit and vegetables. In the case of NO_x the emissions are respectively 5,354 tonnes and 1,317 tonnes for each of the two consumption groups. In other words the consumption of meat here gives rise to four times as great an emission as the consumption of fruits and vegetables.

Global direct and indirect emissions

Global direct and indirect NO_x emissions are recorded at 525,557 tonnes, thus - as in the case of SO_2 - the foreign emissions are of the same order of magnitude as the Danish emissions. Direct and indirect emissions from exports rise from 96,629 tonnes to 293,276 tonnes when the focus is changed from Danish to global emissions. A major contributory cause of the heavy global emissions from exports is - as in the case of the other types of emission - the use by Danish ships of oil bunkered abroad (cf. the reference to this point in section 9.2). Emissions in connection with private consumption are up from 134,762 tonnes to 170,128 tonnes when foreign NO_x emissions are brought into the itemisation.

Relative emission intensity

Each million DKK worth of private consumption in Denmark gave rise to 301 kg of NO_x in Denmark and 381 kg globally.

The relative NO_x emission figures for exports were 341 and 1,034 kg of Danish and global emission respectively per million DKK worth of exports.

Table 9.3 NO_x-emissions by final demand categories 1992

		Direct	Direct and indirect		Direct	Direct and indirect	
			In Denmark	Globally		In Denmark	Globally
		ton			kg per mill. DKK final demand		
100	**Food**	-	14 869	24 605	-	223	370
1	Bread and cereals	-	1 460	2 339	-	190	304
2	Meat	-	5 354	8 027	-	277	416
3	Fish	-	491	1 495	-	228	695
4	Eggs	-	361	493	-	304	415
5	Milk, cream, yoghurt, etc.	-	1 783	2 344	-	343	450
6	Cheese	-	1 013	1 391	-	279	383
7	Butter	-	355	599	-	288	486
8	Margarine and lard	-	201	415	-	208	429
9	Fruits and vegetables	-	1 317	2 989	-	146	332
10	Potatoes, etc.	-	463	674	-	233	340
11	Sugar	-	146	179	-	287	352
12	Coffee, tea, cocoa	-	317	705	-	118	263
13	Ice cream	-	269	406	-	181	274
14	Chocolate and sugar confectionery	-	670	1 297	-	108	210
15	Other foods	-	670	1 252	-	202	378
150	**Beverages and tobacco**	-	2 345	3 934	-	83	140
120	Non-alcoholic beverages	-	522	704	-	188	254
131	Beer	-	1 007	1 331	-	143	189
132	Wine and spirits	-	402	1 053	-	66	172
140	Tobacco	-	414	846	-	34	70
200	**Clothing and footwear**	-	1 851	4 479	-	80	195
210	Clothing	-	1 570	3 764	-	81	194
220	Footwear	-	281	715	-	78	199
300	**Gross rent, fuel and power**	3 878	45 931	50 067	31	365	398
311	Gross rents	-	4 393	5 771	-	45	59
312	Water charges	-	402	440	-	518	567
321	Electricity	-	26 898	28 737	-	2 715	2 901
322	Gas	1 492	1 602	1 721	565	606	652
323	Liquid fuels	2 173	2 347	2 737	374	403	470
324	Other fuels	213	10 290	10 662	27	1 289	1 335
400	**Household equipment and operation**	-	2 858	5 427	-	104	198
410	Furniture, fixtures, carpets, etc.	-	1 028	1 741	-	118	199
420	Household textiles, furnishings, etc.	-	352	677	-	108	207
431	Major household appliances	-	300	743	-	71	175
432	Repairs to major househ. appliances	-	99	117	-	145	172
440	Glassware, tableware, househ. utensils	-	322	616	-	102	196
451	Non-durable household goods	-	507	1 230	-	114	277
452	Household services	-	217	265	-	132	161
460	Domestic services	-	33	39	-	26	31
500	**Medical care**	-	849	1 371	-	91	147
510	Medical and pharmaceutical products	-	228	576	-	82	208
520	Therapeutic appliances and equip.	-	275	374	-	128	174
530	Physicians, dentists, etc.	-	219	258	-	69	81
540	Hospital care and the like	-	83	108	-	96	125
550	Accident and health insurance	-	45	55	-	125	154
600	**Transport and communication**	47 021	65 806	76 320	693	970	1 125
610	Personal transport equipment	-	499	1 934	-	30	118
621	Maintenance of transport equipment	-	1 404	2 259	-	84	135
622	Gasoline and oils for trsp. equip.	47 021	47 500	48 191	4 638	4 685	4 753
623	Other expenditure on trsp. equip.	-	522	621	-	178	211
630	Purchased transport	-	14 953	22 197	-	1 147	1 702
640	Communication	-	929	1 119	-	108	131
700	**Recreation, entertainment, etc.**	-	4 968	7 958	-	108	172
711	Wireless and TV sets, gramophones	-	330	664	-	80	160
712	Photo and musical equipment, boats	-	244	446	-	93	170
713	Other recreational goods	-	1 581	2 931	-	145	269
714	Maintenance of recreational goods	-	103	154	-	117	175
720	Entertainment, cultural services, etc.	-	1 108	1 391	-	85	106
730	Books, newspapers and magazines	-	731	1 235	-	126	212
740	Education	-	402	520	-	102	132
750	Day-care institutions for children	-	470	617	-	98	129

Table 9.3 cont. NOx-emissions by final demand categories 1992

		Direct	Direct and indirect		Direct	Direct and indirect	
			In Denmark	Globally		In Denmark	Globally
		ton			kg per mill. DKK final demand		
800	**Miscellaneous goods and services**	-	6 763	10 234	-	135	205
811	Barbers, beauty shops, etc.	-	432	513	-	145	172
812	Goods for personal care	-	445	943	-	102	216
821	Jewellery, watches, rings, etc.	-	181	319	-	103	181
822	Other personal goods	-	163	335	-	104	213
823	Writing and drawing equipment	-	82	140	-	120	204
831	Expenditure in restaurants	-	3 729	5 687	-	158	241
832	Expenditure for hotels and lodging	-	480	738	-	168	259
850	Financial services, n.e.c.	-	818	995	-	118	143
860	Services, n.e.c.	-	433	564	-	82	107
994	**Purchases in DK by non-res. househ.**	-6 885	-11 736	-14 596	267	454	565
995	**Purchases abroad by res. households**	-	-	-	-	-	-
	Cons. by private non-profit inst.	-	257	330	-	46	59
	Total private consumption	44 015	134 762	170 128	98	301	381
	Government consumption	-	21 544	28 306	-	106	140
	GFCF, construction	-	14 197	19 343	-	189	257
	GFCF, machinery, transport equip. etc.	-	4 672	12 124	-	73	190
	Exports of goods and services	6 885	96 629	293 276	24	341	1 034
	Other final demand	-	2 447	2 380	-	109	106
	Total final demand	50 900	274 251	525 557	48	258	495

9.5 CO

Table 9.4 shows the CO emissions by final demand categories.

Direct emissions

The private consumption of gasoline and oil for vehicles caused a direct CO emission of 367,305 tonnes. If the direct emission from the private consumption of fuel, etc. is added, direct emissions in aggregate amount to 397,719 tonnes of CO, which, as mentioned in section 7.5, correspond to 63% of the total CO emission in 1992, of 630,560 tonnes. If the direct emissions are corrected for foreign tourists' purchases of petrol and oil (including border trade in Denmark), 343,938 tonnes is obtained with respect to emissions induced by private consumption by Danish households.

Direct and indirect Danish emissions

Direct and indirect Danish CO emissions from private consumption amounted to 431,048 tonnes. Emissions induced by private consumption thus rose by 87,110 tonnes or as much as 25% when the indirect emissions as a result of activity by industries are included.

The direct CO emission in connection with exports (foreign tourists plus border trade in Denmark) amounts to 53,781 tonnes, viz. approximately 37% of the total direct and indirect emissions from exports.

Of the indirect emissions from private consumption totalling 87,110 tonnes, the private consumption of meat gave rise to 5,808 tonnes, while the consumption of fruits and vegetables caused 2,019 tonnes of CO emission.

Direct and indirect Danish emissions from private consumption by way of gross rent, fuel and power of 41,035 tonnes amount to just under 10% of the emissions created by private consumption.

Global direct and indirect emissions

Global direct and indirect CO emissions are recorded at 704,539 tonnes, corresponding to foreign emissions totalling 73,979 tonnes. In relative terms and compared with CO_2, SO_2 and NO_x the foreign emissions are comparatively modest. This is due, *inter alia*, to the fact that CO emission, to a greater extent, is linked to the consumption of gasoline (especially by households) and that exports, *inter alia*, do not have the same impact via Danish ships' use of oil bunkered abroad as in the case of CO_2, SO_2 and NO_x.

Relative emission intensity

Each million DKK worth of private consumption in Denmark gave rise to 964 kg NO_x emission in Denmark and 1,004 kg globally. In the case of other final demand, the relative Danish emissions were between 81 and 507 kg per million DKK worth of final demand and the global emissions ranged from 52 to 664 kg per million DKK worth of final demand. It is the large direct emissions from private consumption, which also have such an impact on the relative emissions.

Table 9.4 CO-emissions by final demand categories 1992

		Direct	Direct and indirect		Direct	Direct and indirect	
			In Denmark	Globally		In Denmark	Globally
		ton			kg per mill. DKK final demand		
100	**Food**	-	17 740	22 985	-	267	345
1	Bread and cereals	-	1 763	2 264	-	229	294
2	Meat	-	5 808	7 202	-	301	373
3	Fish	-	595	862	-	277	401
4	Eggs	-	442	512	-	372	431
5	Milk, cream, yoghurt, etc.	-	1 601	1 892	-	307	363
6	Cheese	-	1 151	1 355	-	317	373
7	Butter	-	294	442	-	239	359
8	Margarine and lard	-	257	368	-	267	381
9	Fruits and vegetables	-	2 019	3 111	-	224	346
10	Potatoes, etc.	-	663	778	-	334	392
11	Sugar	-	170	184	-	334	362
12	Coffee, tea, cocoa	-	750	1 003	-	279	373
13	Ice cream	-	352	435	-	237	293
14	Chocolate and sugar confectionery	-	1 126	1 511	-	182	244
15	Other foods	-	750	1 067	-	226	322
150	**Beverages and tobacco**	-	3 502	4 477	-	125	159
120	Non-alcoholic beverages	-	642	736	-	232	266
131	Beer	-	1 159	1 324	-	164	188
132	Wine and spirits	-	850	1 292	-	139	211
140	Tobacco	-	851	1 126	-	70	93
200	**Clothing and footwear**	-	4 197	6 504	-	182	282
210	Clothing	-	3 567	5 473	-	184	282
220	Footwear	-	630	1 031	-	175	287
300	**Gross rent, fuel and power**	30 414	41 035	42 289	242	327	337
311	Gross rents	-	6 949	7 655	-	71	78
312	Water charges	-	101	111	-	130	143
321	Electricity	-	1 442	1 664	-	146	168
322	Gas	801	967	995	303	366	377
323	Liquid fuels	863	1 082	1 211	148	186	208
324	Other fuels	28 749	30 495	30 654	3 601	3 819	3 839
400	**Household equipment and operation**	-	5 669	7 475	-	207	273
410	Furniture, fixtures, carpets, etc.	-	1 980	2 474	-	226	283
420	Household textiles, furnishings, etc.	-	717	964	-	219	295
431	Major household appliances	-	633	1 025	-	150	242
432	Repairs to major househ. appliances	-	232	243	-	341	357
440	Glassware, tableware, househ. utensils	-	669	892	-	212	283
451	Non-durable household goods	-	958	1 369	-	216	308
452	Household services	-	403	427	-	245	260
460	Domestic services	-	77	81	-	62	65
500	**Medical care**	-	1 619	1 948	-	174	209
510	Medical and pharmaceutical products	-	471	688	-	170	249
520	Therapeutic appliances and equip.	-	654	731	-	305	340
530	Physicians, dentists, etc.	-	345	364	-	108	114
540	Hospital care and the like	-	89	100	-	103	116
550	Accident and health insurance	-	61	65	-	169	182
600	**Transport and communication**	367 305	400 418	403 812	5 415	5 904	5 954
610	Personal transport equipment	-	1 222	2 544	-	75	155
621	Maintenance of transport equipment	-	2 815	3 399	-	168	203
622	Gasoline and oils for trsp. equip.	367 305	368 077	368 310	36 228	36 305	36 328
623	Other expenditure on trsp. equip.	-	1 087	1 114	-	370	379
630	Purchased transport	-	25 406	26 531	-	1 948	2 035
640	Communication	-	1 812	1 914	-	211	223
700	**Recreation, entertainment, etc.**	-	8 150	10 122	-	177	219
711	Wireless and TV sets, gramophones	-	781	1 099	-	189	265
712	Photo and musical equipment, boats	-	587	764	-	224	291
713	Other recreational goods	-	2 346	3 255	-	215	299
714	Maintenance of recreational goods	-	238	274	-	271	312
720	Entertainment, cultural services, etc.	-	1 821	1 980	-	139	151
730	Books, newspapers and magazines	-	1 416	1 668	-	243	286
740	Education	-	473	527	-	120	133
750	Day-care institutions for children	-	489	556	-	102	116

Table 9.4 cont. CO-emissions by final demand categories 1992

		Direct	Direct and indirect In Denmark	Direct and indirect Globally	Direct	Direct and indirect In Denmark	Direct and indirect Globally
		ton			kg per mill. DKK final demand		
800	**Miscellaneous goods and services**	-	8 850	10 726	-	177	214
811	Barbers, beauty shops, etc.	-	1 016	1 064	-	341	357
812	Goods for personal care	-	1 007	1 408	-	230	322
821	Jewellery, watches, rings, etc.	-	436	545	-	247	309
822	Other personal goods	-	366	501	-	233	319
823	Writing and drawing equipment	-	176	214	-	257	313
831	Expenditure in restaurants	-	3 632	4 520	-	154	192
832	Expenditure for hotels and lodging	-	465	583	-	163	204
850	Financial services, n.e.c.	-	969	1 045	-	139	150
860	Services, n.e.c.	-	782	845	-	148	160
994	**Purchases in DK by non-res. househ.**	-53 781	-60 695	-62 022	2 082	2 350	2 401
995	**Purchases abroad by res. households**	-	-	-	-	-	-
	Cons. by private non-profit inst.	-	564	600	-	100	107
	Total private consumption	343 938	431 048	448 915	769	964	1 004
	Government consumption	-	22 417	25 470	-	111	126
	GFCF, construction	-	23 296	25 962	-	310	345
	GFCF, machinery, transport equip. etc.	-	8 208	14 697	-	129	230
	Exports of goods and services	53 781	143 777	188 333	190	507	664
	Other final demand	-	1 815	1 162	-	81	52
	Total final demand	397 719	630 560	704 539	374	593	663

9.6 NMVOC

Table 9.5 shows the NMVOC emissions by final demand categories.

Direct emissions

As in the case of CO, the private consumption of gasoline and oil for vehicles gave rise to the bulk of the direct NMVOC emission.

As mentioned in section 7.6, the total direct NMVOC emission of 66,992 tonnes corresponds to 55% of the total NMVOC emission in 1992 of 121,302 tonnes. The 55% share is slightly less than in the case of CO but considerably higher than the corresponding shares for CO_2, SO_2 and NO_x emissions.

Danish direct and indirect emissions

Danish direct and indirect NMVOC emissions induced by private consumption amounted to 77,709 tonnes. The exports of goods and services gave rise to 31,424 tonnes of NMVOC emission, while the emission from other final demand categories, including government consumption and gross fixed capital formation, accounted for 12,000 tonnes in total.

As in the case of CO, the direct emissions stemming from exports (foreign tourists and border trade in Denmark), represent a very large proportion (30%) of the total direct and indirect emission from exports.

Global direct and indirect emissions

Global direct and indirect NMVOC emissions are recorded at 139,416 tonnes, corresponding to total foreign emissions of 18,114 tonnes.

Relative emission intensity

Each million DKK worth of private consumption in Denmark gave rise to 174 kg of NMVOC emission in Denmark and 183 kg globally. In the case of other final demand the intensity of Danish emissions ranged between 18 and 111 kg per million DKK of final demand and the global emissions ranged from 12 to 152 kg per million DKK worth of final demand.

Moreover, there is close agreement between NMVOC and CO as far as the breakdown of emissions by causing final demand category is concerned.

Table 9.5 NMVOC-emissions by final demand category 1992

		Direct	Direct and indirect In Denmark	Direct and indirect Globally	Direct	Direct and indirect In Denmark	Direct and indirect Globally
		ton			kg per mill. DKK final demand		
100	**Food**	-	3 633	4 805	-	55	72
1	Bread and cereals	-	348	457	-	45	59
2	Meat	-	1 234	1 555	-	64	81
3	Fish	-	115	182	-	54	85
4	Eggs	-	94	110	-	79	93
5	Milk, cream, yoghurt, etc.	-	350	416	-	67	80
6	Cheese	-	243	289	-	67	80
7	Butter	-	66	100	-	53	81
8	Margarine and lard	-	51	76	-	53	79
9	Fruits and vegetables	-	388	616	-	43	68
10	Potatoes, etc.	-	134	160	-	68	81
11	Sugar	-	33	36	-	65	72
12	Coffee, tea, cocoa	-	140	200	-	52	74
13	Ice cream	-	69	87	-	47	59
14	Chocolate and sugar confectionery	-	218	300	-	35	49
15	Other foods	-	150	220	-	45	66
150	**Beverages and tobacco**	-	677	890	-	24	32
120	Non-alcoholic beverages	-	125	146	-	45	53
131	Beer	-	226	262	-	32	37
132	Wine and spirits	-	163	256	-	27	42
140	Tobacco	-	163	225	-	13	19
200	**Clothing and footwear**	-	795	1 282	-	35	56
210	Clothing	-	676	1 078	-	35	55
220	Footwear	-	120	204	-	33	57
300	**Gross rent, fuel and power**	1 992	4 115	4 401	16	33	35
311	Gross rents	-	1 430	1 582	-	15	16
312	Water charges	-	20	22	-	25	28
321	Electricity	-	243	295	-	25	30
322	Gas	165	201	208	62	76	79
323	Liquid fuels	130	175	211	22	30	36
324	Other fuels	1 698	2 046	2 084	213	256	261
400	**Household equipment and operation**	-	1 105	1 487	-	40	54
410	Furniture, fixtures, carpets, etc.	-	393	502	-	45	57
420	Household textiles, furnishings, etc.	-	139	192	-	43	59
431	Major household appliances	-	121	203	-	29	48
432	Repairs to major househ. appliances	-	44	46	-	64	68
440	Glassware, tableware, househ. utensils	-	128	174	-	41	55
451	Non-durable household goods	-	186	270	-	42	61
452	Household services	-	80	85	-	48	52
460	Domestic services	-	15	15	-	12	12
500	**Medical care**	-	315	391	-	34	42
510	Medical and pharmaceutical products	-	92	144	-	33	52
520	Therapeutic appliances and equip.	-	125	141	-	58	66
530	Physicians, dentists, etc.	-	64	69	-	20	22
540	Hospital care and the like	-	20	23	-	24	27
550	Accident and health insurance	-	13	14	-	36	39
600	**Transport and communication**	65 000	74 725	75 544	958	1 102	1 114
610	Personal transport equipment	-	227	500	-	14	30
621	Maintenance of transport equipment	-	557	679	-	33	41
622	Gasoline and oils for trsp. equip.	65 000	65 153	65 216	6 411	6 426	6 432
623	Other expenditure on trsp. equip.	-	234	240	-	80	82
630	Purchased transport	-	8 138	8 470	-	624	650
640	Communication	-	417	439	-	49	51
700	**Recreation, entertainment, etc.**	-	1 634	2 051	-	35	44
711	Wireless and TV sets, gramophones	-	149	218	-	36	53
712	Photo and musical equipment, boats	-	111	149	-	42	57
713	Other recreational goods	-	452	642	-	41	59
714	Maintenance of recreational goods	-	45	53	-	51	60
720	Entertainment, cultural services, etc.	-	371	405	-	28	31
730	Books, newspapers and magazines	-	285	337	-	49	58
740	Education	-	107	119	-	27	30
750	Day-care institutions for children	-	115	130	-	24	27

Table 9.5 cont. NMVOC-emissions by final demand category 1992

		Direct	Direct and indirect		Direct	Direct and indirect	
			In Denmark	Globally		In Denmark	Globally
		ton			kg per mill. DKK final demand		
800	**Miscellaneous goods and services**	-	1 776	2 185	-	36	44
811	Barbers, beauty shops, etc.	-	192	202	-	64	68
812	Goods for personal care	-	195	279	-	45	64
821	Jewellery, watches, rings, etc.	-	83	105	-	47	60
822	Other personal goods	-	69	97	-	44	62
823	Writing and drawing equipment	-	34	41	-	49	60
831	Expenditure in restaurants	-	739	939	-	31	40
832	Expenditure for hotels and lodging	-	94	120	-	33	42
850	Financial services, n.e.c.	-	206	223	-	30	32
860	Services, n.e.c.	-	164	178	-	31	34
994	**Purchases in DK by non-res. househ.**	-9 517	-11 179	-11 481	368	433	444
995	**Purchases abroad by res. households**	-	-	-	-	-	-
	Cons. by private non-profit inst.	-	114	122	-	20	22
	Total private consumption	57 475	77 709	81 677	129	174	183
	Government consumption	-	5 261	5 943	-	26	29
	GFCF, construction	-	4 832	5 402	-	64	72
	GFCF, machinery, transport equip. etc.	-	1 670	3 038	-	26	48
	Exports of goods and services	9 517	31 424	43 097	34	111	152
	Other final demand	-	406	259	-	18	12
	Total final demand	66 992	121 302	139 416	63	114	131

10. Emission content of foreign trade

The Danish demand for goods and services for private consumption, government consumption, gross fixed capital formation and stock accumulation creates - as described in chapter 9 - energy related emissions abroad via the production in foreign enterprises which is necessary to make exports to Denmark possible. Correspondingly, some Danish emissions are derived from goods and services being produced in Denmark as a result of exports to the rest of the world.

Balances

In table 10.1 balances are drawn up with respect to CO_2, SO_2, NO_x, CO and NMVOC for the energy related emission content of goods and services exchanged between Denmark and the rest of the world in 1992. Included in the emission content is both direct and indirect emissions, viz. account has been taken of all energy related emissions caused by the production of intermediate consumption materials in the various industries.[40]

Table 10.1 **Direct and indirect emission content of goods and services exchanged between Denmark and the rest of the world in 1992**

	CO_2	SO_2	NO_x	CO	NMVOC
	Mill. ton	1 000 ton			
Goods and services exported	16.4 (15.7)	61.6 (61.5)	96.7 (89.7)	143.8 (90,0)	31.4 (21.9)
Goods and services imported	11.2	51.8	54.7	29.4	6.4
Net burdening of Denmark via foreign trade	5.2 (4.6)	9.8 (9.7)	42.0 (35.1)	114.4 (60.6)	25.0 (15.4)
- as % of Danish emissions	9 (8)	5 (5)	15 (13)	18 (11)	21 (14)

The figures in brackets refer to emissions excluding direct emissions from foreign tourists' use of gasoline and oil bought in Denmark (including border trade).

Exports

The first row in the table records energy related emissions in Denmark caused by the direct and indirect production, which Danish exports have brought about (cf. also the exports rows in tables 9.1-9.5).

Imports

The second row in the table shows the emissions, which were borne abroad in order to meet Danish imports. In the itemisation of Danish imports in this connection, imports induced by export activities are not included. Export activities are omitted on the basis of a consideration that the derived effects abroad are not a Danish matter, because exports are produced with a view to use abroad.[41]

Net burdening

The third row in the table shows the difference in the emission content of imports and exports. This corresponds to the difference between the burden of emission in Denmark and abroad having been created via the direct and indirect production for foreign trade. In general, positive figures reflect the fact that through foreign trade a net burdening of Denmark regarding the emissions takes place, while negative figures reflect the fact that a net burdening of the rest of the world takes place.

[40] Direct and indirect activities are discussed in greater detail in section 9.1.

[41] Calculated on the basis of tables 9.1-9.5 as (global emission in total - Danish emission in total) - (global emission relating to exports - Danish emission relating to exports).

CO_2

Among other things, it is evident from the table that the direct and indirect Danish CO_2 emissions in connection with the Danish exports amounted to 16.4 million tonnes. Correspondingly, the CO_2 emission abroad associated with the Danish imports amounted to 11.2 million tonnes. The difference between the emission content of exports and imports of 5.2 million tonnes is thus a net burdening of Denmark, which has taken place in connection with the foreign trade.

Other types of emission

In the case of other types of emission too, Denmark took responsibility for larger emissions for abroad than abroad took responsibility for in the case of Denmark. The net burdens on Denmark were of an order of magnitude of 9,800 tonnes of SO_2, 42,000 tonnes of NO_x, 114,400 tonnes of CO and 25,000 tonnes of NMVOC.

Percentages

Expressed relative to the total Danish emissions, net burdens - as apparent from the last row in table 10.1 - were 9% in the case of CO_2, 5% in the case of SO_2, 15% in the case of NO_x, 18% in the case of CO and 21% in the case of NMVOC.

Tourism and cross-border trade

Particularly in the case of NO_x, CO and NMVOC, the net burdens are of a substantial size. This result is linked to, among other things, the fact that emissions from the gasoline and oil bought by foreign tourists in Denmark (including border trade in Denmark) are included in the emissions linked to Danish exports. The statement of how much gasoline and oil is actually bought by foreign tourists is, however, subjected to some margins of uncertainty. To monitor how great a significance these emissions have as far as the balance is concerned, the figures for emissions are therefore given in brackets, excluding that part which corresponds to foreign tourists' purchases of gasoline and oil in Denmark.

Alternative statements

From the figures in brackets, it is seen that the net burdening of Denmark is reduced to 8% in the case of CO_2, 5% in the case of SO_2, 13% in the case of NO_x, 11% in the case of CO and 14% in the case of NMVOC if the emission content of Danish exports is not burdened by the emissions from gasoline and oil bought by foreign tourists in Denmark. Even expressed in this way, there is still a considerable net burdening of Denmark via foreign trade.

Exports

The differences between the different types of emission with regard to the net burdening of Denmark by foreign trade are, moreover, linked to the fact that exports of Danish goods have an impact on the energy use for Danish transport services and as this is of relatively greater importance in respect of the emission types NO_x, CO and NMVOC, Danish exports accordingly also have a greater impact in the case of these types of emission than in the case of CO_2 and SO_2.

Uncertainty

Note that the itemisation has been drawn up on the basis of input-output model calculations and thus in the light of a number of assumptions. The remarks in chapter 9 regarding uncertainties therefore also apply in respect of these calculations.

Appendix The kind-of-activity classifications used for the national accounts

	National accounts 117-Classification		Statistics Denmark's industrial classification code DSE 77	National accounts 27-Classification	
1	11101	Agriculture	11101		
2	11103	Horticulture	11102-03	11000	Agriculture, horticulture etc.
3	11109	Fur farming, etc.	11104-07, 11300		
4	11200	Agricultural services	11201-09		
5	12000	Forestry and logging	12000	12000	Forestry and logging
6	13000	Fishing	13010-29	13000	Fishing
7	20099	Extraction of coal, oil, and gas	21000, 22000, 71150	20000	Mining and quarrying
8	29000	Other mining	23000, 29011-90		
9	31113	Slaughtering etc. of pigs and cattle	31111-16, 31119		
10	31117	Poultry killing, dressing, packing	31117		
11	31121	Dairies	31121		
12	31123	Processed cheese, condensed milk	31122-23		
13	31124	Ice cream manufacturing	31124		
14	31130	Processing of fruits and vegetables	31130		
15	31140	Processing of fish	31141-42		
16	31151	Oil mills	31151		
17	31152	Margarine manufacturing	31152	31000	Manuf. of food, beverages, tobacco
18	31153	Fish meal manufacturing	31153		
19	31160	Grain mill products	31160		
20	31171	Bread factories	31171		
21	31173	Cake factories	31172-73, 31179		
22	31174	Bakeries	31174		
23	31180	Sugar factories and refineries	31180		
24	31190	Chocolate and sugar confectionery	31190		
25	31210	Manufacture of food products n.e.c.	31211-19		
26	31229	Manufacture of prepared animal feeds	31154, 31220		
27	31310	Distilling and blending spirits	31310		
28	31338	Breweries	31330, 31340		
29	31400	Tobacco manufactures	31400		
30	32118	Spinning, weaving etc., textiles	32111-17, 32140		
31	32120	Manufacture of made-up textile goods	32121-29		
32	32130	Knitting mills	32130	32000	Textile, clothing, leather industry
33	32158	Cordage, rope and twine industries	32151-52, 32190		
34	32200	Manufacture of wearing apparel	32211-99		
35	32300	Manufacture of leather products	32310-30		
36	32400	Manufacture of footwear	32401-09		
37	33100	Manufacture of wood products excl. furniture	33111-97	33000	Manuf. of wood products, incl. furniture
38	33200	Manufacture of wooden furniture, etc.	33201-09		
39	34110	Manufacture of pulp, paper, paperboard	34110		
40	34128	Manufacture of paper containers, wallpaper	34120, 34191-99		
41	34210	Reproducing and composing services	34211-12		
42	34221	Bookprinting	34221		
43	34222	Offset printing	34222	34000	Manuf. of paper, printing, publishing
44	34223	Other printing	34223-24, 34229		
45	34230	Bookbinding	34230		
46	34240	Newspaper printing and publishing	34240		
47	34291	Book and art publishing	34291		
48	34292	Magazine publishing	34292		
49	34293	Other publishing	34293, 34299		
50	35110	Manufacture of basic industrial chemicals	35111-19		
51	35120	Manufacture of fertilisers and pesticides	35121-22		
52	35130	Manufacture of basic plastic materials	35131-33		
53	35210	Manufacture of paints and varnishes	35210	35000	Chemical and petroleum industry
54	35220	Manufacture of drugs and medicines	35220		
55	35230	Manufacture of soap and cosmetics	35231-32		

	National accounts 117-Classification		Statistics Denmark's industrial classification code DSE 77	National accounts 27-Classification	
56	35290	Manufacture of chemical products n.e.c.	35291-99		
57	35300	Petroleum refineries	35300		
58	35400	Manufacture of asphalt and roofing material	35400	35000	Chemical and petroleum industry (cont.)
59	35510	Tyre and tube industries	35510		
60	35590	Manufacture of rubber products n.e.c.	35590		
61	35600	Manufacture of plastic products n.e.c.	35601-09		
62	36100	Manufacture of earthenware and pottery	36101-03		
63	36200	Manufacture of glass and glass products	36201-02	36000	Non-metallic mineral products
64	36910	Manufacture of structural clay products	36911-12		
65	36920	Manufacture of cement, lime and plaster	36921-23		
66	36 993	Concrete products and stone cutting	36991-93		
67	36998	Non-metallic mineral products n.e.c.	36994-96, 36999		
68	37101	Iron and steel works	37101		
69	37102	Iron and steel casting	37102	37000	Basic metal industry
70	37201	Non-ferrous metal works	37201		
71	37202	Non-ferrous metal casting	37202		
72	38121	Manufacture of metal furniture	38121		
73	38138	Manufacture of structural metal products	38131-33, 38190,92		
74	38191	Manufacture of metal cans and containers	38191		
75	38198	Manuf. of other fabricated metal products	38110,22, 38193-99		
76	38220	Manufacture of agricultural machinery	38220		
77	38238	Manufacture of industrial machinery	38231-33, 38241-49		
78	38280	Repair of machinery	38280		
79	38293	Manufacture of household machinery	38291-93	38000	Manuf. of fabricated metal products
80	38298	Manufacture of refrigerators, accessories	38210, 38251-52, 38294-99		
81	38320	Manufacture of telecommunication equipm.	38321-29		
82	38330	Manufacture of electrical home appliances	38331-32		
83	38392	Manufacture of accumulators and batteries	38392		
84	38398	Manufacture of other electrical supplies	38311-12, 38391,93,99		
85	38410	Ship building and repairing	38411-19		
86	38438	Railroad and automobile equipment	38420, 38431-39		
87	38498	Manufacture of cycles, mopeds, etc.	38440-50, 38491-99		
88	38500	Professional and measuring equipment	38500		
89	39010	Manuf. of jewellery, etc.	39011-12	39000	Other manufacturing industries
90	39098	Manufacture of toys, sporting goods, etc.	39020-30, 39091-99		
91	41010	Electric light and power	41010		
92	41020	Gas manufacture and distribution	41020	40000	Electricity, gas and water
93	41030	Steam and hot water supply	41030		
94	42000	Water works and supply	42000		
95	50000	Construction	50000	50000	Construction
96	61000	Wholesale trade	61000	60099	Wholesale and retail trade
97	62000	Retail trade	62000		
98	63000	Restaurants and hotels	63000	63000	Restaurants and hotels
99	71118	Railway and bus transport, etc.	71110, 20		
100	71138	Other land transport	71130, 40		
101	71210	Ocean and coastal water transport	71210	71000	Transport and storage
102	71230	Supporting services to water transport	71230		
103	71300	Air transport	71300		
104	71509	Services allied to transport, etc.	71161-69, 71911-20		
105	72000	Communication	72000	72000	Communication
106	81000	Financial institutions	81000	80099	Financing and insurance
107	82000	Insurance	82000		

		National accounts 117-Classification	Statistics Denmark's industrial classification code DSE 77		National accounts 27-Classification
108	83110	Dwellings	83110	83110	Dwellings
109	83509	Business services	83121-300, 93501	83509	Business services
110	93109	Education, market services	93101-09, 93200	93009	Market services of education, health
111	93300	Health, market services	93312-20		
112	94000	Recreational and cultural services	94000	94000	Recreational and cultural services
113	95130	Rep. of motor vehicles	95131-39	95009	Household services, incl. auto repair
114	95299	Household services	92012-24, 95110-22 95140-207, 95911-99		
115	95400	Domestic services	95400	95399	Other producers, excl. government
116	97099	Private non-profit institutions	93400, 93502-900		
117	98099	Producers of government services	Remainder of 90000	98099	Producers of government services

Bibliography

Adriaanse, A. et al., 1997: Resource Flows: The Material Basis of Industrial Economies. World Resources Institute, Wuppertal Institute, Netherlands Ministry of Housing, Spatial Planning, and Environment, National Institute for Environmental Studies, Japan.

Alfsen, Knut H. and Rosendahl, Knut E., 1996: Economic Damage of Air Pollution. Third meeting of the London Group on Natural Resource and Environmental Accounting. Proceedings Volume, Stockholm, Sweden. May 28-31 1996, Statistics Sweden.

Anderberg, Stefan, 1998: Industrial metabolism and the linkages between economics, ethics and the environment. Ecological Economics, Vol. 24, pp. 311-320.

Bleken, M.A. and Bakken, L.R., 1997a: The Nitrogen Cost of Food Production. Norwegian Society. Ambio Vol. 26. No 3. Royal Swedish Academy of Sciences.

Bleken, M.A. and Bakken, L.R., 1997b: Nitrogenflyten i Norge (Nitrogen flows in Norway). In Brekke. K.A. et al., 1997.

Bleken, Marina, 1997: P og N-innhold (P and N content). Unpublished data. Agricultural University of Norway. Department of Horticulture and Crop Sciences.

Brekke, K.A., Lone, Ø. and Rødseth., T. (eds.), 1997: Økonomi og Økologi: Verktøy for en bærekraftig politikk (Economy and Ecology. Tools for sustainable politics). Ad Notam Gyldendal. Oslo, Norway.

Bringezu, S., Behrensmeier, R., Schütz, H., 1996: Material flow accounts indicating the environmental pressure of the various sectors of the economy. Paper contributed to the international Symposium on Integrated Environmental and Economic Accounting in Theory and Practice. Tokyo, March 5 to 8, 1996. Wuppertal Institute, Department of Material Flows and Structural Change.

Bringezu, S., Fischer-Kowalski, M., Kleijn, R., Palm, V. (eds.), 1997: Regional and National Material Flow Accounting: From Paradigm to Practice and Sustainability. Proceedings of the ConAccount workshop 21-23 January, 1997. Wuppertal Special 4. Wuppertal Institute for Climate, Environment, Energy.

Eurostat, 1994: SERIEE - 1994 Version. European Commission, Luxembourg.

Eurostat, 1996: Environment Statistics. European Commission. Luxembourg.

Fenhann, J. and Kilde, N., 1994: Inventory of Emissions to the Air from Danish Sources 1972-1992. Systems Analysis Department, Risø National Laboratory, Roskilde, Denmark.

Gravgård Pedersen, O., 1995: Miljøet og nationalregnskabet. Samfundsøkonomen 1995:8. DJØF, København. (The Environment and the National Accounts. The Social Economist 1995:8, Copenhagen).

Gravgård Pedersen, O., 1996: Input-output Analysis and Emissions of CO_2, SO_2, and NO_x - Linking Physical and Monetary Data. Chapter 9 in *Madsen et al., 1996.*

Gravgård Pedersen, O., 1998: Problems in Combining National Accounts and Environmental Statistics. Paper for the 5th. Annual Meeting in the London Group on Environmental Accounting. Statistics Denmark, May 1998.

Harboe-Jepsen, Morten, 1994: Analysis of Packaging Flows in the Nordic Countries Denmark. RENDAN A/S. Søborg, Denmark.

Harboe-Jepsen, Morten, 1996: Emballageforsyningsmængden Danmark 1994. Udkast (Volumes of packaging materials in Denmark 1994, Draft). RENDAN A/S, Denmark.

Høeg, Peter, Højlund Larsen, Michael and Domela, Ilonka, 1994: Materialestrømsovervågning - Udvikling i udvalgte materialestrømme i 1992 - Statusnotat (Material flows surveillance - development of selected material flows in 1992). RENDAN A/S, Denmark.

Høeg, Peter and Højlund Larsen, Michael, 1993: Bygge- og Anlægsaffaldsstatistik 1992 (Statistics on waste from construction 1992). Mimeo, Materialestrømsovervågning (Material flows surveillance), RENDAN A/S, Denmark.

Kaysen, Ole, 1991: Returpapir 1990 Materialestørmsovervågning (Recycled paper 1990 - Material flows surveillance). RENDAN A/S, Denmark.

Konijn, P.J.A., de Boer, S., van Dalen, J., 1995: Material flows and input-output analysis - methodological description and empirical results. Statistics Netherlands, Sector National Accounts, Netherlands.

Kyllingsbæk, Arne, 1995: Kvælstofoverskud i dansk landbrug 1950-1959 og 1979-1994. Statens Planteavlsforsøg (Nitrogen surplus in Danish agriculture 1950-1959 and 1979-1994 - Danish Institute of Agricultural Sciences), SP-report No. 23, Denmark.

Madsen et al. (eds.), 1996: Modelling the Economy and the Environment. Springer. Berlin-Heidelberg, Germany.

Miljøministeriet, 1992: Råstofproduktionen i Danmark 1990. Miljøministeriet - Skov- og Naturstyrelsen (Raw material production in Denmark 1990 - Ministry of Environment and Energy - The National Forest and Nature Agency).

Miljøstyrelsen, 1990: Prognose for bygge- og anlægsaffald - hovedrapport. Miljøprojekt nr. 150. (Forecasts of construction waste - main report. Environmental Project no. 150, Danish EPA - Denmark).

Miljøstyrelsen, 1993a: Affaldsstrømmene i Danmark. RENDAN A/S. Søborg, Denmark. (Waste flows in Denmark - Danish EPA).

Miljøstyrelsen, 1993b: Byggeri og renere teknologi. Arbejdsrapport nr. 23 (Construction and cleaner technologies - Danish EPA Working Paper no. 23).

Miljøstyrelsen, 1994a: Produktion og miljøforhold i papirindustrien. Miljøprojekt nr. 257. (Production and the environment in the paper industry - Danish EPA - Environmental Project no. 257).

Miljøstyrelsen, 1994b: Vandforbrug i fremstillingsindustrien. Miljøprojekt nr. 259. (Water consumption in the manufacturing industries - Danish EPA - Environmental Project no. 259).

Miljøstyrelsen (Danish EPA), 1994c: Vandforbrug i fremstillingsindustrien - bilagsrapport til Miljøprojekt nr. 259 (Water consumption in the manufacturing industries - annex. Environmental Project 259 - Working Paper no. 20).

Miljøstyrelsen, 1995a: Miljøprioritering af industriprodukter. Miljøprojekt nr. 289 (Environmental priorities for industrial products - Danish EPA - Environmental Project no. 281).

Miljøstyrelsen, 1995b: Miljøøkonomi for papir- og papkredsløb. Miljøprojekt nr. 294 (Environmental economics for paper and cardboard flows - Danish EPA - Environmental Project no. 294).

Miljøstyrelsen, 1995c: Miljøøkonomi for papir- og papkredsløb. Delrapport 1: Metodebeskrivelse, materialestrøm og referencer. Arbejdsrapport nr. 28 (Environmental economics for paper and cardboard flows. Report 1: Methodology, material flows and references - Danish EPA - Working paper no. 28, Denmark).

Miljøstyrelsen, 1995d: Miljøøkonomi for papir- og papkredsløb. Delrapport 2: Bølgepap Arbejdsrapport nr. 29. (Environmental economics for paper and cardboard flows - Danish EPA - Report 2: Cardboard, Working Paper no. 29).

Miljøstyrelsen, 1995e: Miljløøkonomi for papir- og papkredsløb. Delrapport 3: Aviser og ugeblade. Arbejdsrapport nr. 30 (Environmental economics for paper and cardboard flows. Report 3: Newspapers and magazines - Danish EPA - Working Paper no. 30).

Miljøstyrelsen, 1995f: Miljøøkonomi for papir- og papkredsløb. Delrapport 4: Blandet papir. Arbejdsrapport nr. 31. (Environmental economics for paper and cardboard flows. Report 4: Miscellaneous paper - Danish EPA - Working Paper no. 31).

Miljøstyrelsen, 1995g: Brancheanalyse beton - renere teknologi ved betonfremstilling. Delrapport fase 1: Branche- og produktprofil. Arbejdsrapport nr. 40. (Industry analysis concrete - cleaner technologies for manufacturing concrete - Danish EPA - Report phase 1: Industry and product profiles. Working Paper no. 40).

Miljøstyrelsen, 1995h: Brancheanalyse beton - renere teknologi ved betonfremstilling. Miljøprojekt nr. 304 (Industry analysis of concrete - cleaner concrete manufacturing technologies - Danish EPA - Environmental Project no. 304).

Miljøstyrelsen, 1996a: Affaldsstatistik 1995. Orientering fra Miljøstyrelsen (Waste statistics 1995 - Danish EPA - Information from the Danish Environmental Protection Agency no. 14).

Miljøstyrelsen, 1996b: Status for produktion og disponering af restprodukter og jord. Miljøprojekt nr. 334. (A statement of production and disposal of residual products and soil - Danish EPA - Environmental Project no. 334).

Miljøstyrelsen, 1997a: Erhvervsaffald og udvalgte affaldsstrømme. Et debatoplæg. (Industrial waste and selected flows of waste - Danish EPA - A discussion paper).

Miljøstyrelsen, 1997b: Miljøeffekter og ressourceforbrug for 3 grafiske produkter i et livscyklusperspektiv. Miljøprojekt nr. 341. (Environmental effects and resource use for 3 graphical products in a life cycle perspective - Danish EPA - Environmental Project no. 341).

Møller, A. & Saxholt, E., 1996: Levnedsmiddeltabeller. 4th edition, Levnedsmiddelstyrelsen, Søborg, Denmark (Nutrition tables - The National Food Agency).

Nielsen, Arne, 1992: Returpapir 1991. Materialestrømsovervågning (Recycled paper 1991. Material flows surveillance). RENDAN A/S, Denmark.

Radermacher, W., 1998: Material flow analysis in the framework of the environmental economic accounting in Germany. Federal Statistical Office, Wiesbaden, Germany.

Rosendahl, Knut Einar, 1996: Helseeffekter av luftforurensning og virkninger på økonomisk aktivitet. Generelle relasjoner med anvendelse på Oslo. Statistisk Sentralbyrå, Norway, Report no. 8/96. (Health effects of air pollution and consequences for economic activity. General relationships and applications for Oslo. Statistics Norway).

Rørmose Jensen, Peter, 1998: The Eco-Industry in Denmark. An investigation of the possibilities of an assessment through administrative registers. A report prepared for Eurostat, Statistics Denmark.

Sibbesen, E., 1990: Kvælstof, fosfor og kalium i foder, animalsk produktion og husdyrgødning i dansk landbrug i 1980-erne. Afdeling for Husdyrernæring og Fysiologi. Forsøgsanlæg Foulum. Beretning nr. S 2054. (Nitrogen, phosphorus and potassium in feed, animal production and farmyard manure in Danish agriculture in the 1980's - Research Park, Foulum - Department for Animal Nutrition and Physiology, Report no. S 2054).

Skatteministeriet, 1994: Lovbekendtgørelse nr. 674 af 13. juli 1994: Bekendtgørelse af lov om afgift af affald og råstoffer (Consolidated act no. 674 of 13. July 1994: Promulgation of act on excise duty on waste and raw materials - Ministry of Taxation).

Skogesal, Olav, 1997: Avfallsregnskap for Norge - prinsipper og metoder. Resultater for papir og glass. Statistisk Sentralbyrå, Rapport nr. 12/97. (Waste accounts for Norway - principles and methodology. Results for glass and paper. Statistics Norway - Report no. 12/97).

Skov- og Naturstyrelsen, 1992: Råstofproduktion i Danmark 1990, Havområde. (Raw material production in Denmark 1990, Offshore - The National Forest and Nature Agency).

SNA, 1993: System of National Accounts 1993. United Nations, International Monetary Fund, World Bank.

Stahmer, C., Kuhn, M. and Braun, N., 1997: Physical Input-Output Tables for Germany, 1990. Report prepared for DG XI and Eurostat. Eurostat Directorate B, Unit B6. Luxembourg.

Statens Byggeforskningsinstitut, 1995: Miljødata for udvalgte byggematerialer. Forbrug af fossile brændsler og emission af CO_2 og SO_2. SBI-meddelelse 113.

(Environmental data for specific construction materials. Consumption of fossil fuels and emission of CO_2 and SO_2 - Danish Building Research Institute - Announcement no. 113).

Statistics Denmark, 1986: Commodity flows systems and construction of input-output tables in Denmark. Working paper no. 15. Division of National Accounts, Copenhagen.

Statistics Denmark, 1990: Tal om natur og miljø (Figures on the Environment). Statistics Denmark, Miljøstyrelsen (Danish Environmental Protection Agency) and Skov- og Naturstyrelsen (The National Forest and Nature Agency), Copenhagen.

Statistics Denmark, 1991a: Landbrugsstatistik 1991 (Agricultural statistics 1991). Statistics Denmark, Copenhagen.

Statistics Denmark, 1991b: Udenrigshandelen fordelt på varer og lande (Foreign trade according to countries and commodities). January-December 1990. Published in series statistics service 1990:4.

Statistics Denmark, 1991c: Varestatistik for Industrien, Serie A-D (Commodity Statistics for the Manufacturing Sector, Series A-D). Published in the series statistics service 1990:4.

Statistics Denmark, 1994: Nationalregnskabsstatistik 1994 (National Accounts Statistics 1994). Copenhagen.

Statistics Denmark, 1995: Beslutningsreferat angående statistik over kvælstofbalancer i landbruget (Minutes regarding decisions on statistics on nitrogen balances for agriculture). Division for Environment and Energy 23 of November 1995. JMA/ Act. no. 91-1020. Unpublished.

Statistics Denmark, 1996: Input-output tabeller og analyser 1992 (Input-output tables and analysis). Copenhagen 1996.

Statistics Denmark, 1997: Forbruget af drikkevand 1995 (Consumption of drinking water). Statistical Surveys, Environment no. 4. Copenhagen.

Statistics Denmark, 1998: New National Accounts 1988-1996. Statistical Surveys no. 47. Copenhagen.

Statistisk Sentralbyrå, 1997: Naturressurser og miljø 1997 (Natural resources and the Environment 1997). Statistical analysis. Oslo, Norway.

Statistiska Centralbyrån, 1997: Miljöräkenskaper. Samband mellan miljö och ekonomi (Environmental accounts. The interaction of the environment and the economy). Örebro, Sweden.

United Nations, 1993: Handbook of National Accounting - Integrated Environmental and Economic Accounting, Interim Version. United Nations, Department of Economic and Social Development, Statistical Division, New York.

Vadmand Jensen, H. and Gravgård Pedersen, O., 1998: Danish NAMEA 1980-92. Statistics Denmark.

Videnscenter for Affald & Genanvendelse (Knowledge Centre for Waste and Recycling), 1994: Affaldshåndbogen 1994/95 (Manual on waste 1994/95). RENDAN A/S, Denmark.