



REGIONPLANE - &
TRAFIKKONTORET

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Regional Environmental Accounts for the Greater Stockholm Region – a first step

Foreword

Physical environmental accounts demonstrate the relationship between the environment and finance. The production of goods and services has always had some impact on the environment. The aim of environmental accounts is to use an information system to explain how environmental issues relate to financial operations.

Work on producing environmental accounts for Sweden has its origins in three parliamentary assignments that were issued in 1992:

- Statistics Sweden (SCB) to develop physical environmental accounts as well as to improve and supplement environmental statistics.
- The National (Swedish) Institute of Economic Research (KI) to report on the most important relationships between finance and the environment, and to assume responsibility for research and development in the field of financial environmental accounts.
- The (Swedish) Environmental Protection Agency (EPA) to develop a system of environmental indices in order to provide an overall picture of the state of Swedish ecosystems and the changes taking place within them.

The environmental accounts are constructed on the basis of the national accounts, which means that environmental data are structured under the same headings as the financial data. For instance, in the environmental accounts emissions are allocated according to the economic activities that have generated them, i.e. the various branches of industry, public authorities and households.

In this memo, we are presenting regional environmental accounts for the first time. The development of environmental accounts is a long-term process. To date at a national level, most progress has been made in the fields of energy, emissions to the air and waste. In working with regional environmental accounts, it is also most appropriate to start with these same areas, from a methodological perspective and also because access to data is relatively good. As the official energy and environmental statistics have not been produced for use in regional accounts, it is often difficult to obtain reliable regional environmental statistics that are themselves categorised by industry branch.

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Stockholm in May 1999

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Background

Development of Environmental Accounts in Sweden

In Agenda 21, the final document from the UN Conference on the Environment and Development held in Rio de Janeiro in 1992, it was established that environmental accounts are to be developed to form the basis for integrating financial and environmental considerations into decision-making processes. Today, both the UN and the EU stipulate in their environment programmes that member nations are to develop environmental accounts.

Work on environmental accounts in Sweden has its origin in three assignments commissioned by the government in the spring of 1992, which closely align with the proposals in the report from the Committee on Environmental Accounts (SOU 1991:37), requiring:

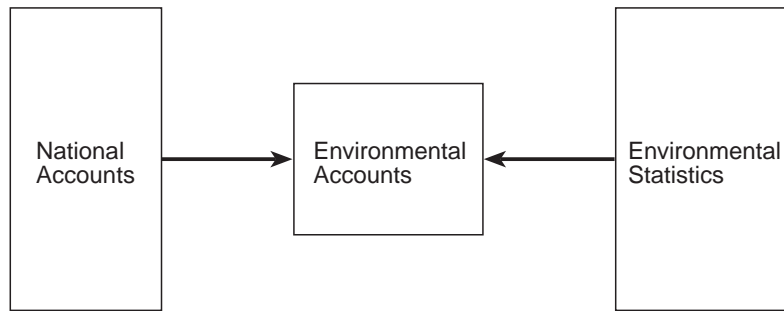
- *Statistics Sweden (SCB)* to develop physical environmental accounts as well as to improve and supplement environmental statistics.
- *The National (Swedish) Institute of Economic Research (KI)* to report on the most important relationships between finance and environment, as well as to assume responsibility for research and development into financial environmental accounts.
- *The Swedish Environmental Protection Agency (EPA)* to develop a system of environmental indices to provide an overall picture of the state of Swedish ecosystems and the changes going on within them.

The *physical environmental accounts* developed by SCB link together environmental and financial statistics in a common information system. Physical environmental accounts only report on environmental impacts in terms such as kilograms of emissions or wastes, square kilometres of acidified ground, or cubic metres of oil consumed. Figures are not worked out for the actual costs of these environmental impacts. *Financial environmental accounts* are about trying to put a figure on the cost of damage resulting from society's impact on the environment. The work being done on the financial environmental accounts is carried out at KI. The Swedish EPA is responsible for reporting on the state of the various Swedish ecosystems and how they change. The Swedish EPA also calculates the cost of reducing emissions and other negative environmental effects.

A new series of reports on the environmental accounts, entitled "Miljöräkenskaper" in Swedish, presents the current progress being made in this area by the three authorities (see the reference list).

SCB and their work on Environmental Accounts

Environmental accounts are developed using the national accounts as a base. This means that the environmental data are formatted using the same headings and categories as the financial data. Emissions are categorised by the economic activities, i.e. the various industry branch, public authority or household (private consumption) generating them. More conventional environmental statistics are often categorised differently than financial statistics, focusing more on the *source*, using headings such as industrial processes and traffic, or alternatively on the *destination* of the emissions, such as the ground, air or water.



Formatting the environmental statistics the same way as the financial statistics, makes it possible to study the relationships between the environment and finances. Environmental accounts do not actually produce new statistics, rather they rework the existing data into the national accounting system format. Among the various authorities responsible for collecting environmental statistics are the Swedish EPA and the National Chemical Inspectorate.

The environmental accounts form a satellite system to the national accounts. The UN is responsible for the System of National Accounts (SNA) which is used by the member countries, and has also produced a draft handbook for keeping environmental accounts for SEEA, its System of integrated Economic and Environmental Accounting. NAMEA, an alternative system to SEEA, has been developed in Holland. Both systems have a lot in common and are based on national accounts. The Swedish efforts have been based primarily on these two systems.

Emissions from the various producers or households that are responsible for negatively impacting on the environment can be read directly from the environmental accounts. At the same time one can access financial information on industry production and contribution to GNP. With the help of direct data from the environmental accounts, key ratios such as the production of emissions per added value currency-unit can be calculated. Environmental accounts can also be used for deeper analysis, for example on how the environment is affected by current financial structure and how the various environmental safeguards which are put in place effect particular financial factors. So-called input-output analyses and general equilibrium models can be used for these types of analyses.

The task of SCB in the long term is to work on developing a system of environmental accounts at the national level. Currently SCB is working on certain sub-areas that have been given priority based on environmental considerations, economic significance and the access to data. The sub-areas are listed below.

Emissions and wastes

Emissions and wastes are reported on here in relation to the activities generating them within the various branches of industry etc. In this way various types of emissions can be presented in relation to added value or employment levels within a particular branch.

Energy consumption and the flow of materials

The way in which various sorts of energy or materials are being used is demonstrated here, as well as how much is accumulating in society, being recycled or ending up as wastes and emissions.

The cost of Environmental Safeguards

This sub-area reports on how much money is being put into protecting and conserving our environment.

Natural resources

The way natural resources are being used as well as the effects society is having on them is reported on here.

Where SCB has advanced furthest has been in the area of linking energy consumption, emissions and wastes to various branches of industry etc. Currently data are available which show energy consumption and emissions for 1989, 1991 and 1993, broken down into 16 industry branches as well as private and public consumption. Information on waste from the manufacturing industry is available for 1993.

Categorisation into 16 branches of industry has been done to provide a first step towards getting a manageable number of branches into the financial-environmental models being used to analyse energy consumption.

The actual categories being used are presented in the supplement section. In the long term it is envisaged that more groups will be added to the current range of categories.

Information on energy consumption within different branches is based not only on the national accounting system's financial terminology but also on physical terminology. This provides a basis for correspondingly relating the information on the environmental impact of energy-consumption to the accounting system, as some of the emissions can be linked to the consumption of various types of energy. Adding energy data to the environmental accounting system, in practice means that access to, and consumption of, various energy resources can be reported in physical terms according to the categories laid out in the national accounting input-output system.

Work is currently in progress on modifying the Swedish national accounts, which includes making adjustments to comply with the ENS, the system of national accounting used in Europe. The adjustments are expected to be fully completed somewhere around the beginning of the year 2000. The new input-output matrices will not be ready before 1999, which means that the environmental accounts will have to wait until a new basis for reporting of definitive data for the period 1994–1997 becomes available.

The Swedish EPA, which is the authority responsible for the official waste statistics, commissions SCB to produce the official statistics on waste. Completed reports to date include investigations into industrial wastes and recoverable raw materials for 1993.

Regional Environmental Accounts

Environmental accounts can be developed into regional accounts in the same way as the national accounts. Developing regional environmental accounts also ought to be seen as a long-term process, proceeding in unison with the development of the regional financial accounts and the development of opportunities to link with regional environmental statistics. In order to supplement the existing regional accounts, it ought to be possible to also categorise the environmental data regionally into the various branches.

The EPA intends to use these statistics for providing a firm base for decision making at a national level and to satisfy international reporting requirements. Statistical requirements at the regional level will have to be addressed in other ways. For the environmental accounts this means that it will be difficult to report with adequate quality on environmental statistics categorised by branch.

An appropriate start for developing regional environmental accounts can be to report on those areas where it is already possible to present regional environmental data for

branches included in reports on economic development. These areas correspond well to those branches where the greatest advances have been made at the national level, i.e. energy consumption, emissions to the air, and waste for the 16 branches used in the national environmental accounts. This also provides an opportunity for comparing regional figures with national averages.

The following are included in the pilot study on regional environmental accounts:

- *Financial data*

These data have been obtained from the regional accounting system developed by SCB. Regional accounts are national accounts categorised geographically. Gross regional product (GRP) corresponds to GNP and represents the total value of production after deductions for the costs of goods and services. As with the national environmental accounts, the regional accounts contain information such as production value, added value and employment levels by branch.

- *Energy consumption and emission data*

Complete energy accounts and data on emissions are not available at the county administration level. Consequently special calculations for the analyses used in this report had to be done. In some instances, investigations other than those used at the national level have also had to be used. As a result there have been problems with various definitions and delimitation. Figures for Stockholm County are therefore not directly comparable with those for the country as a whole. Deviations between the County and country sometimes also depend on the particular material used as a basis for reporting and not on the actual differences in structure. Methods and sources for the County information are addressed in more detail in the supplement section.

- *Waste from the manufacturing industry*

Statistics on industry waste relate to 1993 and report the amounts of various types of wastes and how these have been managed. The details come from an SCB questionnaire sent to a selection of the country's industries. As the selection was not intended to form a basis for regional accounting, details are therefore lacking for various branches (iron, steel and metal works as well as mines and quarries) in Stockholm County. The number of operations selected within these branches in the County is so small that in the interest of maintaining confidentiality and/or quality, the information cannot be reported. The investigations are addressed in more detail in the supplement section.

The Swedish EPA is the authority responsible for the official statistics on waste. Those statistics reported on to date, where waste can be broken down further into branch of origin, are those that relate to industry. The Swedish EPA expects corresponding statistics for the other sectors of society to be available within the next few years.

Results

Financial Base Data

All the tables referred to here are located in the table supplement.

Table 1 presents financial base data for the various branches of industry¹ within Stockholm County and Sweden as a whole. Information relates to 1991 and 1993. Public authority production is not included in the tables.

The economic figures presented here are taken from the regional and the national accounts, and present production value, added value and the mean number of employees. Production value includes the entire value of the producer price. The added value² is the production value after deductions of costs associated with input goods (components etc).

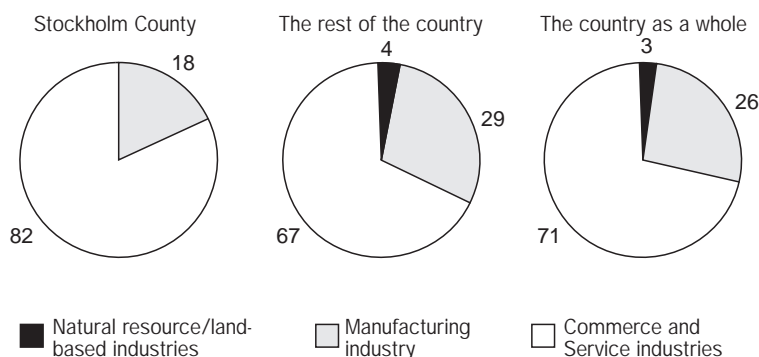
Production volumes within the different branches vary with swings in the general business cycle as well as changes in demand for goods and services. This also affects the total energy consumption as well as the amounts of emissions and wastes produced. In order to produce a useful figure of the efficiency seen from an environmental perspective, it would be interesting to see how the environment is affected by various physical production-volumes. However base data are lacking for such analyses, consequently added value has been used in the form of fixed prices to report on the effects of changes in physical production volumes.

In Stockholm County, value added by industry increased by barely one percent in fixed prices between 1991 and 1993, while for the whole of Sweden during the same period, it reduced by three percent.

Stockholm County was responsible for 25 percent of the total value added by industry for the whole of Sweden.

In Stockholm County, commerce and other services were responsible for 82 percent of the entire value added by industry, while the manufacturing industry was responsible for 18 percent. Figures for Sweden as a whole were 71 and 26 percent respectively.

Diagram 1. Added Value by industry branch, measured in percent for 1993



1. Industry includes all marketable production to be sold on the open market. In addition to private companies, industry also includes commercial and other operators who finance their own production through charging. Industry is divided into branches according to SNI 69, the standard used for the categorisation of Swedish industry into branches. A list of branches is included in the supplement section.

2. The contribution made by the branch to GNP or GRP (Gross Regional Product).

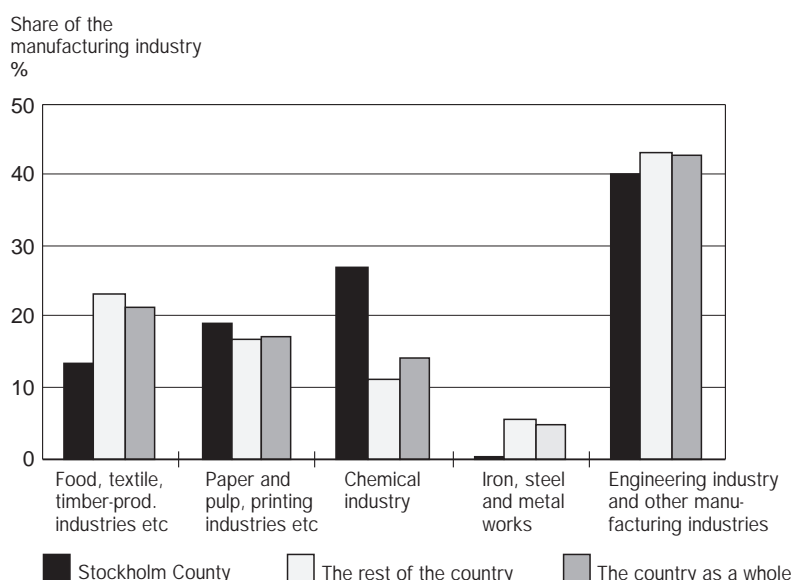
Data contained in the environmental accounts at the national level are currently divided into 16 industry branches. Due to a lack of available data and for confidentiality reasons, data for some of the branches in Stockholm County have been represented as one group.

Data for the manufacturing industry at the national level are divided into five branches:

1. Food, textile, timber-products, earth and crushed-rock industries
2. Paper and pulp, printing and graphic industries
3. Chemical industries including oil refineries
4. Iron, steel and metal works
5. Engineering industry (workshops, garages, laboratories etc.) and other manufacturing industries

The engineering branch dominates the manufacturing industry in both Stockholm County and the rest of Sweden. In Stockholm County, there is a significant chemical industry accounting for 27 percent of the value added compared to an average of 14 percent for the whole country.

Diagram 2. Value added by the manufacturing industry in 1983, by five different industry branch-groups



The various branches within the manufacturing industry encompass a broad range of operations that can have widely varying production orientation, and therefore different environmental effects. Chart 1 shows the differences in structure between Stockholm County and the whole of Sweden. Within the food, textile and timber-products industries in Stockholm County, the food industry accounts for 85 percent of the value added compared with 54 percent for the whole country. The group referred to as *non-plastics chemical branches* (which includes the pharmaceuticals industry) are responsible for 82 percent of the value added in the County, but only 40 percent in Sweden as a whole. The group referred to as *other chemical industries* (which includes oil refineries) are responsible for 10 percent of the value added in the County and 36 percent in the country as a whole.

The differences in structure within the groups are important to keep in mind when comparing, at the County and the national levels, energy consumption, emissions and

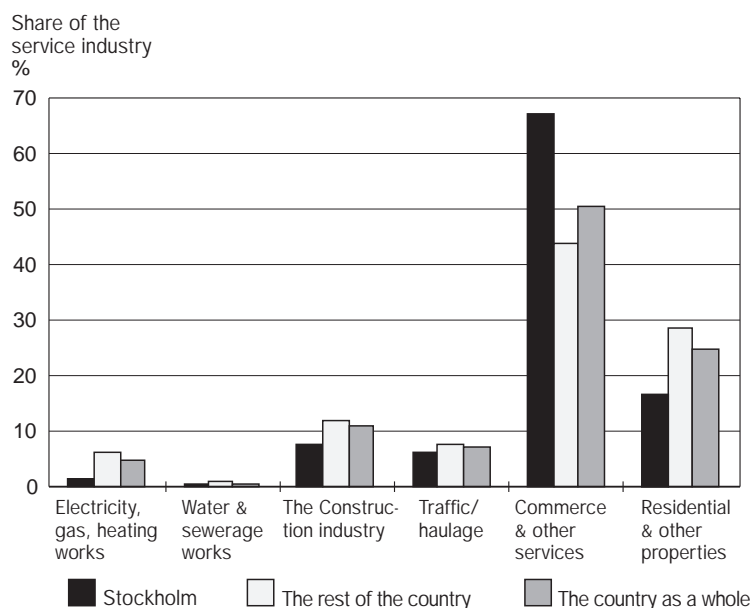
wastes produced by each manufacturing industry branch to their financial data. An improvement in branch categorisation is needed in relation to some of the analyses, though for the time being it is adequate enough, for instance for financial equilibrium models at the national level, and for following how the environment is affected by production levels in society. Within the ongoing effort to produce national environmental accounts there are plans for reporting on around 50 industry branches.

Chart 1. Branch-grouping within the manufacturing industry

	Share of the value added by respective branch, 1993 (%)	
	Stockholm County	The whole of Sweden
Food, textile, timber-products, earth and crushed-rock industries	100	100
Food industry	85	54
Timber-products industry	6	25
Other	9	21
Paper and pulp, printing and graphic industry	100	100
Paper and pulp, paper-products industry	9	47
Printing and graphic industry	91	51
Chemical industry	100	100
Chemical, plastics industries	8	24
Non-plastics chemical industries	82	40
Other chemical industries	10	36
Engineering industry and other manufacturing industries	100	100
Machine industry	29	29
Electrical products	26	14
Transport, haulage etc	16	26
Instruments	17	7
Other	12	24

When data on the share that each of the various branches contribute to total emissions and wastes are analysed, it is important to be aware that distributors are also responsible for some of the pressure that the products exert on the environment. Much of the production within a branch goes into input goods (components, parts etc) for other

Diagram 3. Added value in the service industry 1993, by branch group



branches. Operations that come in at the top end of the value-adding chain often produce relatively small amounts of waste, while simultaneously adding significant value. Through so-called input-output analyses, which are based on financial transactions between companies in various branches, it is possible to reassign pressure on the environment to all of the particular raw materials, semi-manufactured products and services required for manufacturing a product. At present these analyses can only be done at the national level.

Within the commerce and services industry, commercial activities dominate accounting for 67 percent of the value added by the industry in Stockholm County, and 50 percent for the industry in the country as a whole.

Energy and Emissions

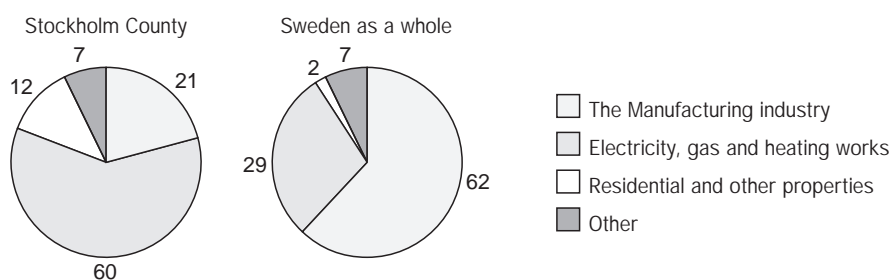
Energy

Consumption of *fuels* for energy production (electricity and heating) in Stockholm County constitutes barely 10 percent of Sweden's total consumption. The figures for the County are probably a little too low (see the supplement "Energy and Emission Figures", where the uncertainties in the figures are presented). The fuel consumption for the County is relatively low with respect to the number of residents in the County, who represent 20 percent of Sweden's population. Low consumption is explained by:

- the use of large-scale solutions by the energy sector (including for instance well developed district heating networks)
- the lack of energy-intensive basic industries in the County
- that some of the electricity and heat used here may have been produced in another county which will report the fuel consumption and emissions as their own.

Manufacturing accounts for around 20 percent of industry fuel consumption in Stockholm County, and about 60 percent for the whole country. Value adding shows the same pattern. The manufacturing industry accounts for 18 percent of the value added in the County and 26 percent in Sweden as a whole (see table 1). This lower figure means that apportioning amongst the 16 branches in the County differs from that in the country as a whole. For example, the electricity, gas and heating branch in 1993 accounted for 60 percent of the fuel consumption in the County compared with barely 30 percent for Sweden as a whole. Households in the County show low fuel consumption compared to those in the country in general, as by and large they purchase their heat. This is recorded against the user (in this case the seller) instead of as household heating fuel.

Diagram 4. Fuel consumption 1993
Percentage break down into industry sectors



Electricity consumption shows the same pattern as fuel consumption. However consumption of district network heating by various sectors in the County is in alignment with Sweden as a whole. This stands to reason, as the private sector is the main consumer. Industry structure does not affect the relative proportions to any great extent. Industry accounts for 25 percent, while the public authorities and households together account for the rest. The relative break down into authorities and households varies somewhat more between the County and the country as a whole, however this can be the result of shortcomings in the underlying statistics. Variations probably exist in delimiting what is or is not a public service.

Fuel consumption by vehicles and industrial machines are attributed to the particular branch they belong to. For instance, consumption by haulage contractors etc. falls under traffic and haulage. The consumption of fuels for running operations is attributed to the respective branch for the country but not for the County, where details on fuels only relate to delivery and not consumption. Only data for petrol and diesel are contained in the County data, and not for other operating fuels such as aviation fuel/kerosene, and oils used in shipping. Consequently operating fuel figures can not be used in comparisons between the County and the country as a whole.

Between 1991 and 1993 consumption of fuel for generating electricity and heat increased. The rise, which was proportionately greater for the County than for Sweden as a whole, involved mainly oil consumption by electricity, gas and heating works, and manufacturing.

Emissions

Of the total emissions of carbon dioxide and nitrous oxide in Sweden, about 10 percent is released in Stockholm County, while the figure for sulphur dioxide is about 7 percent. These are relatively small proportions considering that 20 percent of Sweden's population live in Stockholm County, and that about 15 percent of all the cars and trucks registered in Sweden are registered in the County. However the figures are little uncertain, and uncertainties are specified in the supplement section under the title "Energy and Emission Figures".

Diagram 5. Stockholm County's share of total emissions of CO₂, SO₂ and NO_x (%)



The proportionately low levels of CO₂ and SO₂ emissions in Stockholm County are partly the result of the large-scale solutions incorporated into electricity and heat generation. The efficiency is high at these plants, and district network heating is extensively developed at the same time as a large proportion of the County's inhabitants live in multiple dwellings (such as blocks of flats) compared to the rest of the country. This means that the electricity, gas and heating works report a high proportion of the County's total emissions. However in relation to the high amounts of energy produced, these emissions are low (refer to the previous section on energy). Emission levels

are also affected by the fact that the industry structure in Stockholm County is not built up around larger heavy basic industries, which means that processing emissions are practically zero.

Emissions of NO_x result for the most part from mobile sources including motor vehicles, shipping, railways, aviation and industrial-machinery. It is estimated that mobile sources in Stockholm County emit about 10 percent of the country's total emissions. The fact that this is below the County's proportionate share of both the total number of inhabitants registered in the country and the total number of registered cars and trucks is probably attributable to the driving-patterns being different here than in other parts of the country.

Among the categories of financial sectors, it is by and large the industrial branches that account for the generation of the various emissions. Public authorities produce the lowest emissions across the board. This holds true for both the County and Sweden as a whole, though there are some differences in the relative size of the amounts (see chart 2).

Private consumption generates significantly lower emissions per capita in Stockholm County than in the country as a whole. The majority of emissions emanate from private-heating and private transportation (see chart 3).

Emissions to the air in Stockholm County have remained fairly constant in their distribution across the various financial sectors during the period 1991–1993, though the amounts of SO₂ and NO_x emitted have reduced while CO₂ has increased. The pattern is the same for Sweden as a whole except that CO₂ emissions decreased between 1991 and 1993. Reductions in SO₂ and NO_x can partly be attributed to the lower levels of sulphur in heating oil and the increase in the number of vehicles fitted with catalytic converters. The emission of CO₂ is directly correlated to the amount of fuel consumed, which increased in the County and reduced in Sweden as a whole.

Chart 2. CO₂, SO₂ and NO_x emissions by type of producer and private consumption

		CO ₂		SO ₂		NO _x	
		Tonne	%	Tonne	%	Tonne	%
<i>Stockholm County</i>							
Industry	1991	4 412 800	70	5 900	75	33 050	82
	1993	4 905 700	72	5 500	80	32 900	83
Public authorities	1991	365 000	6	800	10	700	2
	1993	327 600	5	600	9	550	1
Private consumption	1991	1 557 500	25	1 200	15	6 500	16
	1993	1 580 800	23	750	11	6 250	16
Total	1991	6 335 300	100	7 900	100	40 250	100
	1993	6 814 100	100	6 850	100	39 750	100
<i>Sweden as a whole</i>							
Industry	1991	47 634 600	74	105 600	91	297 350	73
	1993	46 578 600	73	91 650	93	291 650	74
Public authorities	1991	2 128 000	3	2 250	2	3 300	1
	1993	2 293 100	4	1 300	1	2 800	1
Private consumption	1991	15 003 600	23	8 800	8	108 400	27
	1993	14 749 100	23	6 000	6	101 950	26
Total	1991	64 766 200	100	116 650	100	409 050	100
	1993	63 620 800	100	98 950	100	396 400	100

Chart 3. CO₂, SO₂ and NO_x emissions from private consumption/person 1993

	Stockholm County	Sweden as a whole
CO ₂	940 kg	1 690 kg
SO ₂	0,4 kg	0,7 kg
NO _x	4 kg	12 kg

Industry emissions in Stockholm County are attributed to various sectors somewhat differently than the figures for the whole country (see table 3). This can also be seen in the proportionate-share diagram 6, where the branch-share of added value and employment are presented in relation to their share of total CO₂, SO₂ and NO_x emissions respectively.

The manufacturing industry's share of the emissions in Stockholm County is significantly lower than in the country as a whole for all three emissions. This is due to factors such as those previously mentioned in relation to electricity, gas and heating works, which contribute to a higher proportion of the County's total emissions. Residential dwellings and other properties account for a significantly greater proportion of emissions in the County than they do at the national level. This can be explained to some extent by the method used for the apportioning of industrial-machine emissions in the County, which is different from that used for Sweden as a whole. For the County, figures for added value are used when apportioning the total emissions from industrial machinery into the various branches, while at the national level apportioning is based on two special reports on industrial machinery. Results using the national methods were not adequate for Stockholm, as agriculture, forestry and other branches with little representation in the County were still apportioned a large share of the emissions to the air. On the other hand, the branch referred to as dwellings and other property is given slightly too large a share and the branch commerce and other services is given too low a share using the added-value method.

Within the environmental accounts a method has also been developed to report on environmental-economic profiles (see diagram 7). These show both the contribution to GRP or GNP, and the emission and energy consumption share by branch. Most of the NO_x emissions comes from mobile sources such as motor vehicles, ships, industrial machines and so on, and are attributed to the branch owning the vehicles. This means that a large proportion of the emissions from mobile sources are attributed to the transport/haulage branch, i.e. the owners of the vehicles and not to the branches buying the services of the company in the transport branch.

Table 5 and diagram 8 show emissions in relation to added value in tonne per million Swedish Krona (SKr). Even here, Stockholm County clearly differs from Sweden as a whole with many branches showing significantly lower emission levels per unit added value than the national figures.

Diagram 6. Proportionate-share diagrams showing emissions of CO₂, SO₂ and NO_x from industry in relation to added value and employment for 1993

1 Added value

G Employment

Stockholm County

Sweden as a whole

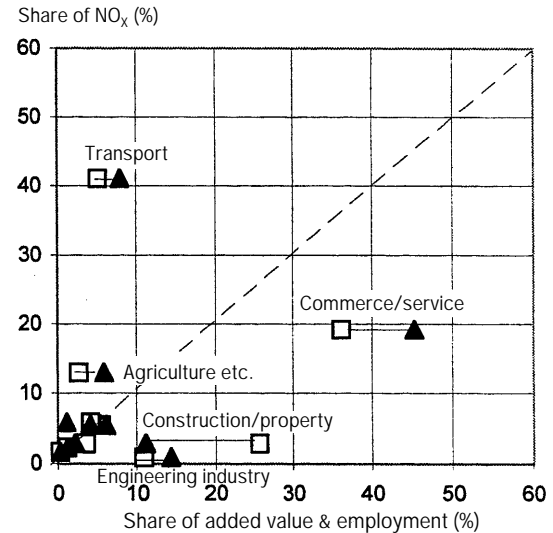
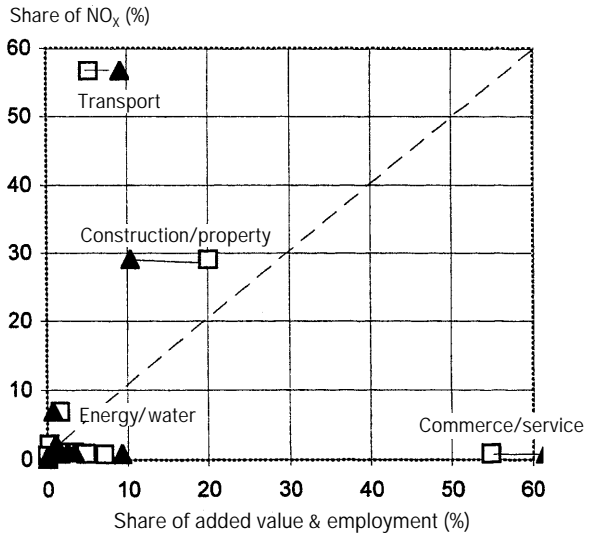
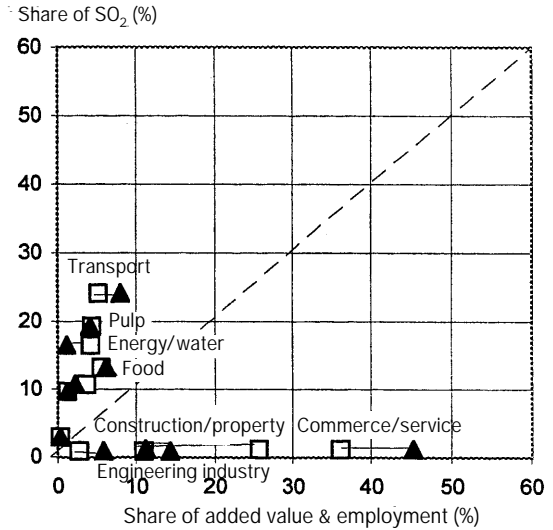
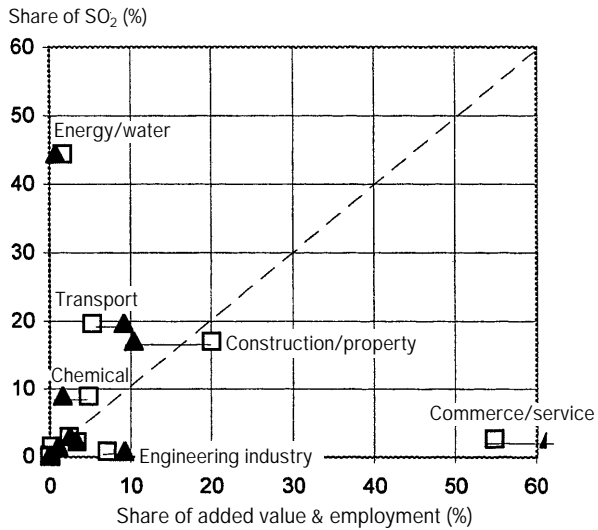
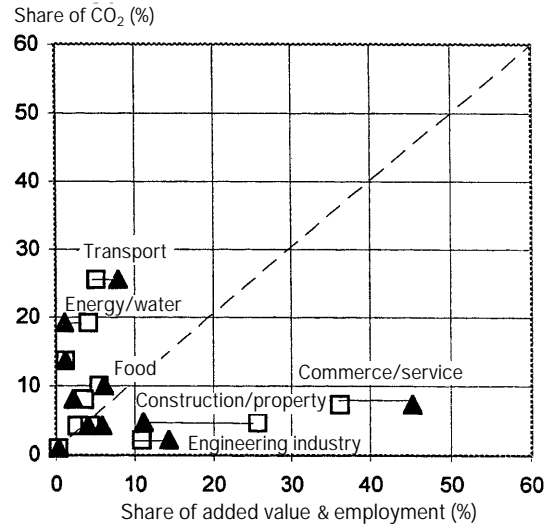
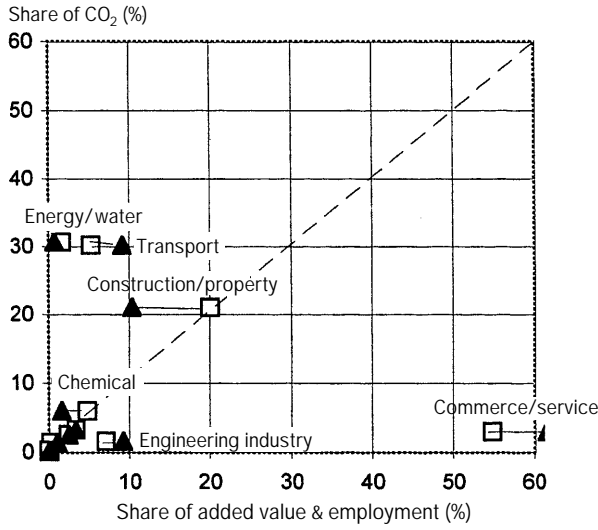


Diagram 7. Environmental economic profiles for industry branches-share of County and national totals 1993

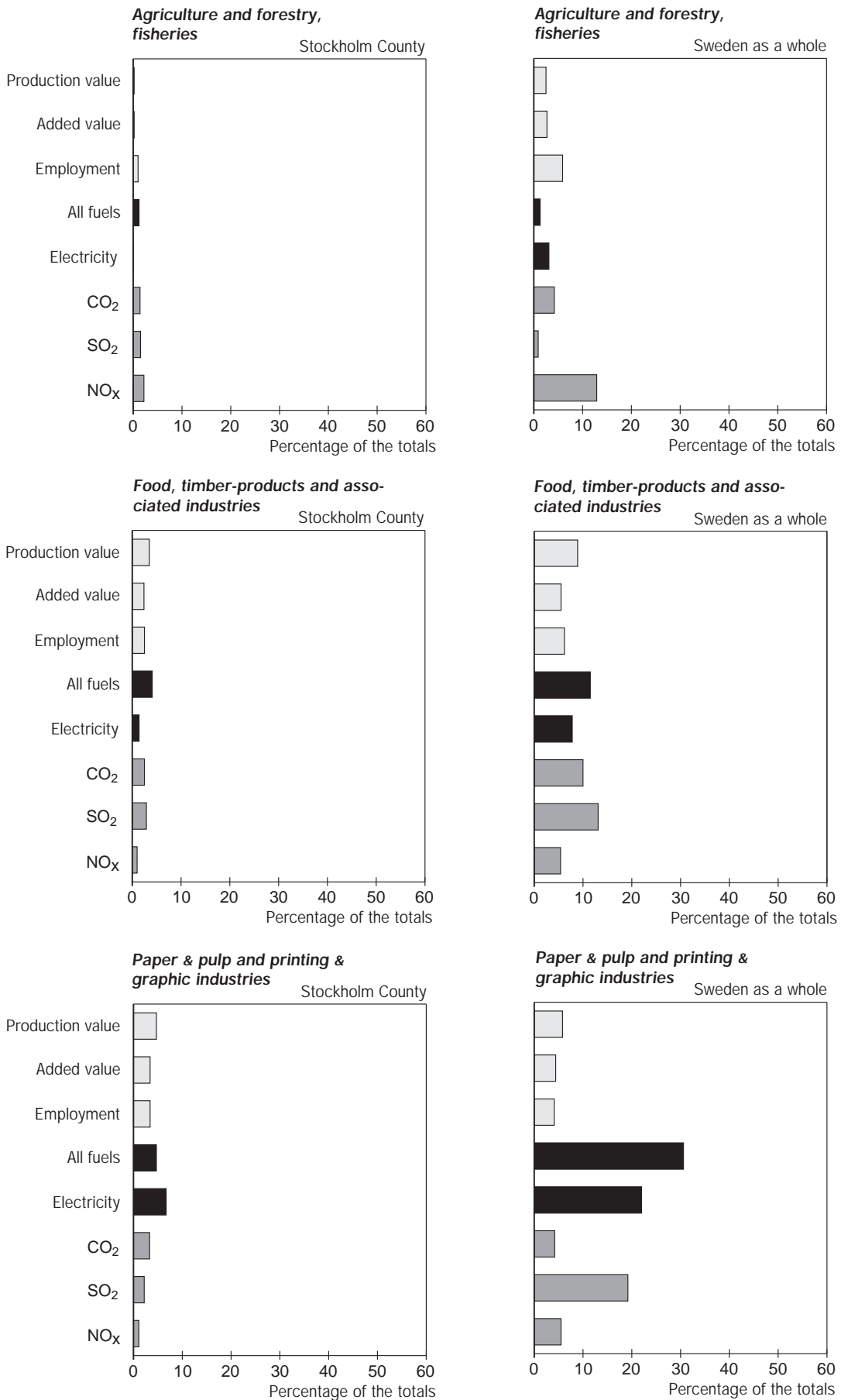


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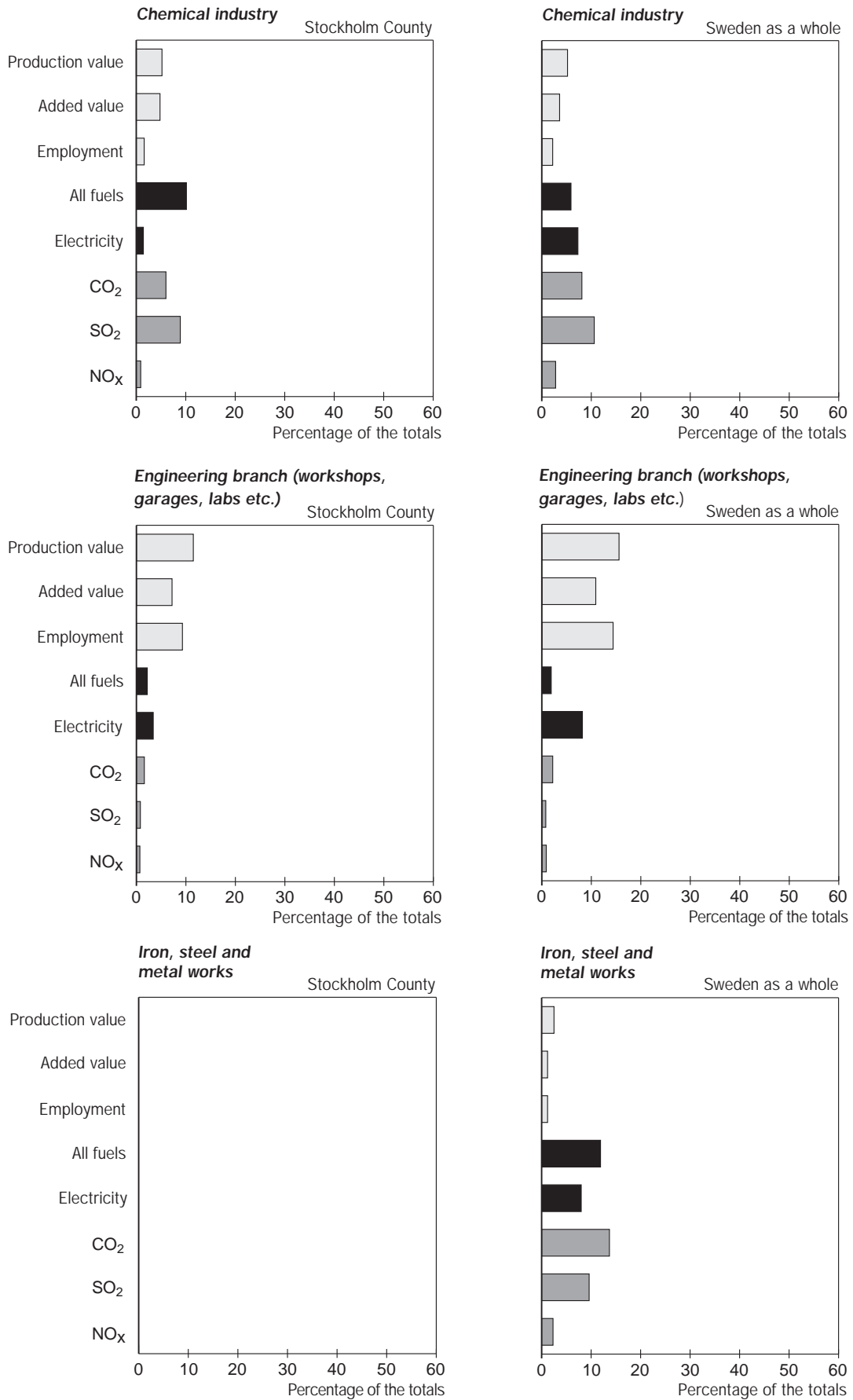


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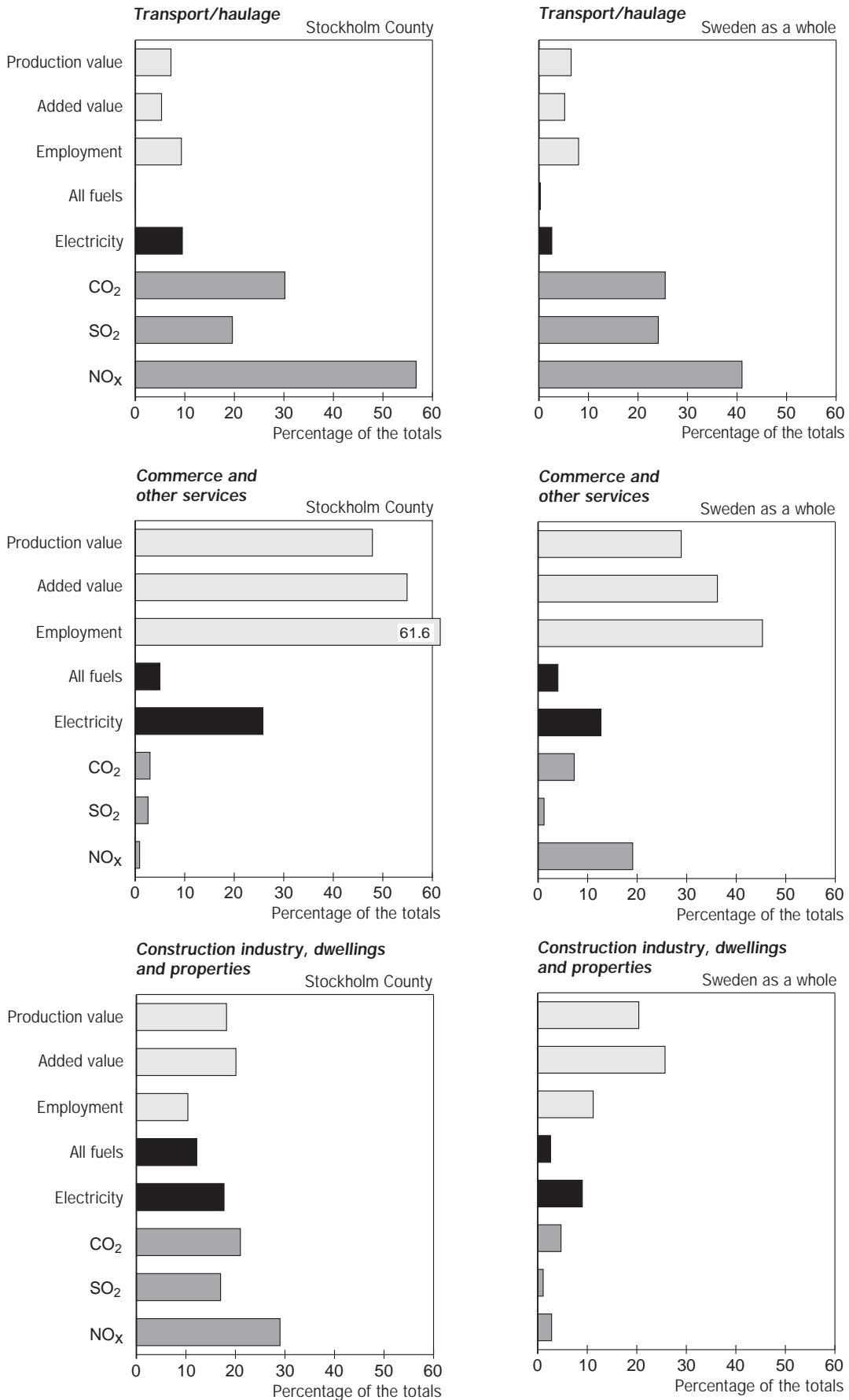


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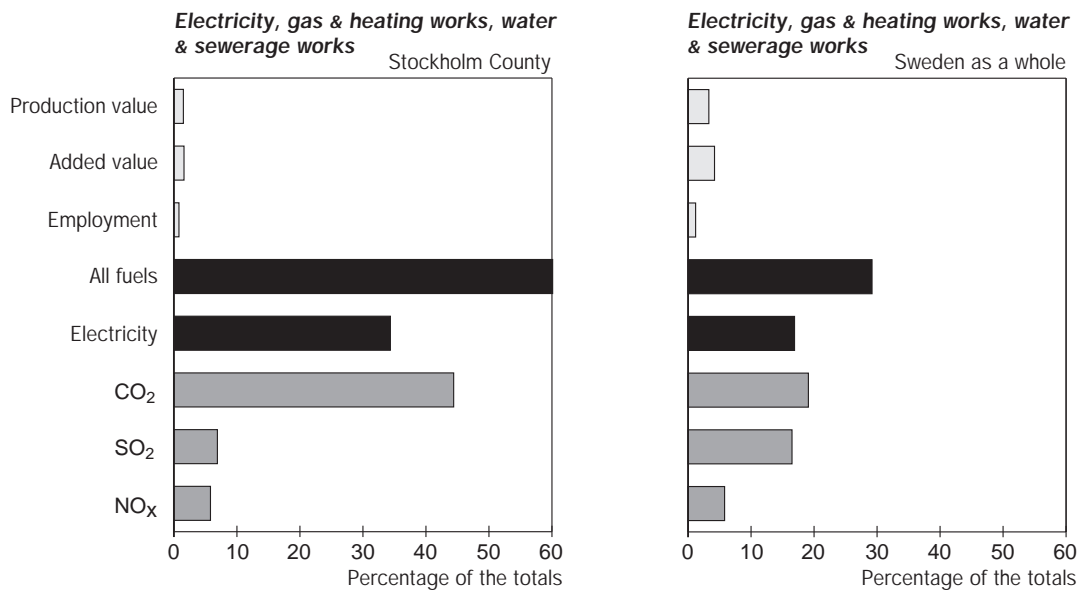
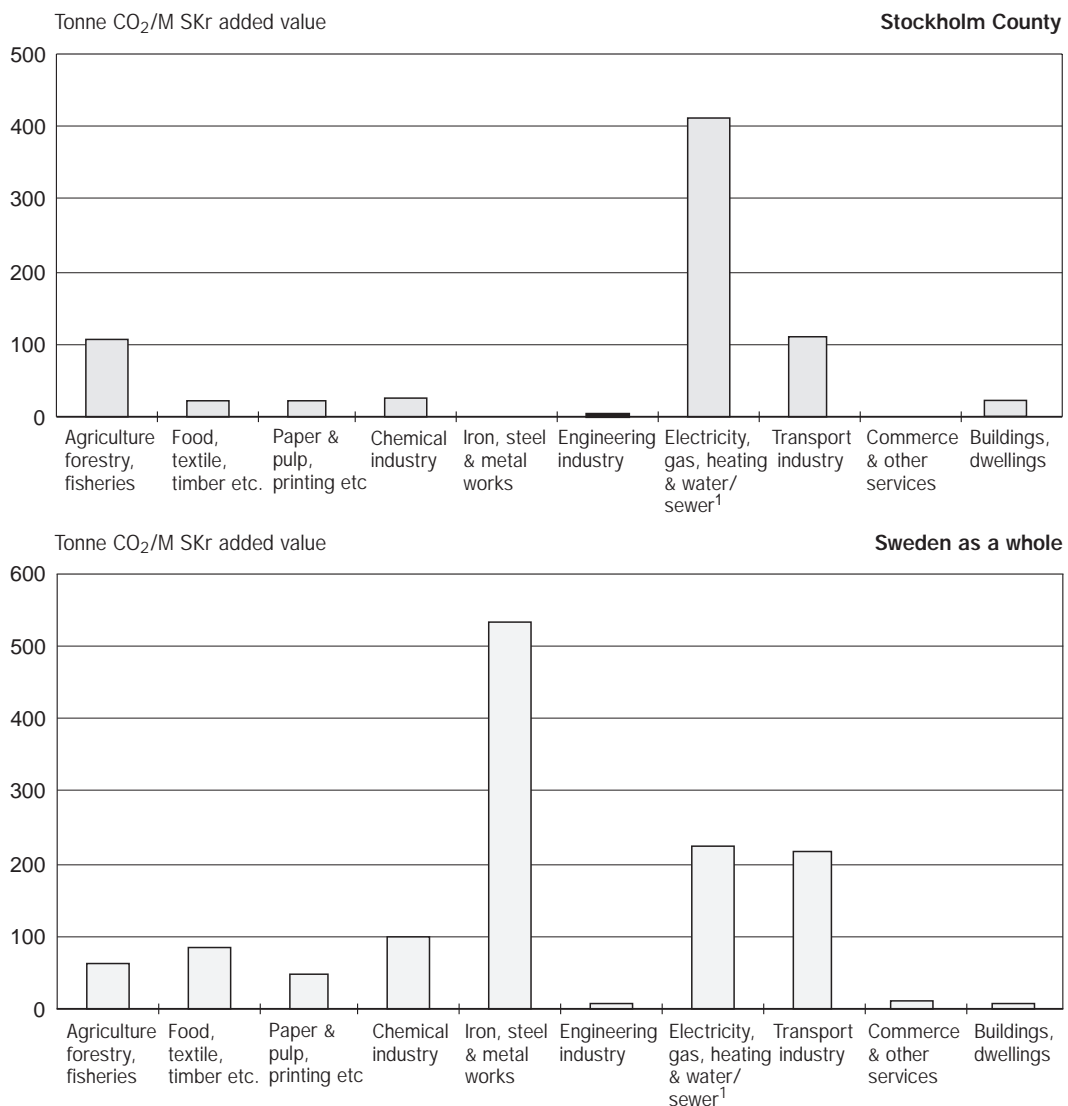


Diagram 8. CO₂ emissions in relation to added value in Stockholm County and the country as a whole 1993



1. Mean values for both branches.

Waste

Waste figures show the amount of waste produced and the various methods used for managing *waste and recoverable raw-materials* in the manufacturing industry. The term waste used throughout this report encompasses both waste and recoverable raw-materials used for filling, padding and so on. Reusable products, such as returnable bottles are not included. The definition of waste and recoverable raw-material is as follows. *Wastes are residual/surplus materials which the owner considers lacking utility value and therefore wishes to discard, setting it aside for waste management. Recoverable raw-materials are “materials which through reprocessing and handling can be used again as raw materials in production or processing”.*

The following terms are used in the report:

Wastes

- Total wastes (the sum of the following)
- Branch-specific wastes
- Other wastes (including household rubbish, construction and demolition wastes, excavation material, wastes generated by energy extraction, non-specific branch wastes and “other”, i.e. non-specified from companies).
- Environmentally hazardous wastes

Management

- Dumping, for example in landfills
- Incineration for energy extraction
- Re-utilisation
- Other management (includes temporary storage, incineration without energy extraction, composting, export and those amounts that companies send away without registering how the product is to be dealt with ultimately)
- Unknown (the difference between the amount of waste generated and the total amount the company makes management provisions for)
- Environmentally hazardous waste (in some parts of the report environmentally hazardous waste is reported as one method of waste management)

Table 6 provides figures on the amounts of wastes produced, waste-handling and management.

The investigation into wastes is addressed further in the supplement section.

The manufacturing industry in Stockholm County reported a total of 204 700 tonnes of waste, which corresponds to a bit over one percent of the industrial waste of the whole country. The County’s share of added value in the manufacturing industry is 18 percent. Chart 4 shows that the proportion of the total added value attributable to all of the manufacturing-industry branches reporting in Stockholm County is significantly larger than their share of the total waste produced. One reason to this may be that the industries in the County are located higher up on the value-adding chain; being so-called end processing and finishing industries which add proportionately much more value than heavier, more waste-intensive processing industries. As a result they provide even less waste per thousand SKr in added value. In other words the amounts of waste are small in comparison with the branches’ contribution to the economic figures. The total amount of waste produced by the manufacturing industry in the County is slightly over 4 kg per thousand SKr in added value, compared to 58 kg for Sweden as a whole.

Chart 4 shows that the County’s contribution to the total amount of environmentally hazardous wastes in the whole country is more significant than for the other types of

wastes. Stockholm County, with its considerable pharmaceutical industry accounts for 50 percent of the country's hazardous wastes generated by the chemical industry. Within the paper and pulp, and printing and graphic industry, 30 percent of the environmentally hazardous wastes originate from Stockholm County.

Chart 4. Waste generation 1993

Branch	Added value, M SKr	Waste generation 1993 ¹ , tonne			Total
		Branch-specific	Other	Environmentally hazardous	
Food, textile, timber-products, earth/rock					
Stockholm County	6 191	37 700	18 600	300	56 600
Sweden as a whole	55 795	8 236 000	456 000	7 100	8 699 400
Stockholm County's share of the waste, %	11.1	0.5	4.1	4.2	0.7
Paper and pulp, printing and graphic industry					
Stockholm County	8 741	31 600	25 700	4 400	61 700
Sweden as a whole	44 467	2 654 300	135 200	14 400	2 803 900
Stockholm County's share of the waste, %	19.7	1.2	19.0	30.6	2.2
Chemical industry					
Stockholm County	12 427	9 600	8 500	20 200	38 300
Sweden as a whole	36 699	255 200	81 500	42 300	379 000
Stockholm County's share of the waste, %	33.9	3.8	10.4	47.8	10.1
Iron, steel and metal works					
Stockholm County	67
Sweden as a whole	12 384	2 167 900	28 300	63 100	2 259 300
Stockholm County's share of the waste, %	0.5				
Engineering industry and other manufacturing industries					
Stockholm County	18 390	23 900	21 400	2 800	48 100
Sweden as a whole	110 789	665 500	169 600	69 000	904 100
Stockholm County's share of the waste, %	16.6	3.6	12.6	4.1	5.3
Manufacturing industry in total					
Stockholm County	45 816	102 800	74 200	27 700	204 700
Sweden as a whole	260 134	13 978 900	870 900	195 900	15 045 700
Stockholm County's share of the waste, %	17.6	0.7	8.5	14.1	1.4

1. Figures are rounded off to the nearest 100.

Diagram 9 and 10 show the amount of waste produced by the various branches in relation to value adding. In Stockholm County all the branches have low values compared to the national figures. When it comes to environmentally hazardous wastes, both the paper, pulp and printing branch, and the chemical industry produce greater amounts of waste per unit added value than the country as a whole.

Chart 5 shows the total amount of waste by branch and method of waste management. The amount of environmentally hazardous wastes generated has been put into the one figure for handling (as special handling regulations apply). It is clear by the amounts of waste generated by the chemical industry in the County, that it has a different structure than the rest of the country. About 50 percent of the waste from the chemical industry in the County is hazardous. In the rest of the country the corresponding figure is 6 percent.

Chart 5 also shows that generally a relatively small amount of waste is incinerated in the County compared with the rest of the country. This can be a result of there being too few incineration plants in the County that accept industrial wastes.

Diagram 9. Total waste-production in relation to added value, 1993

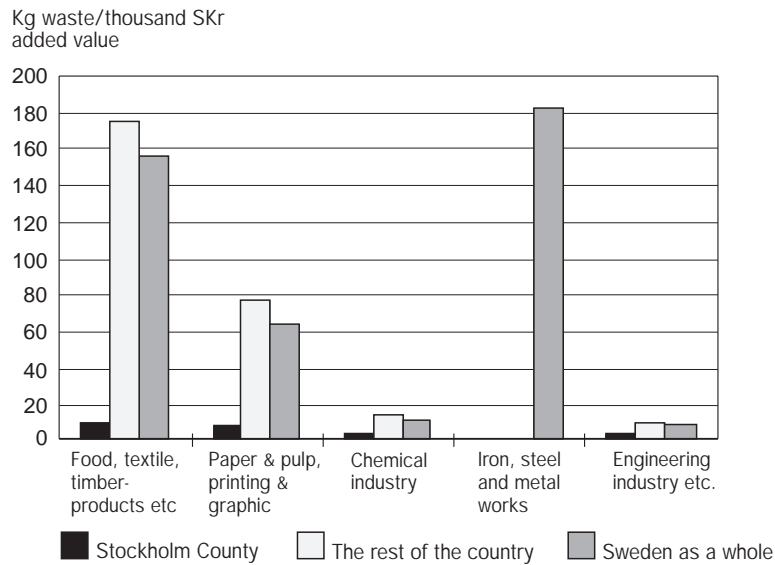
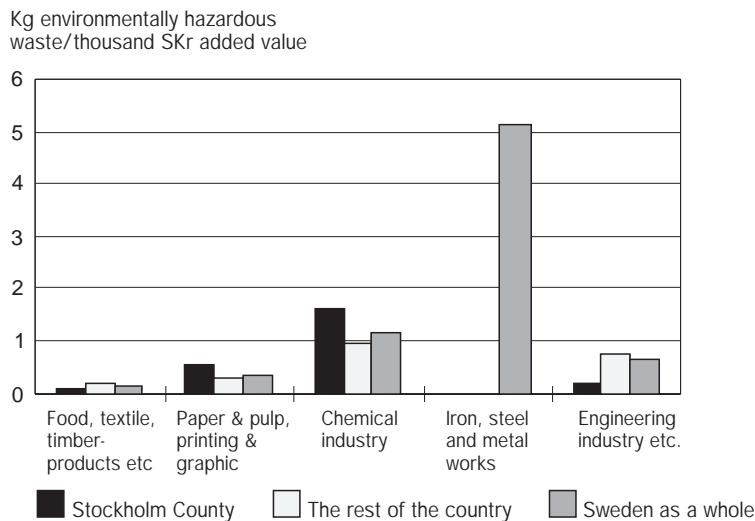


Diagram 10. Total production of environmentally hazardous wastes produced in relation to added value, 1993



Just as with energy consumption and emissions, waste statistics can also be presented in the form of environmental economic profiles. Diagram 11 presents the branch share of the totals for the manufacturing industry in the County and the country as a whole. In the County, the tree branches – paper and pulp, chemical and engineering industries, represent a greater proportion of the manufacturing industry’s waste production and dumping than in the country as a whole. One reason for this is that the iron, steel and metal works branch, which produces relatively large amounts of waste, is not well represented in the County, but is relatively well represented in the country as whole, thereby reducing the share attributed to the other branches in the rest of the country. Here again it can be seen that the chemical industry in the County produces large amounts of environmentally hazardous waste. The branch is responsible for over 60 percent of all the environmentally hazardous wastes produced by the manufacturing industry in the County compared with about 20 percent in the rest of the country.

Chart 5. Waste production and management

	Waste generated, tonne	Waste management by treatment, %					Total	
		Dumped	Incineration, energy extraction	Re-utilised	Other	Un-known		Environmentally hazardous
Branch								
Food, textile, timber-products, earth/rock								
Stockholm County	56 600	16	6	55	15	7	0	100
The rest of the country	8 642 800	11	33	38	9	9	0	100
Sweden as a whole	8 699 300	11	33	38	9	9	0	100
Paper and pulp, printing and graphic industry								
Stockholm County	61 700	38	4	23	27	1	7	100
The rest of the country	2 742 100	34	45	15	4	1	0	100
Sweden as a whole	2 803 800	34	44	15	5	1	1	100
Chemical industry								
Stockholm County	38 300	19	6	6	13	3	53	100
The rest of the country	340 700	38	11	35	7	4	6	100
Sweden as a whole	379 000	36	10	32	7	4	11	100
Iron, steel and metal works								
Stockholm County	..							
The rest of the country	..							
Sweden as a whole	2 259 000	23	0	62	11	0	3	100
Engineering industry and other manufacturing industries								
Stockholm County	48 100	42	4	31	14	3	6	100
The rest of the country	856 000	24	21	37	8	3	8	100
Sweden as a whole	904 100	25	20	37	8	3	8	100
Manufacturing industry in total								
Stockholm County	204 700	30	5	31	18	4	13	100
The rest of the country	..							
Sweden as a whole	15 045 400	19	29	37	9	5	1	100

Diagram 11. Environmental economic profiles for branches in the manufacturing industry 1993

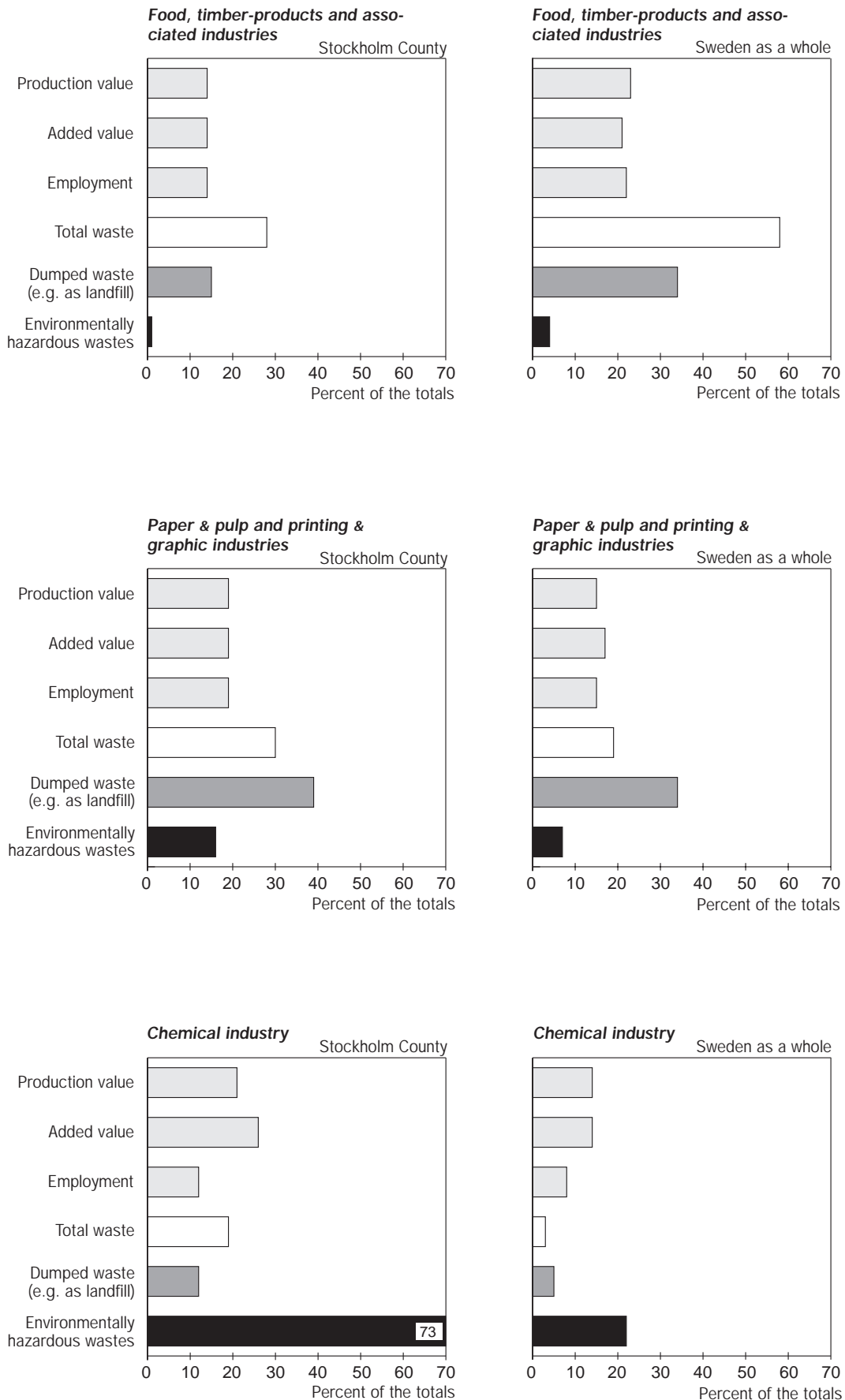
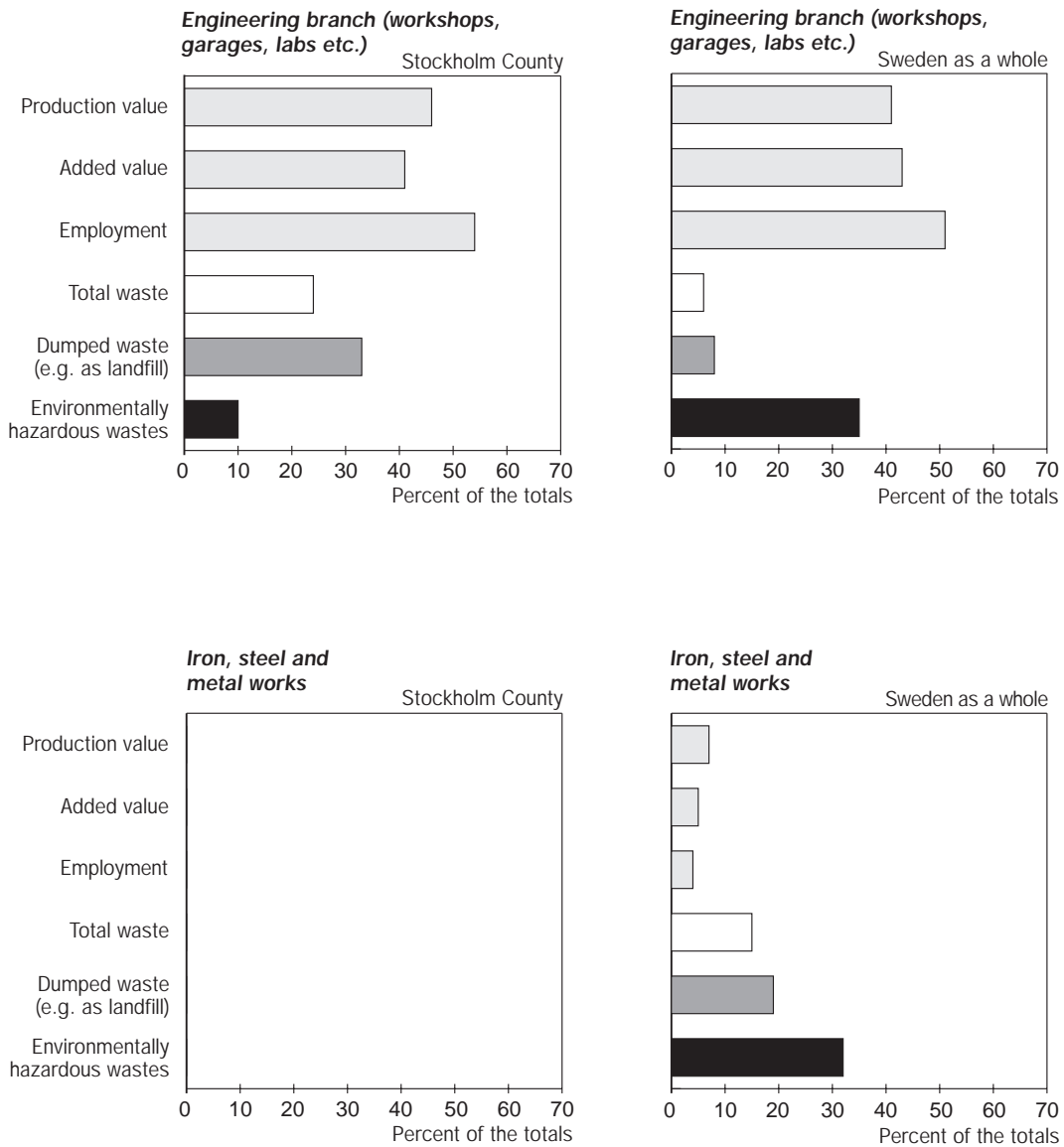


Diagram 11. Environmental economic profiles for branches in the manufacturing industry 1993



Reference List

The following have been published in the Swedish Environmental Accounts series "Miljöräkenskaper".

- 1998:1 SWEEA, Swedish Economic and Environmental Accounts
Svenska miljöräkenskaper, en lägesrapport.
(A progress report on SWEEA.)
KI och SCB 1994
- 1998:2 SWEEA, Swedish Economic and Environmental Accounts English
version 1994.
KI och SCB
- 1998:3 Materialflöden och kretslopp i de svenska miljöräkenskaperna – en
förstudie 1995.
(A pilot study on material flow and cycles.)
SCB
- 1998:4 Industrins miljöskyddskostnader 1991.
(A report on the cost to industry of environmental protection.)
SCB
- 1998:5 Aggregering av miljödata till miljöhot – en förstudie 1996.
(A pilot study accumulating environmental data on environmental threats.)
SCB
- 1998:6 Samband mellan miljö och ekonomi, en rapport om fysiska miljö-
räkenskaper i Sverige.
(A report on the physical environmental accounts in Sweden – the
relationships between environment and finances.)
SCB
- 1998:7 Kostnader för att minska utsläpp av kväveoxider och flyktiga organiska
ämnen.
(A report on the cost of reducing NO₂ and volatile organic substance
emissions.)
NV
- 1998:8 Avfall 1993
(A report on wastes 1993.)
SCB
- 1998:9 Svenska miljöräkenskaper för svavel och kväve samt Sveriges
kostnader för kväveutsläpp.
(Swedish environmental accounts for sulphur and nitrogen plus
the cost of nitrogenous emissions in Sweden.)
KI
- 1998:10 Miljöräkenskapsprojektet vid Konjunkturinstitutet 1992–1997 med bilagorna
Gröna nationalräkenskaper
Att konstruera ett miljöräkenskapssystem.
(Report on developing an environmental accounting system, from the
Environmental Accounts project at KI 1992–1997, including the Green
National Accounts in the supplements.)
KI

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Na 53 Miljöräkenskaper, Fysiska räkenskaper för energi och utsläpp till luft.
(A report on environmental accounts – physical accounts on energy and air emissions.)
SM 9601: 1989, 1991 and 1993.
SCB

Other reports

In addition to the series "Miljöräkenskaper" (above), there are reports on the methodology as well as a number of supplementary reports. These reports can be ordered from the various authorities concerned.

Miljöräkenskaper, lägesrapport, 1993.
(A report on environmental accounts, a progress report, 1993.)
SCB

Miljöskyddskostnader i industrin – en probleminventering, 1993.
(An inventory of problems faced by industry associated with the cost of environmental protection.)
SCB

Miljöräkenskaper och mobila källors utsläpp. PM M/MI 1995:21.
(A report on environmental accounts and mobile emission sources.)
SCB

Återvinningsindustrin i Sverige 1995, PM M/MI 1996:7.
(A report on the recycling industry in Sweden 1995.)
SCB

Material flow studies at Statistics Sweden and the National Chemical Inspectorate.
PM M/MI 1996:10
SCB

Testing SERIEE's Environmental Expenditure Account in Sweden. PM M/MI 1996:13.
SCB

Koppling ekonomiska och fysiska data: Miljöskyddskostnader för svavel och kväve – en delrapport. PM M/MI 1996:14.
(An interim report relating financial and physical data: the cost of protecting the environment from sulphur and nitrogen.)
SCB

Några tankar om input-outputanalyser i miljöräkenskaperna. PM M/MI 1997:2.
(A compilation of ideas on input-output analyses in environmental accounting.)
SCB

Supplements to SWEEA – Swedish Economic and Environmental Accounts, 1998:1
Beskrivning av energiräkenskaperna, av utsläppsberäkningarna samt av näringsgrensklassificeringar.
(A report on the energy accounts, the emission figures and industry-branch classifications).
SCB

Statens miljövårdskostnader.
(The cost of environmental protection for the country.)
SCB

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(A report on nationally adjusted forestry accounts 1987–1991.)

KI

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(A report on the environmental assets in the national assets accounts.)

SCB

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(A report on classification of natural capital plus environmental services and natural resource accounts in financial terms.)

KI

En beräkning av skogsförurningens skadekostnader samt Korrosionsskadekostnaden orsakad av SO₂ emissioner

(A report calculating the costs of acidification damage to forests and corrosion damage caused by SO₂ emissions.)

KI

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Den svenska skogens rekreativvärde.

(A report on the recreational value of the Swedish forests)

KI

Nitrate concentration in Swedish groundwater – costs and benefits of reduction.

KI

Samhällsekonomisk värdering av kväveoxidrelaterade hälsoeffekter.

(A report on the cost of ill-health caused to society by nitrous oxides.)

KI

Fisk – en miljöhotad naturresurs.

(Fish – a threatened natural resource.)

KI

Årsstatistik 97 för Stockholms län och landsting

(Yearly Statistics 1997.)

Rtk

Statistisk årsbok för Stockholm 1997

(Statistical Yearbook of Stockholm 1997.)

USK

Supplements

Energy and emission figures

Several different sources have been used to estimate the energy and emission data for the County. Several assumptions with varying degrees of support have also had to be made. Therefore the regional accounts for Stockholm County presented here ought to be seen as a first attempt and caution ought to be exercised when drawing conclusions from them.

Energy

Energy statistics in the form of energy accounts exist at the national level and are based on the input-output tables in the national accounts. Corresponding details are not available at the county level. Energy consumption within the various industry branches in Stockholm County have therefore been estimated using a combination of results from various SCB investigations plus regional statistics from the Office of Regional Planning and Urban Transportation (Rtk), Stockholm County Council and the Stockholm Office of Research and Statistics (USK), Municipality of Stockholm. Resorting on occasions to figures from investigations other than those used to base the national data on, has led to problems arising with various delimitation and definitions. This has meant that figures for the County are not directly comparable with those for the country. Some of the discrepancies between branches and levels can also be attributed to the differences within the base material used, and not only on differences in real structure.

Quality reporting in the traditional statistical sense cannot be done on the energy accounts. Energy figures for the country are based on various investigations using different techniques and conditions. Within certain areas, investigations are more universal, whereas others are lacking direct statistical bases, which is why indirect calculation methods have been used. The total consumption of the various types of energy can be reconciled with the national energy balances, but breaking the total down into the various industrial branches is less certain due to shortcomings in the statistical bases in some of the areas. The figures can be considered to be of moderately good quality. Energy data for the County are to some extent based on other sources than the corresponding data for the country. This means that comparisons between the country as a whole and the County are a little uncertain. Some of the energy types have not been able to be reported for the County, which makes it impossible to make comparisons with national figures. An important task for raising the quality of the results for the County is therefore to improve the County's energy statistics .

Access to data on energy varies between the consumer groups. The method of reporting is therefore divided up into the consumer groups – manufacturing industry, electricity, gas and heat works, as well as the rest of the branches. Mobile consumption is reported under the heading “Operating Fuel”.

Manufacturing industry

For the manufacturing industry's five branches, there are various statistical investigations from SCB on which to base the figures for consumption of different combustion fuels. Figures for companies with less than 10 employees, as well as some of the data relating to district network heating are lacking in the manufacturing industry investigations. The fact that small companies are excluded means that energy con-

sumption within the manufacturing industry is slightly underestimated for the County. Data on electricity and district heating networks have been taken from the Statistical Yearbook of Stockholm (USK) and the Yearly Statistics for 1997 (Rtk). Firstly, figures for delivery/supply data from the yearly statistics 1997 (Rtk) were taken and then broken down by industry branch with help from the Statistical Yearbook of Stockholm (USK). Reporting is based on the assumption that the breakdown into branches is the same in the Municipality of Stockholm and the whole of Stockholm County. District heating networks have not been broken down into the various industrial branches, as this information is not available.

Information on consumption of the different forms of energy as production input-products is lacking, especially for crude oil. This means that tables cannot be drawn up showing the total consumption of various types of energy in the County. Only data on the consumption of fuels for electricity and heat generation, plus consumption of electricity and district network heating can be reported.

Electricity, gas and district network heating

Data for the electricity, gas and heating works branch are available in a full and comprehensive statistical investigation by SCB covering consumption of various combustion fuels. What is lacking however, are figures for the branch's own consumption of electricity. These data have been obtained from the Statistical Yearbook of Stockholm (USK) as well as the Yearly Statistics for 1997 (Rtk), and are used in the corresponding way described for the manufacturing industry.

Other branches

County statistics for consumption of various fuels for heat generation (not including electricity production) are lacking for the other 10 branches. Even at the national level, data for these groups are incomplete as they are not investigated specifically in regard to energy consumption. Data about consumption of fuel for the County have been obtained from SCB's regional oil delivery figures broken down into consumer categories. Those fuels included are heating oils 1 and 2–5, and the consumer categories are as follows:

Agriculture, forestry and fisheries	Public administration
Residential buildings	Other properties
Other	

The divisions are quite limited with respect to the existing need for accounts and the following assumptions have been taken:

Agriculture, forestry and fisheries	<i>not divided up into respective branches</i>
Public administration	<i>assumed to be public authorities</i>
Residential buildings	<i>assumed to be in the private sector</i>
Other properties	<i>assumed to correspond to the dwellings and properties branch</i>
Other	<i>assumed to correspond to commerce and other services</i>

The transport branch shows very low fuel consumption for heat production at the national level, and is assumed to be negligible at the county level. The same report material used for the electricity, gas and heating and the manufacturing industry has been used for electricity gas and district heating works' consumption. The branch divisions are superior in these statistics than in the delivery/supply statistics. What is lacking is

the specification of the amounts that agriculture, forestry and fisheries received. These amounts are probably included under the heading "Dwellings", which are assumed to correspond to private consumption and are found there in the results tables. District network heating supplies are not as well categorised into recipient groups as electricity is, rather the two groups dwellings and properties, and commerce and other services receive a common figure for district network heating at the county level.

Operating fuel

Information about how much operating fuel industry branches, public authorities and the private sector used during 1991 and 1993 is lacking at the county level. Calculations of emissions are based on other material than consumption (see Emissions). Working back from the emission figures cannot derive the amount of fuel consumed. Therefore the amount of petrol or diesel that has been delivered to the various consumer categories has been reported according to SCB's delivery statistics as a total only in the energy tables. But this amount does not agree with the corresponding amount of emissions from mobile sources. In order to make comparisons, the national figures have been cleaned with respect to petrol and diesel figures wherever necessary. Figures on delivery to various groups are seen as too uncertain to assume that they do correspond to consumption. Therefore deliveries are not broken up into the consumer categories.

Emissions

Energy figures play an important role in calculating emissions from stationary sources. Comments and shortcomings elaborated on under the heading "Energy" also apply to emission data at both the national and the county levels. Process emissions for the whole country have primarily relied on figures at the company level from environmental reports. The same information has been used for the County. Emissions from mobile sources have been calculated at the national level mainly with the help of various models based on quantity, running time, fuel-type etc. The figures are of moderately good quality. A drawback with the national figures is that there is not any material in the models supporting the break down of the figures to the county level. Instead, details for the County have been obtained from other sources, where they have been calculated slightly differently. Unfortunately no comments can be made regarding their quality. Uncertainty is therefore greater in comparisons made between the County and the country as a whole, due to the use of different models. However, those details that are reported are seen as being the best currently available and provide a picture of the various relationships between Stockholm County and the country as a whole.

Stationary consumption

Material used to base the estimation of emissions from stationary consumption sources consists of the energy data presented earlier. These data have been multiplied by various emission factors applicable to both the County and the country. These factors come from the Swedish EPA, and depend on the type of fuel, consumer, and purification measures in place.

Industrial processes

Emissions from industrial processes are reported annually in the national statistics and are the source of the details used in this report. There are no process emission sources of carbon dioxide in Stockholm County.

Mobile consumption

As mentioned earlier, details on the emissions from mobile sources have not been based on energy consumption data. Instead calculations are based on local air quality management analyses for Stockholm (from SLB). One of the reasons for this is that certain emissions are not always directly proportional to the amount of fuel consumed. SLB's figures are seen as better corresponding to the actual amounts of emissions produced according to the delivery figures, for example is kerosene not included, nor is bunker oil.

Details from SLB included the various types of sources – road traffic, shipping, aviation, railways and industrial machinery – for 1993. Data for 1991 were calculated back from 1993 values through making adjustments for the growth shown in national data from 1991 to 1993.

The different sources were then categorised into financial sectors according to the following:

Shipping	<i>All to transport</i>
Aviation	<i>All to transport</i>
Railways	<i>All to transport</i>
Road traffic	<i>Broken down into the number of registered vehicles in each respective industry branch</i>
Industrial machinery	<i>Broken down with the assistance of added values in the respective industry branch</i>

Breaking down road traffic emissions with the help of numbers of registered vehicles provides a skewed picture, as the method does not take into consideration how often or how far the vehicles are driven. For the numbers on the national level for 1993, a better model is used where information about distances travelled is taken into account. However this has not been used for the analyses at the County level in this report since the results are compared with data from the older model. Breaking down emissions from industrial machinery has been done by using different methods in the County and the country as a whole. The reason for this is that the structure of the branch is different in Stockholm. Instead information about the added value by branch is used. This means that the branch dwellings and property has probably been attributed with disproportionately higher emissions and commerce and other services with lower emissions. The problems with the various models are common to all three emissions SO₂, NO_x and CO₂.

Waste from Industry 1993

The waste statistics used in this report are obtained from SCB's investigation into the generation and management of wastes and re-utilisation of raw materials 1993. This covers a selection of industrial sites, all with at least 20 employees, from the mineral extraction industries (SNI-92 C) and manufacturing industry (SNI-92 D).

The investigation was undertaken via a postal questionnaire sent to every industrial site in the selection. SCB's centralised company and workplace register (CFAR) was used as the selection guide. At the time of selection the register contained 4 482 industrial workplaces within the SNI-areas mentioned above with over 20 employees. After over-representations were identified and removed a total of 1 742 workplaces were selected.

The sample population was divided up into 25 sub-populations (strata) according to

industry branch per SNI, and these sub-divided into five size-classes according to the number of employees. In each stratum an independent and random selection was made. All the members of the following groups/sub-groups have been investigated: (i) the group with over 200 employees, (ii) sub-groupings within “industries producing major environmental effects”, (iii) tanning and other leather-preparing and processing sub-groups, and (iv) manufacturers of chipboard. Within the other strata, the selected fractions varied from 0.5 (50–199 employees) to 0.1 (20–49 employees). The selection has not been made with the intention of producing regional accounts.

The material used in the investigation consists of 12 different branch-specific questionnaires. The workplaces have been categorised into 12 groups after assessing the types of emissions they produce. These assessments are based on information from experts on the various branches and on the types of wastes reported in previous environmental reports. Each group has received a specific questionnaire, specific in regard to the questions relating to branch-specific wastes. The branch-specific waste was categorised differently in the various questionnaire types.

The data on waste collected in this survey of the manufacturing and extraction industry can be broken down further in several different ways. One can break the amount of waste generated down into source of origin, i.e. into the particular branch it originates from, or into the type of waste and its management. Below is a demonstration of the classification used in this report. One can even break the data down into other types or management categories. The branch-specific waste can for example be broken down further into a number of more specified waste types, or even show how much has been managed within the actual companies in comparison to what they have sent off for external management.

The following are definitions of particular types of waste used in the 1993 investigation:

Branch-specific industrial waste

Solid or liquid waste which is generated as a direct result of the company’s processing and production, for example spills and disposals, though of course not environmentally hazardous wastes. In the questionnaire there is a break down into branch-specific types of waste under this title. These types of wastes are different for the different branch-specific questionnaires.

Household and comparable wastes

Waste generated as a direct result of people residing/spending time in a premises or plant – regardless of the reason for this or the activity, for example: (i) paper wastes including newspapers and magazines, (ii) general household rubbish including kitchen scraps and garden clippings etc, (iii) larger-sized rubbish (bulk waste) such as discarded furniture etc, and bulkier garden refuse.

Construction and demolition wastes

Waste from new constructions, i.e. associated with the construction of buildings and installation plants etc. Wastes associated with demolition, renovation and extensions.

Excavation wastes

Material from earth and excavation works.

Waste from energy extraction

Slag, ash, chimney dust/gas purification products, waste-incineration, waste from coal burning, wood/wood-chip burning, peat burning and oil burning.

Non branch-specific industrial waste

Solid or liquid waste not arising directly from the company's specific production activities, but rather in a more general way. For example packaging material, shreds/rags, wrapping, discarded pallets etc. The following sub-headings were used in the questionnaire: paper/cardboard, glass, metal, plastic, and other.

Other wastes

Wastes not falling into the above groups and which are not classed as environmentally hazardous wastes.

Environmentally hazardous wastes

Wastes covered by paragraph two (2) of the "(Swedish) ordinance regarding environmentally hazardous wastes" (1985:841). In the Swedish EPA's catalogue of guidelines (General Policy 85:7) there is a list of examples covering the 12 different types of waste referred to by the ordinance (today (1998) the term "hazardous wastes" is used, and a new break down of waste types has been made). The 12 types of hazardous wastes used in the 1993 report are as follows:

1. Oil/petroleum wastes
2. Chemical solvent wastes
3. Paint and lacquer wastes
4. Adhesive/glue wastes
5. Strongly acidic or strongly alkaline wastes
6. Wastes containing cadmium
7. Wastes containing mercury
8. Wastes containing particular metals¹
9. Wastes containing cyanide
10. Wastes containing PCBs
11. Pesticide wastes
12. Laboratory wastes

1. Wastes containing antimony, arsenic, barium, beryllium, lead, cobalt, copper, chromium, nickel, selenium, silver, thallium, tin, vanadium or zinc.

Industry Branch Categories

Industry has been divided into 16 branches in the environmental accounts project.

SNI 69	Branch
11	Agriculture
	111 Agriculture, horticulture
	112 Agricultural services
	113 Hunting, game preservation
12	Forestry
	121 Forestry/forestry science, coaling/coking
	122 Logging, log-floating
13	Fisheries/fishing
	1301 Open sea and coastal fisheries/fishing
	1302 Other fisheries/fishing
2	Mining and quarrying
	210 Coal-mining
	220 Oil/petroleum-mining and natural-gas extraction
	230 Ore-mining
	2901 Quarrying
	2902 Mining of chemical raw-materials
	2903 Salt-extraction
	2909 Other mining
31–33, 36	Food, textile, timber-products, earth and crushed-rock industry
	311–312 Food industry
	313 Beverage industry
	314 Tobacco industry
	321 Textile industry
	322 Clothing manufacture
	323 Production of leather and leather goods
	324 Shoe manufacturing
	331 Manufacture of timber-products, excluding furniture
	332 Furniture manufacturing
	361 Porcelain and ceramics industry
	362 Glass and glass-products manufacturing
	369 Brick, cement and other mineral-based production
34	Paper and pulp, printing and graphic industry
	3411 Paper and paper pulp manufacturing
	3412 Paper and paper-packaging
	3419 Other paper and cardboard manufacturing
	3420 Printing and graphic production and publishing
35	Chemical industry
	3511 Manufacturing of chemicals and industrial gases
	3512 Manufacturing of fertilisers and pesticides
	3513 Synthetic fibre and plastics manufacture
	352 Manufacture of chemical products
	353 Oil/petroleum refineries
	355 Manufacture of rubber products
	356 Manufacture of plastic products

SNI 69	Branch
37	Iron, steel and metal works
	371 Iron, steel and ferro-alloys
	372 Non ferro-metals
38, 39	Workshop and other manufacturing industries
	381 Manufacture of metal-products
	382 Machine manufacture
	383 Manufacture of electrical products
	384 Manufacture of products for the transport
	385 Manufacture of instruments, photography and optical equipment
	390 Other manufacturing
41	Electricity, gas and heating works
	4101 Provision of electricity
	4103 Provision of heat via district heating networks
	4102 Provision of gas
42, 92001	Water and sewerage works
	42 Provision of water
	92001 Sewer-system and purification
5	Building/construction industry
	501 Construction of buildings and plant
	502 Building trades
71	Transport
	711 Land transport
	712/9 Shipping transport
	713 Aviation transport
	719 Transport agencies, storage agencies
6,7,2,8,9	Commerce, waste-management, other services
	61/62 Wholesale and retail businesses
	63 Hotel and restaurant businesses
	72 Post and telecommunications services
	81 Banks and financial institutions
	82 Insurance services
	832 Commissioned services (consultancy)
	92 Purification/maintenance/cleaning services (other than sewer and purification services)
	93 Education, research and medical services
	94 Recreation, cultural services
	95 Repairs, laundry and other services
83	Buildings and properties
	831a Smaller buildings and holiday houses
	831b Property management

Tables



Figures surrounded by boxes in the tables represent the combined value of the included branches