MILJÖRÄKENSKAPER

Rapport 2000:8

The environment industry in Sweden 2000

Employment and economic data for enterprises primarly producing environmental goods and services

Statistiska centralbyrån
Statistics Sweden

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THE ENVIRONMENT INDUSTRY IN SWEDEN 2000

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Statistics Sweden

Environmental accounts

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Preface

Work on developing statistics for the environment industry at Statistics Sweden is an integral part of the work developing physical environmental accounts, that started in 1993. In the beginning the focus was on setting up environmental accounts for energy use and emissions to air. The last few years have seen substantial developments in the more economics related parts of the environmental accounts, such as environmental protection expenditure, environmental taxes and not least the environment industry.

Work on the environment industry at Statistics Sweden started in 1997. The methodological approach chosen is to build up a database of individual establishments and enterprises producing environmental goods and services, and combine this with a number of existing registers and surveys to provide detailed data. The statistical agencies in Canada, France and Germany have chosen instead to develop new surveys in this area.

The first stage of the work focused on identifying enterprises involved in environmental production, analysis of the existing registers and surveys, and presentation of a first set of data. In the second stage the focus was mainly on ensuring that the environment industry database was as complete as possible. Although the coverage, completeness and quality of the database have improved substantially, this is a long-term project, with continuous improvements. The present report, the third report in this area produced with support from the Commission, presents detailed data on employment and economic data for the establishments and enterprises primarily producing environmental goods and services, that have been identified.

The report contains a detailed description of employees at environment industry establishments. Besides information on environmental activity and industry, data is also presented about geographical distribution, age, sex, level and orientation of education, income and former unemployment.

The report also contains a detailed economic description of the enterprises. Data is presented about number of enterprises, private and public ownership, turnover and exports in the different environmental activities and industries. New sources of information have been used in order to produce information on which environmental activities are responsible for the exports to and to which countries exports go. Indicators are presented on financial solidity, profit and value added. A new breakdown of the information has been introduced in order to show the importance of small and medium-sized enterprises in different environmental activities and industries and for different economic variables.

This report has been prepared on commission from EUROSTAT, which supports and co-ordinates the development of environmental statistics in the EU Member States. The European Commission DG Environment has contributed financially to the project. Lena Tängdén, Ulf Johansson, Madeleine Nyman and Peter Fränngård have all contributed in preparing this report.

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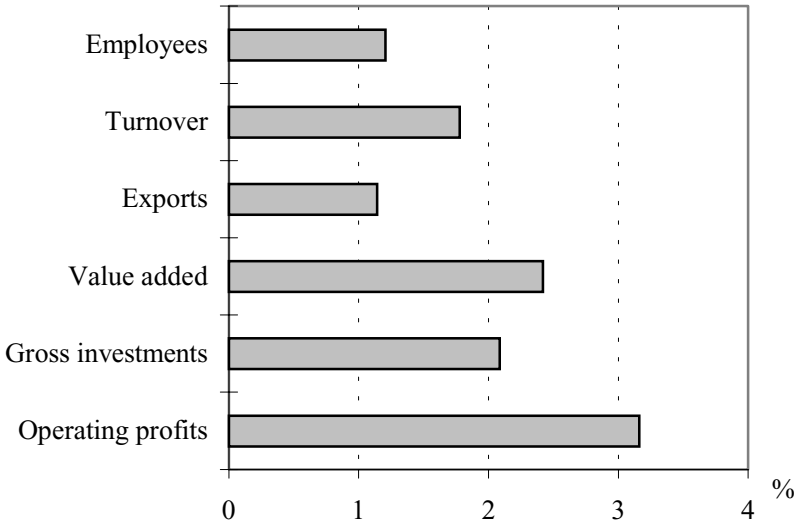
Summary

This study follows the definition of environment industry developed by OECD/EUROSTAT[1]. The report presents data about enterprises and establishments primarily producing environmental goods and services. These the report terms the "environment industry". The reason for the delimitation is that data on other industries follows this division. There is however also substantial production of environmental goods and services outside the primary enterprises.

Enterprises and establishments primarily producing environmental goods and services account for between one and three per cent of all employees, turnover, exports and other economic variables in Sweden, according to different registers (see below). The figures represent the shares environment industry held by as delimited in the registers. Employment refers to the whole labour market but turnover refers only to turnover registered in the VAT register. The financial data does not include municipal or governmental authorities; only business activities are included.

Share of employees, turnover, exports, value added, gross investments and operating profits in Sweden 1999



Source: Environment industry database, Swedish Business Register, VAT Register and Structural Business Statistics Survey

Activities related to air pollution, waste and wastewater management and environmental consultants in group A "Pollution Management" are most important in terms of employees. Activities related to C "Resource Management" such as renewable energy, recycled materials, indoor air pollution and water supply, are the most important in terms of turnover, and equally important in terms of exports. Environmental activity B "Cleaner technologies and Products", is rather small in terms of employees and turnover but relatively important in terms of exports.

[1] OECD/EUROSTAT 1999

Number of employees, turnover and exports in SEK million in the environment industry by environmental activity 1999.

Environment activity	Employees	Turnover	Exports
A Pollution Management	22 222	31 346	4 984
B Cleaner Technologies and Products	1 697	3 869	1 502
C Resource Management	18 536	45 576	4 653
Total	42 455	80 791	11 140

Source: Environment industry database, Swedish Business Register and the VAT Register

Other results in brief

- Recycling (NACE 37) has had a rapid increase in number of enterprises and turnover. The number of employees increased by 86 per cent between 1994 and 1998.

- Environmental consultants are growing in importance and the number of employees and turnover increased by 10 per cent between 1998 and 1999. These employees have a very high level of education, as high a proportion has more than twice university level education as in the labour market as a whole.

- The employees in the environment industry are more evenly distributed over the country than the labour market as a whole.

- Over 80 per cent of the employees are men. This has affected the mean income, which is higher on average in the environment industry than on the labour market as a whole, although both men and women have lower mean incomes than the labour market average.

- The largest number of formerly unemployed persons within the environment industry work in environmental activity A3 “Waste management”.

- Manufacturers of machinery and equipment account for 60 per cent of all environment industry exports compared to 17 per cent of total turnover. These exports mainly relate to environmental activities A2 “Wastewater management”, C 1 “Indoor air pollution control” and B 1 “Cleaner technologies”.

- The results indicate that the environment industry enterprises are often more export-dominated than the average in their particular industry (NACE). In NACE 28 “Manufacture of fabricated metal products” and NACE 26 “Manufacture of non-metallic mineral products”, for example, the share of exports is twice as high in environment industry enterprises as in non-environment industry enterprises.

- Germany, Norway and USA are the largest exports collecters. Exports are slightly more concentrated to Nordic and East European countries than Swedish exports as a whole.

- More than 90 per cent of environment industry enterprises have less than 50 employees. These small and medium-sized enterprises (SMEs) account for one third of all environment industry employees and 29 per cent of turnover. For environmental activity A 6 “Environmental monitoring, analysis and assessment”, SMEs account for 60 per cent of turnover and 74 per cent of exports.

1 Introduction

1.1 Background

Statistics Sweden started work on estimates of the environment industry in 1997. This initiative sprang out of the large and increasing political interest nationally and abroad, which could not be met with adequate data. It was preceded by a study of the waste and recycling industry conducted by Statistics Sweden (part of the core industry as defined below), and attempts to estimate the size of the environment industry in the EU using existing data from the expenditure side[2]. An informal OECD/Eurostat working group exchanged experience in this field and agreed on a common definition and framework for data production[3].

The approach chosen by Statistics Sweden was to try and establish a database of individual producers of environmental goods and services, based on the OECD/Eurostat definition[4], and then use and combine this with existing registers and surveys[5]. It was foreseen that in this way a lot of detailed information could be produced without the introduction of new surveys. The database would however also be a valuable tool and frame for surveys in the future.

The main task of the first phase of the work was to establish a first preliminary database of environmental enterprises, and to investigate what could be used from existing registers and surveys. Data were presented for the so-called ”core industries” in order to exemplify and test what could be done for all enterprises in the database in the future. The core industries[6] are here defined as industries (NACE groups) which are deemed to be included entirely under the definition of environment industry. In the present report the core industries consist of NACE 25.12 ”Retreading”, NACE 37 ”Recycling”, NACE 41 ”Collection, purification and distribution of water, NACE 51.57 ”Wholesale of waste and scrap” and NACE 90 ”Sewage and refuse disposal, sanitation and similar activities”. A few aggregate figures were also presented for the entire list of environmental producers. The results were published in Eurostat Working Paper 2/1999/B/3.

[2] Ecotec 1996
[3] OECD/EUROSTAT 1999
[4] The general definition given by OECD/EUROSTAT is as follows:
”The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air, and soil as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services which reduce environmental risk and minimise pollution and resource use.”
[5] The objective of the database is to include all enterprises in Sweden that can be considered to fall under the definition of environment industry as defined by OECD/EUROSTAT. This means that both the core industry and the so-called non-core industry are to be incorporated in the database.
[6] The core industries (NACE groups) are considered to contain 100 % environment industry. Therefore all enterprises in these groups are included in the database.

After this, continued work focused mainly on improving the database, both as regards coverage and detail. At this stage of the work enterprises in the database were classified according to how important the environmental activity was (primary, secondary, etc.) and what the primary environmental activity was. Aggregate data on turnover, exports and employment were presented for the entire list of producers and results were published in Eurostat Working Paper 2/2000/B/5.

The results of the work have also been published in two reports in the Swedish environmental accounts report series. There has been a lot of interest both in the data produced and in the database itself. The reports have often been quoted in the press and the most important results from the previous study were published in the Long-Term Survey 1999/2000, Ministry of Finance. The results from the previous report were presented at a conference on FEESE (Fostering employment in the environmental sector in Europe) at the Swedish Environmental Protection Agency. The FEESE project is an R&D project involving universities of technology in Germany, Finland and Sweden, which focuses on the environment technology part of the environment industry and environmental education. Contacts have also been made with the Swedish delegation for sustainable technology, which focuses on developing environment industry enterprises in Sweden and supporting them in their exports efforts. There have also been requests to use the environment industry database for other, more direct commercial purposes. Because of the broad interest in the environment industry, Statistics Sweden has plans to produce regular statistics in this area.

1.2 Objective

The main objective of this project was to analyse in more detail the employment in the environment industry, the overall division between different environmental activities and industries, and specific information on the employees such as age, sex, line and level of education and income.

During the course of the work the objective has expanded. The large interest in environmental exports and the role of small and medium-sized enterprises led to a decision to include also a more detailed description of economic data. The possibilities for combining the environment industry database with new sources of information such as the Foreign Trade Statistics and the Structural Business Survey enabled this to be done.

It also proved possible to substantially improve the environment industry database itself by using a few new sources of information. The most important was a database of the official description of business activities the enterprises provide when they register a new enterprise or change the name of the enterprise. The use of these new sources of information made it possible to reclassify the status of many enterprises (how important the environmental activity is) from ”uncertain” to primary or secondary.

1.3 Delimitation

The detailed data presented in this report relate only to the enterprises or establishments that are included in the environment industry database, are active, and where environmental activities are classified as the primary activity. These are termed *environment industry* in the report. The coverage of the database should be fairly good by now but it is still under development and there is much room for improvement. Certain environmental activities or types of producers are very difficult to cover and the figures presented sometimes reflect this fact. The use of the main activity criterion is in line with the production of statistics for other ”industries”.

- This does not, however, correspond with efforts to estimate the total value of the production of environmental products and services, which would include estimates of environmental aspects in all enterprises, whether the activity is of a primary, secondary or even ancillary (internal) type.
- This is also different from the approach used in earlier reports where data for all enterprises and establishments in the database were presented.

The data presented relate only to those enterprises and establishments in the database for which information is available in the different registers and surveys used. The coverage is usually very high, however, which can be seen from the descriptions of the sources that are included at the beginning of each new section. Data on employment refers to the whole labour market, data on turnover only refers to the enterprises liable to pay VAT according to the VAT register. The financial information refers only to business activities, which means that the non-business activity operations of municipal and governmental authorities are not included.

1.4 Structure of the report

The second section presents more detailed data on environment industry employees. The first subsection gives an overall picture of the employment structure, with information on total number of employees by environmental activity and industry. The second and third subsections present two types of time series. First, longer time series for the core industries and then the development in the last two years for all environment industry enterprises. The next subsection describes in more detail the geographical distribution of the employees and the varying importance of the environment industry in different municipalities. Sections 2.6 to 2.10 give more detailed information on the people working in the environment industry, such as age and sex, level and orientation of education, income, and whether they have been unemployed in the last few years.

More detailed economic data for the environment industry enterprises are presented in section 3. The first subsection gives an overview of the number of enterprises in different environmental activities and industries. It also includes time series on developments in the core industries, and an analysis of the importance of public ownership in different parts of the environment industry. Section 3.2 focuses on environment industry turnover. It includes information on turnover broken down by environmental activities and industries and the development in the last few years. Section 3.3 gives a detailed account of environment industry exports.

This section includes an analysis of the importance of different environmental activities and industries. A substantial part is devoted to the geographical distribution of the exports, i.e. which countries import goods and services from the environment industry, and the activities of importance. Section 3.4 presents financial information for environment industry enterprises, such as value added and operating profits, and a set of indicators describing their economic status. The last subsection presents the economic data with a new breakdown in order to describe the importance of small and medium-sized enterprises.

Section 4 presents estimates of the volume of internal environmental activities based on a recent survey on environmental protection expenditure in the industries Mining, Manufacturing and Energy supply.

The report concludes with suggestions for future work.

2 Employment

2.1 Introduction

This section describes employment in the core industries and for the whole environment industry.

Time series have been produced for the core industries (5 years) and for the whole database (2 years). The database description will only be given for active establishments classed as ”primary” establishments. There were 6 878 active establishments[7] with 42 455 employees in this class. This represents 65 per cent of the total number of active establishments and 44 per cent of the total number of employees in the database. The core industries, which are all classified as primary, consist of 2 910 establishments with 13 267 employees. There are 2 940 enterprises in the database with no employees. The owners of the enterprises are not included in the data presented on number of employees in this report, which leads to an underestimation. 2 180 active establishments with 32 332 employees are classified as secondary establishments, i.e. establishments where the environmental component is substantial.

Number of active establishments and employees by status in the database

Status	Number of establishments	Per cent	Number of employees 1999	Per cent
Primary	6 878	65	42 455	44
Secondary	2 180	21	32 332	34
Other status	1 515	14	21 188	22
Total	10 573	100	95 975	100

Source: Environment industry database and Swedish Business Register

2.2 Employment structure

In this section the active establishments with primary classification including the core industries are described by number of employees at the establishments and by environmental activity. In this section, the number of employees is based on figures from the Swedish Business Register and refers to 1999. This means that the figures are based on estimations made by the enterprises themselves and not on income statements, which is the case with data from the Employment Register presented later in the report.

Employment by establishment size

There are 2 940 establishments in the database with no employees, which equals 43 per cent of all the active establishments classed as “primary”. A lot of the establishments have 1-9 employees (44 per cent). The total number of employees working at establishments with 1-9 employees is 9 541 or 22 per cent of all employees. Most of the employees (58 per cent) work at establishments with less than 50 employees.

[7] According to the Swedish Business Register, March 2000, referring to the number of employees in 1999.

Employment by environmental activity
The largest environmental activity is A3 ”Solid waste management” with 13 722 employees or 32 per cent of all employees in the environment industry. 64 per cent of the employees in this activity work at establishments with less than 50 employees. 10 548 (77 per cent) of the 13 722 employees work in the core industries (NACE 37, 51.57, 90.002-90.008).

Other large environmental activities are C1 ”Indoor air pollution control” (15 per cent of employees), A2 ”Wastewater management” and C4 ”Renewable energy” (9 per cent of the employees work in each of these two). However, in environmental activities C1 ”Indoor air pollution control” and C4 ”Renewable energy” about 62 per cent of the employees work at establishments with more than 50 employees, whereas in A2 ”Wastewater management” most employees work at establishments with less than 50 employees (61 per cent).

Employment by NACE group
Large NACE groups in terms of number of employees, besides the core industries, are NACE 29 ”Manufacture of machinery and equipment” (4 973 employees), NACE 45 ”Construction” (4 414 employees) and NACE 40 ”Electricity, gas, steam and hot water supply” (4 090 employees). In NACE 29, environmental activities C1 ”Indoor air pollution control” (1 919 employees) and A2 ”Wastewater management” (1 204 employees) dominate. In NACE 45 the most common environmental activities are C1 ”Indoor air pollution control” (1 870 employees) and C5 ”Heat / energy saving and management” (1 821 employees). The environmental activity that dominates in NACE 40 is C4 ”Renewable energy” (3 434).

Number of employees by NACE and environmental activity 1999

Environmental activity / NACE	Core industries	Mining, quarrying and manufacturing (NACE 10-36)	Electricity, gas and hot water supply (NACE 40)	Wholesale and retail trade (NACE 50-52)	Other business activities (NACE 74)	Other NACE	Total
A1: Air		437	12	40	12	268	769
A2: Wastewater	2 001	1 299		216	403	113	4 032
A3: Waste	10 548	1 026	450	561	252	885	13 722
A4-5: Soil and noise		259		2	128	61	450
A6: Administration		134	161	55	2 292	607	3 249
B1: Clean technologies		815	3	37	160	8	1 023
B2: Clean products		338		228	97	11	674
C1: Indoor air pollution		3 431		866	192	1 871	6 360
C2: Water supply	2 188	61		86		130	2 465
C3: Recycled materials	718	612		28		16	1 374
C4: Renewable energy		167	3 434	134	54	82	3 871
C5: Energy saving		620	30	552	123	1 824	3 149
C6: Sustainable agriculture		22		4	7	1 190	1 223
C9-10 no code: Eco-tourism, other		61			2	31	94
Total	15 455	9 282	4 090	2 809	3 722	7 097	42 455

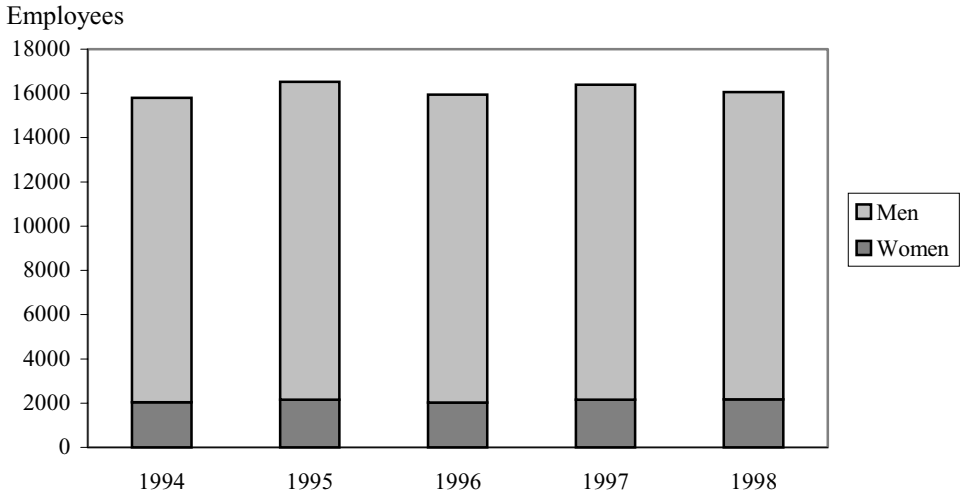
Source: Environment industry database and Swedish Business Register

2.3 Time series for the core industries

In this section the core industries are presented according to the Employment Register 1994-1998. The number of employees is based on income statement figures for each person working at each specific establishment every year.

The total number of employees in the core industries has changed very little during the last five years (1994-1998). In 1998 the core industries had 16 049 employees, 86 per cent of whom were men.

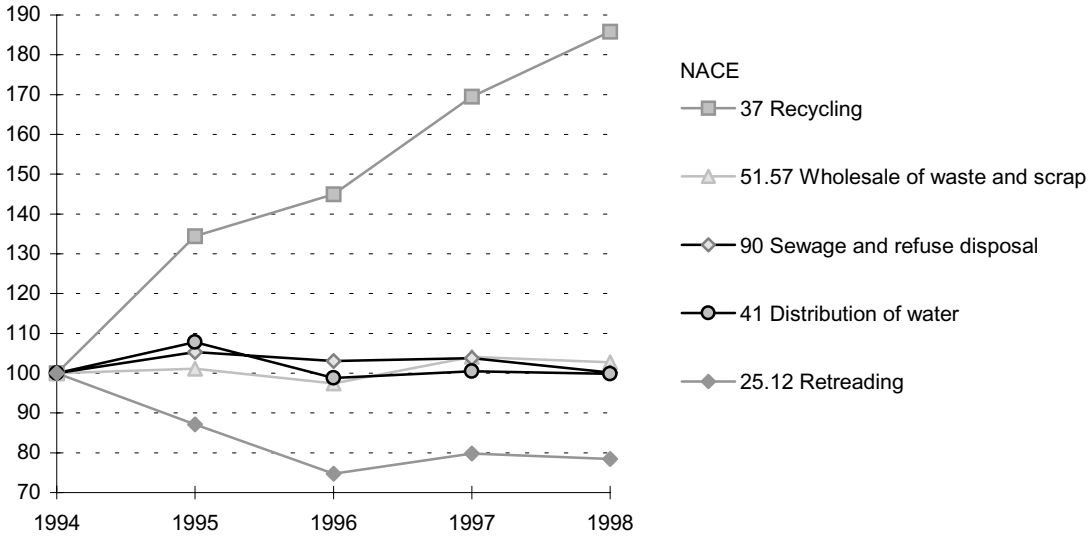
Employees in the core industries 1994 - 1998



Source: Employment Register

The two core industries which have changed during this five-year period are NACE 37 ”Recycling” and NACE 25.12 ”Retreading”, as can be seen in the following chart.

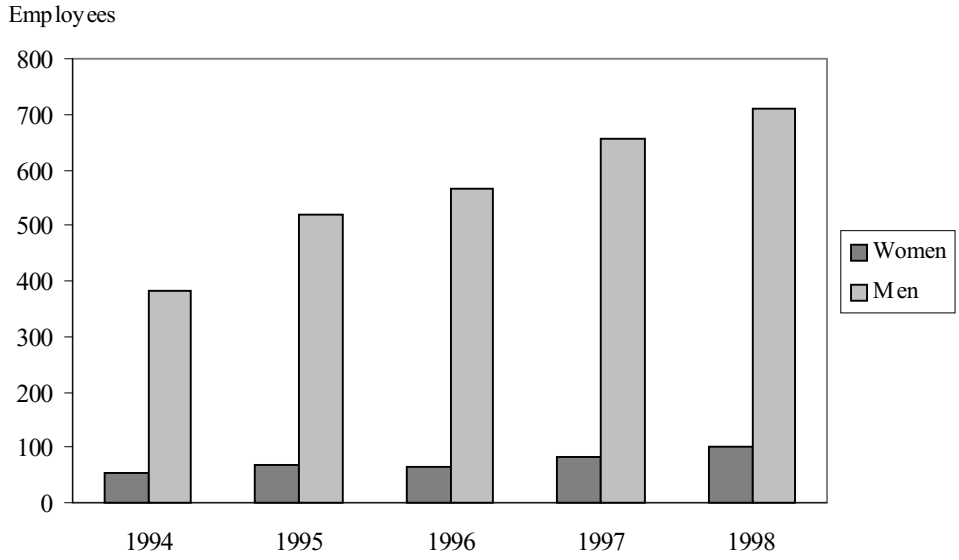
Number of employees in the core industries. Index 1994 = 100



Source: Employment Register

In NACE 37 ”Recycling”, the number of employees has increased rapidly, by 86 per cent, from 436 employees in 1994 to 810 employees in 1998. One of the reasons for this increase could be that households have increased their recycling. According to the Swedish Association of Waste Management[8] ”1998 saw the breakthrough of the retrieval of household electronic waste” and ”the results of metal collection have improved dramatically”. Since 1994 producer responsibility has been in force. This means that manufacturers, importers or sellers of a good are responsible for taking care of the good when it has been used. This has improved the recycling of plastic and paper packaging.

Employees in NACE 37 "Recycling" 1994 - 1998



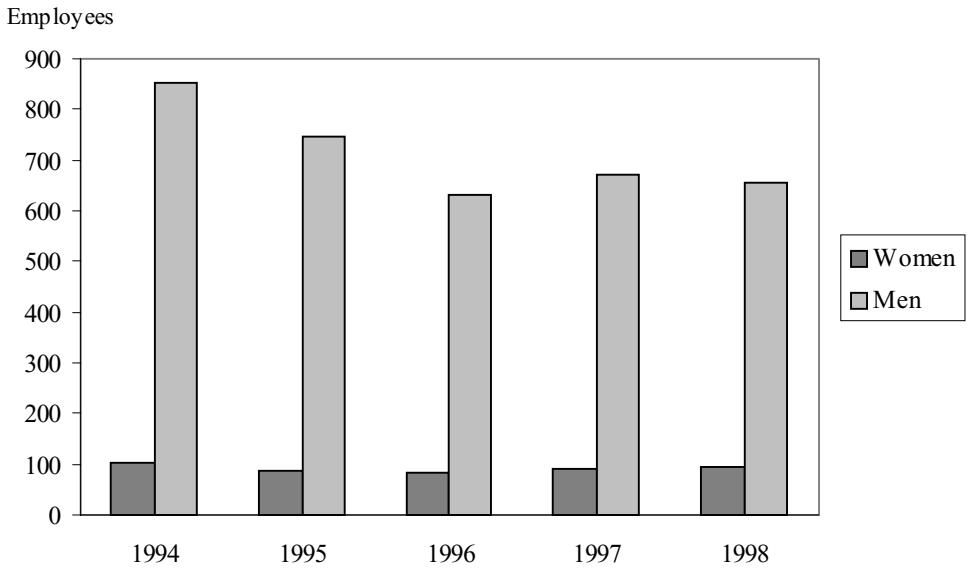
Source: Employment Register

NACE 25.12 ”Retreading” has decreased by 22 per cent, from 955 employees in 1994 to 749 employees in 1998, but might increase in the coming years due to a new law that makes winter tyres obligatory in winter conditions, introduced in autumn 1999. In January 1995 a compensation scheme for recovered tyres started, which probably moderated the decrease. Turnover, however, has increased between 1996 and 1999, as can be seen in section 3.2.

There are 87 per cent men and 13 per cent women working in NACE 25.12 ”Retreading”. The decrease between 1994 and 1998 has not been as significant for women as for men (7 per cent for women and 23 per cent for men).

[8] http://www.rvf.se

Employees in NACE 25.12 "Retreading" 1994 - 1998



Source: Employment Register

2.4 Change in number of employees 1998-1999

In this section the employees in the environment industry database are presented according to the Swedish Business Register. Time series for the number of employees 1998-1999 are only given for establishments ”active” during both years. Similar time series for turnover and exports are presented in section 3.

The number of employees in environmental activity A6 ”Environmental monitoring, analysis and assessment”, has increased by 10 per cent between 1998 and 1999. This indicates that the need for environmental analysis has increased. Many of today’s environmental consultants started to develop quality management systems and have now continued to develop environmental management systems. Enterprises introducing environmental management systems have to give their employees environmental education, which is often done by the environmental consultant (see also section 4, Internal green jobs). The enterprises often have to invest in environmental management systems to stay competitive. Besides working with environmental management systems, the consultants work among other things with analysis of air and water, monitoring and assessment.

An environmental activity where the number of employees has decreased is A3 ”Solid waste management” (-1 per cent). This may be the result of more efficient waste management enterprises. In the same period turnover has increased by 6 per cent (see further section 3.2).

Change in number of employees between 1998 and 1999[9] by environmental activity

Environmental activity	Number of employees	per cent
A1 Air pollution control	18	2
A2 Wastewater management	-27	-1
A3 Solid waste management	-72	-1
A4-5 Soil and noise etc.	12	3
A6 Environmental monitoring, analysis and assessment	286	10
B1 Cleaner / resource-efficient technologies and processes	37	4
B2 Cleaner / resource-efficient products	8	1
C1 Indoor air pollution control	-3	0
C2 Water supply	-27	-1
C3 Recycled materials	-18	-1
C4 Renewable energy	-6	0
C5 Heat / energy saving and management	65	2
C6 Sustainable agriculture and fisheries	10	1
C9-10 no code Eco-tourism, other	6	7
Total	289	1

Source: Environment industry database and Swedish Business Register

2.5 Geographical distribution

The geographical distribution of the employees by municipality and by different environmental activities and the share of total employees are described in this section. The figures are collected from the Swedish Business Register, March 2000 version, and refer to the number of employees in November 1999.

Large environmental activities

The five largest environmental activities according to the number of employees are:

- A3 ”Solid waste management”, with the highest number of employees in the municipalities Göteborg, Stockholm and Norrköping
- C1 ”Indoor air pollution control”, with the highest number of employees in Jönköping, Huddinge and Båstad
- A2 ”Wastewater management”, with the highest number of employees in Emmaboda, Solna and Malmö
- C4 ”Renewable energy”, with the highest number of employees in Stockholm, Linköping and Sundsvall, and finally
- A6c ”Analytical services, data collection and assessment”, with the highest number of employees in Stockholm, Göteborg and Eskilstuna.

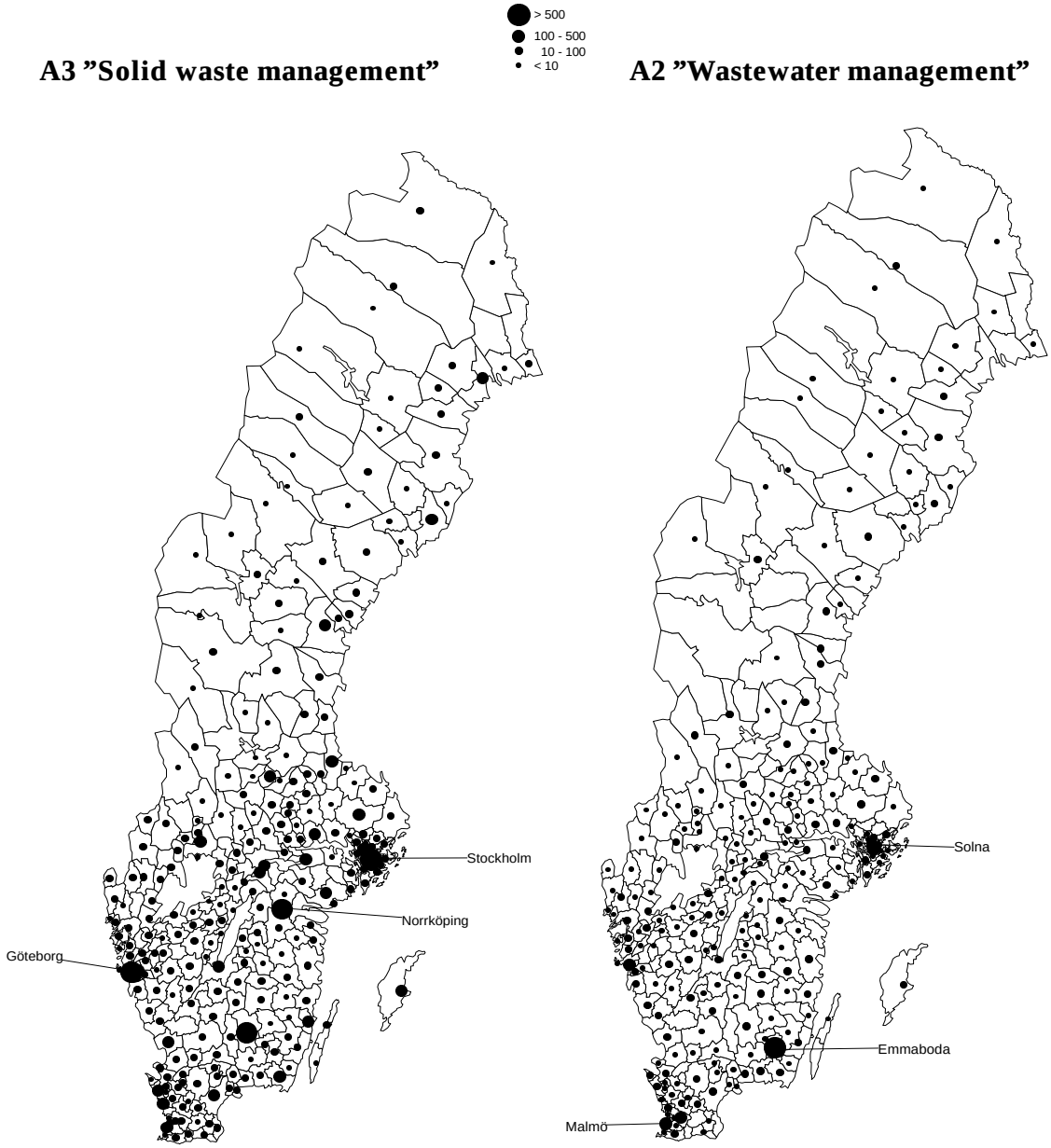
A3 ”Solid waste management” establishments include mainly NACE 90.002 ”Collection, sorting and reloading of non-hazardous waste” and NACE 51.57 ”Wholesale of waste and scrap”. Together these two NACE groups involve 7 661 employees. These employees are more equally distributed over the country than the labour market as a whole. This is mainly because these activities have to exist in all municipalities and therefore follow the distribution of the population rather then

[9] The time series for the whole database in 1999 and 2000 includes only establishments which are active in both years, so as to make comparisons possible. This differs from the previous time series for the core industries where the establishment can be inactive one year because the studies cover a whole industry.

the labour market. In Sweden, there is a higher share of employment in the large city areas.

A2 ”Wastewater management” establishments are often publicly owned and situated where people live. Therefore the employees working in this activity also follow the distribution of the population. The foremost NACE groups are NACE 90.001 ”Wastewater treatment” and NACE 29 ”Manufacture of machinery and equipment”.

Number of employees by municipality 1999

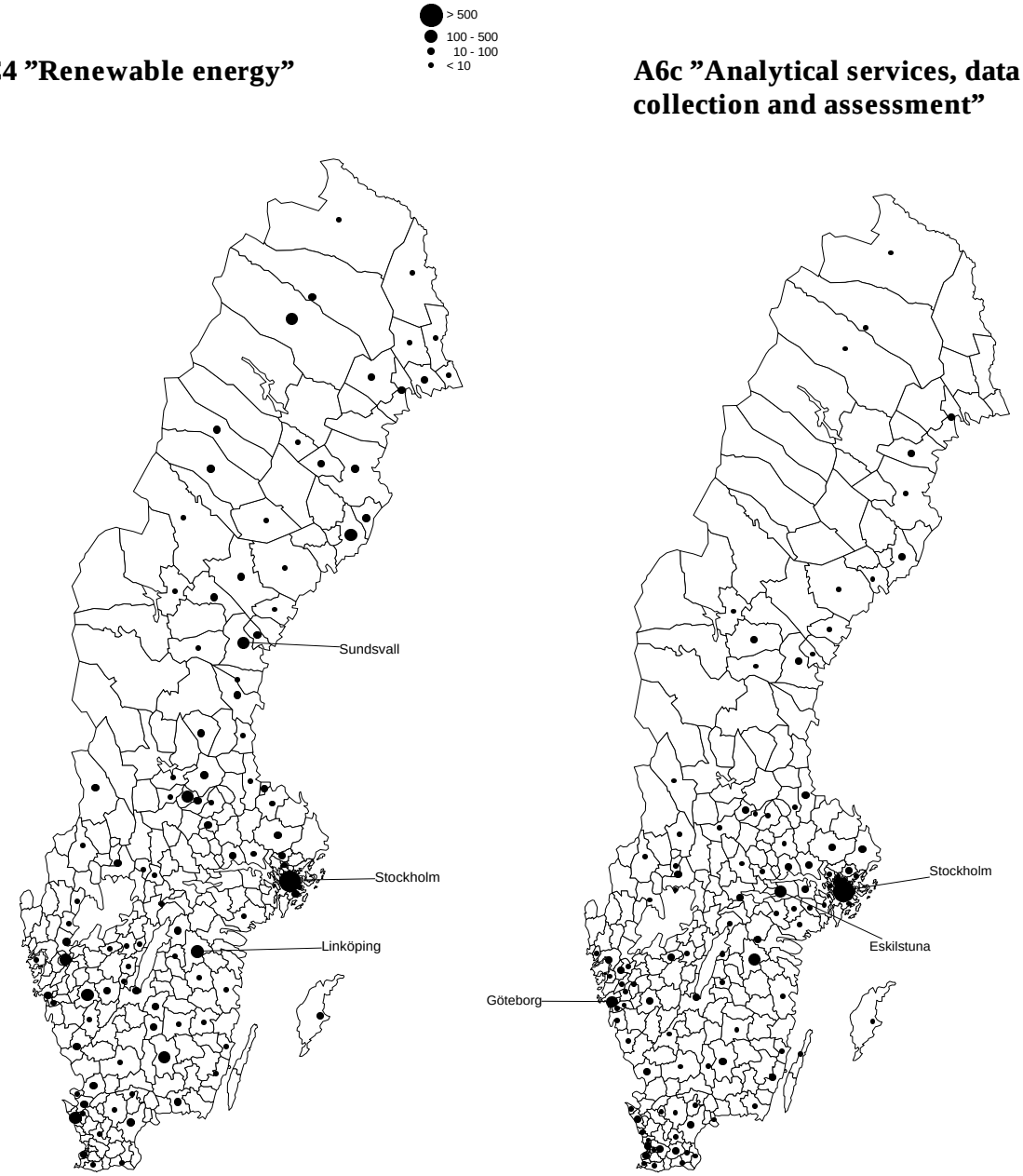


Source: Environment industry database and Swedish Business Register

N.B. The three municipalities with the highest number of employees in each environmental activity are marked on the maps.

Activity C4 ”Renewable energy” has many employees situated in the north of Sweden compared to other activities. One important reason for this is the hydroelectric power plants which are situated in the north of Sweden. Analytical consultants on the other hand are concentrated around the large cities in Sweden.

Number of employees by municipality 1999



Source: Environment industry database and Swedish Business Register

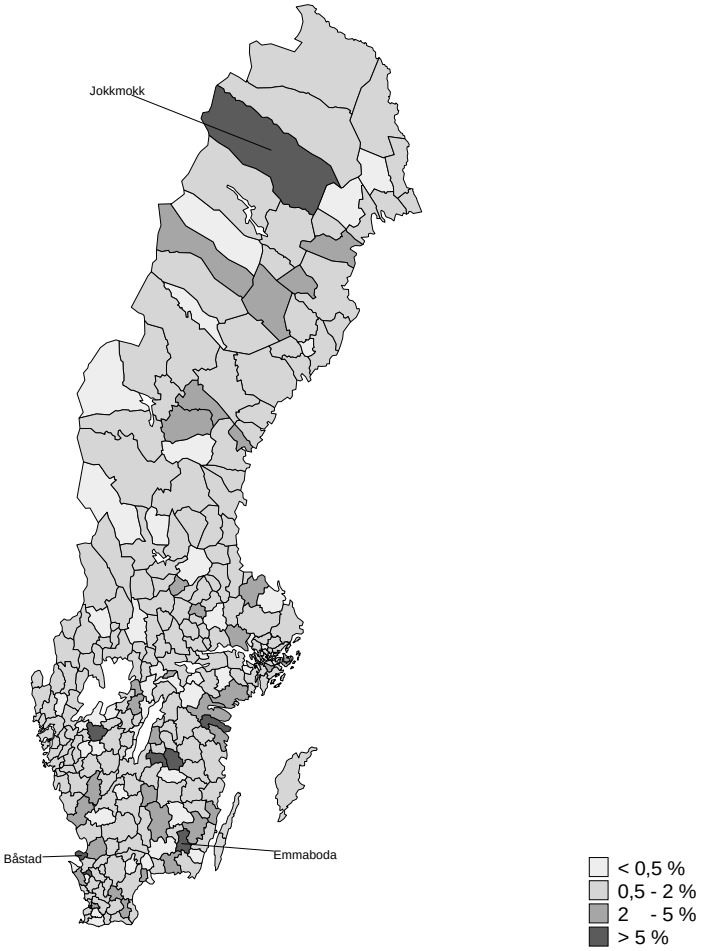
N.B. The three municipalities with the highest number of employees in each environmental activity are marked on the maps.

Number of employees
Municipalities with a lot of employees in the environment industry are not surprisingly Stockholm, the capital, with 3 866 employees, and Göteborg, Sweden's second largest city, with 2 302 employees. The third largest municipality in terms of employees in the environment industry is Helsingborg, situated in the south of Sweden. Environmental activities A3 "Solid waste management", A2 "Wastewater management" and B1 "Cleaner technologies and processes" are important in Helsingborg.

The environment industry share per municipality
Another interesting indicator is to look at the share of environment industry employees out of the total number of employees at establishments located in the municipality.

Municipalities with high shares of environmental employees are Jokkmokk in Norrland, Båstad in the south of Sweden and Emmaboda in the Kalmar region. In these municipalities C4 "Renewable energy", C1 "Indoor air pollution control", A2 "Wastewater management" and C2 "Water supply" dominate.

Share of environment industry employees in total number of employees in the municipality 1999



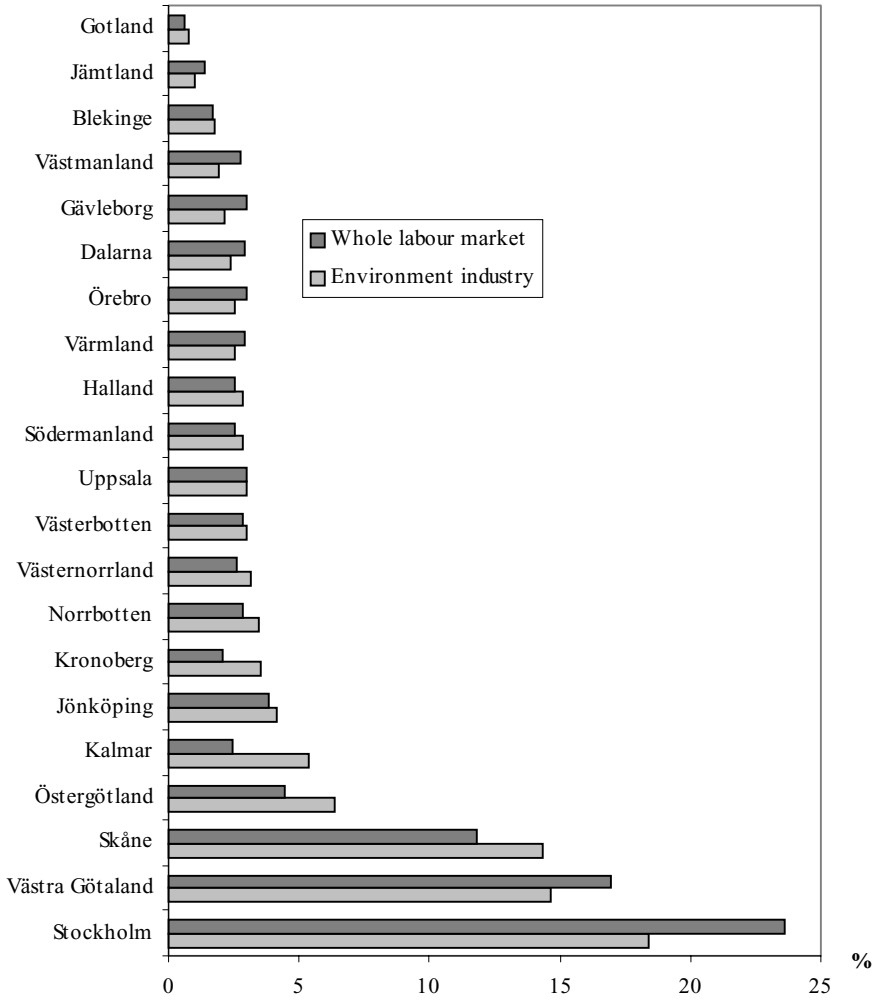
Source: Environment industry database and Swedish Business Register

N.B. The three municipalities with the highest percentages of employees in the environment industry are marked on the map.

Municipalities in sparsley populated areas often depend on one or a few larger enterprises. In some cases these enterprises are within the environment industry. For these municipalities the development of the environment industry is very important.

The share of environmental employees basically follows the geographical distribution on the labour market as a whole. However, the share of environmental employees is a little less concentrated to the large cities and more to the cities in central and in the north of Sweden. In the north of Sweden a lot of employees work at establishments within C4 ”Renewable energy”, such as hydroelectric power plants.

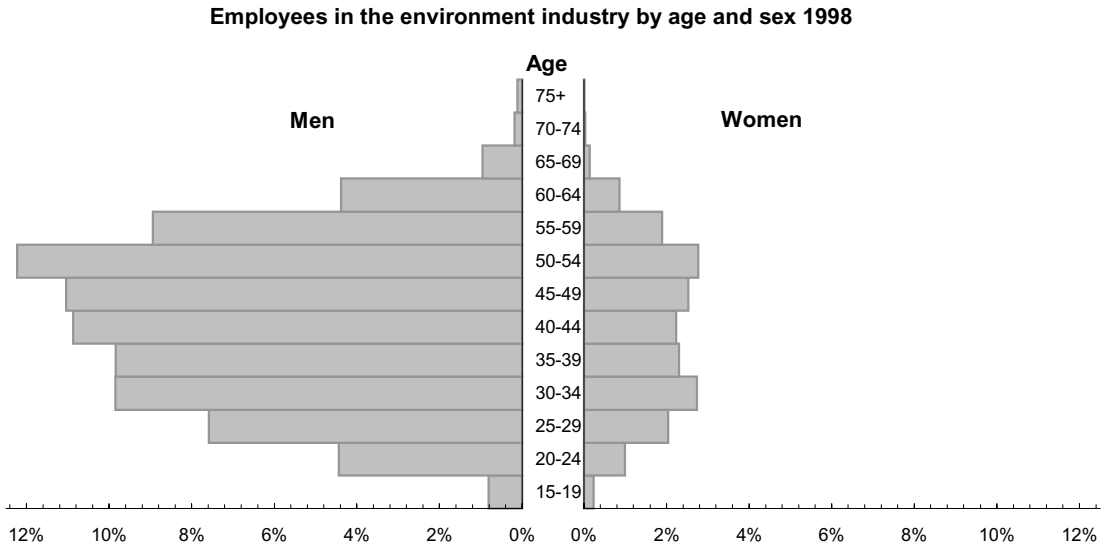
Geographical distribution of employees in the environment industry and on the whole labour market in Sweden 1999

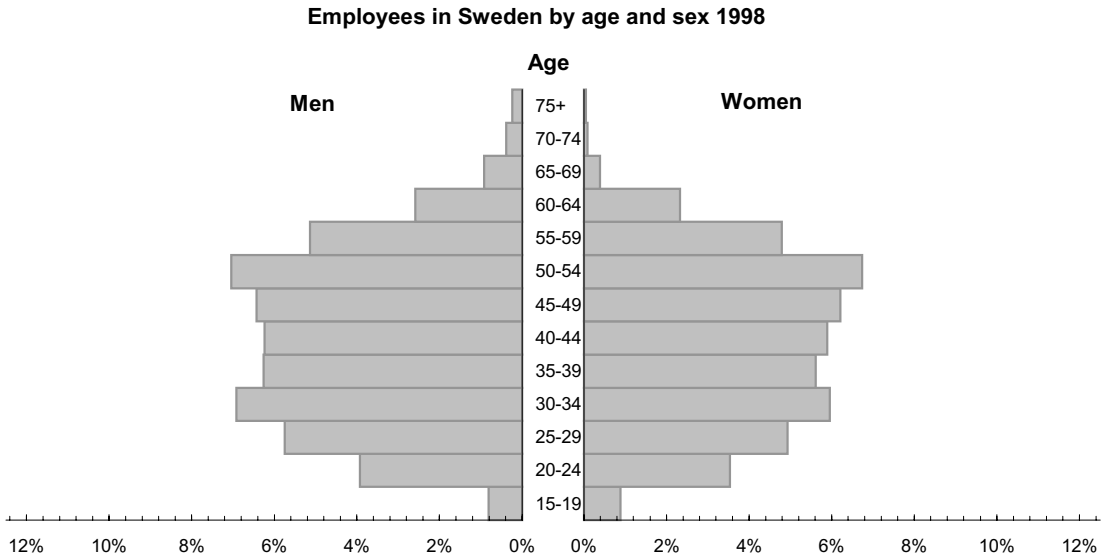


Source: Environment industry database and Swedish Business Register

2.6 Employees by age and sex

The environment industry employees are mainly men. There are only 19 per cent women and as many as 81 per cent men in the environment industry whereas on the whole labour market there are 47 per cent women and 53 per cent men. Overall, the age structure of the employees in the environment industry varies similarly to the labour market as a whole. 18 per cent of the employees in the environment industry are over 55 years old and 41 per cent are under 40 years old. There is a larger share of male employees 60 - 64 years old and 25 - 39 years old in the environment industry than on the labour market as a whole. This means that the environment industry enterprises probably will have to hire a lot of new employees in the near future, due to retirement and because young employees tend to move more often between employers as well as branches of industry.

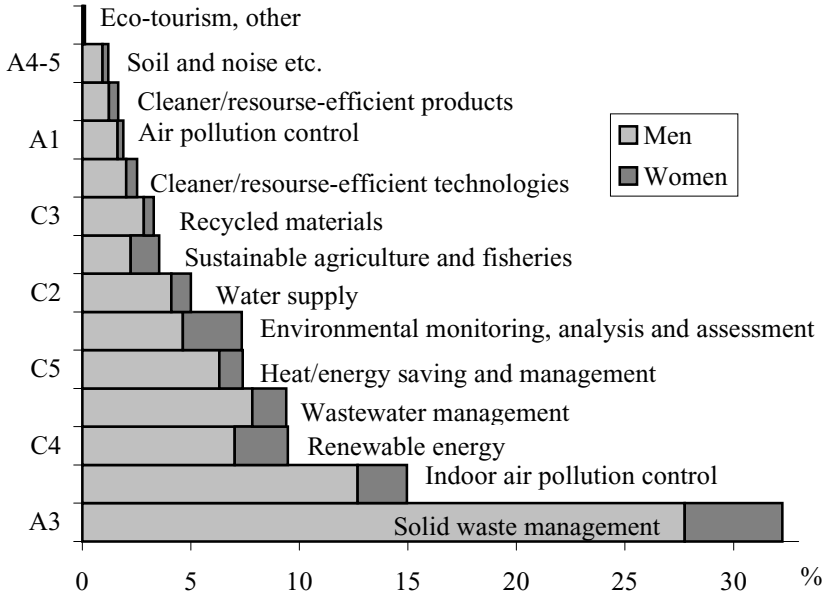




Source: Environment industry database and Employment Register

Environmental activities C6 ”Sustainable agriculture and fisheries” and A6c ”Analytical services” have a relatively high share of women. The largest environmental activity in terms of number of employees, A3 ”Solid waste management”, has 86 per cent men and 14 per cent women.

Share of employees (men/women) in the environment industry by environmental activity 1998



Source: Environment industry database and Employment Register

2.7 Level of education

The level of education among the employees is an indicator of the level of knowledge content in a branch of industry. It is also considered to be one indicator of the development potential of the branch. Many of the important exports enterprises in Sweden are characterised by high education levels. The same observation applies to measuring the development potential among countries. Sweden has been known for a high level of education among the population. Over the last few years, other countries have taken the lead, but Sweden is still considered to have a rather high educational level. The share of employees with university level education is 28 per cent. The average for the total environment industry is only 20 per cent.

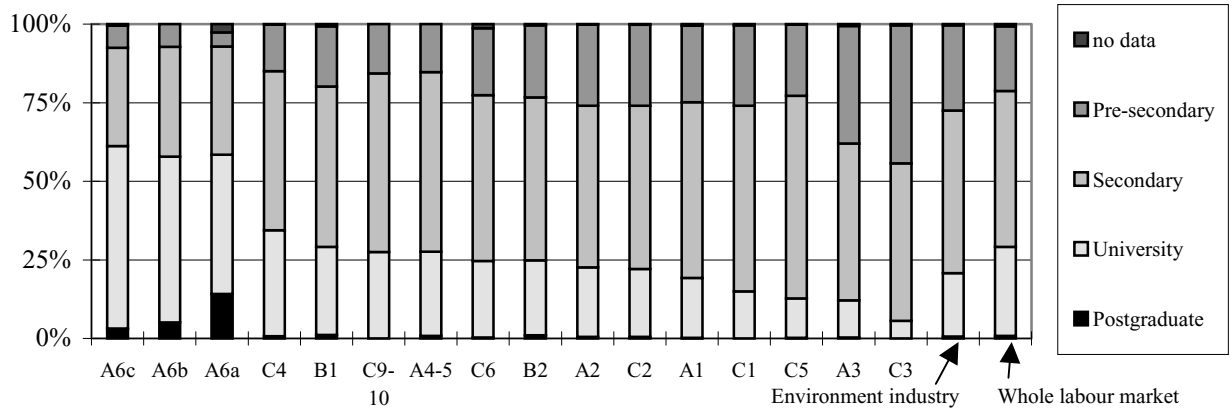
There are, of course, hopes that the environment industry will become an important exports industry and even though the environment industry as a whole has a rather low level of education, there are certain environmental activities with a lot of well-educated employees.

The environmental activities A6a ”Environmental R&D”, A6c ”Analytical services, data collection and assessment” and A6b ”Education, training and information” are all characterised by a very high education level. The share of postgraduates is very high (14 per cent, 5 per cent and 3 per cent respectively), far above the country average of 0.8 per cent. These activities also have large shares of university

graduates. A6c ”Analytical services, data collection and assessment” has the highest share, 58 per cent of the employees have university level education. A6b ”Education, training and information” (53 per cent) and A6a ”Environmental R&D”(44 per cent) also have shares much higher than the average among employees in Sweden. This is not very surprising. Environmental R&D like other lines of R&D, is characterised by high levels of education. This is also the case with education, training and information, which generally has a high level of education among the employees, not only when the focus is set on environmental issues. A6c ”Analytical services, data collection and assessment” is an activity which contains a lot of environmental consultants who, like economic consultants, often are academics specialising in their line of work.

In Sweden, the educational level among employees differs between men and women. The share of employees with university level education is 25 per cent among men and 32 per cent among women. Looking at postgraduates, the opposite pattern occurs. More than one per cent of male employees have postgraduate education, compared to less than half a per cent of the women. The environment industry shows the same gender patterns when it comes to university education, 28 per cent of the female employees have university level education and only 18 per cent of the male employees. The share of postgraduates is the same for male and female employees. However, the group of post graduates only includes 254 (49 women) employees so it is not wise to draw any far reaching conclusions from this group, even though it seems that the environmental area has appealed to women postgraduates more than perhaps other fields of research.

Level of education among employees (1998)



Source: Environment industry database and Employment Register

Environmental activities

A	Pollution management	B	Cleaner technologies and products	C	Resource Management
A1	Air	B1	Clean technologies	C1	Indoor air pollution
A2	Wastewater	B2	Clean products	C2	Water supply
A3	Waste			C3	Recycled materials
A4	Soil			C4	Renewable energy
A5	Noise			C5	Energy saving
A6	Administration			C6	Sustainable agriculture
A6a	R&D			C7	Sustainable forestry
A6b	Education and information			C8	Natural risk
A6c	Analytical services			C9	Eco-tourism
				C10	Other

The total number of employees in the environment industry was 42 642 in 1998; 8 874 of these had university or postgraduate education according to the Employment Register.

The above-mentioned activities have high educational levels among their employees. One environmental activity, which has both a high share of high educational levels and a high share of exports compared to total turnover is B1 ”Cleaner technologies. See section 3.3.

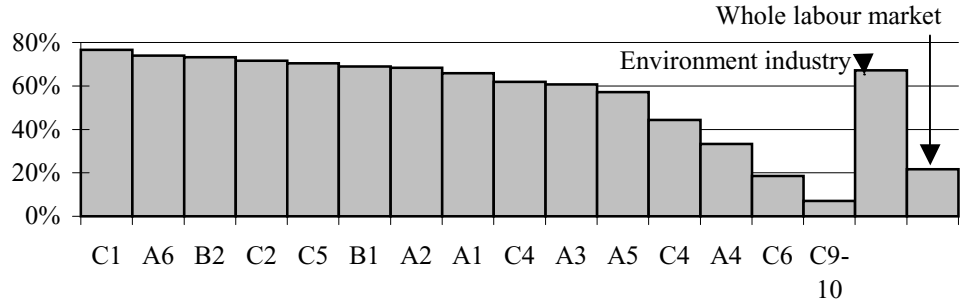
A somewhat different question is whether the environment industry can provide jobs for low educated and / or unemployed persons. Even though the labour market figures in Sweden have improved, with an unemployment rate a little over five per cent compared to over eight per cent in the mid-nineties, some groups still have great difficulty in obtaining regular jobs, especially people with short education. This also goes for people with foreign backgrounds at all educational levels. Young people with short education who have never had the chance to get a regular job also have high unemployment rates, as well as a large group of people over 50 who were laid off during the recession in the early nineties.

The lowest educational levels were found in environmental activities C3 ”Recycled materials” and A3 ”Solid waste management”. These activities often include manual work or driving the different machinery and vehicles involved, which do not require long education.

2.8 Educational orientation

In order to see what skills could be required from employees in the environment industry, data about field of education have been produced. Compared to the labour market as a whole, there is a large share, 46 per cent of the employees, with ”Technical, natural science and industrial” education programmes in the environment industry and as many as 69 per cent in the activity A6a ”Environmental R&D”. Only 23 per cent of the employees on the whole labour market had this educational orientation. An activity with a remarkably low share in this field of education was the activity C6 ”Sustainable agriculture and fishery” with only 18 per cent ”Technical, natural and industrial” education. In this activity ”Agriculture, forest and fishery” education was the most common field with 25 per cent of the employees, compared to only two per cent on the whole labour market.

Share of employees (1998) with technical, natural science, industrial education programmes



Source: Environment industry database and Employment Register

Environmental activities

A	Pollution management	B	Cleaner technologies and products	C	Resource Management
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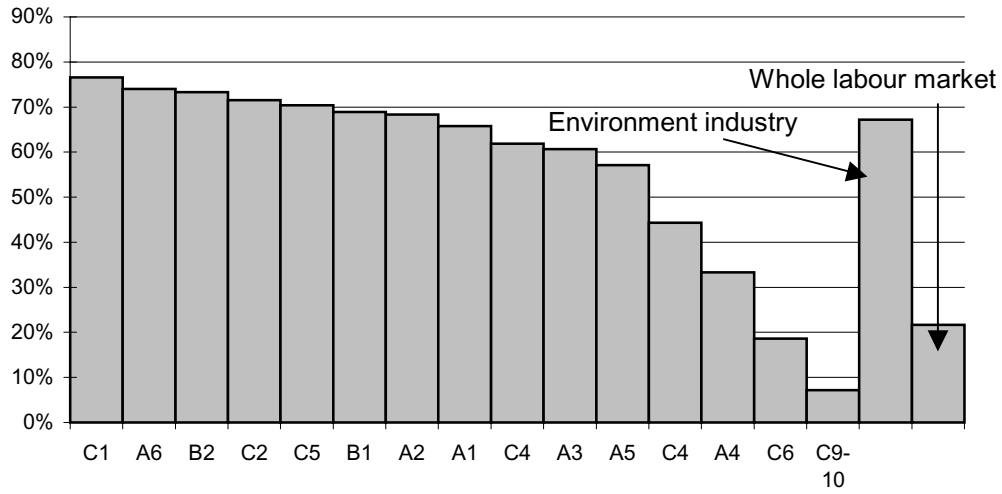
A2	Wastewater	B2	Clean products	C2	Water supply
A3	Waste			C3	Recycled materials
A4	Soil			C4	Renewable energy
A5	Noise			C5	Energy saving
A6	Administration			C6	Sustainable agriculture
A6a	R&D			C7	Sustainable forestry
A6b	Education and information			C8	Natural risk
A6c	Analytical services			C9	Eco-tourism
				C10	Other

When it comes to educational planning, it is important to look at the needs for employees with longer education, because these gaps take time to correct. A shortage of engineers for example takes at least five years to correct and the enterprises can not wait that long. A shortage of employees with education important for an enterprise can put the growth potential at risk. The fields of education for the employees with university and postgraduate level education have therefore been further studied. The pattern shown among all the employees in the environment industry is valid also for the employees with long education. The largest share has ”Technical, natural science and industrial” education programmes, with 66 per cent of the employees.

Share of technical, natural science or industrial education programmes among employees (1998) with university level education



Source: Environment industry database and Employment Register

Environmental activities

A	Pollution management	B	Cleaner technologies and products	C	Resource Management
A1	Air	B1	Clean technologies	C1	Indoor air pollution
A2	Wastewater	B2	Clean products	C2	Water supply
A3	Waste			C3	Recycled materials
A4	Soil			C4	Renewable energy
A5	Noise			C5	Energy saving
A6	Administration			C6	Sustainable agriculture
A6a	R&D			C7	Sustainable forestry
A6b	Education and information			C8	Natural risk
A6c	Analytical services			C9	Eco-tourism
				C10	Other

2.9 Income

In order to further describe the environment industry, figures describing the yearly mean income among the employees have been produced. On the labour market as a whole these figures often vary with the educational level within an activity or industry. A high educational level means a high mean income. This is however not as marked in Sweden as in other EU countries because the income range is smaller in Sweden than in other countries. The environment industry as a whole has a yearly mean income which is a bit higher than on the labour market as a whole. This, however, is somewhat misleading, because it is only a consequence of the fact that a large share, over 80 per cent, of the employees in the environment industry are men. In Sweden, as in other European countries, men have higher mean

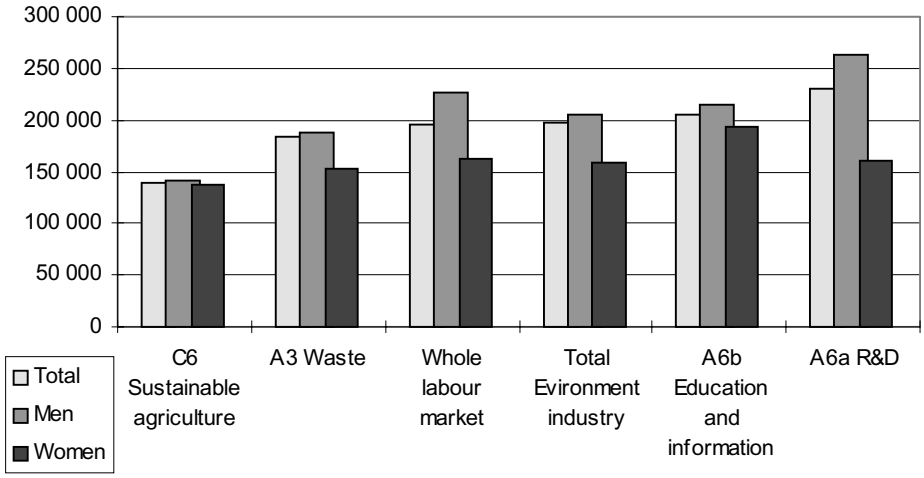
incomes than women. So even though both men and women working in the environment industry have lower mean incomes than men and women on the labour market as a whole, the total mean income is higher than for the whole labour market. This makes it important to study men and women separately when it comes to the variable income.

Some of the environmental activities have mean incomes above the average on the labour market for both men and women. These are A5 ”Noise and vibration”, C2 ”Water supply”, C4 ”Renewable energy”, B1 ”Cleaner technologies” and A6c ”Analytical services”. Only A6c ”Analytical services” were found among the activities with high educational levels among the employees.

Among men, activity A6a ”Environmental R&D” had the highest mean income of all activities, 17 per cent above the average on the labour market. This is an activity with very high educational levels among both men and women. This is however a small group, with only 113 employees.

Among women, the activity with the highest mean income is A6b ”Education, training and information”, with a mean income almost 20 per cent above the average for women on the whole labour market. This is also a rather small group, with only 235 employees according to the Employment Register. This activity has a remarkably even distribution of men and women among the employees. Women are well represented in many other lines of education activities as well and incomes are often higher than in other lines of work dominated by women.

Mean yearly income 1998 (SEK)

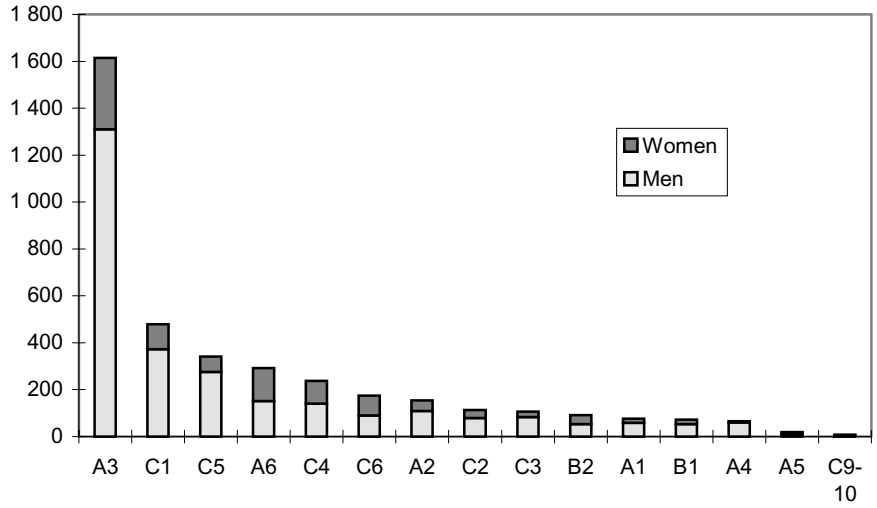


Source: Environment industry database and Employment Register

2.10 Formerly unemployed persons

In order to see whether the environment industry has been able to create work for formerly unemployed persons, the employees at the environment industry establishments have been listed according to former unemployment. This information is possible to produce from the employment register, which contains data about unemployment allowances and labour market actions, such as public relief work given to unemployed people. The share of employees in 1998 who had been unemployed in 1995, 1996 and / or 1997 is one way of measuring this. On the labour market as a whole, eight per cent of employees in 1998 had been unemployed on one or more occasion during the three preceding years, according to the definition above. The result for the environment industry is basically the same (9 per cent) as for the whole labour market, but in different environmental activities the results differ a lot. The largest share of formerly unemployed persons, 24 per cent, was found within A4 ”Soil and groundwater”. The establishments in the group A6b ”Education, training and information” had the second largest share of formerly unemployed persons, 20 per cent. Environmental activities A2 ”Waste water management” and C2 ”Water supply” had low shares of formerly unemployed persons. This could be explained by the fact that these activities have been rather stable in the last few years, and have even shrunk slightly in terms of number of employees. Unfortunately there are no long time series for A4 ”Soil and groundwater” or A6b ”Education , training and information”, so it is not possible to say whether these activities have grown and therefore have hired a lot of new employees. Even though the above-mentioned activities have large shares of formerly unemployed persons, the numbers are of little importance (only 65 and 46 persons). The activity with the largest number of formerly unemployed persons was A2 ”Waste management”. Establishments in this activity had 1 615 employees who had formally been unemployed according to the above definition. The whole environment industry had 3 846 formerly unemployed persons among their employees in 1998. The unemployment rate has been high during the last few years, so there is probably a good chance that establishments who have made a lot of new appointments during this period have often hired formerly unemployed persons. The unemployment rate increased from 75 000 in 1990 to 330 000 in 1995.

Number of formerly unemployed persons by environmental activity 1998



Source: Environment industry database and Employment Register

Environmental activities

A	Pollution management	B	Cleaner technologies and products	C	Resource Management
A1	Air	B1	Clean technologies	C1	Indoor air pollution
A2	Wastewater	B2	Clean products	C2	Water supply
A3	Waste			C3	Recycled materials
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A6b	Education and information			C8	Natural risk
A6c	Analytical services			C9	Eco-tourism
				C10	Other

3 Economic data

This section presents information on number of enterprises, turnover, exports and other economic data. This information is only available at enterprise level, in contrast to the employment data in the second section, which is based on information at establishment level. This means that there is no economic data for a certain number of establishments which are classified as environment industry but where the enterprise is not so classified. This concerns in particular municipal activities, which are not organised in limited liability companies. All data have been collected by combining the environment industry database with existing registers and surveys such as the Swedish Business Register, the Register for VAT, Foreign trade statistics (Intrastat) and the Structural Business Statistics survey.

The environment industry database contains a total of 6 861 active enterprises. 4 549 of these enterprises are classified as primarily producing environmental goods and services, for 1 371 enterprises environment is a secondary activity and the remaining 941 enterprises are classified in the group “other status”.

Information is only presented for “Primary enterprises”. These represent 66 per cent of the total number of enterprises and 49 per cent of the total turnover for the enterprises in the database.

Number of active enterprises in the environment industry database and turnover by status

Status	Number of enterprises	Per cent	Turnover SEK Million	Per cent
Primary	4 549	66	80 791	49
Secondary	1 371	20	55 642	34
Other status	941	14	27 833	17
Total	6 861	100	164 266	100

Source: Environment industry database and Swedish Business Register, VAT Register

3.1 Number of enterprises

In this subsection, the number of enterprises will be described in more detail. The table below presents information on environmental activity and NACE group for the 4 549 primary enterprises.

1 998 enterprises or 44 per cent of all primary enterprises in the environment industry database belong to the core industries, i.e. NACE 25.12 ”Retreading”, NACE 37 ”Recycling”, NACE 41 ”Collection, purification and distribution of water”, NACE 51.57 ”Wholesale of waste and scrap” and NACE 90 ”Sewage and refuse disposal, sanitation and similar activities”. The enterprises in the core industries are concentrated to a few environmental activities. In A3 ”Solid waste management” over 90 per cent of the enterprises belong to the core industries, and the share is 86 per cent in C2 ”Water supply” and 84 per cent in C3 ”Recycled materials”. The core industries are however not as important in terms of turnover and exports (24 and 12 per cent respectively), as shown later in this section.

The table also shows the relative shares of production and sales of products. Only five per cent of the primary enterprises are classified as producers, i.e. they belong to NACE 10-36 ”Mining, quarrying and manufacturing”. As shown later in this section, production is much more important in terms of turnover (17 per cent) and exports (61 per cent). In environmental activity B “Cleaner technologies and products”, there are more enterprises in NACE 50-52 ”Wholesale and retail trade” than in NACE 10-36 ”Mining, quarrying and manufacturing”. However, there are rather few enterprises classified within this environmental activity, regardless of NACE group. The reason for this is mainly that it is difficult to identify these enterprises in existing registers, i.e. the coverage of these in the environment industry database is far from complete. Another reason is that many large enterprises have production within this activity, but it is not their main activity. The relative importance of the environmental activities might therefore change if secondary activities were also incorporated.

The enterprises in NACE 40 “Electricity, gas and hot water supply” are today classified in several environmental activities, and not only C4 “Renewable energy”. This is because the classification into environmental activities was based on a description of the business activities in different sources, and not the NACE classification. The cross-classification of NACE and environmental activities does provide additional information which could be used for consistency checks in the future. This might lead to reclassification of environmental activity in the environment industry database, or changes in NACE code in the Business Register.

Most of the environmental consultants can be found in NACE 74 ”Other business activities”, involved in environmental activity A6 ”Environmental monitoring, analysis and assessment”. The importance of these consultants seems to be growing; their turnover increased by 10 per cent between 1998 and 1999 as shown later in this section.

Number of enterprises by NACE and environmental activity 2000

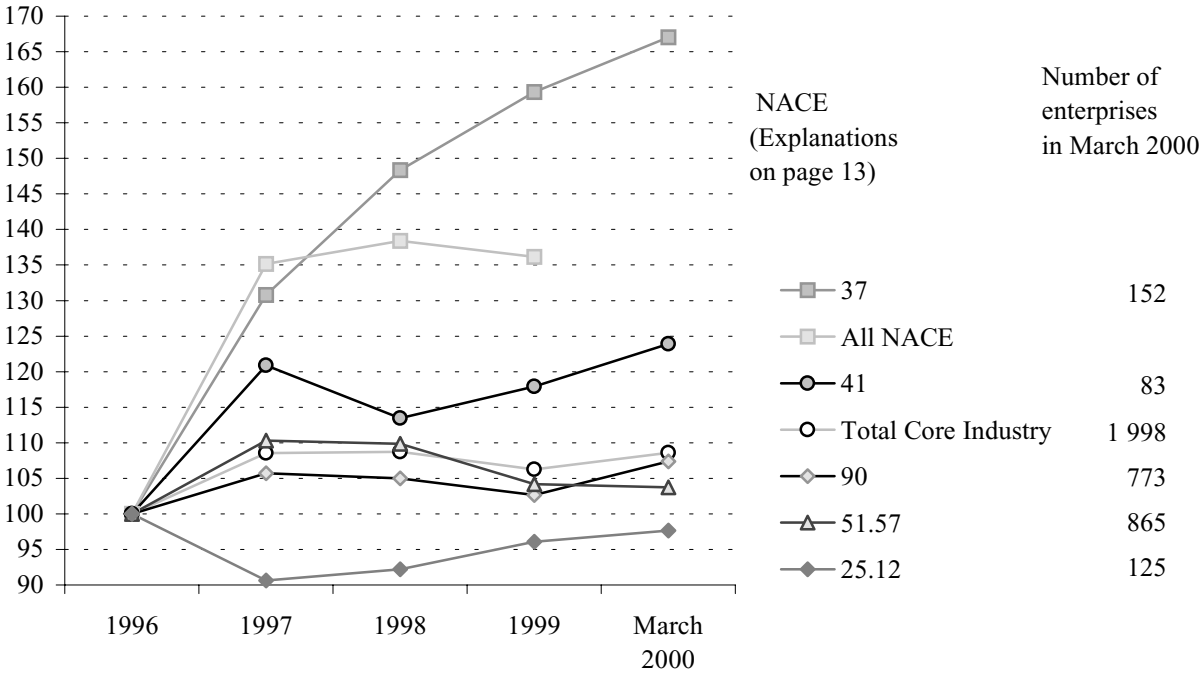
Environmental activity / NACE	Core industries	Mining, quarrying and manufacturing (NACE 10-36)	Electricity, gas and hot water supply (NACE 40)	Wholesale and retail trade (NACE 50-52)	Other business activities (NACE 74)	Other NACE	Total
A1: Air	0	11	1	3	2	9	26
A2: Wastewater	42	17	0	38	25	11	133
A3: Waste	1 748	39	5	49	37	58	1 936
A4-5: Soil and noise	0	2	0	2	12	8	24
A6: Administration	0	26	1	26	356	102	511
B1: Clean technologies	0	5	3	7	13	4	32
B2: Clean products	0	14	0	31	7	7	59
C1: Indoor air pollution	0	37	0	16	8	76	137
C2: Water supply	83	7	0	2	0	4	96
C3: Recycled materials	125	9	0	10	1	3	148
C4: Renewable energy	0	22	21	41	21	35	140
C5: Energy saving	0	25	1	98	16	215	355
C6: Sustainable agriculture	0	18	0	31	35	850	934
C9-10 no code: Eco-tourism, other	0	4	0	0	4	10	18
Total	1 998	236	32	354	537	1 392	4 549

Source: Environment industry database and Swedish Business Register

Time series for the core industries

As the core industries consist of all enterprises within separate NACE groups, it is possible to present a time series of the number of enterprises. The figure below shows the development between 1996 and 2000. Except for NACE 25.12 "Retreading and rebuilding of rubber tyres", the development is positive for all the core industries. However, it is only NACE 37 "Recycling" that has had much greater growth than the average development in Sweden. One of the reasons for this increase could be that households have increased their recycling of metal and electronic scrap. According to the Swedish Association of Waste Management[10] "1998 saw the breakthrough of the retrieval of household electronic waste" and "the results of metal collection have improved dramatically". Since 1994 producer responsibility has been in force. This means that manufacturers, importers or sellers of a good are responsible for taking care of the good when it has been used. This also includes plastic and paper packaging.

Number of enterprises in the core industries 1996-2000. Index 1996=100.*



** Starting from 1997 all enterprises that pay value added tax are included in the Business Register. Before 1997 the register only included enterprises paying more than SEK 200 000.*

Source: Swedish Business Register

[10] http://www.rvf.se

The importance of public ownership

There is an owner category connected to each enterprise in the Swedish Business Register. This classification shows if the enterprise is owned by the government, by a municipality, or if it is privately owned. It is quite common to find municipal establishments specialising in waste collection and treatment, wastewater treatment or water supply. In this case, the municipality itself is treated as an enterprise in the Business Register. The establishment is included in the environment industry database, but not the enterprise.

In order to be able to describe the full importance of public ownership in different environmental activities and NACE classes, the owner category of the enterprises and the number of employees at the establishments have been combined.

The table below shows the number of employees in each environmental activity and NACE group, working at establishments where the state or municipalities own the enterprise. It also shows the share of the environment industry employees that work in publicly owned establishments. All NACE groups that are shown separately except NACE 40 "Energy" are core industries. This means that the public share of the environment industry employees is equal to the share of all employees in these NACE classes.

Number of employees in publicly owned establishments by NACE and environmental activity, 1999

NACE/Environment activity	A2 Waste water	A3 Waste	C2 Water supply	C4 Renewable energy	Other Environment activities	Total Public sector	Per cent Public sector
Energy (NACE 40)		450		3 190	191	3 831	93
Water supply (NACE 41)			2 158			2 158	99
Wastewater (NACE 90.001)	1 918					1 918	98
Waste collection (NACE 90.002)		2 935				2 935	54
Landfill (NACE 90.004)		83				83	86
Other NACE 90		610				610	31
Other NACE		680		87	1 287	2 054	13
Total Public sector	1 918	4 758	2 158	3 277	1 478	13 589	33
Per cent Public sector	48	35	88	85	16	33	

Source: Environment industry database and Swedish Business Register

One third of all employees in the environment industry database work in establishments that are publicly owned. These are, however, concentrated to a few NACE groups and activities:

- Wastewater treatment and water supply are mainly the responsibility of municipalities and over 98 per cent of the employees in NACE 41 "Collection, purification and distribution of water" and NACE 90.001 "Sewage disposal" work at publicly owned establishments.
- In the area of waste collection and treatment there has been a substantial privatisation. Only 54 per cent of the employees in NACE 90.002 "Waste collection" work in publicly owned establishments.
- NACE 90.004 "Landfills" is mainly a municipal responsibility. The Business Register is not complete, as many of the landfills are not classified as separate establishments.

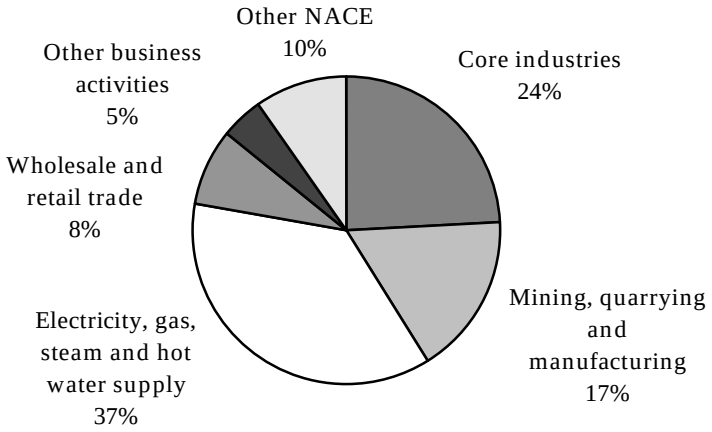
- There are also large shares of publicly owned enterprises in NACE 70 “Real estate, renting and business activities”, NACE 75 “Public administration and defence” and NACE 80 “Education”. These include government authorities responsible for different types of environment protection.

3.2 Turnover

In this section, the turnover in the primary enterprises will be described in detail. This information is produced by linking the environment industry database with the VAT register, which includes enterprises with a turnover over SEK 1 million. This means that information is available from the register (and presented here) for 2 871 of the 4 549 active primary enterprises. These enterprises however account for 98 per cent of all employees in the primary enterprises and at least 98 per cent of total turnover. As was mentioned above, for a limited number of enterprises (mainly municipalities) there are only one or a few establishments included in the environment industry database, and no information on turnover is available for these in the VAT register. Information on turnover might, however, be available in the Structural Business Survey and could be estimated in a future project.

Total turnover in 1999 for the enterprises with environment as their primary activity was SEK 81 billion, equalling 1.8 per cent of total turnover in the VAT register. NACE 40 ”Electricity, gas, steam and hot water supply” accounted for 37 per cent of the total environment industry turnover, the core industries (NACE 25.120, 37, 41, 51.57 and 90) for 24 per cent, and NACE 10-36 ”Mining, quarrying and manufacturing” accounted for 17 per cent of total turnover.

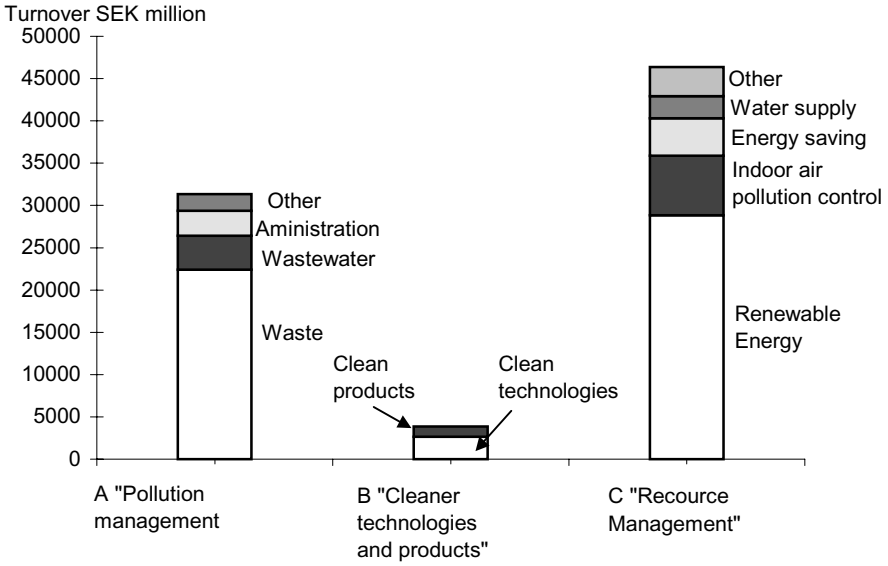
Environment industry turnover by NACE 1999, per cent



Source: Environment industry database and VAT Register

The largest environmental activities in terms of turnover are C4 ”Renewable energy” and A3 ”Solid waste management” with 36 and 28 per cent of total environment industry turnover.

Environment industry turnover by environmental activity 1999, per cent



Source: Environment industry database and VAT Register

The cross-classification of NACE groups and environmental activities shows that

- 54 per cent of turnover in environmental activity A2 ”Wastewater management” can be found in NACE 10-36 ”Mining, quarrying and manufacturing”, twice the size of turnover in the core industries (mainly NACE 90). This is mainly attributed to enterprises in NACE 29 ”Manufacture of machinery and equipment n.e.c.” producing machinery and equipment for wastewater management.
- Turnover in environmental activity B2 ”Cleaner products” is equally distributed between manufacturers in NACE 10-36 ”Mining, quarrying and manufacturing” and sellers in NACE 50-52 ”Wholesale and retail trade”. This is most likely due to the fact that it has been easier to identify the sellers of these products than the actual producers. Another possible explanation is that a larger share of the production can be found in enterprises with environment as a secondary activity.
- Manufacturers, however, dominate the production of clean technologies, equalling almost three-quarters of total turnover. Much of this turnover is attributed to enterprises in NACE 24 ”Chemical industry”.

Environment industry turnover by NACE and environmental activity 1999, SEK million

Environmental activity	Core Industries	Mining, quarrying and manufacturing (NACE 10-36)	Electricity, gas and hot water supply (NACE 40)	Wholesale and retail trade (NACE 50-52)	Other business activities (NACE 74)	Other NACE	Total
A1 Air	0	528	20	51	1	560	1 161
A2 Wastewater	1 033	2 181	0	411	113	256	3 995
A3 Waste	15 826	1 430	1 627	1 146	366	2 026	22 421
A4-5 Soil and Noise	0	607	0	9	161	42	818
A6 Administration	0	136	473	34	2 125	181	2 950
B1 Clean Technologies	0	1 921	456	73	170	13	2 633
B2 Clean Products	0	566	0	568	98	4	1 236
C1 Indoor air pollution	0	3 964	0	1 085	126	1 842	7 017
C2 Water supply	1 716	94	0	624	0	195	2 630
C3 Recycled materials	907	792	0	51	0	17	1 767
C4 Renewable energy	0	393	26 787	1 091	422	166	28 859
C5 Energy saving	0	985	362	1 097	109	1 865	4 418
C6 Sustainable Agriculture	0	13	0	75	6	677	772
C9-10 no code: Eco-tourism, other	0	105	0	0	1	8	113
Total environment industry	19 483	13 716	29 726	6 316	3 698	7 852	80 791
Per cent of total turnover	100,0	1,1	19,0	0,4	1,3	0,6	1,8

Source: Environment industry database and VAT Register

Change in turnover between 1998 and 1999

A first attempt to describe the development over time for environment industry turnover has been made. This relates to turnover in primary enterprises which are active, registered in the VAT Register and had turnover both in 1998 and 1999. A total of 2 686 or 94 per cent of the enterprises with turnover in 1999 were also active and had turnover in 1998. Turnover in these enterprises represents nearly 99 per cent of environment industry turnover in the VAT Register in 1999. A full estimate would also include enterprises with turnover in 1998 but not 1999 and vice versa. In a future study it would be interesting to expand the time series.

As can be seen in the table below total environment industry turnover decreased by SEK 1.5 billion. The enterprises in C4 ”Renewable energy” had a decrease in turnover of nearly SEK 3 billion between 1998 and 1999. Most of these enterprises are also found within NACE 40 “Electricity, gas, steam and hot water supply”. The main reason why there are such large differences between the two years is a sharp decline in the price of energy. Another possible reason why turnover has decreased is changed weather conditions. According to the Swedish Meteorological and Hydrological Institute (SMHI)[11], the average temperature in 1998 was clearly below the average temperature in 1999. The volume of precipitation also affects the production of hydroelectric power. These differences can influence the demand and the supply of electricity, and therefore the turnover. As shown in section 2.4, there were almost no changes in the number of employees in this NACE class and environmental activity between the two years.

[11] http://www.smhi.se

Turnover in other parts of the environment industry (all except C4 ”Renewable energy”) increased by SEK 1.4 billion (≈ two per cent) between 1998 and 1999.

- Turnover in A3 “Solid waste management” increased by six per cent, although the number of employees decreased by one per cent. This was the largest increase in monetary terms, SEK 1.2 billion.
- Both turnover and number of employees increased by about ten per cent in A6 “ Environmental monitoring, analysis and assessment”, an indication of the growing importance of environmental consultants.
- Turnover in B1 “Cleaner technologies” decreased by 21 per cent while the number of employees increased by four per cent. This environmental activity is however rather small and dominated by a few large enterprises.

Changes in environment industry turnover between 1998 and 1999 by environmental activity

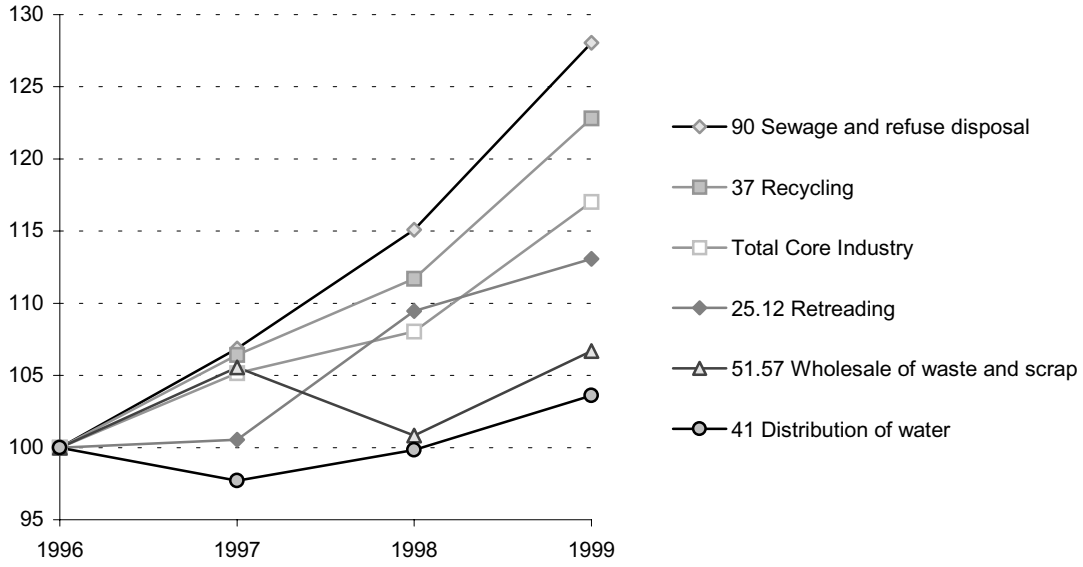
Environmental activity	SEK million	Per cent
A1 Air pollution control	103	10
A2 Wastewater management	-109	-3
A3 Solid waste management	1 246	6
A4-5 Soil and noise etc.	129	19
A6 Environmental monitoring, analysis and assessment	236	9
B1 Cleaner / resource-efficient technologies and processes	-690	-21
B2 Cleaner / resource-efficient products	146	14
C1 Indoor air pollution control	57	1
C2 Water supply	217	9
C3 Recycled materials	29	2
C4 Renewable energy	-2 937	-9
C9-10 no code Eco-tourism, other	41	1
Total	-1 532	-2

Source: Environment industry database and VAT Register

Time series for the core industries

For the core industries it is possible to produce a longer time series. The figure below presents the change in turnover between 1996 and 1999. Total turnover in the core industries has increased by more than 15 per cent in this four-year period. One possible reason for the large increase in NACE 90 “Sewage and refuse disposal, sanitation and similar activities” and NACE 37 “Recycling” could be the increased recycling trend in Sweden. Turnover in NACE 25.12 “Retreading” has also increased, contrary to the development in number of employees, as was shown in section 2.3. One probable reason is that this industry is machine and technology intensive, i.e. the labour requirement is comparatively low but the capital procurement cost is high for a new enterprise.

Turnover in the core industries 1996-1999. Index 1996=100.



Source: VAT Register

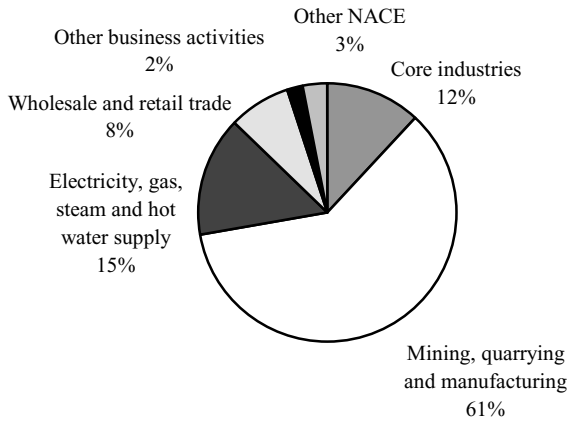
3.3 Exports

In this section, environment industry exports will be described in more detail. Data on exports is produced in the same way and with the same coverage as for total turnover, through linking the environment industry database with the VAT Register.

The exports in the primary enterprises were worth SEK 11 billion in 1999, which equals 1.4 per cent of total exports. The figure below shows the distribution of environment industry exports by NACE groups. This could be compared with the similar figure in the preceding subsection.

- The core industries account for 12 per cent of total exports, compared to 24 per cent of total turnover. This is almost exclusively from enterprises in NACE 51.57 ”Wholesale of waste and scrap” and NACE 37 ”Recycling”.
- Manufacturers in NACE 10-36 are much more important in terms of exports than in terms of turnover. They account for SEK 6.8 billion or 61 per cent of total exports, compared to 17 per cent of total turnover.
- The production of renewable energy in NACE 40 is mainly for national consumption. Although the exports share is low, the value of exports is still considerable compared to other parts of the environment industry. NACE 40 accounted for 15 per cent of total exports, compared to 37 per cent of total turnover.

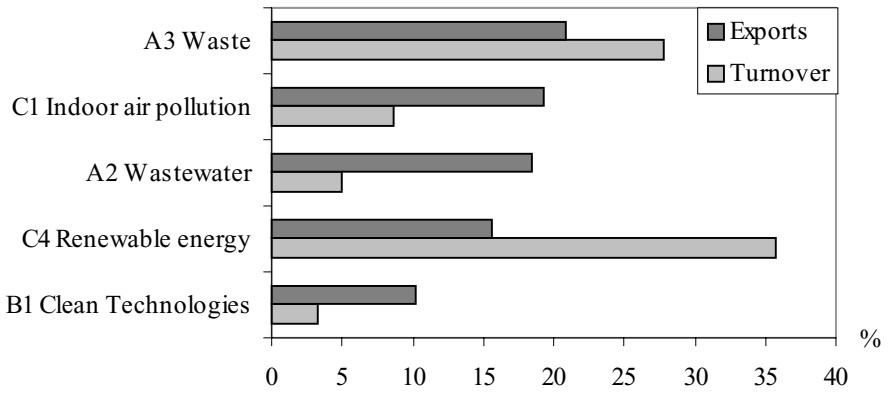
Environment industry exports by NACE 1999, per cent



Source: Environment industry database and VAT Register

Five environmental activities account for over 85 per cent of total environment industry exports. C1 ” Indoor air pollution control, A2 ” Wastewater management” and B1 ” Cleaner technologies” are much more important in terms of exports than turnover (see figure below). This is because enterprises in NACE 10-36 ”Mining, quarrying and manufacturing” account for a large share (over 50 per cent) of turnover in these environmental activities, and a large share of their products are exported. The exports in these environmental activities are almost exclusively from manufacturers. Important in terms of exports are also C4 ”Renewable energy” from NACE 40 ”Electricity, gas, steam and hot water supply”, A3 ”Solid waste management” by the core industries (37 and 51.57) and manufacturers in NACE 29 ”Manufacture of machinery and equipment” and NACE 34 ”Manufacture of motor vehicles, trailers and semi-trailers”.

Share of exports and turnover in the largest environmental activities 1999, per cent.



Source: Environment industry database and VAT Register

Earlier estimates of the volume of exports in the environment industry were produced for all enterprises regardless of status classification. The data presented here are limited to enterprises classified as primarily producing environmental goods and services. Two of the largest environmental activities in the earlier

estimates were enterprises in A6 ”Environmental monitoring, analysis and assessment” and C3 ”Recycled materials”. Much of these exports came from enterprises where the environmental activity is of a secondary nature. These environmental activities are of minor importance for the primary enterprises as can be seen in the table below. It is likely that the production in some environmental activities is more often of a secondary nature, e.g. clean technologies and products and recycled materials. An estimate of the value of total environmental production or exports (environmental component in primary, secondary, classes etc), instead of total environment industry production or exports as in this report (total primary), is therefore needed in order to value the overall importance of individual environmental activities.

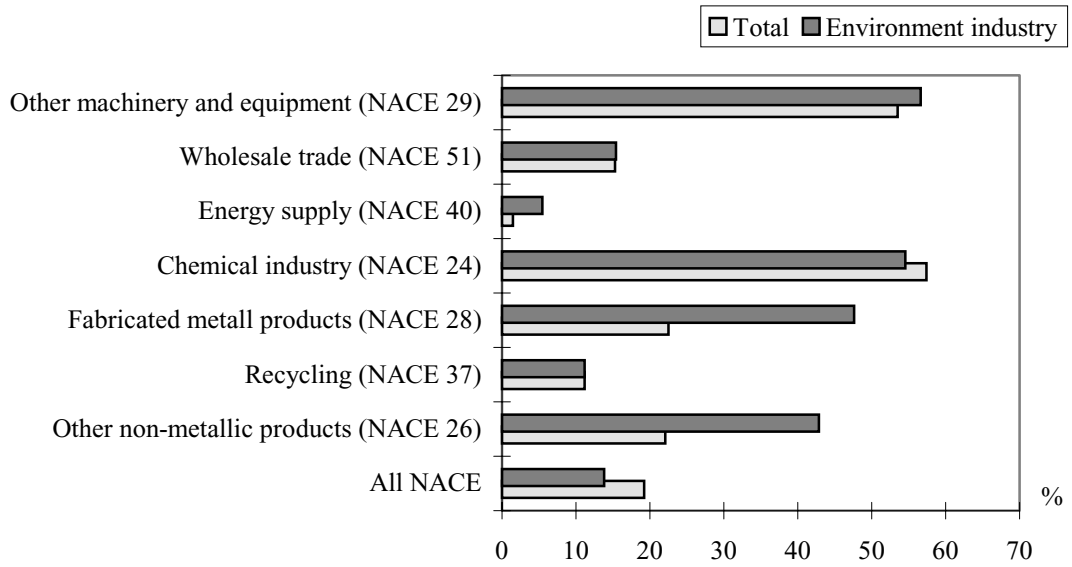
Exports by NACE and environmental activity 1999, SEK million

Environmental activity	Core Industries	Mining, quarrying and manufacturing (NACE 10-36)	Electricity, gas and hot water supply (NACE 40)	Wholesale and retail trade (NACE 50-52)	Other business activities (NACE 74)	Other NACE	Total
A1 Air	0	180	0	25	0	3	208
A2 Wastewater	8	1 765	0	69	37	168	2 048
A3 Waste	1 269	676	0	319	9	44	2 317
A4-5 Soil and Noise	0	262	0	2	1	1	266
A6 Administration	0	44	0	2	95	4	146
B1 Clean Tech	0	1 086	0	54	4	1	1 145
B2 Clean Prod	0	168	0	184	5	0	357
C1 Indoor air pollution	0	2 121	0	9	1	13	2 145
C2 Water supply	28	64	0	96	0	22	210
C3 Recycled materials	50	80	0	11	0	0	141
C4 Renewable energy	0	45	1 627	44	1	14	1 731
C5 Energy saving	0	309	0	73	20	11	413
C6 Sustainable Agriculture	0	0	0	10	0	2	12
C9-10 no code: Eco-tourism, other	0	2	0	0	0	0	2
Total	1 355	6 803	1 627	898	174	283	11 140

Source: Environment industry database and VAT Register

Exports constitute on average 14 per cent of total turnover (exports intensity) in the environment industry in 1999, compared to 19 per cent for the whole economy. The exports share varies considerably between industries, often but not always with a similar trend for the environment industry and the non-environment industry components (see figure below).

Exports intensity (share of turnover) in the NACE classes with largest environmental exports 1999, per cent



NACE 51 here includes the core industry NACE 51.57 "Wholesale of waste and scrap"
Source: Environment industry database and VAT Register

As could be expected, the exports intensity is clearly highest in the Manufacturing industries (NACE 15-37). In NACE 28 "Manufacture of fabricated metal products" and NACE 26 "Manufacture of non-metallic mineral products", the exportshare is twice as high in the environment industry enterprises as the average for the NACE group. Environment industry exports account for about 4.5 per cent of the total exports in these NACE classes compared to the average 1.4 per cent for the whole economy. In NACE 29 "Manufacture of machinery and equipment" and NACE 24 "Manufacture of chemicals and chemical products", the exportshare of total turnover in the primary enterprises is high but rather similar to the average in the respective NACE groups. Exports from the environment industry enterprises account for over five per cent of total exports in NACE 29.

Enterprises classified as primarily producing renewable energy in NACE 40 "Electricity, gas, steam and hot water supply" account for almost 15 per cent of total environment industry exports. As much as 70 per cent of the total exports in this NACE class are classified as environmental. Although the exports intensity is much lower than in the Manufacturing industries it is higher in the environmental than in the non-environmental sector, five compared to one per cent of total turnover.

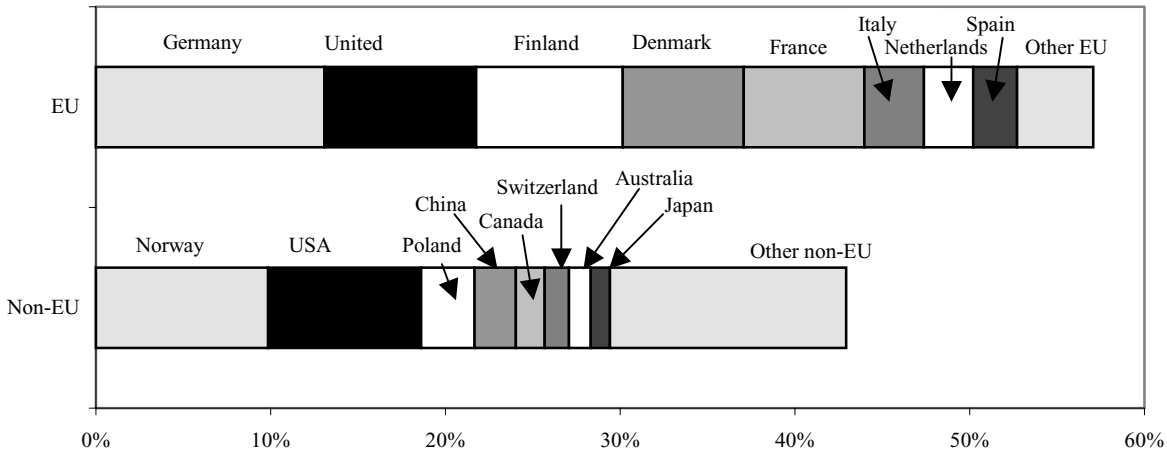
Exports corresponded to only five per cent of total turnover for the environmental consultants in NACE 74 "Other business activities", compared to the average 23 per cent. However, this is not surprising. These consultants are operating on a comparatively new market, which is still expanding. Therefore the focus is on the home market at the moment. These services also benefit from a close contact with the customer. Nevertheless, exports have increased by 22 per cent in the last two years, although from a low level, as shown later in this section.

Exports by countries
By combining the environment industry database with Foreign trade statistics, Intrastat, it is possible to get information on exports and imports for each individual enterprise broken down by countries. A first attempt to study the distribution of environment industry exports by countries has been made in this project.

1 170 of the primary enterprises had exports according to the VAT Register. 502 enterprises had exports according to Intrastat. The total value of exports in Intrastat, however, equalled SEK 7.9 billion, which is over 70 per cent of the total value of exports in the VAT Register.

The results show that 57 per cent of the environment industry exports went to EU member countries. The largest countries were Germany with 13 per cent of total exports, followed by theUnited Kingdom and Finland with 9 and 8 per cent respectively. 43 per cent of total environment industry exports were sold to countries outside the EU. The largest countries here were Norway with 10 per cent of total exports, followed by the USA with 9 per cent.

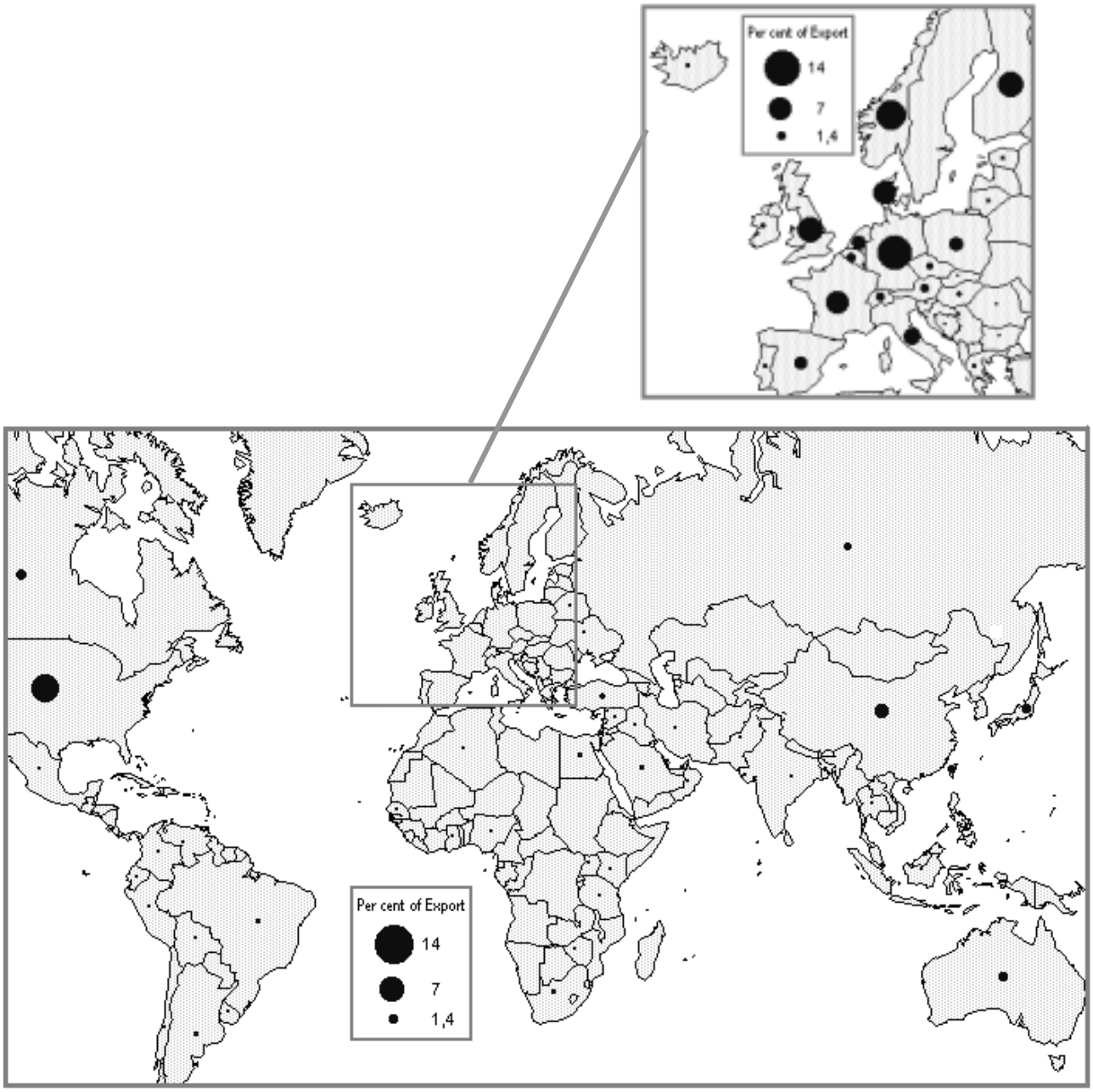
Environment industry exports to EU and non-EU countries 1999, per cent



Source: Environment industry database and Foreign Trade Statistics

The map below shows the relative size of environment industry exports to different countries. The majority of the exports (75 per cent) go to European countries and these are highlighted at the top of the map. The USA, Canada and China are the largest countries outside Europe.

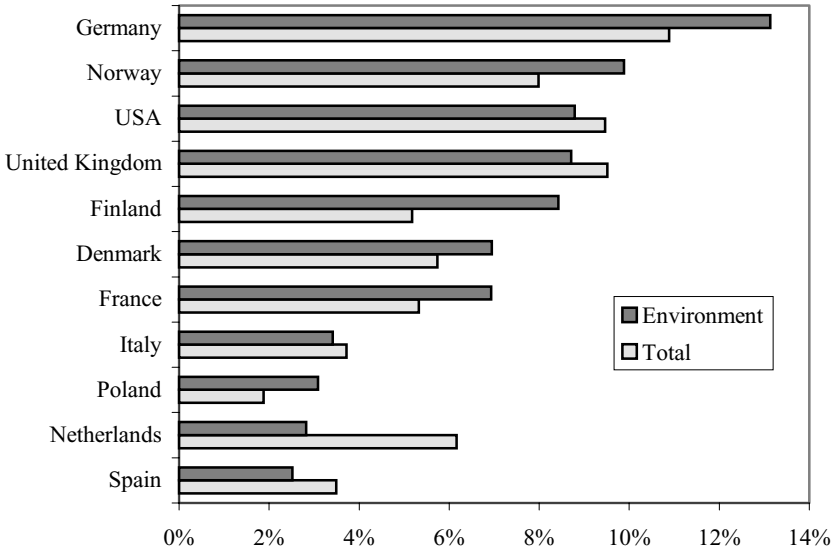
Geographical distribution of exports from the Swedish environment industry 1999



The map only includes countries where the exports exceed one million SEK.
Source: Environment industry database and Foreign Trade Statistics

The largest countries in terms of environment industry exports are also the largest in terms of total exports. However, there is a somewhat stronger concentration to Nordic and East European countries. Despite this, it is likely that a lot of environmental aid and exchange of technology with East European countries is not included in these exports figures. One reason is that Swedish government grants are used for investments in local enterprises. Another reason is that the exchange of technology often involves large groups of enterprises which are not classified as primary producers.

Share of environment industry and total exports for the largest countries 1999, per cent

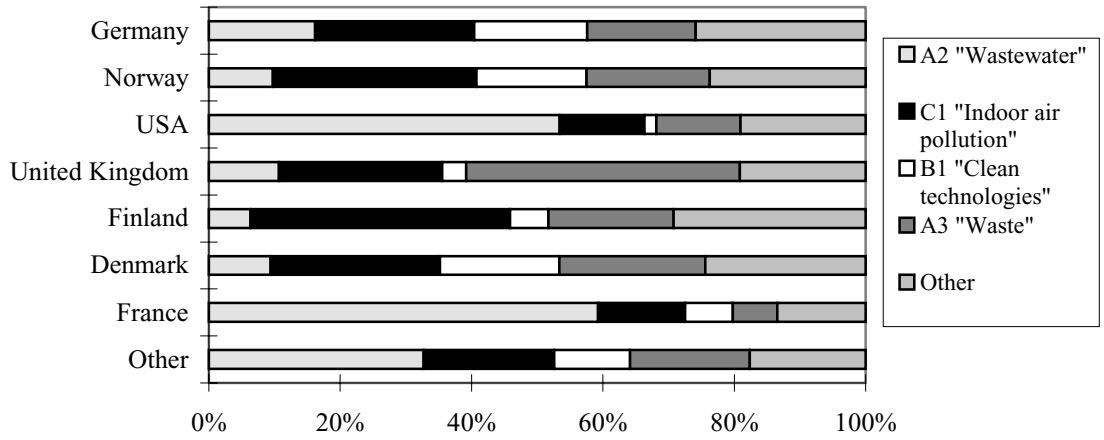


Source: Environment industry database and Foreign Trade Statistics

63 per cent of the environment industry exports go to seven countries. The importance of individual environmental activities differs between these countries, as can be seen in the figure below.

- Machinery and equipment for A2 ”Wastewater management” dominate the exports to France and the USA, with 59 and 53 per cent of total exports to these countries respectively. Italy, Canada and Australia are also important for this environmental activity.
- 40 per cent of the exports to Finland comes from environmental activity C1 ”Indoor air pollution control”.
- A3 ”Solid waste management” dominate exports to the United Kingdom, with over 40 per cent of exports. The exports to Spain are also of importance in this environmental activity.
- The exports to Germany, the largest country in terms of environment industry exports as well as total exports, are characterised by the relatively equal distribution between the environmental activities.
- The exports of clean technologies is quite important in Germany, Norway and Denmark. Half of the exports of clean technologies go to these three countries.

Exports from environment industry by environmental activity 1999, per cent



Source: Environment industry database and Foreign Trade Statistics

Change in exports between 1998 and 1999

A study of the development of environment industry exports has been made, similar to the one previously presented for turnover. This relates to exports by primary enterprises which are active, registered in the VAT Register and had turnover both in 1998 and 1999.

The total environmental exports for these enterprises has decreased by 9 per cent between 1998 and 1999. The largest decrease in exports is within C4 ”Renewable energy” and NACE 40 ”Electricity, gas, steam and hot water supply”, similar to the development of total turnover. This decline might be explained by price declines and changes in weather conditions between the years (as described in section 3.2 “Change in turnover between 1998 and 1999).

There has also been a decrease in A2 ”Wastewater management”, A3 ”Solid waste management” and B1 ”Cleaner technologies”. However, there is a need for more in depth analysis before drawing conclusions about this.

Change in environment industry exports between 1998 and 1999 by environmental activity

Environmental activity	SEK million	Per cent
A1 Air pollution control	-34	-14
A2 Wastewater management	-147	-7
A3 Solid waste management	-182	-7
A4-5 Soil and noise etc.	19	7
A6 Environmental monitoring, analysis and assessment	26	22
B1 Cleaner technologies	-201	-15
B2 Cleaner products	28	9
C1 Indoor air pollution control	98	5
C2 Water supply	58	38
C3 Recycled materials	-19	-12
C4 Renewable energy	-764	-31
C9-10 no code Eco-tourism, other	-7	-2
Total	-1 125	-9

Source: Environment industry database and *VAT Register*

3.4 Financial information

The environment industry database has been linked with the Structural Business Survey. This makes it possible to get detailed information on e.g. operating profits, value added, gross investments and other information from the profit and loss accounts and balance sheets. Information on enterprise statistics is available for 3 167 of the 4 549 active primary enterprises. These however account for 93 per cent of all employees in the primary enterprises. The table below presents four variables from the Structural Business Survey.

Environment industry financial data by environmental activity 1999, SEK million

Environmental activities	Operating profit	Annual result	Value added	Gross investment
A1 Air pollution control	50	5	339	23
A2 Wastewater management	303	188	1 417	411
A3 Solid waste management	1 230	669	6 184	2 283
A4-5 Soil and noise etc.	50	47	207	16
A6 Environmental monitoring, analysis and assessment	133	62	1 163	200
B1 Cleaner technologies	253	1 434	924	442
B2 Cleaner products	10	8	225	38
C1 Indoor air pollution control	293	53	1 947	150
C2 Water supply	339	-1	1 029	509
C3 Recycled materials	81	33	545	95
C4 Renewable energy	4 539	3 965	9 896	1 783
C5 Energy saving	206	109	1 051	205
C6 Sustainable Agriculture	91	67	243	512
C9-10 no code: Eco-tourism, other	18	1	43	25
Total	7 596	6 640	25 213	6 690

Source: Environment industry database and Structural Business Survey

The information above basically follows the size of the environmental activities e.g. in terms of turnover. Financial information from the Structural Business Survey is often published in the form of a selection of indicators, which makes it easier to analyse the characteristics of each activity. The table below presents nine of these indicators for each environmental activity.

The first two indicators describe the rate of return, first compared with adjusted equity, and then compared with the total assets. Several environmental activities have high rates of return. C1 ”Indoor air pollution” has the highest return on equity, and C5 ”Heat and energy saving” has a high return on total assets. Low rates of return can be found in B “Cleaner technologies and products”. For the NACE groups, the highest rate of return on equity in the environment industry is in the core industries, but as their solidity is lower than the other NACE groups the return on total assets is not as high. The environment industry enterprises in NACE 74 “Other business activities” have much lower figures for both these indicators than the average in the NACE class.

The third and fourth indicator relates the profit and loss to net sales, without and with financial income respectively. Environmental activities C2 ”Water supply” and C4 “Renewable energy” have high shares of net profit. They also have high shares of value added per employee, as can be seen in the fifth indicator. This indicates also how capital-intensive the business is.

Indicators number six and seven are related to revenues and costs. The first relates net sales to the number of employees. The second relates labour costs to net sales. A capital-intensive industry would have high figures on the first indicator and low on the second. This is the case mainly for B1 ”Clean technologies” and C4 ”Renewable energy”.

The two final indicators are related to assets. Indicator number eight relates equity to total assets and is a measure of how solid the financial situation is. The last indicator relates net sales to total assets. B1 ”Clean technologies” have high figures on the first of these indicators and low on the second. This would indicate that this environmental activity is dominated by large and financially solid enterprises.

Environment industry financial indicators by environmental activity 1999

Environmental activities	Rate of return		Profit / loss			Revenues and costs		Assets	
	1	2	3	4	5	6	7	8	9
A1 Air pollution control	29	8	3	3	420	1 386	26	22	2,4
A2 Wastewater management	19	9	9	10	616	1 519	26	33	0,9
A3 Solid waste management	26	8	6	8	537	1 664	19	22	1,0
A4-5 Soil and noise etc.	25	15	8	11	480	1 449	23	60	1,5
A6 Environmental monitoring, analysis and assessment	14	6	6	7	471	945	38	33	1,0
B1 Cleaner technologies	10	6	4	18	687	4 846	9	44	0,3
B2 Cleaner products	2	2	1	1	410	1 682	21	32	1,6
C1 Indoor air pollution control	37	10	5	6	426	1 270	26	25	1,8
C2 Water supply	13	7	19	19	966	2 078	20	10	0,4
C3 Recycled materials	18	8	5	5	433	1 305	24	31	1,5
C4 Renewable energy	13	8	15	21	1 948	5 626	9	36	0,4
C5 Energy saving	25	12	7	7	419	1 255	24	36	1,6
C6 Sustainable Agriculture	13	8	13	18	541	1 524	15	34	0,4
C9-10 no code: Eco-tourism, other	94	26	18	18	513	1 162	24	25	1,4
Total environment industry	15	8	10	14	732	2 217	16	34	0,6
All industries	15	8	6	11	507	1 812	18	34	0,8

Rate of return

1	Rate of return on adjusted equity	Profit / loss after financial items in per cent of adjusted equity
2	Rate of return on total assets	Operating profit / loss plus financial income in per cent of total assets

Profit/loss

3	Gross margin	Operating profit / loss in per cent of net sales
4	Profit margin	Operating profit / loss plus financial income in per cent of net sales
5	Value added / number of employees	Value added in per cent of number of employees

Revenues and costs

6	Net sales / number of employees	Net sales in per cent of number of employees
7	Labour costs / net sales	Labour costs in per cent of net sales

Assets

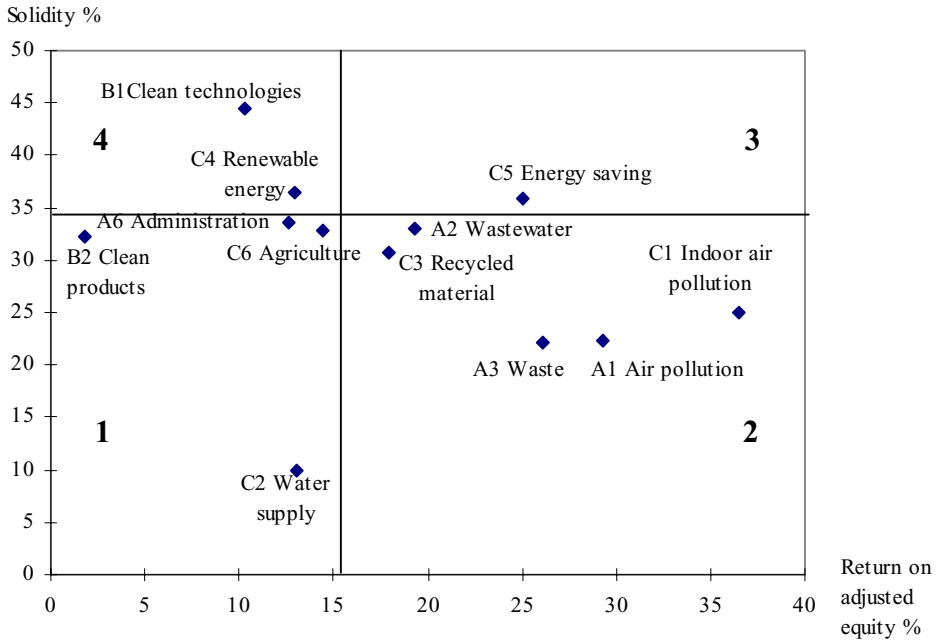
8	Solidity	Adjusted equity in per cent of total assets
9	Net sales / total assets	Net sales in per cent of total assets

Source: Environment industry database and Structural Business Statistics

The figure below presents the average solidity and return on adjusted equity in the environmental activities (indicators number 1 and 8 in the table above). These are two indicators which are often used in financial analysis. The average solidity in the environment industry and in the whole economy is 34 per cent, and the average return on adjusted equity both in the environment industry enterprises and the whole economy is 15 per cent. This is indicated in the figure by the straight lines,

which divide the figure into four parts. Theoretically a movement from square 1 to 4 over the lifetime of an enterprise could be imagined. The comparison made below should be seen as an example and preliminary indicator only. Some of the environmental activities are rather small, there is information for one year only, and more analysis of the reasons behind the structure shown in the figure below is needed.

Solidity and return on adjusted equity by environmental activity 1999, per cent



Source: Environment industry database and Structural Business Survey

1. The first square is characterised by both low solidity and low return on equity. This might be the characteristic of new enterprises. Included here is environmental activity C2 ”Water supply”. Municipals often owns these enterprises, but their solidity is nowadays quite often rather low. In principle, these municipal activities are not allowed to generate profit.
2. In the second square the solidity is low but the return on equity is high. This might be the characteristic of the relative new enterprise which has started to generate profit but which has not yet been able to build up a good solidity. Included are the environmental activities A1 ”Air pollution control”, A3 ”Solid waste management” and C1 ”Indoor air pollution control”.
3. In the third square both the return and solidity are above average. This is the characteristic of the successful enterprise which keeps on generating good profits, but also has had time to build up good solidity. Included in this square is environmental activity C5 ”Energy saving”.
4. In the fourth and final square the solidity is above average, but the return on adjusted equity is lower. This might be the characteristic of the mature enterprise which has generated enough profit in its time to build up solidity but now has started to generate lower returns. These enterprises need to find new markets to invest in or they could run a risk of a takeover. Included here are environmental activities B1 ”Cleaner technologies” and C4 ”Renewable energy”.

3.5 Small and medium-sized enterprises

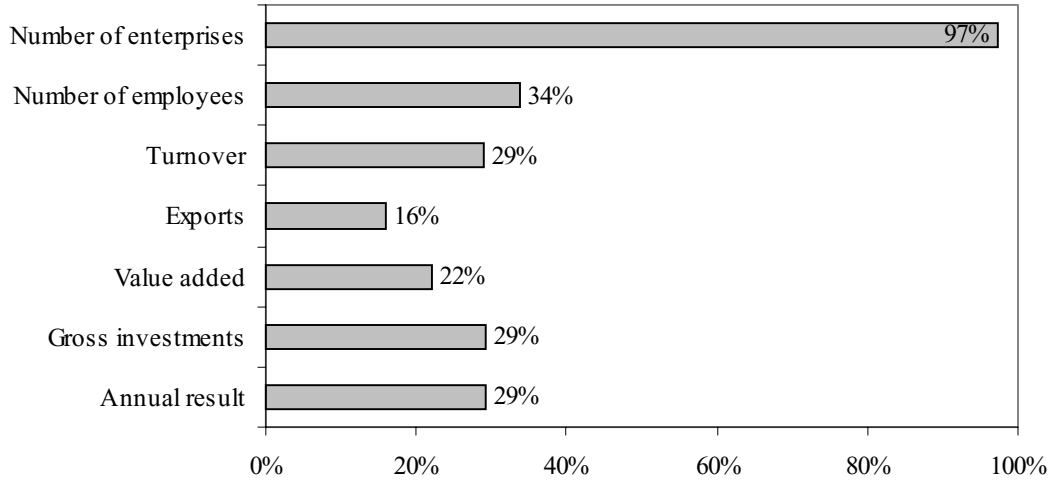
There has been a special focus on small and medium-sized enterprises (SME) in recent years, especially as regards possibilities of providing new jobs in the future. The definition of small and medium-sized enterprises in Sweden is enterprises with less than 50 employees. Because Sweden is a small country this is equivalent to the Eurostat definition of small enterprises. As all data presented in this report is linked with the Business Register, it is possible to provide detailed economic data and data on employment broken down by size classes. This section presents the first attempt to provide this kind of data. The figures presented relate to active primary enterprises with less than 50 employees.

The table below presents an overview of the importance of small and medium-sized enterprises for different variables. A vast majority of the environment industry enterprises, 97 per cent, have less than 50 employees. This is similar to the overall share of SMEs in the Business Register (99 per cent). These enterprises account for one third of total employees in the primary enterprises, and 29 per cent of their turnover.

Exports is more dominated by large enterprises. The small and medium-sized enterprises account for only 16 per cent of environment industry exports. There has been a discussion in Sweden recently on how to improve the possibilities for small environment industry enterprises to exports. One possibility that has been mentioned is to use the information in the environment industry database and make it easier for these enterprises, which often specialise in specific areas, to get joint contracts.

Nearly 30 per cent of the gross investments are made in enterprises with less than 50 employees and these enterprises account for 22 per cent of the value added in the environment industry. The solidity in SMEs is slightly above and the return on equity is slightly below the average in the environment industry, with 37 and 14 per cent respectively.

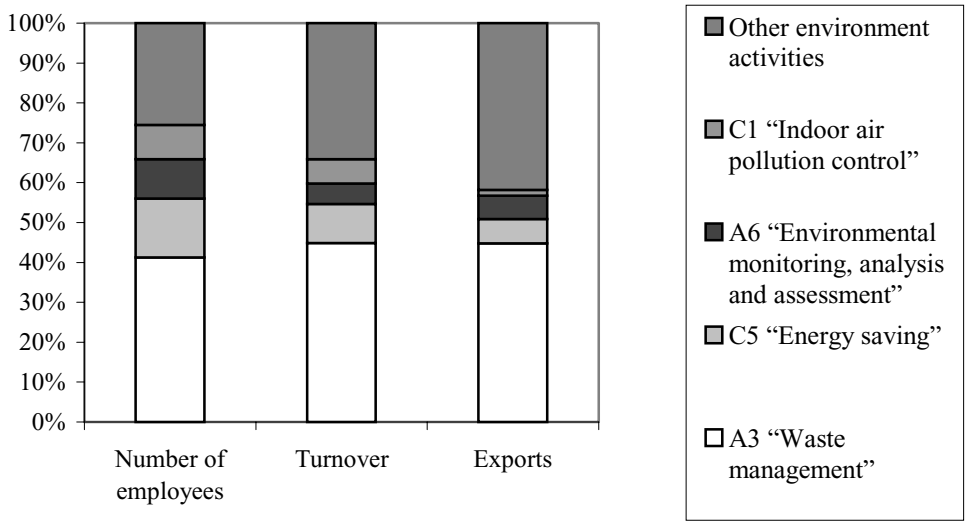
The importance of enterprises with less than 50 employees (SMEs) in the environment industry 1999, per cent



Source: Environment industry database, Swedish Business Register, VAT Register and Structural Business Survey

Four environmental activities account for nearly three-quarters of all employees in SMEs. 41 per cent work in A3 “Waste management”, 15 per cent in C5 “Energy saving”, 10 per cent in A6 “Environmental monitoring, analysis and assessment”, and 9 per cent in C1 “Indoor air pollution control”. These environmental activities also account for 66 per cent of SME environment industry turnover and 58 per cent of SME environment industry exports. Environmental activity C4 “Renewable energy” is also important in terms of turnover, and for exports environmental activities A1 “Air pollution” and A2 “Wastewater” are important.

Environment industry employees, turnover and exports in enterprises with less than 50 employees by environmental activity 1999, per cent.



Source: Environment industry database and Swedish Business Register, VAT Register

The share of SMEs in the environmental activities shows a different picture as can be seen in the table below. The environmental activities that are dominated by small and medium-sized enterprises are C6 “Sustainable agriculture” and C9-10 “Eco-tourism, other”. These types of enterprises mostly have less than 50 employees. There is also a rather large share of SMEs in A6 “Administration”, B2 “Clean products”, C3 “Recycled materials” and C5 “Energy saving”.

One reason why SMEs are important in A3 “Waste management” is that collection of waste does not demand many employees. Another possible reason is that many municipalities have outsourced the collection of mainly household waste to small private enterprises, which are responsible for a smaller region.

Many of the environmental consultants in NACE 74 “Other business activities” and environmental activity A6 “Environmental monitoring, analysis and assessment” work in SMEs. Enterprises with less than 50 employees account for 43 per cent of all environment industry employees in NACE 74, 60 per cent of turnover, and 74 per cent of exports.

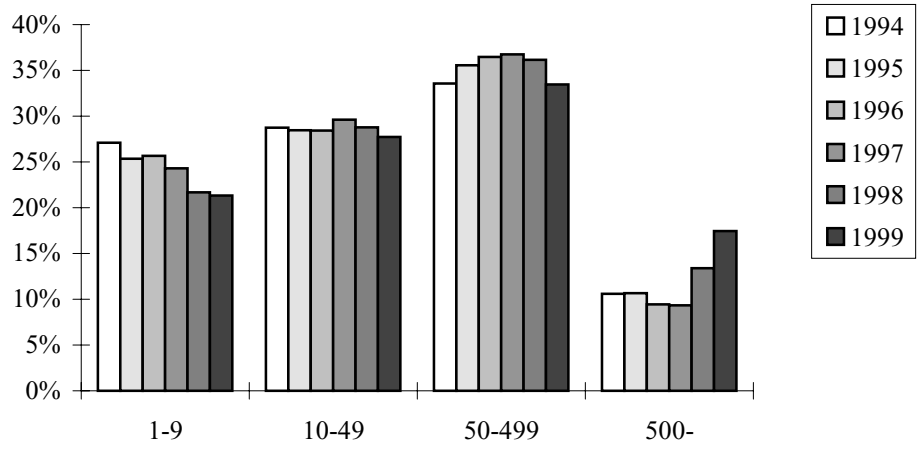
Share of environment industry employees, turnover and exports in enterprises with less than 50 employees by environmental activity 1999, per cent

Environmental activity	Employees	Turnover	Exports
A1 Air pollution control	22	26	59
A2 Wastewater management	24	31	8
A3 Solid waste management	43	47	34
A4-5 Soil and noise etc.	42	26	2
A6 Environmental monitoring, analysis and assessment	36	41	71
B1 Cleaner technologies	13	25	6
B2 Cleaner products	47	58	26
C1 Indoor air pollution control	20	20	1
C2 Water supply	13	13	46
C3 Recycled materials	49	52	53
C4 Renewable energy	11	10	6
C5 Energy saving	59	52	26
C6 Sustainable Agriculture	53	84	100
C9-10 no code: Eco-tourism, other	100	100	100
Total SME	34	29	16

Source: Environment industry database, Swedish Business Register and VAT Register

Many of the enterprises with less than 50 employees are included in the core industries. The core industries account for about 40 per cent of SME environment industry employees, turnover and exports. This could be compared with the core industries' share of the environment industry totals, which are 36 per cent of employees, 24 per cent of turnover, and 12 per cent of environment industry exports. However, it seems that the relative importance of larger enterprises has increased over the last few years. The figure below shows the development of the share of employees in four different size classes between 1994 and 1999. The share of employees in the core industries working in the smallest enterprises (1-9 employees) has decreased from 27 to 21 per cent, while the share in the largest size class has increased dramatically in the last two years.

Share of employees in the core industries in different size classes 1994-1999, per cent



Source: Swedish Business Register

4 Internal green jobs

The other sections in this report include data on environment industry products and services which are bought and sold on the market. Estimations of the total value of environment industry activities also include internal activities, which are in effect production of environmental services for own use. Examples of internal activities are in-house waste collection and treatment, management of own wastewater treatment plants, education and training and other general administration.

One reason to include this in the estimate is that in many cases the enterprise has a choice between own production and buying the service from e.g. environmental consultants. There has been a trend in Sweden for enterprises to concentrate more and more on their main activity. This means that changes in the size of the environment industry might be explained by changes in the level of ”outsourcing” of the internal activities. This could also be a reason why the importance of environmental consultants and environmental activity A6 “Administration” has increased in recent years, both in terms of turnover and number of employees.

Information on internal activities is available in the survey of environmental protection expenditure in industry in 1997. In this section, data from that survey are used to estimate the labour costs associated with internal environmental protection activities and the equivalent number of employees. It should be said that the definition of environmental protection is much narrower than the definition of environment industry activities. Environmental protection corresponds mainly to environmental activity A ”Pollution Management”, since it excludes many activities linked with management and saving of natural resources, such as recycling, water supply, energy saving, etc.

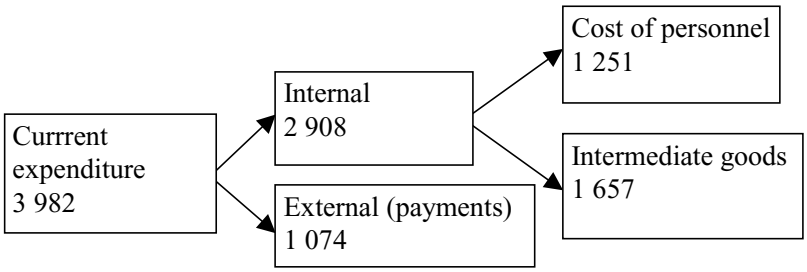
In the survey, enterprises were asked to record separately the total labour costs for internal environmental protection activities. Several enterprises included these costs under the item current expenditure without answering this separate question. However, enterprises were asked to give a rather detailed breakdown of their current expenditure both between payments for bought services and internal expenditure, and between eight different cost-types. The internal current expenditure on two cost-types can be regarded as consisting more or less solely of labour costs: general administration and research and development.

The cost of employees has been estimated by using the information in the separate question on labour costs for each enterprise, or the sum of the internal current expenditure on general administration and R&D, if that was higher. Written comments in the survey forms for all enterprises in NACE 21 ”Manufacture of pulp, paper and paper products”, NACE 27 ”Manufacture of basic metals” and a selection of the largest enterprises in other NACE classes have been analysed. In a few cases the written information made it possible to adjust the estimate of the labour costs for these enterprises. The estimate should be seen as a minimum since labour costs are also a part of other cost-types, mainly maintenance and control, and these costs are only included in the estimate if the enterprise answered the separate question.

The breakdown of current expenditure is shown in the figure below. Total current expenditure for environmental protection in the industries Mining and quarrying, Manufacturing and Energy supply (NACE 10-40 excluding 37) was SEK 3 982 million. This could be further divided into payments for external services of SEK 1 074 million, and internal expenditure of SEK 2 908 million. Now internal expenditure has been further divided into personnel costs of SEK 1 251 million, the remaining SEK 1 657 million being costs for energy and other intermediate goods used for environmental protection purposes.

Only information on labour costs is used here. However, it is not likely that many of the intermediate goods could be identifiable as used for environment purposes, so the value of these is most likely not included in the environment industry estimate. These costs could be seen as part of the indirect effects of the internal activities. A complete picture of the total importance of environment industry activities should include not only internal and external activities, but also the suppliers of goods and services needed to produce the environmental goods and services. This could be estimated through the use of so-called input-output analysis.

The components of current expenditure for environmental protection in industry 1997, SEK million



Source: Environmental Protection Expenditure Survey

Information from the Structural Business Statistics Survey on total labour costs and average number of employees in each NACE class 1997 have then been used to estimate that the SEK 1 251 million represents 3 332 employees. Both the total population and the sample for the industry survey include enterprises which are already included in the environment industry database. In order to make comparisons with the number of employees in the environment industry presented earlier in this report, adjustments were made in order to avoid double counting. This mainly affects NACE 40 ”Energy supply” where most of the primary environment industry enterprises were part of the sample and population for the industry survey. The results show that there are 2 302 internal employees in industries outside the environment industry enterprises.

Labour costs and number of employees for internal environmental protection in industry 1997.

NACE	Industry	Labour cost SEK million	Internal employees	Internal employees adjusted
10-14	Mining, quarrying	15	40	40
15-16	Food, beverages, tobacco	46	146	146
17-19	Textile, leather	18	69	69
20	Wood products	40	136	132
21-22	Pulp and paper	158	433	373
23	Coke, petroleum	3	7	7
24	Chemicals	135	325	317
25	Rubber and plastic	20	65	62
26	Other mineral products	23	71	59
27	Iron and steel	65	181	181
28	Other metal products	55	188	185
29-36	”Other manufacturing”	278	778	683
40	Energy	394	893	48
	Total	1 251	3 332	2 302

Source: Environment industry database, Environmental Protection Expenditure Survey and Structural Business Survey

5 Future work

This study has improved the environment industry database by using a database of the official description of business activities enterprises provide when they register a new enterprise or change the name of the enterprise. However, the database is still far from complete and more work is needed in order to make the database as complete and correct as possible. Some databases used in the former work could be used more thoroughly for example by introducing futher key words. There is also a great need to build up routines for getting new information from the different registers used in order to facilitate the work of keeping the environment industry database up to date. This is very important since there are plans for regular statistics production in this area.

A regular database / register on the environment industry would among other things make time series for the whole environment industry possible. This would be of great interest for analysis of the development as well as a tool for measuring the quality of data maintained.

The new areas involved in this report such as exports by countries, financial data and information on small and medium-sized enterprises should be analysed in more detail in the future. This might be done in cooperation with experts in the statistical registers and surveys involved.

In the future it would be interesting to introduce specific surveys sent to a selection of environment industry enterprises in order to test and match the various types of information produced here and improve the database.

One area that needs further examination is the environment industry component (often secondary) in large enterprises such as ASEA and SKF and municipalities where not all establishments are included. Today, there is a lack especially of economic data about these important parts of the environment industry.

It would be very useful if the Swedish Business Register contained a description of business activity for all enterprises. If that was possible, it would open up many new possibilities for analysing the economy and labour market in new dimensions. The basic problem when examining the environment industry, or other “new” industries is that the NACE code system is not specific enough and changes much more slowly than the economy does. If these descriptions were available in the Swedish Business Register, it would be possible to find producers in any area through key words. This would make the information system much more useful, not only when examining the environment industry, but when new lines of products or production arise. Another new area of interest in Sweden, which is difficult to examine via the ordinary registers, involves ethical enterprises, dealing in ethical production and trade.

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Foreign trade statistics (Intrastat)
Structural Business Statistics Survey
Swedish Business Register - The number of employees is based on the employers' estimated figures for annual workers.
VAT Register

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