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# Environmental goods and services sector in Sweden 2002-2005

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# Preface

This report has been prepared on commission from Eurostat, which supports and coordinates the development of environmental statistics in the EU Member States. The European Commission through DG Environment has contributed financially to the project. Hanna Brolinson, Maja Cederlund and Mats Eberhardson have carried out the work and are responsible for the contents of the report.

In 1993, Statistics Sweden, the National Institute of Economic Research and the Swedish Environmental Protection Agency were instructed by the Government to prepare a study covering the physical links between the economy, the environment and natural resources, the monetary reflection of these relations and the state of the environment. The aim of the work on environmental accounts at Statistics Sweden is to develop and maintain a system of physical accounts that are linked to the production and consumption activities described in the national accounts. In practice, this means developing and maintaining a system of environmental and natural resource statistics linked to the industry, product and sector categories used in the national accounts, thus forming a satellite system of accounts around the national accounts.

According to the UN, a system of environmental accounts should in principle cover[1]:

• Flows of materials through the economy, e.g. energy and chemicals, together with the emissions and waste to which these flows give rise. Within the EU, many countries have opted to use the NAMEA system[2] to describe these flows.
• Economic variables that are already included in the national accounts but are of obvious environmental interest, such as investments and expenditure in the area of environmental protection, environment-related taxes and subsidies and environmental classification of activities and the employment associated with them.
• Natural resources: Environmental accounts should make it possible to describe stocks and changes in stocks of selected finite or renewable resources. Environmental accounts should deal both with questions related to the monetary valuation of this natural capital and qualitative aspects that do not have any market or other defined monetary value, e.g. the value of outdoor life and biodiversity.

Statistics Sweden, February 2007

[1] The SEEA handbook can be downloaded at http://unstats.un.org/unsd/envAccounting/seea2003.pdf
[2] NAMEA stands for National Accounting Matrix including Environmental Accounts. In principle this is a Social Accounting Matrix (SAM) supplemented by environmental accounts data on, e.g., emissions to air and waste, linked to the Use and Supply Matrices that a SAM is constructed around. Just as a SAM is a way of presenting national accounts data, NAMEA is a way of presenting environmental accounts data.

# Summary

The interest for the environmental technology sector is large both internationally and in Sweden. The world market for the environmental technology sector is considered to be fast growing. A recent report[3] from the European Commission, DG Environment estimates the annual turnover for the environmental technology sector in the EU to 227 billion euros. The total direct and indirect employment in the environmental sector is estimated to 3.4 million full-time job equivalents. Its exports are estimated to 13 billion euros and imports to 11.1 billion euros, of which 57% of the trade is within EU.

The environmental sector is hard to define as it is interdisciplinary. The terms environmental sector, environmental technique, green jobs, eco-industry, environmental companies and establishments are all used with different definitions but with the common aim of describing a sector which has the purpose of preventing and treating environmental damage or of providing techniques that are less environmentally damaging than existing techniques. A general definition, used by Statistics Sweden, of an establishment belonging to the environmental sector has been developed within OECD/Eurostat:

"Environmental goods and services industry consists of activities to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use."[4]

Since 1998 the Environmental Accounts at Statistics Sweden has developed a database containing enterprises and their establishments that are active in the environmental goods and services sector (hereafter referred to shortly as the environmental sector). The main work with this database was performed between 1999 and 2000 and thereafter between 2003 and today. One driving force for building up the database has been the interest of the European Union and Eurostat. It has been predicted that the environmental sector will become an area of economic growth and the demand for environmental technology is growing, according to many actors. In this perspective, Statistics Sweden finds it important to provide information about this sector to determine whether it is decreasing or increasing in terms of, for example, employed men and women, exports and turnover.

**Purpose and method**
The main purpose of this project is to further improve the methodology behind the identification of the population of environmental establishments as well as to present data for the period 2002 to 2005. This includes also trying to improve the present classifications used in the database, something which is necessary to enable a more correct estimation of the total environmental sector in the future. A second purpose of the report is to study the possibilities of including environmental products in the database and to investigate if a 'product view' is applicable in the environmental sector. An international comparison on methods and data availability will also be performed.

The database of the Swedish environmental sector is built on existing register data. The attempt is to build up a database which contains a total population of Swedish establishments in the environmental sector. As it is not just a sample, it makes it possible to link other register data to

[3] EU, 2006
[4] OECD/Eurostat, 1999

the population. In addition to turnover, exports and employment, as discussed in this report, it can be interesting to also link imports, wages and education levels to the environmental sector establishments. The method used to build up the Swedish environmental sector database can be described in three steps

1. Identification of the population
2. Classification
3. Adding supplementary information

The current report discusses two different perspectives. The first one is the Swedish environmental sector from an establishment perspective, i.e. the perspective that has been developed and used in Sweden since the end of the 1990s. The second one uses a different starting point, initiating a new perspective not previously used in Sweden, a product perspective.

**Summarised results – establishment perspective**

In Sweden the environmental sector employs more than 50 000 people in the primary sector (in more than 8 000 establishments) and more than 40 000 people in the secondary sector (in almost 7 000 establishments), see Figure 1 below. The actual employment figure can be said to be somewhere in this interval of 50 000 and 90 000 people. A little more than 1% of the total employed men and women in Sweden in 2004 worked in the primary environmental sector. If we include the secondary sector, the percentage increases to just over 2%. Of the people employed in the Swedish environmental sector, 20% are women and 80% are men. This share varies with environmental domain. For example, the shares in the primary sector for Environmental monitoring etc. were 41% women and 59% men in 2004.

Exports from the Swedish environmental sector had a value of more than 2 billion euros from the primary sector and almost 1 billion euros from the secondary sector. The turnover of the Swedish environmental sector amounts to more than 16 billion euros in the primary sector and more than 10 billion euros in the secondary sector.

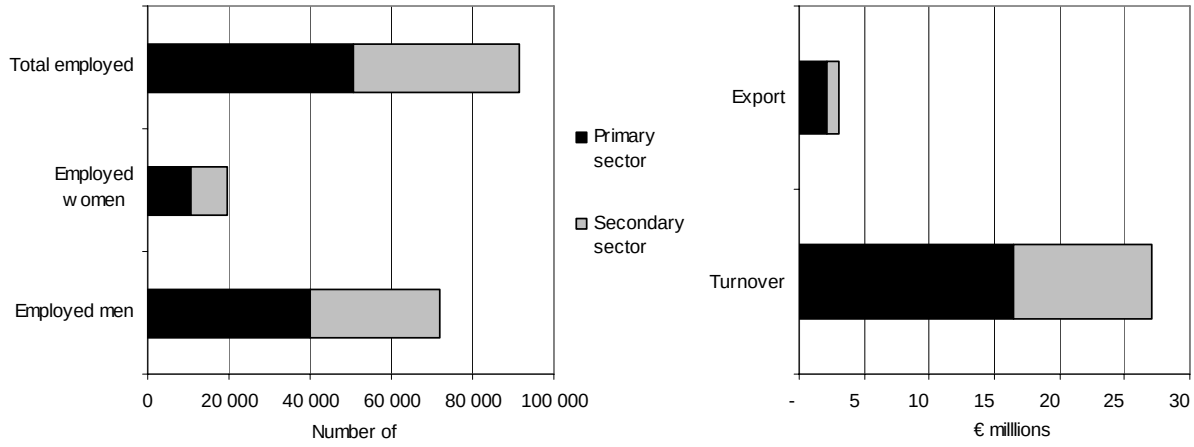


**Figure 1** Swedish exports, turnover, and employed men/women in primary and secondary environmental sector. 2004/2005 (number and million euros)

Studying the environmental sector over time, it can be seen that the sector is growing steadily. Table 1 presents data for turnover, exports and employed people for the period 2002 to 2005. It has not been possible to present employment data for 2005.

**Table 1.** Exports, turnover and employed men/women in the Swedish primary and secondary environmental sectors. 2002-2005 (number and million euros)

| | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| **Primary environmental sector:** | | | | |
| Turnover (€ millions) | 12 710 | 14 466 | 14 376 | 16 468 |
| Export (€ millions) | *n.a.* | 1 522 | 1 652 | 2 129 |
| Total employed | 49 487 | 49 620 | 50 621 | *n.a.* |
| *Employed women* | *10 114* | *10 348* | *10 439* | *n.a.* |
| *Employed men* | *39 373* | *39 272* | *40 182* | *n.a.* |
| **Secondary environmental sector:** | | | | |
| Turnover (€ millions) | 9 761 | 11 416 | 9 886 | 10 568 |
| Export (€ millions) | *n.a.* | 820 | 938 | 926 |
| Total employed | 38 554 | 39 631 | 40 811 | *n.a.* |
| *Employed women* | *8 545* | *8 884* | *9 067* | *n.a.* |
| *Employed men* | *30 009* | *30 747* | *31 744* | *n.a.* |

n.a. = not available

When breaking down exports, turnover and employed people by environmental domain, as in Figure 2 below, it is seen that the domain Air pollution control has larger exports than domestic turnover. Also the domains Wastewater management, Indoor air control, Recycled materials and Other resource management are export-intensive.

The domain Renewable energy is an example of the opposite, not exporting as much in relation to total turnover. Other domains that depend more on domestic turnover than on exports are, for example, Other pollution management (including soil, groundwater, noise and vibration) and Sustainable agriculture/fishery and forestry.

A comparison of the number of employed people with turnover gives an indication of work intensity. The environmental domain Environmental monitoring etc. has a larger share of employed people than of turnover. The domain Renewable energy, on the other hand, has a larger share of turnover than of employed people.

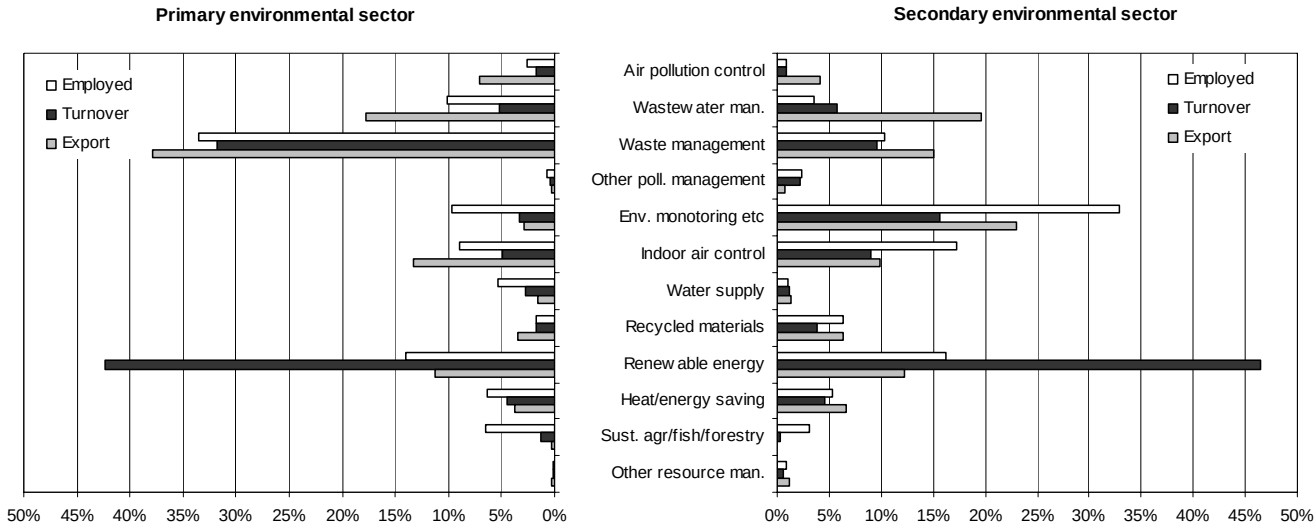


**Figure 2.** Employees, turnover and exports by environmental domain in the Swedish primary and secondary environmental sectors. 2004/2005 (Expressed as percent of total values in each sector)

It is also possible to break down the results into regions. In Figure 3, it can be seen that the environmental sector is concentrated in the south, east and middle of Sweden.

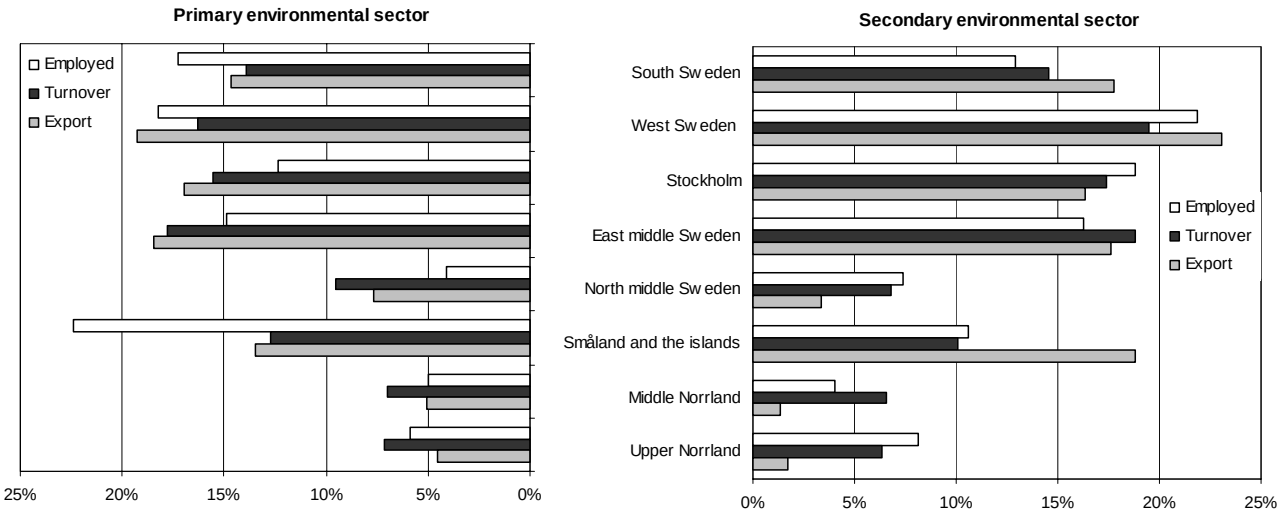


**Figure 3.** Employees, turnover and exports in the Swedish primary and secondary environmental sectors by region. 2004/2005 (Expressed as percent of total in each sector)

**Summarised results – product perspective**

In this section of the report, the possibilities to estimate the environmental sector from a product, or goods, perspective are examined. The primary material used is foreign trade statistics divided into Combined Nomenclature[5] (CN) codes, the environmental sector database and different lists of environmental goods. Environmental services are not included in this part due to the fact that only records on goods are compiled in the foreign trade statistics.

A comparison is made between export estimates from different perspectives. The results clearly indicate that a large share of the environmental goods are produced outside the establishments included in the environmental sector database. One implication of this finding is that a more comprehensive analysis of the environmental sector is needed. A proposal is made in the section to develop an environmental goods database with a two-fold purpose. First, to generate better coverage and higher quality in the existing environmental sector database, which focuses on the establishments, and secondly, to be a source of information on flows of environmental goods through the economy.

**Future work**

Currently the environmental sector is an area that is receiving a lot of attention and, as there are several stakeholders asking for data on the sector, there is a lot of future work that can be performed to enhance quality and usability. Future work will concentrate to the following: improving the IT application used for managing the environmental sector establishment database and revising the content of the database and at the same time implementing more precise classification of establishments. From 2007, Statistics Sweden will present a yearly update of data from the environmental sector database. When obtaining data of better quality and when the method of defining the environmental sector has stabilised, in-depth analyses of changes over time will become meaningful and give us new knowledge about the sector in the future.

[5] The CN code classification of the European Community corresponds with the *Harmonized System* (HS) to the 6-digit level and in addition comprises an 8-digit subdivision, see Section 1.3.3 for a further description.

One of the methods to enhance the quality of the existing database will be to develop the product perspective further and in this way enhancing the coverage and quality of the existing environmental sector database. In this work more research and access to several data sources will be needed, e.g. statistics on production divided into CN codes. After this step there will be possible to develop a new separate database which focus is primarily on environmentally related goods.

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# 1 Introduction

## 1.1 Background

Interest in the environmental technology sector is large both internationally and in Sweden. The world market for the environmental technology sector is considered to be fast growing. A recent report[6] from the European Commission, DG Environment, estimates the annual turnover for the environmental technology sector in the EU to 227 billion euros. The total direct and indirect employment in the environmental sector is estimated to 3.4 million full-time job equivalents. Its exports are estimated to 13 billion euros and imports to 11.1 billion euros, of which 57% of the trade is within EU.

The environmental sector is hard to define as it is interdisciplinary. The terms environmental sector, environmental technique, green jobs, eco-industry, environmental companies and establishments are all used with different definitions but with the aim of describing a sector that aims to prevent and treat environmental damage or to provide techniques which are less environmentally damaging than existing techniques.

The EU has identified the environmental technology sector as a future engine for economic growth and formed a European Environmental Technologies Action Plan (ETAP) with the aim to enhancing opportunities in this field[7]. As a part of this work, a Swedish national environmental technology centre, named SWENTEC[8], was formed in 2006. The aim of SWENTEC is to help Sweden become a world leader in the fields of environment-driven business development, environmental technologies exports and sustainable development. SWENTEC will act as a hub, bringing together stakeholders in this field from within the business community, academics and researchers, financiers, NGOs, central government authorities and regional actors, and international organisations. Statistics Sweden delivers data about the environmental technology sector to SWENTEC, such as the number of establishments and companies, turnover, export and employment in Sweden in order for them to estimate this sector as well as to identify changes in time. The data will be used to help SWENTEC prioritise in which environmental areas resources will be invested. SWENTEC work within the environmental techniques area whereas Statistic Sweden cover the whole environmental sector, this means that SWENTEC uses a subset of existing data.

The existence of an environmental establishment or company is an example of how the three dimensions for sustainable development (environment, social and economy) can be united successfully. When the environmental sector grows, employment and the economy increase at the same time as a positive environmental effect can be obtained. To support this development of the environmental sector it is important to have information about this sector. What is the size of the sector in terms of employment and export, for example? How is the sector expected to develop in the future? In order to answer such questions, reliable and relevant statistics are necessary. OECD and Eurostat started working with statistics in the sector for environmental goods and services during the 1990s. The outcome of the work was a manual for data collection and analyses, which was published in 1999. Statistics Sweden has produced statistics of the environmental sector since 1998, following this Eurostat manual (however, not on a yearly basis). The outcome of this work at Statistics Sweden is a database containing environmental establishments which is maintained by

[6] EU, 2006
[7] EU, 2004; see also http://ec.europa.eu/environment/etap/index_en.htm
[8] The homepage of SWENTEC is http://www.swentec.se/

the environmental accounts unit. Results from the database have so far been published in four reports, of which two have been published in English[9].

## 1.2 Purpose

The main purpose of this report is to further improve the methodology behind the identification of the population of environmental establishments as well as to present data for the period 2002 to 2005. This also includes trying to improve the present classifications used in the database, which is necessary to enable a more correct estimation of the total environmental sector in the future.

The second purpose of the report is to study the possibilities of including environmental products in the database and to investigate if a 'product view' is applicable to the environmental sector.

A third purpose is to make an international comparison on methods and data availability.

The main purpose and the second purpose represent two different perspectives, namely the establishment perspective and the product perspective. Section 3-6 deals with the Swedish environmental sector from an establishment perspective, i.e. the perspective that has been developed and used in Sweden since the end of the 1990s. Section 7 uses a different starting point by initiating a new perspective not formerly used in Sweden. This part of the report will discuss the possibilities of using a product perspective in order to estimate the Swedish environmental sector from a different point of view.

## 1.3 Definitions

Using common definitions is crucial in the work on estimating the environmental goods and services sector, not the least to enable international comparisons.

### 1.3.1 OECD/Eurostat definition of environmental sector

The environmental establishments making up the environmental goods and services sector, hereafter referred to as the environmental sector, are defined by the OECD/Eurostat as follows:

> "Environmental goods and services industry consists of activities to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use."[10]

The definition is broad and allows room for own interpretations. Therefore it is important that each country that uses the definition also specifies their interpretation, i.e. which activities that have been included in the statistics.

The OECD/Eurostat manual from 1999 specifies three groups in which the environmental goods and service sector can be classified. These are the Pollution management group, the Cleaner technologies and products group and the Resource management group, all of which have underlying environmental domains. Read more about this in Section 2.

[9] SCB (2005:2), SCB (2000:8), SCB (2000:1) and SCB (1999:2).
[10] OECD/Eurostat, 1999

*1.3.1.1. A new manual underway*

A new compilation guide on environmental industry is underway and will be finished during 2008. The manual is based on standard tables which aim at separately identifying employment, turnover, value added and exports by different sectors and activities of the environmental industry. The compilation guide intends to be a complete reference tool for building a new data collection system and aims to the production of harmonised and cross-country comparable data sets. The work with the new manual uses the existing compilation guide (published in 1999) as a starting point.

One foreseen change in the coming manual is that the Cleaner technologies and products group is removed and instead replaced with a new structure. Both remaining classes, Resource and Pollution, should according to the coming manual include cleaner/resource-efficient technologies and products.

### 1.3.2 Swedish interpretation of OECD/Eurostat definition

The OECD/Eurostat manual and definition have been used as the starting point for the Swedish work. Over the years, Statistic Sweden has developed the work with the environmental database, which in some ways differs from the method described in the OECD/Eurostat manual. The concept of the establishment versus the company view and primary and secondary environmental sectors are described below.

*1.3.2.2 Establishments versus companies*

A company can be made up of several establishments. In most cases, the relationship is one-to-one but many companies do have establishments in different locations. The Swedish environmental sector database is based on establishments.

*1.3.2.2 Primary and secondary environmental establishments*

Since the Swedish method is based on establishments performing environmental activities it was decided to separate between primary and secondary establishments. A primary establishment has more than 50% of environmental production while a secondary has less than 50%. All primary establishments together make up the primary environmental sector and all secondary establishments together make up the secondary environmental sector. This classification should not be confused with the concepts principal, secondary and ancillary activities, defined in the OECD/Eurostat manual[11]. According to the manual a company providing an environmental product or service as a main activity is principal, if the product or service constitute a smaller part of its range it is secondary and internal environmental work is ancillary.

### 1.3.3 Environmental products

In Section 7, The environmental sector from a product perspective, references are made to the classifications of Harmonised System (HS) and Combined Nomenclature (CN). These classifications divide the production, exports and imports of goods into commodity groups. The HS was elaborated by World Customs Organisation and holds around 5 000 different groups. The CN classification of the European Community corresponds with HS to the 6-digit level and in addition comprises an 8-digit subdivision.[12] Among these commodity groups there are some groups that can be labelled as environmental goods. Among others, OECD and APEC[13] have

[11] OECD/Eurostat, 1999

[12] http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/harmonised_system/index_en.htm

[13] APEC (Asia-Pacific Economic Cooperation) is an Asian-Pacific equivalent to OECD, see http://www.apec.org for further information.

established such lists of supposed environmental goods and these are the lists Statistics Sweden has used to estimate the environmental sector from a product perspective.

## 1.4 Limitations

In this report the variables employment, turnover and export will be presented, as well as information on the number of companies and establishments that are active in the environmental sector. Other variables such as salary, imports, educational levels and receiving countries of the exports can also be presented but have not been included in this report. A separation between the public and private sector has only been performed for employment in this report, but could be performed also the other variables.

Different years are presented in the report. Data on employment are presented for 2002 to 2004. The source of this data, Labour statistics based on administrative sources, has a delay of two years and 2005 will not be ready until April 2007. Turnover is presented for the whole period, 2002 to 2005 and exports are presented for 2003 to 2005.

## 1.5 Disposition of the report

The report starts with *Section 2* where the methodology behind the environmental sector database is described as well as the sources used for the identification, classification and publishing of data.

*Section 3 to 6* describes the Swedish environmental sector in terms of number of establishments, employment, turnover and exports for the period 2002 to 2005. In each section, the results are presented for both the primary and secondary sector as well as broken down into environmental areas, NACE industries and Swedish regions.

In *Section 7* the possibilities of developing a product, or a goods, perspective of the environmental sector are investigated and the advantages of creating a environmental goods database are discussed.

*Section 8* contains an international review where methods and results from the United Kingdom, the Netherlands, Hungary and Germany are briefly summarized.

Finally *Section 9* summarizes the report and discusses future work both regarding the current environmental sector database, i.e. the establishment perspective, and the product perspective.

# 2 Methodology and sources

*This section describes the methodology and sources used to build up the Swedish environmental sector database, a database based on environmental establishments. Methodology for describing the environmental sector from a product perspective will be described in Section 7, since this has been a pilot project and is not yet a regularly used method to estimate the Swedish environmental sector.*

## 2.1 Background methodology

Since 1998, the Environmental Accounts at Statistics Sweden has developed a database containing enterprises and their establishments that are active in the environmental goods and services sector (hereafter referred to as the environmental sector). The main work with this database was performed between 1999 and 2000 and thereafter between 2003 and today.

One driving force for building up the database has been the interest of the European Union and Eurostat. It has been predicted that the environmental sector will become an area of economic growth and the demand for environmental technology is growing, according to many actors. In this perspective, Statistics Sweden considers it important to provide information about this sector to determine whether it is decreasing or increasing in terms of, for example, employed men and women, exports and turnover.

The database of the Swedish environmental sector is built on already existing register data. The database contains an attempt to collect a total population of the Swedish establishments in the environmental sector, not just a sample, and this allows us to link other register data to the population. In addition to turnover, exports and employment as in the present report, it can be interesting to link imports, wages, and education levels to the environmental sector establishments.

### 2.1.1 Recent developments

As there is no standardised method for how to build up data on the environmental sector (using a database perspective), the method is constantly being revised and enhanced. Recent main changes in the way of working are that establishments instead of companies are counted and that we use a specialised IT application when adding establishments to the database. Both these recent developments have made the work more efficient and the quality higher.

#### *2.1.1.1 Establishments, not companies*

Until 2002 the database was based on whole companies. In 2002 Statistics Sweden started to focus instead on establishments. The reason for this is that, within a company, there can be quite diverse activities, some within the definition of the environmental sector and some outside the definition. Also, establishments within one company can differ in terms of environmental domains and NACE classification. By building up the database on establishments, we can ensure better precision, as each establishment is classified and accounted for separately. Hence, an activity can be primary for an establishment while it is secondary for a company.

#### *2.1.1.2 IT application*

In 2003 an IT application was developed with the purpose of simplifying the handling of the environmental sector database. In the application it is possible to make searches in the environmental sector database as well as to make searches in the Business Register.

## 2.2 Method

The method used to build up the environmental sector database can be described in the following steps:

1. Identification of the population
2. Classification
3. Adding supplementary information

The method is illustrated in Figure 2.1 and each step is described in detail in the following sections.

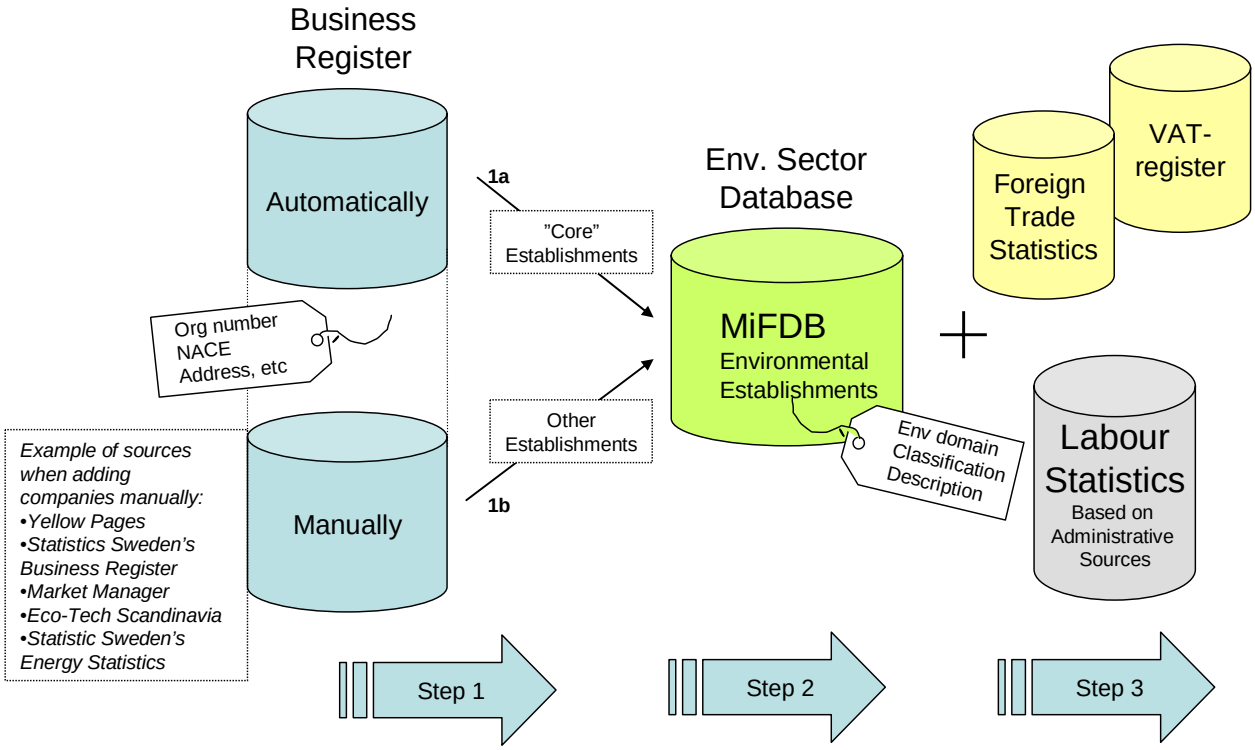


**Figure 2.1** Overview of method behind the environmental sector database, MiFDB

### 2.2.1 Identification of the population – Step 1

A general definition of an establishment belonging to the environmental sector has been developed within OECD/Eurostat:

> "Environmental goods and services industry consists of activities to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use."[14]

Swedish Standard Industrial Classification, SNI code, is based on the recommended standard within the EU, NACE[15]. SNI 2002 is primarily an activity classification. Production units as companies and local units are classified based on the activity which is carried out. One company

[14] OECD/Eurostat, 1999
[15] NACE is short for Nomenclature statistique des Activités économiques dans la Communauté Européenne

or local unit can have several activities (SNI codes). Some SNI codes are seen as pure environmental activities and establishments belonging to those SNI codes are called core industries. The method used to identify environmental establishments differs between core industries and non-core industries.

**Core industries**
The core industries are here defined as industries (NACE Rev. 1 Division 16) whose activities, goods and services are considered to fall entirely under the definition of environmental goods and services sector. 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”. According to the OECD/Eurostat manual currently used, the five core industries are entirely included in the environmental sector. They are retrieved from Statistics Sweden Business Register by their NACE code, as illustrated by 1a in Figure 1. These establishments are added to the environmental sector database (MiFDB) by a single click in the IT application. It is also possible to search for secondary core establishments in the Business Register, which have less than 50% activity in one of the five core industry NACE codes.

**Non-core industries**
All environmental establishments with other NACE codes than the core NACE codes require a manual procedure to be identified and added to the database. This is illustrated by 1b in Figure 2. A variety of sources are used to find these establishments. When the company is found and identified as environmental according to the definition, the name of the company must firstly be associated to its organisation number and then to the unique identification number of the establishment. This is necessary since all establishments are stored by their unique identification number in both the Business Register and in the Swedish environmental sector database. Finding this number is sometimes straightforward and sometimes not. This is because the registered name might differ from what the company actually calls itself. Once the organisation number is found it is easy to locate its establishments and add them to the environmental sector database as described above.

### 2.2.2 Classification - Step 2

Before the newly identified environmental establishment can be saved in the environmental sector database it must both be classified in which environmental domain it belongs and according to how much the environmental activities contribute to the total activity of the establishment (i.e. if it is a primary or secondary environmental establishment).

#### *2.2.2.1 Environmental domain*

In order to classify each establishment by environmental domain, the OECD/Eurostat manual is used together with the information needed about the establishment. See Table 2.1 for the environmental domains used. When data are presented they are sometimes given by the three grouped domains and sometimes by the more detailed environmental domains.

[16] The correspondence between the different classes of activities could be found on the site of htttp://forum.europa.eu.int/irc/dsis/nacecpacon/info/data/en/nace%20correspondance%20table.htm

Regarding the core industries it is clearly defined in the manual which NACE belongs to which environmental domain[17]. For establishments belonging to the non-core industries, further information needs to be collected before they can be classified. Information about the business activity can for example be found on their website or in various business registers on the Internet. In cases where the manual is unclear, we decide policy on a case-by-case basis, which is documented and followed for similar activities. In cases where several establishments are collected from a reliable source we do not make individual investigations for each and every establishment.

**Table 2.1** Grouped domains, environmental domains and included activities

| Grouped domain | Environmental domain | Examples of included activities |
|---|---|---|
| Pollution management | Air pollution control | Treatment and/or removal of exhaust gases |
| | Waste water management | Emissions to water. Collection, treatment and transport of wastewater. Wastewater reuse systems |
| | Waste management | Collection, treatment, management, storage and recovery of waste. Excludes manufacture of new products from recovered material. |
| | Soil and groundwater | Emissions to soil and groundwater. Soil sanitation. |
| | Noise and vibration | Reduction of (mainly outdoor) noise. |
| | Monitoring, control etc | For example R&D, Environmental education and information, Environmental consultants and similar. |
| Cleaner technologies and products* | Cleaner/resource-efficient technologies | Reduced impact from production e.g.: decrease material inputs, reduce energy consumption, recover valuable by-products, reduce emissions, minimise waste disposal problems. |
| | Cleaner/resource-efficient products | Reduced impact from use of products e.g.: decrease material inputs, improve product quality, reduce energy consumption, reduce emissions, minimise waste disposal problems |
| Resource management | Indoor air pollution control | Treatment and renewal of indoor air to remove pollutants. Excludes air-conditioning |
| | Water supply | Collect, purify and distribute potable water |
| | Recycled materials | Manufacturing new materials or products from recovered waste or scrap. |
| | Renewable energy | Generation, collection and transmission of energy from renewable sources, including biomass, solar, wind, water or geothermal. |
| | Heat/energy saving and management | Reduce heat and energy use or minimise loss |
| | Sustainable agriculture and fisheries | Reduce environmental impact of agriculture and fishery. |
| | Sustainable forestry | Programmes and projects for reforestation and forest management on a long-term sustainable basis |
| | Eco-tourism | Provides services or education for eco-tourism |
| | Other resource management | Nature conservation, biodiversity and other. |

* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

See the OECD/Eurostat manual[18] and Appendix 1 for examples of activities and types of establishments that are included in the different environmental domains.

[17] NACE 25.12 ”Retreading” belongs to Recycled materials, NACE 37 ”Recycling” belongs to Solid waste management, NACE 41 ”Collection, purification and distribution of water” belongs to Water supply, NACE 51.57 ”Wholesale of waste and scrap” belongs to Solid waste management and NACE 90 ”Sewage and refuse disposal, sanitation and similar activities” is divided between Wastewater management (90 010) and Solid waste management (the rest).

[18] OECD/Eurostat 1999

**Grouped domain Cleaner technologies and products removed since 2005**
Since 2005 we no longer classify establishment as Cleaner technologies and products. Instead we will use a separate classification for all establishments implying whether they use cleaner and resource efficient technology or not. This will be included from 2007 in the environmental sector database. This will make analyses possible regarding, for example, the share of all environmental establishments engaged in Cleaner technologies.

**Primary and secondary establishments**
Each establishment in the database is classified to either the primary or the secondary sector, if regarded to be an environmental establishment[19]. If primary it is estimated to have more than 50% of its production of goods and services (the estimation is based on turnover or employment) within the definition of an environmental establishment and if secondary less than 50%. This separation is necessary in Sweden since we include activities based on establishments and it is very common that an establishment has several different activities within the same business. The procedure varies depending on whether the establishment is identified as a core or non-core industry. The core industries are considered to be pure environmental industries and therefore all their establishments are classified as primary in the database. If an establishment has less than 50% activity in one of the five core NACE codes (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”), it is then classified as secondary. The non-core industries have to be treated one by one in order to get the right classification, unless the source of information is assumed to be reliable enough. In many cases the classification is obvious. Many establishments in, for example, the waste and ecotourism domains have one main activity and are hence easily identified as primary. For others, such as renewable energy, heat/energy saving or environmental monitoring, it is common that the activity in the establishment is diversified.

In many cases, the classification is performed by estimating the share of the activity based on the information found about the business. The classification is therefore normally not based on the exact share of turnover or employees, mainly because it is very time-consuming to find this information, if available at all. In general we follow a safety principle; if we are not sure that the environmental activity is more than 50%, it is classified as secondary. However, the entire turnover, exports and employment are counted for the secondary sector, even if only a part of this can be related to environmental activities.

**Desirable development – a more detailed classification**
Since all the turnover, exports and employed people are counted for the secondary sector, even if only a part of these can be related to environmental activities, the *real* turnover, exports and employed people is said to be in the interval between the primary sector and the primary and secondary sectors together. However, as there is a need for better estimated total values, attempts to develop better methods have been made in the framework of this report (see Section 2.3 in this report). For some domains, such as Renewable energy, the need for more precise estimations is more evident than for other domains. As in the case of Renewable energy, power plants produce heat or electricity from different kinds of fuels. A plant using a share of 49% renewable fuels will be classified in the same secondary group as a plant using only 2%. When using the two

[19] There are also other classifications used in the database, used in cases when we can not classify an establishment according to primary or secondary. For example, one is used for large companies with a large turnover, where we know that only a very small share is environmentally-related. Since these would have a too big an impact on the total secondary result, they are not classified as secondary. Another example of classification is when we do not have enough information to classify an establishment as primary or secondary.

classification groups primary and secondary and, even though they contribute differently in the environmental sector, in our results the employed people and turnover will be added together equally when publishing results for the secondary sector. A better estimate would be obtained, in this case, if we could multiply these shares with, for example, the turnover of these establishments. This is mainly relevant for the secondary sector since we assume that an establishment with over 50% environmental production is an “environmental” establishment no matter if the share is 55% or 100%. Its main activity is environmental despite its share and that is the important factor.

### 2.2.3 Adding supplementary information – Step 3

There are mainly three sources used to link supplementary information to the total population of environmental establishments. These are the Business Register (for information about turnover), Trade statistics (for information about export and import) and Labour statistics based on administrative sources (for information about for example employment, salary and education levels).

Labour statistics are based on establishments, like the environmental sector database, so it is easy to connect the two information sources in order to produce statistics. However, for turnover and exports it is not so easy as this information is given on company level, i.e. not as detailed as the establishments about which we have information in the environmental sector database. Therefore it is necessary to break down this data into establishments.

#### *2.2.3.1 Method of breaking down exports and turnover into establishment level*

Every establishment is connected to a company through its unique identification number. By the identification number of the company – the organisation number – it is possible to link our database to the different registers containing data on exports and turnover and thereby obtain information for each company. We then distribute the data from company level to establishment level by constructing weights. We mainly use two different methods. The first method is to construct a weight by dividing the number of employed people at the establishment with the total number of employed people in the company. This is the most commonly used method.

When it comes to companies with a large number of establishments where there are few or no employees, as in most energy companies, this method is not suitable. If using this method when distributing exports and domestic turnover of these types of companies into regions, for example, most of the distributed turnover will end up in the city regions even if most of the production takes place elsewhere. This is due to the fact that most employees are located in the company headquarters that are often located in a city. In these cases we use another method, mostly within NACE 40 as mentioned above. Instead of employees, we use the number of establishments and distribute equal parts to each of the establishments. Using one of these two described methods we then end up with a weight for each establishment. To make the distribution we then simply multiply the weight with the company level exports and turnover, giving us a value for each establishment.

### 2.2.4 Adding a new establishment

In 2003 an IT application was developed with the purpose of simplifying the handling of the environmental sector database. It made it easier to both make searches among the environmental establishments as well as to make searches in the Swedish Business Register. From the Business Register, it is possible to add an establishment to the environmental sector database in a single step. The application window consists of a set of tools and several tabs. The first tab, as can be

seen in Figure 2.2, is the main window for the environmental sector database IT application (Swedish abbreviation MiFDB). In this window, it is possible to make searches based on, for example, business name, environmental domain or region among the 12 000 establishments included in the database. The second tab is the window to the Business Register (Swedish abbreviation FDB). Here it is possible to search among the 900 000 companies and 975 000 establishments that exist in Sweden. The other tabs in the application have various functions such as identifying new establishments and updating information.

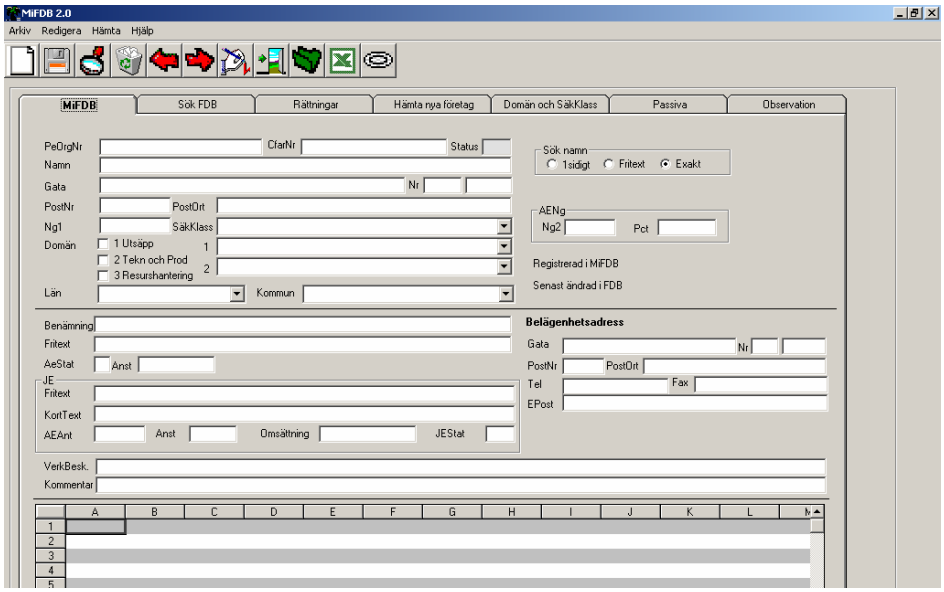

**Figure 2.2.** IT application used for administration of the Swedish environmental sector database

To add an establishment to the environmental sector database the following is performed:

1. Search for the establishment in the Business Register tab by organisation number or business name.
2. Make sure the establishment is not already included in the environmental sector database by clicking the “clean” button (which in turn checks if the given establishment is already in the environmental sector database).
3. Copy the establishment to the environmental sector database window by a single click.

The establishment and all data that are stored in the Business Register (such as organisation number, its unique identification number, address and NACE) are now visible in the MiFDB tab. Before the establishment can be saved in the environmental sector database it must be classified regarding environmental domain and environmental share. It is also possible to write a short description of the activity as well as a comment.

This IT application will be developed further during 2007. Read more about future changes in Section 9.

## 2.3 Improved secondary classification

In order to see if it is possible to use the more detailed information from Energy statistics to improve the current secondary classification in the database, a study was initiated. The result is important for the database of many reasons. For the specific situation of Renewable energy many stakeholders are interested in this information since it would give better estimations of the size of the domain. This specific domain stands for a large share of the total environmental sector,

primarily regarding turnover, which makes it important to analyse it more in detail. For the whole environmental sector it is important to include additional information of the secondary establishment in some form to the database in order to make the estimations of the total environmental sector more accurate.

### 2.3.1 Used method today

The main source for the domain Renewable energy is the energy statistics at Statistics Sweden. It is used to include wind power, hydropower as well as heat and/or power plants using renewable biomass fuels in the environmental sector database. For wind-driven power plants as well as for hydropower plants we use their statistics on plants and can, in most cases, include them as primary establishments in the environmental sector database (except for cases when one single establishment handles many different activities and therefore might have to be classified as secondary). In most cases this method works well, but in some cases more work has to be carried out manually in order to connect the plant to the right establishment in the Business Register. This is due to the fact that the two registers are not linked. The registers base their statistics on different unique identification numbers and unfortunately a plant in energy statistics does always not correspond to an establishment in the Business Register.

For heat or power plants the received energy statistics are very important in order to classify the establishments as either primary or secondary. Since a plant can be heated by both renewable fuels as well as non-renewable it is important to see for each plant whether it is heated by over 50% renewable fuels (i.e. a primary establishment) or between 1% and 49% (i.e. secondary). Plants only heated by non-renewable fuels are not included in the database. This division is possible since we receive exact information from energy statistics about the share of renewable fuels each plant uses for their heat or power production. The following are defined as renewable fuels: wood fuels, tall oil, sulphate & sulphite lyes, landfill gas and other biomass. Waste and peat are, for example, not included. As for the wind and water plants, a usual problem is to link the plant in the statistics with the establishment in the Business Register and, therefore, some manual work is needed in order to do this match. Sometimes estimations have to be made, when the registers cannot be matched. The used energy statistics have a delay of more than a year, meaning that we used 2004 as reference year for 2006.

### 2.3.2 Using shares for the secondary establishments

The study has looked into how we can use the information from energy statistics in order to supplement the classification of the secondary establishments with information on shares in some form for the heated power plants. This could be either with the precise share, from 0.01 to 0.49, or with a less specific share indicating groups, for example if it is between 0.01 to 0.19 or 0.20 to 0.39 or 0.40 to 0.49. In this project, we decided to use the specific shares since this information was available. It could also be possible to account for the exact share for the primary plants but we have chosen for the current time to regard an establishment which has more than 50% activity in environmental production as primary, regardless of its share. This is according the classification in industries used today.

As mentioned above, the energy statistics have a delay of more than one year. This means that “old” information is used, something which could be of higher relevance when including exact shares compared to simply classifying an establishment as broadly secondary. At least the information will be consistent for all establishments, making it comparable, even though the given share risks having a delay of two years (for example if a plant suddenly changes their use of fuels). Another issue is that this delay means that it is difficult to calculate for all the purchases occurring in this industry. The majority of these can however be followed manually. This was also a

problem before we began looking at the specific shares, since we in some cases had information about an establishment that no longer existed. If the company that buys the establishment stays organised in the same way, it is still possible to use the information regardless of ownership.

The study showed that, for most of the secondary establishments producing heat/power from renewable biomass fuel, it was possible to include exact shares of used renewable energy. This information will be included in the environmental sector database as soon as it is possible to do so in the application. In some cases, the above-mentioned problems with purchasing and therefore information about the wrong establishment, led to some manual work in order to link the share to the right establishment. In some cases, rough estimations and guesswork were needed, which adds to the uncertainty. However, the differences between energy statistics and the Business Register will always lead to the need for some estimations (since we do not have unlimited resources to investigate each company active in the energy industry and its organisational structure). Despite this uncertainty in some cases, exact shares will be a better indicator compared to only using the general secondary classification.

By including this new information on shares for the domain Renewable energy and using the share multiplied by the variable, such as turnover, we will have information much closer to reality for the secondary sector than is presented today. Future studies will present comparisons between the more exact secondary values and the values for the secondary sector based on the former method.

### 2.3.3 New variable in the database including shares

As a result of this study we will, during the spring of 2007, include the possibility of inputting information on shares into the environmental sector database. This will be possible for all domains, not only Renewable energy, and for both the primary and secondary establishments. However, the main intention with this new information is to include it only for the secondary establishments. In the future, this development will make it possible to better calculate the exact turnover, exports and employment for the different domains. Naturally, it is not possible to include this additional information for all the almost 9 000 establishments in the database directly, and for some it will never be included, but the more establishments that we have with this information, the more exact the final presented results will be. In the situation with Renewable energy it was decided to use the specific shares, rather than estimated shares, since we had such information available. Less specific shares could also be included in the database in the future, if such information is easier to identify.

In this project, we started investigating the use of shares in the area Renewable energy. Another possible domain is Air pollution control which includes environmentally less-damaging fuels. Since now making it possible to include exact shares, it will also be possible to include large companies which we, until now, have regarded as having too small an environmental share to be included in the environmental sector database as secondary. For example, a car manufacturer producing environmentally friendly cars together with their other cars in one establishment. At the moment, using only the primary and secondary classification, such companies have not been included at all since their total turnover would raise the turnover of the secondary sector too much. Future studies will investigate for which domains and for which types of companies the new variable is relevant.

## 2.4 Sources

The content in the environmental sector database is dependent on several sources, of which the most important are briefly described in the following sections. Firstly the sources used to identify

and classify environmental establishments are presented and then the sources used to link to the database in order to present relevant statistics.

### 2.4.1 Sources for identification and classification

Many different search functions and lists on the Internet as well as specialised databases are used both to find and to classify environmental establishments. The main sources for this purpose are listed and presented below.

**The yellow pages**
The companies belong to different areas in the yellow pages. We have used for example Filters, Environmental care and Solar energy to find environmental establishments. For each company found in the yellow pages we need to search in the Business Register in order to find its organisation number and then the unique identification number of the establishment. (www.eniro.se)

**Business Register of Statistic Sweden**
This source is used both for automatic identification of the core industries and manual search for establishments by searching for specific words in the name of the company, for example wind power, recycling, environmental or nature. (For more information of the Business Register, see http://www.scb.se/templates/Listning1____19852.asp.)

**Market Manager**
This publicist company produces and sells information about companies. We use some of their own categories, for example heat pumps, bio fuel, eco technology or refuse collection, in order to identify environmental establishments for the database. (www.mmp.se)

**The Swedish Trade Council and their network in environmental technology**
The participants of the Swedish Environmental Technology Network are regularly controlled and included in the environmental sector database if their activities correspond to the used definition. At the moment about 650 companies are included in their network. Read more at http://www.swedishtrade.se/english/ and http://www.swedentech.com

**Eco-Tech Scandinavia**
This exhibition is a regular event every second year in Gothenburg, with participating companies in the environmental arena. These are searched for in our database and included if not already there. (For more information about the exhibition see www.miljoteknik.com).

**Energy statistics at Statistics Sweden**
From the annual energy statistics (electricity, gas and district heating) at Statistics Sweden, we use the information about hydropower plants, wind energy plants and electricity/heat plants using renewable fuels in Sweden. The survey is made annually and is a total survey. In 2004, just over 1 000 companies were included. The information is mainly gathered by an Internet collection and, in the 2004 survey, 93% of the included companies answered. The statistics have a delay of about 14 months. (Read more about energy statistics at Statistics Sweden at: http://www.scb.se/templates/Amnesomrade____6059.asp)

From this survey we use many variables in order to calculate each biomass-fuelled plant's share of renewable energy. The variables we use are: organisation number, an unique identification number for each plant (unique for energy statistics), name of the company, name of the plant (if available), type of power, address, share of renewable fuel, combined heat and power production (Mwh), heat

production, heat pump production and electric steam boilers. Information on address, name etc is necessary in order to match each plant in the energy statistics to the establishments in the Business Register, a match made manually since no correlation exists between energy statistics and the Business Register. (They both use different unique numbers for the plants/establishments.) The energy statistics also give us information on the wind and water plants in Sweden. A manual match is also necessary here.

**General searches on online search pages**
Pages such as Google, the SUNET web catalogue over businesses[20] and similar are used in order to find more information about possible environmental establishments as well as to search for lists of environmental companies.

**Searches on industry specific lists on the Internet**
There are several different industry specific groups in Sweden with their members listed on their website. For example, heating boilers and burners (SBBA) and biomass fuels (SBCA). These and others can be found at www.branschgrupperna.se.

Examples of lists used to find establishments active in the different environmental domains are given below. Many different ones are used for the areas of Renewable energy and Heat/energy saving (which many times are closely connected). For example, regarding solar energy (which is not included in energy statistics) the Solar Energy Association of Sweden and their list of members is used. (http://www.solenergiforeningen.se). In order to find establishments active in the area of Heat/energy saving there are a variety of lists that can be used as a source. For example, http://www.energycentre.info/ is used to find companies offering services of, for example, heating using pellets and solar energy. Other companies in the biofuel industry have been found on www.bioheat.info/index.sv.html where producers as well as consultants in the energy area are listed.

Other lists on the Internet have been used to find establishments active in the areas of, for example, Sustainable forestry (http://www.pefc.se and www.fsc-sverige.org), Ecotourism (www.ekoturism.org and www.naturensbasta.se) and Soil sanitation (http://home.swipnet.se/marksanering).

**Cooperation agreements**
Cooperation agreements are another possible source of information, besides specific lists on the Internet. The only long-term agreement used today for the environmental sector database is with KRAV in Sweden, in order to receive information on organic farmers. No other agreements have been established, mainly because the information has been easy to collect from the Internet. In some cases, an agreement would be desirable from our point-of-view in order to get more detailed information but has not been possible to establish for different reasons. In the case of the Solar Energy Association of Sweden, for example, an agreement has not been established since they do not have information about each member's organisation number in their records. Their member's names are easy for us to collect from their website without an agreement.

KRAV is a key player in the organic market in Sweden and it develops organic standards, inspect these standards and promote the KRAV label. It is organised as an incorporated association with, at present, 28 members. It represents farmers, processors, trade and also consumer, environmental and animal welfare interests. From KRAV, we receive annual information about organic farmers,

[20] http://katalogen.sunet.se/kat/business

their organisation numbers (when this is available), type of organic activity and if they are entirely converted or not.

### 2.4.2 Sources for supplementary statistical information

There are three main sources used to add supplementary information to the total population of environmental establishments:

**The Business Register**
The Business Register is our source for much of the company and establishment information that we use in the environmental sector database, for example address, NACE classification, turnover and employees[21]. Statistics Sweden's Business Register is a register of enterprises and local units in Sweden. The register contains all legal persons. The register also contains natural persons who fulfil at least one of the criteria listed below, and estates of deceased persons fulfilling at least one of the first two of the criteria:
- Registered for VAT
- Registered as employer
- Having a registered firm
- Registered for F-tax (business tax) in a VAT exempt activity

In Statistics Sweden's Business Register, an enterprise is regarded as active if it is registered for VAT, has employees or is registered for F-tax (business tax) in a VAT-exempt activity.

**Labour statistics based on administrative sources (RAMS)**
Labour statistics are used in order to link information about the number of employed men and women, for example, education levels and salary to the environmental sector database. RAMS offers annual information on employment, commuters, employees and industrial structures and also illustrates occurrences and flows in the labour market. The statistics are based on total population surveys and can be broken down into smaller regional areas. RAMS allows data to be presented in great detail. Flows in the labour market can also be reported. The statistics are produced annually and are presented approximately 13 months after the measured period (in November) each year.

**Trade statistics and the VAT register**
Information on exports is obtained from the VAT register or the foreign trade statistics (FTS). FTS contains exports of goods, collected partly by surveys, partly from data originating from the Swedish customs. The export data in the VAT register is calculated from the reported VAT from companies and therefore contains both goods and services.

## 2.5 Quality assessment and data confidentiality

The environmental sector database is being developed continually and each year new improved methods are tried out. This will be the case for at least a few years into the future as well. The results are seldom revised backwards unless there is a specific reason, so there will be different methods behind the results in the published time series. The reason for this is that the environmental sector database is a fairly newly developed product and the quality and development work behind a database of this size is considerable.

[21] The variable “Employee” differ some regarding definition from the variable “employed” used in this report. We use employees for example to break down turnover and export to establishments. Read more about the Business Register at: http://www.scb.se/templates/Listning1____19852.asp

### 2.5.1 Quality assessment

The environmental sector is made up of two parts: core industries and non-core industries (read more about method used in Section 2.2) and the quality differs between the two parts. As the core industries are clearly defined by NACE codes and the data are received directly from Statistics Sweden's Business Register[22], the quality of the core industries follows the statistical standard.

It is hard to get a general view of the non-core industries due to delimitation issues as the population is dependent on what information that is found about the establishments (read more about method used in Section 2.2). Still, using a register is considered a more accurate method than using surveys, when estimating the total population of the Swedish environmental sector.

There are three main sources used to add supplementary information to the total population of environmental establishments. These are the Business Register (for information on turnover), Trade statistics[23] (for information on exports and imports) and Labour statistics[24] based on administrative sources (for information on, for example, employment, salary and education levels).

Labour statistics are based on establishments, as is the environmental sector database, so linking the two information sources to produce statistics is straightforward. However, for turnover and exports, it is not so easy as this information is given on company level and not establishment level. Therefore it is necessary to break down this data into establishments. When distributing the data on establishments, we use constructed weights (read more about this method in Section 2.2.3) which gives a rough but adequate estimate of the data on establishment level.

#### *2.5.1.1 A complete database is not the target*

Reaching an exact total population of the environmental sector in Sweden is not the primary target for the work with the environmental sector database. There are two main reasons for this. Firstly it is hardly possible to include all establishments active in the environmental arena using the existing methods, as environmental companies and establishment are spread all over the industry spectra, i.e. they are not easy to identify. Secondly, many companies and establishments only have a smaller share of environmental activity and, unless they market themselves as "environmentally friendly", it is difficult to identify them.

Even when the variable "environmental share" is implemented in the database during 2007 it will hardly be completed for all establishments in the database. It would not be time- nor cost-effective to include this variable for more than the larger establishments or in cases where we can easily identify the share. The target for the work is primarily to achieve as good quality of a database in this area as possible and not to create a complete database on the Swedish environmental sector.

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[22] The register contains all legal persons in Sweden. The register also contains natural persons who fulfil at least one of the following criteria, and estates of deceased persons fulfilling at least one of the first two of following criteria: registered for VAT, registered as employer, having a registered firm, registered for F-tax (business tax) in a VAT-exempt activity. In Statistics Sweden's Business Register an enterprise is regarded as active if it is registered for VAT and/or has employees or if it is registered for F-tax (business tax) in a VAT exempt activity. For information, see http://www.scb.se/templates/Listning2____31034.asp

[23] For information about the Trade statistics, see http://www.scb.se/templates/Product____7904.asp

[24] For information about Labour statistics, see http://www.scb.se/templates/Amnesomrade____6598.asp

Despite this lack of a complete database, the amount of employees, turnover and exports is presented in this report. When using this information, it is important to regard it as an estimate of the size rather than an exact amount.

#### *2.5.1.2 Interpretation of statistics*

Even after several years of work with the environmental sector database, the establishments outside of the core industries can still not be said to be a total population. Some methodological work still needs to be performed in order tomake the database as complete as possible. A common question is what effect this has on the produced statistics. The database has become more and more complete for each year, as we have found improved methods to include establishments. This makes it important to consider both the improved method (i.e. more accurate population) as well as actual changes in the variables as contributing to the differences in results. The work in 2006 has primarily focused on further improving the methods for how we identify and include environmental establishments in the database. In 2007, the focus will instead be on reviewing all establishments currently in the database in order to improve the quality. It will lead to better classifications of both domains and shares of activities.

### 2.4.2 Confidentiality of data

According to Section 9 § 4 in the Secrecy Act[25], confidentiality applies to a public authority producing statistical data on the personal or economic condition of an individual. Individual here refers to both physical and legal persons. This rule applies to Statistics Sweden and has been taken into consideration when publishing the results of this study.

For the environmental sector database, this means that, when breaking down data on a detailed level, consideration must be taken to confidentiality of data. It means that it is not possible to publish data if one company is dominating a group, i.e. if it has 50% or more of the total turnover, employment or exports, if publication can be considered to harm that company.

[25] In Swedish, *Sekretesslagen*.

# 3 Companies and establishments in the environmental sector

*This section contains information on the number of establishments that play an active role in the Swedish environmental sector. It also explains the relationship between establishment and company, and contains figures for both, for the period 2002 to 2005.*

## 3.1 Number of establishments and companies

The number of companies within the Swedish environmental sector is about 7 000 from 2002 to 2005, which can be seen in Table 3.1. A slight decrease can be seen in the data for 2005, but it is hardly a real decrease within the market. The decrease is more probably due to changes in the method and a higher quality in the database. The number of establishments belonging to these companies is about 9 000 during the same period of time. In most cases, the relationship is one-to-one but many companies do have several establishments. The relationship between the number of establishments and the number of companies is more or less constant over the years. The total number of registered companies in Sweden was 900 151 in 2005 and the number of establishments in the same year was 974 576, according to the Swedish Business Register.

**Table 3.1** Number of establishments and companies in the environmental sector, 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| Establishments | 8 838 | 3 039 | 8 990 | 3 119 | 9 040 | 3 200 | 8 509 | 3 057 |
| Companies | 7 025 | 2 194 | 7 146 | 2 236 | 7 197 | 2 310 | 6 715 | 2 192 |

The environmental sector database is based on establishments and all results hereafter are based on establishments and not companies.

The number of establishments divided in the environmental domain is presented in Table 3.2. The three largest amounts of establishments in the primary sector in 2005 are within Waste management, Environmental monitoring etc. and Renewable energy. In the secondary sector, the three largest areas are Environmental monitoring etc., Indoor air control and Waste management. The large decrease in establishments in the sustainable agriculture and fishery domain is not necessarily caused by an actual decrease. It is more likely due to the fact that this domain has not been updated correctly since 2004. This fault will be revised and analysed in future publication.

**Table 3.2** Number of establishments by environmental domain, 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| Air pollution control | 71 | 40 | 71 | 40 | 71 | 44 | 69 | 40 |
| Wastewater man. | 558 | 88 | 605 | 90 | 604 | 106 | 708 | 125 |
| Waste management | 2 600 | 478 | 2 641 | 509 | 2 644 | 538 | 3 314 | 570 |
| Soil and groundwater | 36 | 51 | 37 | 51 | 38 | 54 | 53 | 60 |
| Noise and vibration | 21 | 6 | 21 | 6 | 22 | 7 | 24 | 7 |
| Env. monotoring etc | 636 | 764 | 663 | 789 | 672 | 802 | 878 | 825 |
| Cleaner technologies | 32 | 15 | 33 | 16 | 33 | 22 | * | * |
| Cleaner products | 74 | 78 | 77 | 79 | 77 | 76 | * | * |
| Indoor air control | 264 | 604 | 264 | 607 | 267 | 612 | 247 | 665 |
| Water supply | 425 | 26 | 409 | 28 | 415 | 28 | 429 | 48 |
| Recycled materials | 143 | 131 | 145 | 134 | 137 | 134 | 135 | 131 |
| Renewable energy | 1 208 | 241 | 1 237 | 245 | 1 261 | 247 | 1 372 | 368 |
| Heat/energy saving | 362 | 89 | 365 | 88 | 373 | 91 | 403 | 131 |
| Sust. agricult./fishery | 2 305 | 387 | 2 318 | 393 | 2 323 | 393 | 725** | 43** |
| Sustainable forestry | 49 | 17 | 49 | 19 | 47 | 19 | 88 | 22 |
| Other resource man. (incl eco-turism) | 54 | 24 | 55 | 25 | 56 | 27 | 64 | 22 |

* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

** Part of the decrease in these figures is rather due to poor quality in data for this specific year, than an actual decrease of establishments

When dividing the results into NACE groups, as in Table 3.3, it can be seen that the largest increase in the primary sector is within Other business activities (NACE 74) and in Mining and manufacturing (NACE 10-37). The largest increase in the secondary sector is in Electricity, gas and hot water supply (NACE 40) and in Wholesale and retail trade (NACE 50-52). The largest decrease is in Other industries (NACE 1-5, 45, 55-73, 75-85, 91-99) and that applies to both the primary and the secondary sector. As mentioned above, the reason for this is not an actual decrease (at least not such a large decrease) but is due to not updating the domain Sustainable agriculture during 2005. Organic farmers are generally classified under NACE 1 (Agriculture, hunting and related service activities).

**Table 3.3** Number of establishments by NACE groups, 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| Mining and manufacturing (NACE 10-37) | 767 | 297 | 799 | 312 | 838 | 319 | 936 | 278 |
| Electricity, gas and hot water supply (NACE 40) | 940 | 164 | 970 | 168 | 992 | 162 | 996 | 207 |
| Wholesale and retail trade (NACE 50-52) | 1 505 | 399 | 1 515 | 413 | 1 515 | 442 | 1 616 | 486 |
| Other business activities (NACE 74) | 748 | 686 | 793 | 709 | 805 | 729 | 1 019 | 732 |
| Water distribution, sewage and waste (NACE 41+90) | 1 925 | | 1 915 | | 1 728 | | 1 984 | |
| Other industries (NACE 1-5, 45, 55-73, 75-85, 91-99) | 2 953 | 1 493 | 2 998 | 1 517 | 3 162 | 1 548 | 1 958 | 1 354 |
| **Total** | 8 838 | 3 039 | 8 990 | 3 119 | 9 040 | 3 200 | 8 509 | 3 057 |

When analysing the data on a regional level, as done in Table 3.4, it can be seen that there has been an increase in both the primary sector and secondary sector in Stockholm and in Upper Norrland.

**Table 3.4** Number of establishments by NUTS 2 areas[26], 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| South Sweden | 1 113 | 366 | 1 154 | 380 | 1 149 | 390 | 1 123 | 375 |
| West Sweden | 1 770 | 643 | 1 792 | 653 | 1 820 | 661 | 1 596 | 615 |
| Stockholm | 939 | 446 | 961 | 452 | 986 | 480 | 1 154 | 489 |
| East middle Sweden | 1 671 | 541 | 1 678 | 553 | 1 694 | 570 | 1 430 | 475 |
| North middle Sweden | 1 223 | 321 | 1 222 | 338 | 1 191 | 347 | 1 134 | 335 |
| Småland and the islands | 1 000 | 271 | 1 026 | 282 | 1 030 | 293 | 921 | 290 |
| Middle Norrland | 609 | 213 | 628 | 215 | 634 | 211 | 581 | 211 |
| Upper Norrland | 513 | 238 | 529 | 246 | 536 | 248 | 570 | 267 |
| **Total** | **8 838** | **3 039** | **8 990** | **3 119** | **9 040** | **3 200** | **8 509** | **3 057** |

When breaking down the results into counties, as in Table 3.5, it can be seen that the largest amount of establishments in the primary and secondary environmental sector are found in the counties of Västra Götaland, Stockholm and Skåne. The largest increase from 2002 to 2005 is in Stockholm.

**Table 3.5** Number of establishments by counties, 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| Stockholm | 939 | 446 | 961 | 452 | 986 | 480 | 1 154 | 489 |
| Uppsala | 301 | 111 | 297 | 113 | 304 | 119 | 239 | 97 |
| Södermanland | 293 | 86 | 285 | 89 | 292 | 94 | 229 | 79 |
| Östergötland | 417 | 133 | 434 | 137 | 443 | 138 | 405 | 114 |
| Jönköping | 352 | 90 | 355 | 93 | 349 | 96 | 313 | 110 |
| Kronoberg | 230 | 68 | 229 | 68 | 226 | 74 | 205 | 74 |
| Kalmar | 283 | 70 | 304 | 76 | 318 | 77 | 304 | 77 |
| Gotland | 135 | 43 | 138 | 45 | 137 | 46 | 99 | 29 |
| Blekinge | 139 | 33 | 156 | 35 | 164 | 34 | 138 | 36 |
| Skåne | 974 | 333 | 998 | 345 | 985 | 356 | 985 | 339 |
| Halland | 324 | 106 | 333 | 106 | 334 | 107 | 303 | 94 |
| Västra Götaland | 1 446 | 537 | 1 459 | 547 | 1 486 | 554 | 1 293 | 521 |
| Värmland | 449 | 97 | 448 | 100 | 442 | 98 | 415 | 97 |
| Örebro | 358 | 90 | 350 | 92 | 350 | 93 | 311 | 90 |
| Västmanland | 302 | 121 | 312 | 122 | 305 | 126 | 246 | 95 |
| Dalarna | 384 | 115 | 377 | 121 | 367 | 127 | 361 | 122 |
| Gävleborg | 390 | 109 | 397 | 117 | 382 | 122 | 358 | 116 |
| Västernorrland | 320 | 122 | 325 | 123 | 335 | 119 | 311 | 122 |
| Jämtland | 289 | 91 | 303 | 92 | 299 | 92 | 270 | 89 |
| Västerbotten | 271 | 106 | 281 | 111 | 289 | 116 | 301 | 127 |
| Norrbotten | 242 | 132 | 248 | 135 | 247 | 132 | 269 | 140 |

[26] NUTS stands for ”Nomenclature des Unités Territoriales Statistiques”. South Sweden (counties of Blekinge and Skåne), East Middle Sweden (counties of Uppsala, Södermanland, Östergötland, Örebro and Västmanland), Stockholm (county of Stockholm), West Sweden (counties of Halland and Västra Götaland), North Middle Sweden (counties of Värmland, Dalarna and Gävleborg), Småland and the islands (counties of Jönköping, Kronoberg, Kalmar and Gotland), Middle Norrland (counties of Västernorrland and Jämtland) and Upper Norrland (counties of Västerbotten and Norrbotten)

# 4 Employment

*This section contains information about the employment in the Swedish Environmental sector, broken down on primary and secondary Environmental sectors. The source of employment statistics is the Labour statistics based on administrative sources at Statistics Sweden.*

## 4.1 Introduction

It is interesting to look closer at employment in the environmental sector for many reasons. Employment could, for example, be seen as an indicator of the development potential in this sector and it can illustrate if the sector is creating new work opportunities. Table 4.1 presents the employment in the primary and secondary environmental sectors between 2002 and 2004. In 2004 more than 50 000 people were employed in the primary sector and almost 41 000 in the secondary sector. More men than women are employed in the environmental sector. In 2004, almost 80% of the employees in the primary sector were men and in the secondary sector 78% were men.

The primary sector increased by 2% during this period and the secondary by 6%. For all years, more people have been employed in the primary sector than in the secondary. Most likely the true number of employees lies somewhere between the total employees in the primary sector and the employees in the primary and secondary together.

**Table 4.1.** Employment in primary and secondary environmental sector, 2002-2004

| | **2002*** | *Share 02* | **2003** | *Share 03* | **2004** | *Share 04* |
|---|---|---|---|---|---|---|
| **Primary environmental sector** | **49 487** | *56%* | **49 620** | *56%* | **50 621** | *55%* |
| *women* | *10 114* | *11%* | *10 348* | *12%* | *10 439* | *11%* |
| *men* | *39 373* | *45%* | *39 272* | *44%* | *40 182* | *44%* |
| **Secondary environmental sector** | **38 554** | *44%* | **39 631** | *44%* | **40 811** | *45%* |
| *women* | *8 545* | *10%* | *8 884* | *10%* | *9 067* | *10%* |
| *men* | *30 009* | *34%* | *30 747* | *34%* | *31 744* | *35%* |

* The result for 2002 has been revised

Table 4.2 presents the share of employment in the primary and secondary environmental sectors as shares of the total employment in Sweden. Total employment is based on the daytime population in Sweden. 1.22% of the total employed men and women in Sweden 2004 worked in the primary environmental sector. When including the employees in the secondary sector, this share amounts to 2.2% of the total employees. The total employment in Sweden was approximately 4 163 000 people in 2004. Around 0.5% of the employed women in Sweden work in the primary sector while around 1.85% of the total employed men in Sweden work in the primary environmental sector.

**Table 4.2** Share of total employment in Sweden, 2002-2004 (in %)

| | **2002** | **2003** | **2004** |
|---|---|---|---|
| **Primary environmental sector** | **1,20** | **1,22** | **1,22** |
| *women* | *0,51* | *0,53* | *0,52* |
| *men* | *1,83* | *1,85* | *1,85* |
| **Secondary environmental sector** | **0,93** | **0,97** | **0,98** |
| *women* | *0,43* | *0,45* | *0,45* |
| *men* | *1,40* | *1,45* | *1,46* |
| **Primary + secondary sector** | **2,13** | **2,19** | **2,20** |

It interesting to compare the employment in the primary and secondary environmental sectors combined, almost 92 000 in 2004, to other industries in Sweden. It is though important to interpret

this comparison with care, since the environmental sector is not an industry according to NACE but rather a sum of some specific industries in Sweden and establishments across the industry scale. (Read more about this in Section 2). In spite of this difference, it is interesting to compare the total employment numbers in order to further analyse the importance of the environmental sector for Swedish employment, in general and not least since there is no "environmental" industry in the NACE classification.

As an example, the Agriculture, hunting and forestry industry (NACE 1-5) employed almost 77 500 persons in Sweden in 2004, of which 81% were men. In the same year, the Hotel and restaurant industry (NACE 55) employed around 110 000 people and the Manufacture of pulp, paper and paper products industry (NACE 21) employed 40 000 people.

Employment in the environmental sector will be analysed in more detail below. Employment will be divided into environmental domains, industries (NACE groups) and regions. It will also be split up into the private and public sector, which is possible only for employment data (and not for turnover and exports).

## 4.2 Employment in environmental domains

Figure 4.1 shows employment in the primary and secondary sectors divided on three grouped domains: Resource management, Cleaner technologies/products and Pollution management. The domain Resource management employed the most people in 2004, 56% worked in the primary sector and 47% in the secondary. However, the domain Pollution management increased the most between 2002 and 2004, 6% in total divided into a 3% increase in the primary sector and a 10% increase in the secondary. Employees in Resource management increased by 3% in total, split up into 1% in the primary and 4% in the secondary.

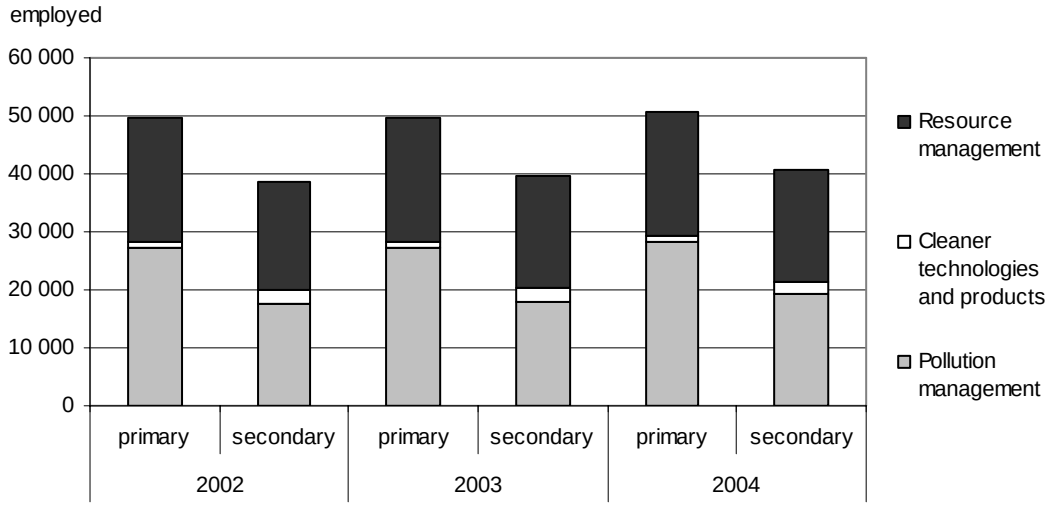



**Figure 4.1.** Employment in primary and secondary environmental sector by grouped domains, 2002-2004.

The results of Figure 4.1 are broken down into more detailed environmental domains in Figure 4.2 below. See also Appendix 2 for the figures on which Figure 4.2 is based as well as the same information for 2002 and 2003. Resource management consists of Air pollution control, Wastewater management, Waste management, Soil/groundwater, Noise/vibration and Environmental monitoring etc. The group Cleaner technologies and products consists of Cleaner technologies and cleaner product. The third grouped domain, Resource management is a

combination of the rest of the environmental domains shown in Figure 4.2 below, i.e. Indoor air control, Water supply, Recycled materials, Renewable energy, Heat/energy saving, Sustainable agriculture/fishery, Sustainable forestry and Other resource management (including ecotourism).

Looking at the total environmental sector, i.e. primary and secondary together, the domain Waste management had the most employees, almost 21 000 in 2004. However, if we separate the primary and secondary sectors, Waste management is the single largest domain in the primary sector with almost 17 000 employed people. The group Environmental monitoring etc had the most employees in the secondary sector in 2004, almost 13 000. The domains Renewable energy and Indoor air control also employ many people. The domain Noise and vibration employed the least amount of people in 2004, only around 120 worked in the primary and secondary sectors together.

In the *primary* sector, the greatest amount of women worked in Waste management, around 2 500. However, this is only 15% of the total employed men and women in this domain. The highest share of women is found in Environmental monitoring etc. where 41% of the total employees were women in 2004.

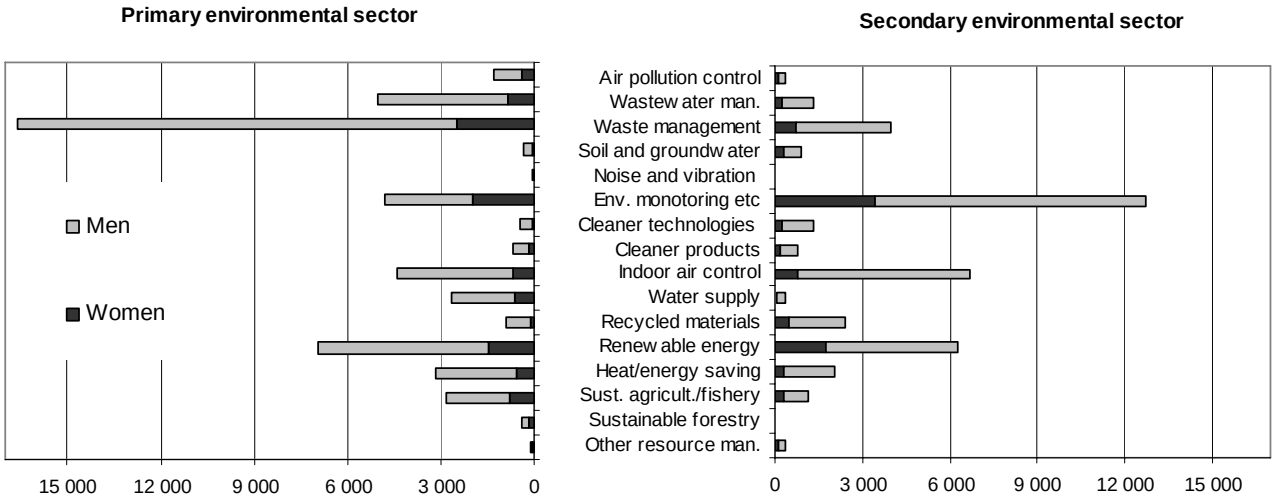



**Figure 4.2.** Employment in primary and secondary environmental sector by environmental domains, 2004.

## 4.3 Employment by NACE

Besides presenting the results by environmental domains, it is also possible to show employed people by the NACE industries in which the establishments are classified. We have grouped the NACE industries into six different groups. In 2004, for the primary sector, most people were employed in the Water distribution, sewage and waste industry as seen in Table 4.2. This equals 25% of the primary sector employment. In the secondary sector, the largest group of people were employed in the Other industries group (35% of the employed). The highest increase during the period 2002-2004 was in the Other business activities industry for the primary sector, the employed men and women in this industry increased by 24%. In the secondary industry, the Wholesale and retail trade industry increased by 23% during the same period.

The highest number of women in the primary sector were employed in the Mining and manufacturing industry, almost 2 300 women worked in this industry in 2004. However only 19% of the employees were women in this industry. The largest share of women worked in the Other business activities industry, 33% of the total primary sector employed women.

**Table 4.3.** Employment in primary and secondary environmental sector, by NACE, 2002-2004

| Industries | 2002 | | 2003 | | 2004 | |
|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary |
| Mining and manufacturing (NACE 10-37) | 12 642 | 8 435 | 11 674 | 7 740 | 12 164 | 8 203 |
| *women* | *2 376* | *1 593* | *2 164* | *1 418* | *2 278* | *1 465* |
| *men* | *10 266* | *6 842* | *9 510* | *6 322* | *9 886* | *6 738* |
| Electricity, gas and hot water supply (NACE 40) | 5 823 | 4 673 | 5 911 | 4 770 | 5 945 | 4 494 |
| *women* | *1 253* | *1 696* | *1 286* | *1 756* | *1 396* | *1 435* |
| *men* | *4 570* | *2 977* | *4 625* | *3 014* | *4 549* | *3 059* |
| Wholesale and retail trade (NACE 50-52) | 5 132 | 1 930 | 5 883 | 2 015 | 5 651 | 2 369 |
| *women* | *945* | *345* | *1 080* | *350* | *1 013* | *419* |
| *men* | *4 187* | *1 585* | *4 803* | *1 665* | *4 638* | *1 950* |
| Other business activities (NACE 74) | 4 304 | 10 208 | 5 298 | 11 371 | 5 345 | 11 438 |
| *women* | *1 362* | *2 644* | *1 762* | *3 056* | *1 752* | *3 199* |
| *men* | *2 942* | *7 564* | *3 536* | *8 315* | *3 593* | *8 239* |
| Water distribution, sewage and waste (NACE 41+90) | 13 880 | 0 | 13 281 | 0 | 12 452 | 0 |
| *women* | *2 129* | *0* | *2 063* | *0* | *1 927* | *0* |
| *men* | *11 751* | *0* | *11 218* | *0* | *10 525* | *0* |
| Other industries (NACE 1-5, 45, 55-73, 75-85, 91-99) | 7 706 | 13 308 | 7 573 | 13 735 | 9 064 | 14 307 |
| *women* | *2 049* | *2 267* | *1 993* | *2 304* | *2 073* | *2 549* |
| *men* | *5 657* | *11 041* | *5 580* | *11 431* | *6 991* | *11 758* |
| **Total** | **49 487** | **38 554** | **49 620** | **39 631** | **50 621** | **40 811** |

In Figure 4.3, the same information is split up into two of the three grouped domains, Resource management and Pollution management. No information is given for the third group, Cleaner technologies and products, due to confidentiality. For all of the accounted NACE groups, the employees can be found in both grouped domains, except for the secondary industry and the Electricity, gas and hot water supply industry (NACE 41+90) where all employees worked in the domain Resource management in 2004.

For some NACE groups, most of the employees belong to one of the two grouped domains. For the primary sector, 97% of the employed men and women in the Electricity, gas and hot water supply industry worked with Resource management. Another distinctive feature in Figure 4.3 is that most of the employees in the Other business activities industry belong to the Pollution management domain and not to Resource management. The reason for this is that many environmental consultants are classified in NACE 74 and they belong to the environmental domain Environmental monitoring etc, which in turn is grouped under Pollution management.

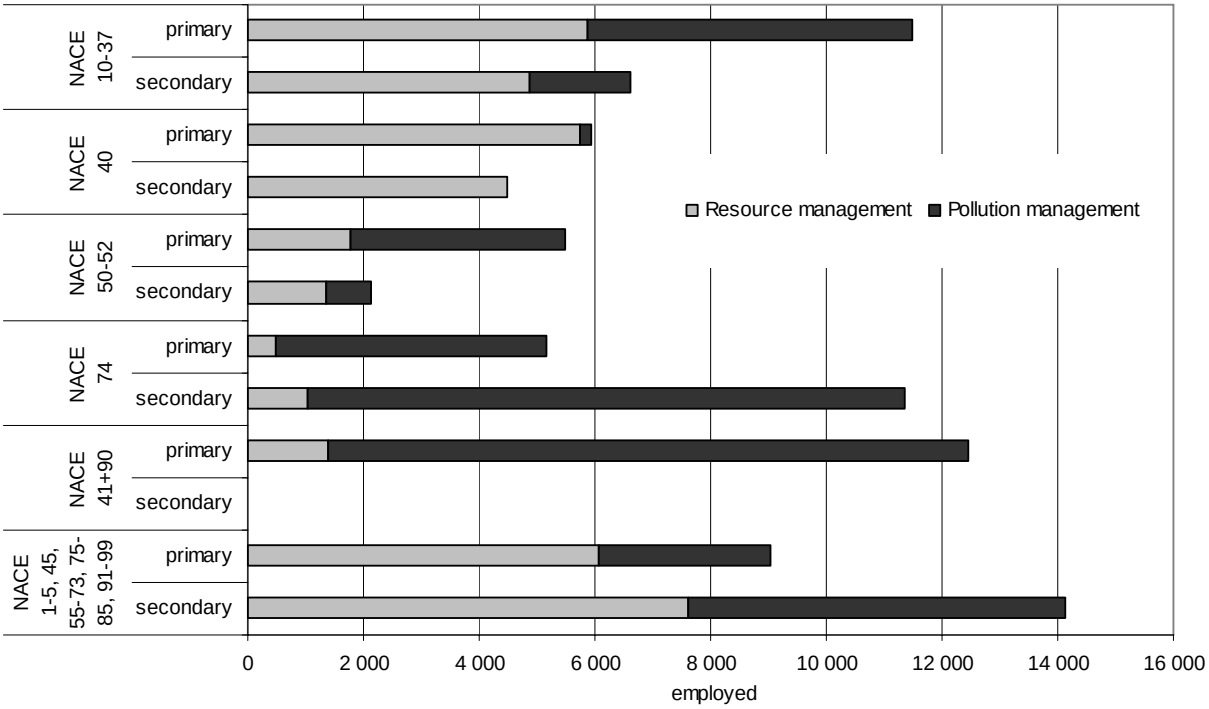



**Figure 4.3.** Employment in primary and secondary environmental sectors by NACE (for NACE codes see Table 4.3) and grouped domains, 2004.

## 4.4 Regional breakdown of employment

Breaking the result down into regions and counties shows in which parts of Sweden the employed in the environmental sector are situated. Table 4.4 presents the results for 2002, 2003 and 2004 by NUTS 2 areas[27]. See also the results broken down into Swedish counties in Figure 4.5 below.

West Sweden had the largest share of employees in 2004, both in the primary and secondary sectors. 19% of employees in the primary sector and 18% of employees in the secondary were situated in West Sweden. However, West Sweden has not been the area with the highest growth in employment for either the primary or the secondary sectors. For the primary sector, Småland and the islands increased the most between 2002 and 2004, by 7%. In the secondary sector, employment in North middle Sweden increased by 15% during the period. At the same time, North Middle Sweden also had the largest decrease in employees in the primary sector, a decrease of 6%.

[27] NUTS stands for ”Nomenclature des Unités Territoriales Statistiques”. South Sweden (counties of Blekinge and Skåne), East Middle Sweden (counties of Uppsala, Södermanland, Östergötland, Örebro and Västmanland), Stockholm (county of Stockholm), West Sweden (counties of Halland and Västra Götaland), North Middle Sweden (counties of Värmland, Dalarna and Gävleborg), Småland and the islands (counties of Jönköping, Kronoberg, Kalmar and Gotland), Middle Norrland (counties of Västernorrland and Jämtland) and Upper Norrland (counties of Västerbotten and Norrbotten)

**Table 4.4** Employment in primary and secondary environmental sectors by NUTS 2[28] areas, 2002-2004

| NUTS 2 areas | 2002 | | 2003 | | 2004 | |
|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary |
| South Sweden | 7 532 | 5 526 | 7 453 | 5 513 | 7 414 | 5 274 |
| *women* | *1 552* | *1 131* | *1 487* | *1 205* | *1 472* | *1 096* |
| *men* | *5 980* | *4 395* | *5 966* | *4 308* | *5 942* | *4 178* |
| West Sweden | 9 328 | 7 913 | 9 510 | 8 421 | 9 752 | 8 919 |
| *women* | *1 931* | *1 965* | *2 008* | *1 987* | *2 015* | *2 182* |
| *men* | *7 397* | *5 948* | *7 502* | *6 434* | *7 737* | *6 737* |
| Stockholm | 8 340 | 7 232 | 8 164 | 7 595 | 8 571 | 7 673 |
| *women* | *2 214* | *1 846* | *2 211* | *2 016* | *2 285* | *2 032* |
| *men* | *6 126* | *5 386* | *5 953* | *5 579* | *6 286* | *5 641* |
| East middle Sweden | 9 026 | 6 425 | 8 999 | 6 327 | 9 357 | 6 654 |
| *women* | *1 864* | *1 334* | *1 928* | *1 425* | *1 987* | *1 375* |
| *men* | *7 162* | *5 091* | *7 071* | *4 902* | *7 370* | *5 279* |
| North middle Sweden | 4 119 | 2 604 | 4 048 | 2 720 | 3 878 | 3 003 |
| *women* | *652* | *483* | *671* | *457* | *599* | *518* |
| *men* | *3 467* | *2 121* | *3 377* | *2 263* | *3 279* | *2 485* |
| Småland and the islands | 6 383 | 4 121 | 6 619 | 4 163 | 6 809 | 4 329 |
| *women* | *1 074* | *854* | *1 174* | *887* | *1 209* | *885* |
| *men* | *5 309* | *3 267* | *5 445* | *3 276* | *5 600* | *3 444* |
| Middle Norrland | 2 460 | 1 838 | 2 578 | 1 726 | 2 544 | 1 647 |
| *women* | *434* | *361* | *469* | *309* | *472* | *289* |
| *men* | *2 026* | *1 477* | *2 109* | *1 417* | *2 072* | *1 358* |
| Upper Norrland | 2 299 | 2 895 | 2 249 | 3 166 | 2 296 | 3 312 |
| *women* | *393* | *571* | *400* | *598* | *400* | *690* |
| *men* | *1 906* | *2 324* | *1 849* | *2 568* | *1 896* | *2 622* |
| **Total women** | **10 114** | **8 545** | **10 348** | **8 884** | **10 439** | **9 067** |
| **Total men** | **39 373** | **30 009** | **39 272** | **30 747** | **40 182** | **31 744** |

In order to see if there are also regional differences regarding the domains that the environmental establishments are active in, Figure 4.4 presents the employment in the environmental sector broken down into the three grouped domains Resource management, Cleaner technologies/products and Pollution management. Since 2005 the establishments are no longer classified in the group Cleaner technologies and products but have instead been moved to relevant domains within either Resource or Pollution. Because of this, and because the quality in this group is not as good, this group will not be further analysed.

In the primary sector, the highest share of employees in Resource management establishments were found in Middle Norrland, 57% of the employees in these establishments were classified as resource and only 40% as Pollution management in 2004. In Stockholm the opposite is shown, 68% of the employees worked in the area of Pollution management and only 30% in the Resource area.

Studying the secondary sector, the results are a little different. In Middle Norrland around 60% of the employees were found in establishments classified as Pollution management. The highest share in the Resource area were found in Småland and the islands, 70%.

[28] See footnote 27 on page 39.

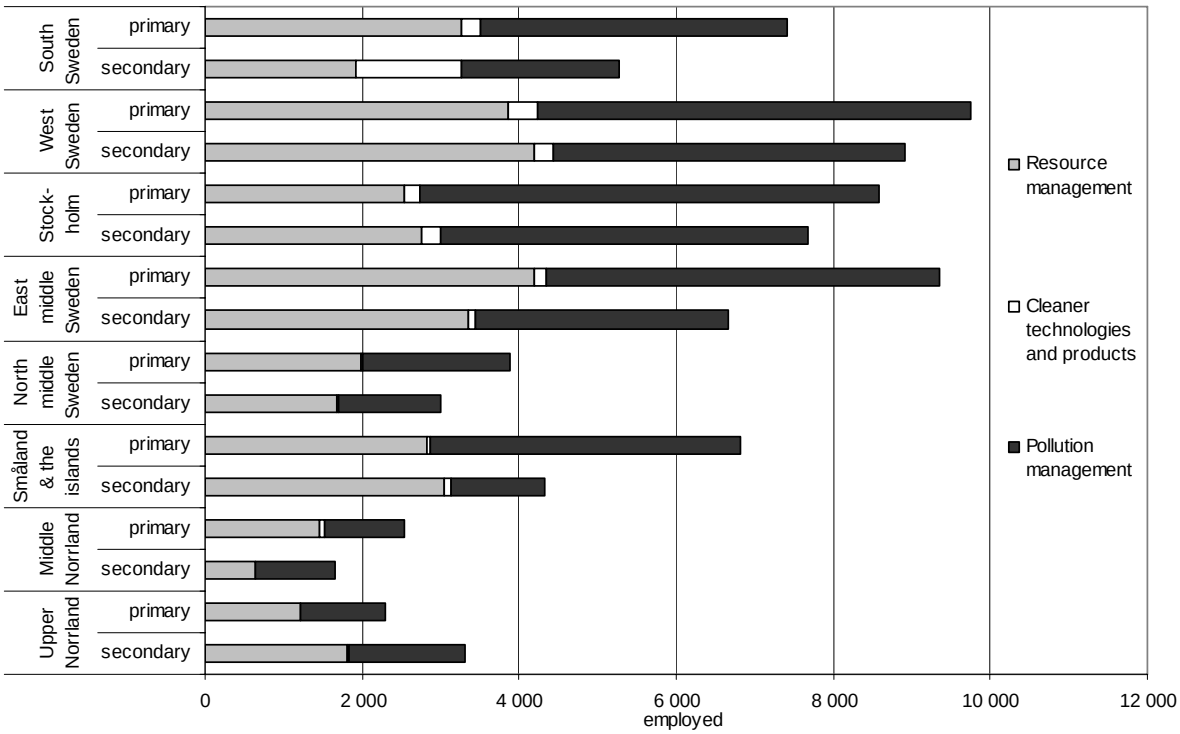



**Figure 4.4.** Employment in primary and secondary environmental sectors by NUTS 2 areas[29] and grouped domains, 2004.

Figure 4.5 shows employed women and men divided into the Swedish counties. In total, the highest number of employed men and women were found in the counties of Stockholm, Västra Götaland and Skåne. In the primary sector, the highest share of men was found in the county of Gotland, 89%. The highest share of women was found in the counties of Stockholm and Södermanland, where 27% were women and 73% men. The shares were similar in the secondary environmental sector, but different counties can be distinguished. In the county of Kronoberg, 85% were men and 15% women.

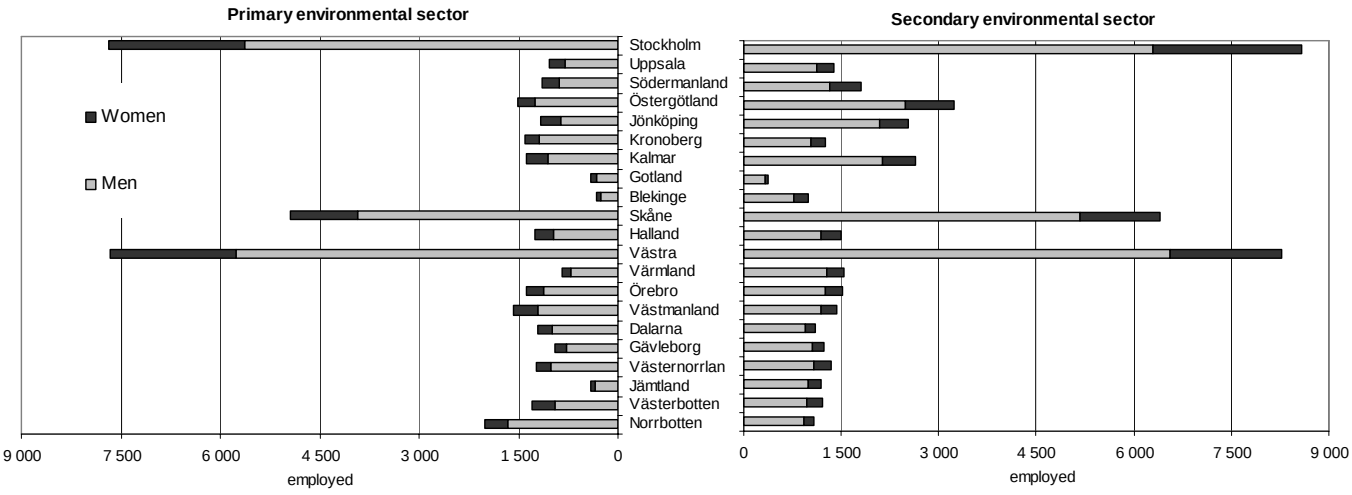



**Figure 4.5.** Employment in primary and secondary environmental sectors by counties, 2004.

[29] See footnote 27 on page 39.

## 4.5 Public and private sector

Employment, in contrast to turnover and exports, has in this report been broken down into the public and private sector. Therefore this analysis is only presented in this section and not in the following sections. As seen in Figure 4.6, most of the employed men and women in the primary as well as secondary sector work in the private sector. In 2004 around 90% of employees in both sectors worked in the private sector and this share has been similar during the whole period.

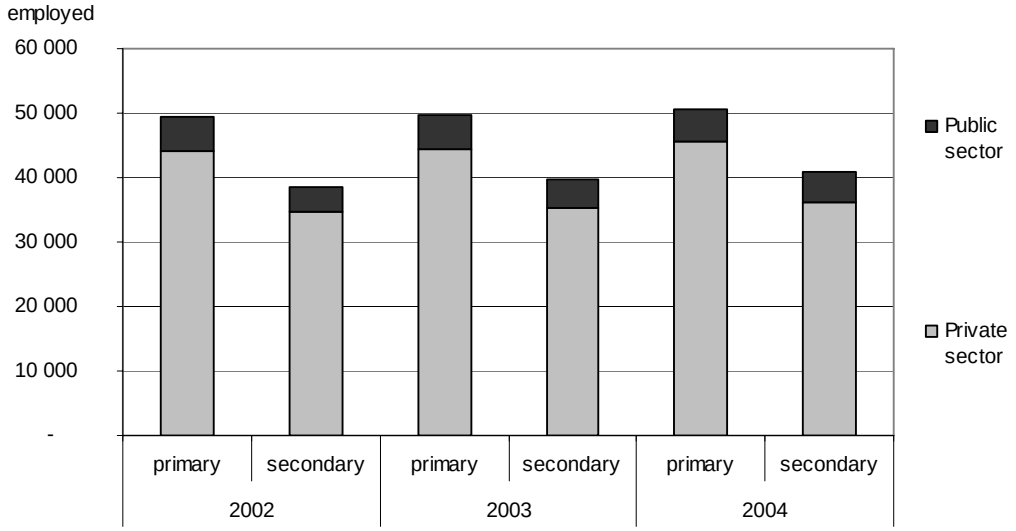



**Figure 4.6.** Employment in primary and secondary environmental sectors by sector, 2002-2004.

Breaking down the results further, for example, by environmental domains, presents more varied results. There are only employees working in the public sector in 8 of the total 17 environmental domains and therefore only these domains are presented in Figure 4.7. This indicates that in most of the environmental domains there are no public employers. In order to avoid confidentiality, several domains in the Resource group are grouped together, i.e. Renewable energy, Heat/energy saving, Sustainable agriculture/fishery and Sustainable forestry.

In this combined domain with Renewable energy and agriculture, among others, almost all of the employees worked in the private sector in 2004. In this group, 98% of the employees in the primary sector, and 93% of the secondary sector, worked in the private sector. The highest share of employees in the public sector was found in the domain Water supply where 39% of the employees in the primary and 70% in the secondary sector had public employers.

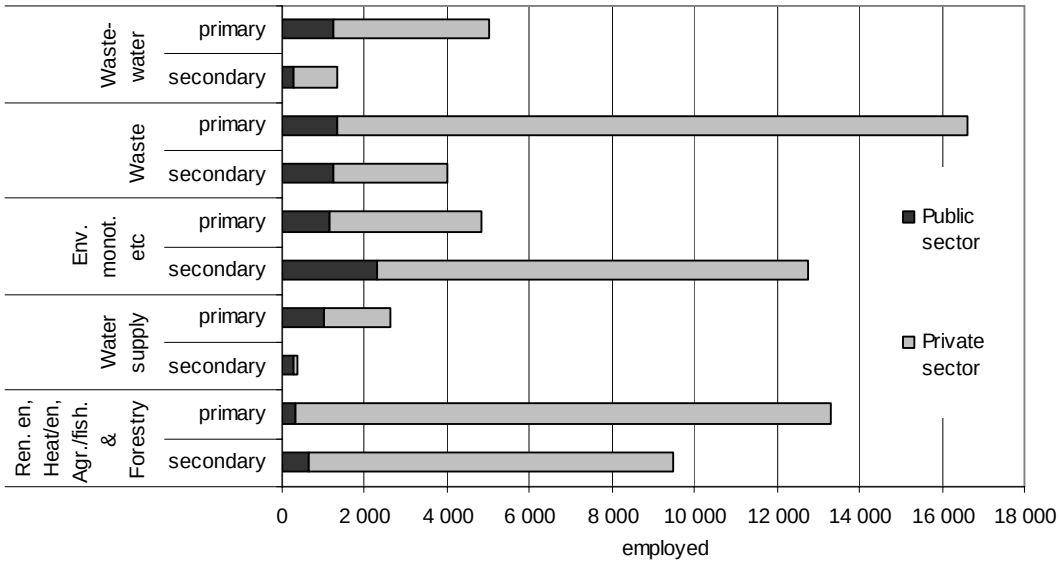



**Figure 4.7.** Employment in primary and secondary environmental sectors by sector and a selection of environmental domains, 2004.

# 5 Turnover

*This section contains information about the turnover in the Swedish environmental sector, broken down on primary and secondary sector. The information on turnover is collected from the Statistics Sweden's Business Register.*

## 5.1 Introduction

The turnover for the environmental sector has increased during the years 2002-2005 as shown in Table 5.1 below. It is likely that the true turnover for the environmental sector lies in the interval between the primary turnover and the total turnover for both primary and secondary establishments.

The turnover of the primary environmental sector in Sweden has grown by 31% from 12.7 billion euros to 16.6 billion euros during 2002 to 2005. During the same period of time the secondary environmental sector in Sweden has grown by 7% from 9.8 billion euros to 10.5 billion euros.

**Table 5.1** Turnover in Sweden 2002–2005 in million euros

| | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Primary environmental sector | 12 710 | 14 466 | 14 376 | 16 468 |
| Secondary environmental sector | 9 761 | 11 416 | 9 886 | 10 568 |

The total turnover in Sweden in 2004 was 4 326 273 million SEK[30] or 480 697 million euros[31]. The turnover in the environmental sector (summing the primary and the secondary sector) is therefore around 5% of the total turnover in Sweden.

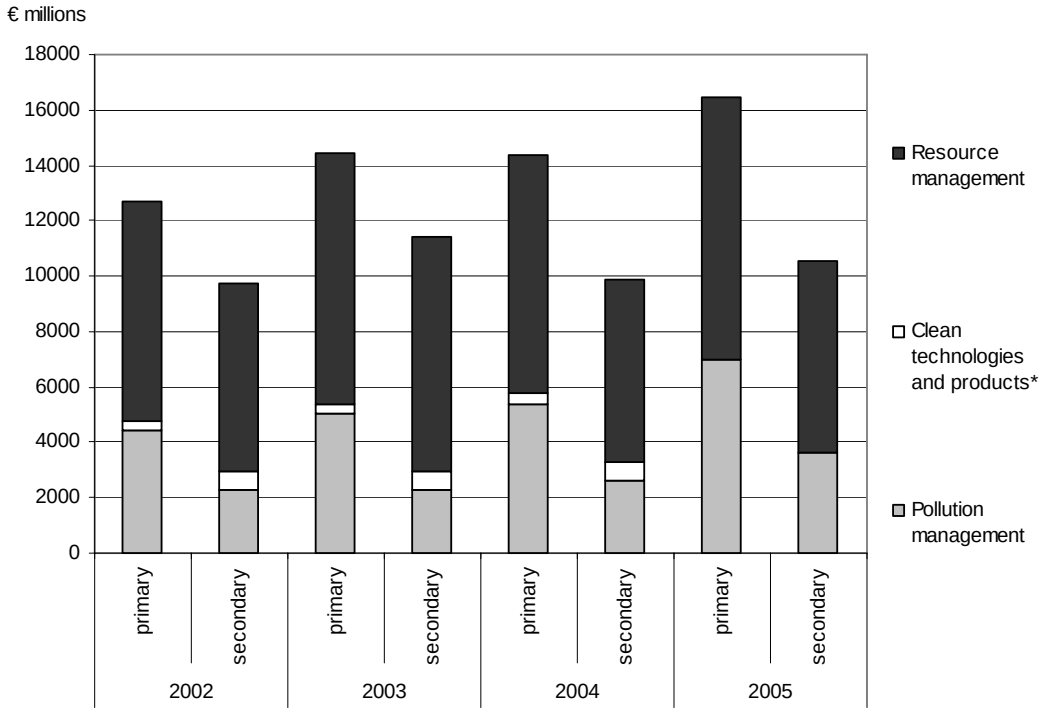
In the following sections the primary and secondary turnover is distributed into environmental domains, industries (NACE groups) and regions in order to analyse the results further.

## 5.2 Turnover by environmental domains

In Figure 5.1, the turnover is shown between 2002 and 2005. The results are presented by grouped domains, which in turn include the detailed environmental domains. The domain Cleaner technologies and products is not used since 2005 and the establishments that belonged to this group have obtained a new classification, now belonging to one of the other two groups. The increase in Pollution management and Resource management can partly be referred to as the transfer of this former group.

The group Pollution management had the largest turnover in 2005, with 57% of the turnover in the primary sector and 67% of the turnover in the secondary sector. Pollution management has increased by 57% in total between 2002 and 2005, split up into 60% of the primary sector and 52% of the secondary sector. The group Resource management has increased by 12% in total, based on a 20% increase in the primary sector and a 2% increase in the secondary sector. See Appendix 2 for a table with the exact numbers behind Figure 5.1.

[30] VAT register
[31] The rate 1 Euro = 9 SEK has been used throughout this report




* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

**Figure 5.1** Turnover in the environmental sector in Sweden 2002-2005 in million euros

In Figure 5.2, the turnover for 2005 has been broken down into environmental domains. Due to data confidentiality, some domains have been merged in the diagram. Pollution management includes the domains Air pollution control through Environmental monitoring etc in Figure 5.2 and Resource management includes the remaining domains, i.e. Indoor air control through Other resource management (including ecotourism).

The domain Renewable energy had the largest total turnover in 2005, nearly 7 billion euros in the primary sector and nearly 5 billion euros in the secondary sector. The second biggest contributor to the primary turnover was the domain Waste management with a little more than 5 billion euros. Regarding only the secondary sector, two other domains had larger turnover than Waste management in 2005: Environmental monitoring etc with a little more than 1.5 billion euros and Indoor air control with 1 billion euros.

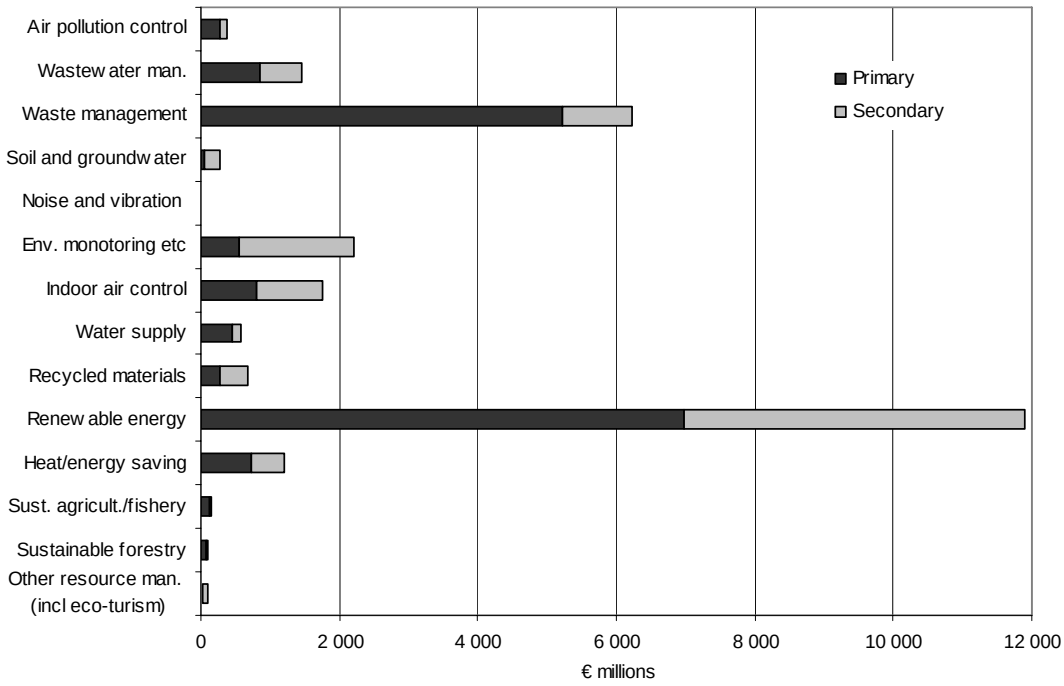



**Figure 5.2** Turnover in primary and secondary sectors by environmental domains in million euros, 2005.

## 5.3 Turnover by NACE

Besides environmental domains, it is possible to break down the turnover in the primary and secondary sector into industries. In Table 5.2, this is carried out for a selection of NACE groups.

**Table 5.2** Turnover in Sweden 2002-2005 in million euros

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| Mining and manufacturing (NACE 10-37) | 2 444 | 1 669 | 2 784 | 1 669 | 3 145 | 1 797 | 3 679 | 1 758 |
| Electricity, gas and hot water supply (NACE 40) | 5 111 | 4 537 | 6 216 | 5 981 | 5 657 | 3 911 | 5 544 | 4 212 |
| Wholesale and retail trade (NACE 50-52) | 1 687 | 732 | 1 912 | 817 | 1 864 | 896 | 2 541 | 963 |
| Other business activities (NACE 74) | 761 | 1 217 | 792 | 1 282 | 821 | 1 441 | 953 | 1 536 |
| Water distribution, sewage and waste (NACE 41+90) | 1 733 | 0 | 1 825 | 0 | 1 891 | 0 | 2 057 | 0 |
| Other industries (NACE 1-5, 45, 55-73, 75-85, 91-99) | 974 | 1 605 | 937 | 1 667 | 998 | 1 841 | 1 694 | 2 098 |
| **Total** | 12 710 | 9 761 | 14 466 | 11 416 | 14 376 | 9 886 | 16 468 | 10 568 |

The Electricity, gas and hot water supply (NACE 40) contributes with the largest turnover in all years. The largest increases from 2003 to 2005 (not counting Other business activities) were within Mining and manufacturing (NACE 10-37) with a 56% increase in the primary sector and Wholesale and retail trade (NACE 50-52) with a 50% increase in the primary sector. In the secondary sector the increase from 2003 to 2005 was largest in Wholesale and retail trade (NACE 50-52) with 32% and in Other business activities (NACE 74) with 26% (not counting Other business activities).

The results for 2005 are shown in Figure 5.3. It is clear that the environmental sector is represented in a variety of industry sectors, and that it consists of resource management and pollution management. The Electricity, gas and hot water supply (NACE 40) has the largest turnover and dominates in the Resource management area.

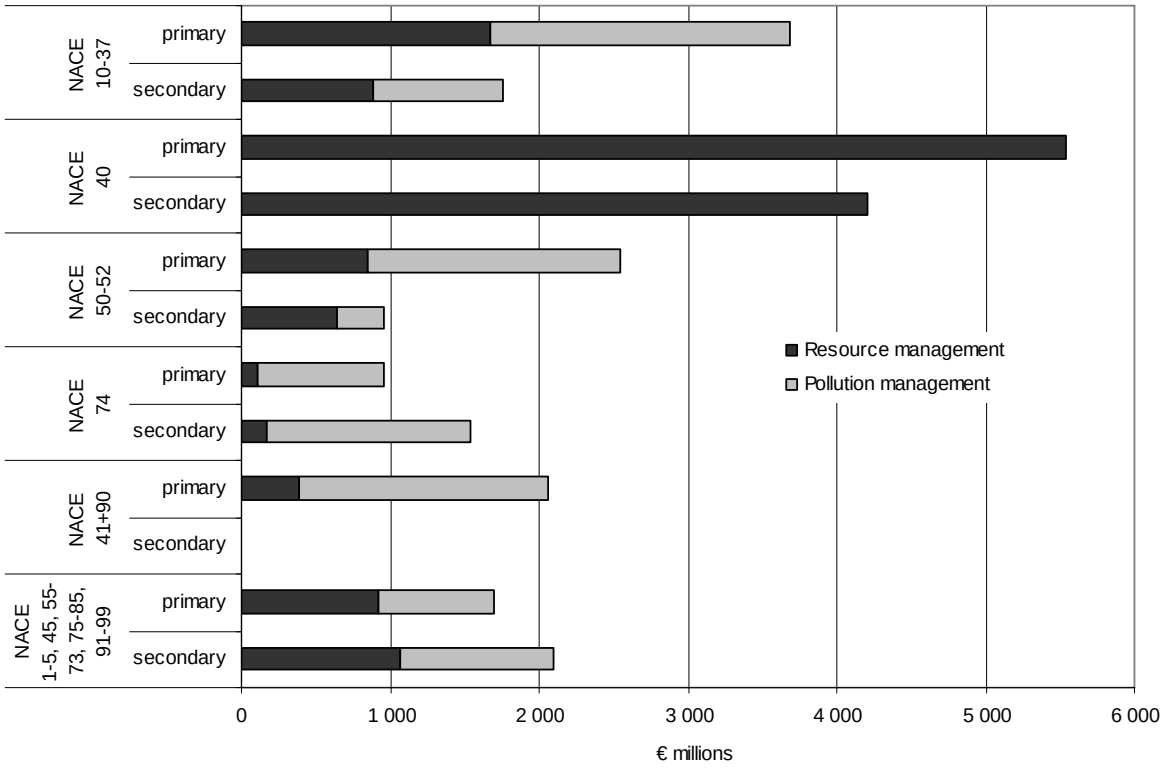



**Figure 5.3** Turnover in million euros by NACE (for NACE codes see Table 5.2), 2005

## 5.4 Regional breakdown of turnover

An additional way of analysing the results is by regional breakdown, looking at how much different areas and counties in Sweden contribute to the total environmental turnover. In Table 5.3 the results are broken down into NUTS 2 areas[32]. Of these areas East Middle Sweden had the largest turnover in the primary sector in all years (around 20% of the total primary sector each year), except in 2003 when South Sweden dominates (21% of the total primary sector). In the secondary sector, Stockholm had the largest turnover in all years (around 25% of the total secondary sector each year) except in 2005 when West Sweden dominated with 20% of the total turnover in the secondary sector.

Comparing the turnover in the primary sector between 2003 and 2005, all areas have increased their turnover. The largest growth in the primary sector has taken place in Upper Norrland where the turnover has increased by 73%. In the secondary sector, two areas have seen a small decrease, two areas have had no change and four areas have had a substantial increase, with Småland and the islands contributing with the largest increase in turnover with 50%.

[32] NUTS stands for ”Nomenclature des Unités Territoriales Statistiques”. South Sweden (counties of Blekinge and Skåne), East middle Sweden (counties of Uppsala, Södermanland, Östergötland, Örebro and Västmanland), Stockholm (county of Stockholm), West Sweden (counties of Halland and Västra Götaland), North middle Sweden (counties of Värmland, Dalarna and Gävleborg), Småland and the islands (counties of Jönköping, Kronoberg, Kalmar and Gotland), Middle Norrland (counties of Västernorrland and Jämtland) and Upper Norrland (counties of Västerbotten and Norrbotten)

**Table 5.3** Turnover in Sweden 2002-2005 in million euros by NUTS 2 areas[33]

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary | primary | secondary |
| South Sweden | 1787 | 1985 | 2990 | 2179 | 2072 | 1566 | 2291 | 1537 |
| West Sweden | 2018 | 1496 | 1930 | 1722 | 2241 | 1783 | 2685 | 2056 |
| Stockholm | 1854 | 2273 | 2373 | 2853 | 2248 | 2764 | 2567 | 1836 |
| East middle Sweden | 2215 | 1399 | 2418 | 1616 | 2846 | 1134 | 2933 | 1987 |
| North middle Sweden | 1503 | 621 | 1395 | 643 | 1259 | 641 | 1566 | 721 |
| Småland and the islands | 1637 | 692 | 1298 | 833 | 1791 | 685 | 2101 | 1062 |
| Middle Norrland | 1016 | 686 | 1271 | 891 | 1067 | 389 | 1150 | 697 |
| Upper Norrland | 680 | 610 | 790 | 679 | 852 | 926 | 1175 | 672 |
| **Total** | **12710** | **9761** | **14466** | **11416** | **14376** | **9886** | **16468** | **10568** |

Looking at the 2005 results specifically, as in Figure 5.4, it can be seen that the turnover in the primary environmental sector is largest in East Middle Sweden, West Sweden and Stockholm.

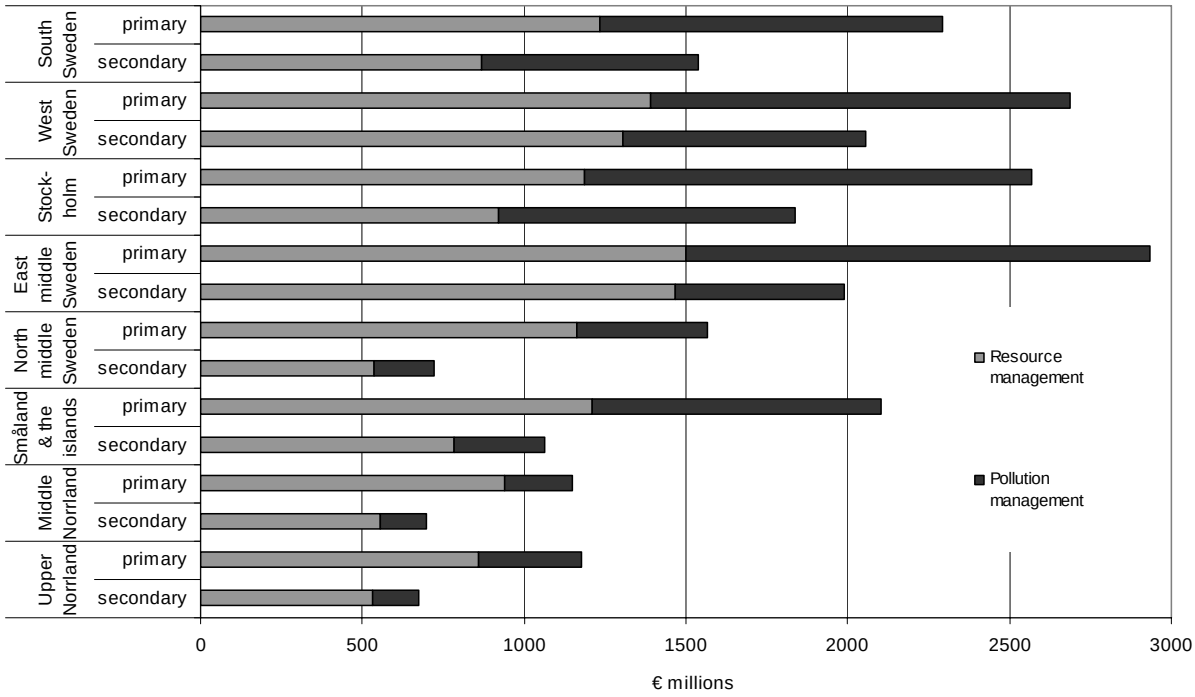



**Figure 5.4** Turnover by NUTS 2 areas[34] in 2005 in million EUR

In Figure 5.5, turnover is presented for each of the 21 counties in Sweden. The three largest counties regarding turnover in the primary sector in 2005 are Stockholm, Västra Götaland and Skåne, with a turnover of around 2 000 billion euros each. The turnover of the other 18 counties is around 600 billion euros each in the primary sector. In the secondary sector the same counties as in the primary sector dominate the turnover, with a contribution of around 1 500 billion euros. The turnover in each of the other 18 counties is around 300 billion euros.

[33] See footnote 32 on page 48
[34] See footnote 32 on page 48

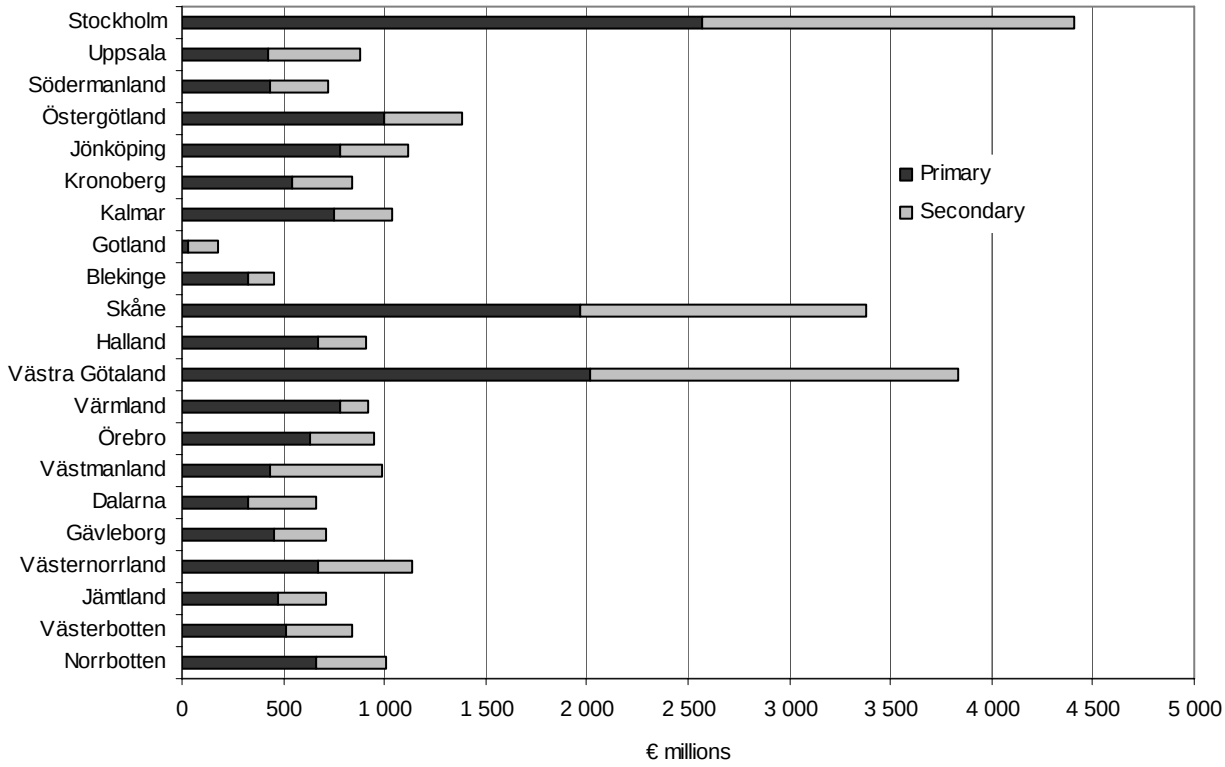



**Figure 5.5** Turnover in primary and secondary sectors by counties in 2005, million euros

# 6 Exports

*This section presents the exports in the Swedish environmental sector, broken down into the primary and secondary sectors. The information on exports is collected from the statistics of foreign trade as well as the Swedish Business Register, both at Statistics Sweden. The source of the Business Register for exports is the VAT register.*

## 6.1 Introduction

There are large hopes for the Swedish environmental sector regarding growth potential and increased exports from this sector play a large part in these expectations[35]. Table 6.1 shows that the exports in the primary as well as secondary environmental sectors have increased between 2003 and 2005. Exports principally occur in the primary sector but the secondary also has substantial exports. It is likely that the true exports from the environmental sector lie somewhere between the primary exports and the total exports for both the primary and secondary sectors.

Establishments in the primary sector exported for almost 2.2 billion euros in 2005 while establishments in the secondary sector had an export of around 920 million euros in the same year. The statistics show an increase of 40% between 2003 and 2005 in the primary sector and corresponding 13% in the secondary. Exports in the total environmental sector (primary *and* secondary) in 2005, i.e. over 3 billion euros, amounted to 11% of the total turnover.

**Table 6.1.** Exports in primary and secondary environmental sectors. Million euros, 2003-2005

| | 2003* | 2004 | 2005 |
|---|---|---|---|
| Primary environmental sector | 1 522 | 1 652 | 2 129 |
| Secondary environmental sector | 820 | 938 | 926 |

* The results for 2003 has been revised

Below the primary and secondary exports are distributed into environmental domains, industries (NACE groups) and regions in order to analyse the results further.

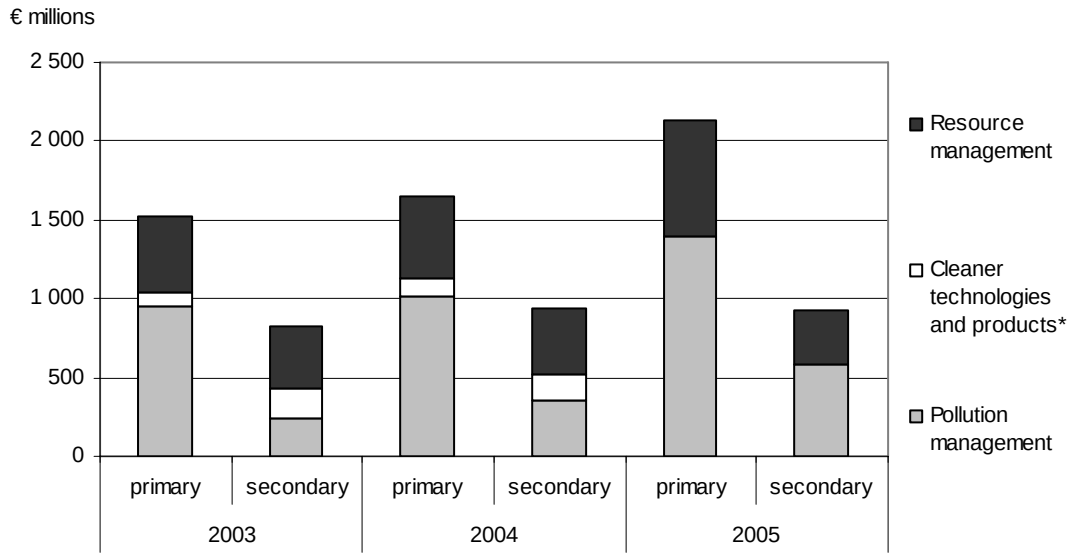
## 6.2 Export by environmental domains

In Figure 6.1, it can once again be seen that both the exports in the primary and the secondary sectors increased between 2003 and 2005. The results are presented in the more general environmental domains, which in turn include several more detailed groups (see Figure 6.2 for the more detail). The group Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups. The total values are still correct but the increase in the Pollution management and Resource management groups can be referred to this transfer as well as to a true increase in exports.

The group Pollution management had the largest exports in 2005, with 66% of exports in the primary sector and 63% in the secondary. Pollution management has increased by 66% in total between 2003 and 2005, split up into an almost 50% increase in the primary sector and 150% in the secondary. The group Resource management has increased by 25% in total, based on a 50% increase in the primary and a smaller decrease in the secondary (10%).

See Appendix 2 for a table with the figures on which Figure 6.1 is based.

[35] SOU 2004:84




* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

**Figure 6.1.** Exports in primary and secondary environmental sectors by grouped domains. Million euros, 2003-2005.

In Figure 6.2, the results from Figure 6.1 (for 2005) are broken down into the more detailed environmental domains. Due to data confidentiality, some domains have been merged together. Pollution management includes the domains between Air pollution control and Environmental monitoring etc. in Figure 6.2 and Resource management includes the remaining domains, i.e. between Indoor air control and Other resource management.

The domain Waste management had the largest total exports in 2005, around 800 million euros resulted from the primary sector and 140 million euros from the secondary. The second biggest contributor to the total exports in the primary sector was the domain Wastewater management, with around 380 million euros. Regarding only the secondary sector, two other domains had larger export values than Waste in 2005, Environmental monitoring etc. with 213 million euros and Wastewater with 180 million euros.

The figure clearly illustrates the variations between the primary and secondary sectors. As an example, the domain Environmental monitoring etc. has a large share of the exports in the secondary sector, a value that would not be noticed by focusing only on the primary environmental sector. Evidently some environmental domains are more active than others in the secondary sector.

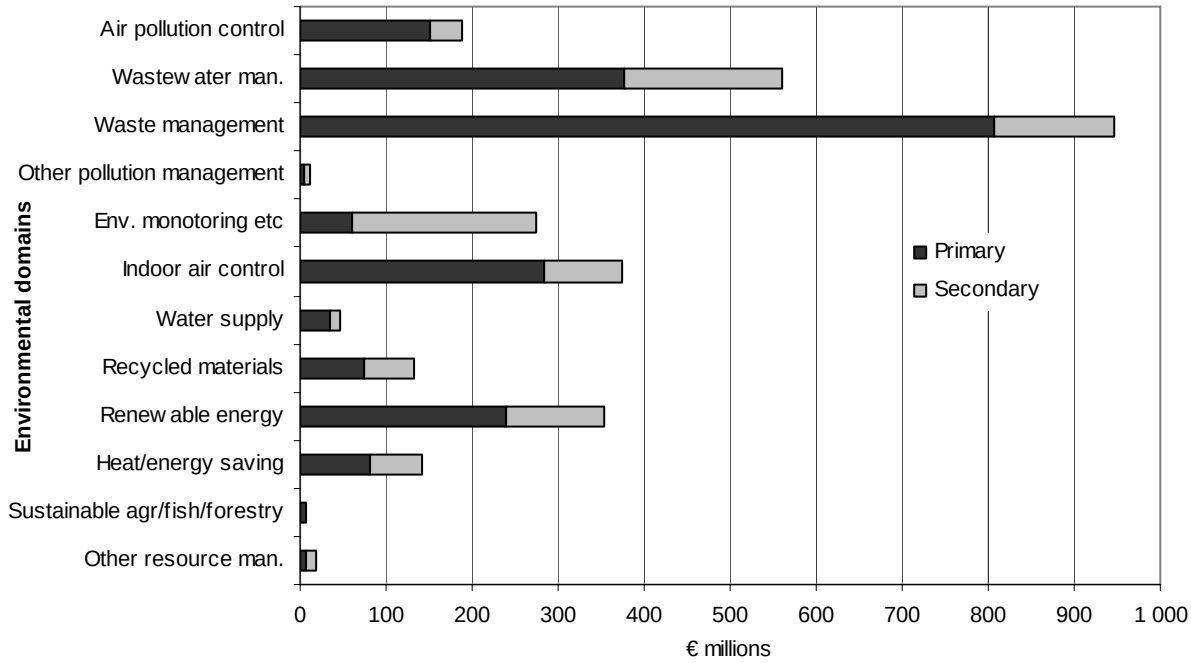



**Figure 6.2.** Exports in primary and secondary environmental sectors by environmental domains. Million euros, 2005.

It is also possible to show the total turnover and distinguish between exports and domestic turnover, in order to see which environmental domains are the most export intensive. Exports constitute 13% of the turnover in the primary sector and 9% of the turnover in the secondary sector. Several of the environmental domains exceed this share and can therefore be called export intensive. The area Air pollution control also has larger exports than domestic turnover, 54% of its turnover in the primary sector comes from its exports and 39% in the secondary sector. The domains Wastewater management (44% for primary, 30% for secondary), Indoor air control (35% and 10% respectively), Recycled materials (26% and 15% respectively) and Other resource management (30% and16% respectively) can also be said to be export-intensive.

The area Renewable energy is an example of the opposite, it does not export as much in relation to its total turnover. In the preceding section it was shown to be the dominating area regarding turnover but only around 3% of its total turnover comes from exports. Other areas depending more on the domestic turnover than exports are Other pollution management (including soil, groundwater, noise and vibration) and Sustainable agriculture/fishery and forestry.

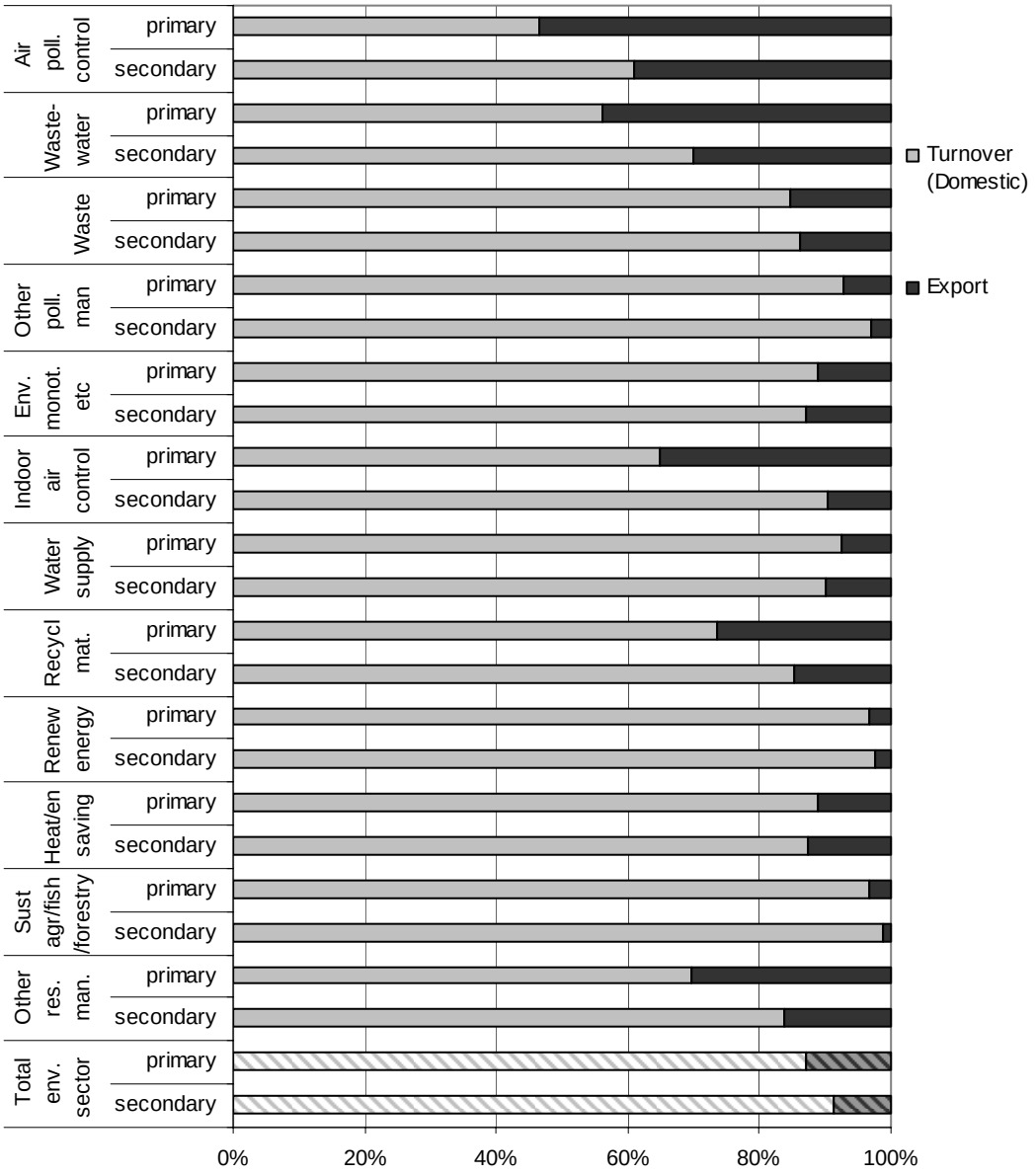



**Figure 6.3.** Domestic turnover and exports in primary and secondary environmental sectors by environmental domains. Million euros, 2005.

## 6.3 Exports by NACE

Besides environmental domains, it is possible to break down exports in the primary and secondary sectors into industries. In Table 6.2, this is carried out for a selection of NACE groups. In contrast to the other sections, it was not possible to account for NACE 40 for exports due to data confidentiality. NACE 40 is therefore included in the group Other.

The Mining and manufacturing industry (NACE 10-37) stands for the largest exports, 55% of the primary sector and 70% of the secondary. The industry Other business activities (NACE 74) has had the largest increase between 2003 and 2005 (not counting the group Other), a 50% increase for the primary sector and a 42% increase for the secondary. Exports in Wholesale and retail trade (NACE 50-52) have also increased considerably during the same period, 46% in the primary and 30% in the secondary.

**Table 6.2.** Exports in primary and secondary environmental sectors by NACE. Million euros, 2003-2005

| Industries | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary |
| Mining and manufacturing (NACE 10-37) | 885 | 594 | 1 003 | 659 | 1 181 | 644 |
| Wholesale and retail trade (NACE 50-52) | 430 | 65 | 377 | 88 | 630 | 84 |
| Other business activities (NACE 74) | 139 | 105 | 188 | 134 | 209 | 148 |
| Water distribution, sewage and waste (NACE 41+90) | 15 | 0 | 18 | 0 | 20 | 0 |
| Other industries (NACE 1-5, 40, 45, 55-73, 75-85, 91-99) | 52 | 56 | 65 | 57 | 88 | 50 |
| **Total** | **1 522** | **820** | **1 652** | **938** | **2 129** | **926** |

All of the NACE groups presented in Table 6.2 have their exports distributed over more than just one grouped domain, as seen in Figure 6.4. However, for some NACE groups, a substantial share can be derived from one of the two groups. For Water distribution, sewage and waste (NACE 41+90) 97% of the exports in the primary sector came from Pollution management. Only 7% of the primary exports from Other business activities (NACE 74), and 4% of the secondary, comes from establishments classified under Resource management.

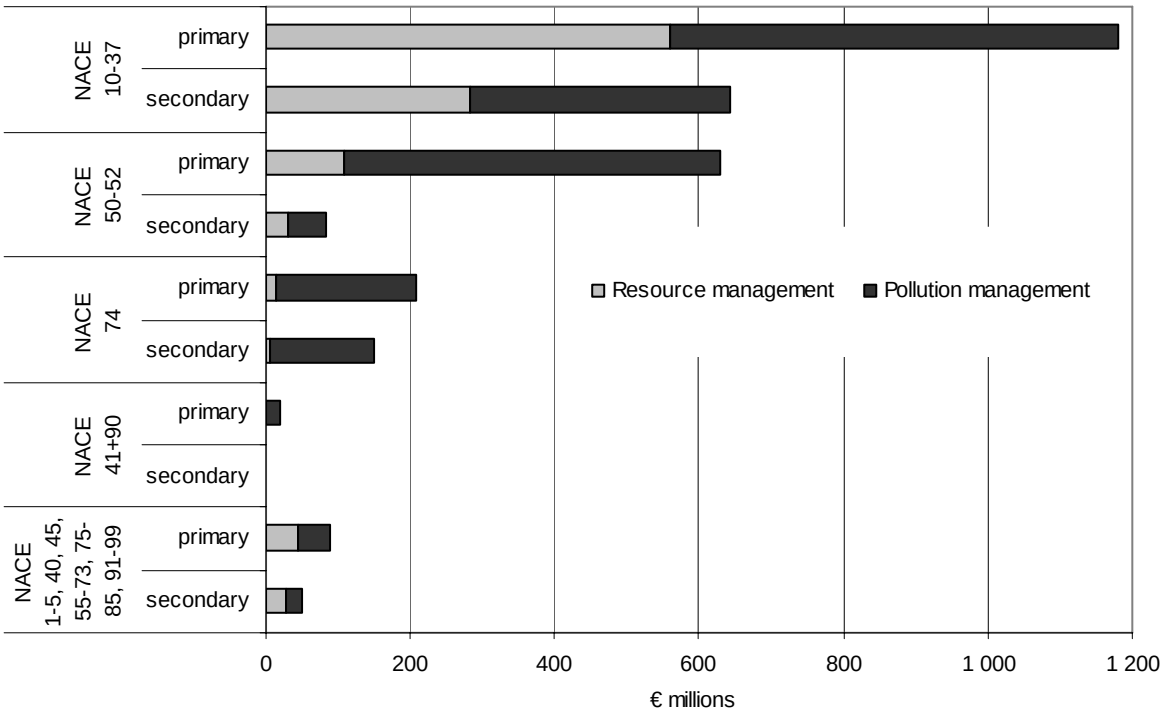



**Figure 6.4.** Exports in primary and secondary environmental sectors by NACE (see Table 6.2 for NACE codes) and grouped domains. Million euros, 2005.

## 6.4 Regional breakdown of exports

Another way to analyse the results is by regional breakdown, looking at which areas and counties in Sweden contribute the most to the total environmental exports. In Table 6.4 the results are broken down into NUTS 2 areas[36]. According to these areas, Småland and the islands stood for the largest exports in the primary environmental sector in 2005, 22%. If looking only at the secondary sector, West Sweden had the largest share with 23% in 2005. The result has changed during the period; in 2003, South Sweden had the largest exports in the primary sector (21%). However, a higher increase in other areas has meant to that Småland and the islands has been the bigger contributor to the total primary exports in both 2004 and 2005.

For the primary environmental sector, all of the areas have increased their exports between 2003 and 2005. The largest growth has been seen in the area Småland and this islands with an 85% increase, closely followed by Upper Norrland (73%) and North Middle Sweden (68%).

The increase has not been as evident in the secondary sector and there are also more variations here. There has been more methodology work carried out for the secondary sector than for the primary, implying that the differences are probably a result of better quality in the database as well as true differences. The reason aside, there has been a 120% increase for the secondary sector in the area North Middle Sweden during the period. Upper Norrland shows a decrease of 90%.

**Table 6.4.** Exports in primary and secondary environmental sectors by NUTS 2 areas[37]. Million euros, 2003-2005

| NUTS 2 areas | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|
| | primary | secondary | primary | secondary | primary | secondary |
| South Sweden | 321 | 160 | 330 | 165 | 367 | 164 |
| West Sweden | 300 | 144 | 297 | 205 | 387 | 213 |
| Stockholm | 196 | 122 | 222 | 152 | 263 | 152 |
| East middle Sweden | 259 | 115 | 227 | 127 | 317 | 163 |
| North middle Sweden | 51 | 14 | 63 | 19 | 86 | 31 |
| Småland and the islands | 258 | 98 | 361 | 83 | 476 | 174 |
| Middle Norrland | 64 | 11 | 72 | 12 | 106 | 12 |
| Upper Norrland | 73 | 155 | 81 | 174 | 126 | 16 |
| **Total** | **1 522** | **820** | **1 652** | **938** | **2 129** | **926** |

In Figure 6.5, we have attempted to break down the results into the 21 counties of Sweden for 2005. However, due to data confidentiality some smaller counties have been grouped. In one case a NUTS 2 area is used, Småland and the islands, together with the county of Blekinge.

Since in total five counties are included under the name Småland and the islands + Blekinge, this area becomes the largest considering the total exports. Apart from this area, the three largest counties in Sweden, Stockholm, Västra Götaland and Skåne, are clearly marked in Figure 6.5. The county of Västra Götaland stands for the largest exports in total of the three, with 15% of the primary exports and 21% of the secondary in 2005. The county of Skåne had the second largest

[36] NUTS stands for ”Nomenclature des Unités Territoriales Statistiques”. South Sweden (counties of Blekinge and Skåne), East middle Sweden (counties of Uppsala, Södermanland, Östergötland, Örebro and Västmanland), Stockholm (county of Stockholm), West Sweden (counties of Halland and Västra Götaland), North middle Sweden (counties of Värmland, Dalarna and Gävleborg), Småland and the islands (counties of Jönköping, Kronoberg, Kalmar and Gotland), Middle Norrland (counties of Västernorrland and Jämtland) and Upper Norrland (counties of Västerbotten and Norrbotten)

[37] See footnote 36 on page 56

total exports, corresponding to 16% of both the primary and secondary sectors. The county of Stockholm accounted for 12% of the export of the primary sector exports and 16% of the secondary.

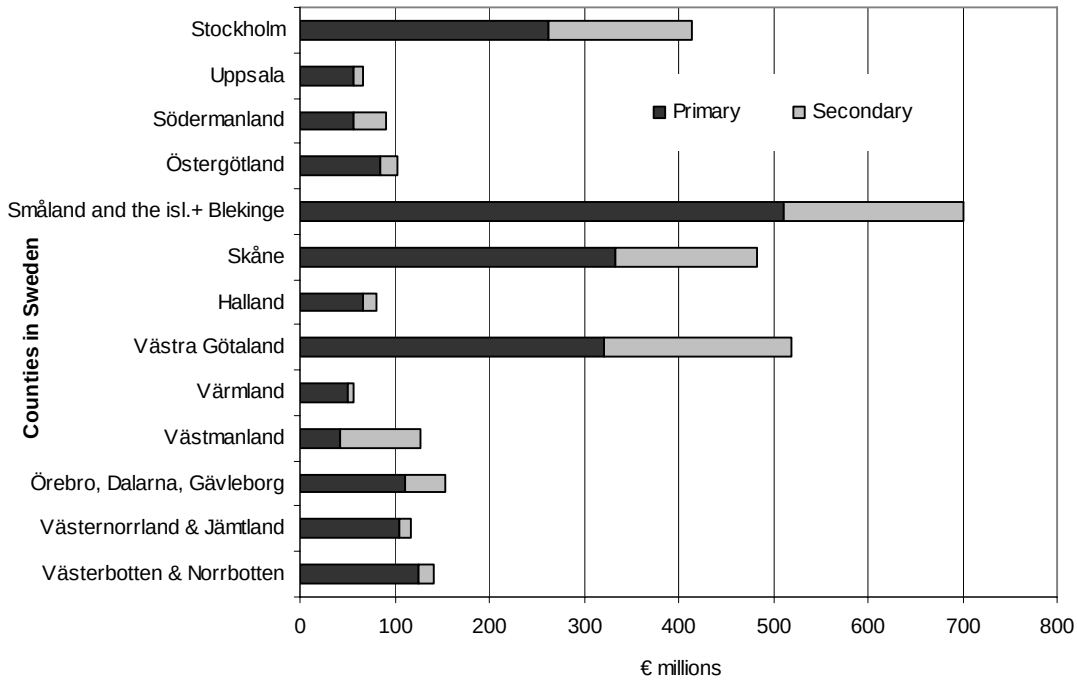



**Figure 6.5.** Exports in primary and secondary environmental sectors by counties. Million euros, 2005.

# 7. The environmental sector from a product perspective

*This section discusses the possibilities of establishing methods of estimating the environmental sector from a product perspective, or rather, from a goods perspective. This means that environmentally related services are excluded in this section. The source of information is statistics on foreign trade divided into the Combined Nomenclature (CN code) system combined with the environmental sector database. In the section, brief results, in terms of export estimates, will be presented since the focus has been on exploring methods rather than producing data.*

## 7.1 Introduction

The work carried out in Sweden regarding the environmental sector has so far only been taken from a company or establishment perspective, as discussed above. For some time there has been interest in investigating the sector from a different perspective. The main reason for this concerns the estimate of export incomes from the establishments belonging to the environmental sector. Questions have been raised on whether all export incomes are related to the definition of the environmental sector. Therefore, Statistics Sweden decided to investigate the possibilities of estimating the sector from a product, or a goods perspective. This part of the report can be seen as a pilot study of these possibilities.

## 7.2 The environmental sector database and foreign trade statistics

The first step of this study was to get access to the foreign trade statistics divided by Combined Nomenclature (CN) codes. To be able to go into detail with the material, we chose the 8-digit CN code, which is the most detailed level available. At the 8-digit level, there are around 10 000 different CN codes and, considering this large number of codes, there are different ways to handle the material. In the study, we chose two different methods: first, to link the trade register to the environmental database, which will be discussed in this section; second, to link the trade register to existing lists of supposed environmental goods, which will be discussed in the subsequent section below, see Section 7.3.

Since the foreign trade register keeps record of CN codes, the company's organisation number and the value of the transaction, it is possible to link a population of companies[38], for example, from the environmental sector database, by organisation number. In this way it is possible to find out which companies have an export income and for which kind of goods, in terms of the CN code.

Of the around 9 000 companies in the environmental sector database, roughly 1 000 are exporting goods according to the foreign trade statistics. The exported goods cover nearly 2 600 CN codes and are scattered all over the classification system. The first problem encountered is, of course, the amount of data material and how to analyse it in a proper manner. One way would be to examine the different CN codes and try to find out to what extent there is an environmental element in the exported goods. Another approach would be to aggregate up to a less detailed CN level. There are advantages and disadvantages with both these approaches. As is apparent, the first method would be very time-consuming but the outcome of such an analysis would be a good knowledge of the contents of the material. This study however allowed only a quick overview at the material, in terms of analysing the CN codes. It was interesting to see which goods where exported by the

[38] For this purpose, we aggregated the environmental sector database from the establishment level into company level to be able to keep track of the organisation number as the foreign trade statistics collect only on company level, not at establishment level.

companies in the environmental sector database. The conclusion reached was that it is hard to define a large part of the export incomes as “environmental goods”. For example, a rather large share of the recorded transactions connected to the companies in the environmental sector database consists of pulp and paper products.

Regarding the second approach, aggregating to a higher level of CN codes, the advantage is a material more easy to understand and less time-consuming to analyse. This could be useful in the first stage of the analysis when trying to identify important areas in terms of export value and in which CN codes these transactions take place. The disadvantage with this is that the CN codes become to general to be able to say anything useful regarding environmental goods. It is already difficult at the 8-digit level to separate environmental goods from “other” goods. The conclusion was to use this approach in the preliminary phases of the analysis to find “hotspots”, for example, high levels of export activities in certain CN codes, for further examination. In the more detailed analysis of the found “hotspots”, the higher level is insufficient and here we can instead use the 8-digit level of CN codes.

## 7.3 OECD and APEC lists of environmental goods

The method discussed above relies on the assumption that there already exists a population of identified “environmental companies”, such as in the Swedish environmental sector database. Thus, the method is still tied to the company/establishment perspective. Useful as it can be – regarding for example analysing the contents of the exports reported as exports by environmental companies and enhancing the quality of the statistics – it does not fully take its stance in a product perspective.

The second method in this study uses a goods perspective in terms of exploring already existing lists of supposed environmental goods, namely an OECD list and an APEC list[39] of identified Harmonised System (HS) codes[40]. Both of these lists were compiled in the late 1990s but for somewhat different reasons than estimating national environmental sectors; the OECD list as a basis for analysing trade and tariffs; the APEC list as an effort to attain early voluntary liberalisation of trade in particular sectors.[41] Although developed for different purposes, the lists could be useful in identifying environmental goods when estimating the environmental sector on a national level.

Both of these lists are based on HS codes (6-digit level) and the OECD list consists of 132 unique HS codes while the APEC list contains 104 unique HS codes. There is some overlapping between the lists but the lists are different from each other in some aspects due to the different reasons for compilation[42].

One interesting feature of the lists is that they have been classified into environmental domains; the HS codes at the OECD list are classified in the ordinary categories stipulated by the OECD/Eurostat manual on the environmental goods and service industry; the APEC list into a classification that is similar but with a few differences. After a minor adjustment of the APEC list,

[39] See Appendix 3 for complete lists of HS codes at the OECD and APEC lists.
[40] At the 6-digit level, CN codes corresponds with the HS codes and therefore connections between the two systems can be made.
[41] OECD, 2005
[42] In this study, we do not focus on the differences between the lists. For a thorough discussion on this matter, see OECD 2005.

a comparison between the value of Swedish environmental exports from different perspectives was possible regarding environmental domains. The results are shown in Table 7.1[43].

**Table 7.1.** Comparison of the exports of goods in the foreign trade register; by companies in the environmental sector database; by HS codes included in the OECD list; and by HS codes included in the APEC list, million euros, 2004-2005

| Environmental domain | Env. Sector database, 2004 | Env. Sector database, 2005 | OECD list 2004 | OECD list 2005 | APEC list 2004 | APEC list 2005 |
|---|---|---|---|---|---|---|
| Pollution management | 833 | 1 445 | 3 437 | 3 656 | 3 391 | 3 497 |
| Cleaner technologies and products | 221 | | 113 | 129 | | |
| Resource management | 826 | 904 | 664 | 741 | 559 | 680 |
| **Total** | **1 967** | **2 382** | **4 214** | **4 526** | **3 950** | **4 178** |

A couple of remarks can be made from this comparison. Firstly, depending on which perspective chosen, very different results emerge, the totals for 2005 ranging from approximately 2.4 billion euros to 4.2 billion euros. The second remark, and possibly more important, is the fact that a great deal of the environmental goods are produced outside the companies that fit in to the OECD/Eurostat definition of an environmental company; that is to say, the companies in the environmental sector database. A brief investigation of the material displayed that the companies exporting on the OECD and APEC lists, but outside of the environmental sector database, are often large companies with diverse activities and with main activities outside the definition of the environmental industry. For this reason, these companies are left outside the environmental sector database by the methods currently used. The implication of using this product/goods perspective opens up an opportunity to include these companies in the database regardless of their main activity. To do this, there has to be a calculated share of their activity that falls inside the definition of environmental industry. One way to calculate this share is to use the total sum of exports that fall within the lists of environmental goods divided by the sum of total exports recorded for the specific company. In this way, we get a percentage that can be used as a weight for estimating environmental exports and in this manner include the company in the environmental sector database[44]. In using this product/goods perspective, it is possible to enhance the coverage and quality of the existing database.

One important objection to the lists of environmental goods is that quite a few of the goods in the listed HS codes are of a multi-purpose character, i.e. they can be used for an environmental purpose but also for other purposes. This raises some questions about whether to include all of the recorded transactions for all the HS codes in the lists, or to try to find "environmental shares" also in this matter. The question goes beyond the scope of this study but a probable solution would be to estimate shares with the help of different industry experts.

An objection to using a *pure* goods/product perspective is that an important part of the environmental sector is lost, namely the services, as only goods are included in the HS codes. The

[43] It should be noted that, in the case of the numbers for the environmental sector database, no division is made between the primary or secondary environmental sectors and that only transactions found in the foreign trade statistics are included, thus only exports of goods. The table is not to be confused with the numbers accounted for in Section 6 "Exports" where the information from the VAT register is also included.

[44] This method is – naturally – only to be used regarding export estimates. When it comes to estimating turnover, employees etc we have to use different sources. One conceivable source could be production statistics where HS codes also are used.

market is moving towards a higher level of inter-linkage between goods and services where know-how and maintenance are sold together with the goods. Complementary data on services is therefore sought. So far, Statistics Sweden has used the VAT register for this purpose, as described in preceding sections. The plausible method is to continue using the VAT register to estimate services but complemented with the more detailed analysis of the foreign trade register in terms of HS codes described above.

## 7.4 Environmental goods database

One of the purposes of this report was to explore the possibilities of including environmental goods in the environmental sector database. As seen in the discussion above, a goods/product perspective at the environmental sector could be useful in identifying activities, i.e. new companies and establishments, that ought to be included within the scope of the environmental industry – companies that, with present methods, are excluded because their main activities fall outside the definition. However, including products in the existing database might not be the best solution. The main reason for this is the structure of the database itself. In the current database, focus is on establishments and companies and, in the view of Statistics Sweden, should remain in that way. A better solution might be to develop a new separate database based on CN codes as the key variable instead of identification numbers for establishments and companies; simply put, a database with *goods* as its focal point rather than *establishments*. From this point, it is then possible to build links between the two databases; the goods database partly as a "supplier" of information (as new companies can enter) to the establishment database but partly also a source of information on environmental goods in itself.

One of the main purposes of such a database on environmental goods would be to keep track of the production of environmental goods as a subtotal of total production. Such a development is in line with the objectives of the Environmental Accounts at Statistics Sweden in their work to identify environmentally relevant subdivisions of the ordinary economic statistics. A prerequisite for this work is to get access to production statistics divided by CN codes which was the original idea for a source for this study. Unfortunately, we discovered that it was more difficult to get access to production statistics than to foreign trade statistics which was why the latter was eventually used as the primary source. Nevertheless, in the future we will be able to use the CN codes from production statistics in order to develop a database.

The idea of an environmental goods database is to observe the total production of environmentally related goods, either from already existing lists of HS codes, such as the lists from OECD or APEC, or revised lists according to advice from different experts. From this starting point, there are some different routes for further investigation and several questions could be posed on the material. These include questions on the distribution between domestic use and exports of total production; on to what extent the different industries, in terms of NACE codes, produce environmental goods. One possible way is to construct an output matrix, either by NACE codes aggregated to a fairly high level or by translating the HS codes into SPIN classification[45]. The long-term objective is to be able to build input-output matrices for the environmental sector similar to the ordinary input-output matrices. If this succeeds, it will be possible to follow flows of goods through the economy and/or through the environmental sector, and there are new opportunities to identify areas of growth or decline. This is work for the future, however, and at this stage, there are quite a few steps before we can arrive at this point.

[45] SPIN 2002 (Swedish Standard Classification of Products by Activity), previously named ProdSNI, is by the first four digits equivalent to CPA, Eurostat´s Classification of Products by Activity.

# 8 International Review

*This section contains short summaries of results and methods used in a few European countries where the environmental sector has been investigated. The information has been collected from published reports and web pages.*

## 8.1 Introduction

As there are no commonly used methods for estimation of the environmental sector, and the statistics are not yet harmonised, it is hard to compare the results from different countries. An extensive report has been published with results from an investigation mapping the environmental industry within EU[46] where comparable statistics are presented. However, as the investigation in that report is based on a completely different method than that used in this project, we have chosen not compare with those results. The international review has not taken into account the product perspective.

### 8.1.1 United Kingdom

The UK has performed studies on the environmental sector in 2002, 2004, and 2005. In the report Mapping The UK Environmental Goods and Services Sector it is stated that the total annual turnover of the sector was estimated to over GBP 25 billion in 2004. The sector contains over 17 000 companies and employs around 400 000 people.

The 2004 study was based on regional aggregation; a questionnaire was sent to all members of the UK Forum for the Environmental Industries (UKFEI). UKFEI membership comprises all English Regional Development Authority (RDA) regions and the Devolved Administrations (Wales, Scotland and Northern Ireland). The companies were defined as environmental using the JEMU definitions, unmodified or with slight changes, which principally agrees with the Eurostat definition of the sector.

The same numbers, as was published in the 2004 study, were presented for the environmental sector for 2005 in the report Emerging Markets In the Environmental Sector, published in November 2006. The study is based on aggregated values from sub-sector analysis. In this report a growth forecast has also been performed and it predicts that the UK environmental goods and services sector market will grow from around GBP 25 billion in 2005 to GBP 34 billion in 2010 and on to GBP 46 billion in 2015.

### 8.1.2 The Netherlands

The Netherlands performed a study of the environmental goods and services sector in 2003. The results do not include activities related to Resource Management. The annual turnover of the sector was estimated to 17 591 million euros and the sector employed 93 246 people. The figures are broken down into market, non-market, principal, secondary and ancillary activities.

The method used was a combination of different existing sources (existing registers and statistics) and other existing data sources (demand-side information, trade associations, yellow pages, etc). The companies were defined as environmental according to the Eurostat definition of the sector.

[46] EU, 2006

Activities related to Resource Management have not been included due to methodological and definition problems.

### 8.1.3 Hungary

In Hungary, the first data collection on the environmental industry was performed in 2002 (based on figures for 2001), following the guidelines developed by Eurostat. Data have been published since 2002 following these guidelines.

The investigation is based on a questionnaire that is combined with the environmental protection expenditure survey. Since Hungary does not publish figures on turnover and number of employees we do not include their results in this review.

### 8.1.4 Germany

The environmental goods and services sector has been investigated since 1999. In 2004 the turnover of the sector was estimated to 37 billion euros.

The study was based on a questionnaire and the respondents were found among members of certain interest groups, environmental fairs and so on. Turnover is underestimated as activities related to energy-saving and renewable energy are not included and there is a risk that small companies are missing.

# 9 Summarised results and future work

The main purpose of the present report was to further improve the methodology behind the existing environmental sector database at Statistics Sweden which is based on the establishment perspective. A second purpose was to study and discuss the possibilities of including environmental products in the database and to investigate if a 'product view' is applicable to the environmental sector; hence, to estimate the environmental sector from a product perspective. The establishment perspective is first analysed and discussed below, followed by the product perspective and its future prospects.

## 9.1 Establishment perspective

Sweden has since 1999 established and maintained an environmental sector database, based on an establishment perspective. This can also be said to be a supply-side approach since it measures the supply of environmental activities. There are also other approaches that can be used in order to estimate the environmental sector, for example demand-side approaches and combined supply- and demand-side approaches. However, for Sweden, the supply-side approach has proven to be a very useful instrument in order to estimate the Swedish environmental sector and it is constantly improved, resulting in better quality of data. It has the advantage, compared to other approaches, that other data can be connected to the population, such as exports, turnover and many different kinds of employment-related data, and it can also be broken down to a regional level.

### 9.1.1 Summarised results and discussion

The work in 2006 has resulted in improved methods for identifying and including environmental establishments in the environmental sector database. The quality of the database is enhanced and Statistics Sweden will from now on produce regular statistics on the Swedish environmental sector.

The size of the Swedish environmental sector has, in this report, been estimated in terms of number of establishments, employed people, turnover and exports. The size has been estimated for several years, with 2002 to 2005 being presented in this report. Since the method is under constant development, it makes comparison over time more suitable for indications of trends than actual changes in the sector. It should always be considered that an increase or decrease can be a result of higher quality as well as of an actual increase or decrease. As there is a time delay for the statistics, the most recent data are from 2005 for all variables except employment which are from 2004.

In Sweden, the environmental sector employed more than 50 000 people in the primary sector in more than 8 000 establishments and more than 40 000 people in the secondary sector in almost 7 000 establishments, see Figure 9.1 below. The actual value of employment can therefore be said to be somewhere in the interval of 50 000 and 90 000 people. A little more than 1% of the total employed men and women in Sweden 2004 worked in the primary environmental sector. If we also include the secondary sector, the percentage increases to just over 2%. Of the employed people in the Swedish environmental sector, 20% are women and 80% are men. This share changes depending on which environmental domain we look at. For Environmental monitoring etc, as an example, the shares in the primary sector were 41% women and 59% men in 2004.

Exports from the Swedish environmental sector amounted to more than 2 billion euros from the primary sector and almost 1 billion euros from the secondary sector. The turnover of the Swedish

environmental sector amounted to more than 16 billion euros in the primary sector and more than 10 billion euros in the secondary sector.


**Figure 9.1.** Swedish exports, turnover and employed men/women in primary and secondary environmental sector. 2004/2005 (number and million euros)

Studying the environmental sector over time, it can be seen that the sector is growing steadily. In Table 9.1 below, data for turnover, exports and employees are presented for the period 2002 to 2005. No employment data are yet available for 2005.

**Table 9.1.** Exports, turnover and employed men/women in the Swedish primary and secondary environmental sectors. 2002-2005 (number and million euros)

| | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| **Primary environmental sector:** | | | | |
| Turnover (€ millions) | 12 710 | 14 466 | 14 376 | 16 468 |
| Export (€ millions) | *n.a.* | 1 522 | 1 652 | 2 129 |
| Total employed | 49 487 | 49 620 | 50 621 | *n.a.* |
| *Employed women* | *10 114* | *10 348* | *10 439* | *n.a.* |
| *Employed men* | *39 373* | *39 272* | *40 182* | *n.a.* |
| **Secondary environmental sector:** | | | | |
| Turnover (€ millions) | 9 761 | 11 416 | 9 886 | 10 568 |
| Export (€ millions) | *n.a.* | 820 | 938 | 926 |
| Total employed | 38 554 | 39 631 | 40 811 | *n.a.* |
| *Employed women* | *8 545* | *8 884* | *9 067* | *n.a.* |
| *Employed men* | *30 009* | *30 747* | *31 744* | *n.a.* |

n.a. = not available

When breaking down exports, turnover and employees by environmental domain, as in Figure 9.2 below, it is seen that the domain Air pollution control has larger exports than domestic turnover. The domains Wastewater management, Indoor air control, Recycled materials and Other resource management are also export-intensive.

The area Renewable energy is an example of the opposite, it does not export as much in relation to its total turnover. Other areas depending more on the domestic turnover than on exports are, for example, Other pollution management (including soil, groundwater, noise and vibration) and Sustainable agriculture/fishery and forestry.

A comparison of the number of employees with turnover gives an indication of work-intensity. The environmental domain Environmental monitoring etc. has a larger share of employees than of

turnover. The domain Renewable energy, on the other hand, has a larger share of turnover than of employees.

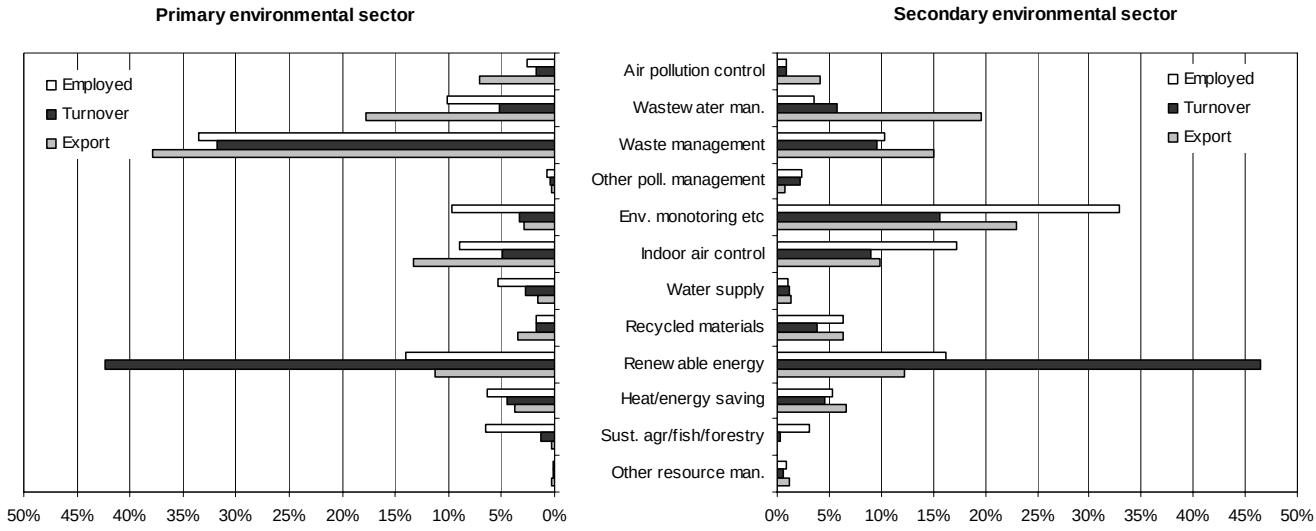



**Figure 9.2.** Employees, turnover and exports by environmental domain in the Swedish primary and secondary environmental sectors. 2004/2005 (Expressed as percent of total in each sector)

It is also possible to break down the results into regions. In Figure 9.3, it is seen that the environmental sector is concentrated to the south, east and middle of Sweden.

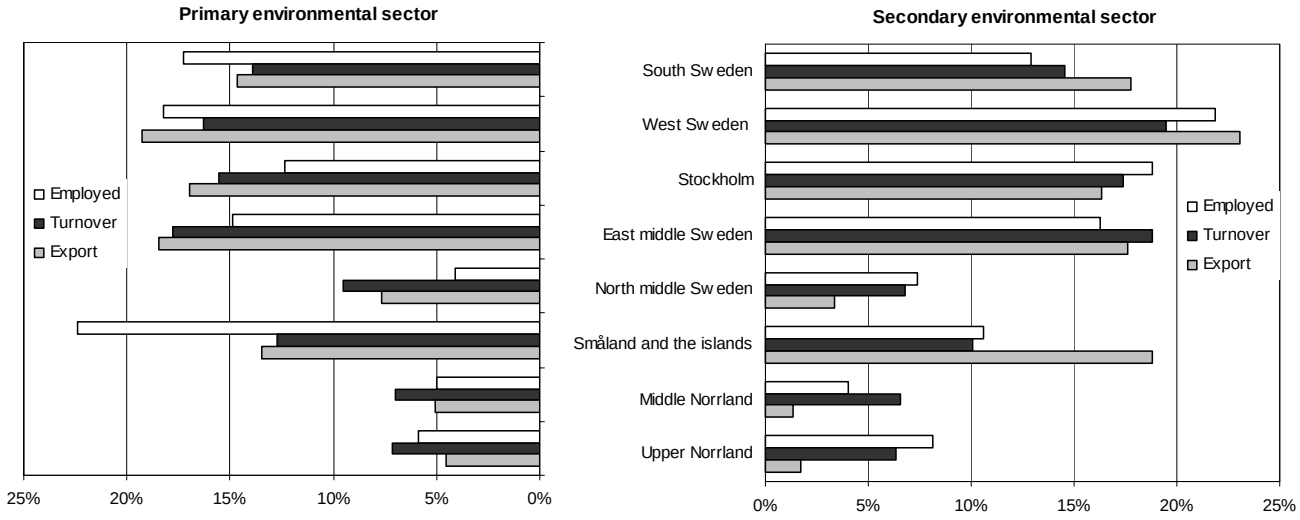



**Figure 9.3.** Employees, turnover and exports in the Swedish primary and secondary environmental sectors by region. 2004/2005 (Expressed as percent of total in each sector)

### 9.1.2 Future work with the environmental sector database

This section contains examples future work that are interesting from an establishment perspective. The product perspective and the future work needed in that area are discussed in Section 9.2.2.

*9.1.2.1 Improved IT application*

The work in 2006 has improved the methods for identifying and including environmental establishments in the environmental sector database. The IT application used in Sweden will be

further developed in the spring of 2007, adding functionalities such as a new classification of Cleaner technologies, several underlying domains to the current environmental domains, an improved use of secondary domains, a possibility to include an environmental share of the establishment and a new grouped domain called “Reduced environmental impact”. These improvements will lead to better estimations of the primary and secondary sectors in the future as well as better knowledge of in which areas the establishments are active.

For environmental domains, we will improve the classification by adding several underlying domains. One example of an underlying domain are those for Renewable energy, where water, wind, solar, biomass fuelled heat/power plants, manufacturing/sales of biomass and renewable transport fuels are new subgroups. In the domain Sustainable agriculture and fishery, it will be possible to separate between organic farmers, sustainable fishery and other. The current domain Monitoring, control etc will have subgroups named consultants, research & development, education & information, control & supervision and other. An improved classification of a second domain in the database will give us a better idea of in which areas the establishments are active. Today we only refer to which domain each establishment is mainly active under.

The work in 2006 has resulted in that the possibility to add information on shares of environmental activity for establishments that are diversified. This information will be possible to include from 2007 and onwards, for all establishments in the database. First of all, it will make it possible to include environmental shares for establishments producing heat or power from biomass, which has been investigated in the framework of this report. Efforts will also be made for the rest of the establishments in the domain Renewable energy. Secondly, adding environmental shares will make it possible to include large companies in the database which today has been considered to have a too large influence on the results (as all turnover, employees and exports are counted, even for the secondary sector) and therefore are excluded. One example of such companies are car manufacturers producing clean cars but where this activity accounts for only a smaller part of the establishment’s total turnover.

One important thing to clarify in future work is if the new variable, share of environmental activity, should be used for both primary and secondary establishments in the database, or only to improve the statistics of the secondary. Using the new variable for all establishments, regardless of whether they are primary or secondary, might be the obvious answer at first, since it would improve the quality of the presented results. However, looking at how the industry classification (NACE) is used today in Sweden and following the same principles for the classification in the environmental sector database, we should limit the use of shares to only the secondary establishments. If we take the Agricultural industry as an example, all companies with its primary industry classification equal to NACE 1 are considered to be in this industry. Having NACE 1 as its first NACE classification in the Business Register implies having 50% or more activity in the agricultural industry. However, the company can have complementary businesses such as 20% in NACE 4011 (production of electricity) and 15% in NACE 02014 (production of forest plants and seeds) and still be considered as agriculture. If we follow this same principle for the environmental sector database, we would consider all primary establishments as environmental since they have at least 50% environmental activity. That is, the environmental activity is what they mainly do and they are consequently environmental establishments. For the secondary sector on the other hand it is important to try to discern the share of environmental activity in order to avoiding overestimations as well as to make it possible to include smaller environmental shares of establishments not included at all in the current database. It is not possible to foresee what impact the future use of environmental shares will have on the size of the secondary sector.

In our upgraded IT application it will be possible to classify establishments if they use a “Cleaner Technology” in their line of work or not. This descends from the previously used grouped domain called Cleaner technologies and products which was hardly used at all as the definition in the manual was difficult to follow. When each establishment can be classified according to whether it uses a cleaner technology, the results and analyses will become more significant. The definition of cleaner technology will be presented in the coming manual from Eurostat where this matter is discussed.

A new grouped domain called “Reduced environmental impact” will be introduced during 2007. The environmental domains in this group will be named Chemicals, Energy, Waste, Transport, and Other. A need for this group has been raised as we have found establishments that we consider are environmental but we do not find support for in the manual. By adding this group we can include these companies in the database and, when presenting data to the EU, easily exclude them. Examples of such establishments are a dry cleaning company that does not use conventional chemicals, a delivery firm that only uses clean cars and bicycles for transportation, a cleaning company that only uses biodegradable and environmentally less harmful cleaning agents.

In order to implement all the changes mentioned above, resources will be invested during 2007 to review many of the establishments in the current environmental sector database. Revising the present content in the database will result in an improved quality of the content of the database since most of the resources in the past years have been invested in finding methods to include new establishments in the database.

*9.1.2.2 Continue with yearly updating and publishing*
From 2007 and onwards, Statistics Sweden will present data about the environmental sector in Sweden. This assumes that the database is updated on an annual basis, regarding the adding of new establishments in all environmental domains. Previously we have had no such routines, mainly due to lack of resources and uncertainty about the future use of the database. Establishing routines for annual updating is very important in order to obtain comparable data over time.

*9.1.2.3 More ways of presenting results and more analyses*
In this report we have presented the results for employment, turnover and exports. It is possible to present the environmental sector in terms of other variables, for example salary, education levels, imports and to which countries or groups of countries the exports and imports are imported from or exported to. A way of enhancing the presentation of data is to use maps when breaking down results regionally.

When obtaining comparable data over time, it is possible to make more complex analyses to answer questions such as *why* the results differ between years or between regions. Up to now we have mainly focused on methodological aspects such as building a useful database, including the right establishments, deciding on classifications etc.

*9.1.2.4 Coming manual from Eurostat*
A new version of the Eurostat/OECD manual will be published in 2008 and Statistics Sweden is participating in the drafting of this manual. We are also following the work of this manual with great interest since it will involve some changes in classifications and environmental domains. One foreseen change is the removal of Cleaner technologies and products as a grouped domain. In this report we have already carried out this change. We will follow the outlines of the new manual, as using the same definitions and classifications as other countries is important to produce comparable data of the environmental sector in the EU.

## 9.2 Product perspective

So far, the work carried out by Statistics Sweden regarding the environmental sector has been done solely from an establishment perspective. The work in this report is the first attempt in Sweden to change the focus from exclusively an establishment perspective of the environmental sector to a product perspective. The pilot study confirms that this could be a useful approach, in combination with the establishments perspective, to produce estimates for the environmental sector.

### 9.2.1 Summarised results

The results of the above pilot study on the possibilities show that a focus on environmental products, or goods, would be useful both for the enhancement of the coverage as well as the quality in the existing environmental sector database. This is due to the fact that a fair share of the goods identified as environmentally-related is recorded outside of the environmental sector database, which is clear from the comparison in Table 7.1. With new methods of creating shares for estimating environmental activities within (often) large companies that have other main activities than environmentally associated activities, the coverage of the establishment database would improve considerably. In addition to this, the proposal of developing a new database with focus on environmental goods rather than establishments would open up new prospects to analyse the flow of goods through the economy.

### 9.2.2 Future work from a product perspective

The first step from this point of departure is to get access to production statistics divided by Combined Nomenclature (CN) codes. When this is granted, research is needed in several areas, among which the work with analysing the different CN codes to be able to establish to which extent the different CN codes are related to environmental production, is the obvious example. This work has to be performed in cooperation with experts in different areas of the industry. The second step to be taken is to develop a product database similar to the existing database but with CN codes as its key variable. From the database information can be retrieved on the flows of environmentally related goods through the economy. Another possibility of such a database is also to link the data on the environmental sector from a goods/product perspective to other environmental accounts' data. From this, Statistics Sweden will further improve in the work to make relevant environmentally related subdivisions on ordinary economic statistics.

# 10 References


Dti –defra, 2005 *Mapping the UK environmental goods and services sector*, can be found http://www.dti.gov.uk/files/file32577.pdf

EU, 2006 *European Commission – DG ENV 2006. Eco-industry, its size, employment, perspectives and barriers to growth in an enlarged EU*, can be found at http://ec.europa.eu/environment/enveco/industry_employment/ecoindustry2006.pdf

EU, 2004, *Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union*, can be downloaded from http://ec.europa.eu/environment/etap/actionplan_en.htm

Hungarian Central Statistical Office, 2003 *Towards environmental protection expenditure and environment industry accounts in Hungary*, is found at http://forum.europa.eu.int/Public/irc/dsis/pip/library?l=/environmental_expenditur/phare_environmental/pilot_studies/epea_and_eia/epeahun_final_reportpdf/_EN_1.0_&a=d

SCB, 2005:2 *Sveriges miljöföretag 2003*. (*Environmental companies in Sweden 2003*) Report by Environmental accounts in Swedish, can be downloaded at www.scb.se/mi1301-en

SCB, 2001 *Statistisk röjandekontroll av tabeller, databaser och kartor*. (*Statistical disclosure control of tables, databases and maps*) Current best method by SCB in Swedish, can be downloaded at http://www.scb.se/templates/PlanerPublicerat/ViewInfo.aspx?publobjid=2049

SCB, 2000:8 *The environment industry in Sweden 2000*. Report by Environmental accounts in English, can be downloaded at www.scb.se/mi1301-en

SCB, 2000:1 *The environment industry in Sweden 1999*. Report by Environmental accounts in English, can be downloaded at www.scb.se/mi1301-en

SCB, 1999:2 *Miljöföretag och gröna jobb i Sverige*. *(The environment industry in Sweden)* Report by Environmental accounts in Swedish and English, can be downloaded at www.scb.se/mi1301-en)

SOU 2004:84, *SWENTEC AB - för en nationall kraftsamling på svensk miljöteknik (SWENTEC AB – for a national investment in Swedish environmental technology)* Can be downloaded at: http://www.regeringen.se/sb/d/108/a/28677

Statistics Netherlands, 2006 *Economic indicators for the Eco Industries in the Netherlands, 2003*.

OECD, Eurostat, 1999 *The environmental goods & services industry, Manual for data collection and analysis*

OECD, 2005 *Environmental goods: A comparison of the APEC and OECD lists*, can be downloaded at http://www.oecd.org/dataoecd/44/3/35837840.pdf

UK CEED, 2006 *Emerging markets in the environmental sector*, is found at http://www.ukceed.org/downloads/files/31-DTIEmergingMarketsFullReport.pdf

# Appendix 1 – Examples of activities in the environmental domains

Below some examples are given of types of activities that are included in the different environmental domains used in the Swedish Environmental sector database.

## Pollution management (Grouped domain)

**Air pollution control**
Goods and services for treatment or removal of exhaust gases and particulate matters from stationary and mobile sources. This class also includes environmentally less-damaging specialised fuels. A typical establishment in this class produces and sells air filters for different applications, for example exhaust filtering.

**Wastewater management**
Goods and services for the management of wastewater. This class includes all establishments within NACE 90010 and those who produce goods and services for collection, treatment and transport of wastewater. Many of the establishments work both with wastewater and water supply, making the boundary to the domain Water supply somewhat indistinct. A typical establishment in this class is a waste water system installer.

**Solid waste management**
Goods and service for the management of solid wastes, collection, treatment and transportation). For example all establishments within NACE 37 (Recycling), NACE 5157 (Wholesale of waste and scrap) and NACE 90021-90030 (Collection and treatment of other waste through Sanitation, remediation and similar activities) are included. Establishments producing containers for waste and trucks aimed at transportation of waste and transport companies are typical for this class.

**Remediation and clean-up of soil, surface water and groundwater**
Good and services to reduce the pollution of soil and ground water. For example establishments providing absorbents or cleaning up systems. Establishments providing protection for soil and groundwater, for example oil spill protection, are also included.

**Noise and vibration abatement**
Goods and services that protects against disturbing noise from sources outdoors. Typical establishments are those which provides noise fences or noise isolation.

**Environmental monitoring, analysis and assessment**
Goods for monitoring and analysis and services within education, research, and consultancy. Typical establishments are environmental consultancy firms, educational firms and establishments performing analysis and monitoring.

## Cleaner technologies and products[47] (Grouped domain)

**Cleaner/resource efficient technologies and products**
In this area we have *previously* included establishments active in reducing the impact from production or use of products. Included here has been the production of equipment, technology, specific materials or services. However, this environmental domain has been difficult to follow of

[47] The grouped domain Cleaner technologies and products has not been used since 2005.

many reasons and therefore it has been removed as a separate domain since 2005. Instead, it will be included as a new classification declaring if each environmental establishment, no matter if primary or secondary, is using a cleaner and/or resource efficient technology. All establishment previously included in this domain have been distributed among the two other grouped domains.

## Resource management (Grouped domain)

### Indoor air pollution control

Includes all establishments that treats or renews indoor air in order to remove pollutants. An establishment must have their primary business in cleaning air rather that in air condition in order to be classified as primary. Since many establishments are active in both of these activities, an estimation of its operation usually has to be made in order to classify them as either primary or secondary establishments. The boundaries in this domain are hard to draw. Examples of establishments are producers of air filters, smoking rooms and units for smoking rooms.

### Water supply

Includes all establishments active in collecting, purifying and distributing drinking water. This class also includes establishments working with conserving and reducing water. All establishments classified as NACE 41 (*Collection, purification and distribution of water*) are included. If they treat wastewater they are found in the domain Wastewater management. However, many of the establishments work both with wastewater and water supply, making the boundaries somewhat indistinct. The main NACE code decides which domain the establishment is classified as.

### Recycled materials

In this domain all establishments active within NACE 25.12 (*Retreading*) are included. This includes all establishments active in rubber tires, vulcanisation and rubber repairs. It also includes producers of new materials or products, separately identified as recycled, from recovered waste or scrap or preparation of such materials or products for subsequent use. Energy recycling is excluded. An example of establishment, except for those active in NACE 25.12, is one producing for example a package or product from recycled plastic.

### Renewable energy

In this domain most of the establishments active in the area of renewable energy are included. However, this domain is very closely related to the domain Heat/energy saving and sometimes the difference is difficult to point out. Renewable energy should include establishments producing equipment, technology or specific materials, or designs, constructs, installs, manages or provides other services for the generation, collection or transmission of energy from renewable sources. Solar energy, hydropower energy, wind power energy and energy from biomass sources are therefore included, as well as their subcontractors if they can be discerned. Peat is not considered to be a renewable source in Sweden, nor is waste. Heat and/or power plants using biomass fuels are included if they use a share of renewable fuels to produce the heat and/or power (the share determines the classification). Also establishments producing and delivering wood, wood chips, chips, pellets and briquettes are included in this domain, since they provide the fuel to generate energy. At the moment most network companies are not included in the database, except for in the few cases when they mainly deliver environmentally produced electricity.

*Read more about this domain and the used source (Energy statistics) and method in Section 2.3 and Section 2.4 of the report.*

### Heat/energy saving and management

This domain should include establishments working with energy efficiency improvements or reduced heat and energy loss. In the case of Sweden this implies for example producers, distributors and installations of technology which saves energy, such as for example pellet heaters, heat pumps and heat meters. It also includes establishment that works with technology or systems in order to minimize the use of energy. Advisors and consultants in this area are usually included in the domain Environmental monitoring/analysis and producers of renewable fuels in the Renewable energy domain. Since many producers both sells for example pellet as well as heaters, an usually rough estimation of which of these activities is the largest will decide in which domain the establishment will be placed.

### Sustainable agriculture and fisheries

In this area, establishments that reduce the impact of agriculture and fishery are included. For agriculture this translates to organic farming in Sweden. We use the register from an association called KRAV[48] in Sweden from which we receive yearly information about organic farmers, their organisation number (if available), type of organic activity and if they are entirely shifted or not. Entirely shifted becomes primary and not entirely shifted becomes secondary. A typical establishment in this area is therefore for example an organic farmer or, for Sustainable fisheries, an establishment active in fishery care.

### Sustainable forestry

In this domain programmes and projects for reforestation and forest management on a long-term sustainable basis are included. One example of establishment in this domain is plantations, which cultivates and plants forest plants.

### Ecotourism

Establishments in this area provide services or education for eco-tourism. In Sweden we include establishments which have been classified as Nature's best as primary and those classified as eco-tourism according to the Ecotourism association becomes secondary[49].

### Other resource management

In this domain establishments involved in nature conservation, biodiversity and other are placed. One example in this group is an establishment that works with liming of lakes.

[48] http://www.krav.se
[49] Nature's best: http://www.naturensbasta.se. Ecotourism association: http://www.ekoturism.org

# Appendix 2 – Background data

## Employed in the environmental sector in Sweden, 2002-2004

| | 2002 | | 2003 | | 2004 | |
|---|---|---|---|---|---|---|
| | Primary | Secondary | Primary | Secondary | Primary | Secondary |
| **POLLUTION MANAGEMENT:** | | | | | | |
| Air pollution control | 1 139 | 318 | 1 371 | 312 | 1 313 | 340 |
| *women* | *353* | *89* | *391* | *86* | *387* | *99* |
| *men* | *786* | *229* | *980* | *226* | *926* | *241* |
| Wastewater management | 5 004 | 1 047 | 5 048 | 1 029 | 5 040 | 1 343 |
| *women* | *828* | *184* | *845* | *185* | *849* | *232* |
| *men* | *4 176* | *863* | *4 203* | *844* | *4 191* | *1 111* |
| Waste management | 16 342 | 3 547 | 15 941 | 3 793 | 16 616 | 4 008 |
| *women* | *2 514* | *501* | *2 482* | *626* | *2 509* | *725* |
| *men* | *13 828* | *3 046* | *13 459* | *3 167* | *14 107* | *3 283* |
| Soil and groundwater | 316 | 857 | 311 | 860 | 317 | 892 |
| *women* | *41* | *267* | *42* | *283* | *47* | *330* |
| *men* | *275* | *590* | *269* | *577* | *270* | *562* |
| Noise and vibration | 80 | 42 | 77 | 49 | 76 | 48 |
| *women* | *13* | *9* | *13* | *9* | *14* | *8* |
| *men* | *67* | *33* | *64* | *40* | *62* | *40* |
| Env. monotoring/analysis | 4 491 | 11 791 | 4 601 | 11 994 | 4 820 | 12 733 |
| *women* | *1 792* | *3 087* | *1 874* | *3 157* | *1 962* | *3 441* |
| *men* | *2 699* | *8 704* | *2 727* | *8 837* | *2 858* | *9 292* |
| **CLEAN TECHNOLOGIES AND PRODUCTS:** | | | | | | |
| Cleaner technologies | 404 | 1 489 | 429 | 1 384 | 426 | 1 307 |
| *women* | *79* | *292* | *82* | *265* | *84* | *260* |
| *men* | *325* | *1 197* | *347* | *1 119* | *342* | *1 047* |
| Cleaner products | 670 | 786 | 651 | 810 | 665 | 777 |
| *women* | *183* | *145* | *178* | *158* | *162* | *161* |
| *men* | *487* | *641* | *473* | *652* | *503* | *616* |
| **RESOURCE MANAGEMENT:** | | | | | | |
| Indoor air control | 4 722 | 6 497 | 4 505 | 6 854 | 4 418 | 6 710 |
| *women* | *750* | *790* | *724* | *822* | *701* | *787* |
| *men* | *3 972* | *5 707* | *3 781* | *6 032* | *3 717* | *5 923* |
| Water supply | 2 529 | 406 | 2 599 | 390 | 2 635 | 380 |
| *women* | *528* | *96* | *578* | *89* | *609* | *85* |
| *men* | *2 001* | *310* | *2 021* | *301* | *2 026* | *295* |
| Recycled materials | 941 | 2 541 | 911 | 2 530 | 884 | 2 434 |
| *women* | *119* | *499* | *109* | *490* | *118* | *464* |
| *men* | *822* | *2 042* | *802* | *2 040* | *766* | *1 970* |
| Renewable energy | 6 706 | 5 935 | 6 941 | 6 262 | 6 946 | 6 270 |
| *women* | *1 358* | *1 861* | *1 438* | *1 994* | *1 463* | *1 732* |
| *men* | *5 348* | *4 074* | *5 503* | *4 268* | *5 483* | *4 538* |
| Heat/energy saving | 2 835 | 1 810 | 2 962 | 1 911 | 3 151 | 2 044 |
| *women* | *490* | *268* | *520* | *292* | *554* | *288* |
| *men* | *2 345* | *1 542* | *2 442* | *1 619* | *2 597* | *1 756* |
| Sust. agriculture/fishery | 2 798 | 1 152 | 2 777 | 1 109 | 2 806 | 1 133 |
| *women* | *858* | *361* | *874* | *329* | *782* | *324* |
| *men* | *1 940* | *791* | *1 903* | *780* | *2 024* | *809* |
| Sustainable forestry | 435 | 55 | 423 | 64 | 413 | 51 |
| *women* | *179* | *3* | *169* | *3* | *160* | *4* |
| *men* | *256* | *52* | *254* | *61* | *253* | *47* |
| Other resource man. (incl eco-tourism) | 75 | 281 | 73 | 280 | 95 | 341 |
| *women* | *29* | *93* | *29* | *96* | *38* | *127* |
| *men* | *46* | *188* | *44* | *184* | *57* | *214* |
| **Total** | **49 487** | **38 554** | **49 620** | **39 631** | **50 621** | **40 811** |

## Turnover in the environmental sector in Sweden, million euros, 2002-2005

| | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|
| | Primary | Secondary | Primary | Secondary | Primary | Secondary | Primary | Secondary |
| **POLLUTION MANAGEMENT:** | | | | | | | | |
| Air pollution control | 266 | 55 | 335 | 53 | 353 | 59 | 281 | 98 |
| Wastewater management | 627 | 121 | 680 | 122 | 671 | 313 | 861 | 604 |
| Waste management | 3 122 | 601 | 3 524 | 586 | 3 833 | 647 | 5 224 | 1 012 |
| Soil and groundwater | 41 | 151 | 43 | 147 | 43 | 156 | 54 | 220 |
| Noise and vibration | 11 | 6 | 13 | 6 | 14 | 7 | 15 | 7 |
| Env. monotoring/analysis | 385 | 1 339 | 410 | 1 371 | 454 | 1 442 | 553 | 1 656 |
| **CLEAN TECHNOLOGIES AND PRODUCTS:** | | | | | | | | |
| Cleaner technologies | 122 | 324 | 156 | 316 | 154 | 301 | * | * |
| Cleaner products | 223 | 345 | 242 | 353 | 271 | 348 | * | * |
| **RESOURCE MANAGEMENT:** | | | | | | | | |
| Indoor air control | 775 | 838 | 784 | 880 | 762 | 918 | 805 | 956 |
| Water supply | 395 | 78 | 387 | 85 | 414 | 82 | 454 | 120 |
| Recycled materials | 215 | 426 | 210 | 412 | 230 | 416 | 284 | 400 |
| Renewable energy | 5 629 | 5 064 | 6 723 | 6 608 | 6 158 | 4 665 | 6 982 | 4 913 |
| Heat/energy saving | 541 | 235 | 577 | 299 | 633 | 327 | 727 | 480 |
| Sust. agriculture/fishery | 251 | 109 | 249 | 107 | 303 | 121 | 117 | 27 |
| Sustainable forestry | 91 | 7 | 119 | 8 | 70 | 8 | 86 | 9 |
| Other resource man. (incl eco-tourism) | 12 | 25 | 12 | 25 | 15 | 26 | 16 | 24 |
| **Total** | **12 708** | **9 723** | **14 466** | **11 377** | **14 376** | **9 835** | **16 461** | **10 524** |

* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

## Export in the environmental sector in Sweden, million euros, 2003-2005

| | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|
| | Primary | Secondary | Primary | Secondary | Primary | Secondary |
| Pollution management | 953 | 240 | 1 015 | 349 | 1 401 | 579 |
| Clean technologies and products | 92 | 193 | 116 | 167 | * | * |
| Resource management | 476 | 387 | 521 | 423 | 728 | 347 |
| **Total** | **1 522** | **820** | **1 652** | **938** | **2 129** | **926** |

* The grouped domain Cleaner technologies and products has not been used since 2005 and the establishments from this group have been distributed among the two other groups.

# Appendix 3 – Lists of environmental goods, OECD and APEC

## OECD list of environmental goods

| Category and product description | HS code |
|---|---|
| **A. POLLUTION MANAGEMENT** | |
| 1. Air pollution control | |
| 1.1 Air handling equipment | |
| Vacuum pumps | 8414.10 |
| Compressors of a kind used in refrigerating equipment | 8414.30 |
| Air compressors mounted on a wheeled chassis for towing | 8414.40 |
| Other air or gas compressors or hoods | 8414.80 |
| Parts for air or gas compressors, fans or hoods | 8414.90 |
| 1.2 Catalytic converters | |
| Filtering or purifying machinery and apparatus for gases | 8421.39 |
| Parts for filtering or purifying machinery | 8421.99 |
| 1.3 Chemical recovery systems | |
| Limestone flux | 2521.00 |
| Slaked (hydrated) lime | 2522.20 |
| Magnesium hydroxide and peroxide | 2816.10 |
| Activated earths | |
| Filtering or purifying machinery and apparatus for gases* | 8421.39 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 1.4 Dust collectors | |
| Filtering or purifying machinery and apparatus for gases* | 8421.39 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 1.5 Separators/precipitators | |
| Other glass fibre products | 7019.90 |
| Machinery for liquefying air or other gases | 8419.60 |
| Other machinery for treatment of materials by change of temperature | 8419.89 |
| Filtering or purifying machinery and apparatus for gases* | 8421.39 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 1.6 Incinerators, scrubbers | |
| Other furnaces, ovens, incinerators, non electric | 8417.80 |
| Filtering or purifying machinery and apparatus for gases* | 8421.39 |
| Parts for filtering or purifying machinery* | 8421.99 |
| Industrial or laboratory electric resistance furnaces | 8514.10 |
| Industrial or laboratory induction or dielectric furnaces | 8514.20 |
| Other industrial or laboratory electric furnaces and ovens | 8514.30 |
| Parts, industrial or laboratory electric furnaces | 8514.90 |
| 1.7 Odour control equipment | |
| Parts for sprayers for powders or liquids | 8424.90 |
| 2. Wastewater management | |
| 2.1 Aeration systems | |
| Compressors of a kind used in refrigerating equipment* | 8414.30 |
| Air compressors mounted on a wheeled chassis for towing* | 8414.40 |
| Other air or gas compressors or hoods* | 8414.80 |
| Parts for air or gas compressors, fans or hoods* | 8414.90 |
| 2.2 Chemical recovery systems | |
| Limestone flux* | 2521.00 |
| Slaked (hydrated) lime* | 2522.20 |
| Chlorine | 2801.10 |
| Anhydrous ammonia | 2814.10 |
| Sodium hydroxide solid | 2815.11 |

| Category and product description | HS code |
|---|---|
| Sodium hydroxide in aqueous solution | 2815.12 |
| Magnesium hydroxide and peroxide* | 2816.10 |
| Activated earths* | |
| Aluminium hydroxide | 2818.30 |
| Manganese dioxide | 2820.10 |
| Manganese oxides (other) | 2820.90 |
| Lead monoxide | 2824.10 |
| Sodium sulphites | 2832.10 |
| Other sulphites | 2832.20 |
| Phosphinates and phosphonates | 2835.10 |
| Phosphates of triammonium | 2835.21 |
| Phosphates of monosodium or disodium | 2838.22 |
| Phosphates of trisodium | 2835.23 |
| Phosphates of potassium | 2835.24 |
| Calcium hydrogenorthophosphate | 2835.25 |
| Other phosphates of calcium | 2835.26 |
| Other phosphates (excl. polyphosphates) | 2835.29 |
| Activated carbon | 3802.10 |
| Water filtering or purifying machinery and apparatus | 8421.21 |
| Other machinery for purifying liquids | 8421.29 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 2.3 Biological recovery systems | |
| 2.4 Gravity sedimentation systems | |
| Flocculating agents | |
| 2.5 Oil/water separation systems | |
| Other centrifuges | 8421.19 |
| Parts of centrifuges | 8421.91 |
| Water filtering or purifying machinery and apparatus* | 8421.21 |
| Other machinery for purifying liquids* | 8421.29 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 2.6 Screens/strainers | |
| Other articles of plastic | 3926.90 |
| Water filtering or purifying machinery and apparatus* | 8421.21 |
| Other machinery for purifying liquids* | 8421.29 |
| Parts for filtering or purifying machinery* | 8421.99 |
| 2.7 Sewage treatment | |
| Flocculating agents | |
| Woven pile & chenille fabrics of other textile materials | 5801.90 |
| Tanks, vats, etc., > 300l | 7309.00 |
| Tanks, drums, etc., >50 l < 300 l | 7310.10 |
| Cans < 50 l, closed by soldering or crimping | 7310.21 |
| Other cans < 50 l | 7310.29 |
| Hydraulic turbines | 8410.00-13 |
| Parts for hydraulic turbines | 8410.90 |
| Incinerators, non electric* | 8417.80 |
| Weighing machines capacity <30 kg | 8423.81 |
| Weighing machines capacity >30 kg <500 kg | 8423.82 |
| Weighing machines | 8423.89 |
| Parts for sprayers for powders or liquids* | 8424.90 |
| Industrial/lab electric resistance furnaces* | 8514.10 |
| Industrial/lab induction, dielectric furnaces* | 8514.20 |
| Industrial/lab electric furnaces & ovens, n.e.s.* | 8514.30 |
| Parts, industrial & lab electric furnaces* | 8514.90 |

| Category and product description | HS code |
|---|---|
| 2.8 Water pollution control, wastewater reuse equipment | |
| 2.9 Water handling goods and equipment | |
| Articles of cast iron | 7325.10 |
| Root control equipment | |
| Positive displacement pumps, hand-operated | 8413.20 |
| Other reciprocating positive displacement pumps | 8413.50 |
| Other rotary positive displacement pumps | 8413.60 |
| Other centrifugal pumps | 8413.70 |
| Other pumps | 8413.81 |
| Valves, pressure reducing | 8481.10 |
| Valves, check | 8481.30 |
| Valves, safety | 8481.40 |
| Other taps, cocks, valves, etc. | 8481.80 |
| Instruments for measuring the flow or level of liquids | 9026.10 |
| Instruments for measuring or checking pressure | 9026.20 |
| 3. Solid waste management | |
| 3.1 Hazardous waste storage and treatment equipment | |
| Other articles of cement, concrete | 6810.99 |
| Other articles of lead | 7806.00 |
| Other electric space heating and soil heating apparatus | 8516.29 |
| Lasers | 9013.20 |
| Vitrification equipment* | |
| 3.2 Waste collection equipment | |
| Household & toilet articles of plastic | 3924.90 |
| Brooms, hand | 9603.10 |
| Brushes as parts of machines, appliances | 9603.50 |
| Mechanical floor sweepers | 9803.90 |
| Trash bin liners (plastic) | |
| 3.3 Waste disposal equipment | |
| Compactors | |
| Refuse disposal vehicles | |
| Polypropylene sheeting, etc. | 3920.20 |
| 3.4 Waste handling equipment | |
| 3.5 Waste separation equipment | |
| Magnetic separators | |
| 3.6 Recycling equipment | |
| Magnetic separators* | |
| Machinery to clean, dry bottles, etc. | 8422.20 |
| Other mixing or kneading machines for earth, stone, sand, etc. | 8474.39 |
| Other machines for mixing/grinding, etc. | 8479.82 |
| Other machines, n.e.s., having individual functions | 8479.89 |
| Tire-shredding machinery | |
| 3.7 Incineration equipment | |
| Other furnaces, ovens, incinerators, non-electric* | 8417.80 |
| Parts of furnaces, non-electric | 8417.90 |
| Industrial or laboratory electric resistance furnaces* | 8514.10 |
| Industrial or laboratory induction or dielectric furnaces* | 8514.20 |
| Other industrial or laboratory electric furnaces and ovens* | 8514.30 |
| Parts, industrial or laboratory electric furnaces* | 8514.90 |
| 4. Remediation and cleanup | |
| 4.1 Absorbents | |
| 4.2 Cleanup | |
| Other electric space heating and soil heating apparatus* | 8516.29 |

| Category and product description | HS code |
|---|---|
| Lasers* | 9013.20 |
| Vitrification equipment* | |
| 4.3 Water treatment equipment | |
| Surface active chemicals (not finished detergents) | |
| Oil spillage cleanup equipment | |
| Other electrical machines and apparatus with one function | 8543.89 |
| 5. Noise and vibration abatement | |
| 5.1 Mufflers/silencers | |
| Parts for spark-ignition internal combustion piston engines | 8409.91 |
| Parts for diesel or semi-diesel engines | 8409.99 |
| Silencers and exhaust pipes, motor vehicles | 8708.92 |
| 5.2 Noise deadening material | |
| 5.3 Vibration control systems | |
| 5.4 Highway barriers | |
| 6. Environmental monitoring, analysis and assessment | |
| 6.1 Measuring and monitoring equipment | |
| Thermometers, pyrometers, liquid-filled | 9025.11 |
| Other thermometers, pyrometers | 9025.19 |
| Hydrometers, barometers, hygrometers, etc. | 9025.80 |
| Other instruments for measuring liquids or gases | 9026.80 |
| Parts of instruments for measuring, checking liquids or gases | 9026.90 |
| Instruments for analysing gas or smoke | 9027.10 |
| Chromatographs, etc. | 9027.20 |
| Spectrometers, etc. | 9027.30 |
| Exposure meters | 9027.40 |
| Other instruments using optical radiation | 9027.50 |
| Other instruments for physical or chemical analysis | 9027.80 |
| Parts for instruments, incl. microtomes | 9027.90 |
| Ionising radiation measuring & detecting instruments | 9030.10 |
| Other optical instruments | 9031.49 |
| Other measuring or checking instruments | 9031.80 |
| Manostats | 9032.20 |
| Hydraulic/pneumatic automatic regulate, control instruments | 9032.81 |
| Other automatic regulate, control instruments | 9032.89 |
| Auto emissions testers | |
| Noise measuring equipment | |
| 6.2 Sampling systems | |
| 6.3 Process and control equipment | |
| Thermostats | 9032.10 |
| Electrical process control equipment | |
| On-board monitoring/control | |
| 6.4 Data acquisition equipment | |
| 6.5 Other instruments/machines | |
| **B. CLEANER TECHNOLOGIES AND PRODUCTS** | |
| 1. Cleaner/resource efficient technologies and processes | |
| Electrochemical apparatus/plant | |
| Extended cooking (pulp) | |
| Oxygen delignification | |
| Ultrasonic cleaning | |
| Fluidised bed combustion | |
| 2. Cleaner/resource efficient products | |
| CFC substitutes | |
| Hydrogen peroxide | 2801.10 |

| Category and product description | HS code |
|---|---|
| Peat replacements (e.g. bark) | |
| Water-based adhesives | |
| Paints and varnishes, in aqueous medium, acrylic or vinyl | 3209.10 |
| Other paints and varnishes, in aqueous medium | 3209.90 |
| Double-hulled oil tankers | |
| Low-noise compressors | |
| **C. RESOURCES MANAGEMENT GROUP** | |
| 1. Indoor air pollution control | |
| 2. Water supply | |
| 2.1 Potable water treatment | |
| 2.2 Water purification systems | |
| Chlorine* | 2801.10 |
| 2.3 Potable water supply and distribution | |
| Water, incl. natural or artificial mineral water | 2201.00 |
| Distilled and conductivity water | 2851.00 |
| Ion exchangers (polymer) | 3914.00 |
| 3. Recycled materials | |
| 3.1 Recycled paper | |
| 3.2 Other recycled products | |
| 4. Renewable energy plant | |
| 4.1 Solar | |
| Instantaneous gas water heaters | 8419.11 |
| Other instantaneous or storage water heaters, non-electric | 8419.19 |
| Photosensitive semiconductor devices, incl. solar cells | 8541.40 |
| 4.2 Wind | |
| Windmills | |
| Wind turbines | |
| 4.3 Tidal | |
| 4.4 Geothermal | |
| 4.5 Other | |
| Methanol | 2905.11 |
| Ethanol | 2207.10 |
| Hydroelectric plant | |
| 5. Heat/energy savings and management | |
| Catalysts | 3815.00 |
| Multiple walled insulating units of glass | 7008.00 |
| Other glass fibre products* | 7019.90 |
| Heat exchange units | 8419.50 |
| Parts for heat exchange equipment | 8419.90 |
| Heat pumps | |
| District heating plant | |
| Waste heat boilers | |
| Burners: fuel other than oil or gas | |
| Fluorescent lamps, hot cathode | 8539.31 |
| Electric cars | |
| Fuel cells | |
| Gas supply, production and calibrating metres | 9028.10 |
| Liquid supply, production and calibrating metres | 9028.20 |
| Thermostats* | 9032.10 |
| 6. Sustainable agriculture and fisheries | |
| 7. Sustainable forestry | |
| 8. Natural risk management | |
| Satellite imaging | |

| Category and product description | HS code |
|---|---|
| Seismic instruments | |
| 9. Eco-tourism | |
| 10. Other | |

*** Indicates that the HS code appears previously in the table.**

## APEC list of environmental goods

| Environ. Activity | HS 6-digit description | HS Code |
|---|---|---|
| R/C | Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, milling or other working of corn | 230210 |
| WWM | Other articles of plastics and articles of other materials of HS 3901 to 3914; other | 392690 |
| WWM | Other articles of plastics and articles of other materials of HS 3901 to 3914; other | 392690 |
| WWM | Mats, matting and screens of vegetable materials | 460120 |
| WWM | Mats, matting and screens of vegetable materials | 460120 |
| WWM | Non-wovens, whether or not impregnated, coated, covered or laminated: of manmade filaments; weighing more than 150 g/m2 | 560314 |
| WWM | Textile products and articles, for technical uses, specified in note 7 to this chapter; other | 591190 |
| M/A | Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous fossil meals or similar siliceous earths; containing by weight, singly or together, more than 50% of the elements Mg, Ca or Cr, expressed as MgO, CaO or Cr2O3 | 690210 |
| M/A | Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous fossil meals or similar siliceous earths; containing by weight more than 50% of alumina (Al2O3), of silica (SiO2) or of a mixture or compound of these products | 690220 |
| M/A | Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous fossil meals or similar siliceous earths; other | 690290 |
| M/A | Other refractory ceramic goods (for example, retorts, crucibles, muffles, nozzles, plugs, supports, cupels, tubes, pipes, sheaths and rods), other than those of siliceous fossil meal or of similar siliceous earths; containing by weight more than 50% of graphite or other carbon or of a mixture of these products | 690310 |
| M/A | Other refractory ceramic goods (for example, retorts, crucibles, muffles, nozzles, plugs, supports, cupels, tubes, pipes, sheaths and rods), other than those of siliceous fossil meal or of similar siliceous earths; containing by weight more than 50% of alumina (Al2O3) or of a mixture or compound of alumina and silica (SiO2) | 690320 |
| M/A | Other refractory ceramic goods (for example, retorts, crucibles, muffles, nozzles, plugs, supports, cupels, tubes, pipes, sheaths and rods), other than those of siliceous fossil meal or of similar siliceous earths; other | 690390 |
| M/A | Ceramic wares for laboratory, chemical or other technical uses; other | 690919 |
| M/A | Laboratory, hygienic or pharmaceutical glassware, whether or not graduated or calibrated; of fused quartz or other fused silica | 701710 |
| M/A | Laboratory, hygienic or pharmaceutical glassware, whether or not graduated or calibrated; of other glass having a linear coefficient of expansion not exceeding 5 x 10-6 per Kelvin within a temperature range of 0 ºC to 300º C | 701720 |
| M/A | Laboratory, hygienic or pharmaceutical glassware, whether or not graduated or calibrated; other | 701790 |
| APC | Auxiliary plant for use with boilers of HS 8402 or 8403 (for example, economisers, super-heaters, soot removers, gas recoverers) | 840410 |
| APC | Condensers for steam or other vapour power units | 840420 |
| APC | Producer gas or water gas generators, with or without their purifier; acetylene gas generators and similar water process gas generator, with or without their purifiers | 840510 |
| N/V | Parts suitable for use solely or principally with the engines of HS 8407 or 8408; suitable for use solely or principally with spark-ignition internal combustion piston engines. | 840991 |
| APC | Parts suitable for use solely or principally with the engines of HS 8407 or 8408; other | 840999 |
| REP | Hydraulic turbines and water wheels of a power not exceeding 1 000 kW | 841011 |

| Environ. Activity | HS 6-digit description | HS Code |
|---|---|---|
| REP | Hydraulic turbines and water wheels of a power exceeding 1 000 kW but not exceeding 10 000 kW | 841012 |
| REP | Hydraulic turbines and water wheels of a power exceeding 10 000 kW | 841013 |
| REP | Hydraulic turbines and water wheels; parts, including regulators | 841090 |
| WWM | Pumps for liquids, whether or not fitted with a measuring device; other rotary positive displacement pumps | 841360 |
| WWM | Pumps for liquids, whether or not fitted with a measuring device; other centrifugal pumps | 841370 |
| PWT | Pumps for liquids, whether or not fitted with a measuring device; other pumps | 841381 |
| M/A | Vacuum pumps | 841410 |
| APC | Fans (and blowers) other than table, floor, window, ceiling or roof fans with a self-contained electric motor of an output not exceeding 125W | 841459 |
| M/A | Air or vacuum pumps, air or other gas compressors and fans; ventilating or recycling hoods incorporating a fan, whether or not fitted with filters; other | 841480 |
| S/H | Industrial or laboratory furnaces and ovens, including incinerators, non-electric; other than bakery ovens and furnaces for treatment of ores | 841780 |
| S/H | Parts of industrial or laboratory furnaces and ovens, including incinerators, non-electric | 841790 |
| REP | Other instantaneous or storage water heaters, non-electric | 841919 |
| M/A | Distilling or rectifying plant | 841940 |
| H/E | Heat exchange units | 841950 |
| M/A | Machinery for liquefying air or other gases | 841960 |
| M/A | Centrifuges, including centrifugal dryers, other than cream separators and clothes dryers | 842119 |
| WWM | Filtering or purifying machinery and apparatus for liquids: for filtering or purifying water | 842121 |
| WWM | Filtering or purifying machinery and apparatus for liquids; other | 842129 |
| APC | Filtering or purifying machinery and apparatus for gases; other | 842139 |
| M/A | Parts of centrifuges, including centrifugal dryers | 842191 |
| APC | Parts of filtering or purifying machinery and apparatus for liquids or gases | 842199 |
| ORS | Machinery for cleaning or drying bottles or other containers | 842220 |
| WWM | Other continuous-action elevators and conveyors, for goods or materials; other, belt type | 842833 |
| WWM | Other agricultural, horticultural, forestry, poultry-keeping or bee-keeping machinery | 843680 |
| S/H | Machine tools for working metal, other than punching or notching and combined punching and shearing; hydraulic presses | 846291 |
| S/H | Other office machines | 847290 |
| ORS | Sorting, screening, separating or washing machines | 847410 |
| S/H | Sorting, screening, separating or washing machines | 847410 |
| ORS | Machines for mixing mineral substances with bitumen | 847432 |
| ORS | Mixing, kneading, crushing, grinding, screening, sifting, homogenising emulsifying or stirring machines | 847982 |
| WWM | Mixing, kneading, crushing, grinding, screening, sifting, homogenising emulsifying or stirring machines | 847982 |
| S/H | Machines and mechanical appliances having individual functions, not elsewhere specified or included in this chapter, other | 847989 |
| WWM | Machines and mechanical appliances having individual functions, not elsewhere specified or included in this chapter, other | 847989 |
| PWT | Parts of machines and mechanical appliances having individual functions, not elsewhere specified or included in this chapter, other | 847990 |
| REP | Generating sets, electric, wind powered | 850231 |
| S/H | Electromagnets; other, including parts | 850590 |
| S/H | Industrial or laboratory furnaces and ovens; electric, resistance-heated | 851410 |
| S/H | Industrial or laboratory furnaces and ovens; electric, induction or dielectric | 851420 |
| S/H | Industrial or laboratory furnaces and ovens, electric, other | 851430 |
| S/H | Parts of industrial or laboratory electric furnaces and ovens or other laboratory induction or dielectric heating equipment | 851490 |
| REP | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes | 854140 |

| Environ. Activity | HS 6-digit description | HS Code |
|---|---|---|
| WWM | Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter; other | 854389 |
| R/C | Inflatable rafts | 890710 |
| R/C | Other floating structures | 890790 |
| M/A | Photogrammetric surveying instruments and appliances | 901540 |
| M/A | Other surveying, hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances, excluding compasses | 901580 |
| M/A | Parts and accessories of surveying, hydrological, meteorological or geophysical instruments and appliances, excluding compasses | 901590 |
| M/A | Apparatus based on the use of X-rays or of alpha, beta or gamma radiations for other than medical, surgical, dental or veterinary uses | 902229 |
| M/A | Apparatus based on the use of X-rays or of alpha, beta or gamma radiations for other than medical, surgical, dental or veterinary uses | 902290 |
| M/A | Thermometers and pyrometers, not combined with other instruments: liquid filled, for direct reading | 902511 |
| M/A | Thermometers and pyrometers, not combined with other instruments: other than liquid filled, for direct reading | 902519 |
| M/A | Hydrometers and similar floating instruments, thermometers, pyrometers, barometers, hygrometers and psychrometers, recording or not, and any combination of these instruments | 902580 |
| M/A | Parts and accessories for hydrometers and similar floating instruments, thermometers, pyrometers, barometers, hygrometers and psychrometers, recording or not, and any combination of these instruments | 902590 |
| M/A | Instruments and apparatus for measuring or checking the flow or level of liquid | 902610 |
| M/A | Instruments and apparatus for measuring or checking pressure | 902620 |
| M/A | Other instruments and apparatus | 902680 |
| M/A | Parts and accessories for articles of HS 9026 | 902690 |
| M/A | Gas or smoke analysis apparatus | 902710 |
| M/A | Chromatographs and electrophoresis instruments | 902720 |
| M/A | Spectrometers, spectrophotometers and spectrographs using optical radiations (ultraviolet, visible, infrared) | 902730 |
| M/A | Exposure meters | 902740 |
| M/A | Other instruments and apparatus using optical radiations (ultraviolet, visible, infrared) | 902750 |
| M/A | Other instruments and apparatus for physical or chemical analysis | 902780 |
| M/A | Microtomes; parts and accessories | 902790 |
| M/A | Gas meters | 902810 |
| M/A | Liquid meters | 902820 |
| M/A | Electricity meters | 902830 |
| M/A | Parts and accessories for articles of HS 9028 | 902890 |
| M/A | Instruments and apparatus for measuring or detecting ionising radiations | 903010 |
| M/A | Cathode ray oscilloscopes and cathode ray oscillographs | 903020 |
| M/A | Multimeters | 903031 |
| M/A | Other instruments and apparatus, for measuring or checking voltage, current, resistance or power, without a recording device | 903039 |
| M/A | Other instruments and apparatus for measuring or checking electrical quantities, with a recording device | 903083 |
| M/A | Other instruments and apparatus for measuring or checking electrical quantities | 903089 |
| M/A | Parts and accessories (for nominated articles of HS 9030) | 903090 |
| M/A | Machines for balancing mechanical parts | 903110 |
| M/A | Test benches | 903120 |
| M/A | Profile projectors | 903130 |
| M/A | Other measuring or checking instruments, appliances and machines, not elsewhere specified in this chapter | 903180 |
| M/A | Parts and accessories (for nominated articles of HS 9031) | 903190 |

| Environ. Activity | HS 6-digit description | HS Code |
|---|---|---|
| M/A | Thermostats | 903210 |
| M/A | Manostats | 903220 |
| M/A | Hydraulic and pneumatic instruments and apparatus | 903281 |
| M/A | Automatic regulating or controlling instruments, other | 903289 |
| M/A | Parts and accessories | 903290 |
| M/A | Parts and accessories (not specified or included elsewhere in this chapter) for machines, appliances, instruments or apparatus of Ch. 90 | 903300 |

**APC = air pollution control**
**H/E = heat/energy management**
**M/A = monitoring/analysis**
**N/V = noise/vibration abatement**
**ORS = other recycling systems**
**PWT = potable water treatment**
**R/C = remediation/cleanup**
**S/H = solid/hazardous waste**
**WWM = wastewater management**