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Creating statistics on environmental technology

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Foreword

The following publication is the final report of the government assignment to produce statistics for the Swedish environmental technology sector. This report also provides proposals for further development (N2013/2919/E). The assignment was given by the Ministry of Enterprise and Innovation as a part of the environmental technology strategy that existed between 2011 – 2014. This report investigates the possibilities to further develop the existing statistics to provide information about Swedish environmental technology.

The assignment was carried out by Statistics Sweden's working group for environmental accounts. The environmental accounts comprise a statistical system that describes the links between the environment and the economy. This is done by measuring the contribution from the environment to the economy (e.g. the use of raw material, water, energy and land) and the impact on the environment made by the economy (emissions to air and water, and waste). The environmental accounts system also shows the environment-related transactions that are in the national accounts system.

The need to know more about green entrepreneurship and green jobs led Statistics Sweden to begin publishing statistics about the environmental sector in 1998. Since 2003 the statistics have been published annually and include information about gainful employment, turnover, exports and the number of workplaces.

Over the next few years, many European countries will begin to create statistics on the environmental sector. The statistics will also help us to understand environmental technology. This report shows new ways to work with statistics on the environmental sector to better understand environmental technology.

The report has been produced by Sebastian Constantino, Nancy Steinbach and Elin Törnqvist at Statistics Sweden's Unit for Environmental Economics and Natural Resources.

Statistics Sweden, March 2016

Marie Haldorson

Kaisa Ben Daher

A word of thanks

Statistics Sweden thanks the private persons, enterprises, government agencies and organisations that make it possible for Statistics Sweden to provide reliable and current statistics that meet society's needs for information.

Contents

Summary

The following publication is the final report of the government assignment to produce statistics for the Swedish environmental technology sector. The report also provides proposals for further development (N2013/2919/E). The assignment has been given by the Ministry of Enterprise and Innovation and has been conducted by Statistics Sweden.

The study is based on existing statistics and gives examples on how statistics can be further developed to better answer questions on environmental technology.

Environmental technology is a concept that is complex to define and thus also to compile statistics on. For instance, existing definitions from ETAP (The Environmental Technologies Action Plan adopted by the EU in 2004) are difficult to use for statistics collection. Environmental technology goes beyond the sphere of those products and activities that are usually measured in the statistics.

A natural starting point would be the existing statistics about the environmental goods and services sector (EGSS)[1]. These statistics include definitions that are suitable for statistics production; EU legislation has recently been passed for annual reporting to Eurostat. The legislation means that regular and internationally comparable statistics will be available from most European countries in a few years. The definitions for the environmental sector include those which are used together with the concept for environmental technology.

New classifications create statistics of better clarity

By categorising the environmental sector in a new way, more information is created about enterprises in the environmental sector and their growth, turnover and exports. This study creates new classifications of the statistics based on the size of enterprises. As a result, it is easier to see examples of the development of small and medium size enterprises in the environmental sector. The largest portion of turnover in the environmental sector is from enterprises with more than 50 employees. But it is perhaps more interesting that small enterprises with fewer than three employees seem to have a steadily increasing turnover that did not decline in connection with the financial crisis, which was the case for the larger enterprises.

Via special register variables it is even possible to identify newly-started enterprises in the environmental sector. With a comparable time series, the newly-started enterprises can be followed as a group from 2003 onwards. In 2003, more than 300 new service enterprises were started in the environmental sector, and within 10 years roughly 60 percent had closed down, most of them within the first four years. The statistics can be

[1] For the purpose of avoiding acronyms, the simpler form environmental sector will be used instead of EGSS throughout the report.

expanded to also include the development of the newly started enterprises in terms of turnover and exports seen over the time series.

Environmentally related innovations and patents in all industries

The statistics on innovation have been studied based on their content of environmental variables. Innovations are often connected to questions about environmental technology. In this study, innovations in processes and products have been connected to environmental enterprises. Thus an overview is obtained on how many environmental enterprises conduct innovations, the line of business for these enterprises and the number of employees.

The innovation survey 2008-2010 requested enterprises to take a stand on factors that were important for their innovation operations. 18 percent of the enterprises in the sample believed that reduced costs for material and energy as well as a reduced impact on the environment were important for innovation operations.

The analysis also shows that all the surveyed industries conduct some environmentally related innovation regardless if they dealt with services or with manufacturing. The analysis also revealed that a larger share of larger enterprises conduct environmentally related innovations compared with the smaller enterprises. In addition, a pilot study has been done with special retrievals from a register with applications for patents that were later studied together with the environmental sector. The pilot study was rather problematic, mainly because no corporate identity numbers were given in the patent application, but this study was still assessed to be of great potential if studied further. Among other things, the register can be used together with the work of the OECD to identify "green patents" and further analyse the types of enterprises who apply for these patents.

International work with environmental technology - focus on waste management and energy supply

A review has also been done of the ongoing international work in the area of environmental technology. The review shows that the area is under development within UN organisations, the EU and the OECD. Much of the work is about policy documents to reduce barriers for innovation and increase the spread of environmental technology around the world. Few of these organisations deal with facts and statistics. When this occurs it is difficult to determine what is included in the data material. For example, the European Commission, DG Environment mentions that environmental technology has a turnover of around 2 percent of GDP in Europe. This figure is found again at Eurostat and refers to the entire environmental sector (i.e. not only environmental technology) within the framework for existing data collection. Thus there are examples where environmental technology and the environmental sector are used synonymously.

The picture that is provided from the different organisations are that research, development and patents lead environmental technology forward, focussing on waste management, the supply of drinking water and energy supply.

A general conclusion of the study is that environmental technology is not something that can be limited to separate parts of the business sector. For example, the connection between the innovation survey and the environmental sector shows that innovation operations are conducted regardless of whether in the manufacturing industry, in waste management or energy production.

There is a great potential in answering questions on environmental technology with the statistics that already exist. Detailed studies about regional statistics or growth of enterprises can be illustrated with special processing of registers, above all in the environmental sector. With further work, the patent register could also be used. Statistics based on registers also offer the flexibility to constantly be developed after new, unforeseen information needs occur. In addition, statistics on innovation can further illustrate issues that are normally difficult to understand. It is also important to maintain the existing international network to share experiences that up until now have been shared between Sweden, the Netherlands and Canada.

1. Introduction

In its assignment N2013/2919/E, the government has tasked Statistics Sweden during 2013 and 2014 to produce statistics for the Swedish environmental technology sector for the years 2011, 2012 and 2013. Statistics Sweden has also been assigned to submit proposals for further development of the statistics. This publication is the final report for the evaluation that Statistics Sweden has conducted in line with the government assignment to submit proposals for further development of the statistics for environmental technology.

1.1 Environmental technology and the environmental sector

It is important to describe early in the report what is considered to be the environmental sector and the environmental *technology* sector, so that each sector is clearly defined.

Since 2003 Statistics Sweden has been publishing annual statistics on the environmental goods and services sector (EGSS)[2]. Businesses that make up the environmental sector are normally referred to as environmental enterprises. The statistics are based on workplaces that are identified with the help of registers and available statistics. The collected statistics are kept in a database called the environmental enterprise database that Statistics Sweden regularly maintains. These statistics follow an international definition produced in cooperation among OECD countries. Within a few years all EU countries will regularly report environmental sector statistics to Eurostat. Eurostat has also described the underlying theory and some of the methodology in the 2009 handbook "The Environmental goods and services sector – A data collection handbook". A rough translation of the definition of the environmental sector from the handbook is as follows:

> *"The environmental sector includes operations that produce goods and services that measure, prevent, limit, minimise or remediate environmental damage to water, air and soil as well as problems related to waste, noise and ecosystems. This also includes cleaner technologies and goods and services that reduce environmental risks or minimise emissions and resource consumption."*

From the beginning, the statistics on the environmental sector were created to examine which workplaces were associated with national environmental legislation, e.g. waste management and sewage treatment. The statistics have since been developed in line with international definitions, and now cover areas which are in many parts of the business sector such as organic farming, renewable energy and environmental consultants. The statistics have been extended over time to also include turnover and exports.

[2] For the purpose of avoiding acronyms, the simpler form environmental sector will be used instead of EGSS throughout the report.

When discussing statistics on the environmental technology sector however, definitions and methodology do not exist to the same extent. There is no regular production of comparable statistics. The current definitions of environmental technology state that there should be elements of development and improvement of existing products or technology. The EU's Environmental Technology Action Plan (ETAP) is one such example. It defines environmental technology as

"*such products, systems, processes and services which provide clear environmental advantages compared to existing or alternative solutions, seen in a life cycle perspective. The approach shifts the focus from products to systems, resource efficiency and sustainable development.*"[3]

These definitions of the environmental sector and the environmental technology sector by and large cover the same things. This is one of the reasons for the confusion when discussing the environmental sector and the environmental technology sector.

Environmental technology enterprises are most likely a subset of the environmental sector that has been identified, but it is also possible that environmental technology enterprises are found outside of the definition for the environmental sector. For instance, the handling of drinking water is an area that due to international comparability, is not to be included in the environmental sector.

To produce statistics that show the actual development in the environmental technology sector fully, enterprises or parts of enterprises that produce environmental technology need to be identified. This has shown to be difficult, partly because there are different definitions of environmental technology, and partly because the definitions are not clearly formulated. Another factor that makes it difficult is that many enterprises only work with environmental technology to a certain extent, thus making it more difficult to identify environmental technology enterprises. In conclusion, a natural starting point for statistics on environmental technology is to take advantage of the statistics on the environmental sector produced by Statistics Sweden.

1.2 Previously produced statistics on the Swedish environmental technology sector

Up to and including 2010 when it ceased operations, Sweden's council on environmental technology (Swentec) was assigned to annually produce relevant statistics within the Swedish environmental technology sector. Swentec's statistics are based on the ETAP definition that was cited above. Swentec assigned Statistics Sweden to maintain a population of enterprises (and workplaces) from which statistics were annually produced. This population of environmental technology enterprises has not been updated since Swentec's assignment was completed. Table 1 below shows the most recently published statistics on Swentec's population. If the statistics are looked at in relation to the total environmental sector for 2009, the number of workplaces, turnover and employees are about twice as large in the

[3]The translation has been taken from "Svensk miljöteknik i siffror 2006" by Swentec.

environmental sector as in Swentec's population. However, exports are only somewhat higher[4].

Table 1 - Examples of statistics on the environmental technology sector from Swentec

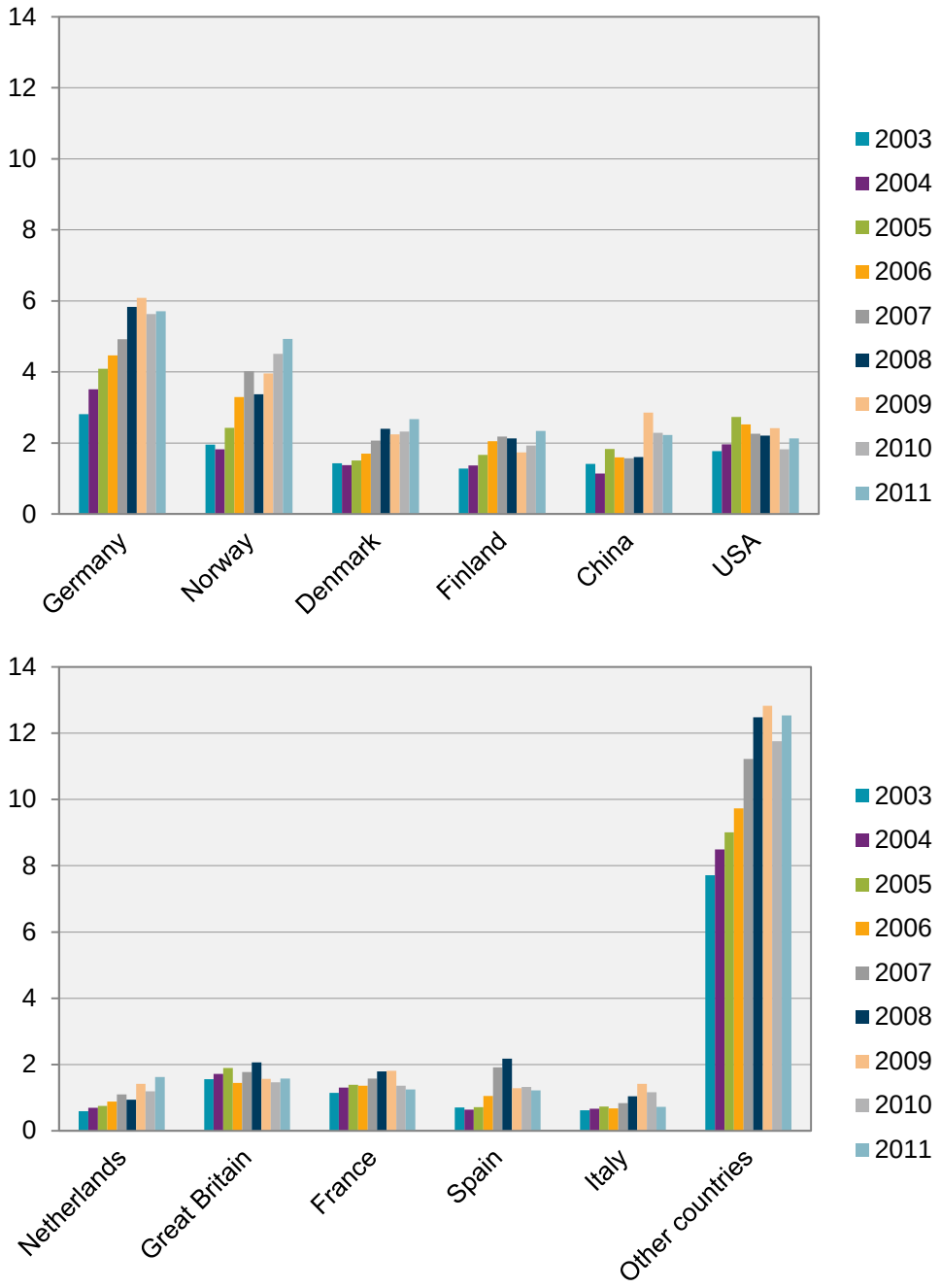
	2003	2004	2005	2006	2007	2008	2009
Workplaces	6 989	7 314	7 650	7 984	8 272	8 025	7 927
Enterprises	5 683	5 936	6 232	6 524	6 753	6 542	6 530
Employees	35 375	36 848	36 976	38 488	40 715	41 807	41 420
Turnover (SEK millions)	74 055	81 617	92 347	104 444	118 314	135 487	119 344
Exports (SEK millions)	20 053	22 220	25 764	30 946	35 550	37 081	38 857

Source: Table 1 and 2, Svensk miljöteknik i siffror 2009, Swentec

In the 2011 appropriation directions the Swedish Agency for Growth Policy Analysis was assigned to manage the statistics on the Swedish environmental technology sector that were previously produced by Swentec/Statistics Sweden. The agency was also requested to continue producing statistics on the environmental technology sector during 2011 and 2012. The Swedish Agency for Growth Policy Analysis and Statistics Sweden assessed that the population of environmental technology enterprises that Swentec used was unnecessarily costly to update in relation to the added value it gave. Instead, more detailed statistics were produced for the regular environmental sector to create a better understanding of the sector. For instance, the sector's regular publishing variables (turnover, exports and employment) was divided into public and private ownership, and statistics were created with value added values and included the countries that the environmental enterprises mainly exported to. Statistics Sweden delivered these special retrievals from the environmental enterprise database to The Swedish Agency for Growth Policy Analysis. This allowed for a deeper analysis of the environmental sector in the series *Statistik om miljösektorn*, most recently with statistics concerning 2003 – 2011, The Swedish Agency for Growth Policy Analysis (2013).

[4]Current statistics on the environmental sector are available on the internet http://www.scb.se/mi1301/, Tables and Graphs, Environmental sector

Figure 1 – exports of the environmental sector by recipient countries, 2003 – 2011, SEK billions, current prices



Source: Statistik om miljösektorn, arbetsställen, omsättning och export 2003-2011, The Swedish Agency for Growth Policy Analysis

The assignment Of the Swedish Agency for the Growth Policy Analysis was completed during 2012 and that Statistics Sweden has now been given this government assignment, a part of which is to continue delivering in-depth statistics on the environmental sector to Ministry of Enterprise and Innovation. The other part of the assignment concerns a development project (where this report is the final report) to better meet the needs of information on the environmental sector in the long term.

Yet another actor, Vinnova, has published statistics on the environmental sector. However, the purpose of Vinnova's study was not mainly to

produce statistics but rather to identify the structures as well as the enterprises in order to obtain a better basis for knowledge. The report is described in more detail in Section 2 below.

2 Comparison of environmental technology enterprises and environmental enterprises

A part of the definition for the environmental sector includes products that prevent, limit, minimise or remediate environmental damage. Among other things, some examples are products that simplify collection of waste, ranging from refuse collection trucks to refuse bags. If we view the same products from a perspective of environmental technology, it is difficult to motivate labelling a normal refuse bag as environmental technology. This illustrates a distinction between the international definition on the environmental sector compared with what is expected when the concept of environmental technology is used.

If the normal refuse bag is instead changed into a refuse bag that is made from renewable raw materials where energy consumption during production is significantly lower than normal, perhaps this can approach the concept of environmental technology. It is even closer to the environmental technology concept if it only refers to the development of the technology behind the production methods for such environmentally friendly refuse bags. Every step taken in this example approaches what people usually think about the concept of environmental technology; but the chance to create statistics becomes more difficult. To create these kinds of statistics requires a very detailed view into the operations of each enterprise.

Besides the above mentioned detailed view, the problem becomes more complex because many enterprises are not specialists in this kind of technology or production, but instead have a section of the enterprise that deals with product development and a section that deals with manufacturing. Yet another dimension is that enterprises that make refuse bags can also manufacture plastic products such as shopping bags, building plastic etc.

All aspects must be considered when creating definitions that will form the basis of statistics production. When Swentec assigned Statistics Sweden to create separate statistics for environmental technology, these statistics mostly reflected what was already available in the regular environmental sector statistics.

Another approach to measure the Swedish environmental technology sector was carried out by Vinnova and the results were published in 2013. The report (Vinnova, 2013) was based on a population of environmental technology enterprises that were selected after an evaluation of the operations of the enterprises. The bulk of the project focussed on this ambitious evaluation, and a total of 5 500 enterprises were examined. 1 571 of these enterprises are included in the final population. Statistics Sweden was able to take advantage of this population of environmental technology enterprises and can thus make a comparison between this population and the existing population in the statistics for the environmental sector. In this

way more data is created to evaluate which parts of the environmental sector are suitable to even measure environmental technology.

2.1 Comparison between the environmental sector and Vinnova's environmental technology sector

The statistics include enterprises and workplaces. An enterprise can have several workplaces that are active within different parts of the operations of the enterprise. The workplace is thus a sub-level to the enterprise. To obtain more detailed knowledge, the workplace is the most suitable level for comparisons between the environmental sector and Vinnova's environmental technology sector.

Table 2 - Number of workplaces in the environmental sector and Vinnova's environmental technology sector broken down by industrial groups, 2011

	The environmental sector		Vinnova's environmental technology sector	
Industrial group	**Number of workplaces**	**Percent**	**Number of workplaces**	**Percent**
1 Agriculture/forestry/fishing	3 783	24	13	0
2 Mining/manufacturing	1 131	7	415	15
3 Energy production	1 495	9	249	9
4 Water/Waste/Wastewater/Recycling	1 510	10	400	15
5 Services	6 918	44	1 592	58
6 Public	859	5	1	0
7 NPISH/Private consumption	120	1	61	2
8 No industry classification	5	0	2	0
Total	15 821	100	2 733	100

Source: Vinnova and Statistics Sweden

Table 2 above shows the workplaces in both of the populations broken down by industrial group. In total, the environmental sector includes more than five times more workplaces than the environmental technology sector. These workplaces are also somewhat differently broken down among the industries in both the populations. The largest difference is that the category that includes agriculture, forestry and fishing account for about 24 percent in the environmental sector; this mainly concerns organic farming. The corresponding industrial group is nearly non-existent in the environmental technology group from Vinnova. Public sector actors are also missing in the environmental technology sector. The industrial group for energy production is equal among the two populations, while Vinnova's environmental technology sector includes a larger share of workplaces within mining/manufacturing, water/waste/etc. as well as services.

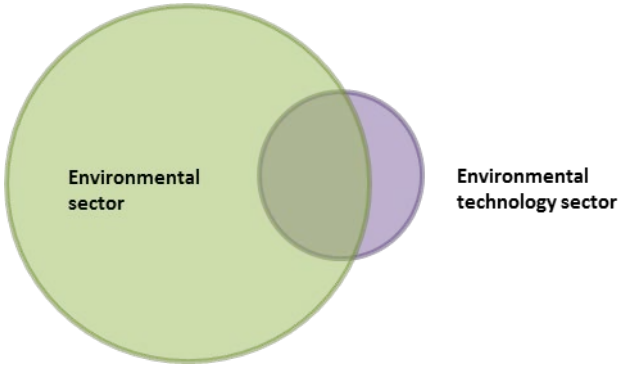


Figure 2 - differences between the two populations.
The picture is only an illustration and is not according to scale.

Both populations share many workplaces among themselves. About 67 percent of the workplaces in Vinnova's environmental technology sector are also included in the environmental sector. The remaining roughly 30 percent are mainly workplaces that run some form of service operations or mining/manufacturing.

However, there may be other reasons than the operations of the workplace that exclude them from the environmental sector. For instance, the environmental sector should not include retailers that do not have any of their own production, nor operations that only offer support services to enterprises in the environmental sector where the support service itself does not suit the definition for the environmental sector. Without these limitations, the same product could be counted several times in the value chain. These somewhat more narrow rules apply to the environmental sector but not for the environmental technology population that the environmental sector is being compared with.

2.1.1 The importance of the share of environmental operations for published variables

In addition to the distribution of the number of workplaces and measures that are taken to avoid duplication of data collection, it is also important to only take into account that only a small part of the operations of the workplace will be included in the statistics, if at all. To begin with, an example was used with the production of refuse bags where the enterprise can also produce other products that are not a part of the environmental sector. When the operations of the enterprise are evaluated by an administrator from Statistics Sweden, an environmental share of production is added. The purpose is to easily remove the parts of production that are not suited according to the definition of the environmental sector. Then only the environmental share of turnover, export and employees are included in the statistics in the end. Special time is taken to examine the larger enterprises in particular, because they are emphasised in the final statistics. Their operations may span many different areas and the environmental shares may sometimes be less than 10 percent. An important example is to sort out production of electricity from nuclear power from the energy producers where only renewable energy production is included in the environmental sector.

Table 3 below illustrates a comparison of gainful employment and turnover that was published from the environmental sector, as well as the report on the environmental technology sector by Vinnova. As previously mentioned, the environmental sector has more than five times the number of workplaces than the environmental technology population; despite this, the turnover and number of gainfully employed persons are lower than for the environmental technology population. The reason is mainly because no estimate on the environmental share of the operations has been done in the environmental technology population, and therefore it is probably somewhat overestimated. If no environmental share was used for the production of statistics for the environmental sector, turnover for 2011 would be about SEK 350 billion instead of the SEK 248 billion that was published.

Table 3 - Number of workplaces, gainfully employed persons and exports in the environmental sector (with environmental share) compared with the environmental technology population (without an environmental share)

2011	Vinnova's environmental technology population	The environmental sector
Number of workplaces	2 733	15 821
Gainfully employed persons	74 742	68 045
Turnover (SEK billions)	260	248
Exports (SEK billions)	Information missing	41

Source: Vinnova, 2013 and Statistics Sweden

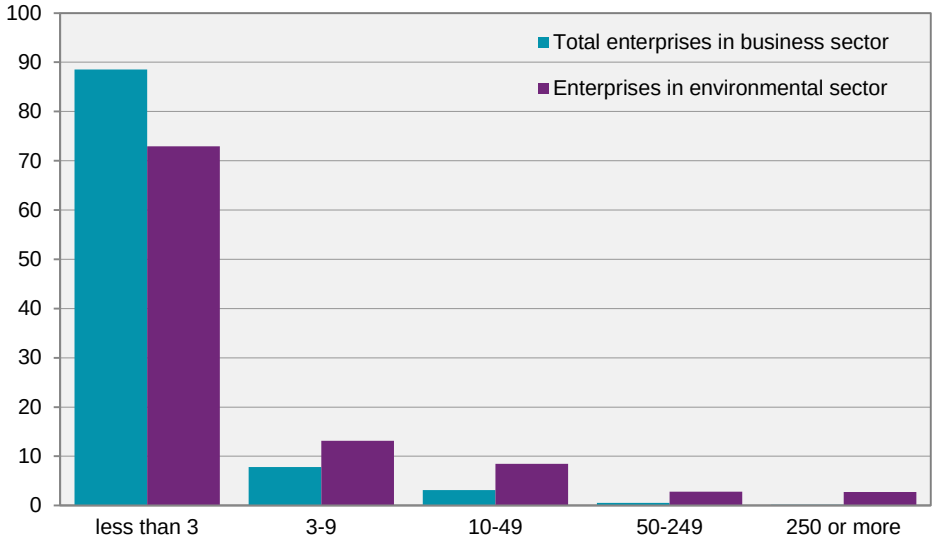
3 Extended analysis of the environmental sector

The introductory chapter has discussed the complexity of the definition and limitations of environmental technology. It has also been shown that the regular environmental sector also includes environmental technology to a large extent. It is not necessarily the operations of the enterprise that differ between the statistics on the environmental sector and environmental technology, but rather it could be that methods and other technical factors differ. By producing new statistics on the environmental sector, we hope to also be able to answer questions on the environmental technology sector. This chapter therefore presents the environmental sector in a new way, focussing on the size of the enterprise and the development for newly-started enterprises.

3.1 Size of the enterprise

Statistics on the environmental sector are normally published according to industry, type of environmental area (for example, organic farming or recycled material) and also by county. The variables of the statistics are turnover, exports and number of employees. This type of breakdown can be helpful for information about the kind of operations of the enterprise and where in the country these operations are carried out. However, the statistics provide no information on the number of small enterprises found in the environmental sector nor about whether small enterprises handle exports. Are enterprises in the environmental sector growing, or does the sector include mostly small enterprises that later do not succeed in increasing their operations?

Figure 3 – enterprises in the environmental sector and the business sector in total, broken down by size of enterprise, by number of employees in 2013, percent



A new breakdown of enterprises in the environmental sector has been made based on the number of employees in each enterprise. Figure 3 above shows five different groups of enterprises. If we compare the structure of the environmental sector with the business sector as a whole, we see some differences. The environmental sector has a lower share of the smallest enterprise category than that of the business sector in general. 73 percent of the enterprises in the environmental sector had fewer than three employees while the corresponding group in the business sector in general accounts for 89 percent of the total number of enterprises. In the other groups, the environmental sector has a relatively larger share of enterprises within all categories than the business sector has. One possible reason for this distribution could be that it's more difficult to find small enterprises with operations within the framework for the environmental sector.

Figure 4 – Number of enterprises in the environmental sector broken down by the size class of the number of employees for 2003, 2005 and 2013

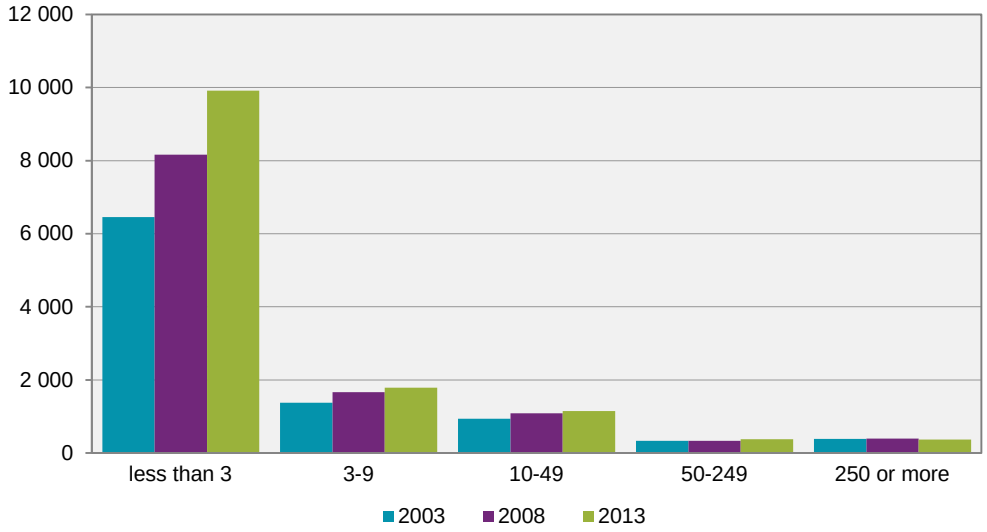
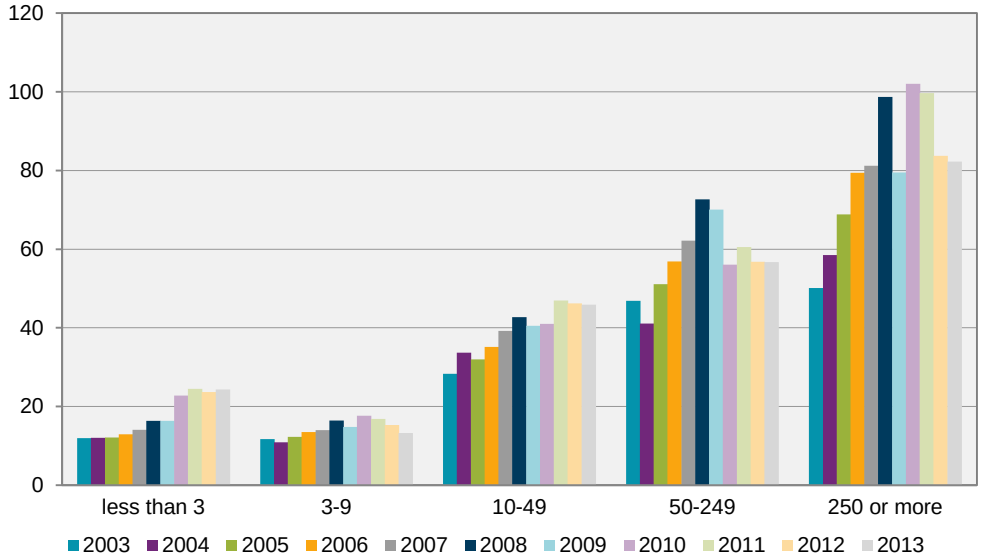


Figure 4 above provides a more detailed picture of the environmental sector. The different size groups of enterprises are compared with each other at three points in time. Most of the enterprises in the environmental sector are very small enterprises with only a few employees. The two groups of enterprises with 50 to 249 employees and 250 or more employees respectively consist of only about 300 – 400 enterprises each. We can also note that new companies were started between the three separate years. Between 2003 and 2013, slightly more than 3500 enterprises were started in the group with very small enterprises. We can also see an increase, although not so great, in the medium-sized categories of enterprises. The enterprises with more than 250 employees have been relatively constant during the entire period with a slight decrease in number in 2013.

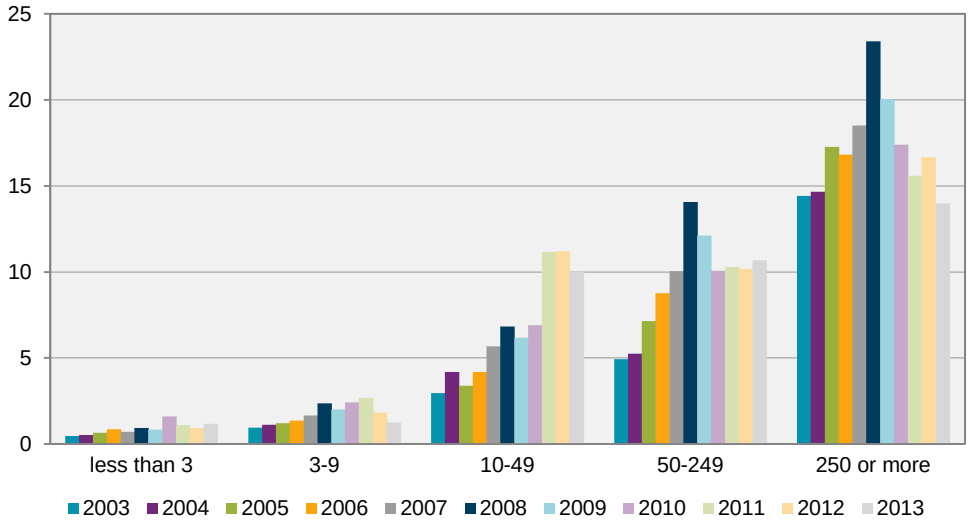
Figure 5 – turnover in the environmental sector broken down by size class of the enterprise by number of employees, 2003 to 2013, SEK billions



Another perspective is to study the turnover of the environmental enterprises. The larger enterprises account for a considerably larger share of the turnover of the environmental sector than the small enterprises. In total the environmental sector had a turnover of slightly more than SEK 220 billion in 2013, of which more than 60 percent is from enterprises that have more than 50 employees. Even among the larger enterprises, turnover increases the most over the time period. In the group with 250 or more employees turnover increases by more than 60 percent, SEK 30 billion between 2003 and 2013 in current prices.

The financial crisis that began 2008/2009 seems to have affected the groups differently. The turnover of the smallest enterprises did not seem to be affected and has steadily increased between 2003 and 2013. In the other groups of enterprises there is a clear break in the trend between 2008 and 2009, followed by a certain recovery. But on the whole the rate of increase from the years before the financial crisis slowed down. The last two years in the time series 2012 and 2013 involved a downturn for all groups except the very small enterprises. The lower turnover in production of renewable energy and the service industries in the environmental sector are behind the slowdown.

Figure 6 – exports from the environmental sector broken down by size class of the enterprise by number of employees, 2003 to 2013, SEK billions



The largest enterprises are even dominant when it comes to exports. Only three percent of exports came from the group of enterprises with fewer than three employees. 2008 was a peak year for Swedish exports, not only in the environmental sector but also in the economy as a whole. The year is shown as a clear peak for the two groups of enterprises with more than 50 employees. These high export figures even surpass the previous figure for turnover in the environmental sector. However, other enterprise groups do not show the same peak. The enterprises with 10 to 49 employees increased their exports by SEK 4 billion between 2010 and 2011, which is 10 percent of all exports in the environmental sector in 2011.

The statistics can also be combined by industry classification to see what is behind the size groupings of the enterprises.

Figure 7 – number of enterprises in the environmental sector broken down by size class of the enterprise by number of employees as well as industry classification, 2013

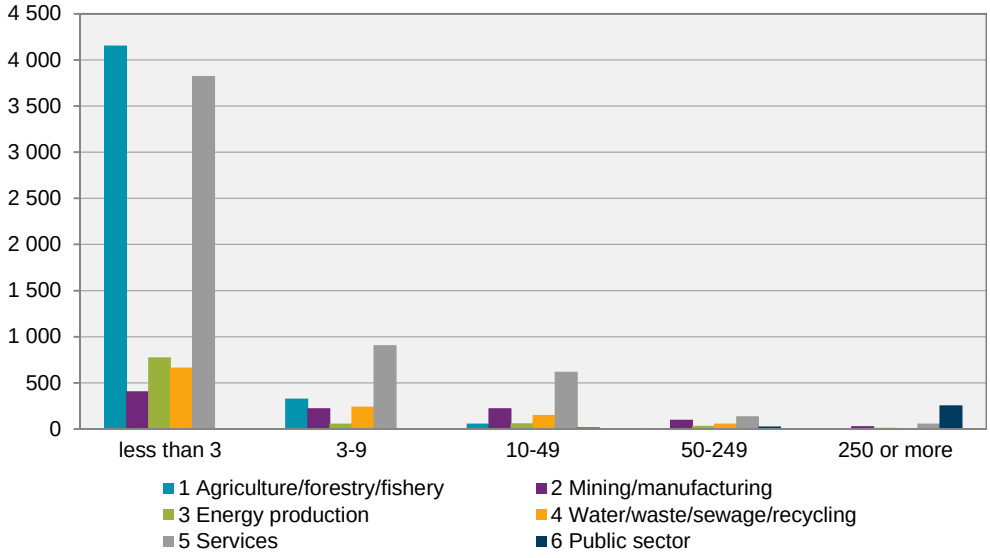
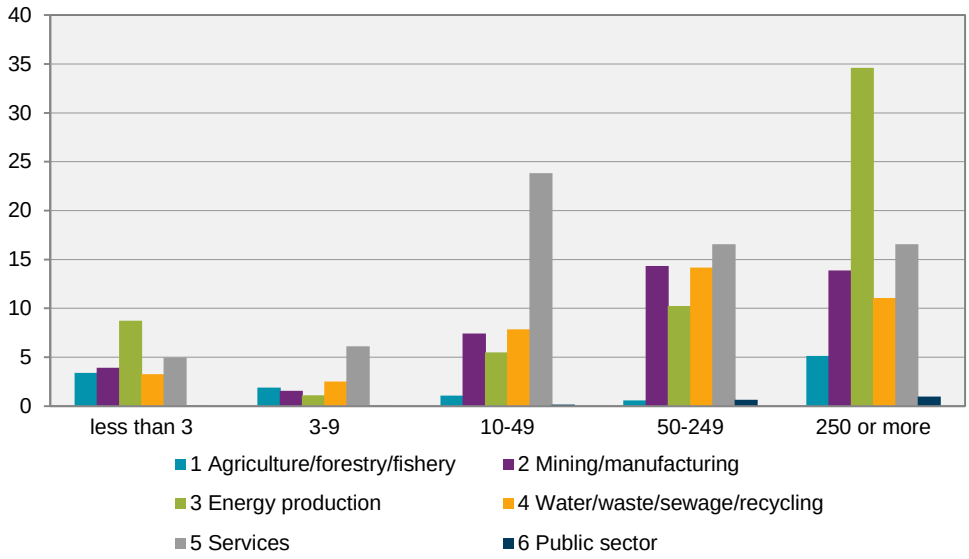


Figure 7 above shows that the group of enterprises with less than three employees in the environmental sector consists largely of agricultural and

service enterprises. Service enterprises are also prominent in the other groups. Operations in the public sector are few in number and almost exclusively belong to the largest categories of employees. One example is waste collection which is sometimes carried out directly by municipalities.

Figure 8 – turnover in the environmental sector broken down by size class of enterprise by number of employers and industry group, 2013, SEK billions



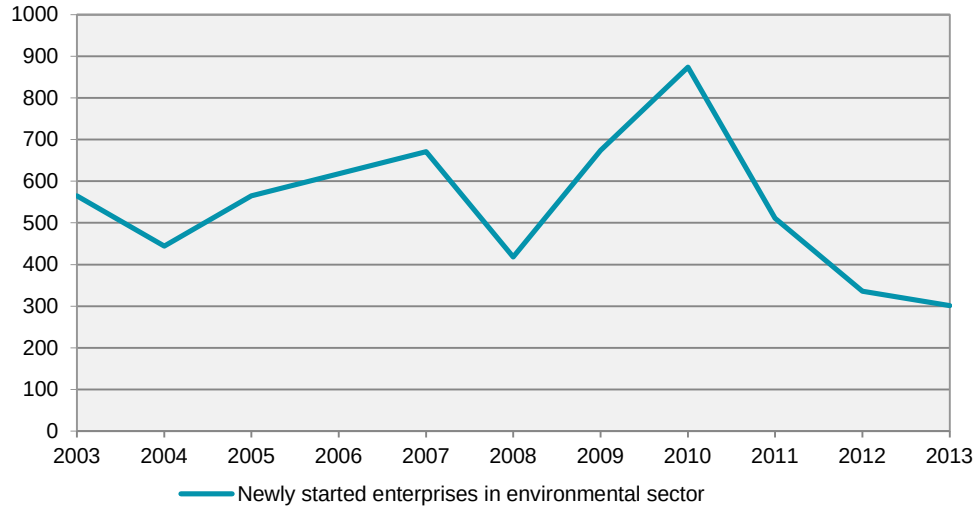
Turnover also varies between industries and size class of enterprises. The most prominent group's turnover from energy production is in the very large enterprises. Interestingly, it is also most prominent among the very small enterprises. The turnover in the service industries is significant for all size groups, especially among the medium-sized enterprises with 10 to 49 employees.

3.2 Newly-started enterprises in the environmental sector

One conclusion from the previous section is that large enterprises have considerable significance for statistics in the environmental sector, with regards to turnover as well as exports. Many of the large enterprises are well-established and have workplaces across the entire country. But what about the enterprises that have recently been started? Is there any new formation in the environmental sector, and if so, in which industries? What is the growth rate of these newly started enterprises and do they export anything? These are questions that can be answered by looking specifically at newly started enterprises in the environmental sector.

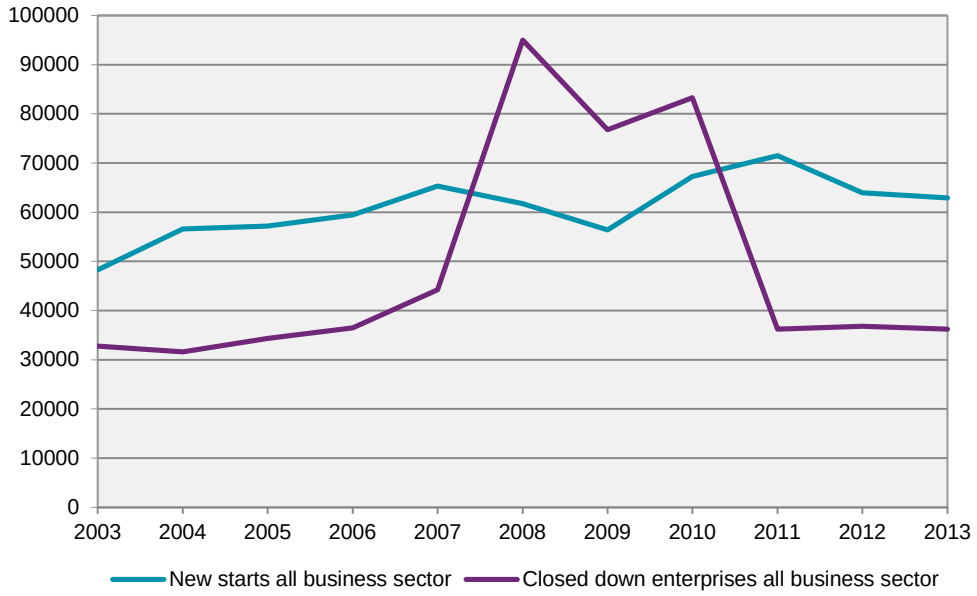
Each enterprise in the environmental sector has a starting date (and a date when it ceased operations, if applicable). These dates are available in Statistics Sweden's Business Register. In the following section, we have selected a subpopulation of the environmental sector that has a starting date during the period 2003 to 2013, the years for which Statistics Sweden has compiled the statistics on the environmental sector. This subpopulation may include spin-offs of already existing enterprises, which should be taken into consideration when interpreting the statistics.

Figure 9 – number of newly started enterprises in the environmental sector, 2003 to 2013



The figure shows that there are newly formed enterprises in the environmental sector that vary between 300 and 900 enterprises per year. There is no clearly rising or falling trend for the entire time period, but peaks and valleys appear for certain years in the time series. After 2010 the number of newly formed enterprises drops sharply and bottoms out in 2013. The top level in 2010 may partly be due to a technical reason in the register, because many enterprises were then reinstated in the business database that were previously assessed to be inactive. Roughly 30 000 enterprises were then reinstated into the business database which in total includes between one and two million enterprises.

Figure 10 – number of newly started enterprises as a whole, 2003 to 2013



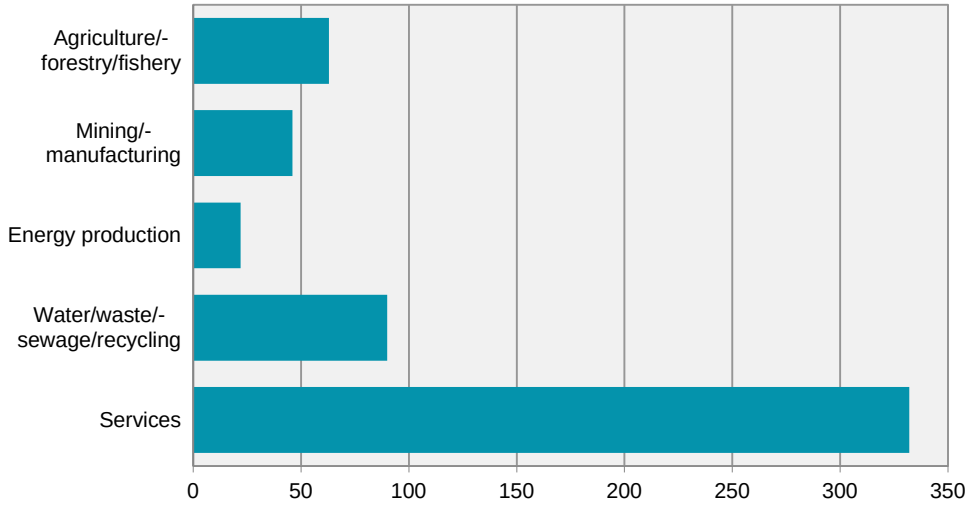
Source: Swedish Companies Registration Office

The number of newly started enterprises in the environmental sector can be compared with the total business section shown above in figure 10. About 63 000 enterprises were started in 2013. The fluctuations in the environmental sector appear to be sharper, especially in the final bottom level of 2013. In the entire business sector newly started enterprises fall back in 2012 and 2013, but not to the lowest level of the entire time period. The number of enterprises that closed down can also be analysed, and we see a clear break in the trend in 2008 to 2010 when a large number of enterprises closed down. At the peak, some 95 000 enterprises closed down in 2008, which is about 33 000 more than were started in the same year.

3.2.1 outcome for newly started enterprises in 2003

The long time series in the environmental sector offers the possibility to see how a certain group of enterprises develops over time. The figure below shows the newly started enterprises in the environmental sector in 2003.

Figure 11 – number of newly started enterprises in the environmental sector broken down by industrial group, 2003



In 2003, slightly more than 560 new enterprises were started in the environmental sector. The enterprises are broken down by industrial groups in figure 11 above. The largest group by far is the group of newly started enterprises in the service industries where over 300 new enterprises were formed. All the remaining groups are less than 100 enterprises each.

It is interesting to see what happens over the next 10 years to these some 560 enterprises that Statistics Sweden has compiled data on.

Figure 12 – number of active years for newly started enterprises in the environmental sector in 2003, broken down by industrial groups. *The bars show how many enterprises that were closed down each year.*

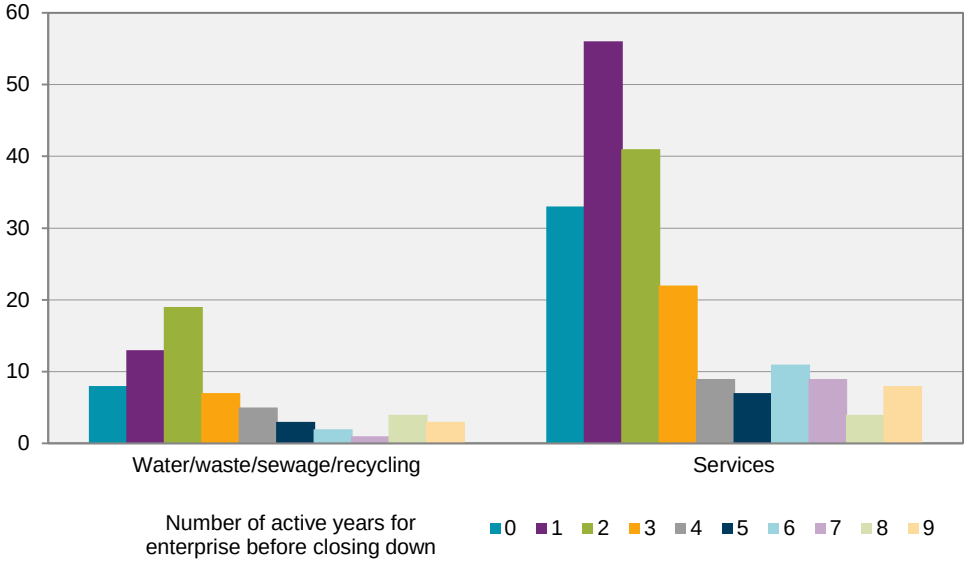


Figure 12 describes how long the companies that were started in 2003 were active, more specifically, in the two largest industrial groups. In figure 11, we saw that more than 300 new service enterprises were started in 2003. In this new figure we see that more than 30 of these service enterprises closed down before they had been active for one year, that is, roughly 10 percent. Before the enterprises have been active for two years, another 56 enterprises closed down and so forth.

It seems that many newly started enterprises closed down in three or four years in both of the industrial groups. When we look at the entire period, about 60 percent of all newly started service enterprises in the environmental sector have closed down within 10 years. The corresponding figure for the industrial group that includes water, refuse, sewage and recycling is 70 percent.

The above figure includes all types of closures of enterprises. It is not possible to see whether a bankruptcy or a fusion lies behind the closure. Unfortunately, the available registers on enterprises do not reveal the type of closure except for the current year, in this case 2014. However, information from 2014 shows that bankruptcy and liquidation are about three times more common reasons for closure than a fusion. Divisions and reconstructions are uncommon.

4 Environmentally related innovation in Sweden

The following chapter describes the statistics on innovation more closely. We will look at the existing survey on innovation activities and also an experimental section about links between the environmental sector and the patent register.

The latest survey on innovation activities in Swedish enterprises concerning the period 2010 to 2012 shows that 53 percent of enterprises in Sweden conducted some form of innovation activities. The results also show that it was most common with innovations within marketing, followed by product innovation (Statistics Sweden 2014).

The Community Innovation Survey illustrates innovation activities in Swedish enterprises with 10 employees or more. The survey is conducted every other year by Statistics Sweden and is based on a questionnaire that is sent out and filled in by the enterprises. The questionnaire is based on a joint EU questionnaire where the basic questions are the same for all the EU member states[5]. Among other things, data is collected about the types of innovations that enterprises have introduced over a three-year period, broken down by innovations for products, processes and organisations, as well as innovations within marketing.

Each survey round since 2009 includes a question module with temporary questions on a particular theme that varies from survey round to survey round. In one round special questions on environmental innovations have been answered by enterprises in Sweden and Europe. In the Community Innovation Survey 2014 (CIS2014) there will again be a theme area for the environment.

4.1 What is an innovation?

An innovation should be something that is useful or considerably improved that the enterprise is either the first to introduce on the market, or something that is introduced within the enterprise for the first time[6].

From a European perspective, environmental innovation is defined within the frame for the EU plan ”The Eco-innovation Action Plan” (EcoAP). This plan states that an environmental innovation is a form of innovation that results in or aims to significantly promote sustainable development by reducing the impact on the environment, increase resilience for an environmental impact or ensure more efficient and responsible use of natural resources[7].

Figure 13 shows a selection of European countries where environmental issues have a high degree of importance to product and process

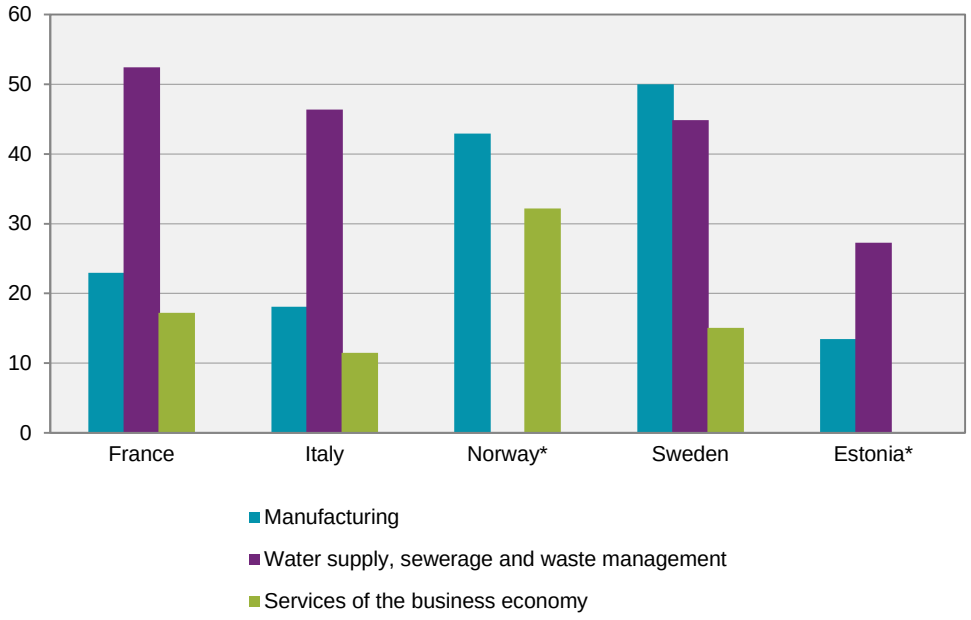
[5]It is then called the Community Innovation Survey (CIS)

[6]Oslo manual, chapter 3, section 146

[7] EC staff working paper, SEC(2011)1599 final. Impact assessment

innovations mainly in water distribution, sewerage and waste. Within the service industries, the significance in Italy is not as high as in Norway.

Figure 13 – enterprises where the environmental aspect has a high degree of significance for product and process innovations, industries for manufacturing, water distribution, sewerage and service enterprises, 2010, percentage of enterprises



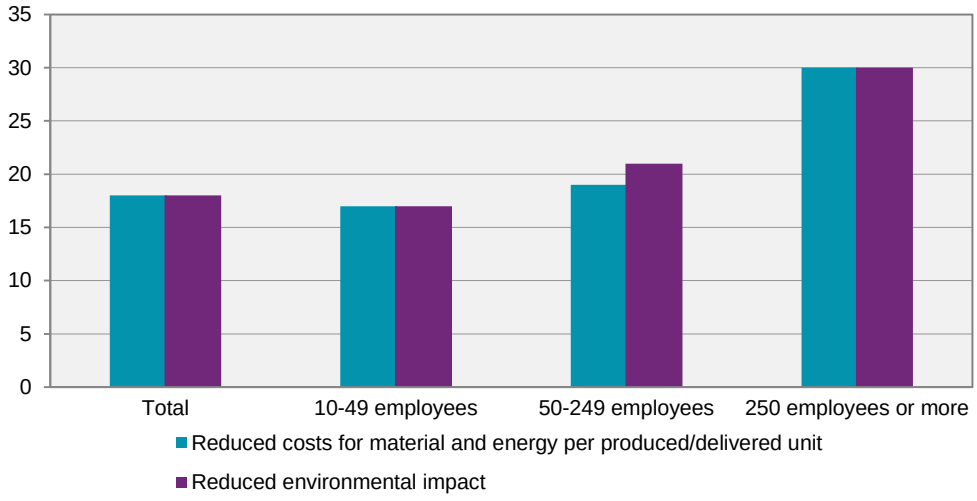
**No values for certain industries*

Source: Eurostat, Community Innovation Survey

4.2 Innovations and environmental technology

The development of environmental technology requires research and development and the ability to innovate. In Sweden, about 18 percent of enterprises claim that the environment and environmental resource conservation are highly important in their innovations (see figure 14).

Figure 14 – Purposes of the innovations introduced in 2008-2010, share of enterprises with innovation activity, high degree of importance (percentage)



Source: Statistics Sweden, Community Innovation Survey

But are those that actually conduct innovations more involved with environmental technology than other enterprises? And are those that conduct these innovations within the environmental area also environmental enterprises for the most part? The evaluation that has been done in this report shows that the largest share of enterprises that conduct innovations within the environment as their main purpose are not environmental enterprises. The total number of innovative enterprises within the environmental area shows that it is mainly the service industries that have the largest share of environmentally related innovations. The lowest share of environmentally related innovations occurs in the industry for the supply of drinking water.

Of the environmental enterprises that also conducted some form of environmentally related innovation (about 12% of all environmentally innovative enterprises), innovations mainly occurred with in waste management and recycling. The least environmentally innovative enterprises were among others the industries for mining and quarrying, food, textiles and manufacturing of furniture.

4.3 Few environmental enterprises conduct environmental innovations

In the 2008 – 2010 innovation survey the following question was asked: *What is the significance of the following purposes of your enterprise's operations to develop product innovations (goods or services) or process innovations during 2008 – 2010?* Two environmentally-related variables were among the answer alternatives:

- Reduced costs for material and energy per produced/delivered unit
- Reduced environmental impact

By linking the enterprises included in the sample of innovations with Statistics Sweden's register of environmental enterprises, the two statistical areas were connected. The results of the main information are presented in tables 2 and 3. Innovation activities of a total of 4 552 enterprises in the business sector were studied, and a total of 14 472 enterprises were found in the environmental sector between 2008 and 2010. The linkage resulted in a total of 497 enterprises that answered the innovation survey were also environmental enterprises, which is a share of 11 percent.

About 43 percent of the total number of innovative enterprises with the environment as their main purpose considered that the environment was important for their product or process innovations.

Among environmental enterprises that were involved in environmentally related innovations, the structure of these enterprises differed from enterprises in general. The largest share of environmentally innovative environmental enterprises was in the industry for waste management and recycling, while in total for Sweden there are environmentally innovative enterprises in the industry for other services and the financial sector.

4.3.1 Environmental enterprises that did not conduct innovations in the environmental area

If we look at the other side of the coin and view environmental enterprises that did not carry out any innovation 2008-2010 in the environmental area, it is again waste management and recycling that have the greatest proportion of non-environmental innovations. They conducted other types of innovations.

Table 4 – Innovations in the environmental area 2008 – 2010

NACE	Economic sector	Total number of innovative enterprises within the environmental area	Number of enterprises that have environmental innovations but are not environmental enterprises	Number of enterprises that have environmental innovations and are environmental enterprises	Environmental enterprises that did not have environmental innovations according to CIS
07-12	Mining and quarrying, Food and tobacco	95	91	4	4
13-15	Textiles and leather	43	39	4	..
16-19	Wood, pulp, paper, hard coal	156	142	14	15
20-21	Manufacture of chemicals and chemical products, basic pharmaceutical products and pharmaceutical preparations	91	84	7	4
22	Manufacture of rubber and plastic products	81	73	8	13
23	Manufacture of other non-metallic mineral products	58	54	4	6
24	Steel and metal works industry	54	41	13	14
25-27	Metal products, computers, electronics and electric devices	250	226	24	11
28	Manufacture of machinery and equipment n.e.c.	127	103	24	5
29-31	Motor vehicles, transport industry	156	149	7	..
32-33	Furniture, repair and installation of machinery and equipment	90	86	4	..
35	Electricity, gas and heating plants	56	25	31	46
36-37	Drinking water supply and sewage treatment	10	..	10	19
38-39	Waste management, materials recovery and remediation	37	..	37	52
46-53	Trade, land transport, storage	268	261	7	28
58-72	Other services, financial sector etc.	415	380	35	41
	Total number of enterprises	1 987	1 754	233	264

.. Values cannot be presented due to confidentiality

4.4 Does size matter?

In those cases where enterprises reported that the innovations they conducted were highly significant, the statistics show that it is mainly large enterprises that conducted the product or process innovations (Statistics Sweden 2012. See figure 14 above).

In this study, even enterprises that had low aims of environmental innovations are included. Of those enterprises that answered they had conducted an environmentally related innovation, most enterprises had over 250 employees. Enterprises with 50-249 employees came in second, and small enterprises were last.

However, there are considerable differences among different industries. In the industry for drinking water, sewage and waste, it is most common that large enterprises conduct environmental innovations. Meanwhile, it is most common for small enterprises to conduct environmental innovations in the industry for textiles and leather.

Table 5 – percentage of enterprises by size class (number of employees) 2010 with environmental innovations, entire CIS per total number of enterprises in Sweden

SNI (Swedish NACE)	Economic sector	20-49	50-249	250+
07-12	Mining and quarrying, Food and tobacco	10	17	46
13-15	Textiles and leather	38	58	38
16-21	Wood, pulp, paper, hard coal and chemicals	15	35	31
22	Manufacture of rubber and plastic products	16	39	19
23	Manufacture of other non-metallic mineral products	22	53	88
24-27	Steel, metal products, computers, electronics and electric devices	10	30	84
28	Manufacture of machinery and equipment n.e.c.	13	20	90
29-31	Motor vehicles, transport industry	26	33	87
32-33	Furniture, repair and installation of machinery and equipment	21	41	54
35	Electricity, gas and heating plants	15	31	63
36-39	Drinking water supply, sewage treatment, waste management and remediation activities	25	37	83
46-53	Trade, land transport, storage	3	7	27
58-72	Other services, financial sector etc.	8	19	75
	Total	8	20	61

4.5 The most common innovation among environmental enterprises is in the energy area

CIS2008 (survey period 2006 – 2008) covered 4 625 enterprises. 34 percent of these enterprises (1 578 enterprises) had some form of innovation that reduce their environmental impact. The environment was a special theme area in this survey and the questions were more detailed than in CIS2010.

The most common type of innovation within the environmental area dealt with reducing energy use per produced unit. The second most common type dealt with waste recycling, water or material. However, most of the enterprises noted that they conducted innovations in nearly all areas; 243 enterprises reported that they had only conducted one activity to reduce their environmental impact.

Out of the 4625 enterprises that answered the CIS2008, 446 enterprises were listed as environmental enterprises. Out of these 446 environmental enterprises, 200 enterprises had conducted one or more innovations connected to the environment.

Table 6 – Innovations in the environmental area 2006 – 2008

SNI (Swedish NACE)	Economic sector	Total number of innovative enterprises within the environmental area	Number of enterprises that have environmental innovations but are not environmental enterprises	Number of enterprises that have environmental innovations and are environmental enterprises	Environmental enterprises that did not have environmental innovations
07-12	Mining and quarrying, Food and tobacco	86	..	..	4
13-15	Textiles, leather	30	27	3	3
16-19	Wood, pulp, paper, hard coal	168	158	12	19
20-21	Manufacture of chemicals and chemical products, basic pharmaceutical products and pharmaceutical preparations	68	61	8	6
22	Manufacture of rubber and plastic products	80	74	6	11
23	Manufacture of other non-metallic mineral products	37	32	5	5
24	Steel and metal works industry	42	31	12	13
25-27	Metal products, computers, electronics and electric devices	198	184	17	11
28	Manufacture of machinery and equipment n.e.c.	106	87	21	9
29-31	Motor vehicles, transport industry	126	120	6	3
32-33	Furniture, repair and installation of machinery and equipment	60	56	5	7
35	Electricity, gas and heating plants	51	27	25	34
36-37	Drinking water supply and sewage treatment	9	0	9	16
38-39	Waste management, materials recovery and remediation	32	0	32	52
46-53	Trade, land transport, storage	232	222	11	21
58-72	Other services, financial sector etc.	253	233	26	32
	Total number of enterprises	1 578	1 396	200	246

.. Values cannot be presented due to confidentiality

4.6 Environmental sector and patent register

Another aspect of innovation operations deals with patents. The advantage of patents is that they are registered, and it is possible to use the register to create statistics, which even include patents from enterprises that have fewer than 10 employees. This is not possible in the innovation statistics.

The Swedish Patent and Registration Office has a register of Swedish patent applications that Statistics Sweden has access to. With the help of the register, the patent can be linked to organisations and thus even to other available statistics on Swedish enterprises. The following section is a pilot study to see how the matching between the environmental sector and the register with patent applications could appear. By doing so we can learn more about what kinds of information can be obtained.

Unfortunately, corporate registration numbers are not required to apply for a patent, so this information is not in the register. This hampers the work, since many of the statistics on business operations in Sweden are connected to the corporate registration number of the enterprise. Instead, we have attempted to link the address in the patent application to the addresses of enterprises in Statistics Sweden's Business Register, but this link is not as good as the corporate registration number, and information may get lost along the way.

The results have provided background data with Swedish patent applications from 2004 to 2012 that was used to produce figures and tables in the following section. These figures are examples of statistics that could be produced if the data source is further investigated.

The number of patent applications in the data source that Statistics Sweden has worked with has dropped during the time period; in 2004 there were 2 740 patents. 140 of these patent applications or about 5 percent were from enterprises in the environmental sector. In 2012 the number of patent applications dropped to 1 655, of which 80 were from the environmental sector, still roughly 5 percent of the total amount. To get an idea about the quality of the statistics, these figures can be compared with statistics provided by the Swedish Patent and Registration Office and granted patents.

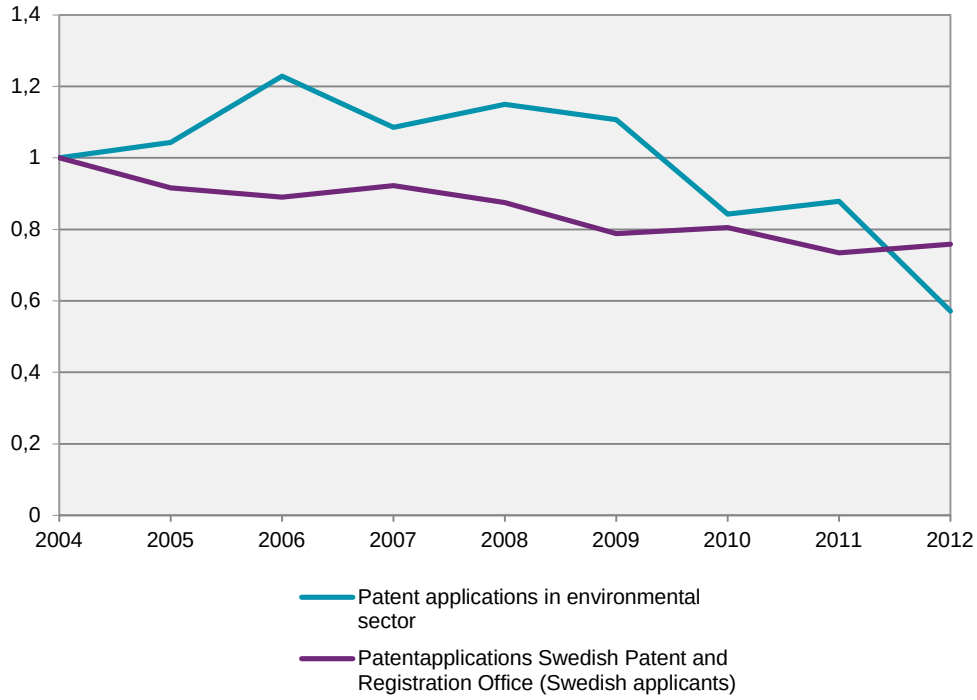
Table 7 - Results of matching of patent databases

	2004	2008	2012
Patent applications at Swedish Patent and Registration Office (Swedish applicants)	2 728	2 386	2 070
Patents granted at Swedish Patent and Registration Office (Swedish applicants)	2 485	1 087	855
Patents in the register after matching with addresses	2 740	2 458	1 655
Patents that matched with the environmental sector	140	161	80

Source: The Swedish Patent and Registration Office, annual statistics, patent applications and patents

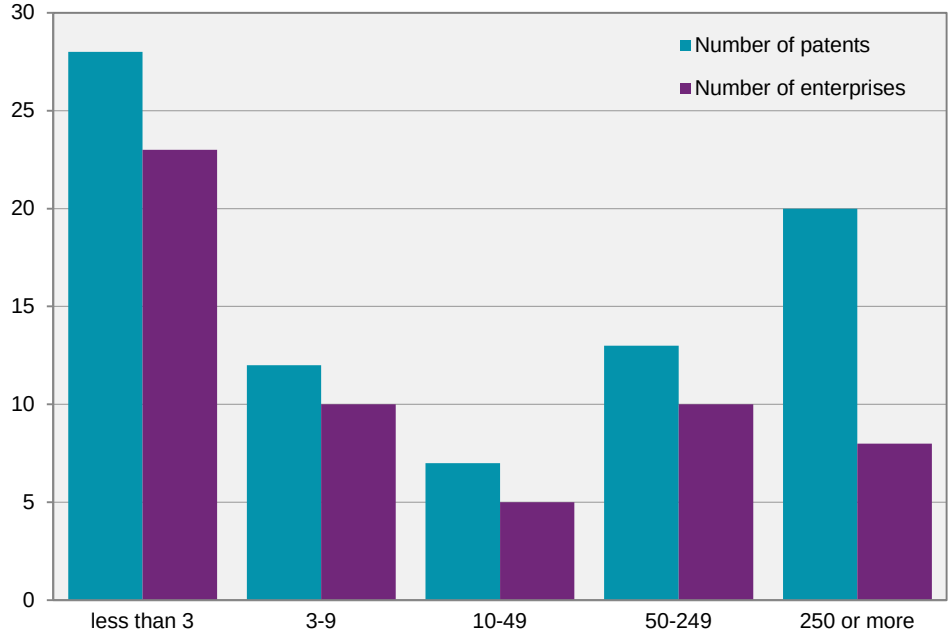
Table 7 above summarises the results from the matching and compares them with the statistics from the Swedish Patent and Registration Office. For 2004, the register that Statistics Sweden has used is at about the level with the patent applications in the statistics from the Swedish Patent and Registration Office. However, the level is higher for 2008 and then considerably lower for 2012. This means that the register match requires more investigation if it is to be used as a reliable data source.

Figure 15 – indexed time series on patent applications between 2004 – 2012



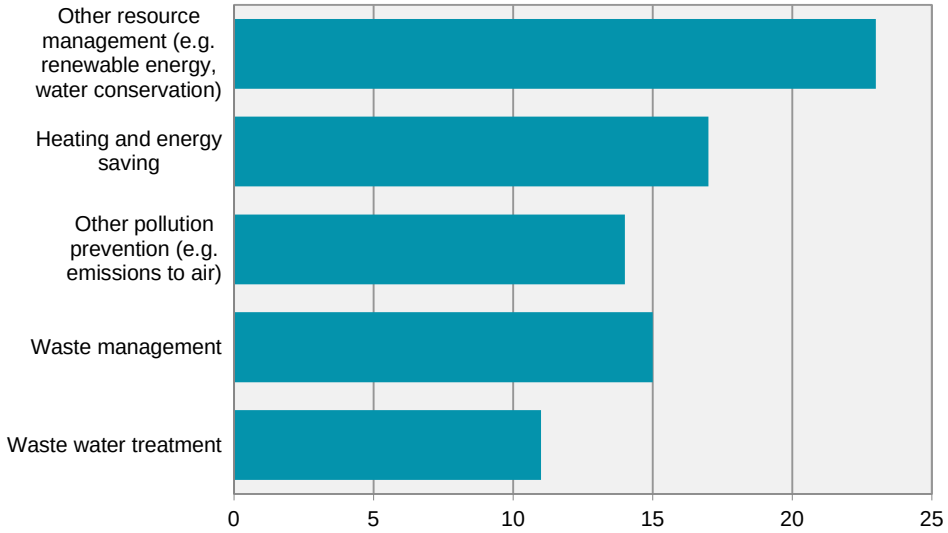
It would be interesting in this study to be able to give examples on the type of statistics that can be created if methods can be further developed. One example would be to see the development of patents in the environmental sector compared with all patents. This is shown in figure 15 above. Just as in the statistics from the Swedish Patent and Registration Office, the statistics seem to decrease over time.

Figure 16 – number of patent applications and number of enterprises that have received patents, in the environmental sector, broken down by size of enterprise, 2012



We can also examine the patent applications in the environmental sector based on the size of the enterprise to see whether it is only large enterprises that receive patents. Figure 16 above shows the patents broken down by size of enterprise for 2012. One of the bars in each size group shows the amount of patents, but a single enterprise can also apply for several patents. Therefore a bar is also shown for the number of companies that have applied for patents. The figure shows that the largest amount of patents is from the smallest enterprises. But even the group of enterprises with more than 250 employees is prominent, and that group also has the largest difference between the number of patents and the number of enterprises. This would mean that the largest enterprises are more likely to apply for more patents per enterprise.

Figure 17 – number of patents per environmental area, 2012



The patents can also be grouped by the operations of the enterprise according to the environmental areas that were used earlier in the report. The three largest categories are shown in figure 17 above: sewage treatment, waste management and heating/energy conservation. In several categories, the number of patents were so few that they are been aggregated to the two categories called other emissions handling and other resource handling that have some ten sub areas together.

Statistics Sweden has only begun to use the patent register as a potential source for statistics. In the future the analysis can be expanded to also include the categorising of each patent, that is, the area of technology of the patent. It would then be possible to connect the register with the patents that the OECD has pointed out as "green patents" [8] to be able to learn more about the enterprises that receive these types of patents. The Swedish Agency for Economic and Regional Growth has continued to add to the OECD's list of green patents in the report *Benchmarking green competitiveness* (2013). The report also takes up some of the problems with using patents as indicators for innovation strength. It mentions that in the end, few patents

[8] http://www.oecd.org/env/consumption-innovation/indicator.htm

are commercialised and therefore it is important to distinguish between inventions and innovation. Enterprises can also choose to change strategies rather than applying for patents, in order to protect their operations. Strict confidentiality within the enterprise is a strategy that can be more simple than applying for patents. The industries that receive patents are also not necessarily the end users of the innovation. One example is agriculture, where the innovations may come from the manufacturing of machinery rather than agriculture itself.

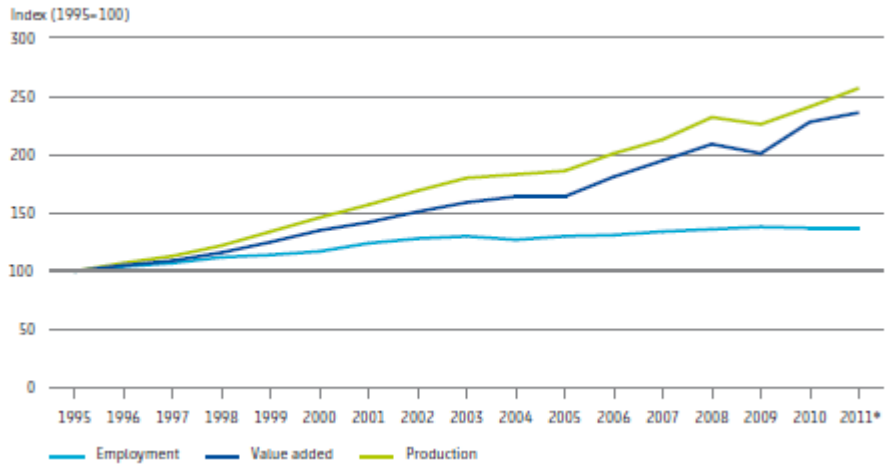
5 International overview

Since the late 1990s the statistics on the environmental sector that Statistics Sweden publishes annually have been developed within the framework of the OECD and Eurostat. The statistics are a part of the EU Ordinance on environmental accounts (EC 538/2014). The first occasion for reporting is 2017 for the reference year of 2015. Within a few years, the EU and EF TA countries will regularly produce statistics about the environmental sector, called Environmental Goods and Services Sector (EGSS). Even today statistics are being produced by a few countries, among others Sweden, the Netherlands, Germany, Latvia, Lithuania and Austria. Eurostat is publishing statistics via their website[9] and has even estimated statistics for the EU28 for the environmental sector.

5.1 The environmental sector and environmental technology enterprises in the Netherlands

The Netherlands have made a subpopulation of the environmental sector that only refers to Cleantech companies. The statistical office of the Netherlands was given an assignment from the industrial organisation Cleantech Netherlands to produce statistics about their members. As a result, there is information about the members of Cleantech companies in terms of turnover and the number of employees. However, the assignment was not made into a public report, so it was not possible to study the material in detail. Figure 18 below instead illustrates the development for the environmental sector in the Netherlands since 1995, where production and value added have steadily increased except for a few years of economic downturn. At the same time, employment has increased more slowly.

Figure 18 – development of the environmental sector in the Netherlands since 1995 (employment/value added/production)



Source: Figure 6.4.1 Environmental Accounts of the Netherlands, 2012, Statistics Netherlands[10]

[9] http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/environmental_goods_and_services_sector

[10] http://www.cbs.nl/NR/rdonlyres/090445AD-E1CB-4147-A404-0C36F02DF112/0/2013c174pub.pdf

5.2 The environmental sector and environmental technology in Canada

Statistics on the environmental sector are published in Canada and there is a growing interest in environmental technology.

In Canada the statistical office Statistics Canada and Natural Resources Canada[11] have tried to develop statistics on the environmental sector with a focus on environmental technology. Among other things, Natural Resources Canada has produced a classification around "cleantech" that is presented in Appendix 1. They focus considerably on renewable energy with elements of recycling and waste, transport technology and agriculture.

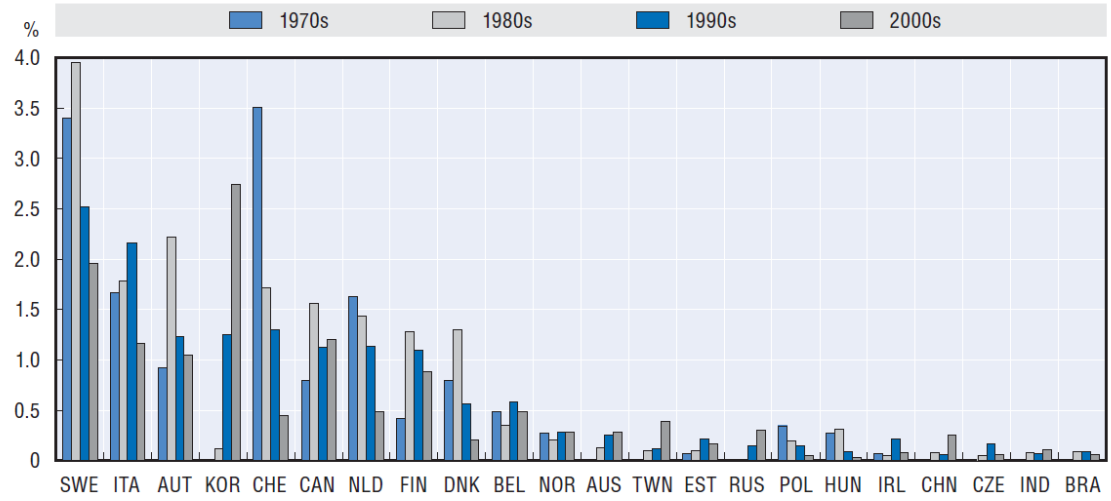
The evaluation in Canada has even presented the groupings of environmental technology of other organisations. Energy technology is prominent in all examples where agriculture, water technology and transport are included. The statistical office in Canada will continue to further develop the statistics dealing with the environmental sector.

5.3 Environmental sector and environmental technology in the OECD

The OECD works to promote environmental technology and environmental innovations via a new and improved policy.

Among other things, the OECD has recommended indicators that can measure innovations in the area of environmental technology. With regard to environmental technology, the OECD conducted an in-depth study about innovations and patents during 2011. The figure below shows that patent applications seem to have decreased since the 1980s and that Sweden is one of the countries that has applied for the most patents.

Figure 19 inspection and decrease of emissions to air technologies, share of world patents by country of applicant



Source: OECD, 2011

[11] http://www.statcan.gc.ca/, http://www.nrcan.gc.ca/home

5.4 The environmental sector and environmental technology in the UNEP

The environmental program of the UN (UNEP) works actively to promote "green industry" and has intensified its work within the frame of the initiative for green economics. The UNEP and the UN's industrial development organisation (UNIDO) have created a joint platform: *The Green Industry Platform* is a global network that aims to mobilise and simplify green industry around the world.

This network believes that it is possible to improve environmental performance of existing businesses and to create green industry. Examples are recycling, waste management and services within the environment and energy.

5.5 The environmental sector and environmental technology in the EU

As mentioned above, there is a European strategy to strengthen the spread of environmental technology within the framework for the Eco-Innovation Action Plan (EcoAP). It was adopted in 2011, replacing the 2004 Environmental Technology Action Plan (ETAP). The purpose of the strategy is to accelerate the ability of the market to accept new environmental technology, look for more in-depth change within environmental innovation and strengthen management and awareness within the EU and member states. The consequence analysis that was the basis for EcoAP discusses statistics about the environmental sector, among other things.

The European environmental office provides a website that links to studies conducted within Europe. However, the links are not updated, indicating that the work has not been given priority.

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http://www.vinnova.se/upload/EPiStorePDF/va_13_06.pdf

US cleantech group: http://www.cleantech.com/about/

Appendix 1 - Canada's evaluation of cleantech taxonomy

Canada's Suggested	US Cleantech Group	Kachan and co	Australian Cleantech	Analytica Advisors	CleanEnergy Portal	Ecotech
Agriculture	Agriculture	Agriculture		Agriculture		
Air, environment, remediation	Air&environment	Air&environment		Remediation and soil treatment	Clean Air Technologies	Air
smart grid	smart grid			energy infrastructure/smart grid	Energy Infrastructure	Water
Energy Efficiency	Energy Efficiency	Energy Efficiency	Energy Efficiency	Energy Efficiency		Energy Efficiency
Biofuels & Biomaterials	Biofuels & Biomaterials		Biofuels	Bio refinery products	Bio-energy Systems	
Wind	Wind		Wind			
Energy Storage	Energy Storage	Energy Storage	Energy Storage			
Solar	Solar		Solar			
Materials	Materials					
Transportation	Transportation	Transportation	Vehicle Technologies	Transportation	Transportation Technologies	Eco-Mobility
Water	Water	water	water	Water and waste water		Soil & Groundwater
Recycling & waste	Recycling & waste		waste management recycling	Recycling & Recovery		Waste
Wave, Tidal, Hydro			Wave, Tidal, Hydro			
Other	Other		Other			
		Clean industry		Industrial Processes and products	Industrial Energy Systems	
		Renewable energy generation			Renewable Technologies	Renewable energy
			Geothermal			
			Biogas generation			
			carbon trading			
			environmental service providers			
				Power Generation		
					Advanced Fuels	
					Clean Fossil Fuel Technologies	
					Community Energy Systems	
					Consulting and Engineering Services	
					Modelling	
					Residential and Commercial Building Systems	
						Green Chemistry

The environmental accounts comprise a system of information that has been developed to systematically describe the connection between the environment and the economy. Statistics on the environment and the economy provide a basis for cost calculations of environmental measures and environmental damage, analyses of environmental and economic policies as well as indicators of the state of the environment and sustainable development.

Report 2016:1 Creating statistics on environmental technology

The following publication is the final report of the government assignment to produce statistics for the Swedish environmental technology sector as well as to provide proposals for further development (N2013/2919/E). The assignment has been given by the Ministry of Enterprise and Innovation and has been conducted by Statistics Sweden.

The study is based on existing statistics and gives examples on how statistics can be further developed to better answer questions on environmental technology. Among other things, a new categorisation of the statistics can increase knowledge about the situation for newly-started enterprises in the environmental sector or provide information comparisons between small and large environmental enterprises.

The report also studies the possibility to extract information from innovation statistics and patent applications when they are combined with the environmental statistics.

Internationally, there are few examples of real statistics developed in the field of cleantech / environmental technology but the report examines the work done within international organisations as well as in Canada and the Netherlands.

Since 1998 Statistics Sweden has published a number of reports in the Environmental Accounts series. These reports are available here www.scb.se/MI1301

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