Eurostat Working Papers

2/2000/B/4 *7 April 2000*

Environment Industry and Employment in Portugal, 1997

Prepared for DG Environment and Eurostat by:
Nuno Romao
Instituto Nacional de Estatística do Portugal

eurostat

Working Paper No. 2/2000/B/4 **7 April 2000**

Environment Industry and Employment in Portugal, 1997

Prepared for DG Environment and Eurostat by:
Nuno Romao
Instituto Nacional de Estatística do Portugal

The views expressed in this document are the author's and do not necessarily reflect the opinion of the European Commission

Copyright: European Commission 2000

Preface

As part of work to develop environmental accounting and environmental statistics, Eurostat is currently looking at measuring environmental employment. The basic framework for the work was developed by Eurostat together with OECD's Directorate for Science, Technology and Industry and published as OECD/Eurostat 1999: The Environmental Goods and Services Industry – Manual for Data Collection and Analysis. Copies of this manual (in English or French) can be obtained from OECD sales points or from the OECD on-line book-shop at http://www.oecd.org/bookshop/.

This Working Paper presents the results of work on measuring the environment industry and environment-related employment by the Portuguese Statistical Office and is the second of a series of 4 Eurostat Working Papers released in 2000 presenting the outcomes of pilot exercises undertaken by Dutch, Portuguese, Swedish and French statistical agencies in 1999.

The pilot exercises benefited from financial support provided by the European Commission's Directorate General for the Environment.

The reports on the pilot exercises provide useful and recent information on environmental employment, thus directly responding to political demand for better information on employment opportunities generated by environmental protection.

The reports also describe the methods developed for estimating environmental employment based on existing statistics and other information and provide indications for improvement of the primary statistics needed for measuring environmental employment.

Whereas each of the pilot exercises used a specific approach, all pilot exercises taken together offer a very comprehensive and helpful exploration of statistical approaches towards measuring environmental employment. It is thus recommended to consult all pilot applications together with the OECD/Eurostat environment industry manual when designing systems to measure environmental employment based on existing information.

In this Working Paper the approach by the Portuguese Statistical Office is presented. The results of a specific survey of private specialised environmental business enterprises are presented. Results include turnover, investment, direct employment and exports of these enterprises. Supplementary data on environment-related expenditure by the public sector and by mainstream enterprises are also presented along with ways to further improve the specific survey, advance the methodology and broaden the scope of the analysis.

Eurostat distributes this report hoping that others wishing to undertake estimates of environmental employment can benefit from the Portuguese experience.

Inger Oehman
Head of Unit F3
Environment statistics

Brian Newson
Head of Unit B1
National accounts methodology
statistics of own resources

Contents

1. Introduction 1

2. Methodological summary 2

2.1. Principal concepts 2

2.2. Selecting statistical units for survey 3

3. Results 4

3.1. Core activities 5

3.1.1. Turnover, employment and investment 5

3.1.2. Disaggregation by subsections of the CAE Rev. 2 6

3.2. Other economic activities (non-core industry) 9

4. Conclusions and future work 10

4.1. Data collection process 10

4.2. Future data collection changes, and implications for other environmental statistics 11

4.3. List of producers of environmental goods and services 12

4.4. Factors transforming the environment industry in Portugal 12

4.5. Elements for an estimate of the environment industry 13

4.6. Demand-side estimate of the environment industry 14

5. Technical data 15

5.1. Response rate 15

5.2. Types of activity performed by enterprises classified in other economic activities 15

5.3. Nomenclatures used 16

6. Bibliography 17

Annex 1 – Specimen statistical survey of Eco-Enterprises 18

1. Introduction

Since the early 1990s the INE has been broadening the scope and subject range of environmental statistics, with the aim of meeting and accompanying the growing need for national and international data on the environment.

Accordingly, in mid-1997, it began a statistical project on enterprises engaged in commercial activity contributing to environmental protection. The survey took the form of an extension of an earlier survey entitled “Eco-Industries and Eco-Services in Portugal”, dating from the first quarter of 1997, aimed at obtaining a preliminary snapshot of this environmental question, and anticipating and guiding future statistical projects.

The aim of the project was to appraise the “Environmental industry”, which comprises the commercial production of goods and services aimed at measuring, preventing, limiting or making good damage to the environment, e.g. water, atmospheric and soil pollution, waste management, noise, and threats to ecosystems generally. The main descriptive variables used were turnover, investments, and employment by sex and educational qualifications. An estimate was also made of turnover by environmental domain.

Recycling activities (NACE Rev.1 Division 37), Wholesale trade in waste (NACE Rev. 1 Class 5157) and Cleaning, public hygiene and similar (NACE Rev. 1 Division 90) are easy to identify and define as economic activities in environmental protection. This concurs with the view of the various sources consulted. In the presentation of data, this set of industries was consequently held to represent the core economic activities of the environment industry, and distinct from the other groups of activities undertaken by enterprises engaged in environmental protection but whose activities cannot be regarded in their entirety as environmental protection.

With the objective stated above, the population of units surveyed corresponds to the concept of specialist producers set out in paragraph 2021 of the SERIEE Manual.

In addition to presenting the principal results of the statistical survey of enterprises, this report attempts a diagnosis of the elements which must be developed in order to better meet the recommendations of the OECD/Eurostat Manual on the Environment industry (Eurostat Doc. Eco-Ind/98/1). In that context available data are presented on public sector activities and expenditures related to ancillary (in-house) activities of enterprises.

2. Methodological summary

The principal concepts for environmental domains and definitions of an environmental protection activity were drawn from the SERIEE Manual – 1994 edition.

2.1. Principal concepts

Eco-enterprise	This is deemed to mean enterprises whose economic activity, i.e. production of or trade in goods, or provision of services, is an environmental protection activity. Conventionally, an enterprise is an eco-enterprise if 50% or more of its turnover results from activities associated with environmental protection.
Core activities of the environment industry	Producers classified in NACE Rev.1 division 37 (recycling), class 51.57 (wholesale trade in waste etc.) and division 90 (sewage, public hygiene etc.).
Non-core activities of the environment industry	Eco-enterprises (see above) not classified under core activities.
Manufacture of substitute products	This comprises the manufacture of connected or adapted products as defined in the SERIEE Manual. This is deemed to be the manufacture of products destined for use as inputs in other manufacturing activities or services, whether or not in environmental protection, e.g. biological products for septic tanks, unleaded gasoline, etc.
Manufacture of investment goods	This comprises the manufacture of investment goods generally for use over a prolonged period, representing tangible assets in the hands of other enterprises, public bodies, households, etc. The use of such equipment contributes to environmental protection.
Trade in investment goods and products	Trade in equipment and products, but not including any transformation of the items sold by the enterprise.
Studies, consultancy and training	Includes the activities associated with environmental impact studies, plus training in environmental protection issues, but does not include training activities in general.
Analyses and other types of activity	Comprises principally the activities associated with the analysis and monitoring of environmental pollutants in general, by means of estimates of air, water etc. quality or pollution levels. Also includes activities arising from the collection or processing of urban and waste, waste water, and other activities not specified or provided for above.
Annual average number of employees	$\frac{\text{Total number of employees in the enterprise at the last day of each month}}{\text{Number of months the enterprise has been in business}}$
Persons principally occupied in environmental tasks	Comprises the individuals who spend at least 50% of their annual working time on environmental management and protection activities.
Persons occasionally or incidentally occupied in environmental tasks	Comprises the individuals who spend less than 50% of their annual working time on environmental management and protection activities.
Characteristic activities	Activities whose aim is to protect or restore the environment from damage caused by human activities.
Specialist characteristic producers	Producers whose principal activity comprises one or more characteristic activities.

2.2. Selection of statistical units for survey

The principal methodological aspects requiring comment relate to the universe of enterprises considered for the survey. The register was drawn from the INE's *Ficheiro Geral de Unidades Estatísticas* (General Register of Statistical Units), with additional data derived from the membership list of the Portuguese Environmental Technology Industry Association and from consultation of various business publications and directories of enterprises active in environmental protection.

Given the definition of "Eco-enterprise", enterprises were considered for the survey if classified in NACE Rev.1 division 37 (recycling), Class 51.57 (wholesale trade in waste etc.) and division 90 (public hygiene etc.), these being the core activities of the environment industry. Also included were enterprises with other economic activities falling within the definition of the environment industry. Section 5.2 of the technical description gives a short description of the activities justifying these enterprises' inclusion in the universe of enterprises to be surveyed.

Given that financial data were also required by the Harmonised Business Survey (1997), and with a view to lightening the burden of response on businesses, financial data were requested only from enterprises not surveyed for the Harmonised Business Survey.

Data on public sector activities and expenditure as well as on in-house (ancillary) activities and expenditure are presented in section 4.5. Such data is based, respectively, on administrative sources and other surveys performed by the INE, Environment Statistics Unit.

3. Results

The results presented below are those of the survey for reference year 1997. The survey questionnaire is reproduced as Annex 1 to this report.

Table 1 breaks down the volume of turnover by environmental domain, according to the nature of the activity pursued. Waste management, associated with recycling and trade in waste (Division 37 and Class 51.57 of the CAE Rev.2 respectively) stands out, as does protection of water resources, which is closely connected with waste water treatment (Subclass 90001 of CAE Rev.2). These two domains account for around 90% of the total turnover generated by the enterprises surveyed. Item 10 estimates turnover in secondary activities unrelated to environmental protection.

Table 1: Volume of turnover by environmental domain

Year: 1997 Unit: 10^3 PTE

Environmental domain	Manufacture of equipment	Trade in products and equipment	Studies, consultancy and training	Analyses, recycling and other activities	Total
1. Atmospheric and climate quality	123 775	323 278	170 431	105 468	722 951
2. Water resource protection	193 483	5 059 949	1 956 475	2 710 448	9 920 355
3. Waste management	595 170	1 886 918	584 797	45 681 067	48 747 953
4. Soil and underground water protection	81 157	234 367	203 114	104 801	623 438
5. Noise and vibration abatement	0	14 502	149 390	6 569	170 461
6. Landscape and biodiversity protection	0	0	265 337	9 548	274 884
7. Radiation	0	0	5 487	0	5 487
8. R&D	632	0	18 737	103 136	122 506
9. Other environmental protection activities	39 376	473 737	1 134 981	1 375 721	3 023 814
Subtotal	**1 033 593**	**7 992 751**	**4 488 749**	**50 096 758**	**63 611 849**
10. Other activities unrelated to environmental protection					2 661 706
Total					**66 273 555**

Figure 1: Volume of turnover by market

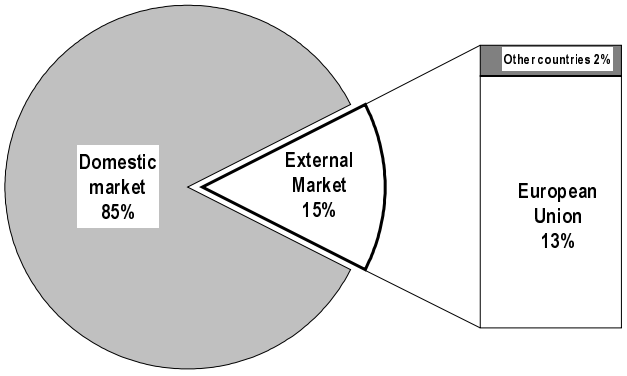


Figure 1 shows the distribution of turnover recorded by markets. It should be noted that in the total volume of business with the European Union, totalling PTE 8.5 bn, around 88% is accounted for by two activities: recycling of metals (39%) and wholesale trade in waste (49%)

3.1. Core activities

The following table sets out global results by core activity. The figures in section 3.1.2 set out data on the same activities in a more disaggregated form.

Table 2: Principal variables of core activities

Year: 1997

Characteristics	Recycling (CAE Rev.2 Div. 37)	Wholesale of waste and scrap (CAE Rev.2 Class 5157)	Sewage and refuse disposal, sanitation and similar activities (CAE Rev.2 – Div. 90)
Number of enterprises	50	135	61
			Unit: 10^3 PTE
Volume of turnover	16 545 110	20 777 371	16 489 152
Domestic market	12 772 217	16 377 104	16 091 508
External market	3 772 893	4 400 267	397 644
European Union	3 764 007	4 224 439	353 556
Increase in tangible fixed assets	1 847 459	1 025 453	7 285 267
Personnel costs	1 541 426	1 300 561	4 103 337
			Unit: Annual average number of employees
Number of employees mainly occupied with environmental tasks	608	794	1 478
Men	463	629	1 197
Women	145	165	281
Educational level			
Basic (9 years) schooling or less	485	684	1 062
Secondary	79	85	216
Higher	44	25	200
Employees occasionally or not mainly occupied with environmental tasks	73	23	21

3.1.1. Turnover, employment and investment

Wholesale trade in waste (NACE Rev.1 51.57) is revealed as the activity generating the greatest turnover, approximately one-third of the total. On the other hand, looked at from the point of view of average turnover per enterprise, it is the sector with the lowest value, PTE 153.9 million per enterprise, in contrast to recycling, which has a value of PTE 330.9 million per enterprise.

As far as the industry's employees are concerned, it can be seen that the core activities of the environment industry are predominantly men's work. In no sector does the number of women employees exceed 24%, with recycling recording the highest percentage. Cleaning, public hygiene and similar activities (NACE Rev.1 90.00) is the sector with the greatest employment, totalling 1478 persons employed. Taking the simple arithmetic mean of numbers of employees per enterprise, this sector leads with 24.2 employees, followed by recycling with 12.1. The trade in waste and scrap is some way behind, with 5.8 average employees per enterprise. But this sector characteristically comprises mainly micro-enterprises: around 65% of all enterprises have five or fewer employees and just 25 enterprises (18% of the waste and scrap sector) account for more than 50% of total employment in the sector.

In terms of investment, the cleaning and public hygiene sector shows the greatest absolute value, at PTE 7.2 bn. Since the mid 1990's there is a tendency to transfer these units from local government services to the private sector. Accordingly, in interpreting and evaluating the future evolution of this sector, account will need to be taken of this public administration strategy, which is resulting in an apparent growth right across the private sector. Previously, water treatment plant and urban waste collection were managed and

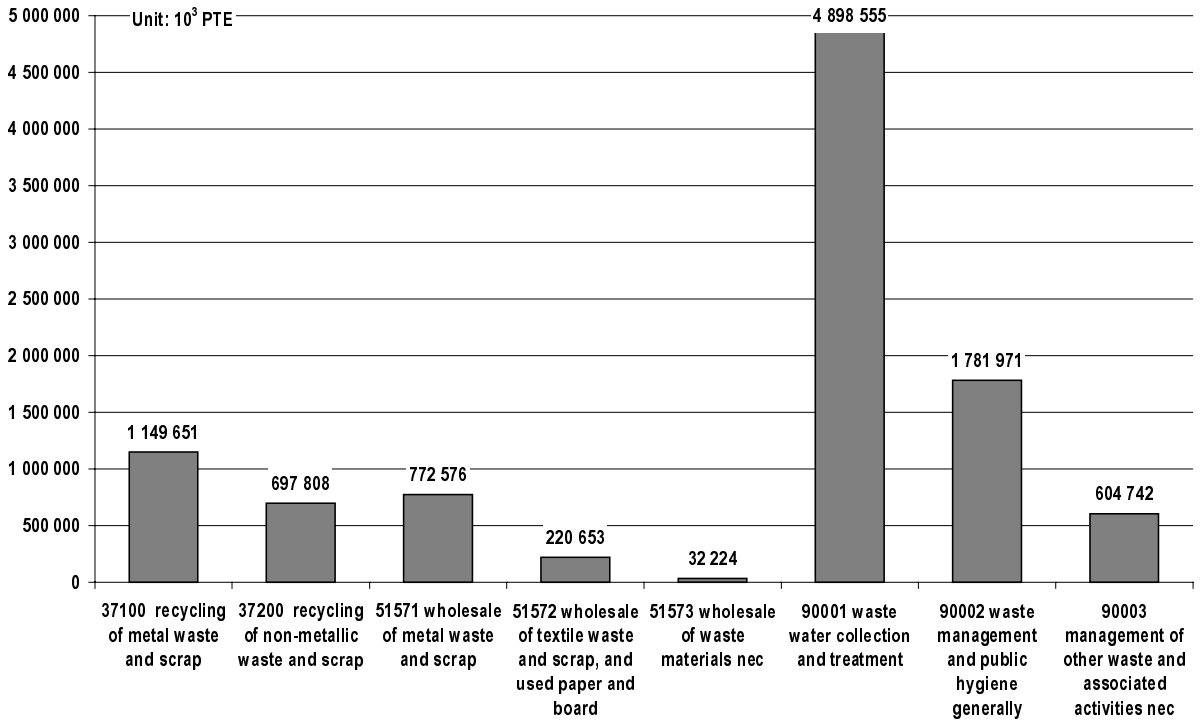
run by municipalities at strictly local level. In late 1993, Decree-Law 372/93 (*Diário da República* No 254 Series I-A) rewrote the rules of this sector, allowing private capital into the provision of waste-water treatment and urban waste collection and processing, by means of the granting of licences.

Greater independence can now be seen in the organisation and running of these public utilities, and we are witnessing the constitution of private-sector companies, although there is still public money in their capital. This transformation has been accompanied by a strategy of integrated and broad-based renewal at regional level, with the participation of numerous municipalities in the capital of these enterprises. We are thus witnessing the switching of resources previously affected to municipal services towards these new enterprises.

3.1.2. Disaggregation by subsections of the CAE Rev. 2

Figures 2, 3 and 4 show the principle variables expressed, in absolute terms, for each economic sector, at the greatest level of disaggregation (fifth digit of the CAE Rev. 2).

Figure 2: Core activities Investment broken down by CAE Rev. 2 sub-classes (1997)



It can be seen that the waste water collection and treatment sector alone accounts for around 50% of all core activity investments recorded in 1997. In addition to the causes mentioned above, this seems to be attributable to the fact that the sector's need for the installation of costly infrastructure, e.g. water-treatment stations. Next comes the sector of waste management and public hygiene generally, with, as its main investments, equipment and containers for selective waste collection, refuse freighters, and installations for the elimination, treatment, transfer and sorting of waste.

For turnover, more than 50% of all core activity business is realised in the wholesaling and recycling of metal waste and scrap, with 32% and 22% respectively.

For employment, the waste management and public hygiene sector is the most labour-intensive, with an average 31 employees per enterprise, accounting for around 30% of all employment in core industries.

Figure 3: Core activities Turnover broken down by CAE Rev. 2 sub-classes (1997)

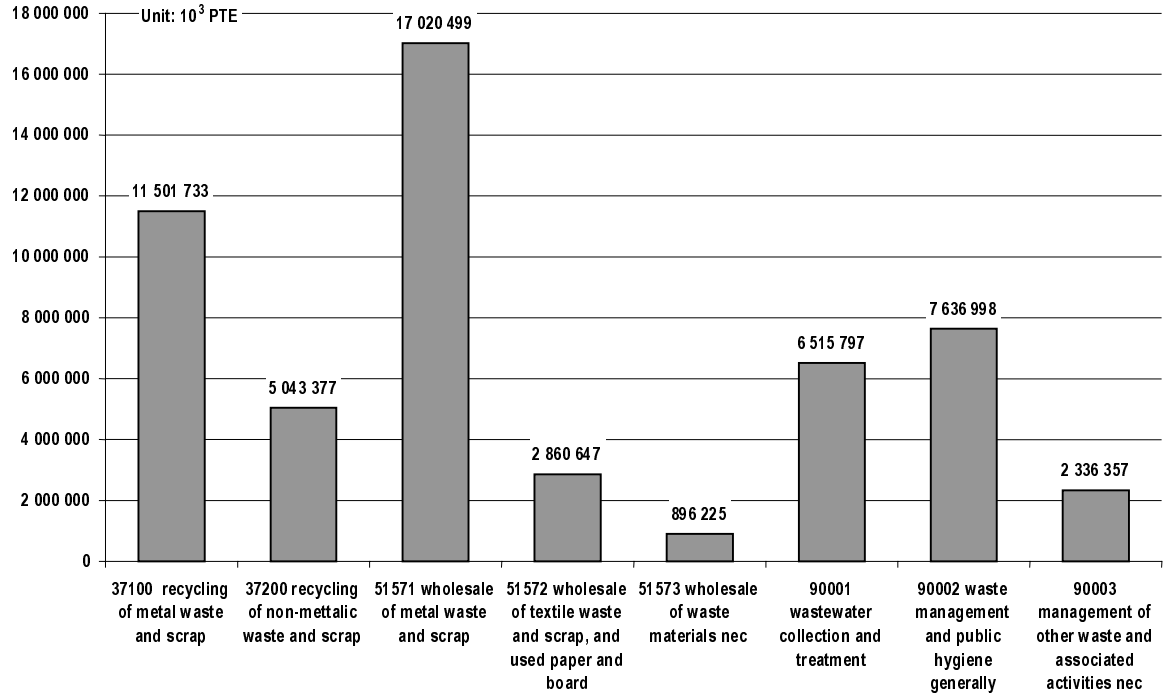


Figure 4: Core activities Employment broken down by CAE Rev. 2 sub-classes (1997)

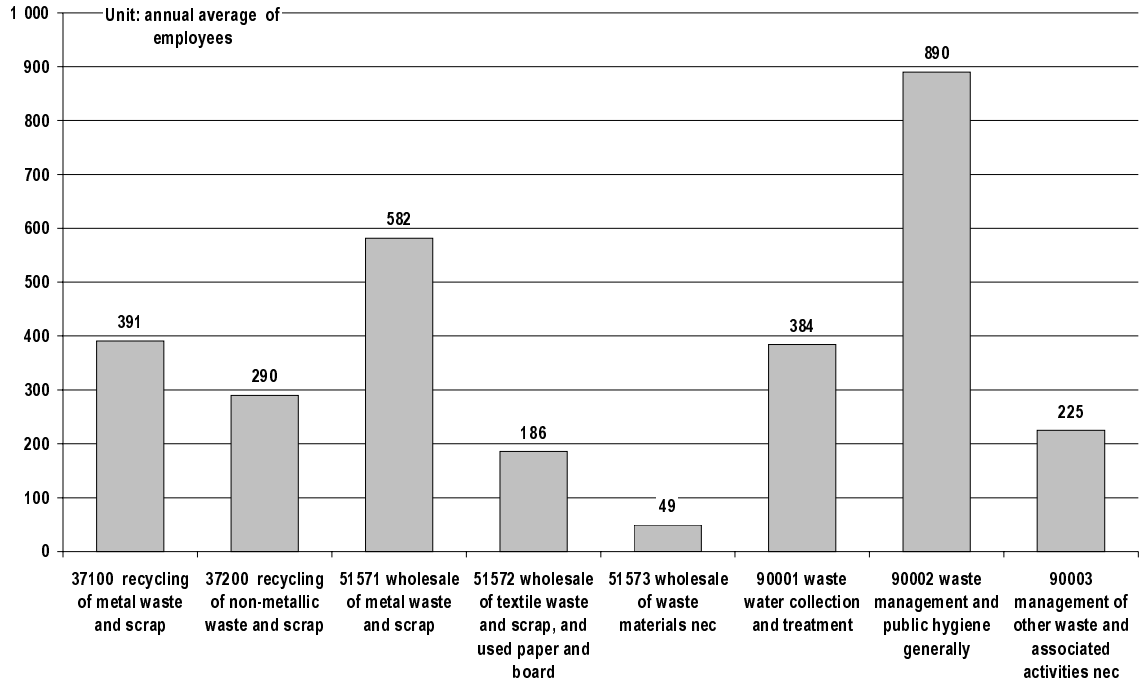
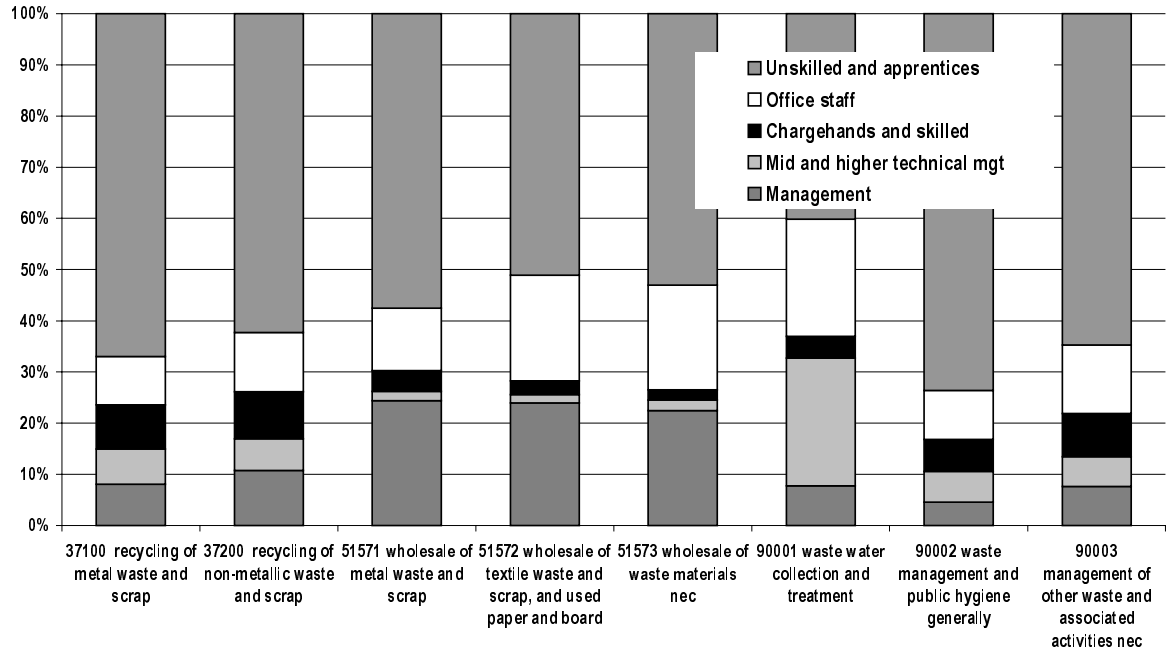


Figure 5: Core activities employees distribution, according to functional groups and broken down by CAE Rev. 2 sub-classes (1997)



The figure above shows the structure of employment considering functional groups for each economic activity. There are no great differences between the activities, which all employ a very high proportion of unskilled labour. Two results are noteworthy. The sub-classes of 51.57 (wholesale of waste and scrap) show a significantly higher proportion of management staff. This results from the fact that this industry comprises a large number of small enterprises, in which the business manager accumulates numerous other functions and in some cases may indeed by the firm's only employee. Second, it may be noted that the enterprises in the subclass of wastewater collection and treatment (90001) have the highest percentage of middle-ranking and higher technical staff (25%). At the other end of the scale, the wholesale trade has the lowest percentage of such staff, never exceeding 2%. The wholesale trade in waste and scrap barely represents 3% of all mid and high ranking technical staff in the entire environment industry.

3.2. Other economic activities (non-core industry)

Table 3: Principal variables of other economic activities (non-core industry)

Year: 1997

Characteristics	Renewable sources of energy	Activities in architecture, engineering etc.	Miscellaneous activities
Number of enterprises	9	17	39
			Unit: 10^3 PTE
Turnover	971 047	3 122 166	5 707 003
Domestic market	969 234	2 918 021	4 865 519
External market	1 813	204 145	841 484
European Union	1 813	186 983	29 020
Increase in tangible fixed assets	551 300	197 402	800 690
Personnel costs	153 173	1 060 694	868 238
			Unit: Annual average employees
Number of employees mainly employed in environmental tasks	19	182	326
Men	16	97	241
Women	3	85	85
Educational level			
Basic (9 years) schooling or less	0	6	108
Secondary	3	48	91
Higher	16	128	127
Employees occasionally or not mainly employed in environmental tasks	3	85	18

The 'renewable sources of energy' group comprises one unit working in biogas, seven in wind power and one in geothermal energy. Since some of the units in this group are automatic, the enterprises contract out installation, maintenance and operation work, which raises some difficulties in identifying the human resources "serving" the enterprise. Alongside this question, and from the economic point of view, there is the problem of double counting since these workers are in practice already working for and included in other sectors.

Compared with the sectors considered in Section 3.1, it can be seen that all enterprises in these branches of the environment industries employ people with a higher level of education, in both relative and absolute terms. In renewable sources of energy, around 84% of those mainly employed on environmental duties have university training. In the sector 'architecture, engineering and related technical consultancy' (CAE Rev. 2 – Class 74.20), 70% of staff have university training.

The "miscellaneous" group of activities (Column 3 of Table 3) comprises enterprises from various economic sectors whose activities, falling within the environment industry, are described briefly in Section 5.2 of this report.

As regards turnover, the entire "non-core industry" generates only 15% of the total PTE 63.6 bn. It represents 13% and 17% respectively of increases in tangible fixed assets and staff costs, out of totals of PTE 11.7 bn and 9.0 bn respectively. Worth noting, on the other hand, is the number of university-trained employees: these enterprises account for around 50% of total graduate employment.

In view of the sectoral dispersion of the 'Other economic activities', little purpose is served by giving a more detailed breakdown.

4. Conclusions and future work

4.1. Data collection procedure

The Environment Industry Manual, which became available in late 1998, disclosed the need for a profound reform of the Portuguese approach to bring it into line with the need for data compiled to international standards. The essential problem which Portugal needed to solve was, however, broadening the scope of the survey to include enterprises with secondary activities falling within the environment industry, and to adopt a classification matching that of the industry's products and services (A. Pollution management; B. Cleaner technologies; C. Resource management).

Generally speaking enterprises had no great objection to the questionnaire, or difficulties completing it. Since the list of enterprises producing environmental goods and services in Portugal is fairly short (fewer than 600 in all), we see no urgent need to exploit other sources of data as an alternative to a custom-built statistical operation. This option would be made all the easier if the questionnaire were restricted to strictly necessary questions, making for a significantly lighter burden of response on enterprises.

The collection of data on the Environment industry has implications for other thematic statistics operations already conducted by the INE, specifically the Harmonised Business Survey (HBS), which covers financial data, and the Annual Survey of Industrial Output which covers production levels and product types.

Although using data from the HBS would reduce the burden on enterprises and the duplication of efforts by the INE in collecting financial data, it would be a lengthy process. The HBS is a large-scale survey managed by a number of departments, with consequent co-ordination problems in obtaining data on the environment industry more rapidly. A database that recently became available on-line offers access to all the data drawn from this survey, at enterprise level. However, the data become available only after the time taken for validation and input. From this point of view, the reduction in the data to be collected from eco-enterprises will also allow enhanced information sharing between environmental data and the HBS during the validation phase of the latter.

Certain data collected were superfluous vis-à-vis the objectives set out in the Environment Industry Manual; we feel that if the survey questionnaire is to be revised, the data collected should be limited to those strictly necessary (turnover, employment; investment; exports and R&D). Similarly, sector-specific data collection annexes should be designed, particularly as regards collection of data on physical variables (type of products or services provided).

Re-use of data from the Annual Survey of Industrial Output is unsatisfactory from two points of view. First, the survey's cover is methodologically and structurally deficient as regards the environment industries generally, since recycling (NACE Rev.1 – Div. 37), is the only sector common to both. In addition this survey does not discriminate between the types of material recycled other than between metals and non-metals, on account of the division into groups within the NACE Rev. 1 – Groups 371 and 372. Here it is important that the PRODCOM includes codes allowing the product to be differentiated according to the type of material recycled: metals, plastics, glass, wood, paper and board, etc. This is important as a source of data for other environmental statistical action, e.g. materials flows accounts.

If the environment industry is to be assessed more accurately, international trade statistics must also be used to identify imported and exported products whose final use is environmental protection. This aspect has not yet been sufficiently investigated: since records relate only to the external trade of the selected enterprises, and then only to their exports. For this import/export aspect, it seems essential to refer to other statistical activities and data sources; specifically external trade statistics, in order to obtain a more comprehensive view of the environment industry. As stated in the Environment Industry Manual, it is possible to identify products usable for environmental protection through the Combined Nomenclature. However, the general run of these products is not designed specifically for use in environmental protection, and can be used for ends outside the environmental sphere. For this reason it would be worthwhile identifying firms which import such products and surveying them to establish the final use of such products and equipment. This could well prove a fairly complex and time-consuming task, and a preliminary but detailed study would thus be necessary. In addition, an approach to this question seems

to require a balance and reconciliation between estimates of the demand and supply sides of the market for environmental protection goods and services. And on the supply side, there is the problem of whether or not the enterprises manufacturing these goods for export are able to specify whether they are destined for environmental protection.

4.2. Future data collection changes and implications for other environmental statistics

The INE began collecting data on what is now known as the "environment industry" as long ago as the early 1990s. This included the collection of data from municipal authorities on water treatment and urban refuse collection. The INE's statistical surveys were conducted from an institutional view of the units surveyed, irrespective of the activities pursued. One reason for this is that in the early 1990s, activities of this type were the task of departments forming an integral part of the local authorities.

When the environment industry survey was being prepared, it was not thought appropriate to reconsider the process by which data were collected from municipalities, since a survey was already under way to collect data including the environment industry component.

At the time of writing, and largely as a result of a new accounting plan to be adopted by local authorities, the conditions seem right to reformulate, co-ordinate and integrate the data from sources which differ widely in both legal and institutional terms. The following table sets out the leading indicators available from the survey of municipalities within the scope of the environment industry.

Table 4 : Principal results of "environment industry" activities of local authority departments

Year: 1997 Unit: 10^3 PTE

Principal variables	Sewerage	Waste water treatment	Solid waste collection and transport	Waste storage and processing infrastructure	Selective waste collection	Collection, storage and processing of industrial waste
Revenue						
local taxes	14 333 007	491 213	2 626 654	124 795	3 036	157 825
Sale of goods and services	3 521 343	2 000 487	2 267 004	60 224	169 446	114 138
Expenditure						
Acquisition of goods and services	2 157 034	2 747 031	6 389 309	1 324 830	53 352	144 960
Payroll	3 796 437	2 087525	20 279 079	951 457	1 370 631	111 172
Investments	16 381 344	14 779 578	3 805 716	3 189 800	357 149	15 482

In recent years, many municipalities have transferred responsibility for these activities (wastewater treatment, collection of urban waste) to private enterprises with public capital, operating under licence.

Table 5: Enterprises which have recently[(a)] taken over activities previously provided by municipalities

	Number of enterprises	**Number of municipalities served**	**Geographical cover**	
			Area [(b)]	**Population [(b)]**
Waste water treatment	2	14	1 954 Km^2	1 134 810.
			2,2%	12,0%
Urban waste disposal	9	85	19 336 Km^2	4 627 516.
			21,7%	48,9%

(a) Between 1995 and 1998.

(b) Percentages are of total territory and population of mainland Portugal.

The table above shows details of the recently established enterprises which, whilst their equity includes public money, are now replacing municipal departments in wastewater treatment and urban solid waste management. The significant change is the separation of these activities into distinct and independent units. Previously, water supply, water treatment and waste disposal were in most cases the responsibility of a single municipal department.

Data on the environment industry form a substantial component of SERIEE statistics, in view of the significant legal and institutional situation occupied by the industry's players. SERIEE cannot be ignored as a methodology, since its results are intended to supply this component of environmental statistics. Ignoring the legal and institutional distinctions could well skew the results, reducing comparability with other countries. SERIEE provides a basis for making good any defects in the collection of data on the environment industries.

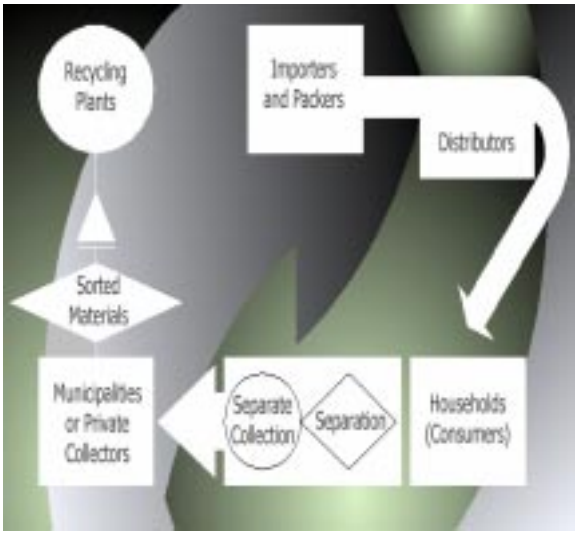
4.3. List of producers of environmental goods and services

Irrespective of the decisions to be taken regarding the collection of data on the environment industry (industry-specific survey or combination of data from alternative sources), it is important that a data base is constructed and maintained on the producers of environmental goods and services. In Portugal, the exploitation of data sources through pairing of data from different sources has proved difficult on account of the constitutional prohibition on allocating a single identification key to businesses registered in official records for administrative purposes. This means there will be problems pairing data from data sources outside the INE. On the other hand, most exploitable alternative sources result from various statistics developed by the INE.

4.4. Factors for change in the Portuguese environment industry

The incorporation and start-up of activity of Sociedade Ponto Verde[1] (SPV – 'Green Point Consortium') in late 1998 will help transform the environment industry in Portugal, as well as expanding it, particularly as regards selective collection and recycling. SPV is the result of legislation that places on packagers, importers and distributors the final responsibility for the packaging they place on the market. These groups have set up SPV and transferred their responsibility to the "company", and it is SPV which runs SIGRE, the Sistema de Gestão de Resíduos de Embalagem (System for Management of Packaging Waste) nation-wide.

Figure 6: Circuit of relations between players involved in the functioning of SPV



Packers and importers: place packaging on the market, ensure management and final disposal of waste, after consumption, transfer that responsibility to the SPV. Finance the system via financial contributions to SPV, calculated on the basis of quantities of packaging placed on the market.

Distributors: may not place non-recyclable packaging on the market unless it is covered by the system. Also finance the system.

Consumers: external to the financial circuit, but the system relies on their willingness to start the selective collection process by placing packaging in the appropriate containers.

Municipalities and private collectors: selective collection of material; receive financial counterparts for the quantities of material brought for recycling and re-use.

Recycling plants: enterprises performing the recycling of selectively collected or sorted packaging waste, grouped by material types (glass, metal, paper and board, plastic, wood, etc.)

[1] Non-profit and non-government organisation.

Packers, importers and distributors channel financial contributions to SPV, which are calculated on the basis of the weight and type of material used in the packaging they place on the market. SPV for its part uses these financial "contributions" to buy back selectively collected or sorted packaging waste and ensure that it is recycled or otherwise recovered. It also finances awareness-raising campaigns for selective collection and supports measures to help local authorities and enterprises working in the collection of solid urban waste to develop selective collection systems.

The emergence of SPV will clearly lead to develop the environment industry in two aspects. First, growth in recycling, given that the area covered by SIGRE will extend to cover the entire country as more municipal authorities join the system, with a corresponding increase in the quantity of material recycled, expansion of the recycling trade and, in time, increase in recycling industry capacity.

Second, with the development of selective collection systems for packaging waste, an increase in commerce and industrial activities is expected, including production of selective waste collection equipment and construction of infrastructure for waste sorting and selection. Underlying these activities, growth in consultancy, research & development activities is also expected, part of which is demand of the SPV through its technical support to local authorities and waste collectors.

SPV includes 148 enterprises grouped into three holding companies:

Embopar: packagers and importers – pay financial counterparts to SPV for the packaging they place on the market;

Dispar: distribution – pay financial counterparts to SPV for the packaging they place on the market;

Interfileiras: production of packaging and packaging material – enterprises which recycle selectively-collected materials.

On the other side of SPV there are 147 municipal authorities (municipal enterprises or consortia of authorities) involved in selective recycling, representing 44% of the territory of continental Portugal, and around 52% of the population.

4.5. Elements for an estimate of the environment industry

The OECD/Eurostat Environment Industry Manual, although its status was only preliminary at the time of undertaking the project presented in this report, brings together the methodological guidelines for the compilation of statistics moderately comparable between the countries using such methodological recommendations. Experience shows that a vital element is correctly identifying the environment industry through nomenclatures of economic activities. The NACE Rev.1 includes entries which should be amended to include specific definitions applicable to the production of environmental protection goods and services, e.g. codes and levels of disaggregation permitting the identification of enterprises producing energy using renewable sources, or enterprises providing environmental consultancy services (environmental impact studies). Eurostat and Member States should be aware of this issue and seek to influence future changes to the NACE Rev.1 with a view to expanding the possibilities for classifying economic activities that pursue environmental protection objectives.

In particular as regards the supporting nomenclatures, there is a constant need to identify the enterprises and economic activities that fall within the environment industry. However, we feel that the nomenclatures, except for a few groups, are unsuited to linear use in identifying the sectors and associated activities of the environment industry. The following paragraphs set out some points regarding the nomenclatures, which would provide for easier definition and identification of the environment industry and the goods and services it produces:

- **NACE Rev.1**: Need to identify and expand the economic sectors containing enterprises producing environmental protection goods and services. Within the scope of the work on the Environment Industry Manual, a more specific set of economic sectors constituting the environment industry should be defined;

- **PRODCOM**: Need to develop codes for environmental protection equipment and products, e.g. vehicles for waste collection and transport, containers for selective collection.

- **Combined Nomenclature (Harmonised System)**: In relation to this nomenclature the Environment Industry Manual offers a wide compilation of codes for potential environmental protection products. Although the list is no more than indicative it offers a good reference basis (through statistics of external trade) for identifying the origin of demand or supplies of products that can be used for environmental protection purposes.

4.6. Demand-side estimate of the environment industry

The INE already has a range of statistics permitting an approximate estimate of the demand for environmental goods and services in Portugal. Since 1994 the INE has been implementing a survey of industrial enterprises (NACE Rev. 1 - Sections C, D and E). For public administration, there is a specific survey of local authorities, and administrative data are collected from regional and central government.

Table 6 : Demand for environmental protection goods and services

Year: 1997 Unit: 10^3 PTE

	Central government	Regional administration	Local authorities	Enterprises
Investments	15 338 217	1 277 224	41 687 714	20 696 995
Acquisition of goods and services	8 879 043	1 157 880	16 458 522	4 311 817

The table above sets out the results of these surveys, showing the financial flows corresponding to the acquisition of environmental protection goods and services.

These results show a significant difference between the goods and services for environmental protection acquired by broad economic sectors in comparison with the turnover of the environment industry (excluding turnover from recycling, wholesale trade in waste and scrap, and electricity generation from renewable energy sources). No attempt is made here to strike a balance and establish a breakdown by comparing demand and supply data. In practice, no such comparison would ever produce a perfect match. But there clearly are problems, and their resolution would provide a sounder and more accurate balance, allowing a greater degree of confidence in the results.

One of the principal reasons for the difference must lie in the methodology of the survey of eco-enterprises. This considered only enterprises whose *principal activity* was in environmental protection. A future version of a questionnaire addressed to producers of environmental protection goods and services should be extended to include enterprises with secondary activities in the same fields. This should evidently be done with a view to considering the greater volume of business in environmental protection generated by units not specialised in this type of goods and services, in particular in areas such as manufacturing of equipment and construction activities for environmental protection.

Another question to be investigated relates to the legal and institutional nature of the producers of these goods and services. The survey considered only private companies, and ignored public bodies such as local authority departments. Although this legal form is becoming less significant, its weight in the total of environmental protection goods and services should not be ignored.

5. Technical data

5.1. Response rate

The response rate was 80% of all enterprises surveyed. The responses deemed valid for analysis, however, are representative of around 60% of the total survey universe. A total of 113 responses (21%), were held not to be valid, either because the firms, although legally recognised had not started business or, on the contrary, had suspended or ceased business for legal reasons or through insolvency.

Table 7 : Response rate

1997 Number of enterprises

Activity	Economic activities CAE Rev. 2				
	37 Recycling	5157 Wholesale of waste and scrap	90 Sewerage, public health and similar	Other economic activities	Total
Total enterprises	84	215	123	104	526
Responses obtained	67	180	98	79	424
Waiting to start business	4	1	10	2	17
Active	50	135	61	65	311
Other situation [(a)]	13	44	27	12	96
No response	17	35	25	25	102
Response rate (%)	79,7%	83,7%	79,6%	75,9%	80,6%

(a) Enterprises not deemed valid for statistical processes: trading suspended, or definitively ceased and other reasons

5.2. Types of activity performed by enterprises classified in 'Other economic activities'

CAE Rev. 2 code	Number of firms	CAE Rev. 2 description	Activity purpose
24160	1	Manufacture of plastics in primary forms	Manufacture of equipment for selective waste collection
28520	1	General mechanical engineering	Manufacture and assembly of equipment for waste water treatment (stopcocks and separators)
29130	1	Manufacture of taps and valves	Assembly of waste water treatment equipment
29230	1	Manufacture of non-domestic cooling and ventilation equipment	Manufacture and sale of ventilation units and escape gas capture and filtering
29564	1	Manufacture of other special-purpose machinery	Manufacture of beach-cleaning equipment
32100	1	Manufacture of [...] electronic components	
45212	1	Construction and civil engineering	Construction and management of waste water treatment plant and equipment
45240	1	Construction of water projects	
45330	1	Plumbing and air-conditioning	Sale and installation of pumping equipment for waste water treatment plant
51140	2	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	Sale and service of sewage treatment equipment (centrifuges and decanters)
51180	1	Agents specialising in the sale of particular products or ranges of products n.e.c.	
51190	1	Agents involved in the sale of a variety of goods	
51540	2	Wholesale of hardware, plumbing and heating equipment and supplies	Sale of solar power equipment

CAE Rev. 2 code	Number of firms	CAE Rev. 2 description	Activity purpose
51550	2	Wholesale of chemical products	Sale of chemical products for sewage treatment Sale of biological composting agents for the transformation of residues into agricultural compost Sale of containers for the selective collection of residues
51620	1	Wholesale of construction machinery	Sale of textiles and geotextiles to underseal land used for residue storage Sale and assembly of burners for biogas produced by fermenting stored residues
51650	5	Wholesale of other machinery for use in industry, trade and navigation	Consultancy and sale of compact water treatment plant and biological water treatment filters Consultancy and sale of equipment for exploitation of renewable sources of energy – wind and solar
52482	1	Retail sale of optical, photographic, cinematographic equipment and precision instruments	
52488	1	Other retail sale in specialised stores, n.e.c.	Sale of waste water treatment equipment
71340	1	Renting of machinery and equipment	Renting of machinery and equipment for the collection and storage of liquid waste (oils, acids, solvents) subsequently sent for recycling or other appropriate treatment
73100	1	Research and experimental development on natural sciences and engineering	Collection of samples for analysis of pollution levels Preliminary analysis of pollution using portable analysis equipment Sale and installation of pollution measuring and monitoring equipment (gas and waste water analysis)
74120	1	Accounting, book-keeping and auditing activities; tax consultancy	Environmental impact studies and consultancy
74140	7	Business and management consultancy services	Environmental consultancy and environmental impact studies
74300	1	Technical testing and analysis	Pollution monitoring analyses
74700	1	Industrial cleaning	
74842	1	Other services provided principally to various businesses n.e.c.	Environmental impact studies and consultancy
80421	1	Occupational training	

It can be seen that throughout these various economic activities there are firms whose *principal activity* (50% or more of turnover) is producing environmental goods and services. Should the NACE Rev.1 be revised, there will clearly be some activities in which it will be difficult to provide a specific and easily identifiable code for the classification of some kinds of production of environmental goods and services. Even so, certain activities are affirming their identity, or tending to consolidate or differentiate, (through development triggered by legal requirements or through economic need or expediency), such as renewable energy, and environment impact studies and consultancy. For these cases, it will be important for the economic activity to be differentiated in the NACE, if only to permit easier identification of the producers who constitute the "environment industry".

5.3. Nomenclatures used

- Portuguese Classification of Economic Activities *Classificação Portuguesa das Actividades Económicas* – CAE Rev. 2 (identical to NACE Rev. 1 up to 4th digit level, but more detailed at a 5th digit level)

- European Statistical Classification of Environmental Protection Activities and Equipment - CEPA

6. Bibliography

Reis, Rogério – *"Relatório sobre Eco-Indústrias e Eco-Serviços em Portugal"* – Instituto Nacional de Estatística, March 1997

"Enquete Associee a l´ E.A.E. 1991 - L´Industrie et le Marche de L´Environnement" - Ministere de L´Industrie et du Commerce Exterieur - SESSI - Bureau Enquetes Industrielles

"Questionnaire on Environment and Technology in Austria" - Eurostat Doc. Eco-Ind/95/6 - Meetings of 22 and 23 November 1995

"The Environment Industry Manual" – OECD/Eurostat – Draft final version, Eurostat Doc. Eco-Ind/98/1 Eurostat

Johansson, Ulf – Nyman, Madeleine and Tängdén, Lena – *"The Environment Industry in Sweden"* – Statistics Sweden, December 1998

"Manual SERIEE" – Eurostat, Luxembourg, 1994

Internet sources:

URL: http://www.pontoverde.pt – "Sociedade Ponto Verde"

URL: http://www.egf.pt – "Empresa Geral de Fomento"

Annex 1: Specimen statistical survey of Eco-Enterprises

Notation instrument of the National Statistical System
(Law No 6 of 15 April 1989) : RESPONSE COMPULSORY
I.N.E. REGISTRATION No 8818
Valid until 31.12.1998

INSTITUTO NACIONAL DE ESTATÍSTICA

DATA REFERENCE PERIOD
1996 CALENDAR YEAR

DEPARTMENT OF POPULATION STATISTICS
ENVIRONMENTAL STATISTICS UNIT

PLEASE NOTE:
THIS QUESTIONNAIRE MUST BE COMPLETED IN ACCORDANCE WITH THE ATTACHED INSTRUCTIONS.
IN CASE OF DOUBT, PLEASE CONTACT THE INE
Mainland: Tlf (01) 847 00 50 Ext:1025/28/32
Azores: Tlf (095) 25 107/08
Madeira: (091) 741 426/7

THE CONFIDENTIALITY OF THESE DATA IS GUARANTEED UNDER THE PROVISIONS OF LAW Nº 6/ OF 15 APRIL 1989

ECO-ENTERPRISE SURVEY

1 *Name and address of the business*

Business name _____

Address: Legal person's identification number (NCPI) |_|_|_|_|_|_|_|_|

District _____ Municipality _____ *Freguesia* (parish) _____ |_|_| - |_|_| - |_|_|

Area _____ Street _____

Post code |_|_|_|_| Tel. |_|_|_| - |_|_|_|_|_|_| Fax |_|_|_| - |_|_|_|_|_|_|

2 *Situation and nature of the business*

Situation of the business *(place an X in the appropriate box)* :

SC2001

· Awaiting start-up of activity ..... 01 ☐
· Active ..... 02 ☐
· Activity suspended on (/ /) ..... 03 ☐
· Wound up on (/ /) ..... 04 ☐

No of months of activity during the reference year ☐ SC2002

Principal activity: _____

_____

_____

_____

Legal form: _____ ☐☐

Year in which current activity began ..... |_|_|_|_|

CAE (Rev. 2) Please leave blank - for INE use ..... ☐☐☐☐

Comments: _____

_____

_____

_____

_____

_____

Person responsible for completing the survey

Name _____ Tel.: ( ) _____

Department _____ Telefax: ( ) _____

Signature _____ Date: ___ / _____ / ___

3 *Turnover by environmental domain and type of business activity*

Environmental domain		Activities of the business					Total percentage of turnover by environmental domain
		Manufacture of substitute products (%)	Manufacture of capital goods (%)	Sales of products or capital goods (%)	Studies, consultancy and training (%)	Analyses and other types of activity (%)	
1	2	3	4	5	6	7	8
· Protection of ambient air and climate ……	ME3001						
· Protection of ambient water……..	ME3002						
· Waste management ……..	ME3003						
· Protection of soil and groundwater …	ME3004						
· Abatement of noise and vibration ……	ME3005						
· Biodiversity and landscape protection ……	ME3006						
· Protection against radiation ……..	ME3007						
· Research and development ……..	ME3008						
· Other environmental-protection activities ..	ME3009						
· *Other activities not associated with environmental protection …….*	ME3010						
Total percentage of turnover per type of activity							100 %

4 *Distribution of customers by institutional sector and their weight in terms of turnover*

Please indicate the percentage of turnover accounted for by each sector (to which the firm's customers belong):

1. Corporations ……	%	DS4001	3. Households ……	% DS4006
2. General government (2.1+2.2+2.3) ……	%	DS4002	4. Non-profit institutions	
2.1. Central government ……	%	DS4003	serving households ……	% DS4007
2.2. Regional government ……	%	DS4004	5. Rest of the world ……	% DS4008
2.3. Local government ……	%	DS4005	6. Total (1 + 2 + 3 + 4 + 5) ……	100 %

5 *Average number of persons employed by the business in the course of a year*

Total number of persons, paid or unpaid, employed by the business : …… RH5001

of which paid employees: …… RH5002

6 Human resources of the business by environmental function

6.1 Average number of persons engaged in environmental tasks, by occupational status, sex and age group

Occupational status	No of persons **primarily** occupied with environmental tasks	No of persons for whom environmental tasks are a secondary or occasional occupation	Persons occupied primarily with environmental tasks:						
			Sex		Age group				
			Male	Female	14-24	25-34	35-44	45-54	>54
1	2	3	4	5	6	7	8	9	10
1. Managers									
2. Senior professionals and technicians									
3. Associate professionals and technicians									
4. Foremen, workshop supervisors, skilled workers etc.									
5. Clerks, service workers, sales workers									
6. Elementary occupations									
7. Apprentices and assistants									

6.2 Persons occupied primarily with environmental tasks, by occupational status and level of education

Occupational status	Level of education						
	None	Elementary 1st level	Elementary: 2nd level	Elementary: 3rd level	Secondary 10th to 12th year	Higher (non-university) (polytechnic etc.)	University
1	2	3	4	5	6	7	8
1. Managers							
2. Senior professionals and technicians							
3. Associate professionals and technicians							
4. Foremen, workshop supervisors, skilled workers etc.							
5. Clerks, service workers, sales workers							
6. Elementary occupations							
7. Apprentices and assistants							

6.3 Persons occupied primarily with environmental tasks, by occupational status and relevant domain of environmental management and protection(1).

Occupational status	Domain of environmental management and protection								
	Ambient air and climate	Ambient water	Waste management	Soil and groundwater	Noise and vibration	Biodiversity and landscape	Radiation	Research and development	Other environmental-protection activities
1	2	3	4	5	6	7	8	9	10
1. Managers	,	,	,	,	,	,	,	,	,
2. Senior professionals and technicians	,	,	,	,	,	,	,	,	,
3. Associate professionals and technicians	,	,	,	,	,	,	,	,	,
4. Foremen, workshop supervisors, skilled workers etc.	,	,	,	,	,	,	,	,	,
5. Clerks, service workers, sales workers	,	,	,	,	,	,	,	,	,
6. Elementary occupations	,	,	,	,	,	,	,	,	,
7. Apprentices and assistants	,	,	,	,	,	,	,	,	,

(1) Since any one person may be active in more than one environmental domain, please use decimals where necessary in order to arrive at an accurate distribution of personnel across the various
Please refer to the formula for calculating the average number of persons employed by the business (page 8 of the instructions).

Financial data on the business

Business name _____ NCPI _____

7 Movements of fixed capital

Value (ESC 10^3)

POC code	Account designation		Capital additions
1	2	3	4
42	Fixed capital	MA7001	

8 Sales, rendering of services, purchases and supplies, by market

Value (ESC 10^3)

POC code	Account designation		External market		National market
			European Union	Other countries	
1	2	3	5	6	7
71	Sales	VP8001			
72	Rendering of services	VP8002			
31	Purchases	VP8003			
62	External supplies and services	VP8004			

9 Profit and loss statement

POC code	Account designation		Value (ESC 10^3)
1	2	3	4
	Cost and expense account		
61	Purchases of goods for resale.....	DR9001	
62	External charges for services	DR9002	
64	Personnel expenses	DR9003	
66	Amortisation of deferred charges	DR9004	
67	Provisions for loss in value of current assets.....	DR9005	
63	Taxes.....	DR9006	
65	Miscellaneous operating expenses	DR9007	
68	Financial expenses	DR9008	
69	Exceptional and extraordinary expenses	DR9009	
88	Profit or loss for the year	DR9010	
	Revenue account		
71	Sales	DR9011	
72	Rendering of services	DR9012	
VP	Capacity usage variance	DR9013	
73	Miscellaneous operating income	DR9014	
74	Revenue grants	DR9015	
75	Capitalised production costs	DR9017	
76	Miscellaneous operating profits	DR9018	
78	Financial income	DR9019	
79	Exceptional and extraordinary operating profits.....	DR9020	