



EMPLOYMENT IN THE ENVIRONMENTAL GOODS AND SERVICES INDUSTRY IN MALTA

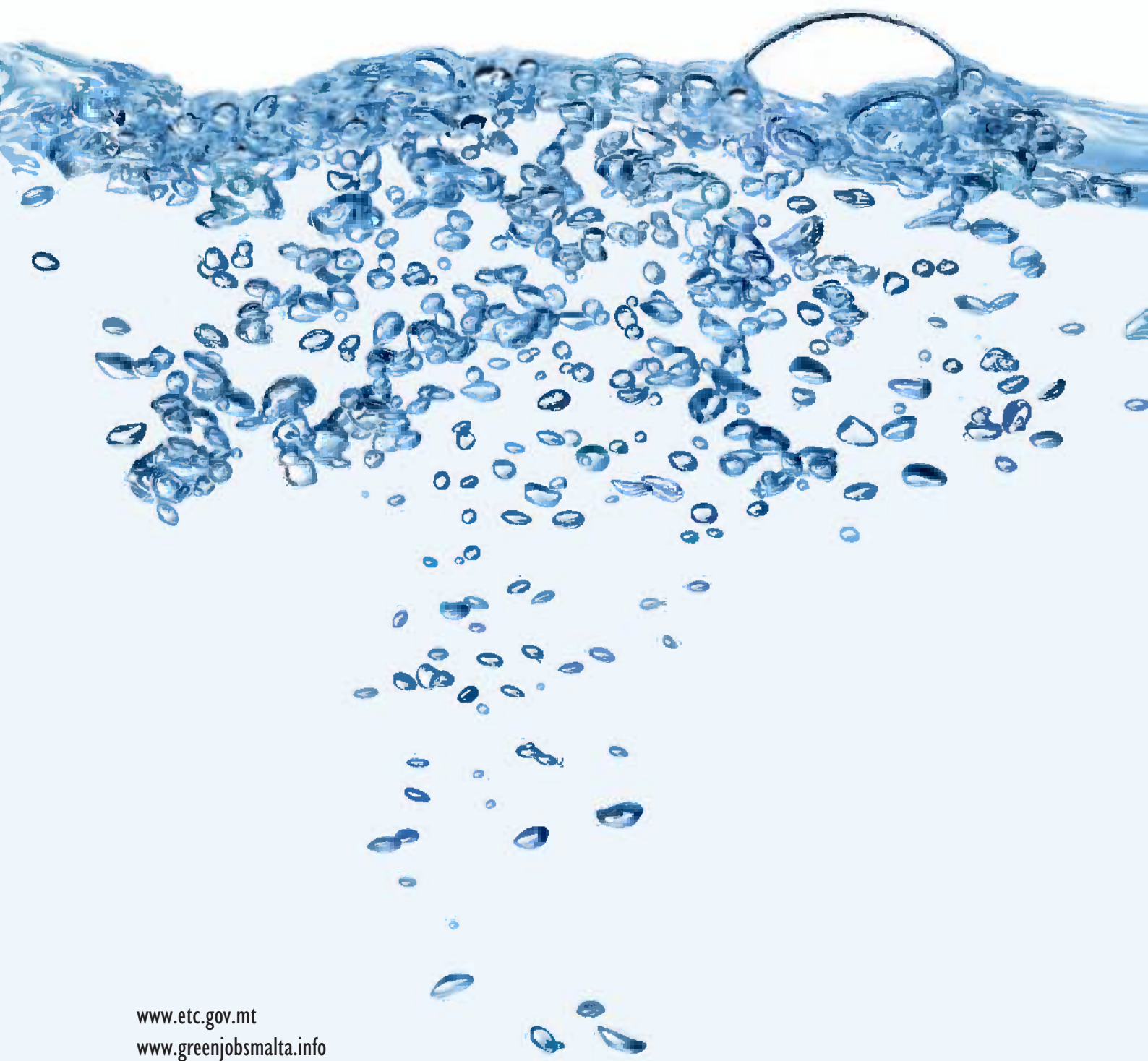


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Executive Summary



The objective of this study is to map out developments tied to environment-related employment both in Malta in the light of international developments especially in the European Union (EU). It is also aimed at outlining to the ETC, the feasibility and subsequent design of employment schemes and training programmes leading to environment-related employment.

The study reviews the latest definitional and methodological issues for identifying and measuring the environmental goods and services (EGS) industry, in particular the EUROSTAT -OECD led initiatives in this field. It suggests a methodology which is best suited to our local circumstance and which conforms with EU requirements.

The study then gives a comprehensive review of all the environment-related *Acquis* applicable to Malta. The review includes the most recent legislative and regulatory developments, with special reference to what has been transposed and implemented to date. Sector by sector, this exercise suggests the type of economic activity most related to the environmental field that would be demanded by industry and households, to conform with EU directives.

The exercise shows that the new obligations on households and industry would be creating new economic activity, demanding a stream of sectoral employment profiles. These, in turn, need to be evaluated in terms of their make-up.

The study then reports the results of a country-wide survey aimed to quantify the size and nature of the Maltese environmental goods and services industry, as it stands today. It finds that like other more advanced countries the industry is fast establishing itself and would expect to reach the same labour force proportions as these countries in the near future. At present the local industry employs about 3% of the national labour force and contributes about 2% of the GDP. The current rate of employment growth of the industry is an average rate of 6% per annum. The major sectors in the pollution management, like all other EU countries, are liquid and solid waste management. In the resources management the most significant is water supply.

As a result of an organised SWOT analysis among industry leaders, advisors and regulators in the environmental field, various observations and recommendations are made as to the likely trend the industry is expected to take and the way the trends could be accelerated and made sustainable. Among the perceived strengths is the significantly increased levels of awareness of the environment, among the weaknesses we find the small size of the market and the fragmentation, with weak inter-linkages. Among the threats we find the discrepancy in enforcement standards with over-strict and burdensome obligations, and total lack of enforcement in other areas. As for opportunities we find the availability of EU funding, the export potential to an enlarged market, and the impressive rate of growth of this sector.

The final chapter evaluates the likely schemes which, while being do-able in terms of funding requirements and institutional capacity available, are able to train or retrain the needed manpower. A number of employment profiles are also indicated.



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I. Introduction



1.1 BACKGROUND

The overall objective of this study is to map out and survey developments tied to environment-related employment both in Malta and internationally, carry a SWOT analysis, and outline to the ETC the feasibility and subsequent design of employment schemes and training programmes leading to environment-related employment.

1.2 SPECIFIC OBJECTIVES

The objectives of this project are as follows:


- To review all environment-related Acquis applicable to Malta and the employment implications of same;
- To define the various environment-related jobs and skills required of each;
- To quantify the number of each of these jobs required to implement the said Acquis;
- To conduct a SWOT analysis of the Maltese labour market in respect of 'green jobs' and to propose feasible and sustainable arrangements for their introduction, including the design of any relevant employment schemes;
- To identify critical success factors (in terms of policies and legislation) needed to bring about the above;
- To propose the training programmes necessary for adequate labour supply in these areas;
- To identify good practices in the area of environment-related employment and training in Malta and abroad, analysing the transferability of foreign practices to Malta.

1.3 STRUCTURE OF THE REPORT

Chapter 2 reviews the definitional and methodological problems associated with the quantification of the environmental goods and services industry and the employment within the industry. Various country studies are cited so as to assist in the choice of the most suitable methodology for this study while keeping consistency with Eurostat-OECD standards.

Chapter 3 examines all the environment-related Acquis and its status in so far as transposition and implementation. The review gives the most recent updates in this regard and suggests the type and level of employment implications for each type of economic activity undertaken mostly, though not solely, by industry to comply with the environmental legislation and respective regulation.

Chapter 4 reports on the nation-wide survey of industry undertaken to identify the type, size and growth rate of the Maltese environmental goods and services industry, in terms of its turnover and employment. Various qualitative variables of the employment profile are collected and reported in this section.



Chapter 5 provides the empirical results derived and extrapolated from the survey. It reviews the eco-industry profile in the European Union countries so as primarily to provide a benchmark for the status of the industry in Malta, and to identify any gaps which may arise once Malta becomes fully compliant with EU legislation.

Chapter 6 reports on the outcome of the Focus Group discussion and produces the SWOT analysis derived from this discussion by high-level officials from the public and private sectors and NGOs.

Chapter 7 is devoted to an assessment of environmental policies which could be of benefit to the labour market for the environmental goods and services industry. The analysis is complemented with a review of possible barriers that may hinder job creation in the industry and a description of good practices tied to employment and training leading to more job creation in the industry. The chapter discusses the feasibility of launching new employment schemes and training programmes and to a description of a number of such schemes and programmes which could be administered by the ETC. The chapter concludes by pointing towards those eligible sectors within the industry which might benefit from these schemes, and which appear to be the most promising in view of their needs for additional manpower.

This report was undertaken by Prof. Edward Scicluna (Applied Economics Consulting Ltd), and assisted by Chris Meilaq (Ernst and Young).





2. Review of Definition and Methodologies

Various country-specific and country-wide studies have underlined the growing importance of the environmental goods and services industry (EGS), trying to define, delimit and describe the environment industry. Nevertheless there are various differences among them. The definitions adopted by these studies differ in a number of ways, and this is also reflected in the approach and methodology these studies utilise in order to arrive at a quantifiable estimate of the EGS industry.

This chapter assesses these various case studies related to environment-related employment in the environment sector, namely eight country-specific studies and six country-wide reports. This comparative review of the literature will include an analysis of the various definitions of the environment goods and services industry that have been adopted by a selection of countries and organisations, as well as an overview of the study approaches and methodologies utilised when attempting to quantify and measure this industry. This review will form the basis of subsequent phases of the assignment, when the team of experts will come to suggest the definitions and template to be adopted for the Maltese context, and on which the survey sample will be based.

2.1 DEFINITION

In order to delineate any particular industry-related job, it is important to identify and delineate the industry itself. This applies as well to the task of demarcating environment-related jobs, which in turn requires defining the environment goods and services industry. Various international statistical organisations have and still are carrying out this industry classification exercise, giving a code to each clearly identified industry. Thus while for many years various countries classified their industry by the SITC/ISIC¹ coding, nowadays we find many countries, including all members of the European Union, using the NACE classification².

The NACE Revision 1³ is a 4-digit activity classification which provides the framework for all national activity classifications within the European Union. It provides sufficient detail to reflect the more important activities of Member States, as well as certain special features of national classifications. Consequently, NACE Rev. 1 features not only the activities that are important in all Member States, but also those that are important in some countries and unimportant in others⁴.

The EGS industry is an exception in that the NACE classification does not as yet recognise and classify separately this important and fast growing industry. This is not surprising, since the complexity of the definition itself, the evolving methodological concepts, and the lack of information available in this new, rapidly-growing multi-faceted activity, has so far prevented international statistical agencies from providing the tools to identify and classify this industry within the current acceptable industrial classification. However, this is indeed the task of this project.

¹ International Standard Industrial Classification of All Economic Activities

² French term for "General Industrial Classification of Economic Activities within the European Communities"

³ NACE Rev. 1 represents a revised version of the first NACE classification (1970). A second revision is currently underway.

⁴ Eurostat (1996), *NACE Rev. 1: Statistical classification of economic activities in the European Community*.



2.2 PROBLEMS OF DEFINITION

Defining the EGS Industry presents a number of difficulties. Most enterprises involved in producing environmental goods and services are also heavily engaged in many different industrial activities. Some of these firms are new firms specialising in this area, while others operate in traditional industries with low specialisation in the environment. Some firms produce environmental services for their own use while others outsource this activity.

There are several reasons for the diverse classifications suggested by the various studies carried out by private and public research and statistical institutions.

Firstly, the EGS industry covers a heterogeneous set of goods and services. At the core of the industry, there is group of clearly identifiable goods and services which are used to clean-up existing processes and production (“end-of-pipe” equipment and/or technologies), such as treating water and effluent, controlling or abating air pollution and reducing noise. There is also a set of waste management and recycling technologies and services to recuperate waste for re-use, and deal with past environmental damage, as well as a growing range of environmental services such as research, design and engineering services. Most of these equipment production, technological and service activities can be identified and measured, but they are heterogeneous, making data collection complicated and the comparisons difficult.

Secondly, there is no agreement regarding the criteria to establish the boundaries of the industry. In particular there is growing interest in including renewable energy, clean technologies and products. In the long run, while they are difficult to account for, clean technologies, production processes and products will reduce the need for clean-up and end-of-pipe solutions, changing the structure of the environment industry and the relative importance of its core group of activities. At the present stage such activity has no boundary and is difficult to measure, since any efficient business expenditure could in a way be environmentally friendly. As with household economic activity which currently is excluded from the National Accounts due to the problem of measurement, so is it with the area of cleaner technologies. It is agreed that it is difficult to include it as part of the eco-industry.

Thirdly, many producers of pollution abatement and control equipment and services have a low degree of specialisation in these products since they would also be involved in other different industrial activities. Environmental goods and services may be classified with other goods and services which are the main line of business and are therefore not readily separable for inclusion in measures of the environment industry. In addition, many goods which may be used for environmental protection (for example, pumps) may also be used for quite different activities, and some goods which at first sight may seem unconnected with the environment may in certain applications be so used.

Different studies have focused on broader or narrower groups of activities or products, producing divergent results, depending on whether they have been developed for environmental jobs surveys, eco-product surveys and general statistical surveys. Values may also depend on whether estimates are made from the supply or the demand side.



In analysing environment-related activities and their impacts on employment, it is difficult to identify all actors involved in pollution management or resource management. A number of studies have focused on environment-related activities in the EGS industry or in utilities and manufacturing (IFEN, 2000; Romao, 2000), while others have also covered activities carried out in the public sector, producing divergent results (Dietz *et al.*, 2000; Korea Environment Institute, 2005). To achieve an analytical framework which will capture broader groups of environment-related activities, not only business activities but also public activities and activities of not-for-profit organisations should be included.

2.3 AGREED DEFINITIONS

Despite the complexity of definition and the difficulties to delimit, describe and assess the environmental content of a heterogeneous set of activities, there are now three groups of activities which are widely agreed on as being environment-related⁵:

2.3.1 POLLUTION MANAGEMENT

This category includes the production of equipment and the provision of services for:

1. Air pollution control.
2. Wastewater management.
3. Solid waste management:
 - a. Hazardous waste collection, treatment and disposal;
 - b. Waste collection, treatment and disposal;
 - c. Waste recovery and recycling (excludes manufacture of new materials or products from waste and scrap).
4. Remediation and clean-up of soil, surface water and groundwater.
5. Noise and vibration abatement.
6. Environmental monitoring, analysis and assessment, including:
 - a. Environmental R&D.
 - b. Environmental contracting and engineering.
 - c. Analytical services, data collection, analysis and assessment.
 - d. Education, training, information.
7. Other pollution management activities.

2.3.2 CLEANER TECHNOLOGIES AND PRODUCTS

This group includes the production of equipment, technology, specific materials or services for:

1. Cleaner/resource-efficient technologies and processes.
2. Cleaner/resource-efficient products.

⁵ OECD/ Eurostat (1999) *The Classification of the Environmental Goods and Services Industry*

2.3.3 RESOURCES MANAGEMENT

This category includes the production of equipment, technology and specific materials, provision of services, and construction and installation for:

1. Water supply.
2. Recycled materials (manufacture of new materials or products from waste or scrap, separately identified as recycled).
3. Nature Protection

An overview of the main areas covered by each of these three areas is given in Appendix D. In conclusion this approach results in an all encompassing definition of the industry, namely:

"The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air, and soil as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services which reduce environmental risk and minimise pollution and resource use."

As we shall see this general definition is based on the purpose of the use of the products and services. Its interpretation and the measurement problems associated with it will now be reviewed in the following sections.

2.4 COUNTRY-WIDE STUDIES

2.4.1 THE OECD 1992 REPORT ON THE STATUS OF THE GLOBAL EGS⁶

The OECD was one of the first international organisations to take up the task of defining the EGS industry. A first report was prepared in 1992 to describe the status of this industry, market developments and the impact of environmental policies (OECD, 1992⁷). Interest in the environment industry was re-affirmed by the Industry Committee in 1994, and in subsequent work on new growth industries. A new report on the environment industry received wide recognition and showed a clear need for continued analysis and improved data on the industry.

Registering the growing interest in renewable energy, clean technologies and products, this 1992 report was a first attempt at creating a definition manual. The environment industry was defined as a supplier of pollution control, reduction, clean-up and waste handling equipment and related services, and a growing range of other environmental services.

The report also points out that it is difficult to account for clean technologies and processes which minimise pollution and material use and clean products which are less environmentally-damaging. The industry is becoming increasingly trade-oriented, but is considerably less trade-intensive than industries selling standardised mass market products such as automobiles and computers.

⁶ OECD (1994), *The Global Environmental Goods and Services Industry*.

⁷ The OECD Environment Industry: Situation, Prospects and Government Policy.



This report also points out that internationalisation has been hampered by differences in national regulations, by the size structure of the industry (many small specialised firms and few large firms), and by the importance of government procurement. Employment in the environment industry, the report states, is growing and is around 1 per cent of total employment in most OECD countries.

As a starting point, this report proposes the use of the general definition expressed at the end of Section 2.3 above.

This wide definition includes clean technologies. These technologies need to be considered as part of the industry, despite definition and measurement problems. Cleaner technologies are difficult to measure because improvements which are less polluting cannot be separated from general improvements which are more efficient, use less resources and produce less waste or harmful by-products.

Hence the share of costs related to environmental improvement cannot be clearly separated from the cost of general efficiency improvements. For these reasons, other definitions, including the one in this original OECD definition, tend to exclude clean technologies. They are excluded from much of the data discussed below, except where indicated.


Description and discussion of the industry which focuses mainly on end-of-pipe technologies and clean-up services will not capture structural change in the industry as regulation and incentives move towards reducing resource use, minimising waste, and adopting cleaner technologies and production processes. Hence clean technologies are discussed qualitatively to the extent that this is meaningful.

The environment industry includes activities producing goods and services that range from end-of-pipe equipment pollution control and clean-up technologies, to recycling and technical and professional services. Clean production technologies, while important in re-structuring the industry, are more difficult to measure, as are eco-products (such as clean cars, efficient refrigerators and washing machines, biodegradable soaps). One way of describing the industry is to include goods and services which provide environmental protection in different domains: water, solid waste, air, soil, noise, natural resources, and other miscellaneous services.

The result of this report's classification is as follows:

ENVIRONMENTAL EQUIPMENT

- waste-water treatment equipment;
- waste management and recycling equipment;
- air pollution control equipment;
- noise reduction equipment;
- monitoring instruments, scientific, research and laboratory equipment;
- natural resource conservation/protection and urban amenities.



ENVIRONMENTAL SERVICES

- waste-water operations;
- waste handling and facility operations;
- air pollution control operations;
- noise reduction operations
- analytical, monitoring and related conservation and protection services;
- technical and engineering services;
- environmental research and development;
- environmental training and education;
- accounting and legal services;
- consulting services;
- other environmental business services;
- other: eco-tourism.

INTEGRATED ENVIRONMENTAL TECHNOLOGIES IN INDUSTRIAL PROCESSES AND CLEANER PRODUCTS (OPTIONAL):

- clean production equipment;
- efficient energy generation and conservation equipment;
- eco-products.

2.4.2 THE OECD 1999 EGS MANUAL⁸

In response to the debate on the EGS industry, the OECD, in collaboration with Eurostat, published a manual for data collection and analysis of the EGS industry (OECD/Eurostat, 1999). This manual developed a common definition and classification of the environment industry, in order to improve the collection of consistent information on production, employment, trade, investment and R&D. It provides a set of flexible guidelines that can be used to produce comprehensive and comparable data on the environment industry.

This manual sought to answer questions related to the quantification of the industry's potential for growth and employment creation, the record in exporting environmental technologies, and the measured progress in R&D for cleaner products and processes. Also one wanted to know whether one could measure the impact on industrial competitiveness due to the application of cleaner technologies, and how could the environmental and economic policy be modified to encourage and support growth, job creation and trade in the environment industry.

The OECD/ Eurostat defined the environment industry as those “activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use.”

⁸ OECD/ Eurostat (1999), *The Environmental Goods and Services Industry: Manual for data collection and analysis*.



Nevertheless, for cleaner technologies, products and service, the manual agrees that there is currently no agreed methodology which allows their contribution to be measured in a satisfactory way, despite their importance.


The manual also points out the difficulty related to measuring the EGS industry from national accounts. The firms that are of interest in identifying the EGS industry are those which produce significant amounts of products deemed to be actually or potentially useful for environmental protection. This is a variation on usual practice in national accounting whereby firms are allocated to industries according to the principal (main) product. Relatively few firms are so specialised that they produce only a single product, and those that tend to be very small. Larger firms almost always produce one or more secondary products. If the activity of all firms whose principal product is environment-related is measured, non-environmental secondary products may be included while environmental secondary production from non-environmental firms may be excluded. To minimise the exclusion of the latter, the manual suggests a more inclusive definition of the “industry” by specifying “significant” production rather than main production of environmental products.

In addition to principal and secondary products, most firms also produce ancillary services, the output of which is not intended for use outside the enterprise. An ancillary activity is undertaken within an enterprise to create the conditions within which the principal and secondary activities can be carried out (e.g. record-keeping, purchasing of material and equipment, hiring, training, managing and paying employees, cleaning and maintenance of buildings and other structures). An ancillary activity may grow to the point that it has the capacity to provide services outside the enterprise. For example, a waste management unit may develop in-house capabilities for which there is outside demand. When an ancillary activity starts to provide services to outsiders, that part of the activity which produces output for sale has to be treated as secondary, rather than ancillary.

In the same way, an enterprise may have to choose between undertaking ancillary activities which provide supporting services for its principal or secondary activities, or purchasing such services on the market from a specialist service producer. In this case, if ancillary activities are not separately considered, institutional changes, which lead to the outsourcing of ancillary activities, may be interpreted as growth rather than as a substitution of internal (ancillary) activities by external (market) transactions. There is some evidence of a trend towards outsourcing of previously ancillary environmental activities or vice versa as a result of economic forces, including the introduction of more stringent environmental regulations. Therefore, the OECD manual suggests that, wherever possible, separate information on ancillary activities should be provided.

The manual also classifies the EGS industry according to the economic activity undertaken. The basic structure is as follows:

Level I distinguishes the three main groups: Pollution management; Cleaner technologies and products; and Resource management.



Level 2 defines the main categories of environmental protection business activities: production of equipment and specific materials, provision of services, construction and installation.

Level 3 comprises the main classes of environmental protection activities: air pollution control, wastewater management, solid waste management, remediation and clean-up of soil and water, noise and vibration abatement.

2.4.3 OECD 2004 ASSESSMENT⁹

Apart from providing a definition of environment-related activities and actors, the OECD (2004) has also reviewed the literature and the available empirical data. A working party on National Environmental Policy has assessed the employment impacts of environmental policies in a number of countries.

In general, data collection and analysis was found to depend on policy or research interest and statistical feasibility. The collection of information and the international comparability of data should be time- and resource-efficient and produce robust results which do not remain disputed. As different methods of data collection pose different questions of data availability, data coverage and resource efficiency, those methods which best respond to policy interest and fulfil information needs should be used. Since quantitative information is now increasingly available both on the level and the composition of environment-related employment effects, it might be helpful to present the various approaches used to investigate these employment effects. Positive, direct and indirect employment effects can be and have been investigated using following approaches:

SUPPLY-SIDE APPROACHES

These include the collection of data on the supply of goods and services for environmental protection, principally by means of targeted surveys of the EGS industry. Business associations, research institutes and more recently statistical offices have launched surveys of broader or narrower groups of environment-related activities. These surveys are often supplemented by labour market statistics for sectors with explicit environment-related activities.

DEMAND-SIDE APPROACHES

These include the collection of information on the demand for goods and services for environmental protection and resource management in the form of the related expenditure. Some demand-side studies try to estimate the direct employment effects by using figures for manpower requirements per unit of expenditure either by type of environmental measures and/or type of expenditure. This rather crude approach requires data on the labour component of various categories of environmental expenditure and entails dividing demand/output data by employment/output coefficients derived from data on productivity, and labour requirements within the supplying industries. More sophisticated demand-side

⁹ OECD (2004), *Environment and Employment: An Assessment*.



approaches try to estimate the direct and indirect employment effects using data on environmental expenditures and input-output calculations. As a rule, statistics or estimates on public and private expenditures are used to derive final demand vectors for input-output calculations. Once the final demand vectors have been established the next step in the analysis entails multiplying the input-output 'inverse' matrix in turn by each of the vectors. The final step in the analysis requires the translation of output into employment by industry. This is accomplished by utilising data on manpower requirements, man-hours, and productivity within each sector. The use of an industry-occupation matrix and corresponding employment/output coefficients make it possible to estimate the number of jobs induced by environmental expenditures.

COMBINED SUPPLY - AND DEMAND - SIDE APPROACHES

These supplement available information on both sides to benefit from the strengths and to reduce the weaknesses of the two approaches taken separately. Using an integrated approach may help to reconcile information on both sides in a consistent accounting work. It may also provide a more comprehensive picture by including indirect employment effects.

OTHER APPROACHES

Some studies try to estimate the direct employment effects of environmental protection by defining and assessing 'green' jobs, that is, jobs in the environmental sector and/or jobs requiring specific environment-related skills. Wherever possible these approaches try to use existing labour-market statistics for the relevant sectors or occupations.

The OECD assessment report utilises data from different country studies, including Austria, Canada, Czech Rep., Denmark, Finland, France, Germany, Netherlands, New Zealand, Poland, Switzerland, UK and Mexico. It summarises information on the employment shares of the private and public sector, direct and indirect employment effects, full-time equivalents and type of activity. The assessment also provides information on the qualitative features of environment-related jobs, namely level of education, share of female employees and part-time employment.

2.4.4 ECOTEC'S 2002 SURVEY OF EU-WIDE EGS INDUSTRIES¹⁰

A study carried out by ECOTEC collated available environmental expenditure data on the market for goods and services produced by eco-industries by EU countries. For the purposes of this study, eco-industries were defined according to the definition contained in the OECD/ Eurostat Manual (1999).

The approach used in this study was to focus on the final expenditure incurred by consumers when using environmental protection services. This was used as a proxy in determining the size (turnover) of the eco-industries. A template for data collection was used for each EU Member State. This enabled a clear audit trail to be established for expenditures on both "Pollution Management" (which includes

¹⁰ ECOTEC (2002), *Analysis of the EU Eco-Industries, their Employment and Export Potential*; and ECOTEC (2002), *Analysis of the Size and Employment of the Eco-Industries in the Candidate Countries*.

“Cleaner Technologies”) and “Resources Management”. A detailed assessment of trade in environmental goods (including renewable energy plant), covering the period 1994 to 1999, was also undertaken for all EU Member States using Eurostat’s COMEXT trade database.

2.4.5 ERNST & YOUNG 2006 REPORT ON ECO-INDUSTRY, ITS SIZE AND EMPLOYMENT¹¹

This study was undertaken by Ernst & Young and RDC-Environment on behalf of the European Commission, with the objective of providing the Commission with a better understanding of the driving forces of the eco-industry development and of potential measures to support this development. The approach was based on analysis of data provided by Eurostat on environmental expenditure, collecting relevant information on eco-industries on the basis of interviews with representatives of industry and administrations and carrying out a selected number of case studies. The OECD definition of eco-industries was adopted throughout this study, with two general sectoral categories, namely pollution management and resource management.

Data on eco-industries in the EU remain incomplete for most sectors. The study reports the following results in terms of:

Turnover: The estimated total turnover of eco-industries in the EU-25 is €227 billion, of which €214,000 million corresponds to the EU-15 area. In constant prices, the turnover of the eco-industries grew around 7% between 1999 and 2004 (for the EU-15 area). The total turnover in 2004 can be split into:

- € 144.9 billion for pollution management activities (64% of the total) and
- € 81.8 million for resource management activities (36% of the total).

The goods and services provided by eco-industries represent approximately 2.2% of GDP in the EU-25 area. The largest national markets for eco-industries are France and Germany which taken together account for 49% of total turnover in 2004. The three following countries (UK, Italy and the Netherlands) represent together another 24% of the EU-25 total expenditures. The 10 new member states represent only 5.7% of total turnover, of which half for Poland alone.

The major eco-industry sectors in terms of turnover by far are water supply, waste water treatment and solid waste management (waste management and waste water treatment each represent approximately one third of the pollution management turnover).

Employment: The total direct and indirect employment due to eco-industries represent approximately 3.4 million full-time job equivalents, of which 2.3 million jobs are from pollution management activities. Resource management activities represent approximately 1 million full-time job equivalents. The majority (77%) of the jobs in the pollution management activities are in the waste water treatment and solid waste management sectors.

¹¹ Ernst and Young (2006), *Eco-industry, its size, employment, perspectives and barriers to growth in an enlarged EU*. Study carried out for the European Commission – DG Environment.



2.5 CLIMATE CHANGE AND EMPLOYMENT (LOTTJE, 1998; ETUC, 2007)¹²

Climate change is one of the most pressing environmental problems. In parallel, perhaps the most prominent political issue of today is unemployment. The European Commission began to bring these two issues together. However the environment has not yet been integrated into the general political discussion on employment even though it is increasingly recognized that there are significant opportunities for job creation in the environmental sector which have not yet been exploited.

A number of studies dealing with climate change and employment have been carried out in recent years. The most obvious conclusion of a review of these studies is that climate protection is beneficial for employment. On average, these studies estimate the employment potential of a CO₂ emissions reduction of 15% until 2010, as compared to 1990 for the European Union, at +1.9 million jobs. This estimate should be taken more as an indication of a trend than as an exact prediction.

2.5.1 COUNTRY-WIDE STUDIES

Following the development of a common definition and classification of the environment industry spurred by the OECD, a number of member countries attempted to test and verify the feasibility of this definition. These studies also aimed to collect more comprehensive information to enable a clearer definition and classification of the environment industry.

These pilot exercises also provided useful information on environmental employment, thus directly responding to political demand for better information on employment opportunities generated by environmental protection.

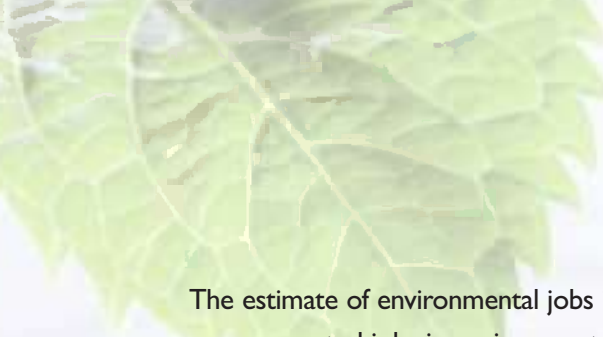
The first studies were carried out by the Commission of the European Communities (1997; combined approach which gathered and matched information from different sources), the US (1998), and Canada (1997). France, Sweden, Portugal and the Netherlands also carried out pilot projects as part of a series of 4 Eurostat Working Papers, all published in 2000. Each pilot exercise used a different approach, as explained in the next sections.

2.5.2 FRENCH STUDY (IFEN, 2000)¹³

In this study carried out by the French Environment Institute (IFEN), the environment has been defined according to the definition used to calculate national environmental expenditure in the various French accounts, with a few exceptions. Expenditure on clean and “adapted” products and technologies was regarded as not generating environmental jobs; conversely, jobs concerning the remediation and clean-up of polluted water and soil were included, even though this field was not at the time monitored in expenditure.

¹² Lottje (1998), *Climate Change and Employment in the European Union*. ETUC (2007), *Climate Change and employment*. See also: OECD (2002c), *Climate change and employment*.

¹³ IFEN (2000), *Environment employment in France, methodology and results 1996-1998*.



The estimate of environmental jobs included:

- central jobs in environmental services: corresponding to current expenditure by enterprises, public authorities and any non-profit institutions active in this area, provided that the expenditure is effected on national territory;
- jobs concerning the production of facilities and structures necessary for performing these central jobs (i.e. non-imported capital expenditure of these same agents)
- jobs concerning the production of products, services, facilities and structures necessary for environmental protection, effected direct by households (i.e. current and capital expenditure by households, not resulting from imports)
- jobs concerning production for export of some services and products, but particularly special equipment used in connection with environmental activities.

The estimate does not include:

- jobs indirectly connected with the production of environmental services: jobs concerning the production of goods consumed by environmental services, jobs in manufacturing facilities supplied with a turn-key capital project and jobs created further upstream in the production chain;
- secondary jobs: generated by the redistribution of incomes and the conversion of price structures and consumption.

In sum, IFEN uses these definitions of environmental jobs:

- "... jobs filled in organizations for which the environment represents their main activity ...".
- "... it is the jobs which have been or are created by taking account of the environment in economic activities in general, be they market activities or not ...".

IFEN uses an accounting approach to assess environmental employment based on a range of available primary data including statistics on environmental protection expenditure, production, foreign trade, results of specific environment industry surveys and national accounts data. The method of estimation used in this study is based on a combination of the various information sources used in the different accounts covering expenditure and eco-activities.

In this study, each type of expenditure is linked to production which is broken down between national production (which creates jobs) and imported production. For each type of expenditure imports were deducted; conversely, exports which provide national jobs but do not generate expenditure were added.

After these adjustments, IFEN use the economic data on eco-activities to calculate national production, split by the following topics:

- I. environmental services
- II. environmental facilities
- III. environmental construction
- IV. environmental products
- V. other facilities
- VI. other construction



To these various types of production activities, the ratio number of persons employed to turnover (exclusive of tax) for the sector/s in question was applied in order to evaluate the corresponding number of jobs. This ratio was taken from the annual French business surveys.

Consequently, the assumptions underlying this study are:

- the ratio used was the average ratio for any category of products or services
- it was sometimes necessary to use general ratios
- the same ratio was used for the same environmental service, whether provided by a private enterprise specialising in that service, by public agencies or by an enterprise in its own internal environmental management.

2.5.3 NETHERLANDS STUDY (DIETZ ET AL, 2000)¹⁴

The OECD Manual was used as a point of reference, but the work of Statistics Netherlands concentrated on tapping sources of information, and less on the question of whether these sources would fit one-to-one in the definition and classification. Another important background document was NACE Rev.1 (Eurostat, 1996).

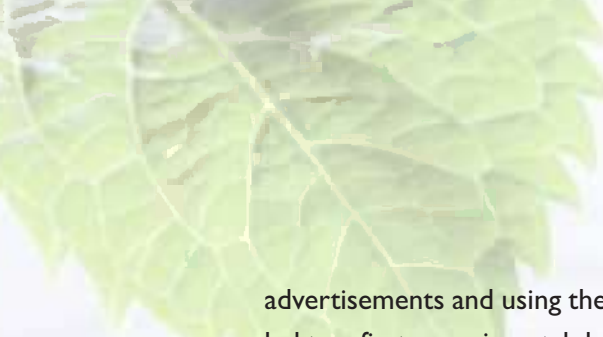
This study collected information on environment-related jobs in general, not paying much attention to the question of whether the jobs were created on the demand or the supply side of the environmental market. Environment-related employment in the public sector was also dealt with in its entirety in this study. Many studies neglect the public sector, at least partly. Of course, it is debatable which government employees working for the environment should be considered as belonging to the environmental goods and services industries, but in this project they were all taken into consideration.

In this study, the information gathered consisted mainly of direct employment related to goods and services for the protection of ambient air and climate, waste water and waste management, protection of soil and ground water, noise and vibration abatement, protection of bio-diversity and the natural landscape. These goods and services refer to both end-of-pipe and cleaner technologies. In terms of the OECD/Eurostat manual (1999), these are mainly group A of the classification, 'Pollution management group' and group B 'Cleaner technologies and products group'. Indirect employment effects or second order effects (for example to apportion part of the employment of a public utility plant that generates electricity used by an eco-industry) were not part of this project.

The method used consisted of six main parts, namely:

- I. Creating an indicative database: An intensive literature study was carried out in order to create a database in a relatively short period with possible environment industry firms. This consisted in exploring the technical literature for names and addresses of enterprises in articles or

¹⁴ Dietz et al (2000), *Environment-related employment in the Netherlands*.



advertisements and using the Internet for information on environment-related employment. This led to a first experimental database with a few hundred potential enterprises. An electronic database was also obtained from a commercial publisher who issues a directory of enterprises operating on the environmental market. Initially this database contained about 800 potential environment enterprises. Lists of members of relevant industry organisations and associations were also collected. The idea was to match all these sources with register information on employment.

2. Using existing statistics and classifications: One of the main starting points was to use existing statistics as much as possible. In this regard, this study used:

- the national environmental expenditure statistics: current costs, including staffing, but not on employment. In principle, this information should make it possible to estimate employment based on assumptions of average wages.
- supply-side statistics developed by Statistics Netherlands: production statistics were set up for NACE 37 (recycling) and 90 (collection and treatment of waste). These NACE classes (and also NACE 5157, wholesale in waste and scrap) which carry out characteristic activities as their main activity, are often indicated as specialised producers. These production statistics supply direct information on employment.
- 5-digit level classification: Other existing statistics were also examined as a possible source of information on environment-related employment. Apart from the classes described above, NACE does not distinguish other activities separately that can be described fully as environmentally related. However, the Dutch standard industrial classification distinguishes several relevant groups of activities at the fifth digit level, namely:
 - a. 74303 Environmental monitoring and analysis
 - b. 92532 Management of natural areas
 - c. 91336 Environmental and ecological movements
- Product classifications. In the national and international literature on the environmental goods and services industries it is often mentioned that the central product classification/Prodcom or trade statistics may constitute a possible source of information. However, several studies have already pointed out the problems with this classification: the limited coverage of the list, multi-purpose goods, etc. The present Dutch project also attempted to use the available information on environmental products in some way to locate environment industries. But the availability of useful information was so poor that this approach was eventually abandoned. R&D: Other relevant statistics were those on Research and development. R&D statistics are an interesting source of information. The survey among research institutions collects data on their employment and their expenditure on each domain of research.

3. Using the business register: The general business register of Statistics Netherlands proved to be a very important source of information on employment. In principle, it gives the number of employees for statistical, legal and local units. The information is not always accurate and up-to-date, but it is useful enough for this type of exercise. For some parts of the standard industrial classification (the 5-digit classes mentioned under point 2 above) the register served as the pri-



mary source. Another interesting experiment of this report was to link the business register with the electronic external database mentioned under point I.

4. Using annual accounts or budgets of governments: For its government finance statistics, Statistics Netherlands collects annual accounts or budgets for all government sectors. These often contain an annex with staffing information (number of employees, salaries). Although these were not always detailed enough, they did prove to be useful input for estimates of environment-related employment in government sectors.

5. Contacts with industry organisations and ministries: In addition to the knowledge within the Bureau, many external sources were used on an ad-hoc basis to gather data on environment-related employment. In the course of this project, various environment-oriented organisations several times were also contacted. For central government several informants were available at ministries.

6. Confronting sources: Where possible or necessary, different sources were consulted for the same item. Confrontation of these sources served as a reliability check and gave an idea what the maximum error would be while making estimates.

2.5.4 PORTUGUESE STUDY (ROMAO, 2000)¹⁵

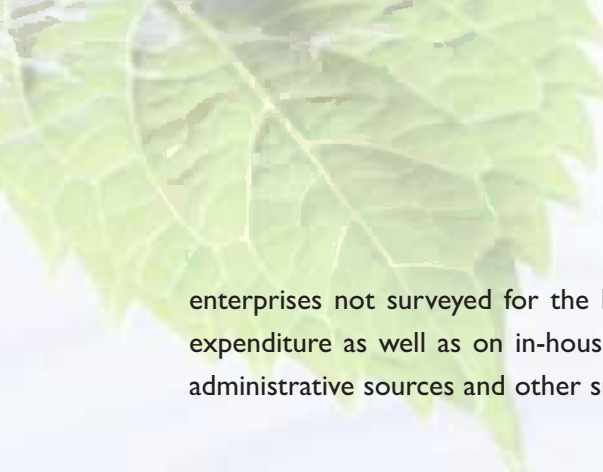
The aim of the Portuguese project was to appraise the “Environmental industry”, which for the Portuguese comprises the commercial production of goods and services aimed at measuring, preventing, limiting or making good damage to the environment, for example, water, atmospheric and soil pollution, waste management, noise, and general threats to ecosystems.

The principal concepts for environmental domains and definitions of an environmental protection activity were drawn from the SERIEE Manual (1994). This study’s database was drawn from the Portuguese General Register of Statistical Units, with additional data derived from the membership list of the Portuguese Environmental Technology Industry Association and from consultation with various business publications and directories of enterprises active in environmental protection.

Enterprises considered for this survey were those classified in NACE Rev.I 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. This report also included enterprises with other economic activities falling within the definition of the environment industry.

Given that financial data were also required by the Portuguese Harmonised Business Survey, and with a view to lightening the burden of response on businesses, financial data were requested only from

¹⁵ Romao (2000), *Environment industry and employment in Portugal*.



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 was based, respectively, on administrative sources and other surveys performed by other international statistical institutions.

2.5.5 SWEDISH STUDY (TANGDEN AND SVENSSON, 2000)¹⁶

This project adhered to the OECD/Eurostat definition of EGS industry. This study also includes some additional information on environment and economy, for example, environmentally certified enterprises and employees with environmental education. These were not included in the estimations on the size of the environment industry.

In Sweden the concept of environment-driven enterprises has been used as a comparison to pure environment-technology enterprises, as explained below:

Pure environment-technology enterprises supply products and services linked to cleaning-techniques, recycling, waste management, measurement of emissions, and energy production. The main purpose of the environment driven enterprises are not environment, but environment is a major force behind process- and product development as well as marketing.

These concepts are complemented by a distinction between pure environment techniques and environmentally adapted techniques:

- The main purpose of the pure environment technique is to treat emissions, pollution and waste. This is equivalent to the concept of end-of-pipe technology.
- Integrated or clean technologies includes techniques, services and methods of reducing the risk of negative effects of the environment: i.e. minimising resource and energy consumption, reducing the generation of waste, using cleaner production resources and environmentally adapted products.

The general definition of the OECD/EUROSTAT working group includes both the pure environment-technology enterprises and the production of environmentally adapted techniques. It does however exclude some of the environment driven enterprises as this concept also includes enterprises with environmentally friendly production.

The work conducted by the Swedish researchers can be divided in five steps:

I. Identifying names of enterprises/establishments with business activity under the OECD/ Eurostat definition of the environment industry. Sources included Internet searches, the telephone directory, the

¹⁶ Tangden, Nyman and Johansson (1998), *Environmental Industry in Sweden*. See also Tangden and Svensson (2000), *The environment industry in Sweden, 1999*. and Statistics Sweden (2000).



Swedish business register, key words and core industries, the Swedish EnviroNet, an EU-report¹⁷, manufacturing statistics and energy statistics, other databases, business organisations, enterprises participating in the Swedish fair for environment technology, Statistics Sweden's Survey of waste management, advertisements and articles in press and television.

2. Classifying the identified enterprises/establishments by environment industry classes and status (i.e. degree of specialisation in environmental activities).

3. Matching the list of identified enterprises/establishments with the Swedish Business Register in order to get the enterprise/establishment numbers.

4. The result is a database with two parts, one for enterprises and one for establishments. The two parts of the database are basically compatible, but differ to some extent due to the fact that some of the enterprises have establishments dealing in different business activities. An important example are municipalities (they are treated in the same way as enterprises) that can have establishments involved in very different activities such as schools or nursing (not included under environment industry) as well as wastewater treatment which is included. In these cases the enterprises were not included so that the establishment part of the database is more comprehensive than the enterprise part.

5. Linking the enterprise/establishment numbers with other registers – the Register for value added tax (VAT) in order to produce data about turnover and export- import figures and a database with data about education of the employees.

2.5.6 KOREAN STUDY (KOREA ENVIRONMENT INSTITUTE, 2006)¹⁸

Because the Korean economy was in a recession in 2000, the Korean government was unsure whether policies to improve the environmental quality would come at a detriment to economic development. The study in question (Korea Environment Institute, 2006) builds on a previous study which showed that there is at least no trade-off between economic development and environmental protection and studies the relationship between environmental policy and job creation in more depth.

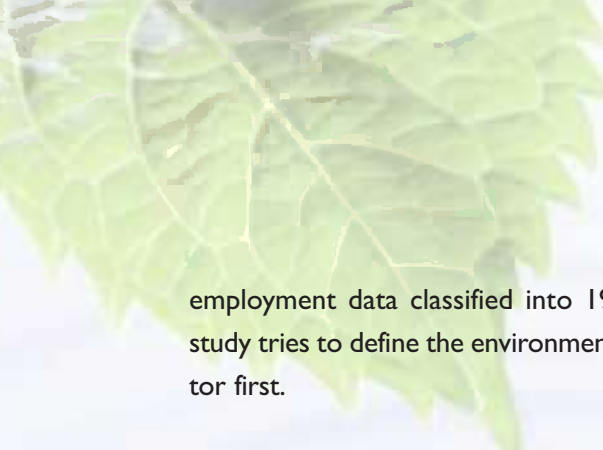
Environmental policies are divided into three categories:

- a policy that can affect the environmental industry
- public expenditure for natural environmental protection
- the effect of renewable energy industry on job creation

The Korea Employment Information Service (KEIS) annually publishes the Occupational Employment Statistics (OES) based on individual surveys. These statistics provide information on occupational

¹⁷ ECOTEC, BIPE and IFO (1996), *Data Collection on Eco-Industries in the EU*.

¹⁸ Korean Environment Institute (2005), *Job Creation and Environment Policy*.



employment data classified into 194 industrial sector with 392 occupational categories. This country study tries to define the environmental jobs directly, instead of passing from the definition of the EGS sector first.

This study analyses the distribution of workers who have environment-related jobs with these statistics. The occupations which are related to the environment in the OES are then categorized as environmental engineers, environment/health hygiene workers, operator of environmental facilities, managers, and cleaners. Among them, the first three occupations can be high-skilled labour jobs and the last two occupations are low-skill labour. When sorting the environment-related occupations, this study only takes into consideration the occupations which in their title indicate a direct relationship with the environment.

Specifically, environmental engineers are the engineers whose job is related to sewage system, waste or waste water treatment, clean technology development, noise protection technology, pollution air prevention technology, and so on. The environment/health hygiene workers engage in inspections of water, air, noise, waste treatment and other environment-related matters. The operators of environmental facilities are the people whose job is related to sewage or water supply facility operation and incinerator facility operation. The managers and cleaners are the people who engage in environmental service businesses.

When it comes to arriving at a total estimate for the number of green jobs, the KEI analyses the distribution of environmental jobs and assigns weights. With these weights, the KEI estimates the whole labour market size and the whole environment labour size.

2.5.7 WESTERN AUSTRALIA STUDY (GREEN SKILLS, 2003)¹⁹

The State Department of Education and Training commissioned a survey to provide previously unavailable information on the current state of the green jobs sector in Western Australia.

This report defines a green job as a job which reduces the negative impact made on the environment, relative to the status quo. These jobs occur across all industry sectors. This broad definition would allow green jobs to be thought of as occurring across a spectrum from innovations that reduce the environmental impact of traditionally “dirty” industries (for example, aluminium smelter), to jobs that are entirely new and have been initiated primarily to address specific environmental problems. Hence these jobs occur across all industry sectors. Jobs and businesses that have been created to primarily address specific environmental needs are referred to as environment industries.

In terms of the approach adopted, a questionnaire form was mailed and emailed to environmental businesses and organizations from an environmental database and industry association contacts. In addition, a random selection of general businesses from the electronic White Pages telephone directory were contacted. Phone and fax follow up was also followed up.

¹⁹ Green Skills (2003), *Environmental Jobs in Western Australia: results of the 2002 Employer Survey*.



The four key industries represented in the 'Environmental Sector' sample were:

- government/ administration/ defence
- agriculture/ fishing/ forestry
- construction/ and
- mining/ mineral processing.

2.5.8 UNITED STATES STUDY (US BUREAU OF THE CENSUS, 1998)²⁰

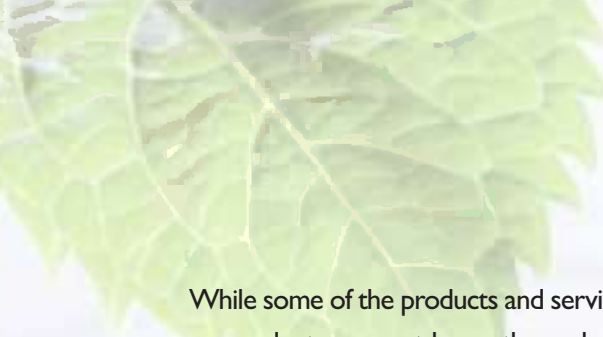
For the purposes of this survey, the environmental industry was defined as the manufacture of products, performance of services and the construction of projects used, or that potentially could be used, for measuring, preventing, limiting or correcting environmental damage to air, water, and soil. The industry also included services related to the removal, transportation, storage, or abatement of waste, noise, and other contaminants. The list of specific products and services falling under the scope of this study was developed based on various definitions and classification systems, consultation with government agencies and the private sector, and the work of the OECD.

This study acknowledges the fact that in the US (at the time of the study) there was no single industry in the US classification for environmental goods and services. Rather, businesses involved in environmental activity cross industries in the manufacturing, service, and construction sectors. To develop a framework for conducting the survey, the researchers identified the industries that included businesses likely to produce the product or provide the services.

The US study selected a representative sample of the environment industry in the following manner:

1. The value of shipments of environmental products and revenues for environmentally- related services provided by private businesses. Information about the shipments of products was available at individual plants.
2. For service activities, the consolidated business enterprise was chosen as the reporting unit.
3. The construction projects of interest are generally built by establishments classified in one of three construction industries. However, construction establishments often are formed temporarily to support current construction projects. They can be dissolved and new establishments created for new projects. Therefore, the consolidated business enterprises were chosen as the reporting unit for construction activities because establishments within the enterprises were subject to change.
4. To select samples of manufacturing plants, companies with service activities and companies with construction activities involving different types of reporting units and differing sources of information, samples were separately selected for each sector.

²⁰ US Bureau of the Census (1998), *Measuring the Environmental Industry in the US*. Similarly, Berg and Ferrier (1998), *The US Environmental Industry*.



While some of the products and services are clearly for environmental use, others have multiple end uses. Since respondents may not know the end use of their products or services, the US researchers asked them first to report the value of the products or services listed; then, if any portion was for environmental use. Respondents that were involved in an activity which was exclusively non-environmental were considered within the scope of the survey since they were in the target population of potential manufacturers or service providers.

Since for some businesses, respondents may have indicated no environmental activity based on their perception that their company is not in an environmental business, the researchers interviewed a small group of respondents to learn more about their perception of environmental activity.

2.5.9 CANADA STUDY (INDUSTRY CANADA, 2002)²¹

This report defined the environment industry as “. . .all companies operating in Canada that are involved in whole or in part in the production of environmental goods, the provision of environmental services and the undertaking of environment-related construction activities.”

For the purposes of this study, a definition similar to the above US report was used to define the environmental goods and services industry. It included those goods and services that are used, or can potentially be used to, measure, prevent, limit or correct environmental damage (both natural or by human activity) to water, air, soil as well as problems related to waste, noise and ecosystems. They also include clean or resource-efficient (“eco-efficient”) technologies that decrease material inputs, reduce energy consumption, recover valuable by-products, reduce emissions and/or minimise waste disposal problems.

This definition focuses on the end-use instead of the physical attributes of goods and services. It also addresses the core question: “Does a particular good or service exist in the market either solely or partly because of its environmental component?”

2.6 CONCLUSION

This chapter has reviewed the academic literature and current practice used by international and national statistical organisations in defining and measuring the environmental goods and services industry. It has given a comprehensive review of definitions and methodologies used in international studies assessing environment-related employment and the environment sector.

This study will be using the framework which is closest to the main authoritative methodology, namely, the OECD and the countries which have shown to have the best practice, such as the Netherlands. It would of course adapt this framework to fit Maltese economic characteristics and the level of compliance currently in practice on the island.

²¹ Industry Canada (2002), *Canada's Environment Industry: An Overview*. Similarly, Statistics Canada (2002), *Environment Industry Survey: Business Sector*.





EU Environmental Acquis Related to Malta



This chapter reviews the transposition and implementation of the EU environmental legislation in Malta. It includes as well any upcoming legislative proposals by the EU in each respective field. The following sections will focus intentionally on that particular environmental legislation that may have most relevancy and impact on environmental job creation. Compliance to environmental legislation necessitates the demand for goods and services from the environment industry. In turn the supply of these goods and services, like any other form of economic activity, requires the use of resources including human resources.

To review holistically the large volumes of cross cutting EU environmental legislation this section classifies EU environmental legislation into two main groups: sectoral and horizontal. The sectoral legislation addresses air pollution, solid waste, water and soil pollution, noise pollution, and nature protection and biodiversity. The horizontal legislation addresses the EU environmental monitoring and planning, including product policy.

3.1 AIR

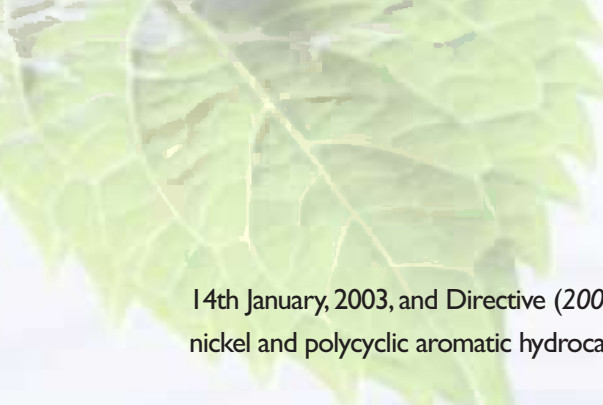
The European air protection legislation may be classified into five main areas the:

- Air Quality Framework and Daughter Directives
- National Emission Ceilings (NECs)
- Large combustion plants Directive
- Directives for mobile (light and heavy duty vehicles) and non mobile combustion engines
- Other regulations on particular chemicals affecting air quality

3.1.1 THE AIR QUALITY FRAMEWORK AND DAUGHTER DIRECTIVES

The Framework Directive on ambient air quality assessment and management (96/62/EC) lays down common rules and principles for setting air quality limit values to be met everywhere in the EU. It lists 12 pollutants for which legislation, including assessment and monitoring functions together with setting of limit values and timeframes for the development of the so-called “Daughter Directives”. These Daughter directives are:

- Directive (1999/30/EC) which sets limit values for sulphur dioxide, oxides of nitrogen, particulate matter, and lead in ambient air. This was transposed into national legislation in through L.N. 224 of 2001 and came into force on 28th June, 2002;
- Directive (2000/69/EC) which sets limit values for benzene and carbon monoxide (CO) in ambient air which was transposed into national law under L.N. 163 of 2002 and came into force on 1st May 2004;
- Directive relating to ozone (2002/3/EC) sets non-binding target values for ozone in ambient air. This was transposed into Maltese legislation under L.N. 11 of 2003 and came into force on



14th January, 2003, and Directive (2004/107/EC) which sets non-mandatory target values for arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons (PAHs) as well as specifying monitoring requirements for mercury.

All Directives require the development of pollution reduction plans by Member State authorities. When a certain concentration of pollutants is exceeded as specified in the different Directives, plans and programmes have to be developed, listing the different policy actions the authority plans to take for achieving the standard. These plans and programmes have to be reported to the Commission and to be made available to the public, in order to allow citizens to trace progress towards meeting the standards in line with access to environmental information laws.

The assessment and monitoring function of the Ambient Air Quality as stipulated in the Framework Directive was transposed into national legislation under L.N. 216 of 2001 on Ambient Air Quality Assessment and Management Regulations, 2001. This came into force on 8th October 2002.

A Preliminary assessment of air quality in Malta undertaken by AEA Technology plc in August of 2002²² highlighted that “Based upon these measurements/surrogate information and guidance provided by the Directives, it has been established that levels of air pollution in Malta are above or, where measurements are not available, likely to be above thresholds which require fixed measurements to be made for compliance with the Daughter and Framework Directives.” One of the recommendations emanating from this report involves the setting up of an air quality monitoring programme.

One of the initiatives undertaken by MEPA in line with the above recommendation was the restructuring of the diffusion tube network in order to have a better spatial coverage over the Maltese Islands which includes 44 localities in Malta and Gozo monitoring monthly averages for nitrogen dioxide, sulphur dioxide, ozone, benzene, toluene, xylene, ethyl benzene and o-xylene. Another initiative involved the setting up of five automated real time measuring stations in Floriana, Msida, Kordin, Zejtun and Gozo. The above air monitoring initiatives have helped considerably in measuring the air quality of the Maltese islands and assess Malta’s compliance and reporting under the Air Quality framework directive and respective daughter directives.

This section focusing on five of the pollutants outlined in the daughter directives (PM, O₃, Benzene, NO₂ and SO₂) which are outlined in the indicators section of the State of Environment Report for 2006²³.

3.1.2 PARTICULATE MATTER - (PM₁₀)

(PM₁₀) concentrations in 2005 were measured at the Floriana and Kordin real-time air quality monitoring stations. At Floriana the daily EU threshold of 50 micrograms per cubic metre (µg/m³) was exceeded in 126 out of 310 days measured. At Kordin, 81 out of 292 days measured were above the EU threshold²⁴. These results highlight a lack of compliance with the EU threshold of 50 µg/m³ since this should not be exceeded more than 35 times a year.

²² AEA Technology plc, (August, 2002) *A Preliminary assessment of air quality in Malta*.

²³ MEPA (2006) *State of the Environment Report*.

²⁴ Number of Exceedences of PM₁₀ in 2005 –MEPA (2006) *State of the Environment Report*.



OZONE - (O_3)

Ozone concentrations were measured at the Floriana, Kordin and Gozo real-time air quality monitoring stations. At Floriana the $120\mu\text{g}/\text{m}^3$ EU threshold (not to be exceeded more than 25 times per year) was recorded on 3 out of 328 days measured, while no excesses were recorded at Kordin. Gozo exceeded the EU threshold 89 out of 271 days measured. This difference between the Kordin and Gozo recordings results from the fact that O_3 is found at higher concentrations in areas less affected by traffic this is compounded further by the fact that the majority of O_3 in the Maltese Islands is of transboundary origin²⁵. From the above monitoring results it can be inferred that there is general compliance with the respective EU threshold of $120\mu\text{g}/\text{m}^3$.

BENZENE – (C_6H_6)

Benzene concentrations were measured through the diffusion tube network. As stated in the SOER the average annual benzene concentrations declined by 27% between 2004 and 2005 and no localities exceeded the EU limit value of $5\mu\text{g}/\text{m}^3$ ²⁶. It may be inferred that improvement in air quality with respect to Benzene may be partly attributed to the entry into force of the Quality of Petrol and Diesel Fuels Regulations under L.N.222 of 2001 which outlines specifications whereby fuels sold should contain no lead and no more than 1% by volume of benzene.

NITROGEN DIOXIDE - NO_2

NO_2 concentrations were measured through the diffusion tube network. As stated in the SOER the concentrations of NO_2 at a national level are well below the $40\mu\text{g}/\text{m}^3$ annual EU limit for human health protection. However between 2004 and 2005 there was a 13% increase in national NO_2 concentrations²⁷. It must be noted that the daughter directive makes reference to other oxides of nitrogen (NO_x) and not only NO_2 . The annual EU limit value for the protection of vegetation as outlined in the Daughter Directive is $30\mu\text{g}/\text{m}^3$ NO_x which cannot be assessed with the above monitoring results.

SULPHUR DIOXIDE - SO_2

SO_2 concentrations were measured both at the Floriana, Kordin and Gozo real-time air quality monitoring stations. The daily average limit value of $125\mu\text{g}/\text{m}^3$ (that should not be exceeded more than 3 times a year) was exceeded on only 2 days in Floriana. At Kordin this limit was not exceeded²⁸. It is likely that the continued improvement in air quality with respect to SO_2 is due, as was the case also in 2004, to the switch to low sulphur fuels in March 2004²⁹.

In view of the above monitoring results the main compound that needs immediate action to come in line with the Air Quality Framework and respective Daughter Directives is Particulate Matter - (PM10). NO_2 and NO_x may need the adoption of a mitigation plan in view of its 13% increase. The absence of monitoring of Arsenic, Cadmium, Nickel, Polyaromatic Hydrocarbons (PAH) and Mercury questions the degree of compliance with the non mandatory obligations stemming from Directive 2004/107/EC.

²⁵ Ozone Concentrations – Ibid.

²⁶ Benzene Concentrations – Ibid

²⁷ Nitrogen Dioxide Concentrations – Ibid

²⁸ Sulphur Dioxide Concentrations – Ibid

²⁹ LNI59 of 2002 on the reduction of sulphur content of certain liquid fuels regulations – whose purpose is to reduce the emissions of sulphur dioxide by reducing the percentage of sulphur content within fuels.

3.1.3 COMMENT

The above evaluation shows that air monitoring plans are needed particularly for PM and proactively for NO_x. This would require MEPA to implement air management plans for the above pollutants in designated areas.

The dissemination of information particularly through the SOER is a step in the right direction in the provision of information on air pollution. The provision of more timely information to the general public through the setting up of information points at Kordin, Floriana and Gozo would also conform to the legislation providing for the access of environmental information to the public³⁰.

The improvement of the monitoring function to include the compounds outlined in Directive 2004/107/EC would also demand added resources.

To address the above obligations besides capital costs a certain degree of employment within MEPA (or within agencies subcontracted by MEPA) would be expected.

3.1.4 THE DIRECTIVE ON NATIONAL EMISSION CEILINGS (NECs)

Directive 2001/81/EC on national emission ceilings (NECs) covers four air pollutants, namely sulphur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and ammonia (NH₃). It sets long-term environmental and health objectives with regard to air pollution in the European Union as well as interim environmental objectives which include:

- Acidification - The areas where critical loads are exceeded to be reduced by at least 50% in all areas compared with the 1990 situation.
- Health-related ozone exposure - Ground-level ozone above the critical level for health to be reduced by two-thirds in all areas compared with the 1990 situation.
- Vegetation-related ozone exposure - Ground-level ozone above the critical level for vegetation to be reduced by one-third in all areas compared with the 1990 situation.
- These interim objectives should be met by 2010. The Directive further specifies country-by-country emission ceilings to be attained by 2010. Malta's National emissions ceilings for SO₂, NO_x, VOCs and NH₃ are 9, 8, 12 and 3 kilo tonnes respectively.

Malta transposed this directive into national legislation through L.N. 291 of 2002 National Emission Ceilings for Certain Atmospheric Pollutants Regulations which came into force on 14th January 2003. Malta's reporting of National Programmes under the National Emissions Ceilings Directive was presented to the Commission in December 2006³¹.

³⁰ L.N. 217 of 2001 - Freedom of Access to Information on the Environment Regulations, 2001.

³¹ MEPA – (December 2006) *Reporting of National Programmes under the National Emissions Ceilings Directive (2001/81/EC)* – http://ec.europa.eu/environment/air/pdf/nat_prog/necd.pdf



An independent evaluation of the national plans submitted to the Commission was undertaken by AEA Energy and Environment in April 2007³² highlighting that Malta's targets for each of the above four pollutants should be achieved with the implementation of the respective measures outlined in Malta's National Programmes under the National Emissions Ceilings Directive.

With the above study in mind the Commission is currently reviewing the NEC Directive for the development of new ceilings for 2020. It is these revised ceilings for the year 2020 which will increase the amount of resources devoted to complying with a revised directive. This originates from developments under the Clean Air for Europe (CAFE)³³ initiative which indicates that the NEC-Directive may be including national emission ceilings for particulate matter. This would increase the urgency for a pollution reduction plan for particulate matter as outlined above in view of a lack of compliance with the PM₁₀ EU threshold under Directive (1999/30/EC).

The main mitigation measures outlined in Malta's National Programmes under the National Emissions Ceilings Directive include conformity to the Large Combustion Plant Directive (LCPD) and conformity to Euro 4 / IV standards in light and heavy duty vehicles. The employment impact of the above two measures will be outlined below in the below sections.

Conformity to the Large combustion plant directive and Euro 5 / V standards for mobile vehicles outlined in other sections of the report should allow Malta to conform to upcoming 2020 targets under the new NEC Directive.

3.1.5 THE LARGE COMBUSTION PLANTS DIRECTIVE

The first EU Directive on Large Combustion Plants entered into force in 1988 (88/609/EEC). The emission reductions required by this Directive did not at all reflect what technology could deliver at that time. In October 2001, it was replaced by the second LCP Directive (2001/80/EC), setting stricter standards for some categories of plant and including more plants within the scope of the Directive.

The Large Combustion Plant (LCP) Directive (2001/80/EC) applies to combustion plants with a thermal capacity greater than or equal to 50 megawatts (MW). The Directive sets emission limit values for three categories of plants:

- plants licensed before July 1987 (so-called existing installations)
- plants licensed between July 1987 and November 2003 (so-called "old" new installations)
- plants licensed after November 2002 (so-called "new" new installations)

The limit values vary according to the age and capacity of the plants, as well as the type of fuel they burn as is outlined in the two tables below:³⁴

³² Evaluation of national plans submitted in 2006 under the National Emission Ceilings Directive 2001/81/EC – AEA Group – 28th April 2007 - http://ec.europa.eu/environment/air/pdf/nat_prog/nec_report.pdf

³³ Clean Air for Europe - <http://ec.europa.eu/environment/air/cape/index.htm>

³⁴ Acid News – No.3 – October 2001 - <http://www.acidrain.org/pages/publications/acidnews/2001/AN3-01.pdf>

Table 1 - Emission limit values for SO₂ and NO_x from plants to be built after 2003 (mg/m³).

Plant size (MW _{th})	Sulphur dioxide			Nitrogen oxides		
	50-100	100-300	>300	50-100	100-300	>300
Solid fuels ¹	850	200	200	400	200	200
Liquid fuels	850	400-200 ³	200	400	200	200
Biomass	200	200	200	400	300	200
Natural gas ²	35	35	35	150	150	100

¹ Where the emission limit values for SO₂ cannot be met due to the characteristics of the fuel, installations smaller than 300 MW_{th} shall achieve either 300mg/m³ SO₂ or a rate of desulphurization of at least 92 per cent. Larger plant must achieve a rate of desulphurization of at least 95 per cent or a maximum of 400mg SO₂/m³.

² Specifically for gas turbines using natural gas, the limit value in most cases being 50 maNO_x/m³

Table 2 - Emission limit values to be applied from January 1, 2008 for SO₂ and NO_x from existing plants (built before 2003). Plant size in MW_{th} and emission limits in mg/m³.

Plant size	Sulphur dioxide			Nitrogen oxides	
	50-100	100-500	>500	50-500	>500
Solid fuels	2000 ¹	2000-400 ^{1,2}	400	600	500 ³
Plant size	50-300	300-500	>500	50-500	>500
Liquid fuels	1700	1700-400 ²	400	450	400
Plant size	>50			50-500	>500
Natural gas ²	35			300	200

¹ Where the emission limits for SO₂ cannot be met due to the characteristics of the fuel, various rates of desulphurization shall be achieved (from 60 to 94 per cent, with the highest rate applicable for plants with a greater capacity than 500MW_{th}).

The Large Combustion Plant was transposed into national legislation under L.N. 329 of 2002 - Limitations of Emissions of Certain Pollutants into the Air from Large Combustion Plants Regulations and came into force on 14th January 2003.

The Delimara Power station with a total generation capacity of 304MW and the Marsa Power Station with a total generation capacity of 267MW fall under the scope of this directive. Enemalta has prepared an Electricity Generation Plan for 2006 – 2015³⁵ in which electrical energy consumption up to

³⁵ Enemalta Corporation (June 2006) *Electricity Generation Plan 2006 – 2015*

³⁶ Enemalta News release – 31st August 2007



2010 was estimated which also presented a number of plans for the reduction of emissions to comply with the LCPD whilst satisfying future energy demands. These include:

- Commissioning a new 100MW power plant by end 2009 in compliance with the LCPD;
- Operating the 'existing' (pre-July 1987) combustion plant at Marsa for not more than 20,000 hours from 1st January 2008 in compliance with the LCPD, which will come to an end in April 2010, and
- Modifications of boilers 1 and 2 at the Delimara Power Station to comply with the LCPD by end 2009.

The Electricity Generation Plan for 2006 – 2015 makes reference to the installation of a submarine cable linking Malta to the European electricity grid, which would enable Malta to buy energy from green sources in Europe.

The advantages of this major investment were it to take place, would provide a significant boost to clean air in Malta. The dismantling of the Marsa Power station and the building of the submarine cable would create a number of jobs whose function is clearly in the environment field.

3.2 COMMENT

A substantial amount of economic activity will be generated in compliance with the obligations under the LCPD and the National Ceilings Directive. This will require both an increase in the provision of equipment and the use of specialised human resources, especially during the construction and upgrading phase. The amount of local employment could be minimal if as expected the potential subcontractors are foreign³⁶. A certain degree of temporary employment within the construction industry may take place in view of possible subcontracting.

Once constructed, Enemalta would need trained environmental engineers to run the above equipment / plant in line with the environmental obligations. Enemalta may provide an estimate of direct employment, though estimation of indirect spill over employment effects from such increased economic activity may be obtained through a separate study.

DIRECTIVES FOR MOBILE (LIGHT AND HEAVY DUTY VEHICLES) AND NON- MOBILE COMBUSTION ENGINES

The pollutant emissions from combustion engines are regulated independently. The Commission splits them as non mobile and mobile. In addition mobile vehicles are once again regulated separately for light-duty vehicles (cars and light vans under 3.5 tonnes) and for heavy-duty vehicles (trucks and buses). The exhaust emission requirements regulate four groups of compounds: nitrogen oxides (NO_x),

Hydrocarbons (HC), Carbon Monoxide (CO) and Particulate Matter (PM). Emissions are measured using a standardised test cycle that is designed to stimulate real driving.

LIGHT DUTY VEHICLES

For light-duty vehicles, the emission standard currently in force is Euro 4, as defined by Directive 98/70/EC. This entails emissions for particulate matter from diesel cars capped at 25mg/km, and NOx emissions from diesel cars and petrol cars capped at 0.25 g/km and 0.08g/km respectively.

Euro 5 will enter into force in September 2009. The main effect of Euro 5 is to reduce the emission of particulate matter from diesel cars from 25mg/km to 5mg/km.

HEAVY DUTY VEHICLES

The legislation currently in force for heavy-duty vehicles is Directive 2005/55/EC and its implementing provisions as outlined in Directive 2005/78/EC. This legislation defines the emission standard currently in force, Euro IV. This entails a 3.5g/kwh capping for NOx, 0.46 g/kWh HC and PM ratio of 20/30 MG/KWH. The next stage Euro V will enter into force in October 2008 the main effect includes stricter emissions for NOx³⁷.

Malta has transposed these directives in national legislation.

Malta's conformance to the current Euro 4 / IV standards and the upcoming Euro 5 / V for light duty vehicles and heavy duty vehicles, respectively, may be difficult in view of country specific conditions. A number of Maltese do not change their cars frequently³⁸. Those cars that have a catalytic converter in the Euro I standard is not effective in practice since the distances travelled are too small for such a technology to function in an efficient manner since the three way catalytic converter does not reach the required temperature due to short trip distances.

The vehicle roadworthiness test includes the exhaust emissions as from the 1st January 2005. The implementation of the exhaust emissions obligations will place an additional cost on the driving population to conform to such EU Standards.

The extra costs to conform to Euro 5 for a diesel car compared with Euro 4 is estimated to range between 200 – 400 Euros³⁹.

Besides costs to the driving population such standards will create increased investment and testing obligations for the Vehicle Roadworthiness Testing (VRT) service stations to comply with the above directives. In addition such legislation needs to be monitored by Transport authority officials which would also require additional capacity building.

The introduction of Euro 5 in September 2009 for light duty vehicles will increase obligations on diesel cars vis-à-vis PM. In light of the excess of PM thresholds under the air framework, compliance to Euro 5 is imperative. For heavy duty vehicles the increased obligations on NOx emissions which would

³⁷ Acid Rain – Environmental Fact Sheet No.17 – September 2004

³⁸ National Statistic Office - 42% of the vehicles purchased in 2004 and 2005 were second hand cars.

³⁹ Acid Rain – Environmental Fact Sheet No.17 – September 2004



come into force under Euro V in October 2008 would also require increased compliance testing by VRT stations and Transport Authority officials. Nevertheless once this investment and recruitment is undertaken to comply with Euro 4 / Euro IV, the incremental change to Euro 5 / V will be minimal.

NON MOBILE COMBUSTION ENGINES

In addition to light and heavy vehicles the EU regulates non-mobile combustion engines through directive 97/68/EC amended by Directive 2004/26/EC on measures against the emission of gaseous and particulate pollutants from internal combustion engines (non-road mobile machinery). Non-road mobile machinery is defined as any mobile transportable industrial equipment or vehicle with or without body work not intended for the use of passenger – or goods – transport on the road, in which an internal combustion engine as specified in the law is installed.

This is transposed into national legislation under LN299 of 2001 amended through LN77 of 2006 and outlines measures against the emission of gaseous and particulate matter from internal combustion engines. This affects activities (particularly enterprises) engaged in manufacturing activities.

3.3 COMMENT

The spread of enterprises engaged in manufacturing activities requiring combustion engines as part of their activities may be substantial. Considering the nature of the directive most costs related to complying with this directive will be capital in nature through the upgrading of internal combustion engines to EU standards. Therefore, increased direct employment stemming from this Directive is assumed to be small. The effect on MEPA (or respective subcontractor/s) to monitor compliance on the other hand would require a certain degree of investment in Human resources. It would require an independent study to assess the number of enterprises and the amount of investment in capital and HR costs.

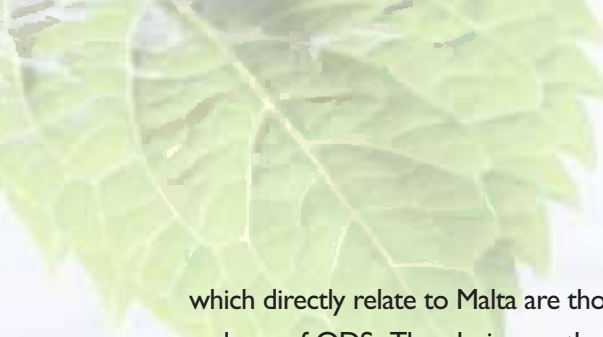
OTHER REGULATIONS ON PARTICULAR CHEMICALS AFFECTING AIR QUALITY

This section will look into other European Air Quality Directives that affect the quality of air stemming from particular pollutants. These include: ozone depleting substances (ODS), Volatile Organic Compounds (VOCs) and EU legislation governing Greenhouse Gas Emissions (GHG).

3.3.1 OZONE DEPLETING SUBSTANCES REGULATION

EU legislation that governs Ozone Depleting Substances (ODS) include Regulation (EC) 2037/00 on substances that deplete the ozone layer and Regulation (EC) 2037/00 (replacing Regulation (EC) 3093/94) creating a more stringent obligation on the phasing out of ODS together with earlier phase out periods than those laid down in the Montreal Protocol.

Malta transposed the above obligations through L.N.292 of 2002 as amended by L.N.145 of 2007. There is currently no production or export of ODS in Malta. To this effect the provisions in the legislation



which directly relate to Malta are those dealing with the importation, placing on the market and importation and use of ODS. The placing on the market, use and importation of HCFCs and methyl bromide needs to be phased out by 31st December 2009 and 31st December 2004 respectively. The regulation also obliges Member States to put in place systems for the recovery of controlled substances from out of service or discarded equipment, together with providing precautionary measures to deter and minimise leakages.

Compliance to limiting the placing on the market of HCFCs is not envisaged as a major stumbling block in the implementation of the above directive⁴⁰. With regards to the phasing out of methyl bromide, besides a certain amount of stock piling that took place prior to accession, the phase out requires investment by the farming community in alternative uses to methyl bromide. This would involve significant capital investments rather than any significant increases in employment. The increase in employment may be small from a consultancy of farms perspective, but minimal.

The setting up of recovery systems from discarded equipment and the development of precautionary measures to minimise leakages would on the other hand ideally require licensed operators by the competent authority. This would encourage the setting up of a limited number of potential operators in this field, with the potential of increased employment in the area of ODS checks. With regards to recovery this will be discussed further in the waste section where any waste containing ODS will be treated accordingly.

3.3.2 VOLATILE ORGANIC COMPOUNDS (VOCs)

EU legislation that limits the emissions of VOCs into ambient air can be grouped into two areas:

Directive 94/63 which specifies control measures on the emissions of Volatile Organic compounds during the storage of petrol and its distribution from terminals to service stations. This was transposed into national legislation through LN 214 of 2001. This legislation directly effects Enemalta's operations together with the various petrol distribution stations around the island.

The implementation of the above directive obliges the distribution stations and Enemalta's fuel distribution truck to invest in the vapour recovery systems required to contain and store emitted VOCs. The liberalisation of the fuel trading may require privatisation of the Enemalta fuel distribution arm. The private investors in the liberalised market would be obliged to invest in vapour recovery systems and employ skilled personnel to comply with the above directive. The volume of employment may be significant. This will depend on the number of operators in the liberalised fuel market.

VOC Solvents Directive 99/13/EC which focuses on the limitation of emission of VOC due to the use of solvents in certain activities and installations. The VOC Solvents Directive gives industrial operators a possibility to be exempted from the limit values, provided that they achieve by other means the same reduction as would be made by applying them.

⁴⁰ European Commission – DG AIDCO – April 2002. *Analysis and approximation for Malta in the field of environmental legislation*



The above directive was transposed into national legislation through L.N. 225 of 2005. The coating of road vehicles is exempt following L.N. 151 of 2007 amending LN255. LN78 of 2006 compliments the objectives of Directive 99/13 which limits the emission of VOCs contained in paints, varnishes and vehicle refinishing products. The drive behind the above legislation is to move to water based paints and limit the use of solvent based paints.

The above legislation effects activities (particularly enterprises) engaged in, but not limited to, adhesive or coating applied to a surface, dry cleaning facilities, manufacturing of pharmaceuticals and printing. The enterprises that fall within the scope of the L.N. were requested to apply for a solvent VOC-Emissions permits in 2006⁴¹ to ensure compliance with the implementation date of 31 October 2007 for existing installations.

The number of enterprises requiring VOC emission permits may be large. Following the request for permit operations an average of 20 installations (mainly dry cleaning and laboratories) are currently estimated to fall under this Directive. The mitigation costs which may include a move to water based paints, and the limited use of solvents may include capital investment costs and a certain degree of employment. Considering the nature of the directive most costs related to complying with this directive will be mainly capital investment in changing of production processes reducing the amount of VOC in line with permit requirements. In addition the large number of micro and small enterprises affected by this directive will not be in a position to recruit additional staff directly to comply with the directive. Therefore, any increased employment stemming from this Directive would be related to a small number of environmental managers in the large enterprises affected by this and other directives together with a small amount of recruitment in environmental compliance firms, which would be sub-contracted to ensure enterprise compliance.


3.3.3 GREENHOUSE GASES

To be better prepared for the launch of an international emissions trading scheme in line with the Kyoto obligations the European Commission kick started a Greenhouse Gas Emissions trading scheme across Europe whereby large industrial installations are allocated allowances for their greenhouse gas emissions according to the overall environmental ambitions of their government.

The scheme has been established through Directive 2003/87/EC as amended by Directive 2004/101/EC establishing a scheme for greenhouse gas emission allowance trading within the Community. This was transposed into national legislation through L.N. 140 of 2005 as amended through L.N. 274 of 2006.

As outlined in the Directive for each trading period each Member State has to prepare a National Allocation Plan in which it determines the total quantity of allowances to be allocated to relevant installations falling within the scope of the Directive.

⁴¹ Permit applications for VOCs from solvents as per LN 225 of 2001 - L



Malta submitted its National Allocation Plan for the 2005 – 2007 period which was accepted by the Commission⁴². A total allocation of 8.8 million tonnes of carbon dioxide was allocated which includes 6.5 million tonnes allocation for the power generating plants and 2.3 million tonnes which would be allocated to any new installations falling within the scope of the Directive.

Since the only two local installations falling within the scope of this Directive are the Marsa and Delimara power stations, the only stakeholder involved in the above Directive is Enemalta. Besides the respective capital investments and employment compliments outlined in the LCPD section Enemalta or MEPA (depending on the onus of responsibility) would require a small additional employment as part of their environmental team responsible for administering the greenhouse gas emissions scheme.

3.3.4 CLIMATE CHANGE, ALTERNATIVE ENERGY AND CLEANER TECHNOLOGY

One has to make reference here to the vast area of lifestyle and behavioural pattern changes being expected in order to mitigate the effects of climate change across all sectors, including households, transport and industry. In buildings, changes in occupant behaviour, cultural patterns and consumer choice can reduce energy consumption. In cities, urban planning and education can reduce car usage and promote efficient driving habits. In industrial organizations, staff training, reward systems, regular feedback, and documentation of existing practices can reduce energy use, and encourage the use of cleaner technology.

3.4 WASTE

This section will evaluate the EU waste legislation by classifying it into three main parts⁴²:

- Waste Framework legislation,
- Waste treatment operations, and
- Waste Streams

The framework legislation section can be grouped into two main areas:

The **Waste Framework Directive** (WFD) which was adopted in 1975 reviewed in 1991 and updated in 2006 to reflect the objectives of the EU Waste Thematic Strategy. The Waste Framework Directive provides the overall framework for waste management in the EU and as of 2006 incorporates the hazardous waste directive (91/689/EEC) and the waste oils directive.

The **Directive on the shipment of hazardous waste** was adopted (84/631/EEC), which was later replaced by a Regulation on waste shipments ((EEC) 259/93). The Waste shipment regulation (EC) No 1013/2006 builds on the Regulation EC/259/93 by providing a clearer and simplified legal framework.

⁴² Malta's National Allocation Plan for the period 2008-2012 is currently being discussed with the Commission in view of a 30 per cent reduction of the targeted allocations

⁴³ Stakeholder Information Meeting Thematic Strategies on the sustainable use of resources and on the prevention and recycling of waste – Brussels - 16 January 2006



The **waste treatment operations** may be grouped into three main areas Incineration, Landfill and Recycling. The EU legislation sets stringent requirements for landfills and incinerators. The EU adopted specific Directives on incinerators (now 2000/76/EC) and on land filling (99/31/EC). The Recycling component is currently planned to be part of the recycling strategy.

The last section focuses on waste streams which is detailed legislation which focuses on specific waste streams which include:

- Sewage sludge used in Agriculture
- Batteries and accumulators containing certain dangerous substances
- Disposals of waste oils (currently part of the WFD)
- Packaging and Packaging waste
- End of Life vehicles
- Disposal of Polychlorinated and Biphenyls and polychlorinated terphenyls (PCBs / PCTs)
- Prevention and reduction of environmental pollution by asbestos
- Electrical and electronic equipment
- Titanium Dioxide (to be included as part of the revised IPPC)

Most of these individual waste streams are rapidly growing and particularly important due to their hazardous or particularly complex character.

The above legislation seeks to ensure as much reuse, recycling and recovery as possible.


3.4.1 WASTE FRAMEWORK DIRECTIVE

The Waste Framework Directive 75/442 was adopted in 1975 and reviewed in 1991. The 1991 Directive was updated in 2006 by Directive 2006/12/EC to reflect the objectives of the EU Waste Thematic Strategy.

The 2006 Directive lays down the EU-wide definition of waste and provides for a European waste list which includes different categories of waste and hazardous waste as outlined in Annex of the 2006 Directive. In addition the Commission will present guidelines on other by products to further enhance the definition of waste.

The Directive also requires a permit for waste treatment or disposal operations, for which basic conditions are laid down in Annex IIA of the 2006 Directive. All persons who treat, eliminate, trade or handle waste, need a permit. For waste incinerators, the most relevant conditions are laid down in the waste incineration Directive; for larger installations the requirements of the Directive on integrated pollution prevention and control may also apply in supplement.

The Directive obliges Member States to draw up **waste management plans** and to report on the application of the Directive on a three year basis.



The hazardous waste directive (91/689 Directive as amended by 94/31 Directive) was previously considered as one of the framework legislation. It has now been repealed and included in the waste framework Directive. The new suggested text sets down four clear requirements that must all be satisfied in order to mix or dilute hazardous waste, thus offering a clearer and better protection of the environment.

Council Directives 91/689 and 75/442 have been transposed into Maltese legislation through L.N.337/2001 - Waste Management (permit and control) regulations and the waste management (Activity Registration) Regulations L.N.106 of 2007 (which provides additional guidance to those outlined in LN337/2001).

The Waste Management (Permit and Control) Regulations relate to permits need for any person proposing to set up and operate an undertaking that would need a waste production permit or a waste management activity. Any of the above activities is obliged to ensure that waste including hazardous waste is:

- safely stored,
- record quantity and nature of wastes,
- managed by a person who holds the required permits,
- dispose of this waste in an authorised waste management site, and
- frequency of collection, destination, mode of transport and treatment of such wastes.

Holders of Hazardous wastes besides conforming to requirements outlined in new waste framework directive on the mixing and dilution of such waste must ensure that such waste is securely packaged and labelled according to national and international standards.

Institutions affected by the above legislation includes energy industries, production and processing of metals, mineral industry such as quarries, chemical industry such as pharmaceutical and printing, sea ports and ship repair, hospitals, farms, slaughterhouses and any company producing hazardous waste.

3.5 COMMENT

The spread of such enterprises involved in waste generation activities is vast. Each enterprise would need to apply for a permit to MEPA and comply with the respective permit conditions. This has created a demand for certified waste collection and processing facilities which will assist the enterprise comply with the permit obligations at a fee which also includes Waste oils which has been incorporated in this Waste Framework Directive.

Wasteserv is one of the main operators creating the general conditions for disposal (i.e. landfill or recycle). In line with this a number of privately own companies are currently applying for permits with MEPA to handle various forms of waste streams. This is creating a small waste management and disposal industry which is increasing in activity and may generate a substantial amount of employment as is specifically described in the section on specific waste streams.



3.5.1 WASTE SHIPMENT REGULATION

The Waste shipment regulation (EC) No 1013/2006 builds on the Regulation EC/259/93 by providing a clearer and simplified legal framework. Its objective is to ensure that waste is handled in an environmentally-sound manner throughout the shipping process, including recovery or disposal in the country of destination. The 2006 regulation came into effect repealing the 1993 regulation on the 12th July 2007.

The regulation provides for greater enforcement measures. It requires Member States to carry out inspections and spot checks. It also allows for physical checks of shipments - such as the opening of containers - to be carried out, and obliges Member States to report to the Commission on their legislation and penalties on illegal waste shipments.

The regulation is based on the commitments undertaken by the European Union within the context of the Basel Convention and the OECD Decision on the transboundary movements of waste. The EU regulation goes a step further and includes provisions on the shipment of waste between Member States.

The regulation lays down criteria for the type of waste shipment that is banned to non-EU countries and the notification procedure and information requirements. Conditions are also provided for taking back illegal waste shipments or shipments which cannot be completed and the financial assurances for returned shipments.

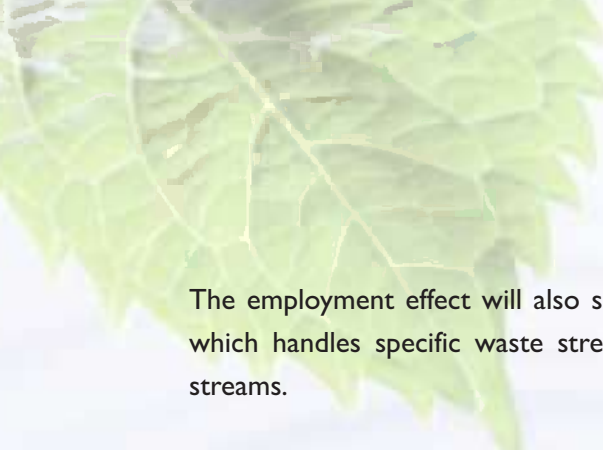
As a party to the Basel Convention Malta transposed the obligations laid down in the Basel Convention through L.N. 205 of 2000 - Control of Transboundary Movement of Toxic and other Substances Regulations, 2000 and came into force on the 17th September 2000.

In view of numerous sources of waste streams (as will be outlined in the section below) will be exported, obligations stemming from the above legislation will need to be carefully considered by all the waste management operators on the islands. It would be expected that most of them would choose to export waste for treatment and recycling abroad as an option. WasteServ is currently setting up a national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes⁴⁴, which include:

- Potentially hazardous wastes including asbestos
- Used batteries
- Used tyres
- End-of-life vehicles, and
- Consumer durable and electronic goods

The above export will have to be in line with the obligations outlined in Regulation 1013/2006. Wasteserv would need to employ a number of specialised staff, potentially set up a department, if not already in place, which will focus exclusively on the export of wastes in line with the Regulation 1013/2006.

⁴⁴WasteServeMalta: Storage, treatment of Hazardous Waste



The employment effect will also spill over onto the small waste management and disposal industry which handles specific waste streams as is specifically described in the section on specific waste streams.

WASTE TREATMENT OPERATIONS

Waste treatment operations may be grouped into three main areas Incineration, Landfill and Recycling. This section will review each section independently:

3.5.2 WASTE INCINERATION DIRECTIVE

The waste incineration (WI) Directive 2000/76, replaces earlier Directives on municipal waste incinerators and hazardous waste incinerators. The WI Directive makes a clear distinction between:

incineration plants (which are dedicated to the thermal treatment of waste and may or may not recover heat generated by combustion) and, co-incineration plants (such as cement kilns, steel or power plants whose main purpose is energy generation or the production of material products).

The Directive does not apply to installations which incinerate radioactive waste, animal carcasses or wood waste.

The Directive fixes detailed conditions for the construction and operation of incinerators, including the minimum temperature of burning waste. The Incineration Directive sets controls on releases to water in order to reduce the pollution impact of incineration on marine and fresh water ecosystems. The Directive also stipulates emission limit values for air emissions of a number of pollutants - including dust, halogenated gases, NO_x, SO_x, TOC, CO and heavy metals as well as dioxins and furans. The Commission is currently assessing the Waste Incineration as part of a review of the IPPC Directive.

The WI Directive was transposed into Maltese law through L.N. 336 of 2001 - Waste Management (Incineration) Regulations, 2001 and came into force on the 1st March 2002. The deadline to bring existing plants into compliance was 28 December 2005. Malta is almost certainly in breach of the above Directive when one considers the St Luke's Hospital Incinerator. Nevertheless, this is to be closed down when the new Marsa incinerator at the abattoir (which is in line with the Directives obligations) is planned to be operational by end 2007.

Malta is planning to have one incinerator which is in compliance with the above directive. This will be the Marsa abattoir incinerator. All waste (hazardous and non hazardous) to be incinerated will be sent to this incinerator.

To this effect Malta will be in compliance with the incinerator Directive in the coming months following a substantial capital investment in the new incinerator. The employment complement to run the new incinerator at the food and veterinary regulatory division would need to be beefed up with technical staff if this has not already been done.



3.5.3 WASTE LANDFILL DIRECTIVE

The EU legislation that governs landfills is Council Directive 99/31/EC on the landfill of waste. The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment from the landfilling of waste, by introducing stringent technical requirements for waste and landfills.

This Directive applies to all new and existing landfills which are in operation. Landfills are divided into landfills for hazardous waste, landfill for non hazardous waste and landfills for inert waste. All waste must be treated before disposal. Landfills for inert waste may not be used for other wastes, landfills for hazardous waste only for hazardous wastes. Liquid waste, hospital waste, complete tyres and explosive, corrosive or inflammable wastes may not be landfilled at all.

For climate change reasons (methane emissions), the disposal of the biodegradable municipal waste fraction is to be progressively reduced. The Directive also regulates in detail procedures (schedules 1, 2 and 3) for accepting wastes, provisions on measuring and control procedures and after care measures.

The above Directive was transposed into Maltese law through L.N. 168 - Waste Management (Landfill) Regulations, 2002 and came into force on the 8th October, 2002. The landfills in Malta that falls under the obligations of the above L.N. include:

- The Taz-Zwejra municipal waste,
- Ghallis hazardous waste landfill,
- Ghallis engineered land fill for non hazardous inert waste,

Together with the rehabilitation of the old Maghtab and Qortin landfill which also fall under the remit of this Directive (Schedule 3).

Wasteserv is the operator developing these landfills to comply with the land fill directive. The various bring in sites also being set up by Wasteserv assist in the separation of waste which will play a role in the reduction of municipal waste and will contribute towards the reduction of biodegradable waste being channelled to the landfills. For Wasteserv to implement the above obligations an increase in internal capacity may be required or subcontracted having an effect on employment.

The rehabilitation process of Maghtab and Qortin has been subcontracted to a foreign firm in partnership with a local enterprise while the design of the landscaping included bidders with both local and foreign companies which will surely create additional employment effects.

Besides Wasteserv a non exhaustive list of stakeholders affected by this Directive includes hospitals, the printing industry, importers of paints and tyres, the construction industry and households in general. The stakeholders outlined above will be using the services being offered by Wasteserv or private approved waste management operators where a charge may be applied for specific waste streams where applicable. To this effect the employment effect on these stakeholders is considered small.



3.5.4 RECYCLING

Unlike the landfill and incineration directives recycling is not governed by a specific directive but by waste streams. The European Commission has defined several specific 'waste streams' for priority attention with regards to recycling and reuse. These include packaging waste, end-of-life vehicles, batteries, electrical and electronic waste.

These Directives are discussed in further detail in the waste streams section to this effect the possible employment effect emanating from recycling is being addressed in the waste streams section of each respective directive.

WASTE STREAMS

This section focuses on detailed legislation on specific waste streams. Most of these waste streams are rapidly growing and particularly important due to their hazardous or particularly complex character. Each of the waste streams is discussed below

SEWAGE SLUDGE DIRECTIVE

The implementation of the Urban Waste Water Treatment Directive 91/271/EEC is increasing the quantities of sewage sludge requiring disposal across Europe.

The Sewage Sludge Directive 86/278/EEC seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. (Updates of the directive are envisaged later this year.)

To this end, it prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. To provide protection against potential health risks from residual pathogens the directive obliges that, sewage sludge used in agriculture must not be applied to soil in which fruit and vegetable crops are growing or grown, or less than ten months before fruit and vegetable crops are to be harvested. Grazing animals must not be allowed access to grassland or forage land less than three weeks after the application of sludge.

The Directive specifies rules for the sampling and analysis of sludges and soils. It sets out requirements for the keeping of detailed records of the quantities of sludge produced, the quantities used in agriculture, the composition and properties of the sludge, the type of treatment and the sites where the sludge is used. Limit values for concentrations of heavy metals in sewage sludge intended for agricultural use and in sludge-treated soils are also specified as annexes of the Directive.

This Directive was transposed into Maltese legislation through L.N. 212 of 2001 - The Sludge (Use in Agriculture) Regulations, 2001 and came into force on the 28th June 2002. The main source of sewage sludge will be from the urban waste water treatment plants that will be located in Malta and Gozo which are currently in their construction phase together with the Sant Antnin waste treatment plant which is currently being modernised.



The amount of sewage sludge will increase substantially over the coming years to comply with the urban waste water treatment directive when the Tal-Barkat waste water treatment plants will be operational starting 2008. In view of the increase in waste sludge in the coming years and its potential use in agriculture (if Maltese farmers decide to go that way) a substantial amount of work may need to be done to conform to this directive. Besides capital investment costs a significant employment effect may take place if Malta decides to use sewage sludge as part of the agricultural industry. Besides, the above discussion needs to take into account the new upcoming directive.

BATTERIES AND ACCUMULATORS CONTAINING CERTAIN DANGEROUS SUBSTANCES

Directive 2006/66/EC on batteries and accumulators repeals Directive 91/157/EEC and needs to be transposed in Member States by 28th September 2008. The Directive prohibits the placing on the market of certain batteries and accumulators with a proportional mercury or cadmium content above a fixed threshold. The Directive prohibits:

- batteries and accumulators, whether or not incorporated in appliances, containing more than 0.0005% by weight of mercury (except for button cells, which must have a mercury content of less than 2% by weight);
- portable batteries and accumulators, including those incorporated in appliances, with a cadmium content by weight of more than 0.002% (except for portable batteries and accumulators for use in emergency and alarm systems, medical equipment or cordless power tools).
- To ensure that a high proportion of spent batteries and accumulators are recycled, Member States must take whatever measures are needed to promote and maximise separate waste collections and prevent batteries and accumulators being thrown away as unsorted municipal refuse.

Member States have to make arrangements enabling end-users to discard spent batteries and accumulators at collection points in their vicinity and have them taken back at no charge by the producers. Collection rates of at least 25% and 45% have to be reached by 26 September 2012 and 26 September 2016 respectively.

This Directive was transposed into Maltese law through L.N. 158 of 2002 - Waste Management (Batteries and Accumulators) Regulations, 2002 and came into force on the 28th June 2002. In line with the above Directive, WasteServ is setting up a national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes which includes used batteries and accumulators. The collected batteries will be exported to be recycled.

To this effect the bulk of possible employment from the recycling of batteries is exported. The employment generation will be minimal and take place at Wasteserv to run the national system for the export of certain hazardous wastes.

Additional amounts of employment in the private sector may arise from the pre-treatment of such hazardous waste since this is not limited to batteries but also asbestos, tyres, end of life vehicles and electronic waste. This may generate some employment in the private sector but this may be minimal since it is clearly highlighted that not all hazardous waste will be treated locally. Thus even components of the employment effect from pre treatment may be exported.

3.5.6 WAIST OIL DIRECTIVE

The Waste Oil Directive 75/439/EEC, as last amended by Directive by Directive 2000/76/EC, was designed to create a harmonised system for the collection, storage, recovery and disposal of waste oils. The Directive also aims to protect the environment against the harmful effects of illegal dumping and of treatment operations. The Directive was transposed into Maltese legislation through LN 161 of 2002.

New scientific information shows that the regeneration of waste oils and their use as a fuel have positive environmental effects through the reduction of pollutants and greenhouse gases. On the other hand uncontrolled and polluting waste oil disposal still takes place in the EU.

To this effect the EU Commission is focusing its legislation on improving the collection of waste oils rather than favouring particular recovery techniques. The above focus is made clear through the insertion of the collection obligation in the new Waste Framework Directive. The Waste oil directive has now been incorporated into the revised waste framework directive permitting framework.

A number of private operators have applied for storage and processing permits in line with the waste management (permit and control) regulations in 2005 as was outlined in the Waste Framework Directive. These waste oil handlers and processors will generate employment in line with the increase in employment mentioned under the Waste Framework Directive. In view that a privately owned oil-water separation and filtration blending plant has been built the processing of waste oils in Malta can generate a reasonable amount of employment in view of the value added nature of this operation.

3.5.7 PACKAGING AND PACKAGING WASTE DIRECTIVE

The packaging waste legislation aims as a first priority at preventing the production of packaging waste and where not possible reusing packaging through recycling and recovery of packaging waste with the objective of reducing the disposal of such waste.

Directive 94/62/EC amended by Directive 2004/12/EC and Directive 2005/20/EC was transposed into Maltese law through LN98/04 amended by LN277/06, and came into force on the 1st March 2007. This legal notice highlights that any person, which in Malta may include manufacturers and importers who in the course of their business import, manufacture, convert, distribute, fill, pack or otherwise supply to other persons, is responsible to recycle and recover a percentage of the packaging waste placed on the market.

The targets set include 41% recovery and 35% recycling of their packaging waste by end 2007. These targets are set to increase to 60% and 55% respectively by end 2013. The spread of such manufactures and importers of packaging waste is vast. MEPA is currently requesting producers of packaging waste to register the types and amounts of packaging waste placed on the market during 2006 as of end of



September 2007 to conform to the LN277 of 2006.

There are specific licensed operators to operate a Packaging Waste recovery scheme. As was highlighted in the Waste Framework Directive other operators are applying for such permits with MEPA creating an industry for the implementation of a packaging waste recovery scheme creating a specific amount of private employment in line with this Directive.

The manufacturers and importers are conforming to the packaging directive by subcontracting these licensed operators to dispose of such wastes in line with the Directive at a fee. Therefore the employment effect would not be felt at enterprise service user level, but at the specialised operators level.

3.5.8 END OF LIFE VEHICLES

The end of life vehicles legislation places the responsibility on the producer for recycling and reuse of the vehicle when the vehicle has no more use.

The definition of producer includes both manufacturers and importers of cars. The producer is responsible to achieve the targets set out in the EU Directive 2000/35/EC. The directive was transposed into Maltese law by L.N.99/2004.

The targets set include that for all vehicles the reuse and recovery shall be increased to a minimum of 85% by an average weight per vehicle as of 1st January 2006. For vehicles produced prior 1st January 1980 the competent authority may lay down lower targets but no lower than 75% for reuse and recovery and not lower than 70% for reuse and recycling. The reuse and recovery shall be increased to a minimum of 95% by average weight per vehicle while the reuse and recycling shall be increased to a minimum to 85% by January 2015.

As was highlighted in the Waste Framework Directive a number of operators licensed to operate End of Life Vehicles (ELV) scheme have applied for permits with MEPA. This will be creating an industry for the end of life vehicles waste stream.

As was highlighted above ELV will fall part of Wasteserv national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes.

The collected vehicles will be exported to be recycled. To this effect the bulk of possible employment from the recycling of end of life vehicles is exported. The employment generation will be minimal and will mainly take place at Wasteserv to run the national system for the export of certain hazardous wastes.

The manufacturers and importers of cars may conform to the ELV directive by subcontracting these licensed operators to dispose of vehicles in line with the Directive at a fee. Therefore the employment effect at an enterprise level would be insignificant.

3.5.9 DISPOSAL OF POLYCHLORINATED AND BIPHENYLS AND POLYCHLORINATED TERPHENYLS (PCBs / PCTs)

Directive 96/59/EC on the disposal of PCBs and PCTs aims at disposing completely of PCBs and equipment containing PCBs as soon as possible, and for big equipment before the end of 2010. This Directive sets the requirements for an environmentally sound disposal of PCBs. Member States have to make an inventory of big equipment containing PCBs, have to adopt a plan for disposal of inventoried equipment, and outlines for collection and disposal of non inventoried equipment.

The directive was transposed into Maltese by L.N. 166 of 2002 - Waste Management (Polychlorinated Biphenyls and Polychlorinated Terphenyls) Regulations, 2002 and came into force on the 28th June 2002. Malta has a waste management plan for the decontamination and/or disposal of PCBs and PCTs⁴⁵. Two organisations have been identified as storing PCB's and PCTs.

In the absence of treatment facilities on the island an agreement for the exportation of PCBs and PCTs has been established with an appropriate facility in France for proper decontamination and disposal. Any bulky old household equipment that may contain substantial amounts of PCB's or PCTs within the regulation thresholds will be collected as part of the national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes and exported for treatment. Considering the small amounts of PCBs and PCTs on the island, and the export of such waste streams, the employment generation of to conform to the obligations of this Directive are expected to be minimal and mostly in the transportation sector.

3.5.10 PREVENTION AND REDUCTION OF ENVIRONMENTAL POLLUTION BY ASBESTOS

The EU Directive 87/217 focuses on the Prevention and Reduction of Environmental Pollution by Asbestos. The main objective of this Directive is to establish measures for the prevention and reduction of environmental pollution by asbestos for protecting human health and the environment. The competent authority⁴⁶ is obliged to:

Reduce asbestos emissions to the air in order to achieve the established limits for emissions (not exceeding 0.1 mg/m³) through Best Available Technologies ;

- Reduce asbestos content in waste water through waste water recycling;
- Reduce environmental pollution by asbestos in every activity where asbestos is present (i.e. the demolition of buildings, removal of asbestos from buildings and the transport of asbestos containing waste); and
- Monitor asbestos emissions into the air and discharges into water through established sampling and monitoring procedures.

⁴⁵ MEPA: Malta's Waste Management Plan for the decontamination and/or disposal of PCB's and PCT's http://www.mepa.org.mt/Environment/index.htm?waste/national_waste_register/mainframe.htm&l

⁴⁶ The Maltese competent authority identified for implementing Malta's obligations under this Directive is the Occupational Health and Safety Authority (OHSa) from a safety to workers point of view.



The above Directive has been transposed into Maltese legislation through L.N. 228 of 2001 - Prevention and Reduction of Environmental Pollution by Asbestos Regulations, 2001 which came into force on the 28th of June 2002. Since compliance to the above directive in Malta is primarily the transport and disposal of asbestos in line with the respective regulations this directive has been grouped under the waste legislation section.

A number of old buildings in Malta together with ad hoc storage sites have considerable amounts of asbestos that needs disposal in line with the above directive. As was outlined above, Wasteserv national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes includes asbestos. Since such waste streams are going to be exported the employment generation of to conform to the obligations of this Directive are minor.

On the other hand additional amounts of employment in the private sector may arise from the safe storage of asbestos and consultancy by private firms on the effective removal of asbestos.

ELECTRICAL AND ELECTRONIC EQUIPMENT

Directives 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment and 2002/96/EC on waste electrical and electronic equipment are designed to tackle the fast increasing waste stream of electrical and electronic equipment. Directive 2002/96 as amended by Directive 2003/108/EC was transposed into Maltese legislation through L.N. 63 of 2007 - Waste Management (Electrical and Electronic Equipment) Regulations 2007.

The 2002/96/EC Directive obliges producers (i.e. manufactures that sell electrical and electronic equipment under their own brand, resells electrical and electronic equipment under their own brand name produced by other suppliers or imports electrical and electronic equipment⁴⁷.) to take back and recycle electrical and electronic equipment.

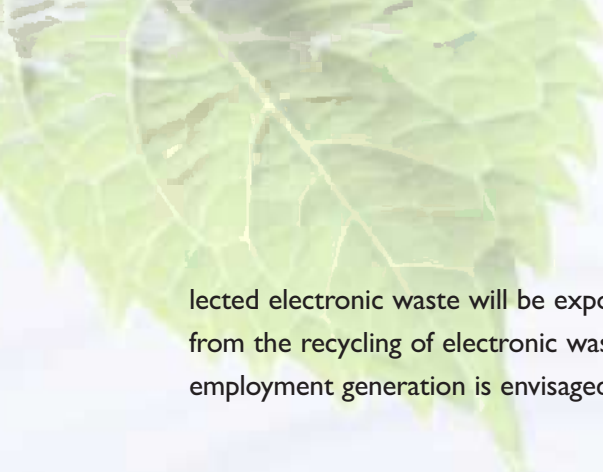
This will provide incentives to design electrical and electronic equipment in an environmentally more efficient way. Consumers will be able to return their equipment free of charge.

Directive 2002/95/EC requires the substitution of various heavy metals such as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)) in new electrical and electronic equipment put on the market from 1 July 2006.

As outlined in the LN each producers is obliged to register with MEPA by the 15 November 2007 with the necessary information for the year 2006. This is creating a demand for certified electronic waste collecting and processing facilities which will assist the enterprise comply with the permit obligations at a fee. There are a number of applications to MEPA from companies requesting a WEE storage and WEE processing facilities

As was highlighted above consumer durables and electronic goods will fall part of Wasteserv national system for the collection, interim storage, pre-treatment and export of certain hazardous wastes. The col-

⁴⁷ It is important to note that producers who manufacture or import electrical and electronic equipment goods for their own consumption (e.g. for their own manufacturing processes) are still obliged to register as producers.



lected electronic waste will be exported to be recycled. To this effect the bulk of possible employment from the recycling of electronic waste would occur in the countries where our waste is exported. The employment generation is envisaged only in the transportation and related sectors like storage.

3.5.11 TITANIUM DIOXIDE

Community legislation on waste from the titanium dioxide industry aims to prevent and progressively reduce pollution caused by waste from the titanium dioxide industry with a view to the elimination of such pollution.

The Directives on the titanium Industry span over 30 years with three main directives introducing rules on:

- Disposal (Council Directive 78/176/EEC),
- Monitoring and surveillance (Council Directive 82/883/EEC),
- Programs for the reduction of pollution (Council Directive 92/112/EEC).

Malta has transposed these Directives through LN223 of 2001 – Waste from the Titanium Dioxide Industry Regulations, 2001 and came into force on the 1st March 2002. Currently the Commission is undertaking an impact assessment with the objective to consolidate the above three directives and make them more relevant to today's operating practise potentially by incorporating them into the IPPC directive.

There are no TiO₂ producing plants in Malta and considering that this will fall under the remit of the IPPC directive in the coming years the employment effects (if any) emanating from this Directive will stem from the IPPC Directive discussed in the next section⁴⁸.

3.6 WATER

The future EU water legislation will be governed principally under the Water Framework Directive (WFD) which can be seen as an umbrella directive under which current and upcoming EU Water legislation will be governed. This section uses the principles of the WFD to simplify the varied EU legislation on water into 3 main groups of legislation:

- The Water Framework Directive;
- Directives to be repealed by the WFD by 2013, and
- Directives enhancing WFD environmental objectives by 2015;

3.6.1 THE WATER FRAMEWORK DIRECTIVE (WFD)

The Water Framework Directive 2000/60/EC will provide the major driving force for achieving sus-

⁴⁸ Correspondence with DG Environment – Sept. 2007.



tainable management of water in Malta and other Member States for many years to come. In summary, the Directive requires that all surface, ground and marine water within defined river basin must reach at least 'good' status by 2015. This will be achieved for each river basin by:

- Defining what is meant by 'good' status by setting environmental quality objectives for defined waters;
- Identifying in detail the characteristics of the river basin district, including the environmental impact of human activity;
- Assessing the present water quality in the river basin district;
- Undertaking an analysis of the significant water quality management issues;
- Identifying the pollution control measures required to achieve the environmental objectives;
- Consulting with interested parties about the pollution control measures, the costs involved and the benefits arising, and
- Implementing the agreed control measures, monitoring the improvements in water quality and reviewing progress and revising water management plans to achieve the quality objectives.

The WFD was transposed into Maltese legislation under L.N.194 of 2004 – Water Policy Framework Regulations – 2004 which came into force on the 23rd April 2004. Malta and Gozo are declared as one water catchment district with the aim of achieving good water quality status by the end of November 2015. The competent authority shall ensure that for each water catchment, it undertakes:

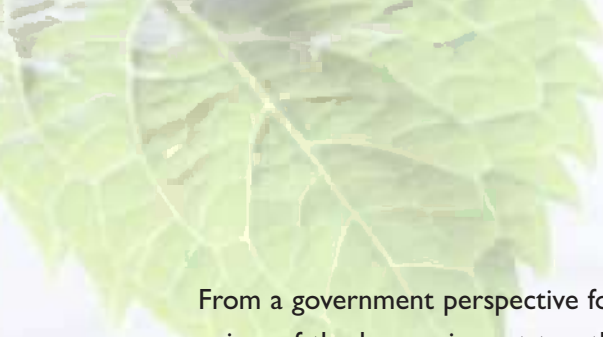
- An analysis of its characteristics
- A review of the impact of human activity on the status of surface and ground water, and
- An economic analysis of water use.

The competent authority also needs to estimate and identify significant point source pollution for substances listed in Annex VIII, from urban, industrial, agriculture and other installations and activities. Once identified, pollution controls may take the form of a requirement for prior regulation, such as prohibition on the entry of pollutants, prior authorisation, or the laying down of emission controls where allowed.

Following the above assessments the competent authority shall establish the respective measures (which will necessitate a strong element of public participation) by November 2009 and ensure that these are operational by November 2012 to ensure to reverse any significant and sustained upward trend in water pollution in order to reduce water pollution, by November 2015.

3.7 COMMENT

When assessing the implementation of the WFD up until 2015 the effects on potential employment are seen to be significant. This will include the capacity building of government departments, and to a smaller degree industry (particularly monitoring compliance) to implement various sections of the WFD. The activities falling under the WFD includes the monitoring and compliance function, the design of catchment area plans, the implementation of the catchment area plans and the issuing, certifying and monitoring of water discharge permits together with market authorisation permits.



From a government perspective following a detailed assessment of the water quality together with a review of the human impact together with an economic analysis of water use a catchment area plan may be developed together with the main stakeholders by 2009. This will require additional HR within MEPA and the private sector to which sections of this may be sub contracted.

The bulk of the human resource requirements will be in the implementation of the catchment area plan to ensure compliance by 2015.

This may include three areas of activity:

- Monitoring
- Prior authorisation permits, and
- Market authorisations.

MEPA is currently designing the **monitoring programme** under the Water Framework Directive. Once identified this will require a substantial amount of subcontracting for monitoring, this will require an increase in private sector monitoring capacity.

Such a **prior authorisation permitting system** for point source discharges limited to the sewerage system is currently in place in Malta as governed under L.N. 139/2002 – Sewer Discharge and Control Regulations – 1993 amended by LN 378/2005. This regulation prohibits any person to discharge effluent into the public sewerage system which contain substances as outlined in the L.N. This permitting system may be used as a starting point for the development of the WFD prior authorisation system nevertheless it must be noted that the scope of the WFD is much wider (i.e. catchment area which includes ground, surface and marine waters) and requires a more holistic prior authorisation permitting system.

The industries based in Malta that may require a prior authorisation permit under the WFD are varied. A non exhaustive list may include:

- laboratory services which may dispose effluent into the sewerage system;
- pharmaceutical, electrical plating, paints, resins, food (particularly the meat and milk processing industries), oil recycling and refining, mineral (such as cement and glass fibre) industries;
- industries (including customs) that may be storing and handling chemicals;
- industries using pesticides such as farms and the general agricultural industries;
- port facilities (such as the Drydocks) which involve themselves in tank and hull cleaning services;
- The operation of maritime vessels together with their maintenance, through the use of antifouling paints, and
- Waste installation (in view of their leechates) and power stations;

A number of these activities may already have discharge permits in line with the respective L.N. nevertheless the WFD requires a more holistic prior authorisation permitting system together with effective monitoring of compliance with the respective permits.

Besides compliance monitoring, Article 16 of the water framework directive requests a review of **marketing authorisations**. This will particularly involve marketing authorisations for compounds



pollution the water environment. This may include the Pesticides Directive (91/414/EEC) and the Biocides Directive (98/8/EC) in order to reduce their impact on the water environment. This will entail a more holistic marketing authorisation procedure unless it is not integrated into the Registration, Evaluation, Authorisation and Restriction of Chemical substances - REACH authorisation procedure. (The REACH Directive is to be discussed in the horizontal legislation section).

Both industry and government would require a general increase in human resources to ensure full compliance to the WFD is achieved by November 2015.

3.7.1 DIRECTIVES TO BE REPEALED BY THE WFD BY 2013

The operative provisions of a number of Directives will be repealed by 2013 with the objective of consolidating the protection of European waters under the Water Framework Directive. This section will briefly review the applicability of each of these Directives to Malta together with their potential employment effect.

3.7.2 THE SURFACE WATER DIRECTIVE

The 1975 Surface Water Directive 75/440/EEC aims at protecting relevant surface waters intended to be used for drinking water purposes such as lakes, rivers and reservoirs. Member States need to take measures to comply with the standards set in the directive. Most of the requirements of the directive have been integrated into the 1980 Drinking Water Directive (DWD). The Surface Water Directive will be repealed by the WFD in December 2007.

The above directive was transposed into Maltese legislation under L.N. 339 of 2001 - Quality Required of Surface Water intended for the Abstraction of Drinking Water Regulations, 2001, which came into force on the 28th June 2002.

Considering that the above Directive will be repealed in December 2007, and

- most of the requirements have been integrated into the 1980 DWD;
- there is no surface water used for drinking purposes in Malta, since spring water is not used for drinking water usage and all drinking water is from ground water or desalination plants⁴⁹, and
- the monitoring and permitting requirements emanating from the above directive have been incorporated into the WFD employment effect.

It may be concluded that the surface water directive's impact on direct employment in relation to this Directive is not expected to increase from the current levels. Any additional employment effect to the WFD emanating from the DWD will be highlighted in the DWD section.

⁴⁹ DG AIDCO (April 2002) *Analysis and approximation for Malta in the field of environmental legislation – Final Report*

3.7.3 FISH WATER DIRECTIVE AND SHELLFISH WATER DIRECTIVE

The objective of the 1978 Fish Water Directive 78/659/EEC is to protect and improve the quality of fresh waters that support, or could support, certain species of fish. Similarly, the 1979 Shellfish Water Directive 79/923/EEC aims to protect and improve the quality of coastal and brackish water bodies, in order to contribute to the quality of edible shellfish products.

In order to achieve the objectives of both directives, Member States have to designate the relevant water bodies, to monitor the quality of these water bodies and to take measures to ensure compliance with the minimum standards set by the Directives.

The Fish Water and Shellfish Water Directive will be repealed by the WFD in Dec 2013. The achievement of a good ecological and chemical status for all waters through the WFD should imply the achievement of quality standards to support fish and shellfish life.

Malta transposed the above directives through L.N. 342 of 2001 - Quality of Fresh Waters Supporting Fish Life Regulations, 2001 and L.N. 341 of 2001 - Quality required of Shellfish Waters Regulations, 2001.

Considering that the above directives are going to be repealed by December 2013, and that with regards to freshwater for fish life there are no such fresh water bodies, and that there are no shellfisheries in Malta, while the aquaculture is carried out is offshore; and that the monitoring and permitting requirements emanating from the above directive have been incorporated into the WFD employment effect.; it may be concluded that the fish water and shellfish water directive's obligations do not apply to Malta⁵⁰ leaving a relatively small effect on employment levels directly related to the above Directives.

3.7.4 DANGEROUS SUBSTANCES DIRECTIVE AND ITS 'DAUGHTER DIRECTIVES'

The Dangerous Substances Directive 76/464/EEC⁵¹ is an important component of EU water legislation and provides the framework for subsequent regulation to control the discharge of specific dangerous substances through its respective Daughter Directives.

The objectives of this legislation is the elimination of pollution by the dangerous substances listed in Annex I ('Black List') of the Directive and the reduction of pollution by Annex II substances ('Grey List'). The Black list substances, which are identified on the basis of their toxic, persistent and bio-accumulative properties, have a higher polluting potential than the Grey list. The regulatory measures to be used by Member States to achieve these objectives are prior authorisations for any discharge of List I substances, which can be granted only for a limited time period.

⁵⁰ DG AIDCO (April 2002) *Analysis and approximation for Malta in the field of environmental legislation – Final Report*

⁵¹ Malta was granted a transition period until March 2007 with regards to sewage dumped into the sea at Ras il-Hobz, iC-Cumnija and Wied Ghammiq and with respect to the Marsa and Delimara power stations outfalls - Aggornat – Special Edition No.14 – Lengthy talks on Malta's Environment draw to a close – 2002.



The Commission identified 129 'candidate' substances which qualify as List I substances according to Directive 76/464/EEC. As of to date 18 out of the 129 substances have been regulated through 5 daughter directives regulating limit values and time limits by which these limit values shall be complied to together with the respective monitoring procedures for each of the 18 substances.

Malta transposed the obligations of the above daughter directives through five L.N. which replicate the five daughter directives of the EU. These are listed below:

- L.N. 227 of 2001 - Limit Values and quality objectives for discharges of certain dangerous substances into the aquatic environment Regulations – 2001;
- L.N. 221 of 2001 - Limit Values and Quality Objectives for Cadmium Discharges Regulations of 2001;
- L.N. 220 of 2001 - Limit Values and Quality Objectives for Mercury Discharges by the Chlor-Alkali Electrolysis Industry Regulations, 2001;
- L.N. 219 of 2001 - Limit Values and Quality Objectives for Mercury Discharges by Sectors Other Than the Chlor-Alkali Electrolysis Industry Regulations, 2001, and
- L.N. 218 of 2001 - Limit Values and Quality Objectives for Hexachlorocyclohexane Discharges Regulations of 2001.

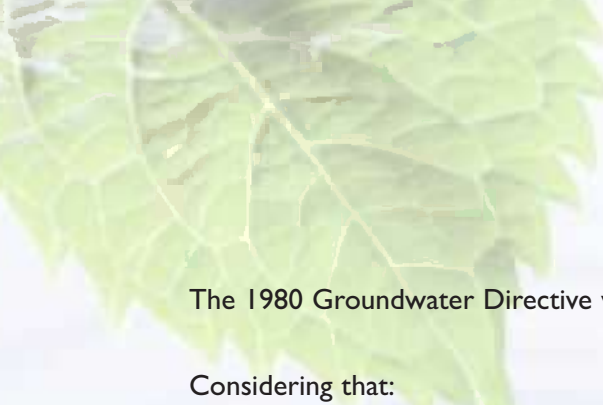
MEPA is responsible for enforcing the waste water effluents into the marine environment stemming from industry to conform with limit values and time limits by which these limit values shall be complied to together with the respective monitoring procedures for substances outlined in each respective L.N.

The WFD will repeal the 1976 Dangerous Substances Directive in 2013 nevertheless the 129 'candidate' substances was immediately replaced by the 33 priority substances in Annex X of the WFD.

The obligations of the above Directives will remain valid until 2013 nevertheless the WFD permitting requirements of the Annex X - 33 priority substances will take precedence at a national level in line with the monitoring and permitting requirements emanating from the WFD which MEPA is currently in the process of designing. In view of the above directives being repealed and the potential employment effects from these directives having been incorporated into the WFD employment effect there is no additional direct employment effect seen emanating from the above directives.

3.7.5 GROUND WATER DIRECTIVE

The Groundwater Directive 80/86/EEC was transposed into Maltese legislation under L.N. 203 of 2002 – Regulation for the protection of Groundwater against pollution caused by certain dangerous substances – 2002. In a similar way to the Dangerous Substances Directive, the Groundwater Directive divides pollutants into two categories – a 'black list' and a 'grey list'. The objectives are to prevent 'black list' substances from entering groundwater and to limit 'grey list' substances introduced into groundwater. To reach these objectives, the national competent authorities have to prohibit any direct discharges and to take all necessary measures to prevent indirect discharges with regard to 'black list' substances. All discharges of 'grey list' pollutants are subject to prior investigation and authorisation.



The 1980 Groundwater Directive will be repealed by the WFD in Dec 2013.

Considering that:

- The above directive will be repealed by December 2013,
- Malta enforces a high degree of control in this area as regards to development conditions imposed in planning permits and no permits are issued for discharges on land⁵², and
- The monitoring and permitting requirements emanating from the above directive have been incorporated into the WFD employment effect;

It may be concluded that there are no additional costs in implementing the above directive leaving an insignificant effect on employment levels directly related to the above Directive.

3.7.6 DIRECTIVES ENHANCING WFD ENVIRONMENTAL OBJECTIVES BY 2015

The achievement of 'good' status by 2015 of all surface waters and ground water within defined river basin as outlined in the WFD is further enhanced through four main Directives. These include the:

- Urban Waste Water Directive;
- Nitrates Directive;
- Drinking Water Directive, and
- Bathing Water Directive.

The Urban Waste Water and the Nitrates Directive focus on the environmental impact of water pollution, while the Drinking Water and Bathing water directives focus more on the impact of water pollution on human health.

This section will assess the general obligations of each Directive, its transposition into national legislation and the potential employment effects at a national level.

3.7.7 URBAN WASTE WATER DIRECTIVE

The Urban Waste Water Directive 91/271/EEC objective is to protect the environment from urban waste water discharges through the collection and treatment of discharges, which according to the WFD has to be achieved by 2015. The setting of Emission Limit Values ELVs for organic biodegradable substances, nitrates and phosphates from urban wastewater treatment plants is dependent on the local aquatic environment. This relates to how sensitive it the aquatic environment with regard to eutrophication or whether it is protected for drinking water abstraction. Some countries such as Belgium and Sweden identified their whole territory as a sensitive, other such as Germany, Spain, Italy and Malta identified parts of their territory as sensitive, while other countries such as Denmark and Finland did not identify sensitive areas but applied the most stringent ELV instead.

⁵² DG AIDCO (April 2002) *Analysis and approximation for Malta in the field of environmental legislation – Final Report*

⁵³ 1. - Marsaxlokk Bay; 2. - Marsaskala Bay; 3. - Masamxetto and the Grand Harbour; 4. - Qammieh Point to Ras ir-Raheb; 5. – Mgarr Harbour; 6. – Mgarr Ix – Xini; 7. – Xlendi Bay; 8. – Marsalforn Bay - http://www.mepa.org.mt/Environment/Legislation/LN_120_2005_E.pdf



Malta transposed the above Directive through L.N. 340 of 2001 - Urban Waste Water Treatment Regulations, 2001 which came into force on the 1st May 2004. This L.N. was amended by L.N. 120 of 2005 – Urban Waste Water Treatment Regulations – 2005 which clearly identifies 8 sensitive areas⁵³ which are subject to high nitrate concentrations to which discharges into such areas, such as from urban waste water treatment plants, should meet strict requirements.

The main industries affected by this legislation include **commercial vessels** such as the cruise ships, fishing boats and tankers through possible sewage release; the **agricultural industry** through the use of excessive fertiliser leaching out into the marine environment and the re-use of sludge as a fertiliser as was stated in the waste section, and the **Water Services Corporation (WSC)** in view of possible sewage outflows together with the proposed sewage treatment plants.

This main impact from an employment perspective is the WSC in view of the construction of three waste water treatment plants to comply with this Directive. In 2006 the WSC started the construction of two wastewater treatments plants - one at Ic-Cumnija, limits of Mellieha and the other Ras il-Hobz, Gozo. In 2007 the construction of a high-capacity wastewater treatment plant in the South of Malta, at Ta' Barkat near Xaghjra is also planned. By late 2008 these three wastewater treatment plants will be completed and untreated sewage will no longer be dumped into the sea⁵⁴. Considering the above developments a substantial amount of specialised human resources will be directly required in 2008 to run the three waste water treatment plants. In addition a substantial amount of spill over employment in the construction industry is currently taking place in view of the construction of the waste water treatment plants.

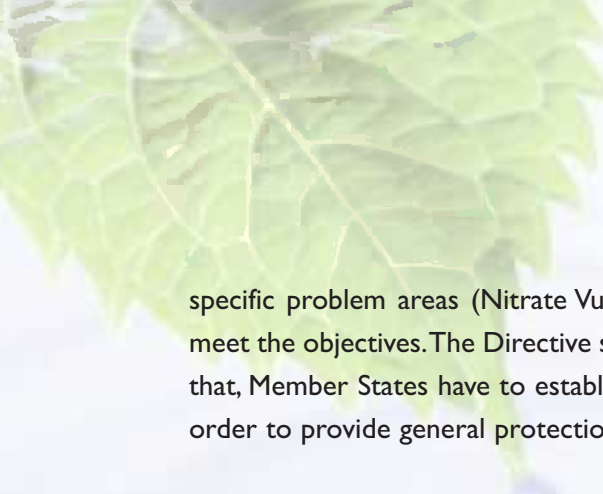
The employment effect on the **agricultural industry** vis-à-vis nitrate lactates will be addressed under the Nitrates Directive and the possible employment effect from the re-use of sludge produced by the Waste Water treatment plants was highlighted in the waste section.

The sewage discharges from **commercial vessels** may be significant in view of the large amount of ship traffic flow, particularly in the Grand Harbour area in view of increased cruise liner activity. Although some services in this area are already taking place further activity in the yachting marinas, through the setting up of appropriate cleaning facilities for sewage collection and treatment from commercial shipping vessels and yachts by the private sector is envisaged. This may generate a small amount of employment in this area.

3.7.8 NITRATES DIRECTIVE

The Nitrates Directive 91/676/EEC objective is to reduce water pollution caused by nitrates from agriculture sources, which according to the WFD has to be achieved by 2015 at the latest. Similar to the Urban Waste Water Treatment Directive the Nitrates Directive requires Member States to identify

⁵⁴ Three New Waste Water Treatment Plants – Water Services Corporation Website – 15th March 2007 - <http://www.wsc.com.mt/default.aspx?MDIS=13&NWID=48>



specific problem areas (Nitrate Vulnerable Zones - NZVs) and apply emission control measures to meet the objectives. The Directive stipulates a drinking water standard of 50mg nitrates / litre. Beyond that, Member States have to establish codes of good agricultural practice, to be applied by farmers in order to provide general protection for all waters.

Malta transposed the above directive through L.N. 343 of 2001 - Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources Regulations – 2001 which came into force on the 14th January 2003. This L.N. was amended by L.N. 233 of 2004 - Protection of Waters against Pollution caused by Nitrates from Agricultural Sources Regulations - 2004 which identifies all of Malta as one entire Nitrate Vulnerable Zone.

The Water Services Corporation and the agricultural industry are the two main stakeholders which may have an employment impact by this directive.

The Water Services Corporation is a stakeholder in this directive since ground water is used for drinking water and reference is made in this directive to drinking water standards. In 2005 nitrate levels in Malta's groundwater exceeded the Nitrate Directive trigger value of 50 milligrams per litre (mg/l), at 9 out of 13 WSC pumping stations⁵⁵. Since a number of measures are outlined in the Drinking Water Directive to possibly address the high value of nitrates the employment effects from a WSC point of view will be tackled under the Drinking Water Directive. To this effect the impact on direct employment specifically related to this Directive from a WSC perspective is not seen as significant.

To comply with the obligations arising from this Directive a concerted effort by both the Water Services Corporation and more so the Agricultural industry would need to be taken. The agricultural industry would need to reduce the amount of nitrogen fertilizer applied to the soil ideally in line with Emission limit Values (ELV) stipulated in the Directive⁵⁶. This may entail material costs in sourcing alternative forms of fertilisation rather than a strong increase in employment in the agricultural sector.

3.7.9 DRINKING WATER DIRECTIVE

The Drinking Water Directive (DWD) (98/83/EC), concerns the quality of water intended for human consumption. The DWD sets standards for the most common substances (so-called parameters) that can be found in drinking water. A total of 48 microbiological and chemical parameters must be monitored and tested regularly some of which include nitrate, fluoride, conductivity, sodium, sulphates and iron.

Member States are obliged to monitor the quality of the drinking water supplied to their citizens and of the water used in the food production industry. This has to be done mainly at the tap inside private

⁵⁵ Nitrate and Chloride Levels at WSC pumping Stations – SOER 2006.

⁵⁶ Emission Limit Value of 170Kg of Nitrogen applied per hectare per year. This limit value can be adjusted according to local soil, crop and climate conditions after approval by the Commission and with the condition that the environmental objectives are achieved.

⁵⁷ Scientific Synthesis Report of the Drinking Water Seminar – Final Report – December 2003.



and public premises. Member States are obliged to report at three yearly intervals the monitoring results to the European Commission.

The Commission is currently looking into a review of the DWD which includes the harmonisation of this directive with the Water Framework Directive; the inclusion of new parameters and the removal of certain parameters⁵⁷. The Commission is currently undertaking a stakeholder consultation on the matter and will define further its position on a revised DWD⁵⁸.

The Environment Health Unit within the Public Health Department is responsible for overseeing the implementation of Directive 98/83 in Malta. The Directive was transposed into national legislation through L.N. 23 of 2004 - Quality of Water Intended for Human Consumption Regulations – 2004 under the Food Safety Act and amended through L.N. 116 of 2004 which highlights the microbiological, chemical and indicator parameters that require monitoring. On accession Malta was approved a transition period until end of 2005 to reach targets on nitrates and fluoride in line with the above Directive.

The works involved in meeting this Directive include:

- Construction of an extensive pipe network to collect ground water to treatment sites;
- Construction of treatment (polishing) plant for 50% of the allocated groundwater to achieve mandatory parameter levels and an additional portion of groundwater to achieve indicator parameter levels;
- Replacing the membranes in the desalination plant;
- Replacing old pipes in the network⁵⁹.

Considering the above actions, a small amount of specialised human resources will be directly required to run the treatment polishing plant. On the other hand a substantial amount of spill-over employment effect in the construction industry will take place in view of the extensive amounts of pipe laying and the construction of the polishing treatment plants.


With regards to the new DWD, in the absence of a clearly defined Directive, (consultation are ongoing), this section cannot define employment effects emanating from the revised Directive.

3.7.10 BATHING WATER DIRECTIVE

The 1976 Bathing Water Directive (76/160/EEC) has set binding standards for bathing waters throughout the European Union. The new Directive (2006/7/EC) lays down provisions for more sophisticated monitoring and classification of bathing water based on bacteriological and physiochemical parameters. It also provides for extensive public information and participation.

⁵⁸ Announcement of Stakeholder Consultation - http://ec.europa.eu/environment/water/water-drink/index_en.html#consult

⁵⁹ DG AIDCO (April 2002) *Analysis and approximation for Malta in the field of environmental legislation – Final Report*



Directive 2006/7/EC requires Member States to draw up a management plan for each site to minimise risks to bathers, based on an assessment of the sources of contamination that are likely to affect it. It provides for the assessment of water quality on the basis of a set of water quality data compiled during the bathing seasons, establishing 4 levels of classification: poor, sufficient, good and excellent. Directive 76/160/EEC will be repealed and replaced by end of 2014 at latest and will compliment the objectives of the Water Framework, the Urban Waste Water Treatment, and the Nitrates Directives.

The Directive was transposed into national legislation under L.N. 380 of 2003 - Quality of Bathing Water Regulations – 2003 under the Public Health Act. The Bathing Water regulations require the achievement of both microbiological and physico-chemical standards. The Environment Health Unit is responsible for bacteriological and viral parameters while MEPA is responsible for monitoring physico-chemical parameters. All of the 87 bathing sites all around Malta complied with EU mandatory values regarding microbiological standards, however full compliance was not achieved due to insufficient sampling of physico-chemical parameters⁶⁰.

The absence of sufficient samples to be in a position to define water quality in accordance with the bathing water directive clearly shows limited capacity in undertaking all the required tests in the 87 sampling points around the island. Such sampling is scheduled to take place 4 to 5 times per week between May and October. This capacity can either be built within MEPA or may be subcontracted. The latter would be the most recommended approach which would generate a moderate employment within the private environmental monitoring business.

3.8 NOISE

3.8.1 DIRECTIVE ON ENVIRONMENTAL NOISE

The Directive on Environmental Noise (Directive 2002/49/EC) aims to provide a common basis for tackling the noise problem across the EU. The underlying principles of this text include:

- Monitoring the environmental problem; by requiring competent authorities in Member States to draw up “strategic noise maps”
- Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise,
- Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality.
- Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source.

⁶⁰ SOER (2006) *Bathing Water Quality*.

http://www.mepa.org.mt/Environment/SOER/indicators2006/pdfs/Separate%20Pdfs/WV3_Bathing_water_quality.pdf



According to the Directive on environmental noise, the competent authorities of Member States shall adopt action plans 'based upon noise mapping-results, with a view to preserving and reducing environmental noise.

Malta transposed this directive into national legislation through L.N. 193 of 2004 - Assessment and Management of Environment Noise Regulations, 2004 which came into force on 23rd April 2004.

As of 30th June 2007 Member states must submit strategic noise maps for:

- Agglomerations with more than 250 000 inhabitants
- Major roads which have more than six million vehicle passages per year. Malta currently has 84Km of roads which correspond to the definition under this directive,
- Major railways which have more than 60 000 train passages per year. Not applicable to Malta, and
- Major airports which has more than 50 000 movements per year within their territories. Malta has no major airport classified as a major airport as defined in this Directive.

Considering that Malta has no major airport as defined, and no railways the scope of this directive has been reduced substantially in its applicability to Malta. Nevertheless the undertaking of monitoring exercises, the compilation of action plans, particularly for the 84 km of roads, and the development of strategies would require an increase in employment levels at the regulating authorities.

Should this also be included to partially address point I assuming Malta qualifies as one agglomeration - L.N. 64 of 2002 - Product Safety Act (Act No.V of 2001) Noise Emission in the Environment by Equipment for Use Outdoors Regulations, 2002 Became operative 1st January, 2003 with exceptions.

3.9 NATURE PROTECTION AND BIO-DIVERSITY

The main directives which are most relevant to us are the Birds Directive (See Council Directive 79/409/EEC on the conservation of wild birds), and the Habitats Directive (see Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

The Birds Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievement are at the discretion of each Member State, so long that these are not seen as going against the spirit of the directive itself. The Directive has facilitated much co-operative conservation action across the European Union. Many initiatives have increased understanding of conservation needs, including the development of international action plans for the most threatened species. Recent years have seen the development of the Ornithology database, a major review of the timing of migration and breeding of quarry species listed under Article II of the Directive, as well as a range of guidance on hunting issues.

The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the

site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest. In such cases compensation measures will be necessary to ensure the overall integrity of network of sites. As a consequence of amendments to the Birds Directive these measures are to be applied to Special Protected Areas (SPAs) also. Member States shall also endeavour to encourage the management of features of the landscape to support the Natura 2000 network.

3.10 EU HORIZONTAL LEGISLATION

This section on EU horizontal legislation will address overarching EU environmental policies that impact air, waste, water and noise environmental policies. These include the:

- I. Integrated Pollution Prevention Control (IPPC) Directive
- II. SEVSO Directive
- III. Environmental Impact Assessment (EIA) Directive
- IV. Strategic Environmental Impact Assessment (SEA) Directive
- V. Registration, Evaluation, Authorisation and Restriction of Chemical substances – REACH Directive.

This section will assess the general obligations of each Directive, its transposition into national legislation and the potential employment effects at a national level.

3.10.1 INTEGRATED POLLUTION PREVENTION CONTROL (IPPC) DIRECTIVE

The Integrated Pollution Prevention and Control (IPPC) Directive (1996/61/EC) transposed by L.N. 234/2002 - Integrated Pollution Prevention and Control Regulations, 2002 came into force on the 1st May 2004, amended by LN230/2004, requires Member States to reduce emissions to the air, land and water from industrial activities as defined in Schedule I of the Directive. The deadline for full implementation of the Directive is the 30th October 2007.

The IPPC directive has been amended twice since it entered in force. The first amendment reinforced public participation in line with the Aarhus Convention. The second amendment clarified the relationship between the permit conditions established in accordance with the IPPC Directive and the EU greenhouse gas emission trading scheme.

The IPPC Directives objective on public participation is further enforced through Regulation (EC) No 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register (EPER) which was transposed into national legislation through L.N. 152 of 2007 - The European Pollutant Release and Transfer Register Reporting Obligations Regulations, 2007. The EPER obliges those industries that report under the Integrated Pollution and Prevention Control to report on the annual releases of 37 air pollutants and 26 water pollutants, including major greenhouse gases and acid rain gases. The information is available online⁶¹ and allows users to view pollution data for around 10,000 individual industrial sites across the EU.

⁶¹ European Pollutant Emission Register - <http://eper.ec.europa.eu/eper/default.asp>



3.11 COMMENT

There are a total of 17 installations in Malta that fall under Schedule I of the IPPC Directive. As of to-date the taz –Zwejra landfill and a newly established pharmaceutical company have been awarded IPPC permit⁶². Such permits include conditions which control emissions to the air, water and land including requests for self monitoring and compliance with specified emission limit values. The operator is obliged to provide monitoring reports to MEPA. The conditions in the IPPC permit are enforced through routine inspections by various regulatory authorities/ departments.

Considering that the obligations emanating from the above directive had to be in force by end of October 2007 and 15 installations still require approval for an IPPPC permit, Malta is still in breach of the IPPC Directive. This will require a possible increase in employment among the private sector for environmental consultancy in obtaining the IPPC permit and the respective governmental authorities need to beef up their compliance team or subcontract the monitoring obligation which may require an increase in private sector monitoring capacity.

The Commission is currently undertaking a review of the IPPC directive to include the obligations of a number of other Directives such as including the Titanium dioxide directive as part of its scope⁶³. Since the Commission is currently in discussions on the revised IPPC this section does not incorporate any potential additional employment effects emanating from this revision.

3.11.1 SEVESO DIRECTIVE


In 1982, Council Directive 82/501/EEC on the major-accident hazards of certain industrial activities the so called Seveso Directive – was adopted. The Seveso Directive was amended in 1987 by Directive 87/216/EEC and by Directive 88/610/EEC. Both amendments were aimed at broadening the scope of the Directive, in particular to include the storage of dangerous substances.

The Seveso II Directive 96/82/EC on the control of major-accident hazards has fully replaced the original Seveso Directive. The main changes include a revision and extension of the scope, the introduction of new requirements relating to safety management systems, emergency planning and land-use planning and a reinforcement of the provisions on inspections to be carried out by Member States. The scope of the Seveso II Directive 96/82/EC was extended under Directive 2003/105/EC to cover risks arising from storage and processing activities in mining, from pyrotechnic and explosive substances and from the storage of ammonium nitrate and ammonium nitrate based fertilizers.

Council Directive (EC) 82/1996 was transposed into Maltese legislation through L.N. 37 / 2003 the Control of Major Accident Hazards (COMAH) Regulations, which came into effect on 4 July 2003. The

⁶² MEPA website - http://www.mepa.org.mt/environment/index.htm?IPPC_new/mainpage.htm&L

⁶³ Correspondence with DG Environment – Waste Section. – September 2007.



provisions of Council Directive (EC) 105/2003, amending the Seveso II Directive, were transposed into the Control of Major Accident Hazards (Amendment) Regulations, LN 6/2005 with effect on 11 January 2005.

The Competent Authority (CA) responsible for the implementation of the SEVESO directive is composed of the Occupational Health and Safety Authority (OHSA), the Malta Environment and Planning Authority (MEPA) and the Civil Protection Department (CPD). The OHSA has responsibility for coordinating the CA's administrative actions and takes primary responsibility in matters concerning health and safety. MEPA has primary responsibility for matters concerning environmental protection and the CPD has responsibility concerning emergency planning.

In Malta as of end of 2005 there are about ten establishments classified as SEVESO establishments⁶⁴. These establishments need to conform to SEVESO reporting obligations which will indirectly require private sector input in the designing of their safety reports, any revisions and updates, unless not done in-house. In view of the small number of operations together with the existence of private capacity in Malta to undertake such safety reports the increase in employment in this area is small. The Competent Authority is obliged to prepare and information and publicly campaign of potential hazards emanating from such establishments together with a year inspection of upper tier establishments. This will require a small amount of capacity building among the CA entities. If this is subcontracted such capacity building will manifest itself within the private environmental monitoring and compliance business.

3.11.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The EIA Directive 85/337/EC on the assessment of the effects of certain public and private projects on the environment was introduced in 1985 and was amended in 1997. The EIA procedure ensures that environmental consequences of projects are identified and assessed before authorisation is given. The public can give its opinion and all results are taken into account in the authorisation procedure of the project. The EIA Directive outlines which project categories shall be made subject to an EIA, which procedure shall be followed and the content of the assessment.

The above directive was transposed into national legislation under L.N. 114 of 2007 - Environmental Impact Assessment Regulations, 2007 which repealed L.N. 204 of 2001. The legal notice clearly specifies which developments require a full Environmental Impact Assessment and a Limited Environmental Impact Assessment. The legislation also specifies a register of consultants and enforcement provisions. In the past years legislation on EIA has generated a small consultancy industry in this field. The register, as specified in the legal notice, will further enhance this private consultancy industry nevertheless since a considerable amount of human resources capacity in this market has been developed, the increase in employment is envisaged to be marginal though. However in view of the growth of the economy this sector is expected to grow in line with this economic growth.

⁶⁴ Malta's report on the implementation of the SEVESO II Directive – 30th November 2006 - http://ec.europa.eu/environment/seveso/pdf/ms_reports/mt_en.pdf



3.11.3 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

The purpose of the SEA Directive 2001/42/EC is to ensure that environmental consequences of certain plans and programmes are identified and assessed during their preparation and before their adoption. The public and environmental authorities can give their opinion and all results are integrated and taken into account in the course of the planning procedure. After the adoption of the plan or programme the public is informed about the decision and the way in which it was made.

The above obligations are transposed into national legislation through L.N. 418 of 2005 - Strategic Environmental Assessment Regulations, 2005 which came into force on the 30th December 2005. The legal notice requires a scoping study of the plan or programme which will define if the respective plan or programme will require a SEA. Once stipulated this would mainly be subcontracted to a private consultancy firm to draft. The private sector consultancy market generated by the EIA legislation is the main candidate in bidding for such work. To this effect the SEA directive has increased the scope of such a consultancy market and this may require an increase in employment in this sector which would require a highly qualified and specialised type of employment.

3.11.4 REACH

REACH deals with the Registration, Evaluation, Authorisation and Restriction of Chemical substances under the EU's Regulation on chemicals and their safe use (EC 1907/2006). It came into force on the 1st June 2007. Over a period of 11 years some 30,000 chemical substances will be registered to ensure their safe use. REACH will also entail the evaluation of risks of such substances. All applications for authorisations would need to include an analysis of alternatives and a substitution plan where applicable. REACH would also facilitate the total or partial ban on chemicals where unacceptable risks are detected.

The main onus will be on industry (i.e. manufacturers and importers) to generate the data and identify measures to manage the risk. If a manufacturer or importer, manufacture or import 1 tonne or more of any chemical substance per year, the respective manufacturer or importer should pre-register the substance with the European Chemicals Agency (ECHA) between 1 June and 1 December 2008. Failure to meet this deadline means that the respective manufacturer and importer cannot continue producing or importing the substance until a full registration dossier is submitted. Pre-registration allows the respective manufacturer or importer to stagger their registration of the substance depending upon the respective chemicals and tonnage per year.

In Malta the degree of impact of such a Regulation may be considerable in view of the potential large number of importers and manufacturers who will be obliged to pre register and register. This will entail a considerable amount of work load on behalf of the impacted manufacturers and importers. A substantial portion of this work will most probably be subcontracted to a number of private firms. In any case the employment effects within the private sector emanating from the REACH Regulation may be significant.



3.12 CONCLUSION

This chapter has reviewed the Maltese transposition and implementation of the Acquis in the environment field. It is seen that the legislation and conformity to it is continuously expanding. Compliance places a burden on both the public and private sectors, both in the regulating and operational functions.

The demand on the environment goods and services industry is obvious. This in turn would require in different degrees an element of human resource training and use. Malta is physically small and so are its economic sectors.

Taken one sector or branch of industry at a time the employment opportunities the demand for the goods and services environment industry will make may be small. Taken together and in proportion this demand for environment jobs could be significant and cannot be ignored.





4. The Survey



4.1 INTRODUCTION

After defining the theoretical boundaries of the environmental sector in the preceding two chapters of this study, this chapter gives an account of the exercise whereby the environment industry in the public and private sectors, and related activity is surveyed, so as to give an estimate of its size, its employment implications, and other related economic parameters.

The survey was necessary because current institutional statistics based on standard classifications are not yet able to identify and measure this fast growing sector as an industry in its own right.

The intention of the survey was not only to gauge and assess the environment industry in Malta, but to compare it to that of other EU countries, which comply with the EU Acquis, in different degrees, according to their compliance status. Mostly this translates itself into distinguishing between the groups of old members and new members.

The ensuing evaluation would be able to quantify the number of each of these jobs required to implement the said Acquis in order to better analyse the environmental-related employment and the environmental sector both in Malta and internationally. An evaluation of these job holders is given in terms of their gender, age, educational background, occupational status, and salary bracket. The firms themselves are evaluated in terms of their markets, their export potential, existing job vacancies, and estimated employment trends between recent past (2004) and the near future (2010).

4.2 METHODOLOGY AND OVERALL APPROACH

4.2.1 THE SAMPLE

In view that under the existing four digit NACE codes there are only a few industrial groups which one could associate directly with the environment goods and services industry, an identification exercise had to be carried out. This was based on similar, though not identical, projects carried out in the Netherlands, Sweden, Portugal and other countries which have attempted this identification exercise. The exercise was based on the nomenclature and five digit NACE codes which were used in the Netherlands pilot project. It must be noted that the five digit is a special environment industry sub-set within some four digit groups, used principally in the Netherlands. Since this has not been applied as yet in our national industrial statistics to date, a sampling exercise was carried out with this scope of identifying these sub-sets. This sampling exercise was designed in collaboration with the ETC and the NSO, with both institutions graciously providing us their respective data-base.

The following NACE code categories were first identified:

TABLE 4.1: CLASSIFICATION OF SELECTED NACE CODES

NACE Code	Description
14. Other mining and quarrying	
14.50 Other mining and quarrying n.e.c.	This class includes treatment of melting slag for reuse (for example in the form of granulates) regardless of its final destination. The heading 37.20 includes this activity as input for sand blasting and construction works.
15. Manufacture of food products and beverages	
15.7 Manufacture of prepared animal feeds	Headings 15.71 and 15.72 also include treatment of slaughter waste to produce animal feeds.
17. Manufacture of textiles	
17.11 Preparation and spinning of cotton-type fibres	In this class manufacturing of polishing cloths or cleaning rags from textile waste is also included.
21. Manufacture of paper and paper products	
21.11 Manufacture of pulp	This class includes activities related to manufacture of pulp from waste paper and shredding of waste paper.
23. Manufacture of coke, refined petroleum products and nuclear fuel	
23.20 Manufacture of refined petroleum products	
23.20.2 Manufacture of oil-based lubricating oils or greases including from waste or used oil.	If manufacturing of oils or greases from waste oil is carried out in combination with collection of waste oil, these will be classified under this item. If enterprises only collect used oil, these will be classified in 90.00.2.
24. Manufacture of chemicals and chemical products	
24.16 Manufacture of plastics in primary forms	This class does not include any recycling activities. Reclaiming, processing of plastic waste (cleaning, melting, grinding) is in principle classified within the heading 37.20, while pure manufacturing of plastic products is 25.24. When enterprises carry out both activities, it is suggested to follow the remarks developed for heading 37.20.
24.64 Manufacture of photographic chemical material	Processing of waste from photographic industry such as fixer solution or photographic film and paper containing silver is classified under 37.20.
25. Manufacture of rubber and plastic products	
25.12 Recovering, retreading and rebuilding of rubber tyres	Enterprises only reclaiming rubber are classified as part of 37.20.
25.24 Manufacture of other plastic products	This class also includes enterprises engaged in the production of new plastic products from plastic waste (e.g. bottles, pickets or flowerpots). If this activity is carried out in combination with a recuperation process such as cleaning, melting, grinding resulting in granulates, it will be included in 37.20.
27. Manufacture of basic metals	
27.4 Manufacture of basic precious and non-ferrous metals	New recycling techniques have been specifically developed to reuse non-ferrous metals from waste; for example reclaiming cobalt from spent industrial catalysts or reclaiming precious metals by means of electrolytic refining. It is suggested that these activities be classified under 37.10.
35. Manufacture of other transport equipment	
35.11 Building and repairing of ships and boats	Includes ship dismantling.
37. Recycling	
37.10 (Preparation prior to) Recycling of metal waste and scrap	This class includes processing of metal waste and scrap into secondary raw material fit for further processing. Typically waste and scrap, either sorted or unsorted, needs to be processed before being used as an intermediate good in another industrial process. Mechanical or chemical processes usually used are: – Shredding of metal waste, end of life vehicles, etc. – Reclaiming metals from cables by grinding. – Reclaiming non-ferrous metals from metal waste by means of a



process other than electrolysis.

This class does not include:

- Manufacture of new metals or new metal products from secondary metal raw materials (these activities classified under 27 or 28).
- Recycling of non-ferrous metals from metal waste by means of electrolysis (classified under 27.4).
- Reclaiming non-ferrous metals from waste other than metal waste such as photographic or hazardous waste (classified under 37.20).
- Wholesale in waste and scrap including mechanical treatment which does not lead to secondary raw materials, such as cutting, pressing or other methods to reduce the volume (classified under 51.57.2).
- Dismantling, demolition of machinery, computers, etc. (included in 51.57.2).
- Car dismantling sites including wholesale trade in second-hand spare parts (included in 51.57.1).
- Pre-recycling of non-metallic waste and waste materials (included in 37.20).

37.20 (Preparation prior to) Recycling of non-metal waste and scrap

- This class includes processing of non-metallic waste and scrap and of non-metal articles into secondary raw material fit for further processing. Waste and scrap, either sorted or unsorted, needs to be processed before being used as an intermediate good in another industrial process. Typical activities are:
 - Processing (cleaning, melting, grinding) of plastic or rubber waste to granulates. Only when these activities are carried out in combination with final good production, and the sales of recycled products represent more than 80% (for example, recycled plastic bottles or rubber tiles) are they to be classified, in respectively, 25.24 or 25.13. This practical rule will help in the case of enterprises which “do” the whole recycling chain (collection, processing, producing granulates and producing end products). Despite the fact that a large part of their output consists of end products, their classification remains NACE 37.
 - Treatment of slag and fly ashes resulting in granulates used for replacement of gravel or in road constructions.
 - Mechanical crushing and grinding of waste from the construction and demolition of buildings (including wood), asphalt.
 - Processing of melting slag to blasting grit.
 - Processing of used cooking oils and fats to secondary raw materials for pet foods or feeds for farm animals.
 - Crushing, cleaning and sorting of glass.
 - Shredding paper, also in combination with destruction of archives.
 - If this activity is carried out in combination with collection, storage and dealing (as is mostly the case), it is to be classified under 51.57.3.
 - Reclaiming materials (also metals) from hazardous waste.
 - Refining of and making fit for reuse chemical baths and liquids, also when containing dissolved metals.
 - Reclaiming metals from photographic waste, for example, fixer solution or photographic films and paper.

This class does not include:

- Treatment of slaughter waste to produce animal feed (included in 15.7)
- Production of new products from secondary raw material such as spinning of yarn from stock (included in 17.1), making pulp from waste paper (included in 21.11) or recovering/ retreading tyres (included in 25.12).
- Recycling of waste oil and grease (included in 23.20.2).
- Wholesale in non-metallic waste and scrap including collecting, sorting, packing, dealing, etc., without an industrial process (included in 51.57.3).



45. Construction

- Collection of household and industrial waste (included in 90.00.2).
- Composting of waste (included in 90.00.3).
- Treatment of manure (slurry) (included in 90.00.3).
- Incineration, dumping, burying, etc., of waste (included in 90.00.3).

This class includes:

- Construction of sewer systems (45.21.3).
- Clearing, de-blocking of sewers (45.33.1).
- Demolition and wrecking of buildings and other structures (45.11.1).

51. Wholesale trade and commission trade, except of motor vehicles and motorcycles

51.42 Wholesale of clothing and footwear

This class includes (51.42.1) sorting of and dealing in used clothes. It also includes dismantling of end-of-life vehicles (dismantling of cars; wholesale of car wrecks; sale of parts from car wrecks to private persons and professional users).

51.57 Wholesale of waste and scrap

This class does not include dismantling of cars by means of a mechanical process such as shredding (included in 37.10).

51.57.2 Wholesale of metal waste and scrap

This class includes:

- Wholesale (purchase and sale) of ferrous and non-ferrous metal waste and scrap.
- Collection of ferrous and non-ferrous metal waste.
- Treatment of ferrous and non-ferrous metal waste without a mechanical or chemical process.
- Demolition or dismantling of machinery, cranes, computers, etc.

This class does not include:

- Treatment of non-ferrous metal waste by means of electrolysis (included in 27.4).
- Ship dismantling (included in 35.11).
- Treatment of metal waste by means of a mechanical process (included in 37.10).
- Demolition and wrecking of buildings and other constructions (included in 45.11.1).
- Dismantling of cars (included in 51.57.1).
- Wholesale of non-metallic waste and scrap and materials (included in 51.57.3).

51.57.3 Wholesale of non-metal waste and scrap

This class includes wholesale (purchase and sale) of non-metallic waste and scrap and materials such as used tyres, glass, construction, paper, cardboard, textile, wood waste, etc.; collection, sorting, pressing of paper, rags, sawdust, etc.

This class does not include:

- Treatment of slaughter waste to produce animal feeds (included in 15.7).
- Treatment of used non-ferrous materials and waste by means of a mechanical or chemical process (included in 37.20).
- Collection and repair of used furniture, household goods, clothes; sale to private persons, often in so-called recycling shops (included in 52.50).
- Collection of household and industrial waste (included in 90.00.2).
- Treatment of waste by means of dumping, incineration, drying, etc.
- Composting of organic, kitchen and garden waste (included in 90.00.3).

52. Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods

52.50 Retail sale of second-hand goods in stores

52.50.2 and 52.50.3 include collection and repair of used furniture, household goods, clothes; so-called recycling shops; and dismantling of furniture, etc., for the reuse of parts.

60. Land transport; transport via pipelines

60.24 Freight transport by road 60.24.2 includes transport of waste and waste materials collected by third parties. The responsibility for the (final) treatment of this waste is mostly not part of the services offered by transport firms. This is shown by the fact that the disposer pays the waste management location separately for waste



treatment. Examples are (bulk) transport of waste from transshipment locations to final treatment locations. Transport of manure, sludge or polluted soil is also classified here.

This class does not include:

Waste transport as an inseparable part of waste collection activities carried out by specialised enterprises (classified under 90.00.2).

71. Renting of machinery and equipment without operator and of personal and household goods

Includes renting of waste containers and similar.

This class does not include:

Renting waste containers to waste disposers as part of waste collection (classified in 90.00.2).

74. Other business activities

Includes maintenance and cleaning activities on behalf of petrochemical installations, for example cleaning of pipelines.

The waste/wastewater collected during these activities is not treated by firms themselves but by waste treatment firms (included in 90.00.3).

90. Sewage and refuse disposal, sanitation and similar activities

90.00.1 Collection and treatment of wastewater

This class includes:

- Maintenance and cleaning of sewers.
- Emptying of septic tanks and cesspools/cesspits.
- Emptying of sewage sinks and pits.
- Transport of wastewater to a sewage treatment plant or points of discharge.
- Treatment of wastewater by means of physical, chemical, and biological processes.

This class does not include:

- Construction of sewer systems (included in 45.21.3).
- Clearing, de-blocking of sewers (included in 45.33.1).
- Treatment of polluted ground or surface water in combination with cleaning-up of environmental pollution (included in 90.00.4).

90.00.2 Collection of waste

This class includes:

- Sweeping of streets, squares, paths, markets, public gardens, parks, etc.
- Collection of waste from households and enterprises by means of refuse bins, wheeled bins, containers, etc.

This class also includes:

- Collection of hazardous waste, used batteries, used cooking oils and fats, etc.
- Collection of used oil from shipment or garages.
- Collection of construction and demolition waste.
- Exploitation of recycling centres.

This class does not include:

- Cleaning of ditches for the benefit of agriculture (included in 01.41.2).
- Collection of waste as part of wholesale of waste (included in 51.57).
- Transport of waste without collection or treatment (included in 60.24.2).
- Industrial cleaning (included in 74.70).
- Exploitation of landfill sites (included in 90.00.3).

90.00.3 Treatment of waste

This class includes the treatment of waste by means of incineration, dumping, burying, separation, drying, neutralising, detoxification, anaerobic digestion and composting. Treatment of hospital waste, radio-active waste, used oil and grease; of polluted soil and dredged soil supplied by third parties; removal and treatment of CFCs from refrigerators, PCBs from transformers; exploitation of landfills are also included

This class does not include:

- Treatment of slaughter waste to produce animal feeds (included in 15.7).
- Treatment of metal waste without mechanical or chemical process and for sale to third parties, such as dismantling of cars, machinery



90.00.4 Cleaning up of environmental pollution

- or computers (included in 51.57).
 - Treatment of non-metallic waste without a mechanical or chemical process and for sale to third parties, such as sorting or pressing of paper, textiles, plastics, wood waste, etc. (included in 51.57.3).
 - Treatment of metal waste by a mechanical or chemical process into secondary raw materials, for example shredders (included in 37.10).
 - Treatment of non-metallic waste by means of a mechanical or chemical process into secondary raw materials such as breaking or grinding of glass, used tyres, rubber into granulates (included in 37.20).
- This class includes:
- Clean-up of polluted soil, including underwater soil.
 - Clean-up of polluted ground or surface water.
 - Removal of asbestos.
 - Removal of underground oil tanks.
- This class does not include:
- Treatment of wastewater (included in 90.00.1).

The ETC provided us with a list of all companies falling within each identified NACE code. This list was further supplemented where necessary with other information collated from the latest edition of the Yellow Pages, a technique adopted in the Swedish pilot project. Specifically, all the companies in the following Yellow Pages groupings were included in the sample and each assigned an appropriate NACE code:

- Asbestos Removal
- Environmental and Ecological Services
- Environmental Products and Supplies
- Recycling Services
- Scrap Iron
- Skip Rentals and Services
- Sale and installation of Solar Heating Equipment and Systems
- Street Cleaning Services
- Waste Management
- Waste Removal Services
- Water purification and filtration systems

Care was taken with this supplementary information, so that there would not be any double counting between these units and the NSO/ ETC data base during the sampling and estimation phases.

Some countries originally used to differentiate between core environment-related businesses and non-core. This distinction is not longer relevant today, since most studies classify industry by the pertinent environmental function. However when it came to sampling, it was decided that all core businesses which could be contacted were in fact contacted. If all business had co-operated fully and all contact numbers were available one would be able to say that the core industry population was surveyed. However, for various reasons the whole population could not be reached and therefore one could consider this well representative sample as a sample just the same, with respect to statistical estimation.



The core industries included the following NACE codes:

- 37.10 Recycling of metal waste and scrap
- 45.24 Construction of water projects
- 45.50 Renting of construction or demolition equipment
- 45.11 Demolition and wrecking of buildings
- 37.20 Recycling of non-metal waste and scrap
- 51.57 Wholesale of waste and scrap
- 74.70 Industrial cleaning
- 74.80 Miscellaneous business activities n.e.c.
- 90.01 Collection and treatment of sewage
- 90.02 Collection and treatment of other waste
- 90.03 Sanitation, remediation and similar activities

The remaining NACE codes were classified as non-core and thus a selection from each code was sampled. The sub-sample number chosen was in proportion to the companies falling under the NACE code in question, with a minimum of three companies being contacted. It is pertinent to point out that the available databases did not contain all the contact details of the companies, so the following procedure was adopted:

In the case of core businesses, an attempt was made to obtain the contact details from other sources, including the updated Yellow Pages and the GO telephone directory. In the case of non-core businesses, the companies with no contact details were a priori eliminated from the sample. Subsequent estimation had to use different approaches in each of these cases in view of the problems just mentioned.

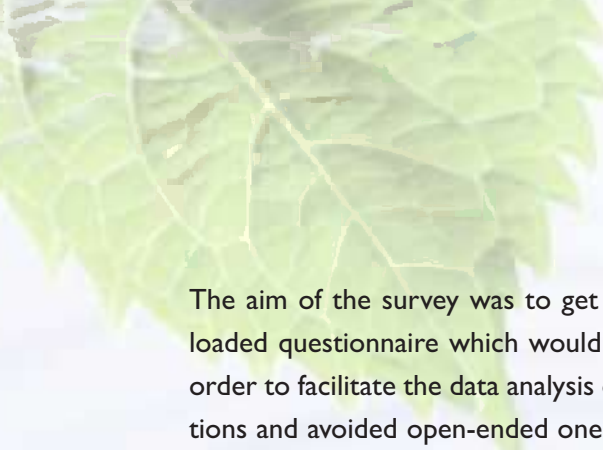
4.2.2 THE QUESTIONNAIRE

Following consultation with the ETC, the NSO and MEPA the questionnaire was formulated and subsequently modified to include useful suggestions until a final version was agreed. The first questionnaire drafting sessions envisaged the following topics being discussed in the survey:

- Activity of business
- Nature of business
- Location
- Size of the business
- The number of jobs provided in the environment industry, which would be the main focus of the survey.

Further questions related to environment-related jobs in terms of:

- Gender
- Age group
- Level of education
- Full or part-time status
- Occupational status, and
- The average income bracket of the income earners



The aim of the survey was to get the most data by ensuring full participation rather than by a fully loaded questionnaire which would discourage response from the very busy business respondents. In order to facilitate the data analysis of the survey responses, the questionnaire used closed-ended questions and avoided open-ended ones.

The first type of questions was defined by factors (qualitative variables) and the second type was defined by covariates (quantitative variables). Where a choice was needed, questions included a list of categories in which a respondent could choose one or more of these pre-defined categories. Final versions of the questionnaire in both English and Maltese are annexed with this report.

4.2.3 DATA COLLECTION

Three standard ways of collecting data include person-to-person interviews, mail questionnaires and telephone surveys. The survey in this study included a judicious combination of the three approaches. The sampled firms (all core businesses and sampled non-core) were first contacted by phone in order to ensure a high response rate and the provision of high quality responses through the over-the-phone assistance given. A questionnaire was then sent to a number of firms who indicated a preference for answering through email, mail or fax. In addition, when and where required, especially for big players in the environmental sector, face-to-face interviews were also carried out.

The telephone interviews were carried out by trained and qualified interviewers under the management of Ernst & Young Malta. An information meeting was held on Friday 12th October 2007 at the Ernst & Young offices. All interviewers and the team members attended this meeting, where the interviewers were given a detailed explanation of the objectives of the study and their role by the team experts.

Given the nature of the survey, the interviewers were instructed to write down the responses on standard questionnaire sheets. These sheets were then reviewed one-by-one by a member of the team of experts to validate and ensure conformity and consistency in classifications and definitions. Once reviewed, the data were inputted into an electronic database and analysed using cross-references and statistical tests using demographic variables chosen by the experts.

Any combination of two variables was analysed simultaneously using statistical packages to assess relationships or associations between the variables. Any relationship or association which resulted to be significant was then generalised because it is not attributed to chance. Inferences were made by using hypothesis tests and by constructing 95% confidence intervals.

The telephone survey commenced on Monday 22nd October 2007 and ended on Monday 29th October 2007. The response was very satisfactory, with 68% of those on our “contactable” list replying to our questions, 8% refusing to reply and 27% not being reached (probably due to changes in telephone number or address). It must be pointed out that a high percentage of business units were not



“contactable” because the database did not furnish a contact telephone or email number. Consequently the effective response rate (excluding the companies not reached) was 89%. The whole of November and the first two weeks of December were then dedicated to follow up those companies which promised to respond via email or fax, or those big players which took long to reply.

4.2.4 RESPONSE RATE

The following table presents the response rate of the total enterprises classified by the core and non-core group. The response rate applies to the business units which had a known telephone number and which were selected randomly as part of the sampling technique used.

TABLE 4.2 RESPONSE RATE OF SURVEY

	Core Industries	Non-core Industries	Total
Total Enterprises	184	455	639
Responses obtained	126	301	427
No response	58	154	212
Response rate (%)	68%	66%	67%

Not all enterprises in the non-care group which responded were necessarily part in the environmental goods and services industry. However the various ratios of enterprises which could be contacted vis-a-vis those which could not, the ratio of those which responded to those which did not, and the ratio of those which responded and where in the EGS industry and those which were not, provided adequate information on which the population estimates could be based.

In conclusion one could comment that the success of the survey with such a high response rate owes it to the balance which had to be struck as to the level of detail of the questionnaire itself. One could have burdened the questionnaire with many other salient questions, but this would have endangered the whole exercise by non-compliance or participation.

4.3 SURVEY RESULTS

All the firms which responded to the survey (see table above) and had any activity related to the environment industry (55% of total responses) were classified according to the environmental function to which they considered to be associated to. The following list provides the ten environmental functions to which the economic activity of the businesses selected from the various NACE code groups were associated with.

TABLE 4.2: CLASSIFICATION OF SELECTED NACE CODES BY ENVIRONMENTAL FUNCTION

ENVIRONMENTAL FUNCTION		NACE CODES													
1	Air pollution	45.21													
2	Waste Water Treatment	45.24	90.01												
3	Waste Management	45.11	45.20	45.25	45.41	45.50	71.34	74.70	74.80	90.02	90.03				
6	Monitoring	74.14	74.20	74.30											
7	Other	15.71	45.22	45.30	45.31	45.32	45.33	45.42	45.45	52.45	60.24	71.32	71.40	75.12	91.33
8	Water supply	41.00													
9	Recycled materials	14.50	25.24	27.42	37.10	37.20	45.23	51.57	52.50						
10	Nature protection	35.11													
11	Not applicable	27.44	27.45	45.12	45.34	45.40	45.43	45.44	71.00	71.10	71.21	71.23	71.31	71.33	74.87

If businesses were classified in their appropriate NACE code correctly, one could in fact utilise solely the Dutch pilot project approach, (Dietz *et al*, 2000) and select only those NACE codes which were identified as belonging to the environmental goods and services industry. However, it was found that it is quite common for Maltese firms to be misclassified. The multi-faceted activity of many firms, especially small ones, means that only one activity (generally the main one) would perfectly match the NACE code classification, while the other activities would be outside their NACE code group. It is therefore with this caveat in mind that the table above should be read. Thus the most glaring example is that while within the whole sample the only firm which described its activity as related to noise abatement was in the 45.21 NACE code, normally associated with the building industry.

Like most of the pilot projects carried out in other countries and which preceded this study (as described in Chapter 2), one should caution against a precise interpretation to be given to these preliminary estimates. The quality of the data varies across firms, and one should treat the results as moderately reliable. Only a full industrial census carried out by public officials with legal powers and with much more manpower and other resources at one's disposal would one be able to give a full and reliable picture of the industry being investigated.

Having said that, the results obtained by the survey give a pretty good picture of the main or core environment industry, and interesting snippets in the realm of other less fully-fledged activities.

4.4 CONCLUSION

One final caveat about differences between our study and other studies carried out in other European countries is the following. Big countries normally have surveyed only those industries where more than 50% of the activity is devoted to the environmental sector. The data for those industries in terms of employment and value added were then taken as fully belonging to the environmental industry. Our



study differs in that all detected or reported activity, no matter how small in proportion to the firm's overall activity was included. On the other hand those core industries which are normally associated with the environmental sector, were only included in so far as the exact proportion devoted to the activity, while any activity which cannot be considered as environmental was excluded. We believe that our approach, though more laborious, is close to the exact size of the industry being surveyed. Furthermore, the microcosmic nature of our industry make this approach more appropriate.



5. Empirical Results

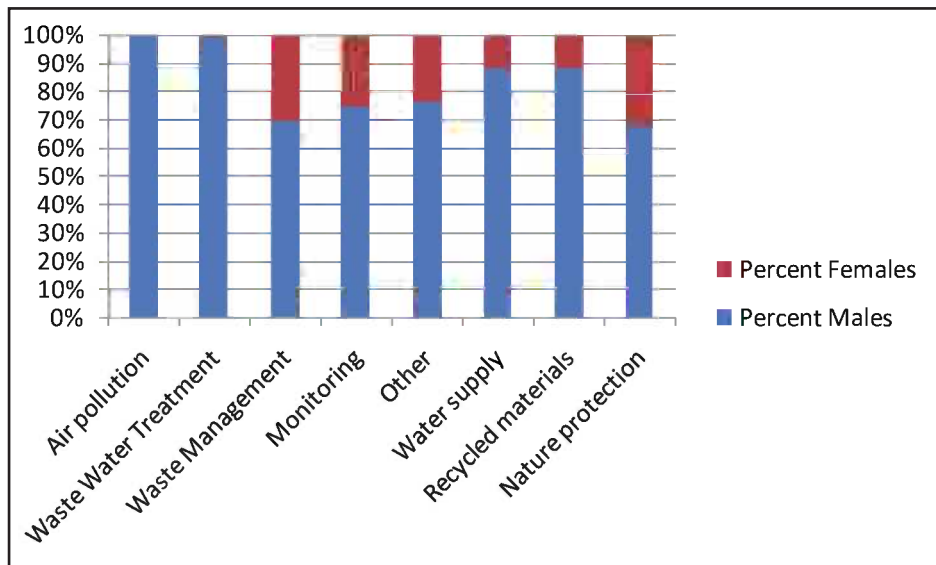


The first set of results is presented in percentage form. These percentages are averaged across firms within each environmental function, and are presented as an indication of the employment profile across these functions. The source of the data presented in this Chapter's tables and charts is this Study's Survey, unless otherwise indicated.

5.1.1 GENDER

As can be seen from the following Chart 5.1 below presenting the gender profile of the industry's labour force, the percentage of female employees ranges from 30 per cent in the recently set up waste management industry, and also in the NGO's nature protection activities to nil or almost nil in air pollution, and waste water management. The activity related to air pollution might have been too small to catch any female participation if this actually took place. In the monitoring and consulting industry, as expected, female participation is observed although not in a strong showing as one would expect.

CHART 5.1 EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY GENDER



5.1.2 AGE

The age of the labour force in the industry was classified into three brackets: the under 25s, the 25 to 50 age bracket, and the over 50. This gives a broad idea of the nature of the industry and its labour force for each gender respectively.

The most aging male labour force is the one in at the long-established Water Services Corporation (WSC) which for sure has affected both the water supply and the waste water management functions in the chart. Taken together the Chart shows that about half of its male labour force in this sector is over 50, and close to retirement age. The other functions indicate a better age related spread of their male labour force.

CHART 5.2A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY AGE

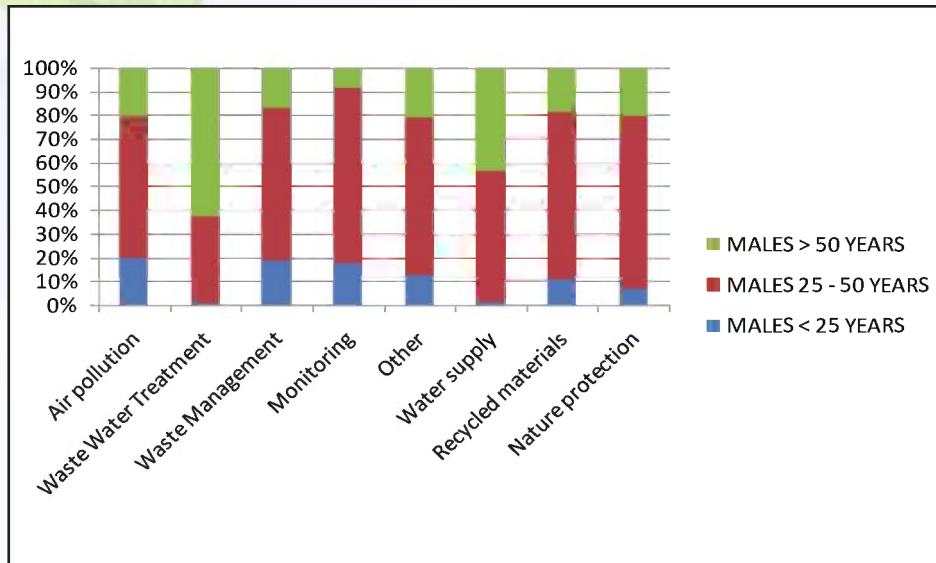
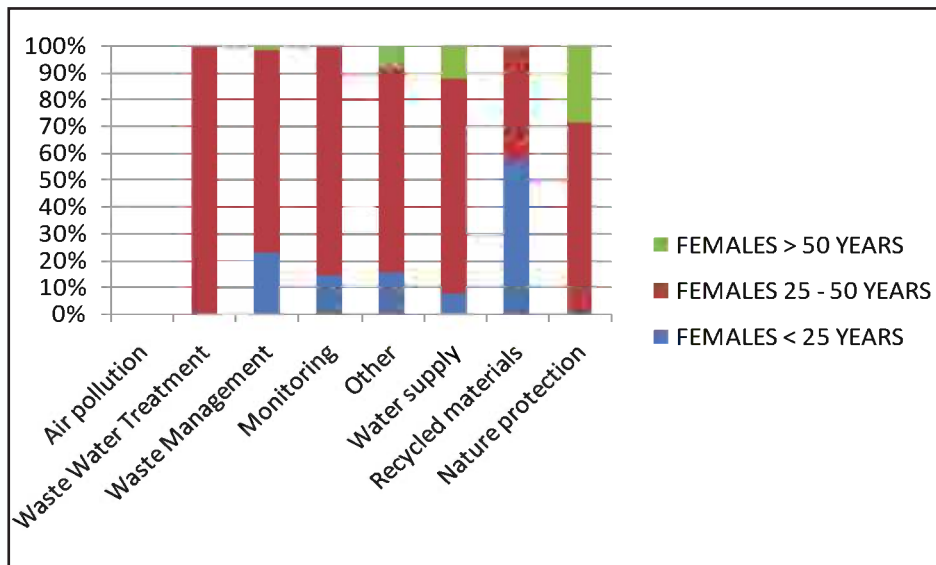


CHART 5.2B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY AGE



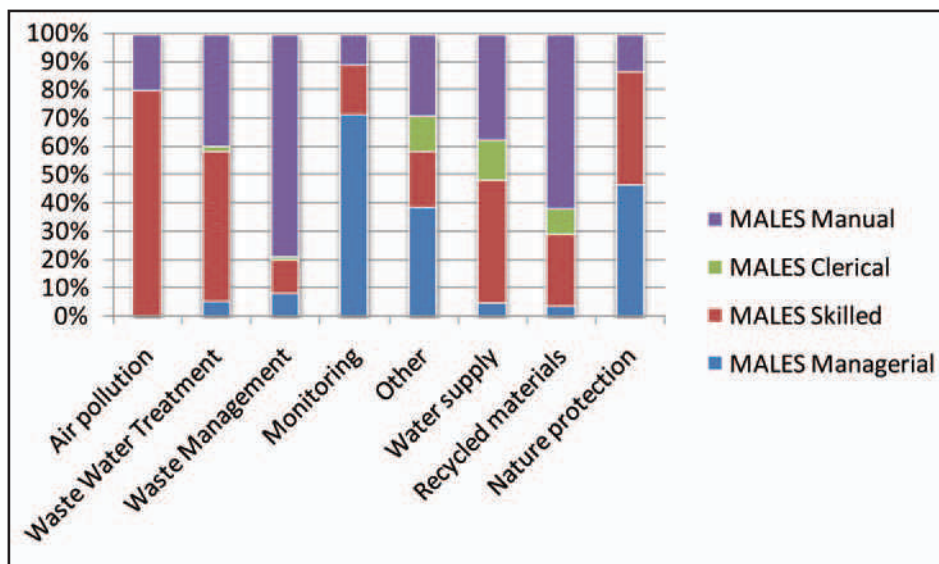
As for the female labour force, this is generally distributed in the 25 to 50 age bracket, while there is a preponderance of under 25s (slightly more than 50 percent) in the recycled materials sector, and as one would expect a slightly older participation in the NGO sector of Nature Protection.



5.1.3 OCCUPATION

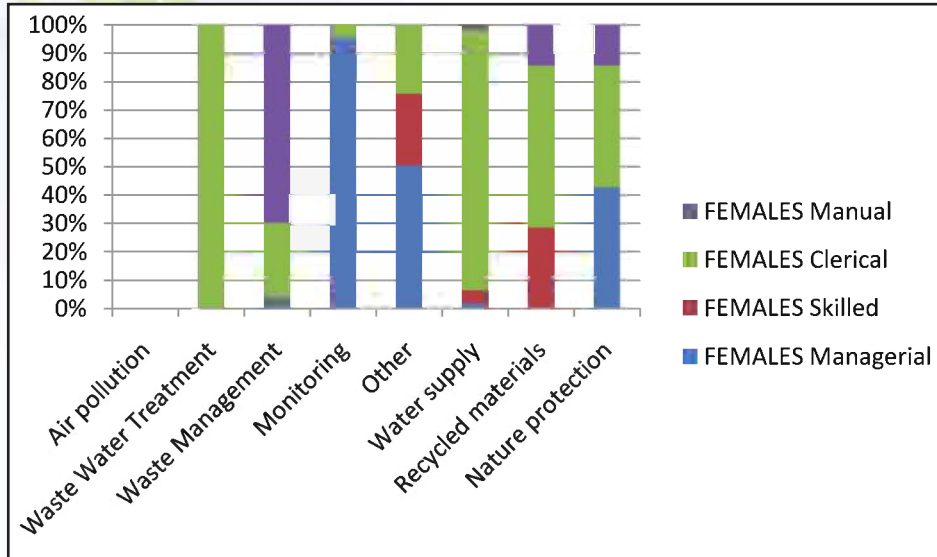
The occupational distribution of the male labour force in the environment industry is definitely not evenly spread. As expected there is a very small percentage of less than 5 percent managerial class in the traditional sectors while in the consulting, monitoring, the “other” and nature protection subgroups the percentage is much higher (40 to 70 percent). The recycled materials and the waste management sectors employ the highest ratio of manual workers with 62 percent and 80 percent respectively. A percentage bracket of about 10 percent of clerical grades is found in the water-supply, recycled materials and the other sub-sectors. The skilled category is found in all the environmental categories though the highest degree is found in the air pollution and nature protection sectors.

CHART 5.3A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY OCCUPATION



The female labour force is generally in the clerical grade as can be seen from the chart below. This applies equally to waste water treatment, water supply and recycled materials. The professional grade is found in the monitoring/consulting, the “other” and nature protection sub-groups. Manual female labour is found in the waste management, while skilled female personnel are represented in the “other” sector.

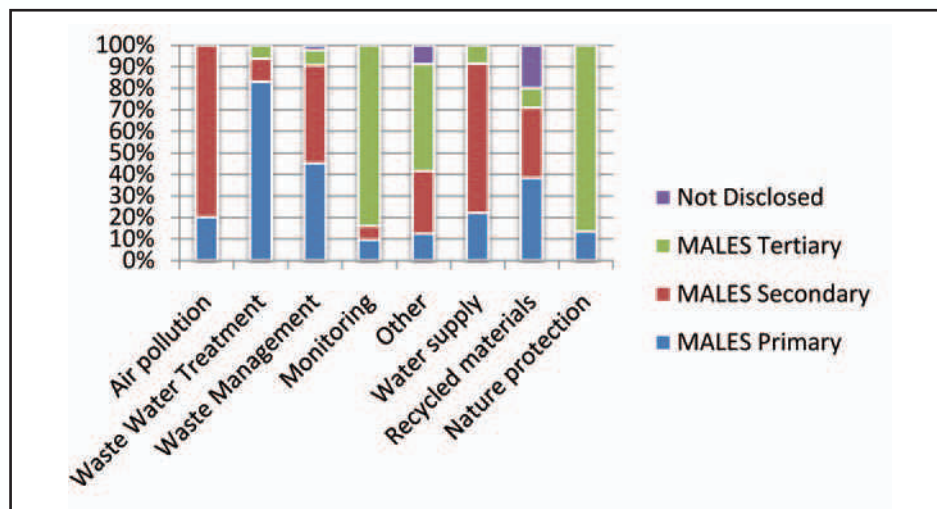
CHART 5.3B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY OCCUPATION



5.1.4 EDUCATIONAL BACKGROUND

The professional degree-holding male labour force is found in the nature protection projects (88 percent), in the monitoring/consulting services (80 percent,) and in the “other” sub-sector (50 percent). The other sectors or environment functions employ about 10 percent each. The primary-education-only male labour force is bound to be found in the same areas where manual and unskilled labour is found, namely in the waste-water, waste management and the recycled materials.

CHART 5.4A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY EDUCATIONAL BACKGROUND

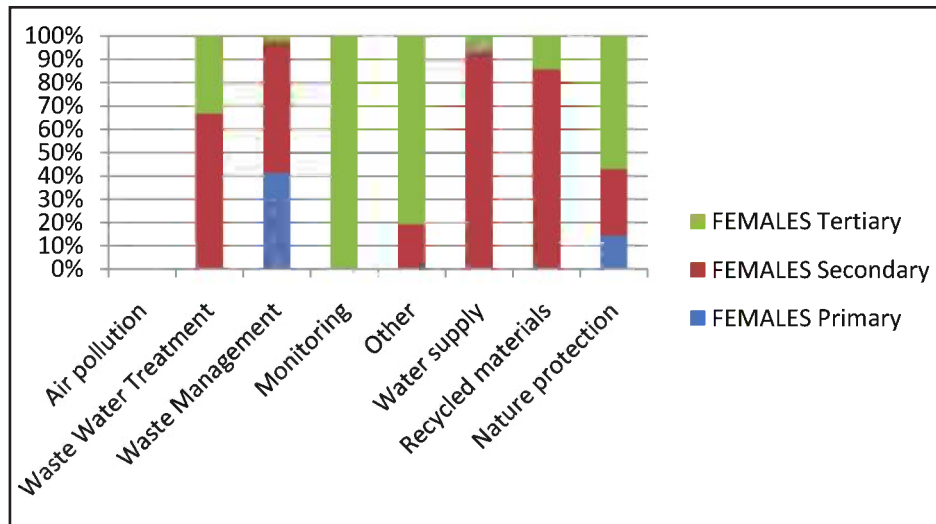


The educational background of the female labour force is significantly better than their male counterpart. Only in the waste management sector are any female participants holders of primary education



only. In all the other sectors the education background is of the secondary type or higher. All females in the surveyed monitoring and consulting activity are holders of a degree or diploma. The graduate female participation is highest in the monitoring sector, very high in the “other” sub-sector (80 percent), in nature protection and in the waste water treatment economic activity.

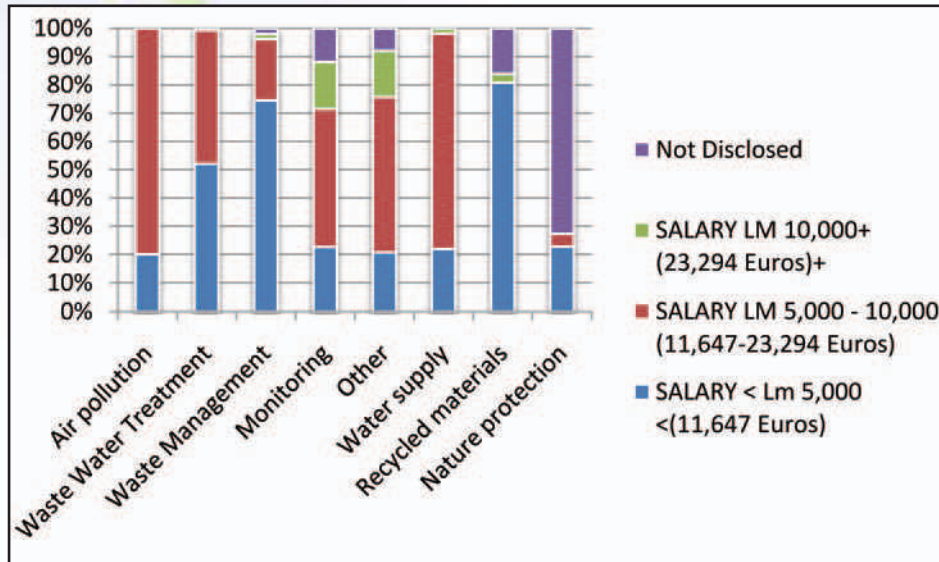
CHART 5.4B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY EDUCATIONAL BACKGROUND



5.1.5 SALARIES

The salaries brackets evaluated in the survey were three: the under Lm5,000 (Euros 11,647) the Lm5,000 to Lm10,000 (Euros 11,647 to Euros 23,294), and the over Lm10,000 (Euros 23,294). The highest overall salary range is found in the profession-based consultancy and regulatory fields, and in the “other” category. In the latter category we find a myriad of service-oriented businesses, which though not closely associated with the traditional environmental functions, are considered new and with high growth potential. The lowest salaries are found in the waste management sector and in the recycling materials sectors.

CHART 5.5 EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY SALARIES EARNED



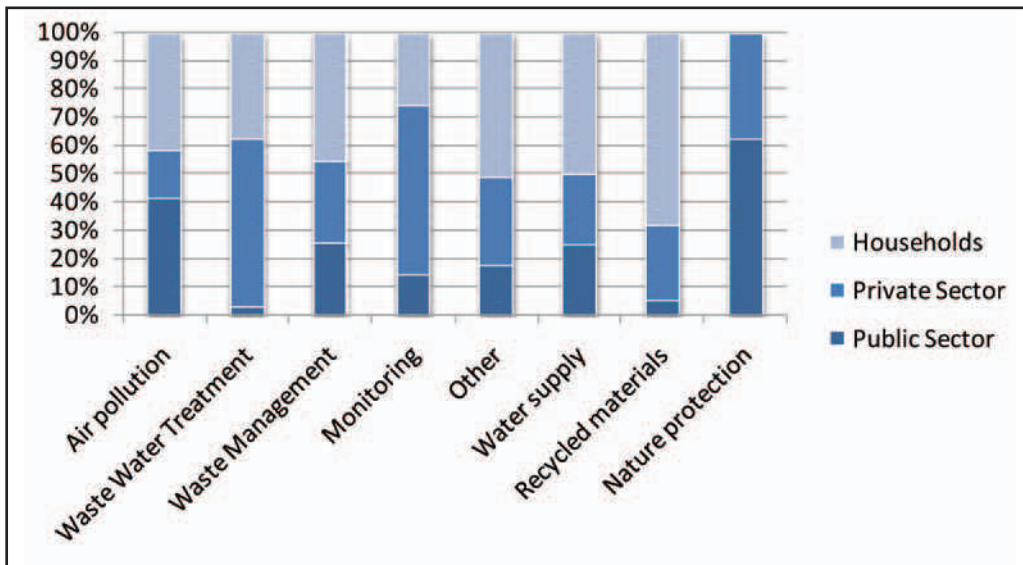
Generally however the labour force is split between those earning less than Lm5,000 (Euros 11,647) and those earning between Lm5,000 and Lm10,000 (Euros 11,647 to Euros 23,294), with the latter group being slightly bigger than the former.

5.1.6 MARKETS

Each firm was asked the market orientation of its economic activity; that is, whether it sells its goods and services to the public sector, to other private businesses or to the household sector. More than fifty percent of the industry's products or services goes to the public and private business sector, with the rest going directly to the household sector. This is an interesting result since there are many who think that most of the compliance burden and the services related to it, fall mostly on industry. The chart shows that while it is finally the consumers who pay for all goods and services directly or indirectly, the environment goods and services industry is used directly by the consumer to a significant degree.



ART 5.6 THE INDUSTRY'S MAIN MARKETS

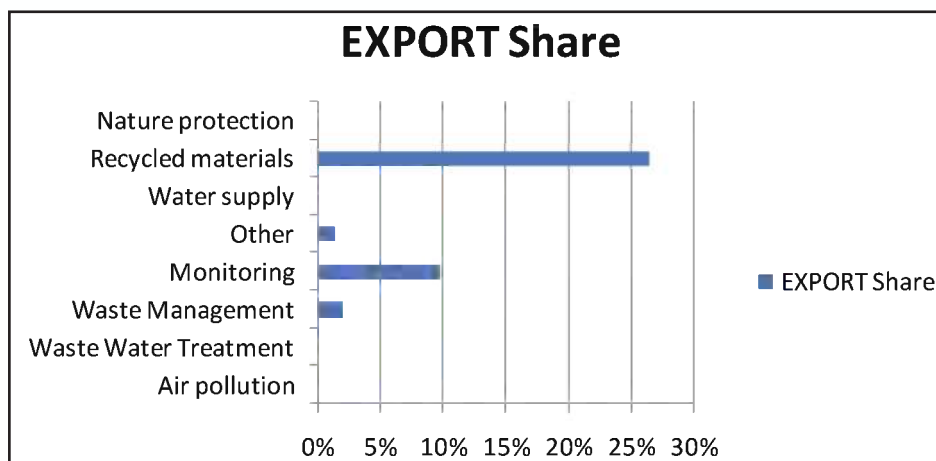


5.1.7 EXPORT SHARE

The demand for the goods and services produced by the environment industry arise, although not solely, from the compliance requirements of environmental legislation and regulations to which they give rise. For this reason the suppliers of these goods and services would be oriented initially to service this newly developing domestic market. It is natural that the export orientation would therefore be expected to be low at this initial stage. However, there is a particular sector which has already discovered and exploited the EU market and is exporting its services abroad. This is the consultancy and monitory sector, whose professional services are being sought abroad.

The recycling and waste management sector is expected to sell its product overseas because of the limitation of our local markets. The chart in fact confirms this hypothesis.

CHART 5.7 THE INDUSTRY'S EXPORT SHARE



5.1.8 JOB VACANCIES

The surveyed firms were then asked about whether they have unfilled vacancies, and if yes, to quantify the number of such vacancies.

TABLE 5.1 THE INDUSTRY'S REPORTED VACANCIES 2007

(Population Estimates based on Sample Data)

Environmental Sector	NACE Code	Economic Activity	Estimated Vacancies
Air Pollution	45.21	General construction of buildings and	4
Waste Mangement	74.70	Industrial cleaning	215
	90.02	Collection and treatment of other waste	57
	45.50	Renting of construction or demolition	17
	45.11	Demolition and wrecking of buildings;	8
	45.41	Plastering	7
Monitoring	74.14	Business and management consultanc	7
Other	45.42	Joinery installation	66
	45.31	Installation of electrical wiring and fi	26
	52.45	Retail sale of electrical household app	22
	75.12	Regulation of the activities of agencies	19
	45.45	Other building completion	8
	37.20	Recycling of non-metal waste and scr	4
	37.10	Recycling of metal waste and scrap	1
	51.57	Wholesale of waste and scrap	1
Nature Protection	91.33	Activities of other membership organis	3
			465

As can be seen from the above table the estimated population vacancies based on the appropriately weighted surveyed sample, show that there are about 465 unfilled vacancies at the end of 2007. It must be said that about 200 of these were made by one particular sector, industrial cleaning. This show the fast growth of certain sectors, which need to meet the growing demand of industry for services required to conform with EU directives in this area.

Apart from the industrial cleaning, other sectors which had a significant number of vacancies were that part of the construction industry, which also carries out environment-related activities (29% of unfilled vacancies – the 45 digit NACE codes), the companies collecting and treating waste (12%), and the government entities with 6% of unfilled vacancies. Companies that sell environment household goods, such as solar panels and water treatment technologies, registered another 5% of recorded vacancies.

In order to get a better picture of the type of vacancies held by these firms at the time of the survey, it is useful to analyse the existing labour force mix of these companies. Their labour force was mostly made up of males (59%), 66% of which were in the 25 – 50 age bracket. Likewise, 77% of the employed females were in this same age bracket.



In the companies that said they had an unfilled vacancy, 54% of their current employees were manual workers, 22% were professionals, while about 12.5% each were skilled and clerical workers. In terms of educational background, 40% of current employees had completed secondary level, 32% had finished up till the primary level while 28% had gone on to a tertiary level of education. Translated into absolute figures for the population at large, this means that there were about 250 vacancies for manual labour, 100 for professionals, 60 for skilled workers and 55 for clerical work.

An indication of the value of these vacancies can be obtained from the salary levels of the current staff of the companies registering a vacancy. Sixty percent of current manpower in these companies earned a maximum of Lm 5,000 (Euros 11,647), 29 percent earned between Lm 5,000 and Lm 10,000 (Euros 11,647 to Euros 23,294) while the remaining 11 percent earned at least Lm 10,000 (Euros 23,294). The registered vacancies, if all had to be filled in, would therefore contribute about Lm 3,000,000 (Euros 6,988,000) in additional annual salaries and wages earned.

5.1.9 SIZE OF INDUSTRY

The biggest question of all to be dealt with at this stage related to the real size of the environmental goods and services industry. Though this is the most salient issue, at the same time it is the most difficult to estimate. The aim of the study was to do this primarily in terms of the jobs it currently creates and the jobs it is expected to create in the near future. Other estimates such as value-added and turnover would be made, but would be based on the employment estimates.

Table 5.2 below shows clearly that the environment industry as defined by the Eurostat and OECD guidelines is a significant industry in Malta, with current estimates of about 4,152 persons. This represents about 3% of the country's labour force. This rate is considered to be at the high end of the spectrum internationally where the rate varies between 0.4 and 3 percent.⁶⁵ However as the next section points out, one must exercise caution when it comes to cross-country comparisons in this area, especially in view of the differences in methods of gathering information.

TABLE 5.2 THE SIZE OF THE ENVIRONMENT INDUSTRY IN TERMS OF EMPLOYMENT, 2004 – 2010*

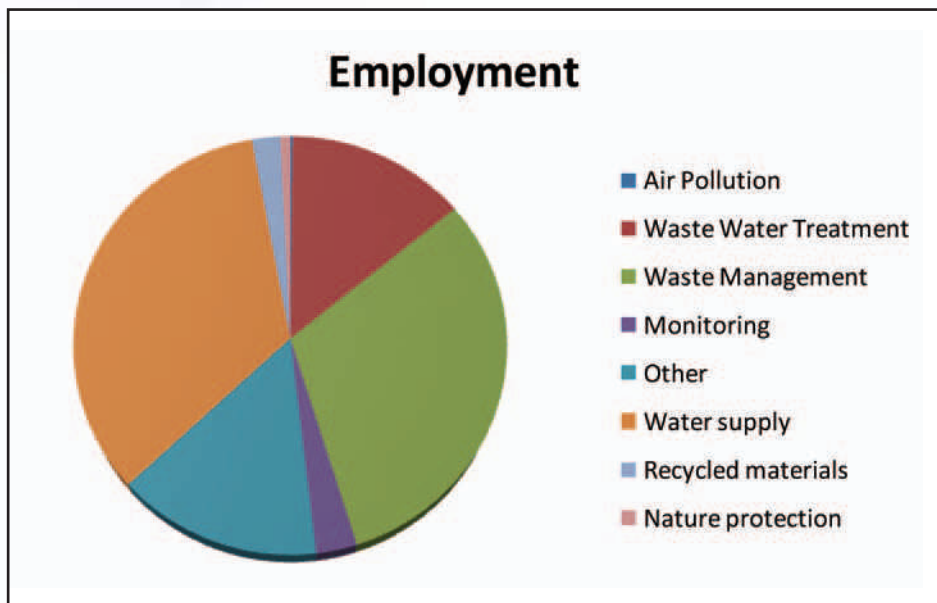
Environmental Sector	2004	2007	2010
Air Pollution	7	7	4
Waste Water Treatment	577	578	575
Waste Management	1087	1291	1835
Monitoring	76	123	124
Other	542	619	805
Water supply	1411	1412	1412
Recycled materials	92	90	101
Nature protection	28	32	42
Population Estimate	3820	4152	4899
Surveyed Sample	2621	2846	3358

⁶⁵ OECD 2003, The Global Environmental Goods and Services Industry, p70

*** Note: 2010 data is based on reported expected employment in that year.**

The profiles of this labour force have been given in the sections above. The largest employers are the big water supply, waste management and waste water management corporations. Together they employ 54% of the industry's labour force. At the same time one cannot ignore the fact that the other sectors together employ slightly less than half the labour force of this industry. The myriad of activities termed "other" include the sale of alternative sources of energy and various environmental related services, including their regulator.

CHART 5.8 THE INDUSTRY'S EMPLOYMENT BY SECTOR 2007



One needs to note from the respective NACE codes that many of the above activities are being supplied by non-specialist organisations, in the sense that a firm sells the environmental good or service side by side with other non-environmental related goods or services. As will be seen from the SWOT analysis this is a normal stage in the development of the industry. Firms would try to supply the service to themselves and to others at the beginning. With time they either grow internally, and specialise, or else, decide to buy from the environmental specialists outside. In either case the firms become a one activity operator rather than a multifarious one like today.

5.1.10 GROWTH

In order to draw a dynamic picture of the EGS industry through an estimate of a growth trend, one question specifically asked for the labour complement at two crucial dates, besides the current one, namely for the past year 2004 and for a future year 2010,



TABLE 5.3 THE EMPLOYMENT GROWTH RATE OF THE ENVIRONMENT INDUSTRY, 2004 – 2010

Years	Annual Growth Rate
2004 - 2007	3% p.a.
2007 - 2010	6% p.a.

This showed that while the annual labour force growth during the three year transition period (pre-EU accession and post EU accession) was an impressive 3% rate per annum, the future three years is expected to double to 6% per annum. One has to evaluate this growth against the background of constant manpower levels in the water supply and waste water management corporations who are presumably over-manned and are not expected to need additional complement. This means that the other sectors will be growing faster than 6%. The implications for job creation are obvious. As Chapter 7 below shows the additional environmentally-related job potential is approximately 750 by the year 2010. This is over and above the 465 jobs being demanded by firms at present.

5.1.1 TURNOVER AND VALUE-ADDED

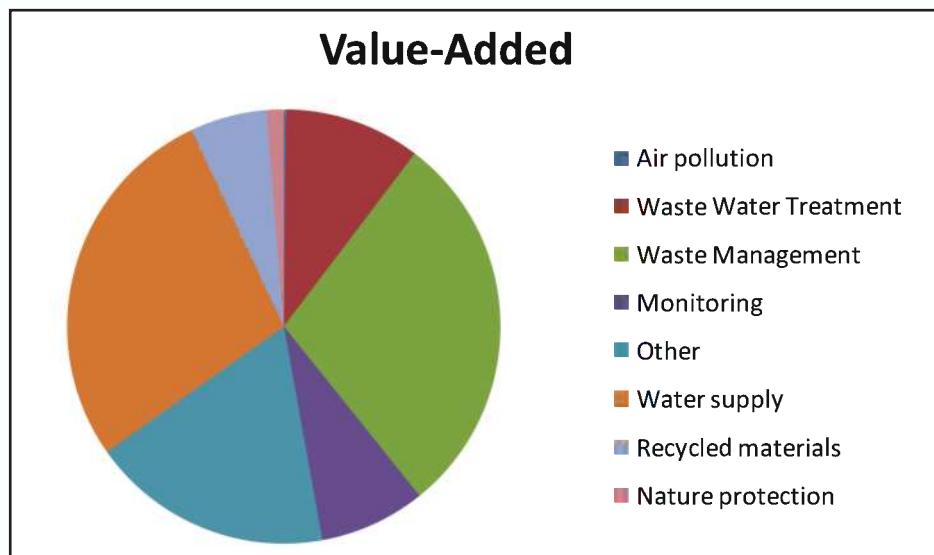
In order to encourage as full a response as possible, no questions were asked as regarding turnover, profitability, and value-added, although the salary brackets of the employees was collected as can be seen from the sections above. It was presumed that in view that the NSO industry survey had the turnover and value-added data on each NACE code, these would not need be asked from the respondents. This in fact applied for most sectors. Unfortunately, in view of the data protection law the data on the single public utilities in the area of water supply, waste-water treatment and management, and waste management could not be supplied. The turnover and value added supplied covered 42% of the industry being evaluated. Estimates had to be made for the rest of the industry, based on the salary information given for their respective labour force, assumptions regarding turnover and profitability per capita.

TABLE 5.4 THE SIZE OF THE ENVIRONMENT INDUSTRY IN TERMS OF TURNOVER AND VALUE ADDED

	Turnover (Lm)	Value-Added at Factor Cost (Lm)
Air pollution	169,314	65,767
Waste Water Treatment	8,081,804	3,964,409
Waste Management	19,011,433	11,314,343
Monitoring	4,713,367	3,089,780
Other	21,550,266	7,039,076
Water supply	21,780,000	10,890,000
Recycled materials	5,703,470	2,228,797
Nature protection	990,000	495,000
	Lm81,999,655	Lm39,087,173
	Euro 191 mill.	Euro 91 million

The over-all estimate on the environmental goods and services industry for turnover and value-added at factor cost (that is excluding taxes) is given in Table 5.4 above and the Chart 5.9 below.

Chart 5.9 The industry's Value-added by Sector



It can be seen that the turnover is estimated at about Lm82 million, or 191 million Euros. The respective value added at factor cost is estimated at Lm39 million, or 91 million Euros. When compared to other industries this is a significant contribution to the country's GDP. In fact it is estimated that the GDP's share is in the region of 2%. To give one comparison this is about more than half of the contribution which the construction industry gives to the national economy (Lm70 million).



5.2 COMPARISONS TO OTHER COUNTRIES

It was noted in Chapter 3 above that the goods and services provided by eco-industries represent approximately 2.2% of GDP in the EU-25 area. In this respect Malta compares favourably with its 2% contribution. The same can be said for employment where, while Malta is estimated to provide direct jobs for about 3% of the labour force, the average for the EU-25 countries is about 1.3%. Some individual countries like Austria, Denmark and France have rates which are higher than this too. However one should caution against sweeping comparisons of this nature. About 40 percent of our local environment industry value-added is in water supply and waste water management. At present they are run by a state corporation, which it is admitted has room for increasing its productivity and perhaps labour shedding. It could be possible that the future growth of the rest of the industry would be balanced by a reduction from the water supply and waste water sectors. This was indicated clearly that no new net job additions are foreseen by this corporation in the near future. This is in spite of the commissioning of three large waste treatments plant, one in Gozo and two in Malta.

In the UK, whilst the waste management sector is enjoying significant expansion, the UK water industry has seen a steady decline in its core staffing levels since privatisation in 1991. Between 1993 and 1999, the industry overall lost 11,000 staff or 19% of its workforce. This has occurred for a number of reasons: the increasing automation of water treatment plants, company mergers, and operational efficiencies.⁶⁶

However, in general, the contribution of each sector to the industry is very much in line with most of the other EU countries. This shows that the bulk of the industry is still dominated by solid and liquid waste management and water resource management close by. The other sector are significant in terms of their spectacular growth.

5.3 CONCLUSION

This chapter has managed to give the first ever glimpse of the size, nature, and growth of the Maltese environmental goods and services industry. It also gave a detailed profile of its labour force and also its likely demand for the foreseeable future. In terms of its contribution to the GDP it compares well with other big industries. Given its fast growth this industry is really worth watching and monitoring.

⁶⁶ Ecotec, (2002b), *Analysis of the Size and Employment of the Eco-Industries in the Candidate Countries*



6. SWOT Analysis of the Labour Market for Green Jobs



6.1 INTRODUCTION

One of the specific objectives of this study was to conduct a SWOT analysis of the Maltese labour market in respect of 'green jobs' as surveyed by this study, and to propose feasible and sustainable arrangements for their growth, including the design of any relevant employment and training schemes to enhance the industry's future and provide sustainable jobs to those who are seeking them. This analysis included a review of possible barriers that could hinder job creation in the sector, and to review the policies and strategies developed in Malta and internationally tied to environmental-related employment and the environmental sector.

The focus group which carried out this SWOT analysis was made up of a select group of business-leaders and environmental experts. The salient remarks and a number of key recommendations made during this SWOT analysis are included in this chapter.

Based on the output from this focus group, a number of successful employment schemes and training programmes related to the environmental sector or related areas carried out in other EU countries will then be screened as to their suitability or adaptability to the local situation.

The list of participants making up the Focus Group may be found in Appendix C.

6.2 OVERALL APPROACH

The focus group was made up of two components:


- Presentation on the first two phases of the study, with special reference to the eco-enterprise survey results as presented in the previous chapter.
- The second part consisted of an in-depth discussion on the themes and trends emerging from the survey results, as well as to their implications for the industry.

Recommendations relating to the employment prospects emanating from this growing new industry were made at the final part of the meeting.

6.3 GENERAL ISSUES

A number of issues were put forward by the participants in the focus group in reaction to the description of the assignment's objectives and presentation on the survey's results.

These included:



1. Increased Awareness: a number of those present highlighted that there is a heightened national awareness of the environment as a whole, and of the obligations resulting from it. The widespread awareness on Environment Impact Assessments (EIAs) was mentioned as a typical example. One should consider the fact that a few years back only few persons knew what an EIA was about, while now it is part and parcel of everybody's vocabulary. However, there still seems to be general misunderstanding of what the environment industry is.

2. Gender Imbalance: The persistent imbalance between males and females in the environmental sector can be considered to be a reflection of the imbalance which is seen across all sectors of the Maltese economy taken together. Some suggested that work in the environmental sector is probably more appealing to females.

3. Malta's size : In view of Malta's size many were of the opinion that the future for the local environmental industry should not be restricted to Malta, but widened to include the much larger EU market.

4. Innovation : The need to look at innovation by re-inventing our method of doing things in growing markets was raised by some participants. Others pointed out that compliance is merely a transitory phase and will soon stop being an issue. Therefore we need to take a holistic look at the environmental business. This industry could be the motor of Malta's future economic growth and could provide the next industry success story.

5. Industry Niches: Some pointed out the need to look at the environmental market and find niches for local industry. The Malta Enterprise (ME) scheme on eco-innovation was cited as an example. The currently witnessed take up (23 applicants) is proof in itself of industry's willingness to comply. On the other hand, due to state aid regulations, ME cannot assist in compliance funding. The schemes it designs can only be aimed at energy efficiency.

6. Out-sourcing: A number of comments related to the development of outsourcing in the environmental market, namely:

Opportunities for primary firms: Many secondary firms (as defined in the study) tend to contract out their environment-related work to specialist firms, including work related to monitoring and reporting. This will lead to opportunities for the creation of primary firms offering these services.

Cost considerations: Many firms allegedly find it cheaper to outsource than to deal with these environmental compliance issues in-house. Lack of available in-house expertise also leads some companies to opt for outsourcing.

Market Trends: It seems a number of people in green jobs are spending a number of years working for a firm before creating their own business and provide that same service to their original employers.

Reporting Obligations: There exists a number of reporting obligations to the



regulatory authorities vis-à-vis regulatory compliance. In the case of a scheme, the firm participating will report to the company in charge of the scheme, who will in turn report to the authority on the **collective** results in a consolidated way. This confidentiality issue is very important for most firms.

Enforcement: The more administrative enforcement there is, the more outsourcing is needed.

7. Compliance issues: Compliance issues emerged as one of the main environmental issues which could have repercussions on employment.

Enforcement: Many highlighted that there needs to be greater enforcement and monitoring of the current environmental legislation. The competent authorities need to have strict enforcement strategies. A list of legislative documents is not necessarily a guarantee of full compliance.

Level Playing Field: compliance issues become very important when companies are not all obliged to comply in the same way. Friction could result as a result of different obligations on competing firms with companies free-riding the system by not being obliged to comply in the same way as their respective competitors. This applies to various areas including pollution abatement and the tendering process.

Self-compliance: Self-compliance is becoming increasingly common. Should compliance be judicious or strict? Special reference was made to the construction industry.

Timeframes: Compliance timeframes should be realistically set with short notices avoided as much as possible. The threat of business closure should not be avoided as much as possible.

Uncertainty: The authorities need to give an indication to industry as to when it plans to implement certain legislation, such as waste management applications for schemes, and the National Waste register.

Information: Authorities should give more information regarding pending information.

Funds: Some highlighted that compliance is not an issue up for debate – you simply have to comply and there are no funds for this. Some funds applications have been filtered to the private sector but at a very late stage.

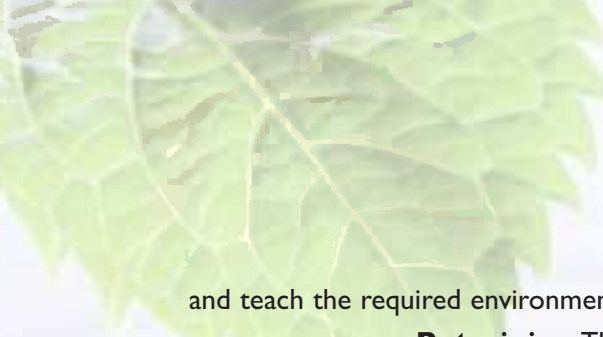
8. Employment

New jobs: Many believed that there are long-term effects on the creation of new jobs.

Laboratories: Lack of local laboratories were also mentioned, with an example being a lab to measure VOCs. The same problem is encountered with recycling plants.

Training for green jobs: Some examples of green jobs were given, including ecological guides and helping the farming industry transform its traditional process to an organic one. There is also a lot of demand for environment-related manual work.

Job market evolution: There is a claimed natural evolution of jobs, and redundancies in one sector will naturally find themselves as jobs in another sector. So the issue to be tackled is whether the ETC should carry out immediate short-term skills training for those whose skills have become obsolete (in transition), or whether it should take a longer-term approach (University)



and teach the required environmental skills to younger students.

Retraining: The older workers should be given opportunities to use their experience and not be pressured unduly to change because this could still represent a waste of time. The older workers will never be as good as the new breed. Thus, for example, the electrician has not changed his knowledge base, but he is now getting different kinds of questions from his clients. This probably explains problems some people were having with an incorrect installation of their solar panels (not facing South).

6.4 CONCLUSION

In conclusion the above remarks emanating from focus group discussion translate into the following SWOT Analysis of Green sector and employment opportunities.

Strengths

- Increased awareness on environmental issues
- Increased firms specialization
- Increased popularity in specialized training courses and continuous educational development

Weaknesses

- Gender imbalance in the sector (perceived versus real)
- Lack of available specialised in-house resources
- Fragmentation in certain areas
- Lack of proper information on government policy/plans/deadlines
- Weak enforcement capabilities leading to imbalances
- Lack of local specialized laboratories
- Diseconomies of scale
- Extensive requirements of environmental *Acquis*
- Resistance to change
- Environment compliance considered as 'extra' and costly by many firms
- Public education still lacking in certain areas

Opportunities

- Increased demand for environment related work
- Export potential of green goods and services
- Malta's small size in comparison to EU potential market
- Lack of available specialized in-house resources
- Creation of new jobs
- Development of specialized industry niches
- Creation of specialized firms
- EU funding for environment-related initiatives
- Evolution in job-market to green related jobs



Creation of short-term and long-term training possibilities

Threats

Increasing reporting obligations

Added compliance costs

Perceived or real different company /industry-wide compliance obligations

Strict enforcement

Deadlines not communicated by the authorities



7. Training and Employment Schemes



7.1 INTRODUCTION

This chapter is aimed primarily at identifying critical success factors (in terms of policy and legislation) needed to bring about jobs in the environmental industry. Secondly, it proposes a number of training programmes which could bring about the needed skilled and qualified labour supply in these areas. Thirdly, this chapter would identify good practice in the area of environmental employment and training in Malta and abroad, analysing the transferability of foreign practices to Malta.

The Study suggest that if the new environmental training and employment schemes are to be implementable, such schemes should be part and parcel of existing or planned employment and training schemes being devised by ETC. This is advised in so as to respect human resources limitations to implement such schemes within the ETC, and the obvious absence of a critical mass in the environment sector to justify environmental training and employments schemes designed solely for this sector.

7.2 POLICIES AFFECTING THE ENVIRONMENT INDUSTRY

The following policies, programmes, schemes and general good practice endeavours are all meant to promote and sustain the environment industry without putting a needless burden on the consumer or producer. Sustainability should be the guiding principle in this respect.

7.2.1 DEVELOPING FINANCIAL MECHANISMS TO ENSURE THE IMPLEMENTATION OF ECO-INDUSTRY AND ECO-HOUSEHOLD PROJECTS

Although as a new member state Malta is considered to be a critical market for the future growth of eco-industries, lack of investment capacity may slow down the expected market development. Financial mechanisms aimed at supporting the development of the demand for eco-industry goods and services should be maintained and reinforced, and if possible, focused on investments in pollution and resource management activities.

7.2.2 PROVIDING TARGETED INFORMATION ON ECO-INDUSTRIES TO CUSTOMERS.

Further efforts to develop awareness of consumers (households, industries, local authorities) on the availability of technologies and services offered by eco-industries, as well as on their costs and potential benefits, would be required to stimulate the demand. Several existing instruments such as eco-labels have proven effective to raise awareness and build consumer trust in the quality of the goods and services delivered.

7.2.3 REINFORCING ENVIRONMENTAL REQUIREMENTS AND THEIR IMPLEMENTATION

The existing policy framework in the EU has proven crucial for the development of eco-industry sectors. It remains a key instrument to sustain growth in these sectors, by setting more ambitious targets and/or requirements, as well as by broadening the scope of existing legislation. The preparation and adoption of new legislation also helps keep other industries in a leading position on new emerging issues, on a global level. In addition, further efforts should be made to ensure the implementation of the existing legislation.

However, this push towards new legislation and respective regulations is, it must be cautioned, a two-edged sword.

The growth of one industry might translate into the demise of another due to the regulatory costs and related burdens. In this respect economists have always sought the employment double dividend, whereby the final effect of environmental legislation would be positive across the whole economy. Various studies have found that this is small and uncertain. When implementing economic instruments, such as taxes and auctioned tradable permits, an employment dividend is possible only when revenues raised are recycled in the form of a reduction of labour costs. The employment increase is likely to be greater when payroll tax deductions are concentrated on unskilled workers.⁶⁷

The literature together with annotated experiences suggest that one would require the use of a combination of instruments if the aim is to broaden the objectives of environmental policies with policies aimed at economic efficiency and employment promotion. As policy mixes increase, so does the complexity of interaction. In the employment field the OECD draws the attention to the importance of policy packages combining environmental policies with other policy measures, for example public finance, labour market policies, trade policies, industrial and innovation policies.

7.2.4 ESTABLISHING HARMONIZED STANDARDS FOR ENVIRONMENTAL GOODS AND SERVICES

The establishment of harmonized standards is to be expected to contribute to the promotion of the quality of outputs delivered by eco-industry and develop awareness of potential purchasers. Rather than seeking new legislation and deciding to increase the degree of enforcement, it would be of greater benefit if the regulators aim to balance the degree of enforcement of current legislation so as to obtain more balance and consistency. This is expected to send the right signals to the industry. The SWOT analysis points out that this lack of consistency is very noticeable in our sector. This creates uneven cost burdens, lack of motivation, incentive to avoid detection of possible infringements, and more importantly does not encourage the growth of the environment industry itself because of the associated risks.

⁶⁷International Standard Industrial



7.2.5 PROMOTING THE INTEGRATION OF ENVIRONMENTAL PERFORMANCE IN INDUSTRY

The promotion of integrating the environmental performance could easily be interpreted, for example, to refer to the construction industry. Standards can have a strong impact in developing the demand for environmentally efficient technologies.

The industry grows in various ways not least by the effort to use more alternative sources of energy. In this respect any effort to save energy whether by insulation of houses, energy use auditing, giving advice to both small and medium firms and households alike are highly recommended.

7.3 EMPLOYMENT AND TRAINING AND EU STATE AID REGIMES

The design of the schemes should first identify the target group. This section is meant to assist in defining under which European Union state aid regimes will the environmental employment and training schemes fall under. The identified state aid regime will then define the eligible costs and the respective co-financing percentages. Once defined some best practice examples of schemes both locally and at European level are then outlined. Finally, the foundations for the recommended schemes built on the identified state aid regimes, will then be laid out.

7.3.1 STATE AID REGIMES

Considering employment and training schemes in principle there are four main state aid regimes one should look into:

NO STATE AID

This is when the assistance is being given to an individual and not an enterprise. An example of such a scenario is a training or employment scheme directed at assisting students or the unemployed to tap into the job market. Another criteria for no state aid is no selectivity whereby the scheme is open to all with unrestricted access to any individual or company.

DE MINIMIS⁶⁸

In principle this is not considered as state aid by the EU Commission since this allows the state to assist enterprises (excluding activities in Article 1 of the Regulation) with a total of €200,000 cumulated over three years to undertake specific activities in line with the conditions stipulated in the *de minimis* regulation.

TRAINING BLOCK EXEMPTION⁶⁹

This exemption allows the state to assist enterprises in providing training in various areas. The block exemption splits training into two main areas of specific training and general training.

⁶⁷ OECD (2003), *Economy-wide Employment Impacts Resulting from the Implementation of the Kyoto Protocol*, page 73.

⁶⁸ http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_379/l_37920061228en00050010.pdf

⁶⁹ http://eur-lex.europa.eu/LexUriServ/site/en/oj/2001/l_010/l_01020010113en00200029.pdf

Specific training is training that involves tuition that is directly and principally applicable to the employee's present or future position in the assisted firm. It provides qualifications which are not, or are only to a limited extent, transferable to other firms or fields of work.

General training is training that provides tuition that is not only applicable or principally related to the employee's present or future position in the assisted firm, but which provides qualifications that are largely transferable to other firms or fields of work and so improve substantially the employability of the employees. Training is considered to be general if:

The aid intensities given to an enterprise are defined by its size in line with EU Commission Recommendation 96/280/EC - and the type of training as is outlined in the below table:

TABLE 7.1 SPECIFIC AND GENERAL TRAINING

	SME	Large	For Disadvantaged workers ⁷¹
Specific Training (gross aid as percentage of eligible cost)⁷²	45%	35%	+10%
General Training (gross aid as percentage of eligible cost)	80%	60%	+10%

EMPLOYMENT BLOCK EXEMPTION⁷³

The employment block exemption allows the state to award aid to enterprises employing new workers for a minimum of 2 years for SMEs and 3 years for large enterprises with the objective of creating employment. The aid intensities given to an enterprise are defined by the size of the enterprise as is outlined in the below table:

TABLE 7.2 AID INTENSITIES BY SIZE OF FIRM

	Small	Medium	Large
Training Aid	65%	55%	30%

In the case of disadvantaged and disabled workers as defined in Article 2 additional aid can be given to the enterprise in line with the conditions of the block exemption regulation.

⁷⁰ http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

⁷¹ Disadvantaged workers are defined in Article 2 of the Employment block exemption – http://eur-lex.europa.eu/LexUriServ/site/en/oj/2002/l_337/l_33720021213en00030014.pdf

⁷² Eligible costs: trainer's fee and expenses (travel, material) and trainees' training time and expenses.

⁷³ http://eur-lex.europa.eu/LexUriServ/site/en/oj/2002/l_337/l_33720021213en00030014.pdf



With regards to the above mentioned training and employment block exemptions the EU Commissions is currently in discussions with Member States to group most state aid block exemptions into a single general block exemption. This is planned to be issued in 2008 and any schemes issued need to conform to this new general block exemption regulation when in force.

7.4 BEST PRACTICE SCHEMES

7.4.1 NATIONAL

On the premise that the recommended environmental training and employment schemes are to be part and parcel of current / planned employment and training schemes being devised by ETC, the recommended national best practice schemes are limited to the main ETC schemes.

7.4.2 TRAINING ASSISTANCE UNDER THE BUSINESS PROMOTION ACT

Background - The objective of this training programme is to promote training amongst employers. This is governed by Regulation 14 of the business promotion regulations.

Target Group - Enterprises deemed qualifying organisations by Malta Enterprise. Employees employed for more than 3 consecutive months.

State Aid Regime – This refers to the Training Block Exemption.

Scheme Description -

The scheme provides assistance on general training and specialised training as outlined in the Training Block Exemption to employees in eligible enterprises. Eligible costs as part of the scheme include qualified trainers fees and costs, qualified trainers and employees travel costs, training materials and supplies, depreciation, consultancy fees and personnel costs relating to the employee.

7.4.3 TRAINING AID PROGRAMME.

Background - Under Cohesion Policy 2007–2013, Operational Programme II, the ETC is currently planning a training aid programme notified under the training state aid framework which will be funded under the European Social Fund.

Target Group - Enterprises and Employees

State Aid Regime - Training Block Exemption

Scheme Description -The guiding principles of the Training Aid Programme originate from the above training assistance programme under the business promotion regulations. The scope of the Training Aid Programme is planned to include a larger number of enterprises than the Business Promotion Regulations Training Assistance. The eligible expense will follow the Business Promotion Regulations, nevertheless the eligible expenses under the Training Aid Programme need to be eligible costs under Operational Programme II.

7.4.4 EMPLOYMENT AID PROGRAMME

Background: Under Cohesion Policy 2007–2013, Operational Programme II , the ETC is currently planning an employment aid programme notified under the employment state aid framework which will be funded under the European Social Fund.

Target Group - Enterprises and Disadvantaged new Employees

State Aid Regime - Employment Block Exemption

Scheme Description- The objectives of the Employment Aid Programme is to promote the inclusion of disadvantaged groups into the labour market which may include registered unemployed under 25 and over 50, ex addicts who are registered as unemployed, disabled persons and persons attempting to re-enter the workforce. The employer needs to maintain the employed person for more than 1 year. The eligible costs under this scheme include employee and employers national insurance costs and the wages of the employees for a defined period of time.

7.4.5 JOB EXPERIENCE SCHEME

Background: Under Cohesion Policy 2004–2006 the ETC launched a Job Experience Scheme funded under the European Social Fund. The objectives of the JES are two-fold, serving both the requirements of the employer who offers to train the participant and the needs of the unemployed & inexperienced youth.

Target Group - Job seekers and public, private organisations and NGOs,

State Aid Regime - Not State Aid.

Scheme Description - Facilitate the school-to-work transition by providing new labour market entrants an inkling of the world of work, thereby assisting and easing their integration into the labour market, and improve the participants' employability by gaining work experience thus replacing the vicious circle of "no job, no experience; no experience, no job".



7.4.6 TRAINING SUBSIDY SCHEME FOR EMPLOYEES IN MICRO ENTERPRISES

Background: This training scheme, part of the National Action Plan for Employment, is intended to assist self-employed persons and persons employed in enterprises with less than twenty employees, to participate in further off-the-job vocational education and training.

Target Group – Self-employed persons, employed persons in a micro-enterprise for at least six months, and apprentices.

State Aid Regime - Not State Aid

Scheme Description - Assistance will be in the form of a training grant that will be reimbursed to the individual after successfully completing the training. The reimbursement will be of 75% of the total training cost up to a maximum of € 465.87. The training costs include the fees paid for the training, examinations and/or registration fees for the final certification, will not qualify for reimbursement.

7.4.7 KNOWLEDGE TRANSFER PROGRAMME (KTP)⁷⁴

Target Group - Enterprises and Students (through Universities & Research Institutes)

Scheme Description - A relationship formed between a company and an academic institution ('Knowledge Base' partner), which facilitates the transfer of knowledge, technology and skills to which the company partner currently has no access. Each partnership employs one or more recently qualified people (known as an Associate) to work in a company on a project of strategic importance to the business, whilst also being supervised by the Knowledge Base Partner. Projects vary in length between 12 and 36 months. The Associates are either postgraduate researchers or university graduates.

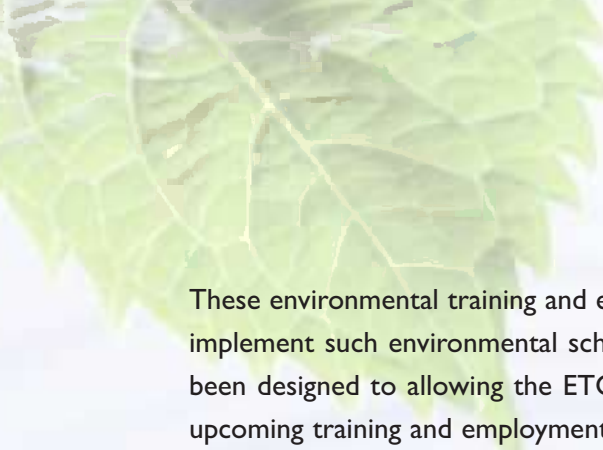
7.5 RECOMMENDED SCHEMES

There are four (4) environmental schemes being recommended two (2) may be *transposed into current ETC schemes* while two (2) are *pilot projects* which if successful may be phased into current ETC schemes such as the Job Experience Scheme.

TRANSPPOSED INTO CURRENT ETC SCHEMES:

- Environmental Training Scheme, and
- Environmental Employment Scheme;

⁷⁴ <http://www.ktponline.org.uk/>



These environmental training and employment schemes keep in mind the limited human resources to implement such environmental schemes. The environmental training and employment schemes have been designed to allowing the ETC to implement the above schemes as modules into the current / upcoming training and employment schemes.

PILOT PROJECTS WHICH MAY BE ROLLED INTO FUTURE ETC SCHEMES:

- Environmental Summer Internship, and
- Environmental Secondment Scheme.

The environmental summer internship and secondment scheme are pilot schemes which the ETC may implement in a phased approach to build on the identified best practice. In view of the absence of critical mass for environmental training and employment schemes it is being recommended to implement the above schemes in a phased approach using the summer internships as a test basis followed by a secondment scheme if the summer internships prove successful which can then form part of a revised Job Experience Scheme.

7.6 ENVIRONMENTAL TRAINING SCHEME

Target Group – Environmental Enterprises and their Employees

State Aid Regime – Training Block Exemption

Scheme Description – This scheme will run in parallel with the ETC training aid programme. This would entail including environmental enterprises as eligible enterprises as part of the training aid programme and environmental training as an eligible training activity for all eligible enterprises under the training aid programme.

Eligible Environmental Enterprises as identified in this report will be discussed in Section 7.9 of this chapter.

Potential *environmental training* that may be considered as eligible under the training aid programme relates to those areas of the environmental *Acquis*. As outlined in earlier in this report Malta is still in the process of implementing on the ground a number of current and but more so forthcoming EU environmental obligations. A general outlined of possible environmental training which may be made available to all enterprises eligible under the training aid programme may include:

- Current and future Environmental EU Directives on Air, Water and Waste,
- Air Quality improvement techniques,
- Water quality improvement techniques,
- Waste Management techniques, and
- Environmental Monitoring and Audit in general.

Possible Eligible Costs - may include qualified trainers fees and costs, qualified trainers and employees travel costs; training materials and supplies, depreciation, consultancy fees and personnel costs relating to the employee, assuming that these are accepted as eligible costs under Operational Programme II,



2007–2013, which the scheme may potentially be funded.

7.7 ENVIRONMENTAL EMPLOYMENT SCHEMES

Target Group - Environmental Enterprises and Disadvantaged new Employees

State Aid Regime - Employment Block Exemption

Scheme Description - This scheme will run in parallel with the ETC employment aid programme. This would entail including environmental enterprises as eligible enterprises as part of the employment aid programme.

The eligible target group may remain disadvantaged new employees nevertheless the employment block exemption allows the ETC to open the scheme to other employees not solely restricted to the disadvantaged since this may considerable limit take up in the context to the environmental employment scheme.

Possible Eligible Costs - This scheme may include employee and employers national insurance costs and the wages of the employees for a defined period of time as stipulated in the respective block exemption.

7.7.1 ENVIRONMENTAL SUMMER INTERNSHIPS

Target Group – Students and Environmental Enterprises

State Aid Regime – No State Aid (assuming the students are the beneficiaries) or de minimis (assuming the enterprises are the beneficiaries).

Scheme Description – The scheme is designed to help students in particular courses at MCAST or at the University of Malta familiarise themselves with the work currently being undertaken in the environmental enterprises and transfer knowledge from academia to business. This scheme will be run on a pilot basis targeting environmental enterprises as identified in this report.

An approved mentor / matchmaker⁷⁵ will match an environmental enterprise with interested students with specific environmental skills. The mentor / matchmaker may be awarded a success fee based on the number of matches. The engagement will be limited to a two month project in the summer period.

Possible Eligible Costs - The ETC will cover a percentage of the stipend / wage and national insurance depending upon the chosen state aid regime.

This pilot environmental summer internship may be funded under the European Social Fund under Operational Programme II. This summer internship scheme may be extended to other sectors if seen of relevance to the ETC goals.

⁷⁵ This mentor may either be engaged by ETC or may be the students' tutor at the University of Malta or MCAST.

7.7.2 ENVIRONMENTAL SECONDMENT SCHEME

Target Group – Students and Environmental Enterprises

State Aid Regime – Employment Block Exemption.

Scheme Description – Assuming the summer internship scheme proves successful and the required demand exists, it may be developed into longer term projects (one year and over) for final year students which may then move into full employment with the environmental industry.

The implementing modalities of the environmental secondment scheme will be similar to the summer internship scheme but the project will be implemented over a longer period of time (12 – 36 months) and the student will be employed with the enterprises for a minimum of 3 years in the case of a large enterprise and 2 years in the case of SMEs as stipulated in the employment block exemption.

Potential Eligible Costs - The ETC will cover a percentage of the wage and national insurance in line with the respective employment block exemption.

This environmental secondment scheme may be funded under the European Social Fund under Operational Programme II. This environmental secondment scheme may be extended to other sectors if seen of relevance to the ETC goals.

7.8 A TYPICAL SCHEME

One example of a very successful job creation scheme is the WISE group in the U.K. (see boxed text with detailed description in Table 7.3 below). The WISE Group uses government programmes supporting environmental improvement for housing insulation to provide training and work experience for long term unemployed. Trainees are paid full wages and are often able to find permanent employment after finishing the programme.⁷⁶

Other local initiatives have found it much more difficult to make an impact on unemployment, although this was a significant objective. They had to recognise that many of the important determinants of unemployment and employment lie outside their remits and localities.

Territorial initiatives have been established as responses to the problems in specific territories, and often as pilot, experimental or model actions. They do not exist in all areas, and are unlikely to ever do so. The area-based nature of the initiatives also means that such initiatives do not necessarily help to tackle more dispersed problems of unemployment and social exclusion within larger areas or largely prosperous areas and are not necessarily focused on areas with the highest unemployment rates or the greatest needs in term of social inclusion (OECD, 2004).

Looking at the type of employment measure in the initiatives included in the research, some initiatives

⁷⁶ OECD (2004) *Environment and Employment: An Assessment*.



have achieved considerably more than others. Here the initiatives identified in the research support by and large the findings from the relevant evaluation literature (OECD, 2000).

TABLE 7.4: THE WISE GROUP, UNITED KINGDOM

W.I.S.E. gives unemployed people in Glasgow, Scotland, on the job training and improves their employability and job seeking skills (such as CV preparation, interview techniques). The work itself is run by the sub-projects Heatwise, Landwise, Tree Wise, Wise Recycling and Newham Wise.

In Scotland the concept of an Intermediate Labour Market (ILM) originated as early as 1984 when the original company, Heatwise, started to provide work experience for unemployed people while undertaking insulation work for Glasgow City Council.

Most of the activities are directed towards housing estates with limited standards in insulation and problems related to low safety, lack of green areas, etc. These activities include energy saving via installation of insulation measures; energy advice and auditing; promotion of energy saving awareness and dissemination activities; and introduction of security systems.

In 1987, Landwise was set up as another core business in the urban regeneration sector. Landwise focused on the regeneration of the urban environment through physical improvements, mainly back yard refurbishment for the Glasgow City Council. As Landwise steadily developed, partnerships with the local economy were initiated and it became involved in custom-built training programmes for the local growth industries.

Finally some new subsidiaries, Treewise, Wise Recycling and Newham Wise, were established in order to diversify activities to other environment-related fields and to test the Wise Group model in England.

Like the Glasgow Works venture, the Wise Group aims to deal with the problem of long term unemployment by creating an ILM that, with the help of partnerships, combines training, work experience and personal development.

In 1996, 1,065 people were employed, including 186 permanent staff and 879 trainee participants, 40% of whom had been unemployed for more than two years. In 1996, 57% of the people (506 trainees) who left the Wise Group succeeded in finding a job in the first labour market or entered further education.

Sources: European Academy of the Urban Environment (1997), Birkhoelzer *et al.* (1998).

The following table presents a recent example of a successful Knowledge Transfer Partnership as a means to increase 'green jobs'. This scheme was set up in Scotland.

TABLE 7.3: KNOWLEDGE TRANSFER PARTNERSHIP AS A MEANS TO INCREASE 'GREEN JOBS'.

Glasgow-based Breval Environmental Limited worked with the School of Science and Technology at Bell College (now part of the new University of the West of Scotland) on this Knowledge Transfer Partnership (KTP). The collaboration aimed to design, prototype, test and develop a system for coating, cleaning and maintaining the internal surface of ducting systems, and prepare manufacturing documentation.

As a building contractor Breval did not have the necessary expertise in-house to see the project through. Help came through this KTP, which provided the Company with access to the expertise in Bell College's School of Science and Technology.

Many benefits accrued from this technically-challenging partnership. Staff increased confidence to take on new product development work, and feel more able to deliver complex technical projects.

Source: <http://www.ktponline.org.uk>

7.9 QUALITATIVE FEATURES OF ENVIRONMENT-RELATED JOBS⁷⁷

If one were to look at the **EGS sector as a source of new jobs** one would require qualitative data about occupational patterns including the level of education and skills. Available information across most advanced countries, including EU ones, indicates that the environment goods and services industry is generally a labour-intensive economic activity principally hiring people in the following occupations: scientists and technicians, craft and service occupations, machine operators as well as helpers and labourers.

In a way the sector is bunched at the two ends of the qualification spectrum of high-skill and low-skill areas. Many of the day-to-day operations rely on relatively unskilled workers. However, these jobs would not exist were it not for the highly qualified service experts and skilled technicians and management executives who plan and develop the operation. The latter comprise about one-third of the work-force in the sector. However, there are various roles in the EGS sector which require skills and qualifications of the higher order. One of these is environmental consulting and monitoring.

According to a comparative study carried out by Austrian Institut für Wirtschaft und Umwelt, the EGS industry does not require skills beyond the general qualifications requirements of the labour force. The only exception is the eco-consulting sub-sector, which requires relatively high levels of university graduates. See Tables 7.5 and 7.6 below. This was in fact also confirmed in the survey carried out by this study for the Maltese islands.

TABLE 7.5 OCCUPATIONAL BACKGROUND OF ENVIRONMENT RELATED EMPLOYMENT IN SOME EU COUNTRIES*

Occupational Category	Labour Force	Eco-consulting	Waste management	Eco-industry
	%	%	%	%
Managerial	7	5	6	6
Scientists	13	9	1	3
Technicians	17	29	5	12
Sales, Administrative, Support Occupations	12	7	11	11
Service	13	6	1	11
Crafts	17	30	36	12
Machine Operators	8	6	29	12
Labourers	9	5	12	32

* Austria, Germany, Netherlands, Spain, and Sweden

Source: Institut für Wirtschaft und Umwelt (2000)

⁷⁷ For a more thorough discussion the reader should consult the OECD documents on subject, in particular OECD (2004).



TABLE 7.6 EDUCATIONAL BACKGROUND OF ENVIRONMENT RELATED EMPLOYMENT IN SOME EU COUNTRIES*

Level of Education	University	Advanced technical college	Secondary school, apprenticeship	Compulsory school, no certificate
<i>Shares in per cent</i>				
Total labour force	16	8	48	26
Eco-consulting	17	23	55	1
Waste management	3	5	50	42
Eco-industry	9	12	58	21

* Austria, Germany, Netherlands, Spain, and Sweden Source: Institut für Wirtschaft und Umwelt (2000)

7.10 ELIGIBLE ENVIRONMENTAL ENTERPRISES

Table 7.7 below gives detailed industry by industry involvement in each environmental domain, and the current estimated manpower complement as well as the additional job requirements for the coming three years, as based on the sample survey. Each environmental activity, although within the same environmental domain, would carry diverse significance according to the type of activity (NACE Code) in which the industry is involved. Thus, for example, the transportation of waste carries different meaning and significance if this is carried out by the building industry or the agricultural sector.

The table was the basis for the industry wide employment estimation. It should therefore be read with caution when trying to interpret the demand of specific environmental sectors. Thus such sectors which deal with air pollution control, noise pollution control and soil and groundwater remediation and clean up have not been well caught up in the survey. The table is useful for pointing towards trends. These trends must then be followed by more detailed and specific surveys which articulate better the needs of that specific industry

One needs to recall the results reported earlier that in the companies that said they had an unfilled vacancy, 54% of their current employees were manual workers, 22% were professionals, while about 12.5% each were skilled and clerical workers. In terms of educational background, 40% of current employees had completed secondary level, 32% had finished up till the primary level while 28% had gone on to a tertiary level of education. Translated into absolute figures for the population at large, this means that there were about 250 vacancies for manual labour, 100 for professionals, 60 for skilled workers and 55 for clerical work.

The following sub-sectors are therefore expected to provide new job opportunities, which in turn would require proper preparation by the respective work-force. These are:

- Recycling of metal waste and scrap
- Renting of construction or demolition

- 
- Demolition and wrecking of buildings
 - Recycling of non-metal waste and scrap
 - Wholesale of waste and scrap
 - Industrial cleaning
 - Miscellaneous business activities
 - Collection and treatment of sewage
 - Collection and treatment of other waste
 - Sanitation, remediation and similar activities
 - Asbestos removal
 - Environmental and ecological services
 - Environmental products and supplies
 - Recycling services
 - Scrap Iron
 - Skip rentals and services
 - Solar heating equipment and systems



TABLE 7.7 ESTIMATED EMPLOYMENT OF THE ENVIRONMENTAL INDUSTRY BY SUB-SECTOR

Env Sector	NACE	DESCRIPTION	Estimated Employment	Estimated Current Vacancies	Estimated Additional Jobs by 2010
1	45.21	General construction of buildings and ci	10	4	-4
2	45.24	Construction of water projects	7	0	-2
-2	90.01	Collection and treatment of sewage	393	0	-1
3	45.11	Demolition and wrecking of buildings; ea	130	8	0
3	45.20	Building of complete constructions or pa	200	0	0
3	45.25	Other construction work involving specia	23	0	-5
3	45.41	Plastering	93	7	47
3	45.50	Renting of construction or demolition eq	44	17	-19
3	71.34	Renting of other machinery and equipment	37	0	0
3	74.70	Industrial cleaning	311	215	282
3	74.80	Miscellaneous business activities n.e.c.	9	0	0
3	90.02	Collection and treatment of other waste	637	57	385
3	90.03	Sanitation, remediation and similar acti	0	0	0
6	74.14	Business and management consultancy	72	7	28
6	74.20	Architectural and engineering activities	62	0	28
6	74.30	Technical testing and analysis	46	0	15
7	15.71	Manufacture of prepared feeds for farm a	90	0	11
7	35.11	Building and repairing of ships	4	0	0
7	45.22	Erection of roof covering and frames	20	0	0
7	45.30	Building installation	80	0	40
7	45.31	Installation of electrical wiring and fi	45	26	26
7	45.32	Insulation work activities	5	0	3
7	45.33	Plumbing	67	0	33
7	45.42	Joinery installation	49	66	99
7	45.45	Other building completion	41	8	32
7	52.45	Retail sale of electrical household appliances and good	148	22	106
7	60.24	Freight transport by road	33	0	17
7	71.32	Renting of construction and civil engine	5	0	5
7	71.40	Renting of personal and household goods	50	0	-17
7	75.12	Regulation of the activities of agencies that provide hea	240	19	68
8	41.00	Collection, purification and distribution of water	968	0	0
9	14.50	Other mining and quarrying n.e.c.	26	0	0
9	25.24	Manufacture of other plastic products	33	0	11
9	27.42	Aluminium production	0	0	0
9	37.10	Recycling of metal waste and scrap	34	1	6
9	37.20	Recycling of non-metal waste and scrap	32	4	12
9	45.23	Construction of motorways, roads, airfie	67	0	0
9	51.57	Wholesale of waste and scrap	4	1	-11
9	52.50	Retail sale of second-hand goods in stor	4	0	4
10	91.33	Activities of other membership organisations	33	3	15
Total			4,152	465	1214

Note: The environmental sector is numbered as follows: Air Pollution (1), Waste Water Treatment (2), Waste Management (3), Other (6), Monitoring (7), Water Supply (8), Recycled Materials (9), and Nature Protection (10).

- Waste management
- Waste removal services
- Water purification and filtration systems

Interesting **comments** made by business persons or senior staff in the environment industry, and collected after a telephone follow-up of those respondents who have reported the existence of vacancies within their business, throw further light on the nature and type of training and other needs related to their situation.

Table 7.8a shows clearly that new jobs, such as those being demanded by a fast growing environmental industry, require new training programmes. Activities such as the sale of new energy efficient products, or contracted works such as the laying of water or drainage piping along roads require appropriate training. That small retailers or even small building contractors do not provide on-the-job training is also a reality. This points to the need of ETC organised training schemes in the areas indicated.

TABLE 7.8A: COMMENTS EXPRESSING THE NEED FOR INSTITUTIONALISED ON-THE-JOB TRAINING

Nace Code	Business Activity	Comments (Quoted Verbatim)
74.14	Business and Management Consultancy	“There is an urgent need for technicians, specialised in installation of solar water heaters and solar panels, photo-voltaic panels and wind turbines, among others. There is not enough expertise in this field of work to keep up with demand at the moment.”
45.11	Demolition and wrecking of buildings	“There are no MCAST or other government-entity courses for our specific line of business, which deals with passing contracted water and drainage utilities, through new or reconstructed roads. This company therefore has to provide the training itself, but unfortunately many employees leave it to join other contractors which offer better job opportunities/ pay. We need trained people for our line of business but do not find them. Persons sent by ETC are not trained specifically in this sector. The skills/ experience required relate to trenching, road construction, water and drainage connections.”
45.31	Installation of electrical wiring and fitting	It would be useful to have some courses available locally which are currently available only abroad. In fact, to learn about gas emissions and their negative impact on the environment, I had to attend a course abroad. I had also attend-



		ed a course on safety at EICC and another one on air-conditioners. Similar courses would help.
45.31	Installation of electrical wiring and fitting	I recycle used oil and I would need an employee who has the skills of a technician dealing in this area.
52.45	Retail sale of electrical household appliances and goods	We have vacancies and are ready to employ people even this very second (had 2 to 4 vacancies at the time of the survey). There is a lot of work in this sector. You do find people, but they would not want to work. I think it is too complicated and difficult for the ETC to design schemes to teach people about renewable energy without this person having first a Diploma in Electrical Engineering or knowledge of software and programming. We have already brought people from the ETC but the outcome was not very encouraging. It did not work. We had trained one guy from the ETC in the installation of solar water heaters but he was not very strong and could not lift the water heaters. The ETC is sending people who do not want to work, with excuses ranging from hunting predilection to religious. ETC is sending us people with personal problems. I believe that who wants to work in this area is already working.
52.45	Retail sale of electrical household appliances	We would need people with a basic knowledge of plumbing and electricity in order to be able to install solar heaters and and goods cooling systems, and photo-voltaic equipment. In addition, specific training related to the solar system would generally be provided by our company, but if the ETC were to provide such information that would be fantastic.

Table 7.8B below shows that the environment industry also requires jobs which are not specialist to the environment industry, but are common to other industries, such as drivers of heavy vehicles, and other such like jobs.

TABLE 7.8B: COMMENTS EXPRESSING NEED FOR TRAINING IN SKILLED JOBS

Nace Code	Business Activity	Comments (Quoted Verbatim)
45.41	Plastering	I currently need a person who is trained in heavy vehicles

Table 7.8C below points to the phenomenon, which was referred to in section 7.9 above, that the industry should not be associated only with highly specialised occupations, but require many low-skilled jobs as well. As the comments suggest, the problem here lies more in labour market related problems.

TABLE 7.8C: COMMENTS EXPRESSING DIFFICULT LABOUR MARKET FOR LOW-SKILLED WORKERS

Nace Code	Business Activity	Comments (Quoted Verbatim)
90.02	Collection and treatment of other waste	Sometimes I try really hard to find people since I would need people really urgently, but I generally do not find people willing to work in this sector and end up going for immigrants. There are no special skills my employees would require.
90.02	Collection and treatment of other waste	I would need every now and then workers who would be able to transport stuff to rubbish sites. Hence no particular skills would be needed for this type of job.
90.02	Collection and treatment of other waste	At the time we needed to fill up 5 vacancies but it is difficult to find people willing to work in street cleaning or bulk refuse collection. There are no particular skills related to this occupation.
90.02	Collection and treatment of other waste	We have many vacancies (6 at the time of the interview) and we apply to the ETC to send us people every single week. The workers we need do not require any special skills or qualifications. They just need to pick up garbage bags. The problem is that the ETC always sends us the names of the same people and we tell them not to send us these people because these people never show up or do not want to come when we call them - probably because they are already working and registering at the same time. Last week we faxed the ETC again and we have not yet got what we asked for. Till now we have never got a single employee from the ETC.
45.42	Joinery installation	I need two permanent employees, but it is so hard to find in this line of work, especially since they come



		and go. They would need to know how to plaster, but I would be ready to teach them.
74.70	Industrial cleaning	There is currently a lack of people willing to work. The people sent by the ETC for jobs as cleaners are either poorly educated, or cannot clean properly and have poor personal hygiene and a poor image.”


The last table of comments expressed relate to the need of funded schemes which would help the environment industry develop further, be competitive and create more jobs.

TABLE 7.8D: COMMENTS EXPRESSING NEED FOR FUNDED SCHEMES

Nace Code	Business Activity	Comments (Quoted Verbatim)
74.14	Business and Management Consultancy	“The Director said that he really requires the help from theETC. He pointed out that the ETC used to send literature regarding the employment of apprentices. Nevertheless, when they went to check this scheme out, they found out that as service providers we were not eligible for this kind of help. Why is this so? The rent of service providers is really high and so they did not have adequate funds to provide the environmental service they were requesting.”

Based on the survey, one can conclude that certain trends can indeed be detected. It is therefore safe to narrow further the search for those job profiles for which both employment and training schemes would apply. In particular:

1. The needs of retail sales people which are increasingly being asked to deal with goods using alternative energies.
2. The needs of plumbers, electricians, builders and persons with similar or related trades who are now being asked to install these new environmental friendly technologies, in the home or in business/industrial premises.
3. Waste management, including the collection, disposal, treatment, and recycling, is a growth area and persons need to be attracted and trained for this growth sector.
4. Industrial cleaning shows too that it is a growth area. Training programmes to meet the cur-



rent and future manpower demand would be appropriate.

5. Among the public institutions which clearly can utilise training in this area are the local councils and MEPA. In the former case a person within each local council has been earmarked to act as a Waste-Manager. In the latter case there is a sizeable number of Enforcement Officers. In both cases it is imperative that these persons received basic training in the nature and management of waste, and in the nature of environmental degradation and monitoring.

7.11 CONCLUSION

This chapter has shown that job creation in the environmental goods and services industry is indeed a viable proposition. The highly effective “bottom-up” approaches, such as the schemes which are undertaken by the ETC, may now be applied with expected success to this high growth industry. So far the reason why the employment potential of this environmental goods and services industry has kept out of the limelight was principally due to the fact that this industry has to date not been measured by any authority. The study has managed to arrive at an estimate of this “difficult to define and measure” industry. Furthermore the study has identified the broad trends and related employment profiles to which the ETC and other interested parties may now link their job creation and training programmes.






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9. Appendix A: Survey Questionnaire in Maltese



Natura tal-kumpanija (<i>Filled in by researcher</i>)	
Xogħol ewlieni skond il-klassifikazzjoni NACE: <i>Collection and treatment of Other Waste</i>	
Xogħol li għandu x'jaqsam ma' l-ambjent:	
Kontroll tat-tniġġis ta' l-arja	
Immaniġġjar ta' l-iskart ta' l-ilma	
Immaniġġjar ta l-iskart solidu	
Tindif u tneħħija ta' sustanzi li jagħmlu l-ħsara mill-ħamrija u ilma	
Kontroll ta' hsejjes u vibrazzjonijiet	
Provvista ta' l-ilma Materjal riċiklat	
Protezzjoni tan-natura	
Energija li tiġġedded	
Studji u konsulenza	
Taħriġ u riċerka	
Sorveljanza u instrumentar	
Regolamentazzjoni	
Provvista ta' servizzi ambjentali	
Manifattura ta' prodotti ambjentali	

If environment-related activity is unclear, ask

<p>Għalkemm ix-xogħol tiegħek huwa l-iktar fuq <i>Collection and treatment of Other Waste</i>, nix-tiequ nkunu nafu jekk tagħmilx xi xogħol ieħor li għandu x'jaqsam ma' l-ambjent, bħal dawk imsemmija hawn fuq? IVA / LE</p> <p><i>Jekk Iva,</i> Tista' tispeċifika x'tip ta' xogħol?</p>

Q1. Kemm għandek ħaddiema li jaħdmu f'xogħol li għandu x'jaqsam ma' l-ambjent?	
--	--

Q2. X'perċentwali jagħmlu dawn in-nies mit-total tal-ħaddiema tal-kumpanija tiegħek?	
- Kwart	
- Nofs	
- Tlett kwarti	
- Kollha kemm huma	

Q3. Kemm minn dawn il-persuni li jaħdmu fl-ambjent huma:	
- Rġiel?	
- Nisa?	

Q4A. Minn dawn l-irġiel [Q3], kemm minnhom għandhom:	
- Inqas minn 25 sena	
- Bejn 25 u 50 sena	
- Iktar minn 50 sena	

Q4B. Minn dawn in-nisa [Q3], kemm minnhom għandhom:	
- Inqas minn 25 sena	
- Bejn 25 u 50 sena	
- Iktar minn 50 sena	

Q5A. X'tip ta' xogħol għandhom dawn l-irġiel [Q3]?	
- Maniġerjali / Professjonalisti / Tekniċi	
- Xogħol ta' supervizzjoni / tas-sengħa (<i>skilled</i>)	
- Klerikali / Xogħol ta' bejgħ	
- <i>Semi-skilled</i> / Manwali	

Q5B. X'tip ta' xogħol għandhom dawn in-nisa [Q3]?	
- Maniġerjali / Professjonalisti / Tekniċi	
- Xogħol ta' superviżjoni / <i>Skilled</i>	
- Klerikali / Xogħol ta' bejgħ	
- <i>Semi-skilled</i> / Manwali	

Q6A. X'livell ta' edukazzjoni għandhom dawn l-irġiel [Q3]?	
- Xejn / Primarju / Sekondarju mhux kompluta	
- Sekondarju komplut	
- Terzjarju (tinkludi diplomi)	

Q6B. X'livell ta' edukazzjoni għandhom dawn in-nisa [Q3]?	
- Xejn / Primarju / Sekondarju mhux komplut	
- Sekondarju komplut	
- Terzjarju (tinkludi d-diplomi)	

Q7. Kemm-il haddiem jaqla' s-salarju li se nsemmi?	
- Taħt il-Lm 5,000	
- Bejn il-Lm 5,000 u l-Lm 10,000	
- Iktar minn Lm 10,000	



Q8. X'percentwali ta' klijenti għandek...				
1. Mis-settur pubbliku	25%	50%	75%	100%
2. Minn kumpaniji privati	25%	50%	75%	100%
3. Mill-pubbliku in ġenerali	25%	50%	75%	100%

Q9. X'percentwali tal-prodotti jew servizzi tiegħek jiġu esportati?	
1. Xejn	
2. Inqas min-nofs	
3. Iktar min-nofs	

Q10A. Għandek xi postijiet tax-xogħol li jridu jimtlew u li għandhom x'jaqsmu mal-qasam ta' l-ambjent? (If 'Le' or 'Ma nafx', GO TO question Q11A)	
1. Iva	
2. Le	
3. Ma nafx	

Q10B. Kemm?	

Q11A. Kemm-il persuna kont tħaddem fl-istess qasam ta' l-ambjent tlett snin ilu (jiġifieri fl-2004)?	

Q11B. Kemm-il persuna taħseb li se tkun qed tħaddem f'dan l-istess qasam fit-tlett snin li ġejjin?	



10. Appendix B: Survey Questionnaire in English

Name and address of the business **(FILLED IN BY RESEARCH TEAM)**

Name:

Address:

Tel. No.:

Fax No.:

Email:

Employees:

Nature of the business (FILLED IN BY RESEARCH TEAM)	
Principal activity by NACE code:	
Environment-related activity:	
Air pollution control	
Waste water management	
Solid waste management	
Remediation and clean-up of soil and groundwater	
Noise and vibration control	
Studies, consultancy, training, monitoring and instrumentation	
Regulatory	
Water supply	
Recycled materials	
Nature protection	
Renewal Energy	

If environment-related activity is unclear:

<p>Even though your principal activity is [STATE PRINCIPAL ACTIVITY FROM ABOVE], we would like to know whether you carry out any environment-related work such as [SPECIFY THOSE MORE RELEVANT TO THE CASE]? If yes, please specify.</p>

Section A: Core Questionnaire

[Introduction]

Q1. How many persons are employed by the business specifically for the eco-activity specified above?	
---	--

Q2. What percentage of your organisation's labour force do these people make up? PROMPT	
- Quarter	
- Half	
- Three-fourths	
- Whole	

Q3. How many of the employees identified in Q1 are:	
- Males?	
- Females?	

Q4A. Of these males, how many are within this age bracket:	
- Under 25 years	
- 25 – 50 years	
- Over 50 years	

Q4B. Of these females, how many are within this age bracket:	
- Under 25 years	
- 25 – 50 years	
- Over 50 years	

Q5A. What is the occupational status of the males identified above?	
- Managerial / Professional / Technical	
- Supervisory / Highly skilled / Skilled	
- Clerical / Sales	
- Semi-skilled / Manual	

Q5B. What is the occupational status of the females identified above?	
- Managerial / Professional / Technical	
- Supervisory / Highly skilled / Skilled	
- Clerical / Sales	
- Semi-skilled / Manual	

Q6A. What is the educational background of the males identified in Q3?	
- None / Primary / Incomplete Secondary	
- Full secondary	
- Tertiary (including Diplomas)	

Q6B. What is the educational background of the females identified in Q3?	
- None / Primary / Incomplete Secondary	
- Full secondary	
- Tertiary (including Diplomas)	

Q7. How many of your employees fall in each of the following 3 income brackets?	
- Under Lm 5,000	
- Over Lm 5,000 but under Lm 10,000	
- Over Lm 10,000	



Q8. What percentage of your customers/ clients are from:				
1. Public Sector	25%	50%	75%	100%
2. Private Business Sector	25%	50%	75%	100%
3. Private Household Sector	25%	50%	75%	100%

Q9. What percentage of your products / services is exported?		
1. None		
2. Less than half		
3. More than half		

Q10A. Do you have any unfilled vacancies relating to eco-activity?		
1. Yes		
2. No		
3. Don't Know		

Q10B. If yes, how many?		

Q11A. How many persons did you employ in the same eco-activity 3 years ago (during 2004)?		

Q11B. How many persons do you foresee being employed by your business over the next three years?		



II. Appendix C: Stakeholders Consultation

II.1 FOCUS GROUP

A focus group was held on Tuesday 18th December 2007 at the Ernst & Young premises in Msida. Prof. Edward Scicluna conducted the sessions, assisted by Mr. Chris Meilak and Ms. Jeanelle Salamone from Ernst & Young.

Participation by high level officials from the public and private sectors and civil society included representatives from the various entities/ organisations which can be considered as stakeholders in the environmental industry. These included:

Government – environmental, resources and health agencies

Mr. Vincent Gauci, MEPA

Mr. Michael Sant, MEPA

Mr. Joseph Camilleri, MRAE

Mr. Sandro Sammut, Environmental Health Department

Government – economic, investment, statistics and employment

Mr. Mark Azzopardi, Malta Enterprise

Ms. Cheryl Bonanno, NSO

Ms. Josephine Farrugia, ETC

Private sector industry/ firm representatives

Mr. Joe Attard, GRTU

Mr. Godwin Micallef, FOI

Private sector environment consultancy firms

Ing. Mario Schembri, AIS Ltd.

Non-governmental organisations

Mr. Vincent Attard, Nature Trust

Representatives from other entities were also contacted, but the above list provides the list of participants who attended the focus group.

The primary objective of this focus group meeting was to conduct a SWOT analysis of the environment goods and services industry in Malta, in particular of the Maltese labour market with respect to 'green jobs'. The focus group discussion was aimed at proposing feasible and sustainable arrangements for the introduction of green jobs, including the design of any relevant employment schemes.

The discussion was also based on the eco-enterprise preliminary survey results which were presented to the group. The group made a number of key recommendations which were integrated in the report. Based on the output from this focus group, a number of successful employment schemes and training programmes related to the environmental sector or related areas carried out in other EU countries have been proposed.



11.2 ONGOING CONSULTATION AND MEETINGS

A number of face-to-face meetings and ongoing consultation was carried out with key project stakeholders. These included the ETC as project clients, MEPA as regulator of the environmental sector and the NSO as the entity responsible for collating data on all Maltese economic sectors.

11.2.1 EMPLOYMENT AND TRAINING CORPORATION

A kick-off meeting with ETC officials was held on July 17, 2007. Five ETC officials and both the key experts attended this meeting held at the ETC offices in Hal Far. In addition, the Project Team was in constant contact with the ETC Project Manager.

A second meeting with ETC officials was held on September 6, 2007. Two ETC officials and three representatives from the consultancy team, including both key experts, attended this meeting held at the ETC offices in Hal Far.

11.2.2 NATIONAL STATISTICS OFFICE

A meeting with Mr. Reno Camilleri, Chairman of the National Statistics Office, was held on August 28 2007 at the NSO offices in Valletta. Three representatives from the consultancy team, including both key experts, attended.

A second meeting with the NSO was held on October 5 2007. The two key experts met Mr. George Said and Ms. Cheryl Bonanno, officers at the Environmental Division of the National Statistics Office, at the NSO offices in Valletta. The team members have contacted the NSO Environmental Division on a number of occasions. The draft questionnaire was also discussed during these email correspondences.

These meetings and ongoing consultation with the NSO ensured agreement between the parties as to the template which was produced as an output to this study and which will be used for future national surveys or data gathering.

In addition, the NSO was requested to provide a sample from their Business Registry for Industry data in relation of the NACE codes that have been included in this study.

11.2.3 MALTA ENVIRONMENTAL & PLANNING AUTHORITY

The team members have also discussed the contents and possible amendments to the survey questionnaire with Mr. Michael Sant, MEPA Project Manager. In this respect, a meeting with Mr. Michael Sant,



MEPA Project Manager, was held on September 18 2007, at the MEPA offices, Floriana. Both key experts attended this meeting. In this meeting, the contents of the chapter report on the EU environmental Acquis applicability to Malta was also discussed.



12. Appendix D: Data Supporting Charts



(Table number corresponds to the Chart number in Chapter 5.)

APPENDIX TABLE 5.1 EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY GENDER

ENVIRONMENTAL FUNCTION	Males	Females
Air pollution	100%	0%
Waste Water Treatment	99%	1%
Waste Management	70%	30%
Monitoring	75%	25%
Other	77%	23%
Water supply	89%	11%
Recycled materials	89%	11%
Nature protection	68%	32%

APPENDIX TABLE 5.2A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY AGE

ENVIRONMENTAL FUNCTION	< 25 YEARS	25 - 50 YEARS	> 50 YEARS	TOTAL
Air pollution	20%	60%	20%	100%
Waste Water Treatment	1%	37%	63%	100%
Waste Management	19%	65%	16%	100%
Monitoring	17%	75%	8%	100%
Other	13%	67%	20%	100%
Water supply	1%	56%	43%	100%
Recycled materials	11%	71%	18%	100%
Nature protection	7%	73%	20%	100%

APPENDIX TABLE 5.2B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY AGE

ENVIRONMENTAL FUNCTION	< 25 YEARS	25 - 50 YEARS	> 50 YEARS	TOTAL
Air pollution	0%	0%	0%	
Waste Water Treatment	0%	100%	0%	100%
Waste Management	23%	76%	1%	100%
Monitoring	14%	86%	0%	100%
Other	15%	77%	8%	100%
Water supply	7%	81%	12%	100%
Recycled materials	57%	43%	0%	100%
Nature protection	0%	71%	29%	100%

APPENDIX TABLE 5.3A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY OCCUPATION

ENVIRONMENTAL FUNCTION	Managerial	Skilled	Clerical	Manual	Total
Air pollution	0%	80%	0%	20%	100%
Waste Water Treatment	5%	53%	2%	40%	100%
Waste Management	8%	12%	1%	79%	100%
Monitoring	71%	17%	0%	11%	100%
Other	38%	20%	12%	29%	100%
Water supply	5%	43%	14%	37%	100%
Recycled materials	4%	25%	9%	62%	100%
Nature protection	47%	40%	0%	13%	100%

APPENDIX TABLE 5.3B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY OCCUPATION

ENVIRONMENTAL FUNCTION	Managerial	Skilled	Clerical	Manual	Total
Air pollution	0%	0%	0%	0%	0%
Waste Water Treatment	0%	0%	100%	0%	100%
Waste Management	4%	0%	26%	70%	100%
Monitoring	95%	0%	5%	0%	100%
Other	51%	25%	24%	0%	100%
Water supply	2%	5%	92%	2%	100%
Recycled materials	0%	29%	57%	14%	100%
Nature protection	43%	0%	43%	14%	100%

APPENDIX TABLE 5.4A MALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY EDUCATIONAL BACKGROUND

ENVIRONMENTAL FUNCTION	Primary	Secondary	Tertiary	Total
Air pollution	20%	80%	0%	100%
Waste Water Treatment	83%	11%	6%	100%
Waste Management	45%	45%	7%	98%
Monitoring	10%	6%	84%	100%
Other	12%	29%	50%	91%
Water supply	22%	69%	9%	100%
Recycled materials	38%	33%	9%	80%
Nature protection	13%	0%	87%	100%



APPENDIX TABLE 5.4B FEMALE EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY EDUCATIONAL BACKGROUND

ENVIRONMENTAL FUNCTION	Primary	Secondary	Tertiary	Total
Air pollution	0%	0%	0%	0%
Waste Water Treatment	0%	67%	33%	100%
Waste Management	41%	56%	3%	100%
Monitoring	0%	0%	100%	100%
Other	0%	19%	81%	100%
Water supply	0%	94%	6%	100%
Recycled materials	0%	86%	14%	100%
Nature protection	14%	29%	57%	100%

APPENDIX TABLE 5.5 EMPLOYMENT IN THE ENVIRONMENT INDUSTRY BY SALARIES EARNED

ENVIRONMENTAL FUNCTION	< Lm 5,000	>Lm 10,000		TOTAL	
		Lm 5,000 - Lm 10,000	Not Disclosed		
	<11,647 Euro	11,647 - 23,294 Euro	>23,294 Euro		
Air pollution	20%	80%	0%	0%	100%
Waste Water Treatment	52%	47%	0%	1%	100%
Waste Management	74%	22%	2%	2%	100%
Monitoring	23%	49%	17%	12%	100%
Other	21%	55%	16%	8%	100%
Water supply	22%	76%	2%	0%	100%
Recycled materials	81%	0%	3%	16%	100%
Nature protection	23%	5%	0%	73%	100%

APPENDIX TABLE 5.6 THE INDUSTRY'S MAIN MARKETS

ENVIRONMENTAL FUNCTION	Public Sector	Private Sector	Households	Total
Air pollution	42%	17%	42%	100%
Waste Water Treatment	3%	59%	38%	100%
Waste Management	26%	29%	46%	100%
Monitoring	14%	60%	26%	100%
Other	17%	31%	51%	100%
Water supply	25%	25%	50%	100%
Recycled materials	5%	27%	68%	100%
Nature protection	63%	38%	0%	100%

APPENDIX TABLE 5.7 THE INDUSTRY'S EXPORT SHARE

ENVIRONMENTAL FUNCTION	EXPORT Share
Air pollution	0%
Waste Water Treatment	0%
Waste Management	2%
Monitoring	10%
Other	1%
Water supply	0%
Recycled materials	27%
Nature protection	0%

13. Appendix E: NSO/ETC Database Used as Sampling Frame



NACE Rev I.I	Description	Total Number of Enterprises	Employed Persons
14.50	Other mining and quarrying n.e.c.	0	0
15.71	Manufacture of prepared feeds for farm a	4	120
25.24	Manufacture of other plastic products	29	265
27.42	Aluminium production	0	0
27.44	Copper production	0	0
27.45	Other non-ferrous metal production	0	0
35.11	Building and repairing of ships	12	1936
37.10	Recycling of metal waste and scrap	9	47
37.20	Recycling of non-metal waste and scrap	3	32
45.11	Demolition and wrecking of buildings; ea	73	175
45.12	Test drilling and boring	0	0
45.20	Building of complete constructions or pa	1024	4086
45.21	General construction of buildings and ci	886	3106
45.22	Erection of roof covering and frames	31	40
45.23	Construction of motorways, roads, airfie	33	820
45.24	Construction of water projects	3	18
45.25	Other construction work involving specia	71	102
45.30	Building installation	712	2407
45.31	Installation of electrical wiring and fi	466	1883
45.32	Insulation work activities	8	10
45.33	Plumbing	122	424
45.34	Other building installation	116	90
45.40	Building completion	1643	1529
45.41	Plastering	855	770
45.42	Joinery installation	20	74
45.43	Floor and wall covering	443	366
45.44	Painting and glazing	152	116
45.45	Other building completion	173	203
45.50	Renting of construction or demolition eq	46	121
51.57	Wholesale of waste and scrap	3	8
52.50	Retail sale of second-hand goods in stor	61	73
60.24	Freight transport by road	323	736
71.00	Renting of machinery and equipment witho	333	849
71.10	Renting of automobiles	167	472
71.21	Renting of other land transport equipmen	10	82
71.22	Renting of water transport equipment	16	84

71.23	Renting of air transport equipment	c	c
71.31	Renting of agricultural machinery and eq	c	c
71.32	Renting of construction and civil engine	5	10
71.33	Renting of office machinery and equipmen	c	c
71.34	Renting of other machinery and equipment	30	74
71.40	Renting of personal and household goods	105	127
74.13	Market research and public opinion polli	36	152
74.14	Business and management consultancy	587	755
74.20	Architectural and engineering activities	456	1248
74.30	Technical testing and analysis	36	91
74.70	Industrial cleaning	46	559
74.80	Miscellaneous business activities n.e.c.	365	914
74.81	Photographic Activities	177	255
74.82	Packaging Activities	29	13
74.85	Secretarial and translation Activities	67	73
74.86	Call centre Activities	3	346
74.87	Other business activities n.e.c.	89	227
90.01	Collection and treatment of sewage	n/a	n/a
90.02	Collection and treatment of other waste	n/a	n/a
90.03	Sanitation, remediation and similar acti	n/a	n/a
	Total	5801	16103

Source: NSO Provisional Data for 2005