



***THE EU ECO-
INDUSTRY'S
EXPORT
POTENTIAL***

***FINAL REPORT TO
DGXI OF THE
EUROPEAN
COMMISSION***

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September 1999

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A REPORT TO DGXI OF THE EUROPEAN COMMISSION

FINAL REPORT

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A STUDY OF EU ECO-INDUSTRIES EXPORT POTENTIAL

FOR DGXI OF THE EUROPEAN COMMISSION

FINAL REPORT

EXECUTIVE SUMMARY

DGXI of the European Commission has commissioned this study to provide an analysis of current export activity by the EU eco-industry, the employment effects of this export activity, whether exports can be increased in the future and to develop appropriate policy recommendations for promoting EU eco-industry exports and related employment in the future.

Objectives:

Specific objectives of the study are to:

- Identify the size and character of global environmental export markets.
- Assess the current extent of EU eco-industry exports, the types of goods and services being exported, to which markets; whether the sector is capitalising on available export opportunities; its competitiveness in world markets and the employment effects of exports.
- Examine future export opportunities, and whether there is scope for increasing exports, whether EU suppliers are in a position to capitalise on future opportunities and the likely future employment effects.
- Develop recommendations for policy instruments to promote future EU eco-industry exports, associated employment and competitiveness.

The study reflects the importance attached by the European Commission to the environmental industry in contributing to the achievement of wider environmental, employment and sustainable development objectives; and also links to other EU priorities such as the EU Accession process, overseas development and Kyoto climate change commitments.

The study draws upon data and expert knowledge of the EU and international environmental industry, and makes use of information from sources such as Eurostat, the European Commission, the OECD, overseas Governments, trade associations and individual companies.

Definition of the Eco-Industries:

The definition of the eco-industries used in this study is consistent with that contained in "The Environment Industry Manual", OECD/Eurostat, Nov 1998 (Doc. Eco-Ind/98/1). This defines eco-industries as "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 resource use". The definition categorises the sector according to equipment, construction activities and services provided in

relation to pollution management, cleaner technologies and resource management. The definition includes goods and services in areas such as:

- wastewater treatment
- air pollution control
- waste management
- process optimisation
- environmental monitoring and instrumentation
- engineering and consulting services
- analytical services
- water utilities
- resource recovery, and
- renewable energy.

SUMMARY OF FINDINGS:

1. Overview of Global Environmental Markets

Estimates of the current global market for environmental goods and services range between 330 and 410 billion EURO (Annex 1). OECD countries currently account for approximately 90% of the total global market.

Approximately 50% of the global market value relates to the provision of environmental services. Equipment and resource management activities (including water utilities) each account for approximately a quarter of world environmental markets.

Split by environmental media, the two largest sub-sectors of the global environmental industry are waste management and wastewater treatment, which together account for approximately 80% of the market value.

Until the late 1970s the environmental industry was mainly located in and focused towards markets in developed countries, particularly western Europe and North America. But international development and the recognition of the global nature of environmental problems means that the industry has rapidly internationalised in the last twenty years and seen high rates of growth - annual rates of growth over the period consistently ranged between 5% and 10%.

There is some evidence that since the mid-1990s, however, growth rates in the more mature global markets (notably the US) have slowed. But at the same time, rapid growth has occurred in environmental markets in many developing countries and emerging economies such, as central and eastern Europe, SE Asia, China and South America.

Global environmental markets have also seen developments in terms of the types of environmental goods and services being supplied. For example, the development of new wastewater treatment and waste management techniques; monitoring technologies; increased use of automation and clean processes to minimise environmental emissions at source and reduce costs; increased recycling and materials recovery; and increased use of renewable energy sources.

Global environmental markets have been highly dynamic in their geographic distribution and goods & services being demanded. This dynamism is likely to continue to 2010. In view of this, it is important for the EU eco-industry's competitiveness that the sector takes account of future trends in terms of geographic

location of markets, the types of goods and services being demanded and ways of doing business in export markets.

2. Overview of the EU Eco-Industry

The EU (EU15) eco-industry has a turnover of approximately 110 billion EURO (Annex 2) and consists of ~30,000 companies. Estimates of the number of jobs in the environmental sector in the EU vary according to the sector definition used. A narrow definition of core eco-industries¹ which excludes activities such as resource management and renewable energy, gives approximately 1.7 million jobs; a wider definition including these categories gives up to 3.5 million² jobs. The latter definition includes the provision “of clean technologies, renewable energy, waste recycling, nature & landscape protection, and ecological renovation of urban areas”³.

3. How important is export activity to the EU eco-industry?

Limited data exists on the extent of EU eco-industry exports. The analysis contained in this report is based primarily on studies of eco-industry exports from France⁴ and the Netherlands⁵. More comprehensive empirical data is required to build on this data in order to obtain a more detailed picture of the extent, destination and growth trends of EU eco-industry exports.

Extrapolations based on these Dutch and French studies indicates that up to 8% (approximately 8.5 billion EURO - see Annex 3.3) of the EU environmental industry’s revenue is generated from exports to markets *outside* the EU. In addition, approximately 15% of the sector’s revenue relates to intra-EU trade, ie. exports to other EU Member States. (Export rates vary according to environmental sub-sector, products & services and EU Member State). The current study focuses on extra-EU exports. Further empirical data from other Member States is required in order to see how representative these French and Dutch figures are for the whole of the EU.

The national studies indicate that a higher proportion of equipment is exported than services: approximately 15% of equipment and 3% of services. In total, exports of equipment and services are estimated to account for 60% and 40% respectively of extra-EU eco-industry exports (Annex 3.1.1). Wastewater treatment, waste management and air pollution control goods and services account for the majority of exports, reflecting the sizes of these sub-sectors in the EU and global markets.

¹ Update of data in “An estimate of Eco-Industries in the EU”, 1997, for Eurostat & DGXI. NB - This 1997 study provides a minimum estimate of both total production and total employment, because of incomplete expenditure data and the non-inclusion of recycling, some private businesses, renewable energy etc.

² Eurostat - for the EU Employment Report 1997

³ Communication from the European Commission on Environment and Employment, COM(97)592, 1997

⁴ Survey of the French Eco-Industry - by the French Ministry of Economy, Finance and Industry (Mr Vittek), 1999 using the latest sector definition agreed by the OECD working group - indicates that extra-EU exports represent 6% of revenue of suppliers in France.

⁵ VLM survey of exports from eco-industries in the Netherlands, 1998 - indicates that extra-EU exports represent 11% of revenue of suppliers in the Netherlands.

The largest export markets for the EU eco-industry are the US and Central & Eastern Europe (CEE), followed by SE Asia, South America and the Middle East. This pattern reflects the size of different export markets and the market shares held by EU suppliers.

Eurostat EU trade data (Annex 3.2) shows that the level of EU export activity has increased significantly over the last 10 years. For example, extra-EU exports of a range of environmental products have risen by 10% per year over the 10 years 1988 to 1997, ie. an increase of over 250% over the period. The increase in EU environmental exports appears to have been driven by a combination of factors, including:

- general internationalisation of world environmental markets and increasing dominance of very large international players;
- EU suppliers seeking to increase exports in the face of increased competition at home; a possible slow down in growth rates in some of the more mature EU national markets (eg. the Netherlands and Germany);
- economic growth and environmental investments in international markets, particularly in developing countries; and
- expansion of growth of international development funding for environmental projects.

Like the EU sector, the US eco-industry has seen growth of exports in recent years, thought to reflect factors such as slower growth and increasingly competitive conditions in the US market, as well as a desire by companies to capitalise on export opportunities in growing overseas markets.

Whilst data on international market shares is limited, it is estimated that the EU environmental industry has a 7% share of markets outside the EU and North America, compared to US environmental industry's 9% (Annex 3.5). This is broadly in line with the relative sizes of the US and EU eco-industries (the US industry being at least 25% larger than the EU sector).

The EU environmental industry is considered particularly internationally competitive in areas such as development of water and wastewater treatment infrastructures, waste management infrastructures and operations, air pollution control technologies and renewable energy goods and services.

It is estimated that 'tied aid' from the European Community and Member States may relate to up to 40% of EU environmental exports. 'Tied aid' is defined as EU or Member State government funding for environmental projects outside the EU - for example, the EU's Phare and Tacis programmes - in which the majority of project work goes to EU suppliers (plus local practitioners). The significance of tied aid to EU eco-industry exports is greatest in Central & Eastern Europe, SE Asia, India, Africa and South America. The remaining ~60% of EU environmental exports goes to markets where EU tied aid is not significant (eg. exports to North America) which indicates that EU suppliers *are* competitive in open market conditions.

Limited data exists on the level of exports by different sized EU suppliers. Although companies of all sizes have been successful in accessing export opportunities, it is likely that the majority of extra-EU export activity is undertaken by the larger suppliers. Smaller firms are often more constrained by availability of resources, lack of export experience and ability to bid for large overseas contracts; nevertheless there are many successful exporters amongst EU environmental SMEs.

Available data indicates that the EU eco-industry has a net trade surplus in eco-industry goods and services. The estimates of extra-EU exports in 1998 of 8.5 billion EURO compare with an estimated 3 billion EURO of imports into the EU - which gives an export trade surplus equivalent to 5% of total EU sector revenue. A similar level of trade surplus (as a proportion of total revenue) was reported for the US environmental sector in 1996 (EBI, 1997).

4. *Is the sector capitalising on available export opportunities?*

The analysis summarised above indicates that the EU eco-industry is successfully capitalising on export opportunities in a wide range of environmental sub-sectors and geographic markets. However, scope does exist for increasing EU environmental exports, particularly in the future when export markets in areas such as Central & Eastern Europe, SE Asia and South America are forecast to grow.

At present, a large proportion of EU exports to developing countries and emerging economies is on the back of 'tied aid' - for example, from the European Investment Bank, EU programmes in CEE and the Asian Development Bank. It is considered that there is relatively limited scope at present to increase exports in relation to this tied aid without increases in the scale of aid available.

More scope for increasing exports exists in relation to exports unrelated to tied aid - for example, work for private sector multinational companies (in other industry sectors) investing in developing countries. Opportunities associated with this non-tied aid are likely to increase in the future with forecast industrial growth and economic development in developing countries and further expansion overseas of 'western' multinational corporations.

5. *What are the employment effects of current EU eco-industry exports?*

The relationship between extra-EU environmental exports and employment is complex. The extent to which exports generate jobs in the EU varies according to factors such as proximity of the export market to the EU, maturity of the indigenous environmental supply-side in the export market and type of environmental goods and services being exported.

Estimates of the employment effect of EU eco-industry exports have been based on survey data from a French study⁶ which uses the latest definition of the sector agreed by the OECD working group. This found that for every 1 billion EURO of eco-industry exports, 6,000 jobs were created - ie. 1 job for every 167,000 EURO of exports. (The data does not distinguish between the employment effects of equipment and service exports, nor according to factors such as destination of exports). More empirical data is required to give a more detailed understanding of this export / employment relationship.

Caution must be applied to the extrapolation of the French study⁶ to provide an EU-wide estimate of employment generated from exports. However, if the export / employment ratio is applied to total estimated extra-EU eco-industry exports of ~8.5 billion EURO, this indicates that 1998 eco-industry exports generated ~51,000 jobs in the EU. This represents between 1.5% and 3% of eco-industry employment in the EU,

⁶ French Ministry of Economy, Finance and Industry, 1999

depending on the sector definition used. This export employment estimate is obviously a rough estimate, but it does nevertheless provide an indication of the scale of export employment relative to the sector's total employment.

6. *Is there scope for increasing EU environmental exports in the future, to 2010?*

Exports to 'Developing' Countries: Considerable scope exists for increasing EU eco-industry exports to developing countries in the future - mainly because of forecast massive expansion in environmental markets in these countries to 2010, in regions such as central & Eastern Europe, SE Asia, China and South America. These markets currently account for 30% of the world total; by 2010, this portion is forecast to increase to over 40%.

EU suppliers will be in a particularly good position to access the increased demand in CEE because of the geographic proximity and gradual harmonisation with EU environmental practices and regulations in CEE.

The annual rate of growth in these developing markets will depend on future economic circumstances and availability of investment finance. Recent economic down-turns in these regions are considered to be a temporary state, with growth returning over the next five years, and potentially ranging between 5% and 10% per year.

Exports to 'Developed' Countries: Less scope exists for increasing exports in the future to developed countries, such as the US, mainly because the size of these markets is not expected to grow substantially to 2010. Conservative estimates for environmental markets in OECD countries forecast annual growth of 1% or 2% up to 2010. However, although investments in areas with traditionally high levels of expenditure (such as wastewater treatment infrastructures) are not expected to increase, higher growth rates are forecast in developed markets in some sub-sectors, for example, waste management / waste recovery technologies and renewable energy services and technologies.

Key messages from the market growth forecasts to 2010 are that the EU15 market is not expected to grow significantly and therefore that if EU eco-industries are going to continue to grow in terms of revenue and employment, it is essential that they access the future opportunities in export markets. To do this, EU eco-industries will need to understand and pre-empt the changes in the geographic location of markets and the changing demands for environmental goods and services, such as increased demand in developing countries for high value expertise in relation to wastewater treatment, water supply and waste management activities; the development of management strategies; setting investment priorities; establishing "build-own-operate-(transfer)" contracts (BOO and BOOT); design, construction, project management, commissioning, operation and servicing of environmental infrastructures (eg. waste management and wastewater treatment facilities).

Future Employment Effects: If the EU eco-industry maintains the same market shares of export markets as those estimated for 1998, it is forecast that EU eco-industry exports could reach 22 billion EURO per year. This level of exports would generate 132,000 jobs (assuming the same export / employment ratio of 1 billion EURO to 6,000 jobs as identified in the 1999 French study⁶). This would mean an additional ~82,000 jobs on current levels.

In reality, these future EU export forecasts and employment implications may be overstated since it is possible that the EU market share of world markets and the export / employment ratio will change to 2010, because of factors such as the future development of indigenous supply-sides in export markets, increased use of local employees in export markets, increased activity in export markets by other international competitors (eg. US), and reduced labour intensities in the provision of environmental goods and services through efficiency improvements.

7. How can EU eco-industry export activity be increased in the future?

The above analysis indicates that the EU eco-industry has performed relatively well in export markets compared to international competitors; and that export opportunities will increase in the future as markets in developing countries and economies in transition (eg. in central & eastern Europe) expand and as new areas of opportunity open up in existing and emerging markets (eg. in renewable energy).

In order to capitalise on future export opportunities, EU suppliers will need to overcome increasingly intense competition from indigenous suppliers and other international competitors in these export markets. They will also need to overcome other potential barriers to exporting such as limited company resources for export business development and lack of export market information and contacts. Considerable effort will be required by EU suppliers to capitalise on future export opportunities - including in areas such as:

- updating their understanding of the needs of export markets and specific contract opportunities;
- developing long-term relationships of mutual benefit with key clients and collaborators in export markets, and work closely with them;
- involving themselves with developing indigenous industries in export markets rather than attempting to compete with them - establishing new trading partners in strategically important emerging markets, through joint ventures and strategic alliances;
- increasingly selling higher value activities such as design and service capabilities, as well as manufactured goods. They will be selling experience, service capabilities, cost-effective solutions which help improve the competitiveness of their client's core business rather than just compliance;
- providing local commitment, on-going presence in a market, backed up by global support networks rather than just shipping equipment long distances;
- developing stronger networks and collaborations with other EU environmental exporters;
- establishing stronger links with financial institutions and potential funders in order to capitalise on the trend towards privatisation of environmental services and preferences for "build-own-operate-(transfer)" contracts (BOO and BOOT) in many areas (eg. waste management and wastewater treatment infrastructures) where Governments in export markets are unable to fund the substantial investments needed.

In meeting these needs, there are obviously many actions that it is up to the individual companies to take. However, experience has shown that support initiatives from external bodies (eg. Member States, the EU, export promotion bodies and trade associations) can bring real benefits to EU environmental exporters.

Examples of successful support initiatives include:

- helping to establish collaborative relationships with suitable indigenous suppliers;
- financial support for feasibility studies and establishing strategic alliances;
- support for tendering for environmental projects;
- sponsoring environmental demonstration projects in export markets to help raise the profile of EU suppliers and techniques;
- assistance with and expert exchanges to help build networks of contacts between EU suppliers and clients or collaborators in export markets.

Whilst successful initiatives have been developed, scope exists for further improvement in the light of apparent weaknesses such as: a relatively low awareness amongst suppliers of the support available; an apparent lack of co-ordination between the providers of support; and inappropriate use of 'hard sell' initiatives when a 'softer' approach combined with overseas development objectives of mutual benefit to the recipient and donor countries may be more effective in developing long-term trade.

8. Policy Recommendations for Promoting Future Exports:

Policy Issues:

In view of the analysis summarised above, two main policy issues emerge in relation to promoting future EU eco-industry exports and associated employment.

- i. **Export Support Initiatives:** It is expected that the EU and other established 'western' environmental markets will see only moderate growth to 2010, and some areas may see reduced demand, for example, construction of wastewater treatment facilities. Over the same period, substantial market growth is forecast for emerging economies such as central and eastern Europe, South America, South East Asia and China. If EU suppliers are going to maintain revenue growth and employment, they will therefore have to capitalise on these extra-EU export opportunities.
- ii. **Development Environmental Goods and Services:** To be in a position to capitalise on future international opportunities, EU suppliers will need to be able to develop and provide goods and services which correspond to future demands.

Policy Recommendations:

i) Promoting Future EU Environmental Exports:

The following actions are recommended to promote future EU eco-industry exports:

- **EU Member State initiatives to support environmental exports.** Export support initiatives provided by individual Member States could be continued or expanded (depending on what individual governments already provide) to help environmental suppliers understand export markets, identify and access export opportunities and develop suitable approaches for working in export markets, for example, developing joint ventures with indigenous suppliers. Potential export support initiatives from Member State Governments include:
 - organising and sponsoring missions (inward and outward) and attendance at eco-industry trade fairs;
 - supported for expert exchanges to help build networks of contacts between EU suppliers and clients / collaborators in export markets;
 - sponsoring environmental demonstration projects in export markets to help to raise the profile of EU suppliers and techniques;
 - technology transfer programmes that publicise and endorse the capabilities and suitability of EU technologies & services for overseas markets;
 - export credits schemes and other project financing to help protect companies from overseas payment problems and raise venture capital;
 - financial assistance to environmental suppliers for overseas tendering;
 - providing EU suppliers with market information and contract leads;
 - assistance and advice from commercial attaches on doing export business;

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- the increased role of public / private partnerships in environmental investments, means that there is scope in assisting EU suppliers to establish links with financial institutions (public and private) to put these partnerships together and thereby enable suppliers to access large opportunities in emerging export markets which favour the use of public-private financing.
 - assistance in networking between EU suppliers for putting together collaborations for very large overseas projects.

There is a strong case for particularly focusing export support on markets in Central & Eastern Europe. This is because these markets are forecast to grow substantially over the next decade and are close enough to the EU to allow EU suppliers to export their goods and services from operations still based within the EU; (exports further afield will increasingly require EU suppliers to establish production facilities, service centres and therefore employment outside the EU, involving a relatively small number of EU nationals compared to indigenous personnel for the labour intensive activities).

- **European Commission Export Promotion Programmes** – Consider expanding existing European Commission initiatives to promote environmental exports (for example, Asia Eco-Best and RIET). These initiatives could be extended to cover other growth markets in regions such as Central & Eastern Europe and South America.
- **EU and EU Member State overseas development aid** – Use EU and national development aid to promote environmental and economic improvement in developing countries. An indirect benefit of this aid can be the stimulation of demand for environmental goods and services in these countries. Development aid programmes can specifically include activities involving European environmental suppliers such as transfer of environmental protection know-how, assistance with strategies for environmental improvement and technologies. This is particularly relevant to EU funding for environmental improvement in Central and Eastern Europe.
- **Performance indicators** – Strengthen the performance indicators used to assess the impacts of EU and Member State environmental export support initiatives in order to provide a clearer picture of the effectiveness of these initiatives.
- **Examine the scope for increasing collaboration between Member States in Environmental Export Support Initiatives.** The potential synergies between the export promotion activities of bodies in different Member States and different parts of the eco-industry could increase the effectiveness of these activities if adequately co-ordinated. Examining the scope for increased multi-lateral collaboration between Member States in support initiatives could involve discussion between the European Commission, EU Member State governments, industry associations and export promotion bodies. At present it is uncertain whether industry or Member States would be enthusiastic about multi-lateral collaboration.
- **Data on the EU Environmental Industry** - Support the collation and improvement of data on the EU environmental industry, employment and export activity. This is required in order to obtain a more comprehensive picture of the extent, destination and growth trends in EU eco-industry exports and future sizes of EU environmental markets.

ii) Promoting innovation in EU Environmental Goods and Services:

To be competitive in future global markets, EU suppliers will need to develop *new* goods and services which correspond to future demands, as well as supplying the proven, established goods and services cost-effectively. Recommended initiatives to promote the development of these new environmental goods and services include:

- **Continue to prioritise EU R&D resources** towards supporting technologies and know-how for sustainable development, for example, EU programmes to develop information and communication technologies for environmental applications, process control technologies and low cost water treatment technologies fully integrated into production processes.
- **Clean processes:** EU environmental policy to continue to promote the adoption of integrated process / clean technology and resource management as cost effective solutions to environmental problems in the EU. This will help to stimulate development of these techniques in the 'home' market, giving EU suppliers the expertise and products to compete successfully in export markets. This part of the environmental industry is still emerging and EU firms would benefit from EU support in order to stay ahead of international competitors (notably the US).
- **Increased collaboration between environmental suppliers and end-users** to stimulate the development of clean technology and help ensure that EU suppliers can provide the techniques required by industry and regulators.
- **Performance standards.** The European Commission and Member States to encourage the development of standards (technology accreditation schemes) for environmental goods and services. These standards would help to promote the quality of EU goods and services and increase overseas clients' 'faith' in them.

A STUDY OF EU ECO-INDUSTRIES EXPORT POTENTIAL

FOR DGXI OF THE EUROPEAN COMMISSION

FINAL REPORT

1. INTRODUCTION

This report provides the findings to a study commissioned by DGXI of the European Commission and undertaken by ECOTEC Research & Consulting Ltd. The study has been commissioned to provide an analysis of current export activity by the EU eco-industry, the employment effects of this export activity, future export opportunities and to develop appropriate policy recommendations for promoting EU eco-industry exports and employment in the future.

1.1 Objectives:

Specific objectives of the study are to:

- Identify the size and character of global environmental export markets.
- Assess the current extent of EU eco-industry exports outside the EU, the types of goods and services being exported, to which markets; whether the sector is capitalising on available export opportunities; its competitiveness in world markets and the employment effects of exports.
- Examine future export opportunities, whether there is scope for increasing exports, whether EU suppliers are in a position to capitalise on future opportunities and the likely future employment effects.
- Develop recommendations for policy instruments to promote the competitiveness of the EU eco-industry, future exports and associated employment.

1.2 Background

The study reflects the importance attached by the European Commission to the environmental industry in contributing to the achievement of wider environmental, employment and sustainable development objectives; and also of the links to other EU priorities such as the EU Accession process, overseas development and Kyoto climate change commitments.

The Commission has recognised the growing economic and social importance of eco-industries and the positive linkage between environment and employment^{7 and 8}.

⁷ European Commission Communication on Environment and Employment, COM(97)592

⁸ European Commission: "An estimate of eco-industries in the European Union 1994", Belgium 1997 - NB - This 1997 study provides a minimum estimate of both total production and total employment, because of incomplete expenditure data and the non-inclusion of recycling, some private businesses, renewable energy etc.

With environmental problems (e.g. overuse of natural resources such as energy, pollution of air and water, household and industrial waste) becoming more apparent and acknowledged in other parts of the world (e.g. Latin America, Asia, Central and Eastern Europe), international demand for environmental technologies and services is increasing - particularly in central and eastern Europe.

Export promotion initiatives are being undertaken by the EU's main competitors on world environmental markets, notably US, Japan and Canada, and there are signs that these initiatives are being geared up. The EU and Member States are also undertaking initiatives to promote EU environmental exports, but it is important to know whether and how these should be developed in the future.

The Commission therefore seeks to obtain a better understanding of: current export activity; the link between environmental exports and employment; potential for future exports; the need for export support initiatives; the support initiatives being undertaken by EU competitors and inside the EU; and policy options for promoting future EU environmental exports.

1.3 Approach

The study draws upon data and expert knowledge of the EU and international environmental industry, and makes use of information from sources such as Eurostat, the European Commission, the OECD, overseas Governments, trade associations and individual companies.

1.4 Report Structure

After this introduction, the report consists of the following sections:

- **Section 2** provides a definition of the environmental industry;
- **Section 3** gives an overview of global environmental markets;
- **Section 4** summarises the EU eco-industry, including the importance of export activity to the EU eco-industry, an examination of whether the sector is capitalising on available export opportunities and the employment effects of current EU eco-industry exports;
- **Section 5** examines whether there is scope for increasing environmental exports in the future, to 2010;
- **Section 6** considers what needs to be done to increase EU eco-industry export activity in the future; and
- **Section 7** provides policy recommendations for supporting the competitiveness of the sector, its future exports and associated employment.

2. DEFINITION OF THE ECO-INDUSTRY

The sector definition used in this study is consistent with that contained in “The Environment Industry Manual”, OECD/Eurostat, Nov 1998 (Doc. Eco-Ind/98/1) – see Annex 5. This defines eco-industries as “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 resource use”. The definition categorises the sector according to equipment, construction activities and services provided in relation to pollution management, cleaner technologies and resource management (see Annex 5). The definition includes goods and services in areas such as:

- wastewater treatment
- air pollution control
- waste management
- process optimisation
- environmental monitoring and instrumentation
- engineering and consulting services
- analytical services
- water utilities
- resource recovery, and
- renewable energy.

This 1998 definition updates a previous classification of the sector contained in the 1996 OECD / Eurostat report “An Interim definition of the environment industry”, OECD/GD(96)117. The main difference between the 1996 and 1998 classifications is that the former did not make such explicit reference to resource management activities (eg. waste recovery and renewable energy) and also tends to categorise the sector into environmental media sub-sectors (eg. wastewater treatment, waste management and air pollution control). The

Much of the data available on the EU eco-industry corresponds to the 1996 classification rather than the 1998 version. The current study therefore makes use of the 1996 classification as well as using the 1998 version where possible.

Examples of goods and services (categorised according to the 1996 OECD⁹ classification) are provided in Table 2.1.

⁹ OECD (1996), “Interim definition of the environment industry”, OECD/GD(96)117

Table 2.1: Examples of Environmental Goods and Services (using the 1996 OECD Classification of Sector)

Environmental Sub-Sector:	Examples of GOODS:	Examples of SERVICES:
Air Pollution Control (APC)	Eg. Gas scrubbers, dust collectors, incinerators	Eg. Installation and servicing of APC equipment.
Waste Water Management (WWT)	Eg. Aeration systems, separation technologies, chemical treatments.	Eg. Construction & operation of wastewater treatment systems.
Solid Waste Management (WM)	Eg. Waste handling, recycling and collection equipment.	Eg. Waste disposal services, waste treatment, recycling operations.
Remediation of Soil & Groundwater (CLR)	Eg. Air strippers, absorbents.	Eg. Groundwater and soil clean up.
Noise & Vibration Control (NVC)	Eg. Mufflers, silencers, vibration control systems.	Eg. Operation and installation of noise and vibration equipment.
Environmental Monitoring, Instrumentation & Analysis (EMA)	Eg. Measuring & monitoring equipment, sampling systems.	Eg. Data collection, measuring & monitoring, sampling, sample analysis.
Environmental contracting / engineering services (ES)	Eg. Environmental management system software, EIA toolkits, legal publications.	Eg. Engineering design / specification / project management of WWT plants, environmental audits & economics, legal services, ecological studies.
Energy management (EM)	Eg. Renewable energy technologies.	Eg. Energy audits, efficiency advice, servicing of renewable energy technologies.
Marine pollution control (MPC)	Eg. Marine pollution control equipment, absorbents, booms.	Eg. Marine pollution clean-up services.

3. OVERVIEW OF GLOBAL ENVIRONMENTAL MARKETS

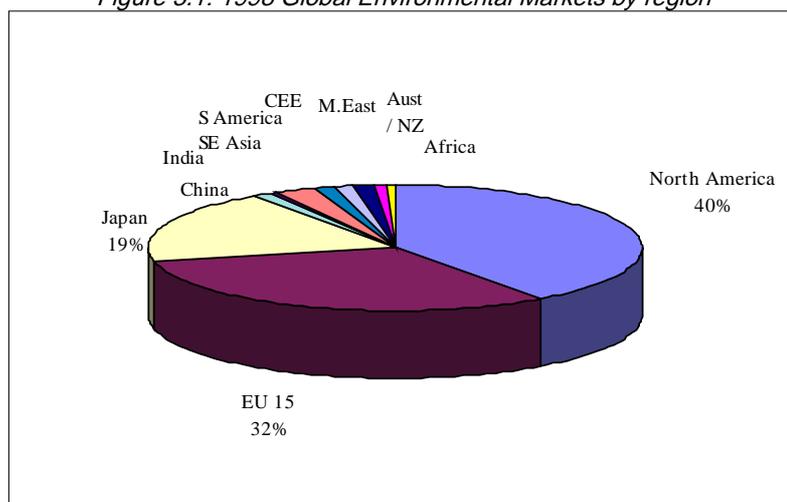
Estimates of the current global market for environmental goods and services range between 330 and 410 billion EURO (Annex 1). This range reflects on-going developments in the classification of the sector; a lack of empirical data on the eco-industry; and uncertainties over market sizes in the wake of recent economic circumstances. The current study uses a conservative estimate of 330 billion EURO for world environmental markets as the basis for further analysis.

The geographic distribution of the global market is shown in Figure 3.1. OECD countries currently account for approximately 90% of the total global market.

The breakdown by equipment, services and resources is shown in Table 3.1. Approximately 50% of the global market value relates to the provision of environmental services. Equipment and resource management activities (including water utilities) each account for approximately a quarter of the total.

Split by environmental media, as shown in Figure 3.2, the two largest sub-sectors are waste management and wastewater treatment, which together account for approximately 80% of the market value.

Figure 3.1: 1998 Global Environmental Markets by region



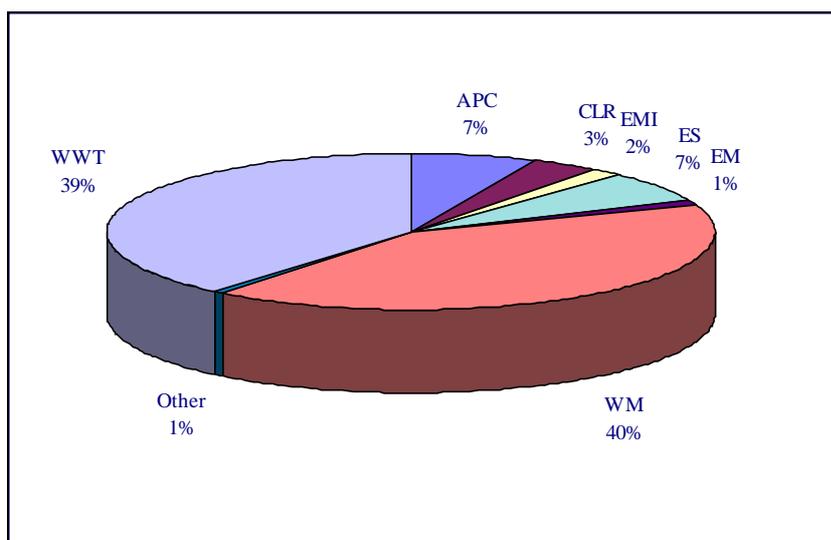
Source: see Annex 1.

Table 3.1: Global Market for Environmental Goods and Services, 1998:

	Billion EURO:	% of total:
Equipment:	79	24%
water equipment & chemicals	28	8%
air pollution control equipment	22	7%
instruments & information	4	1%
Waste management	23	7%
process/prevention technology	2	1%
Services:	172	52%
solid waste management	75	23%
hazardous waste management	12	4%
consulting & engineering	20	6%
remediation & industrial	11	3%
analytical services	2	1%
water treatment services	52	16%
Resource Management:	79	24%
water utilities	53	16%
resource recovery	22	7%
environmental energy	4	1%
Total:	330	100%

Source: see Annex 1. Breakdown based on classification in "The Environment Industry Manual", OECD/Eurostat, Nov 1998.

Figure 3.2: 1998 Global Environmental Markets split by Environmental Sub-sector



WWT = wastewater treatment

APC = air pollution control

CLR = contaminated land remediation

EMI = env'l monitoring & instrumentation

ES = consulting & engineering services

EM = energy management

WM = waste management

Until the late 1970s the environmental industry was mainly located in and focused towards markets in developed countries, particularly Europe and North America. But international development and the recognition of the global nature of environmental problems means that the industry has rapidly internationalised in the last twenty years and seen high rates of growth - annual rates of growth for the period have consistently ranged between 5% and 10%.

There is some evidence that since the mid-1990s, however, growth rates in the more mature markets (notably the US) have slowed; but at the same time, rapid growth has been seen in environmental markets in many developing countries and emerging economies such, as central and eastern Europe, SE Asia, China and South America.

As well as dynamic rates of growth in the last 20 years, global environmental markets have also seen developments of new environmental goods and services. For example, the development of new wastewater treatment and waste management techniques; monitoring technologies; increased use of automation and clean processes to minimise environmental emissions at source and reduce costs; increased recycling and materials recovery; and increased use of renewable energy sources.

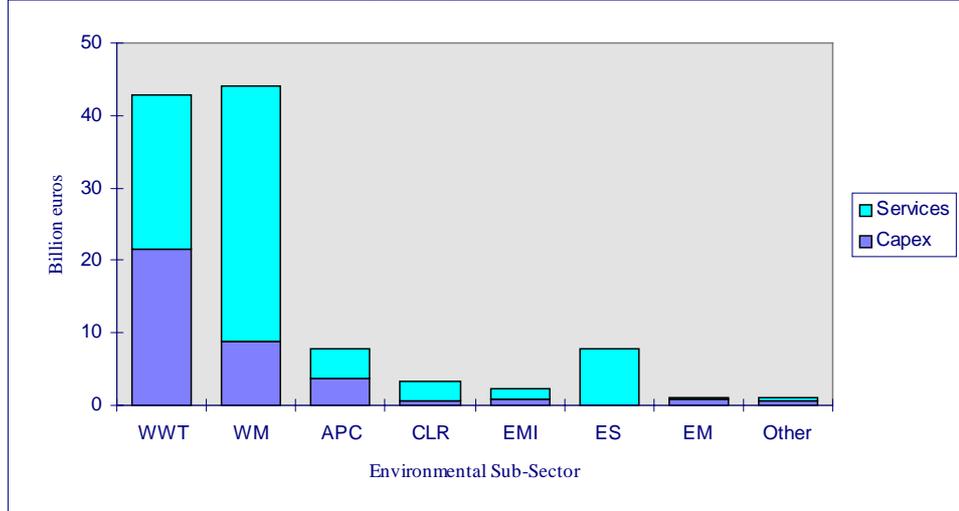
Global environmental markets have therefore been highly dynamic and are likely to continue to be so to 2010. The study shows the importance to the EU sector of understanding these future trends in terms of, for example, geographic distribution of markets, the types of goods and services being demanded and ways of doing business in export markets.

4. THE EU ECO-INDUSTRY TODAY

4.1 Overview

Turnover: The EU (EU15) eco-industry has a turnover of approximately 110 billion EURO (Annex 2) and consists of ~30,000 companies¹⁰. Figure 4.1 shows revenue by environmental sub-sector and between services and capital expenditure (capex - on equipment and construction).

Figure 4.1: Value of EU Eco-Industry split by Environmental Sub-Sector and Services & Capex

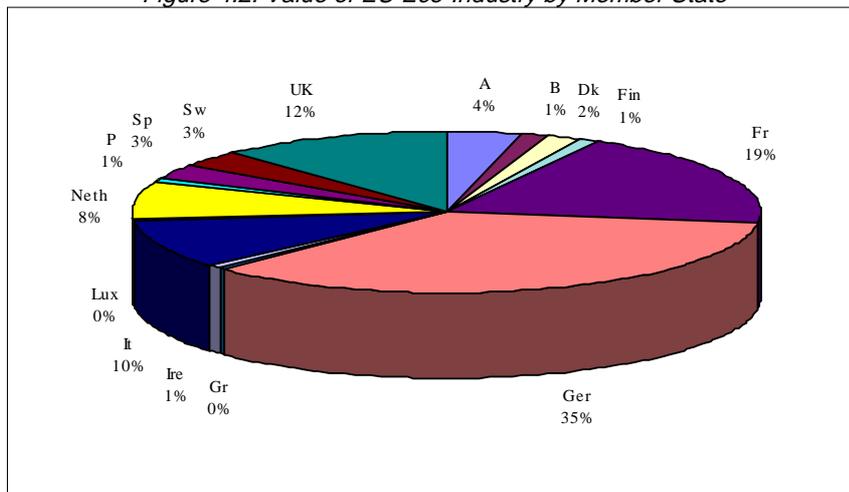


Source: Update of data in "Data Collection on the Eco-Industries in the EU", for DGXI & Eurostat, 1997.

Note: "Capex" refers to Capital Expenditure, which includes equipment and construction.

The geographic distribution of the EU eco-industry across member States is summarised in Figure 4.2. The largest markets and supply-sides within the EU are in Germany, France, the EU, Italy and the Netherlands - these account for over 80% of the EU total.

Figure 4.2: Value of EU Eco-Industry by Member State



Source: Based on DGXI / Eurostat, 1997

¹⁰ Based on "An estimate of Eco-Industries in the EU", 1997, for Eurostat & DGXI

Employment: Estimates of the number of jobs in the environmental sector in the EU vary according to the sector definition used. A narrow definition of core eco-industries, eg. excluding resource management and renewable energy activities, gives approximately 1.5 million jobs (probably a lower estimate); a wider definition gives up to 3.5 million.

According to the 1997 Eurostat / DGXI report, the sector employed at least 1 million personnel *directly* in the provision of environmental goods and services as well as related construction activities in 1994 (this figure may be understated by around 30% due to incomplete expenditure data and the non-inclusion of recycling, some private businesses, renewable energy etc.).

Approximately 70% of direct employment relates to environmental services and 30% to the supply of environmental goods and construction.

A further half a million were employed in 1994 *indirectly* in jobs generated as a multiplier of the direct employment, in related activities such as energy generation, intermediate goods, capital goods and public services. Updating this data to 1998 and assuming annual increases of 2%, this gives 1.13 million and 0.6 million for direct and indirect jobs respectively.

The 1997 study did not cover jobs in waste recycling and renewable energy activities. These were however included in an EU Commission Communication on Environment and Employment (1997) which estimated that 3.5 million¹¹ jobs in the EU were involved in the provision of a wider range of environmental goods and services. "About 2 million of these jobs are related to activities in the area of clean technologies, renewable energy, waste recycling, nature & landscape protection, and ecological renovation of urban areas. In the so-called 'eco-businesses' there are about 1.5 million"¹².

4.2 The Importance of Export Activity to the EU Eco-industry

Limited data exists on the extent of EU eco-industry exports. The analysis contained in this report is based primarily on studies of eco-industry exports from France¹³ and the Netherlands¹⁴. More comprehensive empirical data is required to build on this data in order to obtain a more detailed picture of the extent, destination and growth trends of EU eco-industry exports.

Extrapolations based on these Dutch and French studies indicate that up to 8% (approximately 8.5 billion EURO - see Annex 3.1) of the EU environmental industry's revenue is generated from exports to markets *outside* the EU. In addition, approximately 15% of the sector's revenue relates to intra-EU trade, ie. exports to other EU Member States. (Export rates vary according to environmental sub-sector, products & services and EU Member State). The current study focuses on extra-EU exports.

¹¹ Eurostat - for the EU Employment Report 1997

¹² Communication from the European Commission on Environment and Employment, COM(97)592, 1997

¹³ Survey of the French Eco-Industry - by the French Ministry of Economy, Finance and Industry (Mr Vittek), 1999 - indicates that extra-EU exports represent 6% of revenue of suppliers in France.

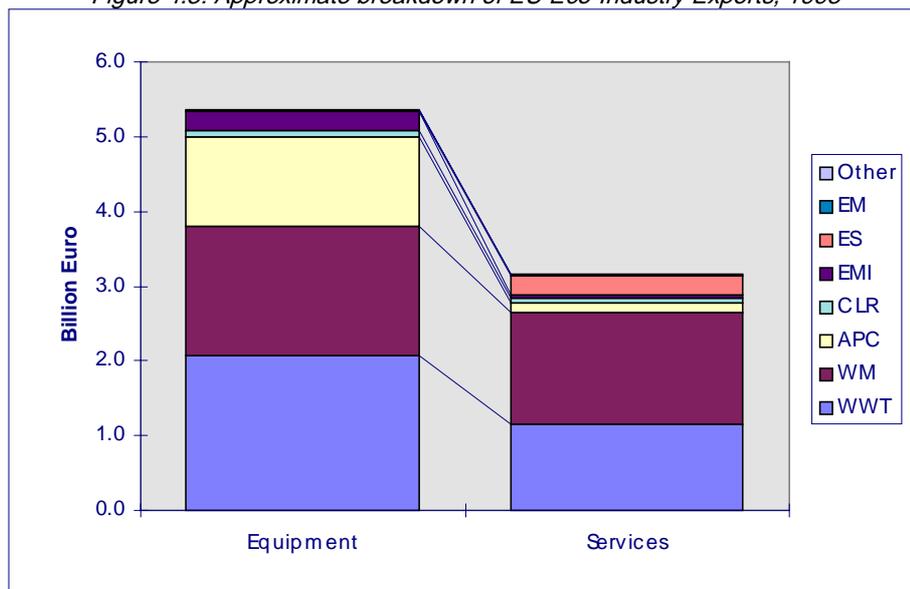
¹⁴ VLM survey of exports from eco-industries in the Netherlands, 1998 - indicates that extra-EU exports represent 11% of revenue of suppliers in the Netherlands.

These estimates of export revenue are based on a number of national surveys of EU eco-industries, such as the 1998 study by VLM on exports from eco-industries in the Netherlands, and the 1999 study on the French sector¹⁵. These studies estimate that the Netherlands' eco-industry obtains 11% of turnover from extra-EU exports, and the French eco-industry 6%.

The national studies also indicate that a higher proportion of equipment is exported than services. For example, an estimated 14% of wastewater treatment *equipment* is exported, versus 3% of wastewater treatment *services*. This seems reasonable in view of the fact that services are often labour intensive and typically use a high proportion of local labour. Services provided to overseas markets would often use local labour; whereas a higher proportion of a product's value can be exported. Hence the proportion of equipment exported outside is higher than for services.

In total, exports of equipment and services are estimated to account for approximately 60% and 40% of extra-EU eco-industry exports respectively - see Figure 4.3. This also indicates that wastewater treatment, waste management and air pollution control account for the vast majority of exports, reflecting the sizes of these sub-sectors in the EU and global markets.

Figure 4.3: Approximate breakdown of EU Eco-Industry Exports, 1998



Note: The sub-sector breakdown of exports is based on findings of the VLM study of eco-industry exports from the Netherlands.

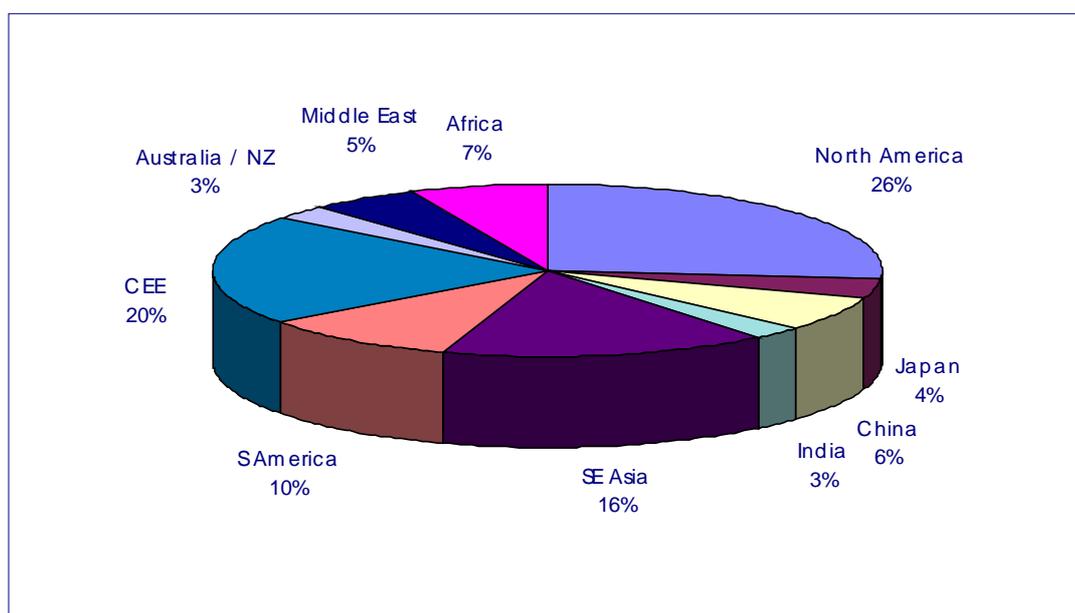
The largest export markets for the EU eco-industry are the US and Central & Eastern Europe (CEE), followed by SE Asia, South America and the Middle East - see Figure 4.4. This pattern reflects the size of different export markets and the market share held by EU suppliers. For example, the US and central and eastern European (CEE) markets are ~40% and ~1.5% of the global market respectively; but the EU eco-industry's market share of these two regions is estimated at 2% and 45% respectively. Hence, CEE

¹⁵ Survey of the French Eco-Industry - by the French Ministry of Economy, Finance and Industry (Mr Vittek), 1999 - which uses the latest sector definition agreed by the OECD working group.

accounts for around the same value of EU eco-industry exports as does the US, despite the fact that the overall US market is far larger than the CEE.

This data is taken from the national surveys mentioned above and discussions with eco-industry trade associations in different EU Member States. (The current study also sent a survey questionnaire on export activity to 180 leading EU environmental suppliers - see Annex 4. However, only 20 responses were received, which meant that the survey data could not be used as a statistically significant data source in its own right, but nevertheless it did provide useful insights into the extent and destination of exports and to barriers exporting and support needs).

Figure 4.4: Estimated Destination of EU Eco-Industry Exports, 1998



Source: see Annex 3.5.

Evidence suggests that the level of EU export activity has increased significantly over the last 10 years. Analysis of EU trade data (Annex 3.2) indicates that extra-EU exports of a range of environmental products have risen by 10% per year over the 10 years 1988 to 1997, ie. an increase of over 250% over the period. This analysis is supported by the 1998 Planistat study of French eco-industry exports which showed that French exports increased by 38% from 1995 to 1997, an annual increase of ~11%.

The increase in EU environmental exports appears to have been driven by a combination of factors, including: EU suppliers seeking to increase exports in the face of increased competition at home; a possible slow down in some of the more mature EU national markets (eg. the Netherlands and Germany); and considerable expansion of international market opportunities, particularly in developing countries.

Like the EU, the US eco-industry has seen growth of exports in recent years. From 1995 to 1996, the US environmental industry grew by 1.2%, but its exports increased by 9%. 60% of the US sector's growth in this period was attributable to the expansion in exports (EBI 1997). This export growth reflects factors such

as slower growth and increasingly competitive conditions in the US market, as well as a desire to capitalise on opportunities overseas.

Whilst data on international market shares is limited, it is estimated that the EU environmental industry has a 7% share of markets outside the EU and North America, compared to US environmental industry's 9% - see Tables 4.1 and 4.2 (and Annex 3.5). These market shares are in line with the relative size of the US and EU eco-industries - the US industry being at least 25% larger than the EU sector.

The EU environmental industry is considered particularly competitive in areas such as installation of water and wastewater treatment infrastructures, waste management infrastructures and operations, air pollution control technologies and renewable energy goods and services.

Although this study focuses on extra-EU exports, it is notable that 'national' exports by a number of EU Member States (ie. intra-EU and extra-EU exports) range between 20% to 25% of eco-industry revenues, compared to an estimated 8%¹⁶ for the US eco-industry. Again, this underlines the fact that EU suppliers are active in export markets (within the EU as well as outside).

It is estimated that 'tied aid' from the European Community and Member States may relate to up to 40% of EU environmental exports. EU tied aid is highest to Central & Eastern Europe, SE Asia, India, Africa and South America. Since the remaining ~60% of EU environmental exports is not linked to EU tied aid (eg. exports to North America) this indicates that EU suppliers win the majority of their export contracts in open competitive market conditions.

Data on exports by different sized EU suppliers is limited. Although companies of all sizes have been successful in accessing export opportunities, it is likely that the majority of extra-EU export activity is undertaken by the larger suppliers. Smaller firms are often more constrained by availability of resources, lack of export experience and ability to bid for large overseas contracts.

Net Trade: Available data indicates that the EU eco-industry has a net trade surplus in eco-industry goods and services. As shown in Table 4.2, EU exports in 1998 are estimated to have been worth 8.5 billion EURO, and that imports into the EU were valued at ~5 billion EURO, giving a trade surplus of 6 billion EURO - ie. a 5% export surplus on total revenue. A similar 5% trade surplus was reported for the US in 1996 (EBI, 1997). The EU surplus appears consistent with the 1997 DGXI / Eurostat study¹⁷ which found that all Member States, with the exception of Greece, Ireland, Portugal and Spain, had positive trade balances with the rest of the world in 1994, and that even in the latter four countries, the level of net imports was low.

¹⁶ The US Environmental Industry, EBI, 1997.

¹⁷ "An estimate of Eco-Industries in the EU", 1997, for Eurostat & DGXI

Table 4.1: Market Shares - % of International Markets held by Environmental Exporters

Market	Market Size (B EURO)	Market Shares held by Exporters:				
		Indigenous supplier share %	EU suppliers' share %	US suppliers' share %	Japan share %	Others' share %
North America	132	96%	2%	96%	1%	1%
EU	104	97%	97%	2%	1%	1%
Japan	62	97%	1%	2%	97%	1%
China	4	55%	12%	15%	15%	3%
India	1	50%	20%	20%	5%	5%
SE Asia	9	48%	15%	20%	15%	2%
S America	4	44%	18%	30%	5%	3%
CEE	4	27%	45%	20%	3%	5%
Australia / NZ	4	59%	5%	25%	10%	1%
Middle East	2	40%	20%	35%	3%	2%
Africa	2	33%	25%	35%	2%	5%
Total =	330					

Source: estimates made by ECOTEC 1999 - See Annex 3.5

Table 4.2: Market Shares - Values (B EURO) of International Markets by Environmental Exporters

Market:	Market Size (B EURO)	Indigenous suppliers (B EURO)	EU share (B EURO)	US share (B EURO)	Japan share (B EURO)	Others share (B EURO)
North America	132	127.0	2.2	127.4	1.3	1.3
EU	104	101.2	101.2	2.1	0.5	0.5
Japan	62	59.8	0.3	1.2	59.8	0.3
China	4	2.5	0.5	0.7	0.7	0.1
India	1	0.6	0.2	0.2	0.1	0.1
SE Asia	9	4.3	1.3	1.8	1.3	0.2
S America	4	2.0	0.8	1.3	0.2	0.1
CEE ¹	4	1.1	1.8	0.8	0.1	0.2
Australia / NZ	4	2.6	0.2	1.1	0.4	0.0
Middle East	2	0.9	0.4	0.8	0.1	0.0
Africa	2	0.7	0.6	0.8	0.0	0.1
Total =	330	303	110	138	65	3

Source: estimates made by ECOTEC 1999 - see Annex 3.5 (Column sums have been rounded)

(These estimates indicate that the US environmental sector has a 9% share of world markets outside the EU and North America; and that the EU sector has a 7% share).

4.3 *Is the Sector Capitalising on Available Export Opportunities?*

Analysis indicates that the EU eco-industry has been successful in capitalising on export opportunities in a wide range of environmental sub-sectors and geographic markets - as evident in the market shares estimated in Table 4.1. These estimates are based on information provided by EU companies and organisations active in the export markets.

At present a large proportion of EU exports to developing countries and emerging economies is on the back of 'tied aid' - for example, from the European Investment Bank, EU programmes in CEE and the Asian Development Bank. It is considered that there is relatively limited scope at present to increase exports in relation to this tied aid without increases in the scale of aid available.

There is probably more scope to increase exports unrelated to tied aid - for example, private sector multinational companies investing in developing countries. As is noted below, opportunities associated with this non-tied aid related demand is likely to increase in the future with forecast industrial growth and economic development in developing countries.

4.4 *The Employment Effects of Current EU Eco-Industry Exports*

The relationship between extra-EU environmental exports and employment is complex and varies according to factors such as:

- **Location of export market** - eg. exports to CEE are more likely to lead to jobs based in Europe than exports to the Philippines.
- **Whether the EU exporter is working on a one-off export or is in a country for the long term.** A long term exporter is more likely to be located in the export market.
- **Type of environmental goods & service being exported** - high value, low bulk technologies are more suited to manufacture in the EU and then exported than high bulk, low value items. For example, high-tech monitoring equipment manufactured in the EU can be exported without incurring large transport costs.

Most environmental *technologies*, apart from the most sophisticated can be manufactured relatively easily without the need for major investments in manufacturing plant. This means that EU suppliers are able to set up manufacturing operations where they can benefit from reduced transport costs and perhaps lower production costs. This point is reinforced by experience of US environmental technology companies 'exporting' to the EU - firms such as US Filter basically buy up existing suppliers in the EU that are able to manufacture their technologies rather than exporting them from the US.

Exported services such as project management of WWT infrastructure construction projects in China by their nature have to be based close to the project, ie. working from a Chinese satellite office.

-
- **Maturity of the export market** - An EU technology manufacturer may be able to export its technologies to developing markets outside the EU before indigenous suppliers in the export market have developed and before competition intensifies. As the export market matures, the EU supplier may have to set up local manufacturing operations to remain competitive.

4.5 Export / Employment Estimates

The employment generated in the EU by current EU exporting activity have been estimated using survey data from a French study of eco-industry exports (French Ministry of Economy, Finance and Industry, 1999). This study found that for every 1 billion EURO of eco-industry exports, 6,000 jobs were created - ie. 1 job for every 167,000 EURO of exports. (The French study does not distinguish between the employment effects of equipment and service exports, nor according to factors such as destination of exports). More empirical data is required to give a more detailed understanding of this export / employment relationship.

Caution must be applied to the extrapolation of the French study ⁶ to provide an estimate of EU-wide employment generated from exports, however, if the export / employment ratio is applied to total estimated extra-EU eco-industry exports of ~8.5 billion EURO, this indicates that 1998 eco-industry exports generated ~51,000 jobs in the EU. This represents between 1.5% and 3% of eco-industry employment in the EU, depending on the sector definition used. This export employment estimate is obviously a rough estimate, but it does nevertheless provide but it does nevertheless provide an indication of the scale of export employment relative to the sector's total employment.

5. SCOPE FOR INCREASING ENVIRONMENTAL EXPORTS IN THE FUTURE, TO 2010

5.1 Exports to 'Developing' Countries

Considerable scope exists for increasing EU eco-industry exports in the future, on the back of forecast expansion on environmental markets in many developing countries to 2010, in regions such as central & Eastern Europe, SE Asia, China and South America.

The rate of growth in these markets will depend on future economic circumstances and availability of investment finance. Recent economic down-turns in these regions are considered to be a temporary state, with growth returning over the next five years, and possibly ranging between 5% and 10% per year. As these regions develop economically and in terms of living standards and environmental quality, huge investments will be needed in water, waste, resource management and energy infrastructures, as well as up-to-date environmental pollution control and resource management systems for new industrial sites and urban areas etc. The environmental component of these investments will be significant. There will also be demand for traditional pollution control, efficient industrial processes and the more sophisticated environmental technologies and services.

The size of the environmental market in central and eastern Europe is forecast to increase 3-fold to 2010 (see below), driven largely by funding programmes such as Phare, Tacis and ISPA, focusing on air pollution control, water and water treatment, soil remediation, waste management and renewable energy capacity.

Referring specifically to the EU accession states which have applied to join the EU in the future - Estonia, Latvia, Lithuania, Poland, Czech Rep., Slovakia, Hungary, Slovenia, Romania, Bulgaria, Malta and Cyprus - the environmental market in these countries currently is estimated at between 1.5 - 2 billion EURO, and is predicted to increase to between 8 billion and 16 billion EURO in 2010 (EDC and EPE, 1997). There are clearly uncertainties over the size of the future CEE environmental market. Poland and Hungary are the two largest, and if these join the EU by 2010, the EU market will increase by approximately 4 billion to 5 billion EURO. EU suppliers will be in a good position to access the increased demand in CEE because of the geographic proximity and gradual harmonisation with EU environmental practices and regulations.

5.2 Exports to 'Developed' Countries

Less scope exists for increasing exports in the future to existing developed countries, such as the US. This is largely because these markets are not expected to grow substantially to 2010 and because competition from US suppliers is intense.

The future size of environmental markets in developed countries is subject to uncertainty. On the one hand, markets such as the EU, US, Canada and Japan may reduce in size to 2010 because much of the environmental infrastructure for water supply, wastewater treatment and waste management will already be in place and most existing industrial sites will be compliant with environmental regulations. This trend is becoming apparent in the US market and more mature markets within the EU. On the other hand, the scale of 'growth' sub-sectors in these mature markets, such as materials/waste recovery and recycling, and renewable energy operations, is likely to increase substantially on current levels. Also, a growing proportion

of public sector environmental operations (eg. waste management and water and wastewater treatment) are likely to become fully or partially privatised, increasing the market available for private sector suppliers.

Conservative estimates for environmental markets in OECD countries would forecast annual growth of 1% or 2% up to 2010. More work is required in this area to establish more robust estimates of future EU environmental market sizes.

These forecasts indicate that EU exporters will not be able to achieve significant growth in exports to developed country markets outside the EU. They also indicate that these markets will become increasingly competitive, for example, in areas such as construction of wastewater treatment infrastructures. Nevertheless, opportunities for expansion will occur in growth sub-sectors such as waste management and renewables.

Market growth in developing countries to 2010 will create enormous export opportunities for EU companies. These markets currently account for ~30% of world total; by 2010, this portion may have increased to over 40% (see Table 5.1). If the EU eco-industry maintains the same market shares of export markets as those estimated for 1998, it is forecast that EU eco-industry exports could reach 22 billion EURO - see Table 5.1 and Figure 5.1. This level of exports would generate ~132,000 jobs (assuming the export : employment ratio of 1 billion EURO to 6,000 jobs). This would mean an additional ~82,000 jobs in the EU on top of current levels.

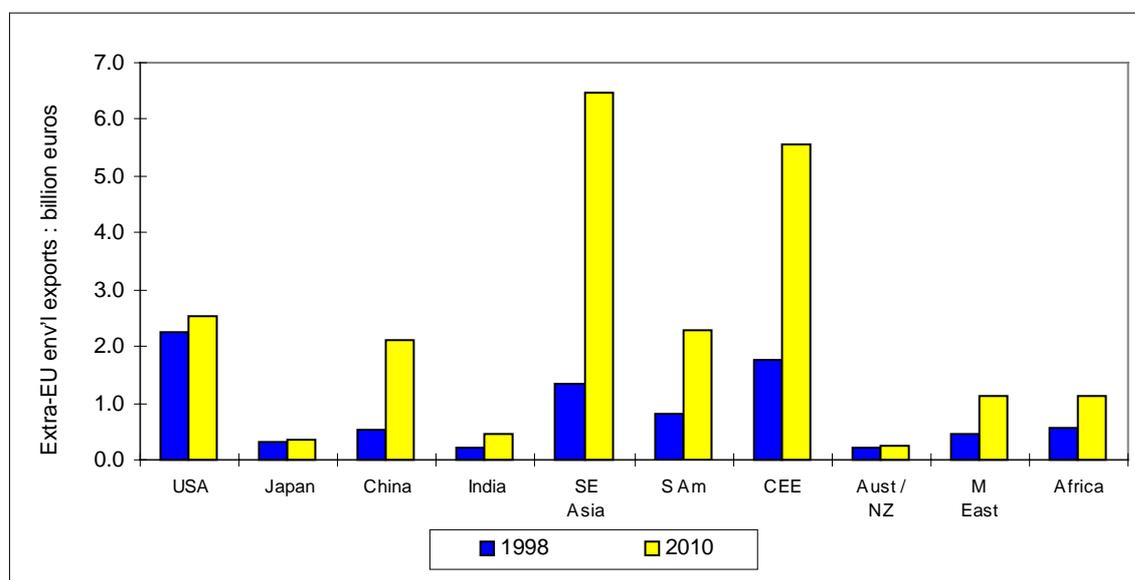
In reality, these future EU export forecasts and employment implications may be overstated since it is likely that the EU market share of world markets and the export / employment ratio will change to 2010, for reasons such as the future development of indigenous supply-sides in export markets, increased use of local employees in export markets and reduced labour intensities in the provision of environmental goods and services through efficiency improvements. As a result, the estimates for EU exports and associated employment in 2010 are only broad estimates.

Table 5.1: Forecast Global Environmental Markets and EU Eco-Industry Exports to 2010

	1998	2010			1998	2010
	Market Size Billion EURO	Market Size Billion EURO	Estimated Annual % growth rate	EU suppliers' estimated market share	Estimated EU exports	Forecast EU exports Note 1
North America	132	149	1%	2%	2.2	2.5
EU 15	104	118	1%			
Japan	62	69	1%	0.5%	0.3	0.3
China	4	17	12%	12%	0.5	2.1
India	1	2	6%	20%	0.2	0.5
SE Asia	9	43	14%	15%	1.3	6.5
S America	4	13	9%	20%	0.8	2.3
CEE	4	12	10%	45%	1.8	5.5
Australia / NZ	4	5	1%	5%	0.2	0.3
Middle East	2	6	8%	20%	0.4	1.1
Africa	2	5	6%	25%	0.6	1.1
Total =	330	439	2%		8.5	22.2

Source: see Annex 3.6. Note 1: The 2010 export forecasts assume the same EU market shares of world markets as in 1998.

Figure 5.1: EU Eco-industry exports, forecast to 2010.



Source: see Annex 3.8.

A key message from the market growth forecasts to 2010 is that if EU eco-industries are going to continue to grow in terms of revenue and employment, it is essential that they access the future opportunities in export markets outside the EU.

The EU sector has performed well in international markets and has a strong foothold from which to build future export growth. In order to capitalise on future export opportunities, the EU eco-industries must be able to understand and pre-empt the changes to the geographic location of markets and the changing demands for environmental goods and services.

The changing demands for environmental goods and services will be driven by factors such as evolving environmental policy priorities (eg. climate change commitments and waste minimisation at source) and industry's desire to improve competitiveness through eco-efficiency. Forecast future changes in demand include:

- Increased demand in developing countries for high value expertise in relation to wastewater treatment, water supply and waste management activities. From scoping studies; to development of management strategies; setting investment priorities; establishing “build-own-operate-(transfer)” contracts (BOO and BOOT); design, construction, project management, commissioning, operation and servicing of environmental infrastructures (eg. waste management and wastewater treatment facilities).
- Increased demand for reliable and cost-effective environmental monitoring technologies in wastewater, solid waste and gaseous applications.
- Increased demand for environmental technologies and services that achieve higher levels of performance at lower costs, particularly in relation to wastewater treatment and air quality.
- Increased demand for resource recovery and recycling technologies and services, particularly in industrial processes and waste management applications.
- Increased demand for renewable energy (eg. waste to energy) and energy management goods and services which help clients reduce energy costs and meet climate change commitments (eg. Kyoto) - see Box 5.1.
- Increased automation of environmental operations such as wastewater treatment plants, including the use of information and communication technologies within environmental decision support systems which collect, process and respond to real time data, and at the same time reduce costs.
- Demand for novel environmental technologies which deal with emerging environmental concerns such as ‘micro pollutants’ (eg. endocrine disrupters).
- A partial shift in demand from end-of-pipe (EOP) equipment to integrated pollution control / clean technologies for some applications particularly in high value industrial manufacturing processes. (Nevertheless EOP will continue to be used for many applications where they are cost-effective and reliable).

Box 5.1: Summary of Implications of Kyoto Instruments for Future Eco-Industry Exports

Commitments agreed at Kyoto in 1998 to reducing greenhouse gas emissions by 2005-2008 will drive demand for services and technologies to help achieve these commitments. To help meet the Kyoto targets, three new instruments have been introduced: (a) "joint implementation" (JI); (b) emissions trading; and (c) the "Clean Development Mechanism" (CDM):

- **"Joint Implementation"** will promote transfer of environmental/energy monitoring technology, sale of more efficient generation equipment, energy and environmental services transfer, and support for energy plant rehabilitation. Once the JI mechanism is fully agreed and established, the EU market could expect strong growth resulting from collaboration with central and eastern European markets, especially given the political support for accession to the EU of the 11 candidate countries.
- **"Clean Development Mechanism"** - The CDM embraces JI for credit in developing countries. The mechanism is the same as for JI, but with a greater emphasis on clean technology transfer. Industrialised ("Annex B") countries - government and/or private corporations - can enter into such co-operative projects in developing countries to promote and transfer clean(er) technologies. The CDM mechanism is planned to come into full operation in the year 2000.

The CDM mechanisms has the potential to be a key driver for the EU eco-industry through the export of EU technologies to developing countries - notably renewable energy sources, cleaner process and generation technologies and associated services - especially to those countries where there are historical and political ties. The export will be assured through the natural linkage of CDM with technology transfer.

- **Tradeable Emissions Permits:** The tradeable emissions permit scheme is not expected to come into force until 2008 (given its complexity and controversy), and therefore this Kyoto Mechanism is not expected to be a key driver on EU Eco-industries by the year 2010, although tradeable emissions permits may be introduced prior to 2008.

These mechanisms encouraging international collaboration will complement the existing (and upgraded) national programmes to address domestic emission reduction requirements. Given the timescale for implementing the Kyoto Mechanisms, it is expected that the national programmes would remain the more significant drivers over the period 2000 to 2005, but over the period 2005-2010 one could expect a more significant role for the Kyoto Mechanism drivers, especially in light of the 2008-2012 greenhouse gas reduction targets.

6. PROMOTING EU ECO-INDUSTRY EXPORTS IN THE FUTURE

The above analysis indicates that the EU eco-industry has performed well in international markets and that export opportunities will increase in the future as markets in developing countries and economies in transition (eg. in central & eastern Europe) expand and as new areas of opportunity open up in existing and emerging markets (eg. in renewable energy technologies and services).

6.1 Potential Barriers

EU suppliers have the potential to access many of these opportunities. However, competition will intensify, from stronger indigenous suppliers and other international competitors, notably the US, who will look to export markets as growth in the US market slows. Other potential barriers to EU eco-industry export growth include:

- client preferences for local/indigenous suppliers, language issues;
- limited company resources for export business development - costs, senior staff time etc.;
- lack of export market information and contacts;
- difficulties in identifying and establishing links with suitable local partners;
- limited available funding for many projects (including international development funds);
- difficulties in winning first projects in a country;
- difficulties in servicing projects over the longer term and maintaining a local presence in the market;
- currency fluctuations;
- payment delays or difficulties.

6.2 Overcoming Barriers

In the face of these types of barrier, EU suppliers will need to work hard to capitalise on future export opportunities and will need to:

- increase their understanding of the needs of export markets and specific contract opportunities;
- develop long-term relationships of mutual benefit with key clients and collaborators in export markets, and work closely with them;
- develop stronger networks and collaborations between different EU environmental exporters;
- involve themselves with developing indigenous industries in export markets rather than attempting to compete with them - establishing new trading partners in strategically important emerging markets, through joint ventures and strategic alliances;
- provide on-going local presence in overseas markets, supported by international service networks, rather than simply shipping equipment from Europe;
- provide high quality and cost competitive goods and services that meet client needs;

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- demonstrate to clients in export markets that they can deliver;
 - increasingly sell higher value activities such as design and service capabilities, as well as manufactured goods, which are cost-effective and help improve the competitiveness of their client's core business rather than just compliance;
 - strengthen links with financial institutions and potential funders in order to capitalise on the growing preferences for "build-own-operate-(transfer)" contracts (BOO and BOOT) in many areas (eg. waste management and wastewater treatment infrastructures) where Governments in export markets are unable to fund the substantial investments needed.

6.3 Export Support

To respond to these needs, there are obviously many actions that it is the responsibility of the individual companies to take. However, experience has shown that support initiatives from Member States, the EU, export promotion bodies and trade associations, can also provide companies with very valuable support in accessing export contracts. Annex 6 provides examples of organisations and programmes supporting EU eco-industry exports.

Successful export support initiatives (some specific to the environmental sector, others applicable to all sectors) include:

- helping companies identify and establish suitable local contacts / joint ventures / agents;
- subsidies to companies to develop presence in environmental export markets (eg. Asia Eco-Best) and business development funds (soft loans from government), for example, for tendering for environmental projects overseas;
- export credits schemes and other financing that helps insulate companies from overseas payment problems and raise venture capital;
- technology transfer programmes that publicise and endorse the capabilities and suitability of EU technologies & services;
- organising and sponsoring missions (inward and outward), attendance at eco-industry trade fairs;
- sponsoring environmental demonstration projects in export markets helps to raise the profile of EU suppliers and techniques;
- expert exchanges to help build networks of contacts between EU suppliers and clients / collaborators in export markets;
- development aid - which serves the mutual interests of environmental and economic improvement in developing countries, helps transfer know-how and technologies and helps to raise the profile of EU suppliers in export markets;
- providing EU suppliers with market information and contract leads;
- assistance and advice from commercial attaches on doing export business;

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- assistance in networking between EU suppliers for putting together collaborations and exchanging information.

6.4 *Is this support already available?*

To date, there have been a range of export initiatives provided in different EU Member States, different environmental sub-sectors, to different export markets and some EU-wide initiatives. These include support designed specifically for the eco-industries and general export support programmes open to all sectors.

Valuable lessons have been learned about what type of support works and what companies require. Generally, successful initiatives have been developed, however, scope exists for further improvement since:

- the coverage of export support initiatives has been 'patchy' in terms of priority markets targeted and types of support available;
- only a proportion of potential exporters are aware of the support available;
- lack of co-ordination between the providers of support (including Government, export support bodies and industry associations within individual EU Member States), hence an apparent need for better co-ordination of effort within Member States and across the EU;
- lack of co-ordination between support programmes across different EU Member States;
- scope for expanding EU-wide initiatives such as Asia-Ecobest to other priority markets (subject to recommendations from the detailed review of the effectiveness of RIET (the Regional Institute of Environmental Technology in Singapore) and the Asia-Ecobest programme).
- scope for strengthening the role of trade associations at the EU level in export support initiatives;
- support programmes have sometimes been too 'commercial', putting off potential clients in overseas markets with the 'hard-sell', whereas a softer approach combined with overseas development objectives of mutual benefit to the 'recipient' and 'donor' countries can be more effective in developing long-term trade relationships.

The current study provides insights into export support needs and existing support initiatives. A more in-depth strategic review is required to examine the effectiveness of EU eco-industry export support initiatives, and to provide an EU-wide strategy for the future. Participants in this review would include the European Commission, EU Member State governments, industry associations and export promotion bodies and other trade promotion bodies, taking into account, for example, their different objectives, availability of resources and interests in multi-lateral or EU-wide collaboration.

7. POLICY RECOMMENDATIONS

7.1 Policy Issues

Two main policy issues emerge in relation to promoting future EU eco-industry exports and associated employment.

7.1.1 Export Support Initiatives:

It is expected that the EU and other established 'western' environmental markets will see only moderate growth to 2010, and some areas may see reduced demand, for example, construction of wastewater treatment facilities. Over the same period, substantial market growth is forecast for emerging economies such as central and eastern Europe, South America, South East Asia and China. If EU suppliers are going to maintain revenue growth and employment, they will therefore have to capitalise on these extra-EU export opportunities. Export support initiatives may assist with this.

Is there a case for increasing EU export support to the EU environmental industry?

EU environmental suppliers report that the export support provided by Member States and the European Commission has been helpful in stimulating EU environmental exports and (perhaps unsurprisingly) would like further support.

However, according to the limited export data available, the EU environmental sector already appears to be doing well in export markets. EU environmental exports have grown significantly in the last ten years, at faster rates than other sectors. These export successes are being achieved by high quality, internationally competitive European companies. This might suggest that there is therefore little need for providing further export support since European companies are already able to capitalise on the export opportunities. The case *against* providing further support can also be strengthened by the apparently relatively small numbers of EU jobs created by environmental exports.

However, the case for further export support is strengthened by a number of arguments, including that:

- overseas environmental markets are forecast to increase significantly in the future, so future export support could help firms access larger markets;
- international competitors (notably the US) are increasing the level of export support provided to environmental suppliers; and
- support for EU environmental exports can also contribute to the achievement of other EU policy objectives such as environmental improvement and sustainable economic development in developing countries.

On balance, existing export support initiatives have contributed to EU export successes and could bring further benefits in the future, both in terms of supporting growth and employment in the European environmental sector and contributing to the achievement of other EU Commission objectives such as environmental improvement in developing countries, including in EU Accession States. Continuation or

expansion of the European Commission's and Member State support for environmental exporters is therefore recommended below.

7.1.2 Development Environmental Goods and Services:

To be in a position to capitalise on future international opportunities, EU suppliers will need to be able to develop and provide goods and services which correspond to future demands. These environmental goods and services will also be in demand in Europe and will contribute to industrial competitiveness and eco-efficiency in Europe as well as enabling EU environmental suppliers to compete in global markets.

7.2 Policy Recommendations

7.2.1 Promoting Future EU Environmental Exports:

The following actions are recommended to promote future EU eco-industry exports:

- **EU Member State initiatives to support environmental exports.** Export support initiatives provided by individual Member States could be continued or expanded (depending on what individual governments already provide) to help environmental suppliers understand export markets, identify and access export opportunities and develop suitable approaches for working in export markets, for example, developing joint ventures with indigenous suppliers. Potential initiatives include:
 - organising and sponsoring missions (inward and outward) and attendance at eco-industry trade fairs;
 - government supported expert exchanges to help build networks of contacts between EU suppliers and clients / collaborators in export markets;
 - sponsoring environmental demonstration projects in export markets to help to raise the profile of EU suppliers and techniques;
 - technology transfer programmes that publicise and endorse the capabilities and suitability of EU technologies & services for overseas markets;
 - export credits schemes and other project financing to help protect companies from overseas payment problems and raise venture capital;
 - financial assistance to environmental suppliers for overseas tendering;
 - providing EU suppliers with market information and contract leads;
 - assistance and advice from commercial attaches on doing export business;
 - the increased role of public / private partnerships in environmental investments, means that there is scope in assisting EU suppliers to establish links with financial institutions (public and private) to put these partnerships together and thereby enable suppliers to access large opportunities in emerging export markets which favour the use of public-private financing.
 - assistance in networking between EU suppliers for putting together collaborations and exchanging information.

There is a strong case for particularly focusing export support on markets in Central & Eastern Europe. This is because these markets are forecast to grow substantially over the next decade and are close enough to the EU to allow EU suppliers to export their goods and services from operations still based

within the EU; (exports further afield will increasingly require EU suppliers to establish production facilities, service centres and therefore employment outside the EU, involving a relatively small number of EU nationals compared to indigenous personnel for the labour intensive activities).

- **European Commission Export Promotion Programmes** – Consider expanding existing initiatives run by the European Commission to promote environmental exports (for example, Asia Eco-Best and RIET). These initiatives could be extended to cover other growth markets in regions such as Central & Eastern Europe and South America.
- **EU and EU Member State overseas development aid** – Use EU and national development aid to promote environmental and economic improvement in developing countries. An indirect benefit of this aid can be the stimulation of demand for environmental goods and services in these countries. Development aid programmes can specifically include activities involving European environmental suppliers such as transfer of know-how, assistance with strategies for environmental improvement and technologies. This is particularly relevant to EU funding for environmental improvement in Central and Eastern Europe.
- **Performance indicators** – Strengthen the performance indicators used to assess the impacts of EU and Member State environmental export support initiatives.
- **Examine the scope for increasing collaboration between Member States in Environmental Export Support Initiatives.** The potential synergies between the export promotion activities of bodies in different Member States and different parts of the eco-industry could increase the effectiveness of these activities if adequately co-ordinated. Examining the scope for increased multi-lateral collaboration between Member States in support initiatives could involve discussion between the European Commission, EU Member State governments, industry associations and export promotion bodies. At present it is uncertain whether industry or Member States would be enthusiastic about multi-lateral collaboration.
- **Data on the Environmental Industry Data** - Support the collation and improvement of data on the EU environmental industry, employment and export activity. This is required in order to obtain a more comprehensive picture of the extent, destination and growth trends in EU eco-industry exports and future sizes of EU environmental markets.

7.2.2 Promoting innovation in EU Environmental Goods and Services:

To be competitive in future global markets, EU suppliers will need to develop *new* goods and services which correspond to future demands, as well as supplying the proven, established products cost-effectively. Recommended initiatives to promote the development of these new environmental goods and services include:

- **Continue to prioritise EU R&D resources** towards supporting technologies and know-how for sustainable development, for example, EU programmes to develop information and communication

technologies for environmental applications, eco-efficient process control technologies and low cost water treatment technologies fully integrated into production processes.

- **Clean processes:** EU environmental policy to continue to promote the adoption of integrated process / clean technology and resources management as cost effective solutions to environmental problems in the EU. This will help to stimulate development of these techniques in the 'home' market, giving EU suppliers the expertise and products to compete successfully in export markets. This part of the environmental industry is still emerging and EU firms would benefit from EU support in order to stay ahead of international competitors (notably the US).
- **Increased collaboration between environmental suppliers and end-users** to stimulate the development of clean technology and help ensure that EU suppliers can provide the techniques required by industry and regulators. The European Commission could play a facilitating role in strengthening the links between the environmental supply- and demand-side.
- **Performance standards.** The European Commission and Member States to encourage the development of standards (technology accreditation schemes) for environmental goods and services. These standards would help to promote the quality of EU goods and services and increase overseas clients' 'faith' in them.

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