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ANNEX 1. ESTIMATES OF WORLD ECO-INDUSTRY MARKETS

ANNEX 1.1 Global Environmental Markets, 1998

International market size estimates in Table A1.1 are based on data from JEMU "Global Environmental Markets: An Update" 1997 and EBI 1997 in COM/TD/ENV(98)37. The current estimated global market for environmental goods and services (including resource management activities is 330 billion EURO. Table A1.2 shows the geographic distribution.

Table A1.1: Global Market for Environmental Goods and Services, 1998: Note 1

	Billion EURO: Note 2	EBI 1997 billion EURO Note 3	% of total:
Equipment:	79	99	24%
water equipment & chemicals	28	36	8%
air pollution control equipment	22	28	7%
instruments & information	4	5	1%
Waste management	23	29	7%
process/prevention technology	2	2	1%
Services:	172	208	52%
solid waste management	75	93	23%
hazardous waste management	12	15	4%
consulting & engineering	20	24	6%
remediation & industrial	11	14	3%
analytical services	2	3	1%
water treatment services	52	59	16%
Resource Management:	79	105	24%
water utilities	53	67	16%
resource recovery	22	34	7%
environmental energy	4	4	1%
Total:	330	412	100%

Note 1: This analysis uses the classification of the eco-industry contained in "The Environment Industry Manual", OECD/Eurostat, Nov 1998.

Note 2: Based on global market estimates contained in the report "Global Environmental Markets: An Update", JEMU 1997.

Note 3: from "The US Environmental Industry", EBI, 1997.

ANNEX 1.2 Global Market Forecasts, to 2010

Table A1.2 shows forecast environmental market sizes to 2010.

Table A1.2: Forecast Global Environmental Markets and EU Eco-Industry Exports to 2010

	1998	2010	
	Market Size Billion EURO	Market Size Billion EURO	Estimated Annual % growth rate 1998 to 2010
North America	132	149	1%
EU 15	104	118	1%
Japan	62	69	1%
China	4	17	12%
India	1	2	6%
SE Asia	9	43	14%
S America	4	13	9%
CEE	4	12	10%
Australia / NZ	4	5	1%
Middle East	2	6	8%
Africa	2	5	6%
Total =	330	439	2%

Source of growth forecasts = update of data contained in the JEMU report, 1997 and the EBI estimates, 1997.

ANNEX 2. DATA ON THE EU ECO-INDUSTRY

ANNEX 2.1 Turnover in the EU Eco-Industries

The current study uses an estimate of **110 billion EURO** for turnover in the EU eco-industries.

A degree of uncertainty exists over the current scale of turnover in the EU eco-industry. This is because of relatively limited available market data (in terms of geographic coverage and time series) and possible differences in the bases used by different Member States for recording environmental spending (eg. in relation to non-transacted 'expenditure').

Three sources are used (noted below) which range between 106 B EURO and 133 B EURO, combined with ECOTEC's judgement and opinions of a number of European environmental suppliers.

Source 1: An indication of the size of the sector's turnover can be obtained from data on EU environmental expenditure. Table A2.1 shows the percentage of GDP represented by environmental spend in 1994, taken from the 1997 JEMU report (Global Environmental Markets: An Update). These percentages are based on the 1997 DGXI/ Eurostat report. If these percentages are applied to 1998 GDP figures, this generates an estimated total EU environmental expenditure of **105.9 billion EURO** for 1998. (Note: 1995 EU15 GDP = 6445 B euro, 1998 EU15 GDP = 7493 b euro; annual growth rate 1994 to 1998 of 4.85%).

Table A2.1: Estimated EU Environmental Expenditure based on percentages of GDP

EU Member State:	Estimated env'l spend as a % of GDP in 1994 (per Eurostat & JEMU 1997)	1998 GDP billion EURO	Calculated Env'l Expenditure: 1998 GDP x 1994 % of GDP relating to env'l expenditure:
Bel	0.8%	222	1.8
Den	1.1%	156	1.7
Ger	2.0%	1911	38.2
Gr	0.3%	106	0.3
Sp	0.7%	496	3.5
Fr	1.5%	1281	19.2
Ire	1.1%	73	0.8
It	1.0%	1045	10.5
Lux	0.8%	15	0.1
Neth	2.3%	337	7.8
Aust	2.3%	189	4.3
Port	1.0%	94	0.9
Fin	1.1%	113	1.2
Swed	1.5%	204	3.1
UK	1.0%	1251	12.5
Total		7493	105.9

Source 2: The OECD report "Assessing Barriers to Trade in Services: Environmental Services" (December 1998) includes global environmental market data calculated by Environmental Business International (US) on the basis of environmental spend as a percentage of GDP. This report estimated 1996 EU environmental

market size for equipment, services and resource management at \$133.5 B (= 121 billion EURO using an exchange rate of 1 EURO = \$1.1). Extrapolated to 1998 assuming annual growth of 4.85% (average GDP growth rate 1994 to 1998 gives a total of **133 billion EURO** for 1998.

Source 3: The DGXI / Eurostat report “An estimate of eco-industries in the EU 1994” published in March 1997 shows an estimate of 90 billion ecus for 1994 EU environmental expenditure. This is based on a combination of survey data and market size estimates using percentage of GDP represented by environmental spend. This study did not include categories of renewable energy and waste recycling. If these categories are added (based on data from EBI, 1997) and updated from 1994 to 1998, this gives an estimated EU market value of **117 billion EURO** by 1998 - see sequence of calculations below:

Step 1: Estimate of eco-industries turnover in 1994 = 90 billion ecu. (1997 DGXI / Eurostat report)

Step 2: Plus, 8 billion EURO for resource management activities not included in the DGXI 1997 estimate (but included in the EBI data for 1996 - see Source 3).

Step 3: Extrapolated from 1994 to 1998, at annual growth rates of 4.85% (as in Source 2), gives a 1998 estimate of 117 billion EURO.

Conclusion:

As already noted, there is relatively limited data available on the size of EU environmental markets, and also, possible differences exist in the bases used by different Member States for recording environmental spending. This means that the EU market size and eco-industry revenue figures have to be based on best estimates using available data and opinion.

In view of the data sources described above, ECOTEC's judgement, combined with the opinion of a number of European environmental suppliers, we conclude that **110 billion EURO** is a reasonable estimate (verging on the low end) of the 1998 EU market for environmental goods and services, assuming that the definition also includes renewable energy and waste recycling activities.

ANNEX 2.2 Services Capex Split of Turnover in the EU Eco-Industry

The split by services and capital (equipment and construction expenditure) per Figure 4.1 of the main report is based on the breakdown of the EU eco-industry turnover shown in Table A2.3.

Table A2.3: Breakdown of EU Eco-Industry Turnover by Sub-Sector and Services / Capex Split

	(A)	(B)	(C)	(D)	(E)	
Environmental Sub-Sector:	Sub-Sector Breakdown of EU sector value	Capex: % of sub-sector turnover	Services: % of sub-sector turnover	Capex B EURO	Services B EURO	Total B EURO
Wastewater Treatment	39%	50%	50%	21.5	21.5	42.9
Waste Management	40%	20%	80%	8.8	35.2	44
Air Pollution Control	7%	47%	53%	3.6	4.1	7.7
Land Remediation	3%	20%	80%	0.7	2.6	3.3
Env'l Monitoring & Instrumentation	2%	40%	60%	0.9	1.3	2.2
Env'l Services	7%	0	100%	0	7.7	7.7
Energy Management	1%	70%	30%	0.8	0.3	1.1
Other	1%	50%	50%	0.6	0.6	1.1
	100%					110

Note: The sub-sector split in column A and split between services and capex (Columns B and C) is based on the analysis in the 1997 DGXI / Eurostat report combined with information contained in EBI 1997. Column totals are subject to rounding.

ANNEX 3. ECO-INDUSTRY TRADE / EXPORT DATA

Three types of data have been used in this study to generate information on EU eco-industry exports: survey data of environmental exports in individual EU Member States; EU trade data provided by Eurostat covering a range of environmental goods; and a separate survey of EU environmental suppliers undertaken by ECOTEC specifically for the purposes of the study. A comparison of the data sets helps check their reliability.

Analysis of this data indicates that up to 8% (approximately 8.5 billion EURO) of the EU environmental industry's revenue is generated from exports to markets *outside* the EU. Approximately 15% of the revenue relates to intra-EU trade, ie. exports to other EU Member States.

ANNEX 3.1 Member State Studies of Eco-Industry Exports

Recent surveys of environmental exports in the Netherlands and France were available for examination in the current study. In addition, discussions on exports were held with eco-industry trade bodies in other Member States.

ANNEX 3.1.1 The VLM study of Eco-Industry Exports from the Netherlands, 1998

The Dutch environmental trade association VLM, undertook a survey of its members during 1998 to provide a range of information including export activity. The survey results are based upon findings from 108 companies.

Extent of Exports: The survey found that 10% of Dutch environmental services and 45% of equipment is exported outside the Netherlands. It also found that 44% of total environmental exports go outside the EU. This indicates that ~20% of equipment sales are exported, and ~4.4% of services are exported - see Table A3.1.

Table A3.1: Calculations used to identify scale of Exports from the Netherlands

	A	B	C = A x B
	% exported from Netherlands (ie. intra and extra EU) (VLM study 1998)	Estimated % of total exports that go outside the EU ² (VLM study 1998)	Estimated % of sales exported outside the EU
Services	10%	44%	4.4%
Equipment	45%	44%	19.8%
Total	-	-	

Combining this data with available data on the structure of the Netherlands' environmental sector indicates that extra-EU exports from the Netherlands represent approximately 11% of total environmental revenue (see Table A3.2)

Table A3.2: Calculations used to identify scale of Exports from the Netherlands

	A	B	C = A x B	D	E = C x D
	Value of Netherlands Eco-Industry ¹	% exported from Netherlands (ie. Intra and extra EU) (VLM study 1998)	Total exports as a % of value of Neth's eco-industry	Estimated % of total exports that go outside the EU ²	Extra-EU exports as a % of the value of Neth's eco-industry
Services	60%	10%	6%	44%	3%
Equipment	40%	45%	18%	44%	8%
Total	100%	-	-	-	11%

Note 1: Split of Netherlands eco-industries into services and equipment as identified in the 1997 Eurostat / DGXI study "An Estimate of EU Eco-Industries".

Note 2: VLM data - see Table A3.3 below for destination of exports.

Table A3.3: Distribution of Environmental Exports from Netherlands - as identified in the VLM survey (% of total exports)

	Wastewater Treatment	Air Pollution Control	Waste Management	Whole Environmental Sector
Intra-EU exports	48%	54%	54%	51%
Eastern Europe	7%	33%	4%	9%
North America	9%	0%	18%	10%
South America	5%	3%	0%	4%
Asia	12%	1%	1%	8%
Others regions	8%	7%	15%	10%
Not specified	10%	2%	9%	9%
Total	100%	100%	100%	100%
Total extra-EU ¹ (% of all exports)	46%	45%	39%	44%

Source: VLM survey, 1998

Note 1: Where export destination is 'Not specified', these are allocated to intra-EU and extra-EU sub-totals in proportion to their sub-totals.

Export Growth: The VLM study also indicates that Dutch environmental exports grew by 11% in 1997, whilst the sector as a whole in the Netherlands grew by 8%. Surveyed suppliers predicted that exports will have increased by 16% during 1998 and the sector as a whole would grow by 10% in 1998.

Table A3.4 shows reported growth during 1997 of different sub-sectors in the Netherlands & exports.

Table A3.4: Growth in Netherlands eco-industries and exports during 1997 (%)

Sub-sector:	Wastewater	Air Pollution Control	Waste	Whole
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	Treatment		Management	Environmental Sector
Growth of sub-sector in the Netherlands	14%	14.5%	10%	8%
Growth of exports from the Netherlands	4%	46%	14%	11%

Source: VLM survey, 1998

The higher growth in the air pollution sector appears to be due to growth in the exports, in particular to Eastern Europe. The other most important destinations for the APC sector in the Netherlands was Western Europe.

Employment: The study does not provide any information on employment specifically relating to exports. However, it does show that during 1997, employment in the manufacture of environmental goods grew by 10.5% (18% expected by suppliers for 1998); and that employment in environmental services grew by 7% (5% expected for 1998). Companies specialising in international trade (export and import of environmental equipment and technologies) grew by 7.5% in 1997 (and expected to grow by 19% in 1998).

The study shows that employment growth in the environmental sector has more or less followed the pattern of output growth.

VLM concludes that after many years of high growth rates in the services sector (eg. environmental advice), mainstream companies are now following the advice they were given and “are buying the environmental equipment”.

ANNEX 3.1.2 Study of the French Eco-Industry by the French Ministry of Economy, Finance and Industry

In 1999, the French Ministry of Economy, Finance and Industry published the findings of a study of the French eco-industry, including exports and employment in 1997.

The study found that the eco-activities in France (pollution control, recycling, energy, and R&D) are undertaken by ~1260 environmental suppliers, with a turnover of 5,936 million EURO, directly employing ~35,000 personnel.

Exports: Export from the eco-activities were valued at 1,351 million EURO (23% of total). 74% of these exports went to EU countries (17% of the total sector revenue), and 26% of exports went outside the EU (6% of the total sector revenue).

Export related Employment: The 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 study does not distinguish between the employment effects of equipment and service exports, nor according to factors such as destination of exports).

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 to

1.5% and 3% of eco-industry employment in the EU.

ANNEX 3.1.3 Information on Exports from Other EU Member States

Very little information on eco-industry exports exists in other Member States. Eco-industry trade associations such as Sercobe in Spain and AIMA in Italy were able to give estimates of the destination of exports (see Table A3.5), but were not able to provide more detailed information on what was exported to where.

Table A3.5: Distribution of Eco-Industry Exports - Netherlands, Italy, Spain (%)

	Neth VLM Note 1	Italy AIMA Note 2	Spain Sercobe Note 3
Western Europe (non-EU)	5	5	3
Central & Eastern Europe	26	15	13
N America	21	20	15
S America	9	30	32
SE Asia	12	20	12
Other Asia (incl. India and China)	7	5	9
Middle East / Africa	-	5	6
Other	20	-	10
Total	100	100	100

Note 1: VLM study 1998, described above.

Note 2: AIMA estimates, 1999 (correspondence with ECOTEC)

Note 3: Sercobe estimates, 1999 (correspondence with ECOTEC)

ANNEX 3.2 Analysis of Trade Data provided by Eurostat

The official trade statistics, in value and in volume, contain data on the export of a large number of distinct products, each with its own “trade code”. We have used these export data from EUROSTAT, for EU-15 and for the period 1988- 1997. Such time series, or data for consecutive years, allow an analysis of developments and trends in the past, giving information on expected trends in the future.

To guide data collection and research into exports from eco-industries, the OECD and EUROSTAT have set up a technical working group that has produced a definition of the sector, and two lists for export analysis: a longer and a shorter one.

The short list (see Table A3.6) gives trade codes or positions referring to products which are specific or typical for eco-industries, eg. waste incinerators. This list of products which are specific to eco-industries is limited to around 15-20 trade positions or codes. The data in each of these positions can be used to analyse the evolution or trend in exports from eco-industries. Using this limited number of trade codes gives us insights into trends over time such as overall increases or decreases.

A much longer list (see Table A3.7) was prepared by the OECD working group and shows all trade codes or positions which contain products produced by eco-industries, but also those produced/exported by non-eco industries. An example of such a trade position or code is “pipes and tubes”. Pipes and tubes can and are exported by water treatment companies (selling water treatment plants), but they can and are also produced by non eco-industries, for use of non-environmental purposes. Environmental services are not included in the official trade statistics - only products.

Methodology used:

Analysing trends in export of eco-industries, using official trade data leads necessarily to a choice. If we want a complete coverage of all products and services exported by eco-industries, this leads to uncertainties in the analysis because environmental and non-environmental goods are mixed together in many of the trade codes/ categories. The list of products is then long but the data on the exports of these goods include products that are not manufactured by eco-industries.

If we select only those trade positions in which environmental goods can be identified as such, we have a much smaller number of trade positions (and smaller coverage) but the figures we use are precise.

If we use the export figures in trade positions of the longer list, we have an over -estimation of the exports by eco-industries, and in the second case we have an under-estimation of the exports from eco-industries.

We have therefore chosen the more precise but lower estimates approach so that we can rely on the trends that are revealed from the analysis of the time series. The trend in these exports can then be used to estimate the growth in employment generated by these exports.

Export trends were analysed for the last 10 years (1988-1997). Only those trade codes/ product groups have been used for which statistics are available for the whole period of ten years (1988-1997). A minor adaptation had to be made for two trade codes for which we did not have the first year and for two other trade codes a few

for which we had no values for the last 2 years, due to changes in the trade codes.¹ For the missing values we have used the preceding or following value, assuming no change in value in those years. This adaptation was minor as the value of exports in these few codes is minimal compared to the value of all the trade codes we have considered taken together for the 10 years.

We have also analysed the exports in trade codes from a somewhat longer list so that we could compare the trend in the short list of eco-industries exports with trends of other, related (and or broader) product groups. We have included the most significant results in this note but a thorough analysis was made of all these positions, looking at exports outside the EU, exports in the EU and total exports (all graphs available for consultation).

Trade codes 84178010 and 84178090 and 84213999 and 84213955 respectively.

Table A3.6: Shorter List of Trade Codes Analysed for Exports

Selected products produced by environmental industries, and the corresponding trade codes, used in the analysis of trends in exports (The 'ECOTEC' list):

SUBSECTOR	PRODUCT CATEGORY	TRADE CODE
Air Pollution Control	Machinery and apparatus for filtering and purifying air.	8421.39-30
	Machinery and apparatus for filtering and purifying gases (excl air) by a liquid process.	8421.39-51
	Machinery and apparatus for filtering and purifying gases (excl air) by an electrostatic process	8421.39-55
	Machinery and apparatus for filtering and purifying gases (excl air) by a catalytic process	8421.39-71
	Machinery and apparatus for filtering and purifying gases (excl air) (by other processes) (excl 8421 39-51 to 75)	8421.39-99
Water Pollution Control	Machinery and apparatus for filtering and purifying other liquids	8421.29-90
	Activated carbon	3802.10-00
	Centrifugal Pumps - submersible, single stage	8413.70-21
'Waste Disposal	Furnaces and ovens for the incineration of rubbish (non electric)	8417.80-10
	Parts of industrial laboratory furnaces and ovens	8417.90-00
Monitoring Equipment	Instrumentation for measuring and analysing liquids	9026.80-91 9026.80-99
	Gas or smoke analysis apparatus (electronic)	9027.10-10
	Gas or smoke analysis apparatus (non-electronic)	9027.10-90
	Parts of machinery for filtering and purifying gases and liquids	8421.99-00
Other Environmental Equipment	Other industrial and laboratory furnaces, (non-electric)	8417.80-90

Source : An Estimate of Eco-industries in the European Union 1994. By ECOTEC for DG XI and EUROSTAT.

Table A3.7: Longer List of Trade Codes Used for Export Trend Analysis

Air pollution control:

842139	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES (EXCL. ISOTOPE SEPARATORS AND INTAKE AIR FILTERS FOR INTERNAL COMBUSTION ENGINES)
84213930	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES (EXCL. SUCH ARTICLES FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10, ISOTOPE SEPARATORS AND INTAKE AIR FILTERS FOR INTERNAL COMBUSTION ENGINES)
84213951	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES OTHER THAN AIR, BY A LIQUID PROCESS (EXCL. SUCH ARTICLES FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10 AND ISOTOPE SEPARATORS)
84213955	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES OTHER THAN AIR, BY AN ELECTROSTATIC PROCESS (EXCL. SUCH ARTICLES FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10 AND ISOTOPE SEPARATORS)
84213971	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES OTHER THAN AIR, BY A CATALYTIC PROCESS (EXCL. SUCH ARTICLES FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10 AND ISOTOPE SEPARATORS)
84213999	MACHINERY AND APPARATUS FOR FILTERING AND PURIFYING GASES OTHER THAN AIR (EXCL. THOSE WHICH OPERATE USING A LIQUID, ELECTROSTATIC, CATALYTIC OR THERMIC PROCESS, MACHINERY AND APPARATUS FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10 AND ISOTOPE SEPARATORS)
84213975	MACHINERY AND APPARATUS FOR FILTERING AND PURIFYING GASES OTHER THAN AIR, BY A THERMIC PROCESS (EXCL. SUCH ARTICLES FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.39-10 AND ISOTOPE SEPARATORS)

Water treatment:

842121	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING WATER
84212190	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING WATER (EXCL. THAT FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.21-10)
84212990	MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING LIQUIDS (EXCL. SUCH MACHINERY AND APPARATUS FOR CIVIL AIRCRAFT OF SUBHEADING NO 8421.29-10 AND FOR WATER AND BEVERAGES, OIL OR PETROL-FILTERS FOR INTERNAL COMBUSTION ENGINES AND ARTIFICIAL KIDNEYS)
380210	ACTIVATED CARBON (EXCL. MEDICAMENTS OR DEODORANT PRODUCTS FOR FRIDGES, VEHICLES ETC., PUT UP FOR RETAIL SALE)
8413	PUMPS FOR LIQUIDS, WHETHER OR NOT FITTED WITH A MEASURING DEVICE (EXCL. CERAMIC PUMPS AND SECRETION ASPIRATING PUMPS FOR MEDICAL USE AND MEDICAL PUMPS CARRIED ON OR IMPLANTED IN THE BODY); LIQUID ELEVATORS (EXCL. PUMPS)

84137021	CENTRIFUGAL SUBMERSIBLE PUMPS, SINGLE-STAGE
681130	TUBES, PIPES AND TUBE OR PIPE FITTINGS OF ASBESTOS-CEMENT, CELLULOSE FIBRE-CEMENT
7303	TUBES, PIPES AND HOLLOW PROFILES, OF CAST IRON
73030010	TUBES AND PIPES OF A KIND USED IN PRESSURE SYSTEMS, OF CAST IRON
73030090	TUBES, PIPES AND HOLLOW PROFILES, OF CAST IRON (EXCL. PRODUCTS OF A KIND USED IN PRESSURE SYSTEMS)
681011	BUILDING BLOCKS AND BRICKS OF CEMENT, CONCRETE OR ARTIFICIAL STONE, WHETHER OR NOT REINFORCED
681020	PIPES OF CEMENT, CONCRETE OR ARTIFICIAL STONE, WHETHER OR NOT REINFORCED
681091	PREFABRICATED STRUCTURAL COMPONENTS FOR BUILDING OR CIVIL ENGINEERING OF CEMENT, CONCRETE OR ARTIFICIAL STONE, WHETHER OR NOT REINFORCED

Air and water treatment:

842199	PARTS OF MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING LIQUIDS OR GASES N.E.S.
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Waste:

84178010	FURNACES AND OVENS FOR THE INCINERATION OR RUBBISH, NON-ELECTRIC
84178090	INDUSTRIAL OR LABORATORY FURNACES, INCLUDING INCINERATORS, (NON-ELECTRIC), (EXCL. 8417.10-00 TO 8417.80-10)
841790	PARTS OF INDUSTRIAL OR LABORATORY FURNACES, NON-ELECTRIC, INCL. INCINERATORS, N.E.S.

Monitoring equipment for liquids and gases:

9026	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE FLOW, LEVEL, PRESSURE OR OTHER VARIABLES OF LIQUIDS OR GASES, E.G. FLOW METERS, LEVEL GAUGES, MANOMETERS, HEAT METERS (EXCL. INSTRUMENTS AND APPARATUS OF HEADINGS 9014, 9015, 9028 OR 9032)
902680	INSTRUMENTS OR APPARATUS FOR MEASURING OR CHECKING VARIABLES OF LIQUIDS OR GASES, N.E.S.
90268091	ELECTRONIC INSTRUMENTS OR APPARATUS FOR MEASURING OR CHECKING VARIABLES OF LIQUIDS OR GASES, N.E.S.
90268099	INSTRUMENTS OR APPARATUS FOR MEASURING OR CHECKING VARIABLES OF LIQUIDS OR GASES, N.E.S. (EXCL. ELECTRONIC)

902620	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE PRESSURE OF LIQUIDS OR GASES (EXCL. REGULATORS)
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Monitoring equipment for liquids and gases:

902610	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE FLOW OR LEVEL OF LIQUIDS (EXCL. METERS AND REGULATORS)
90261051	ELECTRONIC FLOW METERS FOR LIQUIDS (EXCL. FOR CIVIL AIRCRAFT, METERS AND REGULATORS)
90261059	ELECTRONIC INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE FLOW OR LEVEL OF LIQUIDS (EXCL. FOR CIVIL AIRCRAFT, FLOW METERS, METERS AND REGULATORS)

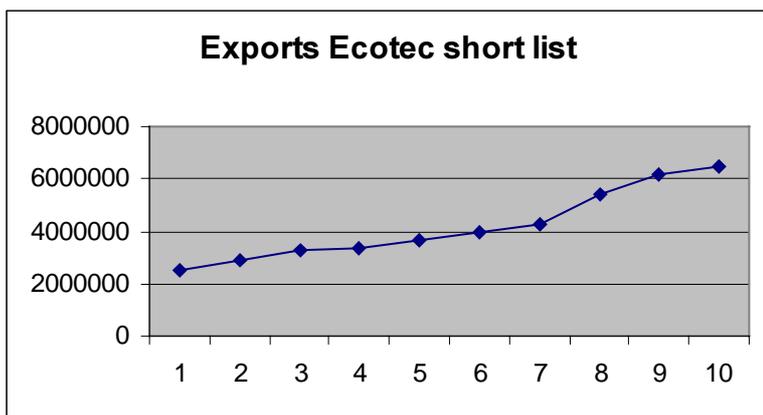
Monitoring equipment for gas or smoke

90271010	ELECTRONIC GAS OR SMOKE ANALYSIS APPARATUS
90271090	GAS OR SMOKE ANALYSIS APPARATUS (EXCL. ELECTRONIC)

ANNEX 3.2.1 Results of Trade Data Analysis:

The following Figures show trends in EU exports of products typical of eco-industries (the shorter ECOTEC list). All trade positions show a steady growth - a overall increase of 154% over 10 years, that is if the first year is set at a value of 100, the last year is at 254, and average of 10% growth per year.

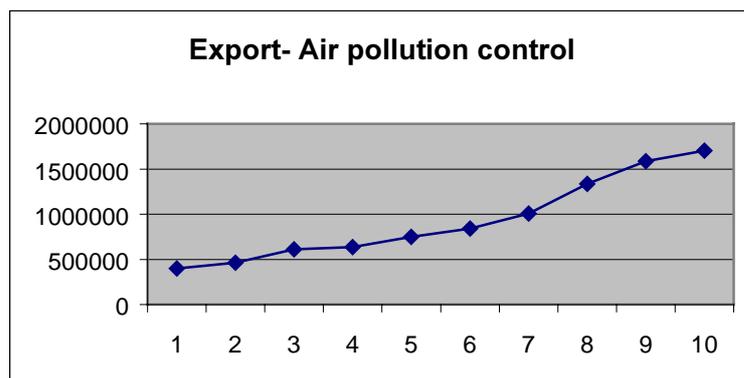
Figure A3.1: EU Environmental Exports 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1998- 1997;
Y- Axis: Value of merchandise, X 1000 ECU
Value of first year: 2550 MECUs, value of last year: 6478 MECUs.
Table A3.8 shows the data used.

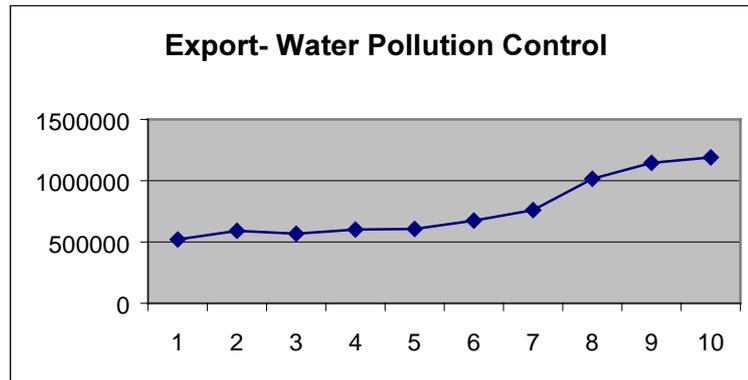
Looking at different environmental sub-sectors we see that the air pollution control sector is growing the fastest: 327% in 10 years, followed by water (128%), waste (122%) and the other monitoring equipment (107-128%). See Figures A3.2 to A3.5.

Figure A3.2: EU Exports of Air Pollution Equipment 1988 to 1997 ('000 ecu)



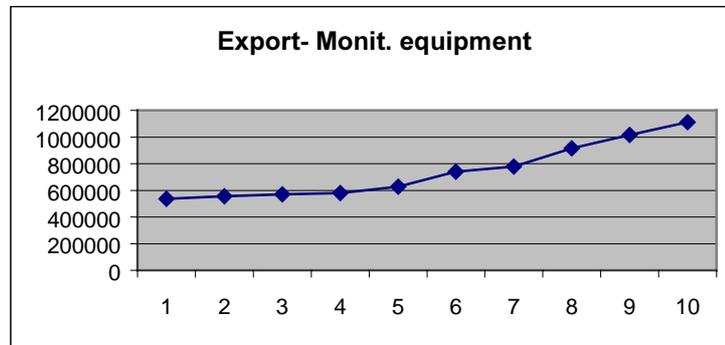
Note: X- Axis: Years: 1998- 1997; Y- Axis: Value of exports ('000 ECU)

Figure A3.3: EU Exports of Water Pollution Equipment 1988 to 1997 ('000 ecu)



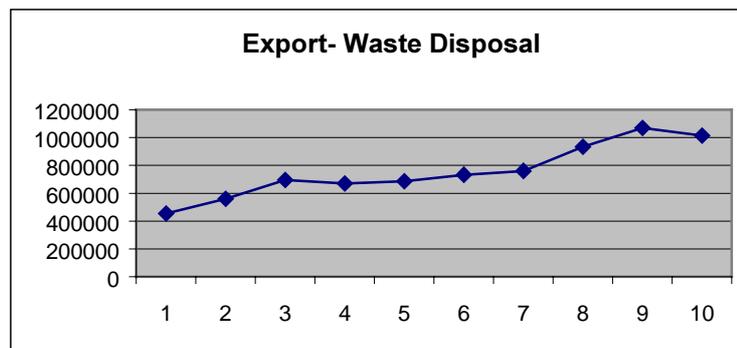
Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

Figure A3.4: EU Exports of Environmental Monitoring Equipment 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

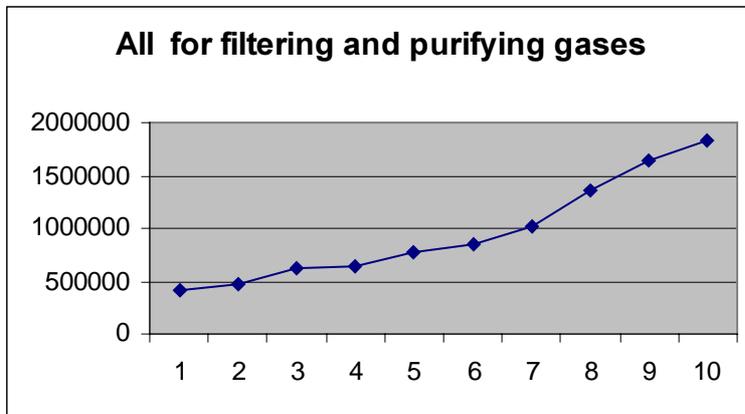
Figure A3.5: EU Exports of Waste Disposal Equipment 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

Examining the air pollution sub-sector, we see that growth in a broader group products, “all equipment used for filtering and purifying gases”, trade code 842139, shows a similar but somewhat higher growth rate (346% instead of 327%) caused by higher growth in the last two years.

Figure A3.6: EU Exports of Air Filtration Equipment 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1998- 1997; Y- Axis: Value of exports ('000 ECU)

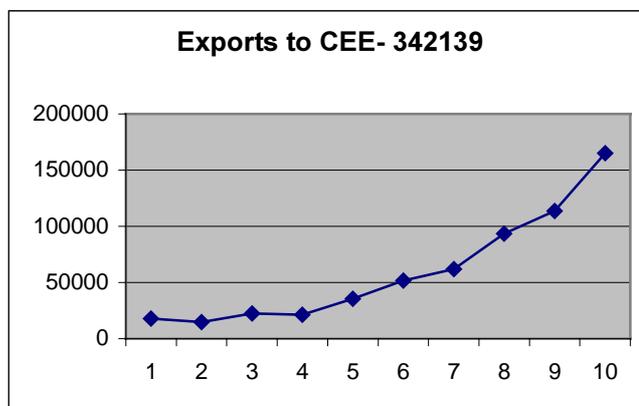
For the water sector, a broader category of products was examined, “all equipment for purifying and filtering water”, trade code 842121. This shows similar growth rates as for the specific eco-industries products (growth of 144% in 10 years, as compared to 128% in more specific trade codes).

Destination of EU Eco-Industry Exports:

As the air pollution control sector has seen a strong growth in exports, we want to know which markets have grown the most. Looking at “all equipment for filtering and purifying gases other than air”, code 842139), we see the largest increase in exports inside the EU (433 % growth) while to non-EU countries the growth has been 256% in the last 10 years.

Looking at exports to non-EU countries, still in the same trade code as above, there is clear evidence that exports to Central and Eastern Europe have seen the largest growth: 828% in ten years.

Figure A3.7: EU Environmental Exports to CEE 1988 to 1997 ('000 ecu)

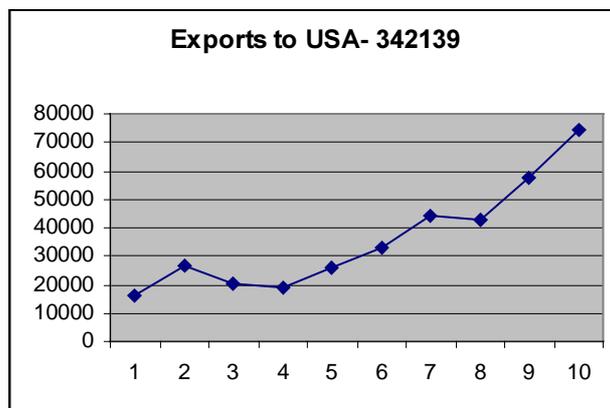


Note: X- Axis: Years: 1998- 1997; Y- Axis: Value of exports ('000 ECU)

Also the exports to other parts of the world, in this category, have shown large increases but the trend has

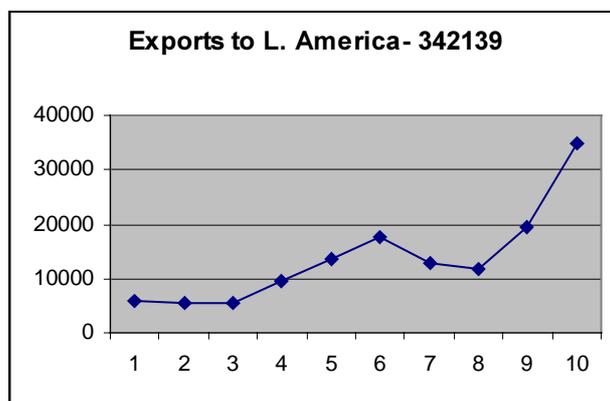
been less constant upward as for Central and Eastern Europe. See Figures A3.8 to A3.10.

Figure A3.8: EU Environmental Exports to USA 1988 to 1997 ('000 ecu)



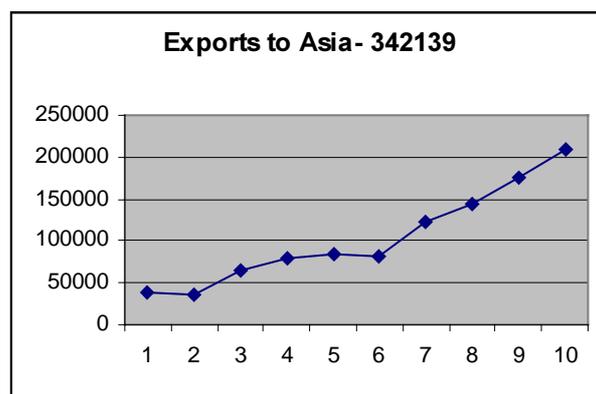
Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

Figure A3.9: EU Environmental Exports to Latin America 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

Figure A3.10: EU Environmental Exports to Asia 1988 to 1997 ('000 ecu)



Note: X- Axis: Years: 1988- 1997; Y- Axis: Value of exports ('000 ECU)

Table A3.8: EUROSTAT DATA USED IN ANALYSIS - ECOTEC SHORT LIST

TOTAL EXPORTS FROM EU, to EU-15 and to the rest of the world, in value (x 1000 ECU)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
AIR POLLUTION CONTROL										
84213930 machinery and apparatus for filtering or purifying gases (excl. such articles for civil aircraft of subheading no 8421.39-10, isotope separators and intake air filters for internal combustion engines)	208040	246644	307011	306795	302149	305423	335294	452064	522416	573603
84213951 Machinery and apparatus for filtering or purifying gases other than air, by a liquid process (excl. such articles for civil aircraft of subheading no 8421.39-10 and isotope separators)	13493	12423	18097	25980	19620	36066	31481	26922	29795	81352
84213955 machinery and apparatus for filtering or purifying gases other than air, by an electrostatic process (excl. such articles for civil aircraft of subheading no 8421.39-10 and isotope separators)	10679	6514	12023	15730	12090	12857	10265	20731	-	-
84213971 machinery and apparatus for filtering or purifying gases other than air, by a catalytic process (excl. such articles for civil aircraft of subheading no 8421.39-10 and isotope separators)	72796	83901	127905	137010	250296	334328	400878	567127	745449	758569
84213999 machinery and apparatus for filtering and purifying gases other than air (excl. those which operate using a liquid, electrostatic, catalytic or thermic process, machinery and apparatus for civil aircraft of subheading no 8421.39-10 and isotope separators)	93226	113751	144585	150477	166246	152032	230750	268910	-	-
TOTAL AIR growth in %	398234 327.68	463233	609620	635991	750400	840706	1008667	1335753	1587301	1703164

WATER POLLUTION CONTROL

84212990 machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for civil aircraft of subheading no 8421.29-10 and for water and beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	332381	380943	415598	440152	437272	511704	565581	652990	721039	730182
380210 activated carbon (excl. medicaments or deodorant products for fridges, vehicles etc., put up for retail sale)	90015	97445	40836	41987	45436	39551	40511	66655	75015	86864
84137021 submersible pumps, single-stage	98666	113860	111918	118749	123846	123457	154976	295528	350108	372031
TOTAL WATER POLLUTION CONTROL	521062	592248	568352	600889	606554	674713	761069	1015173	1146161	1189078
growth in %	128.20									

WASTE TREATMENT

84178010 furnaces and ovens for the incineration or rubbish, non- electric	-	17735	27462	9793	10046	8965	10664	18104	21629	11244
84178090 industrial or laboratory furnaces, including incinerators, (non- electric), (excl. 8417.10-00 to 8417.80-10)	-	129305	139243	159717	196402	213847	230355	256182	282291	256530
841790 parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	308940	413300	528752	502504	481625	510715	520714	659015	766172	746144
TOTAL WASTE	455980	560340	695457	672014	688073	733526	761733	933301	1070092	1013918
growth in %	122.36									

MONITORING EQUIPMENT

90268091 electronic instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	148515	168293	152501	138865	123303	149442	162485	236963	297135	312809
90268099 instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s. (excl. electronic)	142671	136314	134983	130504	135850	140703	150740	174959	199953	229517
90271010 electronic gas or smoke analysis apparatus	117387	136779	161384	176235	179229	222697	237616	266099	299543	328505
90271090 gas or smoke analysis apparatus (excl. electronic)	127286	114211	120398	135023	189639	227779	228735	236621	218682	240937
TOTAL MONITORING EQUIPMENT	535860	555597	569266	580628	628022	740621	779576	914642	1015313	1111768
growth in %	107.47									

OTHER ENVIRONMENTAL EQUIPMENT

842199 parts of machinery and apparatus for filtering or purifying liquids or gases n.e.s.	638901	717988	829332	884950	951270	943003	918936	1196753	1354168	1460304
growth in %		128.56								

TOTAL LIST ABOVE (ECOTEC LIST) note: for trade codes 84178010 and 84178090 in year 1, the value of year 2 was used, for trade codes 84213999 and 84213955 in years 9 and 10, the value of year 8 was used	2550037	2889406	3272027	3374472	3624319	3932569	4229982	5395621	6173035	6478232
growth in %		154.04								

Introducing new code

84213998 machinery and apparatus for filtering and purifying gases other than air (excl. those which operate using a liquid or catalytic process, machinery and apparatus for civil aircraft of subheading no 8421.39-10, and isotope separators)	0	0	0	0	0	0	0	0	342991	405169
TOTAL air with new code note: total includes new trade code 842139.98 for last two years, substituting 842139.55 and 842139.99	294329	342968	453013	469785	572064	675817	767652	1046112	1640651	1818692
growth in %		517.91								

TOTAL LIST ABOVE (ECOTEC LIST) WITH NEW TRADE CODE note: total includes new trade code 842139.98 for last two years, substituting 842139.55 and 842139.99. total equals sub-totals for water, waste, monitoring equipment, other mon. equipment and sub-total for air, including new code.	2446132	2769141	3115419	3208265	3445983	3767680	3988967	5105980	6226385	6593760
growth in %		169.56								

For comparison with broader trade codes

842139 machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	408189	476813	617453	648598	766656	851725	1023394	1350565	1643089	1822356
growth in %		346.45								
842121 machinery and apparatus for filtering or purifying water	419365	478124	533987	507671	587012	616006	689674	849310	906737	1027266

growth in % 144.96

Destinations of exports of broader category of air pollution control equipment

842139 MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING GASES (EXCL. ISOTOPE SEPARATORS AND INTAKE AIR FILTERS FOR INTERNAL COMBUSTION ENGINES)

Export to EU countries	209546.8	246680.4	332659.5	370589.1	470546.1	510896.2	597789.8	925396.9	1127627	1116965
Growth in%	433.04									
Export to non- EU countries	197998	229470	284325	276658	294064	340472	425227	423857	514804	704553
Growth in%	255.84									
Export to USA	16251	26589	20262	19058	25944	33089	44165	42967	57376	74239
growth in %	356.82									
Export to L. America	5725	5647	5409	9384	13685	17466	12861	11883	19618	34684
growth in %	505.84									
Export to Asia	39528	37118	66009	79056	83653	82463	123274	143716	176230	209221
growth in %	429.3									
Export to Central and Eastern Europe	17818	14714	22314	21233	35505	51615	61812	93586	113689	164955
growth in %	825.78									

ANNEX 3.2.2 National Surveys of Eco-Industry Exports

A second source of data on exports from eco-industries are the surveys undertaken periodically by national statistical offices. These more in-depth studies are based on questionnaires sent to a sample of eco-industries. These surveys contain data on exports, but they relate to one year only and have been undertaken in very few countries, as they are costly.

The main advantage of these data is that they cover all exports (not just some specified and identifiable environmental goods but all environmental goods and services).

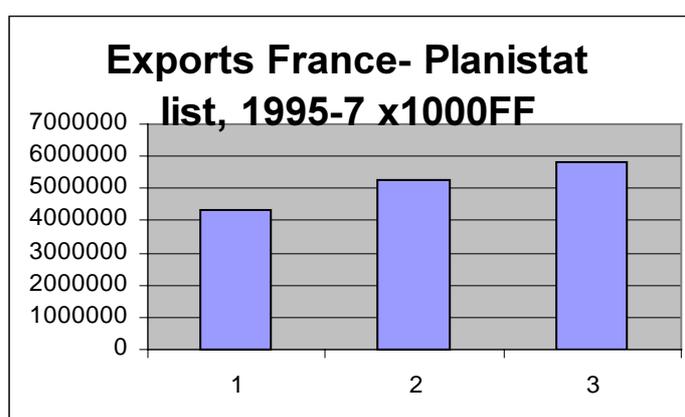
The main disadvantages are that such specific surveys are not frequent as yet, and only cover one year and only exports (so no trade balances can be made) and that the questionnaires distinguish only between a few destinations. However, specific surveys are very useful to clarify the data we have from specific trade codes. For the moment, only Germany and France have agreed to do such surveys, based on the definitions and methodologies agreed on in the OECD-EUROSTAT working group on eco-industries.

Results from the French analysis of trade flows:

A French study, done by Planistat (1998/99), using 15 eco-industries trade codes (see Table A3.9), and analysing their evolution in the last 3 years, shows that there has been a clear growth in total exports from French eco-industries: a growth of 35% in two years.

Evolution of exports by French eco-industries (total exports, to EU countries plus to the rest of the world) according to Planistat study:

Figure A3.11: French Eco-Industry Exports 1995 to 1997 ('000 FrF)



Applying the trade codes used in the French study to the whole of the EU gives a slightly lower growth over 1995-97 (21%).

Figure A3.12: French Eco-Industry Exports 1995 to 1997 ('000 ecu)

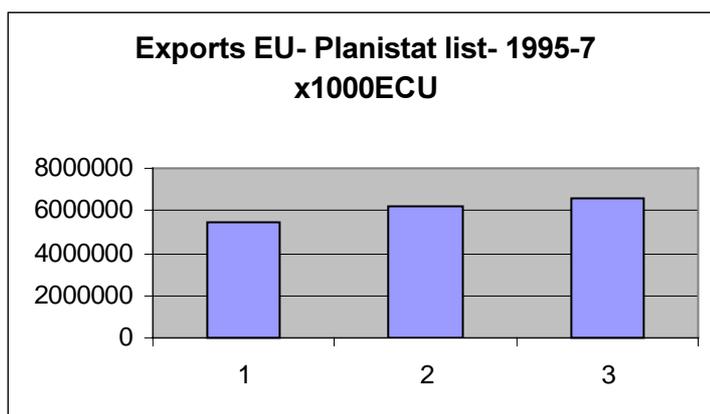


Table A3.9: Environmental Trade Codes used in the French / Planistat study

Secteur	Catégorie de produits	Code commercial
Contrôle de la pollution de l'air	Machines et appareils pour la filtration et la purification de l'air	8421.39-30
	Machines et appareils pour la filtration et la purification des gaz (sauf l'air) par un procédé liquide	8421.39-51
	Machines et appareils pour la filtration et la purification des gaz (sauf l'air) par un procédé électrostatique	8421.39-98
	Machines et appareils pour la filtration et la purification des gaz (sauf l'air) par un procédé catalytique	8421.39-71
Contrôle de la pollution de l'eau	Pompe centrifuge (submersible)	8413.70-21
	Carbone actif	3802.10-00
	Machines et appareils pour filtrer et purifier les autres liquides	8421.29-90
Dispositif déchets	Fours et fournaies pour brûler les déchets (non électrique)	8417.80-10
	Parties de fours de laboratoires ou industriels	8417.90-00
Appareils de mesure	Instruments de mesure et d'analyse des liquides	9026.80-91
		9026.80-99
	Appareil d'analyse des gaz ou de la fumée (électronique)	9027.10-10
	Appareil d'analyse des gaz ou de la fumée (non électronique)	9027.10-90
Autres équipements environnementaux	Parties de machines pour la filtration et l'épuration des gaz et des liquides.	8421.99-00
	Autres fours industriels ou de laboratoire (non électronique)	8417.80-90
* Le code a changé entre 1995 et 1996		

ANNEX 3.3 EU Eco-Industry Export Calculations

The following calculations are used to estimate levels of EU eco-industry exports to markets outside the EU. It must be acknowledged that these estimates are based on only two EU Member State empirical studies - one from France and one from the Netherlands - more comprehensive data is required before more accurate estimates can be obtained.

Step 1: Current EU eco-industry turnover is estimated at 110 billion EURO. - see Annex 2.1.

Step 2: Apply the Export Data from the Netherlands and French studies to the Sector Size Estimates from 'Step 1'

The Netherlands study (Annex 3.1.1) found that ~20% of equipment revenue of Dutch eco-industry suppliers was generated from extra-EU export markets, and ~4.4% of service revenue. 'This translates into approximately 11% of the Netherlands's sector total income. This compares with ~6% of total revenue for French suppliers (Annex 3.1.2).

This export data has been applied to the EU eco-industry revenue estimate of 110 billion EURO described Annex 2.1. See Table A3.10. **Using the Dutch figures gives an estimate of 8.5 billion EURO eco-industry exports; using the French figures gives an estimate of 6.6 billion EURO. This represents between 6% and 8% of the EU sector turnover. For the purposes of this study EU exports are taken to be 8.5 billion EURO (8% of the total turnover). This is considered as a mid-point between the 11% and 6% of the Dutch and French exporting respectively.** Further empirical data is required in the future to build on these initial estimates.

Table A3.10: Estimate of EU Eco-Industry Exports (Extra-EU)

Column:	Estimates based on Dutch Study (VLM), 1998					Estimates based on French Study (French Ministry), 1999			
	A	B	C	D = A x B	E = A x C	F	G	H = A x F	I = A x G
	EU eco-industry turnover: 110 B EURO	EU market %	Extra-EU exports %	EU market B EURO	Extra-EU Exports B EURO	EU market %	Extra-EU exports %	EU market B EURO	Extra-EU Exports B EURO
Equipment:	23.9			19.2	4.7			20.2	3.7
water equipment & chemicals	8.7	80%	20%	6.9	1.7	85%	15%	7.3	1.3
air pollution control equipment	6.0	80%	20%	4.8	1.2	85%	15%	5.1	0.9
instruments & information	1.3	80%	20%	1.1	0.3	85%	15%	1.1	0.2
waste management	7.5	80%	20%	6.0	1.5	85%	15%	6.4	1.2
process/prevention technology	0.4	80%	20%	0.3	0.1	85%	15%	0.3	0.1
Services:	57.4			54.9	2.5			55.4	2.0
solid waste management	24.3	96%	4%	23.3	1.1	97%	3%	23.5	0.8
hazardous waste management	4.3	96%	4%	4.1	0.2	97%	3%	4.1	0.1
consulting & engineering	6.9	96%	4%	6.6	0.3	97%	3%	6.7	0.2
remediation & industrial	3.1	96%	4%	2.9	0.1	97%	3%	2.9	0.1
analytical services	0.8	96%	4%	0.8	0.0	97%	3%	0.8	0.0
water treatment services	18.0	96%	4%	17.2	0.8	97%	3%	17.4	0.6
Resources:	28.7			27.4	1.3			27.7	1.0
water utilities	16.2	96%	4%	15.5	0.7	97%	3%	15.7	0.6
resource recovery	11.2	96%	4%	10.7	0.5	97%	3%	10.8	0.4
environmental energy	1.2	96%	4%	1.2	0.1	97%	3%	1.2	0.0
Total:	110.0			101.5	8.5			103.4	6.6

Table A3.11: Data on Sub-Sector Breakdown of Extra-EU Exports per Figure 4.3

Sub-Sector:	Equipment	Services	Total
WWT	2.1	1.1	3.2
WM	1.7	1.5	3.2
APC	1.2	0.1	1.3
CLR	0.1	0.1	0.1
EMI	0.3	0.0	0.3
ES	0.0	0.2	0.2
EM	0.03	0.03	0.1
Other	0.0	0.0	0.0
	5.4	3.2	8.5

ANNEX 3.4 Survey of EU Eco-Industry Exports Undertaken during the Study

ECOTEC developed a questionnaire on eco-industry exports which was sent to over 180 companies. This is included in Annex 4. Only 20 companies responded and because of this, 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 the barriers and support needs.

ANNEX 3.5 Market Share Estimates

Data contained in Tables A3.12 and A3.13 is based on ECOTEC judgement informed by discussions with companies and trade bodies.

Table A3.12: 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%	7%	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					

Table A3.13: 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

Note: Totals are subject to rounding.

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.

ANNEX 3.6 Forecast Future EU Environmental Exports

The forecast future EU environmental exports (Table A3.14) are based on the forecast market sizes and estimates of current and future market shares held by EU suppliers. These market share estimates have been based on ECOTEC's expert opinion informed by discussions with trade associations and companies, as well as various reports such as "The US Environmental Industry", EBI 1998 which includes estimates of international market shares held by US suppliers. Forecast EU market shares in 2010 have been adjusted to account for likely future increases in the competitiveness and capabilities of indigenous supply-sides in export markets.

Table A3.14: 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	Forecast EU exports Note 1
North America	132	149	1%	2%	2.5
EU 15	104	118	1%		
Japan	62	69	1%	0.5%	0.3
China	4	17	12%	12%	2.1
India	1	2	6%	20%	0.5
SE Asia	9	43	14%	15%	6.5
S America	4	13	9%	20%	2.3
CEE	4	12	10%	45%	5.5
Australia / NZ	4	5	1%	5%	0.3
Middle East	2	6	8%	20%	1.1
Africa	2	5	6%	25%	1.1
Total =	330	439	2%		22.2

Note: These forecasts have also taken into consideration the "Environmental Market development Model" - described below. Briefly, the Model argues that environmental markets typically develop through four phases, the "initial phase" during which preparatory work is undertaken to identify the scale of environmental problems and develop strategies for environmental improvement; the "infrastructure investment phase" during which high levels of investment are made in environmental infrastructures; the "infrastructure slow-down phase" during which infrastructure investments are reduced or completed; and the "clean technology / resource management" phase. (These phases can occur concurrently).

The "Environmental Market Development Model":

The market forecasts above take into account the "Environmental Market Development Model" which describes the development of environmental markets through four phases:

- Phase 1: Initial Phase
- Phase 2: Infrastructure Investment Phase
- Phase 3. Slow Down in Infrastructure Investments

- Phase 4. Resource Management / Clean Technology Phase

Phase 1: Initial Phase:

Main characteristics:

- environmental monitoring to identify environmental stresses, infrastructural and improvement needs
- formulation of environmental improvement strategies, development of legislation and government policy
- compliance cost assessments and financing strategies - including privatisation advice and public private partnership financing
- demand from multinational industry in export countries
- (demand for advanced environmental goods and services from multi-national industrial investors)

Eco-industry opportunities:

- many opportunities for high value environmental consultancy services (fewer opportunities for environmental equipment suppliers, apart from monitoring)
- state of the environment and impact assessment and monitoring
- environmental strategy and policy development - eg. waste management plans, legislative implementation plans, choice of environmental policy instruments
- (opportunities for state-of-the-art env'l goods & services supplied to multi-national industrial investors)

Employment effects:

- employment associated with these services is relatively footloose, ie. opportunities for imported consultancy skills, which do not necessarily need to be permanently based in country.

Phase 2: Infrastructure Investment Phase:

Main characteristics:

- large scale investment / construction of environmental infrastructure, eg. WWT, WM, CLR
- demand from industry - seeking compliance
- investment by lower-tech industry in pollution control equipment (end-of-pipe)
- increased environmental operating expenditure – utilities and industry
- (demand for advanced environmental goods and services from multi-national industrial investors)

Eco-industry opportunities:

- environmental contracting / engineering services
- environmental infrastructure construction
- services relating to public/private finance partnership arrangements
- pollution control, monitoring and remediation technologies - WWT, WM, EMI, APC, CLR, ECE
- (opportunities for state-of-the-art env'l goods and services supplied to multi-national industrial investors)

Employment effects:

- surge in employment - construction, engineering, product manufacture, operating services
- construction jobs tend to come from the local market
- some engineering, project management expertise initially imported
- infrastructure engineering and construction may be imported
- operating jobs may at first be imported, but gradually replaced by local personnel
- environmental technologies (especially EOP) may at first imported (generating production jobs in exporting countries), but gradually replaced by local production jobs

Phase 3. Slow Down in Infrastructure Investments:

Main characteristics:

- large scale investment in infrastructure slows down
- demand for industrial compliance goods and services continues as environmental regulations on industry tighten
- industrial pollution control investment (EOP) continues
- environmental operating expenditure continues
- environmental monitoring continues
- refinement of government environmental policy
- (demand for advanced environmental goods and services from multi-national industrial investors)

Eco-industry opportunities:

- reduced demand for infrastructure construction, engineering
- continued opportunities for many types of environmental goods and services
- (opportunities for state-of-the-art env'l goods and services supplied to multi-national industrial investors)

Employment effects:

- reduced jobs in construction, engineering
- service / operating jobs continue - but increasingly supplied by local employment
- jobs in EOP product manufacture continue - but increasingly supplied by local employment

Phase 4. Resource Management / Clean Technology Phase:

Main characteristics:

- EOP slows
- clean technology / integrated pollution control increases
- increased resource management - eg. energy efficiency
- environmental operating expenditure reduces through increased automation, telemetry

Eco-industry opportunities:

- resource management, energy efficiency
- process engineering

Employment effects:

- some fall in jobs in EOP product manufacture
- very few infrastructure construction jobs
- growth in resource management / process engineering jobs
- these jobs may initially be imported, but will increasingly be supplied by local employment

Position of International Markets within the Model:

It is possible to show where different international environmental markets lie on the environmental market development model - Figure A3.13. The mature US market, for example, is placed across Phase 3 and 4; the more mature parts of the EU lie towards the end of Phase 2 and in Phases 3 and 4; the less mature EU markets still lie in Phase 2.

Figure A3.13: Indication of where geographic markets lie within the "Environmental Market Development Model"

	Phase 1: Initial Phase	Phase 2: Infrastructure Investment	Phase 3: Infrastructure Slow Down	Phase 4: Clean Technology / Resource Management *
USA / Canada				
EU - mature markets				
EU - less mature markets				
Japan				
China				
India				
SE Asia				
S America				
CEE				
Australia / NZ				
Middle East				
Africa				

*= some investment in clean technology / resources management from multi-national industrial investors in less developed markets. Phase 4 investments can occur concurrently with the other Phases.

ANNEX 4. ECO-INDUSTRIES EXPORT QUESTIONNAIRE

EUROPEAN COMMISSION STUDY OF EU ECO-INDUSTRY EXPORTS

COMPANY DETAILS:

Company Name	
Contact Name	
Position	
Location	
Tel & Fax	
e-mail	

Note: If you would prefer not to provide data for certain questions because of commercial sensitivities (e.g. turnover) please omit the question and move onto the next one.

A. GENERAL COMPANY ACTIVITIES:

1. Please briefly describe the environmental goods & services supplied by your company, (ideally in terms of eco-industry sub-sectors shown in Note 1 at the end of this questionnaire).

2. Please show the total annual **environmental** turnover from your businesses based in the EU:

Currency Unit () Amount:.....

3. What approximate proportion (%) of your **total** turnover in your EU businesses does the environmental turnover (in Q.2) represent?

.....%

4. In the table below, please show:

	Geographic sources of environmental turnover in Q.2 (as percentages)
Geographic market:	
Home country in EU	%
Other EU	%
Exports outside the EU	%
Total	= 100%

5. How does the environmental turnover in Q.2 break-down between goods & services?

Goods:% Services%

6. How many persons do you employ in the EU to generate your environmental turnover in Q.2?

Number of employees:

B. EXPORTS TO COUNTRIES OUTSIDE THE EU

7. How do your exports to countries outside the EU break-down by environmental sub-sector?

Environmental Sub-Sector	% of exports outside EU:	Environmental Sub-Sector	% of exports outside EU:
Air Pollution Control	%	Environmental monitoring, analysis & assessment	%
Waste water management	%	Renewable energy	%
Solid waste management	%	Heat / energy management & efficiency	%
Soil & groundwater remediation	%	Marine pollution control	%
Noise & vibration control	%	Other (<i>please specify</i>).....	%
Environmental contracting / engineering services	%	Total =	100%

8. How do your environmental exports to countries outside the EU break-down between goods and services?

Goods:% Services%

9. In the table below, please show:

(i)	(ii)	(iii)
Your main geographic environmental export markets outside the EU: (Note 2)	% of environmental exports outside the EU (eg. X% of exports outside the EU go to China)	The main environmental goods & services exported to these markets (please refer to Note 1):
1	%	
2	%	
3	%	
4	%	
5	%	
Other	%	
	Total = 100%	

10. What percentage of your company's environmental employment in the EU (see Q.6) relates to exports to countries outside the EU?

.....%

11. By what approximate percentage have these jobs in the EU relating to exports outside the EU (per Q.10) increased or decreased in the last 2 years (1997 & 1998 or financial years)?

.....%

12. In the table below, please show:

(i)		(ii)	(iii)
Which export markets outside the EU do you expect to grow most over the next 5 years?		The main factors driving this growth: (Note 3)	Do you expect to increase your revenue from these markets? (yes or no)
Geographic market: (Note 2):	Environmental Sub-Sector (Note 1):		

Examples of market drivers are shown in Note 3.

13. What are the biggest barriers to your environmental exports to countries outside the EU?

14. Are there any EU or national policies or support that would help you increase your environmental exports to countries outside the EU?

15. Have you used external assistance (eg. from government, trade associations) in increasing environmental exports to countries outside the EU? If so, what type of support was most useful & which organisations provided it?

Comments: Please insert below any other comments you may have on your environmental export activities or this questionnaire:

Please tick the box if you would like to receive information on the study findings.

THANK YOU FOR YOUR ASSISTANCE

PLEASE FAX BACK THE COMPLETED QUESTIONNAIRE TO

YOUR RESPONSES WILL BE TREATED AS STRICTLY CONFIDENTIAL

NOTES AND DEFINITIONS (relating to the questionnaire):

NOTE 1: ECO-INDUSTRY SUB-SECTORS - Examples of Goods and Services

Environmental Sub-Sector:	Abbreviation	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	WW	Eg. Aeration systems, separation technologies, filters, chemical treatments, pumps, pipework.	Eg. Construction & operation of wastewater treatment systems.
Solid Waste Management	WM	Eg. Waste handling equipment, recycling equipment, waste collection equipment, waste management vehicles.	Eg. Waste disposal services, waste treatment, recycling operations.
Remediation of Soil & Groundwater	RSG	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 & Analysis	EMA	Eg. Measuring and monitoring equipment, sampling systems, process control systems.	Eg. Data collection, measuring & monitoring, sampling, sample analysis, laboratory services.
Environmental contracting / engineering services	CES	Eg. Environmental management system software, environmental impact assessment toolkits, legal publications.	Eg. Engineering design / specification / project management of wastewater treatment plants, environmental audits, environmental economics, legal services, ecological studies.
Renewable energy	RE	Eg. Equipment for solar, photovoltaics, wind, hydro, tidal, geothermal etc.	Eg. Installation and operation of renewable energy technologies.
Heat / energy management & efficiency	HEM	Eg. Energy monitoring equipment, energy efficiency software.	Eg. Energy audits, installation of energy efficiency equipment.
Marine pollution control	MPC	Eg. Marine pollution control and prevention equipment, absorbents, booms.	Eg. Marine pollution clean-up.

NOTE 2: INTERNATIONAL EXPORT MARKETS OUTSIDE THE EU:

Eco-industry export markets outside the EU are categorised into the following regions:

- Non-EU Europe - eg. Norway, Switzerland
- Central and Eastern Europe - eg. Slovakia, Poland, Russia, Baltic States, Bulgaria, CIS.
- Middle East - eg. Egypt, Saudi Arabia, Turkey, Kuwait, Israel, Jordan, UAE, etc
- China
- India
- South East Asia - eg. Malaysia, Thailand, Indonesia, Singapore, Taiwan, Korea, Vietnam, Philippines.
- Japan
- Australasia - eg. Australia, New Zealand
- North America - USA, Canada, Mexico
- South America - eg. Argentina, Brazil, Peru, Chile, Columbia etc
- Africa - eg. South Africa

NOTE 3: EXAMPLES OF OVERSEAS MARKET DRIVERS:

- development and enforcement of environmental regulations
- inward investment by multi-national companies
- economic growth
- overseas development funds from the 'west'
- relaxation of trade barriers
- commitments to international environmental & climate conventions - eg. Kyoto

ANNEX 5. OECD/EUROSTAT ENVIRONMENTAL GOODS AND SERVICES INDUSTRY MANUAL CLASSIFICATION

Source: OECD *Environmental Goods and Services Manual*, 1999, Annex 1.
COM/TD/ENV(98)37/FINAL

The “POLLUTION MANAGEMENT” Group

A. Environmental Goods

Air pollution control

This class includes any activity that produces equipment, technology or specific materials for the treatment and/or removal of exhaust gases and particulate matter from both stationary and mobile sources. It includes air-handling equipment, dust collectors, precipitators, filters, catalytic converters, chemical treatment and recovery systems, specialised stacks incinerators, scrubbers, odour control equipment, environmentally less-damaging specialised fuels.

Waste water management

This class includes any activity that produces equipment, technology or specific materials for collection, treatment and transport of waste water and cooling water. It includes pipes, pumps, valves, aeration equipment; gravity sedimentation equipment, chemical treatment and recovery equipment; biological recovery systems, oil/water separation systems, screens/strainers, sewage treatment equipment, waste water reuse equipment; water purification equipment and other water handling systems.

Solid waste management

This class includes any activity that produces equipment, technology or specific materials for collection, treatment, transport, disposal and recovery of hazardous and non-hazardous solid waste. It includes waste storage and treatment equipment (thermal, biological, chemical), waste collection equipment, waste disposal equipment, waste handling equipment, waste separation and sorting equipment, recovery equipment. It also includes equipment for outdoor sweeping and watering of streets, paths, parking lots, etc. It includes equipment, technology or specific materials for treatment of low level nuclear waste. It excludes high level nuclear waste. Recycling activities excludes manufacture or production of new materials or products from recovered waste or scrap and subsequent use of these materials or products.

Remediation and cleanup of soil, surface water and groundwater

This class includes any activity that produces equipment, technology or specific materials to reduce the quantity of polluting materials in soil and water, including surface water, groundwater and sea water. It includes absorbents, chemicals and bio-remediators for cleaning-up, as well as cleaning-up systems either *in situ* or in appropriate installations.

Noise and vibration abatement

This class includes any activity that produces equipment, technology or specific materials to reduce or eliminate the emission and propagation of noise and vibration both at source and dispersed. It includes mufflers/silencers, noise deadening material, noise control equipment and systems vibration control equipment and systems.

Environmental monitoring, analysis and assessment

This class includes any activity that produces equipment, technology or specific materials for sampling, measurement, and subsequent recording, analysis and assessment of various characteristic of environmental media. It includes measuring and monitoring equipment, sampling systems, data acquisition equipment, other instruments or machines for measurement. Environmental information systems, analytical software, specific safety and personal protection are included.

B. Environmental Services

Air pollution control

This class includes any activity that designs, manages systems or provides other services for treatment and/or removal of exhaust gases and particulate matter from both stationary and mobile sources.

Waste water management

This class includes any activity that designs, operates systems or provides other services for collection, treatment and transport of waste water and cooling water. It includes design, management or other services for sewage treatment systems, waste water reuse systems, water handling systems.

Solid waste management

This class includes any activity that designs, operates systems or provides other services for the collection, treatment, management, transport, storage and recovery of hazardous and non-hazardous solid waste. It includes design, management or other services for waste handling (collection, transports separation, sorting and disposal), operation of sites, recycling (including collection of waste and scrap), operation of recycling plants. It includes services for outdoor sweeping and watering of streets, paths, parking lots, etc. Services for treatment of low level nuclear waste are included. It excludes high level nuclear waste. It excludes services for manufacture of new materials or products from recovered waste or scrap and subsequent use of these materials or products.

Remediation and cleanup of soil, surface water and groundwater

This class includes any activity that designs, manages systems or provides other services to reduce the quantity of polluting materials in soil and water, including surface water, groundwater and sea water. It includes cleaning-up systems either *in situ* or in appropriate installations, emergency response and spills cleanup systems. Treatment of water and dredging residues are included.

Noise and vibration abatement

This class includes any activity that designs, manages systems or provides other services to reduce or

eliminate the emission of noise and vibration both at source and dispersed. It includes designing, management or other services for acoustic and sound-proof screens and street covering.

Environmental R&D

This class includes any systematic and creative activity which is concerned with the generation, advancement, dissemination and application of scientific and technological knowledge to reduce or eliminate emissions in all environmental media and to improve environmental quality. It includes creative scientific and technological activities for the development of cleaner products, processes and technologies. It includes non-technological research to improve knowledge on ecosystems and the impact of human activities on the environment.

Environmental contracting and engineering

This class includes any activity that investigates feasibility, designs and manages environmental projects which are not included elsewhere. It includes multidisciplinary environmental contracting and engineering. Environmental management consulting, and auditors are included.

Analytical services, data collection, analysis and assessment

This class includes any activity that designs, manages systems or provides other services to sample, measure, and record various characteristics of environmental media. It includes monitoring sites, both operating singly and in networks, and covering one or more environmental medium. Health, safety, toxicology studies, and analytical laboratory services are included. Weather stations are excluded.

Education, training, information

This class includes any activity that provides environmental education or training or disseminates environmental information and which is executed by specialised institutions or other specialised suppliers. It includes education, training, and information management for the general public, and specific environmental work-place education and training. The activities of the general educational system are excluded.

C. Construction

This class includes any activity for the construction and installation of facilities for: air pollution control; waste water management; solid waste management; remediation and cleanup of soil, water and groundwater; noise and vibration abatement; environmental monitoring, analysis and assessment; other environmental facilities.

The “CLEANER TECHNOLOGIES AND PRODUCTS” Group

This group includes any activity which continuously improves, reduces or eliminates the environmental impact of technologies, processes or products.

Cleaner/resource efficient technology

Cleaner and resource efficient technologies decrease material inputs, reduce energy consumption, recover valuable by-products, reduce emissions, minimise waste disposal problems, or some combination of these.

Cleaner/resource efficient product Cleaner or resource efficient products decrease material inputs, improve product quality, reduce energy consumption, minimise waste disposal problems, reduce emission during use, or some combination of these.

The “RESOURCES MANAGEMENT” Group

NOTE: In the case of the “Resources management” group, activities aimed at the production of environmental goods and services and connected construction are gathered together for convenience. However, it is suggested that wherever possible information on these items be separately collected and presented.

Indoor air pollution control

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for the treatment and renewal of indoor air to remove pollutants. It excludes air-conditioning.

Potable water treatment and distribution

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for water supply and delivery systems, both publicly and privately owned. It includes any activities aiming to collect, purify and distribute potable water to household, industrial, commercial or other users.

Recycled materials

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for manufacturing new materials or products, separately identified as recycled, from recovered waste or scrap, or preparation of such materials or products for subsequent use.

Renewable energy plant

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for the generation, collection or transmission of energy from renewable sources, including biomass, solar, wind, tidal, or geothermal sources. (Do we wish to include renewable energy collection and plant management, etc.?)

Heat /energy saving and management

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services to reduce heat and energy use or minimise heat and energy loss (e.g. co-generation). It includes equipment, technology or specific materials to reduce climate change.

Sustainable agriculture and fisheries

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for systems which reduce the environmental impact of agriculture and fishery activities. It includes biotechnology applied to agriculture and fishery activities.

Sustainable forestry

This class includes any activity that produces equipment, technology, or specific materials, designs, constructs or installs, manages or provides other services for programmes and projects for reforestation and forest management on a long term sustainable basis.

Natural risk management

This class includes any activity that produces equipment, technology, or specific materials, designs, constructs or installs, manages or provides other services for systems to prevent or reduce the impact of natural disasters (storms, floods, volcanic eruptions, etc.).

Eco-tourism

This class includes any activity that designs, constructs, installs, manages or provides other services for tourism that involves protection and management of natural and cultural heritage, or education and interpretation of the natural environment, and that do not damage or degrade the natural environment.

Other

This class includes any activity that measures, prevents, limits or corrects environmental damage to air, water, and soil, as well as problems related to waste, noise and eco-systems, which is not included in any other class. These activities should be separately specified and listed.

ANNEX 6. EXAMPLES OF ORGANISATIONS & PROGRAMMES SUPPORTING EU ECO-INDUSTRY EXPORTS

	Organisation / Support Programme:
Austria	<ul style="list-style-type: none"> - The Austrian Chamber of Commerce, in collaboration with the Austrian government, is striving to organise the Austrian eco-industry in sub-sector associations - FMS trade association
Belgium	<ul style="list-style-type: none"> - Fabrimetal trade association
Finland	<ul style="list-style-type: none"> - International Trade Board has a section dedicated to the environmental sector (Finnish Government).
Germany	<ul style="list-style-type: none"> - German government has developed two initiatives to support the German EGSs (environmental goods and service sector) exports: the International Centre for Environmental Technology Transfer (Internationales Transferzentrum für Umwelttechnik – ITUT), and the independent export-credit agency Hermes. - The ITUT aims to increase industrial co-operation with and transfer of cleaner technologies to Third Countries. It supports German EGSs suppliers by providing a wide range of information on foreign environmental markets (e.g. local and regional environmental priorities, market access information, possibilities for joint venture development etc.). Also, It participates to international environmental conferences and trade fairs. Since 1996, in collaboration with the Ministry of Trade and Industry, a number of environmental advisors have been set up within the network of Chambers of Commerce. These environmental advisers are contact points for German EGSs supplier interested in exporting to foreign markets. ITUT activities focus on the following priority regions and countries: Eastern Europe (Poland, Hungary, Czech Republic); Asia (China, Malaysia, Thailand, India, Indonesia); Latin America (Brazil and Mexico); Africa (South Africa). - The Hermes export-credit agency is managing Germany's official exports guarantee scheme. This aims to support German exports to high-risk markets, such as developing economies and the Eastern European transition economies, by providing export guarantee credits, especially to SMEs. These schemes apply to any export activity, including exports of environmental technologies. Statistics on the share of environmental projects on the total export guarantees provided are in the process to be developed. This could provide more information on the effectiveness of this programme in supporting German EGSs exports.
Ireland	<ul style="list-style-type: none"> - Enterprise Ireland (Irish Government) – Support activities include organisation of trade missions (inward and outward), company specific advice on business expansion, information on markets, helps establish business links in export markets, assists in technology transfer.

Italy	<ul style="list-style-type: none"> - Institute for Foreign Trade, an independent body related to the Ministry of Foreign Trade, has recently set up a unit dealing with export promotion of EGSs. In co-operation with the national eco-industry organisations (such as CISPEL, the national public services organisation), this unit provides a wide range of activities for export promotion. These include, for instance: the preparation of market studies at sectoral and country level; financial support for participation to trade fairs and trade promotion missions; organisation of trade conferences etc. The implementation of these activities is supported by the IFT network of trade offices in foreign countries. Priority regions for export promotion include the Mediterranean area (Maroc and Turkey), Eastern Europe (Poland), Latin America (Argentina), and China.
Netherlands	<ul style="list-style-type: none"> - VLM trade association
Portugal	<ul style="list-style-type: none"> - ANIMA / UIDA trade association - APEMETA trade association
UK	<ul style="list-style-type: none"> - Joint Environmental Markets Unit (JEMU) and the Technology Partnership Initiative (TPI) (both UK Government) - Support activities include organisation of trade missions (inward and outward), information on markets, helps establish business links in export markets, assists in technology and know-how transfer to developing countries. - Environmental Industries Commission (EIC) – trade association
EU	<ul style="list-style-type: none"> - <i>The Asia-INTERPRISE facilities</i>, under the <i>Asia Invest Programme</i>, support initiatives, events and business encounters which are aimed at promoting co-operation between small and medium-sized enterprises from the Asia-Invest beneficiary countries and the EU Member States operating in the same sector. Priority industrial sectors cover environment and environmental technologies. In 1999, activities includes: a trade fair organised in India, which covered, amongst others, the environmental sector; two trade fairs targeting specifically EGSs, which will be held at the end of 1999 respectively in Bangkok and Kuala Lumpur. - The Singapore based <i>Regional Institute for Environmental Technology (RIET)</i>, which was launched jointly by the European Commission and the Singapore Government. RIET runs '<i>Asia-EcoBest</i>' - a 5 year Programme designed to assist European organisations co-invest with Asian partners in the environmental sector. - The <i>EC-ASEAN COGEN Programme</i> is an economic co-operation programme between the European Commission (EC) and the Association of South-East Asian Nations (ASEAN) co-ordinated by the Asian Institute of Technology (AIT), Bangkok, Thailand. Its aim is to accelerate the implementation of proven co-generation technologies within the industrial sectors of the ASEAN region through partnerships between European and ASEAN companies.