Analysis of the EU Eco-Industries, their Employment and Export Potential

Executive Summary

ECOTEC
Research & Consulting Limited

Priestley House
28-34 Albert Street
Birmingham B4 7UD
United Kingdom

Tel: +44 (0)121 616 3600
Fax: +44 (0)121 616 3699
Web: www.ecotec.com

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A Final Report to DG Environment

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Priestley House
28-34 Albert Street
Birmingham B4 7UD
United Kingdom
Tel: +44 (0)121 616 3600
Fax: +44 (0)121 616 3699

Web: www.ecotec.com
E-mail: welcome@ecotec.co.uk

13b Avenue de Tervuren
B-1040 Brussels
Belgium
Tel: +32 (0)2 743 8949
Fax: +32 (0)2 743 7111

Modesto Lafuente 63 – 6a
E-28003 Madrid
Spain
Tel: +34 91 535 0640
Fax: +34 91 533 3663

19 Buckingham Gate
London SW1E 6LB
United Kingdom
Tel: +44 (0)20 7630 6090
Fax: +44 (0)20 7630 6339

31-32 Park Row
Leeds LS1 5JD
United Kingdom
Tel: +44 (0)113 244 9845
Fax: +44 (0)113 244 9844

EXECUTIVE SUMMARY

1.0 BACKGROUND

This study has collated available environmental expenditure data on the market for goods and services produced by eco-industries in both the EU-15 and the Candidate Countries, as the basis for describing the economic significance of the sector, including employment levels. Whilst there are gaps and inconsistencies in the available data sets, only limited estimation procedures are required to derive a detailed and rigorous basis for economic analysis. The study also provides insights into the export capabilities of EU Member States, particularly their relationship with the Candidate Countries.

For the purposes of this study, eco-industries have been defined according to the definition contained in "The Environmental Goods and Services Industry – Manual for Data Collection and Analysis" (OECD/Eurostat, 1999). 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 that reduce environmental risk and minimise pollution and resource use".

The main eco-industry domains covered by this study are shown in Table 1:

Table 1: Environmental Domains comprising the EU Eco-industries Market

Eco-industry Group	**Environmental Domain (Sub-Sector)**
Pollution Management*	Air pollution Control (APC) Waste Water Treatment (WWT) Waste Management (WM) Remediation and Clean up of Soil & Groundwater Noise and Vibration Control Environmental Monitoring & Instrumentation Environmental Research & Development Public Environmental Administration Private Environmental Management
Resources Management	Water Supply Recycled Materials Nature Protection

Note (*) Pollution Management includes all investments in Cleaner Technologies and Processes. Such investments will be incorporated primarily into the values for APC, WWT and WM.

The approach used in this study is to focus on the final expenditure incurred by consumers when using environmental protection services. This is used as a proxy in determining the size (turnover) of the eco-industries. A template for data collection was used for each EU-15 Member State and the Candidate Countries. This enabled a clear audit trail to be established for expenditures on both "Pollution Management" (which includes "Cleaner Technologies") and "Resources Management". A

detailed assessment of trade in environmental goods (including renewable energy plant), covering the period 1994 to 1999, was also undertaken for all EU Member States using Eurostat's COMEXT trade database.

2.0 KEY FINDINGS

Characteristics of the EU Eco-industries in 1999

- Total **EU eco-industries supply some 183 Bn euro of goods and services a year**, of which 54 Bn euro are investment goods and 129 Bn euro are services, including 'in-house' non-market services.
- Total **Pollution Management and Cleaner Technologies eco-industry supplies are around 127 Bn euro of goods and services a year**, of which 40 Bn euro are investment goods and 87 Bn euro are services, including 'in-house' non-market services.
- Total **Resources Management eco-industries (excluding renewable energy plant) supply around 56 Bn euro of goods and services a year**, of which 14 Bn euro are investment goods and 42 Bn euro are services, including 'in-house' non-market services.
- The **current size of the renewable energy plant market in the EU is around 5 Bn euro a year**. This ties in well with the anticipated spend of 20 Bn euro over the period 1999-2003 as outlined in the Commission's "Campaign for Take-Off, 1999-2003".
- The **waste management industry has seen a tremendous increase in operational expenditure since 1994**, and is the domain with the biggest annual expenditure.
- Spending on wastewater treatment continues to remain strong, whilst **air pollution control expenditure has dropped**.
- The estimated value added provided by eco-industries, based on direct labour costs, is 98 Bn euro, up from 35 Bn in 1994.
- **Investment in eco-industries in the EU each year totals 54 Bn euro** with consequent benefits for construction, capital goods industries and associated services.
- Average per capita expenditure in the EU in 1999 for 340 euro for pollution management and 150 euro for resources management, or close to **average per capita expenditure of 500 euro overall**.

Employment in EU Eco-industries

- **Direct employment in the EU in eco-industries amounts to over 2 million (FTE) jobs** – around 1.5 million jobs for pollution management and 650,000 for resources management.
- The **1.5 million jobs in Pollution Management eco-industries** are split into over 1 million operations-related jobs and 400,000 capital-related jobs.
- The **650,000 jobs in the Resources Management eco-industries** are split into 500,000 operations-related jobs and 150,000 capital-related. This demonstrates that employment levels for the wider environmental industry sector are significantly larger than the core eco-industry (i.e. pollution management) definitions used in the past. Areas such as nature protection and organic

farming, which have not been covered by this study, also offer the potential for significant employment creation in rural economies in the future.

- Total employment generated by the demand for environmental goods and services is at least **2.6 million jobs taking into account the (first round) indirect effects** on the rest of the economy. These indirect jobs include, for example, jobs in supply of electricity to the eco-industry, as well as jobs in a range of other industries that supply (non-environmental) goods and services to ensure that environmental infrastructure remains fully operational (e.g. maintenance firms).
- A **high end estimate of environmental employment is around 4 million jobs**, using various procedures to give more realistic coverage and including the use of 'multipliers', which try to build in the indirect effects of environmental expenditure.
- Environmental sector employment accounts for on average **1.3% of total paid employment** in the EU-15, although it is higher in some countries (e.g. Austria, Denmark, France).
- The current study has produced robust employment data that compares well with a range of other Member State studies. This has been helped by significant developments in employment estimates since 1997.
- For every 1 Bn euro of investment in environmental goods and services there is another 1.6 Bn euro generated in operating expenditure and the generation of 30,000 direct jobs.
- **A significant level of investment-related jobs in the EU are generated by sales to Candidate Countries**.
- **Employment levels are expanding in the waste management sector**. Waste recovery and recycling offer particularly good prospects for future employment growth.
- Environmental employment has been a **source of job creation** at the Member State level, although it is impossible to identify accurately the impact on aggregate employment.
- There has been a **shift in employment from the public to private sectors**, particularly within the waste management sector (e.g. Netherlands, Sweden and UK).
- Parts of the environmental sector (e.g. environmental consultancy and research) comprise of highly educated and skilled workforces. There is, however, a **continual need for improvements in skills and training** across many sectors. For example, the rapid technological changes in the waste treatment and recovery/recycling sectors are creating a growing demand for new skills, with obvious implications for training providers.

Changes in EU Eco-industry Turnover and Employment Levels since 1994

Many of the results from this current study can be directly compared to the findings of a similar 1997 study, also commissioned by DG Environment. Comparisons show that:

- In real terms, **total pollution management expenditure has risen by 5% per annum** since 1994.
- The proportion of expenditure spent on **operating costs has increased in real terms by 8% per annum** to a level of 69% in 1999.

- The **73% increase in operating expenditure** (+12% per annum) is significant compared to the **4% rise in capital expenditure** (+0.7% per annum).
- The **share of capital investment has fallen across many EU Member States**, particularly in larger markets. This has major implications for the domestic eco-industries within these Member States and firms may well be looking elsewhere for capital equipment sales.
- The share of **capital investment in the former Cohesion Fund countries** – notably Ireland (48%), Portugal (55%) and Spain (46%) still remains high compared to other Member States. This reflects the on-going investment programmes to implement EU Directives.
- **Increased waste management activities during the period (of 11% per annum) could well explain the large increase in operating costs**. Increased waste management costs reflect rapidly increasing waste disposal costs as treatment routes become more sophisticated and landfill taxes are imposed.
- **Wastewater treatment expenditure has increased by 3% per annum in real terms**. This may well be due to the implementation of the 1994 Urban Waste Water Treatment Directive, which has imposed stringent environmental obligations on public/private water companies across the EU.
- **Air pollution control expenditure has fallen by 5% per annum**. This is likely to be a result of substantial investments having already been made during the past 10 years, for example, as a result of the Large Combustion Plant Directive of 1988.
- Contaminated land remediation and noise and vibration control expenditure have both risen.
- The **private sector is increasingly important** in driving pollution management expenditure rising from 45% of total expenditure in 1994 to 59% by 1999. Household expenditure remains around 5% of total expenditure.
- Total **direct employment resulting from Pollution Management activities has risen by around 500,000 jobs since 1994**.
- Direct employment due to **Resources Management increases this amount by a further 650,000 jobs** (although this employment was not determined in the 1997 Study). Including Resources Management means that the number of direct investment related jobs in the EU in 1999 has increased by around 75% to 550,000 jobs.

International Trade

- The **EU eco-industries is a strong and diverse export sector, and a major global player** alongside the USA and Japan.
- **North America remains the EU's biggest export market** and has shown significant growth, while the Candidate Countries **are becoming increasingly important export markets**, in particular for EU Member States with close historical trading relationships to that region. The favoured method of EU company penetration into this market is through setting up a joint venture with domestic companies.
- **Northern European countries tend to be more active exporters** than Southern European countries.

- EU companies are amongst the **world leaders in developing new renewable energy technologies**, both for domestic markets and worldwide. The strong and expanding domestic markets provide the basis for many EU companies to be active in worldwide markets. For example, the EU is the largest market for wind energy developments, with 75% of the total world installed capacity of 18.5 GW.
- Although the EU operates a **trade surplus in environmental products** with the rest of the world (estimated, from a realistic scaling up of the trade code analysis, to around 5 Bn euro in 1999), the **amount of this positive trade balance overall is likely to have fallen** between 1997 and 1999, as a result of **increased imports and a levelling out in exports**.
- The **balance of trade with respect to environmental services is unknown** due to the difficulties of gathering accurate information.
- Estimates of total environmental exports from other countries show that these can be around 10% of revenues. Assuming the same level of exporting would mean that **total EU exports may be in the region of 18 Bn euro**.
- The **global eco-industry market is estimated at around 550 Bn euro**. This means the EU has approximately one third of the overall market (183 Bn euro), equal to the USA. The Japanese market is estimated to be worth about 84 Bn euro. The Canadian market is the next most significant at 36 Bn euro.
- Over the next 5 years, **real growth rates in developing markets are estimated to be between 5-8%, while those in western markets will fall to only 1-3%.**
- Variations are apparent in support schemes available in different EU countries but, in general, these are outweighed by the similarities.

Characteristics of the Candidate Country Eco-industries

- Total **Pollution Management eco-industries supply around 10.3 Bn euro of goods and services a year**, of which 5.5 Bn euro are investment goods and 4.8 Bn euro are services, including 'in-house' non-market services. Assuming Resources Management represents a further 20-30% of this figure, a low end estimate of the total eco-industry is approximately 13 Bn euro.
- The **most important environmental domain is the wastewater management industry**, which accounts for 35% of the market, followed closely by air pollution control at 30%. Solid waste management represents 20%. General environmental administration expenditure is significant at 13% of the market, reflecting the increasing role of staff in public administration.
- Overall, the Polish market, with total expenditure of around 3.8 Bn euro, constitutes almost a third of the Candidate Country Pollution Management market, followed by Turkey (2.6 Bn euro), Czech Republic (1.3 Bn euro) and Hungary (1 Bn euro).
- **Most Candidate Countries spend more on traditional end-of-pipe technology than on process integrated/cleaner technologies**. However, implementation of EU Directives such as IPPC will lead to increased investment in cleaner technologies.
- The **environmental *acquis* is the main driving force** behind each of the Candidate Country markets for environmental protection, particularly EU regulations such as the IPPC Directive.

- The **importance of international donor agencies**, programmes from the EU and elsewhere, as well as financial institutions is critical to the future funding of environmental projects in Candidate Countries.
- Candidate Country eco-industries currently **run a trade deficit with the rest of the world**, although this appears to have **declined since 1995**. Indeed, these countries are gradually reducing the market share of other global eco-industry suppliers into the EU, and have doubled exports to the EU since 1995.
- **Growth in exports to the EU is dominated by the Czech Republic**, followed by Poland, which together account for over 74% of exports.
- Poland, Czech Republic and Hungary are the countries where domestic environmental technology production capabilities appear to have improved the most since 1995.
- The **average share of GDP spent on pollution management expenditure in Candidate Countries was 1.9%.**
- **Average per capita spend in the Candidate Countries is 66 euro**. This is a substantial rise since 1995 (possibly doubling), with **average growth of around 10% per annum**.
- **Average compliance time with the environmental acquis is 8 years**, although several countries have very demanding requirements if they are to meet compliance within the next 20 years.

Employment in Candidate Country Eco-industries

- Direct employment in the Candidate Country pollution management eco-industries is **around 770,000 (FTE) jobs,** of which 460,000 (60%) are operational-related and 310,000 investment-related. Direct operating-derived employment on average accounts for 0.7% of national employment. Including investment-derived jobs means that **total direct employment is equivalent to around 1% of total national employment in Candidate Countries**. However, due to the significant level of capital-related imports (and hence leakage of jobs to other exporting countries) this figure should be treated with a degree of caution.
- **Exactly 50% of operational employment is in the waste management sector**, whilst wastewater treatment accounts for 25% and air pollution control 8%. Environmental administration accounts for 17% of operational employment.
- Turkey, Poland, Romania, Czech Republic and Hungary have the largest direct employment. Investment related employment is dominated by Poland, Turkey and the Czech Republic, which together account for 73% of this employment.
- **Employment in the environmental sectors is generally increasing at a significant rate**. Future employment growth is expected to be greatest in waste management, wastewater treatment as well as in the formation of new (as well as the expansion of existing) public sector environmental institutions.
- **Overall, the trade deficit has led to jobs being displaced to developed exporting countries**, with the largest displacement of investment related jobs in those Candidate Country markets that are weak, both in domestic production (and export) of environmental technologies. However, this job displacement is reducing over time.

Relationship of EU eco-industries to those in Candidate Countries in the next 5-10 years

- The **continued demand for environmental technology investments in the Candidate Countries is unlikely to be fully met by domestic production capabilities**. This implies sustained employment for the EU overall, although individual Member States may well lose out.
- **EU firms will keep establishing joint ventures with domestic companies**, although fully-owned subsidiaries are likely to increase in the future. Also, consolidation within the sector and the purchase of promising Candidate Country firms by EU firms is highly likely.
- **Employment shifts from the EU-15 to the Candidate Countries** in the short term are most likely to occur in Poland, Czech Republic and Hungary since these are three of the largest markets; are rapidly expanding; have good domestic capabilities, especially in APC, WWT and WM; and are rapidly expanding their export capabilities.
- The **export performance of the Candidate Countries is likely to strengthen**, particularly from the most rapidly developing markets.
- **Export trade with the EU-15 is set to increase**, particularly in areas where the sales price is affected by labour costs. In particular, Candidate Country exports of end-of-pipe technologies are likely to increase, coinciding with a shift of EU exports towards cleaner technologies.