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**BUILDING CAPACITY IN THE ENVIRONMENTAL GOODS AND SERVICES
INDUSTRY IN THE CENTRAL AND EASTERN EUROPEAN COUNTRIES
AGENDA FOR ACTION**

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FOREWORD

Thesereportsinthisdocumentwerepreparedforaworkshopon“BuildingCapacityintheEnvironmental GoodsandServicesIndustryinCentralandEasternEuropeanCountries”heldon25-26November1996 inSzentendre,Hungary. TheworkshopwasundertakenaspartoftheprogrammeoftheOECDAdvisory GrouponIndustryandEnvironmentinCentralandEasternEurope(AGIE),undertheaegisoftheCentre forCo-operationwiththeEconomiesinTransition(whichwassucceededin1998bytheOECDCentrefor Co-operationwithNon-Members).

PreparedjointlybytheOECDandtheRegionalEnvironmentalCenterforCentralandEasternEuropean Countries(REC),theworkshopaimedtoidentifyandanalysebarrierstodevelopmentoftheenvironment industry, to discuss practical solutions to foster growth in this sector, and to formulate an Agenda for Action.

Discussion was principally based on the results of the two surveys of environmental goods and services enterprisesintheregionandonageneraloverviewofconditionsfordevelopmentofthisindustryreported in this document. The OECD conducted one of the surveys focusing on analysis of barriers to developmentintheVisegradcountries (theCzechRepublic,Hungary,PolandandtheSlovakRepublic) andRussia, whiletheRECfocusedontheanalysisofthefeaturesofthisindustryinBulgaria, Croatia,RomaniaandSlovenia.

Theworkshopconcludedthatcommonbarrierstodevelopmentoftheenvironmentalgoodsand servicesindustry mainlyrelateto:

- *weak development of the environmental market* due to lack of comprehensive environmental regulation or weak enforcement; and insufficient information on environmental policies and regulations;
- *poor development of environmental goods and services supplying firms* due to difficult access to credit and finance; weak general and specific managerial skills; and shortage of general market information.

IntheOECD,theworkontheenvironmentindustrywasorganisedbyGrahamVickeryandMariaIarrera (bothfromtheDirectorateforScience,TechnologyandIndustry).IntheREC,theworkwasorganisedby JernejStritihandWinstonBowman. Theopinionsexpressedarethoseoftheindividualauthorsanddo notnecessarilyreflecttheviewsoftheirorganisationoroftheOECD. Thereportispublishedunderthe responsibilityoftheSecretary-GeneraloftheOECD.

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AGENDA FOR ACTION

In November 1996, the Organisation for Economic Co-operation and Development (OECD) and the Regional Environmental Center (REC) co-hosted a workshop on building capacity in the environmental goods and services supply industry in the Central and Eastern European Countries (CEECs) in Szentendre, Hungary. The context for this workshop was the recognition that the development of a strong domestic environment industry in the CEECs can make a major contribution to enable enterprises to better integrate cleaner technologies and environmental practices in production and more generally improve environmental performance. (See Ministerial Conference on "Environment for Europe" held in Sofia in October 1995.)

On the basis of the results of two surveys of environmental goods and services enterprises active in the region, and an overview of macro-economic and micro-economic conditions for the development of this industry, the workshop discussed and analysed barriers to development in order to identify practical solutions to foster growth, and suggested an Agenda for Action.

Attending the meeting were experts representing environmental goods and services entrepreneurs and business associations from the region -- the Czech Republic, Poland, Hungary, the Slovak Republic, Estonia, Latvia, Lithuania, Russia, Bulgaria, Romania, and Slovenia -- along with financial institutions, the European Commission and the European Bank for Reconstruction and Development (EBRD). Discussion focused on factors which were identified as crucial for the development of the environment industry: access to financial resources and to information, environmental regulations, management skills and demand for environmental goods and services.

Barriers to development of the environmental goods and services industry

Environmental goods and services entrepreneurs, representatives from business associations and from international financial institutions regarded the various obstacles to development of the environment industry as differing in importance. Entrepreneurs mainly stressed difficulties in having *access to credit and finance*.

Barriers to credit and finance are mainly related to discrepancies between supply and demand for financing: on one side young and inexperienced small enterprises and on the other side conservative and sometimes inefficient financial systems. In general, financial markets in CEECs are weak and characterised by high interest rates and by financial institutions which are not fully developed. In particular, the environment industry in Central and Eastern Europe faces barriers in accessing credit and finance which are typical of emerging markets.

This industry, although it is growing rapidly, is still perceived by investors as bearing a high risk for investments. Markets for environmental goods and services are not yet large and stable, and the environment industry is often composed of young small and medium-sized enterprises.

Banks for the funding of projects require guarantees such as a good cash flow and collateral, which young companies are not normally able to provide. Moreover, generally high interest rates for credit do not facilitate the use of short term loans.

International financial institution representatives underlined that there are many programmes in the region making available finance and credit for either investments in environment projects or in the environment industry. Most of these programmes have experienced difficulties in disbursing their funds because borrowers do *not have sufficient experience in preparing either a good business plan or substantive financial analysis of their projects*. Lack of access or difficult access to information on availability of finance have also hindered development of environmental goods and services enterprises.

The existing high level of technological knowledge and technical education, witnessed by a large number of new enterprises created as spin-offs from technical institutes, universities or other technical organisations, can sustain the growth of the environment industry. However, technically-oriented entrepreneurs lack *general and specific management skills*, which often hinder development of their business.

In general, *access to information* affects growth of this industry. Information and understanding of environmental regulations and markets are very important to environmental goods and services enterprises. Lack of information on *environmental policies and regulations and weak enforcement of regulations* prevent enterprises on both supply and demand sides from perceiving correctly the dimension, development and structure of environmental markets.

Differences in the state of advancement of the transition to market economies also affect growth of the environment industry. Countries such as the Czech Republic, Hungary and Poland, which are more advanced in terms of institutional development, have as a result better conditions for the start-up and development of new enterprises than other countries in the region. Greater economic stability and more efficient financial markets along with comprehensive and realistic environmental regulation and better enforcement have positive effects on the development of environmental markets and therefore of the environment industry in many CEECs.

In conclusion, environmental goods and services enterprises in this region are facing common barriers to development:

- supply: difficult access to credits and finance; lack of general and specific managerial skills, and lack of general market information;
- demand: lack of comprehensive environmental regulation and weak enforcement; lack of information on environmental policies and regulations.

Practical solutions to overcome barriers to development

During the workshop, the two-way relation between the supplying industry and the demand for environmental goods and services was strongly underlined. Growth in the environmental market will create demand, while good, low-cost, practical environmental solutions proposed by the supply side can foster development of demand.

Environmental markets will expand, if *implementation and enforcement of environmental regulations become more consistent* at national and local level in most countries. More transparent environmental policies and regulations and in-depth analysis of the size and structure of environmental markets in this region will also boost demand for environmental goods and services, by providing entrepreneurs, both on the supply and demand side, with a clearer picture of future environmental requirements.

For several CEECs, eventual membership of the European Union will require them to enforce *environmental regulations*, which will foster rapid growth and reshape demand for environmental goods and services. For all countries including those not currently near EU membership, better market analysis at all levels will allow a clearer picture and estimation of business opportunities.

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Governments should amend legal and fiscal regulations to facilitate development of small and medium enterprises and increase dialogue with environment industry associations or specialised business associations to *improve the general business environment for small and medium-sized firms*.

Easier access to credit through special funds for environmental investments and for environmental goods and services enterprises will be important for the development of the environment industry. Existing financial institutions, which already make available special finance and credit lines to foster development of this sector (e.g. credits in the form of soft loans for production of equipment; planning and consulting; modernisation; environmental services), should strengthen mechanisms to raise awareness of existing financial programmes.

The experience of the Polish Environmental Fund, whose success is based on its independence from the environment ministry, direct link with Parliament and large and stable financial resources (generated from high environmental charges and substantial fines) may not be repeated in other CEECs. Indeed, proposals for environmental funds in other countries have met with resistance and have not been considered a priority for allocation of scarce funds.

General access to information can be improved by supporting activities of existing specialised business associations. These institutions can provide a forum for discussion at both multi-country regional level and at national level to promote information exchange on different subjects: sources for credits and finance, training courses, assistance programmes etc. Joint ventures with Western companies and improved exportabilities of environmental goods and services enterprises could also be promoted.

Training courses should be organised on a continuous basis to fulfil needs of entrepreneurs for *managerial skills* to organise business more efficiently and improve enterprise performance. They should focus on issues such as: better understanding of markets, how to start a company, how to prepare a project for potential investments and manage business plans, organisational and marketing techniques. These kinds of training courses will help spread a market-oriented culture among enterprises.

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Agenda for action

The development of more stable demand for environmental goods and services, improvement of financing mechanisms, better information on environmental regulations and markets and on access to credit, and support for continuous management training were suggested as the main steps which the different stake-holders should consider to foster development of the environment industry. These suggestions are organised below into a focused Agenda for Action, which identifies who should undertake different actions.

The importance of repeating this kind of workshop for an individual country or with a smaller and more homogenous group of countries was widely stressed. Such workshops should focus on the practical implementation of the Agenda for Action and should involve representatives of the Central and Eastern European governments and a larger number of entrepreneurs from individual countries to ensure broader implementation and impact of the Agenda.

AGENDA FOR ACTION

Actions	Actors
<ul style="list-style-type: none"> • Develop demand for environmental goods and services <ul style="list-style-type: none"> ⇒ Strengthen environmental regulation ⇒ Improve enforcement of environmental regulation at national and local level ⇒ Improve transparency of environmental policies and regulation by increasing dialogue between policy-makers and enterprises ⇒ Promote cleaner production and waste minimization programmes 	<p>National governments and Local authorities</p> <p>National governments and Local authorities</p> <p>National governments and Local authorities, Business or industry associations, European Union (PHARE), REC, OECD</p> <p>REC, Existing networks, Environmental goods and services enterprises, OECD</p>
<ul style="list-style-type: none"> • Foster development of small and medium-sized environment enterprises <ul style="list-style-type: none"> ⇒ Improve local legal and fiscal regulation ⇒ Promote joint ventures with Western companies ⇒ Improve exportabilities of SMEs ⇒ Enable exchange of information and provide a forum for discussion (on a country, media basis) through specialised business associations (e.g. one stop shop centres) at regional and national level 	<p>National government and Local authorities</p> <p>Business or industrial associations</p> <p>Business or industrial associations, Export banks, EBRD</p> <p>OECD, European Union (PHARE), REC, Existing networks, Environmental goods and services enterprises</p>
<ul style="list-style-type: none"> • Improve access to credit <ul style="list-style-type: none"> ⇒ Raise awareness of credit availability ⇒ Explain advantages of different sources of financial aid ⇒ Improve awareness of equity funds ⇒ Compile and disseminate a directory of financial support options 	<p>OECD, Financial institutions</p> <p>OECD, Intermediary institutions, Specialised investment banks</p> <p>EBRD, Specialized investment banks</p> <p>Environmental projects, Banking sector, EBRD, European Union (PHARE), Intermediary institutions</p>

Actions	Actors
⇒ Promote greening of banks (e.g. programmes to make banks evaluate the environment impact of projects, or aware of the needs for environment investments)	EBRD,EuropeanUnion(PHARE),Financial institutions
⇒ Creditguaranteeschemes	Financialinstitutions,Nationalgovernmentand Localauthorities
<ul style="list-style-type: none"> • Providespecialenvironmentalfunds 	
⇒ Foster financial preference for the environment industryorforenvironmentinvestmentingeneral	Financialinstitutions
⇒ StrengthentheroleofEnvironmentalFunds	Governments,Financialinstitutions,EBRD, EuropeanUnion(PHARE)
⇒ Estabilishorencouragespecializedequityfunds	Financialinstitutions
<ul style="list-style-type: none"> • Provide information on markets, technologies and legislation 	
⇒ Estimate and publicise the impact of environmental regulation on the market for environmentalgoodsandservices	Governments,EuropeanUnion(PHARE),REC, Localconsultants
⇒ Estimate and publicise the impact of approximation to European Union environmental regulations	EuropeanUnion(PHARE)
⇒ Survey environment markets and industry size andstructurein-depth	REC,Nationalactors,Localconsultants
⇒ Spread market information through newsletters, andothermechanismsincludingthroughexisting networks	OECD,EuropeanUnion(PHARE),REC,Existing networks
⇒ Organise national meetings of existing networks to increase dialogue with policy-makers and to formalizeinformalcontacts	OECD,EuropeanUnion(PHARE),REC, Governments

Actions	Actors
<ul style="list-style-type: none"> • Improve management strategy planning and organisationskills 	
⇒ Assess the demand for training	Financial institutions, REC
⇒ Improve capacity in business planning and business project preparation“	Intermediary Institutions, Business or industrial associations, Local consultants
⇒ Provide training in general business management and organisational techniques (e.g. MBA, techniques such as Environmental Impact Assessment)	National government and Local authorities. European Union (PHARE), REC, Private sector supported by external funds, Professional associations and educational institutions
⇒ Training the Trainers” to provide managerial and technical advice	EBRD, European Union (PHARE), Local authorities, Universities, Local policy-makers, Private institutions
⇒ Assist in certifying professional skills and qualifications	OECD, REC
<ul style="list-style-type: none"> • Improve marketing skills 	
⇒ Provide training in market research techniques for assessing market needs and trends and evaluating customer satisfaction	Governments, European Union (PHARE), REC
⇒ Improve language skills	Governments, European Union (PHARE), REC

**THE ENVIRONMENTAL GOODS AND SERVICES ENTERPRISES
IN THE CZECH REPUBLIC, HUNGARY, POLAND, THE SLOVAK REPUBLIC
AND RUSSIA: SURVEY RESULTS**

by Maria Iarrera

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Introduction

A survey of environmental goods and services enterprises was launched by the Organisation for Economic Co-operation and Development (OECD) in co-operation with the Regional Environmental Center (REC) to have a better understanding of this industry. In designing the survey and the subsequent questionnaire, the main interest was to identify the major barriers to development of this industry, which are related to either the general economic framework or the enterprises themselves, and investigate practical solutions to overcome these obstacles.

The questionnaire (see Annex 2 for details) was sent in June 1996 to almost 250 environmental goods and services enterprises in the Czech Republic, Hungary, Poland, the Slovak Republic and Russia. The sample was selected from the REC Environmental Business Directory and from the St. Petersburg Green Pages on the basis of three main criteria: ownership (private enterprise), size of the enterprises (small and medium enterprises), language skills (English speaking).

In the Czech Republic, Hungary, Poland, and the Slovak Republic respondents were first contacted by phone, while in Russia the questionnaire was mailed without a prior contact. The total number of respondents is sufficient to give a good general picture of the major problems which environmental goods and services enterprises are facing in this region, except for Russia, where the response rate is too small to be significant.

The average response rate was 40 percent, which is relatively high for a postal questionnaire. Of the 250 firms that were sent the questionnaires, 101 had responded by September 1996. Of the 101 responses, only 9 responses were not taken into consideration, being incomplete. The response rate is higher (63 percent), if we do not consider Russia, for which the response rate was very low (6 percent).

This paper will report and analyse the survey results by first considering barriers to development related to the general economic framework and specific barriers to enterprises, and secondly proposing practical solutions and priorities for action. Analysis will focus both on regional and more general features, and on national and more specific characteristics of the environmental goods and services industry. Results from the survey of environmental goods and services were used to estimate a series of Logit models, in order to clarify the determinants of the Agenda for action. The outcomes of these estimates are discussed in Annex 1.

Structure of the environmental goods and services industry and markets

Environmental goods and services enterprises in Central and Eastern Europe are equally distributed between the manufacturing and services sector: approximately 50 percent in manufacturing and 50 percent in services. In most cases, enterprises which produce environmental goods as their main activity, also provide the related services.

Environmental goods and services enterprises in Central and Eastern Europe are mainly active in markets for the treatment of water and waste-water and solid waste. On average 30 percent of enterprises in the region are producing goods or services for water and wastewater treatment, 23 percent for solid waste management, and 21 percent of the enterprises are producing air pollution control goods and services. Recent environmental regulations in these countries have given special attention to water and waste-water, waste management, and air pollution since they were recognised as being the larger and more urgent environmental concerns in this region.

Only 8 percent of the enterprises are providing goods and services to remediate water, groundwater and soil from past pollution and 3 percent to abate noise pollution. Most enterprises are operating in more than one environmental segment, which indicates that environmental goods and services enterprises are in general diversified (see Table 1).

The Slovak Republic and Russia differ from this distribution, with respectively 75 and 16 percent of environmental enterprises in services. The different state of advancement of economic reforms and structure of production may explain this divergence in the case of the Slovak Republic, while the small number of respondents certainly affects the result in the case of Russia.

Table 1. Structure of environmental goods and services production

	Czech Republic	Hungary	Poland	Russia	Slovak Republic
Specialisation					
Services	58%	50%	56%	n.s. ¹	75%
Equipment	42%	50%	44%	n.s.	25%
Segments					
Air	18%	12%	22%	44%	6%
Water and wastewater	23%	35%	28%	33%	33%
Solid waste	23%	29%	28%	11%	35%
Remediation	18%	4%	6%	-	13%
Noise	3%	6%	6%	-	-
Others	15%	14%	11%	11%	13%
Affiliated to a foreign company	30%	43%	37%	33%	13%
Interested in affiliation with foreign firms	65%	54%	63%	100%	73%

1. Not significant, since the sample is too small.

Source: OECD survey.

Affiliation with foreign enterprises varies widely among countries: from 43 percent in Hungary to 13 percent in the Slovak Republic. Among those environmental goods and services enterprises which are not already co-operating with foreign firms, more than 50 percent are interested in starting a partnership with them.

The surveyed firms in the environment sector mostly provide their products (goods and services) in order of importance to domestic enterprises, regional authorities and to governments (see Table 2). On average almost 14 percent of the environmental goods and services enterprises export their products to foreign markets. Czech and Slovak enterprises depend more on foreign markets, which could be the result of their recent separation.

The environmental goods and services enterprises in the CEECs are mainly young firms -- most of them were created after 1990 -- which produce a combination of goods and services to curb pollution in water, soil and air. They trade most of their products with private firms active in other industrial sectors, regional authorities and governments. Only a minority are globalised, with 30 percent of them affiliated to foreign firms and only 14 percent active in foreign environmental markets.

Table 2. **Structure of environmental demand**

	Czech Republic	Hungary	Poland	Russia	Slovak Republic
Government	17%	15%	18%	38%	21%
Regional Authorities	21%	22%	24%	29%	17%
NGO	11%	13%	6%	19%	8%
Domestic companies	24%	32%	31%	14%	29%
Foreign Aid	10%	4%	8%	-	12%
Foreign companies	17%	13%	13%	-	13%

1. Data refers to the percentage of enterprises which provide goods and services to clients. Most enterprises provide their goods and services to more than one kind of client.

Source: OECD survey.

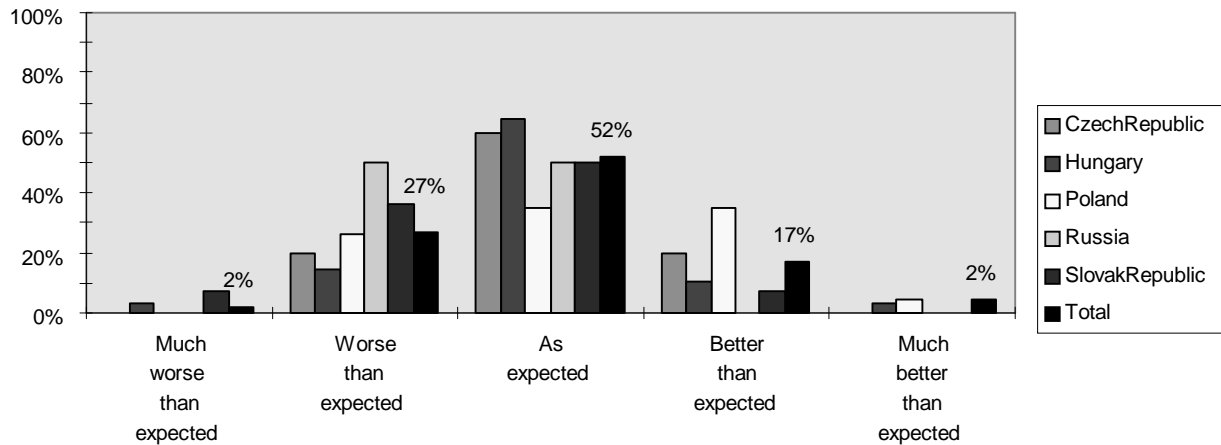
Environmental enterprises' potential for growth

The environmental goods and services industry *is likely to grow* in the future. Most respondents to the questionnaire appeared satisfied with the present state of development of their environmental goods and services enterprise, by declaring that their enterprise is developing either better than expected (17 percent) or as expected (52 percent). Very few of them (4 percent in Poland and 7 percent in the Slovak Republic) declared that their enterprise is developing much worse than expected, while almost 27 percent thought that their development is worse than expected (see Figure 1).

Future *demand* for environmental goods and services *is perceived as growing*, although there is no agreement on the pace. Almost all enterprises in the region forecast growth in environmental markets, 43 percent of enterprises indicated that demand will grow, 39 that it is already growing but slowly, and 19 percent that demand is rapidly growing. The Polish demand for environmental goods and services is more widely perceived as rapidly growing, while for most of the Czech enterprises demand will grow in

the future (see Figure 2). It is very interesting to notice that only one of the respondents has indicated that demand is dropping in the Czech Republic and that none suggested that demand will not grow.

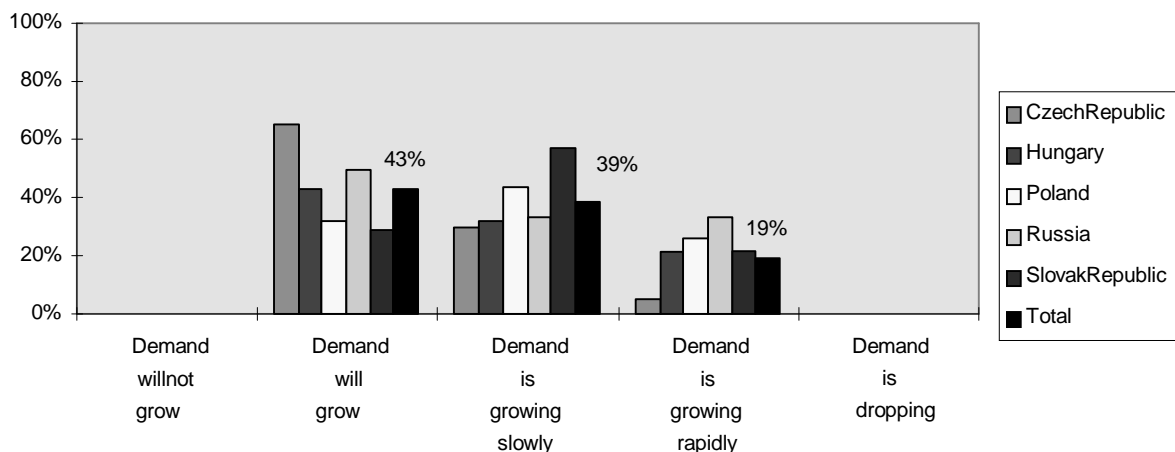
Figure 1. Environmental goods and services enterprises development



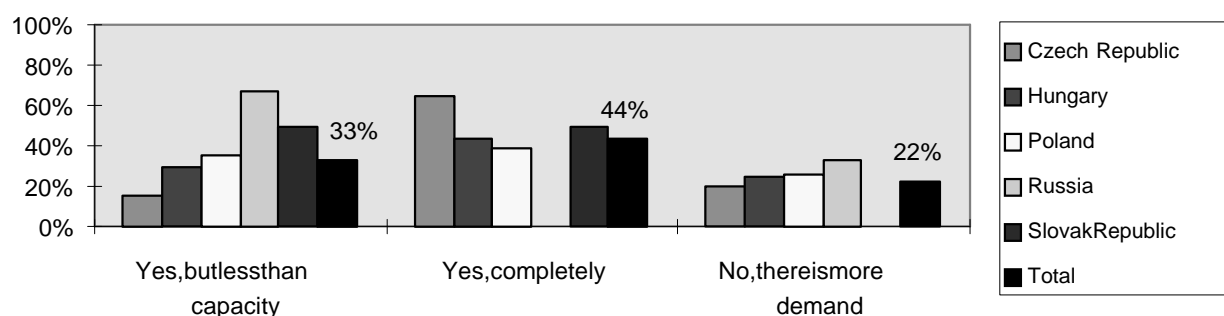
Source: OECD survey

Most of the enterprises are able to satisfy demand for environmental goods and services: 77 percent of respondents meet demand, of which 44 percent do not have any more capacity available. Moreover 22 percent of enterprises perceive that there is more demand than they are able to meet (see Figure 3). Furthermore, it seems that the actual capacity is not sufficient to face the future increase in the demand, since 66 percent of the enterprises which responded are already having problems in satisfying the present demand for environmental goods and services. This suggests that more attention should be paid to facilitating the development of this sector.

Figure 2. Future demand for environmental goods and services



Source: OECD survey

Figure 3. **Enterprisecapacitytomeetdemand**

Source :OECDsurvey

Impedimentstodevelopment

Environmental goods and services enterprises were asked to rate various barriers to growth on a scale of 1 (least important) to 5 (most important). Results were weighted on the basis of this system. To simplify the enquiry, factors significant to the development of this industry were grouped into four categories: general external impediments to development of environmental goods and service enterprises; factors which have affected the start-up of these enterprises; barriers which have hindered development in the past; and factors which most likely will affect the development of this sector.

General external impediments

The most important external factor hindering their development is *access to credit and finance*, which results from weak financial markets. In most CEECs, financial institutions and investment infrastructures are not yet completely efficient, which make financial intermediation expensive in terms of time and interest rates (see Figure 4).

Environmental regulation has been rated as the second most important factor affecting the development of the environment industry. This industry largely depends on the state of advancement of environmental regulations for its development. If enterprises perceive environmental regulation as an impediment to development, it is because of incomplete regulations, weak and uncertain enforcement or difficult access to information on the present state and future trends of the environmental regulation. (The environment industry in OECD countries is affected similarly by regulations and enforcement).

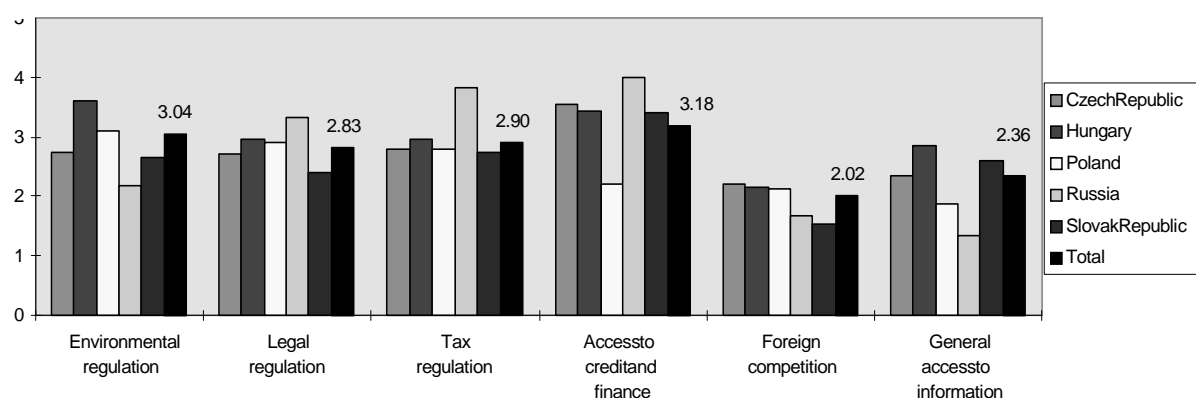
Tax regulation and legal regulation are also perceived as significant impediments for development, while foreign competition is considered the least important barrier to growth. Some enterprises indicated more specifically licensing and patent regulation as extra factors which were impeding the development of their business.

Specific country results slightly differ from this general set of results. For example, in Poland access to credit is only the fourth important factor affecting development of this industry, while the first is environmental regulations. Poland has recently reduced interest rates and has introduced measures to

liberalise capital markets and has a dedicated Environmental Fund, which is effectively devolving funds for environmental projects both on the supply and demand side.

Environmental regulation is the most important barrier to development also according to Hungarian enterprises. For Hungary this outcome is the result of less advanced environmental regulation, while for Poland it is more a problem of uncertain enforcement, since Polish regulation is known as one of the more advanced along with the Czech regulation. Foreign competition remains in all countries the least important factor.

Figure 4. External impediments to development



Source: OECD survey

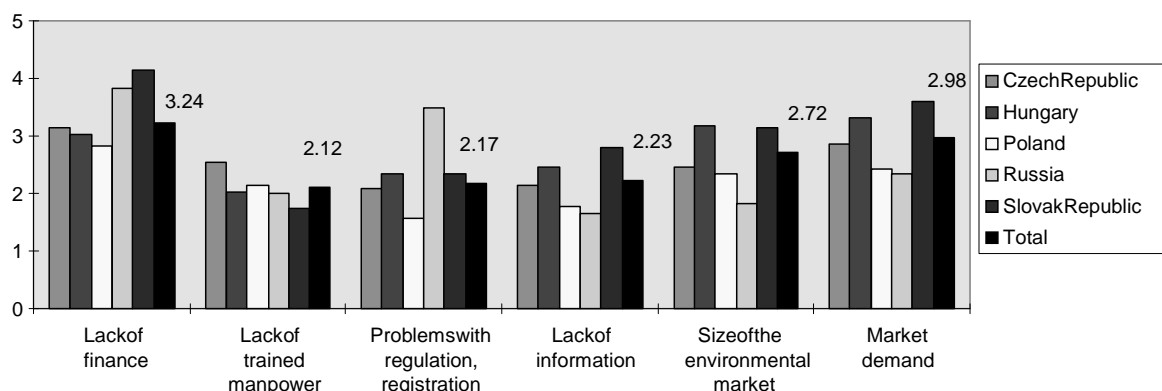
Factors affecting start-up

Entrepreneurs in this region had difficulties in starting-up their environmental goods and services enterprises mainly because of *lack of finance* and *weak demand for environmental goods and services*. These findings largely confirm previous results. If financial markets are not completely efficient, it will be difficult to obtain credit to start up any firm. If environmental regulation is uncertain, not comprehensive or badly enforced, demand and markets for environmental goods and services will be small (see Figure 5).

Trained technical manpower is not a major barrier to start-up environmental goods and services enterprises. These countries have a pool of skilled engineers and technicians. It appears that it is more difficult to get information on fiscal regulation, registration or markets than to obtain trained manpower (see Figure 5).

The only country which differs from this picture is Hungary, where weak demand for products and services is the major obstacle to start-up of environmental business, probably due to less advanced environmental regulation. In all countries, demand for environmental goods and services is in general difficult to identify and market analysis is still a new concept, as enterprises used to work on the basis of centrally designed production plans.

Figure 5. Factors affecting enterprises start-up



Source: OECD survey

In Russia (although results have to be analysed with prudence), enterprises would have greater uncertainty with general regulation and registration procedures (see Figure 5) when starting up a business. In all the countries analysed, enterprises which provide goods and enterprises which provide services rated the different factors affecting business start-up in the same order of importance, even though manufacturing firms normally gave a bigger weight to each of the barriers. Only Polish manufacturing enterprises think that general regulation and registration procedures have been the second important obstacle when they started their business.

Factors affecting development

Lack of finance, high cost of development, marketing problems and lack of information have mainly affected the development of environmental goods and services enterprises in Central and Eastern Europe. High costs of development hinder manufacturing more than services enterprise growth. Difficulties in obtaining general and market information are related to the transition to market economies. Specific country results are very similar to these general results (see Table 3).

Table 3. **Barriers which have hindered the development of environmental goods and services enterprises**

	Czech Republic	Hungary	Poland	Russia	Slovak Republic	Average
Lack of finance	2,95	2,75	3,0	4,83	4,53	3.28
High cost of development	3,30	2,04	2,70	2,83	3,33	2.74
Technical problems with products/services	1,90	1,75	1,61	1,67	1,80	1.75
High production costs	2,05	1,96	1,74	2,33	2,33	2.01
Marketing problems	2,95	2,61	2,48	3,00	3,07	2.75
Problems hiring skilled employees	2,65	2,04	2,13	0,83	1,93	2.10
Organisational problems	2,50	2,04	1,91	1,83	2,67	2.20
Labour relations	1,60	1,89	1,13	1,17	1,47	1.52
Lack of information	2,50	2,82	2,17	3,17	3,07	2.65
Lack of networking opportunities	2,25	1,29	2,35	3,17	2,73	2.12

Note: Scale, 1=least important, 5=most important

Source: OECD survey

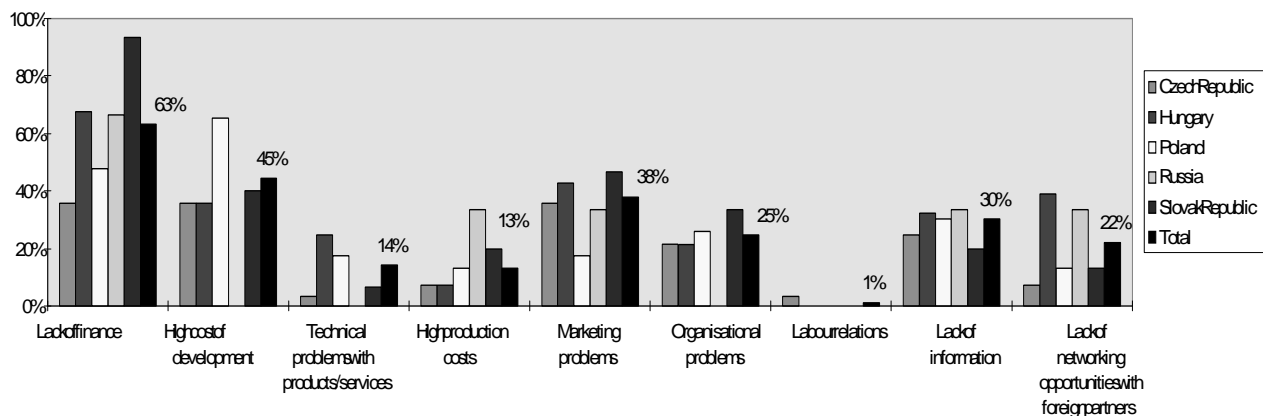
Barrier to future development

Lack of finance will continue in future to affect development of environmental goods and services enterprises. Customers ability to pay (both government and private) will be an important factor affecting future development. *High cost of development* will also create difficulties to enterprises, especially in Poland. The combination of high cost of development and lack of finance will very likely slow the growth of this industry.

Marketing problems and *lack of information* are the third and fourth most important barriers to future development. Barriers to future development are very similar to factors which have hindered development in the past (see Figure 6). Polish environmental goods and services enterprises, which differ from the general picture, find it more difficult to face high costs of development than to find finance, and marketing problems are far less important than lack of information. Some enterprises mentioned that lack of knowledge of new technologies and uncertain development of environmental regulation will hinder their growth.

These results are very interesting when compared with the forecast growth of demand for environmental goods and services. If demand grows because of increasing environmental concern and improved economic conditions in this region, it will be a priority to provide efficient financial mechanisms to help growth in this industry.

Figure 6. Barriers which will hinder the development of environmental goods and services enterprises



Source :OECD survey

Overcoming barriers

Enterprises' performance could be improved if they had a *better understanding of the market* and if they were *more efficiently organised*. Easier access to credit is the second most important instrument to overcome barriers to development (see Table 4), even though it is usually seen as most important general problem by firms in CEECs (see above).

By the importance which they attach to *better understanding of the market* and *more efficient organisation*, firms clearly recognise that improving their own ability is crucial for better performance. The fact that access to credit is not seen as the single most important factor to overcome barriers could be explained by looking at two aspects: on one side the scarcity of finance and the generally high interest rates which characterised the financial market of these countries, and on the other side an industrial sector which has been heavily in debt, which created a lot of problems during the privatisation process. It could also be the result of the wish to be more independent. Under the old industrial organisation, enterprises could easily have access to credit through the Ministry of industry, but they did not have any freedom in the decision making process. Now, firms may be more determined to maintain the control on ownership.

Easier access to information in general and more specifically to technical knowledge on new environmental technologies is strategic to development of this industry in the region. Manpower with better managerial skills, which include accounting practices, market analysis and marketing techniques will improve enterprises' performance by increasing internal efficiency.

In Hungary, entrepreneurs strongly believe that by reaching a better understanding of the market they will be able to perform more efficiently. In Poland, where the market economy is slightly more advanced, entrepreneurs need more efficient organisation and better managers to help the development of their business (see Table 4).

In both the Czech Republic and the Slovak Republic, it is important for entrepreneurs to gain a better understanding of the market and to have easier access to credit to help development. Slovak entrepreneurs need more efficient use of the *labour force*, while Czech enterprises require more *skilled manpower*.

Russian entrepreneurs differ completely from all the other countries. They prefer to improve the access to credit and the flexibility in new product development to help overcome obstacles to the development of environmental goods and services.

Table 4. **Best ways to overcome barriers to development of environmental goods and services**

	Czech Republic	Hungary	Poland	Russia	Slovak Republic	Average
Better understanding of general economic framework	1.9	2.3	2.0	2.2	2.3	2.14
Better understanding of environmental regulations	1.8	2.7	1.9	3.0	2.3	2.32
Better understanding of market	3.1	4.4	2.4	3.5	3.4	3.34
Easier access to credit	2.8	3.3	2.1	4.8	3.4	3.27
Easier access to general information	2.5	3.1	1.9	2.0	2.9	2.48
Lower production costs	2.7	2.6	2.1	2.5	2.7	2.52
Flexibility in new product development	2.5	2.2	2.6	3.7	2.6	2.70
More skilled manpower	2.9	2.6	3.0	1.3	2.2	2.41
Access to more technical knowledge	2.6	2.9	2.6	1.2	2.7	2.38
More efficient organisation	2.7	3.0	3.0	3.7	3.2	3.11
More efficient use of labour	2.5	2.8	1.9	2.2	2.8	2.42

Note: Scale, 1=least important, 5=most important

Source: OECD survey

Entrepreneurial training is the most common practical solution to be undertaken by enterprises to overcome problems (see Table 5). *Technology transfer* through co-operation with foreign enterprises, *development of networks among enterprises*, and *dissemination of information* among enterprises are the other most advocated actions which firms wish to undertake to foster their business growth. Even though firms had identified access to credit as a major problem, fewer enterprises intend to apply for credit at the conditions actually offered on the financial market as a practical step to overcome their difficulties. Among the types of financial capital for business, enterprises prefer bank loans to equity funds. Business and industry associations are considered less important than independent networking among enterprises.

Entrepreneurs in the Czech Republic will make a stronger effort to have information more efficiently disseminated to increase market opportunities. On the contrary, in Hungary most firms consider undertaking co-operation with foreign enterprises to enable technology transfer and to have better information and access to markets (see Table 5).

Enterprises judge trade and promotion through participation at trade fairs relatively highly, although some of them consider that Western European markets are still difficult to access, so they prefer to limit themselves to the eastern market. In the Czech and Slovak Republics trade in environmental goods and services is very much seen as a possible solution to foster development of this industry. Counselling services and vocational training are rated as only moderately important ways to help the development of

environmental goods and services enterprises and these are particularly low in Poland, where enterprises are focused mainly on entrepreneurial training to overcome difficulties and improve performance.

Table 5. Practical steps which enterprises intend to undertake to overcome their difficulties

	Czech Republic	Hungary	Poland	Russia	Slovak Republic	Average
Vocational training	2.8	2.4	1.1	1.7	2.5	2.09
Entrepreneurial training	3.1	2.9	3.5	3.0	3.1	3.11
Finance capital for business			0.5			0.10
Bank loans	2.1	2.1	0.9	1.8	2.2	1.83
Equity funds	1.3	2.3	1.3	2.0	1.5	1.67
Other sources	1.8	2.6	0.9	3.5	2.9	2.33
Technology transfer through co-operation with foreign enterprises	2.5	3.6	2.4	3.7	2.8	2.99
Development of networks among enterprises	2.9	3.3	2.7	2.8	3.0	2.95
Dissemination of information among enterprises	3.5	2.8	2.2	2.8	2.7	2.80
Establishment of business/industrial association	2.1	2.2	1.9	2.5	1.9	2.11
Counselling services	2.5	2.4	1.7	1.2	1.9	1.91
Trade and trade fair promotion	2.9	2.3	2.0	1.5	3.3	2.39
Others	--	0.2	--	--	--	

Note: Scale, 1=least important, 5=most important

Source: OECD survey

Sources of support

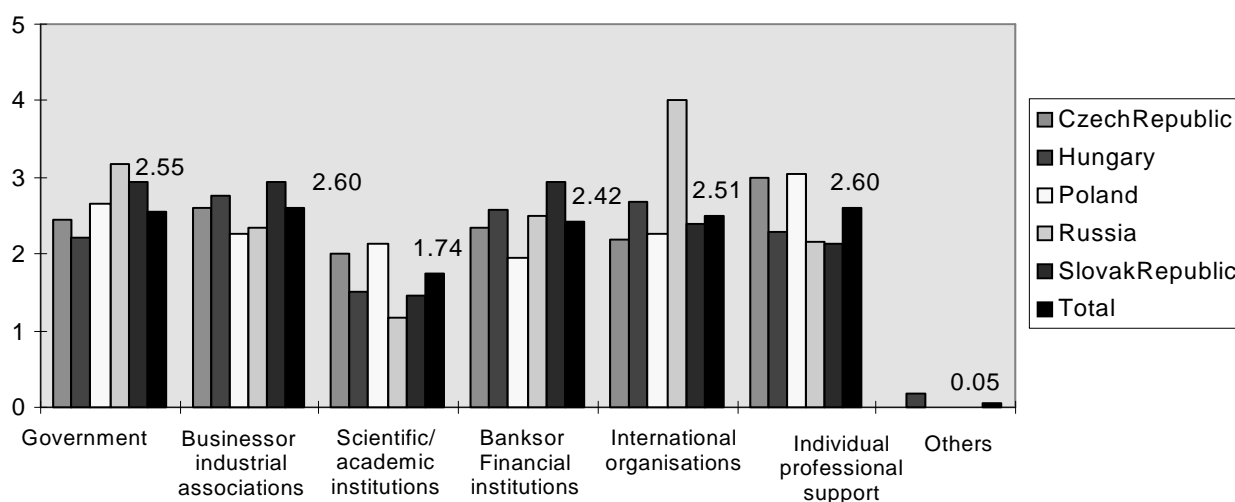
Individual professional support and business or industrial associations were indicated as the most effective sources of external support for development of the environmental goods and services supply industry. According to enterprises, governmental support and international aid would also be important. Banks, financial institutions and academic institutions, on the other hand, are rated as less significant (see Figure 7).

Countries' results are very similar to the general findings. Most of the environmental goods and services enterprises prefer to rely on business associations and individual professional support for help in designing or shaping their business. Firms also recognise the important role that governments play in fostering the environment industry (see Figure 7).

In general, environmental goods and services enterprises indicated that by improving their understanding of the market and their internal organisation, they will overcome most of the barriers to development of their business. Practically, they intend to enrol in entrepreneurial training courses to acquire the

management skills which will enable them to be more effective on the market. Firms mainly rely on industrial associations or on individual professional support for assistance. Government and international organisations are also judged important in providing help and assistance to the development of this industry.

Figure 7. Most effective sources of support for enterprise development



Source: OECD survey

Financial support

The nature and size of enterprises determines the nature and size of financial needs. In the case of the CEECs, the environment industry is mainly composed of young small and medium-sized enterprises which usually require modest funds to finance future development. On average, 44 percent need less than US\$100000, 38 percent between US\$100-300000, 11 percent between US\$300-500000, 5 percent between US\$500000-1million, and 1 percent more than US\$ 1million. Specific country results confirm this general picture (see Table 6).

Table6. Financialneedsforfuturedevelopment

	Czech Republic	Hungary	Poland	Russia	Slovak Republic
LessthanUS\$100000	40%	32%	48%		60%
BetweenUS\$100-300000	30%	29%	35%	67%	33%
BetweenUS\$300-500000	5%	18%	9%		7%
BetweenUS\$500000-1million	5%	4%			13%
MoretheUS\$1million		4%		33%	7%

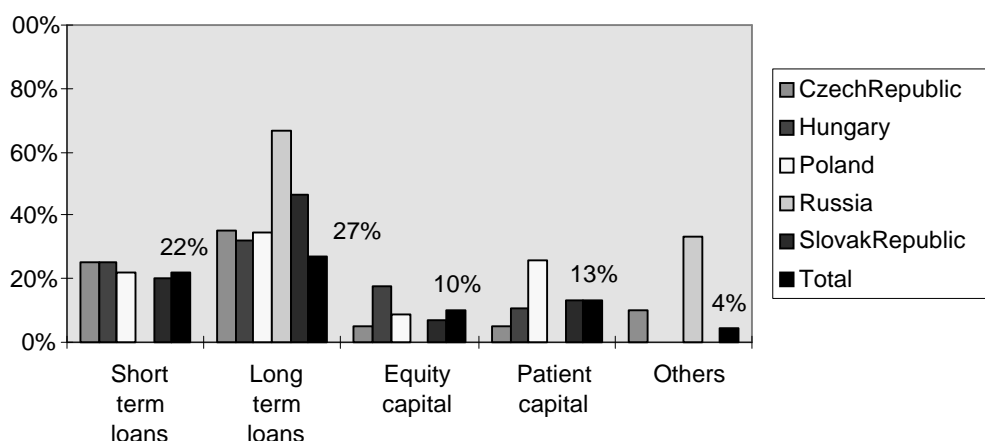
Source:OECDsurvey.

Financial institutions are usually reluctant to lend small amounts, while --as mentioned above-- small enterprises prefer to increase their performance to enable them to invest in future development rather than asking for credits. Nevertheless, 76 percent of the environmental goods and services enterprises have applied for financial aid. Most firms prefer long term loans (27 percent of the total), rather than short term (22 percent), while 10 percent of the firms have used equity funds and 13 percent other kinds of patent capital. The preference for long term loans can be explained by the higher interest rates which are normally applied on short term loans (see Figure 8).

This result confirms the previous outcomes. Although entrepreneurs apply for external financial aid, they think that by improving their managerial skills they may become more efficient and be able to reduce their financial needs.

Enterprises in Poland have very rarely applied for equity funds, while in Hungary firms seem to use equity funds for financing their needs more than in any other country. In the Czech Republic and the Slovak Republic, entrepreneurs mainly employ long term loans, and very few equity funds.

Figure8. Kind of external finance used by environmental goods and services enterprises



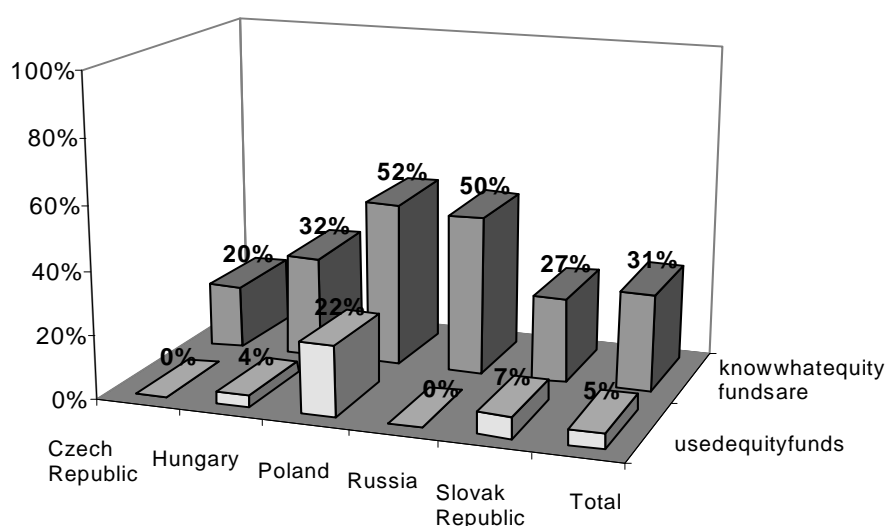
Source:OECDsurvey

Difficulties met by international financial institutions in disbursing equity funds in most CEECs suggest that there are major problems with acceptance of this kind of finance. Results indicated that lack of specific information hindered the use of equity funds in the region. On average only 31 percent of environmental goods and services enterprises knew what equity funds are and, as a direct consequence, only 5 percent have used them (see Figure 9).

Although the share of enterprises which declare that they have used equity funds differs from the previous results (compare Figure 8 and Figure 9), it remains always very small. It will be necessary to carry out some kind of further test or in-depth analysis to be able to improve understanding of barriers to use equity funds in CEECs.

In general, enterprises in most CEECs do not know what equity funds are, therefore they do not apply for them. According to these findings, Poland seems to be the country where enterprises knew and used equity funds more than all the other countries, while the Czech Republic is the least informed and has the smallest number of enterprises which used equity funds.

Figure 9. Understanding and use of equity funds in environmental enterprises

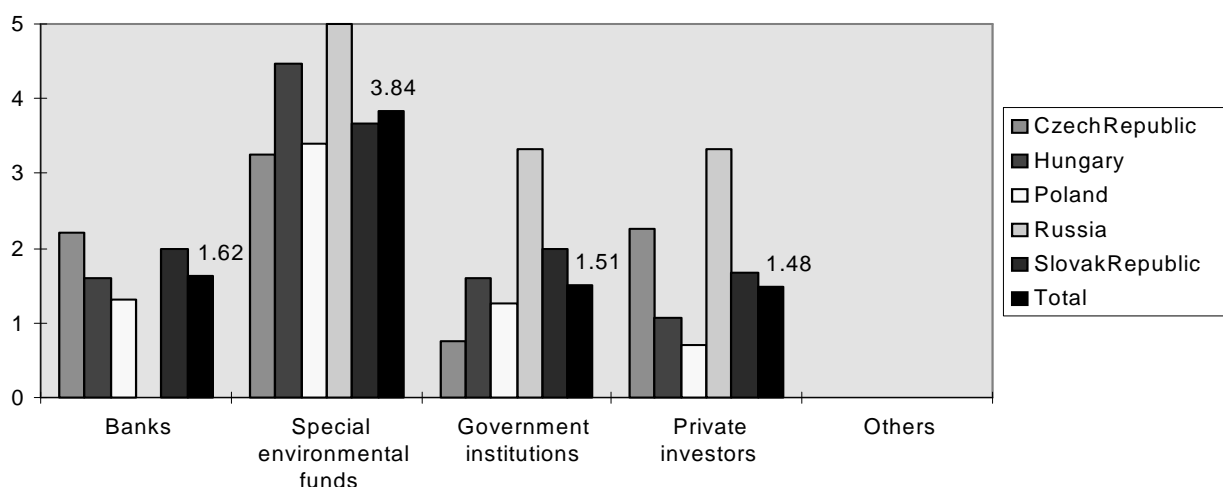


Source: OECD survey

Among financing institutions, *environmental funds* are seen to be by far the more suitable institutions from which to obtain finance. Banks are considered the second best institution for finance aid, government institutions are third best, while private investors are judged a less attractive source of financing.

National environmental funds usually lend money at a lower interest rate than other financial institutions. Banks and government institutions are traditionally the main actors in the financial market. The stock market is still young in this region; enterprises which were surveyed are small or medium sized, and in general prefer to maintain control of their own business, therefore they are cautious with private investors (see Figure 11). A specific credit line or funding for the environment industry were consistently indicated as efficient instruments to foster development of this industry.

Figure 10. Best financing institutions



Source: OECD survey

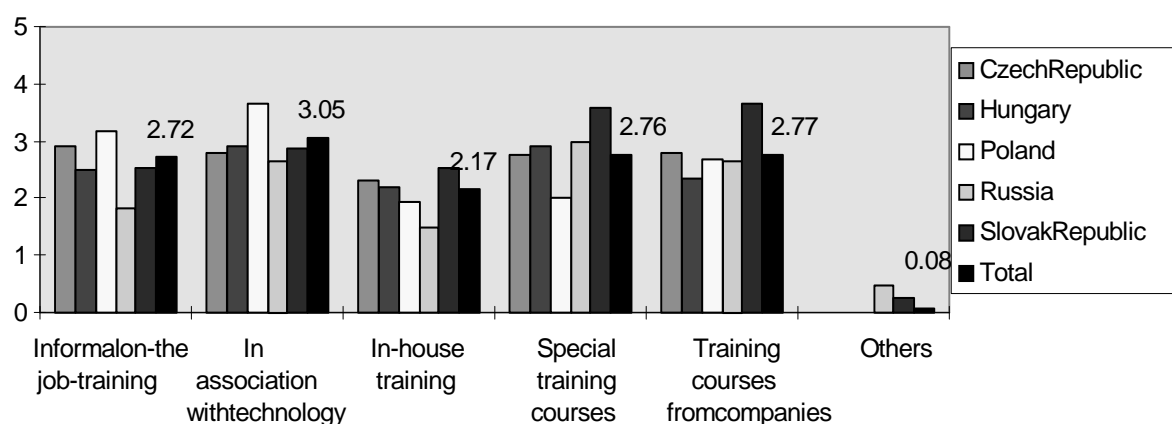
Enterprises in the Czech Republic differ slightly from this picture. They prefer to rely on banks and private investors more than on governmental institutions. On the contrary, Slovak firms find it easier to deal with banks and government institutions than with private investors. Results for the other countries are very similar to the total results.

Developing small and medium-sized enterprises

Most institutions which deal with development and co-operation in the Central and Eastern European countries have supported and/or run training courses and other kinds of technical assistance such as: professional training for start-up enterprises, professional training for SMEs, twinning programmes with Western partners, technology transfer, funding and assistance for special groups of companies, credit mechanisms for SMEs, tax incentives, specific help for environmental enterprises and data bases on environment enterprises. These initiatives, which help small and medium-sized enterprises, are well known by many enterprises in the region. In general, enterprises have used most of them, although professional training, and twinning and technology transfer programmes were perceived as the most useful.

Training for enterprises' personnel has also been advocated as an important way to overcome obstacles to development by most of the surveyed enterprises. Training courses were seen to be the best when provided to firms in association with technology transfer and on an informal on-the-job basis (see Figure 11). Whether training courses are run either by different companies working in the same field or by a specialised institution, they were seen to be equally effective.

Figure 11. Best forms of training for environmental goods and services enterprises



Source: OECD survey

Country results show that Polish enterprises prefer informal training in association with technology transfer, while Slovak enterprises prefer special training courses from different companies working in the same field. In Hungary, the Czech Republic and Russia, entrepreneurs have not indicated a strong preference for any of the different types of training courses.

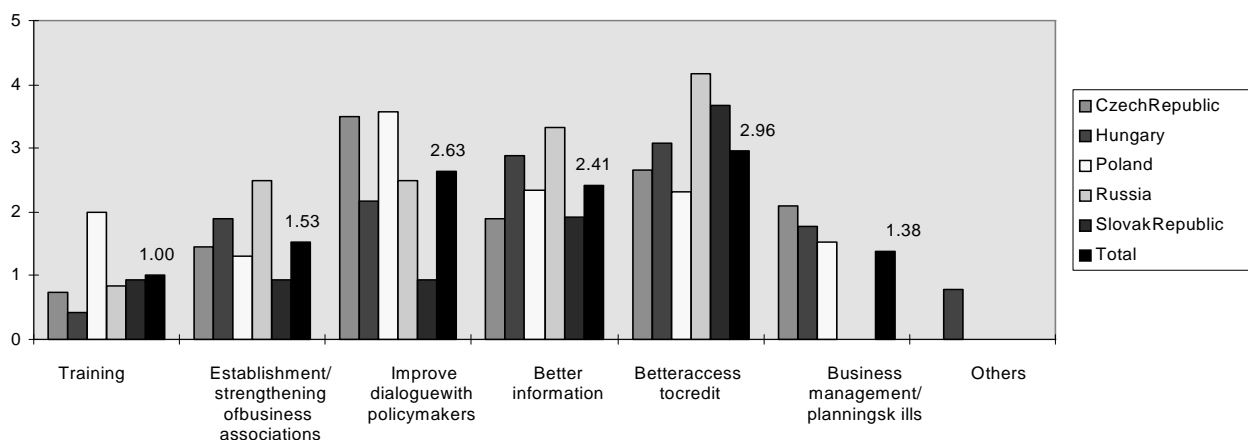
Agenda for action

Enterprises were asked what is the highest priority need for action to strengthen the industry.

First, access to credit and to financing facilities should be improved. In general, entrepreneurs in the environmental goods and services industry in this region believe this is an important task for governments and financial institutions.

Second, dialogue with policymakers should be improved. They judge that policymakers should increase transparency and strengthen relations with industry to better understand industry needs. This would also improve information on environmental and economic policy, which would help to reduce uncertainty and risk for enterprises (see Figure 12).

Figure 12. Agenda for action



Source: OECD survey

Third, it is important to improve general information and more specifically on new technologies, networking opportunities and markets. This need was already mentioned by enterprises with regard to obstacles hindering past and future development, and to solutions to overcome barriers to growth. In general, government as much as industrial associations and enterprises themselves are the most suitable mechanisms to foster diffusion of better information.

Fourth, it is necessary to establish or strengthen business and industry associations. In most of the countries analysed, business or industrial associations were already established. However, they need to assure better contact on one side with environmental goods and services enterprises and on the other side with government and financial institutions (domestic or foreign).

Fifth, enterprises need to undertake action to improve management and planning skills. They indicate that it would be their responsibility and interest to enrol in training courses and to make sure that managers improve their skills. Nevertheless, they welcomed international and national programmes which aim to provide entrepreneurs with management and planning skills.

Sixth, training courses were advocated as a general action to be undertaken. Whether training courses are run either by different companies working in the same field or by a specialised institution, they were seen to be equally effective by entrepreneurs.

Specific country results differ slightly from this general picture. In Poland and in the Czech Republic, enterprises judge it more important to improve dialogue with policy makers than to improve access to credit and financing facilities. This is probably because these two countries have better developed financial markets. Moreover, training courses are considered more significant in Poland than in all the other countries.

ANNEX1

Results from the Logit models

Results from the survey of environmental goods and services were used to estimate a series of Logit models, in order to clarify determinants of what firms considered were priority actions to strengthen the industry. Three models are estimated, in which the probability for an action to be indicated as the most important is linked to: firm's main features; external barriers to development and internal barriers to development.

A multinomial Logit model is chosen, as the dependent variable has six different possible outcomes. To facilitate the model estimation each outcome is considered as if it is independent from the others and six separated equations are estimated for each model. As a result, each dependent variable of the model is equal to one if the action is indicated as the most important and zero otherwise. This simplification is commonly used in the statistical literature.

The estimated multinomial Logit models are shown in the tables which follow. Each coefficient indicates how much more likely (or unlikely) it is for the outcome to be present among firms which indicated that they are part of a particular group ($X=1$) than among those which indicated they are not part ($X=0$). For example, in the first model, (Table 1) which related the priority actions to characteristics of enterprises, the first coefficient indicates that it is highly likely that a firm which is affiliated to a foreign company would state that training would be the priority action.

Table 1 shows results for the Logit model which relates the priority action to the main features of enterprises. *Affiliation to a foreign company* ($X=1$ if an enterprise is affiliated, $X=0$ otherwise), *main activity* ($X=1$ if the main activity is manufacturing, $X=0$ otherwise) and *number of employees* are chosen as most relevant independent variables.

Reading across the table, the estimated coefficients show the relative importance in determining the probability of each action: enterprises which are affiliated to a foreign company would more likely to undertake a training course and improve their management skills. At the same time, those enterprises which are not affiliated to a foreign company would more likely ask for better access to credit.

To be affiliated to a foreign company represents an advantage for environmental goods and services enterprises, as it appears easier to obtain credit and it represents for enterprises an incentive to improve management and planning capacity and undertake training. Therefore, improving links with foreign firms could be a good instrument to foster development of the environment industry in Central and Eastern Europe.

When manufacturing is the main activity, enterprises are more likely to wish to establish or strengthen business or industry associations (although the t-student is low), improve access to credit and improve dialogue with policy makers. The number of employees is in general not relevant in determining the priority action, since most of the enterprises are small or medium-sized.

Table 2 shows results for the Logit model which relates the priority action to the main external barriers to development of environmental goods and services enterprises. *Tax regulation*, *general information*, *environmental regulation*, *legal regulation* and *access to credit* (they all assume the value $X=1$ if the enterprise indicated it affects development, $X=0$ otherwise) are retained as relevant independent variables. The other factors which are indicated as possibly affecting development of the environment

industry in the questionnaire are ignored as they do not add any extra explanatory power to the model. This second model is not able to explain the phenomenon: most coefficients do not give significant results for the t-statistic test for the confidence interval, and do not differ appreciably from each other. As a result it is difficult to say anything sensitive on the likelihood that enterprises would rate priority action according to their barriers to external development. It is possible that the sample is too small compared with the number of independent variables considered in the model.

Table 3 shows results for the Logit model which relates the priority action to the main internal barriers to development of environmental goods and services enterprises. *Lack of finance*, *high development cost*, *marketing problems*, and *lack of information* (they all assume the value X=1 if the enterprise indicated it affects development, X=0 otherwise), result in being the most relevant independent variables. The other factors which are indicated as possibly affecting development of the environment industry in the questionnaire are ignored as they do not add any information to the model (see above).

The outcome of this model suggests that enterprises which face marketing problems in developing their business (e.g. understanding of markets or difficulties in promoting their products) would more likely ask for training courses (although the t-statistic is low), probably to improve marketing skills, the establishment of business or industry association, and better information. Undertaking these three actions will certainly facilitate enterprises' understanding of environmental markets.

Enterprises which indicated shortage of finance as an internal impediment to development, will more likely state that they would need better information (e.g. on the sources and condition of financing) and better access to credit. Enterprises facing high development costs ask governments for better access to credit. Interest in improving business and planning skills is principally shown by firms which lack general information.

Overall, the most striking result for this analysis is the positive impact of being associated to a foreign company on the likelihood of having a strategy based on internal training and improving business management and planning skills. This may reflect better adaptation to market mechanisms.

**Table 1. Determinants of the Agenda for action: First Logit model
Firm features**

	Affiliation to a foreign company	Main activity	Number of employees
Training	0.7769	0.5471	0.0019
-2loglikelihood=64.73	(1.27)	(0.67)	(0.16)
Establishment-strengthening of business/industry association	-0.18	0.12	0.005
-2loglikelihood=54.88	(0.39)	(0.22)	(1.2)
Improved dialogue with policy makers	0.90	1.23	0.002
-2loglikelihood=78.02	(2.04)	(4.20)	(0.20)
Better information	-0.26	-0.75	-0.0172
-2loglikelihood=74.34	(0.14)	(1.47)	(1.17)
Better access to credit	-0.8152	0.5162	0.0071
-2loglikelihood=79.22	(1.33)	(0.77)	(2.65)
Business management/planning skills	0.18	-1.53	0.0037
-2loglikelihood=63.59	(3.49)	(0.07)	(0.83)

Source: Estimated from OECD survey. T-statistic in parentheses.

**Table 2. Determinants of the Agenda for action: Second Logit model
External barriers to development**

	Tax regulation	General information	Environmental Regulation	Legal regulation	Access to credit
Training	6.1	6.5	7.04	7.10	5.15
-2loglikelihood=60.87	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)
Establishment-strengthening of business/industry association	-9.5	-0.91	-1.74	-9.05	-1.15
-2loglikelihood=40.70	(0.03)	(0.31)	(1.49)	(0.040)	(0.07)
Improved dialogue with policy makers	5.9	5.5	5.8	6.8	5.9
-2loglikelihood=79.84	(0.07)	(0.07)	(0.1)	(0.08)	(0.06)
Better information	7.5	8.2	7.04	5.085	6.35
-2loglikelihood=71.74	(0.04)	(0.05)	(0.04)	(0.027)	(0.033)
Better access to credit	-1.945	-2.30	-2.68	-1.79	-1.45
-2loglikelihood=65.91	(1.76)	(1.963)	(3.83)	(1.65)	(1.23)
Business management /planning skills	7.95	0.0	7.54	7.59	7.97
-2loglikelihood=69.92	(0.0191)	0.0	(0.017)	(0.017)	(0.0192)

Sources: Estimated from OECD survey. T-statistic in parentheses.

**Table3.DeterminantsoftheAgendaforaction:ThirdLogitmodel
Internalbarrierstodevelopment**

	Lackof Finance	High Development Cost	Marketing problems	Lackof Information
Training -2loglikelihood=63.63	-0.7538 (0.81)	0.1823 (0.0391)	0.2877 (0.07)	-6.60 (0.034)
Establishment-strengthening ofbusiness/industry association -2loglikelihood=44.38	0.1823 (0.023)	0.15 (0.011)	1.54 (1.365)	-5.62 (0.26)
Improvedialoguewithpolicy makers -2loglikelihood=77.10	-1.35 (4.14)	-1.079 (1.63)	-1.81 (2.32)	-7.71 (0.52)
Betterinformation -2loglikelihood=72.21	1.63 (2.20)	1.08 (0.69)	1.66 (1.61)	3.04 (3.89)
Betteraccesstocredit -2loglikelihood=77.35	0.701 (0.68)	1.71 (3.32)	-0.741 (0.003)	-6.60 (0.03)
Businessmanagement/planning skills -2loglikelihood=63.23	-0.03 (0.76)	-8.27 (0.09)	-1.017 (0.70)	0.423 (0.10)

Source: Estimated from OECD survey. T-statistic in parentheses.

ANNEX2
QUESTIONNAIRE

Aims

This questionnaire will investigate:

- barrier to the development of the environmental goods and services industry related to the general economic framework;
- barriers to the development of the environmental goods and services industry within enterprises;
- practical solutions to overcome these obstacles;
- priorities for action.

This questionnaire is being sent to environmental goods and services enterprises to develop an overview of barriers and opportunities and priority needs, to strengthen the environmental goods and services industry in CEECs.

General information

Full enterprise name
Address
City, Postal Code
Tel Fax E-mail

1. Please indicate your

environmental revenues	
environmental employment	

If only part of your revenues comes from environmental activities, please indicate what is the share?

Please indicate the breakdown of environmental revenues by

segments (water, waste, air, noise etc.)	
specialisation (end-of-pipe equipment, clean technologies and products, services)?	

2. Please indicate the breakdown by client of your enterprise revenues (as percent of total):

Government	
Regional authorities and municipalities	
Non-governmental organisation	
Domestic companies	
Foreign aid programmes	
Foreign companies	

3. Please indicate whether you are affiliated to a foreign enterprise?

If yes, please indicate your partner enterprise.

If no, would you be interested in foreign partners/investment?

4. *Please indicate what you think will be the development of demand for environmental goods and services?*

Demand will not grow	
Demand will grow	
Demand is growing slowly	
Demand is growing rapidly	
Demand is dropping	

5. *Please indicate whether your enterprise is developing*

Much worse than expected	
Worse than expected	
As expected	
Better than expected	
Much better than expected	

6. *Please indicate whether your enterprise is able to meet demand*

Yes, but less than capacity	
Yes, completely	
No, there is more demand than we can meet	

Impediments to development

7. *Please rate in order of importance (from 5= most important to 1= least important) the following external impediments to the development of your enterprise.*

Environmental regulation	
Legal regulation	
Tax regulation	
Access to credit and finance	
Foreign competition	
General access to information (e.g. lack of information on requirements for starting a new business)	
Others (Please give details)	

8. *What factors have affected the start-up of your enterprise? (Please rate in order of importance from 5 = most important to 1 = least important)*

Lack of finance	
Lack of trained manpower (technical, managerial, production)	
Problems with regulations, registration of business etc. for start-up	
Lack of information	
Size of the environmental market	
Market demand for products and services	
Others (Please give details)	

9. *Please rate in order of importance (from 5 = most important to 1 = least important) each of the following barriers that have hindered the development of your enterprise.*

Lack of finance	
High cost of development (new products and processes etc.)	
Technical problems with products/services	
High production costs	
Marketing problems	
Problems hiring skilled employees	
Organisational problems e.g. inappropriate project management, planning, delivery, cost control, financing plan etc.	
Labour relations	
Lack of information (financing, investors, foreign partners etc.)	
Lack of networking opportunities with foreign partners	
Others (Please give details e.g. co-operation with government officials, understanding of environmental regulation, knowledge of new environmental technologies)	

How have they affected your enterprise?

10. *What factors affect future growth of your enterprise? (tick one or more, as appropriate)*

Lack of finance	
High cost of development	
Technical problems with products/services	
High production costs	
Marketing problems	
Organisational problems, e.g. inappropriate management, planning, delivery, cost control, financing plan, etc.	
Labour relations	
Lack of information (financing, investors, foreign partners etc.)	
Lack of networking opportunities with foreign partners	
Others (Please give details e.g. co-operation with government officials, understanding of environmental regulation, knowledge of new environmental technologies)	

Practical solutions

11. *What for your enterprise are the most important ways of overcoming the problems you listed in question 9? Please indicate the importance of each of the following ways (from 5= most important to 1=least important)?*

Better understanding of the general economic framework	
Better understanding of environmental legislation	
Better understanding of the market	
Easier access to credit	
Easier access to general information	
Lower production costs	
Flexibility in new product development	
More skilled manpower	
Access to more technical knowledge	
More efficient organisation	
More efficient use of labour	
Others (Please give details)	

12. *What practical steps do you want to take in order to overcome your problems? Please rate each of the following mechanisms (from 5=most important to 1=least important).*

Vocational training	
Entrepreneurial training, including business management skills	
Finance capital for business:	
Bank loans	
Equity funds	
Other sources	
Technology transfer to small and medium-sized enterprises through co-operation with foreign enterprises	
Development of networks among enterprises	
Dissemination of information among enterprises	
Establishment of business/or industrial association	
Counselling services	
Trade and trade fair promotion	
Others (Please give details)	

13. *Please indicate the most effective external sources of support to the development of your enterprise (from 5 = most important to 1 = least important)*

Government	
Business or industrial associations	
Scientific/academic institutions	
Banks or Financial Institutions	
International organisations	
Individual professional support	
Others (Please give details)?	

14. *Which of the following initiatives/practical solutions exist in your country to develop small and medium-sized enterprises (SME)? (tick one or more, as appropriate)*

Professional training for start-up enterprises	
Professional training for SMEs	
Twinning programmes with western partners	
Technology transfer	
Funding and assistance for special groups of companies	
Credit mechanisms for SMEs (e.g. equity funds)	
Tax law (e.g. tax incentive)	
Specific help for environmental enterprises	
Database on environment enterprises	
Others (Please give details)	

Which of these have you used?

Which do you think most useful for your enterprise?

15. *If you have sought external finance, what kind have you used and for what reason?*

Short term loans	
Long term loans	
Equity capital	
Patent capital (e.g. repaying from royalties or sales)	
Others (Please give details)	

What kind of institution would you prefer to obtain finance from?

Banks	
Special environmental funds	
Government institutions	
Private investors	
Others (Please give details)	

How much would you need to carry out the development of your enterprise, over the next year?

less than US\$100000	
between US\$100-300000	
between US\$300-500000	
between US\$500-1 million	
more than US\$1 million (please indicate the amount)	

16. Do you know what equity funds are?

Have you had any experience with them?

If yes, was your experience successful?

If not, would you explain the reason why?

17. Could you indicate which is the most important form of training for your enterprise? (from 5 = most important to 1 = least important)

Informal on-the-job training	
In association with transfer of technologies	
In-house training courses	
Special training by an institution	
Training courses from different companies working in the same field, e.g. chemicals, consulting	
Others (Please give details)	

Priorities for action at institutional/enterprise level

18. Please identify the highest priority need for action to strengthen the environmental goods and services industry in your country

Training (of goods and services suppliers)	
Establishment/strengthening of business/industry associations	
Improve dialogue with policy makers (environment, economic, industry, trade, etc.)	
Better information (e.g. information on environmental legislation/regulations, new technologies, networking opportunities with foreign partners/potential clients)	
Better access to creditor financing facilities	
Business management/planning skills	
Other, e.g. marketing, accreditation, etc.	

Who should take this action?

ENVIRONMENTAL GOODS AND SERVICES ENTERPRISES IN BULGARIA, CROATIA, ROMANIA AND SLOVENIA: SURVEY RESULTS

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Introduction

The development of the environmental business sector depends on many factors: general political and economic conditions; environmental priorities set out by the governments through national environmental policies; environmental expenditures undertaken by the public and private sector; environmental legislation and regulatory enforcement system, environmental institutional capacity, and the general business environment. This report brings together some of these factors and presents the status of the emerging environmental market, through a survey of environmental enterprises. Among these factors, special attention is dedicated to information and training needs of the environmental business sector -- previously identified as effective instruments to support development of this business.

Project objectives

The principal objectives of the survey are to describe the status of the environmental business sector (profile of businesses) and to provide an overview of the environmental market (including political and economic situation, environmental priorities and expenditures, environmental legislation and enforcement). Secondary objectives of the project are to identify the information and training needs, and the barriers to the development of the environmental business sector in Bulgaria, Croatia, Romania and Slovenia.

Methodology

The Regional Environmental Center (REC) developed the methodology and the questionnaire for the survey. In each country the REC commissioned both a local environmental expert and a market research firm to identify environmental businesses and to conduct the survey.

The standard questionnaire, provided by the REC, was translated into the local language, and used as a basis for the interviews. To obtain a representative sample, up to 140 environmental businesses were interviewed in each country. The companies came from a wide variety of sizes, ownership forms, incomes, and areas of expertise. To draw more precise country profiles, information was gathered from different sources, e.g. newspaper reports, governmental environmental policy plans, professional literature and REC's in-house information resources. This information was integrated with the results of the survey in each country.

Structure of the report

This report provides qualitative information about the environmental market, the status of the environmental business sector, barriers to development and the demand for information and professional training. The report is structured as follows:

- Overview of the environmental markets looking at major environmental problems, priorities in the state environmental policy plans, environmental expenditures, activities of state environmental funds and estimates of the size of the environmental market.
- Profile of environmental businesses which provides an overview of the environmental business sector, including ownership structure, size, age, revenues by environmental media and activity, foreign co-operation.
- Information on business opportunities, an overview of major environmental and business publications, and professional associations.
- Barriers to development and possible measures for assistance. Discussion of the major sources of assistance and the main barrier to business development.

Overview of the environmental market

The political situation has improved in recent years, especially with the newly elected democratic governments in Bulgaria, Romania and Slovenia. On the contrary, Croatia still experiences a lack of democracy as a result of the transition period from war. All these countries, except Croatia which is currently excluded from the PHARE programme, are associated countries of the European Union, and have applied for full membership. Slovenia might be the first of these countries to be accepted in the first wave of EU enlargement, together with the Czech Republic, Hungary, Poland and Estonia after the year 2000. This implies that Slovenia has already undertaken many initiatives to harmonise domestic structures and legislation with those of the European Union.

Environmental expenditure

The share of environmental expenditures in Gross Domestic Product over the past years has been below 1 percent in all surveyed countries, as a result of difficult economic conditions and political instability (e.g. consequences of the Yugoslavian war, unstable political situation in Bulgaria and Romania and high unemployment and social problems). Bulgaria, with 0.9 percent, accounted for the highest share of GDP, followed by Croatia and Slovenia with 0.8 percent, whereas Romania had the lowest share with 0.6 percent in 1995. Although these countries made serious effort towards environmental protection, the figures are considerably lower compared to investments undertaken by OECD countries, which spend annually 1-2 percent of their GDP on environmental protection activities.

It is important to note that data on the environmental expenditures as a percentage of the GDP is not easily calculated and the use of this indicator to assess the countries "environmental commitment" must be qualified. Governments use different definitions for environmental expenditures, which include types of expenditure which may have only marginal environmental benefits, or might be more environment-unfriendly than friendly. The figures presented below reflect the most optimistic current status of environmental expenditures.

Table 1. Total environmental expenditures in 1995

Country	Expenditures (US\$ millions)	Share of GDP
Bulgaria	118	0.9%
Croatia	152	0.8%
Romania	211	0.6%
Slovenia	150	0.8%
Total	631	-

Source: Ministries of Environment for Bulgaria, Romania and Slovenia, 1996.
State Directorate for Environmental Protection of the Republic of Croatia, 1996.

Table 1 shows total environmental spending from both the government and private sectors in the surveyed countries exceeded US\$630 million in 1995, the figure is expected to nominally grow to almost US\$1 billion by the year 2000. Data for the year 1996 were not available.

Environmental investments are in competition with the more urgent demand for investments for the restructuring of many sectors of these economies. Environmental goods and services enterprises in Central and Eastern Europe are well aware that they need the assurance of funds to finance environmental projects. Below are six of the sources of financing for environmental investments:

- state budget and regional/municipal budgets;
- extra-budgetary funds (State Environmental Protection Funds, Eco Funds or other earmarked funds);
- environmental investments of commercial enterprises both state and privately owned;
- commercial credit, both domestic and foreign;
- foreign environmental investments;
- assistance programmes and donations from abroad (bilateral co-operation, PHARE, etc.).

At present, the biggest portion (almost 90 percent) of environmental investments is financed by using the first three sources. In the future, governments intend to decrease their spending on environment protection, which will increase the share of environmental expenditures financed by local governments and environmental funds. Furthermore, the contribution of polluting industries is expected to increase significantly as the "polluter pays principle" becomes fully implemented in these countries.

Most of state funding is used for the construction of wastewater treatment and sewage facilities, as well as for the construction of public water supply networks. Funding for air protection and waste management projects is mainly provided by international assistance programmes (especially in the energy sector), private enterprises, and municipalities.

In conclusion, the low public and political support for environmental protection and the poor financial condition of governments, municipalities and industries are probably the most significant obstacles to greater environmental investments. Uncertain macro-economic conditions, uncertain environmental

regulation and weak economic and regulatory incentives hinder the development of environmental protection activities.

State environmental funds

Most CEECs have established extra-budgetary environmental funds to finance environmental protection activities. These funds are quasi independent or independent and in almost all the countries where they are operating, the funds are under the auspices of the Ministry of Environment. They usually receive revenues from pollution charges and fines, product charges, various environmental taxes and other fees. The collected funds are used to support environmental investments. Environmental investment priorities are mainly set out through national environmental policies and priorities set by the Ministry of Environment. Tenders are announced through the media or in information leaflets available from the Ministry of Environment or directly from the National Environmental Protection Funds. Financial support provided by these funds is disbursed in various forms, most commonly as grants and soft loans with interest rates lower than the ones offered by other financial institutions. The application procedures have to be clear and transparent.

Environmental Protection Funds operate only in Bulgaria and Slovenia. Bulgaria operates the National Environmental Protection Fund, under the Environmental Protection Act of 1991, while Slovenia established the Environmental Development Fund (called EcoFund) with the Environmental Protection Act of 1993. These funds are currently not operative in Croatia and Romania, although in the case of Romania, the government has been considering since 1995 establishing an Environmental Protection Fund. However, no final decisions have been made so far. Table 2 shows the spending of the environmental protection funds in Bulgaria and Slovenia in 1996.

Table 2. Breakdown of 1996 Expenditures of State Environmental Funds in US\$ millions

Country	Bulgaria ¹	Slovenia ²
1996 Expenditures	9.3	10.3
Number of Funded Projects	102	1,257 ³
Expenditures by Sector	Air protection (13%) Water protection (45%) Waste management (8%) Monitoring and information systems (17%) Others (17%)	Air protection (57%) Water protection (29%) Waste management (14%)

¹ Bulgaria is currently operating three environmental funds: The National Environmental Protection Funds, Municipal Environmental Protection Funds and the Eco-Fund. The Eco-Fund was not operational in 1996 regarding financing environmental projects.

² Slovenia operates its Environmental Development Fund (EcoFund).

³ Slovenia is also providing soft loans to private persons, e.g. conservation of cleaner heating systems in households, etc. Additionally, the system of co-funding is very common which explains the high number of funded projects.

Source: The National Environmental Protection Fund in Bulgaria, 1997; The Environmental Development Fund of the Republic of Slovenia, 1997.

The major part of the fund's expenditures in Bulgaria are allocated to water-related projects (45 percent), followed by investments on the national monitoring and information system (17 percent) and air protection-related activities (13 percent). Whereas the major bulk of the fund's expenditure in Slovenia

was allocated to air pollution control-related projects (57percent) followed by water-related projects (29percent)andwastemanagementprogrammes(14percent).

In 1996, Bulgaria also established the Ecofund under a debt-for-nature swap agreement with the governmentofSwitzerland. WithatotalamountofUS\$11Million,thefirstprojects will be financed in 1997.

Legislationandenforcement

The development of the environmental market is regularly stimulated by environmental regulations, standards, and subsequent enforcement. Environmental expenditures, both private and public, are stimulatedbyenvironmentalregulation. Industriesandlocalauthorities,whicharethemajorinvestorsin the environmental market for air, waste, water and wastewater projects, are especially affected by these variables.

In all the surveyed countries, both a general environmental act and comprehensive environmental legislation have been implemented in the last five years (e.g. regulations related to air, water and waste management). Bulgaria introduced an Environmental Protection Law in 1991, and Slovenia an EnvironmentalProtectionActin1993.CroatiaandRomaniaimplementedtheirEnvironmentalProtection Acts respectively in 1994 and 1995. These general environmental acts promote principles such as the polluter pays, prevention, and precautionary, free access to environmental information and public participation. Although the regulatory systems are rapidly changing to include more comprehensive piecesoflegislationforwastetreatment,thellevelofenforcementisstillinconsistentinallcountriesand theresponsibleauthorities(e.g. theenvironmentalinspectorates)areoftennotabletoexercisetherequired control,becauseeithertheylacktrainedstaffordonothavetheappropriateequipment.

Three of the surveyed countries, Bulgaria, Romania and Slovenia have signed Association Agreements with the European Union to seek full membership in the near future. As part of the integration process these countries have to harmonise their environmental laws and policies with EU legislation. Formal approximation will involve the adoption of over 200 environmental laws. In most cases, stricter environmental legislation and enforcement can be expected in these countries as well as new standards whichwillfavourgrowthintheenvironmentalbusinesssector.

In 1996 the REC conducted a study to asses the level of compliance of EU environmental legislation in these countries. Results showed that national legislation will need to be widely changed to reach the desiredlevelofcomplianceespeciallyinthefollowingareas . First,wastemanagementregulations, which are on average the least developed area in the surveyed countries, reach approximately 21 percent, on average,oftheEUenvironmentalrequirements.

Secondly,regulationsregarding *chemical, industrial risks and biotechnology* reached an average level of compliance of 27percent. Third, regulations regarding *noise emissions* attained only a 39percent compliancerate. Fourth,regulationsfor *airpollutioncontrol* showed an average level of compliance of 43percent,(regulationsforemissionby motor vehicles are generally well-developed in Bulgaria and in Slovenia),butregulationsonairpollutionfromstationarysourcesneedtobewidelyrevised.

Given that three of the foursurveyedcountrieshaveexpressedtheirinteresttojointheEU,EUregulations will offer guidance asto what the future trends might be, which will have significant impact on the growth of the environmental market and will indicate market opportunities for the environmental business in the coming years.

Environmental standards and economic instruments are widely used in all the surveyed countries. In general, pollution charges are paid when regulated substances are emitted into the air and/or water and for the extraction of natural resources or the disposal of waste, whereas fines are applied when a specific polluter exceeds emissions standards and limits according to their operational permits. Pollution charges and fines are often too low and do not fulfil the function of changing the “pollution” behaviour of the most polluting industry. The current situation shows that charges and fines are generally so low that it is cheaper for the polluting industries to continue paying them rather than make investments to eliminate or reduce emissions. Enforcement of environmental regulations remains the most critical issue in environmental protection activities within these countries.

Permits systems including pollution charges and fines for non-compliance are the main instruments applied to reduce pollution in industries. The collected charges and fines are mainly earmarked for environmental purposes and administered through the National Environmental Protection Funds.

Table 3. Compliance level of EU environmental legislation (percent)

Legislative Areas	General environmental policy	Air	Chemicals, industrial risks and biotechnology	Nature conservation	Noise	Waste	Water
Bulgaria	55	43	27	67	50	24	50
Romania	38	37	32	33	17	21	61
Slovenia	55	50	23	67	50	19	44

Note: Croatia is not an EU associate country and, therefore, was not included in the study.

Source: Approximation of European Union Environmental Legislation; The Regional Environmental Center, 1996.

Other economic and regulatory incentives, which are supposed to encourage environmental expenditures in industries, are often not as effective as hoped. For example, prices for energy are still subsidised in most of the countries, which encourages inefficient and wasteful use of natural resources. In particular, this hinders environmental investments in energy efficient technologies which would contribute to less consumption and pollution emissions under “normal” market conditions.

Environmental administration

During the past few years, the system of environmental administration has undergone major changes in all the surveyed countries. Not only has the administrative structure changed and new responsibilities been added to the Ministry of Environment, but also the number of staff has increased significantly. However, all of the surveyed countries, except Croatia which opted for a State Directorate for Environmental Protection, have a Ministry of Environment. In addition the countries have set up their own administration structures for various areas such as health care, agriculture, forestry, water management, physical planning, and transport which are not always merged within the Ministry of Environment.

Generally, all countries except Slovenia (responsibilities at the regional level are mainly covered by local authorities and the Ministry of Environment) have established three levels of environmental administration.

- national level (e.g. Ministry of Environment, State Directorate for Environmental Protection or other ministries with environmental related duties);
- regional level (e.g. environmental department of regional authorities, inspection bodies, water management authorities, etc.);
- municipal level created by local authorities.

Environmental Ministries are usually in charge of determining the national environmental policy and of implementing specific environmental programmes. In the case of Slovenia, the Ministry of Environment's responsibilities include a wider range of tasks: environmental and nature protection; water and waste management; geological, seismological, meteorological and other geophysical phenomena; land development; physical planning; nuclear safety; survey and mapping responsibilities.

The regional environmental authorities are in most cases responsible for regional policy development, issuing environmental permits, imposing penalties and developing local standards. The environmental inspectorate conducts site visits to assess compliance with the law and retains the right to stop any production process which violates environmental regulations.

Physical planning and construction permits are generally issued by the municipalities which are increasingly responsible for waste management, wastewater treatment (including operating the system), and calculating and collecting charges.

Free access to environmental information is guaranteed by law, but the practical enforcement is extremely difficult. Governments are collecting information, such as records of compliance, environmental monitoring and discharge monitoring. However, most of this data is not published or announced publicly. The main information sources gathering environmental information are generally the State of Environment reports and Bulletins which are published by the ministries of environment. The quality of information varies significantly from country to country. In addition, national statistical offices have the duty of processing and disseminating environmental information.

Environmental priorities

Environmental priorities are mainly set out in the national environmental policy plans of the respective countries, which also determine the environmental expenditure. According to the Statistical Yearbooks of the surveyed countries, the majority of the environmental spending in 1995 was invested in Bulgaria and Romania for water and wastewater-related projects which accounted for 34 percent and 41 percent of total spending. Whereas in Slovenia 71 percent of total spending was invested in air pollution control related technologies. The data on environmental expenditure, which is collected by National Statistical Offices, should be considered with cautions since they often are misleading.

Table 4. Environmental expenditures by media, 1995

Country	Environmental Expenditure (US\$ millions)	Air Pollution	Water and Wastewater	Waste	Others
Bulgaria	118	28%	34%	16%	22%
Croatia ¹	152	N/A	N/A	N/A	N/A
Romania	211	41%	32%	20%	7%
Slovenia ²	147	71%	9%	18%	2%

1. Estimates.

2. Breakdown of environmental expenditure by media only available for 1994.

Source: 1996 Statistical Yearbook of the surveyed countries and Ministries of Environment.

These figures correspond in most cases with the priorities for environmental investment set out in the National Environmental Action Plans. In Bulgaria, the highest priorities concern air pollution control and drinking water supply, whereas in Croatia industrial waste management and drinking water supply. In Romania drinking water supply and air pollution control received the largest attention, and Slovenia gave priority to air pollution control and domestic waste management.

The status of environmental businesses -- results of the survey

This section reports the results of the survey of over 450 environmental businesses which was carried out at the end of 1996. The objective is to compare features of environmental businesses -- assess their information and training needs and determine the best channels for disseminating essential information -- with the results of another similar survey, which was run in 1995 in the Visegrad countries. In addition, a short section is dedicated to analyse barriers to development and possible forms of assistance.

Profile of environmental businesses

Age, ownership structure and size

Since 1990, the steady growth of the market for environmental services and technologies in all the surveyed countries has led to the dynamic development of local environmental businesses. Currently, it is estimated that 700 small and medium-sized enterprises are active in the environmental market and the number is still growing. However, the difficult economic and political situation, the lack of information on project opportunities and financing aspects, etc. significantly affect their daily business life.

Although the market place is different in each country, results showed several similarities between the four new countries surveyed and the Visegrad countries, which were surveyed in 1995. In all four countries, the market is extremely young, with the vast majority of companies established after 1990. The companies are generally small: more than half of the companies in Slovenia and Croatia have less than 6 employees; while 38 percent in Bulgaria and 42 percent in Romania are small enterprises, revealing a trend in the latter two countries for larger, state owned companies. The privatisation process has moved very quickly in the environmental business sector in all countries. Nearly two-thirds of the interviewed

companies are privately owned, although this is a considerably smaller figure than the Visegrad countries, where 85 percent of companies are private.

Table 5. **Profile of companies**

Profile	Bulgaria	Croatia	Romania	Slovenia
Number of companies interviewed	68	141	122	121
Size (% of <6 full-time employees)	38	53	42	57
Ownership (% of fully privately owned companies)	54	81	68	57
Age of companies (% founded after 1990)	60	56	69	52

Source: The author

Company gross revenues

To estimate spending on environmental activities, companies were asked to indicate their annual income from environmental activities. Not all of the businesses were willing to provide information on their income and some had difficulties distinguishing between their total annual income and their income related only to environmental activities. Especially in Bulgaria and in Romania, interviewed businesses were reluctant to report their income situation due to tax declaration concerns, business secrets, and cultural attitudes.

The combined annual turnover of the 337 companies that responded was approximately US\$247 million. Croatian and Slovenian environmental businesses indicated the largest annual turnover from environmental activities, which reflects not only the high amount of environmental spending in these countries but also the high number of businesses which were willing to provide financial data.

Table 6. **Total annual turnover derived from environmental activities in 1995** ¹

Total Annual Turnover US\$	Bulgaria (42)	Croatia (118)	Romania (82)	Slovenia (95)
<25000	22%	18%	37%	21%
25000-100000	37%	29%	22%	13%
101000-250000	17%	12%	12%	20%
251000-500000	5%	10%	15%	10%
501000-1000000	6%	10%	4%	13%
>1000000	13%	21%	10%	23%
Combined Annual Turnover of Surveyed Companies ²	23 millions	99 millions	38 millions	87 millions

1. Numbers in brackets indicate how many businesses were willing to provide income data.

2. Calculation of combined annual turnover: The average value of total revenues was calculated by multiplying the number of companies within a given range by the mean US\$ amount in the range. For the first range, US\$20000 was used in the calculation.

Source: The author

In addition, companies were asked to provide information about their income so as to determine their business activity in specific service areas (e.g. technical services, environmental technology, testing/monitoring)and in media areas (air, water and wastewater, waste, energy).

Across the four countries, companies declared that they generate 28 percent of their annual turnover from environmental technologies and 47 percent from technical services, which includes engineering, construction, planning and general consulting activities. Testing and monitoring accounted for 13 percent.

Table 7. Source of revenues by business activity derived from environmental activities in 1995¹

Activity	Bulgaria(42)	Croatia(118)	Romania(82)	Slovenia(95)
Technical services	46%	51%	50%	40%
Environmental technologies	33%	30%	26%	26%
Testing/monitoring	11%	14%	10%	15%
Others	10%	5%	14%	19%

1. Numbers in brackets indicate how many businesses were willing to provide income data.

Source: The author

When asking companies to indicate revenues by media, 36 percent derived their annual income from water and wastewater related activities which reflect the low percentage of sewage treatment in the surveyed countries. Solid waste related activities generated an annual income of 29 percent, followed by air and energy related activities which generated 10 percent of market activity. This situation is always changing due to the dynamics of the market and the changing environmental priorities set out by the governments. Therefore these figures just reflect a snapshot of the market in the surveyed countries.

Table 8. Sources of revenues by media in percentage of total revenues derived from environmental activities in 1995¹

Media	Bulgaria(42)	Croatia(118)	Romania(82)	Slovenia(95)
Water and wastewater	39%	29%	46%	30%
Waste	25%	40%	19%	30%
Air	8%	7%	13%	9%
Energy	8%	7%	12%	7%
Others (not media specific activities)	20%	17%	10%	24%

1. Numbers in brackets indicate how many businesses were willing to provide income data.

Source: The author

Foreign co-operation

Both local and foreign companies can benefit from business co-operation and the creation of joint ventures since local companies have a better knowledge of local market conditions and rules, whereas foreign businesses have better management and marketing expertise and easier access to financial resources and modern technologies. Furthermore, successfully operating joint ventures ensure a faster

development of the environmental market and strengthen the ability to solve local environmental problems.

The survey showed that there is little co-operation between local and foreign companies--just 9 percent of the surveyed companies have foreign partners. Croatia and Slovenia have the highest percentage of joint ventures, respectively 14 and 13 percent, whereas the percentage for Romania is around 10. The lowest share can be found in Bulgaria with just 7 percent. This probably reflects the extremely difficult economic situation in the country which hinders major foreign investments.

Most of the foreign partners in Croatia and Slovenia come from Austria, Germany and the USA. In Romania environmental businesses involved in joint ventures had partnerships with companies from Germany, France, and the USA whereas in Bulgaria the foreign partners were Austrian and German companies.

Table 9. Joint ventures, top three venture partners and foreign language proficiency

	Bulgaria	Croatia	Romania	Slovenia
Joint ventures	7	14	11	13
Partner's country	Austria Germany USA	Germany USA Austria	France Germany USA	Austria Germany Croatia
Top three foreign languages spoken	Russian(80%) English(73%) German(30%)	English(82%) German(62%) Italian(18%)	English(80%) French(68%) German(34%)	English(88%) Croatian(84%) German(71%)

Source: The author

Language barriers might be a problem for the successful operation of joint ventures. Therefore, business representatives were asked to indicate their foreign language abilities. The two most common foreign languages spoken in the surveyed countries are English and German. 80 percent indicated that they speak English, followed by German which is spoken by 50 percent. In general, language does not seem to be a major barrier for business development.

Income from foreign sources

Due to the relatively small environmental market and less developed environmental businesses in the surveyed countries, only a few companies were actively exporting environmental technologies and services. Almost 60 percent of the companies stated that they do not receive income from foreign sources whereas 16 percent indicated a minor income of less than 10 percent. Just over 18 percent earned between 10 and 50 percent from foreign sources and less than 6 percent are earning a significant share of their income from exporting products and services.

Table 10. Income from foreign sources in 1995 and 1996

Percentage of income from foreign sources	Bulgaria	Croatia	Romania	Slovenia	Average
0%	66%	50%	72%	54%	60%
<10%	8%	18%	17%	23%	16%
10-50%	18%	21%	10%	20%	18%
>50%	8%	11%	1%	3%	6%

Source: The author

Larger-sized firms and firms with foreign partners indicated on average a higher income from foreign sources than others. This seems to indicate that joint ventures increase business opportunities and foreign income-earning opportunities. Comparing the four countries, Croatia and Slovenia are the most active ones on the foreign markets. Bulgaria and Romania still struggle with their severe economic situation, explaining the low percentage of foreign activities.

Information channels for business opportunities

Major sources of information for business opportunities

Information on business opportunities is essential to environmental businesses in eastern Europe. Therefore interviewees were asked to rank their current sources of business information. In general, professionals interviewed were not aware of any central body or organisation collecting information on environmental business opportunities. Also most of the countries are in the process of establishing transparent bidding procedures. As a result *personal and professional contacts* and the *daily press* were ranked on average in all four countries as the most useful information channels, followed by the *Ministry of Environment, trade and fair shows*, and *environmental publications*. The Chamber of Commerce and Professional Associations were not regarded as essential sources of information, which indicates the low priority given to the environmental business sector by Chambers of Commerce and also the early stage of development of professional associations.

Major publications

Surprisingly no single business or environmental publication reaches the majority of respondents. Based on the survey, the main environmental and business publications read by environmental professionals are shown in table 12.

Major professional associations

Although personal contacts are ranked as the most important source of information for business opportunities, only a third of the interviewed environmental businesses belong to a professional association. However, there is only limited cross-border regional co-operation as no professional association operates beyond its own borders. In Slovenia more than a quarter of the respondents indicated they were members of the Chamber of Commerce. Most environmental associations focus on very specific scientific topics and therefore names of associations mentioned by the respondents vary significantly. This might also explain the relatively low percentage of membership (only a tenth belonging to a professional association) in the other countries.

Table 11. Information channels for business opportunities

Source of information	Bulgaria	Croatia	Romania	Slovenia	Average
Personal contacts	94%	97%	93%	96%	95%
Daily press	65%	56%	63%	61%	61%
Environmental Ministry	60%	56%	55%	70%	60%
Trade shows and fairs	59%	68%	52%	61%	60%
Environmental publications	66%	63%	57%	49%	59%
Direct mail	46%	41%	69%	57%	53%
Conference attendance	65%	46%	42%	57%	52%
Local Authorities	35%	55%	54%	54%	50%
Business publications	40%	43%	38%	36%	40%
Chamber of Commerce	15%	42%	35%	43%	34%
Professional Associations	22%	40%	43%	36%	35%
International organisations	34%	23%	25%	31%	28%
Broadcast fax service	16%	18%	51%	26%	28%
University/Academy of Sciences	30%	26%	33%	24%	28%
Ministry of Economics/Trade	13%	28%	26%	29%	24%
Email	10%	8%	7%	20%	11%
Commercial banks	6%	7%	12%	7%	8%

Source: The author

Table 12. Major environmental or business publications, and readership

Bulgaria	Croatia	Romania	Slovenia
Pari, (19%)	Gospodarstvo i okolis, (38%)	Capital, (34%)	Gospodarski vestnik, (36%)
Kesh, (9%)	Okolis, (21%)	Tribuna Economica, (13%)	Uradni list RS, (19%)
Bulgarian Business, (6%)	Hrvatske vode, (16%)	Mediul Inconjurator, (11%)	Okolje, (16%)
Capital, (6%)	Banka, (16%)	Bursa, (7%)	Gospodarjenje z odpadki, (13%)
Eco, (6%)	Zubor, (10%)	Protectia Mediului, (7%)	Manager, (9%)

Source: The author

Table 13. Major professional associations, and membership

Bulgaria	Croatia	Romania	Slovenia
Bulgarian Association for Water Supply and Sewage, (9%)	Croatian Water Pollution Control Society, (10%)	Association of Environmental Private Companies, (10%)	Chamber of Commerce, (28%)
Phoenix Resource Waste Branch Association, (4%)	Croatian Association of Energy Experts, (4%)	Association of Engineers, (6%)	Association of the Protection of Water, (5%)
BIEA--General Constructions, (4%)	Association of Recyclers, (4%)	Association of Hydrogeologists, (3%)	IAH (International Association for Hydrogeology), (3%)
Association for Water Quality, (4%)		Association of Environmental Engineers, (3%)	Association of Landscape Architects and Urban Planners, (3%)
		Romanian Society of Chemistry, (3%)	Ecological Association of Slovenia, (3%)

Source: The author

Conference attendance

A significant number of business representatives attend environmental related conferences and trade and fair shows to learn more about business opportunities. In most of the countries over 50 percent of companies participated in more than 2 conferences per year to receive additional training or to network and market their products and services. However, in Romania and Slovenia it appears that environmental professionals are participating more often in conferences than their counterparts in Bulgaria and Croatia.

Table 14. Number of environmental conferences attended annually

Environmental Conferences (past 12 months)	Bulgaria	Croatia	Romania	Slovenia
none	10%	17%	10%	14%
1-2	43%	42%	35%	29%
3-5	33%	35%	33%	36%
over 5	14%	6%	22%	21%

Source: The author

When asked about the reasons for attending conferences, the importance of personal contacts and networking was stressed. 71 percent of respondents indicated that they met others in the same professional area of expertise. Two-thirds of respondents indicated that they learned about new project opportunities during conferences and meetings, and 60 percent indicated that they participate with the goal of finding potential partners, and 59 percent to increase the firm's marketing capabilities, while the desire for training was mentioned only by 57 percent.

Table 15. Purpose of attending conferences

Purpose of attending	Bulgaria	Croatia	Romania	Slovenia	Average
Meet others in the same field	70%	69%	75%	68%	71%
Learn about new project opportunities	72%	66%	74%	57%	67%
Find potential partners	72%	56%	59%	53%	60%
Marketing of firm products	48%	56%	43%	26%	59%
Participate for professional training	44%	55%	68%	63%	57%
Participate as speaker	35%	32%	61%	44%	43%

Source: The author

Information and training needs

Demand for information

In the CEECs businesses suffer from lack of information. To be successful in the environmental market, companies need a better understanding of financial and regulatory constraints. In most of the surveyed countries businesses have strongly relied on personal contacts with various governmental agencies and local authorities to obtain information. Public procurement processes are, except in Slovenia, in their early stage and clear bidding processes are recurrently not in place.

To better understand information needs, companies were asked to indicate how important they find the following information resources.

As *environmental regulations* affect the demand side of environmental services and technologies, it was natural that the need for information on environmental regulation was highly rated. *Information on domestic partners* for joint projects and experience exchange was also ranked as very important. Information on *in-country environmental problems* and *new environmental technologies* was also identified as a high priority followed by information on *sources of project financing* and *domestic tenders* for projects.

Information on business opportunities abroad, international conferences, and partners was of minor interest. Information on cleaner production practices was also mentioned as a minor information need which might be explained by the general lack of information on this topic. Information on EU environmental regulation was mainly prioritised by Slovenia due to the fact that Slovenia is considered as one of the next candidates to EU enlargement.

Table 16. Ranking of Environmental Information Topics by Country

Information Topics ¹	Bulgaria	Croatia	Romania	Slovenia	Average
Domestic environmental regulations	3.5	3.6	3.2	3.7	3.5
Information on where to find domestic partners	3.3	3.7	3.1	3.1	3.3
Domestic environmental problems	3.4	3.3	2.9	3.4	3.2
New environmental technologies	3.2	3.2	2.9	3.3	3.2
Sources of project financing	3.3	3.2	2.6	3.4	3.1
Domestic tenders for projects	3.2	3.0	2.9	3.4	3.1
Environmental quality standards for industries (e.g. ISO 14000, EMAS)	3.3	3.1	2.8	2.8	3.0
EU environmental regulations	3.0	3.1	2.6	3.3	3.0
Eco-efficient and cleaner production practices	3.3	3.1	2.4	2.9	2.9
Announcements of domestic conferences or trade-fairs	2.9	2.8	2.7	3.1	2.9
Certification requirements for environmental professionals	3.0	3.0	2.5	2.8	2.8
Information on where to find international partners	3.0	2.9	2.5	2.8	2.8
Contact information to government agencies	2.8	2.7	2.3	2.6	2.6
International environmental problems	3.0	2.4	2.2	2.7	2.6
Announcements of international conferences or trade-fairs	2.7	2.5	2.1	2.8	2.5
International tenders for projects	2.6	2.3	2.1	2.8	2.4

1. The following scale was used for ranking information demand: 4=very important; 3=important; 2=somewhat important; 1=not important

Source: The author

Preferred delivery options for information and willingness to pay

To identify the most efficient means of providing local environmental professionals with information, companies were asked to rank how useful the current delivery options are.

A *regular newsletter* sent to environmental professionals, addressing updates regarding project opportunities, financing projects and development of environmental regulations and legislation, was considered the most useful delivery option by the interviewed businesses. *Conferences* arranged to address and discuss specific environmental problems were also considered as an important channel to disseminate environmental information. The third preferred option was an *Environmental Business Directory* in printed format. Some respondents suggested including specific market information in such a directory. Furthermore, an information research service and partnering workshops were suggested as good options for disseminating information through the environmental business community.

Some respondents from Bulgaria and Romania also indicated the need for an environmental business association which should lobby for the environmental business sector at government agencies, regional authorities, and municipalities.

In addition, companies were asked if they would be willing to pay for “information products”. Almost half of the companies indicated that they would be willing to pay for most of the “information products” if the price was reasonable and the information received was useful.

Demand for professional training

As the environmental field continues to develop at a rapid pace and the business framework quickly changes, professional training becomes an ever-more important issue. Successful business development requires not only expertise in certain environmental areas but also an understanding of financial aspects, knowledge of regulatory frameworks and project management skills. To identify the preferences of companies, the respondents were asked to rank the importance of professional training for their daily business. As with information needs, training on the development of *environmental regulations and policies* was indicated as very useful in all of the surveyed countries, followed by *environmental impact assessment and training on how to finance environmental projects*. Training on environmental economics, environmental management, and auditing was also seen as important topics by respondents.

Assistance and barrier to business development

Sources of assistance

To get a better picture of the importance that various institutions have for the environmental business community, companies were asked to indicate the importance of the following institutions for their business development.

As expected *governmental institutions* and *business or industrial associations* were considered important by most of the surveyed countries followed by *financial institutions*. However international organisations and professional training institutions received minor attention.

The environmental business sector in Bulgaria and Slovenia considered information from government institutions as very important whereas in Croatia and, in particular, Romania, government institutions received less attention. Business or industrial associations and financial institutions play an important role in Bulgaria, Croatia, and Slovenia.

Barriers to development

Access to credit and finance was rated by the respondents as the most important factor hindering further business development. Actually this reflects the current weak situation of the financial market. Commercial loans are difficult to obtain and even if businesses are successful they have to pay extremely high interest rates. *Tax regulation* including *legal regulations and registration requirements* are also seen as major obstacles for business development, but vary country by country. With the exception of Slovenia, *general access to information*, and *market demand* were ranked as significant barriers to business development.

Table 17. Preference for information delivery options and willingness to pay (percent)

Type of Delivery Options ¹	Bulgaria	Croatia	Romania	Slovenia	Average
Regular newsletter	3.2 (51%)	3.0 (65%)	2.8 (46%)	2.8 (48%)	3.0 (53%)
Conferences arranged to address specific environmental problems	3.2 (47%)	2.9 (57%)	2.4 (21%)	3.1 (33%)	2.9 (40%)
Environmental Business Directory (book)	2.8 (46%)	2.7 (54%)	3.1 (54%)	2.8 (36%)	2.8 (47%)
Information research service providing specific information	3.0 (67%)	2.6 (47%)	2.5 (32%)	2.7 (40%)	2.7 (47%)
Partnering workshops designed to introduce participants to western partners, government environmental officials, and NGOs	3.0 (37%)	2.8 (46%)	2.1 (19%)	2.8 (41%)	2.6 (36%)
Environmental Business Directory (CD diskette)	2.2 (48%)	2.7 (50%)	2.7 (56%)	2.8 (40%)	2.6 (49%)
Local business co-ordinator to arrange meetings, contacts, and workshops	2.7 (24%)	2.9 (54%)	1.8 (16%)	2.5 (12%)	2.4 (27%)
Computer database of information resources available on Internet	2.5 (33%)	2.6 (42%)	2.0 (32%)	2.8 (40%)	2.4 (37%)
Broadcast fax service	2.1 (14%)	2.4 (35%)	2.8 (32%)	2.3 (15%)	2.4 (24%)

1. The following scale was used for ranking delivery options: 4=very useful; 3=useful; 2=somehow useful; 1=not useful. Numbers in brackets indicate the percent of respondents willing to pay for such services.

Source: The author

Table18. Trainingtopicsrankedbycountry

Environmentaltrainingtopics ¹	Bulgaria	Croatia	Romania	Slovenia	Average
Environmentalregulationand policy	3.2	3.2	2.4	3.2	3.0
Environmentalimpact assessment	2.8	3.0	3.0	3.2	3.0
Financingenvironmental investments	2.9	3.0	2.3	3.0	2.8
Environmentaleconomics	2.7	2.7	2.7	3.0	2.8
Environmentalmanagement	3.0	2.7	2.4	2.9	2.8
Environmentalauditing	2.6	2.6	2.5	2.8	2.6
Environmentalsystemsandtheir sustainability	2.5	3.1	2.3	2.6	2.6
Projectmanagement	2.7	2.8	2.2	2.7	2.6
Environmentalriskassessment	2.6	2.8	2.3	2.7	2.6
Strategicplanning	2.6	2.6	2.3	2.8	2.5
Integratesolidwaste management	2.3	2.9	2.1	2.5	2.4
Hazardouswastesiteranking	2.3	2.6	2.2	2.6	2.4
GIS(GeographicInformation Systems)	2.1	2.3	2.1	2.5	2.3

1. The followingscale was used for ranking information demand: 4=very useful; 3=useful; 2=somewhat useful; 1=not useful.

Source: The author

Table19. AssistanceforBusinessDevelopment

	Bulgaria	Croatia	Romania	Slovenia	Average
Government	67%	49%	26%	65%	52%
Businessorindustrial associations	52%	64%	31%	42%	47%
Financialinstitutions	62%	56%	19%	43%	45%
Scientificoracademic institutions	50%	44%	23%	44%	40%
Professionaltraining institutions	30%	38%	30%	43%	35%
Internationalorganisations	48%	34%	13%	41%	34%

Source: The author

Although environmental regulations and enforcement are considerably weak in the surveyed countries, this was not seen as a major obstacle to business development. Interestingly, this might indicate a lack of understanding on how much the environmental business sector relies on regulations and enforcement. Most of the countries are EU associate countries and their environmental legislation must eventually comply with EU standards. This means, in many cases, the standards will be tougher and enforcement

stricter. However, in the next years, it is expected that this will have a significant influence on the environmental market.

Foreign competition within the environmental market was seen by most of the respondents as a minor barrier to business development.

Steps to overcome these barriers are largely out of the hands of environmental firms. Most of the barriers mentioned during the survey could be addressed by governments if they took action to provide instruments and incentives which encourage environmental enterprises. Above all, better enforcement of environmental regulation, tax regulations, and improved access to financing will play a major role in eliminating the barriers faced by the environmental business sector.

Table 20. **Barriers to business development**

	Bulgaria	Croatia	Romania	Slovenia	Average
Access to credit and finance	67%	77%	62%	64%	68%
Tax regulation	66%	59%	33%	39%	49%
Legal regulations and registration requirements	49%	33%	70%	33%	46%
General access to information	54%	47%	55%	34%	47%
Market demand for products and services	54%	55%	48%	24%	45%
Environmental legislation	45%	42%	39%	49%	44%
Foreign competition	33%	22%	16%	15%	22%

Source: The author

Executive summary

The Regional Environmental Center for Central and Eastern Europe (REC) conducted between October 96 and February 97 a survey on the status of the environmental business sector in Bulgaria, Croatia, Romania and Slovenia. This survey is part of a REC programme on the status of the environmental business sector in Central and Eastern European countries started in 1995. The first survey of environmental goods and services enterprises was carried out in the Visegrad countries--the Czech Republic, Hungary, Poland, and Slovakia--in 1995.

The principal objectives of these surveys were to describe the status of the environmental business sector and to provide an overview of the environmental markets. The secondary objective was to identify information and training needs, and barriers to development of the environmental business sector.

The survey was largely based on formal interviews with senior representatives of environmental firms across the widest geographical and company range possible with firms of varying sizes, ownership structures, incomes and areas of expertise. It was estimated that the environmental business sector comprises over 700 providers of environmental services and technologies, of which approximately 450 were included in the survey. In each country, between 70 and 140 environmental businesses were interviewed.

The development of the environmental business sector is principally affected by government commitment to environmental protection, comprehensive environmental policy and legislation, efficient economic mechanisms, incentives to environmental investments by both the public and the private sector, regulatory enforcement capability, and the general business environment.

Government commitment to environmental protection issues is different in each country. Slovenia showed the stronger commitment to environmental protection, whereas Croatia seemed to be the least committed. In Croatia, the recently-ended war largely explains the relative slowness in political and economic development. Governments in Bulgaria and Romania manifested serious commitment, although concrete action is hindered by difficult economic conditions.

Each of the surveyed countries has implemented a "general" or "framework" environmental act and comprehensive legislation, e.g. regulations for air, water, and waste management. However, efficiency and effectiveness of regulations varies among countries. Bulgaria introduced the Environmental Protection Law in 1991, followed by Slovenia's Environmental Protection Act in 1993. Croatia and Romania implemented their Environmental Protection Acts respectively in 1994 and 1995. These framework environmental acts and the following amendments are based on principles such as the polluter pays, the prevention and the precautionary one, free access to environmental information, and public participation.

The implementation of environmental policies mainly relies on charges and fines, which currently are too low to be effective in promoting environmental investments. The level of enforcement is still inconsistent in all countries, since most of the responsible authorities (e.g. the environmental inspectorates) are either understaffed or do not have the appropriate equipment and training to assure the enforcement of the environmental regulations.

Total environmental spending from both government and private sector exceeded US\$600 millions in 1995 for the four countries. It is expected that nominal environmental expenditure will grow at the rate of 6 to 10 percent annually. Currently, state budgets (including State Environmental Protection Funds which are already operating in Bulgaria and Slovenia), municipal budgets, and investors' own funds are the main sources of financing for environmental projects. In the coming years, a major change is expected to take place in the structure of financing funds for environmental protection: the share of the private sector is expected to increase whereas the contribution from the state budget will significantly decrease.

Environmental expenditure is mainly allocated to water and wastewater projects, air pollution control activities, and waste management related activities. The state tends to allocate funds firstly to the construction of wastewater treatment and sewage facilities, and secondly to air protection and waste management projects, which benefit more extensively from industrial plants' and municipalities' investment.

The size of the environmental market and the state of development of the environmental business sector differs in each country, depending on the level of progress in the transition to a market economy and the scale of privatisation. In Croatia, 81 percent of companies have been privatised, 68 percent in Romania, 57 percent in Slovenia and 54 percent in Bulgaria.

Nevertheless, some common features can be found among these countries. In all of them, the environmental market is relatively young, as both regulation and enterprises were only established after 1990. Total annual environmental revenues of surveyed enterprises exceeded US\$240 million in 1995. Croatian and Slovenian environmental enterprises' annual turnover was respectively US\$99 and 87 million. In all the countries technical services generated the highest revenues (47 percent), followed

by the sale of environmental technologies (29percent), and testing and monitoring activities (13percent). Croatian firms are more specialised in technical services (51percent) whereas Bulgarian firms focus on environmental technologies (33 percent).

36percent of environmental enterprises are dedicated to water and wastewater activities, 29percent to waste management activities, and 9percent both to air pollution control and energy-related activities. Industrial safety and noise control, environmental impact assessment, environmental management, soil and land remediation activities represent 17 percent of the markets.

In Croatia, 14percent of environmental enterprises have established joint ventures with foreign partners. This is the highest rate in the region examined, in Bulgaria the figure stands at only 7percent. Partners mainly come from Austria, Germany, and the USA.

All countries lack effective formal channels for information on project opportunities. This information is principally channelled through personal and professional contacts, the press, the Ministry for Environment, environmental fairs, and specialist environmental publications. Professional associations, such as Chambers of Commerce, Academies of Science, etc. are not seen as major information sources or as effective lobbying groups for the environmental business sector.

Environmental professionals showed high interest in information on domestic environmental regulations, domestic partners, domestic environmental problems, new environmental technologies, sources of financing for projects, and domestic tenders, while interest in finding the same kinds of information for foreign markets was lower. This is typical of any business sector at the early stage of development.

The majority of environmental professionals suggested that regular newsletters containing updated information on project opportunities, technologies, and sources of financing would be the best way to fill this information gap. Other options included specific conferences on common environmental problems and project opportunities; and environmental business directories with relevant market information.

As the environmental markets will continue to develop and the business environment will continuously change, professional training becomes an important instrument to keep up with these transformations. Professional training was especially requested on environmental regulations and policy, environmental impact assessment, financing environmental investments, environmental economics, and environmental management.

Access to credit and finance was indicated to be the biggest barrier to business development. On the one hand, financial markets, especially in Romania and Bulgaria, are very weak, with high interest rates and unstable banks, while the environmental business sector is still perceived as very risky by potential investors. Banks require guarantees such as cash flow and property for financing projects and they seek short term profits, which especially young businesses normally are not able to provide, even though environmental markets are growing.

The second major barrier facing environmental professionals are the high taxes applied to the business. Legal regulations and registration requirements, general access to information, market demand, and environmental legislation are the other factors which hinder development of this sector. Foreign competition was only considered by 22 percent as a barrier.

In most countries, more than half of the respondents thought that governments are better placed than any other institutions to provide assistance for the development of this sector. In Bulgaria 65 percent of entrepreneurs indicated government as the first institution in order of importance, whereas in Romania the

figure was only 26 percent. Business or industrial associations, and financial institutions were identified as second in order of importance. Scientific or academic institutions, international organisations, and professional training institutions were seen as minor players.

ENVIRONMENTAL BUSINESS SECTORS IN ECONOMIES IN TRANSITION: BARRIERS TO GROWTH OF THE SUPPLY SIDE

by Kenneth J. Macek

Introduction

Stakeholders (e.g. international donors, national governments) in CEECs have supported the institutional and capacity building activities necessary to foster the creation of adequate levels of national environmental investment (NEI). These efforts have been responsible for the development of the demand side of environmental markets in parts of the region. However as these efforts succeed, the development of an adequate local supply of the required environmental goods and services is essential to (i) maximise the returns on those national environmental investments, (ii) remedy past environmental damages, and (iii) promote future sustainable development.

Stakeholders (including financial institutions) can assure maximum returns on NEIs by fostering the efficient development of a local environmental business sector which provides a full range of least cost solutions to environmental problems. Thus, stakeholders may need to shift their focus in certain countries from increasing national environmental investment (thereby creating demand for environmental goods and services) to maximising the returns on that investment (by assuring adequate supply of required environmental goods and services).

The development of an efficient supply of least cost environmental solutions to a country's environmental problems enters a critical stage at a specific point in the developmental process responsible for the emergence of domestic environmental business sectors. This developmental process shares many commonalities in market economies, including barriers to efficient development. Thus, it may be instructive to consider this process, in general, and where in the development process, specifically, individual countries in Central and Eastern Europe may be at the present time. This perspective may allow stakeholders to focus on the most appropriate forms of assistance to ensure the efficient development of the environmental supply side in each country. Having done so, stakeholders may then assist domestic suppliers of environmental goods and services to overcome the barriers to efficient development of least cost environmental solutions.

Key questions to consider relate to market timing, types of barriers to efficient supply side development, and possible solutions to overcome those barriers. These questions are:

- What are the essential components, and their sequence, for the development of an efficient supply side of environmental business sectors in market economies?
- What are the barriers to efficient development of the supply side, and at what stage of the development process is it critical to address them?

- What can stakeholders do to assist domestic suppliers of environmental goods and services to provide a broad range of least cost environmental solutions to the market?

In order to address these questions, the author's objective herein is to:

- a) provide a paradigm for the evolution of both sides of environmental business sectors (i.e. *demand* = *supply*), from the standpoint of creating, and maximising returns on, NEI in market economies;
- b) consider at what stage in this developmental process the various countries in the region may be, in order to optimise the types of stakeholder assistance provided to each country;
- c) identify barriers to the efficient development of an adequate supply of a full range of environmental goods and services in economies in transition; and
- d) suggest key areas, for future focus by interested stakeholders, fundamental to the development of the required supply of least cost solutions in the economies in transition of Central and Eastern Europe.

It is necessary to consider barriers limiting both sides of the supply-demand equation in order to understand all of the factors that directly or indirectly influence the supply of environmental goods and services. Barriers to the growth of environmental business sectors can be both external and internal to the enterprise supplying environmental goods and services to the marketplace.

External barriers to environmental sector development are social, political, economic, legal, and institutional factors. These directly influence the level of national environmental investment, and thus the (*demand*) side of the environmental business equation. External barriers to sector development usually influence the *supply* side of the environmental business equation, and thus the efficiency of NEI, indirectly.

Internal barriers to development relate to market knowledge, technology and/or technical expertise, management capability, and financial resources. They typically have little, if any, influence on the level of NEI. Internal barriers exert their influence directly on the supply side of the environmental business sector equation, and influence the return on NEI by limiting the supply of least cost solutions available in the domestic marketplace.

Development of environmental business sectors: A paradigm

The demand side

The evolution of environmental markets in economies in transition has paralleled the comparable evolutionary process in the market economies of the West, with certain important differences. The essential phases, and their major components, of the *demand* side of this developmental process are:

- PHASE I – POLICY:

government commitment \Rightarrow environmental policy \Rightarrow
 environmental legislation (economic mechanisms) \Rightarrow

– PHASE II – INSTITUTIONAL CAPACITY:

institutional capacity building \Rightarrow regulations & standards \Rightarrow enforcement \Rightarrow

– PHASE III – INVESTMENT:

national environmental investment \Rightarrow *demand* for goods & services \Leftrightarrow *supply*

Evidence suggests that the principle external barriers to the development of the demand side of the environmental business sector equation are lack of:

- government commitment to the environment;
- comprehensive environmental policy & legislation;
- efficient economic mechanisms and incentives to fund NEI;
- regulatory implementation & enforcement capability;
- participation of the private sector in NEI.

In every economy, the formulation, implementation and enforcement of government environmental policy is primarily responsible for the level of national environmental investment (i.e. *demand* side of the environmental business equation). Thus, it is appropriate that, in the early stages of environmental market development, stakeholders focus their assistance efforts on policy development, institutional and capacity building, and involving the private sector in directing NEI.

The supply side

The developmental process for the *supply* side of environmental business sectors in a market economy typically consists of the following components:

demand for environmental goods and services \Leftrightarrow

defined market needs \Rightarrow
entrepreneurial management \Rightarrow
technical solutions \Rightarrow
financial resources \Rightarrow
range of efficient environmental solutions (*supply*)

As previously discussed, the most critical factor in the quantitative evolution of the supply side of the environmental business equation is market *demand*, which is determined by factors external to enterprises (e.g. the political, economical, legal and institutional aspects of government policy). On the other hand, a host of factors, most of which are internal to enterprise development, can represent barriers to the qualitative (efficient, appropriate) development of the required, least costs environmental solutions (*supply*).

The supply side of CEE environmental markets is most advanced in the Visegrad countries. These economies can offer insights regarding potential barriers to sector development throughout the region.

Evaluation of environmental business sectors in these countries reveals certain characteristics about developing environmental goods and services sectors in economies in transition.

First, where government policy, environmental institutions, and national environmental investment have stimulated market demand, there will emerge a plethora of environmental commercial enterprises (e.g. Poland, the Czech Republic, Hungary). Second, analyses of the structure of these developing environmental goods and services sectors indicate that initially they will be heavily weighted toward the services sector. In this sector, there is usually more supply than demand, competition is intense, and enterprises of significant size and market share are rare. Conversely, product sectors, when significant, will often be characterised by obsolete technologies, few alternative solutions to the customer's needs, and limited domestic production capacity. These two phenomena probably result from the juxtaposition of several different factors.

In the environmental services sectors of the CEE economies in transition:

- there is an ample supply of the technical expertise (i.e. engineers, biologists, environmental scientists, chemists, etc.), at least in the early stages of development;
- barriers to entry to environmental services businesses are quite low and easily overcome;
- financial resources required to enter environmental services markets are usually modest and within the capacity of many entrepreneurs; and
- technical solutions to market needs are usually well defined (often prescribed) for the marketplace and, thus, clearly understood by potential suppliers.

With respect to environmental products sectors in these economies:

- domestic technologies are often less than state-of-the-art, and information about current, state-of-the-art technological alternatives may be difficult to acquire (especially in the local language);
- barriers to entry for product businesses can be significant, (e.g. access to technologies, capital investment, etc.); and
- the most cost-effective technical solutions to the customers' needs are usually not well defined in the marketplace or perceived by potential suppliers.

Assessment of country progress

The environmental sector developmental process in each of the economies in transition of Central Europe is in various stages of the paradigm development. For example, the Visegrad countries have, by and large, succeeded in creating significant NEI. The environmental goods and supply sector tends to be further along in development than other CEECs, although even among the Visegrad countries significant differences exist. For example, the level of environmental investment and the demand for environmental goods and services is quite advanced in Poland. However, the lack of efficient economic mechanisms to fund the required national environmental investment limits the development of NEI in the Czech Republic. Until recently, the development of the environmental business sector in Hungary was mired in the policy phase, awaiting a strong government commitment to address environmental issues. In

Slovakia, the lack of effective economic mechanisms and enforcement of existing environmental regulations restricts the further development of environmental business sectors.

In most other CEECs, the development of the environmental supply side is less advanced, especially as regards the role of the private sector. Governments are still addressing the policy, legislative and institutional issues which drive environmental investment and create demand for environmental goods and services. The environmental supply sectors in Russia, Bulgaria, and Romania are less developed than in the Visegrad countries. For example, the government of Romania has only recently enacted a comprehensive framework environmental legislation. This milestone should allow the development process to move to the institutional phase in that country; and already the beginnings of an environmental goods and services sector are evident. Environmental supply sectors in the Ukraine, Kazakhstan and Moldova are even less developed, at this point, than in the preceding group of CEECs. Finally, the situation with respect to the development of the environmental supply side in the former Yugoslav Republics, Belarus, and the Asian Republics appear to be in the very early embryonic stages.

Perhaps the most significant factors affecting the pace of this developmental process in CEECs and the resulting level of national environmental investment are (a) the state of the national economies and (b) government's ability to increase the participation of the private sector in the environmental investment process.

When governments in the industrialised economies of the west mandated quantum increases in NEI, those market economies were established and growing. Government policy imposed the responsibility for most environmental investment on the private sector, and the private sector was able to internalise environmental costs into the prices for goods and services. Most importantly, western market economies were able to bear these additional environmental investment costs without serious economic dislocations.

However, prevailing conditions in economies in transition often were, and in many cases still are, notable to absorb additional costs of required environmental investments. Often, mechanisms which readily allow the internalisation of true environmental costs do not exist. As a result, governments were, and are, either reluctant to increase the NEI by imposing additional environmental costs on their struggling economies, or unable to shift the burden for national environmental investment to the more efficient private sector.

The Central European country most closely resembling the western environmental market paradigm is Poland. Assisted by a growing economy in recent years, Poland has created a relatively high level of NEI. In response to this NEI, Poland has the most advanced environmental business sectors among all of the CEECs. However, in the author's view, the most critical factor in the development of Poland's vibrant environmental goods and services sector was the government's ability to shift responsibility for environmental investment to the private sector, both by direct and indirect means.

To better understand the relative maturity of the environmental business sectors in the economies in transition in the region, it is useful to compare the various sources of environmental investment in the Visegrad countries, where the environmental goods and services sectors are most advanced. Values for the years 1993-94, based on a variety of published sources (see table 1),¹ are

Table 1. Sources of environmental investment in the Visegrad countries

	Poland	Czech Republic	Hungary	Slovak Republic
Government Budgets	10%	50%	60%	65%
Extra-Budgetary Environmental Funds	45%	15%	20%	20%
Private Sector	40%	30%	15%	10%
Other Assistance	5%	5%	5%	5%

Source: Author's estimates ($\pm 5\%$).

One can measure the extent of the private sector's participation in environmental investment by the percentage of total investment represented by (i) the private sector, *per se* (both domestic and foreign), **and** (ii) that portion of earmarked environmental funds derived directly from the private sector (from user fees, charges, fines, etc.) In Poland, the authors estimate these two sources represent more than 80 percent of the national environmental investment, while corresponding estimates for Hungary and the Slovak Republic are less than 35 and 25 percent, respectively. The situation in Hungary should improve dramatically in the future as a result of the comprehensive set of economical incentives and mechanisms enacted as part of the 1995 framework environmental legislation.

Barriers to efficient development of the supply side

A recent survey of environmental entrepreneurs in the Visegrad countries (OECD, 1996) indicated that the level of national environmental investment is the most significant macro-issue affecting supply side business development. Responses relating to market demand consistently identified external factors such as environmental legislation, customer understanding of environmental regulations, and environmental investment levels as limiting factors to market development.

Actions to overcome these external barriers to demand side development are, largely, out of the control of enterprises. Other than government lobbying, there is little enterprises can do to influence the rate and direction of development to address these barriers. Only governments are in a position to develop policy, implement legislation, develop regulations and standards, and create national environmental investment.

However, evidence indicates that governments throughout the region are, or soon will be, putting into place the necessary paradigm components to reduce the disparity between the required and actual level of NEI. Such actions will drive the demand side of environmental markets. Therefore, it seems prudent for stakeholders to consider those internal barriers which may limit the efficient development of the supply side of the environmental business equation.

The OECD (1996) survey identified more than a dozen factors internal to enterprises, some general and some specific, which represent barriers to the efficient development of the supply side of environmental business sectors. Respondents identified barriers which impacted the development of their own business during start up or subsequent development, as well as barriers which they anticipate might limit future enterprise development.

Issues identified as barriers were:

- information regarding market size, customer needs, alternative and best available solutions to customers' needs, current trends, and future developments;
- the performance characteristics, capital costs, and operating costs of least cost technology alternatives;
- access to technology, technology transfer, and strategic partnering;
- the need for improved skills in such areas as market research, cost control, financial management information systems, strategic planning, contracts management, and preparation of credible investment proposals;
- high costs of product development, need for capital investments; and
- access to credit, and lack of equity capital.

It is possible to reduce potential internal barriers to development of an efficient supply side to four generic types, related to the sequential phases of the process of enterprise development:

- MARKET
- TECHNOLOGY
- MANAGEMENT
- CAPITAL

It is interesting to point out that respondents almost always ranked these more general types of barriers highest. Respondents from each of the countries surveyed ranked "financing" issues as the most significant barrier to enterprise development. "Marketing problems" and "lack of information" ranked as the second and third most significant barriers. [The author's interpretation, based upon five years experience living and working in the sectors and the region, is that these responses typically refer to the "inability to procure accurate information about markets and trends" and "lack of access to information about technological alternatives", respectively]. Finally, respondents ranked organisational problems (i.e. management) as the fourth most significant barrier to enterprise development in the environmental goods and services sector.

One might question whether the above ranking characterises the respondents' perception of these barriers in terms of:

- their operational immediacy;
- magnitude (i.e. difficulty to overcome);
- impact on the future success of the business; or
- a combination of the above.

For example, in a struggling business, financial issues may appear to represent the most immediate barrier. However, lack of good market information, choice of a poor technology, or poor management

may result in a competitively disadvantaged business for which no amount of capital will ensure success. Similarly, one can envision the manager who feels that he can overcome technological barriers or market barriers with sufficient effort, but is overwhelmed by the inability to overcome financial barriers solely with human resources. Finally, it is not surprising that managers may tend to minimise the impact of their own managerial shortcomings on the future development of their enterprise.

The above notwithstanding, there seems little doubt that as the supply side of the environmental sectors matures, financing issues become the critical limiting factor (barrier). This applies to the availability of both debt and equity financing.

In the case of debt financing for the environmental sector, commercial banks seem to view environmental investments, and thus enterprises engaged in the environmental business sectors, as a cash drain rather than investment opportunities. As a result, in a climate where debt financing is scarce, environmental sectors will inevitably fall low on the priority list for available debt capital.

In addition, as the environmental business sectors are relatively immature in Central European economies, there is no history of performance. Thus, relative risk is perceived by lenders as unacceptable, and available debt capital thus flows to more mature, predictable business sectors. Finally, where capital is available, the term is usually too short, and the cost of capital too high, for an immature industry such as the environmental sector to tolerate.

In the case of equity financing the problems are more complex and the solutions less obvious. In the West, equity financing, such as venture capital, particularly seed capital, has been a major engine driving the growth of the supply side of environmental business sectors. However, venture capital is scarce in the economies in transition, where the "comfort levels" which investors traditionally expect with respect to financial history, business predictability, and management capability are difficult to find. High risk seed capital is virtually non-existent. Where available, equity capital usually flows to other business sectors where investment opportunities are larger (and thus transaction costs are proportionately smaller), management is more experienced, markets (and thus risks) are more predictable, and potential returns are more quantifiable. Also, entrepreneurs in these economies are often (a) unaware of the venture capital alternative for financing enterprise development; or (b) fearful of losing management control of their enterprise to the venture capital investor.

Solutions to overcoming barriers internal to enterprises

Current efforts

Initially, stakeholders in the markets of Central and Eastern Europe justifiably focused their supply side directed assistance programmes on issues related to the management barriers and technology barriers.

Virtually every stakeholder (US AID; UKKHF; EU-PHARE) has supported numerous business management training programmes. These efforts familiarise managers with the principles of market economies and managing businesses in such economies in order to build institutional capacity in the emerging private environmental sector. Stakeholders usually focus such efforts on classical business management themes (e.g. strategic planning, financial analyses, competitive analyses, sales techniques, etc.). Clearly these training efforts are critical and productive, and stakeholders should continue, and even expand such efforts.

Stakeholders also direct substantial training efforts toward technical environmental issues. Initial efforts (e.g. World Bank; EBRD, US EPA, EU-PHARE) focused on technical procedures to assess environmental damages, such as environmental audits (EA) and impact assessments (EIA). These efforts have been accurately directed toward the suppliers of such services, and the efforts appear to have been successful. More recently, the technical training focus has shifted toward technology based issues (e.g. waste minimisation, process efficiency, and clean production). Often, however, stakeholders direct these efforts to the demand side of the equation (i.e. the local private sector end users) rather than suppliers of environmental goods and services.

Also, stakeholders direct considerable efforts to the process of environmental technology transfer (US DOC). However, it seems the emphasis of such efforts is focused on the foreign provider of such technology (exporter) rather than on the local market needs (end user) and local supplier (importer) of such technologies.

Initially, stakeholders (World Bank; USAID; EU-PHARE; EBRD) directed efforts to address financial barriers toward the demand side of the environmental business equation, focusing on municipal environmental infrastructure (e.g. revolving funds) and pollution control technology (end-of-pipe). Such efforts tend to be reactive. Stakeholders should consider fostering proactive approaches to the environmental supply sector. One such proactive approach, in widespread use in the region, builds environmental due diligence capacity in local financial institutions.

Examples of current stakeholder efforts to address internal barriers

Barriers related to market information

- The US Environmental Training Project has supported tiered training modules focused on building market research skills among managers of environmental enterprises.

Barriers related to technology

- UNIDO (Vienna) supports the dissemination of information regarding environmental control technologies through local sources in various countries in the region.
- The Global Environment & Technology Foundation (USA) has established and maintains GENet, an Internet site, where local entrepreneurs can access the latest information regarding environmental technologies, often in their own language.
- USAID supported efforts by the World Environment Center to demonstrate the benefits of waste minimisation throughout the region.
- The governments of Norway and the Netherlands have developed institutional capacity in the region by supporting Cleaner Production Centers throughout the region.

Barriers related to management capacity

- Virtually every stakeholder in the region has supported some type of management training activity to build management capacity in the emerging private sectors.
- USAID is providing technical assistance to project managers and entrepreneurs to help them prepare credible financing proposals for potential lenders and investors. [These efforts tend to focus on municipal environmental infrastructure rather than on the development of the environmental supply side.]

Barriers related to financing

- Several governments support debt-for-environment swaps in the region.
- EBRD and the EC through the PHARE and TACIS programmes have built institutional capacity in environmental due diligence.
- EBRD has taken a role as a lead investor in a regional, sector-specific (environmental) fund.
- EU-PHARE supports efforts to screen, identify and conduct due diligence on equity investment opportunities in the environmental business sectors of Central Europe. The objective of these efforts is to demonstrate the availability and attractiveness of such opportunities to equity investors.
- EBRD provides financial support to various energy efficiency initiatives in the region (e.g. ESCOs).

Suggested future stakeholder efforts to address internal barriers

All stakeholders should continue their current efforts to build management capacity in the local environmental business sectors.

One management training theme, of particular interest to environmental entrepreneurs, that seems not adequately addressed by current stakeholder efforts is the use of financial (cost allocation) information systems as a tool to improve business performance. Historically, most managers in the region viewed financial information as a necessary evil to satisfy cumbersome reporting requirements. Today, most business managers are unfamiliar with the use of financial information as a tool to improve cost management, identify operational problems, structure cost (price) proposals, and justify investment. As a result, despite the prior efforts to provide training in preparing business plans, managers are often still incapable of constructing credible plans with compelling economic arguments to attract debt or equity financing.

Stakeholders should expand future environmental technology related efforts to consider the information needs of the potential local providers of goods and services. Such efforts should provide access to information, in the local language, regarding all relevant environmental technologies. The advent of the Internet and its ready access to electronic information should greatly facilitate the dissemination of such information.

Also, stakeholders should orient future efforts to foster partnering (access/transfer) with western environmental technologies to the needs of the potential local market needs (end users) and suppliers (importers) of new technologies. Rather than stakeholders focusing on what the West can export to countries in the region, those countries would be better served by efforts to more clearly identify those least cost environmental solutions required in the region.

With regard to management, technology and market related supply side barriers, stakeholders should consider fostering activities which provide managers, scientists and engineers opportunities to exchange information regarding management, environmental technologies, and environmental market issues. Such activities include supporting professional societies, trade associations, industry publications, environmental seminars and exhibitions, etc. Each of these appears to be a potentially effective means of overcoming the information-related aspects of these barriers. Again, the advent of the Internet provides a platform from which to address these issues.

The two types of supply side barriers which stakeholders seem heretofore not to have adequately addressed are those related to market information and capital. The former is typically necessary at the earliest stages of environmental enterprise development, while the latter typically is more critical in the expansion stages of enterprise development.

Regarding market barriers, stakeholders should bear in mind that "markets" are a totally new concept to the current generation of managers in the economies in transition. Having functioned in command economies, where sensitivity to the customer was unnecessary, they are unfamiliar with the traditional requirement for, and methods of, market research. These include methods to (a) identify and focus on defined market segments and niches, quantify market potential, and evaluate future trends, (b) perceive and analyse customer needs in terms of solutions rather than problems, and (c) establish and nurture continuing relationships with customers based upon customer satisfaction.

Future efforts to build management capabilities in the environmental goods and services sector should consider training programmes to address such market oriented issues. These efforts should address management's understanding of marketing principles and increase market research skills within existing enterprises.

The OECD study indicates that the most critical barrier to the development of an efficient supply side of the environmental business sectors in economies in transition are related to the availability of capital.

As stated earlier, the most important financial issue at the macro level is the national level of environmental investment and the role of the private sector in that investment. Governments in the region are making substantial progress in reducing the disparity between the amount of national environmental investment required and the amount available, thereby stimulating the demand side of the environmental equation. Stakeholders currently direct significant effort toward attracting private equity and debt capital to both environmental infrastructure (i.e. privatisation) and environmental investment in other activities (industry, forestry, agriculture, etc.) and these should be continued.

Internal financial barriers, related to access to debt and equity capital, will become the major limiting factor in the development of the supply side of the environmental business sectors.

Stakeholder efforts toward attracting debt and equity capital to the supply side of the environmental equation are only just beginning. In one sense this is understandable, as the environmental market paradigm shows that the supply side development must of necessity await the development of the demand side. However, as demand for environmental goods and services emerges it is imperative that

stakeholders address financial barriers internal to environmental enterprises, in order to foster the development of an efficient and adequate local supply of required environmental goods and services. In those countries where the development of significant demand for environmental goods and services is imminent, stakeholders should anticipate the need to address these supply side financial barriers.

Stakeholders should consider providing incentives to the environmental supply sector, similar to those utilised to attract commercial debt financing to environmental infrastructure projects. Such debt financing will foster the development of this emerging business sector into a mature environmental industry. These efforts could include such traditional mechanisms as providing sector specific credit lines, state guarantees for a portion of long term commercial loans to environmental enterprises, increased tax credits for interest paid on commercial loans by environmental enterprises, etc.

The issue of stakeholders efforts to overcome equity capital barriers is complex and difficult. Certainly stakeholders should continue to support training efforts to build management capacity.

A serious problem for potential equity investors is the availability of sufficient relevant information (i.e. well conceived, credible business plan) upon which to base an investment decision. Stakeholders should consider efforts (e.g. technical assistance, training) to enhance enterprise management's capacity to develop credible financing proposals for consideration by both lenders and investors. Efforts to train managers in the preparation of credible, economically sound business plans, based on competitively advantaged businesses are essential. Such training efforts will surely contribute to developing local managers capable of instilling the required confidence in lenders and investors, and attract debt and equity capital to the environmental markets of the region. In the interim, providing technical assistance to help package credible business opportunities in the environmental goods and services sectors will bridge the management gap that currently exists.

However, such efforts will only bear fruit when there is sufficient debt and equity (e.g. venture) capital focused on the region and the environmental sector. Thus stakeholders should consider mechanisms to provide or attract additional debt and capital, focused specifically on environmental sectors, to the region.

In one sense there is a classic chicken and egg problem. The financial community will inevitably be attracted to any region and sector where there are demonstrated opportunities for attractive financial returns. However, without some venture capital invested in the environmental sectors of economies in transition, this investment potential will never be adequately demonstrated to equity investors. The EBRD and the EU-PHARE are supporting several innovative initiatives to address this issue (see below).

Other stakeholders must follow suit, in order to generate sufficient evidence of the potential for attractive returns to investors in the environmental business sector and thereby attract other regional venture capital investors, such as the Enterprise Funds, to the environmental sector. Alternatively, stakeholders could mandate that a certain percent of existing equity capital in the region (e.g. Enterprise Funds) be committed to the environmental business sectors.

The corporate mentality of the new local entrepreneur further complicates the issue of equity capital. Having lived for decades in an environment where "ownership" was largely a figment of one's imagination, entrepreneurs are reluctant to give up ownership in exchange for future growth and increased value. Stakeholders must educate this new genre of business managers about the advantages of equity (versus debt) capital, and the value added represented by the knowledgeable venture capital investor.

Examples of future stakeholder efforts

Stakeholders should consider additional training efforts to build capacity within environmental enterprises to address the market information barriers. Specifically, such efforts should enhance management's ability to identify and assess market needs, where they are not obvious or prescribed.

- Provide training in classical market research techniques for assessing market needs, evaluating customer satisfaction, predicting market trends, etc.

Stakeholders should consider additional efforts to allow enterprises to access information on all available technical solutions to determine those least cost solutions which best satisfy the local market needs. Also, stakeholders might consider increased efforts to provide access to those technologies deemed appropriate to the local market by the local supplier (importer), rather than those of particular interest to the exporters of environmental technologies.

- Expand the environmental technology database on the Internet and make sure information is available in, or easily converted to, a wider range of CEE languages.
- Develop strategic partnering electronic forums oriented towards, and responsive to, the local supplier.
- Provide technical and legal assistance to local environmental enterprises in negotiating technology transfer and other strategic agreements to ensure they are fair to both parties.

Stakeholders should consider additional efforts to build management capacity in the critical area of demonstrating the creditworthiness of their environmental business opportunities and environmental investments to potential lenders and investors. In the interim, stakeholders should consider providing technical assistance to enterprises to develop such financing proposals.

- Provide in-depth training in developing economic justification for environmental investments. This capacity will enable managers to demonstrate the creditworthiness of their own businesses as potential borrowers of debt financing or as potential equity investment opportunities.
- Provide in-depth training in the economic justification of environmental investments to environmental enterprises in order to allow them to assist end users to acquire financing for environmental improvements.
- Provide technical assistance to demonstrate economic returns to lenders from investments in suppliers of environmental technologies (e.g. clean production).

Stakeholders should consider additional efforts to address the financial barriers that limit the development of suppliers of environmental goods and services. These efforts should provide capital and demonstrate to financial institutions and investors the creditworthiness of environmental enterprises and the potential for investors to realise attractive returns.

- Establish additional environmental sector specific funds focused on seed capital and early stage financing.

- Earmark a portion of existing government equity capital (e.g. Enterprise Funds) for the environmental supply side sectors.
- Assign a portion of National Environmental Fund resources for equity investments.
- Establish environmental sector specific credit lines, or sector specific components of broad credit lines.
- Support environmental efficiency (e.g. cleaner production) initiatives in a manner similar to energy efficiency initiatives. Develop the concept of environmental service companies (ENSCOs) comparable to the proven energy service companies.

Summary and conclusions

As stakeholder efforts to create national environmental investment succeed, the development of an adequate local supply of the required environmental goods and services is essential to (i) maximise the returns on those national environmental investments, (ii) remedy past environmental damages, and (iii) promote future sustainable development. Stakeholders (including financial institutions) can assure maximum returns on NEIs by fostering the efficient development of a local environmental business sector which provides a full range of least cost solutions to environmental problems.

Barriers to growth of the environmental business sectors of economies in transition can be both external and internal to environmental enterprises. External barriers are typically social, political, economic, legal or institutional in nature and affect the demand side of the environmental business equation. Internal barriers typically relate to markets, technology, management and capital and directly affect the supply side of the environmental equation.

A paradigm for the development of environmental business sectors in market economies suggests that government policy, institutions, and investment are the critical components necessary to create demand for environmental goods and services. The paradigm further suggests the rate of development of the demand side is a function of the involvement of the private sector in creating environmental investment. Critical components to the development of the supply side of the environmental business sector are information, management capacity, access to technology, and financial resources (capital).

Environmental enterprises are unable to significantly affect the rate and development of the demand for environmental goods and services. The barriers to the development of the demand side relate to national issues which require action at governmental and institutional levels. Recognising this fact, stakeholders in the region have previously focused their assistance efforts on overcoming those barriers, external to environmental enterprises, that directly affect demand for environmental goods and services. However, as the levels of national environmental investment in economies in transition begin to approach levels of environmental investment comparable to that of western economies, stakeholders should begin to focus on assistance on the supply side. Particular emphasis should focus on efforts enabling enterprises to overcome internal barriers to the development of the supply of environmental goods and services thus ensuring the maximum returns on national environmental investment.

Among the countries of Central and Eastern Europe, Poland and the Czech Republic have the most mature environmental business sectors, followed by Hungary and the Slovak Republic. Russia, Bulgaria and Romania are beginning to show evidence of an emerging supply side. The supply side of environmental business sectors in the other CEECs would seem to be in various stages of embryogenesis.

Stakeholders have provided a wide range of efforts to build management capacity. Also, stakeholders support modest efforts to assist in building certain aspects of the required technology information base. The emergence of the Internet would seem to provide a platform for making a quantum leap forward in the accessibility of environmental technology information to environmental enterprises in the region. Stakeholders should explore opportunities to leverage this electronic library into ways to overcome the information barriers that still limit the development of the environmental sectors in CEECs.

Finally, there is little stakeholder effort directed towards assisting environmental enterprises in overcoming the single most critical barrier to the development of the supply of environmental goods and services, namely, availability of capital.

Stakeholders should consider providing incentives, similar to those utilised to attract commercial debt financing to environmental infrastructure projects, to the private environmental sector in order to foster the development of this emerging business sector into a mature industry.

More important, stakeholders should consider mechanisms to demonstrate the availability of suitable lending and investment opportunities in domestic environmental enterprises and technologies in order to attract financing to the sector. They also should consider investing in focused environmental funds in the region, or mandating a portion of non-focused, regional venture capital be earmarked for the environmental business sectors. In the interim, stakeholders may want to assist environmental enterprises to demonstrate the economic viability and creditworthiness of environmental loans and investments to the financial community.

In summary, stakeholders in the economies in transition of Central and Eastern Europe should anticipate the need to change their focus from the demand side of environmental business sectors (i.e. creating national environmental investment) to the supply side of environmental business sectors (i.e. maximising efficiency of national environmental investment).

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