Rapidly growing environmental business needs monitoring

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FOREWORD

Environmental technology is becoming one of the key fields of development in society. The development is similar to that of the pivotal change in the status of information technology about ten years ago. A key trend then was the converging of information technology and communications technology into one field (ICT). New innovations and powerful structural changes in business structures and legislation spurred rapid development growth in this sector. Accomplishing growth then meant intensive concentration of capital in the sector and venture capital investment in the field overheated quickly. The environmental industry is now increasingly a target of investment.

Venture capital investors in different parts of the world, especially in the US, have been taking increasing notice of growth forecasts for environmental technology. Different kinds of statistics and index services have developed quickly in the US's advanced venture capital markets to monitor the developments in this field. The situation is different in Europe and especially in Finland, where the environmental technology sector is deemed to be rather scattered and statistical analysis of it has been inadequate.

The objective of Finnish actors was to find out how venture capital investments in the environmental business are monitored and statistics compiled in European countries and to find means for the monitoring to be carried out in Finland as easily as possible. During the two studies carried out in Finland, the objectives were expanded to include international dimensions and evaluating the funding needs of companies. There were four types of data needed for analysis. The study compiled information on the success of the companies, general development of venture capital, interest of venture capitalists in investing especially in environmental companies and the willingness of companies in this sector to use the services of venture capitalists in these markets.

The study includes an overview of this sector's stage of development in Europe and Finland's needs. It also includes proposals for measures to create a monitoring system. In addition, it assessed the interest of Finnish environmental business companies in receiving venture capital investments.

Wide interest was expressed in the study when it was being carried out. It is noteworthy that the study generated attention in both European circles and on a Nordic level. The aim is to bring about monitoring activities on a European scale covering national venture capital associations and their European umbrella organization.

INTRODUCTION

The three-year Environmental Programme (2004-2007) launched by Sitra (Finnish Innovation Fund) seeks to promote the environmental business. The environmental business is a growth sector creating jobs and generating export revenues. In addition, it is a vital sector for fostering sustainable growth on a worldwide basis. One of the goals of Sitra's programme is to facilitate compilation of data on this field. Data is needed by companies seeking to reduce emissions as well as by communities, government authorities, companies in this sector and investors. This is a proposal for developing international monitoring of the environmental business, and we invite other countries to join us in this endeavour.

Until now the data produced regarding the environmental business has been insufficient and contradictory. There is a vast amount of information produced about the state of the environment. In contrast, there is considerably less information produced about the environmental business. Comprehensive, consistent, international statistics are not available. The same holds for investments in the environmental business.

Building a monitoring system for the environmental business requires the following:

- A common definition of the environmental business
- Plans for compiling and processing statistics on the environmental business
- Monitoring of venture capital activities focused on the environmental sector

This publication covers the above-mentioned matters. We tell about development work carried out with Sitra and make proposals as a basis for discussion about how the monitoring could be organized.

We aim to build a pilot monitoring system in Finland. At the same time we seek to foster creation of an international monitoring system covering different countries. It would be based on national monitoring systems that are sufficiently standardized. The monitoring system would provide comparable data for international cooperation thereby facilitating competition between countries, companies and investors in order to improve the state of the environment.

DEFINITION OF ENVIRONMENTAL BUSINESS

The environmental business is a group of activities carried out in very diverse sectors. It includes clean technologies and production of environmentally friendly products as well as ancillary services such as waste management and recycling and related construction activities. Part of the environmental business, for example, clean technologies and applications thereof, are an integral part of different sectors. Clean technologies and environmentally friendliness are nevertheless relative concepts. Along with new innovations, even more environmentally friendly technologies and products will replace the best practice products.

The environmental business is difficult to comprehensively and unambiguously define. Despite this, a definition is needed. We must have a common concept of the environment as well as products and production techniques that save nonrenewable natural resources. This information is needed when companies renew their production processes and products. Investors prefer to invest in companies that take into consideration environmental impacts while striving to reduce undesirable effects and improve the environment. Ultimately, the government – at both central and local levels – needs data on the state of the environment. In recent years the environmental business has also become a significant sector from an economic perspective. Data on the environmental business is needed also for setting the direction of business policy.

Environmental business

In broad terms the environmental business can be defined as follows:
"The environmental business strives to prevent, reduce, offset or completely eliminate as well as correct negative environmental externalities spawned by economic activities. The environmental business also includes ancillary activities related to training, research, consulting and financing as well as measurement, monitoring and certification. The aims of the environmental business can be fostered by reducing use of natural resources, limiting pollution, preventing creation of waste and emissions and by clean-up of environmental accidents. Also fostering productivity regarding use of natural resources can be regarded as a nature saving activity[1]".

According to the definition of the OECD and Eurostat, the environmental business can be divided into the following groups:

1) Environmental protection, which consists of air pollution control, wastewater management, solid waste management, remediation/clean-up of soil and water, noise abatement as well as monitoring, analysis and assessment.
2) Clean technologies and environmentally friendly products
3) Sustainable use of environmental resources and activities related to renewal, such as recycling, renewable energy production and energy saving, sustainable agriculture, forestry, fishing and tourism, indoor air purification and portable water production as well as management of assorted environmental risks.

The environmental business in these groups encompasses production of goods and technology, services and related construction and installation activity.

1 For example, by shifting from separate production of electricity and heat to their joint production, we can produce the electricity and heat we need with less fuel.

Clean technologies

The main segment of the environmental business is the production of environmental technologies. Environmental technologies include all technologies that are less environmentally harmful than relevant alternatives, i.e. best practice technology from an environmental point of view. Environmental technology is consists of two parts:

1. Clean technologies are technologies via which different sectors can better preserve the environment, energy, natural resources, promote recycling of raw materials and improve their eco-efficiency.
2. Communities and the environment, which includes municipal water supply and sanitation, waste and treatment of by-products, protection and monitoring of the environment, as well as related construction of infrastructure and maintenance of technology.

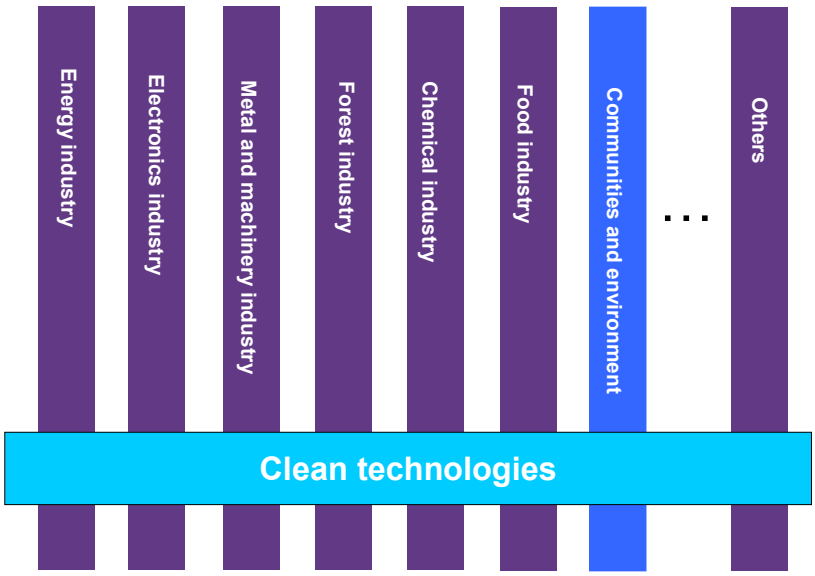

Figure 1. Clean Technologies

Clean technologies constitute a segment that horizontally intersects industrial sectors and social activities, including various kinds of environmental know-how and assorted environmental technologies. The main segments of public sector are water and waste management, sanitation, recycling, air, soil and water protection, environmental monitoring, construction and transportation. Clean technologies protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes. Clean technologies in the context of pollution are process and product technologies that generate low or no waste, for the prevention of pollution. Environmentally sound technologies are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures.

Suggestion for definition

We suggest the following definitions for monitoring the environmental business and compilation of statistics:

A. Production of clean technologies B. Production of environmentally friendly products and materials C. Recycling D. Renewable and low emission energy production E. Efficient energy use and energy saving	F. Environmental management - Water management and waste water treatment - Air pollution control - Waste management - Soil and landscape protection - Noise abatement G. Environmental data collection, PR and administration

Depending on the sub-sector, it includes production of technologies and systems, products and materials or services and other activities.

A more detailed proposal for the definitions is presented in Appendix 1. These definitions are based on the definitions of the Environmental Goods and Services Industry made by the OECD and Eurostat. The definitions facilitate the compilation of statistics for the environmental business and related venture capital activities.

GROWTH PROSPECTS FOR ENVIRONMENTAL BUSINESSES

The environmental business is a global growth sector. The internationally renowned environmental business consulting firm Helmut Kaiser Consulting estimates that sustainable development technology and services will be growing by about 10 per cent annually until the year 2015. Environmental protection and waste management as well as clean energy production are projected to grow by over 6 percent annually.

The size of the global market for sustainable development technology and services was USD 1500 billion in the year 2005. At the projected growth rate of 10 percent the markets would reach USD 3800 billion by the year 2015. Europe and North America are the most significant market regions.

The worldwide markets for environmental business were USD 812 billion in the year 2005. If the annual growth is on par with the forecast annual growth of 6 percent, the global markets will expand to USD 1050 billion by the year 2015. The main sectors include water management and waste water cleaning as well as treatment of waste management and hazardous wastes. The largest market regions are Western Europe and Asia.

Europe will be a leading developer of technology in clean-energy, environmental and production technologies. Strong environmental awareness and high population density will encourage European countries to innovate and adopt new technology. The USA is nevertheless ahead of Europe in venture capital investments and thus poses a threat to Europe's position also in technological development. The fastest growth in environmental technology – especially in so-called end-of-pipe technology – is in Asia. Industrial development in Asia, China, India and Southeast Asia will spawn considerable environmental problems that must be swiftly addressed.

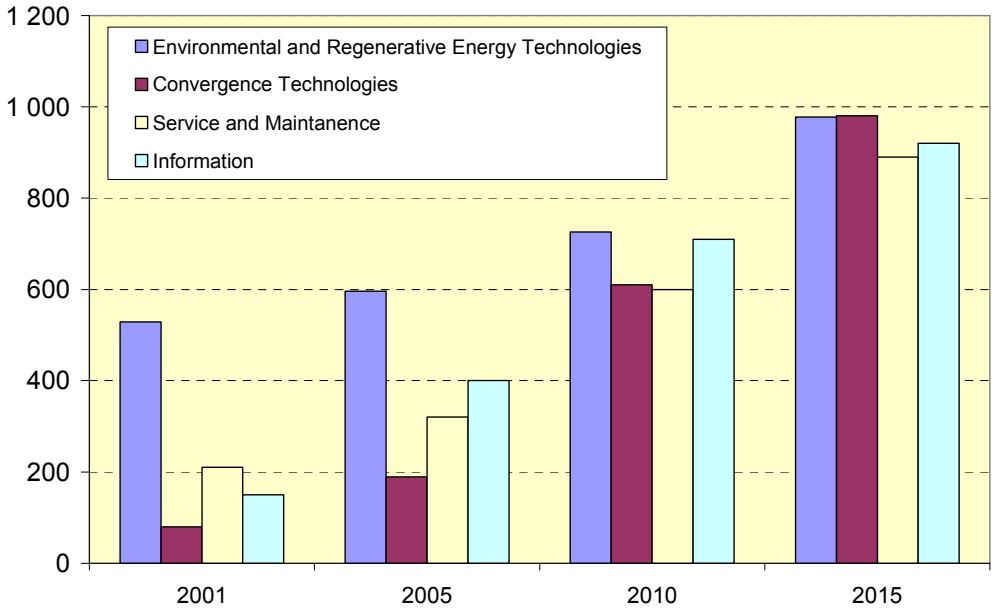

Figure 2. Markets for Sustainable Development Technologies and Services 2001–2015 in USD Billion: *(Source: Helmut Kaiser Consulting, Cleantech Forum Lahti, June 2006)*

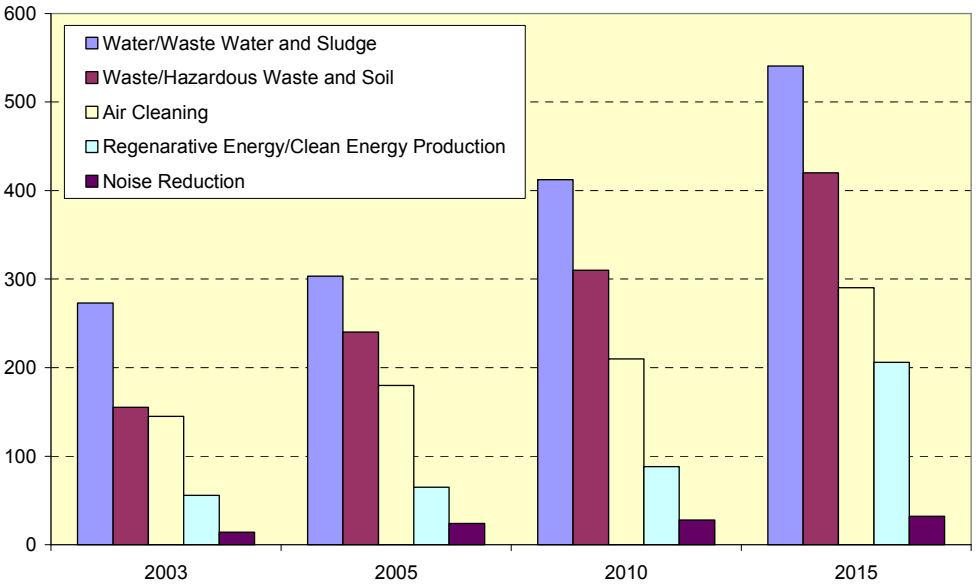

Figure 3. Markets for Environmental Industry Worldwide 2003–2015, Billion USD *(Source: Helmut Kaiser Consulting, Cleantech Forum Lahti, June 2006)*

VENTURE CAPITAL INVESTMENTS IN ENVIRONMENTAL BUSINESSES

There are no comprehensive statistics investments in the environmental business. The markets and output of the overall environmental sector is estimated to be larger in Europe than in North America. Venture capital investments in clean technologies are nevertheless considerably greater in North American than in Europe, as indicated by the data compiled by the Cleantech Venture Network. The development of the investment market in North America can be divided into three stages. In 1999-2001 there was an investment bubble, which subsequently burst. The years 2002-2005 were a time of learning and diversification of investments. The years 2006-2008 are projected to be a time of rapid growth and reaping of profits.

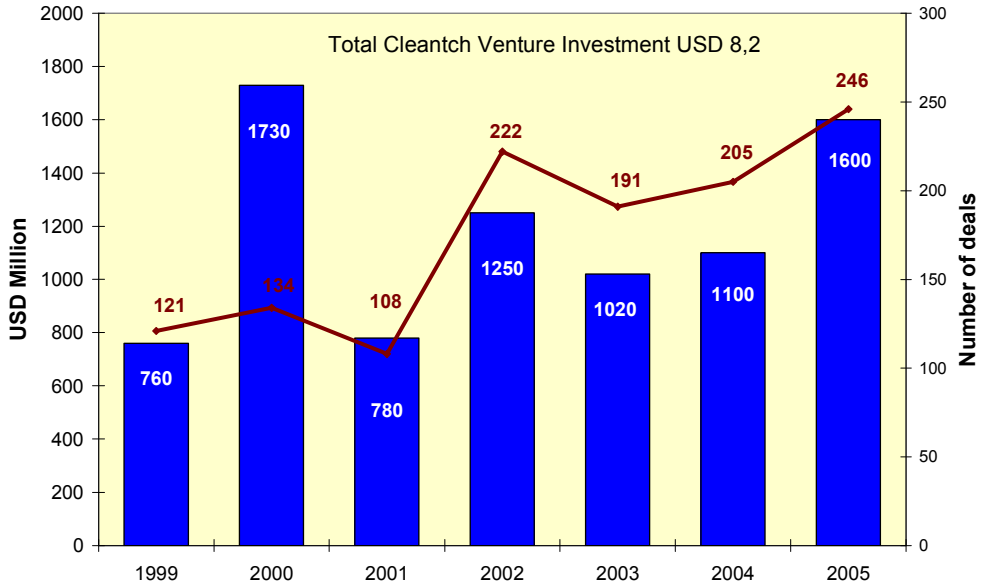

Figure 6. US and Canadian Cleantech Venture Capital Investments, 1999–2005 *(Source: Cleantech Venture Network, Nicholas Parker, Cleantech Forum Lahti, June 2006)*

In Europe venture capital investments in clean technologies in the years 2003-2005 and the first three months of 2006 totaled USD 2,078 billion. The number of investments was about 300. Some 58% of the investments were in energy, while the corresponding figure for North America was 43%. Also the investments in recycling were relatively large in Europe. The European markets were dominated by Great Britain, France, Germany, the Netherlands and Belgium, which accounted for 66 percent of the investments. The combined share of North America is 20%, which is relatively large compared to its GDP and population.

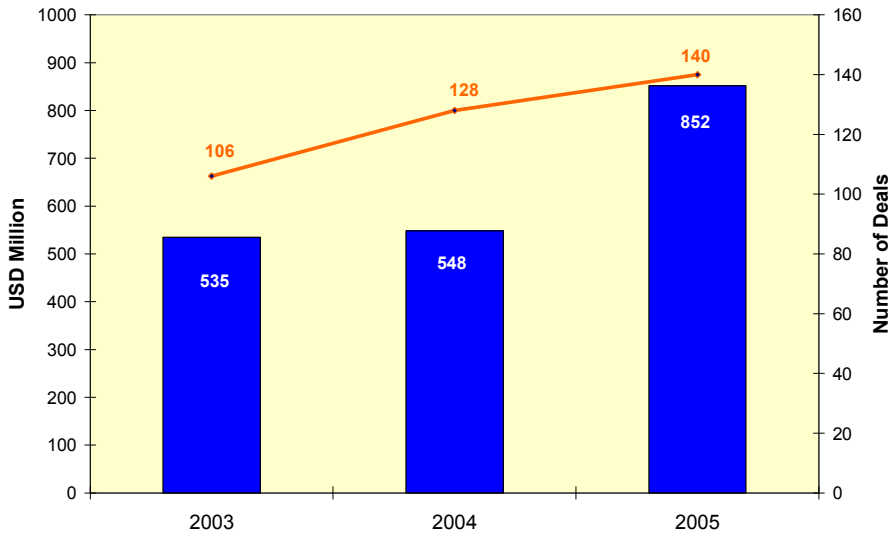

Figure 7. European Cleantech Investments, 2003–2005 *(Source: Cleantech Venture Network, Nicholas Parker, Cleantech Forum Lahti, June 2006)*

MONITORING OF ENVIRONMENTAL BUSINESS

The monitoring of the environmental business and related venture capital investments requires national and international data from different markets. We need to know the following: i) How are the firms in the environmental business developing? ii) How are venture capital investments developing? iii) What are the driving forces behind investments in the environmental business compared to other sectors? iv) What is the demand for venture capital by environmental business firms? Below we will briefly describe our proposal for the monitoring system. It has been designed for Finland, but the aim is to create a generic system that could be adopted more widely in European countries and internationally.

Built on a common definition

The monitoring system is based on a commonly accepted definition of the environmental business. We propose a definition based on the definition by the OECD and Eurostat. The definition and guidelines must still be developed via international cooperation. Appendix 1 presents the definition developed for Finland. The development of the definition will require that in addition to technical development and tightening of environmental requirements also the best practices in the environmental business will continuously develop.

The environmental business includes the following sectors:

- Clean technologies and environmentally friendly products that represent the best practices of this sector (Best practice group)
- Sustainable production that does not harm the environment – for example, renewable energy production (Resource management group)
- Environmental business sectors that protect and improve the environment as well as carry out waste management and recycling of materials (Pollution management group)

The environmental business is not an ordinary sector, but rather it includes companies, activities, technology and products from different sectors. The cross-sectional nature of this business is an important property because it emphasizes that different sectors are responsible for the state of the environment.

Database of environmental companies

The cross-sectional nature of this segment means that conventional classifications cannot be used to define the environmental business unambiguously. Environmentally more friendly technology and products as well as the companies manufacturing them are in the midst of a continuous process of change. For this reason, we propose that a database of companies in the environmental business should be compiled and updated at regular intervals. This would facilitate detailed assessments on their respective shares in the environmental business.

The database would offer the following advantages:

- The database would constitute a core from which statistics on the environmental business could be compiled.
- The database would give a "face" to the environmental business. It would give information to those investing in the environmental protection and the environmental business as well as offer a PR channel for companies engaged in the environmental business.

The database should be maintained by a neutral organization (association or company) or by governmental authorities. The activities would be based on already existing databases. These would include, for example, membership lists of environmental company networks and other databases where companies are classified on environmental criteria as well as companies' address and financial databases. The database would use the internet for collection of data as well as its distribution. Proceeds from ancillary services could cover the costs of maintaining the database either partially or completely.

Environmental business statistics

We also propose that statistics on the environmental business be compiled in individual countries on a periodic basis. The raw data used for the statistics would be compiled from a database covering a group of companies in the environmental business as well as separately gathered data regarding the shares of each company's operations geared toward the environmental business. Other data would be compiled, if possible, from national data registers of statistical authorities.

The task of compiling and publishing of data would most naturally be a suitable one for the national statistical authorities. This would guarantee the dependability and neutrality of data collection as well as secrecy of individual companies' data. If necessary, the statistical authorities could oblige companies to provide missing data.

Proposal for organizing Finnish statistics

- Statistics would be compiled by Statistics Finland, for example, every other year. The costs of compiling statistics would be included in the state's budget earmarked for Statistics Finland.
- Statistics Finland would receive initial data from the organization maintaining the database: names of companies, register numbers and shares of environmental business.
- A significant key would be needed for its own and other public registers (tax authorities, customs, etc.), which would enable the integration of data and register numbers of individual companies.
- Missing data would be requested from companies separately and there would be collaboration with large corporations on an individual basis regarding compilation of their data.
- Statistics Finland would publish in their environmental business statistics at least the following data: turnover, value added, number of personnel, and exports of environmental business broken down by sector and region. The registers would give a possibility to publish information on the education of the employees (sector and level), investments and R&D expenditures.

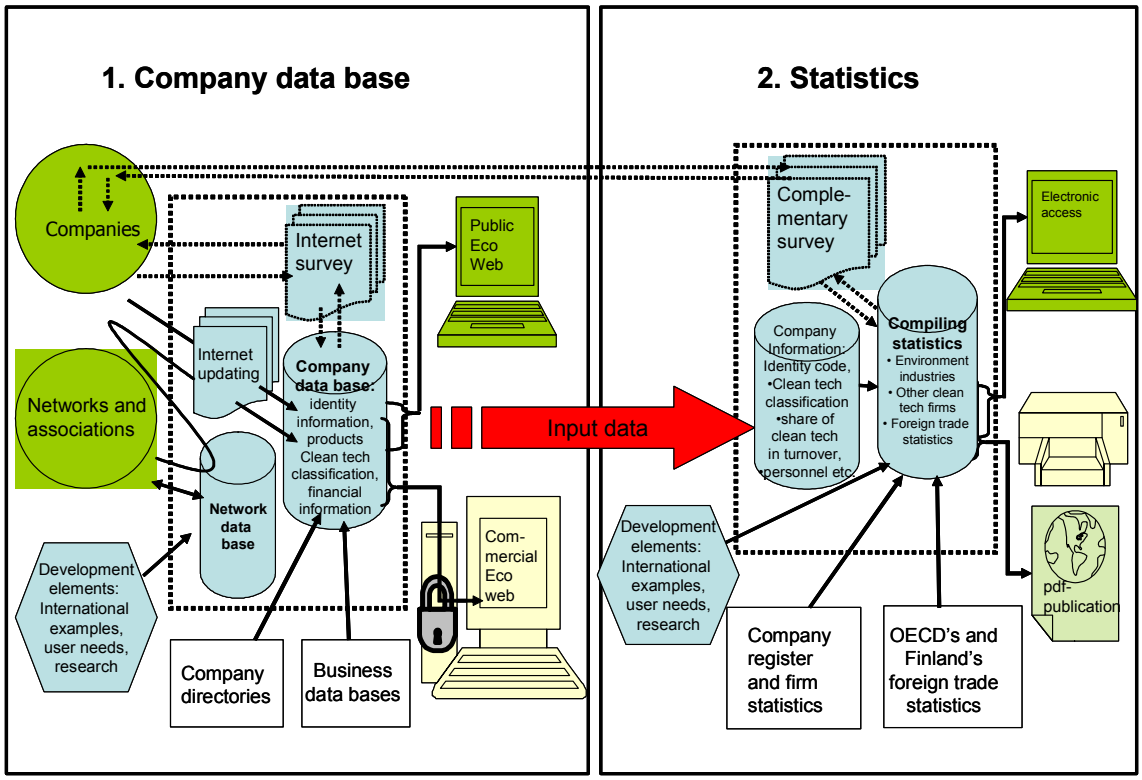

Figure 8. Plan for monitoring system of environmental businesses in Finland

The value of the statistics on the environmental business will grow when the data is compiled repeatedly, so that it indicates the development of the business. Also the compiling and publishing of statistics in different countries would give a possibility to compare the development of the business activities, which would significantly augment the value of the statistics.

The environmental business is one of the sectors where the European Union countries are highly competitive on world markets and it constitutes one of the growing sectors in the global economy. The development of the sector can be fostered significantly by means of environmental, industrial and innovation policy. These factors substantiate the need to develop statistics on this sector.

Venture capital monitoring

Information on venture capital is collected and published annually by the venture capital associations of different countries. In Europe information is compiled and published by the European Venture Capital Association. The collection of information is organized in an exemplary fashion and it is possible to develop these activities jointly within the organization.

In Europe national venture capital associations follow the sectoral classifications set by the EVCA. Additionally, information is collected in different countries on new growing business activities. In Finland information has been collected on high-tech investment and investment in internet-related businesses. This is a question of compiling data to supplement sectoral-based statistics. Together they produce noticeably more information on venture capital investment than separately.

We have made a proposal to the Finnish Venture Capital Association regarding compilation of statistics on investments in the environmental business. Technically this is very easy to carry out in conjunction with the annual survey, where in addition to the sector the respondent simply marks whether the investment is also directed towards the environmental business. This reform has been approved by the FVCA and it will be implemented in the 2007 inquiry. A corresponding objective has also been set within the EVCA.

Also important in venture capital investment statistics is instructing the respondents on what the environmental business is. This also stresses that establishing a common definition and guidelines for the environmental business will require international cooperation, which is already in progress in the EVCA.

Another important area is to clarify the financial state of environmental businesses and their desire to receive venture capital investments. In addition to the supply of venture capital, information is needed on the demand. As a part of Sitra's environmental project a survey of this nature was conducted. We recommend repeating the survey in the future. The natural candidate to carry out the survey would be the organization maintaining the environmental business database.

Utilization of data

The natural users of the data from the monitoring system of the environmental business are communities and companies investing in environmental protection, environmental business companies as well as investors. The data to be distributed should be as transparent as possible and internationally comparable while not disclosing companies' trade secrets.

We propose that the data be distributed to the above-mentioned interest groups free of charge or at a low cost also to research institutes and universities, which are responsible for developing the knowledge capital of the sector and training of new experts. Good research data would increase the amount and quality of academic studies as well as research and development work.

CONCLUDING REMARKS

The environmental business is experiencing strong growth. Venture capital investments in the environmental business are also growing swiftly. Sitra has made a proposal regarding the publishing of statistics on the Finnish environmental business and venture capital investments aimed toward this sector. Statistics Finland will begin to compile environmental business statistics using as source material a data base covering environmental businesses. The Finnish Venture Capital Association will in turn determine the amount of investments in the environmental business in conjunction with its annual survey.

Corresponding information is needed also internationally. We are prepared to cooperate with interested parties in developing statistics so that different countries could have comparable and transparent statistics at their disposal. In addition to national organizations, the main bodies regarding development of statistics in Europe are Eurostat and European Venture Capital Association, under the auspices of which the development of statistics could be carried out.

STAKEHOLDERS

Important stakeholders in Finland for promoting environmental businesses and venture capital investment.

FVCA

The Finnish Venture Capital Association (FVCA) was established in 1990. The number of members at the moment is 42 full and 70 associate members. The goal of FVCA is to develop private equity and venture capital as an industry and promote the interests of its members in Finland. FVCA improves the operating environment of the industry by overseeing the general interests and ethics of the industry, by promoting the relations between venture capitalists and entrepreneurs, and by organizing research and training activities. FVCA also handles the industry's public relations and foreign contacts. FVCA is a member of the European Private Equity & Venture Capital Association (EVCA).

Ministry of Environment

The Ministry of the Environment formulates the Finnish Government's environmental and housing policies. These policies cover issues including environmental protection, pollution prevention, land use, nature conservation, construction and housing. The Ministry is also responsible for strategic planning and management in these fields, the drafting of new legislation, and international co-operation on environmental issues. 13 regional environment centres deal with these issues in their respective regions.

Ministry of Trade and Industry

The Ministry of Trade and Industry of Finland supports research and product development, as well as productive utilization of new technology. It seeks to ensure the supply of energy and its efficient and safe use in an environmentally sustainable and responsible manner. The Ministry is working for efficient competition and dependable consumer policy and is looking after Finland's

business policy interests within the European Union. The Ministry of Trade and Industry is an internationally esteemed and recognized implementer and pathfinder of business environment policy.

Tekes

Tekes is the main public funding organization for research and development in Finland. Tekes funds industrial projects as well as projects in research organizations, and especially promotes innovative, risk-intensive projects. Tekes offers partners from abroad a gateway to the key technology players in Finland. Tekes has had several environmental business-related programmes.

Sitra

The Finnish Innovation Fund (Sitra) is an independent public foundation under the supervision of the Finnish Parliament. Through its activities, Sitra aims to promote the economic prosperity and the future success of Finland. Sitra's aim is to be a respected partner in building a knowledgeable and innovative society. Sitra's operations are funded with endowment capital and returns from capital investments. The Environmental programme of Sitra was established to boost the growth of the environmental business and its internationalization and to streamline the field and its development.

Statistics Finland

Statistics Finland operates administratively under the Ministry of Finance, but is fully and independently responsible for its activities, services and statistics. Statistics Finland combines collected data with its own expertise to produce statistics and information services for the needs of society promotes the use of statistics and develops national official statistics.

Appendix Environmental business clusters and subsectors

Main sectors	Subsectors
Clean processes, materials and products	Material-efficient production methods
	Low emission production methods
	Material-efficient final products
	Ecologically disposable products
	Production of ecological materials (nano-, biomaterials etc.)
Efficient energy use and Energy saving	Monitoring, auditing and certification of energy production and consumption
	Energy-efficient machines, equipment and systems
	Low energy equipment, insulation etc.
Clean energy production	Bioenergy and biofuels
	Wind energy
	Solar energy and heat pumps
	Hydrogen and fuel cell technology
	Other low emission energy technology
Recycling	Collection, recycling and reprocessing of materials
	Composting and anaerobic digestion
Waste management	Waste collection and transportation
	Waste treatment
	Waste storage and final deposal
	Waste-to-Energy
Water management and waste water treatment	Water and waste-water measurement, monitoring and analysis
	Tap water production, treatment and purification
	Industrial waste-water treatment
	Municipal waste-water treatment
	Other activities related to water treatment and protection of water systems
Air pollution control	Measuring of air quality and emissions
	Air conditioning and filtering
	Cleaning of exhaust and combustion gases
	CO2 capture and sequestration
Soil and landscape protection and restoration	Soil analysis and measurement
	Clean-up and restoration of soil
	Environmental construction and landscaping
Noise abatement	Measurement of noise
	Soundproofing and protection of hearing
	Planning of acoustics and soundproofing
Environmental data collection, PR, administration	Research and education
	Publishing activities, exhibitions, conferences
	Data and communications systems
	Consulting, assessment, financing, legal services
	Environmental sector networks and organizations
	Governmental activities