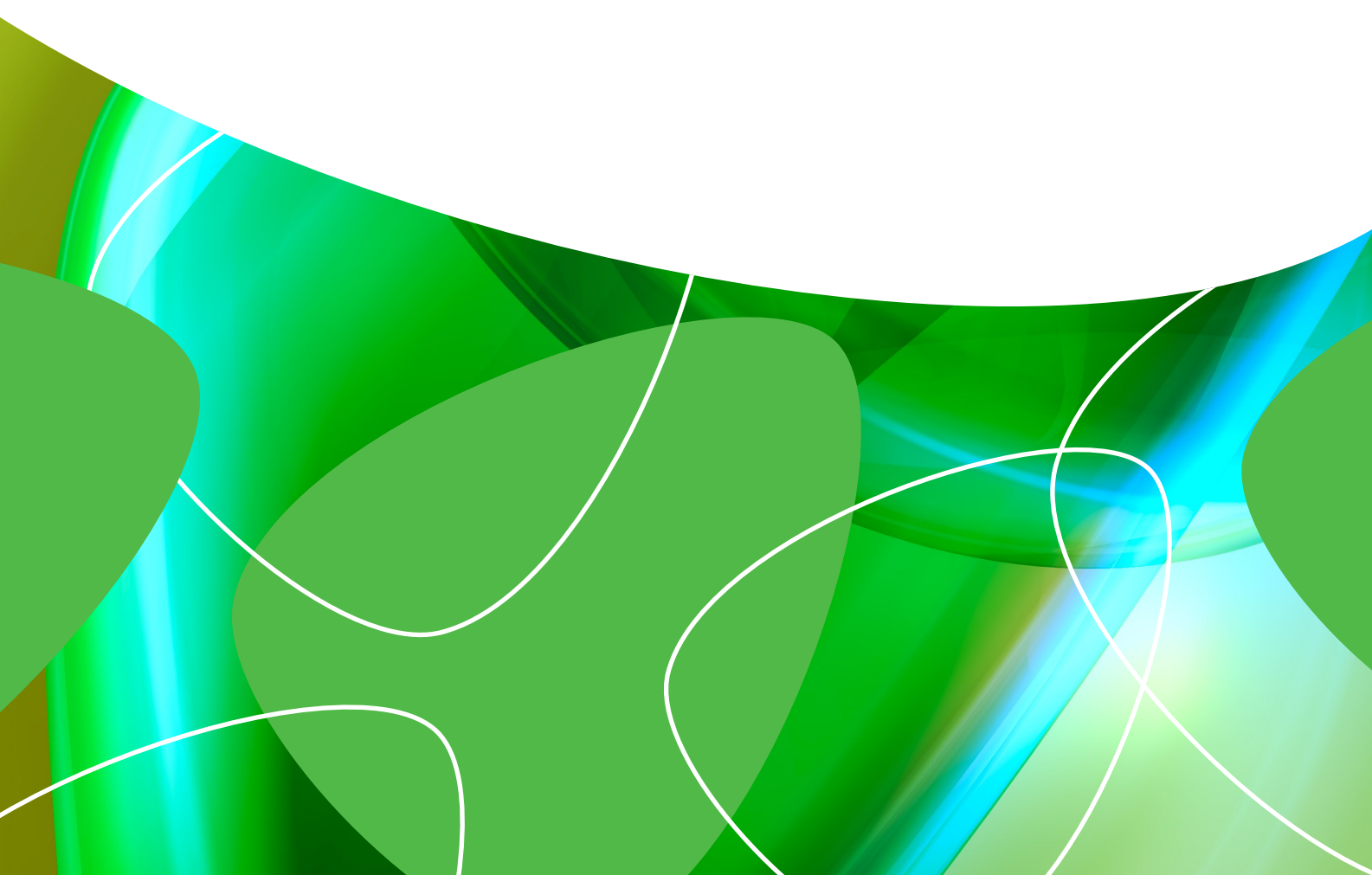




Business in the forefront of **the green economy**



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the green economy

Contents

Foreword	3
Summary	4
1. Going green is a part of economic development	6
2. Companies are becoming greener and provide green solutions	8
3. Markets and political decisions promote green business	10
4. Enterprises building a green future	16



Foreword



The green economy, green growth, green business – these are terms that are presently being used in many forums, both in Finland and internationally. Other terms in use include green jobs and skills, green energy and infrastructure, green consumption, green technology and innovation, and green taxation...

Greening is a global megatrend that can be seen in both the daily lives of individuals and more broadly in society. Greening is a cross-cutting perspective: it entails taking environmental aspects and ecological sustainability into consideration in all operations.

A broad band of society is involved in the discussion concerning the green economy: political decision-makers, researchers and NGOs. Business too is keen to participate in this discussion.

This report is based on discussions between experts in different fields at the Confederation of Finnish Industries EK. The objective is to outline the green economy and its various dimensions from the perspective of industries.

We hope that this report will help to identify the role that business plays in greening the economy, as well as what opportunities are offered by green business, what is required to benefit from these opportunities, and how green business can be promoted.

Helsinki, September 2010

Confederation of Finnish Industries EK

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Summary



In a green economy, growth, employment and wellbeing are created in a way that minimises negative impacts on the environment, the climate and nature.

The strengths of the Finnish economy have traditionally been based on our natural resources: forests, waters and mineral resources. This has resulted in solid environmental know-how.

Global environmental problems and the increasing demand for natural resources have created a tremendous global need to develop and adopt technologies and operating methods that reduce environmental impacts and promote eco-efficiency.

The sustainable use of natural resources and environmental know-how will therefore provide business opportunities for Finnish enterprises also in the future. Success will require development and renewal.



Companies play a decisive role in greening the economy, as they are able to improve the environmental impacts of their own operations, to offer consumers and citizens products and services that help conserve the environment, and to create solutions for reducing the environmental impacts of other companies.

Companies are thus in many ways active in the forefront of the green economy.

The catchword is green business. Similar terms used in the same context include cleantech, environmental business and eco-industries.

Labelling individual sectors of industry according to how 'green' they are is neither possible nor constructive. Production of all kind can be green as long as products are made in a sustainable manner that uses energy and materials efficiently and minimises emissions.



Green business does not appear out of nowhere, nor does it guarantee automatic success for companies. Green business is business just like any other and involves the same prerequisites for success as business in general.

Markets and demand are the drivers of all business, including green business. In addition, innovation, entrepreneurship and expertise are essential.

Green business also requires a labour force, funding, energy and infrastructure. Factors of production must be sufficiently available at competitive prices and in a way that satisfies the needs of companies.



Competition in the markets for green business is intense. For this reason enterprises require a global level playing field and equal incentives for their operations, investments, technology development and trading.

Instead of national or EU-wide obligations and policy instruments, international agreements and rules are needed. This is important for three reasons: to promote a greener economy globally; to offer enterprises more equal business conditions; and to create international markets for green technologies, products and know-how.

1. Going green is a part of economic development



In a green economy, growth, employment and wellbeing are created in a way that minimises negative impacts on the environment, the climate and nature. The greening of the economy is a process in which society as a whole and all its functions go green – not just individual elements or actors.

Low emissions and eco-efficiency are generally used as characteristics of the green economy. Low emissions means minimising greenhouse gases and other emissions that negatively impact the environment. Eco-efficiency refers to the sustainable and efficient use of natural resources.

The aim is to "decouple" economic growth from the use of natural resources and emissions. This means that the consumption of natural resources and emissions do not grow at the same rate as economic growth, but rather they are optimally reduced.

At first this may not seem particularly new, as already by the late 1980s there was an awareness that the economy should grow without negatively

impacting the environment. Around the same time a discussion emerged on the long-term greening of economic structures – or "ecological structural change."

Today environmental challenges have reached a new scale. Awareness over intensifying climate change and the depletion of natural resources has increased the pressure and desire to reduce emissions from economic activities and to use resources more efficiently.

Green stimulus to overcome the recession

The global economic crisis has created a new incentive for greening the structures of the economy. It has been noted that economic and environmental problems can be solved simultaneously if the economy is rebuilt in a way that reduces emissions and conserves natural resources.

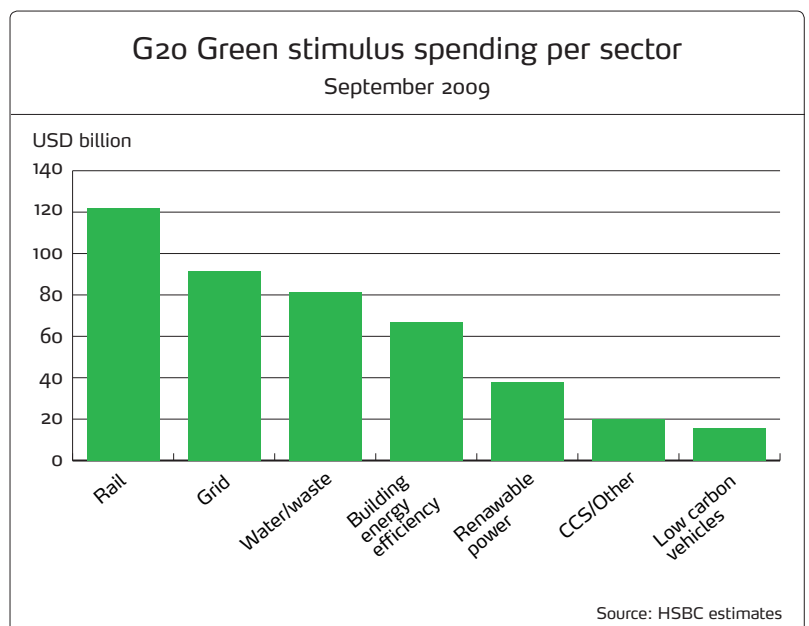
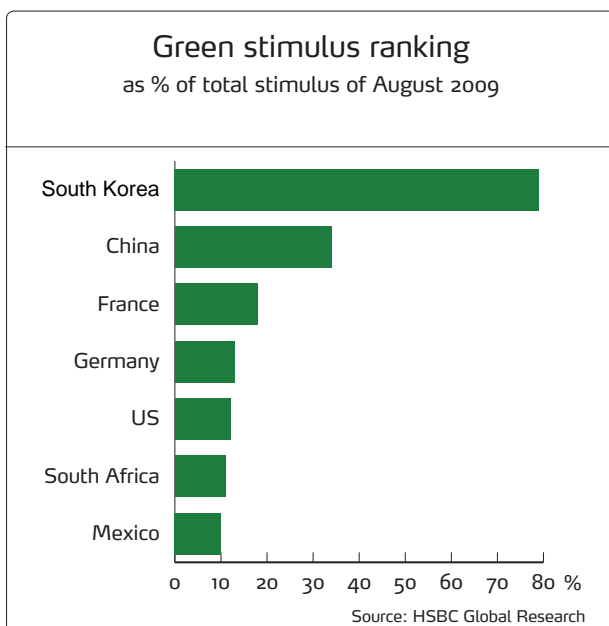
In many countries a significant portion of the recovery packages that have been introduced to overcome the

economic recession has been allocated towards environmental and energy-related projects. The purpose of this so-called green stimulus is to accelerate economic growth and create new jobs in a way that also prevents climate change and reduces negative impacts on the environment.

Green stimulus spending has been particularly prominent in South Korea, China, the USA and certain European countries, such as in France and Germany. These countries have allocated stimulus funding to expand rail services, construct electricity networks, upgrade water and waste management, improve the energy efficiency of buildings and to promote renewable energy.

Private capital for green investments

Pursuing a green economy will require massive new investments over the coming decades. Primarily these investments will come from the private sector. The availability of



private capital and well-functioning capital markets are thus critical for the progress of green growth.

Private investments in environmental and energy-related projects have increased significantly in recent years. During the global economic recession, green investments declined considerably less than investments in general.

Nevertheless, funding the investments needed to spur the green economy is a challenge right now for European companies. The uncertain economic outlook and increased regulation following the financial crisis have had an impact on the price and availability of funding. The USA is in a stronger position due to its more advanced venture capital markets. Europeans also face additional competition from China, for example.

Economic structures are transforming

Going green is also part of a long-term structural change that continuously takes place in a market economy. Structural changes help adapt to globalisation

and other major transformations in the business environment.

The collapse of the global economy at the turn of the decade has sparked a search for new sources of growth and success.

The strengths of the Finnish economy have traditionally been based on our natural resources: forests, waters and mineral resources. An export-oriented process industry and expertise in mechanical engineering have evolved around the refining of natural resources. Although the relative share of services has gradually increased, industry still plays a significant role.

The sustainable use of natural resources and environmental expertise will no doubt offer business opportunities also in the future. Success will require both development and renewal. An array of R&D work is carried out in Finland at the moment with the aim of finding new techniques for utilising natural resources and manufacturing entirely new products from natural resources.

One possible growth sector is the "bioeconomy", which refers to

production based on different types of biomass. New added value is also being sought from services related to industrial products, as well as the widespread use of ICT in industry and services.

A global perspective is needed

In an open economy, it does not make sense to limit the analysis on the green economy to the national economy alone. Instead, the perspective has to be global.

The environmental impact of products is determined in global markets according to overall demand and the eco-efficiency of production. The greening of a single country or even a broader region will not alter the situation decisively if most products are manufactured in countries with a lower level of eco-efficiency.

Even if Finnish industry reduced its carbon dioxide emissions to zero, this would have little impact on global emissions. However, if for example steel production were everywhere as efficient as it is in Finland, the emissions created by the global steel industry would be reduced by a third.

Similarly, the greening of a single national economy would not solve global environmental problems. Combating climate change, in particular, requires the participation of all countries in reducing their emissions. The participation of not only industrial countries but also rapidly developing countries is needed, as emissions and the consumption of raw materials is increasing most rapidly in the latter.

In an open economy, eco-efficient products, technologies and operating models spread quickly from one country to another. Open international trade is therefore essential for the greening of the global economy. ■

Here are some of the international and European initiatives and strategies that are aimed at the long-term greening of the economy.

- United Nations Environment Programme's Green Economy Initiative
www.unep.org/greeneconomy
- OECD's Green Growth Strategy
www.oecd.org/greengrowth
- EU's Europe 2020 strategy for smart, sustainable and inclusive growth
www.ec.europa.eu/eu2020

2. Companies are becoming greener and provide green solutions



Companies have paid attention to environmental concerns for decades.

These days, environmental issues are considered an integral part of all business operations, including the procurement and consumption of energy, the choice of raw materials, logistics, production and so on.

Environmental impacts are taken into account in accordance with life cycle thinking throughout the entire product chain. Companies set targets and demands not only for their own operations but also for the entire network in which they operate.

In order to respond to growing challenges, companies have developed various operating models for managing environmental issues and reducing their environmental impacts.

Today, environmental concerns are included in corporate strategies and are also part of management expertise and the professional skills of the personnel.

On the broader level, environmental issues can be seen as part of corporate responsibility, in which a company's economic, social and environmental performance is assessed together.

Green business benefits the customers

It is a clear trend that enterprises in all sectors and of all sizes are paying closer attention to environmental issues.

In addition, a growing number of companies practice "green business", i.e. they offer products, processes, equipment, services or business models by which the environmental impacts of other companies, the public sector or consumers can be reduced.

Similar terms used in the same context as green business include cleantech, environmental business and eco-industries.

Green business can create environmental benefits for customers in numerous ways. The benefit of many products, technologies and services is created by virtue of the fact that they are eco-efficient and low in emissions when used. The benefit of other products is achieved due to the fact that they are manufactured in an energy-efficient and environmentally friendly way, so their ecological footprint over their entire life cycle is small for the customer. Other products and technologies represent traditional environmental technology, such as methods for treating emissions and waste.

By offering environmentally sound products and solutions worldwide, Finnish companies can reduce global environmental impacts far more than if the benefits were limited to Finland alone.

Companies play a decisive role in the greening of the global economy, as they are able to improve the environmental impacts of their operations, to offer environmentally sound products and services, and to create solutions for reducing environmental impacts. In other words, companies are in many ways active in the forefront of the green economy.

All companies and sectors on the same line

So-called green sectors are often perceived of as the trendsetters in the green economy. Correspondingly, it is believed that more resources and incentives should be allocated to these sectors in order to green the economy.

But what exactly are these green sectors? As there is no one all-encompassing definition for what "green" stands for, it is impossible to label sectors or operations as green or non-green.

Services are often considered to be greener than industry and the production of consumer goods to be greener than heavy industry. However, production of all kind can be green as long as products are made in a sustainable manner that uses energy and materials efficiently and minimises emissions.

It also has to be borne in mind that different types of sectors, such as heavy industry and the production of consumer goods and services, are connected to each other through networks. For this reason too it is not pragmatic to rank sectors according to how green they are.

Rather, the potential of all sectors should be seized in the pursuit of a green economy. The opportunities for green business and growth should be fostered by offering all actors a business environment that is favourable and supportive. It would be easy to lose the potential by "picking winners" through political decisions, by supporting certain sectors for example.

A green enterprise is a green job

Climate and environmental issues are being felt ever more strongly in daily work routines, as well as in the type of jobs that will be created in the future.

As part of normal dynamics of the economy, old jobs are eliminated and replaced by new ones all the time. This change provides opportunities to develop and restructure, as well as to improve employment.

As with companies and sectors, it is neither possible nor useful to classify job tasks and workplaces as being either green or non-green. What is more important is that an effort is made within all workplaces to adopt ecological and sustainable solutions.

Many people consider the most attractive jobs to be those that specifically seek methods and tools for solving environmental problems. However, it is just as important that employees in all workplaces can feel that they are working for the good of the environment and that environmental issues are taken seriously. This is also expected by young people entering the job market.

Green business is an opportunity...

Just as Finnish enterprises have developed their operations, improved their energy and material efficiency and reduced their emissions, so they have also accumulated expertise for which there is now a growing demand worldwide. Solutions that may seem commonplace in Finland could offer substantial environmental improvements in developing countries, for example.

Well-known Finnish products and technologies include, for example, energy efficient industrial processes, bioenergy boilers, frequency converters, wind power components, clean transportation fuels, water purification chemicals, waste management systems, monitoring equipment and ICT.

The global greening of the economy thereby offers a considerable opportunity for Finnish companies to engage in international trade and investments.

... but requires the same prerequisites as any other business

How can companies then benefit from the opportunities presented by the green economy and encourage its pursuit to the best of their abilities?

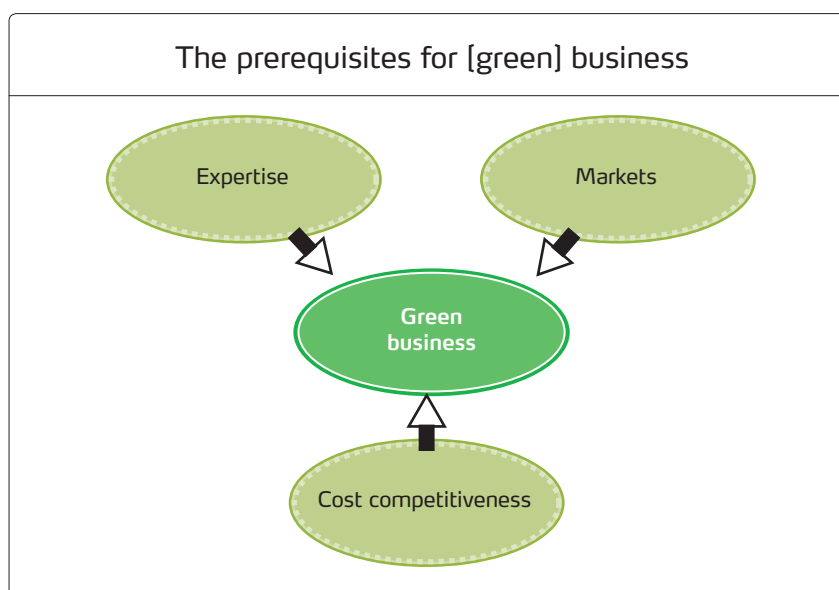
What is most important is to look after the business environment and competitiveness of companies

overall. When the basic preconditions are in place, companies will have better opportunities to allocate their resources to developing and applying environmentally friendly solutions.

Green business does not appear out of nowhere, even if there is a great global demand for it. Nor does it guarantee automatic success for companies. Green business is business just like any other and involves the same prerequisites for success as business in general.

Green business requires a labour force, funding, energy and infrastructure. Factors of production must be sufficiently available at competitive prices and in a way that satisfies the needs of companies.

Competition in the markets for green business is intense. For this reason enterprises require a global level playing field and equal incentives for their operations, investments, technology development and trading. ■



3. Markets and political decisions promote green business



Many factors and phenomena promote green business. Some of these are market driven, such as the globalisation of the economy and changes in demand, whereas others are based on political and regulatory decisions, such as obligations to reduce emissions.

Markets and demand are the drivers of all business, including green business. They are also the prerequisites for business. In addition, innovations and expertise as well as an infrastructure and a business environment that reinforces competitiveness are essential.

Supply and demand are growing rapidly

Environmental problems have created a tremendous need to develop and adopt technologies and operating methods that reduce environmental impacts and promote eco-efficiency. In recent years, this need has matured into genuine demand that can now be seen

in the strong growth of environmental business worldwide.

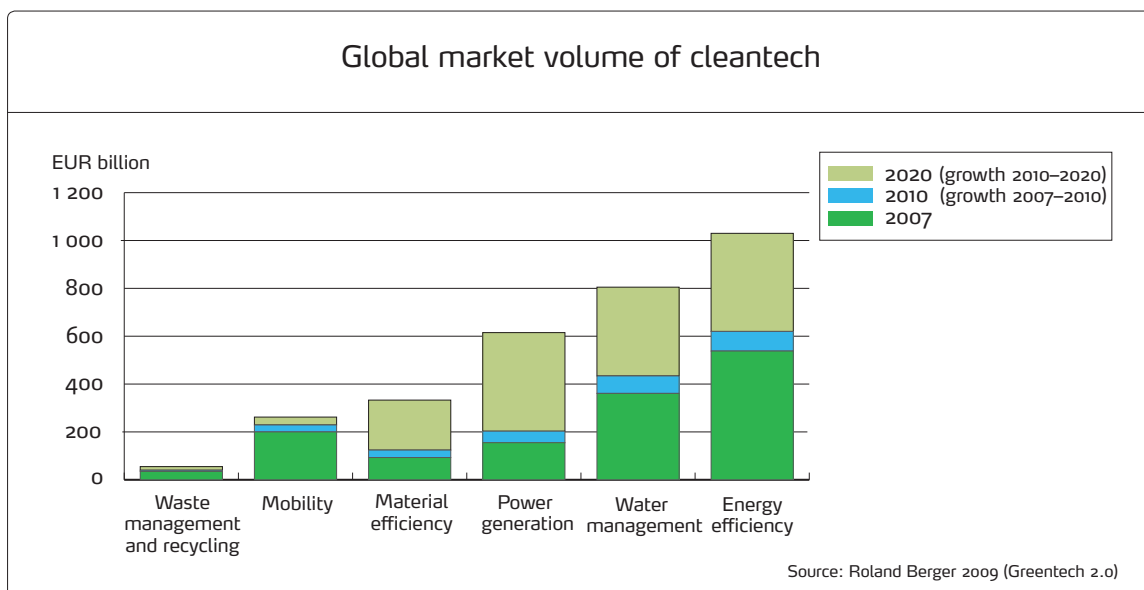
Today the global market for environmental technologies is estimated to be more than one thousand billion euros annually and this figure is expected to double by the year 2020. In addition to the European Union and the USA, emerging economies have become important developers and suppliers of low-emission and eco-efficient technologies.

International agreements and standards expand the markets

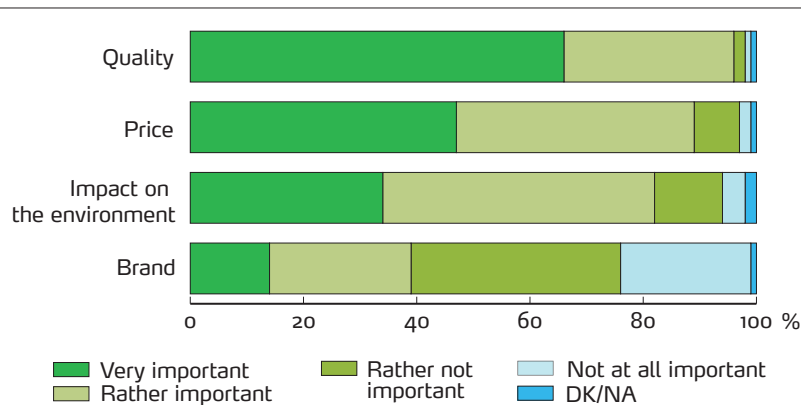
Legislation and political decisions have been introduced to combat climate change and promote actions to protect the environment. Numerous policy instruments, often overlapping each other, are being employed: environmental permits, emissions trading, environmental taxes and feed-in tariffs. In addition, voluntary agreements and standards are being applied.

Different policy instruments can also be used to stimulate demand for environmentally friendly products, services and technologies. When implemented properly, norms, standards and economic incentives can accelerate innovations and the spread of both new and existing technologies. On the other hand, badly administered regulations can distort competition in the markets, increase bureaucracy and raise costs.

The key requirement for regulation is its global equality. This ensures that enterprises have equivalent conditions and opportunities for developing technologies and new solutions regardless of where in the world they are located.



Importance of various aspects of products when deciding which ones to buy



Source: Eurobarometer 2009

Public procurement requires expertise

In addition to consumers, the public sector can have a significant influence on demand by means of public procurements that promote environmental business. Using public procurements to green the economy requires new type of procurement expertise that is nevertheless often lacking in municipalities and at the state level.

All public procurements should comply with the rules of the EU's internal market. Green procurement criteria must not discriminate against any company or method of production, nor should they threaten the fair and equal treatment of all players in the market. The criteria must be in proportion with the nature, size and purpose of the procurement.

Furthermore, green procurement criteria should not make it difficult for companies to participate in tenders. Active competition and ample supply always benefit the buyer, too.

Investors and financiers increasingly interested in green performance

In addition to customers, also shareholders, investors, financiers and insurance institutions are increasingly focusing attention on the environmental performance of companies. In doing so they are creating an incentive for both the greening of business in general and for green business in particular. Public funding and business advisory services can also promote green investments.

A new type of demand challenges companies

Households and consumers also play a key role in the pursuit of a green economy. Consumption and consumer preferences are changing, and more attention is being paid to environmental friendliness and ethical production. This new type of consumption challenges companies to adapt their products and services to correspond with the demand.

Consumers can influence the greening of society by paying closer attention to the energy and material efficiency, recyclability and durability of their purchases. Goods are not necessarily purchased for personal ownership; instead they can be rented or purchased in the form of a service or they can be intended for shared use.

Changes in consumption can be seen in the everyday choices that people make, such as their eating habits, purchases, mobility, hobbies and travel. The biggest

changes in consumer behaviour require investments in infrastructure, such as traffic systems and recycling services.

Consumers can be encouraged

Orienting consumer demand according to the principles of sustainable development can be promoted by increasing the availability of information and employing various economic incentives.

Ecolabels have been introduced to assist in making purchasing decisions. These include the EU Flower and Nordic Swan ecolabels. Producers and retailers have their own labels. Labels describing the carbon footprint and water footprint of products are also becoming increasingly popular.

Taxation is one way of influencing consumer behaviour. For example, Finland's car taxation system and transportation fuel taxation have been developed to reflect emissions: the more emissions cars and fuels generate, the more taxes you have to pay.

A growing number of private and institutional investors analyse their investment targets on the basis of economic, social and environmental criteria. Sustainable development indexes, such as the Dow Jones Sustainability Index, monitor the share prices of companies selected on the basis of these criteria.

The importance of energy and environmental business is also growing in the selection and focus of investment targets. For example, the DB NASDAQ OMX Clean Tech Index monitors the share prices of international companies focusing on clean energy and technology. In addition, the number of funds focusing on green business and investment targets that conform to the principles of sustainable development has increased.

Eco-innovations at the heart of green growth

Pursuing a green economy requires new innovations. These are often referred to as eco-innovations.

Innovation occurs as a response to the needs of customers and markets.

Technology plays a key role in the development of green business. For example, in order to improve energy and material efficiency, new solutions are being sought from generic technologies, such as biotechnology, nanotechnology, material technology, and information and communication technology.

Eco-innovations are not just technological however, but also involve new practices and services. Eco-innovations can be environmentally friendly products and services, eco-efficient production methods and processes, or new innovative ways of thinking, organising and operating that broadly promote environmental efficiency.

Eco-innovations can involve small improvements based on old business practices or so-called radical innovations, such as technology leaps, that revolutionise prevailing practices and their foundations.

Innovation can be accelerated through public funding

The innovation process consists of a wide range of activities: basic research, applied research, development, piloting, demonstration, commercialising and finally market entry and internationalisation. These activities are carried out concurrently and in different phases.

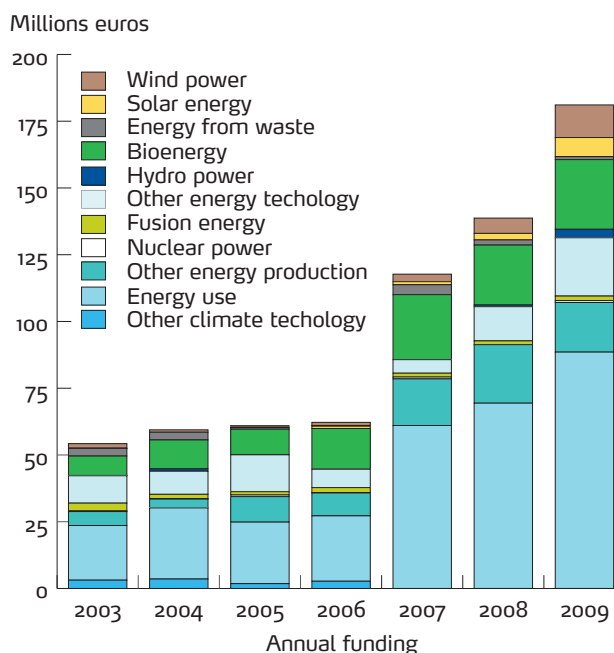
Both private and public funding is needed to encourage innovation. Public funding for research, development

and innovation is designed to support projects and development processes within companies, as well as to promote co-operation and networking between companies and research institutes.

The challenges and opportunities related to the environment, eco-efficiency and climate change already influence a large part of innovation and funding activity in Finland and the European Union. For example, innovations are being funded and promoted in Finland through programmes by Tekes (Finnish Funding Agency for Technology and Innovation), SHOKs (Strategic Centres for Science, Technology and Innovation) and the Centre of Expertise Programme (OSKE).

National programmes have been

Teakes funding for energy and climate change technology



Source: Tekes

found to be beneficial, particularly in the R&D phase of eco-innovation. Further investments are nevertheless required, especially to commercialise these innovations. Bringing viable ideas to the market is a big challenge for SMEs in particular.

More companies in Finland could be activated to develop eco-efficient processes, products and services if R&D tax incentives were introduced to compliment direct public funding. Tax incentives for the capital investments of business angels would in turn promote and strengthen the availability of private funding.

Innovations are created in networks

Eco-innovations are created in interactive and multidisciplinary processes that involve ever expanding networks. Research institutes and universities are often important co-operation partners for companies in the early stages of an innovation. Various company networks and clusters offer fruitful co-operation platforms especially for SMEs.

In addition to domestic partnerships, more international co-operation is required in innovation activities. It is worthwhile for Finnish companies to effectively take advantage of research and innovation programmes and other forms of co-operation offered by the EU, but more co-operation on a global scale is also needed.

Protecting intellectual property rights is essential

Intellectual property rights (IPR) are crucial for the development of eco-innovations, as in the case of all innovations. It is essential to look after these rights also when technology

exports are promoted by means of bilateral and multilateral agreements within the framework of international climate co-operation. Otherwise the basis for creating innovations can easily evaporate and the spread of technologies, expertise and best practices slow down.

Entrepreneurship and business skills are required

In order to truly bring about new eco-efficient solutions and green business, strong business skills is required alongside innovativeness and entrepreneurship. Without such business know-how it will not be possible to realise the benefits of continuously growing international markets.

SMEs are looking for assistance and expertise in marketing, commercialisation and internationalisation. It is worthwhile for companies to participate in various business development projects, for example. Encouraging venture capital investments by business angels through tax incentives would also improve the availability of business expertise within SMEs.

Many companies active in environmental business are small in size. Companies should be encouraged and supported to grow, internationalise and network so that they can better take advantage of their business opportunities.

Furthermore, entrepreneurship should not be made more difficult with unnecessary regulation. The "think small first" principle should be adhered to when preparing all decisions and policy instruments. This means taking into consideration the effects on SMEs.

In addition to creating entirely new businesses, it is important to develop existing business operations so that

they are able to meet the demands of the green economy. What is needed is an ability to seek and identify new growth areas – the ability to listen carefully to the surrounding environment. Expertise at the strategic level is essential here.

A skilled labour force is also needed

Green skills and know-how are required not only in green business, but also within all types of businesses. These can be understood in two ways: firstly, as special expertise in environmental issues and the green economy; and secondly, as part of all professional skills and know-how.

In the first case, environmental expertise refers to a specific education or work tasks. This applies for instance to experts in environmental impact assessment or environmental economics, technology, law and policy.

The second perspective describes the increasingly popular view that green know-how is needed in all lines of work. It belongs to the professional skills of everyone. It involves ensuring that environmental impacts are minimised in all tasks and professions. This applies equally to managers, designers, factory workers and service staff.

Education plays an important role in achieving the level of green skills and know-how required in worklife. Although the environmental perspective is central, it is nevertheless only one component of an education by which the conditions for green know-how and green business are fostered. It is at least equally as important to learn entrepreneurial and innovation skills. A good way to enhance this is to promote co-operation between educational establishments and enterprises.

Green business requires an efficient infrastructure

In addition to innovation, skilled personnel and funding, an essential precondition for successful business operations is a technical infrastructure.

The importance of ICT and information systems is growing as both the economy and society are being digitalised. At the same time society is rapidly becoming increasingly electrified. As a result, efficient and low-carbon energy production is needed.

An efficient materials economy in turn requires a well-functioning traffic and logistics system for transporting materials and products. It also requires the possibility to utilise and process end-of-life products and materials efficiently.

As society becomes more electrified, emissions are diminishing

Energy is essential for both enterprises and society as a whole. It has to be available at all times in sufficient quantities and without disruption.

Energy is an essential production factor for green business, but it can also be a product of green business.

Since most greenhouse gas emissions come from energy, it is important to pursue low carbon energy production. This can be achieved by replacing fossil fuels with low-carbon energy sources: nuclear power and renewable energy. These two options do not exclude each other but rather supplement one another.

The electrification of society is good for the climate and the environment, as increasing the use of electricity can decrease overall energy consumption and reduce

emissions from transportation and heating, for example. Low emission electricity production therefore requires favourable investment conditions.

Energy efficiency offers the greatest global potential

Energy efficiency is considered to have the greatest potential in combating climate change. Energy efficiency helps to curb energy consumption, which is otherwise expected to triple worldwide over the next two decades.

By improving energy efficiency, considerable cost savings can be achieved. Pursuing energy efficiency therefore makes sense also economically.

The pursuit of energy efficiency involves all parts of society: consumers, services and industry. In Finland, actions have been taken to promote energy efficiency already for a long time through voluntary agreements. The work continues, and the energy efficiency agreement scheme is being further expanded. At the same time, actions required to improve energy efficiency are becoming more challenging.

Over the years, Finland has accumulated a lot of know-how in this area, particularly in improving the energy efficiency of industry. This

expertise can now be put to good use elsewhere in the world.

Generating savings through material efficiency

In an eco-efficient materials economy, action is taken to make the use of natural resources and raw materials more efficient, to minimise the creation of waste and to reuse waste fractions. This is sensible on both economic and environmental grounds.

Industry is responsible for taking care of its own waste and municipalities for municipal waste. In addition, producers of certain product groups are responsible for the waste management of their end-of-life products. This producer responsibility system covers paper products, packaging, vehicles, tyres, batteries, and electrical and electronic equipment.

Improving material efficiency generates savings for companies. Reusing materials by recycling them or by using them in energy production offers business opportunities, too.

Efficient logistics is a competitive advantage

An efficient materials economy requires an undisrupted and efficient traffic system. Companies plan their logistics

Ways of reducing traffic emissions

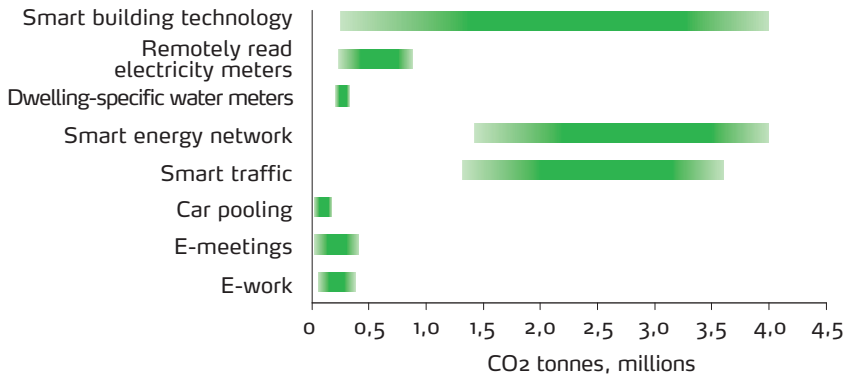
Personal transport

- Vehicle and fuel technology
- Urban structures
- Public transport
- Consumer choices, lifestyles

Goods transport

- More efficient logistics chain
- More efficient use of vehicles
- Energy-efficient vehicles
- Low-emission energy sources
- Economical driving technique

The potential for reducing carbon dioxide emissions through the use of ICT, ranges



Source: Emission impacts of information and communications technology and electronic services, Finnish Ministry of Transport and Communications 12/2010

and transportation routes as efficiently as possible, which in turn improves energy and environmental efficiency. Flexible and low-emission logistics are an important factor of competitiveness for all type of business and therefore for green business as well.

Transportation offers new opportunities for green business, too. For example, the demand for hybrid and electric vehicles, as well as cleaner fuels, is growing rapidly.

Urban structures can also influence the development of efficient transport. Land-use planning can determine the location of workplaces, homes and services, as well as transportation needs.

ICT should be adopted on a widespread basis

Information and communication technology (ICT) is an important component for greening the entire economy, as it can be used to make the use of natural resources more efficient and even to replace them altogether.

In many sectors, ICT can be used to

promote energy efficiency and reduce carbon dioxide emissions. The biggest reductions in emissions could be achieved by introducing new "smart" solutions in logistics, buildings, energy production and consumption, and industry.

Cost competitiveness is vital for enterprises

In order for Finnish companies to be competitive in environmental business both in the EU's internal market and in global markets, they require favourable business conditions domestically compared to their foreign competitors.

Climate and environmental policies create many cost pressures for enterprises in terms of energy, manufacturing and transportation. Costs are rising due to environmental obligations and various economic policy instruments.

In pursuing the green economy, it is particularly important to ensure that the cost burden on companies does not become heavier than that of

their foreign competitors. Otherwise emissions can "leak", meaning that companies operating in countries that lack similar burdens start to conquer the markets. In other words, unilateral obligations do not reduce emissions but in the worst case can in fact increase them on the global level.

All kinds of protectionism must also be avoided, as open international trade is a precondition for the dissemination and deployment of eco-efficient products, services, technologies and production methods.

The emissions trading scheme has become a key policy instrument for climate policies. The scheme sets a price for carbon dioxide with the aim of encouraging companies to reduce their emissions. Emissions trading should, however, be global in order to achieve the desired effect and to ensure that companies have a level playing field.

The international competitiveness of companies should be safeguarded also when developing energy and environmental taxation. Taxation should be targeted in such a way that it truly steers operations and does not increase the production costs of companies.

Instead of national or EU-wide obligations and policy instruments, international agreements and rules are needed. This is important for three reasons: to promote the greening of the economy globally; to offer enterprises more equal business conditions; and to create international markets for green technologies, products and know-how. ■

4. Enterprises building a green future



Finnish companies are continuously improving their operations so that they can offer new products and solutions to consumers, to the public sector and to other companies domestically, in the European Union and in global markets.

The following are examples of different types of projects that are currently underway:

New bioproducts from wood



The forest and the chemical industry see vast and versatile opportunities in wood biomass for the future. R&D work is currently targeted strongly on biorefineries.

In biorefineries, the various constituents and chemical compounds of wood are refined into different materials, chemicals and energy products. Biorefineries integrated into modern forest industry plants diversify the use of domestic wood biomass and bring new products with high added value to the market.

Forest biomass can be used to refine second generation synthetic diesel, ethanol, fuel oil and renewable energy; in the future it could also be used to create pulp-based nanofibers, as well as various biopolymers and biochemicals for the food, medical and cosmetics industries.

Water expertise offers multiple opportunities



Finland has a long tradition in developing products, services and solutions based on our water expertise. The latest undertaking is the Center of Water Efficiency Excellence (SWEET) established by Kemira together with the Technical Research Centre of Finland, VTT.

The center combines the expertise of Finnish enterprises, research institutes and universities and creates new business opportunities. The aim is to develop new technologies to optimise water usage and recycling, and to create more sustainable and energy-efficient solutions for the water intensive industry.

Examples of the center's research areas include the energy- and cost-efficient cultivation of seawater into drinkable water and the use of biomass resulting from wastewater treatment in the production of energy and biofuels.

Sustainable food production to satisfy consumer demands



Clean water and the productivity of land are vital factors in food production. Finland has great opportunities in food production in the future.

The Finnish food and drink industries, together with other actors in the food chain, are developing new products and dietary concepts that comply with the values of consumers aware of environmental and health issues. One such concept is functional food. Consumers are also offered more information about the composition, origins and environmental impacts of

food products. Environmental impacts are communicated by means of carbon and water footprint labels, for example.

Product and package design are aimed at enhanced functionality and a more efficient use of raw materials. A good example of this is biodegradable packaging. At the same time, environmentally friendly production processes are under development. An important objective is also to use biowaste as a source of energy.

Metals and minerals in a sustainable manner



The Finnish bedrock contains rare earth metals and other so-called high-tech metals that are essential in the equipment and components of environmentally sound energy technologies and the IT industry. Our reserves of lithium-containing minerals make it possible to produce lithium batteries for electric vehicles, for example.

Finland's high-quality mining and refining technology and metallurgical expertise provide a strong foundation for sustainable mining operations. For example, nickel can be enriched innovatively by using bioheap leaching technology whereby metals are leached from the ore as a result of bacterial action.

Finnish metal refineries are global leaders in energy and carbon dioxide efficiency. These companies invest continuously in R&D to improve energy and material efficiency. The specific energy consumption of manufacturing processes is being reduced and recycling increased. In addition, high-strength steel grades are being developed that allow light structures, which in turn conserve materials.

Energy efficient machinery and equipment



The Finnish technology industries are actively developing energy and material efficient machinery and solutions. The range of products is expanding and exports are growing.

Companies in this sector are creating advanced bioenergy and wind power plants as well as their components. Forest and mining machinery and ship engines are being improved so as to consume less energy, for example. Energy-efficient processes and equipment are also produced for different industrial sectors.

More efficient logistics systems are being developed for the transportation of goods, such as energy-efficient harbour cranes and intelligent work machines that use automatic identification technologies.

ICT and Finnish mobile expertise are increasingly being used in the development of machinery and industrial processes. By strengthening synergies between different sectors, productivity can be improved and benefits achieved in terms of material, energy and environmental efficiency.

Growth from the manufacturing of electric vehicles



Significant business opportunities are developing around the electric vehicle industry in Finland. This is being fostered by our strong technology industry and the advanced infrastructure of our electricity networks. In addition to electric and hybrid cars and related systems targeted to consumers, business opportunities have been identified also in mobile work

machines (such as container straddle carriers at harbours, forklift trucks and mining and forest machinery), hybrid buses, military vehicles, batteries and charging systems.

Finland's broad and cross-sectoral electric vehicle cluster contributes to the creation of new business and growth. The cluster includes manufacturers of electric vehicles and work machines, as well as their suppliers of subsystems and components. In addition, companies specialised in developing and maintaining the charging infrastructure are active in this cluster.

Energy efficiency through smart grids



Smart grids, i.e. electricity grids that take advantage of internet technology, combine ICT with electricity distribution. Smart grids help energy companies and consumers to manage electricity production and consumption more efficiently.

Smart grids allow for small-scale electricity production to be connected to the distribution network. Consumption can be monitored and controlled in real time, and in the future electricity could also be stored using electric vehicle batteries.

Finnish smart grid expertise is evolving as a joint effort between electricity and distribution companies and energy technology and ICT companies. Finland's advanced electricity network and strong IT know-how offer excellent opportunities for competing in the manufacturing and exporting of equipment, software and systems required by smart grids.

Remotely read electricity meters

represent the first step towards smart electricity networks and are already widely in use in Finland.

From waste management to waste utilisation



Reusing end-of-life products and materials through recycling or as energy offers many new business opportunities.

Waste materials are being used to develop replacements for fossil fuels, such as refuse-derived fuel that is used in power plants. Waste (including biowaste, slurry from wastewater plants, and manure) is also being used to create biogas, and it is being refined into transportation biofuel.

Such forms of waste that cannot be utilised as material can be used instead in state-of-the-art waste incinerators. Energy produced in these can be utilised in district heating, for example.

The recycling and reuse of non-renewable waste is also promoted. Virgin raw materials can be replaced by recycled metals, ash and slags, concrete waste and batteries. Possible applications include metal processing and earthworks.

Eco-efficient and sustainable cities



The business opportunities surrounding sustainable cities can involve both entire concepts as well as individual products, systems and technologies. Finnish companies are piloting projects in cooperation with their partners and are exporting their design services and technologies especially to China.

Solutions are being developed for optimising the energy efficiency of homes and other buildings, for example. The objective is for these buildings to produce as much or even more energy than what they consume. The energy systems of urban buildings are based on energy-efficient district heating and on building-specific energy production in outlying areas. Smart grids allow residents to optimise their energy consumption.

Using ICT in traffic systems can improve the safety, speed, efficiency and environmental friendliness of urban transportation. The infrastructure required for electric vehicles is also being built.

Nature recreation services that conserve the environment

 More and more tourists are interested in experiencing an unspoilt nature. The peace and quiet that Finnish nature offers is a significant competitive advantage for the travel industry.

At the same time, the environmental awareness of customers is increasing; travellers want to be sure that tourism is ecologically sustainable. Companies in the Finnish travel industry are developing their services and operations to meet the demands of their domestic and foreign customers.

Energy production in the new

generation of holiday centres is based on renewable energy sources, such as bioenergy, wind power and geothermal and air source heat pumps. Companies are also reducing their carbon footprint by consuming energy more efficiently and using less of it. Their waste management practices emphasise recycling and the prevention of waste. Water is consumed more sparingly.

Companies are also creating incentives for their customers to promote environmentally friendly practices. ■

EK: informing, influencing, networking, branding

The Confederation of Finnish Industries EK is doing its part to accelerate green growth and business in many ways:

- EK provides decision makers with information and views on how the business environment of companies can be improved. This involves energy and environmental policies, innovation and educational policies, funding and taxation policies, trade and development policies, and many other political considerations.

- EK provides companies with information about business opportunities, networks for cooperation, development projects, funding sources and other business-related issues.

- EK has established a Cleantech Finland Business Forum (CFBF) which is an informative and interactive platform for companies and other organisations in the Finnish cleantech sector. EK also owns the Cleantech Finland brand which aims to enhance the exports and internationalisation of Finnish cleantech companies. The brand

strategy is implemented by Finpro and the Finnish Cleantech Cluster.

www.ymparistofoorumi.fi
www.cleantechfinland.fi

Environmental issues have been on the agenda of EK and its predecessors for over three decades. The focus areas and targets have kept up with the times. The first environmental protection guidelines were drawn up in the late 1980s. This report continues this tradition.

Environmental projects by EK and its predecessors

- **Guidelines for environmental management and protection within industry (1988)**
 - Environmental protection manual for industry (1992)
 - Environmental protection checklist for SMEs (1992)
 - Agreement for an energy conservation action plan within industry (1992)
- **Know-how, partnership, eco-competitiveness (1995)**
 - Environmental issues in supply chains (1997)
 - Agreement for promoting energy conservation within industry (1997)
- **Responsibility for the environment and wellbeing (1997)**
 - Environmental protection improvement models for SMEs (2000)
 - Products and the environment – towards eco-efficient products (2000)
- **Corporate responsibility (2001)**
 - CO₂ Reduction Commitment by Finnish Industry (2001)
- **Sustainable development and competitiveness (2004)**
- **Fair and productive climate policies (2007)**
 - Energy efficiency agreement for industries (2007)
 - Material-efficient operations save nature and money (2008)
- **Business in the forefront of the green economy (2010)**

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