



EFOP-3.4.3-16-2016-00014

SZÉCHENYI 2020

Fundamentals and Trends of Environmental Market in Central and Eastern Europe

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Szeged
2019

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This teaching material has been made at the University of Szeged, and supported by the European Union. Project identity number: EFOP-3.4.3-16-2016-00014

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ISBN: 978-963-306-291-3

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Contents	page
Preface	3
1. The concept of the environmental market and diversity of its interpretation	6
2. Increasing the content of the environmental market as concept	12
3. A short summary of the history of the environmental market	16
4. Characteristics of the environmental market – neutrality to market trends	25
5. Characteristics of the environmental market – constraints for long-term growth and state guarantees.....	29
6. Characteristics of the environmental market – internalisation, production-service concentration	33
7. Characteristics of the environmental market – the role of the environment protection in security policy	38
8. Characteristics of the environmental market – its role in labour market	42
9. Characteristics of the environmental market – economy rationalising effect.....	47
10. Dynamizing factors of the environmental market – direct involvement of the state and legal and economic regulation of the environmental market	52
11. Dynamizing factors of the environmental market – the involvement of the financial sector, the corporate environmental management of the company, and the environmental activity of the population	57
12. Dynamic factors of the environmental market – innovative effect and retrodistributive channels.....	64
13. Chrestomathy for case studies to implement the UN Global Goals The Global Goals For Sustainable Development – attitude at the Faculty of Engineering, University of Szeged	68

Preface

Today, we are witnessing an ever increasing social expectation in relation to the environmental protection. Its legal and economic regulation is done with direct and indirect methods globally, regionally and countrywide, or – in certain cases – even locally. By the beginning of the 21st century it has become natural that the use and burden of our environment should be done in spirit of sustainability. It can be achieved only with conscious economy. The Faculty of Engineering at University of Szeged includes environmental science in more BSc and MA-courses either as a separate material or as a part of a subject, specified on a given profession. **By that time** the students **have known** the basic concepts and more significant details embedded in other subjects which then are complemented with the trends of the changes in environmental market, **knowledge** on environmental economics, the goals of UN Sustainable Development (SZE_10), the environmental risks of their future profession (UN Global Goals The Global Goals For Sustainable Development) and expectations related to their profession. This teaching material serves to complement their knowledge and to widen their horizons with no claim of being exhaustive. After a general overview, **my aim** is to emphasise the characteristics of both the environmental economics and environmental market, to show the peculiarities of some fields of application and to assist in the practical application of theoretical knowledge.

This teaching material keeps in view the correspondence with the **learning outcome-based approach**, the prescribed and expected professional competencies, competence-elements, the formation of which the subject typically contributes to, thus the student:

a) regarding his/her knowledge, it can be said that:

- knows the environmental processes, the ways, limits and possibilities of their running.
- is familiar with the operating principles and structural features of machine systems suitable for the implementation of environmentally conscious technological processes.
- knows the basics, limits and requirements of logistics, management, environmental protection, quality insurance, legal, economics specialities which are directly connected to his/her area of interest.
- is familiar with the methods of learning, acquiring and collecting data on environmental management, their ethical limits and problem-solving techniques.
- knows the impact of human activities on the environment, both global and local environmental problems, the environmental effects of pollutions.

- is familiar with and capable to apply independently the methods of environmental inspection and analysis of complex technological systems.
- knows the mechanical-technological processes of various fields of environmental protection.
- knows the fundamentals of sustainable development and modern environmental policies.
- is familiar with the environmentally conscious ways to solve practical problems.

b) as a result of the development of his/her skills

- is able to comprehensively evaluate and differentiate between the importance of each environmental problem based on the risks.
- is able to overview, analyse complex systems, also to identify environmental problems.
- is able to size up and select the environmental technology solutions adequate to the exposed environmental problems.
- is able to influence the people around him/her to promote environmental awareness.
- is able to apply the computational and modelling principles and methodologies related to environmental processes.
- is able to interpret and characterise the elements of environmental processes, and their relationship, role and significance in the whole process.
- is able to organise and manage the operation of systems in an environmentally conscious way.
- is able to manage and control the environmental processes having quality insurance and quality regulation in sight.
- is able to detect errors in the logistics system and to select the response operations.
- is able to plan, organise and realise self-study.
- is able to comprehend and use the specialised literature of the field of environmental protection, and its sources in informatics and libraries.
- is able to apply the acquired IT-knowledge in solving problems emerging in his/her field of interest.
- is able to use his/her knowledge in a creative way to manage the workplace resources efficiently and environmentally consciously.
- is able to communicate in a professionally adequate manner both verbally and in writing according to his/her field of interest.
- is able to make decisions with full consideration of laws and ethical standards even in situations requiring complex approach or unexpected arrangement.

c) his/her attitude is expected to change favourably,

- is committed to the goals of environmental protection, represents the complex approach of environmental management.
- is interested in environmental emissions of new products and technologies; initiates technical

- and technological innovations which reduce emissions of the existing technologies.
- initiates the introduction of processes of environmental protection which can be fitted into the given technology; is open to get to know new technical and technological processes in environmental protection.
 - aspires to monitor changes in legislation related to environmental protection; keeps the regulations in mind.
 - seeks to apply processes of waste management which guarantee protection of both the environment and human health; keeps an eye on the aspects of both the environment and human health.
 - aspires to consider environmental aspects in industrial developments; by means of his/her complex attitude regards by-products and wastes as values; initiates to recycle by-products and wastes of food industry in greater proportion.
 - is committed to the environmental principles of the corporation and to their application in practice.

d) his/her autonomy and responsibility develops,

- makes autonomous and professional decisions even in unexpected situations.
- performing his/her professional duties, he/she cooperates responsibly with other qualified professionals (primarily of the legal and economic fields).
- reveals the shortcomings of the applied technologies and the risks of processes, and initiates measures to reduce them.
- is aware of the legal, economic, security, social, health and environmental consequences of his/her work and decisions.
- in accordance with the instructions of his/her work manager, directs the work of the personnel assigned to him/her, supervises the operation of processes and vehicles.
- evaluates the effectiveness, efficiency and safety of the work done by the employees.

Regarding environmental management, including environmental market, the author intends to emphasise that it requires a creative way of thinking, from both the lecturer teaching the given subject and the student, to get to know and acquire more study materials, to weigh carefully how to use them in practice. I hope that my essay will be of great help for this work, which is based on my PhD thesis -Trends of Environmental Market in Central and Eastern Europe - defended in 2003 at University of Technology and Economics, Budapest.

the Author

1. The concept of the environmental market and diversity of its interpretation

Examining the field of environmental market the question may arise whether environmental protection can be marketed in the sense of economics at all. Is it the developed or underdeveloped economy that causes environmental problems? In the 60s and 70s economic growth and the developed market were proclaimed the main culprit for the environmental crisis. It was explained so that the „invisible hand” is not capable to repair the problems. This terminology, introduced by Adam Smith, can operate efficiently neither in the countries of Central and Eastern Europe. Through the price, the market gives distorted impulses to the economic actors so they can experience the damage only damp. The environmental issues are presented only in a distorted form in a decision-making situation that is why companies do not include them in their expenses to the necessary extent. In a market free from environmental regulations the efficient distribution of resources should be formed on the basis of “**pareto-principle**”, then no one could be placed in a more favourable position in an economic transformation or change without placing somebody else in a more disadvantageous position (Kósi K. – Valkó L. [1999]). In practice, environmental problems depart significantly from this model. This theory has to be modified with **external economic impacts (externalities)** which say (Samuelson, P. A. – Nordhaus, W. D. [1987]) that purely market-based processes differ significantly from the use of resources considered socially optimal due to the impact of externalities. Related to this, A. Marshall introduced the concept of external costs and profits. On its basis, production of the polluting company and thus its emission of pollutants are around a point where the company compensates for the private damage caused by its own pollution. (Szlávik J. [1991]) This kind of ignorance towards externalities on behalf of the company often causes a situation where the emitter does not or just partly perceives what directly affects the sufferer bypassing the market. The essential problem is that pollution is not included in the market regulations. In this case, the private marginal costs can differ significantly from the social marginal costs thus distorting bearing of burdens and putting an extra burden on the state, as well. This problem will not solve itself – especially, if other more frequented effects of social-economic transformation in the examined region can be felt (just think of the unfavourable effects accompanying the social-economic transformation processes in Central and Eastern Europe) –, since the economic actors receive false information continuously. Eventually, the process can go so far as the whole economy and society can feel it.

In relation with **environmental pollution, burden and use** we can mention only negative externalities. This statement is especially true when we

exceed the limits of the self-cleaning capacity of nature as a new situation arises and rehabilitation of the environment requires a considerable amount of resources.

A list of damages which exceed the assimilation capability of the environment can be enumerated in the transforming countries of Central and Eastern Europe. These problems may differ by countries or by groups of countries but their interference cannot be left out of consideration. Degradation of nature in Albania, the collection and treatment of waste in Bulgaria and Romania have been identified as a major problem. The issue of water quality – both that of the drinking and sewage water – is a cardinal problem in the Central and Eastern European countries. It reflects the territorial potential and globality of this topic that regarding the Asian areas of Russia, Kazakhstan and Kyrgyzstan experts of these countries consider this problem as an urgent task to be solved. According to the experts of the coastal countries (especially Russia, Lithuania, Albania and Croatia) deterioration of the water quality of seas near the coastlines is a huge problem, too. Approximately the third part of the population live on the coasts (Europe's Environment [1995]) which burdens the given area even more. The extent of the urbanisation load is increasing, especially air and noise pollution. The examples show a great variety of issues.

In transition countries a significant change has taken place in the issue of public goods and free goods. As a result of **privatisation**, the increase in proportion of private properties had a favourable effect, since the value of common property has always had a lower position. The value retention and enhancing motivation of the ownership approach acts against degradation, which is good for the public as well.

An interesting phenomenon has been experienced in the Central and Eastern European countries. In the first years of political-social-economical transformation, a kind of spontaneous improvement in the state of the environment occurred. It can be seen as an externality but rather as a positive effect on the environment due to the changes in ownership. This phenomenon is not entirely real as the improvement of emission values is the result of the disappearance of more factories or even industries in the countries in question. Let us take as an example that in Moldavia almost all of the raw material and energy supply for the heavy industry came from the territory of the former Soviet Union, thus at market prices, the production in the earlier construction was unprofitable, so practically, the whole industry has stopped. In case of Belorussia a similar situation can be observed in the field of raw material and energy sources. The Soviet technical-economical development reached the regions of Belorussia quite late so it started from relatively higher standards, also because of the geographical distances, the proximity of

the Western (Comecon, that time) markets made formation of a relatively modern industry possible, regarding the standards of that period. The country produces for experts even today (eg. tractors) but they pay less attention to developments which allow for the aspects of environmental protection. The high import content of products has brought about a kind of an improvement in the environmental indicators of Belorussia. The heavy industry which heavily burdens the environment has also fallen here. This situation is not unique, a similar phenomenon can be seen in other Central and Eastern European countries, too.

However, in cases when the production is still maintained – for some other reasons – the weak environmental performance carries little weight in decision making. If direct or indirect regulations do not work effectively, businesses will not be forced to ponder the difference between private damage and social damage since they do not really experience the resulting risks. In the troubled times of transition there is always a company which employs a “creaming” tactic to take advantage of this difference. We might as well mention the case of the Austrian waste imported to Mosonmagyaróvár as an example. This seemed to be a good deal from the view of both the company and the local council. Here, the short-term profit rose above the responsible long-term thinking. The effective state regulation and proper motivation could channel pro and counter arguments, interests after approaching the economic optimum for the ecological optimum. The case of the Gulf of Finland, the Neva Estuary and the untreated sewage coming from St. Petersburg is similar, though bigger in its extent. Without state or even international intervention, the ecological catastrophe cannot be avoided. It is a common interest to extend the notion that it can be possible to talk about a great regional and even global damage. This kind of change in attitude, communion can be started between countries of different stage of development only with difficulties, however, we can hope that processes which are advantageous for both parties in the long run will become important. The task of the environmental regulation is exactly that it has to create a conformity for the environmental, economic and social interests so that they can stay in harmony with nature even for a long time. Now, we have reached the idea of sustainable development and sustainability in Central and Eastern Europe.

The socio-economic transformation processes of the nineties in the countries of the region took place in different degrees and with different time lags, and were stalled in certain contexts.

From this point of view, the countries of Central and Eastern Europe **can be divided into two groups:**

- countries where reform processes started quickly and their implementation is being carried out with success, these are the ones in Central Europe, and

- countries where reform processes started later and their effectiveness is lower, these are the ones in Eastern Europe.

More developed countries from this region that wanted to join the European Union improved their environmental performance considering EU recommendations. Although it was possible for the candidate countries to have a temporary waiver on request, they used it only in absolutely necessary topics, since all aspects were taken into consideration in the overall assessment. The countries pondered it, so they have been member states of the European Union for more than a decade, but the joining process of other countries has slowed down and it is pending when a new member country can join after that the United Kingdom has decided to exit the Union.

If society, economy and environment do not form a trio, environmental protection will remain an ad hoc fire-fighting job. (Papp S. [1992]) It can be stated that there is no economic goal, task or strategy which would serve the interest of the society without allowing for the environmental elements. Here again, the lack of accordance of the long-term way of thinking of ecology with the profit-oriented, short-term way of thinking of the economic sphere is the most significant hindering factor. This set of values can only be enforced through legal means, with external force, in the hope of effective solutions. This set of values cannot be imposed on the society with external force, meaning through legal means, in the hope of effective solutions.

As an example, it is worth showing and comparing the value of sulphure dioxide emissions per km² in some countries. On the basis of data of 1985, it was 25 tons in Czechoslovakia, 14,8 tons in Great-Britain, 10,6 tons in the Netherlands and the Federal Republic of Germany, 3,1 tons in France, 1,6 tons in Austria and 0,6 tons in Sweden. Today, these values are significantly lower. Regarding the export-import balance of harmful substances, there were conflict zones, since for example, the export of Czechoslovakia of that time was 45-82% higher than its import. The contrary can be observed at the Northern and Eastern borders of Austria. (Valkó L. [1994]) There are areas of especially high concentration within the borders of Central and Eastern European countries. The environment protection targets these focal points. The industrial agglomeration around Katowice, which accounts for 2% of Poland's territory, had 30% of total dust pollution and 40% of gas pollution. Poland has contributed ten times more to the pollution of the Baltic Sea, mostly through the Vistula than the former Federal Republic of Germany.

These values have changed since then but there is still a conflict zone between the countries of Western and the ones of Central and Eastern Europe, that is



between the developed and the transforming worlds. It is quite understandable that the Austrian environment policy has become the leader of the regional, cross-border environmental protection, since it is clearly in its own interest, as well.



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Questions to check understanding

1. What does “pareto principle” mean?
2. What do positive and negative externalities mean?
3. How did privatisation affect environmental activity?
4. How did changes in the social system affect environmental protection in the countries of Central and Eastern Europe?
5. Does being a member of the EU have any influence on the environmental policy of the given country?

2. Increasing the content of the environmental market as concept

Environment can be defined in several ways, it is a **complex notion**. In this present approach, environment can be defined as a combination of natural factors and the economic, cultural and political factors created by the society. Altogether, it is a highly complex interrelation of single and multiple sub-systems. The natural environment surrounding them absolutely belongs to the human environment, in its entirety. Also, it includes the material and intellectual goods that were created by humans, and interrelations, interactions that exist between humans and their environment.

As for the Hungarian terminology, the **specialised literature** does not have an entire consensus. We can find the notions of environmental market, environmental protection market, environmental industry, environmental or environmental protection sectors, which are supposed to have identical contents, being used as synonyms for each other.

It was K. Zimmermann (Zimmermann, K. [1981]) who attempted to define it comprehensively in 1981. When describing its content, he mentioned:

- elimination of environmental emissions, and creation of a toolbox to ensure it,
- production of consumer goods that have less burden on the natural environment,
- contribution to increase the assimilating capability of natural systems,
- measuring and analysing emissions and imissions, and its toolbox,
- collection and management of waste materials,
- rational management of the natural resources by means of re-use or further use,
- services in connection with environmental protection (counselling, trade, marketing, research-development, planning, education-training).

In Hungary, it was Valkó László who attempted to interpret and to introduce the terminology in his candidate thesis Attempt to define the environmental market, in 1994. According to him, the term "environmental market" refers to the technical-technological and economic-intellectual tools of environmental management and its forms of movement. Regarding its structure, it is formed by investment goods, consumer goods and services. (Valkó L. [1994])

The environmental market is a relatively new field, its subject and objectives are both in formation, but it is clear that it attempts to help and realise harmonisation the increasing human needs with the natural environment. His examinations show that we use our environment on the input side, while burden it on the output side, but the extent of use and load must be consistent with the load bearing capacity of the environment. However, it is a natural demand that we want to ensure better conditions without causing irreparable

damages or damages that can be repaired only at the price great sacrifices in our natural environment. In the environmental market, as the scene of environmental (protection) happenings and activities, the environmental management serves implementation of these objectives. Its activity includes prevention, reduction and elimination of harmful, polluting effects.

According to another definition, the term “environmental sector” refers to the entirety of businesses that provide products and services for measuring environmental damages, such as water, air and soil pollution, and impacts associated with waste and noise pollution, for preventing harmful effects and for limiting damages. Also, it includes clear, waste-poor technologies.” (Szlávik J. – Valkó L. [1997-A])

I think it is the term “environmental market” which covers the examined content most, that is why I am using it in my book. The high degree of diversification of market needs (from individual recycling to integrated systems) offers start-ups an easy market entry and retention opportunities, but also companies that change product and service structures. Small and middle-sized companies generally have a limited offer. Bigger companies can satisfy more significant needs with their offer, thus their sector of environmental industry operated besides their core activity can enter the environmental market with favourable offers by selling its capacity – beyond their own use.

The question arises as to what size of the market we are talking about? It is quite difficult to define it but on the basis of EU sources the global environmental market (industry) has now increased to around € 740 trillion. A half of this is given by the countries of the European Union (Database on Eco-industries in the European Union [2018]) which ratio has not changed significantly even though the number of the member states has. Such an extent requires development action plans, in which the expected trends are formulated, so they also provide the opportunity to engage in processes that determine the long-term future. Another study reinforces the idea of long-term increase (Dewick, P. – Miozzo, [2002]) the authors of which suggest examination of effects in 50 years time.

According to this database, the countries joining the European Union represented € 10,3 trillion in industrial production, € 5,5 trillion in service and € 4,8 trillion in investment (Analysis of the Candidate...[2002]) before joining. Within this, the Polish environmental market was the highest at € 3.8 trillion, the Czech Republic at € 1.3 trillion and Hungary at € 1 trillion. It is typical to the region, but mostly to the countries not mentioned here, that besides the end-of-pipe-solution, other solutions involving significant changes in technology were hardly at present.

It is still a question what **the subject of environmental market includes?** Does it have only elements of negative effects or are there positive elements, as well? I am of that opinion that an event, change, activity that is generated by a person, animal or other living being, natural phenomenon does not necessarily bring

about a harmful effect on the environment on its own. However, human intervention into our environment has become so large that in several cases not only we cause these changes but suffer from them at the same time. In the meantime the humanity faces both the phenomenon of shortage in everyday life and the challenge we call the combination of think globally and act locally. The increase of processes has provoked an environmental crisis in certain regions, areas even globally. The environmental sensitivity was responded first by protests, later – by the development of environmental awareness – with solutions. It has become clear that damaging the environment is not only a regional but a global problem, as well, because elimination of environmental damages takes long time and needs widespread caution in large areas. It shows its complexity that it contains natural, economical and social elements.



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Questions to check understanding

1. Define the term 'environmental market'!
2. What goals can be set in connection with environmental market?
3. What does the subject of environmental market include?

3. A short summary of the history of the environmental market

As a result of the processes that took place in the 1980s, **the environmental market became independent** in developed countries, and as a consequence, environmental management embedded in the processes of the national and international economy. Today, the role of time factor is becoming more and more valuable, reaction to the induced demand in time creates a favourable market position. Technical innovation stimulates environmental protection, environmental market generates demand, it just pulls out solutions. It selects the direction that “is a prerequisite for the development of production inputs and outputs in an environmentally friendly way, on one hand, and integration of environmental industry-service sector into the economy gives new impulses to conduct socially tense issues without using direct means of social policy, such as unemployment.” (Valkó L. [1997]) We can experience a double effect in this field. Some say that environmental protection increases the number of employees on the long run, while others are of that opinion that expenses of protection and prevention take away sources from other opportunities of development, which are directly connected to production, thus they reduce the competitiveness of the company, and in extreme cases, the business might as well reach to the point when it has to be closed down. Both opinions are equally supported, but the specialised literature, typically, casts its vote to the positive results related to employment with the proviso that it depends to a large extent on macro-economic contexts, market and customer preferences. The publication Environment and Employment [1998] – adding that the job of environmental protection can be defined only roughly, since work that is connected to it either directly or indirectly is included – estimates the number of people employed in environmental protection for all jobs in OECD (Organization for Economic Cooperation and Development) countries. (Environment and employment [1998]) In the United States, as a result of environmental costs, approximately 4 million workplaces were created in 1992, 4,3 million in 1995, 4,9 million in 2000. This increase for 1992 was 7,5% in 1995, 22,5% in 2000, while 35% in 2005, according to the above-mentioned literature. The increase in Germany, related to the 680 000 people in 1990, was approximately 1 million in 1994, 1,1 million in 2000. This, a 47.1% and 61.8% growth rate should be adjusted downwards with the effect of integrating the Eastern areas to create a realistic picture. Today, this percentage is higher.

It is worth noting that the cost of job creation programs through environmental policy is not higher than programs implemented in other areas. This statement was formulated for the environmental industry of developed

countries, however, in Central and Eastern Europe the relatively cheap living labour shifts this value, so the job-creating capacity of environmental market has to be judged together with its complex (economic, social, etc.) effects.

In Central and Eastern Europe, but also in developed countries, there is an apparent opposition to environmental protection at the microeconomic level, therefore, it is advisable to study the topic in larger regions and to analyse, evaluate and adapt the structural features experienced there for the economy of the region. Efficiency of international cooperations, agreements, action programmes is influenced to a large extent by the commitment and local results of each country.

In **developed countries** the following factors catalyzed creation of an independent environmental market, which can be examples for the countries of Central and Eastern Europe:

- increase in environmental protection at state level,
- growing awareness of environmental problems both in a wider range of the population and of professional opinion,
- organizational and content foundation of international environmental cooperations,
- strengthening the environmental background industry.

In this marketing process the integrative connections of environmental protection – for the sake of “ecological hit security” – are taking more and more important role. The example of countries with developed environmental awareness and thus having a more efficient environmental practice – mostly members of the European Union – shows that the technical-economic-intellectual tools of environmental management, defined as an environmental market, can have positive effects on several social problems, as well. Existence enhancing effects of economic rationalization, organizational upgrades and technical developments motivated by environmental protection are very important for companies and institutions. Its effectiveness depends to a large extent on the speed, quantity and efficiency with which the technical, economic and intellectual resources needed to identify and manage the environmental problem can be realized. To successfully achieve it, it is desirable to have – both at micro- and macro-economic levels – a well-developed and operating environmental market. It is not enough to declare the intention only but it is worth considering the historical background, the social-economic processes which have taken place in the past decades. These positive externalities can be realized in Central and Eastern European countries provided the necessary reception and legal-economic support are ensured.

For this, it is worth looking back upon some connections. In the second half of the 1960s the Club of Rome started to

develop its world models with a new approach. They called the attention to the interrelation between the increase of population and the pollution and degradation of the environment. They published their summary study in 1972, entitled *The Limits to Growth*. The UN (United Nations) supported the idea and they organized their meeting Conference on the Human Environment in Stockholm in the same year which had a huge importance. Here, the delegations of the participating countries were faced with the fact that, even in peaceful circumstances, there could be an emergency for the inhabitants of our Earth due to the depletion of resources and pollution of the environment. They also pointed out that poverty is also a driving force for environmental problems. (Láng I. [2001]) In 1987 the World Commission of Environment and Development published its report entitled *Our Common Future*, and as its impact, the concept of sustainable development has been reinforced and got a special importance. (*Our Common Future* [1987]) Five years later the UN Conference on the Environment and Development was organized in Rio de Janeiro where the need for linking the environment and economic development was re-established. Sustainable development had been in the common knowledge and a wide range of actors in social and economic life was enthusiastic about it which also meant that it was quite improbable to form a uniformed interpretation. Significant promises were made, mostly toward the developing countries, but only a small part of them were realized later. The Conference of Rio accepted the agreement on climate change and protection of biodiversity, entitled *Agenda-21*, which included usable recommendations both for national governments and international organizations. (*Agenda-21* [1993]) After that, environmental protection gained a great impulse, which had a positive effect on its condition. There were results primarily at international level. International financial institutions, so did the World Bank, placed greater emphasis on environmental impact assessments, and made it a condition upon the disbursement of loans and aid for many regional banks. Five years later, in 1997 the results were reviewed and it was regretted that only a fraction of the recommendations made in Rio could be met. In contrast to the promised 0.7% GDP support, only 0.25-0.30% was realized. The situation is worsened even more by the increase in difference between the poor and the rich.

The process called **sustainable development** and then sustainability has been in the centre since the Agreement Treaty of Amsterdam (1997). A much debated part is related to climate change in connection with which an additional protocol was adopted in Kyoto (1997). To reduce greenhouse gas emissions the European Union committed on average 8% by 2012, the US 7% and Hungary 6%, but other countries in our region made commitments, too. (Láng I. [2001])

On the basis of the Action Program 5, 6 and then 7 of the European Union,



promising steps have been taken in the region, especially in the fields of protection of environmental elements (air, water, soil, living world, settlements) and environmentally-friendly operation of certain economic sectors (energetics, industry, agriculture, traffic, tourism). The EU directives have become or are becoming part of the legislation of the member countries. Harmonization in legislation has also become a requirement in this area for the new member states and for the future accession countries. In case of Central and Eastern European countries differences in the field of environmental protection are larger than economic-social differences. For the under-developed ones a realistic goal would be to reach the Central European average, while the most developed ones have the chance, though with great efforts, to implement the EU directives. All this has been updated and supplemented by UN Global Goals The Global Goals for Sustainable Development (2015).

Experiences of the past years have shown that in order to realize sustainable development in practice, it is also necessary to consider social connections, besides cooperation between environment and economy. In this context the operation of market mechanisms which allows for effects on the environment is strongly emphasized, but also it is necessary to underline the responsibility taken by sciences, education, local governments and national politics. In the transition economies of Central and Eastern Europe, global long-term thinking often falls into the background, and everyday problems often suppress forward-looking initiatives. Sustainability has been set as a requirement in different social-economic scenes in these countries, too, but individual and corporate sacrifice is mostly only achieved by how much the legal and market environment force it for those involved in the process.

There have been radical changes in the environmental state of the countries in the region (Illés I. [2002]), which shows that emissions of each pollutant has been reduced to a large extent, as a whole. Today, the primary reason for this is not the decline in production. At the same time, however, the European Union's concerns and reservations about the state of the environment in the region have increased. The beginning of the socio-economic transformation created a new situation.

Market systems that are dominated by private property cannot work in harmony with the environment if they are left alone. The “invisible hand” cannot be achieved in the countries of Central and Eastern Europe; for example it does not operate efficiently in the field of waste management either.

This problem is due to the fact that the material and energy flow in the secondary waste processing sector does not directly obey the market suction power, but it is only its by-product. It is the task of regulation to work as a catalizator in this

field and to direct the processes into the desirable bed. Regulation has to find solution that it would be able to form an appropriate suction power even for these dull flows. This can be achieved by economic means (price system, internal interest system), which can move the processing and utilization of waste and secondary raw materials. The rate of the direct and indirect interventions of the state has changed favourably in developed countries which is a step forward. The environmental policy that applied only direct means, after the first success, worked costly and with less efficiency. All **Central and Eastern European countries** have taken some steps to create an environmental market but the less developed ones have not got beyond the legislation. The effectiveness of law enforcement is also questionable, as the other direct economic and social problems of the economy suppress the issue of environmental protection that requires long-term solutions.

In general, the environment market has not still appeared as an independent sector in Central and Eastern Europe. Also, its development is not carried out on the basis of a unified concept but often with an ad hoc intervention. Increase in demand, which has grown in the past years and is expected to become even more significant, is fulfilled from other, developed countries, so this region cannot experience the impact of the environmental market on the economy as a key sector. It is also important to note that this sector is capable to connect environmental quantity with economic growth and improvement of life quality in the interest of sustainable development.

Efforts and results to achieve this showed that there is a combination where economic growth and environmental aspects can be compatible with each other, what is more, by creating proper conditions their interactions can be mutually beneficial. An important prerequisite for this is that the various elements of environmental protection and economic policy should be coordinated and future-oriented even at the definition of the direction of development. The long-term goal cannot be anything else than mutual positive interaction.

Three aspects of this can be defined:

- It should be in the interest of the user's side to employ economically effective techniques and technologies which load the environment less, and their waste and pollutant emission is smaller, too.
- The customer's side has to be in the situation to raise demand for environmentally-friendly products.
- The government should motivate the desired behaviour not only with bans and prohibitions but other incentives which help application.

Looking into the future, to solve the contradictions between **short and long-term interests technological development and innovation can be an efficient solution**. Technological development, provided it takes environmental aspects into account, includes beneficial solutions as a positive output. Systems are cost-effective when their operation does not produce wastes, or if recycling, re-use are carried out to a large extent.

“Macroeconomic relationships are relatively quick and easy to accept, but a microeconomic conflict can only be realized through conscious state involvement.” (Grossmann F. [1993]) It is not necessary to accept this thought since a number of examples shows that inclusion of environmental aspects into management provides the applier with competitive advantage, so it gets more and more important. These thoughts – besides forward-looking examples – are still new in Central and Eastern Europe. The economic sector in the countries that are likely to join the European Union in the future is also not generally in the position that solutions that use and burden the environment less are a competitive advantage for their producers and distributors. Experts from Albania, Moldova and Ukraine have clearly indicated that it has not yet been formulated widely in their country that the issue of environmental protection built into products and services has to be an important aspect.

Trust in the products of the environmental industry in Central and Eastern Europe is lower than in the case of well-known Western products and technologies. This prestige-effect hinders the work of businesses in the region. Of course, companies in developed countries are happy about this situation since they want to secure their free capacities, so they have a great interest in the countries of Central and Eastern Europe. This is particularly true for the new EU countries, as the EU (European Union) environmental requirements are a defined obligation for these countries.

Today, the international trade offers all kinds of available solutions for the less developed countries which is beneficial, on one hand, - since tools, methods and processes become accessible – but it is also disadvantageous because it does not stimulate formation of the national sectors of production and service.

From the users’ point of view environmental protection is undergoing a major transformation in Central and Eastern Europe. In the first year of social-economic transition, practically without considering the parties, the experts selected the most important steps to be taken in connection with environmental protection. A wide range of solutions can be found on how to put environmental policy into practice. (Zádor E. [1996]) If economic incentives are market conforms and the competitiveness of the companies involved is not only preserved but enhanced, the industry will comply with environmental standards for its own well-

understood purposes, otherwise the innovative initiatives fade away.

In 1993 Frost & Sullivan's market research firm found that the state of environment was severely damaged and sometimes disastrous in Bulgaria, the Czech Republic, Slovakia, Hungary, Poland, Romania and Yugoslavia (its former territory). However, other researches dispute it not regarding this area as a disaster zone. As a result the firm F&S calculated a sudden increase in the number environmental businesses both in the examined countries and countries in the region. It is undoubt that this market became open for Western companies in the fields of environmental technology and know-how. However, the region's lack of capital should not be overlooked, so the existence of market potential alone is not sufficient for the efficient functioning of the environmental market. What should be assessed separately is the short-term international financing and support, and the possibility of short- and middle-term increase in environmental market in certain countries which depends to a large extent on reforms, the efficiency of environmental legislation and the commitment of the managing system. In the transition period investors in developed countries should have a manager-approach in order to become successful in these markets. They have established formal and real partnerships with local businesses, related national and local organizations and bodies.

Definition of environmental market has to be formed in four fields, so it will be possible to compare these definitions:

- The need for a product or service that determines the amount of additional materials to a significant degree. The user lives together with the product or service so the life-cycle approach will be appreciated. If the proportion of prestige consumption is high and cost saving is small, the attitude of consumer society inevitably means unjustified environmental burden.
- The ratio of material and energy input to output is remarkable. The use of the environment, because of its finality, - I am thinking of non-renewable resources - endangers sustainability and thus our future on the long run. Another component is the structure of the input, which can cause a shift in balance in our environment.
- Changes in the state of system (technology, company) due to its operation. One of its components is the cost-oriented way of thinking of the company. Searching for and application of environmentally friendly solutions is one of the positive results. In addition to the achievements of the before-mentioned state involvement, voluntary auditing has become increasingly important (EMAS, ISO 14001). I think the primary motivation for searching for more modern solutions is not to implement the transition to environmentally friendly solutions but besides other economic and market effects, this aspect system also appears.
- The output side shows the burden on the environment which is also an important

component of environmental management. Spreading the life-cycle approach helps reduce this burden since the environmental burden expected at the output has to be tried to reduce at the input, then the chances of recycling and further use have to be examined again at the output.

Another interesting aspect of the problem is the provision of information and education, which can help divert the contents of the consumer basket from traditional to environmentally friendly. This goal can be achieved only with products and services that are competitive in their prices, which are unlikely to be realized in pure market conditions. State involvement is essential in order to succeed, to create a greener lifestyle.

Stimulation to volunteer actions creates an interesting and desirable situation. A typical example for it in the founding member states of the European Union is the EMAS as a result of which the given company – among others - publishes independent reports, certified by an accredited auditor, on their environmental performance, also undertakes the regulated and documented operation of its activities and premises. In addition to the regulatory compliance, prestige and competitive advantage also play a role in the background. The LIFE-program of the EU gave assistance to businesses and local governments to realize opportunities and advantages due to a better environmental performance. Businesses that do not comply with the environmental regulations required by law are to be fined, while the rewarding system of those with a good performance is under development. Its form – in addition to that the market often appreciates it – can be different from the simplified authorization procedure to the granting of subsidies. Examining the demand side, “greening” the customers’ shopping habits, modification of public purchases according to it, motivation for a more environmentally friendly product planning can be the greatest pulling power. It can be considered a problem that even forward-looking environmental initiatives fail because of the lack of information or impediments of flow. It is especially important to develop this area because it is also essential to include life-cycle approach in consumer’s way of thinking. The counterpart of this is that supported solutions which burden the environment more than necessary (eg. coal for energetic goals, some agrarian subsidies regarding fertilizers, etc.) have to be reconsidered because their operation strengthens the harmful effects on the environment.

In my book I am describing the special characteristics of the environmental market, then some of its dynamizing factors, some results of the countries of Central and Eastern Europe, the assessment of their problems and special positions, finally the main elements of The United Nations Global Goals for Sustainable Development (Sustainable Global Goals [2015]) related to the education in our university

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Questions to check understanding

1. When and what made the environmental market independent in developed countries?
2. Describe the main events from the 1960s to achieve sustainable development!
3. In which areas does the system fail to operate on a market basis?
4. Why is the development of environmental market is slow in Central and Eastern Europe?
5. Describe the principles of the three sides involved in environmental sector for the mutual goal!
6. Describe the four approach areas of environmental market!

4. Characteristics of the environmental market – neutrality to market trends

When examining the environmental market – especially in Central and Eastern Europe – account should be taken of the level of development of its economy, the socio-economic structure there and the internal and regional context. It can hardly be denied that environmental market always appears in a form which is modified with externalities, so it has to be examined as environmental products, services, ie a segment of market, also, as a set of environmental standards, a set of impulses that affect the entire market. Even in case of developed countries we often disregard the efficiency enhancing effect of the environmental market. It is necessary to carry out a complex examination to evaluate it. I am underlining only some of its elements, the context of which **must be examined** in any case:

- the relation between environmental costs and the prevented damage,
- a cost-bearing and profitable relationship at different levels,
- the time factor.

Crisis of environmental protection can be as complex as oil crisis, therefore I think it is worth examining its special interrelations and effects.

Neutrality to market trends is a special characteristics of the environmental market. Over the past few decades this market has shown less volatility than the general economic downturn. To explain this the following facts have to be understood (Valkó L. [1997]): the importance of environmental protection in security policy (See: later chapters) and the widespread use of the preferring, helping means of state. The author mentions that on the basis of his researches the market of environmentally friendly consumer goods and services is steadily expanding, which reached 10-12% as an annual average in the 70s and 80s, and he predicted an annual increase of 8-10% for the next 10-15 years. The researches looked at Central and Eastern Europe and the Soviet Union (later referred to as the successor states) as a bloc, indicating that the region was then almost same everywhere, but today, as a result of significant political and economic changes in Central and Eastern Europe, there are significant differences between countries. The expected regional trend of the environmental market between 1990 and 2000, then 2010 can be seen in Figure 1 (Valkó L. [1997]). The percentage values of the research material of OECD - Forum Discussion on the Environment Industry are referred to year 1994, as a basis, so he does not calculate the growth rate with the method of compound interest. It can be seen from the chart data that the OECD countries (on the basis of OECD membership in 1994) represent a dominant share of 82% in the world economy but a slight decrease in their potential can be forecast. For the period 1999-2000, the study defines the estimated growth rate in a smaller value, of 2,2-2,6%, considering the weighted average, in 5,5%, then 4% till 2010, after that keeping this value seems to be a realistic goal.

Figure 1

Regional trends of the environmental market expected between 1990 and 2010 (billion USD)

Source: Valkó L. [1997] supplemented by Gál J. based on OECD – Forum Discussion on the Environment Industry

	1990	2000	Estimated annual growth rate (%)	2010
North-America	84	125	5,4	185
Europe	54	78	4,9	115
Asia-Oceania	26	42	6,2	38
OECD altogether	164	245	5,5	338
Non-OECD countries	36	55	5,9	53
Altogether	200	300	5,5	391

In my view, the amount shown here is considered to be an optimistic version, as time-proportional realization is debatable and the same applies to the subsequent period. The explanation of this is very complex but it must be taken into account that – primarily in the Central and Eastern European countries – the transformation of economy brought a number of unexpected problems into surface so the rate of economic increase lagged behind expectations. In this situation the environmental protection can get less sources. In 2004, several Central and Eastern European countries joined the European Union, as a result the dynamics of the region strengthened which affected the environmental performance, too. Nowadays, however, the economies of several countries have achieved higher economic growth than before, and the integration of **environmental awareness** through intensive technologies is also a major achievement.

On the basis of a survey taken out in Germany only 7,6% of the businesses thought that the general economic recession affected definitely adversely their environmental activity, 10,7% experienced a noticeable negative effect, regarding correlation significant, 49,1% found hardly recognisable interrelation, while 32,6% discovered no recessionary influence on their environmental activities, according to the author's survey.

Several surveys confirm that environmental protection needs much less expenditure in the cost structure of businesses as it is said to be, so the recession cannot be explained with it. Depending on their level of development,

in the countries of Central and Eastern Europe environmental protection is often regarded only as an expenditure or something that limits their economic activity. There is a unified view that bureaucracy connected to environmental protection has to be rationalized and simplified. (Szlávik J. – Valkó L. [1997-B]) However, this situation confirms that in the transforming countries of Central and Eastern Europe there are contradictions between the short-term and long-term interests of the economy. As a goal, the process of their elimination is promoted and encouraged.

In the developed world environmental investments are considered to be remunerative – though on the long run, since they are gaining more and more emphasis in the system of sustainability and international competitiveness.

Neutrality to market trends should not be mixed up with neutrality to competition. It is often a view that in the neighbouring countries compliance with the international environmental law, which is stricter than the regulations in force, hinders competition. To compensate for this partially or fully, for example the Austrian government has developed and applies several programs (eg. a system of environmental taxes, levies and subsidies), while striving to raise the environmental standards of the member states to higher standards in the appropriate levels of the European Union.

In Central and Eastern Europe, the determination of economic neutrality is a much more complex task, and it takes years to prove it with reliable results. I explain this with that that there were changes of such volume in the social-economic transformation during which examination of changes in environmental market, if it noticeable at all, has not been taken into consideration. Based on the data and results of the last few years, I do not consider the definition of a high-reliability trend to be correct; the presented character is only of an indicative type.

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Questions to check understanding

1. Which three factors are examined to judge the complexity of environmental market?
2. What does the economic neutrality of environmental market mean?
3. What is the relationship between neutrality to market trends and economic increase?

5. Characteristics of the environmental market – constraints for long-term growth and state guarantees

Today we are witnessing the long-term growth of world market. Some important negative events, like the terror attack of 11th September 2001, the wars in Afghanistan and Iraq, the conflict in Syria, caused shorter stops in the economy of several countries but by today the trend is predicted to grow. Forecasts different in their size but similar in their trends have been published in the literature. In the developed Western European countries the growth index is significantly steadier than in the Eastern European region. The data are similar in both groups of countries from the point of view that they predict long-term growth. The opinion which regards Central and Eastern Europe a zone of catastrophe from the environmental aspect is disputable, especially if we take the efforts of the last decades into account. It is due to the fact that most of the countries of this region have overcome the bottom of socio-economic transition, on one hand, and the level of citizens' environmental consciousness, the strengthening of their environmental awareness, and the pursuit of their actions from internal motivation have developed significantly.

I am of the opinion that there is no strictly direct correlation between the actual level of the transition process and **the environmental market performance of a country** in each case. However, it can be said that formation of the environmental market in the transforming countries of Central and Eastern Europe has already started, of course, with different intensity and methods per country. It can be seen clearly that dynamics of environmental market is the largest in states considered reform countries. It is also clear that it is Russia that has the largest market potential, due to its size of its territory. It is estimated that more than 250 billion EUR would be needed to raise Russia to an average Western-European level in the field of environmental technology. This has a very small chance, since efforts of the annual 5-10 billion EUR in environmental market lag behind the predicted ones. (Valkó L. [1997]) In the former member states of the Soviet Union the rate of growth is very different (Estonia, Latvia, Lithuania, against Belarus, Moldova, Ukraine, Russia), but each is a good opportunity to create new markets, because here they are very far from saturation. (Kaiser, H. [1997]) One of the most important steps is to exceed the threshold of environmental awareness. Eco-consciousness of both the inhabitants and the business sector is still low in Central and mostly Eastern Europe. This statement of mine is based on my examinations. For the population of certain poor regions of Europe there is a double stress which is increasing, according to some predictions, regarding life instinct and pollution. As a result, consequence, degradation of nature is a real threat.

The environmental market in Central and Eastern Europe is **increasing to different degrees by sectors**, with a particular focus on:

- water, sewage, sewage sludge,
- waste, hazardous waste, soil,
- clean air,
- noise reduction and
- saving energy.

Regarding Central and Eastern Europe it is worth taking into the development of sectors today into consideration. Examining the areas, the sectors of water, sewage and sewage sludge, and waste show a significant increase. The value of saving energy is raising in the Eastern European region. However, it seems that there is still no serious improvement in noise reduction and in noise protection. The result of the last decades proves that development of the environmental market was a motivating factor for the countries that wanted to join the EU, while in case of the others these processes are very slow. In spite of this, allowing for the periods of recession in the developed countries, there is only one way for the countries of the region in connection with environmental protection they have to follow, and it is the long-term growth.

The other characteristics of the environmental market is the **state guarantee**, when the state with its direct or indirect interference has a great impact on the dynamics of development. In a legislative role, it directly influences the market, being the most prominent investor in environmental protection. In its indirect role, it can encourage other actors in the economy to carry out environmentally conscious activities through subsidies. The role of the state varies by groups of countries, by countries, even, in certain cases, by regions, however, the importance of its role cannot be questionable. It can be effective if its environmental policy is based on both pillars.

There is a prominent role and responsibility in the purposeful management of the problems of complex regions, for example with the support of local governments in this direction, but this can include the promotion of selective waste collection, the solid waste disposal program or the rehabilitation of the environmental status of the former military objects.

Comparing the environmental costs of developed countries, the above statements are confirmed. Papp, Sándor [2000] reinforces this opinion in his article “Environment and future visions”, while earlier “a definite future was outlined (deterministic picture), and nowadays more and more elements of the vision are only probable (stochastic), and even more often the reference to unpredictable

factors (chaotic processes) is becoming more common.

The state, as the largest buyer, as the maker of macroeconomic processes, through its power can do much to form and develop the environmental market in the countries of Central and Eastern Europe. Its most important tasks include regulations and orientation. As a result, the positive externalities of environmental protection can be recognised, so the attitude to environmental market in Central and Eastern Europe changes in a beneficial way.



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Questions to check understanding

1. What is the long-term growth pressure of the environmental market?
2. What does the state guarantee of environmental market mean?
3. What roles does the state have in development of environmental processes?

6. Characteristics of the environmental market – internalisation, production-service concentration

In Central and Eastern European countries concentration of environmental industry and service sector is small comparing founder European Commission countries. It is displayed as a counter-pole the role of a multinational companies, in less developed countries earning extra profit.

Development of products and technologies require special knowledge, relatively higher costs and time, therefore not a surprising share of some countries on the world market of environmental technology. In 1997 it was published, according to data between 1990 and 1996 Germany, Japan and United States of America shared between 53,4% and 57,1% shares in value. (Valkó L. [1997]) Likely, that these countries have an international market activity – according to demand - they are able to change with great flexibility, whereas their shareholding remains significant. Taking into account the geographical location of the countries a relatively balanced continent three-pose can be seen. Shows the degree of concentration, about 10% of companies make about half of the whole market trade. It also means, that about 100 million EUR annual turnover and high concentration of cooperation or maybe the creation of a strategic alliance can keep small businesses alive. Based on German data for 1995, but from 7500 operating enterprises in 1996 800 disappeared, in the same time 300 new companies engaged in environmental activities started its operation. Remarkable, enterprises doing environmental activities' exportintensity was 21%, which was double of average of Germany in 1992. Characteristic of the potential of the German environmental industry, despite this German environmental industry produces just 20% export of it, comparing it the total industry average was 27%, and 9% of enterprises can be seen export intensive. Eastern Europe is just a market, out of production. An example is the export of Austrian environmental industry, based on data from recent years, 39% of all EU countries (compared to 63% of total exports), it is important to mention, that Eastern Europe ranks second in environmental exports, its ration 9,2%. The forecasts indicate an increase in total volume, in addition to the decline in EU share. (Kiss K. [2000])

In Austria, in 1997 315 enterprises were on the environmental market. Production value was 34 billion schillings, 20 billion were export. This sector had 15 thousand employees. End of pipe technologies represented 44%, and intensive, cleaner production's

equipments shared about 50%. It is very low of measurement, analyst and control-technology, just 6% ratio. Employers in environmental industry follow ratio of product and services. In professional proportions 27,9% was the waste management., 26,3% was air cleaning protection, 20,8% was energy sector. These areas were all together 75%, so technologies joining other technologies all 25% remains. After Central and Eastern European countries European Union joins started a type of restructuring, so much capital flows up to now, territorial expansion looks, but capital remains concentrated in some economic leading countries.

It was calculated on the basis of per capita production value, which is a productivity indicator in environmental industry higher than generally in the industry. In Austria, in 1997 it was 2,5 million schilling/person/year, while the industrial average was 2,3 million schilling/person/year. In the sense of the size of businesses the smaller ones reached higher relative values in the specific indicators above.

Examining the same way **per person employed weighted market value** the highest is in the sector of measuring, analyzing and regulating techniques (2,6 million schilling/person/year was in 1997). After it 2,3 million schilling/person/year values by cleaner technology producers, and providing a post-treatment technique with 2,1 million schilling/person/year values.

The trends regarding the increase in the number of employees in cleaner technologies, expected production areas and equipment used in the monitoring area, with 5,6% yearly. It is likely that its growing trend is likely to be (4.8%) for post-production companies. The most intense increase in ex-post technology growth in trade is expected to be 7%, this is followed by a 5% increase in the distribution of cleaner technologies and retrofitting. (Kiss K. [2000])

It is worth examining Austria's position on the border of Central and Eastern Europe. Austria has achieved relatively higher results in the international market for environmental technology than in total turnover.

It is undeniable that the United States is leading the list of exporting countries. The demand for the environmental technology market is largely a corporate investment, within it is an industrial enterprise in billion euro order of magnitude. Municipal investment has also been worth billions of euros over the past decade, 1.1 billion of these were made by households. Discharge-neutralization was the most significant in the performance of environmental services. The growing field of expertise is

eco-consulting, which is also close to billionaire, which is significant for environmental market performance.

The strengthening of international relations is already observed between the developed world and the countries of Central and Eastern Europe. (Valkó L. [1998])

It can be predicted that in the environmental industry - internationally - the concentration process can be further strengthened, mainly in waste management, energy environmental technology, water management and recycling. In these areas, the literature cites an experiential critical turnover volume in euro, Hungarian companies do not even reach HUF in terms of annual turnover, so, despite significant improvements, there is always a lot of backlog. (Zsótér B. – Schmidt A. – Trandafir N [2014])

Several decades of research have been confirmed (Pálvölgyi I-né [1995], [1996]), that stricter environmental regulation for the sectors requires techniques, technologies to operate, which can only be realized by strong companies. A representative example of this is incineration, for which growth and concentration are combined.

Environmental industry in Central and Eastern Europe, **small and medium enterprises** are trying to find their place - especially in analytics, laboratory technology and other special fields. Lucky cooperation could develop if large international companies would choose suppliers from small and medium-sized enterprises, thereby strengthening the region's economy.

Developing and manufacturing integrated environmental techniques in Central and Eastern Europe is relatively rudimentary. The lucky realization of this is the project-centered cooperation of the stakeholders, which is also referred to in the following example.

With the support of the World Bank, it places great emphasis on combating climate change. Hungary has also signed the Kyoto Convention (1998), this has declared the need for a change in mindset. Hungary has requested assistance from Austrian experts to develop its national strategy. The task is also important from the Austrian point of view, since the 6% reduction in gas emissions is a product of Austria's export of product and know-how, and can open other markets in Central and Eastern Europe. (Farnleitner, D. [1999])

In the area of environmental market building, the European Union's associated member states can play a kind of missionary role, can be a bridge to the countries of Eastern Europe. In these relationships, regions play a key role. There are some examples of cross-border cooperation (Visegrád countries,



Carpathians-EuroRegion, Alps-Adria or Vojvodina, Transylvania and South-East Hungary in alliance of interests).



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Questions to check understanding

1. How does environmental market become international?
2. Present the leader role of Austria in environmental market!
3. What can be the role of small and medium enterprises in environmental market?

7. Characteristics of the environmental market – the role of the environment protection in security policy

The issue of environmental protection **has risen internationally to the rank of security policy**. According to some experts, it is much more complicated than armament or disarmament, but as the practice shows, in emergency situations the parties involved are ready to negotiate and to find solution.

Based on research results, it can be concluded (Kerekes S. – Rondinelli, D. Vastag Gy. [1995]) that there is a relatively strong relationship between the environmental risks of businesses and the practical implementation of the operation of their environmental management. For the company it is advisable to follow a preventive strategy. Depending on the character of its production or service, there is a huge difference between the elements it has to deal with (eg. reduction works, chemical works or ceramic industry). In Central and Eastern Europe there is a relatively small number of businesses which – when forming their product policy – put the emphasis not only on the compliance with the existing regulations, though by doing it they realize really valuable steps in security policy, but they set a good example with their innovative activities in the field of environmental awareness. This kind of attitude would be desirable from a number of points of view, as the consequences of a disaster can be corrected at a much higher cost, if at all possible, and often its outcome cannot be precisely defined, especially in the long run.

The existential security of corporate executives is increasingly linked to whether the company responds adequately to the environmental challenge. We can experience in certain cases that managers oversecure themselves. The background to this is "very often not the recognition of the environmental problem and the pursuit of a real solution, but the need to transfer legal responsibility". (Kerekes S-Rondinelle, D, - Thick Gy. [1995])

Number of environmental disasters shows that the environmental protection exceeds the threshold of response in action only after that the pollution has taken place. Forests in the Czech Republic, the pollution of the river Rhine, Bhopal, Chernobyl, Apajpuszta, cyanide pollution in the rivers Szamos and Tisza etc. all prove this. This situation requires the recognition in environmental protection that sometimes it is possible to achieve quick and effective results with regional, or international agreements of global scope, while in some cases with specific tasks of limited perspectives that focus on the given area.

The other prominent aspect in this issue is the inter-, and multidisciplinary. The literature calls the attention to it several times. "This topic is: the risks of modern life and the chances to remove them." As the topic is very broad (Kollár L. [1999]), it only deals with risks to human health and physical integrity. It calls the attention to that non-professionals and

often even professionals tend to believe that everything can be calculated with full certainty at this development level of technology. At the same time people have the fear of the unpredictable events.

There are researchers who point out that “eco-globalism” is not a viable option (Regenwalder, B. [1998]), so instead, they prefer local solutions. Others are of that opinion that it has to be asked who is involved, who benefits. (Ritt, T. [1998]) The author refers to the effect of distribution of environmental taxes. I think neither of these extreme solutions can be efficient and effective, an appropriate combination must be applied for the given place and situation. Today, in Central and Eastern Europe the recognised positive externalities of environmental protection often structure legislation, regional developments and other innovative processes, though its rate is much lower than in more developed countries.

The solutions applied in the field of disaster prevention were mainly developed for ecological disasters, mostly in connection with soil pollution. Processes to clean polluted soil are relatively underdeveloped in Europe, with the exception of Germany. However, this field is developed in America and Australia. In the future the application of biological methods can substitute present technologies. On the medium and long run, OECD surveys show a slight increase in this area. (Szlavik J. - Valko L. [1997-B])

Global threat is a **catalyst which stimulates** for communication and action. In case of the greenhouse-effect, pollution of seas, the hole in the ozone layer, desertification, the global lack of sweet water etc., the source of damage cannot be defined clearly, they are the common result and legacy of human activities altogether. However, we have to be careful this attribute “common”, since it cannot mean that only others have the responsibility, or have to take steps in this field. A part of the specialized literature points out that environmental protection, being so complex, has to become a strategic element of the international security policy. Following this train of thoughts, it can be concluded that the issue of environmental protection is not the duty of the Great Powers only but also it gives tasks for medium and small countries. It can be observed that the previously mentioned effects of global, large and micro-regions have different effects on the developed and less developed countries. The developing, catching-up Central and Eastern European countries are particularly vulnerable because of their limited economic potential, and environmental damages can further aggravate their other economic problems. The most striking example is the combination of indebtedness and environmental problems, which puts a strain on the country concerned, hindering international cooperation and inflows of working capital.

Special attention should be paid to operating nuclear power plants (Lohmeyer, M. [1998]) and their waste, which in the countries of Central and Eastern Europe typically represent an older, lower technological standard.

In the past few years we have met the attitude as a result of which for countries located on the two sides of different conflicting zones, the environmental

problems and rehabilitation of the less developed one are stimulated by the increased role of the developed one. Due to the disparity in environmental quality and chances of protection between Austria and its Eastern neighbours, the cross-border small regional investments bring larger benefits for the less developed area, as compared to their effects on the developed area, and have a positive impact on the region as a whole. According to some researches, the joint economic and ecological benefit of the international environmental investments of Austria can be up to three times as if it were invested in Austria.

This effect on foreign and security policy in connection with environmental protection can be considered relatively new. A significant proportion of aiding-crediting is replaced by technical-economic cooperation in Central and Eastern European countries. It is often said that developed countries often relocate, export their technology that is still usable, but not always modern, to the underdeveloped East, which can be seen as environmental colonization and colonialism. Still, the receiving countries accept this, since a more developed technology can be brought to the area this way. The frequency of this ambiguous situation can be reduced by a rational self-control on behalf of the developed region. Others dispute this view, considering international relations disturbing, humiliating and unfounded.

Another component of security policy is formation and retention of trust. For this, it is indispensable to have fair communication, acceptance of the opinions and experiences of other professionals. The regrettable but current test of this was the failure in spring 2003 at the Paks Nuclear Power Plant. With the combined expertise of an international team of experts, they worked to bring the situation to its working state as quickly as possible, and at the same time safely.

In general, it is both a chance and an urging requirement for the countries of Central and Eastern Europe. It is desirable to form and implement a kind of environmental values and strategy. The example of the government is desirable in terms of responsibility and sacrifice, as it is an important component of the common future of the region.



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Questions to check understanding

1. What does the part of environmental protection in security policy mean?
2. Which catalizator of environmental market can be named in connection with security?
3. How do environmental policy, security and trust interrelate in Central and Eastern Europe?

8. Characteristics of the environmental market – its role in labour market

Due to the recognised positive externalities of environmental protection, perception of environmental market in Central and Eastern Europe is changing to a favourable direction, its dynamic effect on labour market can be observed.

Increase in the volume of environmental market has a significant effect on the labour market and regional development. In the OECD countries the environmental industry had a share of 0,5-1% (companies of purely environment-profile) in the total employment in 1992 (Szlávik J. – Valkó L. [1997-A]). The environmental market shows a more intensive growth than other fields of economy, so this rate has multiplied in the more developed regions since then.

When analyzing the effect of the environmental protection on the labour market the following **four areas** have an especially important part:

- environmental legislation reflecting political commitment,
- market forces,
- self-regulatory mechanisms and
- the power of publicity on these previous ones.

In the European Union the issue of environmental protection is having more and more importance. The traditional fields are gradually including environmental protection, like water and waste management. In ranges of action generated by the current social- and environmental policy reduction of harmful emissions and organic farming can be accentuated. Jobs and professions (that of counselling, services to inform customers, etc.) organized on tasks induced by the market demand are getting more and more significant. Surveys show that in the EU, based on data from 2000, environmental protection accounts for 3.5 million jobs, of which about 2 million people work in the field of development of environmentally friendly technologies, renewable energy, or work with waste recycling and nature protection. The remaining 1.5 million jobs can be found in other fields of environmental industry. (Kiss K. [2000])

Integration of environmental protection into economic processes gives new stimulus to reduce problems in the society through its effect on the labour market. It has been the issue of debates since the start of the environmental industry's independence process whether the environmental protection has a positive or negative impact on closing down or creating jobs.

Both points of view can be either supported or challenged, however, in case of consistently planned and implemented environmental programs both effects have to be taken into account. The decisive question, however, is the balance of opposing processes. It is worth examining what the employee gains from the environmentally-conscious business

behaviour as a positive externality. I can say that things which are beneficial for the employer, too. A kind of a greater satisfaction and motivation for environmental protection or a reduction in workplace accidents, less sick pay are all in line with companies' approach to modern operations.

The environmental programs of developed countries are primarily implemented in environmental policies at regional and national levels which appear as a positive by-product of stricter measures. In Central and Eastern Europe this model has been realized in an initial form or it is still have to be waited for. On the other hand, when planning the employment policy the environmental protection is the first one among the opportunities to create jobs the cost claims of which is not higher than the ones of programs with similar goals implemented in other fields. Austrian and German researchers called the attention to that environmental protection can take especially important part because of its labour force – intensive nature. Experts point out that waste management, water management, programs for conservation of natural habitats and rehabilitation tasks in polluted areas have a significant effect on creating jobs. Unanimous opinions can be read about that jobs related to environmental protection imply permanent employment. There is still a serious reserve against this argument in several areas of Central and Eastern Europe.

In Germany, based on data from 1997, 2,7% of the population capable of earning their living work at a place which is related to environmental protection. It is pointed out that the effect of 1% export of environmental goods on labour market implies creation of 1500-2000 new jobs in Germany. Austrian researchers (Getzner, M. [2001]) assessed what the increase of environmental protection gives for employees. On the basis of a survey carried out on the most important quality impacts of integrated environmental measures, 61% of them expect satisfaction of higher volume and motivation, 53,7% improvement in noise conditions, mostly at workplaces, 36,6% reduction in risks of accidents at workplaces, 29,3% less emission of harmful substances at workplaces, and 12,2% less days spent on sick leave.

Actions taken by Austria in this field are exemplary. A further significant employment impact is expected from the technology development program to reduce carbon dioxide emissions. This project, which includes 34 measures, ensures responsibilities accepted in Treaty of Turin, also, as a positive result, it creates 12 thousand long-term jobs. No other similar example to create seasonal jobs can be found in the countries of the examined region.

The German Institute for Economic Research conducted a survey in 1990 to identify the number of people employed in environmental protection in the Federal Republic of Germany without the new regions. Based on data of that time, they defined this value as 550.000 people to which they added 131.000 people from the new regions. This number represented 1,9% of the employed the 76% of whom satisfied the German domestic demand. Due to the fact that the

environmental market is getting more export-intensive, this rate has decreased. The dynamism of the field was demonstrated by the fact that jobs of about 120,000 people were created in the decade preceding the examined date. (Kaiser, H. [1997])

In 1994 four institutions for economy research repeated this survey in a common research. (Ritt, T. [2001]) Based on the data, the environmental sector gives employment for the 2,7% of the employees. It is 650 thousand people in the Western regions, which means 2,3%, while it is 300 thousand people in the Eastern regions, so the environmental industry represents a share of 4,7%. It is noteworthy that nearly 40% of those employed in the environmental sector in less developed Eastern regions are engaged in environmental tasks related to rehabilitation and restructuring. 53% of them perform so-called direct environmental tasks, while 47% produce products for the environmental market.

The authors of the study estimated the number of those employed in environmental protection by the turn of the millennium. According to their calculations, the total number is 1.1 million in Germany, 785.000 in the Western and 340.000 in the Eastern regions. The trend showed an increase, but it did not reach the expected rate. There have been doubts in connection with the job creating force of environmental protection (Zwölfer, R. [1997], Burger, C. [1998]), though more and more experts support its positive effect.

In the case of labor market effects, it is wrong to calculate only with the gross values as the stricter, though indisputably forward-looking legislative and market-conform environment can limit certain businesses to the extent that they cannot continue their activities. This situation may result in closing down workplaces, that is why it is necessary to point out that consequences can be drawn only from the balance.

Hungary belongs to the top-ranking countries in the examined area. On the basis of a research (Kiss K. [2000]), experts of the Institution for Environmental Management (KGI) drew the conclusion that the number of companies of significant environmental users in Hungary was around 2,500, and they employed at least 4,000 independent environmental experts. The number of people working in the environmental industry and services is estimated to 1,500. Altogether it involves about 5,500 employees. If we consider only the countries joining the EU (Analysis of the EU Eco-Industries... [2002]) the number of workers engaged with direct environmental protection is huge. 770,000 work in pollution management, 460,000 in direct operation and 310,000 in investments. Regarding sectorial distribution, 50% work with waste and 25% with sewage-water. In addition to Hungary, Poland and the Czech Republic should be highlighted.

However, I concluded from my researches that the job creating potentials of the environmental protection has not been recognised in the countries of Central and Eastern Europe. The more active involvement of governments, due



to the compelling effect of EU directives, seems to be realized, but at the moment the fulfillment of minimum requirements is given priority over prevention, long-term thinking.



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Questions to check understanding

1. What effects does environmental protection have on the labour market?
2. What model can be adopted from Western Europe in order to increase the number of people employed in environmental protection?
3. What results can be enumerated in Hungary?

9. Characteristics of the environmental market – economy rationalising effect

Environmental activities **cannot be included in any classical sectors of the economy**. In some areas dynamic development can be expected the heart of which is the rationalising mechanism of the economy. Environmental market analysts point out that EU and national government determination also provides companies with a positive opportunity to deliver the expected environmental performance. If the legal regulation and the inspiring, motivating market background are presented, a 'win-win' situation can be formed which is beneficial for both the national economy and the wider region, as well.

From the point of view of the economy reaction, it is worth examining the acceptance of the application of additive and integrated environmental techniques and the extent of the burden and the commitment related to feasibility.

“On one hand, there is a claim to internalize harmful environmental externalities, as an organizing principle of consequent environmental policies, on the other hand, environmental regulation cannot lack the combination of “whip and carrot.” (Valkó L. [1994]) In this way, the idea of companies specialized in the environmental market and that of the government engaged in the harmonization of their environmental interests overlap.

The goal of the environmental policy is clear since the efficient prevention cannot be substituted by any other subsequent compensating, restoring technology. However, the role of the additive environmental technique is indisputable in the economy. Its processes, measures are well-defined and described. Their most important characteristic feature is that they are attached to the production processes supplementing it, but they do not cause any important changes in the main process, thus reducing the residues of products and processes, which burden the environment, or releasing the materials in a less damaging form which is easier to control. The typical forms include filters, flue gas cleaning processes, catalysts, and so on.

In the absence of motivation, the economic sphere only shows willingness to use it if it is required by law or the society puts pressure on the emitter. The counterarguments of the companies include the fact that the equipments mounted subsequently or as an accessory appear as an investment item, and their operation also means a cost that has to be incorporated into the price in some form. (Zsótér B. – Császár V. [2013]) This opinion is typical to Central and Eastern Europe, and the market does not always accept it, so the company which undertakes more protection than what is compulsory can find itself less competitive. I would like to note that this corporate fear is exaggerative, in most cases the specific plus cost ratio is not as much as it is predicted. Other companies in the market generally take the necessary environmental measures because these are compulsory for them, also their

reputation can become unfavourable compared to their rivals. Examining the processes from a different aspect, solutions which exploit and load the environment less imply reduction of costs in the fields of the use of materials and energy, waste management etc., so they are appealing for the companies. It is necessary to size up the situation when making decisions, the impetuous manager attitude, which sees only the expenses, can cause real loss for the business.

In case of **integrated environmental techniques**, it is an essential requirement to eliminate or to reduce the drawbacks of additive techniques. (Wolf A. [1996]) The definition of the integrated environmental techniques is being formed, however, some of its features or criteria can be regarded as uniform. The problem can also be investigated from a production-integrated and product-integrated side, but in both cases the following are formulated:

- transition to production processes that need less energy and financial sources,
- more economical energy management due to the use of waste heat,
- primary recycling and the regulated implementation of material flow within the process,
- reduction of residues, possibilities for further utilization,
- substitution of environmentally harmful substances with less polluting ones,
- exchange processes with ones that burden the environment less,
- encouraging re-use and further utilization.

Disregarding geographical areas it is true that the purchase of intensive techniques usually needs more resources than the one of additive techniques. It relatively rarely happens that an investment of such an extent is realized purely for environmental reasons. However, it has to be added that development of the environmental industry, its innovative force imply such a positive effect that – built in the new technique or technology – involves environmentally friendly solutions, thus bringing about advantages in the competition. The additive and integrated techniques are not alternatives for each other. When optimizing the processes and the products ecologically in most cases only the joint application of these two solutions can be effective. The technical-technological background behind these two concepts appears as a paradigm shift in environmental engineering in the countries of the region under review. Now, we are witnessing the shift from the attitude concentrating on waste to the resource-oriented view. Its intensity and development level vary from region to region.

Introduction of new techniques and technologies involves a lot of transition costs for the companies, which most often include license fees, research and development expenditures, the cost of obtaining information. A number of material and energy rationalization programs can be implemented through central support. Their authorization procedures are also simpler, as they are standard techniques that has already introduced somewhere else. In contrast, the integrated techniques require significant resources since they are not about simply mounting a supplementary part but a radically new technique or technology.

The other cost element that appears is a set of adaptation and conversion costs. Examples include the cost of education, which depends on the difference between the existing technology and the new technology. If the new technology changes the production processes significantly, its adaptation to the old technology (eg. elimination of the bottleneck, application of a new inventory method), changes in certain basic materials or semi-finished products, or perhaps the appearance of new waste puts the business in a new situation.

The risk of the integrated environmental technique, technology to be introduced is higher since it is not a proven equipment or method. The “teething troubles” of the equipment and the probability of its failure are less known, therefore the risk of loss of production has to be taken into account as the production and service process also stops when the integrated technology stops. Due to the doubts that have arisen, the ability to receive integrated techniques is often low and companies should be encouraged by reference projects and funding.

It is also worth considering how long a process or product introduced for environmental protection purposes can be considered as that one. As an example, I refer to unleaded petrol, which has been introduced as an environmentally friendly version. Today, in Hungary only unleaded petrol is sold so this product has been taken into the category of common goods. A new question is whether it has to be taken into account when considering the elements of the environmental market.

I have already referred to the fact that in some cases **the efficiency of cross-border environmental investments** may be higher for both the investment site and the investing country. I will explain this in the following section, so we should talk about regional disparities, conflict zones.

The literature closely follows the modified or new market opportunities resulting from the interregionalization and globalization of environmental issues. The process of internationalization can be observed in case of environmental programs too, while in implementation, in addition to the development of tools, the importance of the role of financial funds that encourage the introduction of a technology is increasing, as a result, the weight of cleaning and control tasks is transferred to prevention. It can be realized to a different extent in case of countries with different levels of development, since shift to a relatively modern technology from an old one is a great advance – mostly in Eastern Europe –, however, the developed world appreciates only “the future technology”. As a result, formation of the environmental market structure in Eastern Europe and in some countries of Central Europe will be similar to the earlier structure of the European Union, while in the developed world there is a kind of restructuring towards integrated, intensive solutions. At the borders of the regions, we often find different indicators, measurement technologies, significant attitudinal differences (eg. Finland and Russia), but especially for smaller countries, the only sustainable solution is to reduce the differences and to develop harmonized

common development solutions by this. In the transforming countries of Central and Eastern Europe the process of eliminating conflicts between the short-term interests of the economy and the long-term interests of the environment has already started, of course, with different intensity and methods per country.

It is desirable to develop a vision in which different regions with different socio-economic backgrounds do not develop as subordinates to each other, but in an intensive division of labour, that is, in harmony with each other. Territorial inequalities are diminishing, regions and countries are the main drivers of development, creating the opportunity to catch up with the European integration processes in close cooperation with cross-border regions and encouraging their involvement in the circulation of pan-European cooperation. In this, the conflict zones with the countries with significantly different levels of development play a prominent role.

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Questions to check understanding

1. Explain the economy rationalizing effect of the environmental market!
2. How can the economic sphere be motivated for environmental consciousness?
3. What does the use of integrated environmental techniques mean?
4. Why can cross-border environmental investments be useful?

10. Dynamizing factors of the environmental market – direct involvement of the state and legal and economic regulation of the environmental market

In the previous chapters I described the most important characteristics of the environmental market. We can read in numerous publications and studies about the dynamism that characterizes the environmental performance of the developed countries. The terms and conditions of the interpretation of the environmental market as an independent economic sector were formulated together with some characteristic features that distinguish it from the development of other markets and the movements there. In this chapter I am introducing its major dynamizing factors in which the developed countries have achieved serious results so the opportunity to adapt them is given.

Regarding the environmental market **some basic components** have to be mentioned that have an impact on its dynamism:

- it is one of the economy sectors that produces the fastest increase,
- the motivating effect of innovation is outstanding,
- it has significant external effects on other sectors and consumers too,
- its products and structure are mainly influenced by the political willingness and state involvement.

It can be stated that this market is relatively full in the developed countries, while the countries of Asia, South-America and Central and Eastern Europe can be considered the important receiving markets in the future. Here, the most frequent fields are the water and sewage-water treatment, also waste management. Mechanisms of financial support provided by the developed countries and international organizations (they return more efficiently for the investing country, too, than the same investment in its own territory) have a great part to exploit this market potential, depending on the economic development of the countries in the Eastern European region and the acceptance there. (Zsótér B. – Tóth A. [2014])

In less developed countries private businesses still do not take an important part in quick formation of the environmental market and its efficient operation. There are two factors that fundamentally limit the extent of their involvement. The first one is the lack of capital and the lack of developed environmental market mechanisms. The capital prefers investments with quick return (environmental investments are usually not like that), so they tend to reduce investments of this kind. (Pausits Attila [2001]) The other reason is the absence of companies, service providers with appropriate experience, experts and technologies in the field of environmental protection. That is why it can happen that even if there is some resource to solve a problem, they have to find a foreign company that works much more expensively.

In this chapter we always have to keep in mind that Central and Eastern Europe has a different culture, historical background, heritage and mentality. The general context of the environmental market cannot be regarded as evident, and in the transition countries of Central and Eastern Europe, the process of eliminating the contradictions between the short-term and long-term interests of the economy (of course, with different intensity and methods per country) has begun.

In this present state, the sector in Central and Eastern Europe is not suitable to satisfy the environmental needs to a greater extent and more efficiently, and having it as a basis it cannot enter new markets in Central and Eastern Europe.

In the same region, it can be seen as danger that, **due to the underdevelopment of the environmental industry**, compliance with increasingly stringent regulations and needs is primarily a demand for the economies of developed countries. This means that the interests of the national economy are less than expected.

The direct involvement of the state is very important. The development of a market economy, the existence of market conditions alone and automatically do not solve the environmental problems; state interventions are not indispensable.

The state activity and involvement has an important effect on the environmental protection, also on businesses and institutions that are engaged with development and production of environmental techniques or with providing environmental services. Due to the market feature, supports of smaller volume are more typical which are rarely supplemented with orders of a larger volume. This situation requires huge flexibility and considerably solid capital from the businesses, that is why a large part of them cannot preserve their competitiveness in the changing market. From the demand side, legal regulations and the law-abiding behaviour of businesses can be regarded as motivating factors, also the combination of the suction, inhibition and flow mechanism that can move the situation away from the deadlock. The condition of its operation is that it can influence the entire economy beyond itself, including social processes, as well. According to the terminology, inhibition means that materials, energy, products should be prevented from leaving production and consumption processes too early. It has to be realized within rational limits. Regulations help suction and flow to channel the generated side-product, waste out of the system, not allowing them to remain uncontrolled or to accumulate in an environment damaging way. Further utilization, waste collection, management and disposal play important roles in this process. Most of the processes have a regional effect, so the role of co-operation is getting more and more significant. Only a part of the activities can be carried out on purely market basis, in other cases the key to success and efficient solutions is the extent of involvement of the state or the local authority. There are a lot of good and unacceptable examples for it in Central and Eastern Europe. For example, efforts of Austria prove that there can be results in areas – meaning collection of paper waste, its utilization as a secondary raw material, etc.- that are

not efficient in other countries, mostly in Eastern Europe.

Due to recognized positive externalities of the environmental protection, judgment of the environmental market in Central and Eastern Europe has changed into a favourable direction, its dynamizing effect can be felt in legislation, regional developments, in the labour market and in other innovative processes.

The above is supported by a study of Tübingen (Valkó L. [1998]), which estimates that 45% of Western European environmental technology companies survive 5 years and only 35% will stay on their feet after ten years. They also state that the condition of survival is that the enterprise can encompass the entire market vertical from design, analysis, consulting, execution, operation, servicing to aftercare. The business risk of dealing with only one activity is relatively high. The position and the long-term existence of service providers, which mean oversupply, in the environmental market are of higher risk than businesses presenting intensive environmental techniques or technologies. The condition of survival is the adaptation to the regional and local conditions in which the role of eco-marketing is outstanding. In this context, the importance of state involvement and the stimulating effect of measures to trigger demand are also formulated. There are regional programs not only in the European Union but in the conflict zones, including the borders of Central and Eastern Europe. The regional attitude is supported by the fact that the countries of Eastern Europe, especially the pre-accession countries, are trying to develop their national environmental policies, their environmental economics and their development programs at a high speed, as their backwardness is significant.

Figure 2

The thematic action programs of NEP-II. and its cost claims (draft) (2002)

Name of	1	The total cost of the period 2003-2008 from central budget		
		% (mFt)	(mFt)	
1. Urban environmental quality		1.626.561	900.647	29,3%
2. Protection of our waters and their sustainable use		1.095.875	680.100	19,7%
3. Climate change		961.273	262.575	17,3%
4. Environmental health and food security		682.273	386.757	12,3%
5. Quality and use of the rural area		541.752	245.046	9,7%
6. Waste management		363.000	94.817	6,5%
7. Biological diversity and landscape protection		181.166	106.706	3,3%
8. Environment security		64.527	61.677	1,2%
9. Raising environmental awareness		40.577	32.612	0,7%
Alltogether:		5.556.820	2.770.937	100,0%

Source: NEP-II. and its cost claims (2002)

Hungary compiled a thematic action program and planned its cost claims in the National Environmental Program-II that shows the state of that time (Figure 2) on the basis of which the harmful effects of urbanization and water protection require most of the costs. These two problematic areas are typical to the Central and

Eastern European countries. The technical-technological side of the solution is given, what hinder its implementation is the lack of sources.

It is worth seeing that what resources Hungary – as a pre-accession country that time – planned to realize its expenses. I think the proportions were similar in the other pre-accession countries, too. The situation is completely different in case of other countries since the rate of the EU-funds is considerably smaller. The rate of sources from the central and local council budgets exceeded 60%, the EU contributed with 13,9% and then came the most problematic own share. (Weiterhin großer Nachholbedarf [2003]) In case of countries that have not joined the EU, today the structure shows similar proportions and problems.

The **frequently typical** 50% of governmental source rate and 10,2% local council rate together show the importance of the state involvement. Interestingly, the prognosis, which also gives equal opportunities to small, medium and large enterprises, seems to be contradictory to the one described above. My assumptions are supported by the available data and ratios. In case of Hungary, in addition to the values projected to the GDP in the period of accession to the European Union, the framework for spending on environmental protection increased and then reached a balanced level. Though it is the case only one country but its structure can be seen as desirable. Water and wastewater issues are a major problem when examining the division of the backward sector. For Hungary, information on proportions can be obtained from the Environmental Development Plan. Other issues have to be considered too but Hungary has to solve this urgent problem (related to sewage-waters) by 2025 in compliance with the regulations of the European Union. There is a debate about its realizability, but I believe that it can be realized. Other countries in the region are also struggling with this problem, but everybody can see that our long-term future can be jeopardized by postponing the task.

Here, I also state that, in addition to the role of national governments, the role of larger regional (here the EU) governments should be increasingly determined in order to achieve a common, effective goal.

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Questions to check understanding

1. What factors have an effect on the dynamism of the environmental market?
2. What dangers can be mentioned in the countries of Central and Easter Europe?
3. What resources can be used to finance environmental investments?

11. Dynamizing factors of the environmental market – the involvement of the financial sector, the corporate environmental management of the company, and the environmental activity of the population

The specialized literature mentions eco-banks that have been elaborated only theoretically so far. In practice co-operation between the industry and certain banks, spread of referential projects are less typical to the Central and Eastern European region. The possibility of receiving foreign preferential loans and their availability can be a catalyst for future cooperation. This process is supported by the above-mentioned fact that regarding its environmental effect, the capital invested in the less developed region shows a more efficient return than the one invested in a developed region, also due to the geo-political position it has a beneficial effect on the environmental conditions of more developed countries.

The following example is remarkable. Reduction of the sulphuric content of diesel fuel from 0,3% to 0,2% can result in a profit/cost ratio of 14,3-20 at the national economy level. The spread of vehicles with regulated catalysts ranges to cost/benefit ratio of 1,2-3,3, and the development of noise reduction solutions for cars is 1.6 times, while the noise reduction pathway solution can achieve up to 3 times the profit/cost ratio. The study sees these values especially realistic for countries starting from a relatively low level of development, like the Eastern European countries, for example. The same article points out that in Austria or in the Federal Republic of Germany a 50% increase in environmental costs would increase corporate costs to a lesser extent than a 2.5% increase in wage costs along with contributions, as savings achieved through environmental investments can reach 35%.

A special area of capital import is the establishment of environmental institutions, the environmental industry. Having known the success achieved in the developed countries, it is getting more important role in the field of intensive environmental protection. This interest is remarkable with regard to the development of the region which has to be taken into consideration by the involved countries building it into their economic policy.

Banks generally strive to provide as much credit as possible because of the fact that the evaluation, and thus the associated costs, may be smaller. Small and medium enterprises are often undercapitalized so it often happens that they are excluded from the money market as the amount disbursed is usually capped at % of the company's equity. Because of the recognized positive externalities of the environmental protection the attitude towards environmental market in Central and Eastern Europe is changing to a favourable direction, its dynamic effect can be felt in the legislation, in regional developments, in the labour market and in other innovative processes.

Several Central and Eastern European banks have loans aimed at promoting environmental investments. Loans are granted for the development, production, manufacture of products, components and their parts that meet international technical quality standards, for the adaptation of modern technological processes, for industrial restructuring, for environmental energy rationalization projects and for the reorganization of enterprises. Figure 3 shows the invested amounts by countries. It can be seen that investments are approximately half of the amounts which refers to that the increase of the market and the new investments are significant, on one hand, and the existing stock is small, on the other hand. In the present case, I disregard the analysis of the specific cost of operation compared to what can be called effective.

Figure 3
Pollution management – capital and operation cost in countries before accession

Source: Analysis of the Size ... ECOTEC [2002]

Country	capital	operation	altogether	capital	operation
	flow	flow	flow	market distribution	market distribution
	M euro	m euro	m euro	%	%
(Bulgaria)	50	150	200	25%	75%
Cyprus	60	60	120	50%	50%
the Czech Republic	650	600	1 250	52%	48%
Estonia	30	20	50	60%	40%
Hungary	400	580	980	41%	59%
Latvia	60	90	150	40%	60%
Lithuania	20	30	50	40%	60%
Malta	40	50	90	44%	56%
Poland	2 020	1 820	3 840	53%	47%
(Romania)	130	310	440	30%	70%
Slovakia	290	140	430	67%	33%
Slovenia	50	40	90	56%	44%
(Turkey)	990	1 610	2 600	38%	62%
Altogether	4 790	5 500	10 290	47%	53%

Source: on the bas of country pages ECOTEC (2002)

The applicant is asked to provide a statement of environmental impacts in their current activity and in the project to be implemented and being harmful to the environment is a criteria for the exclusion from the credit assessment. In addition, it forms a separate part in the written opinion how much it is in compliance with the environmental rules. This way, demand for the products and services of the environmental industry is increased, also the environmental-conscious management can be strengthened in the operators of economy.

Bartha J. – Éri V. [1998] pointed out that though banks impose conditions like this,

they do not check the impact made on the environmental performance regularly.

One of the most striking features of the formation of market economy is the confrontation with the power of demand and supply, which creates economic difficulties, and sometimes crises. In order to realize crisis management efficiently it is important to ponder over ethical problems, creditors also have to take the responsibility for the risk and costs of wrong decisions.

The credit assessment process of financial institutions is not regulated by law in order to take into account the environmental impact of the loans disbursed. Laws on financial institutions and financial enterprises have aspects that include the environmental activity of the financial institutions. It can give the basis for the financial institutions to conduct an inquiry in this issue, too. Financial institutions predisposed to the environmental protection can have their own environmental policy. Information given for credit assessment is often incomplete as banks, in several cases, have a relatively limited experience in this field. I think the issue of environmental protection carries little weight in the practice of financial institutions, which proves the low level of the operation of the environmental market. It can be mentioned as a good example that in Hungary the Central Environmental Found set as an aim to develop the environmentally-friendly economy structure. In 2000, the sum of development was EUR 117 million (Biacs R. – Kiss S. [2003]). Other campaigns and actions have been or are being implemented by the Széchenyi Plan, however, we still cannot consider the environmental market strong. Foreign enterprises, mostly from Austria, Germany and France, work successfully in our country. Even if foreigners do not benefit directly from the tenders, they have a very high potential as suppliers. This situation can be generalized to the surrounding countries, too.

As I can see, the emergence of banks of Western Europe and other developed regions in Central and Eastern Europe has brought about a positive change that also affects the environmental performance of businesses. This area is very intense in development, and I cannot describe its operation and problems in details in this book because of its complexity.

The other important component is the environmental activity of the company management and the population.

The direct role of the state is indisputable but the private sector can show a significant development in several countries of the developed world. In the 80s Germany, for example, increased substantially the environmental expenditures of the private sector, which the German crediting practice helped in a unique way.

The environment-oriented behaviour of a company has not been only a question of ethics for a long time in the countries of the developed world but the market has started to show interest to it by promoting it. The appropriate action from the aspect of environmental protection can imply

advantages in expenses and in the competition as well.

The efficiency of the company management is the essential component of market demands from the point of view of enterprises, so for the demand side of the environmental market. It is worth examining what makes companies active from the aspect of environmental protection. In the European Union and in the countries of Central and Eastern Europe the emphases are very similar regarding motivation, the difference is only in the extent.

Both country groups prefer saving in costs, the efficient utilization of resources which is not so surprising as the general motivation for the competitive sphere is just like these. The category saying that customers require certification of production processes is in the second rank, behind which we can see the supplier's compliance with transports to the developed countries. However, there is a much bigger difference here and in the motivation associated with organic production between the two groups, in the Central and Eastern European countries, and in the circulation between each other, these factors play a much smaller role. New investments require new equipments, which are modern from the aspect of environmental protection in the region. The explanation for this is that they have crossed the stage of transformation, where equipment from the West (no longer modern, but economically operable) promised to be a very desirable investment. This solution is still appealing in the less developed countries. The eco-product, the ecological attraction, is about a quarter of an interesting one than in the EU. I think examination of this subject in some decades would give a very interesting and absolutely different picture of the country group in question.

In the ecological-ecosocial processes ahead, classical economic theories can only be used in a reinterpreted form. The ecologically oriented economics tries to have regard for the transformation of raw materials into consumable goods and their waste by production. As how the classical macro-economy interprets, the growth theory does not define entropy under the second law of thermodynamics, meaning that raw materials are more valuable than waste. The problem is that the environment is devalued in terms of the amount of raw materials extracted and the rate of waste. This also means that today's economic processes are viable if the energy input is less than the output due to the high entropy. Summing it up, the traditional profit rule of the economic system is nothing else than the acceleration of natural entropy processes. (Takács J. [1998]) In the present management attitude the manager who wants to comply with the usual requirements of the capital and profit is forced to cause entropically irreversible destructive effect. The contradiction is caused by the fact that the costs of environmental destruction - in the absence of regulation - do not arise directly at the originator, but often at macroeconomic level. The entropic side of our activities cannot be eliminated without the basic reinterpretation of the processes and system of the economy. It is often disregarded how environmental conditions affect the well-being of workers. It is worth seeing what disturbs workers most as it also has an economic value. Nowadays, we can obtain more information about hazardous materials, however, it can often give rise to overreaction, aversion in people. Interestingly, dust pollution is in the

midfield but not too much can be heard of it, practically. Noise is also ranked high, though it is a less frequented task to trigger changes in it. A part of the problems gets less attention than it would be reasonable, mostly in less developed countries. According to the modern attitude, development cannot be judged only by the availability of financial-economic welfare.

There is a growing need to take into account other contexts so that more and more people - financially and socially - do not become victims of rapid change in the economy and society. Depleting resources question the priority of sales promotion, so it may become a requirement to take ecological goals into account. This urges the economic sphere to exercise more self-constraint which can be the source of conflicts in the fight for more place in the market. This danger is increased in Central and Eastern Europe because of structural and political reasons.

Environmental expenditures of private enterprises have risen to almost the same level as the ones of bigger companies in many respects. These indicators could not be realized without an environmental legislation, economic regulation within a uniform framework that satisfies the requirements and safeguards consistently enforcing them. It has to be considered again that corporative environmental-consciousness cannot be carried out without support, example and role of the state. The short-term profitability requirements of enterprises – in this present economic environment – are difficult to reconcile with the long-term, overall social environmental benefits. The consistent governmental regulation promotes the environmental market activities that are formed on the basis of a combination of legal constraints and economic incentive systems. To preserve the competitiveness of enterprises – especially, in case of small and medium enterprises -, the proper constraint and incitement serves all-economy interests, as well, furthermore, it ensures the sustainable future, too.

The other factor that cannot be ignored is **the population** as the final consumer and active participant in production. The specific manifestation of its environmental activity and ecological consciousness is the change in consumer behaviour that is becoming more pronounced. Manifestation of the environmental-conscious behaviour of the population can be assessed through their consumption habits. The structure according to which they organize their life, fill the basket, do the shopping, use products affects production and services thus generating demands. Experiences show that the consumer with higher eco-awareness is a pulling force for the environmental market of his/her country. Austria, the Federal Republic of Germany, the United States of America, Japan, etc. could obtain advantages in the competition with other countries in the world market with the help of their domestic customers. Education of the population, as the human condition for environmental protection, seems to be an investment requiring the less amount. This is coupled with corporate environmental management, its efficient operation, which is a living space, a dynamizing factor, and an engine of innovation for the environmental market.

Environmental education should be started in the kindergarten where children can discover their environment; then by the end of the secondary and tertiary education the technocratic approach has to be transformed into a complex way of

thinking and activity based on rational knowledge. The maximum consumption – optimum production ratio has to be transformed in the economic sphere into the optimum consumption to which use and production, which is acceptable from environmental aspect, is linked. In the countries of developed world free time and rational use of the environment compete with material values.

An interesting contradiction can be formed that necessary to dissolve with conscious environmental education and awareness. Business managers often decide strictly on ecological issues based on operational economy criteria, but its concept of value for private individuals is different, as they are also affected by environmental damage. This contradictory experience awakens them not to solve ecological risks only and exclusively with cost-profit decisions. (Papp S. [1992])

Public opinion sees employment in the environmental industry as a less appealing activity which is harmful for health as workers often have to work with waste and polluting materials. However, as a result of technological developments, cleaner materials are produced, the environmental damage is reduced, so workers in this field are getting increased appreciation.

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Questions to check understanding

1. What is the attitude of banks towards environmental investments?
2. What conditions are taken into account in bank processes?
3. What is the environmental activity of the population like in Central and Eastern Europe?
4. Evaluate the opportunities of environmental education!

12. Dynamic factors of the environmental market – innovative effect and retrodistributive channels

Sustainable development cannot be achieved without technical-technological development and modernization. Innovation, which has an important role in the constant renewing process of enterprises, has to include, as an inner factor, the need for the management of environmental effects. Modernization, development are passing beyond more and more the level of sufficient requirements for environmental protection and effective strategies are coming to the fore. The extensive solutions that are in compliance with regulations and compulsory expectations put the emphasis on complementing the existing tools and technologies. These solutions motivate the innovative process, though they set correction of the existing processes as an aim. Comprehensive, intensive solutions have a complex approach, prevention has an important role in their formation, which aims at reduction of the use of resources in the input side, together with the environmentally-friendly implementation of the process of transition, while reduction of the load on the environment in the output side.

The innovation character of the sector is supported by the fact that the companies operating here appear with a new product twice as large proportion as the total industrial indicator, over a period of three years in the developed countries. This is especially true for energy use, waste water and waste management, and for certain areas of agriculture.

Humans intervene with their activities in the processes of their environment, polluting and damaging them. Activities to eliminate, correct, reduce, prevent, observe and analyse these impacts form the functional environmental protection.

Techniques for posterior environmental protection include those that are capable of eliminating or reducing the environmental impacts of past production and consumption. The ones mentioned here extend beyond the institutional boundaries of the cause, whether they are industrial production or individual consumption. The literature also includes techniques for rehabilitation, waste treatment, waste water treatment and secondary (for materials leaving the original recovery phase) recycling techniques.

Compensating environmental techniques are also posterior ones, however, they are intended to increase the capacity and loadability of environmental elements and ecological systems. Their other function is the reduction of the effect of the existing environmental burdens without eliminating the environmental burden itself, so it is not about the management of residues. The following techniques are included here: liming forests, airing waters, programs that help plants and animals to adapt themselves to the changed environmental conditions, technical solutions against erosion, geographical deflation and noise.

By preventive environmental techniques we mean methods that are suitable to reduce emissions coming from production and consumption in forms of waste water, polluted air, waste heat and solid waste on the spot. Posteriorly built-in or additive environmental techniques (“end of pipe”) are included here which are generally procedures and techniques connected to the end of the production process. The purpose of the preventive techniques is to reduce environmental load (eg. flue-gas cleaning techniques, catalysts), which may leave additional environmental problems (discharge and storage). The literature counts the integrated environmental techniques here that are applied at the source of the potential environmental load in order to eliminate, as early as possible, the application of materials which are especially dangerous for the environment. Regarding its possible version we can describe three of them:

Transformation of products and production processes resulting in lower material and energy demands which leads to greater material and energy efficiency, replacing environmentally harmful substances with less harmful ones, replacing production processes and products with less environmentally-friendly processes or products.

Considering innovation, integrated (intensive) environmental techniques belong to the (primary) recycling within the firm, as a result of recycling demand for new materials and waste formation can be reduced. Other literature disputes this view saying that recycling involves additional energy use, therefore this can put the effect of relieving the burden from the environment into question.

Techniques for the observation of environment serve to measure emissions and supervise environment quality. Besides monitoring water, air, soil, noise, etc., environmental functions of space research can be counted here.

Environmental services have an important role in formation and practice of environmentally conscious behaviour and diffusion of environmental techniques, technologies. Its most typical forms are consulting, environmental impact assessments and analyses required by relevant legislation, conducting eco-audits, preparing environmental balance sheets, analysis of product lines and material flows, processes, developing communal waste management concepts and disposal programs for existing pollutants. An increasing share of environmental service providers' activities are the introduction of up-to-date techniques and technologies to economic actors and the general public.

It is a less spread view in Central and Eastern Europe that solutions to manage an environmental problem can generate other solutions with better and of higher utility value, also production costs can be reduced as a result, or even both can be realized together. It is clear that a product of innovation can imply advantages in competition, or create a market. This situation points out that investing into the environmental market is a good business.

The best competitors can see that their work to reduce environmental costs with innovative methods can win the prize on the long-run. Enterprises that recognised the opportunities gain shares from the market from their competitors that produce expensive products, while less innovative companies lose shares and remain losers in the future, too. To compensate for this and to regulate it efficiently, redistribution can be considered a particularly important element.

On the basis of experiences gained in the field of environmental protection results achieved by means of **retrodistributive channels** are the most market-intensive solutions. The essence of this is that not renouncing the cause-principle, a development activity based on state-bank-corporation collaboration is implemented which encourages, with financial support, cooperations between commercial and industrial companies that help to return recyclable and reusable materials back to the industrial processes. A successful example for this can be seen in Austria in the field of paper and packaging materials. Unfortunately, spread of this process is not really successful in the countries of Central and Eastern Europe. The aforementioned example of Austria is encouraging for the viability of the idea (in other areas, too), and the strengthening of retrodistribution plays an important role in the long-term strategic vision of the entire EU environmental market, which can lead to further development and strengthening of environmental awareness at the corporate and environmental levels, meaning the guarantee for the long-term effectiveness of the environmental market.

In the following chapter of my book I am examining the global concerns of these effects on the basis of the UN Global Goals The Global Goals For Sustainable Development program and the possibilities to build them into the engineer training of the University of Szeged.



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Questions to check understanding

1. What innovative solutions can make the environmental market more dynamic?
2. How can environmental-conscious behaviour be developed?
3. Describe the role of retrodistributive channels!

13. Chrestomathy for case studies to implement the UN Global Goals The Global Goals For Sustainable Development – attitude at the Faculty of Engineering, University of Szeged

The United Nations has been dealing with global issues for a long time and provides diverse answers to the issues raised.

In 2015, it set its sustainability goals in **17 categories**, which are:

- Goal 1: End poverty in all its forms
 - Goal 2: Zero Hunger
 - Goal 3: Health
 - Goal 4: Education
 - Goal 5: Gender equality and women's empowerment
 - Goal 6: Water and Sanitation
 - Goal 7: Energy
 - Goal 8: Economic Growth
 - Goal 9: Infrastructure, industrialization
 - Goal 10: Inequality
 - Goal 11: Cities
 - Goal 12: Sustainable consumption and production
 - Goal 13: Climate Change
 - Goal 14: Oceans
 - Goal 15: Biodiversity, forests, desertification
 - Goal 16: Peace, justice and strong institutions
 - Goal 17: Partnerships
- (<https://www.un.org/sustainabledevelopment/> 14.12.2018)

In 2012, the University of Szeged, in this spirit, prepared a Strategy for Sustainable Development in which it set out its ambitions and guidelines for its departments. It is also necessary to incorporate everything that can be interpreted in the operating order in the Faculty of Engineering into the training, in the case of the bachelor and master courses maintained by the Faculty of Engineering. For our students only that information has been introduced in this book which directly affects the future practice of their profession. The presentation is about taking over the details of the UN material as a collection of texts that provide the reader with a basis for preparing case studies in this spirit.

Goal 6: Ensure access to water and sanitation for all

'Clean, accessible water for all is an essential part of the world we want to live in and there is sufficient fresh water on the planet to achieve this. However, due to bad economics or poor infrastructure, millions of people including children die every year from diseases associated with inadequate water supply, sanitation and hygiene.

Water scarcity, poor water quality and inadequate sanitation negatively impact food security, livelihood choices and educational opportunities for poor families across the world. At the current time, more than 2 billion people are living with the risk of reduced access to freshwater resources and by 2050, at least one in four people is likely to live in a country affected by chronic or recurring shortages of fresh water. Drought in specific afflicts some of the world's poorest countries, worsening hunger and malnutrition. Fortunately, there has been great progress made in the past decade regarding drinking sources and sanitation, whereby over 90% of the world's population now has access to improved sources of drinking water.

To improve sanitation and access to drinking water, there needs to be increased investment in management of freshwater ecosystems and sanitation facilities on a local level in several developing countries within Sub-Saharan Africa, Central Asia, Southern Asia, Eastern Asia and South-Eastern Asia.' (<https://www.un.org/sustainabledevelopment/water-and-sanitation/> 14.12.2018)

Goal 6: Facts and figures

- 3 in 10 people lack access to safely managed drinking water services and 6 in 10 people lack access to safely managed sanitation facilities.
- At least 892 million people continue to practice open defecation.
- Women and girls are responsible for water collection in 80 per cent of households without access to water on premises.
- Between 1990 and 2015, the proportion of the global population using an improved drinking water source has increased from 76 per cent to 90 per cent
- Water scarcity affects more than 40 per cent of the global population and is projected to rise. Over 1.7 billion people are currently living in river basins where water use exceeds recharge.
- 4 billion people lack access to basic sanitation services, such as toilets or latrines
- More than 80 per cent of wastewater resulting from human activities is discharged into rivers or sea without any pollution removal
- Each day, nearly 1,000 children die due to preventable water and sanitation-related diarrheal diseases
- Approximately 70 per cent of all water abstracted from rivers, lakes and aquifers is used for irrigation
- Floods and other water-related disasters account for 70 per cent

of all deaths related to natural disasters.
(<https://www.un.org/sustainabledevelopment/water-and-sanitation/> 14.12.2018)

Goal 6 targets

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all
 - By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
 - By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
 - By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
 - By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
 - By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
 - By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
 - Support and strengthen the participation of local communities in improving water and sanitation management
- (<https://www.un.org/sustainabledevelopment/water-and-sanitation/> 14.12.2018)

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy

Energy is central to nearly every major challenge and opportunity the world faces today. Be it for jobs, security, climate change, food production or increasing incomes, access to energy for all is essential. Working towards this goal is especially important as it interlinks with other Sustainable Development Goals. Focusing on universal access to energy, increased energy efficiency and the increased use of renewable energy through new economic and job opportunities is crucial to creating more sustainable and inclusive communities and resilience to environmental issues like climate change.

At the current time, there are approximately 3 billion people who lack access to clean-cooking solutions and are exposed to dangerous levels of air pollution. Additionally, slightly less than 1 billion people are functioning without

electricity and 50% of them are found in Sub-Saharan Africa alone. Fortunately, progress has been made in the past decade regarding the use of renewable electricity from water, solar and wind power and the ratio of energy used per unit of GDP is also declining.

However, the challenge is far from being solved and there needs to be more access to clean fuel and technology and more progress needs to be made regarding integrating renewable energy into end-use applications in buildings, transport and industry. Public and private investments in energy also need to be increased and there needs to be more focus on regulatory frameworks and innovative business models to transform the world's energy systems. (<https://www.un.org/sustainabledevelopment/energy/> 14.12.2018)

Goal 7: Facts and figures

- 13% of the global population still lacks access to modern electricity.
- 3 billion people rely on wood, coal, charcoal or animal waste for cooking and heating
- Energy is the dominant contributor to climate change, accounting for around 60 per cent of total global greenhouse gas emissions.
- Indoor air pollution from using combustible fuels for household energy caused 4.3 million deaths in 2012, with women and girls accounting for 6 out of every 10 of these.
- The share of renewable energy in final energy consumption has reached 17.5% in 2015.

(<https://www.un.org/sustainabledevelopment/energy/> 14.12.2018)

Goal 7 Targets

- By 2030, ensure universal access to affordable, reliable and modern energy services
- By 2030, increase substantially the share of renewable energy in the global energy mix
- By 2030, double the global rate of improvement in energy efficiency
- By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support (<https://www.un.org/sustainabledevelopment/energy/> 14.12.2018)

Goal 13: Take urgent action to combat climate change and its impacts

Climate change is now affecting every country on every continent. It is disrupting national economies and affecting lives, costing people,

communities and countries dearly today and even more tomorrow. Weather patterns are changing, sea levels are rising, weather events are becoming more extreme and greenhouse gas emissions are now at their highest levels in history. Without action, the world's average surface temperature is likely to surpass 3 degrees centigrade this century. The poorest and most vulnerable people are being affected the most.

Affordable, scalable solutions are now available to enable countries to leapfrog to cleaner, more resilient economies. The pace of change is quickening as more people are turning to renewable energy and a range of other measures that will reduce emissions and increase adaptation efforts. Climate change, however, is a global challenge that does not respect national borders. It is an issue that requires solutions that need to be coordinated at the international level to help developing countries move toward a low-carbon economy.

To strengthen the global response to the threat of climate change, countries adopted the Paris Agreement at the COP21 in Paris, which went into force in November of 2016. In the agreement, all countries agreed to work to limit global temperature rise to well below 2 degrees centigrade. As of April 2018, 175 parties had ratified the Paris Agreement and 10 developing countries had submitted their first iteration of their national adaptation plans for responding to climate change.

Goal 13: Facts and figures

Oceans cover three quarters of the Earth's surface, contain 97 per cent of the Earth's water, and represent 99 per cent of the living space on the planet by volume.

Over three billion people depend on marine and coastal biodiversity for their livelihoods.

Globally, the market value of marine and coastal resources and industries is estimated at \$3 trillion per year or about 5 per cent of global GDP.

- Oceans contain nearly 200,000 identified species, but actual numbers may lie in the millions.
- Oceans absorb about 30 per cent of carbon dioxide produced by humans, buffering the impacts of global warming.
- Oceans serve as the world's largest source of protein, with more than 3 billion people depending on the oceans as their primary source of protein
- Marine fisheries directly or indirectly employ over 200 million people.
- Subsidies for fishing are contributing to the rapid depletion of many fish species and are preventing efforts to save and restore global fisheries and related jobs, causing ocean fisheries to generate US\$50 billion less per year than they could.
- Open Ocean sites show current levels of acidity have increased by 26 per cent since the start of the Industrial Revolution.
- Coastal waters are deteriorating due to pollution and eutrophication. Without concerted efforts, coastal eutrophication is

expected to increase in 20 percent of large marine ecosystems by 2050. (<https://www.un.org/sustainabledevelopment/climate-change-2/#tab-c4bdf348fc128b87c4d> 14.12.2018)

Goal 13 tagets

- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- Integrate climate change measures into national policies, strategies and planning
- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
- Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change. (<https://www.un.org/sustainabledevelopment/climate-change-2/#tab-c4bdf348fc128b87c4d> 14.12.2018)

Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss

Forests cover 30.7 per cent of the Earth's surface and, in addition to providing food security and shelter, they are key to combating climate change, protecting biodiversity and the homes of the indigenous population. By protecting forests, we will also be able to strengthen natural resource management and increase land productivity.

At the current time, thirteen million hectares of forests are being lost every year while the persistent degradation of drylands has led to the desertification of 3.6 billion hectares. Even though up to 15% of land is currently under protection, biodiversity is still at risk. Deforestation and desertification – caused by human activities and climate change – pose major challenges to sustainable development and have affected the lives and livelihoods of millions of people in the fight against poverty.

Efforts are being made to manage forests and combat desertification. There are two international agreements being implemented currently that promote the use of resources in an equitable way. Financial investments in support of biodiversity are also being provided. (<https://www.un.org/sustainabledevelopment/biodiversity/> 28.12.2018)

Goal 15: Facts and figures

Forests

- Around 1.6 billion people depend on forests for their livelihood, including 70 million indigenous people.
- Forests are home to more than 80 per cent of all terrestrial species of animals, plants and insects.
- Between 2010 and 2015, the world lost 3.3 million hectares of forest areas. Poor rural women depend on common pool resources and are especially affected by their depletion.

Desertification

- 6 billion people depend directly on agriculture, but 52 per cent of the land used for agriculture is moderately or severely affected by soil degradation.
- Arable land loss is estimated at 30 to 35 times the historical rate
- Due to drought and desertification, 12 million hectares are lost each year (23 hectares per minute). Within one year, 20 million tons of grain could have been grown.
- 74 per cent of the poor are directly affected by land degradation globally.

Biodiversity

- Illicit poaching and trafficking of wildlife continues to thwart conservation efforts, with nearly 7,000 species of animals and plants reported in illegal trade involving 120 countries.
- Of the 8,300 animal breeds known, 8 per cent are extinct and 22 per cent are at risk of extinction.
- Of the over 80,000 tree species, less than 1 per cent have been studied for potential use.
- Fish provide 20 per cent of animal protein to about 3 billion people. Only ten species provide about 30 per cent of marine capture fisheries and ten species provide about 50 per cent of aquaculture production.
- Over 80 per cent of the human diet is provided by plants. Only three cereal crops – rice, maize and wheat – provide 60 per cent of energy intake.
- As many as 80 per cent of people living in rural areas in developing countries rely on traditional plant--based medicines for basic healthcare.
- Micro-organisms and invertebrates are key to ecosystem

services, but their contributions are still poorly known and rarely acknowledged.
(<https://www.un.org/sustainabledevelopment/biodiversity/> 28.12.2018)

Goal 15 targets

- By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development
- Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed
- Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products
- By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
- By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
- Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
- Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
- Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.
(<https://www.un.org/sustainabledevelopment/biodiversity/> 14.12.2018)

The aims of the University of Szeged in the field of Sustainable Development and action programs related to these aims

“The University of Szeged aims to increase its contribution to sustainable

development, taking into account its areas of operation. The University's main objective was to reduce the amount of greenhouse gases emitted during its activities in the institution. For this reason it has aims in five areas (energy management, environmental protection, social awareness, protection of built and natural heritage and information management) in connection with sustainable development. The goals of the University of Szeged regarding sustainable development are:

1. Installation of an energy and air-conditioning system in the university that produces less green-house gas.
2. Keeping the quantity of the waste coming from the university at present level, or its reduction and increasing the proportion of recycling.
3. Formation of an environmental and health conscious approach.
4. Protection and conservation of the built and natural heritage in possession of the university.
5. Improvement of information management in the institutional areas connected to sustainable development.”

The aims of the University of Szeged in the field of Sustainable Development and action programs related to these aims: (<https://www.u-szeged.hu/download.php?docID=27345> 28.12.2018)

Green University Project Summary

The basic task of the Green University Project is to spread the environmentally conscious attitude and way of thinking to the teachers and students of the University of Szeged. The aim of the project is that the university employees recognize in their duties the opportunities with the application of which they can contribute to create sustainable development. Within the framework of the Green University Project we grouped the following tools and opportunities:

- Offices (Informatics and office technology)
- Events, public programs
- Transport policy
- Rules and procedures
- Built environment (central infrastructure)
- Awareness (Communication)
- Research university (green direction)

The Green University Project aims to identify specific tasks and development directions in the short, medium and long term by expressing the above mentioned categories and to clearly communicate the benefits of environmentally conscious aspects to educators, researchers, employees and students in higher education. It is one of the conditions of a modern research university to develop and study environmentally friendly

technologies, also commitment and education for a sustainable human lifestyle in the long term. According to the definition of the Green University Project, the University of Szeged wants to become not only a kind of actor, as a green university, but also as a normative "guide" in the life of a socially sensitive, responsible and environmentally conscious society.

By implementing the elements of the Green University Project outstanding success can be expected in the following areas:

- Operation of the institution – effectiveness, environmental consciousness, savings.
- Minimalization of pollutants, increasing efficiency in energy use so that we have regards for the principles of environmental consciousness, thus producing substantial cost savings.
- Social engagement and education in the Southern Great Plain Region.
- It is an important part of social engagement that the society can follow ambitions initialized by the University of Szeged. It can be carried out by education, believing that goals, ways and feasibility directions set by the University of Szeged are acceptable to the majority society and the Hungarian institutions, trusting that some universities and state institutions will follow our aspirations.
- PR and marketing value – popularity, fame, reputation, students, partners, clients.
- Green aspirations are moving in this direction not only in Hungary, but as the global community, so the European norms. In Hungary, these views and processes are less widespread at both legal and social levels.
- Our goals can go through a huge development not only in the majority society, but also in the development of strategy partners, clients, and future university students, ie high school students and younger ones.
- In addition to quality and high-level education and research, green aspirations can be one of the keys to long-term survival for our university.

(<https://www.u-szeged.hu/download.php?docID=27345> 28.12.2018)

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- Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss, <https://www.un.org/sustainabledevelopment/biodiversity/> 28.12.2018

Questions to check understanding (creative questions and study works)

1. On a few pages, describe how water and sanitation is implemented in your residence!
2. On a few pages, describe what suggestions you would make in order to ensure affordable, reliable, sustainable energy in your future job!
3. On a few pages, describe what you would do in the field of combating climate change and its impact!
4. What do sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss mean to you?
5. Make suggestions to make the environmental principles described above work more effectively in the University of Szeged!