

Study no. 3

**STRATEGIC DIRECTIONS OF SUSTAINABLE
DEVELOPMENT IN ROMANIA**

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LIST OF ACRONYMS

ANM – *National Meteorology Administration*;
BM – *World Bank*;
BERD – *European Bank for Reconstruction and Development*;
CASE – *Centre for Social and Economic Research*;
CASPIIS – *Anti-poverty and Social Inclusion Promotion Commission*;
C-D – *Research-development*;
CDI - *Research-development and innovation*;
CIE – *International Emission Trading*;
CIP – *EU Program for Competitiveness and Innovation*;
CK – *Kuznetz curve*;
CMBT – *The best technologies*;
CNDD – *National Centre for Sustainable Development*;
DFID- *UK Department for International Development*;
DGE - *Directorate General for Enterprises*;
EEA – *European Environment Agency*;
EMAS - *Eco-Management and Audit Scheme*
ETAP - *EU Plan of Action for Environmental Technologies*;
ETS - *European Emissions Trading Scheme*;
EU SDS – *EU Strategy for Sustainable Development revised in June 2006*;
FS – *Structural Funds*;
GHG/GES – *Emissions of greenhouse-effect gases*;
GIS/SIV – *Green investments schemes*;
GPP – *Green Public Procurement*;
IC – *Implementation in common*;
IMA – *Large burning installations*;
IMM – *Small and Middle Enterprises*;
INS- *National Institute of Statistics*;
IPPC – *Integrated pollution control*;
ISPA - *Pre-Adhesion Structural Instrument*;
MDC – *Mechanism of clean development*
MIE – *Ministry of European Integration*;
MMGA – *Ministry of the Environment and Water Management*;
ODM – *Millennium Development Goals*;
OECD – *Economic Organisation for Cooperation and Development*;
OMC- *World Trade Organization*; WTO – *World Trade Organization*;
PDR – *Plan of regional development*;
PIB – *Gross domestic product*;
PIP – *Integrated product policies*;
PNA – *National plan of allocation*;
PND – *National plan of development*;
PNUD – *United Nation Development Program*; UNDP – *United Nation Development Program*;
POI - *Plan of implementation*;
POS – *Sectorial Operational Program*;
POS CCE - *Sectorial Operational Program Increase of the economic competitiveness*;
POS DRU - *Sectorial Operational Program Human resources development*;
RCE – *Certified emission reductions*;
SDS – *EU Strategy for Sustainable Development approved at the Göteborg Council, 2001*;
TIM – *Total material inputs*;
SNDD- *Romanian Strategy for Sustainable Development*;
SERI - *Sustainable Europe Research Institute Vienna*;
TIC – *Technology of information and communication*;
UCD – *Units of displaced amounts*;
UNFCCC – *UN Framework Convention of Climate Changes*;

CHAPTER 1. INTRODUCTION

1.1. Sustainable development: concept, characteristics and methodological approaches

1.1.1 Dimensions of the sustainable development

Within the context of increasing population and consumption of natural resources, sustainable development is a pattern of development that targets a balance between the economic growth, the quality of life and the preservation of the environment in the medium and long run without increasing the consumption of natural resources beyond Earth' capacity to support.

The best known and most cited definition of the concept of sustainable development is included in the so-called Brundtland⁶ Report of the World Commission for Environment and Development: “*sustainable development is the development that meets the needs of the present without compromising the ability of the future generations to meet its own needs*”. The term ‘*ability*’ means the maintenance of the consumption and production options and refers to the general types of capital: a) economic capital; b) human capital – knowledge, health, security; c) ecologic capital – renewable and non-renewable natural resources; and d) social capital – culture, institutions, social norms, etc. The term of ‘*needs*’ designates a normative nature and make it necessary to determine the basic human needs that are relevant from the human and ecologic points of view⁷.

The essential *characteristics* of sustainable development are a) equity, b) long-term approach and c) systemic thinking⁸.

Sustainable development aims to eliminate the disparities of access to resources both for the poor or marginalised communities and for the future generations trying to provide every nation with the opportunity to develop according to its social and cultural values while not denying this right to the future generations either.⁹ *Equity* involves therefore a just distribution of the costs and benefits of development both among the wealthy and poor and among the generations and nations.

The *long-term approach* means to consider the needs of the future generations and to elaborate equitable scenarios of development based on the limited natural resources of the planet.

The *systemic thinking* appeals to understanding the complex interactions between planet subsystems, of the propagation effects between local and global and of the multiple interdependencies between the environment, economy and society.

The *elements* considered by the pattern of sustainable development are: a) global **interdependency** of the ecological problems; b) the long-term **perspective** regarding the consequences of pollution and shrinking natural resources and c) the **distinction** between the forms of capital and the possibility to make substitutions among them¹⁰.

⁶ World Commission on Environment and Development, *Our common future*, Oxford University Press, 1987, p. 43.

⁷ Cf. Isabella Pierantoni, *A few remarks on methodological aspects related to sustainable development*, in *Measuring sustainable development integrated economic, environmental and social frameworks*, OECD, Paris, 2004.

⁸ Sustainable Development Gateway, *Introduction to Sustainable Development*, <http://www.sdgateway.net/>

⁹ Friends of the Earth Olanda, *Sustainable consumption: A global perspective*, Amsterdam, Friends of the Earth Netherlands, 1996, p. 8.

¹⁰ Cf. F. Bran, *Ecological component of the decisions of economic development*, ASE Press, 2002.

From the *economic* point of view, the key points of sustainable development are the reduction of environmental pollution and the productivity of the natural resources, namely more goods and services by consumed unit of nature. The economic dimension of the environmental problems has its origin in two key problems a) the fact that the difference between the social costs and the private costs of the economic activities in using the natural resources can not be achieved under conditions of *laissez-faire*; and b) the connections existing between the economic growth and the environment¹¹, which due to the conflicting nature of the effects must be solved by a compromise most times.

The *rules* that link the ecological and economic concepts within the context of sustainable development are¹²:

- the rate of exploitation of the renewable resources must be equal with the rate of their regeneration;
- the rate of waste generation must be equal to the absorption capacity of the ecosystem in which the wastes are stored
- the non-renewable resources must be exploited in a sustainable manner, namely their rate of consumption must not exceed the rate of their substitution by renewable resources.

The *central objective* of the *social* dimension of sustainable development is the just distribution of opportunities among generations. A high level of occupation and quality jobs represent the link between the economic and social dimensions of the sustainable development which can be quantified by GDP and by the level of occupation, as primary macroeconomic indicators, and by the index of population's health state – regarded as a long-term reservoir of work force.

The *key flows* between economy, society and environment are (Figure 1):

A. From the environment towards economy: (1) the functions of ecological productions (functions of the natural resources and polluting emissions), economic costs of environmental protection.

B. From the economy towards environment: (2) the pressure of the productive activities on the ecologic resources; investments in environmental protection; property rights on natural and environmental resources.

C. From the environment towards society: (3) environmental threats for human welfare; dangers for human health and safety caused by environmental degradation.

D. From the society towards environment: (4) pressure of the consumption patterns on the environmental resources; ecological responsibility of the citizens.

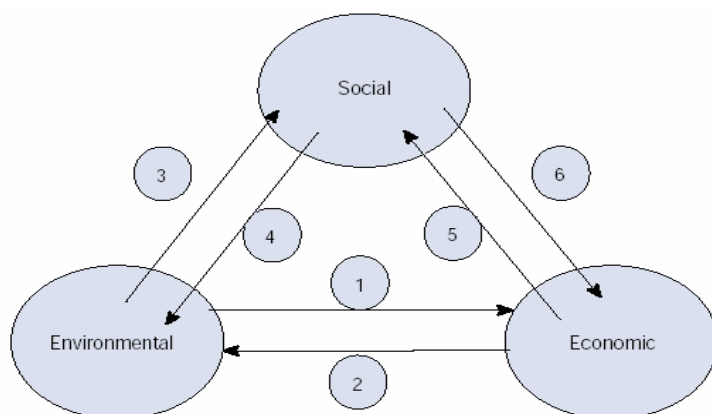
E. From the society towards economy: (5) amount and quality of the work force; social plans for market transactions.

F. From the economy towards society (6) employment opportunities and living standard; income distribution; resources to finance the social security programs; pressure on the social and cultural systems, which results in dysfunctions and migration.

Figure 1.1. Interactions between the economic, social and environmental factors

¹¹ J. Nicolaisen și P. Hoeller, *Economics and the Environment: A Survey of Issues and Policy Options*, OECD Economics Department Working Papers, 82/1990, OECD Publishing.

¹² Cf. H. E. Daly, *Towards some operational principles of sustainable development*, *Ecological Economics*, 2/1990, pp 1-6 and K. Rennings, H. Wiggering, *Steps towards indicators of sustainable development: linking economic and ecological concepts*, *Ecological Economics*, 20/1997, pp. 25-36.



Source: OECD, *Sustainable Development: Critical Issues*, OECD, 2001.

1.1.2 Methodological approaches of the sustainable development

Sustainable development experienced different approaches, which evolved from the analysis of the conditions required for an optimal long-term consumption which to consider the technological progress and the rate of demographic growth¹³, to the analysis of the compatibility between the conditions of economic and environmental development which are not to affect the options of the future generations¹⁴. If during the **70s** in the debate started by Meadows *et al*¹⁵, focusing on the limits of the non-renewable natural resources and on the environmental impact of the economic growth, environment quality and economic growth were seen as being divergent, starting with the **80s** on the front page of the debates was the reconciliation of the two dimensions. During the recent years the economic and ecologic literature focused on problems such as: a) *how much* and *how* the natural resources must be exploited; b) impact of human activity on environment quality (pollution, wastes, etc.); c) the concept of long-term sustainable development which targets the intergenerational equity by integrating the economic development with the social and environmental dimensions.

1. In **1974**, J. Stiglitz¹⁶, using a Cobb-Douglas production function with natural resources showed that, under certain conditions, optimal ways of development are possible even with non-renewable natural resources. The optimal choice is done between development ways with different rates of economic growth, the ways with high rates of natural resources utilisation having low rates of long-term economic growth.

2. Robert M. Solow¹⁷ dealt with the problem of the intergenerational distribution of the optimal capital accretion. The introduction of the exhaustible natural resources in a Cobb-Douglas function does not change the results, on condition the elasticity of natural

¹³ According to this approach, the development is sustainable when the rate of consumption increase equals the sum of the rate of population growth and the rate of technical progress development.

¹⁴ Cf. Isabella Pierantoni, *op.cit.*

¹⁵ D.H. Meadows , D.L. Meadows, J. Randers, *The Limits to Growth. A Report for the Club of Rome's Project on the Predicament of Mankind*, Universe Books and Potomac Associates, New York, 1972.

¹⁶ J. Stiglitz, *Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Paths*, *The Review of Economic Studies*, vol. XLI, Symposium on the Economics of Exhaustible Resources, pp. 123-137, 1974. According to Stiglitz, there are three economic forces that compensate the limits imposed by the natural resources: the technological changes, the capital and the scale economies.

¹⁷ R.M. Solow, *Intergenerational Equity and Exhaustible Resources*, *The Review of Economic Studies*, vol. XLI, Symposium on the Economics of Exhaustible Resources, pp. 29-45, 1974.

resources and capital goods replacement must be at least unitary. Therefore, a constant per capita rate of consumption can be maintained even in the presence of exhaustible natural resources. To maintain intact the total stock of capital, a generation can use the limited stock of natural resources, but it has to increase the stock of renewable capital, which means to maintain a sustainable way of development. According to this approach, the direct substitution between the production factors by technical replacement of the natural resources maintains the production and, subsequently, the consumption levels.

3. Sustainable development can also be defined as the intact preservation of the potential of consumption of traded goods and natural resources per individual of the future generations¹⁸. The potential of consumption is a function of the two types of capital:

$$W = W(K, E), \quad (1)$$

where: **W** is the potential for consumption, **K** the stock of capital created by man, and **E** the stock of natural resources.

The potential for consumption is linked to the prospective potential of production that is to the stock of capital, which includes the technical progress and the natural resources as elements. It follows that a sustainable economic growth would require *either* a constant stock of capital (natural resources and capital created by man) *or*, in order to maintain intact the stock of capital, an efficient **substitution** of the natural resources by production capital.

Under these terms, the condition of sustainable development becomes:

$$-qE' \leq K', \text{ for } W' \geq 0, \quad (2)$$

where E' , K' and W' represent changes in time of K , W and E and q stands for the true shadow-price of the ecologic capital measured in terms of capital created by man. Equation (2) claims that the true value of the ecologic consumption must not exceed the true value of investments in man-made capital. Would the substitution between the two types of capital be optimal that is if the man-made capital would compensate environmental degradation, then the sustainable economic growth would be ensured.

These initial models are based on production functions having as elements the natural resources, the work force and the capital, where the possibility of substitution between the renewable resources and the non-renewable resources is an essential aspect. In 1997, Robert M. Solow¹⁹ showed that the limits of the future development depend on the technical capacities to substitute the natural resources within the production process which, in turn, will depend on: 1) the requirement of natural resources within the function of production and 2) the cost of replacing the non-renewable natural resources with capital, non-renewable natural resources or technical progress – which can allow the replacement of the natural resources by man-made capital. The **role** of this substitution is to reduce pollution, the dematerialisation of the products or the dissemination of the recycled goods within the function of production **is crucial**. However, the substitution possibilities are limited. Furthermore, the creation and dissemination of technology for

¹⁸ Cf. R. Haveman, *Thoughts on the sustainable development concept and the environmental effects of economic policy*, OECD, octombrie 1989; Nicolaisen, J. și P. Hoeller, *Economics and the Environment: A Survey of Issues and Policy Options*, OECD Economics Department Working Papers, No. 82, 1990, OECD Publishing.

¹⁹ R.M. Solow, *Georgescu-Roegen versus Solow-Stiglitz*, *Ecological Economics*, vol. 22/3, pp. 267-268, 1997.

sustainable development can be stimulated by the correct evaluation of the natural resources.

Therefore, as the environment degrades the market cost of the ecologic capital must increase, which makes the persistence of the negative externalities to become unsustainable. It results that is the It results that is the market cost of pollution is not equal to the true shadow-cost of environment degradation, the long-term sustainable economic growth can not be attained²⁰.

4. The *Kuznets curve* (CK) tries to **establish** the relation between the environmental impact and the long-term economic growth²¹. It **shows** that, up to a given limit environment degradation increases with the income, beyond which the quality of the environment is improved by a higher per capita **GDP** level. At low levels of development, the shape of the curve **shows** environmental degradation (both quantitative and as intensity). As the economic growth gains momentum by intensified extraction of resources and by expansion of the industrialisation, the rate of resources exhaustion starts to **exceed** the rate of resources regeneration, while the wastes grow in quantity and noxiousness.

At high levels of development, the structural **orientation** towards services and knowledge-intensive industries, coupled to an increased ecological **awareness**, with new environmental regulations, more efficient technologies and increased investments in the environment, leads to the progressive **alleviation** of the environmental degradation²². The structural change that accompanies the economic growth **influences** the impact on the environment by **changing** the composition of the economic activity towards sectors that are more or less intensive in pollution. At a low level of income, the predominant change is from agriculture to industry, which means a natural increase of the impact on the environment. At higher levels of the income, the economy becomes preponderantly focused on services, which means a lower ecological impact.

Criticizing CK, Stern *et al*²³ identified certain problems related to CK and its interpretation: a) the supposition of a unidirectional causality from the economic growth towards environment quality and the reversibility of ecological changes; b) the hypothesis that the changes in the trade relations associated to development have no effect on the quality of the environment; c) econometric problems; d) problems related to the used data; e) the asymptotic behaviour; f) the problem of the average-median income and g) the interpretation of certain CK in an isolated manner, without making reference to other environmental problems.

5. The indicator *Total material inputs* (**TIM**) can be interpreted both as production factor and as an expression of the pressure of the economic activities on the environment and it includes all the materials required for the production, use, and final storage of a product. To dematerialise the economic growth, the material intensity (**TIM/Y**)²⁴ must decrease

²⁰ Cf. Nicolaisen, J. și P. Hoeller, *op. cit.*

²¹ Kuznets, S., *Economic growth and income inequality*, American Economic Review, 45 (1), 1-28, 1955.

²² Panayotou, T., *Empirical Tests and Policy Analysis of Environmental Degradation at Different Stages of Economic Development*, Working Paper WP238 Technology and Employment Programme, Geneva: International Labor Office, 1993.

²³ D.I. Stern, M.S. Common și E.B. Barbier, *Economic growth and environmental degradation: the environmental Kuznets curve and sustainability*, World Development 24, pp. 1151-1160, 1996.

²⁴ Y is the obtained production.

by: a) changes in the structure of the demand for goods and services; b) the increase of efficiency due to the technological changes; c) substitution effects between resources²⁵.

An attempt to introduce **TIM** into a production function²⁶ analyses the effects of laying taxes on **TIM**: this leads not just to the reduction of **TIM**, but also to the reduction of the production and occupation. These unwanted effects can be removed by the introduction, in parallel, of a subsidy for the reduction of the costs with the labour force. Therefore, due to the interdependency of the market factors, to reach a sustainable development, the instruments used to cut down the consumption of resources must be combined with instruments of cutting down the costs with the labour force. For instance, a proper strategy for dematerialisation should combine a tax on the material inputs with a subsidy for the costs with the labour force, which would increase the material costs and would simultaneously reduce the costs with the labour force.

Because the indicators of sustainable development – **GDP**, unemployment rate, **TIM**, work productivity and the consumption of resources – are not independent, the economic growth is ecologically sustainable is the rate of economic growth, $d(Y)$, is accompanied by a higher rate of resources productivity, $d(Y/R)$. Furthermore, the rate of work productivity increase, $d(Y/L)$, should be lower than $d(Y)$. Therefore, the inequation describing the minimal condition of the short-term sustainable development is:

$$d(Y/L) < dY < d(Y/R) \quad (3)$$

On long-term, the growth potential of resources productivity, $d(Y/R)$ is limited by the laws of thermodynamics²⁷.

6. *Living Planet Report 2006*²⁸ centres on two indicators: *Living Planet Index* – measuring the health of the planet’s ecosystems – and *Ecological Footprint*. The *Ecological Footprint* is the productive area **taken** from the biomass offer of the Earth – *Earth biocapacity* – by the direct consumption and by the human activities convertible into energy consumption and, finally, into CO₂ emissions which are thereafter converted into hectares of vegetation required to assimilate the carbon. The dimension was defined in **1994** by William Rees and Mathis Wackernagel, currently existing at the international level annual reports of the international organisation *Redefining Progress* based on statistic yearbooks.

The ecological footprint of a country is influenced by the population, by the average amount of consumed goods and services and by the intensity of resources consumed to obtain these goods and services.

The report shows that the planet’s resources are consumed faster than their capacity of regeneration: at global level, between 1970 and 2003, the first indicator decreased by about **30%**; related to the ecological footprint from 1961, compared to that of 2003, it tripled, which means that it exceeds by about **25%** the planet’s capacity of regeneration (biosphere productivity can not keep up with the speed of consumption and of waste

²⁵ Friedrich Hinterberger *et al.*, *Employment and Environment in a Sustainable Europe*, Sustainable Europe Research Institute, www.seri.at.

²⁶ S.Klingert, *Material Flows in a Neoclassical Model*, Hamilton, 2000.

²⁷ Cf. Friedrich Hinterberger *et al.*, *op.cit.* Also, N. Georgescu-Roegen, *The Entropy Law and the Economic Process*, Harvard University Press, Cambridge, 1971.

²⁸ World Wildlife Fund (WWF), Global Footprint Network (GFN), Zoological Society of London (ZSL), *Living Planet Report 2006*.

generation). The most significant increase was the CO₂ footprint, which reached in 2003 a level nine times as high than the 1961 level.

1.2 Evolution of the global strategy of sustainable development

Although an older idea²⁹ and with a continuous transformation of its significance, the sustainable development was for the first time approached at the institutional level by the international community at the UN Conference for the Human Environment, Stockholm, 1972, year when *Limits to Growth* published by the Club of Rome appeared. The Declaration and Plan of Action adopted on this occasion established, among other things, the principles of natural environment preservation in the industrialised countries³⁰.

The Tokyo reunion of February 1987 adopted the *Global Agenda for Change* in the area of sustainable development, with the purpose to integrate the ecological, social and economical dimensions, establishing, among other, the following *principles of action*:

1. **stimulate** the economic growth particularly in the developing countries and the increase of the stock of natural resources;
2. **change** the quality of the economic growth by integrating the major objectives of the sustainable development – social equity and security;
3. **preserve** and increase of the stock of natural resources – air, water, forests, soil – preservation of the biodiversity and efficient use of the energy, water and raw materials;
4. **direct** the technological development towards solving the ecological problems;
5. **integrate** the environment and economy in determining the commercial, energetic, agricultural et., policies to anticipate and prevent the damages to the environment.

In 1992, at Rio de Janeiro, on the occasion of the United Nations Conference for Environment and Development³¹, the need of harmonising the economic and social needs with the reserves of natural resources was acknowledged officially and, based on the Brundtland Report, *Agenda 21: Program of Action for Sustainable Development*³² was adopted, a concrete plan of action regarding the key policies for achieving a sustainable development and the manner of approaching the environmental issues. This resulted in initiatives of implementing Agenda 21 at the sectorial, regional and local level, as well as in significant reorientations in environmental policy and in initiation of strategies for sustainable development.

Table 1.1 Elements of Agenda 21

Elements	Problems
Social and economic dimension of the development	poverty, production and consumption, health, human settlements, decision integration;
Preservation and management of the natural resources	atmosphere, forests, land, mountains, biological diversity, ecosystems, biotechnology, fresh water resources, toxic chemical products, noxious solid and radioactive wastes;
Strengthen the role of the important	youth, women, indigenous populations, NGOs, local

²⁹ Already Malthus and Ricardo referred to the problem of the natural limits of the economic growth, the first focusing on the rapid growth of the population and the second on the limited availability of land as natural resource.

³⁰ For a review of the main stages in the approach of the sustainable development, since the publication in 1962 of the study *Silent Spring* by Rachel Carson until 2005, see *Timeline of Sustainable Development 2006*, http://www.iisd.org/pdf/2006/sd_timeline_2006.pdf.

³¹ www.ecouncil.ac.cr/rio/earthsummit.htm.

³² Agenda 21, www.un.org/esa/sustdev/agenda21.htm.

groups	authorities, trading associations, business, local authorities, technico-scientific communities;
Instruments for implementation	finances, technological transfer, information, public awareness, education, ability building, juridical instruments, institutional framework;

Source: *Earth Summit 2002: Briefing Paper*, www.earthsummit2002.org.

Concerning the industry, Agenda 21 identified two major directions of action³³: 1) **development** and **promotion** of sustainable patterns of production and consumption; 2) **improvement** and **reorganisation** of the decision-making process for the simultaneous integration of the ecological and socio-economic aspects. The recommendations concerning the consumption patterns refer to:

- a) **evaluation** of the relation between production and consumption, environment, technical innovation, economic growth, development and demographic factors;
- b) **analysis** of the changes in the structure of the industry to achieve an economic growth with lower material intensity;
- c) **examine** the manner in which the economic growth and prosperity can be reached simultaneously with the reduction of energy and material consumption and with the decrease the generation of noxious matter.

By the *Declaration on the environment and Development* adopted on this occasion, **27** principles of sustainable development promotion have been formulated which, like the ones included in the 1987 Brundtland Report, were criticised by the followers of the neoclassical pattern of development³⁴. According to them, the sustainable development pattern, which sacrifice the pre-eminence of growth by the stress on the social and environmental dimension, not only will not improve the quality of life but will make the existing situation even worse. Furthermore, they claimed that in the long run the economic growth will smooth the inequalities in welfare and quality of life, the only thing that has to be done being to adjust the economic theories and practice³⁵. The followers of the sustainable development rely on the evidence that after two hundred years of economic growth there still is a high level of poverty in the developed countries, which shows the failure of the neoclassical pattern.

Although certain progresses have been observed – such as the Convention of the Change of Climate and some regional and national initiatives – the evaluation of the progress achieved in the five years after the Rio Conference at the General UN Assembly in New York, 1997, **observed** a poor progress in the implementation of the sustainable development and showed several deficiencies connected mainly to social equity, poverty, technological transfer, building the capacities for participation and development, institutional coordination and reduction of the excessive levels of production and consumption.

³³ Agenda 21, chapters 4 and 8.

³⁴ This pattern is centred, largely, on microeconomy, the role of the free market and of the technological progress in the social changes, the independence of the individuals in making the decisions on the optimal actions and their trend to maximise utility, that is the profit Cf. Robert B. Ekelund, Jr. Robert, F. Hebert, *A History of Economic Theory and Method*, McGraw-Hill, 1997.

³⁵ P. Govindan, *Sustainable development: The fallacy of a normatively-neutral development paradigm*, *Journal of Applied Philosophy*, 15(2)/1998, p. 186. Also, Jonathan M. Harris, *Basic Principles of Sustainable Development*, Working Paper 00-04, Global Development and Environment Institute, 2000.

The 2002 UN Summit for Sustainable Development³⁶ from Johannesburg **established** the sustainable development as a key-element of UN directions of activity and set the political directions of implementation of Agenda 21. The governments agreed on obligations, goals and concrete directions of action to achieve the general objective of sustainable development. The *Johannesburg Declaration on sustainable development* and the *Plan of Implementation of the World Summit on sustainable development* that were adopted brought progress in understanding the concept of sustainable development by highlighting the link between poverty, environment and the use of natural resources. The first document reasserted the three interdependent pillars of sustainable development – economic development, social development, local, national, regional and global environmental protection – and the second one established concrete measures of action in areas such as poverty eradication, change of the production patterns, health care and the sustainable use of the natural resources.

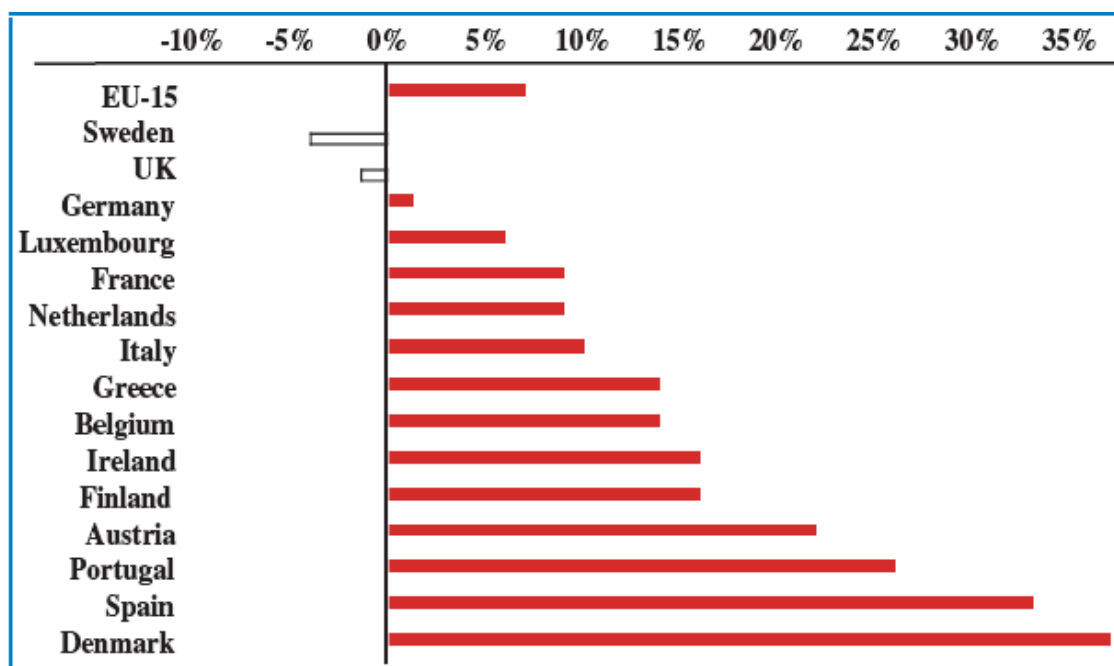
In 1997, at Kyoto, 61 countries agreed on the **Kyoto Protocol** (*see Appendix 1*), which defines the manner of controlling the emissions of greenhouse-effect gases, proposing to reduce until 2012 their level by **5.2%** compared to 1990 (main six gases). The Protocol established quantitative limits of the compulsory reduction for a group of six gases, the most important being the carbon dioxide (**CO₂**), which derives from fossil fuel burning, the methane (**CH₄**) and the nitrogen protoxide (**N₂O**).

Regarding the economic effects of the Protocol constraints, some studies claim that they will encourage innovation in policies and economy with positive effects on the competitiveness of companies and on the economic growth/ Therefore, the companies and economies oriented towards innovation will obtain or maintain competitive advantages. On the other hand, there are intense debates whether, for the promotion of innovation, the legislative restraints and the deterring of pollution are more efficient instruments than the stimulants for innovation and the voluntary actions of the business sector.

EU-15 member states committed themselves to reach until 2010 a level of emissions **7%** above the 1990 level. According to the European Agency for the Environment, it is possible that only Sweden and Great Britain respect these commitments, while Spain, Denmark and Portugal will reach values ranging from **25%** to **35%** over the admitted level (Fig. 1).

Fig 1. 2: Forecasts of the level of greenhouse-effect gases emission in EU-15 in 2010

³⁶ <http://www.earthsummit2002.org/> .



Source: *European Environment Agency*, 30 November 2004, <http://www.eea.europa.eu>.

The challenge for these states is the attempt to reconcile the increase of competitiveness with the admitted levels of greenhouse-effect gases. In addition, one should also consider the impact of the system of trading the emission permits on the price of electricity: although part of the price increase for electricity in EU is due to the increased world market prices, **31%** of the increase might be attributed to the higher prices due to the right to release CO₂³⁷. And this increase of the price of electricity may have adverse effects on the competitiveness of the entire **EU-15** industry.

1.3 Sustainable development in the European Union

1.3.1. Implementation of the sustainable development policy

After the June **1990** European Council demanded a program of action for sustainable development, in **1992** *Program 5 of Action for the Environment*³⁸ was passed, its goal being to promote sustainable development by including the preoccupations for the environment – change of the climate, water pollution and waste management – within other political areas and to transform the patterns of economic growth of the Community. The same document established the priority areas of action: long-term management of the natural resources; integration of the preoccupations of pollution control and waster prevention; reduction of the consumption of electrical power produced from renewable sources in sectors such as industry, energy, transportation, tourism and agriculture; set the (legislative, financial and horizontal) instruments to be used in relation to the environment.

In **1999**, sustainable development was included in the Amsterdam Treaty as one of the key-objectives of the European Union (Art. 2). The EU Strategy for Sustainable

³⁷ American Council for Capital Formation, *The Kyoto Protocol: Impact on EU Emissions and Competitiveness*, oct. 2005, <http://www.accf.org/pdf/test-kyoto-oct52005.pdf>.

³⁸ *Towards Sustainability. A European Community programme of policy and action in relation to environment and sustainable development*, <http://ec.europa.eu/environment/env-act5/5eap.pdf>.

Development (SDS) adopted at the Göteborg Council (2001) and amended in 2002, with an external dimension at the Barcelona Council, from the perspective of the *World Summit on Sustainable Development din Johannesburg*, sustainable development became a complement of the socio-economic goals set by the European Council from Lisbon.

The main objectives set by the strategy for sustainable development of 2001 were the progressive transformation of the existing non-sustainable patterns of consumption and production and granting an increased importance to the sustainable development in areas such as:

- **climate**: it was decided that by 2010, at least **22%** of EU production of electrical power should come from renewable sources;
- **transportation**: the policy of transportation should include measures against noise and pollution and should encourage the forms of transportations having a lower environmental impact;
- **public health**: adopt a strategy on chemical policy;
- **natural resources**: protect the biological diversity and promote the ecologic culture through the agricultural policy.

In February 2005, the Commission published a report on the progresses achieved during 2001³⁹ and drafted future directions of action, observing that non-sustainable trends persist concerning, among other, the change of climate and the use of natural resources.

In June 2005, by the declaration of the EU chiefs of state and government⁴⁰, it was stated that the Lisbon Agenda is an essential part of the horizontal objective of sustainable development. Together, they have the following key-objectives: protection and improvement of environment quality, prevention and reduction of pollution, promote the sustainable consumption and production to break the economic growth from environmental degradation; build an innovative economic climate intensive in knowledge, ecologically efficient and competitive.

After consultations with other interested organisms, the Commission presented in December 2005 the project of SDS revision⁴¹, which set as priorities, among other, sustainable transportation and natural resources. The document stressed the need to find innovative solutions for a better management of resources, the promotion of an economy characterised by a higher efficiency of resources, the increase of EU share on the world market of efficient technologies and the need of increased investments in eco-innovation. In addition, it was shown that the legislative measures of giving bonuses for eco-innovation and the shift to sustainable patterns of consumption and production processes may increase the competitiveness of EU economy.

In June 2006, in conjunction with the renewed Lisbon Strategy⁴², the new **Strategy for Sustainable Development (EU-SDS)**⁴³ aims the promotion of a “dynamic economy, with a maximal degree of occupation, high level of education, health protection, social and

³⁹ COM(2005) 37 final, *The 2005 Review of the EU Sustainable Development Strategy: Initial Stocktaking and Future Orientations*.

⁴⁰ DOC 10255/05, *Declaration on Guiding Principles for Sustainable Development*, Council of the European Union Presidency Conclusions, Bruxelles, European Council, 16-17 iunie 2005.

⁴¹ COM(2005) 658 final, *On the review of the Sustainable Development Strategy. A platform for action*.

⁴² SEC (2006) 619, 24 mai 2006, *Working together for growth and jobs. Further steps in implementing the revised Lisbon strategy*.

⁴³ Council of European Union, *Renewed EU Sustainable Development Strategy*, Bruxelles, 9 iunie 2006.

territorial cohesion and environmental protection within a peaceful and safe world, respecting the cultural diversity'. The four dimensions of it are:

- ***environmental protection*** – prevent and reduce the environmental pollution and promotion of sustainable consumption and production with the view to break the economic growth from the environmental impact;
- ***social cohesion and equity*** – promote a democratic society, healthy, safe and socially cohesive, observing the fundamental rights and the cultural diversity;
- ***economic prosperity*** - promote an innovative economy, knowledge-rich, competitive and ecologically efficient, which to ensure a high degree of occupation;
- ***international responsibility for the entire European Union.***

These objectives aim to clarify the conjunction between the objectives of the Lisbon Agenda – competitiveness and job creation – and the sustainable development. The latter becomes a horizontal principle of all EU policies, beyond the reductive dimension of the Lisbon Agenda, where sustainable development is circumscribed by the third pillar, which acknowledges the crucial role of investments in human, social and ecologic capital and of the technological innovation in achieving the objectives of competitiveness, social cohesion, prosperity and improved environmental protection. Reciprocally, the first is complementary of EU SDS by its objectives of economic growth, competitiveness and job creation. As shown in the Commission report on the Lisbon Strategy, so as not to affect its goals and not to become barriers to economic growth and job creation, all the regulations of environmental policy will be evaluated *ex ante* by cost-benefit analyses.

1.3.2. Sustainable development goals of the European Union

EU SDS set **7 key-objectives** for EU, together with targets, operational objectives and actions for each of them. The key-challenges identified in EU SDS are⁴⁴:

1. In the area of *climate change and clean energies*, **limit the climate change, its costs and adverse effects for the society and environment**. The most important operational objectives and targets for this area are: **8%** reduction compared to 1990 of the emissions of greenhouse effect-gases during 2008-2012, following the commitments assumed through the Kyoto Protocol⁴⁵; EU SDS convergence with the 'green document' on EU strategy in energy, which proposed reaching a balance between the sustainable development goals of competitiveness and energetic security⁴⁶.

2. In the area of *sustainable transportation*, EU SDS set as general goal to **minimise the impact of the transportation activities on the environment, economy and society**. Among the operational objectives and the targets set for this area are: reduction of the

⁴⁴ Cf. EU SDS and Eurostat, *Measuring progress towards a more sustainable Europe*.

⁴⁵ In 2005, the European Emissions Trading Scheme (ETS) was enforced, its purpose being to support the efforts of the member states to reach the level of emissions set by the Kyoto Protocol. According to a study of ETS effects on competitiveness and occupation, properly conceived, this scheme is the cheapest option. It is forecast that ETS impact on competitiveness and occupation in the EU will be modest, lower than that of the scenarios of alternative regulations (Zentrum für Europäische Wirtschaftsforschung GmbH, Centre for European Economic Research, *The Impact of the European Emissions Trading Scheme on Competitiveness and Employment in Europe – a Literature Review*).

⁴⁶ COM(2006) 105 final, *Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy*, 8 March 2006.

polluting emissions and of the noise resulting from transportation activities; modernisation of the passenger transportation infrastructure by 2010.

3. As concerns the *sustainable consumption and production*, **promote sustainable consumption and production**, having as targets and operational objectives: break the economic growth from environmental degradation, improve the social and environmental performance of the products and technological processes; increase the international market share of the environmental technologies and of eco-innovation; reaching by 2010 a level of public green acquisitions (GPP) equal to the best current level of the member states

4. As concerns the *preservation and management of the natural resources*, EU SDS set as key-goal the **improvement of natural resources management and avoiding overexploitation**, with the following targets and operational objectives: improve the efficiency of resources by using renewable resources at a rate which is not to exceed their capacity of regeneration so as to cut down the consumption of non-renewable resources and the ecological impact of using raw materials; securing and preserving a competitive advantage by improving the efficiency of the natural resources and promoting ecologically efficient innovations; limit the volume of wastes and increase the efficiency of natural resources utilisation by applying the concept of life cycle and promotion of recycling; limit the losses of biodiversity by 2010.

5. In the area of *public health*, the general goal of EU SDS aims **a good level of public health and improved protection against the threats to health**, having among the targets and operational objectives: coordination of the efforts to improve the protection against the threats to public health; improve the food legislation and promote a high level of animal health; reduce the inequalities between the member states in the field of health; by 2010, the production, manipulation and utilisation of chemical products should not menace significantly public health.

6. In the area of *social inclusion, demography and migration*, the general goal of EU SDS is **to create a society characterised by inclusion and solidarity and increase the quality of life for the citizens**, with targets and operational objectives such as: social and territorial cohesion, modernisation of the systems of social protection, increased occupation among the youth, women and the elder or the disabled, integration of the immigrants, equality of genders.

7. In the area of *global poverty and challenges for the sustainable development*, the general goal is **to promote sustainable development worldwide and the integration within the EU domestic and foreign policies of the world objectives of sustainable development and of the international commitments**, having among the targets and operational objectives: progresses in fulfilling the objectives resulting from the international commitments assumed by the EU; increase the volume of international aid to 0.7% of the gross domestic product by 2015, with an intermediary target of 0.56% in 2010; promote sustainable development within the context of WTO negotiations; include sustainable development among the EU foreign policies.

EU SDS also set several directions of action for the policies bearing a direct contribution to sustainable development, such as:

1. *education* (education for sustainable development, within the context of *UN Decade of Education for Sustainable Development 2005-2014*);

2. *research-development*, where EU SDS set as objectives to promote inter- and trans-curricular approaches in the area of sustainable development by involving social and natural sciences; integration of research-development and the implementation of its results with the political decisions; additional research on the interdependence between the social, economic and ecologic systems, methodologies and instruments for risk analysis; development of research networks, etc.

Among the *economic instruments* required for EU SDS implementation, are:

- exploit *win-win* instruments of conciliating economic growth with environmental protection;
- ensure price transparency by a correct reflection of the economic, social and environmental costs of the goods and services;
- shift from the taxation of the work force to taxes on pollution or on the consumption of resources and energy;
- reform of the subsidies having adverse ecological effects in each economic sector;
- increase the synergy between various mechanisms of co-financing, such as the policy of cohesion, rural development, Life+, Research and Technological Development (RTD), the Program for Competitiveness and Innovation (CIP).

For the success of the strategy of sustainable development, environmental protection becomes, from a sectorial policy, a horizontal principle of all sectors.

1.3.3. Integration of environment policy into the european energy policy

The sustainable energy policy can be defined as that policy by which one can maximise the long term standard of living of citizens, by keeping concomitantly a dynamic, reasonable equilibrium between the security of supply, the competitiveness of services and the environment' protection as an answer to the challenges of energy systems.

The idea of integrating the sustainable development concept into the sectorial policies has been promoted in June 1998, at the European Council from Cardiff, when a number of economic sectors have been proposed for integrated approaching.

1.3.3.1. Overall objective

The overall objective consists in *limiting the climate change, costs and other negative effects on society and environment, by using clean energies and promoting energy efficiency.*

The EU potential of renewable resources

The fears generated by the polluting effect on the environment of fossil fuels burning and the steady rise of the energy bill because of high oil price – in the context of a current import dependency of around 55% of fossil energies and over 80% on medium term are some of the reasons which determined the EU involvement in an ambitious and successful plan with the aim to become a global leader in the renewable resources production. Moreover, the renewable energies seem to be the only available resources in EU⁴⁷.

⁴⁷ In this category are included all non-fossil energy sources (biogas, biomass, bio-thermal energy, solar, wind, hydro-energy, photo-voltaic cells)

EU renewable energies' market records a turnover of 15 billion euro⁴⁸ (half of the global market) and employs 300.000 people. Moreover at the current high levels of oil prices, the renewable energy is about to compete with fossil fuels prices.

EU potential for energy saving

Starting from the premises that it cannot afford to increase its already high dependency on primary energy sources imports, without affecting its industrial competitiveness, under the supply-side and environmental pressures, EU focused on implementing a common energy strategy, with an emphasis on the objective of the efficient use of energy⁴⁹.

Although EU is one of the most efficient regions in the world from the point of view of energy specific consumptions, it still has an important potential for improving its performances in this field. In its' 2005 „Green Paper about energy efficiency – „Green Paper on Energy Efficiency : Doing more with less”⁵⁰, the European Commission argued that up to 20 % of the current EU energy consumption could be saved; these savings would represent the equivalent of 60 billion euro, would have a benefic (positive) impact on the energy security of supply and would generate one billion new jobs in the involved sectors.

The studies showed that a medium family within EU could save between 200 and 1000 euro/year, only by applying simple energy efficiency measures.

1.3.3.2. Operational objectives

The main operational objectives of integrating the environment policy into the energy policy (established by European Council from Cardiff) have been the following:

- increase of „cleaner” energy sources share (renewable, nuclear energy, natural gases);
- promotion of energy saving and energy efficiency measures;
- reduction of the environmental impact of the energy production and consumption.

Targets:

- By 2010, 12% of energy consumption, on average, and 21% of electricity consumption as a common but differentiated target, should be met by renewable sources, considering raising their share to 15% by 2015.
- By 2010, 5.75% of transport fuels should consist of biofuels, as an indicative target, (Directive 2003/30/EC), considering raising their proportion to 8% by 2015.
- Reaching an overall saving of 9% of final energy consumption over a 9 year period until 2017 as indicated by the Energy Saving Directive.

Actions at EU level:

⁴⁸ Green Paper:” For a sustainable, competitive and secure energy in EU”, Brussels, March 2006

⁴⁹ In its resolution concerning the Green Paper, the European Parliament defined energy efficiency and energy saving as absolute priorities. It asked for an „intelligent” approach of energy use problem, with the aim to make the european economy the most efficient in the world. The Commission' Communication concerning the action plan aiming at increasing the energy efficiency, provides for a supplementary increase of this indicator by one percent a year, as compared to 0,6%/year during the last years. If this objective will be accomplished it means that until 2010, 2/3 of feasible saving potential (estimated at 18%) will be realized.

⁵⁰ Green Paper on Energy efficiency : Doing more with less”, Brussels, 2005

- Adoption and implementation of an ambitious but realistic plan (Action Plan on Energy Efficiency) for turning over the energy saving potential, estimated at 20 % from the current consumption, until 2020;
- Analysing the way to achieve the existing tasks (2010) for the renewable energy sources and promoting them in a cost-efficient manner over the long term and in the same way further the use of biofuels in the transport sector. Support for research& development of II-nd generation biofuels.
- Promotion of biomass consumption with the view to diversity EU energy sources, to diminish the pollutant emissions from transport, to create new jobs and opportunities for increasing the standard of living in rural areas, by expanding the proposals included in „The Biomass Action Plan” in the following sectors: heating and cooling, electricity, transport;
- Enhancing the power stations efficiency, particularly by further promoting the use of combined heat and power.

1.3.3.3. Instruments to tackle the objectives

At the Community level, there are a series of instruments by which one can achieve these objectives, respectively orizontal policies and sectorial policies.

a) Orizontal policies

The orizontal policies are aimed at preventing and alleviating the negative impact of an uncontrolled increase in the energy consumption, by setting up a certain indirect control, mainly by means of energy prices, which must reflect real costs, including those of externalities and stimulate energy saving.

The main instruments of orizontal policies are : **liberalization, financial and fiscal policies, dissemination of new technologies.**

The main EU legislative instruments are: „**Directive** on electricity produced from renewable energy sources” (COM/2001/77); „**Directive** of biofuels” (COM/2003/30); **Resolution** of European Council no.93/500/EEC concerning promotion of renewable energy sources (Altener Programme); **Directive** of Council 92/75/EEC – detailed in a series of Directives of the Commission – for energy labeling of appliances.

Economic Instruments: *liberalization of energy market* and creation of internal market can ensure a healthy competition and guarantee the security of energy offer; *enhancing the european economy competitiveness*, provided that *the transport capacity and interconnection of trans-european-networks will be developed.*

Decoupling the energy consumption from the economic growth is another trend of the common policy whereby it is intended to reduce or stop the negative influences of the energy sector on the environment and social life. The recommended instrument is the conservation and efficient use of energy.

Fiscal instruments. *Energy taxation* is, on a market more and more opened, a flexible and efficient instrument to stimulate a change in the producers and consumers’ behaviour as regards the promotion of energy efficiency.

The fiscal policy instrument is meant to eliminate the distorsions at national level and also the disparities between energy producers, to encourage the energy conservation by *favouring the internalizing of prejudices to the environment and the reduction of CO2 emissions.*The harmonisation, at the Community level, of the energy products’ tax

framework is necessary to prevent the distortions of competitive nature on the internal European market. The fiscal policy must have a net neutral result, meaning that the increase of taxes applied to non-energy efficient services must be set off by tax reductions applied to labour force or to some other energy efficient activities. The member states will be then obliged to use the revenues derived from these activities in measures of energy conservation, instead of using them for other initiatives.

Among the **opportunities** aiming at promoting the energy efficiency by means of fiscal system one can mention:

- concentration** of efforts on excise taxes in some essential areas (for instance harmonisation of taxes' rates in case of competition' distortions, use of differentiated taxes for promoting renewable sources etc);

- bringing** the excise tax rates on the energy products **nearer** to that applied to the electricity consumed captive -in the production process- and **introduction** of automatic indexation in order to avoid tax erosion due to inflation;

- specific taxation** of transports, both as regards excise taxes and tax on the added value (VAT);

- **adjustment** of conditions regarding the border trade;

- **taxation** of energy consumption for thermal energy production, mainly in the new and big buildings;

- rationalizing** the system of tax exemption and facilities

Financial instruments – *The structural funds for energy* are an instrument which tends to become the most important financing source of the development projects in EU member states. The fact that during 2007-2013 period an important share (about 1/3) of EU budget (336 billion euro) will be earmarked for structural funds, increases the possibility to direct important financial funds for energy efficiency measures, renewable energies etc.

Instruments of Research, Development, Innovation (CDI)- *Dissemination of new technologies (research & development)*

In order to sustain this process it is also necessary to *develop the markets* able to absorb the new technologies by means of production based on economies of scale. In this context, the *public acquisitions* can play an extremely useful role. In April 2005, the European Commission adopted a proposal for the *7-th Framework- Programme for Research and Development*, which established for the energy sector the following priorities: use of renewable resources, development of clean technologies for coal exploitation, increase of energy networks efficiency and cooperation programmes for promoting energy efficiency.

The promotion of research promotion and of best practices will be made with the contribution of a guide – for 2005-2008 period- on the basis of which, EU member states will be encouraged to launch *specific annual programmes of actions* in order to promote and implement energy efficiency.

b) Sectorial programmes for EU energy conservation

The **constructions** represent the most important sector of EU, as for its energy saving potential.

Targets: Achieving savings of 40 billion t.e.p., during 2006-2013 period, only by applying energy efficiency measures (details in Annex no.1).

Legislative instruments: „*Directive on energy performances of buildings*” (2002/91/EC), „*European Greenlight Programme*”.

Economic Instruments combined with R&D policies

Use of energy efficient technologies, available and economically affordable can reduce the energy consumption in buildings by 1/5, at least, equivalent to a reduction of 10% of net petroleum imports and of 20% of pollutant emissions.

It is intended also, to encourage the renewable energy resources use at the new buildings, the connection of heating and air conditioned systems at multiple energy sources, integration of photo-voltaic cells technologies and of solar panels in roofs and buildings' frontage's utilisatios.

It is supposed that up to 50% of the energy consumed could be saved by applying the so-called principle of „intelligent lighting” as it is stipulated in „European Greenlight Programme”.

Voluntary instruments: the main instrument for achieving this objective will be the „*certificate for energy performances of buildings*”, drawn up on the basis of about 30 european standards in this field. These will be applied, at national level, by voluntary agreements, negotiated at community level. (Details in Annex no.3).

Industry

Actions at EU level

- Conclusion of long-term agreements concerning the energy efficiency;
- Increase of the combined production heat/power;
- Increase of energy efficiency' role in the energy services offered by the distribution companies.

Legislative instruments: „*Directive concerning the combined production heat/power*”⁵¹; „*The Framework-Directive concerning the Ecodesign*”; „*Directive of Council 92/75/EEC – for energy labeling of household appliances*”.

Voluntary (agreements) instruments: The household appliances are appropriate for major improvements by combining the informal measures with the voluntary agreements. EU countries adopted measures for products labelling, so that the consumers should be informed about the energy specific consumptions of the appliances they use. „Eco-design” measures are the first step towards improving the energy performances of household appliances. Other measures refer to the reduction of electric energy consumption in „stand-by” mode (which accounts for 5-10% from the whole consumption) and to the VAT reduction for efficient equipments.

Road transport

The transport sector is the main responsible for EU failure in fulfilling the objectives of Kyoto Protocol. EU transport sector is **98%** dependent on fossil fuels and 96% on petroleum products. About **90%** of the estimated increase in CO2 emissions during 1990-2010 period is attributable to the transport sector, the engines with internal combustion will be the main available transport technology, by 2030, and the liquid fossil fuels and renewable sources will be the main fuels.

Targets: achieving an average fuel saving of about 25% until 2008-2009 (as compared with 1998), by diminishing the average specific fuel consumption, to **5.8 liters/100 km** for gasoline and to **5.25 liter/100 km** for diesel oil. This will entail a CO2 emissions' reduction of about **120 g/km** for all passenger vehicles, sold in EU market.

⁵¹ COM-2004/8/EC

Legislative instrument : „*CARS 21 Programme*”

Voluntary instrument: the voluntary agreements concluded with car producers

Administrative instruments for promoting the best practices: **the labeling system** for motor cars – which implies the member states obligation to guarantee that the informations concerning the fuels consumption and CO2 emissions will be delivered to the consumers.

Fiscal instruments:

Motor cars’ tax calculation on the basis of fuel consumption and of CO2 and particles’ emissions; fiscal measures aimed at eliminating the cars worned out and encouraging those using „clean” fuels.

Financial instruments:

These projects will be supported by *structural and cohesion funds* (COM/2005 from 5 July 2005). These funds could finance farmers’ training, ensure the necessary equipments for biofuels producing systems for centralized heating using biomass.

State aids for supporting the development of biofuels production.

The state aid should cover the cost difference between the fuels’ production from renewable energy sources and that from fossil energy sources. EU asks for the notification of such measures, but is favouring them. It is not necessary to approve them by the unanimity of the member states.

Economic instruments:

EU is promoting a stimulative policy of progressive substitution of diesel cars equipped with motors using ethanol, because of the greater availability of production capacities for bioethanol than for biodiesel, of the advantage of using a lesser agricultural surfaces and also because of the better prospects to diminish industrial production’ costs :it is intending to use modified motor cars, able to use 95% ethanol mixed with diesel oil and also to revise the standard **EN14214** in order to allow switching from methanol to ethanol.

The stimulation of the production and acquisition of motor vehicles (with an emphasis on urban transportation) with little pollution degree, by using biofuels can be achieved by means of fiscal policies.

It has been estimated that bioethanol can become competitive at an oil price level of 90 euro/barrel (about 130 \$/barrel), and biodiesel at 60 euro/barrel (75 \$/barrel), but the uncertain evolution of the international oil price and the production costs of biodiesel make difficult a cost estimation.

Preliminary estimates, based on 2005’ market prices indicates that a quote of about 25% of biofuels in road transport up to the year 2030, would imply supplementary costs of 31 billion euro/year (at EU level), or 6.6 eurocents/litre for gasoline and 8.2 eurocents/litre for diesel oil.

1.3.4. Integration of the environmental policy within the new agricultural policy (PAC) 2003

Support to implement the measures from the program Nature 2000: the aids from the areas with environmental restrictions will be directed according to the requirements of *Habitats Directorate* (Nature 2000); conditions are thus provided to offer, in justified situations, larger aids. These can be, for the beginning, of maximum 500 Euros/ha, reducing over the following 5 years to 200 Euros/ha, the manner of granting being justified by the higher initial costs generated by the adoption of the practices according the destination of the lands specified in Nature 2000; in justified cases, the duration of

granting the 200 Euros/ha aids may be prolonged for longer periods. The eligible areas are limited to no more than 10% of the member states area;

Aids for forests: the covering area of the support measures for forests is expanded by including the investments with positive social and economic effects in the forests owned by the state;

Increase the rate of co-financing afferent to the Community in agro-environment and animal welfare: with the view to improve the efficiency of agro-environment actions and to increase animal welfare an increase was decided for the relative EU contribution to a maximum of 85% in the regions afferent to Objective 1 and to 60% in the other areas (compared to 75% and 50%, the previous figures);

The amounts thus obtained are intended to supplement the funds afferent to pillar 2 and they are already available starting this year. When the modulation rate will reach 5%, the additional funds accumulated for rural development in EU are forecast to reach 1.2 billion Euros per year.

1.4. Progresses of sustainable development in Romania

The EU environment policy is a key aspect for the elaboration of the National Strategy for Sustainable Development, reflected in the formulation of its global objective. It can not be different from the global and regional (European) priorities identified and communicated by UN and EU structures. The policy of compliance with the EU programmatic documents is summarised below (Table 1.2).

Table 1.2. Compliance of the Romanian policy of sustainable development with EU policy

EU policy ad main provisions	Manner in which EU policy reflects in the general and specific objectives proposed by the environment sector and by the other sectors
<p><i>The 6th Program of Action for the Environment</i> targets the environment component of the strategy for sustainable development, having as main goals to protect and rehabilitate the natural ecosystems and to preserve biodiversity in the European Union; to improve the quality of life and implicitly, to reduce the adverse impact of pollution on human health; utilisation of renewable sources of energy within the context of sustainable development; reach a level of air quality that has no adverse impact on the other environmental factors and on human health; reduce the amount of wastes to be stored and reduction of the amount of dangerous wastes, etc.</p>	<p>Efficientise waste management systems, sustainable utilisation of the natural resources, protection of air quality</p>
<p>The European Strategy for Sustainable Development - Goteborg 2001 – centres on several key-priorities: limit climate changes and increased utilisation of energy obtained from renewable resources; limit the adverse impact on health; efficient management of the natural resources.</p>	<p>Improve the standards of waste management; Population access to public utilities of water and used water; Ecological reconstruction of the damaged ecosystems; Bring air quality parameters within the legal limits</p>

1.4.1 Current situation in the field of the environment

The environmental aspects are a basic criterion to select the projects of sustainable development, eligible being especially those of protection and rehabilitation of the natural patrimony, of the cultural character and ecological stability of the landscape, and to raise

the awareness and to involve the citizens in the decision-making process, while observing the principles of sustainable development and compliance with the European Standards. The sectors with the highest environmental impact in Romania are the industry, transportation and agriculture.

Industry is the main source of environmental pollution by the amplitude of the technological process and by the large amount of impurities released in the air and water. Several industries pour waters with a high level of residues, mainly inorganic. The pressures on soil quality result mainly from mining activities and nonferrous metallurgy. Thus, the mine waters and the waters from coal washing contain large amounts of *magnesium, nickel, manganese* salts and coal dust, while the washing plants for nonferrous ores pour waters full of *dead soil* and *lead, zinc, copper, iron* salts and even *cyanides*. The siderurgy plants, power plants, atomic plants also pour waste waters. The non-renewable natural resources have been and still are exploited and processed with technologies that resulted in a strong pollution of some areas of the country. The use of non-renewable resources – minerals and fossil fuels, associated with waste production – generates an impact on the environment and on human health. The air emissions of pollutants from the large burning installations have a particular impact on environmental pollution (see Appendixes 4 and 9).

Transportation represents, next to *industry* and *agriculture* (see Appendix 9), another source of pollution, by the irrational location of the communication ways and by the release into the atmosphere of exhaustion gases. A serious situation of pollution is the spill of oil residues into the seawater. A major concern related to road transportation is the sustainable development and the reduction of the adverse environmental effects generated by chemical or noise pollution.

Agriculture contributes to environmental pollution by using a large volume of chemical fertilizers and pesticides (see Appendix 5). These substances end in lakes and flowing waters (by flowing on slopes) and destroy the fauna and flora. The irrational exploitation of the land and even the irrigations, when don improperly or exaggeratedly, may contribute to soil degradation and to the loss of land area for agriculture. Thus, *soil, water* and *air pollution, habitat fragmentation* and *the loss of wildlife* are, most times, consequences of inadequate agricultural practices.

Romania already built a sectorial operational program for environment (**POS Environment**). The main objective of POS Environment is to *reduce the gap in environmental infrastructure between the European Union and Romania*, both in terms of quantity and in terms of quality. The expected results will efficientise and expand the environmental services, considering the principle of sustainable development and the principle of “polluter pays”. The “*infrastructure*” within POS Environment context includes:

Public environmental utilities and services;

Network of protected natural areas;

Sites affected by historical pollution or slope erosion

Reaching the global objective depends on the specific objectives of POS Environment, which are transposed into 4 strategic priorities:

Priority 1 – Development of regional systems of water and waste management

Priority 2 – Development of sustainable investments in environmental infrastructure

Priority 3 – Develop adequate management systems for nature protection and to prevent the risk of floods in the selected priority areas

Priority 4 – Technical assistance

To understand the manner in which the strategic priorities for sustainable development in Romania might be ranked we gathered several SWOT analyses in several tables (**Tables 1.3 – 1.6**) which also contain quantitative data on the current situation of the analysed sector (environment, or the sector influencing the environment):

Table 1.3: SWOT analysis of the main environmental aspects in Romania

STRONG POINTS	WEAK POINTS
<ul style="list-style-type: none"> • Environmental legislation harmonised almost completely with EU legislation; strategies and plans of implementation of the relevant Directives for each sector of environment; • Existence of the basal institutional structures for environmental protection – to monitor compliance with community acquis, to implement the development programs, for the integrated management of the water resources by hydrographic basins; • Experience in running programs financed by pre-adhesion funds (PHARE, ISPA, SAPARD) or from other international sources; • Technical assistance available to prepare a consistent portfolio of projects to be financed through POS (with PHARE, ISPA support and state budget); • The experience gathered by some 35 ISPA beneficiaries in large Romanian localities will be used to implement FSC projects in regions; • Delimitation of the agglomerations and of the areas for air management and air quality assessment; • Variety and wealth of biodiversity in Romania, important natural resources; • Undergoing delimitation of the protected areas; • About 8% of the territory of Romania is already declared protected area; 21 special protected areas have been identified and fulfil Nature 2000 criteria; • Significant tourist potential; • Increase the awareness of the decision-making factors to apply the policies and plans of actions for environmental protection. 	<ul style="list-style-type: none"> • Low access of the population to centralised systems of water and salubrity compared to EU countries; low quality of the drinking water supplied to the population in many areas; • Rather low level of investments, after 1990, in all the sectors of the environment compared to the requirement of investments to comply to European standards; • Insufficient administrative capacity, particularly at the regional and local level, to implement the environmental legislation; • Existence of a large number of municipalities without performing water supplying companies; • Existence of a large number of sites with historical pollution due to past intensive economic activities; • Precarious infrastructure to collect, transport and remove wastes; • Poor awareness of the population and economic agents on proper waste management; • High proportion of wastes produced and stored, low level of selective waste collection, insufficient development of the waste recycling and utilisation market; • Poor awareness of the population and economic agents on the management of the protected areas; • Existence of gaps in the national network of protected areas; low financial and human resources for the management of protected areas and of the species and habitats of community interest; • Limited number of management plans for the protected areas; • High consumption of primary resources (mainly fossil fuels) and high specific emissions of Nox and SO2 mainly from the large burning installations; • Lack of intersectorial communication and of collaboration for the management of the natural resources and of the environment.
OPPORTUNITIES	THREATS
<p>Use of EU funds as an important contribution to the improvement of the environment standards in Romania;</p> <ul style="list-style-type: none"> • Increase of the standards of living and of the economic opportunities by providing quality public services, by remedying the polluted sites and by 	<p>Low capacity of the final beneficiaries/local authorities to elaborate project proposals;</p> <ul style="list-style-type: none"> • Organisation, political and financial difficulties determined by the process of regionalisation; • Non-compliance with the requirements of EU Directives for the water sector in the case of a low

<p>reducing the risks of natural disasters;</p> <ul style="list-style-type: none"> • Decentralisation concerning the management of environment programs; • Apply the principle of partnership in the decision-making process for environmental protection; • Development of long-term investment plans under conditions of sustainable development; • Implementation of the legislation to introduce the best available technologies in environmental infrastructure, to increase the efficiency of resources and energy utilisation; • Reduce the discrepancies between regions and between villages and towns; • Improved access of the population and of the economic agents to public services of water, sewage and heat; • Improved performance of the operators of public services; • Opportunities for private investments and for trade; • Approach in the life cycle of the product within the context of integrated waste management; • Development of a viable recycling market for the wastes/raw materials resulting from waste processing; • Introduction of the renewable energy resources; • Development of public-private partnerships for the environment sector; • Development of the ecologic tourism. 	<p>absorption of EU funds due to the complex process of project preparation and management and due to costly co-financing;</p> <ul style="list-style-type: none"> • Difficulties in supporting the investment costs for the projects of environmental infrastructure, particularly by the small and average-size communities; • High costs to comply with European standards on the exchange of technologies and the use of BAT for IMA; • Increased pressure on biodiversity and air quality in correlation with the economic growth; • Inefficiency of short- and average-term investments to reduce the risks of natural disasters that may cause important material and human damage; • Cooperation between the institutions and organisms involved in FSC management; • Availability of land for the development of environmental infrastructure; • Inadequate utilisation of EU funds, without considering the possible effects on the environment and biodiversity, for instance for the development of infrastructure that leads to habitat fragmentation.
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Source: *Ministry of the Environment and Water Management, POS Environment, April 2006*, with our completions

1.4.2 Current state of the environment and transportation infrastructure

Table 1.4 - SWOT analysis on environment infrastructures (source POS Environment, 2005)

STRONG POINTS	WEAK POINTS
<p>Water sector</p> <p><u>Environment</u> legislation for the water sector harmonised with EU legislation</p> <p><u>Institutional</u> structures established for an integrated management of the water sector (quality and quantity) concerning the hydrographic basins;</p> <p><u>Identification</u> of population agglomerations and of the areas vulnerable to pollution with agricultural nitrates</p> <p><u>Technical</u> expertise of the National Administration “Romanian Waters” for water management, particularly for the protection against flooding;</p> <p><u>Existing</u> projects for prevention and hydro prognosis developed with US assistance</p> <p><u>Experience</u> concerning the pre-adhesion funds, particularly the ISPA Program to improve the water services (water supply, waste water treatment, sewage system)</p>	<p>Water sector</p> <p><u>Large</u> investments required to comply with EU requirements (9,500 M euro until 2018)</p> <p><u>Low</u> administrative capacity to implement the legislation of the water sector</p> <p><u>Extremely</u> low developed infrastructure for waste water treatment (waste water treatment plants and collection systems), particularly in Regions 8 and 4;</p> <p><u>Insufficient</u> centralized systems for water supply and sewage particularly in rural areas;</p> <p><u>Insufficient</u> data to characterise drinking water quality at the national level;</p> <p><u>Poor</u> quality of the drinking water supplied to the population due to old pipes and discontinuation in drinking water supply;</p> <p><u>Insufficient</u> allocation of funds for protection against flooding (there still are 2050 localities that require protection against flooding)</p> <p><u>Size</u> of the agricultural areas affected or that may be affected by pollution with agricultural nitrates</p>

Waste management	Waste management
Full transposition of EU legislation in this area; Elaboration of the National Strategy and Plan for Waste Management Administrative structures established at the national, regional and local level to implement the national policy on wastes and for inspection and control Availability of annual data concerning waste management at the national level Experience in implementing projects financed by pre-adhesion funds (PHARE or ISPA)	Poor infrastructure for waste collection, transportation and disposal Poor capacity of the recently-established ARPM and ANPM concerning waste management Insufficient financial and human resources at the level of the public administration of the municipalities to involve in waste management Poor awareness of the population and economic agents Insufficient promotion of the administrative instruments which to facilitate the creation of viable waste market
Air quality	Air quality
Full transposition of EU legislation in this area Designation of the agglomerations and areas for the management and evaluation of air quality Network of air quality in Bucharest, which may supply data on-line Experience in implementing projects financed by pre-adhesion funds (PHARE)	High level of fossil fuels utilisation to produce energy High pollution with heavy metals and particles in some areas; High specific emissions of greenhouse-effect gases, NOx and SO₂ and powders resulted mainly from IMA National network monitoring air quality not yet completely fitted; Low numbers of operators having monitoring and control systems for the atmosphere polluting emissions; Absence of ISPA projects to protect the atmosphere, although this area is eligible according to Regulation no. 1267/1999/EC
Nature protection	Nature protection
6,89% of the territory of Romania is declared protected area; Variety and wealth of the biodiversity and biogeographical regions of Romania that have international importance 21 special protected areas have been identified and fulfil Nature2000 criteria The limits of 80% of the total protected areas were determined in GIS format Significant tourist potential	Large number of endangered habitats and species Insufficient infrastructure for nature and landscape protection; Low financial and human resources for the management of the protected areas and of the important biotopes; The management plans of the protected areas are yet to be elaborated and not all administrations have been assigned There still is no complete inventory of all natural habitats and of flora and fauna species.
OPPORTUNITIES	THREATS
Water sector	Water sector
EU funds allocated for the environment (water) sector in Romania Business opportunities for the foreign companies to invest in the water sector (within the context of the allocated funds) Development of public-private partnerships for the water sector	Low capacity of the final beneficiaries/local authorities to develop project applications for the water sector. Non-compliance with the requirements of EU Directives for the water sector in the case of a low absorption of EU funds due to the complex process of project preparation and management and due to costly co-financing Difficulties in supporting the investment costs for the projects of environmental infrastructure, particularly by the small and average-size communities
Waste management	Waste management
Availability of structural and adhesion funds	Staff insufficiently trained and experimented to

<p>Opportunities for private investments and trade Development of a viable market of wastes / raw materials resulting from waste processing Establishment of public-private partnerships (PPP) for the wastes sector Finalisation of the pilot projects to recover / recycle package wastes</p>	<p>apply the legal framework for wastes management. Insufficient capacity of absorption of the European funds Poor social support of good wastes services, mainly selective collection Requirement for financial assistance through co-financing which involves the allocation of important sums from the state budget</p>
Air quality	Air quality
<p>Common projects of implementation to reduce GHG emissions Introduction of renewable sources of energy</p>	<p>High costs to comply with European standards for the exchange of technologies and the use of BAT-IMA. Higher pressure on air quality in correlation with the economic growth Lack of financial resources to finance the environmental measures that require large investments, particularly at the local level; Uncontrolled increase of vehicle traffic with adverse consequences on the emissions into the air</p>
Nature protection	Nature protection
<p>EU funds allocated for this sector Development of ecological tourism Economic and rational exploitation of the species of flora and fauna</p>	<p>Higher pressure on biodiversity in correlation with the economic growth Environmental pollution</p>

Table 1.5. Current state of the environment infrastructures targeted by Priority 3 of the PND

FRESH WATER SUPPLY	Comments
<p>68 % of the Romanian population connected to the utility – 98 % urban and 33 % rural (3,4 million inhabitants)</p>	<p>Europe has 100 % connection to the utility in urban and 87 % in rural areas</p>
<p>In 2002 2915 localities had a centralised system for drinking water distribution – 265 municipalities and towns (100 %) and just 2647 rural localities (17 %)</p>	<p>In rural areas water supplied from soil water table, usually contaminated with nitrates and heavy metals</p>
<p>Drinking water treatment plants: 1.398 units</p>	<p>25 % chemically nonconforming in localities with 50 – 500 inhabitants; 10 % nonconforming in localities with more than 5000 inhabitants; 9,8 million inhabitants from urban areas exposed to risks due to these nonconformities.</p>
SEWAGE SYSTEM	Comments
<p>Localities with sewage system: 675 servicing 11.5 million inhabitants (of which 10.3 million – 90 % in urban areas and 1.15 million – 10 % in rural areas)</p>	<p>52 % of the Romanian population benefits of both drinking water supply and sewage, 16 % only of drinking water supply and 32 % of neither</p>
WASTE WATER TREATMENT	Comments
<p>28.8 % treated properly, 42 % insufficiently treated and 29.2 % non-treated</p>	<p>In conclusion, about 71 % of the waste waters poor directly into emissaries; of these, 49 % originate from heat and electricity producing plants and 39 from public units</p>
<p>1359 plants for waste water treatment (in 2004 – 555 plants, 40.8 % were functioning properly and 59.2 % were not functioning properly)</p>	<p>Only 340 urban agglomerations benefit of waste water treatment plants.</p>
WASTES MANAGEMENT	Comments
<p>29 million tons (in 1998) and 39 million tons (2003)</p>	<p>60 % are house wastes, the balance of 40 % coming from constructions, demolitions and packages</p>
<p>29 % are municipal / urban wastes and 71 % are</p>	<p>Only 5 % of rural wastes benefit of salubrity</p>

production wastes disposed of by the urban salubrity services	services
40 % of the wastes are recyclable, 20 % recoverable	But only 2% are recycled by selective collection, the balance being disposed of at the dump
267 municipal wastes dumps – 13 discontinued functioning, 238 are to be closed down for non-compliance with EU norms, only 16 comply	49 additional waste dumps are needed for non-dangerous wastes with capacities of 50,000 up to 100,000 tons /year
2 686 wastes dumps 1 ha or larger do not comply	Will be closed until 2010 and the rural collection of waste will expand
169 industrial waste dumps (51 for dangerous wastes, including for 10-25 % of overall medical wastes); 116 for non-dangerous industrial wastes, 2 for inert material)	Only 15 are according to EU norms; 154 will be gradually closed down and 346 burning installations / incinerators for medical wastes do not comply and will be shut down by 31.12.2008.
AIR QUALITY	Comments
39.24 % of the air pollution is from the large burning installations producing energy and industrial conversion, 31.58 % from traffic and 11.39 % from the processing industry	The most dangerous pollutions are the emissions of deposit powders, SO₂ and heavy metals
BIODIVERSITY AND NATURE PROTECTION	Comments
13 National Parks; 13 Natural Parks and a Biosphere Reservation – the Danube Delta (1,655,333 ha) plus 935 Scientific reservations amounting to 180,000 ha , totalling 7.8 % pf the country area	The target for 2015 is 15 %
116 special area of protection for birds and 79 sites of community interest so far for Nature 2000 network	Compliance by January the 1 st
NATURAL DISASTERS	Comments
Black Sea beach lost in 35 years more than 2400 ha (about 80 ha / year), while the accumulations did not exceed 7 ha / year	The coast line advanced into the hinterland by 180 – 300 meters, in some places by 400 m.

Table 1.6 SWOT analysis of some administrative – institutional aspects concerning the environment

Area	Strong Points	Weak Points
Institutional framework	Existence of the permanent interministerial councils for the integration of the environment policy within the sectorial policies	The Commission is established, it does not work efficiently (SEA – EIA)
Consultation during the stage of investment planning	Legally established duty (energy law; environment law; oil law; law mines?)	The obligation is not enforced systematically (staff, resources, political pressure)
Allocated financial means	Some ministries have budgets by programs (the economic ones)	The Ministry of the Environment has no such budgets
Coherent methodology of evaluation		It doesn't exist / it is not public / it is not known
Cooperation between stakeholders, at the national and international level (civil society; government; companies / federations; local authorities)		It is very poor

1.4.3. Level of rural development

According to recent estimates⁵², at the level of the 10 candidate countries, the rural communities – defined in agreement with OCDE⁵³ criterion – totalled 89% of the overall number of communities, 86% of the total area and 43% of the population. At the same time, the 10 CEE countries total an agricultural area amounting to 45/6% of EU 15 agricultural area and a population occupied in agriculture 13.4% larger than that of EU-15.

The development level of the public infrastructure is a key-factor of the economic development in the rural areas and we refer here both to the elements of physical, social, financial infrastructure, and at the infrastructure specific to markets.

The development level of the social infrastructure, mainly the health and education services, influence the decision of the population to stay or migrate from the rural environment. At the same time, the degree of accessibility to attend a quality form of education influences the training level of the future rural work force.

Romania has to recover important stages of development of the rural environment to close the large difference from the average level of the older EU member states. A more detailed presentation of the current level of rural development in Romania will be done in Chapter 3.

1.4.4 Measures adopted in areas on which rural development depends

1.4.4.1. Regional development

The programming documents of the National regional policy from the perspective of accession to the EU have as main document the National Plan of Development (PND), which contains the strategic priorities of regional and sectorial development. The PNDs are elaborated based on the *Regional Plans of Development* (PDR) and they reflect the *National Strategy of Development* and the regional and sectorial *Operational Programs* (PO).

1.4.4.2. Management of the flood risk

*The National Strategy for the management of the flood risk*⁵⁴ has the purpose to reduce the impact of floods on the population and goods, by an adequate planning and by a policy which to correspond to the standards and expectations of the human communities, under the conditions of environment protection.

Its general objectives are to:

increase the quality of life by reducing the damages produced by floods, but being ready for the occurrence of other such phenomena;

diminish the impact of the measures of risk management on the ecological systems;

use adequately the resources to build, maintain and exploit the infrastructures and measures of reducing the risk of floods;

⁵² The Future of Rural Areas in the CEE New Member States, Network of Independent Agricultural Experts in the CEE Candidate Countries, coordinated by Institute of Agricultural Development in Central and Eastern Europe, Halle, Germany, under the aegis of CE, Directorate General for Agriculture, January 2004.

⁵³ Areas with a population whose density is lower than 150 inhabitants /sq. km.

⁵⁴ Ministry of the Environment and Water Management, *National Strategy for the Management of Flood Risk*.

maintain some proper economic activities (agricultural, industrial commercial, dwelling and leisure) in the flood areas.

The general objectives are supported by **14** specific economic, social and environmental objectives.

1.4.4.3. Climate changes

In the area of *climate change management*, Romania ratified the Kyoto Protocol at UNFCCC. The total **GES** emissions (not considering the absorbents) decreased by **46%** during 1989-2003, while the net emissions of **GES** (considering **CO₂** absorption) decreased by **49.5%**, in agreement with the latest National Inventory of the emissions of greenhouse effect-gases. This important decrease of **GES** emissions is caused, mainly, by the decrease of the industrial production and less by the policies and measures to reduce emissions. The Government of Romania adopted in June **2005**, by **GD** no. **645/2005**, the *National Strategy on Climate Changes*. With it, Romania took the first steps towards a concerted national effort to implement the policies in this area during 2005-2007, to limit the emissions of greenhouse effect-gases and to prepare the measures of adaptation to the possible effects of climate change. Based on this strategy, the *National plan of action on climate changes* was elaborated, which includes the concrete actions aiming to fulfil the general and specific objectives presented in SNSC to be developed in Romania during 2005-2007.

The *Strategy for the use of renewable energy sources (HG 1535/2003)* promotes the use of ‘clean’ sources of energy (wind, sun, biomass, hydro, etc.) for heating and the production of electricity, having as effect the reduction of emissions of greenhouse effect-gases and supports the transfer of energy required to use them aiming to integrate the renewable sources of energy within the national energetic system and to create the conditions for the participation of Romania on the European market of the green certificates.

The *National Strategy for the protection of atmosphere* and the *National Plan for the protection of atmosphere (HG 731/2004, HG 738/2004)* approach problems related to air quality and the change of climate and have the following objectives:

- **Promotion of BAT** (Best Available Techniques);
- **Set** measures to stabilise the polluting emissions;
- unconventional energy sources;
- **elaborate** and **implement** plans of action to reduce pollution at the national, regional and local plan;

Within this context, the implementation of the *National Plan of Climate Changes* to achieve the goals of the *National Strategy on Climate Changes* and of the *National Plan and Strategy for the Protection of Atmosphere* correlated with the results of the preliminary evaluation of air quality ensure the tools to fulfil the objective of reducing the newt emissions of **CO₂**, and this is due just partly to the reorganisation of the energy and industrial sectors.

By decision of the President of Romania the National permanent Commission to elaborate the Strategy of sustainable development for Romania – Horizon 2025, was established in 2003; the strategy is currently under development.

The first official document stating the national objectives in this field was elaborated in 1992 – “*The National Strategy for Environmental Protection*” updated in 1996 and 2002.

After 1996 one can observe a compliance of the national strategy with the EU strategy in terms of principles, priorities and goals. Thus, the pursued principles are:

- preservation and improvement of human health;
- sustainable development;
- prevent pollution;
- preserve biodiversity;
- preserve the cultural and historical inheritance,
- apply the principle “polluter pays”
- stimulate the activity of environmental rehabilitation (by subsidies, low interest loans, etc.).

1.4.4.4. Preservation of the biodiversity

In 1996, with World Bank support, Romania elaborated the *National Strategy and Plan of Action for the preservation of biodiversity*.

The *Strategic objectives* are as follows:

- **to establish** the legislative framework and of the institutional capacity to preserve the biological diversity;
- **to create** the national network of protected areas and to ensure the management for the protection of the natural habitats and to preserve the biological diversity;
- **to preserve** *in situ* and *ex-situ* the rare or endangered species that have a high economic value;
- **to integrate** the National strategy for the preservation of the biological diversity and sustainable endowment of its components within the National Strategy and within the national, sectorial and local policies of sustainable development;
- **to protect**, preserve and rehabilitate the biological diversity, beyond the protected areas.

These will be fulfilled by:

- reduction of the adverse impact of pollution, overexploitation of the natural resources and restoration of the deteriorated ecosystems and habitats;
- involvement of the non-governmental organizations and of the local communities in programs and actions of protection, preservation and restoration of the biological diversity.

Between 1999 and 2003, the national strategy for the environment is completed by several additional documents such as – the “*Report on the state of environment in Romania*”, which corresponds to the first part of the “*Strategy for the Protection of the Environment*” and completes it by a detailed analysis of the quality of the main environmental factors: quality of the atmosphere, quality of atmospheric precipitations, state of the surface and subterranean waters, state of the soils, state of the forests, waste management, situation of the noise pollution, etc.

The *National Strategy for the Protection of the Environment* was joined in 2002 by the “*National Strategy for Waste management*”, by transposing the Framework Directive on wastes **75/442/EEC**.

The stages of developing the strategy consist in: analysis of the current situation, problem identification, set the strategic objectives, assess the options of fulfilling the objectives and elaborate a “*National Strategy for Waste management*”.

1.4.4.5. Strategy of sustainable development

The National Centre for Sustainable Development (**CNDD**), established in 1997 as project of the United Nations Program for Development, in cooperation with the Ministry of Foreign Affairs, the Romanian Academy and the University Foundation of the Black Sea, coordinated the elaboration of the *National Strategy for Sustainable Development* adopted by the Government in 1999.

The fundamental goal of the *National Strategy for Sustainable Development* is to provide for a higher standard of living and prosperity for the people and for the whole society, at the national level, economic development within the limits of sustainability determined by the offer of the natural capital so as not to affect the basic needs of the future generations.

The strategy stipulates the establishment of a support-system for the following *priorities*: public health; economic growth; preservation of the energy resources, supported by a complex and interdisciplinary activity for environmental protection.

1.5. National Plan of Development (PND) 2007-2013

The strategic directions of **Priority 3** of **PND**, *Protection and improvement of environment quality*, are in agreement with the long-term objectives of the Romanian policy of the environment and are based on the *European Strategy for Sustainable Development*, the 6th *EU Program of Action for Environment* and the Lisbon Agenda.

The *Strategic Framework* of **PND** is centred on the following directions: sustainable **development** of the natural values and **improvement** of environment quality; **integration** of the policy of environment protection within the regional and sectorial policies; **protection** and **preservation** of the natural patrimony; **preservation** of the biodiversity; **reduction** of disparities between regions and improvement of population access to public services; **promote** the education for environmental protection and the flow of information. The *Objectives* are: consolidate environmental protection and reduce the adverse impact on the environment.

According to the horizontal objectives of PND 2007-2013 – sustainable development, equal opportunity and promote the information society – country development must have a sustainable character from the economic, social and environment protection points of view. Romania will use in an efficient and responsible manner its natural resources and will take actions to efficientise energy consumption, to reduce the amount of produced waste and to develop waste management, to improve pollution prevention and control and to develop agricultural and fishery processes and systems.

Road transportation

The homologation norms for the vehicles and of periodical technical inspection have been aligned to the related EU provisions.

Railroad transportation

There is a pledge to develop railroad transportation, which is more energetically-efficient than other means of transportation, less polluting, socially acceptable and generator of few accidents.

Energy consumption

Both the economic competitiveness and the sustainable development rely largely on an efficient consumption of energetic resources and energy. Romania is characterised by a very high primary and final energetic intensity as compared to the **EU-25** average (about

4 times higher). Furthermore, the comparative analysis of the indicators of competitiveness shows that the energetic intensity represents the competitiveness factor with the widest gap compared to the EU countries, which may be an important handicap for the competitiveness of the national economy, especially from the perspective of the gradual increase of the prices for energy and their alignment to the European levels.

The efficient and ecological preservation and utilisation of the energy resources is of major importance because the pollution produced by the energetic activity is responsible for the existence of over 50% of the polluting emissions of methane and carbon monoxide, of 97% of the polluting emissions of sulphur dioxide, 88% of the emissions of nitrogen oxides, 99% of the emissions of carbon dioxide⁵⁵. The electricity plants using coal as fuel release into the atmosphere a much more amount of polluting substances than the plants using hydrocarbures as fuel, over 70% of the total NO_x emissions, 90% of SO₂ emissions originating from these electricity plants.

Under this aspect, PND proposes to consider:

- rehabilitation/new technology of the worn out energy-producing units or of those using old technologies, closing down the ones that are not worthy; encourage private investments in new production capacities based on cogeneration and renewable resources;
- energy saving by decreasing the energetic intensity at the level of EU countries and implicitly the increase of the energetic efficiency throughout the chain natural resources – production – transportation – distribution – final utilisation of the electrical and heat energy;
- valorisation of the renewable resources (sun, wind energy, biomass);
- decrease the quite large losses from the networks of transportation and distribution of the electrical / heat energy, oil and gases;
- increase the capacity of interconnection of the networks of transportation of the electrical energy, oil and gases with EU networks;

Tourism

To prevent the adverse environmental impact of *tourism* activities, the areas have been identified where the pressure of tourism at peak season can exceed the support capacity by increasing the amount of house waste water, road traffic and implicitly of the car emissions and noise levels.

Preservation and improvement of the natural resources

Following the negotiations at chapter 22 “*Environment*”, Romania has to establish Nature Network 2000 before the date of accession. After that moment, Romania must ensure the plans of management and monitoring for all the sites included in this network. This aspect refers to the short- and long-term activities and target, first of all, the preservation and the efficient and balanced utilisation of the renewable resources (water, vegetation and fauna).

1.6. National Plan of Reforms-2006

According to the *National Plan of Reforms - 2006*⁵⁶, the preoccupations of Romania are directed towards:

⁵⁵ Ministry of Water and Environment Protection, www.mappm.ro.

⁵⁶ Government of Romania, *National Plan of Reforms – 2006*.

- observe the commitments of Romania resulting from the Kyoto Protocol and from the conclusions of the Göteborg European Council with the view to achieve a balance between the objectives of socio-economic development and the six objectives included in the Strategy of Sustainable Development;
- evaluate the ecologic basis with the view to make efficient use of the renewable and non-renewable resources;
- enforce a judicious policy of using the agricultural and non-agricultural land according to the local socio-economic development and the environmental impact;
- protect the biodiversity;
- elaborate and implement the National Plan of Action on Biomass;
- develop the Plan of action for the promotion of eco-technologies;
- reduce the energetic intensity and rehabilitate thermally the buildings.

The goal of Romania is to observe the commitments resulting from the international agreements, namely the Kyoto Protocol and the Conclusions of the Göteborg European Council that target the measures required to alleviate the change of climate produced mainly by the emissions of gases that have an adverse effect on the layer of ozone and by the inefficient use of the natural resources, which may cause the change of ecosystems. *To this respect, it is necessary to achieve a balance between the objectives targeting the need for socio-economic development and the six SSD objectives.*

CHAPTER 2. SUSTAINABLE DEVELOPMENT AND THE LONG-TERM INCREASE OF ROMANIA COMPETITIVENESS

2.1 General considerations

The economic growth and its limits are subject of controversy, with a long history. Even from the early 1970s, the famous report *Boundaries of knowledge* concluded: “If the current trends of growth in world population, industrialisation, world pollution, food production and exploitation of the resources remain unchanged, then the limits of growth on this planet will be reached within the next hundred years” (Meadows and Meadows, 1972). The bleak previsions of the Club of Rome were not confirmed by the subsequent evolutions, but the report had the merit of introducing on the public agenda some problems such as those related to the environment. Furthermore, the opening of an area of discussion on the subject of growth proved to be highly relevant for the public strategies of development. Related to the population, the “zero increase” (equal number of births and deaths) concept started to be circulated and studies and political programs were developed to reach this objective. Fierce polemics existed on the subject of economic growth and its consequences. On the one side, economic growth was regarded as having the role of locomotive⁵⁷ that trails the development of all the other spheres of society. On the other side, “the negative economic growth”⁵⁸ and stagflation (economic stagnation and high inflation) of the 70s created problems for whose solution a new approach was needed, that of “balanced growth” or “qualitative growth”, which includes aspects of human and social development besides the economic growth, as well as a dimension of environmental protection.

Among the most important objectives of the *environment dimension* of the sustainable development is the preservation of the ecosphere, the sustainable use of the renewable natural resources and the minimisation of use of the non-renewable resources. The total material input of economy can be used as indicator for the environmental impact of the economy. From the ecological point of view, the essential problem is not the rarity of resources, rather the environmental impact of the extraction and utilisation of the natural resources within the economic activities.

The central objective of the *social dimension* is the fair distribution of opportunities among generations. In terms of the economic and social dimension of the sustainable development, a high level of occupation and quality jobs is the link among them and is quantified in terms of GDP and level of occupation.

The *economic dimension* of the sustainable development, besides the dematerialisation of the economic growth, also focuses on the competitiveness, particularly by the development and dissemination of ecoefficient technologies. The integration of ecoefficiency within the EU policies is tightly linked to the efforts to integrate the aspects of environmental and sustainable development within the sectorial policies. The 2004 report of DG Environment⁵⁹ underlines the role of ecoinnovation and of increasing the

⁵⁷ The supporters of this point of view are numerous even today in the debates on the situation in the countries in transition from communism to market economy and democracy, Romania included.

⁵⁸ The decrease between 1973-1983 of the growth rates of the general product in comparison with the rates of the period 1963-1970. For instance, in Germany the evolution was from 4.43 to 1.64, and in Japan from 10.43 to 3.70. (Thelma Liesner, *Economic Statistics 1900-1983*, 1985, cited by Dahrendorf, 1996, p.189)

⁵⁹ COM(2005) 17 final, 27 January 2005, *2004 Environmental Policy Review*.

efficiency of resources utilisation in an effort to transform the EU economy in the most competitive knowledge-based economy worldwide, with a balance between the economic reforms established by the Lisbon Agenda and the policy of sustainable development based on ecoefficiency and on a firm plan of action for the environment. Furthermore, it is shown that the 'environmental policy and ecoinnovation can promote economic growth, can keep and create jobs, contributing to competitiveness and occupation'. However, the total consumption of natural resources will decrease when the increase of resources productivity (calculated as ratio between the total used resources and the GDP) exceeds the economic growth in terms of GDP⁶⁰.

The European Environment Agency identified *three points of intersection* between ecoefficiency and the objectives of the Lisbon Strategy⁶¹:

a) *Increase the occupation in eco-industries.* In EU, the ecoindustry – that is the production of goods, services and technologies to measure, prevent, limit or correct the impact on the environment and the volume of used resources – already is extremely competitive on the world market, covering together with the USA and Japan, 85% of the world market. In the European Union, the ecoindustries had a turnover 227 billion Euros in 2004⁶², split between pollution management (145 billion Euros) and resources management (82 billion Euros), accounting for a share of 2.25% of EU-25 GDP. 77% of this turnover is achieved in just 4 of the 14 branches of economic activity that fall within the category of ecoindustry: solid waste and garbage recycling and management, water treatment, production and distribution of drinking water and material recycling. Generators of over 500,000 new jobs over the past 5 years, the ecoindustries obtained better achievements than the rest of the EU economy: over 3.38 million employees worked (directly or indirectly) within these branches in 2004 (1.7% of UE-25 work force), the growth rate being 5% per year. The demand for export of environment technologies, ecoefficient products and services is increasing because of the global increase of natural resources utilisation, oil crisis and application of the environment *acquis* by the new member states.

b) *Increase the competitiveness by decreasing the costs.* The processing industry is forced to increase its competitiveness because its products (chemical products, equipment, etc.) are much more present on the world market than the services, whose beneficiaries belong especially to the domestic EU market.

Because in many processing industries the material and energy costs exceed the costs with the work force, the increase of ecoefficiency will impact directly on the competitiveness. Certain statistics (for instance, the structure of costs in the German processing industry, with 20% of the wage costs and 35-50% material and energy costs) shows that the improvement of the energetic productivity of the resources is a better way to increase the competitiveness of the industry than the stress on reducing the costs with labour. In addition, the increase of work productivity results in the reduction of the job number. Furthermore, in the EU, work productivity is already rather high, increasing by

⁶⁰ Sustainable Europe Research Institute (SERI) Viena *et al.*, *Eco-Efficient Innovation. State of the Art and Policy Recommendations*, www.seri.at.

⁶¹ David Gee and Stephan Moll (EEA), *Making sustainability accountable: Eco-efficiency, resource productivity and innovation*, October 1998, Copenhagen.

⁶² Ernst & Young, *Study on Eco-Industries. Its size, employment, perspectives and barriers to growth in an enlarged EU*, report to DG Environment European Commission, August 2006.

270% over the past 40 years, while energetic and raw materials productivity increased with just 100% and 20%, respectively, over the same period.

c) *Dematerialization of the economic growth*. A recent study⁶³ on the effects of economic growth dematerialization on the German economy shows that the effect of reinvesting the economies resulting from the reduction of material and energy costs would be a 2.3% increase of the GDP and 750,000 new jobs.

In January 2004, as point of conjunction between the EU Strategy of Sustainable Development and the Lisbon Strategy, the Commission launched a plan of action due to stimulate the development and utilisation of the environment technologies, to eliminate the financial, economic and institutional barriers in the development of environment technologies and to integrate environmental protection, technological innovation and competitiveness⁶⁴. The environmental technologies – which are less polluting, use fewer resources and recycle more waste than the traditional technologies – can act as a bridge between the SSD, as it was initially defined by the Göteborg Council of Europe and the objectives of the Lisbon Agenda. To achieve this conjunction, the European Commission presented in January 2004 the Environment Technologies Plan of Action (ETAP), having three large goals:

1. Facilitate the passage from research to market by technological platforms and networks of technological testing;
2. Improve market conditions and eliminate the economic barriers;
3. Promote environmental technologies in the developing countries and promote direct foreign investments in this field.

Several recommendations were made⁶⁵ when the first report on the implementation of ETAP, was published in January 2005: creation of risk funds for ecological investments, especially for the SMEs; b) definition of the performance ecological goals for the main products, processes and services; c) development by the members states of the 'national travel sheets' for the implementation of ETAP.

2.2. Methodological approaches of the competitiveness

Competitiveness, in the most general economic meaning, can be defines as the ability of a nation to form an economic, social and politic environment which to support the accelerated creation of added value. The term is used with several meanings, making reference, for instance, to the level of development of a given country, to its comparative position within the international trade or to the performance and potential of a company or economic sector, etc. Price competitiveness is the advantage of a product in relation to a similar one with a higher market price. A company as much more competitive than another one when it can bring the same product at a higher quality to price ratio; in this latter case, the phenomenon hides a more performing technology, a higher work productivity or lower labour costs.

⁶³ Fischer *et all*, *Wachstums- und Beschäftigungsimpulse rentabler Materialeinsparungen*, Hamburgisches Welt-Wirtschafts-Archiv, 84, Jahrgang, Heft 4, 2004.

⁶⁴ COM (2004) 38 final, *Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union*.

⁶⁵ COM (2005) 16 final, 27 January 2005, *Report on the implementation of the Environmental Technologies Action Plan in 2004*.

The evaluation of competitiveness could mean the analysis of the economic policy of a country or the elaboration of international hierarchies based on a given set of indicators (for instance, *Growth Competitiveness Index* elaborated by the World Economic Forum). On the other hand, the competitiveness analyses could mean the analysis of given economic sectors, with the view to identify and support the activities that have potential comparative advantages.

As it results from the *definitions* of competitiveness given below, the goal of competitiveness is to maintain or increase the standard of living of the population (particularly by increasing the incomes and occupation), concomitantly with the increase of the share of participation of a country on the international markets.

"competitiveness is the degree to which a nation can produce, under conditions of free market and fair competition, goods and services capable to pass the test of the international markets, achieving at the same time the maintenance or increase of the real income of its citizens."⁶⁶

"... the capacity of a country to reach the central goals of economic policy, particularly the increase of incomes and occupation, without putting the payment balance into difficulty."⁶⁷

"competitiveness is the capacity of a country to maintain and increase its share of international markets, improving at the same time the standard of living of its population."⁶⁸

"... the capacity of companies, branches, regions, nations and supranational associations exposed to international competition to ensure a rather high relative profitability of the production factors and rather high levels of occupation on sustainable bases."⁶⁹

While, from the *macroeconomic perspective*, the essence of the international competitiveness consists in factors based on prices, the *microeconomic perspective* considers the individual performance of competitiveness of the companies or branches of an economy (business strategy, manner of behaviour towards the competitors, differentiation, specialisation, innovation, technology, etc.). According to the first perspective, competitiveness means to ensure an internal and external balance at the national level and focuses on the effect of the factors on competition. It reveals the links between the change of the payment balance, the evolutions of the real exchange rate, the reallocation of resources between the different economic activities and the changes of competitiveness, and its ultimate purpose is to increase the real income of the citizens. The level of the macroeconomic competitiveness can also be regarded as aggregation of the export performance of a nation's companies⁷⁰.

Michael Porter defines three stages of the economic competitiveness: 1) economy based on factors; 2) economy based on capital; 3) economy based on innovation. In the economy based on factors, the primary production factors such as cheap work force and

⁶⁶ President's Commission on Industrial Competitiveness, *Global Competition: The New Reality*, Washington DC, Government Printing Office, 1985.

⁶⁷ J. Fagerberg, *International Competitiveness*, The Economic Journal, 98/1988, pp. 355-374.

⁶⁸ F. Fajnzylber, *International Competitiveness: Agreed Goal*, Hard Task, CEPAL Review, 36/ 1998.

⁶⁹ European Commission, *EU Sectoral Competitiveness Indicators*, 2005.

⁷⁰ Cf. *Increase the competitiveness of the Romanian economy*, study coordinated by the Institute of World Economy, financed by the Ministry of Economy and Trade.

the access to natural resources are the dominant resources of the competitive advantage. The competitiveness by price, determined by these factors, proves to be increasingly less functional in industry, under the conditions in which it requires an orientation towards labour-intensive activities, which affect the exchange rate. However, it can prove to be decisive in the area of services, including those connected to the industrial activities. In the economy based on capital (investments), the increase of production efficiency and the improvement of the quality of the produced goods or services are factors increasing the competitive advantage. In the economy based on innovation, innovation is an essential means to make the difference from the competitors⁷¹.

The most important *factors* which influence the competitiveness of a sector are: a) the costs; b) the proportion of the environment costs within the total costs; c) intensity of the competition; d) the strong points and the weak points of the competitiveness level of a given sector, related to work quality, capital, technology, management, innovation, productivity, product quality, etc.; e) demand of the customers and consumers to increase the ecological performance of the company; f) the technological and innovation level⁷².

The *Global Competitiveness Index 2006-2007* calculated by the World Economic Forum shows the key-factors to stimulate productivity and competitiveness, grouped in nine categories: 1) institutions; 2) infrastructure; 3) macroeconomic climate; 4) health and primary education; 5) higher education and training; 6) market efficiency; 7) technological level; 8) level of the business environment; 9) innovation.

In determining the competitiveness level of a country, the *Composite Inclusive Index*⁷³, in addition to the Global Competitiveness Index, proposes the introduction of two non-economic areas: the environment, through the *Environmental Sustainability Index*, and the governance capacity, through the *Governance Index*, index elaborated by the World Bank.

2.3. Competitiveness within the context of sustainable development in the European Union

A distinctive element of the European pattern of development is the junction between the goal of competitiveness increase and the social and environmental goals. The EU treaty demands to integrate the environmental aspects in the conception and implementation of all policies, which involves a balance between the economic, social and environmental goals. The EEU Strategy for Sustainable Development (SSD, 1991) is based on the development pattern according to which the long-term economic growth must be accompanied by social inclusion and environmental protection. In the political plan this means the promotion of "good governance", materialised by *ex ante* evaluation of the impact of the political instruments and the large scale consultation of all the involved factors. In the economic plan, this is synonym to the full utilisation of the potential of technical innovation of the industry and the promotion of ecoefficiency, which to allow dematerialization and to break the economic growth from the use of natural resources and

⁷¹ Cf. R. Gheorghiu, D. Pâslaru, G. Turlea, *Innovation-based competitiveness of the Romanian economy, within the context of the Lisbon Strategy*, April 2004, www.cerpe.ro/

⁷² Cf. *Increase the competitiveness of the Romanian economy*.

⁷³ H.P. Bowen, W. Moesen, *Benchmarking the Competitiveness of Nations: Non-Uniform Weighting and Non-Economic Dimensions*, Vlerick Leuven Gent Management School, Working Paper series 2005/2, <http://www.vlerick.be/research/workingpapers/vlgms-wp-2005-2.pdf>.

from the generation of waste. As the environment is concerned, beyond the long-term impact, the EU also adapted higher standards than most of the other world countries, which brought a minus of competitiveness. Beyond the apparent incompatibilities between the three dimensions of the sustainable development, several theoretical and practical advances were reached in integrating the environmental aspects within the economic objectives.

At the level of the European Commission, the Directorate General for Enterprises (DGE) supports the *integration of the sustainable development within companies' strategies* and has something to say about the manner of conceiving and implementing the instruments of the environmental policy, so as they stimulate the entrepreneurial activity and innovation, key-factors to increase competitiveness. In terms of SSD implementation, DGE activity materialises in:

- involvement in preparing the legislative propositions on the environment (wastes, air quality, etc.);
- contributions to the implementation of the integrated system of impact evaluation and the development of strategies to use the resources, to prevent wastes and to implement ecological technologies.

An important role in fulfilling SSD goals will continue to be the increase of the share of the services sector during 2006-2030, which although represent about 70% of the gross added value of EU economy, will display an annual average rate of increase of 2.7%⁷⁴. In industry – sector which will continue to represent during 2006-2030, about 20% of the gross added value of EU economy, of particular importance will be to continue to stimulate ecoefficiency at company level, through the system of environment management. The introduction of the environment management systems allows the continuous improvement of the environment performance, concomitantly with the increase of efficiency and productivity. Having innovation as catalyser, the harmonisation between profitability and the ecoefficiency strategies stimulate company competitiveness because, once adopted, this management system compels the enterprise to a continuous process of improving its activity, with positive effects in reducing the manufacturing costs and, implicitly, in product competitiveness. Thus, the system becomes an important instrument in company policy stimulating technical innovation and modernization.

To break apart the economic growth from the energy consumption, the first has to be accompanied by a reduction of the energy consumption, mainly through structural changes in the economy. During 1990-2003, the total EU-25 energy consumption had 0.8% average annual rate of increase and 2% average annual rate of GDP increase, which means a relative 1.2% break of the economic growth from the energy consumption. Despite this relative break, the total energy consumption increased during this period by 10.9%.

Currently, ecoefficiency became an important element of the EU policy of sustainable development. The European Environment Agency (EEA) monitors the ecoefficiency as one of the important national indicators showing the performance of the member states. Although the alignment to the environment standards and the introduction of clean

⁷⁴ According to the report of the European Environment Agency 4/2005, *European Environment Outlook*, http://reports.eea.eu.int/eea_report_2005_4/en/outlook_web.pdf

technologies involve substantial costs, they account for a low proportion of company turnover (about 1-2%), except some sectors that are heavy polluters and intensive in natural resources, where these costs are much higher. Compared to other costs, these do not affect competitiveness or the national trade balance. On the long run, however, the achievement of a high level of ecoefficiency might have a significant contribution to the increase of product and services competitiveness, by improving the technologies along the entire chain of value and the introduction of new goods on the market. Because the ecoefficient innovations drive the companies to a more productive utilisation of a wide range of inputs, compensating thus the costs of alleviating the environmental impact, eventually, this increased productivity of the resources leads to the increase of the competitiveness. However, a high ecoefficiency level is necessary but not enough to dematerialize and alleviate the environmental impact of the economic activities: it has to be accompanied, at the level of the entire economy, by an absolute reduction of the use of natural resources and of the environmental impact.

At EU level, *the observance of the commitments resulting from the Kyoto Protocol is a serious challenge*, because this must not affect EU world competitiveness. Under the conditions in which the USA did not subscribe to this process, the American companies might get a significant advantage on the world market, particularly due to the lower costs and pressures in implementing these measures. Another challenge comes from the developing countries, which might take advantage of this world process of reducing the greenhouse effect-gases by the transfer to these countries of certain technological processes of EU companies. However, under the conditions of coexistence of numerous risks and potential opportunities, the impact of observing the Kyoto Protocol on the international competitiveness of the EU companies is hard to evaluate.

2.4 Competitiveness of the romanian economy and the goals of sustainable development

In the hierarchy World Economic Forum 2006-2007, based on the Global Competitiveness Index, Romania ranks 68, compared to 67 in 2005, in the section of efficiency-based development, characterised by more efficient processes of production and higher quality products. In this section, the sources of competitiveness are the higher education and the professional training (category 5). The efficient markets (category 6) and the capacity to utilise the existing technology (category 7)⁷⁵.

Over the past five years, Romania displayed *macroeconomic stability*, essential to the sustainable development of the country, characterised by GDP increased through investments and exports. The average annual rate of economic growth of about 6% during 2001-2006 was due to constructions (8.2%), industry (5.4%) and services (5.8%). In 2005, the 4.1% increase of the GDP was due to the significant increase in constructions (9.9%) and services (8.1%). Compared to the European competitors, Romania has a GDP level (at the purchase power parity) of about 50% from that of the new member states and of about 40% from the one of the poorest developed EU-15 countries (Greece and Portugal)⁷⁶.

⁷⁵ World Economic Forum, *Global Competitiveness Report 2006-2007*, www.weforum.org.

⁷⁶ Cf. Ministry of Economy and Trade, Sectoral Operational Program *Increase of the economic competitiveness*, June 2006.

Work productivity (calculated GDP at the purchase power parity to occupied person ratio) increased significantly from 27.9% of the EU-25 average productivity in 2000, to 35.3% in 2004, with a 11.6% annual rate of growth in industry over the 2000-2003 period. In the industry, this growth was both the result of staff cut and of the modernisation of production and of a competent management, on the background of increased proportion of the foreign capital in the Romanian industry. The level of productivity in the processing industry is about 4.5 times lower than the EU average. Overall economy, the continuing increase of labour productivity will require the introduction of new technologies, modern methods of production and increased energetic efficiency.

The volume of *exports* doubled over the period 2000-2005, from 11.273 mil Euro in 2000, to 22.255 mil Euro in 2005. About 98% of the exports rely on industry (equipment, textile and metallurgy industries on the top three positions), depending largely on products without high technological content. The gross added value (GAV) in industry increased from 30.9% in 2000, to 35.1% in 2004. The proportion of GAV of the processing industry within the overall industry increased from 68.3% in 2000 to 79% in 2004 with the following contributions: metallurgy (27%), consumption goods (26%), chemistry (20%), machinery construction (11%), electronics-electro-technical (4%).

The processing industry is the main component of the Romanian industry: 79.4% of the 2004 industrial production, employing 85.4% of the total work force in industry. During 2001-2004, a significant increase was observed in the production of rubber and plastic materials (201.3%), in wood processing (180.3%), road transportation means (151.0%), electrical machinery and equipment (145.9%), chemical industry (149.0%), oil processing (122.3%), celluloses, paper and paper products industry (121.7%). In 2004, the structure of the processing industry was the following: food and beverage industry – 17.2%, textile products – 2.9%, wood processing and wood products (excluding furniture) – 3.7%, metallurgy – 12.6%, metallic constructions and metal products – 4.1%, other branches – 59.5%⁷⁷.

The increase of the industrial export, correlated to the increase of the industrial production, shows the increase of competitiveness in certain industrial sectors. The structure of processing industry exports reflects the high proportion of the traditional industrial sectors, which use low-skilled work force and the low presence of the high-technology sectors.

Concerning the *structure of processing industry exports*, during 1999-2004, the proportion of resources export diminished (from 16.1% to 15.6%) as well as the proportion of low-technology production (from 49.6% to 43.1%); the proportion of average-technology products increased from 16.1% to 22.3%, while the share of high-technology products increased from 2.5% to 5%⁷⁸. In 2004, the industrial exports accounted for 18,560 million Euro of the total 18,432 million Euro worth of Romanian exports. The most important branches of the processing industry in this respects were (million Euro): clothing articles (3,409), textile products (845), leather products and footwear (1,368), wood processing and wood articles, excluding furniture (847), oil processing, coal coking and nuclear fuel processing (1,196), chemical substances and products (1,031), metallurgy (2,647), machinery and equipment, excluding the electrical

⁷⁷ According to the National Institute of Statistics, www.insse.ro.

⁷⁸ *Ibidem*.

and optical equipment (1,355), electrical machinery and equipment (1,366)⁷⁹. The FOB exports during January – September 2006 amounted to 19,095.9 million Euro, 16.0% higher than during the similar period of 2005. Among the exported items, 6 of the 22 sections of goods from the Combined Nomenclature account jointly 77.5% of the total exports as follows: mechanical machinery and tools, electrical machinery, apparatuses and equipment, video and sound recorders and players (20%); clothing articles made of textiles, knitwear or embroidery, textile products (16.5%); metallurgic products (14.7%); mineral products (oil, oil products, ore, coal, cement, salt, etc.) (11.4%); transportation means and materials (9.4%), footwear and similar (5.5%).

In Romania, the *research-development and innovation activity* (CDI) is done mainly by the public sector (about 60%), with still insufficient but sharply increasing financing during the recent years (the total expenditure for research-development represented just 0.4% of the GDP in 2004, increasing to 0.7% in 2006, of which 0.37% in the public sector). The 2007 state budget will allocate 0.5% of the GDP for research-development, the strategy announced by the government targeting 1% of the GDP in 2010-2011. The lack of funds obstructed and still does so the access of companies to the results of CDI activities and to technological transfer. In 2004, the companies allocated for innovation only 3% of their turnover, of which 24.5% for C-D, 53.4% for the purchase of equipment and 6.6% for patents. There is a poor link between research in the public sector and the economy and a low capacity to use the research results in economy. Hardly the first steps were taken towards developing the infrastructure for technological transfer and innovation by establishing the centers of technological transfer, of the incubators of innovative business, of the liaison offices with the industry and of the scientific and technological parks⁸⁰. Therefore, the goal of POS *Increase of the Economic Competitiveness* (POS CCE) in this area is to increase the C-D capacity and to stimulate cooperation between the CDI institutions and the productive sector. The priority Axis 1 (*Promote the innovative system of production*) will promote innovative activities with high added value which use advanced technologies and equipment, with lower environmental impact. POS CEE also includes measures meant to help reaching the sustainable development goals of Romania, considering part of the actions indicated by the Johannesburg World Summit for Sustainable Development: promote the cooperation between the C-D sector and the companies; promote the production of clean energy; valorization of the sources of renewable energy and of the alternative technologies.

Table 2.1. SWOT analysis of the Romanian economy competitiveness in terms of sustainable development

STRONG POINTS	WEAK POINTS
<ul style="list-style-type: none"> - Macroeconomic stability; - GDP increase with an average rate of 6% per year during 2001-2006, due to the high average rates of growth in industry (5.4%) and services (5.8%); - Work force with an acceptable level of education; 	<ul style="list-style-type: none"> - High energy intensity of the Romanian economy, high proportion of the polluting industries; - Very low proportion of the eco-branches in economy (added value and work force); - Technological and competitiveness gaps from the EU; - Low proportion of investments for new technology

⁷⁹ According to the National Institute of Statistics, www.insse.ro.

⁸⁰ *Ibidem*.

<ul style="list-style-type: none"> - Quality, usable natural and energy resources (oil, natural gases, salt, wood, clay, sand, marble); - Liberalization of the energy sector (entirely privatised in the oil sector, partially in the area of energy distribution and natural gases); - Liberalization of the telecommunications market. 	<p>and modernization;</p> <ul style="list-style-type: none"> - Highly worn-out energy producing units, or units using old and polluting technologies; - Production concentrated in sectors with low added value; - Low enterprise productivity; - Low number of certified enterprises (ISO 9000, ISO 14000, EMAS); - Exports based mainly on products with low or average added value; - Insufficient financing of the DD sector from public and private funds; - Enterprise competitiveness due to low costs rather than innovation; - Low capacity of absorption of the research results and low level of innovation in enterprises; - Low level of cooperation between the research institutes/universities and industry; - Insufficient development of the infrastructure and of the services of technological transfer and innovation; - Electricity price for the industrial users above than the EU-15 average; - Large losses in the networks of transportation and distribution of the electrical/heat energy, oil and gases; - Low level of utilisation of renewable resources other than the high capacity hydro sources.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - New sources of investments, including Structural Funds; - Integration of the national energy system within the regional networks; - Increased access on the global market by development of TIC products 	<ul style="list-style-type: none"> - Continually increasing costs of the raw materials and energy, including of the imported ones; - Foreign migration of the workers with high level of education; - Average- and long-term increasing trend of the energy consumption; - Increased pollution due to industrial processes, mainly of those from the area of energy

Source: MET, Sectoral Operational Program *Increase of the economic competitiveness*, June 2006.

2.5 Energy efficiency, ecoindustries and sectoral structure of the Romanian economy

2.5.1. Energy efficiency

The problems affecting the *energy sector* are: a) high energy intensity, which might become a handicap for the economic competitiveness within the context of the continuing liberalization and implicitly, of the increasing prices of energy; and b) the negative

environmental impact of the energy producing units, mainly of the large burning installations.

The price of electricity for the industrial users is increasing and higher than the EU-25 and EU-15 average (Table 2.2), which is a weak point of competitiveness for the Romanian industry, given its proportion among the exports (98%).

Table 2.2. Price of electricity for the industrial users (Euro/KWh)

	2004	2005	2006
EU-25	0.0623	0.0672	0.0754
EU-15	0.0634	0.0681	0.0766
Romania	0.0468	0.0769	0.0773

Source: Eurostat

The *total domestic consumption of primary energy* was in 2004 of 39,588 thousands tep, of which 70% was covered from domestic production (about 28 mil. tep). In 2005, the total domestic consumption increased to 40,500 thousands tep, and for 2006 the estimates are around 41,800 thousands tep. 56.7% of the total electrical energy was produced last year from fossil fuels, with high costs, while the hydropower stations produced about 34% of the electrical energy.

Energy efficiency is low in Romania because of the low outputs of the transformation, transportation and utilisation of the energy carriers and, particularly, due to the structure of the Romanian economy with a high proportion of high energy-intensive branches and products. Considering the energy intensity of the Romanian economy, the forecast 3% annual increase of the energy consumption during the following period, requires: modernization of the existing production capacities, reduction of the energy intensity, improvement of the energy efficiency and valorisation of the renewable sources of energy.

Table 2.3. Energy intensity of the Romanian economy (gross domestic consumption of energy/GDP; 1995-100; kg oil equivalent/1000 euro 95)

	2000	2001	2002	2003	2004
EU_25	208.76	209.71	206.51	207.56	204.89
EU-15	190.53	191.35	188.42	189.48	187.48
Romania	1457.22	1368.64	1316.48	1353.68	1226.95

Source: Eurostat

The proportion of energy-intensive branches in the added value and of the number of employees of the Romanian processing industry is lower, however, than in other former communist states, such as the Czech Republic, Poland or Bulgaria. Nevertheless, the proportion in production is the highest, which reveals higher consumptions of materials by employee and a lower proportion of the added value in Romania – in other words, higher economic inefficiency.

Table 2.4. Proportion of energy-intensive branches within the total processing industry in Central and South-Eastern Europe (2005)

Energy-intensive branches within the processing industry, total (branches, CAEN 21,24,26,27)

Number of enterprises 2003	Production ¹⁾			Added value (2003) ¹⁾				Salariati	
	mil EUR Nominal	mil EUR by PPE	% of total process.	mil EUR Nominal	mil EUR by PPE	% of total process.	% of GDP	thousands persons	% of process.

Romania	4409	9361.1	17576.9	25.6	1556.2	2876.1	14.2	2.9	186.0	12.7
Czech Rep.	9818	15409.6	23907.1	22.8	3865.5	5996.8	20.6	4.9	180.9	17.8
Hungary	4055	9792.1	13094.0	16.0	2651.6	3718.5	18.6	3.7	91.8	13.3
Poland	15972	28419.3	43701.1	19.2	7078.1	12259.3	20.7	3.6	336.9	14.7
Slovakia	579	5546.3	7561.1	23.3	1591.6	2169.8	30.2	4.8	68.4	18.8
Bulgaria	2084	3484.0	6314.1	23.6	378.9	990.0	23.6	2.8	86.8	13.9

Source: WIW and CERME, *Study on the energy-intensive branches in Romania*, 2006.

During the period 1999-2004, the *energy efficiency* increased by about 1% per year, due to the discontinuation of some inefficient economic units activity and due to a more efficient utilisation of the energy. Due to the reorganisation of the economy, the consumption of primary energy decreased by about 30% in 2006 compared to 1990, while the final energy consumption decreased by 38% in 2006 compared to 1990 due to the lower losses in the flow of energy production-transportation-distribution⁸¹.

82% of the energy and heat producing plants are more than 20 years old, they exceeded the operation period, have low technological performance and an adverse environmental impact. 37% of the hydropower stations have exceeded the normative functioning period while other have highly worn-out equipment. The equipment of the Electrical Transportation Network and of the distribution networks also have exceeded the normative functioning period and are highly worn-out.

Romania has five main types of *renewable sources of energy*: wind, hydropower, sun, biomass and geothermal. Despite the variety of resources they are insufficiently utilised so far. Currently, about 29% of the consumed energy comes from renewable sources, most of it being from hydropower sources. Because of the high investment costs there is a low degree of valorisation of the renewable resources of energy (except for the hydropower).

The large heat and energy producing plants with large burning installations are responsible for about 88% of the total emissions of NO_x and CO₂, over 90% of the total emissions of SO₂, while about 72% of the dust emissions are generated by the power plants working on coal. If the energy producing plants are not modernised with technologies that reduce the polluting emissions and if the older installations are not replaced according to the commitments assumed by Romania in the treaty of accession to the EU, this will result in shutting down the energy groups afferent to the large burning installations and to the endangerment of the National Energy System.

Both the economic competitiveness and the sustainable development rely largely on the efficient consumption of energy resources and of energy, and the comparative analysis of the specific indicators of competitiveness shows that the energy intensity is the competitiveness factor with the largest gap from the EU countries. The priority axis 4 of POS CCE, *Increase of the energy efficiency and the sustainable development of the energy system*, by its areas of intervention directed towards the improvement of the energy efficiency and towards the valorisation of the renewable sources of energy, limits the greenhouse effect and promotes the use of clean energy.

The *national objectives* are:

- a) to reduce by 40% until 2015, the intensity of the primary energy, compared to 2001,
- b) to increase up to 33% by 2010, the proportion of energy obtained from renewable sources of the gross national consumption of energy;

⁸¹ According to Sectoral Operational Program *Increase of the economic competitiveness*.

c) to reduce the noxious emissions from the energy sector.

And the *key-elements* to reach these objectives are:

a) to reduce energy intensity by implementing new, high-output technologies in the energy sector;

b) to increase the efficiency of energy utilisation;

c) to increase the proportion of energy from renewable sources; to implement new technologies to reduce the emissions generated by the large power producing plants;

d) to reduce the adverse environmental impact of the energetic system.

The reduction of the energy intensity in the Romanian economy can be reached by structural changes and by increasing the efficiency of energy utilisation. Particular attention must be paid to the increase of energy efficiency in the competitive branches having significant contributions to the Romanian exports, by modernizing the energy-intensive industrial technological processes, by reorientation of the production towards products with high added value and less intensive in raw materials and by the implementation of the new technologies.

2.5.2. Ecoindustries and the polluting industries

State of fact:

The branches that fall within the so-called ecoindustries are underrepresented in Romania by comparison to the EU average, as also observed in other new EU member states. The Romanian statistical system has yet to develop a system which to monitor these branches (services⁸², actually), as macroeconomic indicators (production, added value, work force) and as microeconomic indicators (survey of company performance in the field, investments and financing programs). Furthermore, in the classification of the branches according to the economic activities (CAEN), the distribution of the water from the heat producing plants is done by one CAEN category (electrical and heat energy), while most ecoindustries fall within the category *water catching, treatment and distribution*. The proportion of this latter branch within the production of Romania was of merely 0.26% in 2003 (last available official statistical data on the national accounts, inputs-outputs table), while the added value was 0.24%, which reveals an indicator of underspecialisation of Romania, compared to the average EU value of 1:9. The work force employed in this branch accounted for just 0.9% of the total 2005 work force, equivalent to less than 0.44% of the occupied population, compared to the average 1.75% for the EU, under the conditions in which the increased level of occupation in ecoindustries is an European priority.

In Romania, the exploitation and processing of the non-renewable natural resources with inefficient technologies, the lax regime of enforcing the environmental standards, the low level of investments in the environmental infrastructure and leaving the environmental externalities outside the costs resulted into an intense pollution in branches such as the extraction of fossil fuels, siderurgy and metallurgy, energy industry, chemical and oil processing industry, industry of the construction materials, etc. Most polluting industries from Romania are energy-intensive. The chemical and oil processing industry, next to transportation and the population households are the largest polluters with noxious

⁸² The confusion comes from the English „industries”, which signifies economic branches and not industrial branches.

emissions released into the atmosphere. Almost 80% of the waste water come from economic activities, the balance coming from household activities. Energy production and distribution (71%), the chemical and oil processing industry (5%) and the metallurgic industry (4%) are the largest producers of waste industrial water. Again, all these branches are energy-intensive. Their contribution to the total turnover in Romania is almost two-fold higher than their contribution to the added value, which shows the lack of economic efficiency of these branches (the chemical industry and the production of electrical energy, preponderantly).

Objectives: *Increase the share of ecoindustries in Romania, both as added value and as total work force.*

Decrease the share of energy-intensive branches simultaneously with the increase of their efficiency in terms of work productivity and added value (competitiveness in a broad meaning).

Romania considers to develop the *Plan of actions for the promotion of ecotechnologies*, plan supported by the European Union by a set of 28 concrete actions, stressing particularly on the maximization of the efforts of linking to the European platforms working in this field and of increasing the access to financing of the enterprises which have the capacity of innovation in ecoefficient products and materials.

To facilitate reaching these objectives, which include simultaneously desiderates included in the national energy strategy, in the operational program for competitiveness and in the environmental strategies, the coordination of the political measures is needed in areas such as fiscal, state aids, small and middle size enterprises, innovation and research, enabling thus the reorientation of the Romanian economy structure towards increased proportions proportion of “clean” branches without using forbidden methods of classical industrial policies, impermissible state subsidies or schemes of enhancing the economic activities that are discriminatory within the European context.

The following measures can be mentioned with the view to increase the share of ecobranches within the Romanian economy:

- Conduct studies on the current situation of ecobranches in the Romanian economy and implementation of a special program of monitoring these economic sub-branches;
- Construction of programs to enhance the activity of eco-braches within the national research-development-innovation programs;
- Formation of trainers and support of the advisory organisations in the field of ecobranches to increase the capacity of absorption of European and state budget funds allocated to these activities, with priority at the level of the small and middle size enterprises.

To reduce the proportion of energy-intensive branches and their economic inefficiency (lack of competitiveness), there is a long-term need to discontinue the subsidies for energy price on the domestic market and to support the investment programs aiming to change the technology of energy-intensive companies, to increase the energy efficiency and to reduce the polluting emissions. In the case of the average and large size companies

to be affected by these measures, social programs of professional reorientation and social integration of the redundant work force have to be developed *a priori*.

2.6 Work force market in Romania and long-term competitiveness. Impact of the indirect policies.

2.6.1. Education and occupation

The Sectoral Operational Program Development of the Human Resources (POS DRU), elaborated on the basis of the National Plan of Development 2007-2013, analyses the instruments of economic development and structural changes related to education and the work force, through investments in the human capital that will contribute to the increase of productivity and to sustainable development – highly skilled work force, with a high level of education and of capacity to adapt to the new technologies. Besides, POS DRU will support the developments of SMEs by promoting the entrepreneurial training, development of managerial competencies and development of the advisory services to start a business. The *general objective* of POS DRU is to develop the human capital and to increase its competitiveness on the labour market by providing equal opportunity continuous education and by the development of a modern labour market, flexible and inclusive, which the lead by 2015, to the integration of 900,000 persons into the labour market through the following specific objectives:

- increase the level of education and professional training of the human capital;
- develop the human resources within the system of education;
- promote the entrepreneurial culture;
- facilitate the access of the young on the labour market;
- develop a comprehensive, flexible and modern labour market;
- promote the insertion of the inactive persons into the labour market, including in the rural areas;
- improve the public service of occupation;
- facilitate the access of the vulnerable groups⁸³ to education and on the labour market.

Due to the importance of the human capital, Romania will promote policies of increasing the adaptability and flexibility of the work force and will invest in the development of its productive capacity so as to achieve a higher rate of participation on the labour market.

The complementarity between POS DRU and POS Economic Competitiveness can be identified by the actions of the Priority Axis 1 of POS DRU, *Education in support of occupation and of the development of the knowledge-based society*, and in Priority Axis 2 of POS Economic Competitiveness, *CDI in support of the economic competitiveness*.

A) Education. Compared to the school year 2000-2001, in the school year 2004-2005, a 3.49% decrease of the school, population was noticed – elementary education (18.7%) and middle education (23.26%), compensated by the high school education and by the vocational and technical education, which reported a 12.63% and 20.85% increase of the school population. This evolution is the result of the demographic evolutions and of increased number of rural school units (particularly for vocational and technical education). The number of higher education students increased by 23% over the same period.

⁸³ Ministry of Labour, Social Solidarity and Family, *Sectoral Operational Program Development of the Human Resources*, April 2006.

According to the forecasts, the population of school age will decrease by about 20% over the period 2005-2013, the sharpest decrease being in the age group 15-24, with differences by the level of education and region.

The level of attendance of the high school and vocational education displays an increasing trend: the gross rate of attendance increased from 71.4% in 2000-2001 to 76.4% in 2004-2005, rather evenly distributed among the two forms of education. During the reference period the attendance rate displayed a slight increase in the technological branch of the high school education compared to the theoretic and vocational branches. The large difference, of about 27%, between the gross rate of attendance in the two residence environments (87.8% in urban and 61.0% in rural, in 2004-2005) is an element with direct adverse influence on the level of education and on the distribution of human capital qualification.

The rate of early school dropout increased from 22.4%, in 1999-2000, to 23.6%, in 2004-2005, level much in excess from the value of 10% (reference European standard for 2010).

In the *vocational and technical education*, the reorganization of the education system starting with the 2003-2004 school year, done with the purpose of increasing the initial access to vocational and technical education, resulted in a 9.7% increase of the number of students compared to the level of 2002-2003.

In the *higher education*, the attendance rate increased until 2004-2005, the gross attendance rate reaching 27.7%, in 2000-2001 and 40.2 %, in 2004-2005, due to the development of the private higher education, to the development of the university network and to the increased interest for higher education supported by a higher level of absorption of high-skilled workers by the labour market.

The *quality of the human capital* is directly influenced by the level of education. The population from the age group 25-64 which graduated at least the high school increased from 67.9% in 1999 to 70% in 2003, higher than in other European states, but lower than the average level of the 10 new member states and than the European target of 85% by 2010. Although the proportion of the people with higher education in the same age category displays a rising trend (from 8.7%, in 1999, to 9.6%, in 2003), it still is below the level of the developed countries. 75.3% of the age group 20-24, in 2004, graduated at least the high school, higher level than the EU average (73.8%). In 2004, of the active population of 9,158,000 persons, 12% graduated the higher education, 30.6% the high school, 25.3% the vocational education, 4.8% the post-high school and technical education and 18.8% just the middle education⁸⁴.

The increased competitiveness of the labour force is determined by knowledge and competence expansion and updating throughout the life and to the adaptation of the qualification to the ever-changing requirements of the labour market. In Romania, the opportunities of continuous learning are limited to the offers of continuous professional training, being reduced in comparison to the offers of initial education, and being confined just to programs of complete studies. The absence of the mechanisms for the transfer of knowledge acquired within formal, informal and non-formal contexts limits the opportunities of the adult population, particularly, to join back the formal system of

⁸⁴ According to the National Institute of Statistics.

education and to certify the acquired competencies. The offer of continuous professional training is fragmented and it addresses mostly the individuals, not the companies.

In order to *adapt the education and professional training to the requirements of the labour market*, the increase of education and professional training relevance to the labour market has yet to be accomplished, both in terms of policies and in terms of the activity of the suppliers of education. The high unemployment rate among the young is a major adverse effect determined by the low correlation between the qualifications supplied by the initial education and professional training and the labour market demands. This rate still is high for almost all the levels of education/training and is caused by the:

- insufficient involvement of the social partners in planning the educational activities/offer;
- insufficient development and valorisation of the partnership in education, the low cooperation in the development of programs of continuous training and of stages of applied work, etc;
- absence/partial or isolated existence of forecasts on the long-term economic development at the national and regional level;
- inexistence of functional mechanisms to monitor the insertion and professional track of the graduates⁸⁵.

B) Labour market and human resources. The evolution of the labour market in Romania was characterised over the period 1993-2004 by the decrease of the active and occupied population, by a rather constant, not quite high, unemployment rate and by the increase of the long-term unemployment. These were accompanied by important changes in the structure of occupation by sectors, areas of activity, regions, types of property, age and professional status. The evolution of the human resources was influenced by demographical and social phenomena such as the accelerated reduction of the birth rate and the preservation of a quite high rate of mortality and by increased migration, which resulted in a growth of the segment of population aged over 60.

In 2004, the occupied population reached 9.16 million persons, and the rate of occupation decreased by 5.6% compared to 1999, reaching 57.9% (compared to 70%, the target for 2010, according to the Lisbon Agenda).

In the rural environment, the rate of occupation of the 15-64 age group decreased sharply because of the shrinking population of this group occupied in agriculture from 73.3% in 1999 to 63.5% in 2004. In the urban environment, between 1999-2004, the rate of occupation of the 15-64 age group decreased by 0.9%, from 56.8% in 1999 to 55.9% in 2004. The reorientation of the migratory flow of population from the rural to the urban environment may be correlated to job creation in the urban environment within the context of the increasing private sector.

In terms of share by economic sector, 31.2% of the employed persons worked in 2004 in industry and civil constructions. Between 1999-2003, the proportion of population occupied in agriculture dropped by 10.2%, from 41.8% in 1999 to 31.6% in 2004. The rate of population employed in services increased by 6.6%, from 30% in 1999 to 37.2% in 2004, particularly in the private sector.

⁸⁵ Ministry of Labour, Social Solidarity and Family, *Sectoral Operational Program Development of the Human Resources*, April 2006

The current distribution of the occupied population by level of education shows both the present economic structure and the low share of employees with higher education, which remained constant. The persons with middle level of education form the large majority of the occupied persons, over 20% higher than the EU-15 average.

During 2001-2004, the SMEs had an important contribution to job creation and, implicitly, to the increased rate of occupation in Romania. The staff employed by SMEs increased by +3.2%, +0.7%, +13%, +10% in 2001, 2002, 2003 and 2004, respectively. The largest continuous increase is displayed by the sectors of constructions and industry. The number of employees in industry increased by just 5% in 2003, compared to the previous year, remaining constant in 2004. Considering the important role of the SMEs in job creation, the 2004-2008 strategy of the Romanian Government concerning the SMEs set as priority goal the creation of 760,000 new jobs to support the long-term development of the SMEs sector. The support of the SMEs sector is the optimal solution to control the adverse effects of the structural adjustments and of the industrial reorganisation.

The *undeclared work* appears to represent 20-30% of the GDP, with about 2.7 million persons and is augmented by the subsistence agriculture. Other sectors affected by the informal work are the constructions and services. The economic activities with a lower added value are susceptible to become informal; they display a tendency to make large-scale use of informal work or to employ on low wages.

After the fiscal reform started in early 2005, a reverse direction of the above trends was noticed. Thus, many jobs emerged from the informal (or "grey") area of the economy and a phenomenon of net job creation was observed in dynamic sectors of the economy (mostly in services). Over 500,000 new jobs were registered in 2005, this trend continuing at a lower pace in 2006 too.

Unemployment. The decrease of the unemployed persons with a middle level of education or professional reflects the actual economic structure in Romania, characterised by sectors with low or middle added value, which claims to shift the focus on investments in vocational education and particularly to a continuous professional training.

Unemployment rate (15-24 years) was rather constant over the period 1999-2004, 18.8% in 1999 and 21.0% in 2004. The rate of long-term unemployment increased from 3.0% in 1999 to 4.7% in 2004, compared to 4.0% in EU-25 and 3.3% in EU-15. Occupation will decrease slightly until 2008, but the drop in the active population will result in the decrease of the unemployment rate. The occupation in agriculture decreased while it increased in constructions and in the public sector. In 2004, the structure of the occupied persons (9,154 thousands) by activities of the national economy was as follows (thousands persons): agriculture, game and forestry – 2,892; industry – 2,377; electrical and heat energy, gases and water – 192; constructions – 479; trade – 943; hotels and restaurants – 148; transportation, storage and communications – 454; financial intermediation – 86; real estate and other services – 232; public administration and defence – 538; education – 402; health care and social work – 362; other activities - 240⁸⁶.

⁸⁶ According to the National Institute of Statistics, www.insse.ro.

The following can be inferred from the previous analysis:

- low rates of attendance of education and professional training, at all ages, particularly in the rural environment, resulting in a low level qualification of the labour force in Romania;
- incapacity of the education and occupation structures to adapt rapidly to the ever-changing demands of the labour market;
- changing structure of production during the recent period, with a higher share of services;
- decrease of the active and occupied population on the background of a slow but steady process of population ageing and increased immigration.

Table 2.5 SWOT analysis

Strong points	Weak points
<ul style="list-style-type: none"> - lower labour force compared to the EU; - human resources properly trained in IT and engineering; - proper geographical coverage of the education offer; 	<ul style="list-style-type: none"> - rather high rates of early school dropout; - absence of internal of ensuring and managing the quality of education, initial and continuous professional training; - inadequate infrastructure for education, initial and continuous professional training in the rural environment; - insufficiently developed network of suppliers of professional training - insufficiently development of the national framework for training - insufficient involvement of the social partners in the specific programs of human resources development; - low level of attendance of education and continuous professional training by adults and lack of offers for continuous learning adapted to the needs of adult persons in the system of initial education; - low level of fitting of the education offers to the labour market demands; - limited entrepreneurial culture; - large share of the population occupied in agriculture, especially in the subsistence agriculture; - rather high number of persons working in the informal economy; - low mobility on the labour market; - low level of participation in temporary applied activities ; - high unemployment rate, particularly on long-term unemployment, among the young;
Opportunities	Threats
<ul style="list-style-type: none"> - acceptance of the professional qualification from Romania within the EU area; - SMEs development; - increased importance of the knowledge-based economy; - intensification of cooperation and partnerships in education and free access on the labour market; - development of an institutional, legislative and financial framework favourable to the development of SMEs and private initiative, stimulating for investments; 	<ul style="list-style-type: none"> - unfavourable demographic evolution; - international challenges for the high-skilled labour force; - limited capacity of absorption of the structural funds or slow fitting to the requirements of structural funds management; - migration of industrial sectors towards lower costs external locations; - foreign migration of the high-skilled workers; - low competitiveness of the economy and of the enterprises compared to the EU partners; - the continuing reorganisation of the economic sectors

will generate large redundancies.

Source: Operational Sectoral Program *Development of the Human Resources*, April 2006.

The efficient utilisation of the human resources will increase competitiveness. POS DRU highlights the requirement of active policies of occupation targeting the unemployed (including them young and aged workers), the low-skilled persons, the vulnerable groups, as well as the inactive population. The development of human resources will focus on increasing the investment in education and qualification, on drawing and keeping as many as possible persons on the labour market, on increasing the offer of labour force, on improving worker and enterprise adaptability and on promoting the social inclusion of the vulnerable groups. The concrete actions to be promoted will approach the development of new professions and professional standards in education, the promotion of the entrepreneurial spirit, encouraging the collaboration with the social partners in promoting the continuous professional training.

The transition to *knowledge-based economy* will be approached by promoting education is support of knowledge-based development, with areas of intervention concerning the provision of quality education in order to develop a competitive human capital; university education to support the knowledge-based economy; competitive human capital in education and research. Particular attention will be paid to the development of opportunities for increased access to the higher education of the persons that do not fall into the category of traditional students, such as people coming from lower socio-economic environments, in order to increase the educational level and to improve the structure of qualifications in Romania. The consolidation of the relations between the universities, the business environment and the research will be transformed into an instrument which to improve the response capacity of the university education and of the research to the changes in society and to stimulate and support innovation.

POS DRU envisages providing a high level of education for the population, to increase the innovation capacity and to develop high-added value activities, as means of supporting a sustainable development.

2.6.2 Innovation and the research-development activity

At EU level, 51% of the productive enterprises are technologically innovative, compared to just 17% (during 2000-2002) and 19.3% (during 20002-2004) in Romania, with the following structure:

- a) in terms of size, 83.4% are SMEs (53.7% small enterprises and 29,7% middle), and 16.6% are large enterprises;
- b) in terms of main area of activity, 73% function in industry and 27% services (12% trading, 10% real estate, 4.7% transportation and communications).
- c) in 2002, the main economic domains allocating the highest share of expenditure for innovation were: transportation and communications; electrical and heat energy, gases and water; food and beverages industry; production of furniture and other industrial activities; metallurgy; extractive industry; machinery and equipment industry; road transportation means industry⁸⁷.

⁸⁷ Ministry of Labour, Social Solidarity and Family, *Sectoral Operational Program Development of the Human Resources*, April 2006.

The level of expenses with innovation is still very low, accounting for about 3.6% of the innovative companies' turnover, in 2004. The purchase of machinery, equipment and software account for the largest share of the innovative expenses (53% in 2002 and 60% in 2004), while the research – development expenditure accounted for 25% in 2002 and 24% in 2004. Romania's exports of high-technology products (3.3%) is very far from the EU-25 average (18%). The group of new member states have levels similar to Romania, except for Hungary (21.7%) and the Czech Republic (12.3%).

The data of the innovation surveys show a very poor preoccupation of the enterprises to protect their intellectual rights by patenting. Thus, according to the innovation survey of 2000-2002, only 1% of all the enterprises applied for invention patents, the similar proportion being 7% for the innovative enterprises; the EU-25 registered 107.7 patent applications/million people for EPO and 59.9 patent applications/million people for USPT.

Innovative activity financing from public funds was very low, only 10% of the innovative enterprises (400, of which 206 are SMEs) receiving funds; there is no legislative framework and there are no financial instruments which to stimulate research and the application of the research results in economy, as well as funds with risk capital for the establishment of *start-ups* and *spin-offs* and of the fiscal facilities for innovating activities.

The structures of technological transfer and innovation specialised in the dissemination, transfer and valorisation in economy of the research-development results (centre of technological transfer, centres of technological information, liaison offices with the industry and technological incubators) are still developed and are an important goal of the governmental R-D policy. They can strengthen the partnerships between the economic actors, universities and the R-D institutions to stimulate the development of own R-D activities by the economic actors, mainly in the areas of top technologies, and can also increase the number of innovative companies in advanced technological areas. Table 2.6 shows synthetically some indicators of the R-D activity in Romania:

Table 2.6 – Current state of CDI

0.5 % of GDP in 2005 and 0.75% in 2006 (of which 0.26 % public expenditure in 2005 and 0.38 % in 2006)	represents less than half of the average 1.9% of EU-25 GDP; the target in Romania is 3% of GDP by 2015
3.13 researchers by 1000 employees	shrinking number of researchers
29 centres of excellence	no bussiness-to-bussiness connection
7 scientific and technological parks	only 3 are operational (Galați, Iași, Brașov)
17 % of the companies had innovative activities (13 % of the small enterprises and 21 % of the medium ones)	in UE 44 % of the companies were considered innovative
only 50 applications for international patents in 2005	the Czech Republic had 500, and Hungary 400

Table 2.7 shows a SWOT analysis of the Romanian CDI system:

Table 2.7 –SWOT analysis of the Romanian CDI

STRONG POINTS	WEAK POINTS
✓ Inventive character	✓ Slow, bureaucratic system of financing
✓ Quality of the human resources produced by the system of education	✓ Reactive educational system
✓ Scientific and technical competence for a large number of areas	✓ Underused labour force (students/master students)
✓ Openness and interest for new directions of the scientific development	✓ Poor communication / collaboration between universities, institutes, academic units
✓ Existence of multiple bases of users in universities	✓ Inertia of the specialisations developed and assumed by Romania 30 years ago (critical mass for the technological maturation) – need for full transformation of the economic system
✓ Existence of programs of CDI exchange in	

<p>universities</p>	<ul style="list-style-type: none"> ✓ Low capacity of forming networks of specialists ✓ Poor international relations of the applied research ✓ Lack of a coherent system to quantify CDI results ✓ Undervaluation of the Romanian researchers activity within the international projects financed by the EU ✓ Unsatisfactory systems of financial management ✓ Insufficient financial education of the researchers ✓ High system inertia (long time of response to the needs of the society) ✓ Lack of coherent systems of dialogue between the research and industry ✓ Poor entrepreneurial education ✓ Poor stimulation of the private initiative ✓ Low E-literacy ✓ Continuous decrease of the pool of researchers ✓ Non-enforcement of the existing laws in the related field ✓ Slow procedure, financially non-stimulating to patent inventions at OSIM ✓ Low capacity of absorption
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ✓ globalisation ✓ opportunity for Romania to integrate within the international research ✓ development of the New National Strategy for Research Development Innovation may be aligned from the beginning with the concepts of the European Research Area ✓ development of the environmental technologies ✓ massive imports of top technologies (for instance: communication) ✓ development of technological clusters (based either on a liberal solution, or on a social-democrat one) ✓ existence of the funds for accession ✓ existence of the European and international programs (research ²with return²) ✓ relative spin-off capacity at the existing experience 	<ul style="list-style-type: none"> ✓ external threats (EU; USA) ✓ impact of the globalisation ✓ gap between CDI targets and society targets ✓ insufficient valorisation of the Romanian market (for instance in the field of energy) ✓ massive imports of top technologies (for instance: communication), without involving CDI ✓ unfitting of the legislative framework to the needs of the areas proposed by the NSSD ✓ brain drain ✓ low motivation, indifference at the level of the entire society ✓ lack of the risk, venture-type capital

General objective: Form human resources with increased abilities of synthesis, integrating, and with spirit of initiative, responsible and responsive

To reach this general goal, the survey of CDI activities and the policy measures in the field may monitor certain *operational targets*, such as:

Reach the average EU indicators in **CDI** (including the financing);

Integration of the Romanian research institutes within the international research network;

Establishment of cluster-type structures by technological area in which Romania has chances of competitiveness; these domains are identified in the National Strategy and must be updated periodically;

Development of a new system of education stressing on the entrepreneurial education;

Development of a normal environment for **CDI** functioning, with the funds allocated by competition, according to the European pattern;

Development of the "molecular", non-polluting technologies with very low energy inputs
Eco-responsible CDI, activity directed towards **5-6** large themes of the sustainable development.

To fluidise and accelerate the achievement of such goals the infrastructural network in communications and IT has to be consolidated and premises must be created to increase the weight of the structures specific to the information society within the Romanian economy and society

2.6.3 Development of the information society and the economy of Romania

The increase of productivity is regarded as a condition to have success on the market, and the impact of the communications and information technology (TIC) on the increase of productivity is an established fact. The use of TIC can stimulate the extensive and intensive development of the sector producing goods and services. Concerning the *extensive development*, TIC provides opportunities to the Romanian companies to access new regional and global markets or to promote and trade goods and services on the domestic market through electronic means. The *intensive development* is due to the decrease of the costs of production, administration and sales due to the use of TIC following the significant increase of productivity of the used factors.

The development of the information society at the international level means:

- increased access to the Internet and to the services of the information society;
- development of the information services in administration – implementation of i2010 Plan;
- increased competitiveness of the companies by the services of e-economy;
- increased competitiveness of the suppliers of TIC services and development of a “TIC culture” among the enterprises, consumers and administration;
- development of the TIC infrastructure at the national level – development and increase the accessibility of the broadband structure and increase the security of electronic communications networks;
- support the development of digital networks and of content-based services.

The increase of Romania’s competitiveness requires the development and operation of e-governing, e-education and e-health applications. Considering that the existence of an adequate infrastructure at home and at the work is crucial for the success of applications, their development must be done in parallel with that of the specific infrastructure. Although Romania caught up lately on the gap in the implementation of the information society by the development of the TIC industry, of the infrastructure (hardware, software, communication means) and of the specific applications and services, the penetration of TIC is still rather slow. One reason is the insufficient development of the infrastructure due to low investments and to the low purchasing power of the population. Major gaps concerning the access to the Internet, key-element in an information-based society (in 2004, just 10% of the population used the Internet weekly, almost four times lower than the Eu\25 average – 38%) mark the entire economic development. Although the European policies are preponderantly oriented towards market liberalization, in some cases delays are notices in the provision of infrastructure, which suggests the need for the intervention of the state. Another reason of the low penetration of TIC is the low number of applications both for the business and for the citizens.

TIC and e-commerce offer benefits for a wide range of activities specific to business. At the company level, TIC applications make more efficient the communications inside and outside the company, as well as resources and customers management. Thus, the low percentage of e-commerce within the overall turnover (1.3% in Romania in 2004,

compared to 2.1% in EU-25) reflects the low level of company efficiency. Support for TIC implementation at the company level and measures to increase the electronic transfers are envisaged to catch up on the gaps.

Objective: *Increase the access to TIC at the level of the entire socio-economic system*

The measures promoted by the Ministry of Communications and Information Technology started from the following the short-, medium- and long term *operational objectives*.

- Implementation of the i2010 Plan – development of the information services in administration.
- Increase the level of penetration of the PCs and of the access to Internet on large scale (MCIT).
- Increase the number of public services within the National Electronic System and the establishment of service centers for the people.
- Facilitate the access of the small local communities to the services of e-administration.
- Develop and increase the efficiency of the public electronic services of e-Governing, e-learning and e-health.
- Increase company competitiveness through e-economy-type services. The plan stipulates the co-financing of the TIC applications and of their inter-operability, the adoption of integrated solutions within the companies, which result in long-term cost reduction, facilitate the access on domestic and foreign markets and make company management more efficient. Network security will also be improved and anti-fraud solutions will be implemented to ensure a safe and dynamic e-business environment.
- Improve electronic communication network security.
- Promote the use of electronic signature. Establishment of the National Authority for the Regulation and Surveillance in the area of the electronic signature.

Following are the measures proposed for the development of TIC infrastructure:

- **Develop and increase the access to broadband infrastructure.** The market for Internet access services experienced one of the most substantial increases, by the end of 2005 existing over 980 operational suppliers, 600 of which supplied access to broadband Internet. At the same moment, the total number of connections to the Internet exceeded 1.8 units – almost double compared to the end of the previous year, 41% offering access to broadband Internet – this segment of the market for Internet services increasing by 96% over the past year.
- **Improved access to TIC means in the disfavoured localities.**
- **Support for the access to the Internet,** by the development of Electronic Networks of the Local Communities (RECL).
- **Prepare the introduction of digital radio and TV and development of content-based services.** Considering that the implementation of these services must be finalised by 2012, Romania will elaborate a strategy of their implementation and development at the national level, according to EU requirements, while the national digital TV networks will have to replace the current national analogical networks, as well as the licensed local stations.

2.7 Coherent policies for competitiveness and sustainable development

The increase of competitiveness, both on the domestic market and on the foreign one, requires economic efficiency. Competitiveness can not increase on the long term unless certain premises are provided, such as:

1. **Ensure the increase of the labour force quality.** Competitiveness is influenced by the quality of the human capital, which is directly influenced by the educational level. Furthermore, the increase of the labour force competitiveness is determined by the expansion and updating of knowledge and competencies throughout the entire life and by the adaptation of the qualifications to the ever changing demands of the labour market. Therefore, particular stress must be laid on the increase of investments in education and qualification, on the attraction and keeping of as many persons as possible on the labour force market, on the increase of demand for labour force, on the improvement of worker and enterprise adaptation and on the promotion of social inclusion for the vulnerable groups with the view to increase the level of social cohesion. The concrete actions to be promoted should target the *reorganization of the educational system, the development of new professions and professional standards in education*, the promotion of the entrepreneurial spirit, encouraging the collaboration with the social partners and the promotion of the continuous professional training, and the formation of a flexible human and labour force potential with competencies for activities with high-value added content plus measures to make the labour force market more flexible while not neglecting the requirement of social cohesion.

2. The **structure of the economy has to be redirected** towards a sectoral distribution auspicious to the sustainable development in order to reduce the energy intensity of the economy. This aspect requires to *reduce the proportion of industrial branches large consumers of traditional energy and the polluting branches* and to *reduce the noxious emissions produced by the activity of transportation*.

3. The exports rely largely on industrial products depending much on products without high technological content. The increase of industrial export and of the industrial production shows the increase of competitiveness in some industrial sectors, however, with a high proportion of the traditional industrial sectors which used low-skilled labour force and a low proportion of the high-technology sectors. Therefore, **the proportion of services and activities with high content of added value and ecologically-clean must increase; the proportion of eco-branches should also increase.**

4. The productivity level of the processing industry is currently about 4.5 times lower than the EU average. The **increase of work productivity** will require the use of new technologies, of modern production methods and the increase of the energy efficiency. To do this a *very permissive business climate should be maintained in Romania* during the following years *as well as an administrative treatment favouring investments* within the limit of non-discriminatory restrictions existing in the EU.

5. Both the economic competitiveness and the sustainable development rely largely on the efficient use of energy resources and energy, and the comparative analysis of the specific indicators of competitiveness shows that energy intensity is the competitiveness factor with the widest gap from the EU countries. The fact that the high energy intensity industries in Romania still play an important role in the Romanian economy, situated at the bottom of the value chain, with a proportion of 20% of the exports of the processing

industry in 2005, shows the **urgent need for reorganisation and investments in new technologies**. However, with high costs for resources, with poor work productivity and low profits, the investment funds of the companies are limited. On the other hand, in order to reduce the proportion of energy-intensive branches and their economic inefficiency (lack of competitiveness) there is a long-term need of support for the investment programs and of new technologies for the energy-intensive companies so as to increase energy efficiency and to reduce the polluting emissions. The following actions are required considering the energy intensity of the Romanian economy and the 3% predicted increase of the energy consumption over the coming period: modernisation of the existing production capacities, improvement of energy efficiency and valorisation of the renewable sources of energy. However, the general program of modernization included in the Industrial policy and in the Export Strategy of Romania must be adapted to the specific needs of the energy-intensive sectors. On the other hand, particular attention must be paid to the co-financing projects based on EU funds and state aids for environmental protection, which may represent viable solutions to increase the competitiveness on the unique European market starting with 2008.

6. As the **energy sector** is concerned, the problems affecting it – high energy intensity and the adverse environmental impact of the energy producing units, particularly of the large burning installations – bear direct influence on the economy and society. The price of electricity for the industrial users is increasing and is higher than the EU-25 and EU-15 average, which means higher costs and less competitiveness for the Romanian industry on the EU market which holds an important share of the Romanian exports. Following the increase of electricity and gas prices many SMEs need horizontal policies of support – facilities to access risk capitals and to modernise their technology, managerial counselling etc. Furthermore, an individual analysis of each industry is required in order to provide an adequate industrial strategy, to determine the opportunity of continuing the processes of reorganisation and implementation of the environmental and innovation strategies in those industries. Increased investments are required to replace the inefficient energy producing units and to access the international distribution networks in order to reduce the extremely high energy prices for the industrial users. The energy efficiency of Romania is low, because of the low outputs of the transformation, transportation and utilisation of the energy carriers and especially because of the structure of the national economy in which the energy-intensive branches and products still hold an important share.

7. **Use of the renewable sources of energy**. A large share of the total electrical energy is produced on fossil fuels. The *national programs supporting CDI and the investments in infrastructure and in programs which to ensure the energy safety of Romania must state the increase of the proportion of renewable resources among their priority objectives*.

8. The low percentage which the companies allocate for **research-development-innovation**, purchase of equipment, patents – the poor linking between the public sector research and economy, the delays in establishing the centres of technological transfer, of the innovative business incubators, of the liaison offices with the industry and of the scientific and technological parks, as well as the low capacity of economic valorisation of the research results also influence the structure and competitiveness of the Romanian economy. The high-added value innovative activities using advanced technologies and equipment, with low environmental impact must be promoted, as well as the cooperation

between the R-D sector and the firms, the production of clean energy and the valorisation of the alternative technologies. *A legislative framework and financial instruments are needed, which to stimulate research and the application of the research results in economy, as well as risk capital funds (for the establishment of start-ups and spin-offs) and innovating activities.* A good opportunity is the use of European funds for investments in R-D and ecological technologies or to do the technological modernisation required to comply with the standards of emission and with the increase of ecoefficiency.

9. Consolidation of the university relation with the business environment and with the research can become an important instrument to adapt the education and research to the changes undergoing in the society and to stimulate and develop the **knowledge-base society**.

CHAPTER 3. SOCIAL COHESION AND THE INCREASE OF THE LIVING STANDARD

Economic growth is a *sine qua non* condition of development. In the long run, however, the economic growth might compromise the welfare of the future generations by its adverse impact on the environment, by exhausting the natural resources, by reducing the biodiversity, the its adverse effects on the public health and on the social inequities. On the other hand, though, the economic growth does not automatically produce social cohesion or a “better society”. As answer to the risks and social costs exacerbated by globalization mostly during the second half of the 90s, an ample movement of international cooperation determined a change of paradigm at the level of policies by integrating the *principle of sustainability*. This means that in terms of principles, the “magical triangle” consisting of *economic increase*, *social cohesion* and *environmental protection* forms the foundation for the elaboration, implementation and evaluation of all developmental policies. The principle of sustainability is promoted as a catalyst of domestic and foreign political decision-making, of the economic actions and of the public opinion, to guide structural and institutional reforms impacting on the production and consumption behavior.

The development of a strategy of sustainable development does not mean simply to relate sectorial social and environmental political measures, rather to reflect on the *long-term implications of all policies*, particularly of the economic ones. That is why the focus on sustainable development requires a radical change both at the level of the political priorities and at the level of the forms of government.

The construction of coherent policies of sustainable development requires first of all conciliation of the main three coordinates – economic growth, social cohesion and environmental protection – which are often contradictory. The high standards of social protection and environmental protection are usually regarded as obstacles to economic increase. With the new paradigm, however, they are regarded as guarantees of an economic growth based on innovation and excellence rather than on cheap work force, on the exhaustion of the natural resources or on dumping prices supported by cheap, yet polluting, technologies.

Sustainable development has deep roots in the concept of fundamental social rights. Therefore, poverty and social exclusion control, the promotion of equal opportunities and equity in terms of capital and income distribution are major objectives of any strategy of sustainable development. This is why the national or global strategies of sustainable development must be fully coordinated with the other documents of strategic planning targeting these objectives.

3.1 Sustainable development and its social aspects within European and world context

Social protection, environmental policy and economic and social cohesion gradually became priority policies of the process of European integration, currently representing *horizontal principles of integration* to which all the community and national policies are subordinated. In 2000, the Lisbon EC set as new strategic objective for the European economy “to become the most competitive and dynamic knowledge-based economy worldwide, capable of sustainable development, with more and better jobs and with a

high degree of social cohesion”. Subsequently, the Stockholm EC decided that environmental protection must complete the Lisbon strategy, so that the economic increase, social cohesion and environmental protection form the three main pillars of a *long-term* vision of development. Therefore, the Strategy of Sustainable Development SSD of 2001 was built on the Lisbon strategy.

The social dimension of the sustainable development was represented by priorities 3 and 4 of the SSD (2001/2002) and did not propose new directions of action, rather it reiterated those from the Lisbon strategy:

Box 3.1 The Lisbon⁸⁸ strategy in the social area

Fight poverty and social exclusion

Objectives

- Substantial alleviation of poverty
- Increase the occupation rate to 67% in January 2005, to 70% until 2010; increase the occupation rate of women to 57% in January 2005 and over 60% until 2010.
- Reduce to half until 2010 the number of unskilled young people (aged 18-24) (with only lower secondary education).

EU measures

- Fight social exclusion by economic growth, by more and better jobs
- Implement the European Occupation Strategy
- Update and implement the legislation on equal opportunity by the end of 2001, particularly in the fields of occupation, vocational training and working conditions
- Agreement in 2001 on a Program of Social Inclusion
- Develop indicators on the quality of work and on the control of social exclusion (by the end of 2001), on the facilities for caring for children and for other economic-dependent persons, and on the system of benefits for the family (in 2002), as well as on the wage difference between women and men.

Social and economic implications of population ageing

Objectives

- Provide adequate pension and health care systems for the elder and maintain the sustainability of the public financing and of the intergenerational solidarity
- Approach the demographic challenges by increasing the occupation rate, reduction of the public debt and adjustment of the social protection systems (including the pension systems)
- Increase the average overall EU occupation rate of the persons aged 55-64 to 50% until 2010.

EU measures

- Use the open method of coordination in the domain of pensions
- Identify coherent strategies and actions to encourage continuous learning
- Regular analysis of the long-term sustainability of the public finance considering the main demographic evolutions
- In depth debates of the themes on immigration, migration and asylum at the Laeken EC (2001), based on the framework established at Tampere.
- Identify effective modalities to increase the economic participation and the promotion of active ageing, modalities that are to be reported by the Council and Commission of the European Council in spring 2002.

⁸⁸ Synthesis of the commitments assumed at the Lisbon, Nice and Stockholm summits.

The importance that has to be given to each priority objective is subject of social controversy. A group, consisting mainly of NGO and individuals, considers that SSD lays too much stress on the “economic growth and occupation” to the detriment of the dimensions of social protection and environmental protection. On the contrary, a second group, consisting predominantly of companies and business associations, considers that the dimension of economic growth is underrepresented in SSD. Beyond the different interests of the two groups, the source of this controversy is the unclear relation⁸⁹ between SSD and the Lisbon strategy (more so as, although in the social area the two strategies overlap, they function as distinct strategies, while the reviewing processes have not been harmonised).

Based on the conclusions of the public surveys and of the different SSD evaluations in 2001/2002, the Commission elaborated in December 2005 the document *On the Review of the Sustainable Development Strategy – A Platform for Action*. Following this participative process, the Council of Europe passed in June 2006 a reviewed SSD, which:

- Wants to be a compromise between the two contradictory points of view – economic growth versus social and environmental protection, but the relation between the revised SSD and the Lisbon agenda remains ambiguous.⁹⁰
- Underlines the need for better regulations integrating the SSD at the level of *all policies*.
- Acknowledges *education* and the *R&D activities* as the main drives of changing the non-sustainable behaviours of consumption and production.
- Requires all EU member states to consider *changing the taxation system* redirecting the taxation basis from the work force towards resources and energy consumption. Up to 2008, the European Commission is expected to produce a sectorial, reformist programmatic document, which to highlight the types of subsidies with adverse environmental impact in the attempt to eliminate them gradually due to their incompatibility with the sustainable development.
- Recommends setting up *campaigns of information and communication* to increase the participation of the civil society and of the business organisations to SSD implementation and to disseminate and stimulate the multiplication of the good practices.
- Decided that every two years, starting no later than September 2007, the Commission must present a *report on the progress on SSD implementation*, which is to be discussed at the December CE.
- Recommends the member states to *review or elaborate new national strategies/plans of sustainable development* which to increase the coherence of policies and actions.

⁸⁹ Concerning the relation between the SSD and the Lisbon strategy, the European Economic and Social Committee (April 2004) stressed that although the Lisbon strategy is an important step forward towards sustainable development, it can not play the role of long-term strategy for sustainable development.

⁹⁰ The Lisbon Agenda is regarded as “driving force for a more dynamic economy”, while the SSD is defined as the general framework of establishing the “time objectives” of long-term development.

Some of the EU priorities highlighted in the Strategy of Sustainable Development of the European Commission SSD EC (June 2006) in the social field are shown in the box below.

Box 3.2 SSD objectives of the European Commission 2006

Social inclusion, demographic evolutions and migration

General objectives

Establish an inclusive society based on intra- and inter-generational solidarity, which to provide for a better quality of life of the citizens

Specific objectives

- Important alleviation of poverty up to 2010, particularly of children poverty
- Provide a high level of social and territorial inclusion at the level of the EU and member states, respecting the cultural diversity
- Modernise the systems of social protection of the member states considering the demographic evolutions
- Significant increase of the economic participation of women, of the elderly and of the immigrants, in agreement with the targets set for 2010
- Develop a European policy of immigration considering the integration of the immigrants and of their families
- Reduce the adverse effects of globalisation on the workers and their families
- Increase the occupational rate of the young. Intensify the efforts to reduce early school dropout to 10% and to reach a proportion of at least 85% young people aged 22 that graduate at least the higher level of secondary education. By the end of 2007, any young person that is not enrolled in any form of education and that has no job must receive a job in a term of maximum 6 months, as well as an additional training course of qualification, apprentice, or any other opportunity of occupation. The interval is to be shortened to 4 months by 2010.
- Increase the economic participation of the disabled.

Poverty control and global challenges to the sustainable development

General objective

Assume an active role in promoting the world sustainable development and provide for consistent domestic and foreign EU policies with the international commitments.

Specific objective

- Significant progress in achieving the objectives of sustainable development assumed at the global level, particularly those included in the Millennium Declaration, those passed at the Johannesburg World Summit of Sustainable Development (2002), in Monterrey Consensus on financing the development, in the Doha Agenda of Sustainable Development and in the Paris Declaration on the harmonisation of the international aid.
- Increase the volume of the international aid to 0.7% of GDP by 2015, with an intermediary target of 0.56% in 2010. The states that joined the EU after 2002 have to provide 0.17% of GDP in international aid until 2010 and 0.33% until 2015.
- Promote sustainable development within the context of WTO negotiations
- Include the preoccupations for sustainable development in all foreign EU policies, including in the Common Policy of Foreign Affairs and Security.

Unlike the previous version, the revised EC SSD is more comprehensive, more coherent and better coordinated with the other documents of strategic planning and with the international EU commitments. Although there still are several controversial issues, the revised EU SSD is “an acceptable start point” (European Environmental Bureau, 2006).

Sustainable development is currently a world priority objective and not just a European priority. Therefore, the 1992 Rio de Janeiro *United Nations Conference for Environment and Development* proposed the Agenda 21 as a worldwide plan of actions for the environment. Chapter 28 of Agenda 21 is an appeal to all the local communities to create their own Agenda 21 according to their local resources and needs.

Agenda 21 promotes the following priority objectives **in the social area of sustainable development**:

- Fight poverty (mainly by enabling the access of the poor to sustainable means of subsistence, by promoting integrated policies of human development and by investments in human capital)
- Demographic evolutions that endanger the sustainable development (stress on the growth of population mainly in the underdeveloped countries)
- Protect and promote human health (focusing on the access to health care particularly in the rural areas, on the control of infectious diseases, on the risks associated to pollution and to the ecologic hazard)
- Strengthen the role of farmers in the elaboration and implementation of the strategies for sustainable development (focusing on agriculture and agricultural practices, provide dwelling and access to agricultural land to the disadvantaged groups, environmental protection in rural settlements)
- Promote education, training and public support to the environmental issues and to sustainable development.

The World Summit of Sustainable Development (Johannesburg, 2002)⁹¹ was another important step towards the worldwide promotion of sustainable development. The Summit passed a *Plan of implementation* (POI) of the sustainable development, strongly criticised, however, (particularly by the civil society) for the lack of concrete measures. POI is structured in the following main chapters:

- a. International trade (reasserts the commitments of the Doha WTO meeting)
- b. Eradicate poverty (reasserts the commitments of the *Millennium Declaration*)
- c. Limit climate changes and increase the use of clean energy
- d. Access to drinking water and sanitary utilities
- e. Protection of the natural resources and biodiversity
- f. Public health and access to medication
- g. agriculture (reasserts the commitments of the World Food Summit, Rome, 1996)
- h. good governing (fight against corruption, promote democracy, gender equality, fundamental rights, access to health care)
- i. change the unsustainable patterns of consumption and production (energy, transportation, wastes, chemicals, corporations responsibility).

In September 2000, at the Millennium Summit, 191 countries, Romania included, passed the *Millennium Declaration*, an ambitious program of development under the logo “a world characterised by sustainable development and poverty elimination”. This framework document defines the United Nations agenda for the 21st century. Currently, the eight *Millennium Development Goals* (MDG) are the framework, acknowledged internationally, for monitoring the progress in development.

⁹¹ At this world summit, the President of Romania presented the program Local Agenda 21 as example of good practice and announced its expansion in 40 towns by the end of 2007.

3.2. Assimilation by Romania of the priorities of sustainable development in the social area

Romania, as signing part of the Rio Convention (1992), committed to take actions to implement the Agenda 21 both at the national and at the local level. The National Centre for Sustainable Development (NCSO)⁹² was established in 1997 and it elaborated the National Strategy for Sustainable Development (NSSD), passed by the government in 1999. The local implementation of Agenda 21 gained momentum starting in 2000, when the project⁹³ *Building Local Capacities to Implement the Local Agenda 21 in Romania* (coordinated by NCSO and MTI) was implemented. Over 40 local municipalities participated in this project, elaborating by a wide participative process a local strategy of sustainable development coherent and specific supported by a concrete plan of action.

On February 27 2004, the first *Report on the Millennium Development Goals for Romania* was presented (the Govern of Romania and UNDP, 2003), which identifies accurate targets and specific indicators for the time horizon 2009-2015.

Table 3.1 Millennium goals – Targets for Romania up to 2009/2015

MDG1	Eradicate extreme poverty
Target 1:	Bring the rate of extreme poverty to half until 2009, compared to 2002
Target 2:	Bring to half the consumption deficit of the poor population by 2009 compared to 2002 and reduce social polarisation
Target 3:	Increase the occupation rate of the youth (aged 15-24)
Target 4:	Support the agricultural producers and processors
Target 5:	Reduce significantly the incidence of low height for a particular age in children, between 2001 and 2015, especially in the rural areas
MDG 2	Increase the graduation rate of the compulsory education
Target 6:	Provide that by 2012, at least 95% of the children from rural environment graduate the full elementary and gymnasium education cycle
Target 7:	Increase the literacy rate of the Roma population
MDG 3	Promote gender equality and assertion of women
Target 8:	Increase the occupation rate of women
MDG 4	Reduce infant mortality
Target 9:	Bring to half between 2002 and 2015, the mortality rate of children aged 1-4
Target 10:	Reduce child mortality by 40% between 2002 and 2015
Target 11:	Eradicate small pox up to 2007
MDG 5	Improve maternal health
Target 12:	Bring to half between 2001 and 2009, the rate of maternal mortality
MDG 6	Control HIV/AIDS and tuberculosis
Target 13:	Maintain the incidence of HIV/AIDS in 2007 at the level of 2002
Target 14:	Stop the increase, in 2005, and start the regression of tuberculosis occurrence
Target 15:	Provide access to essential medication at affordable prices
MDG 7	Provide environmental sustainability
Target 16:	Increase the rate of forestation from 27% to 35% of the country area by 2040
Target 17:	Increase the proportion of protected areas from 2.56% from the country area in 1990, to 10% in 2015

⁹² NCSO was established under the aegis of the Romanian Academy, with UNDP financing. Currently, NCSO is a NGO acknowledged by the government of Romania as the only Romanian agency focused on sustainable development. The mandate of NCSO is to identify the priorities of sustainable development both at the local and national level and to develop the process of Local Agenda 21 in cooperation with the government and local authorities.

⁹³ Financed in cooperation by UNDP and DFID, CIDA, Capacity 21, The Mihai Eminescu Trust (UK), Matra KAP programme (Dutch Government), municipalities, MTI and the Romanian Federation of the Local Authorities.

Target 18: Reduce the emissions having greenhouse effect

Target 19: Double, by 2015, the proportion of persons that have access to drinking water

MDG 8 Develop the communications and the information society

Target 20: Increase the number of subscribers to home phones between 2001 and 2015

Target 21: Increase the number of computers by at least 20% annually

Therefore, the MDG for Romania are largely compatible with the European goals of sustainable development. There are, however, differences that reflect the specific conditions or problems of Romania, resulting mainly from the deficit of development in comparison to the European Union. For instance, concerning poverty eradication, while the EU focuses on the international aid for the programs of development, Romania has yet to solve the problem of poverty, particularly of the extreme poverty. Concerning education, the target of Romania aims to increase the graduation rate of the compulsory education, while the EU focuses on professional qualification (higher secondary education level). Also, the targets concerning infant mortality, maternal health, tuberculosis control or access to drinking water are no longer problems for the EU member states.

3.2.1. Cultural sustainability – dimension of sustainable development in Romania

Romania has undertaken important steps to integrate the concept of sustainable development in the policies dealing with culture. Article 3 of the GO 27/27.01.2005 concerning the organisation and functioning of the Ministry of Culture and Cults, states that culture is a factor of “sustainable development” and of the “increase of the quality of life, of the economic and social cohesion”. Article 4 of GO 78/2005 stipulates among the general objectives the “promotion of diversity and the preservation of the cultural identity”, in line with the new strategy for sustainable development launched in June 2006. The approach of culture from this angle is based on the principle according to which sustainable development is a necessity and a chance for the whole society and for all the individuals.

Law 451/08.07.2002 ratified the *European Convention of the Landscape* (passed on 20.10.2000 at Florence), which sets as goals: the promotion of landscape protection, their management and arrangement, establish an European cooperation to this purpose, integrating the landscape within the environment arrangement, urbanism, cultural, environmental, agricultural, social and economic policies and within other policies with potential direct or indirect impact on the landscape.

Sustainable development also requires the social inclusion of the individuals through mechanisms of social integration and by access/participation to the cultural life. In essence, the strategies of sustainable development put the human being in their centre, which presumes the conjugation of the efforts of all the social actors and the generation and potentiation of the latent synergies of all the components of the social system and of the natural environment. Within the process of sustainable development, education, culture and civic action, the transparency and efficacy of decisions, the diplomacy and the environment become strategic landmarks.

In an integrating vision, sustainable development is “nothing else than a project of civilisation”. Since the process of civilisation and that of culture can not be dissociated, the sustainable development relies on the constitutive elements of the culture (linguistic diversity, theoretical and empirical knowledge, faith, representations of the world,

material and immaterial patrimony, artistic, literary, scientific creations, inventions etc.). The tendency to put the sustainable development in equation exclusively with the economic or social requirements of the individuals is dysfunctional, since it does not consider the fundamental human needs such as access of the individuals and of the groups to education and knowledge, to the cultural heritage of mankind, to all the resources that may develop their creativity and innovating spirit. The dynamics of the sustainable development can not be achieved without an active and complex protection of the local cultural specificity and without investments which to provide the means of wide access and participation to culture.

Cultural development is therefore essential for the common future of mankind, hence the approach of the sustainable development must integrate the cultural dimension next to the economic, social and environmental ones.

In a society that assumes the sustainable development as a fundamental strategic goal, the individuals must have conditions of access to basal education, to the process of continuous formation and continuous cultural enrichment, to benefit of the opportunity to be producers of culture, exceeding thus the status of simple consumers of divertissement, status with which they are often identified.

That is why a society that assumes the goal of sustainable development must maintain and develop free diverse practices and instruments

By the access and participation to culture, the individual level of knowledge increases significantly.

According to the modern economic theories, knowledge is now acknowledged as the driving force of productivity and economic increase, shifting the stress on information, technology and education and on their role in the economic performance. This type of society is named “knowledge-based society” or “IT society” since it uses knowledge and information as essential resources. This society has the following characteristics:

- information and knowledge are unlimited resources.
- the production of knowledge requires creativity and continuous innovation.
- access of all society members to the created contents, facilitated by the new technologies of information communication, dissemination.
- systems of continuous education and formation.
- globalisation and integration of markets including of the cultural market.

Globalisation and the economic growth, social development and the technological progress have a direct impact on the structural elements and functions of the culture.

Creativity becomes “raw material” for an extremely wide and diversified sector of economic activities, designed here as “creative industries”. Within this context, a strategic goal of the Ministry of Culture is the fast, sustainable development of the sector of creative industries by reconsidering their place within the national economy so that they become a priority area within a coherent intersectorial strategy.

The goods and services produced by this sector of the economy, named cultural products, are produced and consumed worldwide, transcending the boundaries of the country of origin representing one of the most important elements of the international trade.

The development of this sector not only brings an important contribution to the economic growth of the gross domestic production of all the countries that will build their

developmental strategy on these coordinates, but it also generates much more profound implications because the creative industries are the ones through fundamental rights of the individual are achieved, such as the freedom of expression, the access to culture, participation to the cultural life⁹⁴.

3.3 Main challenges for the sustainable social development in Romania

The strategic directions of sustainable development for Romania must be fully compatible both with the European (see the revised SSD, 2006) and international ones (particularly with the MDG, 2003) and with the national goals of development assumed by the government within other documents of strategic planning. Therefore, in this section, in order to identify the main challenges for the sustainable development of Romania we analyse the relevant data with a grid consisting of the international and European strategic goals.

3.3.1. Income distribution

State of fact: Income inequality is very high in Romania within the European context and, despite the economic growth, it shows no sign of alleviation.

Income inequality⁹⁵ increased considerably from 21% in 1989 to 30.7% in 2004, similar to the south-eastern European countries in transition but higher than the European mean. Even worse, the economic growth after 2004 did not alleviate income inequality.

Income inequality, however, reflects only partially the inequality between the wealthiest and the poorest, given the process of returning to agricultural activities and the massive development of the informal economy (not officially recorded).

During the period of economic recession (1990-1997) the monetary income was replaced by in-kind income, mainly from the subsistence economy. After 2000, the economic growth reversed this trend, the wage income accounting for increasing shares within the overall household incomes, while the in-kind income lost importance. However, in 2003, the income from the subsistence economy accounted in average 23% of the overall household incomes in Romania, being very important for the peasant households (53.8%) and in important general for the rural households (45.4%). In absence of the in-kind income, income inequality is much higher (the Gini coefficient decreased from 37.8% in 2000 to 36.3% in 2004).

Table 3.2 Structure of the gross total household income, Romania 1989-2003 (%)

	1989		1997		2003		
	Total	Total	Total	Employed	Peasants	Unemployed	Pensioners
a. Cash income	86.2	67.3	74.9	86.4	45.3	73.0	67.2
- wages	62.8	37.9	44.8	78.1	6.9	31.5	17.1
- social transfers	11.7	17.8	19.2	4.7	8.8	23.5	41.5
- other sources	11.7	11.6	8.8	4.0	27.2	9.3	6.3
b. Correspondent value of the products obtained within the household	13.5	31.7	23.4	11.2	53.8	24.6	31.7

⁹⁴ According to the feedback to the draft of our project received from the Ministry of Culture and Cults.

⁹⁵ Gini coefficient calculated on the basis of the available income (self consumption included) by equivalent adult person.

Source: UNPD, 1999b (for 1989 and 1997) and NIS, 2005a.

In 2004, the total incomes of the wealthiest 20% were 4.8 times higher than the total incomes of the poorest 20%. However, if we do not consider the in-kind income from the subsistence economy (self consumption) the respective value increases to 7.1, one of the highest European values⁹⁶. Therefore, income inequality in Romania endangers social cohesion.

3.3.2. Poverty

State of fact: Poverty still displays high rates and the economic growth after 2000 was not socially sustainable, at least until 2004.

Within the context of the structural transformations associated to transition, poverty increased considerably. However, the poverty in Romania: (1) displays a high level of elasticity at GDP variations, (2) it is rather “superficial” (the deficit of consumption being rather low) and (3) it is predominantly temporary and not permanent (Teşliuc and Pop, 1999; Teşliuc, Pop and Teşliuc, 2001; Teşliuc, Pop and Panduru, 2003, CASE, 2004).

Table 3.1: Evolution of poverty and of income inequality, Romania 1991-2004

	1991	1993	1995	1997	2000	2001	2002	2003	2004
a. Population with consumption below \$1 daily (%)					2.0	1.3	1.5	0.9	
Population with consumption below \$2 daily (%)					20.2	16.2	15.5	12.3	
b. Rate of food poverty (%)			5.1	5.8	7.3	5.8	5.6	4.1	2.7
Rate of severe poverty (%)			9.4	11.2	13.8	11.4	10.9	8.6	5.9
Poverty rate (%)			25.4	30.3	35.9	30.6	28.9	25.1	18.8
c. Rate of relative poverty (%)					17.1	17.0	18.1	17.3	17.9
d. Gini coefficient by income, without self consumption	0.20	0.23	0.29	0.35	0.38	0.38	0.37	0.37	0.36

Source: a) World Bank, 2005 (\$ 2000 PPP); b) NIS, absolute poverty evaluated from the total expenditure of consumption by equivalent adult person, according to the CASPIS/WB/NIS methodology; c) NIS, relative poverty – the available incomes of the household (including self consumption) by equivalent adult person are below 60% of the average income; d) NIS, the Gini coefficient calculated from the available incomes of the household (including self consumption) by equivalent adult person.

Thus, absolute poverty, after a dramatic increase between 1990 and 2000, decreased as dramatically to half of its level during the period of economic growth, 2000 to 2004. However, with poverty rates of 18.8% (in 2004) and with more than 12.3% of the population spending less than \$2 daily (in 2003), Romania ranks only with the former Soviet states, the figures being much higher than the maximal EU rates.

The economic growth resulted in a perceivable reduction of poverty but its benefits were distributed unequally among the population. Thus, during the period of economic recession the poor lost less than the rest of the population but, at the same time, benefited disproportionately less of the economic growth after 2000 (CASE, 2004). Therefore, the economic growth in Romania is not yet socially sustainable.

3.3.3. Groups with disproportionate poverty risk

State of fact: The poverty risk of the children and youth is extremely high within the European context.

⁹⁶ The values of this indicator (the ratio between the weight of the top and bottom quintile - quintile share ratio) varies in the EU between 3.3 in Slovenia and 7.2 in Portugal.

If in 1995, the poverty rates of the elderly and children were comparable, in 2004, the persons aged over 64 had a much lower poverty rate than the children (16.7% compared to 24.4%), resulting from the improved protection of the elder between 1997 and 2000 and from the economic growth after 2000.

The children (aged 0-16) by comparison to the adult persons and to the elder, lost a lot during the period of recession and benefited less of the economic growth after 2000 (Zamfir, coord., 2005). In 2004, about one million children lived in poverty and about 350 in severe poverty. The poverty rates among the youth aged 15-24 were even higher than those of the children (26% in 2004).

The other social groups running a disproportionately high risk of poverty are:

- the peasants and the unemployed,
- the persons with no or very low education (no more than eight grades),
- the families with many children,
- the Gypsy (Rroma population),
- the rural residents and the persons living in the NE, SE and SV areas of Romania.

Table 3.2 Profile of poverty in Romania, 2004 (%)

Ethnic group of the household head		Number of household children		Residence	
Romanian	17.5	No children	13.5	Urban	11.6
Magyar	12.7	1 child	14.1	Rural	27.3
Rroma	74.3	2 children	20.6		
		3 children	38.8		
		4 children or more	60.1		
Occupation of the household head		Education of the household head		Region	
Employed	5.9	No education	46.6	North-East	25.9
Company owner	0.6	Elementary	27.5	South-East	23.9
Self employed person, non-agricultural	23.1	Middle	21.6	South	19.8
Self employed person, agricultural	36.1	Vocational school	13.8	South-West	22.7
Unemployed	31.6	High school	7.2	West	11.5
Pensioner	14.9	Post high school	2.6	North-West	14.8
Student	4.0	Faculty/college	1.1	Central	17.0
Household work	38.4			Bucharest-Ilfov	6.1

Source: CASPIS, absolute poverty determined from the total expenditure of consumption of equivalent adult person, in agreement with the CASPIS/WB/NIS methodology.

3.3.4. Social exclusion

State of fact: The poor areas undergoing a process of becoming ghettos, which concentrate children and young people living in extreme poverty, require an urgent, coherent intervention in agreement with the human rights.

In terms of social exclusion one can identify two groups in Romania, namely the Rroma and the poor from the poor areas undergoing a process of becoming ghettos. If the first group was paid attention and there are varied studies⁹⁷, strategies, plans of action and implemented programs which to improve their situation, the second groups is almost completely ignored.

97 E.g., Zamfir and Zamfir (coord.) (1993); Zamfir and Preda (coord.) (2002); Ringold, Orenstein and Wilkens (2005); Rroma Education Fund (2005); UNDP (2005); Sandu (2005).

A survey of 2001 (Stănculescu și Berevoescu, coord., 2004), revealed that “poor areas” were developing in Romania that cumulate the following characteristics: (1) more than half of the residents live in poverty (actually over 40% have a consumption below the line of food poverty); (2) miserable dwelling conditions; (3) unemployment and under-occupation (about half of the residents, mainly men) have uncertain, poorly paid jobs in the informal economy); (4) dependency on low level social transfers (high incidence of child allowance and pensions for disease, inheritor, etc.); (5) very high rate of single parent families compared to the country average; (6) very high fertility within the national context; (7) over representation of the Roma ethnics (30% of the residents in average); (8) high level of petty delinquency; (9) negative reputation (the areas are often described as “infection focuses”).

Four main types of poor areas have been identified in the towns from Romania:

- *garbage dumps* (communities of shelters improvised close to town garbage dumps);
- *historical centres* (districts of houses nationalised during the communist regime that the local authorities transformed into social dwellings after 1990);
- *ghetto-type areas* (former homes for the single people that belonged to the state socialist enterprises, currently closed) and
- *industrial areas no longer in use* (districts of blocks built at the town periphery for the workers of the state socialist enterprises, currently closed).

The poor areas are highly relevant from the perspective of the sustainable development, more so as 60% of their residents are children (aged 0-16) or young people (aged 15-29). In 2001, the gross estimates of the poor living in poor areas undergoing a process of becoming ghettos were in the range of 3% of the country urban population.

Although the process of poor areas forming is much more advanced in the urban environment, poor areas have also been identified in the rural environment as follows: Roma communities living at the village periphery (generally large and developed) and the communities of “*venetici*” from the villages next to towns of former socialist enterprises. Both types of communities display a very high rate of fertility within the national context and are characterised both by very high unemployment rate and by the lack of access to agricultural land.

3.3.5. Demographical evolutions with adverse consequences

State of fact: There is no clearly-cut policy which to stop the dramatic decline of the population.

If during the 1977-1992 period the population of the country increased by about one million persons, between 1992 and 2002, the population shrank also by about one million. The decline of the population continued after 2002 and various demographic projections⁹⁸ show the persistence of this trend for the future too, the estimates for 2050 being a low of 16-17 million persons.

The decline of population is the cumulated effect of a complex of demographic trends observed after 1990, particularly the dramatic decrease of fertility (from 2.19 children by woman in 1989 to 1.3 in 2004), increased mortality and external migration.

⁹⁸ Eurostat (2006); UN Population Division (2006); Ghețău (2003).

The demographic ageing is not a problem for the time being, but it will certainly be a serious problem in 20-25 years (when the generations born after 1967 retire) if the current trends maintain, particularly if fertility doesn't increase to the level required to replace the generations (2.03 children by woman).

Table 3.3 UN demographic projections for Romania (average fertility variant)

Projections:	2010	2020	2030	2040	2050
Total population (thousands persons)	21287	20396	19285	18073	16757
RTF (children by woman)	1.27	1.40	1.54	1.68	1.80
Rate of total dependency (%)	41.90	45.09	46.76	57.65	72.68
Rate of elder dependency (%)	20.93	24.77	27.74	37.52	49.57

Source: UN Population Division: *World Population Prospects DEMOBASE*, June 2006.

Note: The rate of dependency (persons aged 0-14 + persons aged 65 and over)/ persons aged 15-64. Rate of elder dependency: persons aged 65 and over/ persons aged 15-64.

Goal: A fertility-stimulating policy is vital, more so as after 2015 when the ever shrinking cohorts born after 1989 will have a major influence on the volume and structure of the feminine population of fertile age (Ghețău, 2003).

3.3.6. Health

Goal: *Reduction of infant mortality, improvement of maternal health, HIV/AIDS and tuberculosis control and the increased access of the population to drinking water (assumed as MDG) must be maintained as strategic directions at the national level next to the European goals in the field of public health.*

Infant mortality, although displaying a decreasing trend, still is unacceptably high within the European context (16.8 to 1000 live births, in 2004).

The proportion of women that give birth in absence of a prenatal check-up is very high (25% in 2002).

In Romania, mortality has always been high, but it is expected to decrease because the general standard of life increased after 2000.

Life expectation at birth, after a substantial depression during the early years of transition, recorded a positive evolution. Yet, the values for 2004 – 75.1 years for the women and 67.7 years for the men – are 7-8 years short of the developed EU member states.

The health state and the quality of life are strongly affected by the environmental factors. The population considers that the situation is not good here either. Although things have seemingly improved compared to 2001, in 2005 36% of the households mentioned at least one environmental problem that had an adverse effect on the quality of life. The rural environment is perceived by the population in more positive terms than the urban environment. The noise, particularly the traffic noise is the most frequently mentioned environmental factor with adverse effects, especially in the urban environment s.

Table 3.4 Proportion of households whose dwelling is affected by adverse environmental factors (%)

	2001			2005		
	Romania	Urban	Rural	Romania	Urban	Rural
Humidity	5.8	7.2	3.9	7.1	6.4	7.9
Coldness	7.3	9.7	4.2	6.9	6.5	7.5

Traffic noise	19.2	25.2	11.6	17.3	21.1	12.4
Noise from the commercial activity	3.2	4.6	1.5	3	4.7	0.8
Industrial noise	2.2	3.3	0.9	1.3	1.5	1.1
Noise caused by individuals	13.7	19	6.8	9.3	12.8	4.7
Air pollution, odours	16.6	23.2	8.3	10.6	14.1	6
Peeking by the neighbours or passers-by	3.4	2.4	4.7	3	1.8	4.6
<i>At least one environmental factor</i>	<i>44.6</i>	<i>58</i>	<i>27.5</i>	<i>36.3</i>	<i>41.9</i>	<i>29</i>

Source: NIS, *Living conditions of the population from Romania*, 2002 and 2006.

3.3.7. External migration

Goals: *Development of a statistical system which to allow to monitor and evaluate the phenomenon and the identification of its social and economic consequences.*

Elaboration of national policies which to control the long-term effects that jeopardise the social cohesion and the sustainable development.

Active participation of Romania in the elaboration of the migration policies of EU member states.

If the European SSD (2006) approached the problem of external migration mainly from the perspective of the destination countries concerned with immigrant integration, Romania is a source-country of immigrants.

External migration increased continuously after 1990, particularly after January 2002.⁹⁹ The predominant form of external migration is the temporary migration for work.

Although there is a large number of studies approaching external migration elaborated by various actors (the academic environment, international organizations, NGOs) the first solid data on the total number of immigrants abroad were included in a governmental report on 2006 only. The existing studies show neither the characteristics of the phenomenon, nor its consequences. The official statistics only marginally reflect the phenomenon, just because the external migration from Romania is many times informal, that is not officially recorded.

State of fact: The estimates on the number of people working abroad vary with the source: from about 600,000 (Ghețău, 2003) to 1.7 million (IWO, 2003) and, more recently, 2 million persons (Voinea, 2006). The projections for the future are hard to make both because of the lack of data and because the external migration depends at the same time on the economic and social trends from Romania and on the immigration policies of the developed (destination) countries.

The opinions on the consequences of the international migration from Romania are divided, more so as due to the deficit of solid data. The positive effects most often mentioned are: the considerable growth of remittances¹⁰⁰ towards the country, the reduction of the consumption deficit of the population (Sandu, 2005) and the transfer of human capital (Lăzăroiu, 2003). The following issues are frequently mentioned as adverse effects: ever widening gaps between the poor rural environment and the wealthy

⁹⁹ As of January 1st 2002, the Romanian citizens obtained the right of free entrance in the Schengen Area (O.U.G. nr. 144/2001).

¹⁰⁰ The volume of remittances increased from €17 million in 1991 to €2.371 million in 2004 (NBR data published in the *Financial Newspaper*, 3.09.2005 apud Constantinescu, 2006), and to €4.300 million in 2005 (Date BNR published in *Evenimentul zilei*, 24.02.2006).

rural environment (Sandu, 2005), the deficit of skilled work force remaining in the country (particularly in certain sectors of the economy), the use of incomes obtained abroad mainly for private consumption and very little for investments or for public goods, children left behind in Romania without parent surveillance and support, facilitation of the traffic of persons.

Given the considerable wage differential between Romania and the developed countries of the European Union and the strong propensity of external migration particularly among the young, the skilled and the highly skilled persons, one might expect the migration for work to increase after January 2007 too. The future evolutions of the international migration depend on the migration and occupation policies of the developed countries.

Therefore, Romania must adopt a pro-active approach to stop or prevent, for instance, the deficit of skilled labour force in several sectors. The need for a clear-cut strategy in this direction is very high more so as the experience of other European states (i.e. Spain) shows that the absorption of the Structural Funds is not possible in the absence of the work force. On the other hand, the social partners must consider seriously the need to negotiate for wage increase in Romania. Fortunately, in most economic branches, the increase of productivity during the recent years accompanied by comparatively lower wage increases, put at the disposition of the social partners, at least theoretically, a wider range to negotiate the future wage increases (Preda, 2006).

3.3.8. Education

State of fact: The key problems in the area of education are identified within the NPD 2007-2013.

The analysis of the main challenges in the field of education in agreement with the European indicators is done in the NPD 2007-2013, Chapter 4 *Human Capital*. According to this programmatic document, the key problems of Romania in the field of education are:

- The need to form a educated/highly skilled stock of human capital and to adapt the people with average qualification to performing fabrication methods;
- The need to develop a culture of continuous learning and to flexibly the manner of education supply and certification;
- Insufficient material basis for quality education, particularly in the modern technological areas demanded on the labour market;
- The high rate of school dropout of the young people aged 18-24¹⁰¹, particularly of the young people coming from disfavoured environments.

The completion of the compulsory education (MDG) must be kept as priority goal, at least given the current situation in the rural area.

¹⁰¹ In 2004/2005, the proportion of young people aged 18-24 with elementary education (gymnasium, elementary or no education at all) who do not attend any form of education within the total 18-24 population was 23.6% (MER, 2005). For comparison, the EU average was 15.7%, the EU-15 average was 17.8%, while the European goal is 10% by 2010.

3.3.9. Regional disparities

Goal: *Reduce the discrepancies between the rural and urban environments, especially those concerning the access of population to goods, services and opportunities.*

State of fact: Chapter 9 *Regional Disparities in the Economic Development* of the NPD 2007-2013 identifies the following key problems regarding the regional disparities:

- Increased development disparities between Bucharest-Ilfov region and the other regions;
- Misbalanced development between the east and west of Romania;
- Chronic under-development is concentrated in the north-east region, at the border with Moldova and in the south region, along the Danube;
- The existence of important intraregional disparities that reflect the mosaic structure of the economic development: under-developed areas coexist with rather developed areas within the various regions;
- The massive decline of the small and middle towns, particularly of the single-industry towns due to industrial reorganisation;
- Low level of attractiveness of most regions;
- Socio-economic decline of numerous large urban centres and the diminishing of their role in the development of the adjacent areals.

Consistent disparities between the urban and the rural add to the regional disparities.

3.3.10. Social-economic state and rural development

State of fact: The rural environment is characterised in Romania by under development and by massive inequalities between the large villages, commune centres, rather developed, located close to a town or European road and the small villages from the commune periphery, isolated, sometimes aged, and rather poor.

According to the population and dwelling census, in Romania, of the total 3.85 million dwellings in the rural areas, in 2002, just 42.8% had cold tap water (14.0% from the public utility network and 28.8% had their own system), 0.6% had hot tap water from the public utility network and 14.3% had sewage facilities (2.8% from the public utility network).

The low average number of school units in the rural environment and the very large distances that the children have sometimes to go to school, cumulated with the limited financial resources of the family to support them continue their studies caused the urban - rural gaps to widen in terms of young people access to education.

If for the age groups 6-9 and 10-14, the proportion of population attending education within the total population is quite equal for the two means, the gaps between means increase with children age.

Thus, only 48.4% of the population aged 15-19 and 7.7% of the population aged 20-24 in the rural environment attended a form of education, compared to 67.6% and 24.6%, respectively, in the urban environment.

The socio-economic conditions confronting the farmers and land fragmentation are the main causes of school dropout. This phenomenon caused the deterioration of biodiversity and of the semi-natural habitats. The abandoned plots account for 5 to 10% of the agricultural land each year. Even the most fertile lands are affected, particularly where there are small plots but also because the population ages, because of the lack of farming equipment and because of the low incomes. Abandonment affects the local ecosystems and the landscapes and contributes to the degradation of 123,000 hectares of arable land.

The organic agriculture accounts for a mere 0.20% of the country area that is 18,690 hectares in 1200 rural households¹⁰².

Rural development already is one of the strategic approach priorities for the Romanian society and economy. The National Plan for Agriculture and Rural Development in Romania 2000-2006 (NPARD), which is the basis for the implementation of SAPARD¹⁰³ program in Romania, was passed in December 2000. It stipulated a total amount of over 2 billion Euros (public and private expenditure), of which 1,113.4 million Euros was EU contribution. The absorption capacity of the program increased very much towards the end of the financing period (2006) with 100% absorption rate, which required additional funds to be allocated as national budgetary resources.

Table 3.5 shows NPARD structure by main goals, priorities and operational components. Starting from these goals one may identify certain goals specific to the rural sustainable development, particularly in mountain areas, goals presented subsequently next to some proposed measures and implementation tools.

¹⁰² Source: SOEL – Survey, February 2003, Organic agriculture, Environment and Food Security, Environment and Natural Resources, FAO, Roma, 2002

¹⁰³ SAPARD financing program relies on CE Regulation nr.1268/99 of 21 June 1999, its goal being to establish a community framework to support the sustainable development in the candidate countries, to solve the problems affecting the long-term adjustment of the agricultural sector and of the rural areas and to support the implementation of the CE acquis in terms of common agricultural policy and afferent policies (<http://ue.mae.ro>).

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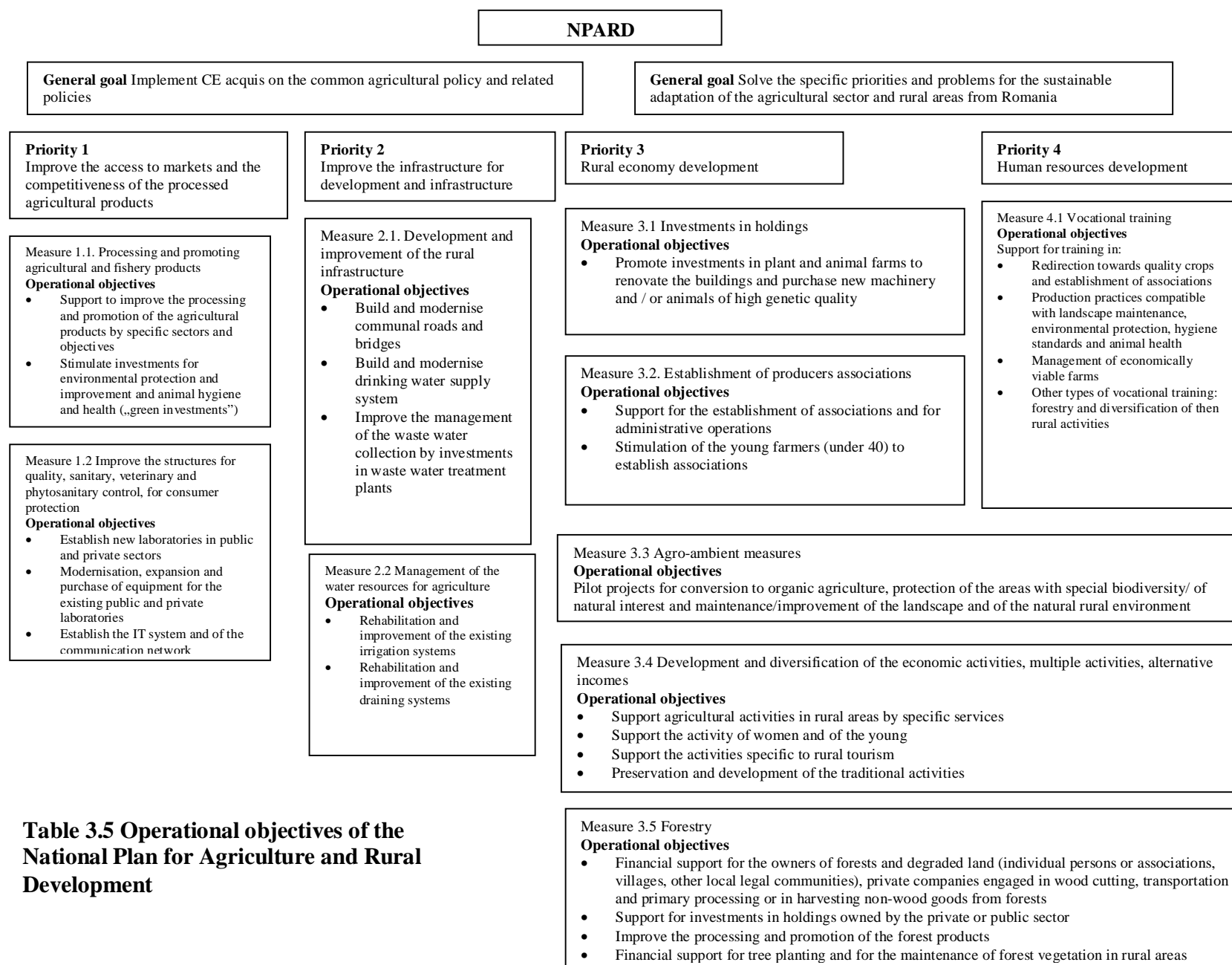


Table 3.5 Operational objectives of the National Plan for Agriculture and Rural Development

Romania holds an important place among CEE countries both as natural potential and as human and rural development potential. The agricultural area of Romania represents **24.4%** of the total **10** Central and East European countries, while the population occupied in agriculture represents almost half (45.8%).

Its agricultural potential is significant¹⁰⁴ but it is not exploited at an optimal level. With 14.8 million hectares of agricultural land (62.2% of the total), Romania ranks second after Poland among the Central and East European countries, while after the 2007 accession, it might rank 7th within EU-27, after France, Spain, Poland, Germany, Italy and UK, with a share of 8% of the total agricultural land in use.

3.3.10.1. General objectives

Focusing on the development of services and on the economically viable agriculture.

Improvement of the quality of life and maintenance of the population in the mountain area – increase the income of the mountain population by making full use of resources (efficientise peasant households)

As the *sustainable management of the agricultural land* is concerned, the program stipulates the **support** of the exploitations that can supply resources whose subsequent processing will increase the added value of the products. Currently, a **trend** is displayed among the food industry enterprises to manufacture series of ecological products. The use of ecological agriculture in Romania is favoured by the existence of the traditional agricultural systems, mostly extensive. During **2002-2003**, the area cultivated according to the norms of ecological production tripled (**57,200 ha**, in **2003**).

The forestry patrimony will be **preserved** by applying the principle of sustainable forestry development, aiming to improve the environmental conditions, to expand the forested area and to exploit the resources in a sustainable manner. The local authorities will apply a judicious policy of land use considering the local socio-economic development and analysing the environmental impact of these activities, with the aim to make correct planning and allocation of the resources supporting the proposed plans and programs of development.

3.3.10.2. Operational and specific objectives of rural development

Held under new auspices, the debates of the **Salzburg** European Conference of rural development, **November 2003**, which proposed to evaluate the results of the rural development policies during the post Agenda 21 period, outlined the following basic principles of the future policies in this field¹⁰⁵, which Romania assumed:

- **the preservation of the viable rural environment** is not just in the interest of the rural world, but of all the society. The investments in the revival of the rural economy and rural communities are vital to *increase the attractiveness* of these rural areas by promoting the sustainable development and the generation of new opportunities of **occupation**, particularly for the young and for the feminine population. These have to be founded on the specific requirements of each region and shaped in such a manner as to ensure the best valorisation of the local potential of the rural areas and communities;

- **the protection of the European rural environment diversity** and the encouragement of the services provided by the *multifunctional agriculture* is gaining importance. The proper

¹⁰⁴ Both the soil and climate conditions are favourable to agriculture. The soil is rich in cernosiom so that most field plots are suitable to cereal crops and to other crops typical to the temperate area. These areas are generally cultivated with wheat, corn, barley, rye and sunflower. In the hill area besides corn and potatoes there are significant areas of vineyards and orchards, while vegetables are generally cultivated in the river flood plains.

¹⁰⁵ Conclusions of Second European Conference on Rural Development, Planting seeds for rural future – building a policy that can deliver our ambitions? Salzburg, November 2003.

management of the farms and forests will preserve the diversity of the European natural and cultural patrimony, particularly in the areas with sites having special natural values;

- **the increase of agricultural farms competitiveness** must represent a *key objective* given the diversity of the agricultural potential of the different rural areas. This will be of particular importance to the new member states given the reorganisation process currently undergoing in those countries. The sustainable economic growth of the agricultural sector from the member states must be achieved mainly by diversification, innovation and production of goods with high added value, of great demand among the consumers;

- **the policies of rural development must be enforced in all the rural areas of the extended EU** so that the farmers and the other rural actors are capable to cope with the undergoing reorganisation of the agriculture, with the effects of CAP reform and with the changing requirements of the agricultural markets;

- **the policies of rural development are intended to serve the needs of the whole rural areas society** and to contribute to its cohesion. The *cohesion* of the rural communities will support the promotion of the new conception on *the sustainable development of the areas among all the involved partners*;

- **the policies of rural development must be promoted by partnership between the public and private organisations and the civil society in agreement with the principles of subsidiary.** An effective answer to the local and regional problems is needed, as well as the continuous dialogue between partners at the rural level and consistency in program implementation, monitoring and evaluation. The future policies must direct EU support towards the rural areas through local partnership, with support from the lessons taught during the **LEADER** program;

- **a greater responsibility for the partnership programs** in defining and supplying comprehensive strategies based on underlying both the objectives and the results. This will require an increased transparency through monitoring and evaluation. Furthermore, the partnerships are supposed to offer higher mutual possibilities of learning through networks and exchanges of good practices;

- **a significant simplification** of EU policy of rural development is not only required but also urgent. This will be done through programming, financing and through the control system that have to be adapted to rural development requirements.

Important financial resources are mobilised to fulfil such objectives both at EU community level and at the level of each member state.

3.3.10.3. Operational objectives for the development of the mountain area

Consolidation and development of the small mountain farms;

Increase the incomes of the mountain agricultural producers (poverty control);

Increase the animal stock (cattle, sheep, goats) and the amount of quality natural fertilizers;

Establishment (development) of specialised professional structures according to the specificity of the mountain agricultural and forestry areas (evolution through: projects; formation of young farmers; continuous advisory activity);

Adaptation (establishment) of the education system according to the mountain agricultural and environmental specificity (gymnasiums, mountain agricultural vocational schools);

Development of complementary activities (crafts, handicrafts, small industries, agricultural and forestry tourism);

Modernisation of the mountain farms (stables, equipment, breeds); new crops, bushes, medicinal and aromatic plants;

Evolution through the quality of mountain products (“*niche*” – natural, ecologic - type products)

Preservation of the cultural identity – selection and preservation of the valuable agricultural-forestry economy traditions

Instruments to fulfil the objectives:

Economic: Protection of the mountain agricultural producers: professional organisations (“*services*” cooperatives, evolving towards “*product*” cooperatives); subsidies for the merchandise products (30%) and by “*head of animal – cow, sheep, goat*”; indicative price (minimal guaranteed) – at least for the strategic product, the milk; access of the mountain agricultural producers to the plus-value for “*ecological products*” (*bio*); relax animal grazing in mountain agricultural forests; wood facilities for mountain agricultural investments (hay storage, stables)

Financial: special **program** for the sustainable mountain development; **Establishment** of a National Fund in support of the mountain (investments in farms = agrotourism, mainly); **Development** of mountain research.

3.4 Institutional arrangements which to ensure the goal of sustainable social development

The actual implementation of a sustainable development strategy requires the use of those structural and institutional reforms that may ensure the coherence of domestic and foreign policies. The **measures recommended** doing this are:

- Regulation of a system of economic instruments which to ensure the integration of the social and environment protection objectives within the economic policies (prices, property rights, taxation, negotiable rights of emission, subsidies, negotiable agreements);
- Reconsideration of the decision-making process to allow a wider participation of the civil society and of the decision-making factors at various levels;
- Establishment and development of a system informing on the impact of policies and to project interventions; development of a system of indicators which to allow an efficient periodical evaluation of policies and actions sustainability;
- Development of markets for public goods and of ecological goods and services;
- Development of research in technologies using fewer natural resources, less polluting, with lower risks to the environment and individual;
- Development of system of education and formation/communication which to establish the premises of a social dialogues, of a transparent decision-making process under the conditions of individual and collective responsibility and of an evolution towards sustainability of the consumption and production behaviours;
- Modernisation of the system of social protection, including the pensions system and preparation to adopt the EU open method of coordination, political instrument established purposely to address in a sustainable manner the problem of poverty and social exclusion, of demographic ageing in relation with the European Strategy for Occupation;
- Increase the coherence of policies by correlating the National Strategy for Sustainable Development with:
 - o Revised EU SSD (2006)
 - o Other programmatic documents associated to the process of integration, such as NPD 2007-2013, JIM, JAP
 - o The national strategies and plans of action relevant to the priority objectives (e.g. the National Plan for Poverty Control and Promotion of Social Inclusion, Millennium Development Goals for Romania, Roma Education, Strategy for the Roma, Strategy for Occupation).

A possible solution in the area of sustainable development is the establishment of “devoted committee” coordinating the intersectorial actions. For all multidimensional/multicurricular themes

it is usually recommended to establish inter-ministerial committees because policies coordination is not effective in the absence of an institutional structure. Furthermore, various reports show that if the strategies are signed by a given ministry, they are not read and disseminated (much less known or assumed) by other ministries or agencies that are supposed to play an active role in target completion.

3.5 Conclusions and recommendations

If during the past six years the Romanian economy displayed an increasing trend, the economic growth is not yet socially sustainable. Even if this growth pattern will continue for a time it will have to change, particularly within the context of integration within the European structures. A strategic orientation is required to turn this potential into reality, a systematic and programmed effort to lead things towards the desired direction. A developed society characterised by access to “decent work” for all its citizens is a goal that may be fulfilled by multiple ways. The first step is therefore to select the way to go, which should ideally be assumed by all the social partners. Anyhow, irrespective of the option for one way of development or another, to make it sustainable, it must have as core of all policies the control of poverty and social exclusion, the promotion of equal opportunities for households and for each citizen, as well as regional equity in capital and income distribution. To this end, **the national or global strategies of sustainable development must be fully coordinated with the other documents of strategic planning targeting these goals.**

Considering the key problems relevant for a sustainable social development in line with the European priorities (SSD, 2005), which we presented earlier, as well as the strategic documents and actions existing in Romania, several priority strategic directions result. We will not list here the various sectorial goals presented in detail by the strategies and plans of action for rural development, poverty control, education, health care and disfavoured groups such as the Roma. However, it is **important to mention that all these documents of strategic planning are currently little coordinated and correlated among them**, some areas/problems being covered by an impressive number of strategies, plans of action, programs and projects, while other areas/problems are rather neglected.

For instance, in 2004, the Anti-poverty, and Social Inclusion Promotion Commission (CASPI) made the first national survey concerning the implementation of the objectives of the *National Anti-poverty, and Social Inclusion Promotion Plan* (PNAinc¹⁰⁶). Only the activity at the central level was monitored, relevant for the policies of poverty reduction and social inclusion promotion identified in PNAinc (49 under-objectives). The data were collected from 20 institutions with responsibilities in the field (10 ministries and 10 national agencies). The survey considered all the initial actions, the running actions and the actions finalised by the ministries and governmental agencies during 2002-2004. The survey results showed that no strategic document addressed the problem of social dwellings, of temporary shelters for the homeless persons or families or the reduction of the number of dwellings with inhuman, degrading conditions of living. In contrast, nine distinct documents elaborated by four institutions approached the under-objective concerning the access to drinking water; the under-objective concerning the prevention of person traffic, sexual exploitation of children or adults and the development of victim recovery capacity was approached by eight strategies and/or plans of actions elaborated by four institutions; the assistance of the children in situations of major risk (victims of abuses, neglect, violence, exploitation) within the family/community, the prevention of social exclusion due to crime, the support for Roma population and the promotion of equal opportunity also displayed a special strategic interest each being covered by seven distinct documents elaborated by three to six institutions..

¹⁰⁶ PNAinc was passed by the Govern as official governing program in July 2002 (HG nr. 829/31.06.2002). In 2005, PNAinc was updated; HG 1827/22.12.2005 concerning the approval of the Program of implementation of the National Anti-poverty and Social Inclusion Promotion Plan for 2006 - 2008 was published in the Official Monitor no. 64 of 24 January 2006.

For a sustainable social development many strategic documents already elaborated by governmental institutions should:

- (a) be better coordinated,
- (b) be better disseminated, and
- (c) be put into practice.

Second, there are several problems concerning fundamental requirements for long-term social inclusion and cohesion, for whose solution strategic documents or specific policies are yet to be elaborated. These are:

- (a) the problem of (mostly urban) areas undergoing a process of becoming ghettos;
- (b) the problem of excluded socially groups such as the homeless persons/families;
- (c) the problem of stimulating fertility increase;
- (d) the problem of migration for work abroad, and
- (e) the problem of access to infrastructure, mostly in the rural environment.

The problem of rural areas underdevelopment will not solve by itself by adhesion to the European Union. Both in Portugal and Greece, the rural areas deprived of massive investments in infrastructure are currently strongly affected by unemployment and depopulation. On the other hand, programs of public works can be achieved to develop the infrastructure which, according to World Bank studies, have the following main benefits:

- (a) are available to everybody, irrespective if previously active within the formal or informal sector, while the (active or passive) measures of unemployed protection are available only to the people that worked in the formal sector;
- (b) are useful to target the disadvantaged groups and the groups out of the formal work market because the public works can be achieved with a large proportion of such persons;
- (c) such programs require a quite low administrative capacity because the candidates do self-selection;
- (d) these programs supply the infrastructure so much needed in many areas of the country.

The main risk associated to the programs of public works is to waste the public money because of corruption or of an inefficient management. Because of this reason, in many countries such programs were transferred to the private sector, but stimulants were elaborated to hire temporary some target-groups of workers.

CHAPTER 4. ENVIRONMENTAL POLICY AND ENERGY POLICY

4.1. CURRENT SITUATION OF THE ENVIRONMENT IN ROMANIA. ENVIRONMENTAL STRATEGY

4.1.1. The approach of the combined effects of pollution on the different elements of environment (air, water, soil) and their interdependencies

The environment, as a structure of organized systems, is disturbed by many human activities, the effects being cumulative and at the same time redounding upon each sector. The tables from the annexes that present the impact of human activities are extremely suggestive from this point of view and give us an idea about how should the **intersectoriality and integration** of policies be approached (Annexes 4-10). The combined effects of pollution on the different elements of the environment (air, water, soil) are presented below, referring to the present situation in Romania.

4.1.1.1 Emissions in the atmosphere: polluting emissions with direct biological effects and greenhouse emissions

Heavy metals emissions

For heavy metals, the main polluting source is represented by the different industrial processes, and for lead it is also added the pollution produced by the exhaust gases from the internal combustion engines and spark ignition engines. Within the period 1998-2003 it could be noticed an unequal decrease of the heavy metals emissions due to the retechnologization of installations. The year 2004 shows a slight increase of heavy metals emissions, respectively an increase by **32% for Hg, 5,6% for Cd and 54,6% for Pb**, caused by the substantial increasing of road traffic and the reopening of some new activities and/or the increasing of some production activities.

Romania has taken the commitment of reducing the emissions by **8%** in the period **2008-2012** compared to the baseline year 1998.

GHG Emissions (in CO₂ equivalents) represented **53,9%** from the total for year 1989¹⁰⁷, the baseline year, especially as an effect of the economic decline and the transition to the market economy. It is clear that Romania will fulfill the commitments undertaken under the Kyoto Protocol for the period 2008-2012. In 1989, **83%** of the GHG emissions (**79%** in 2001) have come from the energy sector, the main polluting sector in Romania. In the industry, most of the CO₂ emissions are generated by the mining products¹⁰⁸.

4.1.1.2 Waste

In 2004, **363 million tons of waste have been generated – approximately 326 million tons come from the mining industry (91%), approximately 29 million tons represent other production waste (from which approximately 16 millions generated by the energy industry), and approximately 8 million tons represent municipal waste.** The environmental quality in some areas are far below the EU standards, especially because of the lack of long term investments in water and waste infrastructure as well as the inadequate systems for environmental management to which it is added the insufficient knowledge on the sustainable development principles and a poor level of population awareness raising¹⁰⁹.

Household waste management. From the total of municipal waste, approximately **40%** represent recyclable materials, from which aprox. **20%** can be recovered not being contaminated. Following the selective collection through pilot projects, only **2%** of the recyclable materials totally generated are valorised. The rest is eliminated through landfilling and thus loosing large quantities of secondary raw materials and energetic resources.

¹⁰⁷ Eurostat, Structural Indicators, *Total greenhouse gas emissions*.

¹⁰⁸ European Environmental Agency (EEA), *The European environment - State and outlook 2005*, november 2005, http://reports.eea.europa.eu/state_of_environment_report_2005_1/en.

¹⁰⁹ Minsitry of Environment and Water Management, *SOP Environment*, april 2006.

Landfilling represents the main method for municipal waste disposal. The municipal waste landfills that comply with the Directive **1999/31/EC** were reinventorized at the beginning of 2004. In Romania there are **267** landfills for municipal waste in the urban area (that receive the waste collected by the salubrity firms in the urban areas) from which:

- **16** landfills are complying or will become complying with the European norms until 31.12.2006;
- **238** non-complying landfills with the European requirements that will cease their landfilling activity in stages **until 2017**;
- **13** landfills have ceased the activity between 2003-2004 and for these ones there are under development some projects for their closure.

Out of the total **16** complying landfills, **11** were built before the European norms regarding landfills were introduced into the Romanian legislation; however, they comply with the European norms from the construction point of view (Constanța, Chiajna, Brăila, Piatra Neamț, Sighișoara, Sibiu – Cristian, Ploiești-Boldești, Vidra, Glina, Băicoi and Câmpina-Bănești); they do not require major investments in order to meet the standards; only costs necessary for improving the operational and monitoring activities, which were estimated to about **3.55 million Euro**. The other **5** were built according to EU norms and they began to operate during 2003 - 2004 (Brașov, Buzău-Gălbinași, Arad, Slobozia, Costinești).

Apart from the municipal landfills in urban areas in Romania there have been identified **2686** dumping sites in rural areas with a surface of maximum **1** ha. The closure and cleaning of these spaces will be done until 16.07.2009, in parallel with the extension of collection services in rural areas, the organization of transport and transfer systems and opening of zonal landfills.

The economic activities, which led to the producing of the biggest waste quantity in 2003, excepting mining industry, were petrochemical, chemical, plastic and rubber (**27%**), metallurgy and metal constructions (**17%**), energy (**13%**), food industry, beverages, tobacco (**10%**) and other economical activities (**33%**).

The industrial branches that are large waste generators are the energy, chemical, petrochemical, metallurgy and food industry. From the total amount of generated production waste, about **30%** is recovered, the rest being disposed of by landfilling or incineration.

At the level of 2003 there were eliminated through incineration/co-incineration aprox. **2 million** tons of waste (mainly fuel waste). In 2003 four incinerators for hazardous waste were operating, belonging to some private operators; other **7** incinerators belonging to four private operators which incinerate hazardous waste generated from their own activities; **3** cement kilns authorized for the co-incineration of waste.

The landfills for production waste that comply with the provisions of **Directive No. 1999/31/EC** on waste landfill were inventorized at the beginning of 2004, resulting a total number of **169** landfills covering approx. **3000 ha**.

According to the type of waste that they receive, these landfills are classified as follows: **51** landfills for dangerous waste, **116** landfills for non-dangerous waste, two landfills for inert waste.

4.1.1.3 Water resources and water quality

In Europe, the population is connected to public water supply networks in a ratio of **96% -100%** in urban ares and **87%** in rural areas, according to “*Global Water Supply and Sanitation Assessment 2000*” Report of World Health Organization.

Public drinking water supply network. In accordance with the 2004 Report of the Public Health Institute, Romania is situated among the average countries regarding the area covered by water supply systems in Europe, having in view that only **65%** of population benefit of drinking water supply from public network.

The resident population in **256** urban localities is of **11,551,096** inhabitants, **86%** of them being supplied with drinking water through the public networks. The figures reported show that in **55** urban localities (**21.5%**), the population is connected in a ratio of **100%** to the public system for water supply.

Out of the total population of **21,7** million inhabitants, in Romania **14,7 mil** persons benefit of drinking water, out of which **11,3** million in urban area (**98%** of the urban population) and **3,4** million in rural area (**33%** of the rural population).

Presently **2917** localities dispose of centralized systems of supplying the drinking water, out of which **265** towns (**100%**) and **2647** rural localities representing aprox. **17%** from their total number (data from January 2002).

The drinking water supply networks have a total length of **40,269 km**, corresponding to **71%** of the total length of the streets in the urban area. The drinking water supply network has continuously extended (in 2002 the network length was **20.1%** above the 1995 level).

The annual quantity of the drinking water supplied to consumers sum around **1,350** million m³ out of which **811** mil. m³ for domestic usage. In the last **10** years, the quantity of total water supplied in the network, decreased mainly due to the metering systems and to the decreasing of industrial activity.

In 2002, the water supplied volume was **1,349** million m³, with **33.6%** less than in 1995.

Nitrates Contamination of ground waters is recognized as being a major problem of environment in Romania. On a significant surface of agricol land, the nitrates concentration reaches **100 mg/l**, going until a maximum concentration of **300 mg/l** (Ministry of Waters and Environmental Protection, 2001). It can't be exactly determined, due to lack of data, which is the proportion that can be assigned to fertiliser usage.

Sewerage network. At the end of 2004, the number of localities endowed with sewerage network installations was of **675**. The sewerage network has a total length of **17,514 km**, out of which **16,397 km** in the urban area. *Only 73% of the total length of urban streets is endowed with sewerage network.*

In the **263** municipal wastewater treatment plants existent in Romania it is treated only **77%** of the total flor evacuated through the public sewerage networks; **47** urban localities (among which Bucharest, Craiova, Drobeta Turnu-Severin, Braila, Galati, Tulcea) discharge wastewaters into the nacional receivers without a preliminary treatment.

Population benefiting of the sewerage service is about **11.5** million inhabitants, out of which **10.3** million inhabitants in the urban area (representing **90%** of the urban population) and **1.15** million inhabitants in the rural area (**10%** of the rural population).

Correlating the two types of endownments - drinking water supply and sewerage systems – the country population can be grouped in three categories:

- Population benefiting of both services – **52%**;
- Population benefiting of water supply but not of sewerage system – **16%**;
- Population benefiting neither of water supply nor sewerage system – **32%**.

4.1.1.4. Soils status

Soil erosion produced by **water** affects **6,3** million ha out of which **2,3** million are object of some antierosional measures. This type of erosion, together with the land sliding (aprox. **0,7 million** ha) lead to a soil loss of **41,5 t/ha** annually. **Soil erosion** produced by **wind** is a charateristic for **0,4 million** ha with the risk that the surface to increase due to the disappearance of protection curtains. **Soil salinisation** affects **0,6 million ha** predominatly on the irrigated or drained lands.

Soil deterioration and compaction takes place on **6,5 million ha** of arable land. Primary compaction is present on aprox **2 million ha** while the tendency of crust formation can be observed on a surface of aprox. **2,3 million ha** (Ministry of Waters and Environmental protection, 2001)

For the efficient usage of natural resources and biodiversity protection, Romania aims the reducing by 2010, of the actual rate regarding the losses of biological diversity through the **development** of clean production methods, inclusively the **usage** of eco-efficient materials. Also the **orientation** towards an improved energetic efficiency grade and the **modernization** of the energy system in its complexity, will lead to savings at the level of enterprises and domestic consumers without affecting negatively their production or consumption.

Also it is envisaged the increasing of the waste management quality for reducing the **CO₂** and **N₂O** emissions. Among the priority areas of investments in environmental protection there is the development of an integrated municipal waste management **system** and a selective collection **system, promotion** of waste recycling and **developing** the facilities for their treatment.

Most of the objectives previously presented can be find in the *Sectorial Operational Programme Environment (2005)*.

4.1.2. Objectives of the environmental protection presented in the Sectorial Operational Programme (SOP Environment)

The overall objective of the Sectorial Operational Programme (SOP Environment) aims at reducing the existing disparities between Romania and EU as regards environmental infrastructure, both in terms of quantity and quality. The expected results envisage the effectiveness and extension of the environmental services taking into account the sustainable development principle „polluter pays”.

The achievement of the overall objective depends on the **specific objectives** of the SOP Environment that envisage:

- **improvement of accessibility to public utilities**, by ensuring the water and waste management regional infrastructure in minimum **35** counties that should cover **70%** of the population until 2015;
- **improvement of the environmental quality**, by supporting the actions for promoting the integrated policies for water, soil and environmental protection, with special accent on the acquis compliance so that, by **2015** it should ensure:

- Ø sufficient treatment of the waste water for more than **200** agglomeration with more than **10 000** equivalent inhabitants, representing **60%** of the biodegradable load;
- Ø adequate quality of drinking water in all localities;
- Ø closing of minimum **80** noncomplying landfills and the ecological rehabilitation of the historical polluted sites or costal erosion;
- Ø retechnologization of the central heating systems in some of the most polluted areas.

- **improvement of nature protection and flood risk management** in the selected priority areas through actions aiming at :

- Ø improving the management of Natura 2000 network;
- Ø prevention of flood disasters

These objectives of the SOP Environment are transposed in 4 strategic priorities (see also Annex 11):

Priority Axis 1 – Development of the regional water and wastewater management systems

Objective: The main objective of this priority consists in ensuring the urban agglomeration population with the adequate water and waste infrastructure and the adherent good quality services at accessible prices. This priority will be supported by the Cohesion Fund.

No. Of localities with water facilities: 250

The population that will benefit of water and sewerage services: 70% (today only 52%)

No. of new/rehabilitated and compliant wastewater treatment plants: 200 (today none)

Approach

With the view of optimizing the investment costs as well as the operational ones induced by the above mentioned commitments, the projects will be grouped (for example by hydrographic basin or by county) and will include priority investments that envisage the compliance with the relevant Water and Waste Directives, at the required quality and at acceptable tariffs. The investment components of these priority will be selected so that they take into account the commitments undertaken by Romania during the negotiations.

Priority 2 – Development of sustainable investments in the environmental infrastructure

Specific objectives:

A. *Improvement of water quality and rational usage of water resources*

Subobjectives:

The main objectives under this subpriority are:

- **reducing** the watercourses pollution by increasing the quantity of municipal wastewater adequately treated and thus contributing to the implementation of **Directive 91/271/EC** on the treatment of urban wastewaters and by ensuring an adequate management of the sludges resulted from the activity of the wastewater treatment plants;
- **supplying** the population from the specific regions with less than **100.000 p.e** (equivalent persons) and the vulnerable areas with the drinking water at the required standards and quantity (contributing to the compliance with **Directive 98/83/EC**) and reducing the disparities among regions;
- **ensuring** the population connection to the sewerage system, reducing thus the disproportions between the access to the drinking water sources and the sewerage ones;
- **protecting** and encouraging the rational usage of water resources.
 - *Wastewater adequately treated: 60% (today only 35%)*

Approach

The main specific objective will be reached by supporting the extension of the sewerage systems and building/rehabilitating the wastewater treatment plants at the required treatment level, especially in order to comply with the requirements established for the sensitive areas (nutrients disposal)

B. *Improvement of soils affected by the inadequate management of waste, by the historical contamination and erosion*

Approach

The main actions will be directed towards the extension/completion of the waste management systems in those counties where the existent, updated investments are limited to a new landfill, non selective collection and transport. The purpose is the creation of a modern waste management that should contribute to the minimization of waste that will be landfilled by creating some adequate operational systems for each type of waste with the view of environmental protection. Approximately half of the **41** counties from Romania not included in priority 1 will benefit from investments on different types of waste. The building of some new waste landfills it's excluded from this priority.

Apart of this, **the rehabilitation** of the *contaminated historical sites* it's foreseen in several priority areas with the aim of reducing the negative impact on the environment and human health.

The protection and rehabilitation of the south coast of Black Sea aims at stopping the coastal erosion, the increasing of the investment value in this area as well as the safety of the dwellings.

No. of integrated management systems at county/regional level: 30 (today none)

Population that benefits of strategic waste management projects: 10 000 000

No. of contaminated sites rehabilitated (including noncomplying waste landfills closed): 90 (today 13)

C. Improvement of air quality in the critical areas

Approach

If the alternatives for traditional fuels are not available the purpose is to promote a *rational usage of the nonrenewable energy sources*.

Priority 3 – Establishing the adequate management systems for environmental protection and prevention of floods risks in the selected priority areas

Approach

a) *Strengthening the nature conservation in the Nature 2000 sites*

b) *Floods management in the most vulnerable areas*

Priority 4 – Technical Assistance

Specific objective

The aim of this priority is to ensure an efficient implementation of the entire SOP Environment and to contribute to the increasing of the absorption capacity of European Funds through:

- supporting the process of projects identification,
- strengthening the administrative capacity of the Management Authorities and Intermediate Bodies,
- financing the activities regarding the monitoring, evaluation and control of projects as well as the publicity actions for SOP Environment.

Financing by FEDER

- sectorial information systems that have a major economical impact (statistic, financing-customs, social protection, financing intermediation).

The key of direction change towards a sustainable development of Romania is the efficient management of resources, either renewable or not, in order to achieve the internal and external competitiveness of goods and services.

4.2. THE CURRENT STATE OF ROMANIA'S ENERGY SECTOR

The internal energy situation of Romania can be summarized as follows:

- **A diversified, but quantitatively reduced potential of hydrocarbons –oil and natural gas.** At the current rate of production, the proved reserves of hydrocarbons have a limited average lifetime of about 14 years. There are also supplementary potential reserves representing about 26-35% from the current amount of proved reserves;
- **An important potential of renewable resources, especially hydroenergy;**
- Important proved reserves of **coal**- with a rather low energy power- and of **uranium**, with an average lifetime of about 120 years, at the current rate of production;
- An **important and diversified transport infrastructure** for oil, natural gases, electricity, petroleum products, oil refinery capacities, portuary capacities;
- A **complex nuclear programme, under development**, based on secure and performant technologies, well perceived by the population;
- **Partial interconnection of natural gas transport systems** with the similar systems of neighbouring countries and about to be completed with the european network.;
- **A primary energy production and consumption based mainly (85-90%) on fossil and depletable energy sources (coal, natural gas, oil)** and with a negative impact on the environment;
- **The renewable resources** have a still limited share in the primary energy sources balance, but they are much better represented in the electricity output energy sources, where they have a weight of about 29%;

- **An energy independency degree of about 70%** ensured, mainly, by coal contribution- a source with a very high pollutant potential- and also by natural gas.

Romania is confronted with a series of **drawbacks** concerning the following features:

- a low energy efficiency of Romania's economic sector, as a consequence of long term subsidized prices and of an economic and industrial policy based mainly on energy-intensive industries (iron and steel industry, aluminium, cement, petro-chemistry, construction materials);
- the outrun standard of life- by 40%- of natural gas distribution networks, as well as of urban centralized heating systems;
- increasing dependency of hydrocarbon imports;
- outrun producing technologies and installations for electricity and thermal energy, generating important losses on the production flows.

The energy national system must face and meet the following challenges at national and EU level: **the security of the energy offer, the increase of economic competitiveness and decrease of the impact on environmental quality**. These challenges are very important to Romania which has to recover severe gaps as concerns the economic performance degree, as compared to the developed countries.

Energy supply security is a major component of the energy policy of a country. Its importance consists in: ensuring a balance between the national energy demand and offer; optimising the primary energy resources structure and growth of energy efficiency, taking to account the outlook of an ever greater long term price of energy, determined mainly by the fact that the replacement rate of consumed reserves is presently lower than the demand increase rate.

The instruments by means of which one can achieve this objective are: *appropriate energy infrastructures*, able to ensure the fuel alternance in the burning processes; *appropriate energy supply sources*; *energy efficient technologies*; *competitive energy markets*.

As a future EU member, *Romania must become an energy security supplier* for the Union; for this purpose it must sustain these objective by adequate actions at national level.

4.2.1. Goals of energy management in Romania

The **general goal** of energy management: meet the current, medium- and long-term energy requirement at a price as low as possible, adequate to a modern market economy and to a civilised standard of living under conditions of quality, safe supply, observing the principles of sustainable development.

Specific objectives:

Maintain an acceptable level of dependence on energy imports; diversify the sources of supply and the transportation routes; improve energy efficiency throughout the entire flow resources-production-transportation-distribution-final consumption; reduce the adverse environmental impact of the energy; use improved technologies to reduce consumption; reorganise the economy and the weight of the heavy industry within GDP structure by changes in the life style (*by voluntary measures of energy saving*).

4.2.2. Specific measures in the energy field

4.2.2.1. Mining sub-sector

Shortcomings : a relative low caloric power of coal, very high emissions of noxes of the energy power units on coal.

Motivations : **On the basis of energy efficiency criteria, the coal output has not favourable outlook neither in EU nor in the countries which adhered or will soon adhere to the European**

Union, taking to account the infrastructure and current technologies limits, but on the other side, in the absence of an active policy of demand management, the simultaneously reduction of nuclear energy and coal's share risks to generate social tensions and to affect the supply security.

On the other side, the competitiveness' reports between energy sources are in a radical changing process, marked by:

- a) enhancing the separating/specializing trend of the utilisation' fields of coal and crude oil;
- b) increase of complementarity between coal and nuclear energy;
- c) increase of gas complementarity with all primary energy source and in all utilisation fields.

On long term, **the steady substitution of coal with gas** risks to create in the European Union a new dependency situation to gas. The increase of gas share in the energy consumption could be followed by a rise in gas prices, which would undermine the EU security of energy supply.

Under the conditions of the inherent rise of international oil prices in the future years and of the prevalence of the dependency on a single gas supply source, **the coal** could become an alternative supply solution for Romania, because of the very high potential of its proved reserves.

Measures/solutions:

- ensuring a concordance between the production capacities and the energy demand;
- concentration of output in the most effective areas, that is in the areas with the lowest possible costs;
- abandonment of non-economic viable mines (especially lignite);
- reconversion of labour force and ecologisation of abandoned areas;
- output valorisation under market conditions;
- starting the privatizations for the units presenting investing interest;
- including in the privatization offer' package, the units which, from different reasons are not included in the restructuring units plan.

4.2.2.2. Oil and natural gas sector

Problems: Decreasing production potential, new discoveries of low dimensions;

Objectives : increase of national hydrocarbons output, enhancing the supply security with the view to diminish the imports' dependency.

Measures: increase of the recovery and discovery rates, especially at underground big depths, with the view to achieve a report between the new discovered reserves/and the current production of a minimum 0.5-1; ensuring the rehabilitation and the proper dispatching of transport systems through oil and gas pipelines, by applying the control and acquisition system in due time- SCADA; diversifying the gas supply sources from import by developing new interconnections with the neighbouring countries' transport systems; accomplishing the cross-countries interconnecting projects:

- the transit project „Nabucco” (Middle East-Western Europe);
- interconnection with the European network, by the completion of Arad-Nădlac-Szeged pipeline; with the Ukrainian system (completion of Huși-Satu Mare pipeline); with Moldova Republic-through the Bălți-Ungheni-Iași pipeline;
- the Pan European Oil Pipeline (PEOP)- the transit pipeline Constanța –Trieste;
- increase of underground storage capacities of natural gas; development of national transmission system and of gas distribution networks;
- increase of exploitation safety.

Geostrategic opportunities for Romania:

1. *Hub for electricity transmission in the Black Sea region;*
2. *Possible route within the oil transport corridor Black Sea-Adriatic Sea;*
3. *Regional hub in the inter-balcanic gas trade, by developing important storage capacities and increasing the cross-countries gas pipelines capacities from The Russian Federation to Bulgaria and Turkey.*

In European Commission's opinion, the problems regarding the hydrocarbons' security of supply are referring mainly to the need to assign great investments in big infrastructure projects, diversified and competitive, and in commercial interconnections able to provide the EU access to new supply sources, to avoid market breaking up and to ensure the energy large dissemination into the European Union's area.

In *our opinion*, for western gas imports to become possible and competitive on the Romanian market two conditions have to be met:

A. Implementation of investments' projects for interconnecting projects to the Western Europe's network;

B. A non-discriminatory access of third parties (TPA) to the transmission, storage and distribution systems;

The **interconnection** stimulates the development of contractual relationships and discourages the vertical integration in the gas industry, favouring the increase of new firms' entry on the Romanian gas market –one of the most important indicators of competition, even more important than the market opening and the eligible consumers' share . In the case of a local deficit, the interconnection can assure the supply from alternative sources,; it ensures also the leveling of the different prices' effect, by introducing and weighting them in the „gas basket”¹¹⁰, thereby increasing the physical security of supply.

The increase of underground storage capacity of gas, in case of a greater third parties access on the Romanian market, presents the following advantages: provides a greater safety/security of gas supply; optimises the balance supply-demand, taking account of the high fluctuations of demand; creates the opportunity for Romania to play an important role in the South-Eastern market trade, on medium term, after the complete liberalization of EU gas markets. A high volume of gas stocks would allow Romania to play an important role in the inter-balkan trade, as a supplier of gas to Bulgaria, Serbia, Turkey, by speculating the optimal moments of demand for storing or selling the gas.

An important storage capacity could also play the role of a balancing instrument for the charging' degree of the pipeline system. If a storage capacity carries out both functions, it will make automatically the object of regulation, because of its involvement with the pipeline transport - which is a regulated activity.

4.2.2.3 . The electricity output of nuclear and hydro origin

Purpose: substitution of classic fossil fuels, limitation of the electricity generated in thermal power units, which are functioning mainly on gases from import, acquired at high prices;

Motivations:the prospect of a further increase in the international crude oil prices, in the following 2-3 years, up to 80 \$/barrel and to about 280\$/1000 c.m for natural gas; a modality to solve the big problems of the Russian and Turkish' power energy systems, requiring investments estimated at 10 billion \$ in the following 2-3 years; the nuclear energy is competitive comparatively with other primary sources for electricity generation, except for the situations where the solid fossil fuels (coal), can be accessed directly , are available at low costs and are not taxed for their CO2 emissions. The fuel costs for nuclear power units accounts for a minor part of the production costs, but the capital costs are bigger than for a coal power plant.

Target: diminution of the electricity's share of hydrocarbon'origin to 14% by the year 2009, and increase of electricity of nuclear origin to 18% in 2007, after putting into operation the Unit no.2 from Cernavodă, and to 40% after putting into operation the Units no.3 and 4.

Measures in the electricity' generation, transmission and distribution:

¹¹⁰ The “gas basket” consists of the entire volume of gas distributed to the consumers, set up as a weighted average of domestic gas offer and of imports. The purpose of this mechanism was to ensure a balanced distribution towards the consumers of the available gas (that is in equal quotes)

- A far-reaching increase of energy power of nuclear origin, by completing the Unit no.2 from Cernavodă (in 2007), as well as accelerating the construction of Units 3 and 4 of Cernavoda (after 2011), by privatizing them;
- The analysis of the necessity to carry on the production of aqua fortis at RAAN-Drobeta Turnu Severin, with the view to cover the needs for 4 nuclear units;
- The improvement of the nuclear security and the safely management of nuclear wastes;
- Turning efficiently to account the hydroenergy potential, by creating new production capacities and by modernizing the existing ones, by putting into operation of groups with a power of about 1100 MW, by installing new groups with high performances and and by rehabilitating - under technical and economic efficiency- some existing groups having an installed power of 950 MW;
- Closing, with the view to set aside a series of power groups, with low performances and expired life-time, totalizing an available power capacity of 2100 MW.
- Internalizing the environmental costs;
- Reducing the energy intensity at EU indicators' level, increase of energy efficiency on the whole generation-transmission-distribution- final consumption chain.

The **economic effects** for Romania could be:

- relaunching the Romanian nuclear industry;
- recovering the expenses made partially for the Units 3 and 4 at Cernavodă;
- providing an energy security able to sustain relatively high economic growth' rates;
- achieving a sustainable development of the Romanian economy, on the basis of the community'acquis in the environmental field;
- accomplishment of an energy ring, which will guarantee a long term economic cooperation with the economies under development, from the ex-sovietic space and the Middle East etc.

4.2.2.4. The thermal power output in the urban heating systems

Purpose: the reduction of wastes and of energy losses on networks, reduction of the price paid by the final consumer

Specific measures:development of the legislative and institutional framework concerning the thermal energy market and the services' market; achieving rehabilitation projects of thermal power units, diminution of production costs and losses; identifying the implementation ways of some investments'projects and of financement sources; modernization or replacement of existing capacities with other new capacities, based on cogeneration; diversifying the primary energy sources for thermal energy generation; generalization of metering for the thermal energy delivered at building and appartements' level.

4.3. Integration of environment and energy policies

The principle of correlating the economic development with sustainability is adopted as a starting point, despite the impression that it could be a contradiction or even an adversity between these terms. This opinion is highly vehiculated in the literature (jobs versus energy resources conservation) and at the international institutions' level (there is a great gap between the developed countries, which are claiming ecological measures and the developing ones which consider these measures as a big obstacle for their economic programmes, seldom interpreted as a kind of an industrial embargo).

We have to mention that for the countries in transition to the market economy, like our's, the environmental problems included in the sustainability concept, are introducing new concepts like inheritance, goods and public interests and coordinated management in all sectorial policies.

The promotion of these ideas can be best realized by means of regulation instruments, of scientific criteria, of „Durability culture” and of long term sustainable economic practices. Integration of environment policy into the energy policy is a very good example of horizontal integration in the sustainable development context, the integration actions having the aim to ensure :

- The cooperation at institutional level and initiating joint legislative actions;

- The attraction of funds for energy efficiency projects;
- The joint promotion of renewable resources' use (the cost of such an operation can be significantly reduced by a series of regulations devoted to the environmental protection);
- The joint support of projects in the field of wastes' management;
- The construction of new micro hydropower units.

4.3.1. General objective

The general objective consists in *reducing the climate change, the costs and other negative effects these aspects on the society and the environment, by using clean energies and by promoting the energy efficiency.*

4.3.2. Operational objectives and targets

The main operational objectives of integrating the environment policy into the energy policy (established by European Council from Cardiff) are the following ones:

- increase of „cleaner” energy sources share (renewable, nuclear energy, natural gases);
- promotion of energy saving and energy efficiency measures;
- reducing the environmental impact of the energy production and consumption.

A. The increase of clean energy sources' share (renewable, nuclear energy, natural gases). The aims envisaged are the replacement of the classic fossil fuels -gasoline and diesel oil- used in the transport sector with the view to accomplish the commitments regarding the control of climate change' effects and the promotion of renewable energy resources, as a modality to decrease the fossil fuel imports' dependency.

B. Promotion of energy conservation measures and of energy efficiency.

These measures are intending to sustain the economic growth, to improve the energy supply security, to reduce the dependency on the primary energy sources' imports and also to increase the economic competitiveness and the energy efficiency at domestic level as well as on the international markets.

Targets:

- **Reducing the primary energy intensity by 40%** during 2004-2015 period and by 2.5-3%/year during 2006-2010 period, comparatively with the year 2001, tacking to account the available saving potential of 50% in the residential sector, of 30% in the centralized thermal energy feeding and of 30% in the the industrial sector;
- **Reaching a share of the renewable energy sources** in the overall primary energy consumption of 11% in the year 2010 and of 11,2% by 2015.
- **By 2010, 12% of energy consumption, on average, and 21% of electricity consumption** as a common but differentiated target, **should be met by renewable sources.** By 2015, 30.4% of electricity consumption will be ensured by renewable sources. The greater utilisation of renewable sources will ensure until 2010, an absolute reduction of energy sources' imports by 4.965 million tep, and until 2015, by 5.527 million tep;
- **Increase to 2%, until 2007, of the share of biofuels** in the overall energy content of all types of fuels used in the transport sector;
- Assuring, until 2011, an increase to 5.75%, as an indicative target, (Directive 2003/30/EC), of biofuels' share on the transports' market considering raising their proportion to 8% by 2015.
- Reaching an overall saving of 9% of final energy consumption over a 9 year period until 2017 as indicated by the Energy Saving Directive.

4.3.3. Integration of energy efficiency in economic-social, policies' mix

1. The regional and local policy

The energy efficiency and the energy conservation can be integrated into the regional and local development policy, by cooperating with the Ministry of Administration and Internal Affairs and

with the Ministry of European Integration. Within the frame of regional development policy, the main instrument for applying it will be the fulfilment of own programmes in the towns with more than 20,000 inhabitants, under the Law no.199/2000's conditions. By using such a criterium concerning the rational use of energy in selecting the regional development programmes, including those with EU financing, one can increase the effects of this objective.

Actions: reducing the losses in the thermal energy feeding systems in centralized regime and promoting the low power cogeneration; reducing the energy specific consumptions in public utilities; use of renewable resources in local public consumption.

2. The industrial policy

Integrating the energy efficiency in the industrial policy is meant to include the energy conservation into the development and restructuring objectives of the industrial units, respectively in the privatizing contracts of the economic agents (details on this subject have been presented in The Chapter 2).

3. Social protection policy

Reduction of energy expenses of the unfavoured social categories has an important social protection impact. At the same time, redirecting the funds initially devoted to the social protection to subsidize investments with the aim to diminish the energy consumption, without affecting the standard of living, can also produce medium and long term effects, in the sustainable development spirit. These investments should be realized in the following fields:

- The metering of connections at the delimitation points between the distributor and consumer's installations;
- Introduction of thermostatic regulators;
- Thermal isolation of buildings;
- Modernisation of equipments for the utilisation of energy and fuel.

4. The policy of European integration

The increase of the energy efficiency will be accomplished by:

- Observing the EU recommendations from the „Route File” (Copenhagen-2002);
- Including substantial projects in the assistance programmes –in order to ensure the rapid implementation of EU directives' transposed in the national legislation as well as of the new documents;
- Including some components of energy efficiency in colligated projects (of social cohesion, local development, environmental protection).

5. Estimated effects and synergies

The accomplishment of this objective will depend on the economic development's scenario but also on the fuel intersubstitution: the switch to another fuel entails, under normal conditions, the old equipments' replacement with new and more efficient ones.

The energy efficiency is an essential requirement of the sustainable development but at the same time is the most accessible, the least pollutant and the cheapest resource from the existing ones. The evolution of GDP's structure towards a tertiarization of the economic activity, includes more categories of favourable effects on the energy intensity:

- The so-called *structure effects*-derived from the change in the production' modes and of sectorial distribution of economic activities (decrease of the relative weight of high energy intensive industries to the benefit of the services' sector, with a higher energy efficiency);
- The *saturation effect*- specific for those countries with 0 (zero) demographic growth rate and with industrial infrastructures almost complete;
- *Specific consumptions' effects* –which indicate the evolution over a period of time, of the energy consumption necessary to obtain a value unit of GDP (calculated in constant currency), supposing the GDP's structure will be invariable.

Accordingly to the recent opinions of some occidental specialists, the decrease of the energy intensity would lead to less energy savings than those provided by the supplementary economic growth generated by the technical progress (incorporated or non-incorporated) associated with the development of the electricity- an energy resource of the best quality. Anyhow, the importance and the diversity of technical and technological progress from the last two decades, tends to reverse the technical-economic paradigm laying at the basis of the economic growth in the post- war period, according to which the economic development has been directly accompanied by a constant and massive increase of energy consumption.

The estimated effects of reducing the energy intensity at the macro-economic level are the following:

- the diminution of the overall energy consumption;
- the reduction of energy resources' imports;
- avoiding some supplementary costs to the energy producers;
- the increase of the energy efficiency, of competitiveness and profits in those sectors having important weights in the balance of primary energy consumption;
- the development of the production of energy effective equipments;
- attraction of financing funds for investments in sectors which could become attractive by applying efficiency measures;
- avoiding or limiting the climate change;
- promoting the transfer of performant technologies to Romania.

The impact at *the social level* can also be important:

- In the *industry field*, the minimization of costs for the energy consumed in the technological process, rises the opportunities to maximize the profits and to generate funds to be invested in the development of the production capacities, having as a result new job creation.
- By means of the thermal rehabilitation of buildings can also be created new jobs in the construction and equipments fields.
- By increasing the energy efficiency of buildings, the energy bills for the population will be diminished.

The estimated impact of the energy efficiency improvement process *on the environment quality* will act in the following directions:

- Reduction of pollutant emissions generally and those of greenhouse gases (CO₂) specially, by 4-7 million tons/year; valuing this potential on the market, through the so-called permits could represent an important financing source;
- Reducing the local impact on the environment of the energy exploitation and consumption;
- Reducing the pollutig effect on underground and surface waters;
- Reducing the soil pollution, by diminishing the slag and ash deposits at the power and thermal units.

CHAPTER 5. OBJECTIVES OF SUSTAINABLE DEVELOPMENT IN ROMANIA. SELECTION OF SPECIFIC APPROACHES

From the previous chapters and the reviewed documentation it was revealed that there isn't a certain scheme for reaching the objectives of the study. Consequently in the following we will only reconsider and restructure the actual processes, the institutional procedures and arrangements after our own needs, priorities and resources. In this respect it is important to reach a common agreement on the basic principles of a strategic planning as well as the holding of a coherent set of mechanisms and actions that could ensure the implementation of the established objectives.

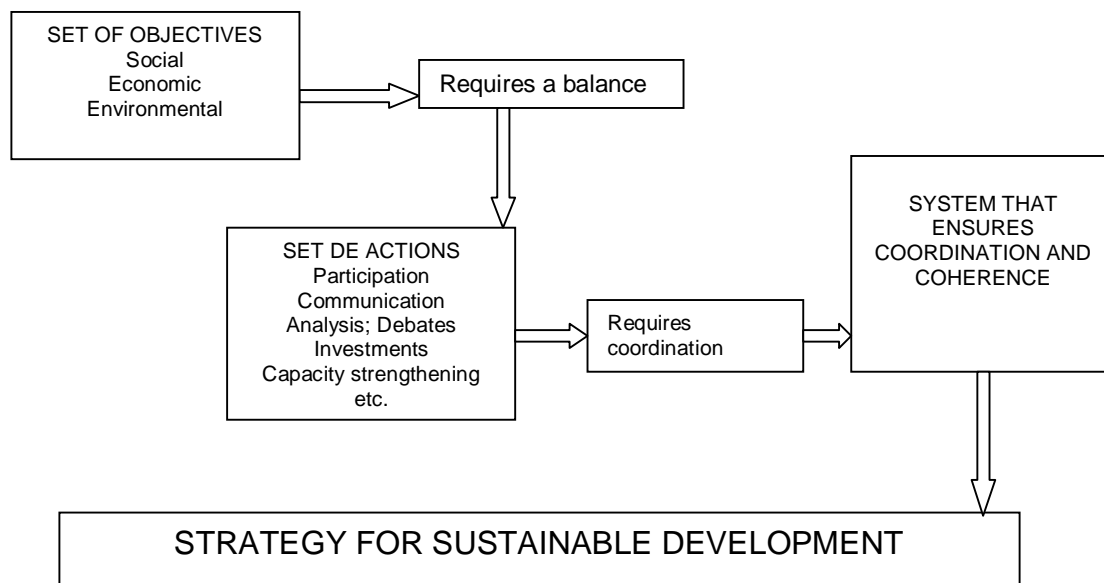


Figure 5.1 Rational explanation of a systematic approach for elaborating a strategy for sustainable development

In this blueprint stage of the study, the research team has proceeded to draft a summary presentation of the main European requirements in the area and to overview all strategic planning processes developed in Romania, with or without external assistance and recording ,at the same time, the actual baseline situation.

The starting point consisted in the ensemble of sectorial strategies, doubled or not by Sectorial Operational programmes consecutive to the National Strategic Reference Framework negotiated with the European Union in the perspective of accessing Structural Instruments.

To these we have added also the iterative process of elaborating the Strategy for Sustainable Development „*Horizon 2025*” and the one of elaborating the „Medium Term National Strategy of Economic Development”.

The **important** aspect is that these strategies represent the result of a large consultation process with all actors, that makes, at least in the identification phase of weaknesses, strengths, threats and opportunities for each sector, to have benefited indirectly from the pertinent opinions of a large number of specialists and institutions.

Once these opinions were gathered as well as the answers to the real problems embodied in general objectives, specific objectives and measures, we were put in front of a picture almost exhaustive of needs and actions necessary for answering those needs.

A **critical analysis** of this picture leads us to the idea that it can't be an useful instruments for the governing policy, as long as it doesn't distinguish from the raft of wishes, the priorities for sustainable development. Each sector of activity aims at tackling all problems they are confronted with, without omission, and those identified initially were almost doubled after the consultations. It is very good, we say, that the strategies and programmes are products of some democratic processes, like all over the modern world, they express the best the real problems. Nevertheless their simultaneously solving it's impossible compared to the institutional and financing capacities of Romania. So that **it is necessary** to have a order of priorities both at sectorial and intersectorial level, and for the latter there should **be identified those priorities that blend in an efficient and effective way the synergies, avoid parallelisms, set aside the confusions and conflicts of competencies and develop in an integrated way the capacities and resources.**

It has resulted thus that the stages to be followed until the finalizing of the study should be done as follows:

- **listing** the priorities from the fundamental areas of sustainable development (economy, competitiveness, environment-energy and social protection);
- **identifying** the inter-relations between the priorities and synergies they bear;
- **listing** them as large programatic directions for sustainable development and their justification;
- **choosing** the most suitable tactic instruments (*legislative, administrative, economic, financing and voluntary*) for attaining these strategic objectives of sustainable development.

Both in the following chapters and especiall in this chapter we have offered and we will offer some examples of approaching the main objectives established for building the premises of sustainable development in Romania.

5.1. CLIMATE CHANGES AND CLEAN ENERGY

5.1.1. Causes and effects of climate changes

Climate changes are **caused** directly or indirectly by the human activities that determine the changing of the global atmosphere composition to which it is added the natural climate variability observed throughout a comparable period of time.

Most of the scientific community of the world agrees that there can be already observed climate changes determined by the antropic activities that produce GHG emissions. Greenhouse gases foreseen in the Kyoto Protocol are: **CO₂, CH₄, N₂O, HFCs, PFCs and SF₆.**

The effects are visible especially by the increase of the average global temperature with **0,6 ± 0,2 °C** from the moment when it started to be monitored (**year 1860**). Other indicators that emphasis the climate changes are the accelerated melting of glaciers during summer and an increase with **10-20cm** of the sea level in 20th century.

5.1.2. General Objective: Limiting the global warming effects on the society and environment and reducing its costs

Policy in European Union

Within the last 100 years Europe's temperature increased faster that the global average (**0,95° C** in Europe compared to **0,7°C** at a global level); **8** out of **9** glaciers decrease significantly their volume, there are more and more often extreme climate events – droughts, heat waves and floods. In order to maintain the global temperature below the level where major climate changes could be produced **it is necessary a radical decreasing of the greenhouse effects.**

Some sources estimate that the damages produced by extreme events have raised to more than **20 billion** euro. In March **2005**, the European Council reconfirmed its decision of stopping the global temperature to exceed more than **2°C** compared to the pre-industrial level and that, consequently, **levels below 550 ppm of CO₂** would contribute to the general efforts of limiting and reducing global warming. Member States have set as **target the reducing of GHG**, through the Kyoto protocol, in the period **2008-2012, by 8% compared to the 1990 level**, and some Member States

more developed will identify decreasing methods between **15 and 30%** until **2020** compared to the initial situation mentioned in the Kyoto Protocol.

Policy in Romania

Romania is the first country included in Annex I (among the developed and economy transition countries) of the United Nations Framework Convention on Climate Changes (UNFCCC), which ratified the Kyoto Protocol to UNFCCC, committing itself to reduce the greenhouse emissions (GHG) by **8%** in the first stage of commitment (**2008-2012**), referring to the baseline year (**1989**).

The total greenhouse emissions (GHG) of Romania (without taking into account the absorbents), calculated in CO₂ equivalent, have decreased with **48%** in the period **1989-2002**, and the net GHG emissions (taking into account the CO₂ absorption) have decreased with approximately **52%** in the same period, in accordance with the last National Greenhouse Gas Emissions Inventory and Dust for 2002, due mainly to the decrease of industrial production meaning the reducing of fossil fuels combusted in the energy sector and less to the policies and measures for reduction.

The **SO₂** emissions were in continuous decrease in the period **1990-2002**, from emissions of approximately **1.311 thousand in 1990** tons to approximately **780,8 thousands** tons in **2002**, and starting with **2003**, an increase has been recorded comparing with the previous years. The main sources of SO₂ pollution are combustion in the activities of energy and processing industries (with a contribution of aprox. **75,73%** in **2003**). The decrease of SO₂ emissions was due to the closing or functioning at a reduced capacity of some industrial activities, as well as the decreasing of the sulphur content from the fuels used in the activities for producing the thermal and electric energy. The decrease of SO₂ emissions will continue also through the introducing, starting with 1st of January **2007**, of the mandatory condition for the economic agents that use the liquid fuels, to use exclusively the black oil with a sulphur content below **1%**.

The **NO_x** emissions were in continuous decreasing in the period **1990-2000**, but starting with 2001, the **NO_x** emissions recorded a significant increasing reaching **326** thousands tons in 2004. The main polluting sources were represented by the combustion from the energetic industry and the processing industry (approximately **39,24%**), road traffic (approximately. **31,58%**) and manufacturing industry (approximately **11,39%**)

The **NH₃** emissions were rather constant in the period **1990-2000** and after that they decreased significantly until **135** thousands tons in 2004. The main source (approximately **80,26%**) is represented by the farms from the cattle breeding and fertilisers used in agriculture.

In Romania, a total of **174** large combustion plants (**LCPs**) were inventoried - power plants and thermal plants with a rated thermal power equal or greater than **50 MW**, which use mainly **22** fossil fuels (*source: Ministry of Environment and Water Management, draft SOP Environment, March 2006*). These **LCPs** are classified according to the owner or their national co-ordinator, in three large groups:

- ü LCPs owned by Ministry of Economy and Trade (MET)
- ü LCPs under the co-ordination of Ministry of Administration and Interiors (MAI)
- ü LCPs owned by other economic operators.

Out of the total number of **174** LCPs (**163** existent and **11** new plants) **7** LCPs are in compliance with the requirements of Directive No **2001/80/EC**, **157** are non-compliant, and **10** LCPs are closed or in closing procedure by the date of accession.

As a result of the analysis of the **174** LCPs, Romania obtained transition period on type of pollutants discharged into atmosphere (SO₂, Nox and dust) between **1-6 years** for **77** LCPs (**2008-2013**) and for nitrogen oxides, between **1-2 years** for **6** LCPs (**2016-2017**).

5.1.3. Operational objectives

The accent of the environmental policy will move from the cleaning measures and actions to the preventing ones, as there is a significant potential of further reducing the carbon intensity in Romanian economy. Among the options we can mention the following:

- Ø further fuel switching and improving the efficiency in the power sector (see also chapter 4.2.1);
- Ø **increasing** the renewable electricity production and further energy efficiency improving in the end-use sectors of the economy;
- Ø **reducing** (in the non-energy sectors) of the methane emissions from agriculture and those of N₂O from agriculture and industry;
- Ø waste **management**
- Ø enhancing CO₂ **sequestration** capacity by afforestation and changes in land usage.

5.1.4. Instruments for achieving the objectives

Legislative Instruments

Romania ratified the United Nations Framework Convention for Climate Change (UNFCCC) by **Law 24/1994** and was the first Annex-I country, which ratified the **Kyoto Protocol** to UNCCC by **Law no. 3/2001**. These are the only laws in Romania related directly to the climate change. The others are adjuvant, regulating connected aspects in this area. We mention the following:

- a) **Updating the GD no. 1275/1996** on establishing the National Commission on Climate Change, reflecting the new mandates, participation and cooperation between the institutions
- b) **Approving the National Action Plan for Climate Change (NAPCC) – GD 645/2005 and GD 1877/2005**
- c) **Transposing of the EU Emissions Trading Directive 2003/87/EC** as amended by **Directive 2004/101/EC**
- d) **Further** implementing of the provisions of **Directive no. 2001/80/EC** on the limitation of emissions of certain pollutants in the air, coming from large combustion plants (**LCP**) by monitoring the evolution of National Program for reducing the emissions of sulphur dioxide, nitrogen oxides and dust from large combustion installations;
- e) **Accelerating** the implementation of the provisions of **Directive no. 96/61/EC** on the prevention and integrated control of pollution (**IPPC**) through:
 - ü **Processing** and effective issuing of the integrated environmental permits for IPPC installations with and without transition;
 - ü **Updating** the inventories of installations/activities at national and regional level;
 - ü **Performing** the compliance control for the activities for which integrated environmental permits were issued;

It is necessary to detail better and more clear which are the responsibilities and institutional and procedural framework for Joint Implementation mechanism (**JI**) and for emissions trading in accordance with **Article 17** of the Kyoto Protocol and with the **Green Investment Scheme - GIS**

Of course it shouldn't be omitted the establishing through GD of the National Registry of Emissions and of a National System for **GHG** assessment.

Administrative Instruments

National Commission on Climate Change (NCCC). The NCCC was established by the Governmental Decision **1275/1996**. The NCCC functions as the main advisory body to the Minister of EWM on decisions regarding climate change policy. Its new tasks that will include the approval of national communications and GHG inventories, and the approval of JI projects and emissions trading activities, need to be updated, detailed and completed.

a. Improvement of inventories and scenarios regarding the GHG emissions

- ü Improving the coverage/completeness level and the quality of inventories of **GHG** emissions in the view of reducing uncertainties ;
- ü completing the data regarding certain non – CO₂ gases (HFC-s and SF₆) and some source categories that are still unsatisfactory up to now;
- ü the detailing of the data collection and processing procedures regarding these gases will have to be **reconsidered** along to the inventories development.

b. Establishing a National Registry

As a Part included in Annex B to the Kyoto Protocol, Romania will establish a National Registry of GHG emissions no later than **December 31st, 2006**. The Registry will ensure the accurate accounting of the issuance, holding, transfer, acquisition, cancellation and withdrawal of Assigned Amount Units (**AAUs**), Removal units (**RMUs**), Emission Reduction Units (**ERUs**), and Certified Emission reductions (**CERs**) as well as the carry-over of these units.

The National Registry must be in the form of a standardized electronic database and should have similar functional specifications to financial securities registries.

The Romanian National Registry of GHG emissions will be **administrated** under the supervision of the MEWM. The specific design of the National Registry of GHG emissions including institutional and capacity needs will be further addressed within **NAPCC**.

On the basis on the new designs elaborated by the NAEP it is necessary to update as soon as possible the databases regarding the installations that fall under the Directives **96/61/EC, 2001/80/EC, 1999/13/EC, 96/82/EC**.

c. Interministerial cooperation in the Permanent Interministerial Council (see the figure)

d. The improvment of the quality and the scenarios coverage degree regarding future GHG emissions in Romania, should also benefit of a greater attention being a *sine-qua non* condition for elaborating the policies and evaluating the performance of the measures undertaken by the decision making structures.

The “Incentive Renewal Programme for the National Auto Park” through which **14.607** vehicles were scrapped in **2005** in exchange of buying new vehicles from certified producers or importers, must continue.

Economic Instruments

The application of the principle “Polluter Pays” under the internalization of externalities, consecutive to the correct calculation of the total pollution taxes required from the economic agents that issue GHG. The instrument is an incentive one, encouraging the adoption of the best technologies in the view of decreasing the emissions and reducing the pollution taxes.

This stimulation gained an additional partial encouraging through the **Directive 2003/87/EC** in short “**EU Emissions Trading Directive**” or “**EU ETS**” that promotes a scheme for GHG emissions allowance trading within the EU Community.

The EU ETS is not a mechanism under the Kyoto Protocol (Annex I) but an instrument for GHG emissions reduction under EU climate change policy.

The EU ETS was conceived to assist the EU Member States in achieving their Kyoto Protocol’s CO₂ emission reduction targets in a cost-effective way and in full compliance with the Pinciple “polluter pays”. The scheme establishes a **cap-and-trade system for GHG emissions**, starting in the first phase with the CO₂ emitting industrial installations. The industrial sectors foreseen in the first phase of applying the scheme include: combustion installations exceeding **20 MW**; refineries; coke ovens as well as steel industry; mineral industry: cement, glass, ceramics; paper and pulp.

The **Directive 2003/87/EC** has been amended by the Directive **2004/101/EC**, the so-called “**Linking Directive**”, that recognizes the decreasing of emissions generated by JI projects and CDM - **Clean Development Mechanisms** and allows their use within the EU ETS.

The first trading period in the EU ETS started in 1st January 2005 and will run until 31st December 2007, after which the 2nd five-year trading period will start (**1st January 2008-31st December 2012**).

The National Allocation Plan - NAP determines the total amount of allowances that the Romanian government intends to allocate and how it will allocate them to individual installations. Assuming a start date for trading of **1st January 2007**, the 1st Romanian NAP will have to be finalized until the end of the year.

Financial Instruments

Expected impact of JI and IET – International Emissions Trading . JI and IET can secure additional sources of income for investment projects in Romania and additional sources of funding for domestic policies and measures on climate change. The investments that these flexible mechanisms can secure will have direct or indirect substantial positive economic and environmental impacts in Romania.

The total potential revenues of **ERU** sales under JI mechanism in Romania depend on the existent potential for **JI** projects. Until now there have been already contracted projects producing a volume of about **7,5 million** tons CO₂ equivalent in **ERUs** and **AAUs**, corresponding to a value of approx. **40 million Euro**. Assuming a rapid enforcing of the JI legislation and procedures regarding JI Module I, this volume could be substantially increased until the end of the first commitment period (**2012**).

The theoretical potential for international emissions trading (**AAU**) under **Article 17** of the Kyoto Protocol is much higher. The emission scenario analysis regarding **GHG** emissions for the 3rd National Communication has indicated a surplus volume of **AAU** of at least **50 million** tons CO₂ equivalent annually during the first commitment period.

The trading will take place under a **Green Investment Scheme (GIS)** and consequently the traded volumes will be restricted by the potential of projects that are feasible under the **GIS**. The potential of trading will, as a result, depend on the exact design of the GIS and the willingness of **AAU** buyers to invest in the Romanian GIS to support the decisions on the use of JI mechanism and GIS in sectors covered by the **EU ETS**.

Preparation with the support of the **RO 03/IB/EN/01** twinning project of a grant scheme for preparing projects in the following areas: water/wastewater, waste management, biodiversity, **air quality**. The scheme will be launched at national level in 2006 and **2007**.

Voluntary Instruments

Romania could also voluntarily participate at the implementation of the **Clean Development Mechanism (CDM)**. Given the capacity to fulfill the reducing commitment foreseen in the Kyoto Protocol, for the first commitment period (2008-2012), Romania will not use this option. The **CDM** usage will be reconsidered in the future (see also chapter **4.2.3**)

Technology

Measures that include the implementation of the **Best Technologies – BAT – the Best References – BREF specific to** specific to LCPs, in view of desulphurization (**DeSOx**) and reduction of nitrogen oxides from combustion gases (**DeNOx**), reducing dust emissions from combustion gases and measurements of the relevant pollutants in accordance with **CEN** standards.

GHG emissions reduction measures from engine vehicles, inclusively planes, giving priority to the **effective options** (see also chapter **4.2.3**).

The measures for carbon **sequestration and assimilation**, through cultures and plantations of forest and extra-forest vegetation

Research

Strengthening the cooperation between different important agencies and research institutes (National Research - Development for Environmental Protection – NSDIEP Bucharest, National Administration of Meteorology (NAM), Forest Research and Management Institute (FRMI) and particularly their capacity of evaluating the impact and vulnerability to climate changes in Romania (see also chapter 4.2.3).

NAPCC and the Research must identify the main actions and measures for adapting to climate changes, a subject that was very little addressed in the integrated policies.

Financing programmes: MENER, AMTRANS, RELANSIN and INFRAS

Education

Increasing the level of knowledge regarding the ecological, economical and social consequences of the climate changes impact.

The development in the school curricula of themes regarding the impact of climate changes and the adapting process to their effects. This will also contribute to increasing the public participation to elaborating the policies in the field of climate changes.

5.2. SUSTAINABLE TRANSPORT**Policy in European Union**

European sustainable transport is defined qualitatively as follows: “Transport that does not endanger public health or the ecosystems and meets mobility needs, using renewable resources at below their rates of regeneration and non-renewable resources at below the rates of development of renewable substitutes”.

The emissions of CO₂, NO_x, VOC and particulates are four out of the 6 criteria for achieving a *sustainable transport system* (STS). The recommended quantitative criteria for CO₂, NO_x, VOC are 20%, 10% and respectively 10% below the total levels of emissions recorded in 1990. For the suspended and sedimentable particles, the recommended reduction is of 55 – 99% depending on the regional and local conditions.

Noise will not exceed 55 – 65 dB during daytime and 45 dB during nighttime and indoor. As regarding the surface of transport land this should be substantially mitigated the more the terrestrial networks toxically fragments the habitats¹¹¹.

Policy in Romania**Table 5.1 Present status of Transport Infrastructure In Romania**

ROAD TRANSPORT	Comments
Public road density 33,3 Km / 100 Km²	În UE-15 116 Km / 100Km² în 2002
No. of registered cars 136 / 1000 inhabitants	UE-15 = 495 ; UE-25 = 463
Daily annual average traffic 3200 (1990) and 4500 (2005)	Means an annual growth rate of 3,7% in 2000 ; congestion growth, pollution with effects on environment, health and biodiversity
Total length of roads– 79.454 Km (15.712 Km – 19,8 % national) și 63.742 Km county and communal	Limited financial resources only for reparations; only 28,36% were repaired and are impracticable for commercial activities
Highways 211 Km with low connectivity with growth attractors	HUngary 448 , Polong 398 , Cezhec 517 Km
Transportul rutier de mărfuri a crescut de la 26,9 mil. tone (2000) la 294,2 mil.tone (2005)	Means a 13% growth in 5 years – growth tendency
Transport (in tons / Km / year) – 14.288 la 37.000 -	Means a 160 % growth per Km /year

¹¹¹ For more information please visit OECD, <http://www.oecd.org/env/trans> .

RAIL TRANSPORT	Comments
Density 42,2 Km / 1000 Km²	in UE 65 Km / 100 Km²
Passenger traffic 400 passengers/Km/inhabitant	in UE-15 - 800 passengers/ Km / an
In 2003 there were 303 speed limitations on rail transport due to a bad maintenance and of rails and signal equipments with a low technological level. 26% of the rail transport network has a speed restriction of 50km/h and others 39% from the network have a speed limitation of 80 km/h	
Commodities rail transport 72 million tons	In GDP terms it's 10 times higher than in EU-15. Decreasing tendency
A key objective for the rail transport network TEN-T will be the increase of maximum speed at 160km/h for the passenger trains and 120 km/h for commodities trains	
In 2003 the Romanian rail transport network covered 11,053km covering all regions out of which 3,965 km (35.80%) electrified and 2,965 km (26.77%) operated on double rails. Also the rail network is relatively well distributed on regions, there aren't communication corridors among the country regions	50% of rail traffic is performed on Ten-T network
FREIGHT TRANSPORT	Comments
Transport capacity 105 million tons/year	Transport demand is only 40-50% of this capacity; old infrastructure. Constanta is situated at the crossroads of corridors IV and VII

Source: *SOP Environment*, March 2006

5.2.1. General objective: Transport systems that meet the economic, social and environmental needs, avoiding unexpected impacts on the economy, transport and environment.

The national road network, which is far from the levels achieved in the European Union, as well as the rail network, will grow in the future decade and will affect substantially the health and ecosystems support of life. Development will be a consequence of labour force mobility, developing of regional labour markets and the interconnectivity needs between regions and localities.

Taking into account that the transport networks are fundamental for the social and economic cohesion policy of the state and the fact that the future development of transport must take into account the environment deterioration, by complying with the sustainable development principles, we choose the future operational objectives in this field:

5.2.2. Operational and specific objectives

- Ø **Improving** the economic and environmental performance of all means of transport and where it's the necessary, the moving from the road means to the rail transport and the usage of internodal transport for goods;
- Ø **The increasing** of the public transport **percentage**; Sustainable transport schemes that take in consideration the towns and their periurban areas inclusively the regions (in some Member States it is mandatory the adoption and implementing of such schemes of urban transport recommended by the European Union).
- Ø **Decoupling** the economic growth and the transport demand from the environment and resources deterioration
- Ø **Reduction** of greenhouse emissions (In accordance with the European Policy in the field, the vehicle park from Romania will reach CO₂ emission level of **140g / km** in **2008 – 2009** and of **120g / km** in **2012**).

- Ø **Reduction** of pollutants emissions to levels that don't harm the human health and environment
- Ø **Improvement** of energy efficiency in the transport sector
- Ø **Reducing** the road accidents by half by **2010** compared to the number of accidents recorded in **2000**

5.2.3. Instruments for achieving the objectives

Legislative Instruments

It is necessary to prepare since now a regulation that would distinctively mark the roads that pass through sensitive ecological areas or near National and Natural Parks, through which to justify the road taxes on the respective distances.

It is necessary a regulation that limits the no. of vehicles that circulate in certain periods, at certain hours and in certain areas of municipalities, without infringing the fundamental rights; it's about a public servitude.

The emission standards should closely follow the evolution of EU directives and regulations, and the control methods for the compliance with these standards should be covering.

Administrative Instruments

The elaboration of some "Guidance on sustainable urban transport plans" to come in the support of local authorities.

Effective urban transport planning requires long-term **vision** to plan financial requirements for infrastructure and vehicles and the designing of incentive schemes for promoting **high quality urban public transport**, **safe cycling and walking** and the coordination of transport plans with land-use planning at the appropriate administrative levels.

Transport **planning** should take account of safety and security, access to goods and services, air pollution, noise, greenhouse gas emissions and energy consumption, land use, should cover both passenger and freight transportation and to integrate all modes of transport. Solutions need to be tailor-made, based on wide consultation of the public and other stakeholders, and targets must reflect the local situation.

Financial Instruments

Support through:

a. Networking and Demonstration Projects

The Commission proposes to continue its support under the new **LIFE** + the Cohesion and invites local authorities to exchange experiences under „**The Cooperation Framework**” for the development of some specific local solutions.

b. Network of National Focal Points on Urban Issues

Local authorities report difficulty in accessing initiatives with promising results. For this reason the European Commission decided three years ago to co-finance **URBACT** - a pilot network of national focal points (**'European Knowledge Platform'**) to provide structured and evaluated information on social, economic and environmental issues in urban areas in response to enquiries from local authorities.

The Commission will evaluate the pilot (end 2006) and will decide whether it can be used as a building block for a "European framework programme for the exchange of experience on urban development" under the proposed Cohesion Policy 2007-2013.

Communal roads will be financed also from the Structural Funds (European Fund for Regional Development).

Economic Instruments

The multiplying the perception points of road Taxes on highways and national or county road, in accordance with the “*Eurovignette*” Directive amended in 2003; the users of the means of transport will gradually take the responsibility for the costs generated by their activities, reducing this was the pollution and congestion. Furthermore, this taxation will generate additional funds for infrastructure investments. It’s important that this instrument is correctly calculated and applied so that equity, proportionality, transparency and nondiscrimination to be ensured.

Tabel 5.2 General structure of environmental indicators in the transport field: these reflect the performance of economic measures/operations/means/instruments

Sectorial tendencies with environmental significance	Interaction with the environment	Tactical aspects that must be taken into account
<p>Traffic tendencies and intermodality Passenger and goods transport Road transport Air traffic Infrastructure Capital expenses Road and rail infrastructure Mobile vehicles and equipments Stock and structure of road vehicles Car propriety regime Energy usage Energy consumption Road fuel consumption</p>	<p>Land usage Land used in infrastructure Access to services Air pollution Air emissions and intensity Population exposure to nxes Water pollution Oil lost by ships Noise Population exposure Waste Transport generated waste and recovering ratio Hazardous waste mobility Risk and safety Fatalities related to road traffic Transport of hazardous material</p>	<p>Environment damage Ambient damagea Social costs Environmental expenses CAP expenses Expenses for clean vehicles and clean fuel Taxation and subsidies Transport subsidies Taxes per vehicle and for vehicle usage Price structures Fuel prices for the road transport means Public transport means Commerce and Environment Sustainable development</p>

Source: OECD 2001

Technology

The Commisioner for Energy, Pielbags presented 5 months ago the prototype of the „*Microjoule*” vehicle built by some French experts from the La Joliverie Highschool in St. Sebastien/Loire, receivers of Eco-Marathon scholarship. The vehicle on ethanol can perform a distance of **2885 Km** with 1 litre of fuel. In other words, everthing is possible.

Research

The 7th Framework Programme for Research will offer similar **opportunities** as well as demonstrative projects on environmental urban problems, especially for the substitutes of biogene fuels.

5.3. BIODIVERSITY CONSERVATION AND SUSTAINABLE USAGE OF NATURAL RESOURCES

5.3.1. Present situation in Romania

5.3.1.1. Natural habitats, wild species of flora and fauna

The natural and semi-natural ecosystems cover around **47%** of the country’s area. On the basis of the studies undertaken in the framework of the CORINE Biotopes Program there have identified and charaterized **783** habitat types (**13** coastal habitats, **89** wetlands, **196** grasslands, **206** forest habitats, **54** marshes, **90** rocky/sandy habitats and **135** agricultural habitats) in 261 analyzed areas throughout the entire country. The high level of habitats biodiversity reflects also a high level of the flora and fauna species diversity.

On the territory of Romania there have been identified **3700** plant species, among them **23** species are declared as natural monuments, **74** species are extinct, **39** species are endangered, **171** species are vulnerable and **1253** are rare species. Grassland species represent approximatively **37%** of the

total species existent in Romania. There are also **600** species of algae and a total of over **700** species of marine and coastal plants. The endemic species represent **4%**. Thus there have been identified a number of **57** endemic taxa (species and subspecies) and **171** sub-endemic taxa.

As regarding the fauna there have been identified a number of **33792** animal species, out of which **33085** invertebrates and **707** vertebrates. From the total of **707** species of identified vertebrates, **55** are endangered, **69** are vulnerable and **24** are rare.

5.3.1.2. Natural protected areas status

In Romania, there are **13 National Parks** (**16,83%** from the total surface of protected areas) **13 Natural Parks** (**42,32%**), as well as the “Danube Delta” Biosphere Reserve (**31,59%**) and other types of protected areas (**9,26%**). The total surface covered by Natural Parks, National Parks and Biosphere Reserves is **1,687,460** ha (**121,779** ha maritime surface), which represents **7%** of the total terrestrial country surface.

Besides the National Parks, Natural Parks and Biosphere Reserves, there are **935** scientific reserves, nature monuments and nature reserves with a total surface approximated at **180,000** ha.

Therefore, the total terrestrial surface of the natural protected areas represents around **7,8%** of the total terrestrial country surface at the end of 2005. By the end of 2013, this percentage should reach **15%**.

There have been identified **116** Special Protected Areas (SPAs) and **79** proposed Sites of Community Interest (SCIs) that comply with the requirements of **Natura2000** Network. At the national level there have been given in custody **362** natural protected areas to the different public and private organizations.

5.3.1.3. Coastal zone status

Romanian seashore is facing serious damages caused by erosion extension on around **60-80%** of its length, where the width of the beaches is reducing each year. In the area of the Danube Delta Biosphere Reserve, the seaside has lost in the last **35** years more than **2,400** ha (around **80** ha/year), while accumulations have been of only **200** ha (around **7** ha/year). The sea shoreline has moved on variable distances from one sector of seashore towards the other with values between **180 – 300** metres, whereas the maximum moving value in some sectors has exceeded **400** metres.

In those sectors where the width of the coast is smaller, during important storms, the sea covers almost completely the shore, thus leading to an intrusion of the marine waters into the lakes along the coasts and thus the specific ecosystem of that lake is affected.

Up to date, around **1,500** vertebrate and invertebrate species have been inventoried in the Black Sea. As a result of the increase in industrial and urban pollution, during the last two decades, a decrease has been noticed in the population of certain predatory fish species, as well as of some economically important species (such as: herring, anchovy, horse mackerel, sturgeons, cetaceans).

5.3.1.4. Forest Status

The National Forest Fund has a surface of **6382,2** thousands ha in **2004**. Apart from this there are other **320000** ha with forest vegetation (grasslands, protected areas) representing in total **26,7%** from the country surface.

5.3.2. General objective: Conservation of biodiversity, improving management and avoiding extraexploitation of natural resources, recognising the value of ecosystem services

5.3.3. Operational Objectives

Considering the present status of biological diversity in Romania and the European provisions for nature conservation and natural resources management, there are several **operational objectives** to be taken into account. Anyway the accent of the biodiversity conservation policy and sustainable

use of natural resources will move also from the cleaning measures and actions to the preventive ones. From this perspective there will be followed:

- Ø **Halting** the loss of biodiversity with a significant reduction by **2010**;
- Ø **Extending** the surface occupied by forests, at the average european percentage (optimistic scenario: **33-34%**, *pesimistic scenario: 30%*)
- Ø **Finalizing** the “Strategic Plan for protecting the costal zone”.
- Ø It is envisaged the declaration of new protected areas and the increasing of the percentage of the natural protected areas surface to aprox. **8,5%** from the country’s surface and the delimitation of more than **1000** protected areas for the **Natura 2000 Network**;
- Ø Effective **contribution** to achieving of the four global objectives on forests by 2015;
- Ø **Defining** the optimal network of protection forest curtains;
- Ø **Increasing** the accesibility of forest fund (optimistic scenario:12 m/ha; pesimistic scenario: 10 m/ha);
- Ø Adequate **planning** of land usage, that will contribute to the mitigation of urban dispersion and to the reduction of land fragmentation with losses of natural habitates and biodiversity.
- Ø Soil **protection** through the rehabilitation and reuse of brownfield sites, contaminated or not, and the space-saving spatial planning with the aim of reducing the soil sealing and ensuring rational use of soil.
- Ø **Developing** the monitoring system of Protected Areas Network (inclusively Natura 2000 sites), of the reporting system on their evolution, as essential instruments for underlaying the decisions for nature conservation, for evaluating the achievement of the national environmental policy targets and for informing the public;
- Ø **Improving** the efficiency of resources for reducing the general usage of nonrenewable resources and the environemntal impact of using raw materials through using of the regenerable sources with the rate that doesn’t exceed their regeneration capacity;
- Ø **Avoiding** the generation of waste and enhancing efficient use of natural resources by applying the concept of „*life-cycle*” thinking and promoting reuse and recycling.
- Ø **Protection, conservation and restauration** of diversity specific for the agro-ecosystems by implementing technologies that favorise the sustainable agricultur;

5.3.4. Instruments for achieving the objectives

Legislative Instruments

- Legislative **approval** of the compensatory payments for the application of the servitutes of conservation for the private property lands on whose surface there are habitats elements that meet the criteria for entering Nature 2000 Network (this is in compliance with the EC Regulation EC **1685/2000** regarding the nature conservation activities);

- **Establishing** the methodology for calculating the value of lands and products obtained for a correct and equitable granting of the compensations under the conditions of imposing of a management compliant with the conservation objectives;

- **Legislative Framework** for applying the organic farms formula and for creating better conditions for the animals owned by farmers

Administrative Instruments

Institutional **support** for the Natura 200 sites management (control, training, developing the institutional capacity, preparing the scientific studies, the inventories, mapping, preparing and implementing the management plans for Natura 2000 sites and the action plans for the protection and conservation of communitary interest species, awareness raising activities and environmental educaion);

Investments in public-private partnership, for supporting the natural reconstruction, protection and conservation of habitats and species, infrastructure development (building and endowing the headquarters of the reservations’ administrations and the visiting centres etc) and purchasing the

necessary lands for the adequate management with the view of extending the surfaces for nature conservation;

Establishing the monitoring systems of natural protected habitats and of wild species.

Elaborating some local guidances containing measures and actions for prevention, protection and intervention in case of natural risks – floods, drought, land slidings and earthquakes, with the view of limiting and eliminating their effects on opulation and goods/commodities of any kind, so that it ensures the normal social and economical life.

The **designing** of works for eliminating or mitigating as much as possible the floods' effects will be done in stages from the point of view of financing and execution, depending on the vulnerability to floods of different basins of hydrographical spaces, the size of budgetary allocations, the frequency and scope of phenomena etc.

The complete **inventory** of all damaged/contaminated areas at national leve; will be done in the first stage of the **2007-2013** programming period with the technical assistance support (TA) within SOP. Following the prioritization of investments, the most urgent projects (ecological reconstruction of heavy metal polluted soils, recultivating mine waste landfills, detoxification and rehabilitation of the soils polluted with oil, oil products and waste through bio-remediation actions, developing of reconstruction technology of the affected lands) will be financed under this measure.

The development of rural tourism activities, studies and pilot projects for promoting nonconventional energies in the „*Danube Delta*” **Biosphere Reserve**;

Enhancing the requirements for giving in custody the protected areas;

Elaborating an Action Plan for Biomass usage as a renewable energetic resource.

Voluntary – Economic Instruments

The **adopting** of an „*integrated products policy*”, aiming at reducing the environment degradation by different products throughout their life cycle and the development of an ecological products market.

Economic Instruments

The **reconsidering** of the taxes on the valorising of commodities whose services are public (taxes on water collection from streams and rivers; taxes on cut wood, additional to the cubage per „foot”, taxes on the fishing and cinegetic resources) (Annexes 12 and 13).

Financial Instruments

Self-financing of the park administration structures for achieving the conservation objectives (Annex 14)

Research Technology

The product lifecycle and its ecological footprint; calculating the ecological footprints for all localities in the country, counties, development regions and the country.

Fuels on renewable resources („*energetic*” cultures)

5.4. Health and ambient of habitats

5.4.1. Threats against health

The emissions coming from industry, transport and agriculture can seriously affect the human health and so do all types of waste. Some of them are extremely toxic like the persistent organic pollutants: among the sources that contribute to PoPs emissions there are the agriculture, through the existent landfills with forbidden substances, unidentified and/or expired, chemical industry that produces pesticides as well as the nonindustrial combustion installations.

With the view of reducing the impact of persistent organic pollutants (**POP**) on environment, the United Nations Programme for Environment has adopted within the Stockholm Convention (May

2001, ratified by Romania through **Law no. 261/2004**), a programme envisaging the control and elimination of **12 POPs** (*pesticides*: aldrin, chlordane, **DDT**, dieldrin, endrin, heptachlor, mirex, toxaphene; *industrial*: hexachlorobenzene **HCB**, polychlorinated biphenyls **PCB**; *subproducts*: dioxins, furans.

Other gases emissions, accompanied by fine particles in suspension, coming from LCPs are harmful through the cumulative effects in time, that also recoil on other inhabitants besides the human being.

As regarding waste, especially the household waste, these are carriers of infectious germs and parasites. There is no need to also mention the aggressivity of toxical and hazardous waste. To this we add the contaminated drinking water, the lack of hygiene generated by a precarious water supply and the sewerage deficit (for a general overview of the elements that generate discomfort and disease, see **chapter 1.4.1** and **annexes 4-10**)

5.4.2.General objective: Nondiscriminatory ensuring of a good health status of the population, habitats ambienting - and improving the protection means against the health threats.

5.4.3.Operational objectives

The **improvement** of protection against health threats through the development of the capacity to answer them in a coordinated manner (by **2015** to ensure: sufficient treatment of wastewaters for more than **200** agglomeration higher than **10000** equivalent inhabitants, representing **60%** from the biodegradable load);

Supplying the population in the specific regions lower than **100.000 p.e** and the vulnerable areas of the drinking water at the required standards and quantity (contributing to the compliance with the Directive **98/83/EC**) and reducing the disparities among regions;

Ensuring the connection of the population to the sewerage system, reducing thus the disproportions between the drinking water resources and the sewerage ones;

Protecting and encouraging the rational use of water resources.

30 integrated management systems **will be finalized** at county/regional level (today there aren't any)

Total population that **will benefit** of strategic waste management projects will reach the figure of **10 million**.

90 contaminated sites will be rehabilitated or closed (noncomplying waste landfills); by now only **13** were closed.

Attenuating the increase of cronical diseases and those related to the lifestyle, especially at the groups and areas socio-economic disadvantaged

Improving the information related to environment pollution and impacts on health.

An air quality monitoring **network** in Bucharest that can supply on-line data. The national air quality monitoring network is not entirely installed; there is very small number of operators that own monitoring systems for the polluting emissions.

5.4.4.Instruments for achieving the objectives

Legislative instruments

Further improvement of the food and alimentation legislation, inclusively the aliments labelling with their origin and chemical content;

Regulations that ensure that by **2020**, the chemical substances, inclusively pesticides, are produced, manipulated and used so that it doesn't exert significant threats on human health and environment. In this context a Regulation regarding the National Registry for recording, evaluating, authorizing

and/or restricting chemical substances, should be adopted as soon as possible, with the aim of finding, meanwhile, alternatives for substituting the chemicals with a high risk for health.

Administrative Instruments

Mandatory **measures** for local authorities for warning the local communities on the potential sources of disease coming from the wells whose freatic waters are contaminated with nitrits resulted from stable's garbge and from the mineral fertilisers landfilled nearby.

Administrative **listing** of the disease sources from the water and atmosphere nozes and from the organic household waste spread, generators of insects that create discomfort and vectors that carry parasitary diseases and iral infections and/or baterians;

Local **plans** for waste landfilling/eliminating and even for valorising in the benefit of community (selective collection with incentives for this type of collection);

Managing the fines dued to local pollution

Financial Instruments

The Cohesion Fund regarding the environemntal infrastructure and structured intervention projects in accordance with **SOP Environment 2006**.

Economic Instruments

Creating the facilities for a favourable environemnt for initiating an organic waste market. Local valorification of waste or on the market, Supply contracts.

Voluntary Instruments

Aliments **labelling**

5.5. ENERGY PRODUCTION AND CONSUMPTION: ENERGY EFFICIENCY

Some of the resources are finite, or are not renewable- as for instance the underground resources; other ones are instead renewable, only if the exploitation rate doesn't exceed their restoration' potential- the grasslands, forests, the underground waters, the plants and animals. In both cases the use of these resources must be parcimonious. We are not talking here only about goods but also of services such as the delivery of electricity, thermal energy, warm water; these ones must at their turn be earmarked and consumed wisely, taking to account their finite character and the costs' dimension for sustaining life and the finite character of the resources.

Because we have already talked about some goods' consumption in the Chapters **5.1** and **5.3.**, we will pay a greater attention to a great challenge for humanity, namely the **energy conservation and its efficient use**.

5.5.1. General objective: Adoption of models for sustainable production and consumption

The promotion of energy conservation (saving measures) and of energy efficiency are aiming at supporting the economic growth, the increase in the security of the energy offer and the reduction of primary energy sources' imports, the increase of competitiveness in the bussiness field and of economic efficiency, both in national and international markets.

5.5.2. Operational and specific objectives

Romania is registering one of the highest degrees of energy intensitythe energy conumption is inefficient and wastefull. At the present time, the energy **intensity** in Romania is four times greater than the EU average, calculated at the parity of the exchange rate .

The most energy intensive sector is the **residential** one. The high energy consumption in the residential sector is determined both by the precarious thermal isolation of builings and by the inefficient use of the appliances in the dwellings. At the overall level of dwellings, the current efficiency of energy use is about 43% from the quantity of thermal energy delivered by sources, so that the remaining potential for saving is 40-50%, on average.

Industry is ranked on second place, as regards its energy intensity, which is due to the still high share of energy-intensive branches, despite the restructuring process, to inefficient technologies, with high specific consumptions and losses on technological processes and networks. Its maximum saving potential was estimated at 17% .

The energy-intensity indicators in the **transport** field indicate that, in the absence of a firm energy policy, having as a priority the energy efficiency promotion, the energy intensity will grow by 30% on average, until the year 2015. Currently, Romania has an energy independence degree of about 70%, but the last years' evolutions in the energy resources' production sector highlights a decreasing trend of this indicator.

The energy efficiency must represent one of the main guidelines for the economic restructuring, because it is supporting the economic growth by the costs' reduction , ensure the competitiveness of goods, cares about environment and diminish the energy imports' dependency.

5.5.2.1. General target:

Reduction of the primary energy intensity, by 40% , during 2004-2015 period

In absolute terms, the maximum energy resources savings, which could be obtained by **reaching the maximum targets of energy potential savings** at final consumers, as well as in the sector of centralised thermal energy delivery is estimated at 11.031 million t.e.p. At an average price of 133 euro/tep (the weighted average of the energy mix' prices, at 2001 year level), the financial effort for the acquisition of energy sources will be diminished by 1.47 billion euro, and in the whole period 2004-2015, by 132 million tep, respectively by 17.6 billion euro.

The elaboration, development and implementation of programmes including organisational and institutional measures for increasing the energy efficiency (with a target to reduce by 15.9 million tep the energy consumption) at all relevant energy consumers (consumers with annual consumptions of over 1000 tep/year, in local collectivities of more than 20,000 people and administrative buildings).

5.5.2.2. Sectorial targets (2015):

Industrial sector: reduction of annual consumption of energy resource with 337,000 tep by : **improving** the management at the energy consumers' level in the industrial units; **initiating** projects for the technological up-dating of installations and equipments; **stimulating** the private sector of industry for implementing energy efficiency projects. Moreover, the energy efficiency reduction in the private sector of industry, which has a contribution of more than 70% to the GDP, can also imply the implementation of the following measures: the **introduction** of long term agreement mechanism in the energy conservation policy; **assumption** of EU expertise concerning the partnership between the central and local administration structures and the private sector, as far as concerns the reduction of energy consumptions and pollutant substances' emissions, particularly CO₂ emissions, by improving the energy efficiency.

Residential sector: reduction of the annual consumption of primary energy resources with 823,000 tep by: **modernising** the installations for thermal energy feeding; **rehabilitation** of thermal energy distribution networks (by intervening both in thermal hubs and in the distribution networks); **introduction** of management measures of energy consumption at final consumers by **installing** flow distributors for warm water at each building's staircase, individual costs' alloters, and subsequently, pre-payment meters ; thermal **isolation** of buildings.

Transport sector: a reduction of the annual consumption of primary energy sources with 303,000 t.e.p by : actions aiming at up-dating the car fleet; using engines with lesser specific fuel consumptions and polluting degree; use of alternative energy sources, including LPG, rehabilitation of road infrastructure.

The sector of centralised feeding with thermal energy : reduction of annual energy by 612,000 tep. The main measures envisaged are:

- Ø **Drawing up** the *“National Programme for increasing the energy efficiency”*, for 2006-2010 period, associated with a mechanism for lending financial assistance from the state budget and from the local budgets, as a co-financing modality for the specific programmes;
- Ø **Implementing** measures and energy efficiency projects, taking to account the saving potential available, of about 50% in the residential sector and 17% in industry;
- Ø **Introduction** of energy efficiency standards in industry, transports, constructions, agriculture, services and in the residential sector, by thermal rehabilitation of buildings, heating systems, lighting, household appliances etc.
- Ø **Setting up** of the legislative framework, necessary to the development of a competitive market for energy services;
- Ø **Promoting** the „white certificates” transactions;
- Ø **Further stimulation** of investments for rehabilitating the centralised systems for feeding the towns with thermal energy and for the reduction of energy losses;
- Ø **Implementation** of the *„Programme for energy efficiency increase in public interest building of the central and local administration, education units and from the sanitary system”*;
- Ø **Adoption of the** *„ National Programme for reducing energy costs for the population”*.

5.5.3. Instruments for fulfilling the objectives

a) *Legislative instruments*

Implementation and enforcement- **Law no.199/2000** concerning the effective use of energy, republished; *The Emergency Decree of Government no.29/2000* on thermal rehabilitation of the existing buildings’ fund and stimulation of thermal energy saving, approved by the Law no.325/May 2002; *The Emergency Decree of Government no 174 /may2002 on the introduction of special measures for the thermal rehabilitation of big residential buildings*; **Law no 3/2001** for the ratification of the Kyoto Protocol at the United Nations’Framework Convention concerning the climate change; **Law no 14/1997** for the ratification of the Energy Chart Treaty and of the Energy Chart Protocol concerning the energy efficiency and other environment related aspects .

b) *Administrative instruments:*

Completing the institutional framework for energy efficiency by the Romanian Fund for Energy Efficiency and the National Energy Observer.

The structures of central and local public administrations, with competences in this field, aimed at integrating energy efficiency and conservation in non-energy policies;

Compulsory energy audit:

-**Obligation** for the energy industrial consumers with an annual consumption of more than 1000 tep/year and of municipalities with more than 20,000 inhabitants to develop their own energy efficiency programmes;

-Consumers’**obligation** to install and operate measurement systems and to have their own data basis on the energy consumption ;

-Energy producers’ **obligation** to develop informal and communication activities for their clients;

- **Promoting** tariffication policies able to stimulate the efficient use of energy.

c) *Financial instruments* for stimulating energy efficiency:

Ø **Financial facilities** for investments;

Ø **Financial facilities** from the state budget for research and development projects, by MENER and RELANSIN programmes;

Ø **Financial resources** ensured by accessing EU structural funds for financing projects in the energy sector;

Ø **Financial resources** acquired by the commercial societies from the energy sector from own funds and banking credits from the international financing bodies, such as WB, BERD, EBI, JBIC or from the commercial banks, without a guarantee from the Romanian state;

- Ø **Financial resources** obtained by setting up commercial societies with joint capital for implementing investments in new energy groups (greenfield);
- Ø **Financial resources** ensured by using specific mechanisms promoted within the framework of Kyoto Protocol, in order to reduce the anthropic greenhouse emissions of gases, by joint implementation projects and by the development of the "green investments' schemes"(GIS);
- Ø **Financial resources** obtained, starting with the year 2007, by selling the gas emissions' permits, as a result of the implementation of the „Directive 2003/87/EC”, concerning the european scheme of merchandising the greenhouse emissions of gases, amended by the Directive 2004/1001/EC.

On the basis of the objectives included in the „*National Development Plan*” 2007-2013, it has been drawn up the „*Sectorial Operational Programme (POS)* for increasing the Economic Competitiveness and Developing the Economy Based on Knowledge”. The intervention spheres of POS, for accomplishing the economic competitiveness objective are the following ones:

- **Improvement** of energy efficiency on the entire generation-transmission-distribution chain, by encouraging investments in:

- Equipments for the electricity generation with a high energy efficiency' degree (including rehabilitations and technological modernisations);
- Electricity distribution networks' development;
- Interconnecting the electricity transmission systems and those for oil and natural gas transport with the european networks;
- Promoting the energy services achieved by the public utilities companies;
- Supporting the programmes aiming at creating an energy services' market.

- **Turning** to account the renewable energy sources, by supporting investments in this field;

- **Diminishing** the negative impact of the energy system' functioning on the environment.

5.6. RENEWABLE ENERGY SOURCES

Romania adopted the obligations derived from European Directives, without establishing a national framework able to stimulate the initiative in this field, by **fiscal regulations** (used by EU member states since 1992) or by **compulsory normative regulations** (the commitment to achieve a mix of min.2% biodiesel with diesel oil). At the same time in Romania there are not inter-sectorial common policies environment-economy-agriculture-research-transport-local administration, able to back the development of biofuels' output and market.

Romania's energy strategy has to ensure the reduction of its dependency from energy resources' imports (Romania's energy policy foresees a rise in import dependency from 35-40% presently, to 60-70% in 2015).

In this context, *the strategy for developing the energy output from renewable sources and the nuclear energy has to become one of the most important guidelines of Romania's energy policy, by 2020.*

5.6.1. Romania's potential of renewable energy sources

Solar energy: the energy contribution of solar-thermal systems to the necessary heat and domestic warm water is estimated at **1,434 million tep (60 PJ/year)**, which could substitute about 50% from the domestic warm water or 15% from the thermal energy for current heating. The manageable/exploitable potential of electricity production by photo-voltaic systems amounted to **1,200 GWh/year**.

Weak Points: There are some demonstrative projects, a relevant potential, but there are neither specific targets nor regulations for upholding them.

Wind energy: on short and medium term the wind energy potential is reaching about **2000 MW**, with an average electricity output of **4,500 GWh/year**. Turning to account the wind energy potential, under efficiency conditions, implies the use of appropriate technologies and equipments.

Weak points: The big installations connected to the national electricity system are still missing.

Hydropower : the hydropower potential of the main rivers is of **40,000 GWh/year (34,000 GWh/year** – big hydropower units and **6,000 GWh/year**- small hydropower units). The new capacities' projects for 2003-2015 period have been estimated at **500-900 MW**.

Weak points: There are not specific stimulation mechanisms for the fulfilment of hydropower projects.

Biomass: Romania has a high energy potential of biomass, estimated at **7594 x 10³ tep/year (318 PJ/year)**, accounting for 19% of the entire consumption of primary energy sources in the year 2000. About 54% of the heat produced from biomass is obtained as a result of burning cellulosic biomass; 89% from the heat used for household heating and cooking (in rural area) proceeds from vegetal offals and residues.

Weak points: despite the existing conditions for developing these sources, they are only in the shape of general objectives.

Geothermal energy: the reserves of geothermal energy, potentially exploitable are estimated at **167,000 tep (7 PJ/year)**.

5.6.2.Strategic objectives in the renewable source' promotion in Romania

General objectives: **integration** of renewable energy sources in the national power system structure; **diminution** of technical-functional and psycho-social barriers in the utilization of renewable energy sources, simultaneously with the identification of cost and economic efficiency elements; **promotion** of private investments and creation of the necessary conditions to facilitate the access of foreign capital on the renewable energy sources'market; **ensuring** the energy independency of the national economy's energy consumption; **ensuring** the energy supply of isolated communities by turning to account the local potential of renewable energy; **creating** the conditions for Romania's participation to the european market of „green certificates” for renewable energy sources.

Specific objectives: turning to account the energy potential of specific sources, from isolated geographic areas or with limited access to the National Power System, including the offals and wastes from agricultural crops or from agricultural abandoned grounds, and increase of their use in electricity generation

5.6.3. Actions aimed at turning to account the renewable energy sources, on medium and long term:

- The transfer of non-conventional technologies from firms with tradition and expertise in this field, with regulations for application and certification in accordance with international standards in force;
- The utilisation of competitive and sustainable raw materials, technologies and processes;
- The completion and implementation of an appropriate legislative, institutional and regulation framework;
- Attracting the private and public sector in the financing, management and efficient exploitation of modern energy technologies;
- Identifying the financing sources to sustain and develop the applications for the renewable energy sources' utilization;
- Stimulating the development of joint-venture societies, specialized in the renewable energies' utilisation;
- Drawing up research programmes with the aim to accelerate the integration process of renewable sources of energy into the national energy system.

5.6.4.Instruments for the implementation of the supporting policies for renewable energy sources

Legislative instruments

Implementation and application: Electricity Law, no.318, The Law 199/2000 concerning the efficient use of energy; Government Resolution no.914/2002 concerning the organisation and functioning of Romanian Agency for Energy Conservation; Government Resolution no. 443/2003 concerning the promotion of electricity production from renewable energy sources; Directive 2001/EC concerning the promotion of electricity production from renewable energy sources on the electricity internal market; Government Resolution no.1892 concerning the setting up of a system for the promotion of electricity generation from renewable sources.

Financial and fiscal instruments

Romania took over a series of methodologies and specific instruments from EU although it has not a common fiscal instrument for promoting the renewable energy sources.

a) Schemes of direct support through prices – the energy producer receives under a national regulation, a direct or indirect financial aid (calculated at the price of the energy produced and sold).

- **Fixed price schemes** – this mechanism consists of the obligation to buy the electricity generated by renewable sources and to pay a minimum tariff/Kwh, variable depending on the technology used.

The producer will have a benefit from a long-term, guaranteed selling price for the electricity from renewable sources; by the buying obligation imposed to public utilities can be guaranteed a market for the electricity derived from these sources.

- **The green certificates** –by this system, the state imposes to the consumers the buying obligation of an electricity quote produced from renewable sources. The producers will receive for each electricity unit sold (1 Kwh or 1 Mwh) a certificate representing the bonus received for the non-pollutant energy they introduce in the National System.Afterwards, these certificates can be sold by the producers.
- **Supporting systems on the basis of bids** – the offers with the least price, accepted by the producers of electricity from renewable sources will be materialized in long term buying contracts (15 years), which will include the guarantee of acquiring the entire electricity output.

b)The aid for capital investments consists of subsidies lended for capital investments or credits for equipments. The subsidy ceiling can be increased in case of using effective technologies (ex. Systems of photo-voltaic modules).

For the technologies already integrated in the market (for instance, the wind energy) the subsidies are constantly used , but their ceiling is lesser.

c)The aid for research/development sector is aimed at promoting, exclusively, the renewable energy sources.

d)The indirect aid for renewable energy sources production is granted with the view to put into operation programmes for reforestration, for favouring the biofuels' use from biomass, offals recycling, etc.

e)The fiscal measures represent an aid which can be lended in different forms:

- exemption or repayment of energy taxes;
- reduction of VAT' quote for certain energy types derived from renewable sources;
- fiscal exemptions for the investments in micropower units for turning to account renewable sources;
- setting up of taxes on SO2 and NO2 emissions with a view to encourage the development of wind and hydro energy.

f) Other financial sources come from the Regional Development Funds: the „Energy Intelligent” programme, „ALTENER” programme, and the Kyoto Protocol (article 6), a specific financing mechanism for investments aimed at promoting renewable energy sources, recommends to apply the Joint Implementation (IC) framework (see Annex 1)

5.6.5. The effects of a policy for promoting the renewable energy sources

The policy of promoting the renewable energy sources ensures important social and economic opportunities and contributes at same time, to the diminution of other unsustainable trends. We can talk both about a direct impact and also indirect effects, which are referring to the multiplication of opportunities that can increase the direct impact. The most important effects/sinergies, that we identified in this field are the following:

a) Opening up new investments projects in different regions of the country which can contribute to the increase of employment, mainly in rural areas, concomitantly with the diversification of offer on the labour market.

The renewable energy sources market is one of the most dynamic sectors in the European Union. The main characteristics of the technologies used in this field are a greater labour force intensity than that of technologies used in classic energy resources field. In Germany, for instance, the renewable sources' sector already employs 130,000 people. A recent study shows that 900,000 new jobs will be created in EU clean energy sector until the year 2020. Due to the huge biomass resources of Central and Eastern Europe, the entire area could benefit, significantly, from the clean energy market potential. The assessments indicates that in Poland, the implementation of the Renewable Energy Strategy (RES) could create new jobs for 30,000-40,000 people, and in Czech Republic for 60,000 people.

b) Investments for the modernisation of the old capacities and for the development of new capacities

The potential for promoting new investments in recently EU admitted countries is very important. If the entire technical potential would be fully developed, the necessary investments will amount to 18-40 billion euro, until the year 2020.

In order to carry out these investments, the governments of these countries have to enforce a new and appropriate legislation .

c) Reduction of import dependency and increase of energy security of supply

Both the EU member states and those which will be soon admitted in EU, are heavily dependent on energy sources imports, mainly of natural gas from Russia. This trend could be counteracted by a programme of accelerated introduction of electric generators based on renewable resources. Because they are not dependent of imports, the renewable resources enhance the energy supply security of the whole region.

d) Improvement of environmental protection and reduction of the risks entailed by the climate change.

Unlike the fossil fuels, the renewable resources doesn't produce atmospheric pollutants, neither locally, nor globally. As a consequence, the clean electricity contributes to the reduction of CO₂ emissions and to the implementation of the parameters proposed by the Kyoto Protocol. It was calculated that by the fully implementation of „RES” Directive only in the "old" EU 15 member countries, the CO₂ emissions could be diminished by 6%, until 2010.

e) The implementation of the investment projects will create the opportunity to produce, transfer and sell new products and technologies in the renewable sources' field.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

The process of elaborating a strategy for sustainable development does not end by making a study. The Government may assume the strategy to the extent in which itself, by its Interministerial Councils, by the Superior Council for the Public Administration Reform, Coordination of the Public Policies and Structural Adjustment, within the Unit of Public Policies of the General Secretariat of the Government, will agree with all the power structures of the state and with the civil society as a whole on the key-principles of the strategy presented below:

- Focus of citizens;
- Consensus over the long-term vision;
- Comprehensive and integrated strategy;
- Targeted strategy, with clear budget priorities;
- Strategy based on complex and feasible analyses;
- Incorporates monitoring, the acquired expertise and the required adjustments;
- Strategy coordinated by Romania and managed nationally;
- Governmental decisions at the highest level and representative institutions with power of influence;
- Building on the existing functions and strategies;
- Actual participation;
- Tight connection between the local and national levels;
- Development and building on the existing capacities.

From the beginning, we must say that neither the conclusions, nor the recommendations cover all the punctual issues of the strategy of sustainable development in Romania. Would we have attempted such an approach within this study, we would have contradicted the holist approach we use on the energy-dissipating dynamic complex systems, namely those natural and seminatural ecological systems conjugated with the socio-economic systems¹¹². Rather, we focused on finding the most cost-efficient ways for an integrated approach of the objective of strategic priority for the sustainable development of Romania and to promote the instruments with synergic effects.

6.1. Conclusions

The main conclusion of the study – based on national documents and of sectoral surveys – is the existence of an obvious **gap** between Romania and EU-25 in the key-areas of sustainable development, despite the existing potential, which doesn't seem to be managed too well.

There are **solutions** for many aspects of economic development and growth which are ignored or applied slowly because of the lack of proper training and/or lack of vision. The **decisions** are seldom properly argued and the actors of development are not guided by all the conditional principles listed below:

- § **Promotion and protection of the fundamental rights** (putting the human being in the focus of the national policy by promoting the fundamental rights, by fighting any forms of discrimination and by contributing to poverty eradication and to the elimination of social exclusion);
- § **Solidarity within the current generation and between generations** (addressing the needs of the current generations without compromising the capacity of the future generations to provide for their basic needs, wherever these generations might be);
- § **Open, democratic society** (guaranteeing the citizen rights of access to information and to justice);
- § **Citizen involvement in the decision-making process and in the process of elaborating the normative documents** affecting them (Consolidation of citizen participation in the decision-making process; promoting the education and public awareness on the sustainable development;

¹¹² Ecosystems together with socio-economic systems form what we often call today „socio-economic systems”

citizen information on their environmental impact and on the options they may have by making sustainable options);

- § **Involvement of the businessmen and of the social partners** (engage social dialogue, induce corporatist social responsibility and the public-private partnership to develop cooperation and joint responsibilities in order to reach sustainable production and consumption);
- § **Policy coherence and high quality governance** (promote coherence among all EU policies and coherence between the regional, national and global policies in order to increased their contribution to the sustainable development);
- § **Policy integration** (promote the integration of economic, social and environmental considerations so that they become coherent and mutually-supporting, making full use of instruments for a better regulation, balanced evaluation of the impact and stakeholder consultation);
- § **Use of the best available knowledge** (ensure that the policies are developed, evaluated and implemented on the basis of the best available knowledge and that they are economically-feasible and cost-efficient);
- § **Principle of precaution** (where there are no scientific certitudes the evaluation procedures are implemented and adequate preventive actions are taken to avoid damages to human health and to the environment);
- § **Principle of "polluter pays"** (ensure that the price reflects the real costs for society of the production and consumption activities and that the polluter pays for the damages it causes to the human health and to the environment).

If these principles are observed and enforced in any sectoral policy, and if the legislative measures are adopted only after a careful analysis of the possible unwanted economic, environmental and social effects, then we will be able to speak of an integrated policy of sustainable development in Romania.

For the time being, the vision that characterises the sectoral strategies approved by normative acts or from NPD is a vision with narrow, reductionist shades still dominated by the obsession of reducing as fast as possible the economic gap between Romania and the EU member states.

The **National plan of reform alleviates** this approach attempting, and largely succeeding, to drive the development policy towards its sustainable aspect.

Anyhow, the Strategy of Sustainable Development elaborated six years ago which, in principle, should be some kind of wise limitation of the uncontrolled growth at the expense of resources, renewable or not, also suffers of a consistent dose of sectoral approach.

The development of a strategy of sustainable development requires a strategic approach which involves, among other:

- § Shifting from “nailed” solutions, ideas and plans to an adapting system that continuously improves the governance allowing it to respond adequately to the social challenges;
- § Reconsider the unique responsibility of the state in matter of development and its transfer to the whole society;
- § Abandon much of the centralised and controlled decision-making process in favour of partitioned results and opportunities, transparent negotiations, cooperation and concerted actions;
- § Diminish the stress on achievements in favour of the stress on results and impact;
- § Shifting from sectoral planning to integrated planning;
- § Target the independence from external assistance by development achieved and financed from own resources;
- § Target a process that can relate the monitoring, the learned lessons and the improvement.

The methodologies to achieve the strategies of sustainable development involve action and monitoring in areas such as: economic increase in favour of the poor; reform of the fiscal policies

that affect the poor or that inflict damages to the environment; increase or at least preserve the built or natural human capital; alleviate the unequal access to natural resources. They also presume profound structural changes and new ways of action in all areas of the social, economic and political life and demand the development of institutions and mechanisms integrated in intersectorial approaches which to involve the government, the civil society and the private sector in developing consensual agreements in terms of vision, planning and decisions.

Based on the objectives and guidelines elaborated by the European Union when building its own strategy of sustainable development and taking into account the existing restrictions and the specificity of the Romanian society and economy during the pre-accession period, we identified **10 possible strategic directions of Sustainable Development** of Romania, which we hereby propose:

- § **Limit** the effects of the global heating on the society and environment and lessen its costs;
- § **Conserve** biodiversity, improve management and avoid overexploitation of the natural resources, acknowledging the value of the services provided by ecosystems;
- § **Adopt** sustainable patterns of consumption and production of resources (mainly energetic);
- § **Statuate** economic competitiveness in the holistic policy of development;
- § **Promote** investments in research and in ecoefficient technologies;
- § **Form** human resources with increased abilities of synthesis, responsible and responsive;
- § **Fight** poverty and social exclusion;
- § **Provide** in a non-discriminatory way a good health state of the population, habitat arrangement and improvement of the protection means against the threats to health;
- § **Accent** put on rural development, especially in the areas less integrated spatially;
- § **Promote** those systems of transportation that meet the economic, social and environmental needs avoiding the adverse effects on economy, transportation and the environment;

As it can be observed, the formation of human resources, the research and the ecological technologies which are usually regarded as *instruments* of any policy to reach specific objectives, were promoted to the rank of *priority strategic directions* so they benefit of all the deserved financial attention.

A first set of **conclusions** concerning the policies related to sustainable development in the sphere of economic competitiveness and social cohesion were stated in the end of chapters 2, 3, 4 and 5 of this study. We will consider additionally some explicit examples for the areas directly correlated to the environmental policies and with the energy policies, presented in detail in chapters 4 and 5.

1. The change of the climacteric regional and local conditions will influence the ecosystems, the human settlements and the infrastructure. The foreseen changes of *temperature* and *precipitations* may cause the change of the vegetation periods and to the displacement of the boundaries between forests and meadows. The extreme weather (*storms, floods, draughts*) might occur more frequently and the related risks and damages might become more significant. The areas affected by draught expanded in Romania during the recent decades. The areas most exposed to draught are in south-eastern Romania, but almost the entire country was affected by the prolonged draught. Next to floods, the long periods of draught cause huge losses in agriculture (including in the low and hilly forested areas), transportation, energy supply, water management, health and households. The predictions based on global climacteric models show that we might expect a more frequent occurrence of extreme weather situations.

On the other hand, the *industrial, commercial, residential, tertiary* and *infrastructure* sectors (including energy and water supply, transportation and waste storage) are **vulnerable** in several ways to the climacteric changes. These sectors are directly affected by the change of temperature and precipitations, or indirectly by the general impact on the *environment, natural resources* and *agricultural production*. The sectors most vulnerable to climacteric changes are the *constructions; transportation; oil and gas extraction; tourism* and the *industries functioning in coastal areas*. Other sectors potentially affected are the *food industry, wood processing, the textile industry, biomass production* and the *production of renewable energy*.

Given the above facts, it is clear that the **use** of an instrument such as the *legislative* one in the direction of enforcing standards of imission or emission, or of other *economic* instruments such as the negotiation of the pollution permits and imposing of stimulating taxes on the pollution with greenhouse-effect gases, on the *use of water* and on *wood exploitation*, will delay the change of climate with the whole corollary of effects on the life support ecosystems (that is, sustainable conservation and utilisation of the natural resources).

2. Transportation contributes to atmospheric pollution at all levels: global, regional and local. The emissions of transportation **account** for a significant share of the total emissions generated by human activity in the industrialised countries. Most such emissions are tightly linked to energy consumption of the transportation activities: the sector of transportation consumes over **60%** of the oil products which account for over **98%** of the source of energy used in transportation. Their consumption depends on the size of the engine, type and quality of the used fuel, on the average efficiency of the fuel, on the age of the vehicle, etc.

Carbon monoxide, carbon dioxide, nitrogen oxides, the suspension particles and the *volatile organic compounds* are the main pollutants released directly by fuel burning inside the engine (primary pollutants), and so are the *lead* and the *sulphur oxides*.

Here too, like for the climacteric changes, we may infer that **ecotechnologies** in the car construction industry and in road infrastructure will bring additional guarantees for human and ecosystem health.

3. The coherent control of biodiversity preservation, sustainable utilisation of the natural resources and integrated management of the above in all the sectoral policies would result in many positive results:

- § Nature and biodiversity are at the basis of the sectoral activities that **guarantee** long-term survival (Appendixes 15 and 16);
- § Biomass-based fuels **reduce** the greenhouse-effect gases and they can be produced locally;
- § Natural areas **act** as „carbon shafts”, diminishing one of the screens responsible for the greenhouse effect;
- § Nature and landscapes **draw** people to rural areas and they also have a generous **cultural dimension** – today the appraisal of a landscape’s value and of the ecological features suffers due to the deficit of methods, while the **multifunctional approach** of agriculture is too often dominated by the sectoral agricultural thinking;
- § The rational use of resources **reduces** the costs with materials avoiding, at the same time, the generation of wastes;
- § Recycling **contributes** to diminishing the pollution generated by raw materials processing and avoids the depletion of natural resources;
- § The organic farms **develop** the appreciation of good taste and help health preservation;
- § Forest certification **encourages** the protection of fauna and flora and preserves the water resources;
- § The pro-biodiversity businesses are an attractive area on investment for the banks to support them. Landscape identity **may play** a determining role in the orientation of the entrepreneurial strategies and the investments related to biodiversity have a direct contribution to the **economic development** preserving and / or improving at the same time the natural patrimony.

The expansion of the protected areas, including of the Nature 2000 sites, the increase of forest and extra-forest vegetation and resource management allocating budgetary funds or public-private partnership funds will only increase the development potential.

The short-term economic thinking and the non-ecological arrangement of the territory would mean the loss of huge opportunities. The commercial companies would see their interests damaged if:

- § They will make investments without considering the **value added** by operating with the biodiversity;
- § Take no mark to **define** the good practices;

§ Do not use indicators to **monitor** the negative or positive level of development;

§ Do not identify new **financial sources** for development;

4. In the area of renewable sources of energy, Romania will have to align to the new regulations to be approved by the EU concerning: the adoption of measures by which the suppliers of fuel (suppliers, storing, distributors, etc.) provide for the possibility of supplying biomass; establishment of criteria of efficiency for the use of biomass and establishment of the installations in which it can be used¹¹³; special labelling to allow the citizens buy efficient equipment.

Biofuel will become a component part of our life only if used based on as comprehensive strategy considering the price, the changes in the sustainable energy resources, the environmental impact and the efficiency of biofuel production and utilisation. The **evaluation** of the environmental requires the **assessment** of its contribution to the reduction of CO₂ pollution, the **identification** of the types of utilisation where the effect of replacing the current systems (transportation, electricity, heating) with biofuel-based systems is maximal; **promotion** of sustainable agricultural policies to preserve the stocks, etc.

It will be necessary to **correlate the sectoral policies of energy-agriculture-environment-rural development**: the enforcement of the system of agricultural subsidies for biomass production; the establishment of the areas that can and must be cultivated for biomass production; the national regulation of the right and conditions of using genetically-modified products. **The concept of bio-refinery will have to have priority** since it might use parts of the existing installations to produce fuels of the second generation; the Romanian standards for biofuels will have to be correlated with the EU standards.

The first step to favour the increase of the share of electrical energy produced from renewable sources is the **support by investment subsidies and the unchanging prices of purchasing energy produced from renewable sources**. After a period of transition, during which a sufficient volume of energy from renewable sources will be produced, it may be possible to shift to the support through market mechanisms, such as the green certificates, more so as the liberalised market of the electrical energy demands the introduction of competition.

5. Promotion of ecotechnologies – Romania considers to develop the *Plan of actions for the promotion of ecotechnologies*, plan supported by the European Union by a set of **28** concrete actions, stressing particularly on the maximization of the efforts to join the related European platforms and on increasing the access to financing for the enterprises displaying the capacity of innovation in ecoefficient products and materials.

Regulations similar to the European ones were adopted concerning the use of the new technologies for biofuels production. The target for Romania in this field is to reach by 2007 a minimal level of **2%** of biofuels and other renewable fuels of the total energy content of all the types of gas and diesel fuel used for transportation, excises included.

Within this context, the additional cost of increasing the consumption of biodiesel (for the population) must be balanced with other benefits: lower emissions of greenhouse-effect gases.

¹¹³ One should also consider that biofuels too may cause serious problems both to the environment and of other nature. Biofuels are obtained from plants grown with massive amounts of oil (as pesticides, fertilizers, fuel used by the agricultural machinery, etc.) and have a very low rate of “return” of the invested energy – sometimes even negative! Ethanol production requires six energy units to produce just one! (In the case of biodiesel, the ratio is just 3:1). Other adverse effects of the development of agricultural production for biofuels production are: water pollution due to fertilizers, soil erosion, lower area of agricultural land used for food production, hence the possible increase of food price, the risk to affect biodiversity by monocultures, a diminishing of just 13% of CO₂ emissions in the case of ethanol. (For instance, to achieve the quota set by the EU at 5.75% by 2010, a third of the agricultural land of the EU should be used just for the plants used to produce biofuel).

diversification of the primary energy balance, increased security of the offer and job creation in rural areas.

Finally, we should mention that the *adoption of realistic policies of sustainable development, materialized in plans of action putting into practice the priority strategic directions, responds to the requirements of the global UN conventions, which Romania is part of.*

6.2 Recommendations

If we wish that all programatic documents for development to be transposed in practice and the general objectives to be reached by decoupling economic growth from social degradation and at the same time become competitive on the internal market, then we will have to reflect more on some recommendations for interventions with **synergic effects** in the economic and social life of Romania.

6.2.1. Constructive interventions based on the existent positive chains

Fortunately, a lot of measures and socio-economic policy instruments that are very good for a competitive economical development are also suitable for a healthy and warm environment, in the conditions that some of them will further remain leverages at the state disposal. Consequently the central administrative structure, built on **GD no.117/2005 and GD no.157/2005**, presented in Annex 17, and that shows the political will for achieving a legislative coherence and sustainable development through the Permanent Interministerial Councils for Coordinating Public Policies Reform (**I-X**) and the coherence of Programs, Plans and Strategies, through the Superior Council for Public Administration Reform, Coordination of Public Policies and Structural Adjustment (**XI**), should play very well the role of national monitor and integrator.

6.2.1.1. Halting the policies that accelerate the excessive use of renewable resources

One of this kind of policies is represented by the **subsidizing** for agriculture or for some exploitations of renewable resources, out of which some (the wood) are destined to export. The prices for such goods produced as a result of these kind of activities are strongly distorted; they don't reflect the real cost because they don't include the damages to the natural capital, the support of life.

The **consolidation** of the control mechanisms, through the mitigation of the monitoring surfaces allocated to the security, inspection and control staff of the management authorities of natural capital.

Impact: the parsimonious usage of grasslands and cultures with special landscape value and the movement from production to services and extensive agriculture; ensuring a minimum number of „carbon digs”.

6.2.1.2. Clarifying the property rights

Generally, there should be very clearly defined and delimited, once and for all, what are the **public** goods and the **private** ones, because the access to these goods and services are guided after specific regulations (sometimes the term of **public good** comes to imply the one of „*distroying*” or „**public evil**”), and themselves can lead to a more judicious land planning and resource management. The collectivities that are public services consumers must be prepared to pay for consuming less than to pay for more.

The **establishing** of some effective environmental objectives should allow that the advantages obtained from their achievement to compensate all losses in production and consumption of some goods and services less important than others. On the other hand it is expected that the general wealth to reflect the quality environmental level reached having in view the technologies of the moment and the society preferences for all goods and services. Or, while the **establishing** of the environmental objectives is **based** on considerations of „*eco-efficiency*”, *ecological* or of *human*

health, the problem of **identifying** some pertinent baseline levels (that include the regeneration costs of the resources claimed by the environmental objectives) are based on considerations of redistributive equity and property rights.

Impact: avoiding extraexploitations on public lands and even private; increasing the interest for sustainable valorification of renewable resources from properties, accepting the conservation servitudes and supplying some recompensated public services.

6.2.1.3. Programmes for accelerating the educative and managerial planning process

A better **education** and a more considerate **training**, followed **absolutely mandatory**, by an appreciation by noting the performances and a responsible selection based on fair competition of human resources dedicated to Romania's development. Only in this way there could be adopted more sustainable practices in agriculture and in the industrial and administrative management and will increase the rate of transition from subsistence agriculture to developing **services** outside the farming sector, as well as the disindustrialization and substitutes *de novo*, with consequences on reducing the regional gaps and on the economic competitiveness.

Impact: increasing the number of initiatives consecutive to the dissemination of „success stories” and of some well developed projects that absorb money from structural and cohesion funds.

6.2.1.5. Enhancing the efforts of extending the agriculture and reinforcing of agriculture research

There are already technologies and agrarian practices that could increase productivity in a sustainable way, but their application will need a better training of agriculturalists an easier access to the agrarian credits and the infrastructures facilities, a better management and a more parsimonious distribution by the authorities, of water in irrigations, and lastly eliminating price distortions that affects the agriculturalists interests. The agriculture research knew a decline in the last years and needs to be reinforced.

Impact: the development of **multifunctionality** of agriculture, sustainable technologies of extensive agriculture and ecological agrarian practices

6.2.1.6. Investments in public salubrity and drinking water sources

Given the complexity of the problem, supported by the **figures from the „actual situation”** of the environment, an increasing number of legislators and decidents recognize that its solving is over the power of the public sector from a financing point of view. Waste elimination, technological mitigation of the pollutants emissions in the atmosphere, improvement of drinking water as well as the bathing water will have to be delegated to a large part to the private sector.

Impact: public private partnerships – can gain a substantial reinforcing, ensuring the achievement of at least four sustainable development objectives.

6.2.2. Halting the negative chains

The policies and investments described above do not require sacrifices for the economic growth. However the decelerating of other forms of damages to the environment, such as industrial pollution and the one coming from road traffic, consecutive to biogene fuels combustions and land clearing, can require such a sacrifice, at least on short term. Approaching such matters require interventions of the following type:

6.2.2.1. Identifying the effort and appreciating the costs and benefits of alternative policies

From the existing data on pollution control up to now it results that: the suspended particles emissions from the power plants and industry, in general, that represent the main sources of diseases and that do not cost too much to be eliminated (**1-2%** of the capital value), should be seriously attacked wherever they are; in exchange the **sulphur dioxide emissions** that require

higher funds for being minimized but that in many places cause easier toxic effects, can remain on the second place as priority; the reduction of **lead emissions** from road traffic that record high expenses should represent a higher priority especially in the cities with an intense traffic. Their control could be exerted by taxes (as instruments for applying the „polluter pays principle”) and by adopting the best available technologies capable of achieving the standards imposed by Directives **1999/30/EC; 2002/3/EC; 2001/81/EC** (Annex18).

The CO₂ emissions as main greenhouse gas couldn't be minimized except by developing of alternative solutions based on renewable sources, accompanied obviously by economic incentives and the applying of Joint Implementation (according to Kyoto Protocol) and the emissions trading forms.

It is more difficult to perform such approaches for forests and natural habitats protection, because there aren't yet sufficient monetary evaluations. Some serious studies suggest that the **value** of protection forests for the local communities and for the region is sometimes, surprisingly high and the value of lands for agriculture is oftenly more low that anticipated. A careful analysis can prove not only **how much** it should be protected but also **who** should pay for this.

Impact: global and local on human health, on climate changes and desertification as well as on the resilience of renewable resources and the conservation of the non renewable ones.

6.2.2. Efficient practices for behaviour change

Such policies for behaviour change fall in two big categories: „market” policies that establishes the taxes or other taxations for polluters, depending on the level of damages they cause; and „command and control” policies that are based on quantitative restrictions and fines for noncompliance.

The market economy instruments are the best in principle and, oftenly in practice, especially if polluters can solve the aggression problems on the environment at the lowest costs.

The command and control instruments have gained a bad reputation in the last years, especially due to their very high costs, the easiness of authorities in applying the rules, discrimination that they practiced towards different industrial operators, discouraging innovations. Nevertheless, in certain situations, equidistantly applied and with firmity, the command and control instruments see to still remain for a good period of time, the best available instruments.

Impact: blocking at origin of resource spoliation and generation of waste above the tolerable level of ecosystems

6.2.3. Obstacles elimination

These measures could lead to overcoming the cost ineffectiveness and to increasing competitiveness in production and goods and services trade.

6.2.3.1. Improving information

Oftenly our successive governments took decisions in the absence of basic information. It seems and it is proved that the structures such as *Permanent Inter-ministerial Councils* and also the *independent consultancy structures* represent the most useful way for a government to support on an expertise and to depoliticize the problems with a strong load of environment and development.

It has come, we think, the moment to accept and advocate for a knowledge based economy, promoting all means of manifesting information technology in economic activities.

This is the moment to mention the **urgent need** to develop **impact studies** on the draft normative acts ("*regulatory impact assessment*"), in order to see if these will really achieve their purpose and if they can't produce unexpected and undesired effects by the legislator. O postrequirement for such an approach still remains the publishing in the Official Journal of the „express of reasons” that

accompanies the normative act, the only one that will allow , during the ex-post evaluation, a comparison between what was desired and what was achieved.

The **transparency** of public expenses will remain a **key** pillon of cost effectiveness control.

Impact: The conscious acceptance of regulating, economic and fiscal instruments and the adoption of behaviours more attentive to resources.

6.2.3.2. Strengthening institutional structures

Furthermore, apart from the obvious need to have better technical instruments, an adequate financing and a clarifying of environmental protection regulations, the experience also suggests other four priorities. The first consists in the needs of keeping an **evidence of the impact on health and environment** (registries for emissions, pesticides, incidence of professional diseases), and on the environmental public authorities' activities as well as the one of donors and financing institutions in environmental protection. The second consists in the need for the government to develop capacities for establishing *priorities* and for developing the **monitoring** process (by *adopting in cooperation with the National Institute of Statistics, relevant indicators if state and process of Sustainable Development*) (annex 19).

The third is that, where intersectorial decisions are needed (for example water management in a river basin or the protection of a large forestry area) , it is required a certain **coordination** for avoiding parallelisms and increasing cost effectiveness. The latter refers to the need of **independence of the regulating and control functions** towards the economic functions, avoiding thus the conflicts of interest.

Impact: Introducing the order in acts and documents, drafting National Registries, avoiding institutional and informational chaos, improving the reporting process (internal and/or international) more serious, more professional, based on a referential with figures (concrete data) permissive at the evaluating of the succes of adopted measures in acertain period of time by the operators from the economic, social and environment field.

6.2.3.3. Involvement of local population

The participative process of the public is essential. Local **participation** to decision-making has useful economical and ambient consequences in implementing the afforesting programmes, soil management, parks and reservations protection, water management, salubrity, floods control, water supply and building the environmental infrastructure.

Impact: Strengthening **the democratic process** of achieving sustainable development.

All the measures presented in the previous subchapter can encounter, in case of their application, of obstacles often generated at the inducing of changes in the socio-economic landscape characteristic to any nation. Among these we will enumerate:

- § Tehnical and political difficulties for addressing the intergenerational dimension of sustainable development;
- § Lack of other models or methodologies tested in other countries;
- § Juridical and legislative systems incapable of integrating and achieving coherence between the sustainable development objectives;
- § Conflicts among the sustainable development priorities at global, national and local levels
- § Additional costs, pretty high for ensuring the participation to fora, collection of information and monitoring the sustainable development indicators.

At the end of this study we will emphasize the need to ensure the increasing of coherence and the degree of integrating social, cultural, economical and environmental policies of Romania, by corelating the future National Strategy of Sustainable Development with the revised Strategy of

Sustainable Development (2006) of EU, with other programatic documents associated to the accession process (such as NDP 2007-2013 or the Reforms Plan) and the national action plans and strategies relevant for the priority objectives in promoting social cohesion, increasing competitiveness and the occupational degree, in the area of spatial development mean to attenuate the regional disparities of living standard and quality of life among different groups of Romania's population.

The National Strategy of Sustainable Development will be a long term documents, that all political forces must assume, the business environmen, Romania's population. There should be a correlation of other strategies elaborated or under elaboration on medium or long term with the objectives of this strategy, such as: Sectorial Operational Programme Competitiveness, Romania's National Programme for Spatial Development, National Environmental Strategy, National Strategy for Energy Development, Employment Strategy, Convergence Programme etc. The correlation would allow the regulation of a system of economic instruments that ensure the integration of social and enironmental protection objectives in the economic policies, inclusivly in the energetic ones.

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APPENDICES

Appendix 1

The Kyoto Protocol

The Kyoto Protocol set three flexible mechanisms (**IC**, **MDC** and **SIV**). They were designed to help the Parties mentioned in Appendix B of the Protocol to reduce the costs of achieving the commitments of reducing the own **GES** emissions taking advantage of the opportunities to reduce them or to increase the capacity of capturing the atmospheric CO₂ at lower costs in other countries than in own country.

Joint implementation – **JI**

Romania involved successfully for several years in the development of *Joint implementation*-type (**JI**) according to the Kyoto Protocol. So far, Romania approved 12 **JI** projects which amount to a **GES** reduction of 7.5 million tons CO₂ equivalent (June 2005).

Two working manners can be observed concerning the **JI** projects:

Manner II applies if the host country is Part of the Kyoto Protocol, it has the calculated assigned amount and has a functional national registry. Within **Manner II**, the international monitoring within a set of international rules and procedures plays a decisive role in the validation and verification of the reduction of emissions following a **JI** projects. Until now, all **JI** projects approved in Romania were elaborated as projects for **Manner II**.

Manner I allows the host country to use national procedures of approving the projects and to monitor and validate the reduction of **GES** emissions. **Manner I** allows the countries hosting **JI** projects to introduce simple and short procedures compared to **Manner II** **JI**. The eligibility criteria, identical with those for the *International Emissions Trading* – **IET**, are:

- Part of the Kyoto Protocol
- Calculated assigned amount
- National system to evaluate the **GES** emissions / captured amount of CO₂, in force
- National registry to monitor the assigned amount, in force
- Transmission of the most recent national inventory of emissions

Currently, Romania does not yet fulfil all these criteria. The future framework for **JI** projects will rely in the following principles and premises:

The largest potential for **JI** projects is in the area of energy (including co-generation, central heating systems, producing of renewable energy, energy efficiency). Forestry projects are also eligible.

The emissions reduced by project implementation and generated before **2008** may be rewarded by early credits (as **UCA**) according to each single case and according to project importance.

The implementation of **EU Directive 2003/87/CE** in Romania together with the Directive linking the EU scheme of emissions trading with other systems of emissions trading and with CO₂ reduction projects (**2004/101/CE**), the so-called “*Linking Directive*” will have a strong impact on the demand for **URE** from the projects implemented in Romania.

The EU integration will reduce the number of potential types of **JI** projects because according to EU legislation Romania will have to develop projects and therefore they will no longer be eligible for **JI**.

Although the future potential of **JI projects Manner II** is limited, Romania will continue to use this mechanism in the following years until it will be eligible to develop **JI projects Manner I** and for *International Emissions Trading* – **IET**

The preparations to fulfil the eligibility criteria and to achieve the internal procedures required to apply **JI projects Manner I** and **IET** are already in progress.

International Emissions Trading

The analysis of the scenario on **GES** emissions in Chapter 3 indicated a considerable potential for Romania to sell **UCA** according to Article 17 of the Kyoto Protocol.

Thus, Romania intends to get involved in the near future in **IET**, according to Article 17 of the Kyoto Protocol

The green investments scheme (GIS) is an optional instrument producing benefits for the environment by trading **UCA** within **IET**. In a **GIS**, the incomes are usually used to finance projects of **GES** reduction, unilateral projects or bilateral

agreements between the seller and the buyer. The largest advantage of **GIS** is its flexibility on eligibility and project approval, or concerning the design of financial mechanisms to support the projects.

Romania intends to use two flexible mechanisms stipulated in the Kyoto protocol: **JJ projects Manner I** and **IET**. At the same time, the installations that represent significant sources of **GES** in Romania will be included in the EU scheme for emissions trading (**ETS UE**).

The ways to use simultaneously the two flexible mechanisms and **ETS UE** will be analyzed in the future.

Clean development mechanism

Romania might also participate voluntarily to the implementation of CDM. Considering its capacity to achieve the reduction commitment stipulated in the Kyoto Protocol for the first period of commitment (**2008-2012**), Romania will not use this option. The use of CDM might be reconsidered in the future.

Appendix 2

Potential economy saving in different sectors

Sector	Average energy saving potential assessed as percentage of consumption	Maximal values for the potential energy saving
	[%]	[ktoe/year]
Industry	13.0 (10-17)	1590
Residential	41.5 (35-50)	3600
Transportation and communications	31.5 (30-35)	1390
Tertiary sector	14.0 (13-19)	243
TOTAL	100	6823

Source: National Strategy of Economic Efficiency of Romania, 2004

Appendix 3

Actions promoting energy efficiency and the efficiency of the renewable sources of energy. Targets derived from the energy policy of Romania and the EU

Area of action	European Union in 2008	Romania – 2006-2009
Renewable sources of energy –RSE	EU set specific targets for the renewable electrical power, to 22.1% of the total production of electricity by 2010. Directive 2001/77	- A promotion mechanism based on <i>green</i> certificates was established – compulsory quotas fro the gross consumption of electrical energy: 2006-2.2%; 2007-3.74%; 2008-5.26%; 2009-6.78%; starting with 2010- 8.4% - The requirement of investment is 500 mil Euro - Promote mechanisms to produce heat and hot water for households Measures to be taken in this field:
1. Wind	1. New capacity of 15.000 MW from wind turbines	1. Increase the degree of valorisation, under conditions of economic efficiency, of the renewable sources of energy for the production of energy;
2. Heliothermal	2. 35 million m2 from heliothermal installations	2. Strengthen the role of the green certificates market and promote the private capital for investments in renewable sources
3. Photovoltaic	3. 1500 MWp from photovoltaic installations	
4. Geothermal	4. 15 new electrical stations and 10 new stations of low and medium temperature and 250.000 new geothermal pumps to be installed	
5. Small hydropower stations	5. New capacity of 2.000 MW small hydropower stations	
6. Biogas	6. 6.000 new stations on biogas	
7. Biomass	7. 450 new combined stations for heat production and 13.000 new installations for heat production / centralisation e	
Fuel for transportation	EU set specific targets for biofuels: 5.75% of the total amount of fuel used for transportation by 2010. Directive	Promotion required to comply with the commitments on the climatic changes and promotion

1. Bio-ethanol 2. Bio-diesel	2003/30 1. Five-fold increase of the bioethanol production 2. Three-fold increase of the biodiesel production	of RSE. Targets: by 2007 at least 2% biofuels and other renewable fuels from the total energy content of all the types of gas and diesel fuel used for transportation; by 2011 - at least 5,75. (2006-proposed investments for 700 thousands t/year by 8 companies)
Heat performance of the buildings 1. Generalities 2. Existing dwellings (small buildings) 3. Existing dwellings (dwellings for a single family or for multiple families) 4. Existing buildings (>1000 m2) 5. New dwellings (dwellings with a single family) 6. All EU dwellings	EU Directive on the energy performance of the buildings (2002/91/CE) directed to a 22% potential of energy saving in constructions by 2010 1. 5 mil verifications and evaluations of the heating systems - 2 mil verifications and evaluations of the cooling systems - 10.000 contracts for energy supply between the public authorities and the private companies 2. 2 mil new certifications of the energy performance 3. 10 mil dwellings to reduce the energy consumption with 30-40% from the current consumption - 1 mil additional dwellings with 50% of the energy supplied from renewable sources 4. 100.000 certifications of energy performance 50.000 additional buildings with 50% of the energy supplied from renewable sources 5. 50.000 houses built on «very low» energy” 6. 1 low power electrical apparatus and one low power source of light (compact fluorescent lamp) – sales monitoring	A program of increasing the energy efficiency of the public buildings will be set up including the reduction of losses and integration of RSE; The owners who want to rehabilitate thermally their dwellings benefit of a subsidy of two thirds of the value of work. Most dwellings from Romania are buildings 15 to 55 years old; Projects for heat plants rehabilitations, for diminishing the production costs and reduction of losses during heat transportation and distribution, with the view to reduce the heat expenditure of the population by up to 30%. This program will benefit of co-financing from the state budget; Modernise the existing capacities or their replacement with new ones, under conditions of co-generation, correlated with the heat requirement of the localities Diversification of the primary sources of energy used to produce heat; Mounting heat meters in each dwelling and apartment; National strategy evaluated the requirement of investments for the analyzed period at about 340 mil. Euro/year.

Source: Elaborated based in the acting legislation in the EU and Romania

Appendix 4

Overview of significant and potential environmental impacts by industrial sectors

	Atmosphere	Water	Soil / Waste
Chemicals (industrial inorganic and organic compounds, excluding petroleum products)	-many and varied emissions – depending on processes used and chemicals manufactured -emissions of particulate, matter, SO ₂ , NO _x , CO, CFCs, VOCs and other organic chemicals, odours -risk of explosions and fires	-use of process water and cooling water -emissions of organic chemicals, heavy metals (Cd, Hg), suspended solids, organic matter, phenols, PCBs, cyanide water quality effects	-chemical process wastes → disposal problems -sludges from air and water pollution treatment → disposal problems
Paper and pulp	-emissions of SO ₂ , NO _x , CH ₄ , CO ₂ , CO, hydrogen sulphide, mercaptans, chlorine compounds, dioxins	-use of process water -emissions of suspended solids, organic matter, chlorinated organic	

		substances, toxins (dioxins)	
Cement, glass, ceramics	-cement → emissions of dust, NO _x , CO ₂ , chromium, lead, CO -glass → emissions of lead, arsenic, SO ₂ , vanadium, CO, hydrofluoric acid, soda ash, potash, speciality constituents (eg.chromium) -ceramics → emissions of silica, SO ₂ , NO _x , fluorine compounds, speciality constituents	-emissions of process water contaminated by oils and heavy metals	-extraction of raw materials -metals → soil contamination and waste disposal problems
Iron and steel	- SO ₂ , NO _x , emissions of CO, hydrogen sulphide, PAHs, lead, arsenic, cadmium, chromium, copper, mercury, nickel, selenium, zinc, organic compounds, PCDD / PCDFs, PCBs, dust, particulate matter, HCs, acid mists -exposure to ultraviolet and infrared radiation, ionising radiation -risks of explosions and fires	-use of process water -emissions of organic matter, tars and oil, suspended solids, metals, benzene, phenols, acids, sulphides, sulphates, ammonia, cyanides, thiosulphates, fluorides, lead, zinc (scrubber effluent) → water quality effects	-slag, sludges, oil and grease residues, HCs, salts, sulphur compounds, heavy metals → soil contamination and waste disposal problems
Non-ferrous metals	emissions of particulate matter, SO ₂ , NO _x , CO, hydrogen sulphide, hydrogen fluoride, chlorine, aluminium, arsenic, cadmium, copper, zinc, mercury, nickel, lead, magnesium, PAHs, fluorides, silica, manganese, carbon black, HCs, aerosols (local exposures depend on the particular material being processed)	-scrubber water containing metals -gas scrubber effluents containing solids, fluorine, HCs	-sludges from effluent treatment, coatings from electrolysis cells (containing carbon and fluorine) → soil contamination and waste disposal problems
Refineries, petroleum products	-emissions of SO ₂ , NO _x , hydrogen sulphide, HCs, benzene, CO, CO ₂ , particulate matter, PAHs, mercaptans, toxic organic compounds, odours -risk of explosions and fires	-use of cooling water emissions of HCs, mercaptans, caustics, oil, phenols, chromium, effluent from gas scrubbers	-hazardous waste, sludges from effluent treatment, spent catalysts, tars
Leather and tanning	-emissions including leather dust, hydrogen sulphide, CO ₂ , chromium compounds	-use of process water -effluents from the many toxic solutions employed, containing suspended solids, sulphates, chromium	-chromium sludges

Source : Europe's Environment, 1995; OECD, 1991; WHO ,1992 and van der Most and Veldt, 1992

Notes: HCs – hydrocarbons; VOCs – volatile organic compounds; PAHs – polyaromatic hydrocarbons; PCBs – polychlorinated biphenyls; PCDDs – polychlorinated dibenzodioxins; PCDFs – polychlorinated dibenzofurans

Appendix 5

Significant impact by agricultural practices

	Air		Water	Soil	Nature / Landscape
Specialization and concentration	-Increasing field sizes, land consolidation, removal of vegetation cover		-removal of vegetation cover → increased surface runoff and sediment load → sedimentation, contamination, eutrophication	-removal of vegetation cover → soil erosion - management neadevat → degradarea solului	-loss of hedgerows, woodlands, small watercourses and ponds → decrease in landscape variety and reduction in species diversity -land degradation if activity not suited to site
	Intensive animal husbandry	-emissions of methane, ammonia	-silage effluent → organic matter and nutrients in waterbodies (see Fertilization)	-spreading of manure high in heavy metal content → elevation of soil concentrations	-construction of storage silos → changed landscapes
	Intensive cropping		soil erosion → increased sediment runoff → water pollution (see Fertilization)	-loss of organic matter in soil → deterioration of soil structure, soil biological activity → decline in soil fertility and absorption capacity → increased erosion and runoff	-potential loss of nutrient – poor habitats

Fertilisation	Animal manure (slurry or solid)	-ammonia and nitrous oxide volatilisation -unpleasant odours	-spills of organic matter and nutrients to waterbodies → eutrophication → oxygen depletion → excess algae and water plants, fewer fish -leaching to groundwater → pollution of drinking water supply	-accumulation of heavy metals and phosphates in soil (may enter food – chain) -overapplication → local soil acidification possible	potential loss of nutrient-poor habitats
	Commercial (nitrogen, phosphorous)	-ammonia and nitrous oxide release	-nitrate leaching and phosphate runoff → elevated nutrient levels → eutrophication of fresh and coastal waters, and contamination of aquifers	-accumulation of heavy metals → effects on soil microflora and entry into food-chain -overapplication → local acidification → deterioration of soil structure, imbalance in nutrients	
	-Sewage sludge		-leaching of nutrients and other chemicals to aquifers	-accumulation of heavy metals and organic micropolutants (may enter food-chain)	-direct contamination of fauna and flora with microbial agents and chemicals
Pesticides application		-evaporation and pesticide drift → adverse effects in nearby ecosystems → long-range transport of pesticides in rainwater	-leaching of mobile residues and degradation products → groundwater → possible impacts on wildlife and fish and drinking water resources	-accumulation of persistent pesticides and degradation products → contamination and leaching to groundwater -use of broad spectrum pesticides → impacts on soil microflora and may affect or eradicate non-target organisms	-possible wildlife poisoning incidents (non-target organisms) -loss of habitat and food source for non-target species -resistance on some target organisms

Irrigation/ water abstraction		-increase of nitrous oxide and methane emissions (greenhouse gases)	-lowering of the water table → soil salinization / alkalisation → impacts on surface and groundwater quality → drinking water -high abstraction required for some crops → strain on resources in some areas	-waterlogging → salinisation / alkalisation of soils -use of saline or brackish waters for irrigation in hot climate (high evaporation) → increased salt precipitation and carbonates → possible salinisation / alkalisation	-soil salinisation/alkalisation → losses of species, desertification -drying out of natural elements affecting river ecosystems
Drainage		chemical changes in soil → greenhouse gases	- channelisation → hydrological changes → possible decrease in aquatic biodiversity - water abstraction → lowering of water table	- oxidation of organic soils → reduction in organic content, acidification and changes in soil structure	- potential loss of wetlands and changes in botanical composition of grassland, fens and other habitats
Mechanisation	-Tillage, ploughing - Use of hard equipment	-increase in dust and particulate matter in air	-increased surface water runoff, sediment load and associated particles → sedimentation, contamination, eutrophication - soil compaction → increased surface runoff and sediment load → sedimentation, contamination, eutrophication	-ploughing up and down slopes → soil erosion (water and wind) -compaction and erosion of top soil	

Appendix 6

Significant and potential adverse environmental effect of forestry activities

Forestry activities	Water	Soil	Landscape	Nature and wildlife
Wood production	- sawdust	- cover good soils in sawdust - erosion, ditch forming	- degrading - aesthetic degradation	- changes of the feeding and breeding places for many animals
Seedling	- build-up of litter following leaf-falling due to acid rain - cultivate species which require a high level of humidity → diminished table water availability	- build-up of litter following acid rains → soil acidification	- uniform plantations → major changes of the shape, form, colour and texture resulting from the clear delimiting of the coniferous plots	- plantations with a single tree species → uniformness, disappearance of biodiversity
Forest clearing	- complete land clearing → alluvia erosion → loading with alluvia and organic matter	- land uncovered due complete clearing → erosion due to wind and water - use of heavy equipment → compacting - sudden decrease of water requirement due to complete land clearing → flash floods	- extensive complete land clearing → desolate landscape	- debris clearing → disappearance of plants and animals depending on it → disappearance of biodiversity
Drainage	- decreasing water table level, which reduces water availability - organic soil oxidation → soil acidification → underground water acidification	- organic soil oxidation → build-up of acid sulphates → soil acidification	- soil aridness determines changes in plant communities and in landscape evolution trends	- decreasing water table level → disappearance of rain forests and of the wet areas with rich biodiversity
Weeding, herbicides, selective cutting	- use of herbicides → underground water pollution	- frequent utilisation of equipment → erosion, compacting	- shoots clearing → uniformness	- background disposal, important habitat for many animal species → disappearance of biodiversity
Use of pesticides and fertilizers	- wash-up and carry the active ingredients → underground water pollution	- fertilisation under conditions of excess humidity → loss of nitrogen → emission of glasshouse-effect gases → contribution to climate changes	- changes of plant community structure and of the landscape	- pesticide release → poisoning other species than the targeted ones - fertilization → changes of plant community d

Use of heavy equipment	<ul style="list-style-type: none"> - soil erosion → increased alluvia load of the surface water flows - spillages / oil spots → water pollution - soil compacting → increased spillage, less infiltration to underground water 	<ul style="list-style-type: none"> - frequent utilisation of equipment → compacting, erosion - spillage oil spots → soil pollution 		<ul style="list-style-type: none"> - frequent utilisation of equipment → disturbance of wildlife biology
Leisure	<ul style="list-style-type: none"> - increased water consumption → lower water availability, pollution from tourist sites, camping sites, lands 	<ul style="list-style-type: none"> - trail making → soil erosion and compacting 	<ul style="list-style-type: none"> - infrastructure development (access roads, facilities for leisure, etc) → landscape changes 	<ul style="list-style-type: none"> - increased number of tourists in the forests → disturbance of the natural life - infrastructure development for leisure places → excess extraction of underground water affecting tree growth
Hunting		<ul style="list-style-type: none"> - soil contamination with lead bullets 	<ul style="list-style-type: none"> - low access in forests during the hunting periods 	<ul style="list-style-type: none"> - chase-off some animal species (wolves, bears, lynx) from their places of origin → disappearance of biodiversity - select game species to the detriment of other species → disappearance of biodiversity - poultry game poisoning due to lead bullets - damages due to intensive hunting
Grazing	<ul style="list-style-type: none"> - overgrazing → soil erosion and compacting → increased alluvia load of the surface water flows less infiltration to underground water 	<ul style="list-style-type: none"> - overgrazing → soil erosion and compacting 	<ul style="list-style-type: none"> - overgrazing → soil erosion and landscape changes 	<ul style="list-style-type: none"> - overgrazing → damaging for young plants, trees and habitats

Appendix 7

Significant adverse environmental effect of fishery activities

Fishery activities	Resources	Water	Nature and water wildlife
Sea fishing	- overexploitation → decreasing stock of fish families, reduced genetic diversity, impact on the natural ecologic dynamics	- fish processing installations on ships → water pollution - fish catch blood spilling → water pollution - antifuling preparations (currently banned by the EU) → water pollution - gas/oil duct damaging / petrol due to bottom net trawler fishing → risk of duct rupture, ecological danger - disposal of unused fish and of fish waste → water pollution unpleasant smell	- bottom net trawler fishing and dredging → impact on benthonic organisms - various types of fishing nets, trawl and <i>țaparină</i> (multiple hooks on a single thread) → impact on vertebrates - electrical fishing → impact on sea fowl and mammals
Freshwater fishing	- overexploitation → decreasing stock of fish families, reduced genetic diversity, impact on the natural ecologic dynamics (remove predators from the freshwater sources)		- lead from leisure fishing → toxic effects of sea fowl - electrical fishing → impact on sea fowl and mammals
Aquacultures		- dispose feeds excess and wastes from fish farms → eutrophication - use antifuling paint on aquaculture facilities → water pollution	- fish escaping from fish farms, exotic and transgenic fish → impact on the genetic fund of the natural populations, which increase the competition for the same ecological niches - increased demand for fish feeds (feeds for aquaculture) - physical barriers for fish farms building → prevent fish migration

Appendix 8

Connection between human activities and coastal area problems

Human activities	Agents/consequences	Problems related to coastal area degradation
Urbanisation and transportation	- changes of land utilisation (for ports, airports); increased road, railroad and airways density; port dredging and sediment disposal; sea spillage (oil, household wastes); water extraction; wastes and waste water disposal	- loss of habitats and biodiversity; visual discomfort; decreasing ground water level; salt water penetration; water pollution; health risks; eutrophication; emergence of new, modified species
Agriculture	- land draining; use of fertilizers and pesticides; high animal stocking; water extraction; river arrangement	- loss of habitats and biodiversity; water pollution; eutrophication; lower supply of fresh water to littoral sea water.
Tourism, leisure and hunting	- land development and altered land utilisation (golf courses); high road, railroad and airways density; harbours and piers; water extraction; waste and waste water disposal	- loss of habitats and biodiversity; disturbances; visual discomfort; lower underground water level; penetration of saltwater into freshwater supply; water pollution; eutrophication; health risk
Fishing and aquaculture	- harbour constructions; equipment for fish processing; fishing equipment; effluents from fish farms	- over fishing; impact on other species than the targeted ones; oil and garbage abandoned on beaches; water pollution; eutrophication; introduction of new species; damages to the habitat and changes of the sea biocoenoses
Industry (including energy production)	- altered land utilisation; power plants; extraction of natural resources; effluent treatment; cooling water; windmills; river dyking; tide dams	- loss of habitats and biodiversity; water pollution; eutrophication; heat pollution; visual discomfort; low supply of fresh water and alluvia to littoral seawater; coast/beach erosion

Appendix 9

Significant adverse environmental effect of transportation activities

Transportation activity	Atmosphere	Water	Soil / land	Nature and wildlife/landscape
Road transportation	- oil products burning → emission of NO _x , CO, CO ₂ , COV, sedimentable powders → local and global environmental impact, effects on health - emission of NO _x and COV → ozone from the troposphere and PAN - use and abandonment of fuels and additives → emission of Pb and COV (benzene) - road transportation → noise and air pollution (increased morbidity)	- spillages containing oil, salts and solvents from the road surface → soil and underground water pollution, emission of NO _x and SO ₂ → acidification - roads → alteration of the hydrological systems	- road construction → loss of arable land for infrastructures and service stations → pressure on and fragmentation of soil resources - transportation of hazardous materials → risk of accidents → soil contamination, increased morbidity - abandoned vehicles, oil wastes, used oil, batteries, old tires, old cars → disposal problems	- extraction of materials for road construction and actual road construction → landscape deterioration - infrastructure → separation and fragmentation of habitats, possible prevention of wildlife migration

Railroad transportation	<ul style="list-style-type: none"> - production of electrical power for the electrical engines → emissions into the atmosphere - Diesel engines → emissions into the atmosphere - steam engines (working on coal) → emissions into the atmosphere 	<ul style="list-style-type: none"> - railroads → alteration of the hydrological systems 	<ul style="list-style-type: none"> - transportation of hazardous materials → risk of accidents 	<ul style="list-style-type: none"> - abandonment of equipment out of use → landscape degradation - railroad infrastructure → possible prevention of wildlife migration
Sea and river transportation	<ul style="list-style-type: none"> - intense harbour activity → emissions into the atmosphere - storage and tank loading → emissions into the atmosphere 	<ul style="list-style-type: none"> - disposal of the sentine water from ships → water pollution - accidental and operational spillage into the sea (including oil) → water pollution - household water and wastes from ships → water pollution - transportation of hazardous materials → risk of accidents 	<ul style="list-style-type: none"> - disposal of materials from dredging and canals construction → problems of waste disposal 	<ul style="list-style-type: none"> - construction of berths and channels for ships → impact on the landscape - abandonment of terminals → impact on the landscape - river arrangement → impact on the landscape
Air transportation	<ul style="list-style-type: none"> - planes → emission of NO_x and CO₂ (higher emissions particularly during takeoff, taxiing and landing) → smog at soil level and acid rain) - contributes to the high rate of ozone utilisation, to ozone depletion in the stratosphere and to global warming; condense - auxiliary road traffic within airports → higher emissions 	<ul style="list-style-type: none"> - spillages of kerosene and antifreeze from airports → water pollution - airports construction → alteration of the hydrological systems 	<ul style="list-style-type: none"> - airports construction → pressure on soil resources 	<ul style="list-style-type: none"> - extraction of materials for airport construction → landscape degradation - airports construction → landscape alteration - airports construction → destruction of ecological areas
Duct transportation	<ul style="list-style-type: none"> →emissions into the atmosphere (CH₄) → global warming 		<ul style="list-style-type: none"> - oil spillage → potential water pollution 	<ul style="list-style-type: none"> - possible barrier to wildlife migration if the ducts are laid at soil surface

Appendix 10

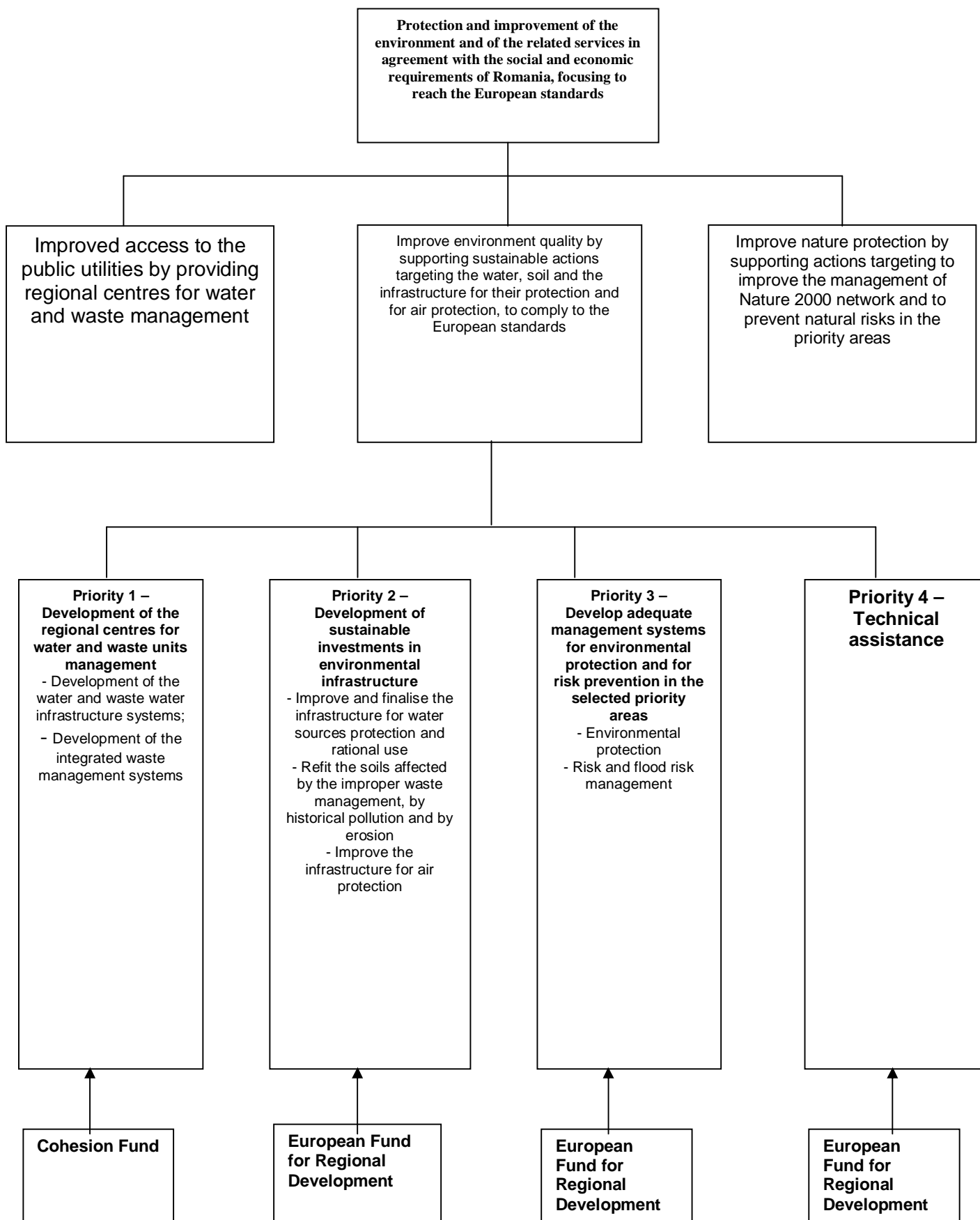
Significant adverse environmental effect of household activities

Household requirements	Air	Water	Soil / dry land
Land (inhabitable area)	<ul style="list-style-type: none"> - construction activities → emissions of formaldehyde and radon 	<ul style="list-style-type: none"> - gardening → pesticides and fertilizers washing and carrying 	<ul style="list-style-type: none"> - renovation and expansion → construction waste → disposal problems - dwellings, gardens, leisure areas → need for space → lack of land for other purposes

Energy (for heating, cooling, cooking, lighting)	- coal, gas and oil burning → emissions of CO ₂ , CO, NO _x , SO ₂ , carbon black, suspended powders and COV		
Household water supply		- sewage water → disposal of organic matter, phosphates and nitrogen compounds - washing and cleaning (with detergents) → suspension of organic matter and solids - use of treated water for washing, cleaning, cooking, gardening, toilets → pressure on tap water supply	
Consumption of goods including foods, drink and tobacco, clothing, footwear, furniture, household appliances, medicines, leisure articles	- aerosols, solvents, paints, cooling installations → emission of COV, CFC - waste burning → air pollution	- use of bleaching agents, disinfectants → organic chloride compounds - food cooking → disposal of nutrients, organic matter	- household wastes (including food wastes, paper and cardboard, glass, ferrous wastes – aluminium particularly – and textiles) → need for garbage dumps → chemical waste such as pesticides, oil, expired paint, Batteries, beauty preparations, medicines, photo developing solutions
	- gas and diesel oil burning → emissions of COV, NO _x , particles in suspension, CO, CO ₂ - car painting → emissions of COV - fuelling and maintenance → emissions of COV	- oils and lubricants spilled into the sewage system from the road surface and from highroads → water pollution	→ used tires, used cars and parts - land for roads and related facilities: water pipes, power cables, communication cables → no space for other purposes

Appendix 11

Priority goals for environmental protection in Romania and financing sources from the structural and cohesion funds



Appendix 12

Development of environment taxes in EU – 15 plus Islande și Norway, after 1996

	A	Be	Dk	Fi	F	D	Gr	Ic	Ir	It	Lu	Ne	No	Po	Es	Sw	UK
Air/energy																	
CO ₂			new after 1996	new after 1996		new after 1996				new after 1996		new after 1996	new after 1996			new after 1996	new after 2000
SO ₂			new after 1996		new after 1996				new after 1996	new after 1996			new after 1996			new after 1996	
NO _x					new after 1996					new after 1996						new after 1996	
Fuels	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996
Sulphur in fuels		new after 1996	new after 1996	new after 1996	new after 1996	new after 1996						new after 1996	new after 1996			new after 1996	new after 1996
Transport																	
Dirty and used cars	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996
Different annual taxes on cars			new after 1996			new after 1996							new after 1996				new after 2000
Water																	
Effluents in water	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996			new after 1996	new after 1996		new after 1996	new after 1996		new after 1996	new after 1996	
Wastes																	
Final wastes	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996	new after 1996			new after 1996		new after 1996	new after 1996		new after 1996	new after 1996	new after 1996
Hazardous wastes			new after 1996	new after 1996	new after 1996	new after 1996		new after 1996									
Noise																	
Noise from the aviation						new after 1996				new after 1996		new after 1996	new after 1996				
Products																	
Tyres	new after 1996		new after 1996	new after 1996								new after 1996					
Beveridge recipients		new after 1996	new after 1996	new after 1996									new after 1996			new after 1996	
Packages	new after 1996				new after 1996					new after 1996			new after 1996				
Plastic bags			new after 1996					new after 1996	new after 1996	new after 1996							
Pesticides		new after 1996	new after 1996										new after 1996			new after 1996	
Cloro-fluoro-carbon (CFCs)	new after 1996		new after 1996														
Batteries	new after 1996	new after 1996	new after 1996					new after 1996		new after 1996						new after 1996	
Bulbs			new after 1996														
PCV / Phtalats			new after 1996														
Lubrifiant oils			new after 1996	new after 1996						new after 1996			new after 1996		new after 1996		
Fertilizers			new after 1996									new after 1996				new after 1996	
Paper, board			new after 1996		new after 1996			new after 1996									
Solvents			new after 1996														
Resources																	
Raw materials		new after 1996	new after 1996							new after 1996						new after 1996	new after 1996

Source : EEA – European Environment Agency, 2005
in 1996 new after 1996 new after 2000



Appendix 13

State of environment taxes in EU – 10 plus Bulgaria, Croatia, România and Turkey in 2004

	Cy	Cz	E	Hu	La	Li	M	Po	Sl	Sk	Bg	Hv	Ro	Tu
Air/Energy														
CO ₂														
SO ₂														
NO _x and other air pollutants														
Fuels														
Sulfur in fuels														
Transport														
Sale and used cars														
Annual tax on traffic														
Water														
Effluents in water														
Wastes														
Taxes on wastes														
Noise														
Noise from aviation														
Products														
Tyres														
Beverage recipients														
Packages														
Plastic bags														
Pesticides														
Chloro-fluoro-carbons (CFCs)														
Batteries														
Bulbs														
PCV / Phtalats														
Lubrifiant oils														
Fertilisers														
Paper, Board														
Solvents														
Resources														
Raw materials														

Source : EEA – European Environment Agency, 2005

Appendix 14

Financial design to self-finance the structures and activities of nature preservation

Financial design	Description	Evaluation	
		Advantages	Disadvantages
Local, regional and national taxes			
Taxes for nature / ecologic or social dues	At the regional or local level, additional payments may be collected from tourists as support for the projects of nature preservation Additional tariffs can be collected from tourists as contribution to the projects of nature preservation both at the local and at the regional/territorial level	<p>The taxes for nature supply constant, certain incomes to the regional or local budgets. In certain projects, the contributions demanded from tourists amounted to 15-20% of the tourist package and they were directed towards financing ecological and social projects.</p> <p>Tourists become more and more aware that their presence may harm the environment.</p>	<p>The acceptance of additional payments for nature is low (compared to the payments for health), but the tourists are ready to pay if they found out about the particular quality of the area and of the consecutive benefits of its quality.</p> <p>In the periods of deflation, the tourists tend to select other destinations or tourist packages that do not include additional tariffs for nature. This demands an increased communication effort to explain the objectives and benefits of this taxation. The implementation of these additional taxes for nature is rather difficult because certain legal and administrative procedures have to be fulfilled.</p>
Taxes paid by the tourism industry			
Dues for renting, franchising or leasing	To build the infrastructure needed by tourism, the suppliers of tourist services must rent, franchise or lease land	<p>This is a certain and constant income from the suppliers of tourist services</p> <p>The supply of tourist services can be thus sized as to limit the impact of tourism</p>	<p>The tourists usually don-t know these payment dues because they affect directly only the suppliers of tourist services</p> <p>The industry of tourism tends to invest in “cheaper” destinations, particularly in situations o deflation</p>
Taxes for damages to the environment (effects of tourism activities)	If the tourism activities are accountable for ecological damages such as water pollution, for instance, payments are demanded to amend the consequences (according to the	<p>These taxes can diminish the environmental impact of tourism</p> <p>This design can be implemented in combination with fines</p>	<p>The actual payments are usually much too small to cover the costs of damages remediation</p> <p>The design doesn’t bring a regular income</p>

	principle the polluter pays)	The design show clearly the principle “the polluter pays”	The income is quite low The income increases with the damages
Measures to compensate for the affected area (for effects due to constructions)	The tourism infrastructure often requires large land areas. To compensate for landscape destruction and for the destruction of the ecological functions, “in kind” rewards may be asked, such as the establishment of new biotopes or the expansion of the already existing ones	The area where such measures are enforced is protected from long-term intensive utilisation This design is often used when construction licenses are granted The design reflects the principle “the polluter pays”	This is not a way to create regular additional incomes that can be used for conservation projects In practice, the companies making investments try to avoid expenses for compensatory measures or keep them as low as possible
Tariffs paid by tourists			
Admission tickets	The tourists pay to enter a protected area	This design brings regular and certain incomes for the protected areas and can be cashed by the management unit of each protected area These tariffs contribute to increasing tourist awareness on the value of nature and of the objectives and measures for nature preservation The cost of the admission tickets for attractive landscapes are accepted by tourists Implementation is quite easy even if, sometimes, there are legislative obstacles The admission tickets limit the tourist number, which reduces the environmental impact of tourism	The admission tickets can exclude some social groups, which are target groups for environmental education, such as the families with children. In such situations the price should be adapted accordingly. The incomes increase with the tourist number. The increase of tourist number tends to increase/stress the adverse environmental impact and to add to the management costs of the protected areas
Additional tariffs for specific attractions	The management of a natural area requires additional payments to arrange or to keep specific attractions such as exhibitions or scenic spots (belvedere spots)	Generally, substantial additional incomes are thus generated The acceptance is generally high Implementation is not hindered by major	Often, the income hardly cover the cost for the required additional tourism infrastructure Particularly, the personnel costs are not covered

		<p>obstacles</p> <p>The tickets limit the tourist number and therefore alleviate the environmental impact of tourism</p>	
Permits	<p>The tourists pay to obtain a permit for special activities in protected areas, such as climbing or navigating</p>	<p>The design allows the tourists to use the protected area for sport or for other activities and is, therefore, accepted by tourists</p> <p>The demanded amounts limit the activities in the protected area and, implicitly, the general environmental impact</p> <p>The tourists become more aware on the potential damages they can cause</p>	<p>If the permit price is too high, the tourists will choose sites outside the protected area. Therefore, payments are usually too low to support nature conservation projects</p> <p>They are hardly accepted by conservationists due to their potential of environmental depreciation, for instance destruction of vegetation, disturbance of the fauna</p> <p>The implementation of such measures demands additional administrative effort, infrastructure and control mechanisms</p>
Voluntary contributions			
<p>Donations: Cash; Materials; Inheritance;</p>	<p>Many protected and natural areas depend on donations. Usually, they are not collected by the protected area, but rather in collaboration with associations or “groups of friends”.</p> <p>The donors can be contacted by mail, advertisements, donation boxes</p>	<p>Tourists may decide voluntarily whether to contribute or not to the conservation of a protected area</p> <p>Income level is only partially dependent on the tourist number in the area</p>	<p>The incomes depend on the economic situation of the donors and on the way they are contacted, for instance, the donation boxes gather little money</p> <p>Donations are seasonal, most coming on Christmas or on Easter</p> <p>Additional administrative infrastructure required</p>
Eco-sponsoring / Funds	<p>Cooperation between the tourism industry and the environmental organisations is mutually advantageous: for instance, the donations for nature conservation and improvement of tourism image</p>	<p>The social and ecological projects are often sponsored by companies</p> <p>Tourist business support the projects with regular amounts of money or with materials</p>	<p>The projects rely much on the sponsor and they fail if sponsoring ends</p> <p>On the other hand, such projects wouldn’t have been possible without the support of sponsors</p> <p>The sponsors prefer to pay specific projects</p>

		No problems with acceptance by tourists	rather than general maintenance costs
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Appendix 15

Goods and services supplied by the ecological systems that support them and examples

Goods and services	Functions	Examples
Regulation of atmosphere gases	Regulation of atmosphere's chemical composition	CO ₂ /O ₂ balance, formation of ozone for protection against ultraviolet or UVB, radiations; regulation of SO _x level
Regulation of the climate	Regulation of global temperature, of the precipitations and of other climate processes mediated biologically at the local and global level	Regulation of greenhouse-effect gases, production of DMS which affects clouds formation
Regulation of disturbances	Integrity of ecological systems' response to the noise fluctuations of the state parameters	Alleviation of storms, flood control, recovery after draught and other aspects related to habitat response to the variability of the physical-chemical parameters
Maintenance of the water resources	Regulation of the hydrological flow	Provision of water for agriculture (irrigations) or for water transportation
Provision of water resources	Water storage and retention	Provision of water for consumption by maintenance of reservoirs and aquifers
Erosion control and retention of sediments	Retain the soil within a given ecosystem	Prevent loss of soil due to wind, surface water runoff, keep the shore of lakes and wet areas
Soil formation	Processes of soil formation	Rock alteration and build-up of organic matter
Nutrient circuit	Storage, recycling, processing and acquisition of nutrients	Binding of N, P and circuit of other elements and trace elements
Waste treatment	Removal or reduction of the excess nutrients or other compounds	Waste treatment, pollution control, detoxification
Pollination	Movements of flower gametes	Ensure the existence of pollinators required for plan reproduction
Biologic control	Regulation of population size through predators, parasites etc.	Reduce the number of phytophagous through their predators
Refuge	Ensure the habitat for the resident or migratory populations	Feeding places, habitats for the migratory species, winter shelters
Production of feeds	Proportion of the gross primary production that can be used as feed	Production of fish, fruits and other subsistence goods
Production of raw materials	Proportion of the gross primary production that can be used as raw materials	Production of timber, fuel or feeds
Provision of genetic resources	Source of materials and unique biological products	Resources for medicine, for scientific research, for the selection of lines resistant to diseases
Leisure	Provide leisure opportunities	Ecotourism, sportive fishing and similar
Culture	Provide opportunities for non-commercial uses	Aesthetic, artistic, educational, spiritual and scientific value of the ecological systems

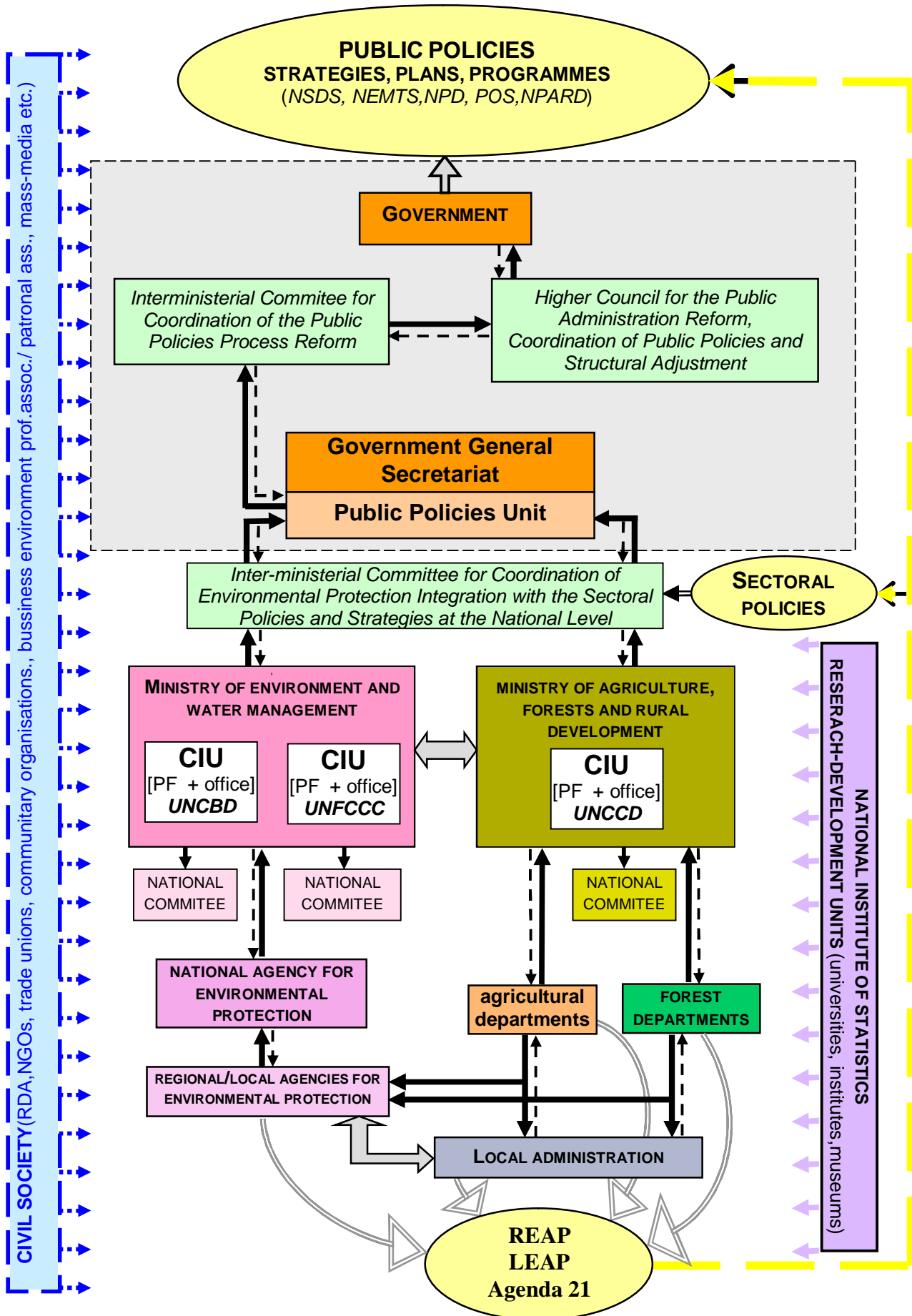
After Costanza R et. al, 1997

Appendix 16

Ecosystem services and their links to human well-being

Ecosystem services		Determinants and constituents of well-being	
<p>Supporting services</p> <p>Services necessary for the production of all other ecosystem services</p> <p>- soil formation - nutrient cycling - primary production</p>	<p>Servicii de furnizare de produse</p> <p>Products obtained from ecosystems</p> <ul style="list-style-type: none"> ○ Food ○ Freshwater ○ Fuelwood ○ Fiber ○ Biochemicals ○ Genetic 	<p>Security</p> <ul style="list-style-type: none"> ∅ Ability to live in an environmentally clean and self shelter ∅ Ability to reduce vulnerability to ecological shocks and stress 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Freedoms and choice</p>
	<p>Regulating services</p> <p>Benefits obtained from regulation of ecosystem processes</p> <ul style="list-style-type: none"> ○ Climate regulation ○ Disease regulation ○ Water regulation ○ Water purification 	<p>Basic material for a good life</p> <p>Ability to access resources to earn income and gain a livelihood</p>	
	<p>Cultural services</p> <p>Non-material benefits obtained from ecosystems</p> <ul style="list-style-type: none"> ● spiritual and religious ● recreation and ecotourism ● Aesthetic ● Inspirational ● Educational ● Sense of place ● Cultural heritage 	<p>Health</p> <ul style="list-style-type: none"> ∅ Ability to be adequately nourished ∅ Ability to be free from avoidable disease ∅ Ability to have adequate and clean drinking water ∅ Ability to have clean air ∅ Ability to have energy to keep warm and cool 	
		<p>Good social relations</p> <ul style="list-style-type: none"> ü Opportunity to express aesthetic and recreational values associated with ecosystems ü Opportunity to express cultural and spiritual values associated with ecosystems ü Opportunity to observe, study, and learn about ecosystems 	

Appendix 17 - INSTITUTIONAL SCHEME OF ENVIRONMENTAL POLICY



Appendix 18

EU ambient air quality limit (LV) and target (T) values for the protection of human health and ecosystems

Pollutant	Value (avarage time)	Number of exceedances allowed / minimum exceedance area	To be met in time
Human health			
Ozone (T)	120 µg/m ³ (8h average)	< 76 days / 3 year	2010
PM ₁₀ (LV)	50 µg/m ³ (24h average)	< 36 days / year	2005
PM ₁₀ (LV)	40 µg/m ³ (average)	None	2005
SO ₂ (LV)	350 µg/m ³ (1h average)	< 25 hours/year	2005
SO ₂ (LV)	125 µg/m ³ (24h average)	< 4 days/year	2005
NO ₂ (LV)	200 µg/m ³ (1h average)	<19 hours/year	2010
NO ₂ (LV)	40 µg/m ³ (annual mean)	None	2010
Ecosystem protection			
Ozone (T)	AOT40c of 18 (mg/m ³)x h (5 year average)	Daylight hours May - July	2010
Ozone	AOT40c of 6 (mg/m ³)xh (5 year average over 22 500 Km ²)	Reduction 33 % compared to 1990	2010
Acidification	Critical load exceedances (year average over 22 500 Km ²)	Reduction 50 % compared to 1990	2010
NO _x (LV)	30 µg/m ³ (annual mean)	> 1 000 Km ²	2001
SO ₂ (LV)	20 µg/m ³ (anual mean)	> 1 000 Km ²	2001
SO ₂ (LV)	20 µg/m ³ (annual mean)	> 1 000 Km ²	2001

Sursa: Directivele 1999/30/EC; 2002/3/EC; 2001/81/EC

Appendix 19

Main set of indicators for Sustainable Development

Category	Chapters of Agenda 21	Indicators of the command factors	State indicators	Response indicators
Economy	Chap.2: International cooperation	True per capita GDP, growth rate; exports of goods and services (in currency); imports of goods and services (in currency)	Per capita GDP; per capita ENP / environmentally adjusted added value; Distribution of the manufactured added value within the GDP (%); Rate of export concentration	Distribution of investments within the GDP (%);
	Chap.4: Patterns of consumption and production (1)	Shrinking mineral resources (% of the identified existing resources); annual consumption of energy per capita (in Joules)	Identified existing mineral resources (tons); Identified energy resources (oil equivalent) Life of the identified sources of energy (years)	Renewable resources consumption to non-renewable resources consumption ratio (%)
	Chap.33: Financial mechanisms and resources		Total ODA (Official Development Assistance) given or received as GDP percentage (%)	Expenditure for environmental protection as GDP percentage; Environment taxes and subsidies as % of governmental

				income; Amount of additional financing for sustainable development given / received after 1992 (currency); Programs that integrate the environment and economic accountability (yes / no)
	Chap.34. Technology transfer			
Social	Chap.3: Poverty	Unemployment rate (%)	Population living in absolute poverty (numbers and %)	
	Chap.5: Demographic dynamics and sustainability	Total birth rate; Population growth rate (%); Population density (inhabitants / Km ²); Net migration rate (persons / year)		
	Chap.36: Promotion of education, public awareness and training (including in related issues)		Rate of adult literacy (%); Rate of enrolment in secondary school (%); Population reaching grade 5 th of primary education (%);	% of GDP spent on education; Women for 100 men in secondary school (no.); women percentage in civil services (%); Women for 100 men in work force (%)
	Chap.6 (2): Protection and promotion of human health	% persons with no access to drinking water; Pesticide in fish (mg/kg); % of the population exposed to SO ₂ , powders, ozone, CO and Pb; Supply of calories / inhabitant (calories / day); Coliform and pesticide concentration in drinking water (mg / l)	Infant mortality rate (by 1000 births); Life expectancy at birth (years); Incidence of environment-generated diseases (no.)	
	CG Chap.7 (3): Human settlements (including traffic and transportation)	Rate of urban population growth (%); Engine vehicles in use (no.); Number of megacities (10 million inhabitants and over)	% of the population in urban areas; Area and population of marginal settlements (Km ² and no.); Cost / damage and casualties number due to natural disasters; Inhabitable	

			area per capita (m ²); % of the population with sanitary services	
Institutional	Chap.35: Science			
	Chap.37: Capacity building			
	Chap.8, 38, 39, 40: Decision-making structures		Impact studies (yes/no); Environment and sustainable development indicators software (yes/no); National councils for sustainable development (yes/no); Main phone lines by 1000 inhabitants (no.)	
	Consolidation of the „traditional information (part of chap.40)		Representatives of the indigenous persons in the national councils for sustainable development (yes/no); Databases for traditional knowledge (yes/no);	
	Chap.23-32: Role of majority groups		Representatives of minority groups in the national councils for sustainable development (yes/no);	
Environment				
<i>Aquatic</i>	Chap.18: Freshwater resources	Annual extraction of underground and surface water as percentage of the total available quantity	Reserves of underground water (m ³); Concentration of Pb, Cd, Hg and pesticides in freshwater basins (mg/l); Concentration of coliform bacteria from faeces in freshwater basins (no./100 ml); Acidification of the water basins (pH value); BOD and COD (oxygen demand) in water basins (mg/l)	Waste water treatment (% population services, total and by type of treatment)
	Chap.17 (5): Protection of the oceans, of all types of seas and coastal areas	Marine fish capture (tons)	Deviation in the stock of marine species from the maximal level of sustainable harvesting (MLSH) (%); Ratio between MLSH abundance and the current level of abundance; N and P load of the coastal	

			waters (tons); Algal index	
Terrestrial	Chap.10: Planning and management of the terrestrial resources	Alter land use (Km ²)	Area affected by soil erosion (Km ²) / erosion indicator	Protected areas as % of global land area
	Chap.12: Control desertification and draught	Consumption of fire wood per capita (m ³); Farm animals per Km ² of arid and semiarid land	Land affected by desertification (Km ²) / desertification indicator	
	Chap 13: Sustainable mountain development			
	Chap.14:Promotion of sustainable agriculture and rural development	Use of fertilizers (t/Km ²); Use of pesticides in agriculture (t/Km ²); Arable land per capita (ha / per capita)	Area affected by salinization and excess moisture (Km ²)	Cost of expanding the supplied services; Reconditioned land area
Other natural resources	Chap.11: Control forest clearing (7)	Forest clearing rate (Km ² / an); Annual log production (m ³)	Changes of biomass (%); Stock of standing wood (m ³); Forest area	Reforestation rate (Km ² /an)
	Chap.15: Conservation of the biological diversity	Extinction rate of the protected species (%)	Extinct, endangered species (no.)	Protected area as % of global land area
	Chap.16: Biotechnology			
Atmosphere	Cap.9: Atmosphere protection	Emissions of CO ₂ (tons); Emissions of SO ₂ and NO _x (tons); Production of stratosphere ozone-destroying substances (tons)	Atmosphere levels of SO ₂ , CO ₂ , NO _x and O ₃ in urban areas (ppm)	Expenditure to diminish air pollution (in currency); Reduce the consumption of ozone-destroying gases (% by year); Reduction of CO ₂ , SO _x and NO _x emissions (% by year)
Wastes	Chap.21: Solid wastes and household waste water	Disposed waste (tons); Generation of industrial and municipal waste (tons)		Expenditure for wastes collection and treatment (in currency); Water recycling rate; Disposal of the municipal waste (tons / inhabitant); Reduction of the waste rate per GDP unit (tons/year)
	Chap.19, 20, 22: Chemical and toxic substances, dangerous wastes	Generation of dangerous wastes (tons)	Land area contaminated by toxic wastes (Km ²)	

Note to the tabel: processed after Agenda 21, Rio de Janeiro 1992