How Sustainable is Turkey's Technology on the Way of European Union Membership

Feride Doganer Gonel, Yildiz Technical University, Turkey

INTRODUCTION

The concept of sustainable development can be examined from two perspectives; one is scientific point of view which is consistent with the management of natural resources and the preservation of its reproductive capacity; other one is socio-economic point of view which implies a focus on economic welfare and the maintenance of a cohesive social system. In this framework, one of the big common areas is about environmental technology, which is defined as the cooperation between technology and environment. According to European Commission report, these technologies "*basically any technologies that, when compared to other similar technologies, does the same thing, but with less environmental impact*" (EU COM, 131 final, 2003). In other words, this definition includes technologies "*to manage pollution, less resource-intensive products and services and ways to manage resources more efficiently*" (EU COM, 131 final, 2003). In order to provide an international competitive edge for European Union (EU), European Environmental Technologies Action Plan (ETAP) was introduced and issued as an important step and it focus on four particular topics: climate change, soil, sustainable production and consumption and water. The objective of ETAP is to optimize the use of the funds within the existing national and European research schemes, such as 6th Research Framework Programme (2002-2005).

On the other hand, the environment is one of the areas where the candidate and new member countries must need to catch up with EU standards. Since these countries have low level of environmental investment in the past, they still face many environmental challenges such as improving their water supply networks or air quality especially in urban areas. Despite the improvements made over the last decade, they still need to adapt EU environmental directives[i] into their national legislation. The European Council invited these candidates and new member countries to take part in the development and wider use of environmental technologies in sectors such as energy and transport. Especially, the energy sector is the most significant area, where candidate and new member countries need to replace their old outdated plants with new eco-efficient technologies and give up to rely on poor quality fuel in their production.

In this paper, the technological development of Turkey and the new members of EU is studied in terms of *environmental acquis*. Therefore, the first part of this study explains the Turkey's technological development and its relation with EU technological path. Then the aim of the second part is to make a connection between Turkey's technological development and EU's environmental *acquis.* Then, the third part provides a brief explanation of the technological and environmental aspects of the new members of EU. Finally the last part makes a comparison between Turkey and EU's new members then summarises and draws conclusions from the study.

IS THE TECHNOLOGY THE SHORT-CUT TO SUSTAINABLE DEVELOPMENT IN TURKEY?

From the perspective of traditional economic theories, the role of technology is accepted as an exogenous variable which is free to buy and easy to receive. This assumption is also valid in environmental issues or in other words within the framework of sustainable development. However, in the real world, technology is not such a reachable factor; contrary to this assumption it is so

expensive and difficult to obtain. Therefore, since there are some environmental and social externalities, in many cases the prices of the products and services are not their real prices. When we add these externalities on the costs of these products and services, probably their prices may increase. If the costs of improving and/or innovating new and clean technologies are considered, the prices will increase further.

On the other hand, according to endogenous (new) growth theories, technology is not an exogenous variable, it is explained within the model. In other words, new growth theory places new technologies or technological development at the center of explanations for why high-income countries continue to grow quickly. In this approach, government may play an important role in supporting the production of technology that contributes to high standards of living. In the same context of endogenous growth models, the case of renewable resources is also analyzed. These models are solved by looking at (optimal) balanced growth solutions, i.e. growth paths on which all variables grow with a constant (possibly zero) growth rate. It is shown that under certain conditions with respect to production and substitution elasticities there is an optimal growth path on which the economy grows at a constant positive growth rate, keeping environmental quality at a constant level. In such models growth in technology and abatement together with self-regenerating capacities of the natural environment compensate for growth in use of natural resources.

As a 'double-edged sword', technology causes many environmental problems and at the same time it finds solutions for these problems. For example, many harmful environmental problems arise from the combustion of fossil fuels, which is presently the major source of impact on human health and on the environment through air pollution, regional acidification and the climate change. However, with the help of technological development it is possible to use more efficient energy, especially at the production processes, or to increase reliance on renewable energy sources and to produce fossil fuel techniques that produce less harmful emission.

In Turkey, after 1980 the first detailed document on Science and Technology (S&T) policy, *Turkish Science Policy: 1983-2003* was prepared as a first and detailed Science and Technology (S&T) policy document. This policy has been considered technology as a priority area with the help of new institution, called as The Supreme Council for S&T. However this policy could not have been implemented and Turkey prepared another new *S&T Policy: 1993-2003*. This new policy and the prepared document represented a turning point in Turkey's S&T policy. Because it helps to establish a new national innovation system, new initiatives and new institutions in Turkey. Accordingly, TUBITAK (The Scientific and Technical Research Council of Turkey) has prepared *Vision 2023: Science and Technology Strategies* as a first technology foresight exercise for Turkey, under this new policy. Since Turkey has understood that the source of the contemporary technology becomes basic scientific knowledge such as in the fields of mathematics, physical sciences, engineering, health sciences and agricultural sciences, her S&T policy related with such specific fields, has gained strategic importance in economic development and social welfare. Actually, in Vision 2023 project, there are four main areas: improving the competitive advantage in industrial production; increasing welfare of the society and the life standards; technological activities for sustainable development and technological activities for strengthening the technological infrastructure of knowledge society. In each area, there are sub-areas which are directly and/or indirectly related with sustainable development and environment. Similarly, within the 7th Five Year Development Plan (2001-2005), *Fundamental Structural Transformation Project* has proposed seven specific fields of investment. These fields are related with research and development (R&D) in sound environmental technologies, in effective use of energy and environment, friendly-renewable energy technologies and nation-wide applications. So, this means that the plans for technological development in Turkey has been more directed towards environmental and sustainable development goals, which is consistent with EU technology policy.

Similarly, since Turkey is facing the large challenge of transposing EU environmental directives into her national legislation, implementing and enforcing them, the document prepared towards EU membership which is called as *Industrial Policy for Turkey*, emphasized "environmentally friendly

technologies shall be given priority in the determination of industrial policies and new industrial investment"(SPO, 2003). Despite this policy priority, when we look at the number of incentives for fixed investment in environmental protection, we find only two incentives in 2000 and 2003.

On the other hand, when we look at the environmental protection and related facilities in Turkey's private industrial sector, we observe the increase in the number of establishments which have received ISO 14000 or similar certificates regarding environmental management systems. It shows that there is an increasing trend among Turkish companies to align their production processes with the principles of sustainable development. For example, the total number of ISO 14000 certificates awarded to products of business firms has increased considerably over time in Turkey; the number of certificates awarded at the end of 2002 (135) was only 2 per cent of world total[ii]. However, Turkey has a serious problem on accreditation; because at the present time, "equipped and accredited" laboratories are limited by only one cement laboratory

As a key component of environmental protection, clean production and its technologies constitute one of the core points of sustainable development; they prevent the creation of waste, therefore it increases efficiency in production, reduces costs and ensures conservation of natural resources. In Turkey, some activities have been undertaken to develop these technologies and make this knowledge available to the industry. They were launched in 1996 mainly in the form of R&D projects spearheaded by TUBITAK and were conducted in cooperation with the World Bank and the Technology Development Foundation of Turkey (TDFT) (CEVKO, 2002) . In this regard Turkey needs quite a large amount of money to achieve the EU standards related with environment; according to Markandya (Markandya, 2003), the costs of the environmental directives for Turkey come out at between 432 euro and 748 euro per capita of the 2000 population. Similarly when we make a comparison between Turkey and CEECs[iii], it is obvious that the environmental costs of EU Accession for the second group exceeds those of Turkey; with the 2001 prices, Turkey's total environmental costs are 576.4 euro per capita while CEECs are 1260.6 euro per capita. As it is observed, Turkey's figure is nearly half of the whole CEECs' figures. In fact, on the official level Turkey made considerable progress in harmonization of the country's legislation with EU *acquis*. At the same time, Turkey has started to carry out several projects on the efficient use of energy, such as to organize energy management courses, competition for the best co-generation establishments and some other training programs. In addition these programs, TUPRAS (Turkey's biggest petroleum refinery) has tried to produce low SO_2 level products for manufacturing industry. Additional and detailed information about Turkey's technological efforts towards sustainable development and EU *acquis* will be analyzed in the next section. However, in spite of all these efforts, the implementation has seriously lagged behind the legislation efforts.

THE BRIDGE BETWEEN TURKEY'S TECHNOLOGY AND EU ENVIRONMENTAL *ACQUIS*

European Union put her general aim as a promotion of sustainable development. In this regard, EU tries to protect the environment and to develop the environmental technologies which is formulated as an 'eco-industries'[iv]. EU investigates eco-industries under three categories of activities: pollution management; cleaner (integrated) technologies and products; and resource management

As a candidate country, Turkey has experienced increasing environmental pressures reflecting rapid sectoral growth in energy industry, transport and tourism. Therefore, the country has to implement sound environmental policies by strengthening its environmental infrastructure and meeting the country's international environmental commitments. For example, the *acquis* comprises nearly 300 different legal acts, legislation or regulations, covering horizontal legislation, water and air pollution, management of waste and chemicals, biotechnology, nature protection, industrial pollution and risk management, noise and radiation protection. Ensuring compliance with the *acquis* requires significant investment, but it brings significant benefits for public health and reduces damage to forests, buildings, landscapes and fisheries. A strong and well-equipped administration at

national, regional and local level is imperative for the application and enforcement of the environment *acquis*[v]

In this part of the study, the connection between Turkey's technological development, particularly in the field of environment and EU's environmental acquis will be explained from the perspective of the EU Commission's regular reports' sub-titles such as air quality or waste management.

Air Quality

The rise in energy consumption and the number of car ownership have increased air pollution in Turkey and the country has tried to reduce this pollution particularly from energy sector. In order to meet EU environmental standards, Turkey requires flue gas desulfurization (FGD) units on all newly commissioned coal power plants and is retrofitting FGD onto older units. Meanwhile since non-fossil energy sources have a high share of energy supply in the country, Turkey is encouraging some renewable energy sources such as hydro electrical power and wind power plants. Electrical Marketing Law which was accepted in 2001 has been carrying out. The main objectives of this law are to provide the electricity effectively, continuously, competitively, transparently and environmentally. In order to achieve them, the Energy Market Regulatory Authority (EMRA) was established in 2001, as an autonomous body. In this law, the following renewable energy policies are considered:

- to encourage the use of renewable and national energy sources in the energy production plants; to use renewable and national energy sources in the production;
- to consider R&D studies on renewable energy particularly hydro, solar, geothermal and wind;
- to establish institutes such as energy institute, water institute, Boron institute and International Centre of Hydrogen Energy Technologies (ICHET). Among them, ICHET is really a good opportunity for helping Turkey to increase the amount of energy produced from non-fossil fuels[vi]. UNIDO helps to build Istanbul Hydrogen laboratory in the country.

On the other hand, as we know from Turkey's wind atlas, several geographical places in Turkey are the promising sites for wind farm development. Currently there are only four active wind turbine manufacturing companies and there is another company already active in the sector which plans to establish turbine wing production facility with the technical know-how from a foreign manufacturer.

Similarly solar energy in Turkey has a great potential; the country is situated at a favorable geographical location and is one of the leading countries in the world with a total installed capacity of 8,2 million m^2 collector area. The industry is well developed with high quality and well-equipped manufacturing and export capacity. In spite of this, photovoltaic (PV) power applications in Turkey are solely limited with some state organizations which use PV for meeting electricity demand.

Turkey is one of the countries with significant potential in geothermal energy[vii]. In this field, geothermal heat pumps, which are relatively new application of geothermal energy, have grown rapidly.

Finally, unlike many of other renewable sources, hydroelectricity is a very well-established technology. There has been 108 hydro power plants built in Turkey by the end of 1999, and Turkey plans to increase the number of hydropower plants to 485 by the year 2010[viii]. In this way, Turkey can come to close to the target of EU's renewable energy use for 2010.

Waste Management

The emphasis in waste management in Turkey is currently on landfill and this is reasonable as the problem with the lack of properly designed landfills is acute. However, among the newly developed waste landfills in Turkey, there are fine examples of sites, which have been constructed according to international standards for environmental protection and safety. But it is also known, a large number of improperly designed and constructed landfills are still in use around the country. On the

other hand, landfilling of waste is actually a waste of resources and therefore waste streams must be diverted to exploitation. The minimization of waste going to landfills is also the current trend in EU legislation. Turkey has some success stories in waste exploitation like reuse, recycling, composting and thermal treatment with energy recovery.

Water Quality

Emission of untreated sewerage, wastewater and solid waste is widespread in Turkey's rivers, lakes and territorial waters. Similarly, due to the rapid development of tourism, sea pollution has become the major problem of the coastal zones of the country. Therefore in order to realize sustainable tourism in Turkey, it is important to treat wastewater and the country makes greater efforts to clean up its seas and rivers. It is roughly estimated that there are around 200 small treatment plants in Turkey (Akça & Samsunlu, 2000). In almost all of these plants, the most common municipal wastewater treatment technology applies: the activated sludge process[ix]. This process with aerated biofilter system meets the discharge requirements of Water Pollution Control Regulation in Turkey. However, since this process produces a large amount of sludge, then a second treatment is necessary in most of the cases. For this reason, in Turkey the anaerobic waste treatment system[x] is also undertaking. For example, in Adana, Turkey's fourth largest city has started to construct the anaerobic system in her new wastewater treatment systems[xi]. This example can be accepted as a representative of the country's small settlements, i.e. they use mostly conventional treatment approach, which contains screening, trickling filters and activated sludge but at the same time new approaches such as anaerobic digesters are also under construction. In both approaches, the effluent meets EU standards. The EU Council Directive concerning urban wastewater treatment (91/271/EEC) requires, by the end of 2005 at the latest, every agglomeration of more than 2000 population equivalent discharging to surface fresh water and estuaries, and of more than 10,000 equivalent inhabitants discharging to coastal waters, to apply at least secondary treatment to its wastewater before discharge.

Industrial Pollution and Risk Management

To reduce harmful emission into the atmosphere from industrial activities, industries are encouraged to develop safe and clean technologies. In that sense, Turkey gives high priority to the promotion of R&D relating to appropriate methodologies of Environmental Impact Assessment (EIA) within industry as a whole, life-cycle analysis of products and eco-audits. For example, between (1993-2003), 8908 EIA decisions have been reached on various activities within the framework of the EIA Regulation[xii]. However, despite all these efforts, Turkey's overall transposition of the environmental *acquis* in this area remains very low, so according to EU Commission's Turkey Regular Report 2004, transposition of the legislation on industrial pollution with the field of Genetically Modified Organism (GMO), has not progressed.

OLD CANDIDATES-NEW MEMBERS: ENVIRONMENTAL PROBLEMS

The gap between the EU's and EU-10's legislation and implementation in environment was particularly wide. In this manner, chapter twenty two (which is about environment) has provided quite big challenges for EU-10 and it was considered one of the most difficult chapters among the *acquis*. Despite these challenges the negotiations in the environment chapter were opened during 2000 and 2001 and by the end of 2001, the negotiations were provisionally closed with nine of them[xiii]. During 2002, the environment chapter has been closed with Malta and substantive progress has been made in negotiations with Bulgaria and Romania, the two other candidate countries. However, for EU-10, today's real situation in environmental panorama still contains significant shortcomings.

At the beginning of the 1990s, most of the EU-10 countries have suffered from heavily polluting and insufficient industrial facilities, the lack of appropriate water supply system to deliver safe and

clean drinking water, and insufficient waste water treatment systems and technologies. During the 1990s, these countries have received several funds from EU, for environmental approximation. However, despite this support, the process of environmental activities had little momentum until EU accession came to the fore. As it is mentioned before, even for after the accession, most of the EU-10 countries have asked for another transition periods in most sub-fields of the chapter twenty-two.[xiv]

On the other hand, industrial pollution, particularly in Central and Eastern European Countries (CEECs) is at a crossroads. Despite the closure of many heavily polluting industrial activities, many of the surviving industries are still polluting well above the acceptable levels. Meeting the requirements of the IPPC Directive (Integrated Pollution Prevention Control) by the deadline for existing plant of 2007, is one of the more demanding parts of EU environmental legislation, particularly where surviving industries are still in trouble with outdated/old machines and equipments. Such technological restructuring will lead to reductions in polluting emissions.

In the field of air pollution, most towns and cities in CEECs are heated by district heating systems, based on coal or other fossil fuels; levels of CO_2 emissions per capita show that these countries' energy supply is based on these kinds of fossil fuels. Instead of fossil fuels, using existing geothermal energy is still relatively modest. In order to develop this energy source, for example Poland has built a geothermal laboratory. This laboratory is important to make a relation to the Podhale Geothermal Project in demonstrating the functioning of geothermal water for heating purposes. There are also other laboratories, which focus on planning and development of renewable energy, testing solar collectors according to the ISO standards, research on solid biofuels properties or wind energy measurement and wind resources assessments.

Despite being far from ideal situation in waste statistics, due to the structural and technological features of each country's manufacturing industries, production waste such as mining or metallurgy[xv] comprises the major share of the total waste. However, during the 1990s, the amount of production waste has decreased due to the phasing out of the most obsolete installations, the modernization and substitution of technology. Land filling is the major disposal route for all categories of waste. By 1999, within the CEEC, there were only 7 large municipal incinerators (capacity over 3 tonnes/hour) in operation in the Czech Republic, Hungary, Poland and Slovak Republic and 3 smaller ones in Poland. 97 incinerators are reported for hazardous waste; 22 of them having capacity of over 10 tonnes/day. The main reason for this large disparity between land filling and incineration can be mainly explained by the fact that landfills are cheaper to construct and operate than incinerators. There is also a lack of investment in building incinerators that would fully comply with the EU emission limits. The existing ones (mainly in the Czech Republic) will have to be either phased out or modernized[xvi]. Despite all these developments, the EU Commission estimates that the EU-10 will attain fully compatibility with *acquis communitaire* by 2010 (Tümer, 2003).

Meanwhile, S&T systems in CEECs have weak, narrow and mixed national innovation systems. Therefore, these systems' products are not as competitive as the other EU-15 member countries. The main problematic areas of these countries include, resolving the problem of industrial R&D institutes through active restructuring, improving domestic S&T infrastructures, supporting vocational training, developing a regional innovation policy and strengthening and differentiating international co-operation in S&T between the EU and CEECs. So the majority of CEECs is still struggling to integrate into international production networks at any technological level. This means that these countries' technological specializations may not be sustainable or economically profitable in the medium or in the long term.

CONCLUSION

On the way of European Union accession period, despite some quick improvements in waste management and build up administrative capacity, Turkey's substantial problems remain unsolved. When we make a comparison between Turkey and other candidate countries of EU, Bulgaria and Romania, Turkey's overall level of transposition of the environmental *acquis* is so low. According to

EU Commission's last regular report, among eleven topics[xvii] only one of them, waste management has good progress. Most of the other topics have only limited progress and two of them, industrial pollution and risk management and genetically modified organism, make no progress. Contrary to Turkey's situation, Romania and Bulgaria have made progress in most of these topics. For example, for Romania, only the topics of the integration of environmental issues into other policies have no progress. Two of them, GMO and chemicals have only limited progress. For Bulgaria, nearly half of the topics (five of them; integration in to other policies, water quality, GMO, chemicals and nuclear safety and radiation protection) have limited progress and the remaining part has good progress. For those two candidate countries, negotiations on environment chapter (chapter 22) still continue but, generally we can say that they have made good progress, particularly in aligning its legislation with the *acquis* in most of the environment sectors and in preparing for its implementation.

Again, for these two candidate countries, negotiations on environment chapter have been provisionally closed. In other words, it is accepted that they are meeting the majority of the commitments and requirements arising from accession negotiations for the chapter. However, in order to be ready for membership, they will pay an attention to certain aspects of some sub-topics.

On the other hand, when we look at Turkey, the country needs extended time to be able to reach the membership goals, targets and the capability of implementation. Through its customs union agreement, it is possible to say that Turkey is much further integrated than were the EU-10 until they became members. But this argument is valid mostly for trade of goods. In other areas such as environmental protection with the help of technological efforts, it is difficult to say that Turkey becomes a large part of the *Acquis*. Implementing new legislation for Turkey comes at a great cost and despite some positive developments in some economic indicators. Turkey has still serious socio-economic problems such as high unemployment rate or inefficient education system. Education system is not feeding the technological development atmosphere in terms of R&D and due to the country's other economic problems, Turkey is unable to handle the financial burden of the investments that she needs to overcome its environmental problems. So there are two problems; one is well-known financial shortages and the other one is technological shortages. Both of them are the serious barriers in front of sustainability. Financial assistance can come in a variety of forms, mostly from EU. But the other problem should be solved by the education system. This reorganization needs time, good and long-term policy more than financial assistance. Supporting this long-term R&D oriented education through financial assistance provides sustainable future for Turkey.

REFERENCES

Akca, L. and A. Samsunlu (2000), "Performance Evaluation of Small Treatment Systems in Turkey", Water Science and Technology, Vol.41, No.1, pp.49

Commission of the European Union (2003) "Developing an Action Plan for Environmental Technology", COM (2003) 131 final, 25.3.2003 http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0181en01.pdf

Commission of the European Union, "Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union", COM (2004) 38 final, 28.1.2004 http://europa.eu.int/comm/research/environment/policy/etap_en.htm

Commission of the European Union (2004), Turkey Regular Report, 2004 http://www.europa.eu.int/comm/enlargement/report_2004/pdf/rr_tr_2004_en.pdf

Commission of the European Communities 1997: Guide to the Approximation of European Union Environmental Legislation, Commission Staff Working Paper, SEC (1997) 1608, 25.08.

CEVKO (2002), "Sürdürülebilir Kalkınma; Rio Konferansı Sonrasında Türkiye'de İş Dünyası ve Sanayi", ÇEVKO Vakfı Yayın No: 09, Istanbul

http://www.iso.ch/iso/en/iso9000-14000/pdf/survey12thcycle.pdf

http://www.water-technology.net/projects/adana

http://www.cedgm.gov.tr/izlemekontrolverileri.htm

http://www.eurowaste.org/art.asp?id=21

Markandya, Anil (2003) Turkey: Towards EU Accession. The Environmental Acquis, paper presented in Conference held in Ankara, May 10-11

Ministry of Energy of United States (2001), Department of Energy, Ministry of Energy of US, An Energy Overview of the Rep. of Turkey

Tümer, Turgut (2003), "The Rationale and Methodology of the Turkish Foresight Programme- Vision 2023", Technology Foresight Summit, Budapest, 27-29/3/2003 http://www.unido.org/file_storage/download/?file_id=10595

NOTES

[i] The environmental acquis comprises around 300 Directives, Regulations, Decisions and Recommendations.

[ii] The world total number of ISO 14000 certificates awarded at the end of 2002 was 49,462. In Europe this number was 23,316 http://www.iso.ch/iso/en/iso9000-14000/pdf/survey12thcycle.pdf

[iii] Most of them are now the member of EU; Bulgaria, Czech Rep., Hungary, Poland, Romania, Slovak Rep., Slovenia, Estonia, Latvia and Lithuania

[iv] Eurostat and OECD define these technologies as all activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems.

[v] European Commission, Turkey Regular Report, 2004
http://www.europa.eu.int/comm/enlargement/report_2004/pdf/rr_tr_2004_en.pdf

[vi] Hydrogen is cheap and completely environment-friendly fuel and it is considered as a future energy system.

[vii] The geothermal potential is estimated as 31,500 MWt. Up to now, nearly 420 geothermal explanatory and production wells and 200 gradient wells have been drilled in Turkey.

[viii] Department of Energy, Ministry of Energy of US, An Energy Overview of the Rep. of Turkey, 2001

[ix] Activated sludge process is a biological process consuming large amounts of energy and generating large amounts of organic sludge. This sludge, separated from the treated water in the last stage of the process, contains more than 90% water and is highly biodegradable.

[x] In anaerobic digestion consists of a complex ecosystem of bacteria to break down waste. It is faster than traditional aerobic processes for complex substrates, less sludge is produced and the main advantage is that it produces methane which can be burnt for energy.

[xi] http://www.water-technology.net/projects/adana

[xii] The legal basis for EIA is the Environment Act and it is implemented through the EIA regulation, which has revised at the end of 2003. Most of these total decisions (57.8%) belong to petroleum and mining sector. During the last decade, sectoral distribution of the EIA decisions were as follows: 11.4 % for Agriculture and Food investments, 10.1 % for manufacturing investments, 8.4 % for Waste and Chemicals, 7.2 % for Tourism and Housing, 2.9 % for Transportation and Coast investments and finally 2.1% for Energy investments http://www.cedgm.gov.tr/izlemekontrolverileri.htm

[xiii] Cyprus, the Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia

[xiv] For example, several countries such as Hungary, Poland and Slovenia, have 2015 for final compliance with the Urban Waste Water Treatment Directive, this date is ten years later than the final compliance date for Member States laid down in the Directive (Council Directive 91/271/EEC and Commission Directive 98/15/EC)

[xv] Waste from mining, metallurgy, quarrying, coal-fired power and heat generation, fertilizers, glass and cement manufacture comprise the major share of production waste.

[xvi] http://www.eurowaste.org/art.asp?id=21

[xvii] These topics are integration of environmental issues into other policies, horizontal legislation, air quality, waste management, water quality, nature protection, industrial pollution and risk management, genetically modified organism, chemicals, nuclear safety and radiation protection and finally administrative capacity.