T.C.

MARMARA ÜNİVERSİTESİ

AVRUPA BİRLİĞİ ENSTİTÜSÜ

AVRUPA BİRLİĞİ SİYASETİ VE

ULUSLARARASI İLİŞKİLER ANABİLİMDALI

EU ENVIRONMENTAL POLICY AND TURKEY
WITH SPECIAL REFERENCE TO INDUSTRIAL POLLUTION

YÜKSEK LİSANS TEZİ

A.Gökhan RAKICI

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ONAY SAYFASI

Enstitümüz AB Siyaseti ve Uluslar arası İlişkiler Anabilim Dalı Yüksek Lisans öğrencisi A.Gökhan RAKICI'nın "***EU ENVIRONMENTAL POLICY AND TURKEY with Special Reference to Industrial Pollution***" konulu tez çalışması **15 Nisan 2010** tarihinde yapılan tez savunma sınavında aşağıda isimleri yazılı jüri üyeleri tarafından oybirliği/ ~~oyçokluğu~~ ile başarılı bulunmuştur.

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12.05.2010....tarih ve 2010/VII.. Sayılı Enstitü Yönetim Kurulu kararı ile onaylanmıştır.

Son ırmak kuruduğunda,

Son ağaç yok olduğunda,

Son balık öldüğünde;

Beyaz adam,

paranın yenmeyen bir şey olduğunu anlayacak.

Kızılderili Atasözü, Siyu Kabilesi

ABSTRACT

Environment has become an important issue ever more for everyone. Environmental consciousness is now seen as a need and requirement both in production and consumption rather than a simple extravagant attempt. Since early 1970s EU institutions and the member states have been trying to keep the environmental issues high on the agenda and trying to act as sensitive as possible. Besides, they have especially urged the candidate countries to act in the same line on the required infrastructure, measures and action plans to be taken during the enlargement process and the accession negotiations with minor exceptions. Regardless of the criticisms raised against the effectiveness of its environmental policy, it can be argued that the EU has affected the environmental policy in the world and particularly in the candidate countries. In this context, the main aim of this study is to examine the compliance process of Turkey to the environmental policy of EU particularly in terms of industrial pollution control which is regarded as coercive and high cost issue given the previous experiences of alignment processes and full membership negotiations of the candidate countries. In this respect, 'waste management' is seen as a topic which may create a positive contribution to reach a constructive solution in the compliance with the EU environmental policy and a more sustainable environment for Turkey.

ÖZET

Çevre konusu herkes için giderek daha da önemli bir hale gelmeye başlamıştır. Hem üretimde hem de tüketimde çevresel bilinç artık cömertce bir girişim olmanın ötesinde bir gereklilik ve ihtiyaç halini almıştır. 1970'li yılların başından beri AB Kurumları ve üye devletler çevre konusunu gündemde tutmaya ve mümkün olduğunca duyarlı davranmaya çalışmaktadırlar. Bunun da ötesinde, genişleme süreci boyunca bilhassa aday ülkeleri de üyelik müzakereleri süresince konuya karşı duyarlı hale gelmeye zorlamış, istisnai durumlar dışında gerekli altyapı, önlem ve aksiyonların alınmasını sağlamışlardır. Çevre politikasının etkililiği aleyhinde yapılan eleştirilere rağmen AB'nin dünya özellikle de aday ülkeler nezrinde çevre politikasını etkilediği ileri sürülebilir. Bu bağlamda, bu çalışmanın amacı Türkiye'nin AB çevre politikasına geçmiş uyum süreçleri ve tam üyelik müzakere tecrübelerinde görüldüğü üzere uyulması oldukça zor ve maliyetli olan endüstriyel kirlilik kontrolü özelinde uyumunu incelemektir. 'atık yönetimi' bu çerçevede ele alındığında AB çevre politikasına uyumda ve Türkiye'de daha sürdürülebilir bir çevre için yapıcı çözüme katkıda bulunacak bir alan olarak gözükmektedir.

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LIST OF ABBREVIATIONS

EPA	Environmental Protection Agency
BAT	Best Available Technique
CEE	Central and Eastern Europe
CEECs	Central and Eastern European Countries
DG	Directorate General
EAP	Environmental Action Programme
EC	European Community
ECSC	European Coal and Steel Community
EEA	European Environment Agency
EEB	European Environmental Bureau
EIA	Environmental Impact Assessment
ELVs	Emission Limit Values
EMAS	Eco-Management and Audit Scheme
EP	European Parliament
EU	European Union
EUEB	European Union Eco-labelling Board
EUSG	Secretariat General for EU Affairs
FMCG	Fast Moving Consumer Goods
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
IEA	International Energy Agency

IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention and Control
ISPA	Instrument for Structural Policies for Pre-Accession
LCPs	Large Combustion Plants
LFG	Landfill Gas
MBIs	Market-based Instruments
MoEF	Ministry of Environment and Forestry
Mtoe	Million tone oil of equivalent
NEPIs	New Environmental Policy Instruments
NGOs	Non-governmental Organisations
NPS	Non-point source Pollution
OECD	Organisation of Economic Cooperation and Development
ORG	Oxford Research Group
PPH	Pollution Prevention Hierarchy
R&D	Research and Development
RES	Renewable Energy Sources
SCP/SIC	Sustainable Consumption and Production and Sustainable Industrial Action Plan
SEA	Single European Act
SEE	South-Eastern Europe
SMCG	Slow Moving Consumer Goods
SMEs	Small and Medium-Sized Enterprises
TEU	Treaty on European Union

TTGV	Technology Development Foundation of Turkey
TUSIAD	Turkish Industrialists' and Businessmen's Association
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
VAs	Voluntary Agreements
WCE	Western and Central Europe

I. INTRODUCTION

The nature of the ecological problems and their perception has been continuously changing. Since the ancient times scarcity problems have been shaping the world politics. What's more with the industrial revolution complex and pollution-related environmental degradation has started to challenge our projections for today and future. Now human health - and even human survival- is under a great danger due to soil, air and water contamination in different parts of the world. Consequently new environmental problems bring the need for new perspectives and different policy instruments.

Indeed historical evolution of the environmental problems reveals that global climate change and depletion of the stratospheric ozone layer are the outputs of the industrial society and the production-consumption model. Therefore, contemporary efforts to constitute 'low carbon economy' and society underline the necessity for the industrial pollution control. Hence, all these developments require a new understanding of energy use and development link. Nevertheless this new understanding succeeds only if an integrated approach becomes a key in policy making. Therefore urgent actions to cope with hazardous results of the industrial pollution have to be taken immediately in order to prevent human suffering. At this point, it is necessary to include all the stakeholders into the implementation and the enforcement of the industrial pollution control policies. Thus, both public and private sectors and even the non-governmental organisations (NGOs) should work together.

Growing number of international agreements on the pollution control of any kind demonstrates once again that pollution does not know man-made boundaries. Since, current pollution problems mostly emerge from the modes of industrial production and consumption patterns, industrial pollution is everywhere. There are some regional initiatives to protect the certain ecosystems from pollution. There is no specific international agreement on the industrial pollution control. However, from transferring of hazardous materials to long range transboundary pollution, there are various regional and international cooperation agreements related to industrial pollution. The European Union (EU) as a *sui generis* organisation in one of the most industrialized regions of the world gives special importance to the industrial pollution in an ambitious way. From industrial threats and accidents to waste management, industrial pollution control both directly and indirectly is at the heart of the EU environmental

policy. Ambitious climate change action plans also show that EU desires to control air pollution arising from industry, especially the carbon dioxide (CO_2) emissions.

Contemporary environmental challenges as in the case of global climate change are complex and can affect the life on earth in an unprecedented way. Since the industrial revolution had taken place, these environmental challenges have been on the rise. Therefore, from land use management to agricultural practices and urbanization patterns industrial pollution causes significant problems. That's why policy measures interaction between public and private sectors should be evaluated within the framework of these new environmental challenges.

From the EU point of view it should be emphasized that one of the challenging topics of the historical enlargement of 2004 was the environment itself. Members states and some other authorities indicated that this enlargement was going to diminish the progressive trend of environmental policy of EU even collapse it[1] . From new member states point of view it should also be expressed that environmental compliance with the *acquis* was and has been the one of the most difficult instruments of the full membership. The accession process to the EU underlines this challenge for Turkey, too. However there are also various opportunities in order to reduce the cost and ease the relevant problems of the compliance with the EU *acquis* particularly concerning the industrial pollution. According to the recent studies, waste management, for instance, can be an efficient tool to reach this end. It is known that the production cost of the recycled products is lower than the production from the raw materials. In addition, recycling lifts the financial and operational burden of the waste management implementations.

The starting point of this thesis is that there is a strong linkage among industrial pollution, waste management, energy consumption and ecological footprint and that industrial pollution in Turkey is a great problem and will require very costly new investments in order to reduce the pollution generated from industry and for the fulfilment of the EU environmental *acquis*. Approximation of the environmental *acquis* is apparently going to be a long and severe process for Turkey as it has been observed during the accession negotiations and even still a problem in some full member states. On the other hand, it becomes evident

[1] For further information see Petr Jehlicka and Andrew Tickle, *Environmental Implications of Eastern Enlargement: The End of Progressive EU Environmental Policy* in , JoaAnn Carmin and Stacy D. VanDeveer, (Eds)., *EU Enlargement and Environment*, London: Routledge Pub., 2005, pp 77-93

that there are some opportunities like 'waste management' to overcome the difficulties arising from this process. It might be further argued that Turkey has a relative advantage on the natural environment and resources in comparison to many EU countries. For instance, the 'ecological footprint' of Turkey is relatively lower than the general situation in Europe[2] . In addition; as one of the main instruments against the energy production and consumption problems of the industries, the renewable energy sources of Turkey are quite advantageous before the European countries thanks to her geographical location. At this point, the wind and solar energy is becoming very vital to be taken into account. Therefore, if these advantages are carefully planned and put in to efficient use; they can facilitate the negotiation and alignment process both in financial and administrative terms.

Depending on the afore mentioned statements this thesis mainly argues that efficient waste management strategies are essential elements of industrial pollution control efforts and that if Turkey can employ efficient and integrated waste management policies starting at the local level, the benefits that can be achieved from sustainable use of natural resources through 're-cycling, re-using and reducing' can be transferred to the necessary investments to comply with the EU *acquis* on industrial pollution control. It is noteworthy to mention that sustainable industrial policy which is essential for Turkey to have an effective environmental policy and to have competitive edge in the world economy is one of the important elements of contemporary industrial policies. Therefore it is necessary to focus on the case studies at the municipal level to understand the full potential of waste management actions in creating a better environment and achievement of overall sustainability; economic, ecological and social, in Turkey.

This study thus tries to demonstrate an example what can be done to prevent pollution arising from the use of industrial products of any kind at the local level in a metropolitan city, İstanbul where the waste, itself and its management as well, is a huge burden and environmental problem. It is an interesting example to show a problem might be turned into a solution to social and economic problems and an instrument to eliminate the stress on environment. This case study though limited in scope might pave the way to a better understanding of prudent use of natural resources and of 'smart consumption' as well as it might convey best practices for 'smart consumption' in Turkey, too. This, in turn might lessen

[2] For further information see *National Footprints: Account 2009*, Global Footprint Network, http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_for_nations/, Retrieved: 23.01.2010

the burden of controlling pollution generated from industrial activities through a gradual shift in industrial actions from pollution control to clean technologies. At that point, the greatest challenge for Turkey to comply with the EU environmental *acquis* in the short term seems financial difficulties of industrial pollution control measures and investments. However, in the middle and the long term, the insistence on going with the old and inefficient technologies which cause industrial pollution would impose more serious problems to Turkey's economic, social and political future.

In line with this argument, this thesis consists of three main chapters. In the first chapter definition of pollution and the state of the industrial pollution all over the world will be discussed to present the environmental degradation and its consequences on life. Mainly what pollution means and what types of pollution exists are to be examined to understand the main features of environmental challenges that the industrial pollution might impose. Furthermore, the situation of pollution in the world and in the EU will also be analyzed to present an overall view of the current state of the environment with a specific focus to the industrialized world.

In the second chapter, the main principles of EU industrial pollution control within the environmental policy will be examined within the light of existing legal measures namely; the Integrated Pollution Prevention and Control (IPPC) Directive, Seveso II Directive, and Large Combustion Plants (LCPs) Directive. And also the EU enlargement process with respect to environmental *acquis* and the problems of compliance of candidate countries will be under focus, too. Consequently, in the third chapter, both the global and the EU scale industrial pollution are briefly examined with the aim of understanding its environmental impact then the position of Turkey in full membership negotiations with regard to industrial pollution is roughly analyzed to underline the possible advantages and the opportunities during the membership process. The third chapter also questions the potential of municipal waste management plans to reduce the impact of usage of raw materials and waste from all kinds of industrial activity through the *İSTAÇ* Co. example in İstanbul. In brief, this study is a modest attempt to provide a practical framework to analyse the impact of EU environmental policy on Turkey with special reference to the industrial pollution. That's why in depth analysis of EU overall environmental policy is out of the scope of this thesis.To this end, official EU documents and papers are included to this study as the main sources along with the academic studies. Comparative analysis of the member and the new member states is employed in order to understand the opportunities and disadvantages that lie before Turkey.

II. INDUSTRIAL POLLUTION IN THE WORLD

'Sustainability' has been one of the most important maxims of the economic development and the welfare state for the last decade. Apparently, the limited resources of the ecological system of the world have reached its peak point due to high pressure on continuous growth strategy of the international economic system. Industrial 'mass-production' approach has gradually shifted to 'eco-friendly production' and nowadays 'low carbon strategy' in industrial production process became even a marketing tool for the multinational corporations and the developed states all around the world to underpin the perception of their environmental awareness. For instance, The "UK Low Carbon Industrial Strategy"[3] was launched on 15 July 2009 with the core objective of ensuring that British businesses and workers are equipped to maximise the economic opportunities and minimise the costs of the transition to a low carbon economy[4] .

2.1. Pollution: Introduction and Basic Concepts

It is known that the term 'eco-logy' was firstly used by Ernst Haeckel in 1873[5] . It means that question of environmental problems so the pollution has been grasping ever-increasing attention for over a century. There are various definitions of pollution but it can be described best as, "the addition of any substance or form of energy (e.g., heat, sound, and radioactivity) to the environment at a rate faster than the environment can accommodate it by dispersion, breakdown, recycling, or storage in some harmless form"[6] .

[3] For further information see http://www.berr.gov.uk/files/file52002.pdf

[4] Retrieved: 23.01.2010, from official website of Government Department for Business Innovation&Skills, http://www.berr.gov.uk/whatwedo/sectors/lowcarbon/lowcarbonstrategy/page50105.html

[5] Allan D. McKnight, Pauline K. Marstrand, T.Craig Sinclair (eds.), *Environmental Pollution Control: Technical and Legal Aspects*, London: George Allen&Unwin Ltd., 1974

[6] *Encyclopedia Britannica*, http://www.britannica.com/EBchecked/topic/468070/pollution, Retrieved: 07.10.2009

There are two main types of pollution: 'the point-source pollution' that can be traced back to "a single origin or source such as a sewage treatment plant discharge"[7] and non-point source pollution (NPS), "unlike pollution from industrial and sewage treatment plants comes from many diffuse sources"[8] . Generally it can be said that NPS pollution does not come from a specific source. It is caused "by rainfall or snowmelt moving over and through the ground, as the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water"[9] . Examples of non-point sources of pollution include the following:

- Sediments from construction, forestry operations and agricultural lands;
- Bacteria and microorganisms from failing septic systems and pet wastes;
- Nutrients (from fertilizers and yard debris) and pesticides from agricultural areas, golf courses, athletic fields and residential yards;
- Oil, grease, antifreeze, and metals washed from roads, parking lots and driveways;
- Toxic chemicals and cleaners that were not disposed of properly
- Litter thrown onto streets, sidewalks and beaches, or directly into the water by individuals[10] .

Coming back to point-source pollution eight different types of pollution can be listed namely: air, water, soil contamination, noise, and radioactive contamination, thermal, light, and visual pollution[11] .

Air pollution is defined as any contamination of the atmosphere that disturbs the natural composition and chemistry of the air[12]. Another definition of air pollution also indicates the existence of "Toxic, radioactive gases or particulate matter introduced into atmosphere

[7] Retrieved: 07.10.2009, from the website of the water and waste water industry, http://www.water-technology.net/glossary/point-source-pollution.html

[8] Retrieved: 07.10.2009, from the official website of US Environmental Protection Agency, http://epa.gov/owow/nps/qa.html

[9] Retrieved: 07.10.2009, from the official website of US Environmental Protection Agency, http://epa.gov/owow/nps/qa.html

[10] Retrieved: 07.10.2009, from the official website of University of Florida, http://campuswaterquality.ifas.ufl.edu/sources/origins.html

[11] Retrieved: 07.10.2009, from website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[12] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

usually as a result of human activity"[13]. Air pollution may come from a wide variety of sources such as vehicle or manufacturing exhaust, forest fires, volcanic eruptions, building construction or demolition.

Water pollution involves any contaminated water, whether from chemical, particulate, or bacterial matter that degrades the water's quality and purity[14] . Water pollution can occur in oceans, rivers, lakes, and ground waters, and as different water sources flow together the pollution can spread around. Main causes of water pollution include high sediment from soil erosion to rivers or sea, improper waste disposal and littering, leaching of soil pollution into water supplies, organic material leakage in water supplies.

Soil, or land pollution, is contamination of the soil that prevents natural growth and balance in the land whether it is used for cultivation, habitation, or a wildlife preserve[15] . Soil pollution sources include hazardous waste and sewage spills, non-sustainable farming practices, such as the heavy use of inorganic pesticides, strip mining, deforestation, and other destructive practices, household dumping and littering[16] .

Noise pollution may refer to human-oriented noise harmful to human health or ecologic system. Transportation vehicles are the worst offenders, with aircraft, railroad stock, trucks, buses, automobiles, motorcycles and construction equipments produce substantial noise pollution[17] .

Thermal pollution should be corrected as the subtitle of the global warming issue. It is a kind of produced heat that creates undesirable effects on all living organisms. As stated in the previous sections of this study the earth has a natural thermal cycle, but excessive temperature

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[13] Richard E. Saunier and Richard A. Meganck, *Dictionary and Introduction to Global Environmental Governance,* London: Earthscan, 2009, p.53

[14] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[15] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[16] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[17] *Columbia Electronic Encyclopedia*, Columbia University Press 6th Edition, 2009, p.1, http://search.ebscohost.com/login.aspx?direct=true&db=khh&AN=39024521&site=ehost-live, Retrieved: 7.10.2009

increases can be considered a rare type of pollution with long term effects. Many types of thermal pollution are confined to areas near their source, but multiple sources can have wider impacts over a greater geographic area even the whole planet. Thermal pollution may be caused by power plants, urban sprawl, air pollution particulates that trap heat, deforestation, loss of temperature moderating water supplies[18] .

Light pollution is the over illumination of an area that is considered obtrusive[19]. Sources like large and crowded cities, billboards and advertising elements, vehicle or main road lights, night time sporting or entertainment events can cause this type of pollution.

Visual pollution -eyesores- can be caused by other types of pollution or just by undesirable, unattractive views like power lines, construction areas, billboards and advertising, neglected areas or objects such as polluted vacant fields or abandoned buildings[20]. It is obvious that all these types of pollution have negative effects on human health. More seriously these negative effects cause genetic problems and hereditary diseases transferred from generations to generations. In addition, nearly all kind of pollution can be conveyed through water or the wind, and can not be confined within area where it originates. Hence, every people have to be sensitive and careful on the environment and try to prevent pollution from household consumption to the industrial production. In general, 'pollution prevention' refers to production technologies and strategies that result in eliminating or reducing waste streams. Thus, pollution prevention includes both the modification of industrial processes to minimize the production of "wastes"[21] and the implementation of "sustainability"[22] concepts

[18] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[19] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[20] Retrieved: 07.10.2009, from the website of *Love to Know online media company*, http://greenliving.lovetoknow.com/Types_of_Pollution

[21] "Industrial wastes are materials coming from a manufacturing process that are not directly used within the corporation and that are marked for disposal or release to the environment", T.E. Graedel, B.R. Allenby, *Industrial Ecology*, Englewood Cliffs, NJ: Prentice Hall, 1995, p.10

[22] Bruntland Commission - a group assigned to create a "global agenda for change" by the General Assembly of the United Nations (UN) in 1984 - defined sustainable as: "Humanity has the ability to make devepolment sustainable-to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.", Paul L. Bishop, *Pollution Prevention: Fundamentals and Practice*, Illinois: Waveland Press Inc., 2004, p.13. For further information see: World Commission on Environment and Development, *Our Common Future*, Oxford University Pres, 1987, Oxford.

to conserve valuable resources[23] . The main premise underlying pollution prevention is that it makes far more sense for a generator not to produce waste than to develop extensive treatment schemes in order to ensure that the waste poses no threat to the quality of the environment[24] . That's why, there is a ranking model defined as 'pollution prevention hierarchy (PPH)' which is illustrated in Figure 2.1:

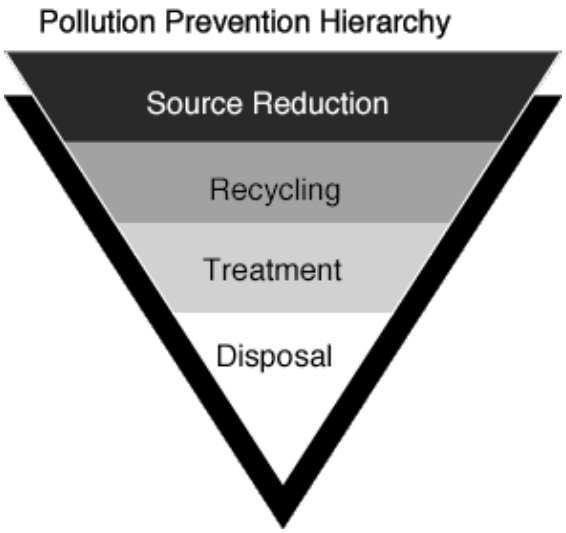


Figure 2.1: Pollution Prevention Hierarchy (PPH)
Source: Environmental Protection Agency, http://205.153.241.230/issues/emergeaug2007/index.html

The basic levels of the PPH can be listed as:

- Pollution should be prevented or reduced at the source whenever feasible;
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner[25].

The main reason for the inverted triangle is to stress the transition from the disposal to the source reduction in pollution prevention strategy by time. The least environmentally

[23] Ibid., p.11

[24] H.M. Freeman, *Pollution Prevention: The U.S. Experience*, Environmental Progress 14, 1995, p.214

[25] Henry F. Habicht II, *Memorandum: EPA Definition of Pollution Prevention*, U.S. Environmental Protection Agency, Washington, D.C., 28.05.1992, http://www.epa.gov/region07/programs/artd/air/nsr/nsrmemos/pollprev.pdf, Retrieved: 08.10.2009

friendly pollution prevention disposal should be left as soon as possible so that the natural cycle of the world can be protected from the negative impacts of industrial pollution. To put it differently, PPH underlines the necessity that the regular cycle of natural life has to be kept sustainable for a better world and less 'ecological footprint'[26] left behind for the next generations. Ecological footprint is the metric that allows us to calculate human pressure on the planet and come up with facts, such as: "If everyone lived the lifestyle of the average American we would need five planets"[27] . The table below illustrates the general situation in the world context on the per-person resource demand (ecological footprint) and resource supply (biocapacity) since 1961.

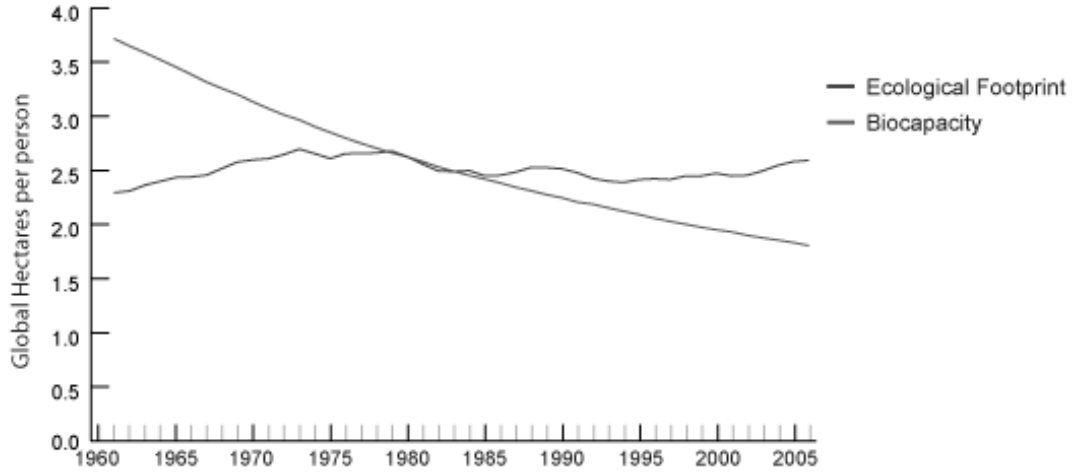


Figure 2.2: World's Footprint and Biocapacity since 1961
Source: Global Footprint Network,
http://www.footprintnetwork.org/en/index.php/GFN/page/trends/world/

As it is illustrated in Figure 2.2 the balance between demand and supply has turned into negative ratio since 1980s. In other words, it means that humanity's demand on nature exceeded the biosphere's supply, or regenerative capacity. It is started to turn resources into waste faster than waste can be turned back into resources by nature itself.

[26] For further information see http://www.footprintnetwork.org/en/index.php/GFN/

[27] Retrieved: 23.01.2010, from the official website of *Global Footprint Network*, http://www.footprintnetwork.org/en/index.php/GFN/page/basics_introduction/

2.2. Industrial Pollution and Global Environmental Change: Problems and Solutions

Planet Earth has limited resources and can not meet the endless demands of humankind[28]. As our 'ecological footprint' has increased all over the world human induced environmental change become discernible even with the naked eye. Especially for the last few decades environmental concerns have become a hot issue for some people, institutions and even the developed states around the world like in Europe. On the other hand, the reluctant approach of other actors (individuals, firms, states) especially developing states concerning environmental problems constitutes the main handicap for the actions to be taken. If a backward projection is necessary to highlight the issue it can be stated that everything started with the invention of steam engine in the 18th century. Industrial revolution and the mass production facilities have started to build up and 'greenhouse gases' (GHGs) like CO_2 and methane (CH_4) emissions released into the atmosphere after that period. In detail, the CO_2 emission increased by 36% in the post-industrial period than the pre-industrial period and moreover this gap has widened up considerably during the last 50 years[29] . Recent statistics demonstrates that Earth is not able to cool and warm itself properly anymore with a comparison to the previous ages. The Figure 2.3 highlights the global temporal change since 1850.

[28] For further information visit a real time interactive data map on earth: http://www.poodwaddle.com/worldclock.swf

[29] *National Geographic-Son Çığlık*, Special Volume 6, 2008, p.36

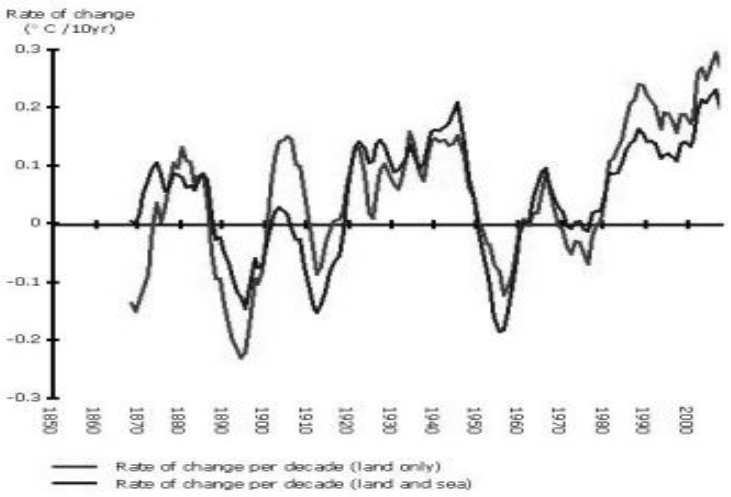


Figure 2.3: Rate of Change of Global Average Temperature, 1850-2007 (in °C per decade, ver. 2.00)
Source: European Environment Agency, http://themes.eea.europa.eu/IMS/ISpecs/ISpecification20041006175027/IAssessment1202733436537/view_content

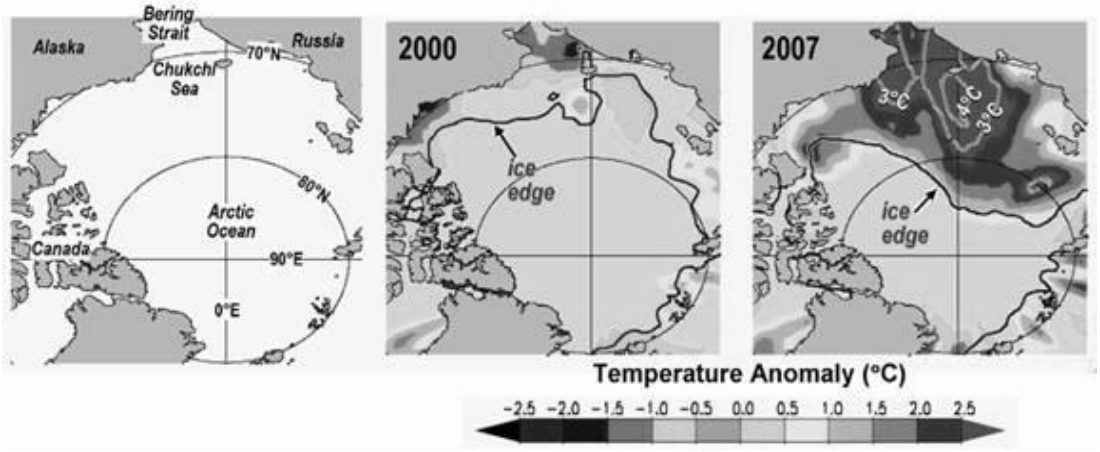
'Global warming' and 'climate change' have become a reality for humankind for the last a few decades rather than a projection. The precipitation rates have been decreasing particularly for the last a few years in Europe. The Map 2.1 shows the water loss of the Europe for the near feature until the 2030. 20% of water loss is going to be observed for the regions that are white-shaded, 40% for the gray-shaded and finally over 40% for the dark gray-shaded regions. It is apparent that the situation of Turkey is considerable.

Map 2.1: Water Exploitation Index (%) Around Year 2030
Source: European Environment Agency, http://epaedia.eea.europa.eu/page.php?pid=518#gallery

A few facts and findings from the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report - WG I (2007) can also be listed to express the serious situation:

- Eleven of the last 12 years rank among the 12 warmest years on record since 1850
- Global average temperatures have increased by 0.74°C over the last 100 years, with the trend over the last 50 years standing at twice the average (0.13 °C per decade)
- Global average temperature will likely increase by a further 1.8-4.0°C this century
- Sea levels likely to rise by 28 to 43 cm[30]

The other dangerous changes have also been observed in the North Pole region. The permanent ice shelf on the Arctic Ocean has been shrunk by 27 % since last surpassed record in 2005[31] . The Map 2.2 illustrates the temperature change for the North Pole nearly for the last 10 years. A comparison of 2000 and 2007 points out how the ice edge has retreated as the ice cap has shrunk and how surface waters have warmed up compared to the 100-year average. For instance, parts of the Bering Strait and Chukchi Sea were 3 and 3.5 degrees warmer than the historical average. The spot that was 5 degrees above average was found at the centre of the 4 degree area of water north of the Chukchi Sea[32] .



Map 2.2: Temperature Anomaly for The Arctic Region
Source: University of Washington, http://uwnews.washington.edu/ni/article.asp?articleID=38531

[30] Retrieved: 13.08.2009, from the EurActive Network http://www.euractiv.com/en/climate-change/science-climate-change/article-162366

[31] Retrieved: 13.08.2009,from Infoplease http://www.infoplease.com/spot/earthdaytimeline.html#news

[32] Retrieved: 13.08.2009, from official website of University of Washington, http://uwnews.washington.edu/ni/article.asp?articleID=38531

And also it is estimated that in the case of full melting of the ice shelf in the Antarctica and Greenland is going to cause 6 meter of increase in the average global sea level[33] .With all these in mind, it is possible to assess the Kyoto Protocol as one of the major steps against the 'global warming' and 'climate change'. According to this protocol signatory states have to decrease their CO_2 emissions by 5.2% between the years of 2008-2012 comparing with the 1990 levels[34] .

Nevertheless political attitude of the big CO_2 emitters lacks a coherent approach. Regardless of their development levels, they underline the competitiveness concerns very strongly. The biggest emitter of the world the United States of America (USA) declines to ratify the Protocol even under the reality that an average American family releases 23.000 kg of CO_2 into the atmosphere each year which is 2 times higher than the average in Europe, 19 times higher than the average in India[35] . Yet CO_2 emissions of the some developing countries have been on the rise. According to a recent research by 2010 the new emerging super power of the world China's CO_2 emissions are expected to increase 11% per year instead of 2.5-5% as previously anticipated[36] . At that point, the most important problem is that how it might be possible to integrate development models into climate change prevention policies all around the world. Obviously, environmental impact mitigation concerns underline the need to decrease the emissions of GHGs which are very much related to our production and consumption matters and a contentious topic for all the countries as have been negotiated for the post-Kyoto period.

On the other hand, renewable energy sources are offered as one of the most compatible solutions to reduce the GHGs. To have unlimited and greener energy production has turned into a vital target not only for the states but also for the multinational corporations. For instance, two of the great oil companies British Petroleum (BP) has a new slogan: "Beyond

[33] *National Geographic-Son Çığlık*, Special Volume 6, 2008, p.31

[34] For further information, please see UNFCCC website http://unfccc.int/kyoto_protocol/items/2830.php or http://www.kyotoprotocol.com/

[35] *National Geographic-Son Çığlık*, Special Volume 6, 2008, p.57

[36] Retrieved: 13.08.2009, from the website of Energy&Enviro Finland http://www.berkeley.edu/news/media/releases/2008/03/10_chinaco2.shtml , also see http://www.energyenviro.fi/index.php?PAGE=1565&NODE_ID=1565&LANG=1 and http://www.infoplease.com/spot/earthdaytimeline.html#news

the Petroleum"[37] and Shell started to develop commercial opportunities in solar and wind energy[38] . It can be said that it is time to take into account the potential role of renewable energy sources for the increasing energy demand of the world. From EU's perspective, the new target for the renewables is that to reach a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector[39] . It is obvious that one of the driving forces of this policy is to reduce the GHGs and also the external dependency of the EU in terms of energy supply.

In addition, nuclear energy which is called as green or environmental friendly energy source by some is suggested as another solution for the GHGs emission problems. Apart from the risky structure of these kind of radioactive facilities and the nuclear waste storing problems, according to the Oxford Research Group (ORG) to be able to record a dramatic decline of CO_2 emission in global context the 1/3 of the total electricity demand has to be generated from nuclear energy. In other words, there has to be built up 2000-2005 new nuclear energy stations in the following 70 years to be able to supply the demand [40] .

Another possible action against these problems is waste management methods especially for the household consumption. The Figure 2.4 illustrates the recycle rate of packaging waste in Europe for 2007. Belgium leads the way by the nearly 80 % of recycling, Norway and Germany follow it with the rate of nearly 70 %[41]. Moreover, European Countries have started to implement the 'pre-cycling' methods which means that the reuse of the packages and other items without recycling.

[37] For further information see *"Renewable and alternative energy"*, Website of BP http://www.bp.com/subsection.do?categoryId=6935&contentId=7050726 , Retrieved: 20.01.2010

[38] For further information see *"Shell Renewables"*, webpage of Shell http://www.shell.com/home/Framework?siteId=rw-br&FC2=/rw-br/html/iwgen/leftnavs/zzz_lhn1_0_0.html&FC3=/rw-br/html/iwgen/welcome.html , Retrieved: 20.01.2010

[39] Retrieved: 20.01.2010, from the official website of European Commission, http://ec.europa.eu/energy/renewables/index_en.htm

[40] *GEO*, Volume 34, October 2008, p.46

[41] Retrieved: 13.08.2009, from European Environment Agency http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=2697

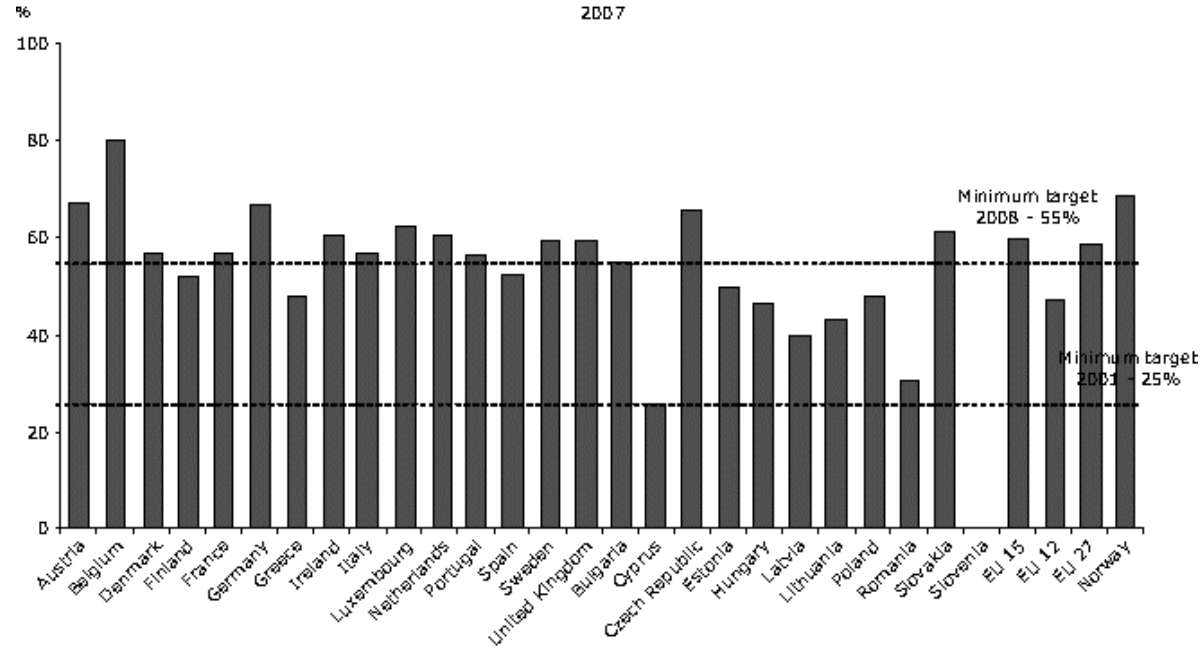


Figure 2.4: Recycling of Packaging Waste by Country, 2007
Source: European Environment Agency, http://www.eea.europa.eu/data-and-maps/figures/recycling-of-packaging-waste-by-country-1/recycling-of-packaging-waste-by-country-2007/CSI-017_Fig_5_V1.eps.100dpi.gif/at_download/image

It is found by 'The Intelligence Group'[42] that 45% of trendsetters and 14% of mainstream consumers have cut down on bottled water purchases in the first half of 2008, while 49% and 16% respectively have 'cut down on use of plastic bags' during the same period[43] . It is becoming a more popular viewpoint that recycling cans, bottles, paper and such is an antiquated misuse of energy, so precyclers remove themselves from junk mail lists, read paper-based media online and even carry around 'precycling kits' consisting of cloth napkins and silverware-anything to reduce waste and not contribute to the recycling bin[44] .

[42] One of the well-known trend research and youth-focused consumer insights company. For further information visit http://www.trendcentral.com/WebApps/App/Global/AboutTIG.aspx

[43] Becky Ebenkamp, *'Precycling' Catches On With Consumers*, The Intelligence Group Cassnadra Report, May 2008, http://www.shapingtomorrow.com/nav-frameset.cfm?hl=http://www.brandweek.com/bw/content_display/news-and-features/packaged-goods/e3ib795ce2f70633fae9a7c054a1f22340e, Retrieved: 20.01.2010

[44] Ibid., *Executive Summary*, p.1

2.3. Industrial Pollution and Environment in the World and EU

The economic boost of post-war era has released the mass production model for the citizens especially in the developed countries. The incredible supply of materials, brands, products and commodities generally both in fast moving consumer goods (FMCG) and slow moving consumer goods (SMCG) sectors created many negative outputs near the positive ones. Beside the continuous consumption model in the same line with this production style the main and the most serious environmental impact of the mass production is the industrial pollution. And this process developed itself in an ascending trend until the growing international coverage of the media and the eco-sensitive citizens focused on the industrial pollution, what they have done to the environment and to the nature.

Industrial pollution is the pollution which can be directly linked with industry, in contrast to other pollution sources. In detail, Industrial pollution and waste encompass the full range of unwanted substances and losses generated by industrial activities, including emissions to air or surface waters and the substances sent to sewage treatment plants, deposited in landfills, released or applied to the land, treated, injected underground, controlled through storage, recycled or burned for energy recovery[45] . This form of pollution is one of the leading causes of pollution in worldwide spectrum. For instance, according to the Environmental Protection Agency (EPA), it has been estimated that industrial pollution is responsible for almost 50% of the pollution present in the USA[46] .

It is clear that industrial production requires large quantities of resources and raw materials. Some of this is used as direct inputs into products or services but much (e.g. energy or water) is used as part of the production process itself. A major by-product of the production process is the generation of pollution into air, water and land. Again EPA concluded that approximately 40% of the nation's surveyed lakes, rivers, and estuaries were too polluted for such basic uses as drinking supply, fishing, and swimming[47]. The pollutants include grit, asbestos, phosphates and nitrates, mercury, lead, caustic soda and other sodium compounds,

[45] Commission for Environmental Cooperation, *The North American Mosaic: An Overview of Key Environmental Issues* , 2002, p.1, http://www.cec.org/Storage/32/2363_SOE_SpeciesCommon_en.pdf

[46] Retrieved: 13.08.2009, from the official website of Environmental Protection Agency, http://www.epa.gov/

[47] Ibid.

sulphur and sulphuric acid, oils, and petrochemicals[48] . Parallel with this, it is known that there are over 370 industrial pollutants generated from factories only detected in Canada as another developed state[49] .

On the other hand, industrial pollution and waste pose potential threats to human and ecological health if not properly managed. The concerns range from toxic effects on foetuses and children to the health implications of low-level exposures to multiple pollutants and the degradation of habitats and ecosystems. These concerns do not stop at the borders, because some pollutants can travel long distances and waste is shipped to recycling and disposal sites across man made political boundaries[50] .

In 2008, a United States of America (USA) based environmental charity documented what it calls the 'Top 10 Worst Pollution Problems' on the planet like they have done in the previous years. The Figure 2.5 illustrates the major problems in a ranked order, and it can be stated that many of these major problems generated from the industrial activities.

Figure 2.5: Top 10 Worst Pollution Problems
Source: Blacksmith Institute, http://www.worstpolluted.org/projects/regions/e_europe

[48] Cited in http://www.infoplease.com/ce6/sci/A0861889.html, Retrieved: 15.08.2009

[49] For the list of industrial pollutants visit official website of The National Pollutant Release Inventory (NPRI) , http://www.ec.gc.ca/inrp-npri/E2BFC2DB-F6EF-4B59-8A68-4675F372A41A/substance_list_2008_e2.xls

[50] Commission for Environmental Cooperation, *The North American Mosaic: An Overview of Key Environmental Issues*, p.3, http://www.cec.org/Storage/32/2363_SOE_SpeciesCommon_en.pdf

According to this report ground water contamination is the most important pollution topic to be dealt with for today and also due to its negative effects for the future generations. It is detected that fresh drinking water makes up only 6% of the total water on Earth and only 0.3% is useable for drinking[51] . In addition, one of the 20 worst pollution sources in the world is industrial facilities so called 'industrial estates' in the report. It is estimated that there are approximately 10-12.000 'industrial estates' in the world and it is known that serious air pollution, heavy contamination of waterways and illegal dumping of hazardous wastes (e.g. toxic waste) are consequences of these estates[52] .

As a response to this kind of serious problems United Nations Environment Programme (UNEP) recently held Copenhagen Discussion Series [working papers produced by UNEP and its partners on the eve of the United Nations Framework Convention on Climate Change (UNFCCC)] Climate Talks in Copenhagen ended up in 19 December 2009. They main aim was to contribute to the discussions on climate change issues, including those under consideration in the UNFCCC Climate Talks[53]. The final document of the disappointing summit so called The Copenhagen Accord[54] is now open to be signed on by other states.

In general, the relationship between industry and environment is like a double edge sword. Industry has many effects on environment and environment has many on industry, too. It is estimated that the change in the environment cause many sectors in the industry adapt their production style, land use even shift in the core business that they have for many years. For instance, sectors dependent on climate-sensitive inputs because of their raw materials, such as the food processing and pulp and paper sectors are likely to experience changes in sources of major inputs. In the longer term, as the impacts of climate change become more pronounced, regional patterns of comparative advantage of industries closely related to

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[51] Blacksmith Institute, *The World's Worst Pollution Problems: The Top Ten of The Toxic Twenty*, New York, 2008, p.21.

For full version of report visit: http://www.worstpolluted.org/

[52] Ibid., p.51

[53] Retrieved 20.08.2009, from Official Website of United Naitons Environment Programme, http://www.unep.org/climatechange/Policy/CopenhagenDiscussionSeries/tabid/836/language/en-US/Default.aspx

[54] For further information visit http://www.denmark.dk/NR/rdonlyres/C41B62AB-4688-4ACE-BB7B-F6D2C8AAEC20/0/copenhagen_accord.pdf

climate-sensitive inputs could be affected, influencing regional shifts in production[55] . The Table 2.1 illustrates the detailed information on sector based impacts of environmental changes[56].

Sector	Direct impacts	Indirect impacts
Built Environment: Construction, civil engineering	Energy costs External fabric of buildings Structural integrity Construction process Service infrastructure	Climate-driven standards and regulations Changing consumer awareness and preferences
Infrastructure Industries: Energy, water, telecommunications, transport (see Section 7.4.2.3)	Structural integrity of infrastructures Operations and capacity Control systems	Changing average and peak demand Rising standards of service
Natural Resource Intensive Industries: Pulp and paper, food processing, etc.	Risks to and higher costs of input resources Changing regional pattern of production	Supply chain shifts and disruption Changing lifestyles influencing demand

Table 2.1: Direct and Indirect Climate Change Impacts on Industry
Source: University of Cambridge, Climate Change 2007: Impacts, Adaptation and Vulnerability, Cambridge University Press, Cambridge, Chapter 7, p.367

From the EU's point of view it should be mentioned that European countries have since the 19th century developed a range of controls on industrial activity, mostly targeted at pollution. Early EU level legislation targeted specific activities (e.g. large combustion plants) or pollutants (e.g. dangerous substances to water). However, with the adoption of the Integrated Pollution Prevention and Control Directive (IPPC) in 1996 a more comprehensive and integrated approach has been taken, targeted at many industrial sectors[57] which is under focus in the subsequent chapters of this study.

[55] W.E. Easterling, B.H. Hurd and J.B. Smith, *Coping with global climate change: the role of adaptation in the United States*, Pew Center on Global Climate Change, Arlington Virginia, 2004, p.40. Cited in *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Cambridge University Press, Cambridge, Chapter 7, p.366

[56] University of Cambridge, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Cambridge University Press, Cambridge, Chapter 7, p.367

[57] Retrieved: 15.08.2009, from the official website of Institute of European Environmental Policy, http://www.ieep.eu/activities/policyresearch/ind_chem_waste.php

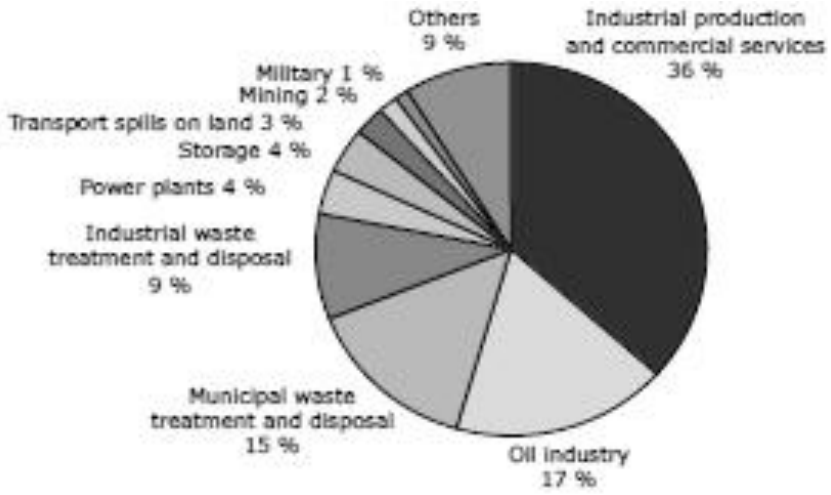


Figure 2.6: Overview of Economic Activities Causing Soil Contamination in some Western and Central Europe (WCE) and South-Eastern Europe (SEE) Countries (% of investigated sites)
Source: "Europe's Environment: The Fourth Assessment Report", European Environment Agency, p.120, http://www.eea.europa.eu/publications/state_of_environment_report_2007_1/Belgrade_EN_all_chapters_incl_cover.pdf

Generally, EU has developed a strategy for integrating environmental issues into enterprise policy as well as measures aimed at limiting the negative impact businesses have on the environment, while at the same time not hampering their development. The activities carried out by businesses can exert considerable pressure on the environment as illustrated in Figure 2.6 on soil contamination basis. European legislation lays down rules aimed at preventing pollution and repairing the damage that companies cause to the environment. It also contains measures aimed at promoting the development of environmentally friendly industrial activities[58] .

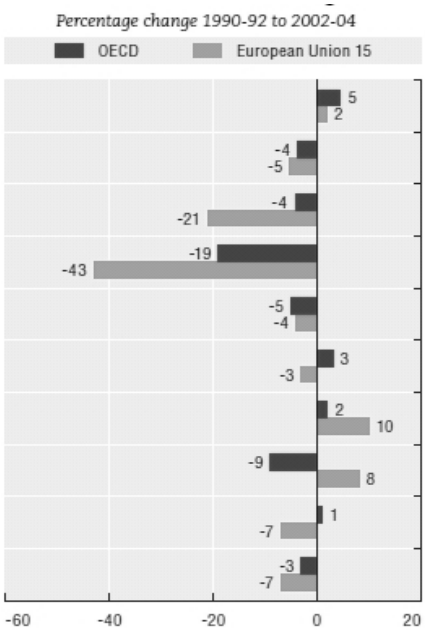
On the other hand there are some European regions that are still inadequate for the environmental concerns especially located in the Central and Eastern Europe (CEE) mostly affected from industrial activities like *Porto Romano* (Albania), *Copsa Mica* Industrial Pollution and *Zlatna* Metallurgical Pollution (Romania), Kosovo *Mitrovica* Legacy Lead Smelter and *Obrenovac* (Serbia and Montenegro), *Meza Valley* (Slovenia)[59] .

Finally, it has to be emphasized that industry is often portrayed as the main source of environmental problems. Nevertheless, Europe's industrial sector has actually made more

[58] Retrieved: 13.08.2009, from the official Website of EU, http://europa.eu/legislation_summaries/environment/sustainable_development/l28169_en.htm

[59] Retrieved: 21.08.2009, from the Blacksmith Institute, http://www.worstpolluted.org/projects/regions/e_europe

progress in reducing its environmental impact than areas such as household consumption and private transport[60]. As illustrated in Figure 2.7 the environmental impact of agricultural industry has relatively reduced between the years of 1990 and 2004.



Absolute and economy-wide change/level

Variable	Unit		European Union 15	OECD
Agricultural production volume	Index (1999-01 = 100)	1990-92 to 2002-04	102	105
Agricultural land area	000 hectares	1990-92 to 2002-04	–7 662	–48 901
Agricultural nitrogen (N) balance	Kg N/hectare	2002-04	83	74
Agricultural phosphorus (P) balance	Kg P/hectare	2002-04	10	10
Agricultural pesticide use	Tonnes	1990-92 to 2001-03	–12 144	–46 762
Direct on-farm energy consumption	000 tonnes of oil equivalent	1990-92 to 2002-04	–640	+1 997
Agricultural water use	Million m^3	1990-92 to 2001-03	+3 916	+8 102
Irrigation water application rates	Megalitres/ha of irrigated land	2001-03	6.1	8.4
Agricultural ammonia emissions	000 tonnes	1990-92 to 2001-03	–249	+115
Agricultural greenhouse gas emissions	000 tonnes CO_2 equivalent	1990-92 to 2002-04	–30 611	–30 462

Figure 2.7: EU 15 Agri-environmental Performance Compared to The Organisation for Economic Co-operation and Development (OECD) Average
Source: "Environmental Performance of Agriculture at a Glance 6", OECD 2008, http://dx.doi.org/10.1787/301361278285

[60] Retrieved: 13.08.2009, from the official Website of European Environment Agency, http://www.eea.europa.eu/themes/industry

III. EU POLICY ON INDUSTRIAL POLLUTION

During the last century European Countries have been in the pursuit of various industrialization strategies regardless with the environmental concerns. The ambitious will to raise up the wealth of the country and of course the citizens had dominated the production and consumption models of the economies. After the initial warnings coming from the environment as a response to these kinds of activities EU has presented six Environmental Action Programmes (EAP) and some other policy actions up to now[61] . The main concern behind these activities was the control of the industrial pollution as the major pollutant, indeed.

3.1. Historical Background

In 1952, one of the cornerstones of the European integration namely European Coal and Steel Community (ECSC) was established without any reference to the environmental politics[62]. At that time, it is certain that the main driving force underlying this attempt was to be able to control the production and the usage of the two main raw materials for the war economy so called coal energy and steel production. The main motto to bear in mind for the post-war era was 'making war unthinkable'. Subsequently, despite the fact that during the late 1950s and the 1960s there were some minor steps taken in order to meet the environmental concerns in the European Community (EC) the growing public and scientific concerns was not able to reach its peak point until early 1970s. The first United Nations Conference on the environment in Stockholm in 1972 paved the way in this respect and this event forced the Commission to become active in initiating an original Community policy on the environment.

On the basis of European Council commitments in 1972 to establish a Community environmental policy, the 1st Environmental Action Programme (EAP)[63] was decided upon in

[61] For the full list of the previous Environmental Action Programmes visit: http://ec.europa.eu/environment/archives/env-act5/envirpr.htm

[62] Nuran Talu, *Avrupa Birliği Uyum Sürecinde Türkiye'de Çevre Politikaları*, ÇMO Kitaplığı: 06-01, Ankara, November 2006, p.61

[63] Official Journal, 1973, C112, 1, 6

November 1973[64] and there has been 6 EAPs released since 1973 lastly in 2001, named as Environment 2010: Our Future, Our Choice[65] .

The Single European Act (SEA) of 1987 made environmental protection an explicit part of the common objectives for European cooperation. When the Treaty of Amsterdam entered into force in 1999, sustainable development became an objective with the same status as economic and social development. The European Parliament (EP) also gained co-decision powers in the environmental field and consideration for the environment has to be integrated into all EU activities. The treaty that was amended recently by the Treaty of Nice in 2003, when a declaration was adopted on the importance of promoting environmental protection both in the EU and globally.

The EC treaty which was most recently in force just before the Lisbon Treaty stated that environmental protection and the improvement of the quality of the environment should be part of the general objectives of the EU (Article 2). It also stated that the environmental protection requirements must be integrated into all Community policies in order to promote sustainable development (Article 6).

Finally, Treaty of Lisbon came into force on 1 December 2009. In all important respects the provisions of the Lisbon Treaty on environment, sustainable development and environmental integration correspond to the wording of the previous treaty. An addition is made to Article 174 to clarify that EU environment policy at international level is to be particularly concerned with the objective of combating climate change[66] .

As stated above the main philosophy of European environment policy, based on Article 174 of the Treaty of Amsterdam establishing the EC, aims to ensure:

- preserving, protecting and improving the quality of the environment;
- protecting human health;
- prudent and rational utilisation of natural resources;

[64] Dr. Christian Hey, *EU Environmental Policy Handbook*, Chapter III, 2005, p.18, www.eeb.org/publication/chapter-3.pdf , Retrieved: 12.08.2009
[65] For further information: COM(2001)31 Final, 2001/0029(COD)

[66] Retrieved: 28.10.2009, from the official website of Government Offices of Sweden, http://www.regeringen.se/sb/d/2951/a/98930

- promoting measures at international level to deal with regional or worldwide environmental problems[67].

In the pursuit of these objectives main principles began from the early times of the European integration and continued progressively until recent time may be listed as; 'polluter pays principle', 'prevention principle', 'proximity principle', 'principle of sustainable development', 'high level of protection principle', 'integration principle', 'derogative principle', 'subsidiarity principle', 'taking account of scientific and technical data principle', 'benefit-cost calculation principle', 'international principle' [these ten principles introduced by Single European Act (SEA)][68] , 'precautionary principle', 'proportionality principle', 'safeguard principle' (these three principles introduced by Treaty of Maastricht)[69].

In detail, the 'polluter pays principle' is the oldest of EU environmental principle which defines the share of the polluters on the pollution generated by themselves. As outlined in the 1st EAP, "The cost of preventing and eliminating nuisances must in principle be borne by the polluter."[70] . In addition, which is mentioned in Article 174, paragraph 2, of the EC Treaty, the cost incurred in combating pollution and nuisances in the first instance falls to the polluter (e.g. the polluting industry). Given, however, that the polluting industry can pass the cost of the prevention or elimination of pollution on to the consumer, the principle amounts to saying that polluting production should bear: the expenditure corresponding to the measures necessary to combat pollution (investment in apparatus and equipment for combating pollution, implementation of new processes, operating expenditure for anti-pollution plant, etc.); and the charges whose purpose is to encourage the polluter himself to take, as cheaply as possible, the measures necessary to reduce the pollution caused by him (incentive function) or to make him bear his share of the costs of collective purification measures (redistribution function)[71] .

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[67] European Commission, *Consolidated Version Of The Treaty Establishing The European Community (97/C 340/03)*, Article (174), http://eur-lex.europa.eu/en/treaties/dat/11997D/htm/11997D.html, Retrieved: 26.08.2009

[68] Official Journal, 1987, L 169

[69] Official Journal, 1992, C191

[70] Official Journal, 1973, C112, 1, 6

[71] Retrieved: 28.10.2009, from the official website of Europedia, http://europedia.moussis.eu/books/Book_2/5/16/02/02/index.tkl?all=1&pos=210

The ‘prevention principle’ was included to the treaties with the SEA Article 130r(2) and also mentioned in the 3rd EAP generally. This principle underlines the necessity of the proactive measures as “preventing the creation of the pollution rather than subsequently trying to counteract their effects”[72] . The pro-active policy of voluntary prevention is manifested in the Directive on the assessment of the effects of certain public and private projects on the environment and on natural resources, known as the Environmental Impact Assessment (EIA) Directive, requires an assessment to be carried out by the competent national authority for certain projects which have a physical effect on the environment[73] . According to this Directive, the promoter of the project, whether it be industrial, agricultural or relating to infrastructure, has to supply detailed information on its possible consequences for air, water, soil, noise, wild animals and their habitats, etc. The decision of the public authority as to whether to authorise the project must weigh the economic, social or other advantages of the project against its environmental consequences[74]. Other means for the prevention of pollutions like the ‘Eco-label’, and ‘EMAS’ discussed in depth in the subsequent chapters.

The ‘proximity principle’ in other words ‘rectification of environmental damage at source principle’ introduced by the SEA Article 130r(2) which is in the same line with the ‘prevention principle’ as set out in the first EAP. It simply asserts “The best environmental policy consists in preventing the creation of pollution or nuisances at source…”[75]. It is well known that the best method especially for the waste management is to take into account the pollution at the earliest possible stage and also dispose or recycle the waste as near as possible to the generation source as pointed out in previous chapters.

The ‘principle of sustainable development’ is a concept that has become a central environmental policy principle only since the SEA. The Article 130r(1) of the SEA mentions “prudent and rational utilisation of resources”[76]. TEU went a step further but left many

[72] Thisvi Ekmeztoglou, Athanassios Balodimos, Yrd. Doç. Dr. Sevim Budak, *Avrupa Birliği’in Çevre Politikası ve Türkiye’nin Uyumu*, İktisadi Kalkınma Vakfı Yayınları, İstanbul, 2001, p. 14

[73] European Commission, *Directive 85/337 consolidated version 25.06.2003*, retrieved: 28.10.2009, from http://europedia.moussis.eu/books/Book_2/5/16/02/02/index.tkl?all=1&pos=210

[74] Retrieved: 28.10.2009, from the official website of Europedia-Euroblog’s Current Theme, http://europedia.moussis.eu/books/Book_2/5/16/02/02/index.tkl?all=1&pos=210

[75] European Union, *1 st Environmental Action Programme*, Official Journal, 1973, C112, 1, 6, p.6

[76] John McCormick, *Environmental Policy in the European Union*, Palgrave, Houndmills, 2001, p.76

environmentalists disappointed by its failure to establish sustainable development as one of the goals of the EU[77]. Finally, the 5th EAP used the definition as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[78] .

The 'high level of protection and improvement of the quality of the environment principle' firstly introduced by SEA finally became binding for all the Community Institutions in the main activities of the Community listed in the Article 3 of the Amsterdam Treaty[79] . It can be said that this is the one of the most important and the most difficult to implement principles of the EU environmental policy due to its comprehensive structure.

In terms of 'integration principle', environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities again referred to in Article 3 of Amsterdam Treaty. According to 'derogative principle' a possible substantial economic burden on poorer states of the Europe to meet the environmental standards may require some derogation (exceptions to the general rule). The amended Article 130r(2) of the Amsterdam Treaty defines " the diversity of situations in the various regions of the Community[80] .

The 'subsidiarity principle' was first introduced to the treaties by the Article 130r(4) of the SEA, and exclusively in reference to the environment and then expanded to all Community activities by Maastricht when it was added to the list of principles at the beginning of the treaty[81] . Finally it remained same with the adoption of the Lisbon Treaty as outlined in Article 5(3),

> Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and insofar as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level[82] .

[77] Ibid., p.76

[78] Ibid., p.77

[79] For Article (3) see http://eur-lex.europa.eu/en/treaties/dat/11997D/htm/11997D.html#0173010078

[80] John McCormick,*Environmental Policy in the European Union*, 2001, p.81

[81] Ibid., p.83

[82] Official Journal, 2007, C306/01

The ‘taking account of scientific and technical data principle’ introduced by Article 130r(3) of the SEA was defined as “preparing its (Community) action relating to the environment [changed by Maastricht to ‘policy on environment’]...shall take account of available scientific and technical data”[83] .SEA Article 130r(3) introduced the ‘benefit-cost calculation principle’ by a call on member states to take account of “the potential benefits and cost of action or of lack of action”[84] . For example, it has been relatively easy to calculate the cost of the reducing GHGs emissions, but almost impossible to calculate how much it will cost the EU if nothing is done[85] .

The ‘international principle’ introduced by Article 130r(5) of the SEA and strengthened by Maastricht Article 130r(1) which says one of the objectives of Community policy would be the promotion of measures at the international level to deal with regional or global environmental problems[86] .The ‘precautionary principle’ added by the Treaty of Maastricht [Treaty on EU (TEU)] Article 130r(2) which may be invoked where urgent measures are needed in the face of a possible danger to human, animal or plant health, or to protect the environment where scientific data do not permit a complete evaluation of the risk[87]. Furthermore, according to the Commission the precautionary principle may be invoked when the potentially dangerous effects of a phenomenon, product or process have been identified by a scientific and objective evaluation, and this evaluation does not allow the risk to be determined with sufficient certainty[88]. With regard to the measures resulting from use of the precautionary principle, they may take the form of a decision to act or not to act. The response depends on a political decision and is a function of the level of risk considered ‘acceptable’ by the society on which the risk is imposed[89] .

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[83] John McCormick,*Environmental Policy in the European Union*, 2001, p.82

[84] Ibid., p.82

[85] Ibid., p.82

[86] Ibid., p.84

[87] Retrieved: 12.08.2009, from official Website of EU, http://europa.eu/legislation_summaries/environment/general_provisions/l32042_en.htm

[88] European Union [COM/2000/1]

[89] Retrieved: 28.10.2009, from the official website of Europedia, http://europedia.moussis.eu/books/Book_2/5/16/02/02/index.tkl?all=1&pos=210

The ‘proportionality principle’, with respect to the Article 3b of Maastricht Treaty the obligations of EU law must be reasonably related to the objectives sought, and EU must leave the member states with as much freedom of movement as possible[90] .Lastly the ‘safeguard principle’ is about allowing member states to maintain or introduce more stringent protective measures as long as they were compatible with the Maastricht Treaty Article 130t, and the Commission was notified[91] .

To put it briefly “protecting, preserving and improving the world around us”[92] is the main motto of EU concerning environment and to enable this EU has some of the highest environment standards in the world developed over decades to address a wide range of issues. The transition concerning the perception of pollution or the environmental policy is very noteworthy for the last a few decades. Traditionally, the dominant paradigm of environmental policy was curative, that is, how best to prevent pollution once waste matter had been created. The goals of policy were framed in such a way as to reduce the amount of waste entering the environment to a level that did, not impair human health and cause excessive environmental damage[93] . Today the main priorities are combating climate change, preserving biodiversity, and reducing health problems from pollution and using natural resources more responsibly[94] . To be able to do this, it can be stated that the main motto on environmental concern is transformed and concentrated on how to prevent the waste before it is generated or at least deal with the pollution at source policy are the main drivers for the new rapprochement concerning the environmental policies as demonstrated in the previous sections.

On the other hand, industrial pollution has become a major issue not only for the EU and member states but also for the candidate countries during the full membership negotiation process in terms of the compliance with the *acquis*. The most important reason for this is that the significant part of the total pollutants emission to the atmosphere, water and soil is generated from the industrial installations as identified previously. According to statistics 83% for sulphur dioxide (SO_2), 34% for oxides of nitrogen (NOx), 43% for dust and 55% for

[90] John McCormick,*Environmental Policy in the European Union*, 2001, p.84

[91] Ibid., p.85

[92] Retrieved: 12.08.2009, from official Website of EU, http://europa.eu/pol/env/overview_en.htm

[93] Andrew Jordan, Rüdiger K.W. Wurzel, Anthony R.Zito, *‘New’ Instruments of Environmental Governence?*2003, p.17

[94] Retrieved: 12.08.2009, from official Website of EU, http://europa.eu/pol/env/overview_en.htm

volatile organic compounds (VOC)[95] comes from the industrial production. With the aim of tackling down this process EU has taken various actions against industrial pollutants since 1970s as mentioned above. The deployment of new environmental policy instruments (NEPIs), namely eco-taxes and other market-based instruments (MBIs), voluntary agreements (VAs) and informational devices such as eco-labels, has grown spectacularly in recent years[96] . If it is needed to have a closer look in brief to the last a few important milestones of the process, the Table 3.1 illustrates the milestones of EU legislation on industrial pollution[97].

- In 1996 the EU has set common rules for permitting and controlling industrial installations in the IPPC Directive (Directive 1996/61/EC). The IPPC Directive has recently been codified by Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control
- Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances as amended by Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC
- Council Directive 2001/80/EEC on the limitation of emissions of certain pollutants into the air from large combustion plants, as amended by Directive 2006/105/EC
- Council Regulation (EEC) No. 761/2001/EC allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)
- 2001/681/EC: Commission Decision of 7 September 2001 on guidance for the implementation of Regulation (EC) No 761/2001 of the European Parliament and of the Council allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)
- Regulation (EC) No. 1980/2000 on a revised Community eco-label award scheme

Table 3.1: Milestones in the EU Industrial Pollution Legislation
Source: EU Commission on Environment, http://ec.europa.eu/environment/enlarg/handbook/handbook.htm

[95] Retrieved: 09.04.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/air/pollutants/stationary/index.htm

[96] Andrew Jordan, Rüdiger K.W. Wurzel, Anthony R.Zito, *'New' Instruments of Environmental Governance*, 2003, p. 3

[97] Regional Environmental Center and Umweltbundesamt GmbH (Ed.), *Handbook on the Implementation of EC Environmental Legislation*, 2008, p.833, http://ec.europa.eu/environment/enlarg/handbook/handbook.htm, Retrieved: 09.04.2009

3.2. EU Legislation Related to the Industrial Pollution

The EU tries to control the industrial pollution by different instruments. The following directives are the main instruments to achieve the EU's targets on industrial pollution. The IPPC Directive and the current codification of it (Directive 2008/1/EC) on 15 January 2008[98] certainly need to be discussed in more detail for the sake of the difficulties of the compliance process to be understood more clearly. The other amended directive on industrial pollution is the Seveso II Directive which is about the prevention of major-accident hazards involving dangerous substances. And lastly the LCPs Directive only sets minimum obligations which are not necessarily sufficient to comply with the IPPC Directive. Nevertheless, EU also tries to enhance its efforts on this issue from a different perspective. Since the Ecological footprint of the EU is on the rise, sustainable consumption and production policies have become more and more crucial as well. These policies are also important to control industrial pollution and its side effects on the European environment. The EU therefore accelerates its Sustainable Consumption and Production Policies through different means.

The Sustainable Consumption and Production and Sustainable Industrial Action plan (SCP/SIC) is one the recent efforts in this regard. It was prepared and presented by European Commission in July 2008 and adopted on 4 December 2008. The main aim of this Action Plan is threefold: "improving the overall environmental performance of products throughout their life-cycle, promoting and stimulating the demand of better products and production technologies and helping consumers to make better choices through a more coherent and simplified labelling"[99] .

This plan also brings amendments to the existing directives such as Ecolabel. However, this study mainly focuses on the above mentioned directives since they describe well the urgent requirements with high cost investments for Turkey and present administrative obstacles as it was the case during the previous enlargements. Since the implementation of the SCP/SIC can be regarded as relatively new compared to those Directives in the EU, the

[98] Retrieved: 03.04.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/air/pollutants/stationary/ippc/index.htm

[99] European Commission, Communication from the Commission to European Parliament, The Council, The European Social and Economic Committee and The Committee of the Regions, on the Sustainable Consumption and Production and Sustainable Action Plan, Brussels, 16.7.2008, COM(2008) 397 final, {SEC(2008) 2110} {SEC(2008) 2111}, p.3

impact of this plan on EU-Turkey relations is not the main concern of this study. On the other hand further research and assessment of this plan will be necessary for accession negotiations of Turkey very soon.

3.2.1. Integrated Pollution Prevention and Control (IPPC) Directive

It can be said that compliance process of IPPC Directive is very coercive not only for the candidate countries but also for the member states. The directive covers about 52,000 installations in the whole EU. By April 2008 only five of the 27 member states have issued permits for all companies falling under the directive[100] . That's why even the member states are divided into three categories as[101] countries which need minor changes (e.g. the Netherlands, Luxembourg and Ireland), countries which require some modification (e.g. United Kingdom (UK), Sweden, France) and lastly dramatic modification required countries (e.g. Finland, Austria, Italy, Spain, Germany) but it has to be also underlined that Finland pioneered the use of environmental taxes, adopting the world's first carbon dioxide tax in 1990[102]. Due to its obligatory provisions this directive lays down basic principles for the installations[103] which are very detailed, high costing and requires long time periods for the necessary fulfilment. The main intention of the directive is the control of the overall impacts of IPPC-controlled sites on the environment and human health[104] . The most important point

[100] European Stability Initiative (ESI) background paper, *Bulgaria's Quest to Meet the Environmental Acquis*, 10 December 2008, p.8 http://www.esiweb.org/enlargement/wp-content/uploads/2009/07/esi_bulgaria-s-quest-to-meet-the-enlargement-acquis-10december2008.pdf, Retrieved: 12.11.2009

[101] *Handbook on the Implementation of EC Environmental Legislation*, p.849

[102] Andrew Jordan, Rüdiger K.W. Wurzel, Anthony R.Zito, *'New' Instruments of Environmental Governence?*,2003, p. 22

[103] " 'installation' means a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution", European Commission, *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)* , Article 2(3), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:EN:PDF , Retrieved: 24.04.2009

[104] "The purpose of this Directive is to achieve integrated prevention and control of pollution arising from the activities listed in Annex I. It lays down measures designed to prevent or, where that is not practicable, to reduce emissions in the air, water and land from the abovementioned activities, including measures concerning waste, in order to achieve a high level of protection of the environment taken as a whole, without prejudice to Directive 85/337/EEC and other relevant Community provisions.", *Handbook on the Implementation of EC Environmental Legislation*, p.857

regarding the IPPC Directive is that it is the first piece of EC legislation that requires the truly integrated control of industrial pollution at source[105] . In addition the integrated approach of the directive is rather an improvement to the topic of environmental protection. To be able to do this the IPPC Directive recasts these seven previous or in other words predecessor regulations on industrial emissions: the preceding IPPC Directive, the LCPs Directive, the Waste Incineration Directive, the Solvents Emissions Directive and 3 Directives on Titanium Dioxide[106] .

In brief, the IPPC Directive has four main characteristics. As it is mentioned above the first aspect of the directive is "integrated prevention and control of the pollution"[107] . This directive combines the separate regulatory tools under the same structure and sets out a total control, measurement and observation chance in different sectors as listed in Annex I of the Directive[108]. This comprehensive approach causes the main difficulty for the compliance period. Although this directive constitutes a separation between the "existing installations"[109] and new installations the binding provisions make the fulfilment process coercive and high costing.

The second aspect of the directive is "Best Available Technique (BAT)"[110] which states that the continuous improvement not only in the cost effective production technology and the

[105] Ibid., p.835

[106] Retrieved: 24.04.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/air/pollutants/stationary/ippc/ippc_revision.htm

[107] European Commission, *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)* , Article 1, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:EN:PDF , Retrieved: 24.04.2009

[108] e.g. energy industries, Production and processing of metals, Mineral industry, Chemical industry, Waste management

[109] "'existing installation' means an installation which on 30 October 1999, in accordance with legislation existing before that date, was in operation or was authorised or, in the view of the competent authority, was the subject of a full request for authorisation, provided that that installation was put into operation no later than 30 October 2000", European Commission, *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)* , Article 2(4), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:EN:PDF, Retrieved: 24.04.2009

[110] " 'best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole", Ibid., Article 2(12)

structure of the installation but also in harmful emission reducing and less impact on the environment which is another deficiency for the compliance period. It is known that continuous improvement is a necessity for the profit raising installations but it is needed to mention that the basic sites for this aspect is not provided for all of the companies because of its costing and know-how necessity. Effective research and development (R&D) departments are established only in some multinational corporations. That's why; BAT brings many other side effects for the installations.

The third aspect of the directive is that it introduces a major change in the permitting system for the installations which will be monitored regularly by the competent authority of the country concerned. Articles 4-9 and 13, 14 of the IPPC Directive lay down the basic principles for the permitting process: requirements, application, conditions, the role of competent authority and compliance with permit conditions[111].

The fourth and the last aspect of the directive is public participation. Parallel with the participatory democracy and transparency principle of the EU, Article 15 of the directive defines basic rules for "the access to information and public participation in the permit procedure"[112] .

3.2.2. Seveso II Directive

The *Seveso* accident happened in 1976 at a chemical plant in Seveso, Italy. Although no immediate fatalities were reported, kilogramme quantities of the substance lethal to man even in micrograms doses were widely dispersed which resulted in an immediate contamination of some 10 square miles of land and vegetation. More than 600 people had to be evacuated from their homes and as many as 2000 were treated for dioxin poisoning[113] . After that seriously dangerous accident the EU has taken some further steps on industrial accidents.

In 1982, *Council Directive 82/501/EEC on the major-accident hazards of certain industrial activities (OJ No L 230 of 5 August 1982)* -so-called Seveso Directive- was

[111] For further information see *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)*, p.12-13, 15

[112] Ibid., Article 15

[113] Retrieved: 24.04.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/seveso/index.htm

adopted. On 9 December 1996, *Council Directive 96/82/EC on the control of major-accident hazards* - so-called Seveso II Directive- was adopted. And lastly, the Seveso II Directive 96/82/EC was extended by the Directive 2003/105/EC of the EP and of the Council of 16 December 2003 amending Council Directive 96/82/EC.

What makes this directive important for the industrial pollution is that the environmental impact of the industrial installations is in a border independent manner as mentioned previously. Although the candidate or member states take the necessary measures on industrial accidents the bordering or other neighbouring countries have to have the same sensitive attention to make the process meaningful and efficient. The transboundary effect of the industrial accidents is considerably serious especially in the case of chemical or radioactive originated ones as happened in Seveso in 1976 and Chernobyl in 1986. This situation brings the main difficulty either for the implementation of the directive and or the positive effects of it for the implementing country particularly for the bordering countries of the EU, as Turkey.

Coming back to the amended Seveso II Directive, it defines basic rules for the protection from the major accidents consisting dangerous substance like chemicals for the human health and environment. This Directive revises and extends the scope, the introduction of new requirements relating to safety management systems, emergency planning and land-use planning and a reinforcement of the provisions on inspections to be carried out by Member States or of course the potential members in full membership negotiation process.

Seveso II Directive's one of the main targets is "the prevention of major accidents which involve dangerous substances and the limitation of their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community in a consistent and effective manner"[114] . In order to do this, directive has basic areas of action and measures to be taken. These are "major-accident prevention policy"[115] which is an action plan

[114] European Commission, *Consolidated version of the Seveso II Directive including the amendment 2003/105/EC*, Article 1, http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1996/L/01996L0082-20031231-en.pdf, Retrieved: 24.04.2009

[115] "Member States shall require the operator to draw up a document setting out his major-accident prevention policy and to ensure that it is properly implemented. The major-accident prevention policy established by the operator shall be designed to guarantee a high level of protection for man and the environment by appropriate means, structures and management systems.", Ibid., Article 7(1)

to be implemented in a case of crisis and also in the same line with this the "safety report"[116] and "emergency plans"[117] scheme gives the chance to check and update or upgrade the situation of the major-accident prevention policy in a demonstrative manner. "Land-use planning"[118] defines the basic rules for the establishment of the installation with respect to the "transport links, locations frequented by the public and residential areas in the vicinity of existing establishments, where the siting or developments are such as to increase the risk or consequences of a major accident."[119] This situations brings the obligation for the "information on safety measures"[120] and also "information to be supplied by the operator following a major accident"[121] for the all persons and all establishments serving the public liable to the possible major-accident. And lastly the "inspection"[122] period ensures all of these subtitles to be observed and checked regularly.

3.2.3. Large Combustion Plants (LCPs) Directive

One measure of the environmental performance of a plant is the concentration of pollutants in the flue or exhaust gases resulting from combustion. Part of the LCP directive sets emission limit values (ELVs) for SO_2, NOx and dust (particulate matter for plants expressed as maximum concentrations of pollutants in the exhaust gases in milligrams per

[116] For further information Ibid., Article 9(1)

[117] For further information Ibid., Article 11(1)

[118] "Member States shall ensure that the objectives of preventing major accidents and limiting the consequences of such accidents are taken into account in their land-use policies and/or other relevant policies. They shall pursue those objectives through controls on:

(a) the siting of new establishments,

(b) modifications to existing establishments covered by Article 10,

(c) new developments such as transport links, locations frequented by the public and residential areas in the vicinity of existing establishments, where the siting or developments are such as to increase the risk or consequences of a major accident.", Ibid., Article 12(1)

[119] Ibid., Article 12(c)

[120] "Member States shall ensure that information on safety measures and on the requisite behaviour in the event of an accident is supplied regularly and in the most appropriate form, without their having to request it, to all persons and all establishments serving the public (such as schools and hospitals) liable to be affected by a major accident originating in an establishment covered by Article 9.", Ibid., Article 13(1)

[121] For further information Ibid., Article 14(1)

[122] For further information see Ibid., Article 18(1)

cubic metre (mg/Nm^3)[123] . So, directive sets out the main air emission limitations for the LCPs[124] in the same line with the IPPC Directive which discussed in detail above. The main importance here is that the LCPs have the potential to be the highest emission generator due to their giant combustion capacity as stated in the subsequent chapters. That's why they have to become compatible with the emission restrictions and such compliance may involve more stringent emission limit values, emission limit values for other substances and other media, and other appropriate conditions[125] . As it is stated out, "This Directive shall apply to combustion plants, the rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used (solid, liquid or gaseous)"[126] .

In addition, increasing excess air lowers the concentrations of flue gas pollutants, but not the total mass of emission. In order to prevent meeting ELVs being met by adding excess air/oxygen, maximum concentrations of oxygen in the exhaust gas may be specified. The LCPs Directive assumes oxygen content by volume in the waste gas of 3% in the case of liquid and gaseous fuels, 6% in the case of solid fuels and 15% in the case of gas turbines[127] .

In more detail, this directive sets out the emission limit values for SO_2, NOx and dust which are significantly stricter than the previous ones[128] . The LCP Directive requires

[123] Retrieved: 28.10.2009, from the official website of Swedish Air Pollution & Climate Secretariat http://www.airclim.org/policy/sub6_8b.php

[124] " 'combustion plant' means any technical apparatus in which fuels are oxidized in order to use the heat thus generated.", *Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants,* Article 2(7), http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2001/L/02001L0080-20011127-en.pdf , Retrieved: 27.04.2009

[125] Retrieved: 27.04.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/air/pollutants/stationary/lcp.htm

[126] *Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants,* Article 1, http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2001/L/02001L0080-20011127-en.pdf , Retrieved: 27.04.2009

[127] Retrieved: 28.10.2009, from the official website of Swedish Air Pollution & Climate Secretariat, http://www.airclim.org/policy/sub6_8b.php

[128] *Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants,* Article 4(1), http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2001/L/02001L0080-20011127-en.pdf, Retrieved: 27.04.2009

significant emission reductions from "existing plants"[129] to be achieved by 1 January 2008[130] by means of:

> a) Taking appropriate measures to ensure that all licenses for the operation of existing plants[131], or
> b) Through a national emission reduction plan to achieve overall reductions defined by LCP Directive[132].

Moreover, the LCPs Directive allows the existing combustion plants to be exempted from compliance with emission limit values under the circumstances of "not to operate the plant for more than 20.000 operational hours starting from 1 January 2008 and ending no later than 31 December 2015"[133] and also "to submit each year to the competent authority a record of the used and unused time allowed for the plants remaining operational life"[134] . The Table 3.2 and 3.3 give the detailed information on emission limits.

[129] " 'existing plant' means any combustion plant for which the original construction license or, in the absence of such a procedure, the original operating license was granted before 1 July 1987;", Ibid., Article 2(10)

[130] "Without prejudice to Directive 96/61/EC and Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management (1), Member States shall, by 1 January 2008 at the latest, achieve significant emission reductions by:

(a) taking appropriate measures to ensure that all licenses for the operation of existing plants contain conditions relating to compliance with the emission limit values established for new plants referred to in paragraph 1; or

(b) ensuring that existing plants are subject to the national emission reduction plan referred to in paragraph 6; and, where appropriate, applying Articles 5, 7 and 8.", Ibid., Article 4(3)

[131] Ibid., Article 4(3a)

[132] Ibid., Article 4(3b)

[133] "the operator of an existing plant undertakes, in a written declaration submitted by 30 June 2004 at the latest to the competent authority, not to operate the plant for more than 20 000 operational hours starting from1 January 2008 and ending no later than 31 December 2015;", Ibid., Article 4(a)

[134] "the operator is required to submit each year to the competent authority a record of the used and unused time allowed for the plants' remaining operational life.", Ibid., Article 4(b)

	SO_2			NOx	
Plant size *MWth*	***50-100***	***100-500***	***>500***	***50-500***	***>500***
Solid fuels	2000[1]	2000-400 [1,2]	4001	600	500[3]
Plant size *MWth*	***50-300***	***300-500***	***>500***	***50-500***	***>500***
Liquid fuels	1700	1700-400 [2]	400	450	400
Plant size *MWth*	***>50***			***50-500***	***>500***
Natural gas	35			300	200

[1] Where the emission limits for SO2 cannot be met due to the characteristics of the fuel, various rates of desulphurisation (from 60 to 94%, with the highest rate applicable for plants greater than 500 MWth) shall be achieved.
[2] Linear decrease.
[3] From 1 January 2016 the emission limit value is 200 mg NOx/m3

Table 3.2: Emission Limit Values to be applied from 1 January 2008 for SO_2 and NOx from Existing (built before 2003) Plants (mg/m^3)[135]
Source: Swedish Air Pollution&Climate Secretariat, http://www.airclim.org/policy/sub6_8b.php

	SO_2			NOx		
Plant size *MWth*	*50-100*	*100-300*	*>300*	*50-100*	*100-300*	*>300*
Solid fuels[1]	850	200	200	400	200	200
Liquid fuels	850	400-200[3]	200	400	200	200
Biomass	200	200	200	400	300	200
Natural gas[2]	35	35	35	150	150	100

[1] Where the emission limit values for SO2 cannot be met due to the characteristics of the fuel, installations smaller than 300 MWth shall achieve either 300 mg/m3 SO2 or a rate of desulphurisation of at least 92%. Larger plants must achieve rate of desulphurisation of at least or 95% and maximum 400 mgSO2/m3.
[2] Specifically for gas turbines using natural gas, the limit value in most cases being 50 mg NOx/m3
[3] Linear decrease

Table 3.3: Emission Limit Values for SO_2 and NOx from Plants to be built after 2003 (mg/m^3)[136]
Source: Swedish Air Pollution&Climate Secretariat, http://www.airclim.org/policy/sub6_8b

[135] Retrieved: 28.10.2009, from the official website of Swedish Air Pollution & Climate Secretariat, http://www.airclim.org/policy/sub6_8b.php

[136] Retrieved: 28.10.2009, from the official website of Swedish Air Pollution & Climate Secretariat, http://www.airclim.org/policy/sub6_8b.php

3.3. EU Enlargement Process and Industrial Pollution

Transposition of over 200 EU Directives, Regulations and Decisions into national legislation, makes environment the third most comprehensive chapter of the *acquis* after agriculture and the free movement of goods[137] . In addition in 2004, according to EU Commission it was estimated that ensuring compliance with the environment *acquis* requires an investment of around €80 to €120 billion for the 10 Central and Eastern European Countries (CEECs) alone[138]. However, a study financed by the European Commission at that time indicated that implementing the EU environmental directives -and the higher environmental protection they entail- in the candidate and/or new member countries would bring significant benefits for public health and reduce costly damage to forests, buildings, fields and fisheries. The estimated total value of the benefits of EU directives for the candidate and/or new member countries would range from €134 to €681 billion[139] . In factual basis, with respect to December 2003 report on the state of environment introduced by European Environmental Bureau (EEB) it is recorded that there is a 60-80% decline in air pollution, 50% decline in pollution from toxic metals, 80% decline in water pollution generated from organic wastes in 10 CEECs only since the accession negotiations had started[140] .

However, having a closer look to the last 5 years of historical enlargement the statistics show that concerning the sources of infringement against EU law in new member states, the highest number of cases is related to environmental rules (23%), followed by taxation and customs union rules (18%)[141] . The coercive and high cost structure of the environmental *acquis* constitutes main reason for this situation of course. It is identified that to achieve full

[137] European Stability Initiative (ESI) Background paper, *Bulgaria's Quest to Meet the Environmental Acquis***,** 10 December 2008, p.1 http://www.esiweb.org/enlargement/wp-content/uploads/2009/07/esi_bulgaria-s-quest-to-meet-the-enlargement-acquis-10december2008.pdf, Retrieved: 12.11.2009

[138] Retrieved: 03.11.2009, from official Website of EU Commission, http://ec.europa.eu/enlargement/archives/enlargement_process/future_prospects/negotiations/eu10_bulgaria_romania/chapters/chap_22_en.htm

[139] Ibid.

[140] *Avrupa Birliği ile Katılım Müzakereleri Rehberi,* İKV Yayınları No:184, İstanbul, 2005, p. 324

[141] European Commission Directorate-General for Economic and Financial Affairs, *Five Years of Enlarged EU: Economic Achievements and Challenges*, 1/2009, p.159, http://ec.europa.eu/enlargement/5years/documents/impact/publication14078_en.pdf, Retrieved 05.11.2009

implementation, the new member states will have to spend on average between 2% and 3% of Gross Domestic Product (GDP) on the environment in the coming years but current expenditure is generally well below this target[142]. On the other hand during the accession negotiations and the membership period of the new 10 member states the adoption of the EU environmental and health standards has benefited citizens in old and new members alike. Food safety and animal health were key concerns in recent accession negotiations. The EU took strict measures to bring the new members up to EU standards. Food processing plants, dairies and abattoirs that failed to meet the standards were shut down before accession, and only those meeting the requirements were allowed to sell their products throughout the internal market[143] . In order to deal with that kind of problems EU has introduced some financial supports for the new member states namely Instrument for Structural Policies for Pre-Accession (ISPA) has, since 1999, been the main Community financial pre-accession instrument for supporting big environmental infrastructure projects in CEECs. Half of the total ISPA budget of €1 billion per year for the 10 countries has been earmarked for environment projects, which have mostly involved large infrastructure in the water and waste sectors, amounting to about €500 million per year for all candidate countries in the environment area[144] .

Under these circumstances, it can be said that this ongoing process is going to cover in the mid and long term the short term cost of the compliance by the positive side effects of the environmental *acquis.* And it is certain that the major part of these compliance benefits will come from the transition in industrial infrastructure and the production-consumption model of the concerned countries. In this chapter, compliance in industrial production and pollution is going to be discussed and a reference point for Turkey's possible problems on it is going to be underlined.

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[142] University of Hull Euro Info Centre, *Questions and Answers on enlargement and environment*, MEMO/04/86, Brussels, 19 April 2004, p.3, http://www.hull.ac.uk/euroinfo/Enlargement%20%20newsletters/environment%20faqs.pdf

[143] European Commission, Directorate General for Enlargement, *Good to Know About EU Enlargement*, Publication Office, 2009, p.3, http://ec.europa.eu/enlargement/pdf/publication/screen_mythfacts_a5_en.pdf

[144] University of Hull Euro Info Centre, *Questions and Answers on enlargement and environment*, MEMO/04/86, Brussels, 19 April 2004, p.3, http://www.hull.ac.uk/euroinfo/Enlargement%20%20newsletters/environment%20faqs.pdf

See also Annex II: Financing for approved environment projects from 2000 to 2002

Having regard to the previous enlargement, it is apparent that the environmental compliance was not a big deal not only for the candidate countries but also for the EU itself. The 1995 enlargement brought Austria, Sweden and Finland into the EU. All three countries were acknowledged to have high standards of environmental protection in general and they had already joined the European Economic Area Agreement and had therefore already harmonised their laws with all internal market legislation except for some minor topics. 'Approximation'[145] with the remaining EU environmental requirements was therefore not a major problem. That's why it is difficult to have a comparison between these countries and the accession and the compliance of CEECs. In addition, the previous socialist period of these countries brings the main barrier for the process. It might be argued that the enforcement of environmental legislation was particularly weak during the socialist period with respect to the Austria, Sweden and Finland. The financial burden is much higher as stated above and the transition period is much coercive because of the remaining infrastructure and the public policy.

For example in 1997, Bulgaria's (as a CEEC) environmental situation was a disaster as a candidate country. Previous regime left Bulgaria with a legacy of inefficient use of energy and raw materials, as well as outdated and highly polluting technologies. In certain areas, there was no legislation at all. In the chemicals production sector, for instance, there were some standards on safety and working conditions, but no environmental standards[146] . There was no coherent system for licensing big industrial plants with regard to environmental standards. 39% of Bulgaria's waste water was discharged untreated. Moreover, with a few exceptions, none of Bulgaria's landfills met EU criteria, designed to prevent leaks and the pollution of soil, water and air[147] . Again in 1997, the EU Commission estimated the total

[145] In EU Jargon refers to: precise transposition of the relevant EU legislation or having in place the necessary administrative and other structures for implementation and enforcement.

[146] ESI interview with Eulina Milova, Head of the European Integration Department in the Ministry for Environment and Water, 20 October 2006. Cited in *Bulgaria's Quest to Meet the Environmental Acquis*, 10 December 2008, p.2 http://www.esiweb.org/enlargement/wp-content/uploads/2009/07/esi_bulgaria-s-quest-to-meet-the-enlargement-acquis-10december2008.pdf, Retrieved: 12.11.2009

[147] Ministry of Environment and Water, National Strategy – Environment Sector, October 2000, p. 9. Cited in Ibid. p.2

financial costs for the implementation of the environmental *acquis* in Bulgaria at €15 billion, a figure lowered to €8.6 billion in 2001[148] .

Furthermore, meeting environmental standards and spending money according to EU rules required hundreds of new experts who still needed to be trained. It directly affected thousands of people in ministries, governmental agencies, regional and municipal bodies, NGOs and companies[149] . The adoption and implementation of the EU's directives and regulations has had an impact on virtually all directorates and departments, who have had to build up the capacity to implement the respective policies. While administrative structures need further strengthening, the accession process -since 1997- has changed the structure and work of the ministry beyond recognition. Bulgaria's environmental transformation has not yet come to an end, however. The sheer size of the challenge in the environmental sector makes it clear that the process needs more time[150] .

That's why -in the same line with that situation- EU has introduced some new action plans for the new member states and even the upcoming memberships to the EU. One of the most important instruments of this policy is called the 'post-accession transition period'.

The EU recognises that post-accession periods of transition will be necessary for the heavy investment directives. EP has taken the view that transition periods should be granted only in exceptional cases and only for short time periods. This applies to environmental legislation as to the rest of the *acquis*[151] . In order to allow sufficient time for compliance with certain EU requirements, in particular for investment-heavy sectors, transitional periods have

[148] EC, Communication from the Commission: *The Challenge of Environmental Financing in the Candidate Countries*, 2001, cited in: ECOTEC, The benefits of compliance with the environmental acquis for the candidate countries, July 2001, p. 15.

[149] European Stability Initiative (ESI) Background paper, *Bulgaria's Quest to Meet the Environmental Acquis***,** 10 December 2008, p.3 http://www.esiweb.org/enlargement/wp-content/uploads/2009/07/esi_bulgaria-s-quest-to-meet-the-enlargement-acquis-10december2008.pdf, Retrieved: 12.11.2009

[150] Ibid., p.8

[151] Danish Ministry of the Environment, *The Environmental Challenge of EU Enlargement in Central and Eastern Europe*, Thematic Report, 2001, http://www2.mst.dk/common/Udgivramme/Frame.asp?http://www2.mst.dk/udgiv/Publications/2001/87-7972-044-7/html/kap03_eng.htm

been granted to all acceding countries for specific measures in the environmental field, mainly the water, waste and industrial pollution sectors[152] .

However, the EU has taken several non-negotiable positions with respect to the environmental *acquis*. One is that the applicant countries must comply with all internal market-related environmental legislation upon accession. This covers important legislation such as motor vehicle emissions, fuel quality, control over chemicals, and general requirements for waste management. Parts of non-market legislation such as nature protection are subject to a similar requirement. Transitional periods may be considered in legislation where the applicant countries will not be able to comply fully with the requirements of the respective legislation on the day of EU membership, e.g. where financially heavy investment will be required or where immediate compliance would have unacceptable social implications. According to this reasoning, Directorate General (DG) Environment has signalled the following acceptable and non-acceptable positions:

> **Acceptable transitional periods:** urban waste water treatment and large combustion plant requirements;
> **Negotiable transitional periods:** packaging waste and industrial pollution prevention and control requirements;
> **Unacceptable transitional periods:** all framework Directives, (e.g. air quality, waste and hazardous waste framework, radiation protection), nature protection, access to information, environment impact assessment[153].

As stated above it should be underlined that there is only a limited flexibility for the compliance period on specific topics. In general, the negotiation process does not accept any kind of privileges for any of the candidate/or new member countries.

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[152] University of Hull Euro Info Centre, *Questions and Answers on enlargement and environment*, MEMO/04/86, Brussels, 19 April 2004, p.2, http://www.hull.ac.uk/euroinfo/Enlargement%20%20newsletters/environment%20faqs.pdf

For further information see Annex I: Transitional arrangements by new Member State

[153] Danish Ministry of the Environment, *The Environmental Challenge of EU Enlargement in Central and Eastern Europe*, Thematic Report, 2001, from http://www2.mst.dk/common/Udgivramme/Frame.asp?http://www2.mst.dk/udgiv/Publications/2001/87-7972-044-7/html/kap03_eng.htm 03.11.2009

IV. INDUSTRIAL POLLUTION AND TURKEY

Increasing rates of population, human mobility and of industrialisation put greater stresses on environment in Turkey. Among all, particularly industrial pollution poses great problems to the environment. However as the contemporary social, political, economic and ecological necessitates dictate a positive sum game between environment and development and as the EU conditionality requires some major changes, Turkey has started to face certain challenges in the field of industrial pollution control. All in all coordination and implementation problems in formulating and implementing the environmental policy became more evident with those challenges. With the opening the environmental chapter, it might be claimed that accession negotiations have also entered into a new stringent period.

Despite the progress achieved in increasing public awareness on environment, improvement of monitoring systems and administrative structures, there are still many weaknesses in Turkey with regard to environmental policy of EU. In this section, the focus will be on the situation of Turkey regarding industrial pollution control in general and the situation with respect to relevant directives of EU from IPPC to Eco-label award scheme in particular. Before a detailed assessment of this position, however it would be interesting to demonstrate how waste management can contribute to the efforts of Turkey in industrial pollution control. Therefore, a municipal waste management example will be given after examining the general situation of Turkey.

4.1. Main Problems on Environmental Performance of Turkey in General

With respect to Turkish Constitution, "Everyone has the right to live in a healthy, balanced environment. It is the duty of the state and citizens to improve the natural environment and to prevent environmental pollution"[154]. This means that nobody can deny protecting the environment including all of the public institutions. This general provision also creates the self-contradictory structure of the environmental performance of Turkey, too.

[154] *The Constitution of the Republic of Turkey*, Article 56, http://www.anayasa.gov.tr/images/loaded/pdf_dosyalari/THE_CONSTITUTION_OF_THE_REPUBLIC_OF_TURKEY.pdf, Retrieved: 20.05.2009

As it is tried to pointed out in previous chapters and according to the report on the state of environment in Turkey there are about 26 different competent bodies in Turkey with respect to environmental issues[155] . From permitting system and monitoring to auditing and sanctions the interwoven and also the overlapped authority distribution of Turkish bureaucracy hampers the course of actions concerning the transitional period.

The EU encourages the member states and candidate countries to establish a single competent body concerning the environment as in other fields. In Turkey, particularly the duplication of services on permitting, monitoring, auditing and sanctions complicates a clear environmental management plan to be implemented in national level. Especially the institutional organizational chart of the Ministry of Environment and Forestry (MoEF) need to be developed in terms of permit, monitoring, auditing, reporting and implementation capacity[156]. The overlapping parts of the legislation cause the loss of time, work and cost and decrease the efficiency. Despite the fact that there has been a remarkable progress compared to the past namely; new law on municipalities contributed to the clarification of environmental responsibilities amongst the various levels of administration, enforcement capacities have been strengthened by new regulations and the creation of a separate division in the Ministry responsible for co-ordination of enforcement efforts and an amended environmental law entered into force in Turkey in 2006. There are still many further steps to be taken concerning environmental performance.

This new environmental law has many initial steps for the transposition of the EU environmental policy principles like "polluter pays"[157] and also the promotion of environmental awareness in public level like the "supreme committee of environment"[158] and "environment volunteer"[159] . On the other hand, the general insensitivity and ignorance of people and institutions in Turkey, especially the rural parts, constitutes and other problem for

[155] Republic of Turkey Ministry of Environment and Forestry, *Türkiye Çevre Durum Raporu*, Ankara, 2007, p.28 http://www.cedgm.gov.tr/dosya/ulkecevredurumraporu.pdf, Retrieved: 20.05.2009

[156] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.78-79, http://www.did-cevreorman.gov.tr/duyuru-doc/uces_tr.pdf Retrieved: 20.05.2009

[157] Republic of Turkey Ministry of Environment and Forestry, *Amended Environmental Code*, Code number/Amendment date: 2872/26.04.2006, Article 3(g), www.cevreorman.gov.tr/yasa/k/2872.doc, Retrieved: 22.05.2009

[158] Ibid., Article (4)

[159] Ibid., Article (2)

the alignment to EU environmental policy which stated in OECD 2008 Turkey report on environmental performance[160] . Not to mention that the MoEF has been organizing many training programmes and projects among the high-school and primary school students for the last a few years in different parts of Turkey to cope with these kinds of problems[161].

In addition, inadequate financial conditions and the institutional capacity of the small and medium-sized enterprises (SMEs) and also small and medium sized municipalities put the achievement in a very difficult situation[162] . Moreover, the deficiency of pollution monitoring network and economic means for promotion and subsidies against environmental pollution, problems on standardization and accrediting and lastly lack of the statistical data delays and restricts the compliance and implementation process. Finally, inadequate recruitment of qualified staff and equipment makes all these obstacles nearly impossible to overcome[163] .

Regarding OECD, it will be necessary for Turkey to:

- strengthen environmental policies and their implementation where appropriate
- further integrate environmental concerns into economic and sectoral decisions
- further develop international environmental co-operation[164] .

It also has to be stressed that parallel with the other candidate countries the highest cost of compliance period for full membership to EU will be on environmental protection investments. It is estimated that the financial cost of the compliance period of Turkey with reference to environment is about 59.6 billion €[165] .

A closer look the recent progress reports of EU Commission on Turkey reveals that there is a slow progress on industrial pollution control in Turkey. It is laid down that no

[160] OECD, *OECD Environmental Performance Reviews: Turkey 2008*, p.14, http://www.oecd.org/document/60/0,3343,en_2649_34307_41441084_1_1_1_1,00.html, Retrieved: 21.12.2009

[161] For further information: *Türkiye Çevre Durum Raporu*, Republic of Turkey Ministry of Environment and Forestry, Ankara, 2007, p.533-537

[162] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.5

[163] Ibid., p.5

[164] OECD, *OECD Environmental Performance Reviews: Turkey 2008*, p.14, http://www.oecd.org/document/60/0,3343,en_2649_34307_41441084_1_1_1_1,00.html, Retrieved: 21.12.2009

[165] Ibid., p.56

progress can be reported regarding industrial pollution control and risk management in 2008 report[166] and in 2009 report it is highlighted that limited progress can be reported regarding industrial pollution control. 2009 Progress report also states that Turkey has aligned with some provisions of the Seveso II Directive and with the LCPs and Waste Incineration Directives. However, the overall level of transposition and implementation capacity remains low and also introduction of an integrated permit system is at an early stage[167] .

4.2. Main Problems in Industrial Pollution Problems with Reference to EU Environmental Legislation

Old infrastructure, financial difficulties and problems with the permitting systems as well as the lack of public participation can be listed as the basic problems that Turkey has to tackle for better industrial pollution control and to comply with the EU *acquis.* Although IPPC Directive constitutes a separation between the "existing installations"[168] and new installations the binding provisions make the fulfilment process coercive and high costing. Turkey's old and inadequate infrastructure is a really handicap not only for the integrated pollution prevention control but also the usage of energy efficiency as mentioned in the directive[169] .

Focusing on financial burden of compliance of IPPC Directive, it is estimated that 700 employee and 9 million €/year is going to be needed only for the operational actions in the

[166] European Commission, *Turkey 2008 Progress Report*, COM (2008) 674, Brussels, 5.11.2008, p.77, http://ec.europa.eu/enlargement/pdf/press_corner/key-documents/reports_nov_2008/turkey_progress_report_en.pdf , Retrieved: 21.05.2009

[167] European Commission, *Turkey 2009 Progress Report*, COM (2009) 533, Brussels, 14.10.2009, p.81, *ec.europa.eu/enlargement/pdf/key.../2009/tr_rapport_2009_en.pdf*

[168] 'existing installation' means an installation which on 30 October 1999, in accordance with legislation existing before that date, was in operation or was authorized or, in the view of the competent authority, was the subject of a full request for authorization, provided that that installation was put into operation no later than 30 October 2000", European Commission, *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)* , Article 2(4), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:EN:PDF , Retrieved: 24.04.2009

[169] Ibid., Article 3(d)

competent bodies[170] . Moreover, the estimated investment need for the implementation of IPPC Directive is about at least 14.1 billion €[171] . Another projection regarding environmental investments on industrial pollution is that the financial need between the years of 2007-2023 is going to be about 27.765 million TL[172] . Contrary to other issues it is projected that the financial need for the industrial pollution prevention will be met by the private sector which forms 26% of the total environmental investments[173] .

Articles 4-9 and 13, 14 of the IPPC Directive lay down the basic principles for the permitting process which are requirements, application, conditions, the role of competent authority and compliance with permit conditions. The basic problem on this topic for Turkey is that, as set out in article 7 of the Directive, member states shall take the measures in the case of more than one competent authority is involved in these processes. Beside the detailed structure of the directive and the situation of Turkish industry regulations the administrative side of the process is difficult to implement too. As in many other areas, Turkish bureaucracy has complicated and overlapping areas of entitlement on the environmental issues. It is highly recommended that to establish a single body for all kind of capabilities concerning the IPPC[174] . It seems that a common accreditation body need to be established under the organisation chart of the MoEF of Turkey.

Coming back to technical compliance problems, in Turkey energy in household and industrial consumption is not used efficiently. According to studies, estimated amount of energy saving would be at least 2.7 and 4.8 Mtoe[175] only in industrial sector[176] . In other

[170] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.36

[171] Ibid., p.37

[172] Ibid., p.56

[173] Ibid., p.60

[174] *Handbook on the Implementation of EC Environmental Legislation*, p.851

[175] Million tone oil of equivalent

[176] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.31

words there is a remarkable energy saving potential in Turkish industry from 10% to 25%[177] as a great opportunity and contribution to the economy.

With respect to BAT, it has to be emphasized that the ratio of technology oriented production in Turkey is far less than labour oriented production both in industrial and service sector. The Table 4.1 shows the situation of Turkey on technology in production and export[178] .

	TURKEY						EU EXPORT (4)
	PRODUCTION			EXPORT			
TECHNOLOGY INTENSITY (1)	2000 (2)	2002	2005 (3)	2000	2002	2005	2003
HIGH	5,9	5,1	6,3	7,8	6,2	6	21,5
ABOVE AVARAGE	22,5	18,2	25,3	20,4	24,3	28,5	41,9
BELOW AVARAGE	30,4	26,7	27	20,5	22,8	26,9	15,9
LOW	41,2	50	41,4	51,3	46,8	38,7	20,7
TOTAL	100	100	100	100	100	100	100

(1) OECD Science, Technology and Industry Scoreboard classification taken as reference
(2) 10+ employees firms included
(3) DPT estimation by 2002 rates
(4) OECD Member EU Countries

Table 4.1: Production and Export Structure of Manufacturing Industry
Source: Republic of Turkey Ministry of Environment and Forestry, "Türkiye Çevre Durum Raporu", Ankara, 2007, p.303

In terms of permitting system there is not any integrated environmental permit system established in Turkey, yet[179] . Regarding the 2008 Progress Report introduction of an integrated permit system is at an early stage[180] and lastly in 2009 report it is again underlined that introduction of an integrated permit system is still at an early stage[181] .

Lastly, the public participation is another deficient part for Turkey to overcome. As the involvement of the third parties to the process Turkish government has to encourage the public and the institutions concerning the environment not only in financial terms but also in

[177] Türkiye Makina Mühendisleri Odası, *Dünyada ve Türkiye'de Enerji Verimliliği Oda Raporu,* Nisan 2008, p.40, http://www.mmo.org.tr/resimler/ekler/a551829d50f1400_ek.pdf, Retrieved: 17.05.2010

[178] Republic of Turkey Ministry of Environment and Forestry, *Türkiye Çevre Durum Raporu*, Ankara, 2007, p.303, cited in TUIK, OECD STAN Database.

[179] Ibid., p.33

[180] European Commission, *Turkey 2008 Progress Report*, COM(2008) 674, p.77

[181] European Commission, *Turkey 2009 Progress Report*, COM(2009) 533, p.81

technical and legal basis. It can be stated that the lack of efficient NGOs and experts on the environmental issues is the main problem for Turkey as seen in Bulgaria case. It should be accepted that environmentally specialized NGOs and experts has to be trained to ensure this public participation process and also the general monitoring and permit consultation and reporting processes that is laid down in the directive.

With respect to Seveso II Directive due to imperfection of real data there is no financial investment forecast. It is estimated that there will be 160 million € cost only for the private sector[182] . On the other hand, for Turkey as the candidate country, as the transboundary nature of the industrial chemical accidents the compliance to the Seveso II Directive is going to create many difficulties on measuring the positive contributions of the compliance process.

Regarding the LCP Directive although the mitigating sanctions for the remaining installations in the member or candidate country the projections indicate that there will be 1.884 million € financial investment need for Turkey[183] . The old and inadequate infrastructure of the remaining installations of Turkey and Turkish industry is the main reason for this situation as mentioned previously.

Again 2008 Progress Report lays down that Turkey has aligned with some provisions of the Seveso II Directive and with the LCPs. However, overall transposition and implementation remain very low[184] in 2009 progress report it is expressed that Turkey has aligned with some provisions of the Seveso II Directive and with the LCPs and Waste Incineration Directives. However, the overall level of transposition and implementation capacity remains low[185] .

Beyond the financial burden of the alignment process to industrial and nonindustrial companies they need to take all aspects of the process into account with reference to profit raising and competitive edge. There are 7 different aspects of effects of environmental investments on competitiveness other than financial cost pointed out in the report of Turkish Industrialists' and Businessmen's Association (TUSIAD) on "Alignment with the EU

[182] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.37

[183] Ibid., p.37

[184] European Commission, *Turkey 2008 Progress Report*, COM(2008) 674, p.77

[185] European Commission, *Turkey 2009 Progress Report*, COM(2009) 533, p.81

Environmental Legislation in Industry"[186] namely "the importance of environmental costs in overall costs, the level of competition, the powerful and weak sides of the competition in non-environmental issues, the size of the firm, the cycle of the investment, market demand, technologic innovation."[187]

ESTIMATED COST OF COMPLIANCE	
	EURO (€)
OVERALL	59.6 billion
IPPC Directive	14.1 billion
LCP Directive	1.884 million
Seveso II Directive	160 million (private sector)

Table 4.2: Estimated Financial Cost of the Compliance of Turkey to EU Environmental Legislation (Summary Table)

With all these in mind, it is possible to say that the transitional arrangements for the compliance period in all means especially financial resources as summarized in Table 4.2 will be the main problematic and difficult issues for Turkey. With regard to the estimated data it is observed that only 22% of the total financial need will be covered by the EU in Turkey between the years 2007-2023[188] which means that Turkey has to find some other financial sources in order to become compatible with the EU environmental standards.

4.3. Current Situation of Turkey on the Full Membership Negotiation Process Regarding Environment Chapter of EU Legislation

As a candidate country Turkey, has many difficulties concerning the accession negotiations process. Apart from the political obstacles generated by the member states due to

[186] TÜSİAD, *Sanayide AB Çevre Mevzuatına Uyum*, TUSİAD Yayın no: TÜSİAD/T-2007-05-440, June 2007, p.68, http://www.tusiad.org/tusiad_cms.nsf/LHome/7EE440A863854807C22573770050CF94/$FILE/sanayi.pdf, Retrieved: 22.05.2009

[187] Ibid., p.68

[188] Republic of Turkey Ministry of Environment and Forestry, *AB Entegre Çevre Uyum Stratejisi (UÇES)*, 2006, p.71

various problems they have with Turkey the consensus model of chapter by chapter negotiations makes the process inefficient for the progress over it. It is known that there are more than 35 chapters in the *acquis* for the accessing countries and Turkey's early stage on this is really considerable. For the last 5 years the only chapter that is opened, negotiated and provisionally closed is 'Science and Research'[189] which is relatively easy for the compromise comparing to the other chapters.

According to the Secretariat General for EU Affairs (EUSG), lists the other opened (accession negotiation) chapters as: Free Movement of Capital, Company Law, Intellectual Property Law, Information Society and Media, Taxation, Statistics, Enterprise and Industrial Policy, Trans-European Networks, Consumer and Health Protection, Financial Control and lastly Environment (21.12.2009). The chapters that are expected to be opened soon are: Economic and Monetary Policy, Education and Culture. The chapters which screening reports approved at the Council of the EU with benchmarks are: Free Movement of Goods, Right of Establishment and Freedom to Provide Services, Public Procurement, Competition Policy, Financial Services, Agriculture and Rural Development, Food Safety, Veterinary and Phytosanitary Policy, Social Policy and Employment, Customs Union. And lastly there are some other chapters which draft screening reports are to be approved at the Council of the EU, namely: Freedom of Movement of Workers, Fisheries, Transport Policy, Energy, Regional Policy and Coordination of Structural Instruments, Judiciary and Fundamental Rights, Justice, Freedom and Security, External Relations, Financial and Budgetary Provisions. The screening report of the Foreign, Security and the Defence Policy has not been drafted yet[190] .

Regarding the IPPC the studies of Turkey which are continuing are:

- Conversion to an integrated environmental permitting system of the permits and licenses which are currently applied as separate and independent processes. With this; issuance of one single permit for one installation (or one enterprise with several plants on the site) is intended.
- Preparation of a list of installations to be done within the project proposed in IPA Component-I, 2008 Programme (TR080204). One component of the project has been devoted to this issue and it is anticipated that the inventory will be prepared by the end of 2011.
- Designation of competent authorities will be done within the IPPC project (TR080204). The project has not been started but its twinning component is at contract preparation stage.

[189] Retrieved: 25.11.2009, from the official Website of Republic of Turkey Prime Ministry Secretariat General for EU Affairs, from http://www.abgs.gov.tr/index.php?p=65&l=2

[190] Retrieved: 25.11.2009, from the official Website of Republic of Turkey Prime Ministry Secretariat General for EU Affairs, from http://www.abgs.gov.tr/index.php?p=65&l=2

- The way the BREF documents will be taken into account in the Turkish permitting system is something that is foreseen to be resolved during the activities under IPPC project (TR080204).
- Improvement of technological applications in the processes in regards to BAT compliance;
- Switching the implementation of procedures to local level in order to increase the efficiency of human resources, minimize delays, bureaucracy.
- Processing the permitting transactions in such a way which will allow more efficient establishment and operation of facilities with less environmental impacts,
- Ensuring efficient inspection in order to ensure that the operation conditions can be determined and realized in accordance with the level of technology and can protect the environment as a whole,
- Development of environmental quality standards based on the conditions of receiving media and to make them compatible with EU standards[191].

These studies will be implemented in accordance with a timetable to be determined according to current situation of Turkey, policies and economical possibilities. The most important factor will be setting of priority areas and the resources which Turkey and external funding sources will allocate for environment protection and sustainable development.

Four directives in industrial pollution control sector (IPPC, LCP, 99/13/EC, and waste incineration) will be recast into a new directive (Industrial Emissions Directive). The first draft text prepared in this scope was sent to the member states for receiving their opinions. According to the information given by European Commission, the renewal is envisaged to be published at the end of 2010. Years 2012-2018, legislation is prepared and implemented step by step. Final date for implementation of the Directive in existing installations will be updated by the end of 2012, based on the results of the project TR0802.04.[192] . The Table 4.3 illustrates the general situation on IPPC for the near future[193] :

[191] Official response from The Secretariat General for EU Affairs to the e-mail question on the current position of Turkey with regard to IPPC on 17.11.2009, Burcu ALTINORDU, Directorate General for Sectoral and Regional Politics

[192] Ibid.

[193] Ibid.

Name of the Study	Results	Date of Completion
The Project for Improvement of the Capacity of Human Resources in Transposition of the Directive 2008/1/EC (IPPC) concerning integrated pollution prevention and control	Legal and Institutional Assessment Report Implementation Guides Results of pilot study and training studies	31.12.2004
Project for the Implementation of the Directive 2008/1/EC (IPPC) concerning integrated pollution prevention and control in Turkey	IPPC Implementation Plan Training Reports	February 2008
TR080204/IPPC Integrated Pollution Prevention and Control Project	Administrative, legal and technical structures to implement integrated environmental permitting of IPPC installations	January 2012

Table 4.3: Ongoing/Undertaken Projects, Legislative and Inventory Studies, as well as Their Respective Results and the Dates of Completion

Source: Secretariat General for EU Affairs, Directorate General for Sectoral and Regional Politics

4.4. Waste Management as Leverage for Turkey: A Case Study of *İSTAÇ* Co.

One of the main actions against the industrial pollution is sustainable production-consumption or in other words 'waste management'. The most important driving force for this situation is the environmental impact of the mass production model of the all sort of industrial activities in every sector.

UNEP has declared six principal elements of industrial ecology/industrial metabolism with respect to the sustainable eco-friendly production creation, these are:

- The creation of industrial ecosystems: maximizing use of recycled materials in production, optimising use of materials and embedded energy, minimizing waste generation, and re-evaluating 'wastes' as raw material for other processes.
- Balancing industrial input and output to natural ecosystem capacity: understanding the ability of the larger natural system to deal with toxics and other industrial wastes in typical and catastrophic situations.
- Dematerialization of industrial output: reducing materials and energy intensity in industrial production.
- Improving the metabolic pathways of industrial processes and materials use: reducing or simplifying industrial processes to emulate natural, highly efficient ones.
- Systemic patterns of energy use: promote the development of an energy supply system that functions as a part of the industrial ecosystem, and is free of the negative environmental impacts associated with current patterns of energy use.

- Policy alignment with a long-term perspective of industrial system evolution: nations working together to integrate economic and environmental policies[194].

It is certain that all these mentioned measures are for the mitigation of the environmental impacts of the industrial activities that are the main reasons of the global and regional pollution as pointed out in the previous chapters. It can be said that recycling, reusing and also reducing is the main slogans for this effort. In the global and Europe context industrial facilities and also citizens are supported in order to develop the waste management and even forced due to legal sanctions for the sake of the contribution to this process. Hence, according to European Environment Agency (EEA) about 1/3rd resources used are turned into waste and emissions. Around 4 tones of waste per capita are generated every year in the EEA member countries and every European citizen on average throws away 520 kg of household waste per year and this figure is expected to increase[195] . In addition, the largest waste streams in Europe originate from construction and demolition, along with manufacturing activities. Most EU municipal waste is still sent to landfill (45%). However, more and more municipal waste is recycled or composted (37%), or incinerated with energy recovery (18%) in the EU[196] .

Under these circumstances waste management has become an obligation for the all kind of sectors, firms and individuals and in order to enable this EU has introduced a waste management strategy for the member states. The EU's approach to waste management is based on three main principles:

Waste prevention: aims to reduce the amount of waste generated.
Recycling and reuse: as many of the materials as possible should be recovered, preferably by recycling.
Improving final disposal and monitoring: Where possible, waste that cannot be recycled or reused should be safely incinerated, with landfill only used as a last resort. Both these methods need close monitoring because of their potential for causing severe environmental damage[197] .

[194] Retrieved 20.08.2009, from the Official Website of United Nations Environment Programme, http://www.unep.fr/scp/cp/understanding/concept.htm

[195]Retrieved: 21.08.2009, from the official Website of European Environment Agency, http://www.eea.europa.eu/themes/waste/about-waste-and-material-resources

[196] Retrieved: 21.08.2009, from the official Website of European Environment Agency, http://www.eea.europa.eu/themes/waste/about-waste-and-material-resources

[197] Retrieved: 21.08.2009, from the official Website of European Commission, http://ec.europa.eu/environment/waste/index.htm

Regarding industrial activities, waste management is increasingly seen as a step in the life cycle of resources and products. Promoting more sustainable waste management, reducing the amount of waste produced, minimizing the environmental impact of waste and reducing the use of natural resources are the main driving forces for the various industries.

With respect to Turkey's situation on this issue as a candidate country it might be stated that waste management is at an early stage for the industrial and also household consumption patterns. Despite the fact that there were some previous attempts in the same line with the environmental awareness it should be accepted that with a comparison to the EU member states, especially in the recycling in household consumption, there are many steps to be taken. As highlighted in Figure 2.4 the minimum EU target on recycling of packaging waste was about 55% in 2008 which was 35% in Turkey. The Table 4.4 shows the minimum targets of Turkey on recycling of packaging waste by year[198] .

Years	Glass (%)	Plastic (%)	Metal (%)	Paper (%)
2008	35	35	35	35
2009	36	36	36	36
2010	37	37	37	37
2011	38	38	38	38
2012	40	40	40	40
2013	42	42	42	42
2014	44	44	44	44
2015	48	48	48	48
2016	52	52	52	52
2017	54	54	54	54
2018	56	56	56	56
2019	58	58	58	58
2020	60	60	60	60

Table 4.4: Minimum Target of Recycling of Packaging Waste by Year (%)
Source: Çevre Koruma ve Ambalaj Atıkları Değerlendirme Vakfı, http://www.cevko.org.tr/cevko/Ic-Sayfa/Ekonomik-Isletmeler/Geri-Kazanim- Sorumlulugunun-Hesaplanmasi/Geri-Kazanım-Oranları.aspx

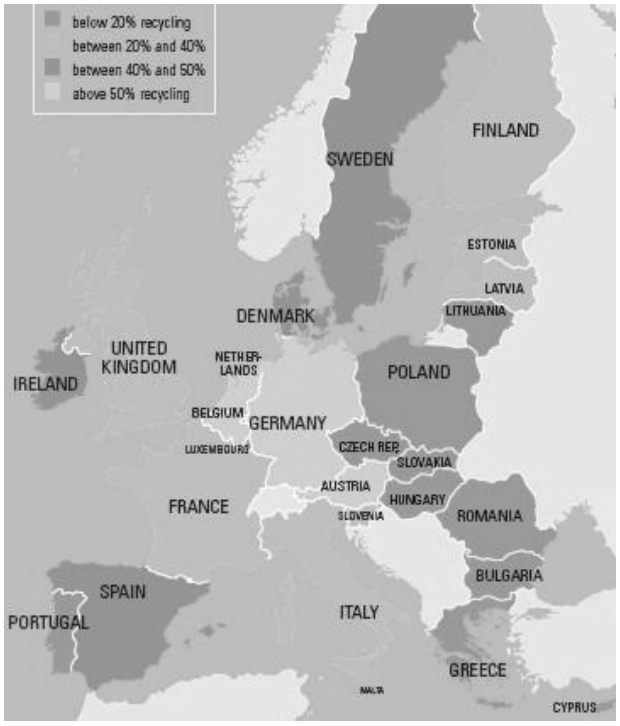
[198] Waste Management Directive Article 19: Recycling Rates, Retrieved: 16.11.2009, from official website of Ministry of Environment and Forestry, http://www.atikyonetimi.cevreorman.gov.tr/yonetmelikler.htm,

In municipal level, according to "Waste Management Action Plan (2008-2012)" [199] in the city of İstanbul (as the largest city of Turkey) less than the 50% of the total capacity of recycling facilities is under usage as illustrated in the Table 4.5.

tones/year	Capacity	Utilised
İSTANBUL	**360.000**	**162.000**

Table 4.5: Capacity Utilisation of the Composting Facilities of İstanbul
Source: Republic of Turkey Ministry of Environment and Forestry, http://www.atikyonetimi.cevreorman.gov.tr/belge/atikeylemplani.pdf

EU countries recycle on average around 37% of their municipal waste. However, there are large variations between the different Member States. The Netherlands recycles 63%, one of four EU countries already recycling over 50%[200] . The Map 4.1 illustrates the recycling rate of EU countries on the municipal level for the year 2008.



Map 4.1: Municipal EU Recycling Rates (December 2008)
Source:http://www.eeb.org/?LinkServID=6EB76766-9070-0C83- F90D7931DAAB4D67&showMeta=0

[199] Republic of Turkey Ministry of Environment and Forestry, *Waste Management Action Plan (2008-2012)* , Ankara, 2008, p.23, http://www.atikyonetimi.cevreorman.gov.tr/belge/atikeylemplani.pdf, Retrieved: 16.11.2009

[200]Retrieved: 16.11.2009, from the official Website of European Environmental Bureau, http://www.eeb.org/?LinkServID=6EB76766-9070-0C83-F90D7931DAAB4D67&showMeta=0

On the other hand the investment estimation for the fulfilment of the EU standards on directive based highlights that over 2 billion € will be needed. The Table 4.6 shows the investment need with reference to waste management[201] .

	TOTAL	2007	2008	2009	2010	2011	2012
LAND FILLING	1.862	200	242	342	345	341	392
PACKAGING	205		41	41	41	41	41
TOTAL (million €)	**2.067**	200	283	383	386	382	433

Table 4.6: Waste Sector Directive Based Investment Need (2007-2012)
Source: Republic of Turkey Ministry of Environment and Forestry, http://www.atikyonetimi.cevreorman.gov.tr/belge/atikeylemplani.pdf

However, as a success story *İSTAÇ* Co. (*İstanbul Çevre Koruma ve Atık Maddeleri Değerlendirme San. ve Tic. A.Ş.*, www.istac.com.tr) as a subsidiary company of İstanbul Metropolitan Municipality has introduced many efficient and profit raising projects on integrated waste management policy. These projects[202] and also *ISTAÇ* itself should be evaluated as pilot projects for the rest of the Turkey.

İSTAÇ Co. established in 1994 with two sanitary landfill areas and after the Turkey's candidacy to the EU a considerable acceleration has been observed. In 2005, *ISTAÇ* introduced 'Integrated Waste Management Strategic Plan compatible with EU Environment Regulation for İstanbul' and lastly in 2008 and 2009 energy generation from landfill areas and also disposal of industrial wastes entered into service[203] . Other basic activities of *İSTAÇ* can be listed as:

> **Sanitary Land filling:** The final step in waste management hierarchy is disposal of non-recyclable wastes and non-recoverable wastes with methods that shall not harm humans and environmental health. Disposal of wastes by sanitary land filling standards is one of the cost efficient disposal method widely used today.
> **Composting and Recovering of Organic Wastes:** One of the important options in recovery of organic municipal wastes is composting process. In Compost and Recovery Facilities municipal wastes with organic content are subjected to physical and chemical process like going into

[201] Ibid, p.58

[202] For further information see http://www.istac.com.tr/en/index.php?categoryid=16

[203] Retrieved: 28.11.2009, from the official Website of İSTAÇ, http://www.istac.com.tr/en/index.php?categoryid=59&p2_articleid=63

reaction and being dissolved with sufficient humidity, temperature and air via microorganisms and producing composts that have high organic values and water retention capacity.

RDF (Refuse Derived Fuel) -first in Turkey-: With globalization and urbanization the new concept developed in waste management is "zero waste" target. "Zero waste" target is defined as selecting proper waste recycling and disposal technologies and decreasing the amount of waste sent for land filling to zero.

Treatment Facilities for Leachate -first in Turkey-: At the biggest leachate treatment facility of Europe every day 5.000 m^3 leachate of high pollution load are treated with Membrane Bioreactor and Nano-filtration technology.

Separate Collection of Wastes: To recycle packaging wastes "Package and Packaging waste Control Regulation" has entered into force after being published on official Gazette no. 2538 dated 30.07.2004.

Cleaning Main Arterial Roads and Avenues: As of 2003, main arterial road cleaning work is being carried out by European and Asian Main Arterial Roads Cleaning Department working under ISTAÇ Co. Operational Directorate under responsibility and management of İSTAÇ Co. In the main arterial cleaning work that is being continuously expanded as of 2003, daily sweeping average was 3,5 million m^2 in 2004 and in 2008 this figure has increased to 7,5 million m^2 in daily average. As boarders of İstanbul Metropolitan Municipality has expanded main arterial roads and avenues are being cleaned and swept with mechanical tools in 32 towns and 41 municipalities in total[204] .

Focusing on electricity generation as leverage for Turkey, there are three main landfill gas (LFG) electricity generation stations[205] in İstanbul region namely: *Hasdal*, *Odayeri* and *Kömürcüoda*. *Odayeri*, which was opened last year, is the largest LFG electricity generation station of the Europe and one of the 10 largests across the world. A 15-20 million $ profit and also 112.000 household/year electricity generation targeted for this facility[206]. Landfill gas from 5,7 million m^3 solid wastes stored in *Hasdal* landfill area until 1994 is being converted into electricity-green energy with the power plant commissioned in 2001 and also with *Odayeri* in European side and *Kömürcüoda* sanitary landfill area, gas collection and energy generation plant in Asian side, generation of 3,400 GWh electricity until 2030. Also by decreasing CO_2 emission by 1 million m^3/year, it became apparent that a major step shall be taken in efforts against climate change[207] .

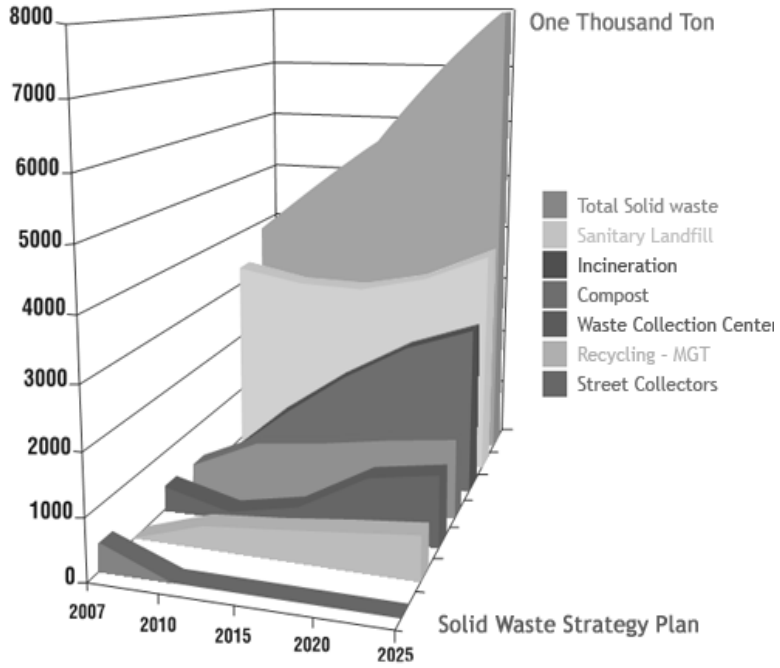
[204] Retrieved: 28.11.2009, from the official Website of İSTAÇ, http://www.istac.com.tr/en/index.php?categoryid=18

[205] Municipal solid wastes stored according to sanitary landfill standards are fermented time dependent in oxygen-free environment and produces landfill gas containing methane CH4 at 50-60% rate with high calorific value (LFG-landfill gas). This gas is grounded and conditioned and are burned in gas motors and converted into electricity energy. See also http://www.istac.com.tr/en/index.php?categoryid=18&p2_articleid=31

[206] Retrieved: 28.11.2009, from the official Website of İSTAÇ, http://www.istac.com.tr/index.php?categoryid=1&p2_articleid=110

[207] Retrieved: 28.11.2009, from the official Website of İSTAÇ, http://www.istac.com.tr/index.php?categoryid=1&p2_articleid=110

As mentioned above there has been some projections and targets for the İstanbul region in terms of waste management. These targets are determined until 2025 with "Integrated Waste Management Strategic Plan compatible with EU Environment Regulation for İstanbul". The Table 4.7 shows the main projections ahead.



	Total	Street Collectors	Compost	Inciner..	ATM	MGT	Sanitary Landfill
Years	ton/years	ton/years	ton/years	ton/years	ton/years	ton/ye..	ton/years
2007	3.849.400	427.700	350.000	0	408.900	0	3.318.200
2010	4.787.400	0	860.800	954.500	117.300	379.500	3.114.500
2015	5.653.900	0	986.900	1.745.900	358.400	466.200	3.092.600
2020	6.960.200	0	1.184.300	2.419.900	1.000.400	592.600	3.348.900
2025	8.054.700	0	1.333.800	2.821.100	1.175.700	708.100	3.858.00

Table 4.7: Integrated Waste Management Strategic Plan 2025
Source: İstanbul Çevre Koruma ve Atık Maddeleri Değerlendirme San. ve Tic. A.Ş.
http://www.istac.com.tr/en/index.php?categoryid=49

In terms of industrial wastes, *Kömürcüoda* solid waste landfill facility received 'temporary permission' from the MoEF on 08.10.2009 for sanitary landfilling of hazardous industrial wastes. It is planned to send these wastes to licensed recycling firms in Turkey and also in abroad[208] .

[208] Retrieved: 28.11.2009, from the official Website of İSTAÇ, http://www.istac.com.tr/index.php?categoryid=80

Since recycling and reuse are important process for pollution prevention in general, all these efforts have twin impacts on the state of environment in Turkey, encouraging the prudent use of natural resources and reducing environmental pollution in particularly in waste disposal areas. All in all it might be argued that in order to cope with the financial and administrative difficulties of industrial pollution control, integrated waste management actions seem one of the best ways to achieve an effective nationwide policy on sustainable consumption and production.

4.5. Measurement of the Environmental Performance of the Industrial or Non-industrial Organisations

The compliance process to the environmental policy of EU has many different aspects especially in terms of the industry as set out in previous sections. Beside the actions taken by the government all sort of economic entities shall remain in the same line with this policy. In micro dimension the public and the private sector has many things to do for the fulfilment of the process. 'EMAS' and 'Eco-label Management' are the most important measurement and evaluation means of the environmental policy of the EU addressing this issue. Recent projects such as the one conducted by Technology Development Foundation of Turkey (TTGV) on the enhancement of the clean production technologies in Turkey provides good examples in the same line with one of the vital EU principles on environmental policy, namely 'prevention is better than cure' and while aiming to improve the environmental performance of the industrial entities.

4.5.1. The EU Eco-Management and Audit Scheme (EMAS)

Eco-Management and Audit Scheme (EMAS) is "established for the evaluation and improvement of the environmental performance of organisations and the provision of relevant information to the public and other interested parties"[209] . The scheme has been available for participation by companies since 1995[210] and was originally restricted to companies in

[209] European Commission, *Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)*, Article 1(1), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:114:0001:0029:EN:PDF, Retrieved: 01.05.2009

[210] EU Council Regulation (EEC) No 1836/93 of 29 June 1993

industrial sectors. EMAS has been open to all economic sectors including public and private services since 2001[211]. Within the EU 15, the number of industrial sites subject to EMAS has risen from zero to more than 4.000 in just six years (2003) [212] and which is now about 7.500[213] . EMAS was strengthened by the integration of EN/ISO 14001 as the environmental management system required by EMAS; by adopting an attractive EMAS logo to signal EMAS registration to the outside world; and by considering more strongly indirect effects such as those related to financial services or administrative and planning decisions[214] . The main differentiation for the EMAS is that it adds four pillars to the requirements of the international standard for environmental management systems ISO/ EN ISO 14001, namely as:

- continual improvement of environmental performance;
- compliance with environmental legislation ensured by government supervision;
- public information through annual reporting;
- employee involvement. [215]

As defined in the Regulation, the main aim of the EMAS scheme is providing the continuous improvement on environmental effect of the organisations in their activities, products and services. To achieve this, the establishment of "environmental management system"[216] and the periodic evaluation of it becomes an obligation for the organisations which plans to obtain EMAS. The more important parts and the differentiation points of the EMAS is that the public information and the employee involvement. Public information makes the organisation much more transparent and responsible to the public. As set out in the Annex I of

[211] Retrieved: 01.05.2009, from official Website of EU Commission on Environment, http://ec.europa.eu/environment/emas/index_en.htm

[212] Andrew Jordan, Rüdiger K.W. Wurzel, Anthony R.Zito, *'New' Instruments of Environmental Governence?*, 2003, p. 3

[213] European Commission, *EMAS Statistics: Evolution Organisations and Sites*, Quarterly Data, 28.10.2009, http://ec.europa.eu/environment/emas/pdf/5_5articles_en.pdf , Retrieved: 28.11.2009

[214] Retrieved: 01.05.2009, from the official Website of EU Commission on Environment, http://ec.europa.eu/environment/emas/about/summary_en.htm

[215] Retrieved: 01.05.2009, from official Website of EU Commission on Environment, *Fact sheet From ISO 14001:2004 to EMAS*, http://ec.europa.eu/environment/emas/pdf/factsheet/fs_iso_en_low.pdf

[216] European Commission, *Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)*, Article 2(k)

the Regulation the top management of the organisation have to envisage an improving programme of the mitigation of the environmental impact of the organisation with a serious commitment named as "environmental statement"[217]. This binding situation creates the main difficulty of the EMAS especially in terms of the reputation of the organisation. The other noticeable point of the EMAS is active involvement of the employees. In the same line with the other participatory democracy policies of the EU, the Regulation lays down the basic conditions for the employee participation such as suggestion-book system or project-based group works or environmental committees[218] . To enable this and also for the other operational burdens of the environmental management system of the organisation the top management shall appoint a specific management representative who has a defined roles, responsibilities and authority[219] .

Coming back to main coercive sides of the EMAS scheme, besides the measures that have to be taken by the implementing organisation the member states and the candidate countries have to provide a close cooperation between the national accreditation bodies for the sake of the single independent and neutral system even by the designation of a new independent competent body responsible for carrying out the tasks provided for in the EMAS Regulation like registry, monitoring, measuring and auditing[220] . In addition, the promotion of the EMAS Scheme and the organizations is an obligation. To be able to do this the member states or candidate countries shall organize –in national and regional level- "support funds, technical assistance measures and ensuring reasonable registration fees encourage higher participation"[221] especially for the SMEs.

4.5.2. Eco-Label

The other concrete sample of the environmental performance measurement mean is the European Union Eco-label Award Scheme. The main objective of the scheme is as stated in the concerned Regulation, "…is to promote products which have the potential to reduce

[217] Ibid., Annex III

[218] Ibid., Annex I-B.4.

[219] Ibid., Annex I-A.4.1.

[220] Ibid., Article 5(1)

[221] Ibid., Article 11

negative environmental impacts, as compared with the other products in the same product group, thus contributing to the efficient use of resources and a high level of environmental protection"[222] . The most important point to be mentioned here is that beyond measuring the environmental friendly structure of the products or services the scheme covers the use of energy and natural resources, during the life cycle of the product[223] . In other words, both the production and consumption process are included to the scope of the scheme for granting the eco-label award even with the pre-production stage (multi-criteria approach). If it is needed to set out this situation as took place in the regulation, "the pre-production stage of the life-cycle of goods includes extraction or the production and processing of raw materials and energy production. Those aspects shall be taken into account, as far as is technically feasible"[224] . The main difficulty here is that especially for the Turkey issue even the product or service is evaluated as the eco-labelled if the pre-production or production process of it does not meet the basic criteria for the scheme then there is no possibility for granting the award. The inadequate infrastructure of Turkey constitutes the main problem here again. If the whole life-cycle process of the product or service is not promoted or improved the structure of the product or service itself becomes meaningless and useless.

On the other hand as laid down in other EU official documents an independent competent body must be established assessment and awarding process including operational tasks. The active involvement of the interested parts is another obligation for the "appropriate level of transparency"[225] . In addition the interested parties shall meet in a "Consultation Forum"[226] . This forum takes place in the European Union Eco-labelling Board (EUEB) which has a significant role in contribution to the setting and reviewing of eco-label criteria which the continual improvement of the scheme.

Coming back to the Scheme's positive contribution the label is awarded only to those products with the lowest environmental impact in a product range. Product categories are carefully defined so that all products that have direct 'equivalence of use', as seen through the

[222] European Commission, *Regulation (EC) No 1980/2000 of the European Parliament and of the Council of 17 July 2000 on a revised Community eco-label award scheme*, Article 1(1)

[223] Ibid., Article 1(2)

[224] Ibid., Article 3(2c)

[225] Ibid., Article 14(1b)

[226] Ibid., Article 15

eyes of the consumer, are included in the same product group[227] . Moreover, the voluntary nature of the scheme means that it does not create barriers to trade but a competition among the firms in the same product or service group. The deficient part of the scheme is that it is not applied for all sectors like food and drink which are very crucial for the basic human needs.

Finally, it has to be mentioned that there is no a further step for the establishment and implementation of 'EMAS' or 'Eco-label Scheme' in Turkey yet. According to 2008 National Programme of Turkey there will be recorded progress on these issues after 2011[228] . However, it should also be underlined that parallel with the global trend on the environmental concerns the consumers in Turkey has started to become sensitive on the issue which means that there might be a further unexpected step very soon from the national and multinational corporations operating in Turkey, contrary to official projections. For instance, The *MİGROS Ticaret A.Ş.* (one of the biggest retail companies in Turkey) and *D&R* (one of the biggest music and book chain-store in Turkey) started to use biodegradable carrier bags[229] for their customers as illustrated in Figure 4.1.

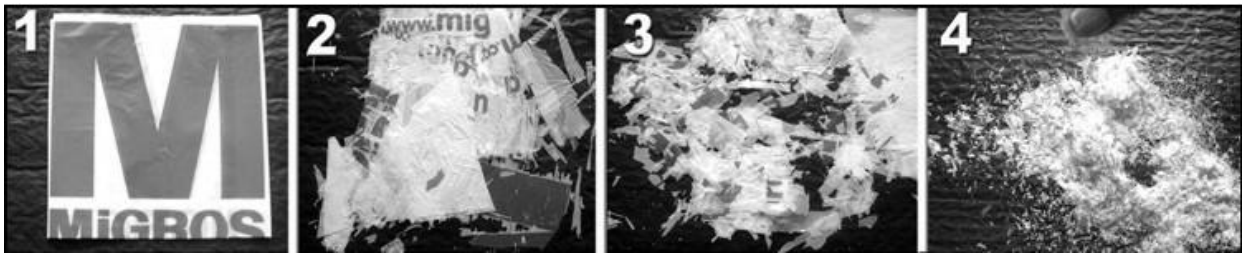


Figure 4.1: Biodegradable Carrier Bags Life Cycle
Source: PEBEV Retail Knowledge House,
http://www.perakende.org/images/runtime/haberon/1229/migros_1229355539.JPG

[227] Retrieved: 16.05.2009, from the official Website of EU Commission on Environment, http://ec.europa.eu/environment/ecolabel/whats_eco/scheme_en.htm

[228] Republic of Turkey Secretariat General for EU Affairs, *National Programme of Turkey for the Adoption of the EU Acquis* , December 2008, p.313, http://www.abgs.gov.tr/index.php?p=42260&l=2, Retrieved: 21.05.2009

[229] The bags, which are produced with 'Oxo-biodegradable' technology and are biodegrade 100% in just 24 months, according to the type of product and the place of conversion, because of a special ingredient (d_2w) added during production., http://www.migroskurumsal.com/en/Icerik.aspx?IcerikID=187, Retrieved: 03.02.2010. For further information see http://www.degradable.net/

Lastly, despite the fact that there are certain examples of environmental friendly products due to increasing environmental awareness in public and the growing interest in the private sector the financial and the administrative challenges on sustainable consumption and eco-design of the products and services need to be eliminated to comply with the EU *acquis* particularly through its consumption and production and also sustainable industrial action plan framework.

V. CONCLUSION

It is evident that as long as the humankind insists to pursue today's lifestyle and consumption trends, the time period that we are living in and the near future is going to be an age of ever increasing environmental problems. Nevertheless it might be argued that the high cost and coercive implementation structures of the existing environmental friendly production and consumption models have so far impeded the pace of the commitment to and investments in the clean technologies. Recent studies, however demonstrate that high costs of environmental investments pay off due to technological developments in a shorter period than anticipated. Besides environment friendly investments bring will likely to create new opportunities for social and economic development such as new employment opportunities. Encouraging private sector and supporting the change of individual attitudes towards sustainable consumption and production modes through different mechanisms can be the best way to reach sustainability targets. On the other hand, both the tough competition in the global economic system, financial pressure and distribution of the limited natural resources of the earth make the eager on 'sustainable development' principle weaker day by day. Especially the basic instinct of the financial sectors on 'profit raising' and the 'continuous growth' and also the 'mass production' of the real sector and the addiction on consumption habits of the individuals have aggravated the existing situation so far.

However, the recent global economic crisis puts the case clearly that this perception and the business model has to be modified. With regard to the latest report of one of the reliable trend searching companies namely Trend Watching, one of the most important trends of 2010 will be 'business unusual' which means that for the first time, there's a global understanding, if not a feeling of urgency that sustainability, in every possible meaning of the word, is the only way forward[230] . Given the increasing burden of the efforts to clean and repair the damaged environment, proactive measures seem to demonstrate their real significance for the worldwide sustainability. The global climate change and recent developments with regard the post-Kyoto period have already signaled an urgent necessity to change the industrial production and consumption patterns. Transition to 'low carbon economy' which is seen essential for a sustainable future requires a major change in energy structures. This is,

[230] Retrieved: 25.01.2010, from official website of Trend Watching, http://www.trendwatching.com/trends/10trends2010/

however, not an easy task and even regarded almost impossible by the developing countries. Nevertheless, all these developments show that existing structures (energy use, production and industrial process as well as consumption patterns) have to be transformed. To achieve this transition several financial and technological mechanisms are encouraged. Market based incentives in many countries are therefore champions of this process in a world where carbon is regarded as an economic asset.

To illustrate carbon tax is on the agenda for the EU side, In September 2009, French President Nicolas Sarkozy announced plans to introduce a carbon tax to reduce greenhouse gas emissions in France. Polluters will have to pay € 17 per ton of carbon emitted, which includes not only businesses but individual households as well. The tax will cover 70% of the country's carbon emissions and bring in about € 4.3 billion of revenue annually[231] .

Furthermore, global economic crisis has emerged some sort of opportunities concerning environmental awareness, too. According to International Energy Agency (IEA) in 2009 global CO_2 emissions decreased more than each last 40 years[232] . 'Green Economy' has started to be discussed not only among the scholars but also among the politicians and also businessman. USA president Barrack Obama introduced a 50 billion $ subsidiary package last year[233] . EU Commission is going to invest on green projects more than 105 billion € which is over 30% of the 2007-2013 general EU budget and it is estimated that there will be an added directly and indirectly employment opportunity of 950 thousands in 2010 and 1.4 million for 2020 in the renewable energy sector[234] . Waste management strategies, in terms of green economy, are also important to provide necessary materials of production through recycling and energy production. Through waste management, the stress imposed on environment would also be lessened. 'Zero waste' is the ultimate aim in green economies so there are many different steps and attitudes with regard to integrated waste management. Clean production and sustainable consumption are the essential elements that enhance the integrated waste management policies.

[231] Retrieved: 25.01.2010, from official website of Trend Watching, http://www.trendwatching.com/trends/10trends2010/

[232] *TİM Report*, official journal of Turkish Exporters Assembly, October-November 2009, volume 57, p. 97. For further information see http://www.timreport.org/tr/

[233] İbid., p.65

[234] İbid., p.66

Coming back to Turkey, it is known that the 'final destination' of the westernization process of Turkey is EU membership and the relationship has a very deep historical roots starting from 1950s. As it is tried to take into account in this study there will be waiting a long and severe negotiation process for 'anchored ally' Turkey which has already started a few years ago. It should also be expressed that the environmental chapter of the *acquis* is one of the most difficult chapters to be compatible with as it has been observed during the previous negotiations and membership processes. Industrial pollution control along with other environmental issues presents a financial challenge to Turkey. Complying with the environmental *acquis* with respect to industrial pollution further complicates the situation. Therefore Turkey tries to deal with this problem via two main ways. The first one includes the efforts on development and implementation of the clean production and environmental friendly products while the second one is directly related to the transition to sustainable consumption patterns.

In all these efforts, integrated waste management systems play a very important role from household consumption to industrial production. Due to development policies, population growth and changing consumption patterns, the demand for raw materials and their impacts on the environment as waste have been increasing in Turkey especially in and around the urban areas. Therefore municipal action plans on the waste management contribute to the successful implementation of the significant environmental motto 'think global act local', leading to the prudent use of natural resources in Turkey. Nevertheless, despite the fact that there are some serious solutions like 'effective waste management' the utilization problem of the capacity usage and the limited financial sources makes the situation hard to overcome. On the other hand, it has to be kept in mind that it would be much more difficult to change the perception of environment and waste management at the individual level and persuade people to act in desired way than to solve the problems mentioned above at the state level. Therefore encouraging individuals to collect their garbage separately is an important task particularly for the municipalities.

Evidently along with the environmental benefits, waste management policies likely to create employment opportunities and facilitate the efforts to reach clean production and sustainable production and helps environmental protection by preventing the imprudent use for natural resources. Parallel to the global attempts for the transition to the 'Green Economy', the biggest industry based holdings and firms of Turkey have focused on energy sector particularly to the renewable energy sources (RES) and also MoEF has put a strategic

importance to the RES, too. In different parts of Turkey there have been nearly 75 hydroelectric power stations, 20 wind power stations and 4 geothermal energy stations under construction in which almost 5.000 engineers recruited[235] . According the projections there will be a need of new 20.000 various engineers more for the new projects similar with these[236]. Encouragement of the private sector initiatives is however the essential step to achieve transition to the green economy. Otherwise, high cost of the investments and bureaucratic difficulties would create greater obstacles before sustainable production efforts in Turkey.

As a result, it should be emphasized that whether Turkey succeeds in the full membership negotiations and become a member to the EU or not, any kind of investment or progress regarding environment is going to be a great contribution to the economy and also to the life standards of the citizens especially for the next generations. Consequently, the accession negotiation process should be evaluated through overall sustainability targets to break vicious circles and unproductive arguments on the Turkey's full membership to the EU.

[235] Ibid., p. 67

[236] Ibid., p.67

ANNEX

Annex I: Transitional arrangements by new Member State

Cyprus

recovery targets of packaging waste until 2005

air pollution from large combustion plants, special provisions

treatment of urban waste water until 2012

a one year derogation on sulphur content of certain liquid fuels, provided by the directive

Czech Republic

recovery and recycling of packaging waste until 2005

treatment of urban waste water until 2010

air pollution from large combustion plants until 2007

Estonia

emissions of volatile organic compounds from storage of petrol until 2006

landfill of oil shale until 2009

treatment of urban waste water until 2010

quality of drinking water until 2013

air pollution from large combustion plants until 2015

strict protection of lynx, special provision

Hungary

recovery and recycling of packaging waste until 2005

treatment of urban waste water until 2015

air pollution from large combustion plants until 2004

incineration of hazardous waste until 2005

Latvia

emissions of volatile organic compounds from storage of petrol until 2008

recovery and recycling of packaging waste until 2007

landfill of waste until 2004

treatment of urban waste water until 2015
quality of drinking water until 2015
integrated pollution and prevention control until 2010 (instead of 2007 for Member States)
storage of asbestos waste until 2004
health protection of individuals against ionising radiation in relation to medical exposure until 2005

Lithuania
emissions of volatile organic compounds from storage of petrol until 2007
recovery and recycling of packaging waste until 2006
treatment of urban waste water until 2009
air pollution from large combustion plants until 2015

Malta
emissions of volatile organic compounds from storage of petrol until 2004
recovery and recycling of packaging waste until 2009, beverage packaging until 2007
treatment of urban waste water until March 2007
quality of drinking water until 2005
discharges of dangerous substances into surface water until March 2007
protection of wild birds, use of clap-nets for capture of seven finch species in order to establish a captive breeding system until 2008
air pollution from large combustion plants until 2005

Poland
sulphur content of liquid fuels until 2006
emissions of volatile organic compounds from storage of petrol until 2005
recovery and recycling of packaging waste until 2007
waste landfills until 2012 (instead of 2009 for Member States)
shipment of waste until 2007
treatment of urban waste water until 2015
discharges of dangerous substances into surface water until 2007
integrated pollution prevention and control until 2010 (instead of 2007 for Member States)

air pollution from large combustion plants until 2017
health protection of individuals against ionising radiation in relation to medical exposure until 2006

Slovakia

emissions of volatile organic compounds from storage of petrol until 2007
recovery and recycling of packaging waste until 2007
treatment of urban waste water until 2015
discharges of dangerous substances into surface water until 2006
integrated pollution prevention control until 2011
air pollution from large combustion plants until 2007
incineration of hazardous waste until 2006

Slovenia

recovery and recycling of packaging waste until 2007
treatment of urban waste water until 2015
integrated pollution prevention and control until 2011 (instead of 2007 for Member States)

Annex II: ISPA financing for approved environment projects from 2000 to 2002 (in €)

Lithuania: 15 projects	**Czech Republic: 9 projects**
2000: 18,200,000	2000: 27,816,844
2001: 35,675,917	2001: 26,090,980
2002: 32,557,184	2002: 31,316,160
Poland: 33 projects	**Estonia: 13 projects**
2000: 132,988,589	2000: 15,808,281
2001: 228,021,167	2001: 17,346,082
2002: 177,455,904	2002: 14,311,876

Hungary: 19 projects

2000: 43,830,843

2001: 42,604,653

2002: 49,116,408

Latvia: 10 projects

2000: 26,568,260

2001: 25,834,204

2002: 15,348,785

Slovakia: 12 projects

2000: 11,606,372

2001: 23,359,778

2002: 28,710,800

Slovenia: 8 projects

2000: 11,355,275

2001: 9,287,062

2002: 8,034,553

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